# Troubleshooting Torque Converter Clutch Cycling on Dodge Trucks

## Easy Solutions for a Common Problem

by Mike Van Dyke

**Unplug the scan tool and road test to verify the symptom. Simply having the scan tool connected can cause the PCM to command TCC on and off.**

A commanded torque converter clutch cycling on and off (TCC shuttle) at 40–50 MPH is a common problem on Dodge full size Ram pickups, Dakotas and Durangos. There are several causes for this, some of which depend on the vehicle year, control system, and engine configuration. In this issue we're going to break the troubleshooting down into easy steps to solve this commanded TCC shuttling problem.

TCC shuttling on these vehicles is mainly because the Powertrain Control Module (PCM) is very sensitive to the TPS signal. Fluctuations in the TPS signal greater than 0.20 volts can cause the PCM to command the TCC to release, then reapply. The problem is usually in the TPS sensor or circuits themselves, the TPS signal being affected by outside interference, or *noise* from other electrical systems.

TCC shuttling can happen intermittently or continuously. Ask the vehicle owner specifically what speed and driving conditions the TCC shuttle occurs. Note whether or not they were towing or hauling with the vehicle. Sometimes the vehicle will only have the TCC shuttle at specific speeds, throttle openings, or under certain engine load conditions. It's important to know the conditions of the problem, so you can duplicate those conditions to verify the complaint, and to make sure it's gone after the repair.

## All Applications

Unplug the scan tool and road test the vehicle to verify the symptom. Simply having a scan tool connected on these trucks can cause the PCM to command the TCC on and off. This is not to say that you can't drive the vehicle later with a scan tool connected for diagnosis, but first you need to verify whether the problem exists with the scan tool out of the picture. After any repair work, unplug the scan tool, then road test the truck to see if it's fixed.

Load, or impedance test the batteries. Clean the battery terminals (figure 1) even if they don't have any apparent "fuzz" on them. All it takes is a little oxide buildup between the battery post and cable clamp to cause trouble. Diesels have two batteries, so be sure to clean and test both. Also, follow the negative battery cable back to the engine block and clean the powertrain ground connection. A bad battery or added resistance from corroded or loose battery terminals or grounds reduces the battery's ability to buffer the charging system. This causes increased generator ripple and charging voltage fluctuations.

A bad generator with a diode failure causing too much ripple or noise is another common cause of TCC shuttle. A quick way to isolate the generator from the system is simply to disable the generator by disconnecting all of its wires and taping them off with electrical tape (figure 2), then road test the vehicle. If the symptom goes away, test and repair the generator and charging system as necessary.

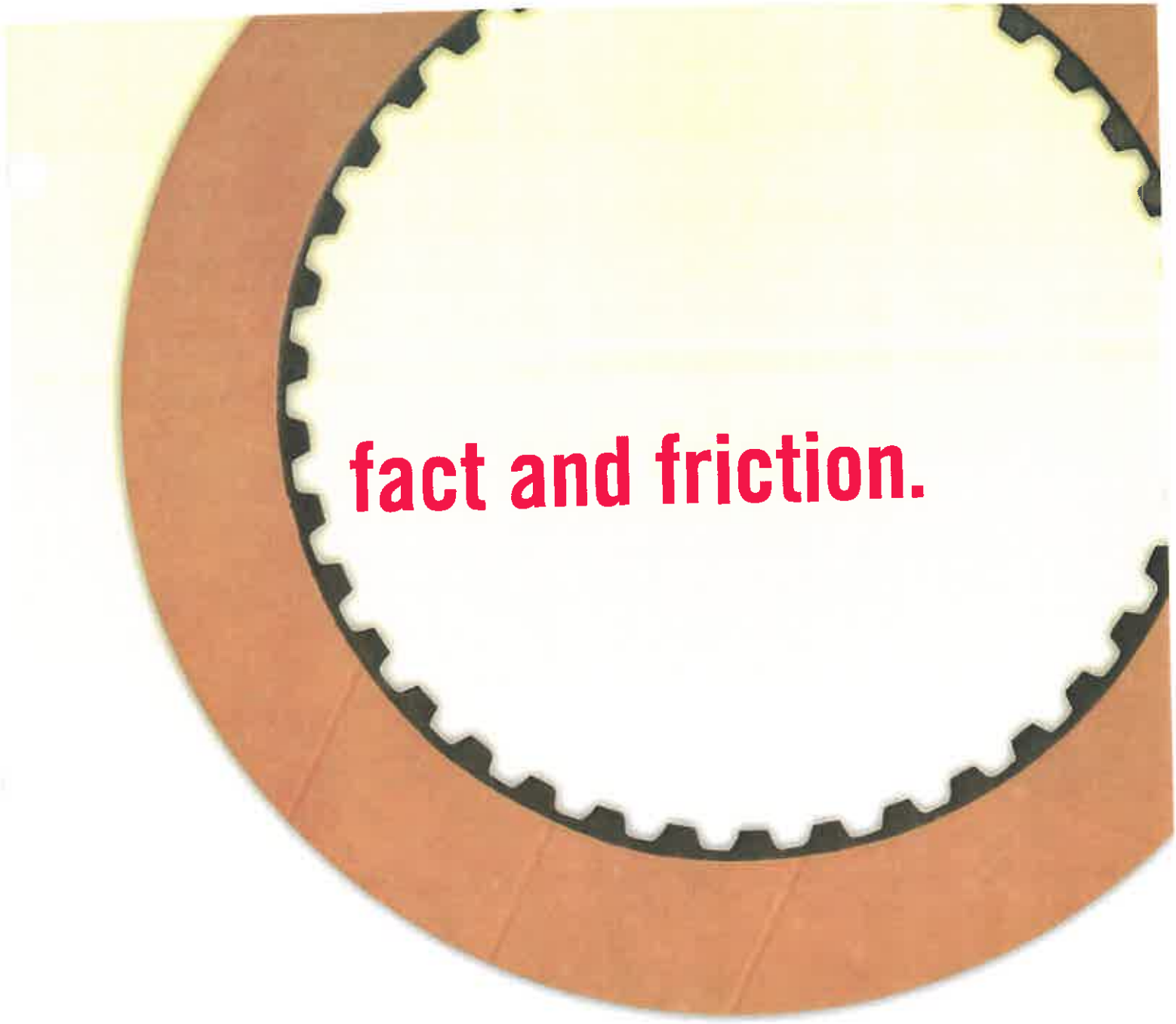
The generator output waveform can also be tested with an oscilloscope to verify correct generator operation (Refer to #1 of oscilloscope test proceedures on page 8).

Figure 1: Clean the battery terminals and load or impedance test the batteries. Follow the negative battery cable back and clean the connection to the engine block.

Other sensor inputs can affect TCC operation, and it's a good idea to make sure you aren't dealing with another sensor problem besides the TPS. Scan data on these trucks can be pretty slow to respond and update, so it's best to check sensor signals and TCC commands by recording a snapshot of scan data when the symptom is occurring.

Keep in mind that a sensor signal problem may not be a bad sensor, check connector terminals for corrosion or loose fit and wire looms for chaffing, especially diesel applications where the vibration of the diesel engine tends to aggravate these problems.

Monitor the TPS, as well as the Output Speed Sensor, Battery Temperature, Engine Coolant Temperature, and Transmission Fluid Temperature signals for significant fluctuations. The battery temperature sensor is underneath the driver's side battery on most diesel applications. Battery acid sometimes leaks down



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and corrodes the sensor, wires and connector, causing an erratic signal.

## Diesel Applications 1998–2003

First, make sure you've eliminated the generator, grounds, and battery problems before going any further. Once you're sure they're okay, there are some specific checks you can make:

Daimler Chrysler has an updated PCM calibration to address the TCC shuttling problem on 5.9L, 24-valve diesel applications with a production date between January 1, 1998 and December 18, 1998. Check the PCM for the latest calibration or reflash the PCM according to Daimler Chrysler TSB 18-02-99.

The Accelerator Pedal Position Sensor (APPS) circuits on these trucks are different than the TPS circuits on the gas engine or earlier diesel applications. The APPS signal first goes to the engine computer. The engine computer then sends the signal out on a separate circuit to the PCM.

The problem is, with some particularly stubborn trucks, the APPS signal coming from the ECM may not be clean enough. The solution is to bypass the ECM and run the APPS signal straight to the PCM (figure 3). Don't cut the wire going from the APPS to the ECM, as the ECM still needs this signal. Here's how to bypass the factory wiring:

- Tap into the APPS signal wire at the APPS (Terminal 3, Light Blue/Black wire).
- Run a jumper wire to the PCM.
- Cut the wire at the PCM (connector 1, Terminal 23, Orange/Dark Blue wire).
- Connect the jumper to the PCM.
- Fold the abandoned signal wire back and tape it into the PCM harness.

## Diesel Applications Before 1998

A common problem specific to these trucks is low TPS signal voltage. When the vehicle is driven at a normal cruise, the TPS signal voltage can actually be on the threshold of closed throttle. This causes the PCM to toggle the throttle assessment between closed and part throttle, and to cancel and reapply the torque converter clutch accordingly.

The TPS on this earlier diesel configuration is mounted on the injector pump linkage in the engine compartment (figure 4). The injector pump/TPS linkage becomes worn and causes the TPS signal voltage to be skewed lower than normal. The solution is either to adjust the TPS, or repair or replace the linkage to restore the correct TPS voltage.

Normal closed throttle TPS signal voltage is 0.50–0.60 volts. Check the throttle percentage in scan data; it should read zero at closed throttle. If it reads higher than zero, the TPS will have to be adjusted to lower the signal voltage.

Another common problem to watch for on pre-1998 diesels is wiring harness chaffing, especially on the part of the engine harness that runs to the TPS. These diesel engines vibrate quite a bit, and any unsupported wiring loom that contacts metal is subject to rubbing through and shorting out.

## Gas Engine Applications

Again, make sure you've checked the battery, grounds and charging system basics before looking for any specific failures.

The most common problem with gas engine trucks is simply a bad TPS. Consider simply pricing a TPS and replacing it. Otherwise sweep it with an oscilloscope (figure 5). Again, be careful about monitoring the TPS in scan data. Scan data on most of these trucks can be pretty slow, and may not show TPS signal glitches or dropouts. Recording a snapshot when the TCC shuttling is occurring is a safer bet but still isn't a sure way to identify TPS problems.

Make sure to eliminate any misfire or secondary ignition problems on a gasoline engine application, as EMI (electromagnetic interference) and arcing resulting from secondary ignition problems can disturb the TPS signal.

On some stubborn gas engine applications, you can install a simple low pass filter into the TPS signal circuit at the PCM to clean up the signal (figure 6); here's how:

- Cut the TPS signal wire at PCM

Figure 2: If the generator is suspect, disconnect and tape off all of the wires on the back of the generator to disable it.

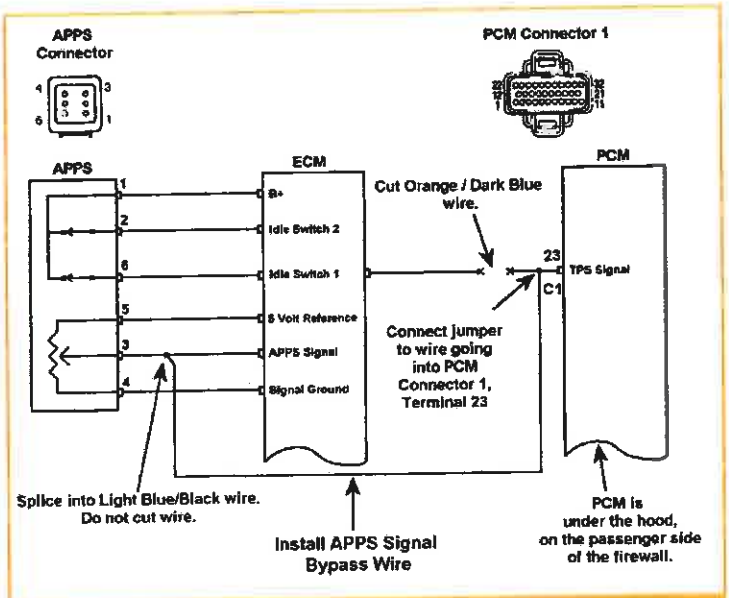


Figure 3: The APPS signal can be jumpered directly to the PCM on the 1998 – 2003 Diesel applications.

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Figure 4: Check for low closed throttle TPS signal voltage on 1997 and earlier diesel applications. TPS is on the injector pump.

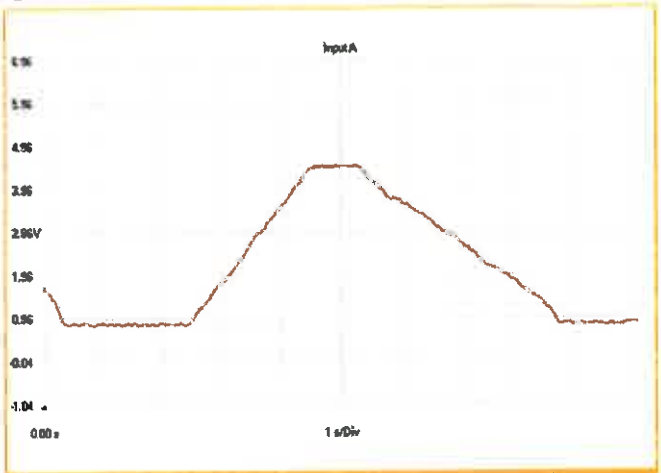



Figure 5: Refer to #2 of oscilloscope test proceedures on page 8 below.

connector 1, terminal 23 (Orange/Dark Blue wire).

- Install a 3.3KΩ resistor and a 10uF, 16-volt capacitor as shown. You can use Radio Shack P/N 271-1328 for the resistor, and Radio Shack P/N 272-1436 for the capacitor. The capacitor is polarized, so be certain to connect the + terminal (marked with a stripe on the capacitor body) to the TPS circuit, and the negative terminal to ground.
- Weatherproof all of your connections with shrink tubing and electrical tape.

TCC shuttle is a common problem on these trucks. By looking at the particular problems that affect the truck you're working with, you'll narrow down the possibilities, and be that much closer to fixing the problem. After all, time is money!

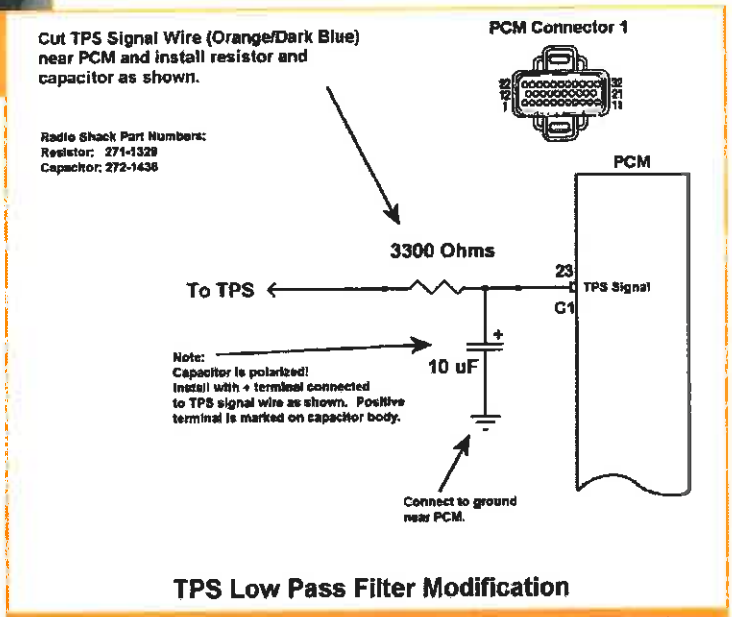
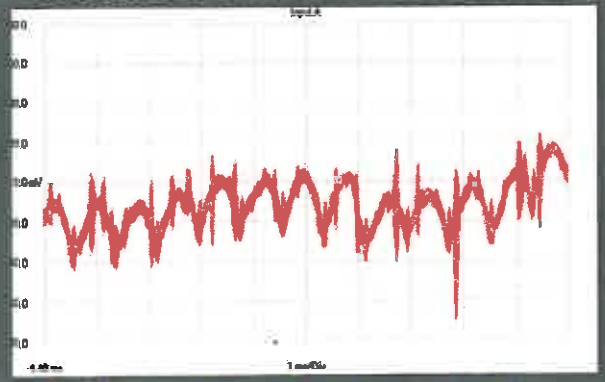



Figure 6: For stubborn trucks a low pass filter can be added to reduce noise on the TPS circuit.

## OSCILLOSCOPE TEST PROCEEDURES



### 1. Checking generator Ripple with a Scope:

Set the input on your scope for AC coupling, 20mV per division. Set your time base to 1ms per division. These settings should allow you to view the generator waveform at idle speed. Turn all electrical accessories off. Connect your positive and negative probes to the positive and negative battery clamps, respectively. The waveform should be a continuous series of "humps" as shown in the screenshot above.

It is normal to have some fluctuation up and down in the waveform as the idle speed varies, and there can be some ignition noise spikes present. A regular negative spike in the waveform (usually every third "hump") indicates a faulty rectifier diode in the generator. The amplitude of the waveform should not exceed 200mV. Note that in the example the amplitude including noise is about 90mV maximum at any given point in the waveform.

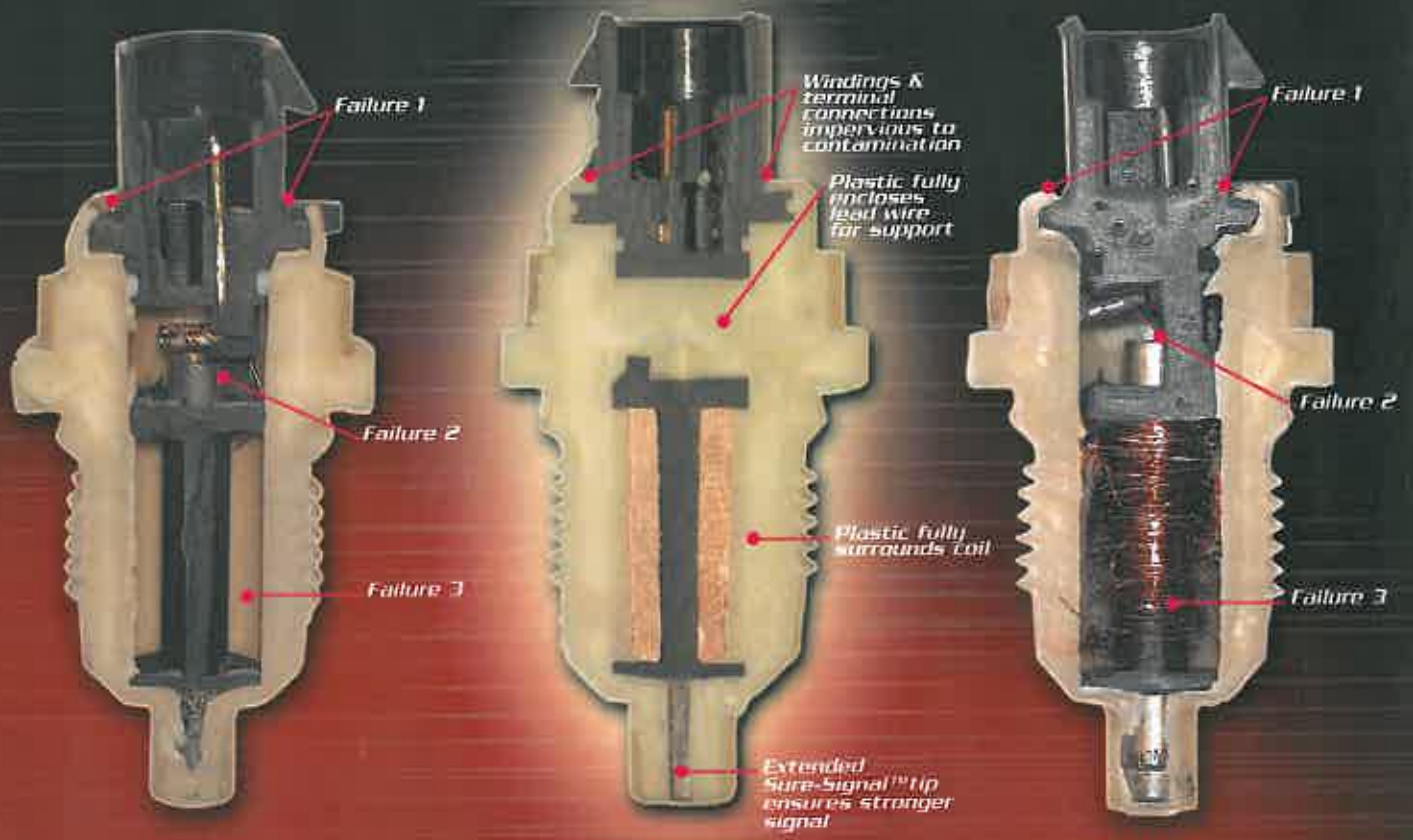
A weak or low battery, accessory loads, or connecting your scope probes at the generator output terminal will show increased amplitude.

### 2. Sweeping TPS with a scope:

Set your scope input for DC coupling, 1 volt per division. Set the time base to 500ms per division. Back probe the TPS signal ground circuit with the negative scope probe and back probe the TPS signal with the positive probe.

With the key on, engine off, sweep the throttle from closed to wide open, then back to closed. You should have a nice "hump" waveform that tracks up and down the throttle sweep. Any positive or negative spikes in the waveform indicate a possible "bad spot" in the TPS. Make several sweeps to verify signal.

Heat can aggravate a faulty TPS, as well as engine vibration. Check the TPS with the engine at operating temperature. Wiggle TPS wiring and connections and look for "glitches" in the waveform.

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# RE Series Diagnostics

## *Introduction*

Welcome to ATSG's Chrysler RWD RE series diagnostic technical training seminar. This transmission operates like no other on the road today. With a governor pressure sensor taking care of the 1-2-3 shift and a separate solenoid used to make the 3-4 shift, system diagnostics become unique to itself. This course is not only designed to educate the student in the systems operation but actual problems with solutions. Many of the problems that frustrate shops across the country are in this diagnostic training seminar along with the solution making the time you spend with this training a valuable commodity.

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# 42-47RE TRANSMISSIONS
## DIAGNOSTIC INFORMATION

**PRELIMINARY INFORMATION:**

Chrysler's Rear wheel drive Electronic series transmissions are unlike any other transmission found on the road today. And for this reason, diagnosing shift complaints and/or solenoid codes becomes entirely unique. Although proper diagnostics begins with an understanding of the solenoid and sensor's principles of operation, there also needs to be an understanding between the TCM and the OBD II computer systems. And to add just another twist, there is a notable difference between gas and diesel governor pressure strategy. Not knowing these important factors has caused confusion for the technician resulting in mis-diagnosis and much time wasted trying to repair a troublesome transmission.

To assist the technician in effectively diagnosing the majority of problems associated with this system, it is imperative that the following be read and assimilated.

**GOVERNOR SOLENOID:**

The purpose of the governor solenoid is to produce governor pressure which in gas vehicles rises proportional to road speed. For example: at 20 mph there should be approximately 20 psi of governor pressure and at 30 mph there should be approximately 30 psi and so on. ***With diesel vehicles, this is not so.*** At approximately 20 mph governor pressure begins to double road speed. So when 20 mph is reached there will be approximately 40 psi and at 30 mph there will be approximately 60 psi of governor pressure. The purpose of this strategy is to prevent 4-2 or 3-2 kick downs which would result in high engine revolutions. Problems may arise here if gas and diesel valve bodies are improperly interchanged. A quick 1-2 and 2-3 shifts may occur if a gas valve body is used in a diesel vehicle while a late 1-2 and 2-3 shift may occur with a diesel valve body in a gas vehicle.

Another point to remember is that the governor pressure control solenoid is no different than a typical line pressure control solenoid in that when it is unplugged, high pressure occurs. Therefor, whenever the case connector on any RE unit is unplugged, governor pressure should reach approximately 60 psi at idle ***with the selector lever in DRIVE.*** If pressure stays low with the connector unplugged, there is an internal transmission problem. The possibilities could be a defective governor solenoid, the screen on the solenoid inlet port is clogged, the overdrive piston support to case gasket is damaged or installed improperly, or an A500/518 overdrive piston support was improperly installed. This solenoid measures approximately 3 to 5 ohms in resistance as with any typical pressure control solenoid.

If and when a scanner will provide data stream information, the governor solenoid is displayed as being: "Desired Governor Pressure" as the solenoid is being controlled by the computer based various inputs such as VSS, TPS, ECT and TFT (See Figure 1). ***NOTE: The selector lever must be placed in Drive before the scanner will provide governor pressure data.***

Throughout all years terminal functions at the transmission case connector has remained the same. It can be observed in Figure 2 that system voltage is supplied to all three solenoids on the valve body. The governor pressure sensor, the OD solenoid and the TCC solenoid. Terminal 5 is the ground wire used by the TCM or PCM to control the governor pressure control solenoid. One amp of current produces zero psi of governor pressure while zero amps sets maximum governor pressure.

# 42-47RE TRANSMISSIONS
## DIAGNOSTIC INFORMATION *continued*

### GOVERNOR SENSOR/TRANSDUCER:

The greatest misconception of the governor sensor (Transducer) is that it is controlled by the computer (Module). The computer does not control the sensor in any way other than supplying it with a 5 volt source. The function of the sensor is to provide information TO the computer as to what the output pressure of the governor solenoid is, i.e. governor pressure. This information can be viewed through the scanner as "Actual PSI" (See Figure 1). This tends to be misleading since it is possible to have a sensor fail providing erroneous data to the scanner. It is to the technicians advantage to verify actual governor pressure with a pressure gauge. ***NOTE: The selector lever must be placed in Drive before the scanner will provide governor sensor data.***

The illustration in Figure 2 shows that terminal 2 in the case connector is the 5 volt supply to the sensor from the computer. Terminal 3 is the transducer's ground wire and terminal 4 is the wire in which the sensor sends an analog linear electrical signal to the computer that is related to governor pressure. The average typical linear voltage range which the sensor sends to the computer is approximately 0.5 volts @ zero psi of governor pressure to 3.0 volts @ 60 psi of governor pressure. It is this linear voltage that the computer reads and compares to a memorized table within itself to determine governor pressure state. This information is used to tailor the control of the governor solenoid for both up shift and down shift operations.

This governor sensor was originally a three wire sensor. In production year 1996 it underwent a change where the externally mounted TFT sensor on the OD and TCC solenoid bracket was incorporated into the sensor making it a 4 wire sensor (See Figure 3). This in no way changed any of the case connector pin functions (Figure 2).

### THE OVERDRIVE SOLENOID:

As previously stated, the governor pressure control solenoid is responsible to produce governor pressure proportional to road speed. This governor pressure is used to make the 1 to 2 and the 2 to 3 up shift in opposition to typical throttle pressure. The 3 to 4 up shift however ***is not*** directly influenced by governor pressure rather, it is controlled by the Overdrive solenoid.

The OD solenoid is fed with 3rd gear oil which when the OD solenoid becomes energized, third gear oil is used to stroke the 3-4 shift valve to make the 3-4 up shift. If there is a loss of governor pressure to the place where 3rd gear oils is lost, the OD solenoid becomes ineffective and a shift into a lower gear will occur and may be described as neutralizing. The Overdrive solenoid is supplied system voltage through terminal # 1 and controlled on the ground side by the computer through the # 6 terminal in the case connector (See Figure 2).

### THE TCC SOLENOID:

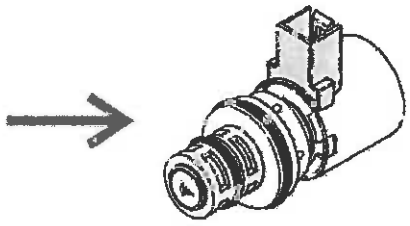
The TCC solenoid is supplied with 2nd gear oil as stroking pressure for the converter clutch switch valve. The solenoid is supplied with system voltage through terminal # 1 and is controlled on the ground side by the computer through the # 7 terminal in the case connector (See Figure 2).

## THE ELECTRONIC GOVERNOR SYSTEM AND SCANNER NOMENCLATURE

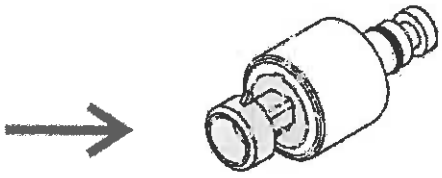
**Governor Solenoid**

*SCANNER NOMENCLATURE:*

**DESIRED PSI**
*This is the command the computer is giving to the solenoid*



**ACTUAL PSI**
*Governor pressure converted to an analog linear voltage signal received by the computer from the transducer*



**Governor Sensor/Transducer**

Figure 1

## CASE CONNECTOR PIN FUNCTIONS

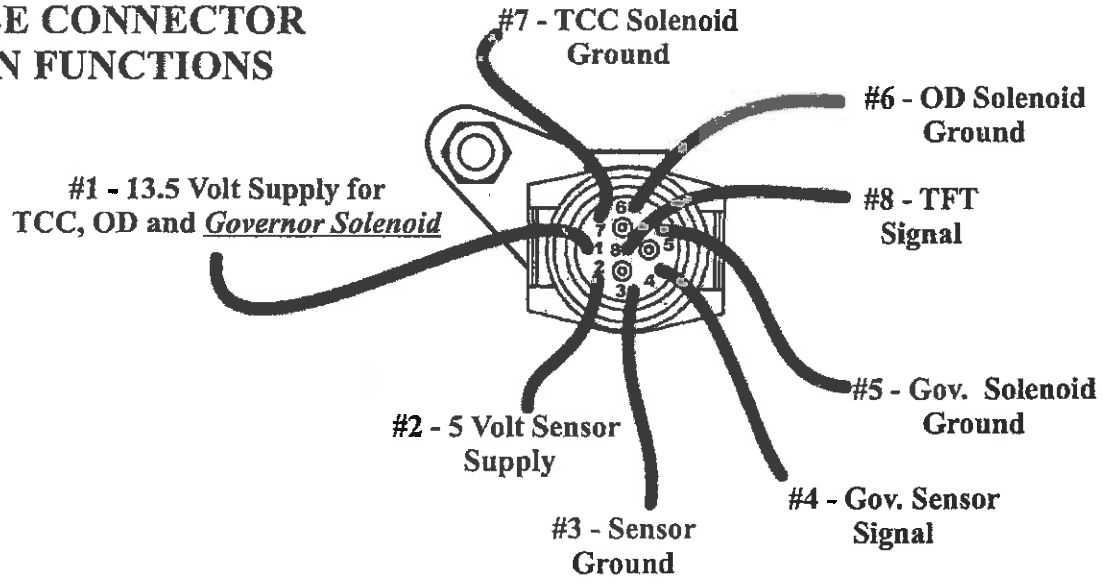
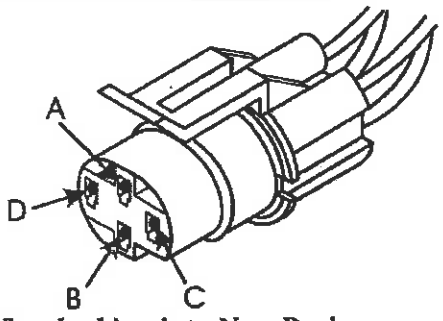



Figure 2

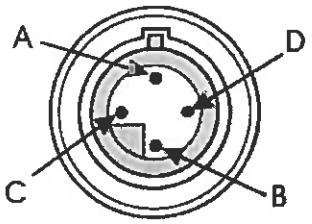
## NEW DESIGN GOVERNOR PRESSURE SENSOR WITH "TFT" INCORPORATED INSIDE THE SENSOR




*View looking into New Design Governor Pressure Sensor Connector*

| Pin Number | All Models |
|---|---|
| A | RED |
| B | WHITE |
| C | BLACK |
| D | GREEN |

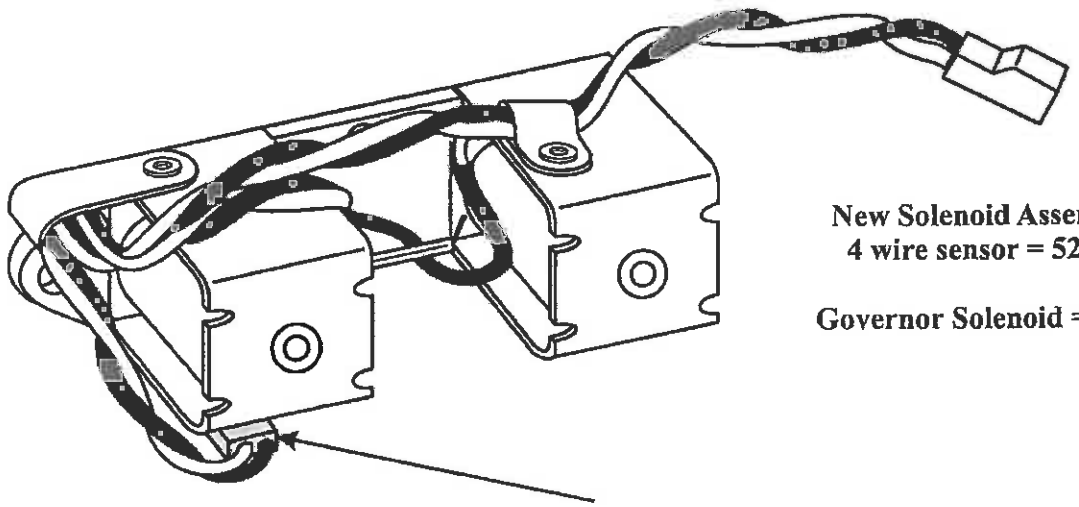
| PIN | FUNCTION |
|---|---|
| A | 5-Volt supply to sensor from PCM |
| B | Governor Pressure Sensor Signal to PCM |
| C | Transmission Fluid Temperature Signal to PCM |
| D | Governor Pressure Sensor Ground |




*View looking into the Governor Pressure Sensor*

*Governor Pressure Sensor*
*3 wire = 56027562*
*4 wire = 56027720*

## PREVIOUS DESIGN "TFT" SENSOR LOCATION



**New Solenoid Assembly for 4 wire sensor = 52118500**

**Governor Solenoid = 4617210**

*Transmission Fluid Temperature Sensor*

Figure 3

# 42-47RE TRANSMISSIONS
## DIAGNOSTIC INFORMATION *continued*

### THE TCM:

1993½-1995 RE series transmissions have a dedicated computer to control all solenoid operations and it is called the "Transmission Control Module" (TCM). This module is located under the left side of the dash as seen in Figure 4. The TCM provides system voltage to all three solenoids out of terminal D-16 to terminal 1 at the transmission connector (See Figure 5). The TCM monitors its operating system and if an error is detected a diagnostic trouble code is produced. The module then enters a "default mode" by cutting the voltage to pin 1 placing the vehicle into third gear. Codes are accessible over the SCI lines in the #2 Data Link Connector with the use of a scanner. If incorrect information is entered into the scanner codes may unretrievable. One such common mistake is entering Cherokee when Grand Cherokee should have been be entered. The #2 DLC is black in color and its location is illustrated in Figure 4. If a scanner is not available, the Overdrive Off Lamp can be used to flash out the DTC's using the following procedure:

A. Turn ignition key on and off three times. Then, leave overdrive OFF switch in normal overdrive ON position.
B. Immediately begin counting the number of flashes displayed by overdrive OFF switch indicator lamp.
C. A code 55 identifies *end of flash code transmission.*

The fault code description are as follows:

11 Engine RPM input
12 Output shaft sensor input
13 Vehicle speed input
14 Governor pressure sensor input
15 Throttle position sensor input
16 Transmission fluid temperature input
17 Overdrive override (control) switch input
18 System voltage
19 Internal fault in modem
21 Governor pressure solenoid output
22 Overdrive solenoid output
23 Converter clutch solenoid output
24 Overdrive override (control switch) lamp output
25 Internal fault in modem
26 Governor pressure sensor offset drift
55 End of code transmission

### THE PCM:

In 1996, a major change took place with the implementation of the Federally Regulated OBD II system. The TCM has been incorporated into the Engine Controller and it is called the "Powertrain Control Module" (PCM) (See Figure 6). This PCM is located in the engine compartment in one or two places as seen in Figure7.

# 42-47RE TRANSMISSIONS
## DIAGNOSTIC INFORMATION *continued*

**THE PCM *continued*:**

Code retrieval can be performed by cycling the ignition 3 times as previously explained with non-OBDII TCM vehicles. However, the codes obtained in this manner with OBDII PCM vehicles are vague and for the most part useless. Codes that are useful can only be achieved with the operation of a scanner through the Data Link Connector (DLC) located below the knee bolster to the left of the steering column.

The fault code description are as follows:

| *Scan Tool Display Generic Scan Tool* | *Code* |
|---|---|
| 3-4 shift sol, no rpm drop @ 3-4 shift | P0783 |
| Gov press above 3 psi in gear with 0 mph | P1757 |
| Gov press not equal to target @ 15-20 psi | P1756 |
| Gov press sen offset volts too low or high | P1762 |
| Governor pressure sensor volts too hi | P1763 |
| Governor pressure sensor volts tool low | P1764 |
| Governor pressure solenoid/trans relay ckts | P0748 |
| O/D switch pressed (Lo) more than 5 min | P1751 |
| P/N switch stuck in park or in gear | P0600 |
| Torque converter clutch, no rpm drop at lockup | P1765 |
| Torque converter clutch solenoid/trans relay ckts | P1780 |
| Trans 12 volt supply relay control circuit | P1765 |
| Trans 3-4 solenoid/trans relay circuits | P0753 |
| Trans temp sensor voltage too high | P0713 |
| Trans temp sensor voltage too low | P0712 |
| Trans temp sensor, no temp rise after start | P0711 |

**THE RELAY:**

One very notable difference is that the system voltage supplied to pin 1 at the case connector is no longer directly fed from the computer as with the TCM. Battery or system voltage is now supplied via a Transmission Control Relay (TCR) (See Figures 6 and 8). All relay locations are displayed in Figure 9. The function of the TCR is the same as the EATX relay found in Chrysler's A604 and A606 transaxles in that it cuts voltage to the solenoids after the PCM has determined that a system fault occurred. This action places the transmission into a 3rd gear only default mode.

Although the function of the EATX relay is the same as the TCR, the operation of it is slightly different. The EATX relay is excited by the TCM via a voltage wire from terminal 15. The TCR however is controlled by the PCM via a ground wire from terminal 30 in the white # 2 or B connector as seen in Figures 6 and 8. Cavity identifications are provided for each terminal of the TCR connector in Figure 9. Since the PCM and the TCR are located in the engine compartment, solenoid resistance can be easily performed from their connectors as seen and explained in Figure 10.

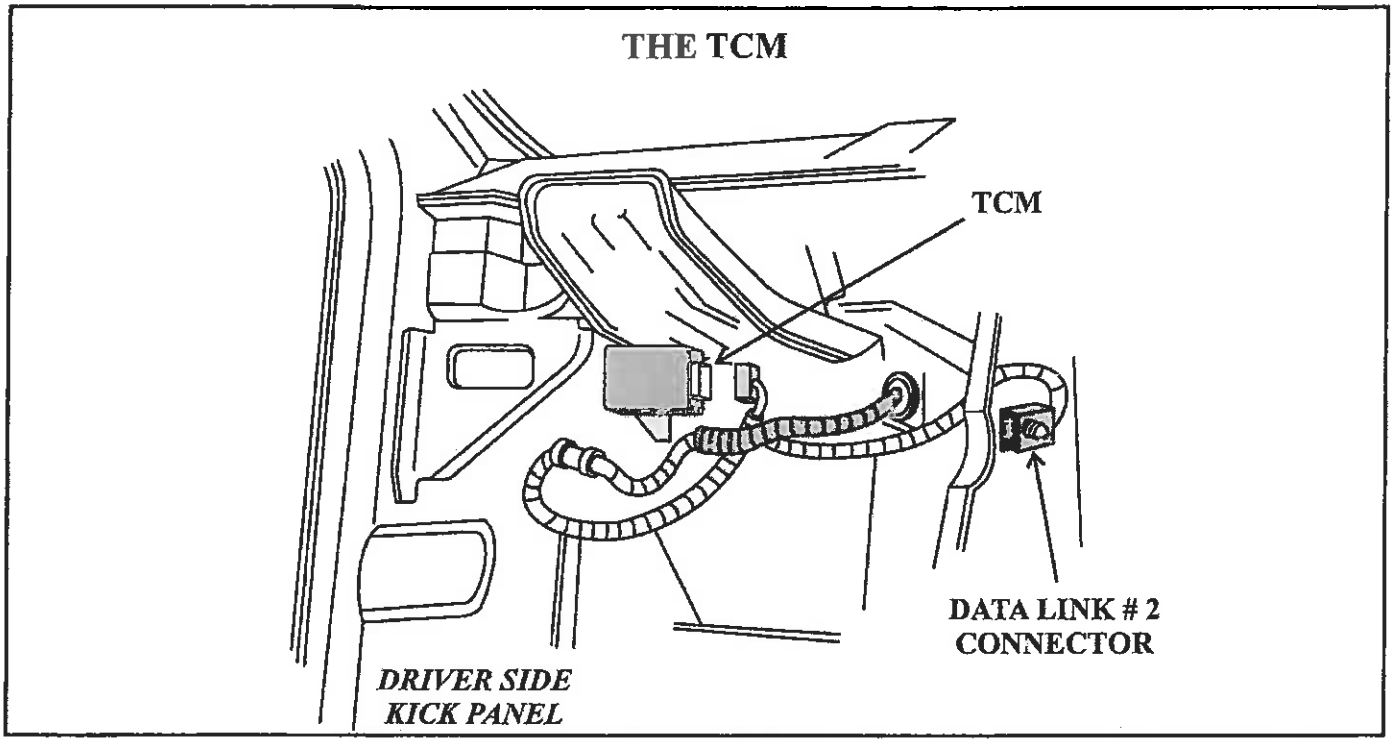



Figure 4

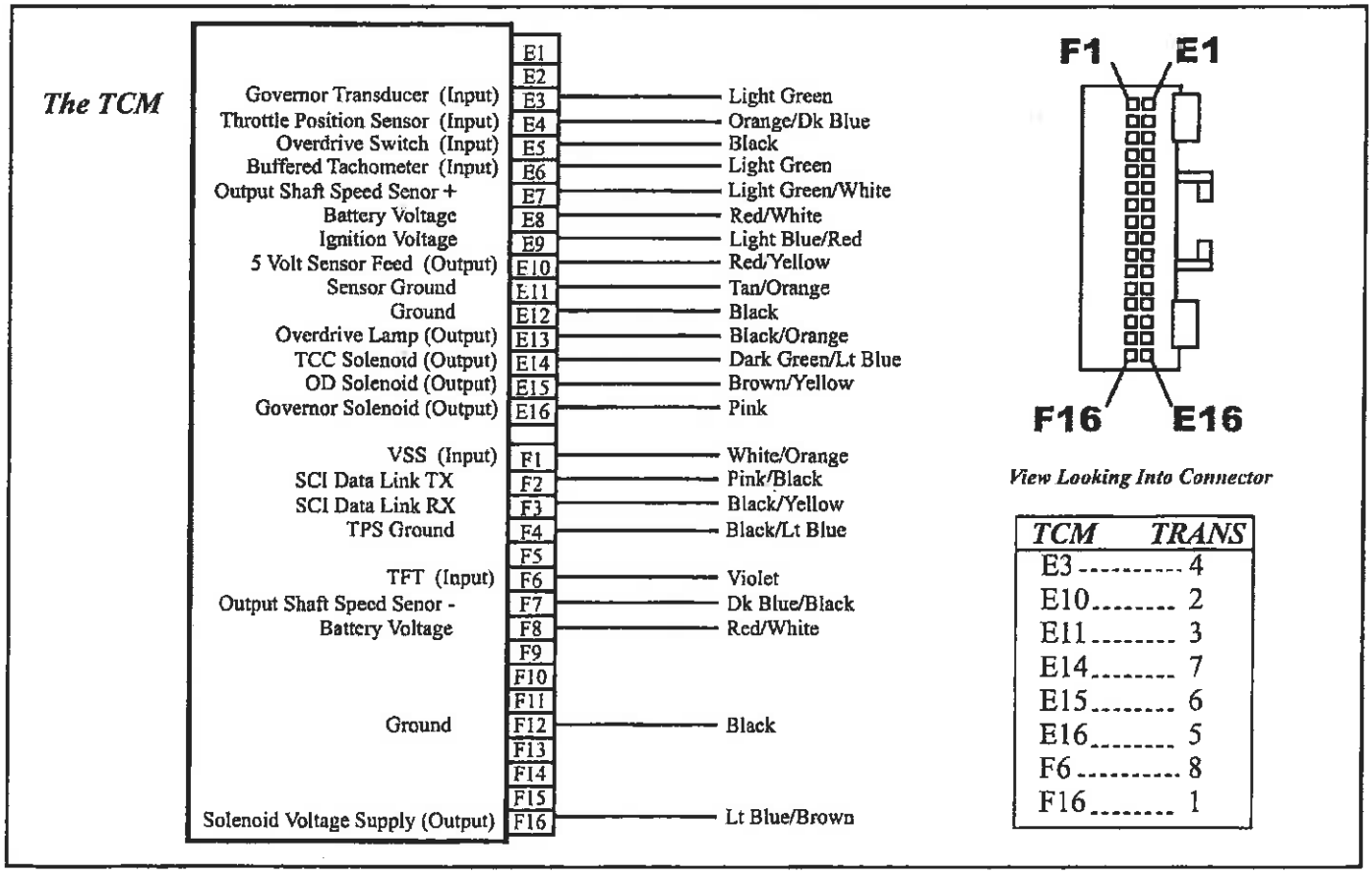



Figure 5

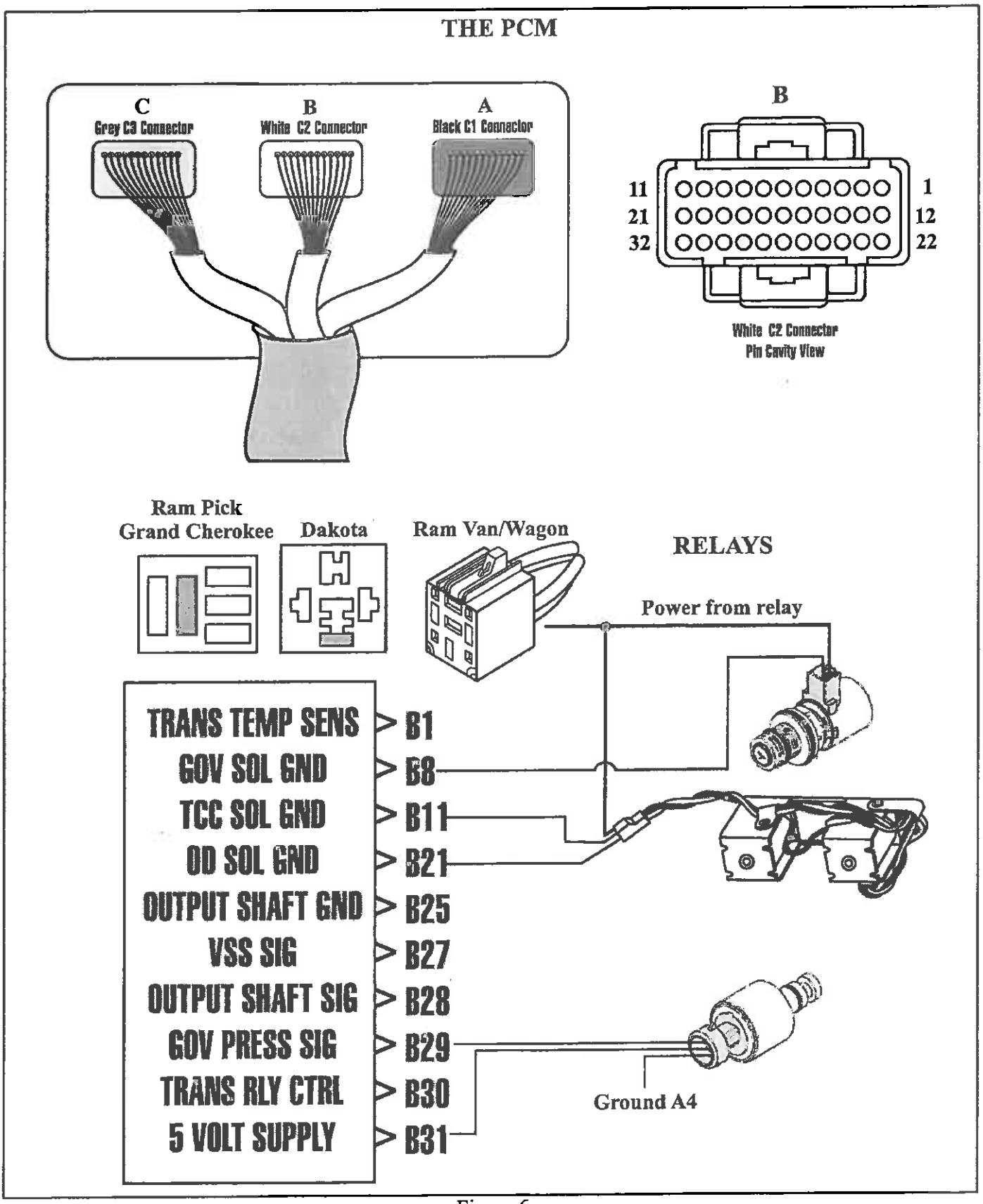

THE PCM
C
Grey C3 Connector
B
White C2 Connector
A
Black C1 Connector
B
11
21
32
1
12
22
White C2 Connector
Pin Cavity View
Ram Pick
Grand Cherokee
Dakota
Ram Van/Wagon
RELAYS
Power from relay
TRANS TEMP SENS B1
GOV SOL GND B8
TCC SOL GND B11
OD SOL GND B21
OUTPUT SHAFT GND B25
VSS SIG B27
OUTPUT SHAFT SIG B28
GOV PRESS SIG B29
TRANS RLY CTRL B30
5 VOLT SUPPLY B31
Ground A4

