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"Shiftin' Great in 2008" Seminar Information

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One notable aspect that our industry is facing is the variety of transmissions and technologies coming our way. We have completely computer controlled 6 speed front wheel and rear wheel drive transmissions on the road, 8 speed rear wheel drive transmissions, CVTs and DSG transmissions. Some of these transmissions have inside of them their very own computer with the case connector containing the power and grounds it needs along with communication lines with which to network with other onboard communication systems. There is now "Shift by Wire" technology where there are no mechanical linkages from the Gear Shift Lever to the transmission. How does one stay on top of all these changes? Attending quality transmission seminars like this one.

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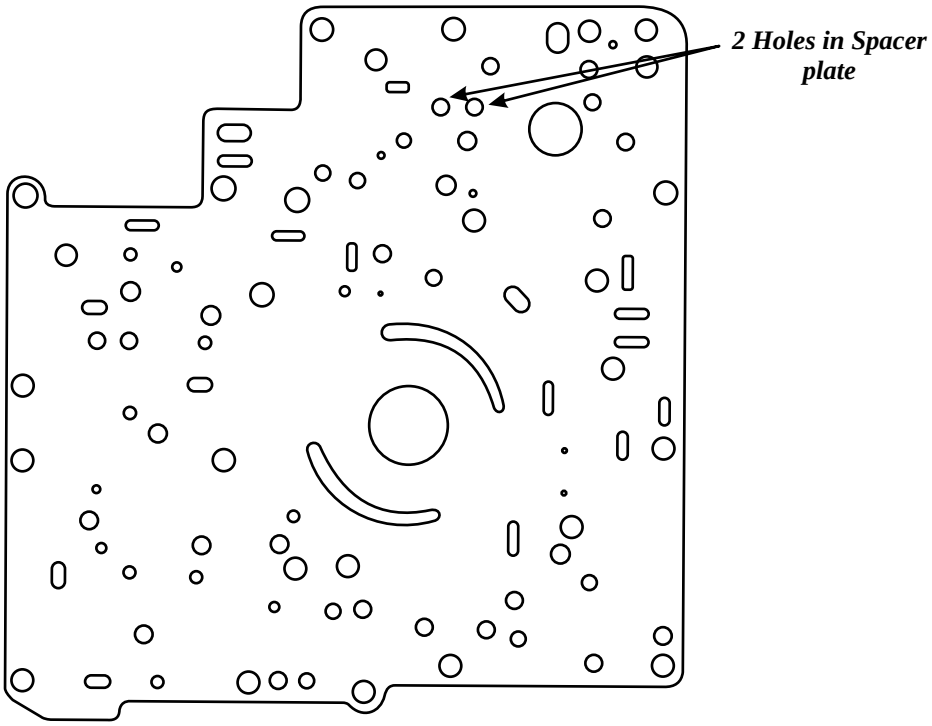
FORD AX4S
1-2 NEUTRAL 1999 & UP MODELS

COMPLAINT: 1999 and Up Ford vehicles equipped with the AX4S transaxle may exhibit a 1-2 neutral condition after overhaul. Upon valve body inspection, the 1-2 Capacity Modulator Valve is not sticking.

CAUSE: The cause may be, during overhaul , the pump had to be replaced , because of typical pump shaft bearing and rotor failure, and a replacement pump body with a 98 and earlier spacer plate was used. The 1999 and up pump plate requires 3 check balls, and when the B5 check ball is left out when using the previous design spacer plate , L12 pressure will be lost at the manual valve, thru the Reverse circuit.

CORRECTION: Refer to Figure 1 to identify the previous design Pump body and Pump spacer plate, and Refer to Figure 2 to identify the 1999 and Up design Pump body and Pump Spacer plate and ensure that the correct plate and checkball locations are used.

92-98 SPACER PLATE



CHECKBALL LOCATIONS 92-98 MODELS "ONLY"

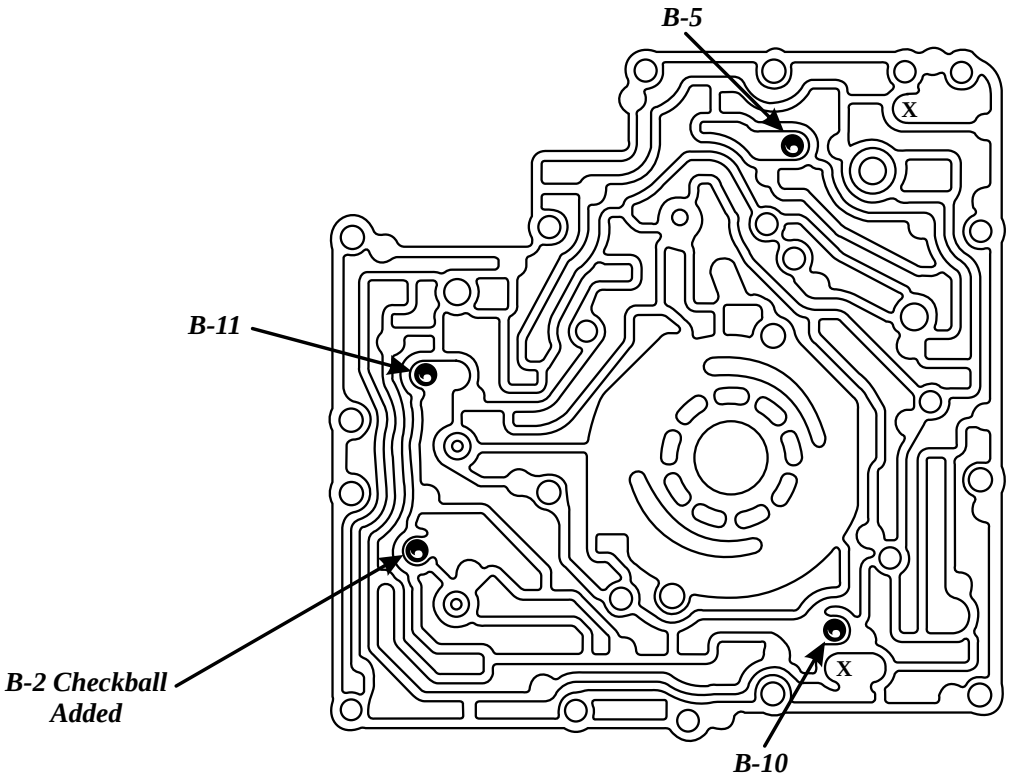
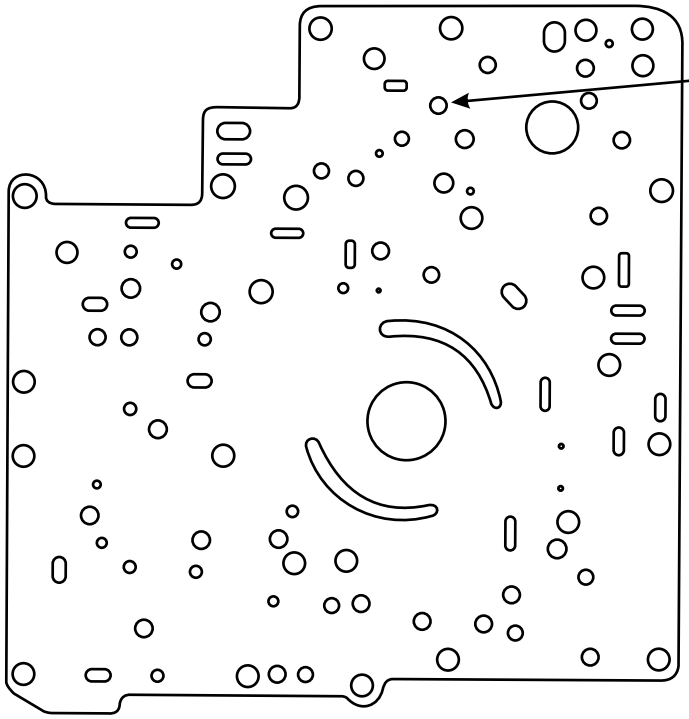


Figure 1

1999 AND LATER SPACER PLATE



CHECKBALL LOCATIONS 1999 AND LATER "ONLY"

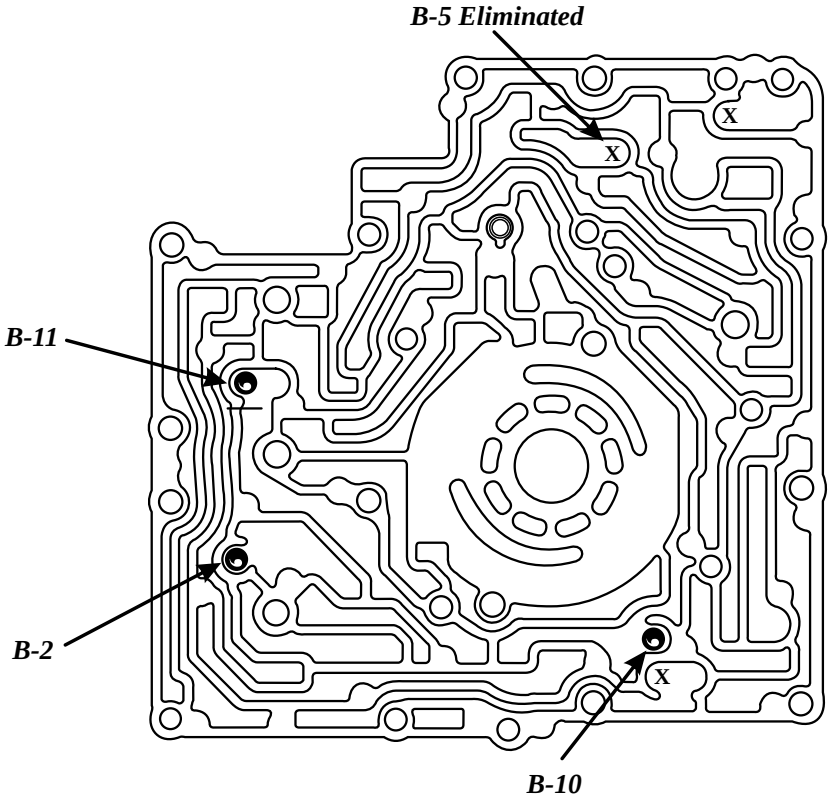


Figure 2

FORD 4F50N
1-2 SLIDE / BANG

COMPLAINT: 2004 and newer Ford vehicles equipped with the 4F50N transaxle may exhibit a 1-2 slide bang before or after overhaul.

CAUSE: The cause may be, a cracked Intermediate Piston, as shown in Figure 3, or a weak 1-2 Capacity Modulator Valve Spring. Note: 2004 and Up 4F50N are equipped with the 1-2 Capacity Modulator Valve that controls the rate of application of the Intermediate Clutch, like the previous 1-2 Capacity Modulator Valve on the AXOD/AX4S. See Figure 4.

CORRECTION: To correct this condition, replace the Intermediate piston with an updated piston from Ford or from your parts distributer as some distributers sell the O.E. pistons. Install a heavier spring into the 1-2 Capacity Modulator valve line-up. Note: the 2-3 Capacity Modulator Valve spring is the same as the 1-2 , if a firmer 2-3 upshift is desired , a firmer spring can be used there also. See Service information for available aftermarket replacement springs. ***Note: the 1-2 and 2-3 Capacity Modulator Valve springs are identical so 2 aftermarket springs can be used, to cover 2nd and 3rd gear shift feel, per transmission overhaul.***

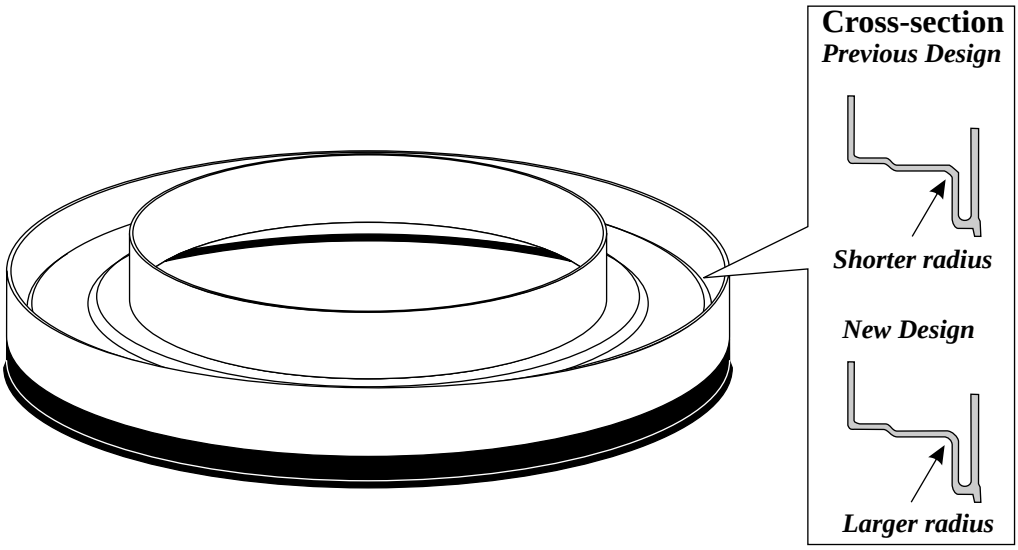
An updated piston can be identified by the engineering number printed on the bottom side of the piston as seen in figure 3. This number is slightly different than the part number.

SERVICE INFORMATION:

UPDATED INTERMEDIATE CLUTCH PISTON.....4F1Z-7E005-AA
SUPERIOR 1-2/2-3 CAPACITY MODULATOR SPRING KIT.....K084
SONNAX 1-2 CAPACITY MODULATOR SPRING.....96201-27

Special thanks to Continental Trans in Illinois

INTERMEDIATE PISTON TOP VIEW



PREVIOUS DESIGN
ENGINEERING NUMBER
F88P-7E005-AA

NEW DESIGN
ENGINEERING NUMBER
4F1P-7E005-AA

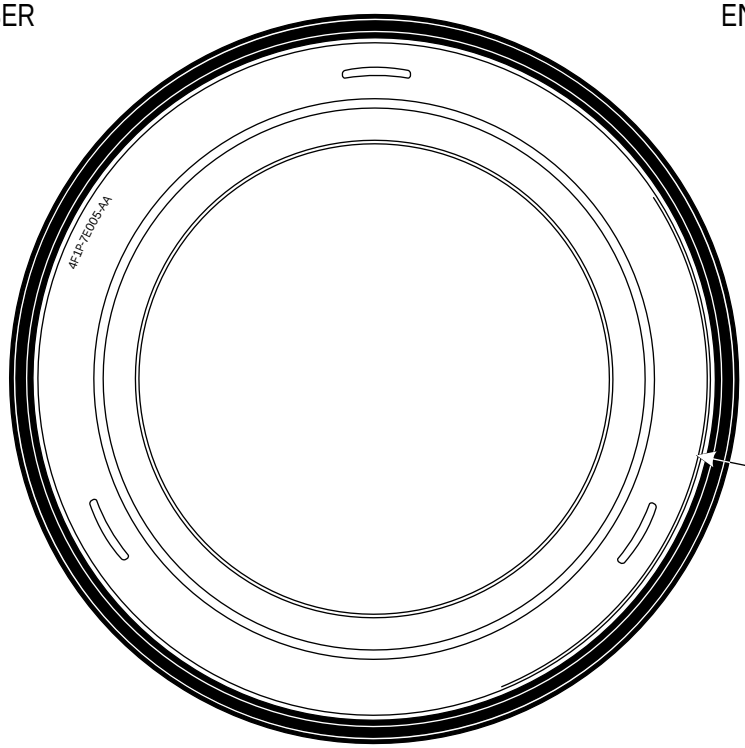
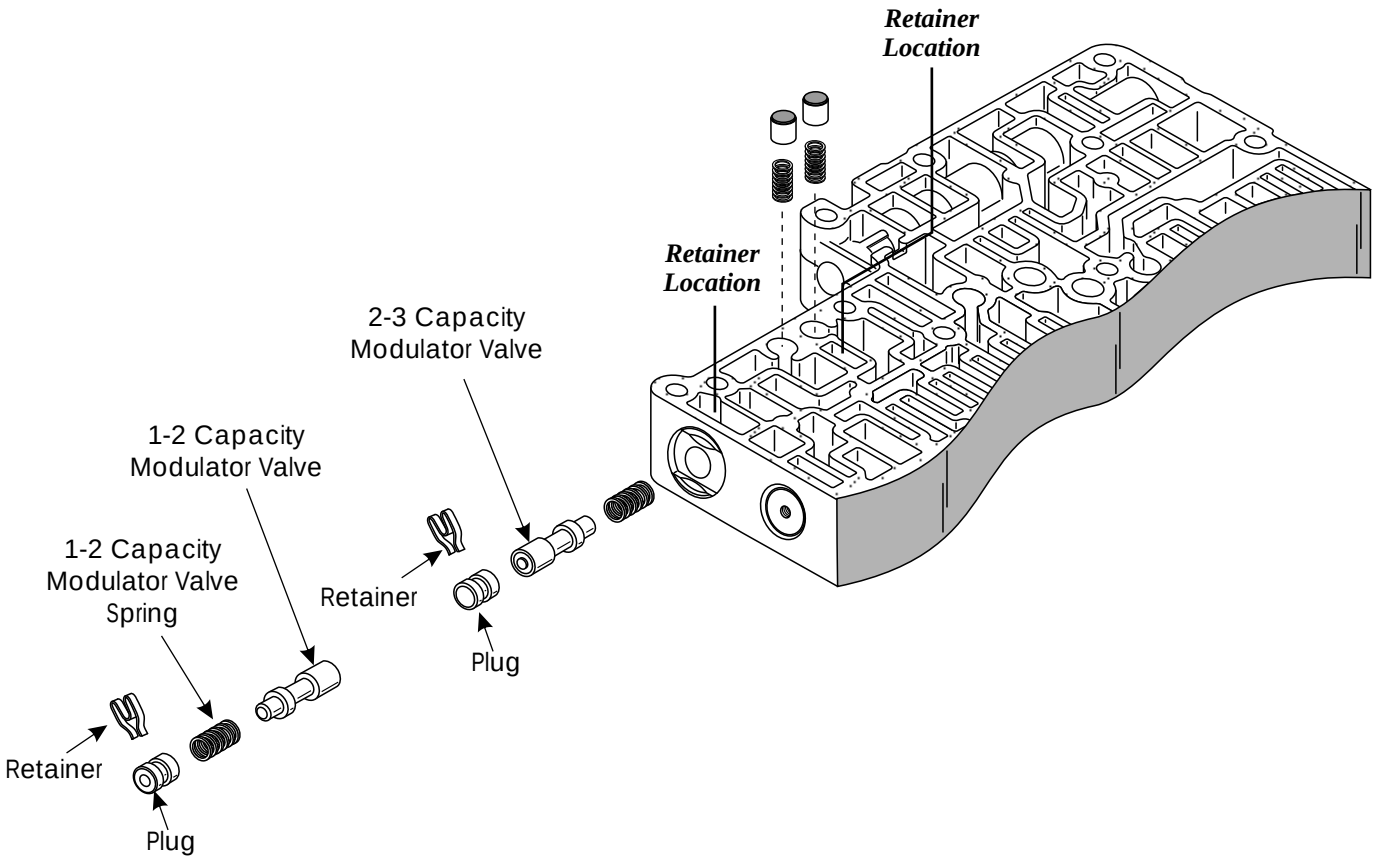


Figure 3

2004 AND UP 4F50N 1-2 CAPACITY MODULATOR VALVE SPRING LOCATION



Note: The 1-2 and 2-3 Capacity Modulator valve springs are the same

Figure 4

FORD AX4S
N-D DELAY/BANG 1999 & UP MODELS

COMPLAINT: 1999 and up Ford vehicles equipped with the AX4S transaxle may exhibit a short delay then bang when engaging any forward range.

CAUSE: The cause may be, a leak in the lube circuit, which is now fed directly from pump output, through an .089" orifice in the main spacer plate, as shown in Figure 5. This leak may be from a broken o-ring on the lube pipe where it fits in the case or a crack in the braised area where it feeds the support, or a damaged "orange" lube seal in the support (see Figures 6 and 7). A leak in the lube circuit may cause a low overall line pressure condition, when the PCM notices that forward has not been engaged, it will elevate line pressure causing the bang when forward is finally engaged.

CORRECTION: To correct this condition, ensure that the lube pipe o-ring and the braised area of the pipe are in good condition, also make sure that the "orange" seal in the support is in good condition.

1999 &UP SPACER PLATE REAR LUBE ORIFICE

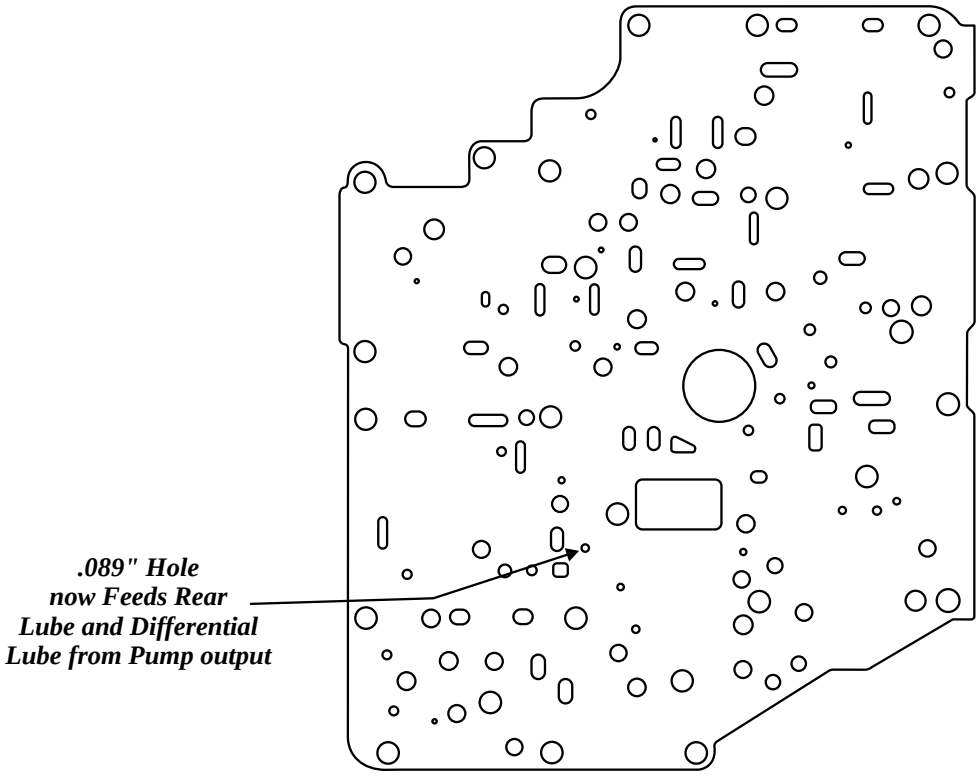


Figure 5

REAR / DIFFERENTIAL LUBE PIPE

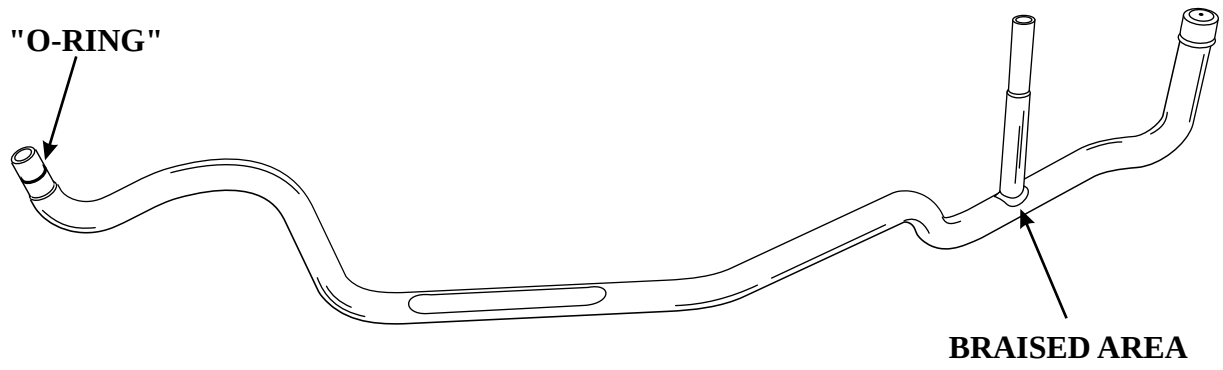


Figure 6

SUPPORT

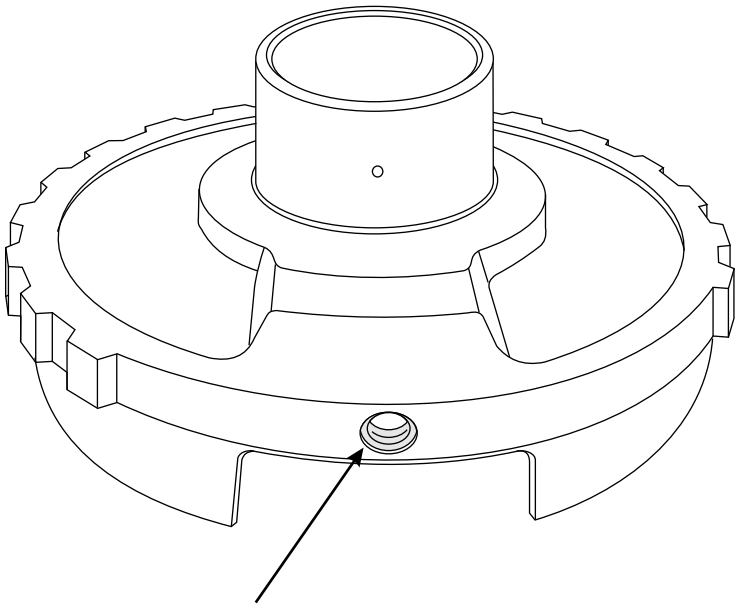


Figure 7

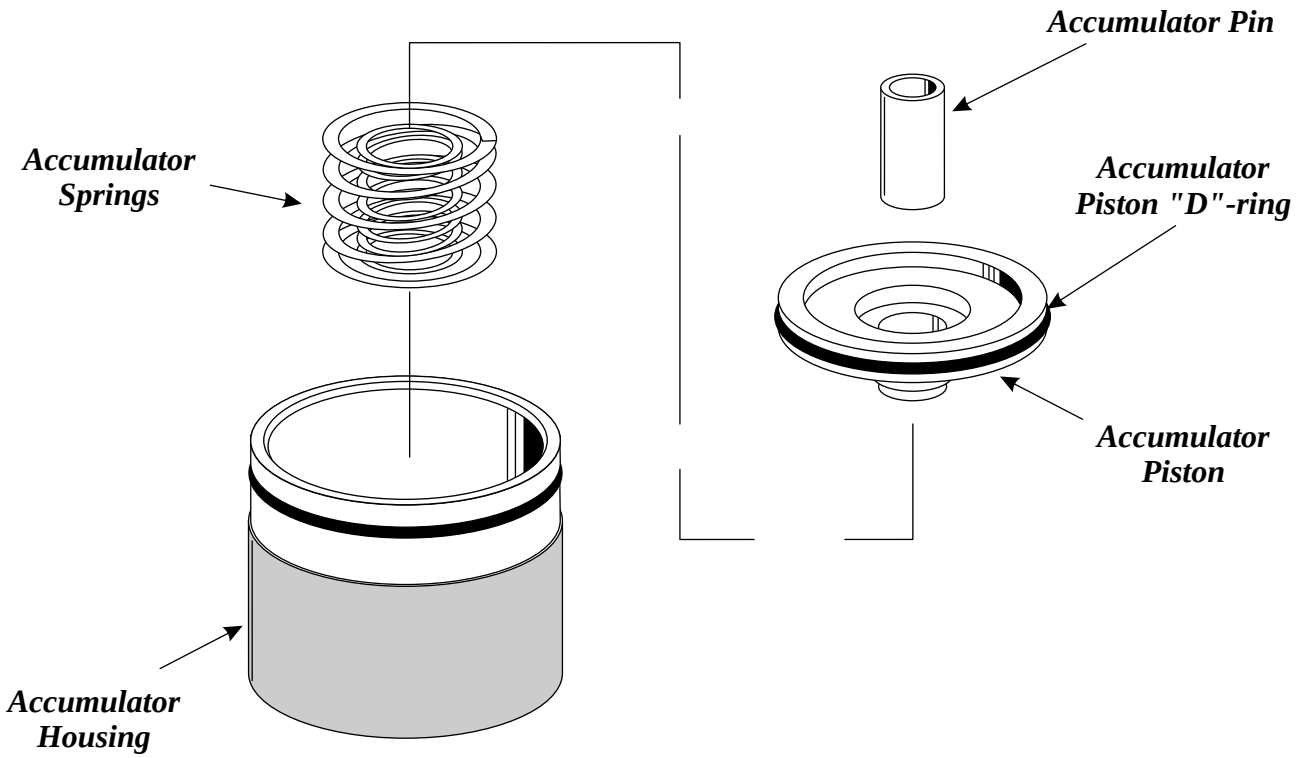
FORD AX4N/4F50N
N-D DELAY/BANG

COMPLAINT: Ford vehicles equipped with the AX4N / 4F50N transaxle may exhibit a short delay then bang when engaging any forward range.

CAUSE: The cause may be, a worn 1-2 Clutch Accumulator pin and piston causing a slow engagement into Drive. This slow engagement will cause the PCM to elevate line pressure which causes the harsh / bang on engagement. Refer to Figure 8 for the identification of the 1-2 Accumulator pin and piston. Refer to Figure 9 for a cross-sectional view of the 1-2 Clutch Accumulator hydraulic circuit.

CORRECTION: To correct this condition, ensure that the Accumulator pin and piston have a snug fit, replace as necessary.

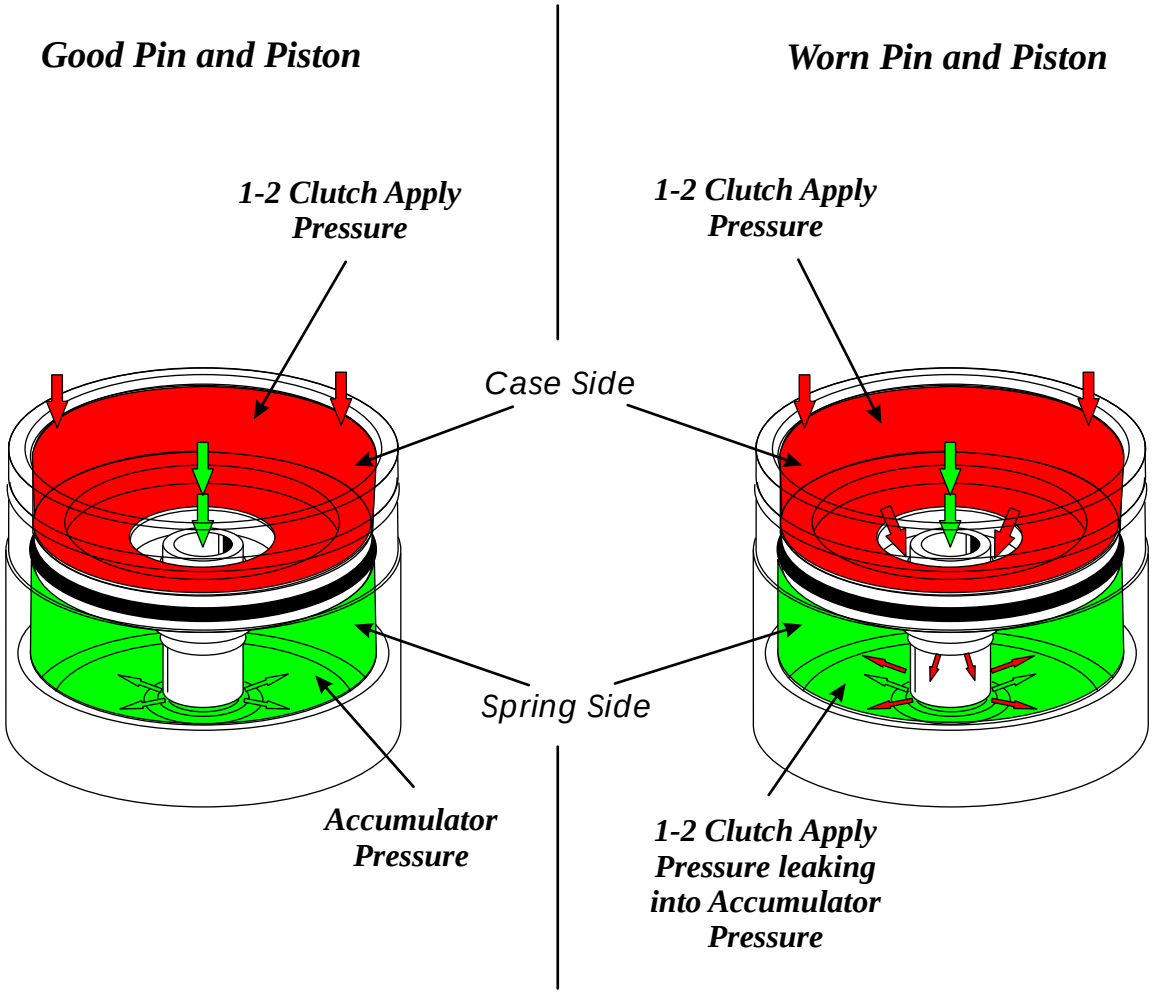
N-D / 1-2 CLUTCH ACCUMULATOR ASSEMBLY



Note: Check the Accumulator pin and piston and ensure a snug fit

Figure 8

N-D / 1-2 CLUTCH ACCUMULATOR ASSEMBLY



Note: Accumulator Pressure is fed thru the pin to the spring side of the Accumulator Piston, when the Pin wears it will allow 1-2 Clutch Apply pressure to leak into the Accumulator Circuit causing a slow engagement of the 1-2 Clutch.

Figure 9

FORD AX4S, AX4N, 4F50N
NO THIRD GEAR

COMPLAINT: After overhaul, Ford vehicles equipped with the AX4S, AX4N or 4F50N, may exhibit a complaint of no third gear.

CAUSE: The cause may be that during overhaul, the direct clutch bonded piston was replaced and the apply ring was not transferred to the new piston. Refer to the cross-sectional view in Figure 10 which shows that when the apply ring is left off, the Direct clutch piston will not contact the Direct clutch bottom steel.

CORRECTION: To correct this condition ensure the apply ring is assembled onto the Direct Clutch Piston as shown in Figure 11.

DIRECT CLUTCH CROSS-SECTION

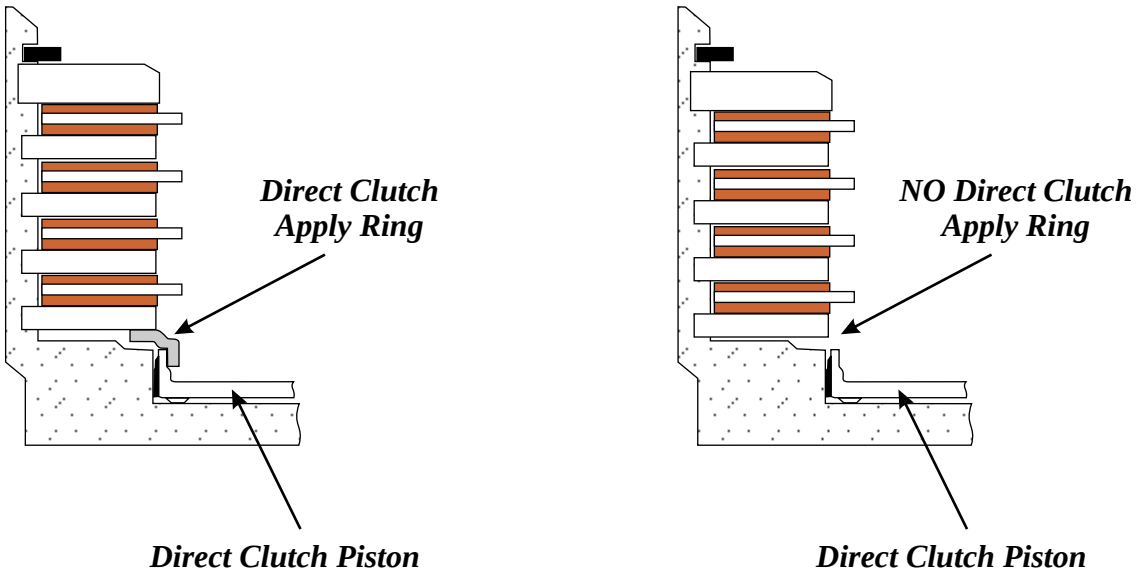


Figure 10

DIRECT CLUTCH PISTON AND APPLY RING

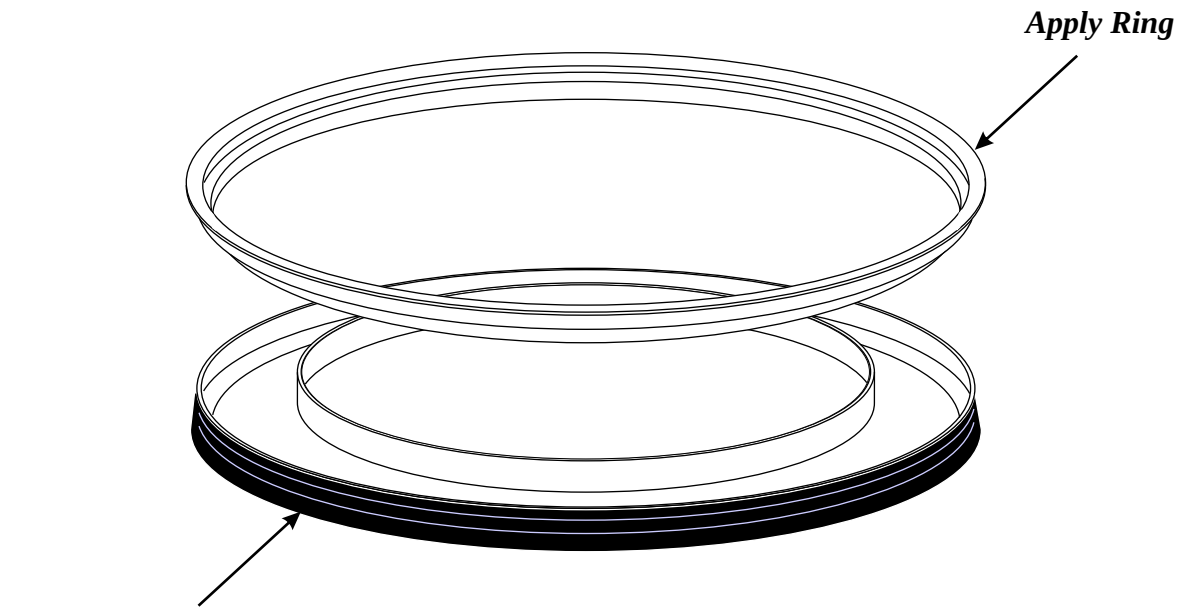


Figure 11

Transtec

FORD TAURUS/MECURY SABLE

MANUAL LEVER POSITION/DIGITAL RANGE SENSORS

COMPLAINT: A 1999 Mercury Sable with 3.0 Liter engine and AX4N Transmission comes into the shop with codes P0708 and P1702 set along with shift scheduling problems. This would indicate a problem with the digital range sensor or its circuits. After installing a new range sensor, the same codes return as well as the shift complaints.
At this time a wiring diagram was acquired at which time the technician discovered that this vehicle could be equipped with an Manual Lever Position or a Digital Transmission Range Sensor.

CAUSE: Because the original sensor on this vehicle was a 12 pin configuration, it was replace with a 12 pin Digital Range Sensor. This immediately brought the above mentioned codes back because this vehicle requires and MLPS, not a DTRS. The newer (2nd design) MLPS has a 12 pin connector configuration exactly like the DTRS connector so they both appear to be the same component.
When the 12 pin DTRS was installed in this vehicle the PCM set the codes because a DTRS in this vehicle could never range correctly. The MLPS is a step down resistor style which indicates approximately 4.5 volts in park and drops as you move the selector lever towards low which will be about 0.75 volts. The DTRS produces a combination of circuits to the PCM that can be 5 or 1- to 12 volts while others are grounded. This combination of voltage and grounded circuits tells the PCM where the gear selector lever has been positioned, Figure 1 illustrates the MLPS internal electrical structure and in Figure 2 the eight and twelve pin connector views can be seen as well as the MLPS ranging logic.
Figure 3 illustrates the DTRS internal electrical structure and in Figure 4 the twelve pin connector view can be seen as well as the DTRS ranging logic.

CORRECTION: Once the MLPS was installed, the codes were gone along with the shift complaints.
The way to deter mine which sensor is required other than checking the circuits for voltage is the **V**ehicle **I**dentification **N**umber. The break points using the 8TH VIN digit for engine type are as follows:

1998/1999 Taurus VIN "N" for SHO models and VIN "S" for all other models use the 12 pin MLPS.
1998/1999 Taurus Vin "1" or "2" for Flex Fuel equipped vehicles and VIN "U" use the 12 pin DTRS.
1998/1999 Sable VIN "S" use the 12 pin MLPS.
1998/1999 Sable VIN "U" use the 12 pin DTRS.

