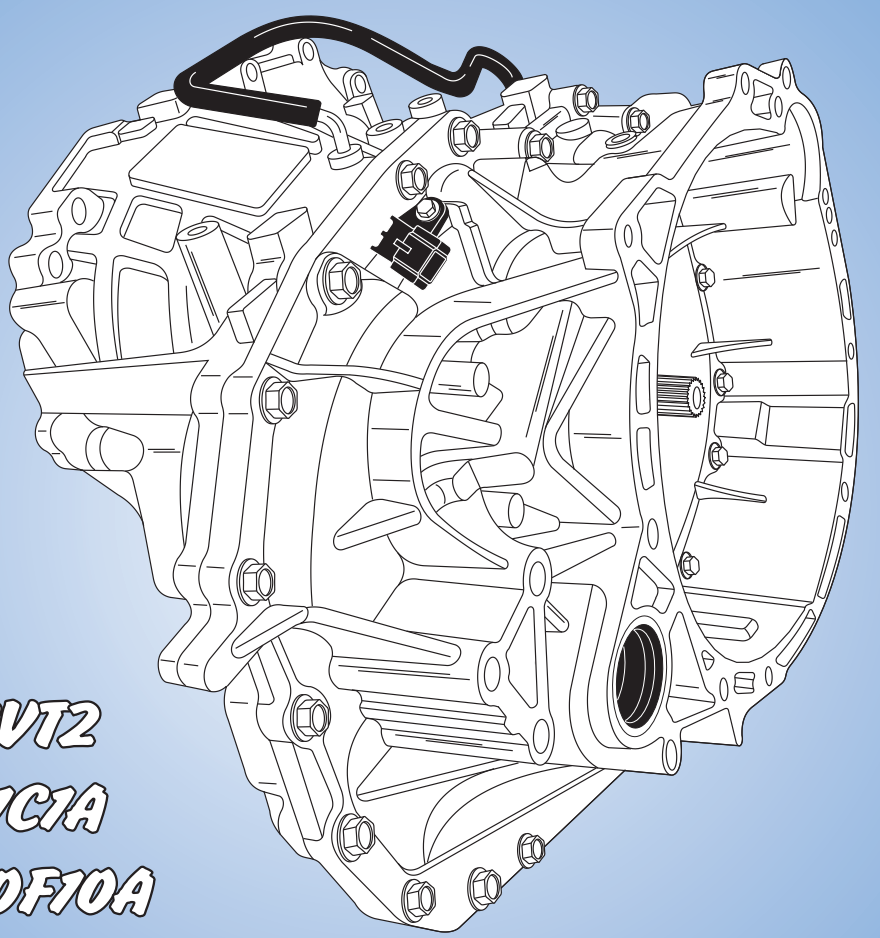
ATSG

DODGE/JEEP MITSUBISHI/NISSAN

TECHTRAN™ MANUAL

JF011E



CVT2
F1C1A
RE0F10A

AUTOMATIC TRANSMISSION SERVICE GROUP

JF011E CVT TRANSMISSION

Introduction

Dodge, Jeep, Mitsubishi and Nissan all use a similar continuously variable transmission (CVT) for their 4 cylinder applications. Built by JATCO, the JF011E is the CVT2 in Dodge and Jeep vehicles. The F1CJA (2WD)/W1CJA (4WD) for in Mitsubishi and the RE0F10A in Nissan.

This style CVT utilizes a torque converter with its intent to provide an optimal driving force that is responsive to throttle opening providing smooth uninterrupted ratio changes eliminating shift shock. Most applications will provide a manual shift mode function for both smooth driving without shift shock, and enjoyable driving with manual ratio selection.

Special thanks goes to Bob Nutall from Autotech and Ralph Abraham from Alonso's Transmissions

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GENERAL DESCRIPTION

Jatco's JF011E CVT transmission utilizes a three-element, one-stage, two-phase type torque converter with a built-in torque converter clutch. The transmission's gear train consists of one forward (multi-disc) clutch drum assembly, one reverse (multi-disc) brake stack-up, a planetary gear set composed of a sun gear, a carrier and an annulus gear (internal ring gear), along with a variator assembly (primary pulley, secondary pulley and a steel push belt). The Input shaft drives the primary pulley through the planetary gear set for forward and reverse direction. The pulleys provide a continuously variable ratio between 2.5 to 0.4 moving forward and a 1.75 reverse ratio. Attached to the secondary pulley is an output gear which drives an Idler/Reduction gear assembly which drives the differential ring gear for a final reduction gear ratio dependent on vehicle platform and engine size such as 5.407, 6.120, 6.466 for example (Final reduction gear ratio in this case can be defined as the number of revolutions of the output gear required for one complete revolution of the front axle).

The transmission is operated by an external TCM which selects the optimal pulley ratio and determines the shift strategy by detecting the vehicle's driving conditions such as the vehicle speed and throttle position (accelerator angle). It then outputs a command to a stepper motor inside the transmission which controls the in and out flow of line pressure to and from the primary pulley. The change in pressure forces the pulley to open and close its moveable half to continuously provide the appropriate ratio. This allows ratio patterns to alter continuously based on the driving method of the driver. Pulley ratio can also be controlled to obtain engine brake suitable for the driving habits of the operator, particularly on downward slopes. Learning compensation is made to meet the driving habits of the operator by judging the amount of the engine braking required from the application of the accelerator or the brake. During uphill climbs, shift ratio change is held to a minimum whenever the accelerator pedal be released.

With this transmission being used in Dodge, Jeep, Mitsubishi and Nissan vehicles, a variety of different shift strategies can be made available. For example; a P-R-N-D + 6-speed sport mode (with paddle shift) can be fitted with the vehicle. When the sport mode is switched ON with the selector lever or paddle shift, a fixed shifting strategy is initiated. The upshift - downshift operation enables the driver to shift in steps according to a predetermined shift strategy providing a manual transmission type shifting with 6-speeds suitable for sporty driving.

Another unique aspect to the operation of this CVT is the converter clutch apply strategy. Nissan refers to Torque Converter Clutch Control as "Direct Clutch Control". Depending on engine size, the converter clutch can begin to partially apply as early as 11 mph just slightly above 1,000 engine rpm's to a full apply shortly thereafter. The TCM controls this operation through two solenoids and two valves in the valve body; the Lock-up Control Solenoid (LCS), the Lock-up Select Switch Solenoid (LSS), the Select Switching Valve and the Select Control Valve. This grouping of solenoids and valves also control the garage shift into both Reverse and Forward gears. Both solenoids are Normally Low. The LCS is pulse width modulated and the LSS is On/Off. Both solenoids are energized in Park/Neutral lowering line pressure to the manual valve. Approximately five seconds after Reverse or Drive is selected routing low pressure to the clutch for a smooth engagement, these two solenoids turn off providing full line pressure to act on the clutch. A malfunction with these solenoids and valves can affect both garage shifts and converter clutch application.

NORTH AMERICA VEHICLE APPLICATION CHART

VEHICLE	YEAR	ENGINE	COUNTRY	TRANS-AXLE
DODGE, CALIBER	*2007-12*	*1.8L, 2.0L, 2.4L (L4)*	*USA*	*CVT 2*
JEEP, COMPASS	*2007-16*	*2.0L, 2.4L (L4)*	*USA*	*CVT 2*
JEEP, PATRIOT	*2007-16*	*2.0L, 2.4L (L4)*	*USA*	*CVT 2*
MITSUBISHI, LANCER	*2009-16*	*2.0L, 2.4L (L4)*	*USA*	*F/WICJA*
MITSUBISHI, OUTLANDER	*2009-16*	*2.4L (L4)*	*USA*	*F/WICJA*
NISSAN, ALTIMA	*2007-12*	*2.5L (L4)*	*USA*	*RE0F10A*
NISSAN, ROQUE	*2007-15*	*2.5L (L4)*	*USA*	*RE0F10A*
NISSAN, SENTRA	*2007-12*	*2.0L, 2.5L (L4)*	*USA*	*RE0F10A*

Figure 1

GENERAL DESCRIPTION

As with many automatic transmission, the selector lever cannot be moved out of Park (P) if the ignition key is turned to the OFF position, or if the key is removed from the ignition switch. Some manufacturers use an Intelligent Key system with a push button to start the engine. Whichever style key system there is, the engine is to be started, the brake applied and the Park-Lock button depressed for the selector lever to be removed out of the Park Position (figure 2).

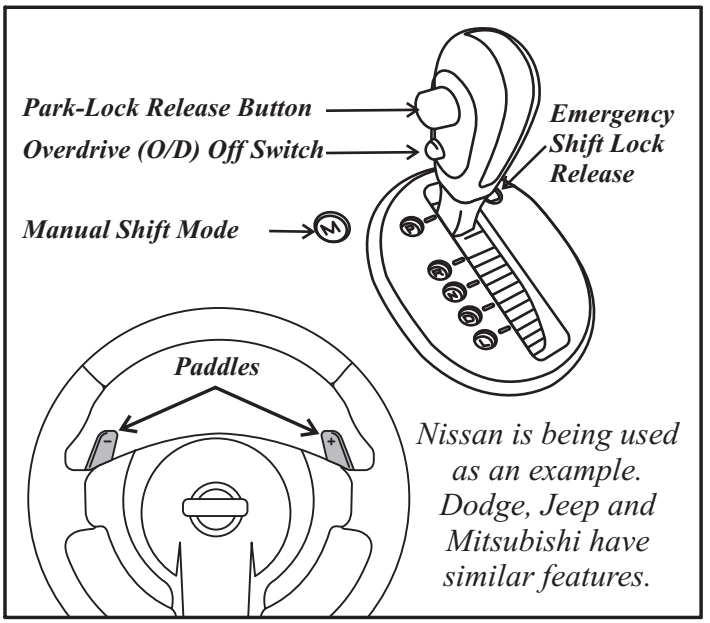


Figure 2

P (Park):
Use the P (Park) selector position when the vehicle is parked or when starting the engine. Make sure the vehicle is completely stopped. The brake pedal must be depressed and the shift selector button pushed in to move the shift selector back to P (Park). Apply the parking brake. When parking on a hill, apply the parking brake first, then place the shift selector into the P (Park) position.

R (Reverse):
This position is used to back up the vehicle. The vehicle must be at a complete stopped before selecting R (Reverse). The speed in Reverse is limited to 25 MPH (40 km/h) and must not be exceeded otherwise internal damage may result.

N (Neutral)
Neither forward or reverse is engaged. The engine can be started in this position. A shift into neutral will allow a restart due to a stalled engine while the vehicle is moving.

D (Drive):
This position is used for all normal forward driving.

L (Low):
This position is used to provide maximum engine braking on steep downhill gradients as well as climbing steep slopes and whenever approaching sharp bends in the road. It is not recommended to use this position in any other circumstances.

M (Manual Shift Mode) *if so equipped*:
The manual shift mode button (figure 2), can be pressed when the vehicle is stopped or while driving. This causes the transmission to enter a manual shift mode. Shift ranges can be selected manually using the paddles on the steering wheel.

In the manual shift mode, the shift range is displayed on the position indicator in the instrument cluster.

Shift ranges up or down by one gear as follows:

M1 ⟷ M2 ⟷ M3 ⟷ M4 ⟷ M5 ⟷ M6

M6 (6th):
This position is used for all normal driving at highway speeds.

M5 (5th):
This position is used when driving up long slopes, or for engine breaking when driving down long slopes.

M4 (4th), M3 (3rd) and M2 (2nd):
Use for hill climbing or engine breaking on downhill grades.

M1 (1st):
This position is used to climb steep hills slowly or driving slowly through deep snow, sand or mud, or for maximum engine braking on steep downhill grades.

Manual Mode Up-Shifting:
Pulling the paddle with the + sign on the steeling wheel towards the driver will shift the transmission into the next highest gear.

Manual Mode Downshifting:
Pulling the paddle with the - sign on the steeling wheel towards the driver will shift the transmission into the next lower gear.

GENERAL DESCRIPTION

Pressing the manual shift mode button (figure 2) will return the transmission to the normal driving mode.

Manual Shift Mode Overrides:

While in the manual shift mode, there may be a request from the driver to make a shift which will be denied. The purpose of the override is to maintain optimal driving performance and reduces the chance of damaging the transmission, vehicle damage, or loss of control.

There may also be situations where, while in the manual shift mode, the transmission will make un unrequested up-shift to the next highest range. This typically occurs when the transmission is left in a lower range for too long increasing engine RPM's to an unsafe level.

Another shift override occurs when vehicle speed decreases while manually holding too high a gear. A shift to a lower gear will occur automatically for both optimum driving performance and to prevent transmission damage. Similarly, when a stop is being made while holding a higher gear, it will automatically shift to the M1 position shortly before the full stop is made. This is to ensure that it takes off in the lower ranger for optimal performance and transmission safety.

CVT Fluid Temperature Affects Manual Shifts:

When the CVT fluid temperature is extremely low, the manual shift mode may be prohibited and will automatically shift as a drive mode. This is not a malfunction. Press the manual shift button to off and drive for awhile in the normal drive range giving time for the CVT fluid to warm up and then reactivate the manual shift mode.

When the CVT fluid temperature is high, the shift range may up-shift in lower rpm than usual. This is not a malfunction (See Fail-safe for high temp protection mode).

Shift Lock Release:

If the battery becomes discharged, the shift interlock solenoid will not function preventing the shift selector to be moved out of Park, even with the brake depressed.

To move the shift selector, use a suitable tool (flat bladed screwdriver) to release the shift lock (figure 2). The shift selector can be moved to Neutral. However, the steering wheel will be locked unless the ignition switch is turned to the ON position. This allows the vehicle to be moved should the battery become discharged.

Shift Lock Release Procedure:

1. Turn the ignition to the LOCK position and remove the key.
2. Apply the parking brake.
3. Remove the shift lock release cover.
4. Insert a small screwdriver in the shift lock release slot and push down.
5. Move the shift selector to the Neutral position while holding down the shift lock release.
6. Turn the ignition to the ON position to unlock the steering wheel. The vehicle can now be moved to the desired location.

Overdrive (O/D) Off Switch:

When the O/D Off switch (figure 2) is pushed with the selector in the Drive position, the O/D OFF light in the instrument panel illuminates. This option is used whenever improved engine breaking is desired. Pushing the button again will turn off the Overdrive off mode and the indicator light will turn off.

Each time the engine is started, or when the selector lever is shifted to any position other than Drive, the Overdrive off mode will automatically be turned off.

Fail-safe:

When the fail-safe operation occurs, the CVT will not be shifted into the selected driving position.

If the vehicle is driven under extreme conditions, such as excessive wheel spinning and subsequent hard braking, the fail-safe system may be activated. The MIL may come on to indicate the fail-safe mode is activated. This will even occur even if the electrical circuits are functioning properly. In this case, turn the ignition to the OFF position and wait for 10 seconds. The vehicle should return to its normal operating condition.

When the high fluid temperature protection mode or fail-safe operation occurs, vehicle speed may be gradually reduced. The reduced speed may be lower than other traffic, which could increase the chance of collision. If driving the vehicle under these conditions, it is best to find a safe place on the side of the road and allow the transmission to return to normal operation or be towed back to the shop for diagnostics and repairs.

ELECTRICAL DESCRIPTION

Park Neutral Position Switch (PNP) or
The Transmission Range Sensor (TRS):

The Park Neutral Position Switch (figure 3) is also referred to as the Transmission Range Sensor depending on the manufacturer. This assembly contains contact points for each shift lever position which is inputted to the Transmission Control Module which specifies shift lever position. The TCM broadcasts this information over the network to other modules which need this information.

System voltage is supplied to one of the PNP Switch (TRS) terminals which is used to be directed to the TCM depending on the gear selection made. For Dodge, Jeep and Mitsubishi it is terminal 3. Nissan it is terminal 5. The continuity check chart in figure 3 shows not only how to inspect the switch with an ohm meter, it also reveals how electrical checks can be made of the switch in the vehicle. For example: Voltage supply to the switch and signal voltage to the TCM should never be lost while the ignition is on and/or engine is running.

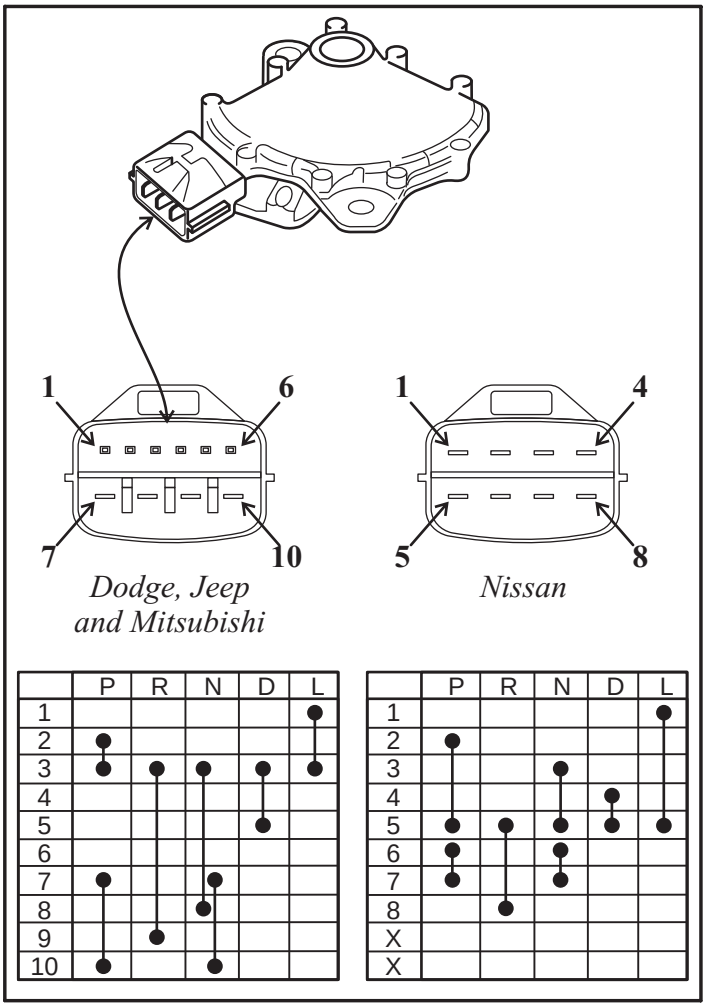


Figure 3

Input and Output Speed Sensors:

The Input and Output Speed Sensors are Hall Effect types (figure 4). The both receive system voltage on terminal 1. Terminal 3 is ground with terminal 2 being the signal line. The sensor produces a 0 to 4.5 volt digital pulse signal to the TCM and is best observed with an oscilloscope. These sensors can be measured in Hertz as well. At 12 miles per hour (20 km/h), the Input Speed Sensor will produce an 890Hz signal while the Output Speed Sensor will produce 460Hz.

The Input Speed Sensor reads the speed of the Primary Pulley while the Output Speed Sensor reads the speed of the Secondary Pulley. The TCM monitors these two sensors to determine pulley ratio. If the pulley ratio does not match with the command given, a diagnostic code may be produced for a Stepper Motor performance fault. The Output Speed signal is converted to a vehicle speed signal by the TCM and is broadcasted over the network.

Care must be taken with the Output Speed Sensor as there may or may not be shims located between the sensor and case. Depending on the ratio of the transmission, there may be one or two or no shims between the sensor and the case. These shims adjust the proper air-gap of the sensor based on the size of the gear it reads. These shims are 0.040" in thickness and can be purchased through Nissan: part number 08915-4361A (see pages 116 and 117).

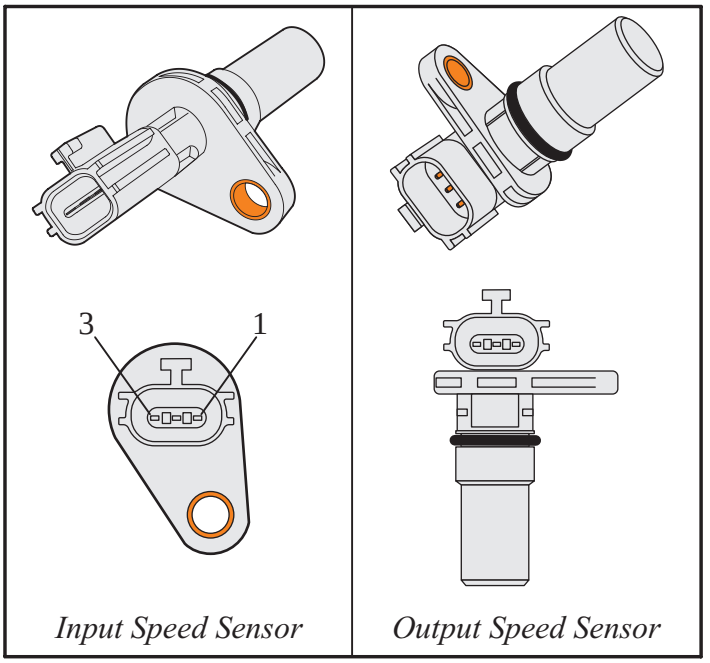
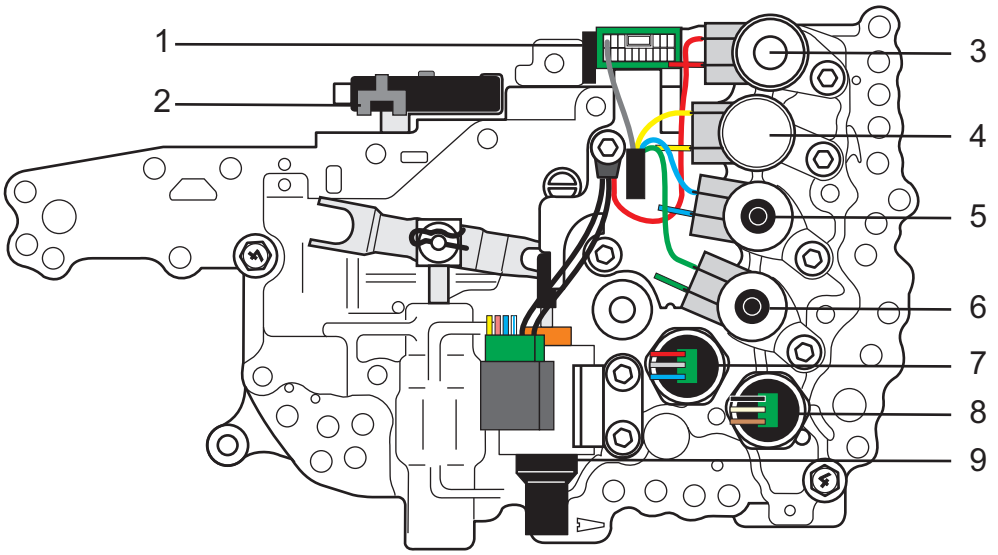
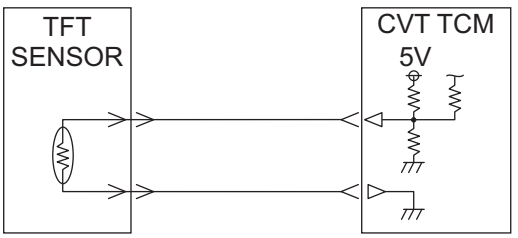


Figure 4

ELECTRICAL DESCRIPTION

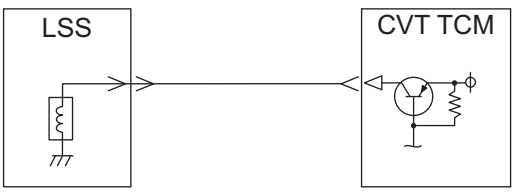


1. Transmission Fluid Temperature Sensor (TFT)
   The TFT sensor is used in the calculations to determine lock-up torque converter operation and variable pulley ratio. The TFT sensor is a negative temperature coefficient sensor which means as temperature rises the resistance decreases.



Temperature	Approx. Resistance Value
0°C (32°F)	15.5K
20°C (68°F)	6.5K (2VDC)
40°C (104°F)	3.1K
60°C (140°F)	1.6K
80°C (176°F)	0.9K (2VDC)
100°C (212°F)	0.5K

2. ROM
   Contains data specific for the vehicle - this must stay with the vehicle when swapping valve bodies or transmissions.
3. Lock-Up Select Solenoid (LSS)
   The Lock-Up Select Solenoid controls the positioning of the Select Switching Valve. It directs pilot pressure from the Lock-up Solenoid to the Select Control Valve for a soft engagement from P/N. It then directs pilot pressure to the Torque Converter Lock-up Control Valve for converter clutch apply control. This is a Normally Closed On/Off solenoid. When in P/N the TCM sends 12 volts to the solenoid. Once the desired gear is selected (D or R), within approximately 5 seconds power is cut to the solenoid by the TCM.



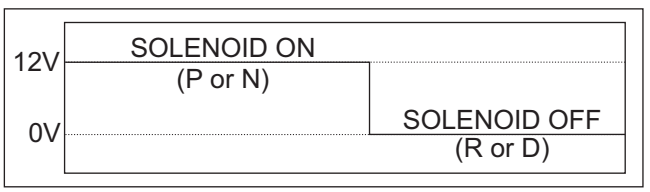
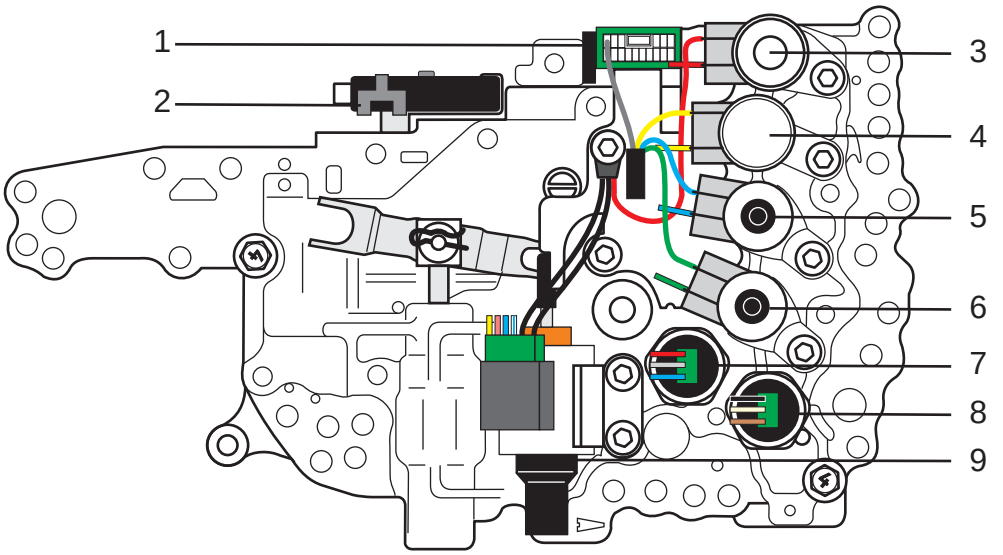
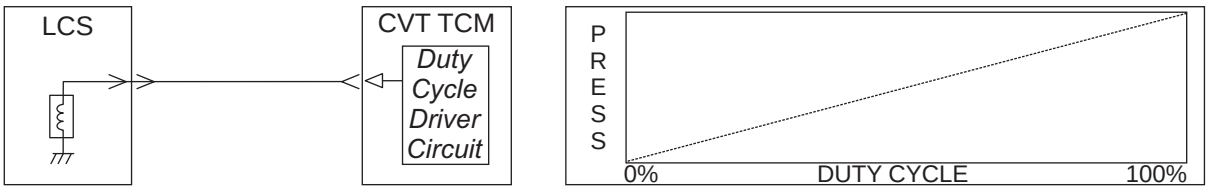


Figure 5

ELECTRICAL DESCRIPTION



4. Lock-up Control Solenoid (LCS)
The Lock-up Control Solenoid is a Normally Low, Linear (Variable Force) Solenoid. To operate the solenoid, the TCM provides a precisely controlled 12 volt variable duty cycle signal to solenoid. The Output pressure from the solenoid is directly proportional to the duty cycle applied to the solenoid. The greater the duty cycle, the greater the output pressure.



5. Secondary Pressure Control Solenoid (SPCS)
The Secondary Pressure Control Solenoid controls the Secondary Pressure Control Valve which controls the Secondary Pulley Clamping force. The Secondary Pressure Control Solenoid is a Normally High, Linear (Variable Force) Solenoid. To operate the solenoid, the TCM provides a precisely controlled 12 volt variable duty cycle signal to the solenoid. The Output pressure from the solenoid is inversely proportional to the duty cycle applied to the solenoid. The greater the duty cycle, the lower the output pressure.

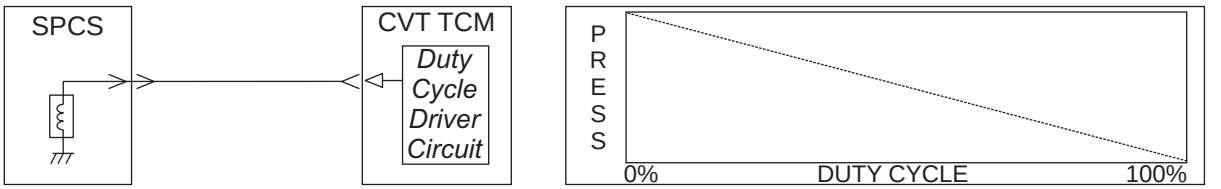
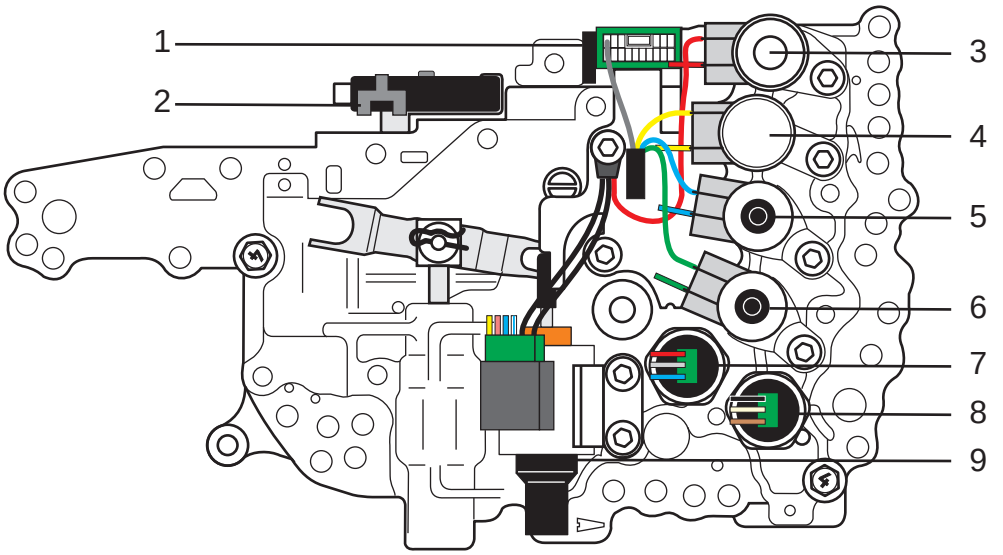
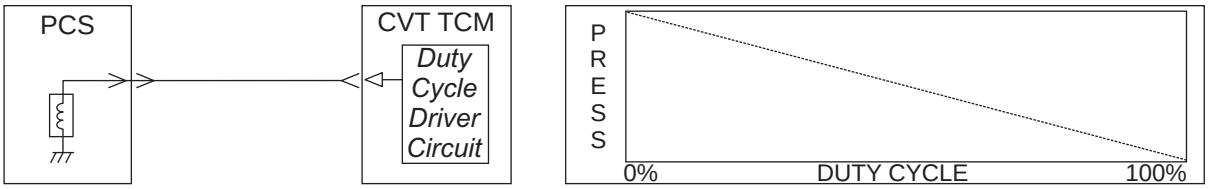


Figure 6

ELECTRICAL DESCRIPTION



6. Line Pressure Control Solenoid (PCS)
   The Line Pressure Control Solenoid controls the Pressure Regulator Valve which then controls main line pressure. The Line Pressure Control Solenoid is a Normally High, Linear (Variable Force) Solenoid. To operate the solenoid, the TCM provides a precisely controlled 12 volt variable duty cycle signal to the solenoid. The Output pressure from the solenoid is inversely proportional to the duty cycle applied to the solenoid. The greater the duty cycle, the lower the output pressure.



7. Primary Pressure Sensor
8. Secondary Pressure Sensor
   The hydraulic pressure sensor signals are used by the TCM to verify proper pulley clamping force is being applied. Each sensor is provided with both a 5 volt power source and ground by the TCM. The TCM then monitors a 5 volt reference signal to determine actual clamping pressure. The voltage on the signal wire will increase as clamping pressure increases. Typical voltage readings would be from approximately 0.5 volts with the ignition on and engine off, up to approximately 4.5 volts during normal operation.

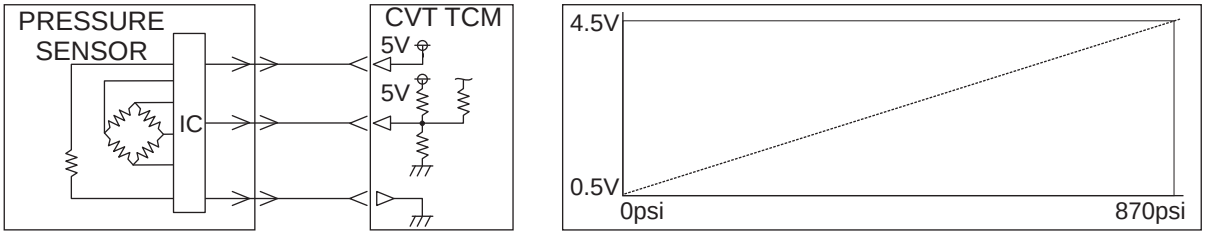
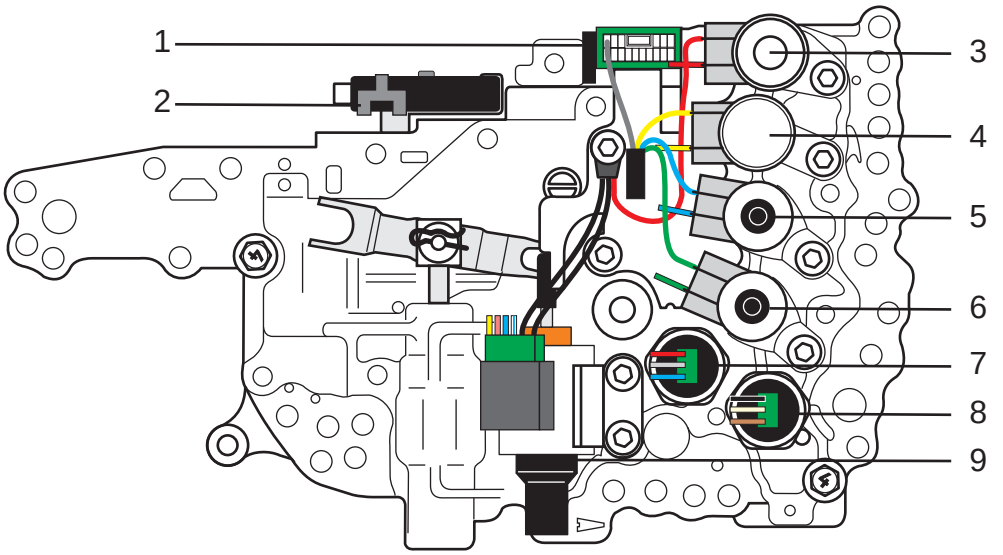


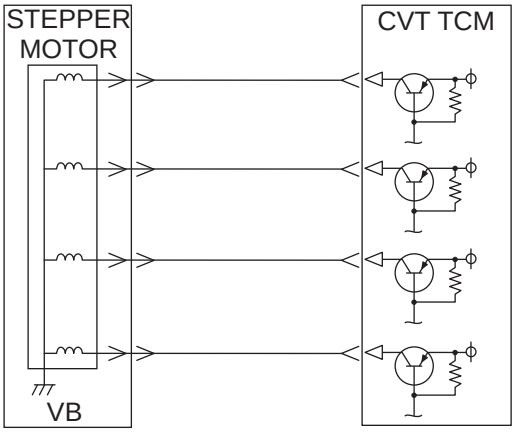
Figure 7

ELECTRICAL DESCRIPTION



9. Ratio Control Motor

The Ratio Control Motor is a Stepper Motor and is mounted directly on the valve body. The Stepper Motor is connected to one end of the ratio control valve link (Pintle). As the Stepper Motor moves the link in or out, the link in turn moves the Ratio Control Valve in the Valve Body to either a pressure feed circuit, or a pressure hold circuit, or a pressure vent circuit. The operation of the Stepper Motor is achieved through a feed control circuit. The TCM pulses battery voltage to the individual coils in order to obtain correct Stepper Motor position.



Note: The stepper motor wiring and description above was provided by Mitsubishi. With each of the 4 coils being pulsed with battery voltage, it suggests that this is a One Phase type stepper motor which means it takes 4 steps (1 pulse per coil) to rotate the pintle 360 degree. The pintle is what controls the movement of the ratio control valve to change pulley ratio. The pintle moves approximately 2.5 millimeters per one revolution. It takes about 9 complete revolutions for the pintle to go from a fully extended position to a fully retracted position. This equates to a total of 22.5 millimeters of pintle movement achieved by 36 pulses to the stepper motors (36 steps). Scan tools may present stepper motor control by the amount of steps taken to move the pintle in either direction or by milliseconds indicating the frequency control for each coil.

Figure 8

2009 Dodge Caliber L4-2.4L

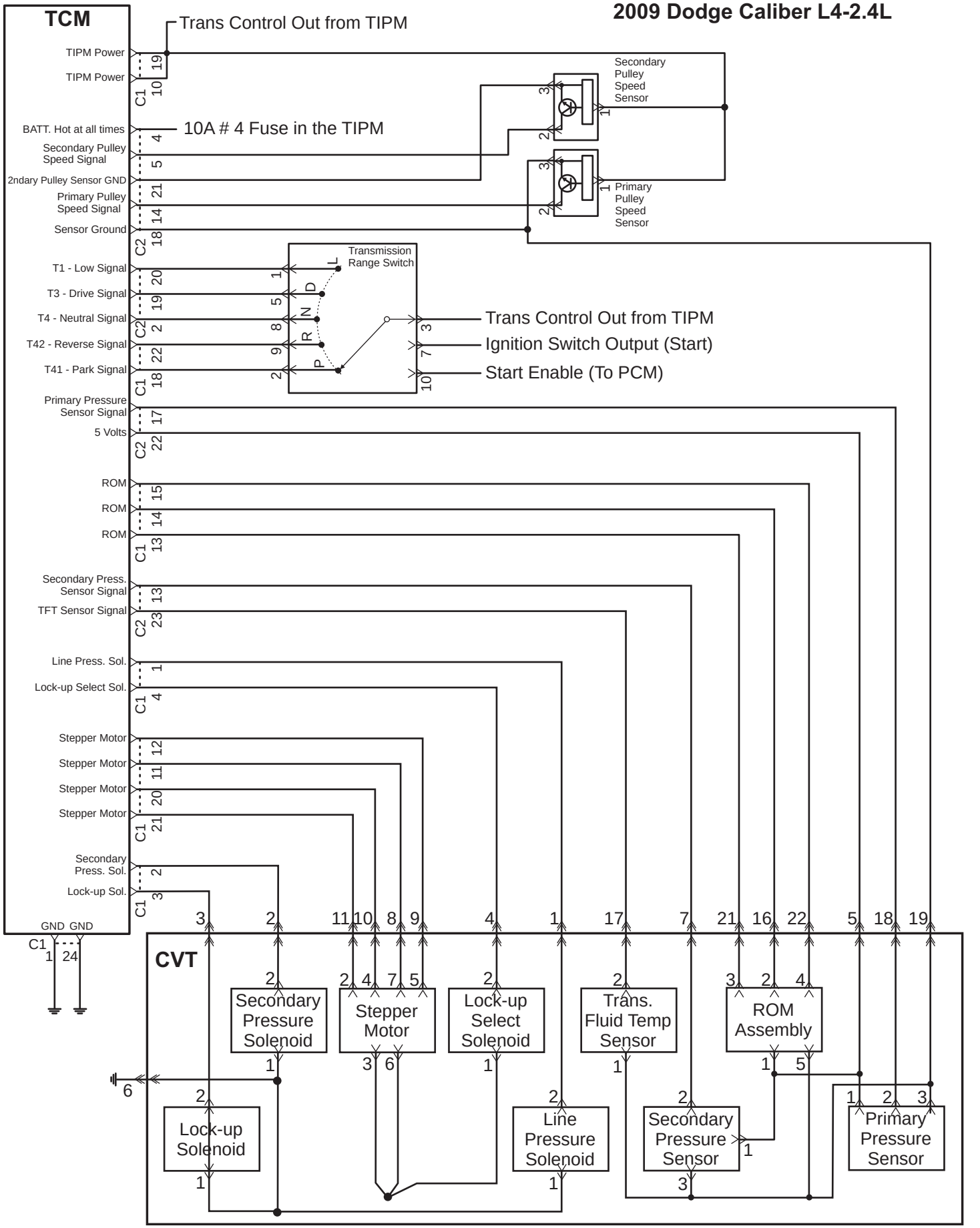
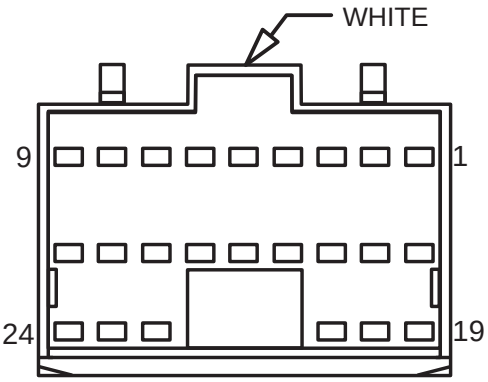


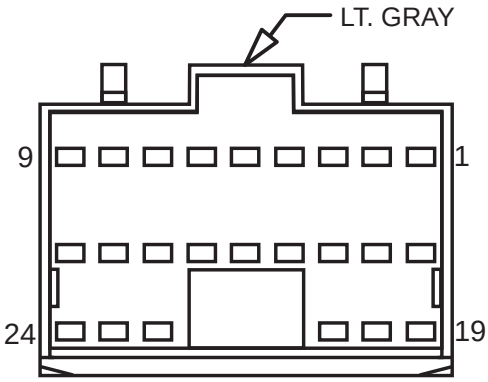
Figure 9



TRANSMISSION
CONTROL MODULE
C1 CONNECTOR

2009 Dodge Caliber L4-2.4L

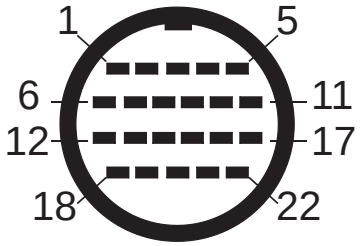
TCM located under the left side of Dash



TRANSMISSION
CONTROL MODULE
C2 CONNECTOR

CAVITY	CIRCUIT	FUNCTION
1	T20 18DG/LB	LINE PRESSURE CONTROL
2	T19 18YL/DB	SECONDARY PRESSURE CONTROL
3	T59 18YL/LB	TCC CONTROL
4	T60 18YL/GY	TCC ON/OFF CONTROL (SELECT)
5	D65 20WT/BK	CAN C BUS (+)
6	D64 20WT/BK	CAN C BUS (-)
7		
8		
9		
10	T16 18YL/OR	TRANSMISSION CONTROL OUTPUT
11	T314 18LB/YL	STEP MOTOR CONTROL A
12	T315 18YL/OR	STEP MOTOR CONTROL B
13	T302 20DG/BR	CLOCK SELECT (ROM)
14	T313 20YL/LG	CHIP SELECT (ROM)
15	T327 20GY/YL	DATA IN/OUT SELECT (ROM)
16		
17		
18	T41 20YL/BK	TRS T41 SIGNAL (PARK)
19	T16 18YL/OR	TRANSMISSION CONTROL OUTPUT
20	T316 20YL/WT	STEP MOTOR CONTROL C
21	T317 20TN/YL	STEP MOTOR CONTROL D
22	T42 20DG/PK	TRS T42 SIGNAL (REVERSE)
23		
24		

CAVITY	CIRCUIT	FUNCTION
1	Z906 18BK	GROUND
2	T4 20DG/LB	TRS T4 SIGNAL (NEUTRAL)
3		
4	A952 20RD/OR	FUSED B (+)
5	T52 18DG/WT	OUTPUT SPEED SIGNAL
6		
7		
8		
9		
10	T5 20DG/LG	AUTOSTICK UPSHIFT SIGNAL
11		
12	T44 20YL/DG	AUTOSTICK DOWNSHIFT SIGNAL
13	T50 18PK/LB	SECONDARY PRESSURE SIGNAL
14	T14 18DG/BK	INPUT SPEED SIGNAL
15		
16		
17	T21 20DG/YL	PRIMARY PRESSURE SIGNAL
18	T13 18DG/TN	SENSOR GROUND
19	T3 20DG/DB	TRS T3 SIGNAL (DRIVE)
20	T1 20DG/GY	TRS T1 SIGNAL (LOW)
21	T130 18TN/DG	OUTPUT SPEED SENSOR GROUND
22	T72 20PK	5 VOLT SUPPLY
23	T54 20RD/WT	TRANSMISSION TEMP SIGNAL
24	Z906 18BK	GROUND



1. Pressure Control Solenoid (PCS)
2. Secondary Pressure Control Solenoid (SPCS)
3. Lock-Up Control Solenoid (LCS)
4. Lock-up Selection Solenoid (LSS)
5. + For Pressure Switches and ROM
6. Ground for PCS, SPCS & LCS
7. Secondary Pressure Sensor Signal
8. Stepper Motor
9. Stepper Motor
10. Stepper Motor
11. Stepper Motor
12. Not used
13. Not used
14. Not used
15. Not used
16. ROM
17. TFT Signal
18. Primary Pressure Sensor Signal
19. Ground Pressure Sensors, ROM, TFT
20. Not used
21. ROM
22. ROM

Figure 10

2009 Jeep Compass 2WD L4-2.4L

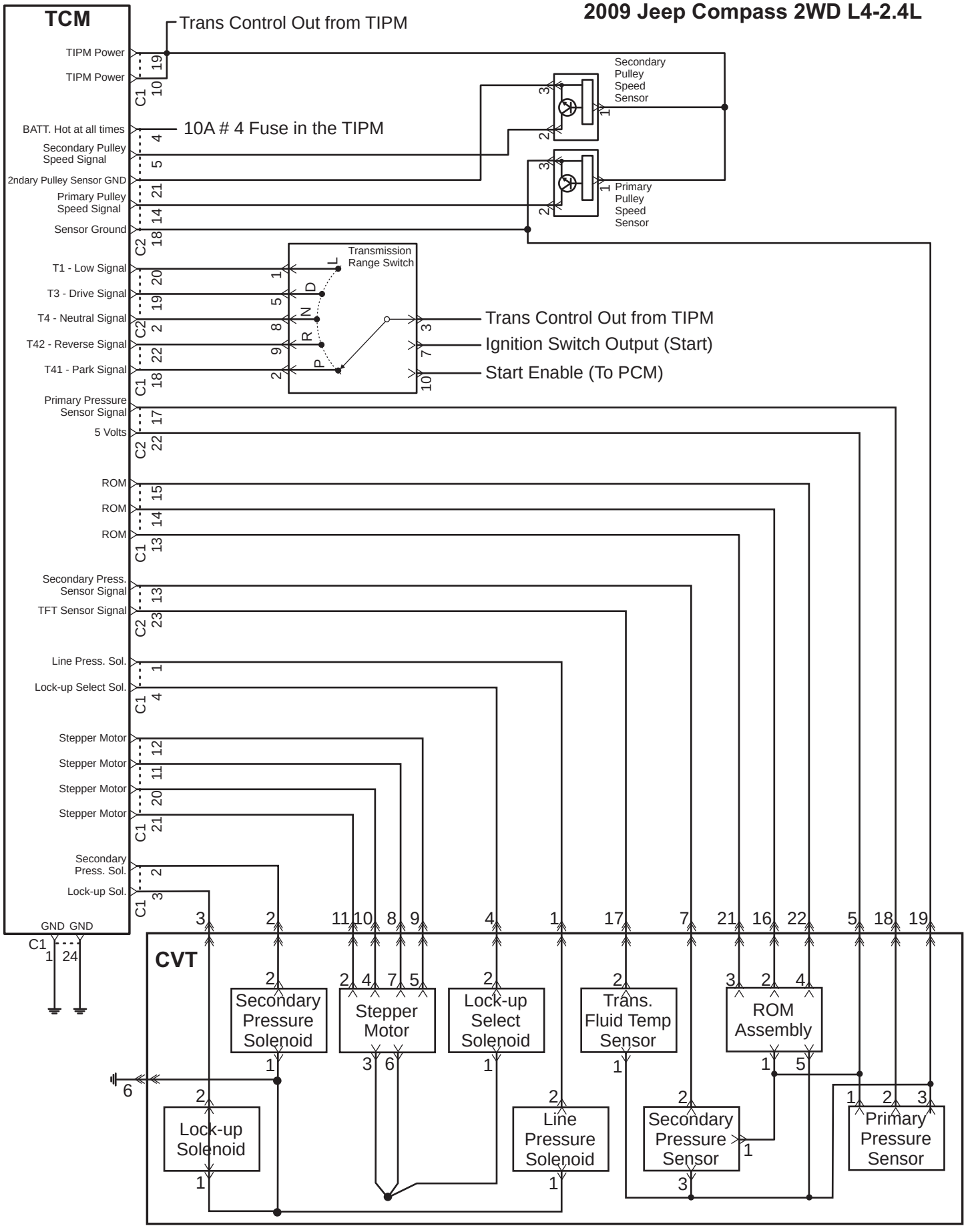
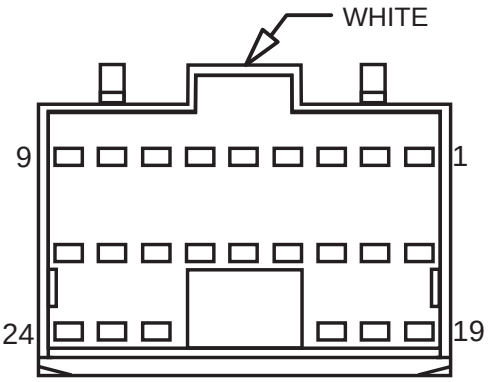


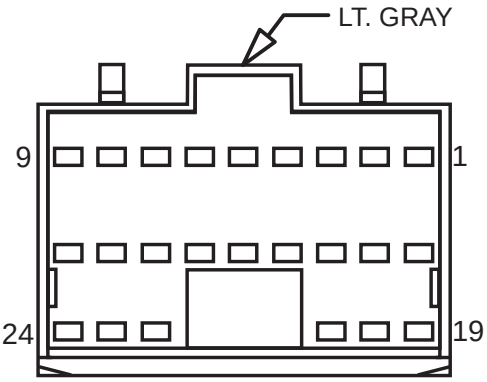
Figure 11



TRANSMISSION
CONTROL MODULE
C1 CONNECTOR

2009 Jeep
Compass 2WD L4-2.4L

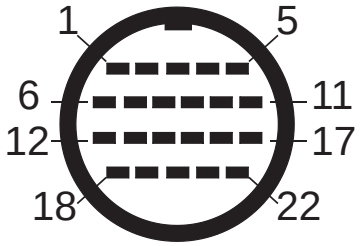
TCM located under
the left side of Dash



TRANSMISSION
CONTROL MODULE
C2 CONNECTOR

CAVITY	CIRCUIT	FUNCTION
1	T20 18DG/LB	LINE PRESSURE CONTROL
2	T19 18YL/DB	SECONDARY PRESSURE CONTROL
3	T59 18YL/LB	TCC CONTROL
4	T60 18YL/GY	TCC ON/OFF CONTROL (SELECT)
5	D65 20WT/BK	CAN C BUS (+)
6	D64 20WT/BK	CAN C BUS (-)
7		
8		
9		
10	T16 18YL/OR	TRANSMISSION CONTROL OUTPUT
11	T314 18LB/YL	STEP MOTOR CONTROL A
12	T315 18YL/OR	STEP MOTOR CONTROL B
13	T302 20DG/BR	CLOCK SELECT (ROM)
14	T313 20YL/LG	CHIP SELECT (ROM)
15	T327 20GY/YL	DATA IN/OUT SELECT (ROM)
16		
17		
18	T41 20YL/BK	TRS T41 SIGNAL (PARK)
19	T16 18YL/OR	TRANSMISSION CONTROL OUTPUT
20	T316 20YL/WT	STEP MOTOR CONTROL C
21	T317 20TN/YL	STEP MOTOR CONTROL D
22	T42 20DG/PK	TRS T42 SIGNAL (REVERSE)
23		
24		

CAVITY	CIRCUIT	FUNCTION
1	Z906 18BK	GROUND
2	T4 20DG/LB	TRS T4 SIGNAL (NEUTRAL)
3		
4	A952 20RD/OR	FUSED B (+)
5	T52 18DG/WT	OUTPUT SPEED SIGNAL
6		
7		
8		
9		
10	T5 20DG/LG	AUTOSTICK UPSHIFT SIGNAL
11		
12	T44 20YL/DG	AUTOSTICK DOWNSHIFT SIGNAL
13	T50 18PK/LB	SECONDARY PRESSURE SIGNAL
14	T14 18DG/BK	INPUT SPEED SIGNAL
15		
16		
17	T21 20DG/YL	PRIMARY PRESSURE SIGNAL
18	T13 18DG/TN	SENSOR GROUND
19	T3 20DG/DB	TRS T3 SIGNAL (DRIVE)
20	T1 20DG/GY	TRS T1 SIGNAL (LOW)
21	T130 18TN/DG	OUTPUT SPEED SENSOR GROUND
22	T72 20PK	5 VOLT SUPPLY
23	T54 20RD/WT	TRANSMISSION TEMP SIGNAL
24	Z906 18BK	GROUND



1. Pressure Control Solenoid (PCS)
2. Secondary Pressure Control Solenoid (SPCS)
3. Lock-Up Control Solenoid (LCS)
4. Lock-up Selection Solenoid (LSS)
5. + For Pressure Switches and ROM
6. Ground for PCS, SPCS & LCS
7. Secondary Pressure Sensor Signal
8. Stepper Motor
9. Stepper Motor
10. Stepper Motor
11. Stepper Motor
12. Not used
13. Not used
14. Not used
15. Not used
16. ROM
17. TFT Signal
18. Primary Pressure Sensor Signal
19. Ground Pressure Sensors, ROM, TFT
20. Not used
21. ROM
22. ROM

Figure 12

2009 Mitsubishi Lancer L4-2.4L

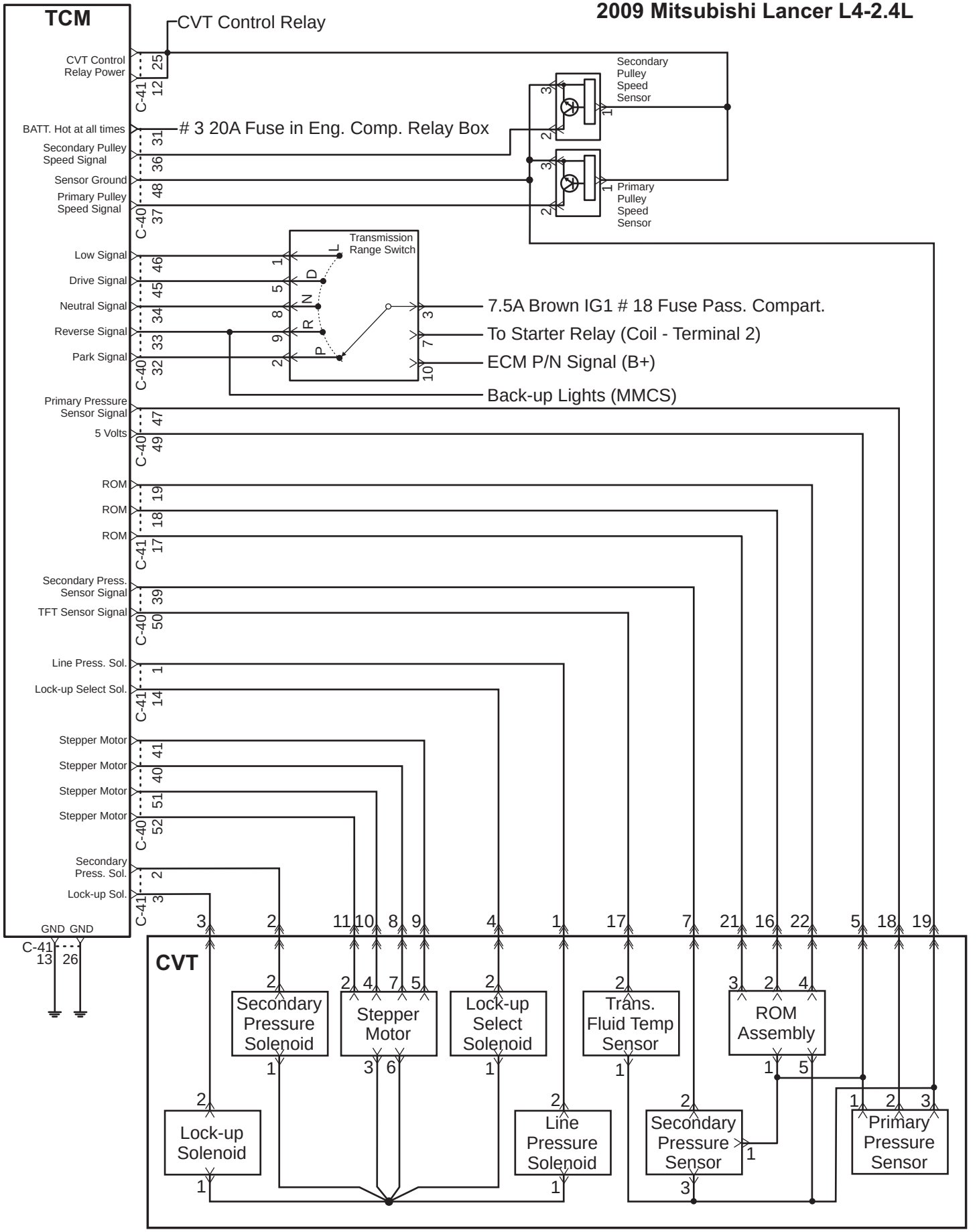
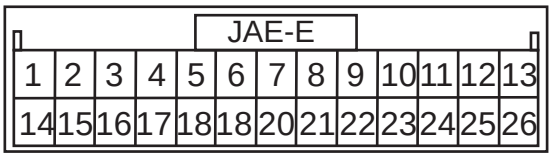


