



# 41TE & 42LE CODE BOOK

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## 41TE & 42LE DIAGNOSTIC CODE BOOK INTRODUCTION

The Chrysler 41TE and 42LE Diagnostic Code Book is designed to provide the technician with a step by step diagnostic approach to each and every transaxle code available from 1989 to 1998 model year. This manual can be used in companion with any type of scanner utilized in retrieving these codes from the controller. As an aid to the technician, component location is recognized throughout the manual.

**We thank the Chrysler  
Corporation for the illustrations  
and information that made this  
booklet possible.**

The information and part numbers contained in this booklet have been carefully compiled from industry sources known for their reliability, but ATSG does not guarantee its accuracy.  
Information Compiled by Wayne D. Colonna

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## Technical Service Information

### PRELIMINARY ELECTRICAL CHECKS

#### PRELIMINARY ELECTRICAL CHECK:

The following preliminary electrical checks should be made on all computer controlled transmissions prior to any diagnosing. Low battery voltage or bad battery grounds can cause erratic computer control. An alternator that either undercharges or overcharges the system could be another source or potential problem in the electrical system. These following preliminary electrical checks can be made quickly and easily with a digital volt ohm meter (DVOM).

#### STEP 1

With the ignition key in the OFF position, turn on the headlights for approximately 1 minute to drain off any surface charge. After 1 minute, turn off the headlights.

#### STEP 2

Using a DVOM set to DC volts, measure the open post battery voltage by placing the negative lead to the negative battery post and the positive meter lead to the positive battery post as shown in Figure 1.

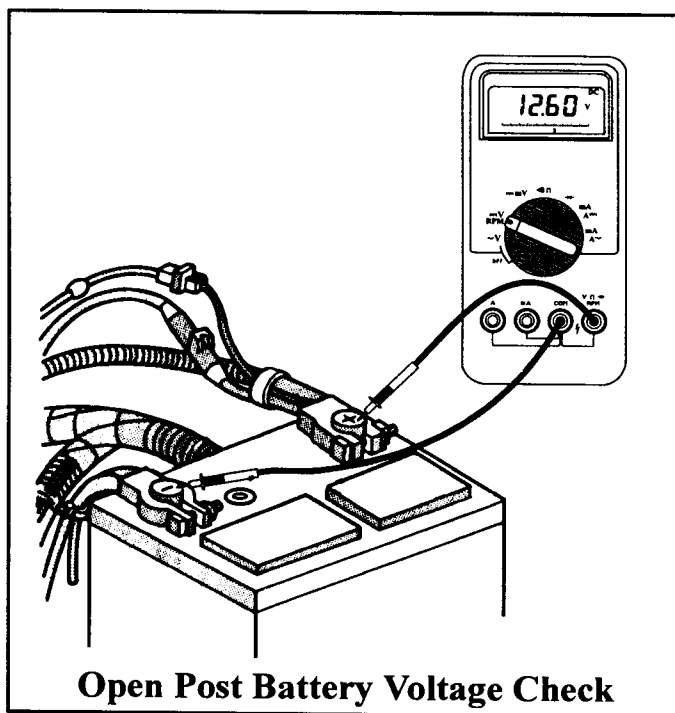


Figure 1

A fully charged battery should measure approximately 12.60 volts. However, 12.40 volts is the average seen and is acceptable. If battery voltage is below 12.00 volts, the result may be erratic computer behaviour. Refer to the table in Figure 2 for the typical voltage values in relationship to percentage of charge.

VOLTAGE	% of CHARGE
12.60V	100
12.45V	75
12.30V	50
12.15V	25

Figure 2

**IMPORTANT:** If the battery needs to be charged, disconnect the NEGATIVE cable first before charging. This will aid in avoiding damage to the electrical system. Never exceed 16.0 volts while charging the battery.

**WARNING:** Do not charge a battery that has an excessively low electrolyte level. The battery may spark internally and explode.

#### STEP 3

With the volt meter connected to the battery as shown in Figure 1, start the vehicle. Turn on the headlights and blower motor to put a load on the voltage system. Approximately 13.5 to 14.4 volts should be seen (See Figure 3). If 15 volts or higher is seen, this may indicate an overcharging alternator which may result in erratic computer behaviour. This problem needs to be rectified before going to the next step.

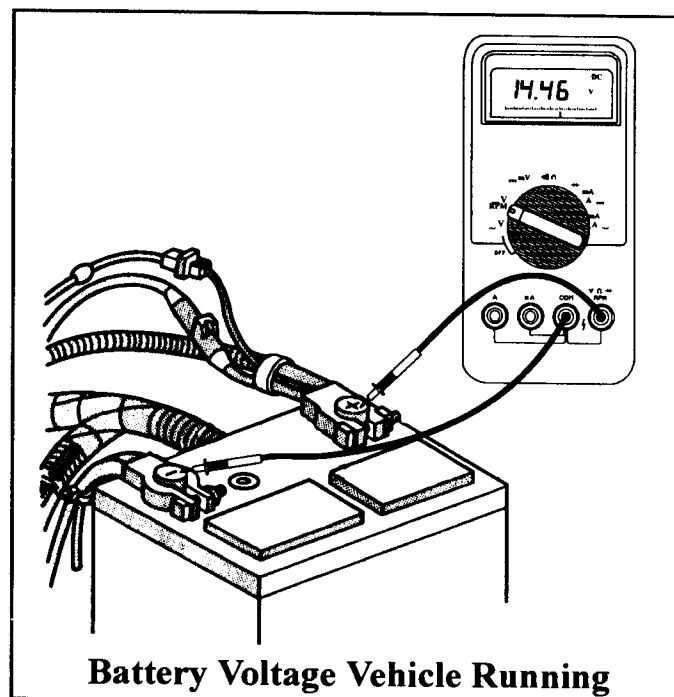


Figure 3

## Technical Service Information

### PRELIMINARY ELECTRICAL CHECKS

*continued*

#### STEP 4

The next step is to perform a voltage drop test across the ground cable. This checks for corrosion or bad connections with the main ground cable itself. To do this, keep the vehicle running and turn on as many accessories as possible, i.e. headlights, AC, radio, etc. With the meter set to DC volts, place the negative lead of the meter to the negative post of the battery. Place the positive lead of the meter to either the body or engine block (See Figure 4). No more than 0.10 volts should be seen. A good ground will usually show 0.00 or 0.01 volts. If 0.20 or more is seen, clean and/or replace the main ground cable to obtain a 0.00 or 0.01 reading.

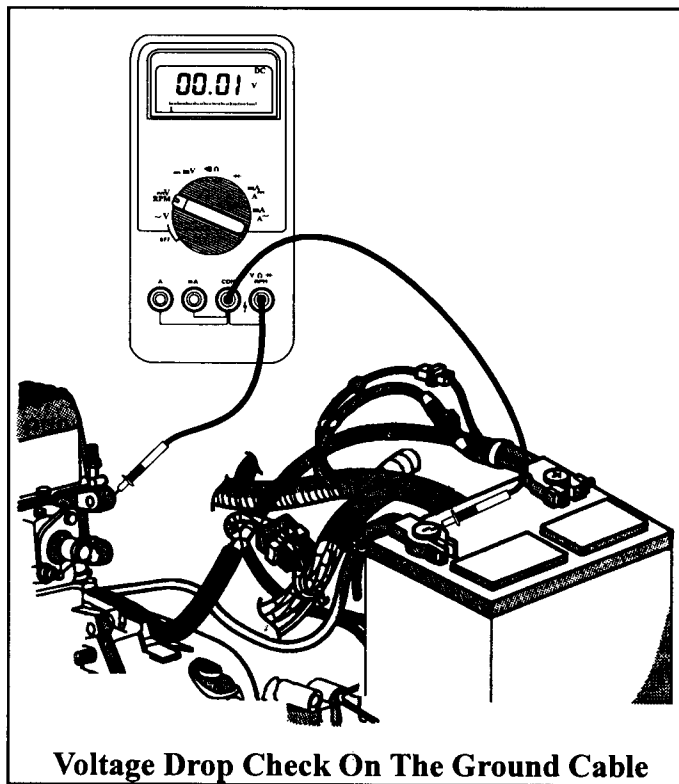


Figure 4

These 4 simple basic electrical steps should be performed on all computer controlled transmissions prior to any other diagnosis. The fifth and final step in which the computer's ground wires are checked should also be included in the basic electrical pre diagnostic routine. Of course this will require specific information as to which wires are the ground wires in the computer for the year and model vehicle being diagnosed.

#### STEP 5

Locate the transaxle controller (See Pages 6 and 7). Once the controller is located, pop the plastic harness cover away from the wires going into the connector (Do not remove the center bolt). Once the cover is removed and the 60 way connector can be viewed from the wire side, locate the ground wires. 1989 to 1992 use wires 53, 54, 57 and 58 for ground (See Figure 5).

**Special Note: 1993 and later vehicles do not use terminals 54 and 58 for ground wires. Refer to Figure 6 for the controllers main ground wires per vehicle year and application.**

Start the vehicle and turn on several accessories. Set the meter to DC volts and place the positive lead of the meter to the negative battery post. Using the negative lead, carefully back probe each ground wire as shown in Figure 5. No more than 0.10 volts can be seen. If more than 0.10 volts is seen, that ground wire is bad.

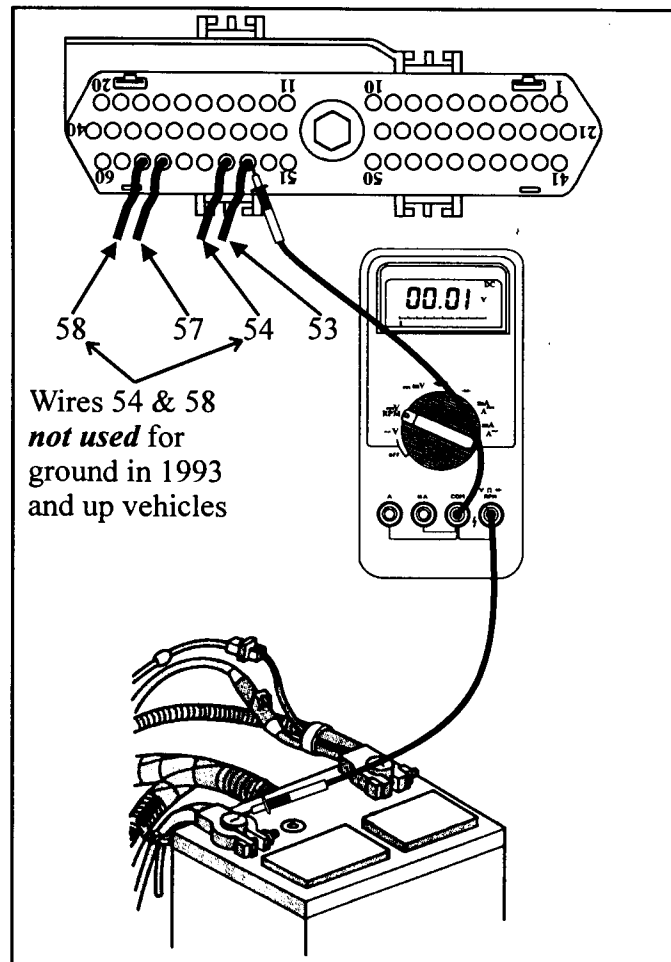


Figure 5



## Technical Service Information

### TCM MAIN GROUND WIRE TERMINAL CHART

YEAR AND MAKE OF VEHICLE	WIRE # →	6	11	13	17	51	53	54	57	58
1989 - 1992 ALL VEHICLES							✓	✓	✓	✓
1993 DAYTONA		✓					✓		✓	
1993 DYNASTY		✓				✓	✓		✓	
1993 5th AVENUE						✓	✓		✓	
1993 IMPERIAL						✓	✓		✓	
1993 NEW YORKER						✓	✓		✓	
1993 - 1994 SHADOW		✓					✓		✓	
1993 - 1994 SUNDANCE		✓					✓		✓	
1993 - 1994 SPIRIT		✓				✓	✓		✓	
1993 - 1994 ACCLAIM		✓				✓	✓		✓	
1993 - 1994 LEBARON SEDAN		✓				✓	✓		✓	
1993 - 1995 LEBARON CONV/COUPE		✓					✓		✓	
1993 - 1995 CARAVAN (3.0L)		✓					✓		✓	
1993 - 1995 VOYAGER (3.0L)		✓					✓		✓	
1993 - 1995 GRAND CARAVAN (3.3 & 3.8L)							✓		✓	
1993 - 1995 GRAND VOYAGER (3.3 & 3.8L)							✓		✓	
1993 - 1995 TOWN & COUNTRY (3.3 & 3.8L)							✓		✓	
1995 - 1996 AVENGER & SEBRING			✓	✓	✓		✓			
1995 - 1996 CIRRUS & STRATUS						✓	✓		✓	
1995 - 1996 TALON			✓	✓	✓		✓			
1996 CARAVAN & GRAND CARAVAN						✓	✓		✓	
1996 VOYAGER & GRAND VOYAGER						✓	✓		✓	
1996 TOWN & COUNTRY						✓	✓		✓	
1996 SEBRING CONVERTIBLE				✓		✓	✓		✓	
1996 BREEZE						✓	✓		✓	
1993 - 1997 ALL LH VEHICLES						✓	✓		✓	

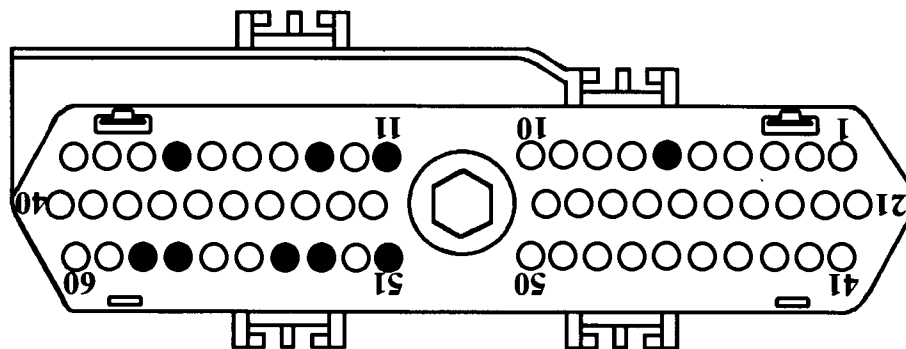


Figure 6



## Technical Service Information

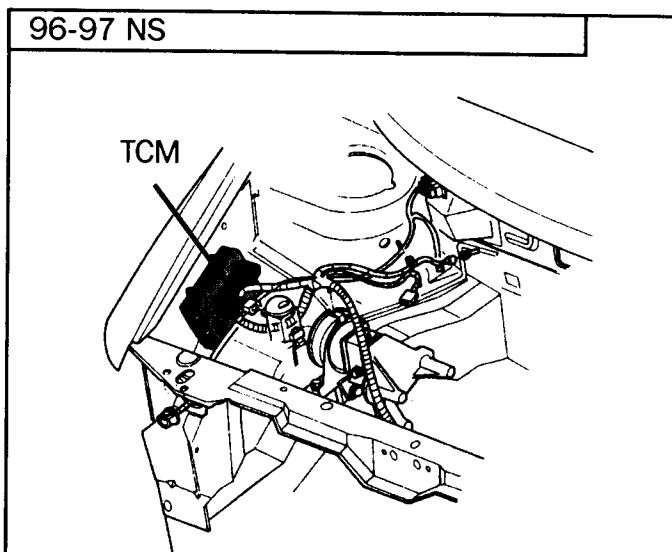
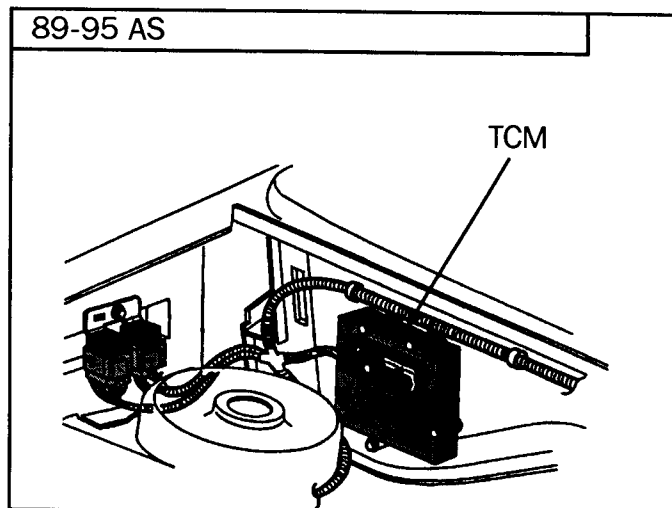
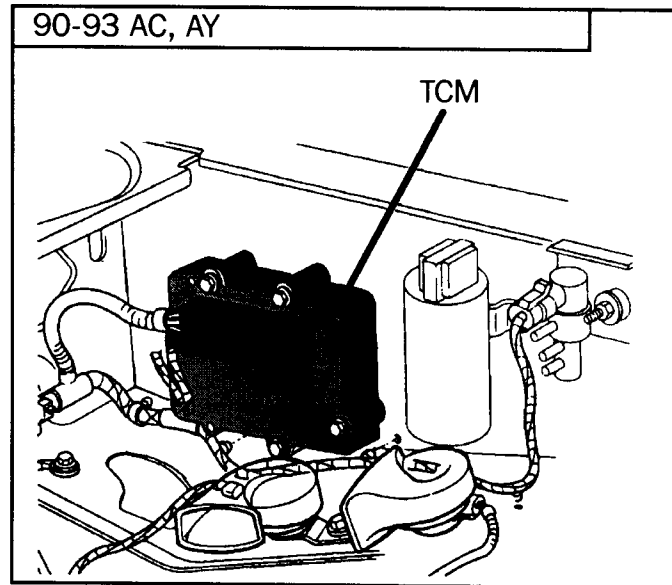
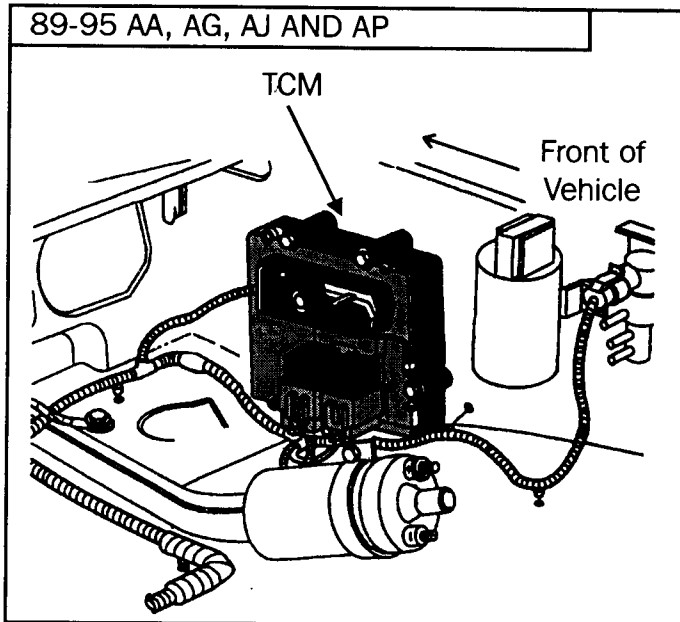
### BODY IDENTIFICATION & TCM LOCATION

#### BODY IDENTIFICATION

The 41TE transaxle was introduced in the 1989 model year. The 42LE transaxle began in the 1993 model year. Both of these transaxles are found in several different car lines. Since component location and diagnostic procedures may vary with year and make of vehicle, this manual will make reference to the following vehicle body identification for clarification.