SERVICE INFORMATION:

12 Pin Manual Position Lever Sensor.....F6DZ-7F293-A
12 Pin Digital Transmission Range Sensor.....F8DZ-7F293-AD

MANUAL LEVER POSITION SENSOR

5 VOLT SUPPLY STEP DOWN RESISTOR TYPE

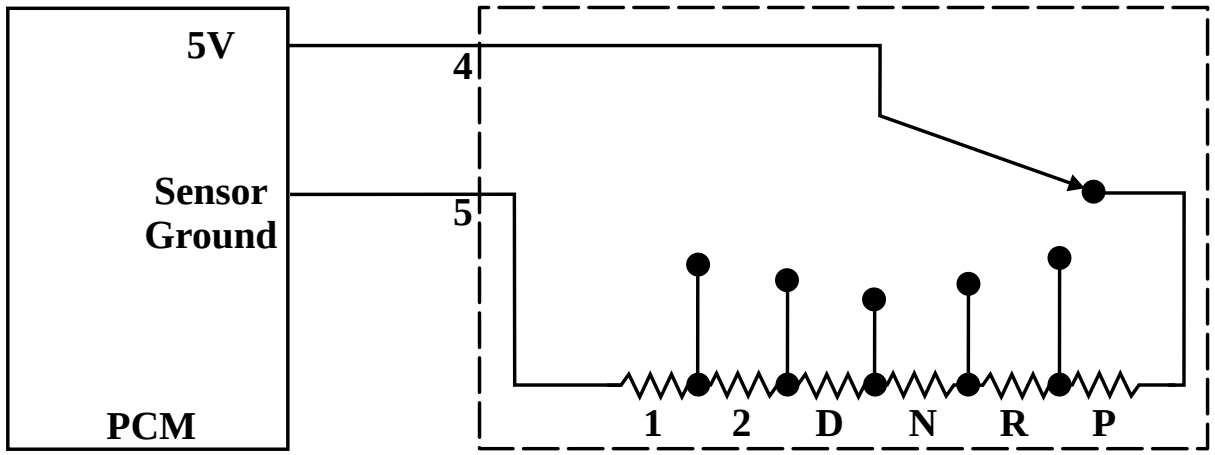
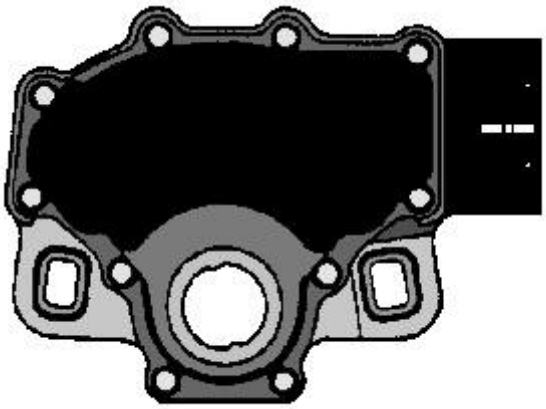
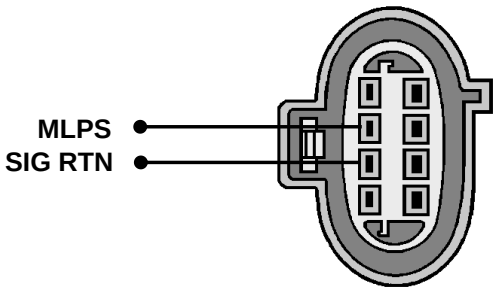


Figure 1

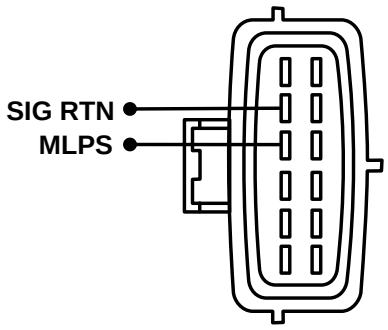
MLPS RANGING LOGIC



TRANS RANGE SELECTOR LEVER POSITION	RESISTANCE (OHMS)		RANGE (VOLTS)
	MINIMUM	MAXIMUM	
P	3770	4607	3.97-4.85
R	1304	1593	3.24-3.96
N	660	807	2.55-3.11
D	361	442	1.88-2.30
D/2	190	232	1.23-1.51
1	78	95	0.61-0.75



VIEW LOOKING INTO 8 PIN MLP SENSOR



VIEW LOOKING INTO 12 PIN MLP SENSOR

Figure 2

Alto

DIGITAL TRANSMISSION RANGE SENSOR

5 & 12 VOLT SUPPLY DIGITAL (ON/OFF) TYPE

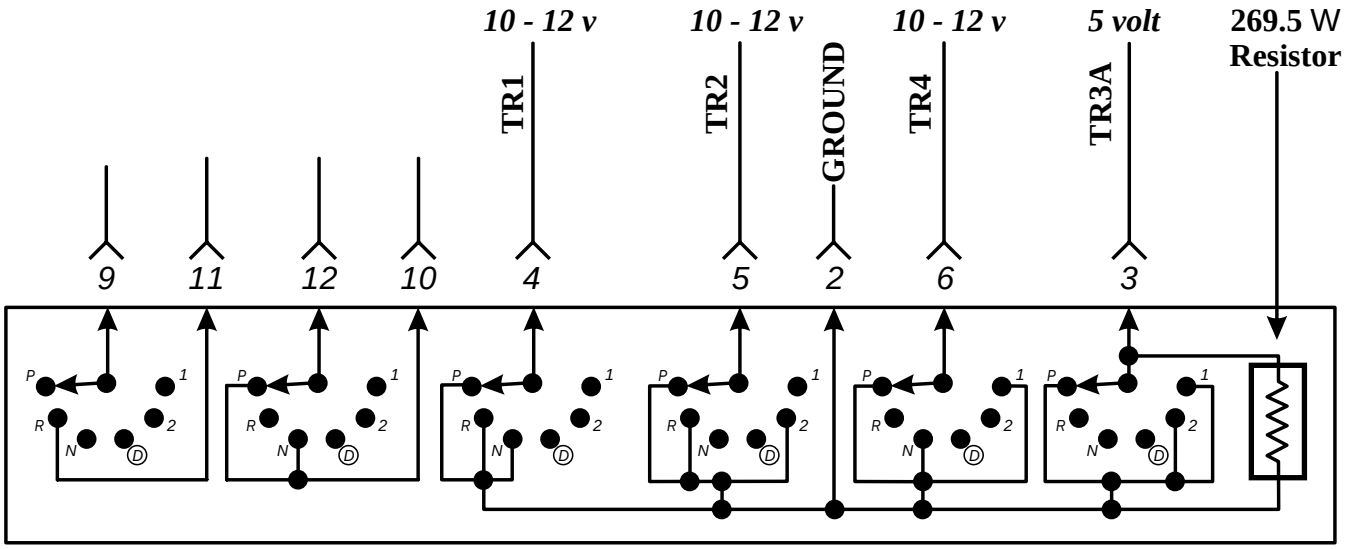
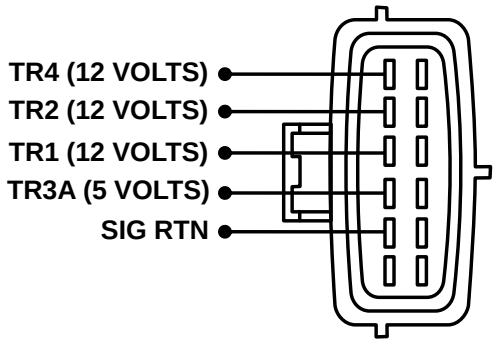


Figure 3

DTRS RANGING LOGIC

SELECTOR POSITION	PID:TR	PID:TR-D (*Scanner Data 0 = Grounded 0 volts 1 = Open Battery volts Except TR3A*)				PID:TR-V (*Scanner Data TR3A*)
		TR4	TR3A	TR2	TR1	TR3A (175B pin 9 to sigrtn)
PARK	***P/N***	***0***	***0***	***0***	***0***	***0.0 Volts***
REVERSE	***REV***	***1***	***1***	***0***	***0***	***1.3 to 1.8 Volts***
NEUTRAL	***NTRL***	***0***	***1***	***1***	***0***	***1.3 to 1.8 Volts***
OVERDRIVE	***OD****	***1***	***1***	***1***	***1***	***1.3 to 1.8 Volts***
MANUAL 2	***MAN 2****	***1***	***0***	***0***	***1***	***0.0 Volts***
MANUAL 1	***MAN 1***	***0***	***0***	***1***	***1***	***0.0 Volts***

**** Will read "Drive" if OD is canceled.***
***** MAN 2 = Drive for applications without OD cancel feature.***



VIEW LOOKING INTO DTR SENSOR

Figure 4

FORD 4R70W /4R70E/4R75E 2003-UP

NO SPEEDOMETER READING OR SPEEDOMETER READING SLOW

COMPLAINT: After overhaul or transmission exchange, Ford Motor Company vehicles equipped with the 4R70W/4R70E/4R75E Transmission may exhibit either a no speedometer reading, or a slow speedometer reading, and may be accompanied by DTC's P0720-P0722 which is an indication of a problem with the OSS (OUTPUT SHAFT SPEED SENSOR), shown in Figure 1. The Powertrain Control Module uses the signal from the Output Shaft Speed Sensor to calculate Vehicle Speed.

CAUSE: Beginning at the start of production for the 2004 model year, this family of transmissions is manufactured with extended parking lugs on the ring gear to trigger the output speed sensor, instead of the previous design with holes in the ring gear, which also required a strategy change in the PCM. If either a transmission earlier than 2004, or the use of 2003 or earlier ring gear is installed in a 2004-up vehicle, the PCM will not be able to correctly calculate vehicle speed, and will result in either no speedometer reading, or a slow speedometer reading. DTC's P0720-P0722 may be set. The 2004-up Rear Ring that has the extended park lugs utilizes the Output Shaft Speed Sensor with the white body, and a black connector (See Figure 5). The 2003-earlier units had the Rear ring gear with the holes, and utilizes the all black Output Shaft Speed Sensor, which is .083 inches longer than the 2004-up Output Shaft Speed Sensor (See Figure 4).

CORRECTION: Make sure that either during overhaul, or transmission exchange, the correct Rear Ring Gear, and Output Shaft Speed Sensor is used. (See Figures 4 and 5).

SERVICE INFORMATION:

OUTPUT SPEED SENSOR, 2001-2003 (Square Connector) 1L3Z-7H103-AB
OUTPUT SPEED SENSOR, 2004 Models (.083" Shorter) 3L3Z-7H103-AA

SLIDE

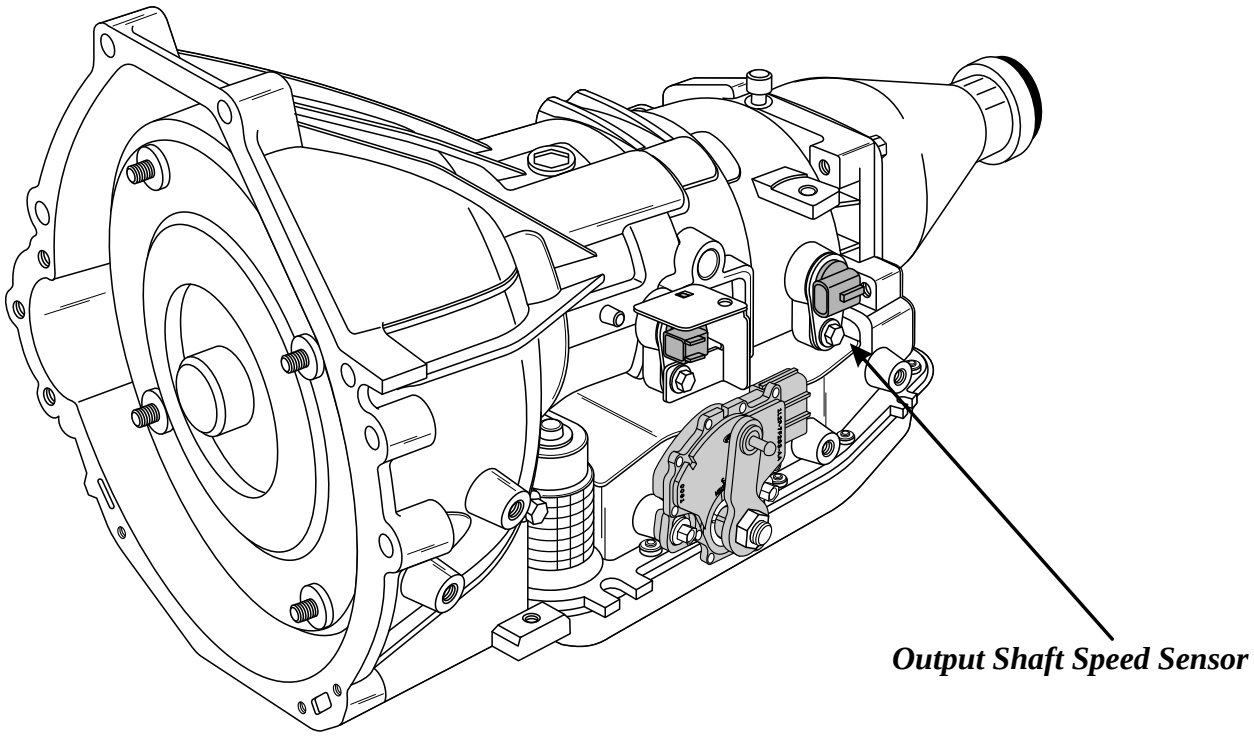


Figure 1

"PREVIOUS DESIGN" RING GEAR
2003-EARLIER

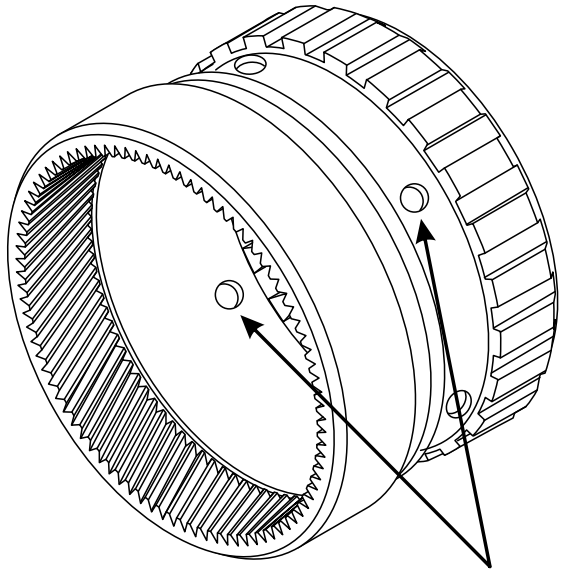


Figure 2

"NEW DESIGN" RING GEAR
2004-UP

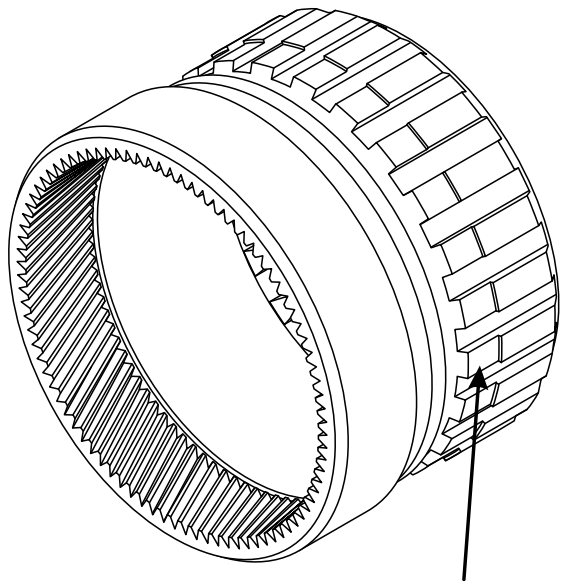
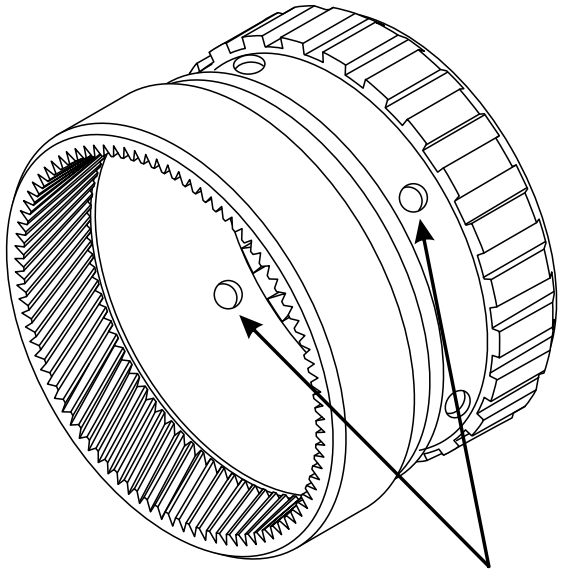


Figure 3

2003-EARLIER

"PREVIOUS DESIGN" RING GEAR
2003-EARLIER



Holes To Trigger
Speed Sensor

2001-2003 OUTPUT SHAFT SPEED SENSOR
PART NUMBER 1L3Z-7H103-AB

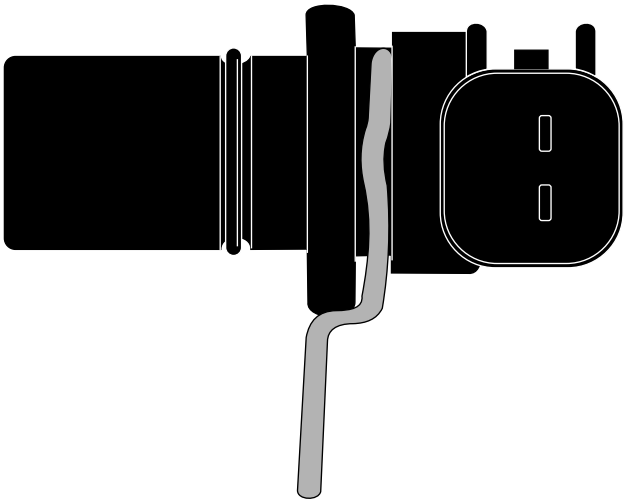
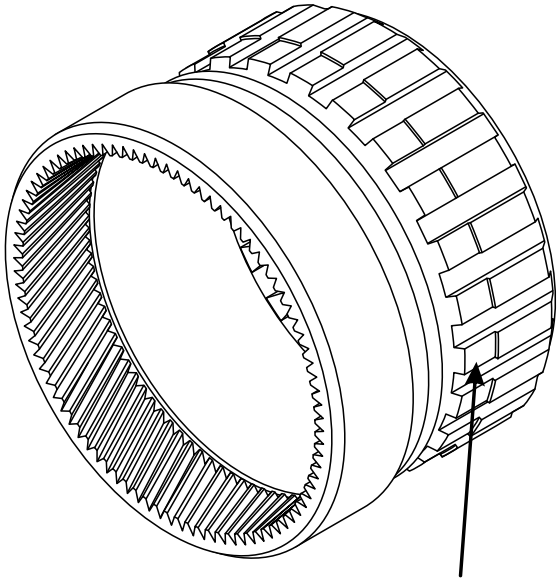


Figure 4

2004-UP

"NEW DESIGN" RING GEAR
2004-UP



Extended Teeth To Trigger
Speed Sensor

2004-UP OUTPUT SHAFT SPEED SENSOR
PART NUMBER 3L3Z-7H103-AA

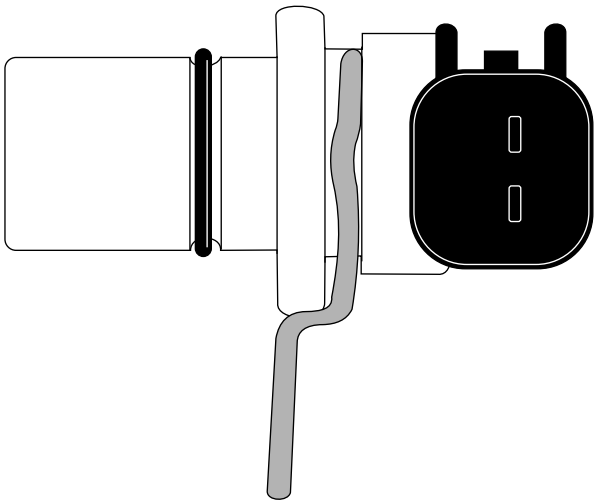


Figure 5

SLIDE

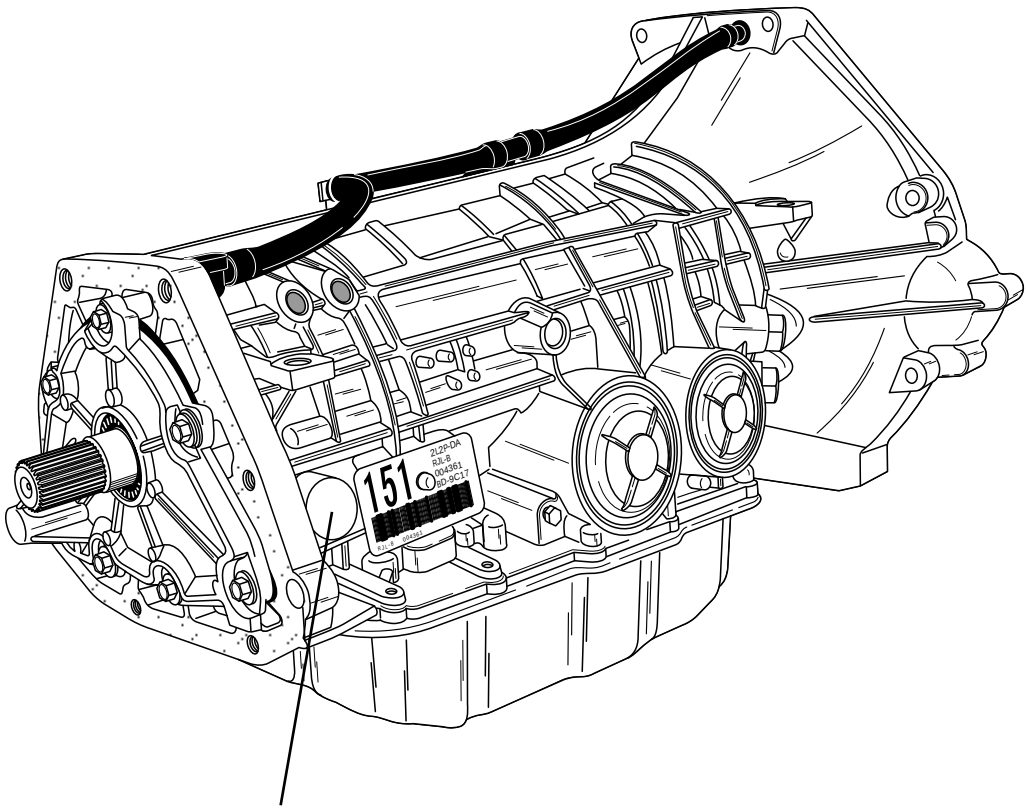
2003 - LATER FORD/LINCOLN

5R55W/S NO PLUG FOR ATF REFILL

COMPLAINT: After an overhaul, or during a routine transmission service, the technician discovers that a Ford/Lincoln vehicle equipped with the 5R55W/S transmission has no fill plug and is unsure how to refill the transmission with fluid.

CAUSE: Beginning in 2003, Ford eliminated the fill plug that is located on the passenger side rear of the transmission. The boss in the case where the plug was located is still there, however, the plug is not.

CORRECTION: Ford factory fill instructions recommend the use of a special tool to pump fluid into the transmission through the check plug in the bottom of the pan. In an effort to simplify the procedure, simply remove the output sensor located on the driver rear side of transmission and fill the transmission through the output sensor hole. Fluid level check is accomplished through check plug as in previous year models. Refer to Figure 1 for previous fill plug location. Refer to Figure 2 for output sensor location. Refer to Figure 3 for oil level check procedure.



PREVIOUS FILL PLUG LOCATION
NOTE; BOSS STILL EXISTS, HOWEVER
FILL PLUG IS NOT THERE.

Figure 1

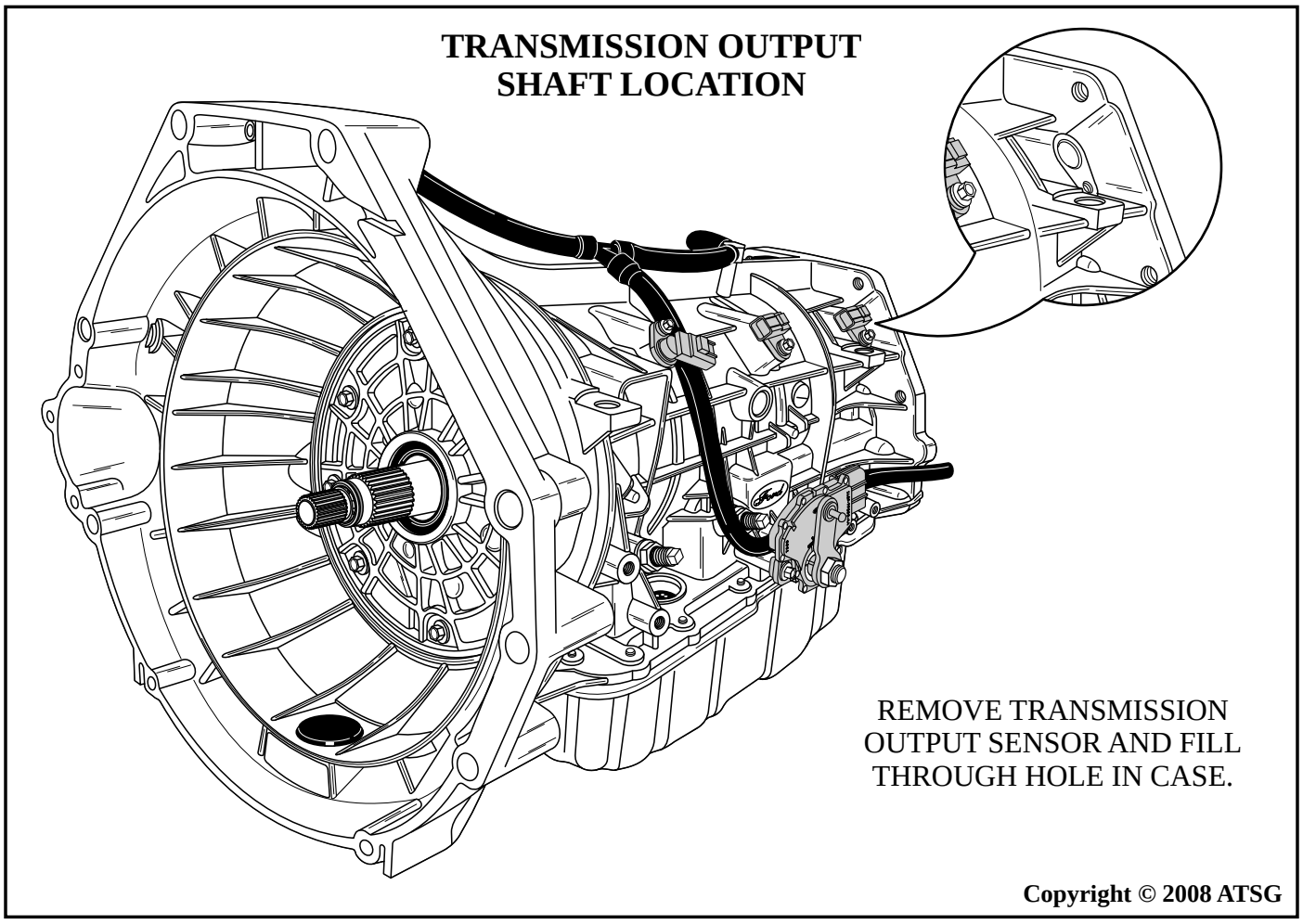


Figure 2

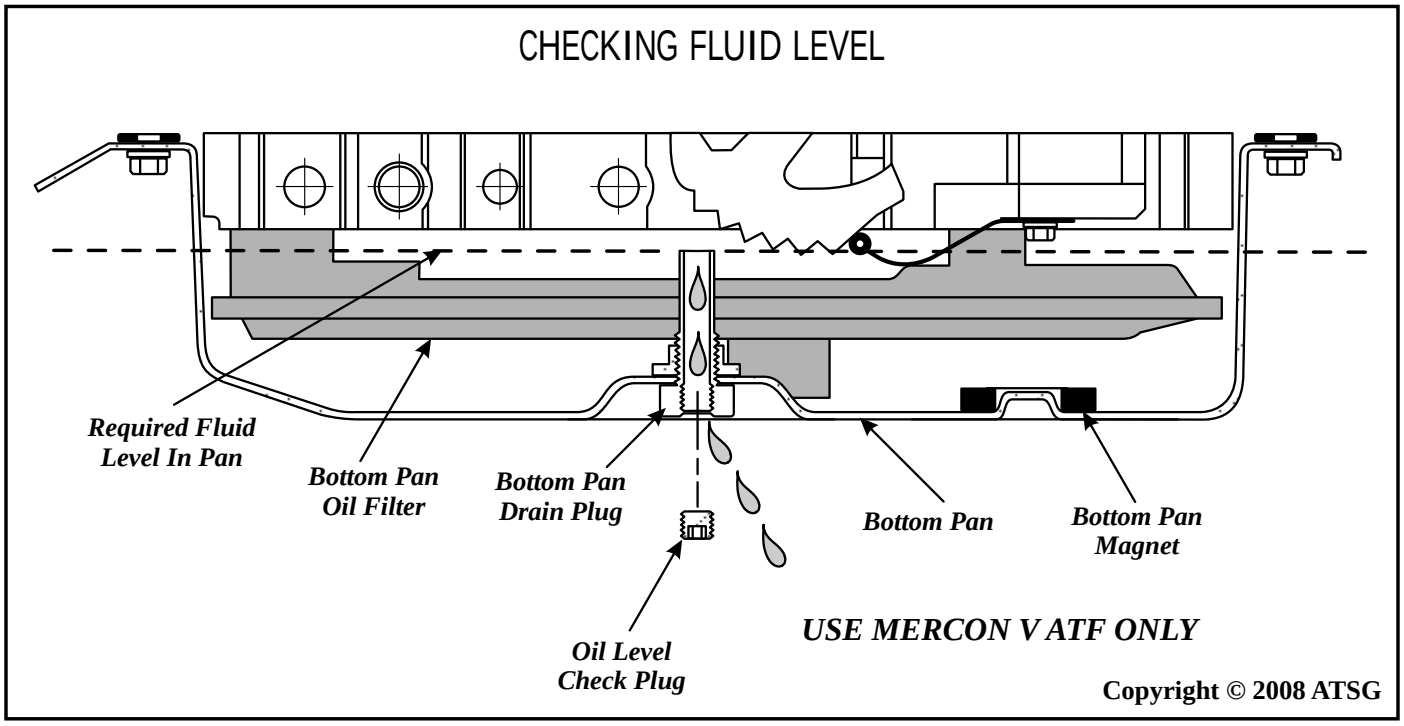


Figure 3

SLIDE

5R110W

ERRATIC SHIFTS AND TFT GAUGE OPERATION

COMPLAINT: A Ford truck equipped with a 5R110W transmission comes to the shop with complaints of erratic shifts, intermittent TFT gauge operation and no Tow/Haul mode function. The MIL may be on and the Tow/Haul indicator lamp may be blinking. (See figure 1) Scan tool data reveals transmission fluid temperature (TFT) readings are fluctuating from normal ranges to -40 degrees (F) coinciding with the erratic display seen on the TFT gauge in the instrument cluster. Code retrieval may indicate fault codes such as P0711-P0712-P0713, or P1711, with no signs of Transmission overheating.

CAUSE: Either the TFT sensor is faulty (Figure 2) or the internal wiring harness is faulty (Figure 3). The transmission fluid temperature (TFT) sensor twist-locks into the solenoid body and is a temperature sensitive device called a thermistor (Figure 2). As the fluid temperature increases, the TFT resistance decreases, as shown in the chart in Figure 4. The PCM uses the TFT signal as an input to determine cold and hot temperature shift scheduling and for TCC apply and release scheduling.
When the transmission is in cold mode operation, below -15°C (5°F), as determined by the TFT sensor, the transmission shifts 1st gear, 2nd gear, 3rd gear, 4th gear (ratio 1.09), 6th gear. When in hot mode the transmission will shift 1st gear, 2nd gear, 3rd gear, 5th gear (ratio 1.00), 6th gear. Either way it is still a five speed unit with six forward gear ratios available, dependant upon cold mode or hot mode operation.

CORRECTION: Unplug the transmission vehicle harness connector and turn the key on with the engine off. Using a Digital Volt Ohm Meter (DVOM) set to DC volts, place the negative meter lead to a ***known*** good ground. Place the positive meter lead to terminal 18 in the vehicle harness connector and check for approximately 5 volts on the wire coming from the PCM (Figure 5). This is the TFT sensor signal wire. If 5 volts ***is not*** seen, then the wire is damaged or the PCM may be defective. If approximately 5 volts ***is*** seen then verify the external sensor ground circuit as follows. Leave the positive meter lead at terminal 18 where approximately 5 volts was previously seen. Remove the negative meter lead from the ***known*** good ground and place the negative meter lead to terminal 22 in the vehicle harness connector. The meter reading should indicate the same 5 volts as was seen when the negative meter lead was connected to the ***known*** good ground. If approximately 5 volts ***is not*** seen at this time then the external ground circuit is faulty and will require repair. (See figure 5 for both front and rear views of the vehicle harness for terminal ID)

Note: Plug in the trans harness connector and the same voltage and ground tests can be performed with the trans pan removed at the 2 terminal connector when unplugged from the TFT sensor as seen in figure 2. This will confirm the complete circuit integrity to the sensor. If this test fails, the internal harness is faulty.
The TFT sensor can be tested externally by unplugging the trans harness connector and measuring the resistance across terminals 18 and 22 at the case pass through connector with a DVOM set to OHMS (See Figure 4).

SERVICE INFORMATION:

Transmission Fluid Temperature Sensor.....3C3Z-7H141-AA
At the time of printing this sensor lists for $81.40 and wholesales at $65.12
Internal Wiring Harness Assembly.....4C3Z-7G276-AA
At the time of printing this harness lists for $98.97 and wholesales at $79.18

SLIDE

5R110W

ERRATIC SHIFTS AND TFT GAUGE OPERATION

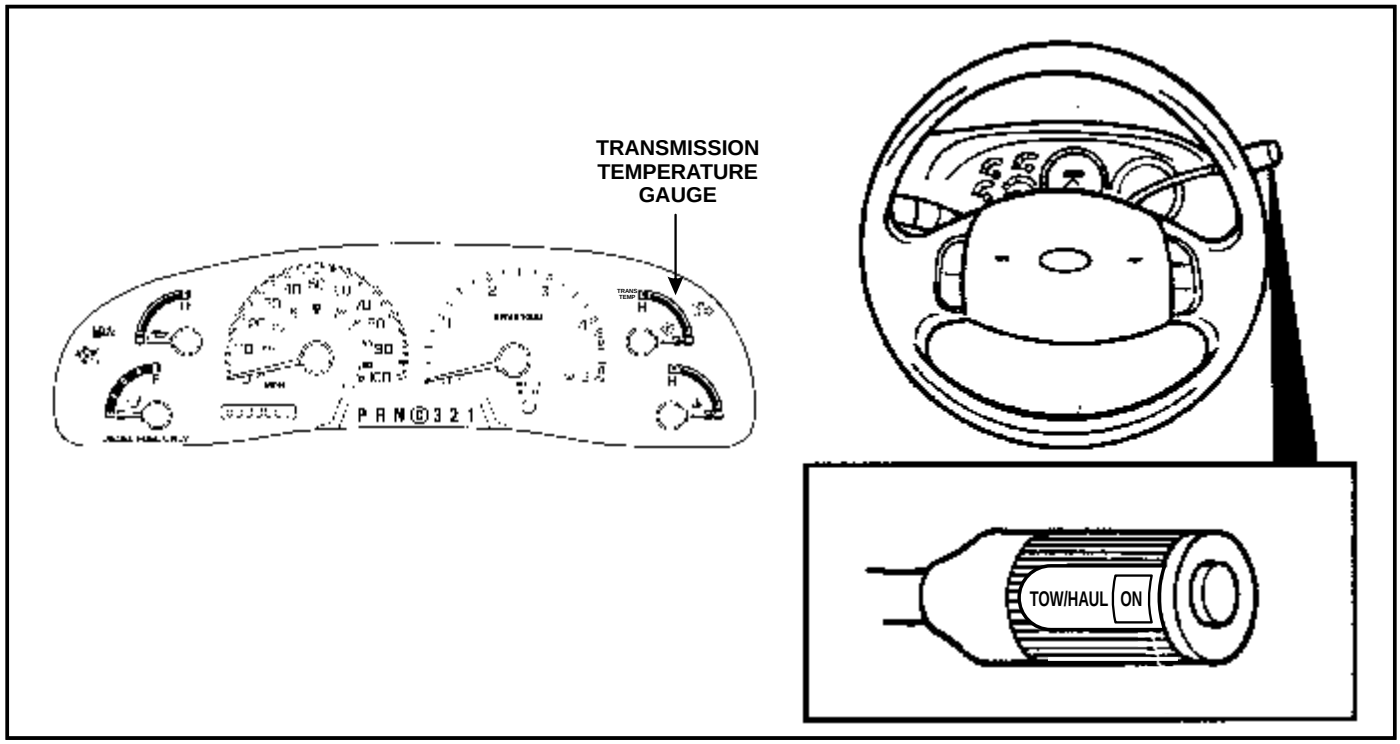


Figure 1

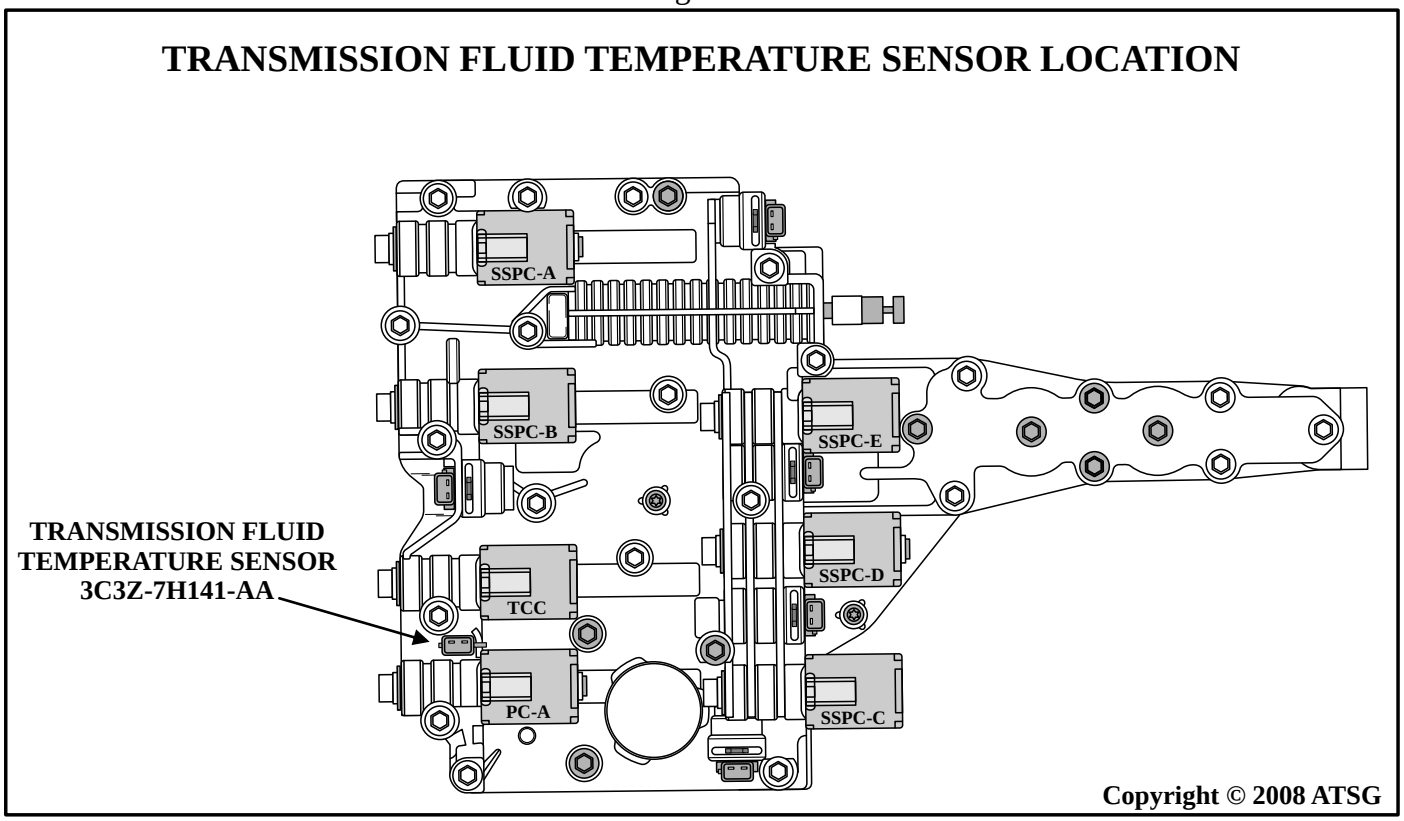
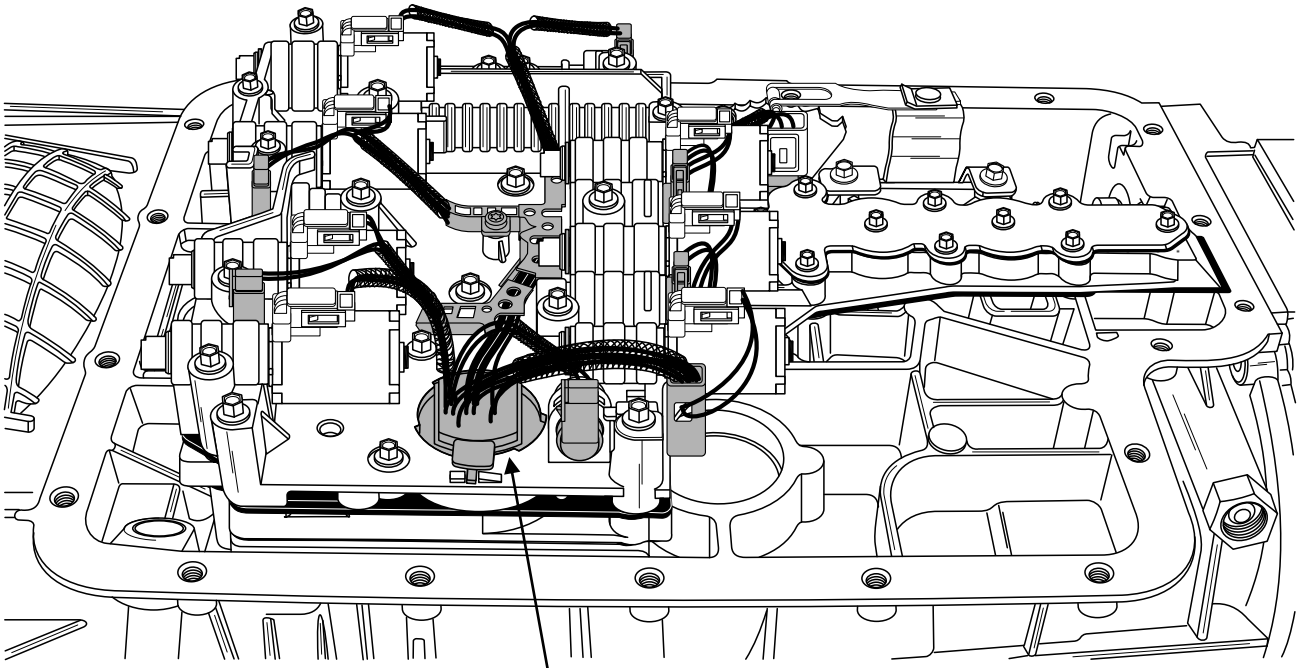


Figure 2

INTERNAL HARNESS

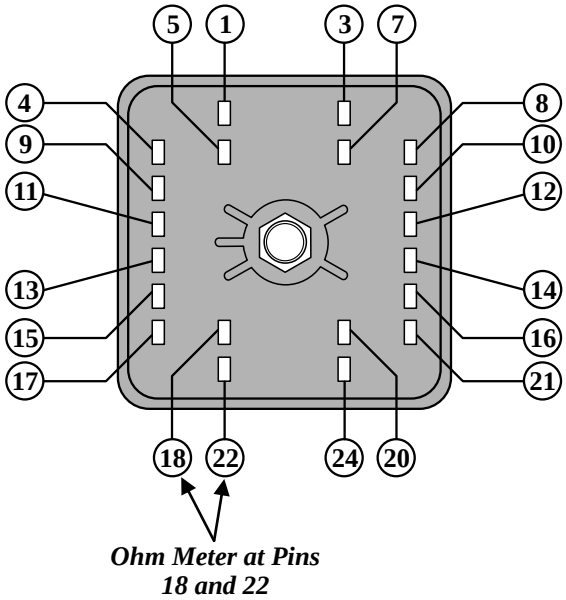


INTERNAL CONNECTOR HARNESS
4C3Z-7G276-AA

Figure 3

OHM TEST

View Looking Into Transmission Case Connector



Ohm Meter at Pins 18 and 22

Transmission Fluid Temperature (TFT)		
Degrees C	*Degrees F*	*Resistance (Ohms)*
-40 to -20	*-40 to -4*	*967k to 284k*
-19 to -2	*-3 to 31*	*284k to 100k*
0 to 20	*32 to 68*	*100k to 37k*
21 to 40	*69 to 104*	*37k to 16k*
41 to 70	*105 to 158*	*16k to 5k*
71 to 90	*159 to 194*	*5k to 2.7k*
91 to110	*195 to 230*	*2.7k to 1.5k*
111 to130	*231 to 266*	*1.5k to 0.8k*
131 to150	*267 to 302*	*0.8k to 0.54k*

The TFT sensor resistance in relation to temperature can be checked with a DVOM set to OHMS. Place the meter leads across pin terminals 18 and 22 in the case connector as shown above.