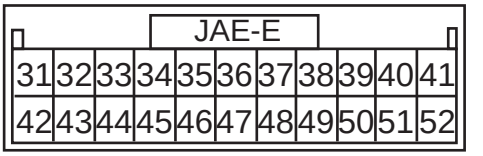
Figure 13



C-41 CONNECTOR

2009 Mitsubishi Lancer L4-2.4L

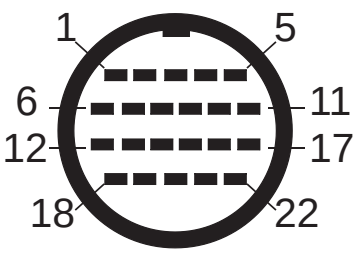
TCM located under the left side of Dash



C-40 CONNECTOR

CAVITY	CIRCUIT	FUNCTION
1	WT/BK BL/WT	LINE PRESSURE SOLENOID
2	BRN/WHT	SECONDARY PRESSURE SOLENOID
3	YELLOW	LOCK-UP SOLENOID
4	VIOLET	CAN_H
5	BLUE	CAN_L
6		
7		
8		
9		
10		
11		
12	RED	CVT CONTROL RELAY POWER SUPPLY
13	BLACK	GROUND
14	YELLOW/RED	LOCK-UP SELECT SOLENOID
15		
16		
17	WHITE/BLUE	ROM (SEL2) - (TCM 21)
18	YEL/GREEN	ROM (SEL1) - (TCM 16)
19	YEL/VIOLET	ROM (SEL3) - (TCM 22)
20		
21	BLUE	PADDLE SWITCH (DOWN)
22	GRAY	PADDLE SWITCH (UP)
23		
24		
25	RED	CVT CONTROL RELAY POWER SUPPLY
26	BLACK	GROUND

CAVITY	CIRCUIT	FUNCTION
31	PINK	BATTERY BACKUP - ALWAYS HOT
32	BLK/WHT	PNP SWITCH PARK SIGNAL
33	ORANGE	PNP SWITCH REVERSE SIGNAL
34	YEL/GRN	PNP SWITCH NEUTRAL SIGNAL
35	RED/BLK	SELECT SWITCH - AUTO/SPORT
36	GRN/WHT	SECONDARY PULLEY SPEED SENSOR
37	SKY BLUE	PRIMARY PULLEY SPEED SENSOR
38		
39	GREEN	SECONDARY PULLEY PRESS. (A) SIGNAL
40	RED/WHT	STEPPER MOTOR (TCM-8)
41	YEL/PNK	STEPPER MOTOR (TCM-9)
42		
43	WHITE	SHIFT SWITCH UP MODE
44	PINK	SHIFT SWITCH DOWN MODE
45	LT. GRN	PNP SWITCH DRIVE SIGNAL
46	BLU/YEL	PNP SWITCH LOW SIGNAL
47	VIOLET	PRIMARY PULLEY PRESS. (B) SIGNAL
48	BLACK	PULLEY SPEED SENSOR GROUND
49	BLUE	5 VOLTS SUPPLY(PRESS. SENSORS & ROM)
50	GREEN	CVT FLUID TEMP. SIGNAL
51	RED	STEPPER MOTOR (TCM-10)
52	BROWN	STEPPER MOTOR (TCM-11)



1. Pressure Control Solenoid (PCS)
2. Secondary Pressure Control Solenoid (SPCS)
3. Lock-Up Control Solenoid (LCS)
4. Lock-up Selection Solenoid (LSS)
5. + For Pressure Switches and ROM
6. Not used
7. Secondary Pressure Sensor Signal
8. Stepper Motor
9. Stepper Motor
10. Stepper Motor
11. Stepper Motor
12. Not used
13. Not used
14. Not used
15. Not used
16. ROM
17. TFT Signal
18. Primary Pressure Sensor Signal
19. Ground Pressure Sensors, ROM, TFT
20. Not used
21. ROM
22. ROM

Figure 14

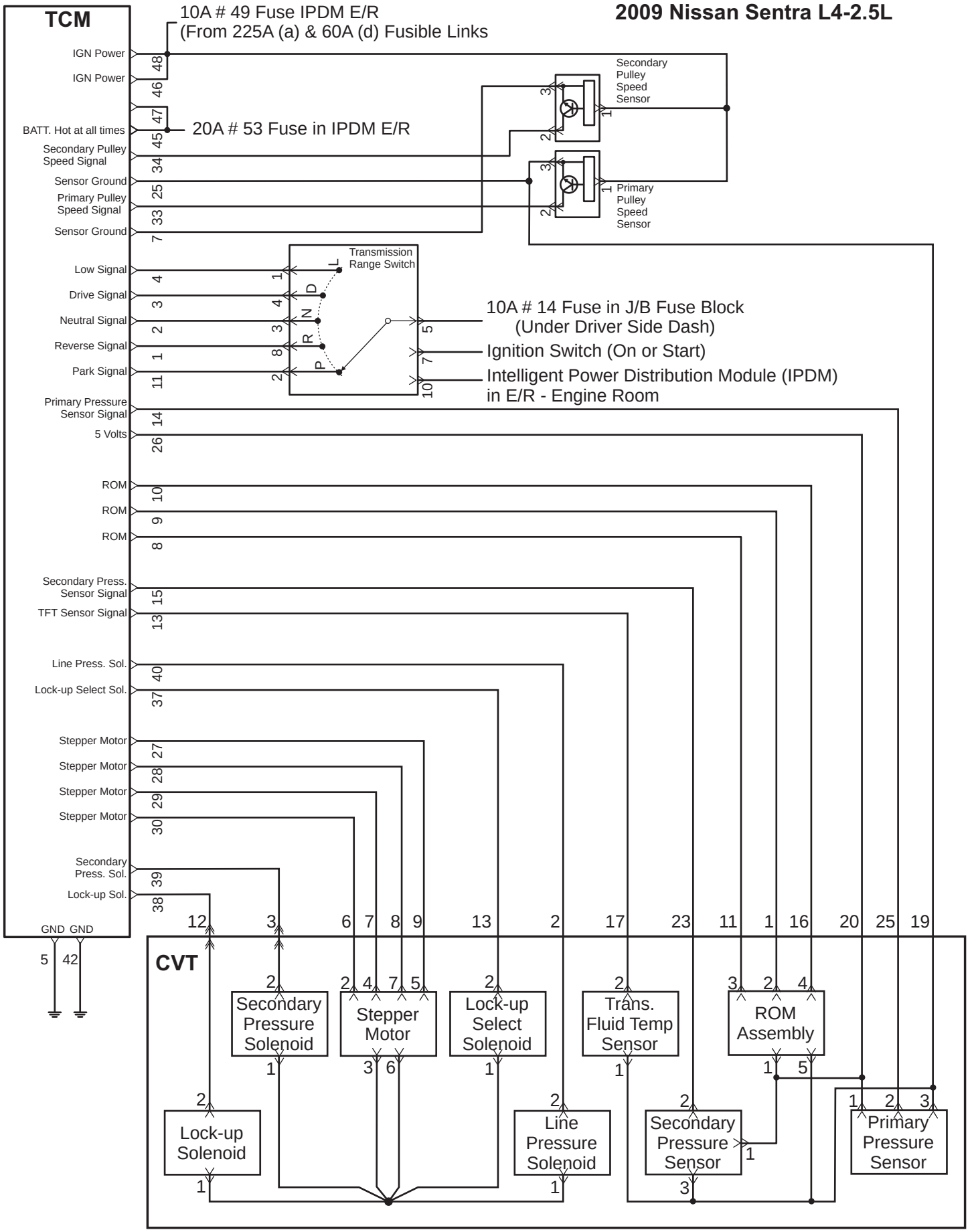
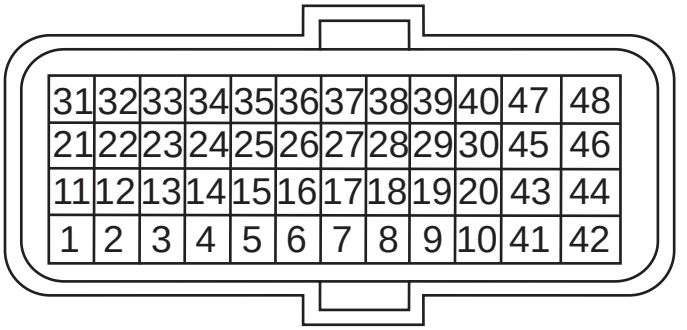

2009 Nissan Sentra L4-2.5L
TCM
10A # 49 Fuse IPDM E/R
(From 225A (a) & 60A (d) Fusible Links
IGN Power
IGN Power
BATT. Hot at all times
20A # 53 Fuse in IPDM E/R
Secondary Pulley Speed Signal
Sensor Ground
Primary Pulley Speed Signal
Sensor Ground
Secondary Pulley Speed Sensor
Primary Pulley Speed Sensor
Transmission Range Switch
Low Signal
Drive Signal
Neutral Signal
Reverse Signal
Park Signal
10A # 14 Fuse in J/B Fuse Block
(Under Driver Side Dash)
Ignition Switch (On or Start)
Intelligent Power Distribution Module (IPDM)
in E/R - Engine Room
Primary Pressure Sensor Signal
5 Volts
ROM
ROM
ROM
Secondary Press. Sensor Signal
TFT Sensor Signal
Line Press. Sol.
Lock-up Select Sol.
Stepper Motor
Stepper Motor
Stepper Motor
Stepper Motor
Secondary Press. Sol.
Lock-up Sol.
GND GND
CVT
Secondary Pressure Solenoid
Stepper Motor
Lock-up Select Solenoid
Trans. Fluid Temp Sensor
ROM Assembly
Lock-up Solenoid
Line Pressure Solenoid
Secondary Pressure Sensor
Primary Pressure Sensor

Figure 15

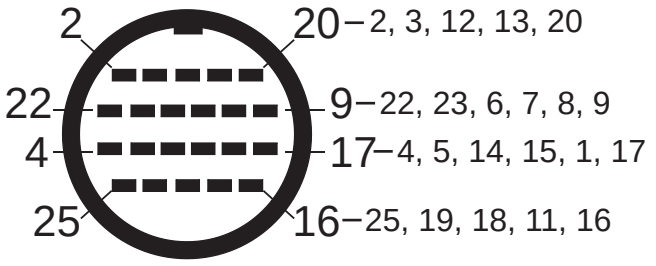


2009 Nissan Sentra L4-2.5L

TCM located under the left side of Dash

CAVITY	CIRCUIT	FUNCTION
1	WHT/BLK	PNP SWITCH REVERSE SIGNAL
2	PNK/BLK	PNP SWITCH NEUTRAL SIGNAL
3	GRN/OR	PNP SWITCH DRIVE SIGNAL
4	GREEN	PNP SWITCH LOW SIGNAL
5	BLACK	GROUND
6	PNK/BLU	K-LINE
7	WHT/RED	SENSOR GROUND
8	GRN/WHT	ROM ASSEMBLY
9	BLU/RED	ROM ASSEMBLY
10	BRN/RED	ROM ASSEMBLY
11	BRN/WHT	PNP SWITCH PARK SIGNAL
12		
13	VIOLET	CVT FLUID TEMP. SIGNAL
14	LIGHT GREEN	PRIMARY PULLEY PRESS. (B) SIGNAL
15	VIO/WHT	SECONDARY PULLEY PRESS. (A) SIGNAL
16		
17		
18		
19		
20		
21		
22		
23		
24		

CAVITY	CIRCUIT	FUNCTION
25	WHT/RED	SENSOR GROUND
26	BLU/OR	5 VOLT SENSOR POWER SUPPLY
27	RED/GRN	STEPPER MOTOR D
28	RED	STEPPER MOTOR C
29	OR/BLK	STEPPER MOTOR B
30	GRN/RED	STEPPER MOTOR A
31	PINK	CAN-L
32	BLUE	CAN-H
33	LT.GRN/RED	PRIMARY PULLEY SPEED SIGNAL
34	WHITE	SECONDARY PULLEY SPEED SIGNAL
35		
36		
37	BLU/WHT	LOCK-UP SELECT SOLENOID
38	GREEN	LOCK-UP SOLENOID
39	WHT/GN	SECONDARY PRESS. CONTRL. SOL.
40	RED/YELLOW	LINE PRESS. CONTROL SOL.
41		
42	BLACK	GROUND
43		
44		
45	YELLOW/RED	BATT. (+) HOT AT ALL TIMES
46	YELLOW	IGN POWER
47	YELLOW/RED	BATT. (+) HOT AT ALL TIMES
48	YELLOW	IGN POWER



2. Pressure Control Solenoid (PCS)
3. Secondary Press. Contrl. Solenoid (SPCS)
12. Lock-Up Control Solenoid (LCS)
13. Lock-up Selection Solenoid (LSS)
20. + For Pressure Switches and ROM
22. Not used
23. Secondary Pressure Sensor Signal
6. Stepper Motor
7. Stepper Motor
8. Stepper Motor
9. Stepper Motor
4. Not used
5. Not used
14. Not used
15. Not used
1. ROM
17. TFT Signal
25. Primary Press. Sensor Signal
19. Sensor Ground
18. Not used
11. ROM
16. ROM

Figure 16

DODGE/JEEP/MITSUBISHI/NISSAN
CVT2 - JF011E/F1C1A/RE0F10A
SOLENOID RESISTANCE CHECKS

COMPLAINT: When it is required to perform solenoid or pressure sensor electrical checks with the JF011E CVT transmission found in Dodge, Jeep, Mitsubishi and Nissan vehicles, there is confusion as to the pin assignments.

CAUSE: There are two reasons that cause confusion in doing electrical checks.

1. Dodge and Jeep provide an external ground for 3 of the internal solenoids through pin 6 while Mitsubishi and Nissan vehicles ground all their solenoids internally (Figures 17 -19).

2. Although each pin function remains the same for all 3 manufacturers (*with the exception of the external ground path used in Dodge vehicles*), Nissan numbers the terminals differently compared to Dodge, Jeep and Mitsubishi (Figure 20).

3. Beginning with production year of 2010 Mitsubishi has eliminated the Primary Pressure Sensor which may also be called Pressure Sensor A (Figure 22).

CORRECTION: When making solenoid resistance checks with JF011E transmissions used in Dodge Caliber and Jeep Compass, Patriot vehicles, use terminal 6 in the case connector as the ground path when checking the Lockup Control, Secondary Pressure Control and Pressure Control Solenoids (Figure 19). For Mitsubishi and Nissan units use the transmission case as the ground path for all solenoid checks.

If Nissan OE information is being used in diagnosing electrical concerns, refer to the case connector terminal identification provided in figure 20 to eliminate confusion in terminal function when compared to Dodge, Jeep and Mitsubishi in figure 19.

CAUTION: To provide a single ground path for 3 solenoids in Dodge Caliber and Jeep Compass, Patriot vehicles, an internal splice is used joining together all 3 grounds into 1 wire (figure 21) which then exits through terminal 6 in the case connector. It is then routed and mounted to an external ground as seen in figures 17 and 18.

Nissan and Mitsubishi join all solenoid ground wires to an internal single eyelet as seen in figure 22. This means that the external wiring harness does not provide a ground path from terminal 6.

Should a Dodge or Jeep valve body be used in a Nissan or Mitsubishi vehicle, electrical fault codes will be produced for the Lockup Control, Secondary Pressure Control and Pressure Control Solenoids as they will have no grounds.

DODGE/JEEP/MITSUBISHI/NISSAN
CVT2 - JF011E/F1C1A/RE0F10A
SOLENOID RESISTANCE CHECKS

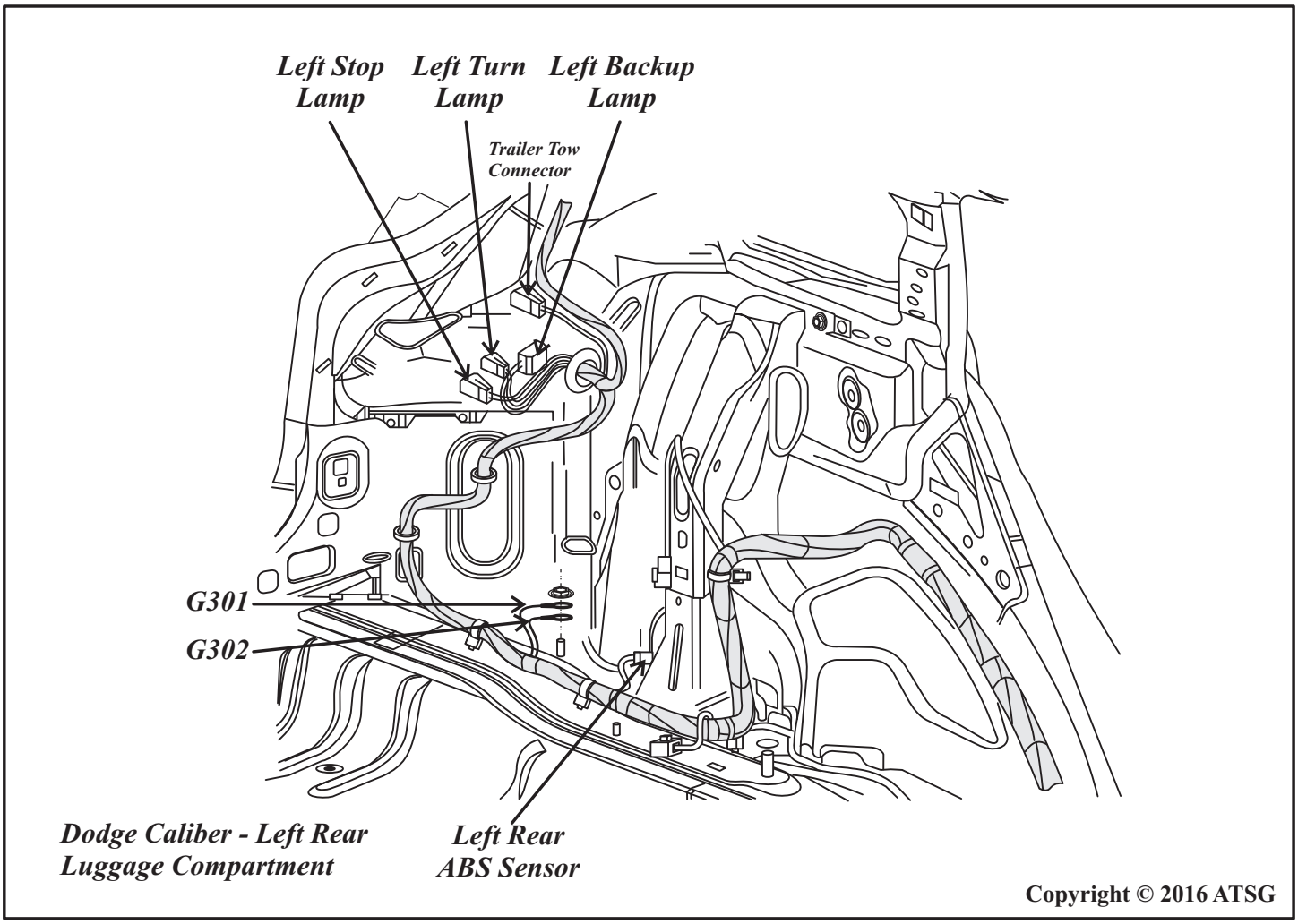


Figure 17

DODGE/JEEP/MITSUBISHI/NISSAN
CVT2 - JF011E/F1C1A/RE0F10A
SOLENOID RESISTANCE CHECKS

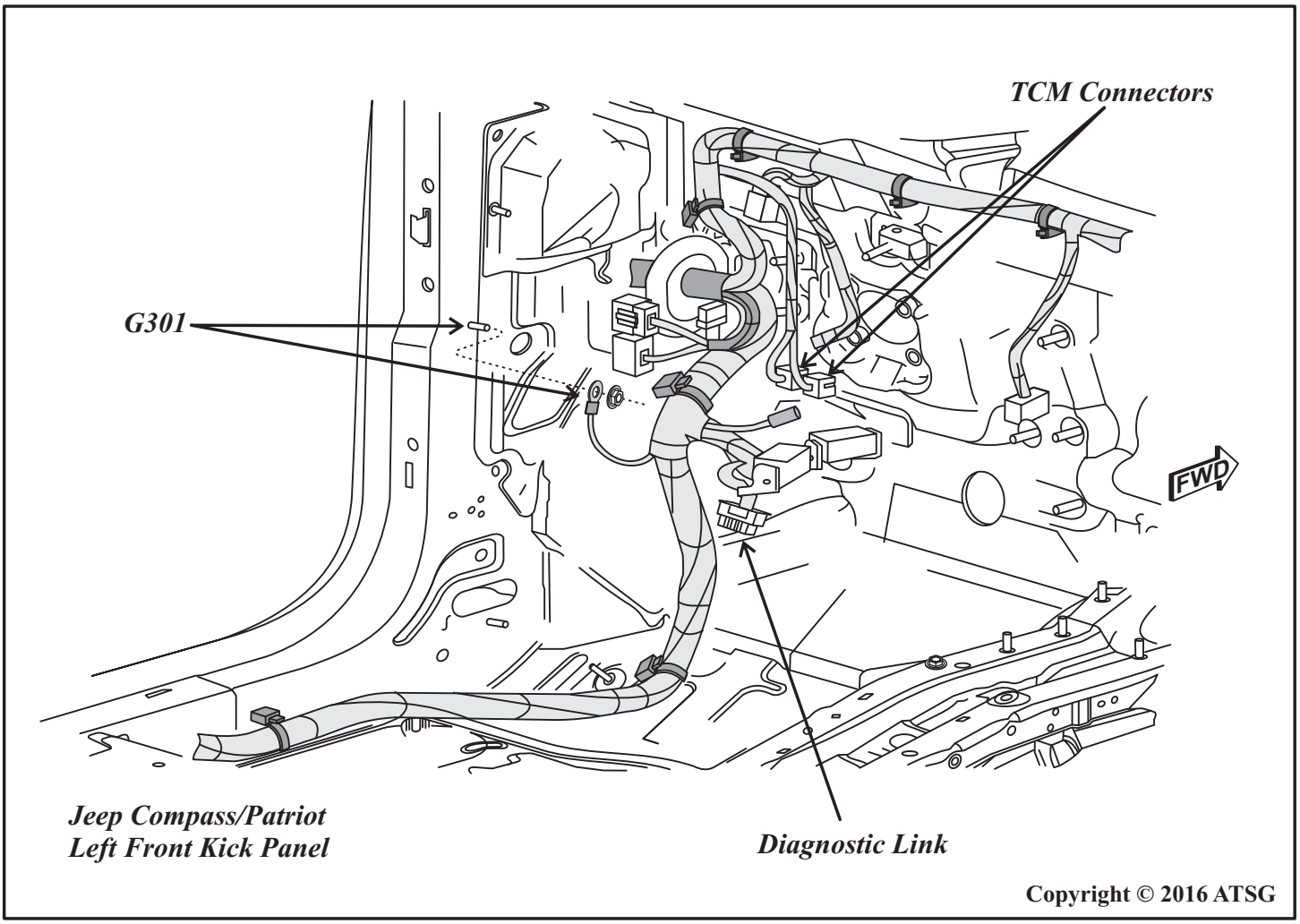
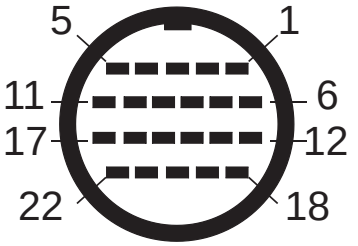


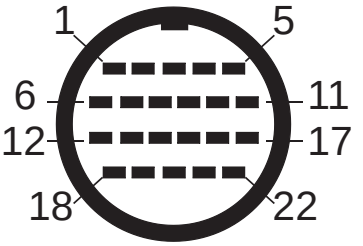
Figure 18

DODGE/JEEP/MITSUBISHI/NISSAN
CVT2 - JF011E/F1C1A/RE0F10A
SOLENOID RESISTANCE CHECKS

Dodge, Jeep and Mitsubishi

HARNESS CONNECTOR VIEW





CASE CONNECTOR VIEW

1. Pressure Control Solenoid (PCS)
2. Secondary Pressure Control Solenoid (SPCS)
3. Lock-Up Control Solenoid (LCS)
4. Lock-up Selection Solenoid (LSS)
5. + For Pressure Switches and ROM
6. Dodge only - ground (G301) for PCS, SPCS & LCS
7. Secondary Pressure Sensor Signal
8. Stepper Motor
9. Stepper Motor
10. Stepper Motor
11. Stepper Motor
12. Not used
13. Not used
14. Not used
15. Not used
16. ROM
17. TFT Signal
18. Primary Pressure Sensor Signal
19. Ground Pressure Sensors, ROM, TFT
20. Not used
21. ROM
22. ROM

Dodge:

PCS - 1 & 6 = 6.5 ohms
SPSC - 2 & 6 = 6.5 ohms
LCS - 3 & 6 = 6.5 ohms
LSS - 4 & Case Ground = 28 ohms

Mitsubishi:

PCS - 1 & Case Ground = 6.5 ohms
SPSC - 2 & Case Ground = 6.5 ohms
LCS - 3 & Case Ground = 6.5 ohms
LSS - 4 & Case Ground = 28 ohms

TFT - 17 & 19 @ 68°F = (20°C) - 2.5k to 6.5k Ohms or 2.0 Volts DC
176°F = (80°C) - 0.3k to 0.9k Ohms or 1.0 Volts DC

The Pressure Control Solenoid and Secondary Pressure Solenoid are Normally Applied Linear (Variable Force) Solenoids, as they duty cycle their signal pressure decreases. *Fully Off - 0.1 amp / Fully On - 1.0 amp*

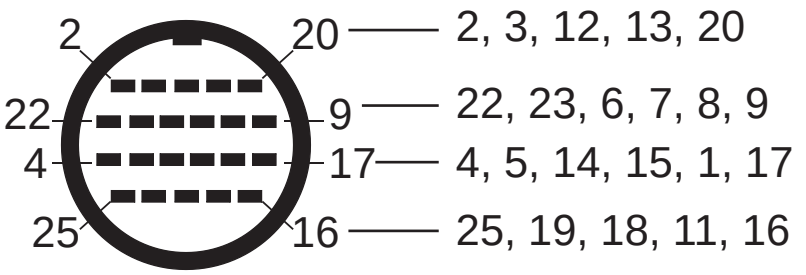
The Lock-Up Solenoid is a Normally Low, Linear (Variable Force) Solenoid, as it duty cycles, its signal pressure increases.
Fully Off - 0.1 amp / Fully On - 1.0 amp

The Lock-up Select Solenoid is a Normally Close On/Off Solenoid. When the solenoid is Off, it blocks pressure from passing through the solenoid. When it is On, signal pressure equals supply pressure.
Fully Off - 0 volts or 0.1 amp / Fully On 13 volts or 0.5 amp

Figure 19

DODGE/JEEP/MITSUBISHI/NISSAN
CVT2 - JF011E/F1C1A/RE0F10A
SOLENOID RESISTANCE CHECKS

Nissan



2. Pressure Control Solenoid (PCS)
3. Secondary Pressure Control Solenoid (SPCS)
12. Lock-Up Control Solenoid (LCS)
13. Lock-up Selection Solenoid (LSS)
20. + For Pressure Switches and ROM
22. Not used
23. Secondary Pressure Sensor Signal
6. Stepper Motor
7. Stepper Motor
8. Stepper Motor
9. Stepper Motor

4. Not used
5. Not used
14. Not used
15. Not used
1. ROM
17. TFT Signal
25. Primary Pressure Sensor Signal
19. Ground Pressure Sensors, ROM, TFT
18. Not used
11. ROM
16. ROM

Nissan:

PCS - 2 & Case Ground = 6.5 ohms
SPSC - 3 & Case Ground = 6.5 ohms
LCS - 12 & Case Ground = 6.5 ohms
LSS - 13 & Case Ground = 28 ohms

TFT - 17 & 19 @ 68°F = (20°C) - 2.5k to 6.5k Ohms or 2.0 Volts DC
176°F = (80°C) - 0.3k to 0.9k Ohms or 1.0 Volts DC

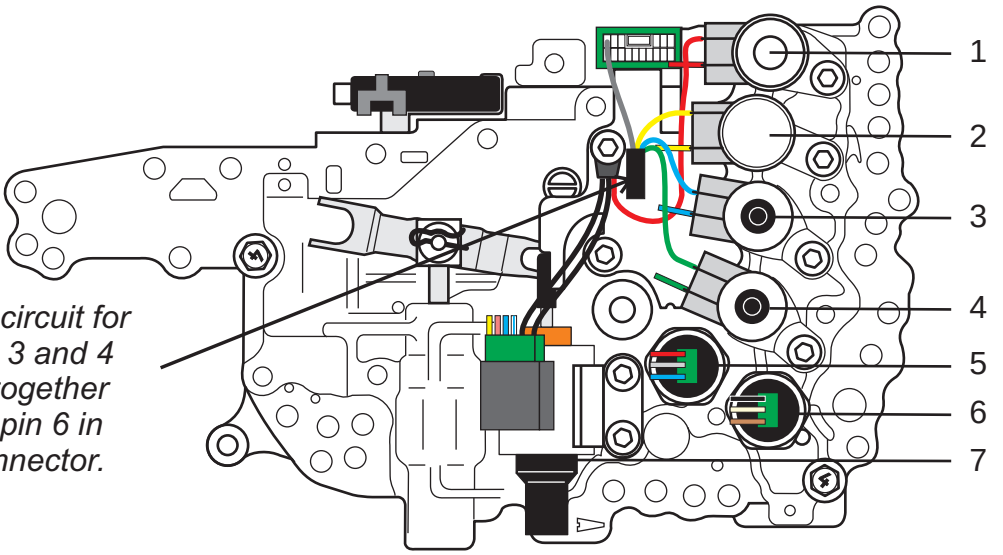
The Pressure Control Solenoid and Secondary Pressure Solenoid are Normally Applied Linear (Variable Force) Solenoids, as they duty cycle their signal pressure decreases. *Fully Off - 0.1 amp / Fully On - 1.0 amp*

The Lock-Up Solenoid is a Normally Low, Linear (Variable Force) Solenoid, as it duty cycles, its signal pressure increases.
Fully Off - 0.1 amp / Fully On - 1.0 amp

The Lock-up Select Solenoid is a Normally Close On/Off Solenoid. When the solenoid is Off, it blocks pressure from passing through the solenoid. When it is On, signal pressure equals supply pressure.
Fully Off - 0 volts or 0.1 amp / Fully On 13 volts or 0.5 amp

Figure 20

Dodge and Jeep Applications

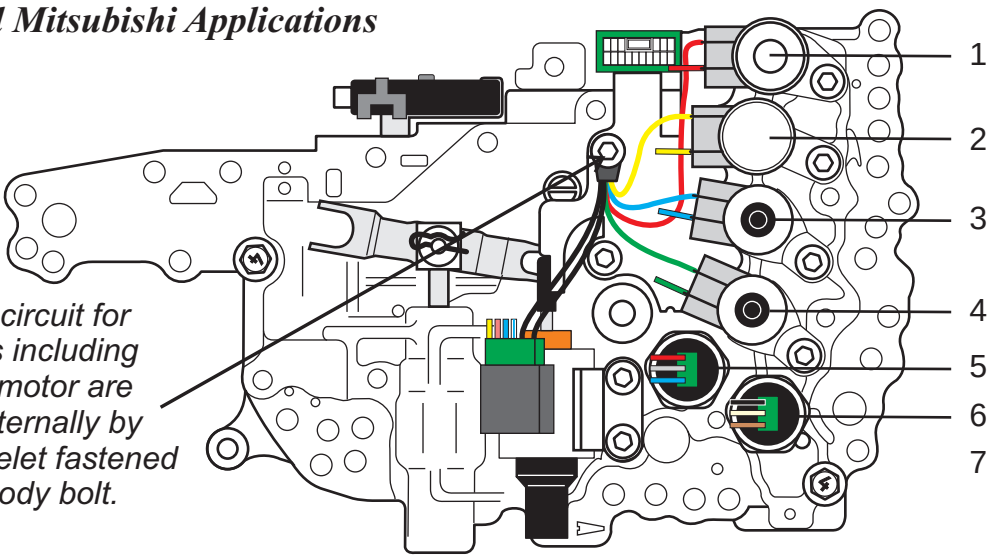


The ground circuit for solenoids 2, 3 and 4 are spliced together internally to pin 6 in the case connector.

1. Lockup Selection Solenoid (LSS)
2. Lockup Control Solenoid (LCS)
3. Secondary Pressure Control Solenoid (SPCS)
4. Pressure Control Solenoid (PCS)
5. Primary Pressure Sensor
6. Secondary Pressure Sensor
7. Ratio Control Motor

Figure 21

Nissan and Mitsubishi Applications



The ground circuit for all solenoids including the stepper motor are grounded internally by a shared eyelet fastened by a valve body bolt.

1. Lockup Selection Solenoid (LSS)
2. Lockup Control Solenoid (LCS)
3. Secondary Pressure Control Solenoid (SPCS)
4. Pressure Control Solenoid (PCS)
5. Primary Pressure Sensor - *Eliminated in 2010 in Mitsubishi vehicles*
6. Secondary Pressure Sensor
7. Ratio Control Motor

Figure 22

*DIAGNOSTIC TROUBLE CODES**	
DTC	**DESCRIPTION**
P0219	*Engine Overspeed*
P0562	*Battery Voltage Low*
P0563	*Battery Voltage High*
P0751	*Brake Switch 1 Performance*
P0602	*Vehicle Information Data Reception Failure*
P0610	*Vehicle Option Mismatch*
P0613	*EEPROM Failure*
P0641	*Sensor Power Supply Circuit*
P0703	*Stoplight Switch Malfunction (Nissan & Mitsubishi)*
P0705	*Malfunction of Transmission Range Switch (Nissan & Mitsubishi)*
P0707	*Inhibitor Switch Circuit Low (No Signal)*
P0708	*Inhibitor Switch Circuit High (Multiple Signal)*
P0710	*Fluid Temperature Sensor Electrical Malfunction (Nissan & Mitsubishi)*
P0711	*Fluid Temperature Sensor Performance*
P0712	*Fluid Temperature Sensor Circuit Low*
P0713	*Fluid Temperature Sensor Circuit High*
P0715	*Primary Pulley Speed Sensor Malfunction (Nissan & Mitsubishi)*
P0716	*Primary Speed Sensor Performance*
P0717	*Primary Speed Sensor Circuit (No Signal)*
P0720	*Secondary Pulley Speed Sensor Malfunction (Nissan & Mitsubishi)*
P0721	*Secondary Speed Sensor Performance*
P0722	*Secondary Speed Sensor Circuit (No Signal)*
P0725	*No/Low ERPM from ECM to TCM over CAN*
P0730	*Incorrect Gear Ratio (Belt Damage - Stepper Motor Performance)*
P0740	*Lock-up Solenoid Malfunction (Nissan & Mitsubishi)*
P0741	*Lock-up Solenoid Performance*
P0744	*A/T TCC S/V Function (Lock-up) (Nissan)*
P0745	*Line Pressure Solenoid Circuit Fault*
P0746	*Line Pressure Solenoid Performance*
P0776	*Secondary Pressure Solenoid Stuck (Off Side)*
P0777	*Secondary Pressure Solenoid Stuck (On Side)*
P0778	*Secondary Pressure Solenoid Circuit Fault*
P0815	*Paddle Shift Up Switch Malfunction (Mitsubishi)*
P0816	*Paddle Shift Down Switch Malfunction (Mitsubishi)*
**** The list of codes were taken from Dodge and Jeep resources and combined with resources for Mitsubishi and Nissan. Additional codes not found in Dodge and Jeep from these manufacturers are noted.***	

Figure 23

DIAGNOSTIC TROUBLE CODES	
DTC	**DESCRIPTION**
P0826	*Manual Mode Switch System Failure*
P0840	*Secondary Pressure Sensor Malfunction (Nissan & Mitsubishi)*
P0841	*Line Pressure Sensor Function Abnormality (Nissan & Mitsubishi)*
P0842	*Primary Pressure Sensor Circuit Low*
P0843	*Primary Pressure Sensor Circuit High*
P0845	*Primary Pressure Sensor Malfunction (Mitsubishi)*
P0847	*Secondary Pressure Sensor Circuit Low*
P0848	*Secondary Pressure Sensor Circuit High*
P0868	*Secondary Pressure Drop*
P0882	*Power Supply System Low Malfunction (Mitsubishi)*
P0883	*Power Supply System High Malfunction (Mitsubishi)*
P0846	*2/4 Clutch Pressure Switch Rationality*
P0962	*Line Pressure Solenoid Circuit Low*
P0963	*Line Pressure Solenoid Circuit High*
P0966	*Secondary Pressure Solenoid Circuit Low*
P0967	*Secondary Pressure Solenoid Circuit High*
P161B	*Battery Disconnected/TCM Internal*
P1637	*Memory Back-up Malfunction (Mitsubishi)*
P1661	*Sensor Ground Open*
P1679	*Failure of Initializing Calibration*
P167A	*Calibration Mismatch*
P1701	*TCM Power Supply (Nissan)*
P1702	*Primary/Secondary Pressure Sensor Performance*
P1705	*Throttle Position Sensor (Nissan)*
P1710	*Vehicle Speed Signal Malfunction (Mitsubishi)*
P1722	*No VSS from ABS over CAN*
P1723	*Speed Sensor Signal Abnormality (Nissan & Mitsubishi)*
P1723	*Lock-up/Selection Switching Solenoid Circuit Open/Short (Dodge & Jeep)*
P1726	*Electric Throttle Control System (Nissan)*
P1729	*Stepping Motor Circuit Open/Short*
P1740	*Lockup/Select Switching Solenoid Malfunction (Mitsubishi)*
P1745	*Monitoring of Percentage Change in Pulley Ratio (Mitsubishi)*
P1770	*Stepping Motor Circuit Open/Short*
P1773	*Malfunction of ABS (Mitsubishi)*
P1777	*Stepper Motor Malfunction (Nissan & Mitsubishi)*

Figure 24

DIAGNOSTIC TROUBLE CODES	
DTC	**DESCRIPTION**
P1778	***Stepping Motor Performance Fault***
P1902	***Engine System Malfunction (Mitsubishi)***
P2769	***Lock-up Solenoid Circuit Low***
P2770	***Lock-up Solenoid Circuit High***
U0001	***CAN Communication System (Bus OFF)***
U0100	***CAN Communication System (TCM - ECM)***
U0121	***CAN Communication System (TCM -ABS module)***
U0141	***CAN Communication System (TCM - FCM)***
U1000	***CAN Communication Line (Nissan)***
U1010	***CAN Transmission Control Module (Nissan)***
U1146	***ROM-ASSY Lost Communication***
U1400	***Implausible TPS Signal Received***
U1401	***Implausible Speed Signal Received***
U1407	***Implausible Engine Torque Request Received***
U140F	***Invalid Vehicle Information (ECM)***
U1410	***Invalid Vehicle Information (FCM/TIPM)***
U1412	***Implausible Vehicle Speed Signal Received***
U1424	***Implausible Torque Signal Received***
U1425	***Implausible Pedal Position Speed Signal Received***
U1426	***Implausible TCC Slip Request Signal Received***
U1428	***Received Engine Torque Request Signal Stuck***
U1429	***Received Engine Torque Signal Stuck***

Figure 25

JF011-E CVT Unit Disassembly Procedures

1. Using a 14mm socket, remove the manual lever attaching nut followed by removing the lever from the shaft (figure 1).

2. Using a 10mm socket, remove two Inhibitor/Range Switch mounting bolts and remove the switch (figure 2).

3. Using a 10mm socket, remove the secondary pulley speed sensor mounting bolt and sensor (figure 3). Caution, there may be a .040 in. shim under the sensor.

4. Using a 10 mm socket, remove the CVT fluid cooler's four mounting bolts. Then remove the cooler and filter from the case (figures 4 and 5).

Figure 3

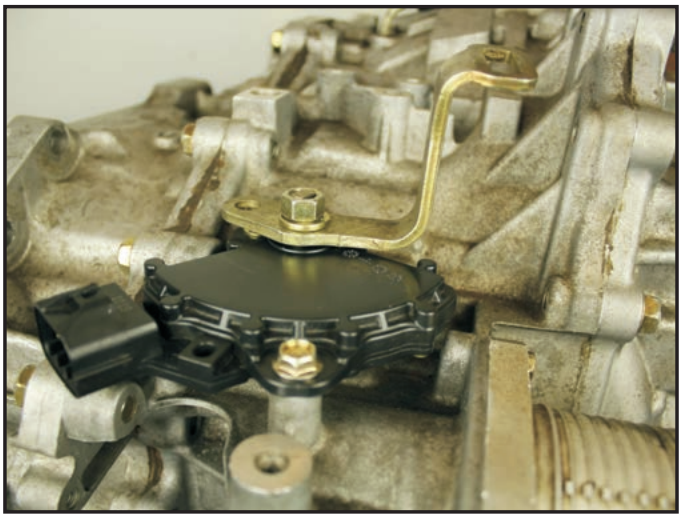


Figure 1

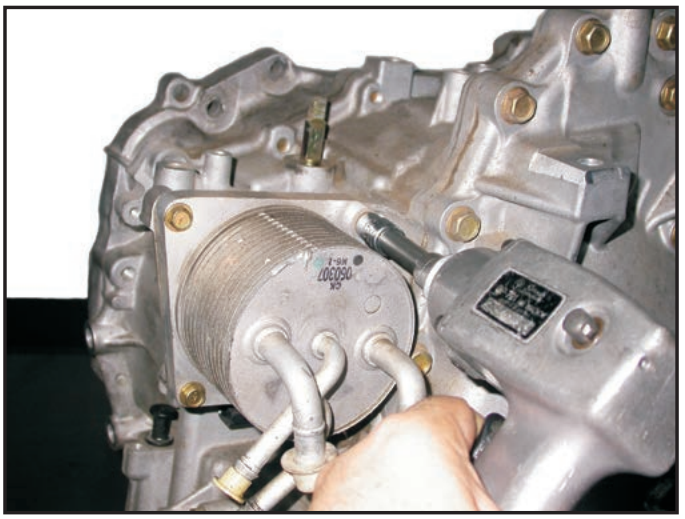


Figure 4

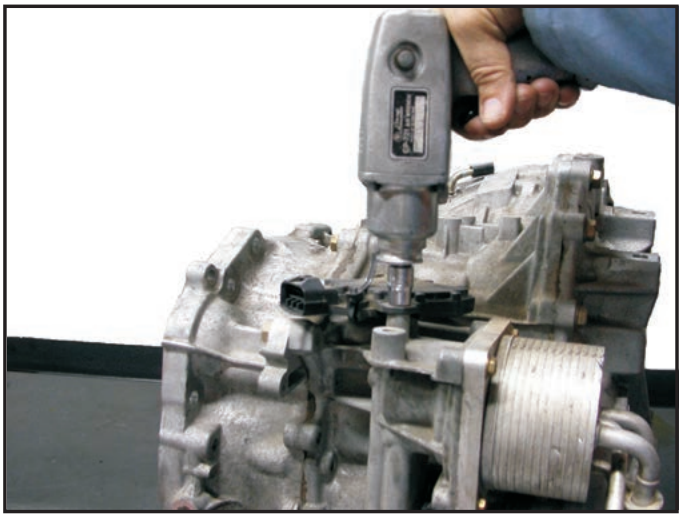


Figure 2

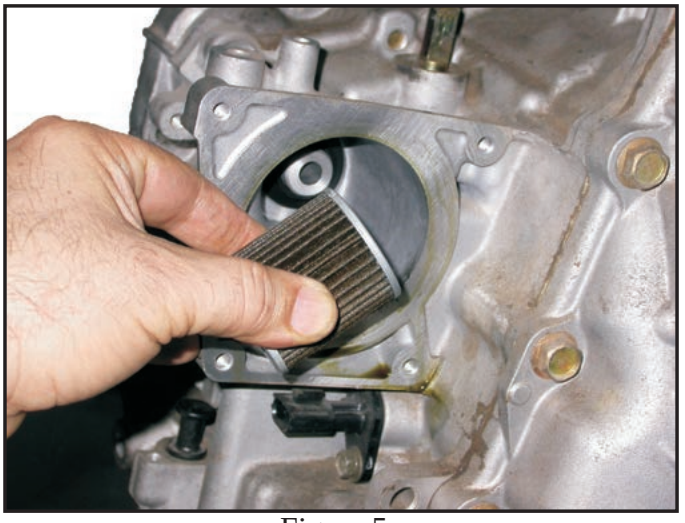


Figure 5

JF011-E CVT Unit Disassembly Procedures

Figure 6

5. Remove the rubber cooler filter seal from the case (figure 6).

6. Using a 10mm socket, remove the primary pulley speed sensor mounting bolt (figure 7).

7. Remove the primary pulley speed sensor from the case (figure 8).

8. Using a pick or small flat head screwdriver, remove the transmission harness retaining clip from the case (figure 9).

9. Using a 14mm socket, remove 19 converter housing to case bolts (figure 10).

Figure 7

Figure 9

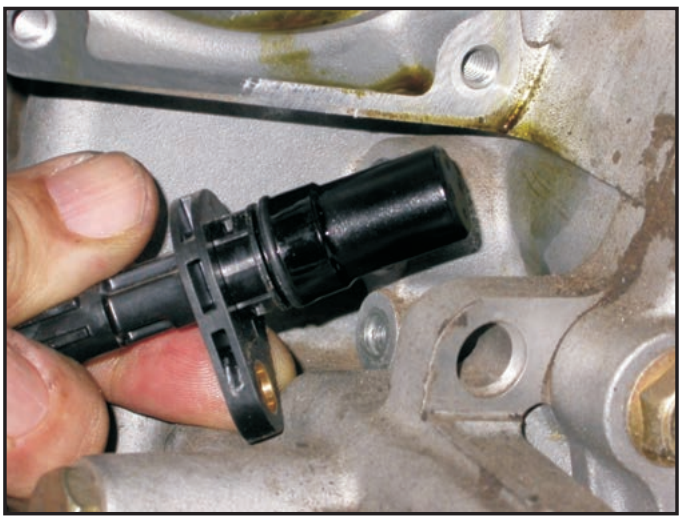


Figure 8

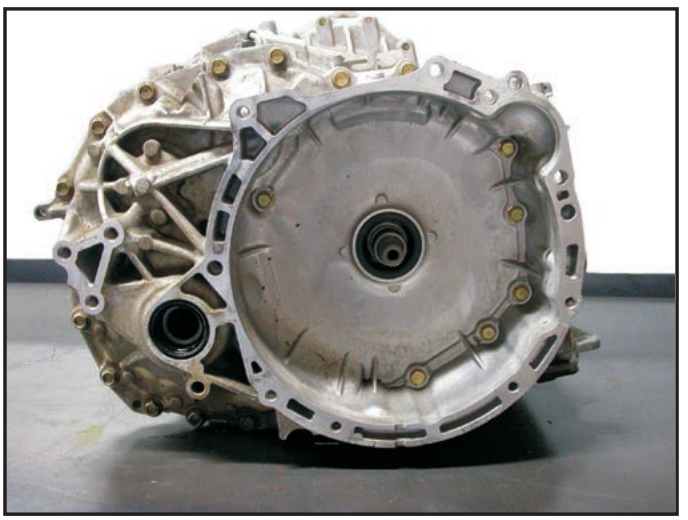


Figure 10

JF011-E CVT Unit Disassembly Procedures

10. A dimple mark will be seen in five of the nineteen converter housing to case bolts. They are longer than the others. Note their locations in figures 11 and 12 for proper installation after rebuild.

11. Using a pick, remove the input shaft o-ring (figure 13).

12. Using a dead-blow hammer and pry bar, carefully tap and pry the converter housing to free it from the main case (figure 14).

13. Earlier models will have selective shims between the pump's driven sprocket and converter housing (figure 15).

Figure 13

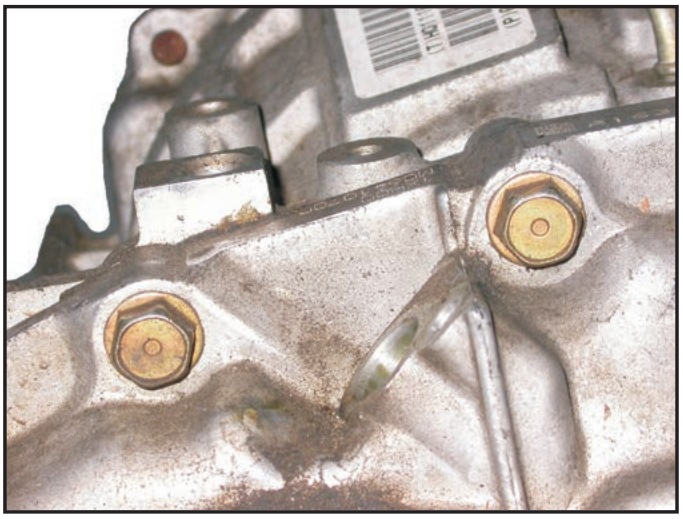


Figure 11

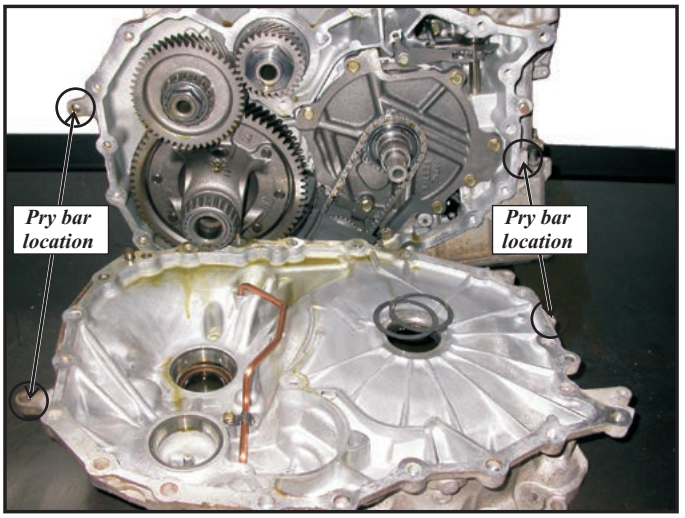


Figure 14

Figure 12

Figure 15

JF011-E CVT Unit Disassembly Procedures

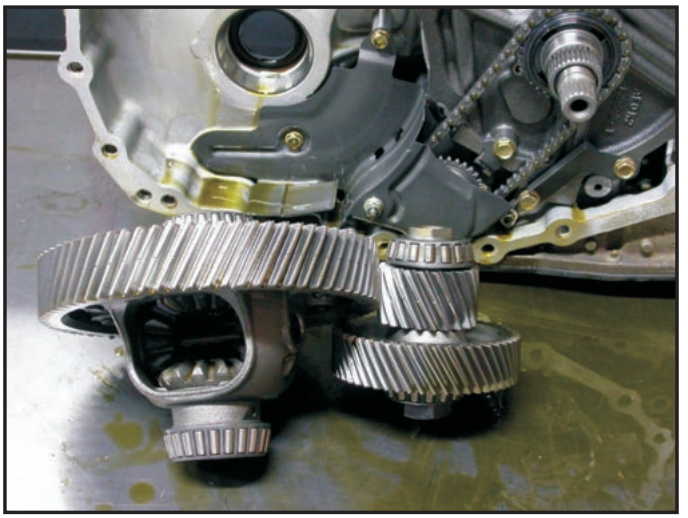


Figure 16

14. Carefully remove the differential and reduction gear assembly from the main case (figure 16).

15. Using a 10mm socket remove two pump cover retaining nuts (figure 17).

16. Rotate the oil pump drive sprocket until one of the cutouts lines up with the opening in the retaining snap ring (figure 18).

17. Using a pair of external snap ring pliers, expand the snap ring and remove both sprockets and the chain (figure 19).

18. Remove the snap ring from the oil pump housing bearing bore (figure 20).

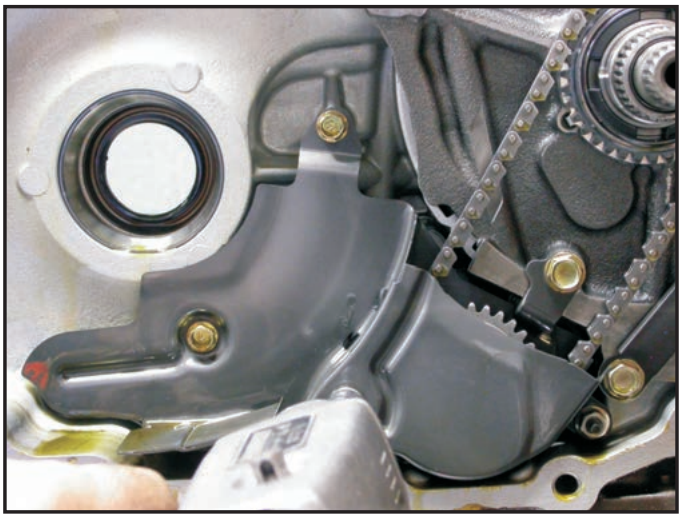


Figure 17

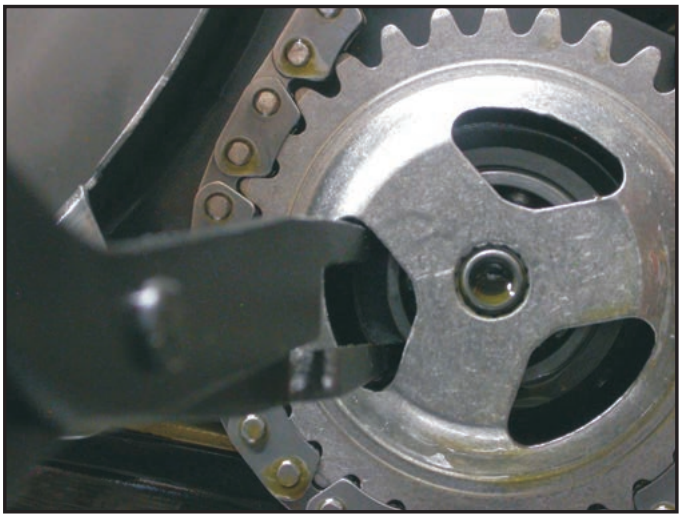


Figure 19

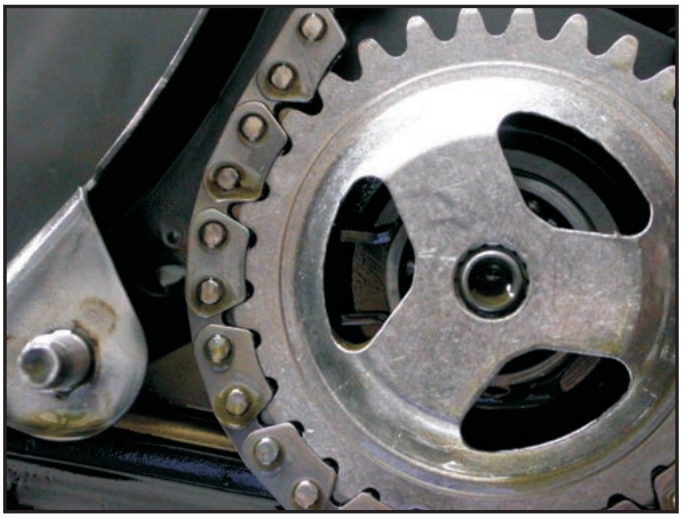


Figure 18

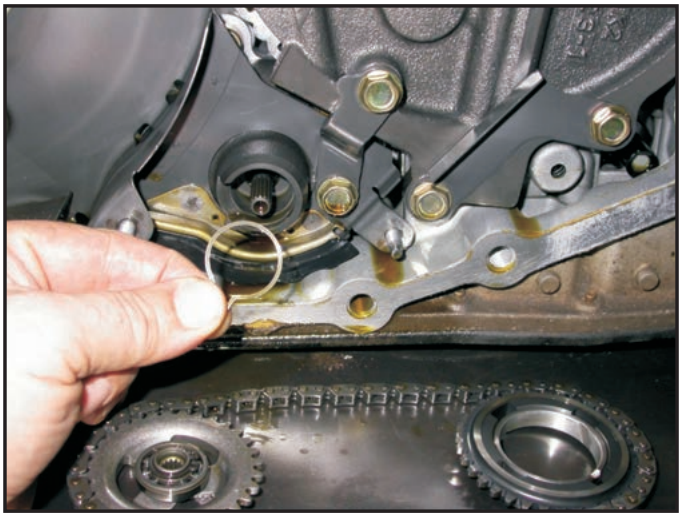


Figure 20

JF011-E CVT Unit Disassembly Procedures

19. Remove the three tang thrust washer from the stator support cover (figure 21).

20. Using a 12mm socket remove the oil pump chain baffle and cover bracket (figure 22).

21. Using a 10mm socket remove the Differential Baffle (figure 23). If the baffle rubber is hard, cracked or damaged in any way it will need to be replaced.

