GM 6T30/40/45/50 TRANSMISSIONS

GENERATION I & II INFORMATION

Refer to Figures 1 and 2 for Vehicle/Transmission Application.

Refer to Figures 3, 4, 5 & 6 for Gen I & II 4-5-6- Clutch Differences.

Refer to Figures 7, 8 & 9 for Line Pressure Control Strategy & Specifications.

Refer to Figure 10 for Pressure Switch Operation.

Refer to Figures 11, 12, 13 & 14 for " Clutch Pulse Learn" Description & Adaptive Procedures.

Refer to Figure 15 for "Brake Pedal Position Sensor Learn" Procedure.

Refer to Figure 16 for Clutch & Solenoid Application.

Refer to Figures 17 & 18 for Neutral Idle Description & Operation.

Refer to Figures 19 & 20 for Transmission Fluid Pressure Switch & Solenoid Identification.

Refer to Figures 21, 22 & 23 for Solenoid Theory of Operation.

Refer to Figure 24 for Solenoid Test Procedures.

Refer to Figure 25 for Gen I & II TEHCM Identification.

Refer to Figure 26 for Gen I & II Valve Body Assembly Identification.

Refer to Figure 27 for Gen I Control Valve Body Identification.

Refer to Figure 28 for Gen II Control Valve Body Identification.

Refer to Figure 29 for Gen I & II Channel Plate Assembly Identification.

Refer to Figure 30 for Gen I & II Checkball Locations.

Refer to Figure 31 for Gen II Channel Plate Small Parts Identification.

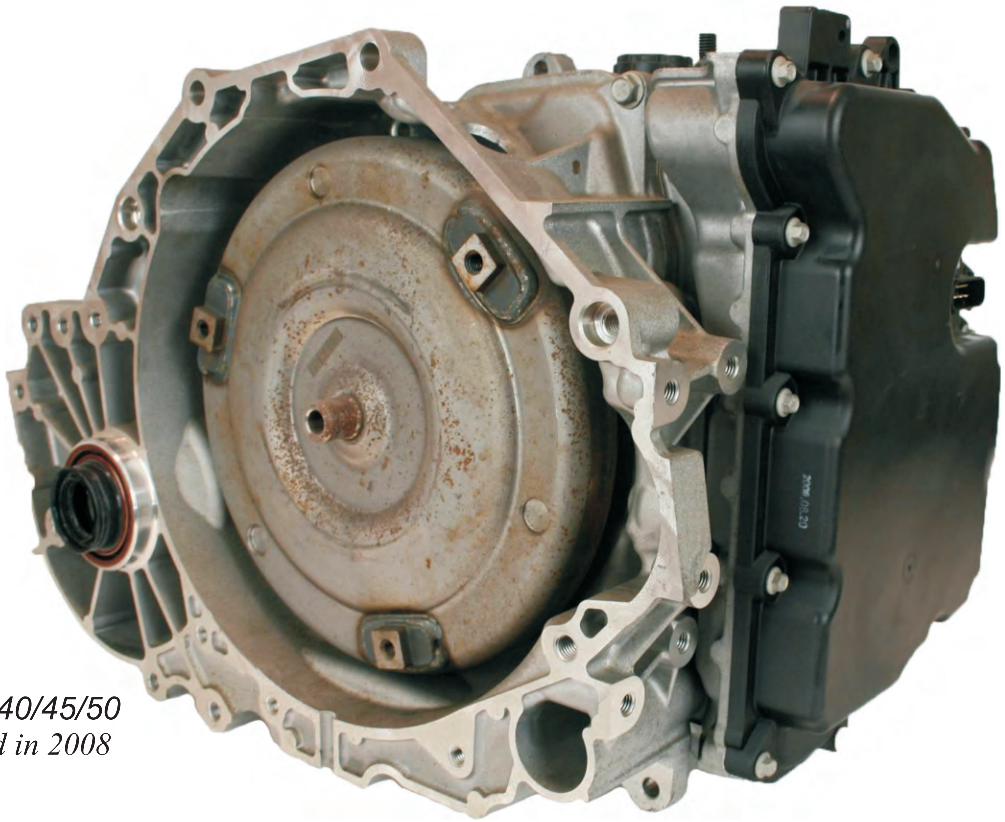
Refer to Figure 32 for Transmission Adaptive Values Description.

Refer to Figures 33, 34 & 35 for Transmission Fluid Fill Specifications & Procedures.

Refer to Figure 36 for Torque Converter Installation Procedure.

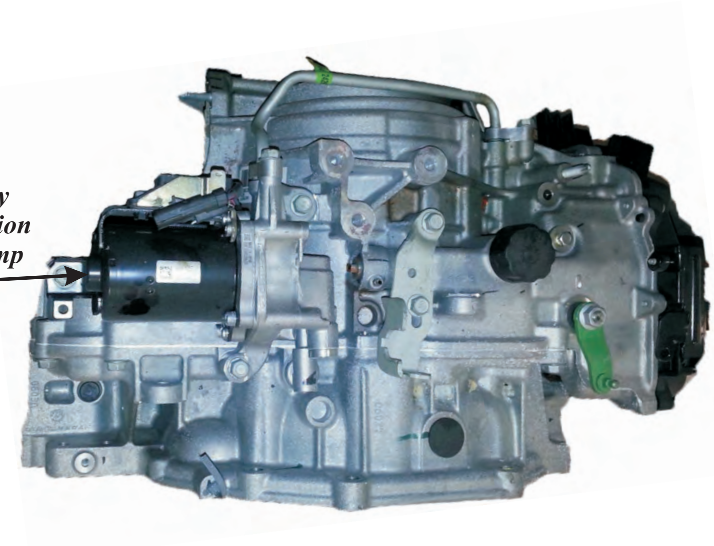
A special thank you to ALTO for the use of this transmission

GM 6T30/40/45/50 GENERATION I & II INFORMATION



6T30/40/45/50
Started in 2008

2009-2015 Chevrolet Cruze
2008-2015 Chevrolet Malibu
2012-2014 Chevy Cobalt
2013-2015 Chevy Impala
2008-2015 Buick LaCrosse
2009-2011 Saturn Aura (4-cylinder only)
2010-2011 Saturn Vue (4-cylinder only)
2009-2015 Chevrolet Equinox/GMC Terrain
2008-2015 Buick Regal
2009-2014 Chevrolet Aveo
2012-2015 Chevrolet Malibu ECO
2012-2015 Buick LaCrosse with eAssist
2012-2015 Buick Regal with eAssist
2012-2015 Chevrolet Sonic
2012-2015 Buick Encore
2012-2015 Buick Verano
2007-2014 Chevy Captiva Sport
2008-2009 Pontiac G6
2010-2011 Saab 9'4x



GM 6T40 Series Generation 2 arrived in 2012 with both software and architectural changes. Pressure switches were eliminated from the TEHCM, solenoids went from being variable bleed to variable feed type, the valve body and many internal parts have changed.
. By 2014-2015 all 6T series transmissions should be converted to Gen 2 design.

Figure 1

GM 6T30/40/45/50 GENERATION I & II INFORMATION

6T30 (MH9)
Type: six-speed front-wheel-drive, electronically controlled, automatic overdrive transaxle with electronically controlled torque converter clutch.
Engine Range: 1.8L
Max Engine Torque: 129 lb-ft (175 Nm (gas)) / 147 lb-ft (200 Nm (diesel))
Weight: 157.6 lbs (71.5 kg)
Assembly Site: GM Korea
Applications: Chevrolet Cruze and Sonic

6T40 (MH8)
Type: six-speed front-wheel-drive, electronically controlled, automatic overdrive transaxle with electronically controlled torque converter clutch.
Engine Range: 1.4L - 2.5L
Max Engine Torque: 177 lb-ft (240 Nm)
Weight: 180.4 lbs (81.8 kg)
Assembly Site: Toledo, Ohio
Applications: Buick Encore, Buick Verano, Chevrolet Cruze, Chevrolet Malibu, Chevrolet Sonic

6T40 (MHH)
Type: six-speed front wheel drive, electronically controlled, automatic overdrive transaxle with an electronically controlled torque converter clutch and an auxiliary, electric-driven transmission oil pump
Engine Range: 2.4L
Max Engine Torque: 177 lb-ft (240 Nm)
Weight: 198 lbs (89.8 kg)
Assembly Site: Toledo, Ohio
Applications: Buick LaCrosse eAssist, Buick Regal eAssist, Chevrolet Malibu Eco

6T45 (MH7/MHC)
Type: six-speed front wheel drive, electronically controlled, automatic overdrive transaxle with an electronically controlled torque converter clutch
Engine Range: 2.4L
Max Engine Torque: 232 lb-ft (315 Nm)
Weight: 184.2 lbs (83.6 kg)
Assembly Site: Toledo, Ohio
Applications: Chevrolet Captiva Sport, Chevrolet Equinox, GMC Terrain

6T50 (MHK/MHJ)
Type: six-speed front wheel drive, electronically controlled, automatic overdrive transaxle with an electronically controlled torque converter clutch
Engine Range: 2.0L - 3.0L
Max Engine Torque: 258 lb-ft (350 Nm)
Weight: 190.3 lbs (86.3 kg)
Assembly Site: GM Korea / China / Mexico
Applications: Buick Regal, Buick Verano, Chevrolet Captiva Sport

Figure 2

*The first generation of transmissions were analyzed for potential enhancements in an effort to increase fuel economy and improved shift quality.

Changes were made with architectural hardware controls in conjunction with system software to increase capacity, reduce system delays (optimize system response times), and increase efficiency.

One example of an architectural change is with the 4-5-6 clutch. The wave plate was removed and an additional friction was added for increased torque capacity (Figures 3 and 4).

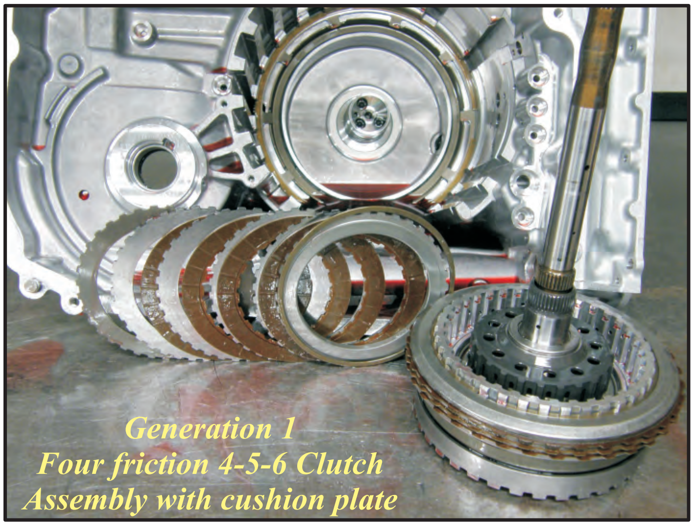


Figure 3

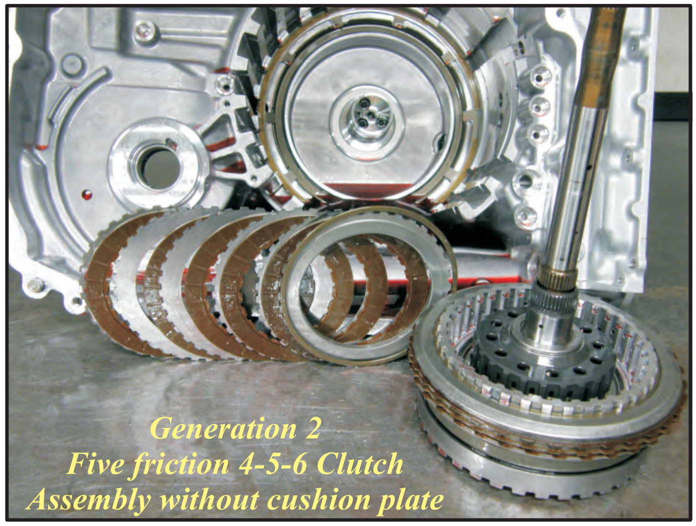


Figure 4

With the exception of the Low and Reverse Clutch, each clutch inside this transmission is operated by a solenoid through its respective regulating valve. With Gen 1 based models, a relatively small feed orifice was located on the line pressure supply side of the 4-5-6 Clutch Regulating Valve (Figure 5). With this orifice on one side of the valve and the wave plate on the opposite side of the valve, it stabilized the valve from having a pressure spike when it moved from a full feed position to regulation. When the cushion (wave) plate was removed to add an additional friction plate for increased torque capacity, this orifice was moved to the clutch pressure supply side of the valve (Figure 6). This was done to have a greater control of the apply of the clutch to prevent a harsh engagement with the absence of a cushion plate.

