Welcome To The

TCRA

Torque Converter Rebuilders Association

2014 Seminar

What Else Can It Be But The Converter

Presented by

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GEARS
FOR THE TRANSMISSION REBUILDING INDUSTRY

ATRA
AUTOMATIC TRANSMISSION REBUILDERS ASSOCIATION

TCRA 2014 Seminar

Index

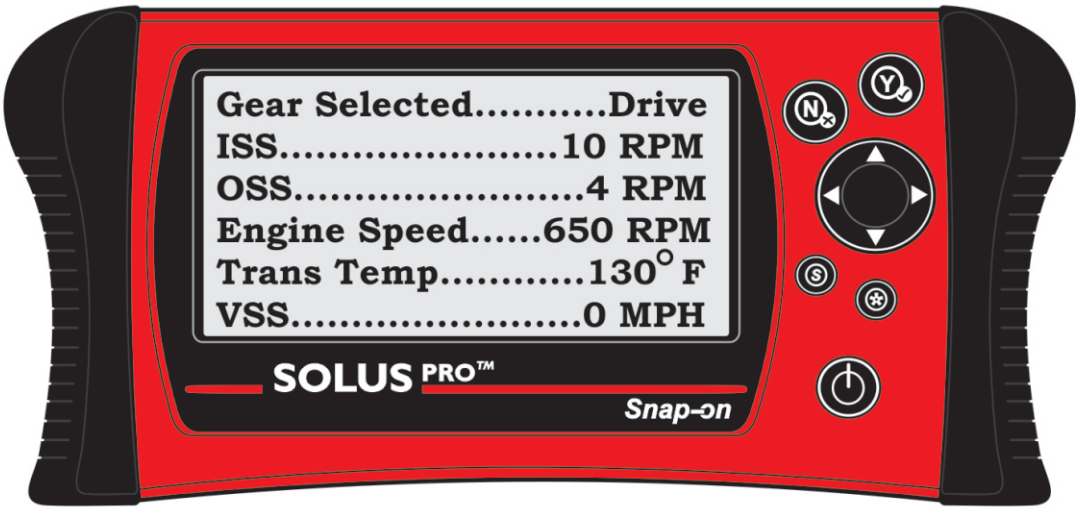
GM 6T40
Bump Or Surge When Coming To A Stop

The Buick Encore and Chevrolet Trax (J body), Chevrolet Cruze (P body) and the Chevrolet Sonic (J body) equipped with a 1.4L (RPO LUJ or LUV) engine and a 6T40 (RPO MHB or MH8) may exhibit a surge or bump when the vehicle is stationary in the Drive range and your foot on the brake.

These applications are equipped with a “Neutral Idle” feature to improve fuel economy. The neutral idle feature will only be active when the following criteria are met:
- Transmission temperature is 37°C (99°F) or greater
- Idle position is indicated by the TP input
- Vehicle speed is not present
- The transmission IS NOT in manual range

Neutral idle is a normal condition (single bump feel), but if the transmission feels like it is going in and out of gear (bumps/surge) and the condition is NOT present when you place the vehicle in the “M” range, replace the 1-2-3-4 clutches with an updated clutch fiber kit 24268545.

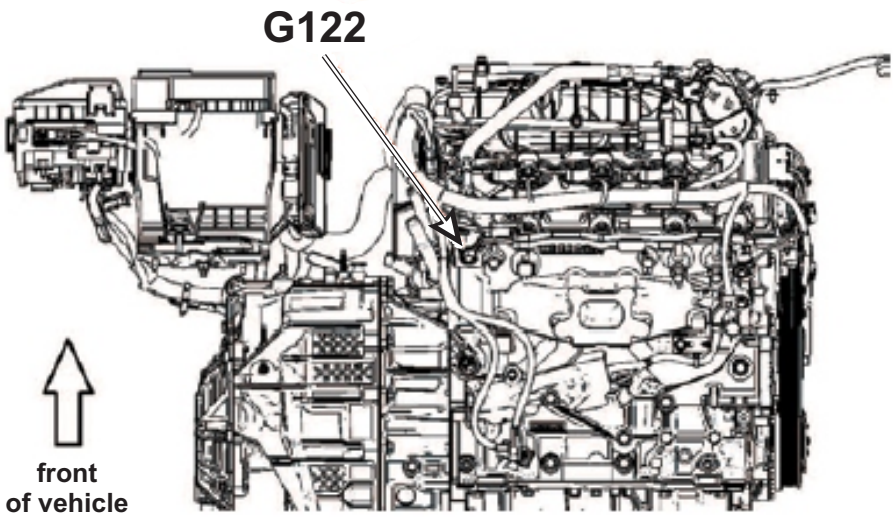
One way to ID the issue is to watch input and output speed when the vehicle is stopped while in gear with your foot on the brake. In the Neutral position, the ISS will closely match engine RPM. In the Drive position the vehicle is stopped in gear with your foot on the brake the ISS should drop to 0 RPM. If the 1-2-3-4 clutch is causing the concern, the ISS will show a varying speed as the clutch grabs and releases. The OSS will typically show a speed reading intermittently as the clutch chatter will typically lead to a small intermittent OSS reading on your scan tool.

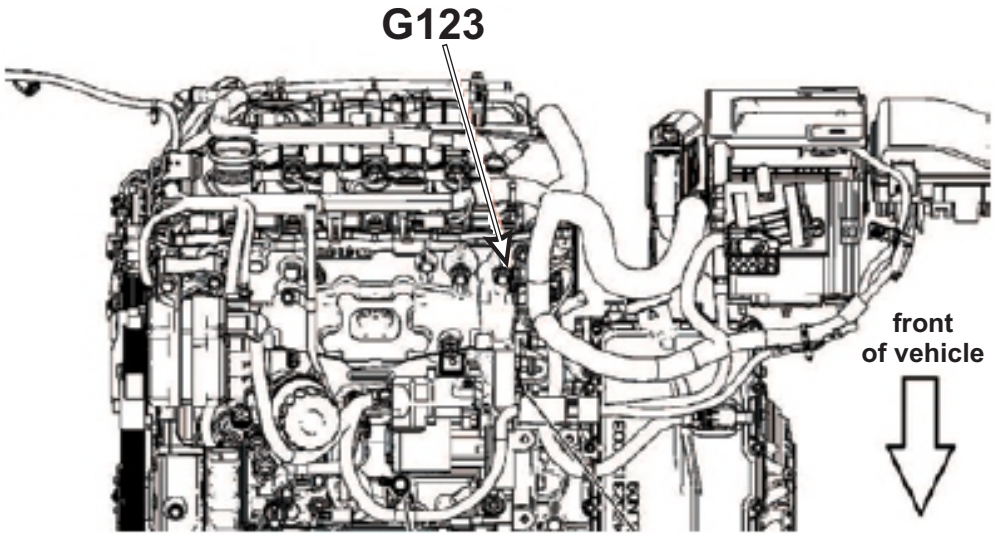


GM 6T70/75
TCC Shudder, Engine Misfire, Possible Misfire Codes P03XX

2010-2014 Buick LaCrosse and Allure (G body) applications equipped with the 6T70 (RPO MH2 or MH4) and the 3.0L V6 (RPO LF1) or the 3.6L V6 (RPO LLT) may develop an engine misfire that is misinterpreted as a transmission or TCC related concern. You may or may not find misfire DTC's set accompanied by a illuminated or flashing MIL.

Inspect the ignition coil grounds for a poor connection. The G122 location supplies the ground for ignition coils 1,3,5 while G123 location supplies the ground for ignition coils 2, 4, 6. The G122 is located on the left rear corner of the inboard head. G123 is located on the right front corner of the outboard head near the high pressure fuel pump.





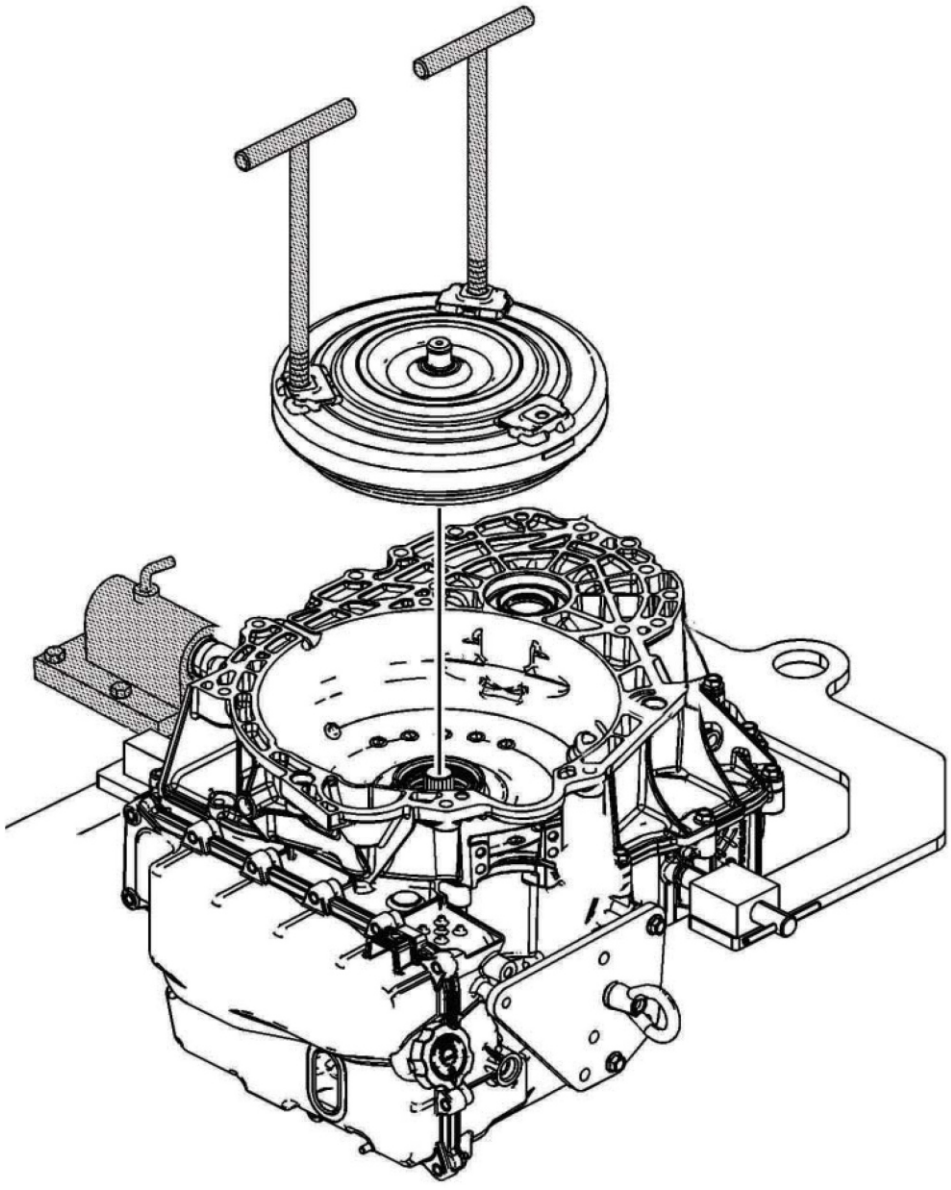
GM 6T70/75

Torque Converter Installation

Torque converter lifting handles can be used as an alternative method for supporting the transmission assembly during repairs.

Only install these handles until they stop. Do not tighten. Over tightening these handles can cause damage to the torque converter.

Failure to raise the torque converter straight up could damage the torque converter clutch lip seal inside the torque converter clutch assembly.



GM 5L40E
TCC Slippage

Lock up feels stacked on top of 4th. Lock up may seem rough, the 3-4 shift feels rough. While monitoring lock up, the lock up engagement may not happen until the TCC duty cycle is in the 50-60% range. This condition does not always set codes.