22. Using a 12mm socket, remove five stator support cover mounting bolts and remove the cover (figure 24).

23. Using a 10mm socket, remove the Detent Spring retaining bolt (figure 25).

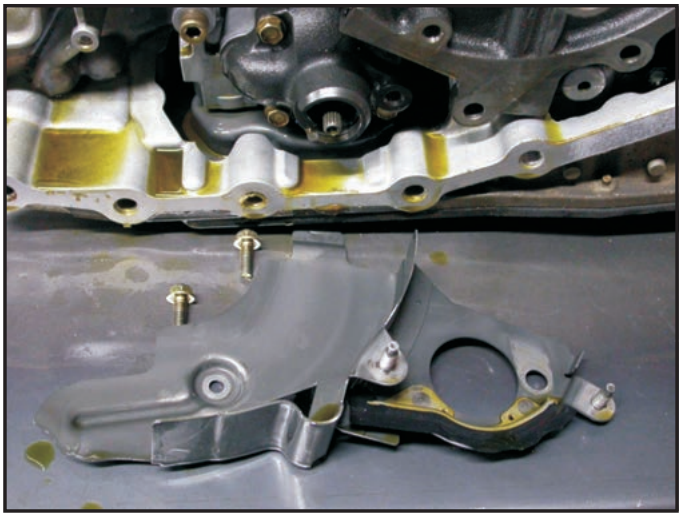


Figure 23

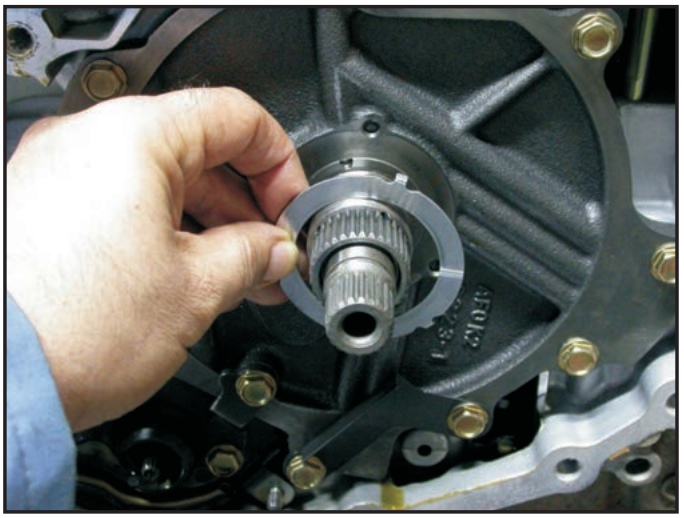


Figure 21

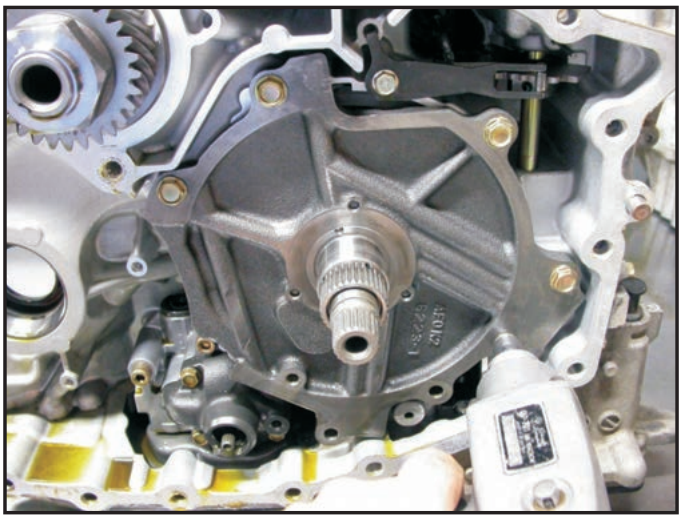


Figure 24

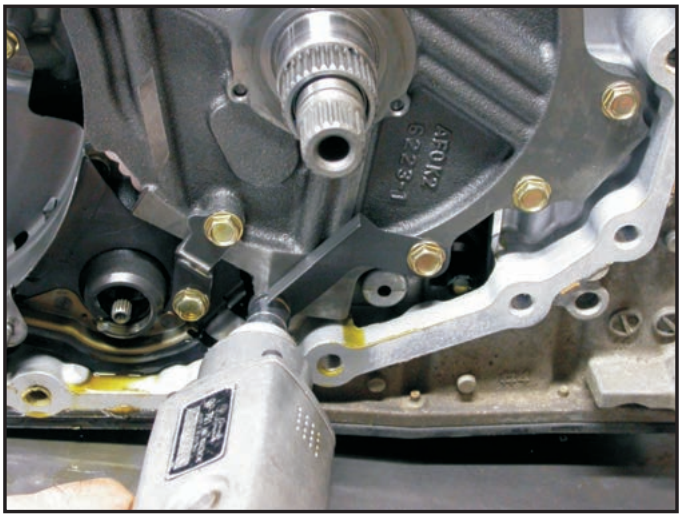


Figure 22

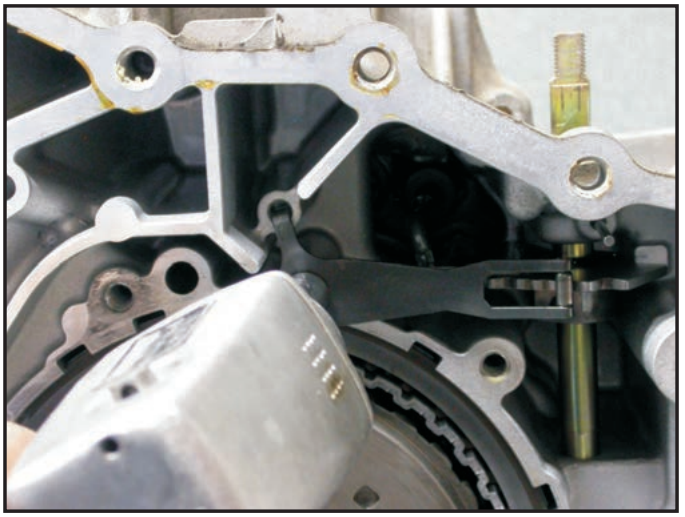


Figure 25

JF011-E CVT Unit Disassembly Procedures

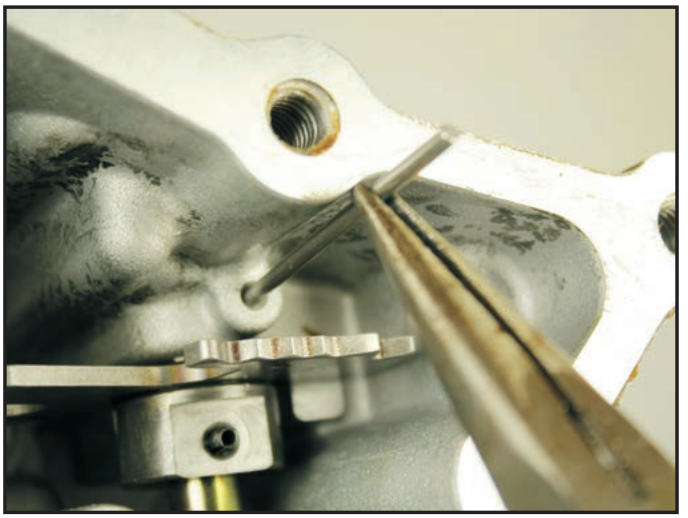


Figure 26

24. Using a magnet or needle nose pliers, remove the manual control shaft locating pin from the case (figure 26).

25. Using a pick, remove selective needle bearing # 1 from the forward drum assembly (figure 27).

26. Remove the forward drum assembly (figure 28).

27. Using a pick, remove needle bearing # 2 from the forward clutch hub and sun gear assembly (figure 29).

28. Remove the forward clutch hub and sun gear assembly (figure 30).

Figure 27

Figure 29

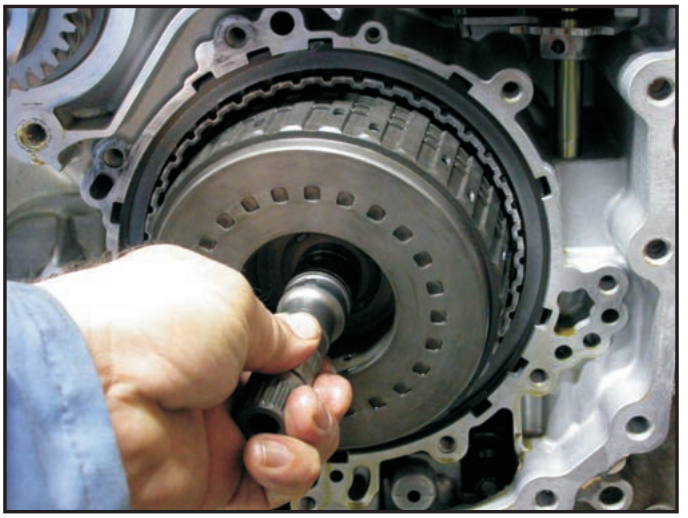


Figure 28

Figure 30

JF011-E CVT Unit Disassembly Procedures

29. Remove needle bearing # 3 from the reverse clutch hub and planet carrier assembly (figure 31).

30. Remove the reverse clutch hub and planet carrier assembly. The needle bearing # 4 is located on the back side and could come out with the assembly (figure 32).

32. Using a flat blade screwdriver, remove the Reverse Brake selective snap ring from the case along with the entire Reverse Brake assembly (figure 33).

33. A special tool is typically used to compress and remove the Reverse Brake return spring. Once compressed, a flat blade screw driver is used to remove the retaining snap ring from the case followed by the retainer plate. The tension on the return spring is light enough to be able to remove the snap ring without the special tool but it will be needed during installation (figure 34).

Special tool part numbers from Miller tool, Mitsubishi and CVT Pushbelt BV:

Miller Tool Compressor Part Numbers 5058A and 9875

Mitsubishi part numbers MB992139-01-1 and MB992139-01-2

CVT Pushbelt BV part number: TOUPRE0F10A (Shown in figure 34).

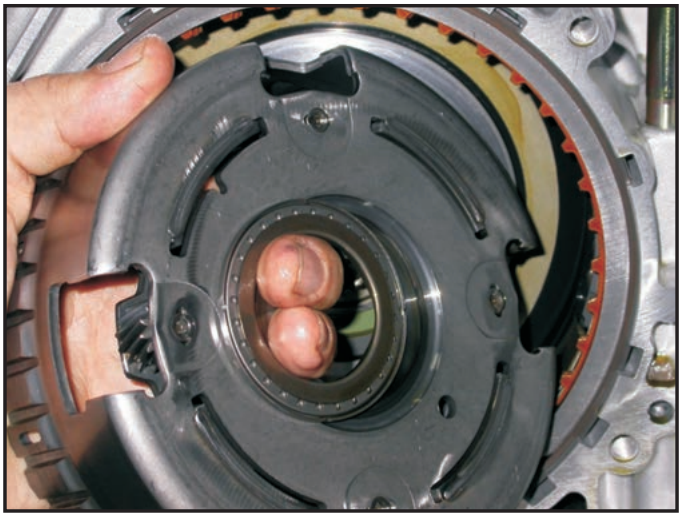


Figure 32

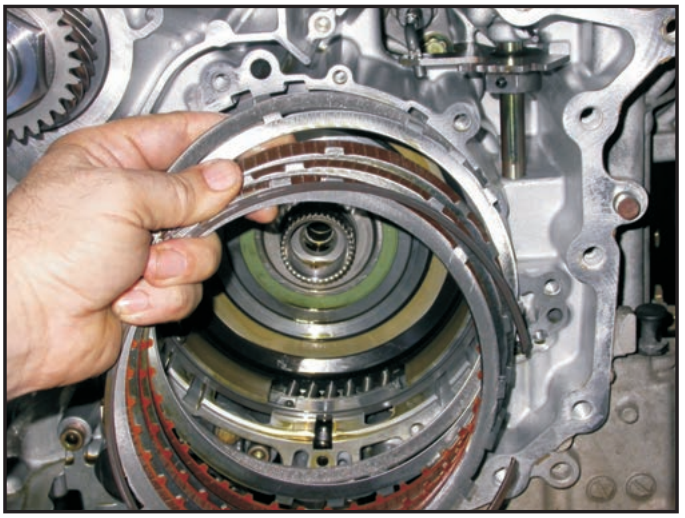


Figure 33

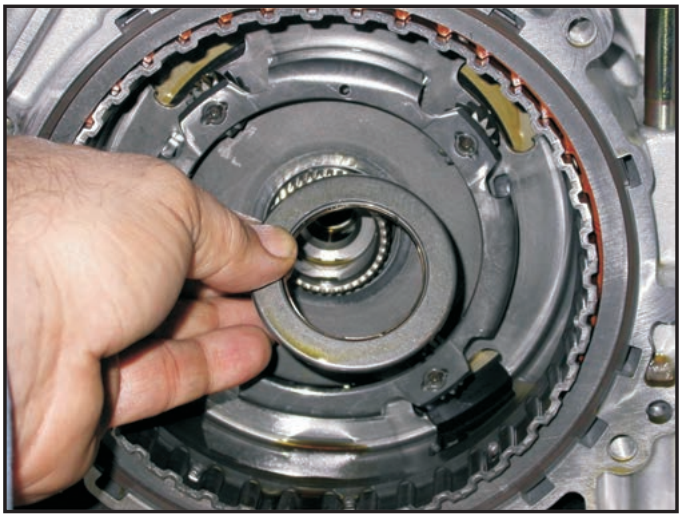


Figure 31

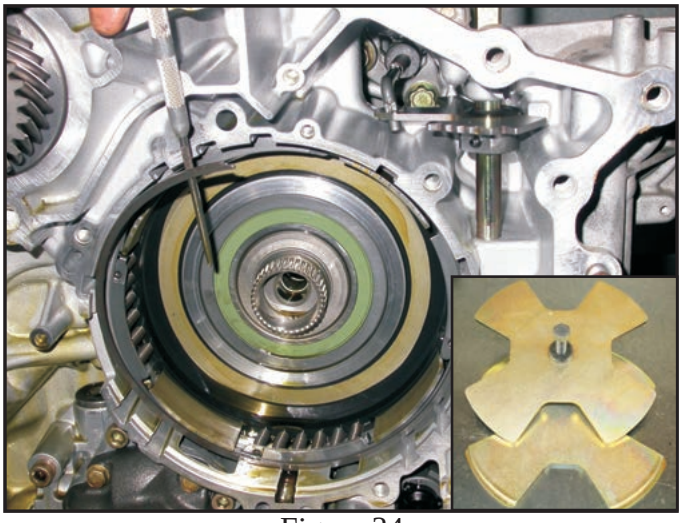


Figure 34

JF011-E CVT Unit Disassembly Procedures

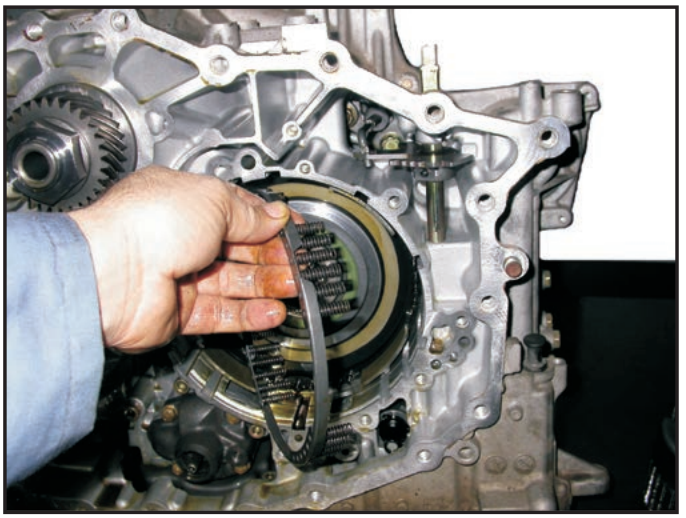


Figure 35

34. Remove the Reverse Brake Piston Return Spring assembly from the transmission (figure 35).

35. Using needle nose pliers remove the Reverse Brake molded piston from the case (figure 36).

36. Using a 10mm socket remove the 18 oil pan attaching bolts, then remove the pan (figure 37).

37. Using a 10mm socket remove the 3 oil strainer attaching bolts and then remove the oil strainer (figure 38).

38. Using a 14mm socket, remove the external oil pump mounting bolt with o-ring seal (figure 39).

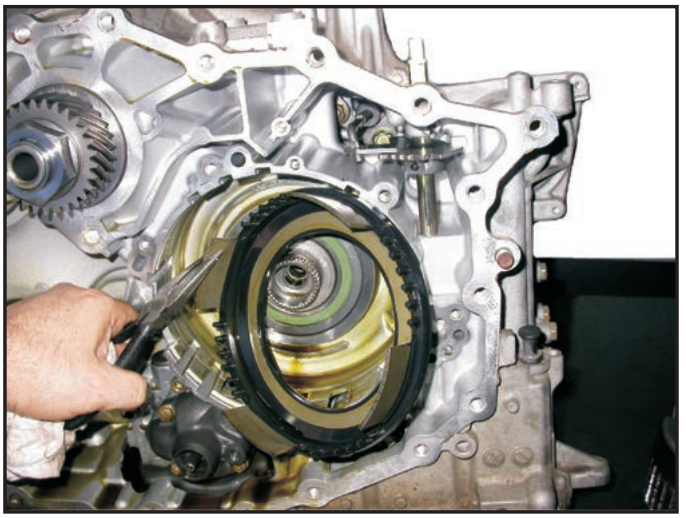


Figure 36

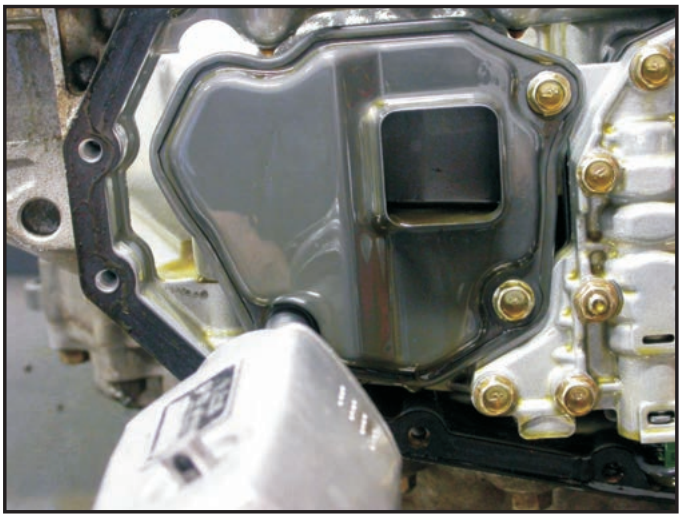


Figure 38

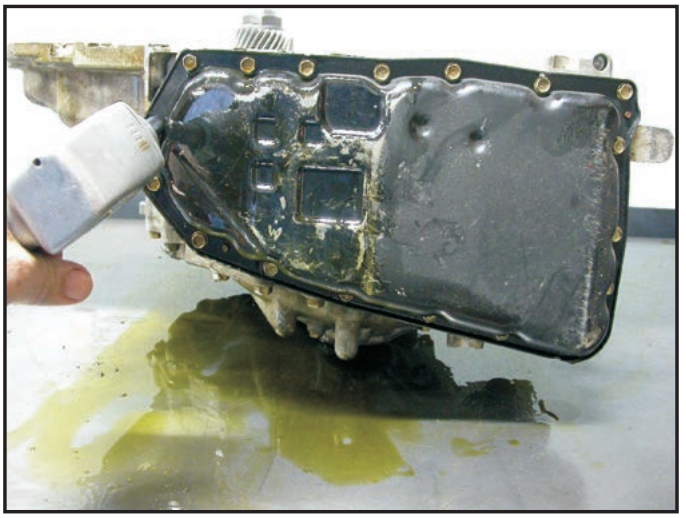


Figure 37

Figure 39

JF011-E CVT Unit Disassembly Procedures

39. Using a 6mm allen socket, remove the 3 internal oil pump mounting bolts (figure 40).

40. Remove the pump assembly from the transmission (figure 41).

41. Using a 10mm socket, remove the 2 oil strainer mounting brackets from the valve body and then remove the bracket (figure 42).

42 Using a 14mm socket, remove the nut and lock washer from the manual control shaft and remove the manual control valve lever (figures 43 and 44).

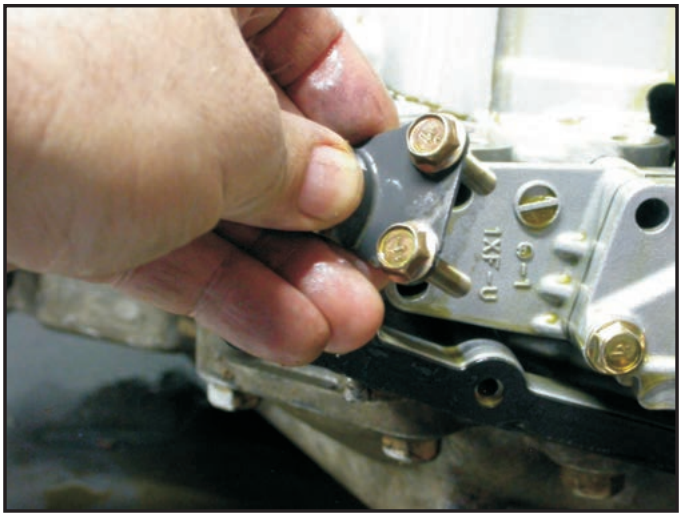


Figure 42

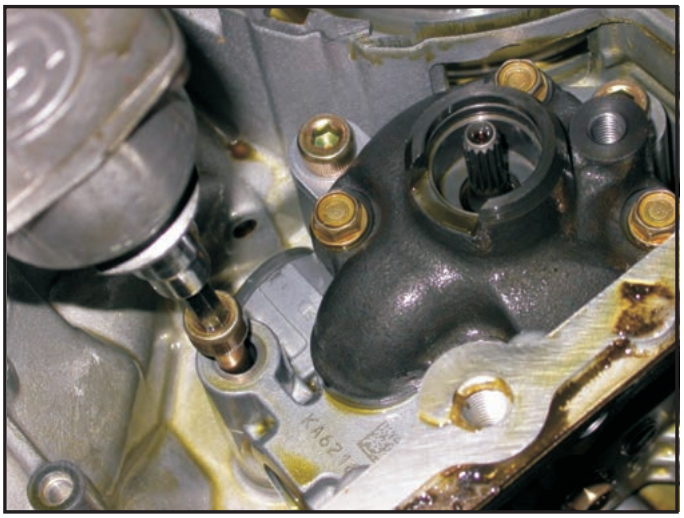


Figure 40

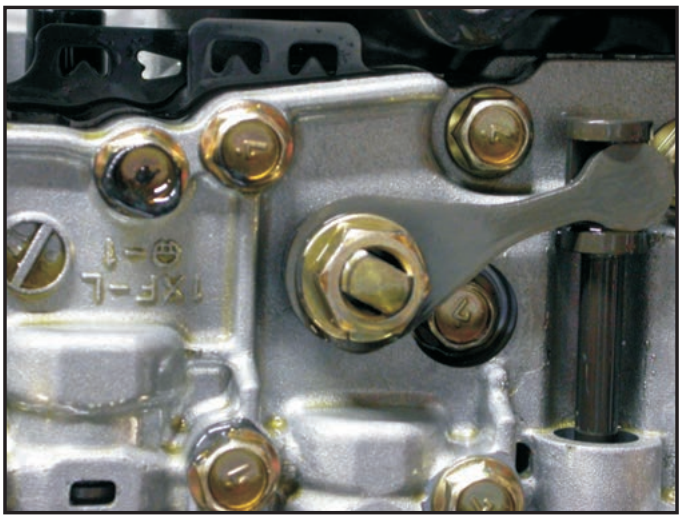


Figure 43

Figure 41

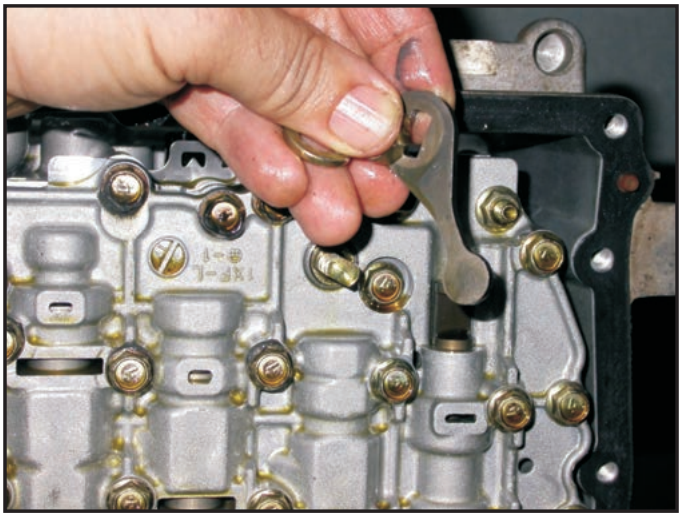


Figure 44

JF011-E CVT Unit Disassembly Procedures

Figure 45

43. Using a magnet, remove the manual control shaft sleeve from the valve body (figure 45).

44. Insert a 3mm diameter wire 126mm in length (5.0”) or equivalent into the retaining pin hole in the valve body next to the harness hold down bracket. This will retain the spring loaded ratio control valve in position when removing the valve body (figure 46).

45. Using a 10mm socket, remove 11 valve body attaching bolts (figure 47).

46. Carefully push the harness connector into the case (figure 48).

47. Remove the valve body assembly (figure 49).

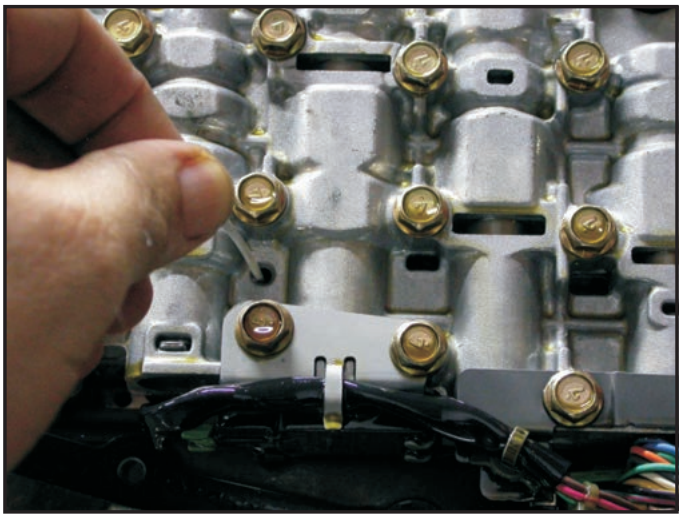


Figure 46

Figure 48

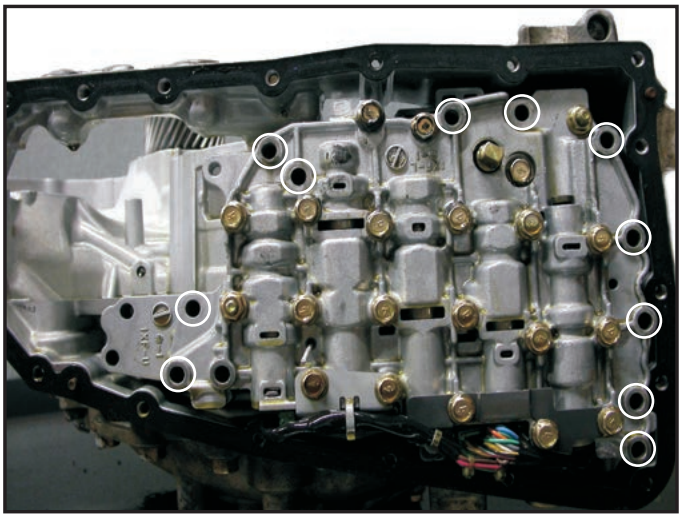


Figure 47

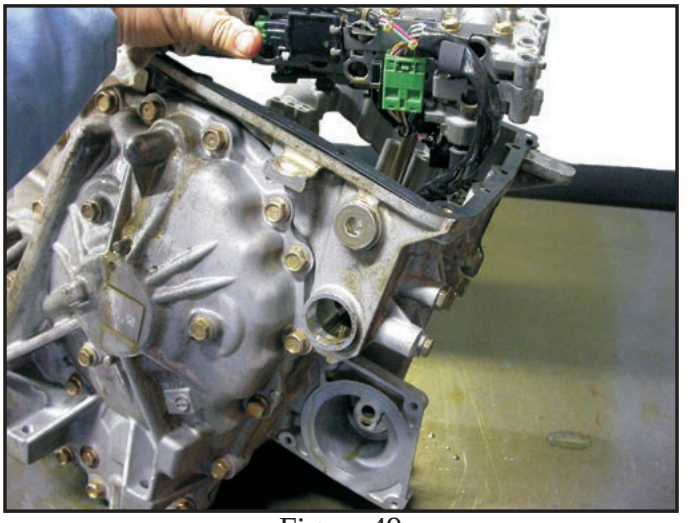


Figure 49

JF011-E CVT Unit Disassembly Procedures

48. As the valve body is being lifted off of the main case, the retaining wire should be holding the ratio control valve in place (figure 50).

49. An alternative valve body removal procedure would be to leave the pass through connector in the case. Open the brackets and unplug the main wiring harness from the upper valve body harness and ROM assembly (figure 51).

50. Insert the wire or equivalent into the retaining pin hole as seen in figure 52.

51. Remove the 11 valve body attaching bolts (figure 53) and remove the valve body assembly (figure 54).

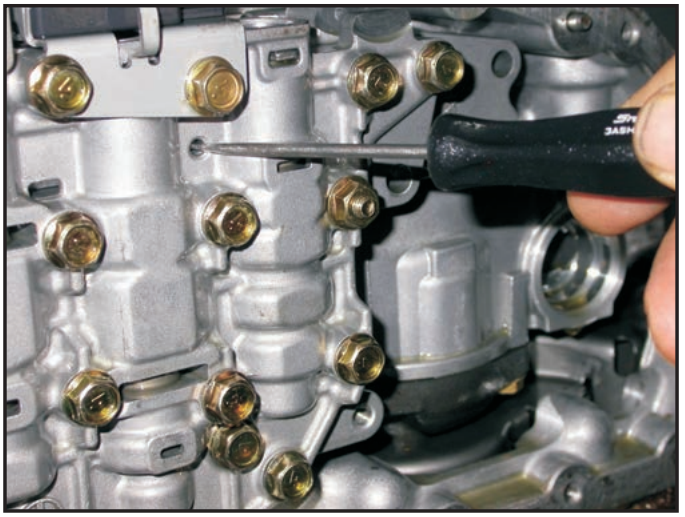


Figure 52

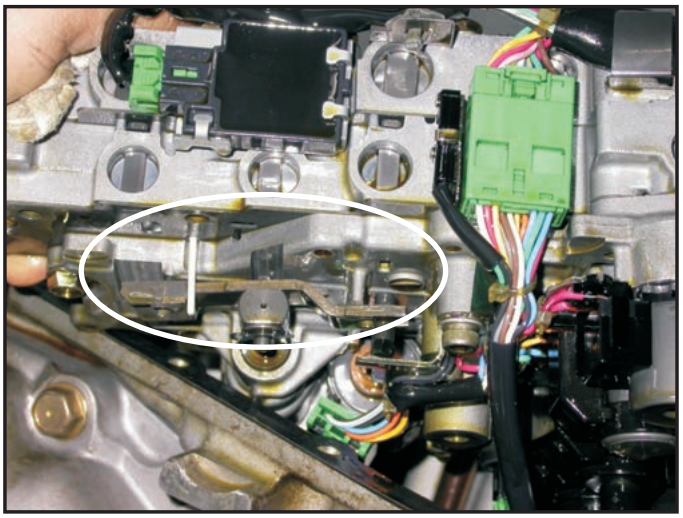


Figure 50

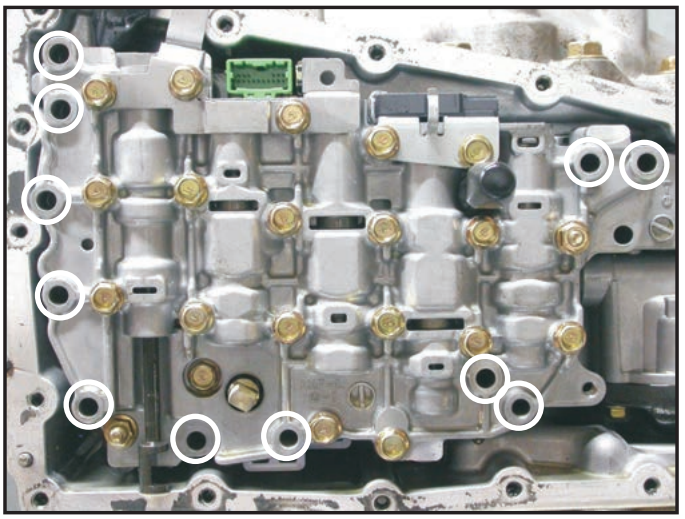


Figure 53

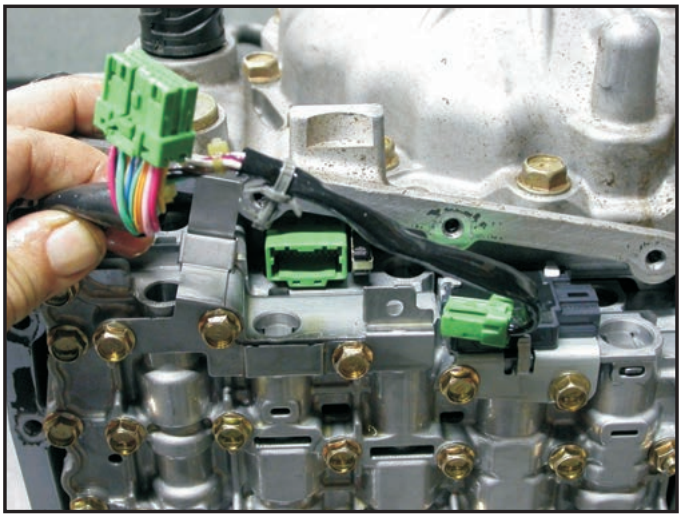


Figure 51

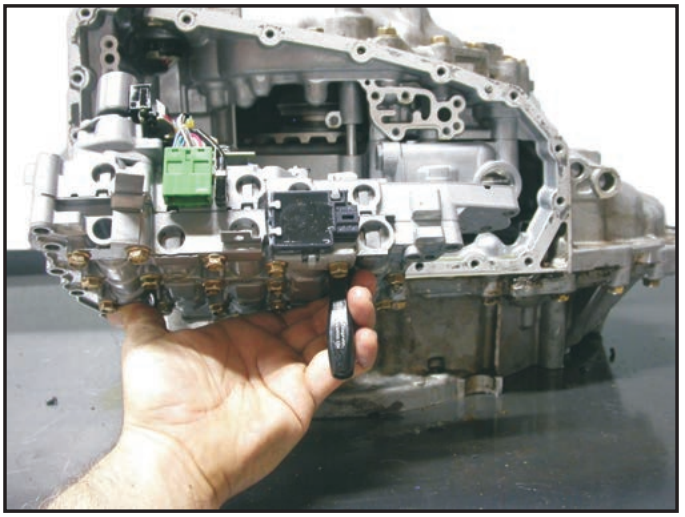


Figure 54

JF011-E CVT Unit Disassembly Procedures

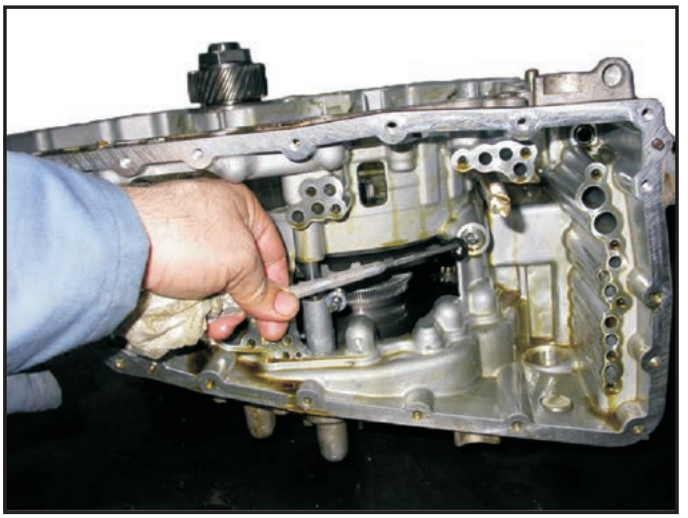


Figure 55

52. Remove the valve body to case o-ring (figure 55) and the high pressure pump to case seal (figure 56).

53. Using a 14mm socket, remove 19 perimeter side cover to case bolts. The two at the bottom are longer in length and are identified with a dimple mark in the hex head of the bolt (figure 57).

54. Using a deadblow hammer or equivalent, tap the side cover loose and carefully remove the side cover and Variator assembly from the case (figure 58).

55. Carefully remove the spring loaded pulley follower assembly from the side cover by first removing the long pin, then the follower and spring (figure 59).

Figure 56

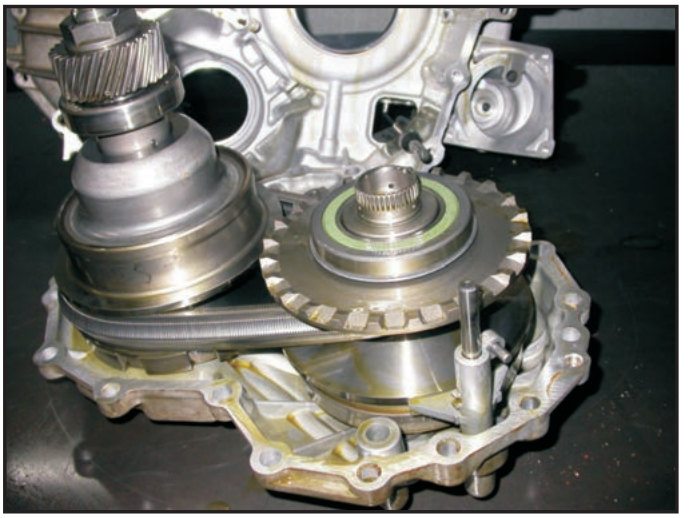


Figure 58

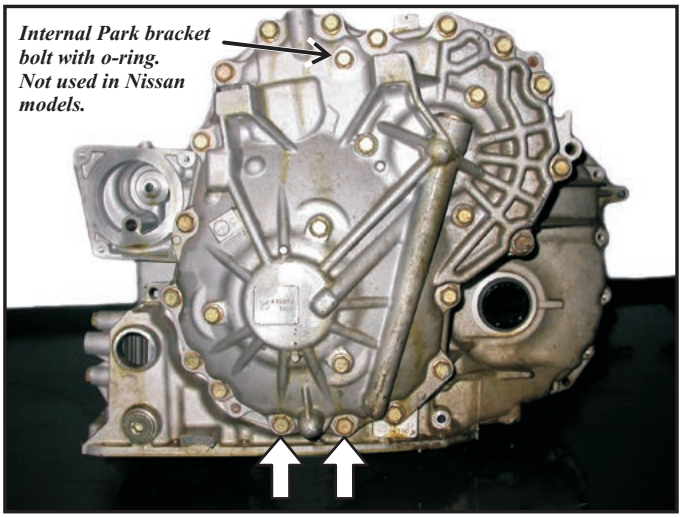


Figure 57

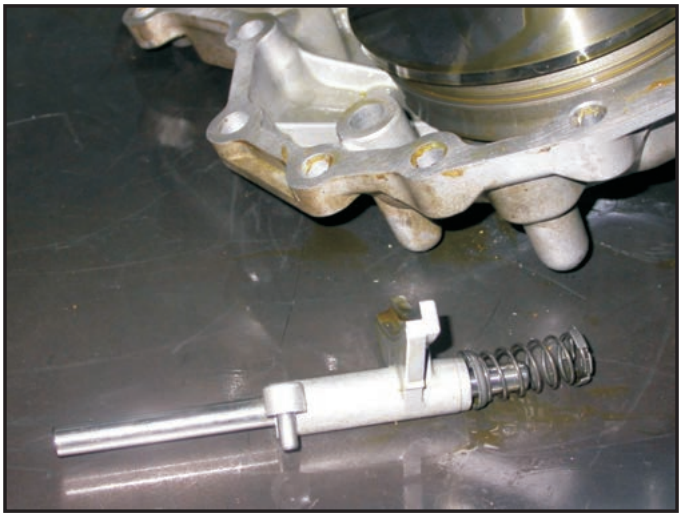


Figure 59

Valve Body Servicing

1.Carefully remove the 3mm wire and the ratio control valve and spring from the valve body (figure 1).

2. Remove the manual valve (figure 2).

3. If the main harness came with the valve body, unplug the side connector. Then remove five mounting bolts using a 10mm socket (figure 3) and lift the main harness with ROM from the valve body (figure 4).

4. Flip the valve body over and unplug the Primary and Secondary Pressure Sensors. Mitsubishi eliminated the use of the Secondary Pressure Sensor in 2010 (figure 5).

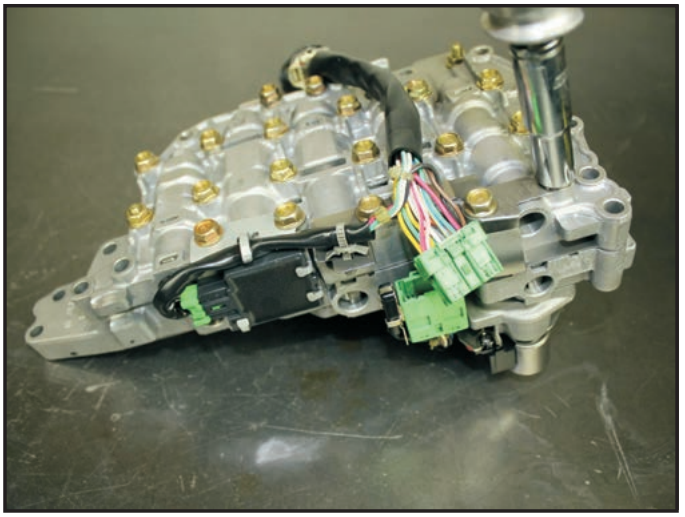


Figure 3

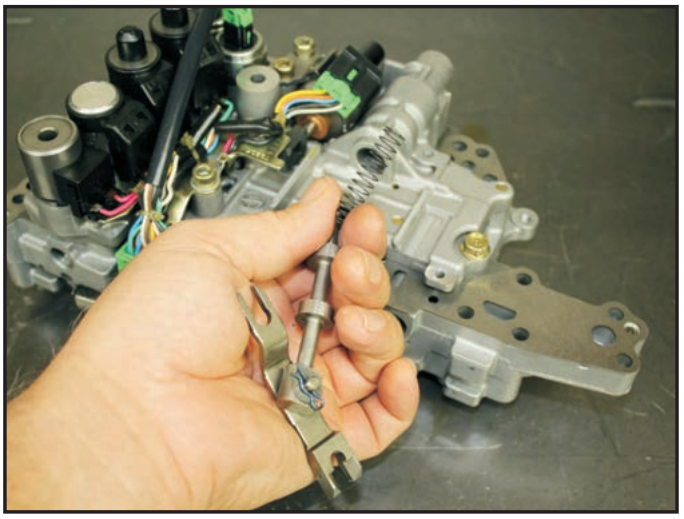


Figure 1

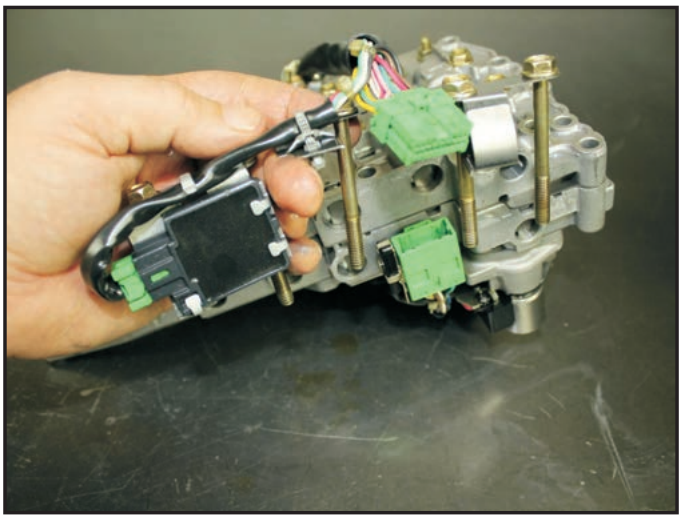


Figure 4

Figure 2

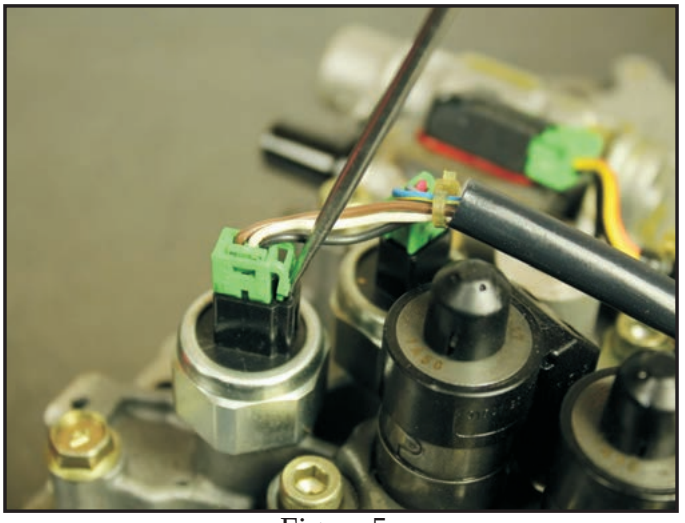


Figure 5

Valve Body Servicing

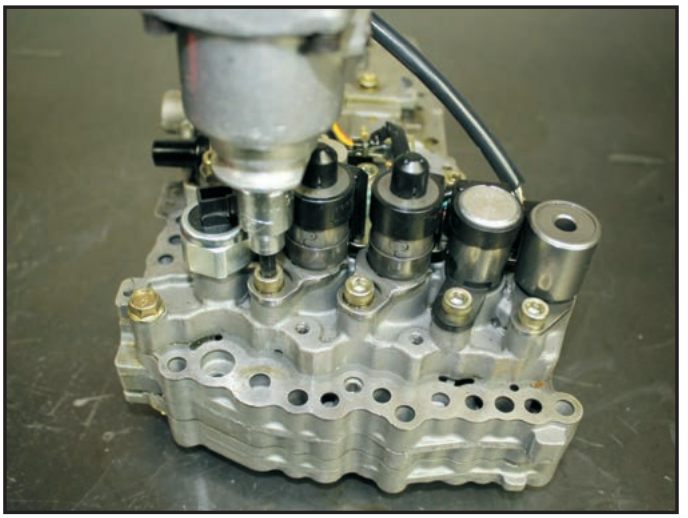


Figure 6

5. Using a 5mm Allen socket, remove eight solenoid and stepper motor hold down bolts (figure 6).

6. With a straight pick, lift each of the solenoids out of their ports (figure 7) and remove the solenoid and harness assembly from the valve body (figure 8).

7. Using a 10mm socket, remove fourteen lower to upper valve body clamping bolts only (figure 9). Do not remove the two bolts with nuts at this time.

8. Flip the valve body over and remove the remaining bolts and nuts using a 10mm wrench and socket (figure 10).

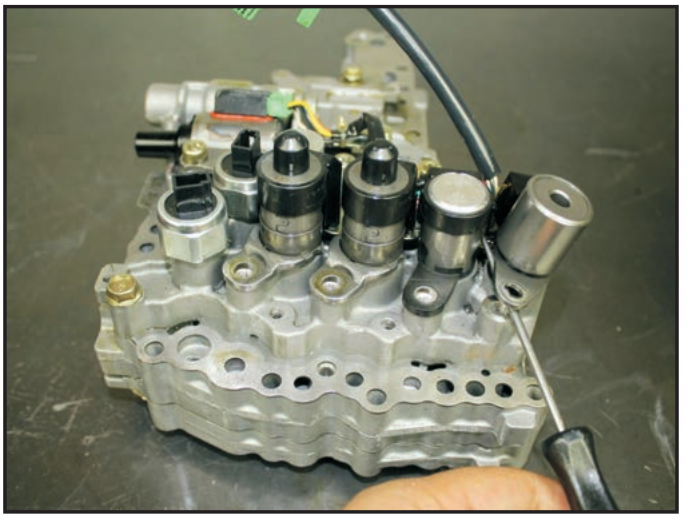


Figure 7

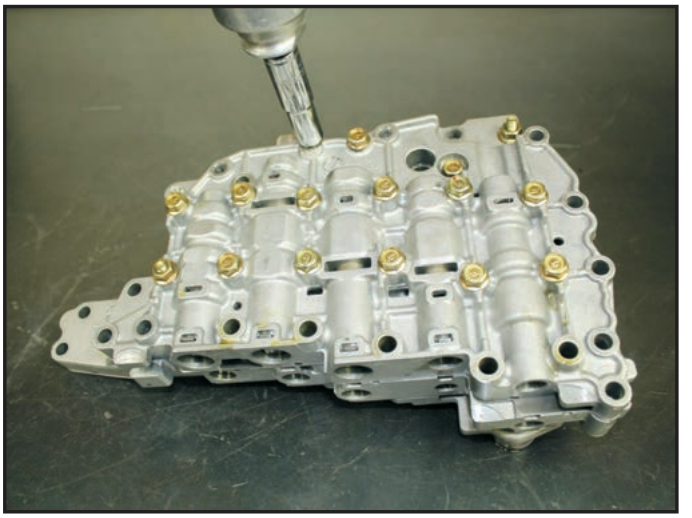


Figure 9

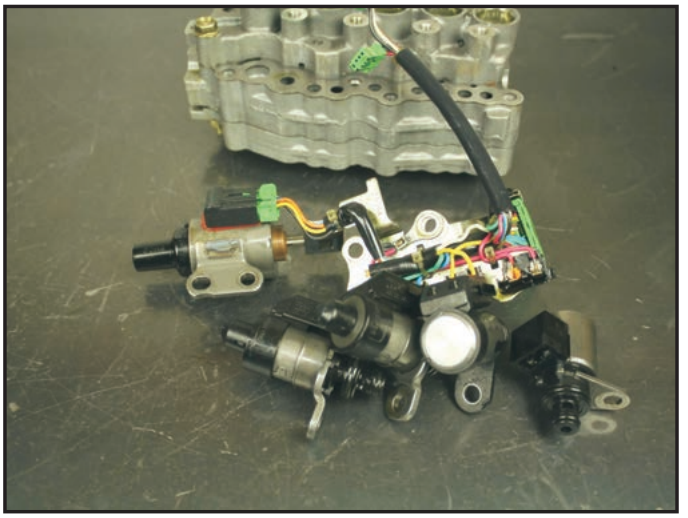


Figure 8

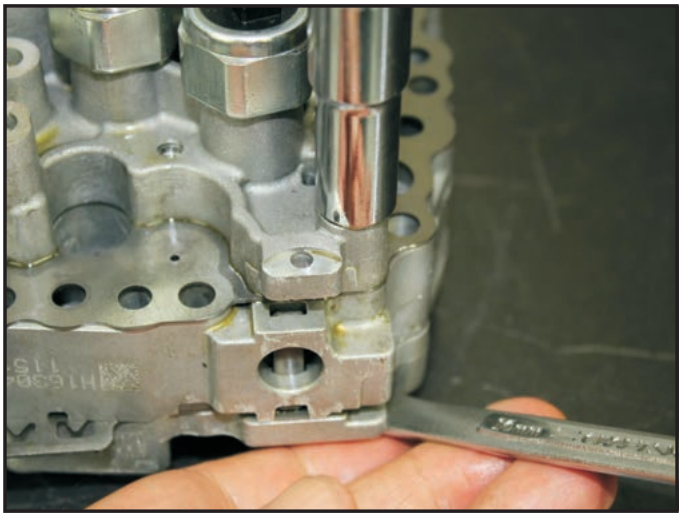


Figure 10

Valve Body Servicing

9. While holding the lower spacer plate to the lower valve body, use a straight pick to carefully lift them together from the middle valve body (figure 11).

10. Using a pencil magnet, remove four 6.35 mm (0.250 in.) steel balls from the middle valve body (figure 12).

11. Using a straight pick, carefully lift out filter # 1 (figure 13).

12. Using needle nose pliers carefully lift out filter # 2 (figure 14).

13. Remove the relief valve and spring from the valve body (figure 15).

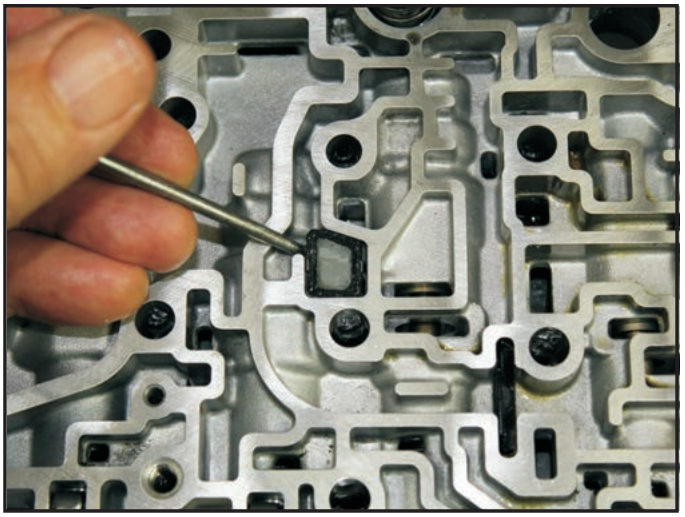


Figure 13

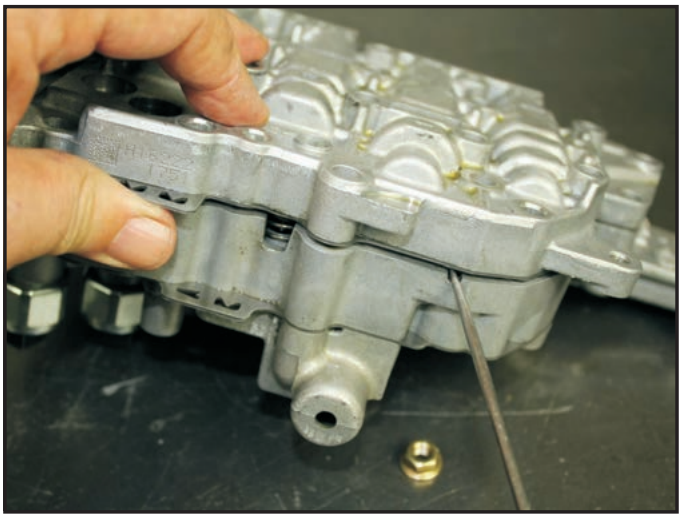


Figure 11

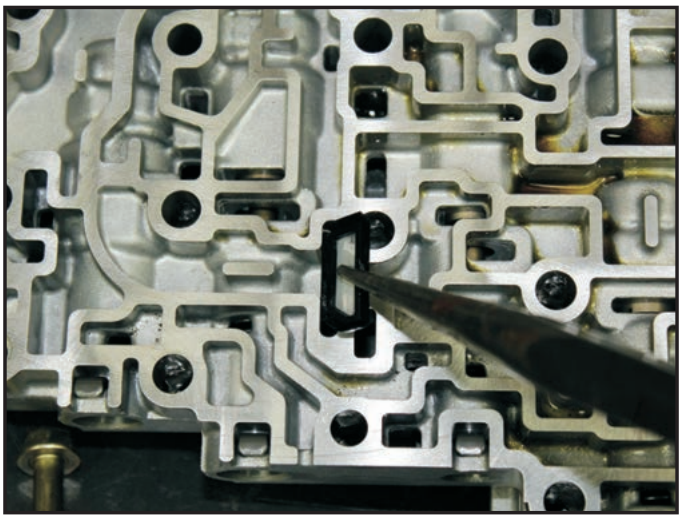


Figure 14

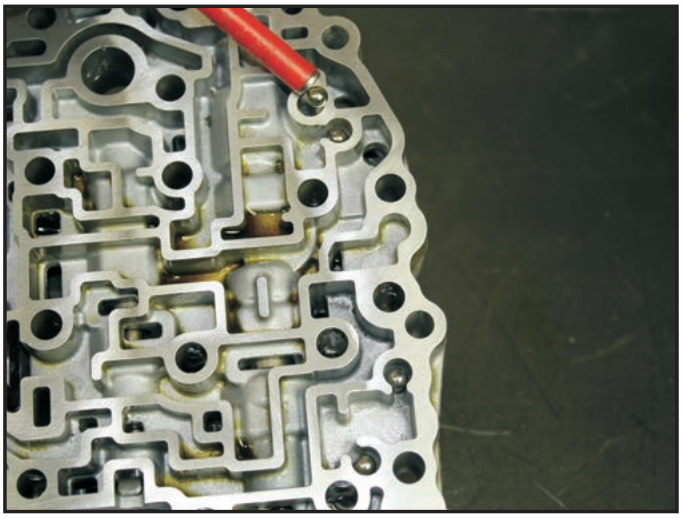


Figure 12

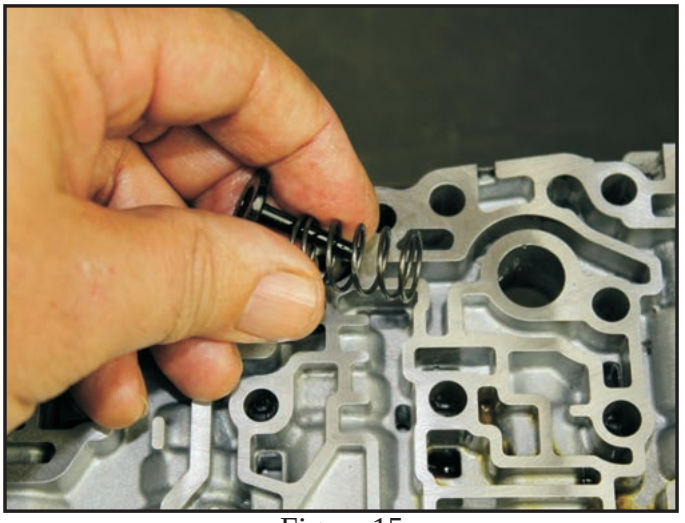


Figure 15

Valve Body Servicing

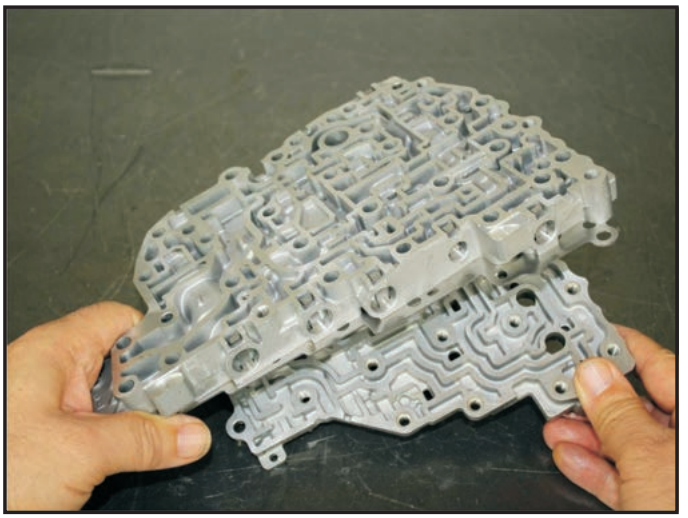


Figure 16

14. Separate the middle valve body and upper spacer plate from the upper valve body (figure 16).

15. Flip the middle valve body with the spacer plate facing up (figure 17). Lift the upper spacer plate off of the middle valve body. Locate and remove the basket filter snapped into the spacer plate (figure 18).

