"2007" SEMINAR INFORMATION
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Ford, Chrysler & Imports

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Superior Transmission Parts

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VBX

FORD 5R55W

DELAYED ENGAGEMENT

COMPLAINT: After overhaul, the transmission has delayed engagements on garage shifts and may even exhibit a 2-3 flared shift.

CAUSE: The internal linkage detent lever has been bent, (Refer to Figure 1), this causes a mis-alignment of the manual valve, and in some instances the manual valve may be bent as well.
The main cause of bending the internal linkage is the manual selector shaft nut. This nut has thread lock on it from the factory, this thread lock compound creates a situation where the nut that retains the manual selector shaft is so tight, that the technician has exerted enough force to bend internal linkage components.

CORRECTION: Heat must be applied to the selector shaft nut in order to loosen the thread lock, (Refer to Figure 2), thereby requiring less force to loosen the nut and preventing the internal linkage from being damaged.
In many instances the Transmission Range Sensor has been damaged from the heat of the torch and will need replacement, the part number is listed below under service information.

SERVICE INFORMATION:

Detent Lever*.....*XW4Z-7A115-AA
Transmission Range Sensor*.....*1L2Z-7F293-AA

A special thanks to John Parmenter from Centereach Transmissions for his generosity in sharing his photos with us.

A special thanks to Dan Klopp of Klopp's Transmission in Corning, N.Y. for sharing his experience with this problem.

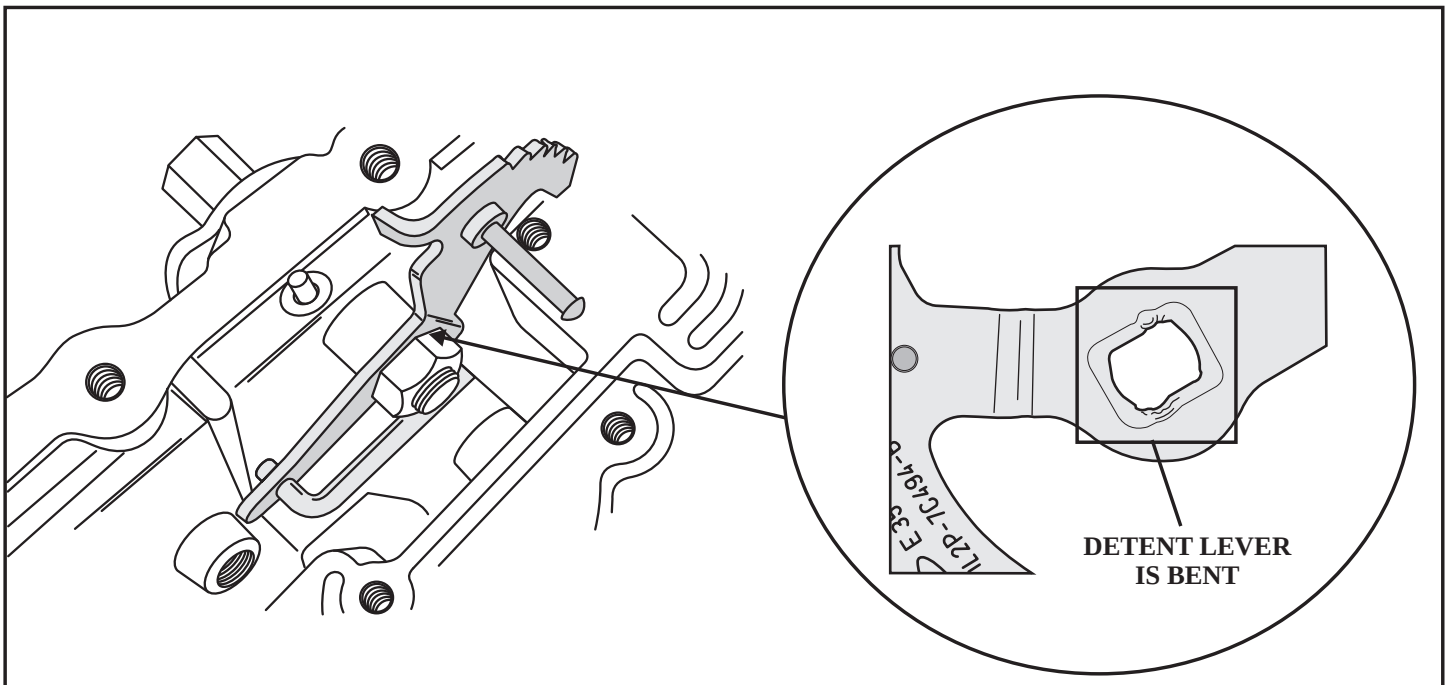


Figure 1

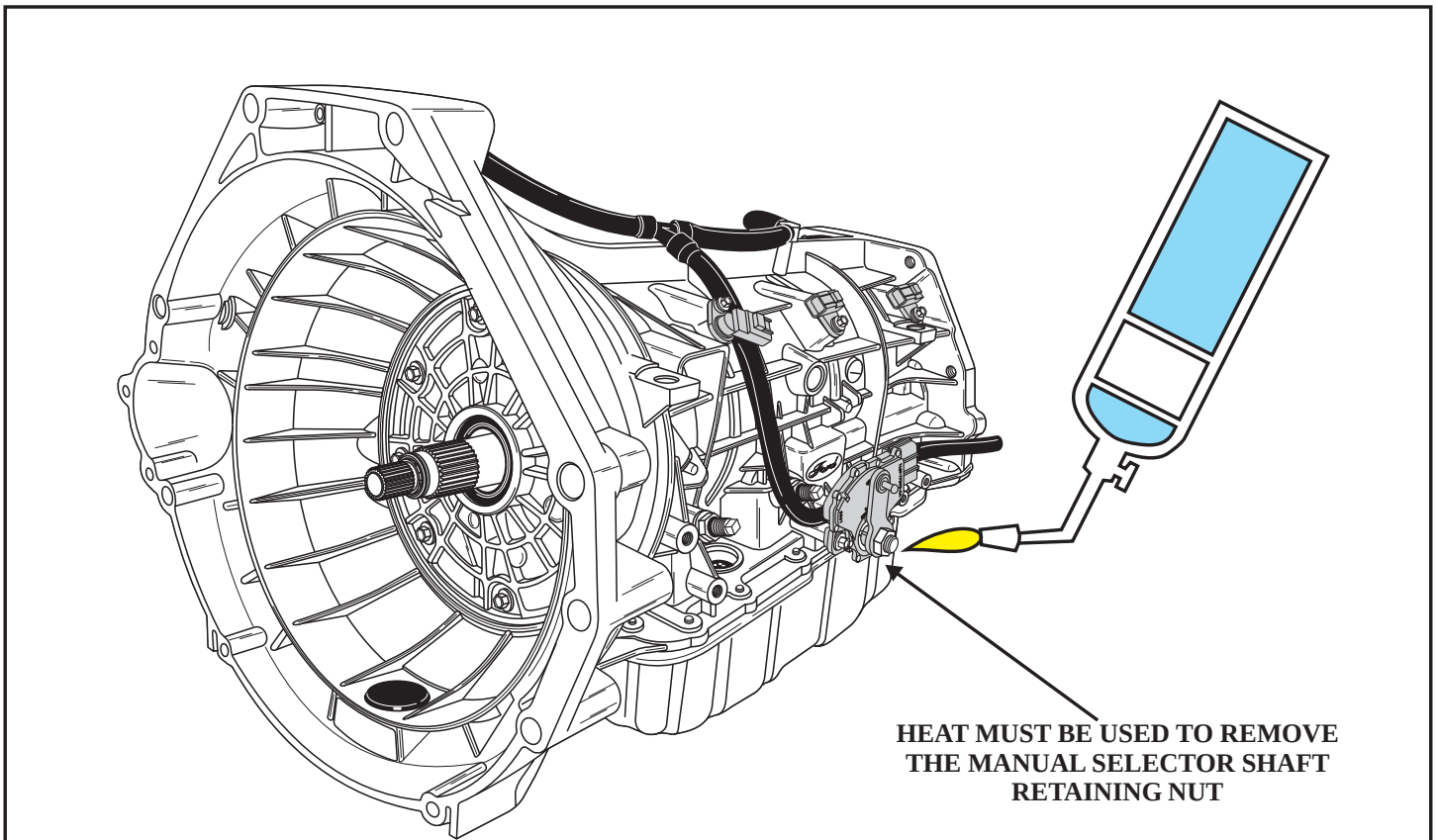


Figure 2

FORD 5R55W/S
TICKING OR RATTLING NOISE FROM BELLHOUSING

COMPLAINT: Explorer and Mountaineer models equipped with the 5R55W/S transmissions may exhibit a ticking or rattling noise coming for the bellhousing of the transmission. This noise can be commonly mistaken as a cracked flywheel or a mis-alignment of the flex-plate to the torque converter.

CAUSE: The cause may be, the plate between the engine block and the bellhousing is flexing, with increased engine rpm, causing the noise.

CORRECTION: Ford Motor Company has released a new style inspection plate, which is located at the bottom of the bellhousing, that has foam rubber to insulate the plate between the engine and transmission to keep it from flexing. Replace the inspection plate with new design as shown in Figure 1.

SERVICE INFORMATION:

INSPECTION PLATE.....2L2Z-7986-AC

INSPECTION PLATE

Figure 1

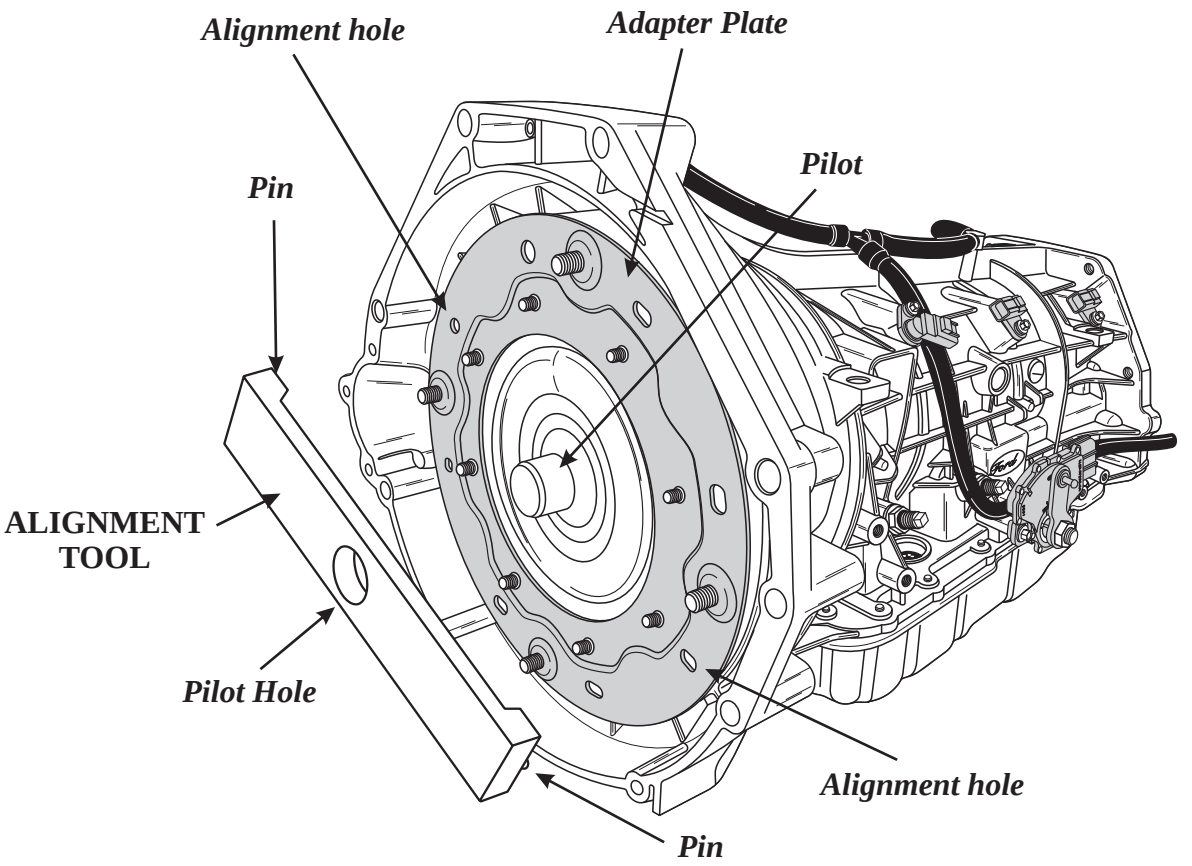
FORD 5R55W/S
METALLIC TICKING NOISE

COMPLAINT: After Overhaul, vehicles equipped with the 5R55W/S may exhibit a metallic ticking noise coming from the bellhousing of the transmission, similar to the sound of a cracked flex plate or flywheel.

CAUSE: The cause may be, the adapter plate and the Torque Converter are not aligned correctly.

CORRECTION: Use the Factory alignment tool, Ford Flex Plate Aligner #307-403, or an alignment tool from many aftermarket distributers to align the pilot of the Torque Converter to the adapter plate before tightening the retaining nuts.
Refer to Figure 1 to see which holes, in the adapter plate and the Torque Converter Pilot, to align with the tool. Refer to Figure 2 to see the Tool installed. Figure 3 shows a view with the tool installed and the tightening of the retaining nuts.

ALIGNMENT TOOL



Line up the pins in the alignment tool with the Pilot on the Torque Converter and the holes in the flex plate

Figure 1

ALIGNMENT TOOL INSTALLED

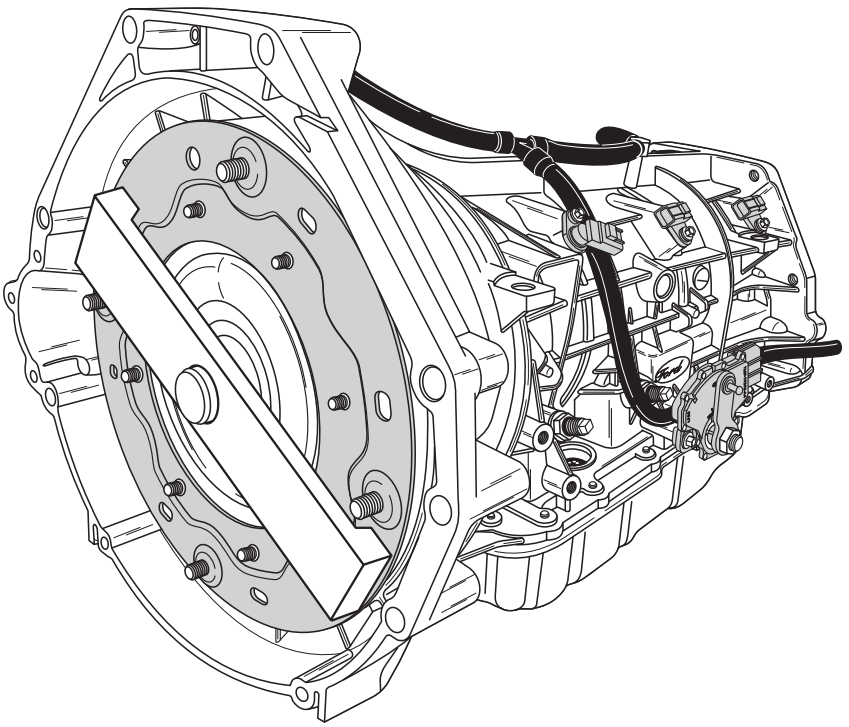
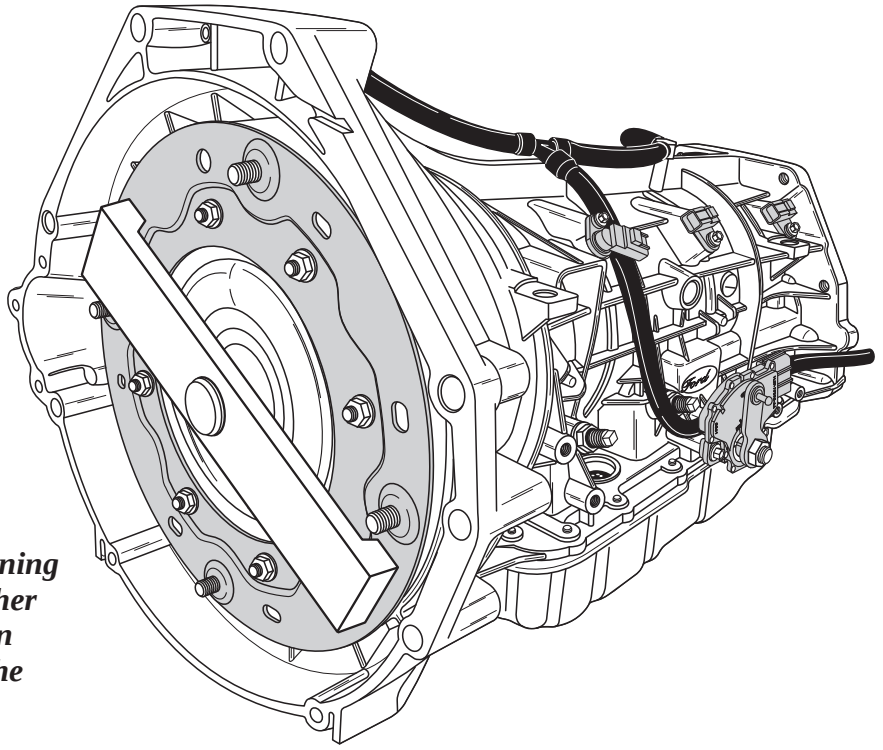


Figure 2

ALIGNMENT TOOL INSTALLED



Install and torque the remaining 2 retaining nuts after all other nuts have been installed and the tool removed

Torque adapter plate retaining nuts to 33 ft.lb.

Figure 3

Transgo
B & W

FORD 4R44E
2-3 UPSHIFT FLARE

COMPLAINT: Vehicles equipped with the 4R44E transmission, may exhibit a 2-3 upshift flare before or after overhaul.

CAUSE: The cause may be, insufficient Direct Clutch pressure during the 2-3 upshift transition.

CORRECTION: Locate the orifice, as shown in Figure 1 and enlarge the hole to .062."

4R44E SPACER PLATE

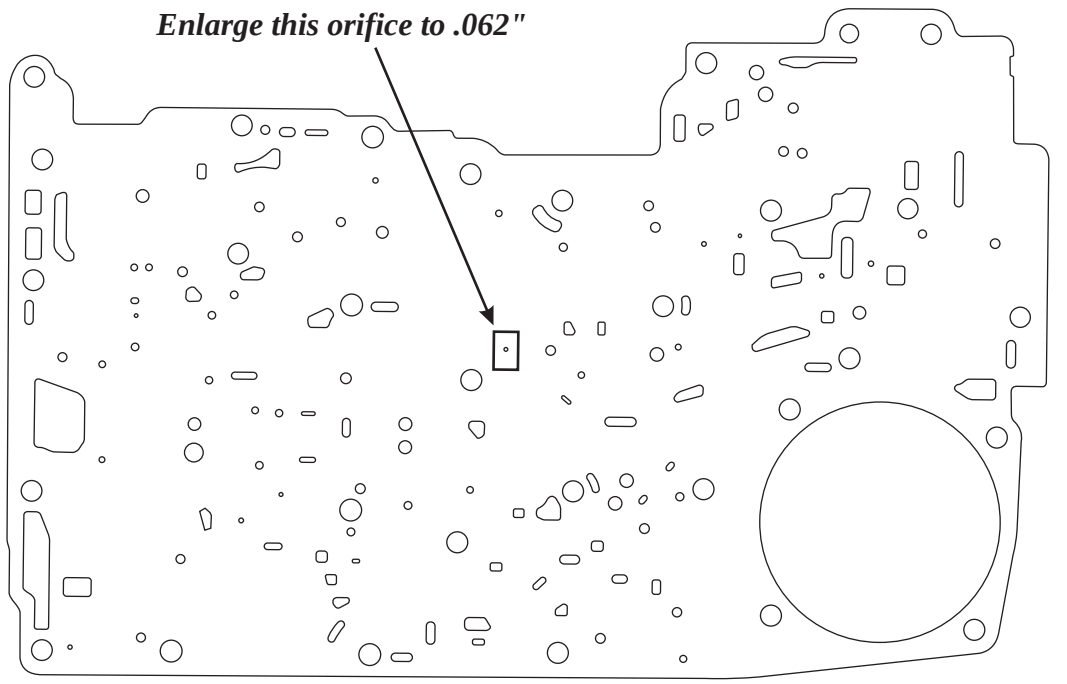


Figure 1

FORD AX4S, AX4N, 4F50N
HARD TO FILL

COMPLAINT: 2000 and up Ford vehicles equipped with the AX4S, AX4N and/or 4F50N, may exhibit a problem filling the transmission with fluid.

CAUSE: The cause may be that the newer design rubber cap air vent is not allowing the transmission to breathe. ***Note: This may cause the dipstick to pop out of the filler tube, and depending on the location of the tube, it may allow water intrusion into the transmission fluid***.

CORRECTION: To correct this condition, replace the vent assembly, as shown in Figure 1, with the part number listed below in service information.

SERVICE INFORMATION:

AIR VENT STEM (Ford Part Number).....YF1Z-7035-AA
RUBBER CAP (Ford Part Number).....XS4Z-7L282-AA

Special thanks to Waynes trans

NEW DESIGN AIR VENT

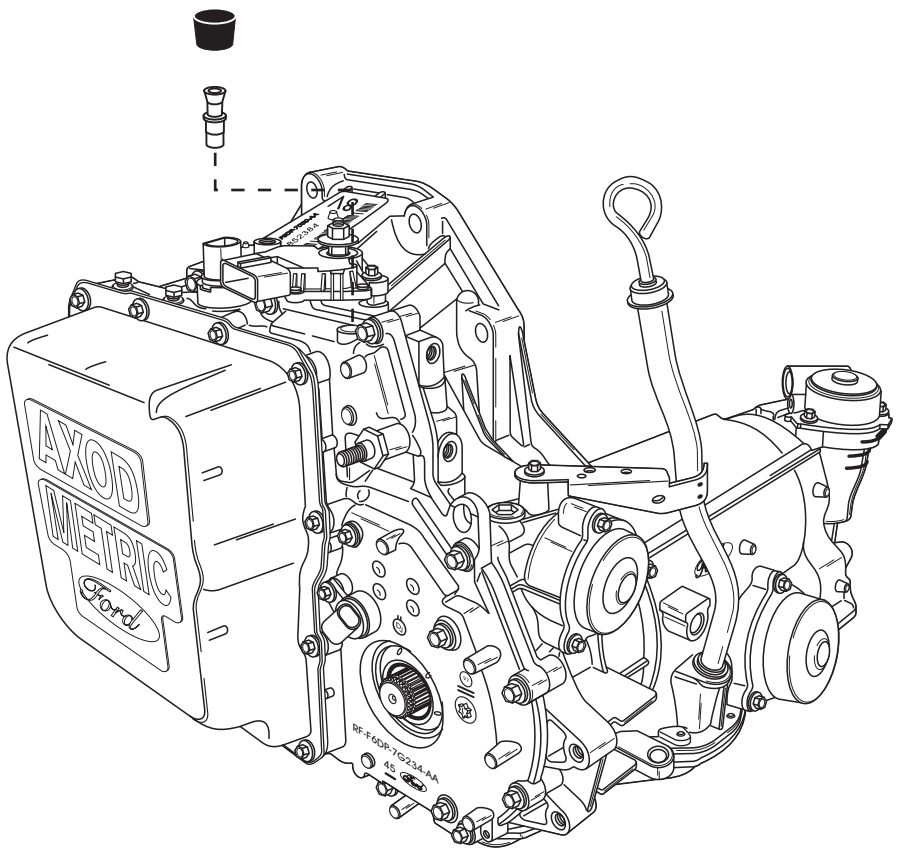


Figure 1

2004-UP FORD 4F50N TRANSAXLE

NO MOVE CONDITION

COMPLAINT: A 2004 and up Ford Motor Company vehicle equipped with the 4F50N Transaxle may exhibit a no move condition in both forward and reverse ranges.

CAUSE: One possible cause for this condition may be that during overhaul, or Valve Body exchange, a Valve body for a 2001-2003 4F50N was installed on the 2004 unit.

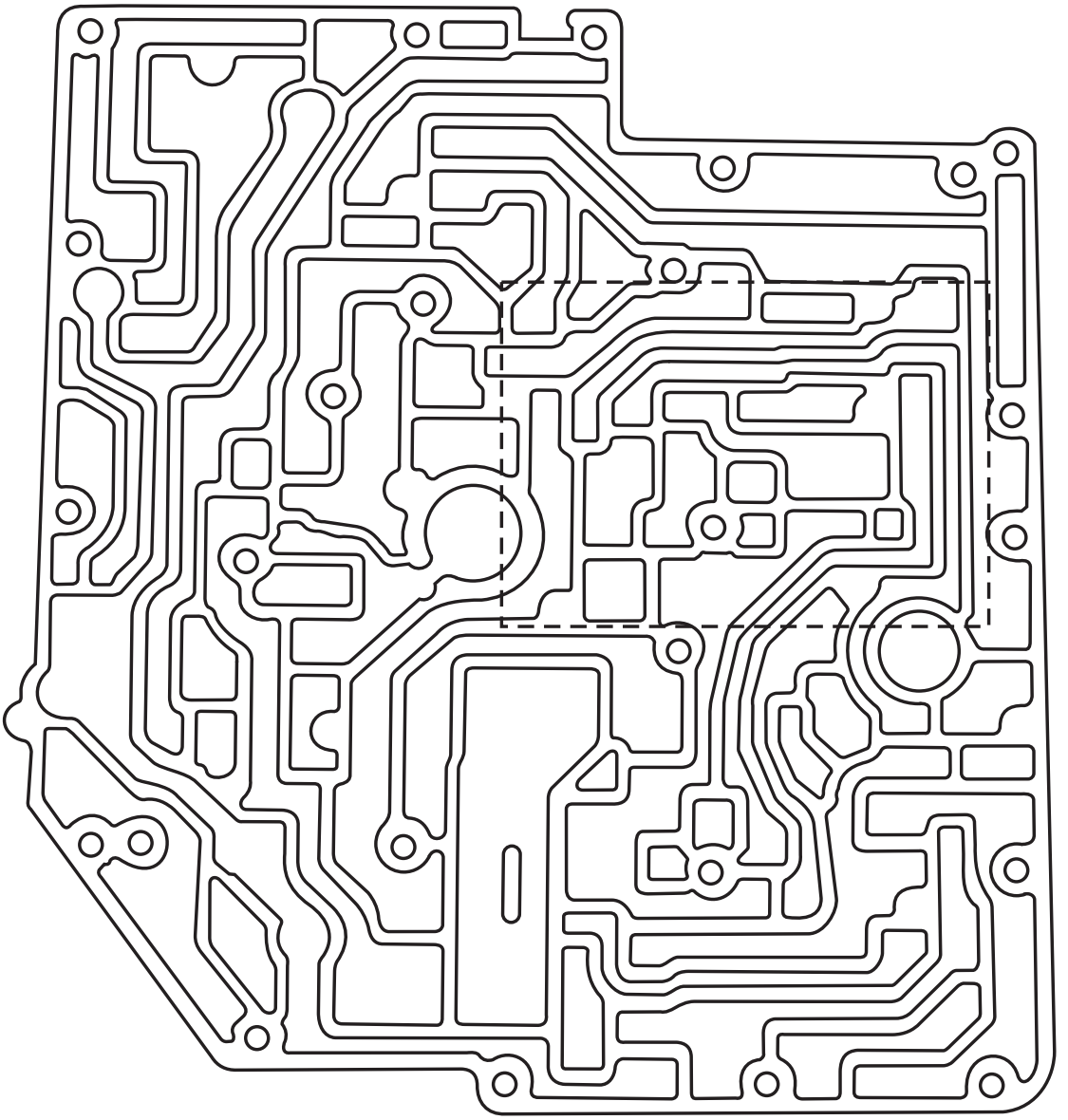
Explanation: In the model year of 2004, vast hydraulic changes were made to the Case Cover, Valve Body, and the Pump assembly. These changes were made to increase the durability of this unit. Figure 1 will show the passages in the 2000-2003 Case Cover. Figure 2 will show the passages in the 2004-up Case Cover. Figure 3 will show the passages in the 2000-2003 Valve Body, Case Cover side. Figure 4 will show the 2004-up Valve Body passages, Case cover side. Figure 5 will show the 2000-2003 Valve Body passages, Oil Pump side. Figure 6 will show the 2004-up Valve Body passages, Oil Pump side. Figure 7 will show the 2000-2003 Oil pump passages. Figure 8 will show the 2004-up Oil Pump passages.

As you can see from the illustrations, the worm tracks on the 2000-2003 castings and checkball locations are totally different than those on the 2004-up units. The bolt locations remained the same on the 2000-2003, and the 2004-up units.

None of the parts listed will interchange with each other, either individually or as a set.

CORRECTION: Use the illustrations in figures 1-8 to identify the proper castings for 2000-2003 and 2004-up. The Rough Forge Numbers will be added with each illustration to aid in proper Case cover, Valve Body, and Oil Pump assembly and checkball identification.

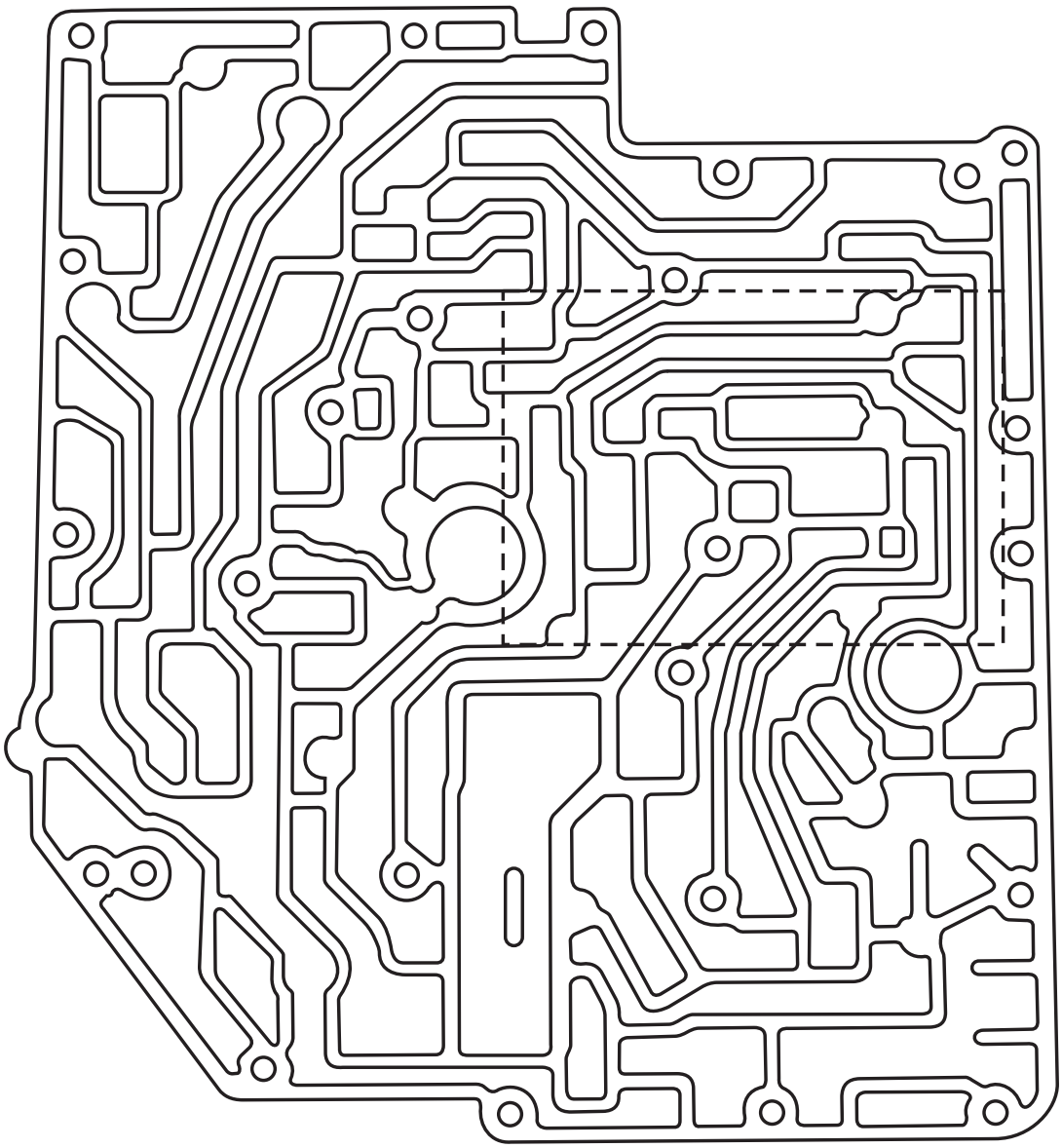
2000-2003 Case Cover Passages



Case Cover Casting Number RF-YF1P

Figure 1

2004-Up Case Cover Passages



Case Cover Casting Number RF-4F1P

Figure 2

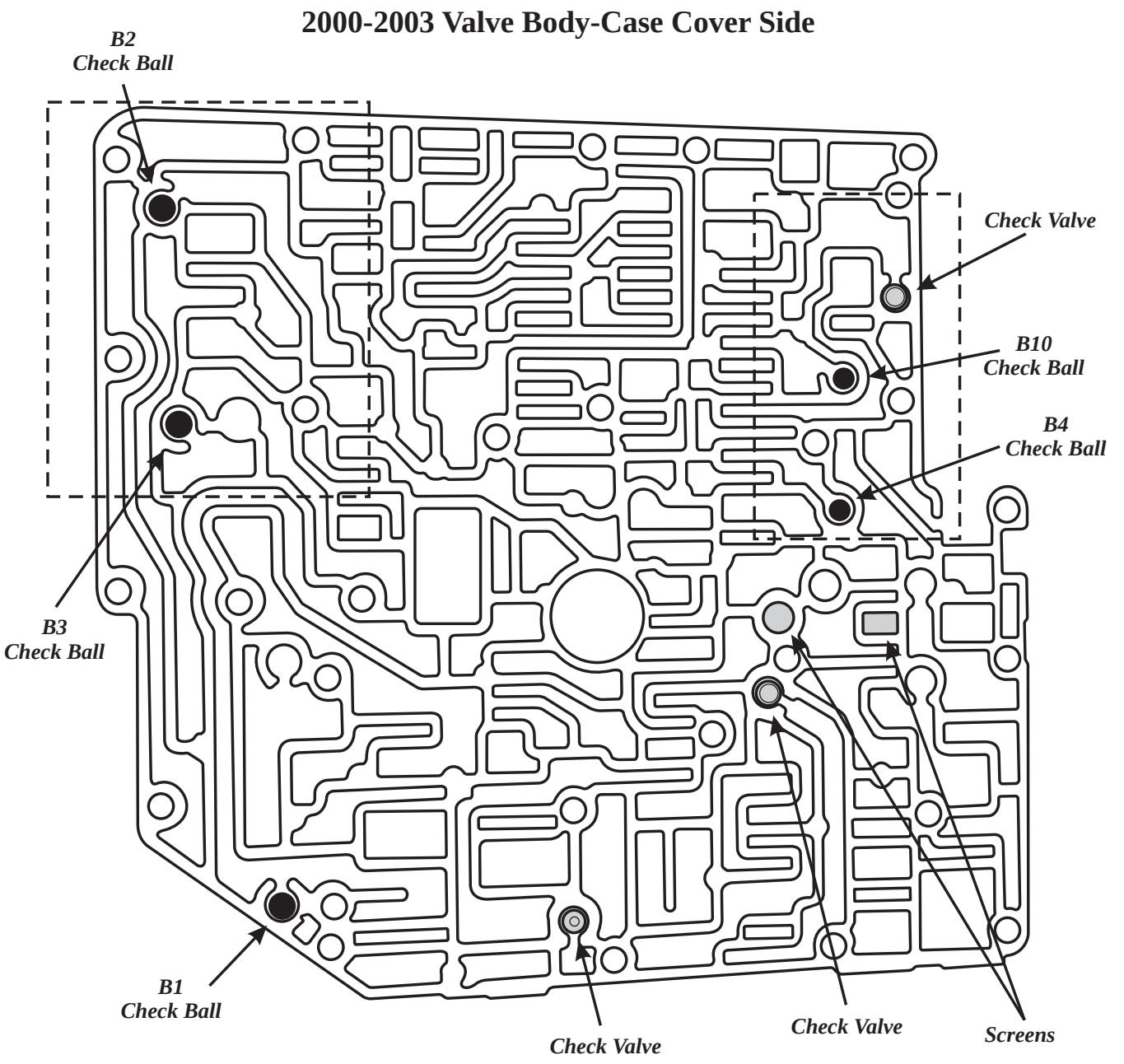
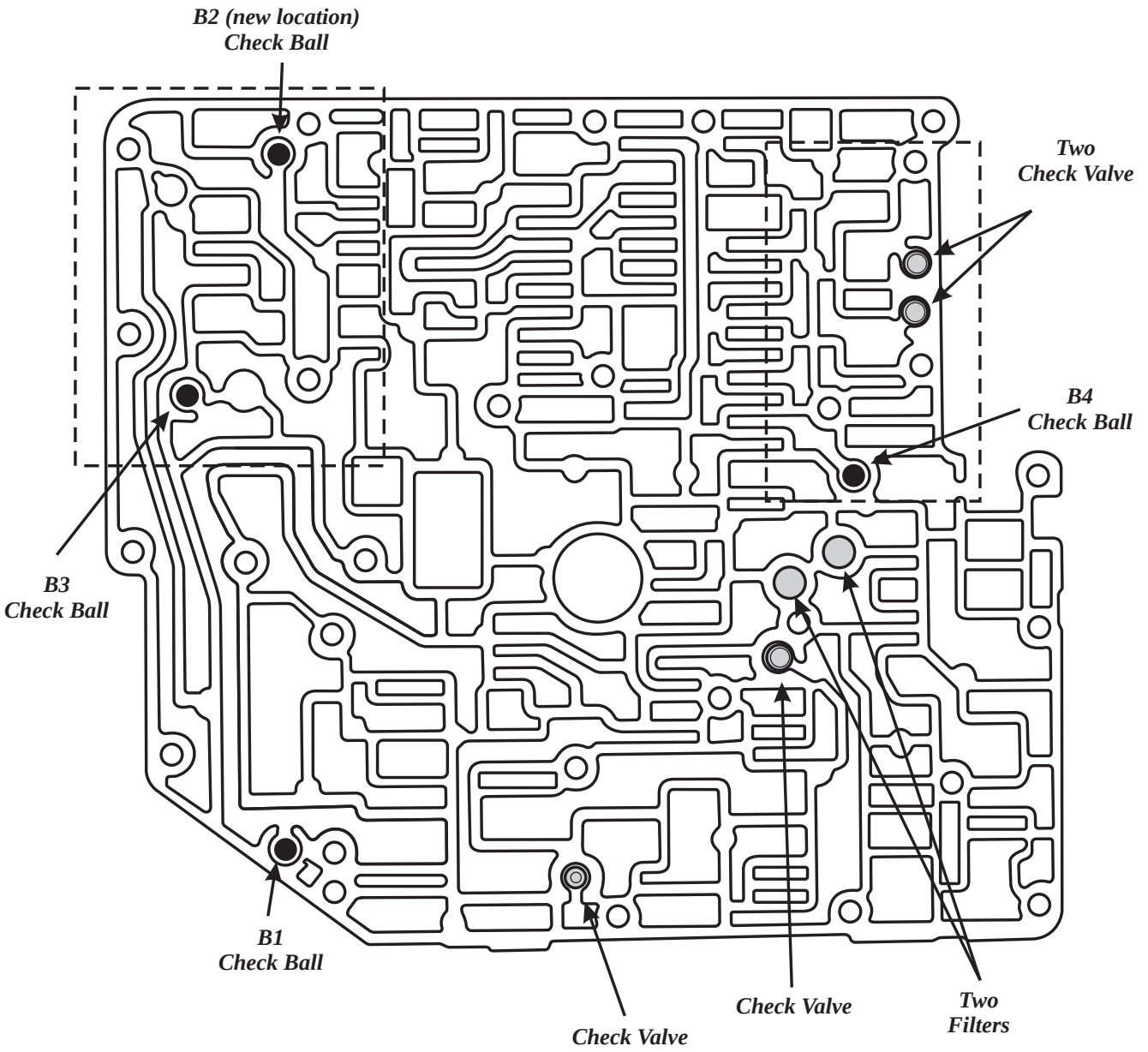

2000-2003 Valve Body-Case Cover Side
B2
Check Ball
Check Valve
B10
Check Ball
B4
Check Ball
B3
Check Ball
B1
Check Ball
Check Valve
Check Valve
Screens
Valve Body Casting Number RF-XF1P
Copyright © 2007 ATSG