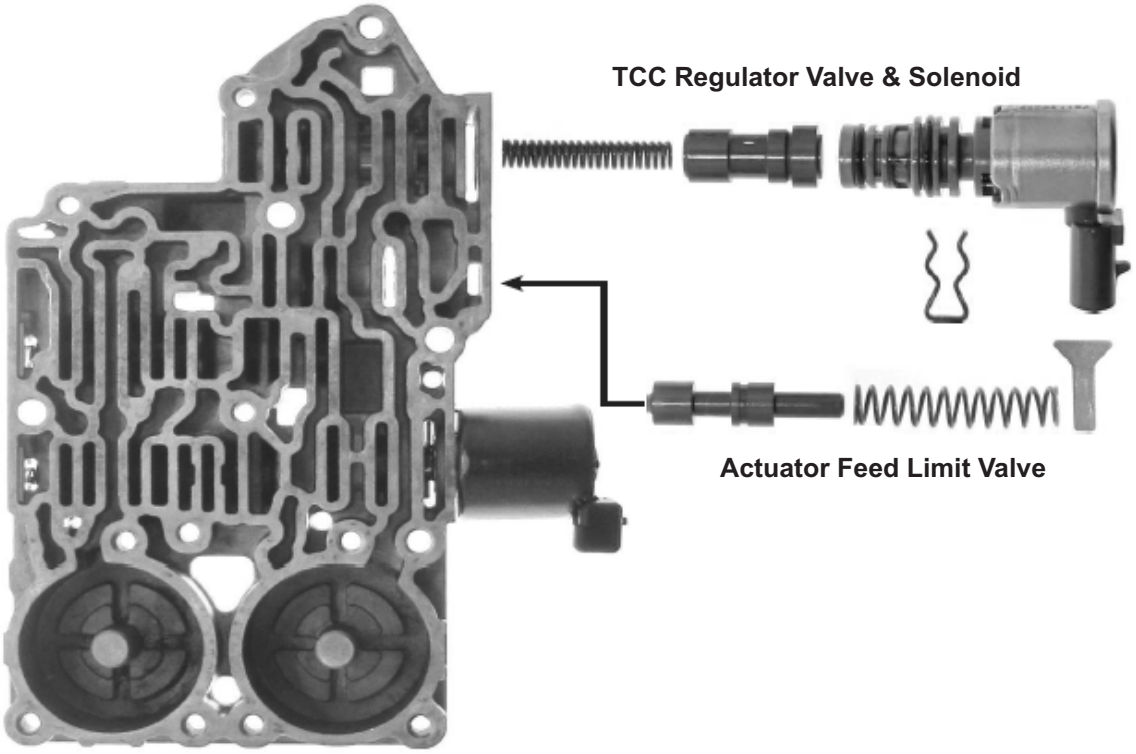
Once the TCC duty cycle gets in the 50-60% range the clutch will suddenly hold, this often occurs right after the 3-4 shift. This complaint is often caused by TCC regulator valve bore wear and TCC PWM solenoid problems.

The pressure regulator needs to be addressed while the trans is on the bench. Check with your supplier for repair components. The actuator feed limit valve bore, the pressure regulator valve bore (In the pump) are problem areas that contribute to the complaint.

Always check for PCM program updates first before performing any repair work.

Example:
2004 – 2006 Cadillac SRX
2005 – 2006 Cadillac STS with 4.6L V8 engines (VIN A RPO Lh2)

A shudder, surge or chuggle on light throttle under a light load may be caused by the incorrect calibration being installed in the PCM. It is important to reprogram the PCM after every rebuild. Refer to the http://calid.gm.com for the latest calibration for the vehicle.

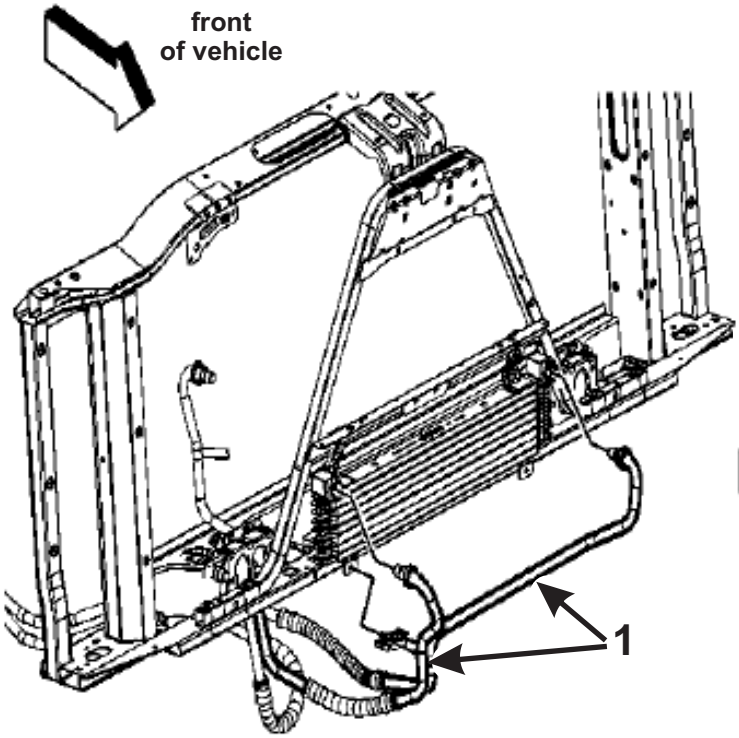


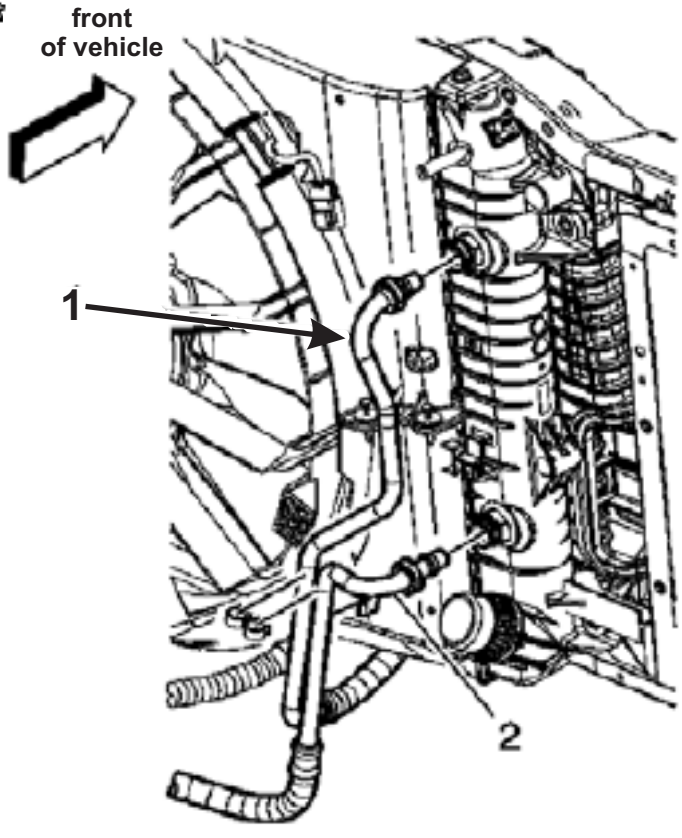
GM LCT1000

Pump Bushing Damage, Radiator Failure, Vibrating Sound After Repair

This unit came in to the shop with a spun pump bushing. The coolers were flushed during the repair. But when the vehicle was driven and reached normal operating temperature the cooler line would rattle. As a test, we bypassed the coolers one at a time to isolate the specific cooler. The noise was still there when each one was bypassed.

Anytime you have a major repair on a transmission that requires the transmission to be removed, always flush the cooler in the radiator and ***"replace"*** the auxiliary cooler. Auxiliary coolers are very difficult to flush even with the best flushing machine. Installing a new radiator fixed the vehicle. In this particular case both needed to be replaced.



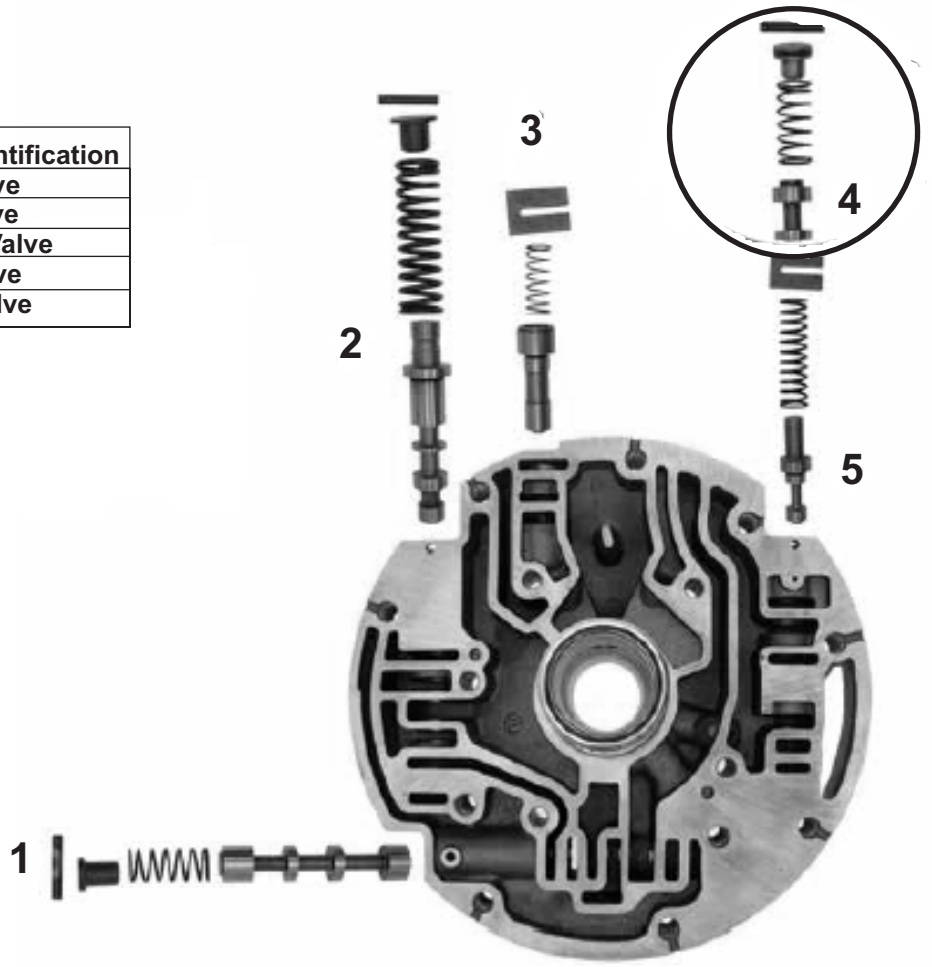


GM LCT1000
Delayed Or No Movement, Possible DTC's Set

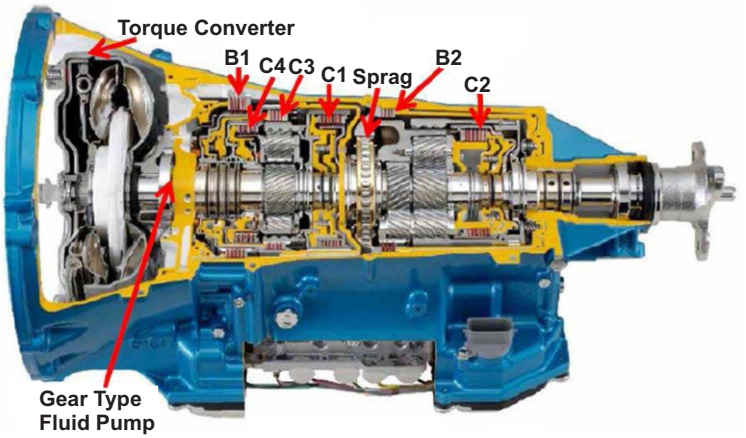
Some LCT 1000 applications (RPO M74 or M7W) may exhibit any combination of the following conditions:
• No movement forward
• No reverse
• No forward or reverse
• Any combination of the following DTC's may be set. DTCs P0701, P0731, P0732, P0733, P0734, P0736,
P0751, P0756, P0761, P0776, P0843, P0848, P0873, P0877, P0894 or P2723
• This condition may be intermittent but it is typically more common during cold temperature startup operation.

Check the transmission fluid level and condition. If the fluid level looks correct, check the transmission line pressure when the condition is present. If line pressure is low, inspect the fluid filter for cracks and make sure the filter matches the pan design (shallow vs deep). If the filter does not appear to be causing the problem, inspect the lube regulator valve (located in the pump) for sticking.

Stator Support Valve Identification	
1	Converter Flow Valve
2	Main Regulator Valve
3	C1 Clutch Backfill Valve
4	Lube Regulator Valve
5	Converter Relief Valve



TL-80SN (8 SPEED)
Self Learn Procedure



TL80-SN self learn procedure is required when one of the following repairs has occurred:
- Transmission replacement
- Transmission internal service or repair
- Valve body repair, cleaning or replacement
- ***Torque converter replacement***
- TCM replacement
- TCM software/calibration update
- Any service or repair in response to transmission DTC's

Self Learn Procedure:

You must meet the following conditions before performing the self-learn procedure:
- Perform any adjustments, programming or setup procedures that are required when a component or module is removed or replaced
- Clear the TCM of all DTC's
- Ensure the transmission fluid is at the correct level
- Verify with a scan tool that transmission fluid temperature is at least 65°C (149°F)

1. Move the shift lever from Neutral to Drive and back to the Neutral position. Between each Neutral to Drive to Neutral position cycle, wait five seconds. Perform this procedure five times.
2. With the engine running, move the shift lever from Neutral to Reverse and back to the Neutral position. Between each Neutral to Reverse to Neutral position cycle, wait five seconds. Perform this procedure five times.