16. Clean all valve body sections and spacer plates. It may be necessary to remove each valve for a more thorough cleaning and inspection (figure 19).

17. Although most of the valves are anodized aluminum (figure 20), they are still prone to wear as well as its bore.

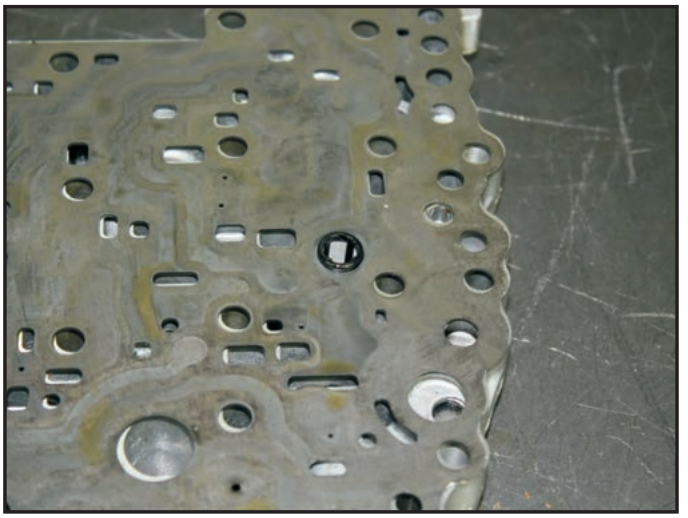


Figure 17

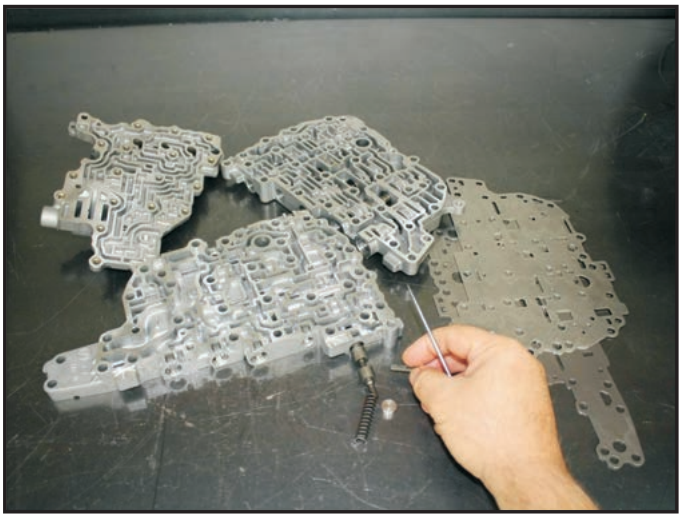


Figure 19

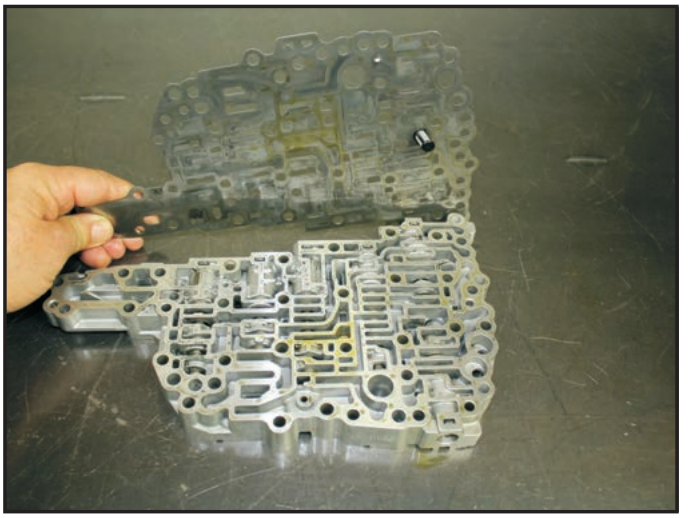
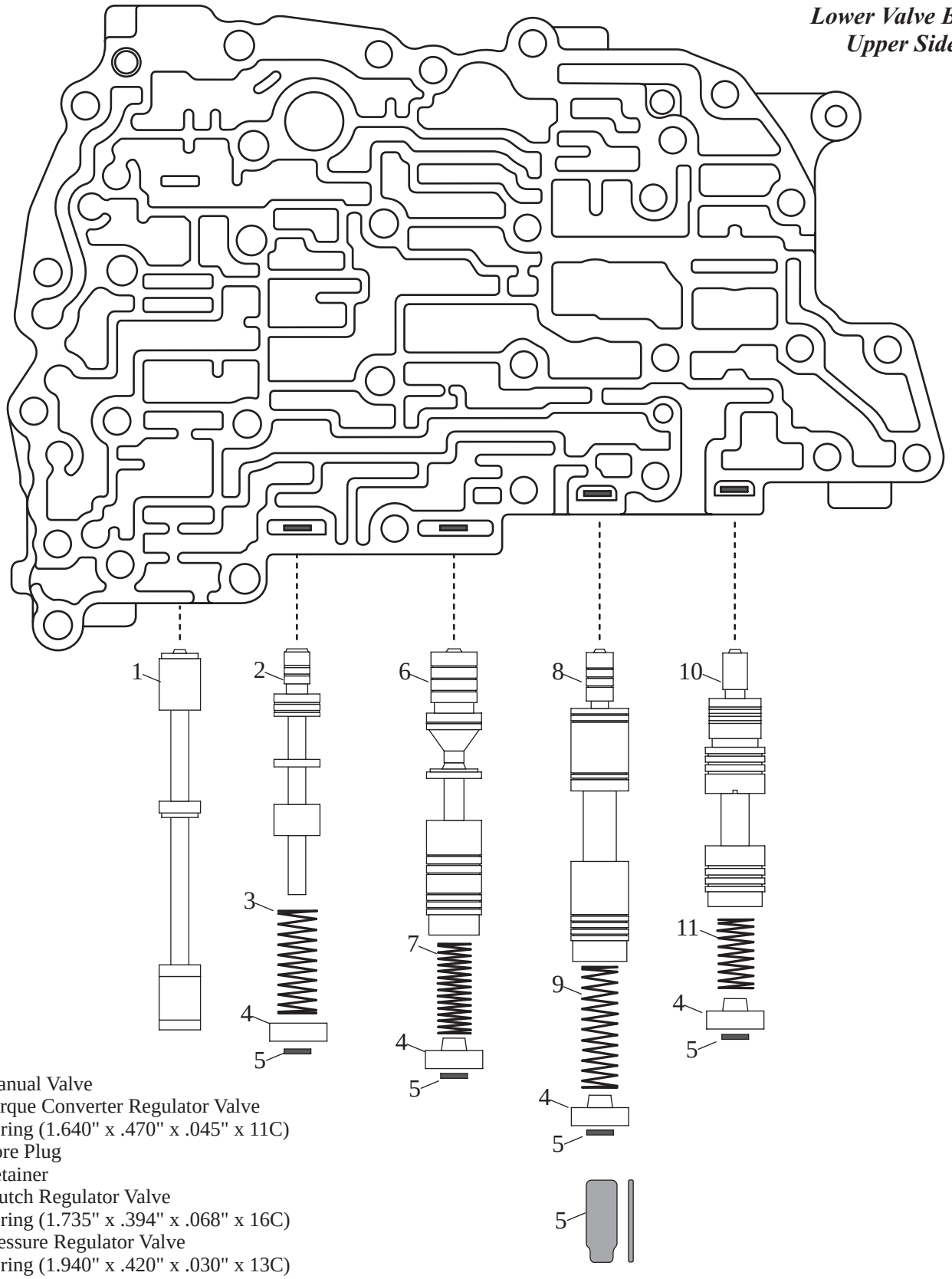


Figure 18

Figure 20



1. Manual Valve
2. Torque Converter Regulator Valve
3. Spring (1.640" x .470" x .045" x 11C)
4. Bore Plug
5. Retainer
6. Clutch Regulator Valve
7. Spring (1.735" x .394" x .068" x 16C)
8. Pressure Regulator Valve
9. Spring (1.940" x .420" x .030" x 13C)
10. Secondary Pressure Regulator Valve
11. Spring (1.100" x .427" x .030" x 10C)

Figure 21

1. Secondary Control Valve
2. Spring (0.827" x .464" x .030" x 6C)
3. Bore Plug
4. Retainer
5. Line Pressure Control Valve
6. Spring (0.920" x .304" x .022" x 8.5C)
7. Lube Relief Valve
8. Spring (0.932" x .558" x .043" x 6C)
9. Lock-up Control Valve
10. Spring (1.273" x .476" x .039" x 9C)
11. Plunger
12. Sleeve
13. Select Switch Valve
14. Spring (0.902" x .336" x .031" x 9C)
15. Spring (1.697" x .424" x .055" x 13.5C)
16. Pilot Valve
17. Select Control Valve
18. Spring (1.559" x .384" x .042" x 13C)
19. Two Steel (0.250") Rev. Eng. Control Balls
20. Two Steel (0.250") Drive Eng. Control Balls

Middle Valve Body
Upper Side

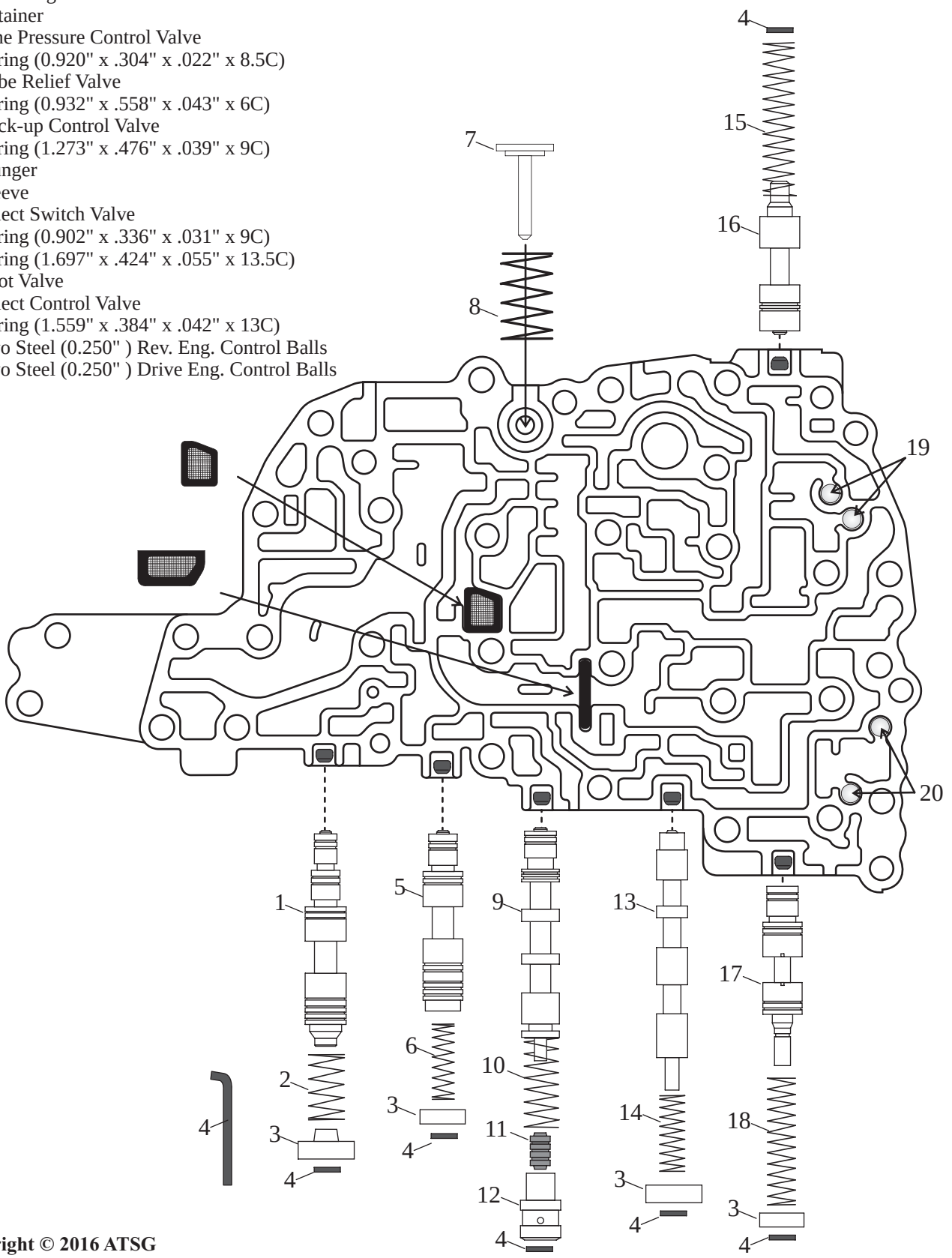
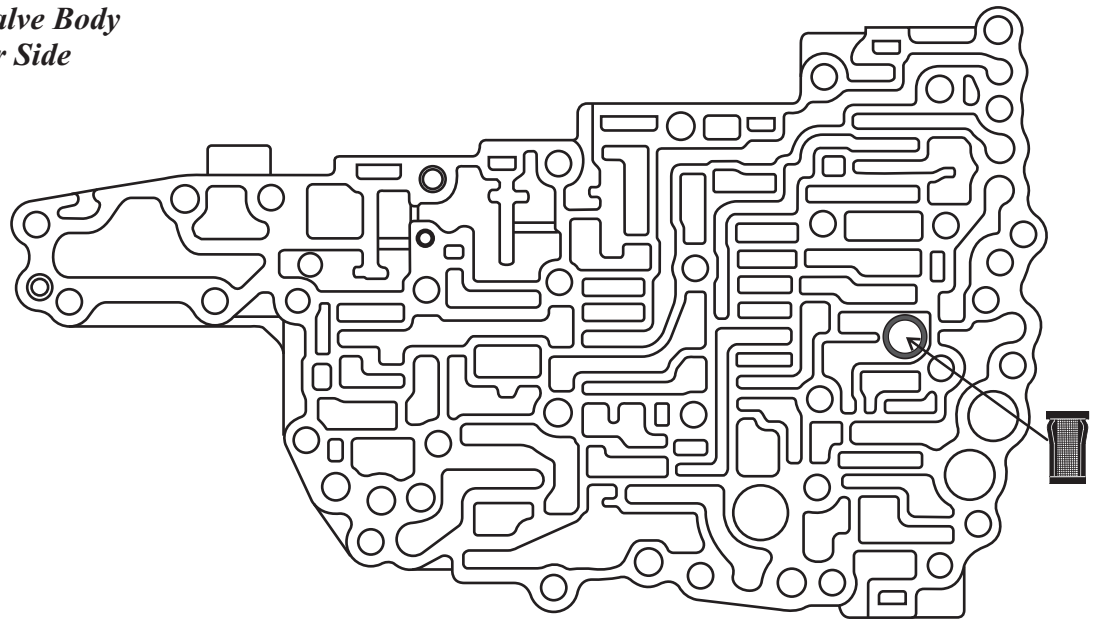
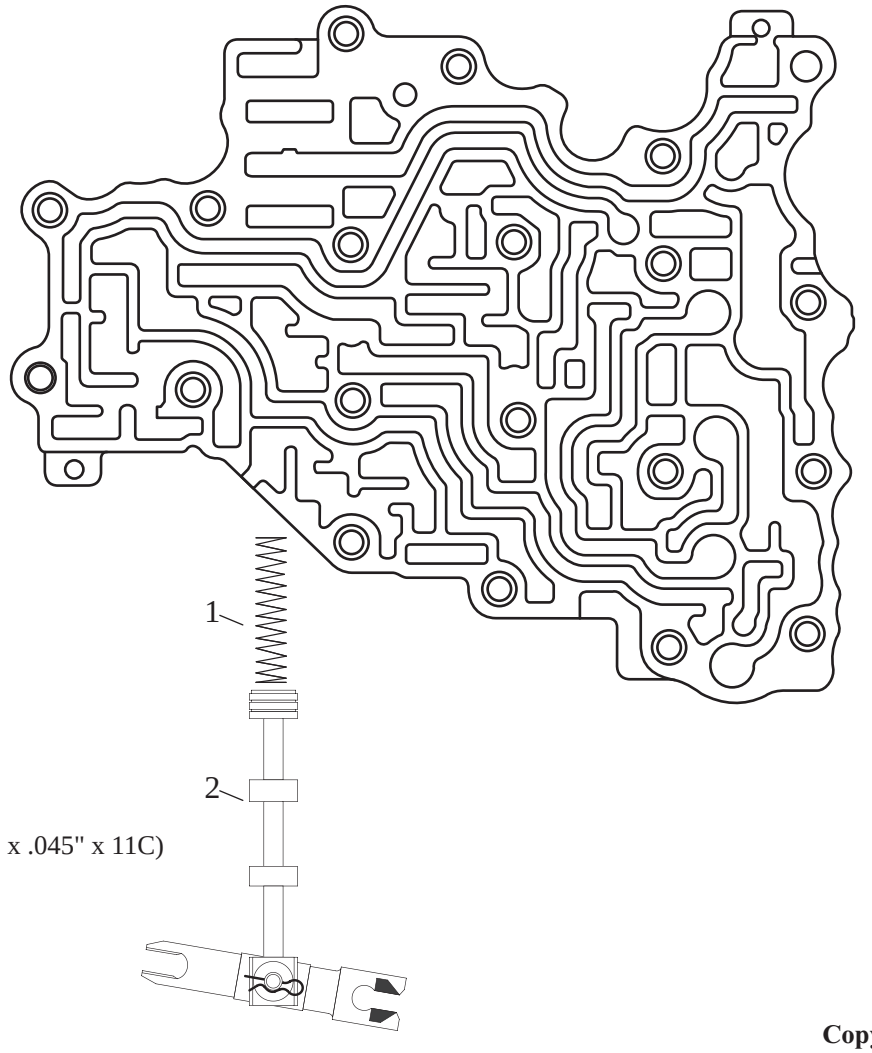


Figure 22

Middle Valve Body
Lower Side



Lower Valve Body
Lower Side



1. Spring (1.640" x .470" x .045" x 11C)
2. Ratio Control Valve

Figure 23

VALVE FUNCTION

Manual Valve:
Depending on shift lever position, directs pressure from the Select Control Valve to the Forward or Reverse Clutch.

Torque Converter Regulator Valve:
Regulates the supply pressure to the transaxle cooling and lubrication circuits during torque converter lock-up operation.

Clutch Regulator Valve:
Regulates torque converter operating pressure.

Pressure Regulator Valve:
Regulates the discharge pressure from the oil pump to optimal pulley clamping pressure for all driving conditions.

Secondary Pressure Regulator Valve:
Controls clamping pressure to the Secondary Pulley.

Secondary Control Valve:
Supplies control pressure to the Secondary Pressure Regulator Valve

Line Pressure Control Valve:
Regulates normal (non-pulley clamping) line pressure.

Lock-Up Control Valve:
Directs line pressure to the apply or release side of the lock-up torque converter.

Select Switch Valve:
Depending on its position, directs Lock-up Solenoid Valve pressure to the Select Control Valve or the Lock-up Control Valve. When Lock-up Solenoid Valve pressure is applied to the Select Control Valve, line pressure to the Forward Clutch or Reverse Clutch is reduced to provide smooth gear engagement from Park or Neutral. When Lock-up Solenoid Valve pressure is being directed to the Lock-up Control Valve, the Select Switch Valve provides normal line pressure to the Forward or Reverse Clutch.

Select Control Valve:
Reduces line pressure to the Forward or Reverse Clutch during gear selection to ensure smooth engagements.

Pilot Valve:
Controls feed pressure to all the solenoids.

Ratio Control Valve:
Controls in/out flow of line pressure to/from the Primary Pulley based on the stroke difference between the stepper motor and primary pulley position.

Figure 24

Valve Body Servicing

18. After the valve body has been cleansed and inspected and is ready to be reassembled (figure 25), with lower side of the middle valve body facing up, install four 6.35mm (0.250 in.) steel balls in the locations identified by the arrows in figure 26.

19. Install the Relief Valve and Spring into the middle valve body as seen in figure 27.

20. Install a new filter # 1 into the valve body pocket as seen in figure 28 and a new filter # 2 in the casting slot shown in figure 29.

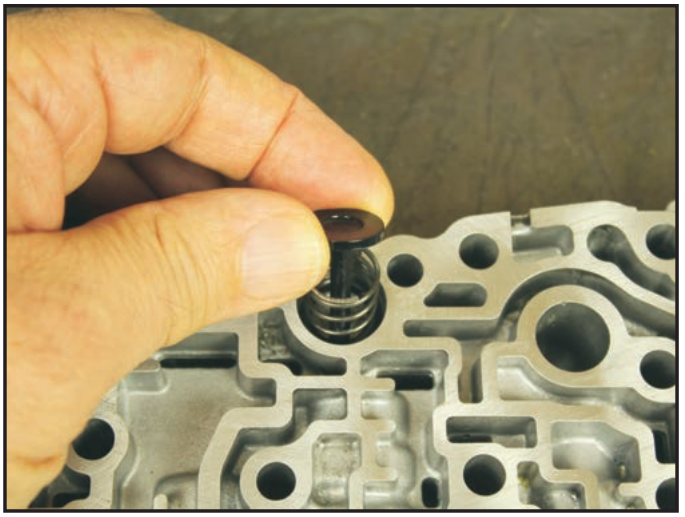


Figure 27

Figure 25

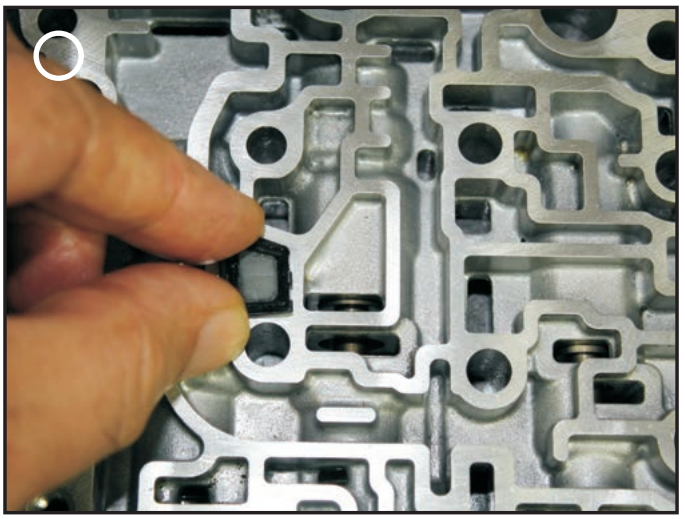


Figure 28

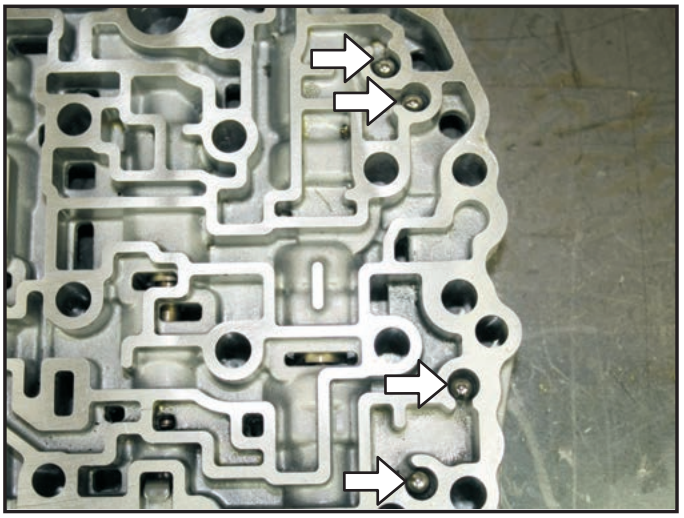


Figure 26

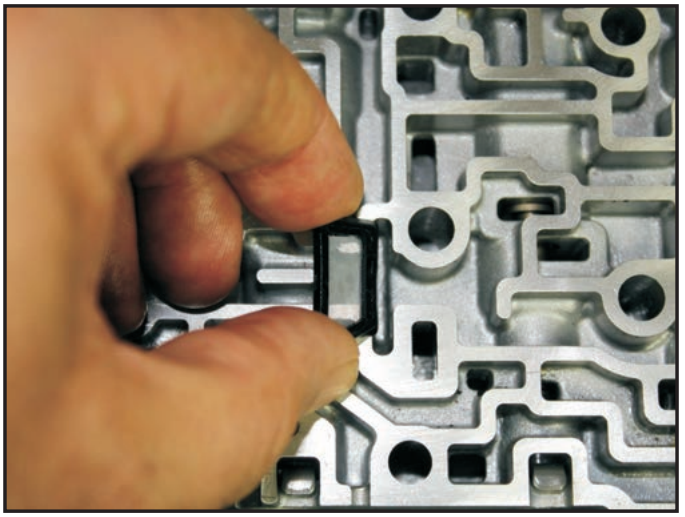


Figure 29

Valve Body Servicing

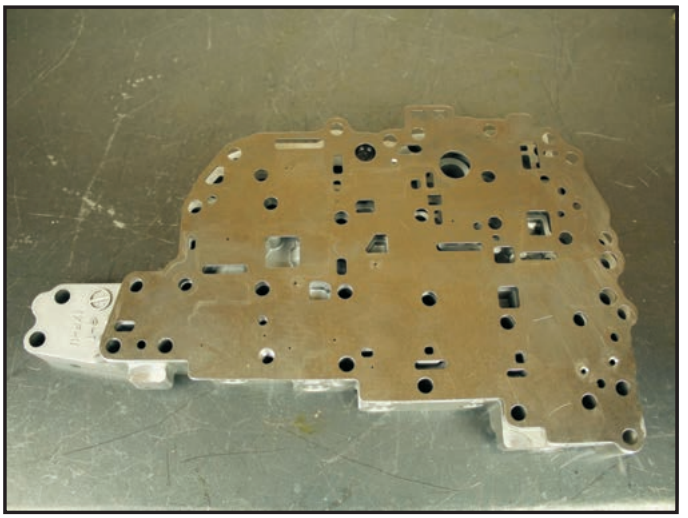


Figure 30

21. Place the lower spacer plate onto the middle valve body lower side (figure 30).

22. Place the lower valve body onto the middle valve body lower side (figure 31).

23. Flip the lower and middle valve body so it is face up (figure 32).

24. Install a new basket filter into the valve body as shown in figure 33.

25. Place the upper valve body onto the middle valve body and upper spacer plate (figure 34).

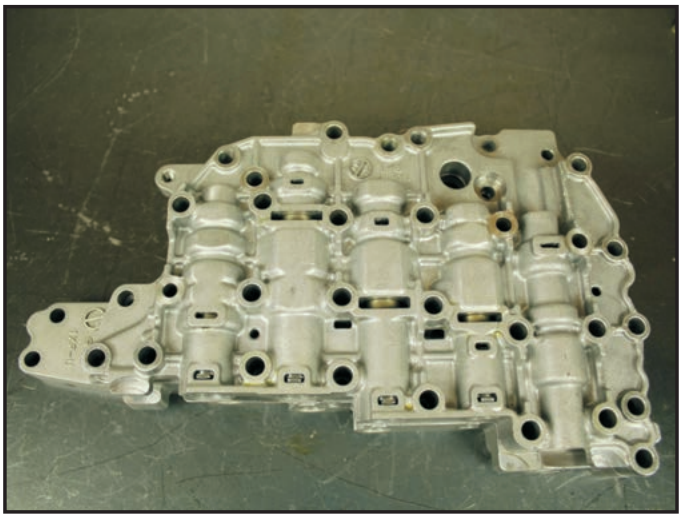


Figure 31

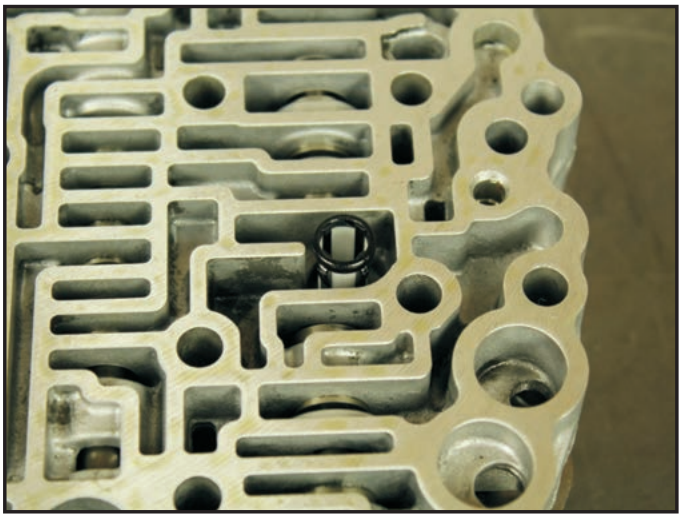


Figure 33

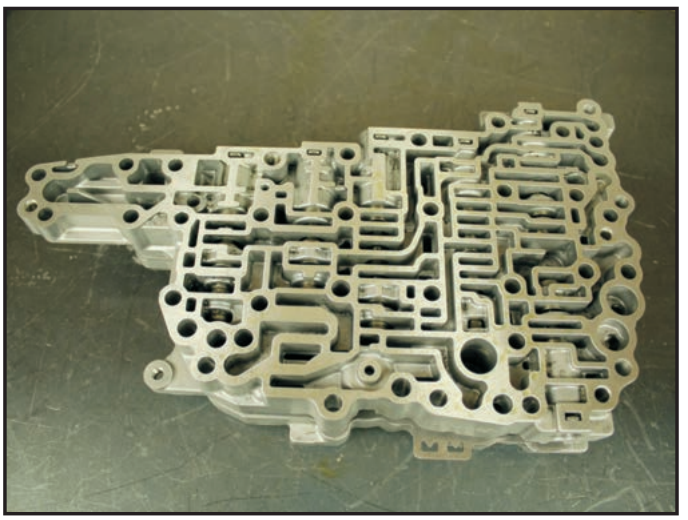


Figure 32

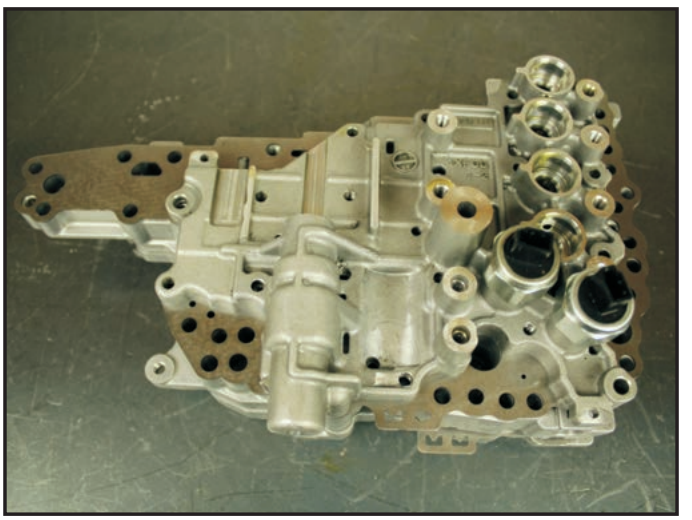


Figure 34

Valve Body Servicing

26. Locate the alignment bolts and nuts as seen in figure 35.

27. Install the alignment bolts in the locations shown in figure 36 with the head of the bolts being on the upper side of the valve body assembly.

28. Hold the assembly together with one hand and finger tighten the nut with the other (figure 37).

29. Install the short 44mm (1.732 in.) length bolt finger tight as seen in figure 38.

30. Install two 51mm (2.000 in.) length bolts finger tight as seen in figure 39.

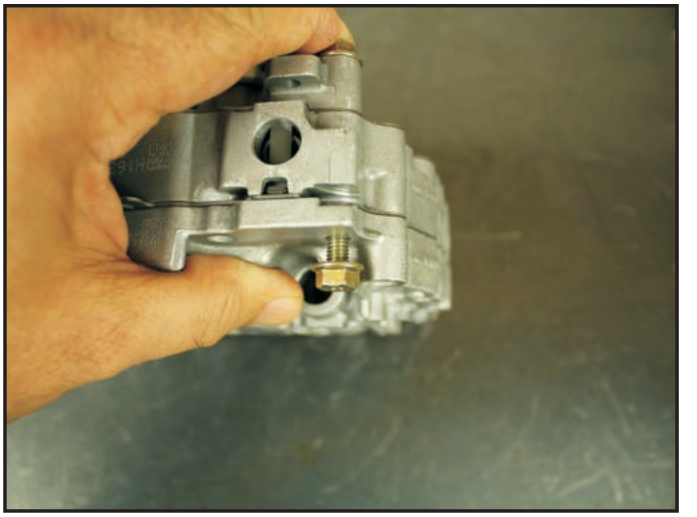


Figure 37

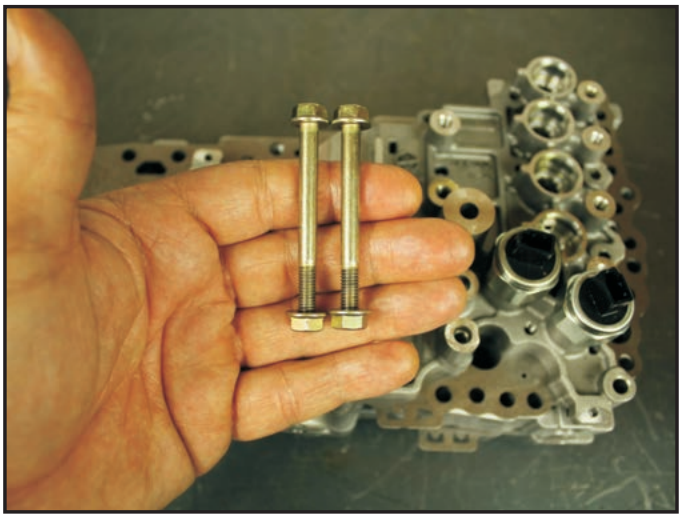


Figure 35

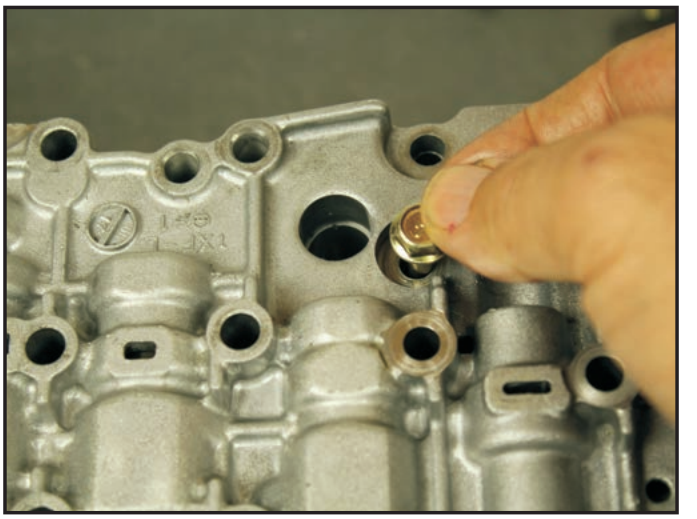


Figure 38

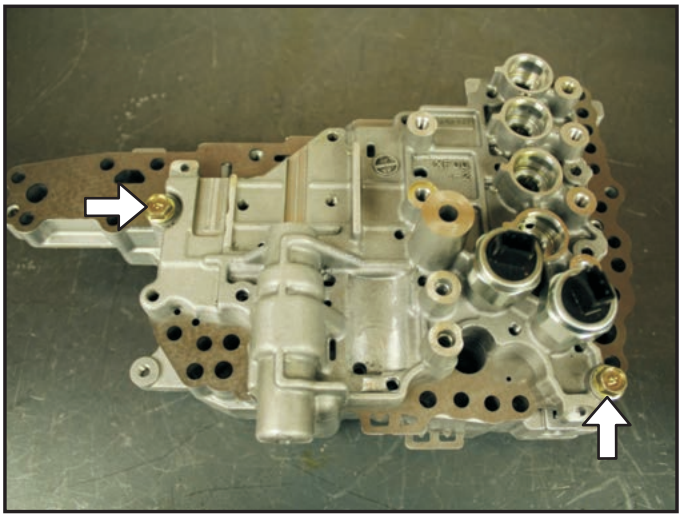


Figure 36

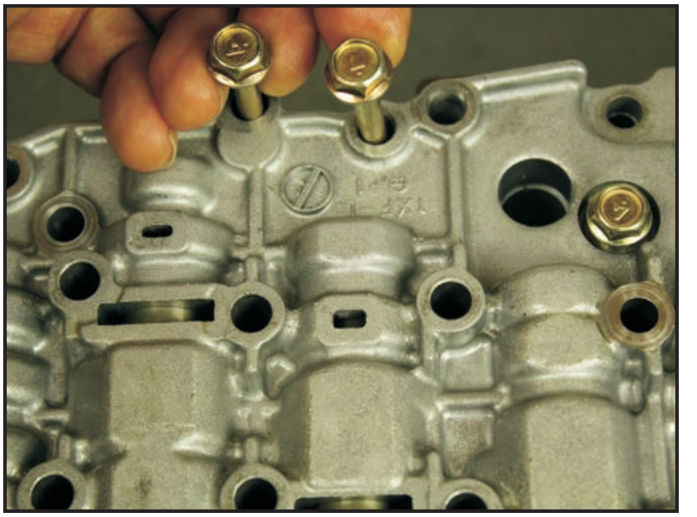


Figure 39

Valve Body Servicing

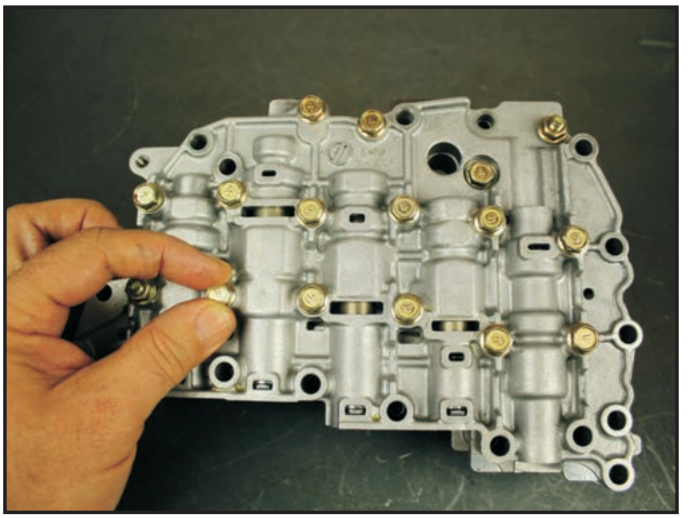


Figure 40

31. Install finger tight eleven 59mm (2.312 in.) length bolts as shown in figure 40.

32. Place four 59 mm (2.312 in.) length bolts and one 35mm (1.372 in.) length bolt into the main harness connector brackets as shown in figure 41. Install the main harness connector brackets onto the valve body as seen in figure 42 and finger tight all five bolts.

33. Using a 10mm socket (figure 43), torque all valve body bolts down to approximately 6.5 Nm (57-60 in-lbs.).

34. Install new solenoid o-rings and lubricate with jell. Then, insert each solenoid into their respective port (figure 44).

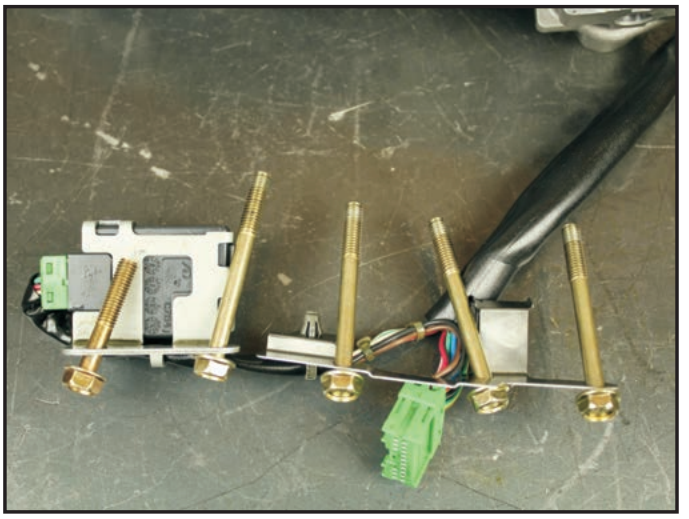


Figure 41

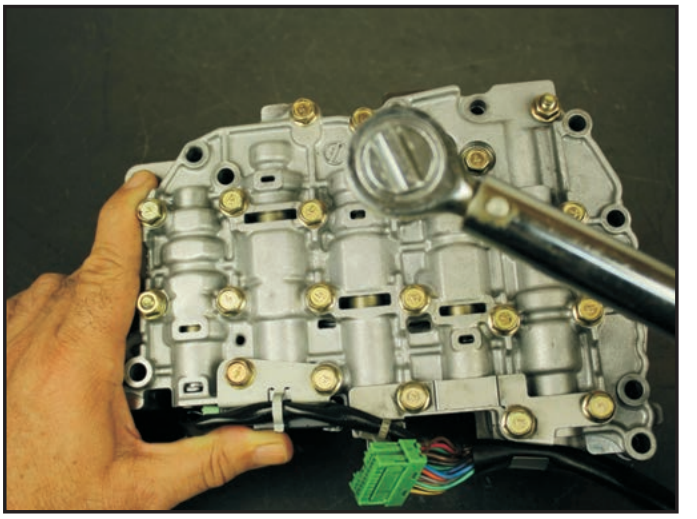


Figure 43

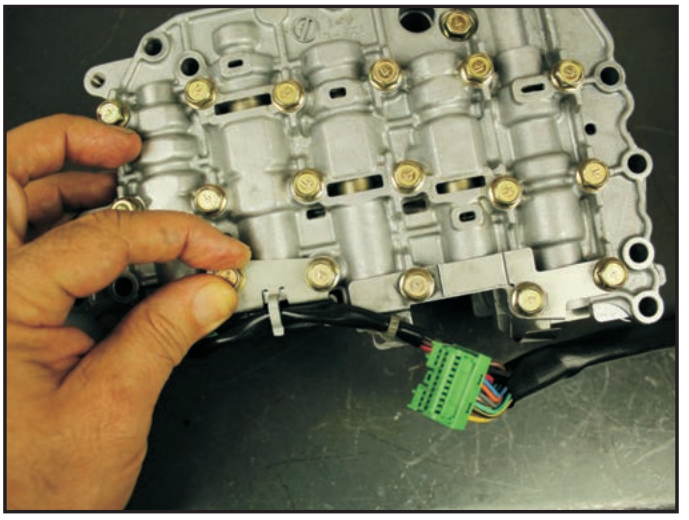


Figure 42

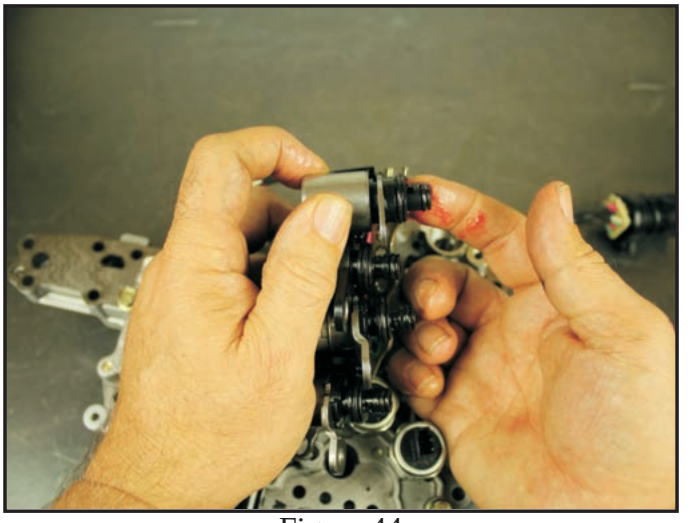


Figure 44

Valve Body Servicing

35. Using a 5mm Allen socket (figure 45), torque all solenoid and stepper motor hold down bolts to approximately 6.5 Nm (57-60 in-lbs.).

36. Plug in the Primary and Secondary Pulley pressure sensors (figure 46).

37. Install the ratio control valve and spring into the upper valve body (figure 47). Index the ratio control valve lever to the stepper motor (figure 48).

38. Insert a 3mm rod or equivalent to retain the spring loaded ratio control valve in place. Us a rod long enough to remind you to remove it once the valve body has been installed onto the transmission (figure 49).

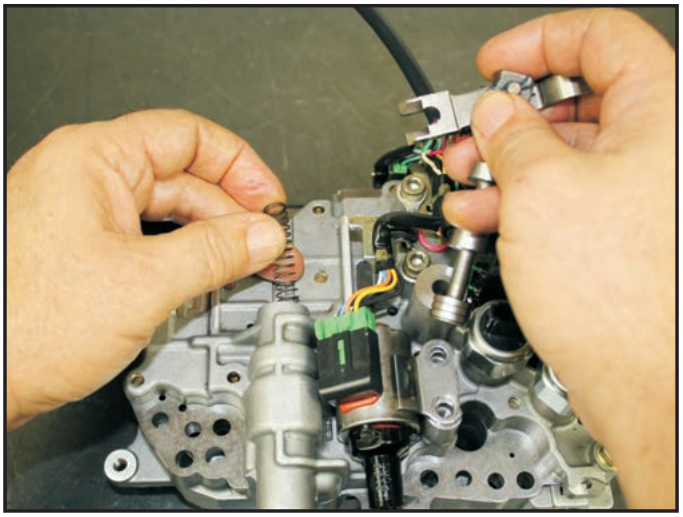


Figure 47

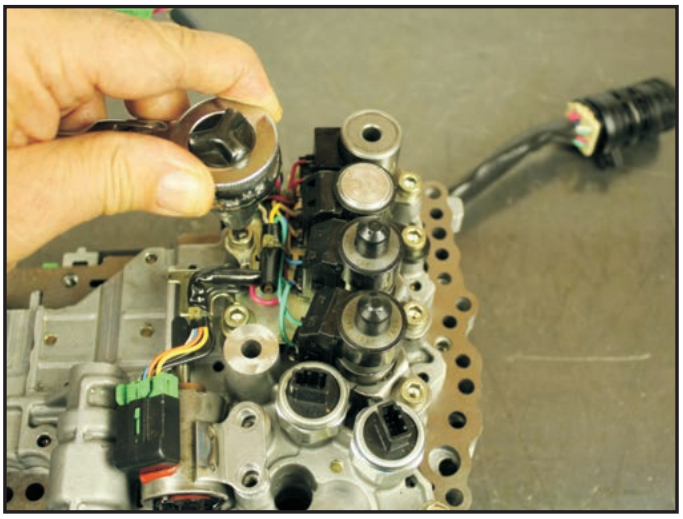


Figure 45

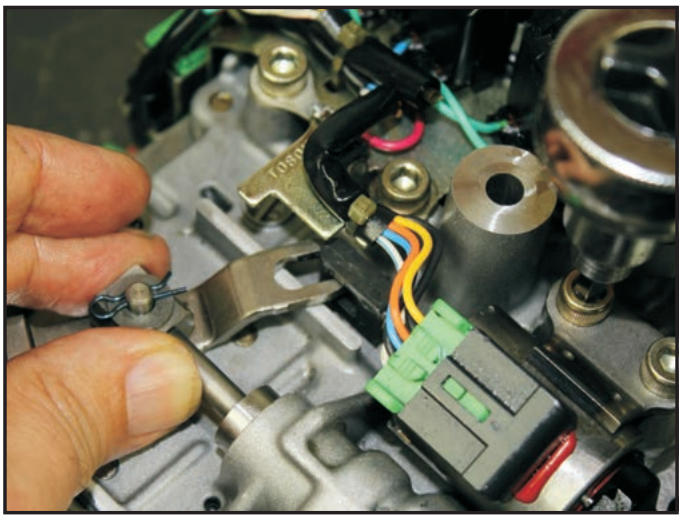


Figure 48

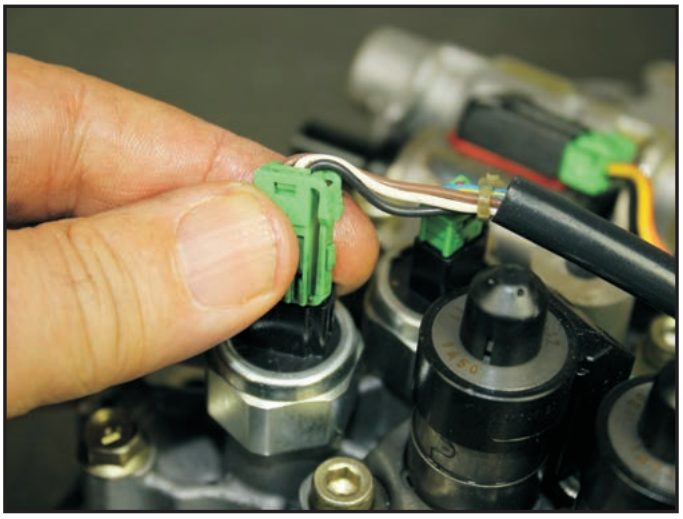


Figure 46

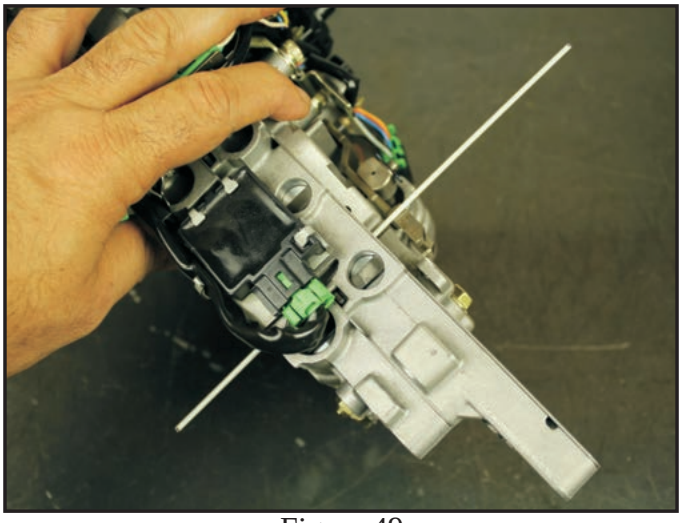


Figure 49

Valve Body Servicing

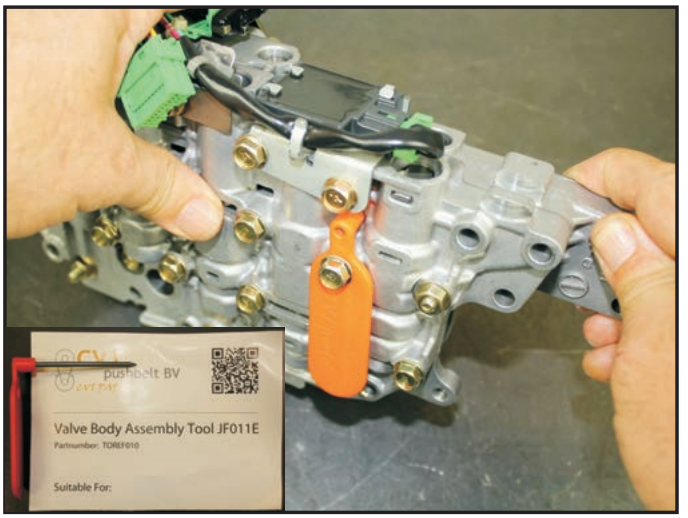


Figure 50

39. A ratio control valve lever tool is available from CVT Pushbelt BV that uses a valve body bolt to hold the rod in place and is removed once the valve body is installed into the transmission (figure 50).

40. Figure 51 is a view of how the tool from CVT Pushbelt BV is retaining the ratio control valve lever into the valve body.

41. Install the manual valve (figure 52).

42. Install a new o-ring on the main transmission harness pass through connector (figure 53).

43. Lubricate the new o-ring with jell (figure 54).

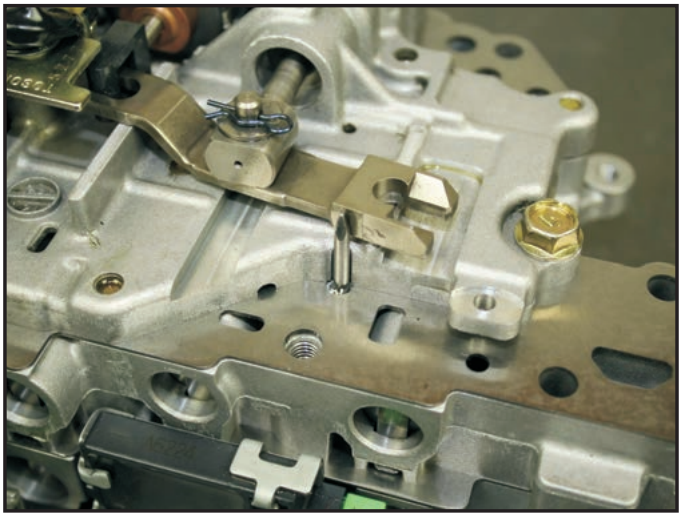


Figure 51


Figure 53


Figure 52


Figure 54

Pump Servicing

1. Using a 10mm socket, remove 4 pump cover to pump housing retaining bolts and remove the cover (figure 1).

2. Remove the pump cover to pump housing rubber molded seal (figure 2).

3. Carefully lift the pump drive shaft, rotor and vanes from the pump housing (figure 3).

4. Lift the pump sleeve from the pump housing (figure 4).

5. Lift the pump's base assembly from the pump housing (figure 5).

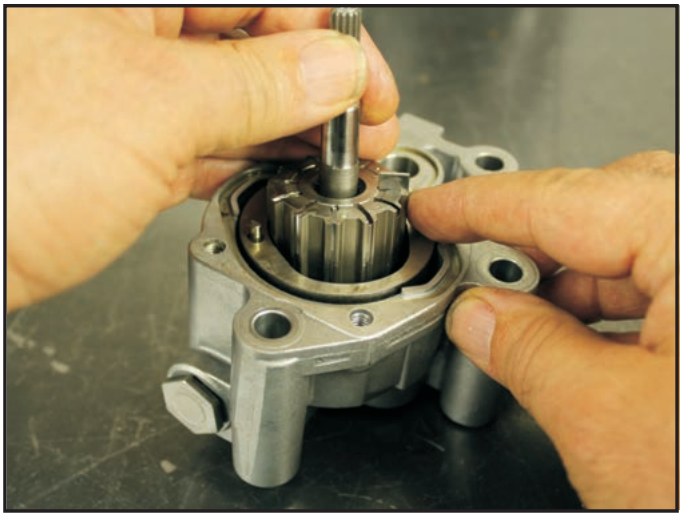


Figure 3

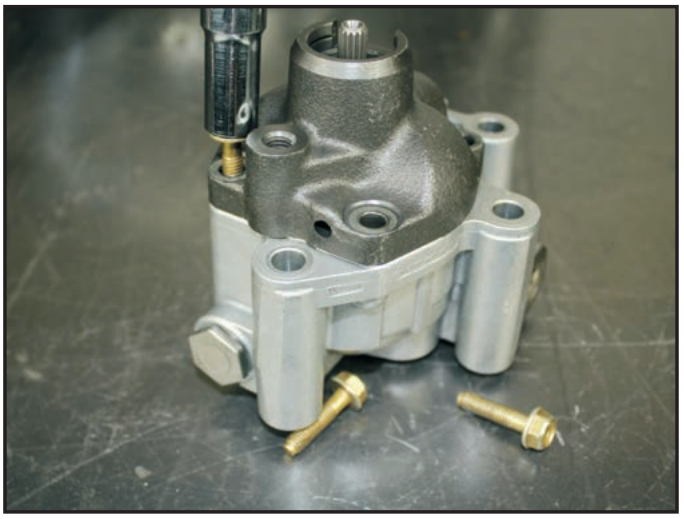


Figure 1

Figure 4

Figure 2

Figure 5

Pump Servicing

Figure 6

6. Remove both the inner and outer pump housing to base plate rubber o-rings (figure 6).

7. Using a 10mm hex head socket, carefully remove the flow control valve and spring retaining plug. Once off, remove the spring and valve from the pump housing (figure 7).

8. Perform a visual and physical inspection of the flow control valve bore (figure 8) and valve (figure 9) for wear. Repair or replace as necessary.