Figure 3

2004-Up Valve Body-Case Cover Side

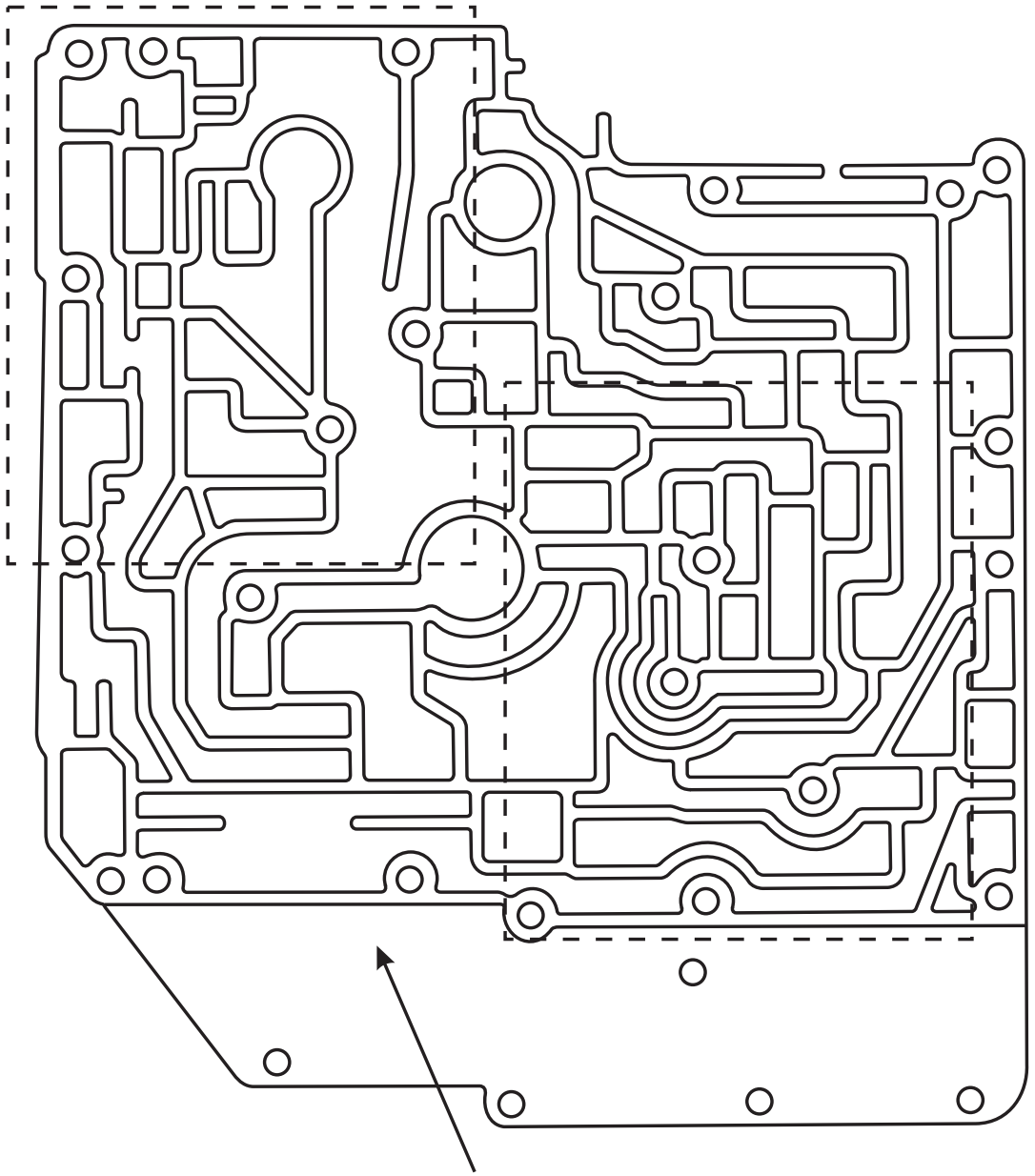


Valve Body Casting Number RF-4F1P

Figure 4

Rostra

2000-2003 Valve Body-Oil Pump Side

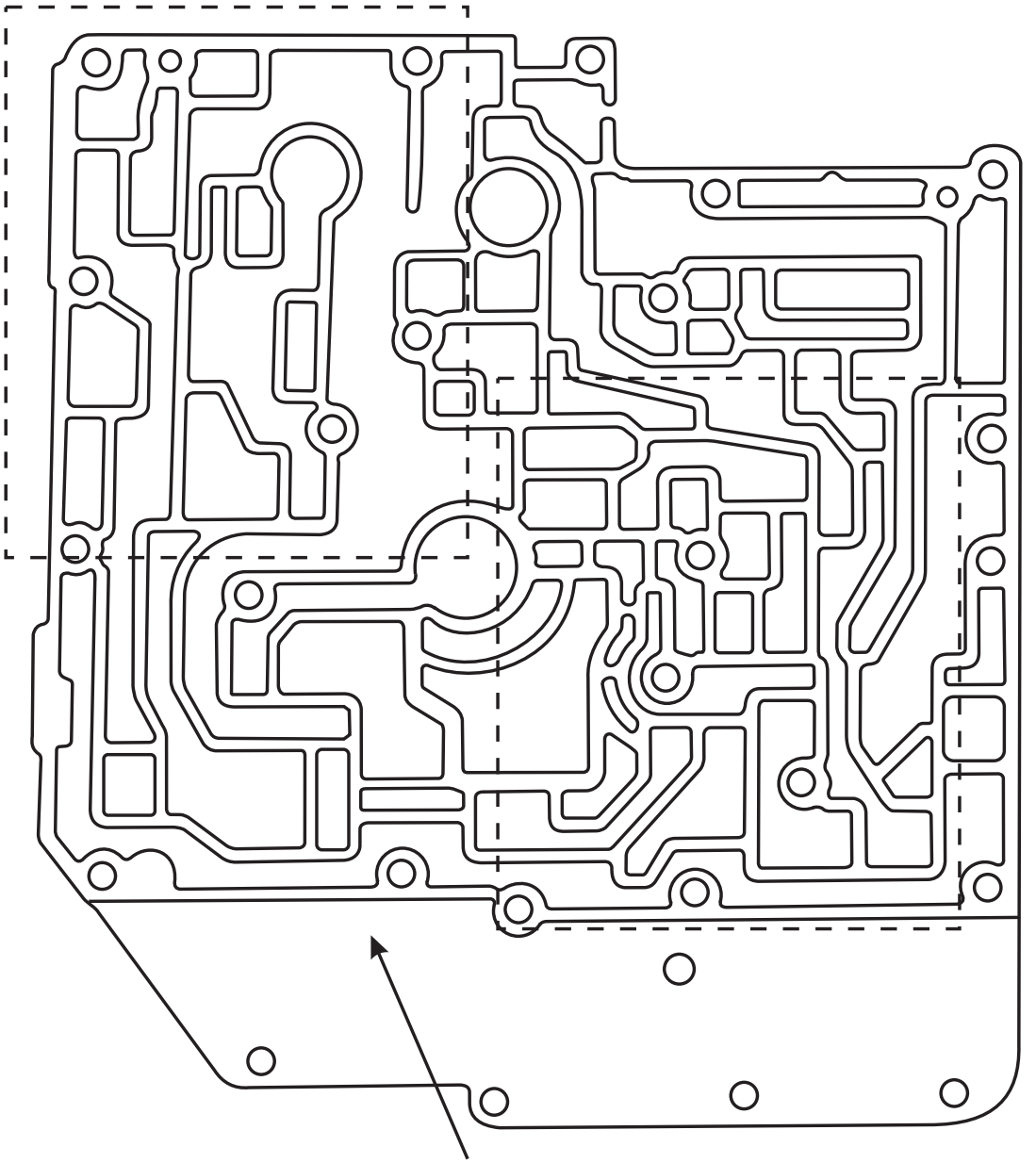


Valve Body Casting Number RF-XF1P

Figure 5

Dacco

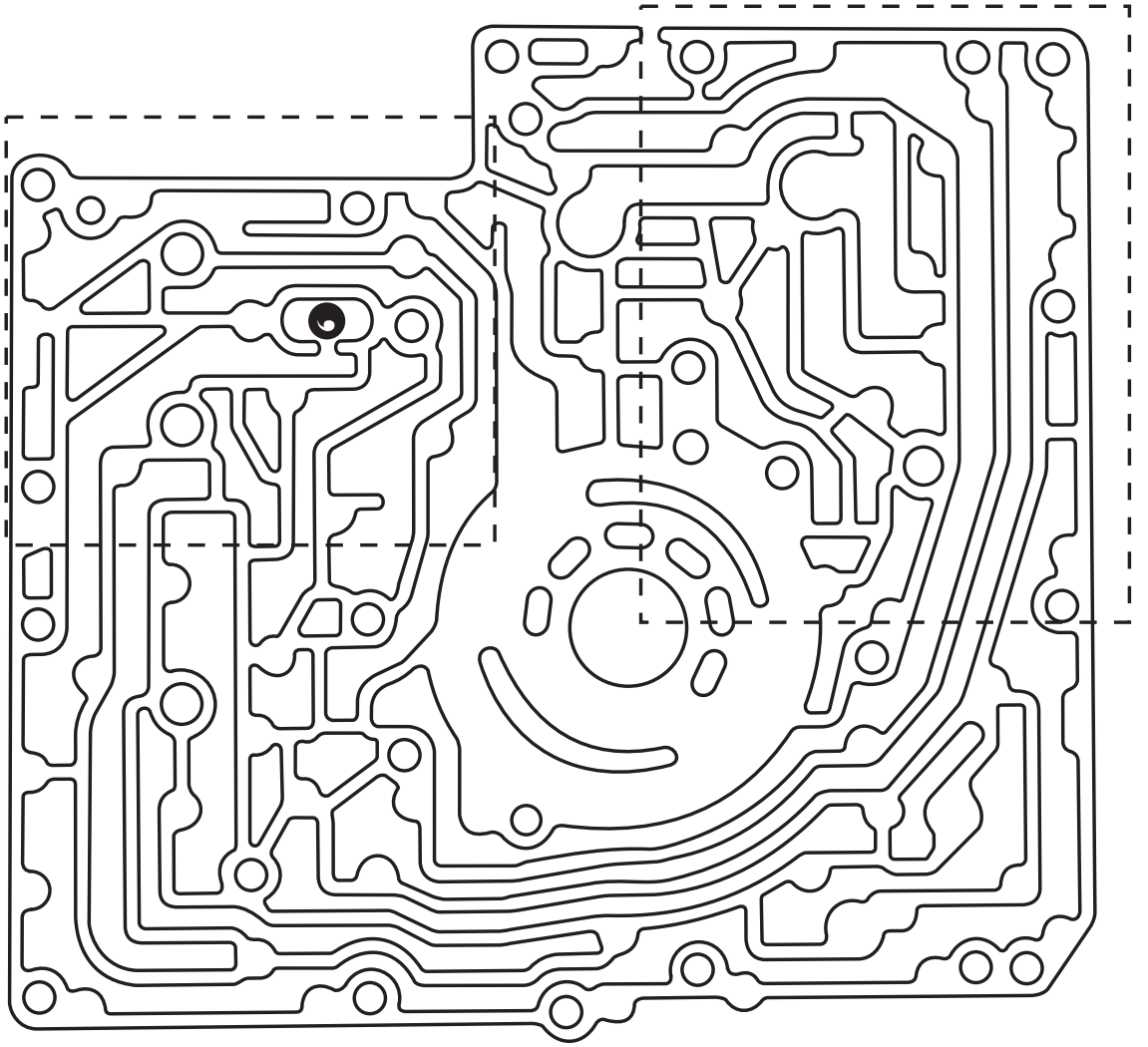
2004-Up Valve Body-Oil Pump Side



Valve Body Casting Number RF-4F1P

Figure 6

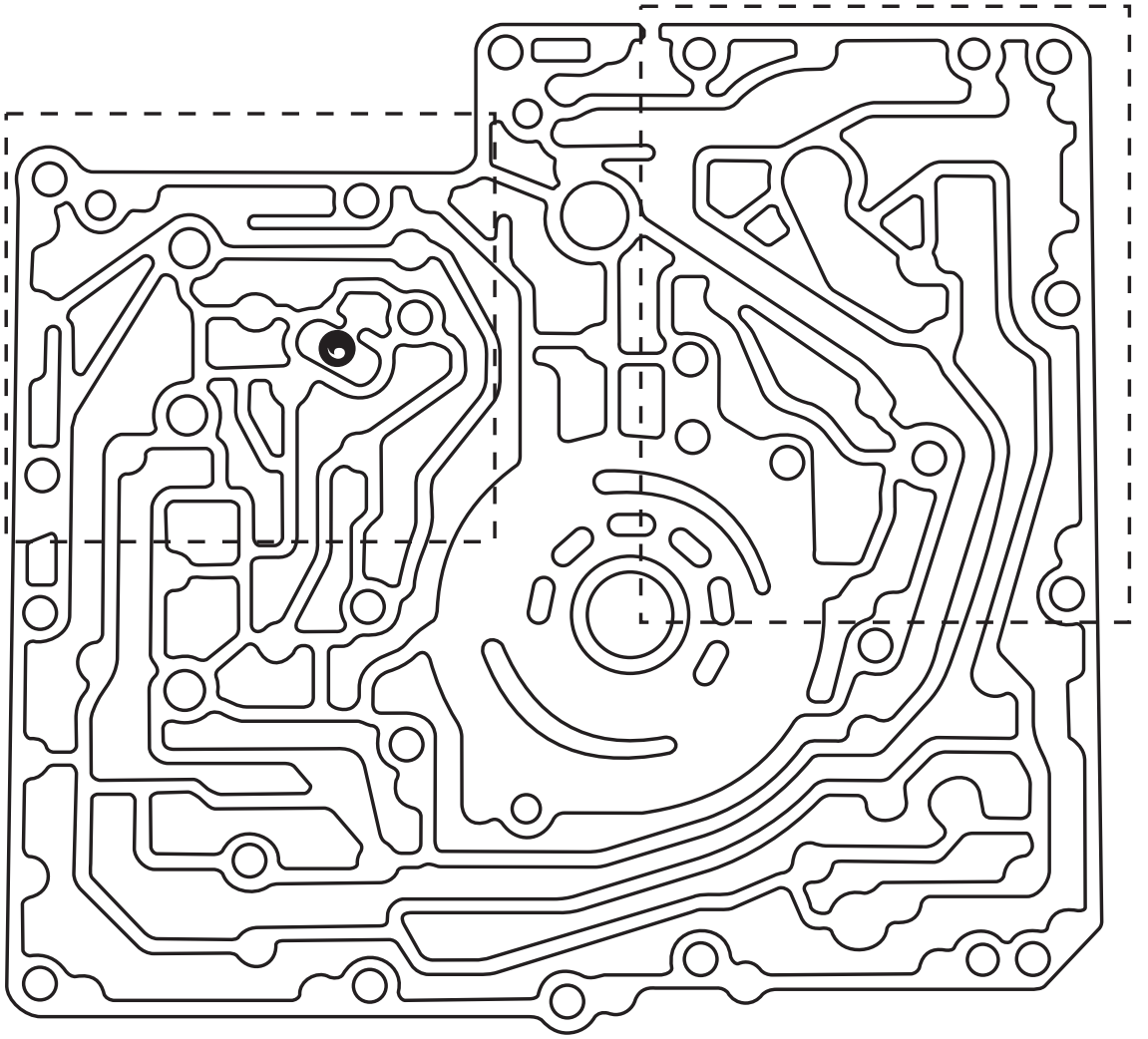
2000-2003 Oil Pump



Oil Pump Casting Number RF-XF1P

Figure 7

2004-Up Oil Pump



Oil Pump Casting Number RF-4F1P

Figure 8

FORD CD4E
3-2 TIMING VALVE CHANGE 02 & UP

CHANGE: In the 2002 model year, Ford Motor Company changed the 3-2 Timing Valve Hydraulics.

REASON: For quicker release of the Direct Clutch during a 3-2 downshift. Figure 3 shows the previous design 3-2 Timing Valve on a 3-2 downshift, notice that the 3-2/CCS Solenoid is at a lower duty cycle providing a regulated exhaust of the Direct Clutch. Figure 4 shows a 3-2 downshift at a higher duty cycle of the 3-2/CCS Solenoid, which will create a quicker "unregulated" exhaust of the Direct Clutch. Figure 5 shows the 2002 and Up Hydraulics, notice that the 3-2 Timing Valve is now held to the left by it's spring, which will created a quicker "unregulated" exhaust of the Direct Clutch regardless of 3-2/CCS duty cycle.

PARTS AFFECTED:

3-2 TIMING VALVE AND SPRING: The 3-2 Timing valve was redesigned as shown in Figure 2 and is now installed into the valve body with the spring first, opposite the previous design. Refer to Figure 1 to see how to identify the Accumulator section of the Valve Body on 2002 and UP. The ink stamp of 2L8P designates 2002 and UP.

2002 AND UP I.D.

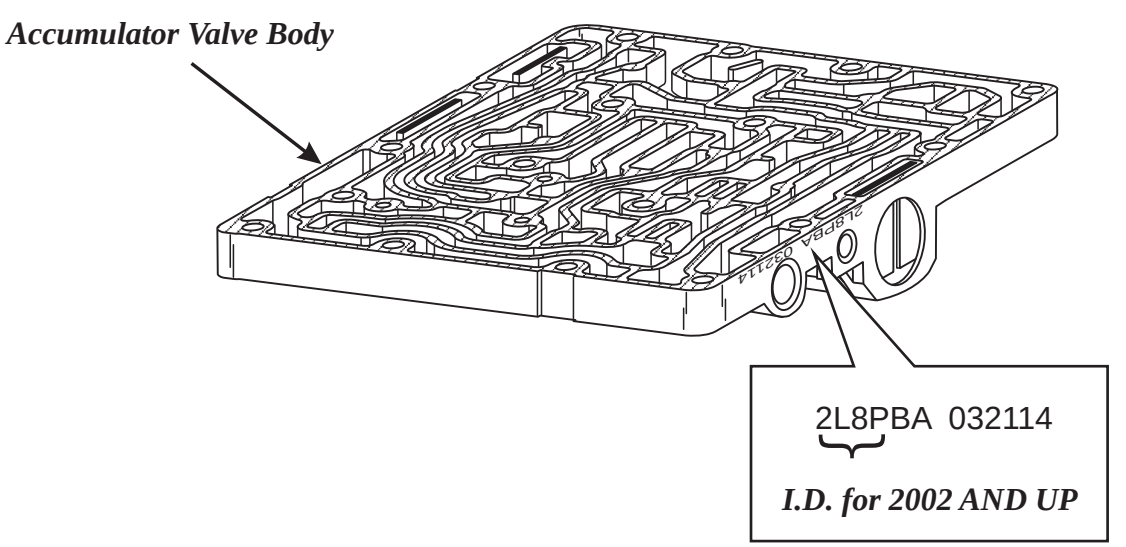


Figure 1

3-2 TIMING VALVE LOCATION

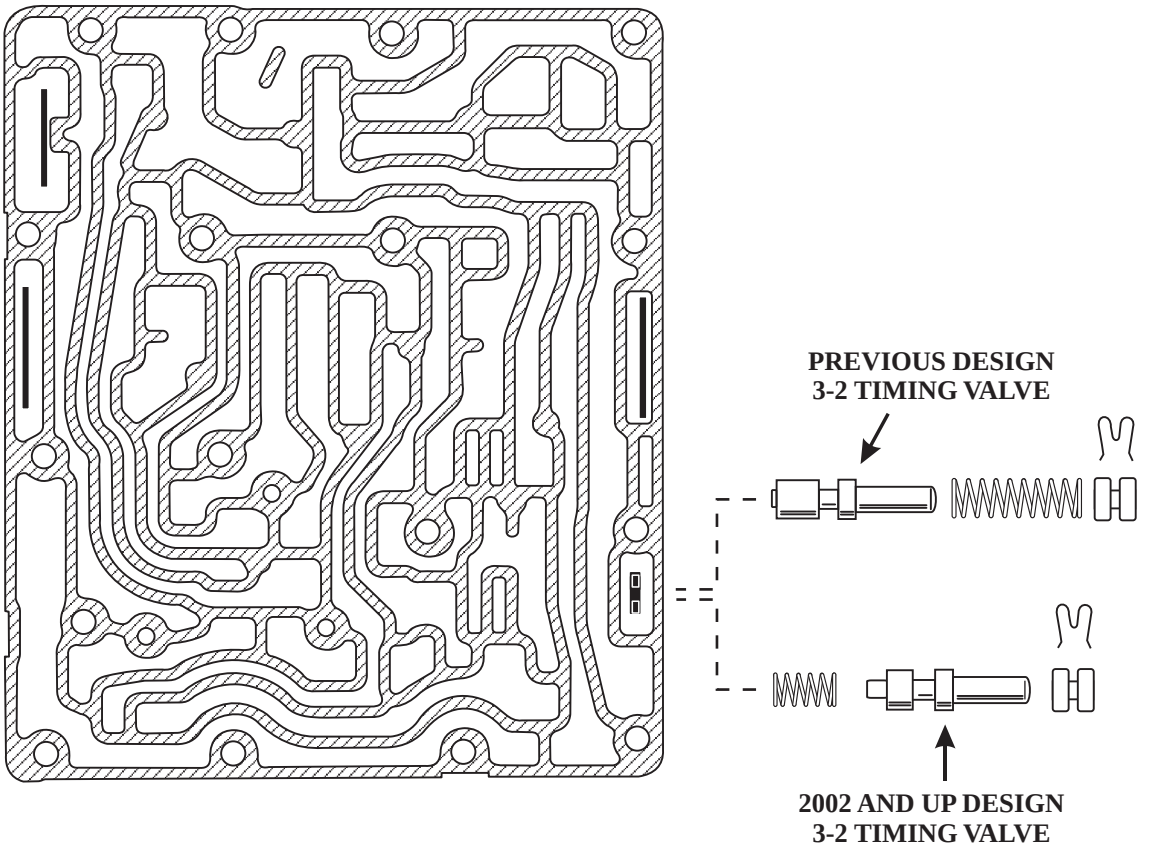
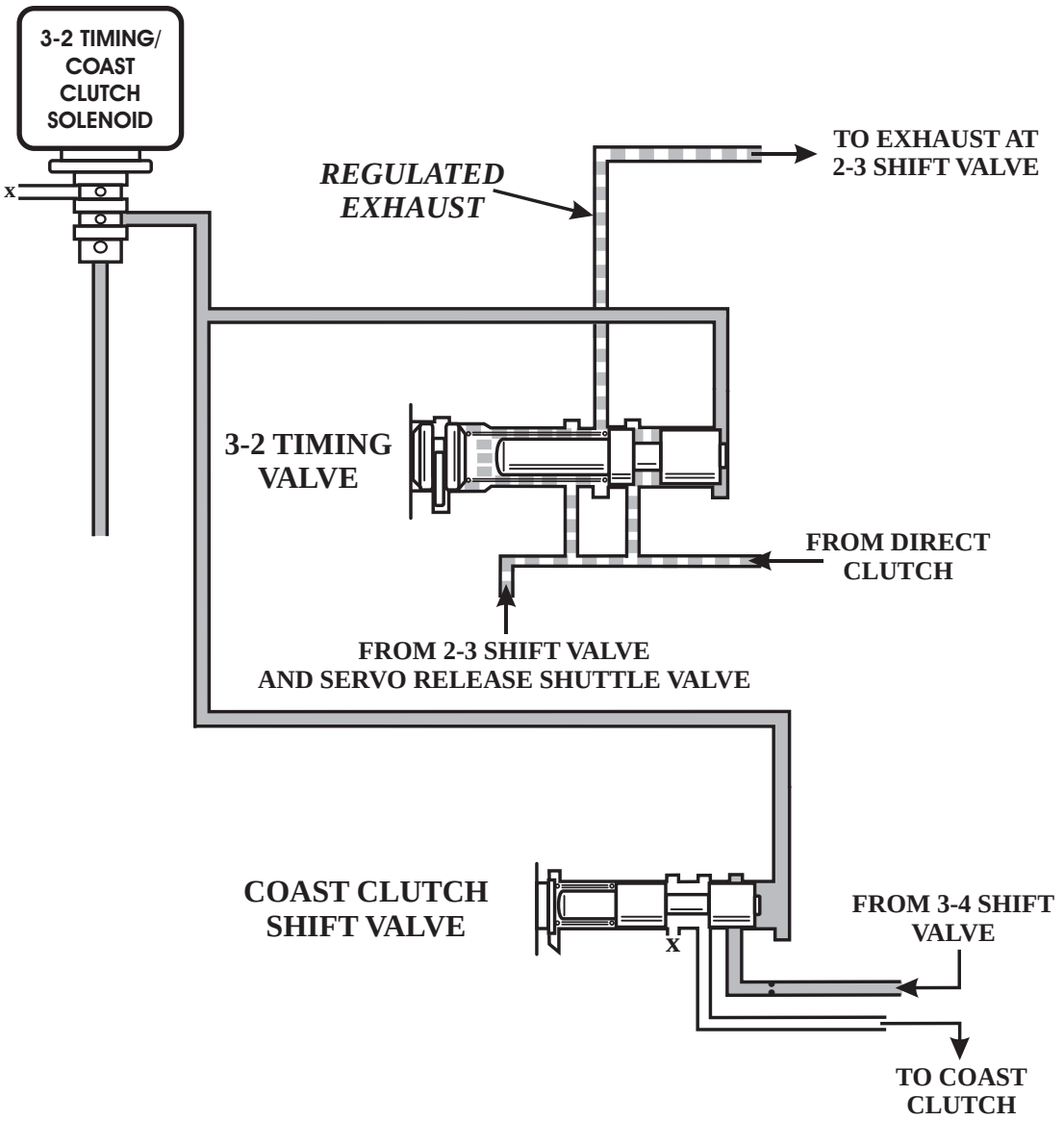


Figure 2

PREVIOUS VERSIONS PARTIAL HYDRAULIC CIRCUIT

3-2 TIMING VALVE POSITION ON A 3-2 DOWNSHIFT

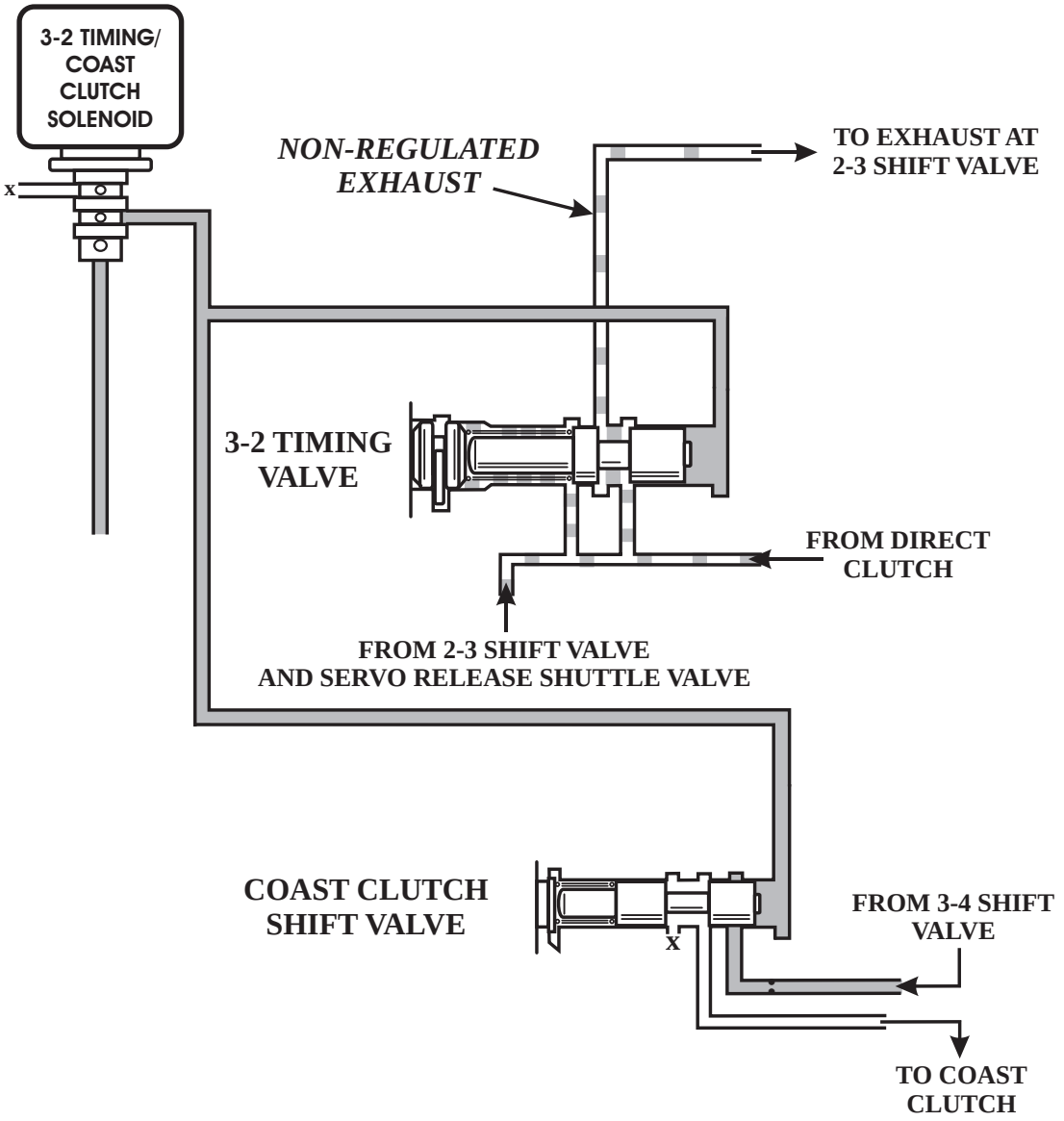


Summary: The 3-2 Timing Valve is forced to the right by its spring tension and Low duty cycle of the 3-2 Timing solenoid to create a regulated exhaust of direct clutch pressure on a 3-2 downshift.

Figure 3

PREVIOUS VERSIONS PARTIAL HYDRAULIC CIRCUIT

3-2 TIMING VALVE POSITION ON A 3-2 DOWNSHIFT

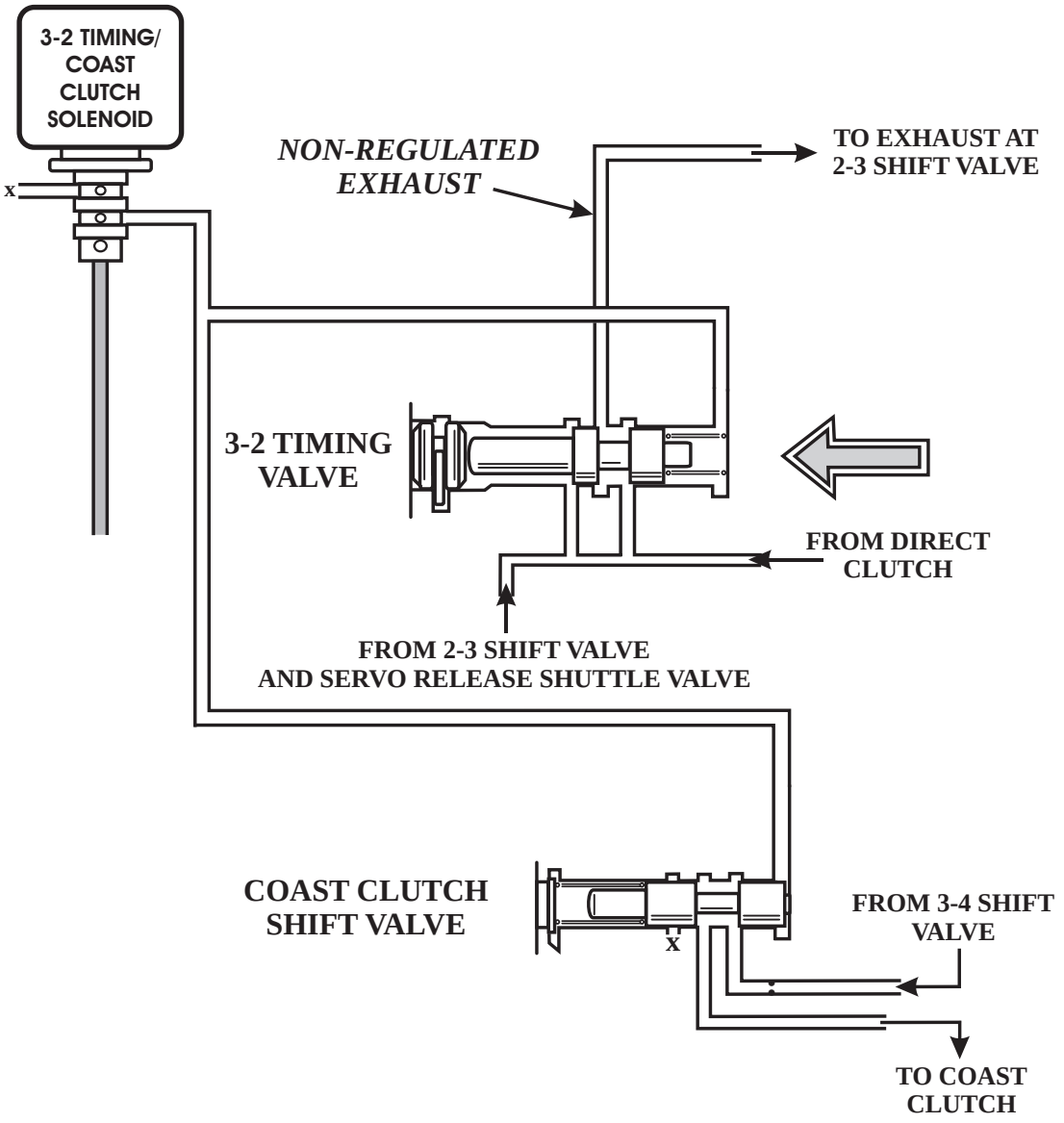


Summary: The 3-2 Timing Valve is moved to the left by high duty cycle of the3-2 Timing solenoid to create a quick and un-regulated exhaust of direct clutch pressure on a 3-2 downshift.

Figure 4

2002 & UP PARTIAL HYDRAULIC CIRCUIT

3-2 TIMING VALVE POSITION ON A 3-2 DOWNSHIFT



Summary: The 3-2 Timing Valve is now moved to the left by the spring allowing a quick exhaust of direct clutch pressure regardless of the duty cycle of the 3-2 Timing Solenoid on a 3-2 downshift, creating a more consistent 3-2 downshift.

Figure 5

FORD 4F27-E MAZDA FN4A-EL
1-2 FLARE AND 3-4 NEUTRAL

COMPLAINT: Ford or Mazda vehicles equipped with the 4F27-E or FN4A-EL, may exhibit a slight flare on the 1-2 upshift and a neutralizing or slide on the 3-4 upshift that is worse with hotter temperatures.

CAUSE: The cause may be, the bonded 2-4 servo piston is worn or the pin is loose from the piston, as shown in Figure 1. The cause for the piston being worn is because of a rough surface in the servo bore in the case.

CORRECTION: Replace the 2-4 servo piston, as shown in Figure 1. Using some fine sand paper or scotch-brite, lightly sand the bore of the case where the bonded rubber part of the servo rides, to ensure that it is smooth. See Figure 2. Re-assemble the servo assembly back into the case as shown in Figure 3. ***NOTE: If this repair is attempted in the vehicle, the linkage which is right over the 2-4 servo piston, will have to be removed, which means the mount bolts will have to be removed and the transmission lowered in the vehicle***.

SERVICE INFORMATION:

2-4 BONDED SERVO PISTON (Ford part number).....XS4Z-7D021-AB
NOTE: This piston is also available from aftermarket parts distributers as well.

Special thanks to Derrick at Waterloo Trans

2-4 BONDED SERVO PISTON

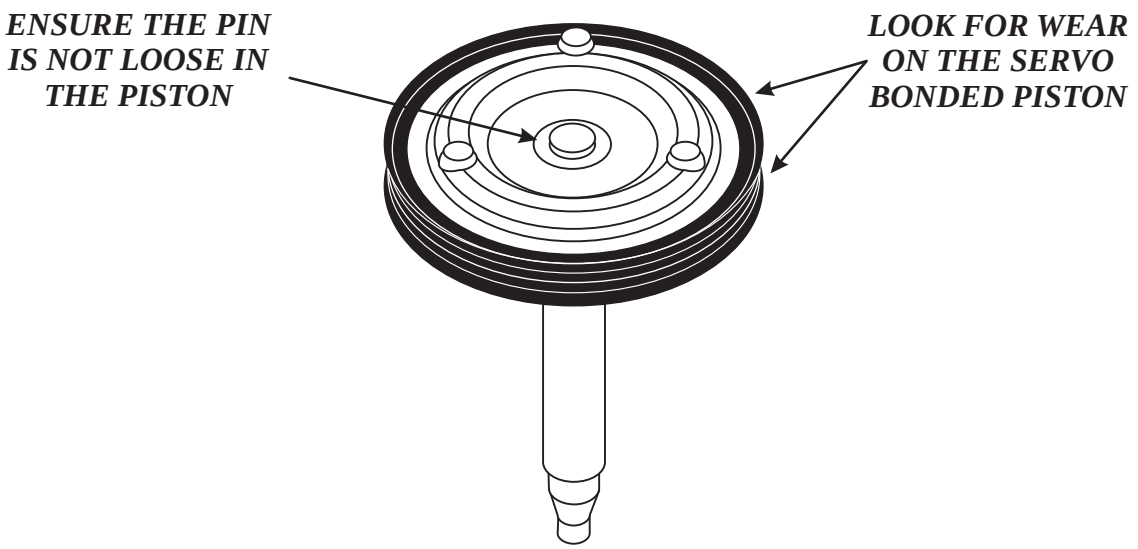


Figure 1

SERVO BORE

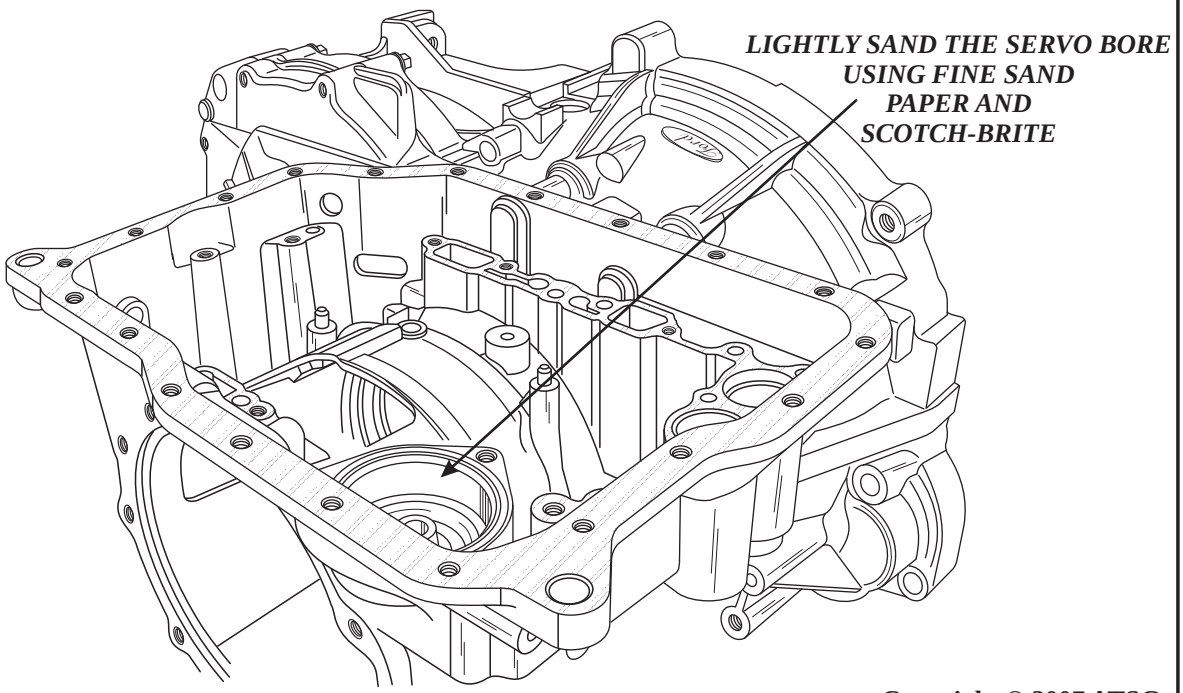


Figure 2

SERVO RE-ASSEMBLY

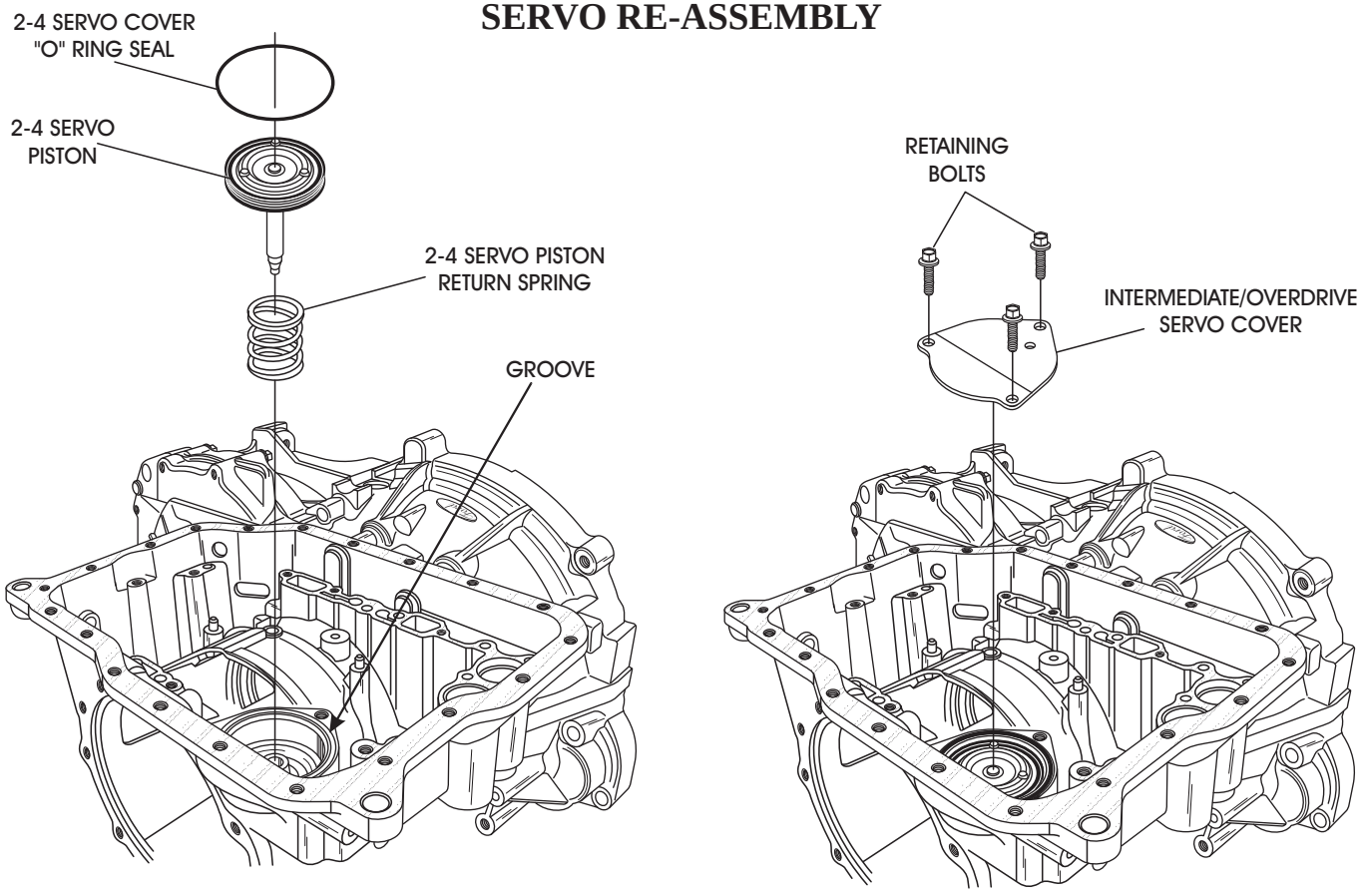


Figure 3

FORD 500 / AISIN AF40-6
PRELIMINARY INFORMATION

The AF40-6 is a front wheel drive 6 speed electronically controlled transmission (Figure 1) which is being utilized in a large variety of car manufacturers such as General Motors, Ford and Volkswagen to name a few. It seems that Aisin AW LTD Co. said, you build the car and we will design the architecture of the transmission to accommodate the engine and body style just like the JF506-E. As a result, there are various versions of this transmission.