Figure 6

**POWERTRAIN CONTROL MODULE LOCATION**

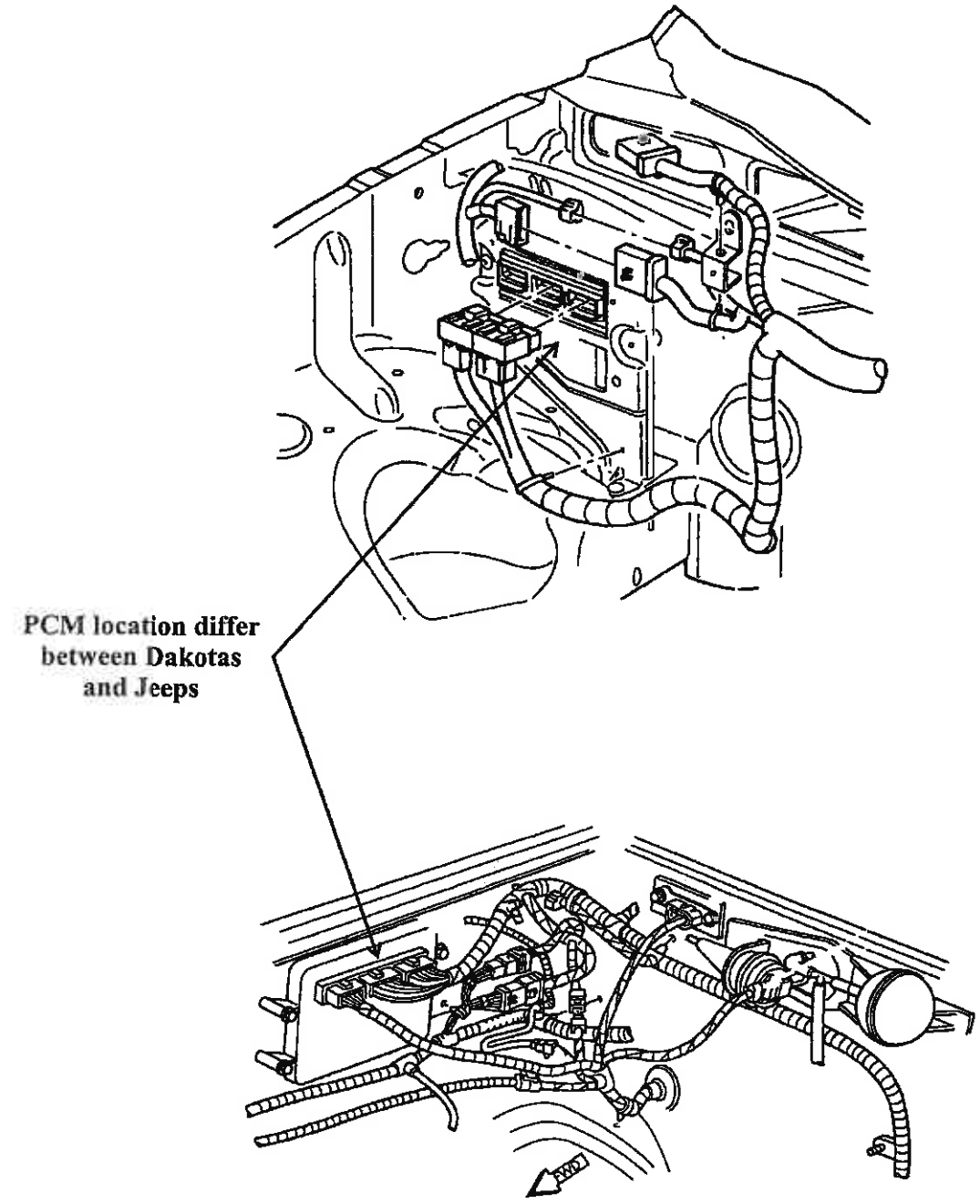



Figure 7

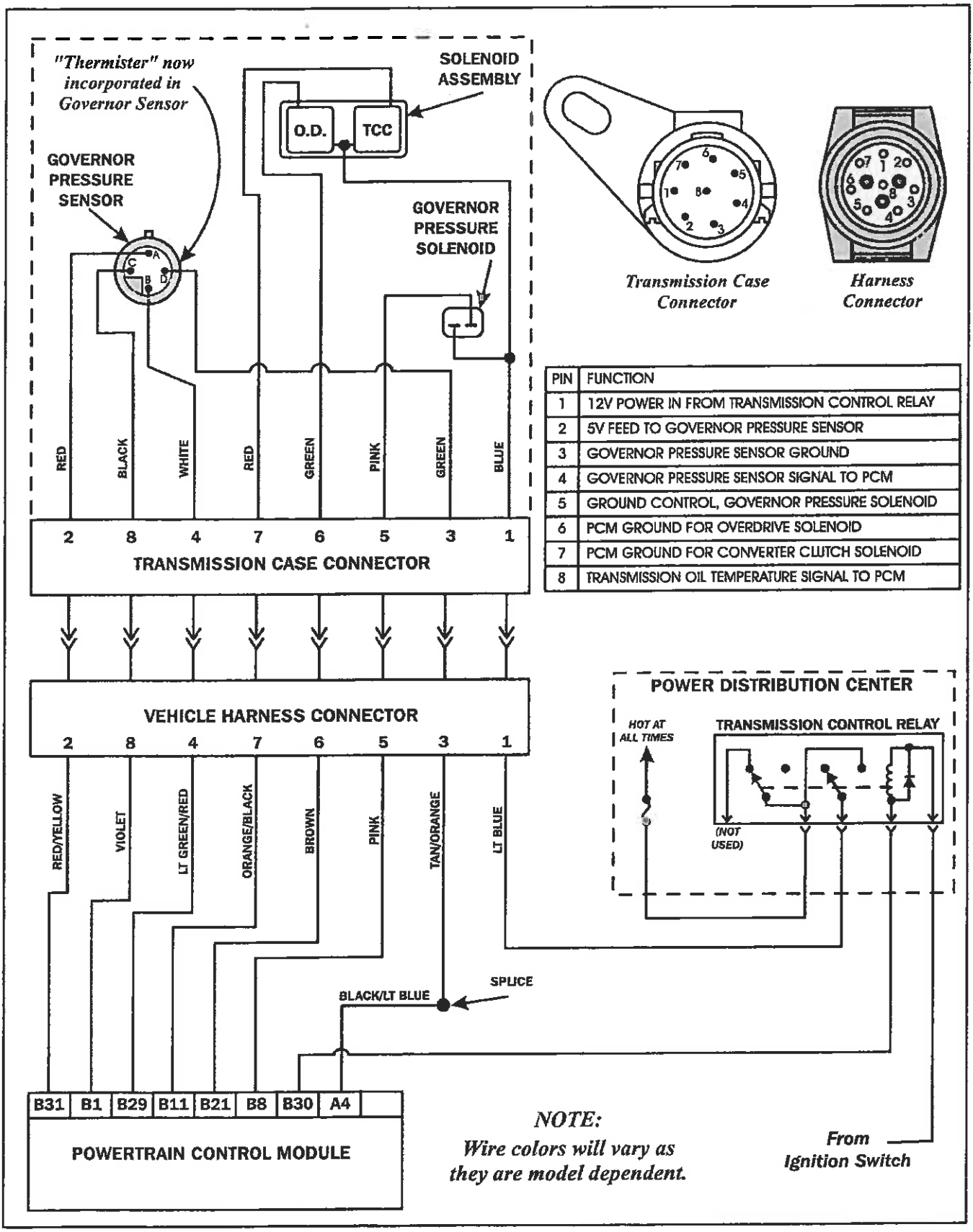
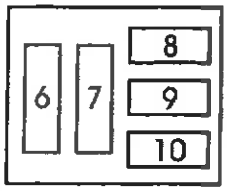

"Thermister" now incorporated in Governor Sensor
SOLENOID ASSEMBLY
O.D.
TCC
GOVERNOR PRESSURE SENSOR
GOVERNOR PRESSURE SOLENOID
RED
BLACK
WHITE
RED
GREEN
PINK
GREEN
BLUE
2 8 4 7 6 5 3 1
TRANSMISSION CASE CONNECTOR
Transmission Case Connector
Harness Connector
PIN FUNCTION
1 12V POWER IN FROM TRANSMISSION CONTROL RELAY
2 5V FEED TO GOVERNOR PRESSURE SENSOR
3 GOVERNOR PRESSURE SENSOR GROUND
4 GOVERNOR PRESSURE SENSOR SIGNAL TO PCM
5 GROUND CONTROL, GOVERNOR PRESSURE SOLENOID
6 PCM GROUND FOR OVERDRIVE SOLENOID
7 PCM GROUND FOR CONVERTER CLUTCH SOLENOID
8 TRANSMISSION OIL TEMPERATURE SIGNAL TO PCM
VEHICLE HARNESS CONNECTOR
2 8 4 7 6 5 3 1
POWER DISTRIBUTION CENTER
HOT AT ALL TIMES
TRANSMISSION CONTROL RELAY
(NOT USED)
RED/YELLOW
VIOLET
LT GREEN/RED
ORANGE/BLACK
BROWN
PINK
TAN/ORANGE
LT BLUE
SPLICE
BLACK/LT BLUE
B31 B1 B29 B11 B21 B8 B30 A4
POWERTRAIN CONTROL MODULE
NOTE:
Wire colors will vary as they are model dependent.
From Ignition Switch

Figure 8

# Relay Location Sheet

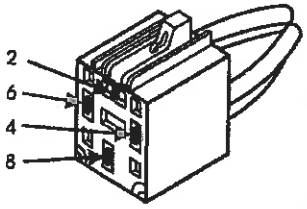
| Pin Number | Model "BR" Ram Pick-up | Model "ZJ" Grand Cherokee |
|---|---|---|
| 6 | RED/WHT | LT GREEN |
| 7 | RED | LT BLUE |
| 8 | PINK | BRN/ORG |
| 10 | LTG/BLK | RED/ORG |




**TRANSMISSION CONTROL RELAY CONNECTOR PIN I.D. FOR "BR" AND "ZJ" MODELS**

| PIN | FUNCTION |
|---|---|
| 6 | Fused Battery Voltage |
| 7 | Transmission Control Relay Output (12V to Transmission) |
| 8 | Transmission Relay Control (Grnd Signal from PCM) |
| 10 | Fused Ignition Switch (12V to Relay from Ign. Switch) |

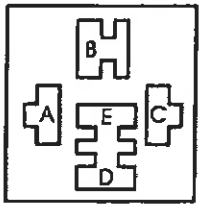
| Pin Number | Model "AB" Ram Van, Wagons and Jeeps |
|---|---|
| 2 | LIGHT BLUE |
| 4 | LT GREEN/BLACK |
| 6 | VIOLET/LT BLUE |
| 8 | RED/WHT |




**TRANSMISSION CONTROL RELAY CONNECTOR PIN I.D. FOR "AB" MODELS**

| PIN | FUNCTION |
|---|---|
| 2 | Transmission Control Relay Output (12V to Transmission) |
| 4 | Fused Ignition Switch (12V to Relay from Ign. Switch) |
| 6 | Transmission Relay Control (Grnd Signal from PCM) |
| 8 | Fused Battery Voltage |

| Pin Number | Model "AN" Dakota Pick-up |
|---|---|
| A | DK BLUE |
| B | PNK/DKB |
| C | DKB/WHT |
| D | LT GREEN |




**TRANSMISSION CONTROL RELAY CONNECTOR PIN I.D. FOR "AN" MODELS**

| PIN | FUNCTION |
|---|---|
| A | Fused Ignition Switch (12V to Relay from Ign. Switch) |
| B | Fused Battery Voltage |
| C | Transmission Relay Control (Grnd Signal from PCM) |
| D | Transmission Control Relay Output (12V to Transmission) |

## TRANSMISSION CONTROL RELAY LOCATIONS

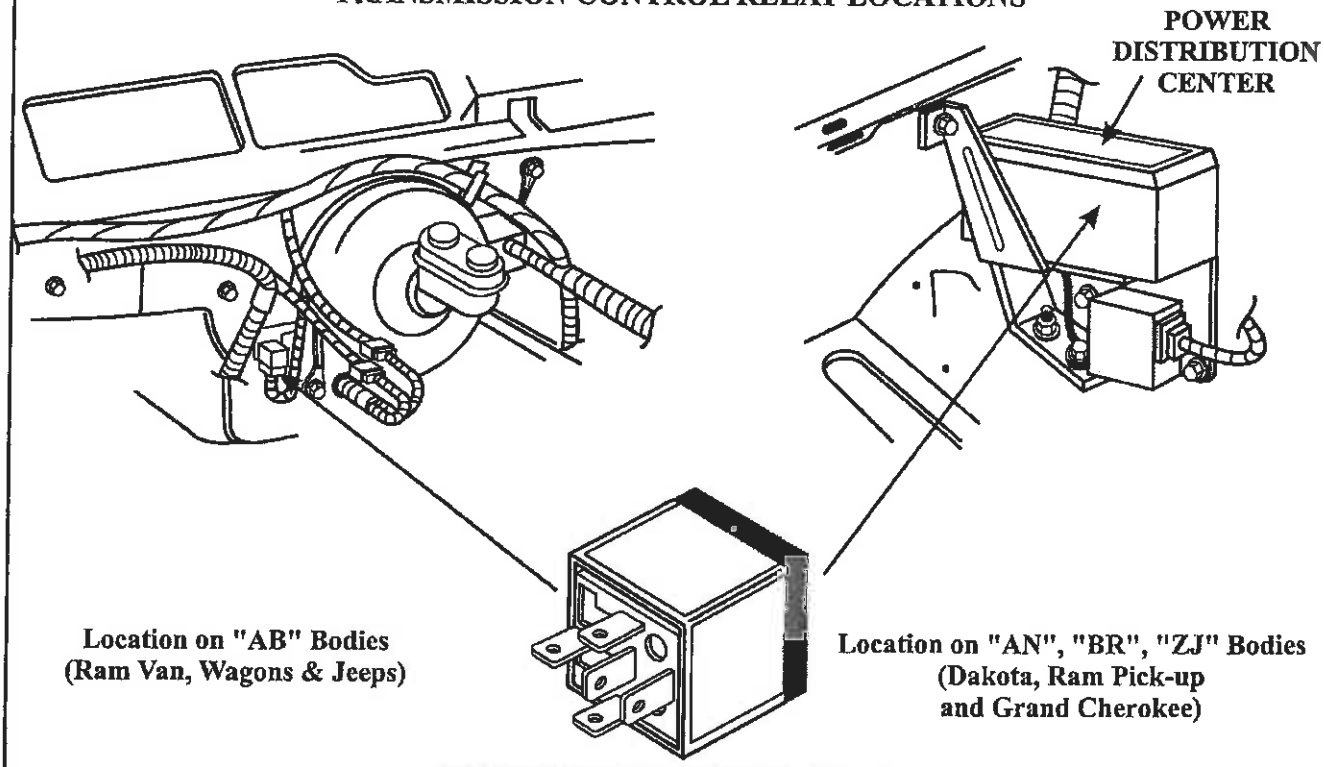



Figure 9

## SOLENOID RESISTANCE THROUGH RELAY AND PCM CONNECTOR

With the introduction of the On Board Diagnostic Systems Version 2 (OBD II) in 1996, Chrysler eliminated the previously used TCM (Transmission Control Module) and incorporated it into the engine computer called the PCM (Power Train Control Module). This system is also known as the JTEC (pronounced like Jay Tech) which stands for Jeep Truck Electronic Control. Resistance checks on the Torque Converter Clutch, Governor and Overdrive solenoids may be easily performed between the PCM connector and Transmission Relay connector with a DVOM in the following manner:

1. Locate the PCM as seen in Figure 7.
   A) Dakota - In the engine compartment on the right inner fender panel.
   B) Ram Pick Up - In the engine compartment on the right side of dash panel.
   C) Ram Van/Wagon - Center of firewall
   D) Jeep Grand Cherokee - On right rear of engine compartment
2. Locate the Transmission Control Relay as seen in Figure 9.
3. Unplug the Transmission Control Relay and place the positive meter lead of a DVOM set to ohms into the Trans Control Relay Output terminal as seen in Figure 10 below.
4. The PCM has three 32 pin connectors, black, grey and white. Unplug the middle connector which is the white connector. With the negative lead resistance checks on the Torque Converter Clutch, Governor and Overdrive solenoids may be checked at terminals 8, 11 and 21 individually as seen in Figure 10 below. Both the TCC and OD solenoids should measure between 25 and 40 ohms. The Governor Pressure Solenoid should measure between 3 to 5 ohms.

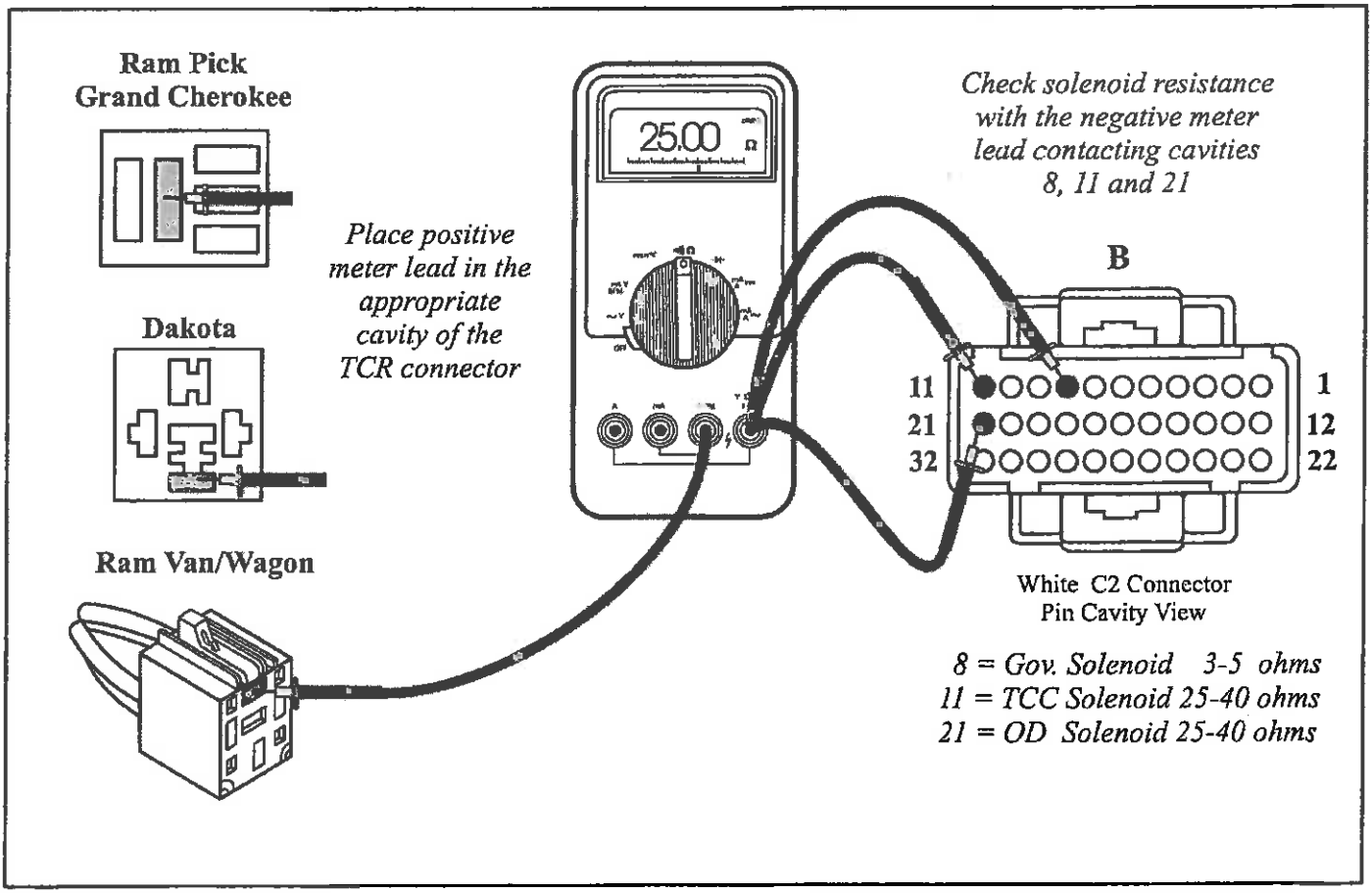



Figure 10

# 42-47RE TRANSMISSIONS
## DIAGNOSTIC INFORMATION *continued*

### CHECKING THE SYSTEM:

***DIAGNOSTIC TIPS:*** Data stream information from the scanner is useful for identifying problems with the vehicle speed sensor, output shaft speed sensor, throttle position sensor, engine coolant temperature sensor, transmission fluid temperature sensor, oxygen sensor, the P/N switch , air conditioning and cruise control operation. All of which should be viewed and considered when diagnosing drive ability complaints. Governor pressure and solenoid operation may also be viewed through the scanner as explained in Figure 1. This can be helpful but it is important that the technician realize that the governor pressure solenoid and transducer information viewed through the scanner can be misleading as they may fail mechanically providing false data to the computer. During the initial road test it is good to first observe all the information the scanner provides including codes. Many times the problem can be spotted quickly and resolved easily. Should this not happen, the next step would be to place an actual gauge on the governor pressure tap as seen in Figure 11 and compare gauged pressure to the scanner pressure. From this comparison the validity of governor pressure information received via the scanner can be confirmed. Should gauged governor pressure be different than the actual psi observed on the scanner, the transducer is defective or there is a wiring problem from the transducer to the TCM or PCM. If gauged pressure and scanner psi match, the transducer is working. If there is a problem with the governor pressure not increasing, the governor solenoid may be defective, the governor circuit inside the transmission has a leak, or there is an electrical problem. To quickly identify which it may be, unplug the transmission case connector. If governor pressure increases to approximately 60 psi, there is an external electrical problem. If governor pressure stays low, there is an internal transmission problem.

As previously stated, governor pressure should increase proportional to road speed for the exception of Diesel applications. The computer controls this pressure on the ground side of the governor solenoid which is the # 5 wire in the case connector. The governor transducer (sensor) sends a linear voltage back to the computer through # 4 wire in the case connector. A comparison chart is provided in Figure 12 as to the approximate voltage seen in relation to governor pressure. The chart in Figure 12 will be needed for comparison against system problems revealed in Figures 15 to 18. As an aid to diagnosing, these figures provides examples of different drive ability complaints experienced with 42RE. It puts together how to look at all the information provided by the scanner, volt meter and pressure gauge. These examples sheets may be considered a library source of information which can be used for comparison purposes.

**FIGURE 13:** ***The Governor Solenoid...***

Figure 13 is an example of monitoring the governor pressure with the use of Snap-On's pressure transducer connected to Snap-On's Vantage digital graphing multi meter. The multi meter is set up in a dual screen mode making it available to monitor both pressure and voltage. The voltage being monitored is the ground side of the solenoid which is wire # 5 in the case connector. If a Vantage multi meter is not available, a typical pressure gauge can be used on the governor tap and a voltmeter probed into wire # 5 with the positive lead and the negative placed to ground.

Note that governor pressure increases proportional to the voltage on the ground side of the governor solenoid. It is important to keep in mind two things, 1. The computer controls the governor solenoid and 2. The voltage seen on the ground wire for the governor solenoid is voltage NOT being used. The solenoid is supplied with system voltage through wire #1 in the case connector. System voltage could be

# 42-47RE TRANSMISSIONS
## DIAGNOSTIC INFORMATION *continued*

**FIGURE 13:** ***The governor solenoid continued...***

approximately 13 to 13.5 volts. This system voltage goes through the coil in the solenoid and out through the #5 ground wire to the TCM or PCM. Figure 13 shows that when the vehicle is not moving and governor pressure is at 0 psi, approximately 8.5 of unused volts is seen. Since this solenoid is being supplied with approximately 13.5 volts and 8.5 unused volts are observed on the # 5 ground wire, it means that the computer is using 5 volts to fully energize the governor solenoid producing 0 psi. As the vehicle speed increases, the computer slowly begins to turn the solenoid off explaining the observance of increased voltage as the voltage seen is the voltage not being used. When a maximum of 60 to 70 psi is seen in the governor circuit, system voltage will be seen on the # 5 ground wire as the solenoid at this point is completely turned off.
The governor solenoid only controls the 1-2 and 2-3 shifts as well as their respective downshifts. The 3-4 shift is controlled by the OD solenoid which is supplied with third gear oil. Should the PCM (96 and later) place the vehicle into fail safe, voltage is cut from wire # 1. This action is the same as unplugging the case connector. The result is third gear only.

**FIGURE 14:** ***The Governor Sensor...***

Figure 14 is an example of a good working governor transducer. The sensor (Transducer) is a device sending information to the computer as to the approximate pressure inside the governor circuit produced by the governor solenoid. When 0 psi exists in the circuit the transducer sends approximately 0.5 volts to the TCM or PCM through wire # 4 from the case connector. As governor pressure increases, this pressure presses on the tip of the sensor causing the voltage to increase proportional to the pressure increasing. When a maximum of 60 to 70 psi is reached in the governor circuit, the transducer sends approximately 3 volts back to the TCM or PCM.

**FIGURE 15:** ***Second gear start...***

Figure 15 is an example of what would be observed with a 2nd gear start complaint due to a defective governor pressure sensor (Transducer). To make this diagnosis, what should be noticed is that the pressure gauge indicates 10 to 12 psi at 0 miles per hour. This amount of governor pressure will keep the 1-2 shift valve stroked in an up shifted 2nd gear position. Comparing this chart to the one seen in Figure 12, it is noticed in Figure 15 that with 10 pounds of governor pressure the sensor is sending to the computer a 0.66 volt reading. This indicates to the computer that their is 0 psi in the circuit when actually there is 10. At 10 pounds of pressure, approximately 0.9 volts should be observed as seen in Figure 12. With the computer thinking that it controlled the governor solenoid to produce 0 psi due to faulty data produced by the sensor, it did not attempt to energize the solenoid any further. Changing the sensor will solve this complaint.

**FIGURE 16:** ***Second gear start...***

Figure 16 is an example of what would be observed with a second gear start due to a stuck 1-2 shift valve. Notice that there is 0 psi of governor pressure and the sensor indicates the same in voltage (0.66). The only way a second gear start could be possible is a 1-2 shift valve stuck in a stroked position.

# 42-47RE TRANSMISSIONS
## DIAGNOSTIC INFORMATION *continued*

**FIGURE 17: No up shift...**

Figure 17 is an example of what would be observed in a no up shift situation due to a leak in the governor circuit or a clogged inlet port to the governor solenoid. Notice that the computer is trying to raise governor pressure by turning the solenoid off. The pressure gauge indicates 0 psi in the governor circuit and it never rises. The governor sensor remains at a 0.66 voltage indicating to the computer that governor pressure is not rising which means the senor is working properly. By 30 mph the computer has turned off the governor solenoid as indicated by the full system voltage observed on the ground wire (#5). A leak in the governor circuit or a clogged inlet port to the governor solenoid can then be concluded.

**FIGURE 18:** ***Third gear start...***

Figure 18 is an example of a third gear start problem due to a mechanically failed governor solenoid. Notice how governor pressure is at a full 60 psi. The governor sensor is sending a 2.95 volt reading which tells the computer that governor pressure is at 60 psi. The computer then begins to increase current draw on the governor solenoid to try to bring down governor pressure. Notice how the voltage is dropping on the # 5 wire. Remember, the voltage seen on the # 5 wire is voltage not being used. The lowest voltage reading observed is 6.3 volts. If you subtract that from 13.5 volts, the computer used as much as 7.2 volts in an attempt to bring down governor pressure based on the information it was receiving from the sensor. With the pressure gauge verifying that governor pressure was high as well as having a third gear start problem, a mechanically failed governor solenoid would be the logical reason for this complaint. It just so happened that this example was taken from a vehicle where the magnet that was in the pan was improperly placed onto the solenoid. The magnet kept the solenoid in a fully applied position causing full governor pressure to remain in the circuit. Another point is that this was a pre 96 vehicle making it a TCM version. Notice that after the computer used as much as 7.2 volts in an attempt to bring down governor pressure it suddenly went to 13.8 volts. This action means the computer had decided to shut the solenoid off going into a failsafe mode. If this was a 96 and later vehicle, the relay would have been turned off cutting the supply voltage to wire # 1 and wire # 5 would have gone to 0 volts.

**FIGURE 19:** ***Work Sheet...***

Figure 19 can be used as a work sheet when diagnosing a troublesome unit. Fill in all the data and compare the chart to the one seen in Figure 12 and make your diagnosis.

# 42-47RE TRANSMISSIONS
## DIAGNOSTIC INFORMATION *continued*

**Use either a transducer from Snap-On with their Vantage OR use a typical pressure gauge on the governor tap**

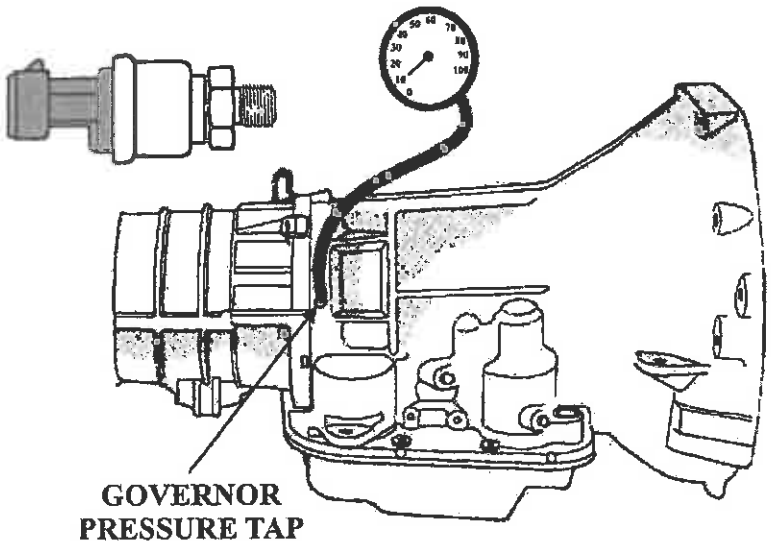
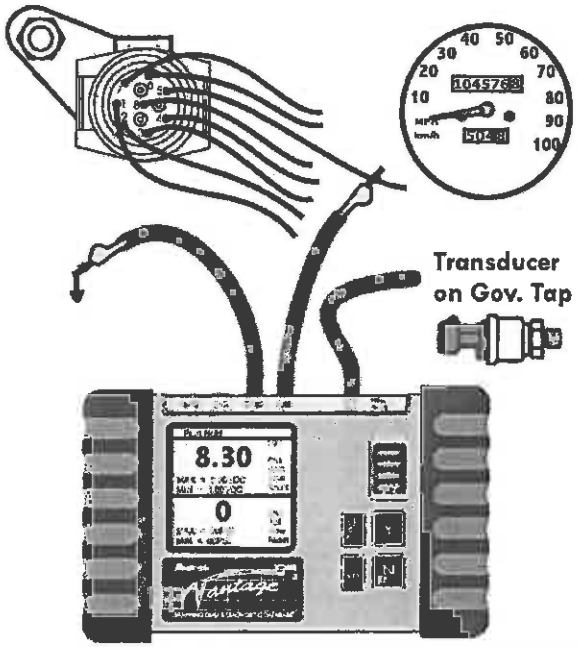



Figure 11

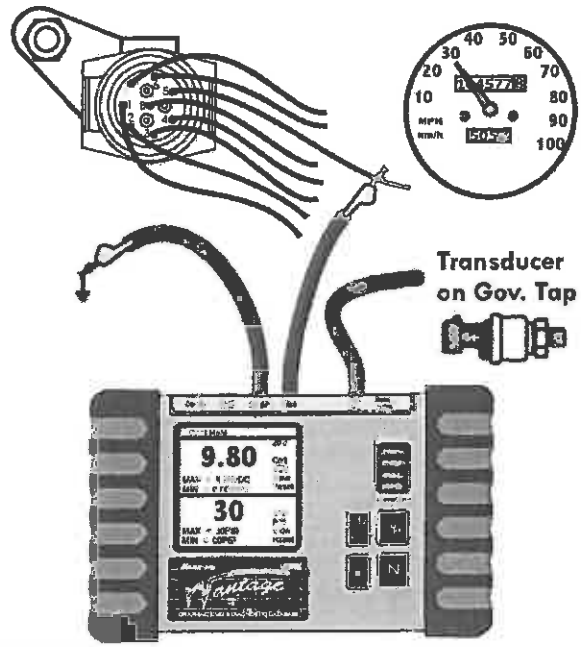
| MPH | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| GOVERNOR PSI - GAS | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
| *GOVERNOR PSI - DIESEL* | *0* | *8* | *38* | *60* | *65* | *68* | *70* |
| WIRE # 4 SENSOR SIGNAL VOLTAGE | .66 | .90 | 1.10 | 1.45 | 1.80 | 2.15 | 2.95 |
| WIRE # 5 SOLENOID GROUND WIRE VOLTAGE | 8.30 | 8.60 | 9.45 | 9.80 | 10.30 | 10.80 | 13.80 |

Figure 12

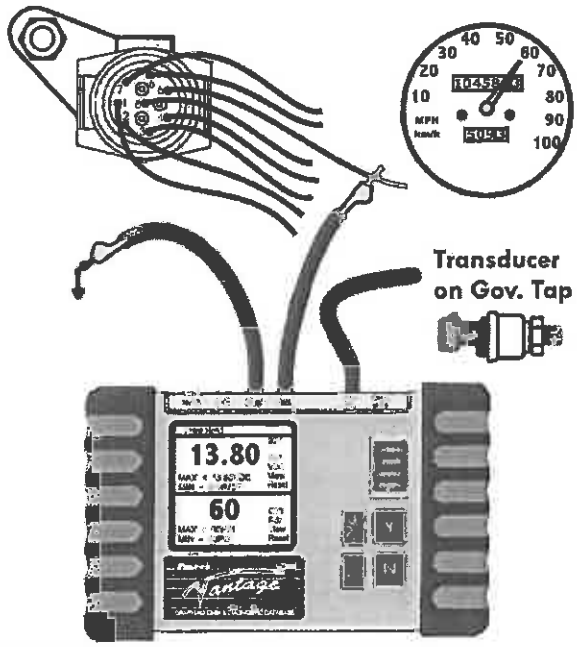
# 42-47RE TRANSMISSIONS
## DIAGNOSTIC INFORMATION *continued*




| MPH | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| GOVERNOR PSI - *Gas* | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
| WIRE # 5 SOLENOID GROUND WIRE VOLTAGE | 8.30 | 8.60 | 9.45 | 9.80 | 10.30 | 10.80 | 13.80 |



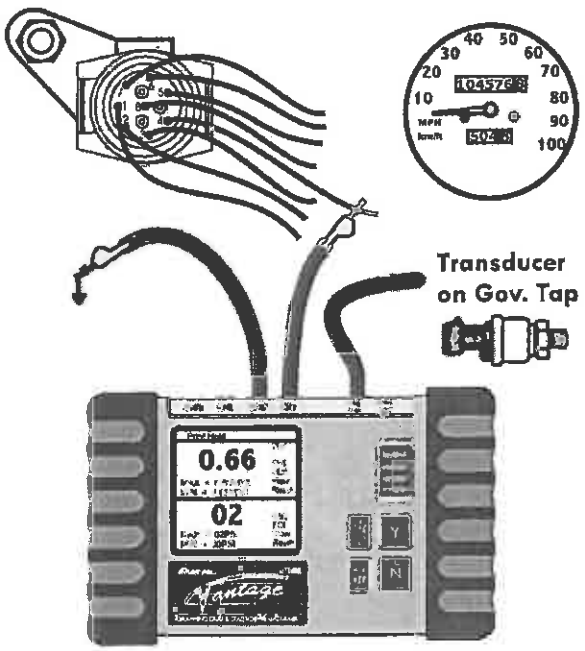

| MPH | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| GOVERNOR PSI - *Gas* | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
| WIRE # 5 SOLENOID GROUND WIRE VOLTAGE | 8.30 | 8.60 | 9.45 | 9.80 | 10.30 | 10.80 | 13.80 |



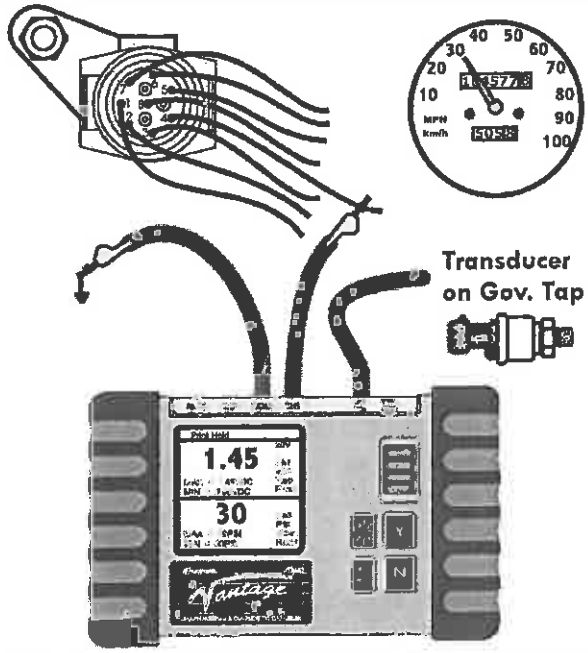

| MPH | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| GOVERNOR PSI - *Gas* | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
| WIRE # 5 SOLENOID GROUND WIRE VOLTAGE | 8.30 | 8.60 | 9.45 | 9.80 | 10.30 | 10.80 | 13.80 |

Figure 13

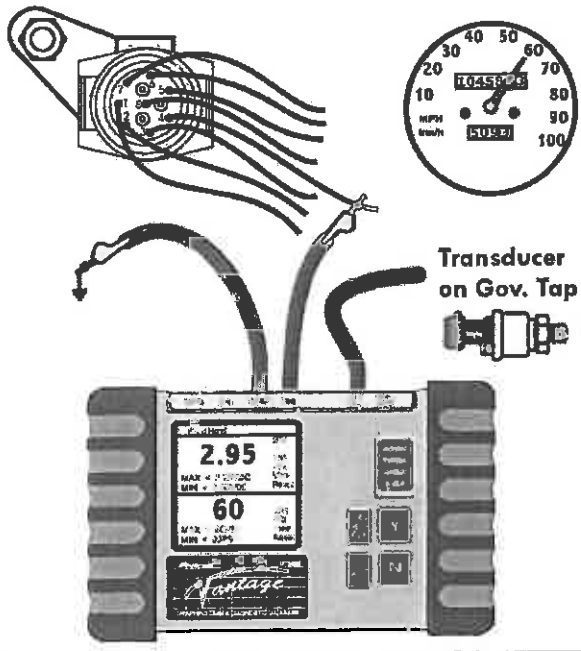
# 42-47RE TRANSMISSIONS
## DIAGNOSTIC INFORMATION *continued*




| MPH | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| GOVERNOR PSI - *Gas* | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
| WIRE # 4 SENSOR SIGNAL VOLTAGE | .66 | .90 | 1.10 | 1.45 | 1.80 | 2.15 | 2.95 |




| MPH | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| GOVERNOR PSI - *Gas* | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
| WIRE # 4 SENSOR SIGNAL VOLTAGE | .66 | .90 | 1.10 | 1.45 | 1.80 | 2.15 | 2.95 |



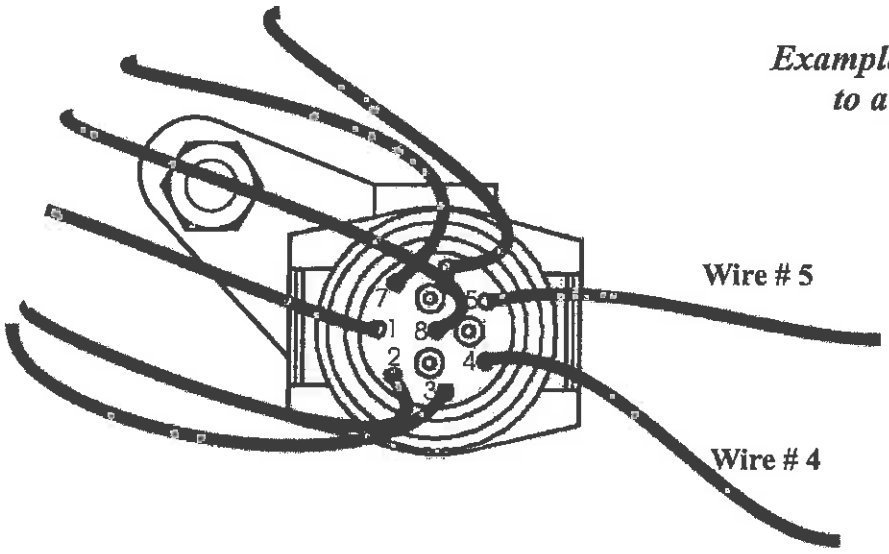

| MPH | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| GOVERNOR PSI - *Gas* | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
| WIRE # 4 SENSOR SIGNAL VOLTAGE | .66 | .90 | 1.10 | 1.45 | 1.80 | 2.15 | 2.95 |

Figure 14
*Automatic Transmission Service Group*

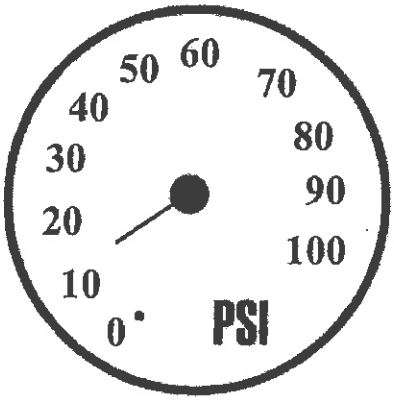
# 42-47RE TRANSMISSIONS

## DIAGNOSTIC INFORMATION *continued*

*Example of a 2nd Gear Start due to a defective transducer*




| MPH | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| GOVERNOR PSI | 10 | 10 | 20 | 30 | 40 | 50 | 60 |
| WIRE # 4 SENSOR SIGNAL VOLTAGE | .66 | .66 | 1.10 | 1.45 | 1.80 | 2.15 | 2.95 |
| WIRE # 5 SOLENOID GROUND WIRE VOLTAGE | 8.60 | 8.60 | 9.45 | 9.80 | 10.30 | 10.80 | 13.80 |