9. Clean and inspect all other pump parts for wear or grooving and replace as necessary (figure 10).

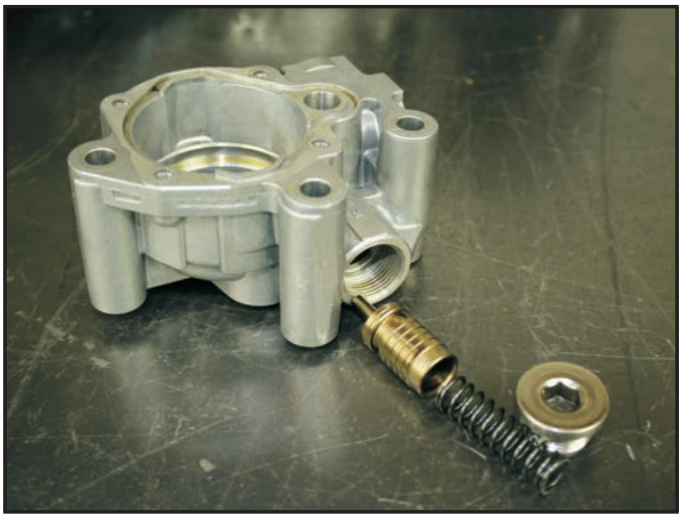


Figure 7

Figure 9

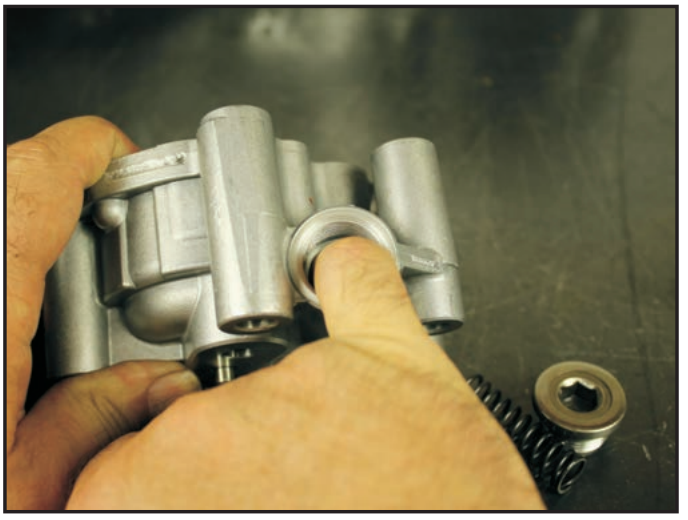


Figure 8

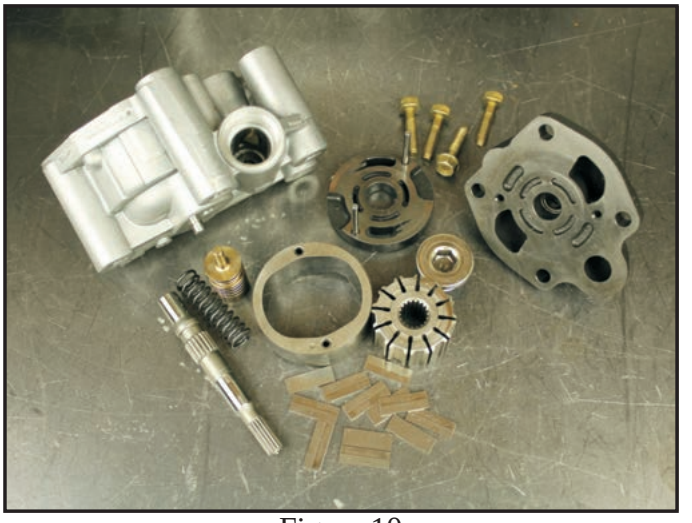


Figure 10

Pump Servicing

10. Install the flow control valve and spring into the pump housing valve first (figure 11). Using a 10mm hex head socket, tighten the flow control valve and spring retaining plug (figure 12).

11. Install new inner and outer pump housing to base plate rubber o-rings and lubricate with jell (figure 13).

12. Install the base plate into the pump housing. Pay attention to the identification dimple in one of the flats of the base plate (figure 14).

13. Install sleeve into the pump housing and onto the base plate with the dimple in the sleeve facing up. Place the sleeve with the dimple in the same position as the dimple underneath on the base plate (figure 15).

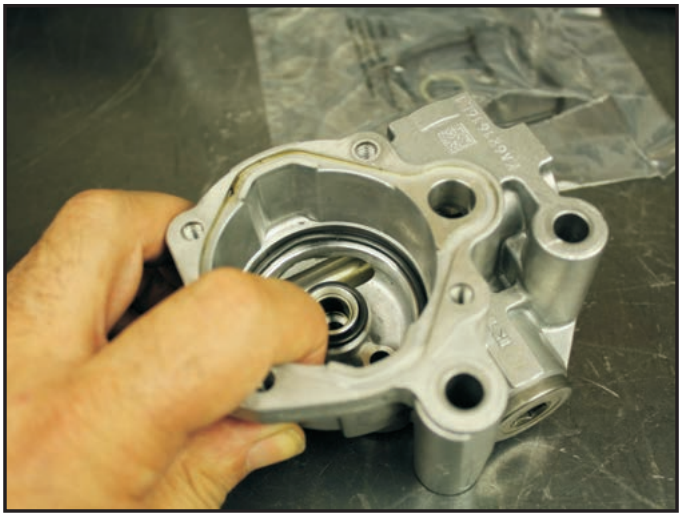


Figure 13

Figure 11

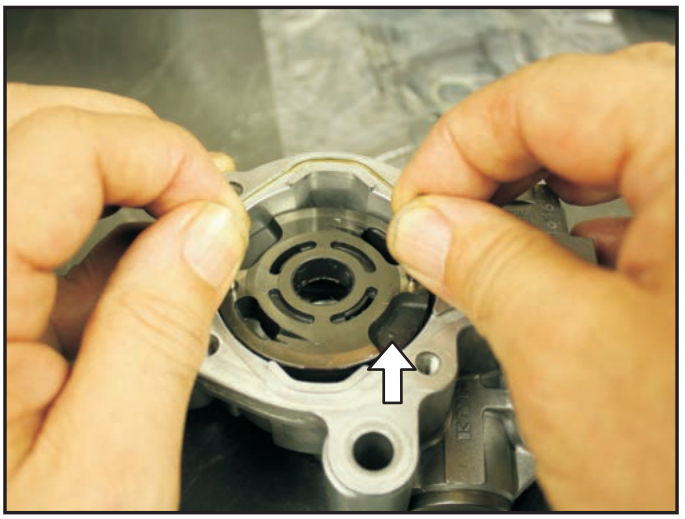


Figure 14

Figure 12

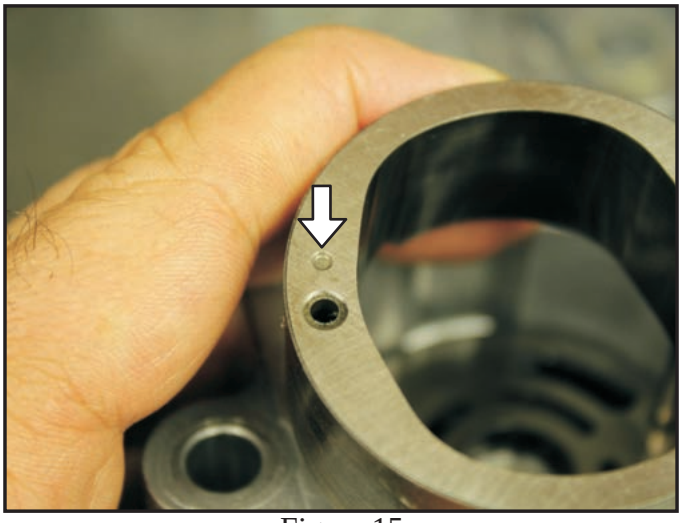


Figure 15

Pump Servicing

Figure 16

14. Install the pump drive shaft and rotor into the pump housing and sleeve with the dot on the rotor facing down (figure 16).

15. Install the pump vanes into the rotor (figure 17).

16. Install a new molded o-ring into the pump housing (figure 18).

17. Align the pins in the pump base to the pin pockets in the pump cover (figure 19). Once indexed, rotate the pump cover, sleeve and base aligning the bolt holes in the cover to the housing. Using a 10mm socket (figure 20), tighten the four pump cover to pump body retaining bolts to 26Nm (19 Ft. Lbs.)

Figure 17

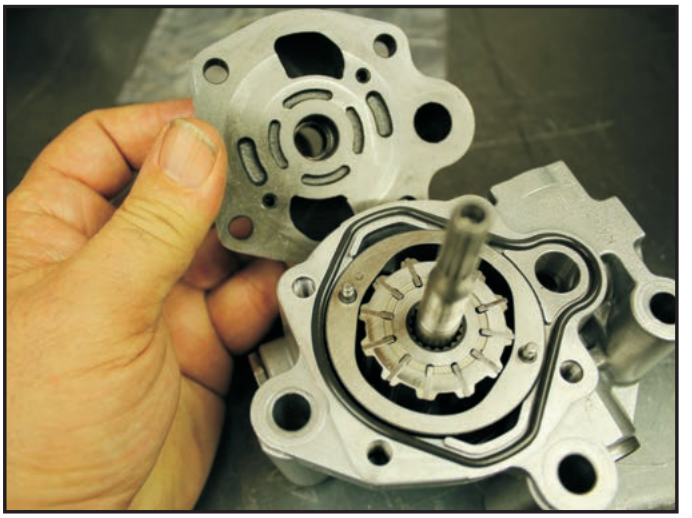


Figure 19

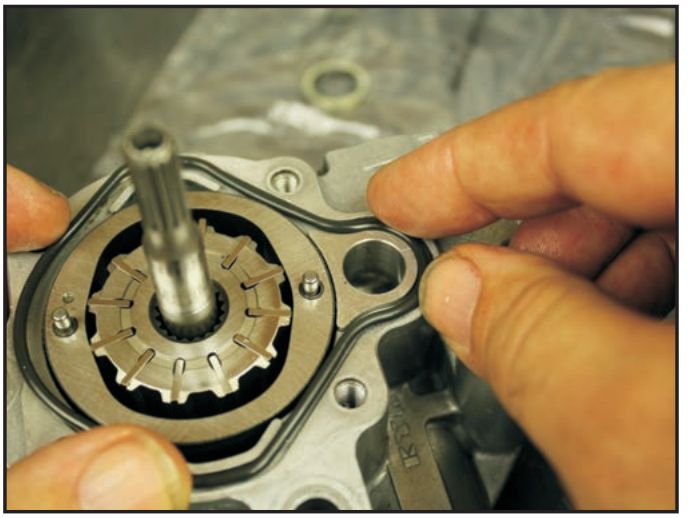


Figure 18

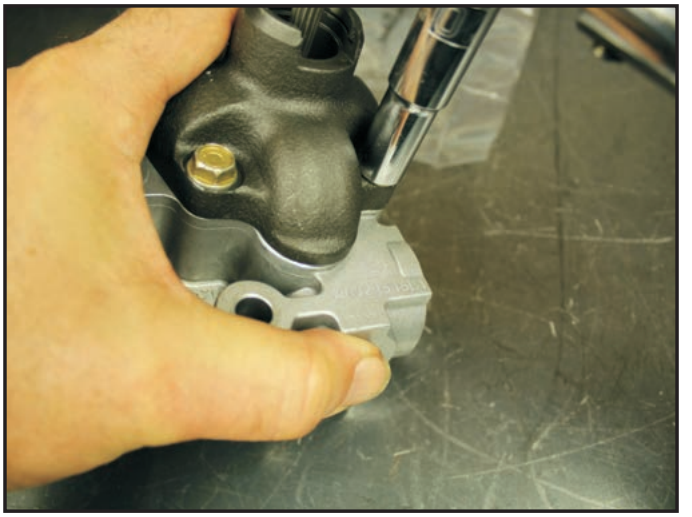


Figure 20

Forward Clutch Servicing

1. Using a pair of suitable snap ring pliers, remove the snap ring that retains the turbine/input shaft to the forward drum and remove the shaft from the drum (figure 1).

2. Remove the sealing rings from the turbine/input shaft (figure 2).

3. Using a pick or small screwdriver, remove the "thin" upper snap ring from the drum (figure 3). Before removing the internal ring gear from the drum (figure 4), make a mark as an identification of the top side of the gear for proper reassembly.

4. Remove the "thin" lower snap ring from the forward clutch drum (figure 5).

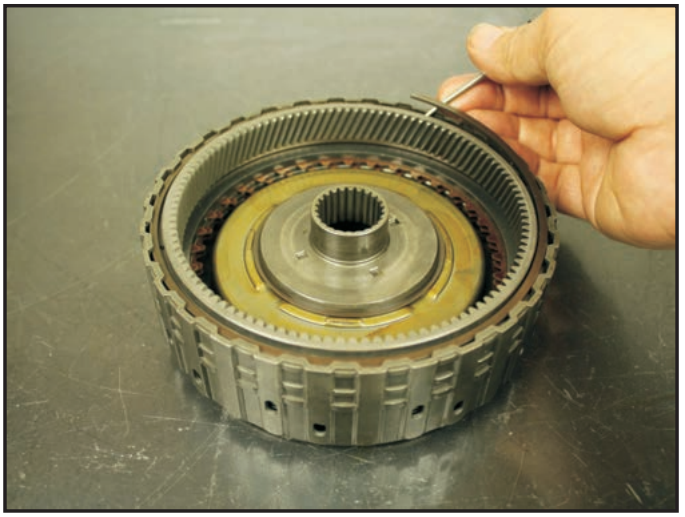


Figure 3

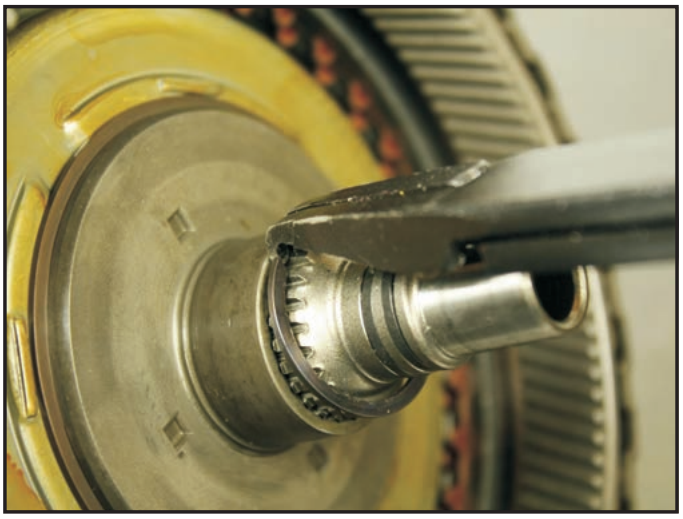


Figure 1

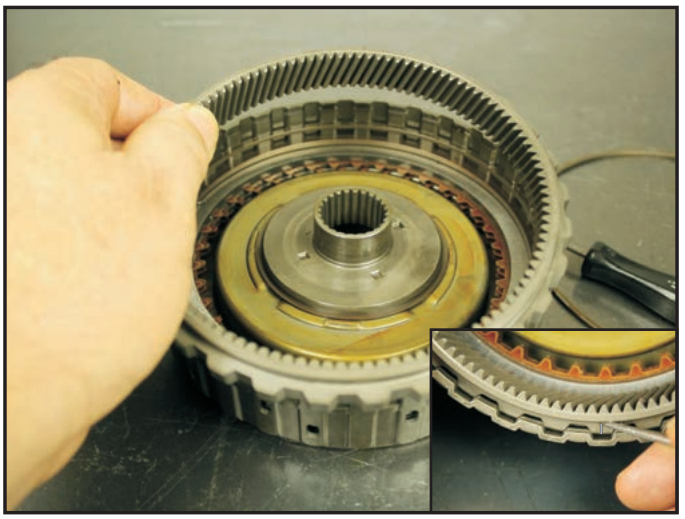


Figure 4

Figure 2

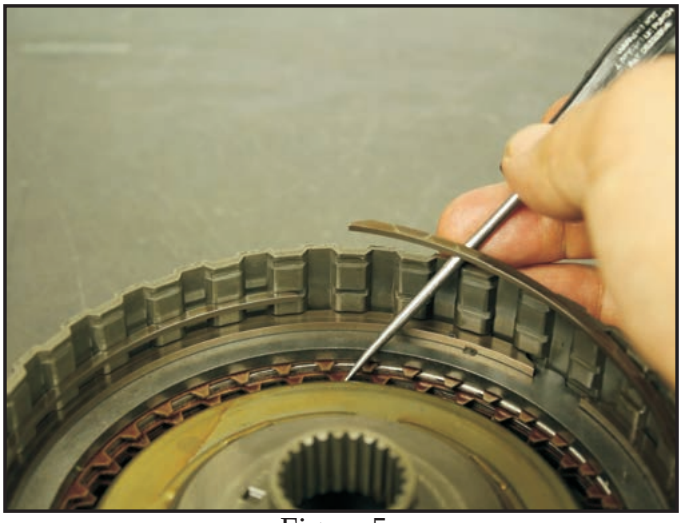


Figure 5

Forward Clutch Servicing

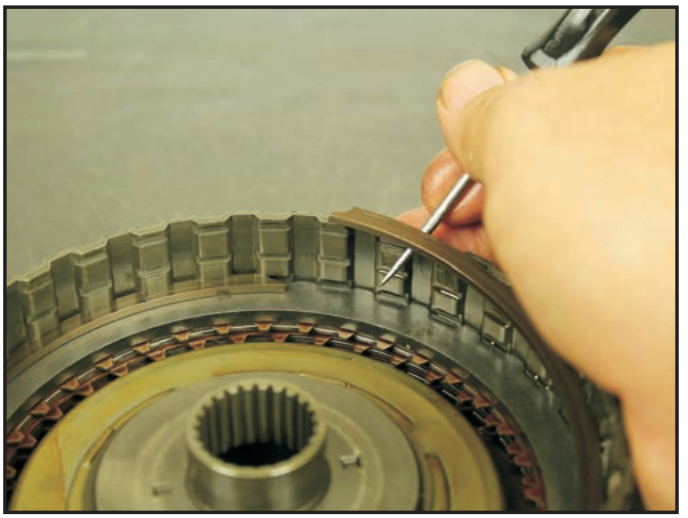


Figure 6

5. Using a straight pick or small flat bladed screwdriver, remove the “thick” snap ring from the forward clutch drum (figure 6).

6. Remove the backing plate, frictions, steel plates and cushion plate from the forward drum (figure 7).

7. Using a suitable press, compress the piston’s return spring. Using a pair of snap ring pliers, remove the snap ring (figure 8).

8. Lift the counterbalance piston and snap ring from the drum (figure 9) followed by the caged spring assembly (figure 10).

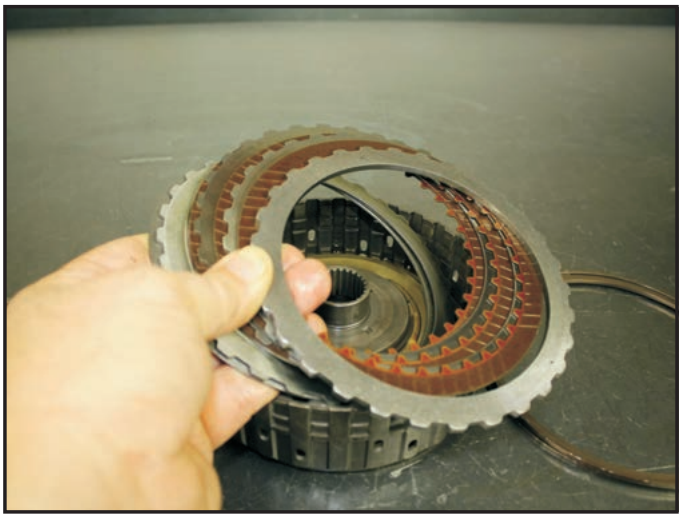


Figure 7

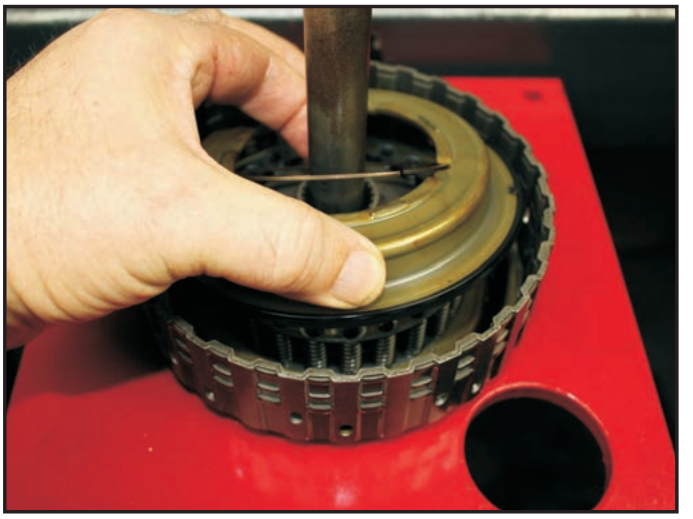


Figure 9

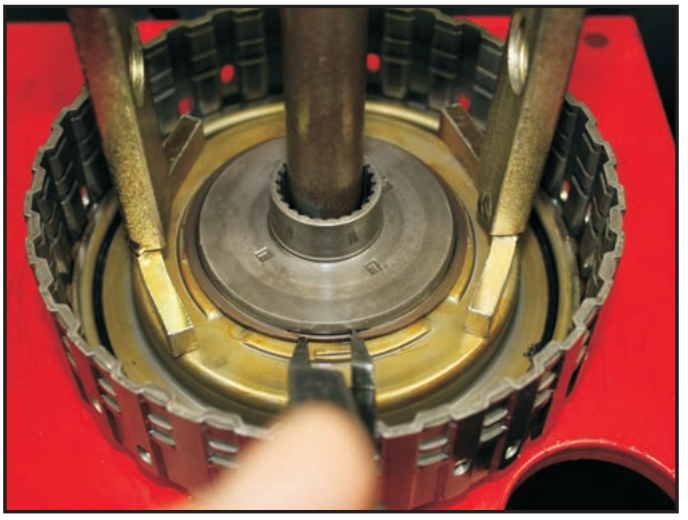


Figure 8

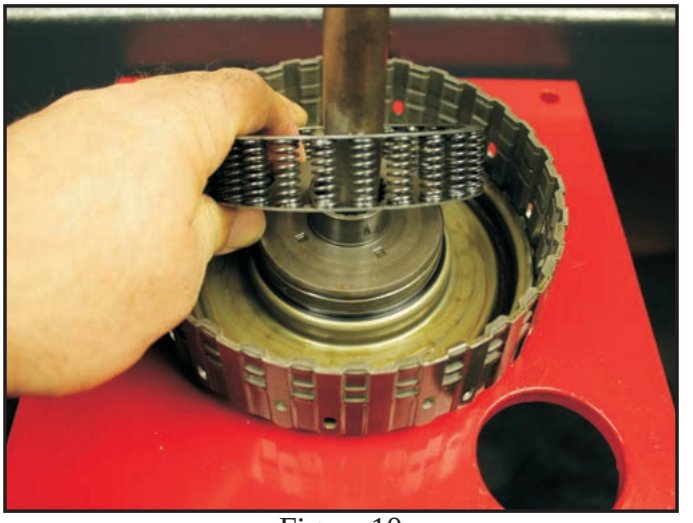


Figure 10

Forward Clutch Servicing

9. Using a suitable pair of pliers, carefully remove the forward clutch molded piston from the drum (figure 11).

10. Clean all parts and inspect and replace as necessary (figure 12).

11. Generously lubricate the forward clutch molded piston with jell (figure 13).

12. Generously lubricate the forward clutch drum with jell (figure 14).

13. With even pressure, carefully turn the piston into the drum (figure 15).

Figure 13

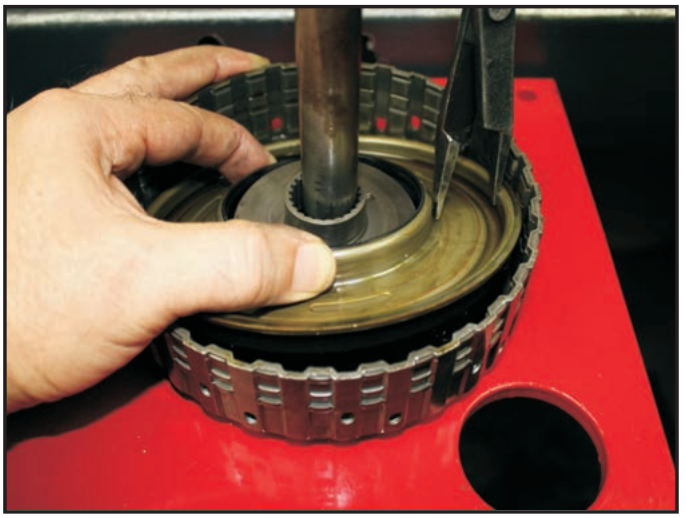


Figure 11

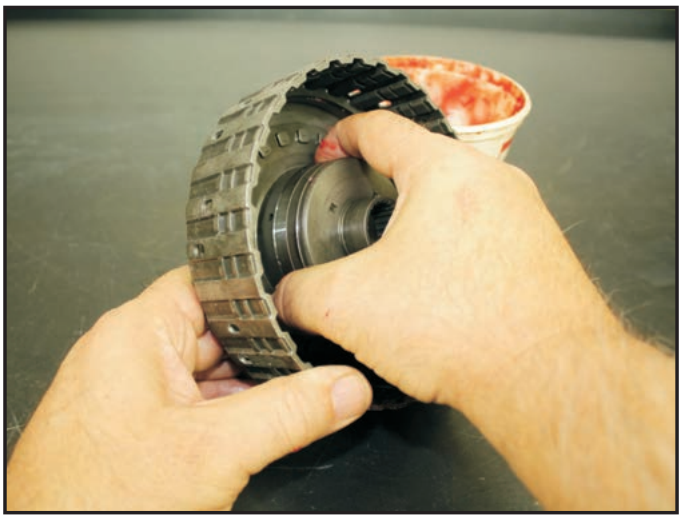


Figure 14

Figure 12

Figure 15

Forward Clutch Servicing

Figure 16

14. Generously lubricate the forward clutch molded piston in the balance piston sealing area with jel1 (figure 16). Then install the caged return spring assembly (figure 17).

15. Generously lubricate the balance piston with jell and place it on the caged spring assembly (figure 18).

16. Install the drum assembly on a press and carefully press down onto the balance piston compressing the caged spring assembly. Simultaneously, install the balance piston into the forward clutch piston. Once in place, install the snap ring (figure 19).

17. Install the cushion plate like a cone (figure 20).

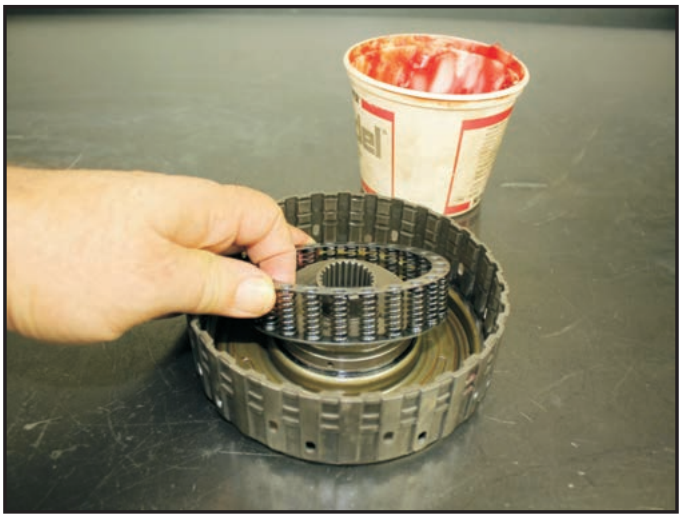


Figure 17

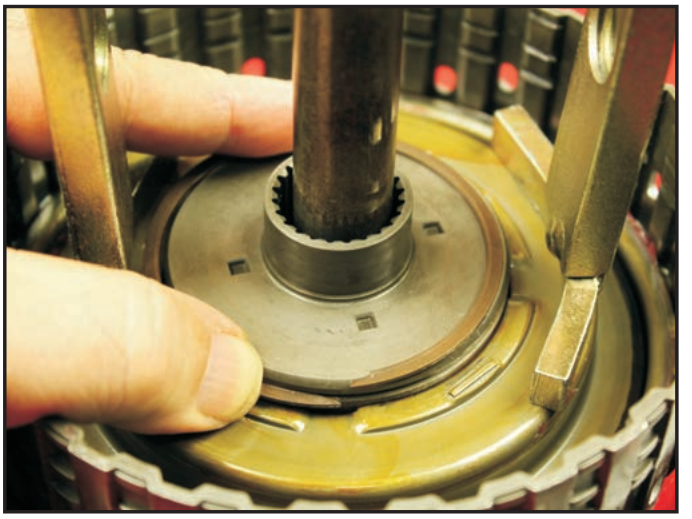


Figure 19

Figure 18

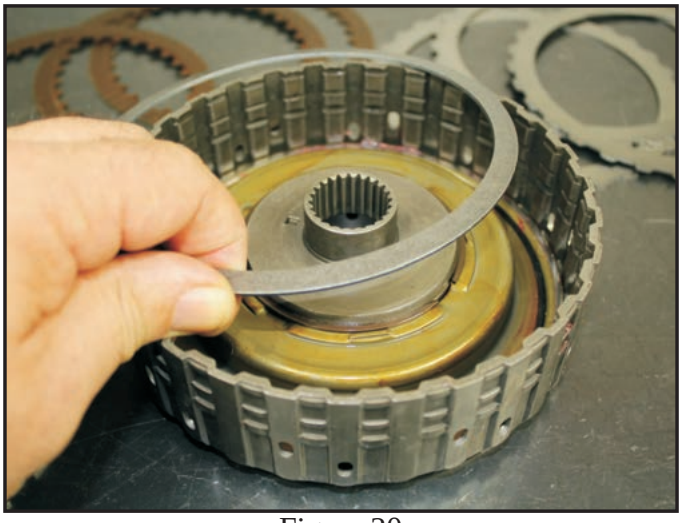


Figure 20

Forward Clutch Servicing

18. Alternately install a total of 3 steel plates and 3 pre-soaked friction plates beginning with a steel plate (figures 21 and 22). End with installing the backing plate with the rounded edges in the lug area facing up towards the retaining snap ring (figures 23 and 24).

19. Install the thick snap ring into the drum. Press down onto the backing plate and measure the clearance between the backing plate and snap ring. Measurements should be taken in two or more places and calculate the average value. Dodge specifies 1.2-1.5mm (.047-.059”). Mitsubishi calls for 1.2mm-1.4mm (figure 25). There are no selective snap rings or backing plates with which to adjust clutch clearances. If proper clearances cannot be obtained a new drum assembly will be required.

Figure 23

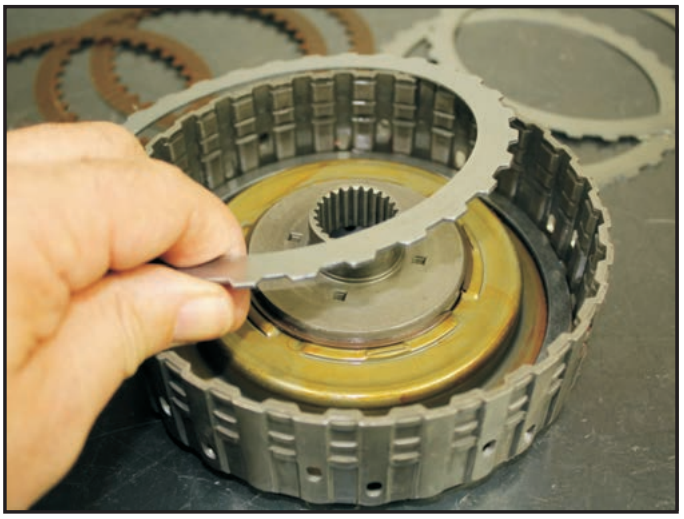


Figure 21

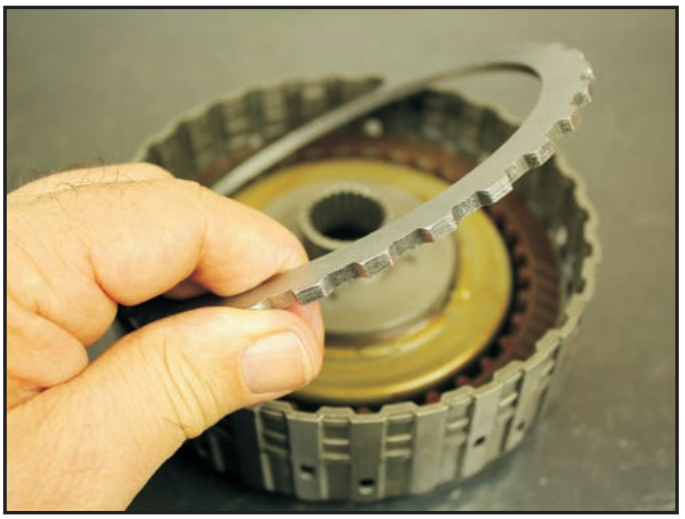


Figure 24

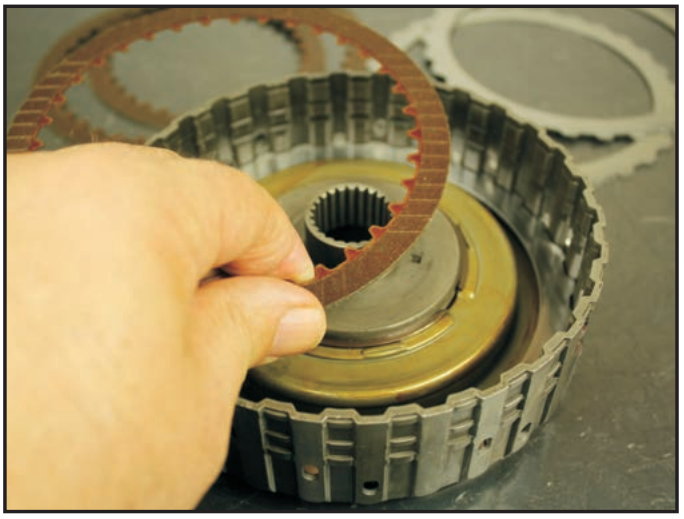


Figure 22

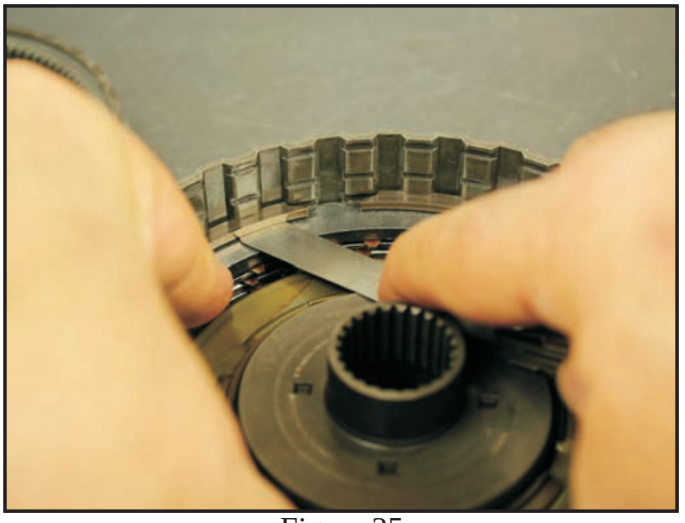


Figure 25

Forward Clutch Servicing

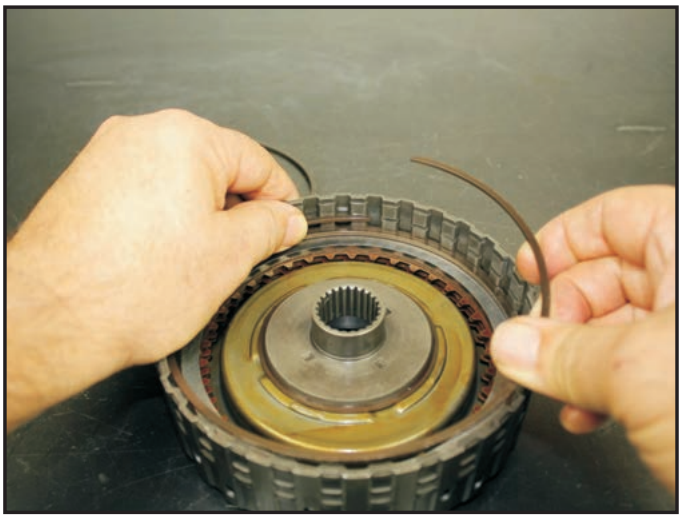


Figure 26

20. Install a thin snap ring into the drum (figure 26).

21. Install the internal ring gear with the previously made mark facing up (figure 27).

22. Install the other thin snap ring securing the internal ring gear in the forward drum (figure 28).

23. Install all new turbine/input shaft sealing rings and lubricate with Jell (figure 29).

24. Insert the turbine/input shaft into the forward clutch drum. Using a suitable pair of pliers, install the snap ring retainer securing the shaft to the forward drum (figure 30).

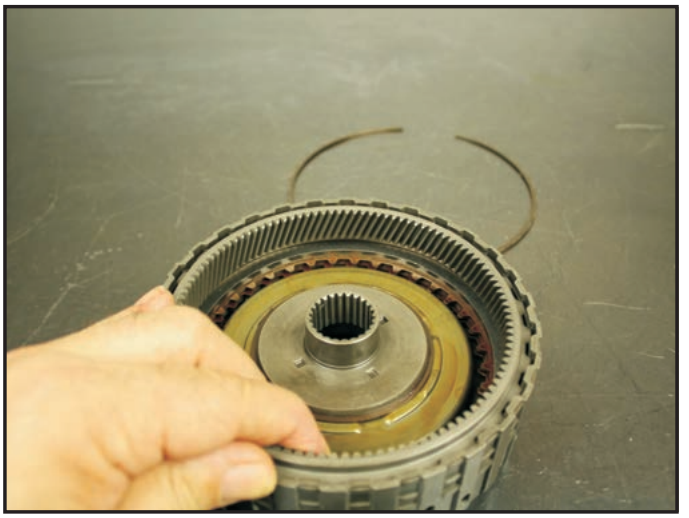


Figure 27

Figure 29

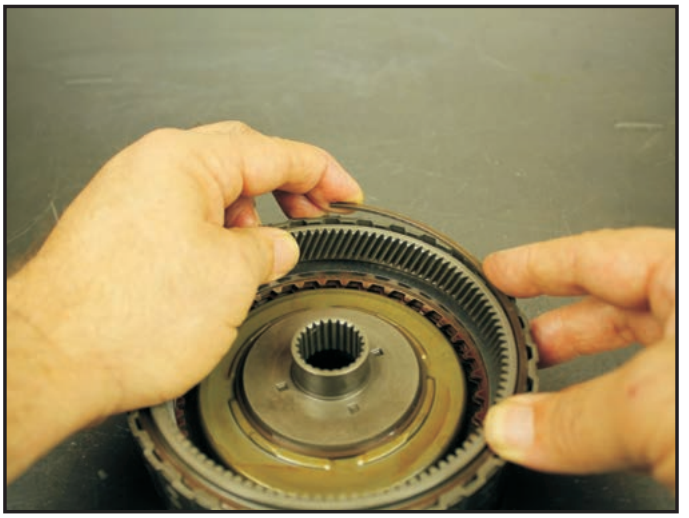


Figure 28

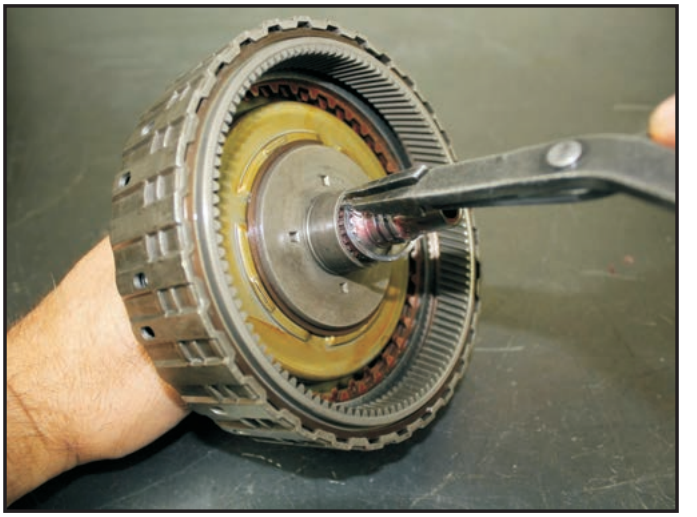


Figure 30

Differential and Reduction Gear Servicing

1. If the differential needs servicing, use a 17mm socket and remove eight ring gear attaching bolts (figures 1 and 2).

2. Measure the backlash between each side gear. (figure 3). Standard value: 0.025-0.150mm (0.001-0.006”). If the backlash deviates from the standard value, replace each side gear spacer with one of an appropriate thickness and measure the backlash again for confirmation.

3. Should removal be necessary, mark each of the gears so they can be installed in the same location. This is a noise preventive safety measure (figure 4).

4. Using a punch, drive out the roll pin (figure 5).

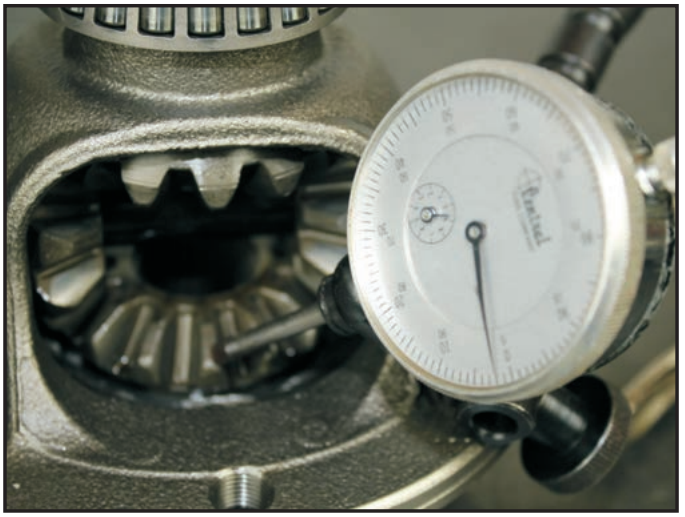


Figure 3

Figure 1

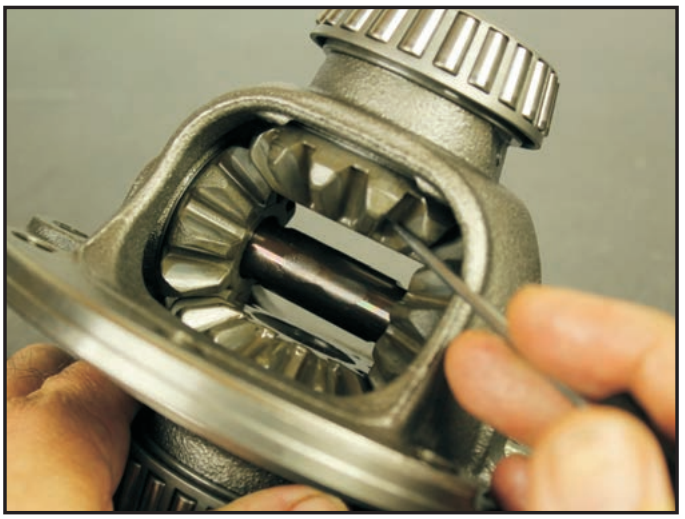


Figure 4

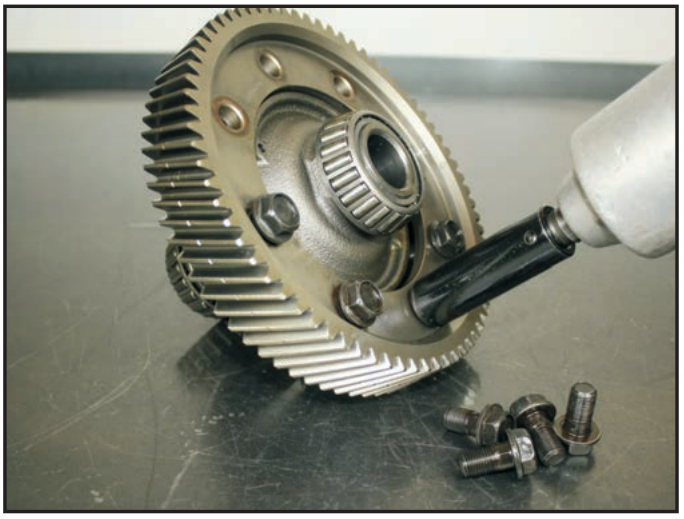


Figure 2

Figure 5

Differential and Reduction Gear Servicing

Figure 6

5. Remove the cross shaft from the differential housing (figure 6). Rotate the side gears and remove all gears for inspection. Should new gears be needed, use .093-1.00mm (.037-.040") thick spacers (figure 7).

6. Clean and inspect all parts and bearings and replace as necessary (figure 8).

7. Assemble all the gears and cross shaft and then drive the roll pin into place (figure 9).

8. Install the ring gear to the housing and apply ATF to each of the bolts (figure 10). Tighten the bolts in the numbered sequence to 135 Nm [+/- 5 Nm] (100 Ft. Lbs. [+/- 4 Ft. Lbs).

Figure 7

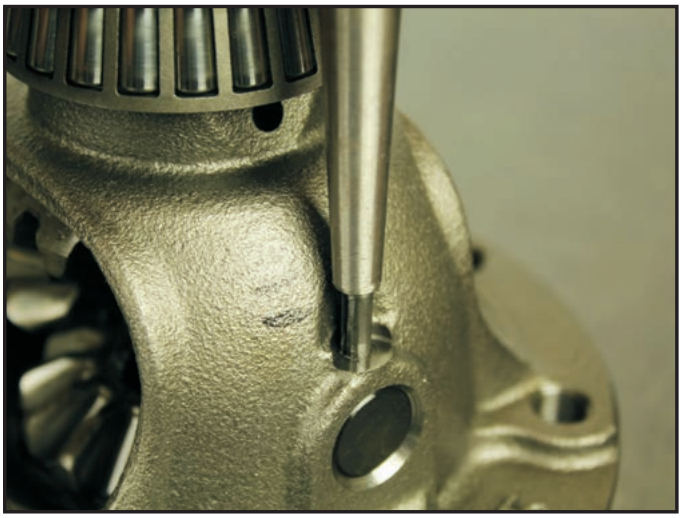


Figure 9

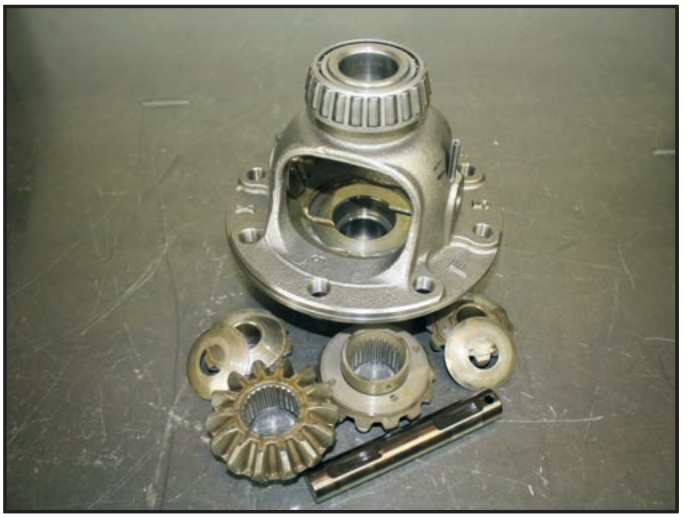


Figure 8

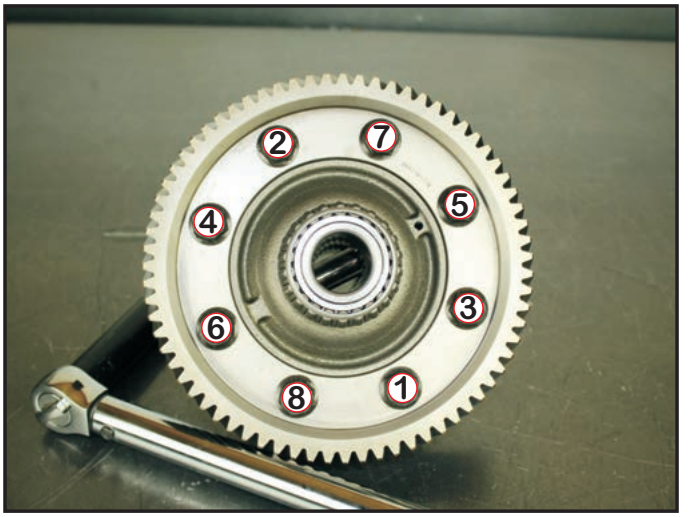


Figure 10

Differential and Reduction Gear Servicing

9. With the case halves cleaned, linkage and axle seals removed and the differential and reduction gear cleaned, an assessment can be made on the bearings and bearing races (figure 11). If necessary, remove and replace the differential bearings and remove the races for the differential. An adjustment shim will be located under the main case bearing race. Keep this bearing race pocket empty but install a new race into the converter housing case without a shim.

10. Place a gauging bar edge across the main case. Measure from the bottom of the bar to the select shim installation surface as seen in figure 12.

This is measurement # 1.

(The required differential pre-load is 0.17 to 0.29mm [0.007 to 0.011"]).

11. Install the differential assembly into the converter case and measure the distance from the differential hub (bottom of the gauging bar) to the surface of the converter housing as seen in figure 13.

This is measurement # 2.

12. Install the main case bearing race onto the differential bearing and measure the distance from the differential housing (bottom of gauging bar) to the outer race of the differential side bearing (figure 14).

This is measurement # 3.

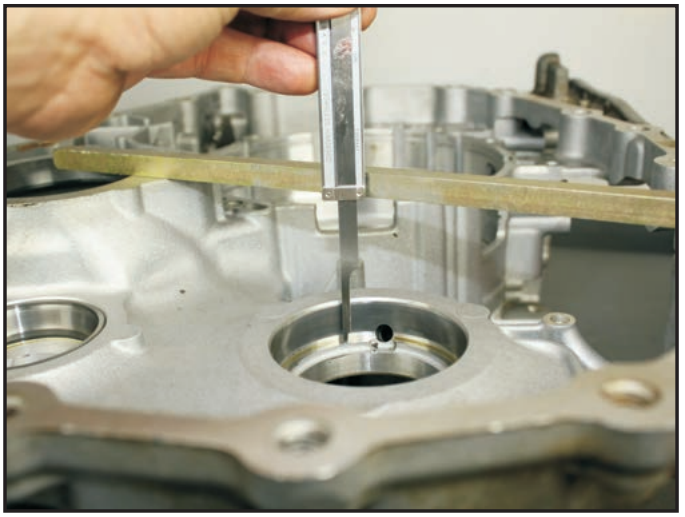


Figure 12

Figure 13

Figure 11

Figure 14

Differential and Reduction Gear Servicing

Figure 15

Figure 16

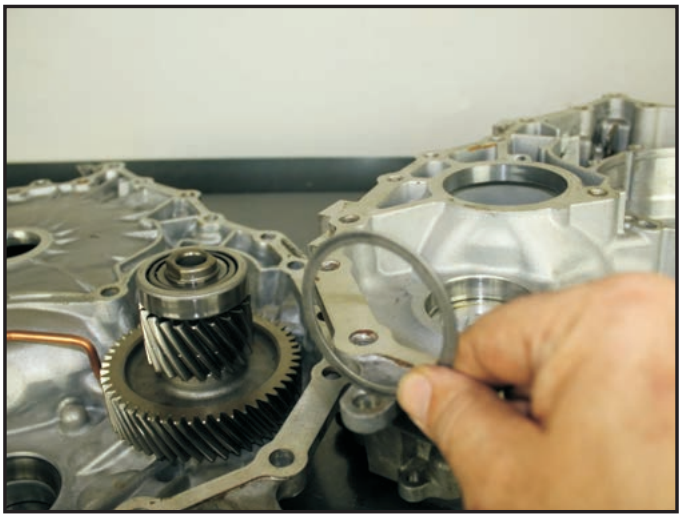


Figure 17

13. The thickness of the required select shim is calculated as follows:

Measurement # 1 – Measurement # 2 + Measurement # 3 + plus 0.23 mm (0.009 in) = the selected shim thickness needed. See service information on pages 110 and 111 figure 8.

Note: When conducting measurements, measure two or more places and calculate the average value.

Install the outer race for the differential side bearing with the measured selected shim between the case and the race (figures 15 and 16).

14. The same procedure is followed should the races and bearings need to be replaced with the reduction gear, but with a slight change to the formula.

The thickness of the required select shim is calculated as follows:

Measurement # 1 – Measurement # 2 + Measurement # 3 + plus 0.16 mm (0.006 in) = the selected shim thickness needed (figure 17). See service information on page 110 figure 7.

Note: When conducting measurements, measure two or more places and calculate the average value.

Variator Servicing

1. Before disassembly of the Variator, make note of the push belt's direction of rotation by the arrow inked onto the belt (figure 1). It must be reassembled in the same direction. Wrap a couple of wire ties around the push belt on each side before removing the pulleys from the side cover (figure 2).

2. Using a 14mm socket, remove 6 bolts retaining the Variator to the side cover (figure 3).

4. Install a special tool to open the secondary pulley relieving tension of the push belt (figure 4). Carefully pry each pulley upwards to free them from the side cover (figure 5). Be as cautious as possible to prevent the push belt from twisting.

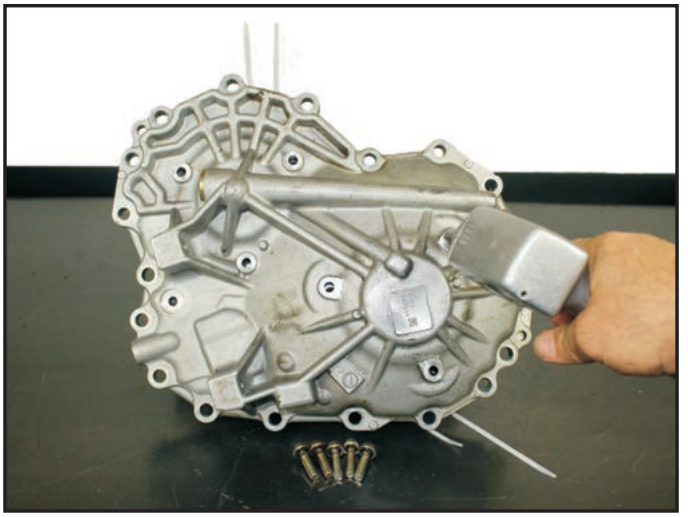


Figure 3

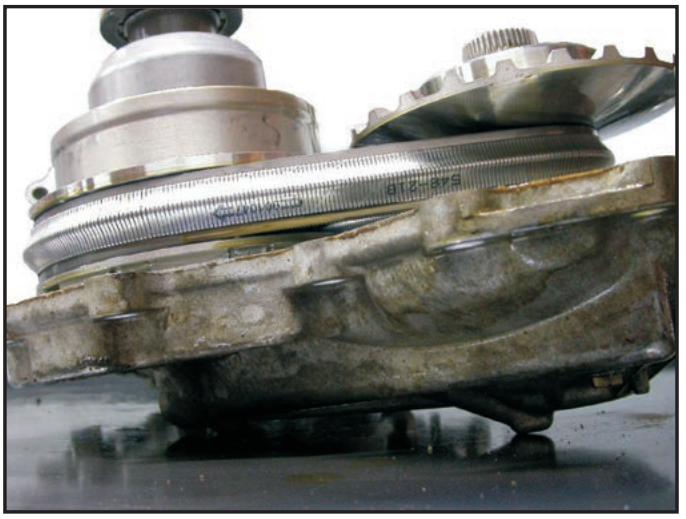


Figure 1

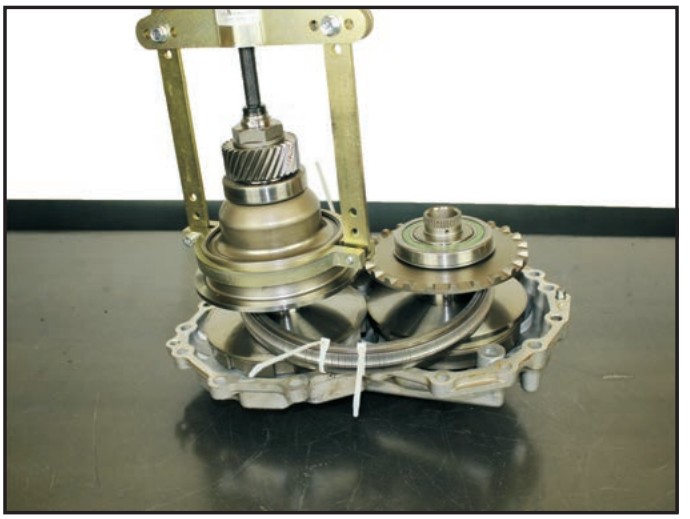


Figure 4

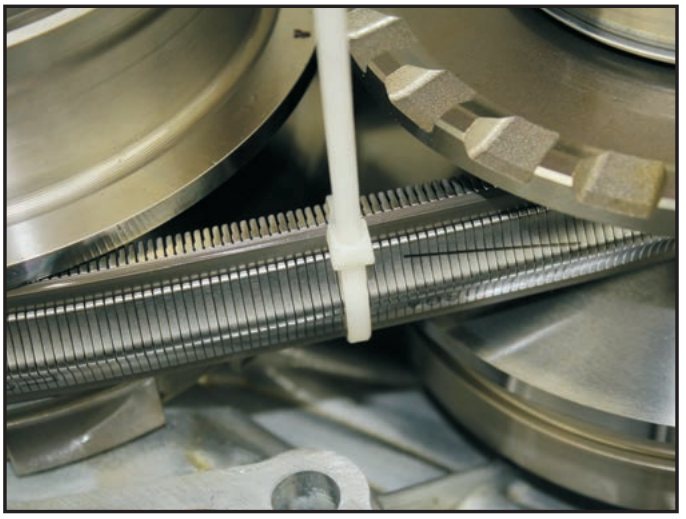


Figure 2

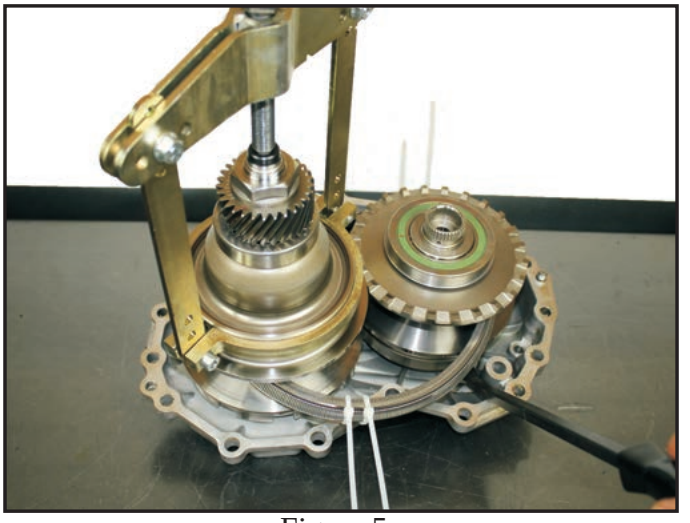


Figure 5

Variator Servicing

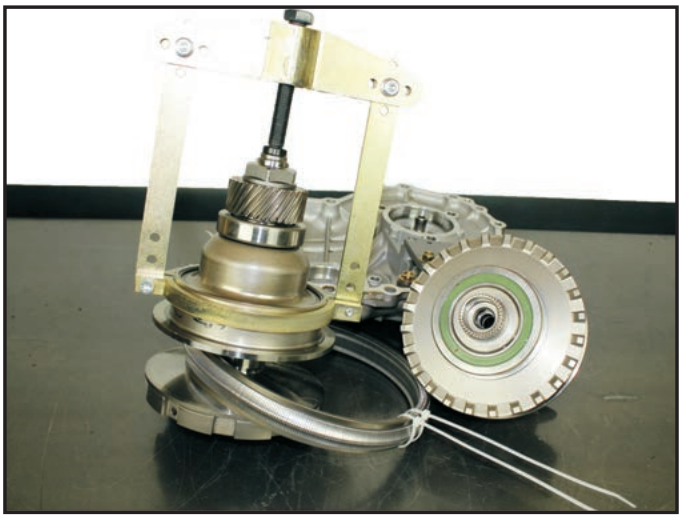


Figure 6

5. Remove the tool and push belt from the secondary pulley (figure 6).

6. Remove the pipe seals and shim from the secondary pulley pocket (figure 7).

7. Using a 55mm socket, remove the primary pulley assembly nut (figure 8).

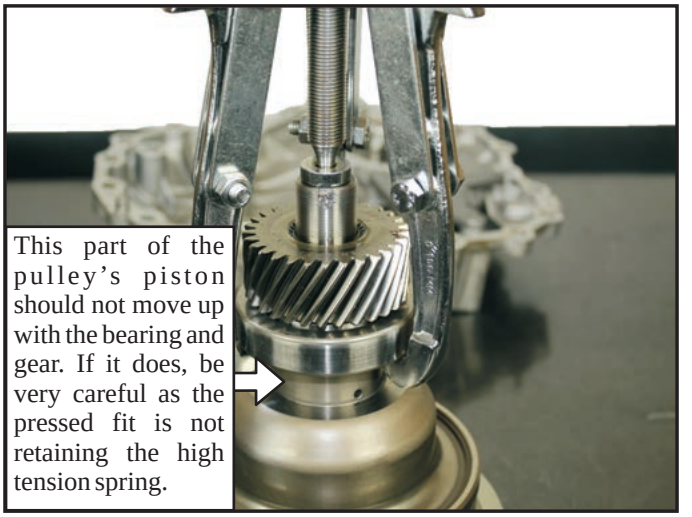
8. Using a 43mm socket, remove the secondary pulley assembly nut (figure 9).