1989-1995	AA	Spirit/Acclaim/Lebaron
1989-1993	AC	Dynasty/New Yorker
1989-1997	AS/NS	Minivan/Caravan/ Voyager/ Town & Country
1990-1993	AY	Fifth Ave./Imperial
1990-1993	AG	Daytona
1990-1995	AJ	Lebaron Coupe/Conv.
1993-1994	AP	Shadow/Sundance
1995-1997	JA	Cirrus/Stratus/Breeze
1996-1997	JX	Sebring Conv.
1995-1996	FJ22	Sebring/Avenger
1995-1996	F24S	Eagle Talon
1993	LH	Concorde/Intrepid/ Vision
1994- 1997	LH	Concorde/Intrepid/ Vision/New Yorker/ LHS

#### CONTROLLER LOCATION



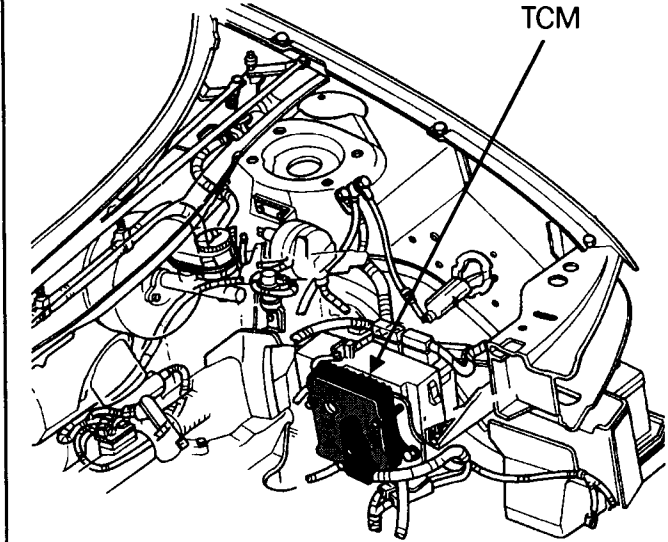


# Technical Service Information

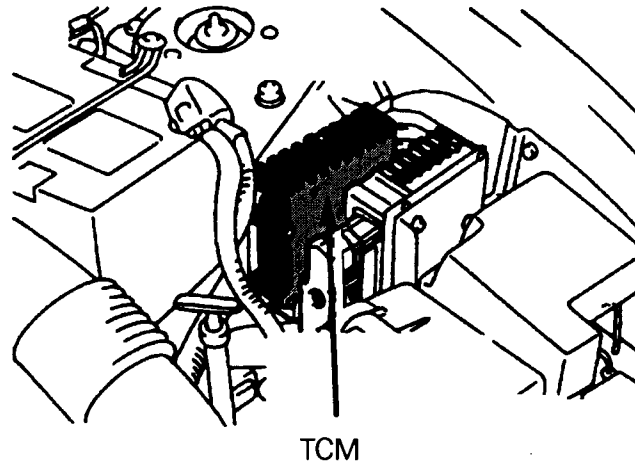
## CONTROLLER LOCATION

*continued*

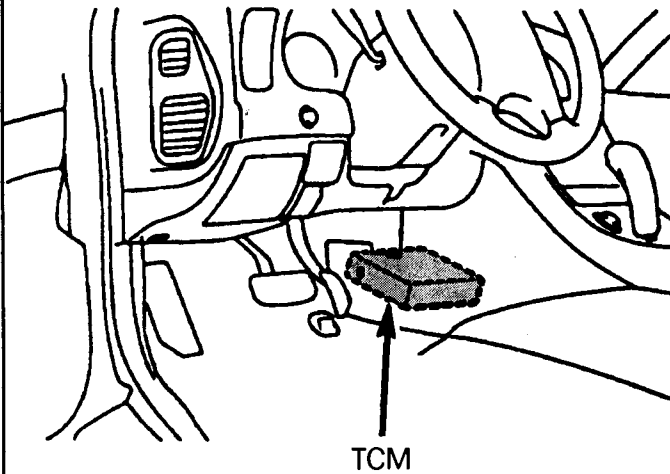
95-97 JA/JX



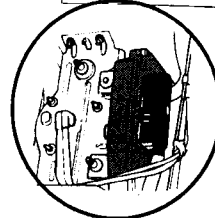
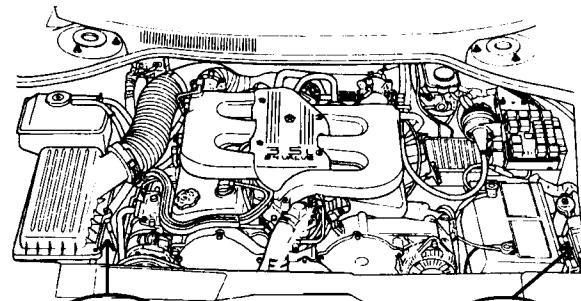
96-97 SEBRING/AVENGER SOHC  
95-97 SEBRING/AVENGER DOHC



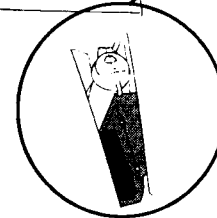
95-97 TURBO EAGLE TALON  
96-97 NON TURBO TALON  
96-97 SEBRING/AVENGER DOHC



93-97 LH



PCM



TCM

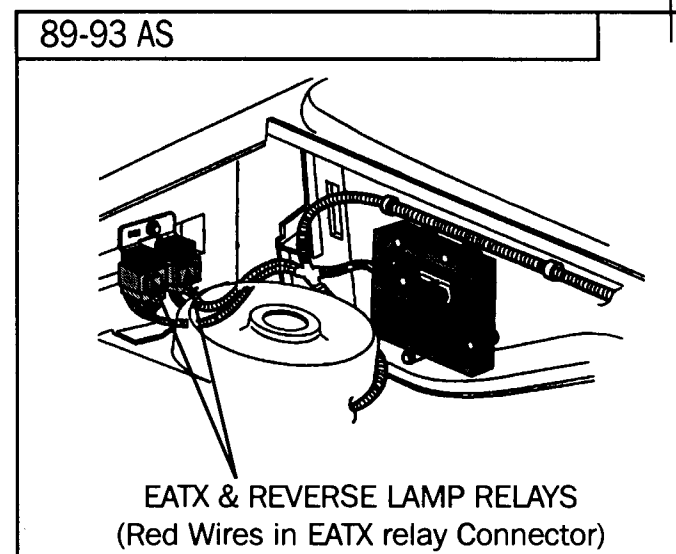
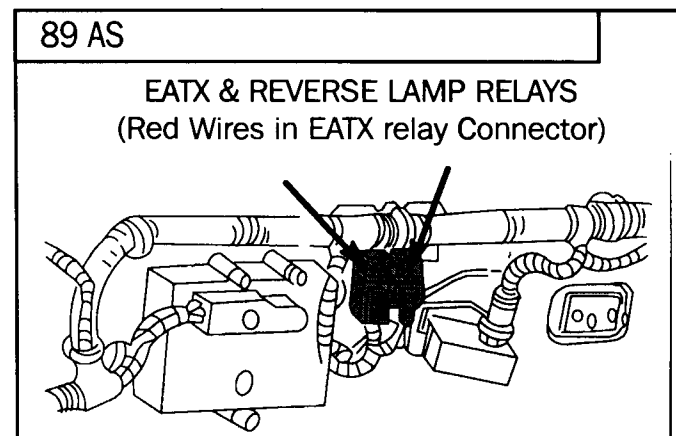
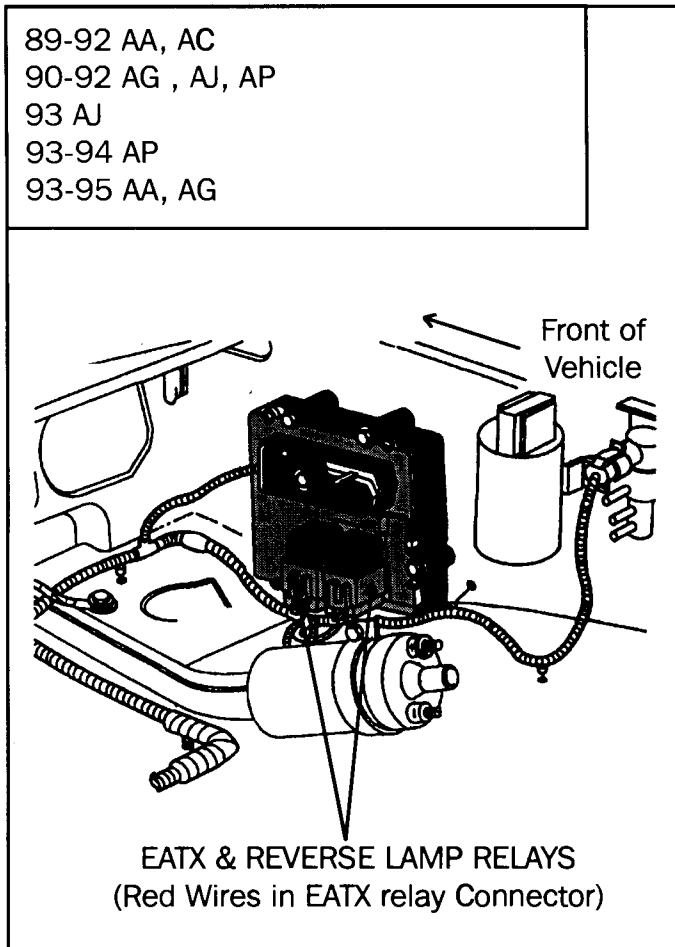
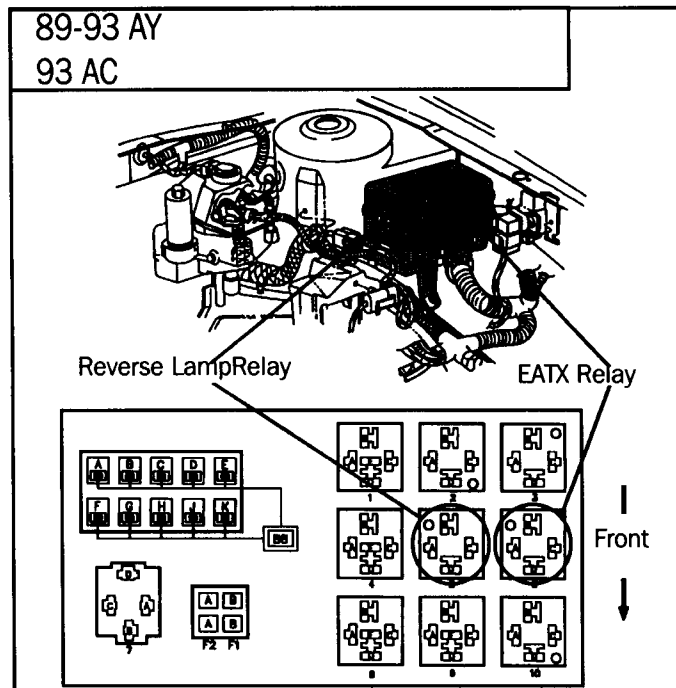


# Technical Service Information

## EATX & REVERSE LAMP RELAY LOCATION

### BODY IDENTIFICATION LIST

1989-1995	AA	Spirit/Acclaim/Lebaron
1989-1993	AC	Dynasty/New Yorker
1989-1997	AS/NS	Minivan/Caravan/ Voyager/ Town & Country
1990-1993	AY	Fifth Ave./Imperial
1990-1993	AG	Daytona
1990-1995	AJ	Lebaron Coupe/Conv.
1993-1994	AP	Shadow/Sundance
1995-1997	JA	Cirrus/Stratus/Breeze
1996-1997	JX	Sebring Conv.
1995-1996	FJ22	Sebring/Avenger
1995-1996	F24S	Eagle Talon
1993	LH	Concorde/Intrepid/ Vision
1994- 1997	LH	Concorde/Intrepid/ Vision/New Yorker/ LHS

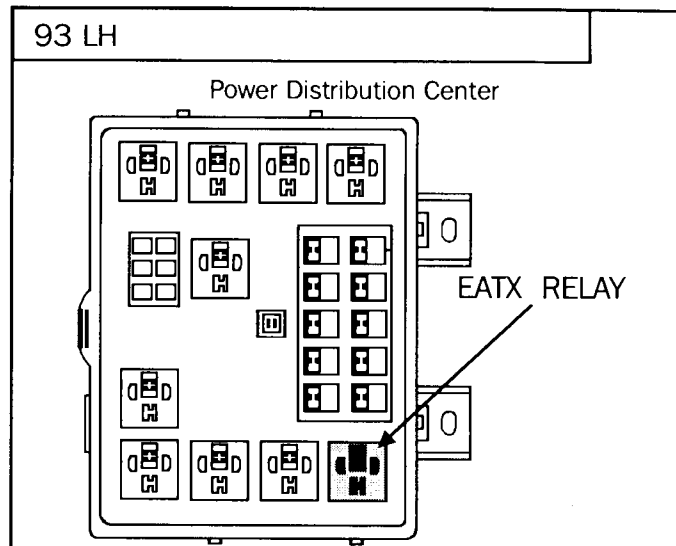
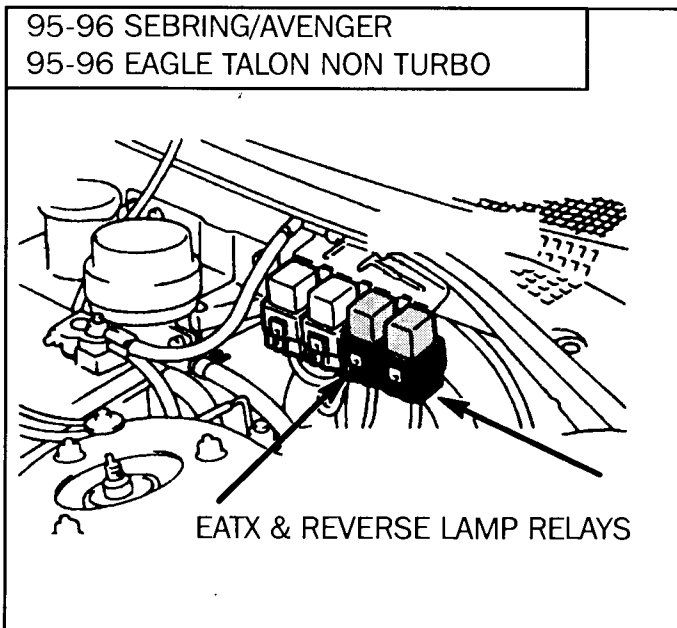
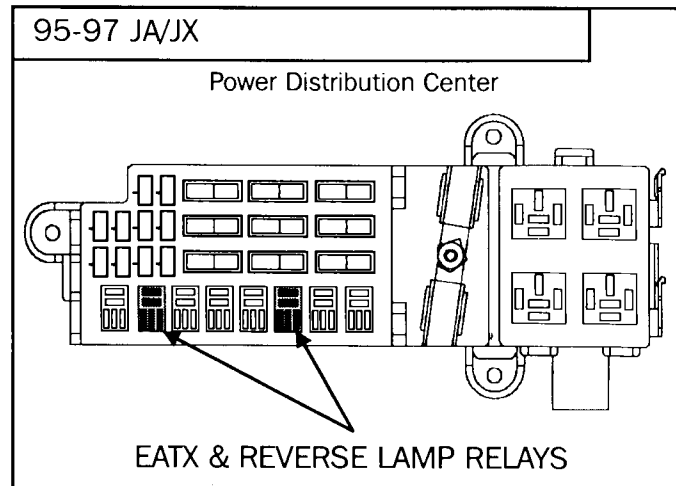
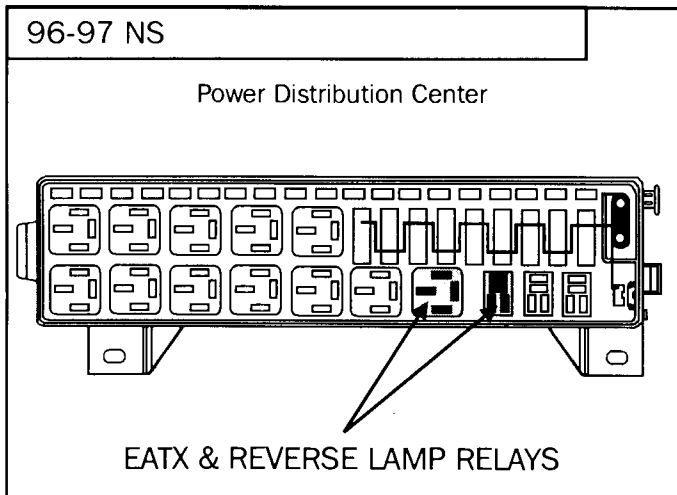
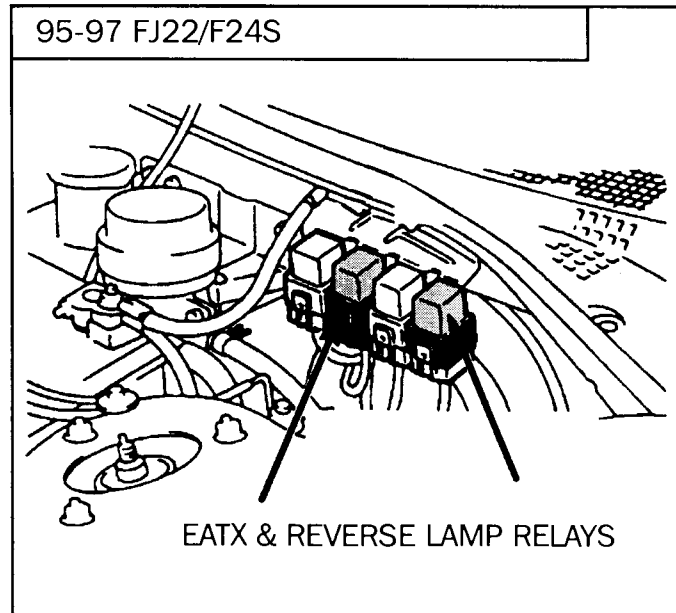
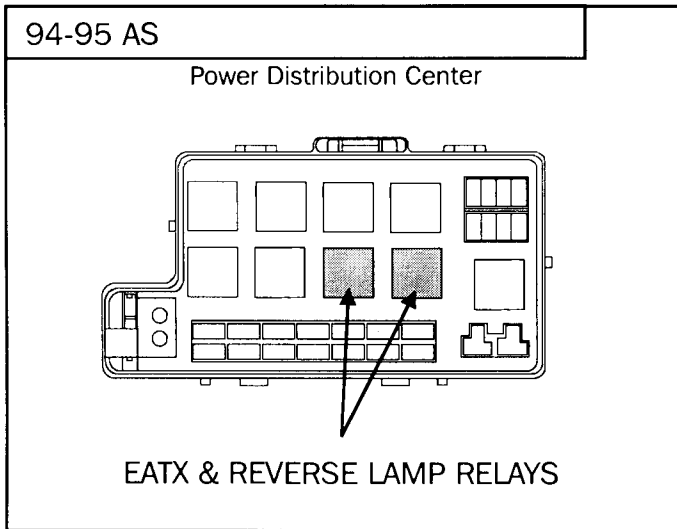






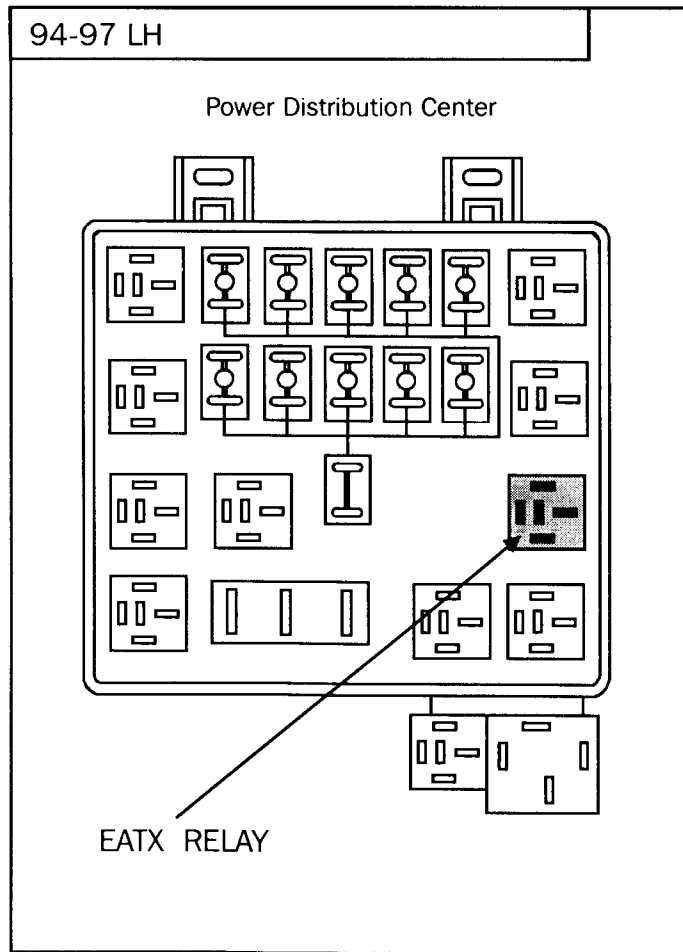
# Technical Service Information

## EATX & REVERSE LAMP RELAY LOCATION

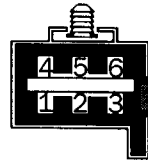
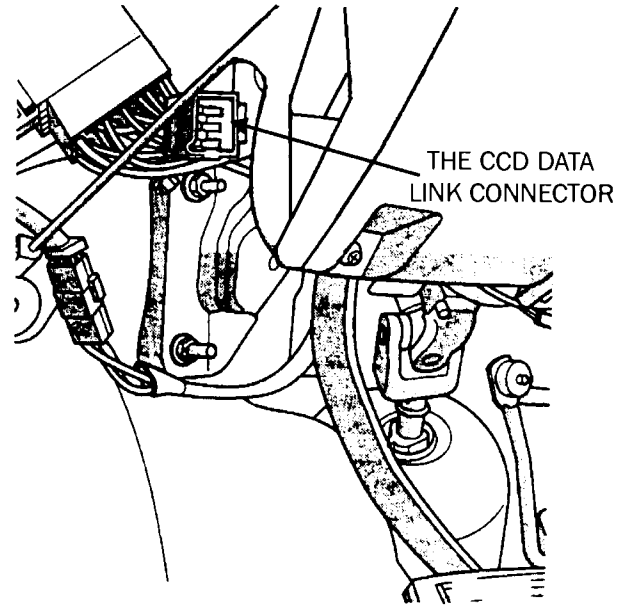


## EATX RELAY *continued* & CCD DATA LINK CONNECTOR LOCATION

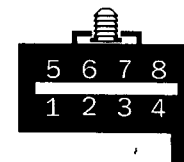
### EATX RELAY *continued*



88-92 AA, AC, AY, AG, AJ  
89-95 AS  
93-95 AC, AY

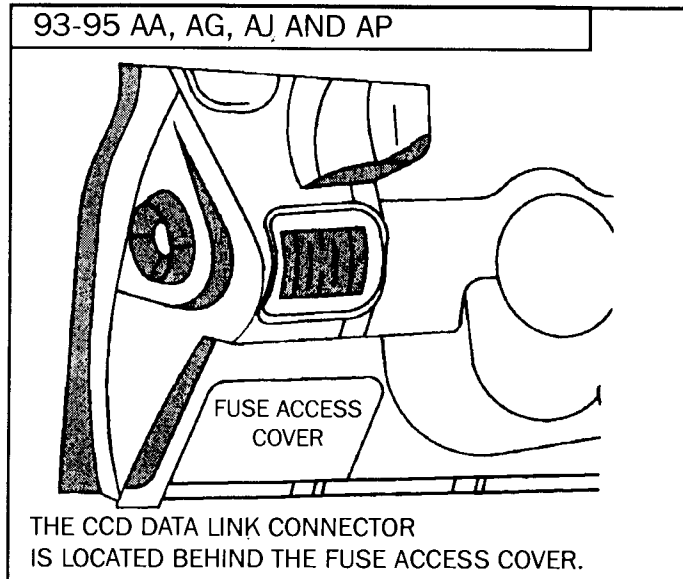


Early 89 vehicles utilized only 4 pins in the light blue CCD data link connector. Midyear the connector went to the full 6 pins and remained light blue in color

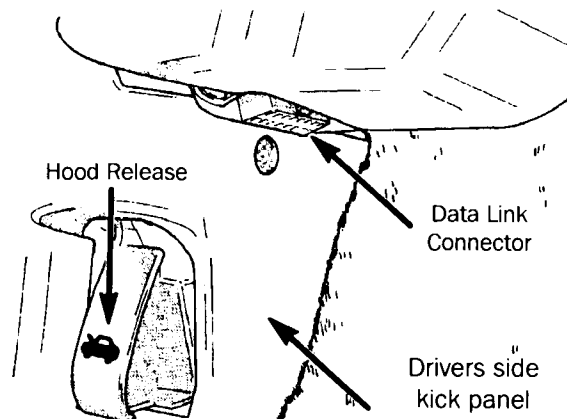


In 1995 the CCD data link connector was replaced by an 8 pin black connector. The previous 6 way scan tool connector will still link up.