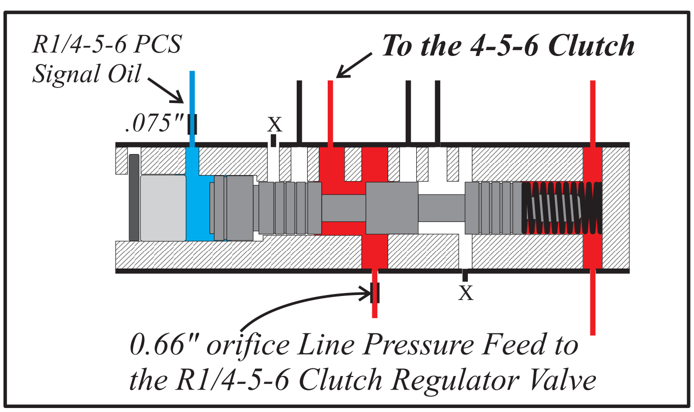


Figure 5

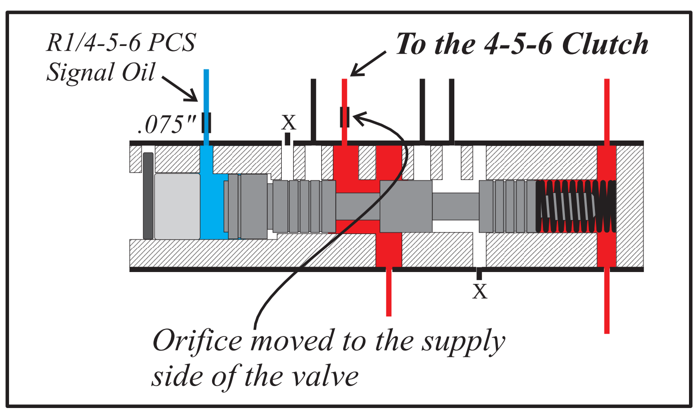


Figure 6

* Gen 2 GF6 Transmission Hardware and Controls Updates - SAE International 2011-01-1428

One software change that took place is related to fuel economy which affects how the TEHCM controls line pressure inside the transmission. Typically, once a shift transition is made, line pressure is increased and held so as to keep the driving or holding clutch from slipping, maintaining the commanded gear. The engine then drives the pump through the torque converter. When line pressure becomes high, this places an additional mechanical load on the engine negatively affecting fuel economy. For Gen 2, a system pressure learn program was written where the computer will periodically bring line pressure down until it sees it slip. It will then raise line pressure just slightly above the slip point minimizing the margin of safety between slip and non-slip conditions (Figure 7). By doing this, the engine is driving a pump at lower pressures for longer periods of time. This places less load on the engine and thus increasing fuel economy.

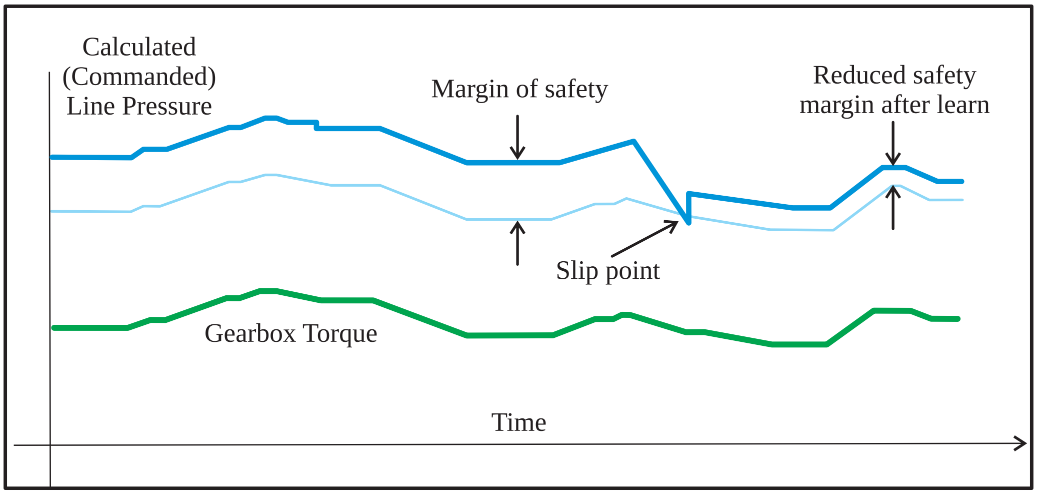


Figure 7

The line pressure tap is conveniently located on top of the transmission along side the transmission's fill cap as seen in Figure 8. Gen 1 and 2 line pressure specification tables are provided in Figure 9. *Specifications were taken from a 2013 Chevy Cruze factory repair manual.*

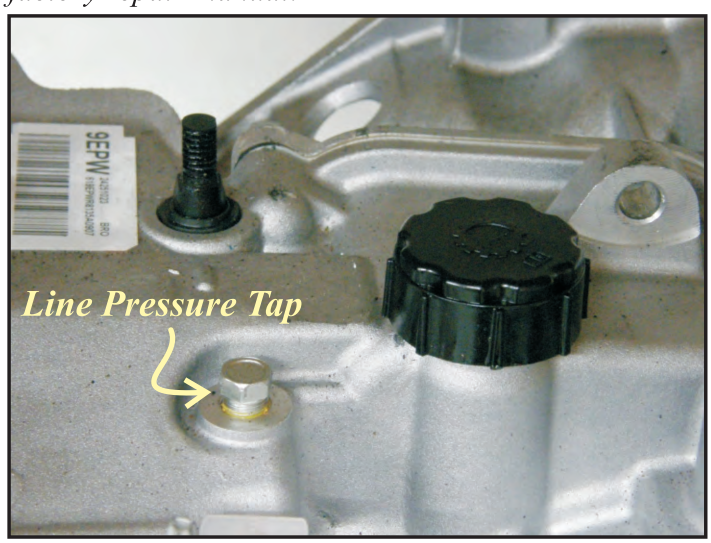


Figure 8

Gen 1 Line Pressure Specification

REQUESTED	ACTUAL	
Pressure (kPa)	English	Metric
None......................	50-80 psi...........	345-550 kPa
200.........................	100-130 psi.......	690-900 kPa
400.........................	160-190 psi.......	1100-1310 kPa
600.........................	220-250 psi.......	1520-1725 kPa
800-2000................	270-330 psi.......	1860-2275 kPa

Gen 2 Line Pressure Specification

REQUESTED	ACTUAL	
Pressure (kPa)	English	Metric
None......................	25-55 psi...........	172-379 kPa
200.........................	96-126 psi.........	662-869 kPa
400.........................	166-196 psi.......	1145-1351 kPa
600.........................	237-267 psi.......	1634-1841 kPa
800-2000................	307-337 psi.......	2117-2324 kPa

Figure 9

GM 6T30/40/45/50 GENERATION I & II INFORMATION

Another software change that took place is related to the elimination of the pressure switches inside the TEHCM assembly (Figure 10). These pressure switches were originally used (Gen 1) to monitor clutch operation via the solenoids and regulator valves for adaptation purposes.

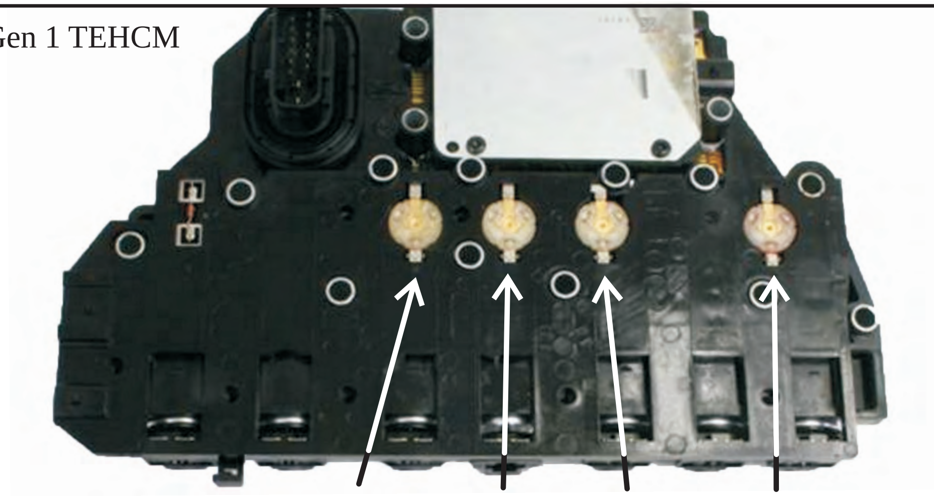


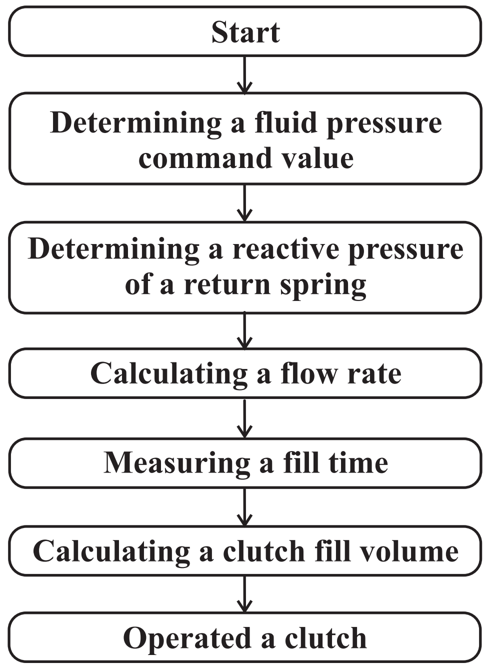
Figure 10

With the elimination of the pressure switches in Gen 2 versions, a new program is used to determine adapts called "Clutch Pulse Learn." United States Patent Application 20120067690 A1 entitled: *Hydraulic clutch and method for determining an adaptive clutch fill volume of the hydraulic clutch* provides some insight to its method for learning a characteristic filling volume of a hydraulic clutch. Generally, the method is comprised of:

1. Applies a pressure pulse to a hydraulic clutch when it is in a disengaged state (Figure 11).
2. It determines an inflection event at a torque path that comprises the hydraulic clutch (return spring force).
3. Derives a characteristic filling volume of the hydraulic clutch from the inflection event.

Clutch Pulse Learn Event	
Disengaged Clutch	**Gear Clutch is Pulsed**
4-5-6 Clutch	3rd Gear
1-2-3-4 Clutch 2-6 Clutch	5th Gear
3-5-R Clutch	6th Gear
Clutch Pulse Learn occurs every 1,000 miles or more	

Figure 11



A flow chart on a method for operating the hydraulic clutch based on fill volume adaptation from the Clutch Pulse Learn paper 20120067690

GM factory manual describes the Clutch Pulse Learn strategy as a Non-Shifting Clutch Function Verification and describes it as follows:

The 6T30/40/45/50 transmission uses a pressure control system to apply and release clutches during shifts. The transmission control module (TCM) controls pressure commands to the pressure control solenoids.

As normal wear of the transmission clutches occur, the TCM performs a clutch function verification. The TCM momentarily commands a clutch on at a low pressure. The clutch function verification is conducted on smooth roads when the transmission is not shifting and engine torque is consistent and positive.

When a clutch function verification is occurring, a slight bump or drag may be detected momentarily. The clutch function verification will occur a few times over several minutes and will not repeat again for a thousand or more miles. This is a normal condition and no repair attempts should be performed.

The clutch function verification will be performed sooner for a particular clutch if the TCM detects it is producing frequent poor shift control.

Figure 12

Transmission Adaptive Values Learn

Transmission Adaptive Values Learn is a procedure for 6 speed automatic transmissions in which a series of tests are run to allow the transmission control module (TCM) to learn individual clutch characteristics. Once the clutch data is learned, Transmission Adaptive Values Learn translates it into the adaptive data cells, which the TCM uses for clutch control during shifts. The scan tool provides initiation of the Transmission Adaptive Values Learn procedure. This procedure is to be used following transmission repair. The Transmission Adaptive Values Learn procedure must be performed when one of the following repairs have been made to the vehicle. Failure to perform the procedure after one of the following repairs may result in poor transmission performance, as well as transmission DTCs being set:

- Transmission internal service/overhaul
- Valve body repair or replacement
- Control solenoid valve assembly replacement
- TCM software/calibration update
- Any service in response to a shift quality concern

Note: *Ensure the following conditions are met before performing the Transmission Adaptive Values Learn procedure:*

- Drive wheels are blocked
- Parking brake is applied
- Service brake is applied
- Zero percent throttle and no external engine RPM control

Transmission fluid temperature is between values listed below, if you attempt to run the test above or below these temperatures, the test will not start:

MY 2011 and prior 70-95°C (158-203°F)
MY 2012 Gen 1 70-95°C (158-203°F)
MY 2012 Gen 2 64-95°C (147-203°F)
MY 2013 Gen 1 70-95°C (158-203°F)
MY 2013 Gen 2 64-76°C (147-169°F)
MY 2014 and later 64-76°C (147-169°F)

Transmission gear selector has been cycled from Park to Reverse 3 times in order to purge air from the reverse clutches.