9. Using a puller, carefully remove the bearing and output drive gear from the secondary pulley shaft (figure 10).

Figure 7

Figure 9

Figure 8



This part of the pulley's piston should not move up with the bearing and gear. If it does, be very careful as the pressed fit is not retaining the high tension spring.

Figure 10

Variator Servicing

10. Secure the shim located between the bearing the output drive gear (figure 11).

11. As a safety precaution, screw the nut back onto the shaft (figure 12).

12. If the piston did not move, the snap ring and balance piston can be removed (figure 13). Remain cautious as the pulley piston could pop free from its pressed fit onto the shaft if the assembly has been compromised (figure 14).

13. Place the Primary Pulley assembly into a suitable press being careful to not score the sheave face of the pulley (figure 15).

Figure 13

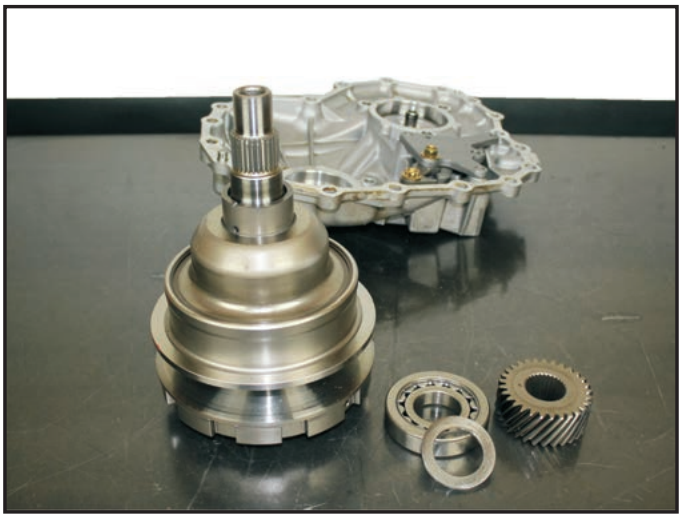


Figure 11

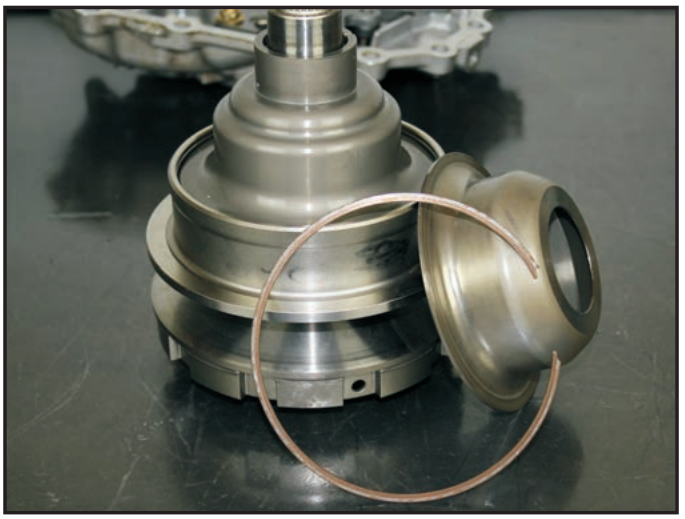


Figure 14

Figure 12

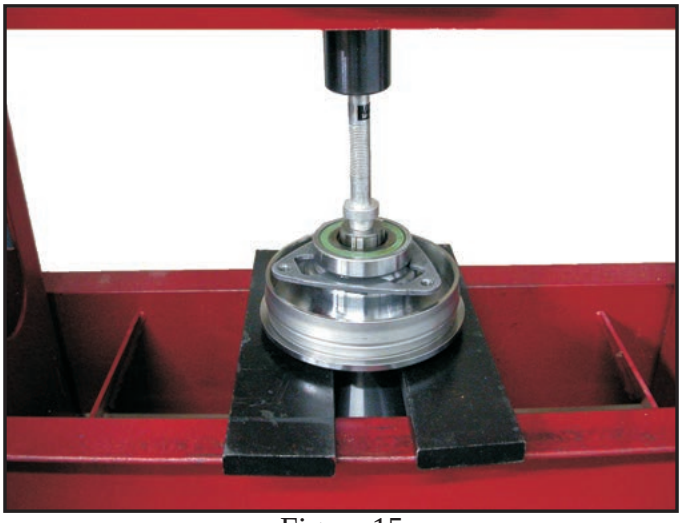


Figure 15

Variator Servicing

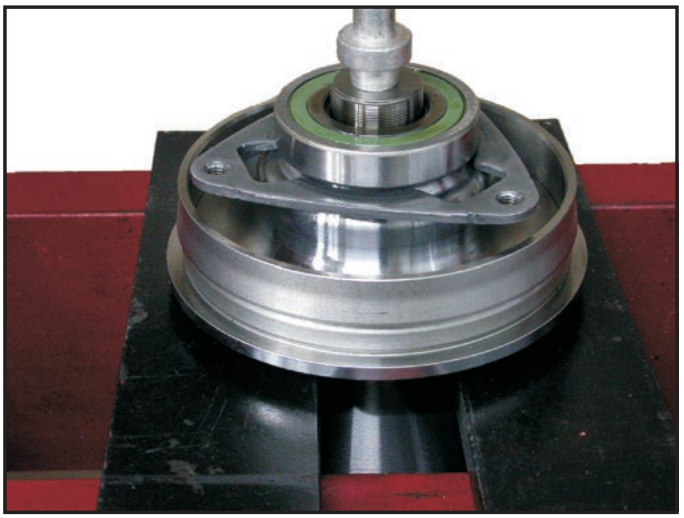


Figure 16

14. Place a catch basin under the pulley assembly and support the stationary half of the pulley as it is being pushed through (figure 16).

15. The catch basin (bucket) is used to catch six 6mm steel balls that will fall out once the pulley halves are separated (figures 17 and 18).

15. Separate the bearing and retainer bracket and pull the primary pulley piston out of the sheave drum (figure 19).

16. Remove the piston's sealing ring (figure 20).

Figure 17

Figure 19

Figure 18

Figure 20

Variator Servicing

17. Place the Secondary Pulley into a press being careful to not score the pulley sheave face. Place a catch basin/bucket below the pulley assembly (figure 21).

18. The shaft will begin to push through the piston once it bottoms out in the sheave drum compressing the high tension spring (figure 22). ***Use caution:*** The moment the shaft has pushed through the pressed fit on the piston, it will pop violently but the nut will hold the parts in place (figure 23).

19. Support the shaft from underneath while disassembling the pulley beginning with the removal of the piston seal (figure 24) followed by the nut (figure 25).

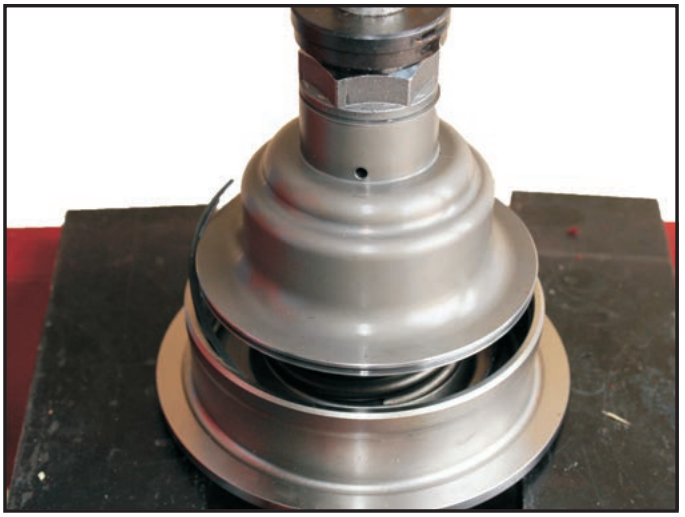


Figure 23

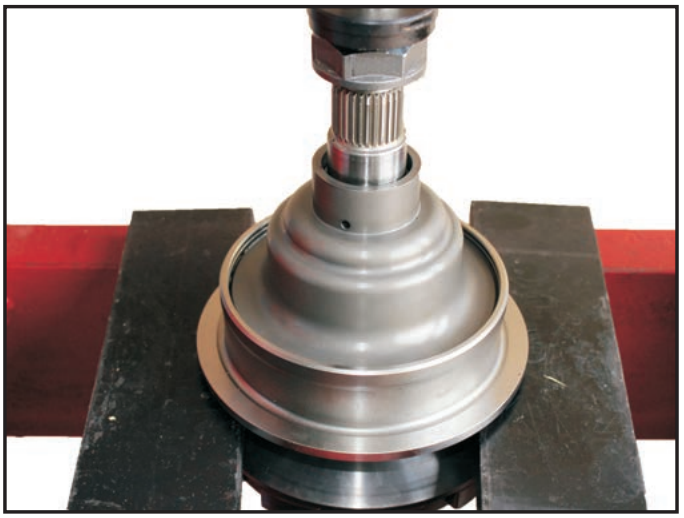


Figure 21

Figure 24

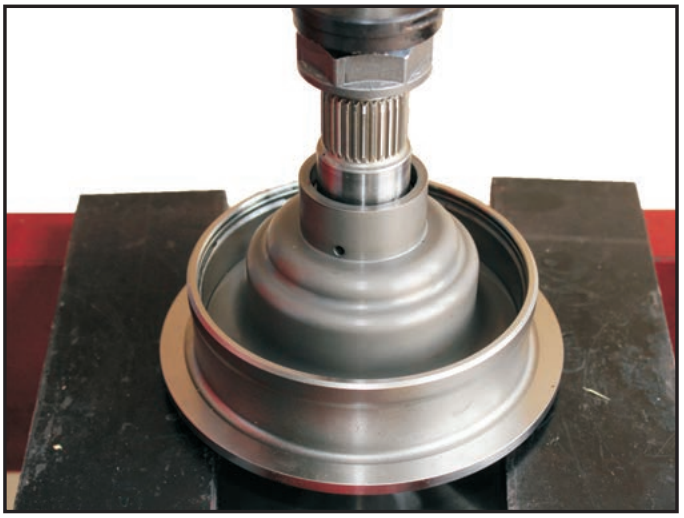


Figure 22

Figure 25

Variator Servicing

Figure 26

20. Remove the Secondary Pulley piston (figure 26).

21. Remove the Secondary Pulley spring (figure 27).

22. At this point either the piston can be lifted off of the supported shaft or you can lower the shaft out of the piston (figure 28).

23. Be careful to not lose the twelve 6mm steel balls when separating the piston from the shaft (figure 29).

24. Thoroughly clean all bearings, the push belt, both pulley shafts and pulley pistons for inspection (figure 30).

Figure 27

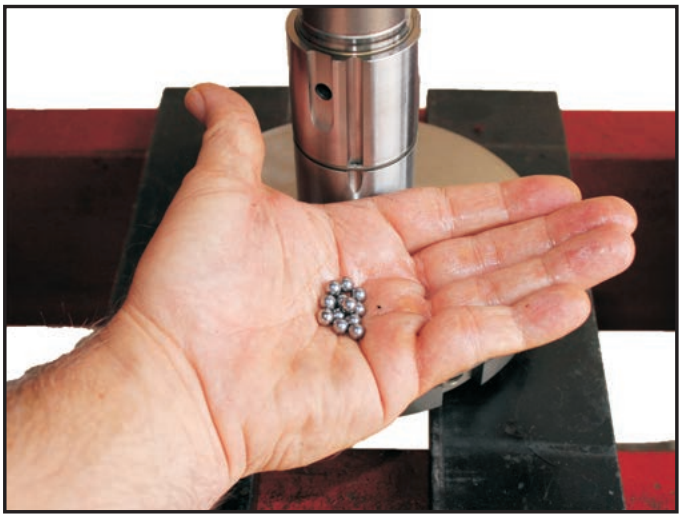


Figure 29

Figure 28

Figure 30

Variator Servicing

25. Inspect the edges of the push belt elements for excessive wear, where it contacts the sheave face of the pulleys (figure 31). Inspect for wear between the elements that would give the illusion of a stretched belt (figure 32). Also inspect the sheave faces of all the pulley halves for smoothness. If there is galling or grooving, replace as necessary (figure 33).

26. Inspect all pulley shaft ball troughs for excessive wear as well as all the steel balls (figures 29 and 34).

27. Inspect all pulley piston ball troughs for excessive wear as well (figure 35).

Figure 33

Figure 31

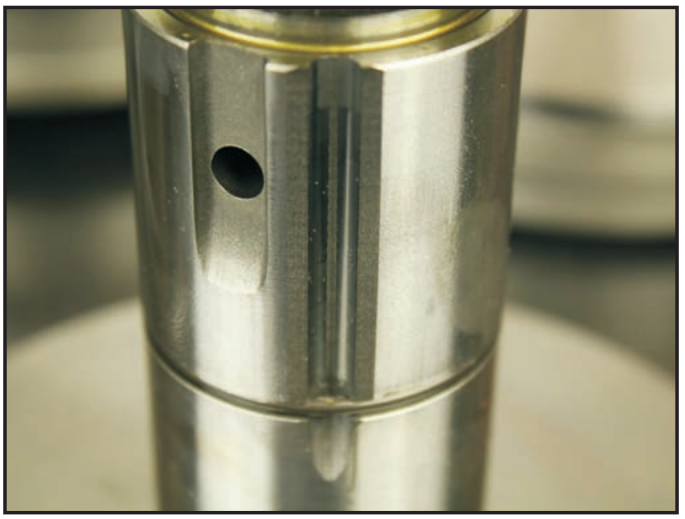


Figure 34

Figure 32

Figure 35

Variator Servicing

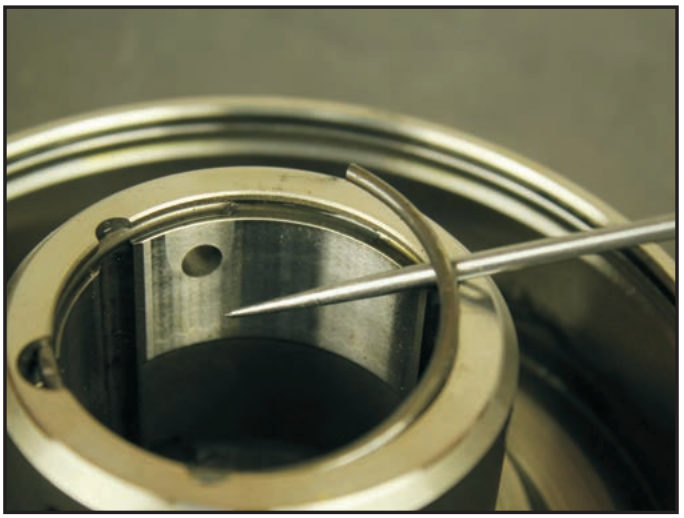


Figure 36

28. If all parts check good, remove the check ball snap ring retainer from the secondary pulley piston (figure 36).

29. Place and align the piston on the shaft (figure 37).

30. Using a soft metal C-clamp or equivalent, clamp it to the shaft with just enough clamping force to support the piston high enough to install the check balls (figure 38).

31. Install four 6mm steel check balls for each of the three key-way slots (figure 39).

32. Using a punch and hammer, lightly tap each ball into place (figure 40).

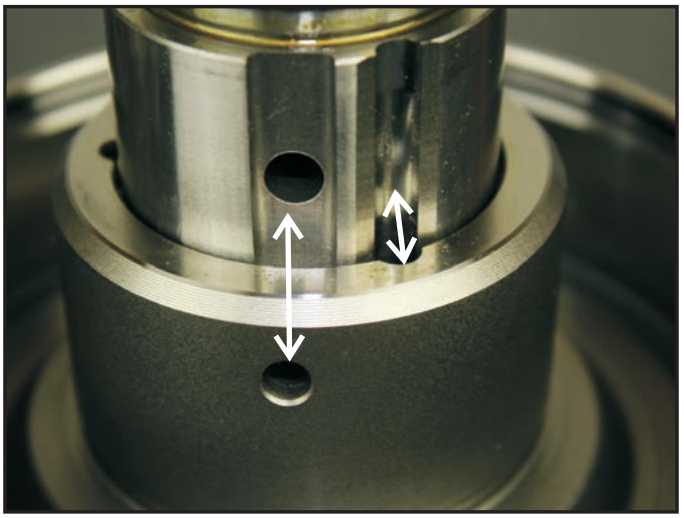


Figure 37

Figure 39

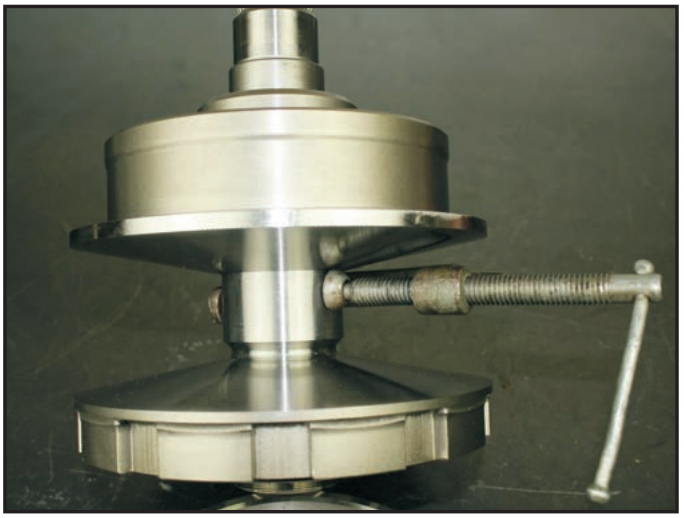


Figure 38

Figure 40

Variator Servicing

33. The snap ring used to retain the check balls has a bulge in it which faces upward and aligns with a notch in the shaft. Align and install the snap ring retainer (figure 41).

34.Generously lubricate the inside of the pulley drum with jell (figure 42) and install the spring (figure 43).

35. Install a new sealing ring onto the piston ensuring the lap joint ends of the ring interlocks correctly. Generously lubricate the piston sealing ring with jell (figure 44).

36. Install the nut screwing it down as far as it can go and remove the C-clamp or equivalent (figure 45).

Figure 43

Figure 41

Figure 44

Figure 42

Figure 45

Variator Servicing

Figure 46

37. Install the balance piston over the top of the pulley piston and bring the pulley to the press (figure 46).

38. Center the assembly into the press for an even press. Use a metal pipe that is approximately 5" in length with 2" inner diameter to press both the pulley piston and balance piston into the pulley drum. Install the balance piston snap ring into the pulley drum (figure 47).

39. Remove the nut and install the bearing and shim (figure 48) followed by the output drive gear (figure 49).

40. Screw the nut down finger tight as much as possible (figure 50).

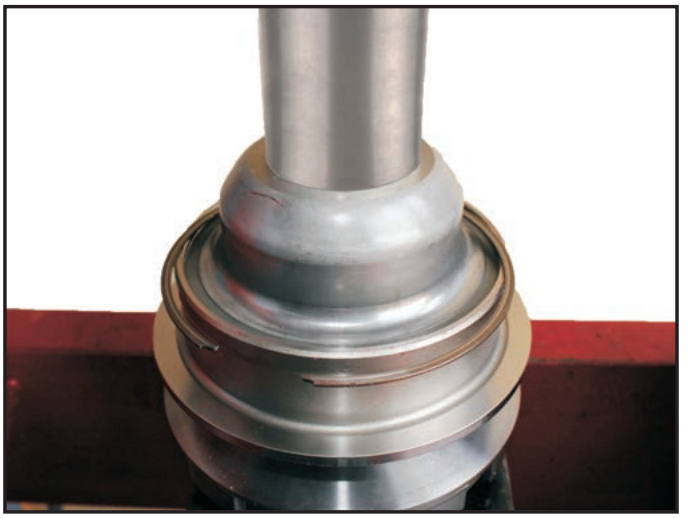


Figure 47

Figure 49

Figure 48

Figure 50

Variator Servicing

41. Using the same steel pipe, press the bearing and output drive gear into place (figure 51).

42. Once the gear is fully pressed, tighten the output drive gear nut (figure 52) and stake the nut to the shaft (figure 53). A factory torque specification is not provided. Suggestion: This gear drives the Reduction Gear Assembly which has a nut that tightens to 250Nm (185 Ft. Lbs.).

43. Using a similar procedure, assemble the Primary Pulley assembly. There are 2 balls per trough instead of 4 with the Secondary Pulley (figure 54).

44. Once the bearing is pressed on install and tighten the nut (figure 55).

Figure 53

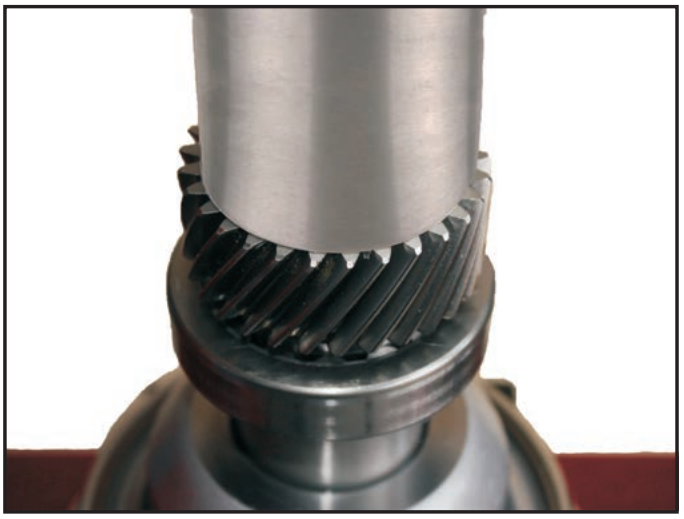


Figure 51

Figure 54

Figure 52

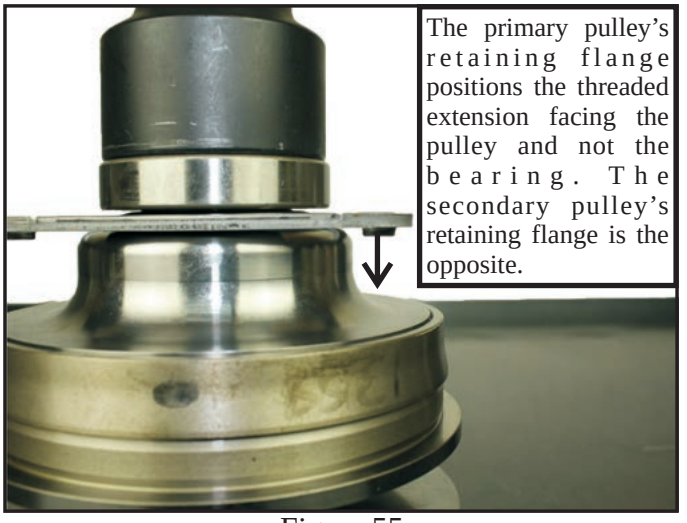


Figure 55

Variator Servicing

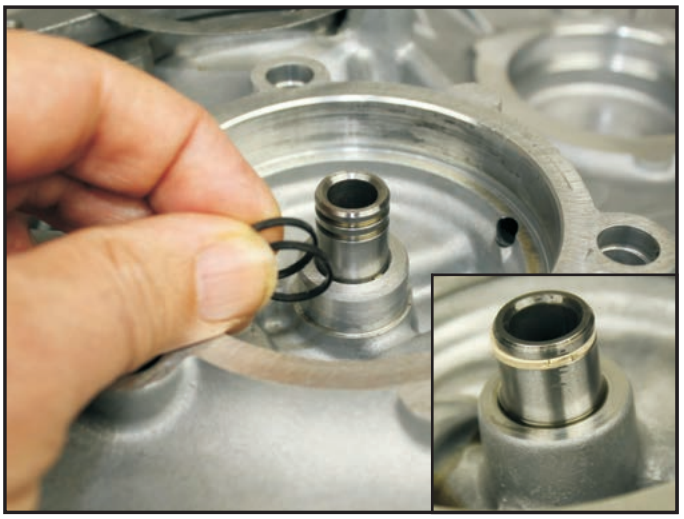


Figure 56

45. Install two new secondary pulley pressure butt cut sealing rings and lubricate with jell. Nissan uses one lap joint type ring (figure 56).

46. Install the shim into the secondary pulley bearing pocket and secure with jell (figure 57).

47. Using a secondary pulley spring release tool, correctly install the push belt into the pulleys using the printed arrow on the belt for reference (figure 58).

48. Assembly tip: make a couple of bolt guides to be used to align both pulley retaining flanges to the side cover (figure 59). Screw one bolt guide into each of the flanges as shown in figure 60.

Figure 57

Figure 59

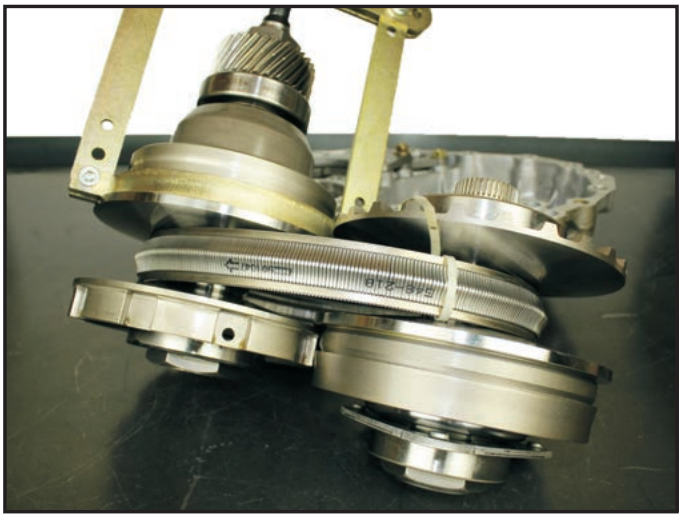


Figure 58

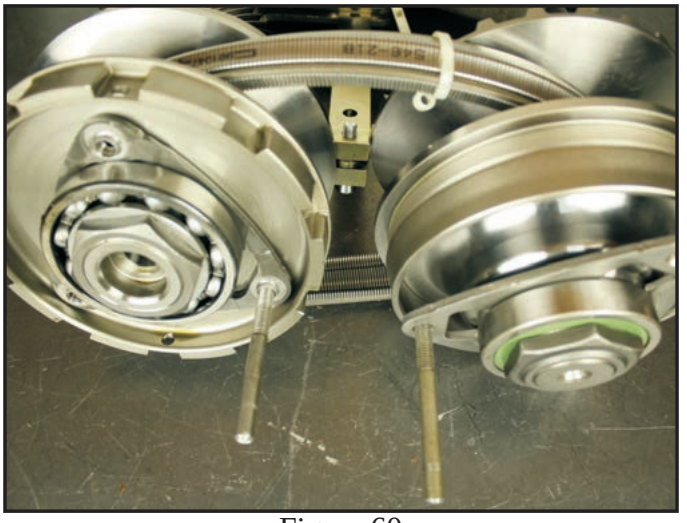


Figure 60

Variator Servicing

49. Remove and install all new o-rings on each of the six side cover to pulley retaining bolts (figure 61). Models without o-rings at the base of the bolt will require a silicone sealant or equivalent (figure 62).

50. Carefully install the pulley assembly into the side cover. Once both bearings are into their pockets, use a hand held straight pick to assist in aligning the flanges and install all six attaching bolts (figure 63).

51. Using a 14mm socket, tighten each of the six bolts to 23 Nm (17 Ft. Lbs) as seen in figure 64.

52. Remove the pulley tool and wire ties and check the pulleys for ease of rotation and push belt alignment (figure 65).

Figure 63

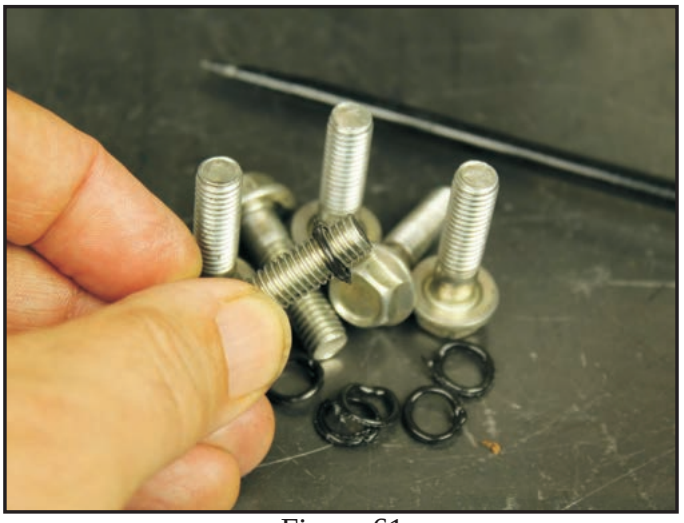


Figure 61

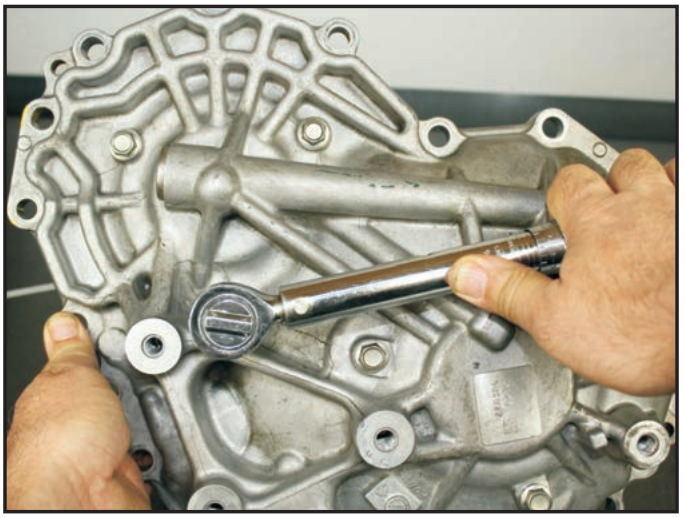


Figure 64

Figure 62

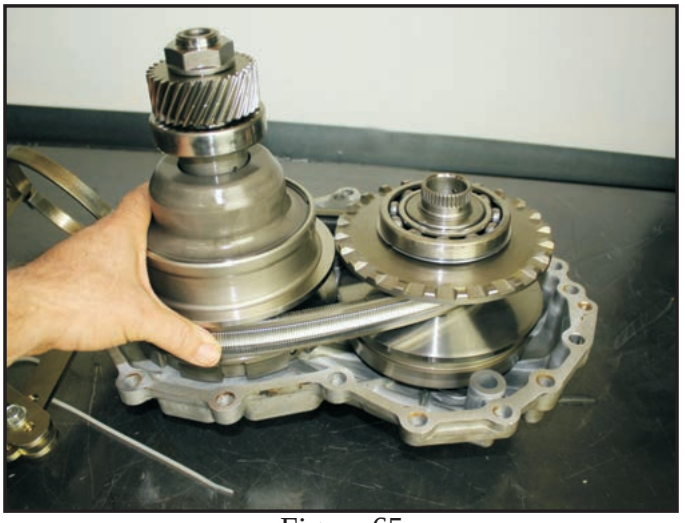


Figure 65

Variator Servicing

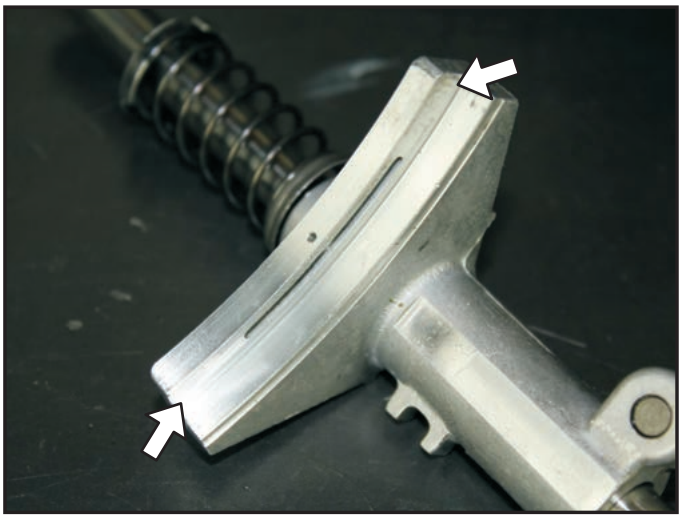


Figure 66

53. Inspect the ledge of the pulley follower where it rides against the pulley for excessive wear and replace if necessary (figure 66).

54. Install the pulley follower spring cup up first (figure 67). Then sit the pulley follower into the spring cup. Carefully push the follower down placing the edge under the pulley sheave (figure 68). Secure the spring and follower into place with the pin guide (figure 69).

55. Install a new main case to side cover secondary pulley o-ring into its pocket and secure with jell (figure 70).

Figure 67

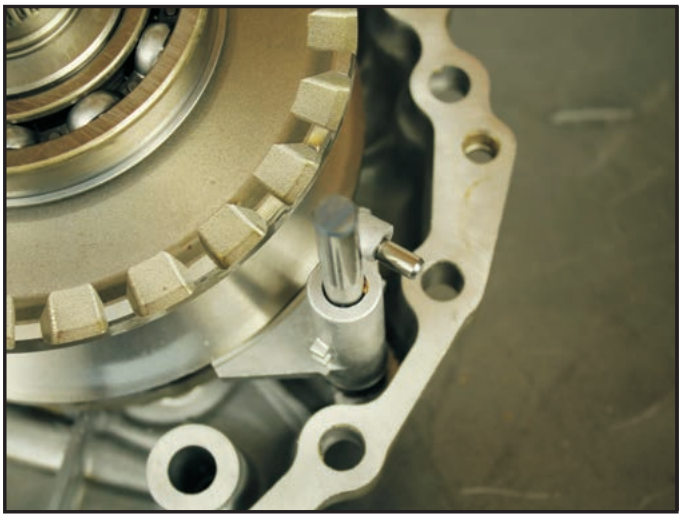


Figure 69

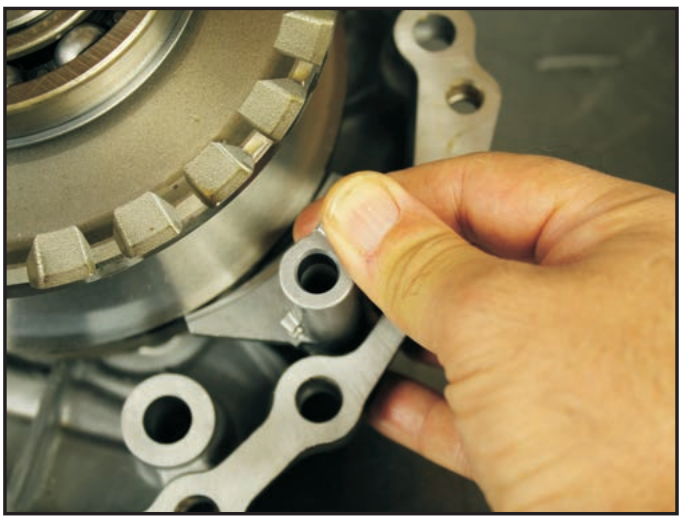


Figure 68

Figure 70

Transmission Reassembly

1. Place a thin coat of silicone or equivalent onto the main case to side cover mating surface figure 1).

2. Carefully place the main case over the pulleys and onto the side cover. Be sure to align the park rod into the park pawl assembly (figure 2).

3. The pulley follower guide pin will also need to be aligned to the main case half. During installation of the main case, care needs to be taken to clear the case as it passes the pin on the pulley follower that indexes to the ratio control valve lever (figure 3).

4. Using a dead-blow or rubber mallet, carefully tap the main case onto the side cover (figure 4).

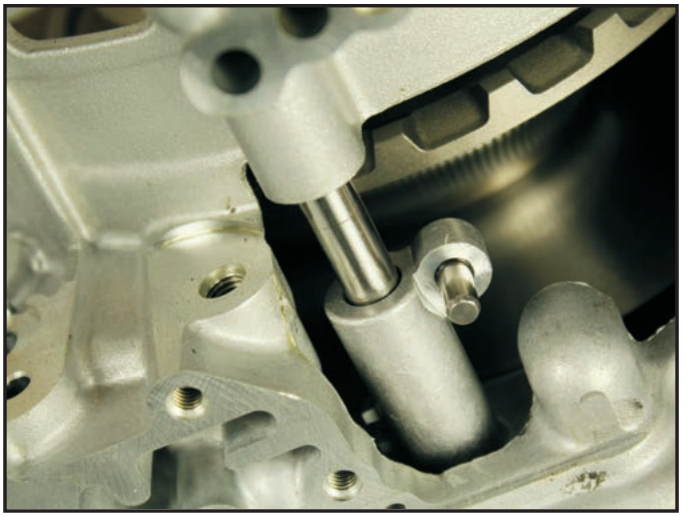


Figure 3

Figure 1

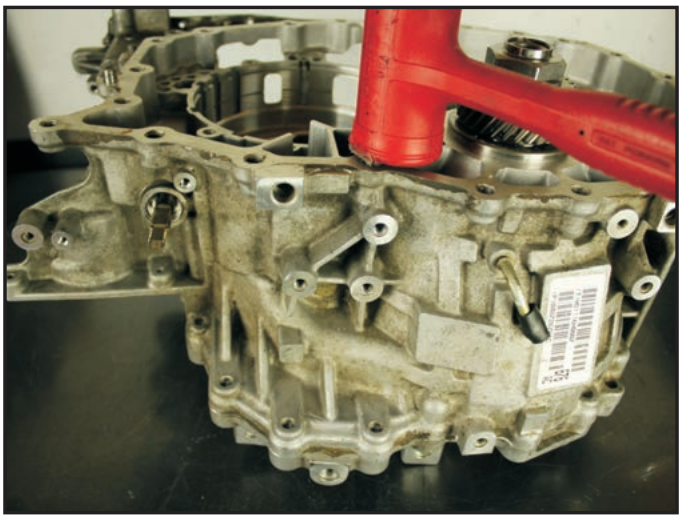


Figure 4

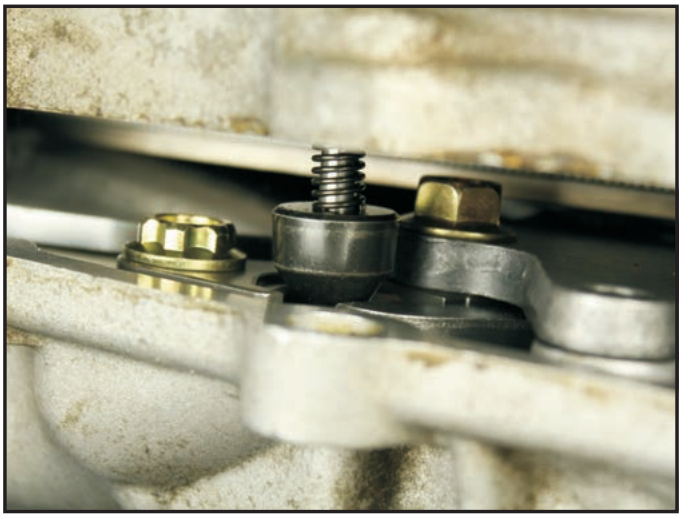


Figure 2

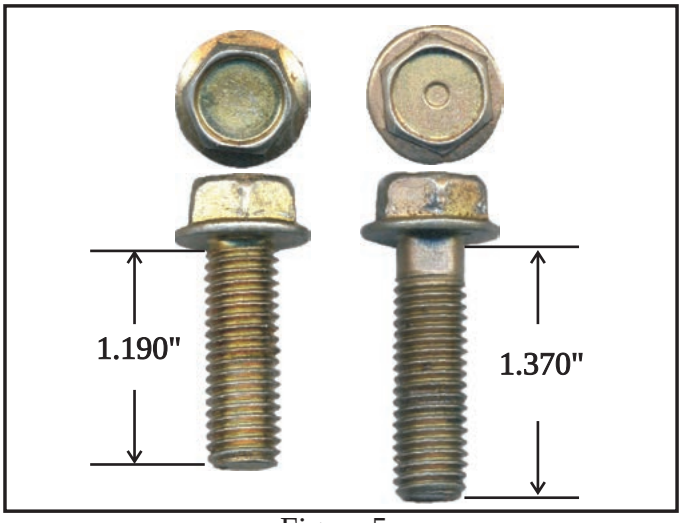


Figure 5

Transmission Reassembly

Figure 6

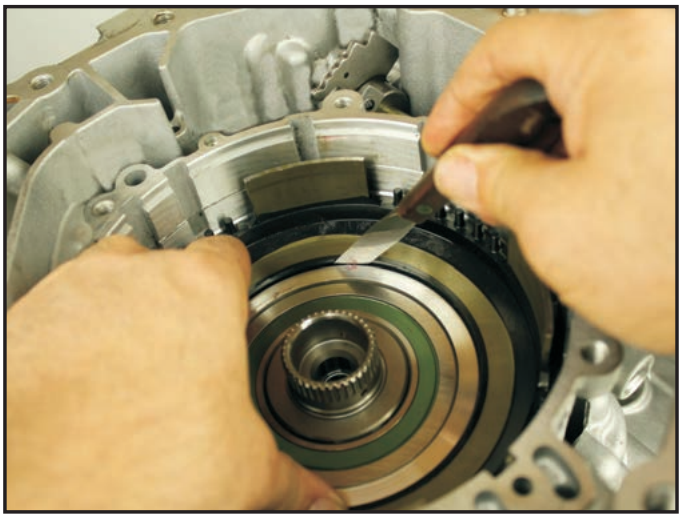


Figure 7

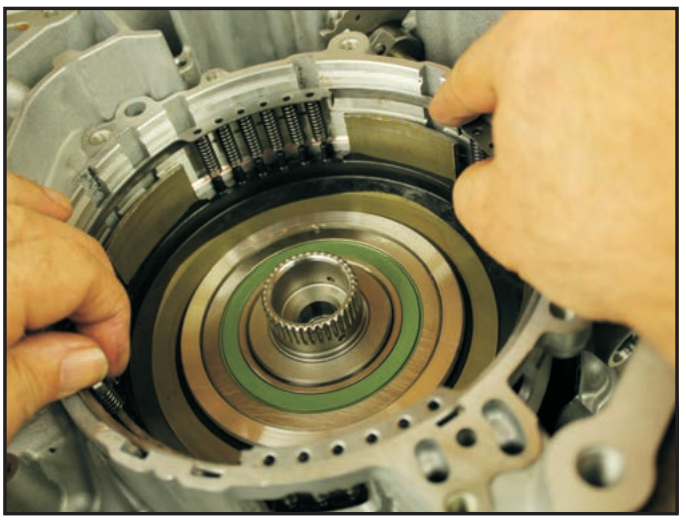


Figure 8

5. Locate and install nineteen side cover to main case attaching bolts. Seventeen are 1.190” in length while two are 1.370” in length identified with a dot in the hex head. These two are to be placed closest to the pain rail (figures 5 and 6). Using a 14mm socket, torque all nineteen bolts (figure 6) to 45Nm (33 Ft. Lbs.).

6. Using petroleum jelly or equivalent, lubricate the lip seals on the reverse brake molded piston. Install the piston into the main case using a seal installer being careful not to tear the rubber lip (figure 7).

7. Install the reverse brake apply piston return spring assembly over the pins on the apply piston (figure 8).

8. Locate the “V” notch on one of the lugs of the spring retainer plate (figure 9).

9. Align the “V” notch to the channel in the case at approximately the 12 o’clock position (figure 10).

10. The spring retainer plate can now be used to properly align the piston and spring return assembly (figure 11).

11. Install the first of two special tools such as the one shown here from CVT Pushbelt BV (figure 12).

12. Place the second special tool into the case followed by the reverse brake retaining snap ring (figure 13).

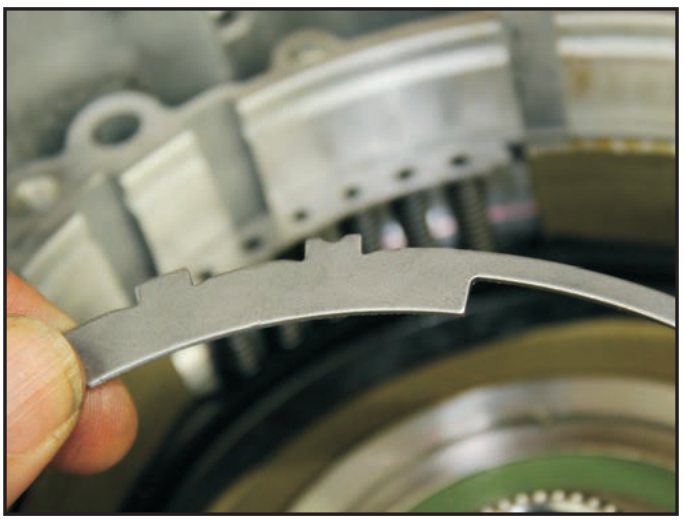


Figure 9

Transmission Reassembly

13. Using the special tool, compress the reverse brake piston return spring and retainer plate far enough to install the thin retaining snap ring. Once installed remove the special tool (figure 14).

14. Locate the "V" notch on one of the lugs of the reverse brake dished plate. Install the dished plate onto the brake piston like a bowl (convex side down) with the "V" notch in the 12 o'clock channel of the case (figure 15).

15. Beginning with a steel plate, alternately install three steel and three pre-soaked friction plates ending with the selective reaction plate and thick retaining snap ring (figure 16).

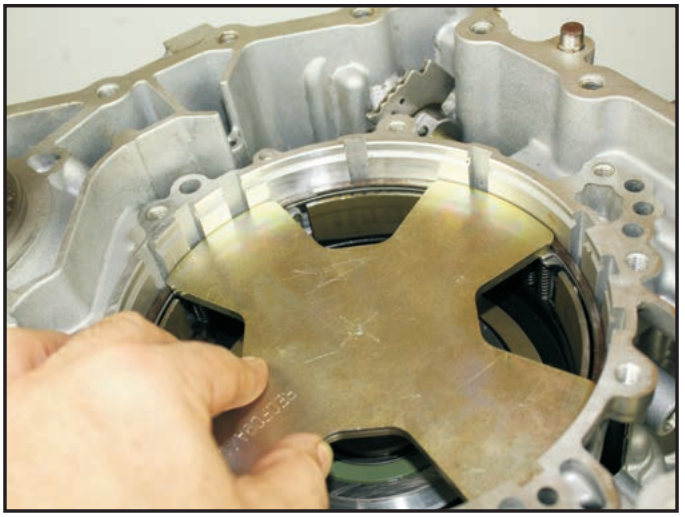


Figure 12

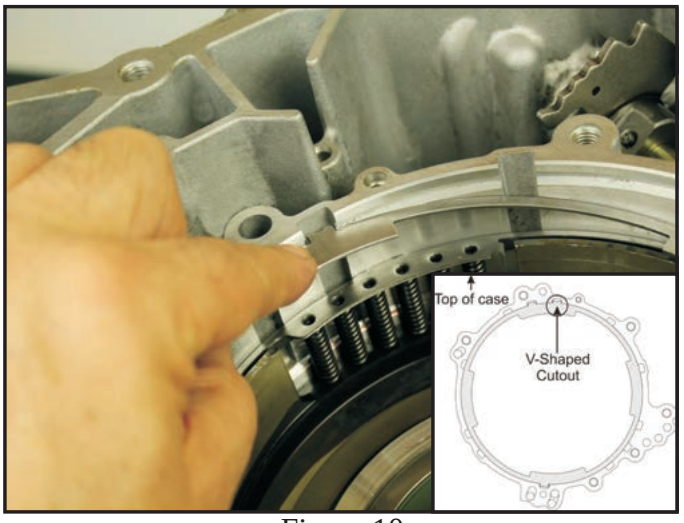


Figure 10

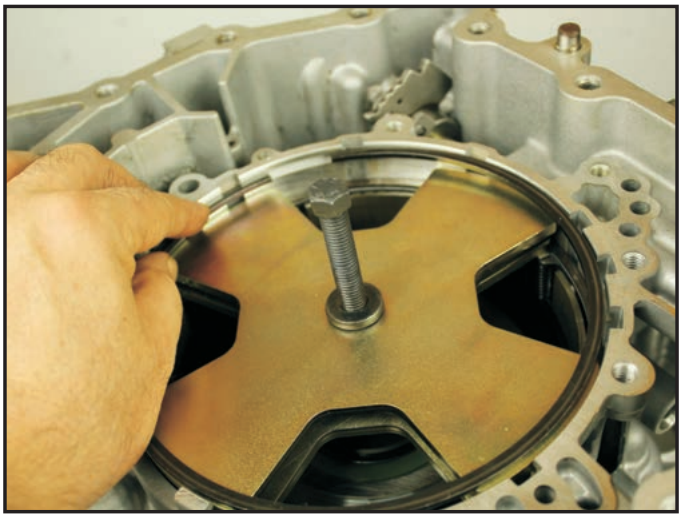


Figure 13

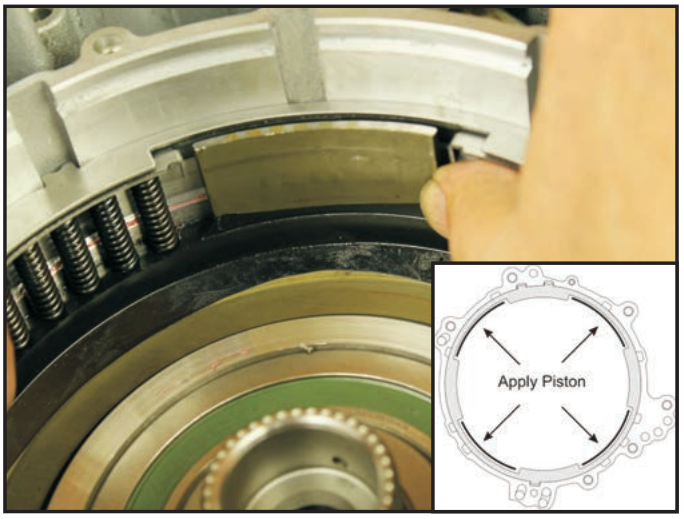


Figure 11

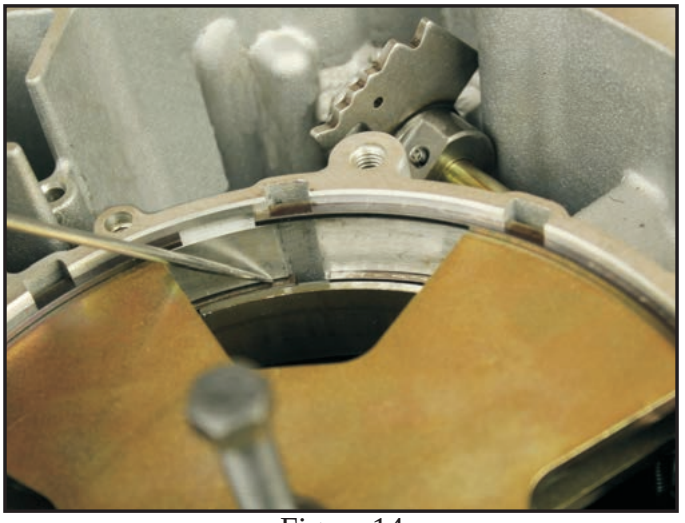


Figure 14

Transmission Reassembly

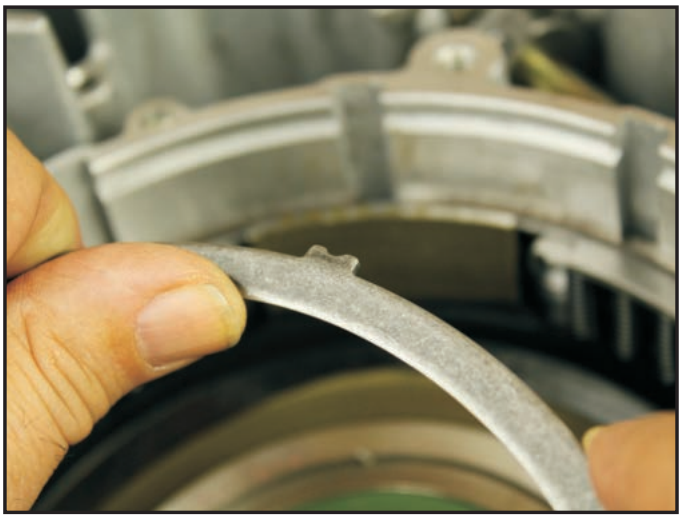


Figure 15

16. Measure the clearance between the snap ring and reaction plate. Measure in two or more places and calculate the average. Clutch clearance should be 1.2-1.5mm (.047-.059 in.).

17. Adjust by selecting the correct selective reaction plate (figure 17). See service information on page 110 figure 5.

18. Install needle bearing # 4 with the inner race face down (figure 18).

19. Install the planet carrier into the reverse brake. Rotate the carrier until the inner teeth of all three friction plates are engaged into the hub of the carrier (figure 19).

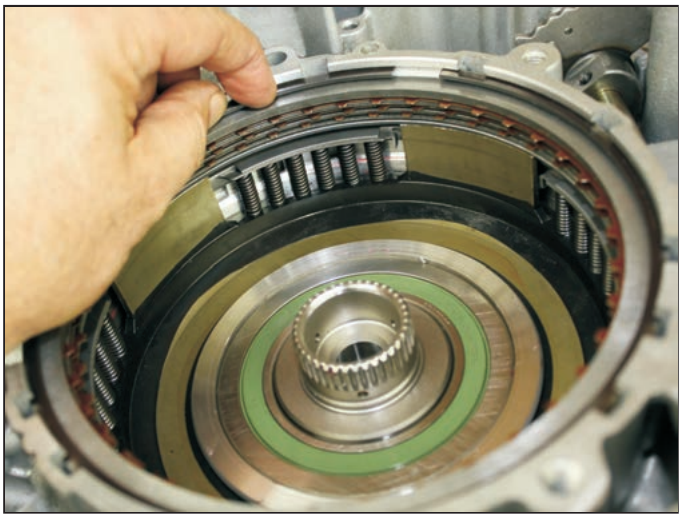


Figure 16

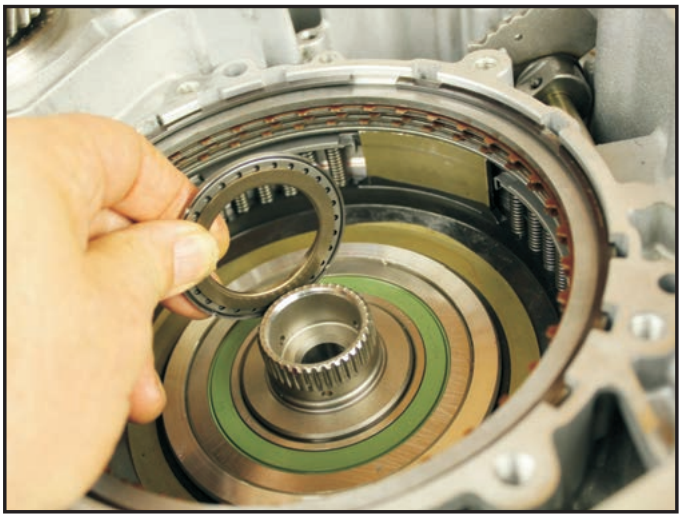


Figure 18

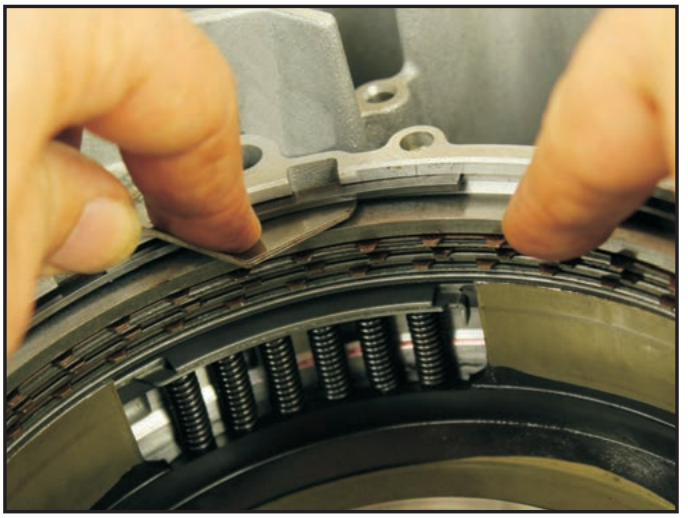


Figure 17

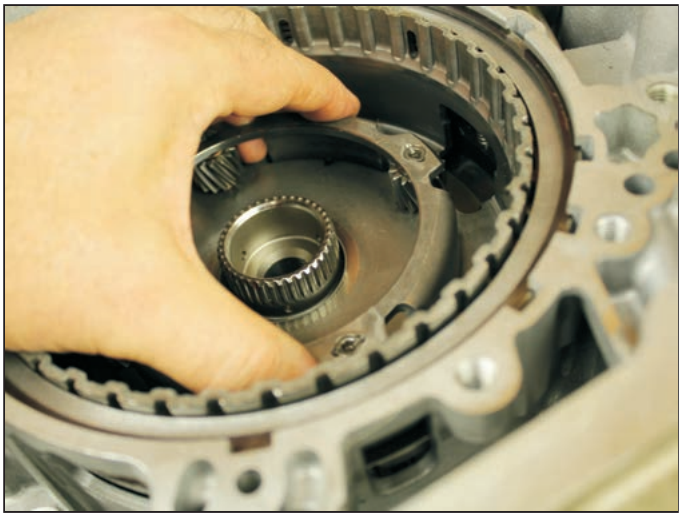


Figure 19

Transmission Reassembly

20. Install needle bearing # 3 with the inner race face down (figure 20 and 21).

21. Install forward clutch hub and sun gear into the carrier aligning the inner spline to the primary pulley's drive shaft (figure 22).

