

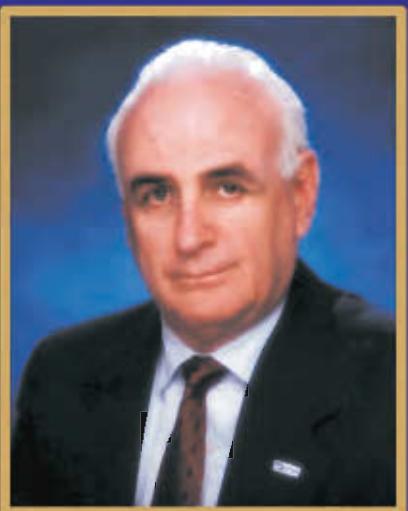
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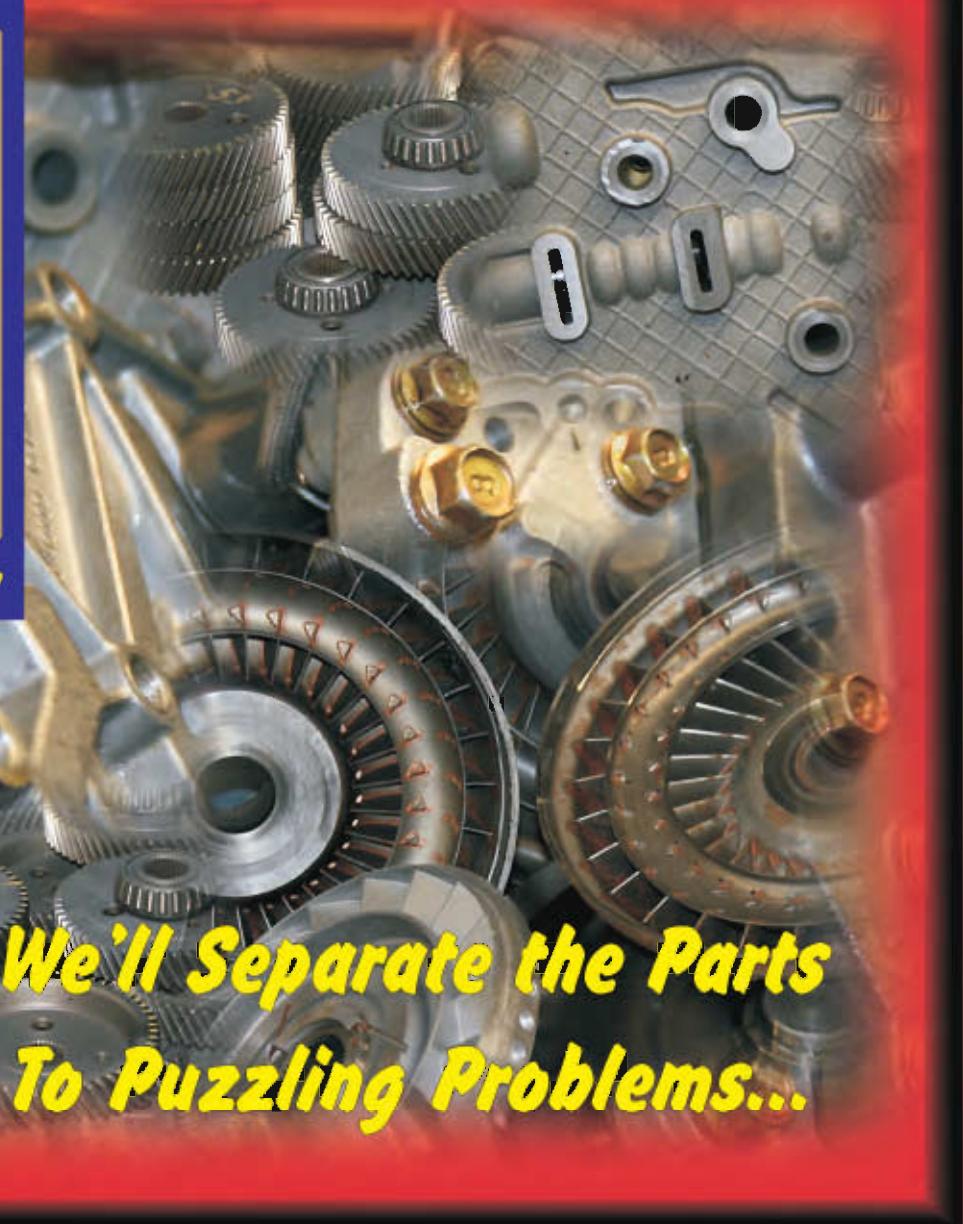
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Robert D Cherrnay



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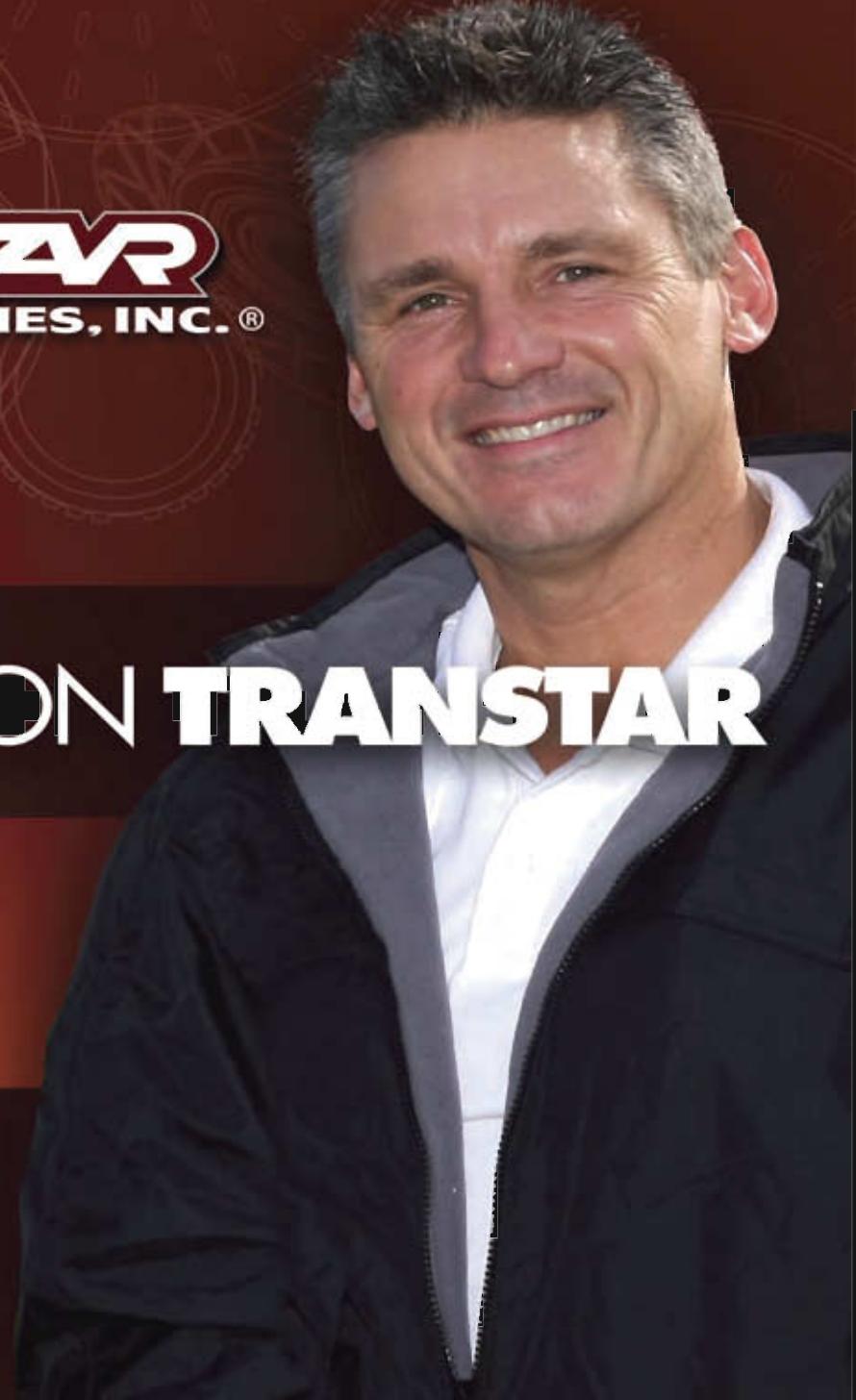


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ATSG Seminars

During the years that Bob Cherrnay conducted seminars, he had the opportunity to be acquainted with numerous people in the industry. He met Bob Wehr from Aaron's Transmissions where he also met Dale England. When Bob started ATSG in 1985, he asked Dale England to join him. Dale brought to ATSG tremendous skills in writing and illustrating technical material. They both had contacts to the manufacturers which provided up to date information making ATSG a leader in a technical information source for the aftermarket. In 1986 Bob and Dale started subscribing members to the technical hotline service of ATSG. The response was enormous and ATSG still retains many of the shops today. Bob also published articles in Transmission Digest from the magazines very beginning and soon after became the technical editor until his retirement in 2002. Eight years later we continue to keep his legacy alive going into ATSG's 25th year of business and we are stronger than ever by getting better each year.

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<ul style="list-style-type: none"> • TCC apply/release problems • Converter codes • Burned converters 	2. Lockup Control Plunger Valve & Sleeve Kit <small>(This kit also fits Toyota U140E/F, U240E & U241E Valve Body)</small>		57917E-03K*
<ul style="list-style-type: none"> • Harsh/flare upshifts • TCC slip or RPM cycling • Loss of cooler flow/overheating 	3. Solenoid Modulator Valve Kit	F-27741-TL13 & VB-FIX	27741-13K
<ul style="list-style-type: none"> • Burned B2 brake/clutch • Delayed reverse • Loss of engine braking in manual low 	4. B2 Apply Control Plunger Kit		27741-06K
<ul style="list-style-type: none"> • Burned B1 brake/clutch • 2-3 or 4-3 bind-up condition • Harsh 1 through 4 maneuver shifts 	5. B1 Apply Control Plunger Kit		27741-04K
<ul style="list-style-type: none"> • Insufficient line rise in drive ranges • Higher than normal reverse pressures • Soft shifts 	6. Boost Valve Assembly		27741-01K
<ul style="list-style-type: none"> • Low/high line pressure • Soft and/or harsh shifts • Clutch and band failures 	7. Oversized Pressure Regulator Boost Valve Kit	F-57917E-TL8*	27741-08K



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FORD 5R110W TRANS RANGE SENSOR/ SPEED SENSOR FAULTS OR NO START

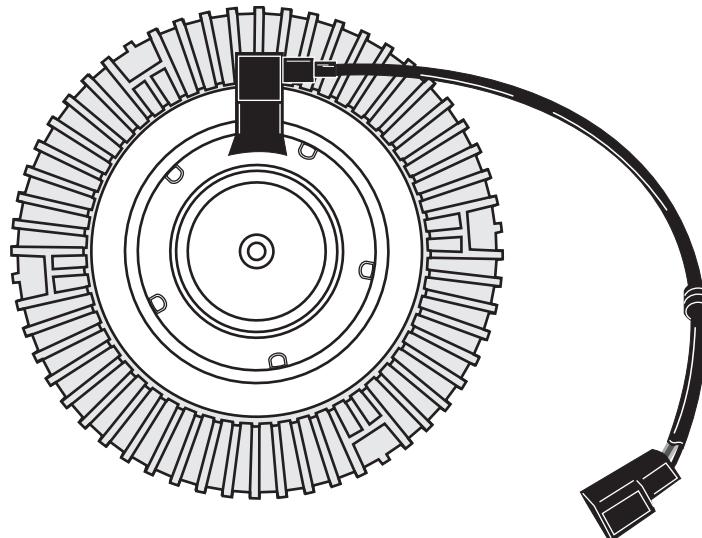
COMPLAINT: Ford Vehicles equipped with the 5R110W transmission, may exhibit a condition of numerous Diagnostic trouble codes set for the Transmission Range Sensor P0706,P708, P1705 or Speed sensor faults including, P0715 up to P0722, and or possibly a No Start condition.

CAUSE: The cause may be a shorted Electronic Fan Clutch speed sensor, as shown in Figure 1, drawing down the Reference Voltage to the Transmission Range Sensor and the Turbine and Output senors which are in-directly connected thru the PCM. This may cause these sensors to provide in-accurate information to the PCM, and of course a No Start situation if the Trans Range Sensor were not operating. Refer to Figure 2 for a connector identification for the PCM Connector "C" which is the connector that the Electronic Fan Clutch speed sensor is wired to, also shown in the partial schematic in Figure 3 . Terminal 46 is the Reference Voltage to the Speed Sensor which is housed inside of the Fan Clutch. Refer to Figure 5 and note that terminal 1 of the PCM connector "B" is the Reference Voltage for the Trans Range Sensor, Turbine, Intermediate and Output speed sensors, also shown in the partial schematic in Figure 6. These Circuits are connected internally in the PCM and if there is a short, it can affect the reference voltage to all.

CORRECTION: To correct this condition, locate the connector for the Electronic Fan Clutch, as shown in Figure 4 which is on the drivers side of the fan shroud, and simply dis-connect it. Clear all DTC's and re-drive the vehicle to verify if the codes reset, and or to see if the vehicle starts. If all is well, replace as necessary.

*Special thanks
to Jim Blatt
Lee Myles*

ELECTRONIC FAN CLUTCH



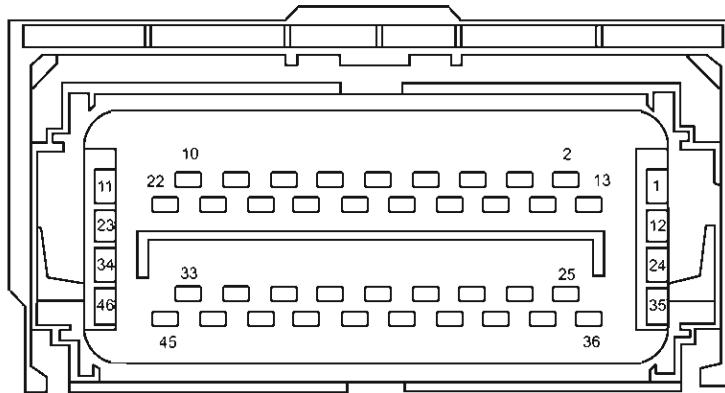
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Figure 1



FORD 5R110W TRANS RANGE SENSOR/ SPEED SENSOR FAULTS OR NO START

SR110W PCM CONNECTOR "C" PIN IDENTIFICATION AND FUNCTIONS



*View Looking Into
Face Side Of Vehicle
PCM Connector "C"*

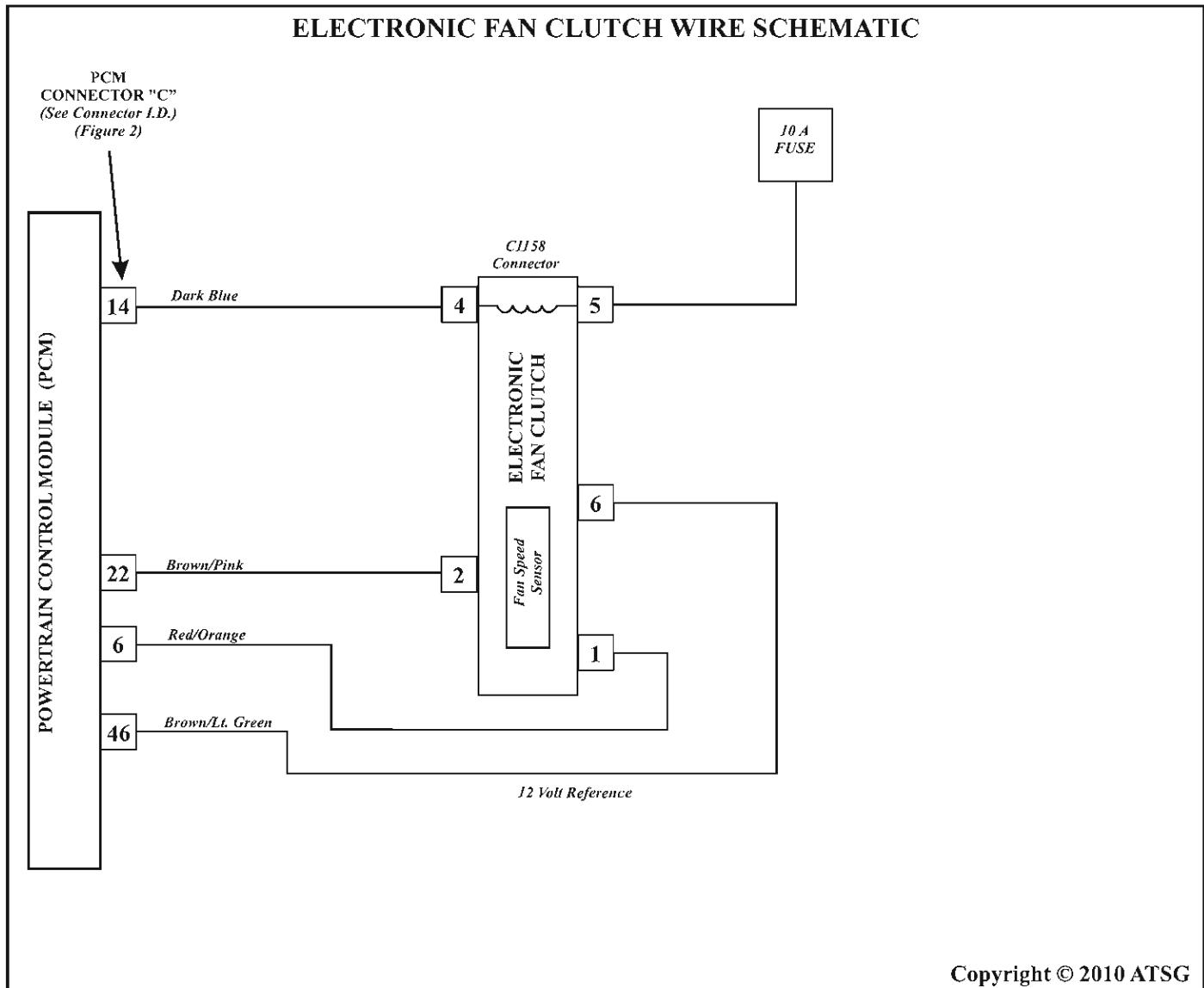
Pin	Wire Color	Circuit Function	Pin	Wire Color	Circuit Function
1	White/Yellow	Charge (ammeter/voltmeter) monitor	24	Yellow/White	Electronic Throttle Control motor +/-
2	Yellow/Red	Injection Pressure Regulator control	25	Gray/Red	Signal return
3	Violet/Orange	Glow Plug System, signal	26	Lt.Blue/White	CAN bus 2L
4	Red/White	Charge (ammeter) monitor- Generator secondary	27	Violet/Lt.Blue	Exhaust Back Pressure Signal
5		"Not Used"	28	Pink/Yellow	Injector Driver Module, Communication
6	Red/Orange	Electronic Fan Clutch signal	29	Dk Blue/Lt.Grn	Injector Control Pressure sensor, signal
7		"Not Used"	30	Dk Blue	Crankshaft position sensor +
8		"Not Used"	31	Red	Camshaft position sensor +
9		"Not Used"	32	Yellow/White	Coolant Temperature sensor, signal
10	Bk/Lt blue	Variable geometric turbo actuator, control	33	Lt.Blue/Orange	EGR valve actuator, position sense
11	Dark Blue	Variable geometric turbo actuator, common	34		"Not Used"
12	Gray/White	Electronic Throttle Control motor +/-	35		"Not Used"
13		"Not Used"	36	Brown/White	Reference Voltage
14	Dark Blue	Electronic Fan Clutch control	37	Red/Lt.Grn	CAN bus 2H
15		"Not Used"	38	Orange/LtBlue	EGR throttle position sensor, monitor
16		"Not Used"	39		"Not Used"
17	White/Lt Green	Glow Plug Control Module, signal	40		"Not Used"
18		"Not Used"	41	Gray	Crankshaft Position Sensor
19	Lt Green/Yellow	Injector Driver Module, fuel delivery command	42	Black	Ground, Drain wire
20	Dk Blue/Orange	Injector Driver Module, cylinder identification	43	Orange	Camshaft Position Sensor
21		"Not Used"	44	Lt.Green/Red	Engine Oil Temp. Sensor
22	Brown/Pink	Engine Cooling fan ground	45	Red/White	Air Charge Temp. Sensor
23	White/Pink	EGR valve actuator, control	46	Brown/Lt.Green	12 V Reference Voltage Electronic Fan Clutch

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Figure 2



FORD 5R110W TRANS RANGE SENSOR/ SPEED SENSOR FAULTS OR NO START



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Figure 3

FORD 5R110W TRANS RANGE SENSOR/ SPEED SENSOR FAULTS OR NO START

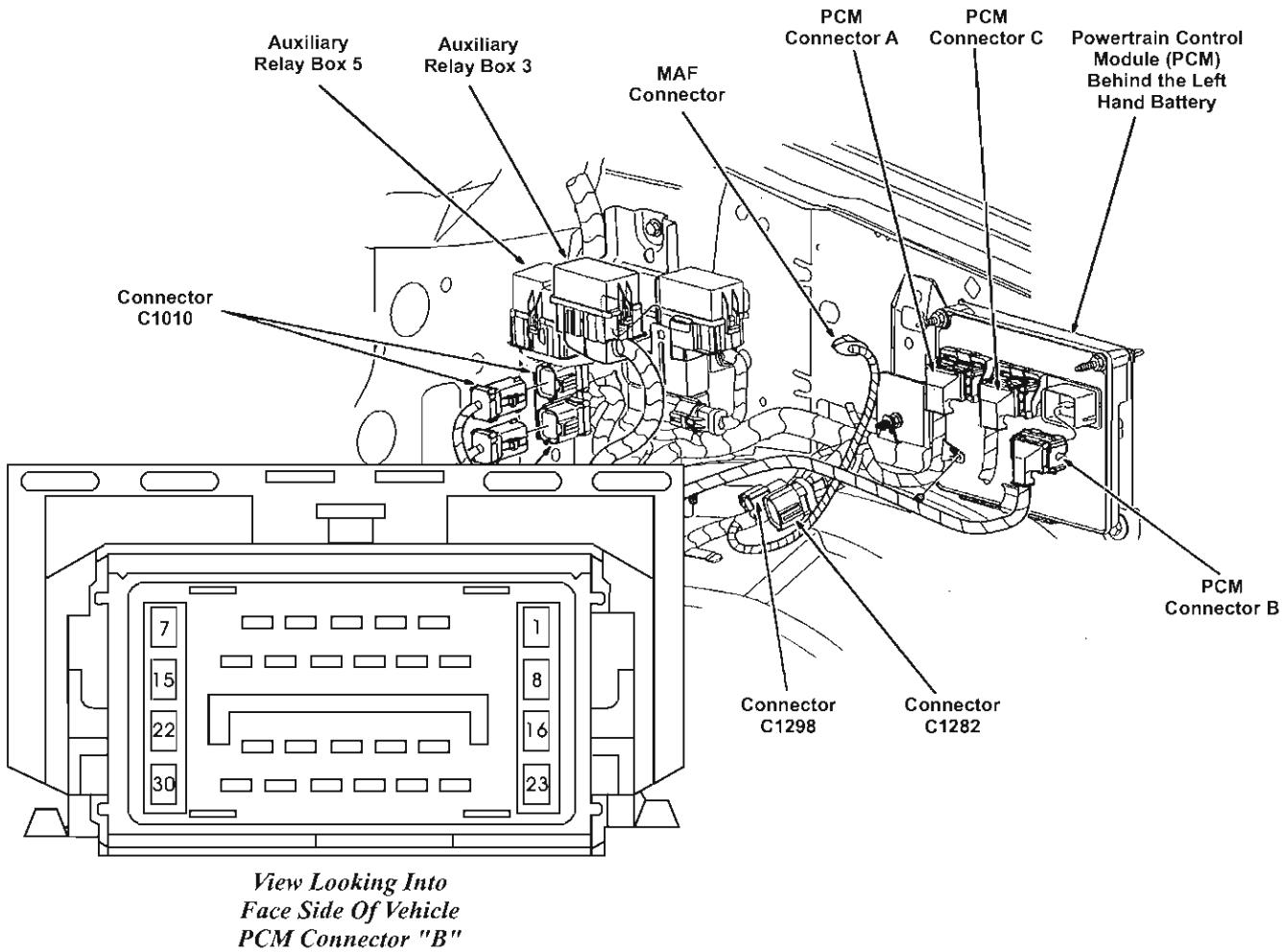
ELECTRONIC FAN CLUTCH CONNECTOR



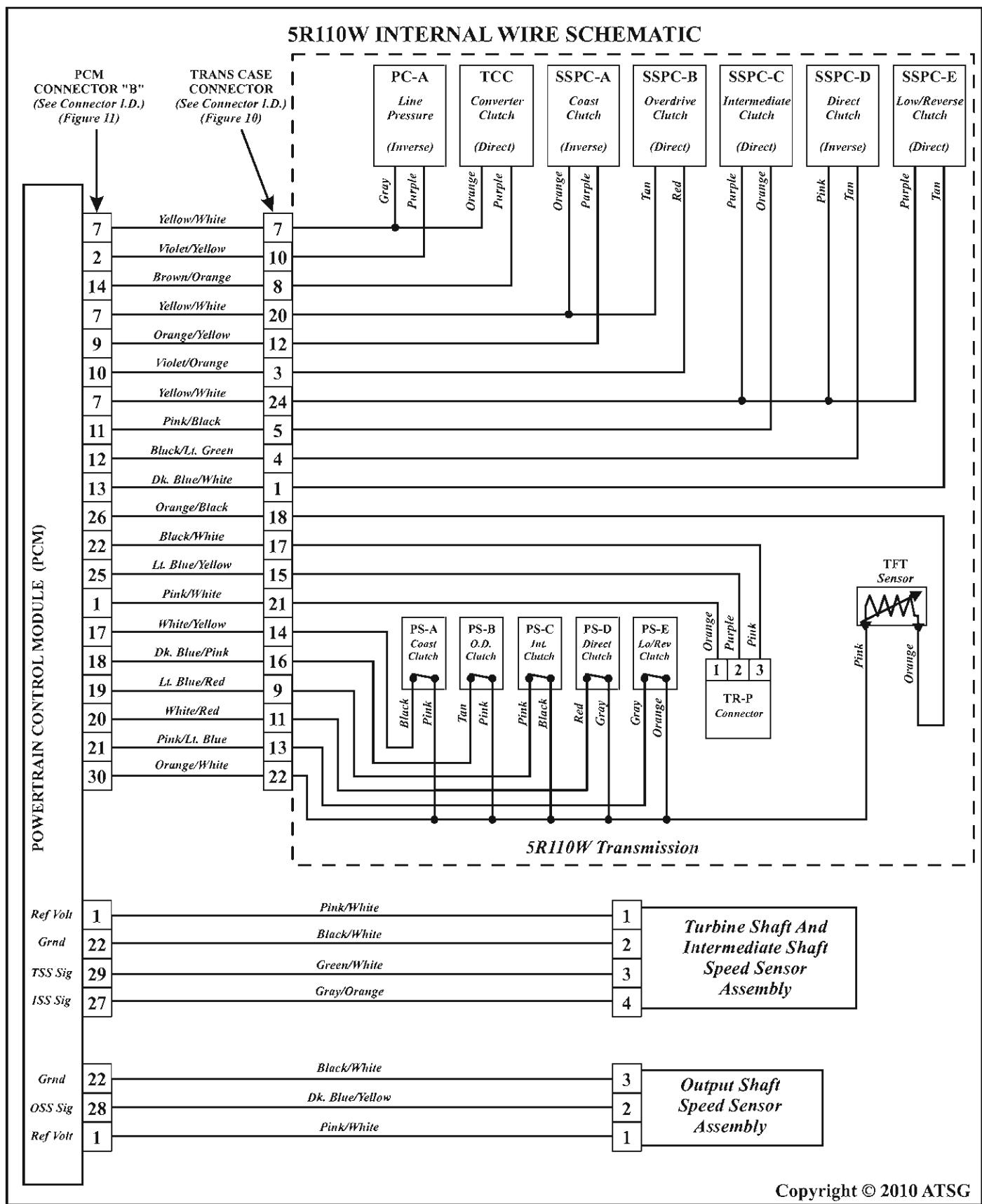
Dis-connect this connector to see if the symptoms go away

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Figure 4

**SR110W PCM CONNECTOR "B" PIN IDENTIFICATION AND FUNCTIONS
AND PCM LOCATION**

Pin	Wire Color	Circuit Function	Pin	Wire Color	Circuit Function
1	Pink/White	12V Reference Voltage, Speed Sensors and TRP	16		"Not Used"
2	Violet/Yellow	PC-A Pressure Control Solenoid Ground	17	White/Yellow	PS-A Pressure Switch "A" Signal
3	Yellow/Lt Green	Reverse Lamp Relay, Control	18	Dk Blue/Pink	PS-B Pressure Switch "B" Signal
4	Red/White	Transfer Case Neutral Signal	19	Lt Blue/Red	PS-C Pressure Switch "C" Signal
5	White/Lt Green	TCIL, Control (Tow/Haul)	20	White/Red	PS-D Pressure Switch "D" Signal
6		"Not Used"	21	Pink/Lt Blue	PS-E Pressure Switch "E" Signal
7	Yellow/White	12V Power to Solenoids	22	Black/White	Both Speed Sensors and TR-P 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	Green/White	TSS Turbine Shaft Speed Sensor Signal
15		"Not Used"	30	Orange/White	Pressure Switch And TFT Sensor Ground



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Figure 6

CHRYSLER 42RLE OUTPUT SHAFT REMOVAL

COMPLAINT: When separating the output shaft from the rear carrier, in many cases, the output shaft retaining C-clip is destroyed due to the force required to remove the output shaft from the rear carrier.

CAUSE: The output shaft C-clip snaps into a groove inside the output shaft, (Refer to Figure 1), when the rear carrier stub shaft is splined into the output shaft the C-clip which is in a groove of its own on the carrier, (See Figure 2), snaps into place in the output shaft groove and is locked in place.

Due to burrs on the splines or debris buildup in the carrier groove under the C-clip, the C-clip may not collapse enough to allow the output shaft groove to clear the C-clip and will get stuck. The force required to remove the output shaft under these conditions damages the C-clip which results in additional force which will now require replacement of the C-clip.

CORRECTION: Removal of the output shaft should be accomplished with the use of a slide hammer with a 3/8 x 16 (10 x 1.5mm) bolt on the end of it and screwed into the threaded hole in the end of the output shaft. This is not a guarantee that the C-clip will survive, however, there is a good chance it will. In the event the C-clip is damaged, the dimensions are .135" thick by 1.095"OD or the O.E. part number can be found below under service information.

SERVICE INFORMATION:

42RLE Output Shaft Retaining C-Clip..... 52852916AA

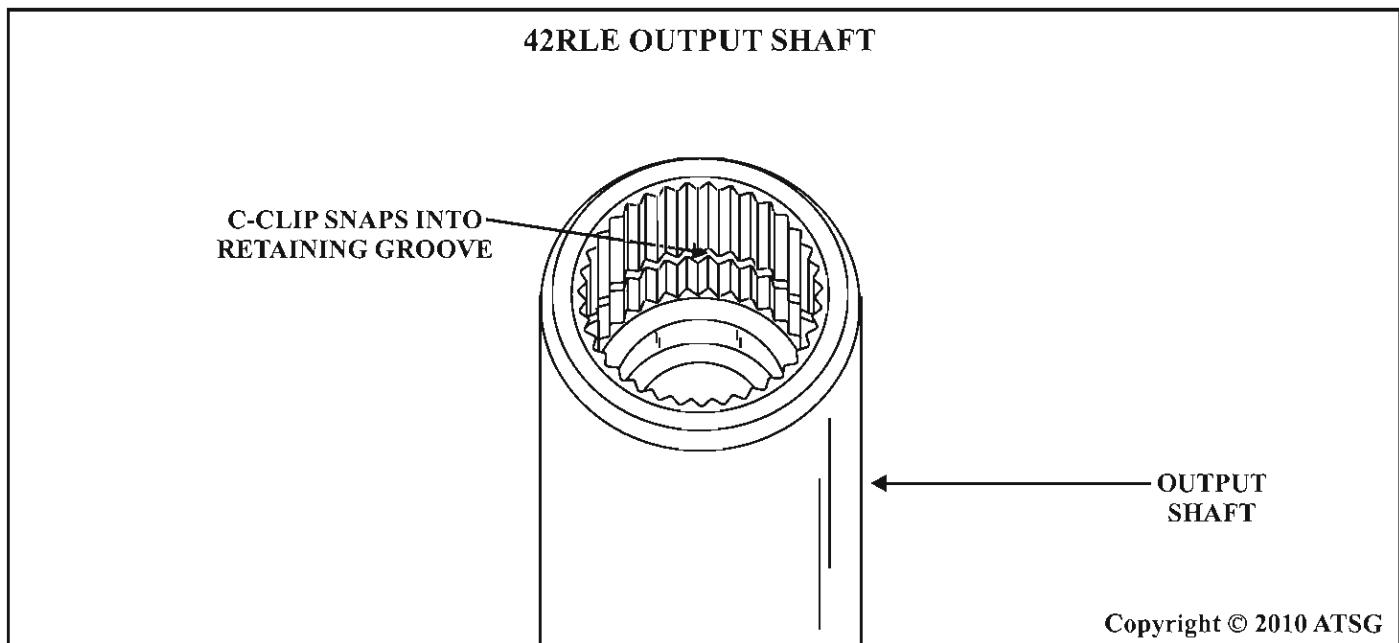
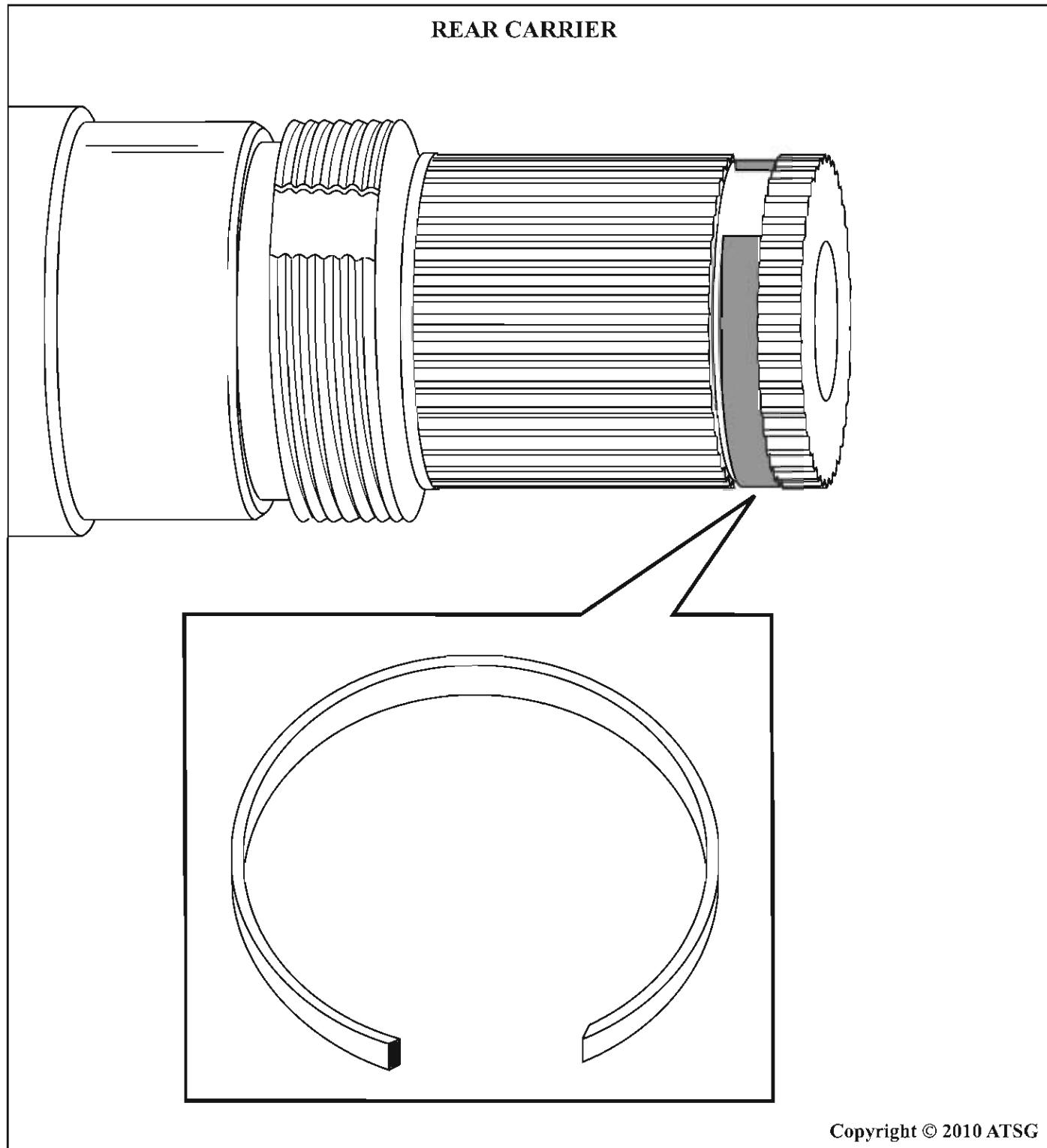


Figure 1



CHRYSLER 42RLE OUTPUT SHAFT REMOVAL



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Figure 2

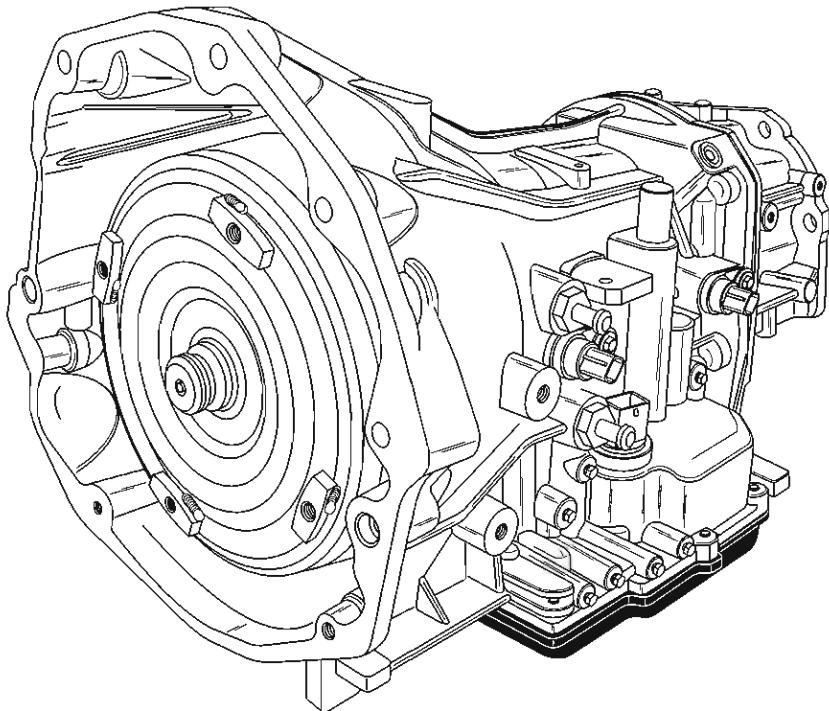
CHRYSLER/DODGE/JEEP 42RLE DTC P0740 TCC SLIP

COMPLAINT: Chrysler, Dodge or Jeep vehicles equipped with the 42RLE, as shown in Figure 1, may exhibit a complaint of a Diagnostic Trouble Code P0740, Torque Converter Clutch Slip, when hot. This could be before or after overhaul.