NOTE: Steps 3, 4, 5 and 6 require vehicle to be driven. Do NOT use manual gear function to perform the following steps.

3. With the engine running, move the shift lever into the Drive position.
4. Accelerate the vehicle with the scan tool throttle position parameter between 15%-25%, or light throttle, up to 73 km/h (45 mph), and decelerate to a complete stop. Perform the procedure five times.
5. Accelerate the vehicle, TP 45%-55%, up to 72 kph (45mph), decelerate to a stop. Repeat the process 5 times
6. Accelerate the vehicle, TP greater than 70%, up to 72 km/h (45 mph), decelerate to a stop. Repeat the process 5 times
7. Turn the ignition off for 2 minutes or more.

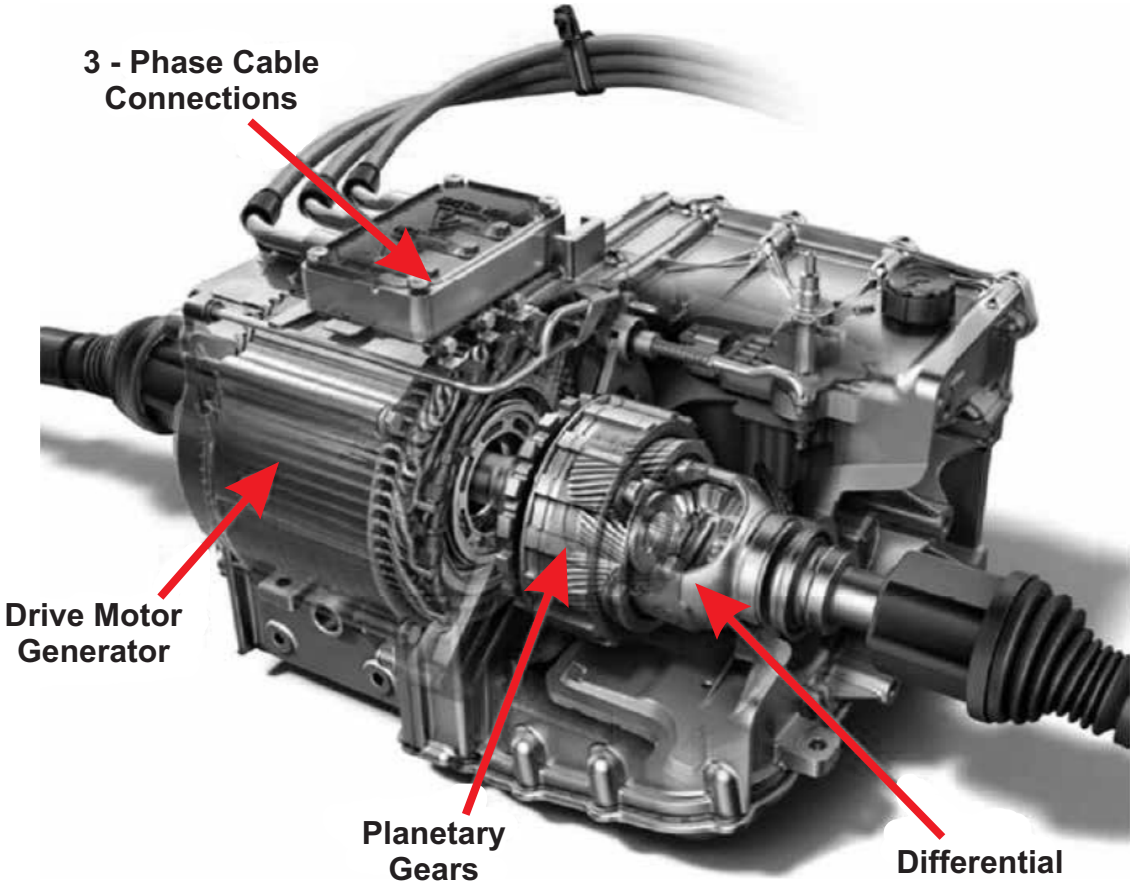
GM 1ET35

Introduction

Another transmission is also available for the Chevrolet Spark (C Body) application. It is known as the 1ET35 (RPO MME) and it is an electric drive transmission application. The 1ET35 is a fully automatic, front wheel drive, variable-speed, electronic-controlled transmission. It consists of one 85kW 360V 3 phase electric drive motor, 1 planetary/differential gear set, IMS, Temperature sensor, a high voltage electric auxiliary fluid pump and housing.

The hydraulic system uses an electric auxiliary fluid pump motor assembly located inside of the transmission for cooling and lubrication of rotating components. This system consists of a gerotor-type pump, electric 3 phase 360 V high voltage pump motor, wiring harness, and a control module.

The control module is located inside of the drive motor generator power inverter module under the hood. The transmission fluid pump operates under low pressure and will only run when out of park or neutral and vehicle speed is detected.



GM 1ET35

Introduction continued....

The drive motor is a permanent magnet 85 Kw peak power electric AC motor and is controlled by the power inverter module. Drive motor speed is controlled and monitored by a resolver-type position sensor (Like the 2ML70).

The drive motor generator power inverter module monitors the angular position, speed and direction of the drive motor based upon the signals the position sensor outputs to the drive motor generator power inverter module . The drive motor position sensor, or resolver, contains a drive coil, 2 driven coils and an irregular shaped metallic rotor. The metallic rotor is mechanically attached to the shaft of the drive motor generator.

When the vehicle is ON, the drive motor generator power inverter module outputs a 5 V AC, 10 kHz excitation signal to the drive coil. The drive coil excitation signal creates a magnetic field surrounding the 2 driven coils and the irregular shaped rotor. The drive motor generator power inverter module then monitors the 2 driven coil circuits for a return signal.

The position of the irregular shaped metallic rotor causes the magnetically-induced return signals of the driven coils to vary in size and shape. A comparison of the 2 driven coils signals allows the motor control module to determine the exact angle, speed and direction of the drive motor.

Fluid:
The fluid required for the 1ET35 is Dexron VI HP GM part # 19300536 . The fluid capacity is 4.4 Qts (4.2L)

Dodge 45/545/68RFE

Stalls Engine Forward Or Reverse

Stalling the engine in gear can be a pump failure causing the torque converter to apply.

To determine this you can monitor cooler pressure. If cooler pressure increases the torque converter is being applied.

A common area of failure is the pump or the torque converter limit valve.

Check the pump for any areas that may be warped causing cross leaks.

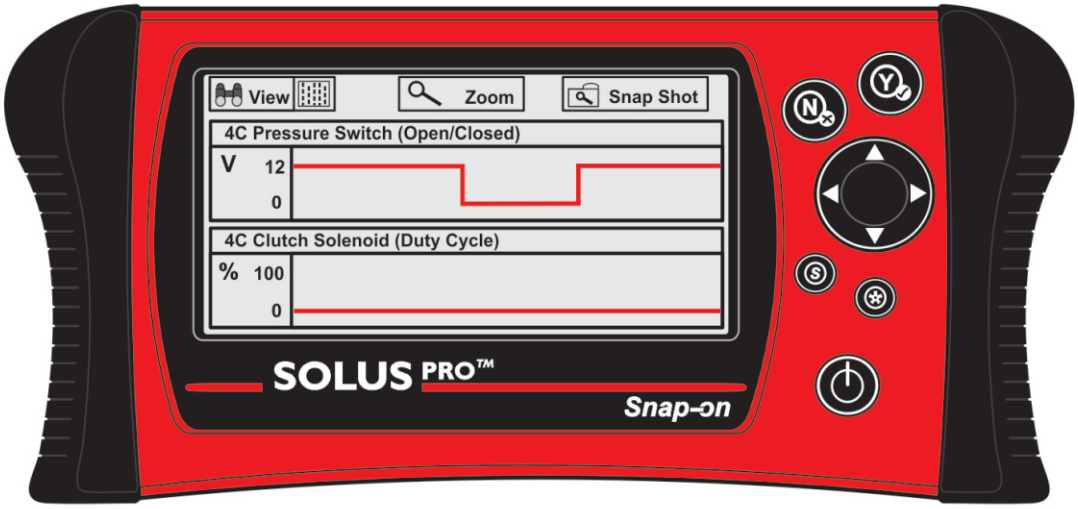
Dodge 545RFE

High Speed Momentary Bind Up

A bind up between 55-57 mph can be caused by the pressure switches or the switch valve. This can sometimes be intermittent. While driving, the transmission may bind up momentarily for a split second, then work normally.

The transmission did not downshift during the bind up, the transmission stayed in 5th. A great way to diagnose this is by shooting a movie with the scanner to see what is going on. In this case you could see the 4C pressure switch close during the bind, but there is no command for the 4C solenoid to activate.

Looking at the hydraulics the only two locations of failure are the #5 check ball or the 4C solenoid sticking.



Dodge 545RFE

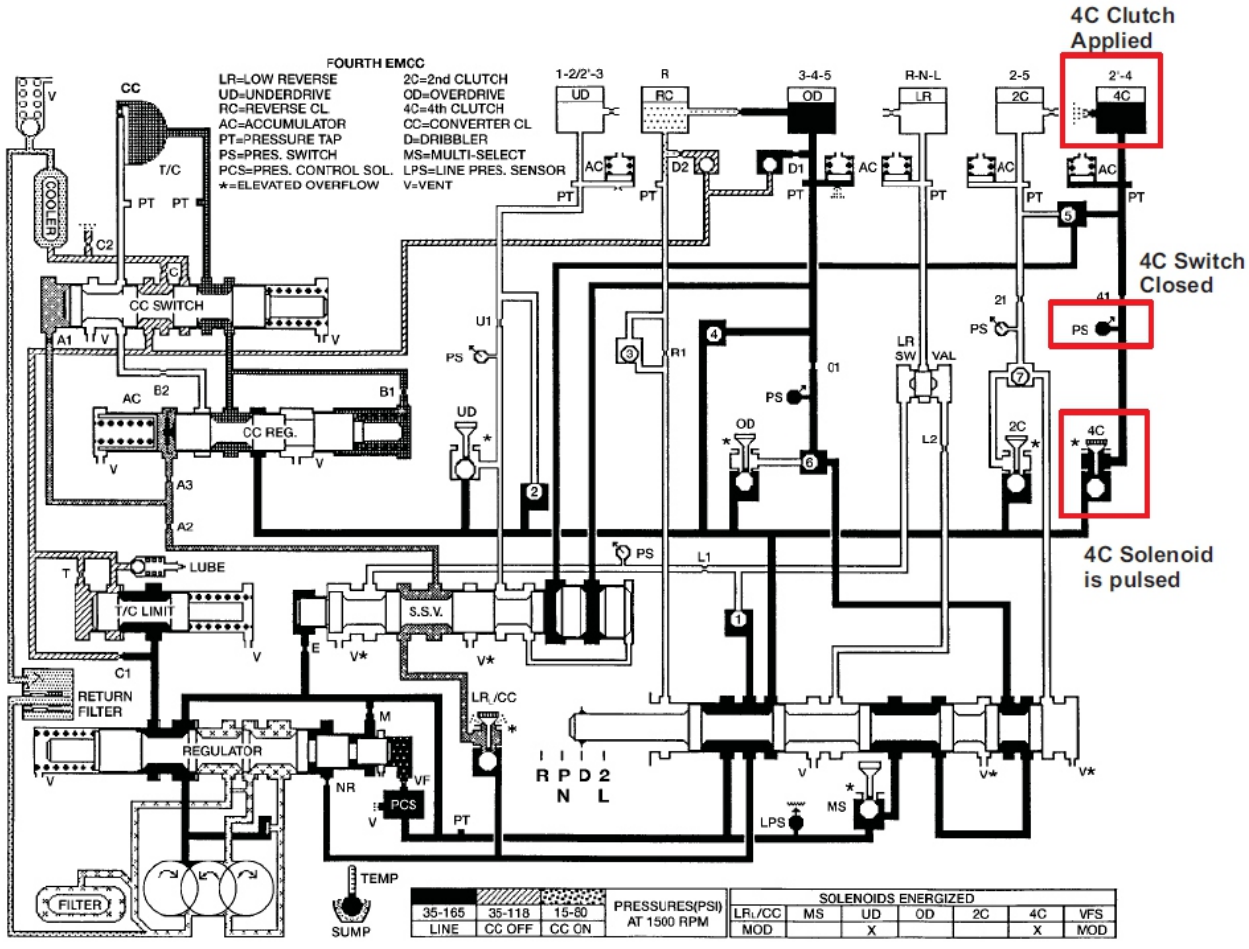
High Speed Momentary Bind Up continued.....