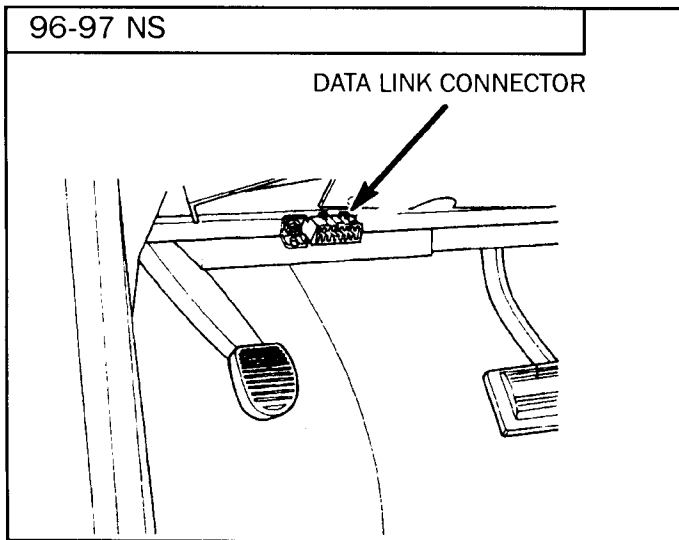
### CCD DATA LINK CONNECTOR



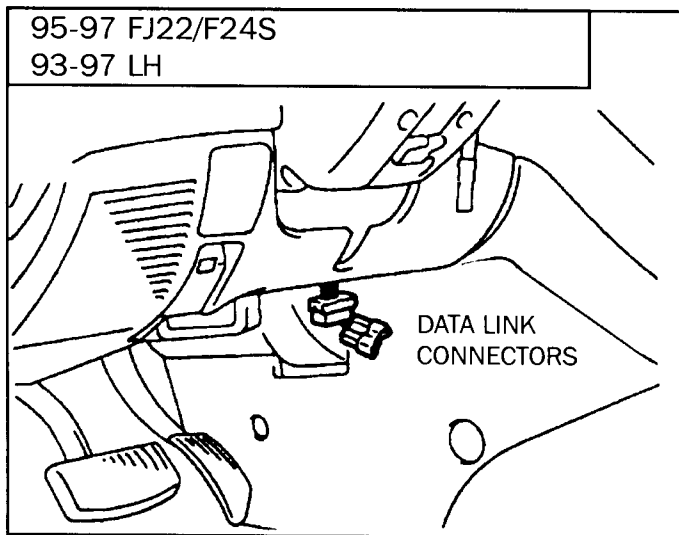
95-97 JA/AX



## DATA LINK LOCATION *continued* & TERMINAL IDENTIFICATION



- 89-94 AA, AS 89-93 AC 93-94 AP  
90-93 AY, AG 90-95 AJ 93-95 LH
- 1....SCI Receive (Vehicle with ABS)
  - 2....Battery (12V)
  - 3....Serial Data Bus (-) (2.5 V)
  - 4....Serial Data Bus (+) (2.5 V)
  - 5....SCI Transmit (Vehicle with ABS)
  - 6....Ground (0.1 V or less)



### 8 WAY DATA LINK TERMINAL I.D.

- 94-95 AS  
95 AA
- 
- 1....SCI Receive (Engine)
  - 2....SCI Receive (Vehicle with ABS)
  - 3....Battery (12V)
  - 4....Serial Data Bus (-) (2.5 V)
  - 5....SCI Transmit (Engine)
  - 6....Serial Data Bus (+) (2.5 V)
  - 7....SCI Transmit (Vehicle with ABS)
  - 8....Ground (0.1 V or less)

### 4 & 6 WAY DATA LINK TERMINAL I.D.

- 89-94 AA, AS 89-93 AC 93-94 AP  
90-93 AY, AG 90-95 AJ 93-95 LH
- 
- 1....SCI Receive (Engine)
  - 2....SCI Receive (Vehicle with ABS)
  - 3....Battery (12V)
  - 4....Serial Data Bus (-) (2.5 V)
  - 5....SCI Transmit (Engine)
  - 6....Serial Data Bus (+) (2.5 V)

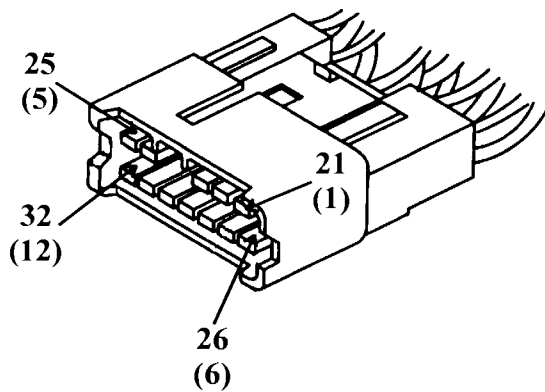
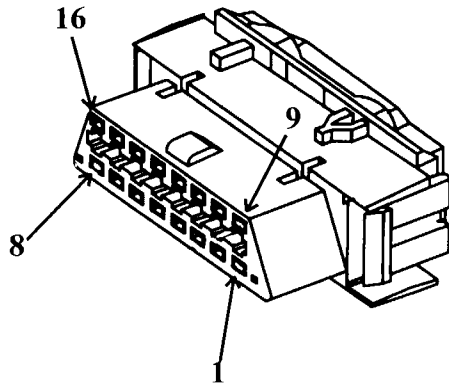


## Technical Service Information

### DATA LINK TERMINAL IDENTIFICATION *continued*

#### 12 & 16 WAY DATA LINK TERMINAL I.D.

95-96 FJ22/F24S



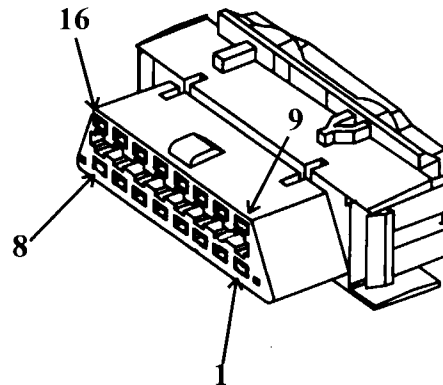
#### 16 WAY

- 1...Diagnostic Control Signal
- 4...Ground (0.1 V or less)
- 5...Ground (0.1 V or less)
- 6...Transmission Control
- 7...SCI Transmit
- 8...Brake Control
- 9...Transmission Control Module
- 12..SRS Air Bag Control
- 13..Speed Control CTRL
- 14..Simulated VSS
- 16..Battery (12V)

#### 12 WAY

- 25..Engine SCI Receive
- 26..Transmission Control Module SCI Receive
- 27..Serial Data Bus (+) (2.5 V)
- 28..Serial Data Bus (-) (2.5 V)

95-97 JA, JX  
96-97 NS  
96-97 LH



#### 16 WAY

- 3...Serial Data Bus (+) (2.5 V)
- 4...Ground (0.1 V or less)
- 5...Ground (0.1 V or less)
- 6...SCI Receive
- 7...SCI Transmit/ISO 9141K
- 11..Serial Data Bus (-) (2.5 V)
- 14..TCM SCI Receive (96-97 JA, JX, NS)
- 16..Battery (12V)

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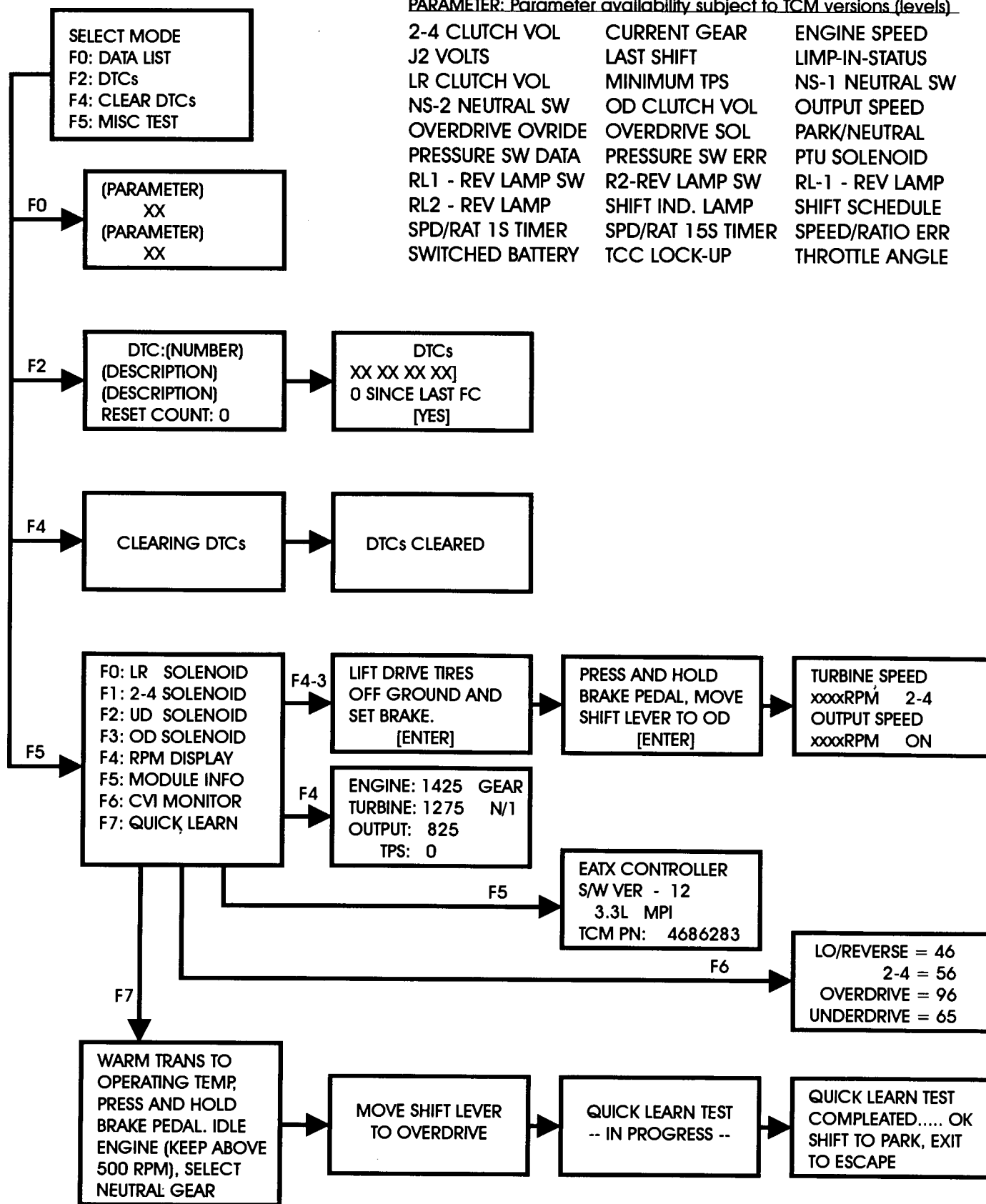


# Technical Service Information

## VETRONIX MASTERTECH SCANNER FLOW CHART

PARAMETER: Parameter availability subject to TCM versions (levels)

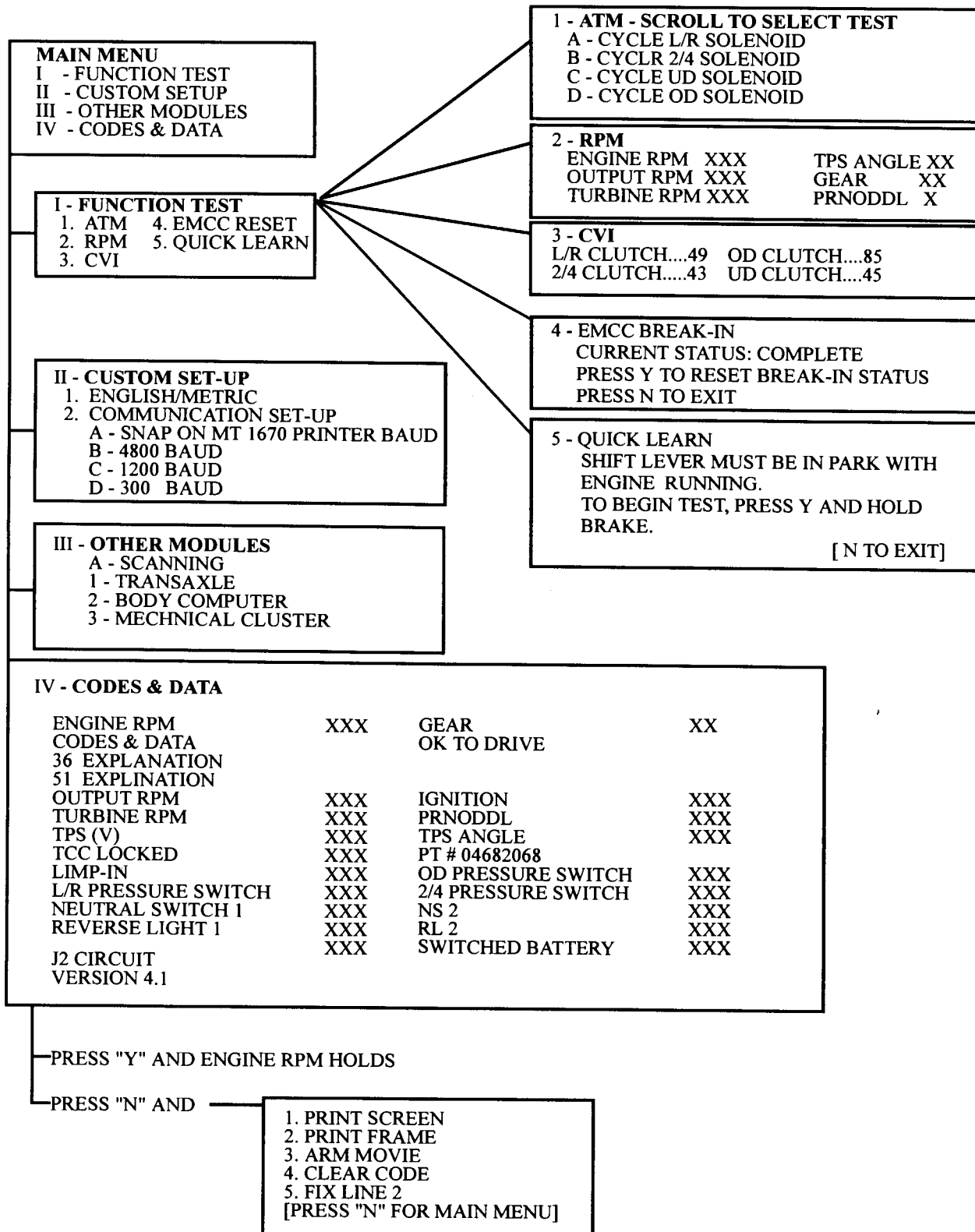
2-4 CLUTCH VOL	CURRENT GEAR	ENGINE SPEED
J2 VOLTS	LAST SHIFT	LIMP-IN-STATUS
LR CLUTCH VOL	MINIMUM TPS	NS-1 NEUTRAL SW
NS-2 NEUTRAL SW	OD CLUTCH VOL	OUTPUT SPEED
OVERDRIVE OVRIDE	OVERDRIVE SOL	PARK/NEUTRAL
PRESSURE SW DATA	PRESSURE SW ERR	PTU SOLENOID
RL1 - REV LAMP SW	R2-REV LAMP SW	RL-1 - REV LAMP
RL2 - REV LAMP	SHIFT IND. LAMP	SHIFT SCHEDULE
SPD/RAT 1S TIMER	SPD/RAT 15S TIMER	SPEED/RATIO ERR
SWITCHED BATTERY	TCC LOCK-UP	THROTTLE ANGLE





# Technical Service Information

## SNAP-ON MT 2500 SCANNER FLOW CHART Version 4.1 Primary Cartridge



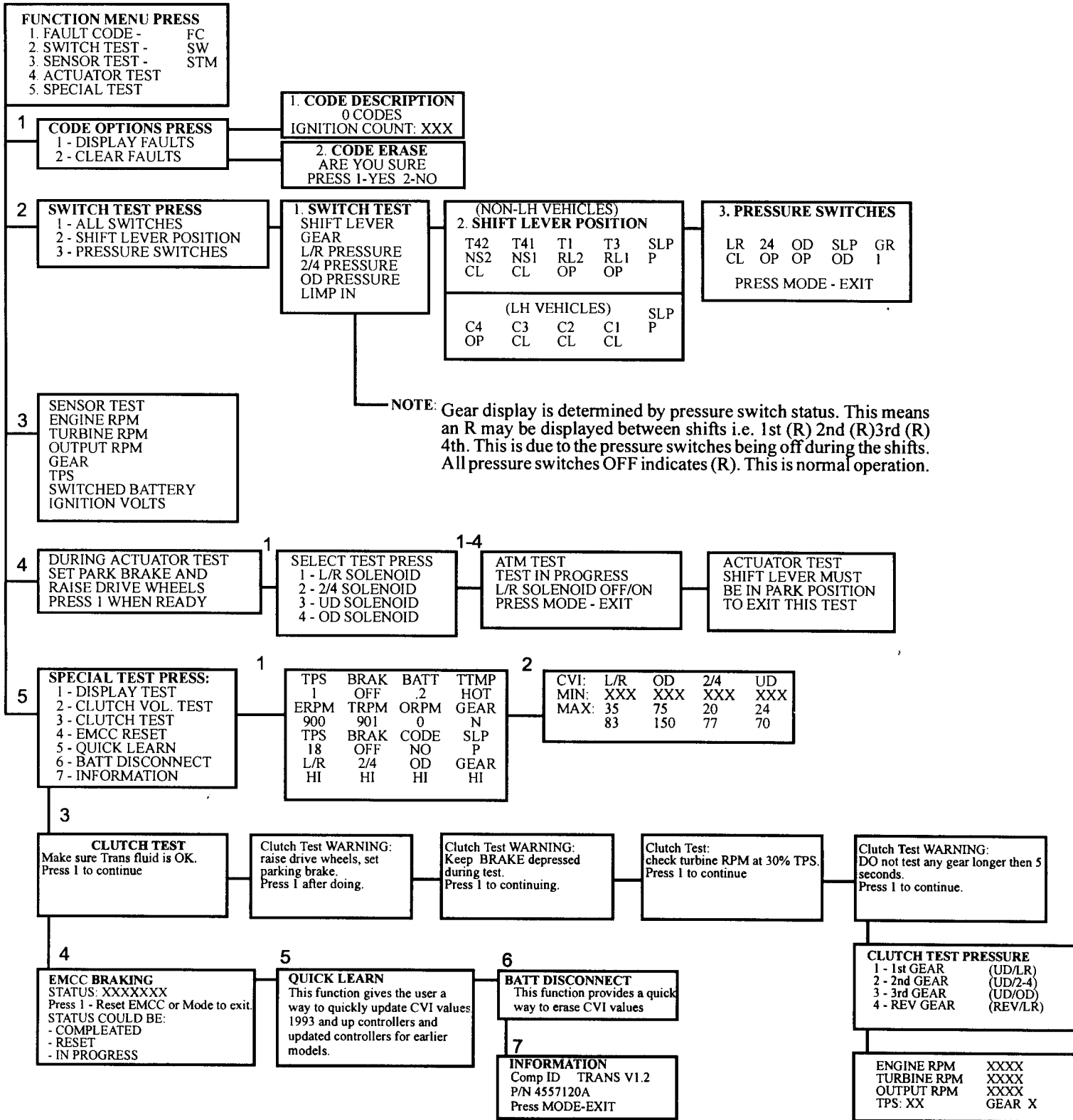


# Technical Service Information

## OTC MONITOR 4000-E SCANNER

### FLOW CHART

#### Pathfinder 95 Primary Cartridge





## Technical Service Information

### NO COMMUNICATION

#### NO COMMUNICATION:

A "NO COMMUNICATION" with a hand held scanner could be defined as two different complaints. One would be that the scanner is just not powering up when it is connected to the CCD Data Link Connector. The Second would be that the scanner is literally saying that there is no communication to the TCM (Transmission Control Module). When the scanner does not power up, it is usually due to low battery voltage, a blown fuse or a cut wire going to the CCD Data Link Connector. If the scanner powers up but provides a "No Communication" message, it is usually due to several possibilities. The scanner could be attached to the wrong diagnostic connector. It could have the wrong cartridge in the scanner or the controller in the vehicle is a newer version than that of the software being used in the cartridge. Or, the wrong information was entered into the scanner. To correct the condition of a no communication, perform the following steps:

1. Check the battery and charging system for proper operation as described on pages 3 through 5 and repair if necessary.
2. Check for battery voltage in the Data link connector with a volt meter by placing the negative lead to a good known ground and the positive lead to the appropriate terminal (See pages 11 and 12 for data link terminal identification). If 0 volts is seen, check for a cut power wire or a blown fuse. Fuses are model and year sensitive which accounts for the following fuse possibilities. Fuses 2, 7, 11, 13, 14, 15 or 23.
3. If battery voltage is present, check the ground wire by placing the negative meter lead to the appropriate terminal (See pages 11 and 12 for data link terminal identification). Place the positive meter lead to a good known ground. There should be 0.1 volt or less. If a higher voltage value is seen, clean or repair the ground wire.
4. Be sure that you are attached to the diagnostic connector located under the dash and not under the hood (See Pages 10 & 11 for Data Link Connector Location).
5. Verify that you have chosen the correct cartridge for the scanner. Most aftermarket scanners utilizes a 3 in one Domestic cartridge which contains the necessary software to communicate with the CCD system. All that would be needed is the proper CCD adapter connector to attach to the CCD Data Link Connector. The exception to this would be that there are cartridges produced by OTC and Snap-On which were strictly dedicated to the CCD system. This means that earlier 3 in 1 cartridges did not support CCD.
6. Another consideration if the previous checks are made and you still have a no communication problem would be that the version of software in the cartridge does not understand the controller version in the vehicle. In other words, even though you may have a 1989 vehicle, someone previous to you may have updated the controller to a version your scanner does not understand.
7. OTC's Monitor 4000E Enhanced has a specific cable that must be used or a no communication problem will occur. The cable to be used does not have a power lead going to the cigarette lighter. It is a single wire cable as the Data Link Connector on the vehicle will power up the scanner.
8. With Snap-On's MT2500 early cartridge, when choosing the CCD mode, be sure that you choose CCD SYSTEMS and not CCD SYSTEMS DEMO. Also, it is very easy to accidentally select ENGINE. You will certainly have a no communication problem trying to access the CCD system through the Engine program.