CAUSE: The cause may be, a worn pump causing low pump volume when hot. These transmissions are equipped with the "Dual Cycloidal" pump from the factory, and as time goes by and the miles increase the pump gears wear slightly causing the low capacity. The previous design pump was much more forgiving, as you could re-use it, with a small amount of wear, without problems. To verify that the problem is related to low pump volume, refer to Figure 2 for pressure port locations and specs, and check pressure at idle on the Low Reverse and the Underdrive pressure taps at idle, pressures should stay the same cold to hot.

CORRECTION: Replace the Cycloidal pump with a new pump assembly available from aftermarket sources or simply use an earlier design 41TE/604 pump body and gears, as shown in Figure 3 on the 42RLE stator, and re-verify pressures.

CHRYSLER/DODGE/JEEP 42RLE

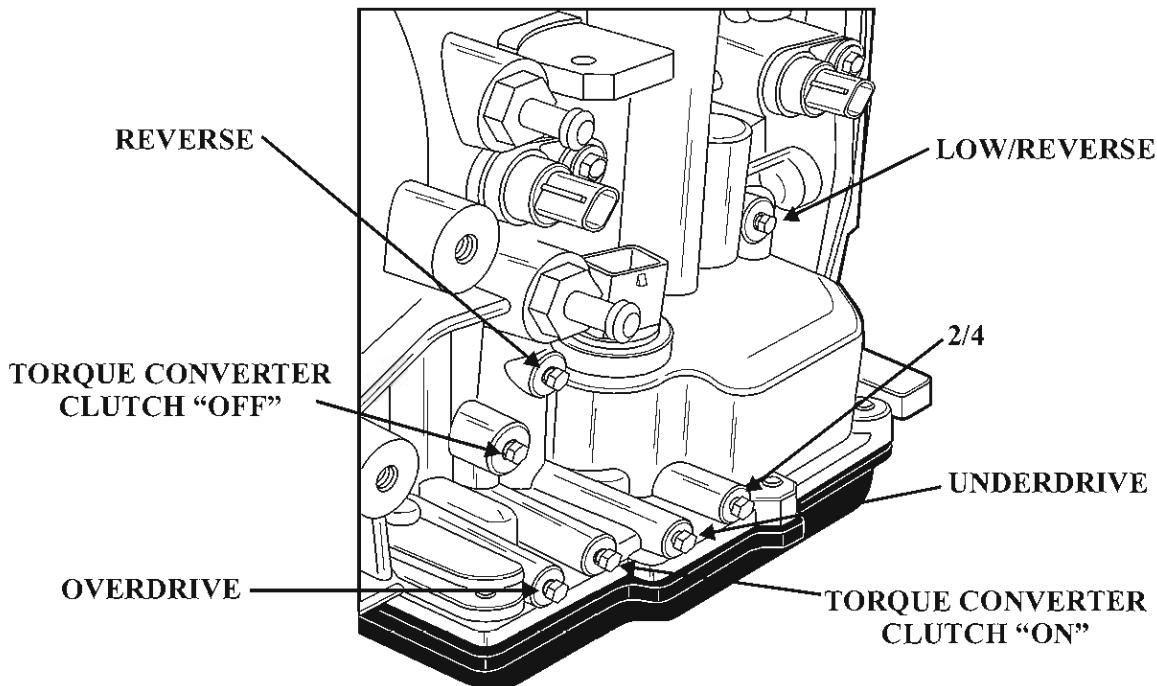


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Figure 1

CHRYSLER/DODGE/JEEP 42RLE DTC P0740 TCC SLIP

CLUTCH PRESSURE AND PRESSURE PORT IDENTIFICATION



42RLE CLUTCH PRESSURE CHART

GEAR SELECTOR POSITION	ACTUAL GEAR	UNDERDRIVE CLUTCH	OVERDRIVE CLUTCH	REVERSE CLUTCH	TORQUE CONVERTER CLUTCH "OFF"	TORQUE CONVERTER CLUTCH "ON"	2/4 CLUTCH	LOW/REVERSE CLUTCH
PARK 0 MPH	PARK	0 - 2	0 - 5	0 - 2	60 - 110	45 - 100	0 - 2	115 - 145
REVERSE 0 MPH	REVERSE	0 - 2	0 - 7	165 - 235	50 - 110	35 - 85	0 - 2	165 - 235
NEUTRAL 0 MPH	NEUTRAL	0 - 2	0 - 5	0 - 2	60 - 110	45 - 100	0 - 2	115 - 145
LOW 20 MPH	FIRST	110 - 145	0 - 5	0 - 2	60 - 110	45 - 100	0 - 2	115 - 145
3 30 MPH	SECOND	110 - 145	0 - 5	0 - 2	60 - 110	45 - 100	115 - 145	0 - 2
3 45 MPH	THIRD	75 - 95	75 - 95	0 - 2	60 - 90	45 - 80	0 - 2	0 - 2
OD 30 MPH	FOURTH	0 - 2	75 - 95	0 - 2	60 - 90	45 - 80	75 - 95	0 - 2
OD 50 MPH	FOURTH WITH TCC	0 - 2	75 - 95	0 - 2	0 - 5	60 - 95	75 - 95	0 - 2

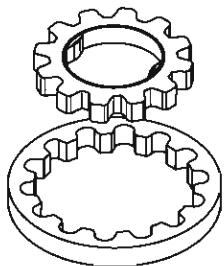
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Figure 2

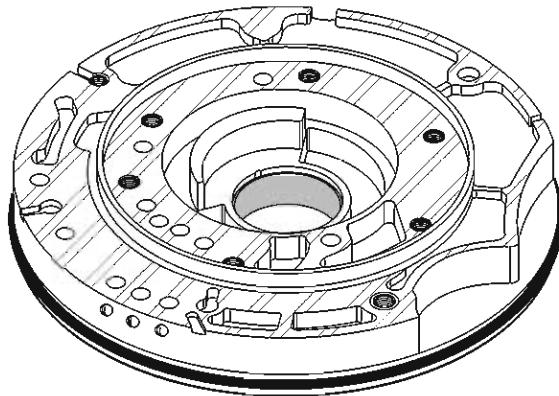
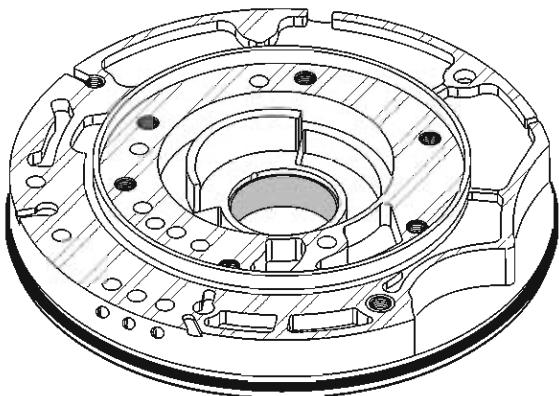
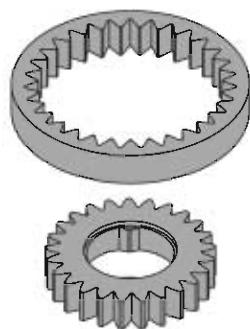
CHRYSLER/DODGE/JEEP 42RLE DTC P0740 TCC SLIP

PUMP BODY

Dual Cycloidal



*Previous Design
41TE/604*



Bolt the previous design pump body and gears on the 42RLE stator

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Figure 3



45/545RFE NO REVERSE

COMPLAINT: After overhaul, a no reverse condition exists, all forward gears are good. Engagement may be felt due to the reverse clutch applying, but there is no rearward movement.

CAUSE: When performing the valve body repair part of the overhaul process, the accumulator cover plate was removed to service the accumulators. Behind the cover plate is the Low/Reverse Switch Valve and bore plug, (See Figure 1). The only thing that keeps this valve from falling out is the cover plate, there is no other valve retainer.

The valve falls out unnoticed and rolls away and the transmission is assembled without the valve. When installation is complete and the shift lever is placed into the reverse position, the vehicle does not back up.

As shown in the hydraulic schematic in Figure 2, the Low/Reverse Switch Valve allows oil from the manual valve into the Low/Reverse clutch circuit to apply the Low/Reverse clutch which, along with the Reverse clutch provides the reverse gear.

When the valve is left out, instead of oil being routed to the Low/Reverse Clutch, the oil will exhaust out through various passages resulting in the failure of the Low/Reverse clutch to apply as shown in the hydraulic schematic in Figure 3.

CORRECTION: Make certain when installing the accumulator cover plate back onto the valve body, that the Low/Reverse Switch Valve is in place. The valve can go in either direction but the bore plug can only go in one way, with the flange facing out.

Mazda GF4A-EL/4EAT GE Lock-up, EPC, PWM
 Ford/Mazda 4F27E On/off Shift Solenoid 2000-on OE
Chrysler 42RLE OSS, 2003-on
 GM 5L40E Shift 1-2, 2-3 & 4-5 solenoid 1999-on
 Toyota A245/246 Lock-up Solenoid - OE Design
 Ford AXODE MCCG T4.5 ohm 1997-on OE solenoid
 GM 350/400 modulator adjustable red
 VW/Audi Universal Internal Harness 096(01M)/097(01N)
 GM 4T80E Pressure Switch Manifold
Toyota U340E, U341E/F
 Toyota A245E, A246E, A247E SLT EPC Solenoid
 Toyota A240/340 On/off Shift (4 per) solenoid
Ford 5R110W Internal Wire Harness
 GM 4L60E Anti-bleed Lock-up 1993-on with Quick Link Connectors
Toyota U150, 151 SS3, SR 2002-on Shift #3 Position
 Ford 5R55E Input Case Sensor 1997-on
 500/518 SE Dual Solenoid and harness 1999-on
Chrysler A604, A606 Output Sensor
 Jatco/Mazda modulator adjustable none
 Toyota A240 On/off Overdrive
 PWM 1987-97
Ford AXODE On/off shift
 VW JF506E/09A 2-4 Brake Timing 1999-on
 GM 4T80E Output Speed Sensor 1993-on (No Harness) OE
Toyota A245/246 Lock-up Solenoid
 Toyota A140 On/off Shift 1
 Ford 4V70W Internal Wire Track 1999-on
 GM 4T60E Internal Wire Harness 1991-95 TCC/PWM
 Chrysler A604, A606 Input Sensor
 Ford 5R110W TCC, Intermediate, Overdrive & Low Reverse (4 per) OE
 Toyota U340E, SLT, EPC solenoid
 Inductive Signal 1997-on OE
 VW 095/096/097 Shift Solenoid OE
 Toyota A140/240/340 2 pc. Shift Solenoid Kit
 GM 350/400 modulator adjustable dual red
Chrysler A500/518 Governor Pres. Sensor 2000-on
 GM TH400 VSS 1985-on OE
 Mitsubishi On/off Shift B (all models)
 U140E/F, U200E/F Shift 1
 Chrysler A500/518 Governor Pressure Solenoid
 solenoid Block (Non-PWM) 95-on OE
Chrysler A604/606 Speed Sensor Re-
 Mazda GF4A-EL/4EAT GE Lock-up Control
 Mitsubishi Solenoid Master Kit (KM) 3 ohm Lock-up 1987-98 on
 GM 4T60E Universal External Repair Harness 1991-on
 GM 4L30E PWM Band Control Solenoid 90-99 OE on L/U
 GM 4L80E Internal Harness 2004-on OE
 Ford 4R70R Shift Solenoid 1995-on OE
Mazda F4A-EL/ 4EAT-F (F4E-III)
 Toyota A541E On/off Shift
 GM 4L80E Pressure Switch Manifold
 Toyota A240E Lock-up 1987-99
 GM 4L60E On/off Shift solenoid A & B
Differential Mounted Speed Sensor 1990-on
 Allison LCT Internal Harness
 Ford E4OD solenoid External Repair Harness
GM 4T40E VSS 1995-on OE
Ford 4R100 Solenoid Block (PWM) 98-on OE
GM 4L60E Internal Wire Harness w/ Anti-bleed LU Sol. 1993-2002
GM 2-pin VSS External Repair Harness
VW JF506E09A Low Timing / Low Clutch solenoid 1999-on
Volvo w/ GM 4T65E Input VSS 1999-on OE
GM 4L65/70/75E Internal Harness w/ LU Sol. (Internal Sensor Design) 2006-07
Chrysler A500 Overdrive & TCC Dual solenoid
Chrysler A500/518 Dual Solenoid and harness 1993-99
GM 4T40E Pressure Switch Man
VW JF506E/09A Shift A 1999-on
Volvo specific A341E / 30-43LE LU Solenoid On/off
GM 4L80E Input & Output Speed Sensor
GM 4L60E Internal Wire Harness w/ LU Solenoid
Mazda JF506E Neutral Shift Control solenoid
Allison modulator adjustable white
GM 4T40F & 4T65F Shift solenoid A & B
Ford AX4N EPC 95-on solenoid OE
Allison modula

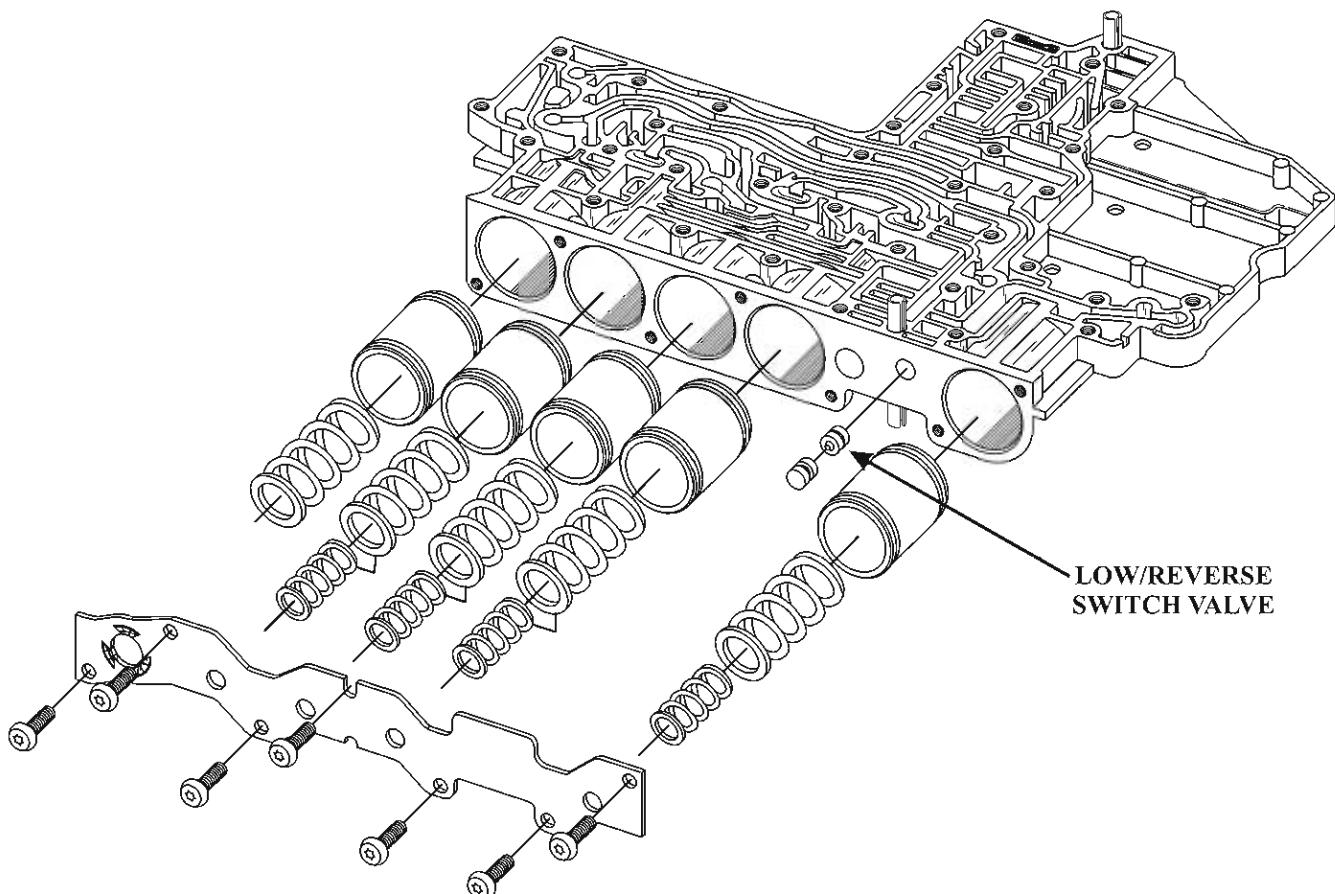


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**45/545RFE
NO REVERSE****MAIN VALVE BODY**

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Figure 1

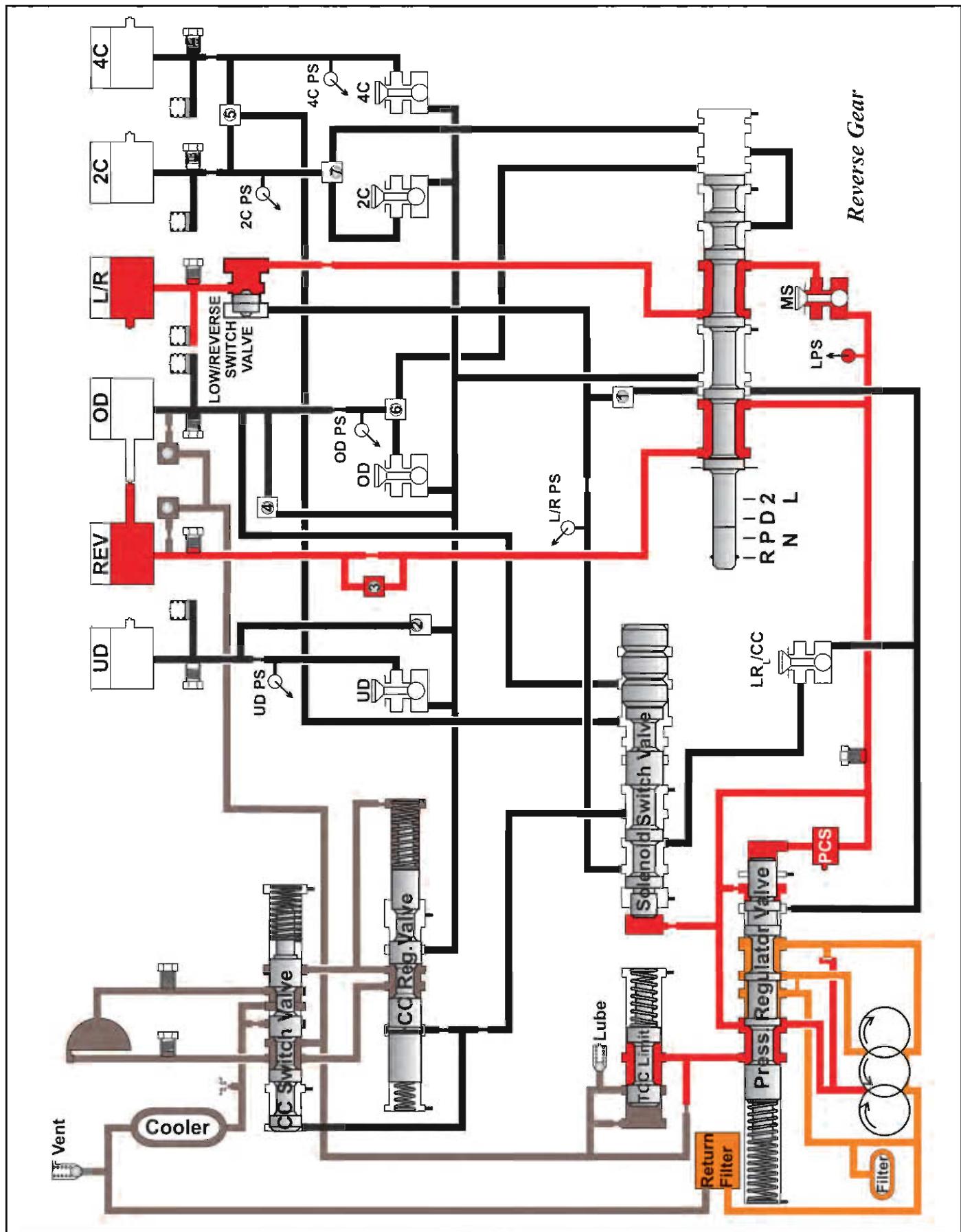


Figure 1

Automatic Transmission Service Group

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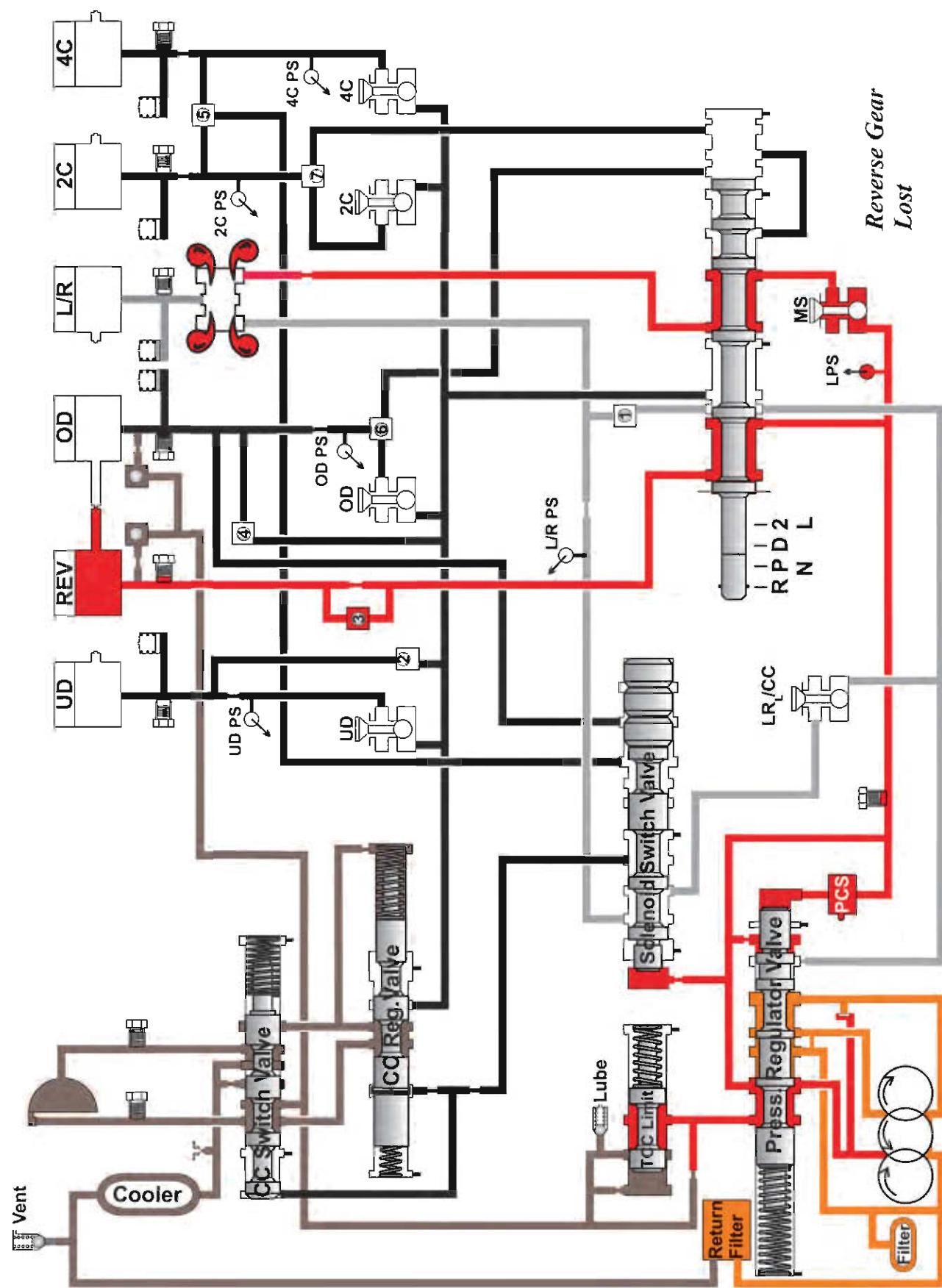


Figure 3

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Automatic Transmission Service Group



CHRYSLER/DODGE/JEEP NEW GENERATION COMPUTER (NGC) TERMINAL ID

CHANGE: The Powertrain Control Module (PCM) has changed to what is now called the New Generation Computer (NGC).

REASON: A cost effective savings due to the elimination of wiring and connectors as well as a lesser amount of computer hardware.

PARTS AFFECTED:

The Powertrain Control Module (PCM) and the Transmission Control Module (TCM) have been incorporated into one computer eliminating a stand alone TCM..

The NGC has four connectors with 38 pins each and serves to control both engine management as well as all electronic transmission operations.

INTERCHANGEABILITY:

There is no interchangeability between the NGC and any previous design level computers.

NOTE (1): Your vehicle may not have all the terminal functions shown in the charts, all possibilities are indicated in the event your vehicle has that circuit.

NOTE (2): The terminal identifications in this bulletin do not reflect any engine management functions unless they directly relate to or affect transmission operation.

SERVICE INFORMATION:

Refer to Figure 1 for NGC Connector Identification.

Refer to Figures 2 and 3 For 45/545RFE Terminal Identification.

Refer to Figures 4 and 5 For 68RFE Terminal Identification.

Refer to Figures 6 and 7 For 41TE/42LE Terminal Identification.

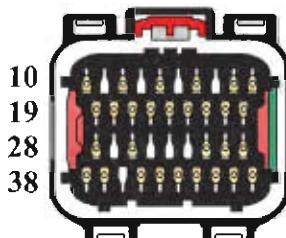
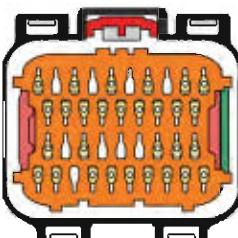
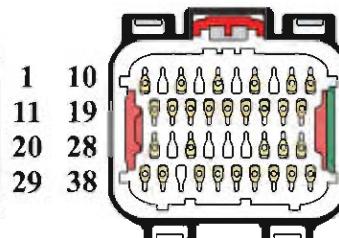
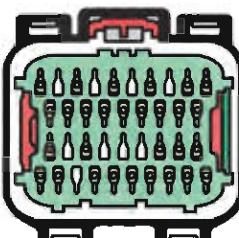
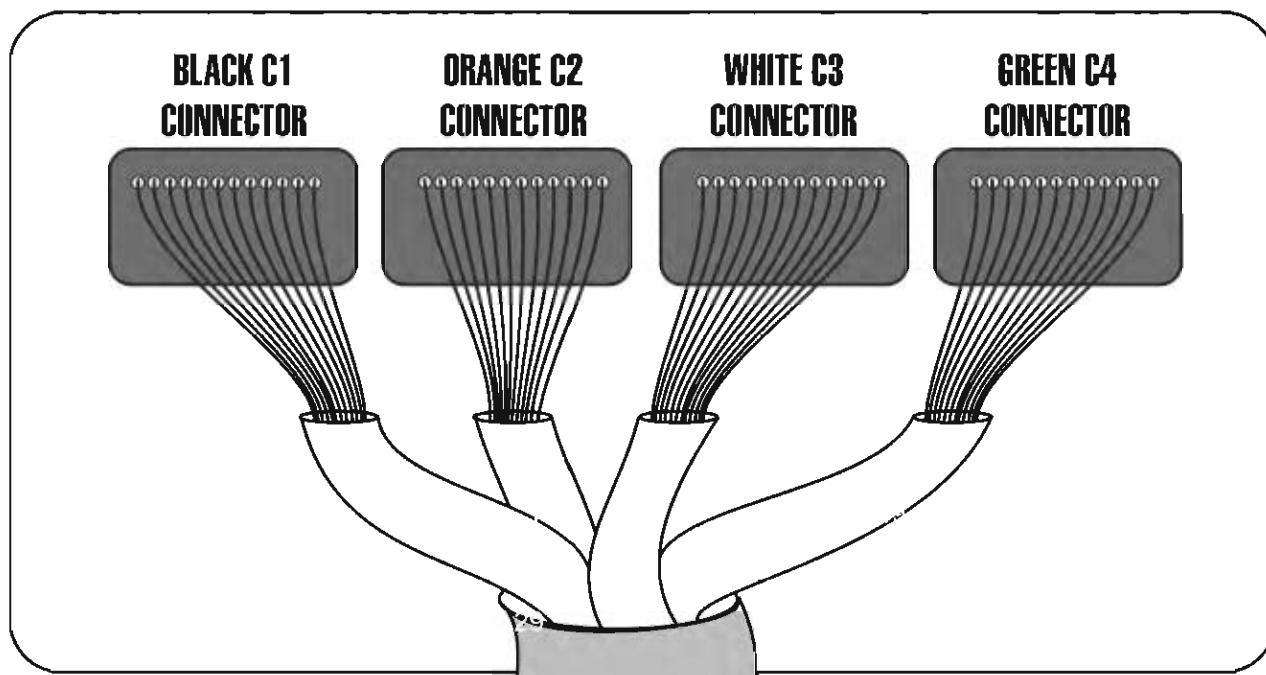
Refer to Figures 8 and 9 For 41TES/42RLE/42RLE VLP Terminal Identification.

Refer to Figures 10 and 11 For 62TE Terminal Identification.



NEW GENERATION COMPUTER TERMINAL ID

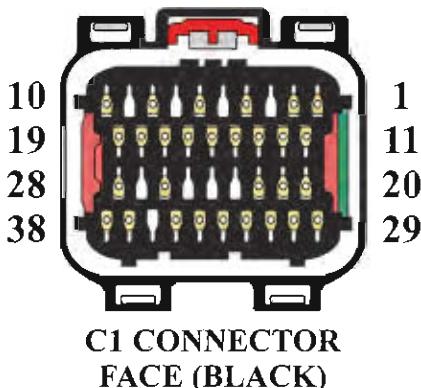
NGC CONNECTOR IDENTIFICATION

C1 CONNECTOR
FACE (BLACK)C2 CONNECTOR
FACE (ORANGE)C3 CONNECTOR
FACE (WHITE)C4 CONNECTOR
FACE (GREEN)CONNECTOR REMOVED
FROM COVERWIRE SIDE IS EXPOSED
FOR BACK PROBING

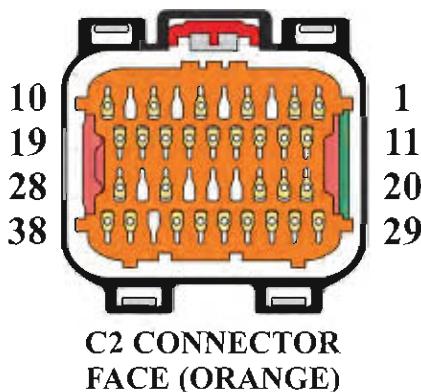


NEW GENERATION COMPUTER TERMINAL ID

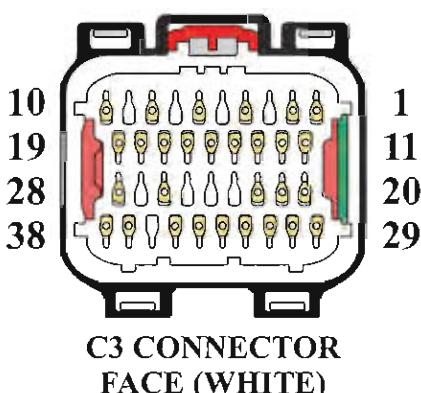
45RFE/545RFE



PIN CAVITY	TERMINAL FUNCTION
9	GROUND
11	FUSED IGNITION SWITCH OUTPUT (RUN-START)
12	FUSED ASD RELAY OUTPUT
18	GROUND
27	5 VOLT SUPPLY
29	FUSED B+ (HOT @ ALL TIMES)
30	FUSED IGNITION SWITCH OUTPUT (RUN)



PIN CAVITY	TERMINAL FUNCTION
15	TPS GROUND
20	ECT SIGNAL
21	TPS SIGNAL 1
27	SENSOR GROUND
28	TPS SIGNAL 2
29	SENSOR 5 VOLT SUPPLY



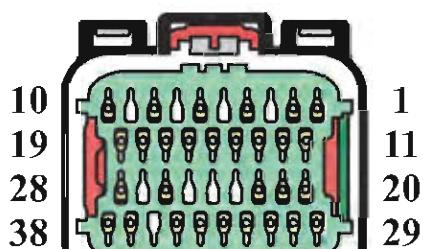
PIN CAVITY	TERMINAL FUNCTION
3, 18, 19	ASD RELAY OUTPUT
14	BRAKE SIGNAL 2
16	APP SENSOR GROUND 1
17	APP SENSOR GROUND 2
21	TRANSMISSION RANGE SENSOR (T41) SIGNAL
23	BRAKE SIGNAL 1
25	APP SENSOR SIGNAL 1
26	AUTOSTICK - UPSHIFT
27	AUTOSTICK - DOWNSHIFT
28	ASD RELAY OUTPUT
36	APP SENSOR SIGNAL 2
38	STARTER RELAY CONTROL

Figure 2



NEW GENERATION COMPUTER TERMINAL ID

45RFE/545RFE

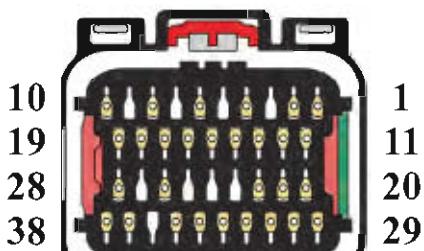
C4 CONNECTOR
FACE (GREEN)

PIN CAVITY	TERMINAL FUNCTION
1	OVERDRIVE CLUTCH SOLENOID CONTROL
2	4TH CLUTCH SOLENOID CONTROL
4	MULTI-SELECT SOLENOID CONTROL
6	2ND CLUTCH SOLENOID CONTROL
8	UNDERDRIVE CLUTCH SOLENOID CONTROL
10	LR/TC CLUTCH SOLENOID CONTROL
11	LINE PRESSURE CONTROL SOLENOID CONTROL
12	GROUND
13	GROUND
14	GROUND
15	TRANSMISSION RANGE SENSOR (T1) SENSE
16	TRANSMISSION RANGE SENSOR (T3) SENSE
17	OVERDRIVE OFF SWITCH SENSE
18	TRANSMISSION CONTROL RELAY CONTROL
19	TRANSMISSION CONTROL RELAY OUTPUT
20	4TH CLUTCH PRESSURE SWITCH SIGNAL
21	UNDERDRIVE CLUTCH PRESSURE SWITCH SIGNAL
22	OVERDRIVE CLUTCH PRESSURE SWITCH SIGNAL
26	TRANSMISSION RANGE SENSOR (T2) SIGNAL
28	TRANSMISSION CONTROL RELAY OUTPUT
29	LOW/REVERSE CLUTCH PRESSURE SWITCH SIGNAL
30	2ND CLUTCH PRESSURE SWITCH SIGNAL
31	LINE PRESSURE SENSOR SIGNAL
32	OUTPUT SPEED SENSOR SIGNAL
33	INPUT SPEED SENSOR SIGNAL
34	SPEED SENSOR GROUND
35	TRANSMISSION OIL TEMPERATURE SENSOR SIGNAL
37	TRANSMISSION RANGE SENSOR (T42) SIGNAL
38	TRANSMISSION CONTROL RELAY OUTPUT

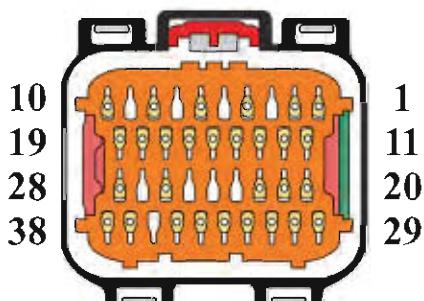


NEW GENERATION COMPUTER TERMINAL ID

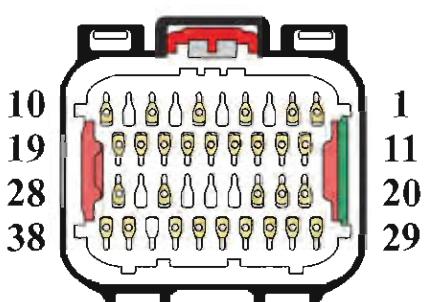
68RFE

C1 CONNECTOR
FACE (BLACK)

PIN CAVITY	TERMINAL FUNCTION
9	<i>GROUND</i>
10	<i>FUSED B+ (HOT @ ALL TIMES)</i>
11	<i>FUSED IGNITION SWITCH OUTPUT (RUN-START)</i>
12	<i>FUSED ASD RELAY OUTPUT</i>
18	<i>GROUND</i>
19	<i>GROUND</i>
27	<i>5 VOLT SUPPLY</i>
29	<i>FUSED B+ (HOT @ ALL TIMES)</i>
30	<i>FUSED IGNITION SWITCH OUTPUT (RUN)</i>
34	<i>CAN C BUS +</i>
35	<i>CAN C BUS -</i>

C2 CONNECTOR
FACE (ORANGE)

PIN CAVITY	TERMINAL FUNCTION
15	<i>TPS GROUND</i>
20	<i>ECT SIGNAL</i>
21	<i>TPS SIGNAL 1</i>
27	<i>SENSOR GROUND</i>
28	<i>TPS SIGNAL 2</i>
29	<i>SENSOR 5 VOLT SUPPLY</i>

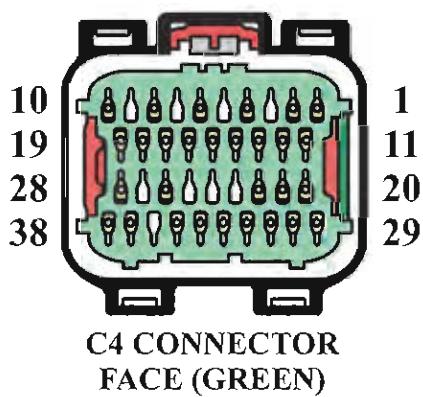
C3 CONNECTOR
FACE (WHITE)

PIN CAVITY	TERMINAL FUNCTION
3 & 19	<i>ASD RELAY OUTPUT</i>
14	<i>BRAKE SIGNAL 2</i>
16	<i>APP SENSOR GROUND 1</i>
17	<i>APP SENSOR GROUND 2</i>
21	<i>TRANSMISSION RANGE SENSOR (T41) SIGNAL</i>
22	<i>PTO SIGNAL</i>
23	<i>BRAKE SIGNAL 1</i>
25	<i>APP SENSOR SIGNAL 1</i>
28	<i>ASD RELAY OUTPUT</i>
36	<i>APP SENSOR SIGNAL 2</i>
38	<i>STARTER RELAY CONTROL</i>



NEW GENERATION COMPUTER TERMINAL ID

68RFE

C4 CONNECTOR
FACE (GREEN)

PIN CAVITY	TERMINAL FUNCTION
1	OVERDRIVE CLUTCH SOLENOID CONTROL
2	4TH CLUTCH SOLENOID CONTROL
4	MULTI-SELECT SOLENOID CONTROL
6	2ND CLUTCH SOLENOID CONTROL
8	UNDERDRIVE CLUTCH SOLENOID CONTROL
10	LR/TC CLUTCH SOLENOID CONTROL
11	LINE PRESSURE CONTROL SOLENOID CONTROL
12	GROUND
13	GROUND
14	GROUND
15	TRANSMISSION RANGE SENSOR (T1) SENSE
16	TRANSMISSION RANGE SENSOR (T3) SENSE
17	TOW HAUL SWITCH SENSE
18	TRANSMISSION CONTROL RELAY CONTROL
19	TRANSMISSION CONTROL RELAY OUTPUT
20	4TH CLUTCH PRESSURE SWITCH SIGNAL
21	UNDERDRIVE CLUTCH PRESSURE SWITCH SIGNAL
22	OVERDRIVE CLUTCH PRESSURE SWITCH SIGNAL
26	TRANSMISSION RANGE SENSOR (T2) SIGNAL
28	TRANSMISSION CONTROL RELAY OUTPUT
29	LOW/REVERSE CLUTCH PRESSURE SWITCH SIGNAL
30	2ND CLUTCH PRESSURE SWITCH SIGNAL
31	LINE PRESSURE SENSOR SIGNAL
32	OUTPUT SPEED SENSOR SIGNAL
33	INPUT SPEED SENSOR SIGNAL
34	SPEED SENSOR GROUND
35	TRANSMISSION OIL TEMPERATURE SENSOR SIGNAL
37	TRANSMISSION RANGE SENSOR (T42) SIGNAL
38	TRANSMISSION CONTROL RELAY OUTPUT