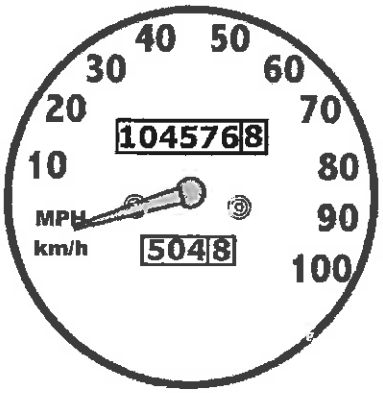
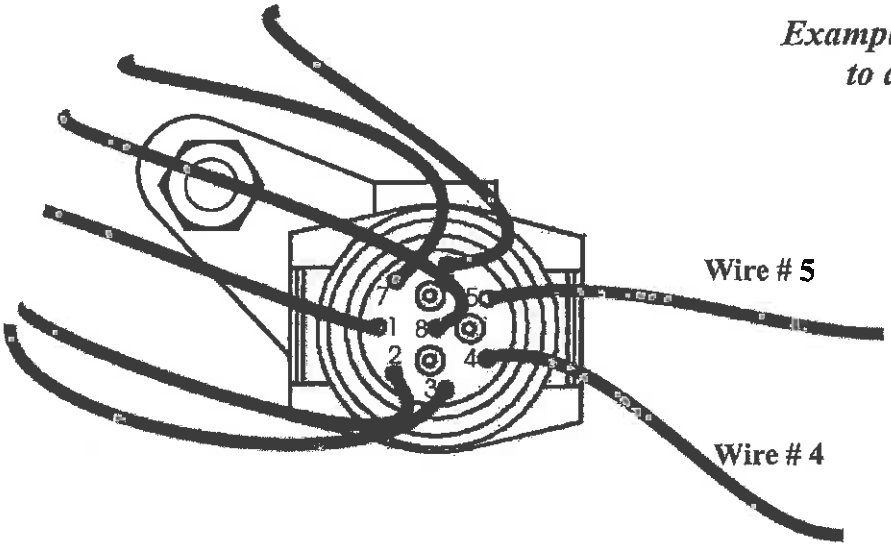




Figure 15

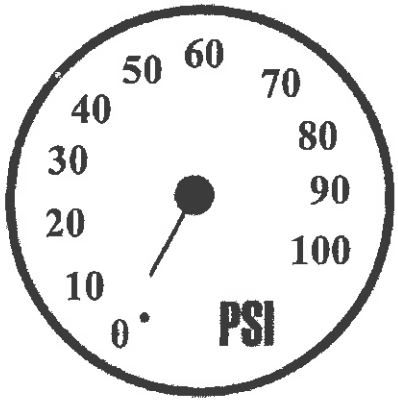
# 42-47RE TRANSMISSIONS

## DIAGNOSTIC INFORMATION *continued*

*Example of a 2nd Gear Start due to a stuck 1-2 shift valve*




| MPH | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| GOVERNOR PSI | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
| WIRE # 4 SENSOR SIGNAL VOLTAGE | .66 | .90 | 1.10 | 1.45 | 1.80 | 2.15 | 2.95 |
| WIRE # 5 SOLENOID GROUND WIRE VOLTAGE | 8.30 | 8.60 | 9.45 | 9.80 | 10.30 | 10.80 | 13.80 |



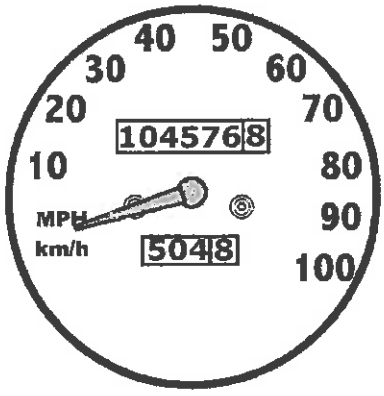
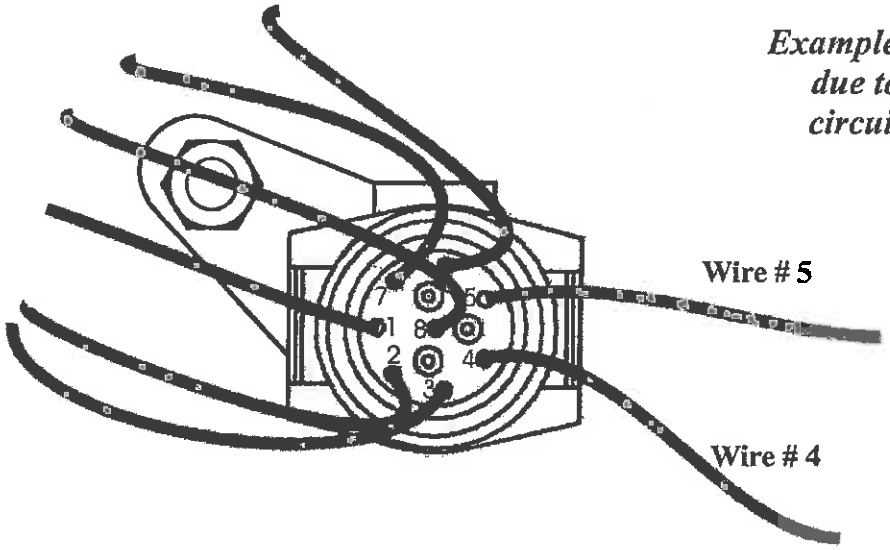




Figure 16

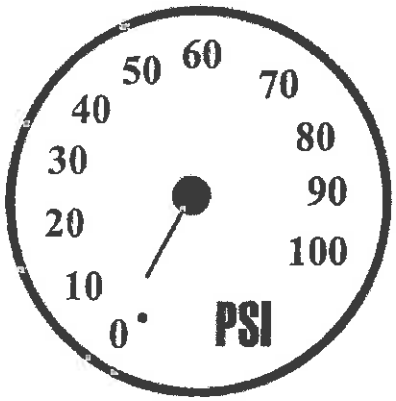
# 42-47RE TRANSMISSIONS

## DIAGNOSTIC INFORMATION *continued*




***Example of a no up shift condition due to a leak in the governor circuit or a clogged inlet port to the solenoid***

| MPH | 0 | 10 | 20 | 30 | 30 | 30 | 30 |
|---|---|---|---|---|---|---|---|
| GOVERNOR PSI | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WIRE # 4 SENSOR SIGNAL VOLTAGE | .66 | .66 | .66 | .66 | .66 | .66 | .66 |
| WIRE # 5 SOLENOID GROUND WIRE VOLTAGE | 8.30 | 8.60 | 9.45 | 9.80 | 10.30 | 10.80 | 13.80 |



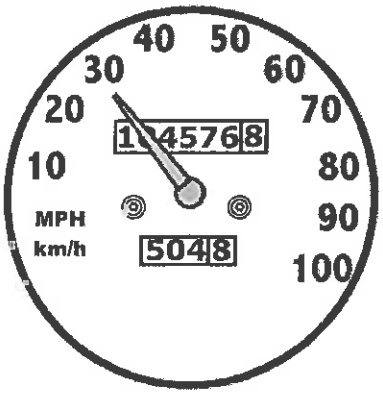
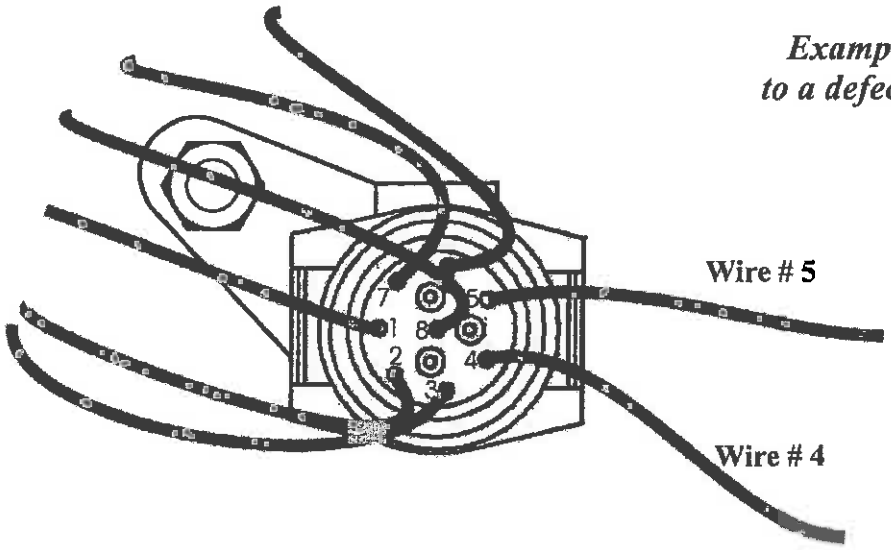




Figure 17

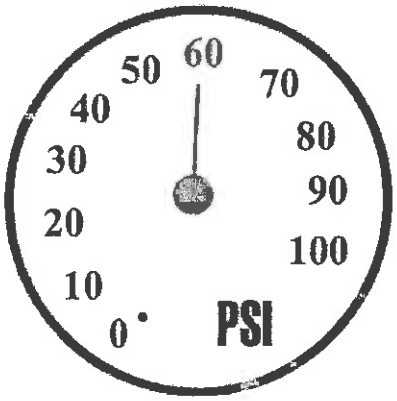
# 42-47RE TRANSMISSIONS

## DIAGNOSTIC INFORMATION *continued*

*Example of a 3rd Gear Start due to a defective solenoid mechanically*




| MPH | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|---|---|---|---|---|---|---|---|
| GOVERNOR PSI | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| WIRE # 4 SENSOR SIGNAL VOLTAGE | 2.95 | 2.95 | 2.95 | 2.95 | 2.95 | 2.95 | 2 95 |
| WIRE # 5 SOLENOID GROUND WIRE VOLTAGE | 8.30 | 8.00 | 7.45 | 6.80 | 6.30 | 13.80 | 13.80 |



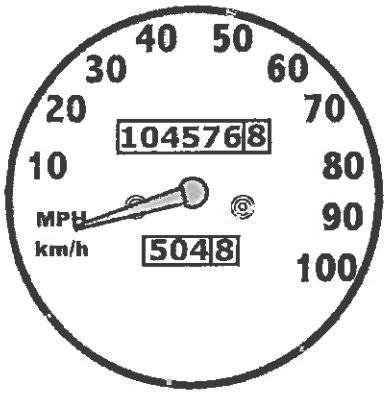
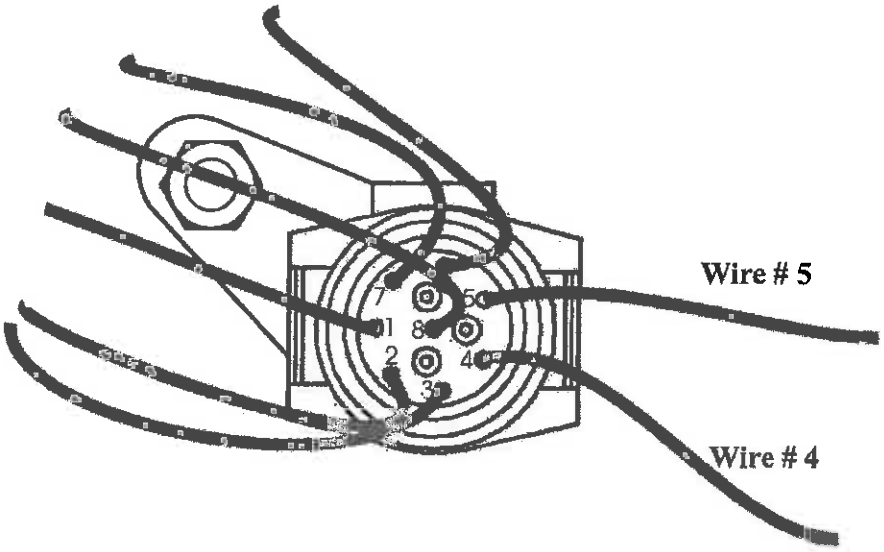




Figure 18

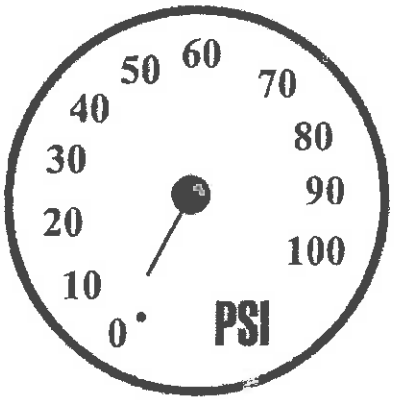
# 42-47RE TRANSMISSIONS

## DIAGNOSTIC INFORMATION *continued*

*In Shop Work Sheet*




| MPH | | | | | | | |
|---|---|---|---|---|---|---|---|
| GOVERNOR PSI | | | | | | | |
| WIRE # 4 SENSOR SIGNAL VOLTAGE | | | | | | | |
| WIRE # 5 SOLENOID GROUND WIRE VOLTAGE | | | | | | | |



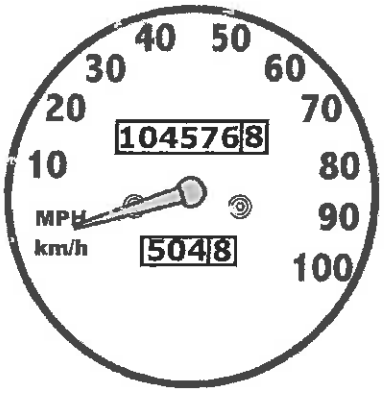




Figure 19

# CHRYSLER 42RE, 44RE, 46RE, 47RE

## GOVERNOR PRESSURE SENSOR AND SOLENOID ASSEMBLY HARNESS DESIGN CHANGE

**CHANGE:** Beginning in the model year 2000, Chrysler Corporation introduced another new governor pressure sensor (transducer), as a running change, which also required another internal wiring harness for all Chrysler 42RE, 44RE, 46RE and 47RE transmissions. This is now the 4th design governor pressure sensor that we have seen and we will cover all 4 design level changes that have occurred to date, in this bulletin.

**PARTS AFFECTED:**

***1ST DESIGN:***

Originally, the Governor Pressure Sensor/Transducer was a 3 terminal sensor, with the Transmission Fluid Temperature (TFT) Sensor mounted on the Overdrive/TCC Solenoid.
The original 3 wire sensor is illustrated in Figure 1, and the wiring schematic for these models is shown in Figure 5.

***2ND DESIGN:***

Beginning at the start of production for all 1996 models, Chrysler incorporated the externally mounted TFT sensor into a new design governor sensor, which required a fourth pin to be added to the new sensor. This also necessitated an internal harness change, to accommodate the redesigned 4 terminal governor sensor.

***Reason:*** - Increased Transmission Fluid Temperature Sensor accuracy for improved reliability and durability.
The 2nd design 4 wire sensor is illustrated in Figure 2, and the wiring schematic for these models is shown in Figure 6. Each terminal in the new sensor has been identified with the letters A, B, C and D, as shown in Figures 2 and 6.

***3RD DESIGN:***

Late in the 1996 model year, Chrysler again changed the connector on the governor pressure sensor, from the previous straight, to a 90 degree connector. This change however, did not require a new internal harness and solenoid assembly.

***Reason:*** - Relieved the stress on the internal harness connector, and once again improved reliability and durability.
The 3rd design 4 wire, 90 degree sensor is illustrated in Figure 3, and the wiring schematic for these models is shown in Figure 6. Each terminal in the new sensor has been identified with the letters A, B, C and D, as shown in Figures 2 and 6.

**PARTS AFFECTED: (Cont'd from Page 1)**

***4TH DESIGN:***

During the 2000 model year, Chrysler Corporation introduced another new governor pressure sensor (transducer), as a running change, which also required another new internal wiring harness, to accommodate the new sensor. The 4th design governor sensor is made of plastic and has four larger "spade" type terminals, transmits a different signal, has a redesigned connector and a shorter snout where it goes into the adapter body.

***Reason:*** - More cost effective because of the material, and the shorter snout allows a much improved flow of governor oil to the sensor, for greatly improved accuracy and reliability. Refer to Figure 8 for illustrations of 3rd and 4th design sensors in the adapter housing.

The 4th design 4 wire, 90 degree sensor is illustrated in Figure 4, and the wiring schematic for these models is shown in Figure 7. Each terminal in the new sensor has been identified with the numbers 1, 2, 3 and 4, as shown in Figures 4 and 7. The 4th design level is illustrated mounted on the valve body in Figure 8. There is also a new design retainer that is required for the 4th design level parts and is illustrated in Figure 8.

**INTERCHANGEABILITY:**

***1st Design Level*** - 3 pin sensor is not recommended for use in any model, and is no longer available from OEM parts department.

***2nd Design Level*** - Will retro-fit back on all models, but requires the upgraded internal harness and solenoid assembly. This one also is not recommended and is no longer available.

***3rd Design Level*** - Will retro-fit back on all models, but requires the upgraded internal harness and solenoid assembly, part number 52118500, as shown below.

***4th Design Level - "Will Not" retro-fit back.*** The 4th design level, is for 2000 model year and later only, that are so equipped. Some 2000 models may be equipped with the 3rd design level parts. 3rd Design level parts must be used in 3rd design level vehicles, and 4th design level parts must be used in 4th design level vehicles. ***They will not interchange!***

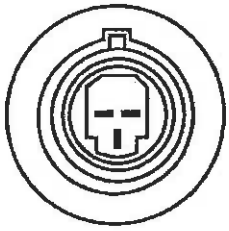
*NOTE: The reason for the non-interchangeability between 4th design an any earlier parts is primarily due to the change in the Transmission Fluid Temperature. The temperature coefficient had changed which also means the computer had changed. Previous design 1st, 2nd and 3rd level, the TFT measures approximately 0.927 k ohms @ room temperature. The new 4th level design measures approximately 1.873 k ohms. If a 4th level design is used in any previous designs, a no 4th, no TCC complaint will occur. It may also be accompanied with a fluid temperature sensor P0711 and/or P0713 code. Earlier design levels placed into a 4th design level vehicle may produce a P0712 code.*

**SERVICE INFORMATION:**

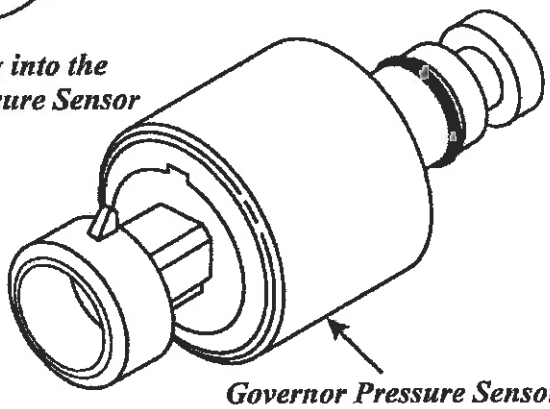
| | |
|---|---|
| Governor Pressure Sensor/Transducer (3rd Design Level) | 56041403AA |
| Internal Harness And Solenoid Assembly (3rd Design Level) | 52118500 |
| Retaining Clip (3rd Design Level) | 4617219 |
| Governor Pressure Sensor/Transducer (4th Design Level) | 56028196AA |
| Internal Harness And Solenoid Assembly (4th Design Level) | 52118500AB |
| Retaining Bracket (4th Design Level) | 52117937AB |

**"1ST DESIGN" 3 PIN GOVERNOR PRESSURE SENSOR WITH "TFT" LOCATED ON SOLENOID ASSEMBLY**

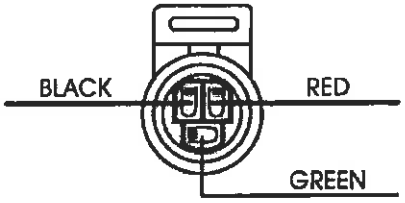
***No Longer Available For Service.***



*View looking into the Governor Pressure Sensor*



*Governor Pressure Sensor*



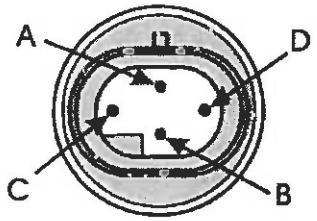

*View looking into the "1st Design" Sensor Harness Connector*



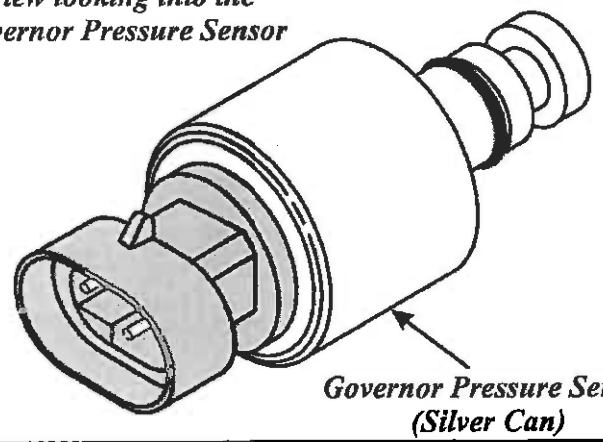
Figure 1

**"2ND DESIGN" 4 PIN "STRAIGHT" GOVERNOR PRESSURE SENSOR WITH "TFT" INCORPORATED INSIDE THE SENSOR**

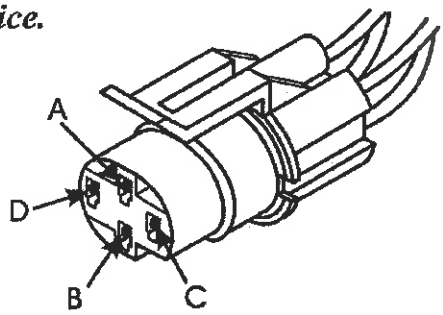
***No Longer Available For Service.***




*View looking into the Governor Pressure Sensor*



*Governor Pressure Sensor (Silver Can)*




*View looking into "2nd Design" Governor Pressure Sensor Connector*

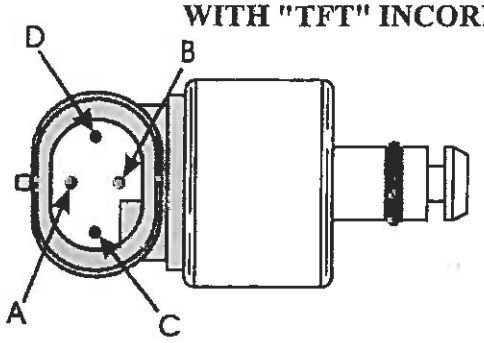
| Pin Number | All Models |
|---|---|
| A | RED |
| B | WHITE |
| C | BLACK |
| D | GREEN |

| PIN | FUNCTION |
|---|---|
| A | 5-Volt supply to sensor from PCM |
| B | Governor Pressure Sensor Signal to PCM |
| C | Transmission Fluid Temperature Signal to PCM |
| D | Governor Pressure Sensor Ground |

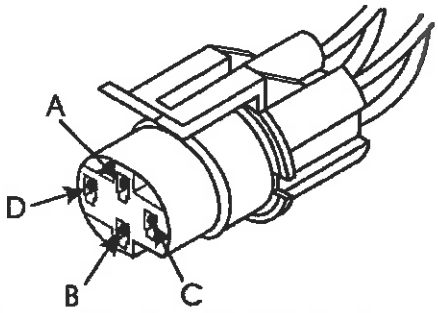


Figure 2

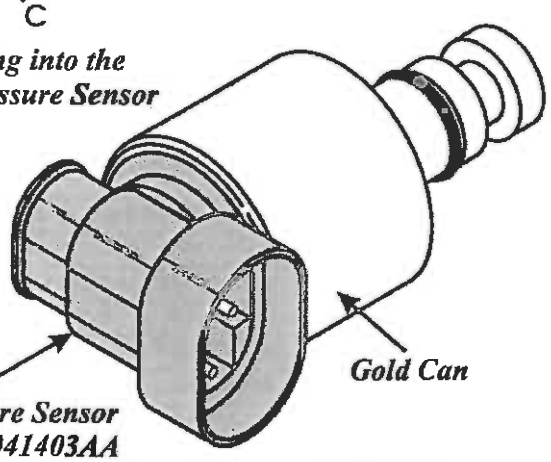
**"3RD DESIGN" 4 PIN "90 DEGREE" GOVERNOR PRESSURE SENSOR WITH "TFT" INCORPORATED INSIDE THE SENSOR**




*View looking into the Governor Pressure Sensor*




*View looking into "3rd Design" Governor Pressure Sensor Connector*



*Gold Can*

*Governor Pressure Sensor Part Number 56041403AA*

| Pin Number | All Models |
|---|---|
| A | RED |
| B | WHITE |
| C | BLACK |
| D | GREEN |

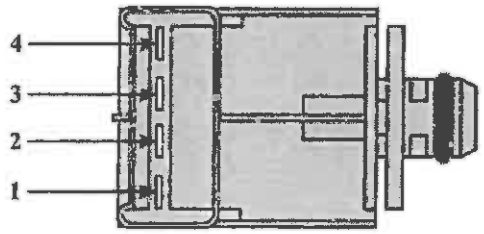
| PIN | FUNCTION |
|---|---|
| A | 5-Volt supply to sensor from PCM |
| B | Governor Pressure Sensor Signal to PCM |
| C | Transmission Fluid Temperature Signal to PCM |
| D | Governor Pressure Sensor Ground |



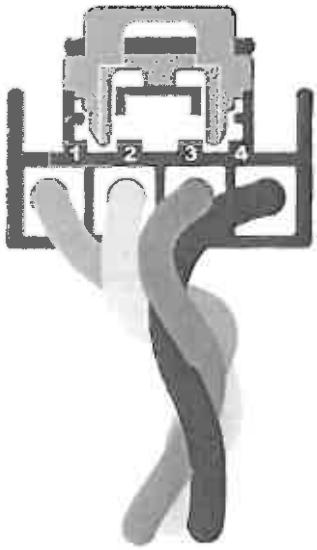
Figure 3

**"4TH DESIGN" 4 PIN "PLASTIC" GOVERNOR PRESSURE SENSOR WITH "TFT" INCORPORATED INSIDE THE SENSOR**

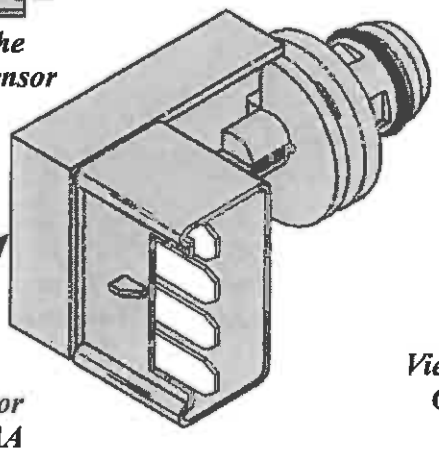
***FOR 2000 AND LATER MODELS "ONLY"***




*View looking into the Governor Pressure Sensor*




*View looking at wire side of "4th Design" Governor Pressure Sensor Connector*

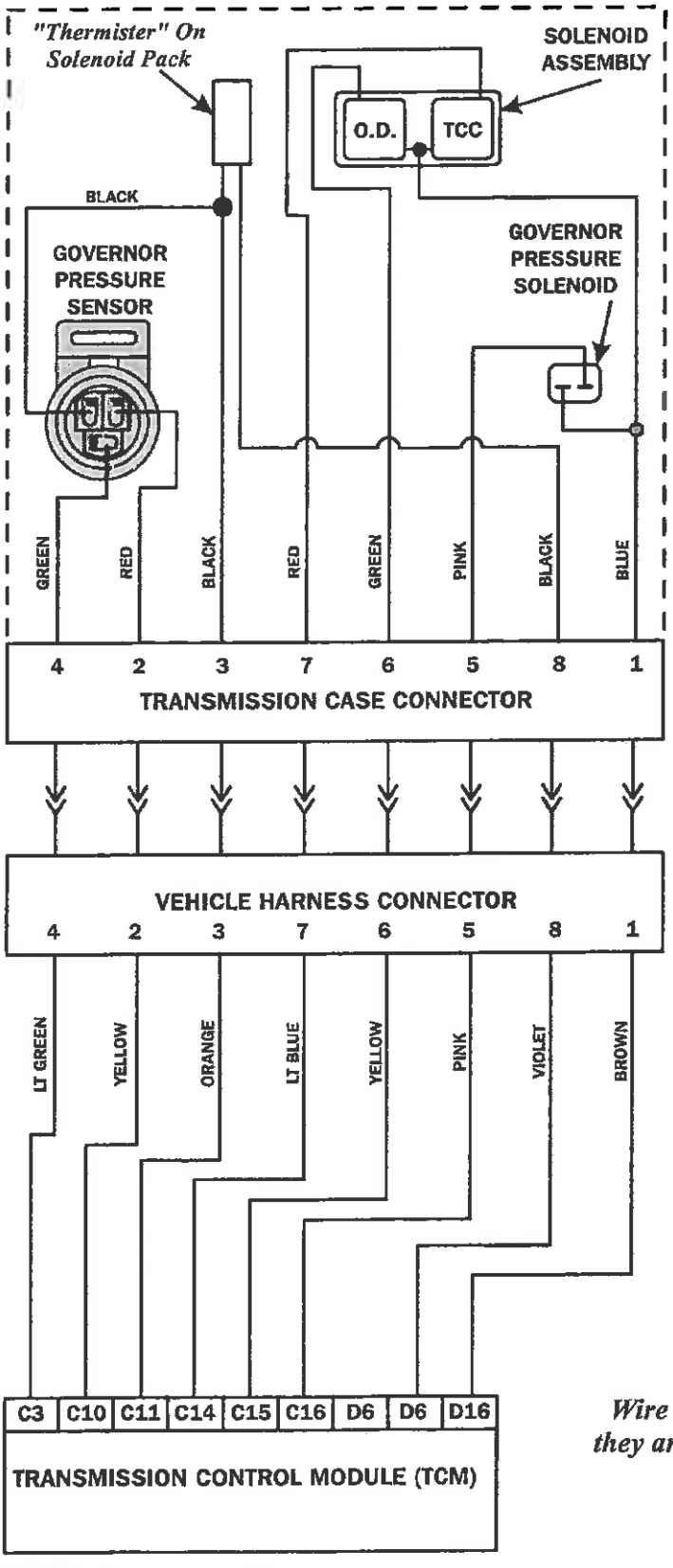


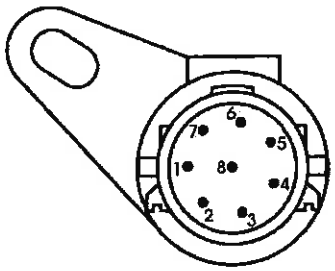
*Governor Pressure Sensor Part Number 56028196AA*



Figure 4

## WIRE SCHEMATIC FOR 1ST DESIGN GOVERNOR PRESSURE SENSOR




*Transmission Case Connector*


*Harness Connector*

| PIN | FUNCTION |
|---|---|
| 1 | 12V POWER IN FROM TCM TERMINAL D16 |
| 2 | 5V FEED TO GOVERNOR PRESSURE SENSOR |
| 3 | GOVERNOR PRESSURE SENSOR GROUND |
| 4 | GOVERNOR PRESSURE SENSOR SIGNAL TO PCM |
| 5 | GROUND CONTROL, GOVERNOR PRESSURE SOLENOID |
| 6 | PCM GROUND FOR OVERDRIVE SOLENOID |
| 7 | PCM GROUND FOR CONVERTER CLUTCH SOLENOID |
| 8 | TRANSMISSION OIL TEMPERATURE SIGNAL TO PCM |

***NOTE:***
***Wire colors will vary as they are model dependent.***



Figure 5

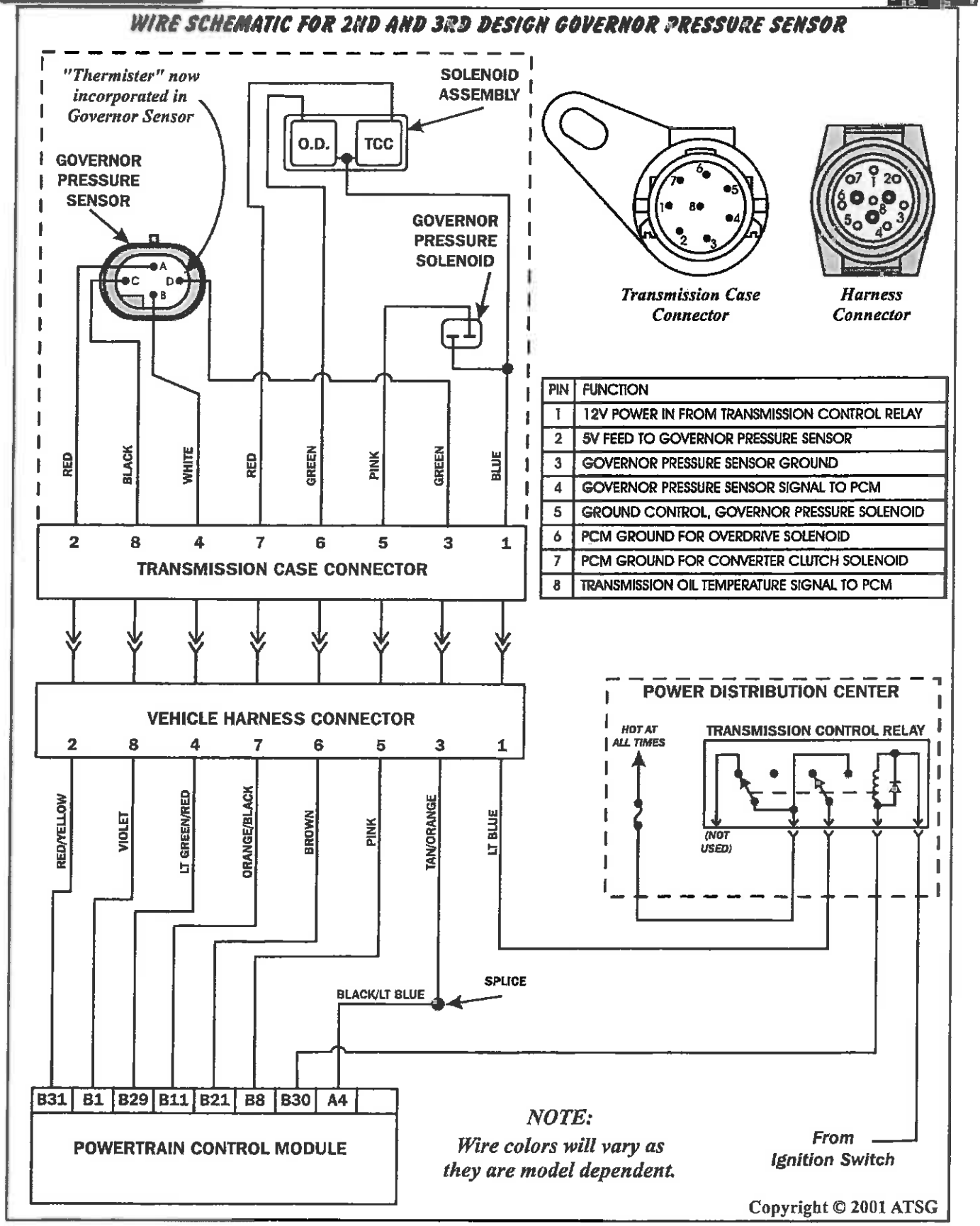

WIRE SCHEMATIC FOR 2ND AND 3RD DESIGN GOVERNOR PRESSURE SENSOR
"Thermister" now incorporated in Governor Sensor
SOLENOID ASSEMBLY
O.D.
TCC
GOVERNOR PRESSURE SENSOR
GOVERNOR PRESSURE SOLENOID
A
C
D
B
RED
BLACK
WHITE
RED
GREEN
PINK
GREEN
BLUE
2 8 4 7 6 5 3 1
TRANSMISSION CASE CONNECTOR
Transmission Case Connector
Harness Connector
PIN FUNCTION
1 12V POWER IN FROM TRANSMISSION CONTROL RELAY
2 5V FEED TO GOVERNOR PRESSURE SENSOR
3 GOVERNOR PRESSURE SENSOR GROUND
4 GOVERNOR PRESSURE SENSOR SIGNAL TO PCM
5 GROUND CONTROL, GOVERNOR PRESSURE SOLENOID
6 PCM GROUND FOR OVERDRIVE SOLENOID
7 PCM GROUND FOR CONVERTER CLUTCH SOLENOID
8 TRANSMISSION OIL TEMPERATURE SIGNAL TO PCM
VEHICLE HARNESS CONNECTOR
2 8 4 7 6 5 3 1
POWER DISTRIBUTION CENTER
HOT AT ALL TIMES
TRANSMISSION CONTROL RELAY
(NOT USED)
RED/YELLOW
VIOLET
LT GREEN/RED
ORANGE/BLACK
BROWN
PINK
TAN/ORANGE
LT BLUE
BLACK/LT BLUE
SPLICE
B31 B1 B29 B11 B21 B8 B30 A4
POWERTRAIN CONTROL MODULE
NOTE:
Wire colors will vary as they are model dependent.
From Ignition Switch
Copyright © 2001 ATSG

Figure 6

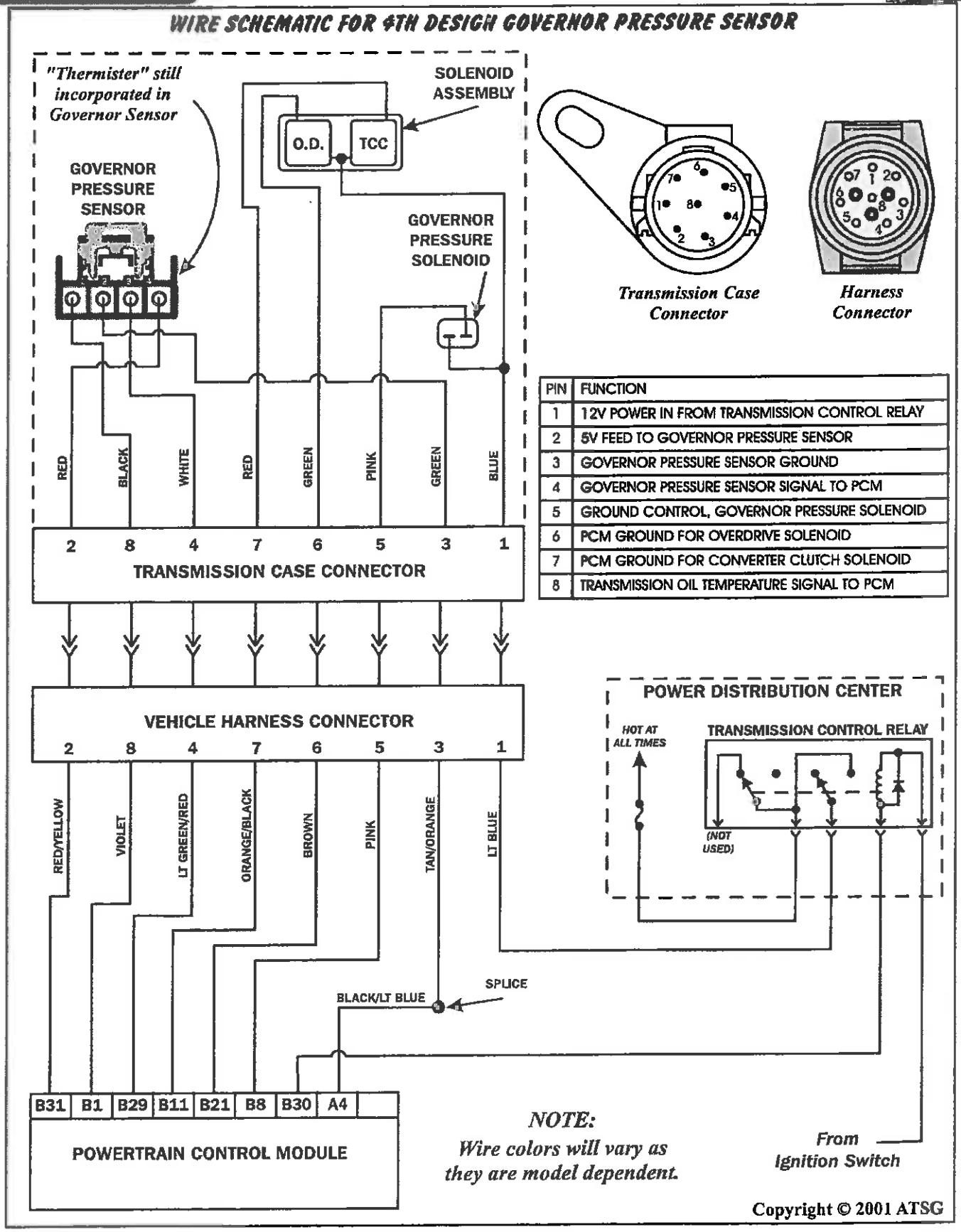

WIRE SCHEMATIC FOR 4TH DESIGN GOVERNOR PRESSURE SENSOR
"Thermister" still incorporated in Governor Sensor
SOLENOID ASSEMBLY
O.D.
TCC
GOVERNOR PRESSURE SENSOR
GOVERNOR PRESSURE SOLENOID
Transmission Case Connector
Harness Connector
RED
BLACK
WHITE
RED
GREEN
PINK
GREEN
BLUE
2 8 4 7 6 5 3 1
TRANSMISSION CASE CONNECTOR
PIN FUNCTION
1 12V POWER IN FROM TRANSMISSION CONTROL RELAY
2 5V FEED TO GOVERNOR PRESSURE SENSOR
3 GOVERNOR PRESSURE SENSOR GROUND
4 GOVERNOR PRESSURE SENSOR SIGNAL TO PCM
5 GROUND CONTROL, GOVERNOR PRESSURE SOLENOID
6 PCM GROUND FOR OVERDRIVE SOLENOID
7 PCM GROUND FOR CONVERTER CLUTCH SOLENOID
8 TRANSMISSION OIL TEMPERATURE SIGNAL TO PCM
VEHICLE HARNESS CONNECTOR
2 8 4 7 6 5 3 1
POWER DISTRIBUTION CENTER
HOT AT ALL TIMES
TRANSMISSION CONTROL RELAY
(NOT USED)
RED/YELLOW
VIOLET
LT GREEN/RED
ORANGE/BLACK
BROWN
PINK
TAN/ORANGE
LT BLUE
BLACK/LT BLUE
SPLICE
B31 B1 B29 B11 B21 B8 B30 A4
POWERTRAIN CONTROL MODULE
NOTE:
Wire colors will vary as they are model dependent.
From Ignition Switch
Copyright © 2001 ATSG

Figure 7

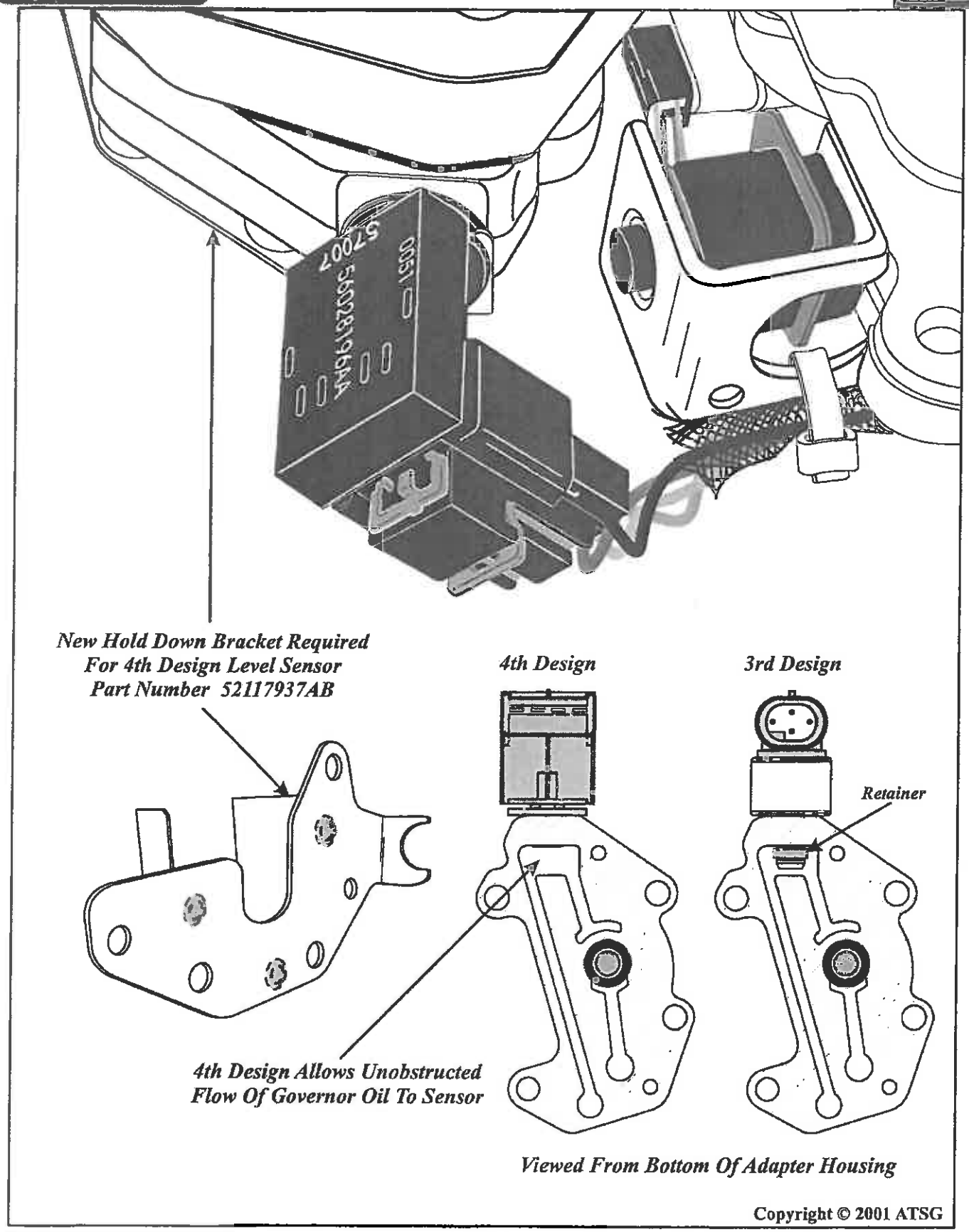

New Hold Down Bracket Required
For 4th Design Level Sensor
Part Number 52117937AB
4th Design
3rd Design
Retainer
4th Design Allows Unobstructed
Flow Of Governor Oil To Sensor
Viewed From Bottom Of Adapter Housing
Copyright © 2001 ATSG

Figure 8

# 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.

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. One such example can be seen on pages 30 and 31. A K500-618-L shift correction package from Superior

## GOVERNOR PRESSURE SENSOR VOLTAGE CODES

**CORRECTION:** Transmission Parts 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 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 which is also mentioned in the line rise modification on page 30.