4th Gear

545RFE CLUTCH APPLICATION CHART

SLP	UD	OD	R	2C	4C	L/R	OVERRUNNING
P–PARK						ON	
R–REVERSE			ON			ON	
N-NEUTRAL						ON	
D–OVERDRIVE FIRST	ON					ON*	ON
SECOND	ON			ON			
SECOND PRIME	ON				ON		
THIRD	ON	ON					
FOURTH		ON			ON		
FIFTH		ON		ON			
LIMP-IN	ON	ON					
2–FIRST	ON					ON*	ON
SECOND	ON			ON			
LIMP-IN	ON			ON			
1–LOW	ON					ON	ON

*L/R clutch is on only with the output shaft speed below 150 rpm.



Dodge 545RFE

High Speed Momentary Bind Up continued.....

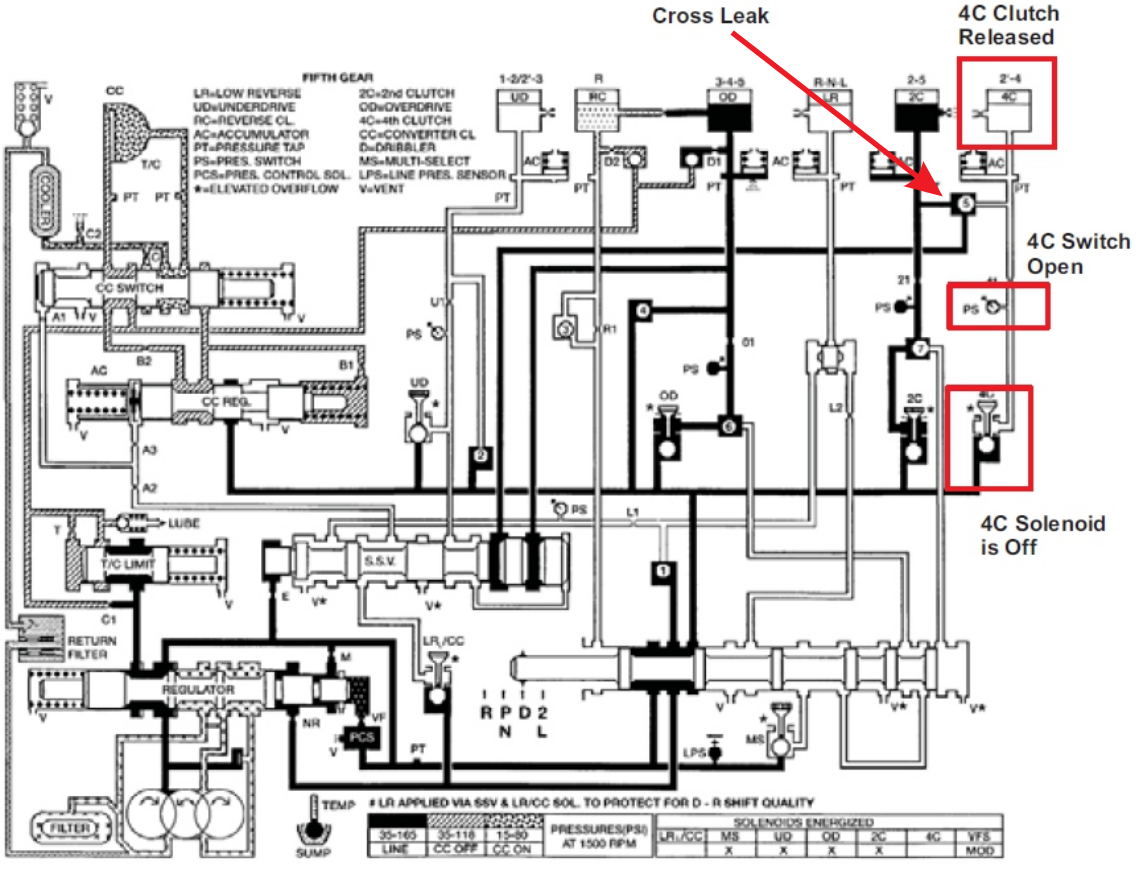
5th Gear

545RFE CLUTCH APPLICATION CHART

SLP	UD	OD	R	2C	4C	L/R	OVERRUNNING
P–PARK						ON	
R–REVERSE			ON			ON	
N-NEUTRAL						ON	
D–OVERDRIVE FIRST	ON					ON*	ON
SECOND	ON			ON			
SECOND PRIME	ON				ON		
THIRD	ON	ON					
FOURTH		ON			ON		
FIFTH		ON		ON			
LIMP-IN	ON	ON					
2–FIRST	ON					ON*	ON
SECOND	ON			ON			
LIMP-IN	ON			ON			
1–LOW	ON					ON	ON

*L/R clutch is on only with the output shaft speed below 150 rpm.

The 4C Solenoid would have to be stuck open momentarily



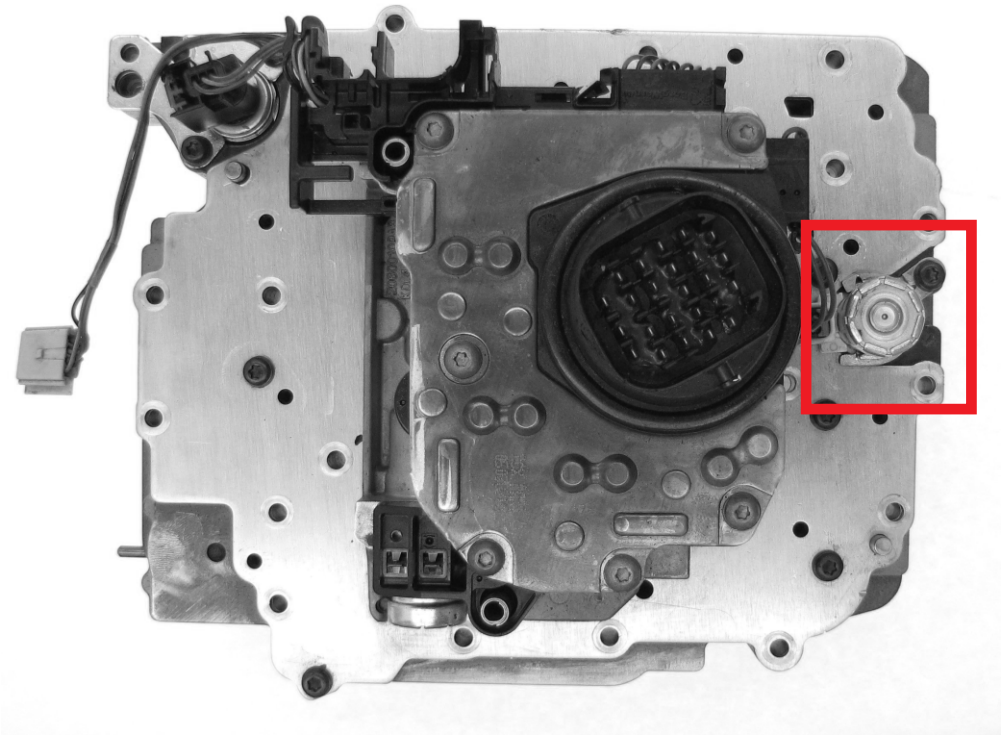
Dodge 62TE

DTC P2764 TCC Stuck "On"

This vehicle was towed in and the customer stated that he was on a long trip and when he got off highway and stopped at gas station, his engine died. After getting gas he started the vehicle and every time he put it in Drive the engine died but not in Reverse.

The EMCC VFS Solenoid is used to control the duty cycle of the Torque Converter Clutch (TCC). The PCM monitors the voltage on the EMCC VFS Solenoid Control circuit. If the PCM detects a failure for 2 consecutive trips, a P2764 DTC is set.

Possible Causes
- (T84) EMCC VFS Control Circuit Open
- (T84) EMCC VFS Control Circuit Short to Voltage
- (T84) EMCC VFS Control Circuit Short to Ground
- (T84) EMCC VFS Control Circuit Short to Another Circuit
- EMCC VFS Control Solenoid Transmission Control Module



Replace the TCC solenoid part#5169313AA.

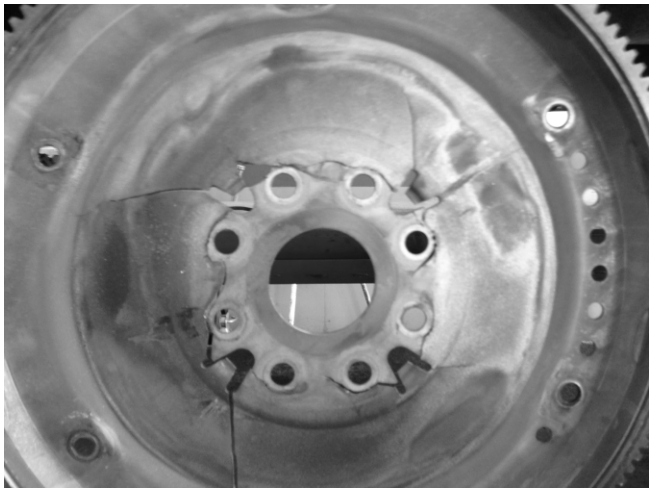
Dodge 68RFE
Billet Converter Bolt Damage

The vehicle returns to your shop with a scraping noise coming from the bell housing. Upon inspection metal particles found in this area. With the unit removed you find the converter bolts have come loose and has caused damage to the flywheel, starter drive, converter pilot and intermediate adapter plate.

This vehicle had a billet converter installed along with a billet flywheel. The billet converter has much deeper threaded holes than a stock converter. It is recommended that a longer thread be used on this application. The billet flywheel is approximately .080” thicker than stock and would require a longer bolt thread.

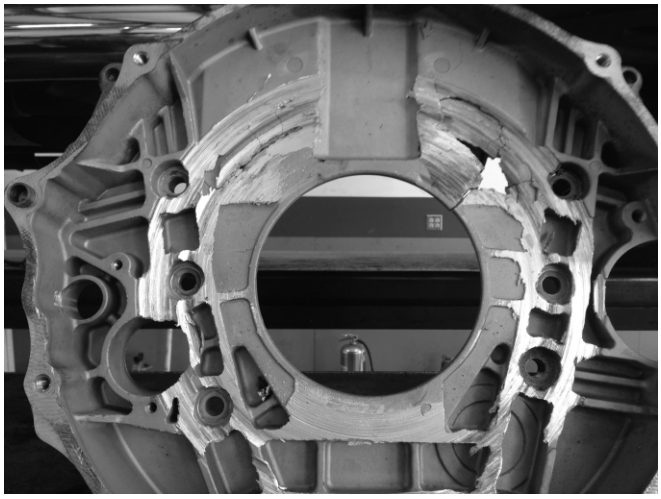
There are some converter companies supplying the converter bolts with a shallow head to prevent them from hitting the adapter plate. The problem is the bolt thread must be longer when using a billet flywheel.

Flywheel

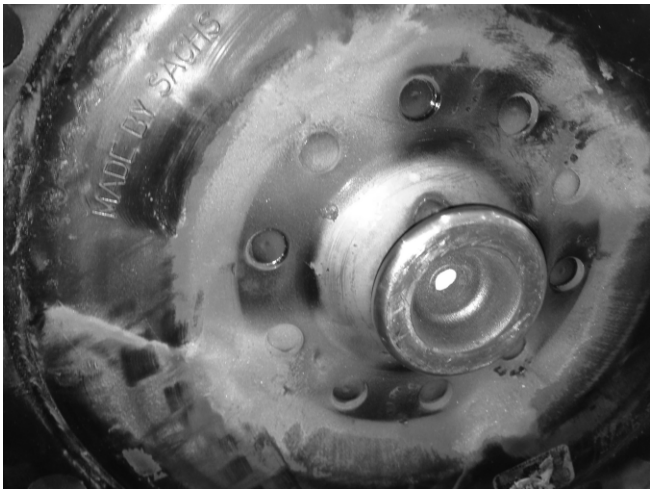


Starter Drive

Intermediate Adapter Housing (comes w/o an oring, if installed without it will cause engine oil leak)



Converter Pilot

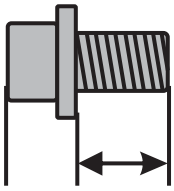


Dodge 68RFE

Billet Converter Bolt Damage

The bolts shown in the diagrams identify what is available and what should or should not be used.