## NO MODULES RESPONDING

### NO MODULES RESPONDING:

A "NO MODULES RESPONDING" may be understood as a module on the CCD BUS System (in this case the TCM) is not responding to the request by the scanner for data. This problem may be defined or interpreted in several ways depending upon the scanner being used. For example, with the Snap-On MT2500 scanner, the message "No Module Responding" may appear on the Main Menu or it just does not display the "CCD Systems" as an option. At this time the Technician should verify the the ignition is in the ON position. If it is not, this may be the problem. Turn the ignition to the ON position. If the ignition is in the ON position, the problem may be that controller has lost its battery feed. Refer to step number 1 on this page.

With OTC Monitor 4000, the scanner displays the word EATX in the screen along side a number "1". The system can be entered by pressing the number "1" and then the "enter" button on the front panel . If the EATX controller (TCM) does not respond, an asterisk (\*) is displayed rather than the number 1 denying any access to the controller. At this time the technician should verify that the key is turned to the ON position. If it is not this may be the problem. Turn the ignition to the ON position. If the ignition is in the ON position and the asterisk does not change to a number 1, press number 4 for "Sys. Info" or 2 for "Bus Monitor" (These selections vary depending on which cartridge is being used). If a BUS Failure message appears, refer to the BUS Failure Section on page 21. If the list of all possible controllers on the BUS System appears on the scanner screen and the EATX controller (TCM) still has an asterisk next to it, the problem may be that controller has lost its battery feed. Go to step number 1 on this page.

1. Locate the TCM (See pages 6 and 7) and carefully unplug the 60 way connector.
2. With a DVOM set to DC volts, check for battery voltage on the J11 circuit at pin 56 as shown in Figure 7. If battery voltage is seen, go to the next step. If battery voltage is not seen, go to step 4.
3. If battery voltage is seen, keep the meter attached to pin 56 and begin to wiggle the wiring harness from the controller to the battery. While doing so, constantly monitor the meter to see if voltage is lost at any time during the wiggle test. If so, repair the break in the wire. If voltage is not lost, plug the 60 way connector back into the controller and attempt to re-enter the scanner. If you can, there was a bad connection to start with. If you still can not, the controller is bad and will need to be replaced.
4. If battery voltage is not seen, a fuse or a fusible wire may be blown. Fusible wires are color coded and can usually be found below and between the battery and driver side spring tower as shown in Figure 8. Refer to Figures 9 and 10 for fusible wire color or fuse number.

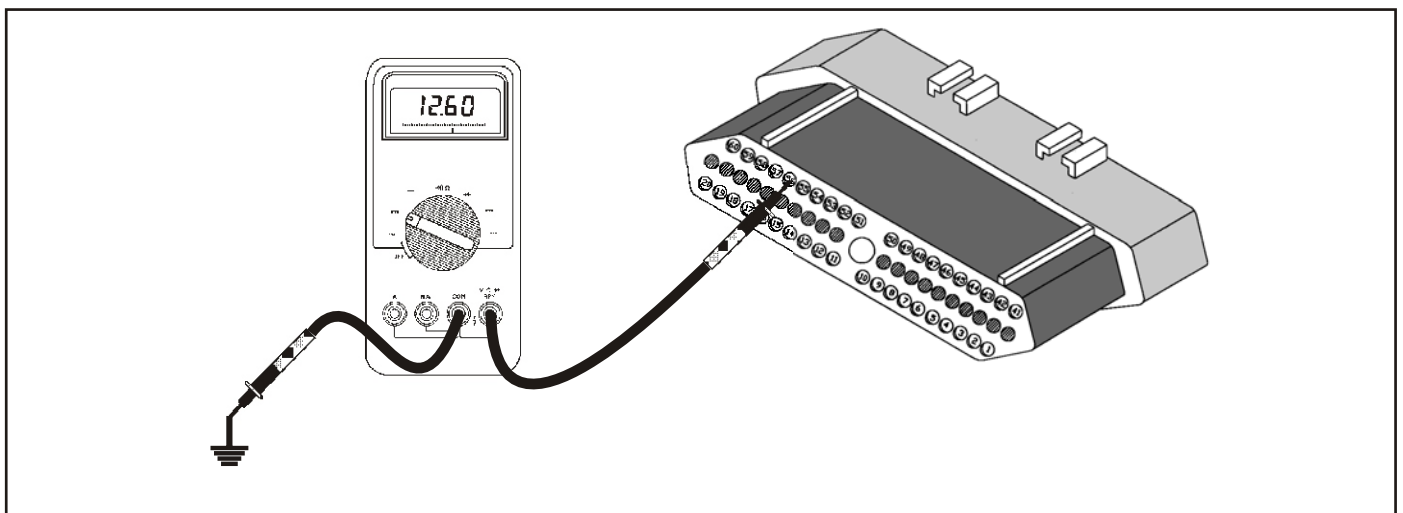
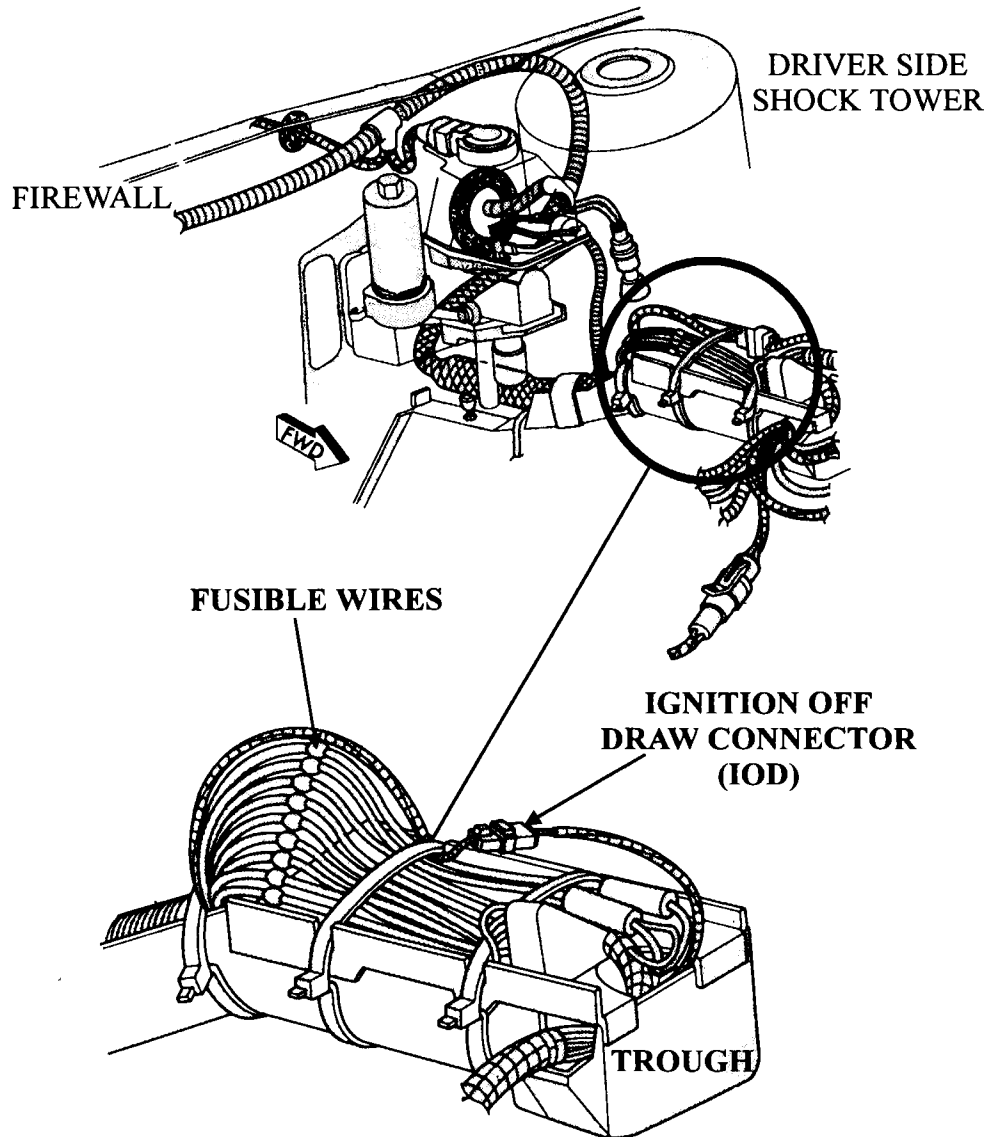


Figure 7



Typical view of both fusible link and IOD connector location. Not all vehicles have an IOD connector or a trough that the fusible links sit into. All fusible links are located behind and below the battery tray towards the driver side shock tower.

Figure 8



## Technical Service Information

### NO MODULES RESPONDING *continued*

#### 1989

Acclaim, Dynasty, New Yorker and Spirit..... White Fusible Link  
Caravan, Mini Ram Van & Voyager..... Orange Fusible Link

#### 1990

Acclaim and Spirit.....(IOD) - Orange Fusible Link  
Daytona.....(IOD) - Orange & or White Fusible Link  
Dynasty, 5th Avenue, Imperial and New Yorker.....(PDC) - Fuse J  
Lebaron Convertable and Coupe..... Orange & or White Fusible Link  
Caravan, Mini Ram Van & Voyager..... Battery Feed comes from Pin # 3 out of the SMEC

#### 1991

Acclaim, Lebaron Sedan and Spirit..... White Fusible Link  
Daytona, Lebaron Convertable and Coupe.....(PDC) - Fuse # 54  
Dynasty, 5th Avenue, Imperial, New Yorker.....(PDC) - Fuse J  
Caravan, Town & Country & Voyager.....(FB) - Fuse # 54

#### 1992

Acclaim, Lebaron Sedan and Spirit..... White Fusible Link  
Daytona, Lebaron Convertable and Coupe.....(PDC) - Fuse # 46  
Dynasty, 5th Avenue, Imperial, New Yorker.....(PDC) - Fuse J  
Caravan, Town & Country & Voyager.....(IOD) - Gray Fusible Link

#### 1993

Acclaim, Lebaron Sedan and Spirit..... Orange Fusible Link  
Daytona, Lebaron Convertable and Coupe.....(PDC) - Fuse # 55  
Dynasty, 5th Avenue, Imperial, New Yorker.....(PDC) - 30 Amp Fuse (Fuel Pump Trans)  
Shadow & Sundance..... White Fusible Link  
Caravan, Grand Caravan, Town & Country, Grand Voyager & Voyager..... Gray Fusible Link  
All LH vehicles.....(PDC) - Fuse A

#### 1994

Acclaim, Lebaron Sedan and Spirit..... White Fusible Link  
Daytona, Lebaron Convertable and Coupe.....(PDC) - Fuse # 55  
Shadow & Sundance..... White Fusible Link  
Caravan, Grand Caravan, Town & Country, Grand Voyager & Voyager.....(FB) - Fuse # 15  
All LH vehicles.....(PDC) - Fuse A

#### 1995

Avenger and Sebring (**NOTE: PIN # 51**)...FL5 30amp Ignition Fuse in Eng. comp. relay box.  
Cirrus and Stratus.....(PDC) - Fuse # 3  
Talon (**NOTE: PIN # 51**).....FL6 30amp Ignition Fuse in Eng. comp. relay box  
Daytona, Lebaron Convertable and Coupe.....(PDC) - Fuse # 55  
Caravan, Grand Caravan, Town & Country, Grand Voyager & Voyager.....(PDC) - Fuse # 15  
All LH vehicles.....(PDC) - Fuse B

Figure 9



## Technical Service Information

### NO MODULES RESPONDING *continued*

#### 1996

Avenger and Sebring (**NOTE: PIN # 51**).....J Block under left side of Instrument Panel - Fuse # 3  
Breeze, Cirrus, Stratus and Sebring Convertible..... (PDC) - Fuse # 3  
Talon (**NOTE: PIN # 51**).....J Block under left side of Instrument Panel - Fuse # 3  
Caravan, Grand Caravan, Town & Country, Grand Voyager & Voyager.....(PDC) - Fuse # 14  
All LH vehicles.....(PDC) - Fuse B

#### 1997

Breeze, Cirrus, Stratus and Sebring Convertible..... (PDC) - Fuse # 3  
Caravan, Grand Caravan, Town & Country, Grand Voyager & Voyager.....(PDC) - Fuse # 14  
All LH vehicles.....(PDC) - Fuse B

Figure 10

## BUS FAILURE or BUS INACTIVE

### BUS FAILURE or INACTIVE:

This complaint is not to be confused with a fault code 19. Fault code 19 is a BUS communication error where the transaxle computer (TCM) is not receiving information from the engine computer (SMEC). Refer to the index for the page number where this problem is covered in further detail. A BUS failure or BUS inactive problem is when the BUS system itself is inoperative and the scanner cannot communicate to any of the computers on the BUS system. The most common reason for this complaint is a bad connection at either the transaxle controller or the body controller or both. First unplug the TCM (For controller locations, refer to pages 6 and 7). Clean the terminal side of the 60 way connector and plug the controller back in and verify scanner communication. If there is still a BUS failure problem and the vehicle is **NOT** equipped with a body computer, the TCM is either bad and will need to be replaced or there is low battery voltage feeding the controller at either pin 11 or 56 (Refer to pages 19 and 20 for battery feed location and pages 3-5 for preliminary electrical checks).

If the vehicle is equipped with a body computer (See Figure 11 for body controller location), unplug and clean its connector. After plugging it back in, verify scanner communication. If a BUS failure still remains, the body computer may need to be replaced. There is not a sure method in determining which controller is causing the BUS failure. When a vehicle is not equipped with a body computer, it is safe to determine that the TCM is bad causing the concern. If it is equipped with a body computer, it could be either controller. However, the body computer would be the most likely cause of the problem. The reason is that the body controller is the computer controlling the voltage in the BUS system. So if there is a BUS failure, the most likely candidate would be the controller responsible for putting the voltage into the BUS system.

The majority of vehicles are equipped with both a body controller and a TCM. Vehicles NOT equipped with a body computer are, all Spirit and Acclaim vehicles, all 1989 and 1990 Vans and some Lebarons. In these cases, the EATX controller would be suspect.

### BODY CONTROLLER

The body controllers in vans is located behind the center of the dash left of the steering column. Passenger cars have the body controller located behind the passenger side kick panel (See Figure 11).

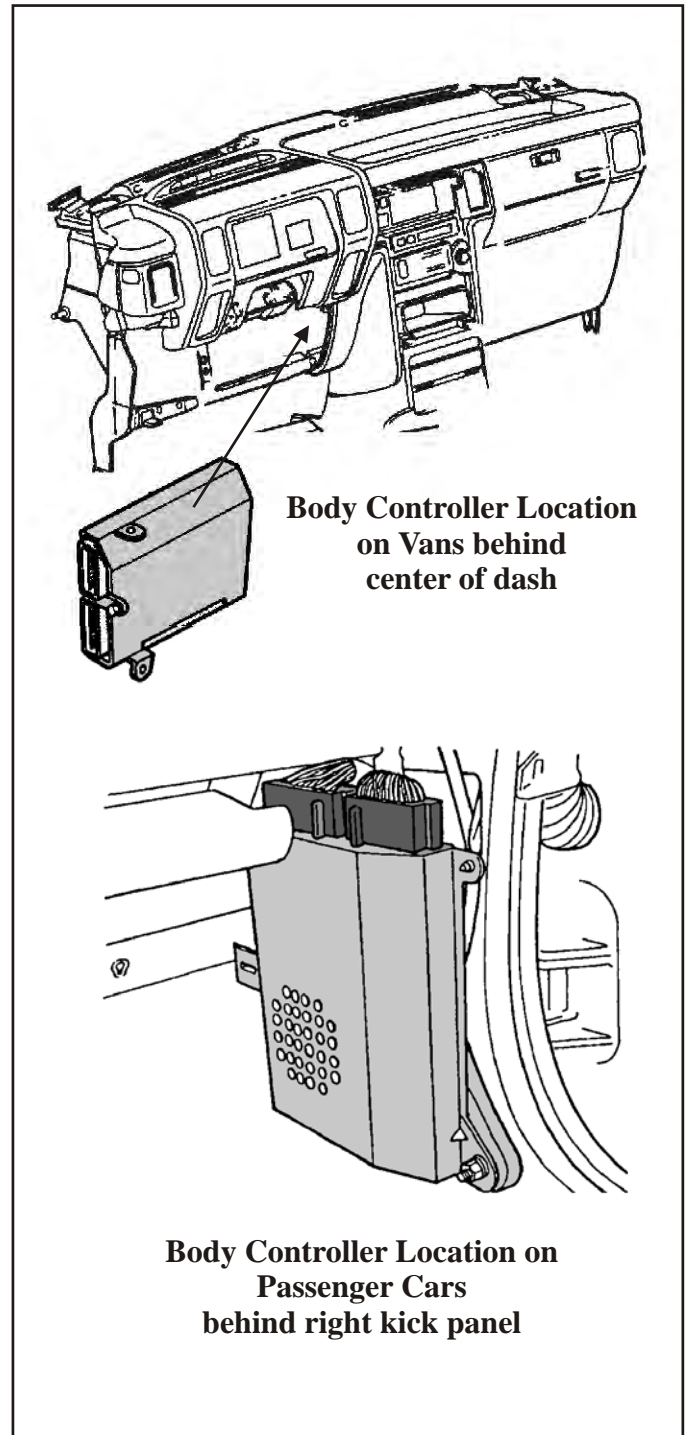


Figure 11



# Technical Service Information

## 41TE & 42LE OBDII DIAGNOSTIC TROUBLE CODE LIST

Fault Code	Description	Limp-in Set	MIL Illumination Late Models Only	OBDII Codes
11	Internal TCM	YES	YES	P0700
12	Battery was disconnected	YES	NO	P1792
13	Internal TCM	YES	YES	P0700
14	Transmission Relay Output Always On	YES	YES	P1767
15	Transmission Relay Output Always Off	YES	YES	P1768
16	Internal TCM	YES	YES	P0605
17	Internal TCM	YES	YES	P0605
18	Engine Speed Sensor Circuit	YES	YES	P0725
19	BUS Communication with Engine Module	YES	NO	P0600
20	Switched Battery	YES	YES	P1765
21	OD Pressure Switch Sensor Circuit	YES (Pre-96)	YES	P1780
22	2/4 Pressure Switch Sensor Circuit	YES	YES	P1781
23	2/4 & OD Pressure Switch Sensor Circuit	YES (Pre-96)	N/A	P1782
24*	L/R Pressure Switch Circuit	NO	YES	P1783
25	LR & OD Pressure Switch Sensor Circuit	YES (Pre-96) N/A (96/97)	N/A	P1784
26	L/R & 2/4 Pressure Switch Sensor Circuit	YES (Pre-96) N/A (96/97)	N/A	P1785
27	All Pressure Switch Circuits	YES (Pre-96) N/A (96/97)	N/A	P1786
28	Check Shifter Signal	NO	NO	P0705
29*	Throttle Position Sensor	NO	YES	P0120

\* In 1997, Codes 24, 29, 37, 38, 47 and 50 through 58 can take up to 5 minutes of substituted gear operation to illuminate the MIL. When using the DRBIII these faults can be found in "OBD II" Diagnostics, "One-Trip Faults". They are OBD II codes waiting to mature.