Transmission Adaptive Values Learn will abort if the transmission fluid temperature increases to the values listed below:

MY 2011 and prior 110°C (230°F)
MY 2012 Gen 1 110°C (230°F)
MY 2012 Gen 2 100°C (212°F)
MY 2013 Gen 1 110°C (230°F)
MY 2013 Gen 2 86°C (187°F)
MY 2014 and later 86°C (187°F)

Figure 13

Note: If at any time during the procedure, required conditions are not met, Transmission Adaptive Values Learn Adapts may abort and the process may need to be started again from the beginning. If this occurs, the transmission will be left in a neutral state until the controller is shut down, key OFF and remove the scan tool and wait for more than 30 seconds prior to re-try procedure. If the procedure repeatedly fails, a limit that engineering set is being exceeded and there is possibly a transmission hardware issue.

1. Use the scan tool to navigate to Transmission Adaptive Values Learn by selecting the following:

1.1. Module Diagnostics
1.2 Transmission Control Module
1.3 Configurations/Reset Functions
1.4 Transmission Adaptive Values Learn

Note: *If at any time during the procedure, required conditions are not met, Transmission Adaptive Values Learn may abort and the process may need to be started again from the beginning.*

2. Use the scan tool to perform the Transmission Adaptive Values Learn procedure. As the procedure is being performed, the scan tool data display will provide operator instructions. Follow the scan tool instructions, as required.

3. Once the procedure is complete, shut OFF the engine and power down the TCM. You will lose communication to the scan tool.

4. Restart the engine. This will complete the Transmission Adaptive Values Learn procedure.

Note: *When the Transmission Adaptive Values Learn procedure is completed, the transmission will remain in a neutral state until the controller shuts down. If after 1-2 minutes of sitting, with the key OFF and scan tool removed, the vehicle remains in a neutral state, disconnect the battery and wait 5-10 minutes and then hook the battery back up. Reverse and drive should return.*

Troubleshooting
If the Transmission Adaptive Values Learn will not run and the above stated conditions have been met, ensure the following:

Note: *The generation of transmission can be determined by using a scan tool to check for Specific DTC P0842. If DTC does not show Invalid, the transmission is Gen 1. If DTC shows Invalid, transmission is Gen 2.*

- Determine if transmission is Gen 1 or Gen 2.
- Verify vehicle model year.
- Verify transmission fluid temperature is between the temperatures listed above for the vehicle model year and generation of transmission.
- *Brakes and brake switch are functioning properly - see following page*
- No active DTCs
- Closed throttle and engine RPM increases above 1,500 RPM while at entrance of the test
- Park/Neutral position switch is properly adjusted and functioning
- Line pressure control is able to provide 1,000 kPa and is within specifications
- Vehicle is not moving or vibrating excessively
- Clutches are properly assembled

Figure 14

GM 6T30/40/45/50 GENERATION I & II INFORMATION

Brake Pedal Position Sensor Learn

Calibration Criteria

Note: Do not apply the brake pedal during the brake pedal position sensor calibration procedure. Any movement of the brake pedal during this procedure will cause the calibration procedure to fail. If this occurs, the brake pedal position sensor calibration must be repeated. Brake pedal position sensor calibration must be performed after the brake pedal position sensor, body control module (BCM), or engine control module (ECM) have been serviced. The calibration procedure will set the brake pedal position sensor home value. This value is used by the BCM and ECM to determine the action of the driver applying the brake system and to provide this information to the vehicle subsystems via serial data.

Calibration Procedure

1. Apply the parking brake.
2. Ignition ON, engine OFF, place the transmission in the PARK position for automatic transmission or NEUTRAL position for manual transmission.
3. Install a scan tool.
4. Clear all DTCs before proceeding.
5. Navigate to the Configuration/Reset Functions menu of the BCM.
6. Select the Brake Pedal Position Sensor Learn procedure and follow the directions displayed on the screen.
7. Navigate to the Configuration/Reset Functions menu of the ECM.
8. Select the Learn Functions menu.
9. Select the Brake Pedal Position Sensor Learn procedure and follow the directions displayed on the screen.

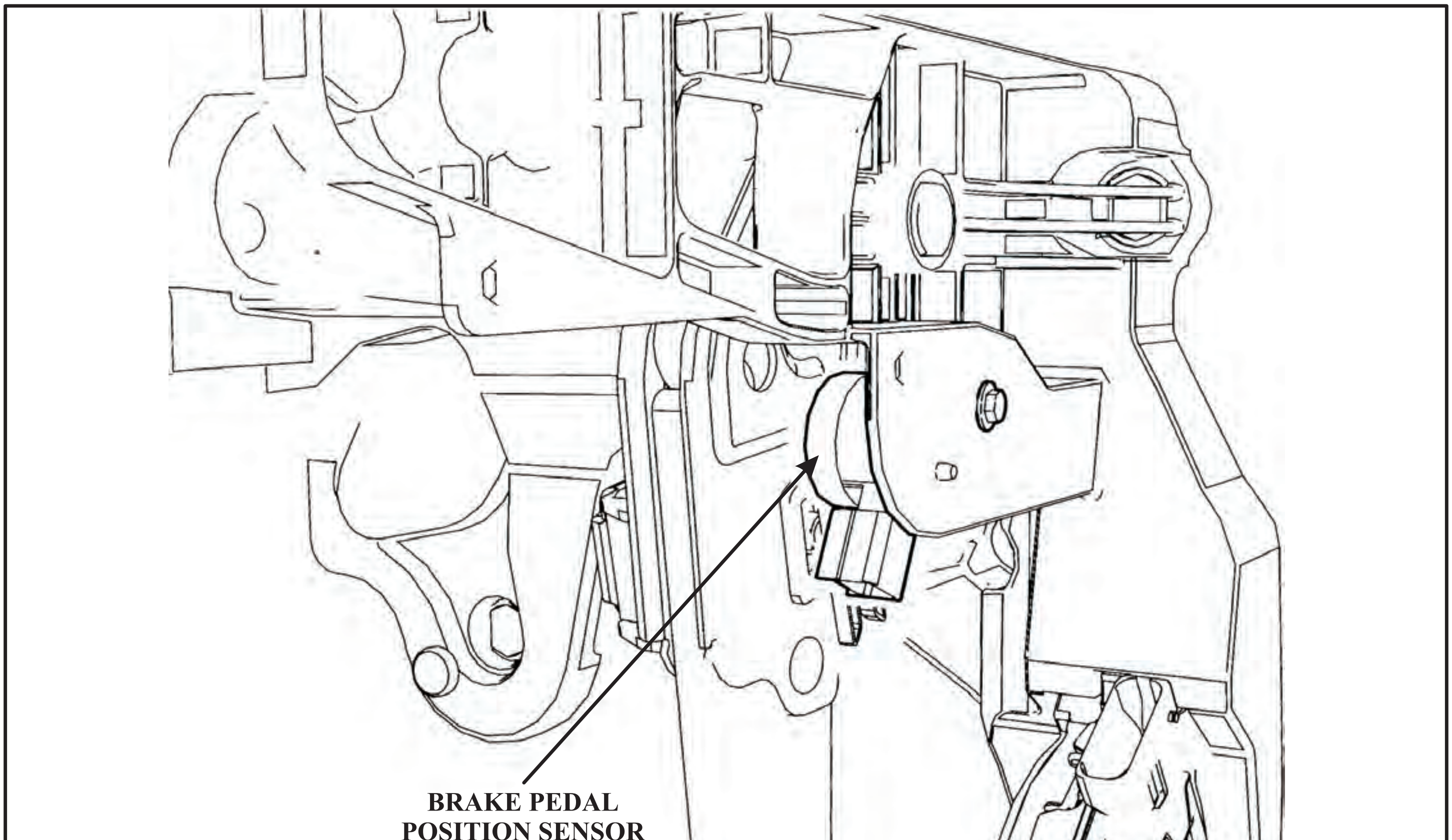
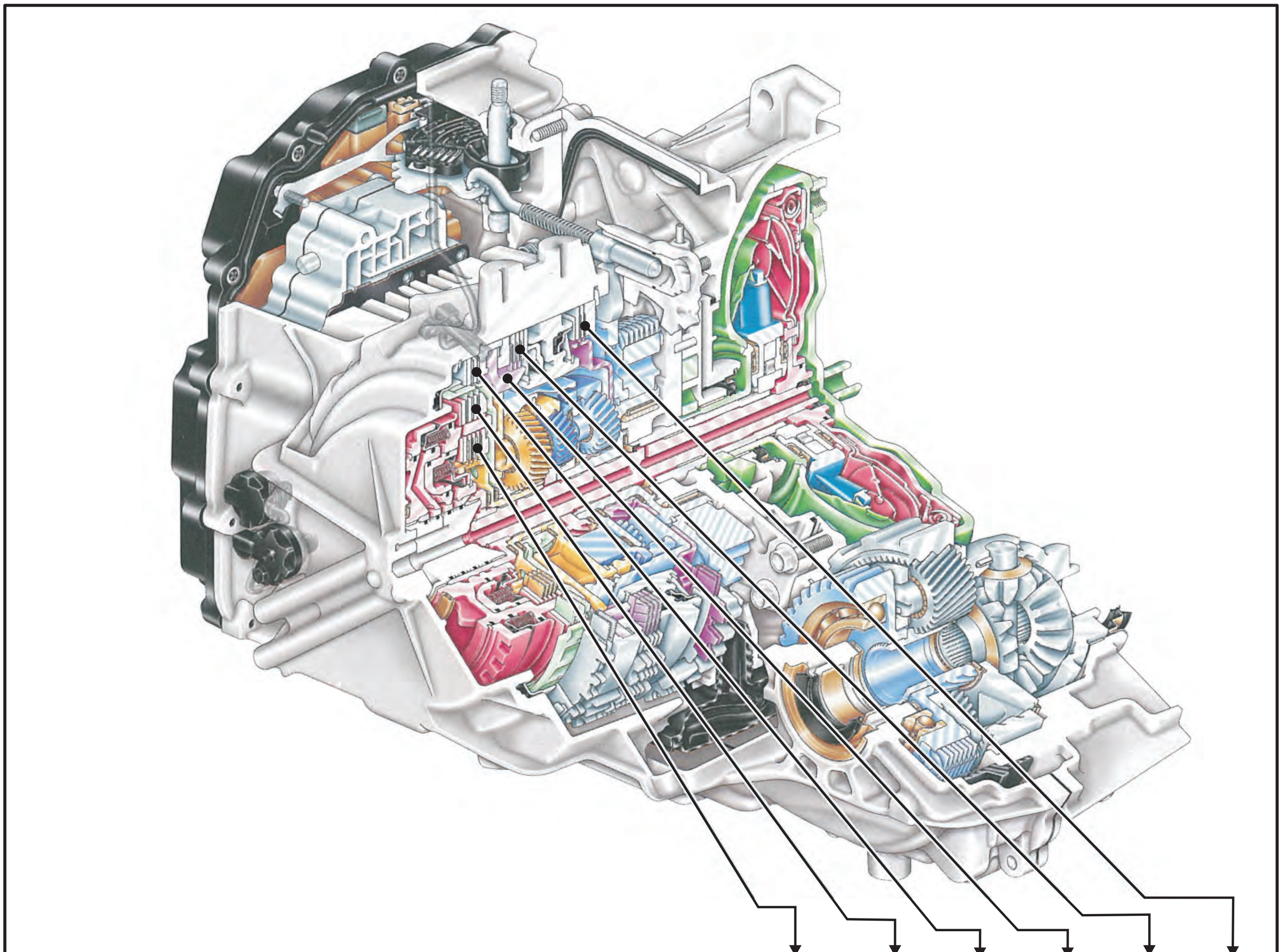


Figure 15

GM 6T30/40/45/50 GENERATION I & II INFORMATION



RANGE	GEAR	RATIO	SHIFT SOL (On/Off)	1-2-3-4CL PC SOL 5 N.L.	2-6 CL PC SOL 4 N.L.	3-5 REV CL PC SOL 2 N.H.	LO/REV 4-5-6 CL PC SOL 3 N.H.	4-5-6 CLUTCH	3-5 REV CLUTCH	2-6 CLUTCH	LOW ONE-WAY CLUTCH	LO/REV CLUTCH	1-2-3-4 CLUTCH
PARK	P		ON	OFF	OFF	ON	OFF					APPLIED*	
REV	R	2.940	ON	OFF	OFF	OFF	OFF		APPLIED			APPLIED	
NEUT	N		ON	OFF	OFF	ON	OFF					APPLIED*	
Neutral Stop Capable (Next Page) ←	1ST BRAKING	4.584	OFF	ON	OFF	ON	OFF					APPLIED	APPLIED
DRIVE	1ST	4.584	OFF	ON	OFF	ON	ON				HOLD		APPLIED
	2ND	2.964	OFF	ON	ON	ON	ON			APPLIED			APPLIED
	3RD	1.912	OFF	ON	OFF	OFF	ON		APPLIED				APPLIED
	4TH	1.446	OFF	ON	OFF	ON	OFF	APPLIED					APPLIED
	5TH	1.000	OFF	OFF	OFF	OFF	OFF	APPLIED	APPLIED				
	6TH	0.746	OFF	OFF	ON	ON	OFF	APPLIED		APPLIED			

* APPLIED WITH NO LOAD

Figure 16

Neutral Idle Description and Operation

Neutral Idle can only be commanded ON when the transmission is operating in Drive Range, First Gear Engine Braking (*Low/Reverse Clutches applied*).