One variation you will encounter besides case designs is the amount of pressure taps available for diagnosing. Another would be the selector lever where some models offer the Tip-Up and Tip-Down Tiptronic feature utilizing 4 quadrants P, R, N, D and a Tiptronic position. Without the Tiptronic feature, 5 quadrants are used, P, R, N, D and L. When L is selected, it will shift from 1st through 4th with extended shift scheduling and increased engine breaking. The Transmission Control Module (TCM) utilizes shift adapt strategies that provide for smooth garage shift engagements and controlled gear changes relative to torque input. A torque converter clutch apply is available as early as second gear for improved fuel economy but the computer strategically slip controls the apply making the apply as seamless as possible for driver please-ability.

AW40-6 Gear Ratios

1st gear - 4.148
2nd gear - 2.370
3rd gear - 1.556
4th gear - 1.155
5th gear - 0.859
6th gear - 0.686
Reverse - 3.394

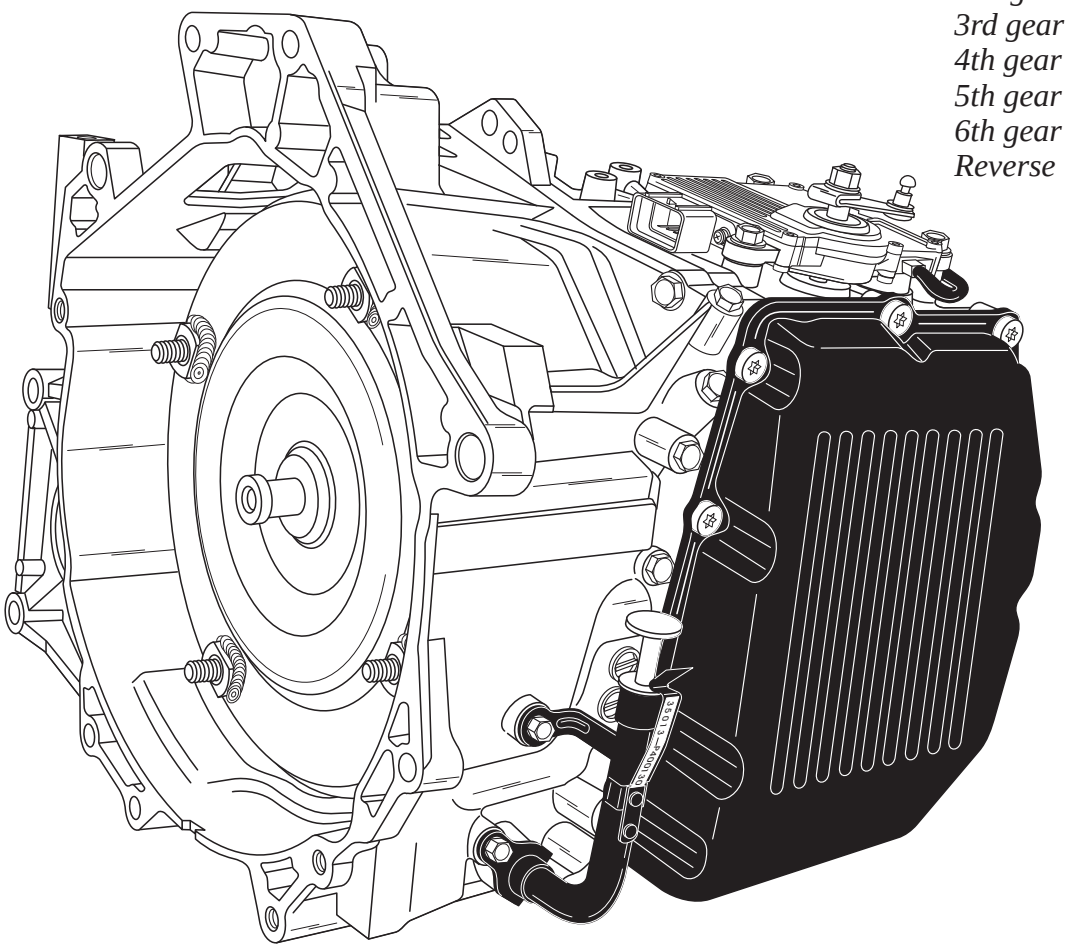


Figure 1

Alternative shift strategy in most vehicle applications does not provide a driving mode select switch that allows the driver to select a mode themselves. However, when specific driving conditions are met, the TCM selects a shifting pattern appropriate to driving conditions from all available shift modes and can switch modes automatically on the fly. The different driving modes available for the TCM to select are as follows:

Adaptive - Used during normal driving conditions, the TCM performs garage shift learning and shift control learning so as to provide smooth clutch engagements with gear selection as well as smooth shifting while driving. Economy mode is used during normal driving conditions.

High Temp - When ATF temperature becomes too high, this mode activates lock-up at an earlier timing to stop the temperature rise and lower the temperature.

Warm-Up Shift Pattern - This mode warms up the engine (and catalytic converter when equipped) by providing slightly higher shift and lock-up points.

Up-Slope - The TCM detects up-slope by comparing engine load to vehicle speed and brake command. When an up hill climb is detected, kick down shifts are desensitized to prevent over revving of the engine.

Down-Slope - The TCM detects down-slope by comparing engine load to vehicle speed and brake command. When a downhill run is detected, transmission engine breaking is utilized alleviating some of the load on the vehicle braking system.

TCC Slip Control

Converter clutch slip control is another aspect of the TCM's strategy with which to provide optimum driver comfort and fuel economy during any and all driving modes (Figure 2). Based on input and output rpm signals as well as engine load data from the ECM (TPS, Engine RPM's), the TCM can time control converter clutch slip to complete engagement. The length of time from a gradual slip to complete engagement is varied based on driving conditions. Since the strategy of the TCM is to gradually slip the clutch on to a full engagement at varying lengths of time, Ford recommends 6-Speed Motorcraft Premium Automatic Transmission Fluid Part Number XT-8-QAW. The approximate capacity of the transmission is 7 quarts. Refer to Figure 15 for Fluid Fill and dipstick locations.

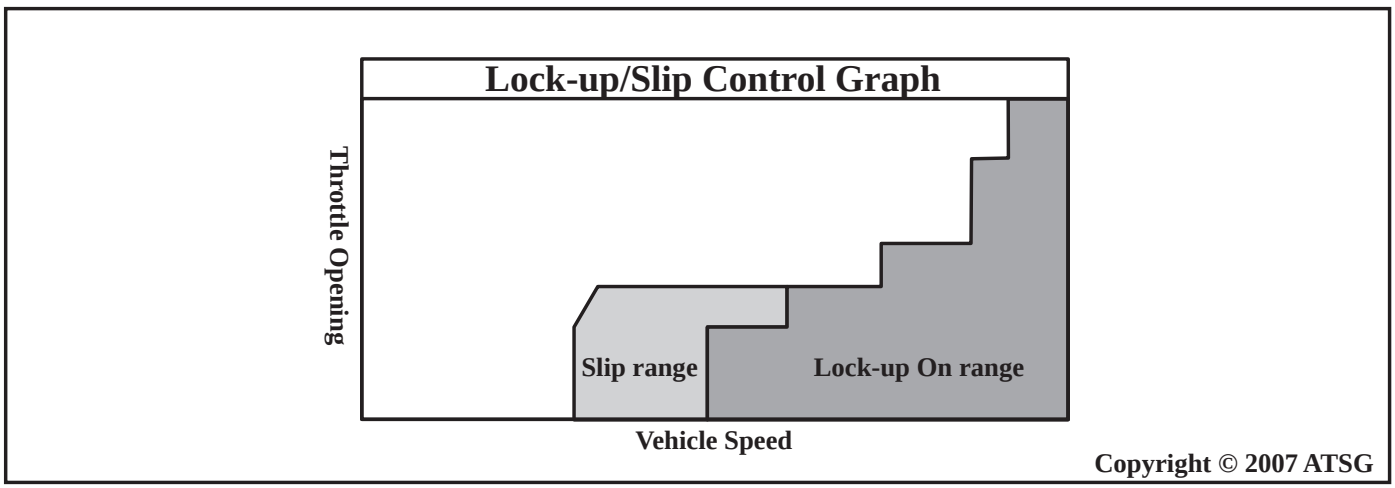


Figure 2

RELEARN PROCEDURES

After replacing or rebuilding the transmission, replacing the TCM, or after re-flashing a TCM, be sure to initialize the following learned values:

Neutral Position Learning - Verify that the N position mark on the TCM is positioned correctly with the manual arm shaft and adjust as necessary (Figure 3). With the ignition ON and engine OFF, release the shift lock and place the shift lever into the Neutral position. Verify with a scanner that Neutral has been selected. Factory scan tools can input a Neutral signal to the TCM to inform the TCM that the Neutral position is selected. Turn the ignition off after releasing the shift lock and place the shift lever into Park. Turn the ignition on for 5 seconds and then shift into the Drive range and check that the indicator light displays the correct position. Once completed, perform the following Initial Learning.

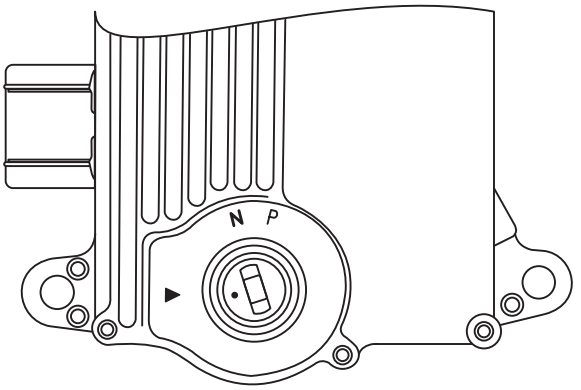


Figure 3

Initial Garage Shift and Gear Shift Learning - Warm up the vehicle by idle or city driving until the transmission fluid temperature has reached between 66° to 110° C (150° - 230° F). During this time, note the degree of shock during garage shifts and gear shifts and compare after the following relearn procedures.

Garage Shift Learning: Place the selector lever into Neutral and hold the brake for 3 seconds. Then place the selector lever into Drive and maintain this position for 3 seconds. Repeat this procedure 5 times. Then repeat this same procedure with reverse.

Gear Shift Learning: From a stand still, take off in the Drive position with the throttle opened between 25% to 35% until sixth gear and 80km/h (50 mph) or higher has been reached. Then release the accelerator pedal and coast down to a stop in 60 seconds minimum. Repeat this procedure 10 times.

Once completed, verify that the degree of shock during garage shifts into gear and shift changes have decreased as compared to conditions before learning.

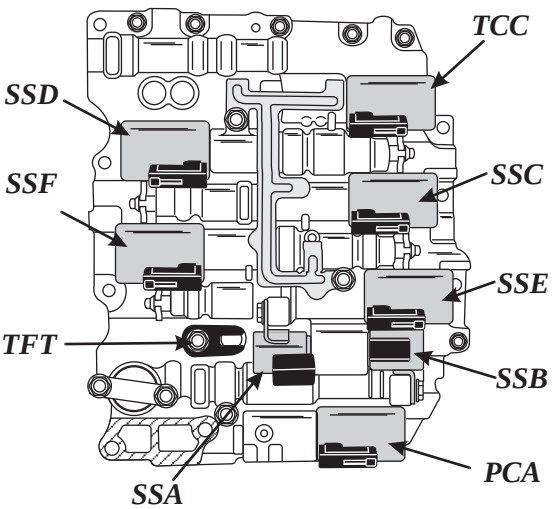
Inside the transmission there are 8 solenoids , two speed sensors and a fluid temperature sensor (Figure 4).Refer to figures 11 and 12 for solenoid locations on the valve body, and Figure 13 for solenoid functions. The Transmission Range Sensor (Neutral Safety Switch/Gear Select Switch) is integrated with the TCM making one unit that can be located on the transmission above the side pan mounted to the gear select shaft. The underside of the TCM also plugs into an internal wiring harness 22 pin case connector along side the gear select shaft. This TCM has an additional 16 pin side connector which a vehicle harness plugs into connecting the TCM to keep alive power and ground, ignition power, the CAN Bus system, and a start lock signal (Figure 6).

The transmission contains 3 driving elements (C1, C2 and C3), 2 brake elements (B1 and B2) and 1 one-way (F1) holding device that are used to provide 6 forward speeds and reverse through a Ravigneaux-type planetary gear set. See Figure 5 for a cross-sectional view of the transmission and an application chart. See Figure 10 for correct freewheel operation. Refer to Figure 14 for case passage identification for air checking, and Figure 15 for pressure port locations as well as specifications. Should a malfunction occur causing the TCM to failsafe, the TCM will inhibit certain driving features or cause high pressure. A hard fault code may cause 3rd or 5th gear starts.

Electrical Diagnosis

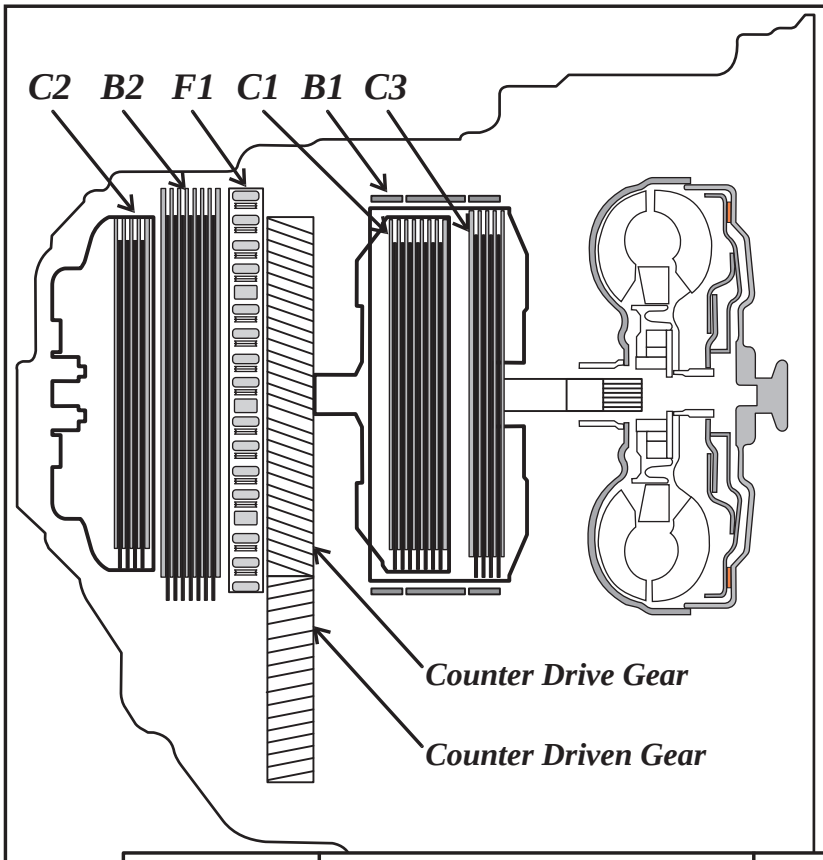
A list of Diagnostic Trouble Codes, their meaning and the action taken are provided in Figures 16-20. For simple electrical diagnosis, refer to a typical wiring diagram of the electrical system in Figure 7. Use Figure 8 for checking the transmission's internal electrical system through the external case connector with the TCM removed.

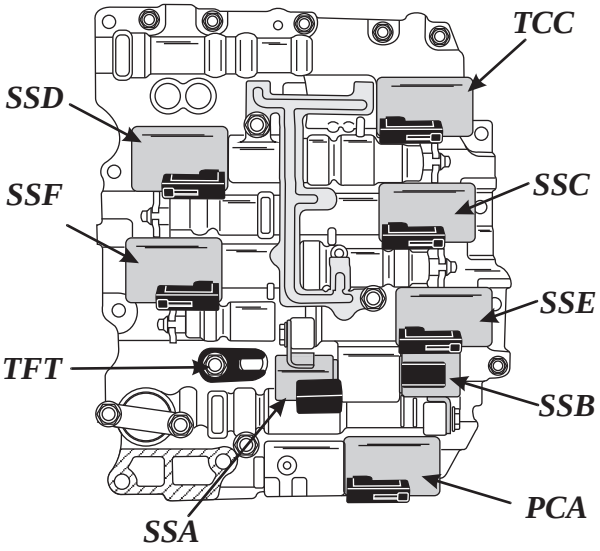
The input speed sensor is called the TSS sensor reading the C2 Clutch drum which is driven by the converter via a turbine shaft that is hard splined to C2 Clutch shaft through the Ravigneaux gear set . The output speed sensor is called the OSS sensor and it reads the Counter Driven Gear. Both of these sensors are Hall Effect Sensors which provide a 5 volt square wave signal to the TCM. Since this signal is sent directly into the TCM it is not possible to view this signal using a scope which is why bench testing these sensors is highly recommended. This method of testing these sensors is provided in Figure 9.



Both sensors are under the valve body installed into the case

Figure 4





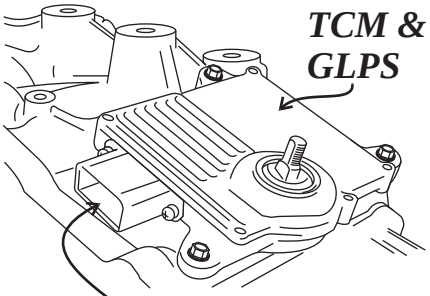
OSS
Reads Counter Drive Gear

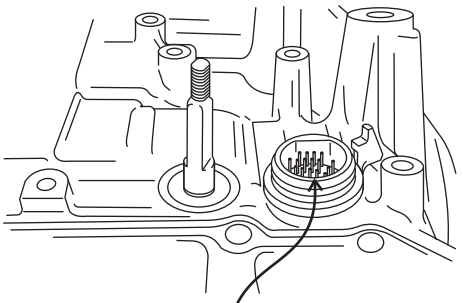
TSS
Reads C2 Clutch Drum

Both sensors are under the valve body installed into the case

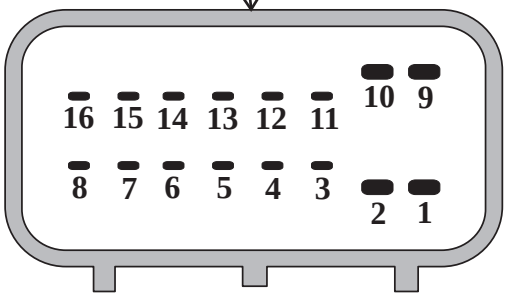
Shift Position		Shift Solenoids						Clutches			Brakes		One-way Clutch
		SSC	SSD	SSE	SSF	SSA	SSB	C1	C2	C3	B1	B2	F1
Park		●	●	●	●								
Rev.	Below 7	●	●		●					●		●	
Rev. Inhibit	Above 7	●	●	●	●							●	
Neutral		●	●	●	●								
Drive	1st		●	●	●			●					●
	Engine Braking		●	●	●	●	●	●				●	●
	2nd		●	●				●			●		
	3rd		●		●			●		●			
	4th			●	●			●	●				
	5th	●			●				●	●			
	6th	●		●					●		●		

Figure 5

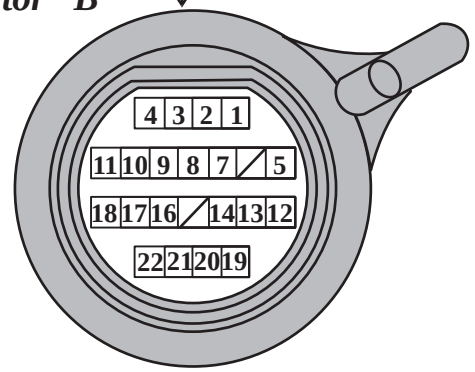




Connector "A"



Connector "B"



1. Ignition +
2.
3.
4.
5. STLK
6. CAN -
7.
8.
9. Ground
10.
11. Battery +
12.
13.
14. CAN +
15.
16.

Typical terminal functions - these will vary depending upon vehicle model

1. PCA -
2. SSB
3. PCA +
4. TCC -
5. SSA
6.
7. TFT -
8. TFT +
9. TCC +
10. SSC -
11. SSC +
12. TSS Signal
13. TSS -
14. SSE +
15.
16. SSF -
17. SSD +
18. SSD -
19. OSS Signal
20. OSS-
21. SSF +
22. SSE -

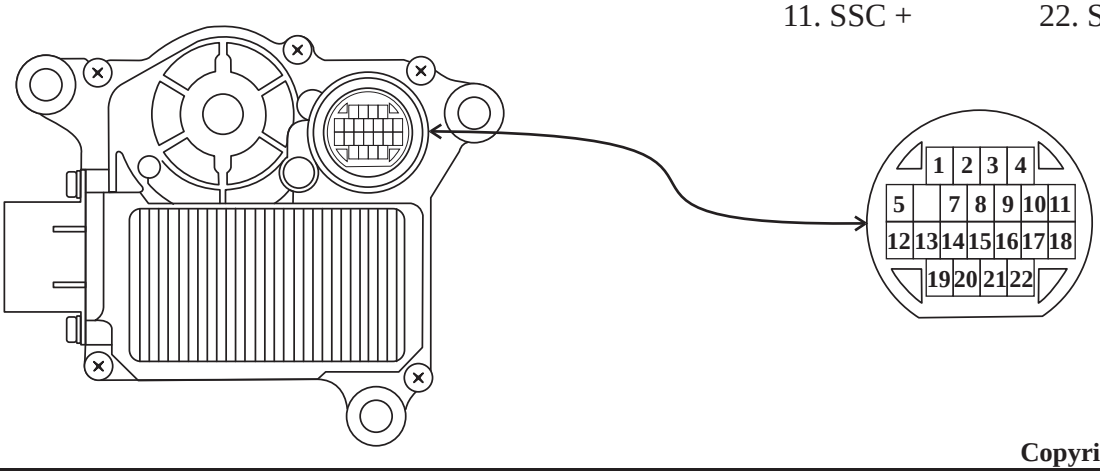


Figure 6

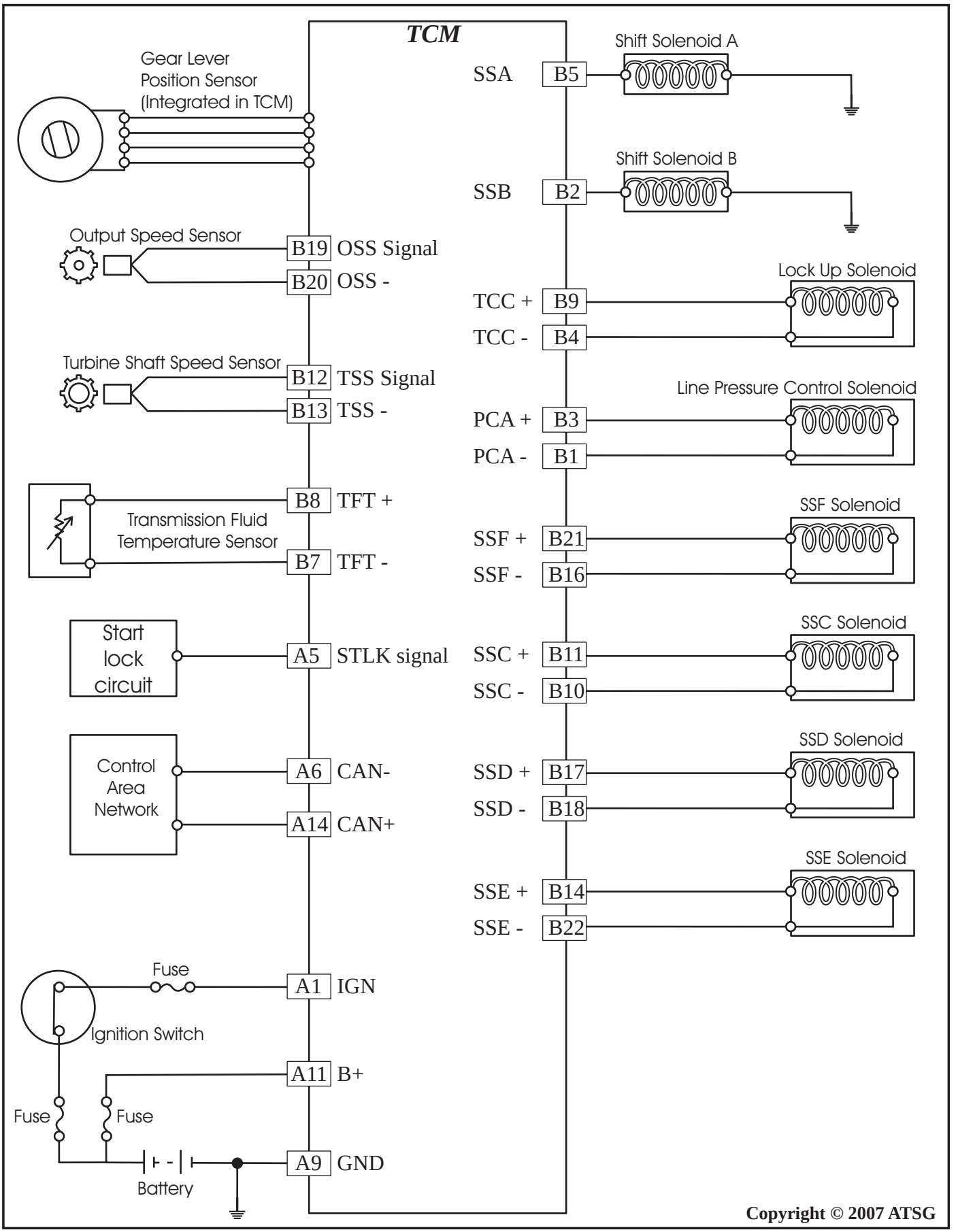

TCM
Gear Lever Position Sensor (Integrated in TCM)
Output Speed Sensor
B19 OSS Signal
B20 OSS -
Turbine Shaft Speed Sensor
B12 TSS Signal
B13 TSS -
B8 TFT +
Transmission Fluid Temperature Sensor
B7 TFT -
Start lock circuit
A5 STLK signal
Control Area Network
A6 CAN-
A14 CAN+
Fuse
A1 IGN
Ignition Switch
A11 B+
Fuse
Fuse
A9 GND
Battery
SSA B5
Shift Solenoid A
SSB B2
Shift Solenoid B
TCC + B9
TCC - B4
Lock Up Solenoid
PCA + B3
PCA - B1
Line Pressure Control Solenoid
SSF + B21
SSF - B16
SSF Solenoid
SSC + B11
SSC - B10
SSC Solenoid
SSD + B17
SSD - B18
SSD Solenoid
SSE + B14
SSE - B22
SSE Solenoid
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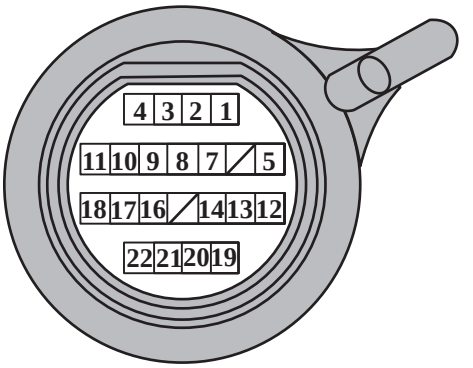
Figure 7

Connector "B"

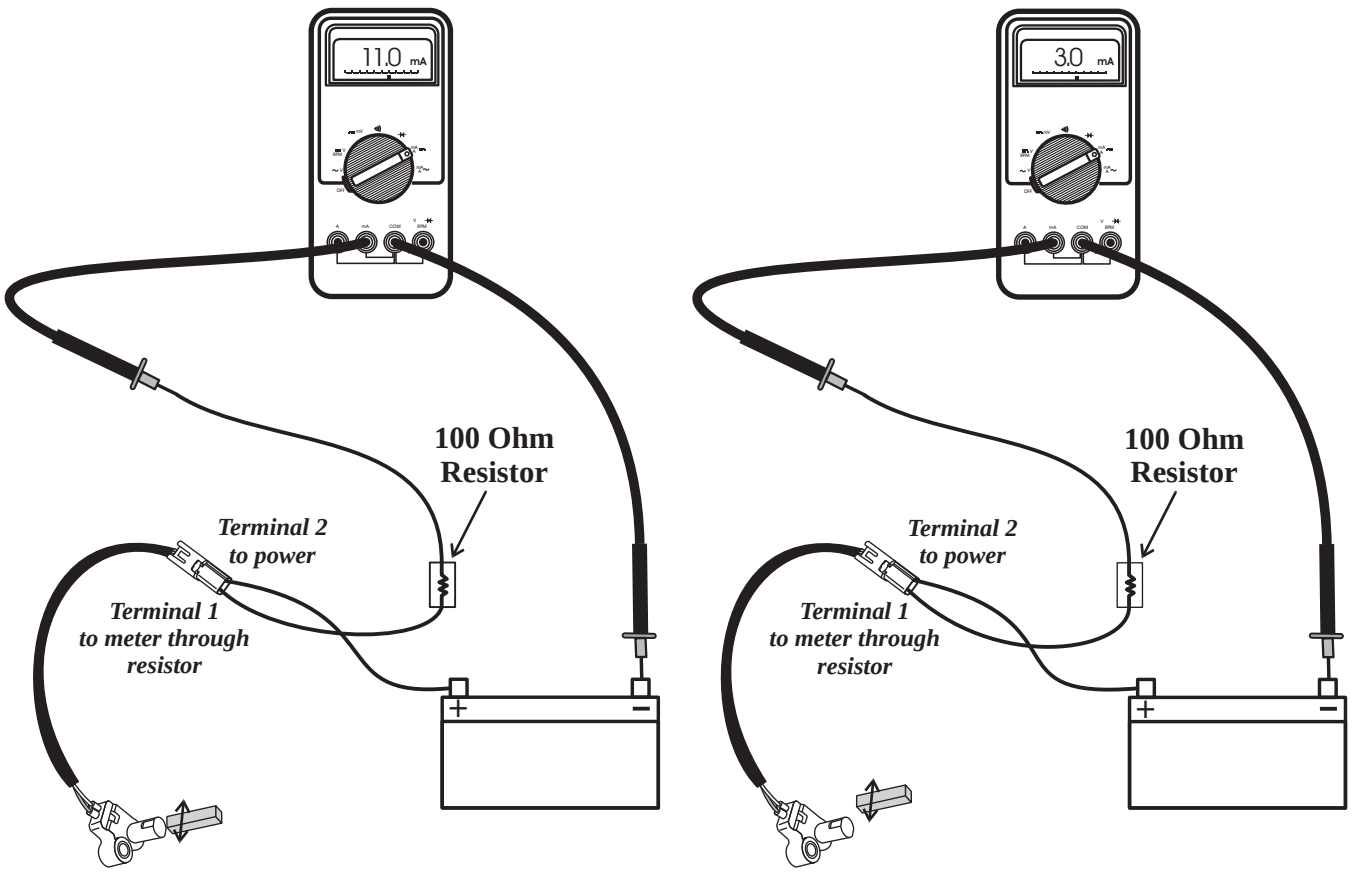


Resistance Check Chart			
Component Name	Terminals		Resistance Value
	Pos.	Neg.	
SSA Solenoid	5	Case Gnd.	11.0 - 15.0 Ohms
SSB Solenoid	2	Case Gnd.	11.0 - 15.0 Ohms
TCC Solenoid	9	4	5.0 - 5.6 Ohms
PCA Solenoid	3	1	5.0 - 5.6 Ohms
SSF Solenoid	21	16	5.0 - 5.6 Ohms
SSC Solenoid	11	10	5.0 - 5.6 Ohms
SSD Solenoid	17	18	5.0 - 5.6 Ohms
SSE Solenoid	14	22	5.0 - 5.6 Ohms
OSS Speed Sensor*	19	20	1.0 - 10.0 M Ohms
TSS Speed Sensor*	12	13	1.0 - 10.0 M Ohms
TFT Sensor	8	7	10 °C - 5..62-7.31 K Ohms 25 °C - 3.5 K Ohms 110 °C - 0.22-.027 K Ohms

* Both the OSS and TSS speed sensors are two wire Hall Effect Sensors so they are not checked in the normal fashion as an AC voltage generator. For bench testing see Figure 9

Figure 8

Bench Testing the Input and Output Hall Effect Sensors

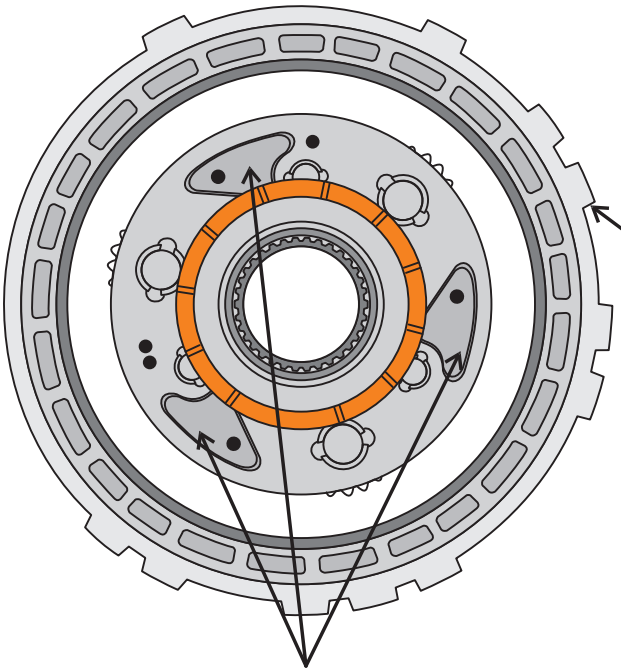


Set meter up to read milli-amps and acquire a 100 ohm resistor and a magnet. Using a 12 volt battery, run voltage directly into the speed sensor on terminal 2 being careful to not damage the connector or terminal end. Place the 100 ohm resistor onto terminal 1 in the sensor connector in series with the positive meter lead located in the mA jack. Place the negative meter lead to the ground post of the battery.

Slowly sweep the magnet pass the tip of the speed sensor. When the magnet is directly in front of the tip of the sensor, approximately 3 mA should be observed. When the magnet has cleared the tip of the sensor, approximately 11 mA should be observed.

Figure 9

F1 Low One-Way Clutch

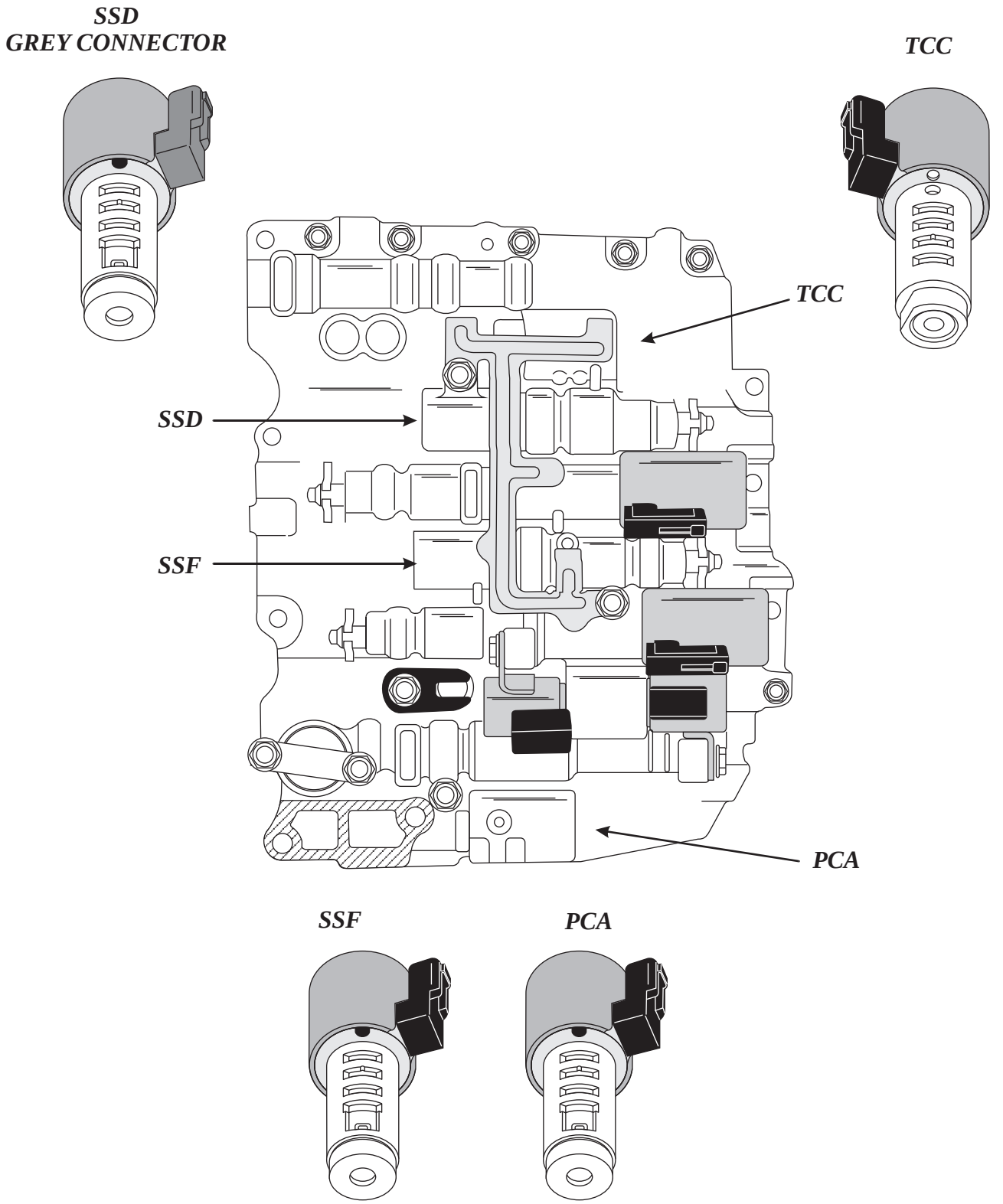


Outer race held stationary by case

Inner race should rotate in a clockwise direction (The front planetary is integral to the sprag's inner race. Using the carrier's pockets as shown, the inner race rotation can be easily checked by hand)

Figure 10

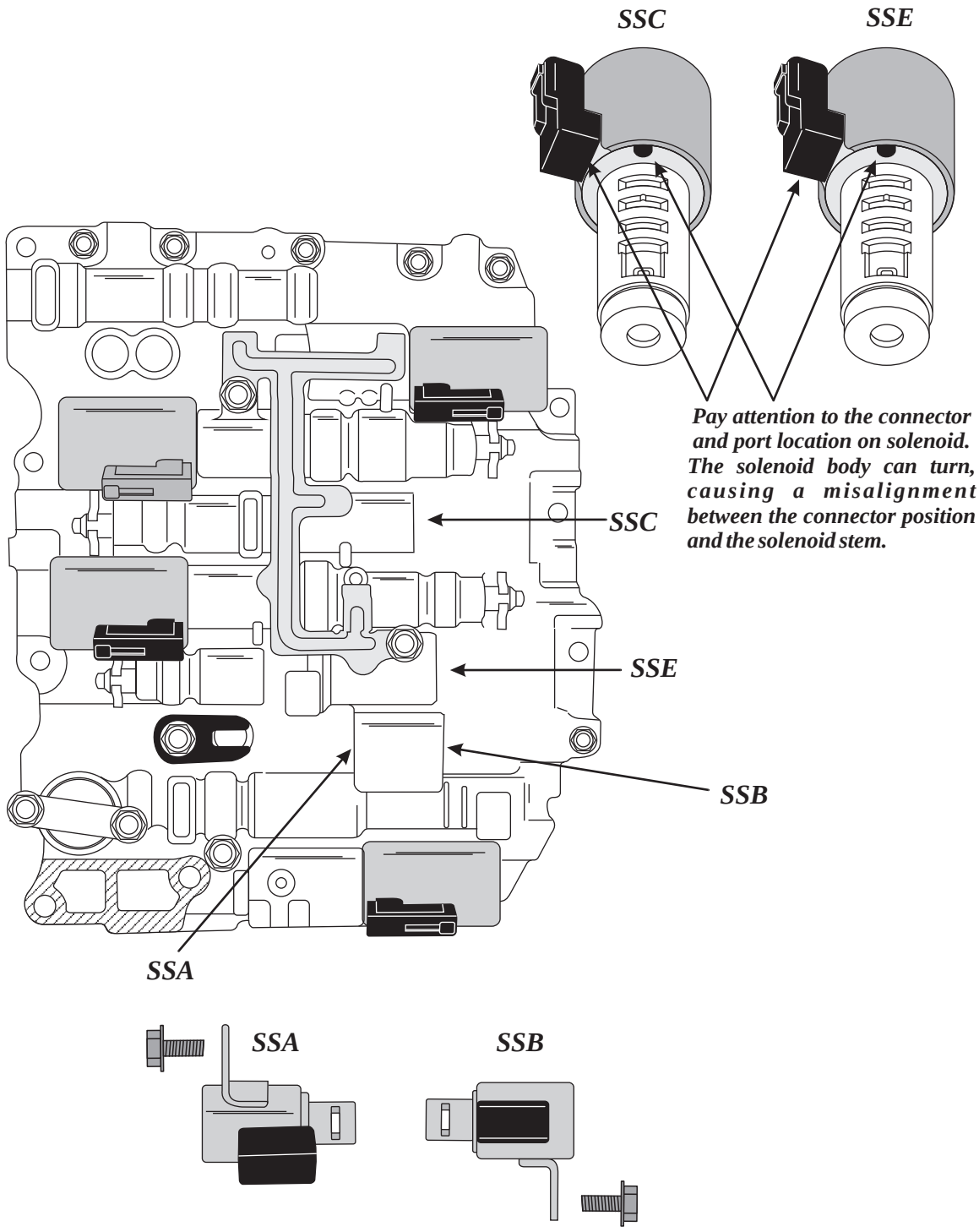
SOLENOID LOCATIONS



Note: Make sure to verify that the solenoids are in the right locations by the positioning of the connectors and the ports. The Solenoids are retained into the Valve Body by roll pins, If a Solenoid is put into the wrong location the feed ports may be blocked, making it inoperable.