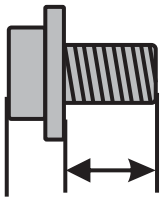
15mm Head (stock)



Metric M10 X 1.50 mm Thread

.251”.595”

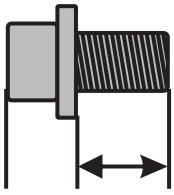
17mm Head (converter supplier)



Metric M10 X 1.50 mm Thread

.190”.452” too short

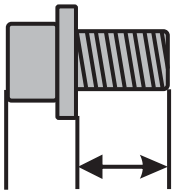
9/16” Head



Standard 3/8” X 24 Thread Fine

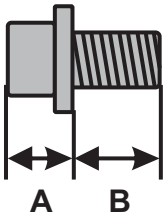
.251”.487”

9/16” Head



Standard 3/8 X 16” Thread Coarse (used in place of 17mm head bolt by mistake)

.251”.487”



A **B**

	SAE Modified	SAE Stock
A	.300 - .306”	.380”
B	.600” or longer	.600” or longer

6.7L Diesel flywheel is .083” thick.

6.7L Diesel Billet flywheel is .165” thick (use a longer bolt thread recommended w/Billet Torque Converter) The supplier may send shorter bolt head but the thread length is too short.
Billet converter can come with all 3 threads.

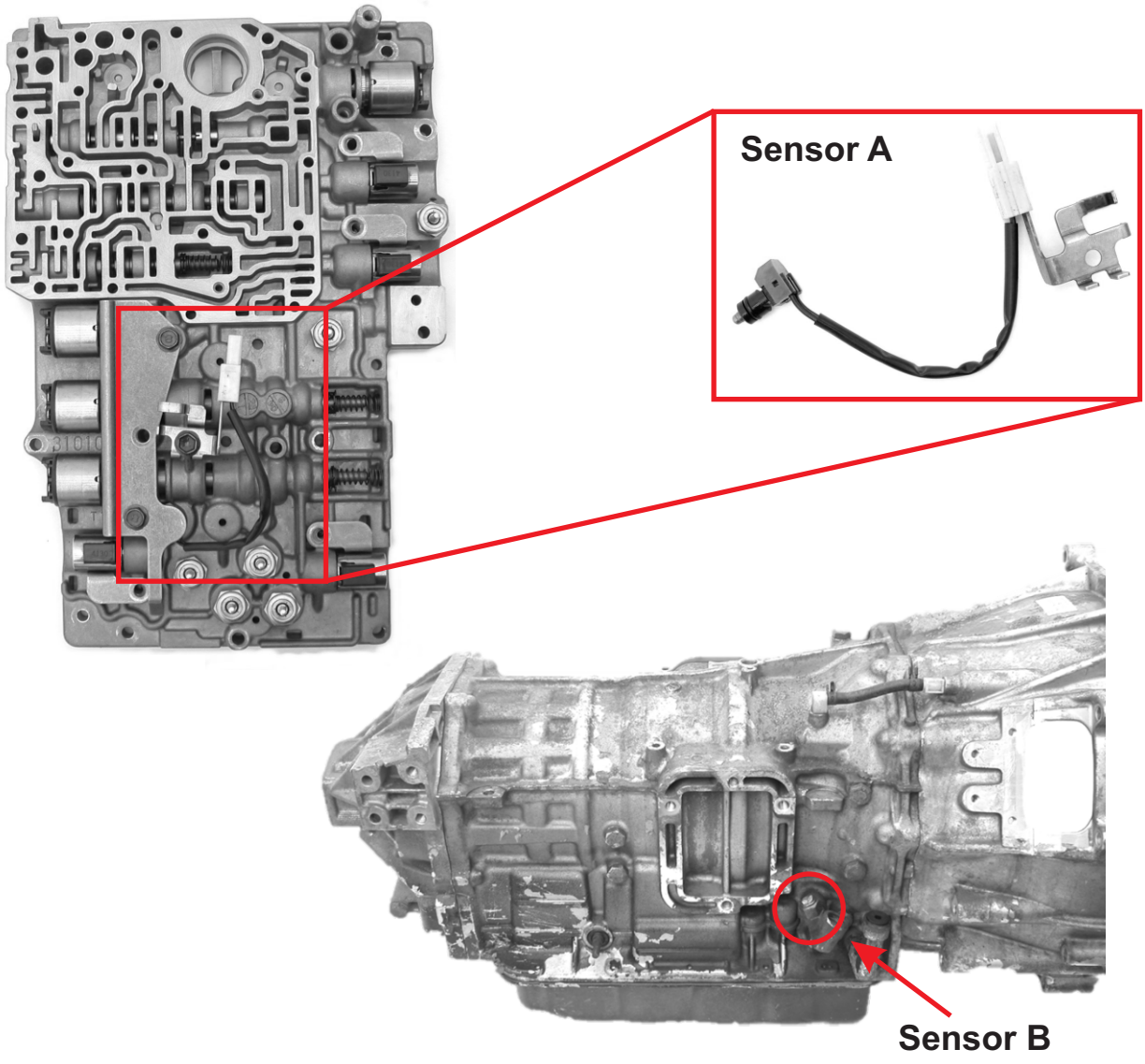
AS68RC

Early Lockup & No PTO Operation

This complaint can be caused by a malfunctioning transmission fluid temperature sensor. There are two temperature sensors used on this transmission. Sensor A is located on the valve body and Sensor B is located on the cooler line out fitting.

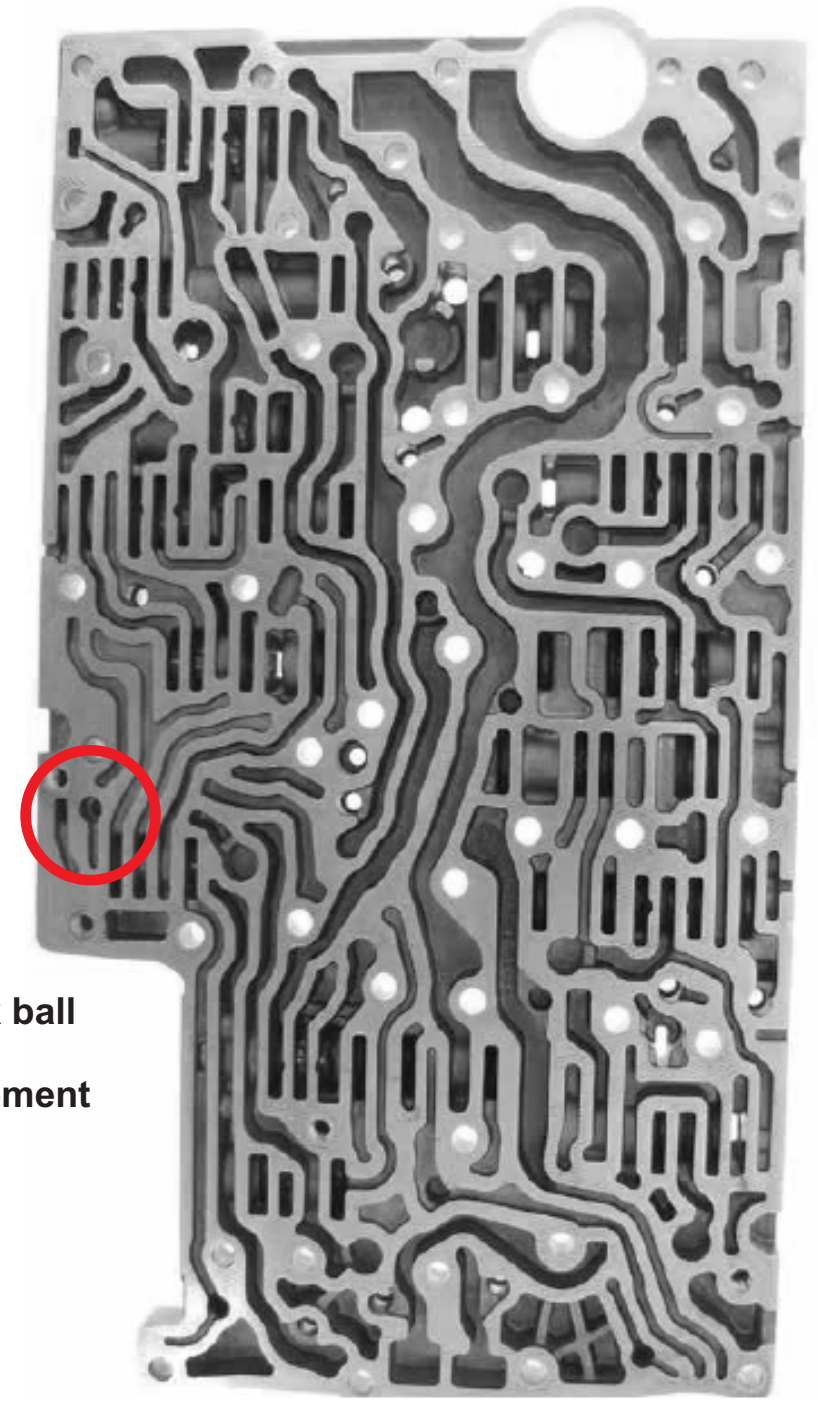
Sensor A monitors the sump temperature and Sensor B monitors the converter temperature. Torque converter temperature is hotter than the sump.

During overheat conditions the TCM strategy is to apply full lockup at approximately 1200 rpm and the PTO is disabled. There may not be any temperature sensor codes stored in the TCM which makes diagnosing difficult.



Mercedes 722.9
No Movement After Rebuild

After rebuild you have a no move condition. One possible problem is a missing check ball.



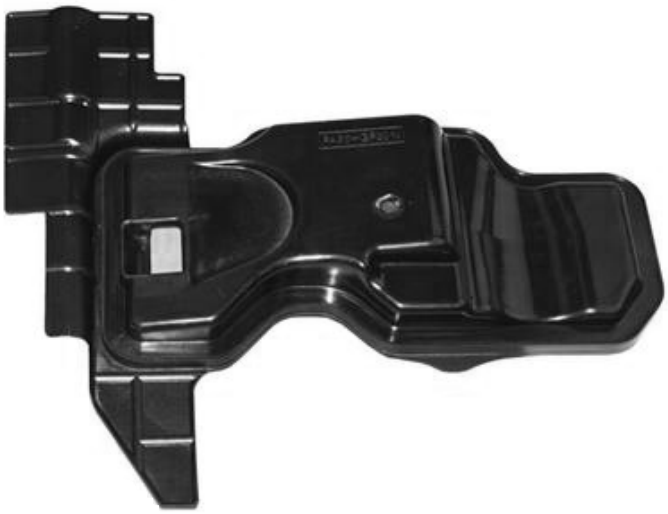
Missing check ball here will cause no movement

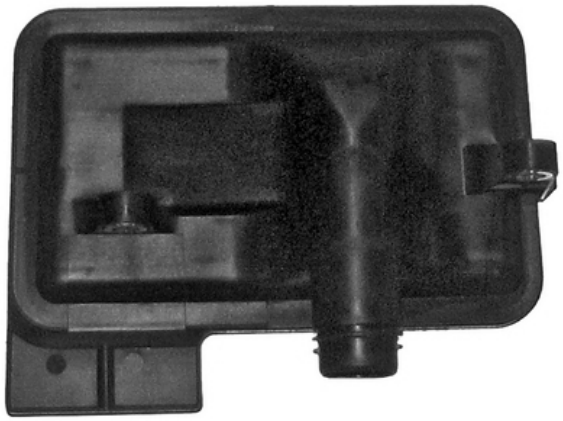
Honda

Overheating After Overhaul

This is becoming the most common tech hotline call today. The are some after market offshore filters that may cause low cooler flow. This will cause the transmission and torque converter to overheat in a short period of time.

Use a name brand or O.E. filter.