## Technical Service Information

### 41TE & 42LE OBDII DIAGNOSTIC TROUBLE CODE LIST

<b>Fault Code</b>	<b>Description</b>	<b>Limp-in Set</b>	<b>MIL Illumination Late Models Only</b>	<b>OBDII Codes</b>
31	OD Hydraulic Pressure Switch Circuit	YES	YES	P1787
32	2/4 Hydraulic Pressure Switch Circuit	YES	YES	P1788
33	2/4 & OD Hydraulic Pressure Switch Circuit	YES	YES	P1789
35	Loss of Prime	NO	NO	P1791
36	Fault Immediately After Shift	NO	NO	P1790
37 *	Solenoid Switch Valve Stuck in the TCC Position	NO	YES	P1775
38 *	TCC Apply Failure	NO	YES	P0740
41	LR Solenoid Circuit	YES	YES	P0750
42	2/4 Solenoid Circuit	YES	YES	P0755
43	OD Solenoid Circuit	YES	YES	P0760
44	UD Solenoid Circuit	YES	YES	P0765
45	Internal TCM	NO	YES	P1795
46	3-4 Shift Abort	NO	NO	P0783
47*	Solenoid Switch Valve Stuck in the L/R Position	YES	YES	P1776
48	TRD Link Communication Error	NO	NO	P1793

\* In 1997, Codes 24, 29, 37, 38, 47 and 50 through 58 can take up to 5 minutes of substituted gear operation to illuminate the MIL. When using the DRBIII these faults can be found in "OBD II" Diagnostics, "One-Trip Faults". They are OBD II codes waiting to mature.



## Technical Service Information

### 41TE & 42LE OBDII DIAGNOSTIC TROUBLE CODE LIST

<b>Fault Code</b>	<b>Description</b>	<b>Limp-in Set</b>	<b>MIL Illumination Late Models Only</b>	<b>OBDII Codes</b>
50*	Gear Ratio Error in Reverse	YES	YES	P0730
51*	Gear Ratio Error in 1st	YES	YES	P0731
52*	Gear Ratio Error in 2nd	YES	YES	P0732
53*	Gear Ratio Error in 3rd	YES	YES	P0733
54*	Gear Ratio Error in 4th	YES	YES	P0734
56*	Input Speed Sensor Error	YES	YES	P0715
57*	Output Speed Sensor Error	YES	YES	P0720
58*	Speed Sensor Ground	YES	YES	P1794
60	Inadequate L/R Clutch Volume	NO	NO	P1770
61	Inadequate 2/4 Clutch Volume	NO	NO	P1771
62	Inadequate OD Clutch Volume	NO	NO	P1772
70	Autostick Sensor Circuit	NO	NO	P1796
71	Manual Shift Overheat	NO	NO	P1797
72	Temperature Sensor	NO	NO	P0710
73	Worn Out/Burnt Transaxle Fluid	NO	NO	P01798
74	Calculated Oil Temp. in Use	NO	NO	P01799
75	Repairing High Temperature Operations Activated	NO	NO	N/A
76	Repairing Power-Up At Speed	NO	NO	N/A

\* In 1997, Codes 24, 29, 37, 38, 47 and 50 through 58 can take up to 5 minutes of substituted gear operation to illuminate the MIL. When using the DRBIII these faults can be found in "OBD II" Diagnostics, "One-Trip Faults". They are OBD II codes waiting to mature.



## INTERNAL CONTROLLER FAILURE CODES 11, 13, 16, 17 & 45

CODE	FAULT	LIMP-IN
11	Watchdog circuit test - Internal controller failure	YES
13	Watchdog circuit shutdown - Internal controller failure	YES
16	Read Only Memory check - Internal controller failure	YES
17	Random Access Memory check - Internal controller failure	YES
45	EEPROM Memory - Internal controller failure	NO

### POSSIBLE CAUSES



- *Low or high controller feed voltage.*
- *Corroded or open controller ground wires.*
- *Defective or corroded 60 way controller connector.*
- *Defective EATX Controller.*

### DIAGNOSTIC STEPS



- Perform the *Preliminary Electrical Checks* outlined starting on page 3. Be sure to use the chart on page 5 when testing the controller's main ground wires.
- Inspect the 60 way controller connector for corrosion, distortion and/or cracks in the connector, pushed back or spread pin cavities. Particularly the power and ground wire pins (See Figure 12).
- If the above checks prove good, the controller will need to be replaced.

### SERVICE INFORMATION



- 60 Way Connector Repair Kit.....4419491
- 60 Way Wire Repair Kit.....4419479
- TCM.....Consult Dealer

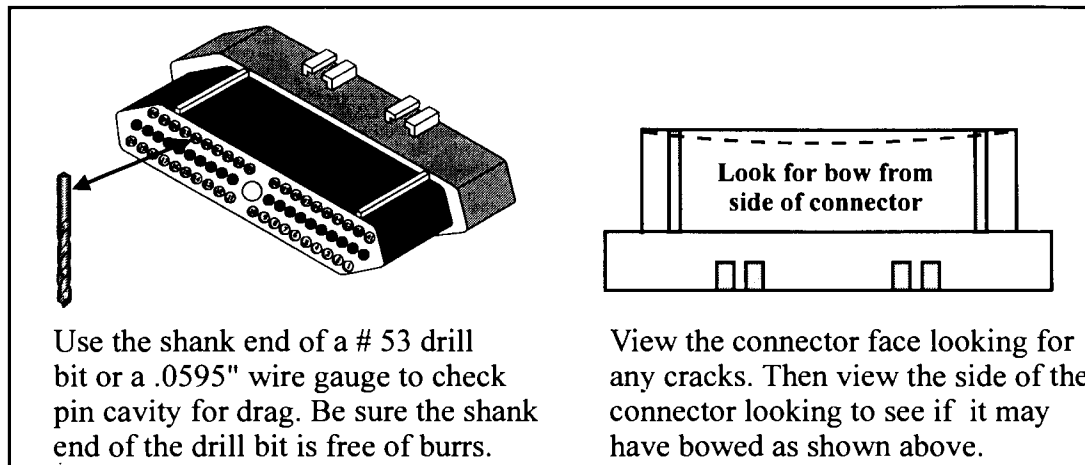


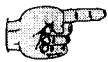
Figure 12

## BATTERY DISCONNECTED CODE 12

CODE	FAULT	LIMP-IN
12	Loss of direct battery feed	NO*

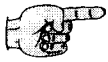
\* At the time of direct battery feed being lost to the controller the vehicle would be in a limp mode condition. The code itself as it remains in memory does not cause a limp in condition.

### POSSIBLE CAUSES



- *Battery disconnected.*
- *60 way controller connector unplugged.*
- *Spread terminal cavity at pin # 56.*
- *Defective fusible wire in the direct battery feed circuit to the controller.*

### DIAGNOSTIC STEPS



- If the battery was not disconnected and the 60 way controller connector was not unplugged, pin cavity # 56 in the 60 way connector will have to be checked for pin drag and battery voltage.
- Unplug the 60 way connector and check for pin drag at the # 56 cavity using the shank end of a # 53 drill bit or .0595" wire gauge as shown in Figure 12. Repair if necessary.
- With the connector unplugged, check cavity # 56 for battery voltage (See Figure 13). While checking for voltage, wiggle the main wiring from the battery to the controller. If battery voltage is lost during this wiggle test, a bad fusible link or a break in the wire has occurred (See Figure 8 for fusible wire location). In Figures 9 and 10 a Fusible Wire Chart can be found showing vehicle application and fusible wire color. In some applications a typical fuse is used and is noted. If a broken wire is in the harness, a continuity check is required at different points across the wire to locate the break.

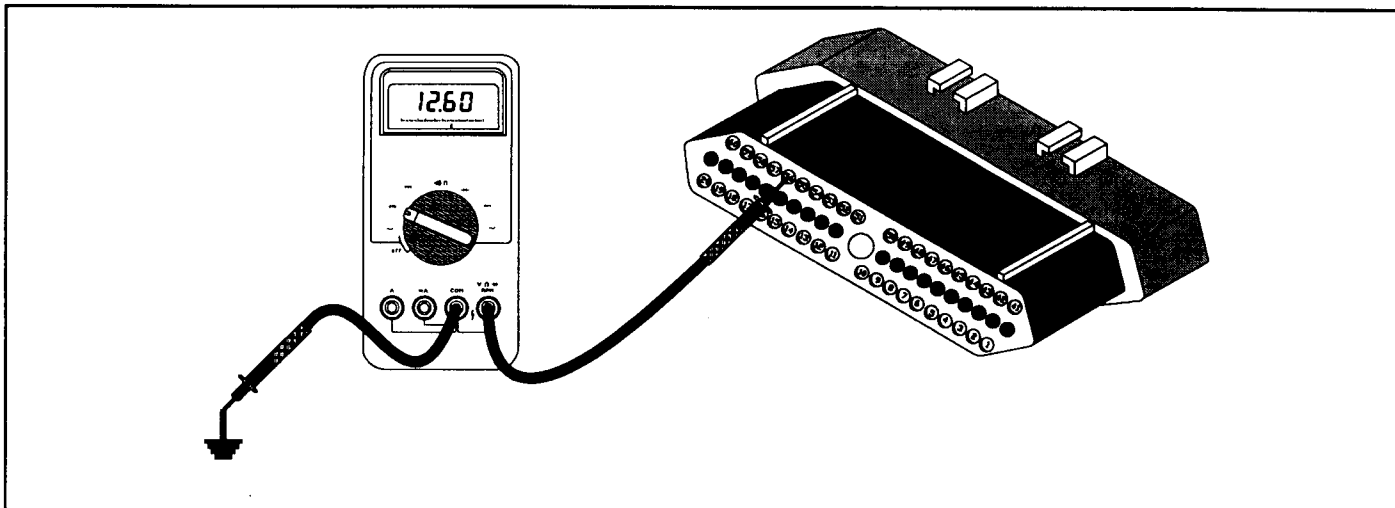


Figure 13



## Technical Service Information

### BULLETIN

#### **FAILSAFE WITH CODE 12 OR NO CODES AT ALL or FAILSAFE WITH NO MODULES RESPONDING or FAILSAFE WITH EATX RELAY PRODUCING A LOUD CLICKING NOISE**

**COMPLAINT:** Vehicle stuck in a failsafe condition with a scanner read out of either a code 12 or 15 or no codes at all. Other symptoms may be the scanner indicates that the transaxle module is not responding, a sudden loss of communication, or that the EATX relay exhibits a loud clicking noise.

**CAUSE:** The two most common causes for the above condition is either a defective EATX relay or a bad fuse or fusible wire. This fuse or fusible wire supplies keep alive battery voltage to 56 at the TCM and switched battery voltage to the EATX relay.

**CORRECTION:** First replace the EATX relay with a known good relay (Refer to pages 8-10 for relay location). If the problem remains, a quick method to verify a bad fuse or fusible wire is to locate wire 56 at the TCM. Carefully remove some of the insulation from the wire and connect battery voltage to the wire with a jumper wire (See Figure 14). Once connected, if all symptoms are removed, a defective fuse or fusible wire is the problem. To assist on locating the defective fusible link, all fusible links are color coded and can be found below and between the battery and driver side spring tower (See Figure 8). Refer to the chart in Figures 9 and 10 which cross references the fusible link color identification to the vehicle make and year.

#### **SERVICE INFORMATION:**

Fusible links are ordered by color and wire gauge.

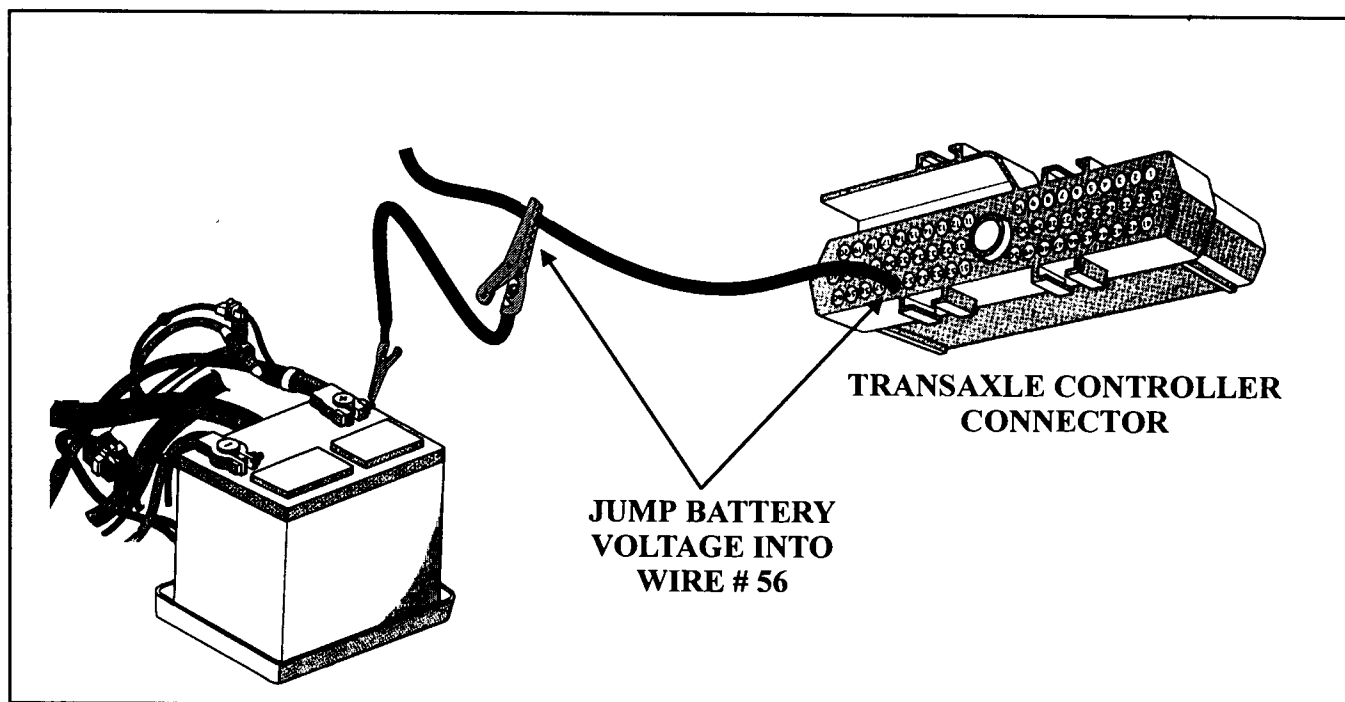


Figure 14

## EATX RELAY/SWITCHED BATTERY CODES 14, 15 & 20

CODE	FAULT	LIMP-IN
14	EATX Relay Output Always On	YES
15	EATX Relay Output Always Off	YES
20	Switched Battery Malfunction	YES

### POSSIBLE CAUSES FOR CODES 14 or 15



- Defective EATX Relay or relay connector.
- Terminals 15, 16 or 17 defective in the Controller connector.
- Severed or open wires in the EATX relay output or direct battery feed circuit.
- Shorted to power in the EATX relay output circuit wires.
- Defective controller

### POSSIBLE CAUSES FOR CODE 20



- Defective EATX Relay.
- Short to power in wire harness from solenoid body to controller or relay.
- Defective controller.

### DIAGNOSTIC STEPS FOR CODES 14 & 15 (Code 20 see page 31)



- Replace the EATX relay, refer to pages 8 through 10 for location. If the problem remains, move to the next step. **Tip:** The reverse lamp relay and EATX relay are the same and can be interchanged. As a quick check, swap the relays. You must keep the selector lever in Reverse for 5 to 10 minutes. If the lights go out, the relay is bad or the contacts need to be cleaned. If the transaxle system works well while the reverse lights exhibits a problem, replace the relay.
- Unplug the EATX relay. Using a volt meter set to DC volts, verify that direct battery feed is present in the connector as shown in Figure 15. If battery voltage is not seen, a severed wire, a blown fuse or fusible wire may need to be repaired (See Figures 8 through 10). If battery voltage is seen, go to the next step.

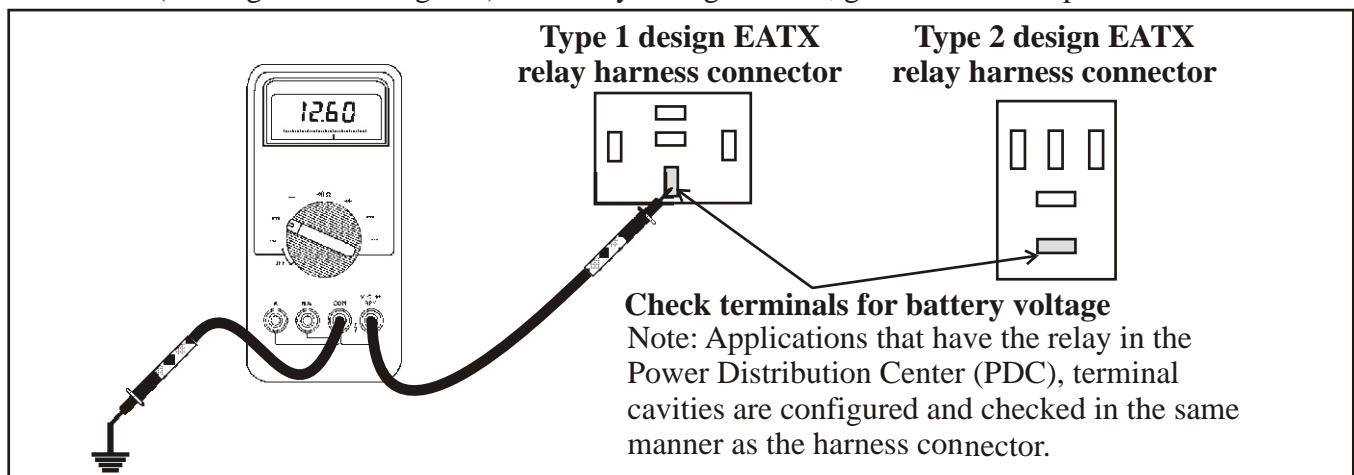


Figure 15

**EATX RELAY/SWITCHED BATTERY CODES**  
**14, 15 & 20 *continued***

**DIAGNOSTIC STEPS FOR CODES 14 & 15**



- Keep the EATX relay unplugged. Unplug both the TCM and solenoid body connector. Place the DVOM to an ohm setting. Maintain the negative meter lead to a good known ground. With the positive meter lead carefully probe terminals 15, 16 and 17 in the controller connector as shown in Figure 16. An open circuit should be seen on all three wires. If an ohm reading is seen, a short to ground has occurred on the wire revealing the reading and will need to be repaired. If an open circuit is seen on all three wires, go to the next step.
- Check for continuity between the EATX relay connector and terminal 15 in the TCM connector as shown in Figure 17. If an open is seen, repair the break in the wire. If continuity is seen, go to the next step.

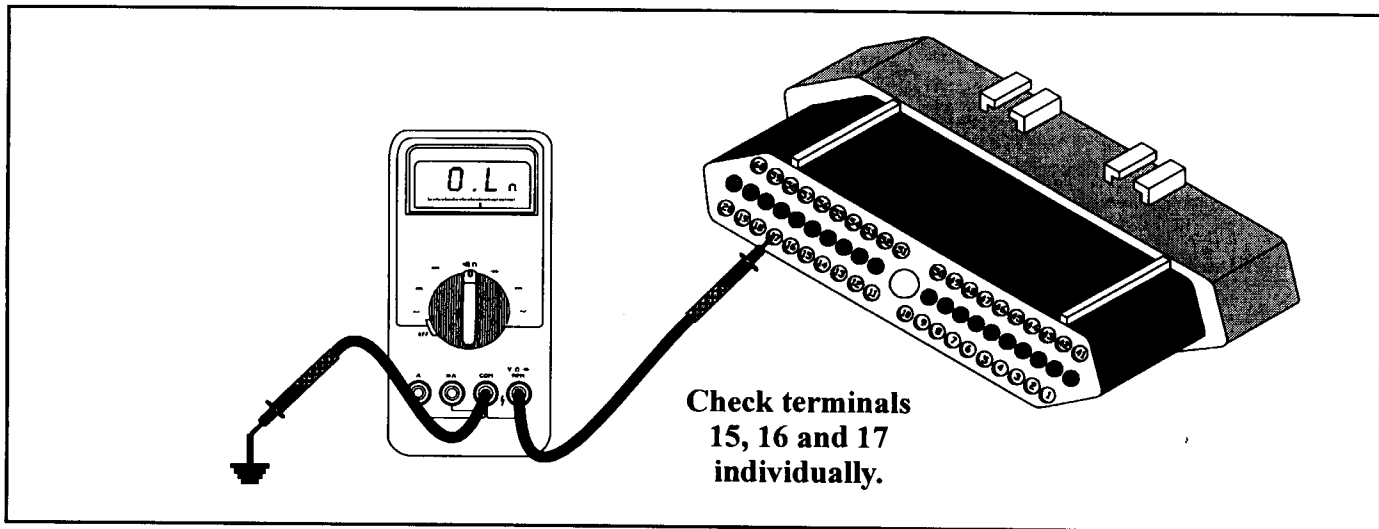


Figure 16

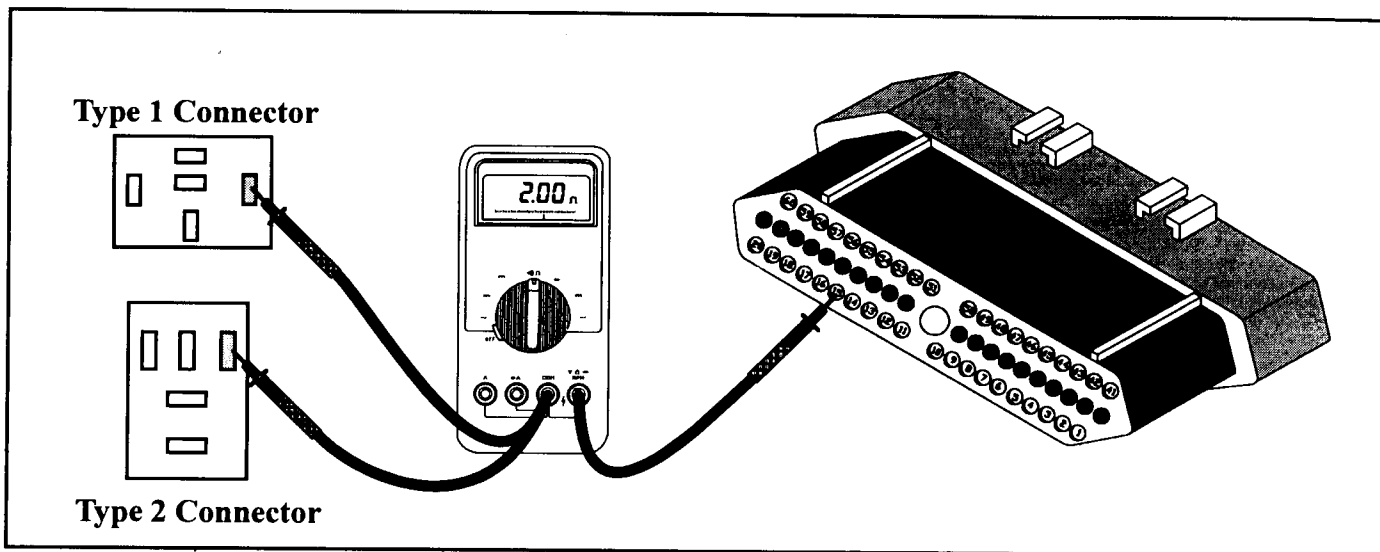
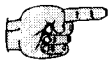


Figure 17

**EATX RELAY/SWITCHED BATTERY CODES**  
**14, 15 & 20 *continued***

**DIAGNOSTIC STEPS FOR CODES 14 & 15**



- Check for continuity between the relay connector and terminals 16 and 17 in the controller connector as shown in Figure 18. If an open is seen, repair the break in the wire that shows the open circuit. If continuity is seen, go to the next step.
- Check for continuity between the ground terminal on the battery to the terminal in the relay connector as shown in Figure 19. If an open is seen, repair the wire. If an open is not seen, go to the next step.
- Replace the TCM.