Figure 11

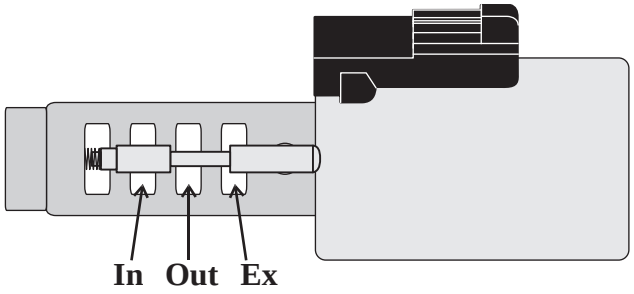
SOLENOID LOCATIONS



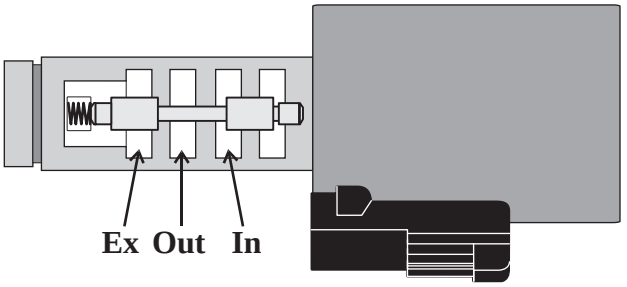
Note: Make sure to verify that the solenoids are in the right locations by the positioning of the connectors and the ports. The Solenoids are retained into the Valve Body by roll pins, If a Solenoid is put into the wrong location the feed ports may be blocked, making it inoperable.

Figure 12

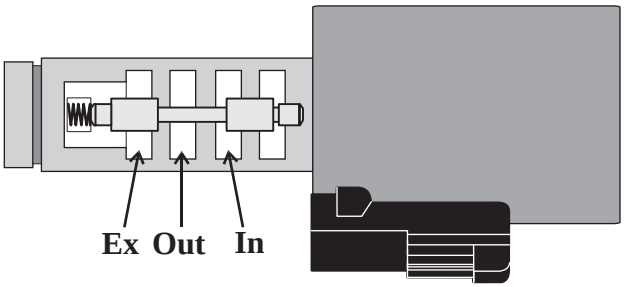
SOLENOID OPERATION



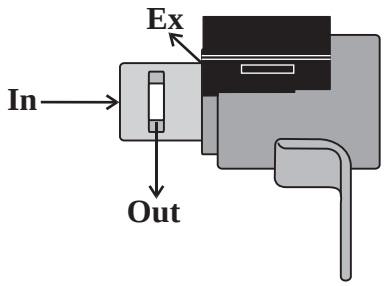
The Lock-up Control Solenoid (TCC) is a Normally Vented Solenoid where without electricity the inlet port is blocked and the outlet port is open to exhaust.



The Line Pressure Control Solenoid (PCA) is a Normally Applied Solenoid where without electricity the exhaust port is blocked and the inlet port is open to the outlet port.



All Shift Control Solenoids (SSD, SSF, SSC,SSE) are Normally Applied Solenoids where without electricity the exhaust port is blocked and the inlet port is open to the outlet port.



SSA and SSB Solenoids are Normally Vented Solenoids where without electricity the inlet port is blocked and the outlet port is open to exhaust.

Figure 13

CASE PASSAGE IDENTIFICATION

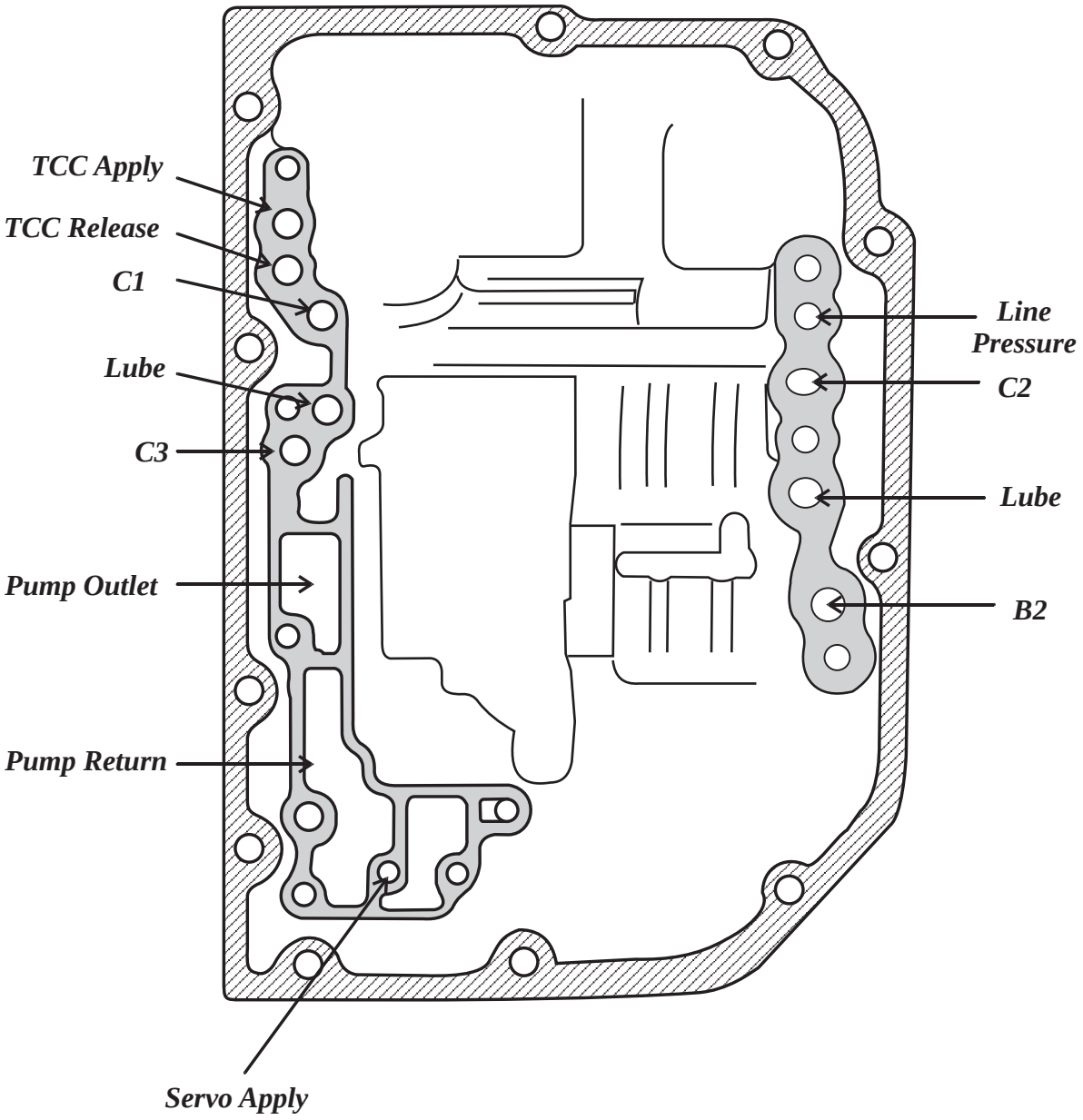


Figure 14

Pressure Taps and Fluid Fill Locations

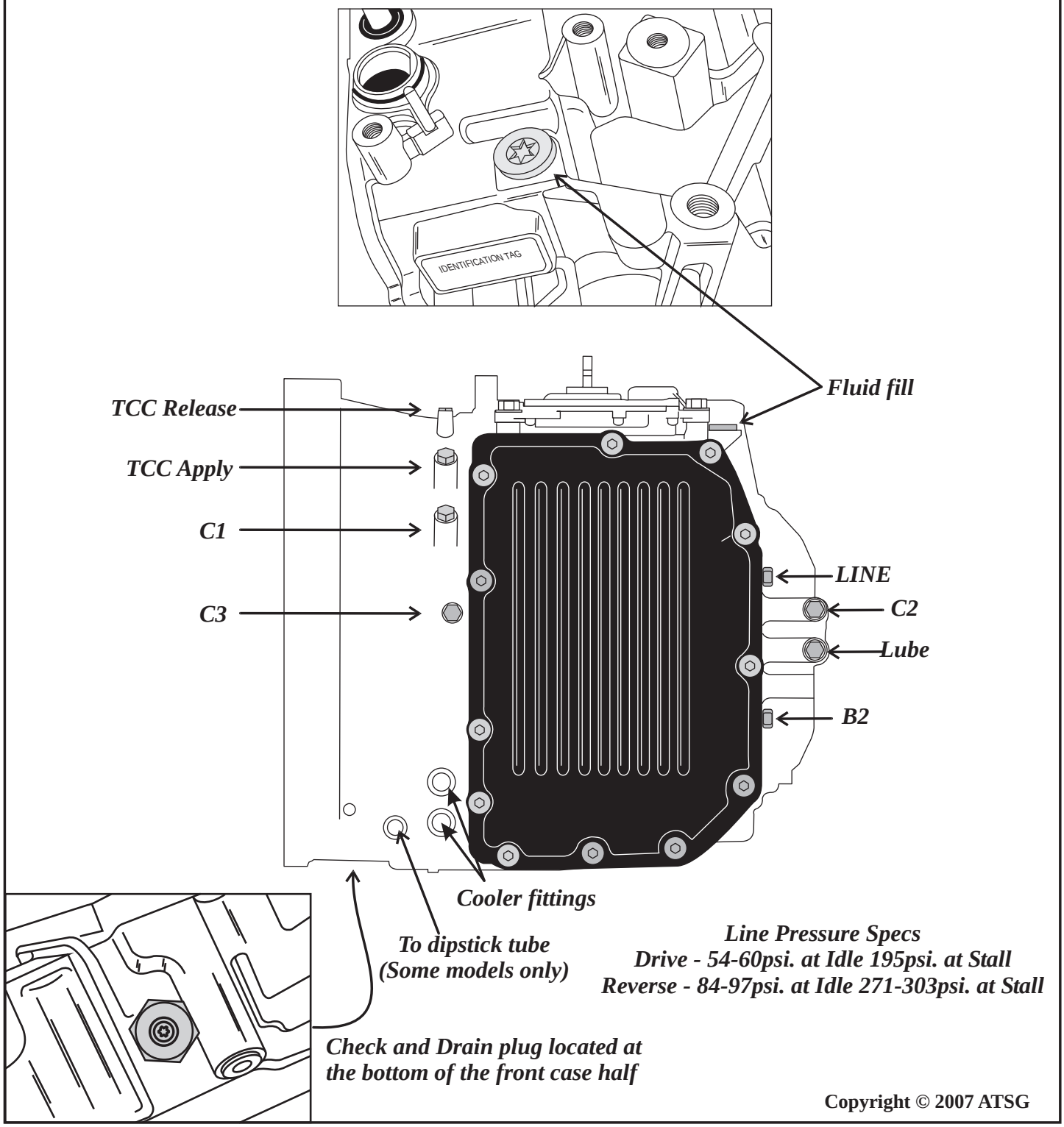


Figure 15

DIAGNOSTIC TROUBLE CODE LIST

P0562 - ***System voltage low***
No self learning control
No adaptive shift control

P0563 - ***System voltage high***
No self learning control
No adaptive shift control

P0601 - ***PCM Read Only Memory Failure***
No Engagements
No self learning Control
No adaptive Control

P0603 - ***PCM Keep Alive Memory***
No self learning Control
No adaptive Control

P0604 - ***PCM Random Access Memory***
No self learning Control
No adaptive Control

P0706 - ***Transmission Range Sensor or Performance***
D-3rd gear
No self learning Control
No adaptive Control

P0707 - ***Transmission Range Sensor circuit Low Input***
D-3rd gear
No self learning Control
No adaptive Control

P0708 - ***Transmission Range Sensor circuit High Input***
D-3rd gear
No self learning Control
No adaptive Control

P0711 - ***Transmission Fluid Temp sensor indicates 176° at all times***
No self learning control
No TCC

P0712 - ***Transmission Fluid Temp sensor circuit exceeds scale 329° indicated***
No self learning control
No TCC

P0713 - ***Transmission Fluid Temp sensor circuit exceeds scale -45° indicated***
No self learning control

P0716 - ***Turbine Shaft Speed Sensor Loss or Noise***
No self learning control
No adaptive shift control
No TCC

P0717 - ***Turbine Shaft Speed Sensor No Signal***
No self learning control
No adaptive shift control
No TCC

P0721 - ***Output Speed Sensor Loss or Noise***
No self learning control
No adaptive shift control

P0722 - ***Output Speed Sensor No Signal***
No self learning control
No adaptive shift control

P0729 - ***Gear Ratio (6th)***
No 6th gear
No TCC
No self learning control
No adaptive shift control

P0730 - ***Gear Ratio Error***
No self learning control

P0731 - ***Gear Ratio Error (1st)***
No 1st gear
No TCC
No self learning control
No adaptive shift control

P0732 - ***Gear Ratio Error (2nd)***
No 2nd gear
No TCC
No self learning control
No adaptive shift control

P0733 - ***Gear Ratio Error (3rd)***
No 3rd gear
No TCC
No self learning control
No adaptive shift control

P0734 - ***Gear Ratio Error (4th)***
No 4th gear
No TCC
No self learning control
No adaptive shift control

Figure 16

DIAGNOSTIC TROUBLE CODE LIST

P0735 - ***Gear Ratio Error (5th)***
No 5th gear
No TCC
No self learning control
No adaptive shift control

P0736 - ***Gear Ratio Error (Reverse)***
No Reverse
No self learning control

P0780 - ***Solenoid or Valve mechanical fault***
Increased rpm during shifts
Slipping or erratic shifting

P0817 - ***Starter circuit error***
No self learning control
No adaptive control
No TCC

P0961 - ***PCA circuit or solenoid failure***
Failsafe 3rd or 5th gear only
No Adaptive control
No Self learning control

P0962 - ***PCA Solenoid signal short or open***
Failsafe 3rd or 5th gear only
No Adaptive control
No Self learning control

P0963 - ***PCA circuit short to power***
Failsafe 3rd or 5th gear only
No Adaptive control
No Self learning control

P0973 - ***SSA solenoid or short to ground***
Failsafe 3rd or 5th gear only
No Adaptive control
No Self learning control

P0974 - ***SSA solenoid or short to power or open***
Failsafe 3rd or 5th gear only
No Adaptive control
No Self learning control

P0976 - ***SSB solenoid or short to ground***
Failsafe 3rd or 5th gear only
No Adaptive control
No Self learning control

P0977 - ***SSB solenoid or short to power or open***
Failsafe 3rd or 5th gear only
No Adaptive control
No Self learning control

Figure 17

DIAGNOSTIC TROUBLE CODE LIST

P0978 - ***SSC circuit or solenoid failure***
Failsafe 3rd or 5th gear only
No self learning control
No adaptive shift control

P0979 - ***SSC Signal circuit short or open***
Failsafe 3rd or 5th gear only
No self learning control
No adaptive shift control

P0980- ***SSC Signal circuit short to power***
Failsafe 3rd or 5th gear only
No self learning control
No adaptive shift control

P0981 - ***SSD circuit or solenoid failure***
Failsafe 3rd or 5th gear only
No self learning control
No adaptive shift control

P0982 - ***SSD Signal circuit short or open***
Failsafe 3rd or 5th gear only
No self learning control
No adaptive shift control

P0983- ***SSD Signal circuit short to power***
Failsafe 3rd or 5th gear only
No self learning control
No adaptive shift control

P0984 - ***SSE circuit or solenoid failure***
Failsafe 3rd or 5th gear only
No self learning control
No adaptive shift control

P0985 - ***SSE Signal circuit short or open***
Failsafe 3rd or 5th gear only
No self learning control
No adaptive shift control

P0986- ***SSE Signal circuit short to power***
Failsafe 3rd or 5th gear only
No self learning control
No adaptive shift control

P0997 - ***SSF circuit or solenoid failure***
Failsafe 3rd or 5th gear only
No self learning control
No adaptive shift control

P0998 - ***SSF Signal circuit short or open***
Failsafe 3rd or 5th gear only
No self learning control
No adaptive shift control

Figure 18

DIAGNOSTIC TROUBLE CODE LIST

P0999 - ***SSF Signal circuit short to power***
Failsafe 3rd or 5th gear only
No self learning control
No adaptive shift control

P1573 - ***APP sensor input error***
No self learning control
No adaptive shift control

P1657 - ***TCM communication link error (CAN)***
No self learning control
No adaptive shift control
Limited Fuel and spark

P1700 - ***TCM detected neutral in the D position***
No self learning control
No adaptive shift control

P1701 - ***TCM detected neutral in the R position***
No self learning control
No adaptive shift control

P1919 - ***ECT Sensor signal error***
No TCC

P1920 - ***Engine Rpm sensor signal error***
No self learning control
No adaptive shift control
Limited Fuel and spark

P2544 - ***Torque management request input signal A***
Failsafe, increased pressures
May also have ECT or MAF codes stored

P2757 - ***TCC Solenoid stuck ON***
No TCC
No self learning control
No adaptive shift control

P2758 - ***TCC Solenoid stuck OFF***
No TCC
No self learning control
No adaptive shift control

P2762 - ***TCC Solenoid circuit electrical during driving***
No TCC
No self learning control
No adaptive shift control

P2763 - ***TCC Solenoid circuit short to Power***
No TCC
No self learning control
No adaptive shift control

Figure 19

DIAGNOSTIC TROUBLE CODE LIST

P2764 - ***TCC Solenoid circuit grounded or open***
No TCC
No self learning control
No adaptive shift control

U0073 / U100 - ***TCM CAN communication error detected by PCM***
No self learning control
No adaptive shift control

U0121 - ***PCM/TCM link fault with ABS***
No self learning control
No adaptive shift control

U0401 - ***Invalid data received from PCM (Engine Performance)***
Failsafe, increased pressures
May also have ECT or MAF codes stored

U415 - ***Wheel speed sensor fault thru CAN via ABS***
No self learning control
No adaptive shift control

Figure 20

CHRYSLER AND DODGE VEHICLES

1776 SOLENOID SWITCH LATCHED IN THE LR POSITION

COMPLAINT: The on board computer system for the transmission may intermittently produce a code P1776 Solenoid Switch Valve Latched in the LR Position causing a default to limp.

CAUSE: There problem with diagnosing this code is that there are several possibilities to be considered.

1. For the 41TE, 42LE and 42RLE transmissions, one such cause was a defective solenoid block which Chrysler revealed in bulletin number 21-008-04 REV issued October 16th, 2004. For the LH vehicles, the solenoid blocks that are prone to this problem can be easily identified with Julian dates between that fall between 3001 and 0603. The first three characters are the day of the year while the 4th represents the year. So a 3001 would be the 300th day of 2001. These Julian dates are either dot-peened or printed on the solenoid block near the pass through connector.

For all other models affected refer to the following information:

2004 (AN) Dakota
2004-2005 (CS) Pacifica
2003-2004 (JR) Sebring Convertible/Sebring Sedan/Stratus Sedan
2003-2004 (KJ) Liberty
2003-2004 (KJ) Cherokee (International Markets)
2002-2004 (LH) 300M/Concorde/Intrepid
2003-2004 (PL) Neon/SX 2.0
2003-2005 (PT) PT Cruiser
2003-2005 (RG) Chrysler Voyager (International Markets)
2003-2005 (RS) Town & Country/Voyager/Caravan
2003-2004 (TJ) Wrangler

APPLICATION INFORMATION

BODY CODE	ENGINE	TRANS
AN	3.7L	42RLE
CS	3.5L	41TE
JR	2.4L or 2.7L	41TE
KJ	3.7L	42RLE
LH	2.7L or 3.5L	42LE
PL	2.0L	41TE
PT	2.0L or 2.4L	41TE
RS/RG	2.4L, 3.3L or 3.8L	41TE
TJ	4.0L	42RLE

CAUSE: 2. Chrysler's TSB on this subject also points out that if the manual valve was not fully placed into the OD position due to the shifter cable either being out of adjustment or defective, code 1776 will also set. This also means that a Transmission Range Sensor malfunction could produce an erroneous P1776.

3. A compromised Low/Reverse Pressure Switch signal wire being shorted to ground intermittently is another possible cause and may be accompanied with either a code P1784 or P0841 indicating a fault with the LR Pressure Switch signal wire.

4. The Solenoid Switch Valve in the valve body is sticking in the Low/Reverse position (See figures 1-4).

CORRECTION: 1. For LH vehicles verify the Julian dates dot-peened on the solenoid block as described under cause number 1 and replace as necessary. For all other affected models refer to the list under cause number 1 and replace the solenoid block as necessary.

2. Inspect the shifter cable and all working parts for wear and play. Replace and/or adjust as necessary. Afterwards, use a scanner to verify that the Transmission Range Sensor (TRS) signal in all positions paying particular attention to the Overdrive position. If the shifter linkage is not loose and has been adjusted properly but the TRS signal is erratic or wrong, the associated wiring and/or the sensor will need to be replaced.

3. Inspect the Low/Reverse Pressure Switch signal wire from the transmission to the computer for a short to ground and replace as necessary.
A) For the 41TE and 42LE transmissions with a TCM: wire 2 at the solenoid block to terminal 50 at the TCM (PCM Models - Terminal 29 in the C4 connector).
B) For the 42RLE transmission with a TCM: wire 10 at the solenoid block to terminal 50 at the TCM (PCM Models - Terminal 29 in the C4 connector).
C) For the 45RFE transmission with a TCM: wire 14 at the solenoid block to terminal 50 at the TCM (PCM Models - Terminal 29 in the C4 connector - See figures 5-8).

4. Clean the solenoid switch valve line up in the valve body and ensure that it has free movement. When the valve body is assembled, you should be able to shake the valve body and hear that it is moving.

Diagnostic tip: If code 1776 sets on top of a TCC command by the computer, the solenoid switch valve is most likely stuck or latched in the Low/Reverse position. This could be easily identified with a dual scope monitoring both the LR Solenoid and the LR Pressure Switch. When the LR Solenoid pulses to apply the converter clutch, the LR Pressure switch will be toggled to ground almost mirroring the pulse signal of the solenoid. As an example, the 45RFE applied the TCC after 4th gear. If the Solenoid Switch Valve was stuck, 1776 would occur soon after a shift into 4th took place. Figures 9 through 13 show how this would appear using a scope. With several possibilities as to the cause of a 1776 being produced, this is one method in determining if the code is actually being produced by the switch valve or not.

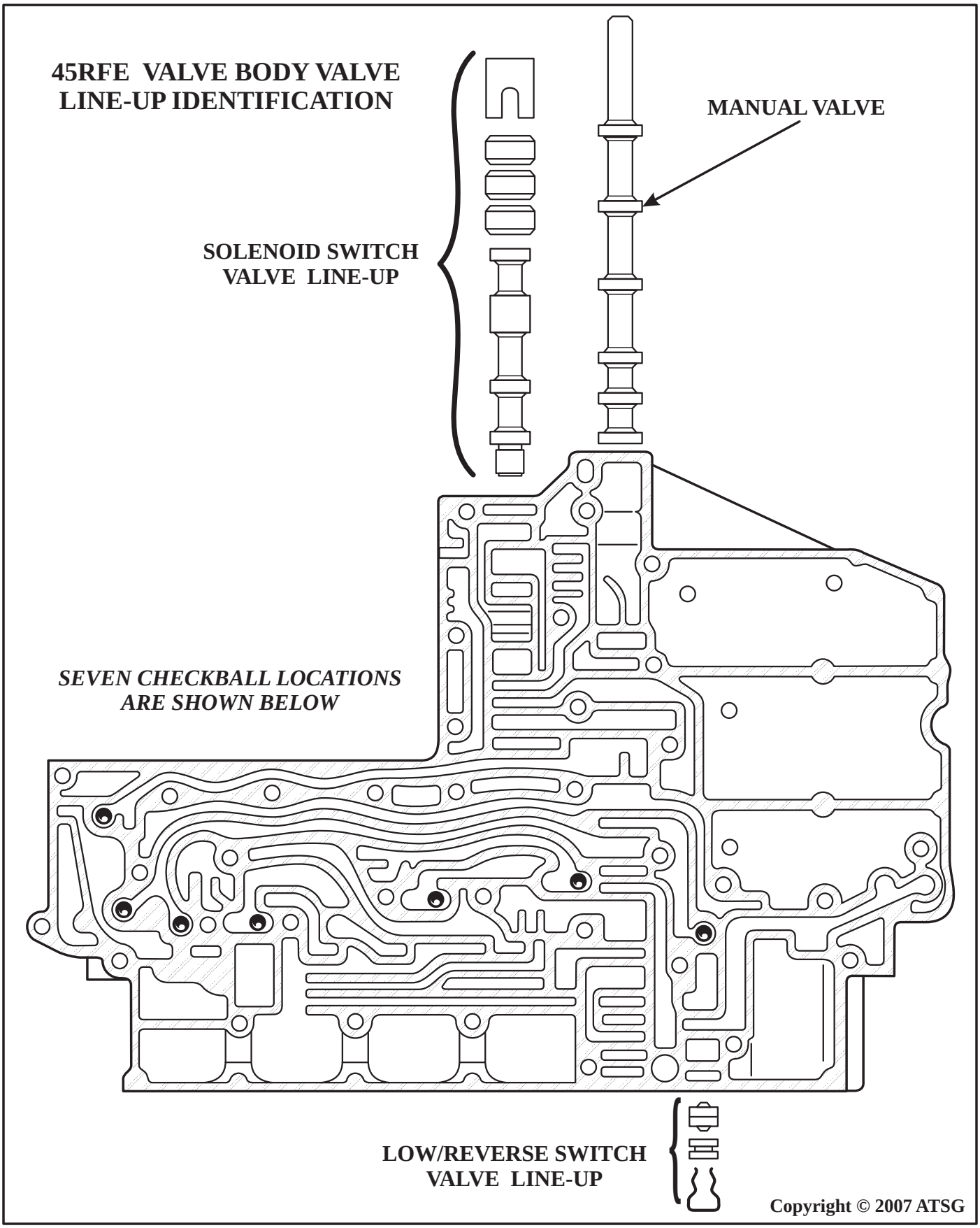

45RFE VALVE BODY VALVE
LINE-UP IDENTIFICATION
MANUAL VALVE
SOLENOID SWITCH
VALVE LINE-UP
SEVEN CHECKBALL LOCATIONS
ARE SHOWN BELOW
LOW/REVERSE SWITCH
VALVE LINE-UP
Copyright © 2007 ATSG

Figure 1

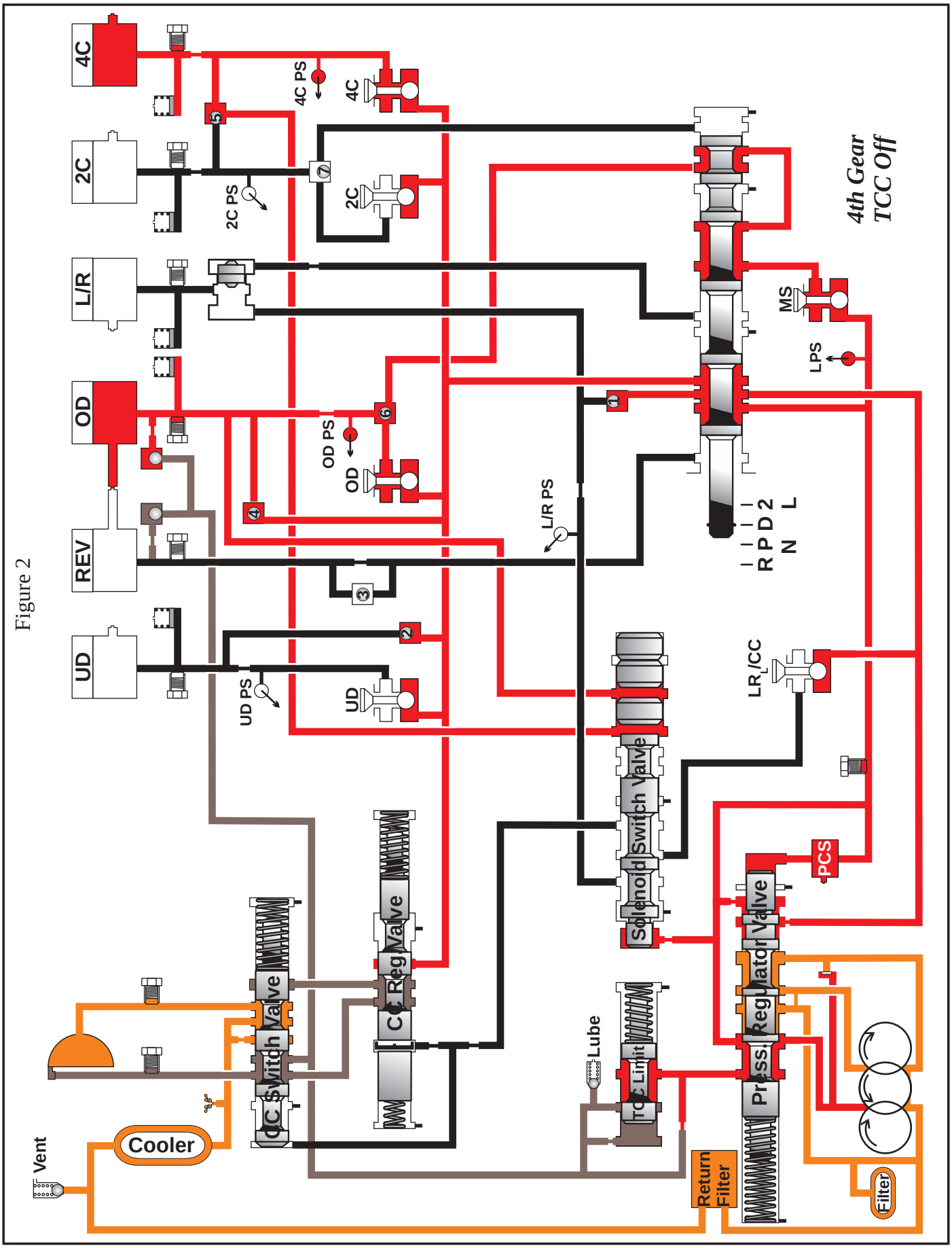


Figure 2

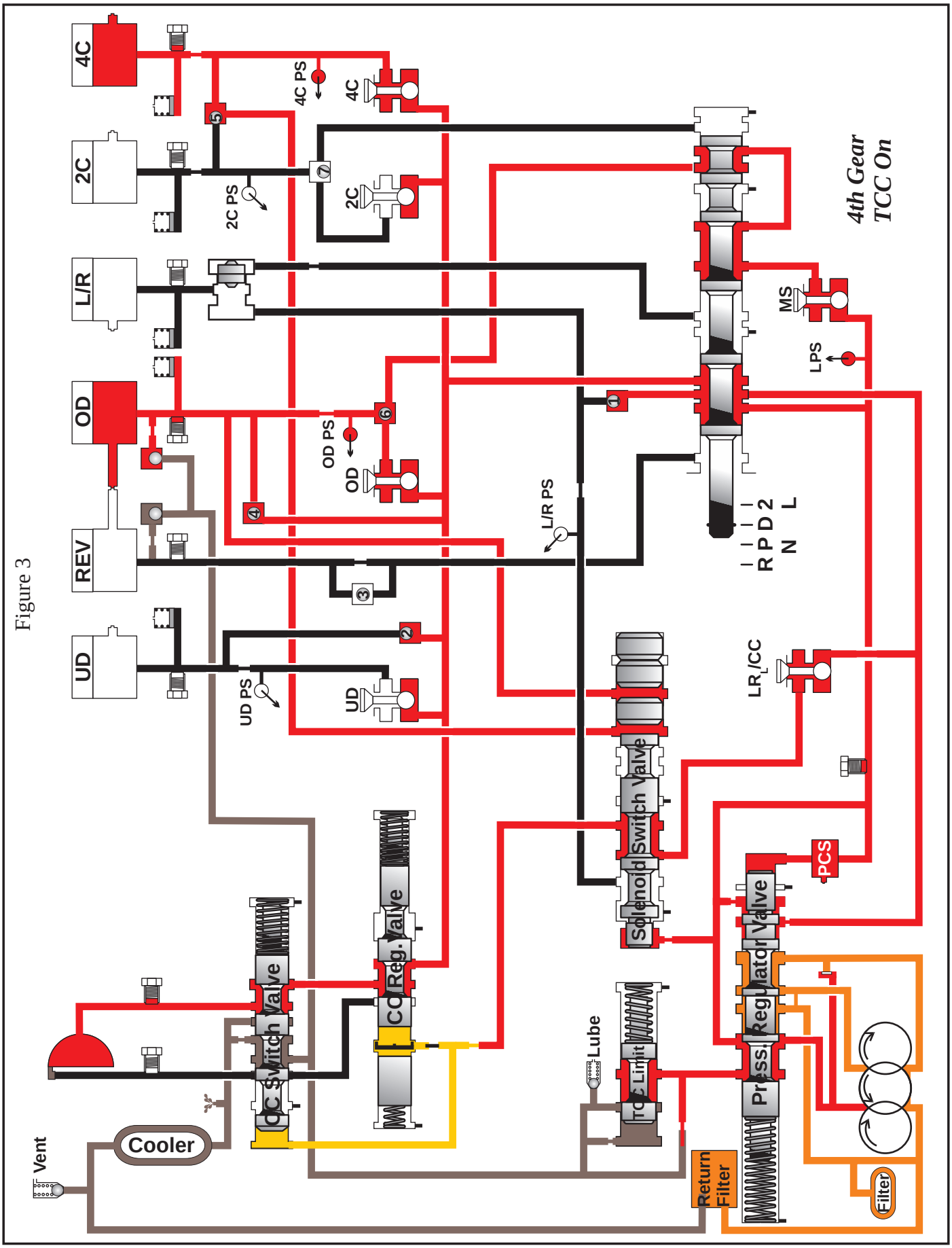


Figure 3

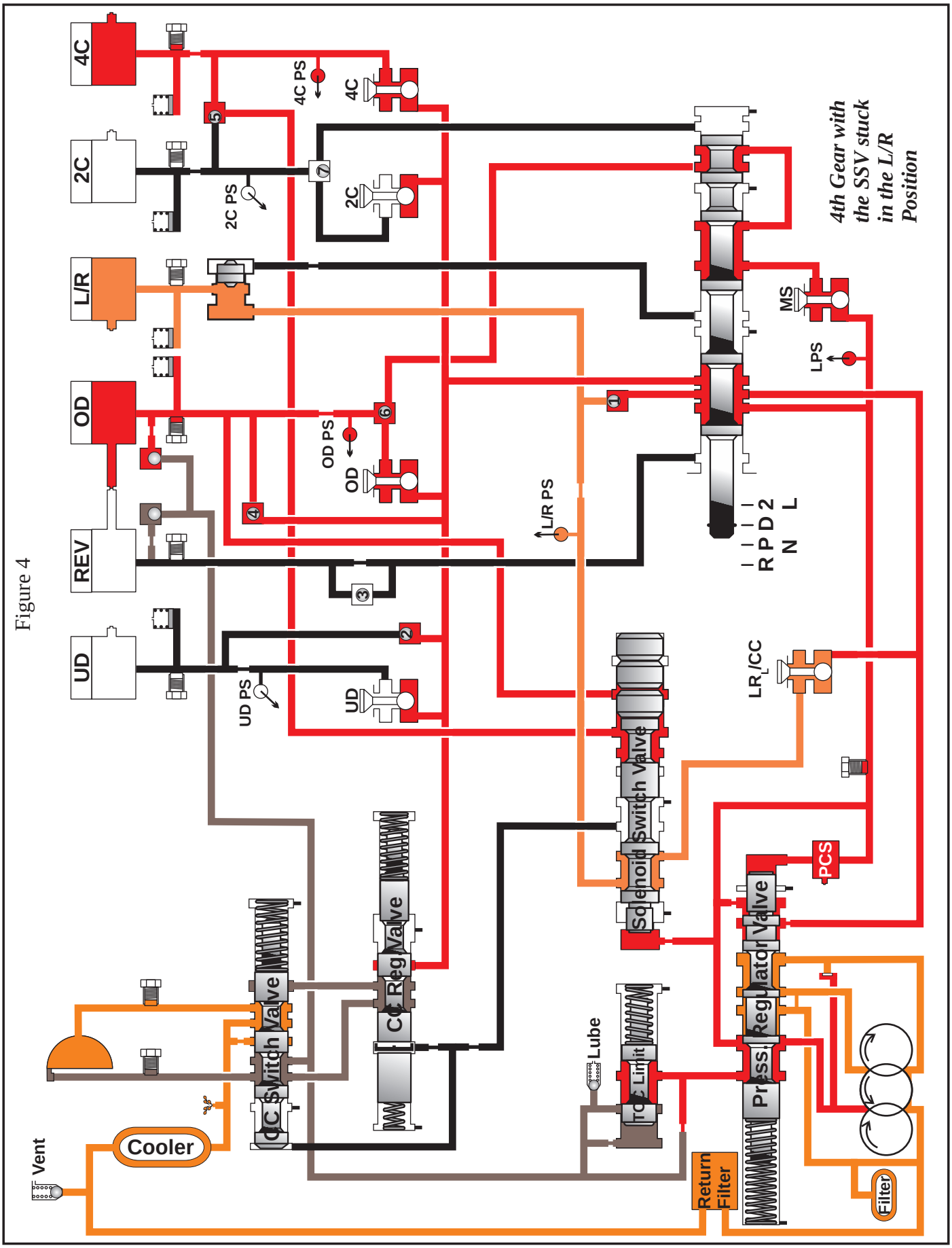


Figure 4

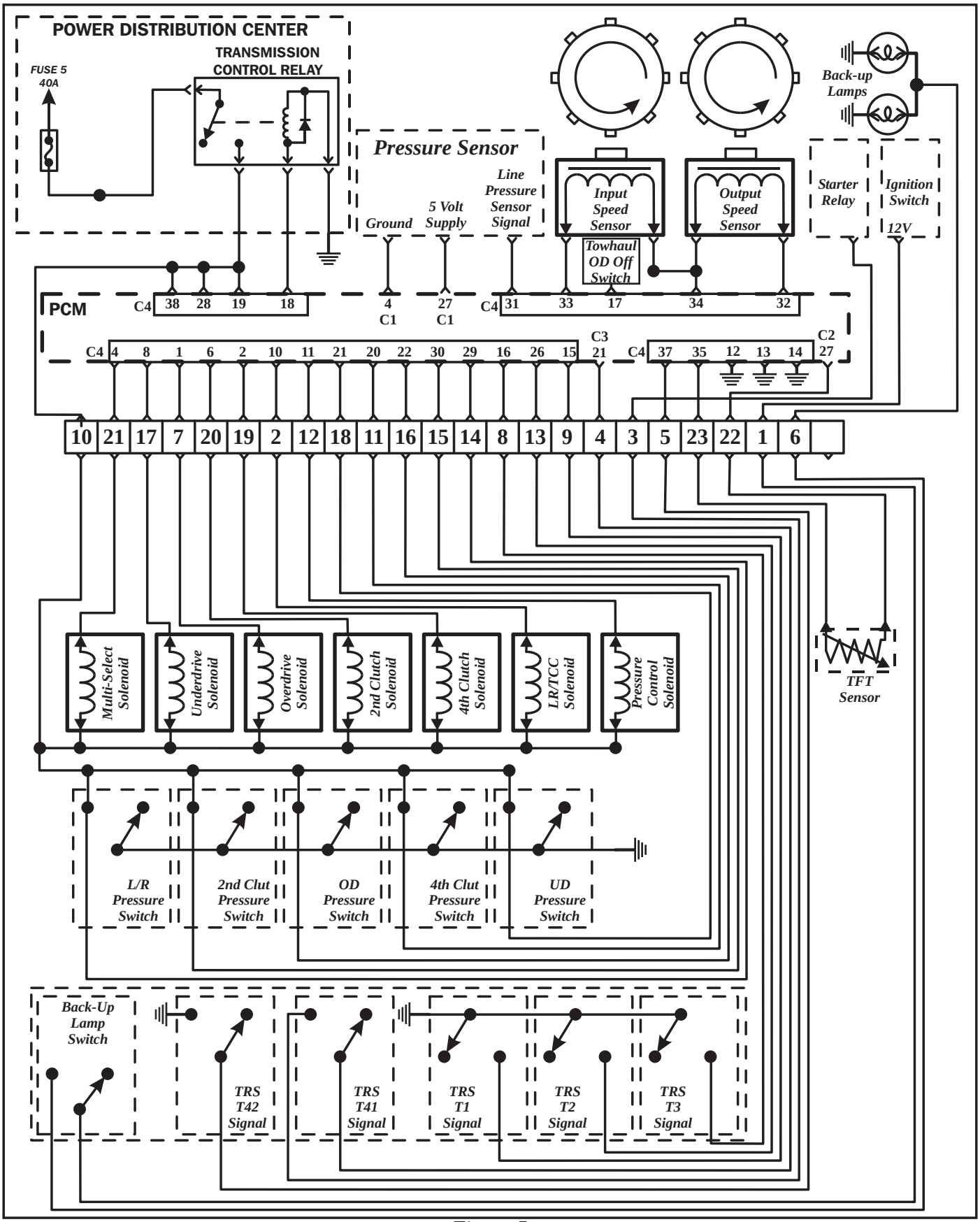


Figure 5

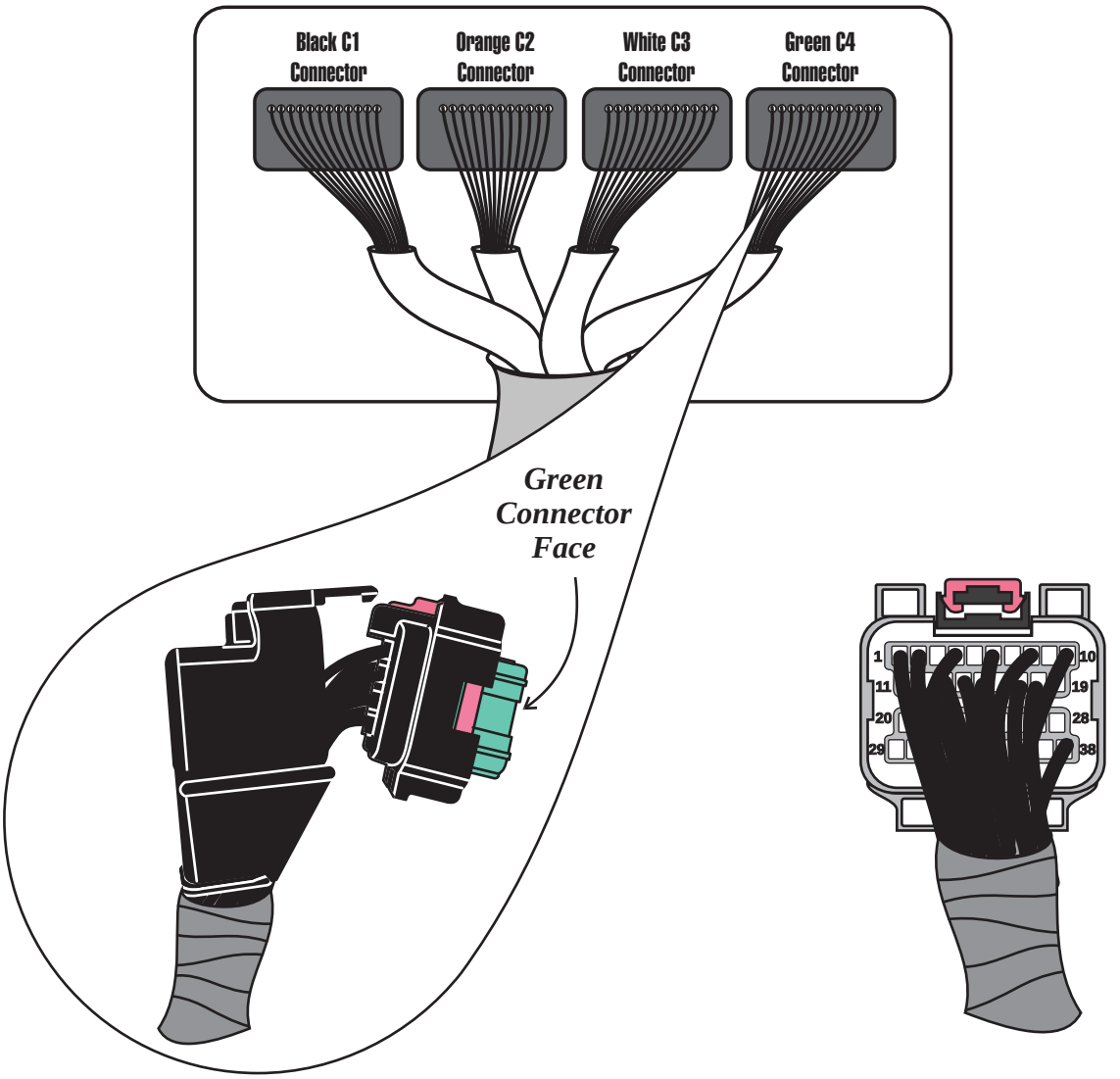
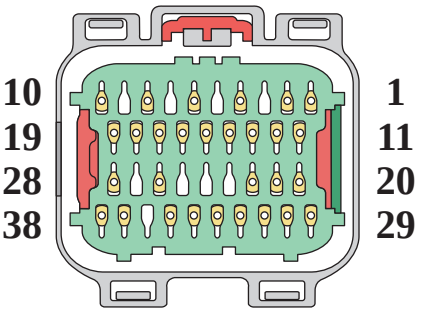