When the service brakes are applied and the vehicle speed, throttle position, and transmission temperature are within the calibration defined limits, the TCM commands Neutral Idle ON. The low and reverse clutch remains applied. The TCM reduces the pressure command to the 1234 PC Solenoid 5, which reduces the fluid pressure to the 1-2-3-4 clutch, allowing the clutch to slip. The resulting slip on the 1-2-3-4 clutch reduces the difference between the torque converter input speed and torque converter turbine speed, or torque converter clutch (TCC) slip speed. The reduced TCC slip speed reduces the engine load. This results in lower fuel consumption while Neutral Idle is commanded ON.

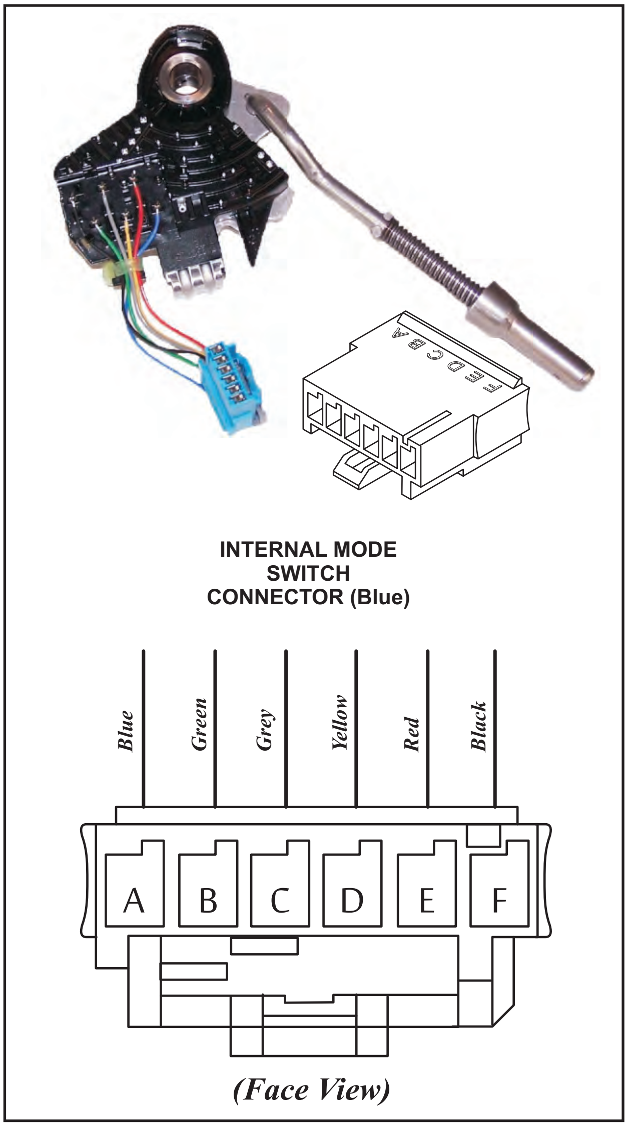


Figure 17

INTERNAL MODE SWITCH LOGIC DATA - SCAN TOOL				
Gear Selector Position	***Signal A***	***Signal B***	***Signal C***	***Signal P***
Park	*LOW*	*HI*	*HI*	*LOW*
Park/Reverse	*LOW*	*LOW*	*HI*	*LOW*
Reverse	*LOW*	*LOW*	*HI*	*HI*
Reverse/Neutral	*HI*	*LOW*	*HI*	*HI*
Neutral	*HI*	*LOW*	*HI*	*LOW*
Neutral/Drive 6	*HI*	*LOW*	*LOW*	*LOW*
Drive 6	*HI*	*LOW*	*LOW*	*HI*
Drive 6/Drive 4	*LOW*	*LOW*	*LOW*	*HI*
Drive 4	*LOW*	*LOW*	*LOW*	*LOW*
Drive 4/Drive 3	*LOW*	*HI*	*LOW*	*LOW*
Drive 3	*LOW*	*HI*	*LOW*	*HI*
Drive 3/Drive 2	*HI*	*HI*	*LOW*	*HI*
Drive 2	*HI*	*HI*	*LOW*	*LOW*
Open	*HI*	*HI*	*HI*	*HI*
Invalid	*HI*	*HI*	*HI*	*LOW*
Invalid	*LOW*	*HI*	*HI*	*HI*

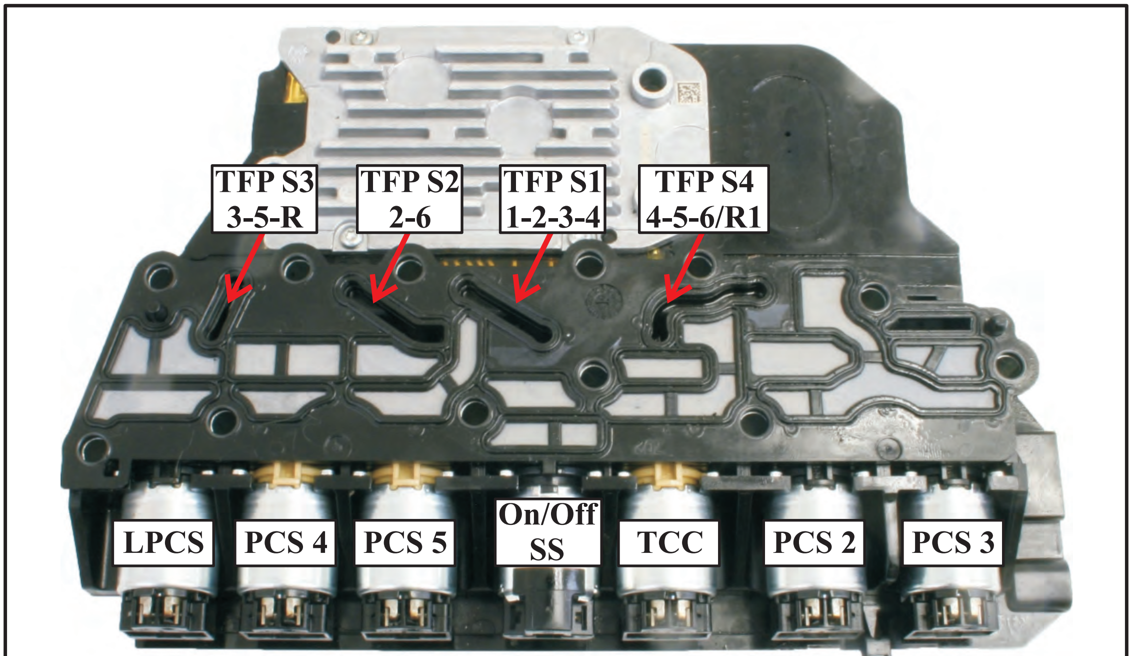
HI = 12 Volts
LOW = 0 Volts

Internal Mode Switch (IMS) Terminal Identification	
Terminal	***Function***
A	*Ground (Blue)*
B	*Mode Switch Signal "A" (Green)*
C	*Mode Switch Signal "B" (Grey)*
D	*Mode Switch Signal "C" (Yellow)*
E	*Mode Switch Signal "P" (Red)*
F	*P/N Start Signal "N" To ECM (Black)*

Figure 18

GM 6T30/40/45/50 GENERATION I & II INFORMATION

Generation 1 Pressure Switches. These pressure switches are used for adaptive control by monitoring clutch regulating valve activity and clutch hydraulic operation.



Generations 1 and 2 solenoid locations.

Figure 19

Generation 1 uses Variable Bleed type solenoids while Generation 2 uses Variable Feed type solenoids. Notice the difference in the way General Motors presents their hydraulic schematics between the two in Figure 20. Generation 1 solenoid and pressure switches displayed in the upper hydraulic while Gen 2 without pressure switches in the lower schematic. The different solenoid configurations between the two schematics represents the change from one solenoid type to another.

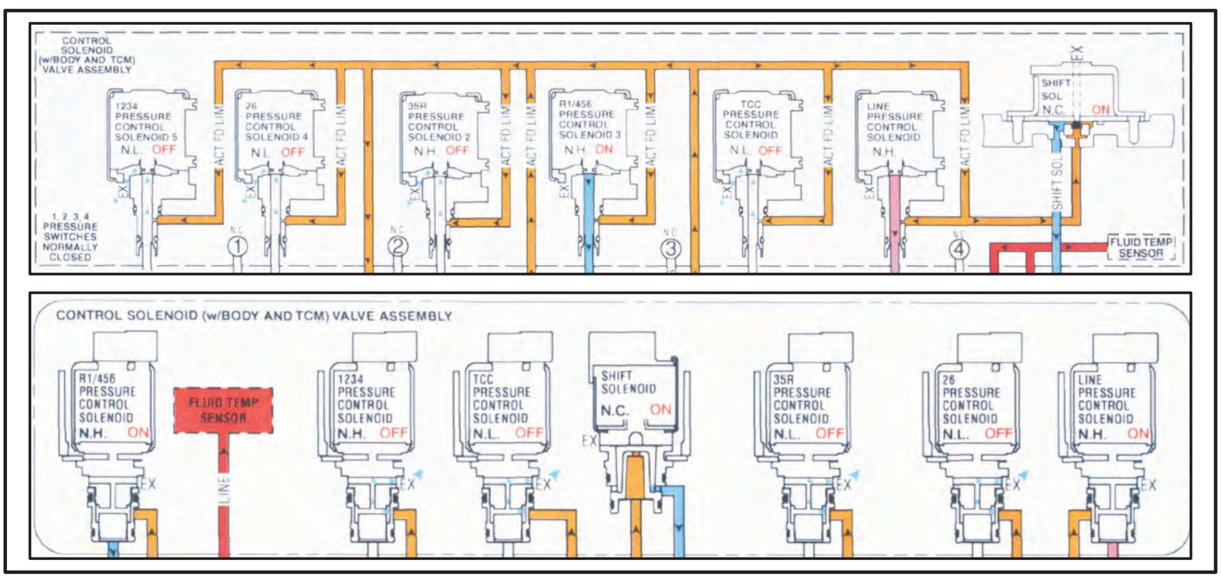
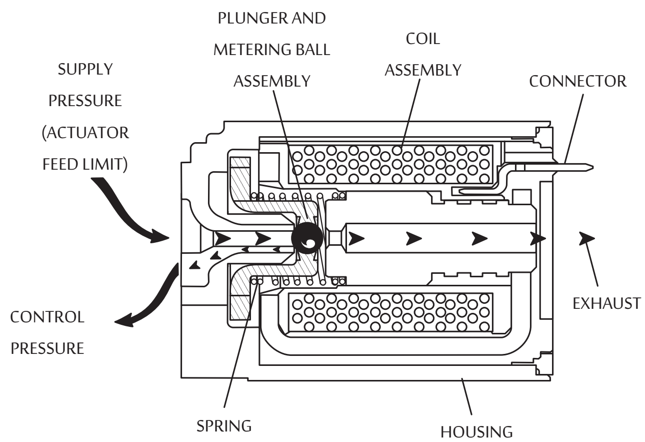


Figure 20

SHIFT SOLENOID

N.C.

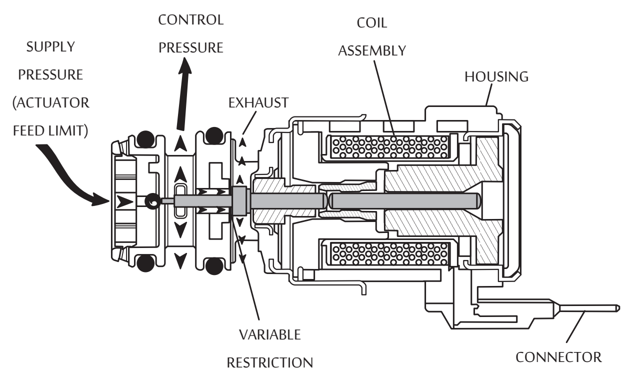


18 Ohms

The Shift Solenoid is Normally Closed. When Off it blocks the passage to the Clutch Select Valve and Shuttle TCC Regulated Apply Valve. When On it connects Actuator Feed Limit Valve pressure to the Clutch Select Valve and Shuttle TCC Regulated Apply Valve, stroking the valves.