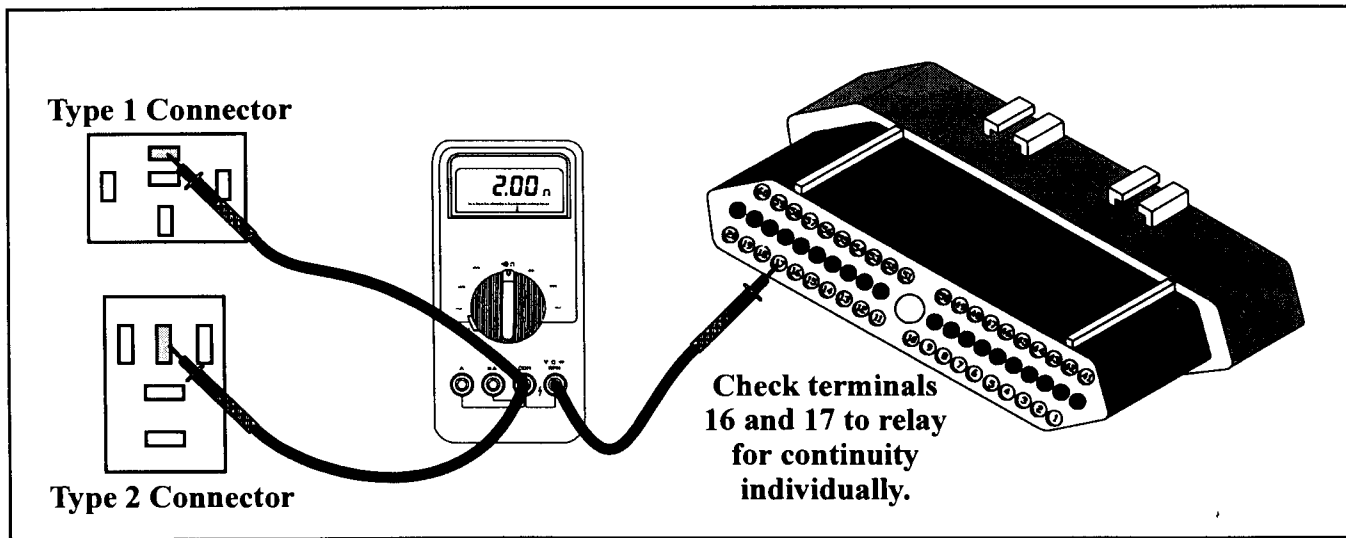


Figure 18

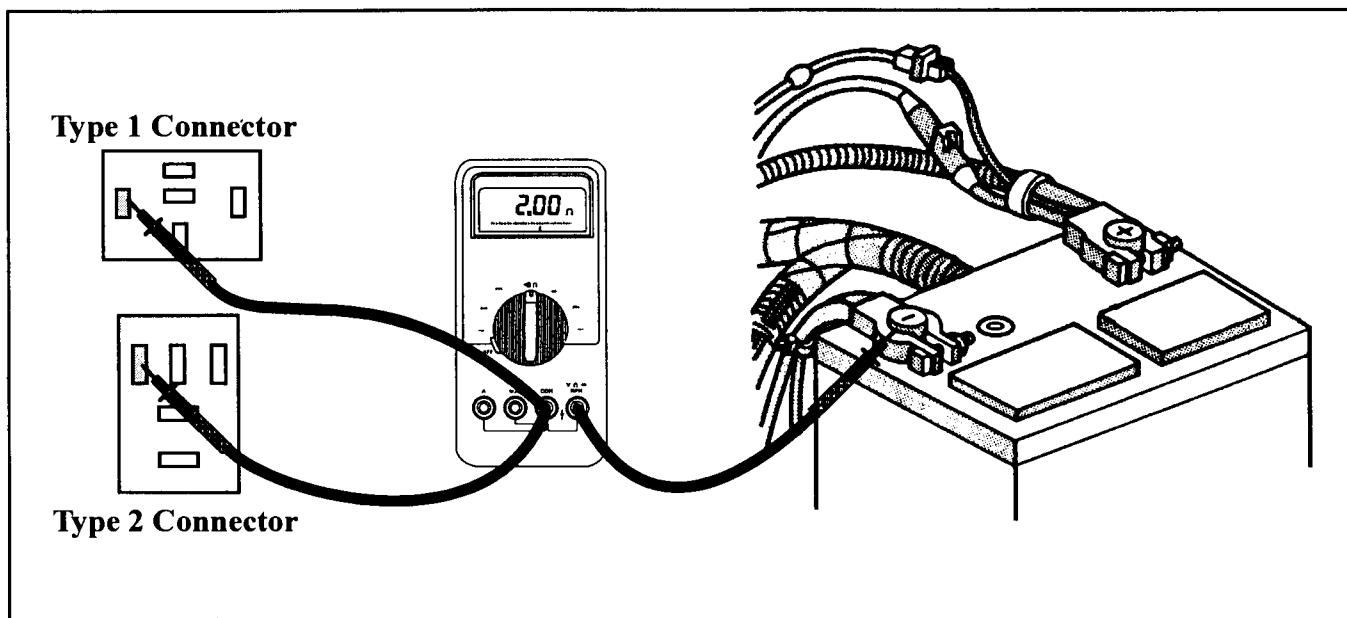


Figure 19

## EATX RELAY/SWITCHED BATTERY CODES 14, 15 & 20 *continued*

### DIAGNOSTIC STEPS FOR CODE 20



- Replace the EATX relay, refer to pages 8 through 10 for location. If the problem remains, move to the next step. **Tip:** *The reverse lamp relay and EATX relay are the same and can be interchanged. As a quick check, swap the relays. You must keep the selector lever in Reverse for 5 to 10 minutes. If the lights go out, the relay is bad or the contacts need to be cleaned. If the transaxle system works well while the reverse lights exhibit a problem, replace the relay.*
- Unplug the controller and place the DVOM to a DC volt setting. With the negative lead place to a good known ground, carefully inspect terminals 9, 47 and 50 with the positive meter lead (See Figure 20). If a volt reading is seen on any one of these three terminals, a short to power has occurred somewhere in the harness from the solenoid body connector to the controller. Repair the short to power or run a new wire or wires from the solenoid body to the controller. Terminal 9 in the controller goes to terminal 3 in the solenoid body connector. Terminal 47 in the controller goes to terminal 1 in the solenoid body connector. Terminal 50 in the controller goes to terminal 2 in the solenoid body connector. If no volts is seen, go to the next step.
- Replace the controller.

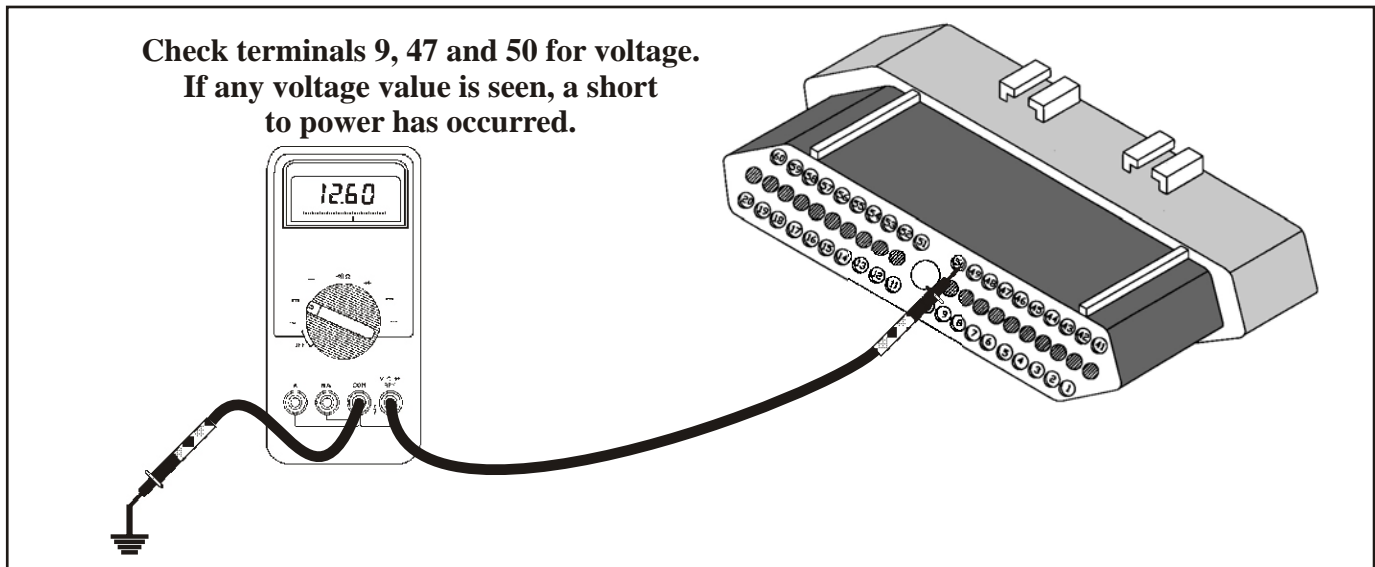


Figure 20

## ENGINE SPEED SENSOR CIRCUIT CODE

### 18

CODE	FAULT	LIMP-IN
18	Engine Speed Sensor Circuit	YES*

### POSSIBLE CAUSES



- *Defective Distributor Signal (89-95 3.0L vehicles) or Engine Crank Sensor (all other vehicles).*
- *Open or shorted Distributor Signal or Engine Crank Sensor wires.*
- *The wrong TCM has been installed onto the vehicle.*
- *A defective Transmission Control Module harness connector (TCM).*
- *A defective Powertrain Control Module harness connector (PCM).*
- *A defective TCM.*
- *A defective PCM.*

### DIAGNOSTIC STEPS



- Verify that the proper controller is on the vehicle. The controller's part number can be viewed through the scanner if the white tag is missing off of the controller itself. Refer the part number to your local dealer to verify its proper application. If the right controller is on the vehicle, go to the next step.
- Check for an RPM reading with the scanner at idle in Park on both the Data Link Connector under the dash for the TCM and the Engine Data Link Connector under the hood for the PCM. If an RPM reading is seen from the data link connector for the PCM and not from the TCM, the crank sensor or distributor signal is functioning indicating that either the TCM is defective or there is an open in the wiring to the TCM. For this problem, go to the appropriate TCM RPM check procedure as there is a test for 3.0 Liter and a separate test for 3.3L, 3.8L and LH vehicle applications.  
If a 0 rpm signal is observed from both controllers, a bad PCM, wiring, crank sensor or distributor signal could be the problem. If this is occurring, go to the PCM check procedure on page 36.

### TCM RPM CHECK PROCEDURE (3.0L)



- With a DVOM set to DC volts, carefully back probe wire 45 at the TCM with the positive meter lead and place the negative meter lead to a good known ground (See Figure 21). With the key on and engine off, an 8 to 9 volt pulse should be seen as the crank shaft is turned by hand. If a voltage pulse is observed, the TCM needs to be replaced. If no volts are observed, go to the next step. *Note:* A square wave form is shown in Figure 22 for those that have oscilloscope testing capabilities (Test is performed with vehicle running).
- Go to the distributor and locate a wiring harness coming out from the bottom of the distributor. Trace the harness downstream away from the distributor until you locate the round 4 wire plug as shown in Figure 23. Unplug this 4 way connector and the TCM connector. Perform a continuity check across terminal 2 in the distributor vehicle harness connector to the number 51 wire in the TCM connector as indicated in Figure 24. If there is no continuity, repair or replace the wire. If continuity is seen, go to the next step.



**ENGINE SPEED SENSOR CIRCUIT CODE**  
**18 continued**

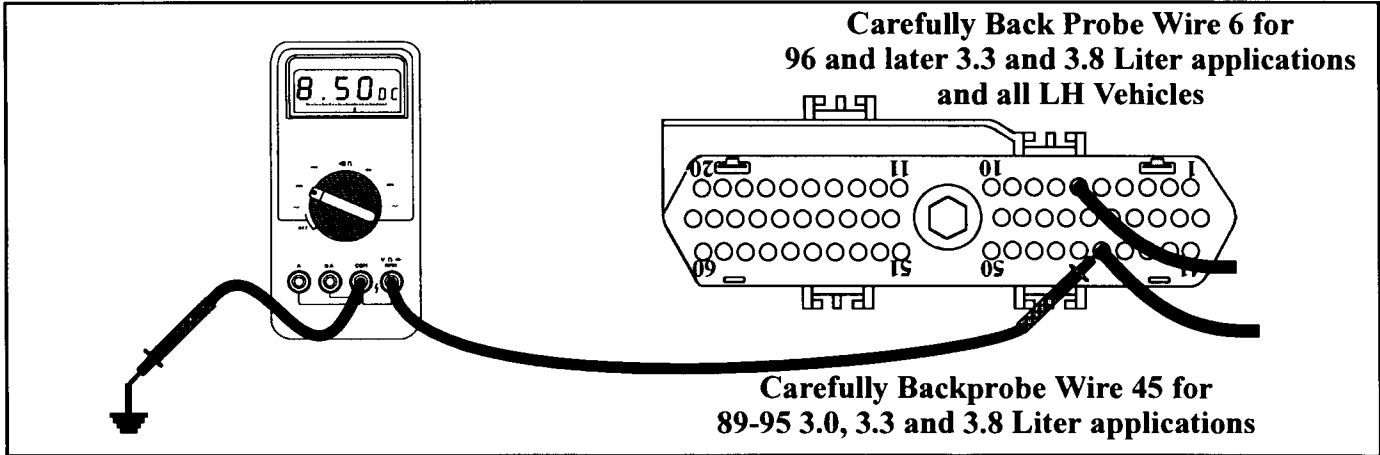


Figure 21

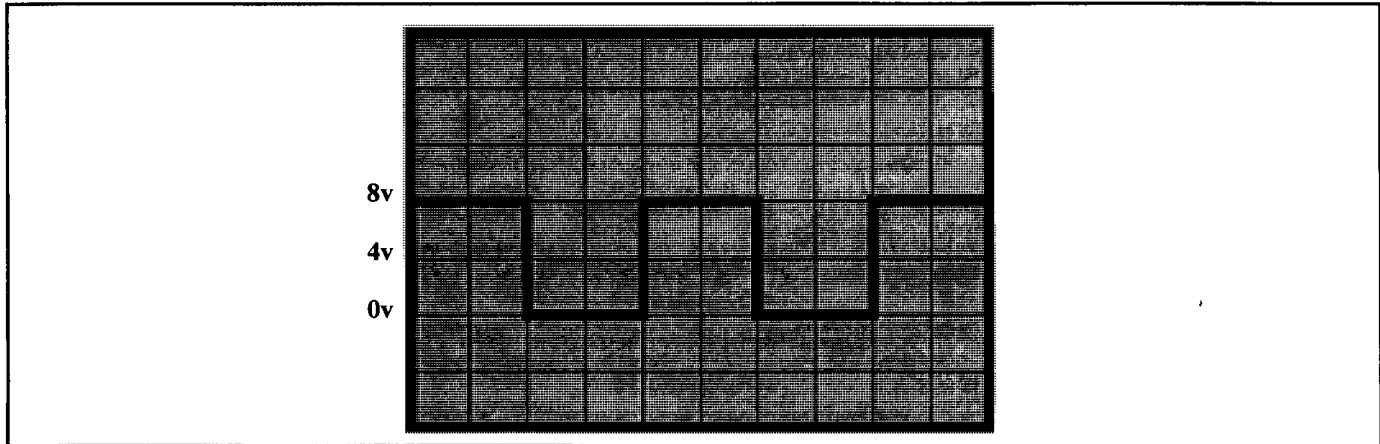


Figure 22

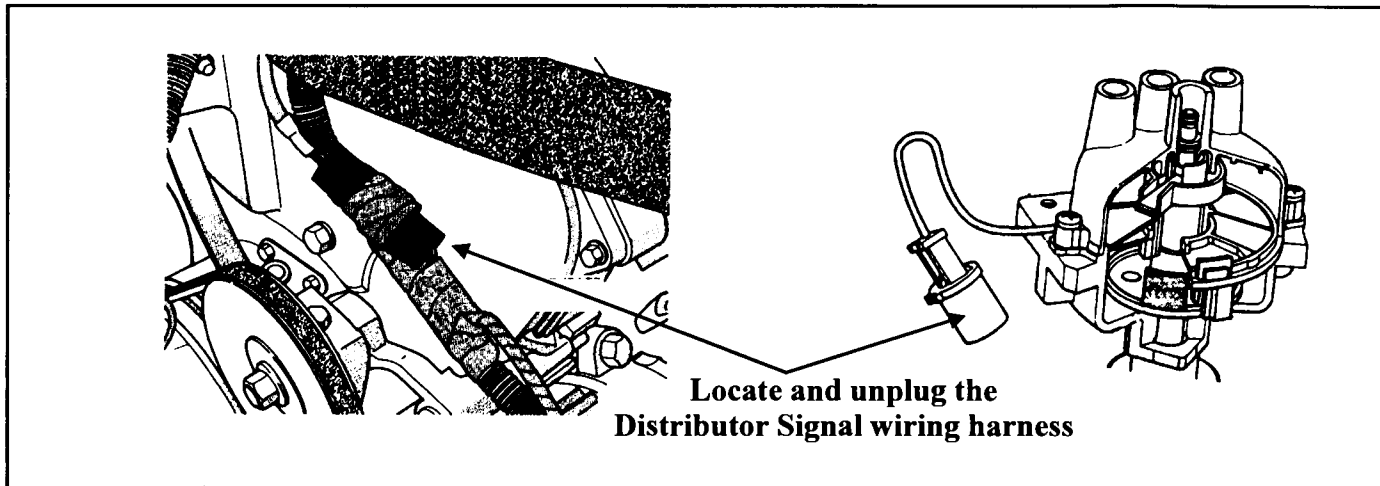


Figure 23

## ENGINE SPEED SENSOR CIRCUIT CODE

### 18 *continued*

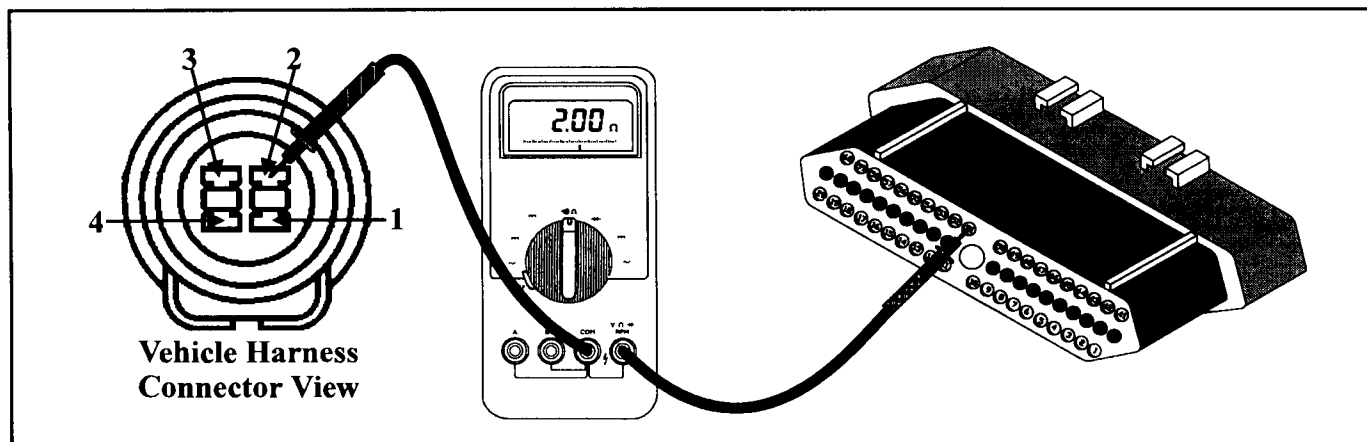


Figure 24

### TCM RPM CHECK PROCEDURE (3.0L) *continued*



- Perform a continuity check across terminal 1 in the distributor vehicle harness connector to the number 45 wire in the TCM connector as indicated in Figure 25. If there is no continuity, repair or replace the wire.