Figure 6

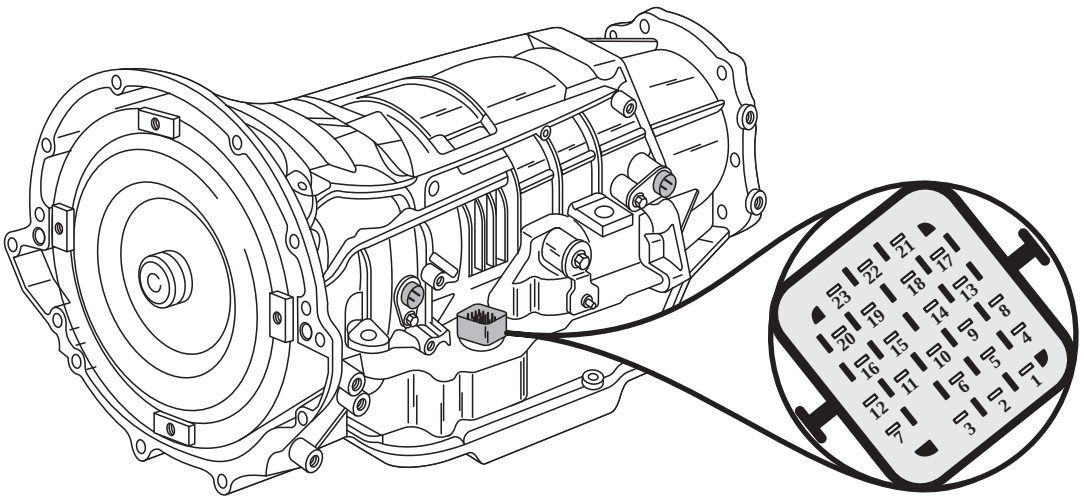
ALTO



C4 Connector
Face (Green)

PIN CAVITY	WIRE COLOR	FUNCTION
1	YL/GY	Overdrive Clutch Solenoid Control
2	YL/DG	4th Clutch Solenoid Control
3		
4	DG	Multi-Select Solenoid Control
5		
6	YL/LG	2nd Clutch Solenoid Control
7		
8	YL/LB	Underdrive Clutch Solenoid Control
9		
10	DG/WH	LR/TC Clutch Solenoid Control
11	YL/GY	Line Pressure Control Solenoid Control
12	BK	Ground
13	BK	Ground
14	BK	Ground
15	DG/LB	Transmission Range Sensor (T1) Signal
16	DG/DB	Transmission Range Sensor (T3) Signal
17	DG	Towhaul Overdrive Off Switch Sense
18	YL/DB	Transmission Control Relay Control
19	YL/OR	Transmission Control Relay Output
20	BR/YL	4th Clutch Pressure Switch Signal
21	YL/WT	Underdrive Clutch Pressure Switch Signal
22	DG/TN	Overdrive Clutch Pressure Switch Signal
23		
24		
25		
26	DG/LB	Transmission Range Sensor (T2) Signal
27		
28	YL/OR	Transmission Control Relay Output
29	YL/TN	Low/Reverse Clutch Pressure Switch Signal
30	DG/YL	2nd Clutch Pressure Switch Signal
31	YL/BN	Line Pressure Sensor Signal
32	DG/BN	Output Speed Sensor Signal
33	DG/OR	Input Speed Sensor Signal
34	DG/VT	Speed Sensor Ground
35	DG/OR	Transmission Oil Temperature Sensor Signal
36		
37	DG/YL	Transmission Range Sensor (T42) Signal
38	YL/OR	Transmission Control Relay Output

Figure 7



PIN CAVITY	WIRE COLOR	FUNCTION
1	WT/GY	Fused Ignition Switch Battery Voltage
2	DG/WT	LR/TC Clutch Solenoid Control
3	BN/YL	Park/Neutral Position Switch Signal
4	YL/LB	Transmission Range Sensor (T41) Signal
5	DG/YL	Transmission Range Sensor (T42) Signal
6	WT/LG	Back-Up Lamp Feed
7	YL/GY	Overdrive Clutch Solenoid Control
8	DG/DB	Transmission Range Sensor (T3) Signal
9	DG/LB	Transmission Range Sensor (T1) Signal
10	YL/OR	Transmission Control Relay Output
11	BR/YL	4th Clutch Pressure Switch Signal
12	YL/GY	Line Pressure Control Solenoid Control
13	DG/LB	Transmission Range Sensor (T2) Signal
14	YL/TN	Low/Reverse Clutch Pressure Switch Signal
15	DG/YL	2nd Clutch Pressure Switch Signal
16	DG/TN	Overdrive Clutch Pressure Switch Signal
17	YL/LB	Underdrive Clutch Solenoid Control
18	YL/WT	Underdrive Clutch Pressure Switch Signal
19	YL/DG	4th Clutch Solenoid Control
20	YL/LG	2nd Clutch Solenoid Control
21	DG	Multi-Select Solenoid Control
22	DB/DG	Speed Sensor Ground
23	DG/OR	Transmission Oil Temperature Sensor Signal

Figure 8

Sonnax

Shift from 3rd to 4th Gear

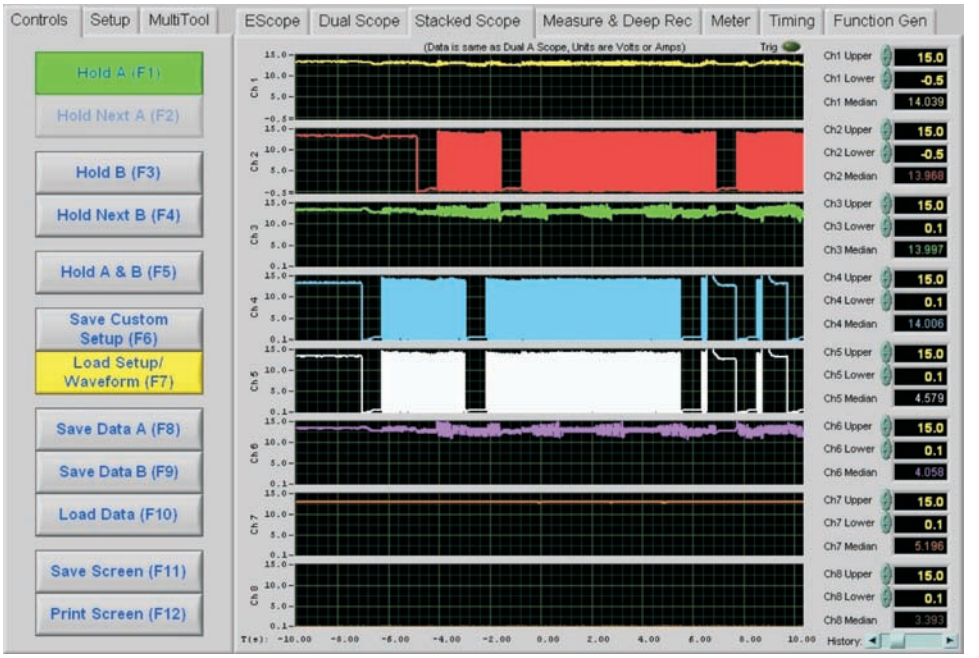


Figure 9

4th Gear

Channel 1 = *LR /CC Solenoid (NV) is energized for TCC Apply*
Channel 2 = *Underdrive Solenoid (NA) is energized - (UD) Underdrive Clutch Off*
Channel 3 = *Second Clutch Solenoid (NV) is de-energized - (2C) Second Clutch Off*
Channel 4 = *Overdrive Clutch Solenoid (NV) is energized - (OD) Overdrive Clutch On*
Channel 5 = *Fourth Clutch Solenoid (NV) is energized - (4C) Fourth Clutch On*
Channel 6 = *Multi Select Solenoid (NA) is de-energized - (OD) Clutch On (Limp-ready)*

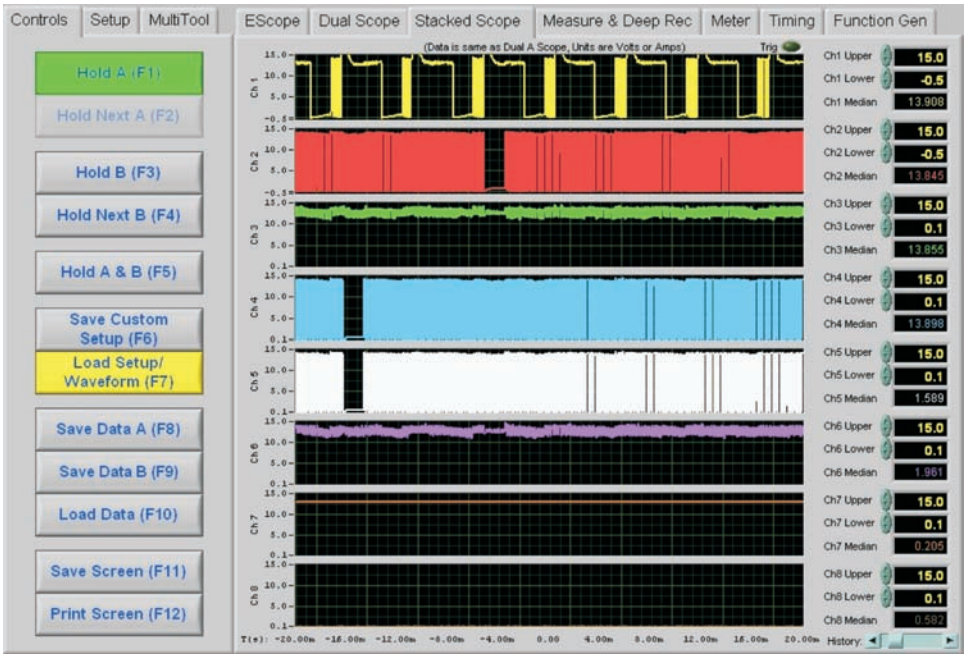


Figure 10

ATS

4th Gear to Limp

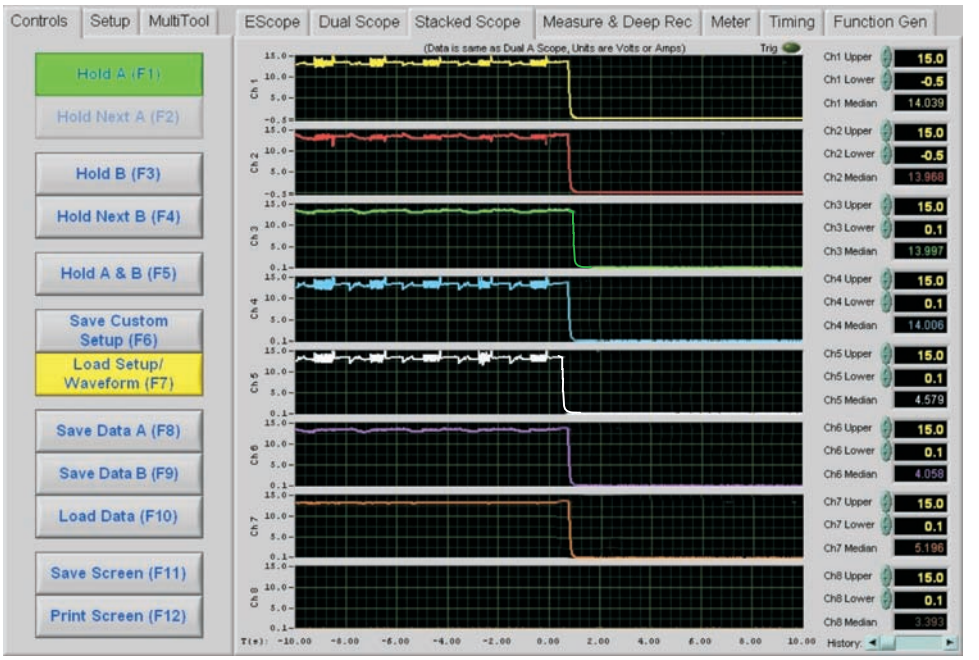


Figure 11

LR Solenoid & LR Pressure Switch Comparison

Channel 1 = *LR Pressure Switch Signal during TCC Command*
Channel 4 = *LR Solenoid Duty Cycle during TCC Command*

As the computer was commanding the TCC to be applied the pressure switch was toggled to ground indicating that the solenoid switch valve was latched in the LR position. The computer went to failsafe cutting all power to the transmission.

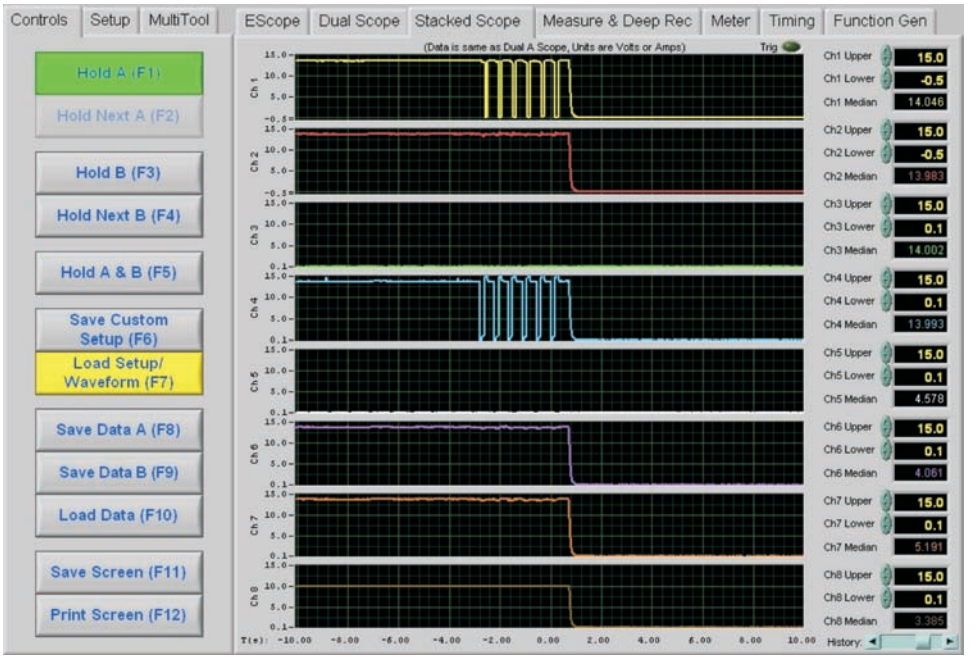


Figure 12

Closer view of LR Solenoid and LR Pressure Switch

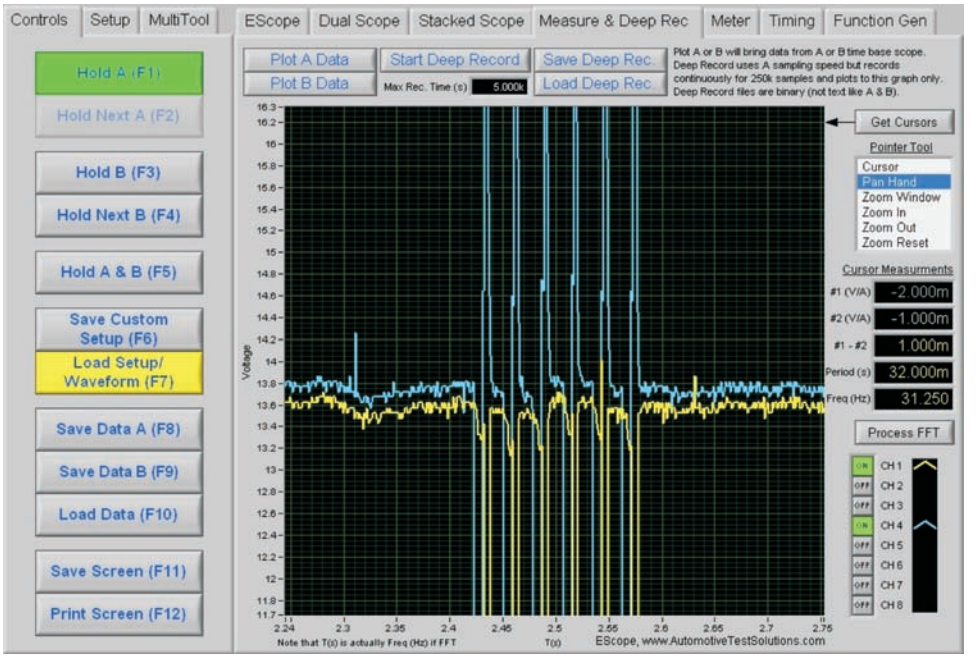


Figure 13

GENERAL ELECTRONICS

ELECTRICAL NOISE SOURCES AND SOLUTIONS

COMPLAINT: Assorted codes and symptoms. Often not making sense.

CAUSE: One cause of this problem is Electrical Noise caused by a bad alternator, wiring issues, Malfunctioning parts, and on rare occasion outside influences.

CORRECTION : A good knowledge of electrical noise causes and corrections.

The first thing to do on any vehicle is a quick overall electrical system check.

1) Connect voltmeter to Alternator or Cigarette Lighter socket. See figure 5.
2) Observe Battery Voltage (12.5 to 13.0) See figure 1.
3) Clear meters Min/Max function
4) Start vehicle
5) Observe System Running Voltage (13.5 to 14.0) See figure 2.
6) Observe voltage drop during startup (no less than 11.00). See figure 3.
7) Switch meter to AC volts and observe reading (no more than .5 VAC). See figure 4.

Low battery voltage indicates a battery that has, or is about to fail. This makes the alternator work harder and possibly create noise or cause the alternator to fail.

A large voltage drop at startup is another indication of a battery capacity problem, or a bad ground, or a problem in the starting system.

System running voltage is an indicator of alternator health. Low or high voltage, as well as noise, can cause a variety of problems.

Excessive AC voltage is an indicator of power system noise which is almost always an indication of alternator problems.

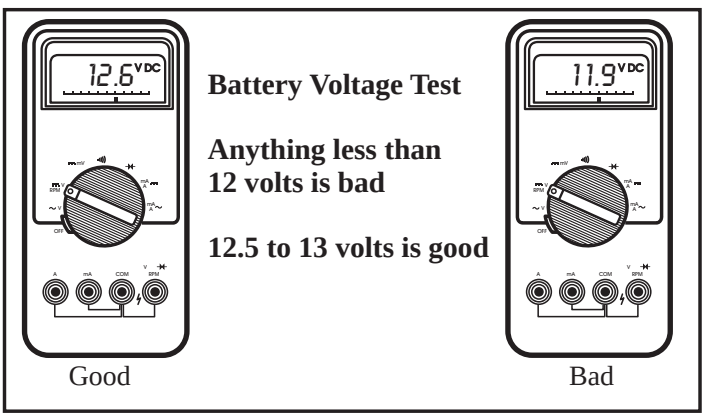


Figure 1

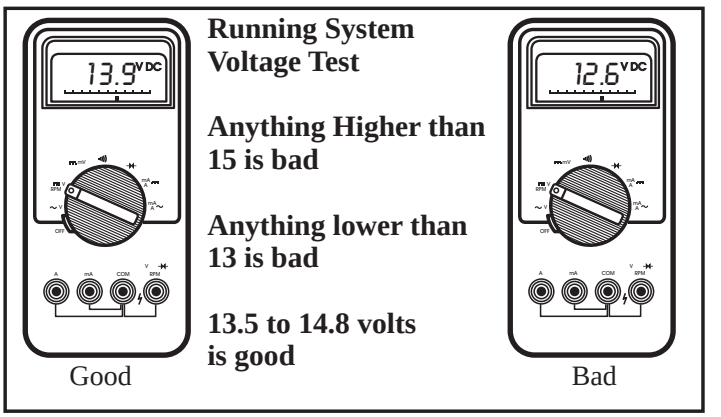
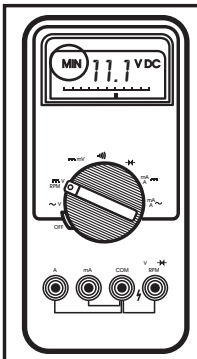


Figure 2

GENERAL ELECTRONICS

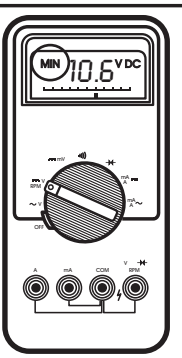
ELECTRICAL NOISE SOURCES AND SOLUTIONS



Starting Voltage Drop Test

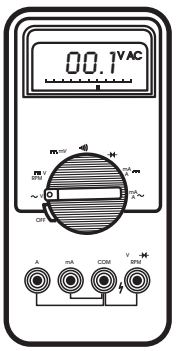
Anything less than 11 volts is bad

Anything more than 11 is good



Good Bad

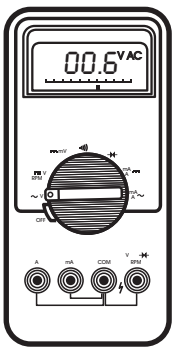
Figure 3



AC Voltage Test

Anything Higher than .5 is bad

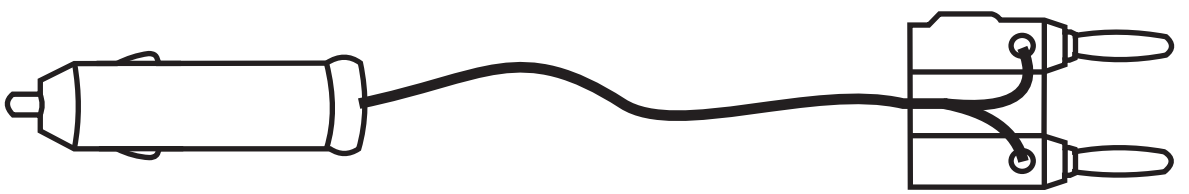
Anything lower than .5 is good



Good Bad

Figure 4

Handy-Dandy Lighter to Meter cord



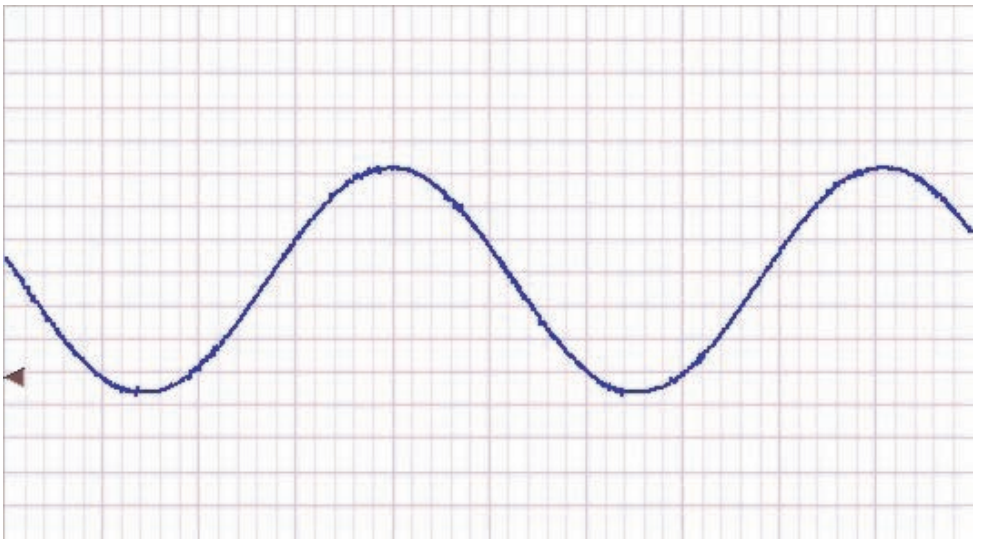
Lighter Plug
(Jameco 124759)

Dual Banana Plug
(Jameco 125209)

Figure 5

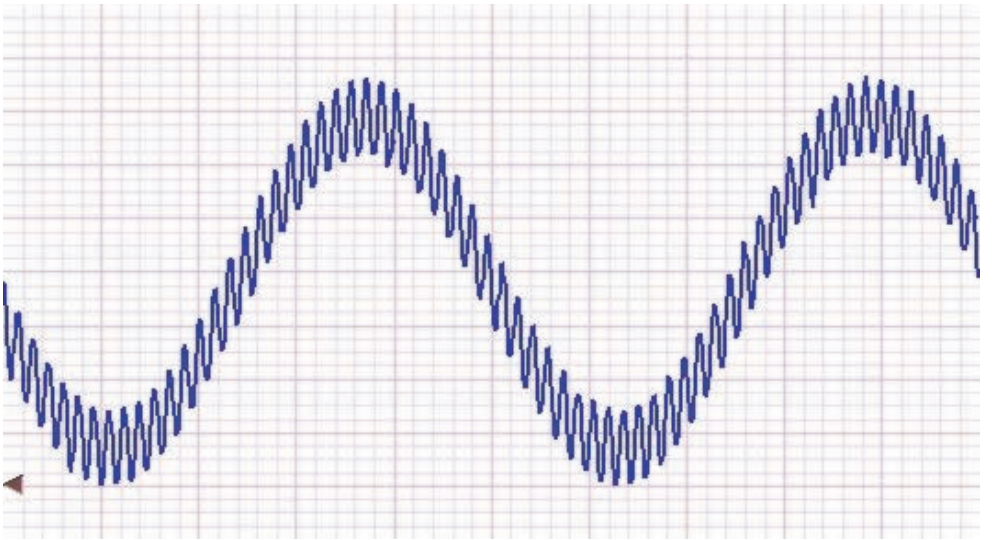
GENERAL ELECTRONICS

ELECTRICAL NOISE SOURCES AND SOLUTIONS



Clean AC Pulse Generator Waveform

Figure 6

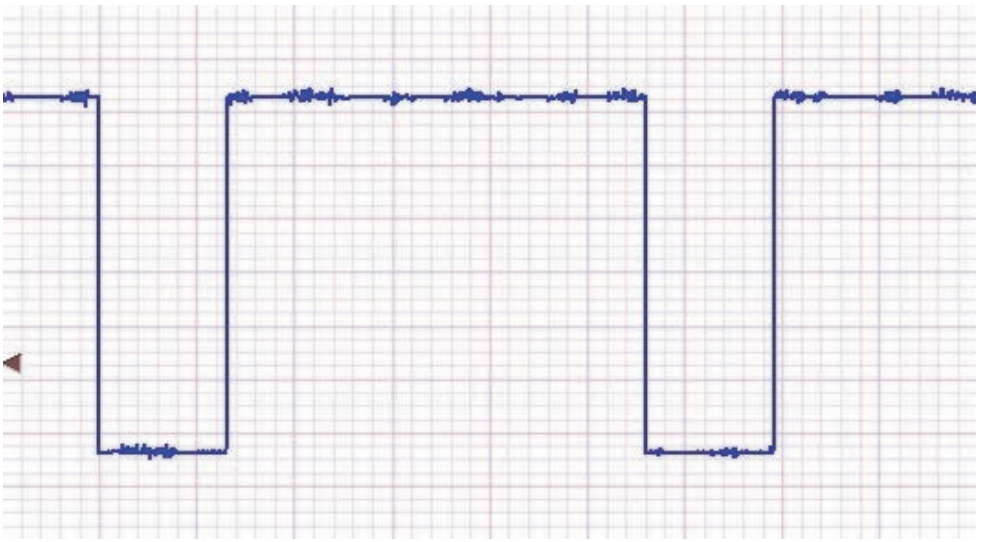


Noisy AC Pulse Generator Waveform

Figure 7

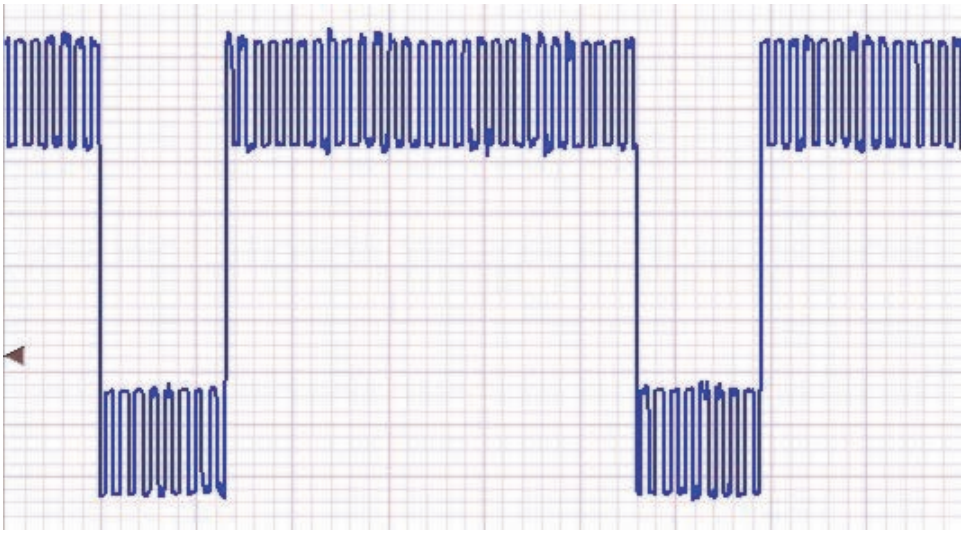
GENERAL ELECTRONICS

ELECTRICAL NOISE SOURCES AND SOLUTIONS



Clean Digital Pulse Waveform

Figure 8

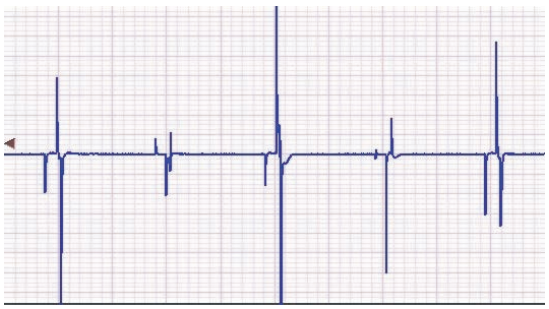


Noisy Digital Pulse Waveform

Figure 9

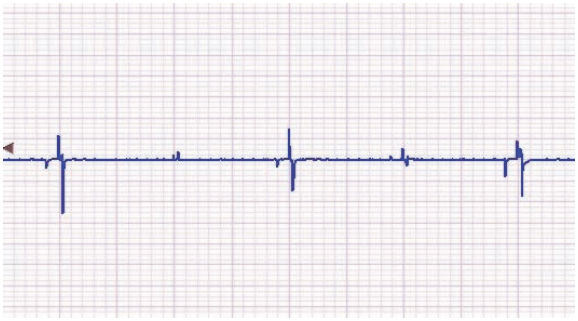
GENERAL ELECTRONICS

ELECTRICAL NOISE SOURCES AND SOLUTIONS



Wiring too close to plug wire

Figure 10

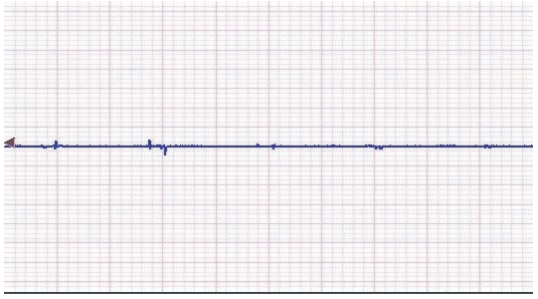


Wiring perpendicular to plug wire

Figure 11

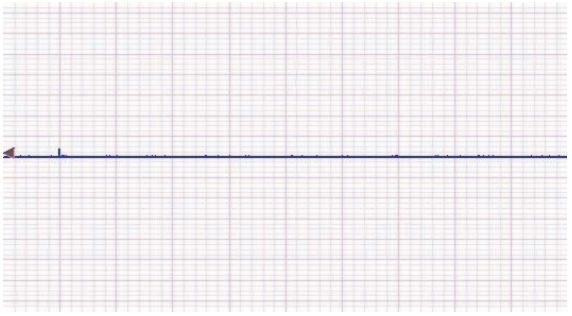
Twisted Pair Wiring

Figure 12



Ungrounded Sheild

Figure 13



Grounded Sheild

Figure 14

DODGE & JEEP RWD VEHICLES

TCC CYCLING

COMPLAINT: As the vehicle reaches cruising speed, the lock-up converter clutch begins a steady release and re-application, in other words TCC cycling. Viewing this parameter on the scan tools data list, it is revealed that the computer is commanding this action.

CAUSE: Although a number of causes are shared by both gas and diesel applications, some are unique to each. The following list of causes will indicate which are for both or specific to gas or diesel equipped:

(1) PCM to sensitive too Noise From APP Sensor (24 Valve Diesel Only).
(2) PCM to Sensitive too Noise From Alternator (Both).
(3) Lift Pump Interference (Diesel Only).
(4) Water In Fuel, warning lamp will be illuminated, (Diesel Only).
(5) Faulty ECM (Diesel Only).
(6) Loose or poor ECM Connector (Diesel Only).
(7) APP Sensor Relearn (24 Valve Diesel Only).
(8) TPS Cam or Bushings Worn (12 Valve Diesel Only)
(9) Plastic Throttle Rod Ball Joints Are Worn (12 valve Diesel Only).
(10) Faulty TPS or TPS Circuit Problems (Both).
(11) Low Coolant Level (Both)
(12) A Faulty or Loose Brake Switch (Both).
(13) Dirty Battery Cables, Especially at the Engine End of the Negative Battery Cable (Both).
(14) New Battery Cable Ends That are Too Loose on the Post (Both).
(15) Faulty Spark Plugs or Plug Wires (Gas Only).
(16) Erratic VSS (Both).
(17) Faulty Engine Coolant Temperature Sensor (Both)
(18) Engine Running Too Cool (Both)
(19) A Faulty Transmission Temperature Sensor (Both).
(20) A Faulty TCC Solenoid (Both).
(21) A Faulty Park/Neutral Switch (Both).
(22) Use of a Generic Scan Tool (Both).
(23) A Faulty Crankshaft Position Sensor (Gas).
(24) A restricted Fuel Filter (Both).
(25) A dirty air filter (Both).
(26) Retarded valve timing (Sloppy timing Chain) (Gas).

CORRECTION:

(1) Reflash PCM as Per Factory Bulletin 18-02-99.
(2) Install Noise Filter In APPS signal Wire. Wrap Alternator battery voltage supply wire in aluminum foil, Disconnect wire as a test first.
(3) Replace the transfer pump or install a transfer pump relocation kit from atsdiesel.com.
(4) Replace Fuel Filter
(5) Replace Cummins ECM.
(6) Repair ECM Connector, resize terminal ends.
(7) APPS/ECM Relearn Procedure: KOEO, Depress throttle pedal to floor and then slowly release it once. Turn key off before restart.
(8) Replace throttle lever and bushings.

continued.....

DODGE & JEEP RWD VEHICLES

TCC CYCLING

CORRECTION: ***continued.....***

(9) Replace with steel rods, PN5011959AB.
(10) Repair TPS circuits or replace TPS.
(11) Repair coolant leaks and bring coolant to correct level (Low coolant lamp may be illuminated if so equipped).
(12) Replace Brake Switch or repair brake switch bracket
(13) Clean or replace battery cables and polish the negative cables engine attachment point regardless of how good it looks.
(14) Remove the necessary material to insure cable end fits tightly.
(15) Replace spark plugs and ignition wires.
(16) Repair VSS in Differential or ABS computer problem.
(17) Repair or replace ECT Sensor.
(18) Replace faulty thermostat.
(19) Repair TFT Sensor circuits or replace TFT Sensor.
(20) Replace TCC Solenoid, (Has been known not to store P0743).
(21) Replace Park/Neutral Switch
(22) Disconnect scan tool and drive vehicle or try a different scan tool.
(23) Replace Crank Sensor.
(24) Replace fuel filter.
(25) Replace air filter.
(26) Replace timing chain.

CHRYSLER 45RFE
NEW SOLENOID PACK

CHANGE: A new design Solenoid pack was introduced as a running change in the 2004 model year.

REASON: Greatly reduced operational noise by using internal solenoids.

PARTS AFFECTED:

(1) SOLENOID PACK - Totally re-designed casting with changes in the worm track area as shown in Figure 1.

(2) SOLENOID BODY SCREEN AND GASKET ASSEMBLY - Changed to accommodate the changes in the Solenoid Pack and is illustrated in Figure 2.

(3) TRS/ AND 23 WAY CONNECTOR - Changed to accommodate internal solenoids. See Figures 3 and 4 for early design and Figures 5 and 6 for updated design.

(4) RANGE SENSOR SELECTOR PLATE - The pocket for the T41 pin was made deeper and is illustrated in Figure 7.

SERVICE INFORMATION:

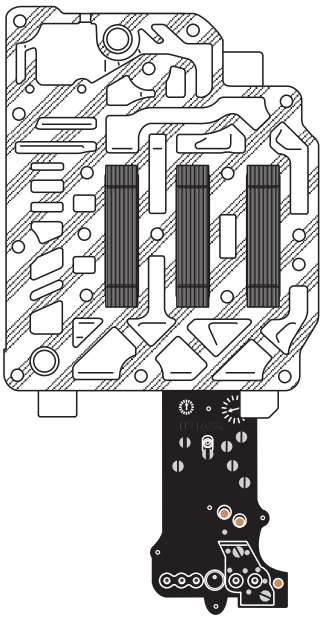
Solenoid Pack (1999-2003 with updated range sensor plate).....68002342AB
Solenoid Pack (2004 - up without updated range sensor plate).....5170877AC

INTERCHANGEABILITY

The new design Solenoid Pack, Gasket and range sensor plate will retro-fit back on previous models.

Special Note: The 1999 - 2003 range sensor plate can be modified and used with the updated Solenoid Pack. by making the T41 pocket .040" deeper (Figure 7).