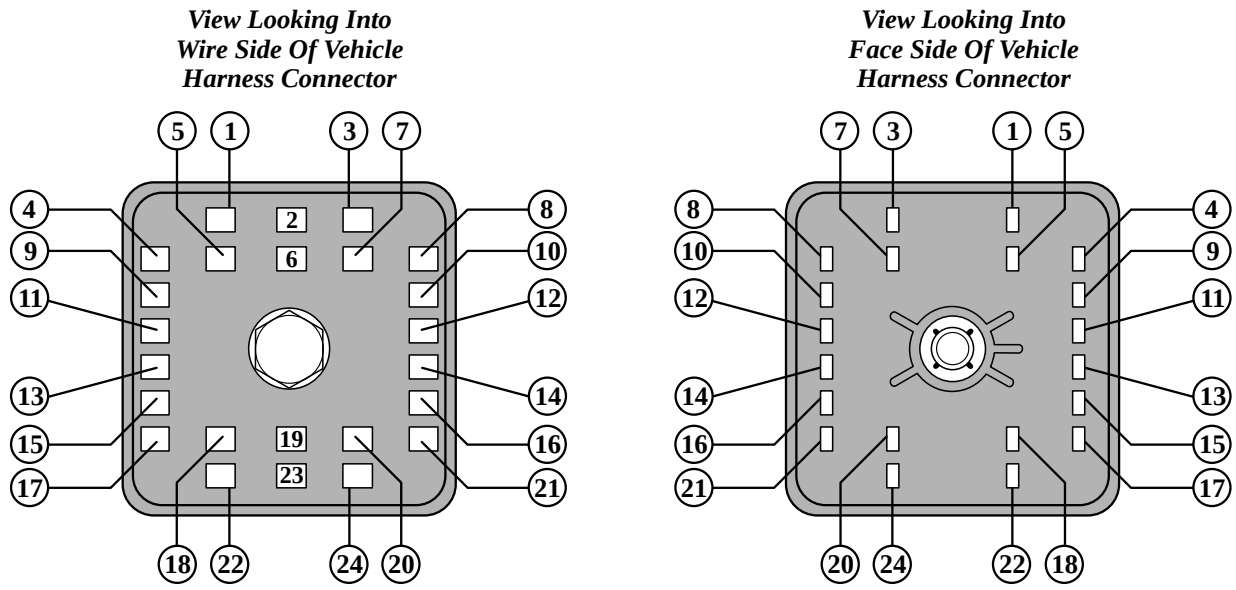
Figure 4

SLIDE

5R110W

ERRATIC SHIFTS AND TFT GAUGE OPERATION

Note: Pin Numbers 2, 6, 19, and 23 are not used.



Use terminal 18 for TFT signal and terminal 22 for TFT sensor ground.

Figure 5

Many thanks to Mark Glasser of X-PERT Transmissions in Philadelphia Pa.

FORD 5R110W-TORQSHIFT TRANSMISSION

SETTING DIAGNOSTIC TROUBLE CODE P0657
LOSS OF ACTUATOR SUPPLY VOLTAGE

COMPLAINT: Ford Motor Company vehicles equipped with the 5R110W-Torqshift transmission either before or after overhaul with the complaint of having 5th gear and reverse only, and displaying DTC P0657: ***Loss of Actuator Supply Voltage.***

EXPLANATION: On 5R110W-Torqshift equipped vehicles, when the ignition is switched to the on position, the Powertrain Control Module sends battery voltage to the transmission from the PCM "B" connector, terminal 7 (See Figure 1). This voltage is sent to the transmission solenoids at terminals 7-20, and 24 at the Transmission Harness Connector (See Figure 4). The voltage is used to power the transmission solenoids. Upon sending voltage to the transmission solenoids, the PCM looks for a voltage return from all of the transmission solenoids to check the integrity of the solenoid circuits. If a no voltage return is detected on several, or all transmission solenoids, the PCM will log DTC P0657, and shut off the voltage supply to the transmission, resulting in the transmission having 5th gear and reverse only.

CAUSE: The cause may be:

(1) The PCM connectors are tightly bundled in the engine compartment, and sometimes will cause the Actuator Supply Voltage wire at PCM connector "B," terminal number 7 to be pulled loose from the connector and cause it to lose the proper connection (See Figures 1-2).
(2) Due to high engine compartment temperatures, the wiring harness may become damaged and require replacement.
(3) The internal transmission harness may be damaged .

CORRECTION: Check for key on battery voltage at pins 7-20, and 24 on the Vehicle Harness side of the Transmission Connector side. (See Figure 4) Wire identification is shown in Figure 3. ***Note: Example given is for a 2004 E450 6.0 Diesel*** Check for continuity to the PCM (See Figure 3). Ohm check internal transmission components. Information for ohm checking internal transmission components has been provided in Figure 5. Refer to Figure 6 for a wire schematic from the PCM. Repair or replace as necessary.

SERVICE INFORMATION:

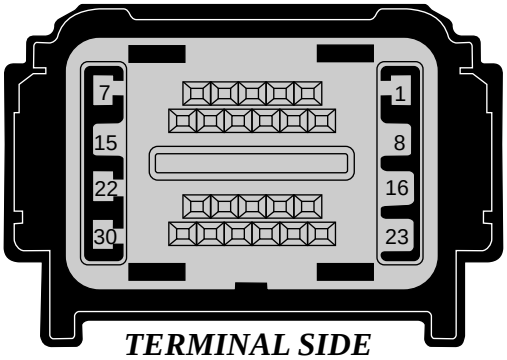
UPPER WIRING HARNESS (E series only).....4C2Z-7Z078-AA
INTERNAL WIRING HARNESS..... 4C3Z-7G276-AA

Special thanks to Dino at Lee Miles

SLIDE

2004 E450 PCM CONNECTOR "B" PIN IDENTIFICATION AND FUNCTIONS AND PCM LOCATION

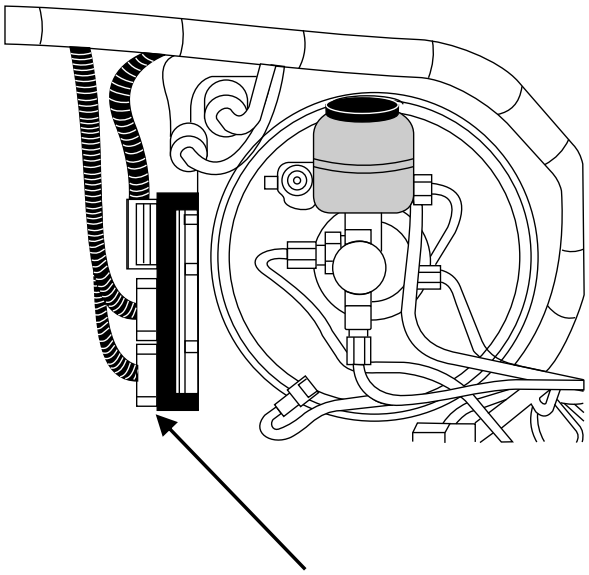
PCM CONNECTOR "B"



TERMINAL SIDE

Figure 1

PCM LOCATION



PCM CONNECTOR "B" LOCATION

Figure 2

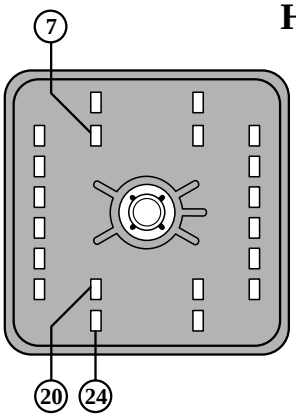
2004 E450 6.0 DIESEL

Pin	Wire Color	Circuit Function	Pin	Wire Color	Circuit Function
1	Green/yellow	12V Reference Voltage, Speed Sensors and TRP	16		"Not Used"
2	Violet/Yellow	PC-A Pressure Control Solenoid Ground	17		"Not Used"
3	DkGrn/Yellow	Reverse Lamp Relay, Control	18		"Not Used"
4		Not Used	19		"Not Used"
5	White/Lt Green	TCIL, Control (Tow/Haul)	20		"Not Used"
6		"Not Used"	21		"Not Used"
7	Red/Yellow	12V Power to Solenoids	22	Tan/Lt Green	Transmission Range Sensor Ground
8		"Not Used"	23		"Not Used"
9	Orange/Yellow	SSPC-A Shift Solenoid Pressure Control A Ground	24		"Not Used"
10	Violet/Orange	SSPC-B Shift Solenoid Pressure Control B Ground	25	Lt Blue/Yellow	TR-P Transmission Range Sensor Signal
11	Pink/Black	SSPC-C Shift Solenoid Pressure Control C Ground	26	Orange/Black	TFT Transmission Fluid Temp Sensor Signal
12	Black/Lt Green	SSPC-D Shift Solenoid Pressure Control D Ground	27	Gray/Orange	ISS Intermediate Shaft Speed Sensor Signal
13	Dk Blue/White	SSPC-E Shift Solenoid Pressure Control E Ground	28	Dk Blue/Yellow	OSS Output Shaft Speed Sensor Signal
14	Brown/Orange	TCC Torque Converter Clutch Solenoid Ground	29	DkGreen/White	TSS Turbine Shaft Speed Sensor Signal
15		"Not Used"	30	Brown/Pink	TFT Sensor Ground

Figure 3

SLIDE

HARNESS CONNECTOR CHECK



View Looking Into Face Side Of Vehicle Harness Connector

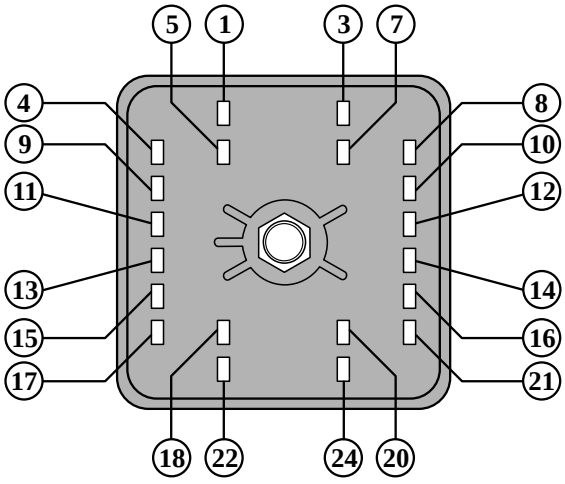
BATTERY VOLTAGE TO TERMINALS 7-20 AND 24 KEY ON

Figure 4

INTERNAL COMPONENT RESISTANCE CHART

INTERNAL COMPONENT	CASE CONNECTOR PIN NUMBERS	OHMS RESISTANCE	*** Internal Wire Colors At Component Connector*
SSPC-A Soleniod	*12 and 20*	*4.1 to 4.7 @ 72° F*	*Purple and Orange*
SSPC-B Soleniod	*3 and 20*	*4.1 to 4.7 @ 72° F*	*Red and Tan*
SSPC-C Soleniod	*5 and 24*	*4.1 to 4.7 @ 72° F*	*Orange and Purple*
SSPC-D Soleniod	*4 and 24*	*4.1 to 4.7 @ 72° F*	*Tan and Pink*
SSPC-E Soleniod	*1 and 24*	*4.1 to 4.7 @ 72° F*	*Tan and Purple*
PC-A Solenoid (Late)	*7 and 10*	*5.1 to 5.8 @ 72° F*	*Gray and Purple*
TCC Solenoid	*7 and 8*	*4.1 to 4.7 @ 72° F*	

*** Wire colors may vary.*



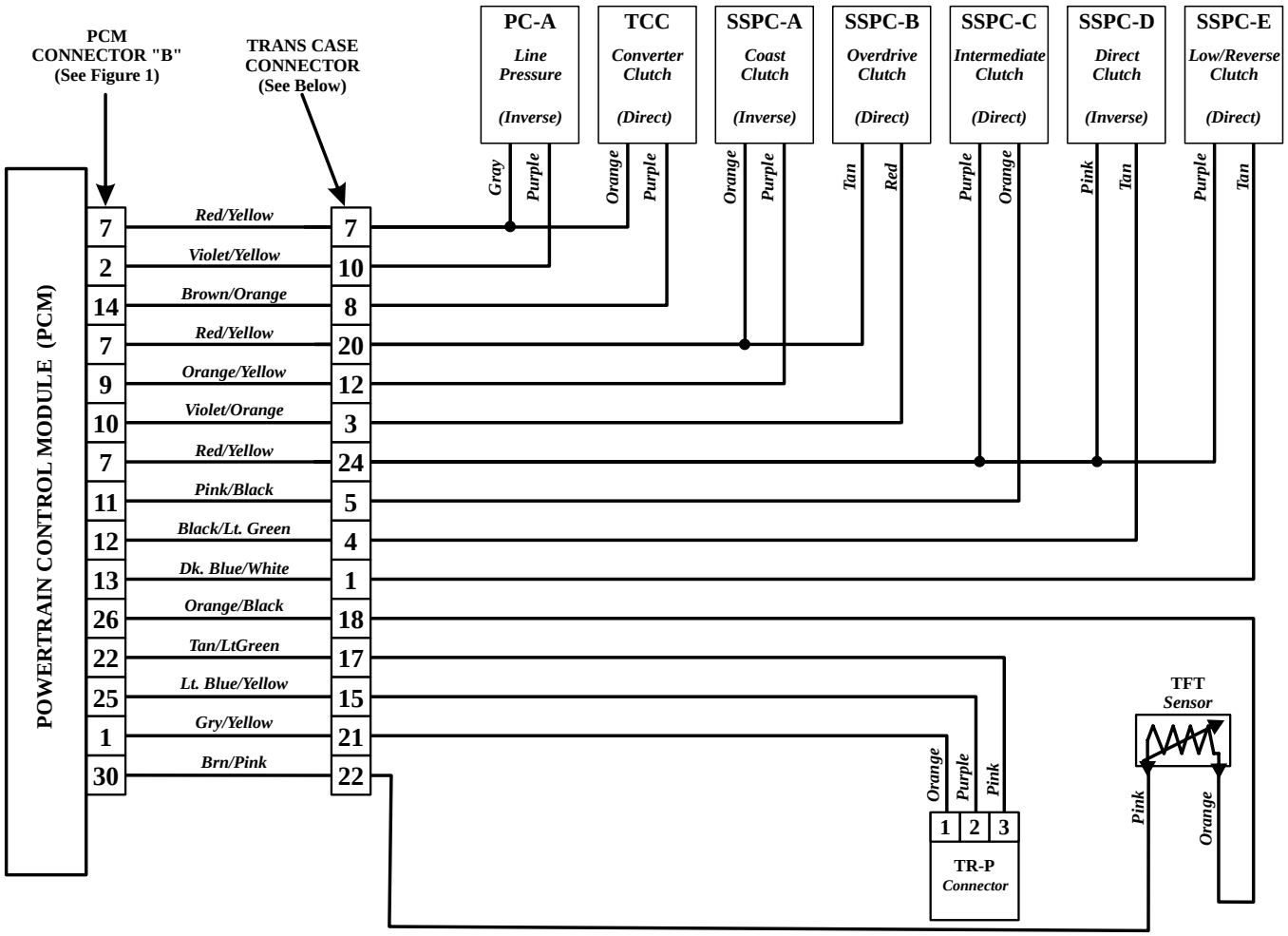
View Looking Into Transmission Case Connector

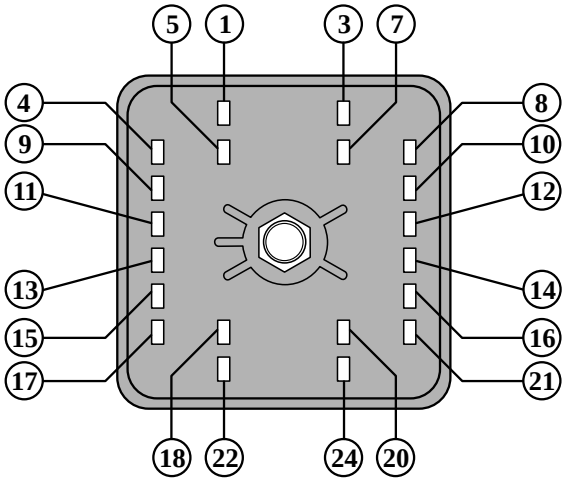
Transmission Fluid Temperature (TOT)		
Degrees C	*Degrees F*	*Resistance (Ohms)*
-40 to -20	*-40 to -4*	*967k to 284k*
-19 to -2	*-3 to 31*	*284k to 100k*
0 to 20	*32 to 68*	*100k to 37k*
21 to 40	*69 to 104*	*37k to 16k*
41 to 70	*105 to 158*	*16k to 5k*
71 to 90	*159 to 194*	*5k to 2.7k*
91 to110	*195 to 230*	*2.7k to 1.5k*
111 to130	*231 to 266*	*1.5k to 0.8k*
131 to150	*267 to 302*	*0.8k to 0.54k*

Figure 5

SLIDE

5R110W INTERNAL WIRE SCHEMATIC





View Looking Into Transmission Case Connector

Figure 6

FORD VEHICLES

SPEED CONTROL DEACTIVATION SWITCH

COMPLAINT: The vehicle is severely damaged by fire, if it was parked inside a building, it to is severely damaged by fire.

CAUSE: A leaking Speed Control Deactivation Switch. When the Speed Control Deactivation Switch develops a leak, the brake fluid drips on to the Speed Control Amplifier connector which carries system voltage even when the vehicle is turned off.
The brake fluid begins to smolder and eventually ignites, the fire then spreads to whatever will burn, the end result could be catastrophic if this process occurs in the middle of the night.

CORRECTION: The Ford vehicles that are susceptible to this hazard are listed in the chart in Figure 1. These vehicles are under ***Safety Recall 05S28*** which will cover all repairs related to this problem free of charge.
However, some owners my not bring the vehicle in for repairs even though they received a letter explaining the situation, or perhaps it is a second owner of the vehicle.
If you do not see a tag wrapped around the Speed Control Deactivation Switch wire harness as seen in Figure 2, then **DO NOT PARK THIS VEHICLE INSIDE YOUR SHOP OR HOME GARAGE!**
The repair consists of replacing the deactivation switch (Refer to Figure 3) and installing a fused sub-harness which routes the connector out from under the brake master cylinder, (Refer to Figure 4).

SERVICE INFORMATION:

Brake Repair Kit ***8W7Z-14A411-C***

A RELATED INCIDENT:

One tech call came in from Brian Doran at Dorans Transmissions in N.C. where he had a 2000 Ford Windstar with no speedometer operation in the instrument cluster and the LCD odometer window was reading bars all the way across. He scanned the vehicle and pulled a P0500 code. A road test confirmed that there were no problems with transmission operation and that the vehicle speed was functioning properly in live data yet not on the instrument cluster. He also noticed that the automatic sliding doors didn't function, the ABS lights were on and the Park Lock solenoid would operate among other things. So Brian went to the fuse box and found a blown #10 fuse in the passenger compartment fuse panel.

He replaced the fuse, took the vehicle for a spin and the speedometer in the instrument cluster began working as it should as well as all the other systems that he noticed was down. However, he began to smell like hot oil the longer he drove the vehicle. One of the functions of this fuse is to also supply power to the Brake Pressure De-Activation Switch. The # 10 fuse would only blow when he stepped into the brake while cruise control was activated. Being concerned, he spoke to a guy he knows at a Ford dealer and they were somewhat familiar with the problem. As recommended, Brian purchased a Brake Repair Kit, Ford part number XW7Z-9F924-BA. This contained a new cruise de-activation switch and harness connector end. List price = $25.44. Net price = $21.62. The smell of hot oil did not return after repairs and the fuse never blew again.

SPEED CONTROL DEACTIVATION SWITCH

AFFECTED VEHICLES			
YEAR	MAKE	MODEL	NOTES
1992 - 1998	FORD	CROWN VICTORIA	1998 Model Year W/O Traction Control
1992 - 1998	MERCURY	MARQUIS	1998 Model Year W/O Traction Control
1992 - 1998	LINCOLN	TOWN CAR	
1993 - 1998	LINCOLN	MARK VIII	
1993 - 1995	FORD	TAURUS SHO	With Automatic Transmission Only
1994	MERCURY	CAPRI	
1998 - 2002	FORD	RANGER	
1998 - 2001	FORD	EXPLORER	
1998 - 2001	MERCURY	MOUNTAINEER	
2001 -2002	FORD	EXPLORER SPORT & SPORT TRAC	
1995 - 2002	FORD	F-53 Motorhome	
1993 - 1996	FORD	BRONCO	
2003 - 2004	FORD	F150 LIGHTNING	
1993 - 2003	FORD	F SERIES	Under 8500 GVW
1993 - 2003	FORD	F SERIES	Over 8500 GVW Built Prior to November 4, 2002 All PLants Except Cuautitian
1994 - 2003	FORD	F SERIES	Over 8500 GVW Built Prior to January 7, 2003 Cuautitian Plant Only
1997 - 2002	FORD	EXPEDITION	
1998 - 2002	LINCOLN	NAVIGATOR	
2002 - 2003	LINCOLN	BLACKWOOD	
1992 - 2003	FORD	E 150/250/350	
1996 - 2003	FORD	E 450	
2002 - 2003	FORD	E 550	
2000 - 2003	FORD	EXCURSION	Built Prior To November 4, 2002

Figure 1

SPEED CONTROL DEACTIVATION SWITCH

SERVICE REPAIR TAG

IMPORTANT: This jumper harness contains an internal fuse that is not serviceable.

If this harness is damaged, or if the fuse is blown, remove and discard this harnes and install service kit #9F924.

Figure 2

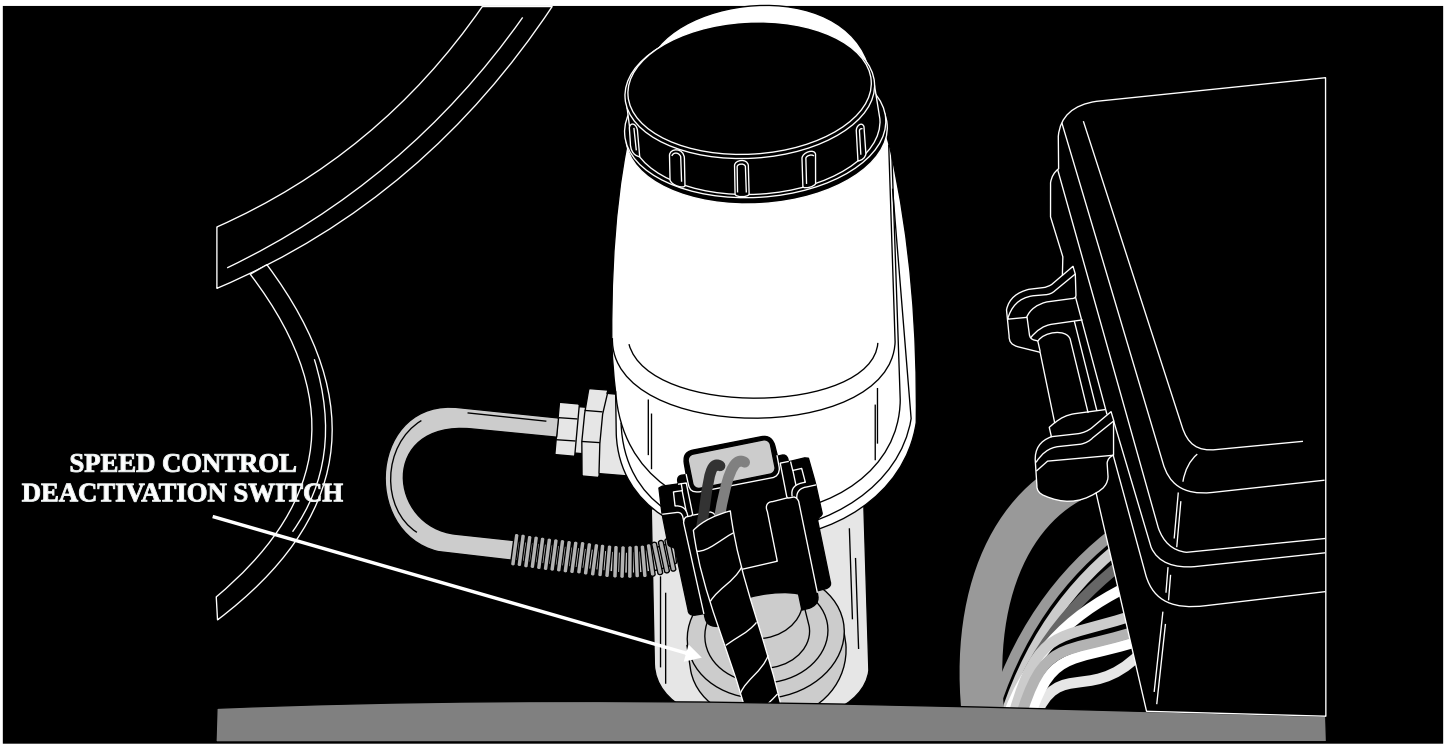


Figure 3

FUSED SUB-HARNESS

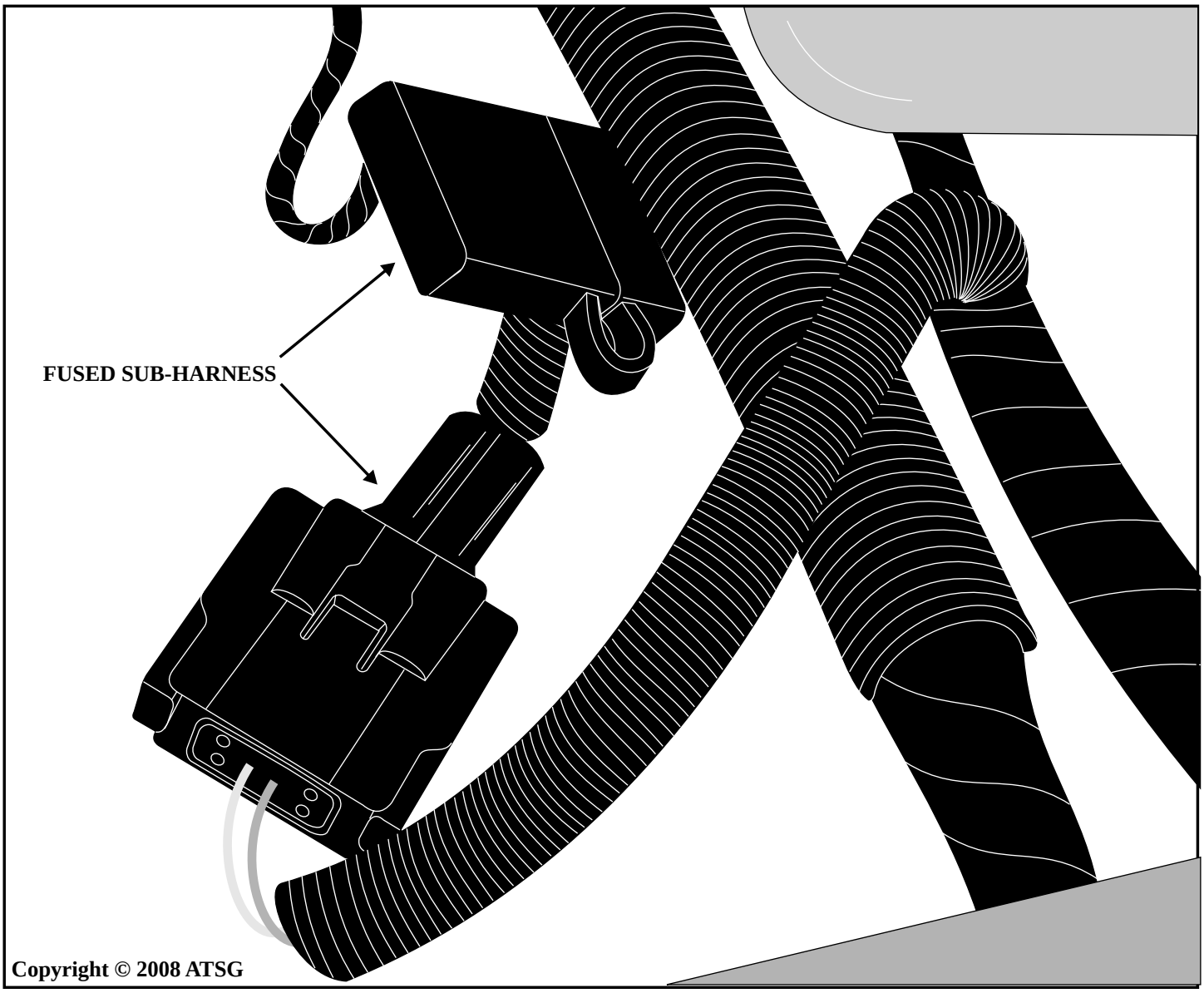


Figure 4

ELECTRICAL SIGNAL MEASUREMENTS

COMPLAINT: Often, not enough information about a particular electrical signal is obtained sometimes leading troubleshooting in the wrong direction.

CAUSE: Failure to use the correct tool or read the needed parameters.

CORRECTION: Different electrical signals have different parameters which indicate different problems. Further, many different tools may be used to read various signals.

In a simple circuit, (See Figure 1) voltage readings tell us the power is available, but it does not tell us if current is actually flowing. A current (Amps) reading tells us if the entire circuit is complete. Voltage readings may be taken with most any voltmeter type, but a graphic representation (graphing multimeter or O-scope) will display noise as well.

Current readings can be done with a multimeter or an "Amp Clamp." The multimeter requires that you cut into the circuit while the Amp Clamp requires a certain skill level.

Simple On/Off input signals may be read with a test light or logic probe. A voltmeter is better to determine the actual voltage level.

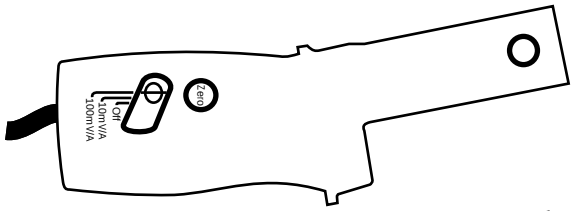
Linear DC voltage level signals are best read with a graphic multinmeter or O-Scope to detect glitches, sags, spikes, aand noise (See Figure 2).

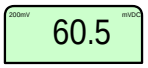
AC signal generators (See Figure 3) put out a sine wave. Although the information that the signal carries is in the form of frequency, the amplitude must be within spec as well.

DC Pulsed signals (See Figure 4) are similar to sine waves but the Pulse Width also must be in spec.

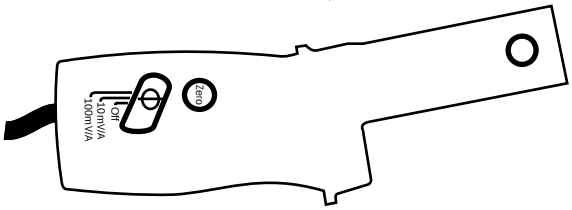
PWM input signals (See Figure 5) carry their information as a percentage of duty cycle. This may be read as on time or off time, and may be the positive or negative duty cycle. PWM signals must also maintain acceptable amplitde.

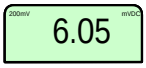
PWM Output signals (See Figure 6) are just like the input signal except that current is a factor as well.



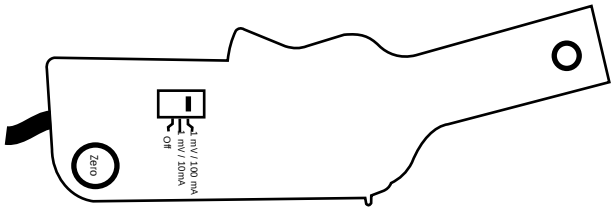


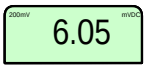
100 mV / A



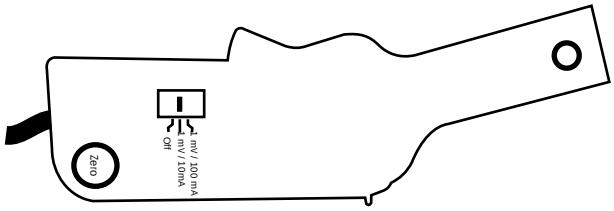


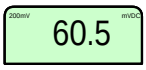
10 mV / A



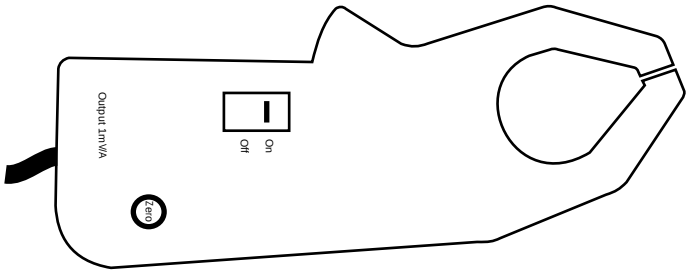


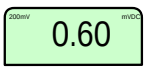
1 mV / 100 mA





1 mV / 10 mA





1 mV / A

Figure 1

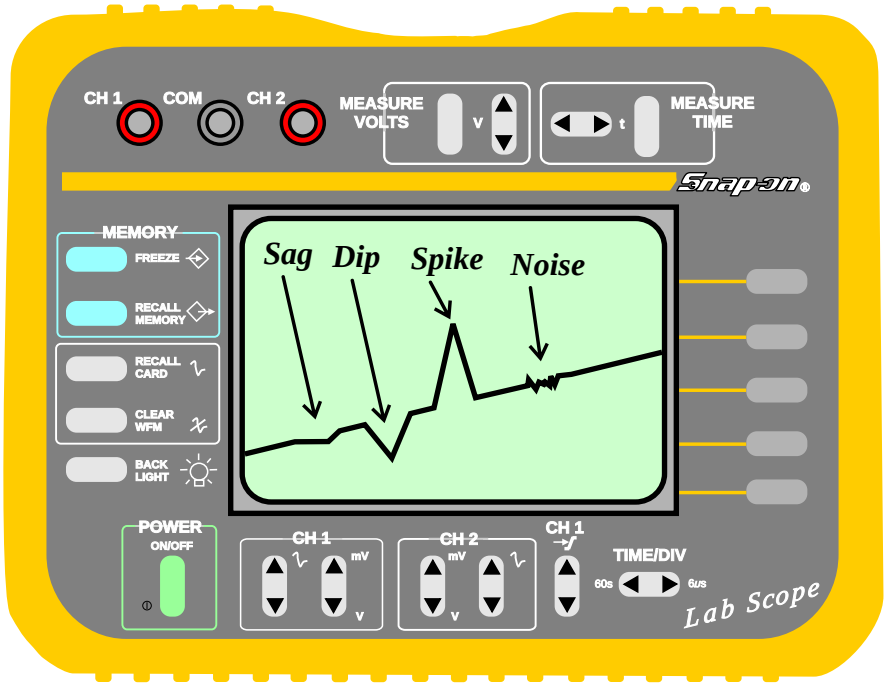


Figure 2

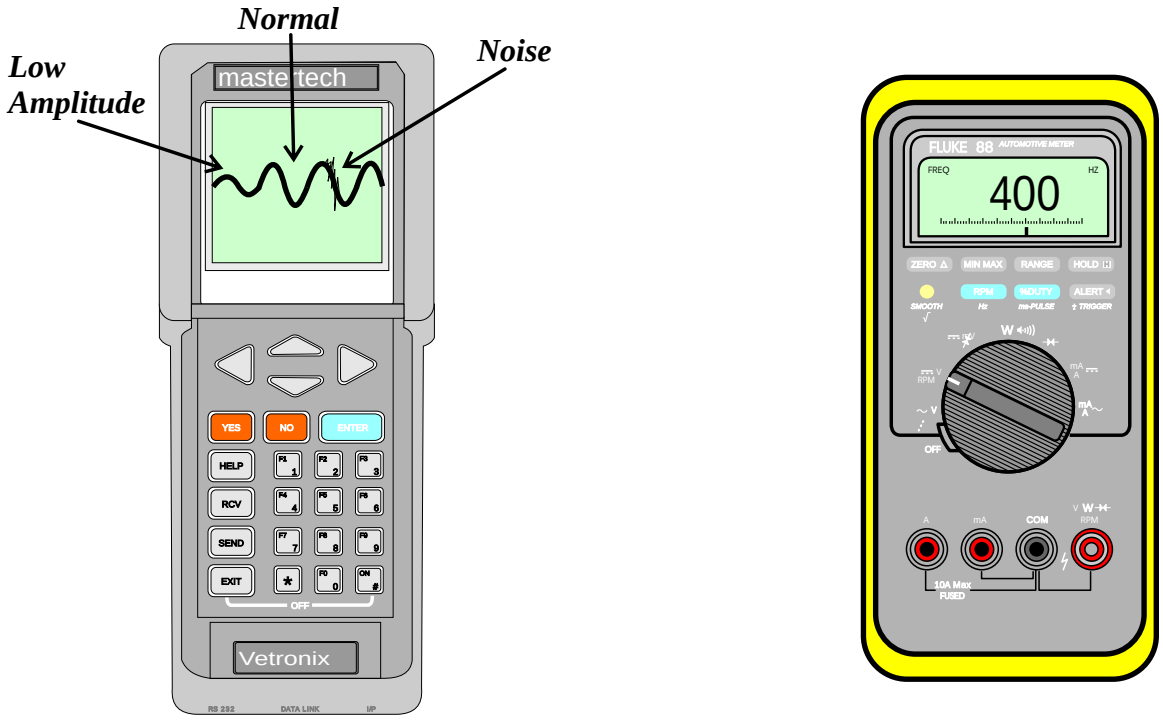


Figure 3

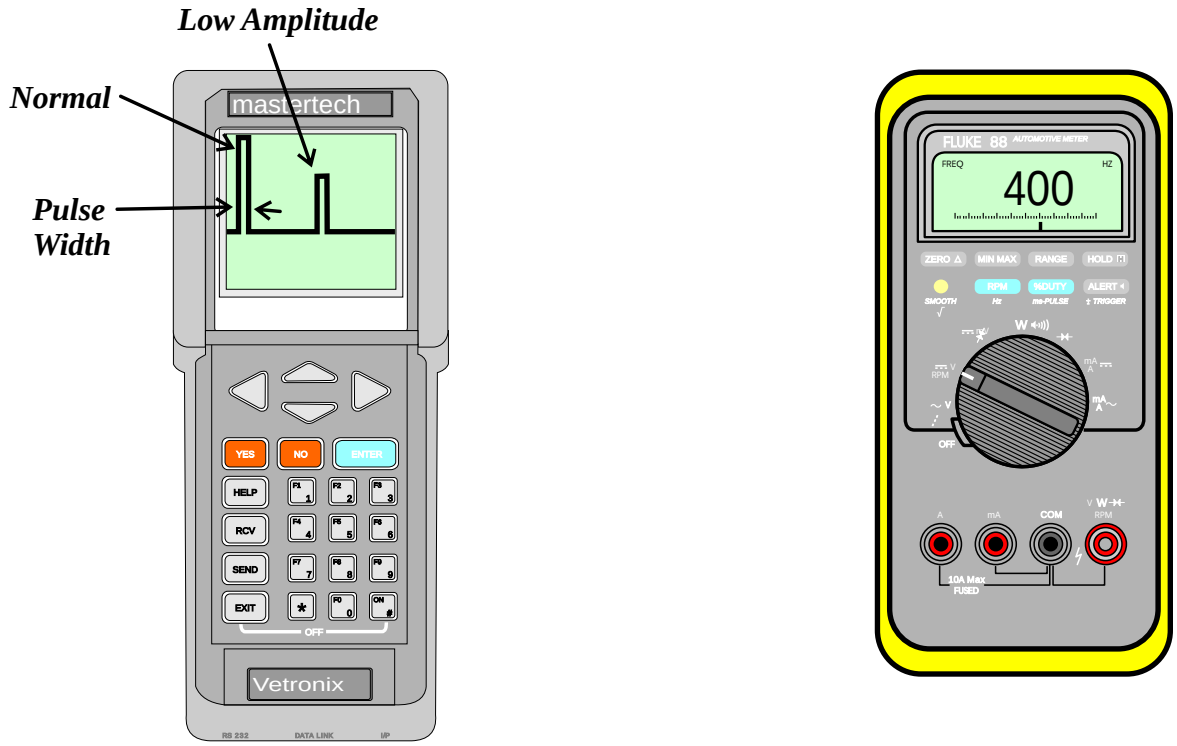


Figure 4

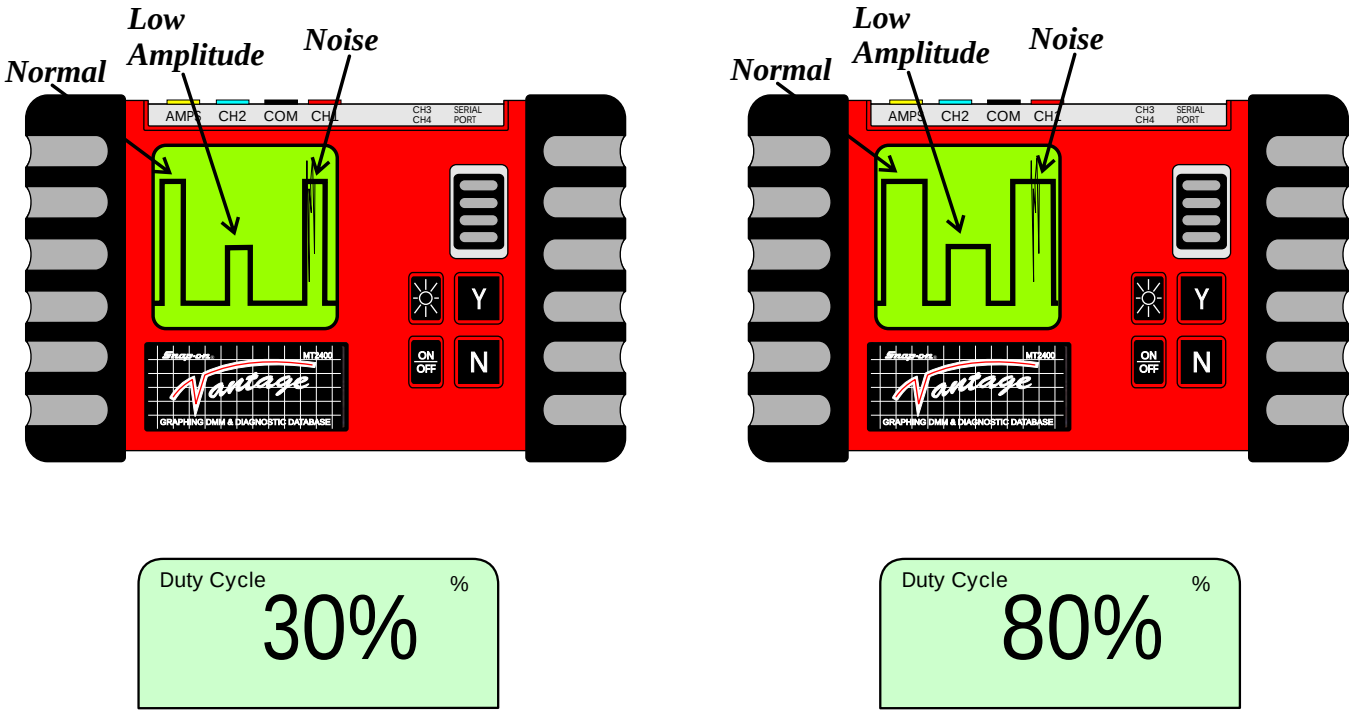
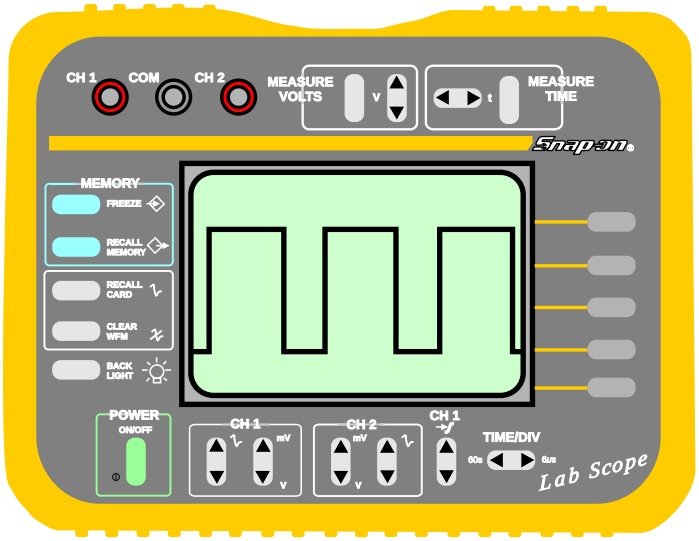
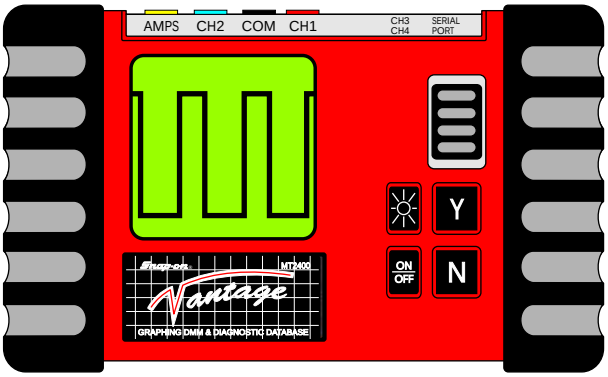


Figure 5

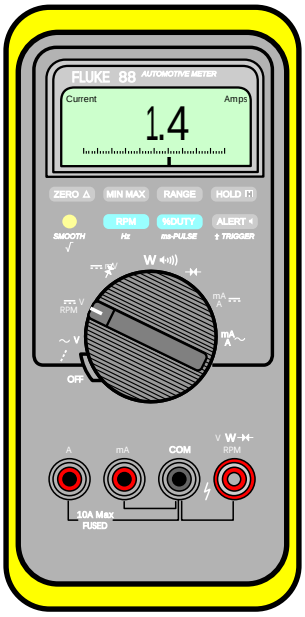
Voltage
0 VDC to 13.5 VDC

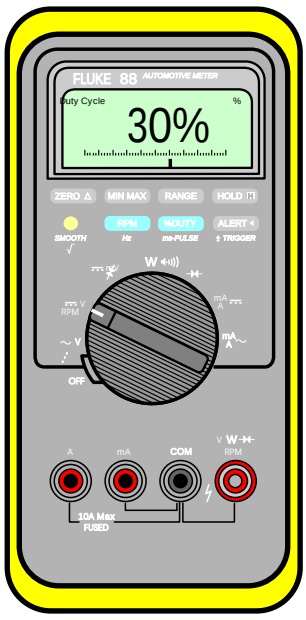


Current
0 mV to 400 mV
0 Amps to 4 Amps
(without averaging
over time)



Current
1.4 Amps
averaged over time





Duty Cycle

Figure 6

1996 & LATER DODGE/CHRYSLER VEHICLES WITH 41TE/42LE TRANSAXLES

PRND3L LIGHTS MALFUNCTION

COMPLAINT: All PRND3L lights illuminated in Park and Neutral while vehicle is running. PRND3L lights illuminate correctly in the Reverse, Overdrive, Drive and Low detents. Scanner will not communicate with transmission control module in Park or Neutral, will only communicate in the Reverse, Overdrive Drive, Drive and Low detents only. Vehicle may start normally depending upon model year and there are no codes present. Scan tool unable to perform Quick Learn procedure. Transmission shifts normal and there may not be any engine related problems.