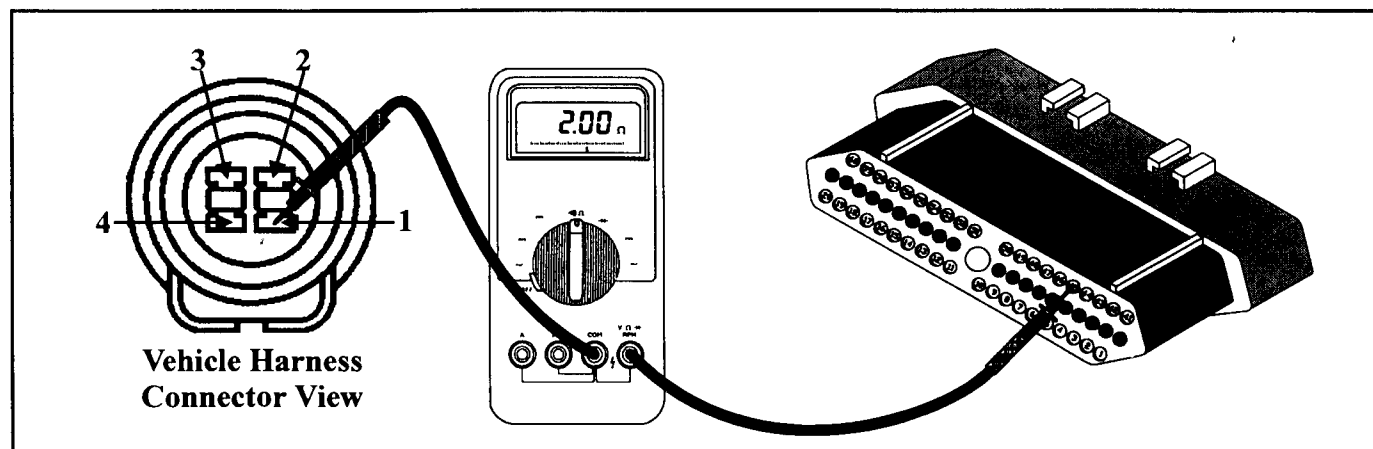


Figure 25

## ENGINE SPEED SENSOR CIRCUIT CODE 18 *continued*

### TCM RPM CHECK PROCEDURE (3.3 & 3.8L & LH Vehicles)



- With a DVOM set to DC volts, using the positive meter lead carefully back probe wire 45 at the TCM for **89-95** 3.3 and 3.8L applications. For all LH vehicles and 96 and later 3.3 and 3.8L applications, back probe wire 6 at the TCM. Place the negative meter lead to a good known ground (See Figure 21). With the key on and engine off, approximately an 5 to 9 volt pulse should be seen as the crank shaft is turned by hand. If a voltage pulse is observed, the TCM needs to be replaced. If no volts are observed, go to the next step.
- Locate the crank sensor as shown in Figure 26. Unplug both the crank sensor and the TCM. For **89-95** 3.3 and 3.8L applications perform a continuity check across terminal 1 in the crank sensor connector to terminal 45 in the TCM connector. For all LH vehicles and 96 and later 3.3 and 3.8L, check across terminal 3 in the crank sensor connector to terminal 6 in the TCM connector (See Figure 27). If there is no continuity, repair or replace the wire.

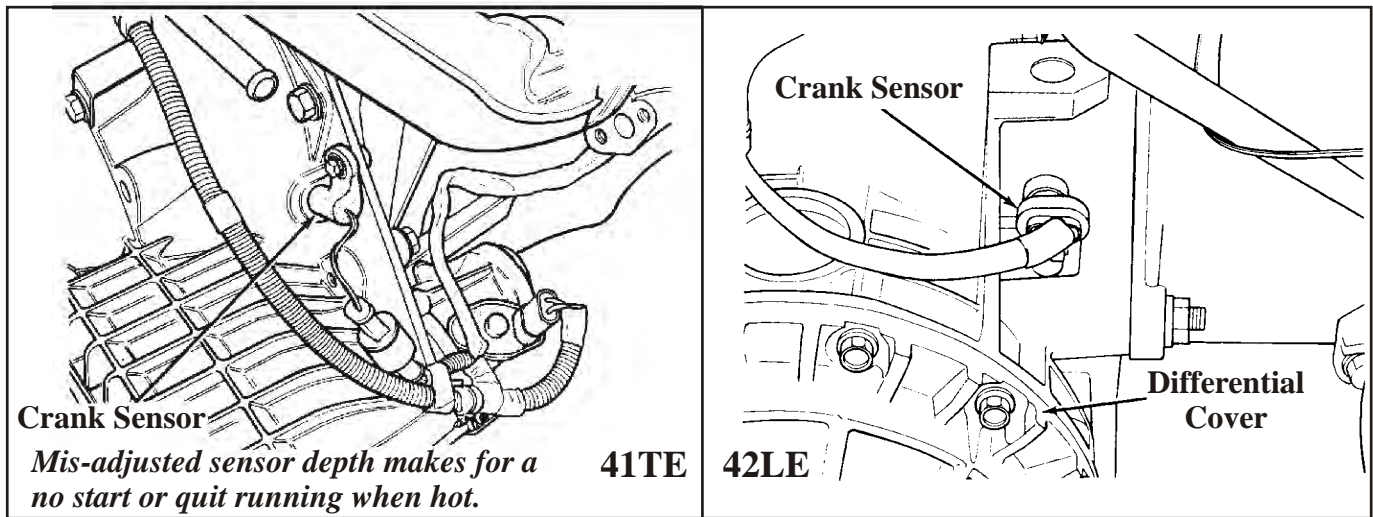


Figure 26

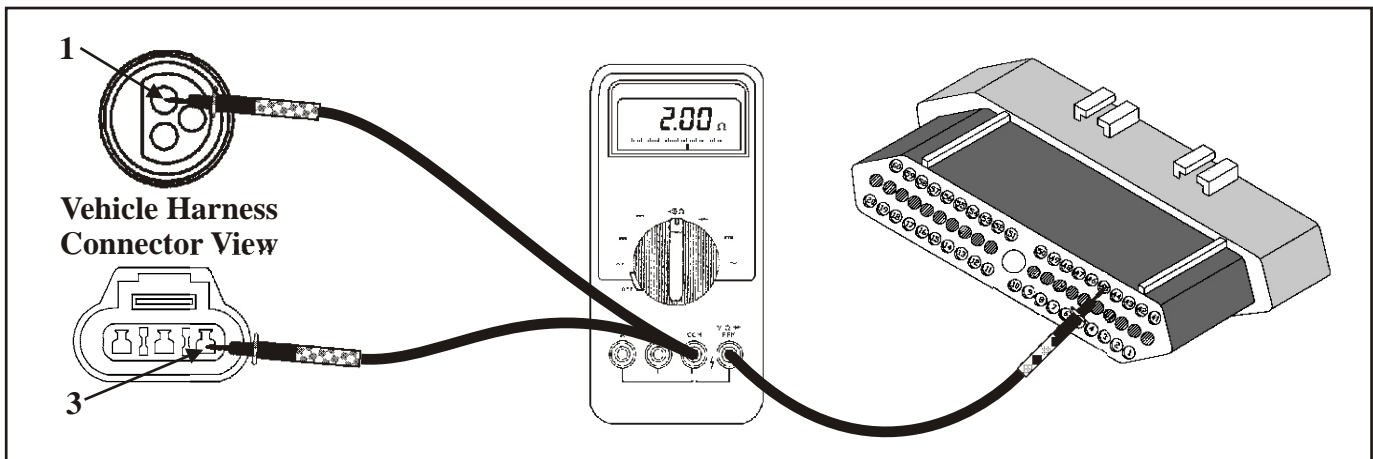


Figure 27

## ENGINE SPEED SENSOR CIRCUIT CODE

### 18 *continued*

#### PCM RPM CHECK PROCEDURE



- A no RPM signal to both controllers would most likely prevent the vehicle from actually running. The engine may crank but never run. This problem usually occurs with the larger liter engines that have a defective or mis-positioned crank sensor. There are times where this sensor will be very erratic, the engine will start but stall when coming to a stop or when you place the transmission into gear. If these symptoms are being experienced, a defective or mispositioned crank sensor is the most likely cause. To properly adjust the sensor, a self sticking .030" spacer is available from Chrysler under part number 5252229. This is to be placed onto the end of the sensor and the sensor is installed into the case until the spacer hits the flywheel. The sensor is then bolted into place. When the engine is cranked, the flywheel will rub the spacer off. If after adjustment has been made and the vehicle will still not run, go to the next step.
- The engine computer (PCM) supplies an 8 to 9 volt feed to the Distributor signal on 3.0L vehicles and 5 to 9 volts to the crank sensor on 3.3 and larger liter engines. If an RPM signal can not be viewed from either the PCM or TCM, first check to see if the PCM is supplying the proper voltage. This can be done by placing the negative lead to ground and carefully back probe wire # 7 in the PCM for all 89 to 95 vehicles. (See Figure 28). Vehicles 1996 and later, carefully back probe terminal 44. If voltage is not seen, replace the PCM. If feed voltage is seen, check the connector from the distributor signal sensor connector or the crank sensor connector for bad or pushed out terminals. If the connector checks good, change the sensor.

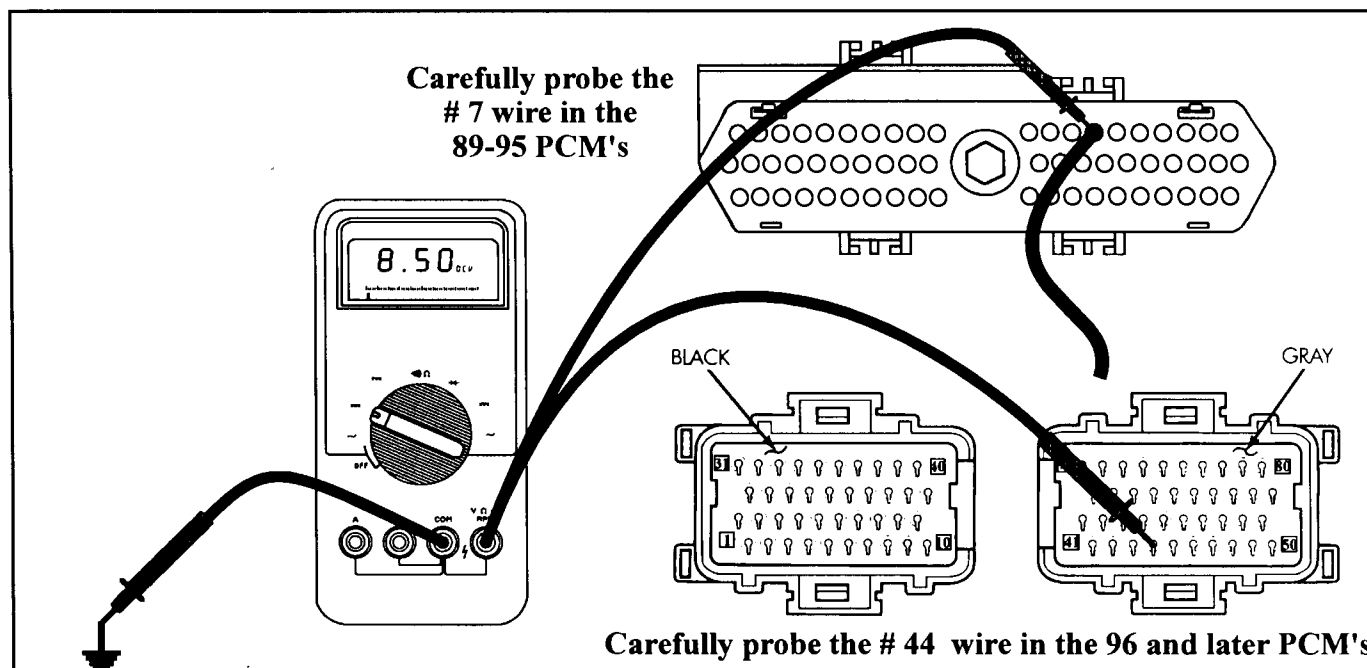


Figure 28

**BUS COMMUNICATION ERROR CODE  
19**

CODE	FAULT	LIMP-IN
19	Bus Communication Error	NO

**POSSIBLE CAUSES**

- *Factory Manuals indicate that a code 19 may be produced by having an open or shorted wire in the Bus Communication circuit. The Bus Communication circuit is a pair of twisted wires used to transfer information to the scanner as well as between two or more controllers depending on the year and make of a vehicle. It has been ATSG's experience that if the biasing voltage in the Bus System is ever interrupted by a permanent short or open or a bad controller, a Bus FAILURE would occur and NOT a code 19 for a Bus Communication error. Refer to page 21 if you have a Bus Failure problem Code 19 means the Transmission Control Module (TCM) is not receiving any information from the Engine Control Module (PCM).*

*Possible causes:*

- *Corroded or defective TCM Connector*
- *Corroded or defective PCM Connector*
- *Defective TCM*
- *Defective PCM*

**DIAGNOSTIC STEPS**

- Unplug and inspect both the TCM and PCM connectors. If necessary, clean or repair the connectors. After plugging the connectors back into the TCM and PCM, drive the vehicle for several miles and see if code 19 returns. If code 19 returns, go to the next step.
- At this point either the TCM or PCM is bad. There is not a diagnostic step which can positively verify which controller has failed. It has been ATSG's experience that the TCM is the most likely controller that has failed producing this code.

## PRESSURE SWITCH CIRCUITS 21, 22, 23, 24, 25, 26, 27, 31, 32, 33

CODE	FAULT	LIMP-IN
21	OD Pressure Switch Circuit	YES
22	2/4 Pressure Switch Circuit	YES
23	2/4 & OD Pressure Switch Circuits	YES
24	LR Pressure Switch Circuit	YES
25	LR & OD Pressure Switch Circuits	YES
26	LR & 2/4 Pressure Switch Circuits	YES
27	All Pressure Switch Circuits	YES
31	OD Hydraulic Pressure Switch	YES
32	2/4 Hydraulic Pressure Switch	YES
33	OD & 2/4 Hydraulic Pressure Switches	YES

### POSSIBLE CAUSES



- *Low fluid/Bad filter or filter O'ring/Pump cavitation*
- *Defective Solenoid Body*
- *Defective or corroded Solenoid Body 8 way connector*
- *Open or shorted wiring from the Solenoid Body to the TCM*
- *Defective or corroded TCM 60 way connector*
- *Defective TCM*
- *Defective Valve Body*

### DIAGNOSTIC STEPS



- If any of the above pressure switch codes are present before overhaul, it is possible that a low fluid level or restricted filter may be the cause. It is suggested to inspect both the fluid level as well as the filter and filter O ring. Correct or replace if necessary. Obviously if the filter is loaded with converter clutch material, the unit would need to come out for other repairs. For codes 21, 22 or 24, refer to pages 44 and 49 before performing the following diagnostic steps.
- Inspect cavities 1, 2 and 3 in the solenoid body 8 way connector for being spread, corroded or pushed back to far. Use the shank end of a # 43 drill bit or a .089" wire gauge to check the terminal for pin drag (See Figure 29). Vehicles equipped with the 41TE transaxle have a connector repair kit available from Chrysler under part number 4419476 if connector replacement is needed.

**PRESSURE SWITCH CIRCUITS**  
**21, 22, 23, 24, 25, 26, 27, 31, 32, 33 continued**

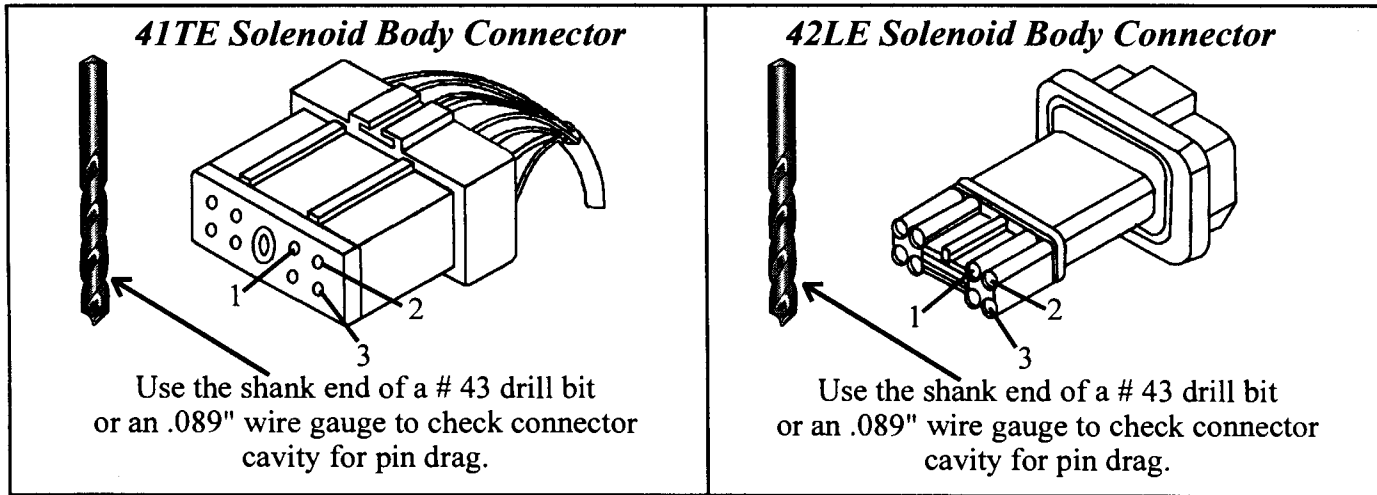


Figure 29

**DIAGNOSTIC STEPS**



- Inspect cavities 9, 47 and 50 in the TCM 60 way connector for being spread, corroded or pushed back to far. Use the shank end of a # 53 drill bit or a .0595" wire gauge to check the terminal for pin drag (See Figure 30). A connector repair kit available from Chrysler under part number 4419479 if connector replacement is needed.
- If the 60 way connector is good, go to the next step.