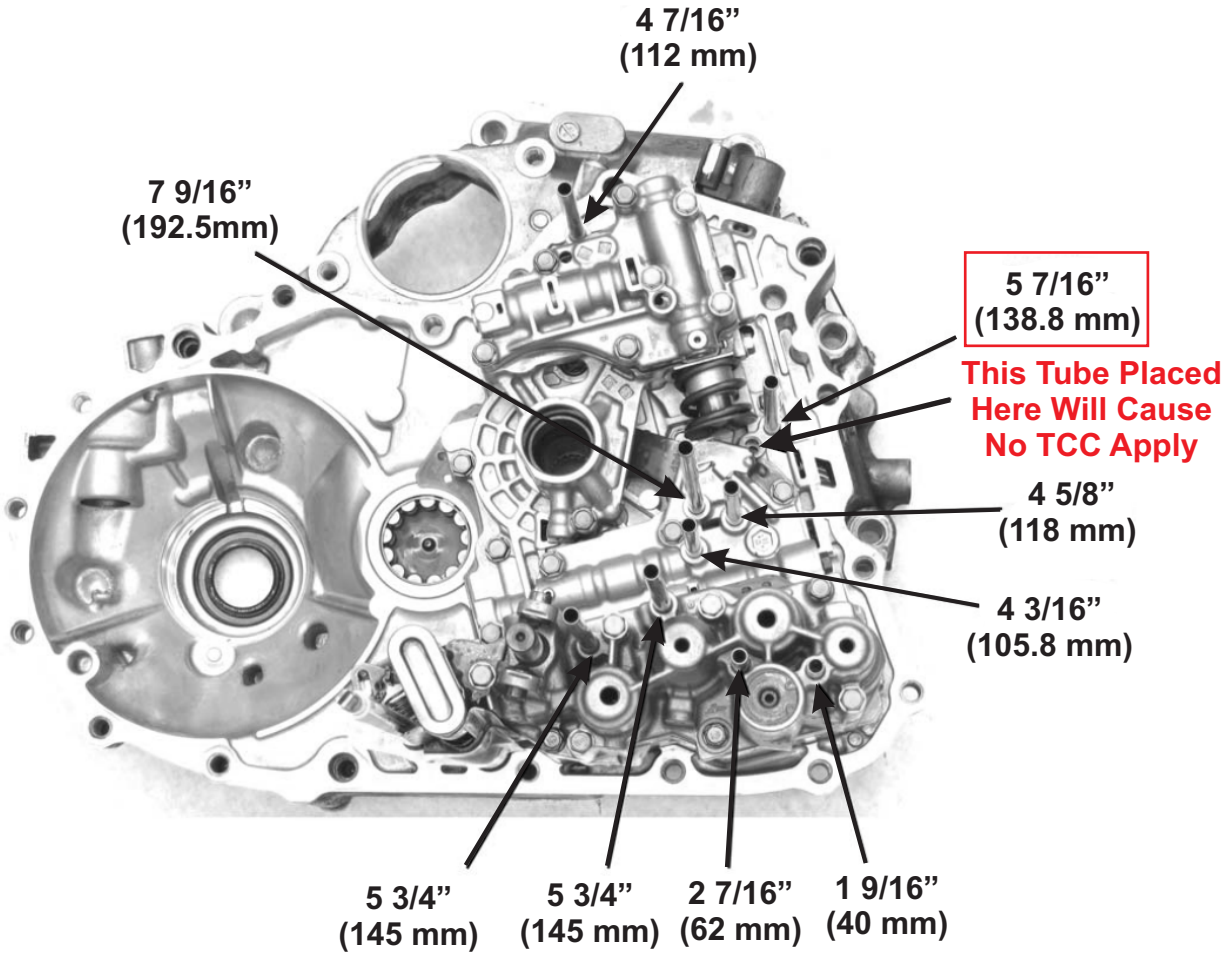
Honda

BMXA No Lockup Apply After Rebuild

This particular vehicle was a 2002 Honda Civic equipped with a BMXA transmission.

The tube shown in the illustration below was misplaced.

This can also cause a 2-3 shift flare complaint.



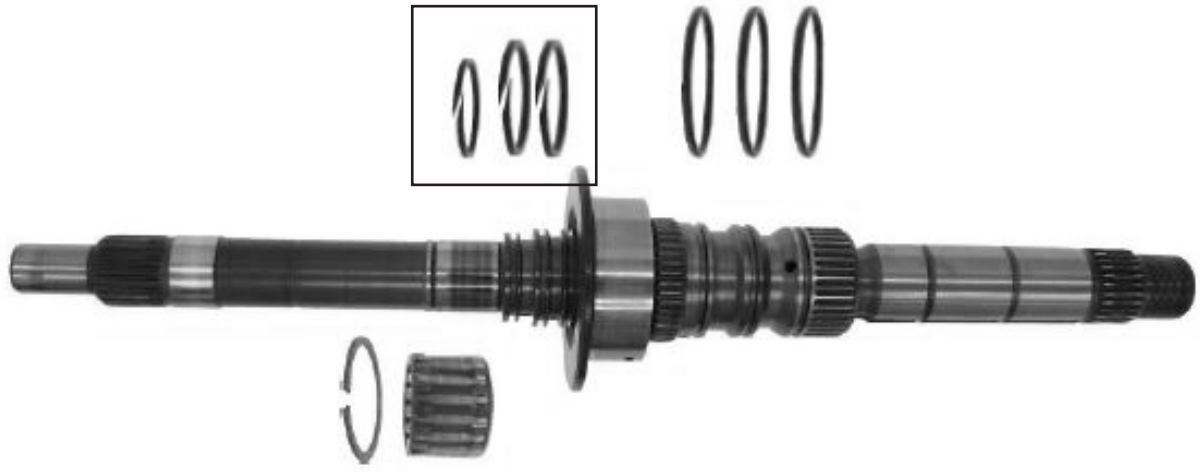
Honda

B7VA Uncontrollable Lockup In Any Gear

This complaint can be caused by a damaged or missing sealing ring on the input shaft.

These sealing ring separates the converter apply and release circuits. Always check for bore wear or damage during rebuild.

check for damaged or missing sealing ring and bore wear.



Honda

2005-06 Odyssey TCC Shudder

It's always a good idea to check for manufacturer technical service bulletins when dealing with any transmission problems.

There are times when these TSB's may not be available to the after market. In those cases it would be advise to check with a local dealer using the vehicle identification number (VIN) for any *"In House"* bulletins that are not printed for the aftermarket. In this particular case there is an extended warranty for this vehicle's complaint.

Reference Number(s): 12-029 Date of Issue: June 8, 2012
Honda: 2005-06 Odyssey EX-L and EX-L Touring
Catagory: Clutch Transmission Differential
Applies to: 2005-06 Odyssey EX-L and EX-L Touring. Check the VIN status for eligibility.
Related Ref Numbers(s) 12-029

A judder from the torque converter lock-up clutch may be felt while driving between 20-60 mph. To minimize the opportunity for the judder to occur, a software update for the transmission is available. To increase customer confidence, American Honda is extending the warranty on the torque converter in affected vehicles to 8 years from the original date of purchase or 105,000 miles, whichever comes first.

If a customer returns complaining about a judder after the transmission software was updated, you must capture a snapshot of the customer's symptom, and forward it to Tech Line for review. Any related repair done without Tech Line's review **will be subject to debit.**

CORRECTIVE ACTION

Update the PGM-FI software with the HDS.

WARRANTY CLAIM INFORMATION

Operation Number: 1255A2
Flat Rate Time: 0.3 hour

Honda

Solenoid Confusion?

On most Honda 4 and 5 speed transaxles there are two linear solenoids attached onto one block to control shift overlap and converter clutch. These Solenoids are designated as Clutch Pressure Control Solenoids A & B (figures 1 & 2).

All Honda 5 speed transaxle will have another single linear solenoid to control lockup feel. The designation for the single linear solenoid is Clutch Pressure Control Solenoid C.

This is where the confusion begins. On some later model 5 speed transaxles such as the B9OA and M91A found in the 2008 and later Accords models. The single linear solenoid is now designated Clutch Pressure Control Solenoid A for shift overlap and the dual Clutch Pressure Control Solenoid C is found on the same block with Clutch Pressure Control Solenoid B (figure 3).

The Clutch Pressure Control Solenoid C still controls lockup feel. During diagnosing a lockup problem on one of these models Clutch Pressure Solenoid A may be replaced by mistake to fix a lockup concern.

4 Speed Models With Only 2 Clutch Pressure Control Linear Solenoids A & B

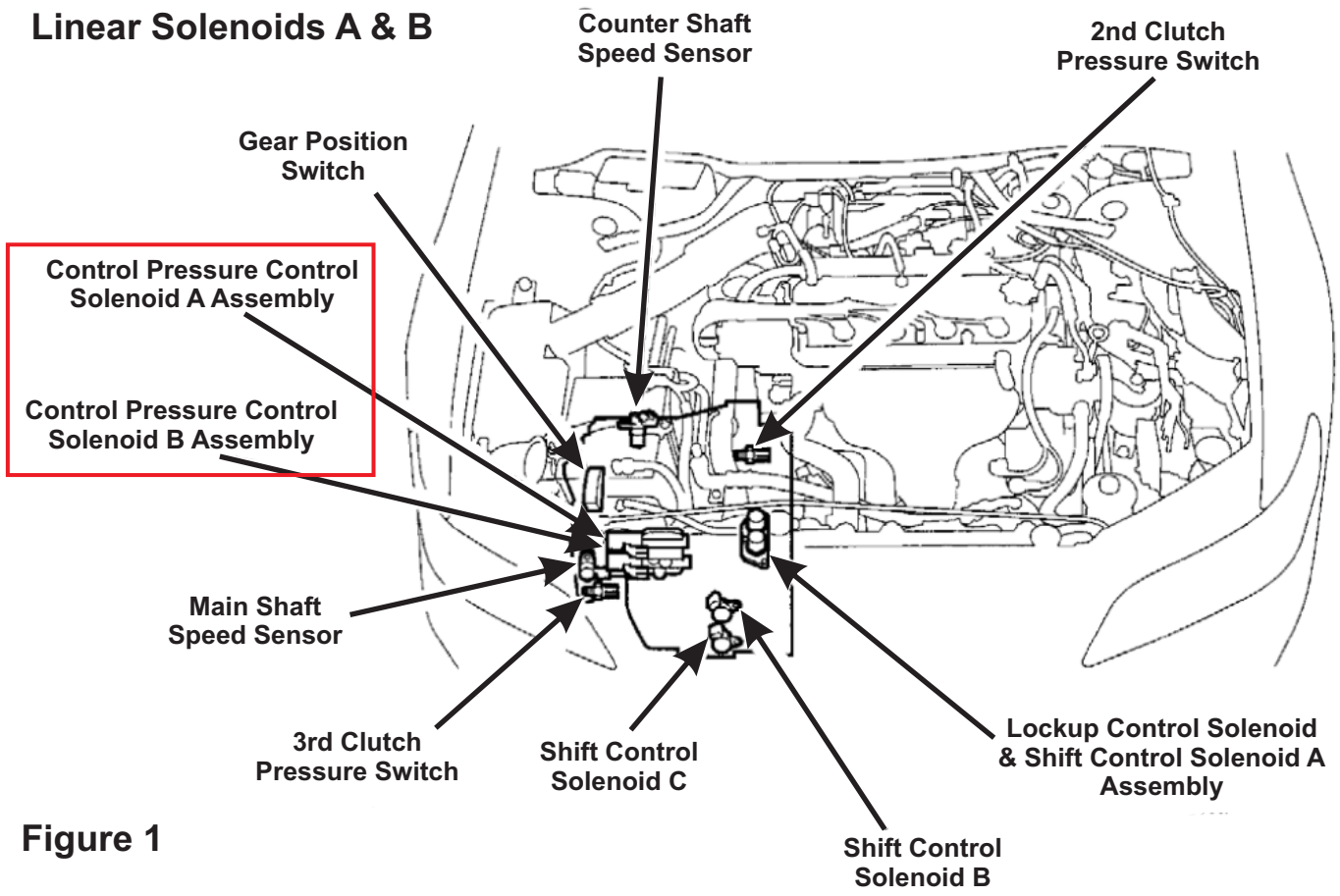


Figure 1

Honda

Solenoid Confusion? continued.....