NORMALLY-LOW CLUTCH PRESSURE TCC CONTROL SOLENOID

N.L.



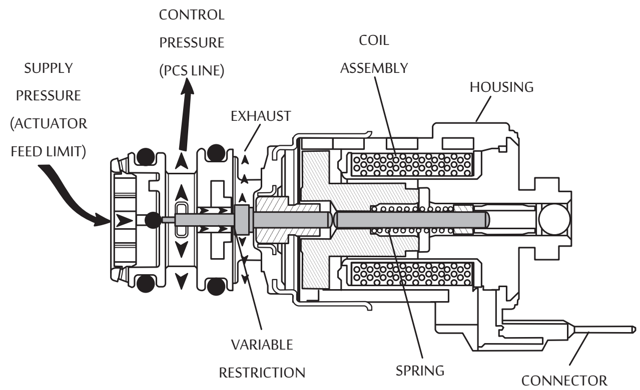
4.5 Ohms

The TCC Control Solenoid is Normally Low. When Off it blocks the passage to the TCC Control Valve and TCC Regulated Apply Valve. When On it connects Actuator Feed Limit Valve pressure to the TCC Control Valve and TCC Regulated Apply Valve, stroking the valves, which apply the Torque Converter Clutch.

Figure 21

NORMALLY-HIGH CLUTCH PRESSURE LINE PRESSURE CONTROL SOLENOID

N.H.

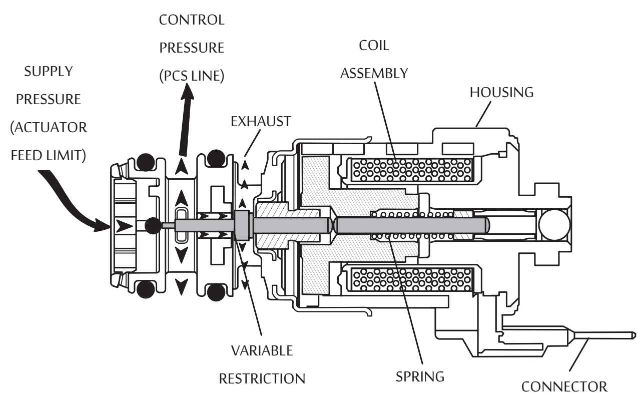


4.5 Ohms

The Line Pressure Control Solenoid is Normally High. When Off it connects Actuator Feed Limit Valve pressure to the Spring side of the Pressure Regulator Valve increasing Line Pressure. When on or at high duty cycle it blocks or limits Actuator Feed Limit Valve pressure to the spring side of the Pressure Regulator Valve decreasing Line Pressure.

NORMALLY-HIGH CLUTCH PRESSURE PRESSURE CONTROL SOLENOID 2 AND 3

N.H.



4.5 Ohms

Pressure Control Solenoids 2 and 3 are Normally High. When Off they connect Actuator Feed Limit Valve pressure to their respective valves. When On they block Actuator Feed Limit Valve pressure to their respective valves.

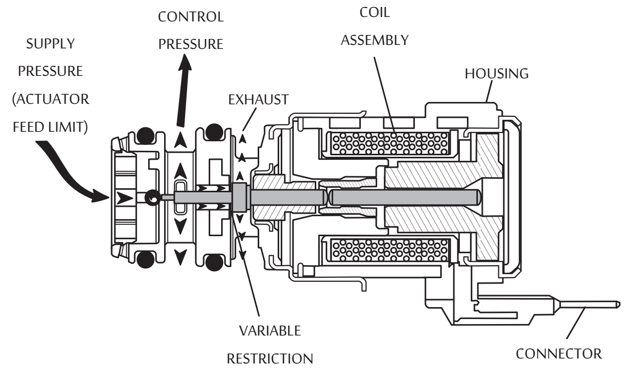
Pressure Control Solenoid 2 controls the 3-5-Reverse clutch Reg. Valve.

Pressure Control Solenoid 3 controls the R1/4-5-6 clutch Reg. Valve.

Figure 22

NORMALLY-LOW CLUTCH PRESSURE CONTROL SOLENOIDS 4 AND 5

N.L.



4.5 Ohms

Pressure Control Solenoids 4 and 5 are Normally Low. When Off they block the passage to their respective valves. When On they connect Actuator Feed Limit Valve Pressure to their respective valves.

Pressure Control Solenoid 4 controls the 2-6 clutch Reg. Valve.

Pressure Control Solenoid 5 controls the 1-2-3-4 clutch Reg. Valve and 1-2-3-4 clutch boost valve.

Figure 23

Example: 90 to 100 psi of shop air is connected to the air inlet fitting. When the shift solenoid is off, no flow on the pressure gauge connected to port D should be seen. When SS is turned on there should be full flow to the gauge.

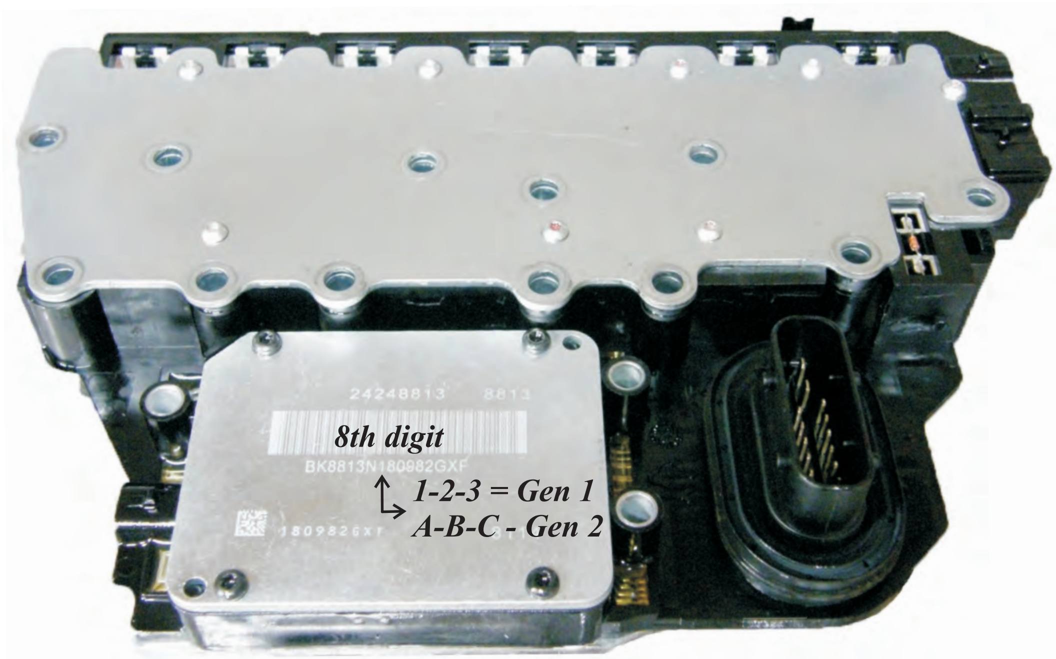
Using the DT-48616 Solenoid Test Plate

With the key on engine off, the TCM will normally cycle some of the transmissions solenoids on and off to facilitate keeping the ports and solenoids clean and free of debris. This dither function is a normal activity and will cause the valves to cycle open and closed quickly when the TCM is powered up. This can cause the psi gauge to flicker high and low as the valves open and close. This may cause some air to exit the ports where the psi gauge is not connected as those solenoids cycle on and off.

Test Port	Solenoid		On	Off
A	LPSC	(N.H.)	Low	High
B	2-6	(N.L. PCS 4)	Max	0
Gen 1 - F Gen 2 - C	3-5-R 3-5-R	(N.H. PCS 2) (N.L. PCS 2)	0 Max	Max 0
D	SS	(N.C.)	Max	0
E	TCC	(N.L.)	Max	0
Gen 1 - C Gen 2 - F	1-2-3-4 1-2-3-4	(N.L. PCS 5) (N.H. PCS 5)	Max	0
G	R1/4-5-6	(N.H. PCS 3)	0	Max

Figure 24

GM 6T30/40/45/50 GENERATION I & II INFORMATION

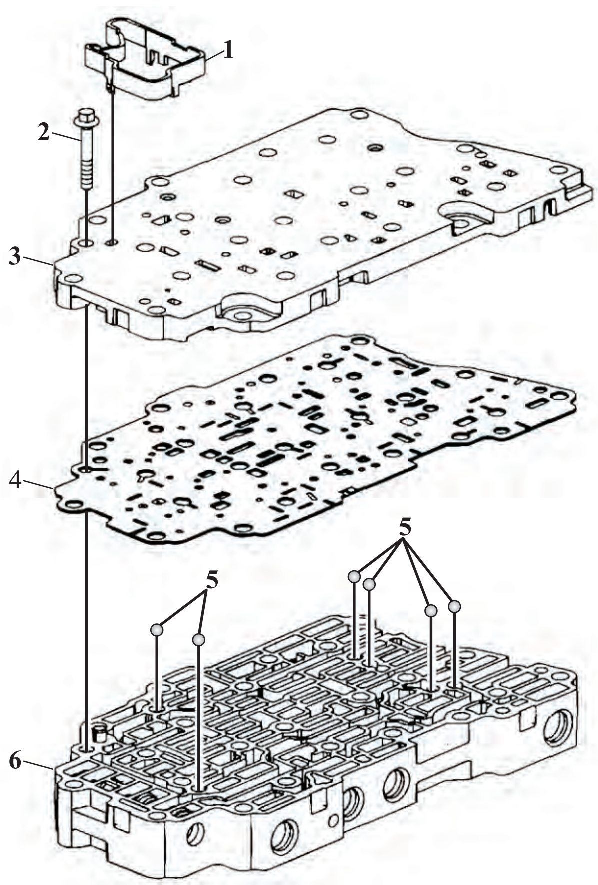


Generation 1 TEHCM's can be easily identified by looking at the color of the solenoid caps. They are either all black or could have 1 white cap. Generation 2 contain various color cap solenoids.

Figure 25

GM 6T30/40/45/50 GENERATION I & II INFORMATION

GENERATION 1 CONTROL VALVE BODY ASSEMBLY



1. Control Solenoid Valve Support
2. Control Valve Body Bolt M5 x 40.5 (Qty: 1)
3. Valve Channel Plate
4. Control Valve Channel Plate Spacer Plate Assembly
5. Valve Body Ball Check Valves (Qty: 6)
6. Control Valve Body