CAUSE: Malfunctioning ignition switch causing a continuous 12 volts present on pin 8 of the TCM while the engine is running (shown in figure 1). Battery voltage on pin 8 should only be present with the ignition switch in the crank position. Voltage should drop to zero when ignition key is released back to the run position (figure 2). Some models vehicle start when the key is turned to the "On" position, such as the 2000 Dodge Intrepid with the type of starting circuit as seen in figure 3.

CORRECTION: Replace ignition switch or fix possible short to power.

Special thanks to Jim DeShields of DeHawk Transmissions Inc. for all his hard work finding the cause of this problem and sharing it with ATSG.

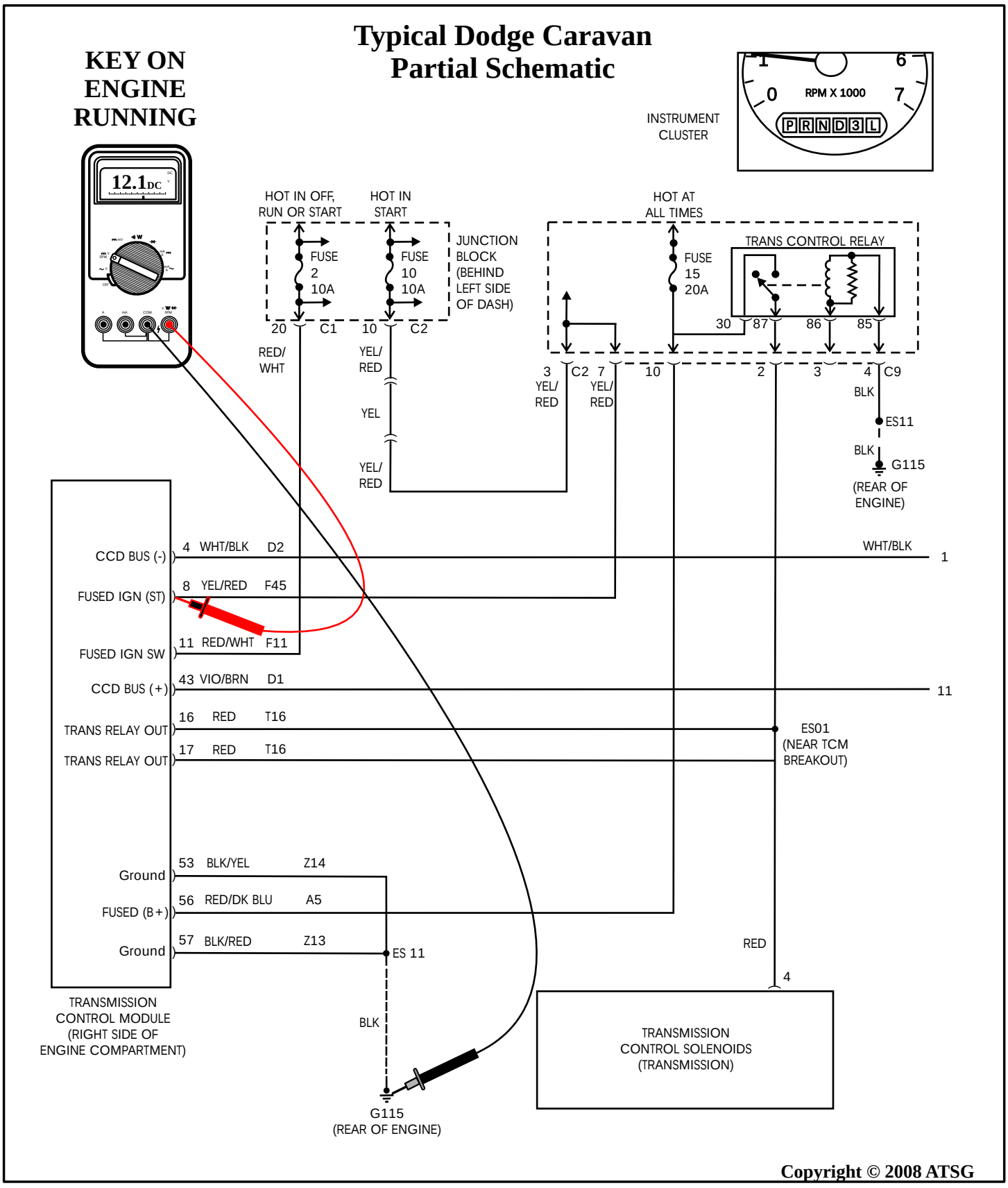

Typical Dodge Caravan
Partial Schematic
KEY ON
ENGINE
RUNNING
12.1DC
INSTRUMENT
CLUSTER
1
6
0
RPM X 1000
7
P R N D 3 L
HOT IN OFF,
RUN OR START
HOT IN
START
FUSE
2
10A
FUSE
10
10A
JUNCTION
BLOCK
(BEHIND
LEFT SIDE
OF DASH)
20
C1
10
C2
RED/
WHT
YEL/
RED
YEL
YEL/
RED
HOT AT
ALL TIMES
FUSE
15
20A
TRANS CONTROL RELAY
30
87
86
85
3
YEL/
RED
C2
7
YEL/
RED
10
2
3
4
C9
BLK
ES11
BLK
G115
(REAR OF
ENGINE)
CCD BUS (-)
4 WHT/BLK D2
WHT/BLK
1
FUSED IGN (ST)
8 YEL/RED F45
FUSED IGN SW
11 RED/WHT F11
CCD BUS (+)
43 VIO/BRN D1
11
TRANS RELAY OUT
16 RED T16
TRANS RELAY OUT
17 RED T16
ES01
(NEAR TCM
BREAKOUT)
Ground
53 BLK/YEL Z14
FUSED (B+)
56 RED/DK BLU A5
Ground
57 BLK/RED Z13
ES 11
RED
4
TRANSMISSION
CONTROL MODULE
(RIGHT SIDE OF
ENGINE COMPARTMENT)
BLK
TRANSMISSION
CONTROL SOLENOIDS
(TRANSMISSION)
G115
(REAR OF ENGINE)
Copyright © 2008 ATSG

Figure 1

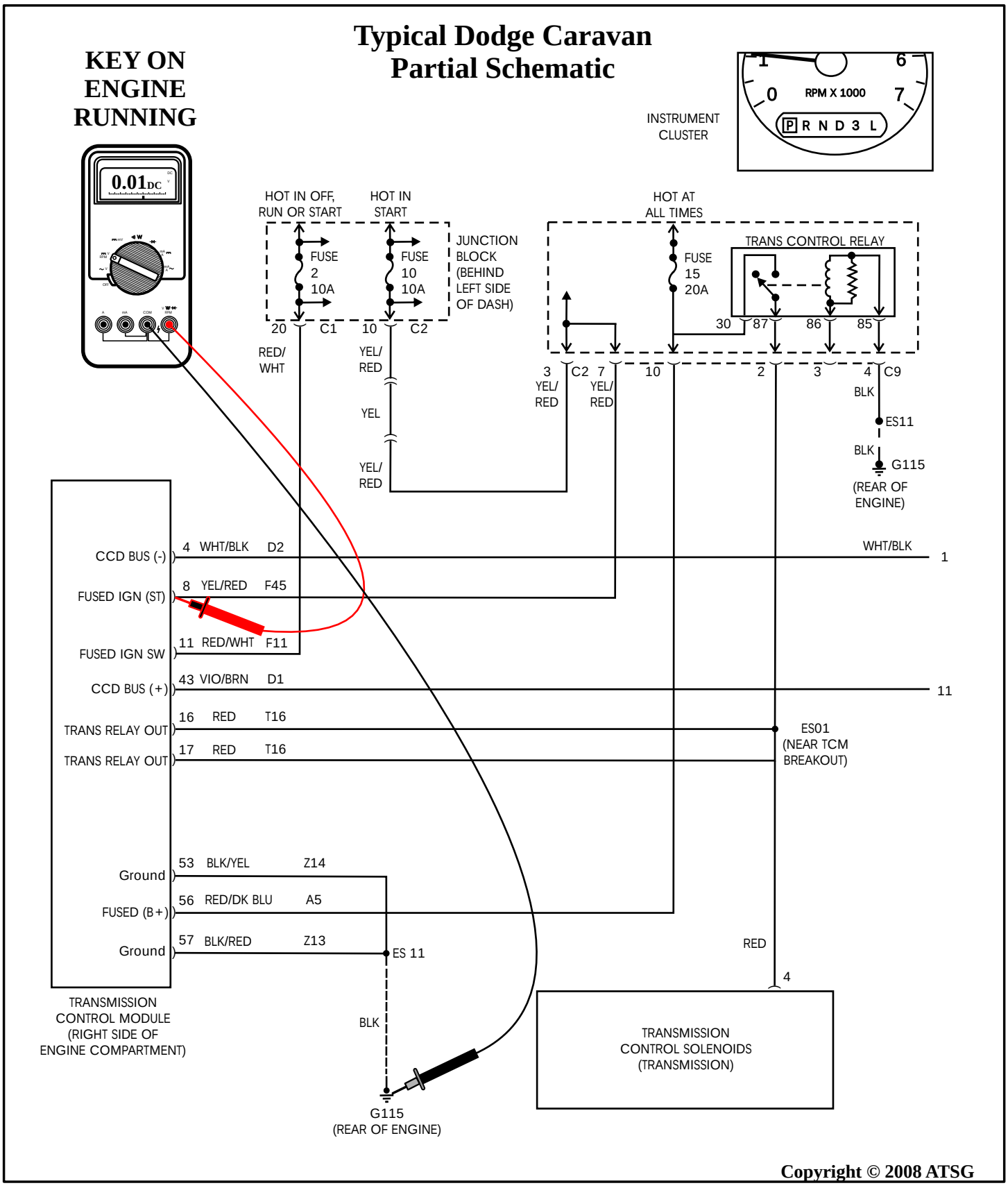

Typical Dodge Caravan
Partial Schematic
KEY ON
ENGINE
RUNNING
INSTRUMENT
CLUSTER
RPM X 1000
P R N D 3 L
HOT IN OFF,
RUN OR START
HOT IN
START
JUNCTION
BLOCK
(BEHIND
LEFT SIDE
OF DASH)
FUSE
2
10A
FUSE
10
10A
HOT AT
ALL TIMES
FUSE
15
20A
TRANS CONTROL RELAY
RED/
WHT
YEL/
RED
YEL
YEL/
RED
YEL/
RED
YEL/
RED
BLK
ES11
BLK
G115
(REAR OF
ENGINE)
CCD BUS (-)
4 WHT/BLK D2
WHT/BLK
1
FUSED IGN (ST)
8 YEL/RED F45
FUSED IGN SW
11 RED/WHT F11
CCD BUS (+)
43 VIO/BRN D1
11
TRANS RELAY OUT
16 RED T16
TRANS RELAY OUT
17 RED T16
ES01
(NEAR TCM
BREAKOUT)
Ground
53 BLK/YEL Z14
FUSED (B+)
56 RED/DK BLU A5
Ground
57 BLK/RED Z13
ES 11
RED
4
BLK
TRANSMISSION
CONTROL MODULE
(RIGHT SIDE OF
ENGINE COMPARTMENT)
TRANSMISSION
CONTROL SOLENOIDS
(TRANSMISSION)
G115
(REAR OF ENGINE)
Copyright © 2008 ATSG

Figure 2

2000 Dodge Intrepid
Starting Circuit

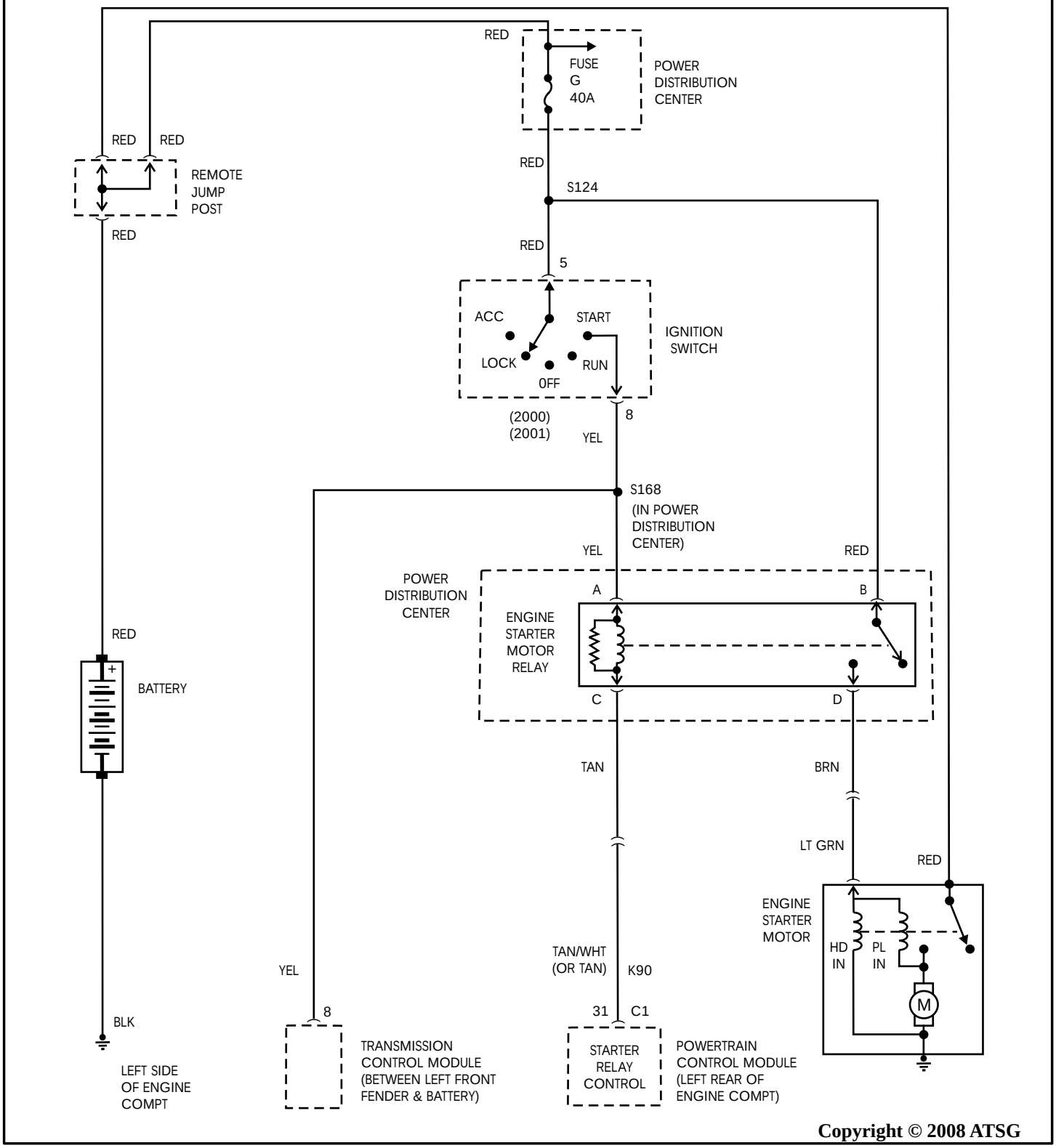


Figure 3

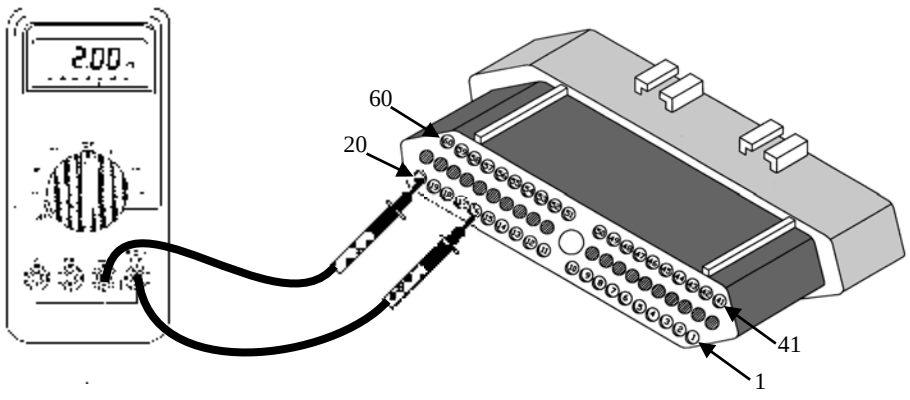
CHRYSLER TRANSMISSIONS

TESTING CONSISTENCY FROM 1989

Chrysler and Dodge vehicles that are equipped with either the 41TE, 42LE, 42RLE, or 45RFE transmissions have a certain degree of consistency when electrically diagnosing solenoid codes, EATX relay codes or input and output shaft speed sensors codes. When looking at the TCM 60 way connector for each of these transmissions, you will observe the following consistency:

TCM Terminal # 13 = Speed Sensor Ground
TCM Terminal # 14 = Output Speed Sensor Signal
TCM Terminal # 52 = Input Speed Sensor Signal
TCM Terminal # 15 = EATX Relay Control
TCM Terminal # 16 = EATX Relay Signal
TCM Terminal # 17 = EATX Relay Signal
TCM Terminal # 19 = 2/4 Solenoid *(except 45RFE)*
TCM Terminal # 20 = L/R Solenoid
TCM Terminal # 59 = UD Solenoid*(except 45RFE)*
TCM Terminal # 60 = OD Solenoid

By becoming familiar with the typical wiring diagrams provided in figures 2 through 6 and memorizing the terminals listed above, quick testing at the 60 way connector can be performed for a large number of vehicles spanning a period of 15 years without ever having to pull a wiring diagram such as the example given in Figure 1. The 45RFE has additional solenoids which caused a variation among the other three transmissions but as you can see two of the solenoids remained consistent. Quick testing can be done with all four of the transmissions with the Input and Output Speed sensors. Factory repair manuals provide a 300 to 1200 ohm value for these sensors but it has been ATSG's experience that they measure 500 to 600 ohms. Relay circuit testing is also the same with a slight exception for the 45RFE as there is one additional signal circuit at terminal 36.



POSITIVE LEAD	NEGATIVE LEAD	SOLENOID	RESISTANCE
PIN # 16 or 17	PIN # 59	UD	1.5 - 2.0 ohms
PIN # 16 or 17	PIN # 60	OD	1.5 - 2.0 ohms
PIN # 16 or 17	PIN # 20	L/R	1.5 - 2.0 ohms
PIN # 16 or 17	PIN # 19	2/4	1.5 - 2.0 ohms

Figure 1

TESTING CONSISTENCY FROM 1989

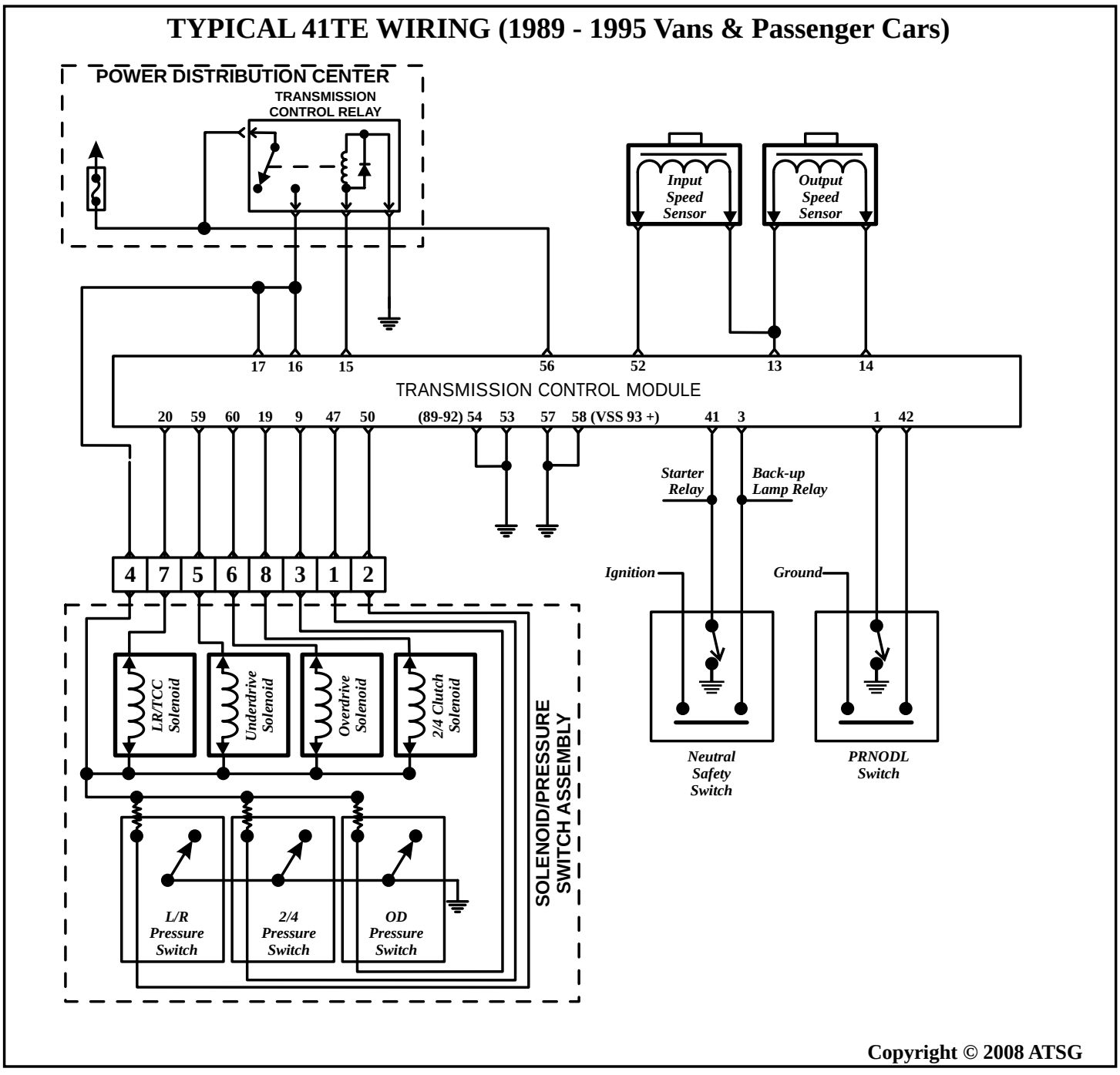


Figure 2

TESTING CONSISTENCY FROM 1989

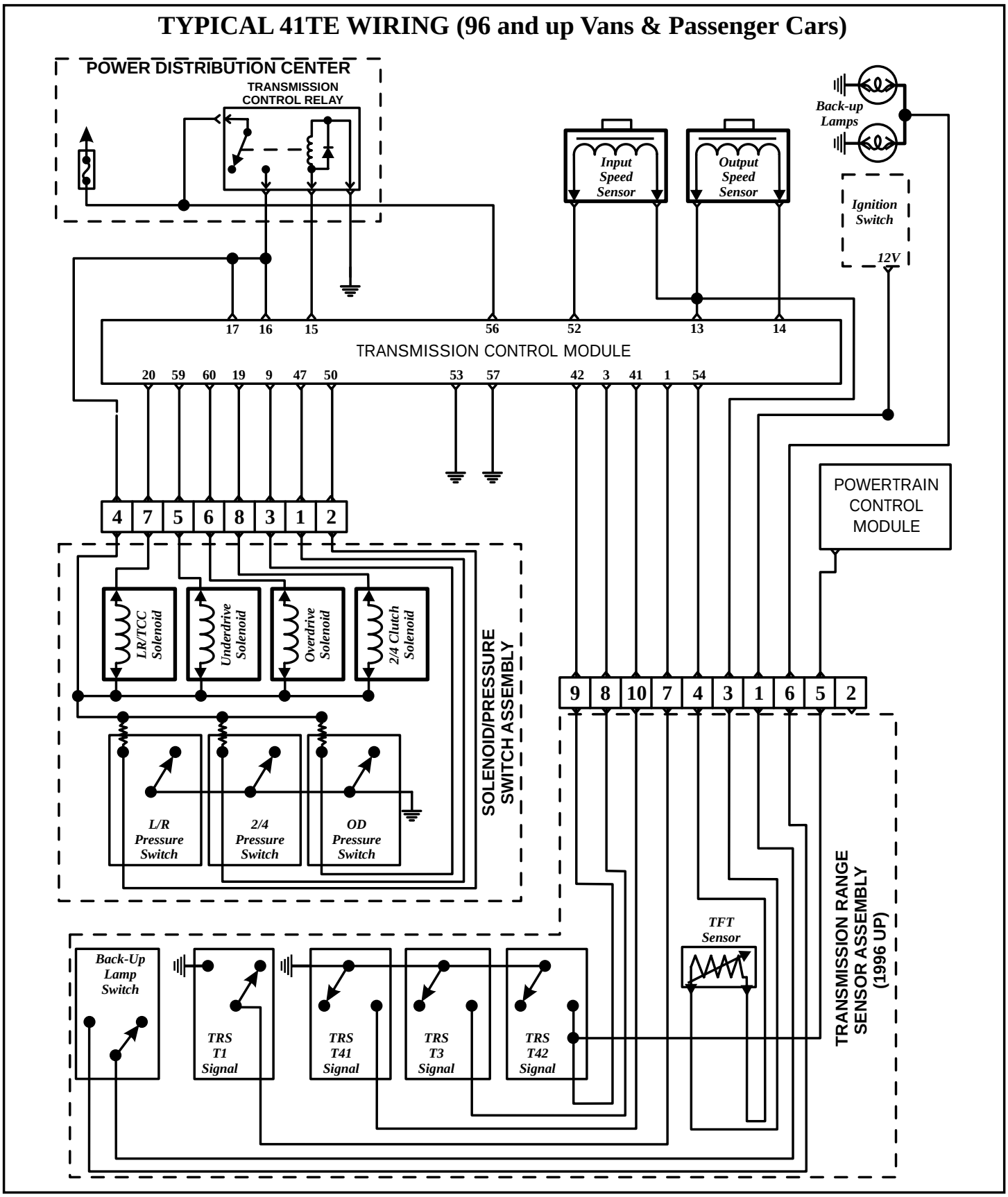


Figure 3

TESTING CONSISTENCY FROM 1989

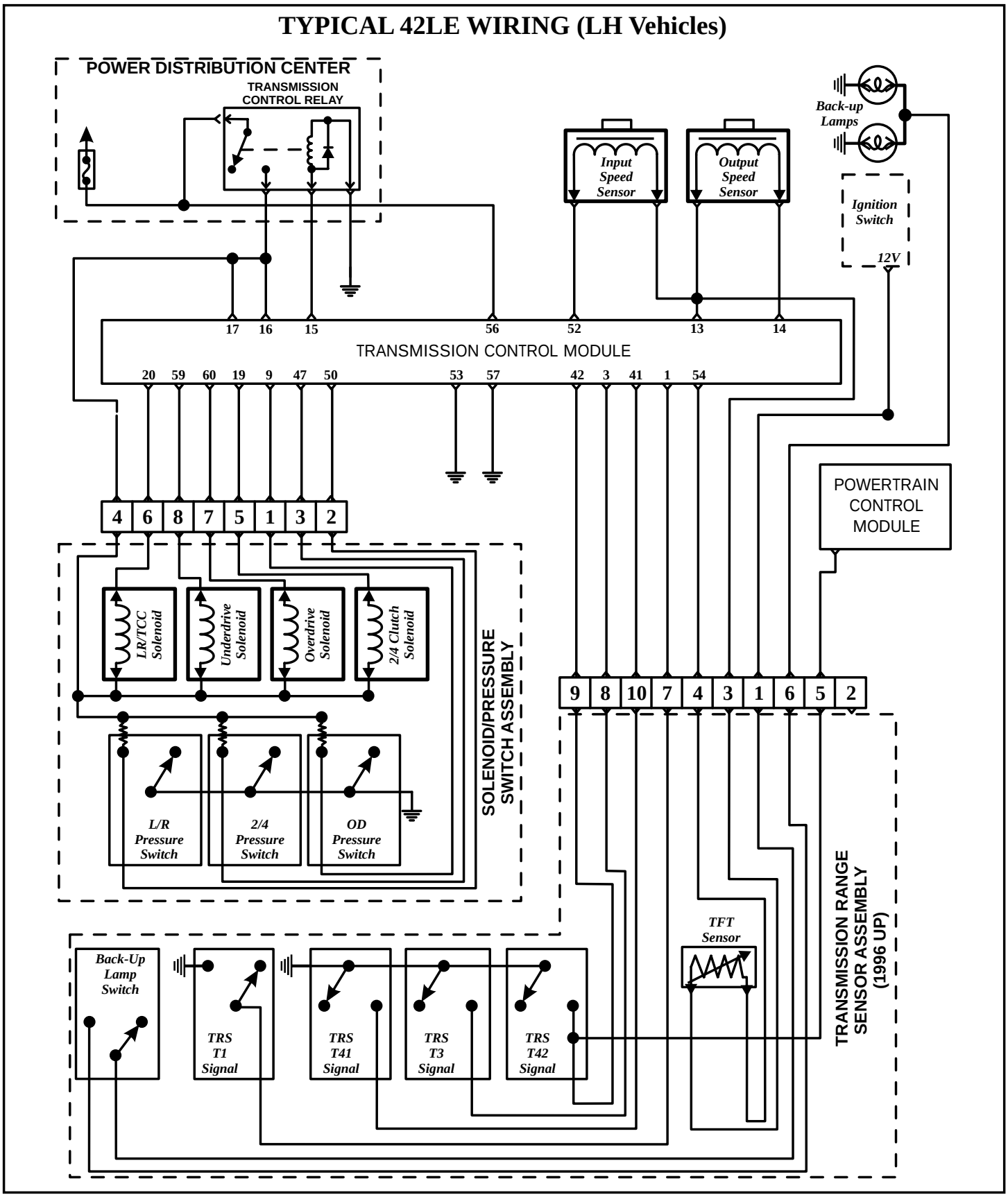


Figure 4

TESTING CONSISTENCY FROM 1989

TYPICAL 42RLE WIRING (Liberty, 300)

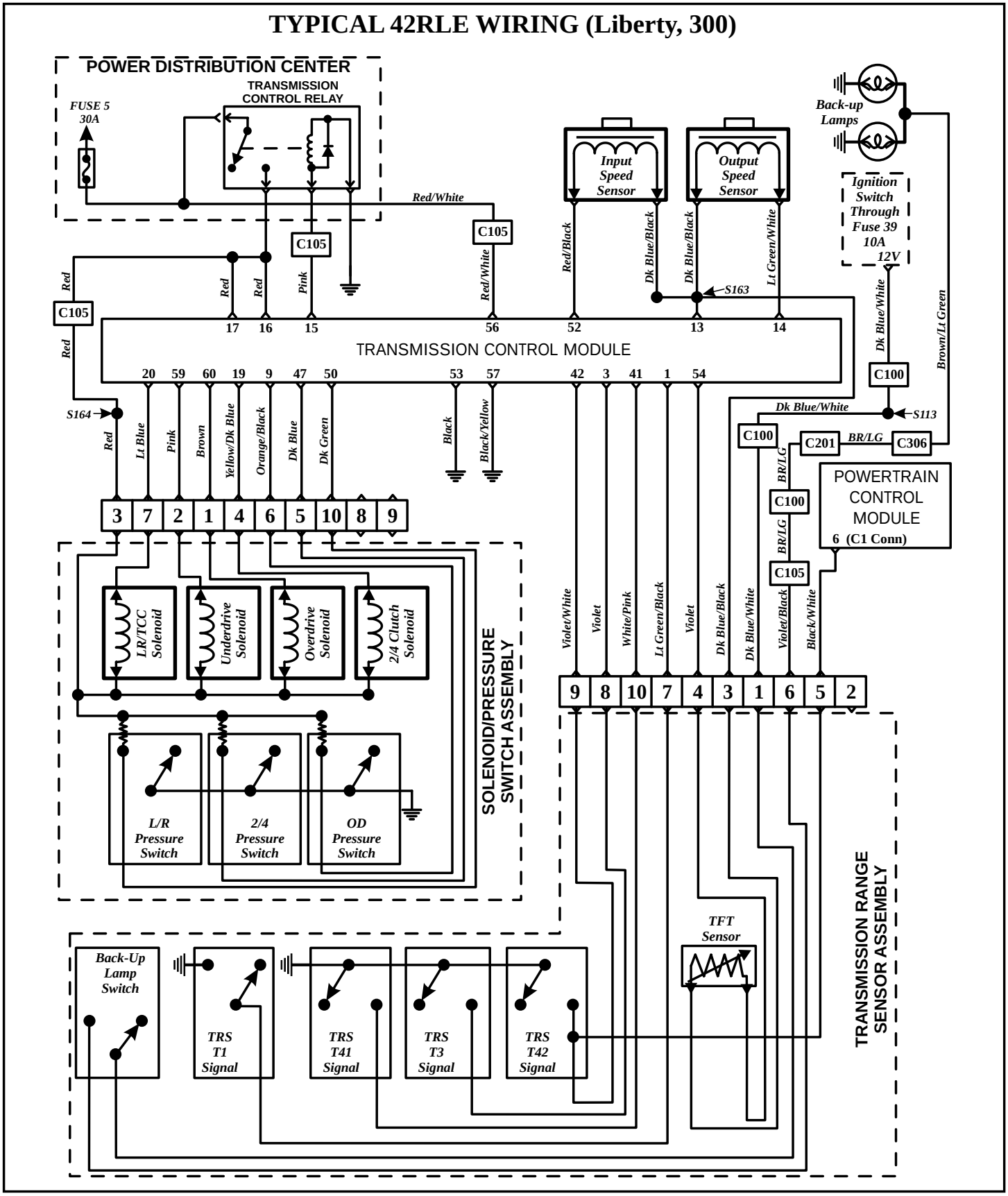


Figure 5

SLIDE

TYPICAL 45RFE WIRING (Durango, Ram 3500)

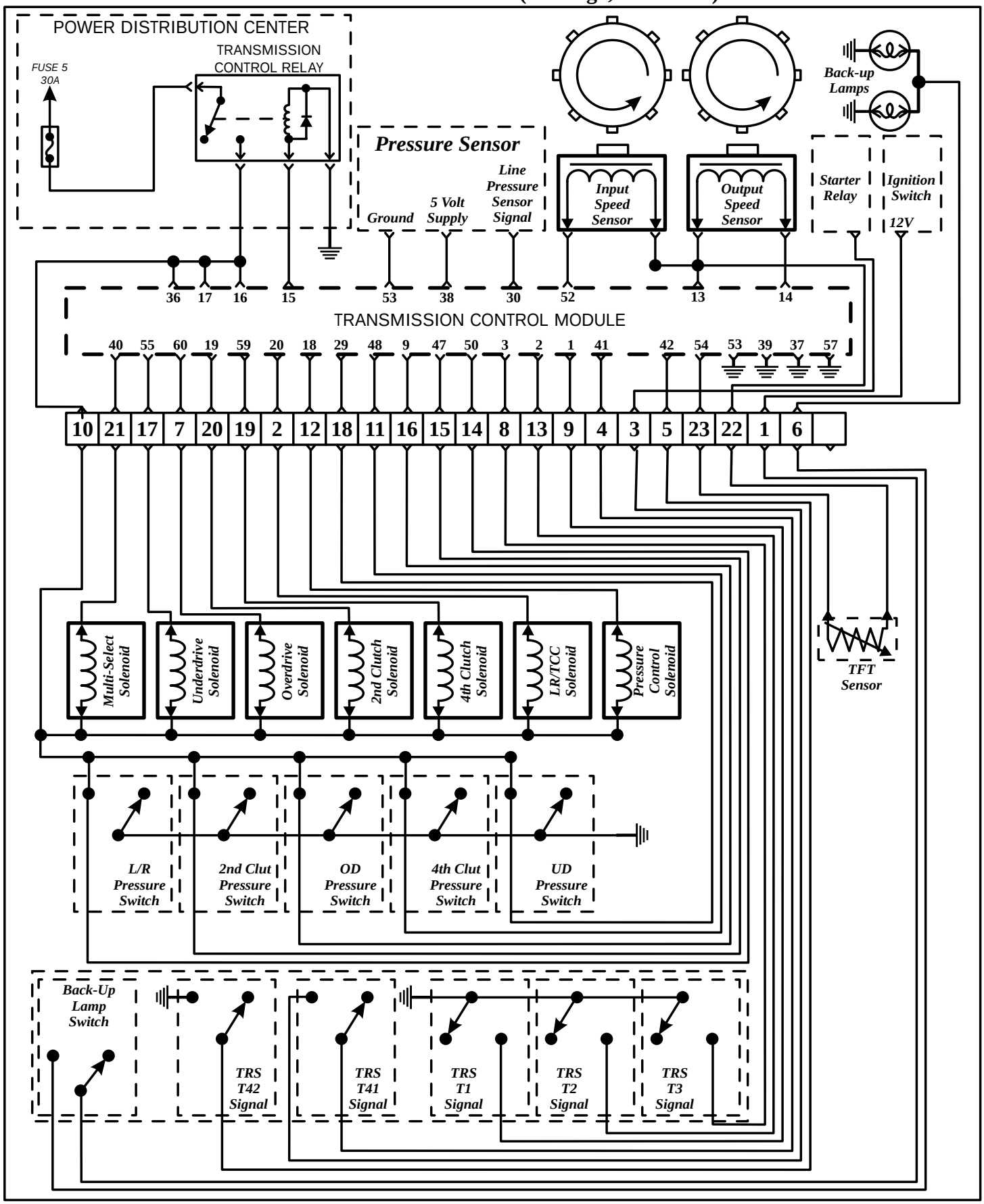


Figure 6

Techpak

Techpak

ATS

DODGE RWD RE TRANSMISSIONS

TRANSMISSION RANGE SENSOR

CHANGE: At the start of production for the 2002 model year, the Transmission Range Sensor has changed from a screw-in type to a push-in type. The screw-in type had three pins, the push-in type has five pins. The push-in type provides battery voltage or ground on its circuits which would permit starting in Park and Neutral positions only as well as reverse lamp operation. The screw-in type will also convey a drive signal to the PCM. Without this signal the transmission would not shift into fourth gear. If the screw-in type fails to Park or Neutral, there will be no 4th gear command from the PCM.
The push-in type provides a Park/Nuetral start signal to the starter relay via the PCM as well as operation of the reverse lamps.
The push-in TRS is a "step down resistor" type which provides a full range of manual lever positions to the PCM, (Refer to Figure 1).