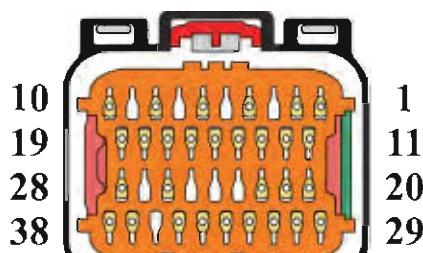


NEW GENERATION COMPUTER TERMINAL ID

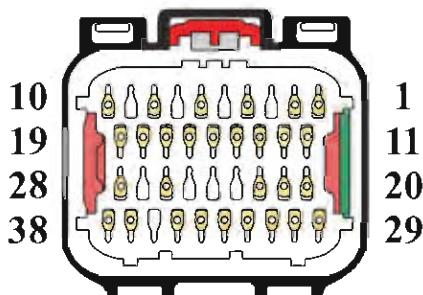
41TE/42LE

C1 CONNECTOR
FACE (BLACK)

PIN CAVITY	TERMINAL FUNCTION
9	GROUND
11	FUSED IGNITION SWITCH OUTPUT (RUN-START)
12	FRONT CONTROL MODULE (UNLOCK-RUN-START)
18	GROUND
25	SCI RECEIVE
26	FLASH ENABLE
27	5 VOLT SUPPLY
29	FUSED B+ (HOT AT ALL TIMES)
30	FUSED IGNITION SWITCH (START)
36	SCI TRANSMIT (PCM ENGINE)
37	SCI TRANSMIT (PCM TRANSMISSION)
38	PCI BUS

C2 CONNECTOR
FACE (ORANGE)

PIN CAVITY	TERMINAL FUNCTION
20	ECT SIGNAL
21	TPS SIGNAL
27	SENSOR GROUND
29	SENSOR 5 VOLT SUPPLY

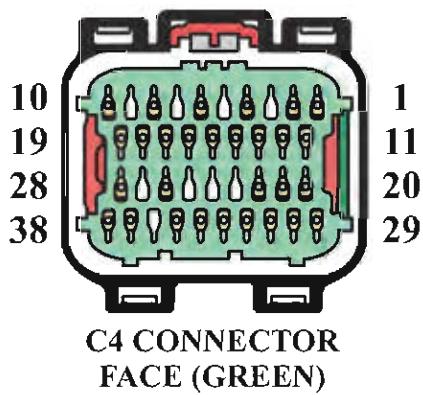
C3 CONNECTOR
FACE (WHITE)

PIN CAVITY	TERMINAL FUNCTION
3, 18, 19	ASD RELAY OUTPUT
23	BRAKE SWITCH
26	AUTOSTICK - UPSHIFT
27	AUTOSTICK - DOWNSHIFT
28	ASD RELAY OUTPUT



NEW GENERATION COMPUTER TERMINAL ID

41TE/42LE

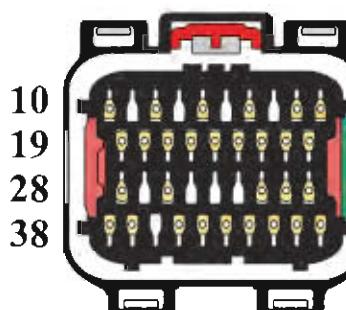
C4 CONNECTOR
FACE (GREEN)

PIN CAVITY	TERMINAL FUNCTION
10	OVERDRIVE CLUTCH SOLENOID CONTROL
19	UNDERDRIVE CLUTCH SOLENOID CONTROL
28	2-4 CLUTCH SOLENOID CONTROL
38	LR/TC CLUTCH SOLENOID CONTROL
1	GROUNd
11	GROUNd
20	GROUNd
29	GROUNd
15	TRANSMISSION RANGE SENSOR (T1) SENSE
16	TRANSMISSION RANGE SENSOR (T3) SENSE
18	TRANSMISSION CONTROL RELAY CONTROL
19	TRANSMISSION CONTROL RELAY OUTPUT
22	OVERDRIVE CLUTCH PRESSURE SWITCH SIGNAL
27	TRANSMISSION RANGE SENSOR (T41) SIGNAL
28	TRANSMISSION CONTROL RELAY OUTPUT
29	LOW/REVERSE CLUTCH PRESSURE SWITCH SIGNAL
30	2-4 CLUTCH PRESSURE SWITCH SIGNAL
32	OUTPUT SPEED SENSOR SIGNAL
33	INPUT SPEED SENSOR SIGNAL
34	INPUT/OUTPUT SPEED SENSOR GROUND
35	TRANSMISSION TEMPERATURE SIGNAL
37	TRANSMISSION RANGE SENSOR (T42) SIGNAL
38	TRANSMISSION CONTROL RELAY OUTPUT

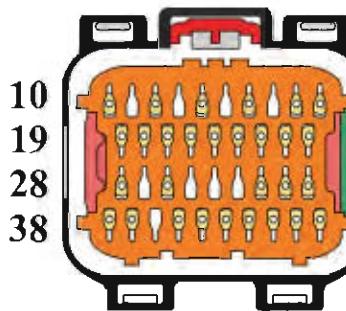


NEW GENERATION COMPUTER TERMINAL ID

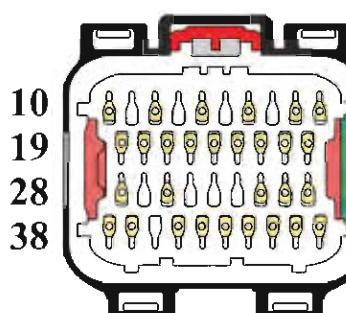
41TES/42RLE/42RLE VLP

C1 CONNECTOR
FACE (BLACK)

PIN CAVITY	TERMINAL FUNCTION
9	<i>GROUND</i>
11	<i>FUSED IGNITION SWITCH OUTPUT (RUN-START)</i>
12	<i>FUSED IGNITION SWITCH OUTPUT (OFF-RUN-START)</i>
18	<i>GROUND</i>
25	<i>SCI RECEIVE - PCM (ENGINE)</i>
26	<i>SCI RECEIVE - PCM (TRANSMISSION)</i>
27	<i>5 VOLT SUPPLY</i>
29	<i>FUSED B+ (HOT AT ALL TIMES)</i>
30	<i>FUSED IGNITION SWITCH (START)</i>
36	<i>SCI TRANSMIT (PCM ENGINE)</i>
37	<i>SCI TRANSMIT (PCM TRANSMISSION)</i>
38	<i>PCI BUS</i>

C2 CONNECTOR
FACE (ORANGE)

PIN CAVITY	TERMINAL FUNCTION
15	<i>TPS GROUND</i>
20	<i>ECT SIGNAL</i>
21	<i>TPS SIGNAL 1</i>
27	<i>SENSOR GROUND</i>
28	<i>TPS SIGNAL 2</i>
29	<i>SENSOR 5 VOLT SUPPLY</i>

C3 CONNECTOR
FACE (WHITE)

PIN CAVITY	TERMINAL FUNCTION
3, 18, 19	<i>ASD RELAY OUTPUT</i>
14	<i>BRAKE SIGNAL 2</i>
16	<i>APP SENSOR GROUND 1</i>
17	<i>APP SENSOR GROUND 2</i>
21	<i>TRANSMISSION RANGE SENSOR (T41) SIGNAL</i>
23	<i>BRAKE SIGNAL 1</i>
25	<i>APP SENSOR SIGNAL 1</i>
26	<i>AUTOSTICK - UPSHIFT</i>
27	<i>AUTOSTICK - DOWNSHIFT</i>
28	<i>ASD RELAY OUTPUT</i>
36	<i>APP SENSOR SIGNAL 2</i>
38	<i>STARTER RELAY CONTROL</i>

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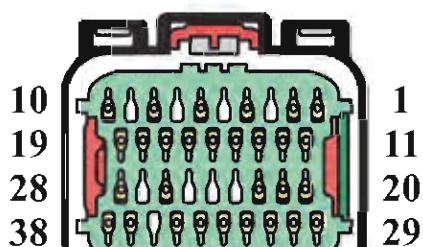
Figure 8

Automatic Transmission Service Group



NEW GENERATION COMPUTER TERMINAL ID

41TES/42RLE/42RLE VLP

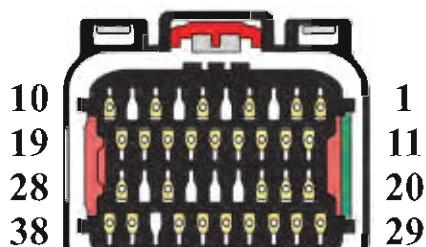
C4 CONNECTOR
FACE (GREEN)

PIN CAVITY	TERMINAL FUNCTION
1	OVERDRIVE CLUTCH SOLENOID CONTROL
2	UNDERDRIVE CLUTCH SOLENOID CONTROL
6	2-4 CLUTCH SOLENOID CONTROL
10	LR/TC CLUTCH SOLENOID CONTROL
11	PRESSURE CONTROL SOLENOID CONTROL
12	GROUND
13	GROUND
14	GROUND
15	TRANSMISSION RANGE SENSOR (T1) SENSE
16	TRANSMISSION RANGE SENSOR (T3) SENSE
17	OVERDRIVE OFF SWITCH
18	TRANSMISSION CONTROL RELAY CONTROL
19	TRANSMISSION CONTROL RELAY OUTPUT
22	OVERDRIVE CLUTCH PRESSURE SWITCH SIGNAL
27	TRANSMISSION RANGE SENSOR (T41) SIGNAL
28	TRANSMISSION CONTROL RELAY OUTPUT
29	LOW/REVERSE CLUTCH PRESSURE SWITCH SIGNAL
30	2-4 CLUTCH PRESSURE SWITCH SIGNAL
31	OUTPUT SPEED SENSOR SIGNAL
32	LINE PRESSURE SENSOR SIGNAL
33	INPUT SPEED SENSOR SIGNAL
34	INPUT/OUTPUT SPEED SENSOR GROUND
35	TRANSMISSION TEMPERATURE SIGNAL
37	TRANSMISSION RANGE SENSOR (T42) SIGNAL
38	TRANSMISSION CONTROL RELAY OUTPUT

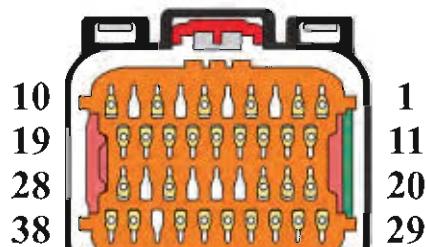


NEW GENERATION COMPUTER TERMINAL ID

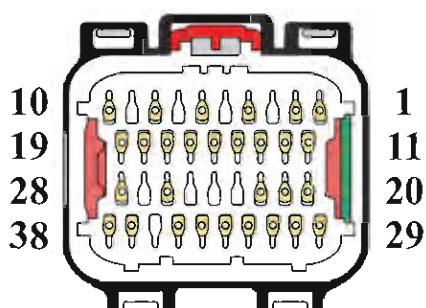
62TE

C1 CONNECTOR
FACE (BLACK)

PIN CAVITY	TERMINAL FUNCTION
9	<i>GROUND</i>
10	<i>FUSED B+ (HOT AT ALL TIMES)</i>
11	<i>FUSED IGNITION SWITCH OUTPUT (RUN-START)</i>
12	<i>FUSED IGNITION SWITCH OUTPUT (OFF-RUN-START)</i>
18	<i>GROUND</i>
19	<i>GROUND</i>
22	<i>EMCC VFS CONTROL (TCC)</i>
27	<i>5 VOLT SUPPLY</i>
29	<i>FUSED B+ (HOT AT ALL TIMES)</i>
30	<i>FUSED IGNITION SWITCH (START)</i>
34	<i>CAN BUS +</i>
35	<i>CAN BUS -</i>
38	<i>FUSED ASD RELAY OUT</i>

C2 CONNECTOR
FACE (ORANGE)

PIN CAVITY	TERMINAL FUNCTION
15	<i>TPS GROUND</i>
20	<i>ECT SIGNAL</i>
21	<i>TPS SIGNAL 1</i>
27	<i>LINE PRESSURE & ATF TEMP SENSOR GROUND</i>
28	<i>TPS SIGNAL 2</i>
29	<i>SENSOR 5 VOLT SUPPLY</i>

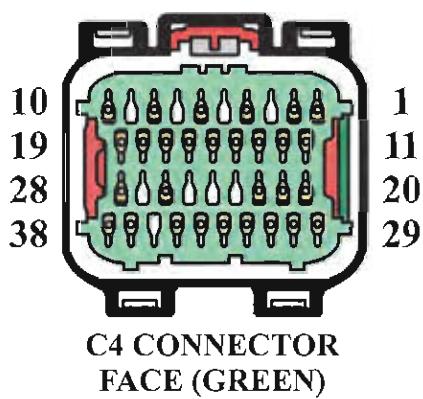
C3 CONNECTOR
FACE (WHITE)

PIN CAVITY	TERMINAL FUNCTION
3 & 19	<i>ASD RELAY OUTPUT</i>
14	<i>BRAKE SIGNAL 2</i>
16	<i>APP SENSOR GROUND 1</i>
17	<i>APP SENSOR GROUND 2</i>
21	<i>TRANSMISSION RANGE SENSOR (T41) SIGNAL</i>
23	<i>BRAKE SIGNAL 1</i>
25	<i>APP SENSOR SIGNAL 1</i>
26	<i>AUTOSTICK - UPSHIFT</i>
27	<i>AUTOSTICK - DOWNSHIFT</i>
28	<i>ASD RELAY OUTPUT</i>
36	<i>APP SENSOR SIGNAL 2</i>
38	<i>STARTER RELAY CONTROL</i>



NEW GENERATION COMPUTER TERMINAL ID

62TE



PIN CAVITY	TERMINAL FUNCTION
1	OVERDRIVE CLUTCH SOLENOID CONTROL
2	UNDERDRIVE CLUTCH SOLENOID CONTROL
3	EMCC VF SOLENOID CONTROL (TCC)
4	DIRECT CLUTCH SOLENOID CONTROL
5	DIRECT CLUTCH PRESSURE SWITCH SIGNAL
6	2-4/LOW REVERSE SOLENOID CONTROL
8	LOW CLUTCH SOLENOID CONTROL
10	LOW REVERSE SOLENOID CONTROL
11	LINE PRESSURE VF SOLENOID CONTROL
12	GROUND
13	GROUND
14	GROUND
15	TRANSMISSION RANGE SENSOR (T1) SENSE
16	TRANSMISSION RANGE SENSOR (T3) SENSE
18	TRANSMISSION CONTROL RELAY CONTROL
19	TRANSMISSION CONTROL RELAY OUTPUT
21	LOW CLUTCH PRESSURE SWITCH SIGNAL
22	OVERDRIVE CLUTCH PRESSURE SWITCH SIGNAL
24	TRANSFER GEAR SPEED SENSOR SIGNAL
27	TRANSMISSION RANGE SENSOR (T41) SIGNAL
28	TRANSMISSION CONTROL RELAY OUTPUT
29	LOW REVERSE CLUTCH PRESSURE SWITCH SIGNAL
30	2-4 CLUTCH PRESSURE SWITCH SIGNAL
31	LINE PRESSURE SENSOR SIGNAL
32	OUTPUT SPEED SENSOR SIGNAL
33	INPUT SPEED SENSOR SIGNAL
34	SPEED SENSOR GROUND
35	TRANSMISSION TEMPERATURE SIGNAL
37	TRANSMISSION RANGE SENSOR (T42) SIGNAL
38	TRANSMISSION CONTROL RELAY OUTPUT

Figure 11



JEEP & DODGE TRUCKS TPS CODE P0123 STORED

COMPLAINT: The vehicle comes in with a complaint of no upshift or a loss of fourth gear with no TCC application. Code retrieval results in code P0123 being stored indicating the TPS signal voltage is too high. The scan tool data list parameter for the TPS signal voltage displays 5 volts at closed throttle, yet when the TPS signal voltage is checked at the TPS signal wire with a voltmeter, the closed throttle voltage is normal.

In some instances a P1596 is also stored which indicates the Speed (Cruise) Control Switch voltage is always high.

NOTE: In order to better understand the cause of the above complaints one must know how the Chrysler JTEC PCM functions.

There are more PCM inputs than there are available microprocessor internal input pins. To accommodate all the required inputs, the microprocessor may receive inputs from two circuits on one pin by using multiplexing. The microprocessor keeps track of which input is being received by the discharging of a capacitor controlled by the PCM's internal clock. If there is a problem that does not allow the capacitor to discharge (for example, an input shorted to voltage), the PCM may set a DTC for the companion input.

What this means is that when one of the two circuits sharing the same capacitor is shorted to power, it has a malfunctioning affect to the PCM internally with both circuits. This would explain why the computer thinks the TPS is at 5 volts yet when you check it with a volt meter at the TPS it works perfectly. This often is diagnosed as a faulty PCM the replacement of which will not cure the above complaints.

CAUSE: *Scenario #1: Jeep with AW4 Transmission...No Upshift Out of 1st Gear*

The chart in Figure 1 shows which inputs are paired with the same capacitor, this is why one affects the other. Notice the top pair, the TPS and Cruise Control inputs share a common capacitor. So if there is a short to power with the cruise control sense wire it will have an affect on the TPS signal wire as is the case with this scenario.

Using an EASE scan tool in the graphing mode (Figure 2), a screen capture was taken of both the TPS and Cruise Control Switch Sense voltage revealing that as far as the computer is concerned, both are pegged at approximately 5 volts. Figure 3 shows a different scan tool displaying the TPS signal voltage being pegged at 5 volts yet with an actual meter on the TPS signal wire, a normal 1.161 volts at closed throttle is seen. This indicates that the companion sensor could be shorted to power preventing the internal capacitor from discharging. Checking the Cruise Control Sense wire at the PCM with a volt meter reveals that 12 volts are present confirming a short to power (Figure 4).

One common reason for this condition is the horn's 12 volt clockspring circuit shorting to the Cruise Control Switch Sense wire circuit. Since the cruise switch sense and the TPS signal share the same internal capacitor, the voltages on both are driven high yet only 5 volts are seen in the scan tool display. The reason for this is that the computer was never programmed to see more than 5 volts on these circuits.

Looking at the wiring in Figure 5, there are several connectors that could allow a short to power from the horn's circuit into the cruise control circuit (C1, C200 and C106). With the C1 connector being located under the steering column, it was the easiest to unplug and when it was, the 12 volts at the Cruise Control Switch Sense circuit disappeared and the TPS Signal voltage went back to normal on the scan tool.



JEEP & DODGE TRUCKS TPS CODE P0123 STORED

CORRECTION: Replace the clockspring assembly.

CAUTION: When performing repairs that require steering wheel removal, be sure to disable the SRS (airbag) system first!

CAUSE: *Scenario #2: Jeep with 42RE Transmission...No 4th gear or Lockup*

The same short to power occurred in this vehicle with the same results, however, the cause of this short to power was found to be corrosion in the C106 connector located in the passenger side footwell, See Figures 6 and 7. *The complaint would only occur when the Park Lamps were turned on!*

If you compare the wiring diagram in Figure 8 with the one in Figure 5 you will notice that a 12 volt supply in the park lamp circuit pass through connector C106 at terminals 53 and 54 right along side the Cruise Control Sense wire in connector C106, terminal 55 causing the short to power.

CORRECTION: Clean corrosion and liberally apply dielectric grease to connector.

CAUSE: *Scenario #3: Dodge Truck with 47RE...No 4th gear or Lockup*

The complaints are the same with the exception being this vehicle had an APP Sensor instead of a conventional TPS. Once the horn fuse was removed all voltages returned to a normal state which also allowed fourth gear and lockup to return to normal operation.

At this point it would appear that the 12 volt short to power was between the power distribution center and the steering wheel. By tracing the wire, the problem was located in a corroded C134 connector in the drivers side footwell left of the steering column. The corrosion in this connector made a connection between the horns clockspring 12 volt circuit from it's relay to the Cruise Control Switch Sense circuit as shown in Figure 9.

CORRECTION: Clean corrosion and liberally apply dielectric grease to connector.

SUMMARY: It seems that Chrysler likes to position a 12 volt circuit next to the 5 volt Cruise Control Switch Sense circuit. The diagnosis is to find which 12 volt circuit is shorted to the Cruise circuit.

It is also of interest how one vehicle can have a no upshift condition while another can exhibit no fourth gear or lockup.

This is determined by the transmission type that is in the vehicle. The AW4 uses shift solenoids to shift the transmission through all four gears. If the PCM sees a wide open throttle voltage from the TPS, it will not shift out of first gear.

In the RE series transmissions, gears one through three are accomplished hydraulically, only fourth gear and lockup are dependant on the TPS signal. The exception to this is any RE unit that is equipped with a TTVA, throttle valve motor.

Many thanks to John Thornton of Autotrain for adding his experiences with ATSG in order to enhance this bulletin with additional information.

A special thanks also to Denny Gipe of Dennis Gipe Transmission in Chambersburg, PA. for sharing his experience with ATSG.

**JEEP & DODGE TRUCKS
TPS CODE P0123 STORED**

1999 AND LATER JTEC MULTIPLEXED INPUTS

NAME	COMMENTS	JTEC PIN #
<i>TPS</i>	(All applicable models)	A23
<i>Cruise MPX</i>		C32
02S UpStream Left Bank	(All applicable models)	A24
MAP		A27
02S UpSteam Right Bank	(5.9L HD 8.0L HD)	A26
Fuel Temperature	CNG	A28
<i>02S DownStream Left Bank</i>	(All LD) (8.0L MD)	A25
<i>Trans Press</i>		B29
02S DownStream Right Bank	(8.0L MD)	A29
Spare		A13
Spare		A30
Fuel Level		A14

Figure 1

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JEEP & DODGE TRUCKS TPS CODE P0123 STORED

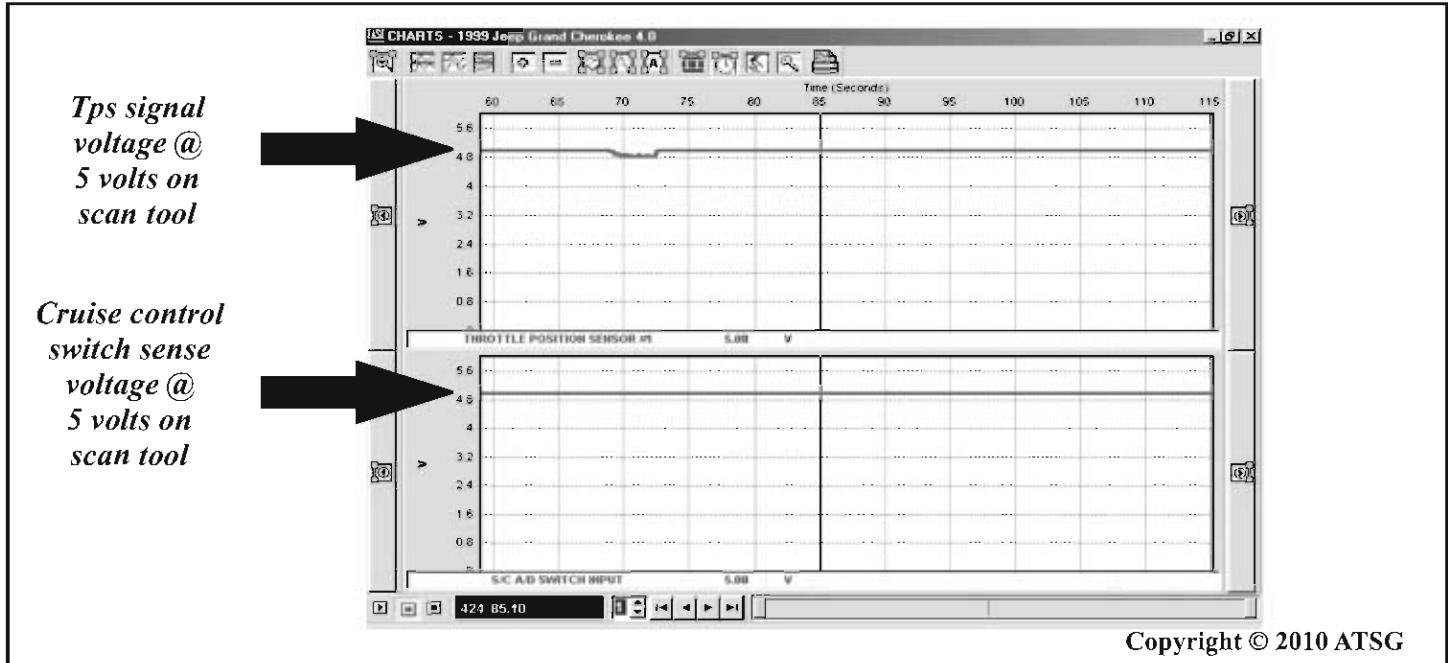


Figure 2

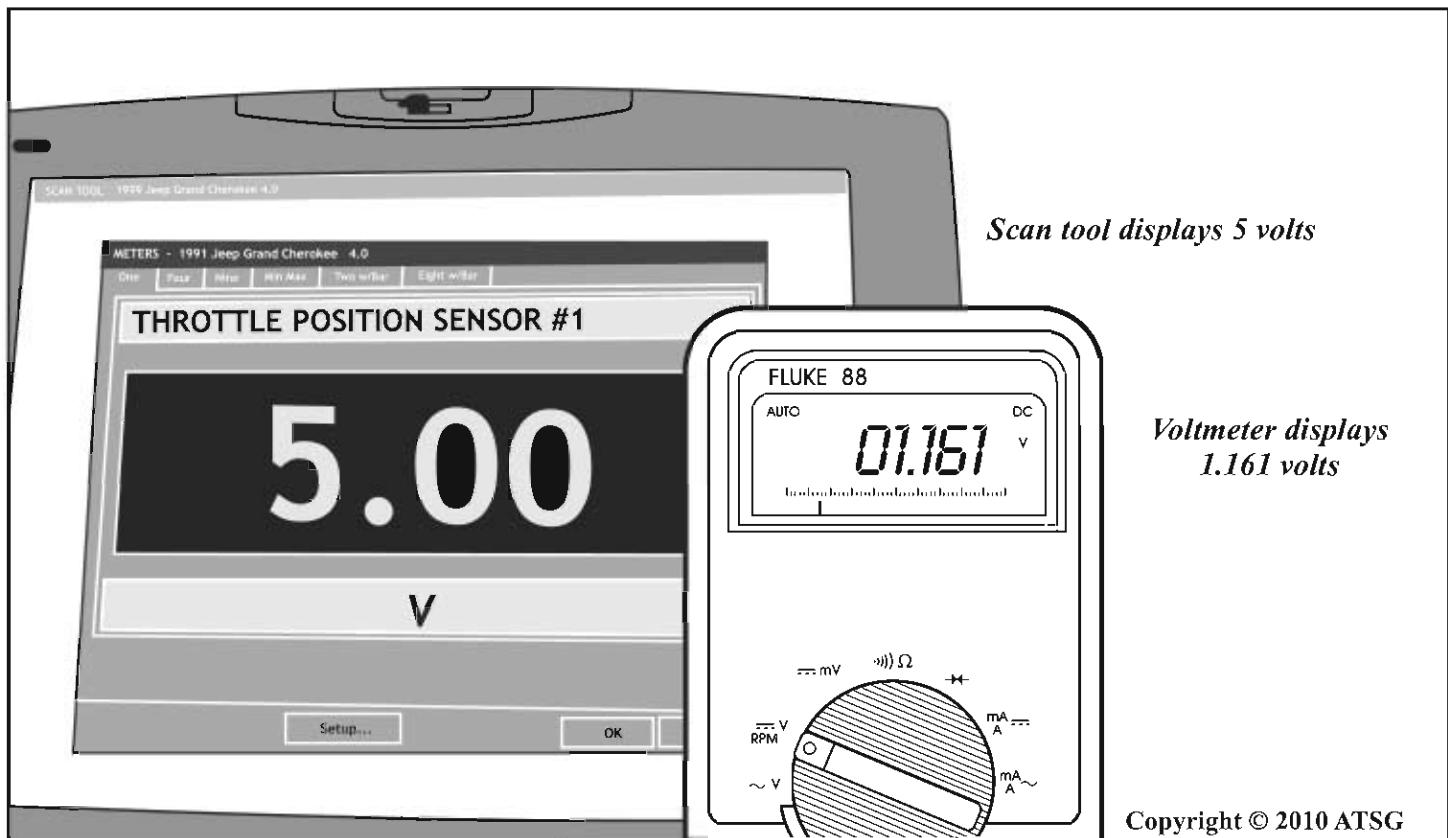


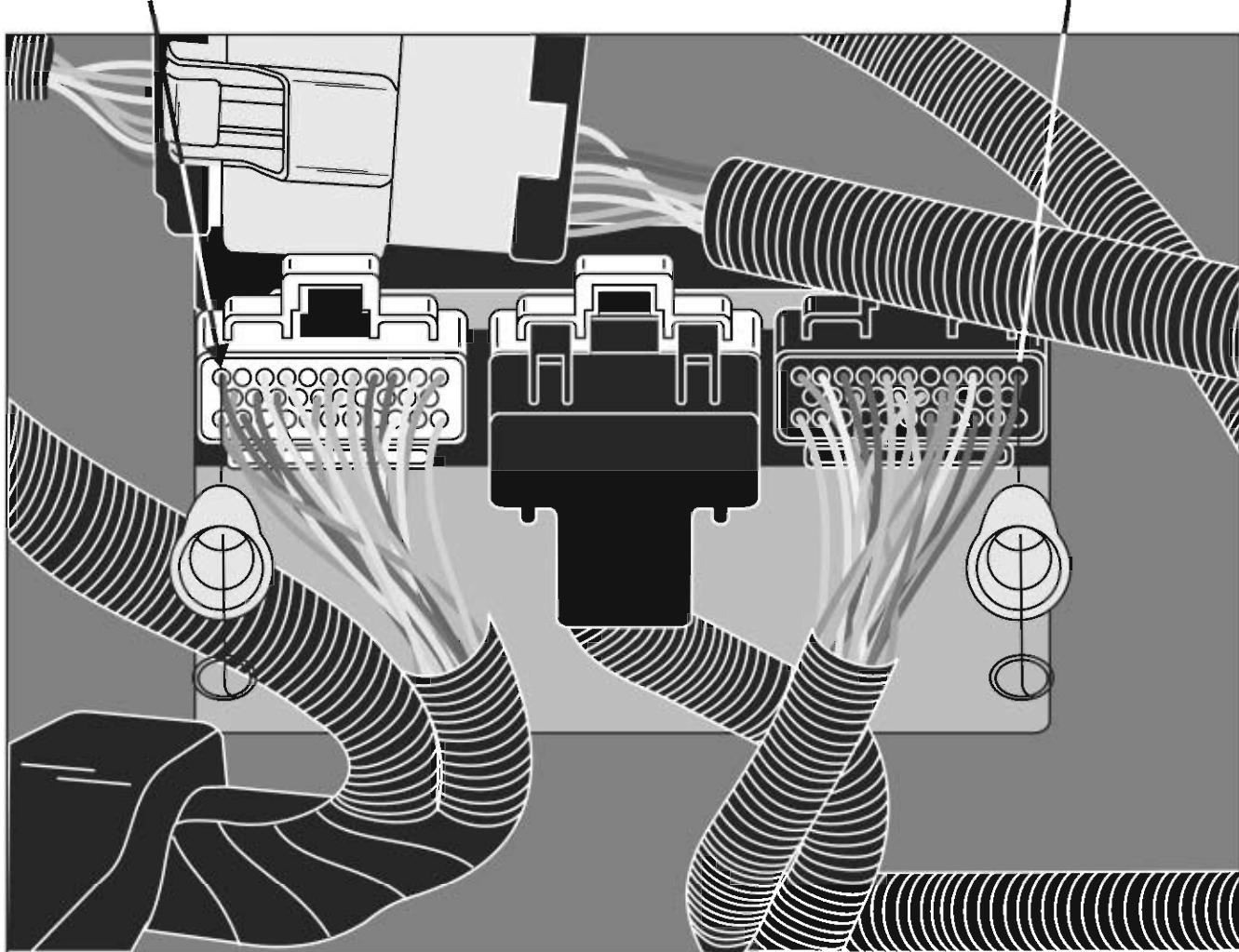
Figure 3



JEEP & DODGE TRUCKS TPS CODE P0123 STORED

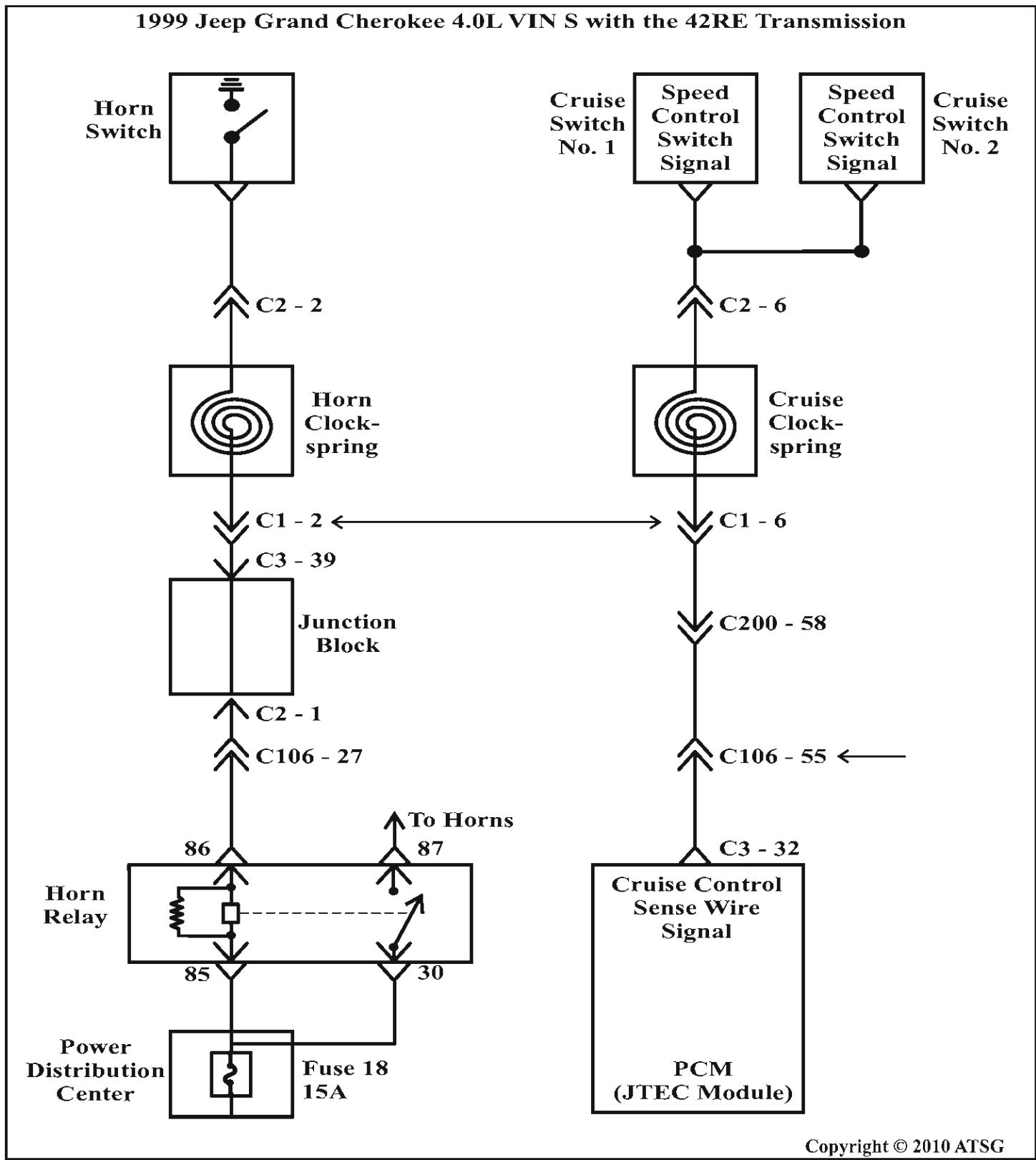
CRUISE CONTROL SENSE WIRE
@ THE C3 CONNECTOR
TERMINAL 32
*(Reads 12 volts at all times
with a DVOM)*

TPS SIGNAL WIRE
@ THE C1 CONNECTOR
TERMINAL 23
*(Reads correct voltage
with a DVOM)*