GENERATION 2 CONTROL VALVE BODY ASSEMBLY

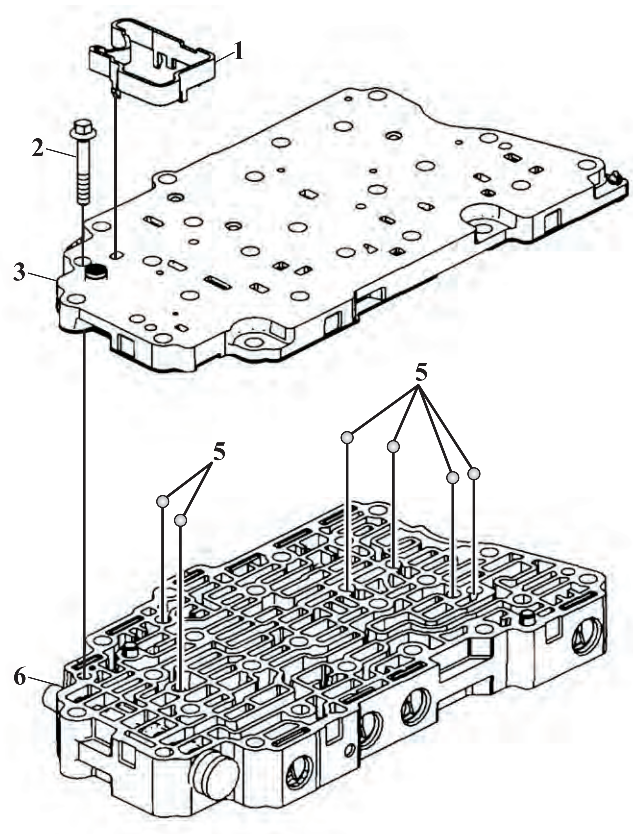
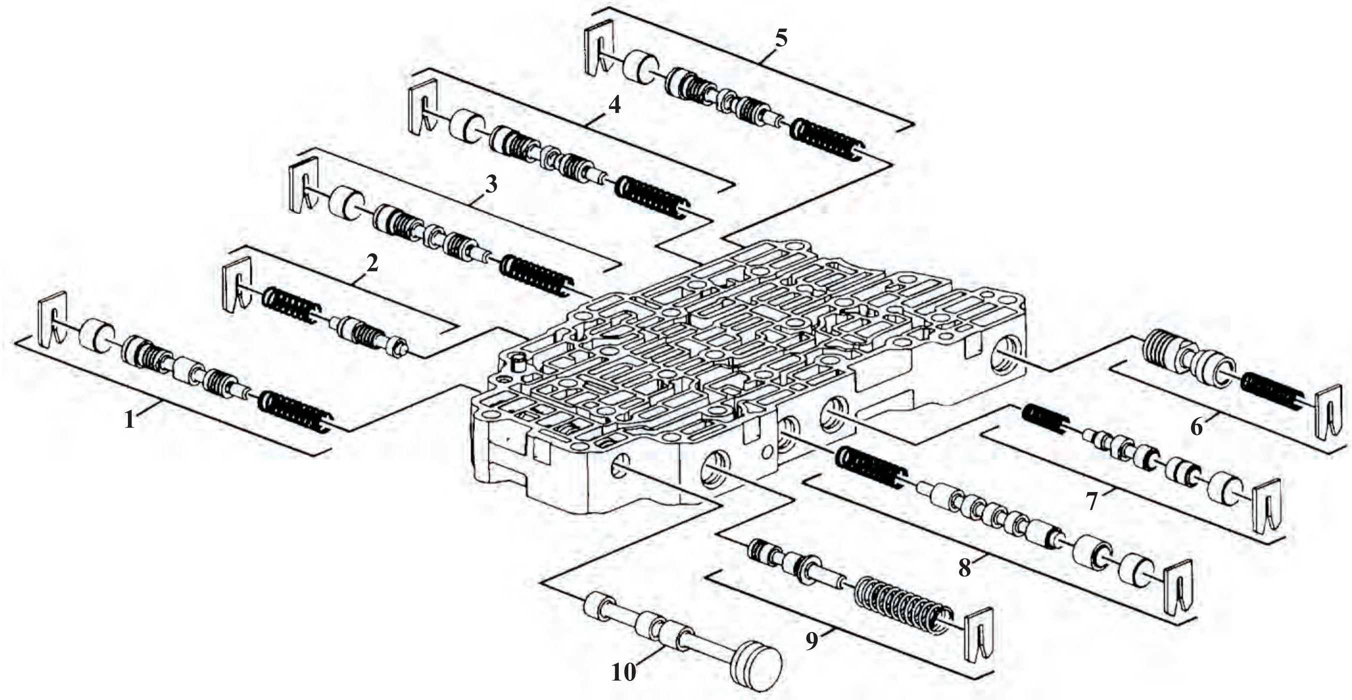


Figure 26

GM 6T30/40/45/50 GENERATION I & II INFORMATION

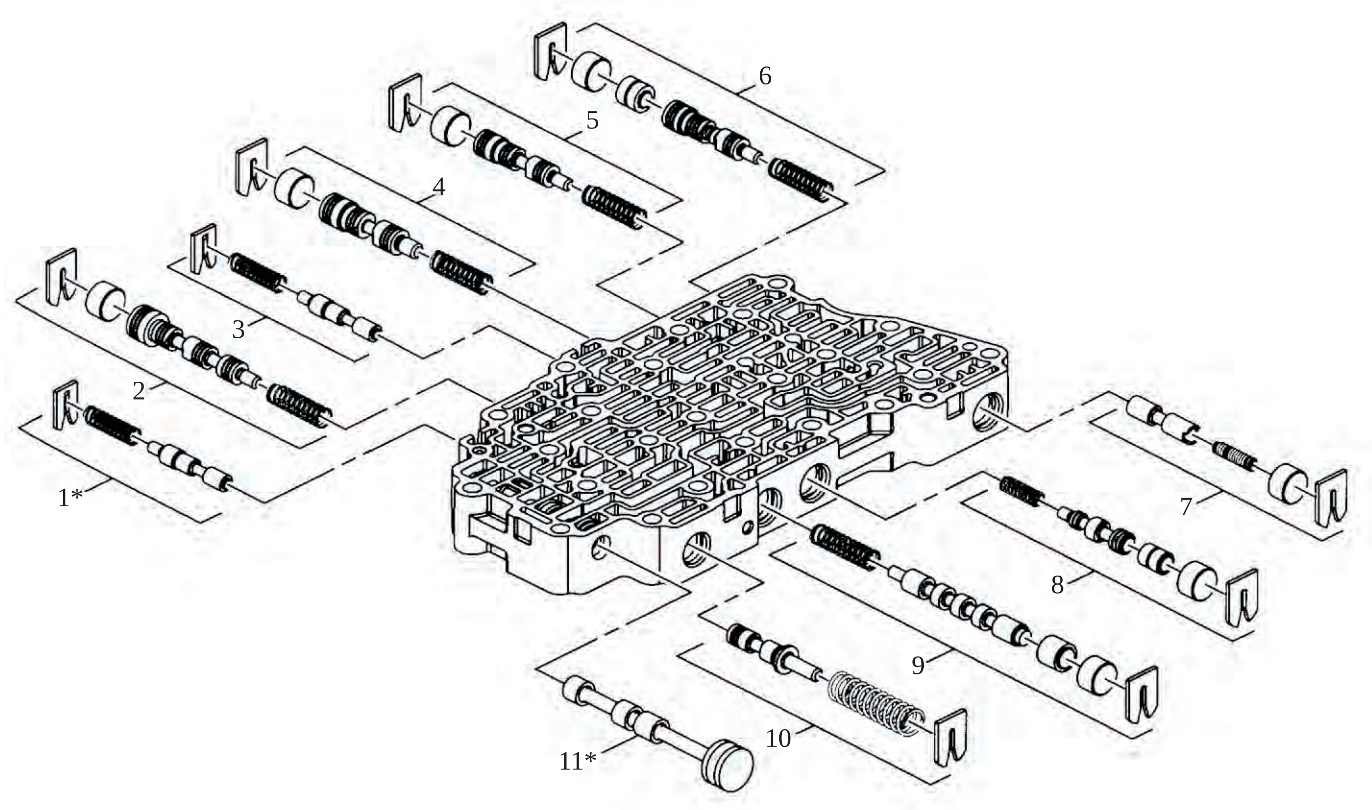
GENERATION 1 CONTROL VALVE BODY VALVE LOCATION AND IDENTIFICATION



1. First-Reverse and 4-5-6 Clutch Regulator Valve Train
2. 1-2-3-4 Clutch Boost Valve Train
3. 1-2-3-4 Clutch Regulator Valve Train
4. 2-6 Clutch Regulator Valve Train
5. 3-5 Reverse Clutch Regulator Valve Train
6. Clutch Piston Dam Feed Regulator Valve Train (*Compensator Feed Reg Valve*)
7. TCC Regulator Apply Valve Train
8. Clutch Select Valve Train
9. Actuator Feed Limit Valve Train
10. Manual Valve

Figure 27

GENERATION 2 CONTROL VALVE BODY VALVE LOCATION AND IDENTIFICATION



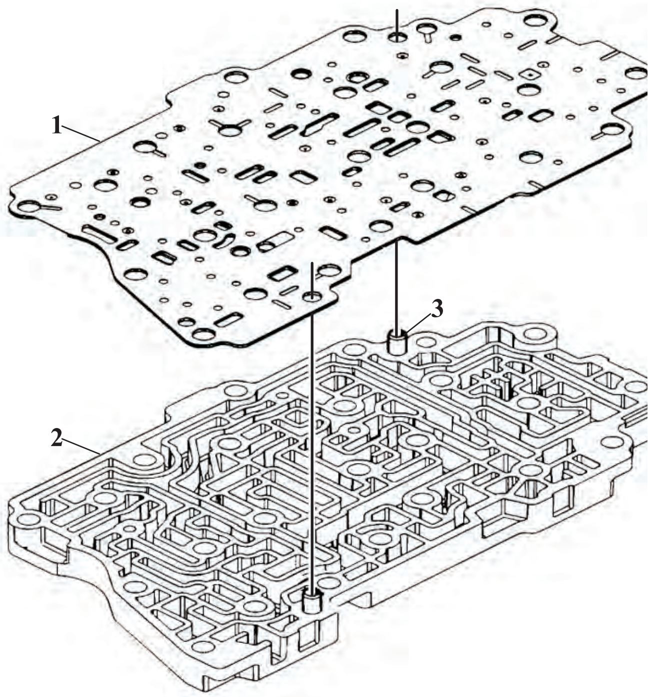
1. Low-Reverse and 4-5-6 Clutch Boost Valve Train - * *added valve line-up*
2. Low-Reverse and 4-5-6 Clutch Regulator Valve Train
3. 1-2-3-4 Clutch Boost Valve Train
4. 1-2-3-4 Clutch Regulator Valve Train
5. 2-6 Clutch Regulator Valve Train
6. 3-5 Reverse Clutch Regulator Valve Train
7. Default Override Valve Train - *New valve line-up, Compensator Reg Feed Eliminated***
8. TCC Regulator Apply Valve Train
9. Clutch Select Valve Train
10. Actuator Feed Limit Valve Train
11. Manual Valve - * *Material says this valve is made shorter with GEN 2.*
GEN 2 valve bodies obtained by ATSG did not have shorter manual valves.

** Generation 2 re-designed the clutch regulator valves so that the exhaust backfill circuits are now used in place of the compensator feed regulator valve which in Generation 1 had dumped through a metered exhaust. The Default Override Valve ensures a Reverse engagement regardless of the state of the solenoids.

Figure 28

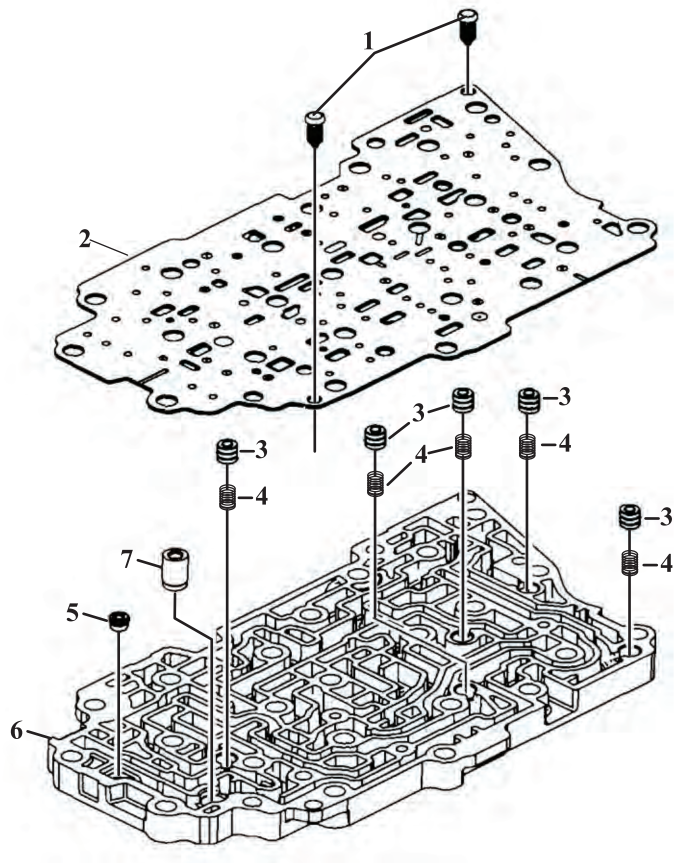
GM 6T30/40/45/50 GENERATION I & II INFORMATION

GENERATION 1 CONTROL VALVE CHANNEL PLATE ASSEMBLY



1. Channel Plate to Valve Body Spacer Plate Assembly
2. Valve Channel Plate
3. Control Valve Body Guide Pins

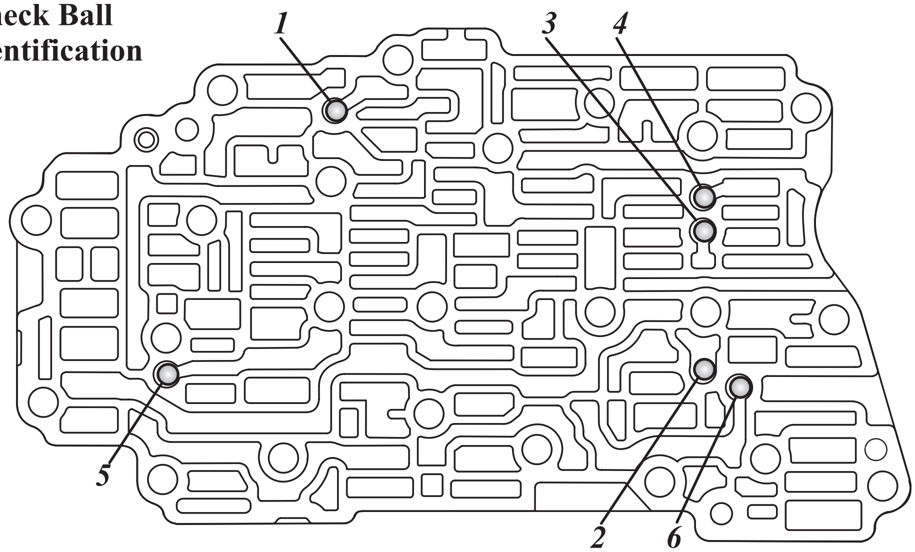
GENERATION 2 CONTROL VALVE CHANNEL PLATE ASSEMBLY