EARLY SOLENOID PACK



LATE SOLENOID PACK

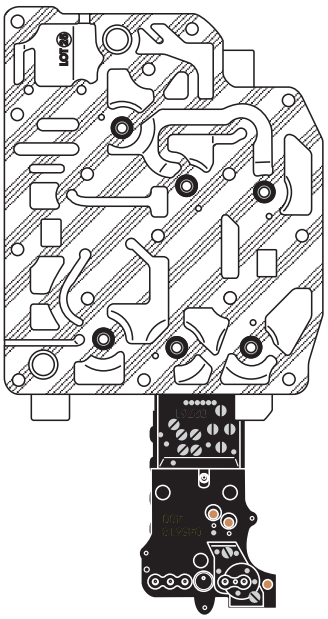
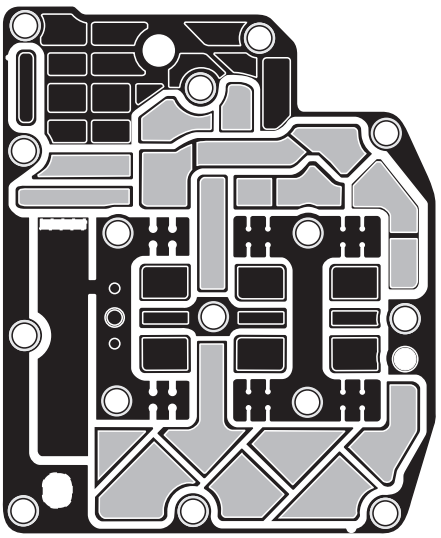


Figure 1

EARLY GASKET



LATE GASKET

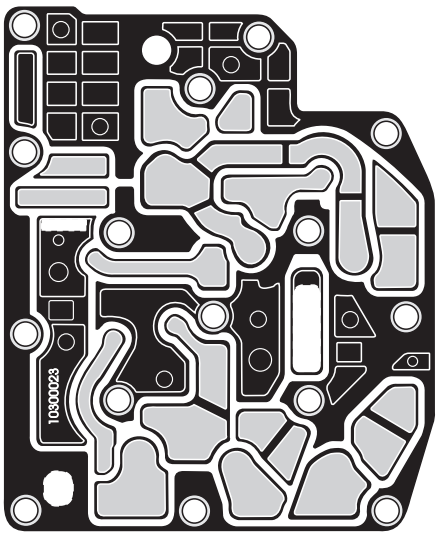
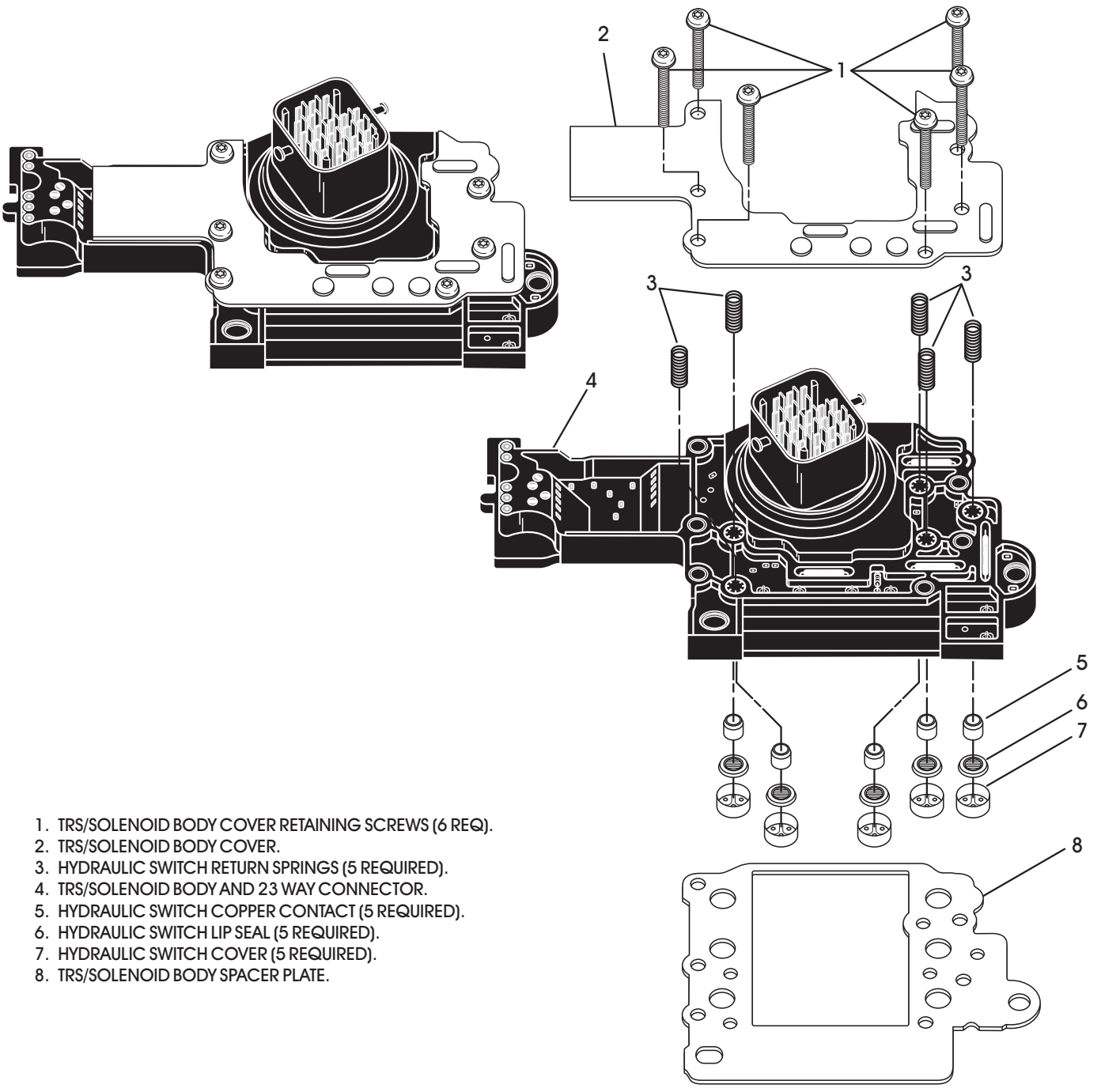


Figure 2

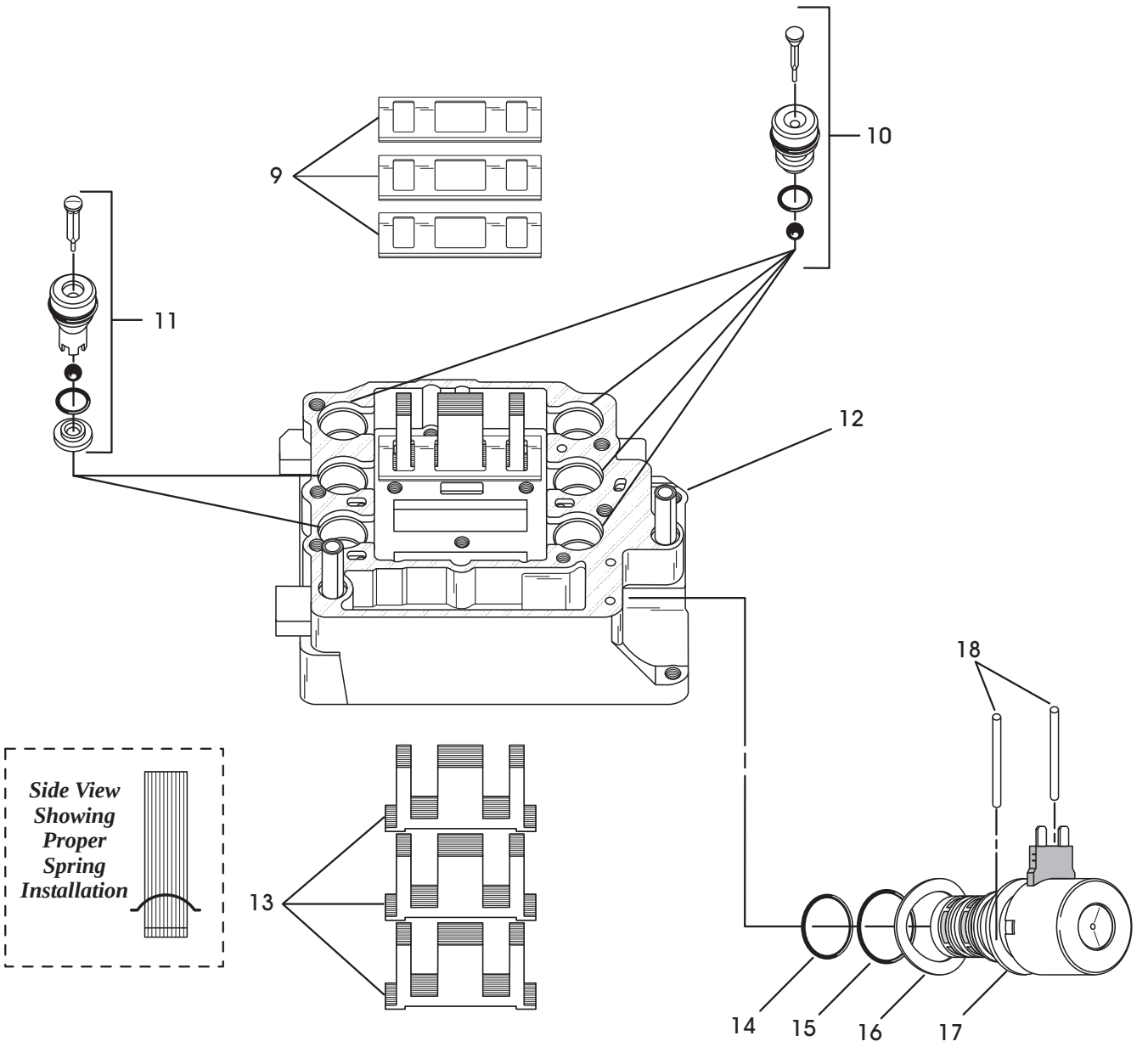
EARLY TRANSMISSION RANGE SENSOR EXPLODED VIEW



1. TRS/SOLENOID BODY COVER RETAINING SCREWS (6 REQ).
2. TRS/SOLENOID BODY COVER.
3. HYDRAULIC SWITCH RETURN SPRINGS (5 REQUIRED).
4. TRS/SOLENOID BODY AND 23 WAY CONNECTOR.
5. HYDRAULIC SWITCH COPPER CONTACT (5 REQUIRED).
6. HYDRAULIC SWITCH LIP SEAL (5 REQUIRED).
7. HYDRAULIC SWITCH COVER (5 REQUIRED).
8. TRS/SOLENOID BODY SPACER PLATE.

Figure 3

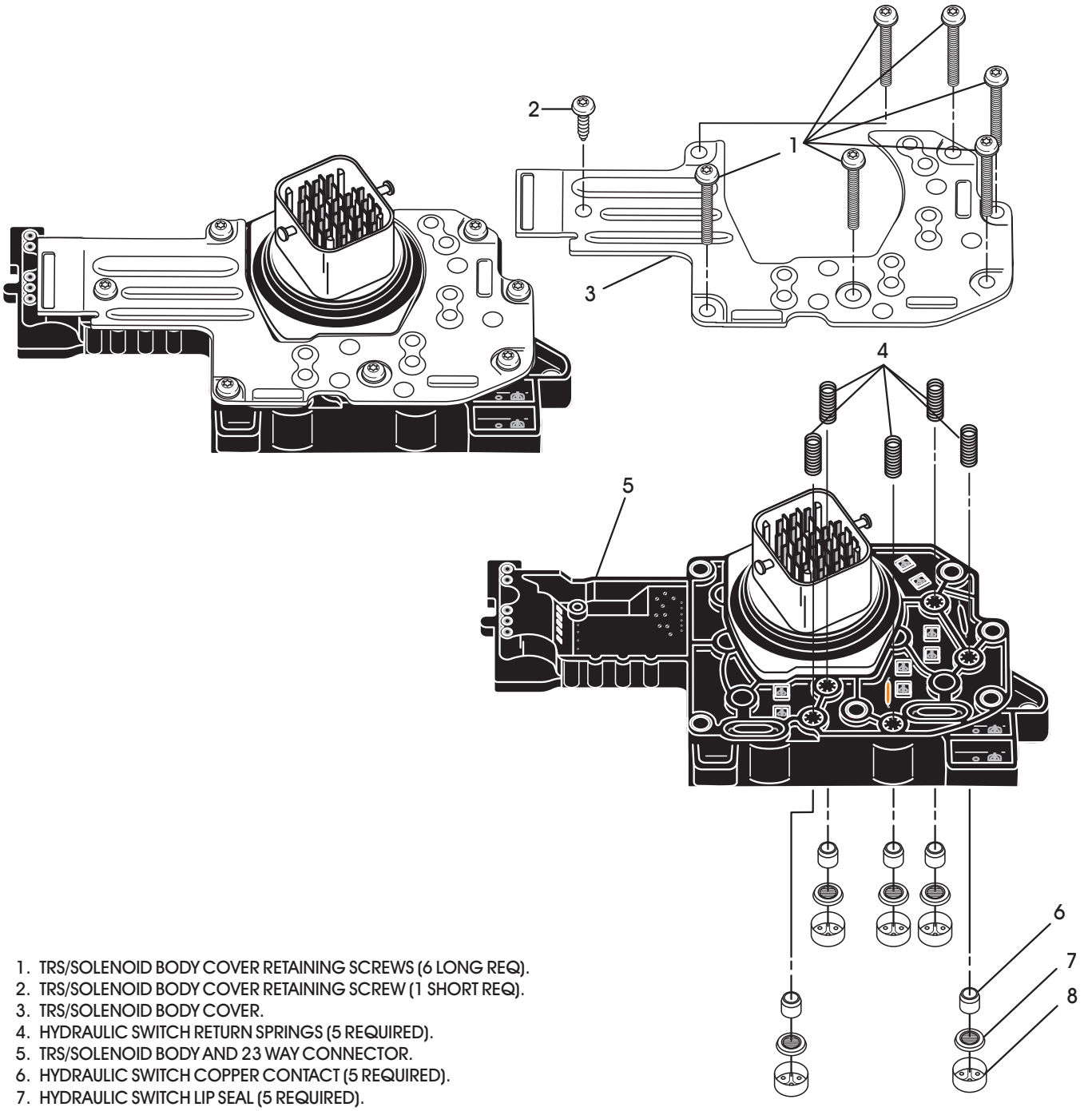
EARLY SOLENOID PACK EXPLODED VIEW



9. SOLENOID RETENTION SPRINGS (3 REQUIRED).
10. SOLENOID NEEDLE VALVE/SEAT ASSEMBLY (4 REQUIRED) LR/CC, OD, 2ND CLUT, 4TH CLUT SOLENOIDS.
11. SOLENOID NEEDLE VALVE/SEAT ASSEMBLY (2 REQUIRED) MULTI-SELECT AND UNDERDRIVE SOLENOIDS.
12. SOLENOID NEEDLE AND SEAT BODY.
13. SHIFT SOLENOID POLES (3 REQUIRED).
14. LINE PRESSURE SOLENOID SMALL "O" RING.
15. LINE PRESSURE SOLENOID LARGE "O" RING.
16. LINE PRESSURE SOLENOID WAVE WASHER.
17. LINE PRESSURE SOLENOID.
18. LINE PRESSURE SOLENOID RETAINING PINS (2 REQUIRED).

Figure 4

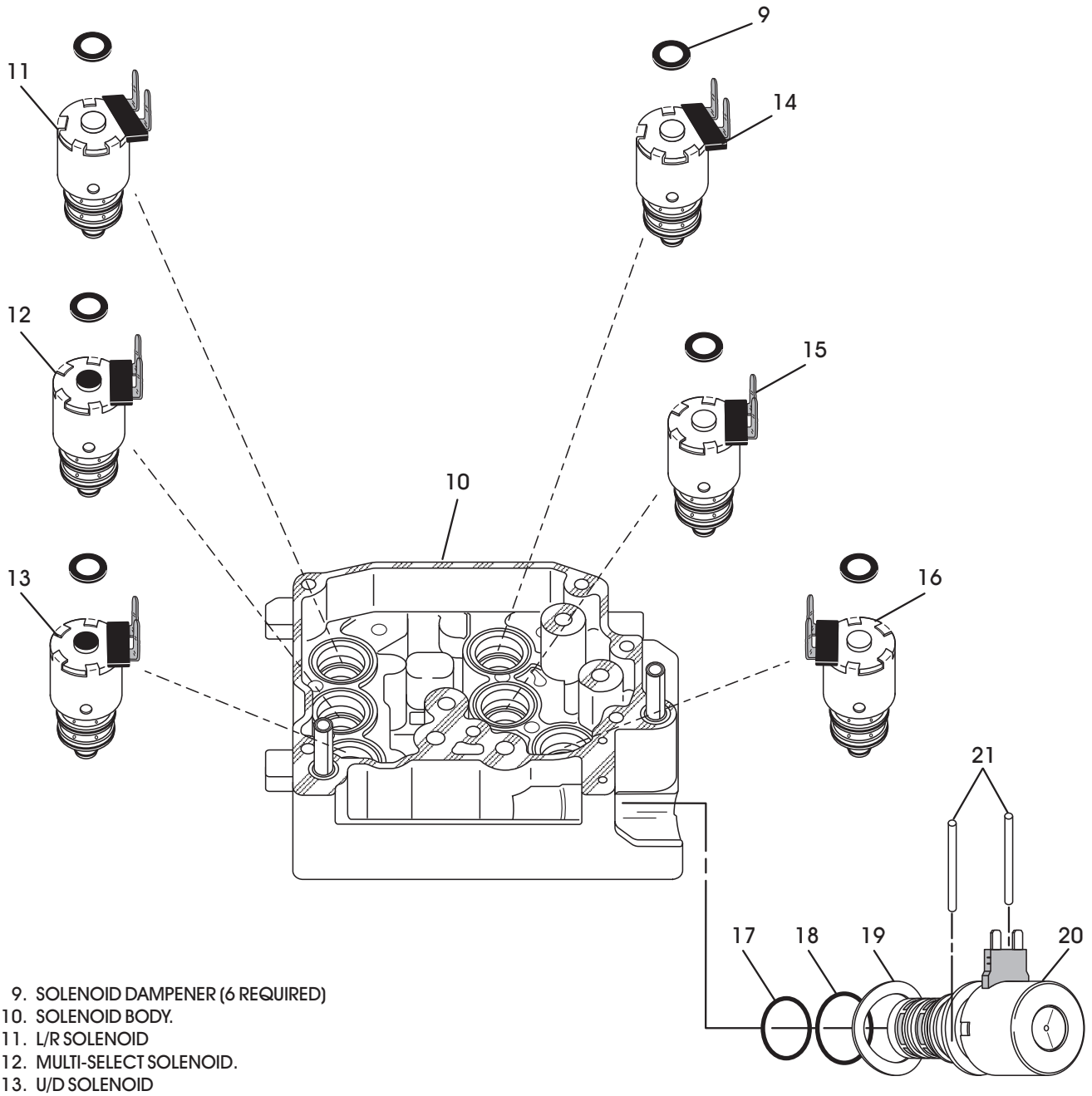
LATE TRANSMISSION RANGE SENSOR EXPLODED VIEW



1. TRS/SOLENOID BODY COVER RETAINING SCREWS (6 LONG REQ).
2. TRS/SOLENOID BODY COVER RETAINING SCREW (1 SHORT REQ).
3. TRS/SOLENOID BODY COVER.
4. HYDRAULIC SWITCH RETURN SPRINGS (5 REQUIRED).
5. TRS/SOLENOID BODY AND 23 WAY CONNECTOR.
6. HYDRAULIC SWITCH COPPER CONTACT (5 REQUIRED).
7. HYDRAULIC SWITCH LIP SEAL (5 REQUIRED).
8. HYDRAULIC SWITCH COVER (5 REQUIRED).

Figure 5

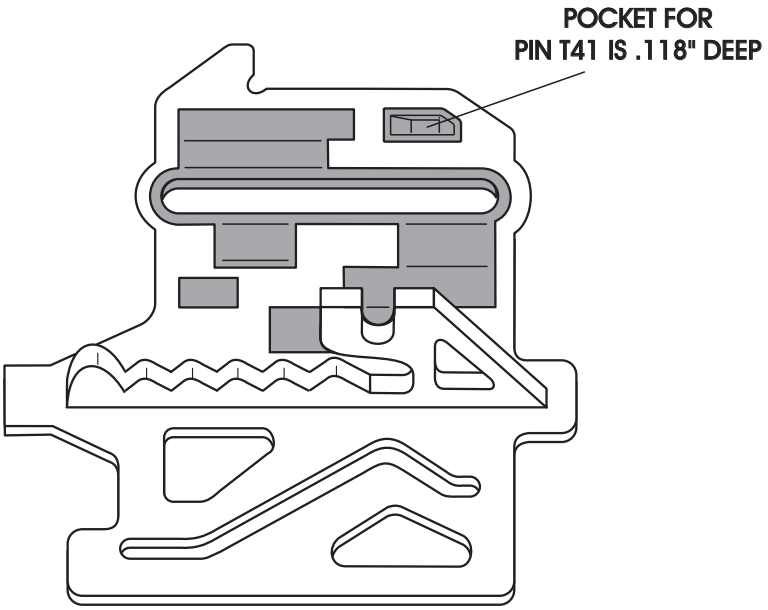
LATE SOLENOID IDENTIFICATION



9. SOLENOID DAMPENER (6 REQUIRED)
10. SOLENOID BODY.
11. L/R SOLENOID
12. MULTI-SELECT SOLENOID.
13. U/D SOLENOID
14. O/D SOLENOID
15. 4TH CLUTCH SOLENOID
16. 2ND CLUTCH SOLENOID
17. LINE PRESSURE SOLENOID SMALL "O" RING
18. LINE PRESSURE SOLENOID LARGE "O" RING
19. LINE PRESSURE SOLENOID WAVE WASHER
20. LINE PRESSURE SOLENOID
21. LINE PRESSURE SOLENOID RETAINING PINS (2 REQUIRED)

Figure 6

EARLY RANGE SENSOR PLATE



LATE RANGE SENSOR PLATE

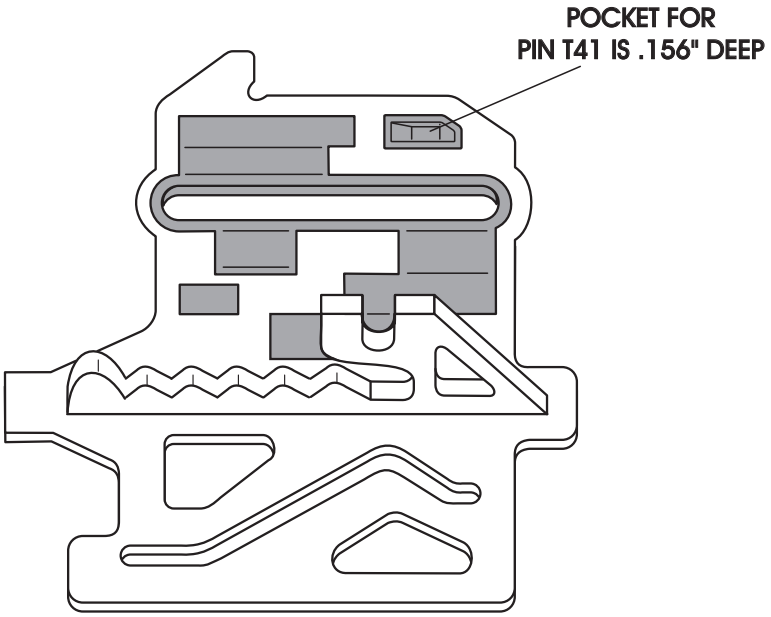


Figure 7

CHRYSLER 45RFE/545RFE
BIND ON 3-4 OR 4-5 UPSHIFT

COMPLAINT: Chrysler vehicles equipped with the 45RFE or 545RFE may exhibit a binding condition on the 3-4 or 4-5 upshift which may also be accompanied by a pressure switch code.

CAUSE: The cause may be that the #2 checkball , as shown in Figure 1 has partially disintegrated, allowing the underdrive clutch to be partially or fully applied when the 3-4 or 4-5 upshift occurs causing a bind-up.

CORRECTION: Replace the checkballs with new plastic checkballs available in aftermarket rebuild kits or from an O.E. supplier. For Valve body exploded views refer to Figures 2 and 3.

VALVE BODY CHECKBALL LOCATIONS

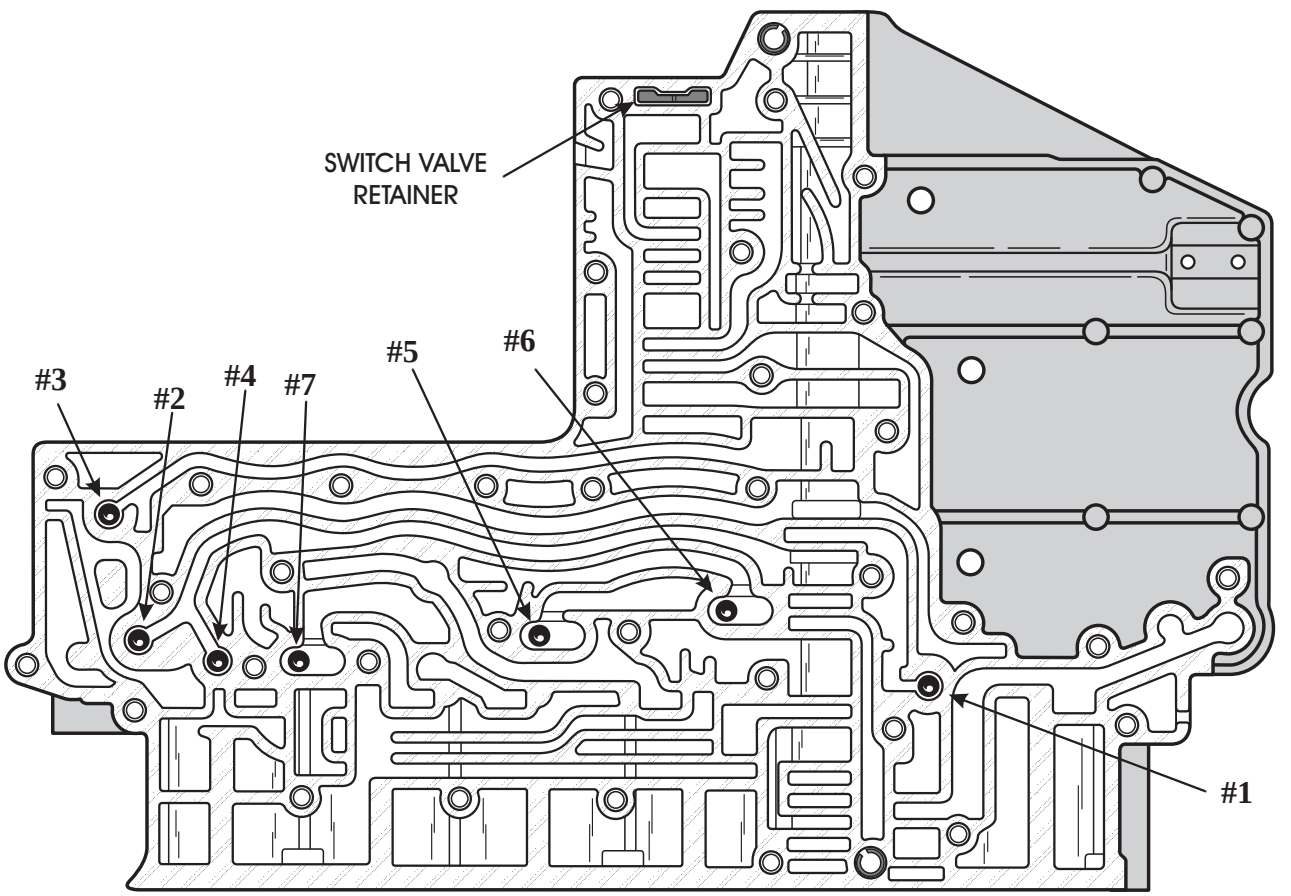


Figure 1

MAIN VALVE BODY EXPLODED VIEW

1. MAIN VALVE BODY CASTING.
2. 1/4" VITON CHECKBALLS (7 REQUIRED).
3. SOLENOID SWITCH VALVE LINE-UP.
4. SOLENOID SWITCH VALVE LINE-UP PLASTIC RETAINING CLIP.
5. MANUAL VALVE.
6. OVERDRIVE CLUTCH ACCUMULATOR PISTON AND SEALS.
7. OVERDRIVE CLUTCH ACCUMULATOR SPRING (SINGLE).
8. UNDERDRIVE CLUTCH ACCUMULATOR PISTON AND SEALS.
9. UNDERDRIVE CLUTCH ACCUMULATOR SPRINGS (DOUBLE).
10. 4TH CLUTCH ACCUMULATOR PISTON AND SEALS.
11. 4TH CLUTCH ACCUMULATOR SPRINGS (DOUBLE).
12. 2ND CLUTCH ACCUMULATOR PISTON AND SEALS.
13. 2ND CLUTCH ACCUMULATOR SPRINGS (DOUBLE.
14. LOW/REVERSE SWITCH VALVE.
15. LOW/REVERSE SWITCH VALVE BORE PLUG.
16. LOW/REVERSE ACCUMULATOR PISTON AND SEALS.
17. LOW/REVERSE ACCUMULATOR SPRINGS (DOUBLE).
18. ACCUMULATOR COVER PLATE.

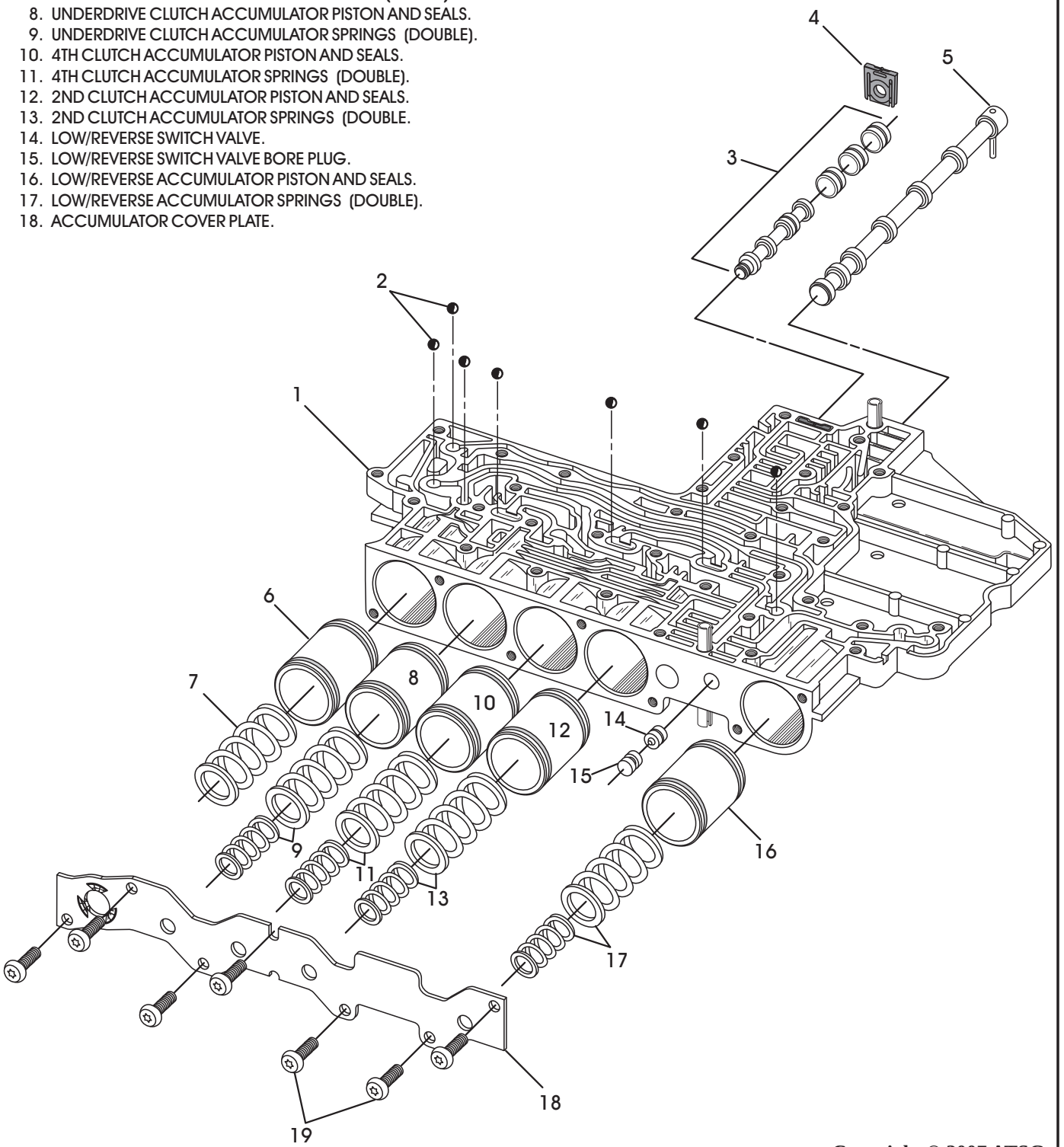
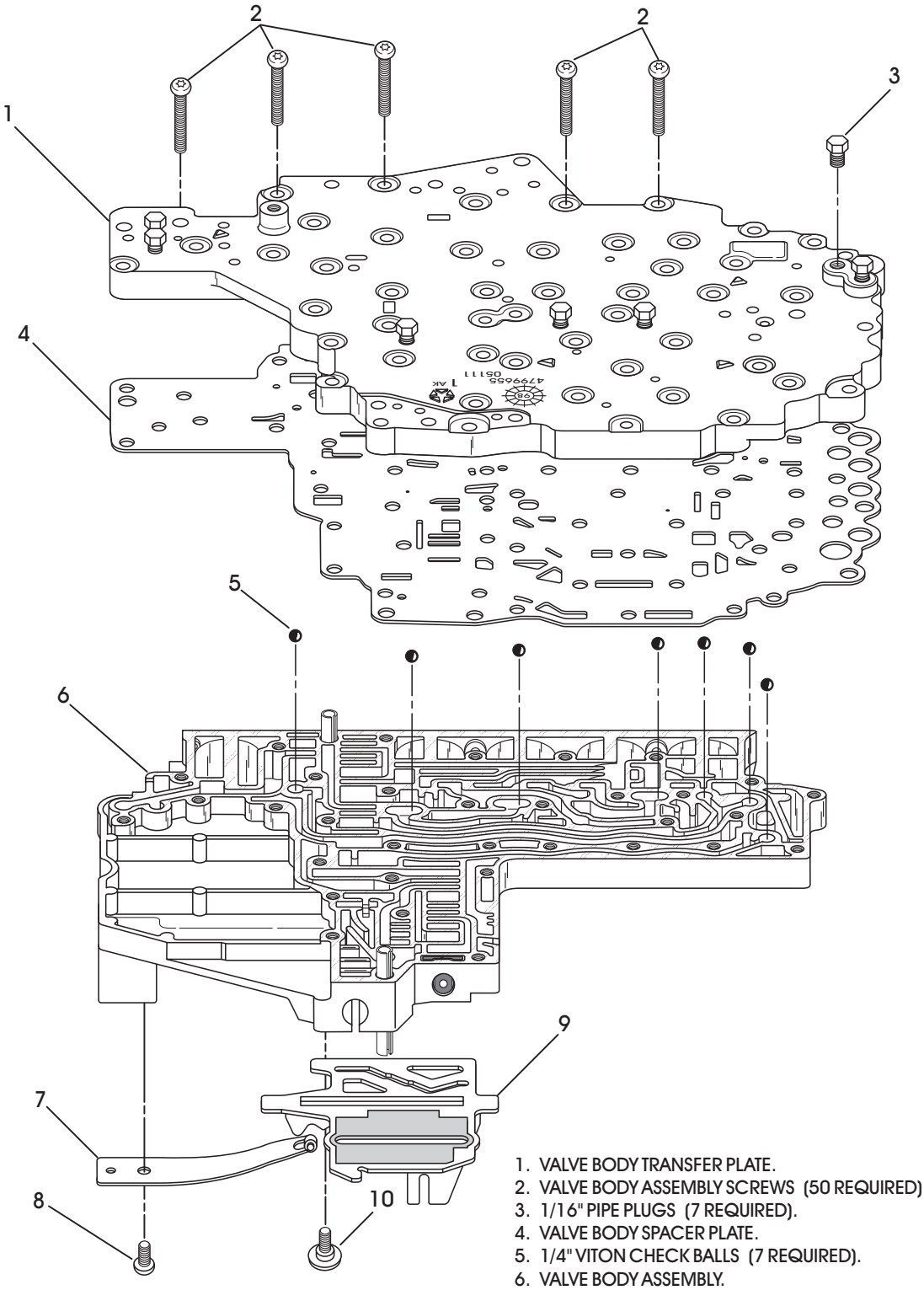


Figure 2

VALVE BODY ASSEMBLY EXPLODED VIEW



1. VALVE BODY TRANSFER PLATE.
2. VALVE BODY ASSEMBLY SCREWS (50 REQUIRED).
3. 1/16" PIPE PLUGS (7 REQUIRED).
4. VALVE BODY SPACER PLATE.
5. 1/4" VITON CHECK BALLS (7 REQUIRED).
6. VALVE BODY ASSEMBLY.
7. MANUAL VALVE DETENT SPRING.
8. MANUAL VALVE DETENT SPRING RETAINING BOLT.
9. TRANSMISSION RANGE SENSOR SELECTOR PLATE.
10. TRS SELECTOR PLATE "SHOULDERED" RETAINING BOLT.

Figure 3

DODGE 48RE
"OUT OF PARK ALARM SYSTEM SAFETY RECALL"

In March of 2006 Dodge issued a Safety recall E17 for 2003 to 2005 Dodge Ram Pickups equipped with the 5.9L Diesel and the 48RE transmission. This recall was issued to alert the driver of the vehicle if the selector was not fully placed in the Park position and the engine left running. This recall consists of a reflash that when initiated will cause the horn to go off, the headlights to flash and the PRNDL display to flash, if the door is opened and the driver attempts to exit a running vehicle without the selector in Park. This recall can only be installed with the DRB-lll and dealer software.

Note: If a vehicle that falls under this recall is taken to the dealer for any service, it will automatically receive this reflash, with or without customer approval or notification. If the driver of this vehicle likes to open his door while backing up to see better, the out of park alarm system will be initiated. If the door switches are dirty or sticking, this will initiate the out of park alarm system. DO NOT ATTEMPT TO CHANGE THE RANGE SENSOR! This is now normal operation.

Special thanks to
Bill at 4 Way transmission

DODGE 48RE
TRANSMISSION THROTTLE VALVE ACTUATOR

CHANGE: Beginning at the start of production for the model year 2005, Dodge trucks equipped with the 5.9 diesel and 48RE transmission, were equipped with a Electronically controlled Transmission Throttle Valve Actuator (TTVA), See Figure 1. This Actuator has replaced the previous Throttle Valve Cable, which controls the Throttle Valve in the Valve Body.

REASON: For electronic control of the Throttle Valve in the valve body.

PARTS AFFECTED:

(1) TRANSMISSION THROTTLE VALVE ACTUATOR - The TTVA consists of an electronic DC motor, which has two potentiometers and a gear driven system that controls the Throttle Valve in the valve body, for shift timing, passing gear below 4th gear and pressure control. The position of the TTVA geartrain is monitored by the TTVA Position sensor which supplies an input to the Engine Control Module. The TTVA is controlled by the ECM thru the inputs of Accelerator Position Sensor 1 and 2. Refer to the chart in Figure 4 for a comparison chart of APP1 and APP2 to the voltages that control the TTVA and the TTVA position voltage feedback to the ECM. ***Note: If the TTVA is removed from the transmission, the ECM will have to relearn it's "0" position. The ignition will have to be turned on and the engine off for 30 seconds to accomplish "Auto Zero."*** With the addition of the TTVA a new wiring harness was introduced. Refer to Figure 3 for a partial wire schematic of the TTVA and its connectors. Refer to Figure 5 for a list of new Diagnostic Trouble Codes related to the TTVA. ***Note: Some of the DTC's listed can cause the voltage to the TTVA to be shut off by the ECM, this will in turn cause the motor position to be in high TV mode.***

(2) TRANSMISSION CASE - The transmission case had two bosses added to it to mount the new TTVA, as shown in Figure 2.

INTERCHANGEABILITY:

The previous design Transmission Case is not interchangeable with the new design TTVA because of the lack of bosses.