JEEP & DODGE TRUCKS TPS CODE P0123 STORED



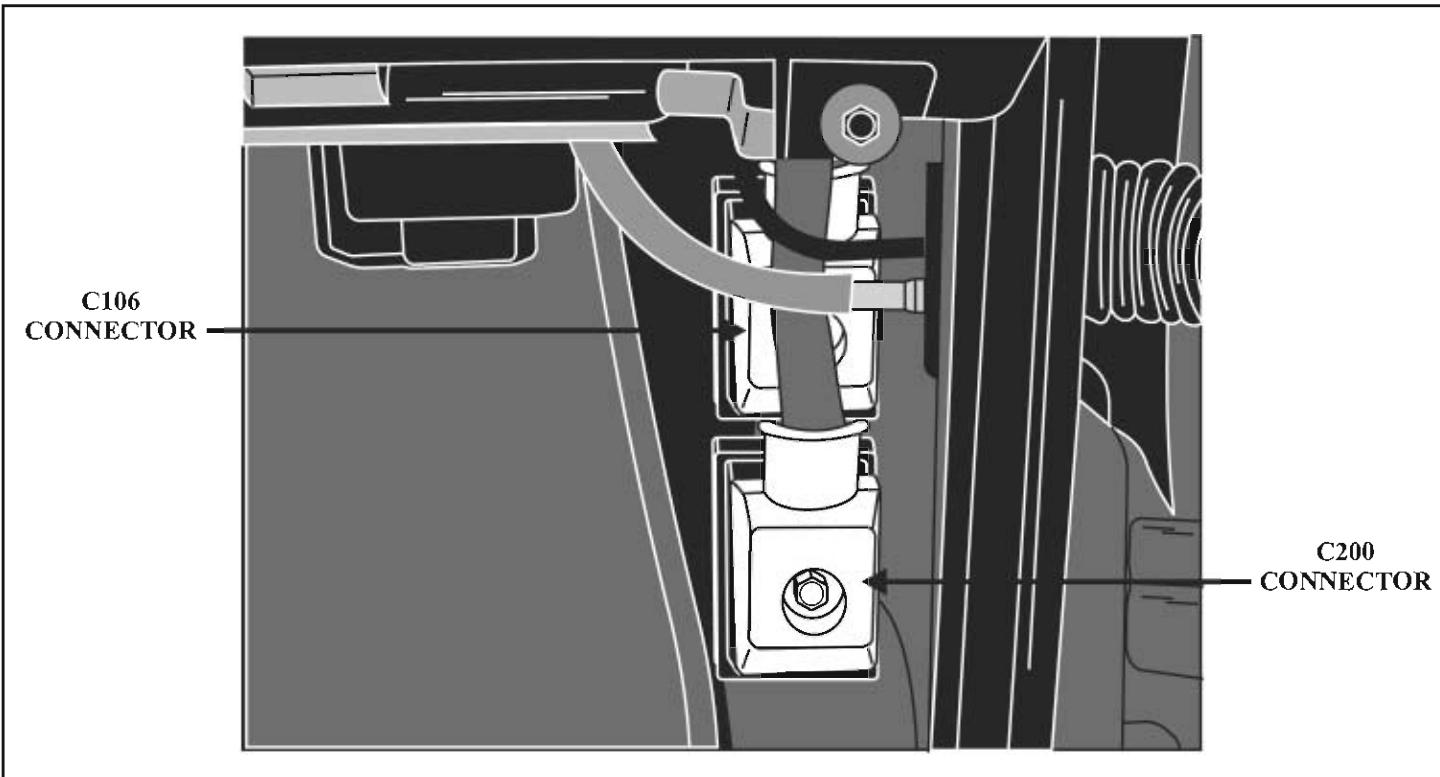
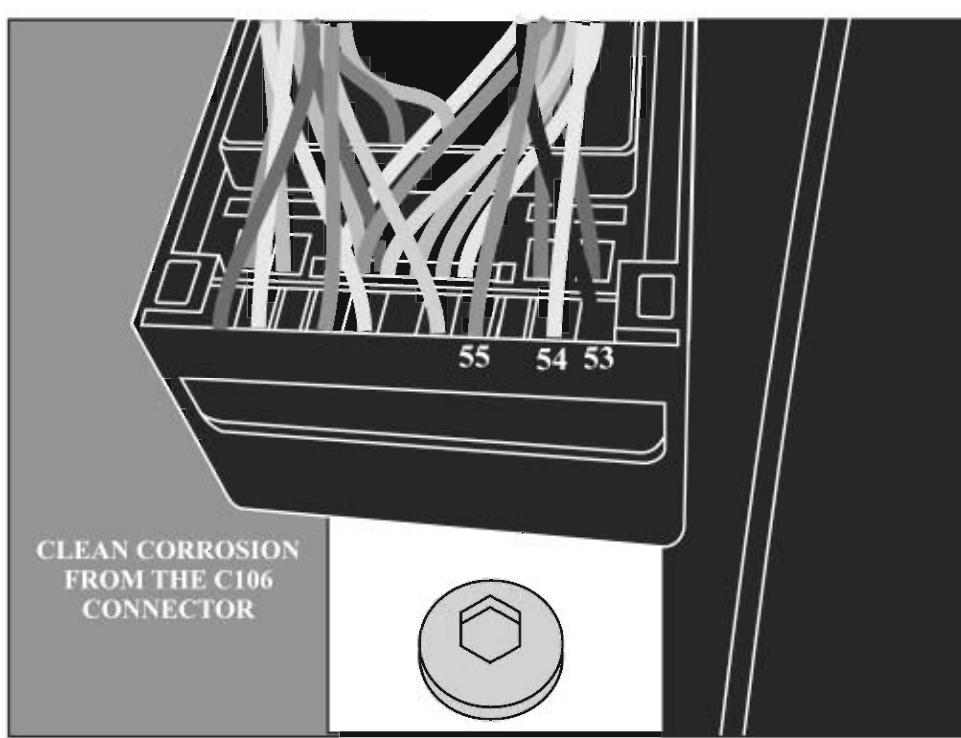
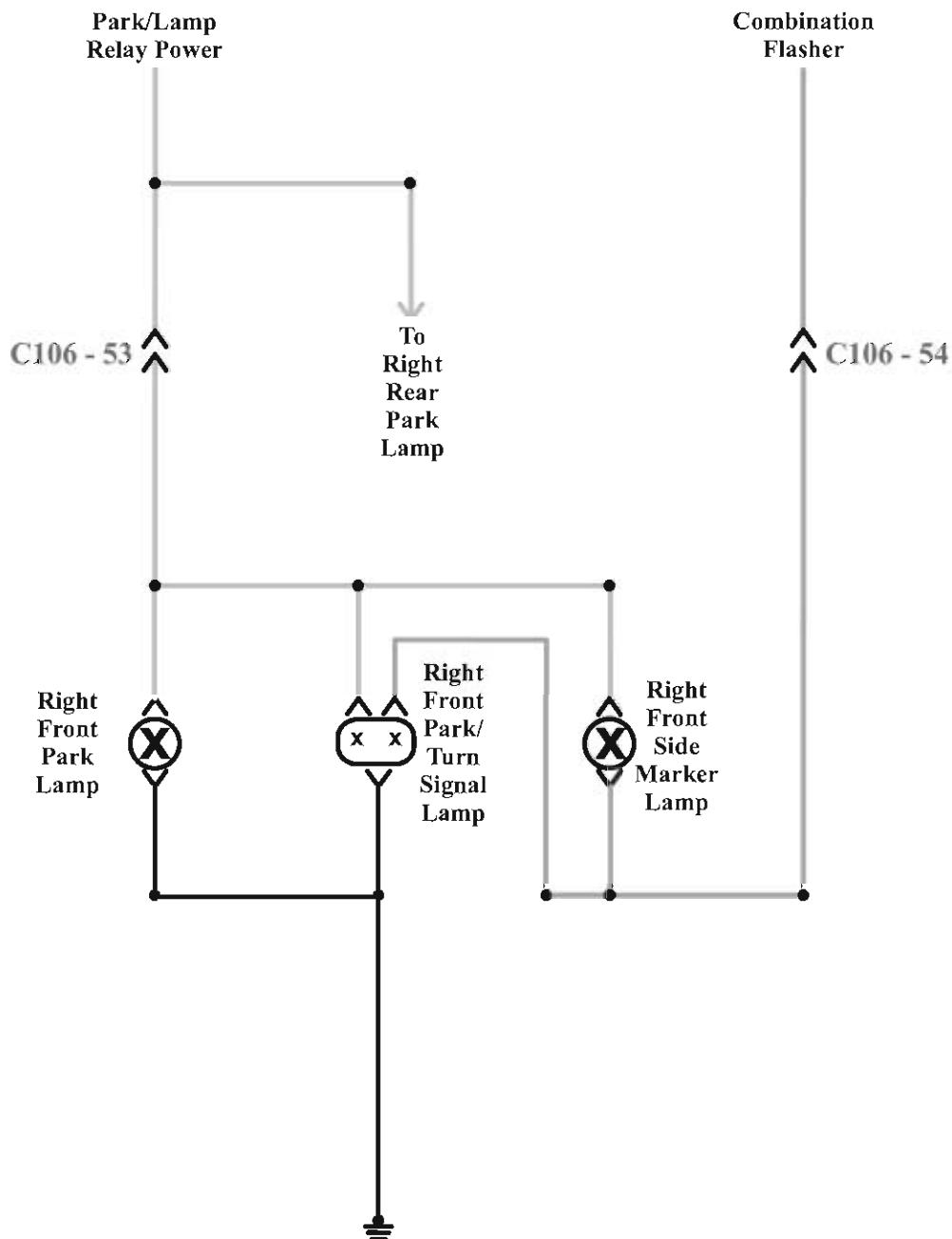
**JEEP & DODGE TRUCKS
TPS CODE P0123 STORED**

Figure 6

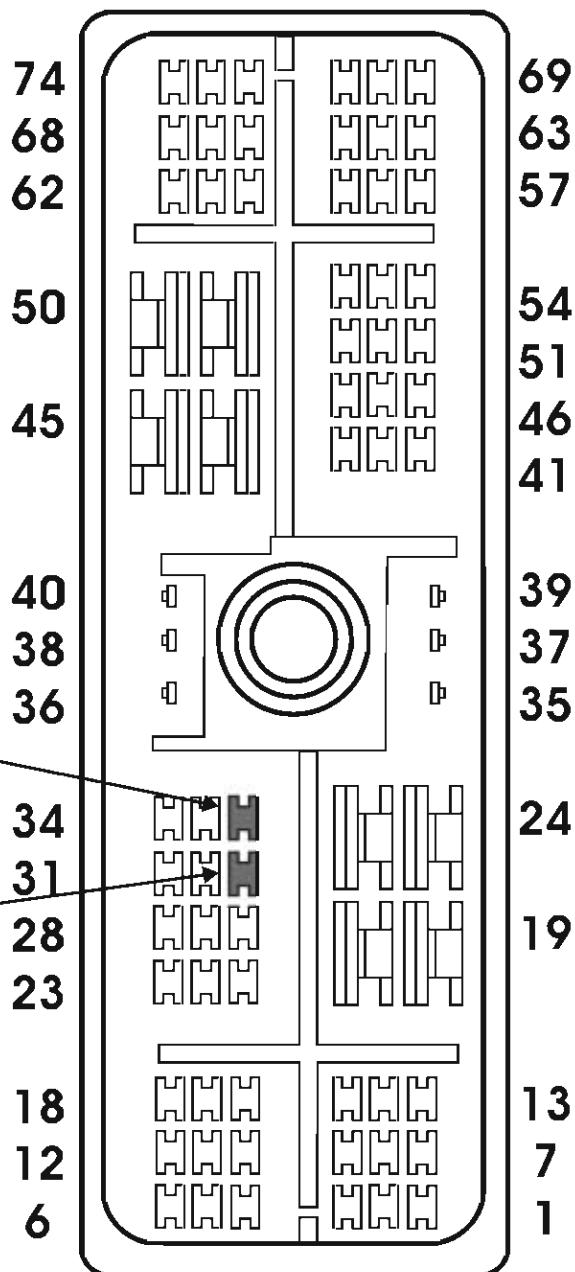


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**JEEP & DODGE TRUCKS
TPS CODE P0123 STORED****1999 JEEP GRAND CHEROKEE 4.0L VIN S WITH THE 42RE TRANSMISSION**

JEEP & DODGE TRUCKS
TPS CODE P0123 STORED

1999 DODGE RAM TRUCK 5.9L DIESEL VIN 6 WITH THE 47RE TRANSMISSION



C134

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Figure 9



DODGE TRUCKS

UNINTENDED "OUT OF PARK" ALARM INITIATION

INTRODUCTION: In March of 2006 Dodge issued safety recall E17 for 2003 to 2005 Dodge Ram pickup trucks equipped with the 5.9 Liter Diesel engine and 48RE transmission. The recall provides a re-flash which installs into the PCM a program that sounds the horn, flashes the headlamps as well as the PRNDL indicator lamps, if the selector lever is not placed in the Park position with the engine running and the door is opened.

NOTE: *When a Dodge vehicle is brought to the dealer for any type of service and falls under this recall will automatically receive this reflash possibly without the owners knowledge.*

COMPLAINT: A Dodge truck equipped with the "Out of Park" alarm system has a complaint of the alarm going off anytime the engine is running and the door is opened with the selector lever in Park. In addition, when the door was closed and the selector lever was placed in the Drive position, the PRNDL indicator did not illuminate the "D" lamp and when the truck was driven, the alarm would intermittently initiate itself at speeds of 35 to 45 mph. No codes were found in the PCM or ECM.

CAUSE: The Transmission Range Sensor five volt supply circuit was found to have battery voltage on it which would indicate that the five volt wire was shorted to power somewhere between the range sensor and the instrument cluster.

When the system is working correctly, with the TRS connector unplugged, terminal 1 and 6 should have ignition voltage on them while terminal 2 should have 5 volts (See Figure 1). When the TRS connector is plugged in, step down voltage should be seen as shown in Figure 2. The voltage in Park will be slightly below the 5 volt supply and then drop as the shift lever is moved towards manual low. But with this circuit being shorted to power, the system operated incorrectly.

By tracing the wires from the TRS to the instrument cluster, a connector located under the dash left of the brake pedal known as the C219 connector is found. This 5 volt wire for the TRS is a Yellow/Tan wire which is circuit number T917 and passes through this connector on terminal 47 (Refer to Figure 3). The cavities surrounding terminal 47 are terminals 48, 51 and 52. However, terminals 51 and 52 are empty leaving only terminal 48 which is a Red/Tan wire. Power distribution wiring diagrams revealed that this is the A12 circuit used to supply system voltage to a power outlet (Refer to Figure 4). This circuit that was shorted to the TRS 5 volt supply wire within the C219 connector and therefore causing the above mentioned complaints.

CORRECTION: The A12 circuit wire was removed from both sides of connector C219 and reconnected externally which restored circuit integrity to the TRS 5 volt supply circuit. Once this was accomplished, the PRNDL lamps and the "Out of Park" alarm system functioned correctly.

NOTE: *Dodge wiring diagrams show TRS terminal 2 as being the TRS ground circuit, it is in fact the 5 volt supply circuit.*

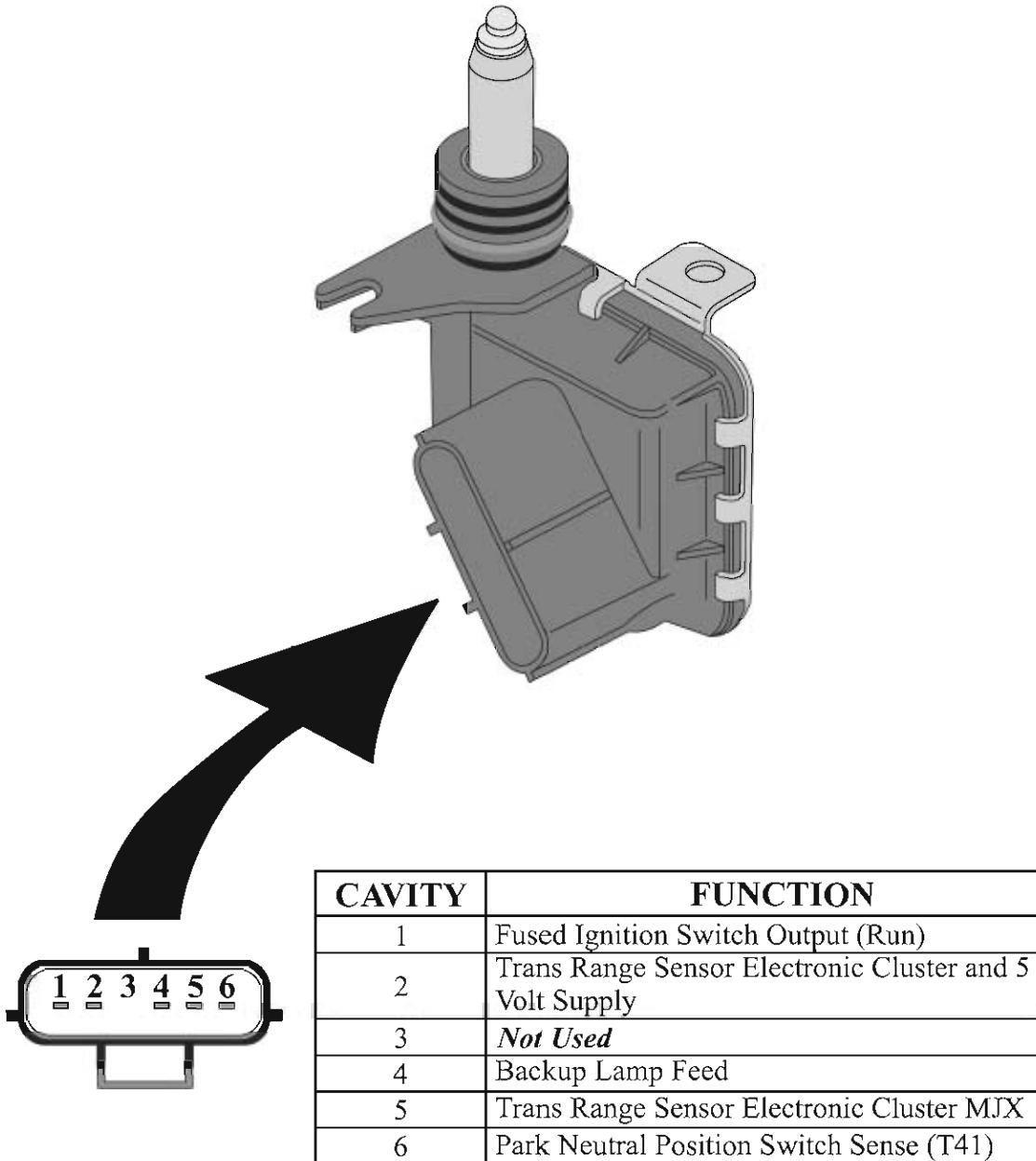
Many thanks to Mister Transmissions in Guelph, Ontario

Automatic Transmission Service Group

DODGE TRUCKS

UNINTENDED "OUT OF PARK" ALARM INITIATION

TRS TERMINAL IDENTIFICATION



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Figure 1

DODGE TRUCKS UNINTENDED "OUT OF PARK" ALARM INITIATION

TRS CIRCUIT VALUES

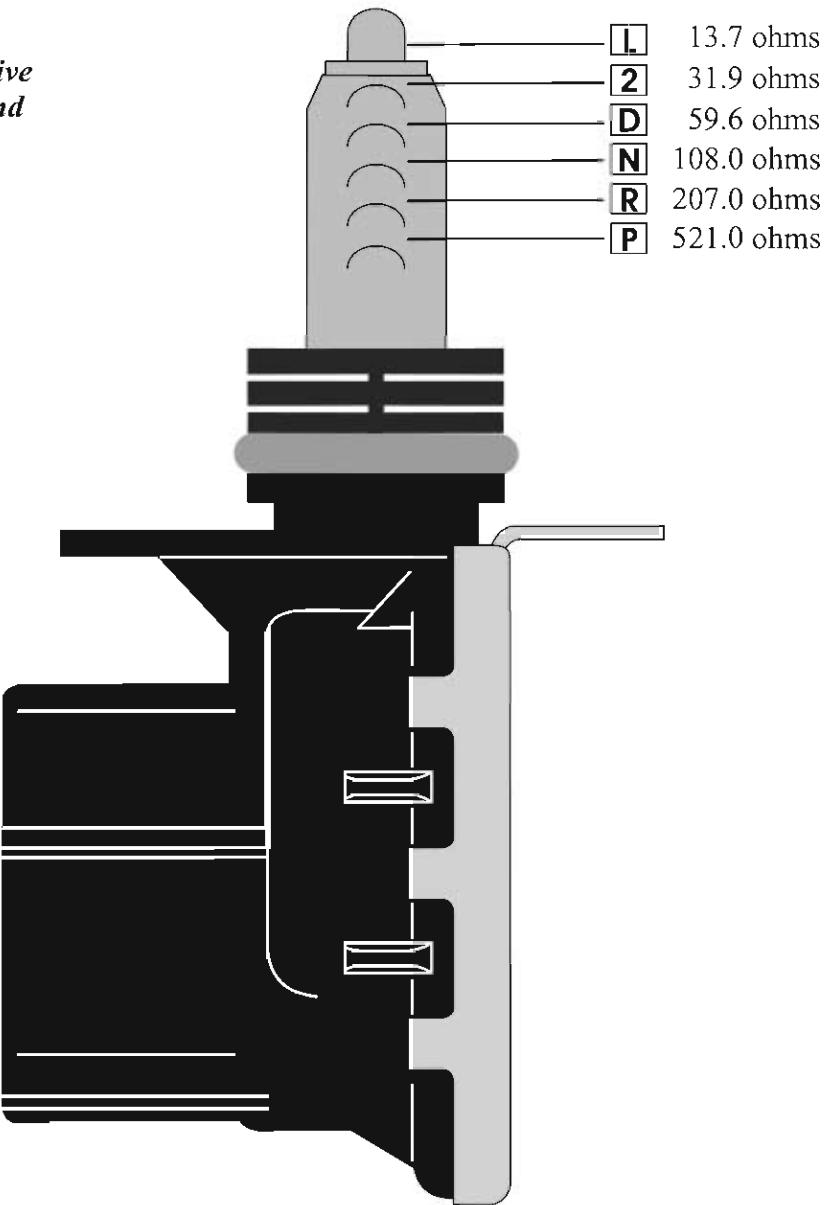
Sensor Connector View



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.



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Figure 2



DODGE TRUCKS

UNINTENDED "OUT OF PARK" ALARM INITIATION

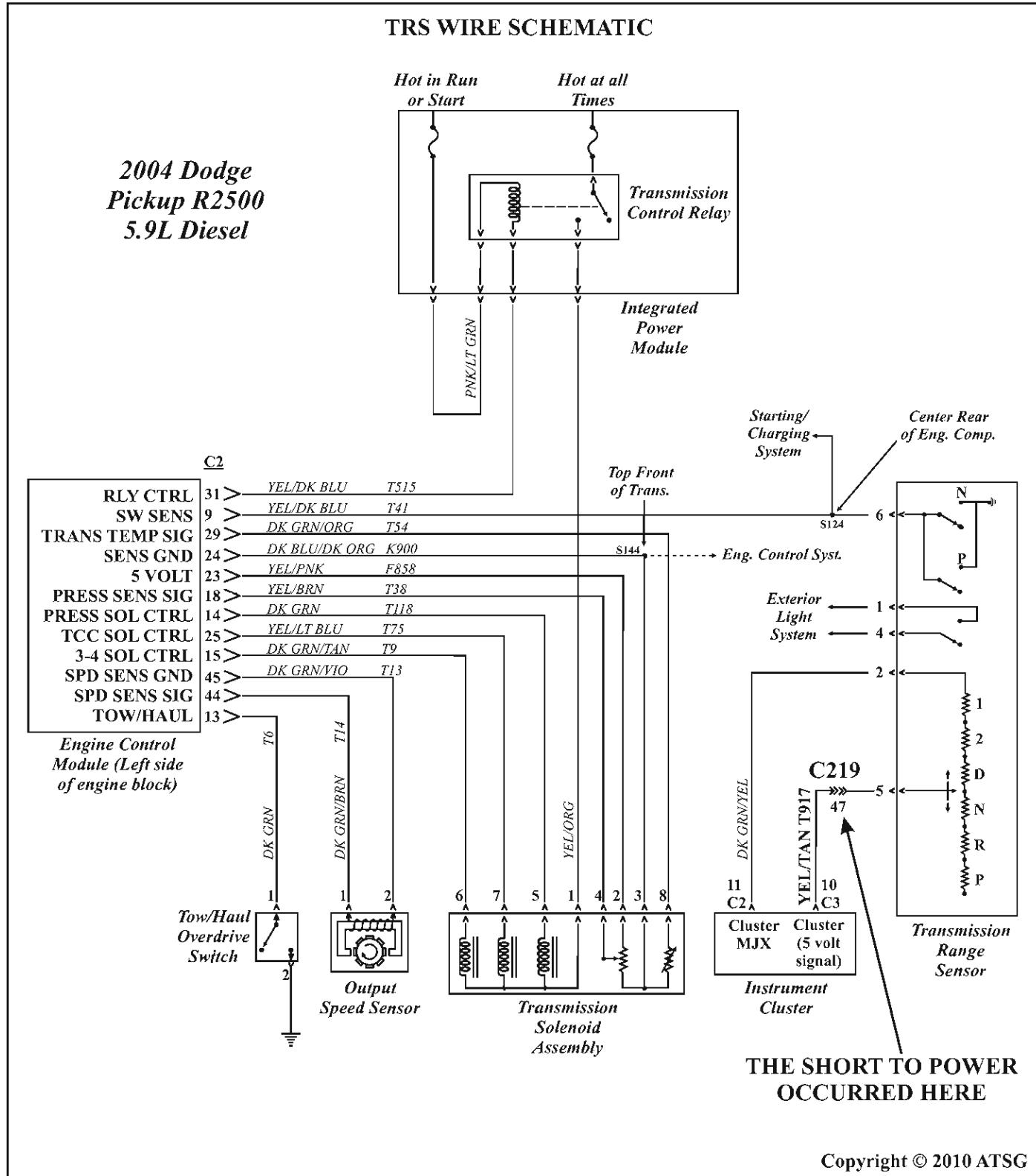
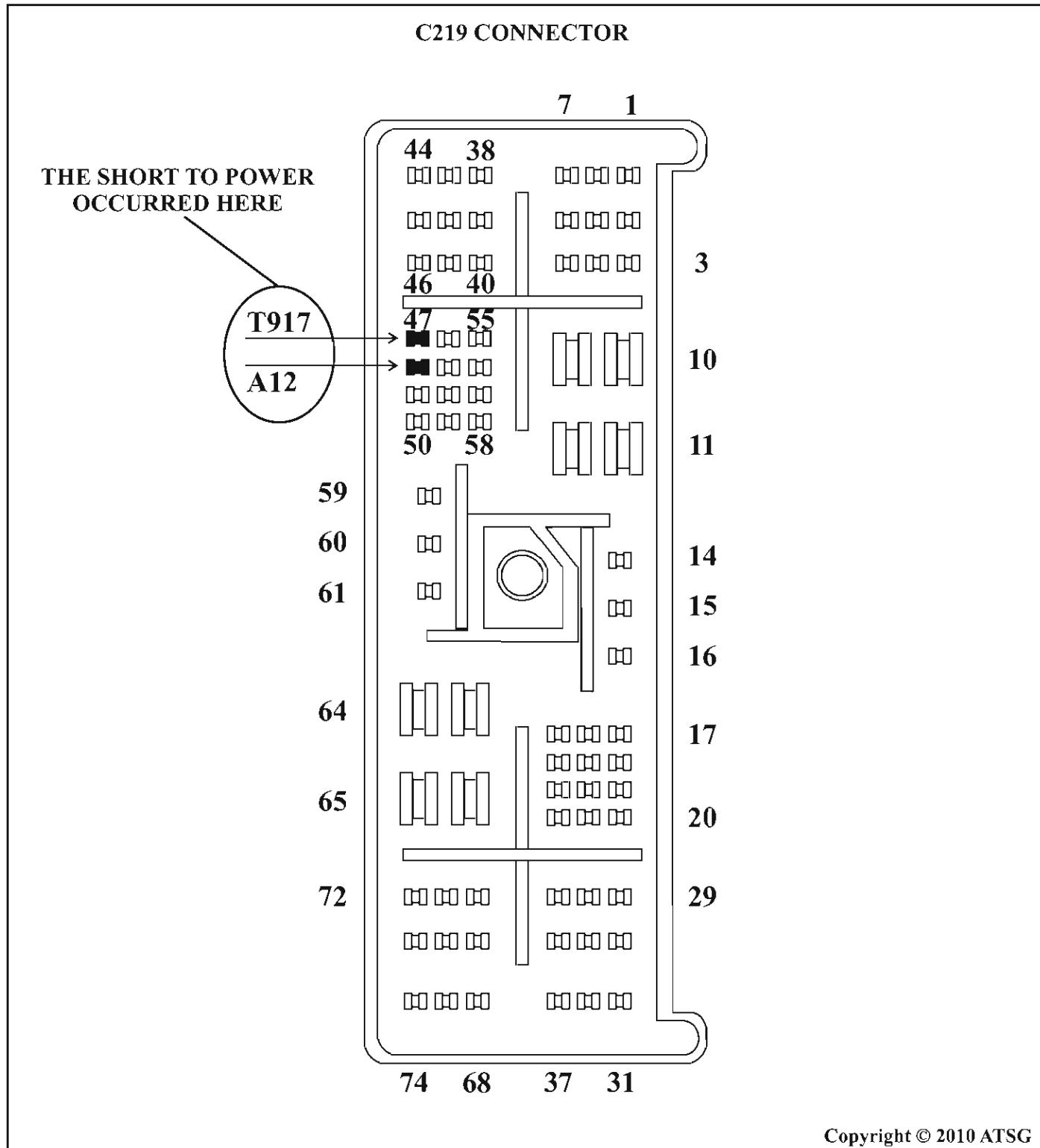


Figure 3
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DODGE TRUCKS UNINTENDED "OUT OF PARK" ALARM INITIATION



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Figure 4



1996 & LATER JEEP & DODGE TRUCKS WITH RE TRANSMISSIONS AND GAS ENGINES GOVERNOR PRESSURE SENSOR VOLTAGE CODES

COMPLAINT: Any 1996 and later Dodge or Jeep trucks using an RE series RWD transmission behind gasoline engines may exhibit a chronic "governor pressure sensor volts to high" code P1763 causing the PCM to place the transmission into 3rd gear failsafe. This may be accompanied with a customer complaint of a loss of engine power. The internal wiring harness, solenoids and sensor may have already been replaced in an attempt to resolve the code.

- CAUSE:**
1. One cause could be that the ground circuit for the governor pressure sensor has been compromised (See Figures 1 and 2).
 - a. Faulty governor pressure sensor
 - b. Faulty battery temperature sensor
 - c. Faulty heated oxygen sensor(s)
 - d. Faulty wiring, splices, other shared sensors or the PCM
 2. Another cause could be that line pressure is running above factory specification. This could be the result of a valve body modification or a valve body malfunction, or the solenoid block is warped and leaking which allows solenoid oil to push on the tip of the transducer.
 3. A malfunctioning alternator producing voltage spikes or high charging voltage would be another consideration.

- CORRECTION:**
1. Since the governor pressure sensor ground circuit is shared with a variety of other sensors including the battery temperature sensor and the heated oxygen sensor, other codes may be present with P1763 such as a P1492 "Battery Temperature Sensor Volts To High." A P1762 Governor Sensor Offset volts or drift too low or too high, or a P1757 Governor pressure above 3 psi at 0 MPH may also be present. But of all the above possibilities listed in cause number 1, malfunctioning heated oxygen sensors are the most common cause for compromising the shared ground path for the governor pressure sensor. A quick check can be made by simply clearing the code and unplug both the upstream and downstream sensors and take the truck for a road test. If the code does not return then run the vehicle with the sensors plugged in one at a time to determine which oxygen sensor is causing the code and replace the sensor. If this quick test proves that the heated oxygen sensors are not the cause of any governor pressure sensor codes, a specific wiring schematic for the vehicle being worked on will need to be acquired and each and every sensor sharing the governor sensor's ground path will need to be inspected.
 2. A quick method to determine if code P1763 is being produced as the result of high line pressure is to first clear the code or codes. Drive the vehicle with the brake applied sufficiently enough to activate the brake switch signal preventing converter clutch apply. If P1763 no longer returns, release the brake and allow the converter clutch to engage. If the code is generated immediately after the converter clutch applied, higher line pressure than factory specifications is the cause. Many times this is due to some form of valve body modification in an attempt to firm up shifts and converter clutch apply.



1996 & LATER JEEP & DODGE TRUCKS WITH RE TRANSMISSIONS AND GAS ENGINES GOVERNOR PRESSURE SENSOR VOLTAGE CODES

If the solenoid block is suspected to be warped, (Refer to Figure 4), verify the voltage on the transducer signal wire is higher at a stop in drive than it should be which is 0.6 volts. Plug a known good set of internal electrical components into the vehicle wire harness connector and now see if the transducer signal voltage is 0.6, if it is, the solenoid block is leaking.

CORRECTION: One fix can be to use Superior's A K500-618-L shift correction package which includes a new governor pressure control valve. This valve allows operating pressure to be raised for heavy-duty use without fear of setting code 1763.

Sometimes you may find that a 150 ohm 1/4 watt resistor has been installed into the wiring harness near PCM "B-C2" white connector terminal 29 as seen in figure 3. This resistor acts as a voltage divider and has proven to work well.

NOTE: Code P1763 sets when 4.89 volts or higher is seen on the governor pressure sensor circuit for 8 seconds or more. If this was caused due to high pressure, this indicates that governor pressure was between 90 to 96 psi or higher while in drive.

The computer controls the governor pressure solenoid to provide governor pressure relative to road speed (except diesel applications). When this solenoid is off it allows full pressure into the governor circuit. For it to provide 0 psi at 0 miles per hour it needs to be fully energized. As vehicle speed increases the computer slowly turns the solenoid off proportional to road speed. Once the vehicle is in fourth gear and the converter clutch is commanded on, the solenoid is turned completely off. Since line pressure is being supplied to the governor solenoid, when the computer turns it off, near all pressure that the solenoid is being fed with now enters the governor circuit. Should line pressure be above 90 psi, so will the governor circuit be and after 8 seconds, P1763 sets.

3. If the alternator is suspect, clear the codes and road test the vehicle with the alternator disconnected from the circuit. If the code does not return then the alternator should be changed. But if the code does return, cause and correction number 1 on the previous page will need to be reviewed before considering the PCM defective.

Another option is to install D-CF1 Kit Transtar part number A12432H which is an "RE" Governor solenoid to GM Pressure control solenoid Conversion kit designed to improve the reliability of the Governor solenoid in normal use and to handle higher base pressure in High performance applications eliminating the need to make any of the above mentioned modifications (Figure 5).

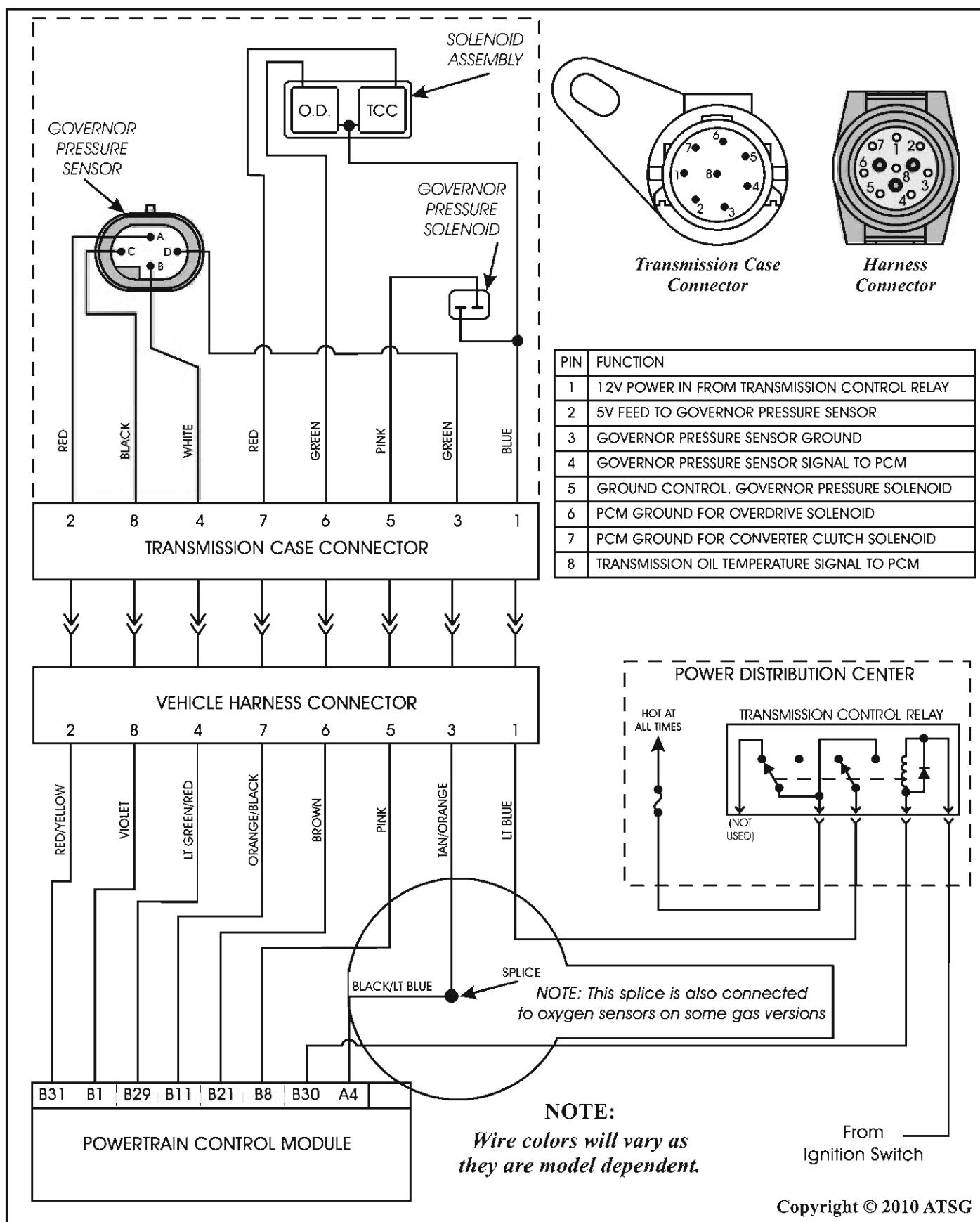


Figure 1

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**1996 & LATER JEEP & DODGE TRUCKS
WITH RE TRANSMISSIONS AND GAS ENGINES
GOVERNOR PRESSURE SENSOR VOLTAGE CODES**

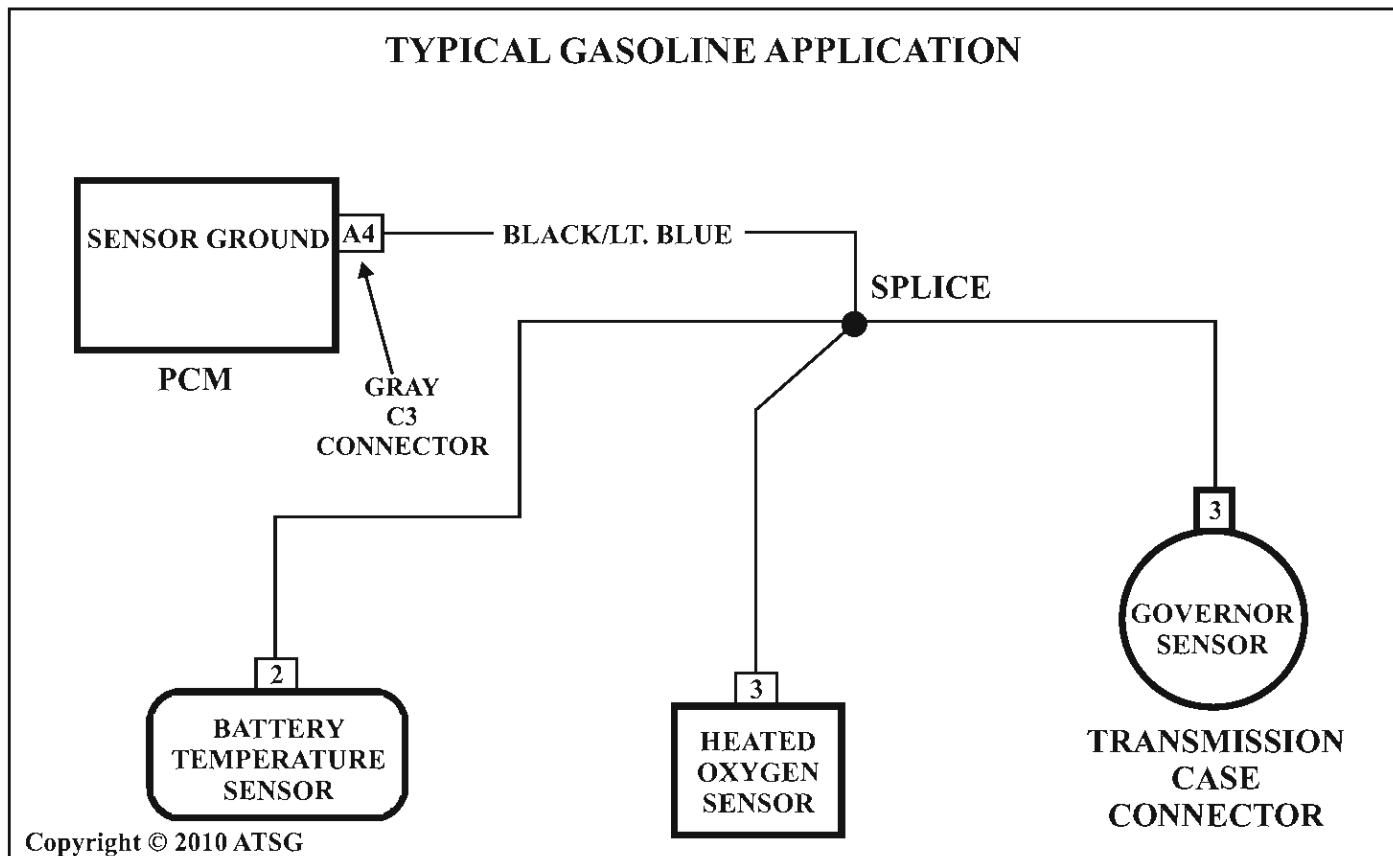


Figure 2

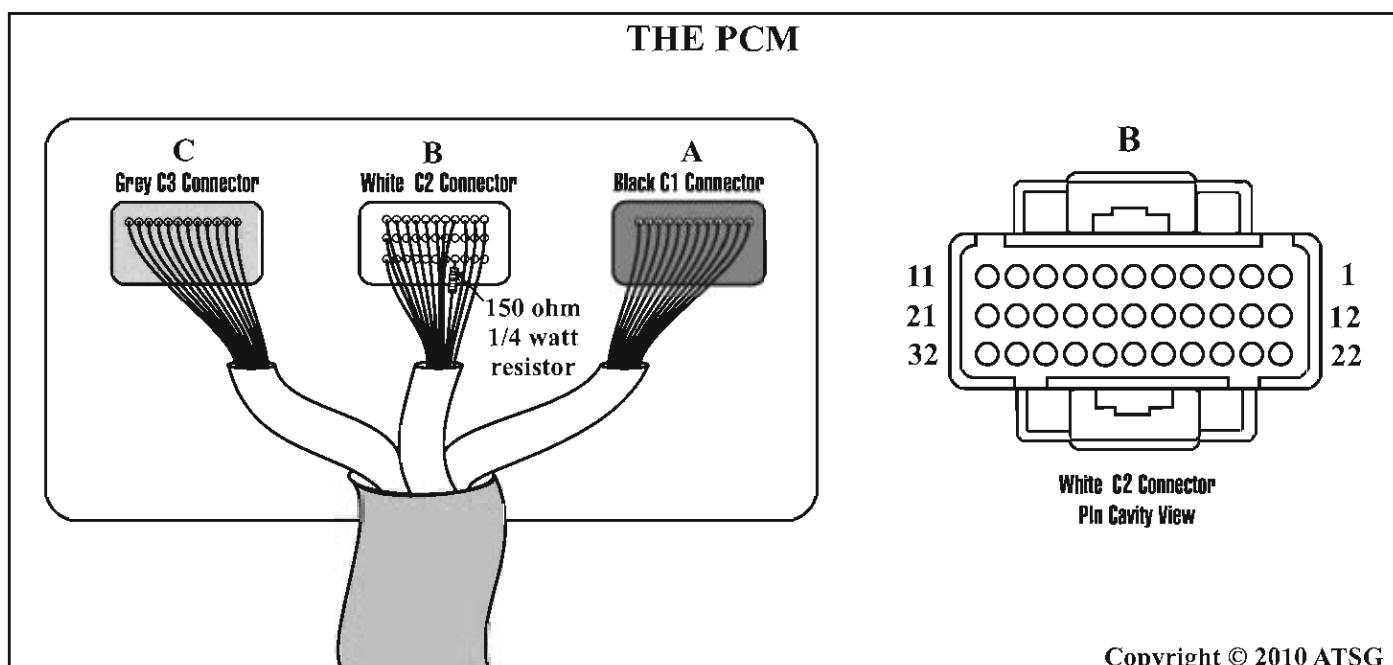


Figure 3

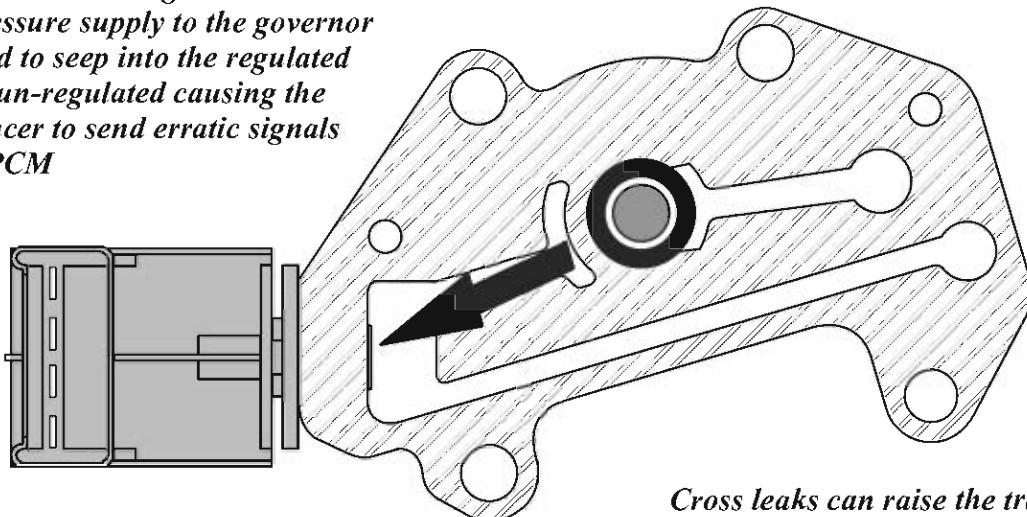
Automatic Transmission Service Group



1996 & LATER JEEP & DODGE TRUCKS WITH RE TRANSMISSIONS AND GAS ENGINES GOVERNOR PRESSURE SENSOR VOLTAGE CODES

WARPED SOLENOID BLOCK

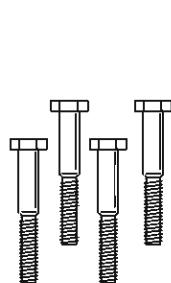
A distorted mounting block will allow line pressure supply to the governor solenoid to seep into the regulated circuit un-regulated causing the transducer to send erratic signals to the PCM



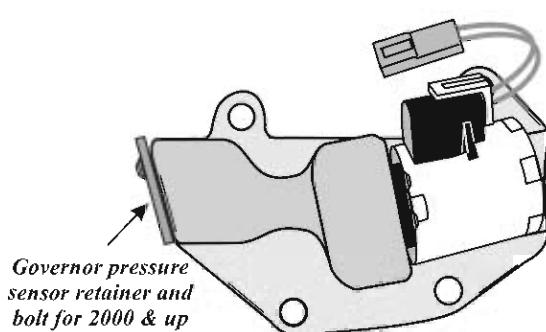
Cross leaks can raise the transducer's signal voltage causing governor offset pressure and wrong gear starts.