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, see page 18). 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.

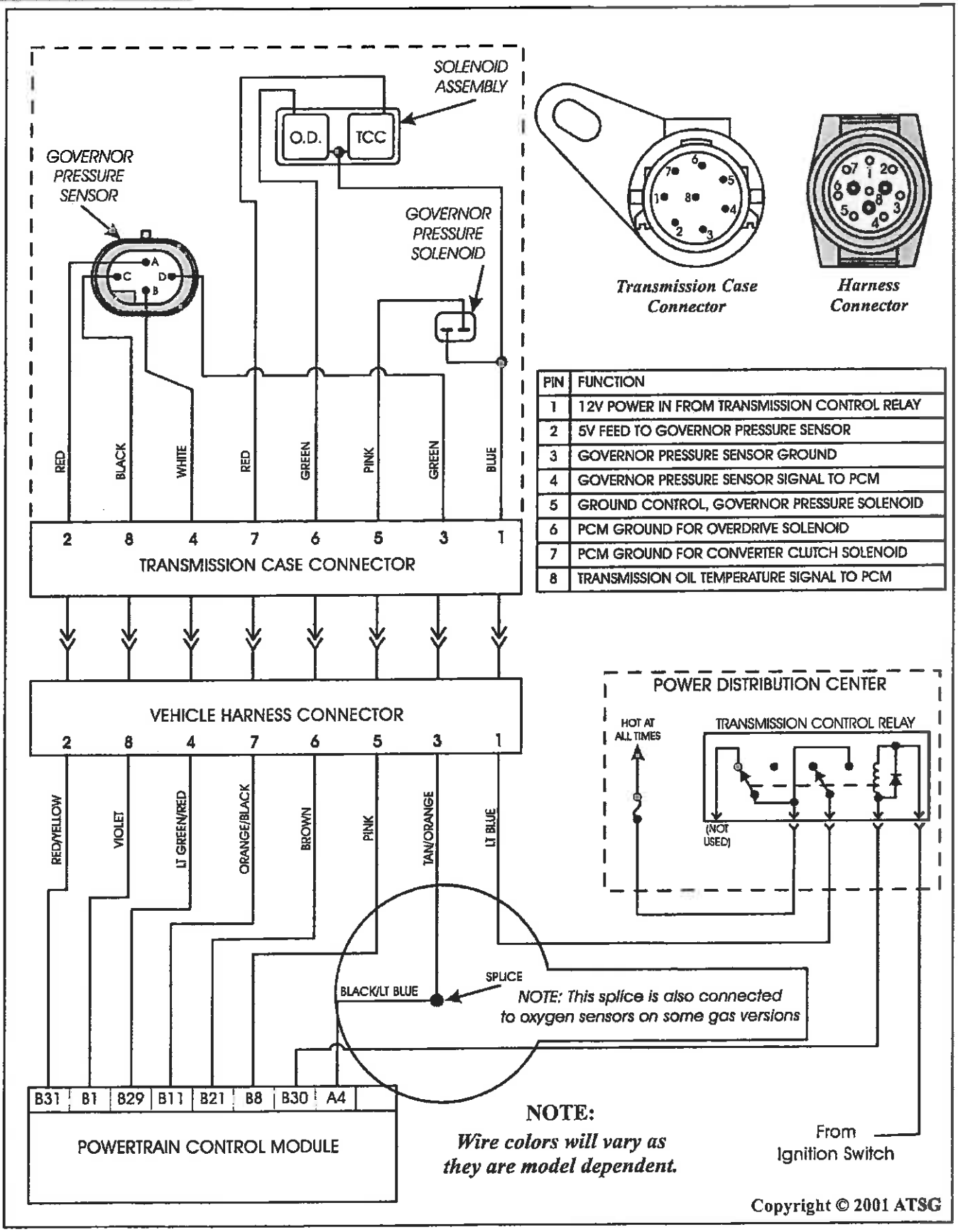

SOLENOID ASSEMBLY
O.D.
TCC
GOVERNOR PRESSURE SENSOR
GOVERNOR PRESSURE SOLENOID
A
B
C
D
RED
BLACK
WHITE
RED
GREEN
PINK
GREEN
BLUE
2 8 4 7 6 5 3 1
TRANSMISSION CASE CONNECTOR
Transmission Case Connector
Harness Connector
PIN FUNCTION
1 12V POWER IN FROM TRANSMISSION CONTROL RELAY
2 5V FEED TO GOVERNOR PRESSURE SENSOR
3 GOVERNOR PRESSURE SENSOR GROUND
4 GOVERNOR PRESSURE SENSOR SIGNAL TO PCM
5 GROUND CONTROL, GOVERNOR PRESSURE SOLENOID
6 PCM GROUND FOR OVERDRIVE SOLENOID
7 PCM GROUND FOR CONVERTER CLUTCH SOLENOID
8 TRANSMISSION OIL TEMPERATURE SIGNAL TO PCM
VEHICLE HARNESS CONNECTOR
2 8 4 7 6 5 3 1
POWER DISTRIBUTION CENTER
HOT AT ALL TIMES
TRANSMISSION CONTROL RELAY
(NOT USED)
RED/YELLOW
VIOLET
LT GREEN/RED
ORANGE/BLACK
BROWN
PINK
TAN/ORANGE
LT BLUE
BLACK/LT BLUE
SPLICE
NOTE: This splice is also connected to oxygen sensors on some gas versions
B31 B1 B29 B11 B21 B8 B30 A4
POWERTRAIN CONTROL MODULE
NOTE:
Wire colors will vary as they are model dependent.
From Ignition Switch
Copyright © 2001 ATSG

Figure 1

## GOVERNOR PRESSURE SENSOR VOLTAGE CODES

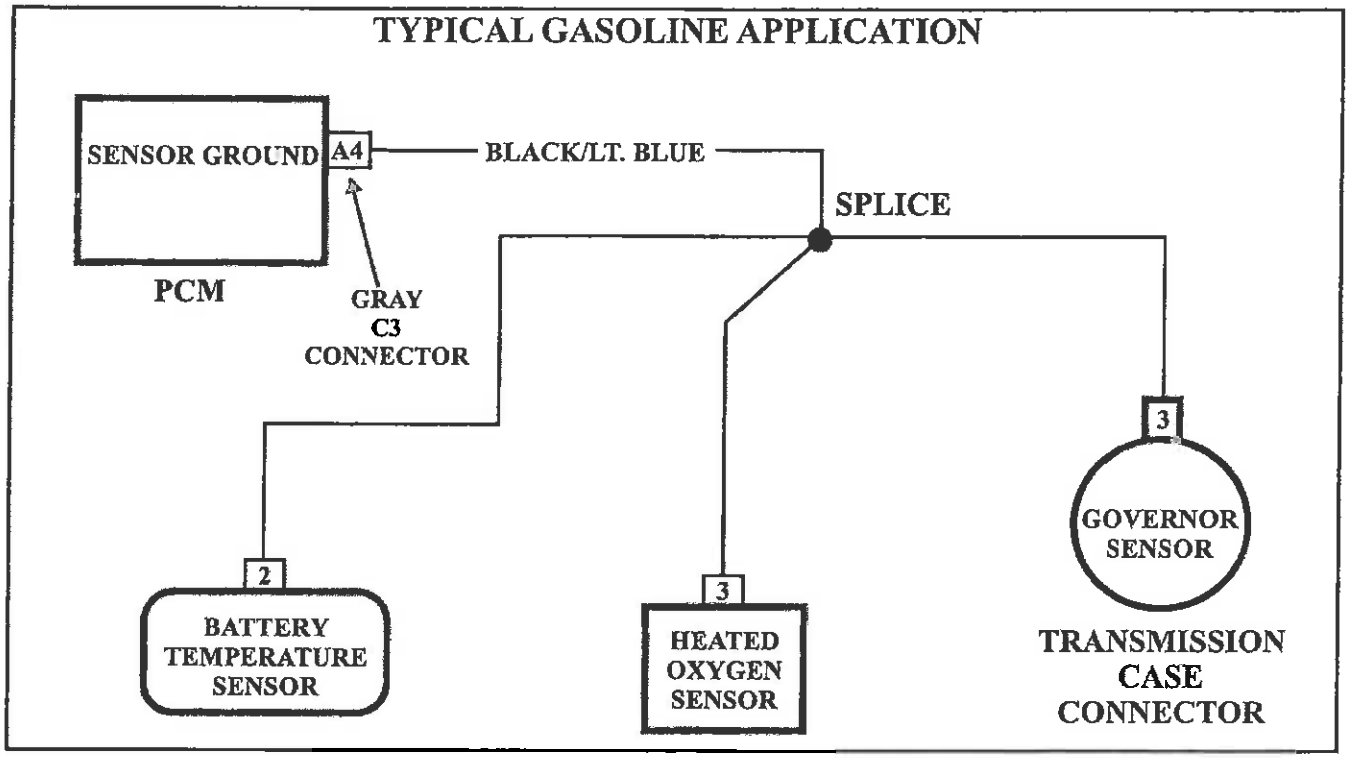



Figure 2

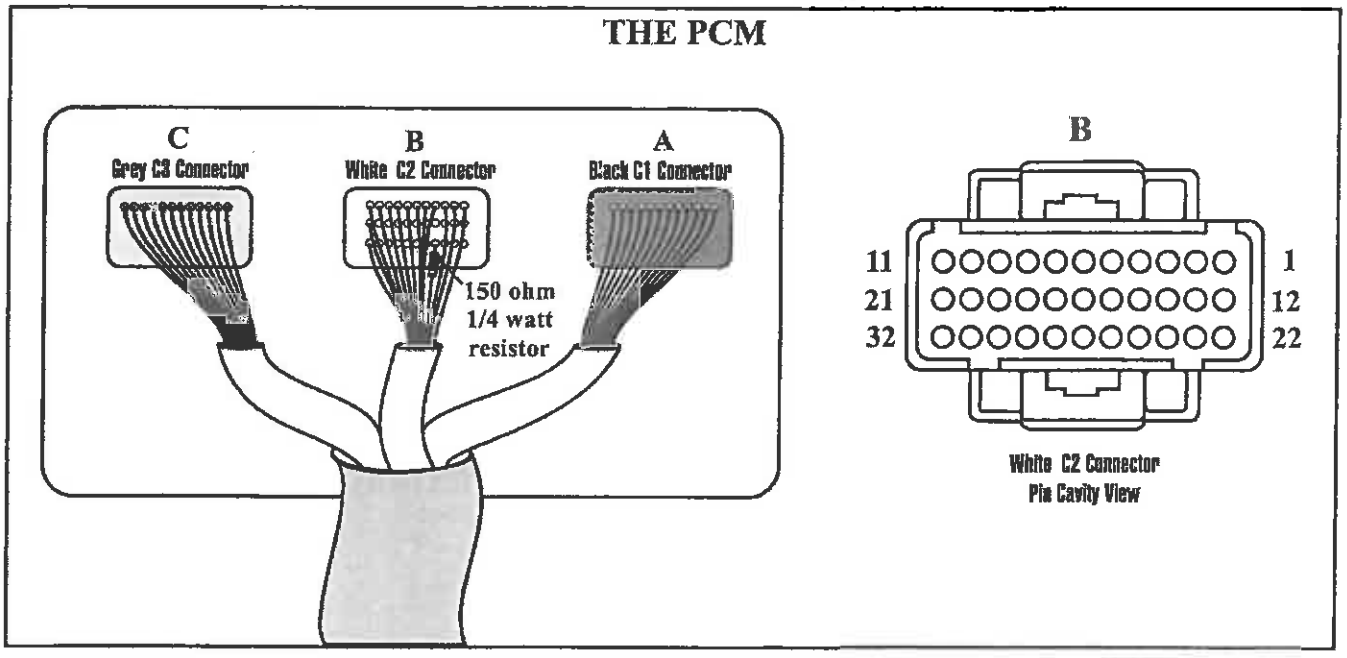



Figure 3

# CHRYSLER RWD TRANSMISSIONS

## IMPROVED LINE RISE & THROTTLE RESPONSE

**COMPLAINT:** It is commonly known that line rise of RWD Chrysler transmissions, i.e. 904, 727, 500/618, all **"PRE"** 1996 RE units is sluggish and in many cases insufficient. This causes technicians to find themselves having to adjust the throttle rod/cable in an attempt to located a happy medium of shift feel and shift timing. Many times the vehicle is delivered with out really achieving the desired shift characteristics.

**CAUSE:** Decrease pressure supplied to the pressure regulator valve throttle plug which is used to prevent line pressure from exceeding approximately 100 to 120 psi at wide open throttle (See Figure 1).

**CORRECTION:** By drilling a 0.040" exhaust hole through the exterior casting into the decrease pressure circuit by following the "example" steps below and illustrated in Figure 2, a controlled venting of this oil will allow a more rapid line rise response to throttle opening improving the shift characteristics of the transmission. It also will allow a more desirable top end line pressure reading as well as a slight increase in the converter clutch apply pressure.

***Step 1.*** Measure the overall length of the plug (.480") as seen with the example in Figure 2.
***Step 2.*** Measure the length of the plug minus one shoulder (.430") as seen with the example in Figure 2.
***Step 3.*** The difference between the two readings is .050". By dividing that number in half (0.025") and adding it to the figure acquired in step 2 (0.430"), the depth from the edge of the bore to the decrease circuit can be marked for drilling at approximately 0.0455" also shown in Figure 2.

**Note:** For 1996 and later vehicles drilling this hole may cause an erroneous code P1763 "Transmission Governor Pressure Sensor Volts Too High." This can be overcome by re-flashing the PCM according to Chrysler bulletin 21-04-00 which re-calibrates the JTEC Powertrain Control Module with new software (calibration change 96Cal18, 97Cal18, 98Cal12, and 99Cal14).

Another option would be to carefully solder a 150 ohm 1/4 watt resistor into the governor sensor signal circuit which will desensitize the P1763 code setting concern. Radio Shack part#271-1312

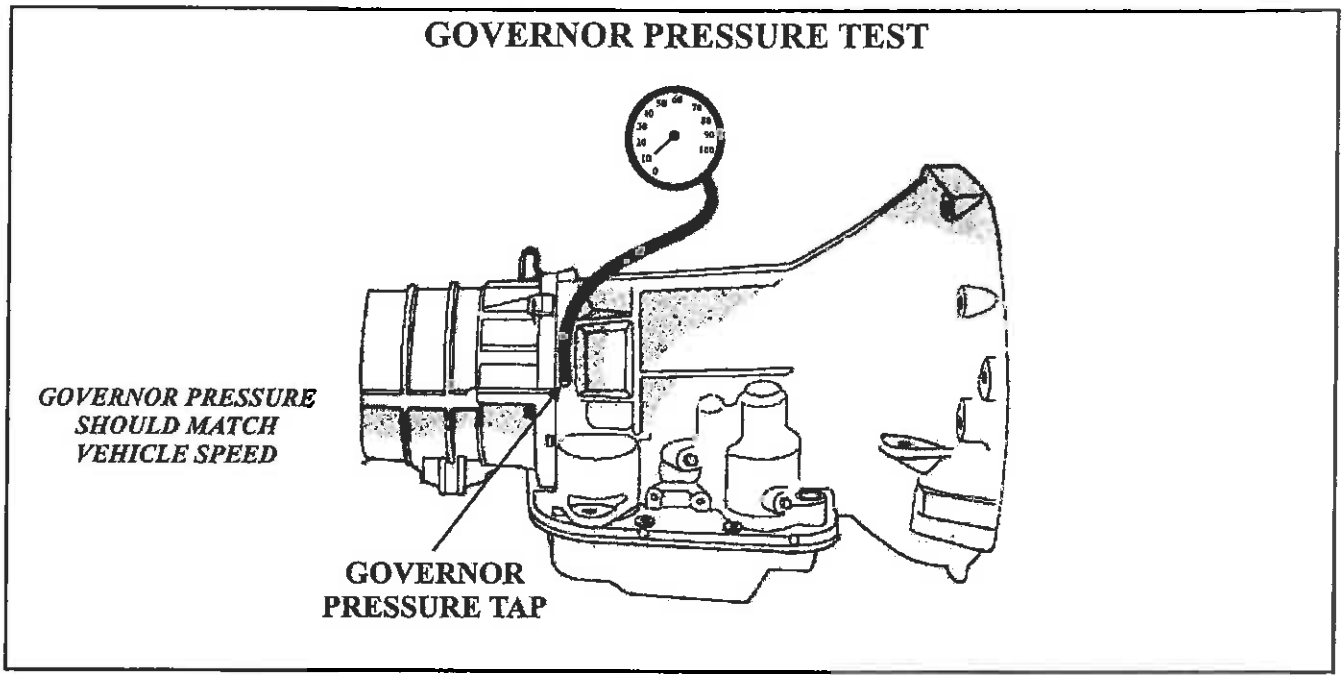



Figure 1

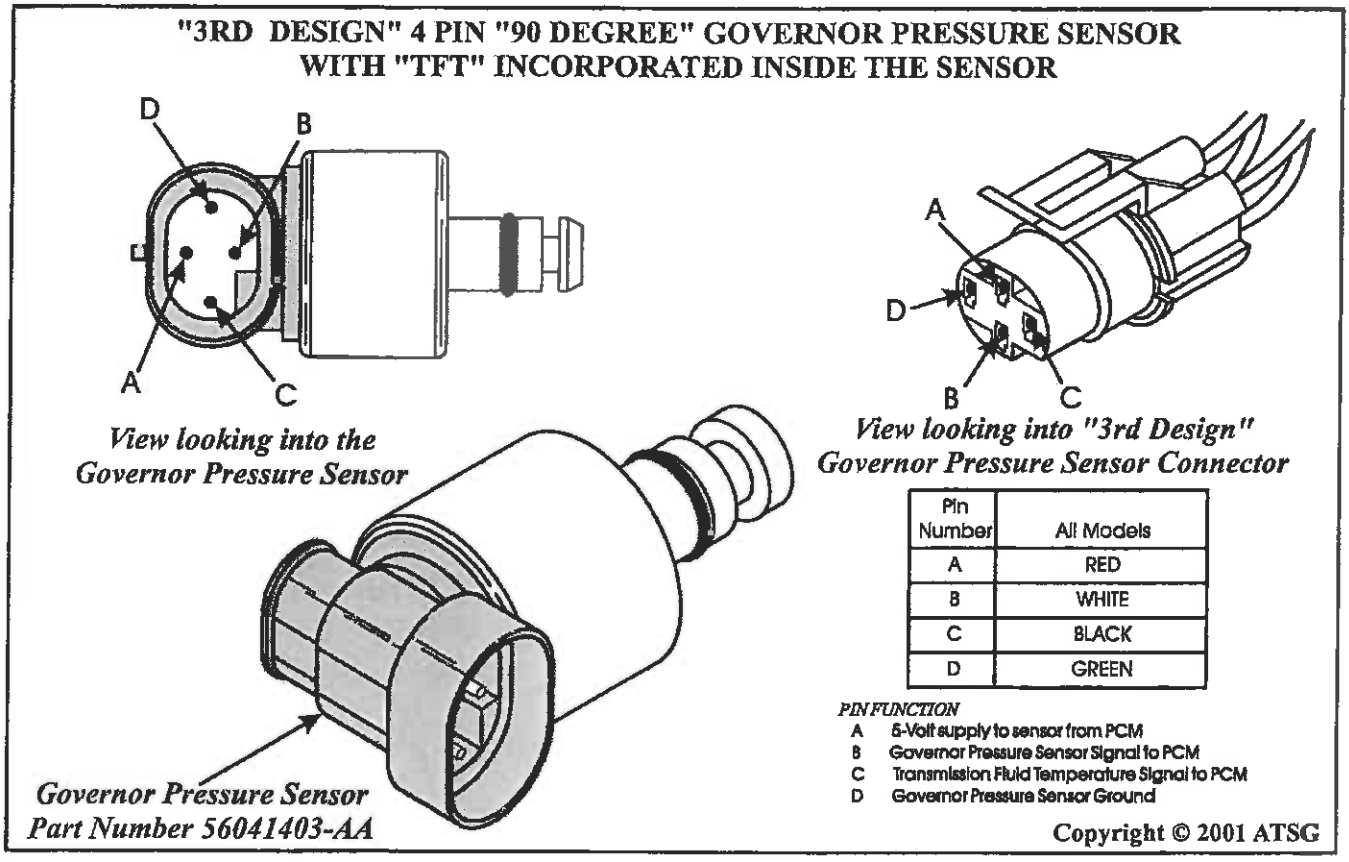



Figure 2

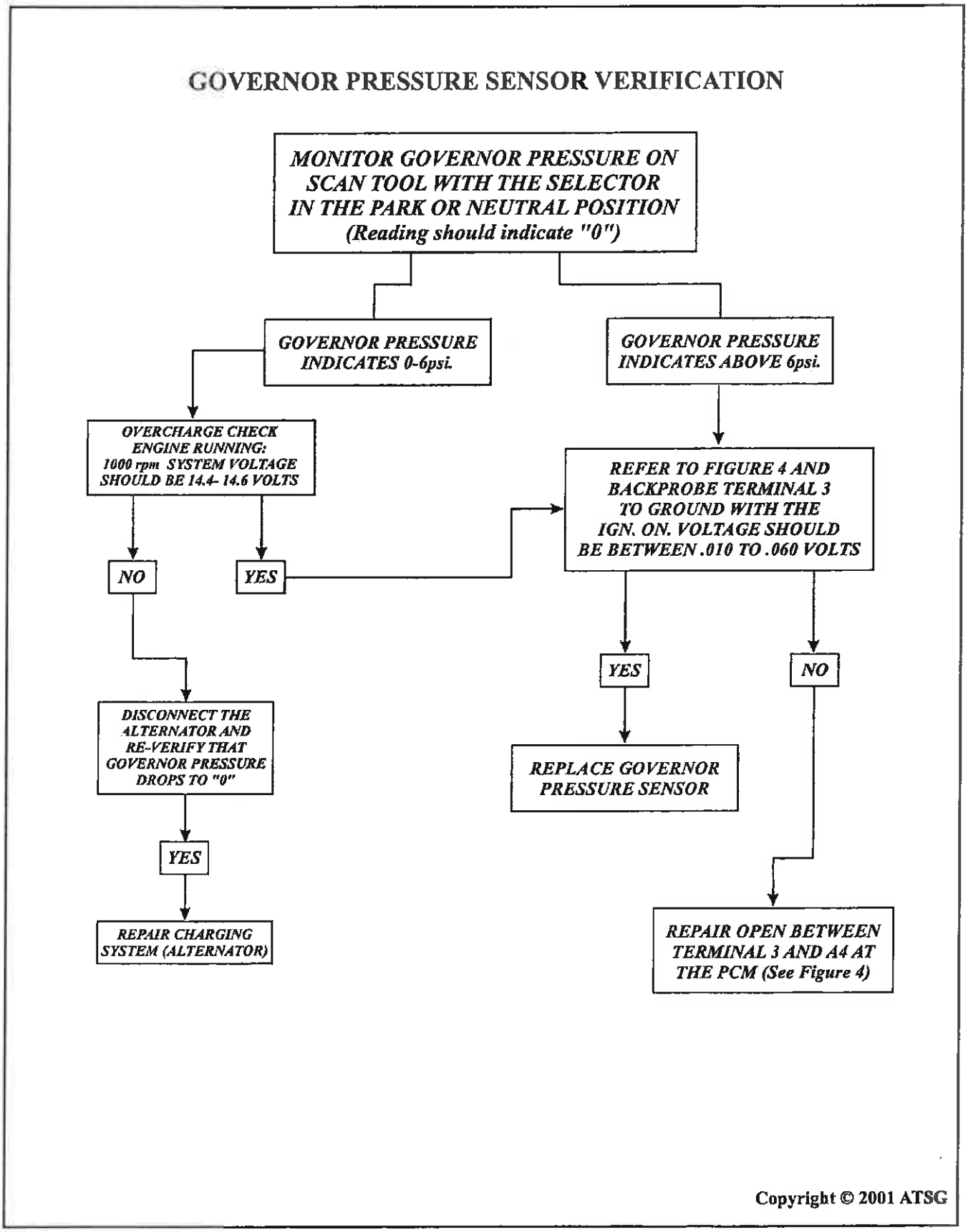

GOVERNOR PRESSURE SENSOR VERIFICATION
MONITOR GOVERNOR PRESSURE ON SCAN TOOL WITH THE SELECTOR IN THE PARK OR NEUTRAL POSITION (Reading should indicate "0")
GOVERNOR PRESSURE INDICATES 0-6psi.
GOVERNOR PRESSURE INDICATES ABOVE 6psi.
OVERCHARGE CHECK ENGINE RUNNING: 1000 rpm SYSTEM VOLTAGE SHOULD BE 14.4- 14.6 VOLTS
NO
YES
REFER TO FIGURE 4 AND BACKPROBE TERMINAL 3 TO GROUND WITH THE IGN. ON. VOLTAGE SHOULD BE BETWEEN .010 TO .060 VOLTS
YES
NO
DISCONNECT THE ALTERNATOR AND RE-VERIFY THAT GOVERNOR PRESSURE DROPS TO "0"
REPLACE GOVERNOR PRESSURE SENSOR
YES
REPAIR CHARGING SYSTEM (ALTERNATOR)
REPAIR OPEN BETWEEN TERMINAL 3 AND A4 AT THE PCM (See Figure 4)
Copyright © 2001 ATSG

Figure 3

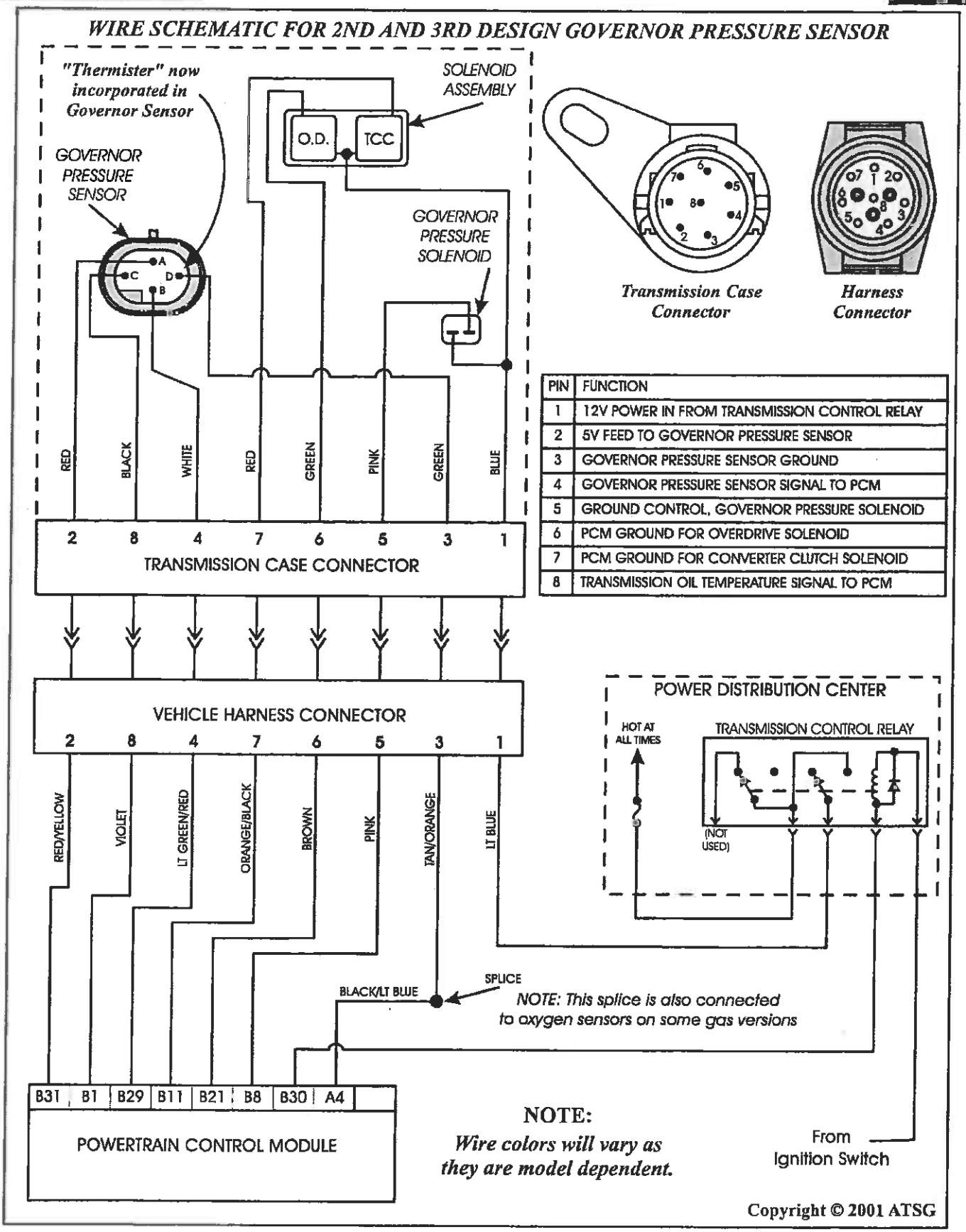

WIRE SCHEMATIC FOR 2ND AND 3RD DESIGN GOVERNOR PRESSURE SENSOR
"Thermister" now incorporated in Governor Sensor
SOLENOID ASSEMBLY
O.D.
TCC
GOVERNOR PRESSURE SENSOR
GOVERNOR PRESSURE SOLENOID
A
B
C
D
Transmission Case Connector
Harness Connector
RED
BLACK
WHITE
RED
GREEN
PINK
GREEN
BLUE
2 8 4 7 6 5 3 1
TRANSMISSION CASE CONNECTOR
PIN FUNCTION
1 12V POWER IN FROM TRANSMISSION CONTROL RELAY
2 5V FEED TO GOVERNOR PRESSURE SENSOR
3 GOVERNOR PRESSURE SENSOR GROUND
4 GOVERNOR PRESSURE SENSOR SIGNAL TO PCM
5 GROUND CONTROL, GOVERNOR PRESSURE SOLENOID
6 PCM GROUND FOR OVERDRIVE SOLENOID
7 PCM GROUND FOR CONVERTER CLUTCH SOLENOID
8 TRANSMISSION OIL TEMPERATURE SIGNAL TO PCM
VEHICLE HARNESS CONNECTOR
2 8 4 7 6 5 3 1
POWER DISTRIBUTION CENTER
HOT AT ALL TIMES
TRANSMISSION CONTROL RELAY
(NOT USED)
RED/YELLOW
VIOLET
LT GREEN/RED
ORANGE/BLACK
BROWN
PINK
TAN/ORANGE
LT BLUE
BLACK/LT BLUE
SPLICE
NOTE: This splice is also connected to oxygen sensors on some gas versions
B31 B1 B29 B11 B21 B8 B30 A4
POWERTRAIN CONTROL MODULE
NOTE:
Wire colors will vary as they are model dependent.
From Ignition Switch
Copyright © 2001 ATSG

Figure 4

# DODGE TRUCKS & VANS WITH RE RWD TRANSMISSIONS

## ERRATIC GOVERNOR PRESSURE

**COMPLAINT:** The vehicle shuttle shifts and when governor pressure is checked it is erratic. The governor pressure sensor voltage, when checked, matches the pressure gauge, it too is erratic. No codes are stored.

**CAUSE:** The area of the valve body where the governor pressure control solenoid and the governor pressure sensor are located is warped (Refer to Figure 1).
When this area is warped governor pressure from the solenoid to the sensor is leaking causing erratic governor pressure which causes the erratic sensor signal voltage (See Figure 2). This results in oil at the tip of the sensor to vary which causes the sensor to vary the signal voltage. The PCM will react by varying the solenoid operation which will result in erratic governor pressure.

**CORRECTION:**
Check the crush on the solenoid/sensor gasket which might reveal warpage in this area. Flat sand the solenoid/sensor mounting block as well as that area of the transfer plate section of the valve body (Refer to Figure 3).

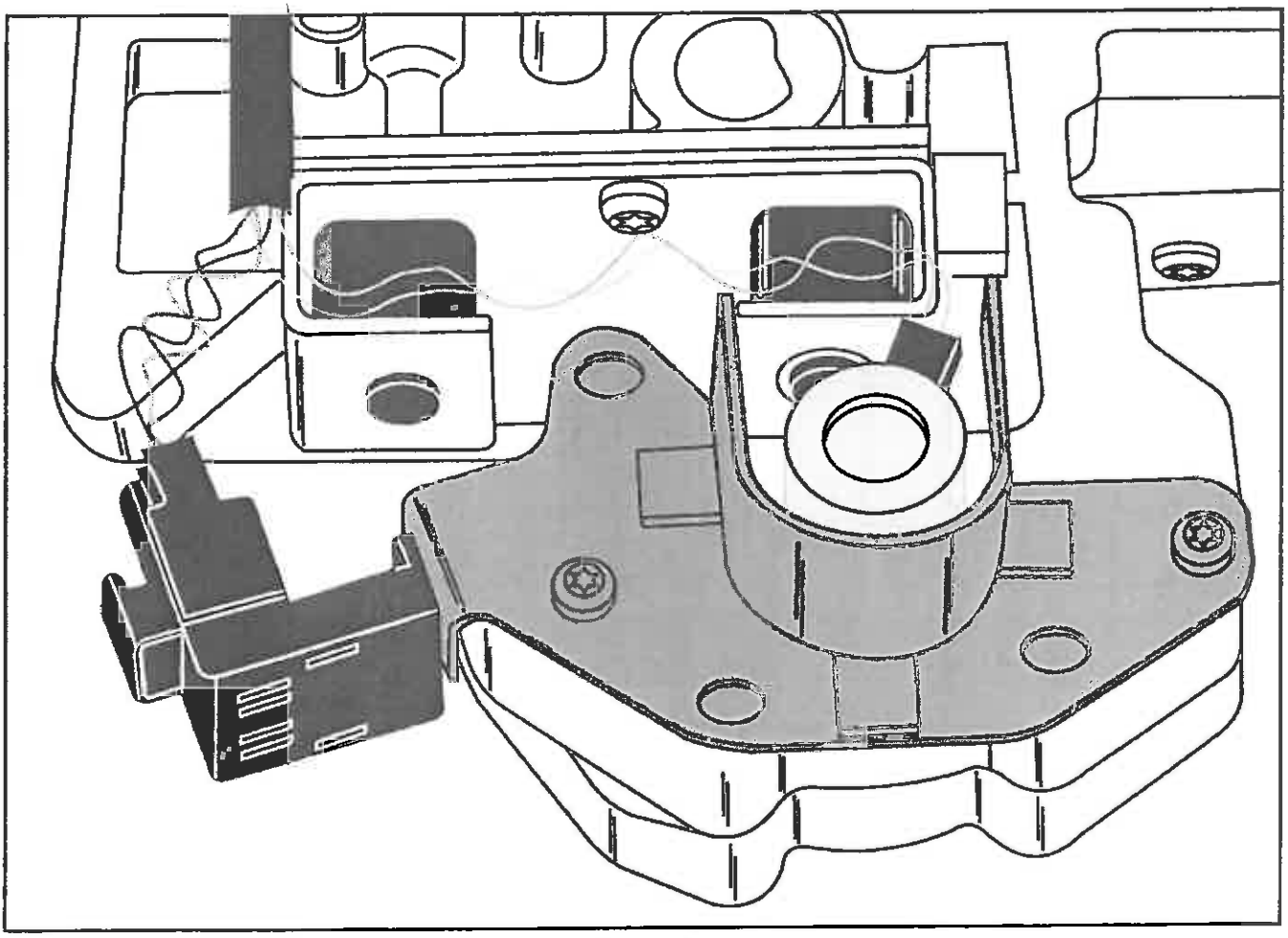


Figure 1

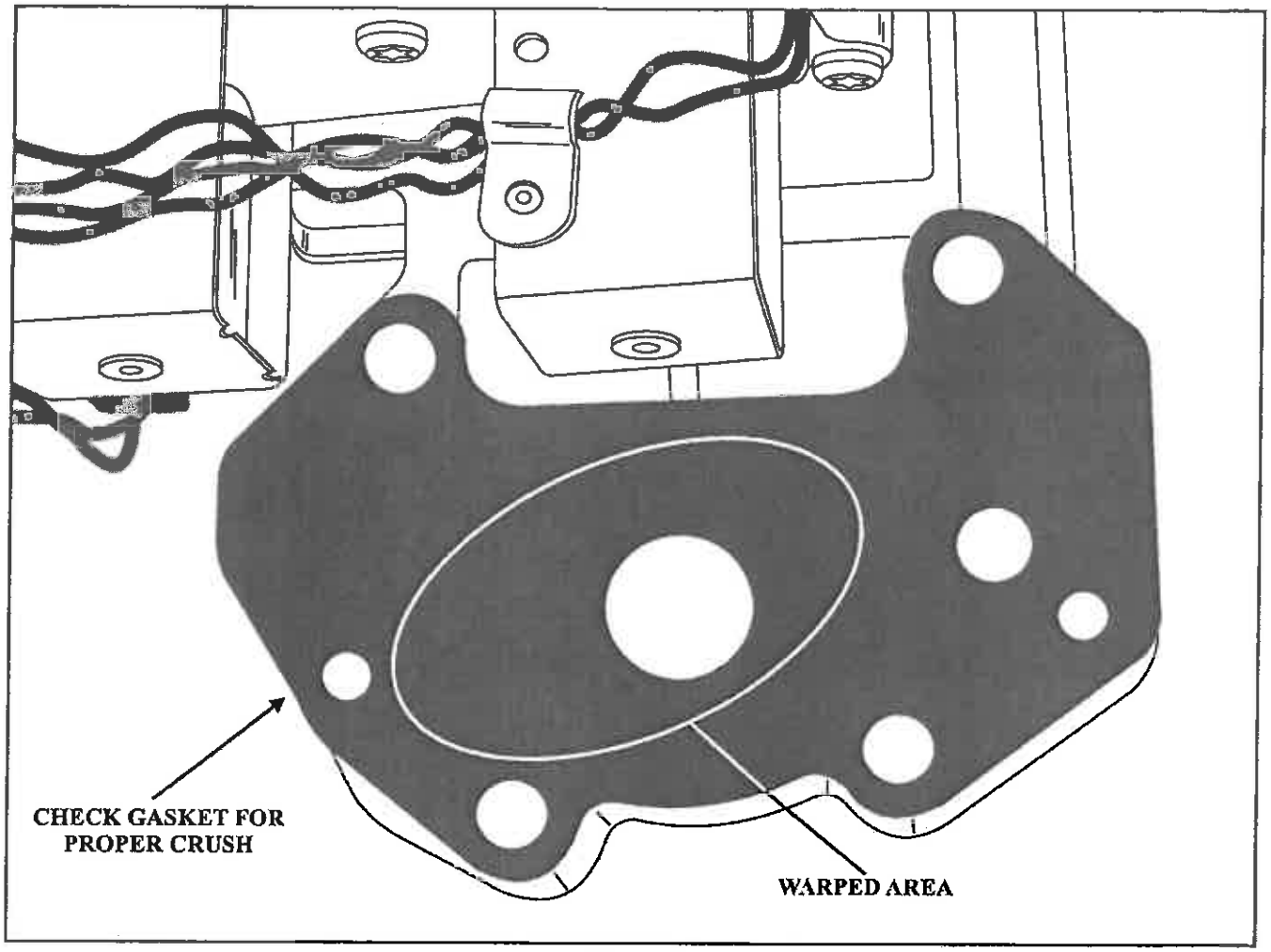



Figure 2

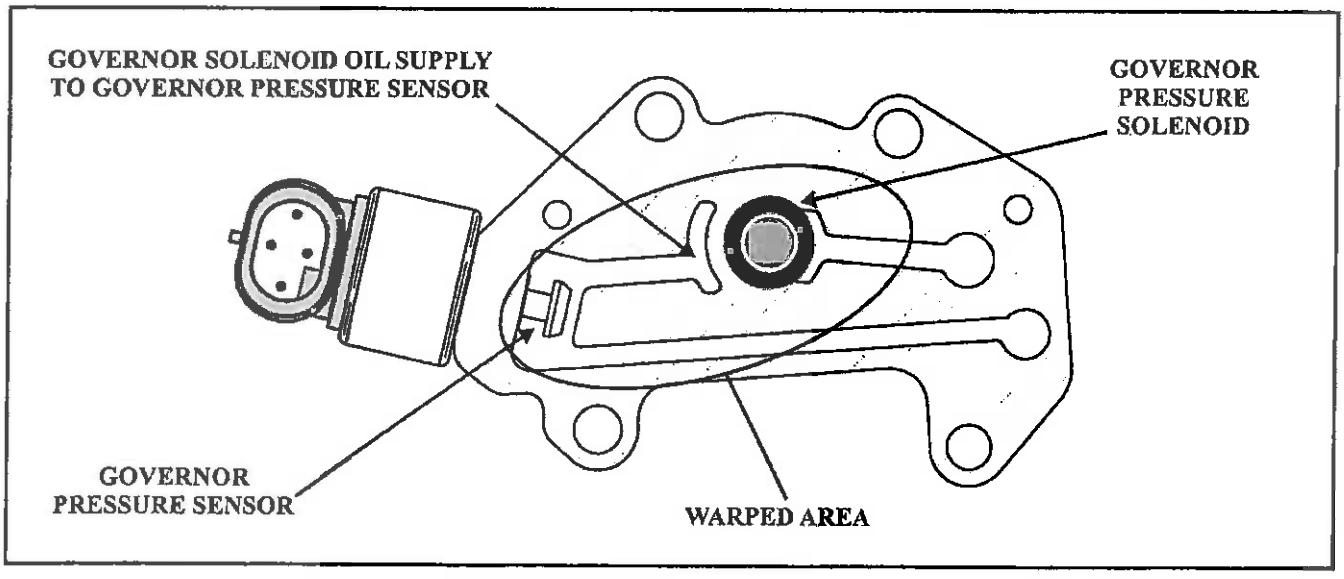



Figure 3

# CHRYSLER 46RE/47RE

## DIAGNOSTIC TROUBLE CODE P1740

**COMPLAINT:** Some 2000-2001 Ram Vans, Dakotas, Ram Trucks and Durangos, may exhibit a flashing Check Engine Light, caused by a DTC P1740. (P1740 is a Torque Converter Clutch or Overdrive Solenoid Performance fault).

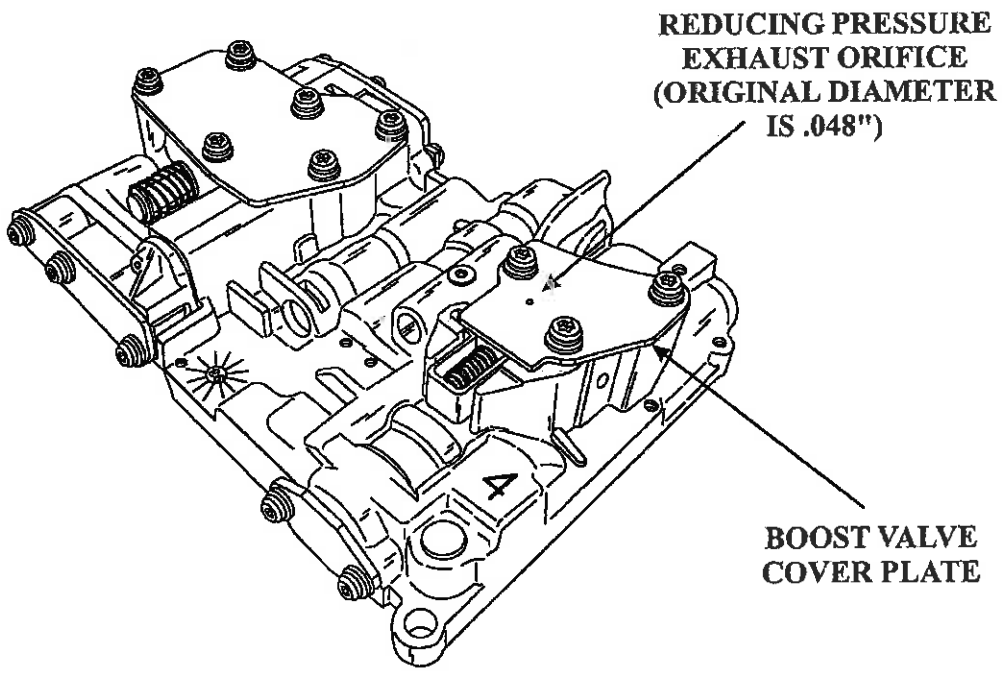
**CAUSE:** The cause may be, a Reducing Pressure Exhaust orifice that is too small, which delays the pressure increase needed when the Torque Converter Clutch is applied. Refer to Figures 2 and 3 for a partial hydraulic schematics explaining the Boost Valves function.