TRANSMISSION THROTTLE VALVE ACTUATOR

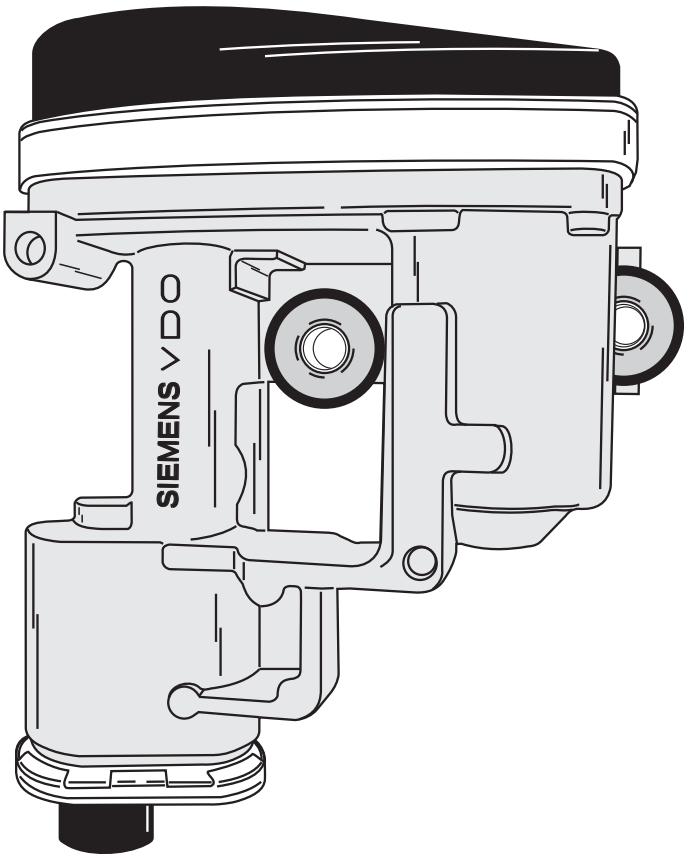


Figure 1

TTVA CASE BOSSES

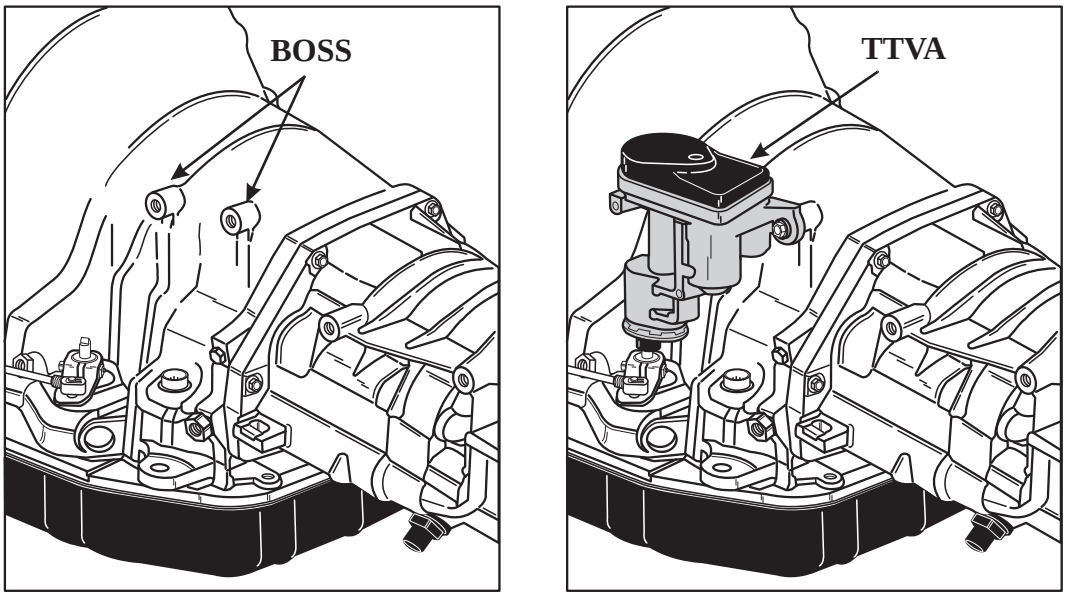
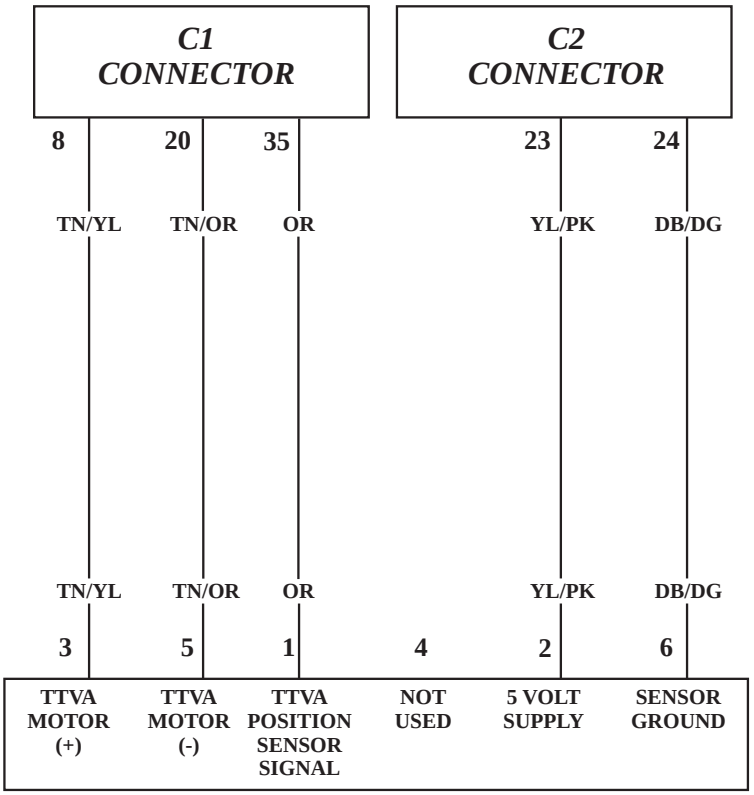


Figure 2

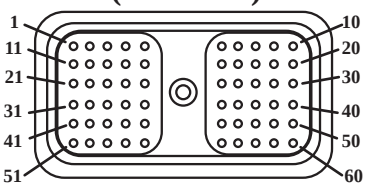
TRANSMISSION THROTTLE VALVE ACTUATOR PARTIAL ELECTRICAL SCHEMATIC

ENGINE CONTROL MODULE
(located on the front drivers side of engine)



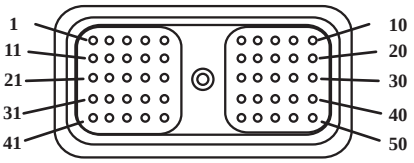
TRANSMISSION THROTTLE VALVE ACTUATOR CONNECTOR

ECM - C1 CONNECTOR (Wire side)



Note: numbers are marked on connector

ECM - C2 CONNECTOR (Wire side)



Note: numbers are marked on connector

TRANSMISSION THROTTLE VALVE ACTUATOR CONNECTOR (Face view)

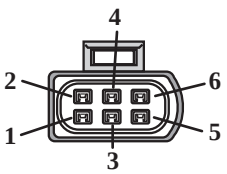


Figure 3

VOLTAGE AND PERCENTAGE CHARTS

ACCELERATOR POSITION SENSOR	CLOSED THROTTLE	WIDE OPEN THROTTLE
ACCELERATOR POSITION SENSOR 1 in %	2%	96%
ACCELERATOR POSITION SENSOR 1 Voltage	.45 V	4.56V
ACCELERATOR POSITION SENSOR 2 in %	3%	97%
ACCELERATOR POSITION SENSOR 2 Voltage	.24V	2.29V

TTVA + MOTOR CONTROL PIN #8 AT ECM C1 CONNECTOR	CLOSED THROTTLE	WIDE OPEN THROTTLE
TTVA +	2.0V-2.5V	.70V-0V

Note: back probe terminal #8 to a good ground

TTVA POSITION SENSOR SIGNAL PIN #35 AT ECM C1 CONNECTOR	CLOSED THROTTLE	WIDE OPEN THROTTLE
TTVA POSITION SENSOR SIGNAL	3.78V	.73V

Note: back probe terminal #35 to a good ground

Note: TTVA motor control and TTVA position sensor voltages are subject to change. The ECM will re-calibrate it's current "0" position when the ignition is turned on and the engine is not running for 30 seconds.

TTVA TROUBLE CODE DESCRIPTIONS

P1749 - TTVA Position Sensor Low (Electrical)

P1750 - TTVA Position Sensor High (Electrical)

P1751 - TTVA Position Minimum range Performance (Mechanical)

P1753 - TTVA Position Mechanical Performance (Mechanical)

P1754 - TTV Actuator Stuck (Electronic/Mechanical)

P1755 - TTVA Control Circuit (Electronic/Mechanical)

Figure 5

CHRYSLER DIAGNOSTIC CODES

REVISED EDITION

2 DIGIT CODE	OBD-II CODE	CODE DESCRIPTION
29	P0120	Throttle Position Sensor Signal Circuit Fault
N/A	P0121	Throttle Position Sensor Signal Performance Fault
N/A	P0122	Throttle Position Sensor/APPS Sensor Signal Low
N/A	P0123	Throttle Position Sensor/APPS Sensor Signal High
N/A	P0124	Throttle Position Sensor/APPS Sensor Signal Intermittent
N/A	P0128B	TCM Power Control Circuit 2 Low (TIPM)
N/A	P0128C	TCM Power Control Circuit 2 High (TIPM)
N/A	P0128D	TCM Power Control Circuit 2 Open (TIPM)
N/A	P0128E	TCM Power Control Circuit 2 Overcurrent (TIPM)
N/A	P0218	High Temperature Operation Activated
N/A	P0562	Low Battery or Transmission Voltage
N/A	P0563	High Battery or Transmission Voltage
19	P0600	Serial Communication Link Malfunction
N/A	P0602	PCM Programming Error - Not Programmed
N/A	P0604	Internal TCM Fault - RAM Error
16/17	P0605	Internal PCM/TCM Fault - ROM Error
N/A	P0613	Internal TCM Fault
11/13	P0700	Transmission Control System - MIL Request
N/A	P0703	Brake Switch Malfunction
28	P0705	Transmission Range Sensor Circuit Fault (PRNDL Input)
N/A	P0706	Transmission Range Sensor Range/Performance Fault
72	P0710	Transmission Fluid Temperature Sensor Circuit Fault
N/A	P0711	Transmission Fluid Temperature Sensor - No Temperature Rise After Startup
N/A	P0712	Transmission Fluid Temperature Sensor Voltage Low
N/A	P0713	Transmission Fluid Temperature Sensor Voltage High
N/A	P0714	Transmission Fluid Temperature Sensor - Intermittent Fault
56	P0715	Input Speed Sensor Fault
57	P0720	Output Speed Sensor Fault
18	P0725	Engine RPM Sensor Fault
50	P0730	Incorrect Gear Ratio Error
51	P0731	Gear Ratio Error In First
52	P0732	Gear Ratio Error In Second
53	P0733	Gear Ratio Error In Third
54	P0734	Gear Ratio Error In Fourth
N/A	P0735	Gear Ratio Error In Fifth
N/A	P0736	Gear Ratio Error In Reverse
38	P0740	Torque Converter Clutch Malfunction - Insufficient RPM Drop
N/A	P0743	Torque Converter Clutch Solenoid/Transmission Relay Circuit Problem
N/A	P0748	Pressure Control Solenoid/Transmission Relay Circuit Problem
41	P0750	Low/Reverse Solenoid Circuit Fault
N/A	P0751	O/D Switch Circuit Low More Than 5 Minutes
N/A	P0753	3-4 Solenoid/Transmission Relay Circuit Fault

CHRYSLER DIAGNOSTIC CODES

2 DIGIT CODE	OBD-II CODE	CODE DESCRIPTION
42	P0755	2-4 Solenoid Circuit Fault (41TE/42LE/42RLE)
N/A	P0755	2C Solenoid Circuit Fault (45/545RFE))
43	P0760	Overdrive Solenoid Circuit Fault
44	P0765	Underdrive Solenoid Circuit Fault
N/A	P0770	4C Solenoid Circuit Fault (45/545RFE))
46	P0783	3-4 Solenoid - Insufficient RPM Drop 4XRE) 3-4 Shift Abort (41TE/42LE)
N/A	P0838	4X4 Mode Switch Circuit Low
24	P0841	Low/Reverse Pressure Switch Sense Circuit Fault
N/A	P0845	2-4 Hydraulic Pressure Test Failure (41TE/42LE/42RLE)
N/A	P0845	2C Hydraulic Pressure Test Failure (45/545RFE)
22	P0846	2-4 Pressure Switch Sense Circuit Fault (41TE/42LE/42RLE)
N/A	P0846	2C Hydraulic Pressure Switch Sense (45/545RFE)
N/A	P0850	Park/Neutral Switch Performance Fault
N/A	P0867	Line Pressure Fault (42RLE/545RFE)
N/A	P0868	Line Pressure Low (42RLE/545RFE)
N/A	P0869	Line Pressure High (42RLE/545RFE)
N/A	P0870	Overdrive Hydraulic Pressure Test Failure
21	P0871	Overdrive Pressure Switch Sense Circuit Fault
N/A	P0875	Underdrive Hydraulic Pressure Test Failure
N/A	P0876	Underdrive Pressure Switch Sense Circuit Fault
N/A	P0882	TCM Power Input Too Low
N/A	P0883	TCM Power Input Too High
N/A	P0884	Power Up At Speed - TCM Power Supply Intermittent
15	P0888	Transmission Control Relay Always Off
20	P0890	Switched Battery
14	P0891	Transmission Control Relay Always On
73	P0897	Worn Out/Burnt Transaxle Fluid
N/A	P0930	Brake Transmission Shift Interlock (BTSI) Control Circuit Low
N/A	P0931	Brake Transmission Shift Interlock (BTSI) Control Circuit High
N/A	P0932	Line Pressure Sensor Fault
N/A	P0934	Line Pressure Sensor Circuit Low
N/A	P0935	Line Pressure Sensor Circuit High
35	P0944	Loss Of Prime
70	P0951	Auto-Stick Sensor Circuit (41TE/42LE)
N/A	P0952	Auto-Stick Sensor Input Circuit Low (41TE/42LE/42RLE)
N/A	P0957	Auto-Stick Sensor Input Circuit Low (545RFE)
N/A	P0958	Auto-Stick Sensor Input Circuit High (545RFE)
N/A	P0973	Transmission Overdrive Circuit Voltage Too Low (Diesel Only)
N/A	P0974	Transmission Overdrive Circuit Voltage Too High (Diesel Only)
N/A	P0987	4C Hydraulic Pressure Test Failure (45/545RFE)
N/A	P0987	Overdrive Pressure Test Failure (41TE/42LE/42RLE)
N/A	P0988	4C Pressure Switch Sense Circuit Fault (45/545RFE)
N/A	P0988	2-4 Pressure Test Failure (41TE/42LE/42RLE)
N/A	P0992	2-4/OD Hydraulic Pressure Test Failure (41TE/42LE/42RLE)
N/A	P1594	Charging System Voltage Too High

CHRYSLER DIAGNOSTIC CODES

2 DIGIT CODE	OBD-II CODE	CODE DESCRIPTION
N/A	P1634	TCM Internal Watchdog Circuit Performance Fault
N/A	P1652	Serial Communication Link Malfunction
12	P1684	Battery Was Disconnected
N/A	P1687	No Communication With Mechanical Instrument Cluster (MIC)
N/A	P1693	Code In Companion Module (24 Valve Diesel Only)
N/A	P1694	No BUS Communication With Engine Module (AW4 Transmission Only)
N/A	P1695	No CCD Message From BCM/No Body BUS Message
N/A	P1698	No CCD Message From PCM/TCM
N/A	P1713	Restricted Port In T2 Range
N/A	P1714	Low Battery Voltage
N/A	P1715	Restricted Port In T3 Range (False Code With Generic Scan Tool, See P0750
N/A	P1716	No BUS Communication With Engine Module
N/A	P1717	No Communication With MIC (False Code With Generic Scan Tool, See P0760)
N/A	P1719	Skip Shift Solenoid Fault (Standard Transmission Only)
N/A	P1720	Loss Of Output Speed Sensor Signal
N/A	P1721	Line Pressure Sensor Circuit Fault (45/545RFE)
N/A	P1722	Line Pressure Sensor Low (45/545RFE)
N/A	P1724	Line Pressure Sensor High (45/545RFE)
N/A	P1726	Underdrive Hydraulic Pressure Switch Circuit Fault (45/545RFE)
N/A	P1727	4C Hydraulic Pressure Switch Circuit Fault (45/545RFE)
N/A	P1727	Overdrive Hydraulic Pressure Switch Circuit Fault (41TE/42LE/42RLE))
N/A	P1728	2C Hydraulic Pressure Switch Circuit Fault (45/545RFE)
N/A	P1728	2-4 Hydraulic Pressure Switch Circuit Fault (41TE/42LE/42RLE))
22	P1728	2-4 Pressure Switch Circuit Fault (41TE/42LE/42RLE))
N/A	P1732	Underdrive Pressure Switch Sense Circuit Fault (45/545RFE)
N/A	P1733	4C Pressure Switch Sense Circuit Fault (45/545RFE)
21	P1733	Overdrive Pressure Switch Circuit Fault (41TE/42LE/42RLE))
N/A	P1734	2C Pressure Switch Sense Circuit Fault (45/545RFE)
22	P1734	2-4 Pressure Switch Sense Circuit Fault (41TE/42LE/42RLE))
N/A	P1735	Inadequate Element Volume 4C (45/545RFE)
62	P1735	Overdrive Inadequate Element Volume (41TE/42LE/42RLE)
N/A	P1736	Gear Ratio Error In 2nd Prime (45/545RFE)
N/A	P1737	MS Solenoid Circuit Fault (45/545RFE)
75	P1738	High Temperature Logic Activated
76	P1739	Power Up At Speed
N/A	P1740	TCC/O/D Solenoid Performance (4XRE)
N/A	P1745	Transmission Line Pressure Too High For Too Long (45/545RFE)
N/A	P1749	Transmission Throttle Valve Position Sensor Circuit Low (4XRE)
N/A	P1750	Transmission Throttle Valve Position Sensor Circuit High (4XRE)
N/A	P1751	Transmission Throttle Valve Position Sensor Minimum Range Performance (4XRE)
N/A	P1752	Transmission Throttle Valve Span Performance Fault (4XRE)
N/A	P1753	Transmission Throttle Valve Span Mechanical Fault (4XRE)
N/A	P1754	Transmission Throttle Valve Actuator Is Stuck (4XRE)
N/A	P1755	Transmission Throttle Valve Control Circuit Fault (4XRE)
N/A	P1756	Governor Pressure Not Equal To Target @ 15-20 PSI (4XRE)

CHRYSLER DIAGNOSTIC CODES

2 DIGIT CODE	OBD-II CODE	CODE DESCRIPTION
N/A	P1757	Governor Pressure Above 3 PSI In Gear @ 0 MPH (4XRE)
26	P1762	Governor Pressure Sensor Offset Volts Too High Or Low (4XRE)
N/A	P1763	Governor Pressure Sensor Offset Volts Too High (4XRE)
N/A	P1764	Governor Pressure Sensor Offset Volts Too Low (4XRE)
20	P1765	Switched Battery (41TE/42LE/42RLE)
N/A	P1765	Transmission 12 Volt Supply Relay Control Circuit Fault (4XRE)
14	P1767	Transmission Relay Output Always ON
15	P1768	Transmission Relay Output Always OFF
60	P1770	Inadequate Element Volume Low/Reverse (CVI) (All TE/RE/RLE & RFE Models)
N/A	P1771	Inadequate Element Volume 2C (CVI) (45/545RFE)
61	P1771	Inadequate Element Volume 2-4 (CVI) (41TE/42LE/42RLE)
62	P1772	Inadequate Element Volume OD (CVI) (All TE/RE/RLE & RFE Models)
N/A	P1773	Inadequate Element Volume UD (CVI) (45/545RFE)
37	P1775	Solenoid Switch Valve Latched In TCC Position
47	P1776	Solenoid Switch Valve Latched In Low/Reverse Position
21	P1780	Overdrive Pressure Switch Sense Circuit Fault
22	P1781	2-4 Pressure Switch Sense Circuit Fault
23	P1782	2-4/OD Pressure Switch Sense Circuit Fault
24	P1783	Low/Reverse Pressure Switch Sense Circuit Fault
25	P1784	L/R/OD Pressure Switch Sense Circuit Fault
26	P1785	L/R/2-4 Pressure Switch Sense Circuit Fault
27	P1786	All Pressure Switch Sense Circuit Fault
31	P1787	Overdrive Hydraulic Pressure Switch Circuit Fault
32	P1788	2-4 Hydraulic Pressure Switch Circuit Fault
33	P1789	2-4OD Hydraulic Pressure Switch Circuit Fault
36	P1790	Fault Immediately After Shift
35	P1791	Loss Of Prime
12	P1792	Battery Was Disconnected
48	P1793	TRD Link Communication Error
58	P1794	Speed Sensor Ground Fault
45	P1795	Internal Transmission Controller Fault
70	P1796	Autostick Input Circuit Failure
71	P1797	Manual Shift Overheat
73	P1798	Worn Out/Burnt Transaxle Fluid
74	P1799	Calculated Oil Temperature In Use
N/A	P1899	P/N Performance (Stuck In Park)
N/A	P2700	Inadequate Element Volume Low/Reverse (CVI) (AllTE/LE/RLE/RFE Models)
N/A	P2701	Inadequate Element Volume 2C (CVI) (45/545RFE)
N/A	P2701	Inadequate Element Volume 2-4 (CVI) (41TE/42LE/42RLE)
N/A	P2702	Inadequate Element Volume OD (CVI) (45/545RFE)
N/A	P2703	Inadequate Element Volume UD (CVI) (45/545RFE)
N/A	P2704	Inadequate Element Volume 4C (CVI) (45/545RFE)
N/A	P2704	Inadequate Element Volume OD (CVI) (41TE/42LE/42RLE)
N/A	P2706	MS Solenoid Circuit Fault
N/A	P2769	Transmission TCC Control Circuit Low (48RE Diesel Only)
N/A	P2770	Transmission TCC Control Circuit High (48RE Diesel Only)

CHRYSLER/JEEP DIAGNOSTIC CODES WITH NAG 1 TRANSMISSION ONLY

2 DIGIT CODE	OBD-II CODE	CODE DESCRIPTION
N/A	P0219	Engine Overspeed
N/A	P0602	TCM Programming Error (TCM Not Programmed)
N/A	P0642	I/O Speed Sensor 6 Volt Reference Voltage 1 Circuit Fault
N/A	P0643	I/O Speed Sensor 6 Volt Reference Voltage 1 Circuit Low
N/A	P0657	Solenoid Supply Voltage Circuit Fault
N/A	P0717	Input Speed Sensor Circuit 1 - No Signal
N/A	P0742	TCC Stuck ON
N/A	P0752	1/2-4/5 Solenoid Circuit Fault
N/A	P0758	2-3 Solenoid Circuit Fault
N/A	P0762	3-4 Solenoid Circuit High
N/A	P0763	3-4 Solenoid Circuit Low
N/A	P0778	Shift Pressure Solenoid Fault
N/A	P1629	TCM Internal Fault-Solenoid Watchdog Circuit - Solenoid Power Did Not Shutdown
N/A	P1631	TCM Internal Fault-Solenoid Watchdog Circuit - Processor Clock Performance Problem
N/A	P1632	TCM Internal Fault - Internal Watchdog Circuit Performance Test Failed
N/A	P1633	TCM Internal Fault - External Watchdog Circuit Performance Test Failed
N/A	P1636	TCM Internal Fault - External Watchdog Performance Problem
N/A	P1637	TCM Internal Fault - EEPROM Performance RAM Fault
N/A	P1638	TCM Internal Fault - CAN 1 RAM Performance Fault
N/A	P1639	TCM Internal Fault - CAN 2 RAM Performance Fault
N/A	P1644	TCM Incorrect Variant/Configuration - Incorrect Vehicle Application Code
N/A	P1704	Input Speed Sensor 1 Overspeed
N/A	P1705	Input Speed Sensor 2 Overspeed
N/A	P1731	Incorrect Gear Engaged
N/A	P2638	Torque Management Feedback Signal Performance Fault
N/A	P2767	Input Speed Sensor Circuit 2 - No Signal
N/A	P2783	Torque Converter Temperature Too High
N/A	P2784	Input Speed Sensor 1/2 Correlation Problem

CHRYSLER DIAGNOSTIC CODES WITH F4A40/50 SERIES TRANSMISSION ONLY

2 DIGIT CODE	OBD-II CODE	CODE DESCRIPTION
11	P0122	Throttle Position Sensor Signal - Short Circuit
12	P0123	Throttle Position Sensor Signal - Open Circuit
14	P0121	Throttle Position Sensor Out Of Adjustment
15	P0713	Transmission Fluid Temperature Sensor Circuit Open
16	P0712	Transmission Fluid Temperature Sensor Circuit Short
21	P0335	Crankshaft Position Sensor Circuit Open
22	P0715	Input Speed Sensor Circuit Failure
23	P0720	Output Speed Sensor Circuit Failure
26	N/A	Stoplight Switch Circuit Shorted
27	P0705	Transmission Range Sensor Circuit Open
28	P0705	Transmission Range Sensor Circuit Shorted
31	P0753	Low/Reverse Solenoid Circuit Failure (Shift Solenoid “A”)
32	P0758	Underdrive Solenoid Circuit Failure (Shift Solenoid “B”)
33	P0763	Second Solenoid Circuit Failure (Shift Solenoid “C”)
34	P0768	Overdrive Solenoid Circuit Failure (Shift Solenoid “D”)
36	P0743	Torque Converter Clutch Solenoid Circuit Failure (Shift Solenoid “E”)
41	P0731	1st Gear Incorrect Ratio
42	P0732	2nd Gear Incorrect Ratio
43	P0733	3rd Gear Incorrect Ratio
44	P0734	4th Gear Incorrect Ratio
46	P0736	Reverse Gear Incorrect Ratio
52	P0741	TCC Stuck OFF
53	P0742	TCC Stuck ON
54	P1751	A/T Control Relay Circuit Failure
56	N/A	“N” Range Lamp System Circuit Open (Vehicles With Sport Mode Only)

NOTE: When using a generic scan tool to retrieve the above codes, always retrieve the two digit codes for accuracy as the OBD-II codes have been known to be unreliable.

41TE / 42LE

FAULT CODE P0605 / MODELS WITH TCM ONLY

COMPLAINT: A Chrysler Corporation vehicle equipped with a 41TE(A604) or a 42LE(A606) automatic transaxle and a transmission control module(TCM) comes to the shop in limp mode. Checking for fault codes with a scan tool reveals a code P0605 defined as an internal TCM read only memory(ROM) error.

CAUSE: The cause is a faulty TCM possibly induced by system voltage irregularities.

CORRECTION: Check for any system voltage concerns such as a weak battery or a defective alternator that may cause a low charge or an over charge condition and repair or replace as necessary.
Clean all battery cable connections including main ground cable at engine or transaxle and body ground.
With a volt meter, check for battery voltage always present at TCM pin 56, key off or on. With the key on and/or the engine running, there must be battery voltage at pin 11. Verify good grounds for any wires located at TCM pins 53 and/or 57. See wire diagram in figure 1.
With key off and battery disconnected, clean TCM connector and check pin terminals 11, 53, 56 and 57 for loose fit on TCM pins. For TCM connector terminal ID refer to figure 2.
Replace the TCM and reconnect the battery.

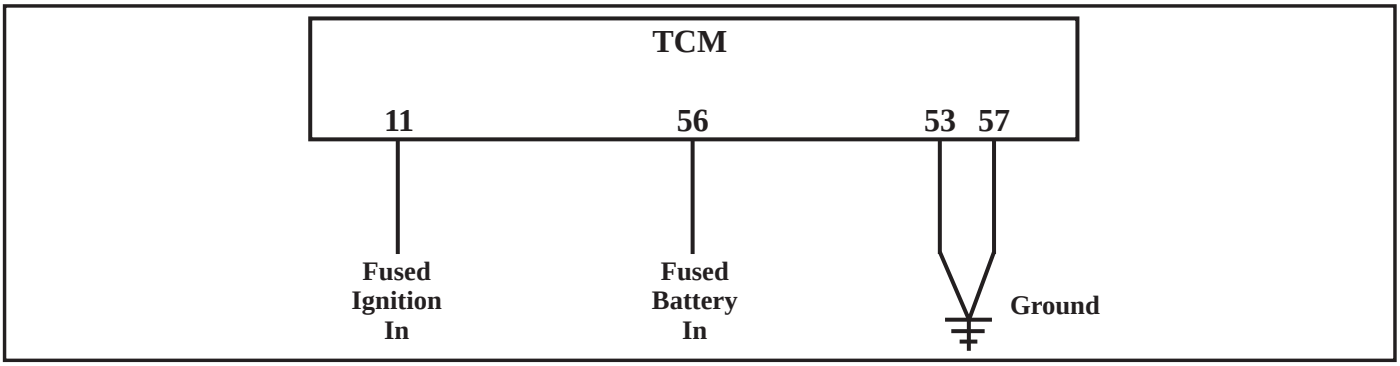


Figure 1

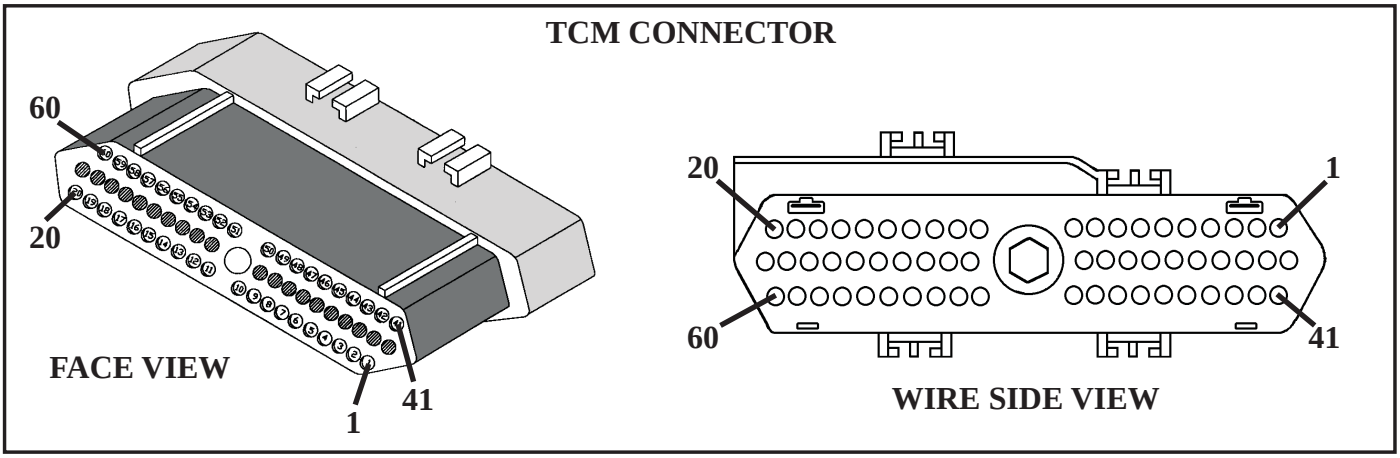


Figure 2

2001 & LATER CHRYSLER/DODGE VEHICLES

INTEGRATED POWER MODULE (IPM)

COMPLAINT: A late model Dodge or Chrysler truck or van comes into the shop with a code P1768 (EATX Relay Stuck Off) stored in the TCM and the transmission is in limp mode.

CAUSE: Beginning in the 2001 model year with the front wheel drive mini-vans, the Power Distribution Center (PDC), in the engine bay was replaced by what Dodge division called the Integrated Power Module. Chrysler division called this the Intelligent Power Module. The major difference between the previous PDC and the current IPM is the various fuses and relays make their connection through electronic circuit boards rather than direct connection as previously done.
The EATX relay is located in this IPM (Refer to Figure 1), the code indicates that the TCM energized the relays coil, but it did not see switched battery voltage at TCM terminals 16 and 17. In some instances the relay would be suspect, but with an IPM, it may not be the relay. In this scenario it was one of the relays solder points in the IPM circuit board.
Referencing the electrical diagram in Figure 2, relay circuit 85 was open, these circuit numbers are imprinted on the IPM in the vicinity of the circuit location. Even though the relay coil was receiving power on relay circuit 86, without a ground, the relay would be stuck off, hence the code and failsafe condition.

CORRECTION: Once the suspect circuit is verified with an ohm meter by placing the meter leads between solder point on the circuit board and its mating terminal in the C3 connector that plugs into the bottom of the IPM, (Refer to Figure 3), the IPM can be repaired.
The IPM circuit board can be re-soldered at the circuit 85 location in the C3 connector as seen in Figure 3.
NOTE: If the relay and electronic circuit board are verified good, the circuit wiring would be next in line as the cause of these type of complaints.

Many thanks to Mike Miskowitz for sharing his experience with us and for supplying the IPM.

FRONT VIEW OF THE INTEGRATED POWER MODULE

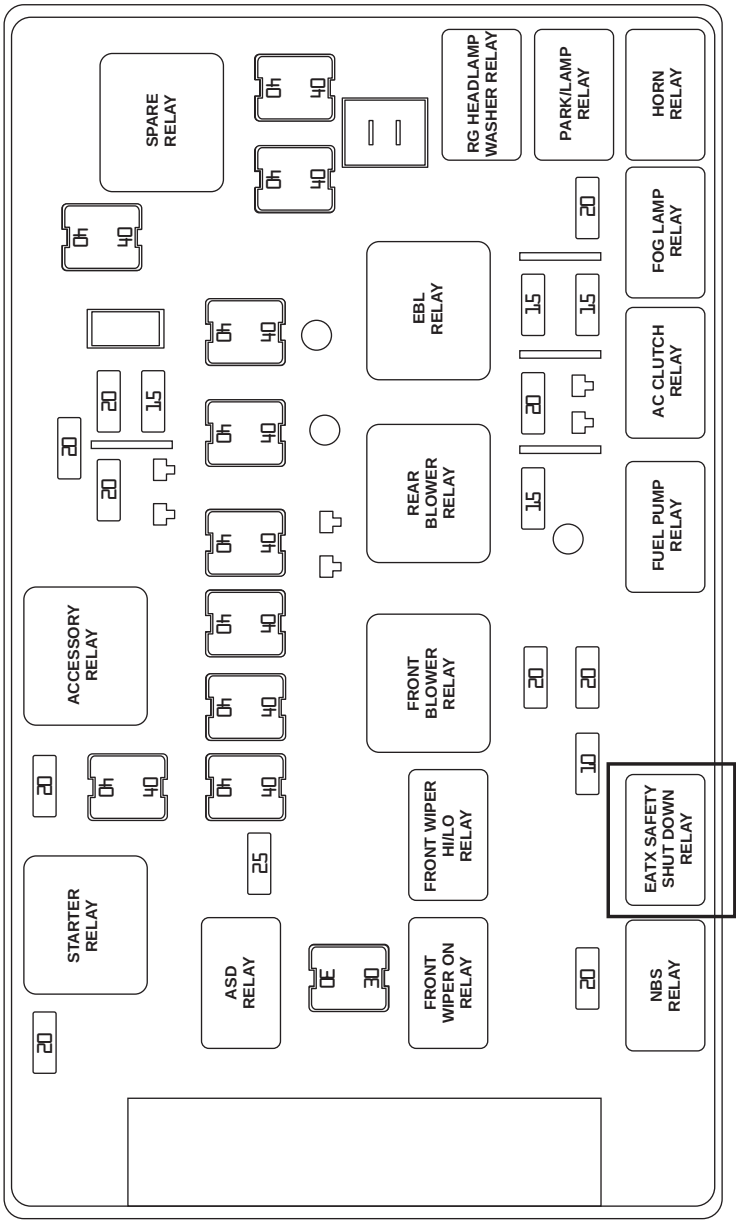


Figure 1

INTEGRATED POWER MODULE EATX RELAY DIAGRAM

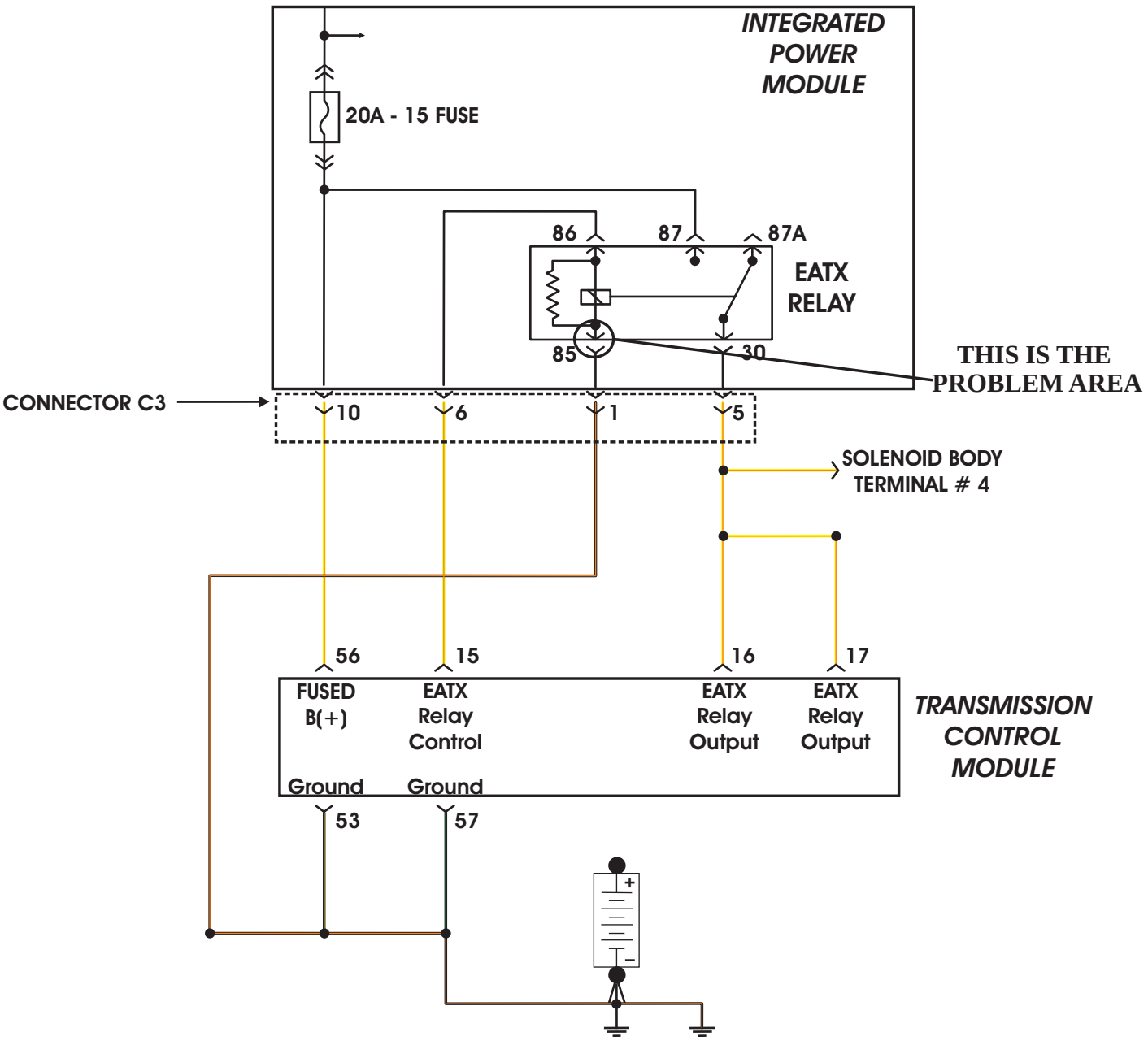


Figure 2

AXIOM

Valve Body Pro

Not Valve Body Express

REAR VIEW OF THE INTEGRATED POWER MODULE

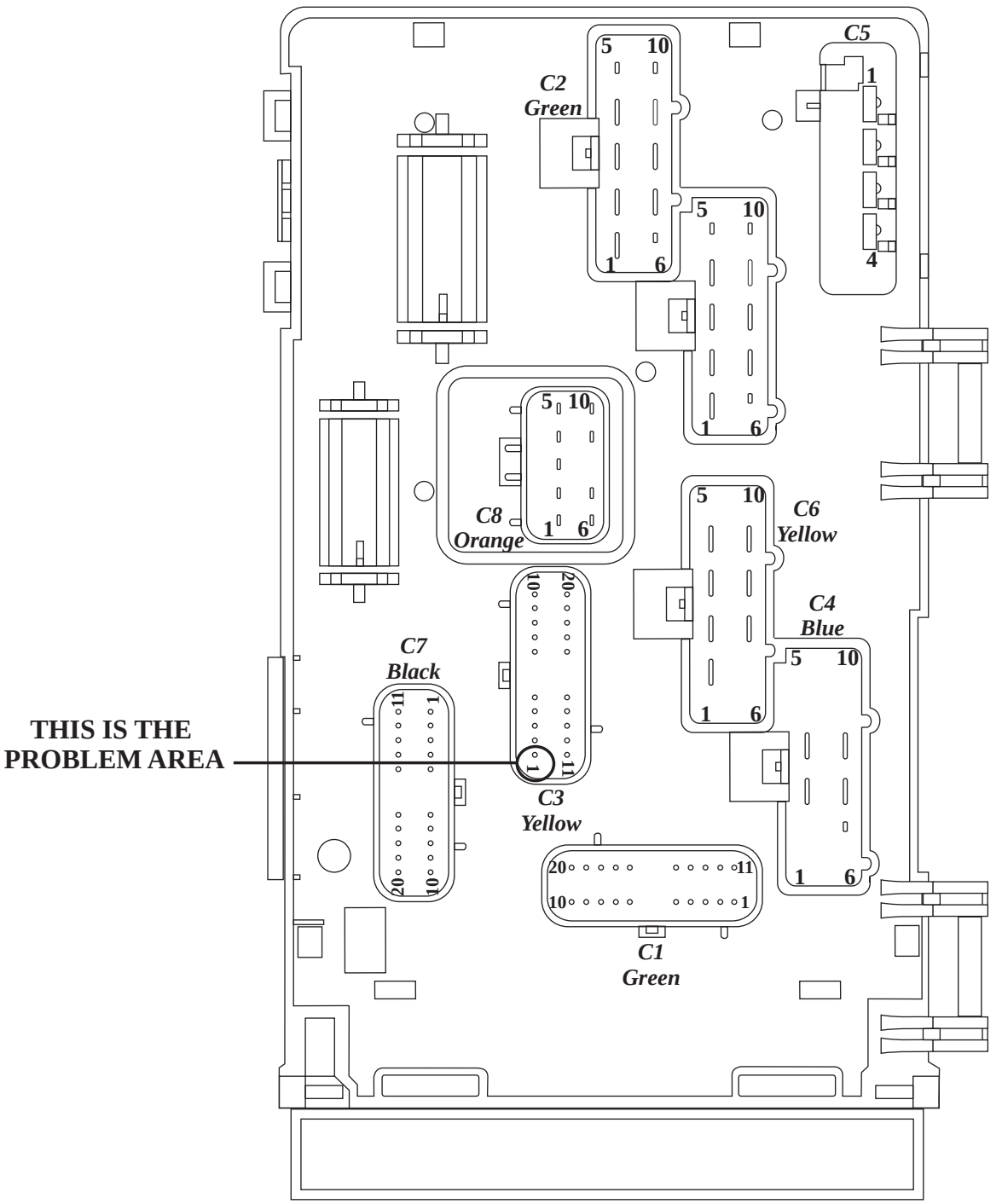


Figure 3

ZOOM

CHRYSLER/DODGE/JEEP NAG 1
TCC OR SHIFT SHUDDER

COMPLAINT: Some 2005-06 Chrysler/Dodge/Jeep, 300, Magnum, Charger and Grand Cherokee equipped with the Mercedes 722.6 or NAG 1, may exhibit shift shudders and or a complaint of harsh Torque Converter application.

CAUSE: The cause may be, a defective fill tube seal allowing water intrusion, contaminating the transmission fluid, creating shuddering shifts, harsh Torque Converter application and premature transmission failure.

CORRECTION: To correct this condition, repair internal components as water intrusion will destroy rubber seals and create friction disintegration, not only inside of the transmission but in the Torque Converter as well. Ensure that all of the models listed above have the Water Shield in place. The kit consists of a new Fill tube seal, longer bolt and a Water Shield, as shown in Figure 1. If this repair is being attempted in the vehicle as per TSB number 21-011-05 Revision A, use a C-clamp to install the Fill Tube Seal, after using a small bit of silicone sealant onto its sealing surfaces inside and out, as shown in Figure 2. ***Caution: It is going to be very difficult to flush out all of the water in this trans.*** Refer to Figure 3 for the installation of the Water Shield, on the transmission.