Figure 4

CONTENTS OF D-CF1 KIT TRANSTAR PART NUMBER A12432H

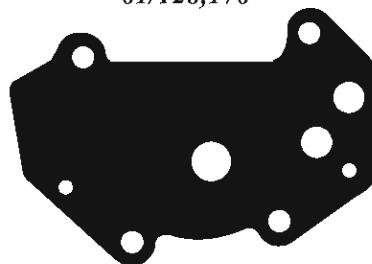


Four new Manifold retaining bolts



New Steel Block Manifold including Pressure Control solenoid and pigtail already assembled

U.S. Patent Number
61/128,176



Manifold Gasket

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Figure 5



JEEP 42RE TORQUE CONVERTER LOCKUP STRATEGY

COMPLAINT: A 2004 Jeep Grand Cherokee equipped with 4.0 liter engine and 42RE transmission may have a complaint of a late lockup application. When checking the signal to apply lockup the scan tool indicates that the late lockup application is being commanded to do so.

CAUSE: These vehicles were selectively reprogrammed with a converter lockup strategy that will not allow lockup application until vehicle speed is greater than 48 mph (77 km/h) and the transmission is in fourth gear. When overdrive is canceled, lockup application will occur at a vehicle speed greater than 29 mph (47 km/h). The difference in engine rpm when lockup is enabled is approximately 300 rpm.

CORRECTION: There is no correction, this reflash was done to enhance vehicle performance.

SERVICE INFORMATION:

Torque Converter Lockup Enable Feature Software Version.....56044563A1



CHRYSLER
CORPORATION

P/N: **56044563A1**

DLR CODE: **XXXXXXX**

DATE: **06/30/04**

AUTHORIZED SOFTWARE UPDATE LABEL

CHRYSLER/DODGE NAG1 SOLENOID CIRCUIT FAULTS/CASE CONNECTOR LEAK

COMPLAINT: Some 2004 and up Chrysler/Dodge vehicles equipped with the NAG 1 transmission may exhibit a symptom of intermittent Solenoid Circuit Fault Codes along with a leak at the case connector area of the transmission as shown in Figure 1.

CAUSE: The cause may be, faulty "O"-rings on the adapter sleeve allowing the transmission fluid to cause connection problems, and setting the intermittent trouble codes.

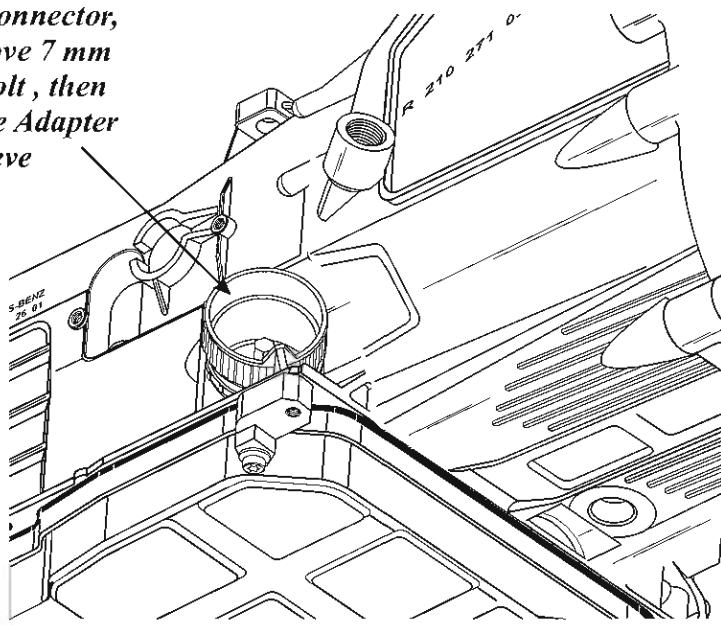
CORRECTION: Replace the adapter sleeve and connector, shown in Figure 2, with the updated part number listed in service information. Verify that all solenoids ohm test correctly as shown in the chart in Figure 2. Refer to Figure 3 for the location of the solenoids on top of the valve body, replace as necessary.

CORRECTION: ADAPTER SLEEVE AND CONNECTOR KIT.....68021352AA
(Includes connector 5120265AA)

Note: This connector is also available at many aftermarket suppliers individually as well.

ADAPTER SLEEVE LOCATION

*Remove Connector,
then remove 7 mm
headed bolt, then
remove the Adapter
Sleeve*

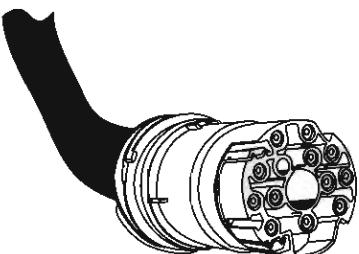
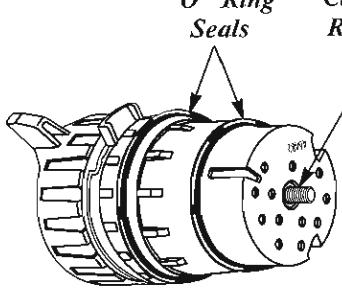
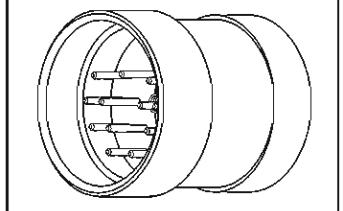
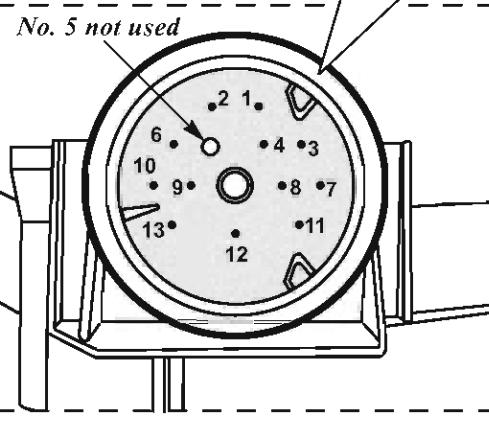


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Figure 1



CHRYSLER/DODGE NAG1 SOLENOID CIRCUIT FAULTS/CASE CONNECTOR LEAK

CASE CONNECTOR IDENTIFICATION																													
 Vehicle Harness Connector 5120265AA	 "O" Ring Seals Captured Brass Retaining Bolt Adapter Sleeve 68021352AA																												
	 Electrical Conductor Plate Connector																												
<table border="1"> <thead> <tr> <th>Pin</th><th>Function</th></tr> </thead> <tbody> <tr><td>1</td><td>N3 Input Speed Sensor Signal</td></tr> <tr><td>2</td><td>Modulation Pressure Control Solenoid Ground Control</td></tr> <tr><td>3</td><td>N2 Input Speed Sensor Signal</td></tr> <tr><td>4</td><td>TFT Sensor and P/N Switch Signal</td></tr> <tr><td>5</td><td>Not Used</td></tr> <tr><td>6</td><td>Battery Supply Voltage For All Solenoids</td></tr> <tr><td>7</td><td>Sensor 5V Supply Voltage</td></tr> <tr><td>8</td><td>2-3 Shift Solenoid Ground Control</td></tr> <tr><td>9</td><td>3-4 Shift Solenoid Ground Control</td></tr> <tr><td>10</td><td>Shift Pressure Control Solenoid Ground Control</td></tr> <tr><td>11</td><td>TCC Solenoid Ground Control</td></tr> <tr><td>12</td><td>Sensor Ground</td></tr> <tr><td>13</td><td>1-2/4-5 Shift Solenoid Ground Control</td></tr> </tbody> </table>	Pin	Function	1	N3 Input Speed Sensor Signal	2	Modulation Pressure Control Solenoid Ground Control	3	N2 Input Speed Sensor Signal	4	TFT Sensor and P/N Switch Signal	5	Not Used	6	Battery Supply Voltage For All Solenoids	7	Sensor 5V Supply Voltage	8	2-3 Shift Solenoid Ground Control	9	3-4 Shift Solenoid Ground Control	10	Shift Pressure Control Solenoid Ground Control	11	TCC Solenoid Ground Control	12	Sensor Ground	13	1-2/4-5 Shift Solenoid Ground Control	 No. 5 not used Electrical Conductor Plate Connector (Face View)
Pin	Function																												
1	N3 Input Speed Sensor Signal																												
2	Modulation Pressure Control Solenoid Ground Control																												
3	N2 Input Speed Sensor Signal																												
4	TFT Sensor and P/N Switch Signal																												
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10	Shift Pressure Control Solenoid Ground Control																												
11	TCC Solenoid Ground Control																												
12	Sensor Ground																												
13	1-2/4-5 Shift Solenoid Ground Control																												
SOLENOID OHMS TEST AT THE TCM OR CASE CONNECTOR																													
Component	Electrical Conductor Plate Term No's.	Resistance Specification																											
1-2/4-5 Shift Solenoid	6 & 13	2.5 - 6.5 Ohms																											
3-4 Shift Solenoid	6 & 9	2.5 - 6.5 Ohms																											
2-3 Shift Solenoid	6 & 8	2.5 - 6.5 Ohms																											
TCC (PWM) Solenoid	6 & 11	2.0 - 4.0 Ohms																											
Modulation Pressure Control (MPC) Solenoid	6 & 2	2.5 - 6.5 Ohms																											
Shift Pressure Control (SPC) Solenoid	6 & 10	2.5 - 6.5 Ohms																											
TFT Sensor	4 & 7	957 Ohms at room temp.																											

CHRYSLER/DODGE NAG1 SOLENOID CIRCUIT FAULTS/CASE CONNECTOR LEAK

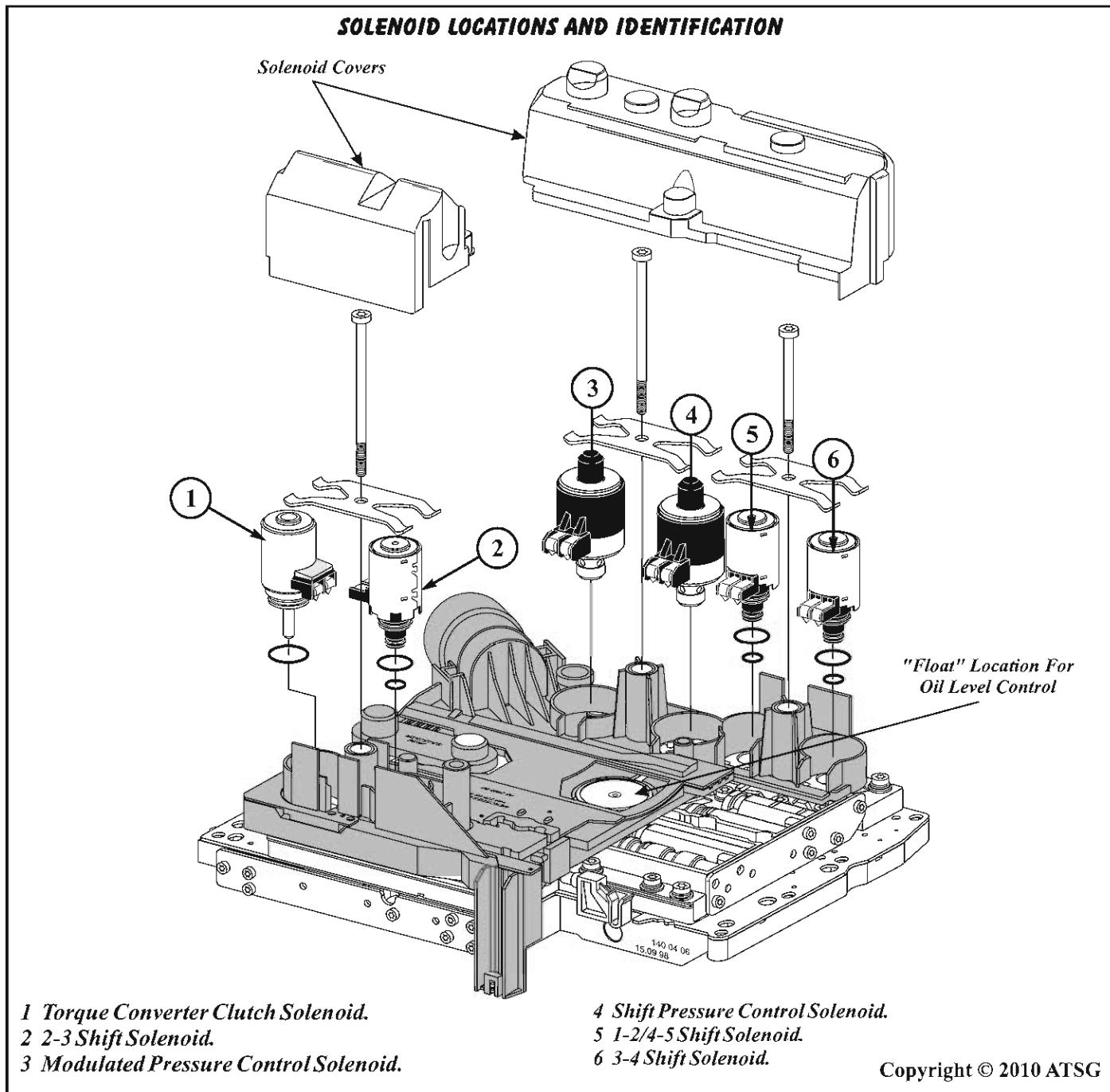


Figure 3

OBD-II GENERIC CODES

GLOBAL ELECTRICAL SOLENOID CODES

When scanning most OBD-II compliant computers, the scan tool may display a generic or global code which means it has the same code definition no matter what make vehicle it may be.

The generic definition can be extremely confusing because the generic definition may not disclose the real name of the component that has a malfunction thereby confusing the technician who may end up replacing the wrong component. When the governing forces put together the rules for OBD-II compliance, it stated that an OBD-II generic code must have the definition no matter what vehicle it is. This began in the U.S. and quickly spread to Europe and Asia. Refer to the OBD-II global definition conversion charts in Figures 1 to 42.

Refer to Figure 1 for Saturn TAAT codes.

Refer to Figure 2 for Saturn AF-33 codes.

Refer to Figure 3 for GM 6L50/80/90, 6T40 and 6T70/75 codes.

Refer to Figure 4 and 5 for Allison 1000/2000 Series codes.

Refer to Figure 6 for Ford 5R55E codes.

Refer to Figure 7 for Ford FNR5 codes.

Refer to Figure 8 and 9 for Ford 5R55N/W/S codes.

Refer to Figure 10 for 5R110W codes.

Refer to Figure 11 for AWF21, AF40-6, TF-80SC, AM6, AW6A-EL, AW6AX-EL codes.

Refer to Figure 12 for Dodge/Jeep 4XRE codes.

Refer to Figure 13 for Chrysler/Dodge/Jeep 41TE, 41TES, 42LE, 42RLE, 42RLE VLP codes.

Refer to Figure 14 for Dodge/Jeep 45RFE, 545RFE, 68RFE codes.

Refer to Figure 15 for Chrysler/Dodge/Jeep 62TE codes.

Refer to Figure 16 for Dodge AS68RC codes.

Refer to Figure 17 for JF506E, JA5A-EL codes.

Refer to Figure 18 for Volkswagen 09A codes.

Refer to Figure 19 for Volkswagen 01M, 01N, 01P codes.

Refer to Figure 20 for Volkswagen 09G, TF60SN, 09D, TR60SN codes.

Refer to Figure 21 for Volvo AW55-50SN codes.

Refer to Figure 22 for Nissan RE5F22A codes.

Refer to Figure 23 for Nissan/Infiniti RE5R05A codes.

Refer to Figure 24 for Subaru 5EAT codes.

Refer to Figure 25 for Toyota A541E codes.

Refer to Figure 26 for Toyota A245E, A246E codes.

Refer to Figure 27 for Toyota A343F codes.

Refer to Figure 28 for Toyota U140E, U241E (2000-2002) codes.

Refer to Figure 29 for Toyota U140E, U241E (2003 & Later) codes.

Refer to Figure 30 for Toyota U341E/F codes.

Refer to Figure 31 for Toyota U660E codes.

Refer to Figure 32 for Toyota U151E, U250E codes.

Refer to Figure 33 for Toyota A340E/F (2000 & Later) codes.

Refer to Figure 34 for Lexus A350E codes

Refer to Figure 35 for Lexus A650E codes.

Refer to Figure 36 for Toyota A750E codes.

Refer to Figure 37 for Toyota A761E/F, AB60E, A960E codes.

Refer to Figure 38 for Lexus AA80E codes.

Refer to Figure 39 for Hyundai/Kia F4A42/51, F5A51 codes.

Refer to Figure 40 for Mitsubishi F4A42/51, F5A51, R/V4A51, R/V5A51, Chrysler F4A42/51 codes.

Refer to Figure 41 for Hyundai A4AF3, A4BF2 codes.

Refer to Figure 42 for Hyundai/Kia A4CF2 codes.

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CHRYSLER
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left & right side.
STICK: A465, A525, A520, A555,
'78-UP, A578, left & right side.
Replacement seal:
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INPUT SHAFT REPAIR KITS

Avoids input shaft replacement.
Installs over the worn Input shaft.



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For ZF Transmissions 6.9 and 7.3 Diesel
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700-R4 REVERSE PISTON CAPSULE

77761C

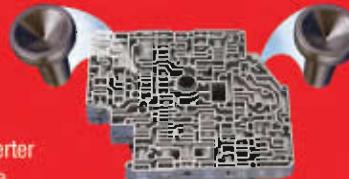
End 700-R4 reverse clutch burnout and
sluggish engagement. Install our flow
restricting capsule '87-UP.



CONVERTER DRAIN BACK/ PRESSURE RELIEF CAPSULE

96280

AXODE / AX4S / AX4N For converter
drain back and pressure release
failures.



22574SS
Shift lever sure
seal for Chrysler
transmissions
fits 904, 727,
518, 618, 404,
417 & 470



5607SS
Shift lever sure
seal for Ford
Transmissions
fits A4LD, AODE,
AOD, 4R44,
4R55, 5R55,
4R70W & 4R100



ANTI-CLUNK SPRING CENTER SUPPORT

76813

For AOD / AODE / 4R70W This spring is
curved differently so it will not ride in
same position in the case. Replaces the
OEM spring / saves the center support.



VALVE BODY PLATE BALL SEAT

VB-101

Save valve body
separator plate from check ball
damage. GM & FORD with 1/4"
balls.





4R70W VALVE BODY ALIGNMENT PIN ADAPTERS

76821

'93-'95 Old style case with the late model '96-Up valve body



SERVO EXTENDO PIN

Extend your servo pin length in seconds!

T84908G 4T65E (Forward Only)

T34913 400 and 4L80E Reverse

84572E 440-T4 (Both servos)

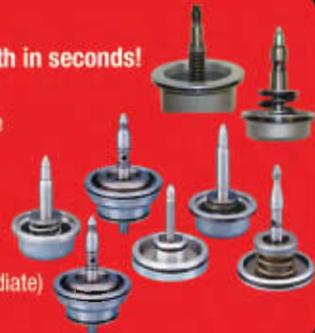
77605E 700-R4

77605G 4L60E

65786E 200-4R (early & late)

96946E AXODE (Low & intermediate)

56605E A4LD (reverse only)



C6M C-6 Mechanical Modulator



MS-AUDE

Fits '92-Early '95 AODE
WARNING: This product will not work in '96 up vehicles



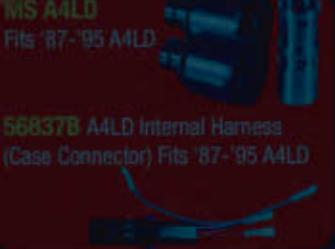
MS-AUDE '95

Fits '95-'97 AODE/4R70W
WARNING: This product will only work in '95 up vehicles



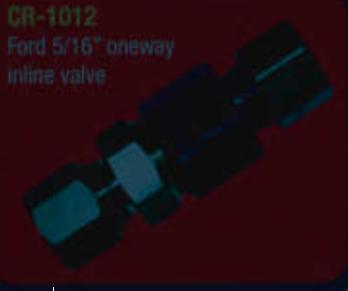
MS-A4LD

Fits '87-'95 A4LD



CR-1012

Ford 5/16" oneway inline valve



CHRYSLER COOLER LINE FITTINGS



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3/8" PUSH-IN



T22996D
1/2" SCREW-IN
LATE 40RE



T22996X
47,498E FOR
EXTERNAL COOLER



31117C
1/2" PUSH-IN

FORD COOLER PUSH-IN LINE FITTINGS



FS-190
11/16"
5/16" LINE



FS-200
13/16"
5/16" LINE



FS-210
11/16"
3/8" LINE

FORD SHIFT LINKAGE PIN REMOVAL KIT



TK-56-RTD

KIT FOR EASY REMOVAL AND REPLACEMENT. THIS KIT INCLUDES (1) 3MM PIN & (1) 1/8 IN. PIN. EASY PULL PINS FOR A4LD, 4R44, 4R55, SR55, AODE, AOD, 4R70W & 4R100. REPLACEMENT PINS AVAILABLE.



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98-UP LATE MODEL FRONT
WHEEL DRIVE BALL JOINT
REMOVER

FORD MODULAR ADJUSTMENT PIN

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TRANSMISSIONS WITH
A MODULATOR. MAKE
THE CORRECT PIN.



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**OBD-II GENERIC CODES
GLOBAL ELECTRICAL SOLENOID CODES**

SATURN TAAT			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0740	TORQUE CONVERTER CLUTCH SOLENOID	TCC ACTUATOR	LOCKUP SOLENOID
P0743	TORQUE CONVERTER CLUTCH SOLENOID	TCC ACTUATOR	LOCKUP SOLENOID
P0746	PRESSURE CONTROL SOLENOID A	LINE PRESSURE ACTUATOR	PRESSURE CONTROL SOLENOID
P0747	PRESSURE CONTROL SOLENOID A	LINE PRESSURE ACTUATOR	PRESSURE CONTROL SOLENOID
P0756	SHIFT SOLENOID B	2ND GEAR ACTUATOR	SHIFT SOLENOID 2
P0758	SHIFT SOLENOID B	2ND GEAR ACTUATOR	SHIFT SOLENOID 2
P0761	SHIFT SOLENOID C	3RD GEAR ACTUATOR	SHIFT SOLENOID 3
P0763	SHIFT SOLENOID C	3RD GEAR ACTUATOR	SHIFT SOLENOID 3
P0766	SHIFT SOLENOID D	4TH GEAR ACTUATOR	SHIFT SOLENOID 4
P0768	SHIFT SOLENOID D	4TH GEAR ACTUATOR	SHIFT SOLENOID 4
P0789	SHIFT TIMING SOLENOID	SHIFT TIMING SOLENOID	TCC, PCS, SS2, SS3 SS4 SOLENOIDS

Figure 1

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Exedy is a powertrain specialist and tier one supplier to the automotive industry world wide. Exedy's products range: From wet & dry friction material, torque converters, complete transmission systems for highway, off-highway and industrial applications.

Exedy is responsible to all 11 OE automotive vehicle manufacturers in Japan. For the conception of powertrain product requirements and needs.

In the US Exedy supplies Ford-GM-Chrysler, powertrain needs such as torque converters, wet friction material and standard clutch systems.

Worldwide Exedy has evolved through developing and patenting the core technologies such as friction, vibration and fluid technology.

Exedy products have been recognized by vehicle manufacturers all over the world. As a premium brand in Japan, Exedy products are valued so highly that our products are renowned all over the world by car manufactures. Exedy continues to hold a large share of the OEM market both domestically and internationally.

CORE TECHNOLOGY

FRICITION
Development of the highest quality FRICTION MATERIAL that can demonstrate the World's top level performance



FRICITION TECHNOLOGY

Excellent Capacity for Development for Fluid Technics



FLUID DYNAMICS
Having analyzed the fluid dynamics inside Torque Converter, EXEDY has successfully developed the most efficient product in the market

VIBRATION
We have developed the most efficient Damper that can absorb vibration from the engine more than ever.



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**OBD-II GENERIC CODES
GLOBAL ELECTRICAL SOLENOID CODES**

SATURN AF-33			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0962	PRESSURE CONTROL SOLENOID A	LINE PRESSURE CONTROL SOLENOID	SLT SOLENOID
P0963	PRESSURE CONTROL SOLENOID A	LINE PRESSURE CONTROL SOLENOID	SLT SOLENOID
P0966	PRESSURE CONTROL SOLENOID B	TCC LOCKUP PRESSURE CONTROL SOLENOID	SLU SOLENOID
P0967	PRESSURE CONTROL SOLENOID B	TCC LOCKUP PRESSURE CONTROL SOLENOID	SLU SOLENOID
P0970	PRESSURE CONTROL SOLENOID C	SHIFT PRESSURE CONTROL SOLENOID	SLS SOLENOID
P0971	PRESSURE CONTROL SOLENOID C	SHIFT PRESSURE CONTROL SOLENOID	SLS SOLENOID
P0973	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1 SOLENOID
P0974	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1 SOLENOID
P0976	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2 SOLENOID
P0977	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2 SOLENOID
P0979	SHIFT SOLENOID C	SHIFT SOLENOID 3	SS3 SOLENOID
P0980	SHIFT SOLENOID C	SHIFT SOLENOID 3	SS3 SOLENOID
P0982	SHIFT SOLENOID D	SHIFT SOLENOID 4	SS4 SOLENOID
P0983	SHIFT SOLENOID D	SHIFT SOLENOID 4	SS4 SOLENOID
P0985	SHIFT SOLENOID E	SHIFT SOLENOID 5	SS5 SOLENOID
P0986	SHIFT SOLENOID E	SHIFT SOLENOID 5	SS5 SOLENOID

Figure 2

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**OBD-II GENERIC CODES
GLOBAL ELECTRICAL SOLENOID CODES**

GM 6L50/80/90 - 6T40 - 6T70/75			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0962	PRESSURE CONTROL SOLENOID A	LINE PRESSURE CONTROL SOLENOID	PC SOLENOID
P0963	PRESSURE CONTROL SOLENOID A	LINE PRESSURE CONTROL SOLENOID	PC SOLENOID
P0966	PRESSURE CONTROL SOLENOID B	CLUTCH PRESSURE CONTROL SOLENOID 2	CPC SOLENOID 2
P0967	PRESSURE CONTROL SOLENOID B	CLUTCH PRESSURE CONTROL SOLENOID 2	CPC SOLENOID 2
P0970	PRESSURE CONTROL SOLENOID C	CLUTCH PRESSURE CONTROL SOLENOID 3	CPC SOLENOID 3
P0971	PRESSURE CONTROL SOLENOID C	CLUTCH PRESSURE CONTROL SOLENOID 3	CPC SOLENOID 3
P0973	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1 SOLENOID
P0974	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1 SOLENOID
P0976	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2 SOLENOID
P0977	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2 SOLENOID
P2720	PRESSURE CONTROL SOLENOID D	CLUTCH PRESSURE CONTROL SOLENOID 4	CPC SOLENOID 4
P2721	PRESSURE CONTROL SOLENOID D	CLUTCH PRESSURE CONTROL SOLENOID 4	CPC SOLENOID 4
P2729	PRESSURE CONTROL SOLENOID E	CLUTCH PRESSURE CONTROL SOLENOID 5	CPC SOLENOID 5
P2730	PRESSURE CONTROL SOLENOID E	CLUTCH PRESSURE CONTROL SOLENOID 5	CPC SOLENOID 5
P2763	TCC PRESSURE CONTROL SOLENOID	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID	TCC PC SOLENOID
P2764	TCC PRESSURE CONTROL SOLENOID	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID	TCC PC SOLENOID

Figure 3

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**OBD-II GENERIC CODES
GLOBAL ELECTRICAL SOLENOID CODES**

ALLISON 1000/2000 SERIES			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH PWM SOLENOID	TCC PRESSURE CONTROL SOLENOID	SOLENOID F
P0748	PRESSURE CONTROL SOLENOID A	CLUTCH PRESSURE CONTROL SOLENOID 1	A TRIM SOLENOID
P0763	SHIFT SOLENOID C	SHIFT SOLENOID 1	SS1
P0768	SHIFT SOLENOID D	SHIFT SOLENOID 2	SS2
P0773	SHIFT SOLENOID E	SHIFT SOLENOID 3	SS3
P0778	PRESSURE CONTROL SOLENOID B	CLUTCH PRESSURE CONTROL SOLENOID 2	B TRIM SOLENOID
P0960	PRESSURE CONTROL SOLENOID A	MAIN MODULATION SOLENOID	SOLENOID G
P0962	PRESSURE CONTROL SOLENOID A	MAIN MODULATION SOLENOID	SOLENOID G
P0963	PRESSURE CONTROL SOLENOID A	MAIN MODULATION SOLENOID	SOLENOID G
P0964	PRESSURE CONTROL SOLENOID B	CLUTCH PRESSURE CONTROL SOLENOID 2	PCS2
P0966	PRESSURE CONTROL SOLENOID B	CLUTCH PRESSURE CONTROL SOLENOID 2	PCS2
P0967	PRESSURE CONTROL SOLENOID B	CLUTCH PRESSURE CONTROL SOLENOID 2	PCS2
P0972	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1
P0973	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1
P0974	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1
P0975	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2
P0976	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2
P0977	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2

**OBD-II GENERIC CODES
GLOBAL ELECTRICAL SOLENOID CODES**

ALLISON 1000/2000 SERIES			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0978	SHIFT SOLENOID C	SHIFT SOLENOID 3	SS3
P0979	SHIFT SOLENOID C	SHIFT SOLENOID 3	SS3
P0980	SHIFT SOLENOID C	SHIFT SOLENOID 3	SS3
P1860	TCC PWM SOLENOID	TORQUE CONVERTER CLUTCH PWM SOLENOID	SOLENOID F
P2727	PRESSURE CONTROL SOLENOID E	PRESSURE CONTROL SOLENOID 1	PCS1
P02729	PRESSURE CONTROL SOLENOID E	PRESSURE CONTROL SOLENOID 1	PCS1
P2730	PRESSURE CONTROL SOLENOID E	PRESSURE CONTROL SOLENOID 1	PCS1
P2761	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID	TCC PCS CONTROL SOLENOID	SOLENOID F
P2763	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID	TCC PCS CONTROL SOLENOID	SOLENOID F
P2764	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID	TCC PCS CONTROL SOLENOID	SOLENOID F
P2810	PRESSURE CONTROL SOLENOID G	MAIN MODULATION CONTROL SOLENOID	SOLENOID G

Figure 5

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OBD-II GENERIC CODES

GLOBAL ELECTRICAL SOLENOID CODES

FORD 5R55E			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH SOLENOID	TCC SOLENOID	LOCKUP SOLENOID
P0750	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1
P0755	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2
P0760	SHIFT SOLENOID C	SHIFT SOLENOID 3	SS3
P0765	SHIFT SOLENOID D	COAST CLUTCH SOLENOID	CCS
P1754	SHIFT SOLENOID D	COAST CLUTCH SOLENOID	CCS
P1746	PRESSURE CONTROL SOLENOID A	ELECTRONIC PRESSURE CONTROL SOLENOID	EPC SOLENOID
P1747	PRESSURE CONTROL SOLENOID A	ELECTRONIC PRESSURE CONTROL SOLENOID	EPC SOLENOID

Figure 6

FORD FNRS			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0745	PRESSURE CONTROL SOLENOID A	ELECTRONIC PRESSURE CONTROL SOLENOID	PCA SOLENOID
P0753	SHIFT SOLENOID A	SHIFT SOLENOID PCA	SSPCA
P0758	SHIFT SOLENOID B	SHIFT SOLENOID PCB	SSPCB
P0763	SHIFT SOLENOID C	SHIFT SOLENOID PCC	SSPCC
P0768	SHIFT SOLENOID D	SHIFT SOLENOID D	SSD
P0773	SHIFT SOLENOID E	SHIFT SOLENOID E	SSE
P0778	PRESSURE CONTROL SOLENOID B	PRESSURE CONTROL SOLENOID B	PCB
P2709	SHIFT SOLENOID F	SHIFT SOLENOID F	SSF

Figure 7
Automatic Transmission Service Group



OBD-II GENERIC CODES GLOBAL ELECTRICAL SOLENOID CODES

FORD 5R55N/W/S			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0740	TORQUE CONVERTER CLUTCH SOLENOID	TCC SOLENOID	LOCKUP SOLENOID
P0743	TORQUE CONVERTER CLUTCH SOLENOID	TCC SOLENOID	LOCKUP SOLENOID
P0748	PRESSURE CONTROL SOLENOID A	PCA SOLENOID	_____
P0750	SHIFT SOLENOID A	SSA	SHIFT SOLENOID 1
P0753	SHIFT SOLENOID A	SSA	SHIFT SOLENOID 1
P0755	SHIFT SOLENOID B	SSB	SHIFT SOLENOID 2
P0758	SHIFT SOLENOID B	SSB	SHIFT SOLENOID 2
P0760	SHIFT SOLENOID C	SSC	SHIFT SOLENOID 3
P0763	SHIFT SOLENOID C	SSC	SHIFT SOLENOID 3
P0765	SHIFT SOLENOID D	SSD	SHIFT SOLENOID 4
P0768	SHIFT SOLENOID D	SSD	SHIFT SOLENOID 4
P0778	PRESSURE CONTROL SOLENOID B	PCB SOLENOID	_____
P0779	PRESSURE CONTROL SOLENOID B	PCB SOLENOID	_____
P0796	PRESSURE CONTROL SOLENOID C	PCC SOLENOID	_____
P0799	PRESSURE CONTROL SOLENOID C	PCC SOLENOID	_____
P0960	PRESSURE CONTROL SOLENOID A	PCA SOLENOID	_____
P0962	PRESSURE CONTROL SOLENOID A	PCA SOLENOID	_____
P0963	PRESSURE CONTROL SOLENOID A	PCA SOLENOID	_____
P0964	PRESSURE CONTROL SOLENOID B	PCB SOLENOID	_____

**OBD-II GENERIC CODES
GLOBAL ELECTRICAL SOLENOID CODES**

FORD 5R55N/W/S			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0966	PRESSURE CONTROL SOLENOID B	PCB SOLENOID	_____
P0967	PRESSURE CONTROL SOLENOID B	PCB SOLENOID	_____
P0968	PRESSURE CONTROL SOLENOID C	PCC SOLENOID	_____
P0970	PRESSURE CONTROL SOLENOID C	PCC SOLENOID	_____
P0971	PRESSURE CONTROL SOLENOID C	PCC SOLENOID	_____
PI746	PRESSURE CONTROL SOLENOID A	PCA SOLENOID	_____
P1747	PRESSURE CONTROL SOLENOID A	PCA SOLENOID	_____
P1760	PRESSURE CONTROL SOLENOID A	PCA SOLENOID	_____
P1788	PRESSURE CONTROL SOLENOID B	PCB SOLENOID	_____
P1789	PRESSURE CONTROL SOLENOID B	PCB SOLENOID	_____

Figure 9

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**OBD-II GENERIC CODES
GLOBAL ELECTRICAL SOLENOID CODES**

5R110W			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0740 P0742 P0743 P0744	TORQUE CONVERTER CLUTCH SOLENOID	TCC SOLENOID	LOCKUP SOLENOID
P0748 P0960 P0962 P0963	PRESSURE CONTROL SOLENOID A	PCA SOLENOID	LINE PRESSURE SOLENOID
P0750 P0753 P0973 P0974	SHIFT SOLENOID A	COAST CLUTCH SOLENOID	SSPC-A
P0758 P0976 P0977	SHIFT SOLENOID B	OVERDRIVE CLUTCH SOLENOID	SSPC-B
P0760 P0763 P0979 P0980	SHIFT SOLENOID C	INTERMEDIATE CLUTCH SOLENOID	SSPC-C
P0765 P0768 P0982 P0983	SHIFT SOLENOID D	DIRECT CLUTCH SOLENOID	SSPC-D
P0770 P0773 P0985 P0986	SHIFT SOLENOID E	LOW/REVERSE CLUTCH SOLENOID	SSPC-E Copyright © 2010 ATSG

Figure 10



OBD-II GENERIC CODES GLOBAL ELECTRICAL SOLENOID CODES

AWF21/AF40/TF-80SC/AM6/AW6A-EL/AW6AX-EL			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0961	PRESSURE CONTROL	PCA	SLT
P0962	SOLENOID A	SOLENOID	SOLENOID
P0963			
P0973	SHIFT	S1	SHIFT
P0974	SOLENOID A	SOLENOID	SOLENOID 1
P0976	SHIFT	S2	SHIFT
P0977	SOLENOID B	SOLENOID	SOLENOID 2
P0978	SHIFT	SLC1	SHIFT
P0979	SOLENOID C	SOLENOID	SOLENOID 3
P0980			
P0981	SHIFT	SLC2	SHIFT
P0982	SOLENOID D	SOLENOID	SOLENOID 4
P0983			
P0984	SHIFT	SLC3	SHIFT
P0985	SOLENOID E	SOLENOID	SOLENOID 5
P0986			
P0997	SHIFT	SLB1	SHIFT
P0998	SOLENOID F	SOLENOID	SOLENOID 6
P0999			
P2757	TORQUE CONVERTER	SLU	TCC
P2758	CLUTCH PRESSURE	SOLENOID	SOLENOID
P2762	CONTROL SOLENOID		
P2763			
P2764			

Figure 11

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OBD-II GENERIC CODES GLOBAL ELECTRICAL SOLENOID CODES

DODGE/JEEP 4XRE			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH SOLENOID	TCC SOLENOID	LOCKUP SOLENOID
P0748	PRESSURE CONTROL SOLENOID A	GOVERNOR PRESSURE CONTROL SOLENOID	GOVERNOR PRESSURE SOLENOID CONTROL
P0753	SHIFT SOLENOID A	3-4 SHIFT SOLENOID	OVERDRIVE SOLENOID

Figure 12

CHYRSLER/DODGE/JEEP 41TE/41TES*/42LE/42RLE/42RLE VLPS*			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0750	SHIFT SOLENOID A	LOW/REVERSE SOLENOID	_____
P0755	SHIFT SOLENOID B	2/4 SOLENOID	_____
P0760	SHIFT SOLENOID C	OVERDRIVE SOLENOID	_____
P0765	SHIFT SOLENOID D	UNDERDRIVE SOLENOID	_____

*The PCM in vehicles equipped the 41TES and the 42RLE VLP do not recognize an electrical circuit problem with the Pressure Control Solenoid, the system will store codes for high or low line pressure only.