5 Speed Models With 2 Clutch Pressure Control Linear Solenoids A & B and 1 Single Clutch Pressure Control Linear Solenoid C For Lockup

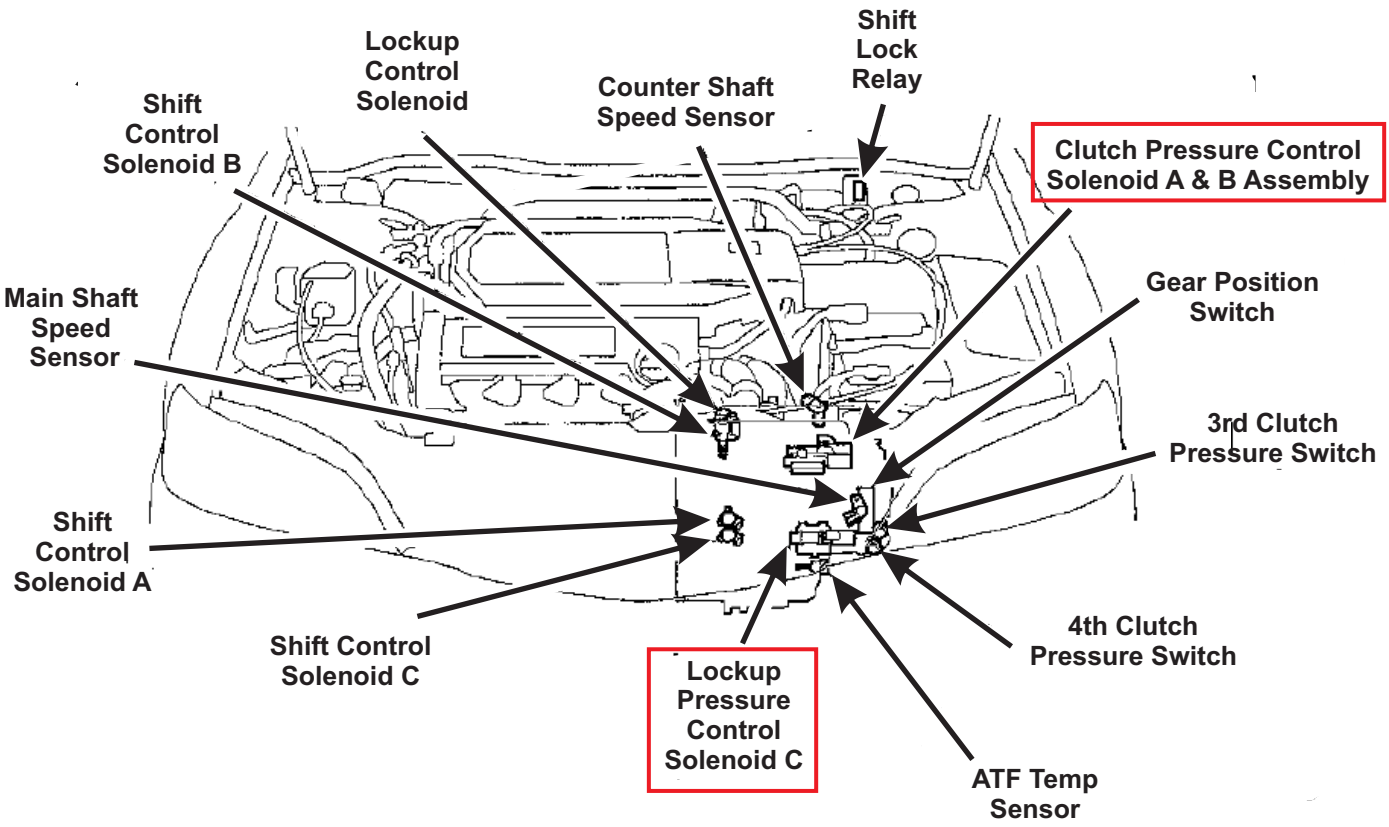


Figure 2

Honda

Solenoid Confusion? continued.....

2008 & Later 5 Speed Models With 2 Clutch Pressure Control Linear Solenoids B & C (lockup) and 1 Single Clutch Pressure Control Linear Solenoid A

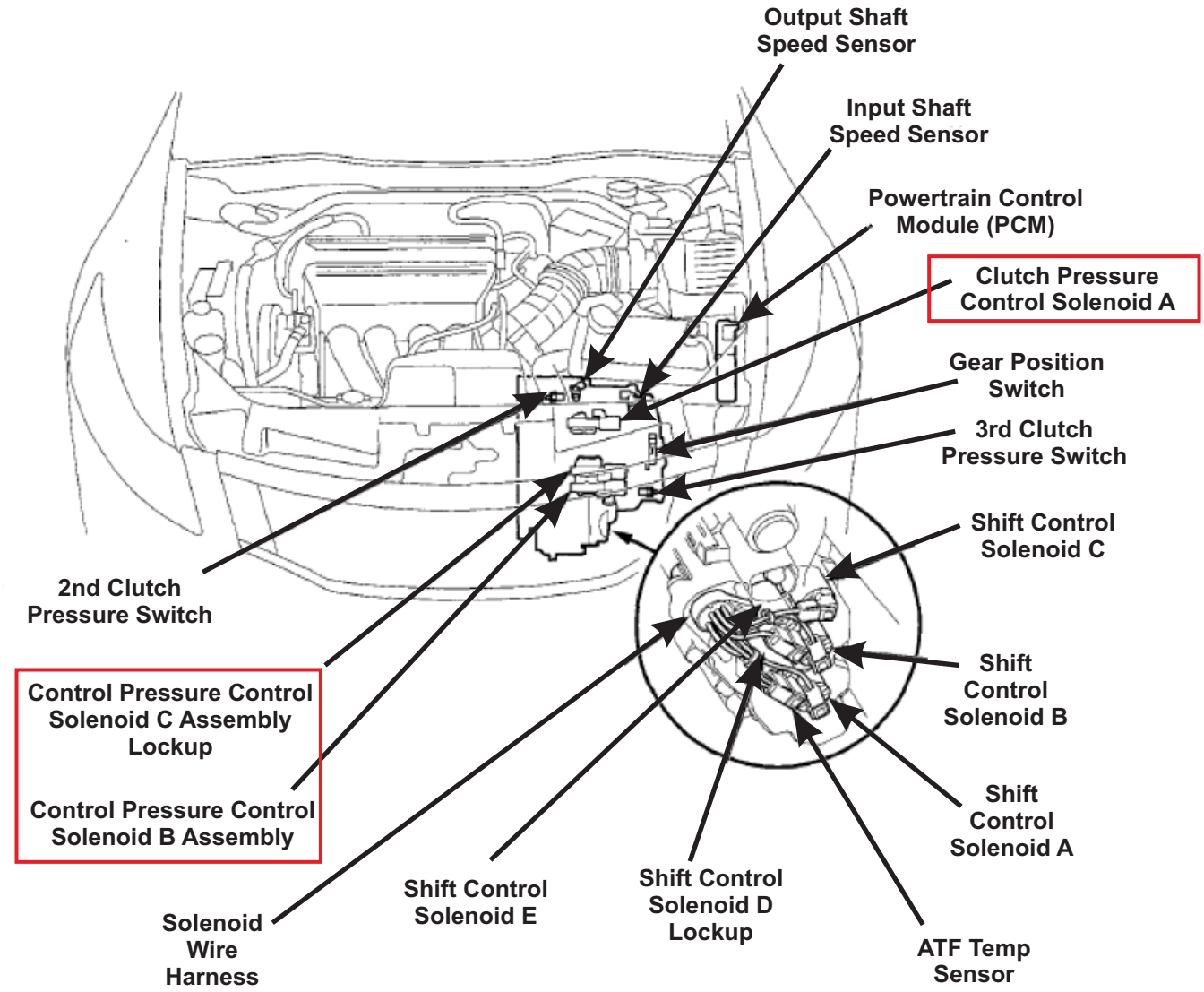


Figure 3

ZF6HP19

Rattling Noise At A Standstill

A 2007 BMW 5-Series with a 6ZF6HP19 transmission arrives at the shop. The complaint is a rattling noise in park and neutral. When you put the transmission in gear with your foot on the brake, the rattle was still there. Once you released the brake and start to take off, the noise goes away… until the next time you come to a stop.

The rattle in park or neutral could easily be in the torque converter or transmission geartrain. But once you put it into gear, the geartrain comes to a stop and the converter's loaded. So, on most transmissions, the noise would go away when you put it into gear.

A fluid check reveals no problems, and there is normal debris in the pan. But there was no doubt the noise is inside the transmission, so you pull the unit and tear it down for a visual inspection. The noise is so bad that your sure to find something loose. But you don't. In fact, except for a little wear on the clutches, you can't find a thing wrong with the transmission.

So it has to be the converter right? What makes things even more confusing is why the noise would continue with the transmission in gear. Putting it into gear would load the converter, so anything rattling should quiet down.

This transmission has a little something extra built into its operating strategy called *decoupling at a standstill*, it's a feature designed to help the manufacturer improve gas mileage during normal driving. It's part of the operating strategy for all ZF6HP19 transmissions.

On most transmissions, putting the unit into gear applies the forward clutch. This effectively locks everything from the torque converter to the output shaft. Since the rear wheels aren't moving, basically everything inside the transmission is at a standstill. The problem with this configuration is that putting the transmission in gear loads the engine. The computer has to raise the idle slightly to maintain the idle speed. This increases fuel consumption.

BMW has a strategy for controlling the transmission in gear, with the brakes on and the vehicle not moving. The computer releases the A clutch ZF's name for the forward clutch. This reduces the load on the engine and improves fuel economy. Then, when you release the brake to start driving, the computer engages the A clutch, and the transmission takes off like normal.

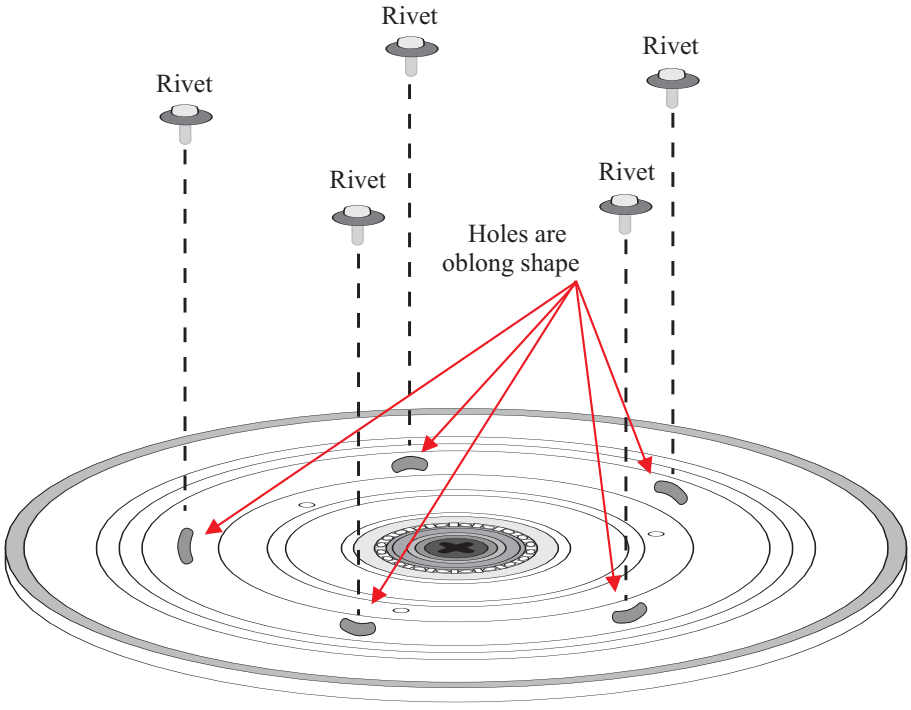
It only occurs when the vehicle's at a standstill, and only in forward gear when the transmission fluid temperature is between 13ºC and 120ºC (55ºF and 250ºF). To make sure the vehicle drives off without delay or load reversal, the power flow isn't completely interrupted; a small amount of converter torque is always transmitted. To determine the amount of decoupling at a standstill, you can calculate converter torque by comparing the difference between engine speed and transmission turbine speed. When the computer sees the brake pedal released and the throttle begin to open it switches the decoupling function off.

This occurs regardless of any other parameters. The A clutch applies to accept power flow from the engine before the driver accelerates; this reduces the risk of rolling backward on a hill.

ZF6HP19

Rattling Noise At A Standstill continued.....

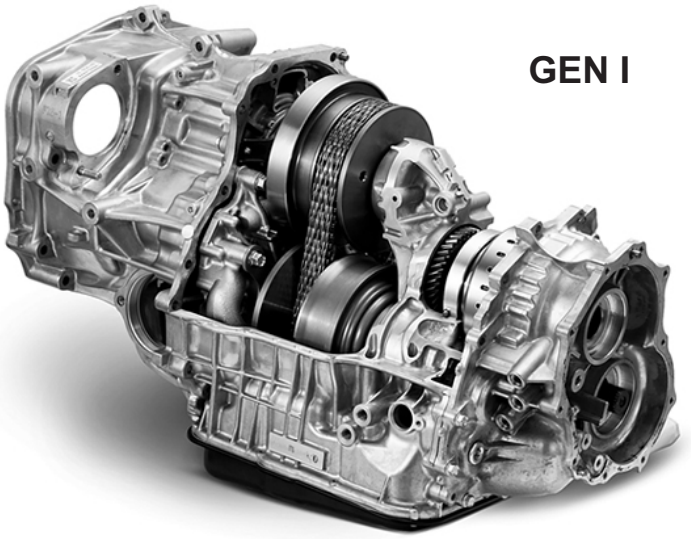
With this transmission, the problem was the rivets in the torque converter drive plate had come loose and the rivet holes worn. This allowed the drive plate to vibrate back and forth until the transmission actually engaged and put a load on the rivets, stopping the rattle.