The sensor is mounted in the transmission housing near the valve body, just above the pan rail. It's in the same position as the Park/Neutral switch on other transmissions. The TRS contacts a cammed surface on the manual valve lever (Figure 2). The cammed surface translates the rotational motion of the manual lever into the linear motion of the sensor. The cammed surface on the manual lever is comprised of two parts controlling the TRS signal: The insulator portion contacts the switch poppet when the manual lever is not in PARK or NEUTRAL. The manual lever itself contacts the poppet when the lever is in PARK or NEUTRAL; providing a ground for the signal from the starter relay and the JTEC engine controller.

As the switch moves through its linear motion contacts slide across a circuit board which changes the resistance between the range sensing pins of the switch (Figures 3 & 4). A power supply on the instrument cluster provides a regulated voltage signal to the switch. The return signal is decoded by the cluster, which then controls the PRNDL display to correspond with the correct transmission range. A bus message of transmission range is also sent by the cluster. In REVERSE range a second contact set closes the circuit providing power to the reverse lamps.

REASON: The push-in type provides more gear range information than the screw-in type to the PCM as well as a greater degree of accuracy.

PARTS AFFECTED:

(1) The Transmission Range Sensor because it now pushes into a smooth hole in the case adapter that is threaded into a larger threaded hole in the later case and is retained by a hold down bracket and bolt.
(2) The case because of the larger threaded hole to accept the push-in style case adapter with ni inner threads for the TRS.
(3) The detent lever on the valve body is shorter to accommodate the longer TRS as seen in Figure 2.

INTERCHANGEABILITY:

The previous design parts do not interchange with the current design parts, however, Sonnax makes an adapter to fit the early threaded switch into a 2002 and Later case that takes the push-in style. Smedley Transmission Service, (330-264-2251),
The push-in type provides more gear range information than the screw-in type to the PCM as well as a greater degree of accuracy. makes an adapter to allow any 1996 to 2001 case to accept the push-in type of TRS.

DODGE RWD RE TRANSMISSIONS

TRANSMISSION RANGE SENSOR

SERVICE INFORMATION:

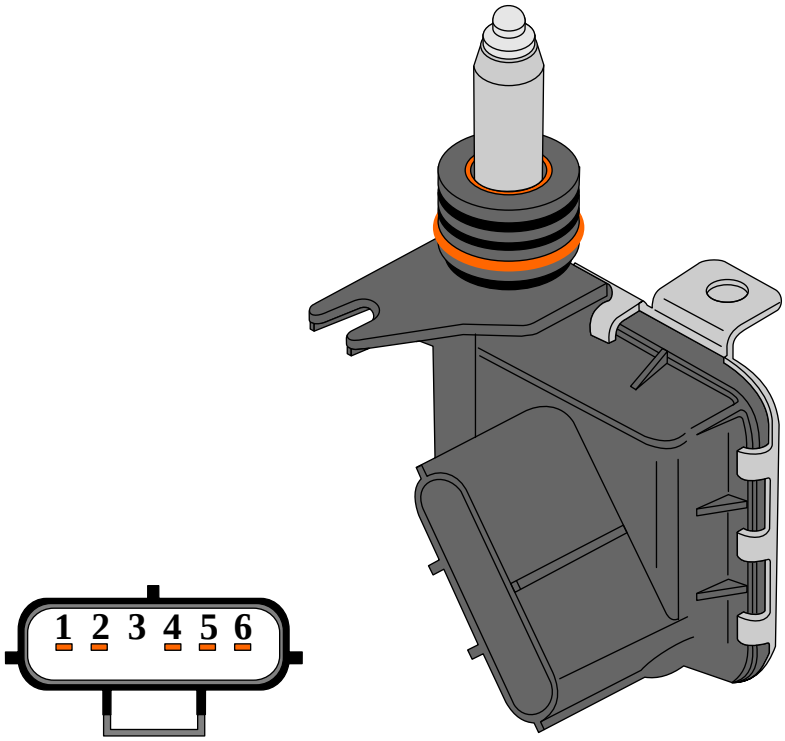
For diagnostic purposes, codes P0705 and P0706 are assigned to this sensor. It has been known that fluid leaks through the sensor and may cause TCC cycling and/or Overdrive cycling. If fluid has seeped into the external harness connector, the sensor will need to be replaced. Otherwise, this sensor can be bench tested as seen in Figure 3. Simply attach an ohm meter to terminals 2 and 5 and carefully depress the plunger to obtain the different gear select positions. The values provided in figure 3 were taken from a known good sensor.

If a case replacement is necessary and all that is available is an early case with the screw-in park/neutral switch, the modified case seen in Figure 5 will accept the later Digital Range Sensor. For more information on this modification contact Smedley Transmission Service at 330-264-2251.

NOTE: Remember to use the correct internal linkage that matches the longer digital sensor as shown in Figure 2.

TRS Part Number.....1-56045489AC

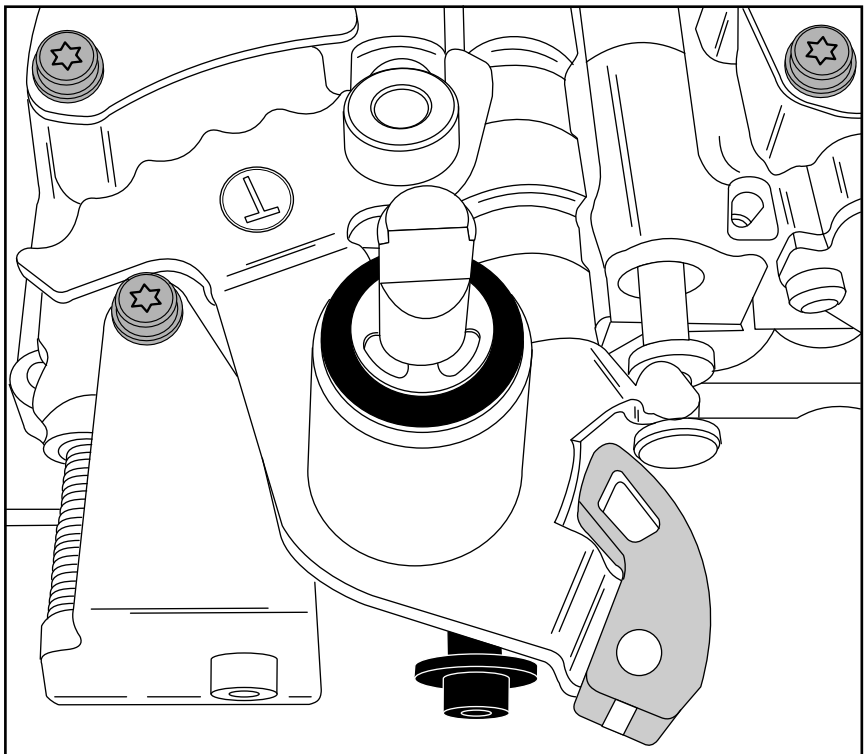
DODGE RWD
TRANSMISSION RANGE SENSOR



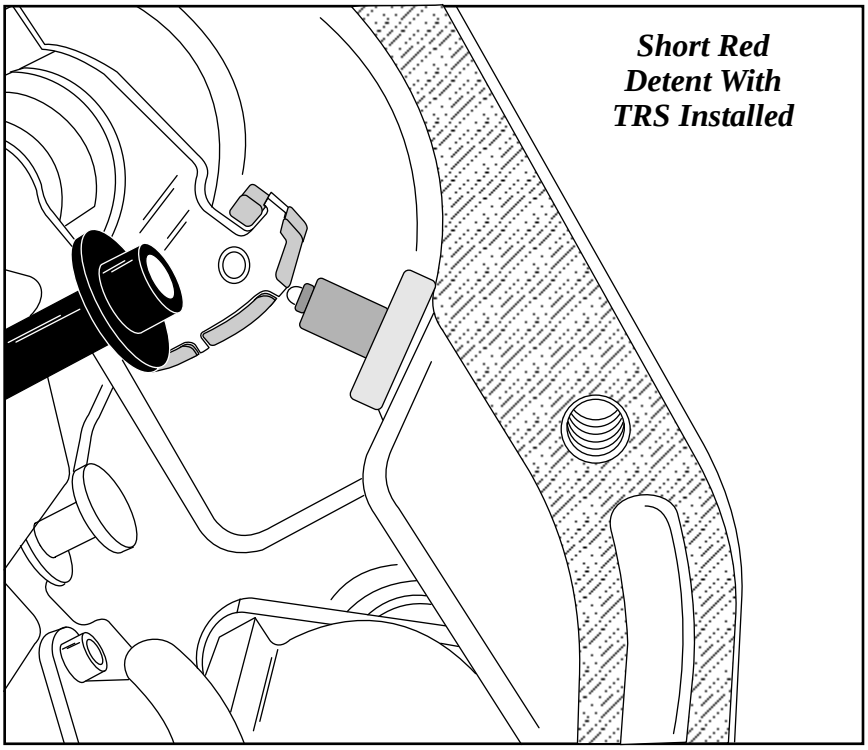
Cavity	Circuit	Function
1	L10 18WT/GY	Fused Ignition Switch Output (Run)
2	T117 20DG/YL	Trans Range Sensor Electronic Cluster and Volt Supply
3	Not used	—
4	L1 18WT/LG	Backup Lamp Feed
5	T917 20YL/TN	Trans Range Sensor Electronic Cluster MJX
6	T41 18YL/DB	Park Neutral Position Switch Sense (T41)

Figure 1

DODGE RWD
TRANSMISSION RANGE SENSOR



Red Plastic Detent Cam

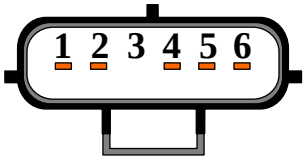


Short Red Detent With TRS Installed

Figure 2

DODGE RWD
TRANSMISSION RANGE SENSOR

Sensor Connector View



In car voltage test with positive meter lead into terminal 2 and negative lead to ground:

L	0.647 DCV
2	1.244 DCV
D	1.903 DCV
N	2.629 DCV
R	3.388 DCV
P	4.213 DCV

These are average voltage readings taken from a working vehicle.

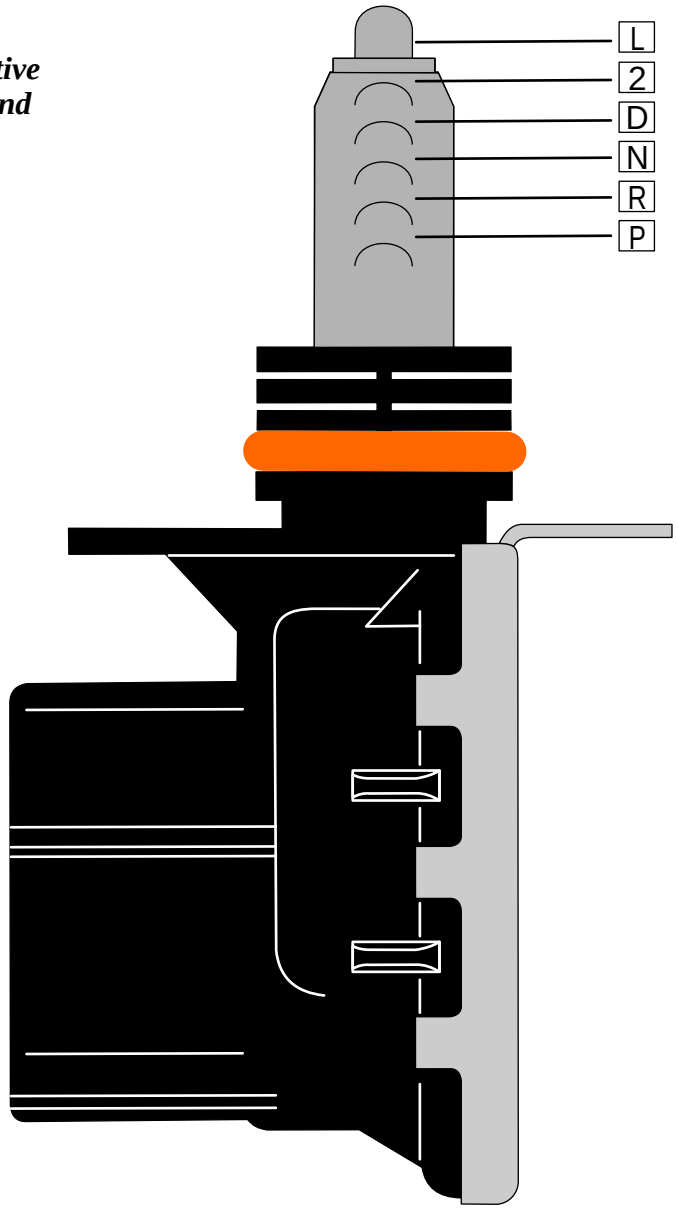


Figure 3

DODGE RWD
TRANSMISSION RANGE SENSOR

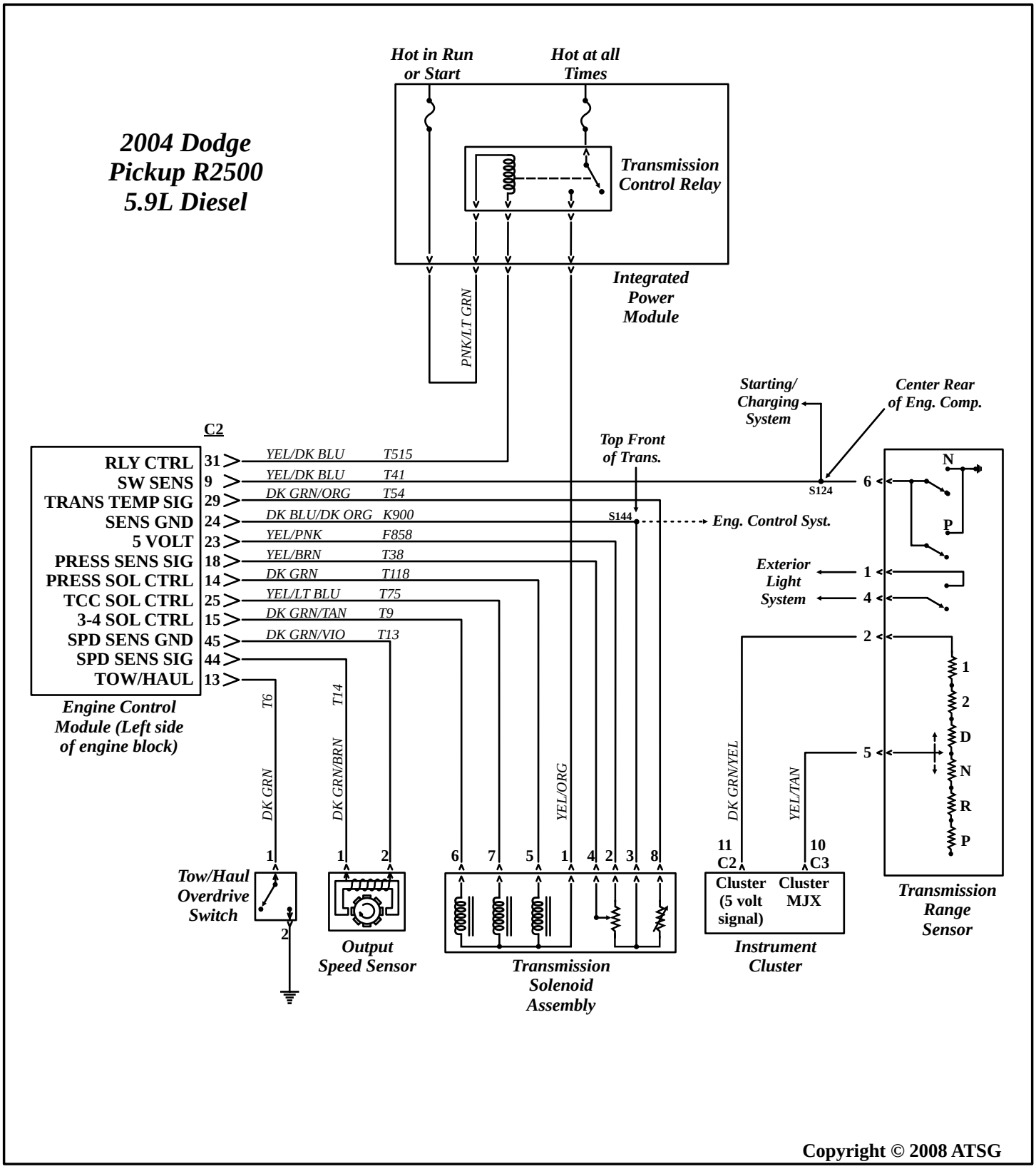


Figure 4

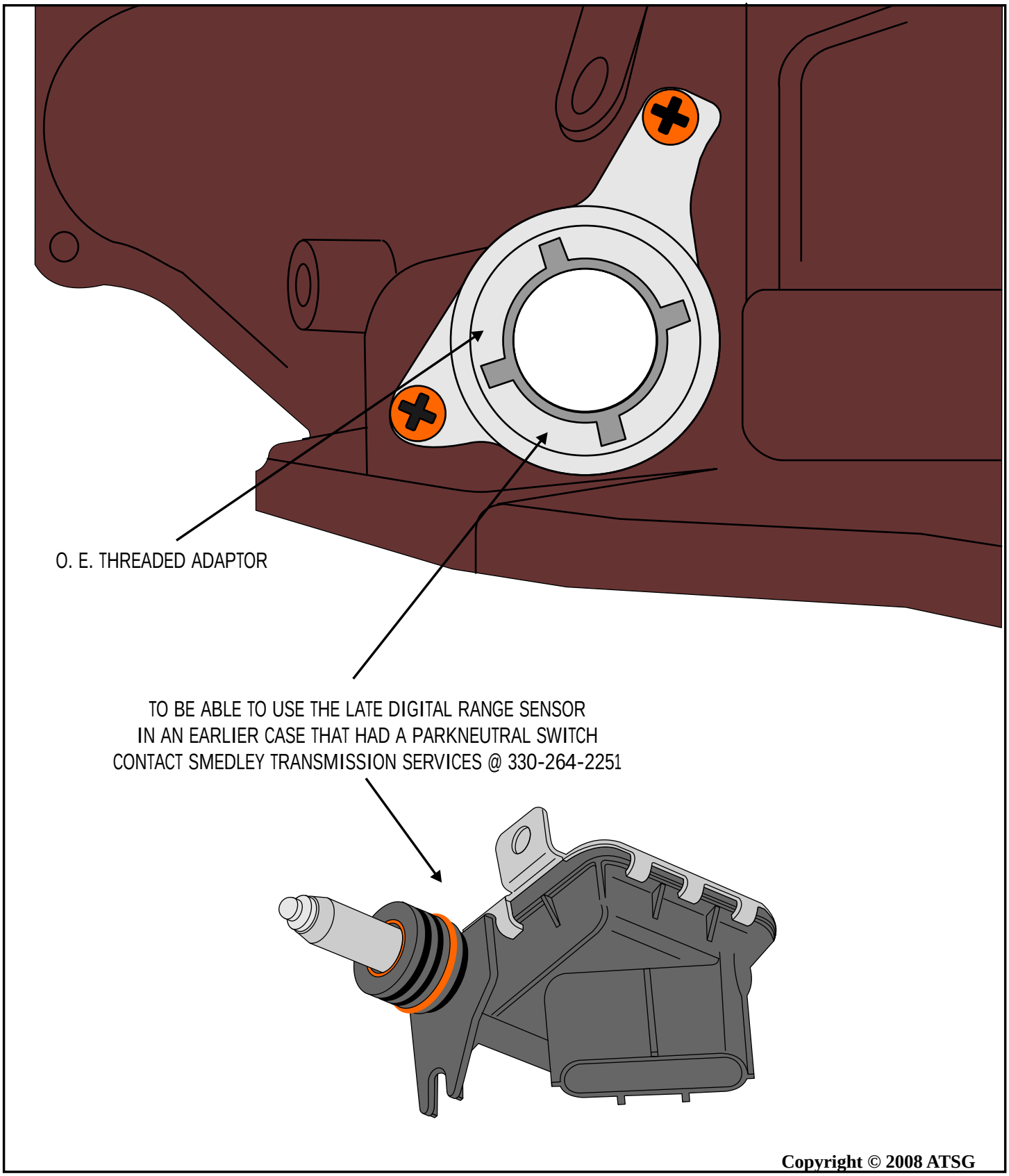


Figure 5

DODGE 48RE
VALVEBODY HYDRAULIC DIFFERENCES

CHANGE: Beginning at the start of production for the model year 2003, the 48RE transmission was introduced to the Dodge line of Heavy Duty trucks. The 48RE is a new designation for the previous design 46/47RE. There are numerous differences as far as a re-designed pump Stator and Torque Converter as well as increased capacity in the clutch drums. There was also a change in the hydraulics in the Valvebody in the Torque Converter Clutch Control circuit.

REASON: The reason for the change in the Torque Converter Control Circuit is so that TCC engagement will be possible in the Manual 2 and Manual 1 position, providing better pulling capacity at lower engine rpm. The TCC Solenoid is now fed Forward Clutch pressure instead of the previous design, that was fed from the 1-2 shift valve. This now makes it possible to have TCC in 1st gear. Refer to Figures 1 and 2 for a partial hydraulic circuit diagram of the TCC circuit.

PARTS AFFECTED: The main changes were made in the Channel plate and the two spacer plates, which required the elimination of the Number 2 checkball. Refer to the Figures below:

Refer to Figure 3 for a view of the previous design 46RE/47RE Main Valvebody and Upper Transfer Plate and checkball locations. There is also dotted circles around the areas that changed in the 48RE.

Refer to Figure 4 for a view of the Main Spacer Plate on the 46RE/47RE, and the hole configuration for the Number 2 checkball.

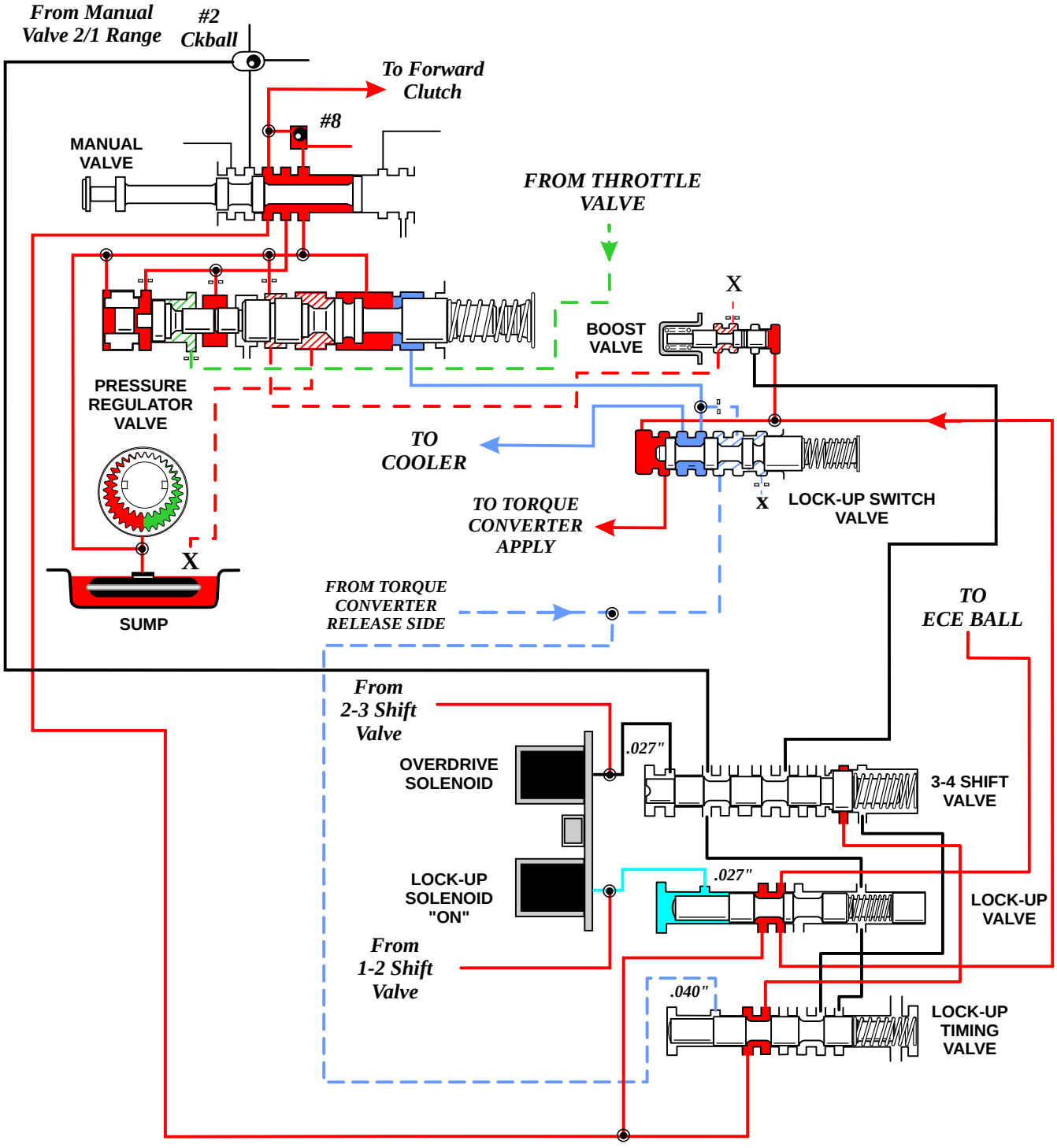
Refer to Figure 5 for a view of the Lower Transfer Plate and Lower Spacer Plate on the 46RE/47RE, and the hole configuration for the Number 2 checkball to the spring side of the Lock-up and 3-4 Shift Valve, and second land of the Lock-up Timing Valve. Also Figure 5 shows the Previous design TCC solenoid feed from the 1-2 shift valve.

Refer to Figure 6 for a view of the new design 48RE Main Valvebody and Upper Transfer Plate and checkball locations, notice the elimination of the Number 2 checkball. There is also dotted circles around the areas that changed in the 48RE.

Refer to Figure 7 for a view of the Main Spacer Plate on the 48RE, and the hole configuration for where the Number 2 checkball used to be. Notice there are only 3 holes, which are square, when compared to the previous plate in Figure 4.

Refer to Figure 8 for a view of the Lower Transfer Plate and Lower Spacer Plate on the 48RE, and the hole configuration for the Number 2 checkball is eliminated. Also Figure 8 shows the Previous design TCC solenoid feed from the 1-2 shift valve has been eliminated and the new hole connects the slot in the channel plate to the Forward Clutch circuit.

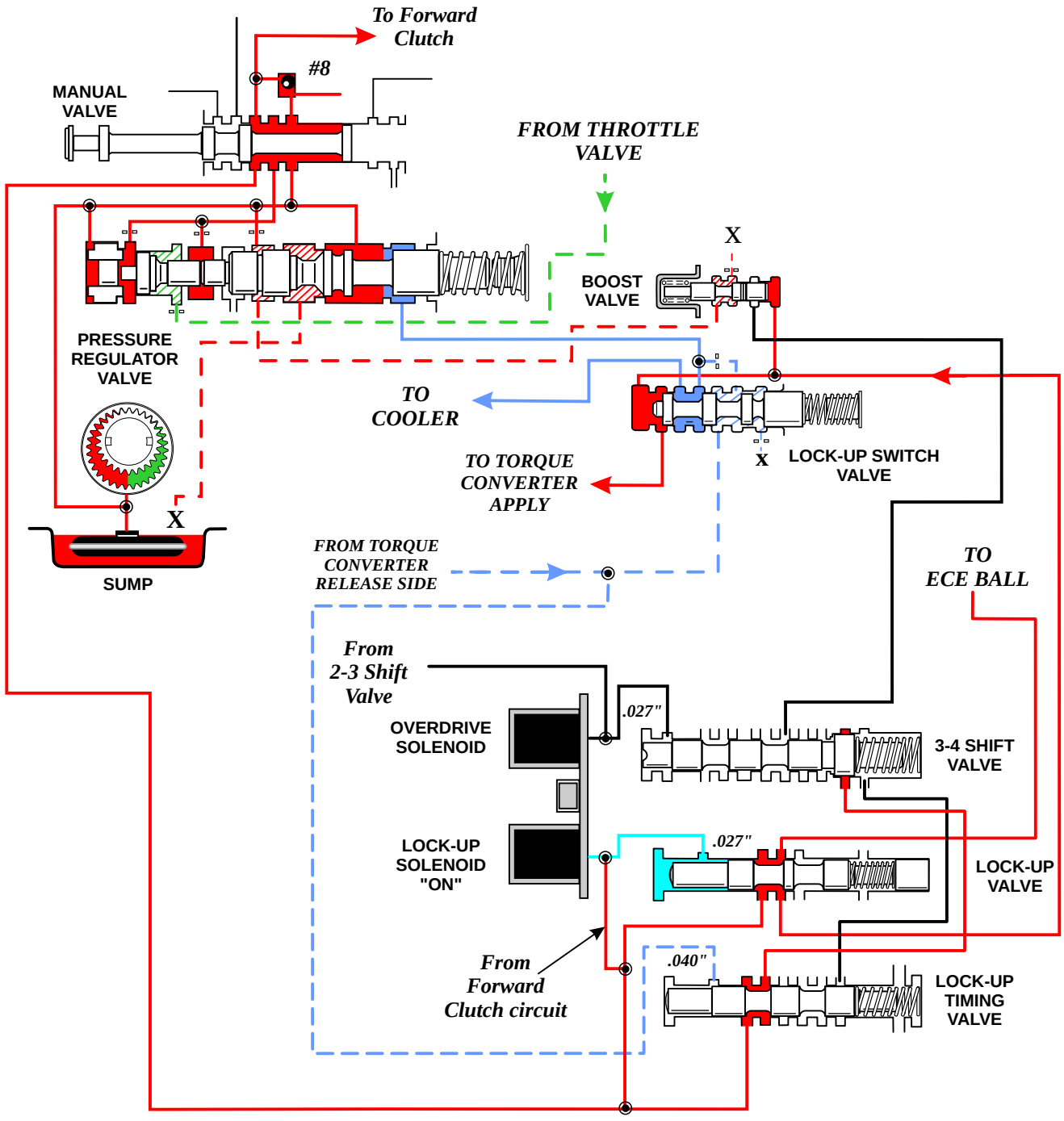
46RE/47RE PARTIAL HYDRAULIC SCHEMATIC
"DRIVE" POSITION 3rd GEAR WITH TCC "ON"



Note: The number 2 Checkball, on 46 and 47RE, is used for a 3-2 manual downshift and for TCC cancel in Manual 2 and Manual 1 ranges, by applying line pressure from the Manual valve to the spring side of the Lock-up and 3-4 Shift Valve, and second land of the Lock-up Timing Valve to Prevent application.

Figure 1

48RE PARTIAL HYDRAULIC SCHEMATIC
"DRIVE" POSITION 1st GEAR WITH TCC "ON"



Note: The Number 2 checkball is eliminated on 48RE, this will make it possible to have TCC apply in Manual 2nd and Manual 1st.

Figure 2

SLIDE

46RE/ 47RE MAIN VALVE BODY AND TRANSFER PLATE "UPPERSIDE"

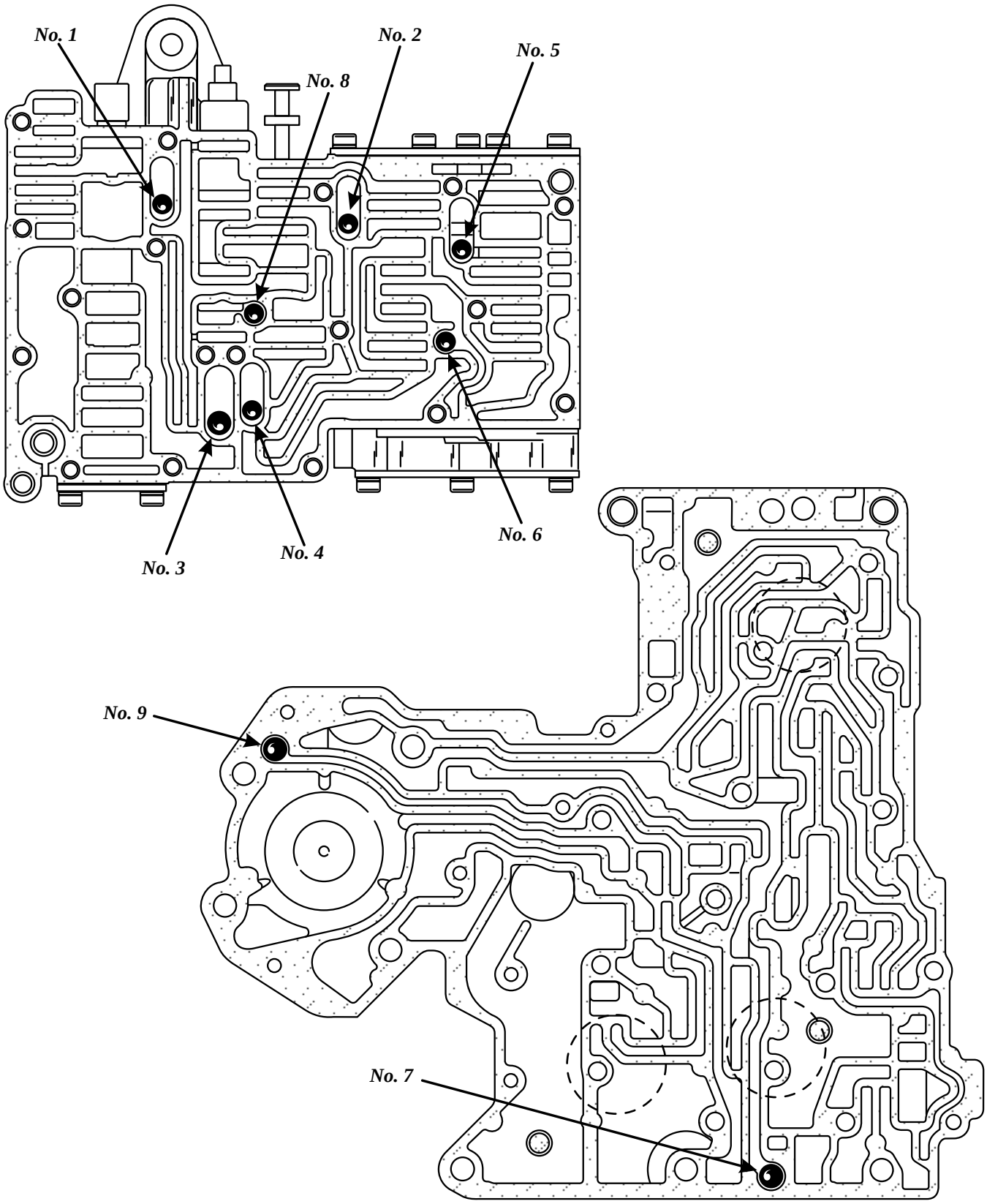


Figure 3

SLIDE

46RE /47RE MAIN SPACER PLATE

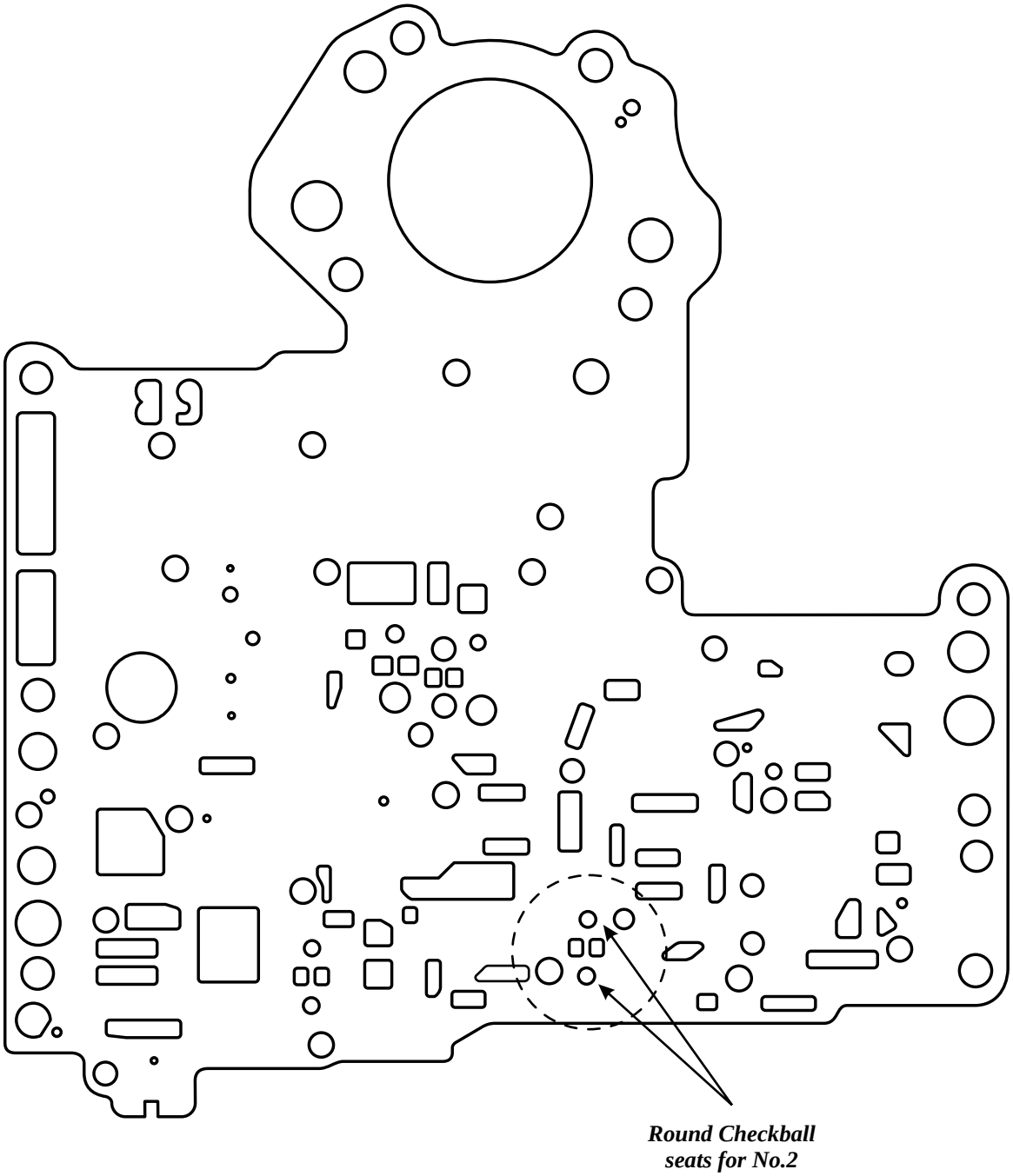


Figure 4

SLIDE

46RE /47RE TRANSFER AND SPACER PLATE "LOWER-SIDE"

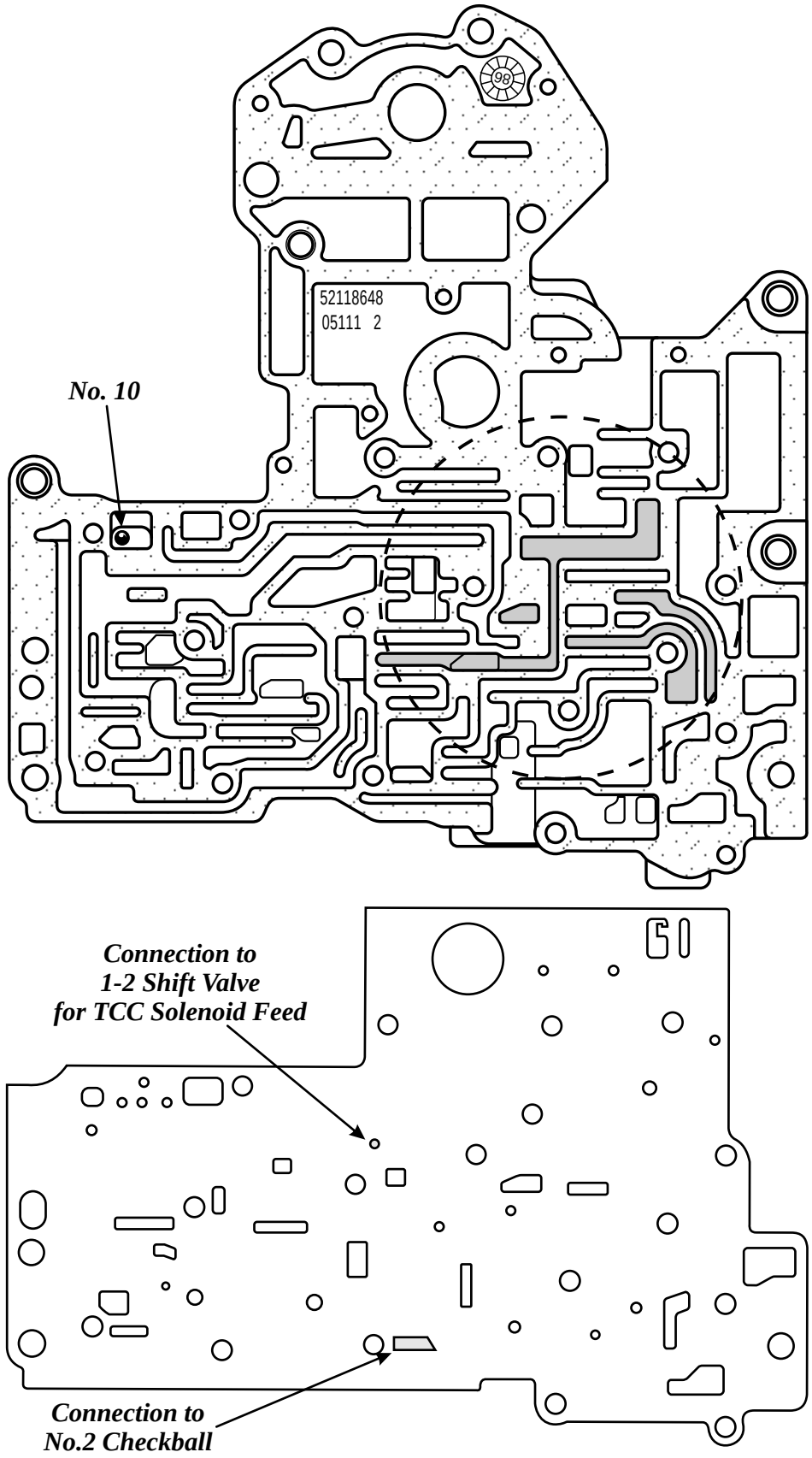


Figure 5

SLIDE

48RE MAIN VALVE BODY AND TRANSFER PLATE "UPPERSIDE"