Figure 13

DODGE/JEEP 45RFE/545RFE/68RFE			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0750	SHIFT SOLENOID A	LOW/REVERSE SOLENOID	_____
P0755	SHIFT SOLENOID B	2C SOLENOID	_____
P0760	SHIFT SOLENOID C	OVERDRIVE SOLENOID	_____
P0765	SHIFT SOLENOID D	UNDERDRIVE SOLENOID	_____
P0770	SHIFT SOLENOID E	4C SOLENOID	_____
P2706	SHIFT SOLENOID F	MS SOLENOID	MULTI-SELECT SOLENOID

Figure 14

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OBD-II GENERIC CODES

GLOBAL ELECTRICAL SOLENOID CODES

CHRYSLER/DODGE/JEEP 62TE			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0750	SHIFT SOLENOID A	LOW/REVERSE SOLENOID	_____
P0755	SHIFT SOLENOID B	2/4 SOLENOID	_____
P075A	SHIFT SOLENOID B	LC SOLENOID	LOW CLUTCH SOLENOID
P0760	SHIFT SOLENOID C	OVERDRIVE SOLENOID	_____
P0765	SHIFT SOLENOID D	UNDERDRIVE SOLENOID	_____
P076A	SHIFT SOLENOID D	DC SOLENOID	DIRECT CLUTCH SOLENOID
P2763 P2764	TORQUE CONVERTER PRESSURE CONTROL SOLENOID	EMCC VFS SOLENOID	TCC SOLENOID

Figure 15

DODGE AS68RC			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0745	PRESSURE CONTROL SOLENOID A	LINE PRESSURE SOLENOID	LINEAR SOLENOID 4 (LS4)
P0748	PRESSURE CONTROL SOLENOID A	PRESSURE CONTROL SOLENOID A	LINEAR SOLENOID 1 (LS1)
P0778	PRESSURE CONTROL SOLENOID B	PRESSURE CONTROL SOLENOID B	LINEAR SOLENOID 2 (LS2)
P0798	PRESSURE CONTROL SOLENOID C	PRESSURE CONTROL SOLENOID C	LINEAR SOLENOID 3 (LS3)
P0973 P0974	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1
P0976 P0977	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2
P0979 P0980	SHIFT SOLENOID C	SHIFT SOLENOID 3	SS3
P0982 P0983	SHIFT SOLENOID D	SHIFT SOLENOID 4	SS4
P2757	TORQUE CONVERTER PRESSURE CONTROL SOLENOID	TORQUE CONVERTER PRESSURE CONTROL SOLENOID	TCC SOLENOID

Figure 16

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OBD-II GENERIC CODES GLOBAL ELECTRICAL SOLENOID CODES

JF506E/JA5A-EL			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH SOLENOID	TORQUE CONVERTER CLUTCH SOLENOID	TCC SOLENOID
P0748	PRESSURE CONTROL SOLENOID A	LINE PRESSURE CONTROL SOLENOID	PRESSURE CONTROL SOLENOID
P0753	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1
P0758	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2
P0763	SHIFT SOLENOID C	SHIFT SOLENOID 3	SS3
P0768 (Mazda)	SHIFT SOLENOID D	REDUCTION TIMING SOLENOID	SS4
P0773 (Mazda)	SHIFT SOLENOID E	NEUTRAL SHIFT SOLENOID	SS5
P0778	PRESSURE CONTROL SOLENOID B	2-4 BRAKE DUTY SOLENOID	2-4 BRAKE SOLENOID
P0798	PRESSURE CONTROL SOLENOID C	HIGH CLUTCH SOLENOID	HIGH CLUTCH SOLENOID VALVE
P1745 (Jaguar)	PRESSURE REGULATOR 1	LOW CLUTCH TIMING SOLENOID	PRESSURE LINE SOLENOID 5
P1746 (Jaguar)	PRESSURE REGULATOR 2	REDUCTION TIMING SOLENOID	PRESSURE CONTROL SOLENOID A
P1747 (Jaguar)	PRESSURE REGULATOR 3	2-4 BRAKE TIMING SOLENOID	PRESSURE CONTROL SOLENOID A
P1748 (Land Rover)	PRESSURE REGULATOR 5	2-4 BRAKE SOLENOID	PRESSURE CONTROL SOLENOID A
P1785 (Land Rover)	CLUTCH TIMING SOLENOID	LOW CLUTCH TIMING SOLENOID	_____
P1786 (Land Rover)	REDUCTION TIMING SOLENOID	REDUCTION TIMING SOLENOID	_____
P1787 (Land Rover)	2-4 BRAKE TIMING SOLENOID	2-4 BRAKE TIMING SOLENOID	Copyright © 2010 ATSG

Figure 17

OBD-II GENERIC CODES GLOBAL ELECTRICAL SOLENOID CODES

VOLKSWAGEN 09A			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH SOLENOID	N91 SOLENOID	TCC SOLENOID SV 4
P0768	PRESSURE CONTROL SOLENOID A	N93 SOLENOID	PRESSURE CONTROL SOLENOID SV 6
P0753	SHIFT SOLENOID A	N88 SOLENOID	SHIFT SOLENOID A SV 1
P0758	SHIFT SOLENOID B	N89 SOLENOID	SHIFT SOLENOID B SV 2
P0763	SHIFT SOLENOID C	N90 SOLENOID	LOW CLUTCH TIMING SOLENOID SV 3
P0773	SHIFT SOLENOID E	N92 SOLENOID	SHIFT SOLENOID C SV 5
P0778	PRESSURE CONTROL SOLENOID B	N283 SOLENOID	2-4 BRAKE SOLENOID SV 10
P1823	This code globally will result in a Transfer Case fault	N281 SOLENOID	REDUCTION TIMING SOLENOID SV 8
P1828	This code globally will result in a Transfer Case fault	N282 SOLENOID	2-4 BRAKE TIMING SOLENOID SV 9

Figure 18

VOLKSWAGEN 01M/01N/01P			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0748	PRESSURE CONTROL SOLENOID A	N93 SOLENOID	EV6 SOLENOID
P0753	SHIFT SOLENOID A	N88 SOLENOID	EV1 SOLENOID
P0758	SHIFT SOLENOID B	N89 SOLENOID	EV2 SOLENOID
P0763	SHIFT SOLENOID C	N90 SOLENOID	EV3 SOLENOID
P0768	SHIFT SOLENOID D	N91 SOLENOID	EV4 SOLENOID
P0773	SHIFT SOLENOID E	N92 SOLENOID	EV5 SOLENOID
P0785	SHIFT/TIMING SOLENOID	N94 SOLENOID	EV7 SOLENOID

Figure 19

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OBD-II GENERIC CODES

GLOBAL ELECTRICAL SOLENOID CODES

VOLKSWAGEN 09G/TF60SN - 09D/TR60SN			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH SOLENOID	N91 SOLENOID	TCC SOLENOID SV 4
P0748	PRESSURE CONTROL SOLENOID A	N93 SOLENOID	PRESSURE CONTROL SOLENOID SV 6
P0753	SHIFT SOLENOID A	N88 SOLENOID	SHIFT SOLENOID A SV 1
P0758	SHIFT SOLENOID B	N89 SOLENOID	SHIFT SOLENOID B SV 2
P0798	PRESSURE CONTROL SOLENOID C	N90 SOLENOID	K3 CLUTCH SOLENOID SV 3
P2716	PRESSURE CONTROL SOLENOID D	N92 SOLENOID	K1 CLUTCH SOLENOID SV 5
P2725	PRESSURE CONTROL SOLENOID E	N283 SOLENOID	B1 CLUTCH SV 10
P2734	PRESSURE CONTROL SOLENOID F	N282 SOLENOID	K2 CLUTCH SOLENOID SV 9

Figure 20

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OBD-II GENERIC CODES

GLOBAL ELECTRICAL SOLENOID CODES

VOLVO AW55-50SN			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0748	PRESSURE CONTROL SOLENOID A	SLT SOLENOID	LINE PRESSURE SOLENOID
P0753	SHIFT SOLENOID A	S1 SOLENOID	SHIFT SOLENOID 1
P0758	SHIFT SOLENOID B	S2 SOLENOID	SHIFT SOLENOID 2
P0763	SHIFT SOLENOID C	S3 SOLENOID	SHIFT SOLENOID 3
P0768	SHIFT SOLENOID D	S4 SOLENOID	SHIFT SOLENOID 4
P0773	SHIFT SOLENOID E	S5 SOLENOID	SHIFT SOLENOID 5
P0778	PRESSURE CONTROL SOLENOID B	SLU SOLENOID	TORQUE CONVERTER CLUTCH SOLENOID
P0798	PRESSURE CONTROL SOLENOID C	SLS SOLENOID	CLUTCH PRESSURE CONTROL SOLENOID

Figure 21

NISSAN RESF22A			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0745	PRESSURE CONTROL SOLENOID A	LINE PRESSURE SOLENOID	SLT SOLENOID
P0750	SHIFT SOLENOID A	S1 SOLENOID	SHIFT SOLENOID 1
P0755	SHIFT SOLENOID B	S2 SOLENOID	SHIFT SOLENOID 2
P0760	SHIFT SOLENOID C	S3 SOLENOID	SHIFT SOLENOID 3
P0765	SHIFT SOLENOID D	S4 SOLENOID	SHIFT SOLENOID 4
P0770	SHIFT SOLENOID E	S5 SOLENOID	SHIFT SOLENOID 5
P0775	PRESSURE CONTROL SOLENOID B	SLU SOLENOID	TORQUE CONVERTER CLUTCH SOLENOID
P0795	PRESSURE CONTROL SOLENOID C	SLS SOLENOID	CLUTCH PRESSURE CONTROL SOLENOID

Figure 22

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OBD-II GENERIC CODES GLOBAL ELECTRICAL SOLENOID CODES

NISSAN/INFINITI RE5R05A			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0740	TORQUE CONVERTER CLUTCH SOLENOID	TORQUE CONVERTER CLUTCH SOLENOID	LOCKUP SOLENOID
P0745	PRESSURE CONTROL SOLENOID A	LINE PRESSURE SOLENOID	_____
P1752	SHIFT SOLENOID A	INPUT CLUTCH SOLENOID	SHIFT SOLENOID 1
P1757	SHIFT SOLENOID B	FORWARD BRAKE CLUTCH SOLENOID	SHIFT SOLENOID 2
P1762	SHIFT SOLENOID C	DIRECT CLUTCH SOLENOID	SHIFT SOLENOID 3
P1767	SHIFT SOLENOID D	HIGH-LOW/REVERSE SOLENOID	SHIFT SOLENOID 4
P1772	SHIFT SOLENOID E	LOW COAST BRAKE CLUTCH SOLENOID	SHIFT SOLENOID 5

Figure 23

SUBARU 5EAT			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH SOLENOID	TORQUE CONVERTER CLUTCH SOLENOID	LOCKUP SOLENOID
P0748	PRESSURE CONTROL SOLENOID A	LINE PRESSURE SOLENOID	_____
P0753	SHIFT SOLENOID A	SHIFT SOLENOID A	SHIFT SOLENOID 1
P0758	SHIFT SOLENOID B	SHIFT SOLENOID B	SHIFT SOLENOID 2
P0763	SHIFT SOLENOID C	SHIFT SOLENOID C	SHIFT SOLENOID 3
P0768	SHIFT SOLENOID D	SHIFT SOLENOID D	SHIFT SOLENOID 4
P0773	SHIFT SOLENOID E	SHIFT SOLENOID E	SHIFT SOLENOID 5

Figure 24

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OBD-II GENERIC CODES

GLOBAL ELECTRICAL SOLENOID CODES

TOYOTA A541E			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0753	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1
P0758	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2
P0773	SOLENOID E	SL SOLENOID	LOCK-UP SOLENOID
*P1765 <i>(A541E ONLY)</i>	LINEAR SHIFT SOLENOID	SLN SOLENOID	ACCUMULATOR BACK PRESSURE SOLENOID

Figure 25

TOYOTA A245E - A246E			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0973	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1
P0974	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1
P0976	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2
P0977	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2
P2716	PRESSURE CONTROL SOLENOID D	SLT SOLENOID	SHIFT SOLENOID VALVE SLT
P2769	SHIFT SOLENOID E	SL SOLENOID	TORQUE CONVERTER CLUTCH SOLENOID
P2770	SHIFT SOLENOID E	SL SOLENOID	TORQUE CONVERTER CLUTCH SOLENOID

Figure 26

TOYOTA A343F			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0753	SHIFT SOLENOID A	SHIFT SOLENOID 1	SS1
P0758	SHIFT SOLENOID B	SHIFT SOLENOID 2	SS2
P0773	SOLENOID E	SL SOLENOID	LOCK-UP SOLENOID
P1760	LINEAR SHIFT SOLENOID FOR LINE PRESSURE	SLT SOLENOID	SS4 Copyright © 2010 ATSG

Figure 27



OBD-II GENERIC CODES GLOBAL ELECTRICAL SOLENOID CODES

TOYOTA U140E - U241E (2000 - 2002)			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0753	SHIFT SOLENOID A	SHIFT SOLENOID VALVE SL1	SL1 SOLENOID
P0758	SHIFT SOLENOID B	SHIFT SOLENOID VALVE SL2	SL2 SOLENOID
P0768	SHIFT SOLENOID D	SHIFT SOLENOID VALVE S4	S4 SOLENOID
P0773	SHIFT SOLENOID E	SHIFT SOLENOID VALVE DSL	TORQUE CONVERTER CLUTCH SOLENOID
P1760	SHIFT SOLENOID VALVE 4	SHIFT SOLENOID VALVE SLT	LINEAR SOLENOID FOR LINE PRESSURE

Figure 28

TOYOTA U140E - U241E (2003 & LATER)			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH SOLENOID	DSL SOLENOID	SHIFT SOLENOID VALVE DSL
P0748	PRESSURE CONTROL SOLENOID A	SHIFT SOLENOID VALVE SL1	SL1 SOLENOID
P0778	PRESSURE CONTROL SOLENOID B	SHIFT SOLENOID VALVE SL2	SL2 SOLENOID
P0982	SHIFT SOLENOID B	SHIFT SOLENOID VALVE S4	S4 SOLENOID
P0983	SHIFT SOLENOID B	SHIFT SOLENOID VALVE S4	S4 SOLENOID
P2716	PRESSURE CONTROL SOLENOID D	SHIFT SOLENOID VALVE SLT	SLT SOLENOID
P2769	SHIFT SOLENOID E	SL SOLENOID	TORQUE CONVERTER CLUTCH SOLENOID
P2770	SHIFT SOLENOID E	SL SOLENOID	TORQUE CONVERTER CLUTCH SOLENOID

Figure 29

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OBD-II GENERIC CODES

TOYOTA U341E/F			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0787	SHIFT/TIMING SOLENOID	SHIFT SOLENOID VALVE ST	ST SOLENOID
P0788	SHIFT/TIMING SOLENOID	SHIFT SOLENOID VALVE ST	ST SOLENOID
P0973	SHIFT SOLENOID A	SHIFT SOLENOID VALVE S1	SSI SOLENOID
P0974	SHIFT SOLENOID A	SHIFT SOLENOID VALVE S1	SSI SOLENOID
P0976	SHIFT SOLENOID B	SHIFT SOLENOID VALVE S2	SS2 SOLENOID
P0977	SHIFT SOLENOID B	SHIFT SOLENOID VALVE S2	SS2 SOLENOID
P2716	PRESSURE CONTROL SOLENOID D	SHIFT SOLENOID VALVE SLT	SLT SOLENOID
P2769	TORQUE CONVERTER CLUTCH SOLENOID	SLU SOLENOID	SHIFT SOLENOID VALVE SL
P2770	TORQUE CONVERTER CLUTCH SOLENOID	SLU SOLENOID	SHIFT SOLENOID VALVE SL

Figure 30

TOYOTA U660E			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0748	PRESSURE CONTROL SOLENOID A	SHIFT SOLENOID VALVE SL1	SL1 SOLENOID
P0778	PRESSURE CONTROL SOLENOID B	SHIFT SOLENOID VALVE SL2	SL2 SOLENOID
P0798	PRESSURE CONTROL SOLENOID C	SHIFT SOLENOID VALVE SL3	SL3 SOLENOID
P2716	PRESSURE CONTROL SOLENOID D	SHIFT SOLENOID VALVE SLT	SLT SOLENOID
P2759	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID	SLU SOLENOID	TORQUE CONVERTER CLUTCH SOLENOID
P2769	TORQUE CONVERTER CLUTCH SOLENOID	SHIFT SOLENOID VALVE SL	SL SOLENOID
P2770	TORQUE CONVERTER CLUTCH SOLENOID	SHIFT SOLENOID VALVE SL	SL SOLENOID
P2810	PRESSURE CONTROL SOLENOID D	SHIFT SOLENOID VALVE SL4	SL4 SOLENOID

Figure 31

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TOYOTA U151E/U250E			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0748	PRESSURE CONTROL SOLENOID A	SHIFT SOLENOID VALVE SL1	SL1 SOLENOID
P0778	PRESSURE CONTROL SOLENOID B	SHIFT SOLENOID VALVE SL2	SL2 SOLENOID
P0798	PRESSURE CONTROL SOLENOID C	SHIFT SOLENOID VALVE SL3	SL3 SOLENOID
P0982	SHIFT SOLENOID B	SHIFT SOLENOID VALVE S4	S4 SOLENOID
P0983	SHIFT SOLENOID B	SHIFT SOLENOID VALVE S4	S4 SOLENOID
P0985	SHIFT SOLENOID E	SHIFT SOLENOID VALVE SR	SR SOLENOID
P0986	SHIFT SOLENOID E	SHIFT SOLENOID VALVE SLT	SLT SOLENOID
P2716	PRESSURE CONTROL SOLENOID D	SHIFT SOLENOID VALVE SLT	SLT SOLENOID
P2769	TORQUE CONVERTER CLUTCH SOLENOID	SHIFT SOLENOID VALVE DSL	DSL SOLENOID
P2770	TORQUE CONVERTER CLUTCH SOLENOID	SHIFT SOLENOID VALVE DSL	DSL SOLENOID

Figure 32

TOYOTA A340E/F (2000 & LATER)			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH SOLENOID	SHIFT SOLENOID VALVE SL	SL SOLENOID
P0753	SHIFT SOLENOID A	SHIFT SOLENOID VALVE #1	SS1 SOLENOID
P0758	SHIFT SOLENOID B	SHIFT SOLENOID VALVE #2	SS2 SOLENOID
P0973	SHIFT SOLENOID A	SHIFT SOLENOID VALVE #1	SS1 SOLENOID
P0974	SHIFT SOLENOID A	SHIFT SOLENOID VALVE #1	SS1 SOLENOID
P0976	SHIFT SOLENOID B	SHIFT SOLENOID VALVE #2	SS2 SOLENOID
P0977	SHIFT SOLENOID B	SHIFT SOLENOID VALVE #2	SS2 SOLENOID
P2716	PRESSURE CONTROL SOLENOID D	SHIFT SOLENOID VALVE SLT	SLT SOLENOID

Figure 33



LEXUS A350E			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0753	SHIFT SOLENOID A	SHIFT SOLENOID VALVE 1	SS1
P0758	SHIFT SOLENOID B	SHIFT SOLENOID VALVE 2	SS2
P0763	SHIFT SOLENOID C	SHIFT SOLENOID VALVE 3	SS3
P1755	SHIFT SOLENOID E	SHIFT SOLENOID VALVE SLU	LOCKUP SOLENOID
P1760	SHIFT SOLENOID VALVE 4	SHIFT SOLENOID VALVE SLT	LINE PRESSURE SOLENOID
P1765	LINEAR SHIFT SOLENOID	SHIFT SOLENOID VALVE SLN	ACCUMULATOR BACK PRESSURE SOLENOID

Figure 34

LEXUS A650E			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0973	SHIFT SOLENOID A	SHIFT SOLENOID VALVE S1	S1 SOLENOID
P0974	SHIFT SOLENOID A	SHIFT SOLENOID VALVE S1	S1 SOLENOID
P0976	SHIFT SOLENOID B	SHIFT SOLENOID VALVE S2	S2 SOLENOID
P0977	SHIFT SOLENOID B	SHIFT SOLENOID VALVE S2	S2 SOLENOID
P0979	SHIFT SOLENOID C	SHIFT SOLENOID VALVE S3	S3 SOLENOID
P0980	SHIFT SOLENOID C	SHIFT SOLENOID VALVE S3	S3 SOLENOID
P0982	SHIFT SOLENOID D	SHIFT SOLENOID VALVE S4	S4 SOLENOID
P0983	SHIFT SOLENOID D	SHIFT SOLENOID VALVE S4	S4 SOLENOID
P2716	PRESSURE CONTROL SOLENOID D	SHIFT SOLENOID VALVE SLT	SLT SOLENOID
P2725	PRESSURE CONTROL SOLENOID E	SHIFT SOLENOID VALVE SLN	ACCUMULATOR BACK PRESSURE SOLENOID
P2759	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID	SHIFT SOLENOID VALVE SLU	SLU SOLENOID

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Figure 35
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OBD-II GENERIC CODES GLOBAL ELECTRICAL SOLENOID CODES

TOYOTA A750E			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0748	PRESSURE CONTROL SOLENOID A	SHIFT SOLENOID VALVE SL1	SL1 SOLENOID
P0778	PRESSURE CONTROL SOLENOID B	SHIFT SOLENOID VALVE SL2	SL2 SOLENOID
P0973	SHIFT SOLENOID A	SHIFT SOLENOID VALVE S1	S1 SOLENOID
P0974	SHIFT SOLENOID A	SHIFT SOLENOID VALVE S1	S1 SOLENOID
P0976	SHIFT SOLENOID B	SHIFT SOLENOID VALVE S2	S2 SOLENOID
P0977	SHIFT SOLENOID B	SHIFT SOLENOID VALVE S2	S2 SOLENOID
P0985	SHIFT SOLENOID E	SHIFT SOLENOID VALVE SR	SR SOLENOID
P0986	SHIFT SOLENOID E	SHIFT SOLENOID VALVE SR	SR SOLENOID
P2716	PRESSURE CONTROL SOLENOID D	SHIFT SOLENOID VALVE SLT	SLT SOLENOID
P2759	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID	SHIFT SOLENOID VALVE SLU	SLU SOLENOID

Figure 36

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**OBD-II GENERIC CODES
GLOBAL ELECTRICAL SOLENOID CODES**

TOYOTA A761E/F - AB60E - A960E			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0748	PRESSURE CONTROL SOLENOID A	SHIFT SOLENOID VALVE SL1	SL1 SOLENOID
P0778	PRESSURE CONTROL SOLENOID B	SHIFT SOLENOID VALVE SL2	SL2 SOLENOID
P0973	SHIFT SOLENOID A	SHIFT SOLENOID VALVE S1	S1 SOLENOID
P0974	SHIFT SOLENOID A	SHIFT SOLENOID VALVE S1	S1 SOLENOID
P0976	SHIFT SOLENOID B	SHIFT SOLENOID VALVE S2	S2 SOLENOID
P0977	SHIFT SOLENOID B	SHIFT SOLENOID VALVE S2	S2 SOLENOID
P0979	SHIFT SOLENOID C	SHIFT SOLENOID VALVE S3	S3 SOLENOID
P0980	SHIFT SOLENOID C	SHIFT SOLENOID VALVE S3	S3 SOLENOID
P0982	SHIFT SOLENOID D	SHIFT SOLENOID VALVE S4	S4 SOLENOID
P0983	SHIFT SOLENOID D	SHIFT SOLENOID VALVE S4	S4 SOLENOID
P0985	SHIFT SOLENOID E	SHIFT SOLENOID VALVE SR	SR SOLENOID
P0986	SHIFT SOLENOID E	SHIFT SOLENOID VALVE SR	SR SOLENOID
P2716	PRESSURE CONTROL SOLENOID D	SHIFT SOLENOID VALVE SLT	SLT SOLENOID
P2759	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID	SHIFT SOLENOID VALVE SLU	SLU SOLENOID

Figure 37

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OBD-II GENERIC CODES GLOBAL ELECTRICAL SOLENOID CODES

LEXUS AA80E			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0748	PRESSURE CONTROL SOLENOID A	SHIFT SOLENOID VALVE SLI	SL1 SOLENOID
P0778	PRESSURE CONTROL SOLENOID B	SHIFT SOLENOID VALVE SL2	SL2 SOLENOID
P0798	PRESSURE CONTROL SOLENOID C	SHIFT SOLENOID VALVE SL3	SL3 SOLENOID
P0985	SHIFT SOLENOID E	SHIFT SOLENOID VALVE SR	SR SOLENOID
P0986	SHIFT SOLENOID E	SHIFT SOLENOID VALVE SR	SR SOLENOID
P2716	PRESSURE CONTROL SOLENOID D	SHIFT SOLENOID VALVE SLT	SLT SOLENOID
P2759	TORQUE CONVERTER CLUTCH PRESSURE CONTROL SOLENOID	SHIFT SOLENOID VALVE SLU	SLU SOLENOID
P2769	TORQUE CONVERTER CLUTCH SOLENOID	SHIFT SOLENOID VALVE SL	SL SOLENOID
P2770	TORQUE CONVERTER CLUTCH SOLENOID	SHIFT SOLENOID VALVE SL	SL SOLENOID
P2810	PRESSURE CONTROL SOLENOID G	SHIFT SOLENOID VALVE SL4	SL4 SOLENOID
P2819	PRESSURE CONTROL SOLENOID H	SHIFT SOLENOID VALVE SL5	SL5 SOLENOID

Figure 38

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OBD-II GENERIC CODES GLOBAL ELECTRICAL SOLENOID CODES

HYUNDAI/KIA F4A42/51 - F5A51			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH SOLENOID	TCC SOLENOID VALVE	LOCKUP SOLENOID
P0750	SHIFT SOLENOID A	LOW/REVERSE SOLENOID VALVE	SS1
P0755	SHIFT SOLENOID B	UNDERDRIVE SOLENOID VALVE	SS2
P0760	SHIFT SOLENOID C	SECOND SOLENOID VALVE	SS3
P0765	SHIFT SOLENOID D	OVERDRIVE SOLENOID VALVE	SS4
P0770	SHIFT SOLENOID E	REDUCTION SOLENOID VALVE	SS5

Figure 39

MITSUBISHI F4A42/51 - F5A51 - R/V4A51/R/V5A51 - CHRYSLER F4A42/51			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH SOLENOID	TCC SOLENOID VALVE	LOCKUP SOLENOID
P0753	SHIFT SOLENOID A	LOW/REVERSE SOLENOID VALVE	SS1
P0758	SHIFT SOLENOID B	UNDERDRIVE SOLENOID VALVE	SS2
P0763	SHIFT SOLENOID C	SECOND SOLENOID VALVE	SS3
P0768	SHIFT SOLENOID D	OVERDRIVE SOLENOID VALVE	SS4
P0773	SHIFT SOLENOID E	REDUCTION SOLENOID VALVE	SS5

Figure 40

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OBD-II GENERIC CODES GLOBAL ELECTRICAL SOLENOID CODES

HYUNDAI A4AF3/A4BF2			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH SOLENOID	DAMPER CLUTCH SOLENOID	LOCKUP SOLENOID
P0745	PRESSURE CONTROL SOLENOID A	PRESSURE CONTROL SOLENOID A	_____
P0750	SHIFT SOLENOID A	SHIFT SOLENOID A	SS1
P0755	SHIFT SOLENOID B	SHIFT SOLENOID B	SS2
P0760	SHIFT SOLENOID C	SHIFT SOLENOID C	SS3
P0775	PRESSURE CONTROL SOLENOID B	PRESSURE CONTROL SOLENOID B	_____

Figure 41

HYUNDAI/KIA A4CF2			
CODE #	GENERIC NAME	MANUFACTURER NAME	ALSO KNOWN AS
P0743	TORQUE CONVERTER CLUTCH SOLENOID	TCC CONTROL SOLENOID VALVE	LOCKUP SOLENOID
P0748	PRESSURE CONTROL SOLENOID A	VFS SOLENOID VALVE	PSCV-A
P0750	SHIFT SOLENOID A	SCSV SOLENOID VALVE	SOLENOID CONTROL SHIFT VALVE A
P0755	SHIFT SOLENOID B	OD/LR SOLENOID VALVE	PCSV-A
P0760	SHIFT SOLENOID C	2-4 SOLENOID VALVE	PCSV-B
P0765	SHIFT SOLENOID D	UNDERDRIVE SOLENOID VALVE	PCSV-C

Figure 42



NETWORK DIAGNOSTICS PART DEUX

THE UBIQUITOUS U CODE

COMPLAINT: OBD-II U-Codes can be either easy, or misleading and difficult to understand, just like P-Codes.

CAUSE: Because there are so many different manufacturers, so many different engineers within those manufacturers, and so few standards for code meanings, U-codes can often be as difficult to figure out as P-codes are.

CORRECTION: A knowledge of the system, some new terms, a different way of signal tracking, and a good wiring diagram can get you out of most of these problems. Tracking bus signal and troubleshooting bus wiring was covered in the 2009 Seminar Red book Page 114.

SERVICE INFORMATION:

The U Codes of the OBDII standard deal strictly with computer network issues. Some of these issues may be a problem with the actual bus wiring itself, some may be problems with a module or group of modules, and some may be sensor related.

The first 100 codes (U-0001 to U0099) all refer to actual bus faults. They all use the terms "Communication Bus," or "Network Electrical." These will always be a wiring fault or a bad bus interface in a module. Sometimes all of the modules on a bus are fed by the same power or ground so have a look at that as well.

The next 200 codes (U-0100 to U-0299) call out lost communications with a specific module. This will generally indicate a problem with the module itself, but wiring faults on data, power, and ground cannot be completely ruled out.

The next 100 codes (U-300 to U399) are "Software Incompatibility" codes. Most of them specify which module has the incompatibility. This will almost always be a problem with the module, and will almost always be the wrong module used as a replacement. It would be very very rare for a modules firmware to be screwed up enough to generate a software incompatibly code but still be working enough to communicate at all. It would be even more rare for a bus wiring fault to allow communication but mess up the data enough to cause a software incompatibility code rather than a no communication code. It is also remotely possible that an incorrect flash may have caused the problem. Try reflashing back to what was there before. One last possibility is bad system voltage, ground, or power noise.

The next 100 codes (U-400 to U-499) are all "Invalid Data" codes. "Invalid" in this case (for this code) does not mean that the information received cannot be correct. What it means is that based on some mathematics (parity, CRC, Etc.) The data that was received does not match the data that was sent. Most of these codes specify a module that is the source of the invalid data. Similar to the Software Incompatibility codes, this is almost always going to be a module. Interference or noise on the bus wiring from that module, in the module itself, or in the modules power line could also cause this type of fault. Again, lets not forget power and ground.



NETWORK DIAGNOSTICS PART DEUX THE UBIQUITOUS U CODE

There are no definitions for "U-Zero" or "U-Oh" codes above 500. Like the "P" codes, codes that start with a zero are "generic" codes, and codes that start with a one are manufacturer specific. Also like the "P" codes, the manufacturers take great liberties in their terminology. Just to make it easier on all of us, the same code number can have different meanings for different OEM's.

For example, code U-1101 has four different meanings from five different OEM's:

U-1101-Ford/Mazda: (SCP) (J1850) Communications Bus Fault

U-1101-Chrysler: Lost Communication with PTS Display - Rear 1

U-1101-Mitsubishi: T/M CAN Timeout/Not equipped

U-1101-Toyota: Generator Inverter Temperature Sensor Circuit High

Obviously, the first thing you have to do is determine the correct meaning of the code you are looking at. If you have OEM code lists available, go with that. There are many resources available on the web as well, such as <http://atsg.com> and click on "NEW OBDII Code Lookup Tool" on the right side links.

Once you have the code "meaning" you have to figure out what they really "mean." Here is a guide for interpreting (and some troubleshooting) for various terms used in the "U-One" codes:

Any "Bus Fault" (including "Communication Bus Fault"). A bus fault almost always means that the bus itself is down. This can be partial or complete, but a complete bus failure often results in a "no scanner communications" fault. Bus faults sometimes include the bus, or the protocol that is faulting. For example, Code U-1001 in a Chrysler is CAN Bus B. This is specifying which bus is faulting. A look at the wiring diagram will show the wiring for CAN Bus A, CAN bus B, and possibly other CAN Buses. You only need to check CAN Bus B wiring in this case. The same code (U-1001) on a Ford or Mazda states that one of the buses (or the bus) that uses the SCP J1850 Protocol is faulting. Again, a look at the wiring diagram should show which bus or busses use this protocol. Although Bus Faults are usually a wiring problem, they are often a bad module causing that bus, or that section of a bus to go down. Don't forget about power wires and grounds common to the faulted bus.

"Communication" or "Communications" almost always refers to DATA communications on the network between modules. It rarely (if ever) refers to communications between a module input or output and a device on the vehicle. For example, Code U-1026 on a GM vehicle is described as "Loss Of Active Transfer Case Control Module Communications." This does not mean that the module is not communicating with the Transfer Case, it means that the Transfer Case's control module is not communicating with the bus. These problems can be caused by a bad module, bad wiring to that particular module, bad system voltage, noise at that module, or a bad ground at that module.

The word "Circuit" can have two meanings depending upon the code. It can either mean the "Communications Circuit" which is the data bus (see the word "Communications" above) or it can mean an input or output circuit. For example, U-1007 on a Chrysler is described as "J1850/PCI Bus Circuit High." So they are talking about a fault on the PCI bus (probably an open circuit, see "high" below). A code U-1101 on a Toyota is described as "Generator Inverter Temperature Sensor Circuit High" which means that the module is detecting an out of range high (open circuit) voltage level on the temperature sensor in the motor generator set.



NETWORK DIAGNOSTICS PART DEUX

THE UBIQUITOUS U CODE

"ID" or "Node ID." Everything in a network has some way to uniquely identify itself. In the shop's computer network the devices (computers, routers, printers, etc) use IP addresses or MAC addresses. In all automotive networks this unique identifier is the Node ID number. In most networks this is a two digit hexadecimal number, although some systems will use one or three digits, and some may use decimal or octal numbering systems. This type of code will always be a problem in one of the modules. Either the peripheral module is using the wrong ID (improper part replacement) or the Main Central module has the wrong Node ID in the lookup table (improper flash or replacement part).

"High or (+)" and "Low or (-)" These terms may have two meanings. When referring to a bus it is talking about which wire. When referring to data it normally means an out of range condition. Most of these busses are voltage differential signals where normally (no data) one wire is a negative voltage (low or (-)) when compared to the other (High or (+)) wire. For the data meaning, an out of range high means that the sensor probably has an open circuit (or is at supply voltage for some reason). An out of range low generally means a short to ground (or the signal wire is at ground for some reason). Even though the error code description does not say "out of range" that is what it means.

"Transmit" and "Receive." This is always referring to the data bus wiring. In some systems half the wires are used for transmitting data and the other half are used for receiving data. Who is the transmitter and who is the receiver is a bit like the terms "Upload" and "Download" in regular computer terminology. It all depends on your point of view. For troubleshooting it doesn't really matter which way the data is moving. The error code will match the way the wire is labeled in the wiring diagram.

"Invalid or missing data." Like in the generic codes, "Invalid" means that based on some mathematical wizardry, the computer knows that the data it got is not what the other computer sent. "Missing" data is in reference to bus data as well. Although it will normally call out a specific sensor, neither one of them indicates a bad sensor. It is just to give you clue as to which module may be bad. The usual suspects are the module itself, bus wiring to that module, or power and ground issues to that module.

"Concern." Ford term for Fault.