22. Install needle bearing # 2 with the inner race facing up (figure 23).

23. Install the forward clutch drum assembly. Index the friction plates into the hub by rotating the drum until it drops down and is seated against the # 2 needle thrust bearing (figure 24).

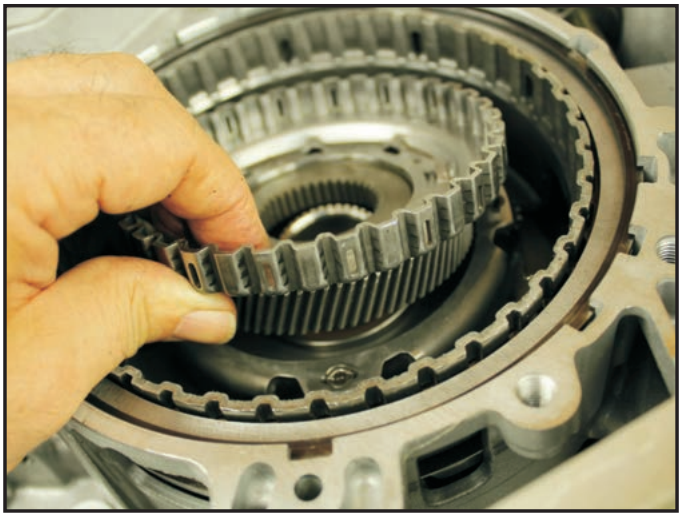


Figure 22

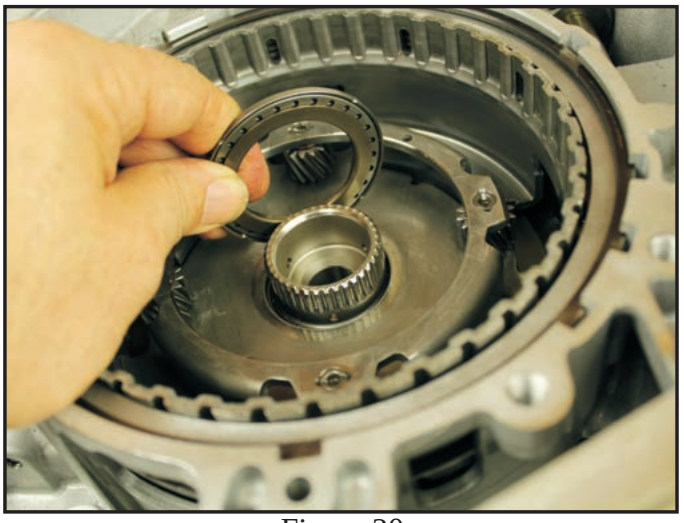


Figure 20

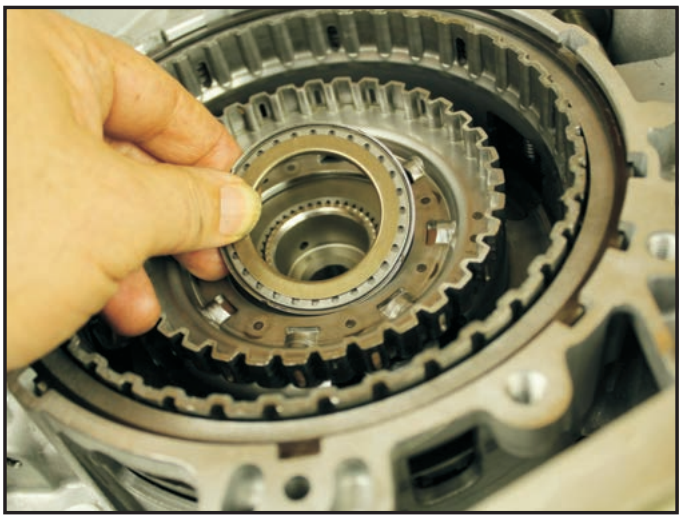


Figure 23

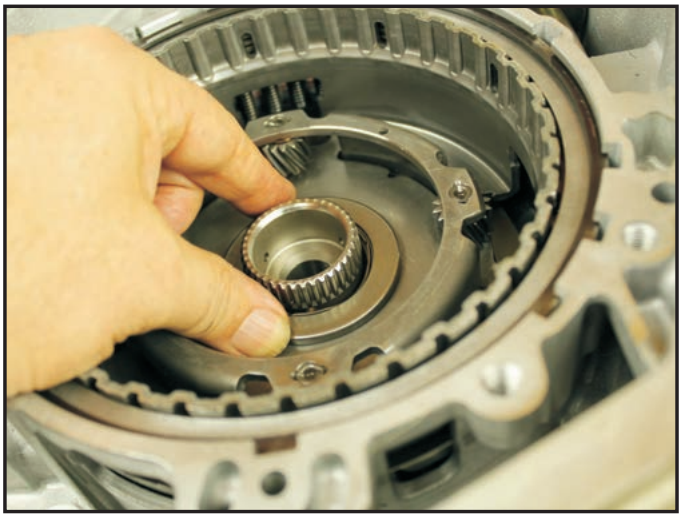


Figure 21

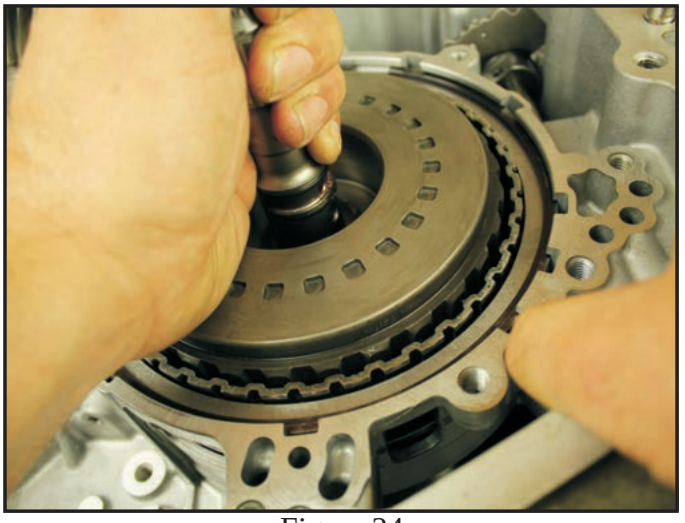


Figure 24

Transmission Reassembly

Figure 25

24. Place a gauging bar across the case and over the forward clutch drum. Using a vernier caliper, measure from the bottom of the bar to the bearing seat. Take two measurements 180 degrees of each other and calculate the average (figure 25). This is measurement # 1.

25. Place a gauging bar across the stator support cover. Using a vernier caliper, measure from the bottom of the bar to the support's mating surface. (figure 26). This is measurement # 2.

26. Calculate the bearing thickness needed which is equal to measurement 1 minus measurement 2 minus the nominal end play of 0.40mm (0.016 in.).

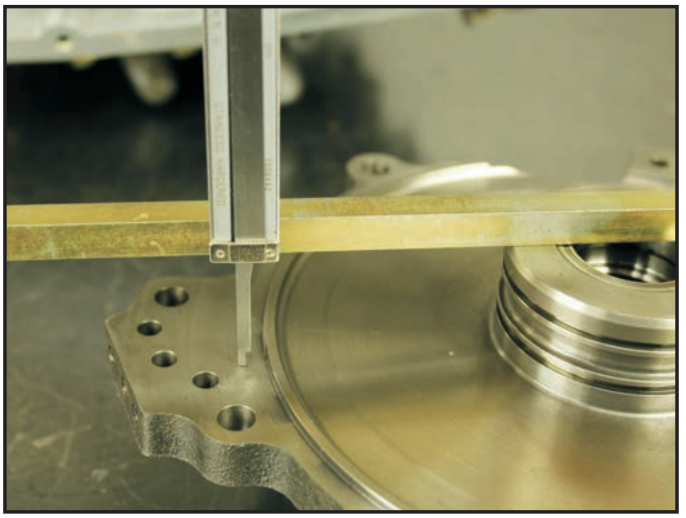


Figure 26

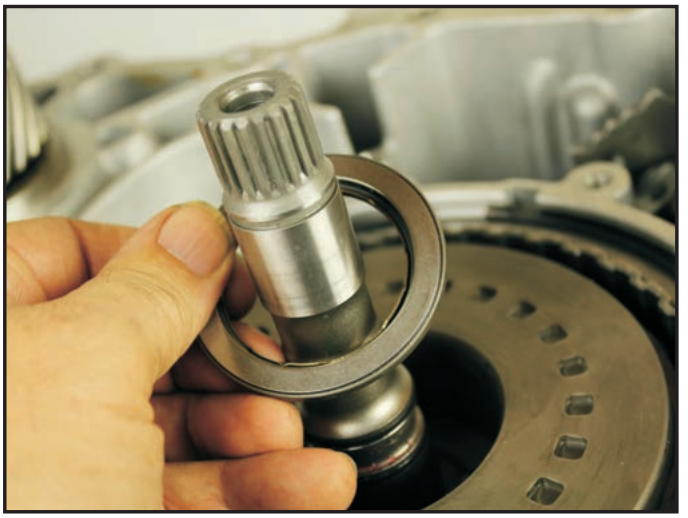


Figure 28

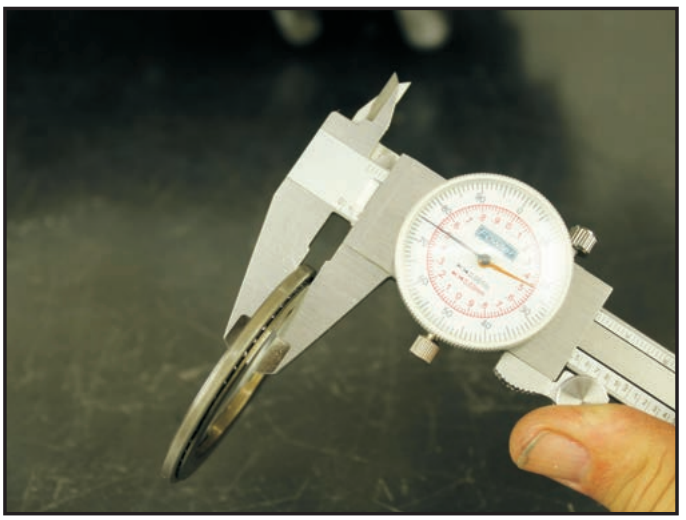


Figure 27

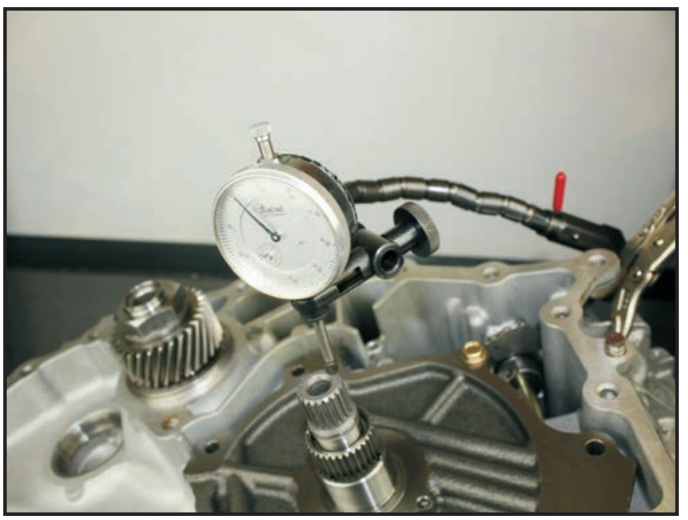


Figure 29

Transmission Reassembly

27. Measure the thickness of the bearing and compare it to the calculation made and verify if the bearing can be re-used or if needs to be replaced (figure 27). See service information on page 110 figure 6 for selective bearing thicknesses.

28. Install the correct selective needle bearing # 1 down into the forward clutch drum with the inner race down. Make sure the bearing is fully seated and not sitting on top of any of the locating tabs on the forward drum (figure 28).

29. Install the stator support with a couple of attaching bolts without any forward clutch sealing rings. Verify end-play to be between 0.25-0.55mm (0.010-0.020 in). If needed, adjust using the correct selective needle bearing assembly (figure 29).

30. Remove the stator support cover and install a high pressure metal clad lip seal into the case. Secure it with trans jell or equivalent (figure 30).

31. Install the oil pump down into the case, then install three 6mm allen head oil pump mounting bolts (70mm [2.75 in.]) finger tight only at this time (figure 31).

32. Depending on the style bolt, install a new o-ring or sealing compound onto the rear of pump mounting bolt. Install the bolt into the pump through the case finger tight (figure 32).

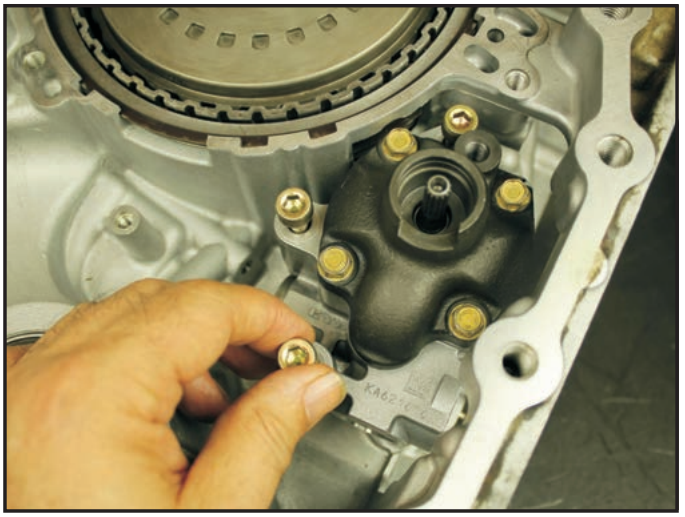


Figure 31

Figure 32

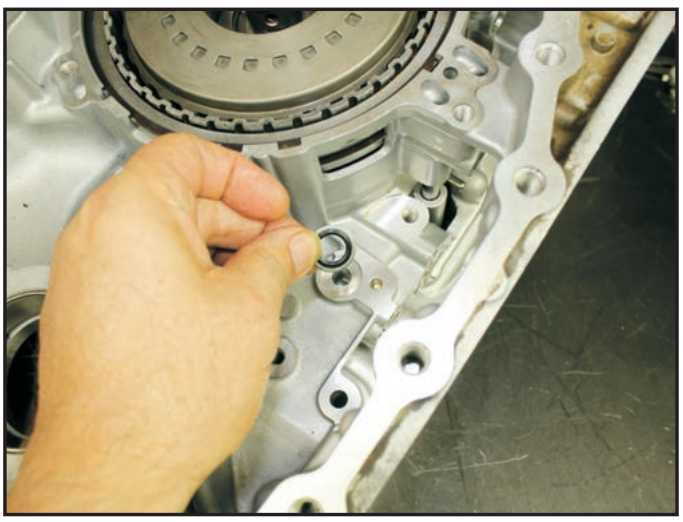


Figure 30

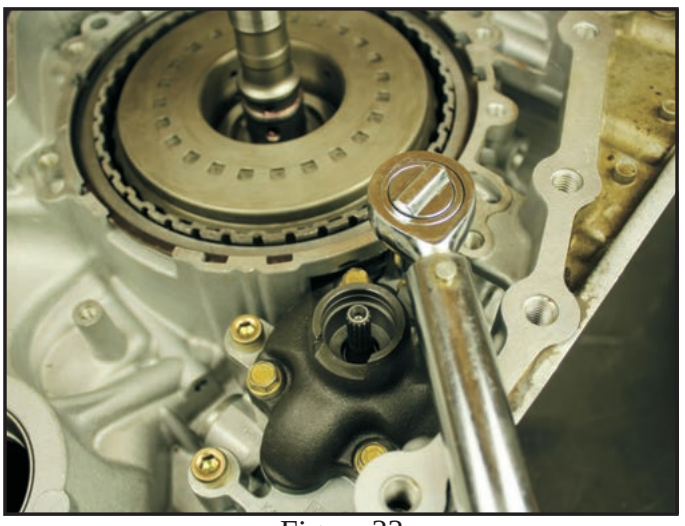


Figure 33

Transmission Reassembly

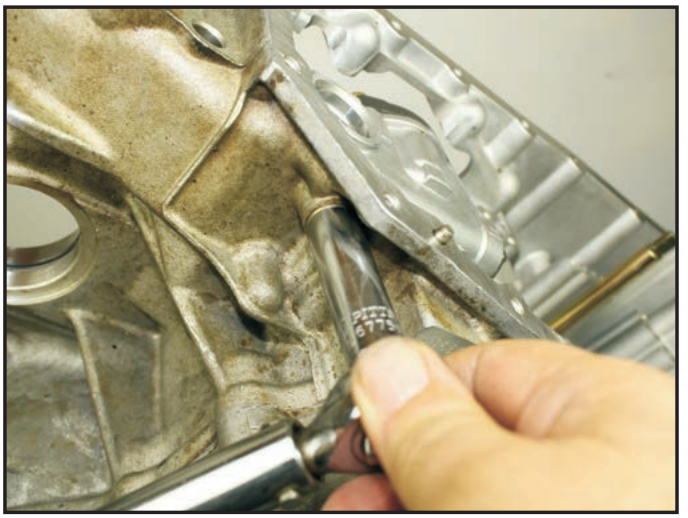


Figure 34

33.Starting with the three 6mm head oil pump to case mounting bolts (figure 33), tighten to 19 Nm (14 Ft. Lbs.). Using a 14mm socket, torque the outside case to pump attaching bolt (figure 34) to 28 Nm (20 Ft. Lbs.).

34. Install the manual control shaft locating pin into the case (figure 35). Install the detent spring and mounting bolt (figure 36). Using a 10mm socket torque the mounting bolt (figure 37) to 7Nm (61 in. lbs.).

35. Install new sealing rings onto the stator support cover ensuring the lap joint ends of the ring interlocks correctly. Lubricate both the sealing rings and bushing surfaces with trans jell (figure 38).

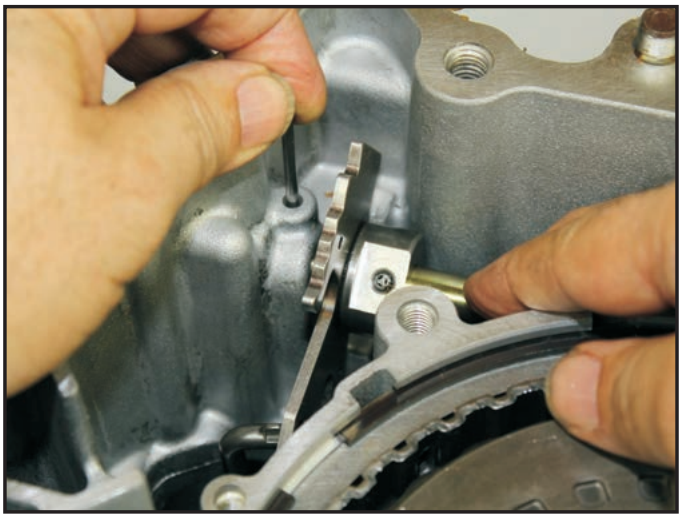


Figure 35

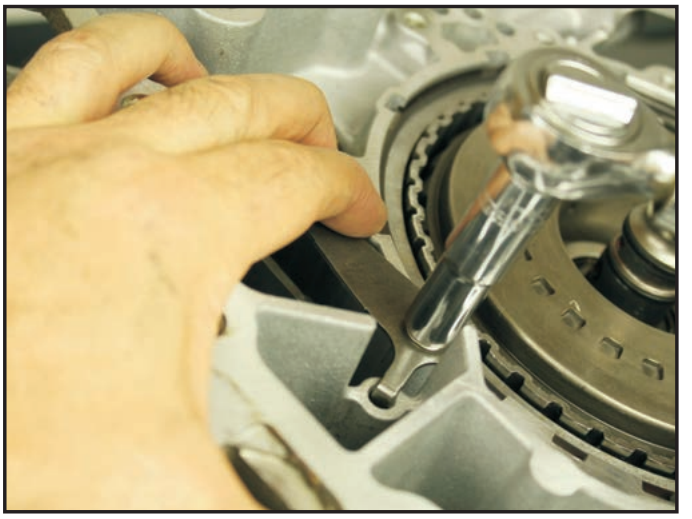


Figure 37

Figure 36

Figure 38

Transmission Reassembly

36. Install the stator support and five 30 mm (1.18 in.) mounting bolts as indicated , finger tight only (figure 39).

37. Install the oil pump chain baffle and two 30 mm (1.18 in.) mounting bolts finger tight only (figure 40).

38. Install the differential baffle plate and two 16 mm (.630 in.) mounting bolts finger tight only (figure 41).

39. Install the oil pump bracket and two 16 mm (.630 in.) mounting bolts finger tight only (figure 42).

40. Using a 10mm socket, tighten the two differential baffle plate mounting bolts (figure 43) to 6 Nm (4.4 ft. lbs.)

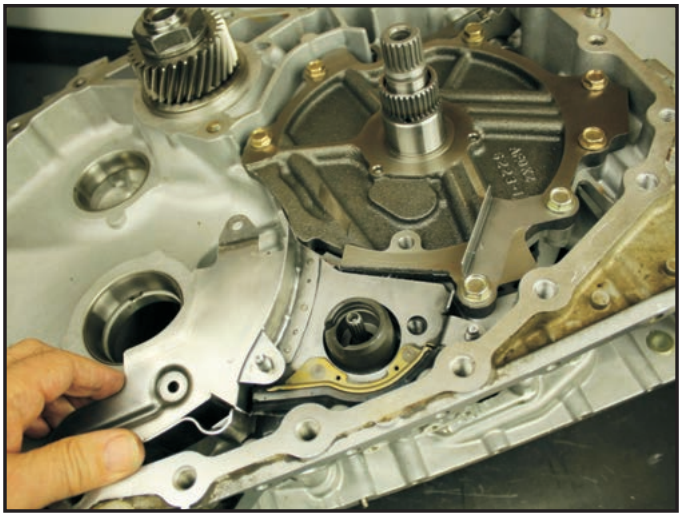


Figure 41

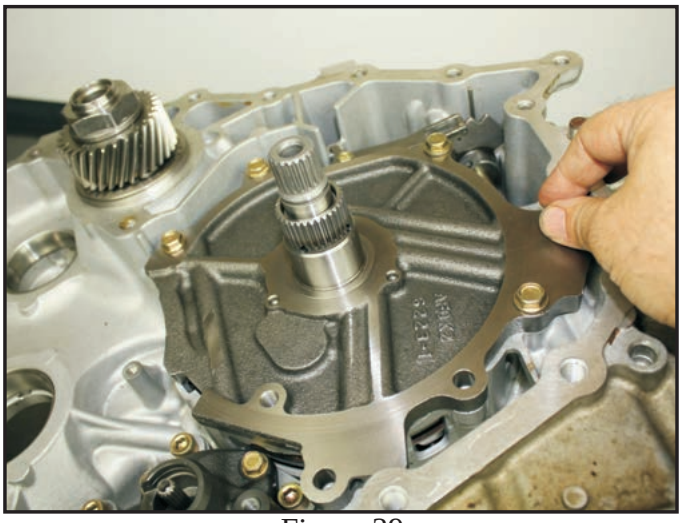


Figure 39

Figure 42

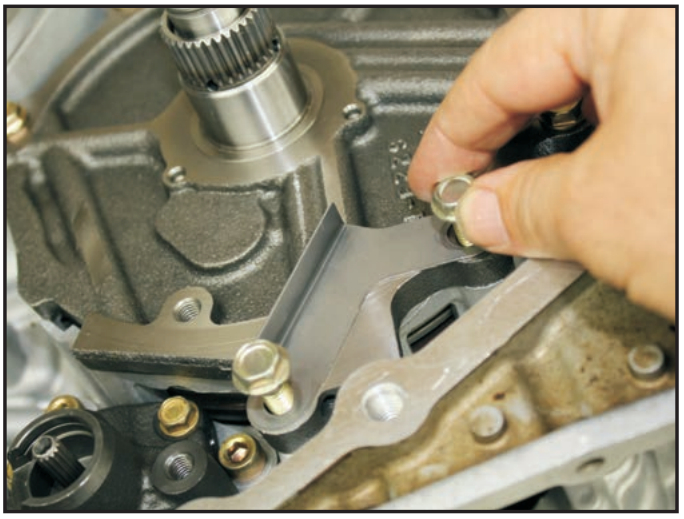


Figure 40

Figure 43

Transmission Reassembly

Figure 44

41. Using a 12mm socket, tighten the stator support, baffle plate and bracket mounting bolts (figure 44) to 26 Nm (19 ft. lbs.).

42. Install a new (*Mitsubishi part # 2791A018*) driven sprocket ball bearing retaining snap ring into the pump with the open end aligned to the cutout in the pump (figure 45).

43. Using petroleum jell or trans jell, secure the three tang thrust washer on the stator support cover (figure 46).

44. Place the smooth side drive sprocket down against the three tang thrust washer (figure 47) with the step side up (figure 48).

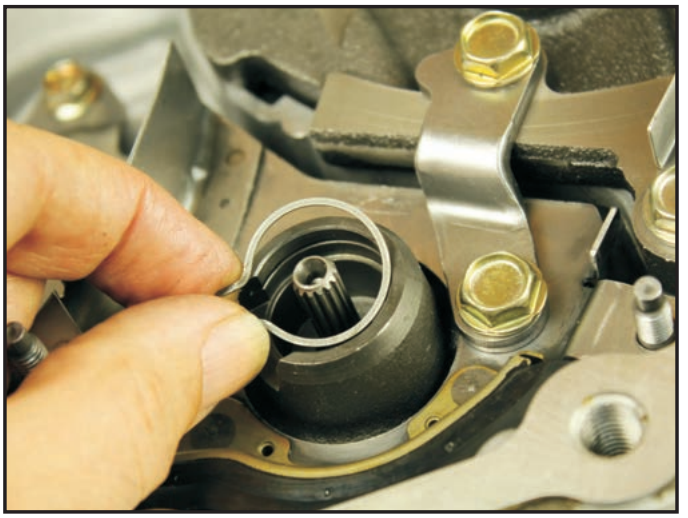


Figure 45

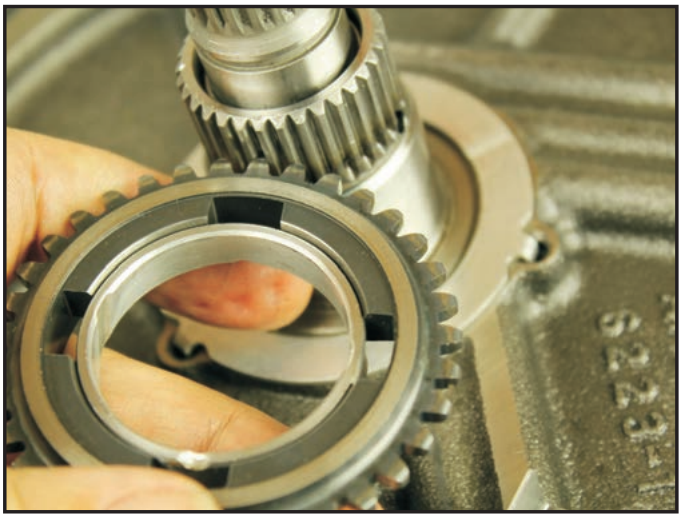


Figure 47

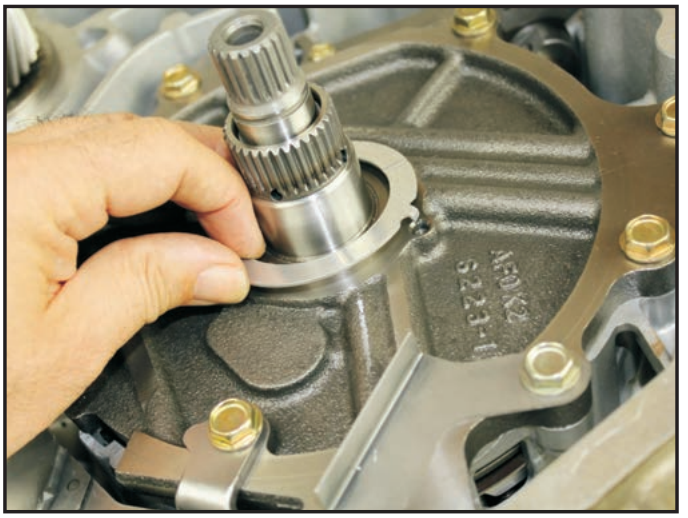


Figure 46

Figure 48

Transmission Reassembly

45. Install the chain and driven sprocket into place (figure 49).

46. With a suitable pair of pliers, carefully expand the retaining snap ring seating it into the groove on the bearing's outer race. Pull up on the driven sprocket enough to ensure that it is securely installed (figure 50).

47. Using a suitable gauging bar and vernier caliper, measure in two places 180 degrees apart, the distance between the case mounting surface and the selective shim seat on the pump driven sprocket (figure 51). Calculate the average for measurement # 1.

48. Using a suitable gauging bar and vernier caliper, measure in two places 180 degrees apart, the distance between the case mounting surface and the selective shim surface on the converter housing (figure 52). Calculate the average for measurement # 2.

49. The thickness required for the two select shims (figure 53, is equal to the following formula:

Measurement # 1 PLUS Measurement # 2 MINUS 0.16mm (0.0065 in.).

The required clearance is 0.10-0.23 mm (0.004-0.009 in.), adjust as necessary.

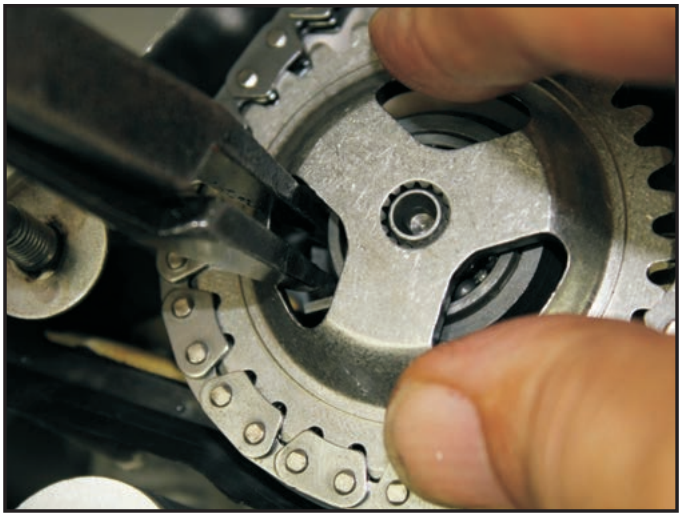


Figure 50

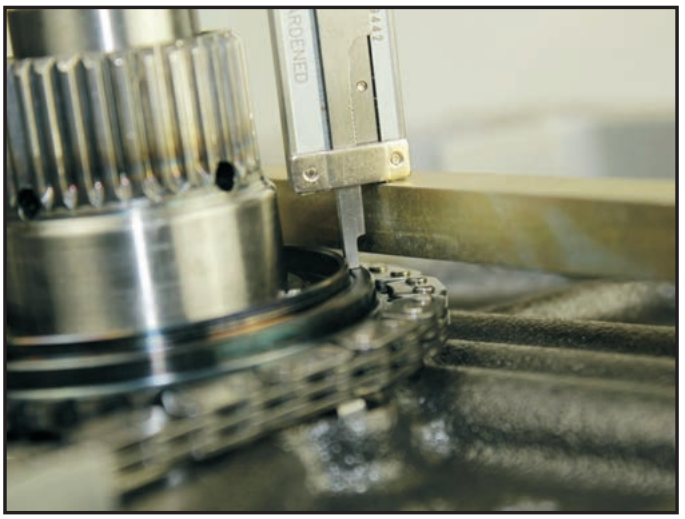


Figure 51

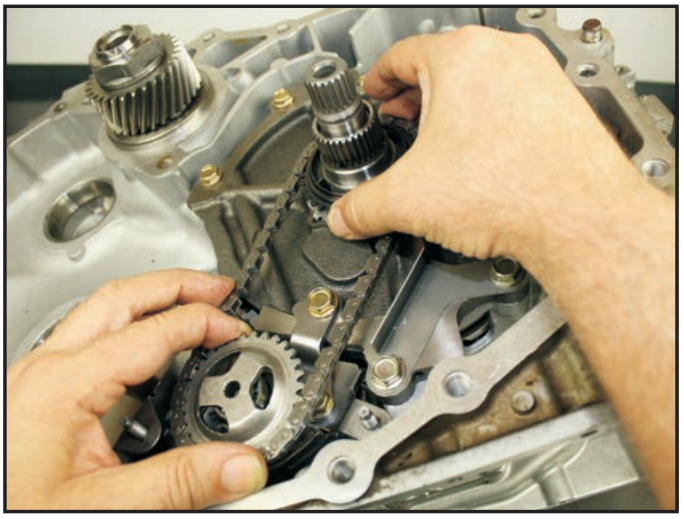


Figure 49

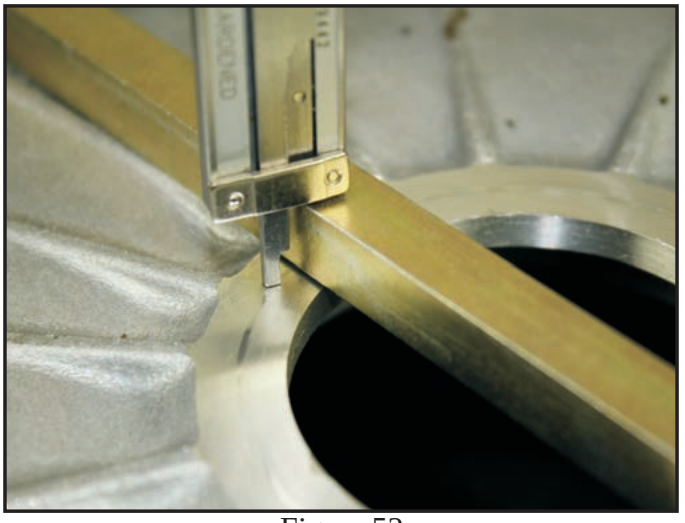


Figure 52

Transmission Reassembly

Figure 53

50. Selective shims (figure 54) are no longer used with later models as the drive sprocket has been redesigned.

51. Install a new Input Shaft o-ring and lubricate with jell (figure 55).

52. Install the baffle plate over the pump driven sprocket (figure 56).

53. Using a 10 mm socket, install and tighten the mounting nuts (figure 57) to 6 Nm (4.4 ft. lbs.).

54. Install the differential assembly and the reduction gear assembly into the case (figure 58).

Figure 54

Figure 56

Figure 55

Figure 57

Transmission Reassembly

55. Install the converter housing oil seal into the converter housing with special tool or equivalent (figure 59).

56. Evenly apply a thin coat of gasket sealer or equivalent on the mating surface of the main case and place the converter housing onto the main case (figure 60).

57. Install three 35 mm (1.38 in.) converter housing bolts identified by the dimple in the hex head into the location shown in figure 61.

58. Install two 35 mm (1.38 in.) converter housing bolts identified by the dimple in the hex head into the location shown in figure 62.

Figure 60

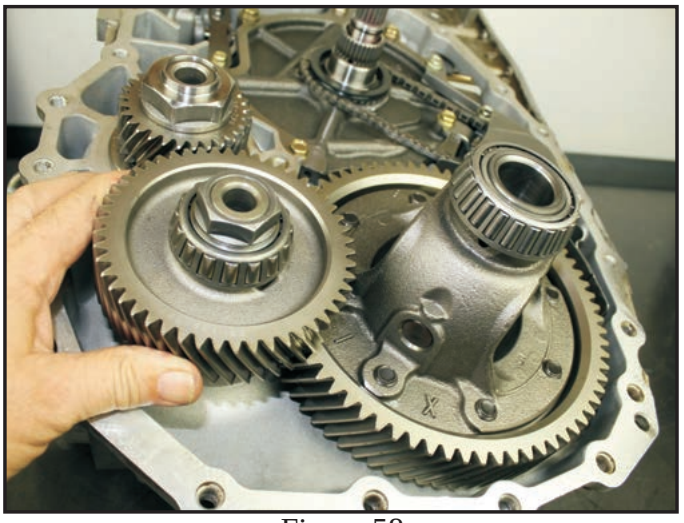


Figure 58

Figure 61

Figure 59

Figure 62

Transmission Reassembly

Figure 63

59. Install the remaining eighteen 30 mm (1.18 in.) converter housing bolts (figure 63). Tighten all converter housing to main case attaching bolts to 45 Nm (33 ft. lbs.).

60. Install new axle seals with special tool or equivalent (figure 64).

61. Install a new reverse brake valve body to main case seal (figure 65).

62. Install a new o-ring on the harness connector (figure 66) and lubricate with jell (figure 67).

63. Separate the main harness from the valve body to be installed into the case (figure 68).

Figure 64

Figure 66

Figure 65

Figure 67

Transmission Reassembly

64. Insert the main harness connector into the case with the stopper tab towards the pan rail (figure 69).

65. Insert the retaining clip into the groove on the harness connector (figure 70).

66. Position the harness so that it is clear for the valve body assembly to be installed (figure 71).

67. Install the valve body into the main case and hold it in place (figure 72). Install the one valve body attaching bolt finger tight followed by the remaining attaching bolts. There are a total of ten 54 mm (2.13 in.) length bolts and one 44 mm (1.73 in.) length attaching bolts to be installed.

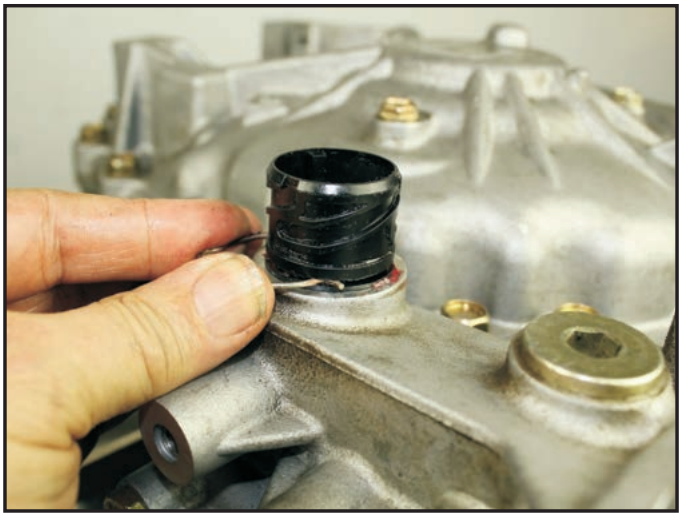


Figure 70

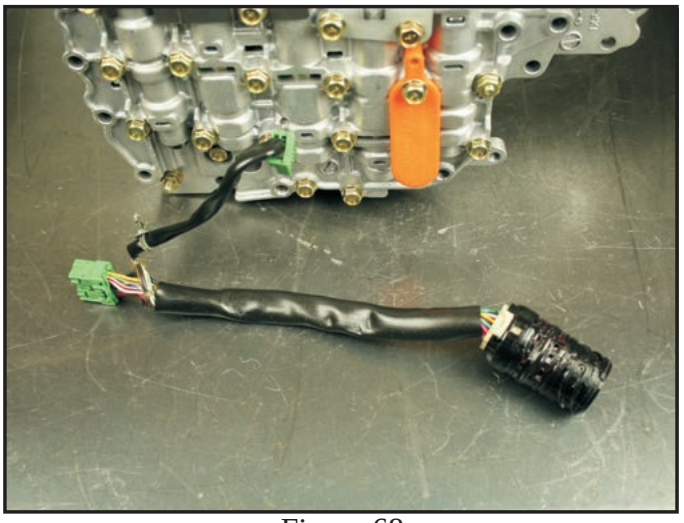


Figure 68

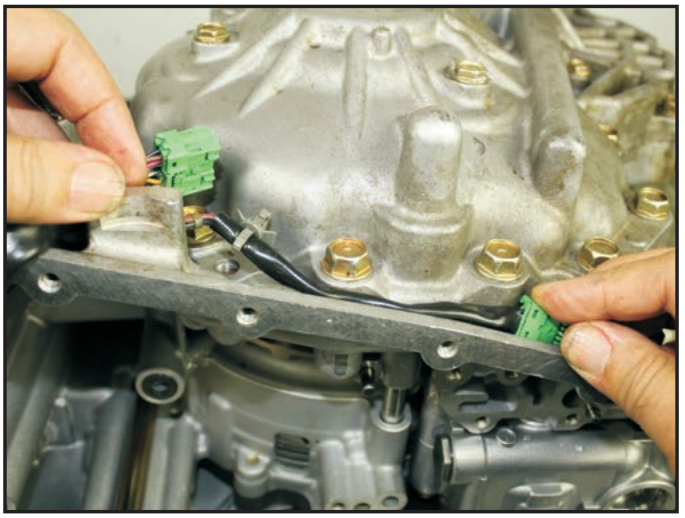


Figure 71

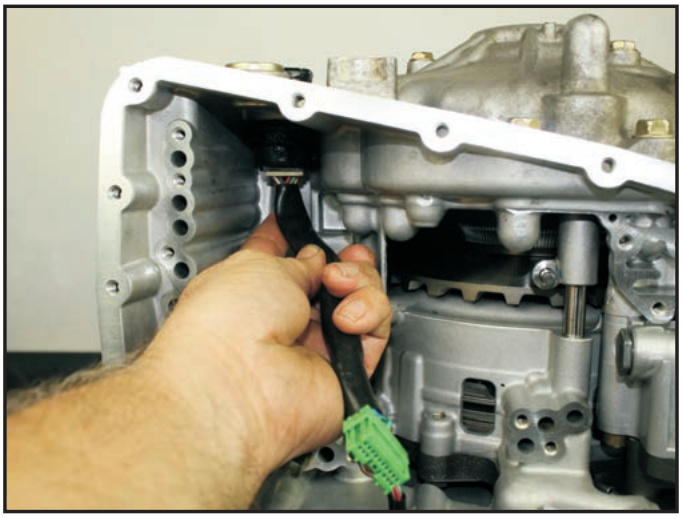


Figure 69

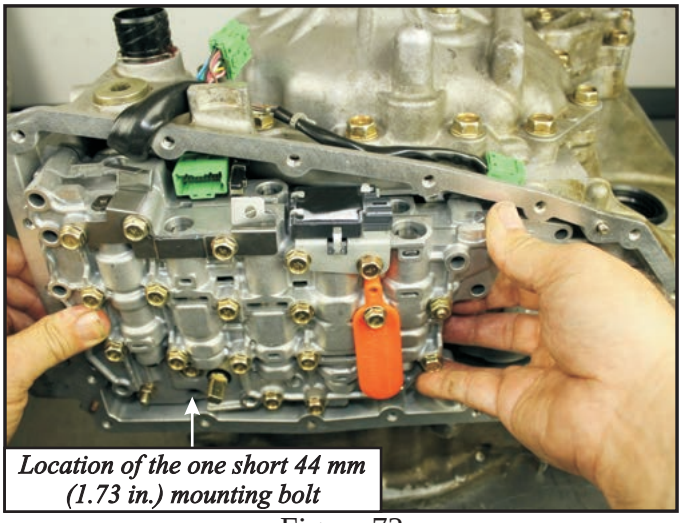


Figure 72

Transmission Reassembly

Figure 73

68. Remove the pin that retained the ratio control valve into position (figure 73). Depending on the pin used, it may have covered one of the valve body's 54 mm (2.13 in.) length mounting bolt which will need to be installed (figure 74).

69. Install the manual control shaft sleeve over the shaft and into the opening of the valve body. Push it in until it becomes flush with the surface of the valve body (figure 75). Install the manual control valve lever into the manual valve followed by the lock washer and nut finger tight (figure 76).

70. Install the oil strainer mounting bracket onto the valve body and its two 25 mm (.984 in.) length attaching bolts finger tight (figure 77).

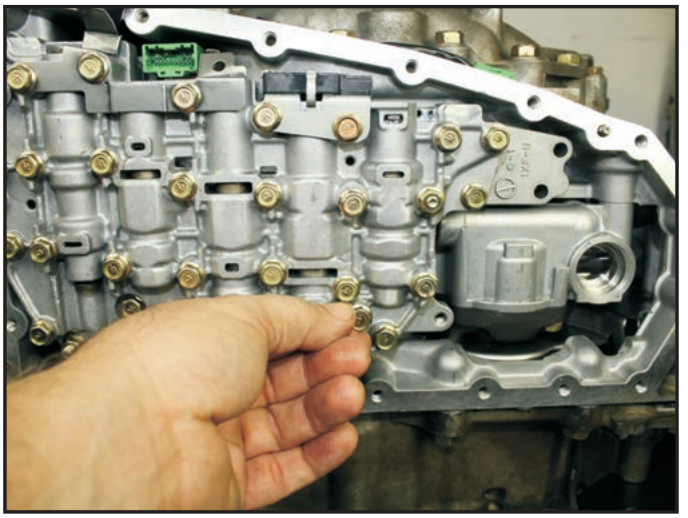


Figure 74

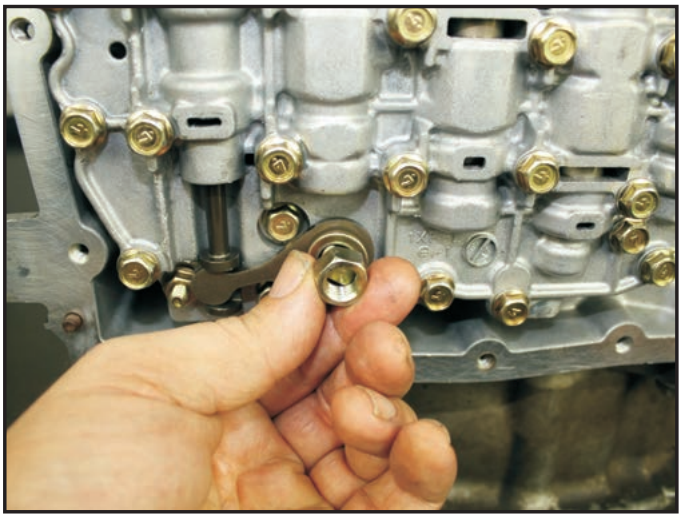


Figure 76

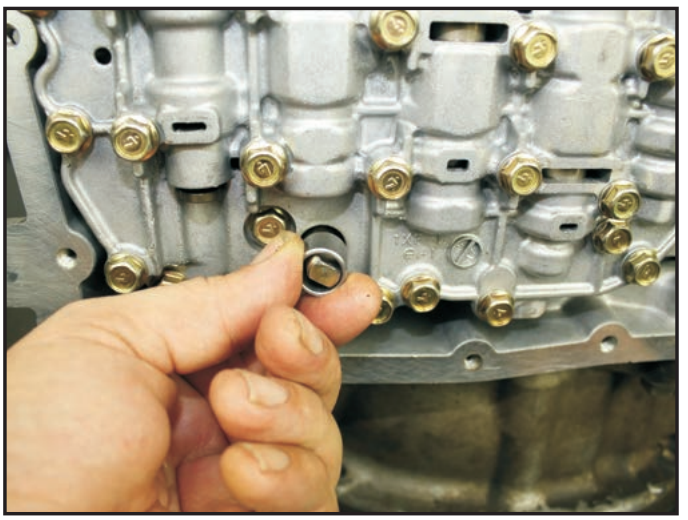


Figure 75

Figure 77

Transmission Reassembly

71. Using a 10 mm socket, tighten the bracket's mounting bolts(figure 78) to 8 Nm (6 ft. lbs.).

72. Using a 12 mm socket, tighten the manual lever attaching nut (figure 79) to 22 Nm (16 ft. lbs.).

73. Install a new oil strainer and o-ring and lubricate the o-ring with jell (figure 80).

74. Install one 44 mm (1.73 in.) and two 12 mm (.470 in.) oil strainer mounting bolts (figure 81). Using a 10 mm socket, tighten all strainer and valve body attaching bolts to 8 Nm (6 ft. lbs.).

75. Pull the harness into place and plug in the main internal connector and ROM assembly (figure 82).

Figure 80

Figure 78

Figure 81

Figure 79

Figure 82

Transmission Reassembly

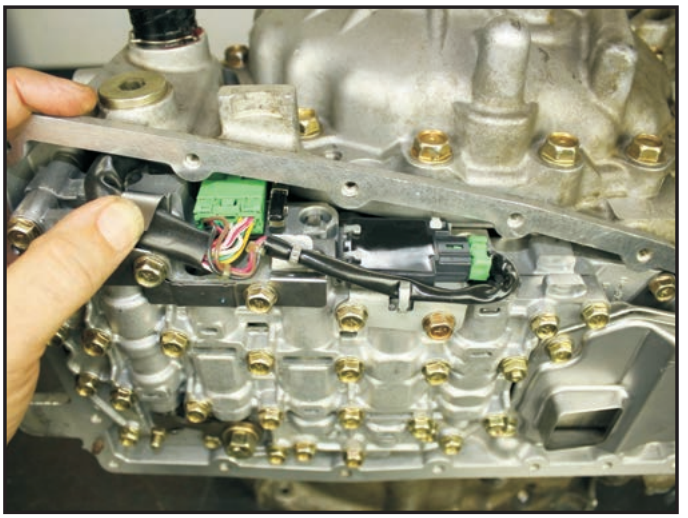


Figure 83

76. Secure the harness by folding down its retaining bracket (figure 83).

77. Install a new pan gasket onto the main case (figure 84).

78. Install two pan magnets onto their designated locations (figure 85).

79. Place the pan onto the main case and hand start eighteen 15 mm (.590 in.) attaching bolts. Using a 10 mm socket (figure 86), tighten to 8 Nm (6 ft. lbs.).

80. Install new o-rings on the primary and secondary speed sensors (figure 87).

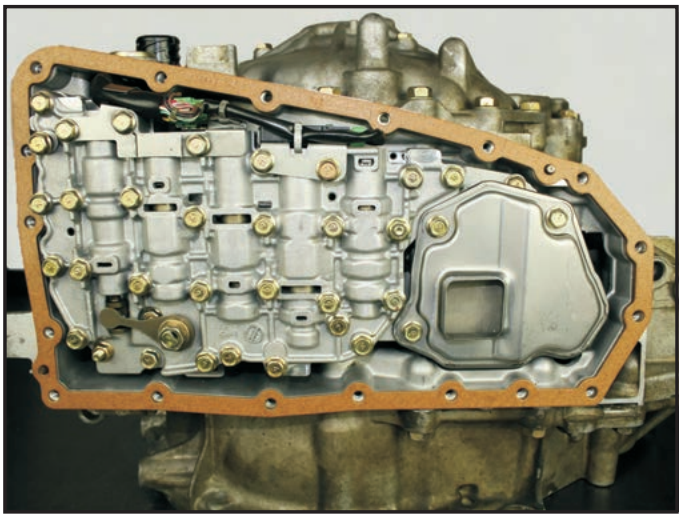


Figure 84

Figure 86

Figure 85

Figure 87

Transmission Reassembly

81. Install both the secondary (figure 88) and primary (figure 89) speed sensors into the case. Using a 10 mm socket, torque each 17 mm (.669 in) mounting bolt to 6 Nm (4.4 ft. lbs.). Only the secondary speed sensor may have one or two 1mm (0.040 in.) air gap shims that go between the sensor and the case. See page 116 for more details.

82. Install a new rubber gasket for the CVT fluid filter with the lip towards the filter (figure 90) and install the filter (figure 91).

83.Install a new rubber o-ring into the grove on the mounting surface side of the CVT fluid cooler assembly and secure with jell (figure 92).

Figure 90

Figure 88

Figure 91

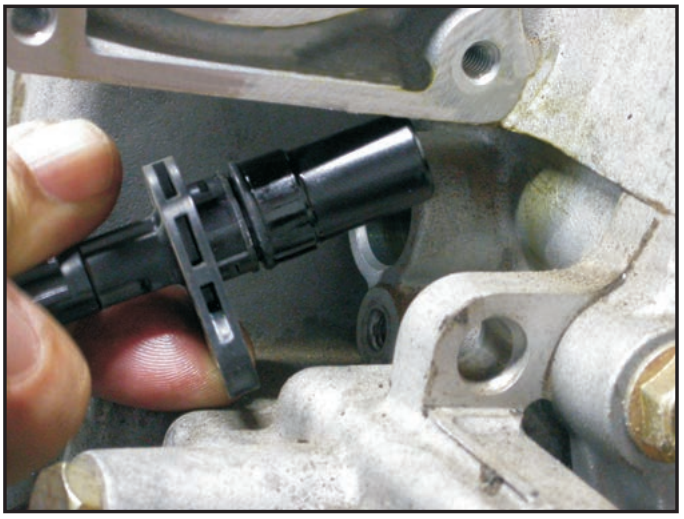


Figure 89

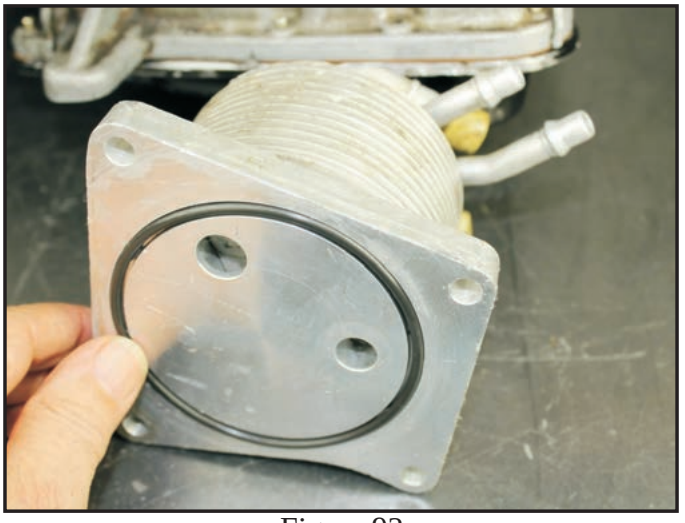


Figure 92

Transmission Reassembly

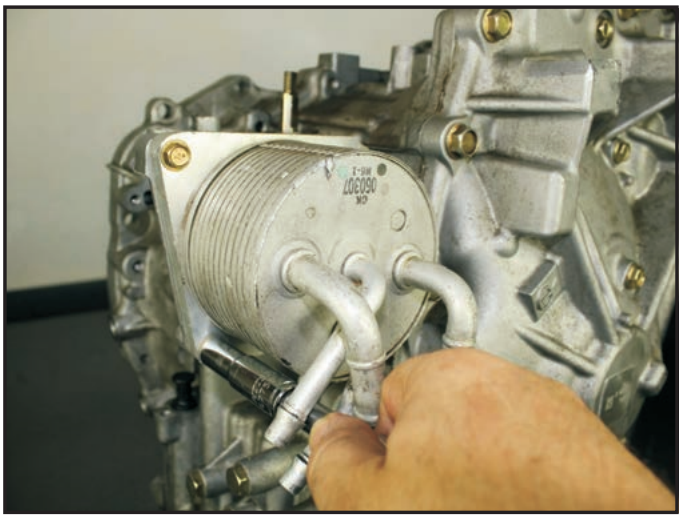


Figure 93

84. Install the CVT fluid cooler onto the transmission case with four 24 mm (.944 in.) length bolts (figure 93). Using a 10 mm socket, torque to 4 Nm (3 ft. lbs.).

85. Lubricate well with jell and carefully hand install a new manual arm shaft seal (figures 94 and 95). Carefully tap the seal down into the case just below flush (figure 96).

86. Install the Inhibitor/Park Neutral switch onto the case with two 17 mm (.669 in.) length bolts finger tight (figure 97).

87. For Mitsubishi models, insert a 5 mm or 3/16 in. diameter pin into the adjusting hole through the manual control valve lever and into the Inhibitor/Park

Figure 94

Figure 95

Figure 96

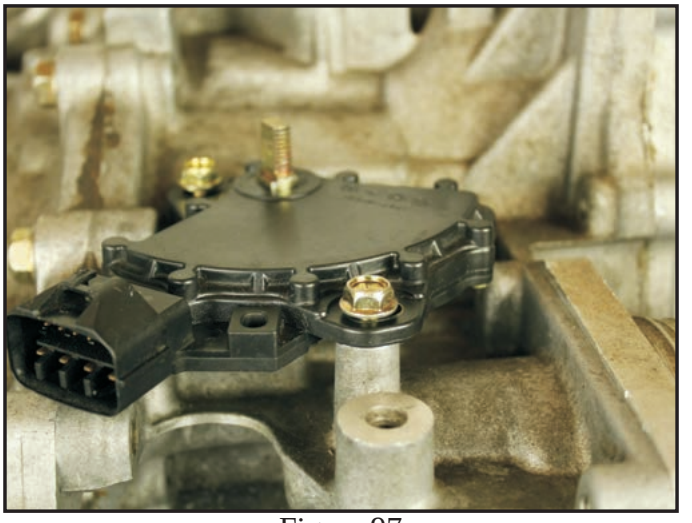


Figure 97

Transmission Reassembly

Neutral switch (figure 98). Nissan use a 4 mm pin. Using a 10 mm socket torque the attaching bolts to 6 Nm (4.4 ft. lbs.).