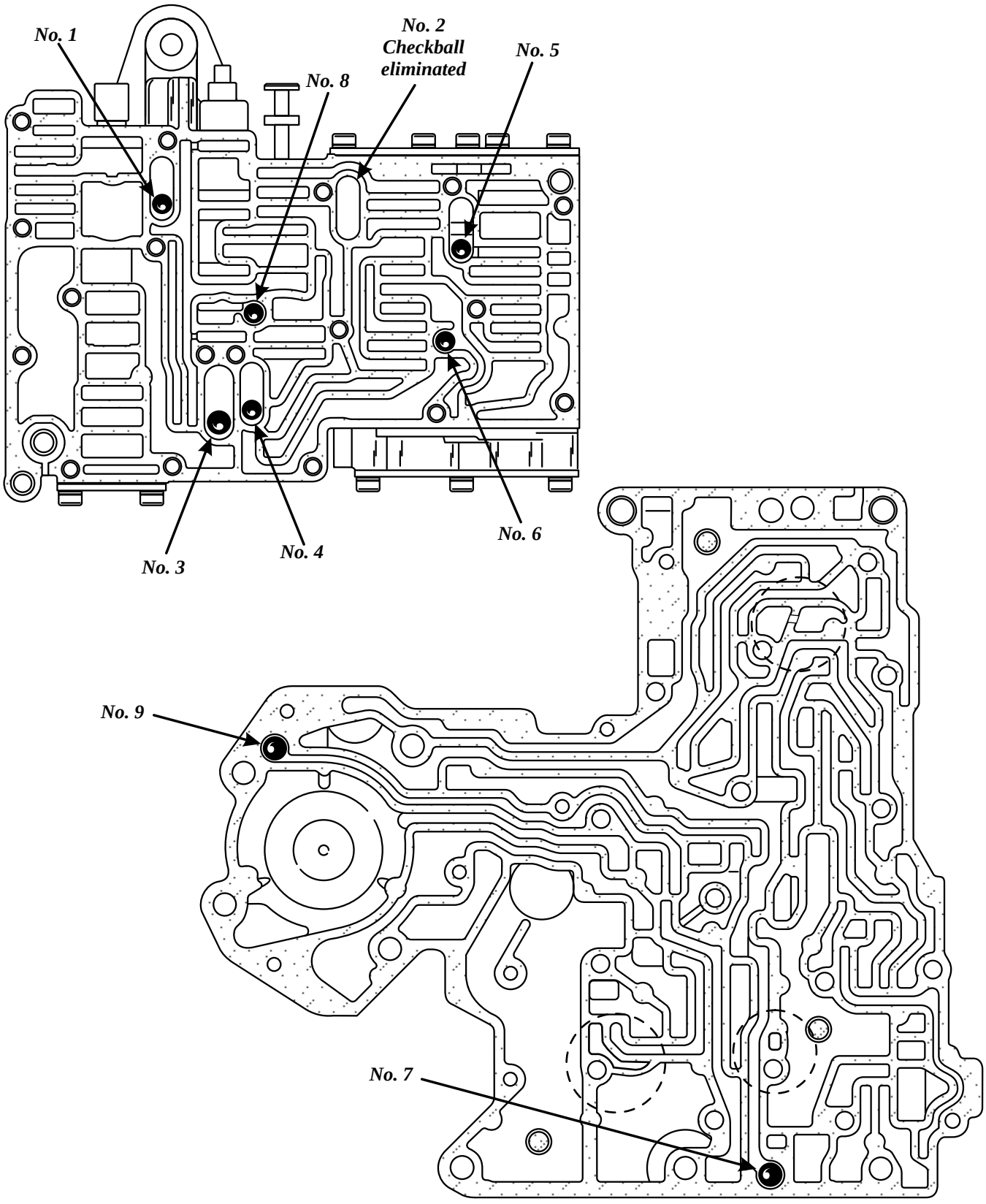


Figure 6

Automatic Transmission Service Group

SLIDE

48RE MAIN SPACER PLATE

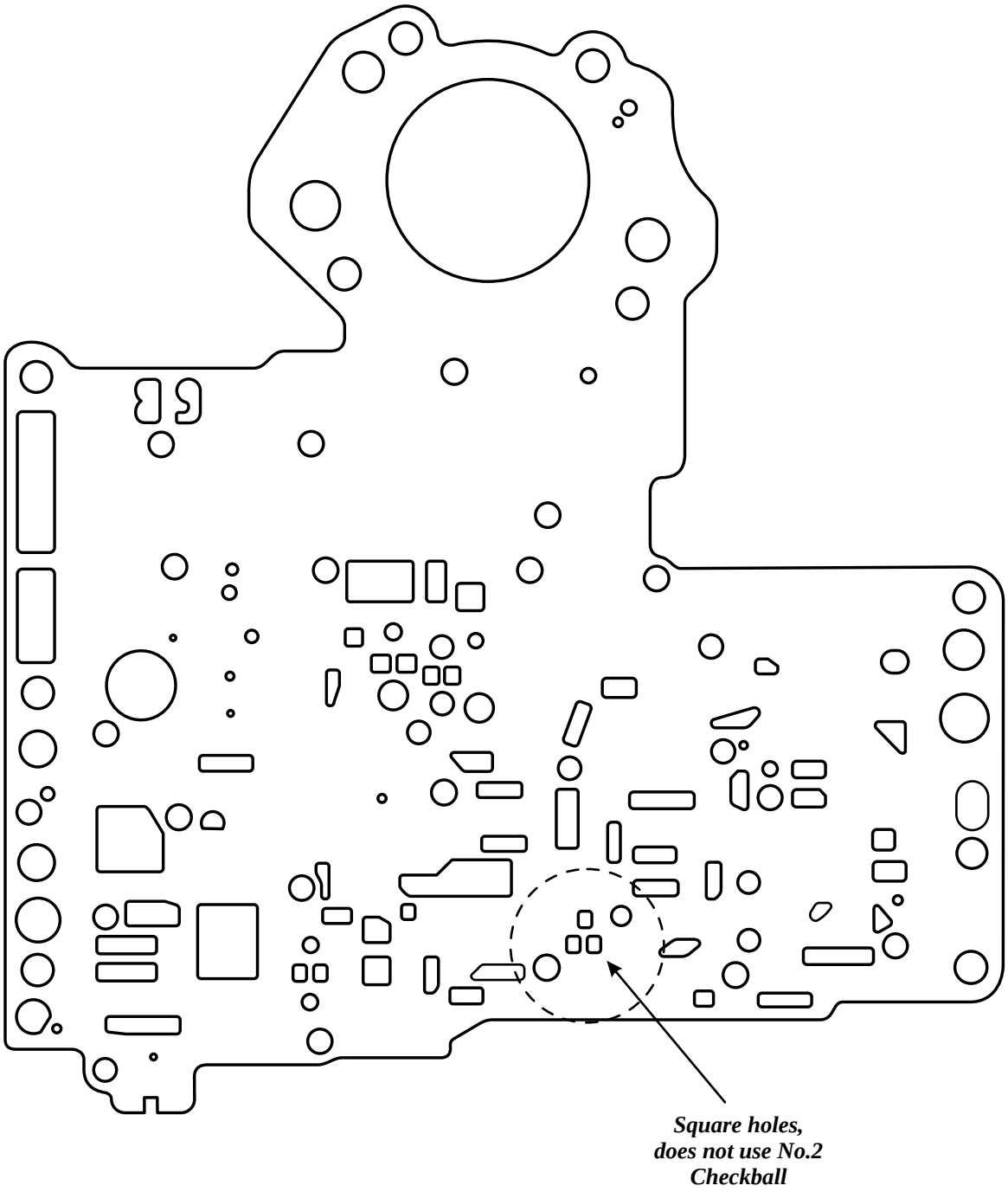
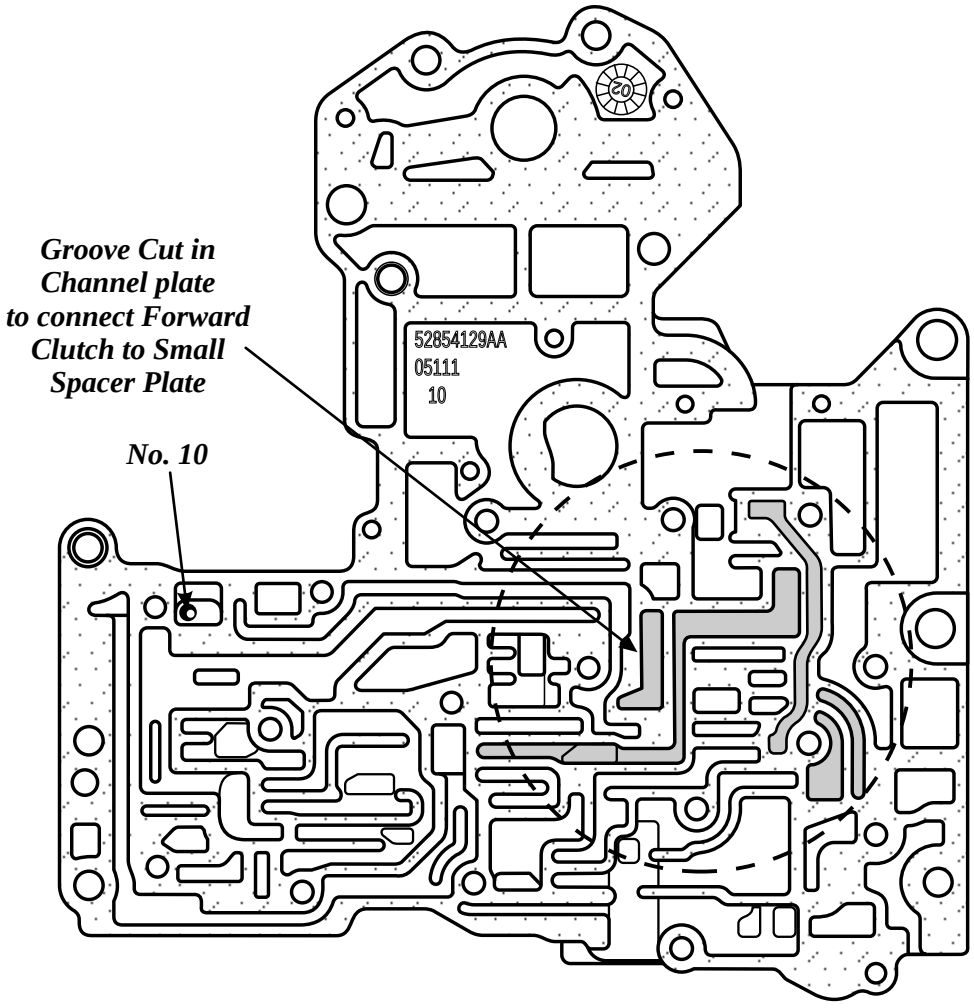


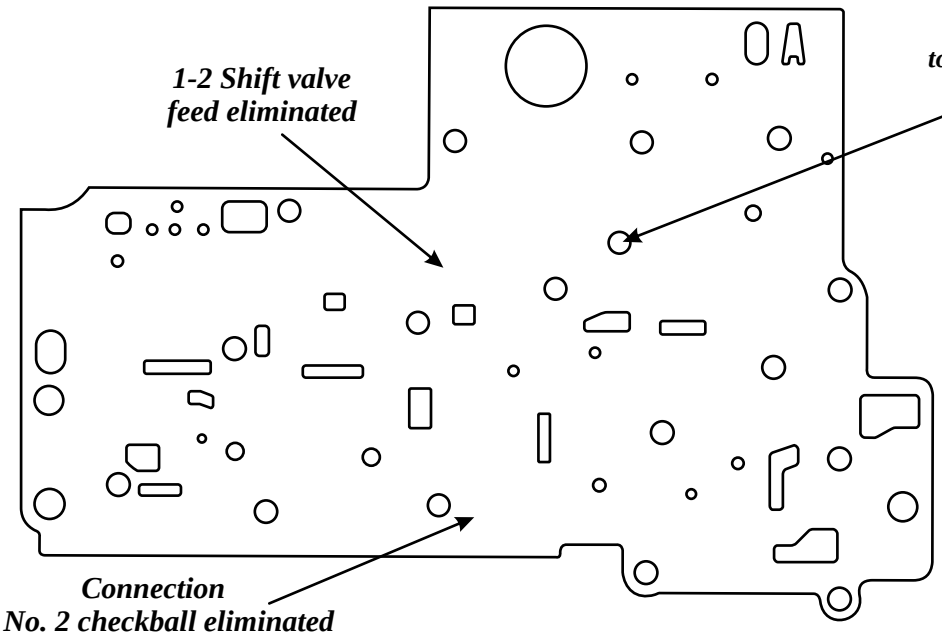
Figure 7

48RE TRANSFER AND SPACER PLATE "LOWER-SIDE"



Groove Cut in Channel plate to connect Forward Clutch to Small Spacer Plate

No. 10



Added hole to connect the Forward Clutch to TCC solenoid Feed

1-2 Shift valve feed eliminated

Connection to No. 2 checkball eliminated

Figure 8

1998 & LATER DODGE DIESEL TRUCKS

THIRD GEAR FAILSAFE

COMPLAINT: The vehicle that spawned this bulletin was a 2003 Dodge truck with a 5.9L diesel engine and 48RE transmission. The truck came into the shop with complaints of taking off in 3rd gear, the park and neutral gear select indicator lamps were the only gear shift indicator lamps that would illuminate. The scan tool could retrieve code P0700, "Transmission Fault Present" from the Cummins ECM, but could not receive PCM communication for transmission information.
Verification that the Transmission Control Relay was not being grounded by the PCM was made indicating that the system was in failsafe. Power and grounds at the PCM were checked and deemed good.

CAUSE: During the diagnostic procedure, a volt meter was connected to terminal 30 at the C2 (White) connector to monitor the PCM controlled ground for the Transmission Control Relay. While connected to terminal 30, the wire lead was removed from the meter and tapped to ground. When the meter lead was plugged back into the meter, the meter indicated .1 volt which meant the PCM was grounding the circuit and the relay should be energized. A road test confirmed this, the transmission performed perfectly, Until.....the ignition was cycled. The third gear start along with the other complaints also returned at this time.
The process of tapping the meter lead to ground again also repeated the correct operation of the transmission. Replacement of the PCM did not cure the problem.

Sometimes when checking a power or ground circuit, it is not sufficient to just back probe the terminal in question, this is one of those times. When the C1 (Black) connector was disconnected, and terminal 22 was checked, the face side of the terminal had only 1.8 volts. The back side of the terminal had 12.9 volts, This circuit provides key on power from the 20 Amp #19 fuse in the Integrated Power Module located in engine bay, driver front side to the PCM.
After pulling the connector apart, it was obvious what was causing the above complaints. The terminal end (Refer to Figure 1) was severely corroded. The reason for the corrosion is shown in Figure 2, the PCM connectors are located next to the air conditioning receiver/dryer. The condensation created by the receiver/dryer compromised the C1 connector which lead to the severe corrosion condition.

CORRECTION: Replace the damaged terminals with wire end repair kit (Figure 6) using figures 3 through 6 to guide through the wire replacement procedure and then protect them from A/C condensation.

SERVICE INFORMATION:

20 Wires w/Terminal Ends (Total of 40) w/40 pieces of Heat Shrink Tubes 04882087

continued.....

THIRD GEAR FAILSAFE

SERVICE PROCEDURE:

1. Record the memorized preset radio stations.
2. Disconnect the battery or batteries on 5.9 L Diesel Cummins and isolate the cable ends.
3. Unplug the damaged connector from the PCM.
4. Locate and inspect the connector lock tab and insulator for damage (See Figure 3). If it is damaged, the entire connector will need to be replaced.
5. Write down each wire color to its appropriate cavity location within the connector before disassembling the connector.
6. Next, pull on the wires individually. If they come out the connector will need to be disassembled to inspect the initial and final locks (See Figure 3).
7. To disassemble the connector, push in on the single locking tab as seen in Figure 4.
8. With Chrysler's special tool 6934 or one similar, insert the tool into the back of the insulator cavity alongside each wire removing them from the connector assembly one at a time as seen in Figure 5.
9. With all the wires removed from the connector, inspect the entire connector assembly as seen in Figure 3. If any of the parts are damaged, replace the connector assembly.
10. While the wires are out of the connector, inspect each terminal end for damage or corrosion. Place each terminal end onto the mating pin in the PCM and check for drag (See Figure 6). If any of the connections are loose, replace the wire.
11. Using the notations taken in step 5 of wire color and location, carefully assemble the new and/or repaired connector assembly. When all of the wires are in place, push the two locking tabs into place to secure the wire terminals in the connector assembly (See Figure 7).
12. Cross your fingers, attach the battery cable or cables, reset the radio station and hope that all your codes do not return.

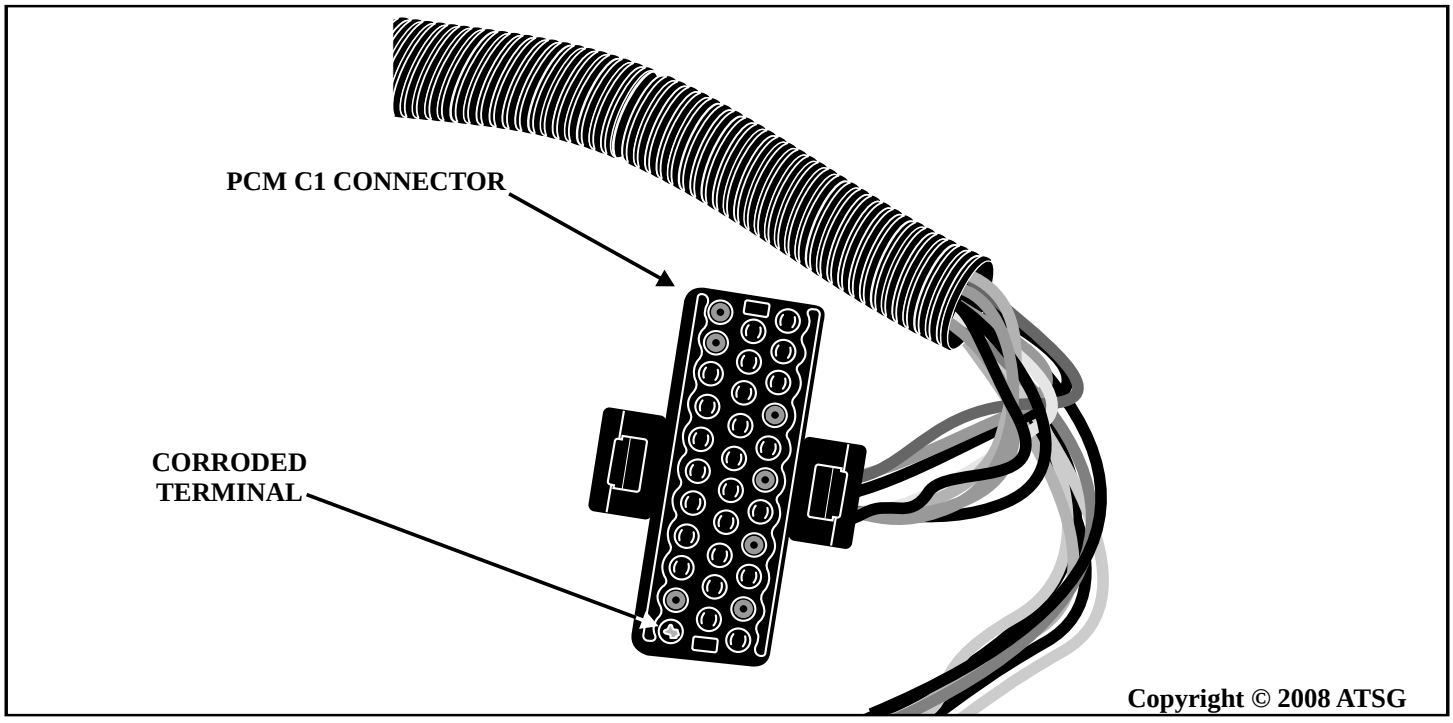


Figure 1

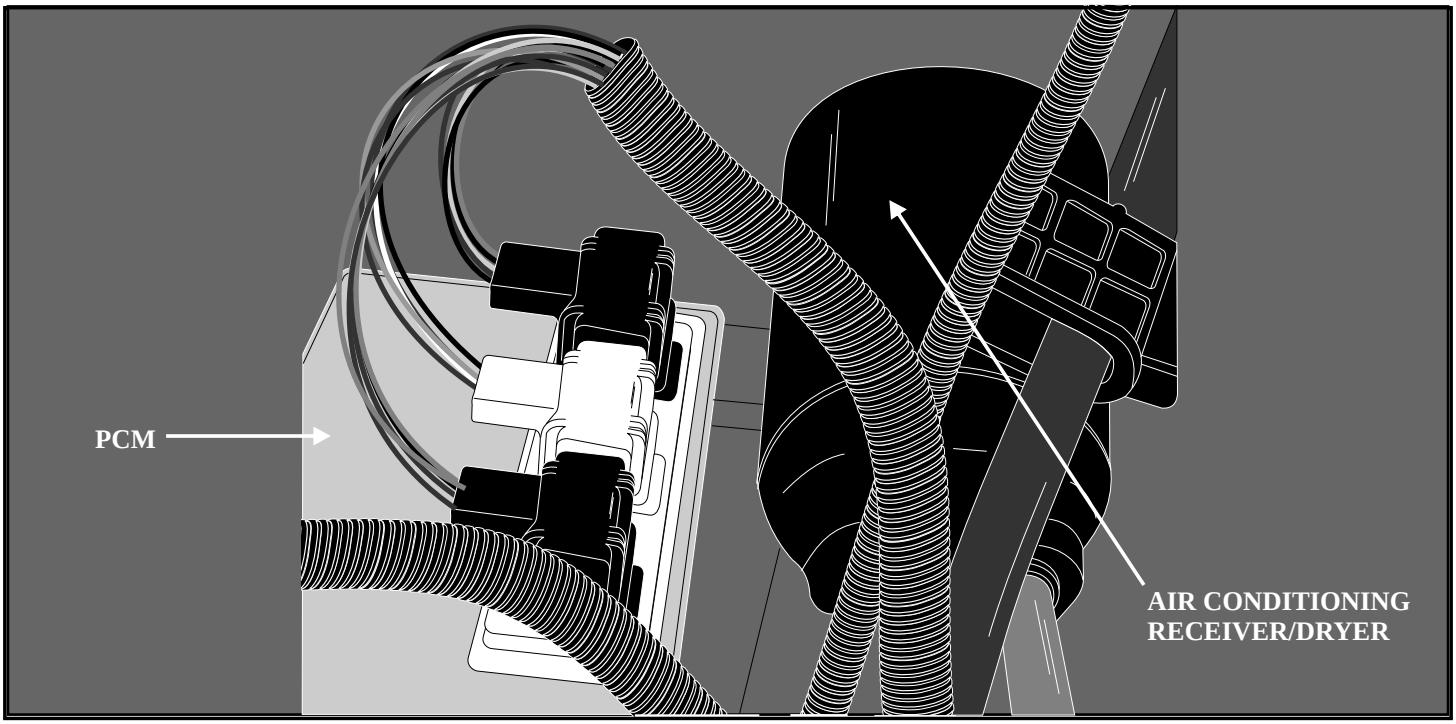


Figure 2

CONNECTOR DISASSEMBLY

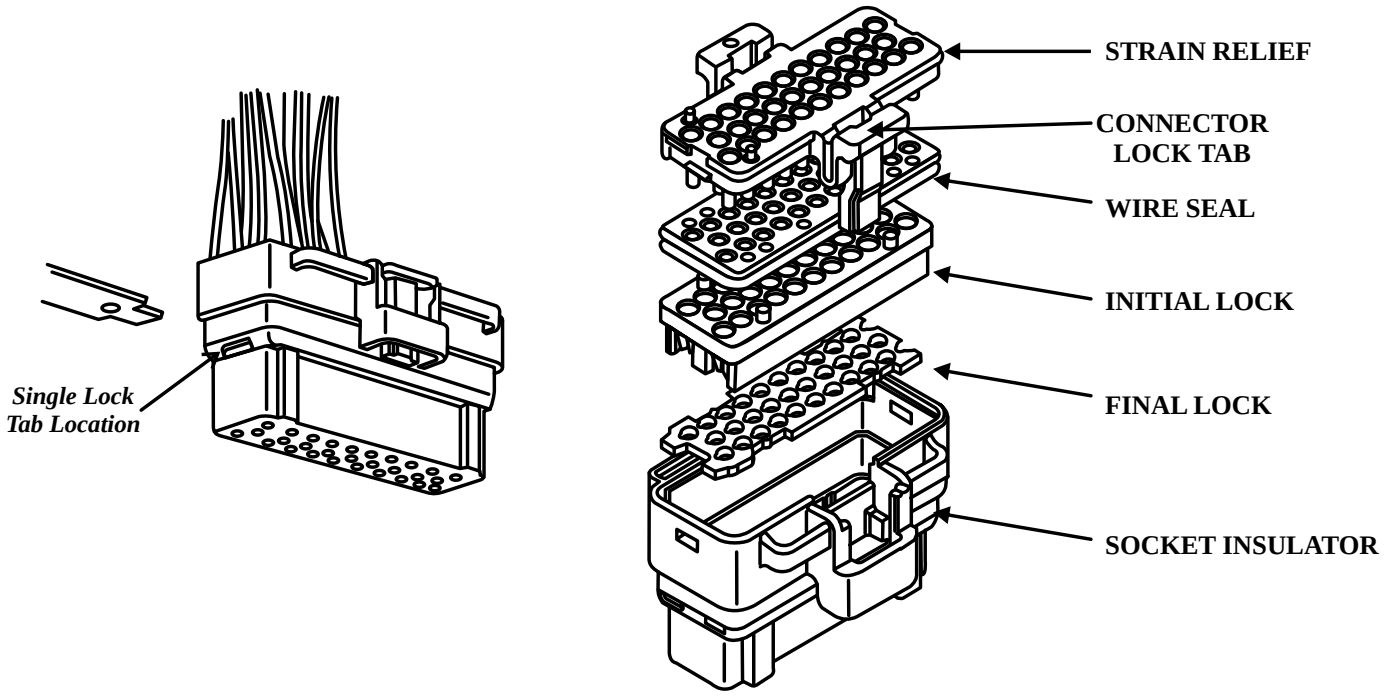


Figure 3

WIRE REMOVAL WITH SPECIAL TOOL

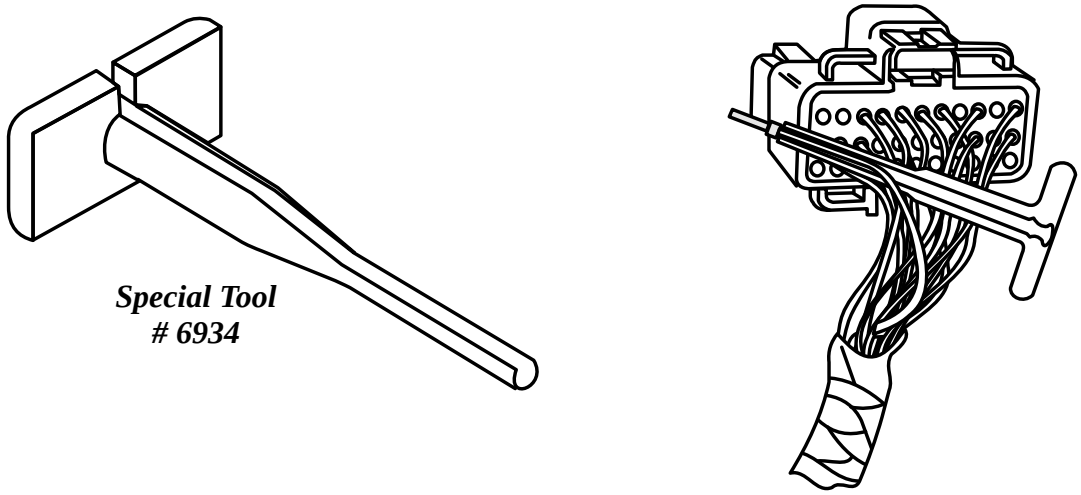
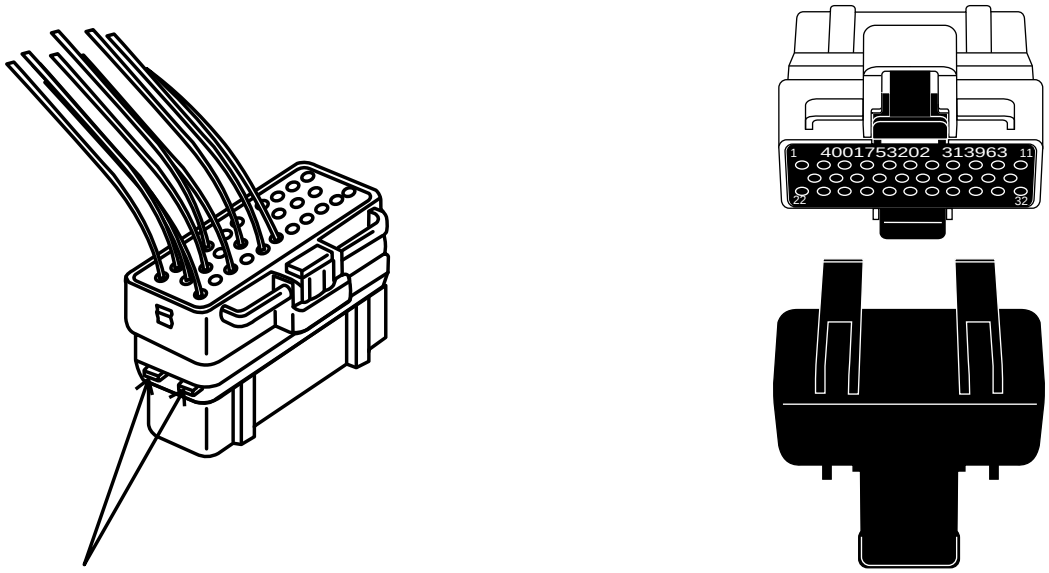


Figure 4

CONNECTOR ASSEMBLY



Lock Tabs

Figure 5

WIRE END REPAIR KIT

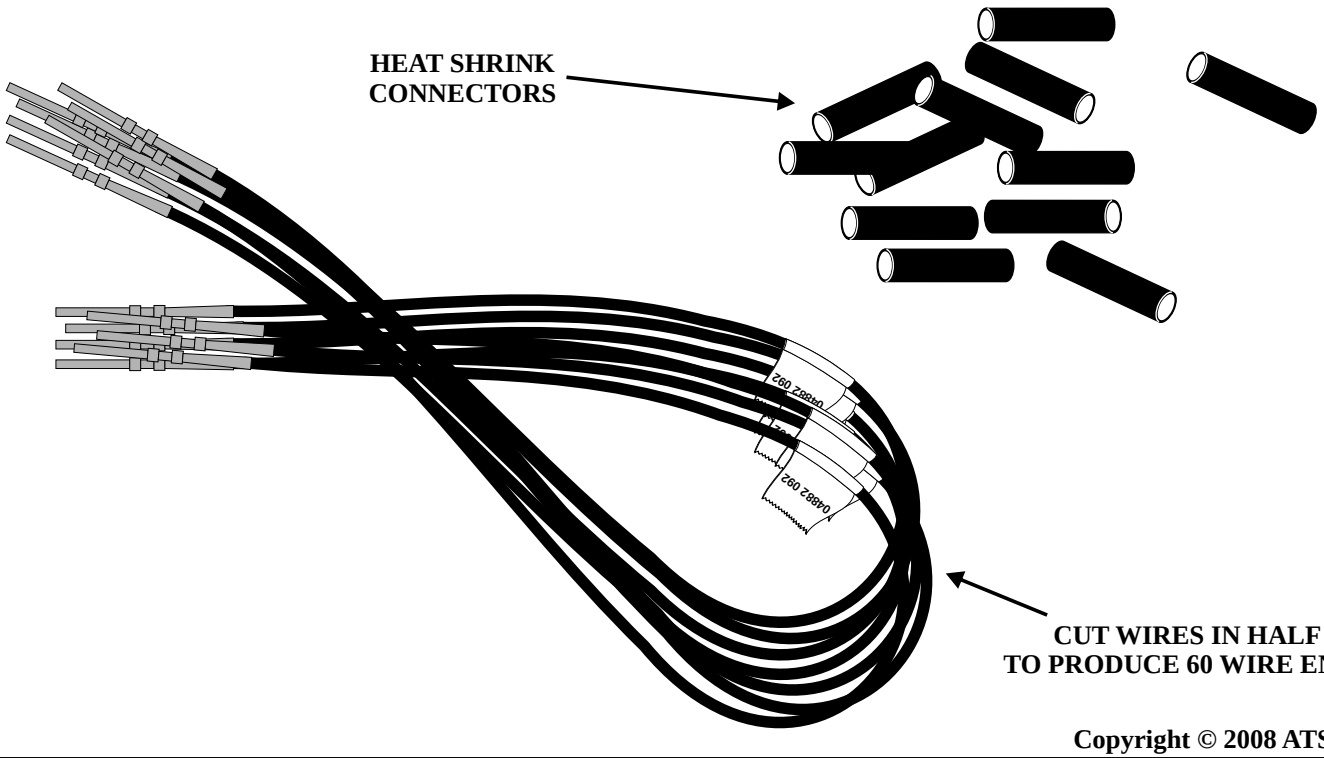


Figure 6

JEEP 42RLE

ENGINE VIBRATION

COMPLAINT: A 2003 Jeep Liberty with a 3.7 Liter engine and 42RLE transmission was sent to the transmission shop after the engine was replaced. After engine replacement a complaint of an engine vibration developed. Disconnecting the torque converter eliminated the vibration. After a preliminary inspection, it seemed that the converter or flywheel may be the cause of the vibration, the transmission was removed.

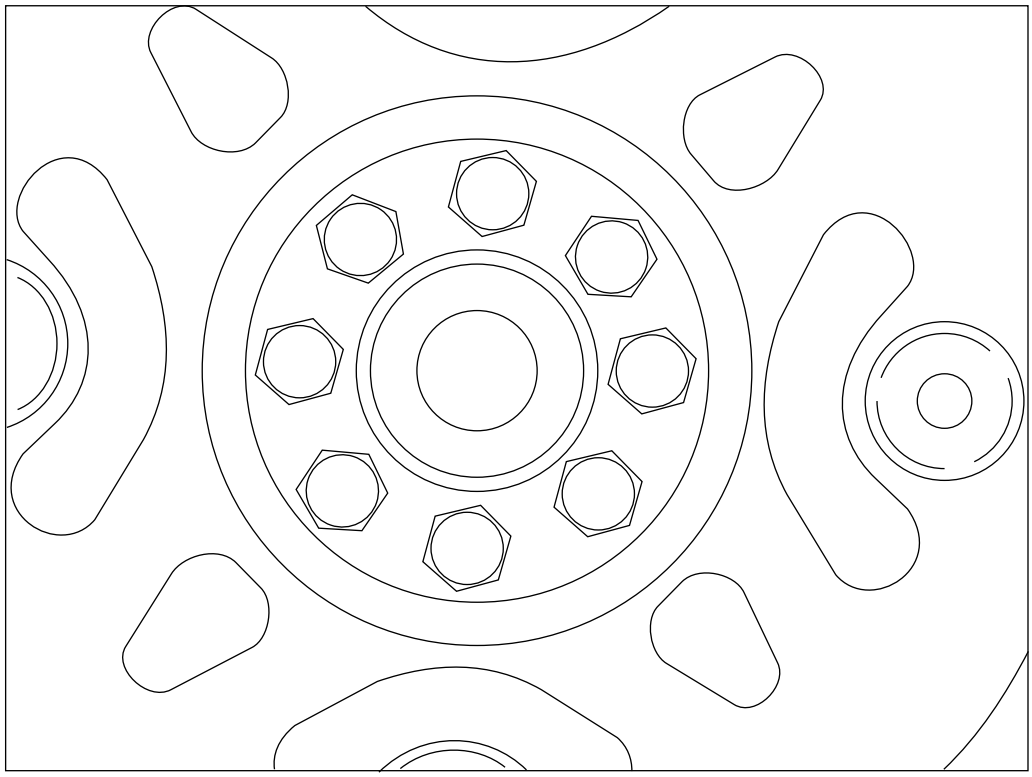
CAUSE: The Crankshaft Pilot Sleeve was left in the original engine and not transferred to the replacement engine, therefore, the nose of the converter had no support which resulted in the vibration, (Refer to Figure 1).

CORRECTION: The crankshaft opening measures about 1.786" with out the sleeve. The converter nose O.D. measures 1.324", lots of room for wobble, (Refer to Figures 2 and 3). The pilot sleeve I.D. measures 1.334".
Make certain the Crankshaft Pilot Sleeve is in place when the engine replaced. Make certain the sleeve has not come out of the crankshaft and is stuck on the nose of the converter, (Refer to Figure 4).

SERVICE INFORMATION:
Crankshaft Pilot Sleeve for 3.7L Engine.....04736483AA

Many thanks to Don Stone from AAA Quality Transmissions in Stuart, FL. for sharing his experience with us and supplying the photos.