"Module." Any electronic gadget and/or gizmo that is directly connected to the bus. A module may have all kinds of things connected to it, but none of those things are modules unless they are also connected to the bus.

"signal missing or incorrect" This one generally refers to the sensor itself. It means that either the sensor's signal was not present at all, or it was so far out of spec as to be impossible (like a vehicle speed of 875 MPH). Note that in most cases this does not include out of range readings.

"Loss" or "Lost Communications" means that a signal or communications was there at some point during this driving session, but is now gone.



NETWORK DIAGNOSTICS PART DEUX

THE UBIQUITOUS U CODE

"Bus-Off." Main computer for bus detected no voltage on bus at all. This is almost always a shorted module or bad power or ground.

"Timeout/Not equipped" This means that the main computer on the bus tried to contact a module and the response took too long (timeout) or the module does not exist. A wiring diagram will tell you if the module should be there or not. Timeouts can occur for a few reasons. If that module is very busy doing something that it believes is more important it can timeout.

"ECU in Single-Wire Mode" Some Chrysler systems are capable of running a two wire bus in single wire mode in the event of a failure of one of the wires in the two wire bus. In this rare situation, the first step is to scope each wire from ground to see which one has signal and which one doesn't. Find the problem on the bus wire that has no signal.

"Message" The data from a sensor. For example, a Chrysler code U110F, "Lost Fuel Volume Message" means that the data for the fuel volume was not present. Check the sensor (and its power/ground). It is possible for the module to be bad as well.

"Yaw rate" Part of the electronic suspension or stability control system. It tells the system the amount of turn. Developed by NASA "Roll," "Pitch," and "Yaw" are the three things needed to navigate a spaceship to any point in space. Roll is rolling the vehicle on its long axis. Pitch is the up and down angle. Yaw is the left right angle. These terms are also commonly used in inertial navigation systems such as a Submarines "SINS."

"Implausible" Like a Chrysler U1401 "Implausible Engine Speed Signal Received." This is pretty much the opposite of "invalid." The computer believes that the data it received is the same as what the sensor originally sent, but it cannot be possible. There is a lookup table in the software that has the minimum and maximum reading a given sensor should have. If it exceeds that amount it trips an "Implausible" code. This is almost always a sensor problem

"Software," "Application Software." This always means something with the actual program running in the computer or module. Either a wrong part (computer or module), a bad flash, or a problem with the computers memory chips.

"Corrupt." This is the same as "invalid" except it is usually used when referring to memory contents rather than bus data. The computer has used some mathematics (Parity, CRC, etc) and determined that the contents of memory is not what it is supposed to be. This will most always be programmable memory (flash memory), but in rare situations may be dynamic or random access memory.



NETWORK DIAGNOSTICS PART DEUX THE UBIQUITOUS U CODE

"Memory Store is Full." If this comes up during or after a flash then the flash file was larger than the programmable (flash) memory capability of the computer. This always means the wrong flash file. If this comes up during normal vehicle operation, and there are no "Corrupt" codes as well, then there is a bug in the software that allows the program to store more data than the dynamic memory has room for. Contact the OEM for a flash update.

"Programmable" or "Flash" memory is memory whose content stays the same all the time under normal circumstances. It even keeps it's contents when power is removed from the computer. The only time the contents of Flash memory changes is when you flash the computer, or if it malfunctions. Many Flash memory malfunctions change the contents, but the chip continues to function normally (believe it or not this happens more often during times of increased sunspot activity, exposure to radiation such as a steel structural weld X-ray machine will cause this as well). Often a reflash will change the contents back to what it was supposed to be and the unit is fixed.

"Dynamic," "RAM," or "Random Access" memory. This is a part of memory that is constantly changing. Live variables such as TPS position and vehicle speed are stored here and updated several time each second. This is also where things like CV values are kept. If "Keep Alive" power is removed from the computer this memory is wiped clean. When this memory fails it usually means a bit is stuck and will no longer toggle between 1 and 0. On RARE occasions removing and restoring all power leads to the computer (leave it disconnected overnight in case there is an internal battery) MAY restore the memory to normal, but this repair is usually short lived and the same bit gets stuck again soon.

"Initialization." When a computer gets power it has many things to do before it is operational. If any of these things have a problem it results in an initialization error. Check all powers and grounds. You may TRY a reflash, but chances are the computer is a brick. When a bus gets fired up it also has some things to do. If any of these things don't happen then you get a bus initialization issue. This needs to be treated like any bus wiring fault.

"Response" can be in reference to operator response or device response. If it is operator response then the system was told to run a test and at a point in the test where the operator was supposed to do something, the system believes that it did not get done. Device responses are automatic. If they fail either the request did not get to the device, the device could not respond, or both. Depending on the situation, "No Response" could also mean the same as "No Communication" or "Lost."

"Supply" "Power" or "Battery" Always refers to power supply and grounds.



PRELIMINARY HYBRID TRAINING HYBRID SAFETY & BASICS

With over 350,000 hybrid vehicles on U.S. roads it is almost a certainty that a percentage of these will find their way into aftermarket repair shops. Hybrid vehicles differ from a conventional gas or diesel powered vehicles which pose a threat to the technician that will repair them.

This threat is in the form of very high voltage, the voltage level in these vehicles can be anywhere from 144 to 650 volts which presents a new level of risk for the technician.

Training and safety equipment is an absolute must without exception, because for the first time the technician is working on a vehicle that can cause injury or death.

Even driving one of these vehicles requires special attention because when these vehicles are in electric only mode, they make no noise. Therefore it is possible to run someone over because they did not hear you and you thought they would get out of the way because we take that for granted with conventionally powered vehicles.

These vehicles also have "Engine Stop/Start technology which means the engine stops and starts back up on its own which poses a hazard for the technician whose hands may be in the way.

Certain makes like Toyota have what is called a smart key which can start the engine without even being in the car. All that's necessary is to get close enough so the vehicles transponder signal is pick up by the key fob.

Once the vehicle is disabled, do not push the around the shop on its wheels, these vehicles have regenerative braking which means they generate electricity when the wheels are turning, use dollies

Once you have hybrid training and proper safety equipment it is important to recognize a hybrid vehicle when it comes into the shop, some hybrid badging is subtle so look for hybrid identification on the vehicle. If you open the hood you will see orange cables, that tells you have a hybrid vehicle.

The following is a list of hybrid vehicles currently on the road, there will be many more to come.

Toyota Prius	Chevy Volt
Toyota Highlander	Cadillac Escalade
Toyota Camry	Saturn Vue Green Line
Lexus RX400h	Saturn Aura Green Line
Lexus GS 450h	Ford Escape
Lexus LS600hL	Mercury Mariner
Lexus RX 450h	Ford Fusion
Lexus HS 250h	Mercury Milan
Honda Insight	Mazda Tribute
Honda Civic	Nissan Altima
Honda Accord	Infiniti M33
Honda Fit	Dodge Durango
Chevy Silverado PHT	BMW 1 Series
Chevy Silverado 2 Mode	BMW X6
Chevy Tahoe 2 Mode	BMW 7 Series
GMC Sierra	Mercedes Benz S400
GMC Yukon	Mercedes Benz ML450
Chevy Malibu	Volkswagen Touareg TSI

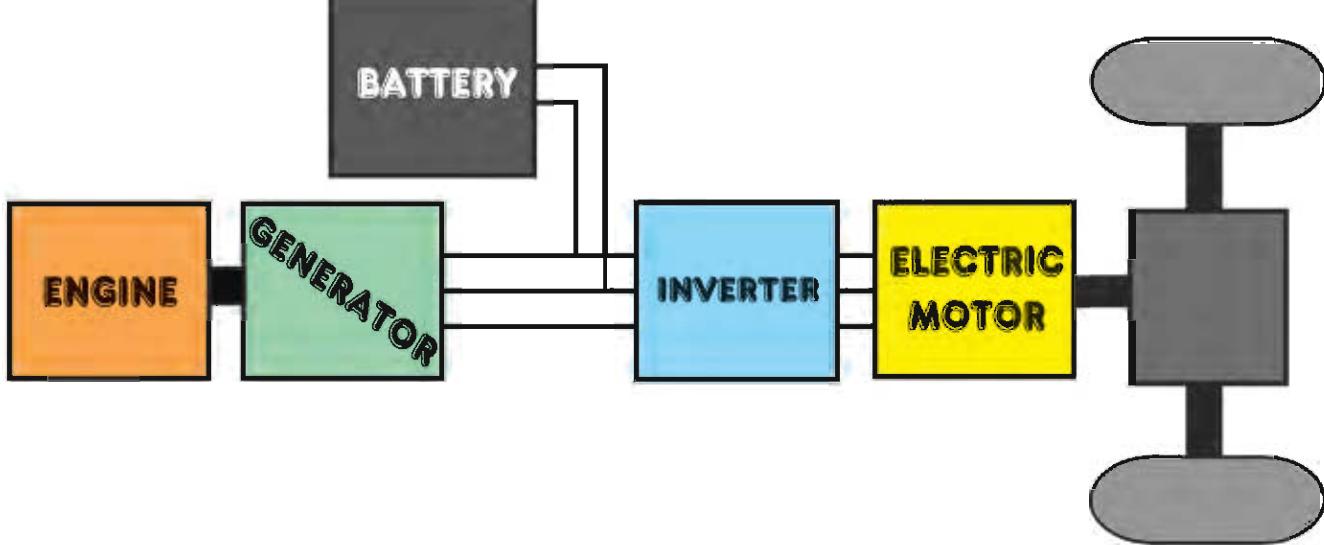
ASSUME NOTHING, IT COULD SAVE YOUR LIFE!



PRELIMINARY HYBRID TRAINING

HYBRID SAFETY & BASICS

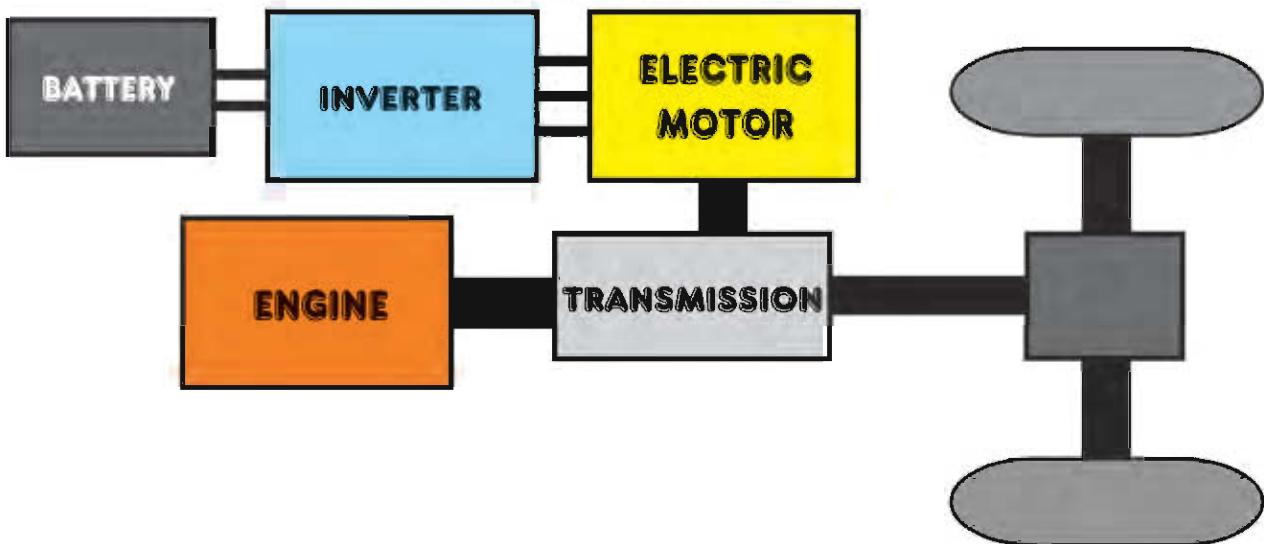
SERIES HYBRID



In a Series Hybrid equipped vehicle, the electric motor is what gets the wheels turning. The motor receives electric power from a generator run by a gasoline engine. A computer determines how much power comes from the battery pack or engine/generator. Both engine and generator and regenerative braking recharge the battery pack. This is the type of system used in the Chevy Volt.

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PARALLEL HYBRID



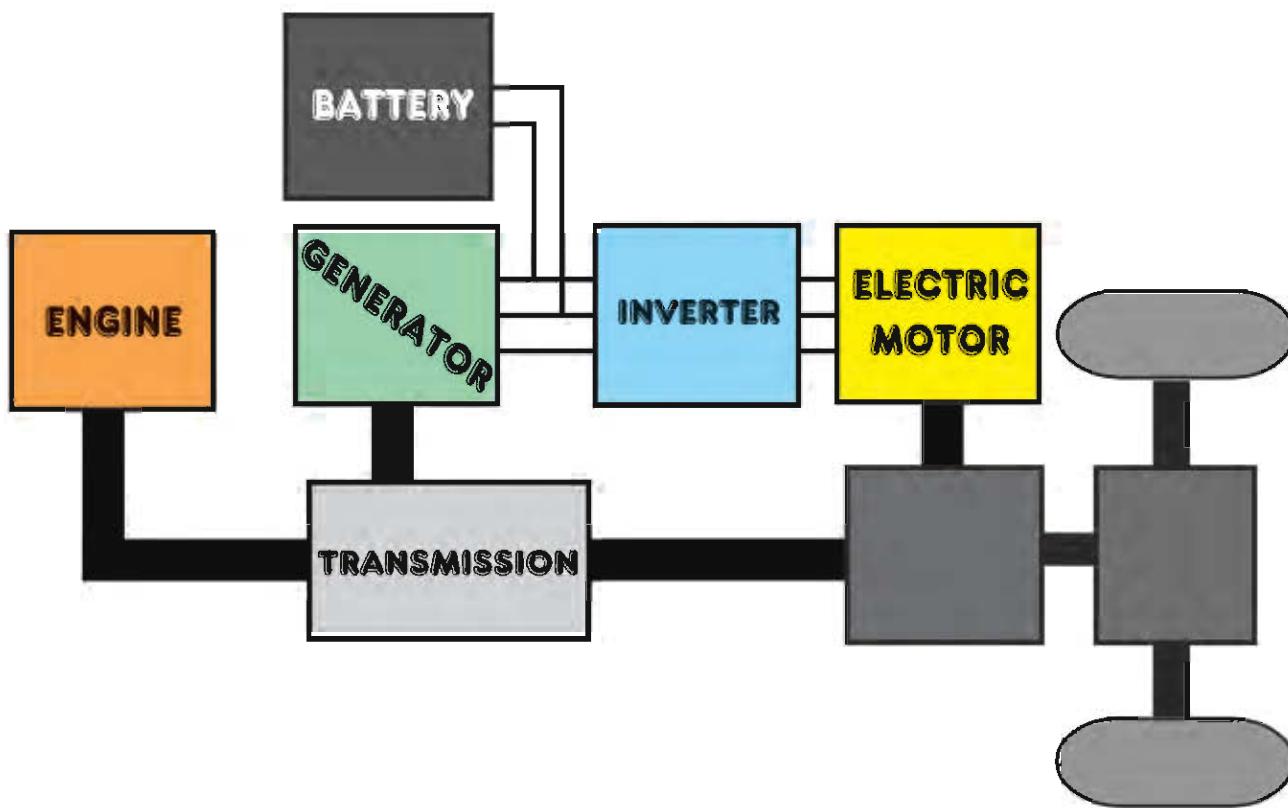
In a Parallel Hybrid equipped vehicle, both the engine and the electric motor generate the power that drives the wheels. Computer controls and a transmission allow these components to work in conjunction with each other. The electric motor and regenerative braking recharge the battery pack. This is the type of system used in Honda Hybrids.

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PRELIMINARY HYBRID TRAINING HYBRID SAFETY & BASICS

SERIES/PARALLEL HYBRID



A Series Parallel Hybrid system is a combination of both a series and parallel system and is currently the most complicated. By combining the two systems, the engine can both drive the wheels directly as in a parallel hybrid system and but can be disconnected from the wheels so that only the electric motor powers the wheels as in a series hybrid system. At lower speeds it operates more like the series hybrid system, but at higher speeds it the engine takes over. This is the type of system used by Toyota.

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HYBRID TERMINOLOGY

ECVT - Electronically Controlled Continuously Variable Transmission
EM - Electric Motor
HEV - Hybrid Electric Vehicle
HV - High Voltage
ICE - Internal Combustion Engine
kW - Kilowatt
Li-ion - Lithium Ion Battery

MG - Motor Generator
MH - Mild Hybrid
NiMH - Nickel-Metal Hydride
PSD - Power-Split Device
SG - Starter Generator
SOC - State of Charge

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PRELIMINARY HYBRID TRAINING HYBRID SAFETY & BASICS

HYBRID SAFETY REQUIREMENTS

The number of hybrid vehicles that are currently on the road and those that will be in the near future can pose a genuine threat to technicians that call the ATSG Help Line for technical assistance on servicing and repairing these vehicles.

What does an electric chair have in common with a hybrid vehicle?

Both can kill you!

These vehicles have battery packs that can deliver between 144 and 330 volts to the hybrid's electric motors. This voltage can be bumped up to 650 volts by the inverter, certainly more than enough to cause severe injuries or death.

Therefore, in order to protect all parties involved in technical assistance as well as the technician working on one of these vehicles, ATSG is establishing a "required criteria" program that must be satisfied before a hybrid vehicle is touched.

The following list of safety requirements **must** be met by the repairing shop:

- Formal Hybrid Vehicle Training. Seek out professional classes by knowledgeable instructors. This is #1 on the list for a good reason.
- Hybrid vehicle identification. A hybrid vehicle may appear to be an ordinary vehicle, look for the common identifiers that let you know this is a hybrid vehicle....**Never Assume that it's not!**
- When road testing a hybrid vehicle, be mindful of pedestrian safety. When operating on electric motors only, these vehicles run silent. Someone stepping into the path of the vehicle you are driving may not hear you coming. **Especially if that person is blind!**
- **ALWAYS** pay close attention to all hazard warning labels.
- Beware of ORANGE or BLUE colored cables, these are the high voltage lines. Before going near any of the high voltage components, locate and turn OFF the high voltage battery "disconnect switch". Wait 5 to 15 minutes for the capacitors to discharge before touching anything, Then **VERIFY** with CAT III voltmeter, that the voltage level has dropped below 12 volts.
- Make certain the vehicle ignition key is OFF and removed from the ignition switch and put in a safe place away from the vehicle. The vehicles use "stop/start" engine technology, if the key is left in the ON position and your hands are in contact with rotating components, the engine could start up at any time. Make certain the "ready lamp" in the instrument cluster is off.
- Before actual work begins, the work area should be secured by cones or yellow "caution" tape. This will prevent a coworker from turning the system back on. Only one technician should be designated to work on a hybrid vehicle at any given time.
- Before disassembly of any component, special gloves MUST be worn that are at least class "O" and are rated to 1,000 volts.
- These gloves must be tested before and after each use to insure that no damage has occurred to them, electricity can find its way through a pin hole. Check them by trapping air inside each glove and look and listen for leaks, this is an OSHA requirement.
- **NEVER** use gloves that are past their expiration date, they should be replaced immediately.
- These gloves are not meant to withstand sharp objects or other severe usage, they will be damaged. There are leather gloves that go over them to prevent damage to the insulating gloves.
- Do not assume that the high voltage circuits have no voltage, check them with a CAT III voltmeter that is rated for 1,000 volts. The meter leads must have the same rating. Immediately replace any lead that has damaged insulation.





PRELIMINARY HYBRID TRAINING HYBRID SAFETY & BASICS

HYBRID SAFETY REQUIREMENTS...*continued*

- Try to limit the amount of metal items you wear when working on or near high voltage components such as jewelry, belt buckles and wrist watches.
- **NEVER** use AC voltage powered test equipment when probing high voltage circuits and NEVER pierce any high voltage cables.
- Use only approved insulated tools when working on high voltage components even if the system is off.
- Be certain to torque to specifications, any high voltage connection. Loose connections can cause high resistance in the circuit and could cause catastrophic damage when there is high amperage behind it.
- Once the vehicle is in the midst of the repair process, it should not be moved until repairs are complete. If the vehicle must be pushed to some other location in the shop with the drive axles in place, the technician **MUST** once again check for the presence of high voltage within the hybrid system. When the vehicle is pushed with the drive axles installed, the motor rotor is turned and will generate electricity into the system. These vehicles are equipped with regenerative braking which also creates electricity in the hybrid system.
- If any repairs are required that cause the technician to be in proximity with the electric motors rotor, he or she should be aware that this component is an extremely strong magnet and can cause death to someone who has a pacemaker.
- Be extremely careful of the hybrid batteries, they contain electrolyte that is far more corrosive than 12 volt battery electrolyte, it can dissolve human tissue, wear protective clothing. Spills should be handled in accordance with protocols for hazardous materials.
- If you intend to ship expired hybrid batteries back to the manufacturer for disposal, you must be DOT HazMat certified.
- Always be conscious of fire hazards and have approved fire extinguishers in prominent locations throughout the shop.
- Be very careful when working on a hybrid vehicle that has been in an accident. The hybrid system does not share its ground with the body, this could change as a result of collision damage.
- In the event that a hybrid or electric vehicle is equipped with Lithium Ion batteries, be aware that these batteries must remain cool, if these type of batteries are allowed to overheat, they can burst into flames. Some such equipped vehicles may use the HVAC system to keep these batteries cool. The AC system in these vehicles **MUST** be totally operational.

ALL SAFETY REQUIREMENTS FOR HYBRID VEHICLE REPAIR LISTED HERE MUST BE MET....IT COULD SAVE YOUR LIFE!

The threshold at which DC voltage becomes dangerous can be as low as 50 to 60 volts, since hybrid systems currently carry anywhere from 144 to 336 volts, it's more than enough to deliver a lethal shock. In most cases you cannot receive a shock by just touching the body of a hybrid vehicle because the hybrid system does not ground to the frame or body, the hybrid system is isolated from the rest of the vehicle. However, care should be taken if the vehicle was in a collision.

It is the ORANGE cables that carry the lethal amount of voltage. In some vehicles they are encased in orange conduit.

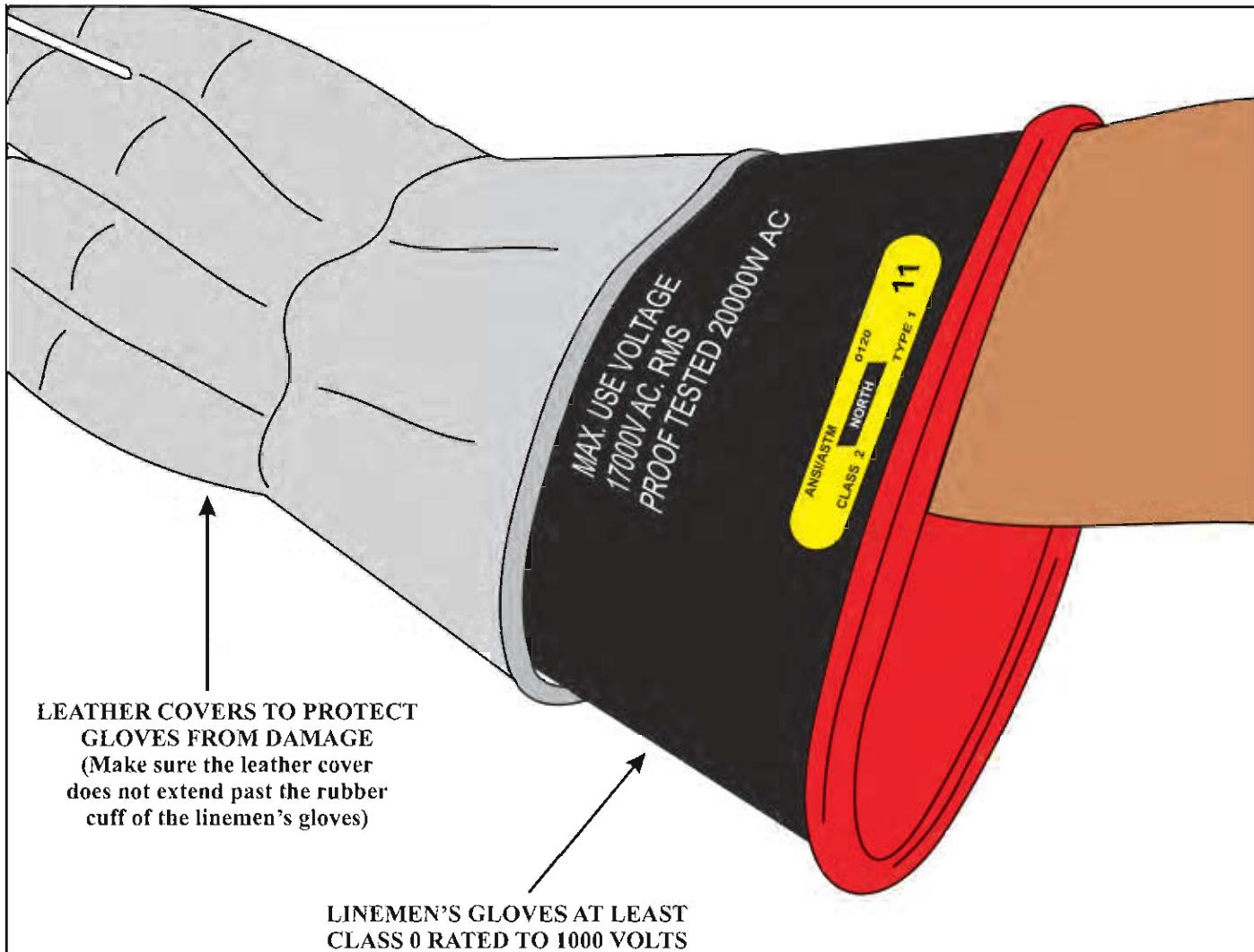
The BLUE cables or conduit can carry anywhere from 42 volts to 201 volts, the latter being a voltage supply to the electric AC compressor.

Conduit that is PLAIN in color will carry the 12 to 14 volt circuits which is powered by a 12 volt battery.



PRELIMINARY HYBRID TRAINING

HYBRID SAFETY & BASICS



One of the most important pieces of equipment to protect the technician are linemen's gloves, these gloves must be at least class zero and rated to 1,000 volts.

The technician should also have leather glove protectors to prevent damage to the rubber gloves. Electricity can find its way through a pin hole, the leather covers are meant to prevent this from happening.

The best way to check the rubber gloves for pinholes is to roll the gloves so air is trapped in side them and then submerge them in water and watch for leaks. OSHA Standards require testing prior to each use, any damaged gloves should be discarded immediately.

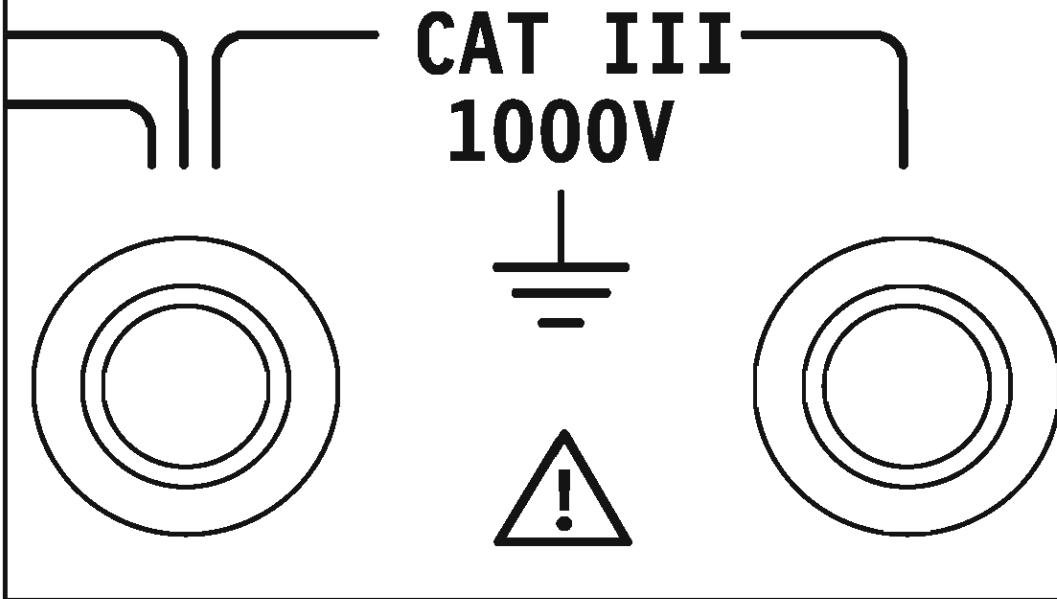
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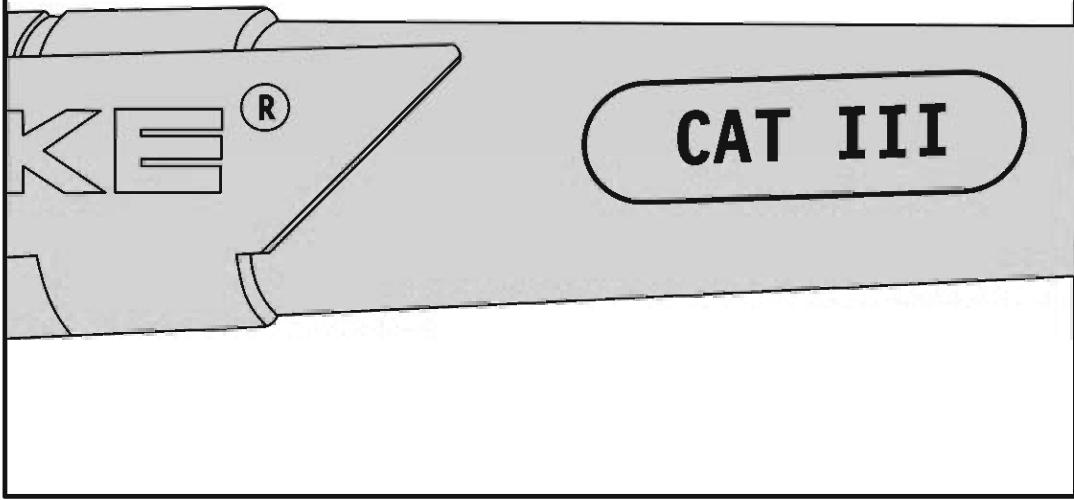
PRELIMINARY HYBRID TRAINING

HYBRID SAFETY & BASICS

A CAT III rated voltmeter is a must when working on high voltage hybrid systems. Any meter that is rated below 600 volts should NOT be used on high voltage circuits.



The CAT III voltmeter test leads must also be rated to 1000 volts. NEVER substitute ordinary voltmeter leads when working on hybrid high voltage circuits.

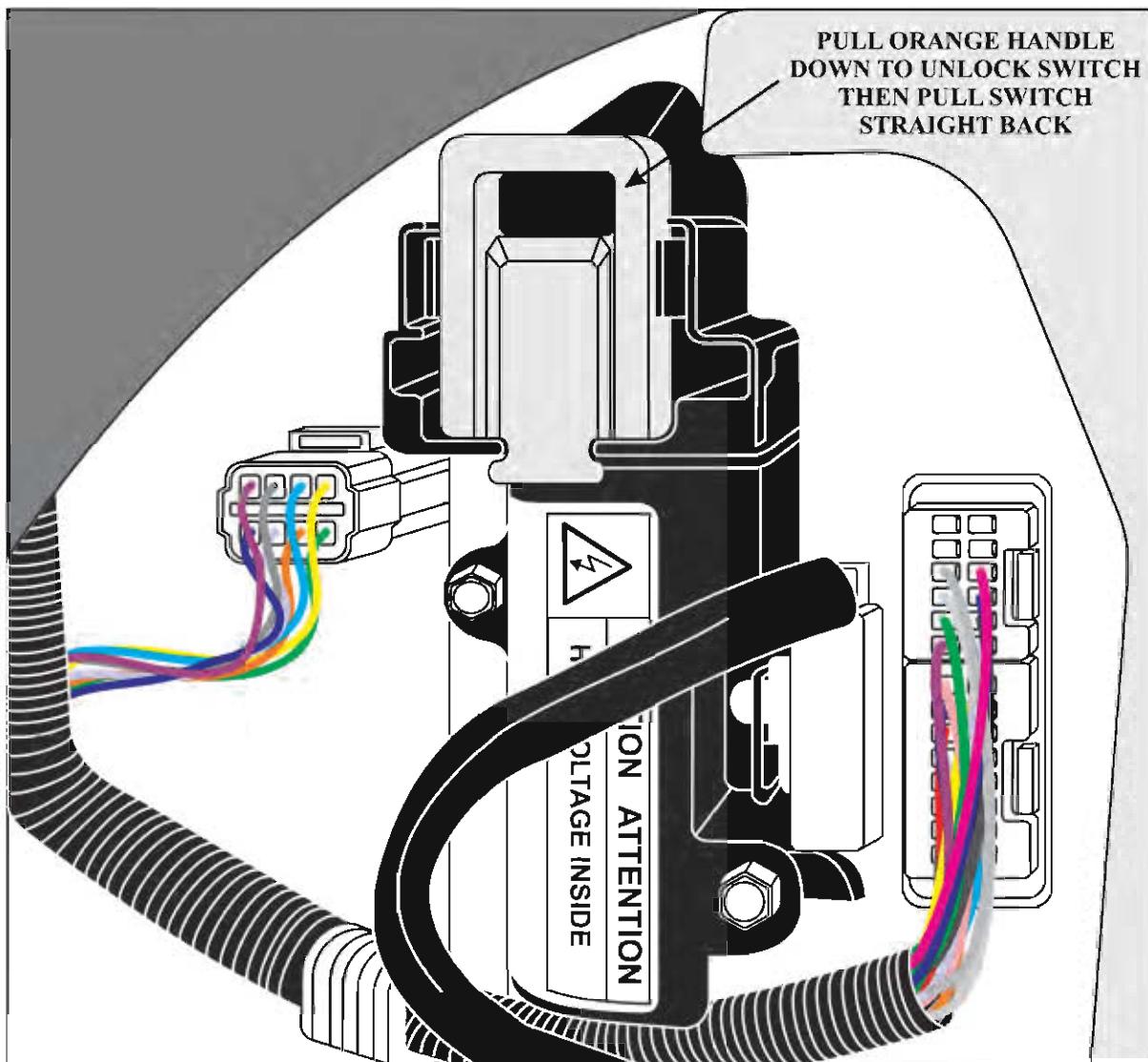




PRELIMINARY HYBRID TRAINING

HYBRID SAFETY & BASICS

TOYOTA PRIUS BATTERY DISCONNECT SWITCH



To remove the battery disconnect switch in a Toyota Prius, Remove the key from the ignition and put it in a different safe location, especially if it is a Smart Key. Open the trunk and remove the liner on the drivers side. Pull the orange handle down to unlock the switch, then pull it straight back until it comes out. Put this in your toolbox for safety. Wait 5 to 15 minutes for the capacitors to discharge, then check the orange cables to insure they less than 12 volts on them with your CAT III rated voltmeter.

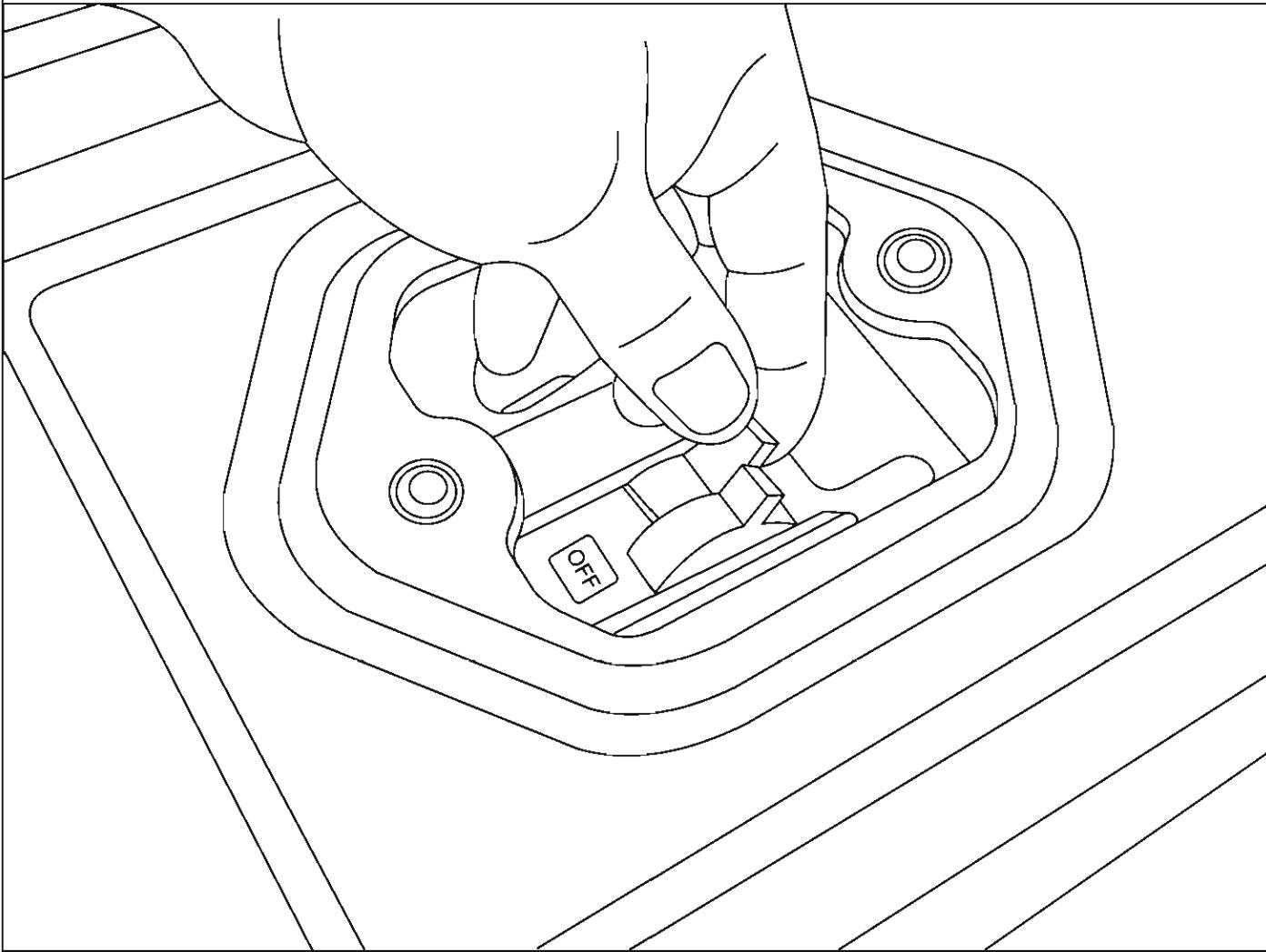
REMEMBER TO WEAR YOUR INSULATED GLOVES UNTIL YOU ARE SURE THERE IS LITTLE OR NO VOLTAGE ON THE HIGH VOLTAGE CIRCUITS!

CAUTION: EVEN THOUGH THE CAPACITORS ARE DISCHARGED, THE HYBRID BATTERY PACK IS ALWAYS LETHAL!



PRELIMINARY HYBRID TRAINING HYBRID SAFETY & BASICS

HONDA INSIGHT & CIVIC BATTERY DISCONNECT SWITCH



INSIGHT: To remove the battery disconnect switch in a Honda Insight, Remove the key from the ignition and place in a different safe location. Next, remove the rear deck carpet then the 2 small screws that hold the small access panel, (it says "UP" on it), Remove the access panel and the RED switch cover and turn the switch OFF. Wait 5 to 15 minutes for the HV capacitors to discharge and then using your CAT III voltmeter, check the HV circuits to make certain the voltage level is below 12 volts.

CIVIC & ACCORD: Remove the back seat upper cushion and follow the above mentioned procedure.