**CORRECTION:** Refer to Figure 1 to locate the Reducing Pressure Exhaust Orifice, which is in the Boost Valve Cover Plate. Remove the plate and enlarge the orifice shown to .069."Chrysler also provides a new Boost Valve Cover Plate which will already have the orifice enlarged.

**SERVICE INFORMATION:**

***BOOST VALVE COVER PLATE (Chrysler part no.).....04617012***

**REDUCING PRESSURE EXHAUST ORIFICE LOCATION**




***REMOVE THE BOOST VALVE COVER PLATE AND ENLARGE THE REDUCING PRESSURE EXHAUST ORIFICE TO .069"***



Figure 1

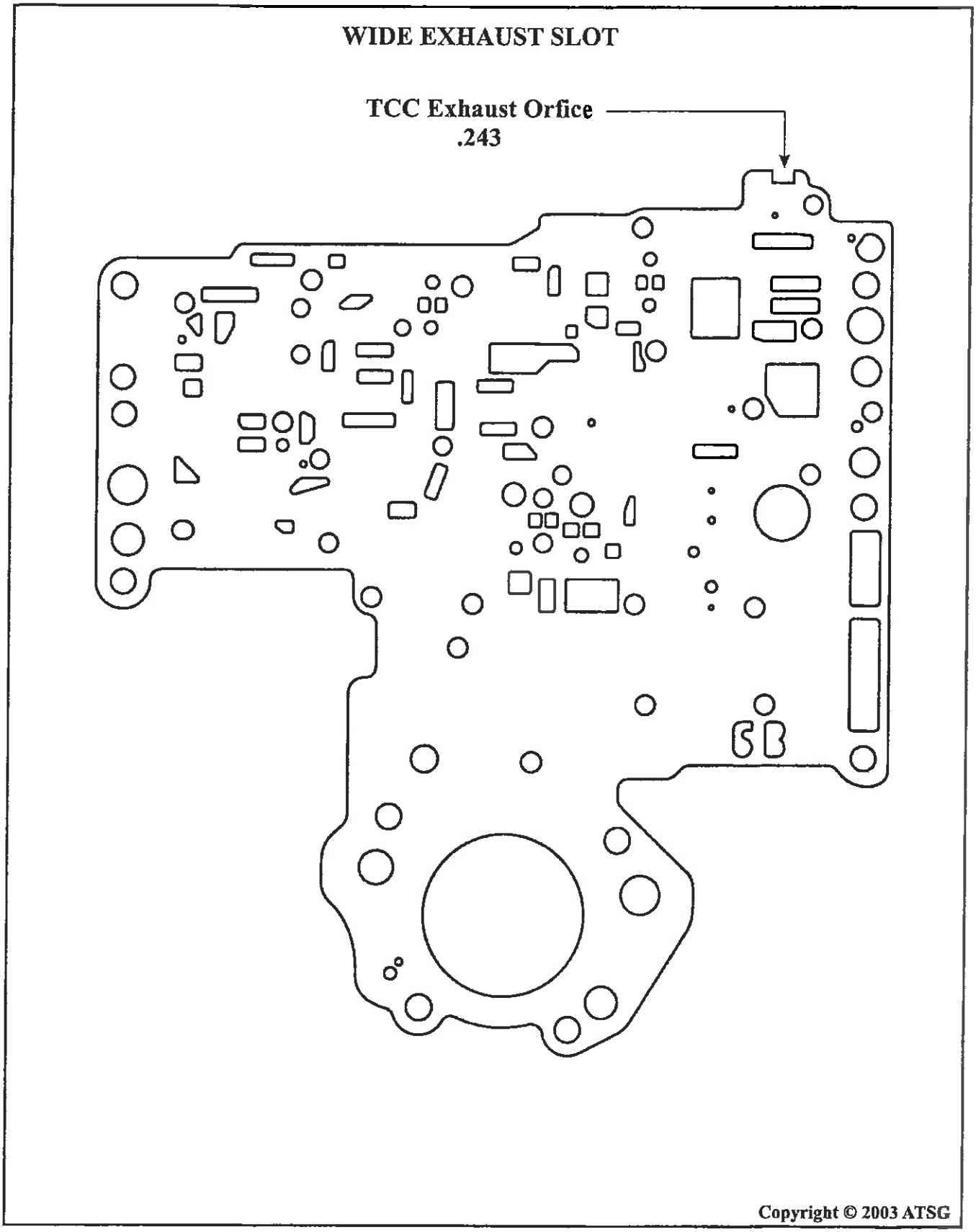

WIDE EXHAUST SLOT
TCC Exhaust Orfice
.243
Copyright © 2003 ATSG

Figure 3

# 47RE/5.9 LITER 24 VALVE DIESEL CUMMINS
## TORQUE CONVERTER CLUTCH CYCLES IN AND OUT

**COMPLAINT:** 5.9 Liter vehicles with the 47RE transmission experiences a cycling in and out of lock up concern during highway speed.

**CAUSE:** There are many possibilities such as a malfunctioning brake switch or brake support bracket. Temperature sensors, alternators, throttle position sensors, vehicle speed sensors to name a few. Chrysler has even issued a reprogramming procedure (Bulletin #18-02-99) for 1996 and later vehicles which compensates for alternator or TPS noise correcting this complaint. Reports of TCC shuttle has also occurred while driving with a scanner attached to the data link connector. Unplug the scanner and the problem goes away. One other possibility that may go overlooked is a defective ECM with 1998 and later vehicles. These vehicles are equipped with an Accelerator Pedal Position Sensors (APPS) rather than a TPS. The APPS sends a typical TPS signal to the ECM and the ECM sends that signal to the PCM. Should the ECM malfunction, the incorrect signal is received by the PCM causing the shuttle shift complaint (See Figure 1).

**CORRECTION:** The APPS is located at the front left of the Engine Compartment under a plastic protective cover (See Figure 2). When the cover is removed it can be seen how the accelerator pedal cable operates a throttle cam which is attached to a mounting plate (See Figure 3). On the back side of this assembly is the where the APPS is located (See Figure 4). The APPS connector terminal identification is shown in Figure 5. The number 3 terminal sends a typical .5 to 3.5-4.0 throttle opening signal voltage to the ECM at connector terminal # 25 (See Figure 6). The ECM in turn sends that same signal to the PCM from ECM terminal # 28 to PCM terminal # 23 in the C1 Black connector (See Figure 7). Simply inspect the voltage from the APPS to the ECM to insure that the APPS is functioning correctly. Then inspect the signal from the ECM to the PCM. If the signal is incorrect, the ECM will need to be replaced. For further verification that an ECM needs to be replaced, cut the wire entering terminal 23 in the PCM's black C1 connector. Run a jumper lead from terminal 3 in the APPS connector to terminal 23 in the C1 connector. If the direct signal from the APPS into the PCM corrects the problem, the ECM has been confirmed faulty.

**SERVICE INFORMATION:**

APPS.....53031575AF

## TORQUE CONVERTER CLUTCH CYCLES IN AND OUT

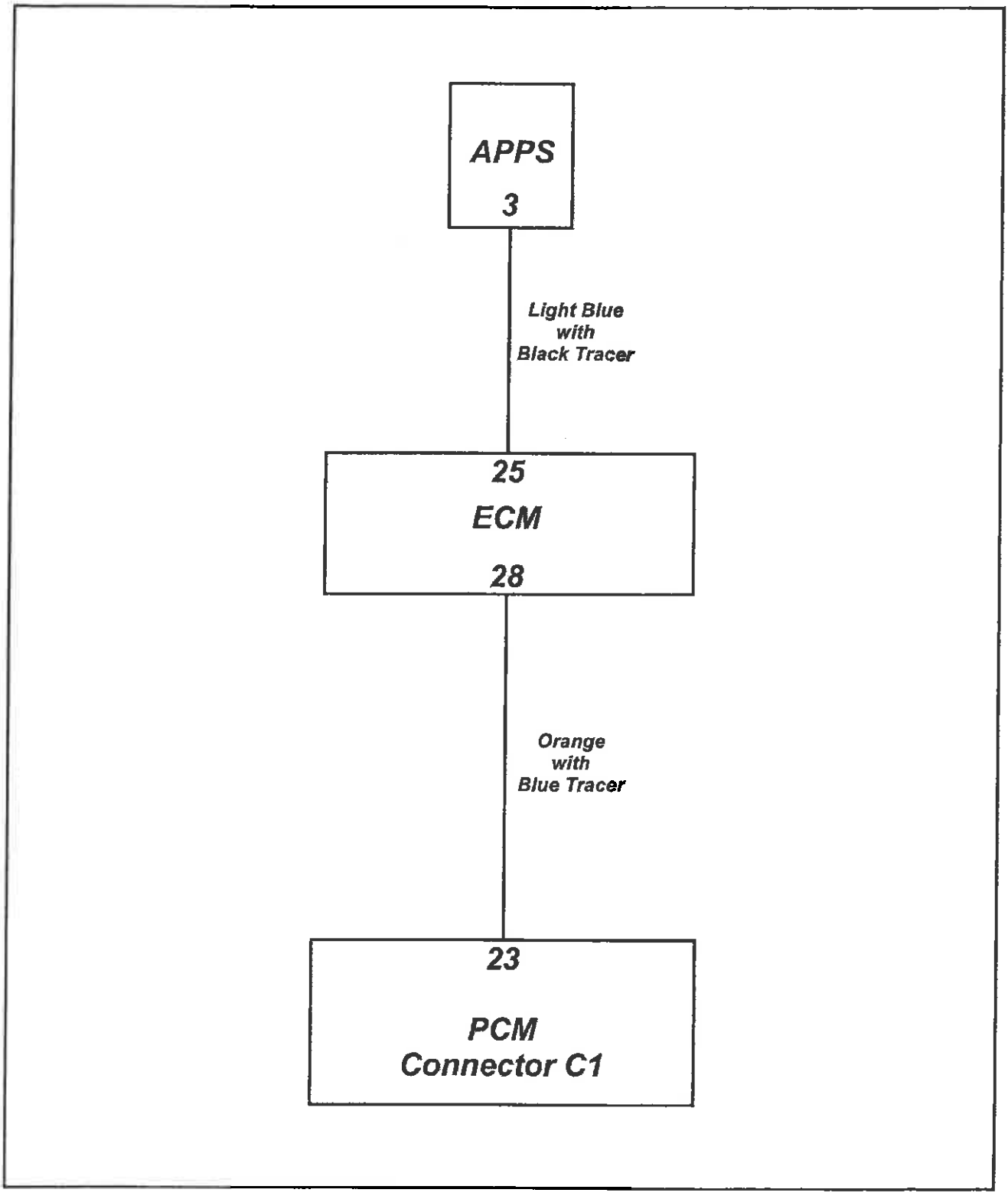



Figure 1

## TORQUE CONVERTER CLUTCH CYCLES IN AND OUT

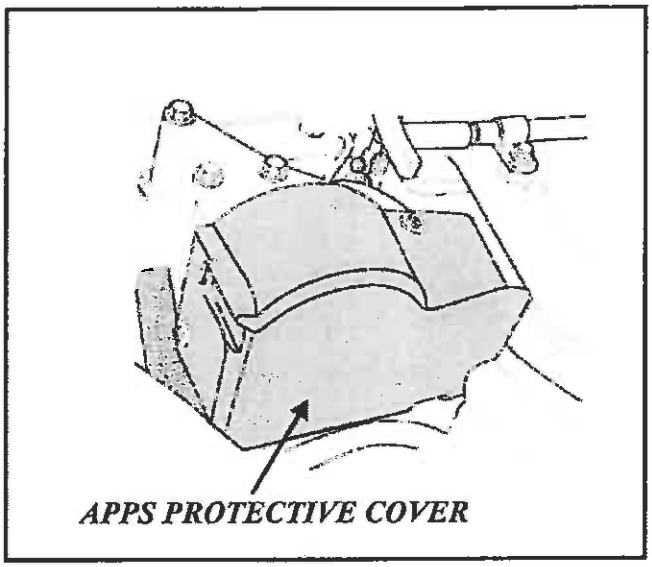



Figure 2

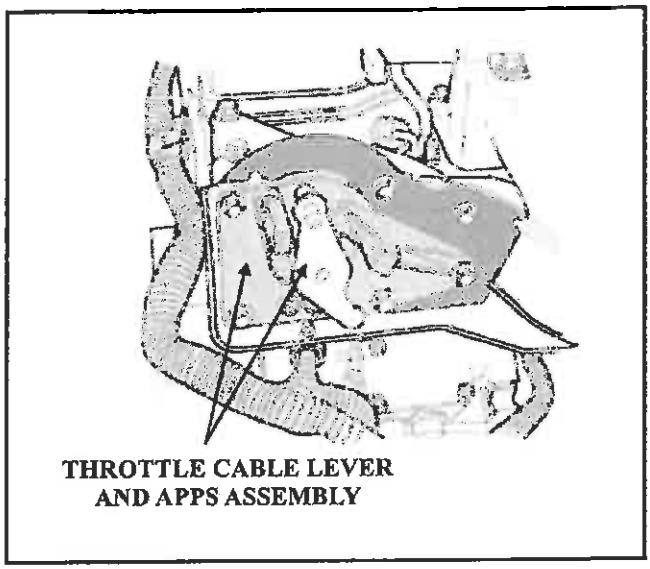



Figure 3

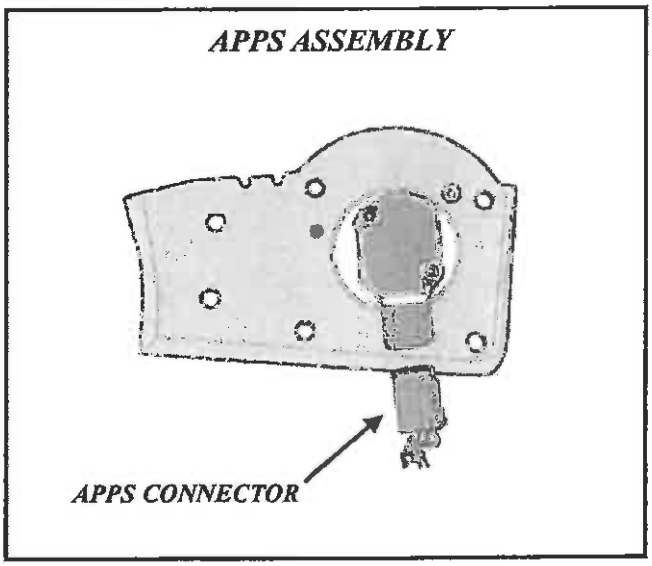



Figure 4

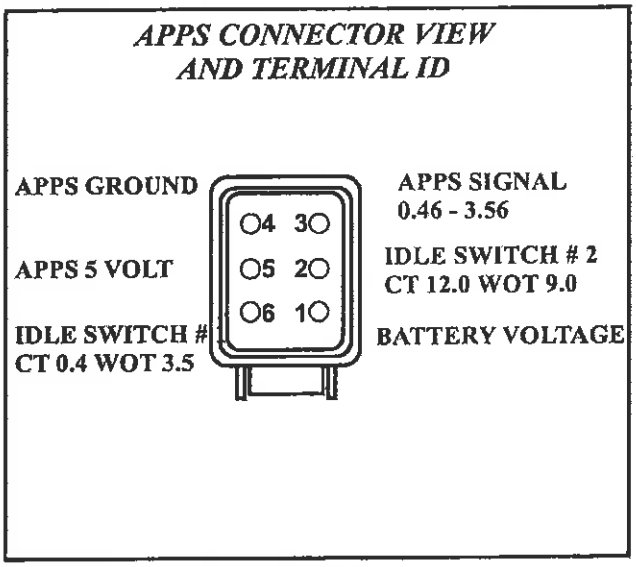



Figure 5

## TORQUE CONVERTER CLUTCH CYCLES IN AND OUT

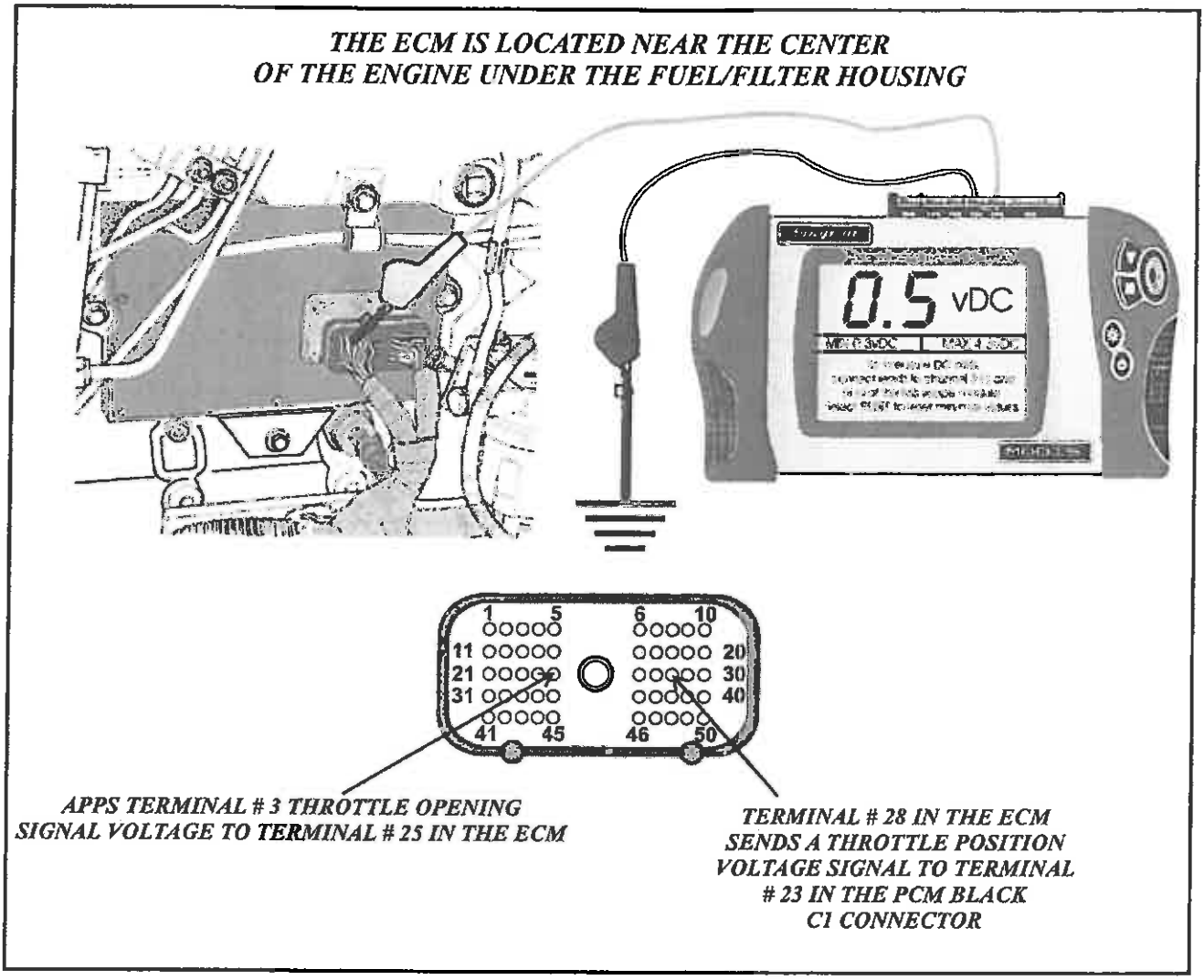



Figure 6

## TORQUE CONVERTER CLUTCH CYCLES IN AND OUT

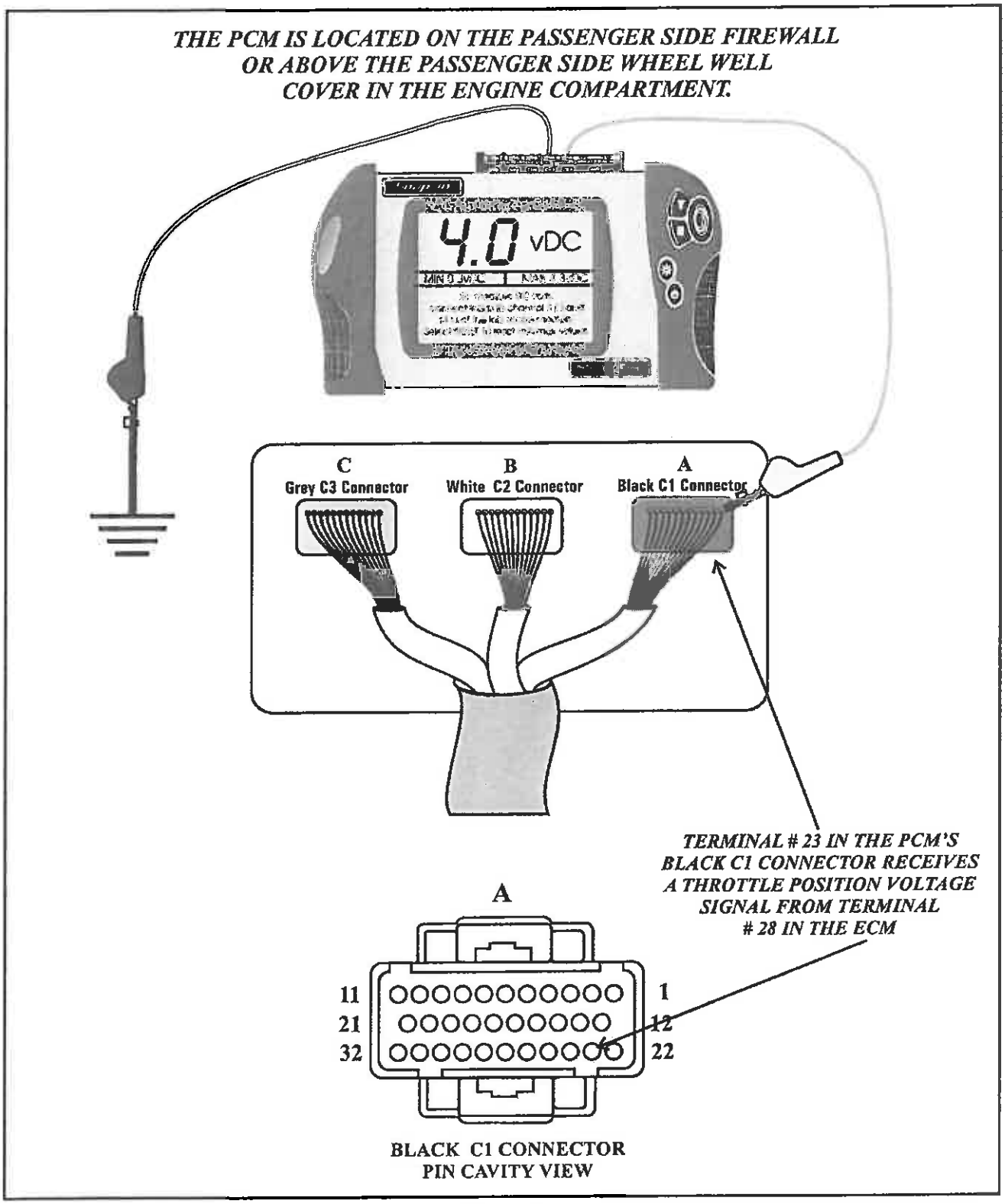



Figure 7

# CHRYSLER RE RWD TRANSMISSIONS

## IN AND OUT OF LOCKUP

**COMPLAINT:** Vehicles with the RE RWD transmissions cycling in and out of lockup

**CAUSE:** Possibly noise on the TPS signal wire.

**CORRECTION:** There are many causes for electrical noise. We most strongly recommend that you repair the SOURCE of the noise rather than filtering the noise. Often the source can be elusive, or repairing the source expensive. In these cases, the noise may be filtered out of the signal using an L-C type "pi" filter on the TPS signal line. These filters are readily available at any car stereo installation shop, and many retail electronics outlets (Echlin RD-13 or equivilent). It is fairly simple to assemble your own as well.

To build an L-C "pi" filter you will need the following:
.68 µH (micro henry) Choke Coil (Jameco 372103 or equiv)
1 µF (micro farad) Capacitor (Jameco 10867PS or equiv)
4700 µF (micro farad) Capacitor (Jameco 93673PS or equiv)
A box to mount it in (Jameco 18913 or equiv)
1 crimp on Ground Ring (Jameco 302762 or equiv)
2 butt connectors (Jameco 320562 or equiv)
Some wire (12" blue, 12" black, 12" violet)
Some solder
(Optional) enough Epoxy to fill the box

(A complete assembled unit is available from ATSG. Jameco parts may be obtained at http://jameco.com, or your local professional electronics parts store.)

Solder the parts together as shown in the schematic in Fig 1, and the pictorial in Figure 2. Install the filter by cutting the TPS signal wire and feeding that signal through the blue wire in the filter (the 1 µF side to the TPS and the 4700 µF side to the computer), then ground the black ground wire to a good ground (the better the ground, the cleaner the signal) as shown in figure 3.

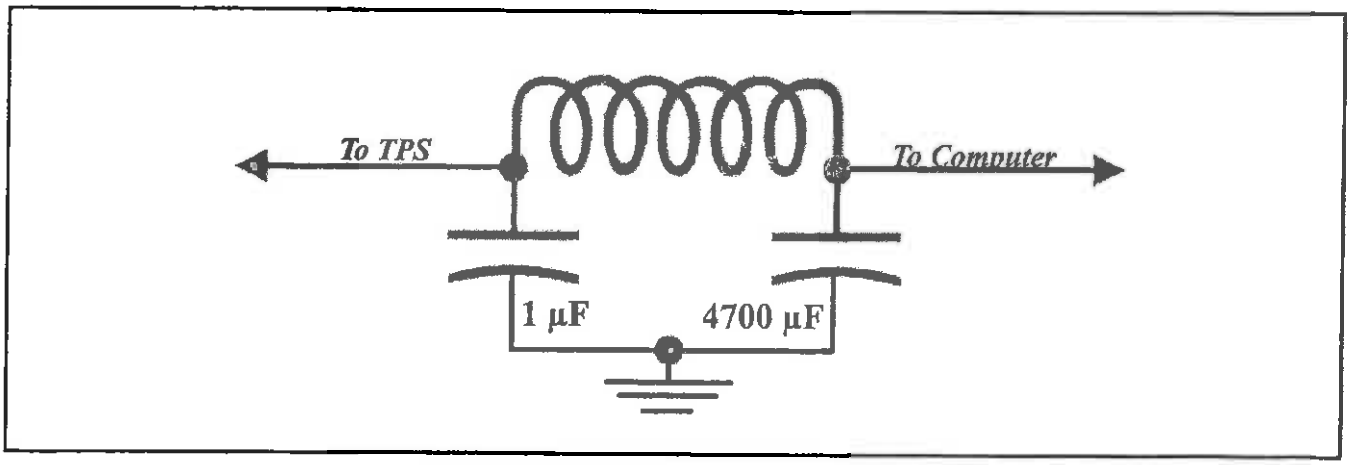



Figure 1

# CHRYSLER RE RWD TRANSMISSIONS

## IN AND OUT OF LOCKUP

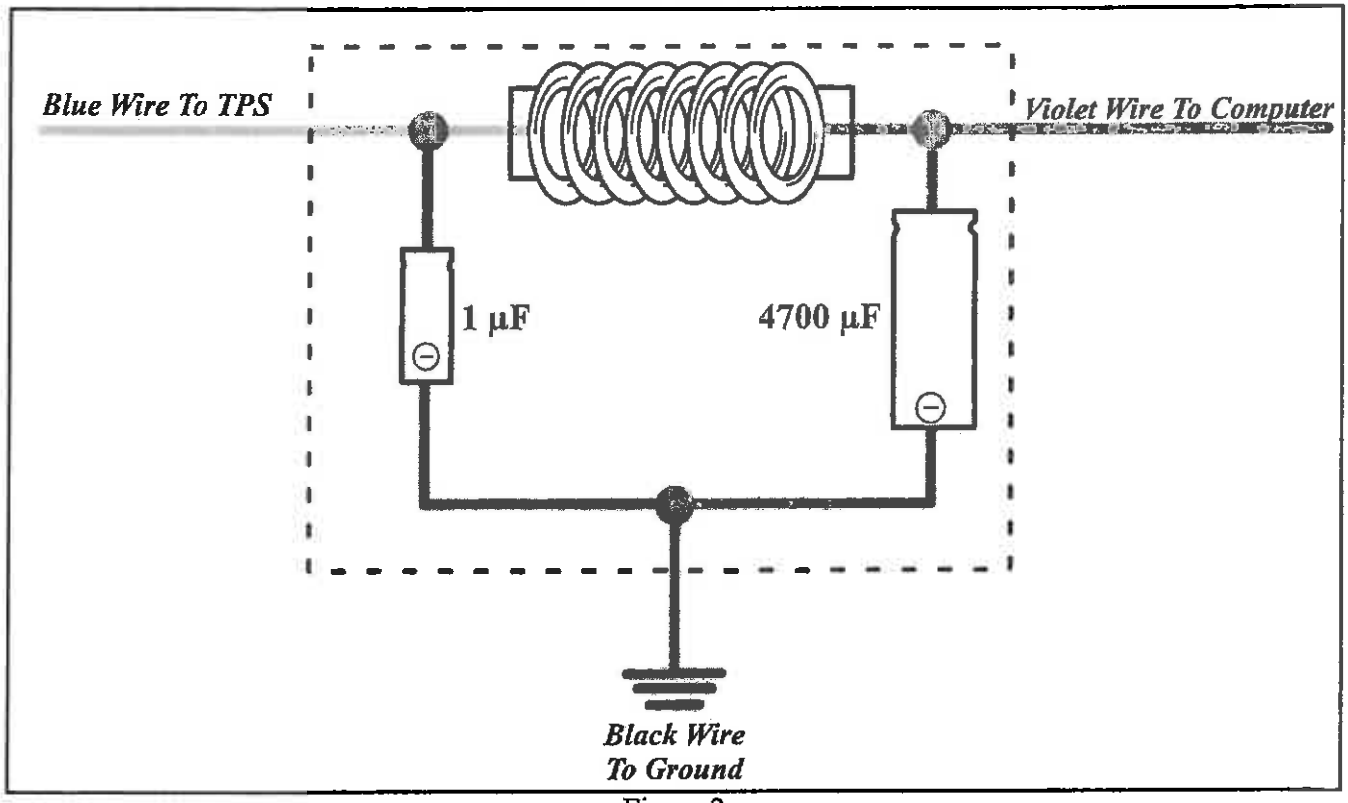



Figure 2

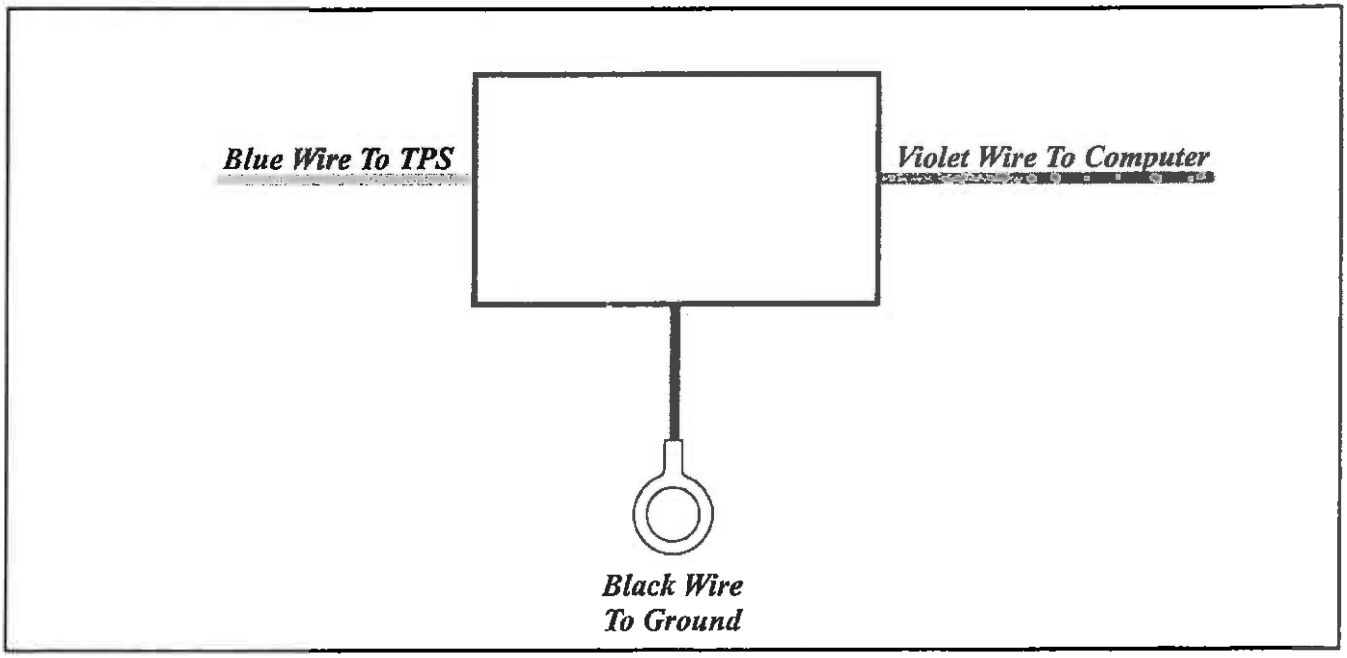



Figure 3

# DODGE TRUCKS

## LOCKUP SHUTTLE

**COMPLAINT:** Trucks using 12 valve diesel engines may exhibit a lockup shuttle condition. The scan tool indicates that the signal remains steadily "ON".

**CAUSE:** (1) The throttle valve adjustment rod is a ball joint type. The socket and clips that hold the rod in place are plastic. As the plastic wears, the rod becomes sloppy resulting in the lockup shuttle condition.

(2) The throttle arm that the throttle position sensor mounts to plastic bushings on the shaft of the throttle arm. These bushings wear and cause the throttle lever to wobble causing erratic TPS signal voltage, resulting in a lockup shuttle condition. The throttle arm blade also wears resulting in improper rotation of the TPS resulting in the same lockup shuttle condition, (Refer to Figure 1). The TPS cannot be adjusted when these items are worn.

**CORRECTION:**

(1) Replace the throttle rod with the plastic sockets and clips with the all metal rod shown in Figure 2.

(2) Replace the plastic bushings and the throttle arm if it is damaged.

**SERVICE INFORMATION:**

***All Metal Throttle Rod*** ..... ***5011959AB***
***Throttle Arm*** ..... ***04863845***
***Throttle Arm Bushing*** ..... ***04425053***

## LOCKUP SHUTTLE

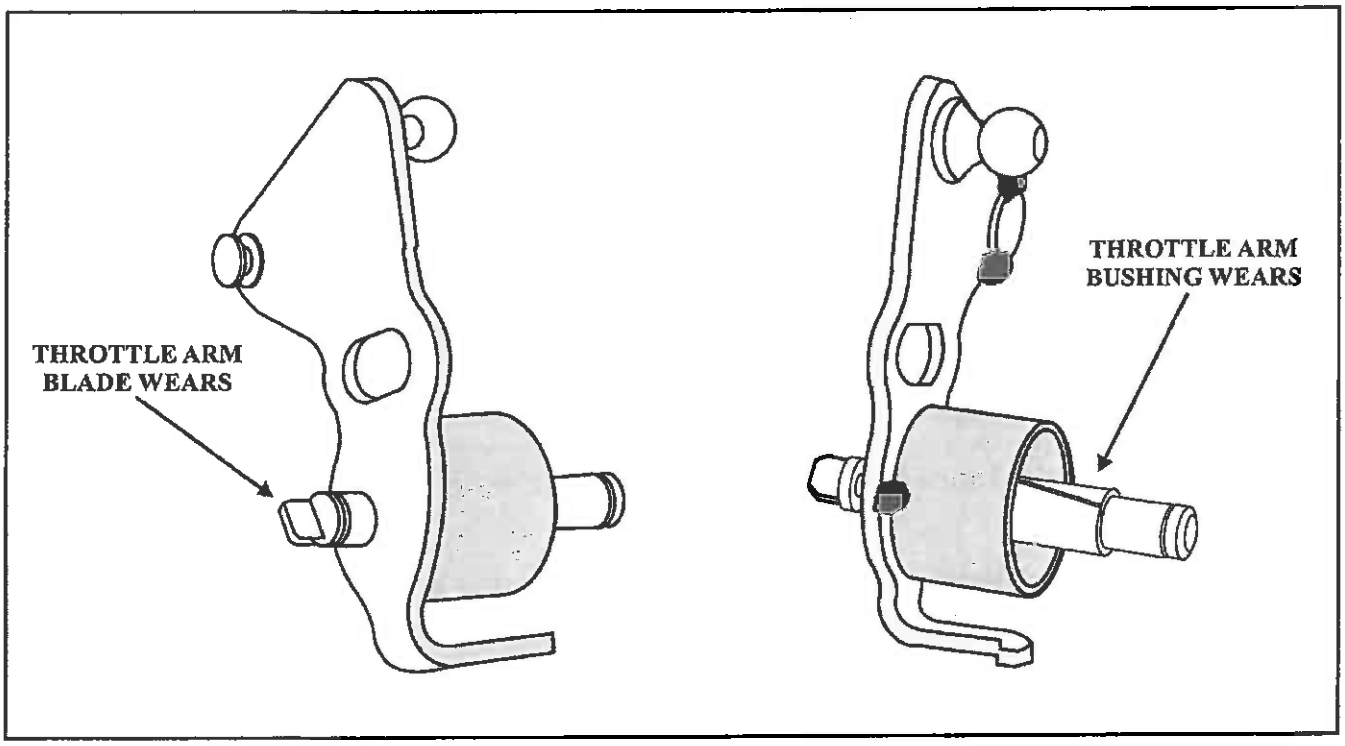



Figure 1

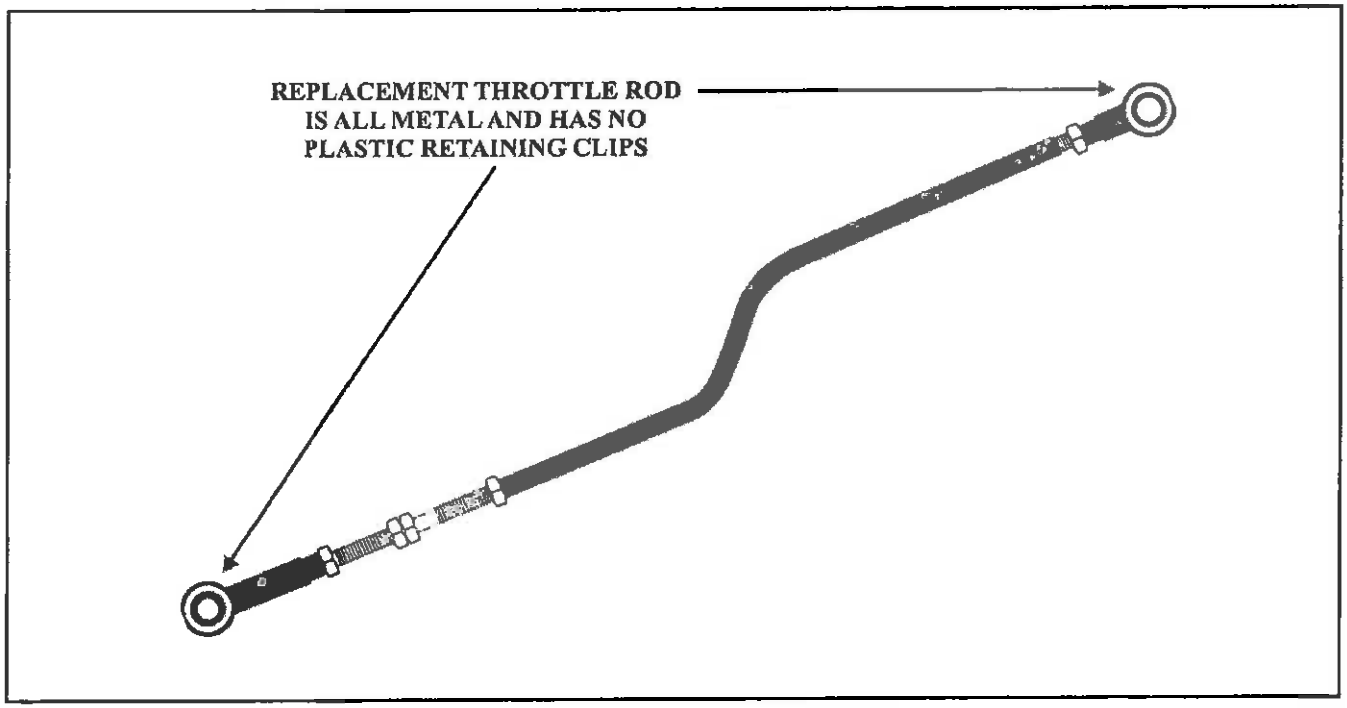



Figure 2

# DODGE TRUCKS
# WITH GAS ENGINES & RE TRANSMISSIONS

## 3-4 SHIFT & TCC SHUTTLE

**COMPLAINT:** After overhaul, during the road test, between 34 and 43 mph (55 and 70 kph), the vehicle exhibited a 3-4, 4-3 shift shuttle. When the vehicle was driven between 43 and 56 mph (70 and 90 kph), TCC cycled in and out. *The computer signals for the 3-4 shift and TCC apply commanded what the transmission was doing, yet, loop status always remained closed throughout the cycling.* When the truck was driven at various speeds above 62 mph (100 kph), the vehicle would experience an occasional "fish bite" effect.

**CAUSE:** This 1999 Dodge 4x4 with 5.2L engine and 46RE transmission had 126,923 miles (204,264 kilometers) on the odometer. Worn spark plugs (See Figure 1)were the cause of the above mentioned complaints.

**CORRECTION:** A new set of Mopar spark plugs and an extensive test drive indicated that the problem was gone.

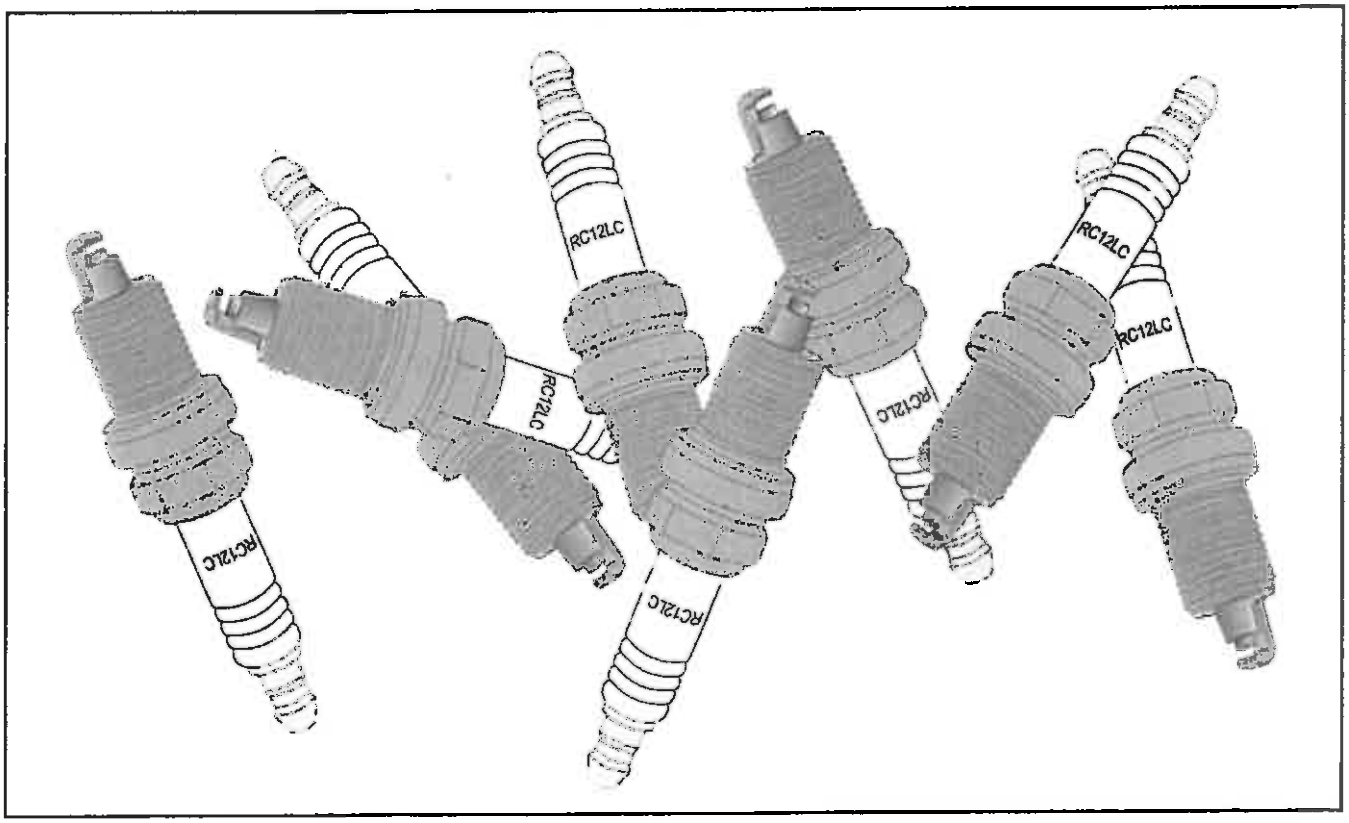



Figure 1

# 45RFE & AW4
## NO SHIFT QUICK SHIFT

**COMPLAINT:** A no shift or a quick shift occurs after changing the TPS.

**CAUSE:** Mid 1999 and Later 4.7 liter Jeep Grand Cherokees had a design change to the TPS where idle voltage is at approximately 4.5 volts and wide open throttle voltage at approximately 0.5 volts (See Figure 1). This is opposite to the typical 0.5 volt to wide open throttle 4.5 volt Dodge/Jeep TPS (See Figure 1). If these TPS's are installed incorrectly, there will either be a no up shift condition or a stacked up shift condition. Although these TPS's have a significant difference in design, they both have the same style connector allowing the installation.