Subaru

Lineartronic CVT Generation I & II

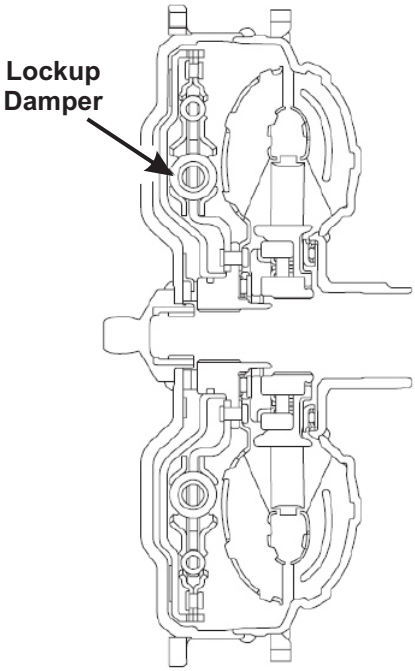
The new Lineartronic CVT was first found in the 2010 model vehicles equipped with a 2.5L engine.



GEN I

GEN II the valve body is mounted on the top of the transaxle.

The lockup damper specially designed for Lineartronic™ has improved the damping performance for engine torque fluctuations and expanded the lockup range to a lower vehicle speed than that of conventional automatic transmission. Converter Lock-Up can occur at a low as 6 mph and remains locked until below approx.19 mph during coast down.



Subaru

Lineartronic CVT

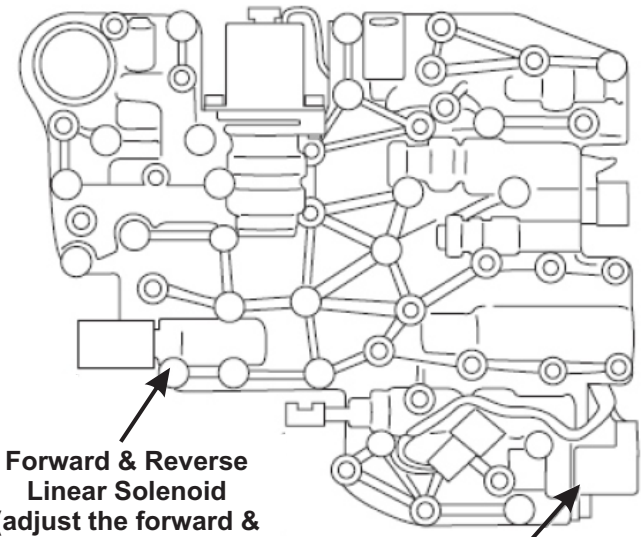
Lockup Duty Solenoid changes over the supply pressure to the torque converter between the lubrication pressure and the lockup pressure.

Lockup On/Off Solenoid adjusts the torque converter lockup pressure

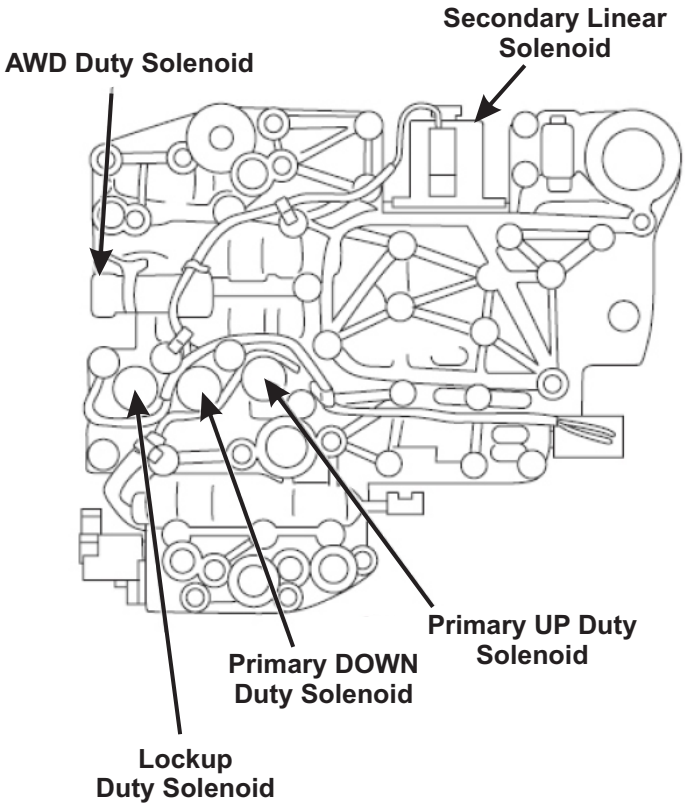
Note: If a trouble occurs with the lockup duty solenoid or ON/OFF solenoid, the Lineartronic™ stops the solenoid driving control and inhibits any lockup.

All Solenoids Are Hard Wired

Lower Side



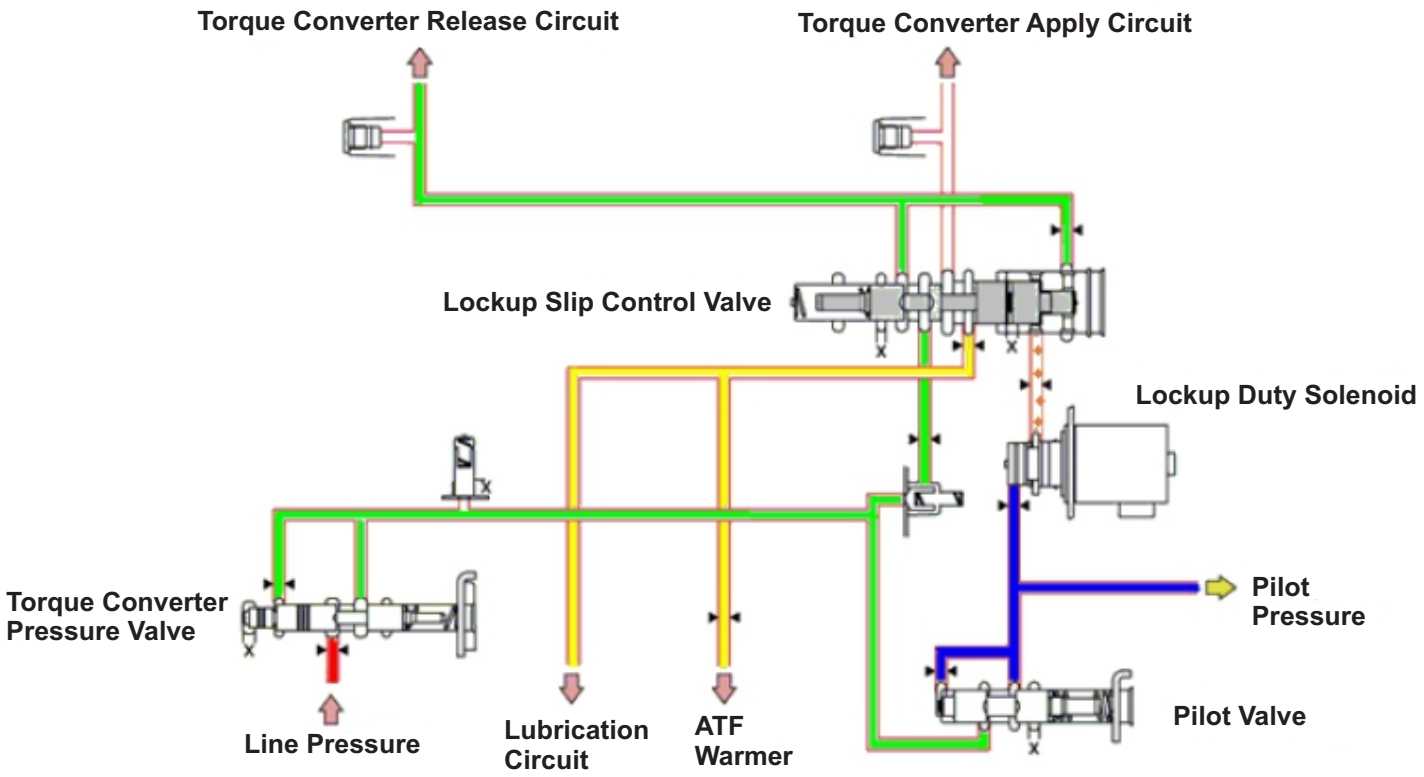
Upper Side



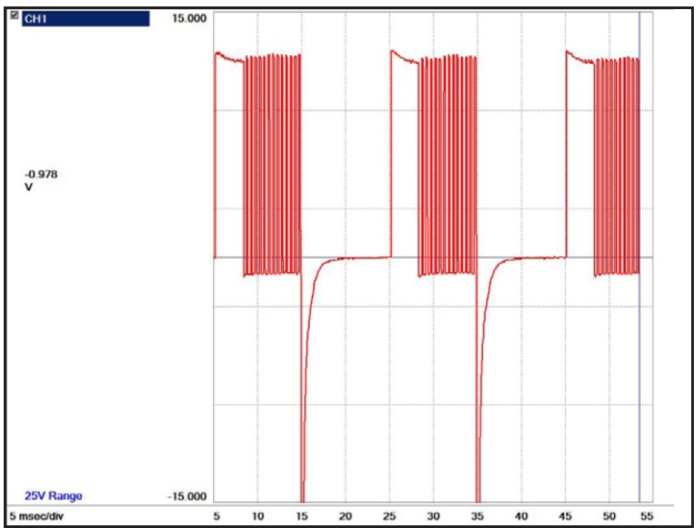
Subaru

Lineartronic CVT

Lockup Released



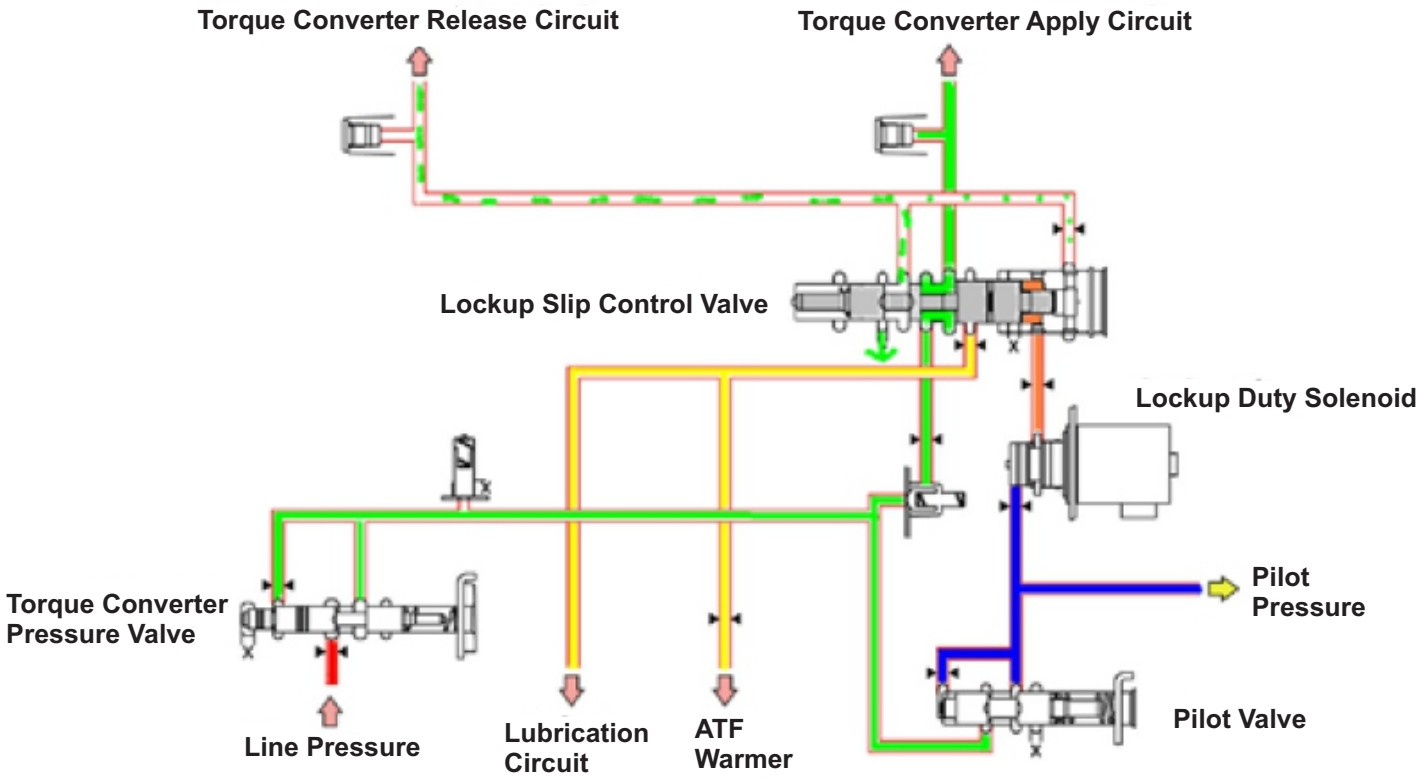
Lock-Up Duty Solenoid Control Signal (less than 100%)



Subaru

Lineartronic CVT

Lockup Applied



Scan Tool Data