REMEMBER TO WEAR YOUR INSULATED GLOVES UNTIL YOU ARE SURE THERE IS LITTLE OR NO VOLTAGE ON THE HIGH VOLTAGE CIRCUITS!

CAUTION: EVEN THOUGH THE CAPACITORS ARE DISCHARGED, THE HYBRID BATTERY PACK IS ALWAYS LETHAL!

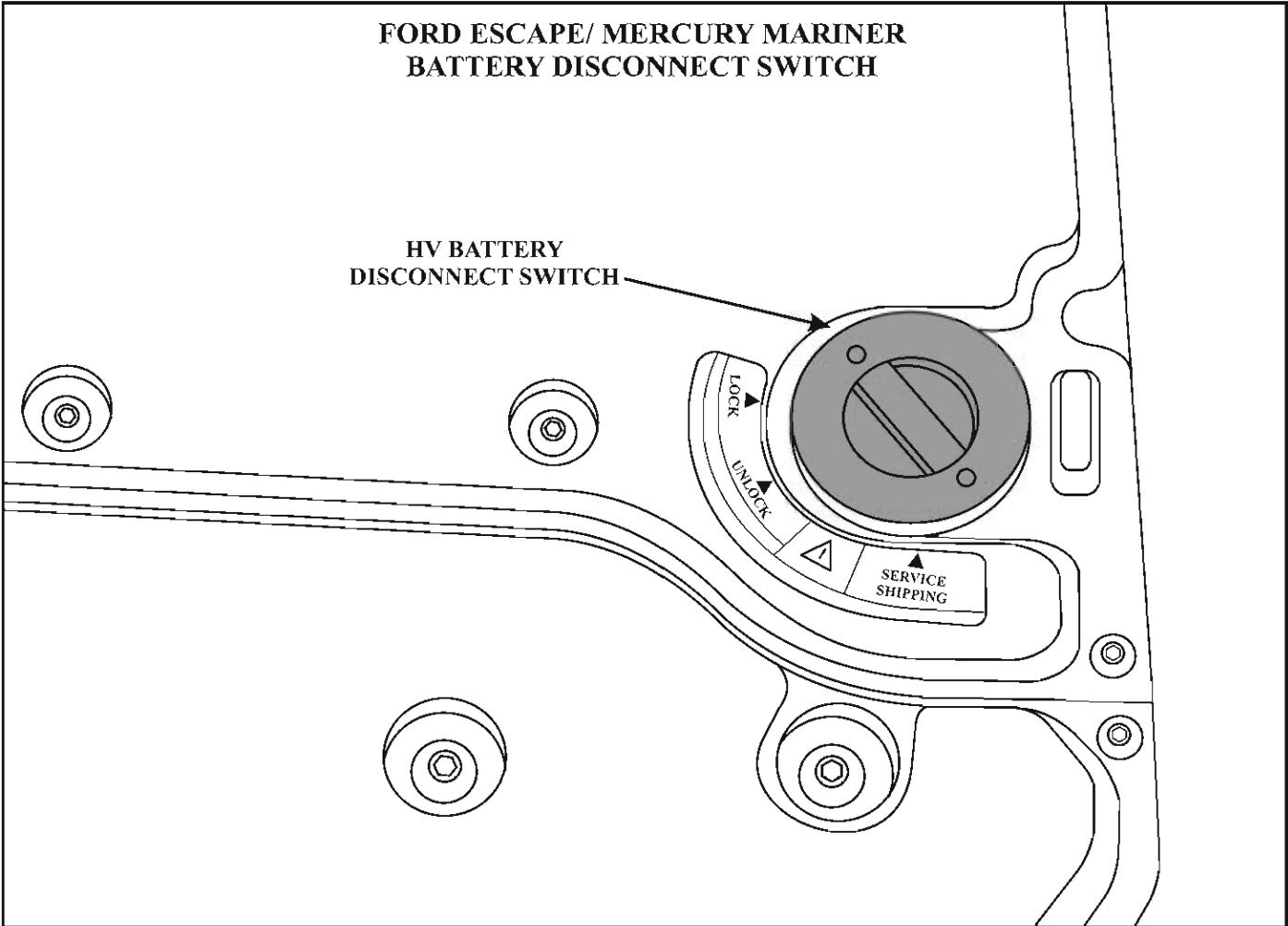
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PRELIMINARY HYBRID TRAINING HYBRID SAFETY & BASICS

FORD ESCAPE/ MERCURY MARINER
BATTERY DISCONNECT SWITCH

HV BATTERY
DISCONNECT SWITCH



To remove the battery disconnect switch in a Ford Escape or Mercury Mariner, remove the key from the ignition and place in a different safe location. Next, Locate the ORANGE locate in the battery pack cover and rotate the cover to the "UNLOCK" position and pull it out. **DO NOT STICK YOUR HAND OR DROP ANYTHING IN THE HOLE, THE 336 VOLT BATTERY PACK IS BELOW THE OPENING!**

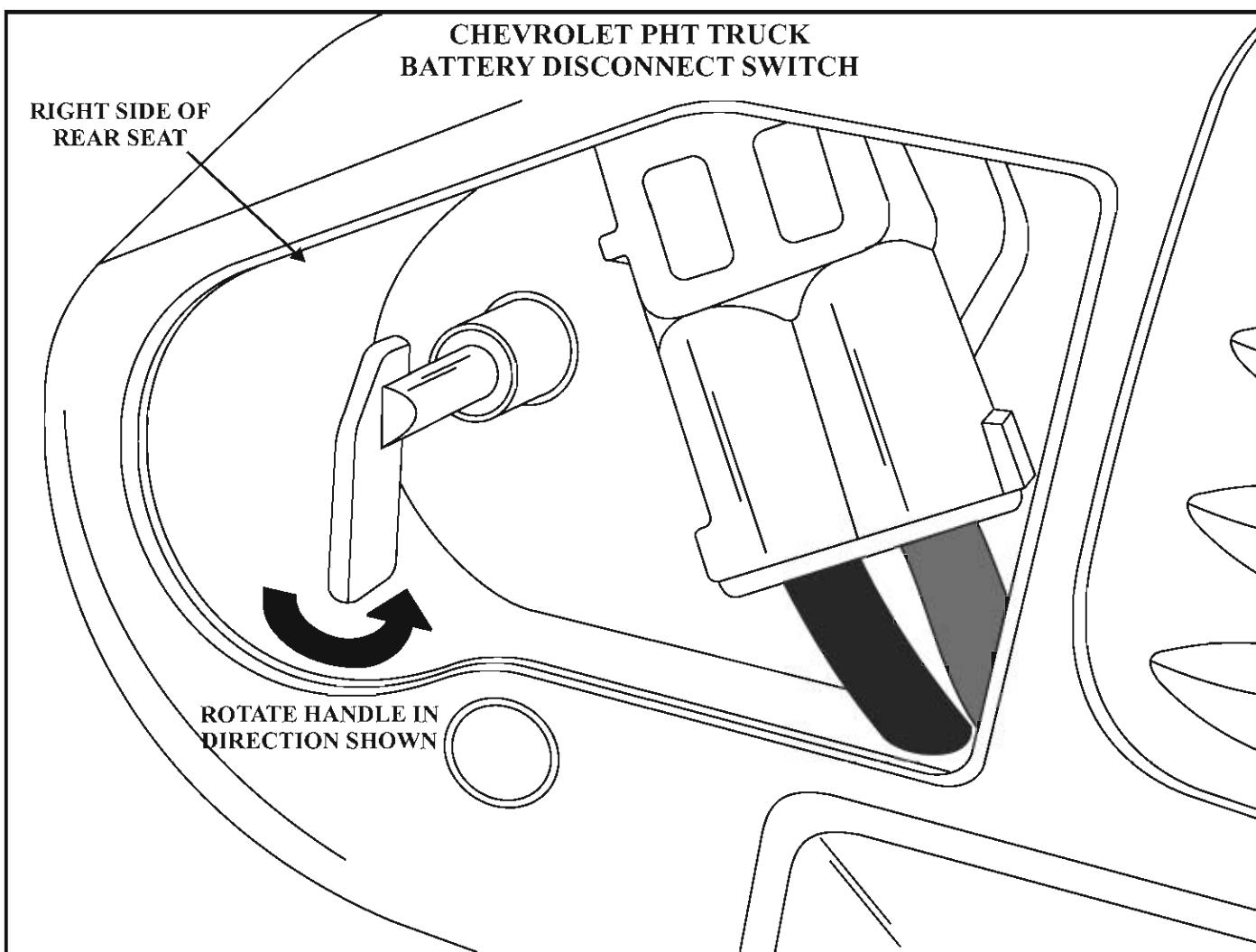
Next, replace the cover in the "SERVICE SHIPPING" location. Wait 5 to 15 minutes for the HV capacitors to discharge and then using your CAT III voltmeter, check the HV circuits to make certain the voltage level is below 12 volts.

REMEMBER TO WEAR YOUR INSULATED GLOVES UNTIL YOU ARE SURE THERE IS LITTLE OR NO VOLTAGE ON THE HIGH VOLTAGE CIRCUITS!

CAUTION: EVEN THOUGH THE CAPACITORS ARE DISCHARGED, THE HYBRID BATTERY PACK IS ALWAYS LETHAL!



PRELIMINARY HYBRID TRAINING HYBRID SAFETY & BASICS



To remove the battery disconnect switch in a Chevy PHT, remove the key from the ignition and place in a different safe location. Next, lift the bench part of the rear seat. Next, Locate the GREEN handle behind the triangular cover at the right end of the HV battery box and rotate it clockwise until it stops.

Next, wait 5 to 15 minutes for the HV capacitors to discharge and then using your CAT III voltmeter, check the HV circuits to make certain the voltage level is below 12 volts.

This vehicle is equipped 120 volt, 20 amp power outlets, Just like the ones in your house or shop, treat these with the same respect!

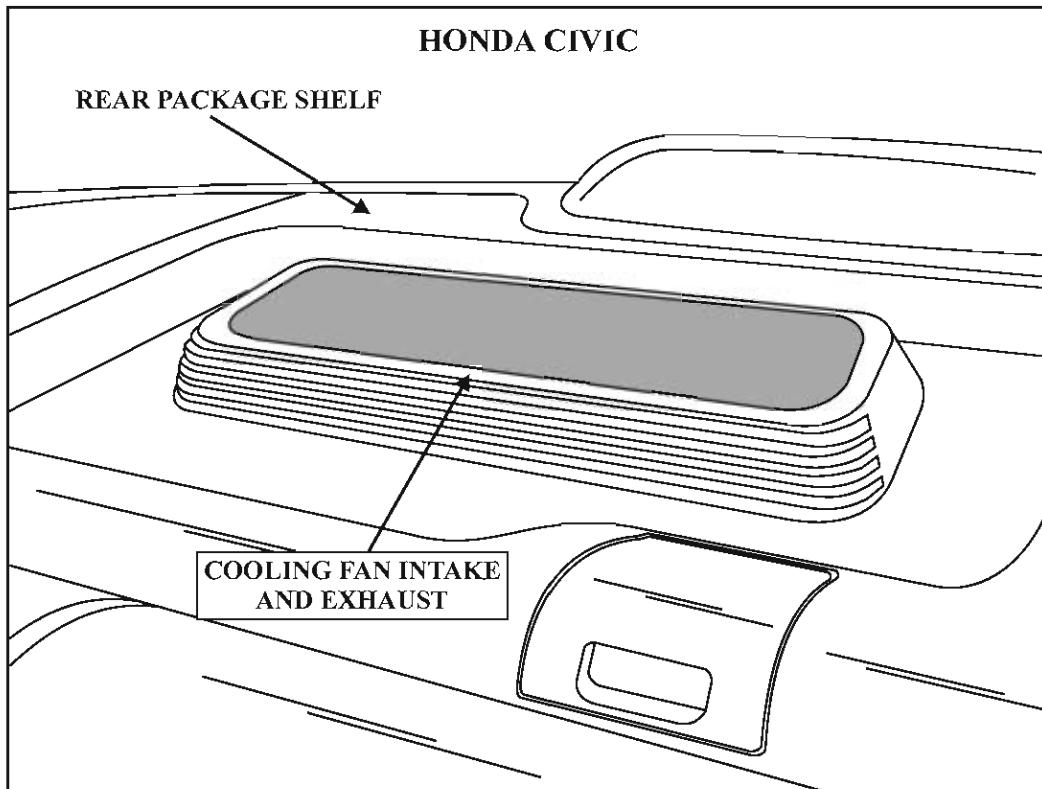
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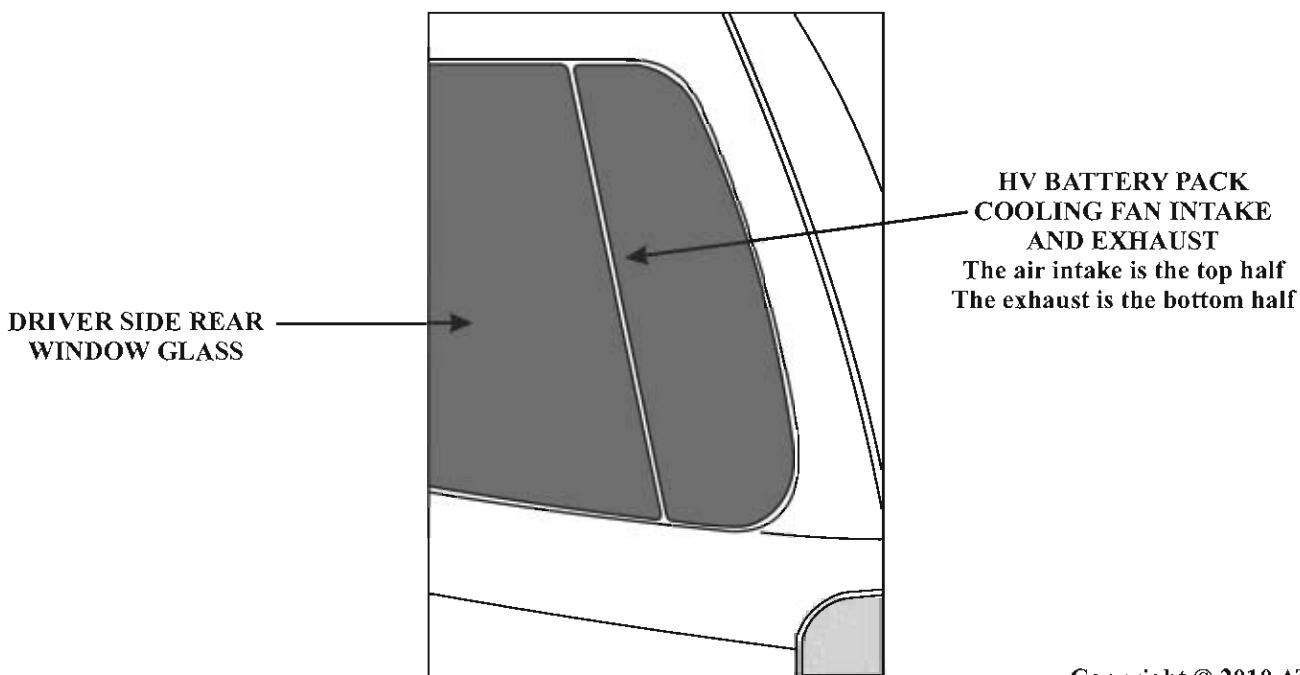
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HV BATTERY PACK COOLING SYSTEMS



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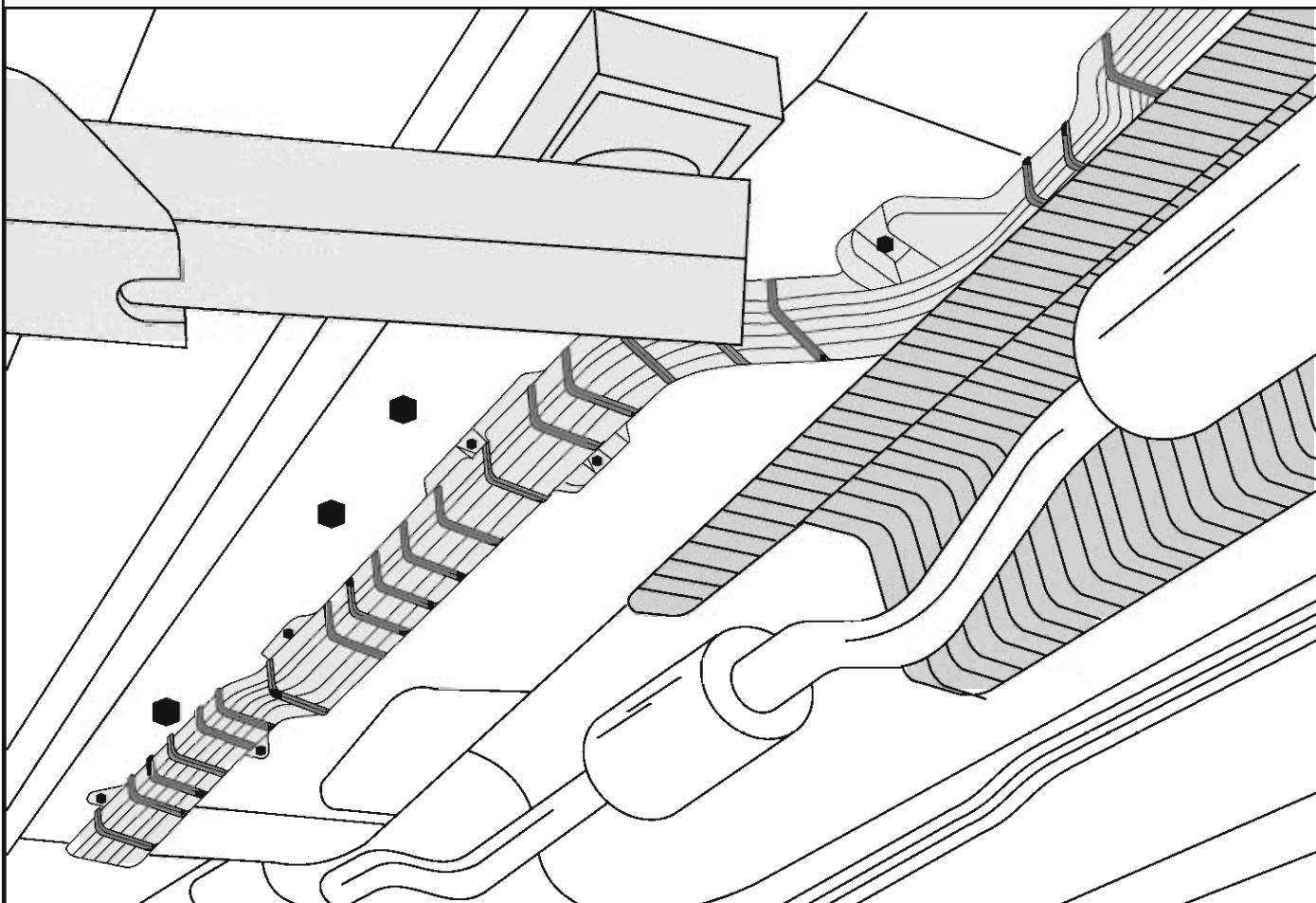
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PRELIMINARY HYBRID TRAINING HYBRID SAFETY & BASICS

HOIST & JACK SAFETY



In most of the current hybrid vehicles on the road at the present time, HV battery packs are located in the rear of the vehicle while the hybrid controls are up front. This means that the high voltage cables that run from the battery pack to the hybrid controls are routed underneath the vehicle.

Therefore special care must be taken when setting the hoist pads or a floor jack so this equipment does not contact and crush the high voltage cables.

THIS WOULD HAVE CATASTROPHIC RESULTS TO BOTH THE VEHICLE AND THE PERSON OPERATING THIS EQUIPMENT!

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MERCEDES BENZ 722.6 BOGS DOWN IN THIRD GEAR

COMPLAINT: After overhaul, the transmission bogs down as it completes the shift into third. A slipping condition may also exist. After a few attempts to shift into third gear, the transmission will go to failsafe.

When the transmission was removed and disassembled, the technician finds that the K2 friction plates have cut through the aluminum rear carrier hub.

CAUSE: There are two different inside diameters for the K2 friction plates, (See Figure 1), the outside diameter and tooth configuration are the same for both and they both have 36 internal teeth. There are two different diameters for the rear carrier hubs to accommodate the difference in the K2 friction plates, (Refer to Figure 2), these differences are dependant on engine size.

When the larger inside diameter frictions are installed on the smaller diameter carrier, the teeth of the K2 friction plates will spin around on the aluminum carrier hub and cut in to it. Figure 3 illustrates the correct and incorrect tooth to spline fit of the K2 friction plates to the carrier hub splines.

CORRECTION: The smaller diameter carrier is easily identified because it is a three pinion design, the larger diameter carrier is a four pinion design.

Insure that there is a proper fit between the K2 friction plate teeth and the splines of the carrier hub.



MERCEDES BENZ 722.6 BOGS DOWN IN THIRD GEAR

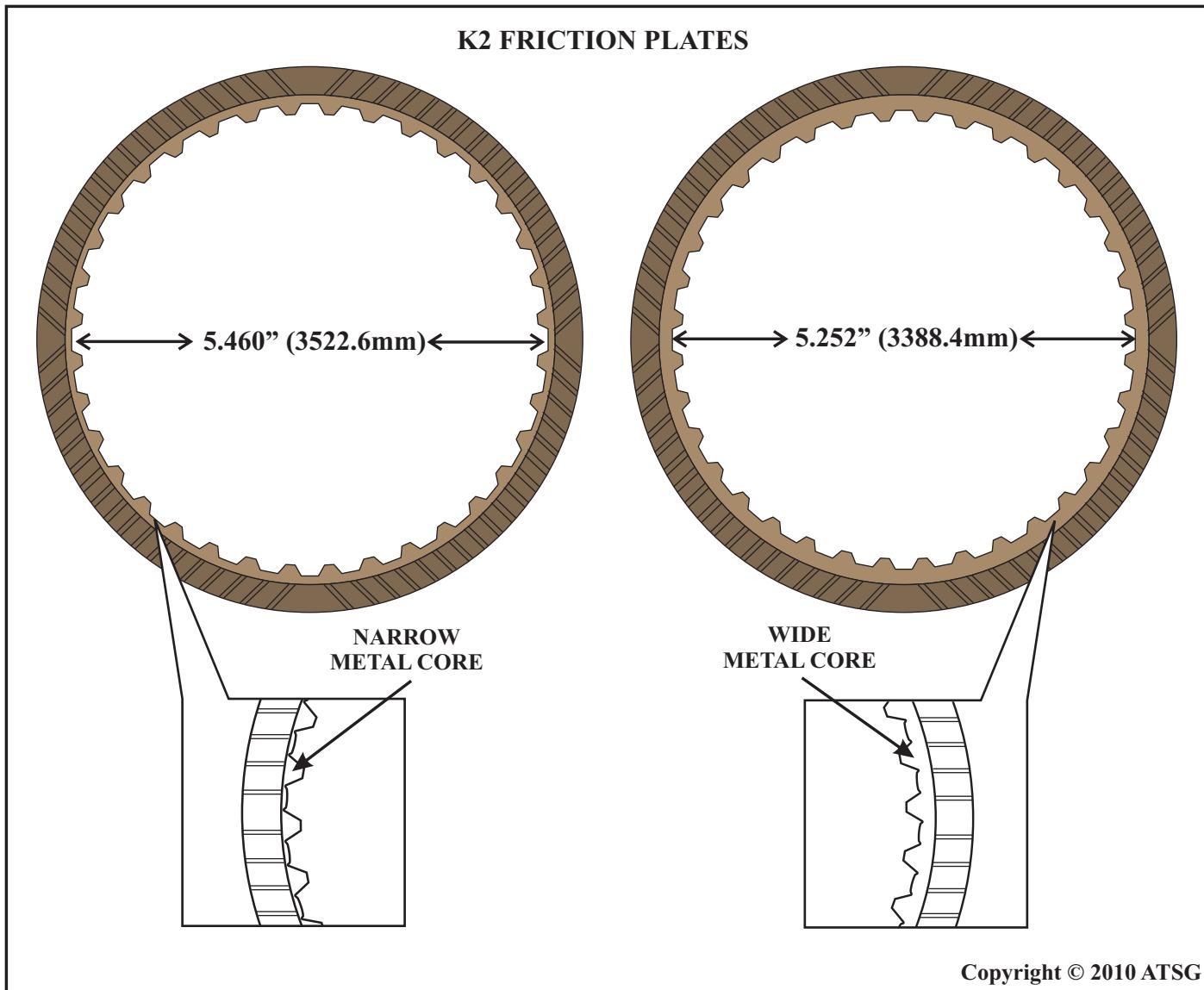
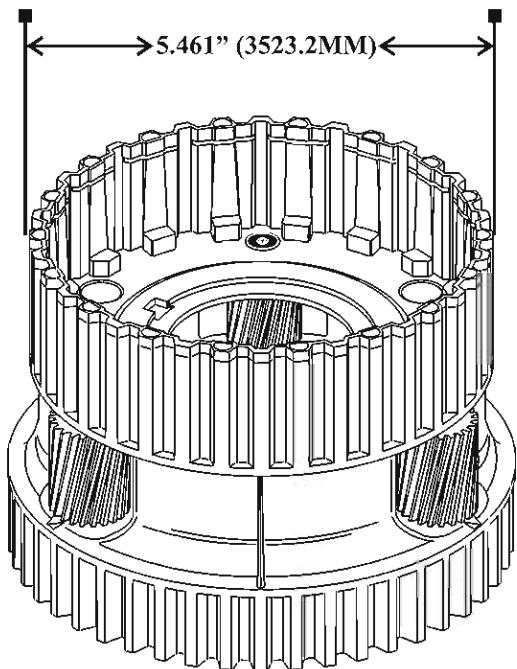


Figure 1

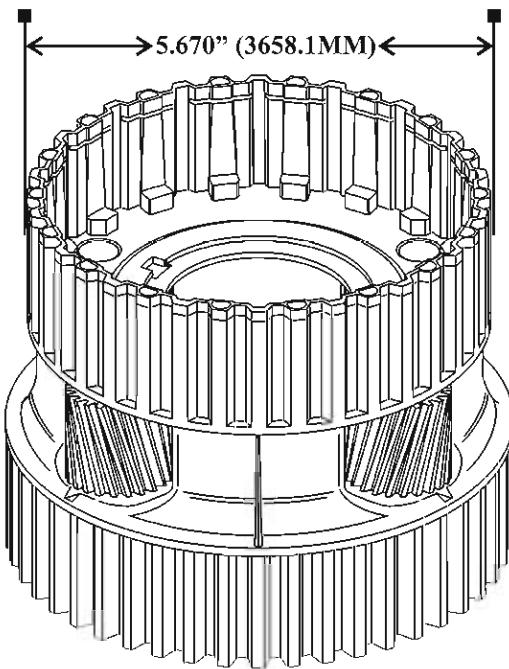


MERCEDES BENZ 722.6 BOGS DOWN IN THIRD GEAR

722.6 REAR ALUMINUM CARRIER



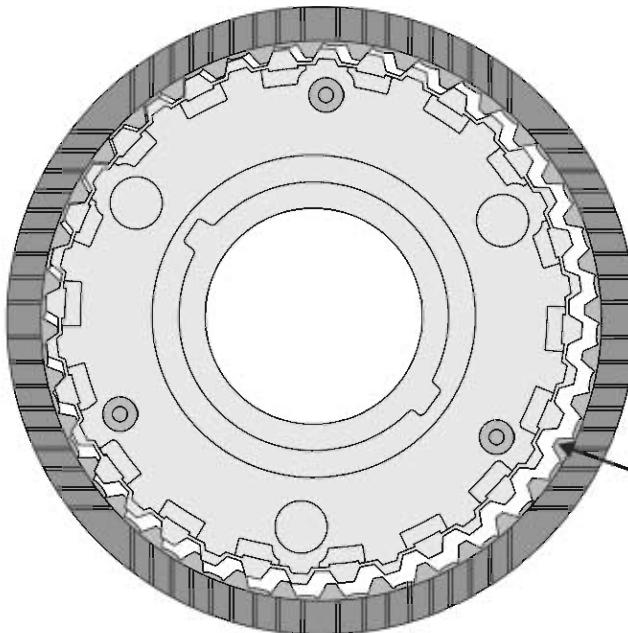
3 PINION CARRIER



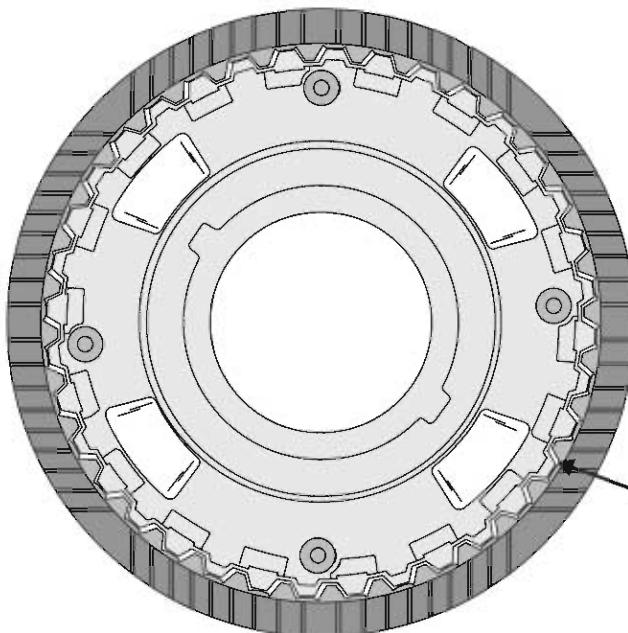
4 PINION CARRIER

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Figure 2

**MERCEDES BENZ 722.6
BOGS DOWN IN THIRD GEAR****INCORRECT**

FRICTION PLATES
TEETH DO NOT FIT
SPLINES ON CARRIER

CORRECT

FRICTION PLATES
TEETH FIT SPLINES
ON CARRIER

Figure 3



HONDA/ACURA D OR D5 LAMP FLASHING

COMPLAINT: The vehicle comes in with the D5 Lamp flashing, but when the technician scans the PCM for codes, none are found. The vehicle may have symptoms that indicate there is a transmission problem and the technician knows that when the D5 Lamp is flashing there should be a code present.

CAUSE: Some after market scan tools do not have the ability to display trouble codes under certain conditions.

Even though these vehicles are OBD-II compliant and five digit codes should be present, in cases such as this flash codes can still be retrieved via a flashing D5 Lamp.

CORRECTION: Locate the ODB-II Data Link Connector (DLC) and ground terminal 9, (in most cases this should be a Brown wire), Refer to Figure 1, this action will put the PCM in Service Check Signal (SCS) Mode and the D5 Lamp will now flash code patterns. The long flashes are the first digit of the code and the short flashes are the second digit. If a code under number 10 is stored, it will be all short flashes.

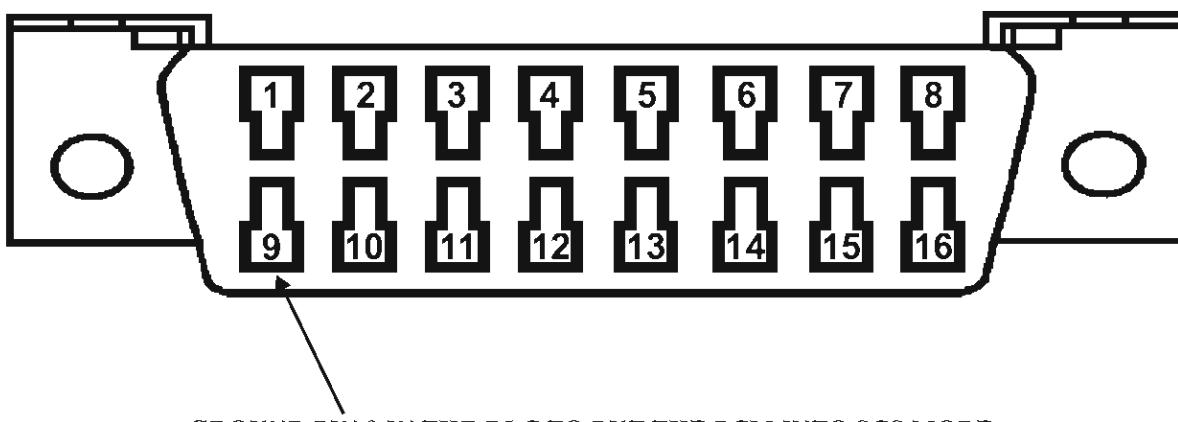
The MIL Lamp may be illuminated, if so, engine codes will always be displayed first.

NOTE: Some scan tools have the ability to put the PCM into SCS Mode by grounding DLC Terminal 9 through the scan tool. The scan tool will now display the two digit trouble code as well as a third digit which indicates the nature of the failure such as a circuit high or circuit low fault as shown in Figure 2.

The charts in Figures 3 and 4 show the conversion from the OBD-II codes to the SCS flash codes.



HONDA/ACURA D OR D5 LAMP FLASHING



GROUND PIN 9 IN THE DLC TO PUT THE PCM INTO SCS MODE
TO RETRIEVE FLASH CODES THROUGH THE D5 LAMP

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Figure 1

SCAN TOOL IN SCS MODE



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Figure 2
Automatic Transmission Service Group



HONDA/ACURA D OR D5 LAMP FLASHING

HONDA/ACURA CODE CONVERSION		
FLASH CODE	OBD-II CODE	CODE DEFINITION
5-2	P0705	Transmission Range Switch - Multiple Shift-Position Input
6-2	P0706	Transmission Range Switch - Open
28-5	P0711	ATF Temperature Sensor - Range/Performance
28-3	P0712	ATF Temperature Sensor - Short
28-4	P0713	ATF Temperature Sensor - Open
15-5	P0716	Mainshaft Speed Sensor - Range/Performance
15-3	P0717	Mainshaft Speed Sensor - No Signal Input
15-6	P0718	Mainshaft Speed Sensor - Intermittent Failure
9-5	P0721	Countershaft Speed Sensor - Range/Performance
9-3	P0722	Countershaft Speed Sensor - No Signal Input
9-6	P0723	Countershaft Speed Sensor - Intermittent Failure
64-1	P0731	1st Gear Incorrect Ratio
64-2	P0732	2nd Gear Incorrect Ratio
64-3	P0733	3rd Gear Incorrect Ratio
64-4	P0734	4th Gear Incorrect Ratio
64-5	P0735	5th Gear Incorrect Ratio
40-3	P0741	Torque Converter Clutch Stuck OFF
76-3	P0746	A/T Clutch Pressure Control Solenoid A Stuck OFF
76-4	P0747	A/T Clutch Pressure Control Solenoid A Stuck ON
70-3	P0751	Shift Solenoid A Stuck OFF
70-4	P0752	Shift Solenoid A Stuck ON
71-3	P0756	Shift Solenoid B Stuck OFF
71-4	P0757	Shift Solenoid B Stuck ON
72-3	P0761	Shift Solenoid C Stuck OFF
72-4	P0762	Shift Solenoid C Stuck ON
74-3	P0771	Shift Solenoid E Stuck OFF
77-3	P0776	A/T Clutch Pressure Control Solenoid B Stuck OFF
77-4	P0777	A/T Clutch Pressure Control Solenoid B Stuck ON
45-1	P0780	Shift Control System Malfunction
78-3	P0796	A/T Clutch Pressure Control Solenoid C Stuck OFF
78-4	P0797	A/T Clutch Pressure Control Solenoid C Stuck ON
62-2	P0812	Transmission Range Switch ATP RVS Switch
25-3	P0842	2nd Clutch Fluid Pressure Switch - Shorted or Stuck ON
25-4	P0843	2nd Clutch Fluid Pressure Switch - Shorted or Stuck OFF
26-3	P0847	3rd Clutch Fluid Pressure Switch - Shorted or Stuck ON



HONDA/ACURA D OR D5 LAMP FLASHING

HONDA/ACURA CODE CONVERSION		
FLASH CODE	OBD-II CODE	CODE DEFINITION
26-4	P0848	3rd Clutch Fluid Pressure Switch - Open or Stuck OFF
27-3	P0872	4th Clutch Fluid Pressure Switch - Shorted or Stuck ON
27-4	P0873	4th Clutch Fluid Pressure Switch - Open or Stuck OFF
16-3	P0962	A/T Clutch Pressure Control Solenoid A - Open or Shorted
16-4	P0963	A/T Clutch Pressure Control Solenoid A - Performance
23-3	P0966	A/T Clutch Pressure Control Solenoid B - Open or Shorted
23-4	P0967	A/T Clutch Pressure Control Solenoid B - Performance
29-3	P0970	A/T Clutch Pressure Control Solenoid C - Open or Shorted
29-4	P0971	A/T Clutch Pressure Control Solenoid C - Performance
7-3	P0973	Shift Solenoid A - Shorted
7-4	P0974	Shift Solenoid A - Open
8-3	P0976	Shift Solenoid B - Shorted
8-4	P0977	Shift Solenoid B - Open
22-3	P0979	Shift Solenoid C - Shorted
22-4	P0980	Shift Solenoid C - Open
60-3	P0982	Shift Solenoid D - Shorted
60-4	P0983	Shift Solenoid D - Open
61-3	P0985	Shift Solenoid E - Shorted
61-4	P0986	Shift Solenoid E - Open
63-1	P1710	1st Hold Switch - Shorted or Stuck OPEN
45-2	P1730	Shift Control System Fault
45-3	P1731	Shift Control System Fault
45-4	P1732	Shift Control System Fault
45-5	P1733	Shift Control System Fault
45-6	P1734	Shift Control System Fault
1-3	P2769	Torque Converter Clutch Solenoid Circuit - Shorted
1-4	P2770	Torque Converter Clutch Solenoid Circuit - Open

Figure 4

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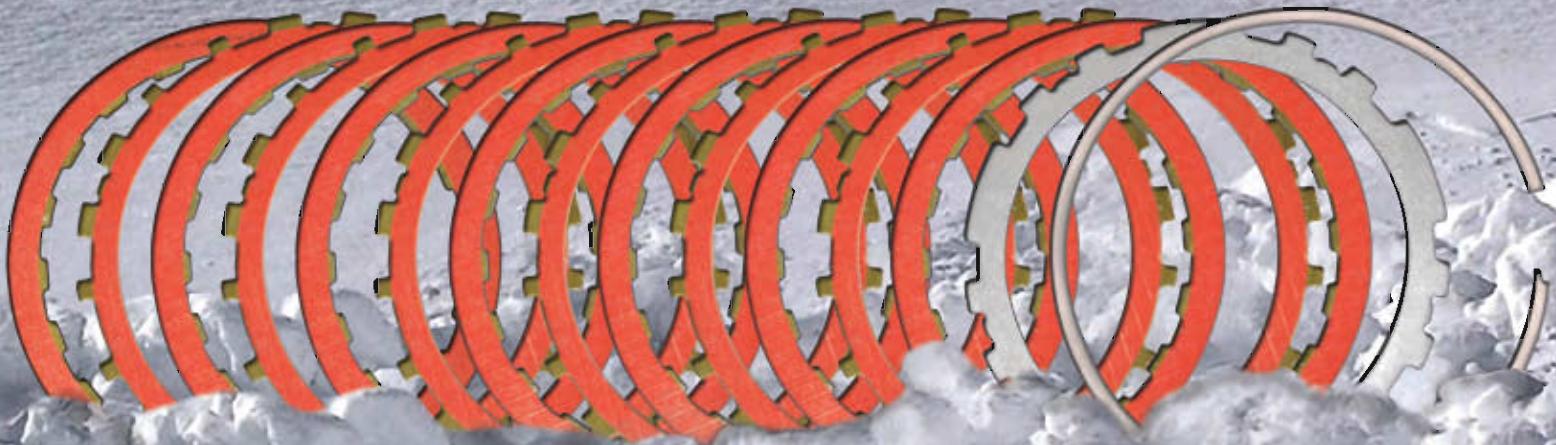
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