**CORRECTION:** Install the correct TPS.

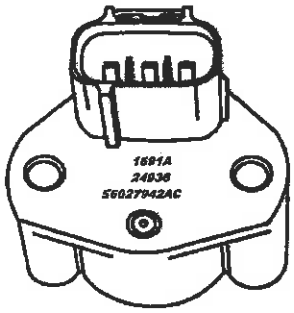
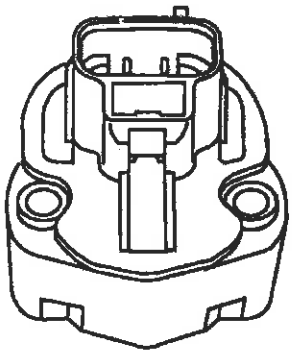
| **Previous style TPS**<br>**Idle Throttle Voltage Low**<br>**Open Throttle Voltage High** | **Late style TPS**<br>**Idle Throttle Voltage High**<br>**Open Throttle Voltage Low** |
|---|---|
|  |  |
| **04874371AC** | **05017479AA** |

Figure 1

# JEEP WITH 2.5 OR 4.0 LITER ENGINES & AW4 TRANSMISSION

## TPS CODE P0123 WILL NOT CLEAR

**COMPLAINT:** A late model Jeep with a 2.5 or 4.0 liter engine and the AW4 transmission comes in with the "MIL" Lamp illuminated and a complaint of late shifts. A scan reveals a code P0123, "TPS Voltage High", is stored. The scan tools data list indicates that the TPS signal wire voltage is at 5.0 volts at closed throttle, and then ranges up to 11.5 volts. A backup check of the TPS signal wire (usually is an Orange/Dk Blue wire), shows 5.7 volts at closed throttle, with a similar rise in voltage as the throttle is opened. A check of the TPS 5 volt supply and ground circuit prove that both of these circuits are good.
A check of the TPS signal wire with the TPS disconnected shows the same 5.7 volts. The technician now begins an inspection of the wiring between the TPS and the PCM and TCM to no avail.
A replacement TPS does not cure the problem, neither does replacement of the PCM or TCM.

**CAUSE:** The Switch Sense circuit in the Clockspring in the steering wheel hub has shorted to battery voltage from the horn button circuit. When the Switch Sense Circuit shorts to the 12 volt HORN circuit the TPS signal voltage is driven high and remains there as shown in Figure 1. This is because the 5 volt reference voltage used by the Cruise "Switch Sense" circuit and the TPS are shared inside the PCM.

**CORRECTION:** Replace the Clockspring assembly. Once the Clockspring has been replaced, be sure to check the sensor 5volt reference voltage at the PCM to insure that circuit has not been damaged by the short to power. Also check the TPS signal range to insure the TPS has not been fried.

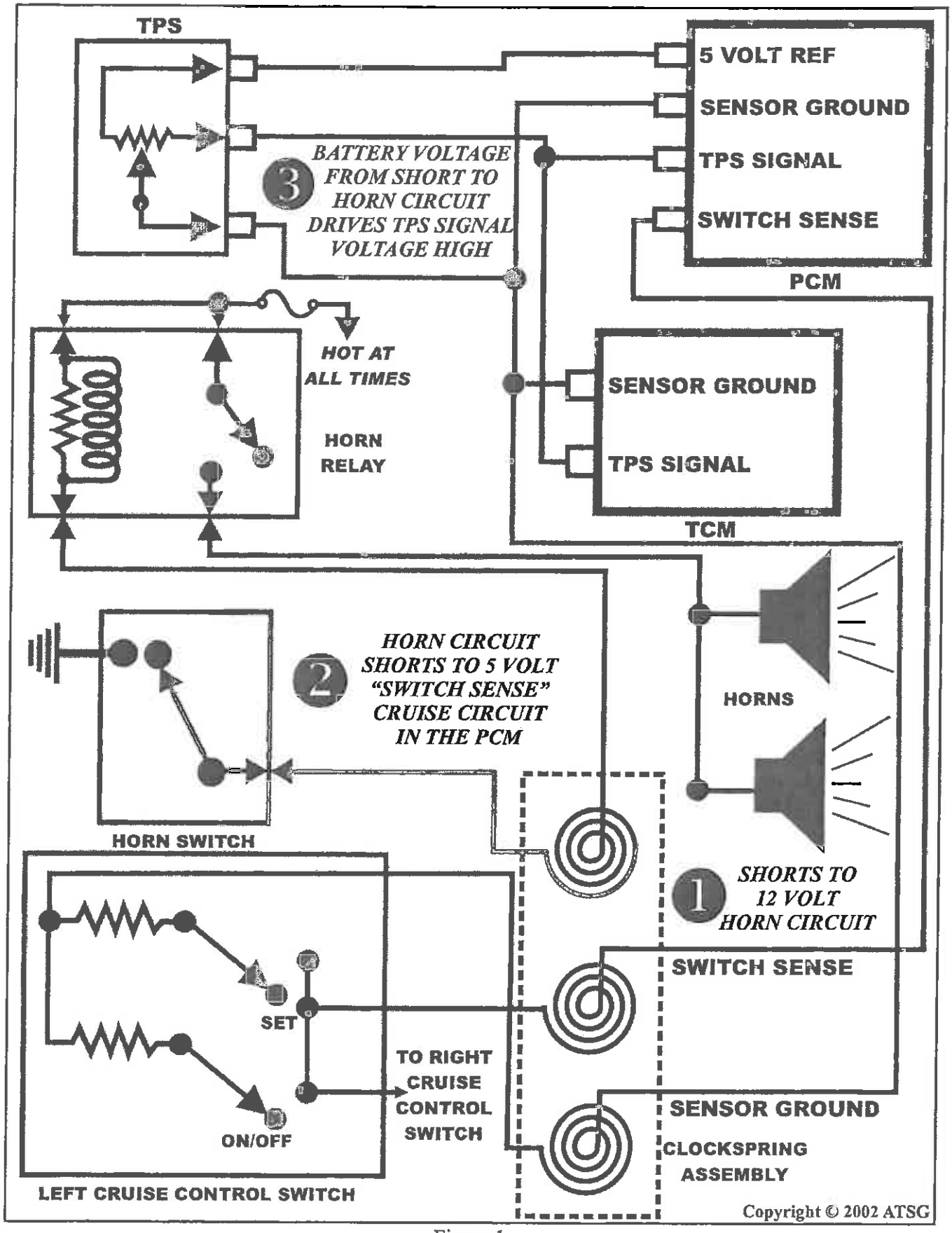

TPS
5 VOLT REF
SENSOR GROUND
TPS SIGNAL
SWITCH SENSE
PCM
3
BATTERY VOLTAGE FROM SHORT TO HORN CIRCUIT DRIVES TPS SIGNAL VOLTAGE HIGH
HOT AT ALL TIMES
HORN RELAY
SENSOR GROUND
TPS SIGNAL
TCM
HORNS
2
HORN CIRCUIT SHORTS TO 5 VOLT "SWITCH SENSE" CRUISE CIRCUIT IN THE PCM
HORN SWITCH
1
SHORTS TO 12 VOLT HORN CIRCUIT
SWITCH SENSE
SET
TO RIGHT CRUISE CONTROL SWITCH
ON/OFF
SENSOR GROUND
CLOCKSPRING ASSEMBLY
LEFT CRUISE CONTROL SWITCH
Copyright © 2002 ATSG

Figure 1

# DODGE TRUCKS & JEEP VEHICLES WITH RE UNITS

## HARD START/NO RUN

**COMPLAINT:** The vehicle is making third gear starts, a check of governor pressure reveals that governor pressure is at maximum. This problem may also be accompanied by a dead battery, charging system problems and possibly codes indicating a problem with the evap system. The scan tool may not communicate with various modules and the vehicle may or may not start. If communication is possible, no codes are stored.

**CAUSE:** The result of all these complaints is what A.T.S.G. will identify as an Engine Running Bus System, loss of power. Power for the "ERB" is provided by the PCM at terminal 25 of the C3 (Black) connector, (Refer to Figure 1) ***but only when the engine is running.***
This is usually labeled "Generator Source" in most wiring diagrams because it actually is the source voltage for the generator's field winding. The "ERB" also supplies power to the Leak Detection Pump and to the Transmission Control Relay.
The ground circuits for the generator as well as the leak detection pump are controlled by the PCM at PCM terminals 10 in the C2 (White) and terminal 10 in the C3 (Black) connector respectively.
The Transmission Control Relay's PCM ground controlled circuit is PCM terminal 30 in the C2 (White) connector. This is the circuit that is shut down by the PCM when the transmission control system is in default, such as when a transmission related code is stored. ***The real cause of all these complaints is a faulty Crankshaft Position Sensor!***

**CORRECTION:** It seems that Chrysler/Jeep Computer strategy dictates that when the crank sensor signal is corrupt the PCM "Engine Running Bus" will not power up.
Disconnect the crank sensor and see if these circuits power up, it they do, the crank sensor is faulty.
This sensor is a Hall Effect Sensor and when it shorts its 5 volt reference source it will cause the above mentioned complaints. It may even "pull down" the 5 volt reference voltage supply to the Governor Pressure Sensor or other sensors using the reference voltage supply as well.

**NOTE:** In all wiring diagrams that were used for the information contained here within, the generator field winding is incorrectly identified. The positive and negative terminals are labeled backwards. Generator terminal 2, which leads to the generator source pin at the PCM is the positive terminal. Generator terminal 1, which leads to the generator field driver terminal at the PCM is the negative terminal as illustrated in Figure 1.

## STUCK IN THIRD GEAR

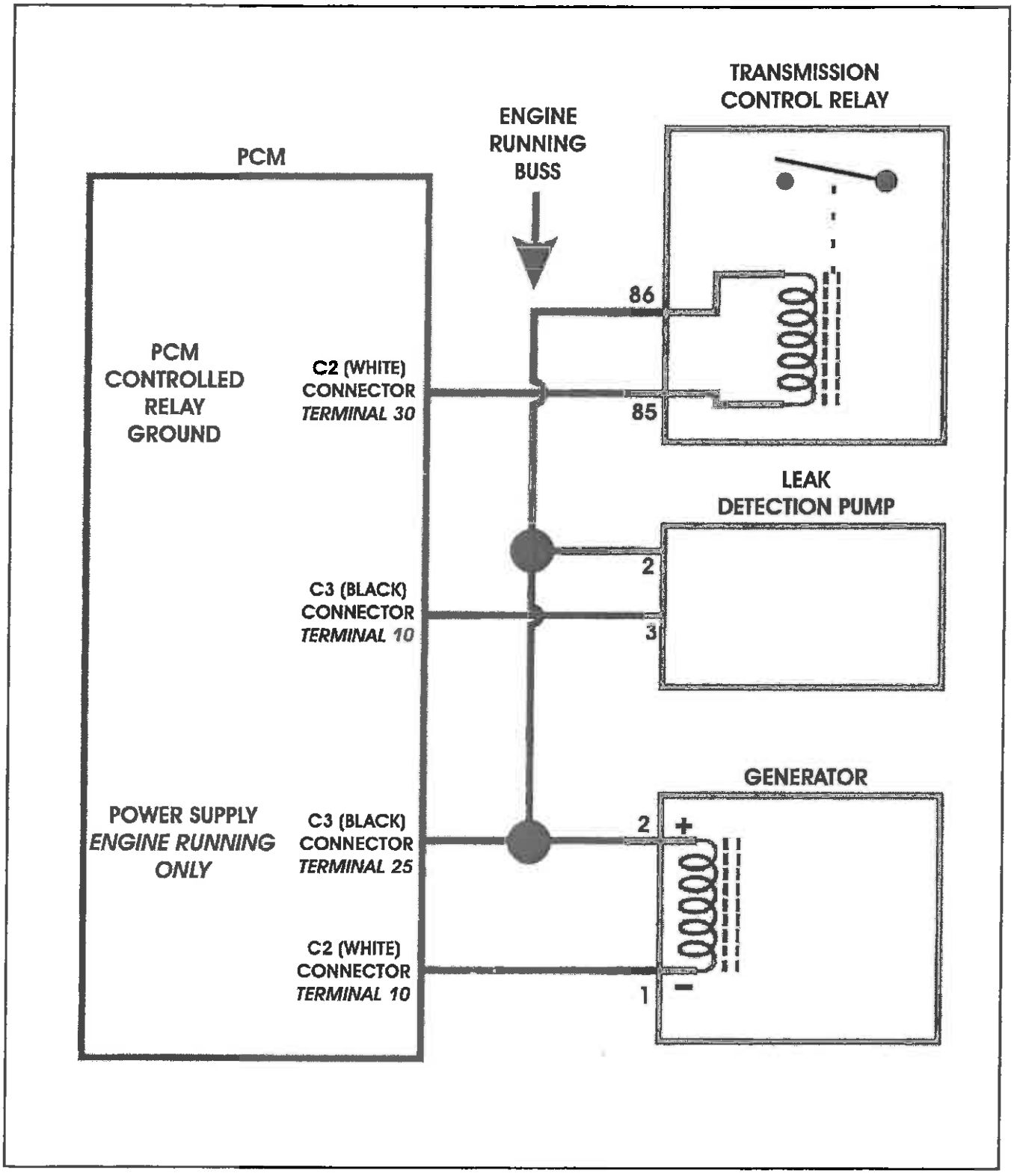



Figure 1

# 1991-99 JEEP WITH GAS ENGINES

## DOUBLE BUMP SHIFT

**COMPLAINT:** The vehicle exhibits what feels like a "double bump" when the transmission upshifts accompanied by an engine miss. There are NO engine or transmission codes stored. In many instances the transmission is overhauled, only to have the same complaint.

**CAUSE:** The cause is a faulty Camshaft Position (CMP) Sensor which is not bad enough to store a code, but produces the "double bump" shift feel and the engine miss.
The CMP Sensor is a Hall Effect Sensor that is located inside the distributor as illustrated in figure 1.

**CORRECTION:** First connect a voltmeter to Terminal 2 of the distributor connector (Refer to Figure 2) and to a ***GOOD KNOWN ground***, it should have .3 volts or less. This is the CMP Sensor ground.

Next, connect the voltmeter to terminal 3 and 2 of the distributor connector as shown in figure 2, it should have 8 volts up to the 1995 model year or 5 volts for 1996 and later models. This is the supply voltage for the CMP Sensor.

Finally, connect a scope or waveform viewer to distributor connector terminals 1 and 2, this will be the CMP Sensor signal and inspect the waveform patterns produced.

The sensor creates a 0 to 5 volt toggled signal. Being a Hall Effect type sensor it also requires a voltage supply and ground and the signal format is a digital square wave type.

The CMP Sensor operation is unique because it produces a **LOW** toggle signal during one revolution of the crankshaft and a **HIGH** toggle signal for the next complete revolution of the crankshaft.

# 1991-99 JEEP WITH GAS ENGINES

## DOUBLE BUMP SHIFT

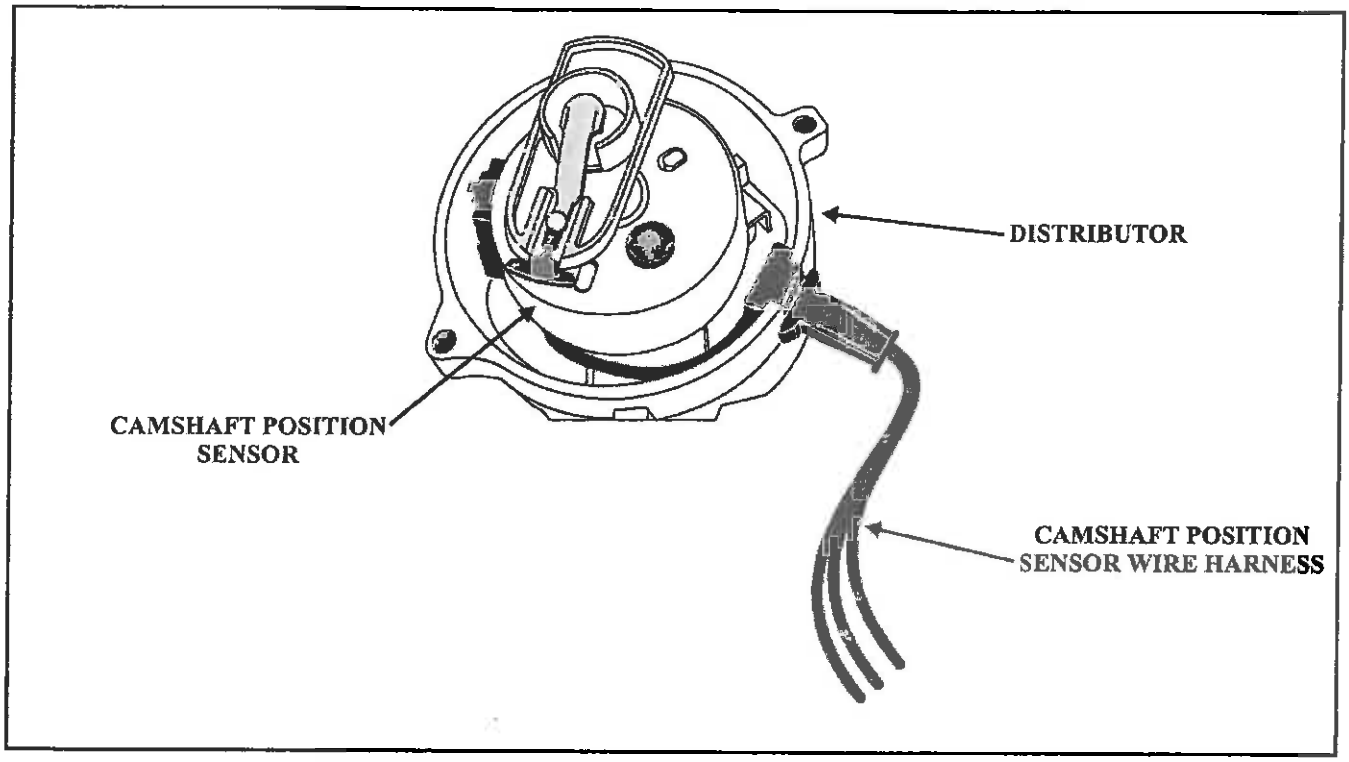



Figure 1

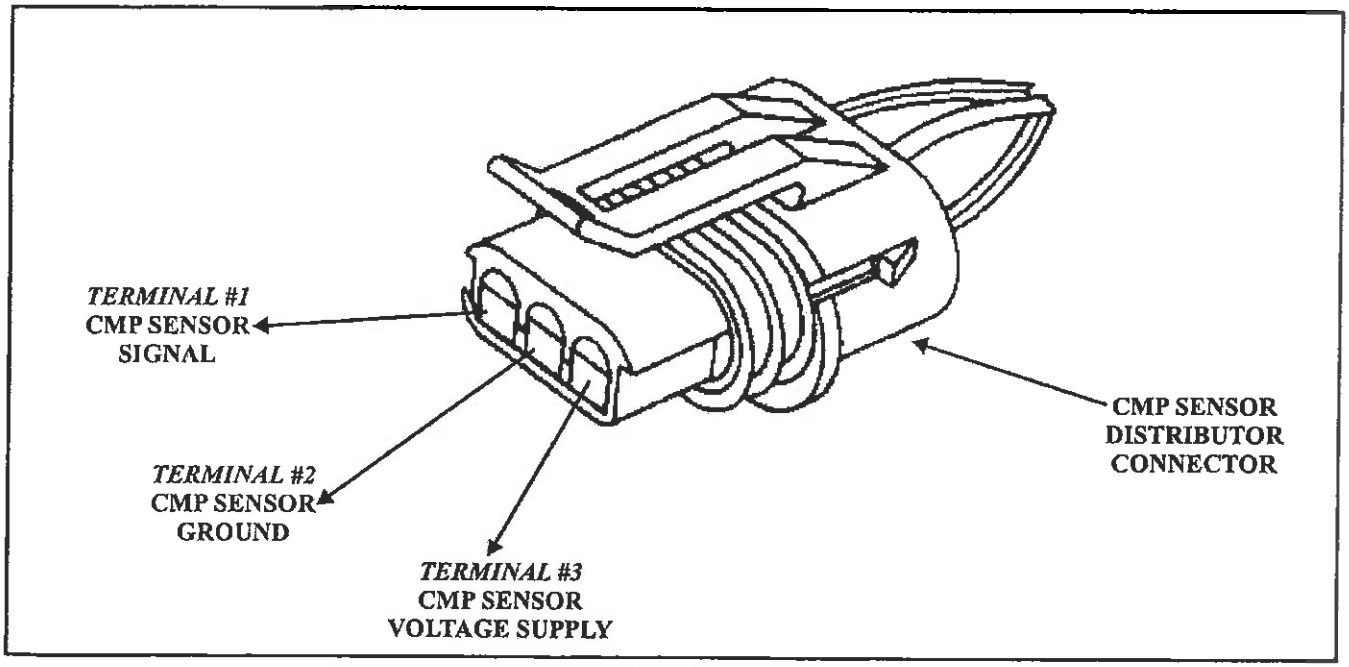



Figure 2

# 1996 AND NEWER DODGE & JEEP VEHICLES
## PCM CONNECTOR REPAIR KIT

**COMPLAINT:** Deteriorated PCM connectors causing a variety of Diagnostic Trouble Codes.

**CAUSE:** The PCM on 1996 and later vehicles is located in the engine compartment (See Figure 1). This location allows connectors A, B and C (See Figure 2) and their associated wiring plugging into the PCM to be subjected to engine compartment heat for sustained periods of time. This heat combined with weathering contributes to the deterioration of the connector.

**CORRECTION:** Chrysler/Dodge/Plymouth has made available PCM connector repair kits under the following part numbers:

Connector A (32 terminal Black C-1 connector).....56017957
Connector B (32 terminal White C-2 connector).....56018614
Connector C (32 terminal Grey C-3 connector).....56018615
20 wires with terminals on both ends and 40 pieces of heat shrink tubing.....04882087
Connector Cover.....56018606
Connector Plug.....56038347

**SERVICE PROCEDURE:**

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

# 1996 AND NEWER DODGE & JEEP VEHICLES

## PCM CONNECTOR REPAIR KIT

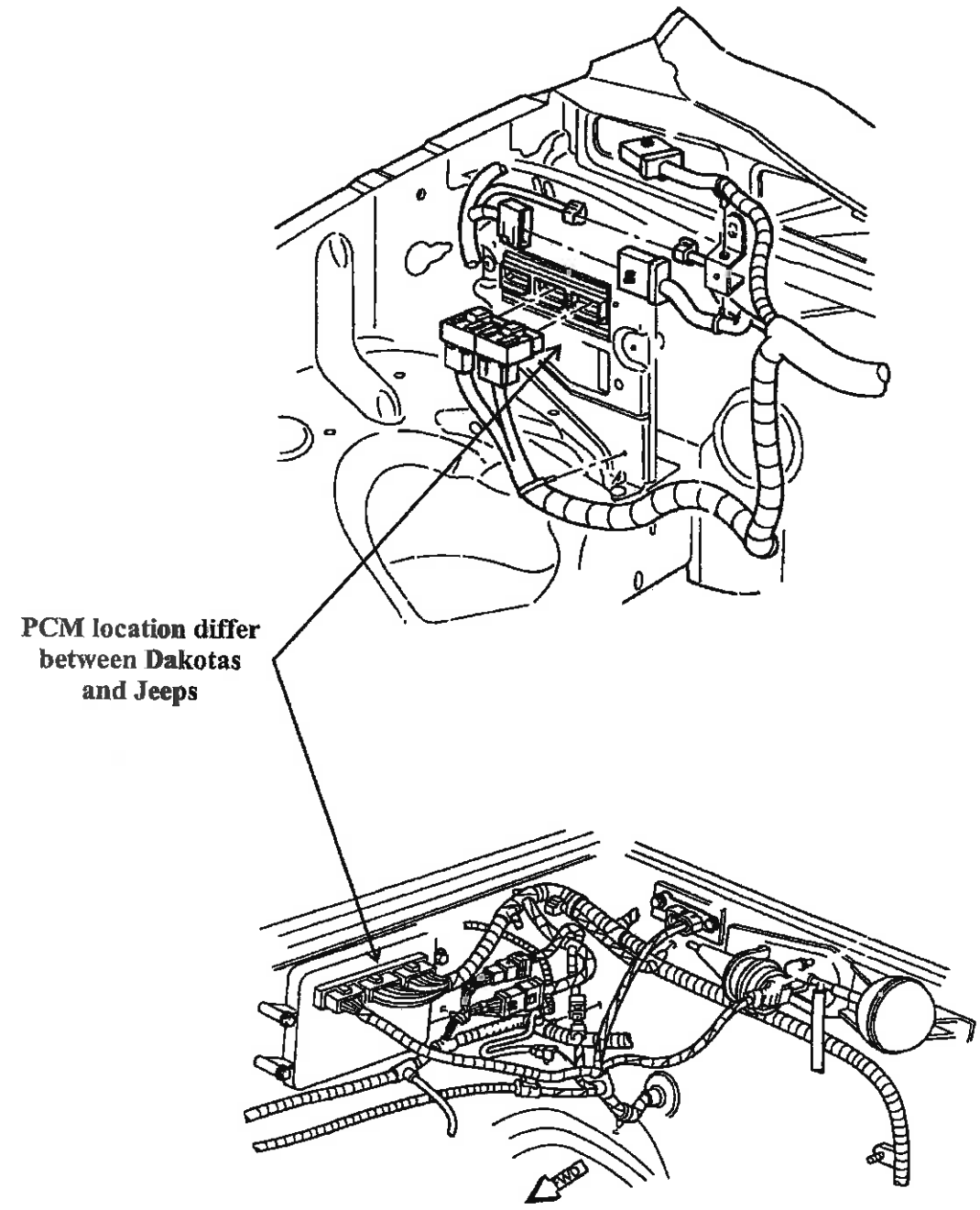



Figure 1

# 1996 AND NEWER DODGE & JEEP VEHICLES
## PCM CONNECTOR REPAIR KIT

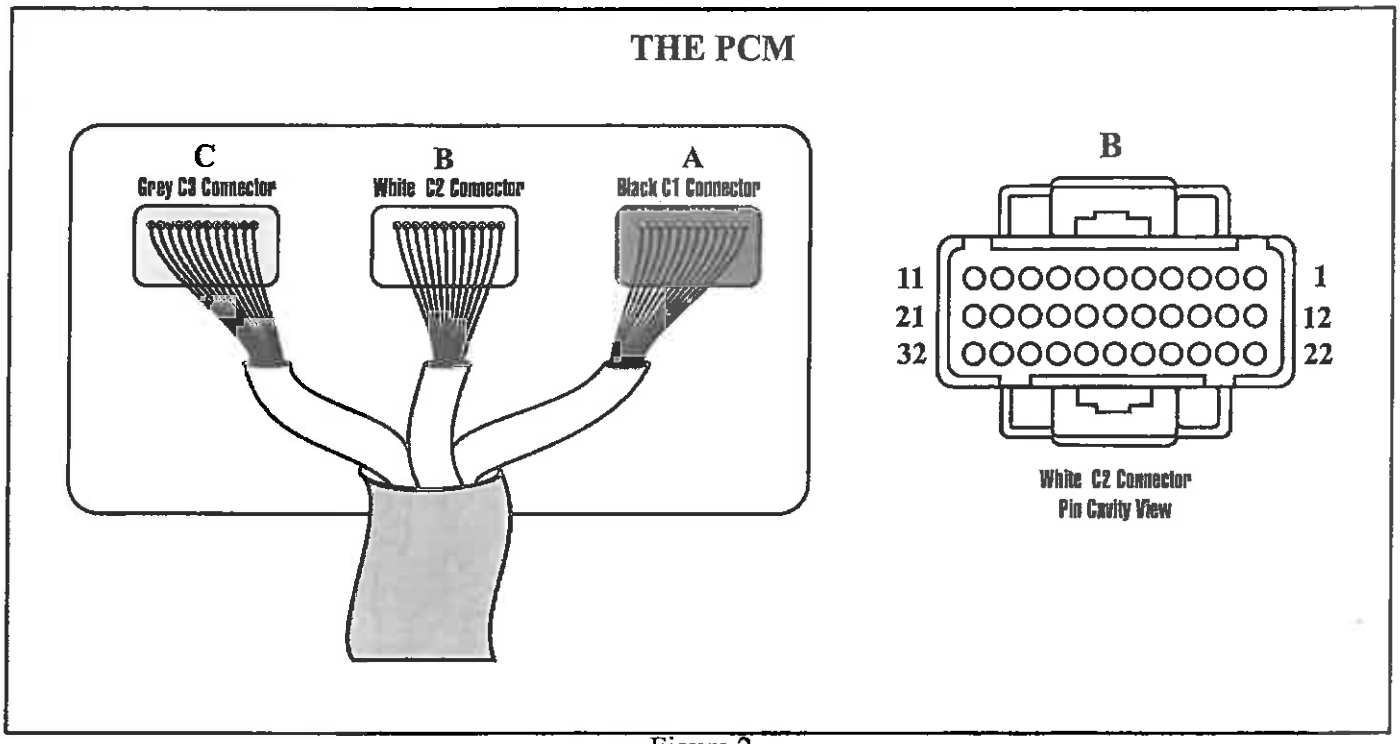



Figure 2

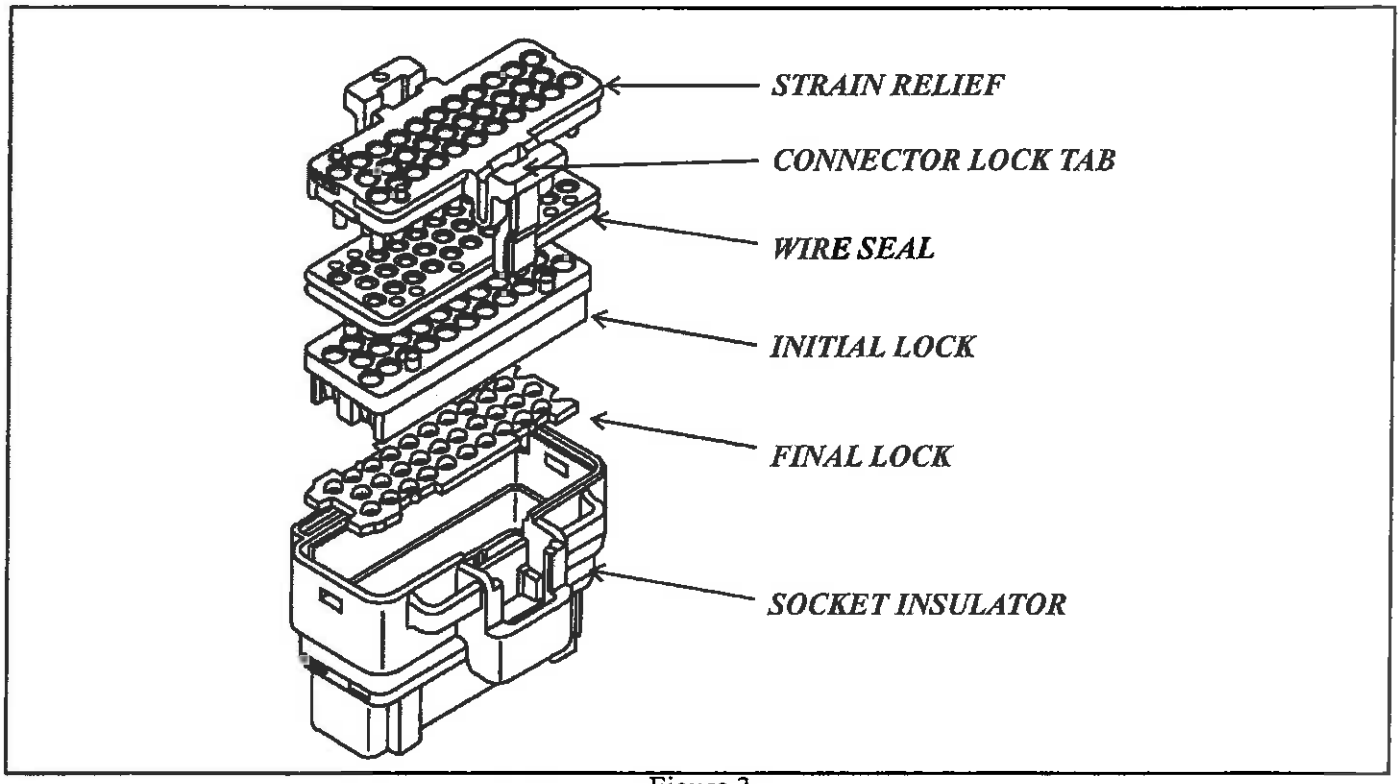



Figure 3

# 1996 AND NEWER DODGE & JEEP VEHICLES

## PCM CONNECTOR REPAIR KIT

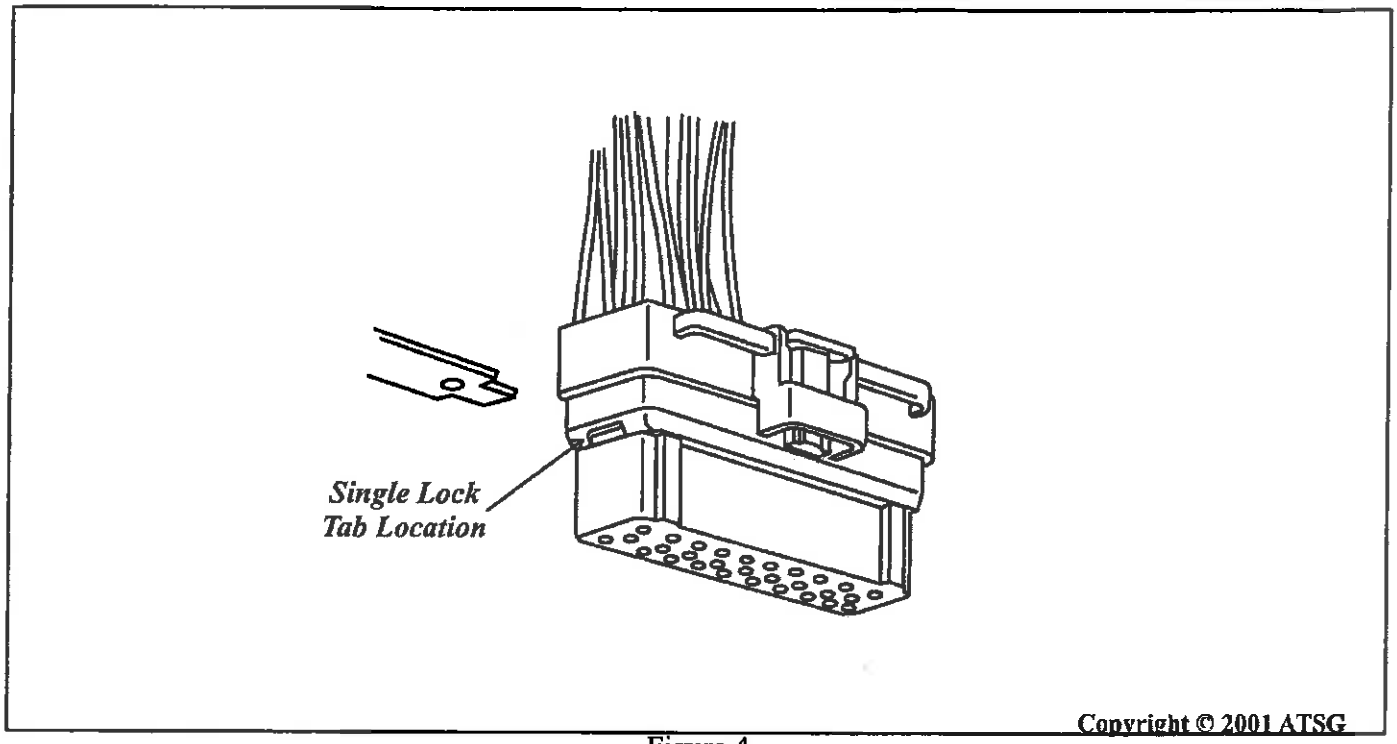





Figure 4

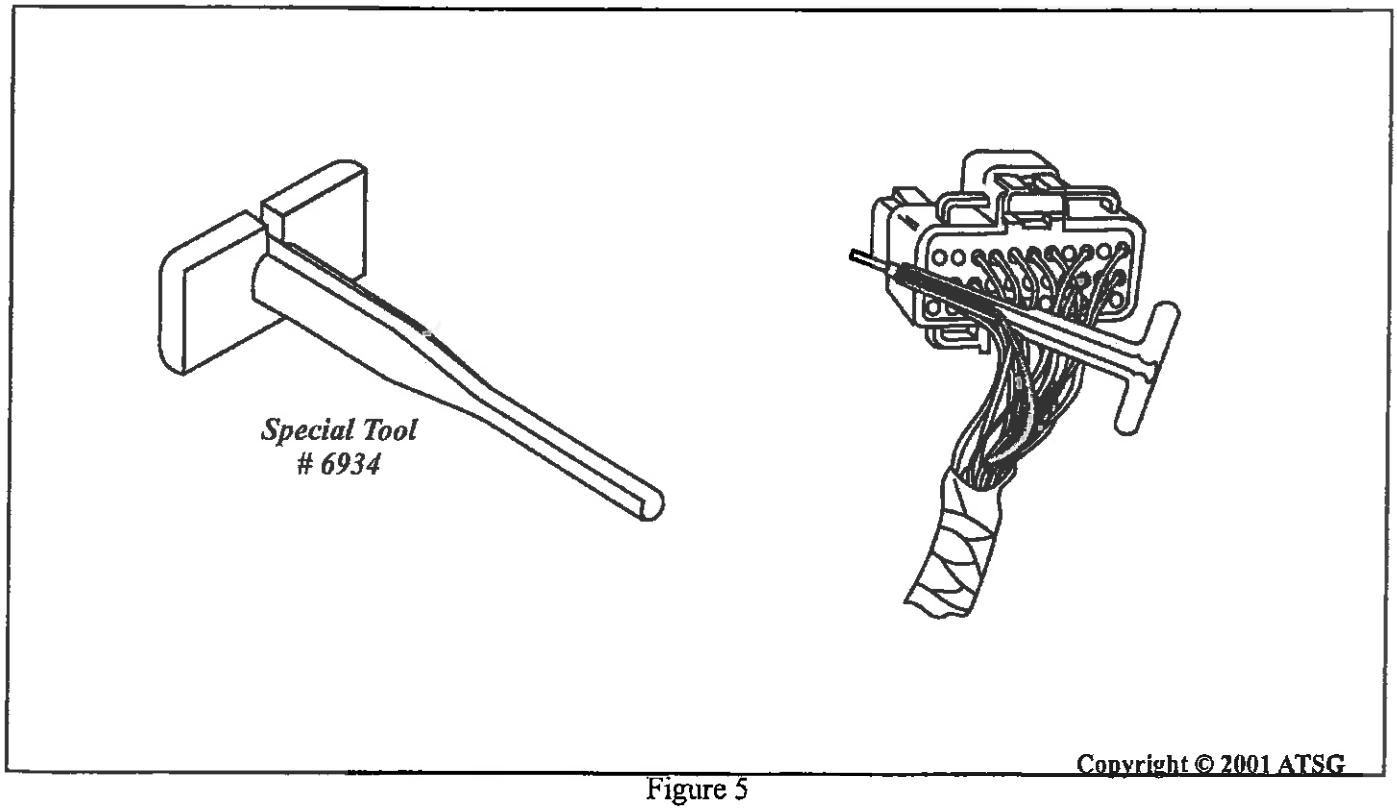





Figure 5

# 1996 AND NEWER DODGE & JEEP VEHICLES

## PCM CONNECTOR REPAIR KIT

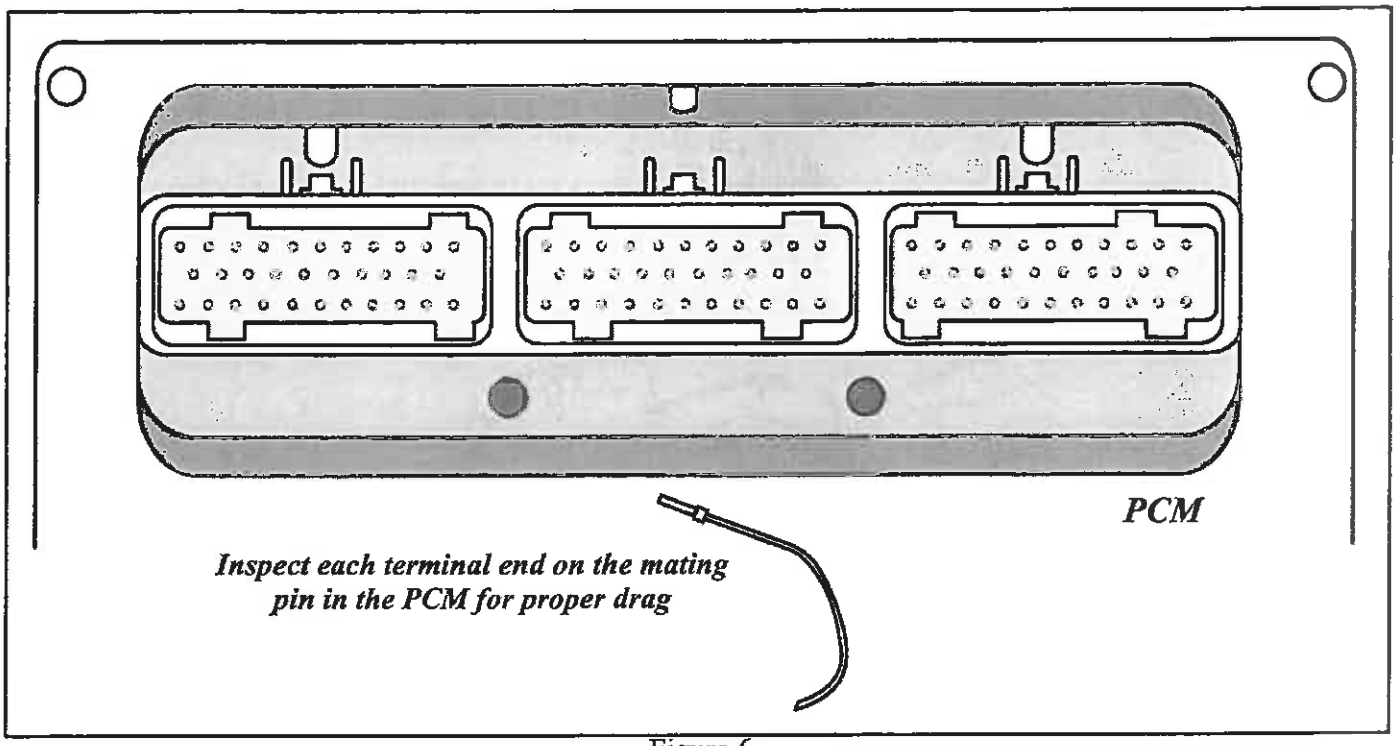



Figure 6

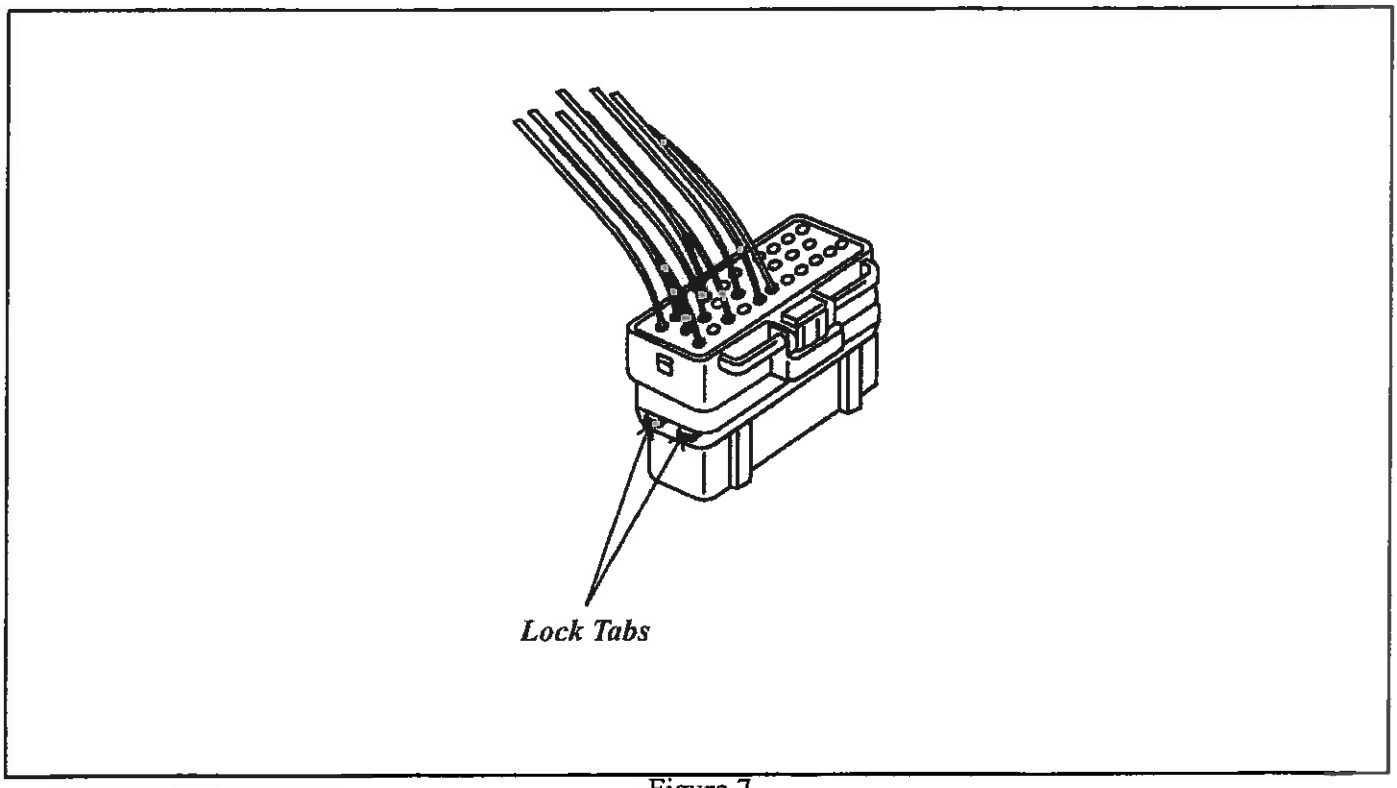



Figure 7

# CHRYSLER OR JEEP 42RE-46RE
## STALLING IN REVERSE AND/OR PLANETARY FAILURE

**COMPLAINT:** Before or after overhaul, Chrysler or Jeep vehicles, equipped with the 42RE-46RE transmissions, may exhibit a stalling condition in Reverse or repeated planetary failure.