WITHOUT PILOT SLEEVE



WITH PILOT SLEEVE

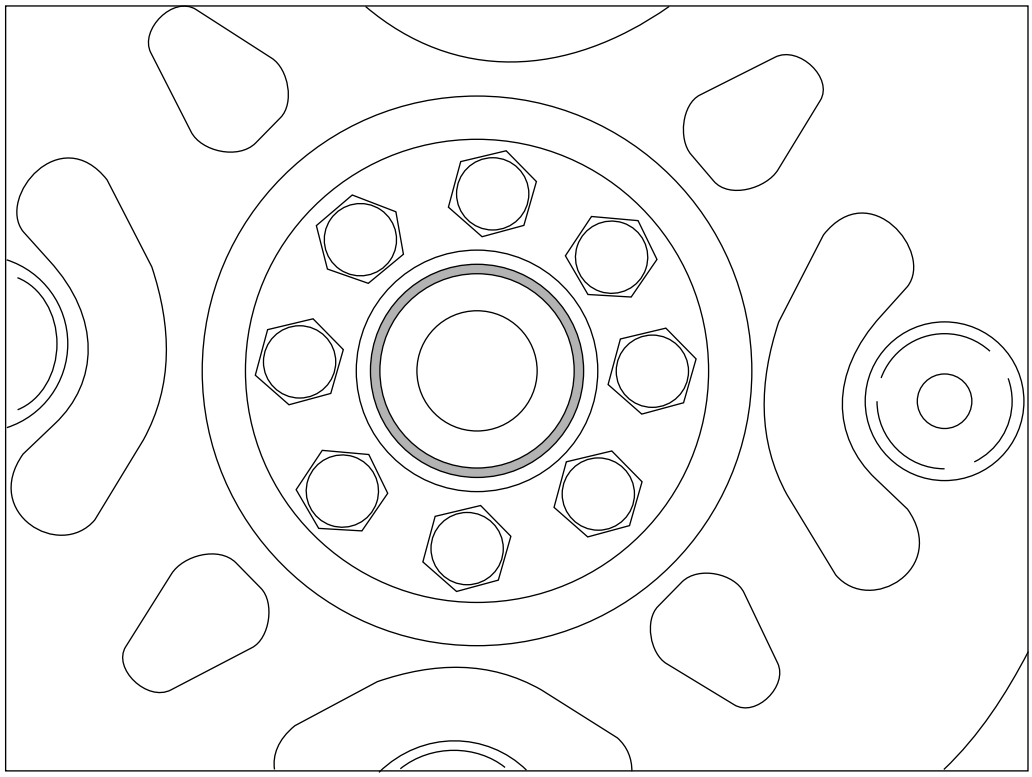


Figure 1

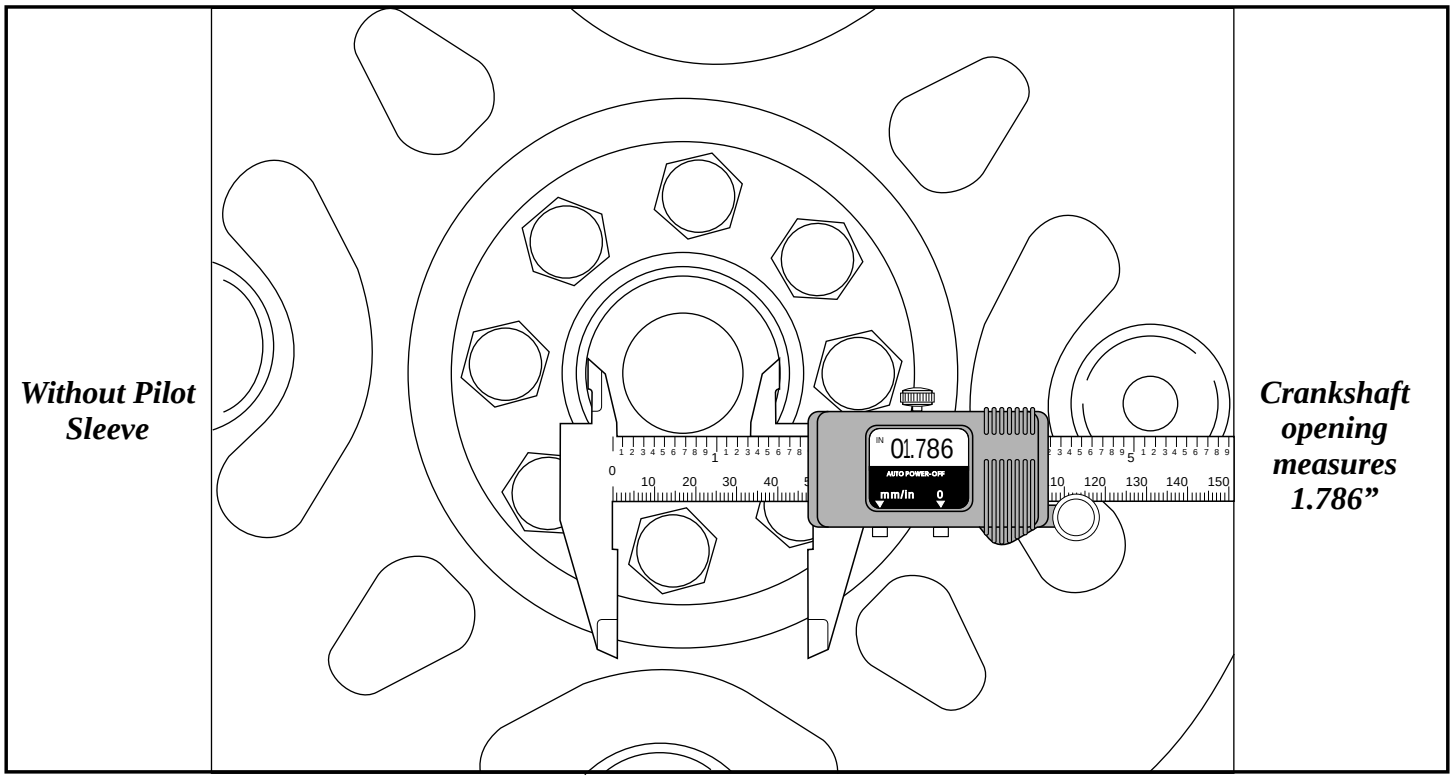


Figure 2

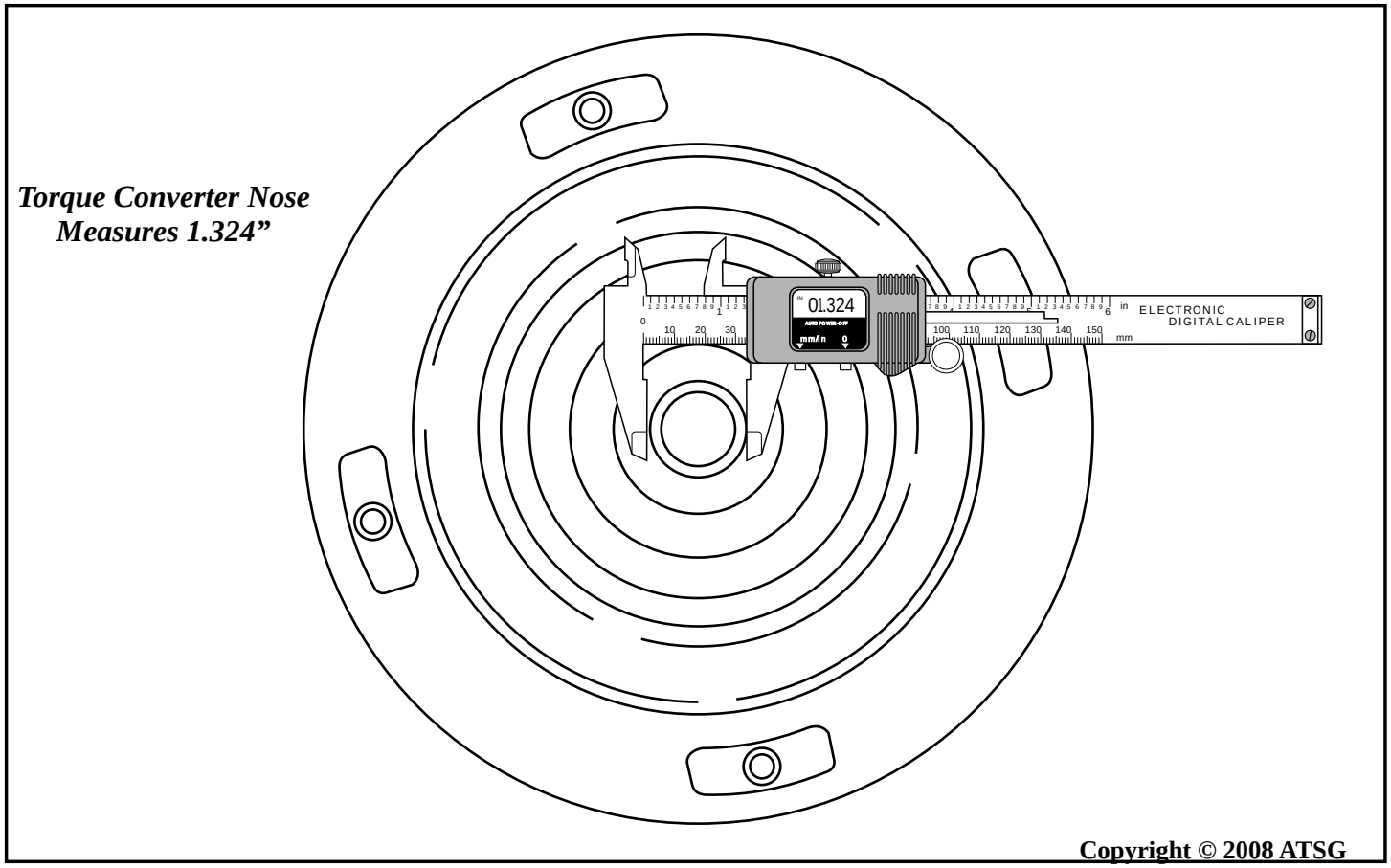
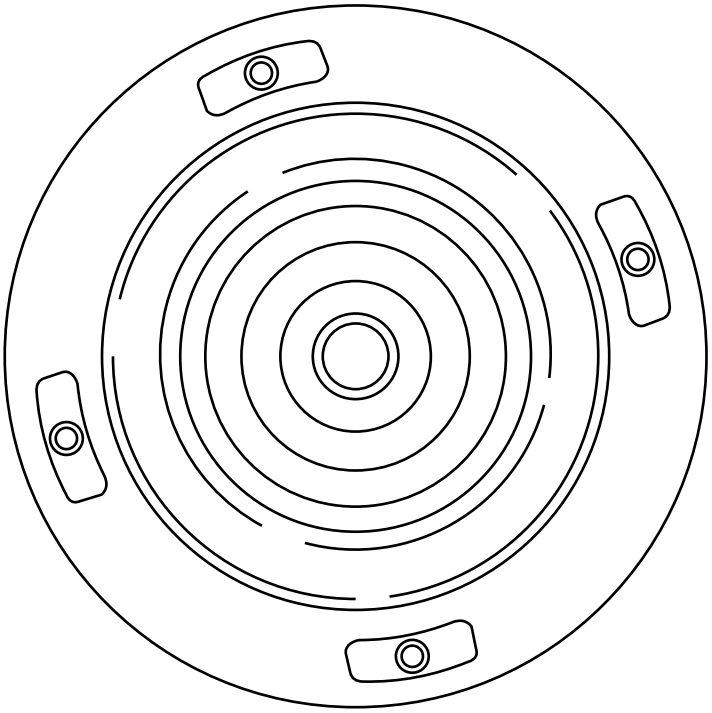


Figure 3

WITHOUT PILOT SLEEVE



WITH PILOT SLEEVE

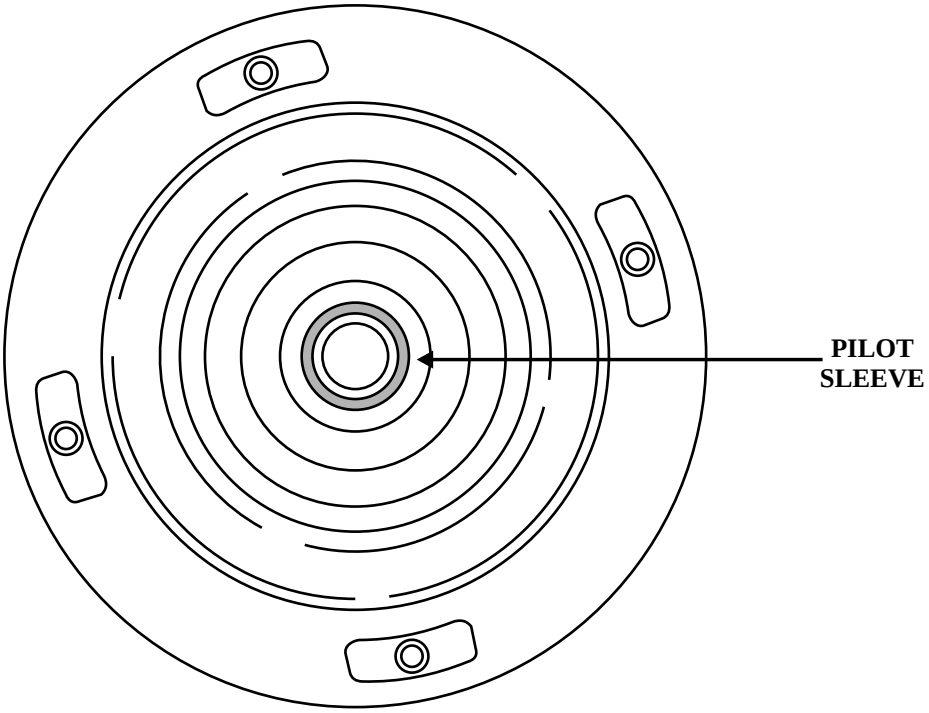


Figure 4

DAIMLER/CHRYSLER VEHICLES
NAG1, 42RLE, CVT MODELS
UPDATED DIPSTICK USAGE

COMPLAINT: During a routine transmission fluid service or after an overhaul, some DAIMLER/CHRYSLER vehicles equipped with the NAG1, 42RLE or CVT transmission are found to have no dipstick in the fill tube for checking oil level. Only a locking cap is found in the top of the filler tube.

CAUSE: Vehicles manufactured by Daimler/Chrysler and equipped with the NAG1, 42RLE or CVT transmission do not come equipped with a dipstick.

CORRECTION: The dipstick is considered a tool by the manufacturer and must be purchased separately. Not all vehicles use the same tool for checking fluid level. There is a stick that is used for Dodge Sprinter and Crossfire vehicles equipped with the NAG1 transmission, and a different stick used in Chrysler 300 and Dodge Magnum/Charger vehicles with the NAG1, or 42RLE. The same stick is also used in Jeep Liberty with the 42RLE and Dodge Caliber equipped with the CVT transaxle.

Refer to Figure 1 for information on checking transmission fluid levels. If you choose to fabricate your own stick, make sure the measurements are taken from the bottom of the transmission fluid pan to the correct marks on your fluid level checking stick. Refer to Figure 2 for refill capacity and correct fluid usage.

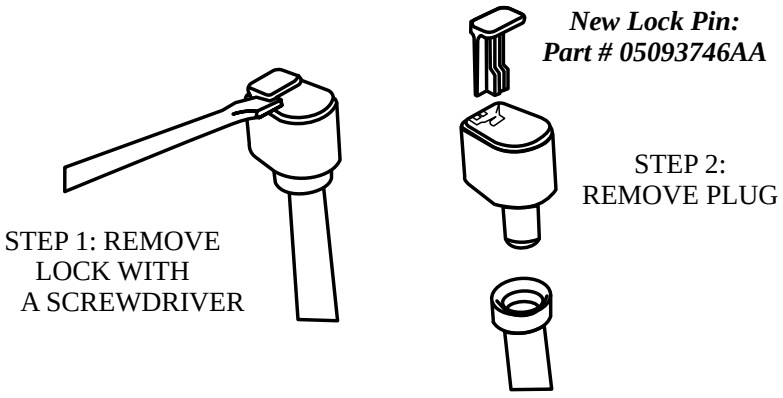
SERVICE INFORMATION:

* Fluid Level Checking Tool 8863B.....Miller Tool Updated Part # 8863B
Sprinter and Crossfire only.

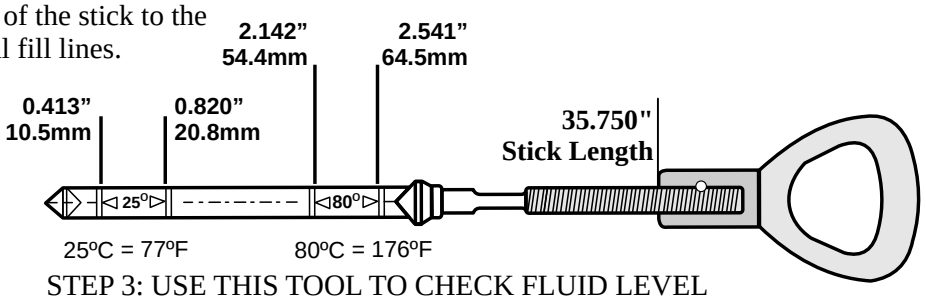
Fluid Level Checking Tool 9336..... Miller Tool # 9336
Dodge Magnum, Charger, Caliber (CVT)
Chrysler 300, Jeep Liberty, Compass (CVT)

* ***NOTE:***
Part # 8863B is a revised design Fluid Level Checking Tool and is used in place of the previous design Part # 8863A. The revised design tool is stronger and more durable.

FLUID CHECKING PROCEDURE STICK # 8863B



Approximate measurements taken from the bottom of the stick to the individual fill lines.



STEP 3: USE THIS TOOL TO CHECK FLUID LEVEL

FLUID CHECKING PROCEDURE STICK # 9336

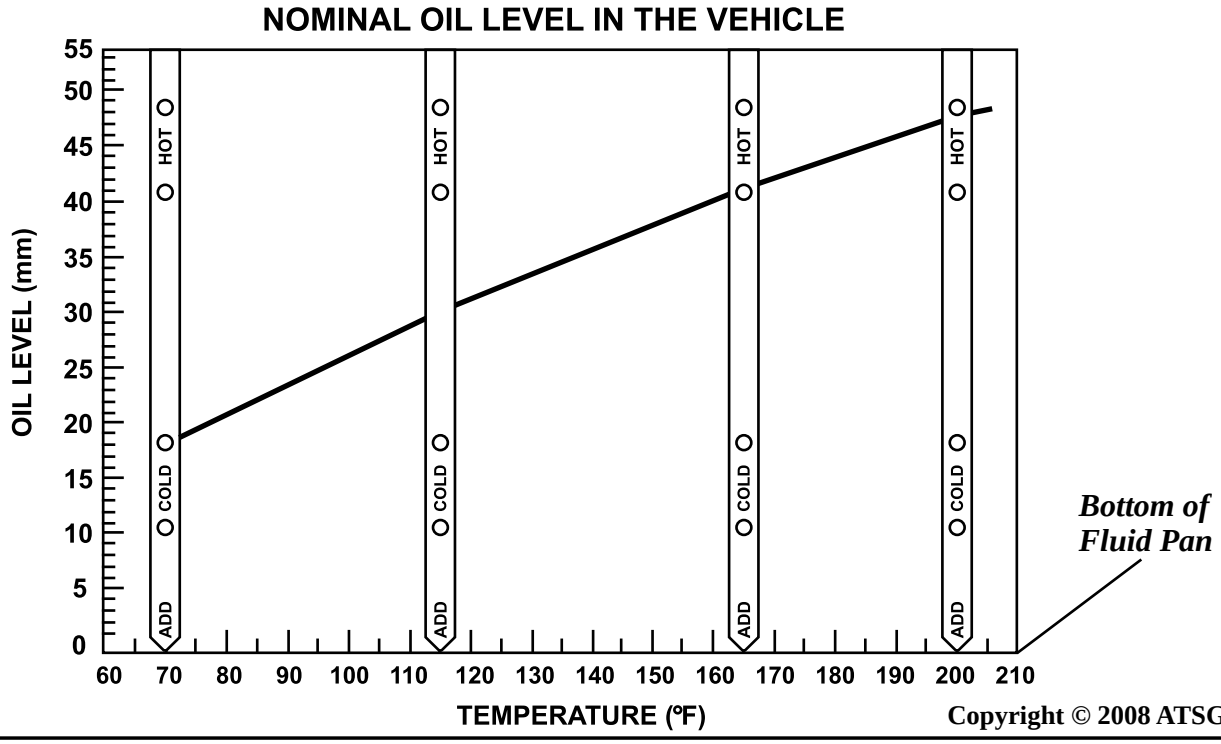


Figure 1

TRANSMISSION FLUID USAGE AND CAPACITY

VEHICLE MODEL	FLUID TYPE	SERVICE REFILL		DRY REFILL	
Chrysler 300	Mopar ATF +4	NAG1	5.0 LTR.	NAG1	7.7 LTR.
		42RLE	3.8 LTR.	42RLE	8.3 LTR.
Chrysler Crossfire	Mopar ATF +4	NAG1	5.0 LTR.	NAG1	8.0 LTR.
		—	—	—	—
Dodge Caliber	Mopar CVTF +4	CVT	3.8 LTR.	CVT	8.1 LTR.
		—	—	—	—
Dodge Charger	Mopar ATF +4	NAG1	5.0 LTR.	NAG1	7.7 LTR.
		42RLE	3.8 LTR.	42RLE	8.3 LTR.
Dodge Magnum	Mopar ATF +4	NAG1	5.0 LTR.	NAG1	7.7 LTR.
		42RLE	3.8 LTR.	42RLE	8.3 LTR.
Dodge Sprinter	Mopar ATF +4	NAG1	5.0 LTR.	NAG1	8.0 LTR.
		—	—	—	—
Jeep Liberty	Mopar ATF +4	42RLE	3.8 LTR.	42RLE	8.3 LTR.
		—	—	—	—
Jeep Compass	Mopar CVTF +4	CVT	3.8 LTR.	CVT	8.1 LTR.
		—	—	—	—

Figure 2

DODGE/CHRYSLER/JEEP

45RFE TORQUE CONVERTER CLUTCH ENGAGEMENT ISSUES

COMPLAINT: Before or after overhaul, a DODGE/CHRYSLER/JEEP vehicle equipped with 45RFE transmission may exhibit a complaint of a harsh engagement when the Torque Converter Clutch applies, or the engine may stall or stumble on a garage shift into Reverse or Drive.

CAUSE: One cause may be broken springs in the Pump Assembly. A broken TCC Accumulator Valve Spring may cause a harsh engagement during TCC apply. A broken TCC Converter Limit Valve Spring may cause the engine to stall or stumble during a garage shift into Reverse or Drive.

CORRECTION: Replace the TCC Accumulator Valve Spring for harsh TCC apply. Replace the TCC Converter Limit Valve Spring for engine stall or stumble during garage shifts.

Refer to Figure 1 for TCC Accumulator Valve and TCC Converter Limit Valve Spring location in the pump assembly.

Note: These springs are available aftermarket from Sonnax.

SERVICE INFORMATION:

TCC Accumulator Valve Spring (Sonnax Part Number).....44912-01
TCC Converter Limit Valve Spring (Sonnax Part Number).....44912-02

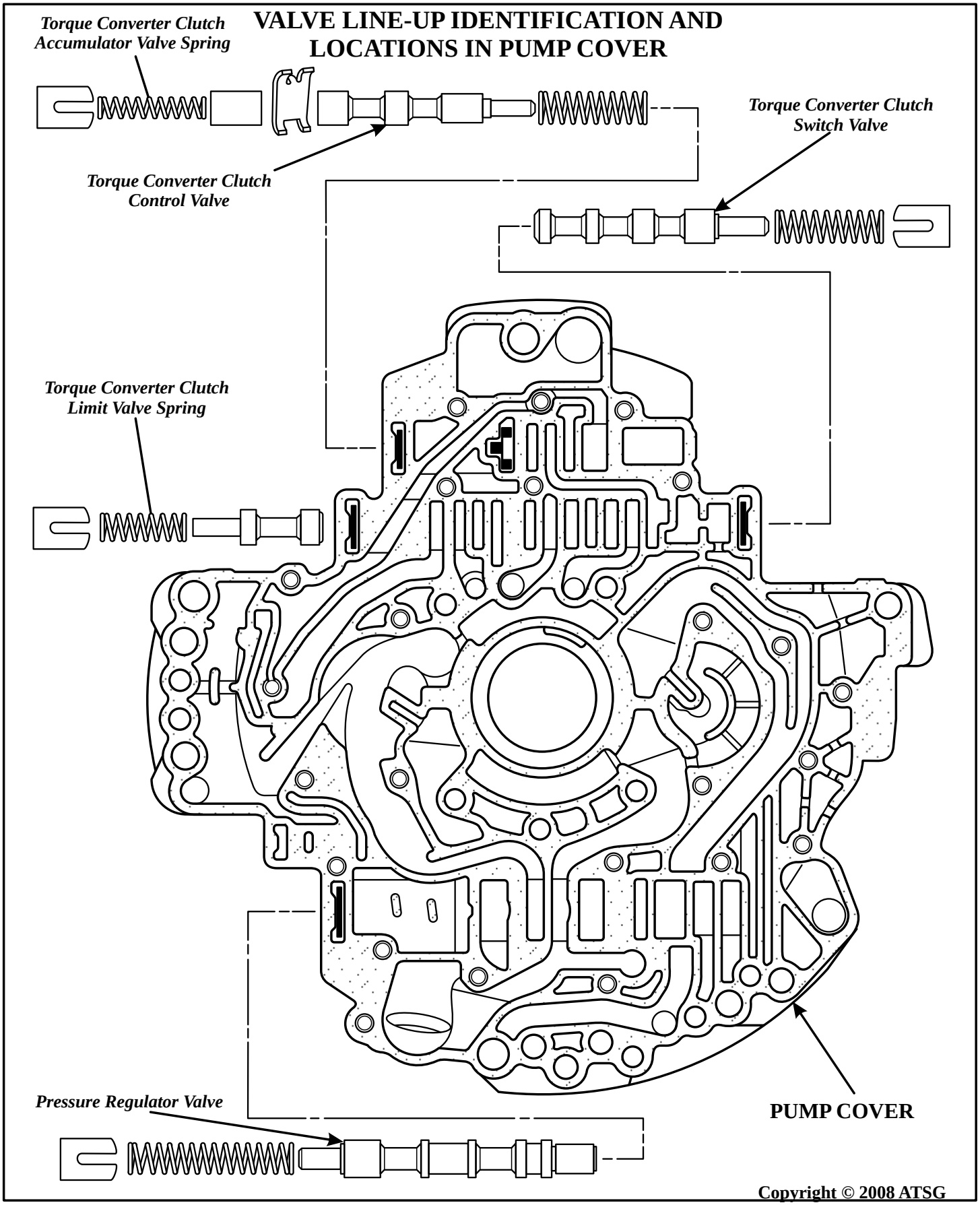

VALVE LINE-UP IDENTIFICATION AND LOCATIONS IN PUMP COVER
Torque Converter Clutch Accumulator Valve Spring
Torque Converter Clutch Control Valve
Torque Converter Clutch Switch Valve
Torque Converter Clutch Limit Valve Spring
Pressure Regulator Valve
PUMP COVER
Copyright © 2008 ATSG

Figure 1

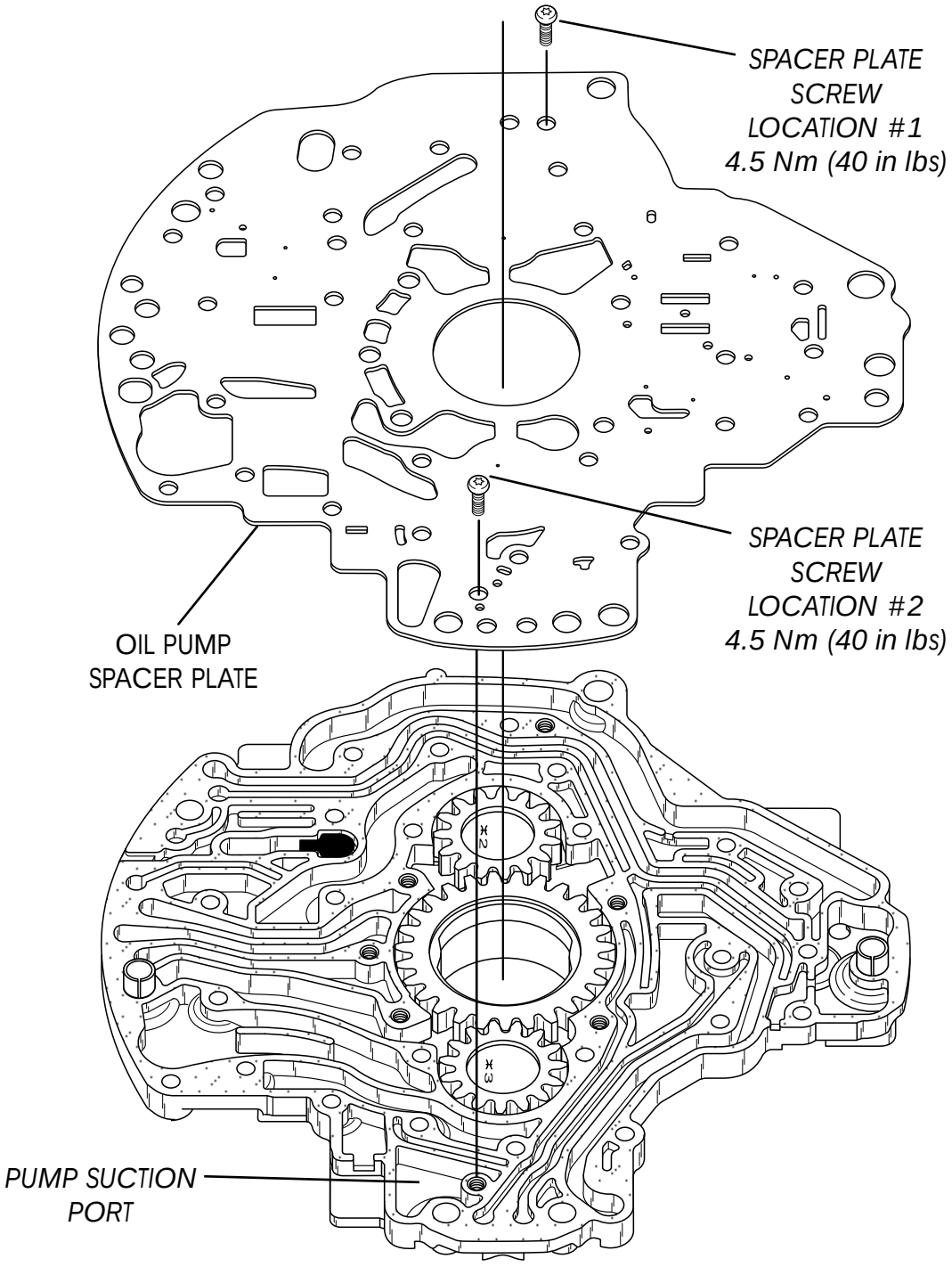
DODGE/CHRYSLER/JEEP
45RFE NO MOVEMENT AFTER OVERHAUL

COMPLAINT: After an overhaul, a DODGE/CHRYSLER/JEEP vehicle equipped with 45RFE transmission may exhibit a complaint of no movement.

CAUSE: One cause may be the Pump Spacer Plate Hold Down Screws in the pump assembly missing. With all the bolts holding this pump together, a brief glance at the pump spacer plate hold down screws may make them appear unnecessary, however, when the location of one of the screws is taken into consideration, their necessity is understood. The pump spacer plate hold down screw locations are shown in the diagram in Figure 1. Take a look at the Spacer Plate Screw Location #2. This Spacer Plate Screw location is directly adjacent to the Pump Suction Port. With this screw missing from the plate, a hole/leak of approximately .190" is immediately opened in the pump suction circuit. Much like having a tremendous amount of pump gear clearance. This huge leak flows to the outside of the pump and creates enough of an air leak that the pump cannot create enough vacuum to pick up transmission fluid from the pan through the filter.

CORRECTION: Install and tighten the Pump Spacer Plate Hold Down Screws to 4.5 Nm (40 in lbs).

PUMP SPACER PLATE
HOLD DOWN SCREWS



VB Pro
(Use 07 Ad)

TRNW

VIDEO

AUDI 01J

DELAYED FORWARD ENGAGEMENT/SHUDDER ON TAKE OFF

COMPLAINT: Some Audi A4 or A6 vehicles equipped with an 01J continuously variable transmission may exhibit a delayed engagement into drive and/or a shudder on take off.

CAUSE: This type of CVT does not use a torque converter. Therefore it must rely on the computer's ability to slip the forward or reverse clutch on and off during engagements, take off and coming to a stop driving conditions. As a result, clutch clearance and the related hydraulic circuits are critical for proper clutch apply and release slip control operation. If the clearance is excessive or the hydraulic circuit develops a marginal leak, clutch control becomes compromised causing a delay and/or shudder on take off. Another feature that may be lost if the clutch system has been compromised is the "hill holder function." If the vehicle rolls back when standing on a slope with only light pressure applied to the brake, the clutch pressure is increased to immobilize the vehicle. If the clutch clearance is to excessive or there is a leak in the circuit, this feature will be lost which is a clue to a system malfunction.

A clutch relearn procedure or a computer reflash will need to be performed after all work has been completed in order to restore proper clutch control operation.

CORRECTION: Once the transmission is removed, the forward clutch assembly can be inspected by removing the front cover (Figure 1).

There are (14) # 45 torx cover retaining bolts. The input shaft, forward clutch and planetary assembly will come out as an assembly as the input shaft is pressed into a bearing in the cover and held into place with a snap ring behind the front seal.

Remove the front seal (1), retaining snap ring (2) and forward clutch feed pipe (27) then carefully press the input shaft, forward clutch and planetary assembly (25) from the cover (3) as seen in Figure 2. Be sure to fully support the cover during this pressing operation as it is very easy to snap the cover.

Once the assembly has been removed from the cover, the forward clutch assembly can be inspected (13 & 14). The planetary assembly is integral to the forward drum and can not be disassembled.

Inspect the forward clutch piston seals and sealing surfaces. The outer seal (10) on the forward clutch piston (9) seals inside the pressure plate (11). The inner seal is located on the input shaft which consists of an inner o'ring (18) and outer Teflon ring (17) and seals against the inside of the pressure plate (11). Both the seals and sealing surfaces are critical for proper operation. Some kits contain a new forward clutch piston with the outer seal installed.

There are two sealing rings on the forward clutch feed pipe (27), an o'ring (26) and a split ring (28). These too are critical sealing areas for the forward clutch hydraulic circuit. The sealing area for the split ring is located in the entrainment pump inside the transmission and should not be grooved. If it is, the entrainment pump will need to be replaced (See Figure 3).

Continued on page 93

ZOOM

VIDEO

AUDI 01J

DELAYED FORWARD ENGAGEMENT/SHUDDER ON TAKE OFF

CORRECTION *continued*:

To gain access to the entrainment pump, the drive and driven pulley set called the variator will need to be removed. This will require removing the differential (Figure 1), back cover (Figures 1 and 4), the valve body and the variator case cover.

When the valve body is removed, there will be 5 small pipe seals, 1 larger pipe seal and 2 speed sender wheels (See Figure 4). These speed sender wheels are not to be mistaken for oil seals which are then popped off with a hammer and screw driver. If you distort these speed sender wheels they will need to be replaced. These speed senders have magnetic strips in them that provide a rotation signal to hall affect sensors built into the TCM. Any distortion of the sender wheel will cause various transmission complaints including delayed engagements, shudder on take off and a loss of the hill holding feature. Some kits have mistakenly thought these were just oil seals and had aftermarket sources make them without magnets and when used there is a complete loss of a speed signal. Some kits that have the right sender wheels will usually have them in their own separate bag for protection along with installation instructions.

Once the pipe seals and the speed sender wheels are removed the variator case cover can be unbolted and removed from the main case.

With the differential out of the main case, remove the pinion shaft oil seal as seen in Figure 5. After the seal has been removed, there is a retainer spacer that must be carefully lifted out of place Figure 5). This retainer is not serviced separately so you must be careful not to distort it during removal as it must be reused during assembly. Once the retainer is removed, the retaining snap ring can be removed (Figure 5).

The variator is now ready to be removed. To do so will require a metal brace and hand pump press. With the metal brace acting as a support, place the press between the support brace and pinion gear. Slowly press the shaft out of the case while another person carefully guides the variator assembly from the main case (See Figure 6).

With the variator assembly removed, the entrainment pump becomes accessible for removal and replacement (See Figure 7).

There is another very critical seal in the forward clutch circuit that will need to be replaced. It is located on the forward clutch feed pipe that runs from the valve body and fits into the entrainment as seen in Figure 8.

To reassemble the variator assembly into the main case, carefully slide it into position as far as possible. With a treaded rod, screw it into the tip of the pinion shaft from the differential cavity. Slide a sleeve over the threaded rod and screw a nut onto the threaded rod. With a wrench, slowly tighten the nut pulling the pinion shaft into place while an assistant us carefully guiding the variator assembly into the case as it is being pulled in (See Figure 9).

Before the assembly is all the way in, loosen the nut and pull back on the sleeve and place the snap ring and the retainer spacer into position. Then begin to tighten the nut allowing the sleeve to guide both the snap ring and retainer into position.

VIDEO

AUDI 01J

DELAYED FORWARD ENGAGEMENT/SHUDDER ON TAKE OFF

CORRECTION *continued*:

Setting up the forward clutch:

As mentioned previously, clutch clearance is critical. Originally these units come with a six friction stack up. There was an update that increased the stack up to 7 friction trapezoid design plates. The part number for this repair kit was ZAW 398 001 which was to be accompanied with a TCM re-flash using CD ROM part number 8E0 906 961J.

This service was superceded with buying a package that consisted of the front cover, planetary and forward drum all assembled and ready for instillation and could only be purchased with the use of a Vehicle Identification Number. Once assembled, a factory re-flash procedure needed to be performed.

This has changed back again. Now the 7 friction stack up can be purchased separately as well as selective steel plates and backing plates to adjust clutch clearance. Part numbers are listed under "Service Information."

Assemble the drum completely. Once the forward clutch is re-assembled, a suitable tool or part number VW 416b must be used to push down on the pressure plate by a second technician as seen in Figure 10.

Using part number T40102 or equivalent .058" feeler gauges, move the two feeler gauges back and forth to complete a full 360º circle beneath the pressure as the arrows in figure 10 illustrates.

The entire circular area needs to be inspected. The two feeler gauges MUST always move freely without any resistance whatsoever. If the gauges can not freely move around the pressure plate the forward clutch stack up will need to be adjusted by changing the selected shims.

It is essential to obtain a successful 0.058" even clearance (or slightly tighter) all the way around the pressure plate otherwise problems will be encountered when driving off from a standstill.

After repairs, it is still recommended to update transmission control module software. A failure to do so could lead to transmission failure as the software update enhances pressure control and clutch control strategies. There is also a drive cycle shift adapt relearn procedure that has been know to work well when the clutch clearance has been made slightly tighter than original specifications.

Drive Cycle Shift Adapt Relearn Procedure (Per Audi):

Warning:
Observe all workplace and vehicle lift safety guidelines in order to reduce the risk of serious personal injury or death.

Note:
Never operate the vehicle without ATF. Do not exceed 35 mph while operating the vehicle on the lift.

VIDEO

AUDI 01J

DELAYED FORWARD ENGAGEMENT/SHUDDER ON TAKE OFF

CORRECTION *continued*:

If just the clutch plates are replaced (the nose pulled but trans not completely rebuilt), the ATF must be flushed by performing the following steps:

1. Drive the vehicle onto a lift and ensure that the vehicle is secure to the lift.
2. Raise the vehicle until all 4 wheels are approximately 8 Inches off the ground. Ensure that all 4 wheels rotate freely.
3. In Tiptronic mode, shift from first to top gear and accelerate moderately after each shift.
4. Shift the transmission back down into first gear.
5. Carefully apply the brake pedal in order to stop the wheels from rotating.
6. With the brake pedal firmly applied, shift the transmission into R.
7. Release the brake pedal and moderately accelerate to approximately 12 mph.
8. Carefully apply the brake pedal in order to stop the wheels from rotating.
9. Return the gear lever to D and repeat steps 3 through 8 five times.
10. Place the gearshift lever into P and turn the engine off.
11. Change the ATF by using a suitable fill pump device, fill the transmission with VAS 5162 Audi CVT fluid (part # G 052 180 A2 for 1 liter) through the fill hole located at the bottom of the main case until fluid begins to overflow (approximately 7.5 to 8 liters). Engage the transmission with the wheels off the ground and top off the fluid before placing the vehicle on the ground for a road test.
12. Repeat steps 3 through 11 a second time.

Now adapt the Transmission Control Module (TCM):

1. Confirm that the ATF is at a minimum 65ºC.
2. With the ATF at a minimum 65ºC, carefully operate the vehicle in an open space (clear of traffic and obstacles).
3. Shift vehicle into D.
4. Drive forward at part load approximately 10 meters (33 feet), then apply brake pedal to a stop and continue to apply brake pedal for approximately 10 seconds.
5. Shift vehicle into R.
6. Release brake pedal.
7. Drive backwards at part toad approximately 10 meters (33 feet), then apply brake pedal to a stop and continue to apply brake pedal for approximately 10 seconds.
8. Repeat steps 1- 7 (alternating between D and R) five times.
9. Compteted adaptions can be viewed in MVB 10 and 11, position 2 with factory scan tool or VAG-COM.

SERVICE INFORMATION:

Program the Transmission Control Module (TCM) with flash CD Part # 8E0-906-961 J

FWD Clutch 7 Friction Update Kit	01J-398-944
FWD Clutch Selective Plate Set	01J-398-941
Reverse Clutch Set	01J-398-241
Reverse Clutch Selective Plate Set	01J-398-139
Entrainment Pump	01J-301-515 K

VIDEO

AUDI 01J

DELAYED FORWARD ENGAGEMENT/SHUDDER ON TAKE OFF

SERVICE INFORMATION:

Forward Clutch Feed Pipe (Inside FWD Drum)	01J-323-530G
Forward Clutch Piston with seal	01J-323-929A
Forward Clutch Pressure Plate	01J-323-945
Large Tube Seal	01J-301-547A
Small Tube Seal	01J-301-547F
Input Speed Sender Wheel	01J-331-291F
Output Speed Sender Wheel	01J-331-191B
Valve Body Cover Gasket (Metal)	01J-301-475A
Front Seal	012-311-113B
Set of 4 Circlips (Behind front seal)	01J-398-941A
Front Cover	01J-323-259G
Front Cover Gasket	01J-301-461B

Forward Clutch Feeler Gauge Set	T40102
Forward Clutch Press Tube	VW 416B

Press Kit.....ATSG-01J Tool Kit*

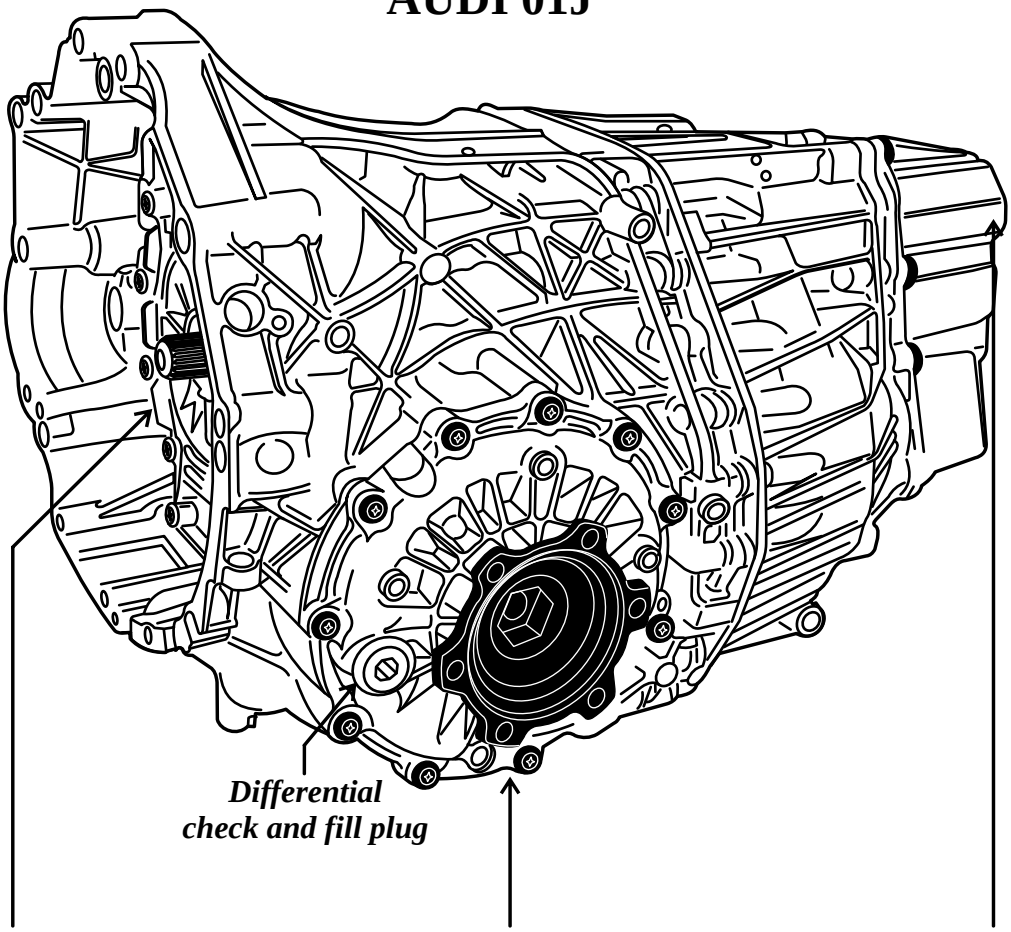
* ATSG is the exclusive North and South America Dealer for this aftermarket tool kit.

Tool Kit includes:

Hand Held Press
Pinion Shaft Nut Tool
Pinion Shaft Puller
Release Oil Screw
Differential Seal Assembly Tool
Seal Assembly Tool
Input Speed Sender Puller
Pinion Shaft Disassembly Tool
Input Shaft Nut Tool
Pinion Shaft Assembly Tool

Sometimes Dealers will sell special tools to the aftermarket. At the time of printing this information, you can call Audi's Equipment Solutions for the required CVT tool package at 1-800-892-9650. This is their tool package which is different than what ATSG offers.

AUDI 01J



When removed, the front cover gains access to the forward clutch and reverse clutch assemblies. The planetary assembly is integral to the forward drum and is pressed into the cover with a retaining snap ring located behind the front seal.

When removed, the differential cover gains access to the pinion shaft seal. Behind the seal is a retainer spacer ring around a snap ring which needs to be removed to press out the drive and driven pulley assembly should any service to the Entrainment pump or pulley assembly is needed.