SERVICE INFORMATION:

FILL TUBE AND WATER SHIELD PACKAGE (Chrysler part number).....CBL0E131

FILL TUBE AND WATER SHIELD PACKAGE

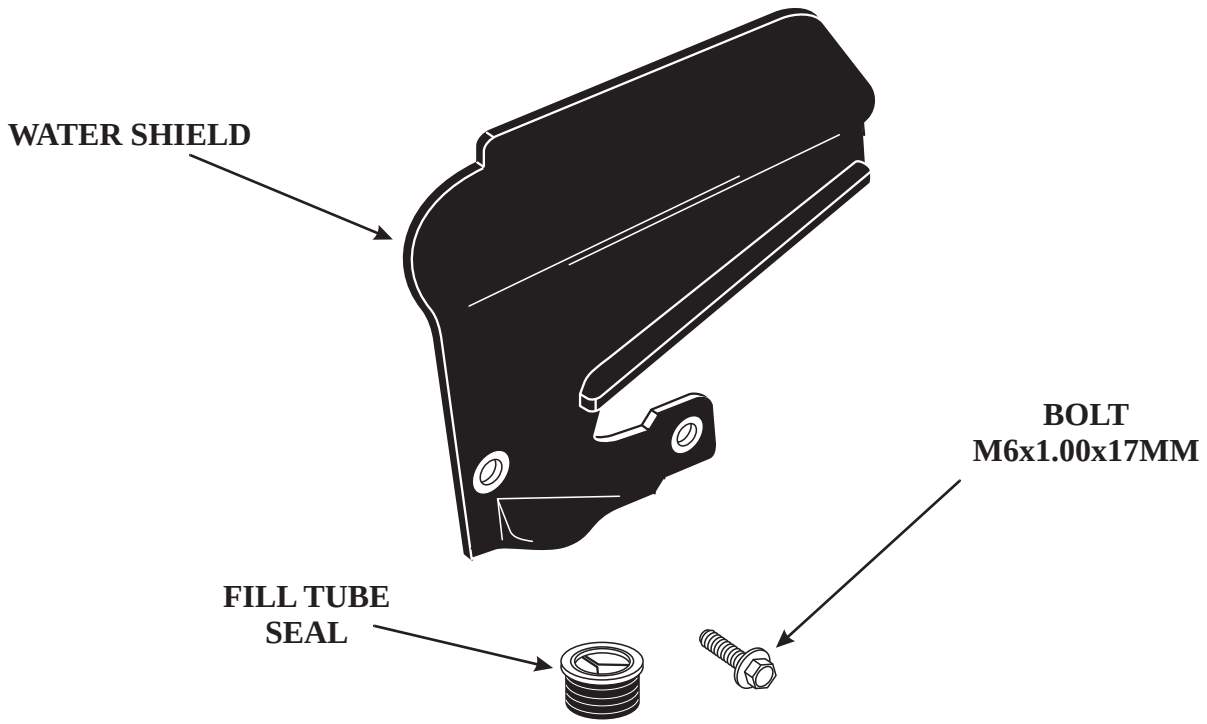
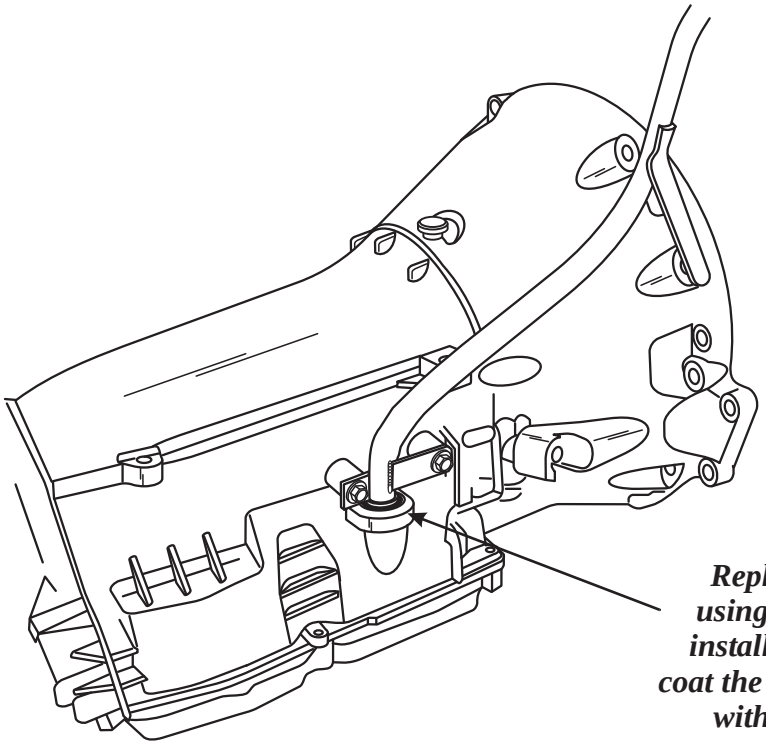


Figure 1

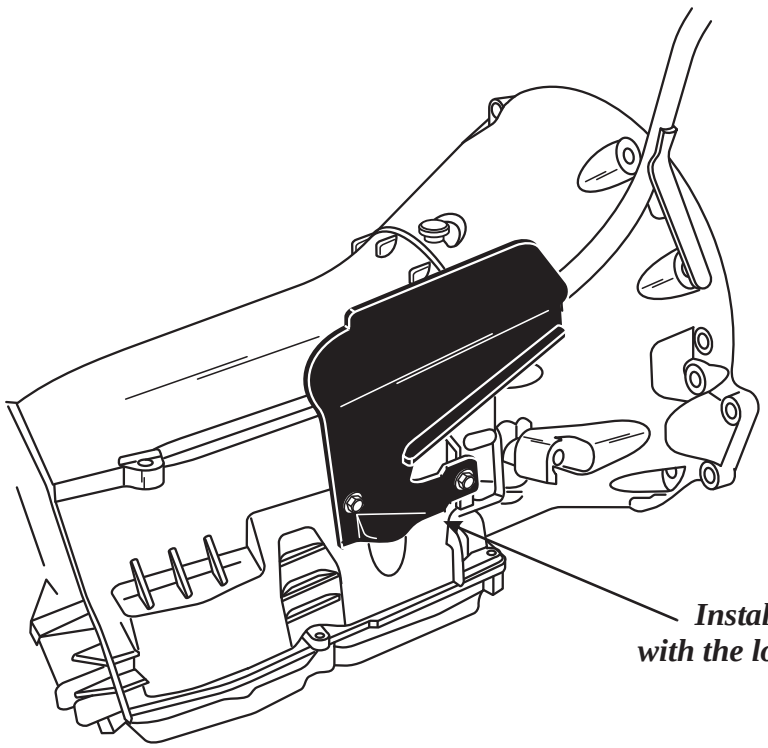
FILL TUBE SEAL INSTALLATION



Replace fill tube seal using a C clamp for an installation tool. Lightly coat the two sealing surfaces with silicone sealant

Figure 2

WATER SHIELD INSTALLATION



Install Water Shield with the longer bolt supplied

Figure 3

VOLVO AW55-50SN

NO LOCKUP AFTER REBUILD

COMPLAINT: No lockup after rebuild, with code P0740 stored.

CAUSE: Incorrect Forward/Direct clutch housing input shaft diameter used. The outside diameter of the different shafts are 0.844 and 0.870 (See Figure 1). If the smaller shaft was installed in place of the larger shaft , there will be a loss of lockup apply oil between the input shaft bushing journal and the undersized bushings in the pump stator shown in Figure 2 .

CORRECTION: Replace the drum with the correct diameter forward drum input shaft.

SERVICE INFORMATION:

The inner diameter stator bushings will correspond to the outside diameter of the forward drum shaft, along with the inside diameter of both the front and rear sun gears as seen in figures 3 and 4. The larger shaft Forward/Direct drum is designed for Turbo and/or All Wheel Drive vehicles with larger engines, and will retro fit as a complete assembly.

FORWARD (C1)/DIRECT (C2) CLUTCH HOUSING

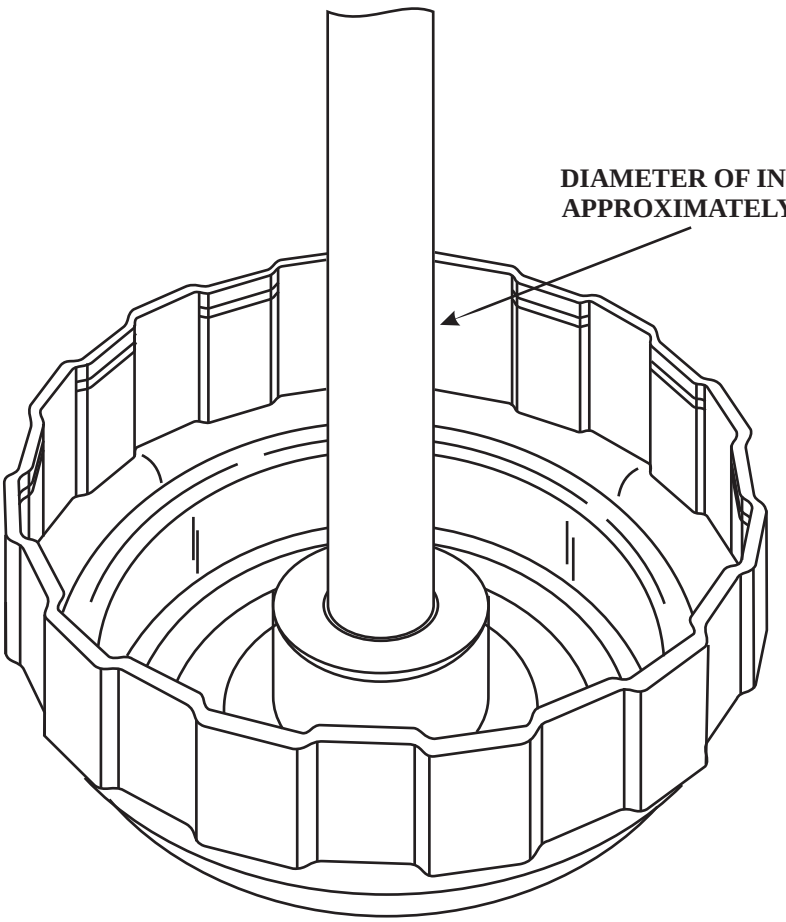


Figure 1

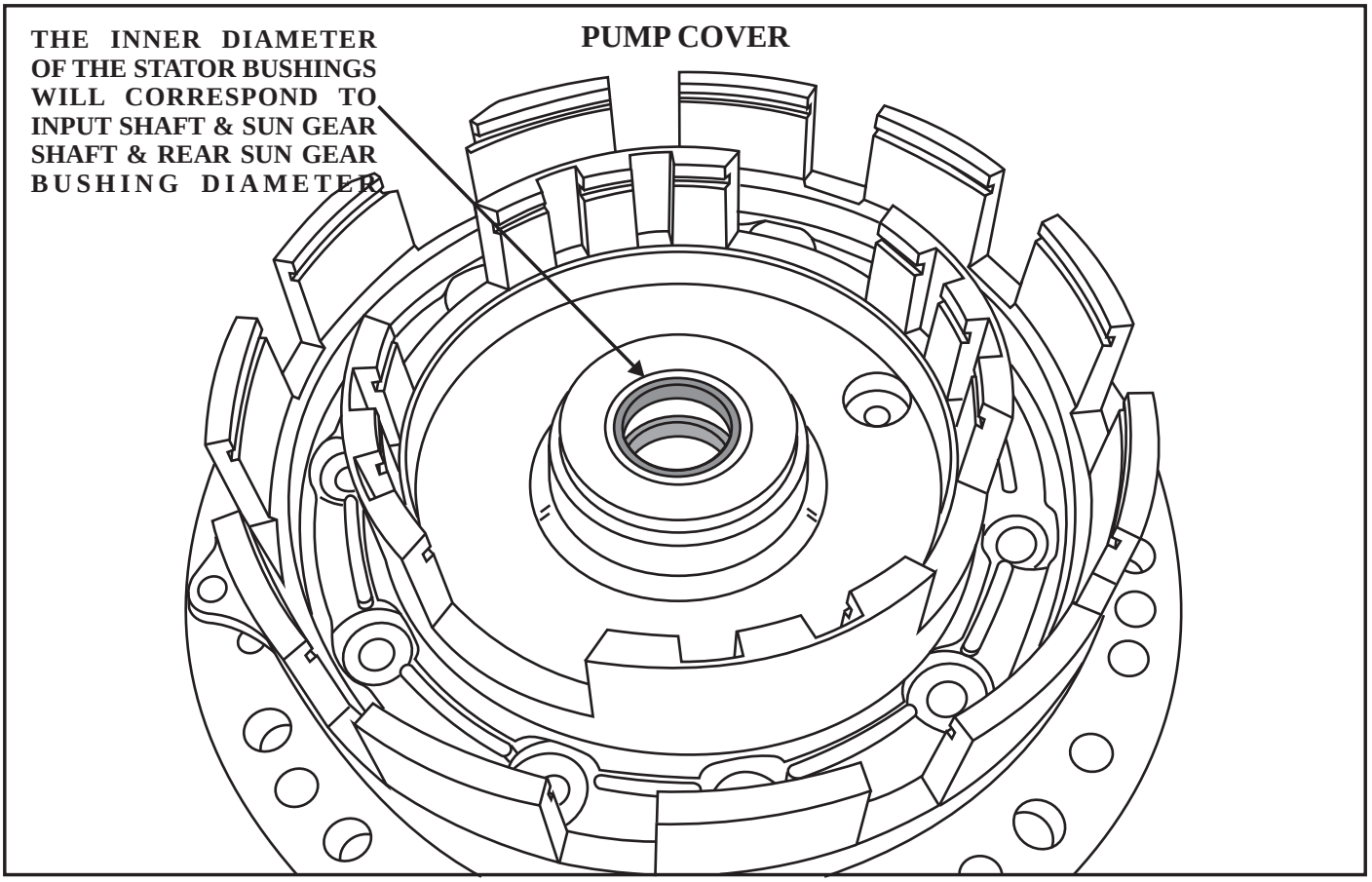


Figure 2

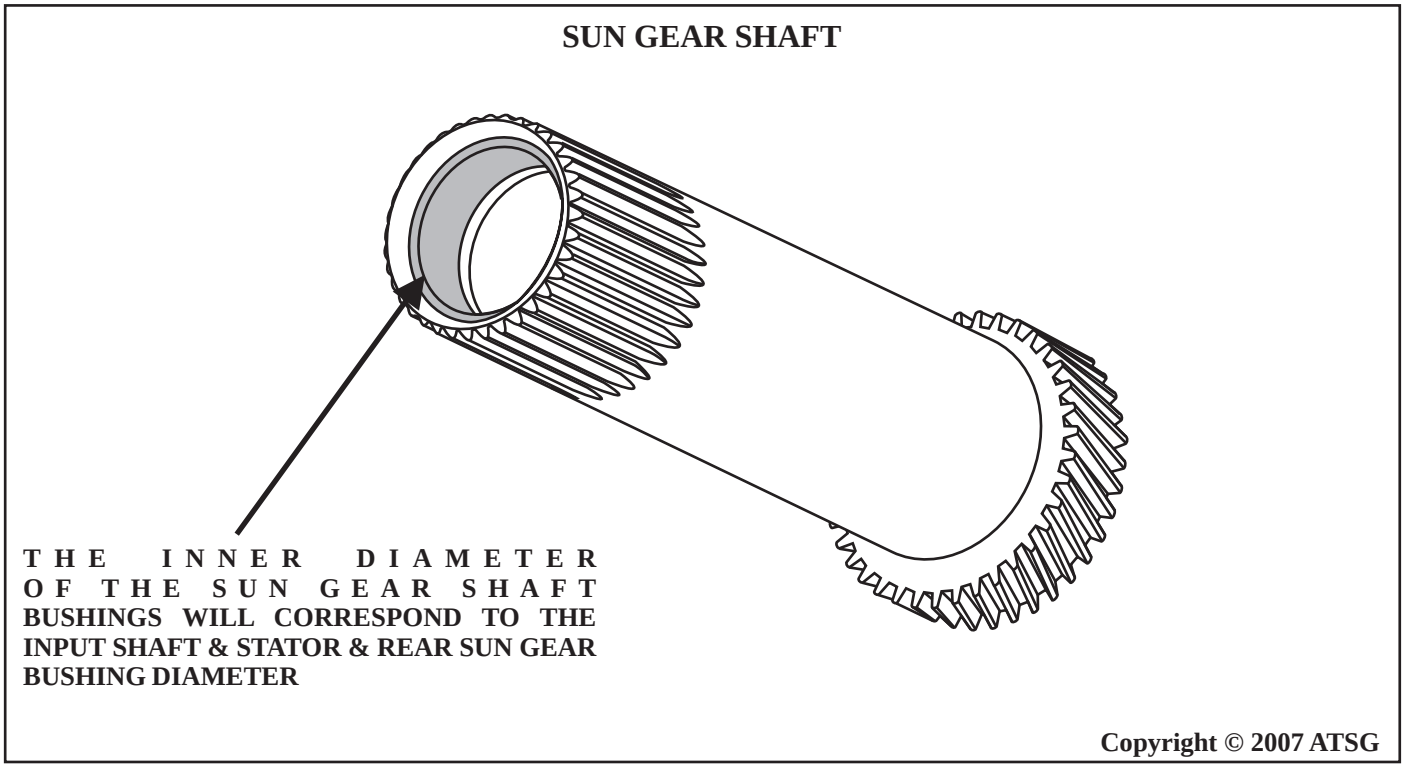


Figure 3

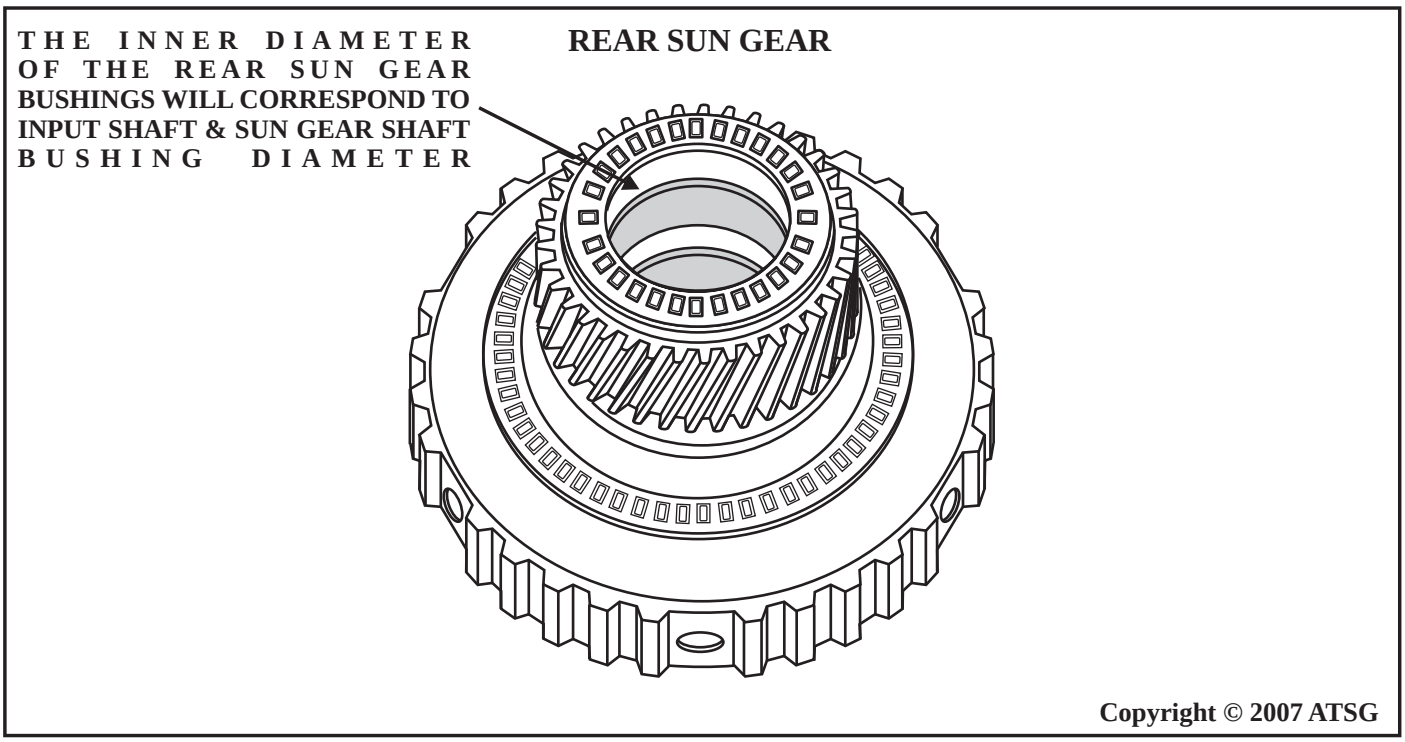

THE INNER DIAMETER OF THE REAR SUN GEAR BUSHINGS WILL CORRESPOND TO INPUT SHAFT & SUN GEAR SHAFT BUSHING DIAMETER
REAR SUN GEAR
Copyright © 2007 ATSG

Figure 4

HONDA

CODE P1298 DIAGNOSIS, ELD CIRCUIT HIGH

COMPLAINT: The vehicle may come into the shop with complaints of, Code P1298 stored (ELD Voltage High) and the TCM/PCM may store any of the following solenoid codes, P0753, P0758, P0763, P1768 or P1773.

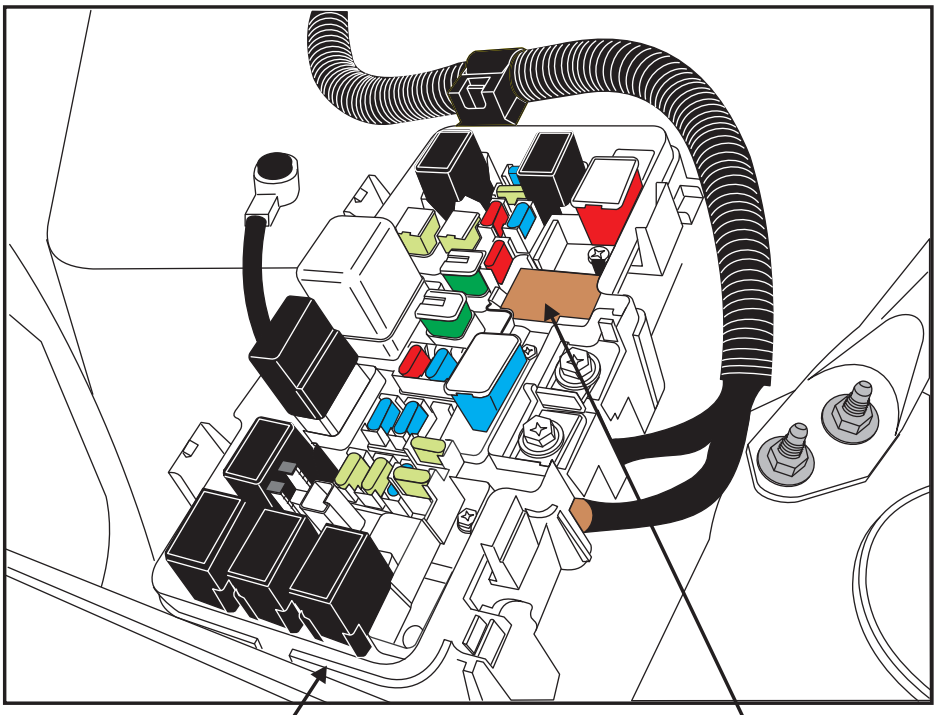
CAUSE: The Electronic Load Detector (ELD), located in the under hood fuse box (Refer to Figure 1), has failed allowing the alternator to overcharge which causes high system voltage which results in ***causing solenoid codes to be stored falsely.***
NOTE: The above complaints can also be caused by the failure of the #15 fuse on earlier models or the #4 fuse on later models, both of which are in the underdash fuse box.
The #15 fuse usually blows on Civics due a wire harness under the intake manifold rubbing through the insulation causing a short to ground. When this fuse blows, the transmission will be stuck in 4th gear, the ELD will not have power and the speedometer will be inoperative.

The ELD could easily be mis-diagnosed if the way it operates is unknown. The ELD limits the amount of alternator output voltage when there is no electrical load sensed. This puts less load on the engine at idle for emission purposes and provides better fuel economy on the highway. Under this "no load" condition a voltmeter across the battery may show open post voltage only (12.6V). Turn the headlights on, and now, the voltmeter would indicate about 14.6V.
The transmission problems occur due to high voltage conditions due to high alternator output as a result of a failed ELD which explains the P1298 code definition of ELD circuit high.

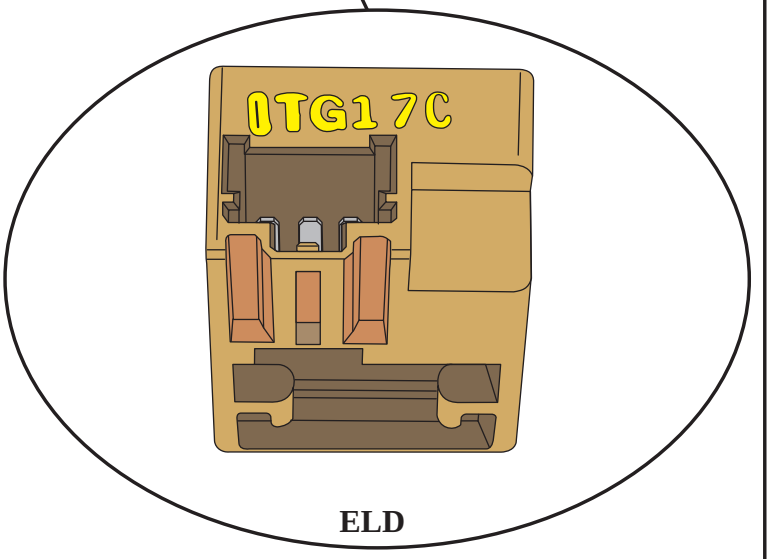
CORRECTION: **Always diagnose the P1298 FIRST.** Start by verifying proper alternator output. The ELD connector which is located on the underside of the underhood fuse box is a three terminal arrangement which is shown in the wiring diagram in Figure 2. Terminal one is the battery voltage supply for the ELD which is fused by the #15 or #4 fuse that was discussed above. Terminal two is ground. Terminal three is ELD voltage output which should drop to about 3 volts with the headlights on.
If the voltage does not drop, the ELD is faulty. If the voltage does drop, the ECM may be at fault.

SERVICE INFORMATION:
The ELD can be bought separately on some models, while on others the entire underhood fuse box must be bought, check with your local Honda dealer.

ELECTRONIC LOAD DETECTOR (ELD) LOCATION



UNDERHOOD FUSE BOX



ELD

THE ELD IS ACCESSED FROM THE UNDERSIDE OF FUSE BOX

Figure 1

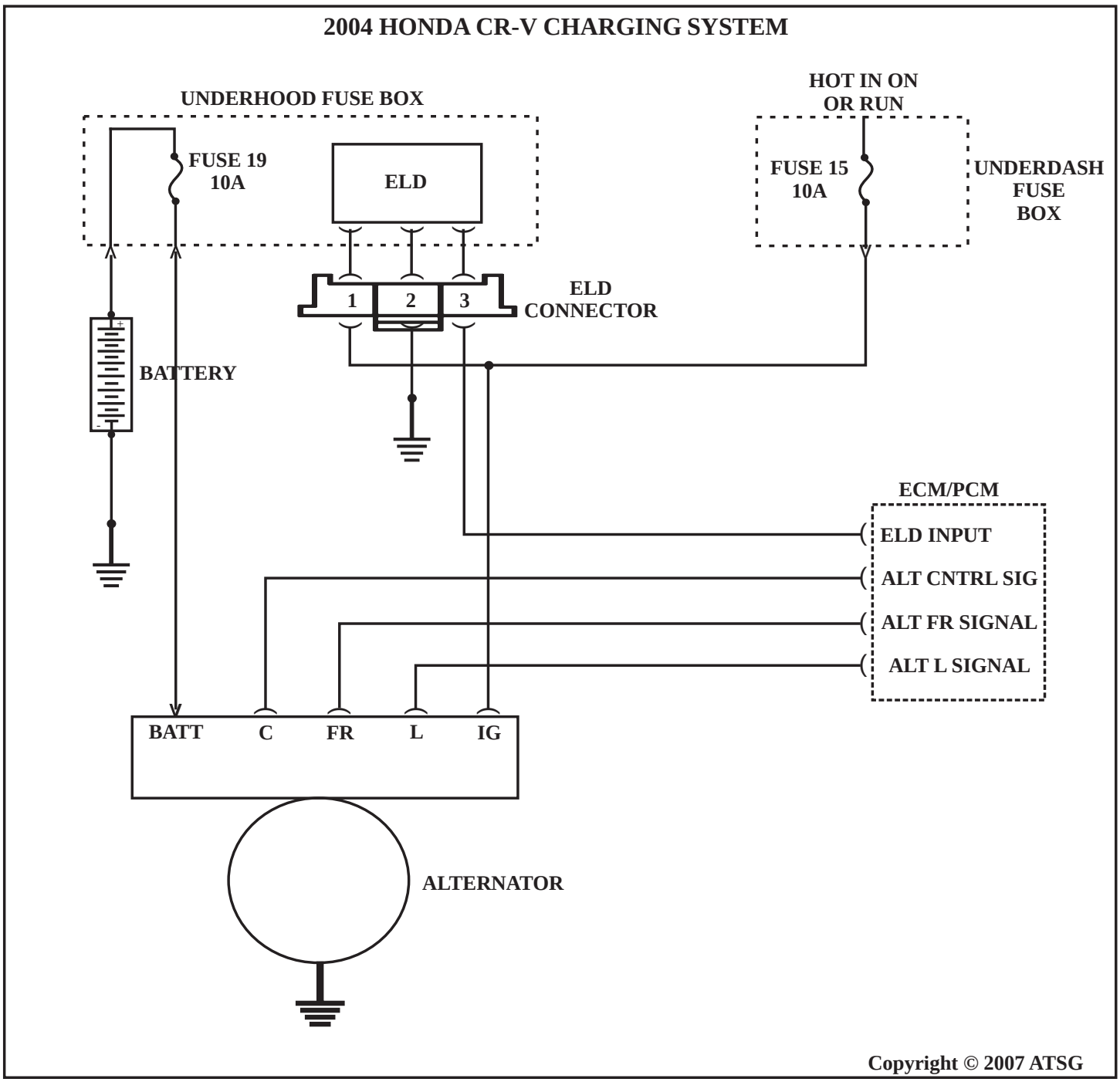

2004 HONDA CR-V CHARGING SYSTEM
UNDERHOOD FUSE BOX
FUSE 19
10A
ELD
HOT IN ON
OR RUN
FUSE 15
10A
UNDERDASH
FUSE
BOX
1
2
3
ELD
CONNECTOR
BATTERY
ECM/PCM
ELD INPUT
ALT CNTRL SIG
ALT FR SIGNAL
ALT L SIGNAL
BATT
C
FR
L
IG
ALTERNATOR
Copyright © 2007 ATSG

Figure 2

HONDA

SHIFTER STUCK IN PARK

COMPLAINT: This bulletin applies to 2003-04 Accords, 2002-04 Elements and 2002-04 CR-Vs with automatic transmission. The manual shift lever cannot be taken out of the park position, (Refer to Figure 1), the only previous work done was the replacement of the throttle body, (Refer to Figure 2).

CAUSE: Whenever the throttle body is replaced on the above mentioned vehicles, the PCM needs to relearn the relative throttle position.

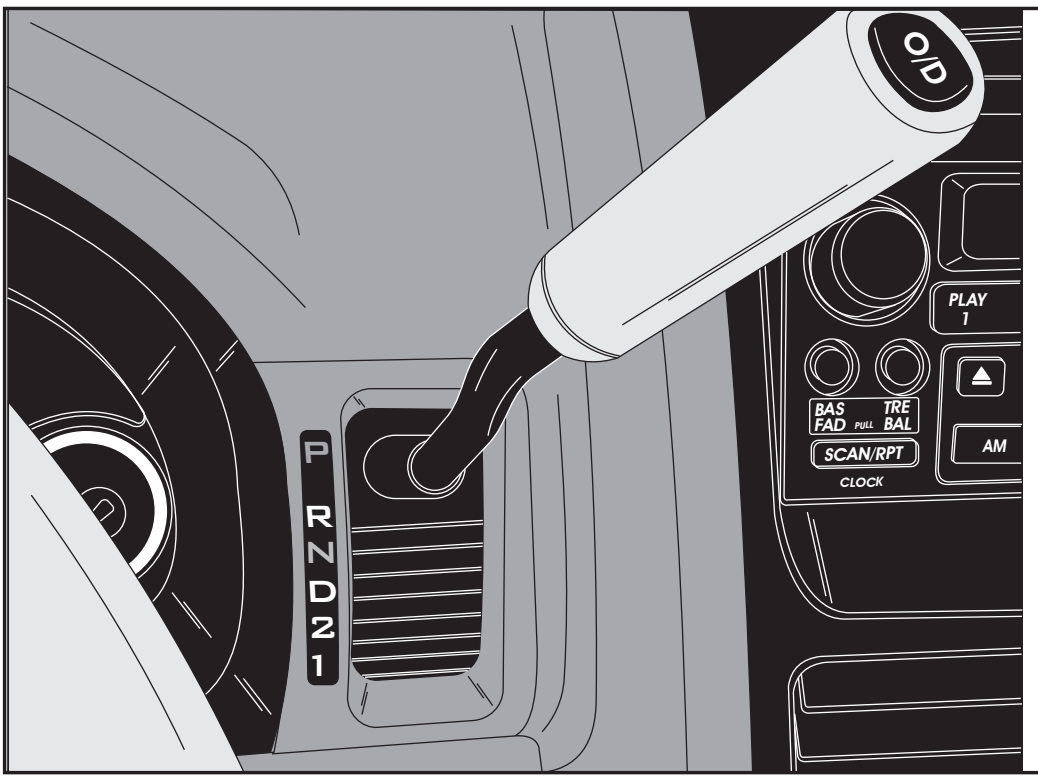
CORRECTION: To relearn the relative throttle position you must first check the TPS voltage with KOEO. With a voltmeter the idle TPS voltage should be 0.49 volts. The scan tool should indicate zero percentage of throttle opening at this voltage.
If the TPS voltage is greater than 0.49, make certain that throttle and cruise control cable are not out of adjustment.
If the voltage is correct but the percentage of throttle opening on the scan tool is higher than zero, reset the PCM adapts with a capable scan tool or a battery disconnect and brain dead the PCM.
CAUTION: Make sure you have the radio anti-theft code before disconnecting the battery. After battery reconnect, perform the idle relearn.
The idle relearn must be performed anytime the following has been done:

(1) A battery disconnect.
(2) Replacement of the PCM or PCM connector removal.
(3) When ever the ECM is reset.
(4) Whenever the throttle body has been replaced.
(5) Whenever the IAC valve has been replaced.
(6) Removal of the #6 15A PCM fuse from the under-hood fuse box.
(7) Removal of the #19 80A battery fuse from the under-hood fuse box.
(8) Removal of the PGM-FI main relay #1.
(9) Removal of any of the under-hood fuse box wiring or connectors.
(10) A disconnect of the main engine harness.
(11) A disconnect of the G2 ground from the transmission housing.
(12) A disconnect of the G1 ground from the body.
(13) A disconnect of the G101 ground from the cylinder head cover.

SERVICE INFORMATION:

The relearn procedure is as follows:

(1) Make certain all electrical items are off.
(2) Start the engine and hold the idle at 3,000 rpm, in park, or until engine temperature reaches 194° F (90° C).
(3) Let the engine idle for about 5 minutes with the throttle fully closed.
(4) Move the shifter out of Park to confirm relearn was successful.



SHIFTER STUCK IN PARK

Figure 1

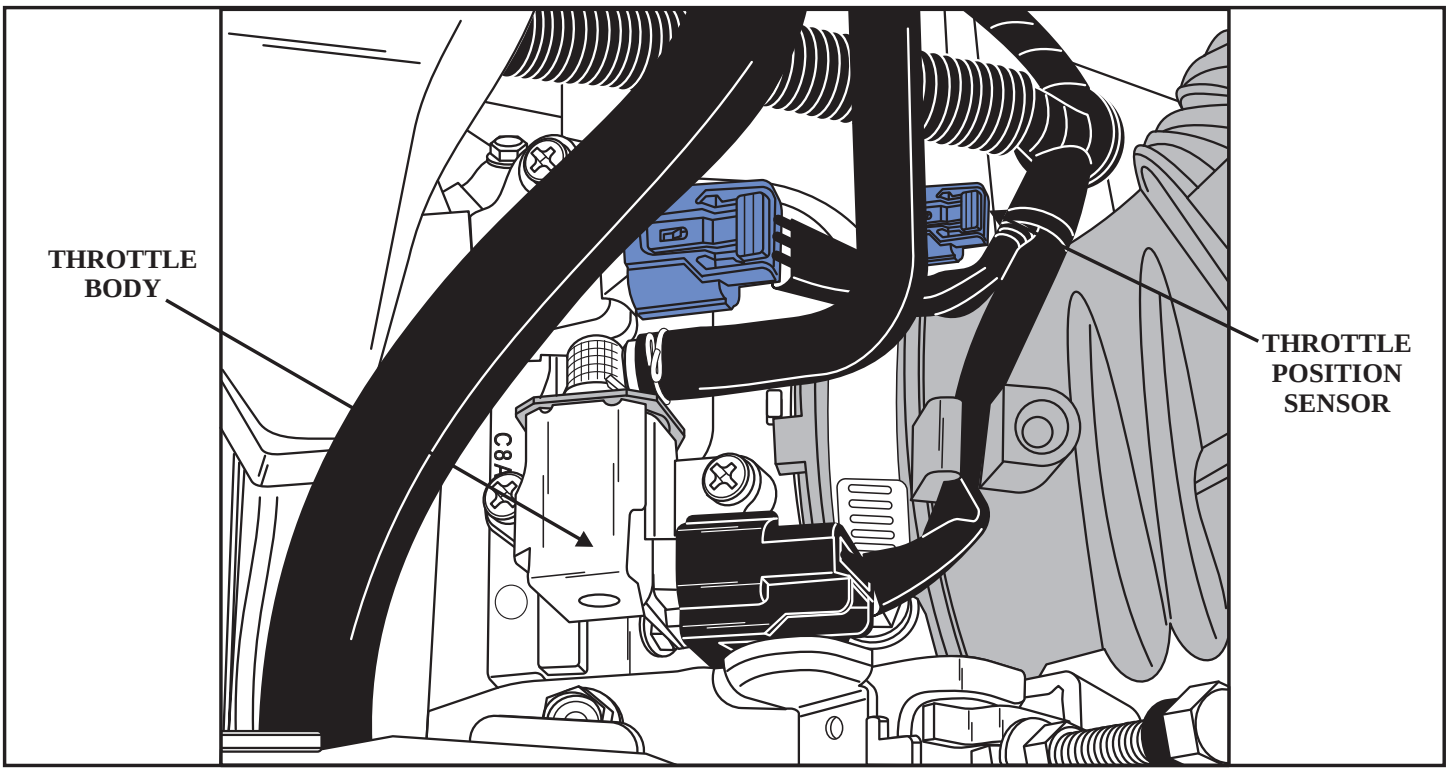


Figure 2

HONDA CIVIC
B4RA-M4RA-BMXA FAMILY
WRONG GEAR STARTS-MULTIPLE SHIFT COMPLAINTS

COMPLAINT: After overhaul, Honda Civics equipped with the B4RA, M4RA and or BMXA transaxle may exhibit wrong gear starts or multiple shift complaints.

CAUSE: The cause may be, that during overhaul of the valve body and re-assembly one or more of the feed tubes were placed into the wrong hole on the accumulator body or valve body, causing low modulating pressure , which is solenoid feed and or low clutch apply pressure to one or more of the clutch packs.

CORRECTION: To correct this condition, refer to Figure 1 and measure the feed tube lengths to ensure that they are going into the correct locations on the accumulator body and valve body.

HONDA CIVIC
B4RA-M4RA-BMXA FAMILY
FEED TUBE LOCATIONS

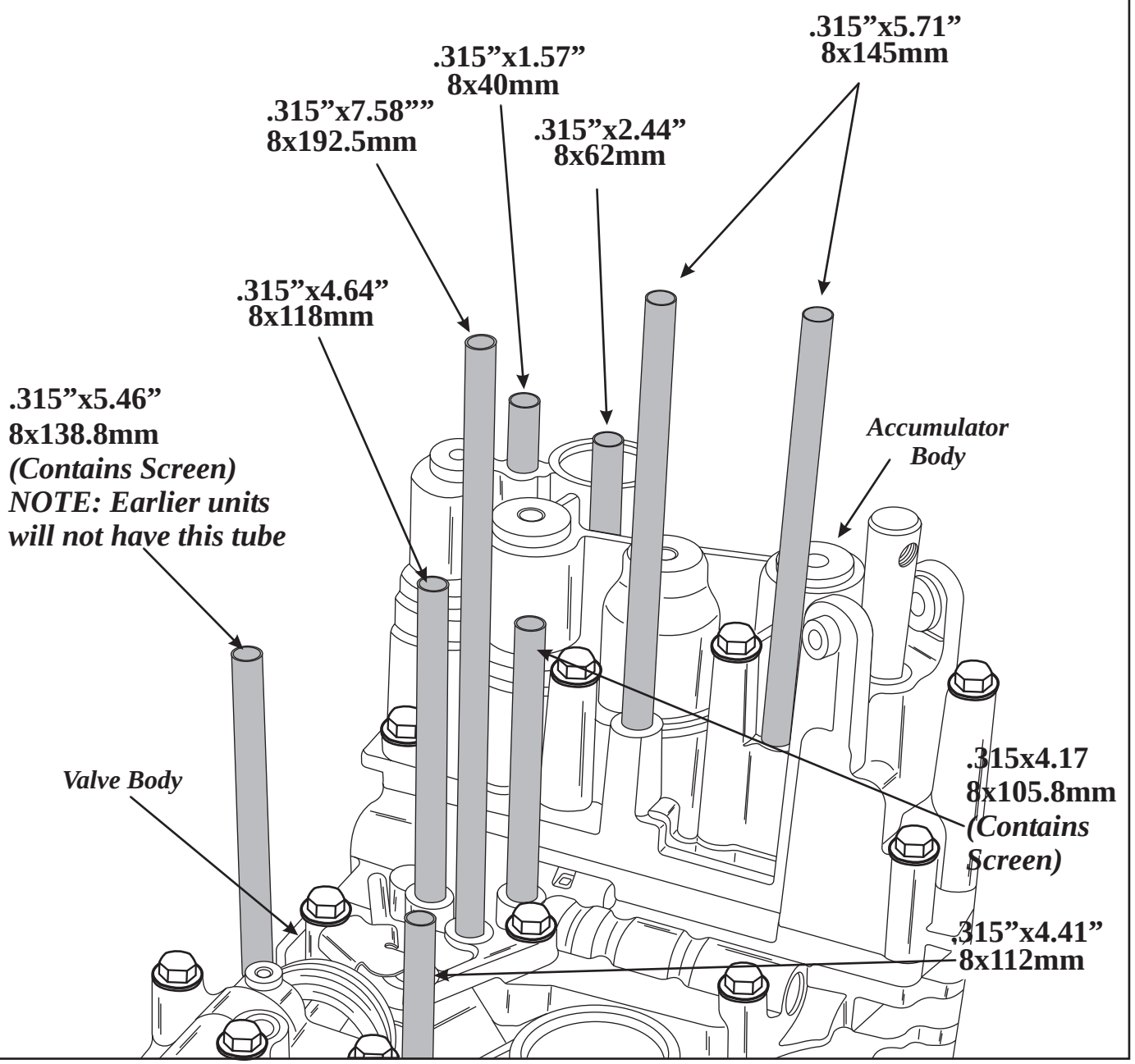


Figure 1

RATIO TEK

ATSG

Transtec

Raybestos

Precision Intl.

BC

Lubegard