**CAUSE:** The cause may be, a restricted Auxillary Transmission Cooler. ***NOTE:*** During the "flushing" process, this may be overlooked because of a "Bypass" tube , as shown in Figure 1, that connects the two cooler lines together, mis-leading the technician into thinking that the Auxillary Transmission Cooler is clear. The Auxillary Transmission Cooler can not be flushed very easily because of its fin type construction, as shown in Figure 2 ***(Note: the Auxillary Cooler has a thermal bypass that does not open until the fluid or cleaning solvent is at temperatures around 160° F)***. This can also cause valves to hang as well as continual clogging of the Governor Solenoid Screen.

**CORRECTION:** Replace the Auxillary Transmission Cooler as needed.

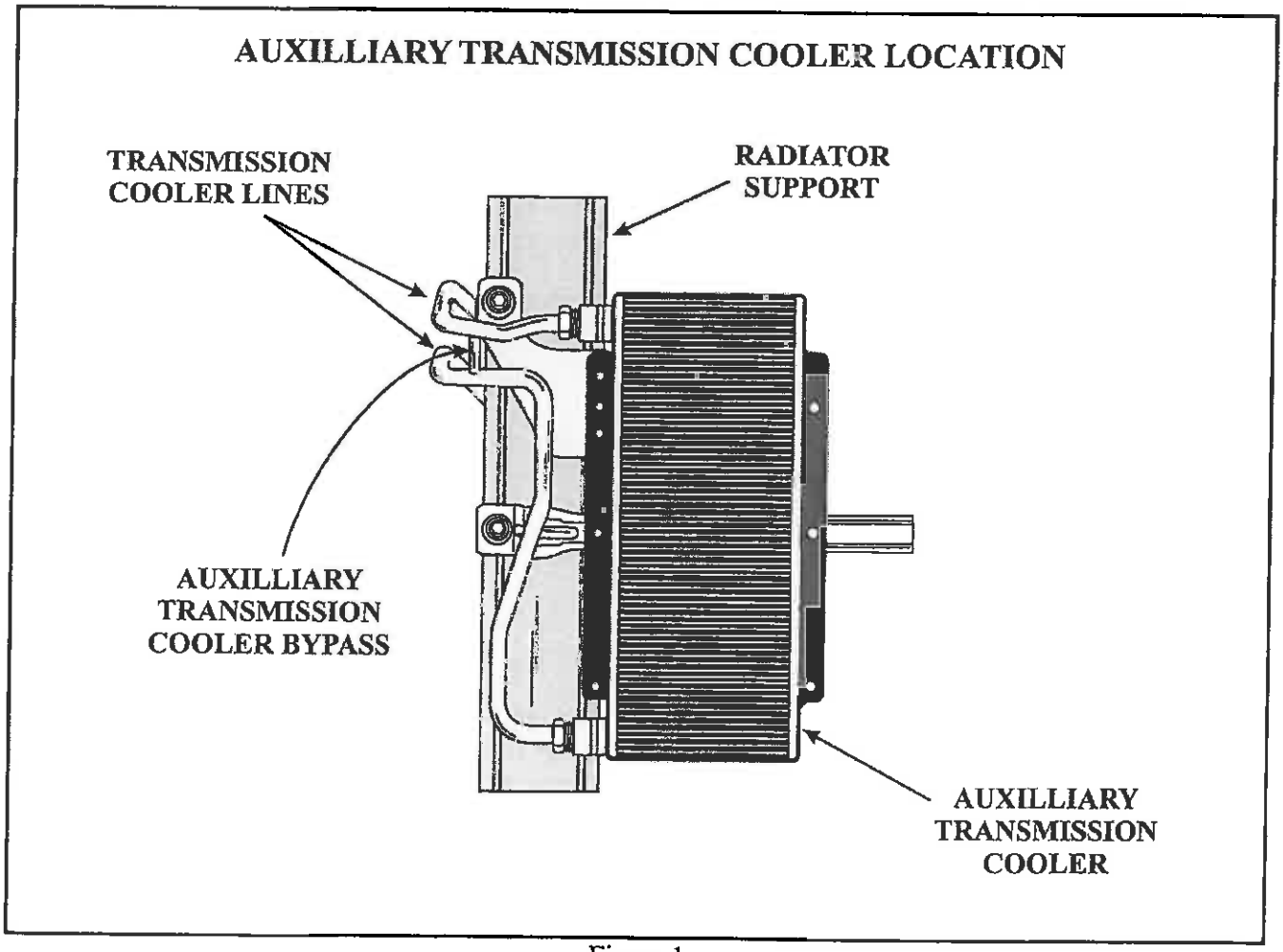
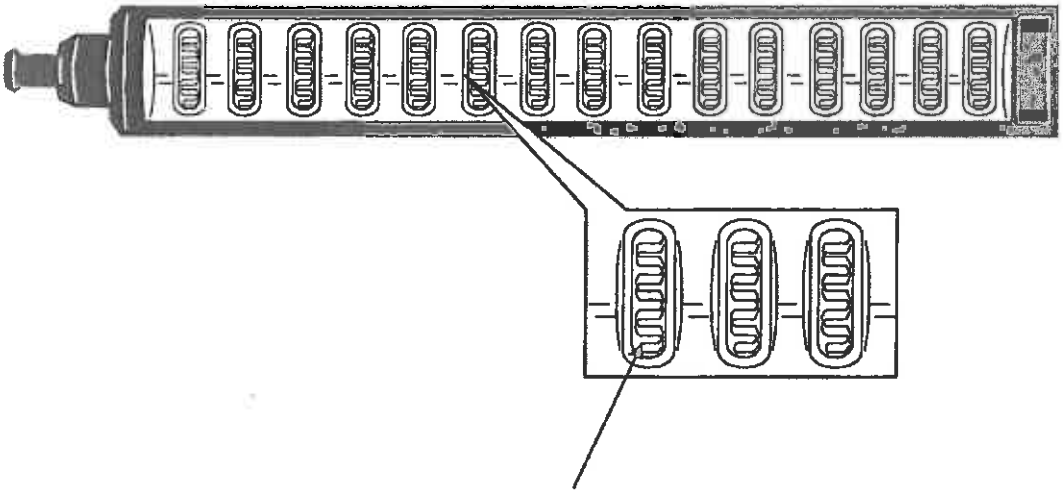



Figure 1

## AUXILLIARY TRANSMISSION COOLER CUT-AWAY



*THE AUXILLARY TRANSMISSION COOLER HAS A FIN TYPE CONSTRUCTION WHICH MAKES COOLER FLUSHING ALMOST IMPOSSIBLE*



Figure 2

# CHRYSLER RWD TRANSMISSIONS

## QUICK DISCONNECT 1/2" COOLING LINES

**COMPLAINT:** Chrysler rear wheel drive transmissions with quick disconnect 1/2" cooling lines may experience repeated front line clip melt down failures.

**CAUSE:** RWD transmissions behind diesel engines are the most common to experience this complaint after heavy trailer towing or reverse to drive rocking situations. This causes the front cooling line (which is the line out to the cooler) to be the recipient of the high fluid temperatures produced by the converter. The front quick disconnect clip assembly suffers greatly under these conditions.

**CORRECTION:** Replace the transmission quick disconnect fittings with threaded fittings that will not melt. This will require 2 cooling lines with the appropriate attaching fittings, 2 case fittings to accommodate the case threads and line fittings plus, approximately 2 feet of flexible hydraulic lines to attach the new lines to the existing lines.

**SERVICE INFORMATION:**

**Fittings:**
**(2 Case Fittings).....52028764AA**

**Cooling Lines:**
**(1 Front Line*).....5011244AA**
**(1 Rear Line).....52028673**

*** This front cooling line part number includes the one/way check valve and temperature sensor port.**

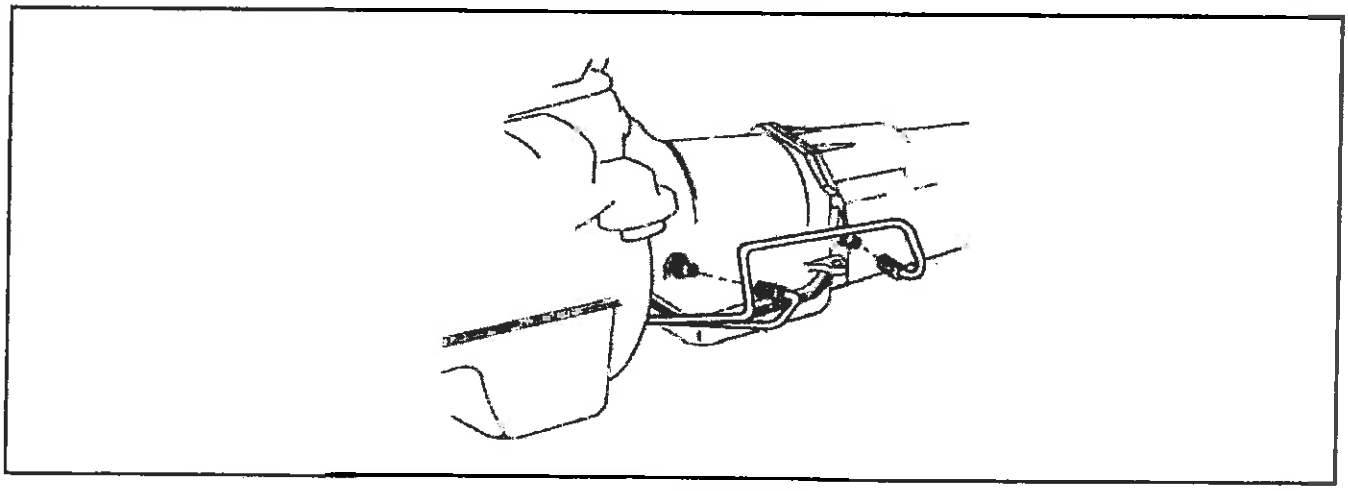


Figure 1

# DODGE/JEEP 42-44 RE UNITS

## REVISED FRONT BAND ADJUSTMENT SPECIFICATIONS

**CHANGE:** The front band adjustment specification has been changed from 3 5/8 " to 3 turns after tightening the band adjustment stud to 70 in. lbs. (Refer to Figure 1)

**REASON:** Improved 1-2 shift quality.

**SERVICE INFORMATION:**

***Factory Service Bulletin*.....*21-16-98***

***NOTE: This adjustment pertains to band adjustment studs with SAE (Fine) thread.***

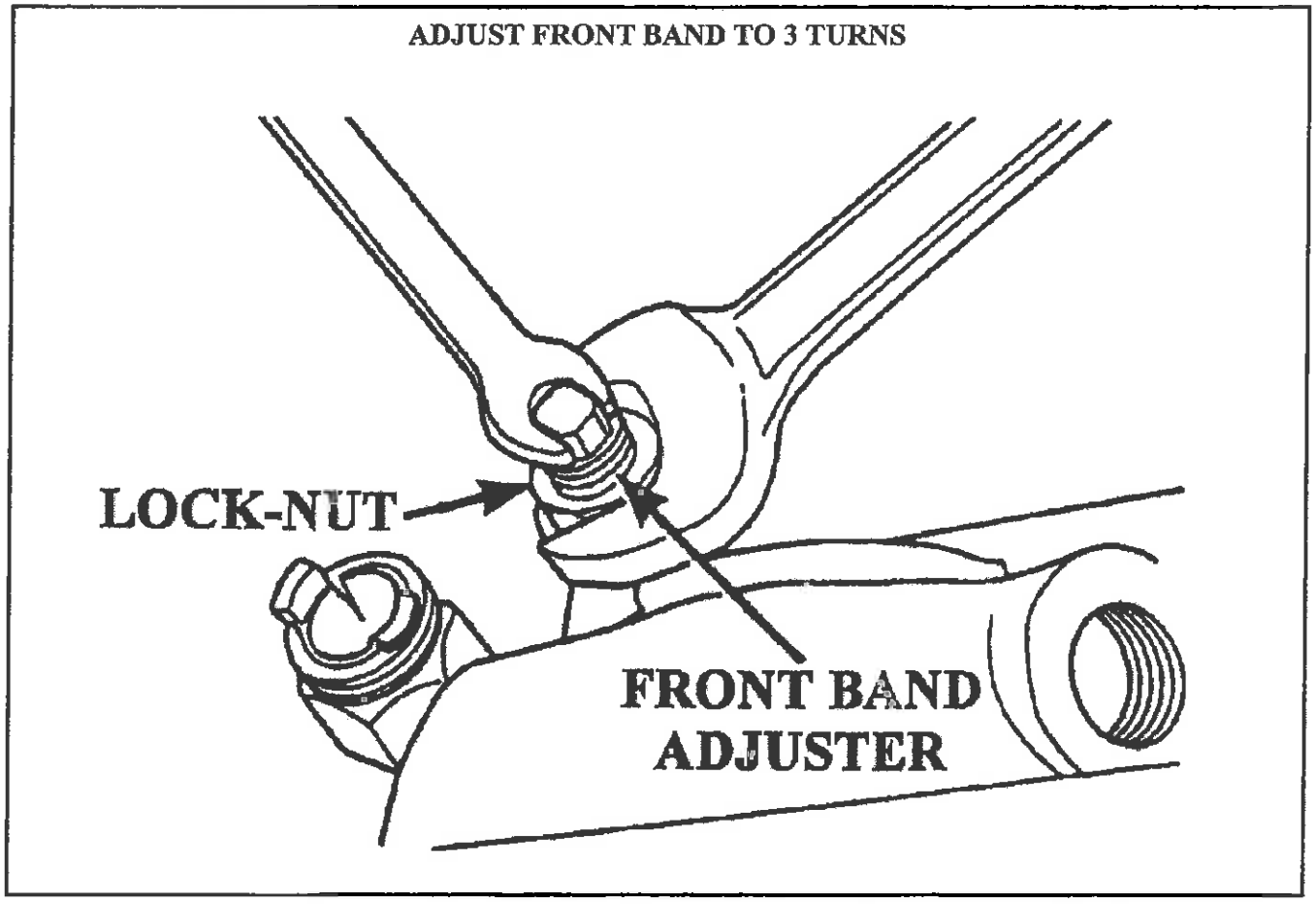



Figure 1

# CHRYSLER 42RE/46RE
## HARSH REVERSE ENGAGEMENT

**COMPLAINT:** Some 1999-2000 vehicles equipped with the 42RE/46RE may exhibit a harsh engagement in reverse.

**CAUSE:** One cause may be, that the number 9 checkball has distorted the separator plate and can no longer seat correctly, allowing excessive apply pressure into the reverse servo apply passage.

**CORRECTION:** On both 42RE and 46RE the steel number 9 checkball should be replaced with a torlon checkball. (See figure 1) Replace the separator plate on the 42RE (See Figure 2) and the 46RE (See Figure 3). Chrysler has issued a bulletin (21-01-00) for 1999-2000 vehicles equipped with either a 42RE or a 46RE with this complaint.

**SERVICE INFORMATION:**

| | |
|---|---|
| TORLON CHECKBALL | 52118261 |
| 42RE SEPARATOR PLATE | 52118272 |
| 46RE SEPARATOR PLATE | 4617196AB |

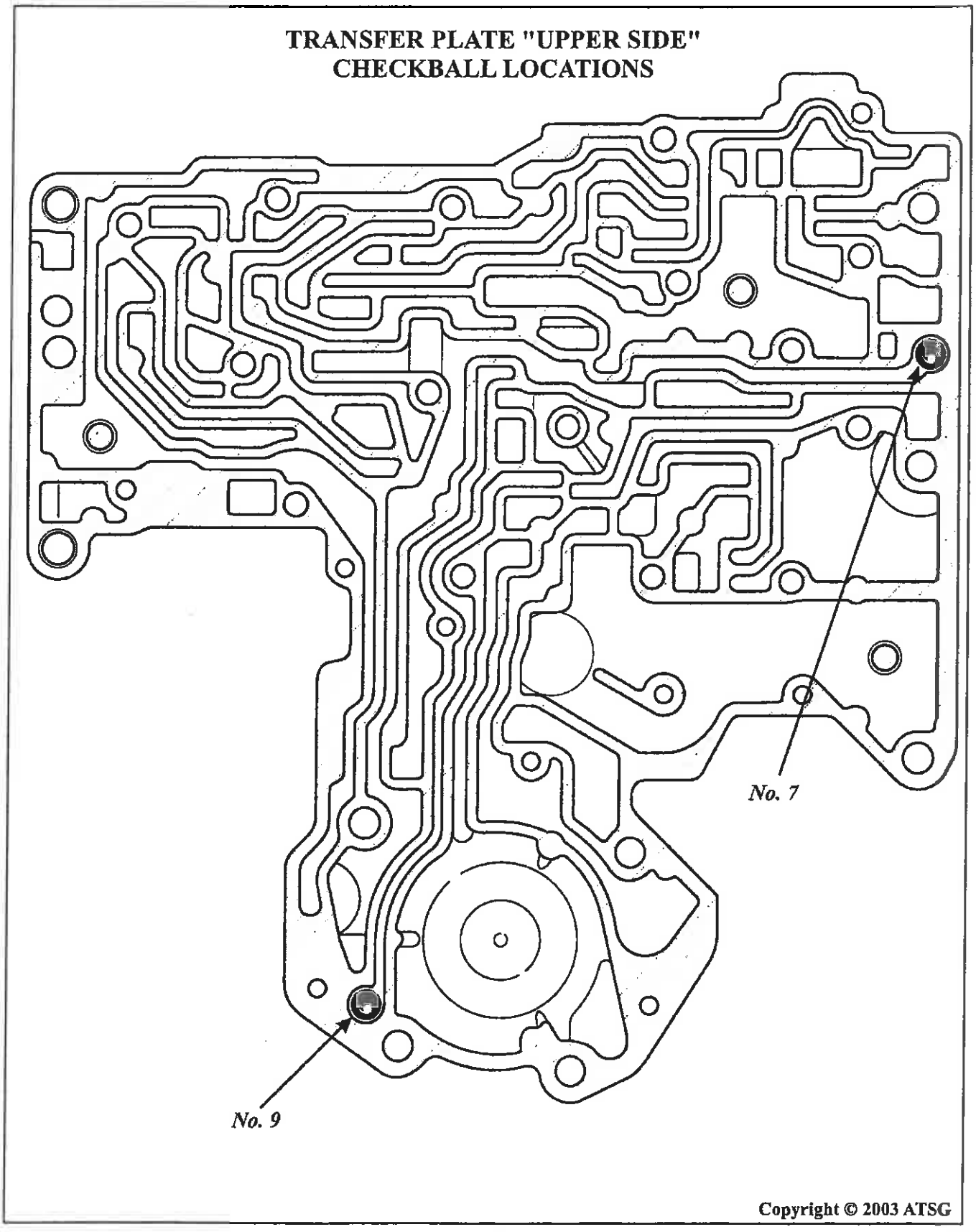

TRANSFER PLATE "UPPER SIDE"
CHECKBALL LOCATIONS
No. 7
No. 9
Copyright © 2003 ATSG

Figure 1

**42RE SPACER PLATE**

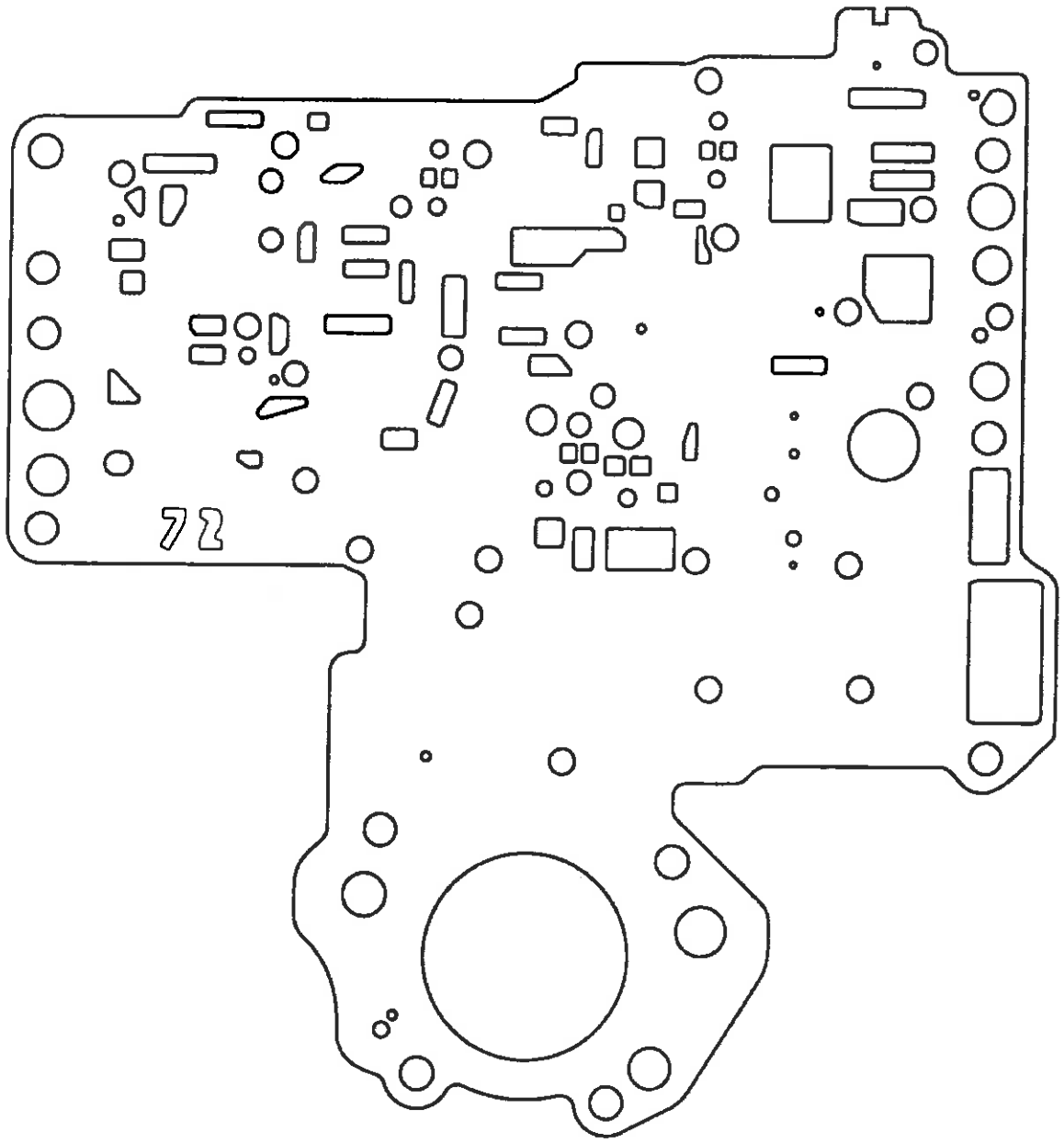




Figure 2

**46RE SPACER PLATE**

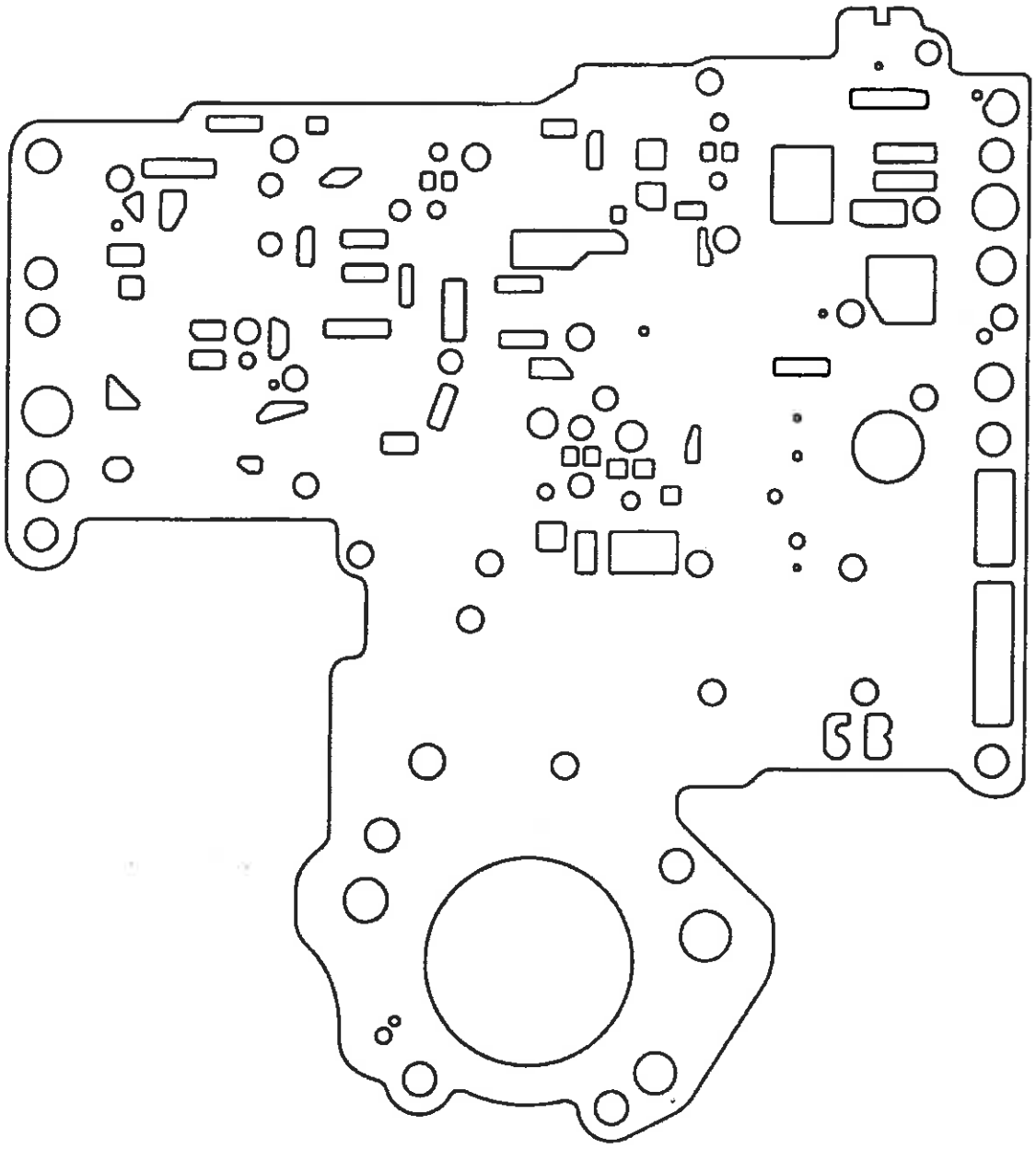




Figure 3

# ALL DODGE RE & RH UNITS
## PREMATURE FAILURE OF THE L/R BAND

**COMPLAINT:** Some RE and RH transmissions (The 500/518/618 transmissions with or without a governor pressure solenoid) may experience a premature low reverse band burn out immediately after overhaul.

**CAUSE:** One such cause may be a cross leak between spacer plate and channel plate near the # 3 check ball seat area (See Figures 1 & 2). The cross leak may be the result of an incorrectly aligned spacer plate to channel plate. This misalignment may allow minimal 3rd gear oil pressure to cross over and intrude into the low/reverse band circuit after a 2-3 shift has occurred. This minimal pressure is enough to make the band drag on the low drum while driving in third and forth gear causing the premature failure of the band.

**CORRECTION:** If the band is destroyed the unit will obviously need to be removed for service. During the transmission repair procedure, disassemble the valve body and carefully flat sand the channel plate to ensure that the channel plate will mate flat to the spacer plate. When assembling the valve body, there are two holes that are to be used to properly align the spacer plate to the channel plate as seen in Figures 2 and 3. Place the spacer plate onto the channel plate and install the two bolts one in each alignment hole by hand. Then put the tension plate in place and tighten to 35 inch pounds to secure the spacer plate to the channel plate (See Figure 4). Remove the two bolts used to align the plate and re-use the same bolts to align the valve body and torque all the attaching bolts to 35 inch pounds. After the unit has been repaired and installed into the vehicle, attach a pressure gauge to the low/reverse pressure port (See Figure 5) and ensure that 0 psi is present while in third and forth gear.

# ALL DODGE RE & RH UNITS
## PREMATURE FAILURE OF THE L/R BAND

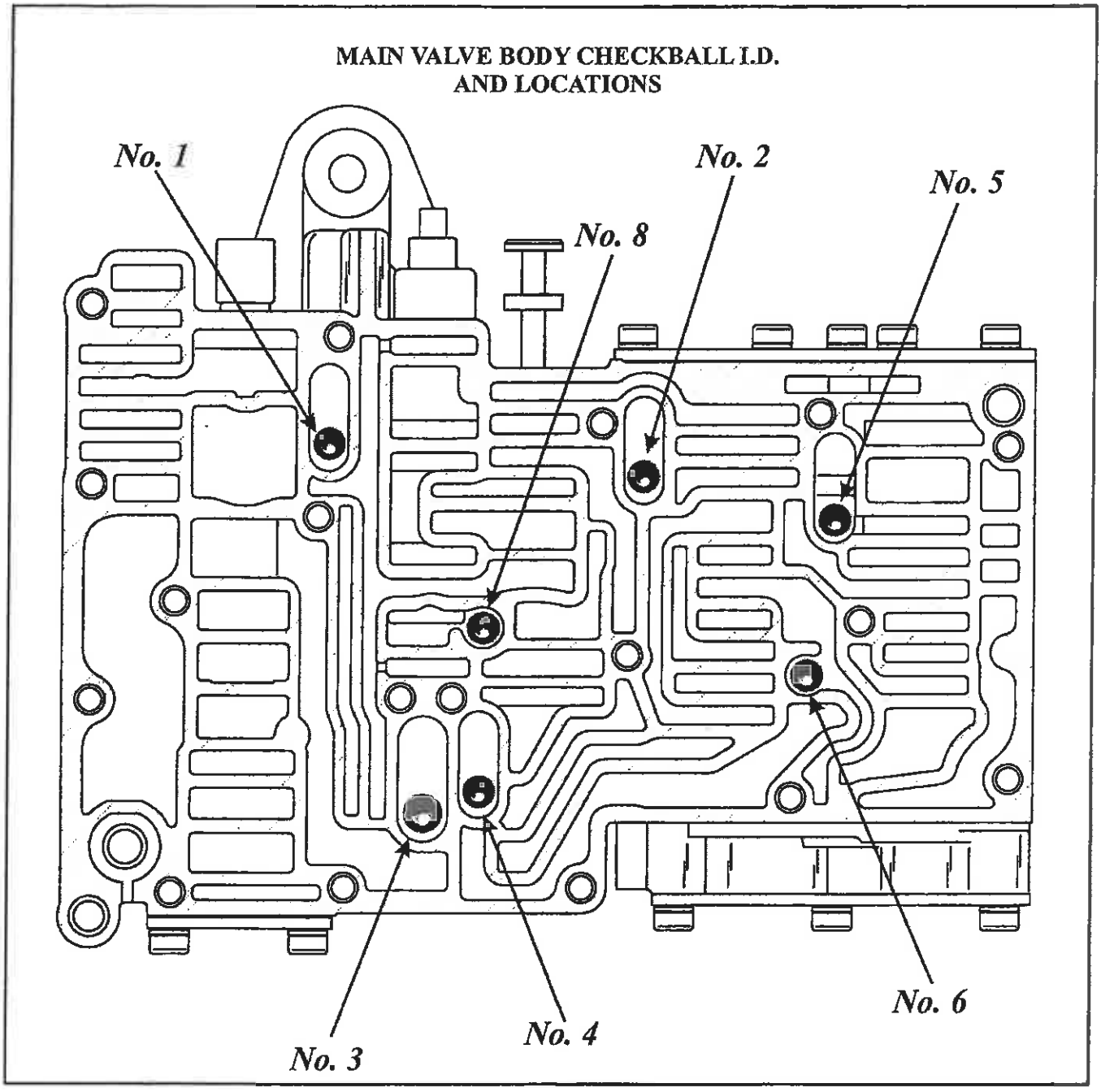



Figure 1

# ALL DODGE RE & RH UNITS
## PREMATURE FAILURE OF THE L/R BAND

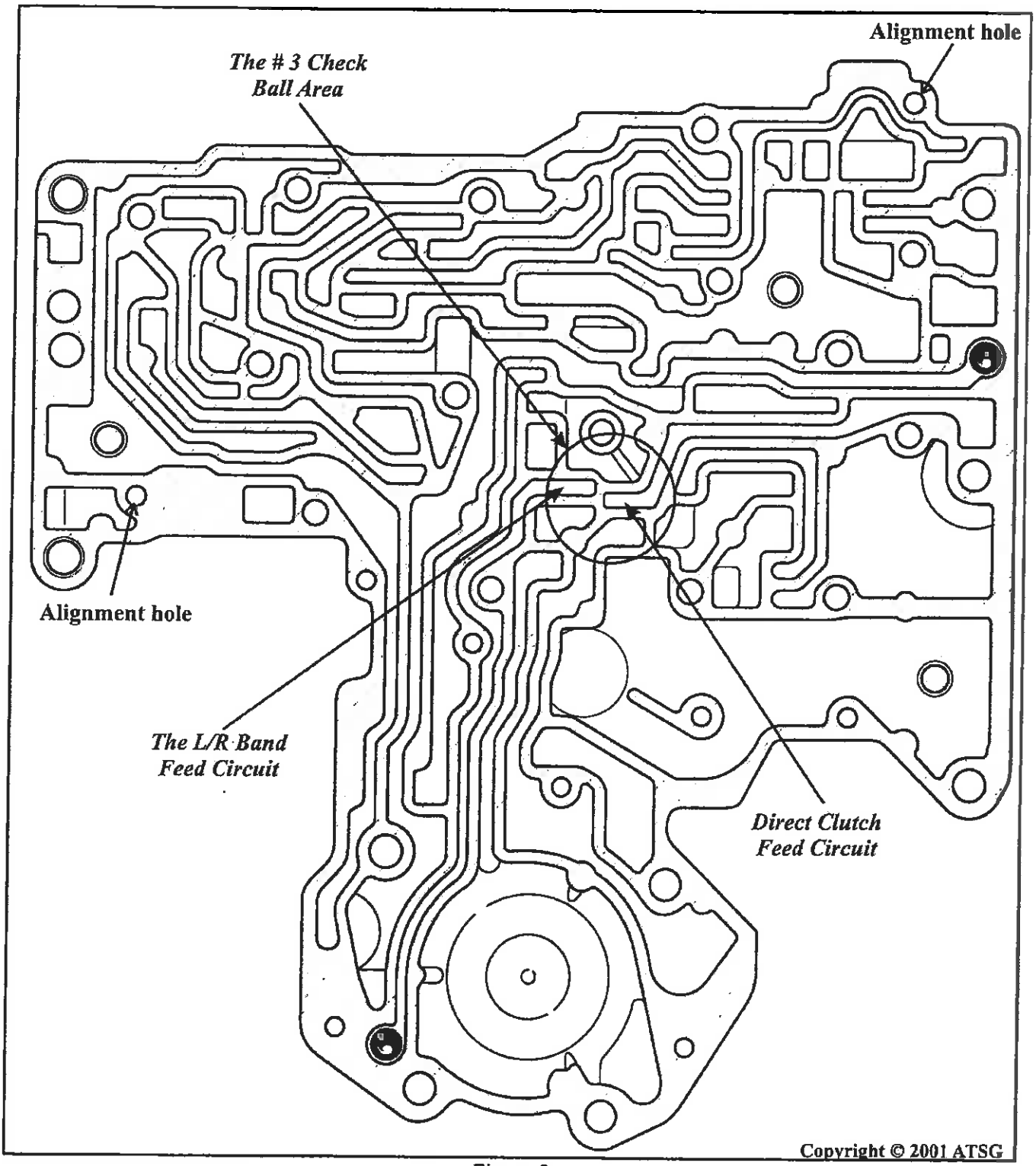



Figure 2

# ALL DODGE RE & RH UNITS
## PREMATURE FAILURE OF THE L/R BAND

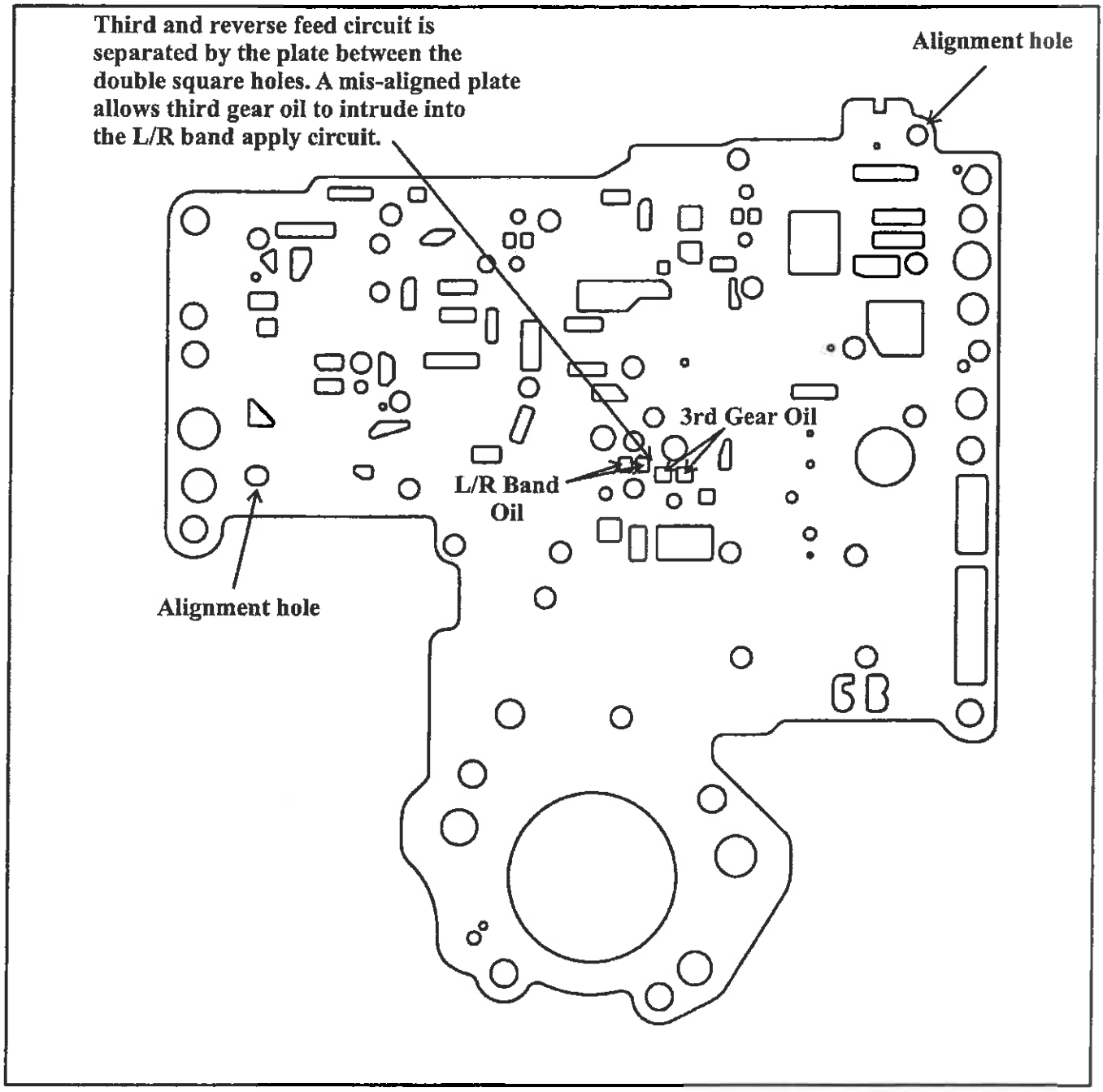



Figure 3

# ALL DODGE RE & RH UNITS
## PREMATURE FAILURE OF THE L/R BAND

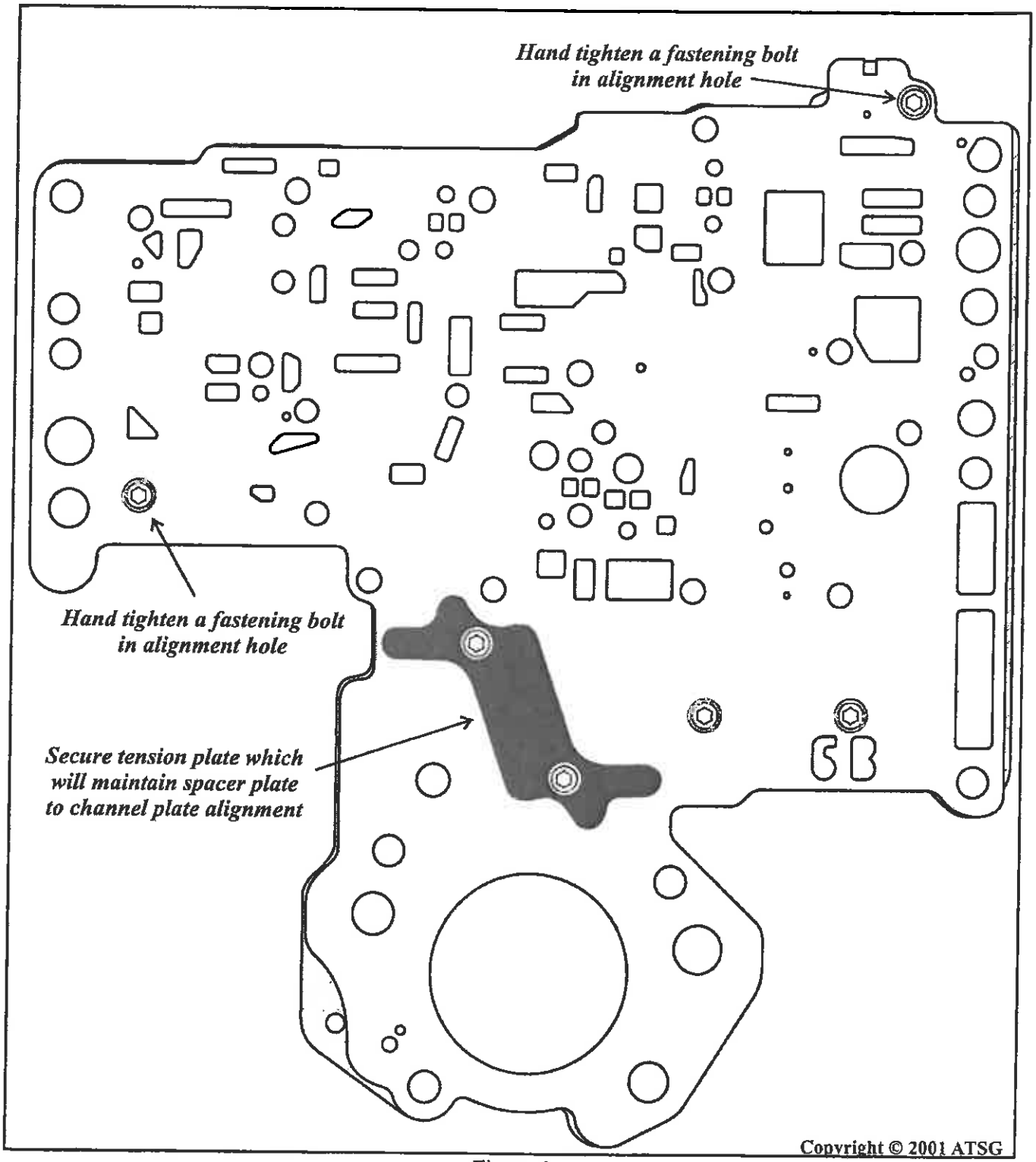



Figure 4

# ALL DODGE RE & RH UNITS
## PREMATURE FAILURE OF THE L/R BAND

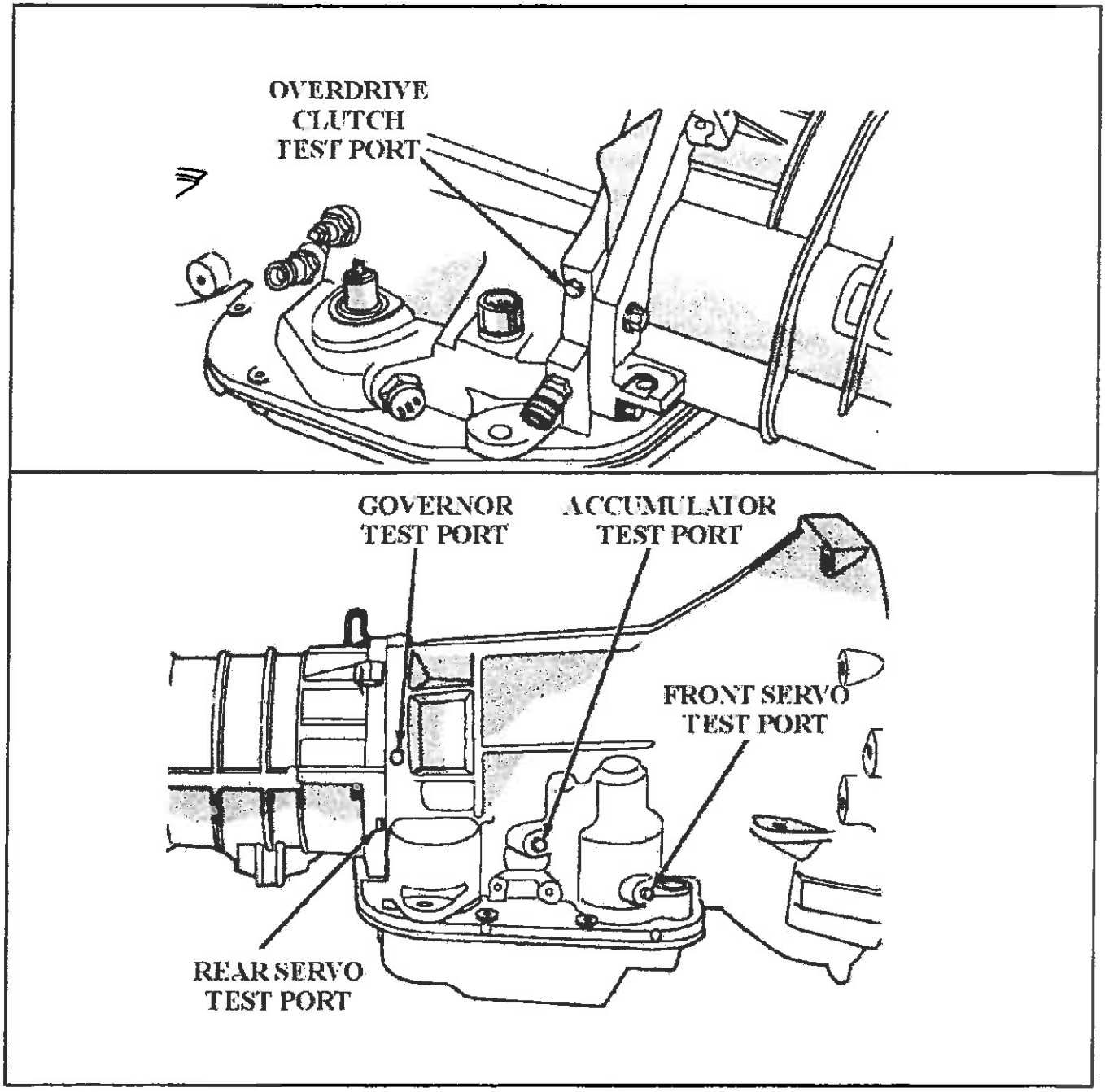



Figure 5

# CHRYSLER 42RE AND 47RE
## CHECKBALL LOCATIONS AND FUNCTIONS, PLUS NEW CHECKBALL ADDED IN TRANSFER PLATE

**CHANGE:** Beginning with the 1996 model year all of the 42RE and 47RE models, with the electronic controlled governor pressure, were produced with an added number 10 checkball located in the transfer plate, as shown in Figure 3.