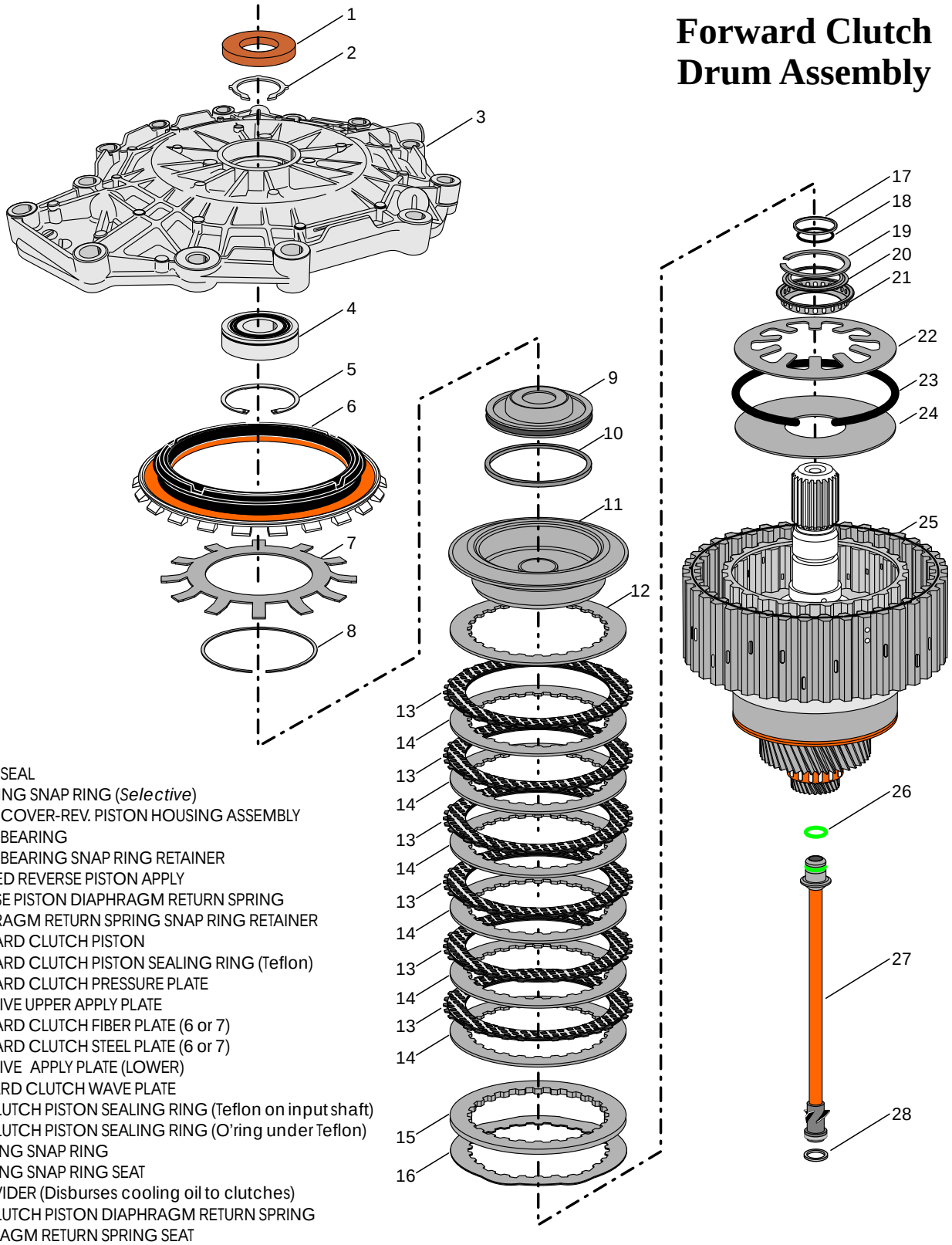
If the Entrainment pump needs to be serviced, the rear cover, TCM, valvebody and pulley case cover will need to be removed. Care must be taken to not mistaken the sender wheels as seals. These must be removed with care.

Differential

The front differential in the transmission receives approximately 1.3 liters of SAE75 W90 synthetic fluid and is filled through the check plug as seen above. The vehicle must be driven to heat the gear oil to approximately 60°C. Allow the vehicle to sit for 5 minutes giving the gear oil time to settle. Remove the plug and using a piece of wire, the fluid level must be approximately 8.5mm below the fill hole. Top off as necessary and tighten plug to 20 Nm. It is recommended that a new plug replace the old. It is very common to find differentials overheated and destroyed as a result of low levels. It seems that the baffling around the differential makes it difficult to get an accurate reading. Of course Audi's awkward procedure for checking the gear oil level doesn't help any either.

Figure 1

Forward Clutch Drum Assembly



1 FRONT SEAL
2 RETAINING SNAP RING (*Selective*)
3 FRONT COVER-REV. PISTON HOUSING ASSEMBLY
4 FRONT BEARING
5 FRONT BEARING SNAP RING RETAINER
6 MOLDED REVERSE PISTON APPLY
7 REVERSE PISTON DIAPHRAGM RETURN SPRING
8 DIAPHRAGM RETURN SPRING SNAP RING RETAINER
9 FORWARD CLUTCH PISTON
10 FORWARD CLUTCH PISTON SEALING RING (Teflon)
11 FORWARD CLUTCH PRESSURE PLATE
12 SELECTIVE UPPER APPLY PLATE
13 FORWARD CLUTCH FIBER PLATE (6 or 7)
14 FORWARD CLUTCH STEEL PLATE (6 or 7)
15 SELECTIVE APPLY PLATE (LOWER)
16 FORWARD CLUTCH WAVE PLATE
17 FWD CLUTCH PISTON SEALING RING (Teflon on input shaft)
18 FWD CLUTCH PISTON SEALING RING (O'ring under Teflon)
19 RETAINING SNAP RING
20 RETAINING SNAP RING SEAT
21 OIL DIVIDER (Disburses cooling oil to clutches)
22 FWD CLUTCH PISTON DIAPHRAGM RETURN SPRING
23 DIAPHRAGM RETURN SPRING SEAT
24 COVER PLATE
25 FORWARD CLUTCH DRUM AND PLANETARY ASSEMBLY
26 FORWARD CLUTCH PIPE O'RING
27 FORWARD CLUTCH PIPE
28 FORWARD CLUTCH PIPE SPLIT SEALING RING

Figure 2

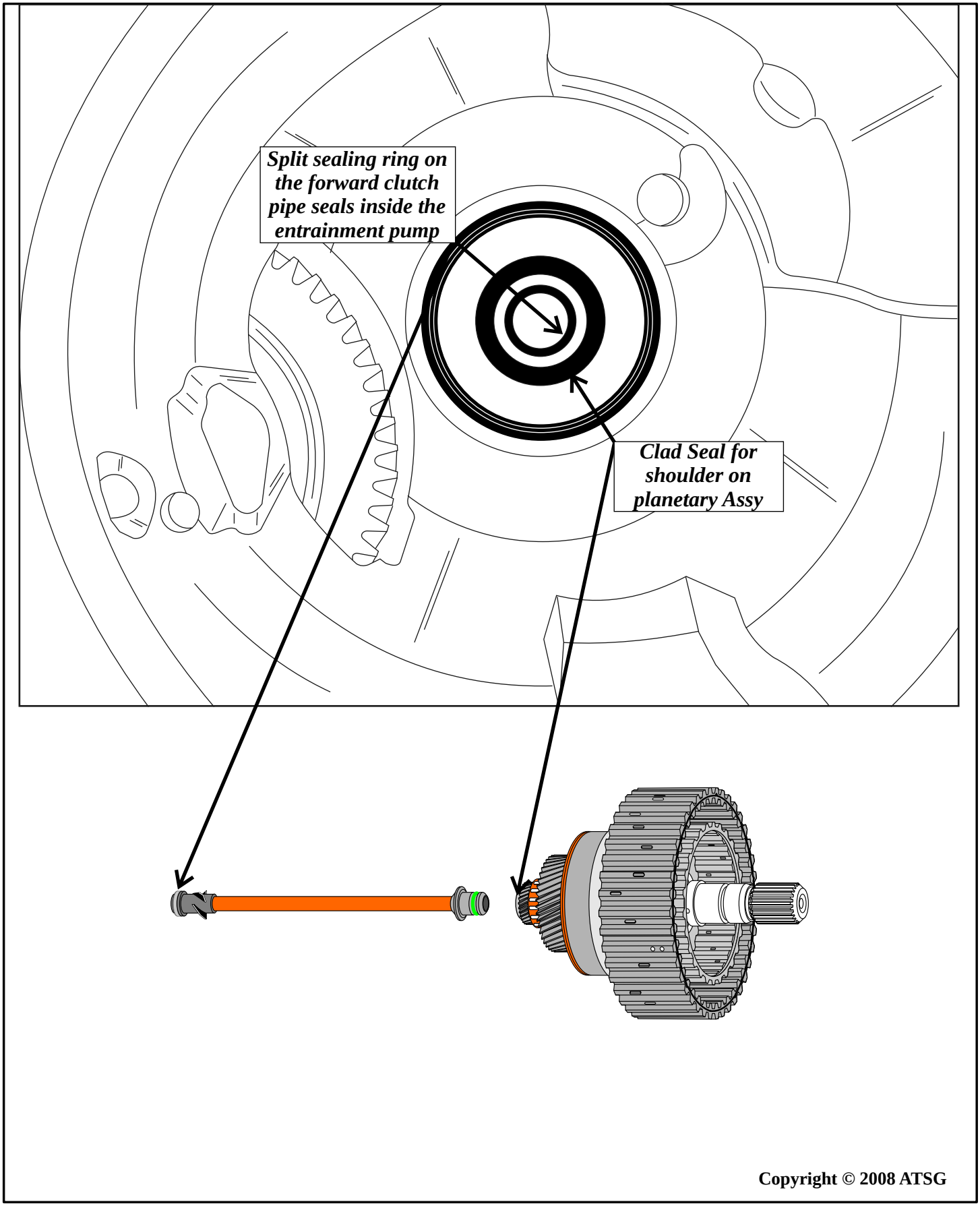
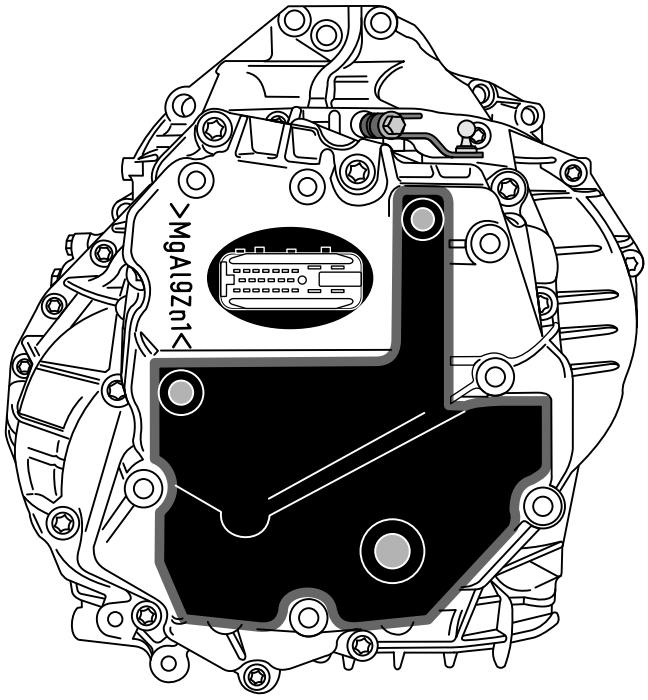
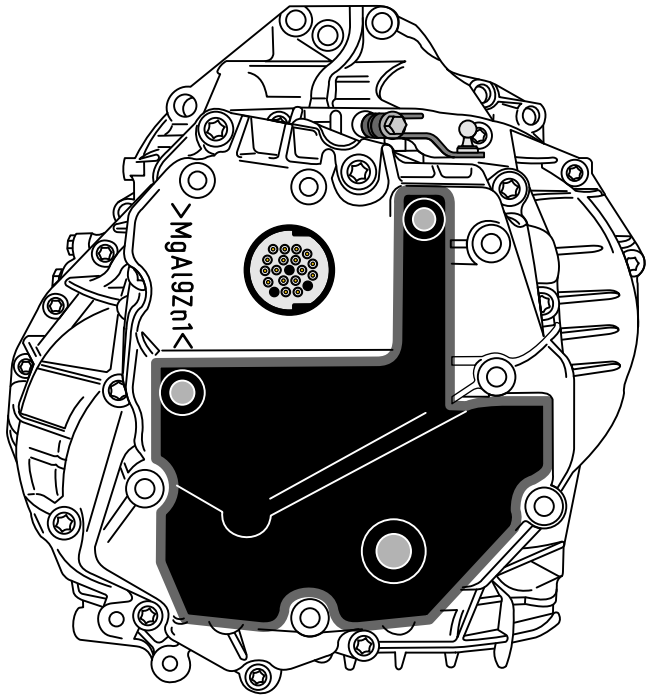


Figure 3



Early Cover View



Late Cover View

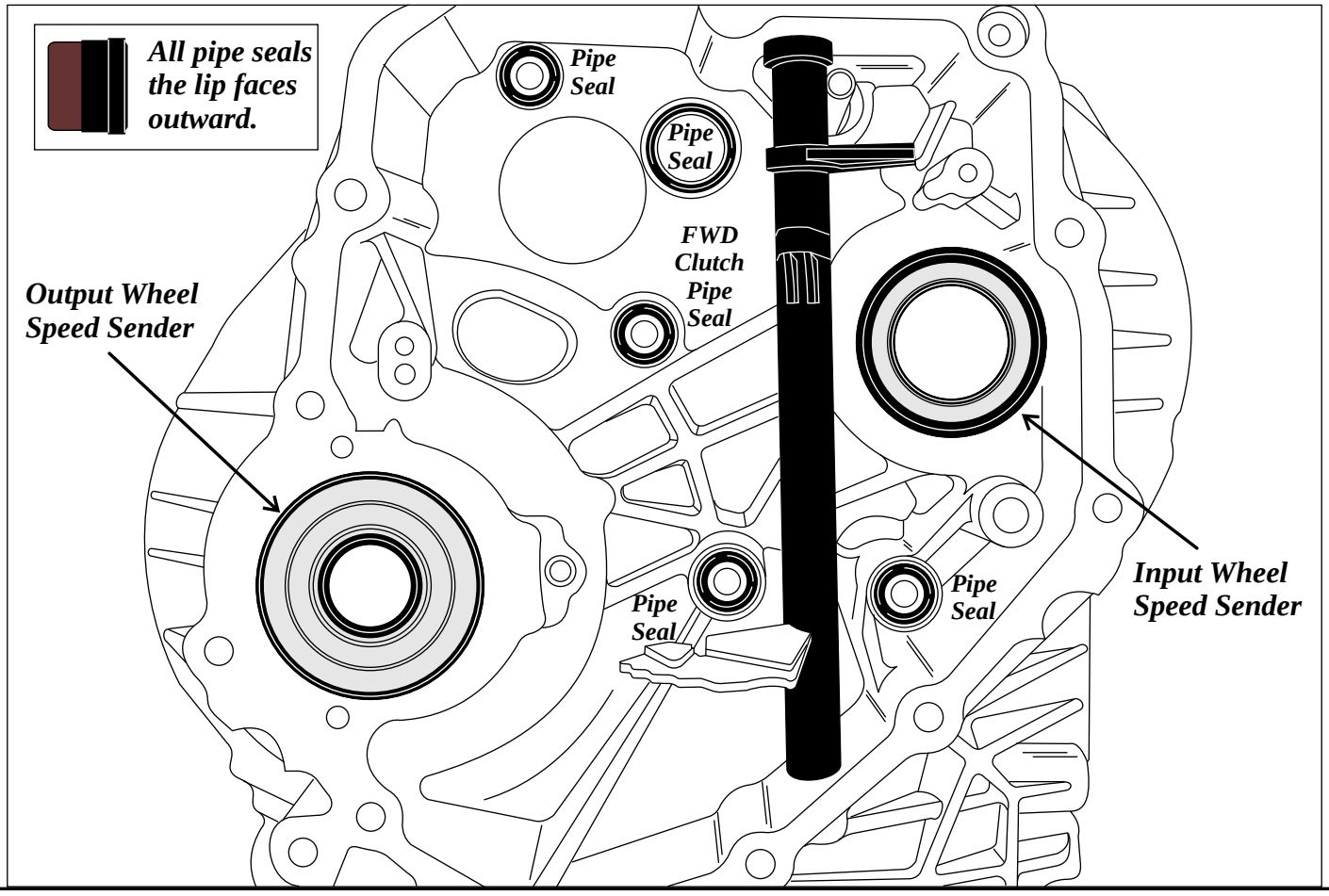
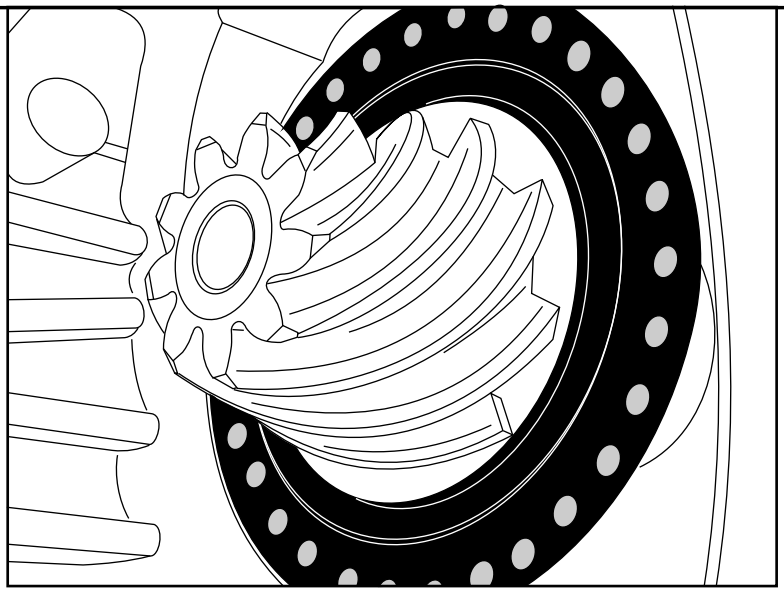
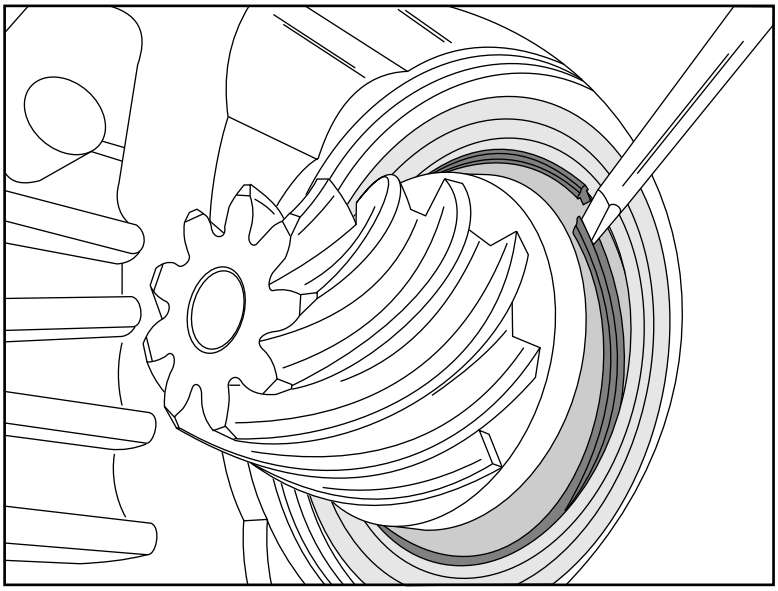


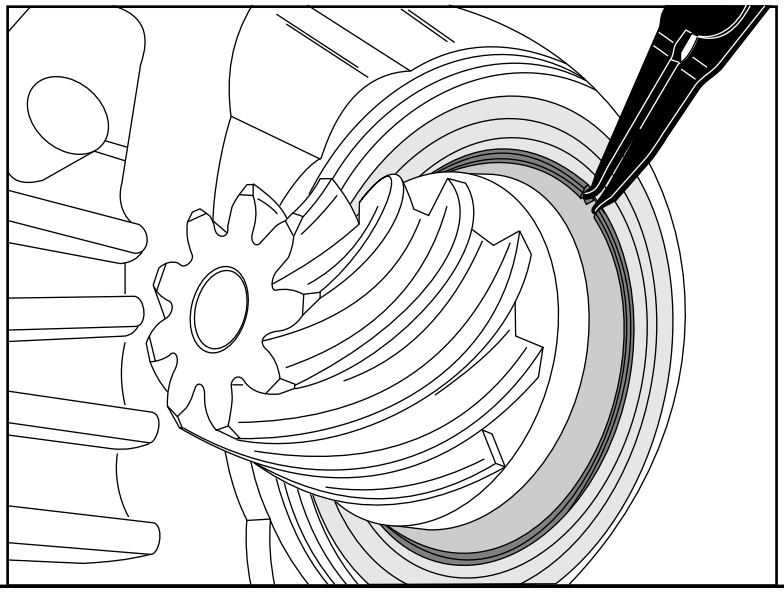
Figure 4



Remove Pinion Seal.



Remove the Retainer Spacer from around the inner snap ring being careful not to distort it as it will need to be reused. This part is not yet serviced separately.



Remove the inner snap ring.

Figure 5

VIDEO

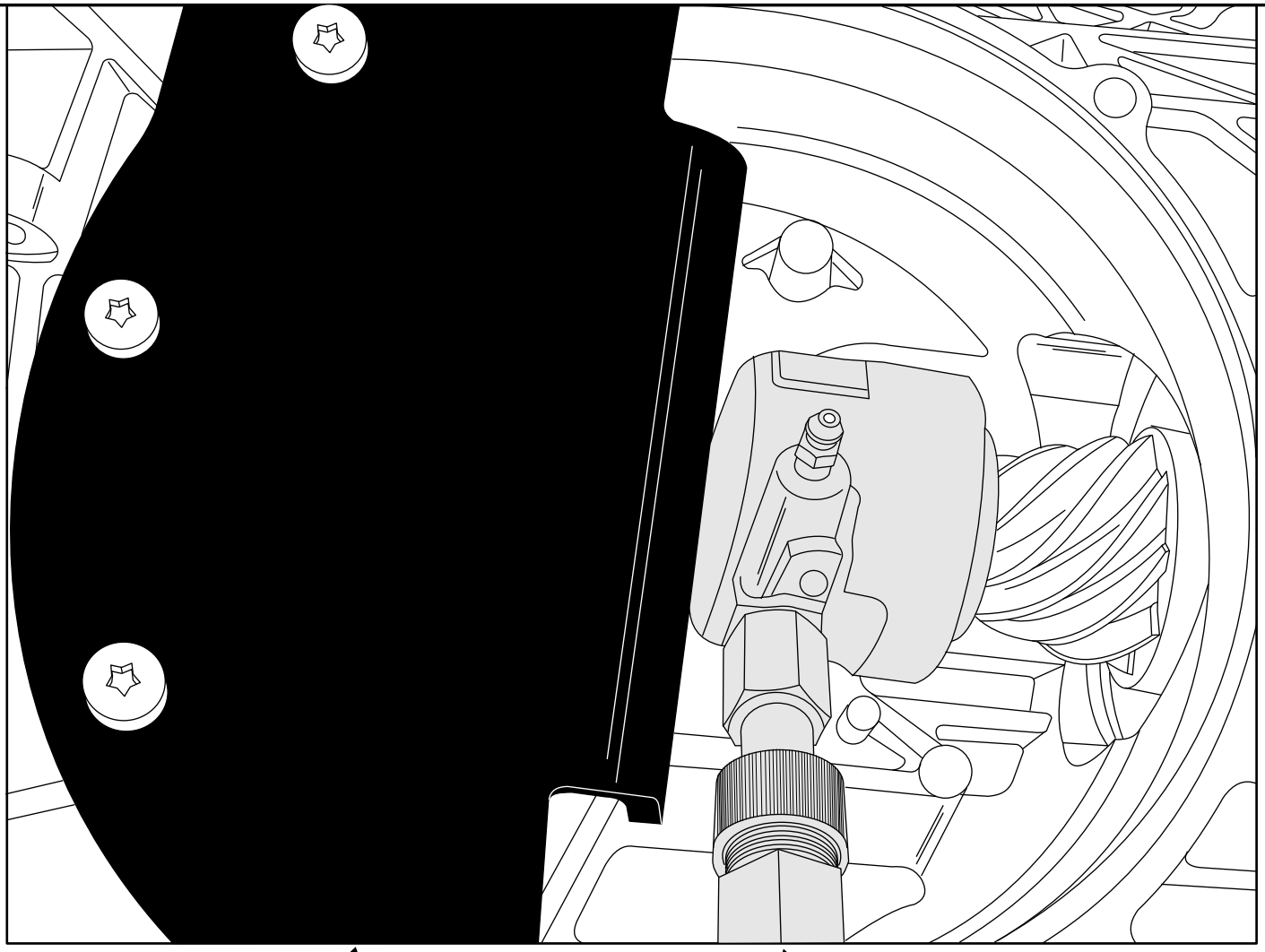
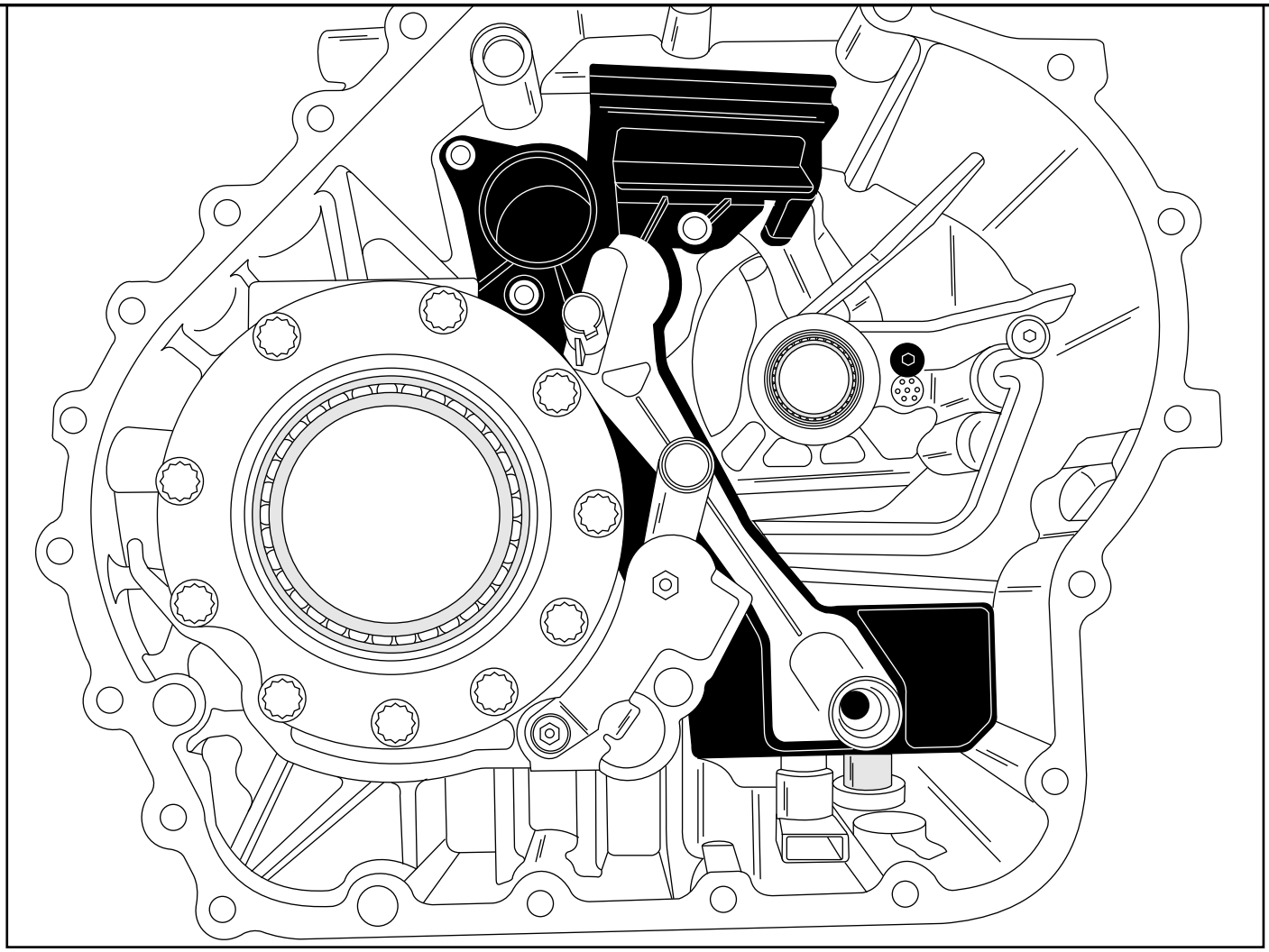
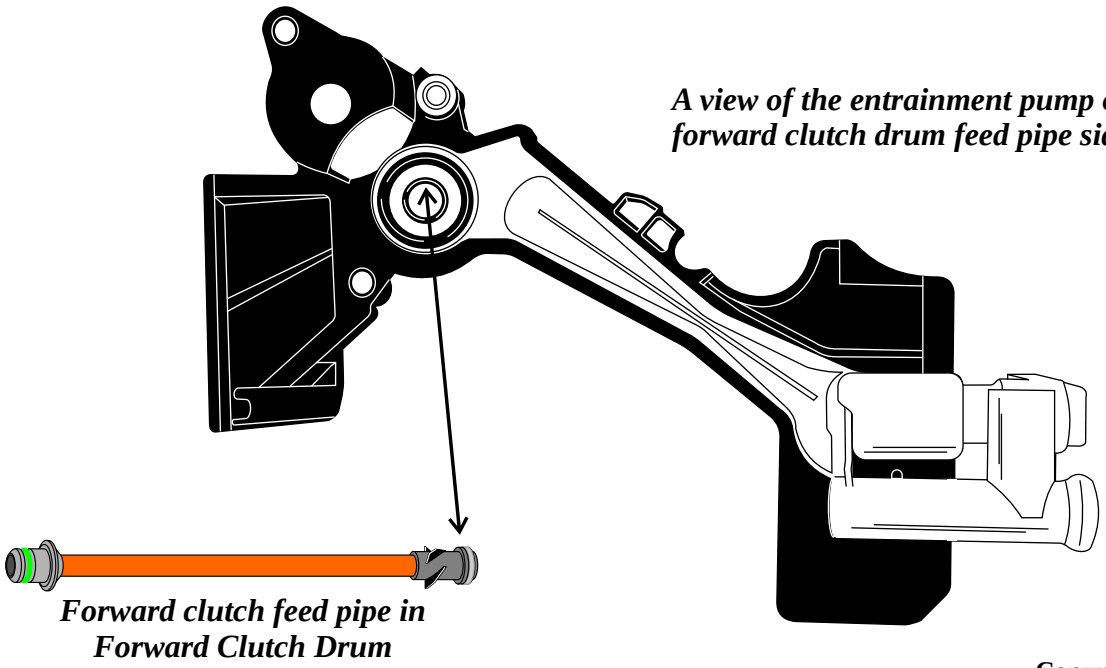


Figure 6

VIDEO





A view of the entrainment pump on the forward clutch drum feed pipe side.

Forward clutch feed pipe in Forward Clutch Drum

Figure 7

A view of the entrainment pump on the forward clutch feed pipe valve body side.

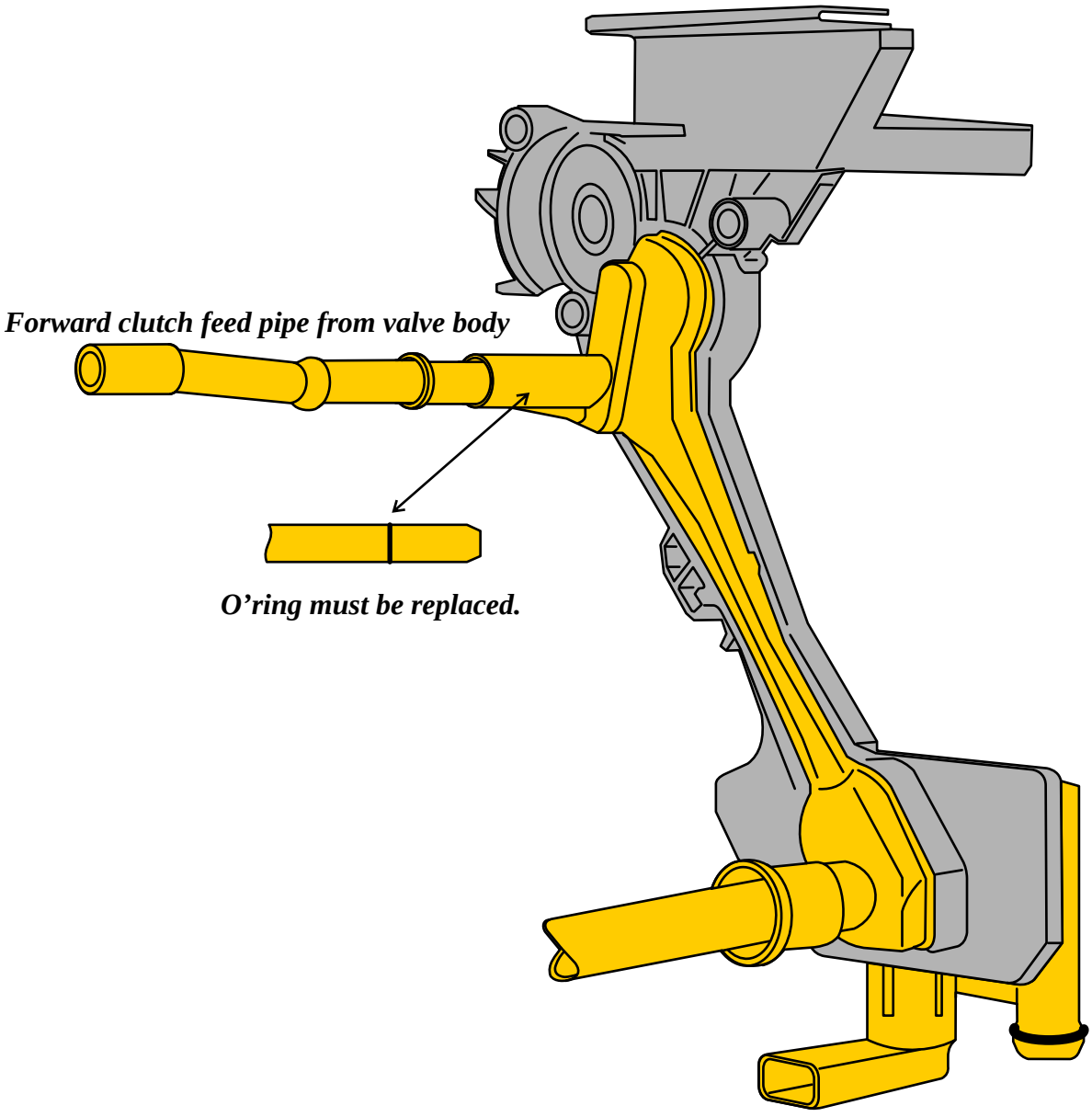


Figure 8

VIDEO

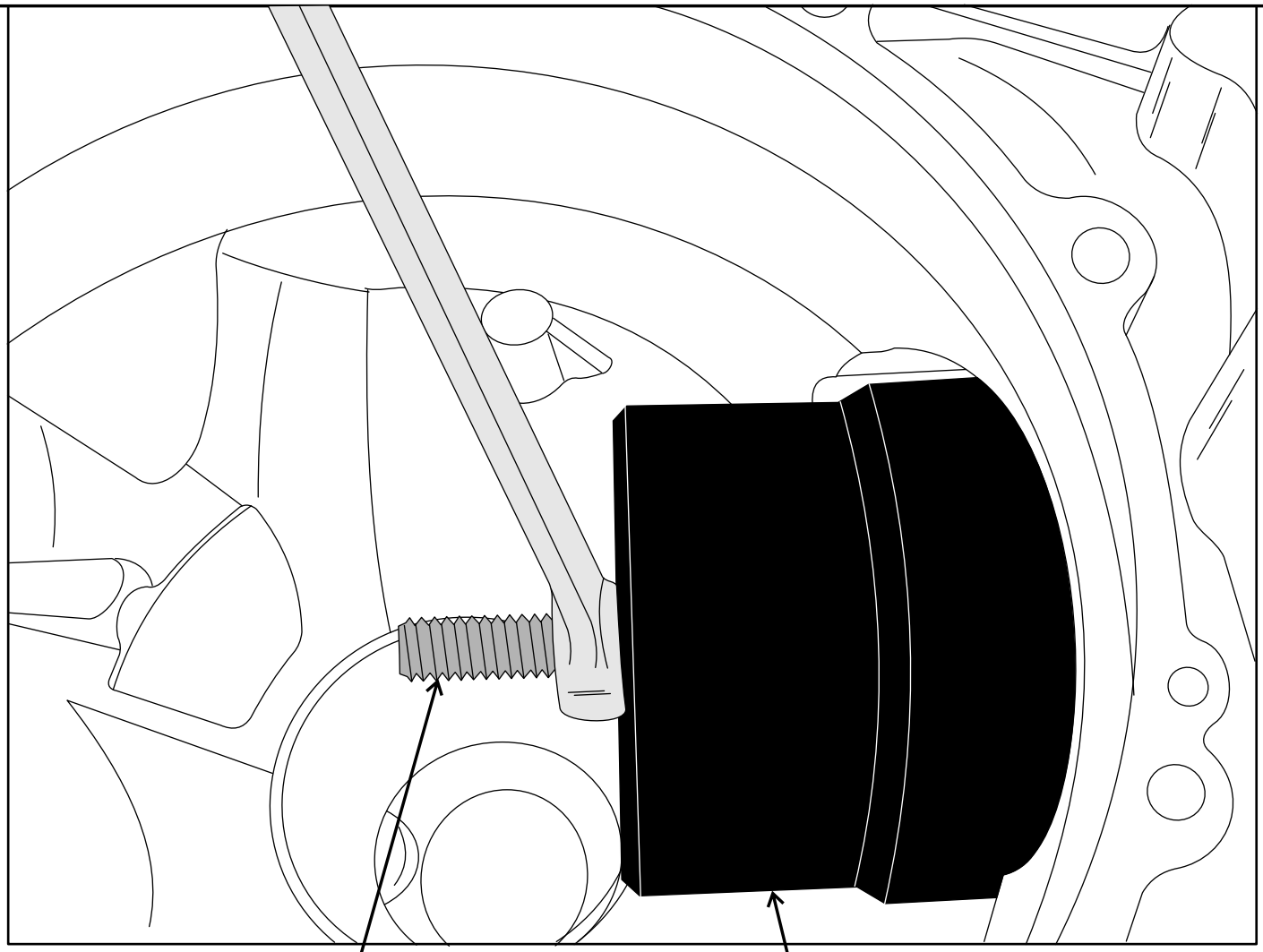
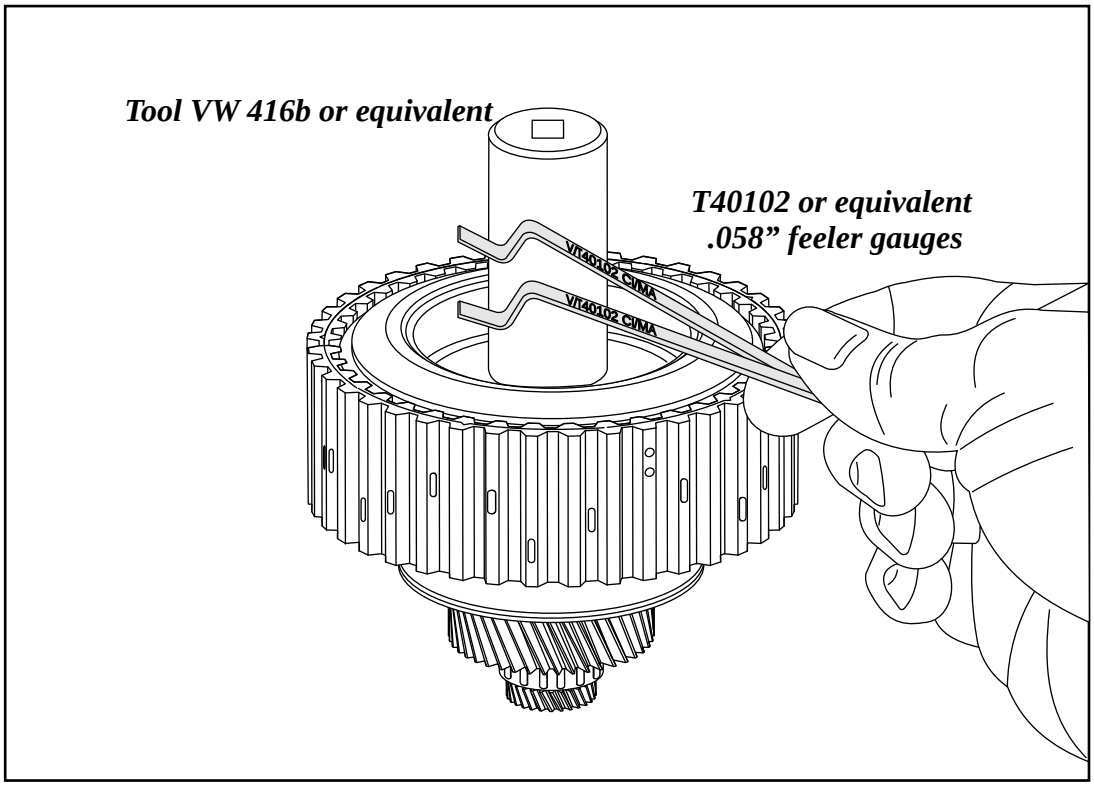
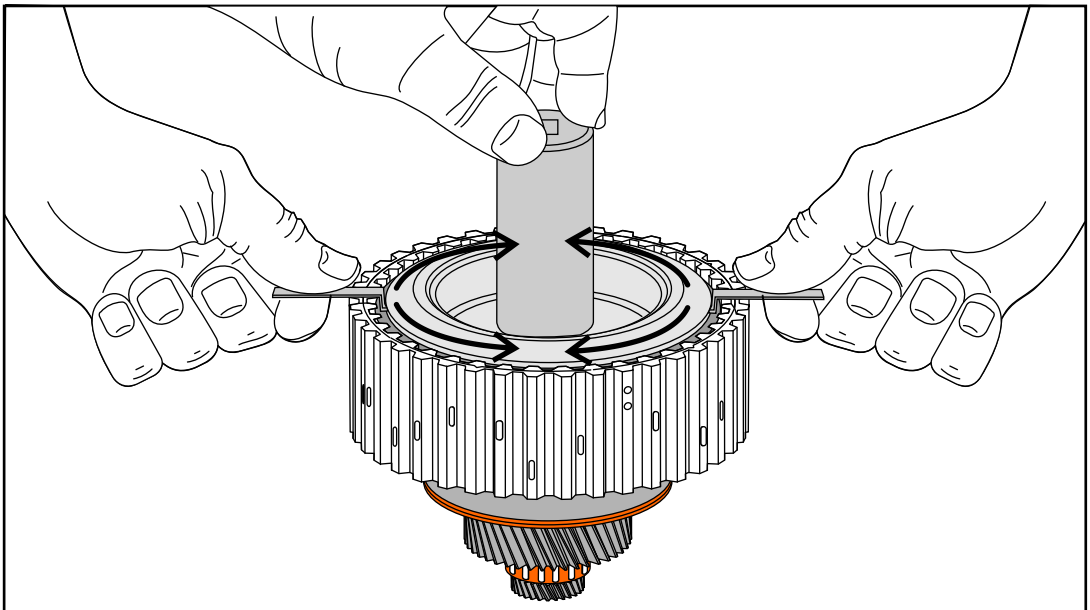


Figure 9





With an assistant providing pressure to center top tool, use the .058" feeler gauges in a half circular motion with each hand to ensure a full 360° even clearance.

Figure 10

RatioTek

Raybestos

Precision Intl.

Lubegard