1. Control Valve Body Spacer Plate Retainer
2. Channel Plate to Valve Body Spacer Plate Assembly
3. Actuator Feed Accumulator Piston (Qty: 5)
4. Actuator Feed Accumulator Spring (Qty: 5)
5. Variable Hi and 2-3-4 Clutch Housing Valve Ball
6. Valve Channel Plate
7. Control Valve Channel Plate Ball Spring Assembly

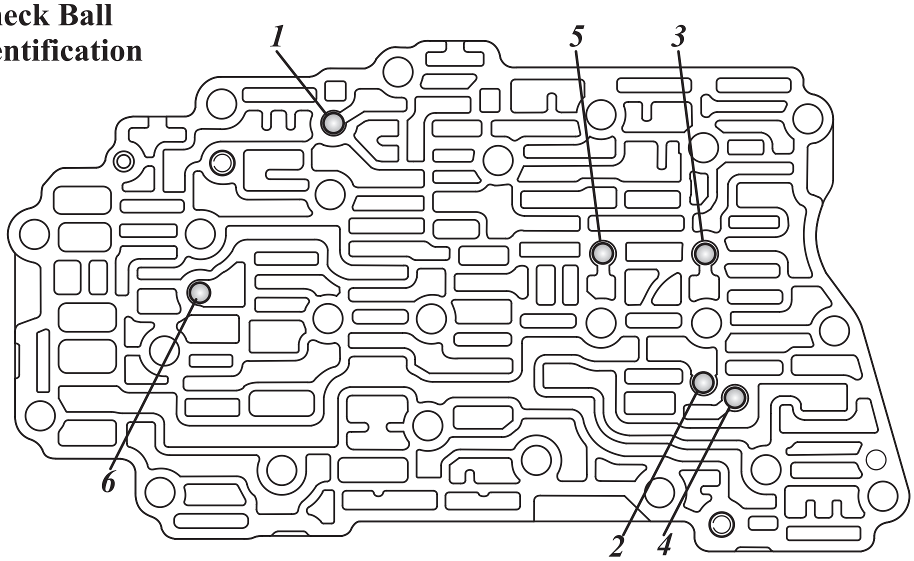
Figure 29

Generation 1 Control Valve Body Check Ball Location and Identification



1. PS4............................ Input - 4-5-6 Cl Fd........ Output - CSV2 Latch
2. 3-5-R/D1-6................ Input - D1-6.................. Output - 3-5-R Feed
3. 3-5-R Feed... Output - 3-5-R Feed
4. Comp. Feed................ Input - 3-5-R.................. Output - 3-5-R Feed/Exh BF
5. Actuator Fd Lm.. Output - R1/4-5-6 Feed
6. Actuator Fd Lm.. Output - 3-5-R Clutch

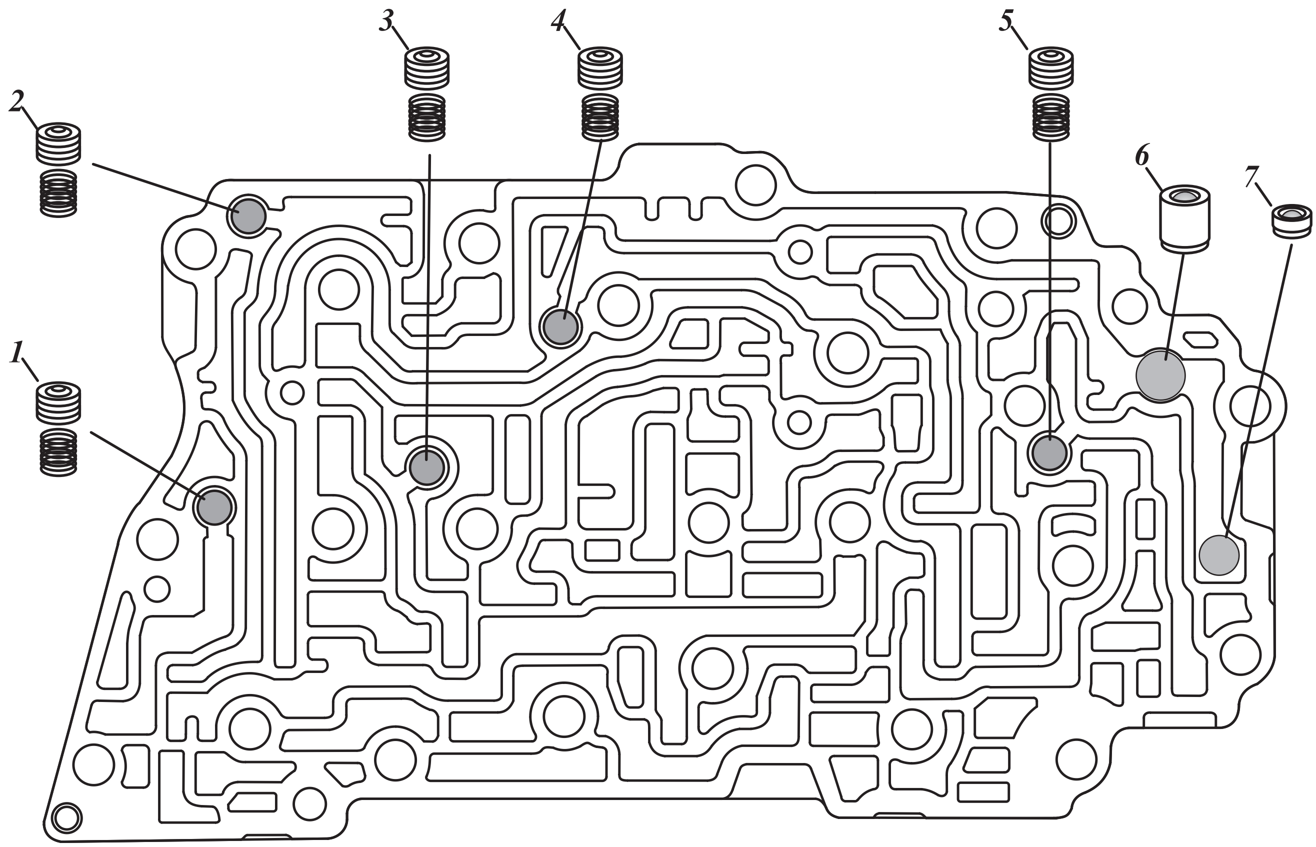
Generation 2 Control Valve Body Check Ball Location and Identification



1. Latch.......................... Input - 4-5-6 Cl Fd........ Output - Latch
2. 3-5-R Feed................. Input - D1-6.................. Output - 3-5-R Feed/D1-6
3. 3-5-R Feed/D1-6.. Output - 3-5-R Feed/D1-6
4. Actuator Fd Lm.. Output -3-5-R Feed Clutch
5. Drive.. Output - Drive
6. Line........................... Auxiliary Line.............. Output - Line

Figure 30

Generation 2 Control Channel Plate Accumulator and Check Valve Location and Identification



1. PCS Accumulator
2. 2-6 Clutch PCS Accumulator
3. 3-5-R Clutch PCS Accumulator
4. 1-2-3-4 Clutch PCS Accumulator
5. R1/4-5-6 Clutch PCS Accumulator
6. Exhaust Backfill Blow Off Ball Assembly
7. Exhaust Backfill Air Bleed Capsule

Figure 31

Transmission Adaptive Values Learn:

- The TCM commands pressure to the clutches to learn the transmission adaptive values. As the procedure is being performed, the scan tool provides operator instructions.

- Test may not start or may abort for the following conditions:
    - Transmission fluid temperature outside required parameters (See figure 13).
    - Brakes and brake switch must function properly.
    - Closed throttle and engine speed increases above 1500 RPM.
    - Park/neutral position switch must be properly adjusted and functioning.
    - Line pressure control is able to command 1,000 kPa (145 psi).
    - Vehicle must be stopped.
    - Vehicle must not be vibrating excessive.

Transmission Adapt Pressure Reset

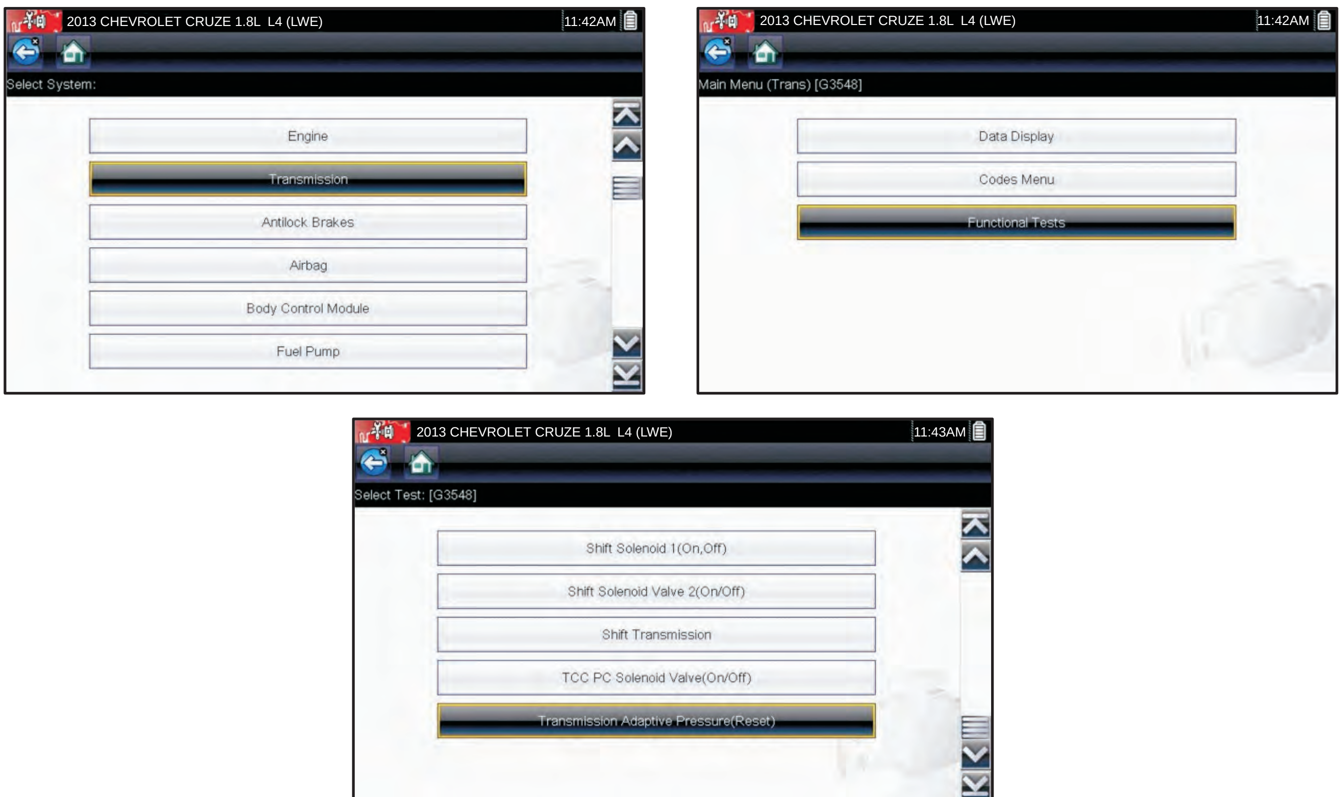


Figure 32

TRANSMISSION FLUID FILL SPECIFICATIONS AND PROCEDURES

Transmission Fluid Level and Condition Check

This procedure checks both the transmission fluid level, as well as the condition of the fluid itself.

Caution: Use Dexron VI transmission fluid only. Failure to use the proper fluid may result in transmission internal damage.

Note: Ensure the transmission has enough fluid in it to safely start the vehicle without damaging the transmission. With the vehicle off and the transmission fluid temperature at approximately 20-25°C (68-77°F) there must be at least enough fluid to drain out of the fluid level hole. This will ensure that there is enough fluid in the sump to fill the components once the vehicle is started.