**REASON:** To ensure sequential downshifts.

**PARTS AFFECTED:**

(1) TRANSFER PLATE - Casting changes to accommodate the added number 10 checkball and illustrated in Figure 3.

(2) OVERDRIVE SPACER PLATE - Changes in the hole configuration to accommodate the added number 10 checkball, as illustrated in Figure 4

(3) OVERDRIVE VALVE BODY - Casting changes to accommodate the added number 10 check ball, as illustrated in Figure 5.

**INTERCHANGEABILITY:**

***None of the individual parts listed above will interchange with previous design level parts. When used as a complete service package, will back service any 42RE or 47RE.***

**NOTE:** We have also provided you with the main valve body checkball locations in Figure 2 and the transfer plate checkball locations in Figure 3. The function of all checkballs are provided for you in Figure 1.

## CHECKBALL IDENTIFICATION AND FUNCTIONS

| Checkball | Size | Function |
|---|---|---|
| No. 1 | 1/4" Steel | A) Checkball No. 1 forces line pressure behind the 1-2 shift control valve and both the 1-2 and 2-3 governor plugs to prevent an upshift into 2nd and/or 3rd gear when the selector lever is placed into Manual Low.<br>B) Checkball No. 1 directs throttle pressure behind the 1-2 shift control valve and blocks the passage to the 1-2 governor plug in order to inhibit a 3-1 downshift during a forced 3-2 downshift when the vehicle is above the calibrated speed. |
| No. 2 | 1/4" Steel | A) Checkball No. 2 forces line pressure behind the 2-3 shift valve to prevent a 2-3 upshift when the selector lever is placed into Manual 2nd.<br>B) Checkball No. 2 blocks the manual 2nd circuit and directs throttle pressure to the 2-3 shift valve during a forced 3-2 downshift. |
| No. 3 | 11/32" Steel | A) Checkball No. 3 blocks front (Direct) clutch oil, after a 2-3 upshift, from entering the reverse band circuit and allows front (Direct) clutch oil to enter the intermediate band release circuit.<br>B) Checkball No. 3 blocks the intermediate band release circuit and allows reverse oil to apply the front (Direct) clutch when the selector lever is placed into Reverse. |
| No. 4 | 1/4" Steel | A) Checkball No. 4 blocks rear band apply pressure from entering the front (Direct) clutch circuit when the selector lever is placed into Manual Low.<br>B) Checkball No. 4 blocks the manual low circuit and directs line pressure into the rear band circuit when the selector lever is placed into Reverse. |
| No. 5 | 1/4" Steel | A) Checkball No. 5 blocks the manual 2nd circuit and directs throttle pressure to the back side of both shift valves and the shuttle valve, when the selector lever is placed into either Drive or Reverse.<br>B) Checkball No. 5 blocks the throttle pressure circuit and directs line pressure to back side of 2-3 shift valve to prevent a 2-3 upshift when selector lever is placed in Manual 2nd. |
| No. 6 | 1/4" Steel | A) Checkball No. 6 forces intermediate band apply oil through an orifice to apply the intermediate band and stroke the 1-2 accumulator on a 1-2 upshift. |
| No. 7 | 1/4" Steel | A) Checkball No. 7 forces rear (Forward) clutch through an orifice for a smooth garage shift into any forward range. |
| No. 8 | 1/4" Steel | A) Checkball No. 8 blocks line pressure from entering the rear (Forward) clutch circuit when the selector lever is placed into Park, Reverse or Neutral. |
| No. 9 | 1/4" Steel | A) Checkball No. 9 forces rear band apply oil through an orifice for a smooth reverse band apply when the selector lever is placed into Reverse or Manual Low. (Not used in 47RE) |
| No. 10 | 3/16" Steel | A) Checkball No. 10 blocks orificed rear (Forward) clutch oil from entering the converter clutch apply circuit and allows orificed rear (Forward) clutch oil to pre-fill the overdrive clutch circuit.<br>B) Checkball No. 10 prevents converter clutch apply oil from entering the overdrive circuit, and allows converter apply oil to stroke the 3-4 timing valve, which in turn loads the 2-3 shift valve in the upshifted position when the converter clutch is on in third gear. |
| | | |

Figure 1

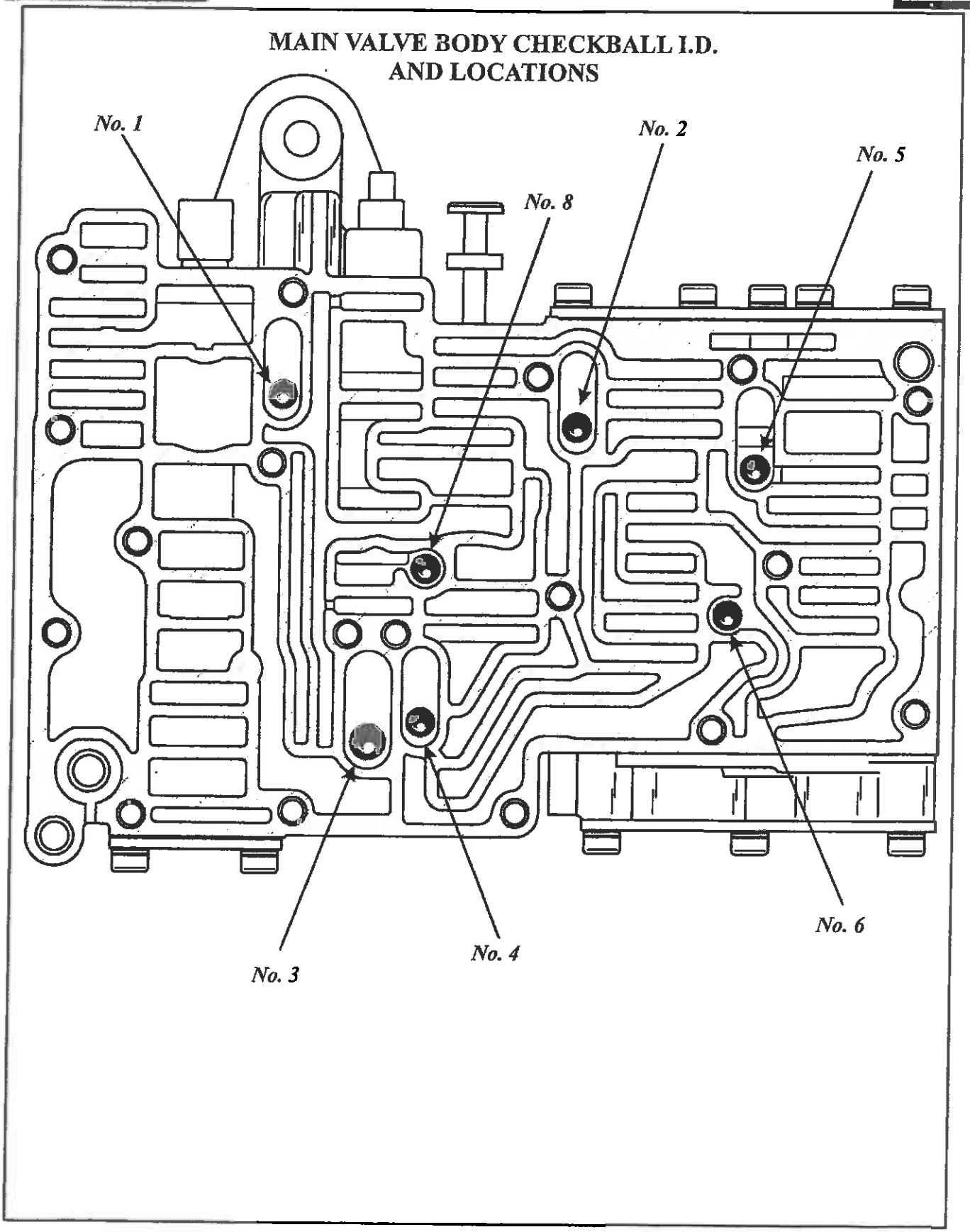

MAIN VALVE BODY CHECKBALL I.D.
AND LOCATIONS
No. 1
No. 2
No. 5
No. 8
No. 3
No. 4
No. 6

Figure 2

**TRANSFER PLATE "LOWER SIDE"**
**CHECKBALL LOCATIONS**

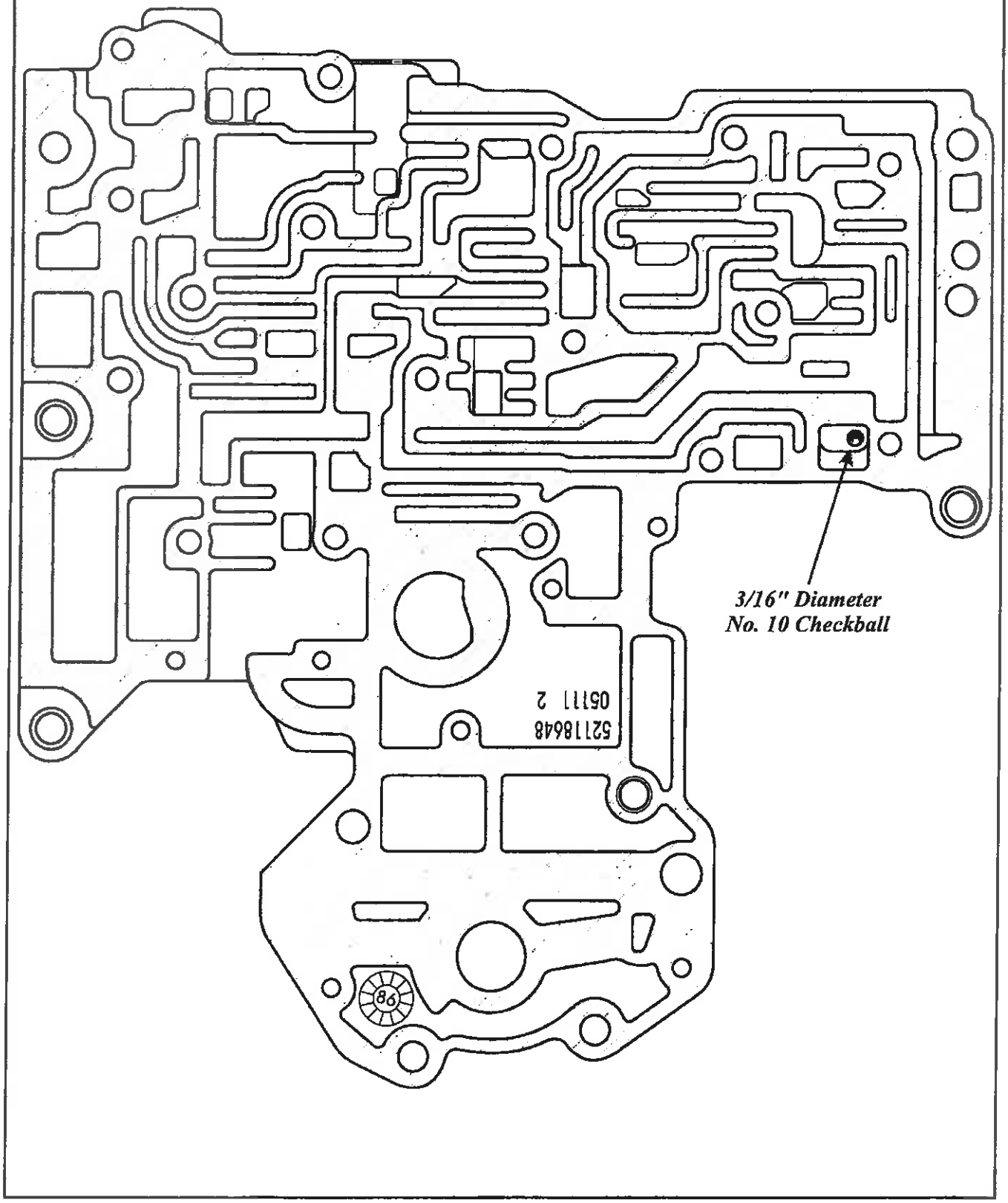



Figure 3

**OVERDRIVE VALVE BODY**
**SPACER PLATE**

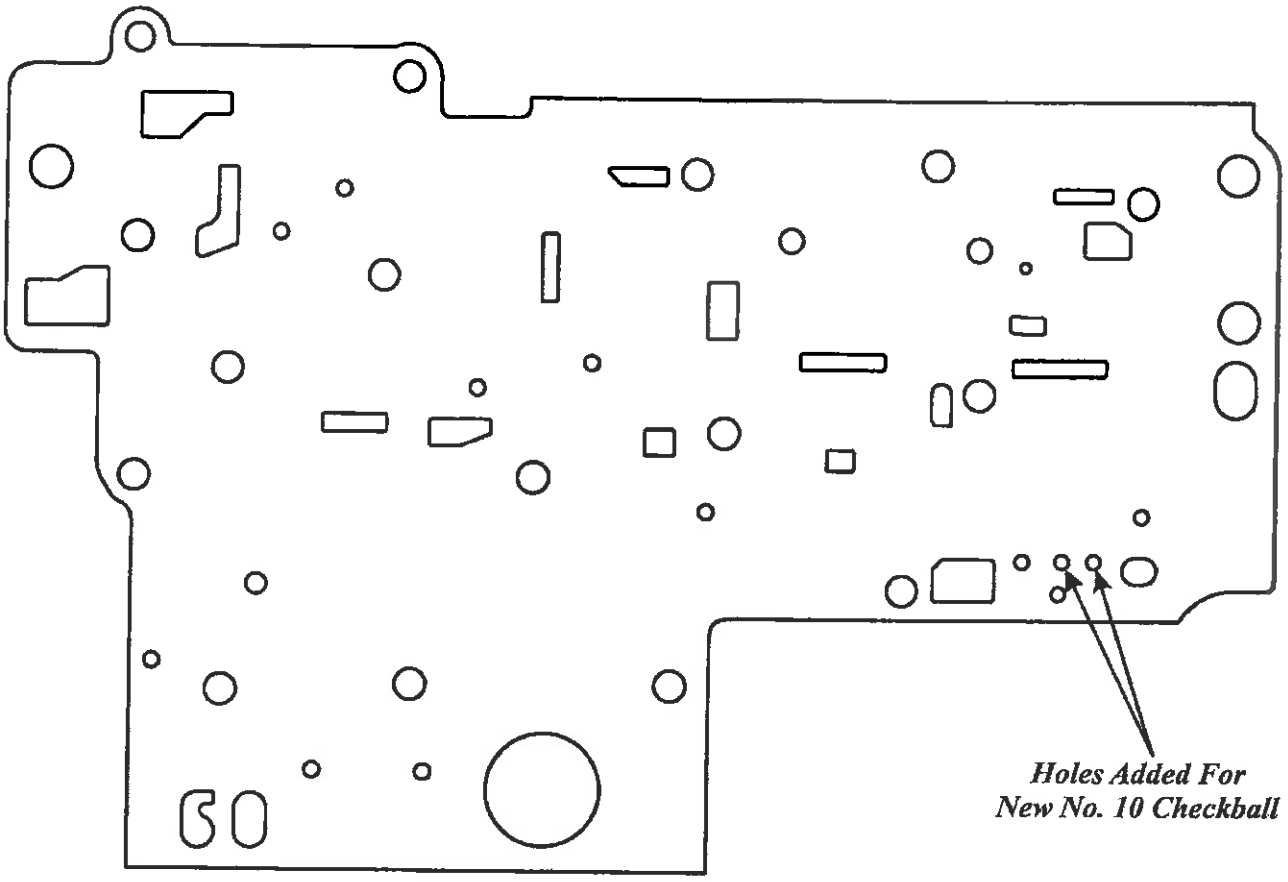



Figure 4

**OVERDRIVE VALVE BODY**

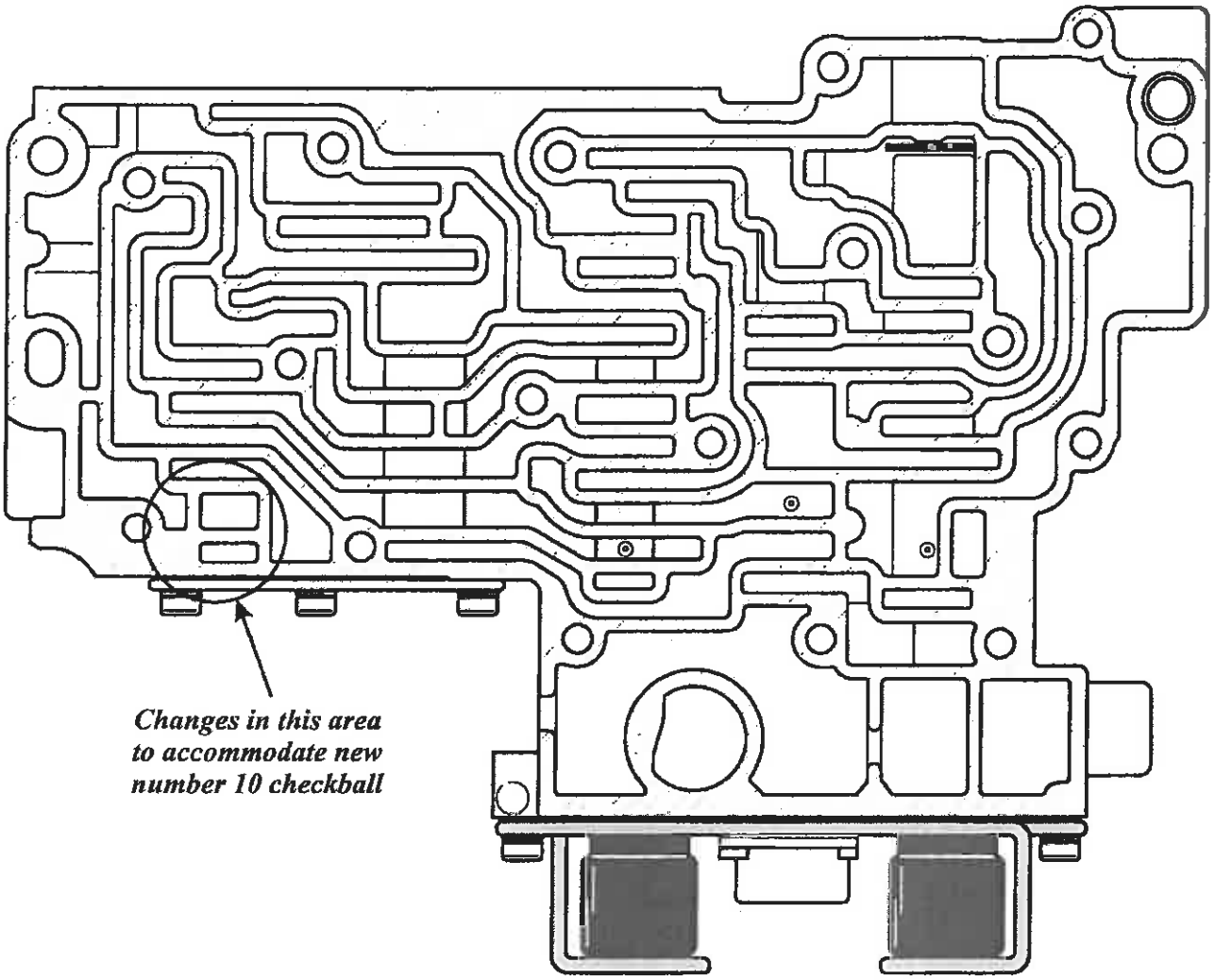



Figure 5

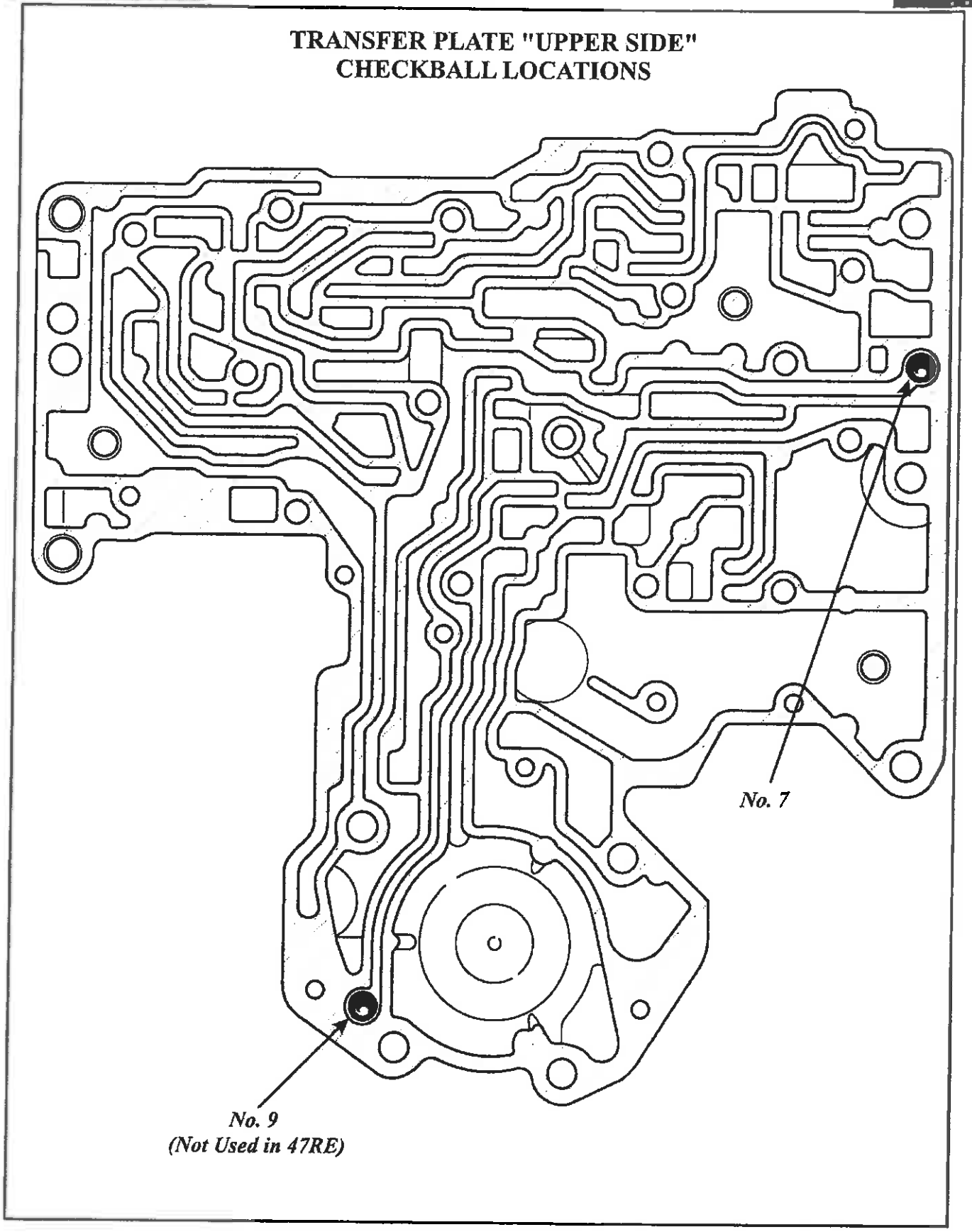

TRANSFER PLATE "UPPER SIDE"
CHECKBALL LOCATIONS
No. 7
No. 9
(Not Used in 47RE)

Figure 6

**MAIN SPACER PLATE**

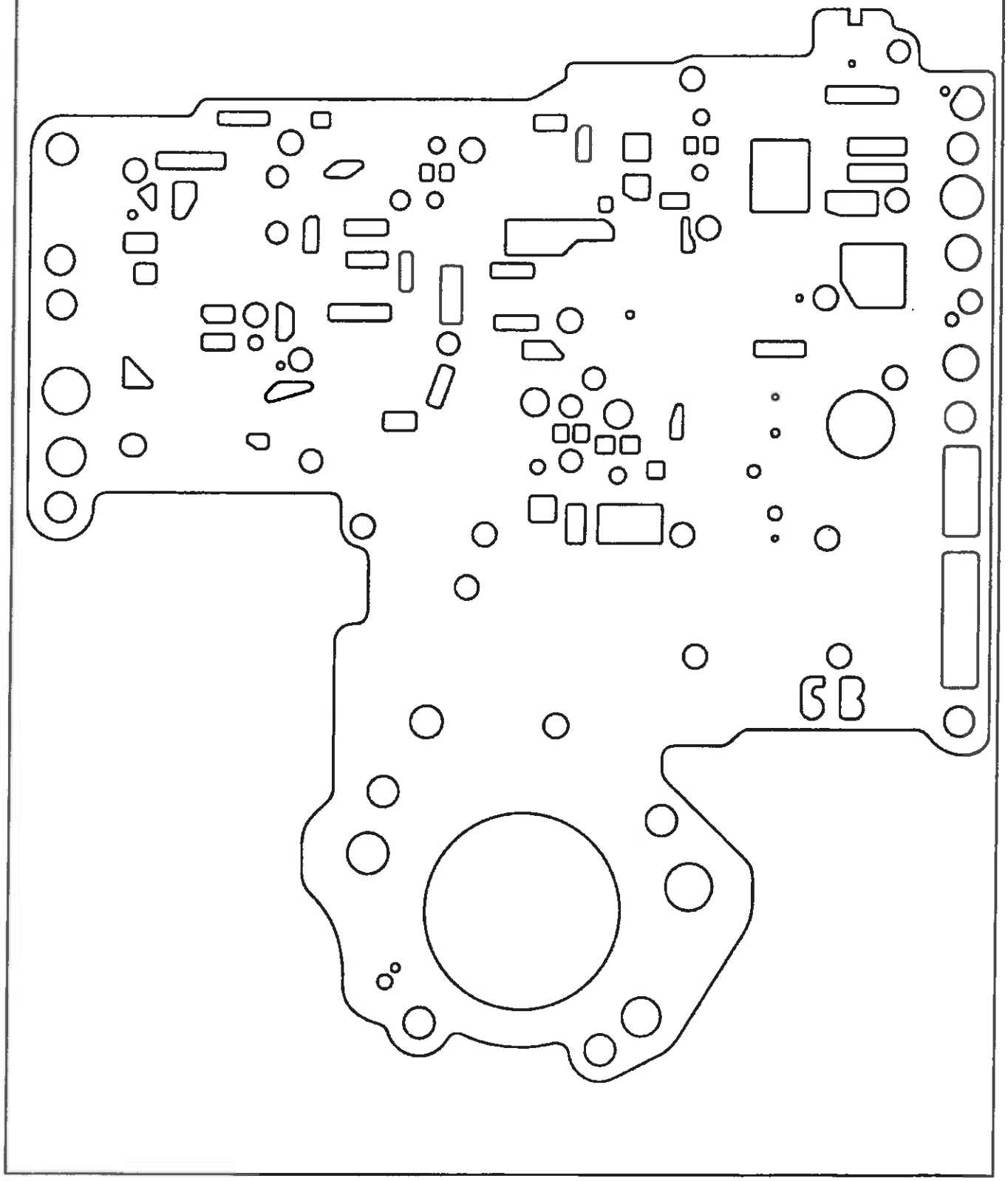


Figure 7

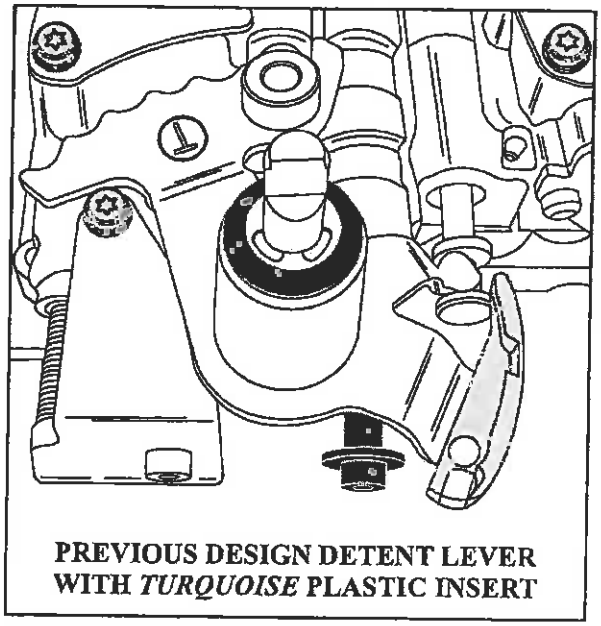
# 2000 & LATER DODGE TRUCKS & VANS

## INTERNAL LINKAGE AND SAFETY NEUTRAL SWITCH CHANGES

**COMPLAINT:** After a valve body exchange, the vehicle does not start or the detent lever cannot clear the safety neutral switch.

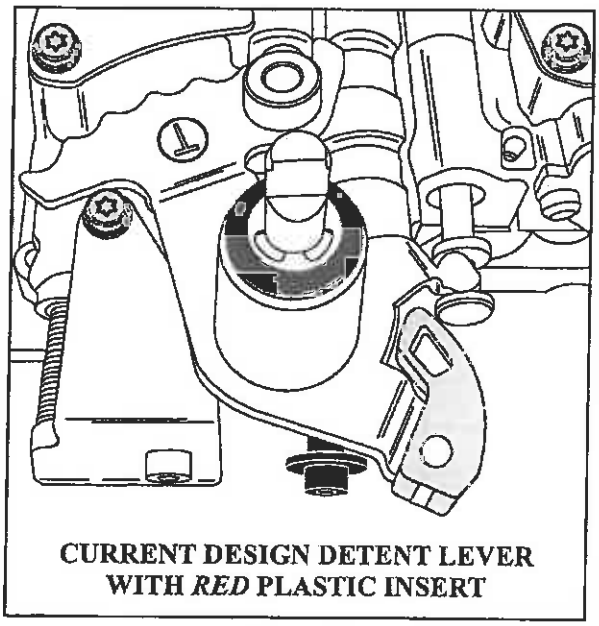
**CAUSE:** The safety neutral switch and the valve body detent lever changed for the 2000 model year. The switch is longer and the detent lever dimensionally changed to accommodate the new switch. Figures 1 and 2 show the dimensional differences between the previous and current design detent levers. Figures 3 and 4 illustrate the correct and incorrect assembly using the short switch. Figure 5 shows the correct assembly using the long switch.
It is unnecessary to show the incorrect assembly of the long switch, as it will be impossible to install either the valve body assembly or the switch with that combination.

**CORRECTION:** The detent lever with the ***red*** plastic insert goes with the ***long*** safety neutral switch. The detent lever with the ***turquoise*** plastic insert goes with the ***short*** safety neutral switch.



**PREVIOUS DESIGN DETENT LEVER WITH *TURQUOISE* PLASTIC INSERT**

Figure 1



**CURRENT DESIGN DETENT LEVER WITH *RED* PLASTIC INSERT**

Figure 2

## INTERNAL LINKAGE AND SAFETY NEUTRAL SWITCH CHANGES

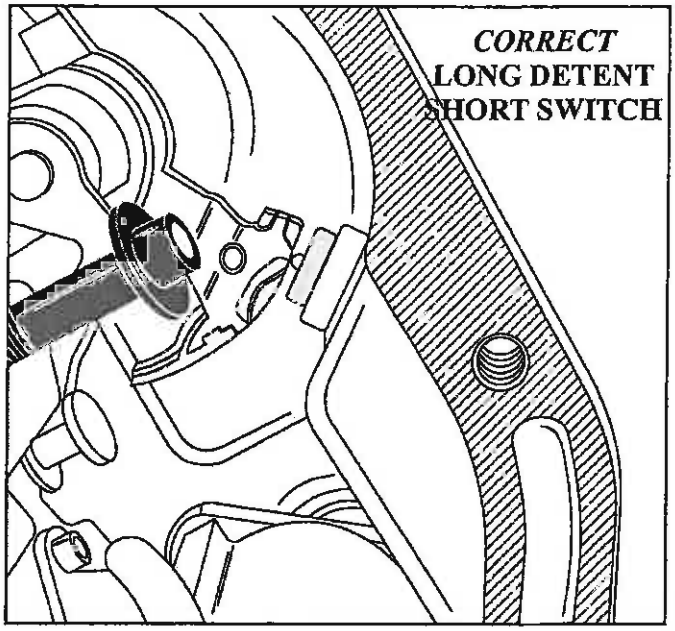



Figure 3

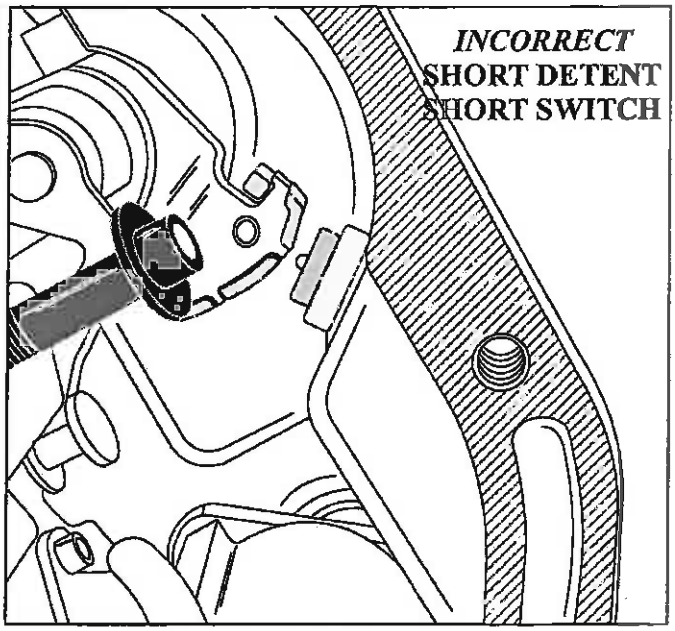
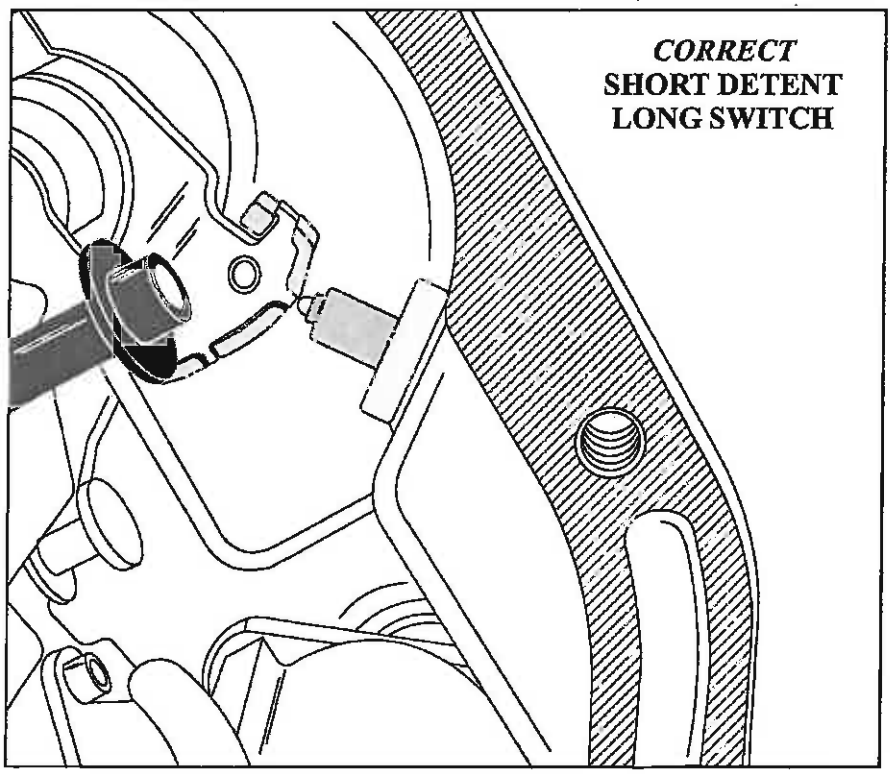



Figure 4



# CHRYSLER 46RE

## REOCCURRING P1740 OR P0740 WHEN HOT

**COMPLAINT:** Vehicles equipped with the 46RE may exhibit a reoccurring Diagnostic Trouble Code P1740 or p0740, Torque converter clutch or Overdrive solenoid performance, or Torque Converter slip, before or after overhaul.

**CAUSE :** The cause may be, that the mating surface, as shown in Figure 1, between the Pump Body and the Pump Stator is not flat, causing a loss of line pressure and Torque Converter apply pressure. Refer to Figure 2 for port identification of t he Pump Body and Pump Stator.

**CORRECTION:** To verify that the stator surface is flat, Pressurex ® Film may be used. This is a product from Sensor Products Inc., which uses microcapsules of a paint like substance that changes color intensity depending on pounds per square inch. The higher the psi., the brighter the color. To repair this condition, have the face of the stator machined so that it is flat.

***Pressurex ® available at Sensorprod.com***

**46RE PUMP STATOR**

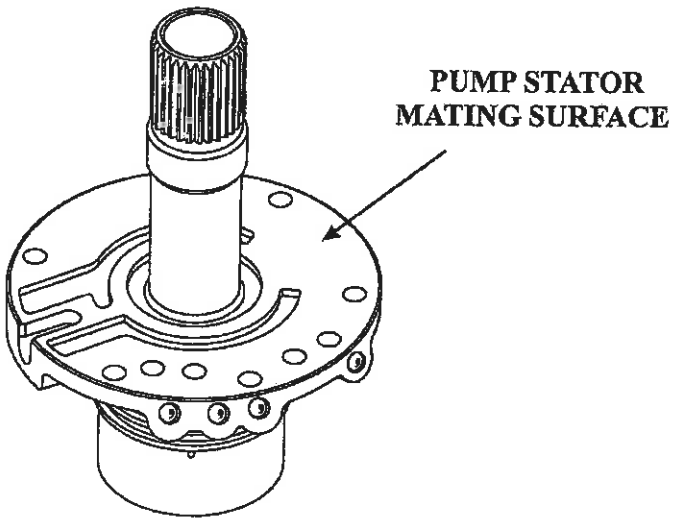



Figure 1

## 46RE PUMP BODY AND STATOR PASSAGE IDENTIFICATION

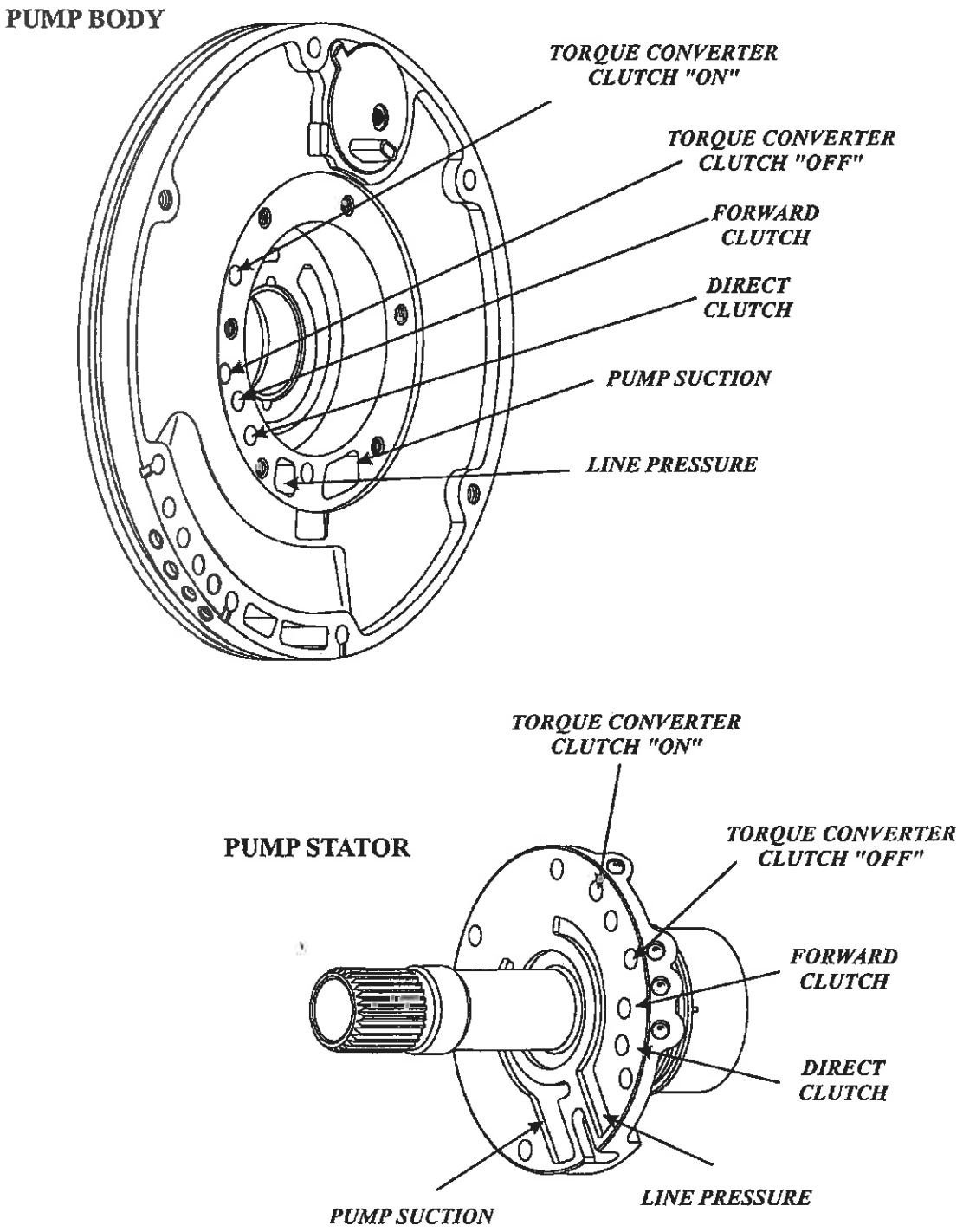



Figure 2

# 5.9 Liter Cummins Diesel Trucks

## PREMATURE CONVERTER CLUTCH FAILURE

**COMPLAINT:** Dodge and Jeep 5.9 Liter Cummins Diesel vehicles may experience premature converter clutch failure. The friction material of the failed converter clutch may then restrict or stop all lubrication fluid by clogging the cooler in the radiator causing premature failure of the planetaries as well.

**CAUSE:** The premature failure of the Converter Clutch is the result of an accumulation of causes. The first being excessive tolerance levels in the converter making it very loose internally. Second, there is a very high speed difference between the turbine and the impeller at the time the clutch is applied. Thirdly, there are damper plate springs which load up to over 2000 pounds of tension when the clutch is applied during pulling conditions. When de-acceleration occurs, the energy from the springs releases in the opposite direction of engine rotation. Incorporate these conditions with perhaps the use of a Jake brake, engine speed trying to go to idle, converter clutch releasing and the weight of the vehicle, a momentary tie up (torque reversal) occurs with all the stress being transferred to the converter bolts. The pads attached to the cover slightly flex dimpling the internal clutch surface. With the clutch surface slightly dimpled, apply pressure drops as it leaks past the clutch into the exhausting release circuit. All these combinations work together resulting in premature failure of the clutch with its fragmented material finding its way into the cooler and valve body. This also leads to the unpleasant experience of a clogged cooler and planetary failure.

**CORRECTION:** Ideally, the correction is to have a customized converter made where the internal tolerance is brought down to a minimum and a change made to the fluid coupling characteristics to lessen the high speed differential and torque reversal stress on the pads. Then making modifications to the valve body providing increased converter clutch apply pressure during peak load conditions.