88. Dodge/Jeep uses an adjustment tool 9876 to align the Park Neutral Switch. Once aligned torque down the attaching bolts (figure 99). Remove the tool an install the linkage, washer and nut (figure 100). Using a 14 mm socket torque the manual lever attaching nut to 17 Nm (12.5 ft. lbs.).

89. Install the fill pipe or plug (figure 101).

90. The transmission is now prepared to receive the torque converter and to be installed into the vehicle (figure 102).

Figure 100

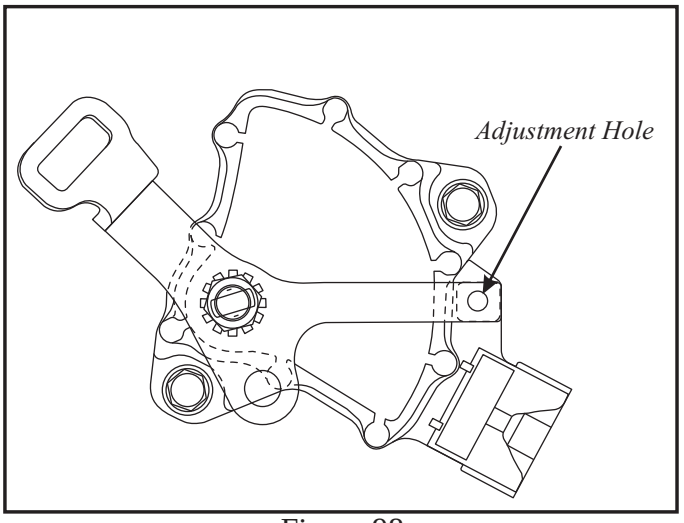


Figure 98

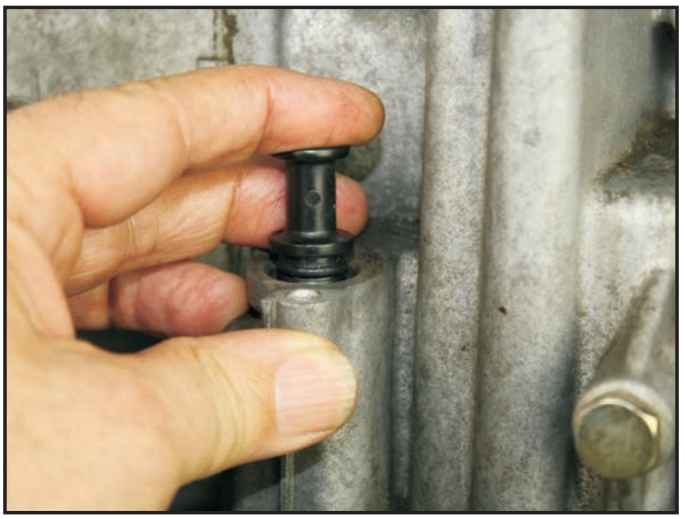


Figure 101

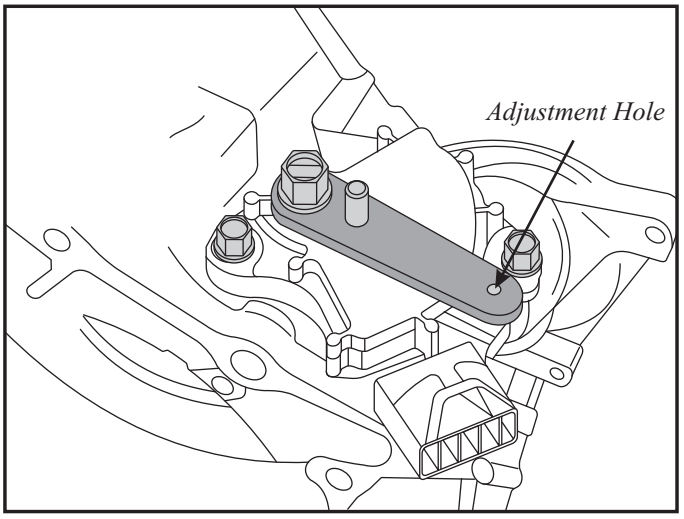
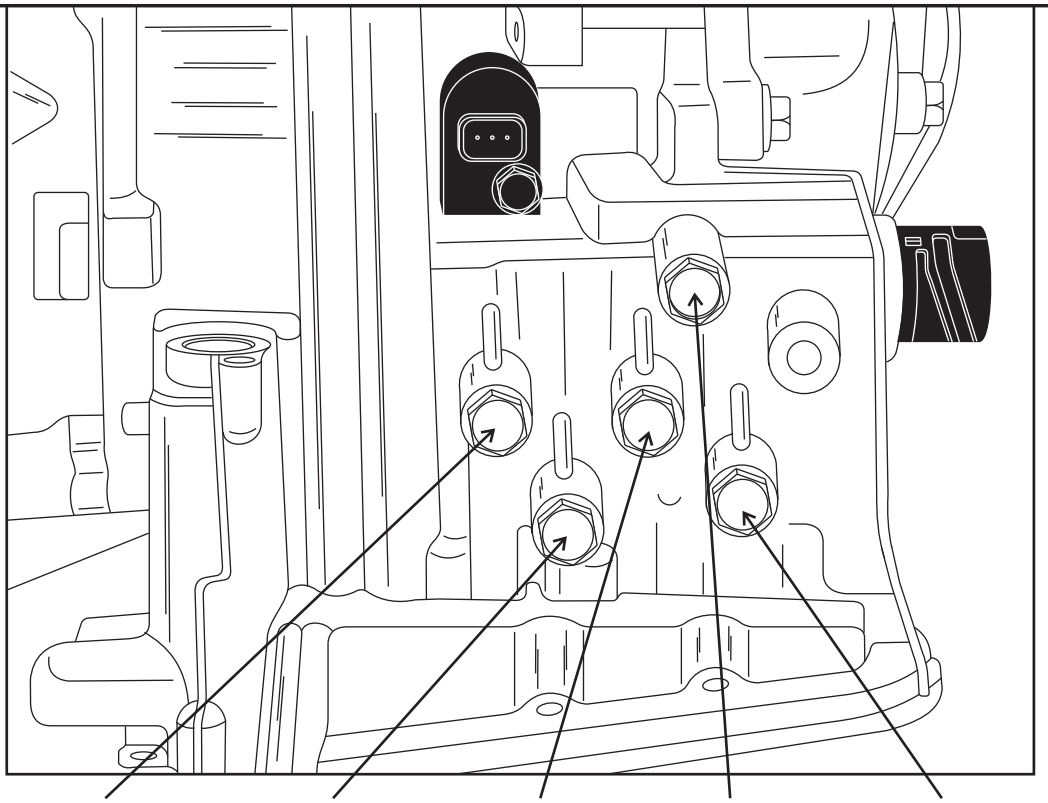


Figure 99

Figure 102

Pressure Tap Location, Identification and Specifications



Line Pressure
Min - 73psi
Max - 218 psi
Failsafe - 870 psi
(All ranges)

Forward Pressure
Min - 74 psi
Max - 145 psi
(Forward only)

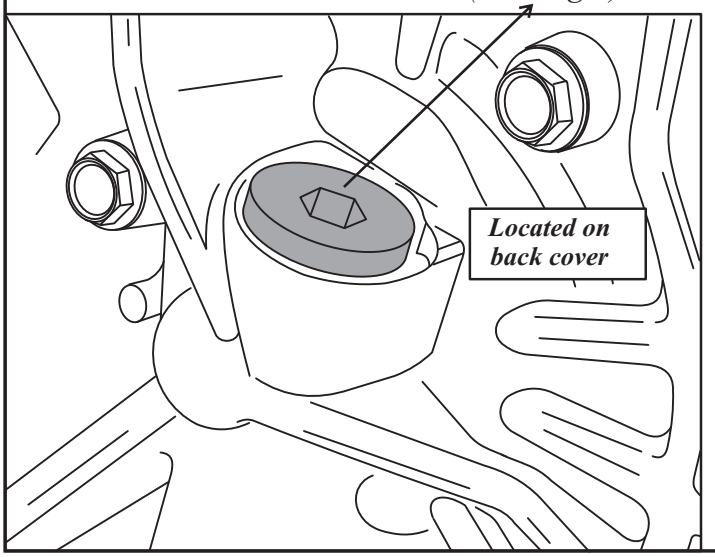
Primary Pressure
Min - 15 psi
Max - 218 psi
(All ranges)

TCC Release Pressure
Min - 15 psi
Max - 145 psi
(TCC Off)
0 psi TCC On

TCC Apply Pressure
Min - 15 psi
Max - 145 psi
(All ranges)

Secondary Pressure
Min - 15 psi
Max - 218 psi
(All ranges)

Reverse Pressure
Min - 74 psi
Max - 145 psi
(Reverse only)



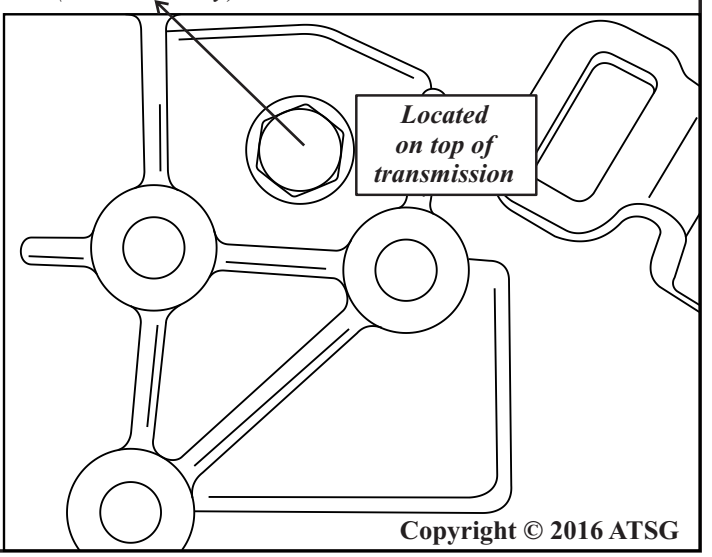


Figure 103

Case Passage Identification

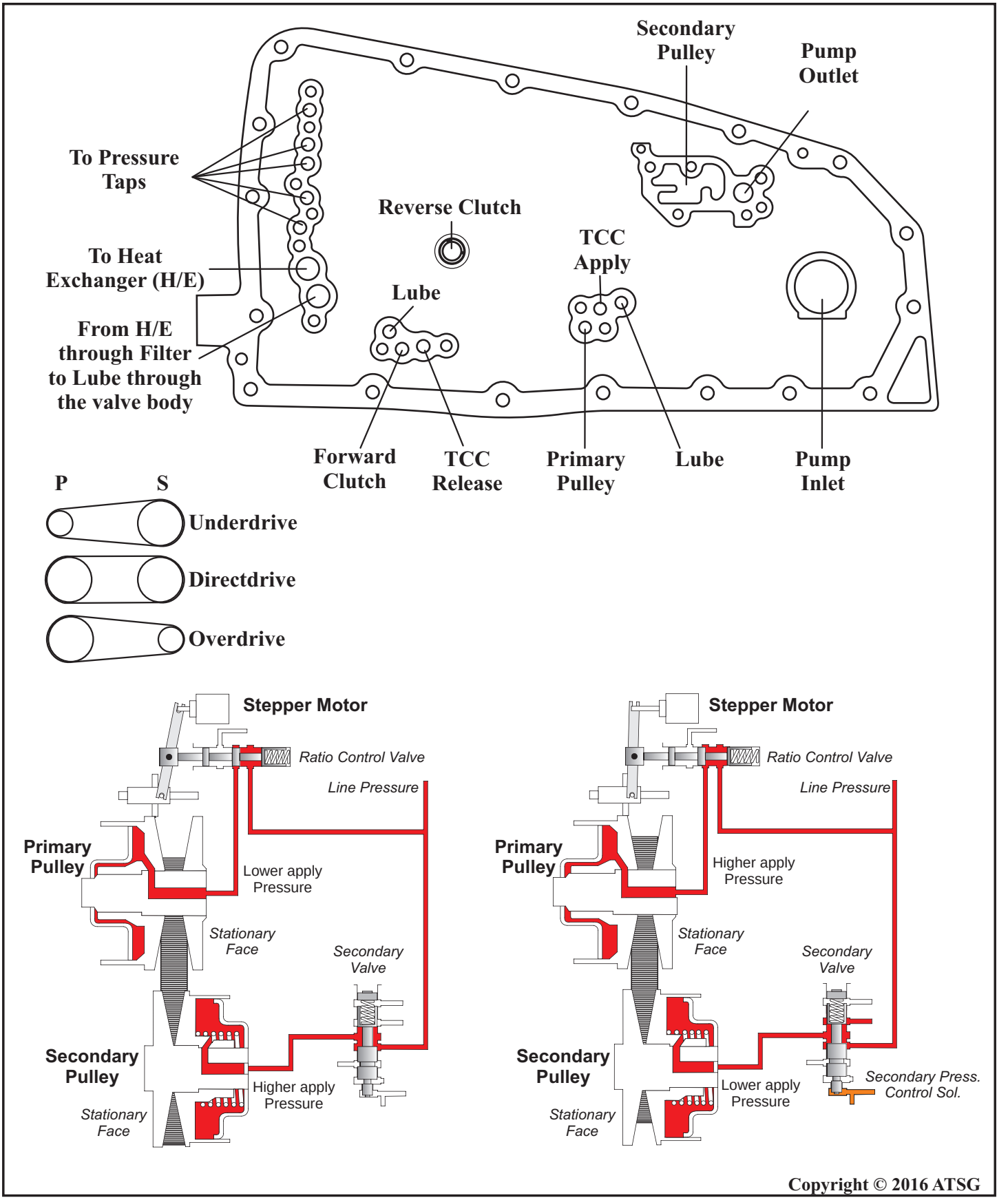


Figure 104

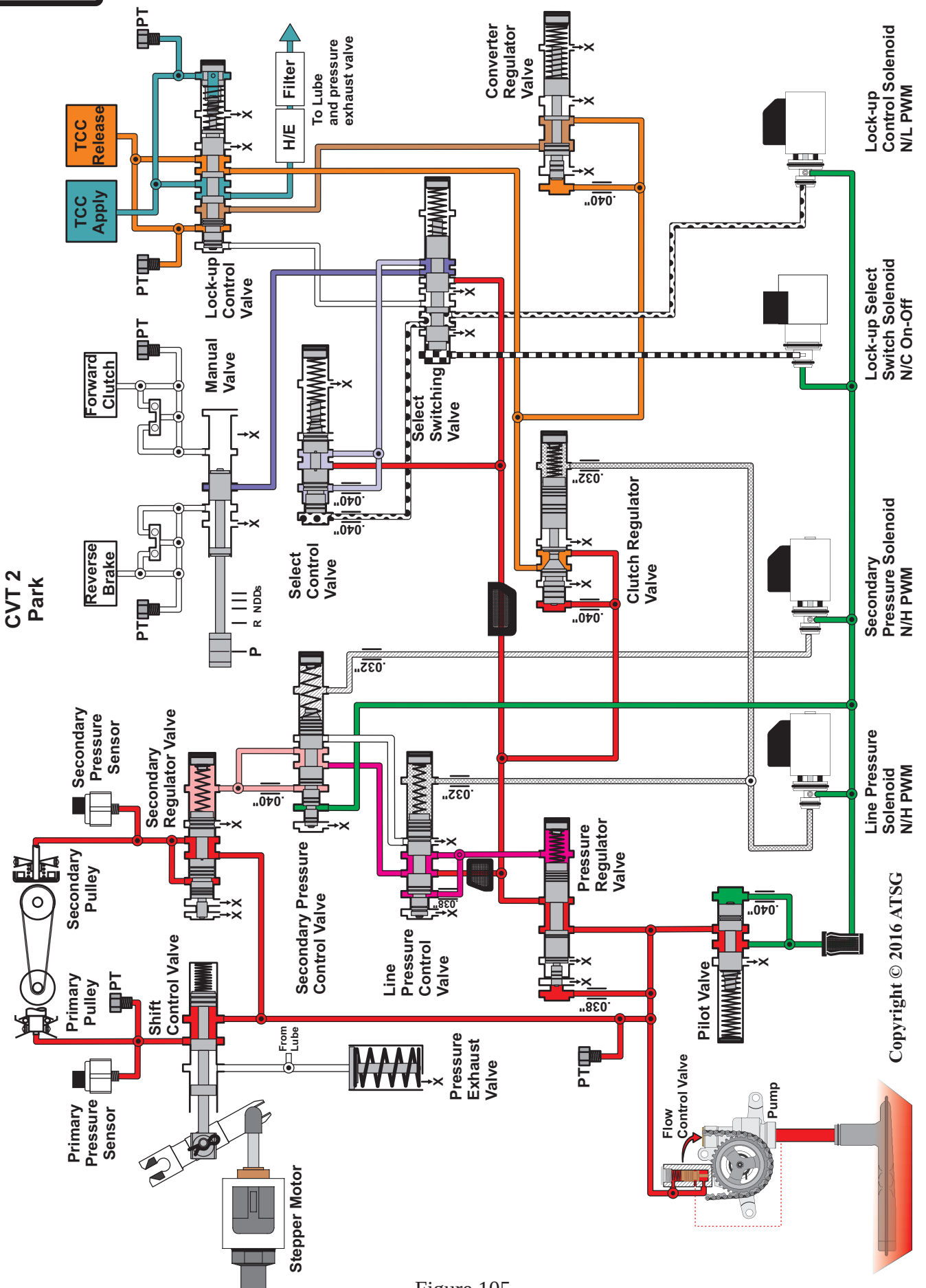

CVT 2
Park
TCC Release
TCC Apply
PT
Filter
H/E
To Lube and pressure exhaust valve
Converter Regulator Valve
Lock-up Control Solenoid N/L PWM
Lock-up Control Valve
Lock-up Select Switch Solenoid N/C On-Off
Forward Clutch
Manual Valve
Select Switching Valve
Reverse Brake
Select Control Valve
Clutch Regulator Valve
Secondary Pressure Solenoid N/H PWM
Secondary Pressure Sensor
Secondary Regulator Valve
Secondary Pulley
Secondary Pressure Control Valve
Line Pressure Control Valve
Pressure Regulator Valve
Line Pressure Solenoid N/H PWM
Primary Pulley
Shift Control Valve
From Lube
Pressure Exhaust Valve
Pilot Valve
Primary Pressure Sensor
Stepper Motor
Flow Control Valve
Pump
.040"
.032"
.038"
Copyright © 2016 ATSG

Figure 105

FLUID CHECKING PROCEDURE

Dodge and Jeep Applications:

1. Verify that the vehicle is parked on a level surface.

2. Remove the dipstick tube cap.

WARNING: There is a risk of accident from vehicle starting off by itself when engine is running. There is a risk of injury from contusions and burns if you insert your hands into the engine when it is started or when it is running. Secure vehicle to prevent it from moving off by itself. Wear properly fastened and close-fitting work clothes. Do not touch hot or rotating parts.

3. Actuate the service brake. Start engine and let it run at idle speed in selector lever position "P".

4. Shift through the transmission modes several times with the vehicle stationary and the engine idling.

5. Warm up the transmission, wait at least 2 minutes and check the oil level with the engine running. Push the Oil Dipstick 9336A (figure 106) into transmission fill tube until the dipstick tip contacts the oil pan and pull out again, read off oil level, repeat if necessary.

NOTE: The dipstick will protrude from the fill tube when installed.

6. Check transmission oil temperature using the appropriate scan tool.

7. The transmission Oil Dipstick 9336A has indicator marks every 10 mm (figure 106). Determine the height of the oil level on the dipstick and using the height, the transmission temperature, and the Transmission Fluid Graph, determine if the transmission oil level is correct.

8. Add or remove oil as necessary and recheck the oil level.

9. Once the oil level is correct, install the dipstick tube cap.

Dry Fill: 8.5 Quarts
Fluid Type: CVTF+4

Fluid Temperature	*Minimum*	*Maximum*
70°F (25°C)	*25mm*	*38mm*
140°F (60°C)	*30mm*	*42mm*
200°F (93°C)	*35mm*	*47mm*
Using Miller Tool No. 9336A Shown Below		

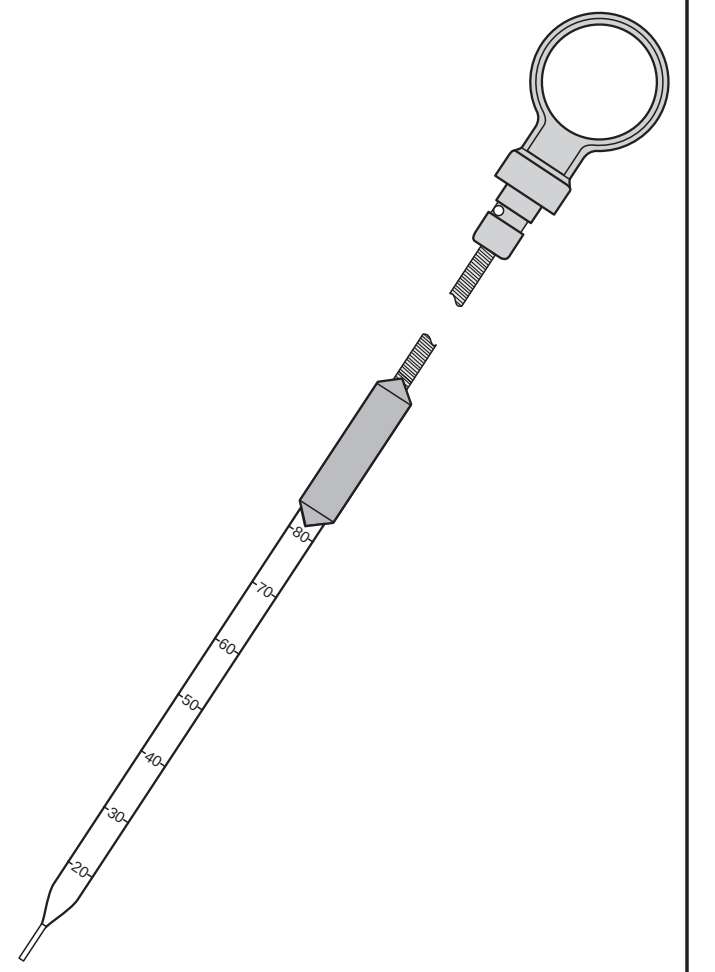


Figure 106

Nissan and Mitsubishi Applications:

Both Nissan and Mitsubishi are equipped with an oil level check stick. Both are checked at normal operating temperatures 70 - 80°C (158 - 176°F).

Dry Fill for both: 7.8 Quarts
Mitsubishi Fluid Type: DIA QUEEN CVTF-J1
Nissan Fluid Type: Nissan 2 (NS-2)

NOTE: Mitsubishi produced a 2009 Lancer bulletin (TSB-10-23-005) for an updated Fluid Level Gauge.

Part number: 2706A085

Dodge and Jeep TCM Initialization:

A. Initial learn (brand-new module, memory already clear)

1. Battery must be connected.
2. If the Totally Integrated Power Module (TIPM) is to be configured, configure the TIPM and then turn ignition key to OFF/LOCKED briefly, then back to RUN.
3. The shifter must be in PARK or NEUTRAL, engine not running.
4. Turn the ignition key to RUN for 4 seconds to allow reading of new values.
5. Turn ignition key to OFF/LOCKED for 2 seconds to allow storing new values in EEPROM.
6. Turn the ignition key to RUN, with scan tool clear DTCs.
7. Turn ignition key to OFF/LOCKED for 2 seconds.
8. After at least 7 seconds, read DTCs.
9. If DTCs reset, perform appropriate diagnostics for related fault codes.

B. Relearn, after replacing a transaxle

1. Turn ignition key to RUN.
2. Clear learning memory using the scan tool.
3. Turn the ignition key to OFF/LOCKED for 2 seconds.
4. Turn the ignition key to RUN Clear DTCs.
5. Turn the ignition key to OFF/LOCKED for 2 seconds.
6. Turn ignition key to RUN.
7. After at least 7 seconds, read DTCs.
8. If DTCs reset, perform appropriate diagnostics for related fault codes.

P167A - Calibration mismatch

During the initial ignition on, the Transmission Control Module (TCM) receives the calibrated data from the EEPROM assembly inside the transmission and stores this information in the EEPROM of the TCM. At every ignition on, the TCM compares the stored data in the EEPROM to the transmitted data from the EEPROM in the transmission. If the calibration data does not match the DTC will set and the MIL will illuminate after one failure.

When Monitored: One time at initial ignition on with a system voltage between 9.0 and 16.0 volts.

Set Condition: If the TCM stored calibration does not match the EEPROM assembly in the transmission. This DTC requires only one problem identification to set the MIL.

Possible Causes:
1. TCM relearn procedure not performed
2. The use of an incorrect TCM
3. The use of an incorrect EEPROM

Note: When dealing with TCM related codes, always verify the vehicles charging system voltage as well as the TCM 's power supply and grounds.

The TCM will monitor system voltage once the engine is above 450 RPM's, Secondary Pulley Pressure is greater than 43.5 psi, along with no active implausible engine speed signal DTC's present. The TCM will then produce a P0562 for low battery voltage only when it detects system voltage below 9.0 volts for more than 5 seconds.

It is not suggested to rely on this code being set to alert the technician that low system voltages exist. The TCM may not function correctly if system voltage is below 12 volts. If this code is stored in the PCM, it indicates that battery voltage to the PCM is less than 11.7 volts. This would be far more reliable than waiting for the TCM to report a system voltage problem.

Similarly, system voltage too high code P0563 sets (more than 16 volts past 5 seconds), after seeing engine speed above 450 RPM's, the Secondary Pulley Pressure is greater than 43.5 psi, vehicle speed is 0 mph, and there are no implausible engine speed and secondary pulley speed signals detected. The PCM is much quicker to set this code. If it sees 1 volt higher than desired voltage for more than 5 seconds the code will set.

Possible causes with code in TCM:
1. Charging system DTC's present
2. TIPM Power control circuit DTC's present
3. Improper jump start or by a 24 volt or higher system.
4. TCM

Possible causes with code in PCM:

1. Gen. sense circuit (A804) open or high resistance
2. Gen. field control circuit (K20) shorted to power
3. Generator
4. PCM

Nissan Relearn Procedures:

After the CVT assembly, engine assembly, and valve body assembly are replaced, their learned value must be relearned. Nissan has 3 specific procedures. Pattern "A" is when only the TCM has been replaced. Pattern "B" is when a used TCM has been replaced or and/or a new or used transmission or valve body was replaced. Pattern "C" is when a new TCM was replaced along with the replacement of a new or used transmission or valve body.

Pattern "A":

1. Shift the selector lever to "P" position after replacing TCM.
2. Turn ignition switch ON.
3. Check that the shift position indicator in the combination meter turns ON (It indicates approximately 1 or 2 seconds after turning ignition switch ON.)

Note: Check the following items if shift position indicator does not turn ON, repair or replace as necessary.

A) The harness between TCM and ROM assembly in transaxle assembly is open or shorted.
B) Terminals disconnected, loose, or bent from connector housing.

Pattern "B":

1. Turn ignition switch ON after replacing each part.
2. Connect scan tool to read CVT fluid temperature.
3. Start engine but do not drive.
4. Warm up transaxle assembly until approximately 68°F (20°C) or more, and then turn ignition switch OFF.
5. Turn ignition switch ON, do not start the engine and place the selector lever into Reverse.
6. Depress the accelerator pedal while depressing the brake pedal (engine off). Perform the operation of erasing DTC's under this condition (even if no codes are set).
7. Release brake pedal and accelerator pedal and turn ignition switch OFF while keeping the selector lever in "R" position.
8. Wait approximately 10 seconds and then turn ignition switch ON while keeping the selector lever in "R" position. With the scan tool, verify that all calibration data reads 00.

Note: Restart the procedure from step 3 if all six gear values are not the same.

9. Shift the selector lever to "P" position.
10. Check that the shift position indicator in combination meter turns ON. (It indicates approximately 1 or 2 seconds after shifting the selector lever to "P" position.)

Pattern "C":

1. Replace transaxle assembly first, and then replace TCM.
2. Perform the service of "PATTERN A". Perform the service of "PATTERN B" if TCM is replaced first.

Mitsubishi Initialization Procedure:

After the CVT assembly, engine assembly, and valve body assembly are replaced, their learned value must be initialized.

1. Move the selector lever to the "P" range and turn the ignition switch to the "LOCK" (OFF) position.
2. Connect a scan tool to read fluid temperature. Have the vehicle where the CVT fluid temperature is equal to ambient temperature
2. Turn the ignition switch to the "ON" position, and then move the selector lever to the "R" range.
3. Depress the accelerator pedal while depressing the brake pedal (engine off). Perform the operation of erasing DTC's under this condition (even if no codes are set).
4. Release the pedals and then turn the ignition off while in Reverse. Then place the vehicle into Park.
5. Wait 10 seconds and start the engine and let idle in Drive for 20 seconds with the brake applied.
6. Run the vehicle at 25-30 mph (40-50 km/h) in Drive steadily for 5 seconds and come to a stop.
7. Bring CVT fluid temperature up to 176°F (80°C) and repeat steps 4 and 5.

SPECIAL SERVICE TOOLS

The tool list for Dodge, Jeep, Mitsubishi and Nissan applications is lengthy covering both general and special tools. Consequently, there is also quite a bit of overlap between these manufacturers since it is the same transmission with slight variations between manufacturers.

The main special tools needed to rebuild a JF011E transmission would be a pulley compressor (lifter) to open the secondary pulley, a reverse brake piston remover and installer, a ratio lever retainer, and a Park/Neutral switch adjuster. Most of the other tools such as gauging bars, seal installers, bearing and bearing race pullers can be found in the shop.

Reman Tools from the Netherlands makes a special tool kit which consists of pulley holder mounting bracket, the pulley compressor, reverse brake piston tool and the ratio lever retainer (figure 1). The part number at the time of printing for this tool kit is TOKIREOF10A and is available through the ATSG bookstore.

Similar tools can be purchased by Miller/Mopar tools (tool supplier for Dodge and Jeep applications), such as the pulley compressor and adapter (figure 2). This pulley compressor will also work with Mitsubishi and Nissan applications.

With most shops already having seal installers, bearing and bearing race pullers, spring compressors, gauging bars that will serve well in the rebuild of this transmission, this manual will provide a partial listing of tools and their part numbers from Dodge, Jeep and Mitsubishi as they are the most forthcoming.

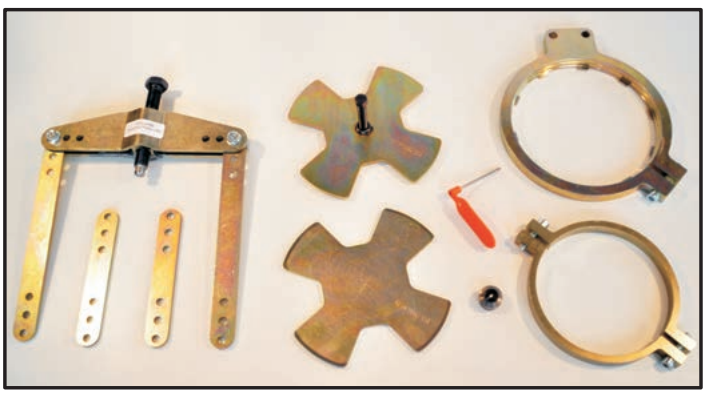


Figure 1

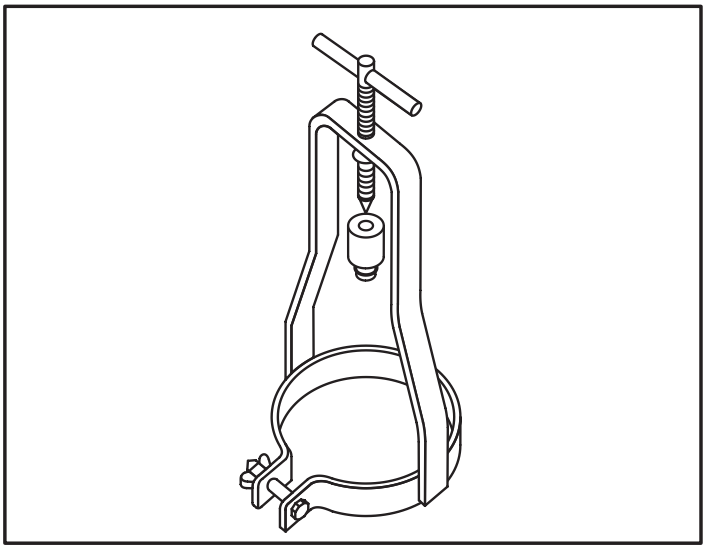


Figure 2

Partial Miller/Mopar Tool Listings (Dodge and Jeep Applications):

Secondary pulley compressor	9874
Adapter	8513-A
Reverse brake spring compressor (1)	9875
Reverse brake spring compressor (2)	5058A
Park/Neutral Switch Adjustment Tool	9876
Transmission Stand	9878
Gauging Bar	6311
Seal Installer	9858-A
Multi-use Spring Compressor (FWD Drum)	8900B
Oil Lever Check Gauge (Dipstick)	9336A
Pressure Gauge Kit	9873
Differential Bearing Race Puller (1)	9664
Differential Bearing Race Puller (2)	7794-A
Differential Bearing Race Puller Handle	C-637
Differential Bearing Race Installer 4WD	9668
Differential Bearing Race Installer	C-4628
Differential Bearing Race Handle 2WD	C-4171
Differential Bearing Race Installer	D-129
Differential Bearing Puller	C-293B-PA
Diff. Bearing Puller (6) Inserts (2WD)	C-293-40
Differential Bearing Press Insert (2WD)	C-4996
Differential Bearing Puller (6) Inserts (4WD)	9613
Differential Bearing Press Insert (4WD)	8888

Figure 3

Partial Mitsubishi Tool Listings:	
Reverse Brake Piston Tool	MB992139-01
Converter Oil Seal Installer	MB992141-01
Converter Housing Axle Seal Installer	MB992206-01
Main Case Axle Seal Installer	MB992140-01
Axle Seal Installer Handle	MB990938-01
Bear race remover	MB990211-01
Converter Housing Bearing Race Inst.	MB991168-01
Main Case Bearing Race Installer	MIT27526
Reduction Side Bearing Race Installer	MIT27522
Bearing Race Installer Handle	MB990938-01
Gauging Bar	MIT6311
Bearing Remover (1)	MB990955-01
Bearing Remover (2)	MB990947-01
Bearing Remover (3) Crow Feet	MB990339-01
Bearing Installer	MIT304180-A
Pressure Gauge and Adapter Kit	MLR-9873

Figure 4

SELECTIVE SNAP RINGS AND SHIMS

*All part numbers provided by Mitsubishi**

PNC	Part Name	Model
27291P	Snap Ring A/T Clutch	GA2W
27298	Thrust Bearing A/T Clutch	GA2W
27791	Spacer A/T Power Train	GA2W
27791P	Spacer A/T Power Train	GA2W

27291P - REVERSE BRAKE SELECTIVE SNAP:	
0.070" (1.8mm)	2721A032
0.079" (2.0mm)	2721A034
0.094" (2.4mm)	2721A036
0.102" (2.6mm)	2721A035
0.118" (3.0mm)	2721A033

Figure 5

27298 - TOTAL END PLAY NEEDLE BEARING:	
0.031" (0.78mm)	2721A028
0.037" (0.95mm)	2721A027
0.044" (1.12mm)	2721A026
0.051" (1.29mm)	2721A025
0.057" (1.46mm)	2721A024
0.064" (1.63mm)	2721A023
0.071" (1.80mm)	2721A022
0.078" (1.97mm)	2721A021

Figure 6

27791 - PRE-LOAD REDUCTION GEAR SHIM:	
0.022" (0.56mm)	2960A384
0.024" (0.60mm)	2960A385
0.025" (0.64mm)	2960A112
0.027" (0.68mm)	2960A113
0.028" (0.72mm)	2960A114
0.030" (0.76mm)	2960A115
0.031" (0.80mm)	2960A075
0.033" (0.84mm)	2960A076
0.035" (0.88mm)	2960A077
0.036" (0.92mm)	2960A078
0.038" (0.96mm)	2960A079
0.039" (1.00mm)	2960A080
0.041" (1.04mm)	2960A081
0.043" (1.08mm)	2960A082
0.044" (1.12mm)	2960A083
0.046" (1.16mm)	2960A084
0.047" (1.20mm)	2960A085
0.049" (1.24mm)	2960A086
0.050" (1.28mm)	2960A087
0.052" (1.32mm)	2960A088
0.054" (1.36mm)	2960A089
0.055" (1.40mm)	2960A090
0.057" (1.44mm)	2960A091
0.058" (1.48mm)	2960A092
0.060" (1.52mm)	2960A093
0.061" (1.56mm)	2960A094
0.063" (1.60mm)	2960A095
0.065" (1.64mm)	2960A096
0.066" (1.68mm)	2960A097
0.068" (1.72mm)	2960A098
0.069" (1.76mm)	2960A099
0.071" (1.80mm)	2960A100
0.073" (1.84mm)	2960A101
0.074" (1.88mm)	2960A102
0.076" (1.92mm)	2960A103
0.077" (1.96mm)	2960A104
0.079" (2.00mm)	2960A105

Figure 7

27791P - PRE-LOAD DIFFERENTIAL SHIM:	
0.009" (0.24mm)	2960A116
0.011" (0.28mm)	2960A117
0.013" (0.32mm)	2960A118
0.014" (0.36mm)	2960A119
0.016" (0.40mm)	2960A120
0.017" (0.44mm)	2960A121
0.019" (0.48mm)	2960A122
0.020" (0.52mm)	2960A123

Figure 8

27791P - PRE-LOAD DIFFERENTIAL SHIM:	
0.022" (0.56mm)	2960A124
0.024" (0.60mm)	2960A125
0.025" (0.64mm)	2960A126
0.027" (0.68mm)	2960A127
0.028" (0.72mm)	2960A128
0.030" (0.76mm)	2960A129
0.031" (0.80mm)	2960A130
0.033" (0.84mm)	2960A131
0.035" (0.88mm)	2960A132
0.036" (0.92mm)	2960A133
0.038" (0.96mm)	2960A134
0.039" (1.00mm)	2960A135
0.041" (1.04mm)	2960A136
0.043" (1.08mm)	2960A137
0.044" (1.12mm)	2960A138
0.046" (1.16mm)	2960A139
0.047" (1.20mm)	2960A140
0.049" (1.24mm)	2960A141
0.050" (1.28mm)	2960A142
0.052" (1.32mm)	2960A143

Figure 8 *continued*

MISCELLANEOUS	
Pump Sprocket Snap-Ring	2791A018
Cooler Filter	2824A006
Updated Lancer Dipstick	2706A085

Figure 9

Pages 110 and 111 show available Mitsubishi part numbers at time of this printing.

DODGE CALIBER CVT
MULTIPLE SOLENOID FAULTS

COMPLAINT: Some 2006 and up Dodge Caliber equipped with the CVT transmission may experience a complaint of the Check Engine Light coming on, accompanied with numerous solenoid circuit faults, such as P0962-963 Pressure Control Solenoid fault, P0966-967 Secondary Pressure Control Solenoid, P2770 Lock-Up Control Solenoid, P1723 Lock-Up Selection Solenoid, P0848 Secondary Pressure Sensor, P0712-713 Transmission Fluid Temperature , P0843 Primary Pressure Sensor. ***Note:*** These codes could be intermittent and may also include Stepper Motor Control issues.

CAUSE: The cause may be that the wiring harness leading to the case connector on the transmission is corroded and or partially disintegrated by battery acid dripping down on to the harness. Figure 1 shows the battery tray. The drain tube exits the bottom of the tray, right above the transmission wiring harness. See Figure 2 for the location of the harness and the connector at the transmission.

CORRECTION: To correct this problem, re-route the drain tube so it is away from the wiring harness, or purchase the new drain tube listed in service information. Repair the wiring harness as necessary. Refer to pages 11 and 12 for wiring diagram and TCM terminal identification. Refer to pages 22 to 24 for solenoid identification and transmission terminal identification along with ohm values should addition diagnostics be needed.

SERVICE INFORMATION:

BATTERY TRAY DRAIN TUBE (Dodge part #).....05054250AC

BATTERY TRAY

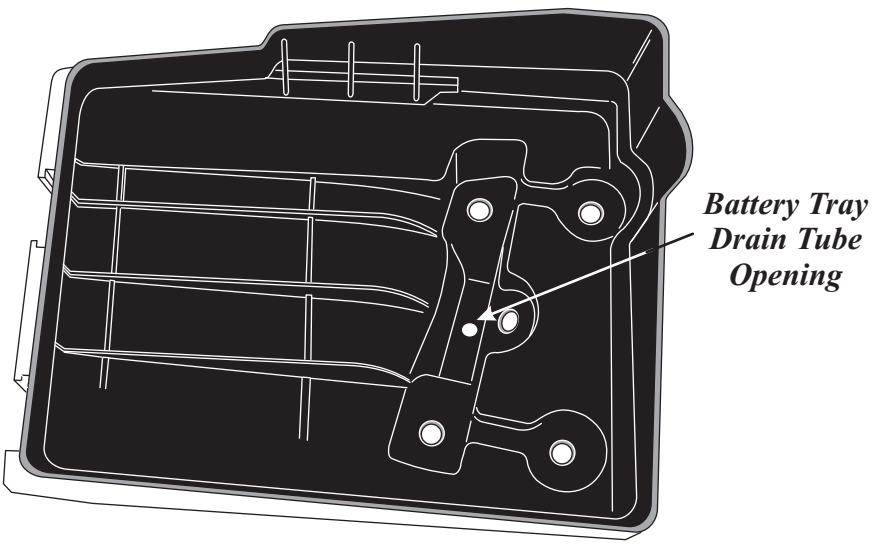
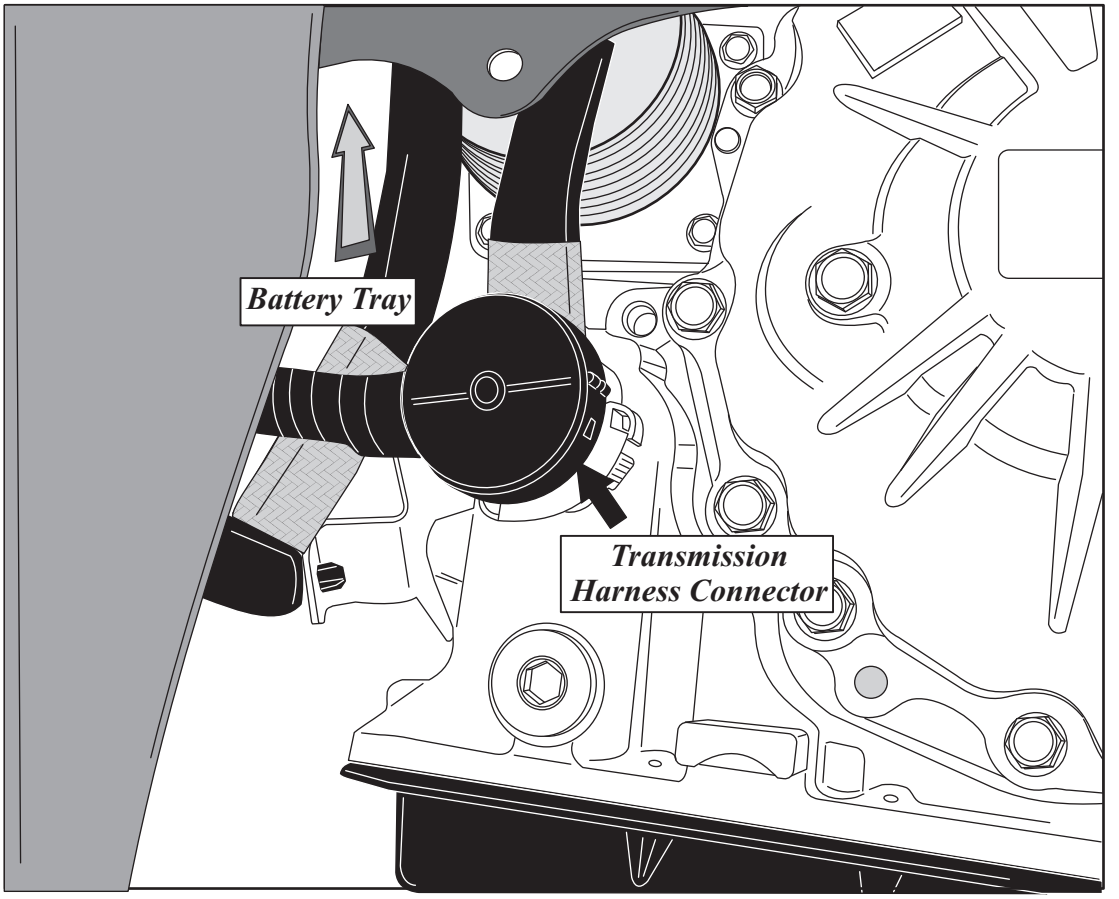


Figure 1

DODGE CALIBER CVT
MULTIPLE SOLENOID FAULTS



The Battery tray and drain tube are located above the harness leading to the Transmission Harness connector. Battery acid will typically leak down on to the harness and corrode/disintegrate the harness protective coating and the internal wiring.

Figure 2

DODGE CALIBER JF011E
P167A CALIBRATION MIS-MATCH

COMPLAINT: After exchanging a complete transmission (CVT) or valve body assembly, the vehicle does not change ratios and code P167A Calibration Mis-match is stored in memory.

CAUSE: Mounted on the valve body is an electrical component called an EEPROM as seen in figure 3. This ROM contains calibration information pertaining to vehicle (*tire size, engine size, if it has Autostick or not, etc.*) which must match with the TCM.

If an EEPROM from a different vehicle is used a P167A sets

Theory of Operation (O.E.)

During the initial ignition on, the Transmission Control Module (TCM) receives the calibrated data from the EEPROM assembly inside the transmission and stores this information in the EEPROM of the TCM. At every ignition on, the TCM compares the stored data in the EEPROM to the transmitted data from the EEPROM in the transmission. If the calibration data does not match the DTC will set and the MIL will illuminate after one failure.

- **When Monitored:** One time at initial ignition on with a system voltage between 9.0 and 16.0 volts.
- **Set Condition:** If the TCM stored calibration does not match the EEPROM assembly in the transmission. This DTC requires only one problem identification to set the MIL.

CORRECTION: Replace the exchanged EEPROM with the original then perform CVT Verification Test.

CVT Verification Test - Perform the following after completion of a diagnostic repair:

1. Reconnect any disconnected components.

2. With the scan tool, erase all Transmission and Engine DTCs.

3. If the Transmission Control Module or the Transmission has been repaired or replaced, it is necessary to perform the scan tool Initialize CVT Re-learn Procedure (O.E.).

4. With the scan tool, display Transmission Temperature.

5. Start and run the engine until the transmission temperature is HOT, above 43°C or 110°F.

6. Check the transmission fluid and adjust if necessary.

CAUTION: The CVT uses a specific transmission fluid type that is green in color. Do not use a standard ATF fluid. Doing so can damage the transmission. Make sure to follow the fluid type and fill procedure.

DODGE CALIBER JF011E
P167A CALIBRATION MIS-MATCH

CORRECTION: 7. Road test the vehicle. With the scan tool, monitor the engine rpm and throttle angle. Drive the vehicle from a standing start to 45 mph with a constant throttle opening of 20 to 25 degrees with an engine speed above 450 rpm.

8. For a specific DTC, drive the vehicle to the Symptom's When Monitored/When Set condition to verify the DTC is repaired.

9. If equipped with AutoStick(R), upshift and downshift several times using the AutoStick(R) feature during the road test.

NOTE: Use the OBDII task manager to run a Good Trip. This will confirm the repair(s) made and to ensure the DTC has not re-matured.

Check for any Diagnostic Trouble Codes (DTCs) during and after the road test.

Did any Diagnostic Trouble Codes set during the road test?

Yes - Repair is not complete. Diagnose and repair DTC's.

No - Repair is complete.

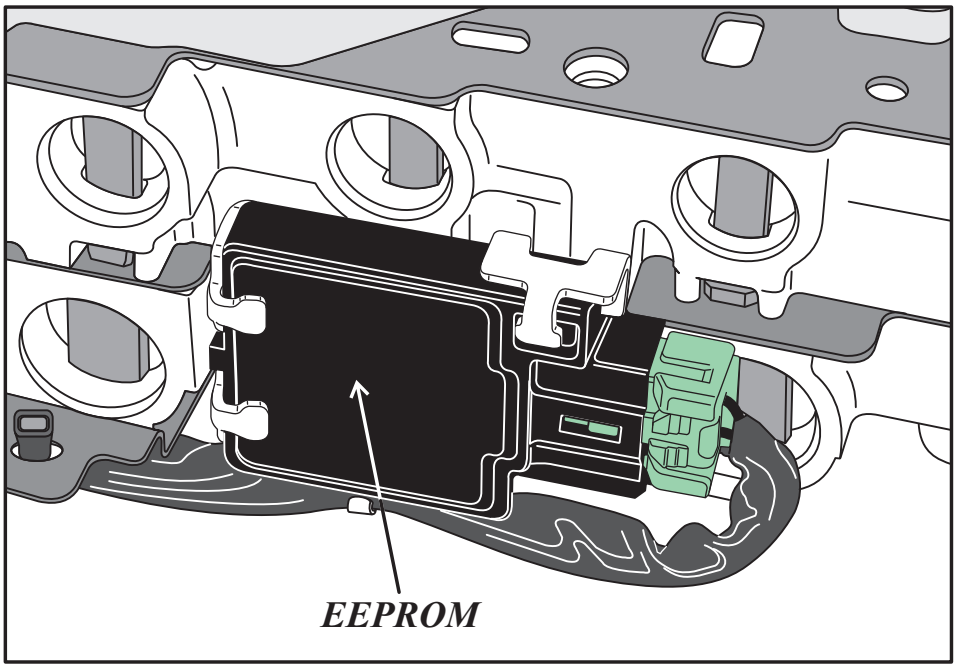


Figure 3

SECONDARY SPEED SENSOR CODE
CVT2/JF011E/F1C1A/RE0F10A

COMPLAINT: After repairing or rebuilding a Continuously Variable Transmission used in Jeeps, Dodge, Nissan or Mitsubishi vehicles a P0721; Output Speed Sensor Performance and/or P0722; Output Speed Sensor No Signal code may set shortly after launch. If driven long enough a P0730 Incorrect Gear Ratio code may also set.

CAUSE: Various applications require one or more shims under the output speed sensor to maintain proper air gap between the sensor tip and signal gear (Figure 4). If the shim or shims are left off, or are placed between the attaching bolt and sensor, the tip of the sensor rests upon the signal gear. Once the gear is in rotation it damages the tip of the sensor and the signal is lost.

Detailed explanation:
The output rpm sensor measures the output gear integral to the output side of the secondary pulley thereby providing secondary pulley rpm readings to the TCM. This signal can also be used for an output speed signal.

The output gear on the secondary pulley drives a reduction gear assembly which in turn drives the differential ring gear. Due to a variety of applications there becomes a variety of different overall gear ratios. These ratio differences change the diameter of the output gear the sensor reads. Since the output speed sensor length remains the same in all applications, to retain the proper air gap between the tip of the sensor and the gear, a shim or shims are used under the sensor to accommodate larger diameter gears.

A gear diameter small enough where the speed sensor does not require a shim will have an approximate .040" air gap.

The next larger diameter gear would require a .040" shim under the sensor to provide that approximate .040" air gap and so on.

CORRECTION: If the shim or shims were incorrectly installed between the bolt and sensor, replace the sensor and install the shim or shims between the case and sensor.

If the shim or shims were not installed, replace the sensor an install the appropriate number of .040" shims under the output speed sensor.

If you are not certain the number of shims required, measure the distance from the highest point on the output gear to the surface area on the case where the output speed sensor bolts to.

The length of the speed sensor is approximately 1.140". If the depth of the speed sensor hole measures approximately the same as the sensor length, install one .040" shim under the sensor. If it measures approximately 1.100", place two .040" shims under the sensor. If it measures approximately 1.180", no shims are required.

SERVICE INFORMATION:

Nissan part number for .040" shim.....08915-4361A

SECONDARY SPEED SENSOR CODE
CVT2/JF011E/F1C1A/RE0F10A

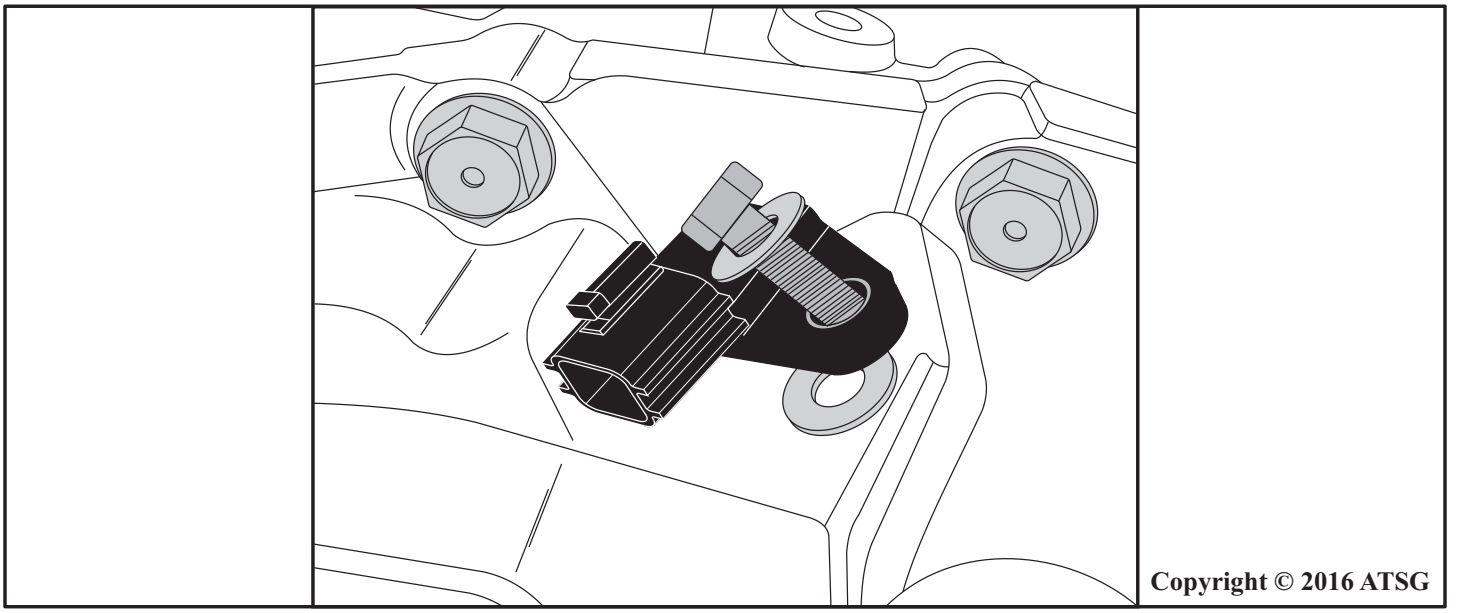


Figure 4

NISSAN RELATED BULLETIN
CVT - OUTPUT SPEED SENSOR SERVICE

NTB11-042
Date: April 20, 2011
APPLIED VEHICLES: 2007-2011 Altima (C/L 32 - QR25 only), 2011 Juke, 2008-2011 Rogue, 007-2011 Sentra (B16 - MR20 & QR25 only).

If the Output Speed Sensor has been removed and replaced for any reason, use the correct number of spacer shims between the Sensor and the CVT body.

Model	Engine type	Model Year	Final gear ratio	Required shim
Altima	QR25	07 through 09MY	5.798	2
		10MY to 11MY	5.122	2
Rogue	QR25	07 through 10MY	6.120	1
		11MY	5.798	2
Sentra	MR20	07 through 09MY	5.407	1
		10MY to 11MY	5.122	2
	SER/QR25	All MY	5.407	1
Juke	MR16 turbo	11MY	5.798	2

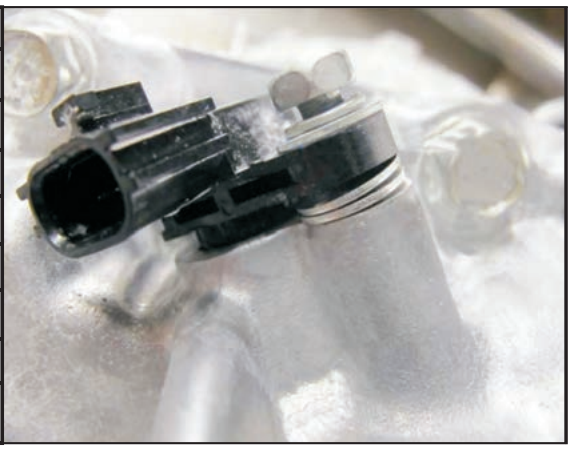


Figure 5

ADDITIONAL FACTORY BULLETINS

2007-2011 ALTIMA
SLIGHT VEHICLE HESITATION OR SURGE TYPE FEEL AT LOW SPEEDS
Classification: AT10-004B
Reference: NTB10-121B

There is a slight vehicle hesitation type feel and/or a surge type feel when all of the following conditions are present:
- Speed between 10 and 45 mph and
- Transmission torque converter clutch is engaged (lock mode)
- Engine RPM between 1200 and 2000 and Light acceleration

Very slight vehicle hesitation type feel and/or surge type feel under these conditions are a normal operating characteristic of this vehicle and are within design specifications for the vehicle. However, for those customers who are particularly sensitive to this characteristic of their vehicle, the actions in this bulletin may be performed for customer satisfaction.

Reprogram TCM
PC0870

Install a Torque Rod Service Kit
11250-ZX60A

DTC P0730 for DTC P0717
Dodge Caliber
Bulletin # 21-014-08

- Built on or before March 20, 2008

- In some cases, DTC P0730 (Incorrect Gear Ratio) may set instead of DTC P0717 (Input Speed Sensor Circuit No Signal).

- This bulletin involves selectively erasing and reprogramming the Transmission Control Module (TCM) with new software.

- 04275086AB