Non Dipstick Level Checking Procedure

1. Start the engine.
2. Depress the brake pedal and move the shift lever through each gear range, pausing for about 3 seconds in each range. Then move the shift lever back to PARK (P).
3. Allow the engine to idle 500-800 rpm for at least 3 minutes to allow any fluid foaming to dissipate and the fluid level to stabilize. Release the brake pedal.

Note: If the TFT reading is not at the required temperature, allow the vehicle to cool, or operate the vehicle until the appropriate TFT is reached. lf the fluid temperature is below the specified range, perform the following procedure to raise the fluid temperature to the specification.

Drive the vehicle in second gear until the fluid temperature is at the specified temperature.

4. Keep the engine running and observe the transmission fluid temperature (TFT) using the Driver information Center or a scan tool.

Caution: The transmission fluid level must be checked when the transmission fluid temperature (TFT) is at 85-95°C (185-203°F). lf the TFT is not at this temperature, operate the vehicle or allow the fluid to cool as required. Setting the fluid level with a TFT outside this temperature will result in either an under or over-filled transmission. TFT 95°C under-filled, TFT 85°C over- filled. An under-filled transmission will cause premature component wear or damage. An over-filled transmission will cause fluid to discharge out the vent tube, fluid foaming, or pump cavitation.

5. Raise the vehicle on a hoist. The vehicle must be level, with the engine running and the shift lever in the PARK range.

6. While the vehicle is idling, remove the oil level set plug. Allow any fluid to drain.

Figure 33

GM 6T30/40/45/50 GENERATION I & II INFORMATION

TRANSMISSION FLUID FILL SPECIFICATIONS AND PROCEDURES

Oil Level Plug
lf the fluid is flowing as a steady stream, wait until the fluid begins to drip. lf no fluid comes out, add fluid until fluid drips out.

7. Inspect the fluid color. The fluid should be red or dark brown.

lf the fluid color is very dark or black and has a burnt odor, inspect the fluid for excessive metal particles or other debris. A small amount of “friction” material is a “normal” condition. If large pieces and/or metal particles are noted in the fluid, flush the oil cooler and cooler lines and overhaul the transmission. If there are no signs of transmission internal damage noted, replace the fluid, repair the oil cooler, and flush the cooler lines.

Fluid that is cloudy or milky or appears to be contaminated with water indicates engine coolant or water contamination.

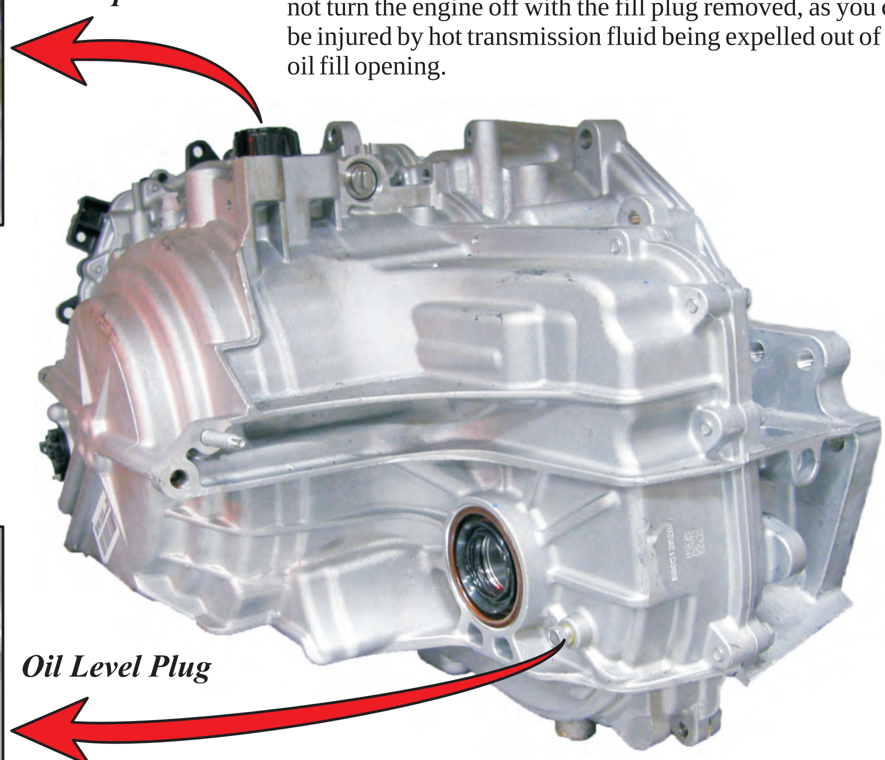
8. Inspect for external leaks.

9 lf the fluid was changed, reset the transmission oil life monitor if applicable.

6T30/40/45/50

Warning - The engine must be running when the transmission fluid fill plug is removed, or excessive fluid loss will occur. Transmission fluid may be hot. Since the actual fluid level is unknown, stand clear when removing the fill plug. Have a container ready to capture any lost fluid. Do not turn the engine off with the fill plug removed, as you can be injured by hot transmission fluid being expelled out of the oil fill opening.

Fill Cap



Capacities are approximate
8.0 liters (8.45 quarts)

DEXRON-VI
Automatic Transmission Fluid.

Oil Level Plug

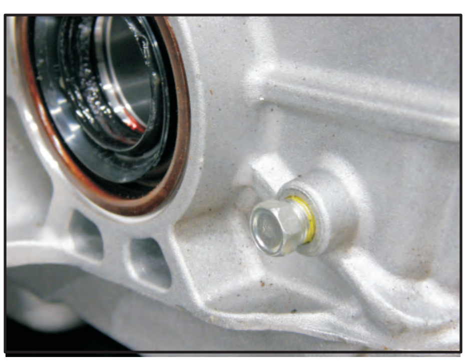
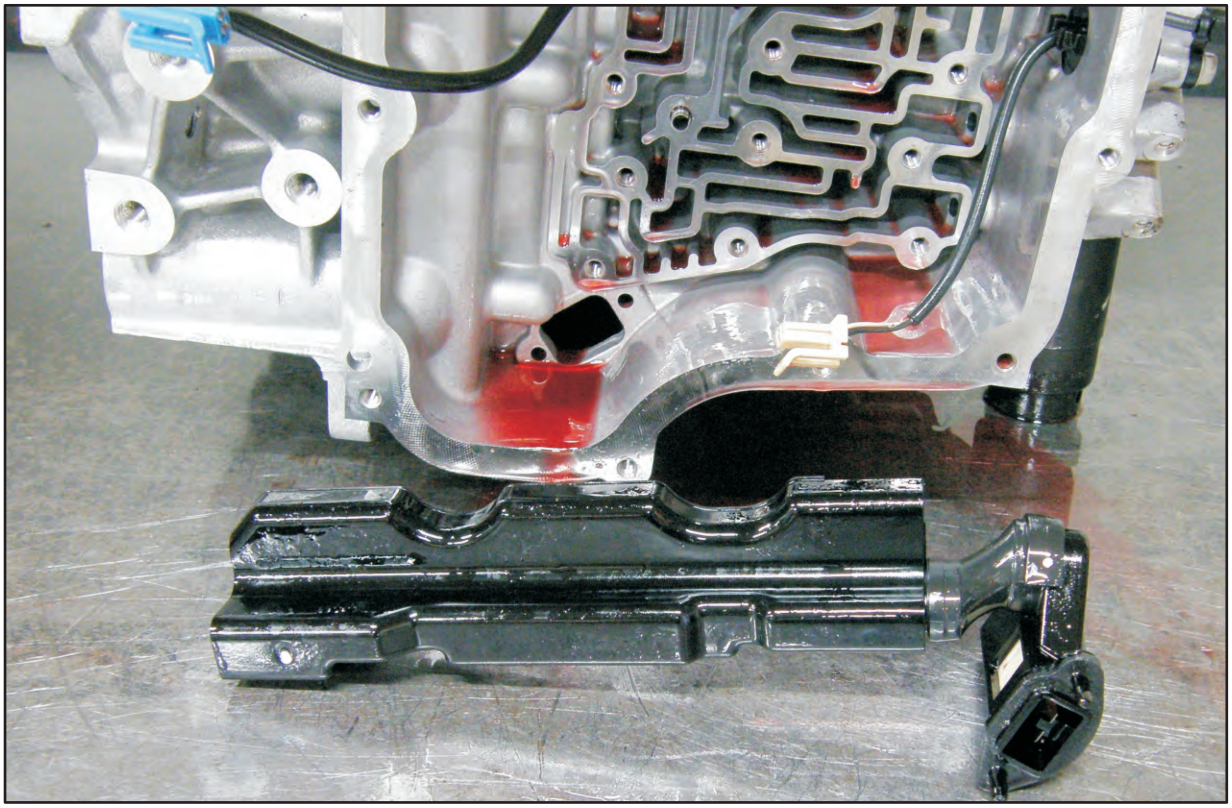


Figure 34

TRANSMISSION FLUID FILL SPECIFICATIONS AND PROCEDURES



Fluid Level Control Valve

The fluid level control valve is attached to the transmission case, next to the control valve body assembly, and is designed to control the fluid level in the control valve body cover assembly.

The fluid level control valve contains a temperature sensitive strip of metal that reacts to fluid temperature changes and opens or closes a fluid passage, at temperatures below 60°C (l40°F), the thermostatic element allows fluid to drain from the control valve body cover area into the case sump. As the temperature of the transmission fluid increases, the thermostatic element traps fluid in the control valve body cover area and the fluid level rises. The maximum fluid level in the control valve body cover area is controlled as fluid overflows the top of the fluid level control valve pipe and drains into the case sump. This level of transmission fluid is required in order to maintain the operation of the hydraulic system in the transmission.

lt should be noted that when checking the fluid level in a Hydra-matic 6T40/45 transmission, the fluid temperature must be at operating temperature in order to obtain a proper fluid level in the case sump. Checking the fluid level with the fluid temperature below operating temperature will result in a too low fluid level.

A damaged or loose thermostatic element could cause fluid foaming or incorrect fluid level.

Figure 35

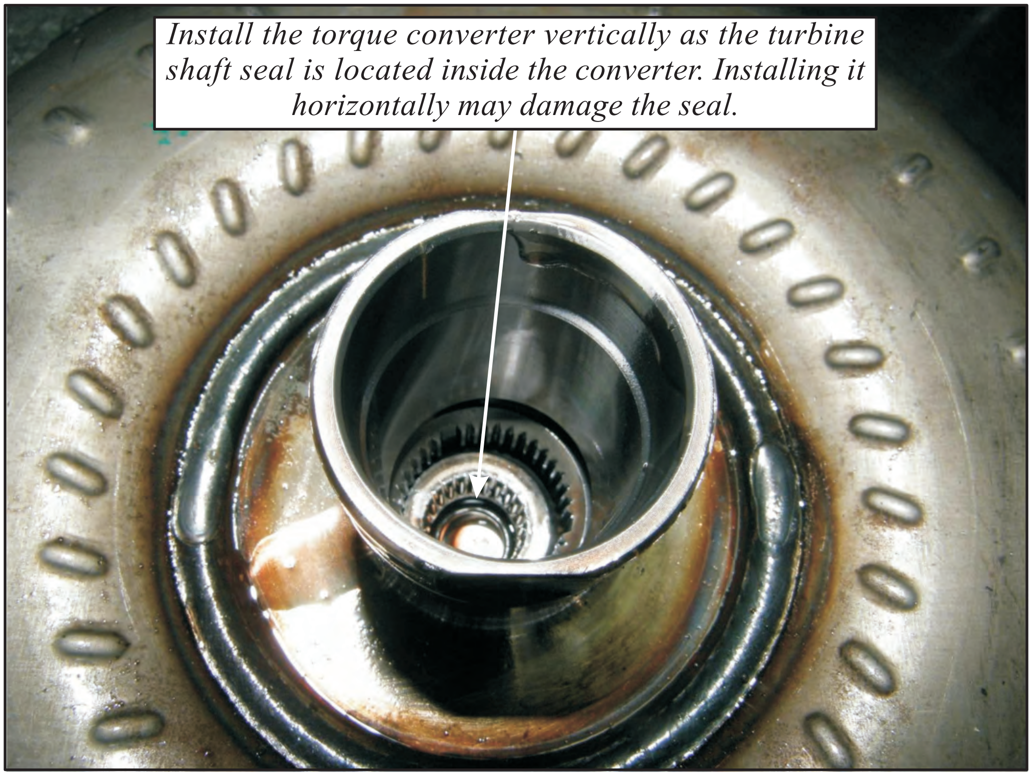

Install the torque converter vertically as the turbine shaft seal is located inside the converter. Installing it horizontally may damage the seal.

Figure 36