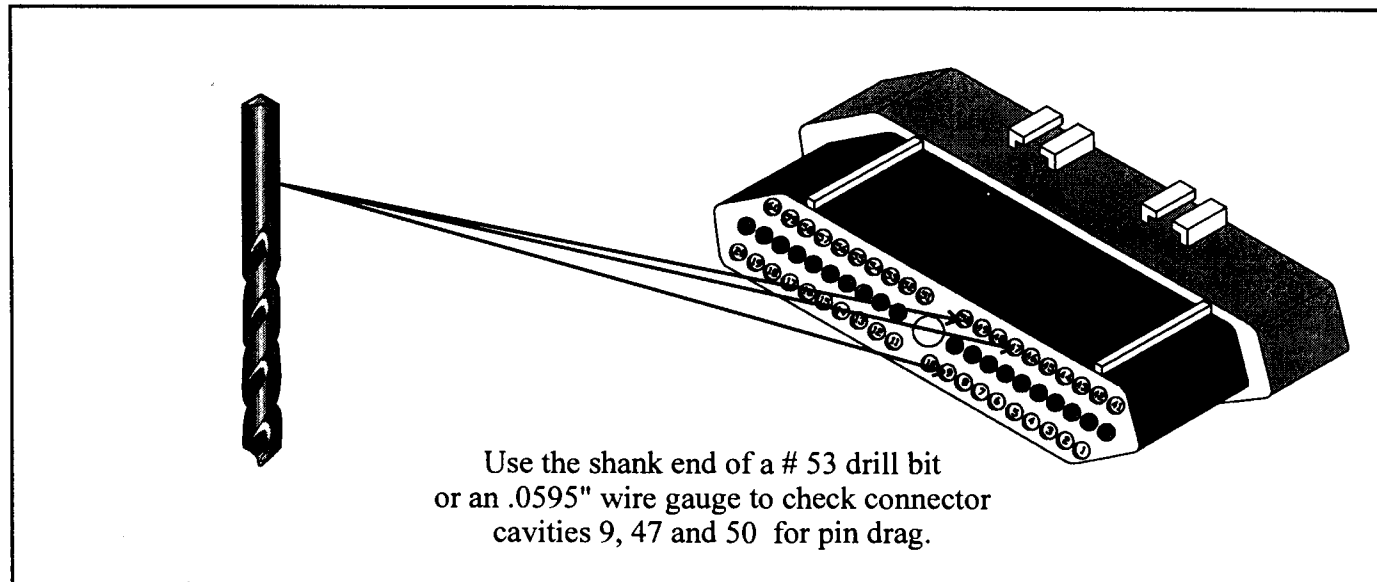


Figure 30

## PRESSURE SWITCH CIRCUITS

**21, 22, 23, 24, 25, 26, 27, 31, 32, 33 continued**

### DIAGNOSTIC STEPS



- A continuity check should be made across the following appropriate wire from the solenoid connector to the TCM connector (See Figure 31):

PRESSURE SWITCH	SOLENOID BODY CONNECTOR	TCM CONNECTOR
Low/Reverse Pressure Switch Wire -	2	50
2/4 Pressure Switch Wire -	1	47
Overdrive Pressure Switch Wire -	3	9

*Special note: 2/4 & L/R Pressure Switch codes could occur due to incorrect placement of check balls in the valve body.*

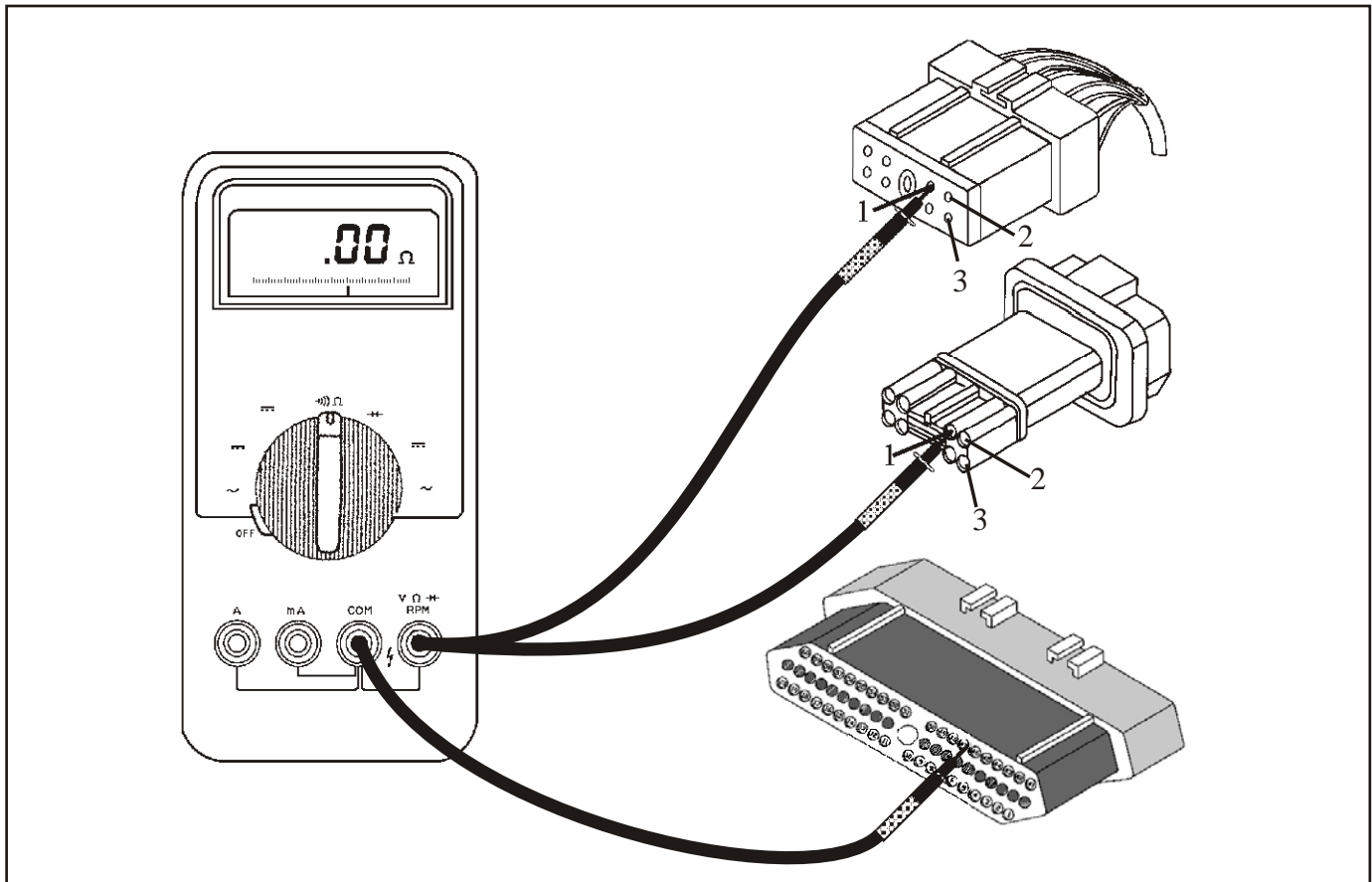


Figure 31



## PRESSURE SWITCH CIRCUITS

### 21, 22, 23, 24, 25, 26, 27, 31, 32, 33 *continued*

#### DIAGNOSTIC STEPS



- Another method which may be employed to verify the wiring integrity for each pressure switch circuit requires both the solenoid body and the TCM to be plugged in.
- Place the ignition to the ON position. Do not start the vehicle.
- With a DVOM set to DC volts, place the negative meter lead to the negative battery post. With the positive meter lead, carefully back probe wires 9, 47 and 50 (See Figure 32). Each wire should show battery voltage. ***Special Note: This method should only be employed when pressure switch codes alone are present. Other codes such as a solenoid code may cause the control to default to a limp mode status with just the ignition turned ON. Voltage would then not be observed at pins 9, 47 and 50 providing a false test.***
- If any one of the wires do not show voltage during this test, there is a break in that wire from the solenoid body to the TCM. Repair the wire.
- If voltage is seen on all three wires, inspect the solenoid body. To check the solenoid body for a 41TE see Figure 33. To inspect a 42LE solenoid body, see Figure 34.
- If the pressure switch codes still set with a good known solenoid body and all the wiring has been inspected, change the TCM. ***Note: Only on rare occasions has a bad valve body provided enough of a cross leak that it may stroke a pressure switch when it should not be stroked causing the code. A worn sleeve in the pressure regulator valve may also be a problem with pressure too high and no valve body gaskets. Problem occurs at high throttle when hot. A valve body change may correct the problem. If it doesn't, change the TCM.***

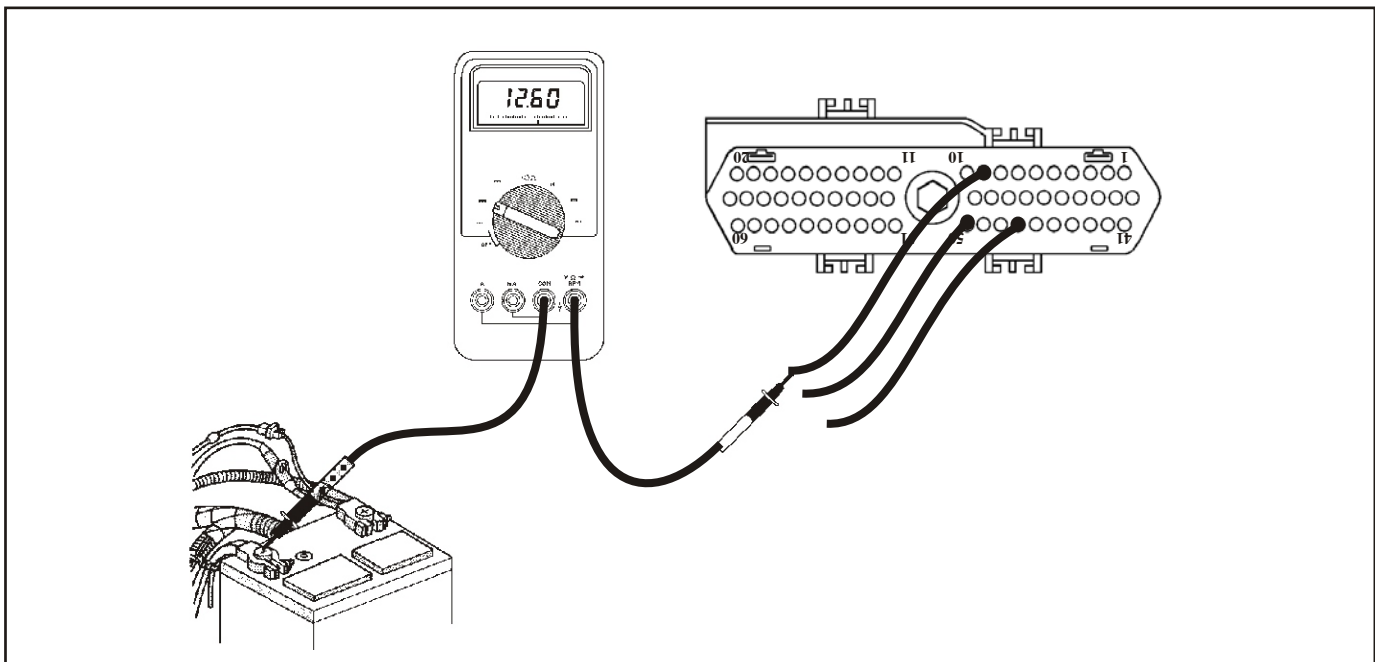
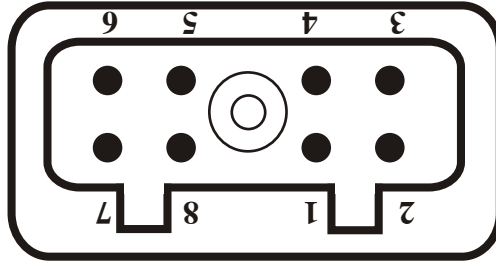


Figure 32

## 41TE SOLENOID BODY RESISTOR AND PRESSURE SWITCH CHECK



### OHM TEST

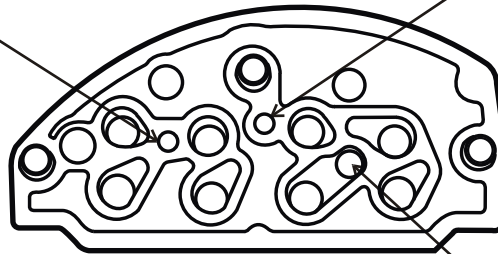
EACH PRESSURE SWITCH HAS ITS OWN RESISTOR IN THE CIRCUIT WHICH RANGE BETWEEN APPROXIMATELY 270-330 OHMS @ 68° F EACH RESISTOR SIMILAR IN RESISTANCE. FOR EXAMPLE:  
2 MEASURE 270 AND 1 MEASURES 330 - NO GOOD

RESISTOR	CONNECT OHMMETER LEADS TO PINS
2-4	4 & 1
L-R	4 & 2
O.D.	4 & 3

### PRESSURE SWITCH TEST

2/4 PRESSURE  
SWITCH PASSAGE

L-R PRESSURE  
SWITCH PASSAGE



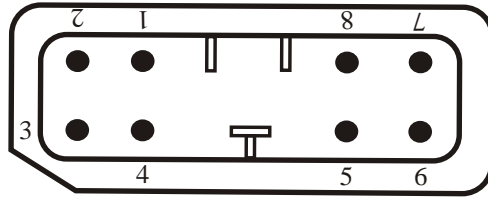
OD PRESSURE  
SWITCH PASSAGE

PRESSURE SWITCH	CONNECT OHMMETER LEADS TO PIN
O.D.	1 & GROUND (Body Base)
L-R	2 & GROUND (Body Base)
2-4	3 & GROUND (Body Base)

OHM METER SHOULD READ "NO CONTINUITY" WITH NO AIR APPLIED TO THE PRESSURE SWITCH. OHM METER SHOULD READ LESS THAN "3" OHMS . WITH 50 PSI OF AIR PRESSURE APPLIED TO THE PRESSURE SWITCH.

Figure 33

**42LE SOLENOID BODY  
RESISTOR AND PRESSURE SWITCH CHECK**

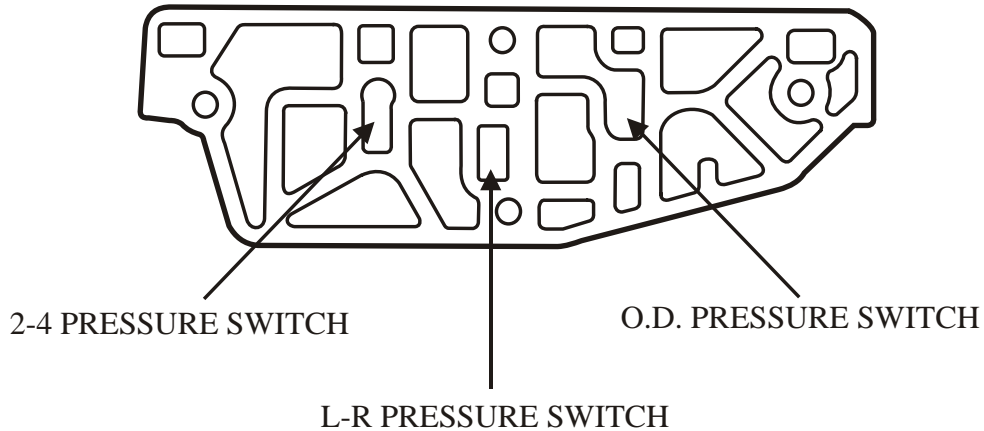


**OHM TEST**

EACH PRESSURE SWITCH HAS ITS OWN RESISTOR IN THE CIRCUIT WHICH RANGE BETWEEN APPROXIMATELY 270-330 OHMS @ 68° F EACH RESISTOR SIMILAR IN RESISTANCE. FOR EXAMPLE:  
2 MEASURE 270 AND 1 MEASURES 330 - NO GOOD

RESISTOR	CONNECT OHMMETER LEADS TO PINS
2-4	4 & 1
L-R	4 & 2
O.D.	4 & 3

**PRESSURE SWITCH TEST**



PRESSURE SWITCH	CONNECT OHMMETER LEADS TO PIN
O.D.	1 & GROUND (Body Base)
L-R	2 & GROUND (Body Base)
2-4	3 & GROUND (Body Base)

OHM METER SHOULD READ "NO CONTINUITY" WITH NO AIR APPLIED TO THE PRESSURE SWITCH. OHM METER SHOULD READ LESS THAN "3" OHMS . WITH 50 PSI OF AIR PRESSURE APPLIED TO THE PRESSURE SWITCH.

Figure 34

## FAILURE TO ACHIEVE PUMP PRIME

### 35

CODE	FAULT	LIMP-IN
35	Failure to Achieve Pump Prime	NO

### POSSIBLE CAUSES



- Fault code 35 "Failure to Achieve Pump Prime" has been added for improved diagnostic capability, and fault codes 21, 22 and 24 are de-sensitized to reduce erroneous limp-in conditions such as when a fluid and filter change is performed.
- **Code 21** (OD Pressure Switch Circuit) - Can be set in error on vehicles with a maladjusted shift cable or if the transaxle is shifted slowly from the OD position to the N position. This typically happens if the operator has a tendency to rest the hand on the shift lever, or overshoots the OD gate while manually shifting from 1 or 3 to OD. The new software detects this maneuver and shifts the transaxle in Neutral rather than setting code a 21 faults and the subsequent limp-in conditions.
- **Code 22 and 24** (2-4 and L-R Pressure Switch Circuits) - In low ambient temperatures (below 32° F or 0° C) some 1989 and 1990 model year vehicles may set this fault in error. Condensation can form and freeze in the PRNDL and/or neutral start switch and cause a delay on garage shifts. The new software prevents this fault code from being set in error and the transaxle going into the limp-in mode.
- **Code 24** (Low Reverse Pressure Switch Circuit) - Can get set in error on vehicles where pump prime problems exist. The new fault code 35 (failure to achieve pump prime) has been added and does not trigger a limp-in condition.

### DIAGNOSTIC STEPS



- If no other pressure switch code is accompanied with code 35, code 35 could indicate a clogged filter, converter drain back, low fluid level condition or pump cavitation.

## CHECK SHIFTER SIGNAL

### 28

CODE	FAULT	LIMP-IN
28	Check Shifter Signal	NO

### POSSIBLE CAUSES



- *A PRNODL or Neutral Safety switch malfunction (89-94 41TE).*
- *A malfunctioning Transmission Range Sensor (95 and up 41 TE & 42RE).*
- *Plastic cam on manual lever assembly on the valve body broken.*
- *Defective connectors.*
- *Severed or shorted wiring from switches to TCM.*

Diagnostic steps for 1995 and later 41TE's & all LH vehicles with a TRS, refer to page 50.

### DIAGNOSTIC STEPS for 1989-1994 41TE with PRNODL & Neutral Switch



- A scanner can be used to observe the OPEN/CLOSED state of both the Reverse Light 1 & 2 and the Neutral Switch 1 & 2 circuits. This can be especially helpful in determining which exact circuit is malfunctioning. Refer to Figure 35 for both the OP/CL chart as well as the RL and NS circuit identification.

Circuit	P	R	N	OD	D	L	
NS1	Closed	Open	Closed	Open	Open	Open	
RL1	Open	Closed	Open	Closed	Open	Open	
NS2	Closed	Open	Open	Open	Open	Closed	
RL2	Open	Closed	Closed*	Open	Closed	Open	*RL2 can also be open

T1, T2 TRANSITION CODES MAY APPEAR BETWEEN GEAR RANGE CHANGES.  
AN "I" OR "?" WILL APPEAR ON SCANNERS IF INVALID COMBINATION OCCURS.

Figure 35

## CHECK SHIFTER SIGNAL 28 *continued*

### DIAGNOSTIC STEPS



- Once the circuit which malfunctioned has been identified, a check needs to be made on that specific circuit. The first step is to check the PRONDL & Neutral switch operation with the use of a ohm meter. This will check the integrity of the switch as well as the plastic cam located on the manual valve detent assembly. Use Figure 36 to check the specific circuit in question for the Neutral Safety switch or Figure 37 for the PRNODL switch.
- If a switch test fails, remove the switch and look through the threaded hole in the case and inspect the plastic cam before changing the switch. Repair or replace the switch or cam if necessary.
- If all the switch tests pass, inspect the connectors for corrosion or damage. Connector repair kits are available from Chrysler under part number 46389968.
- If the connectors check good, use the chart found in Figure 38 to perform continuity checks across each individual circuit.
- If all circuits have continuity, the TCM may need to be replaced. Before doing so, refer to a bulletin found on page 49.

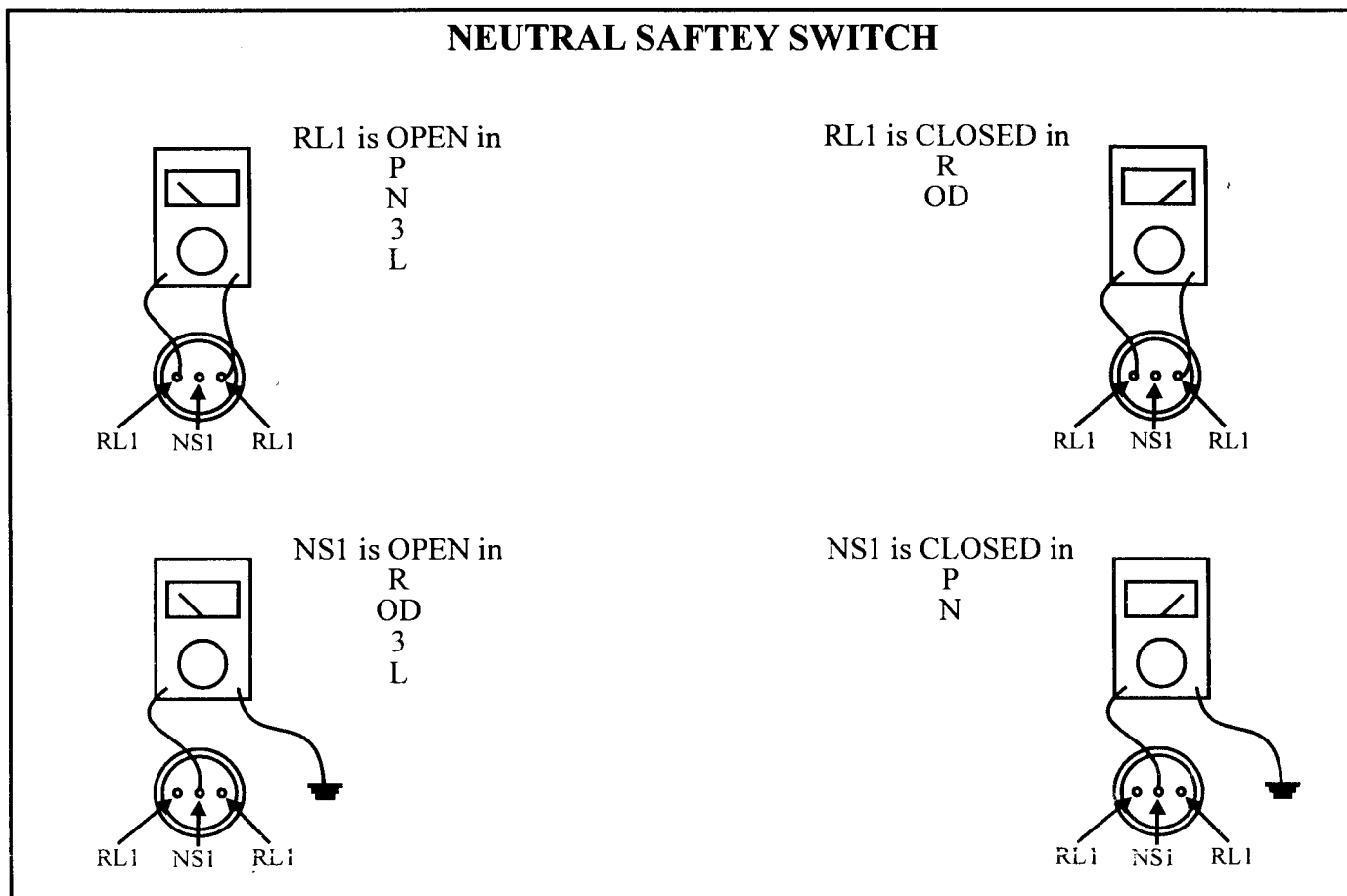


Figure 36

**CHECK SHIFTER SIGNAL**  
*28 continued*

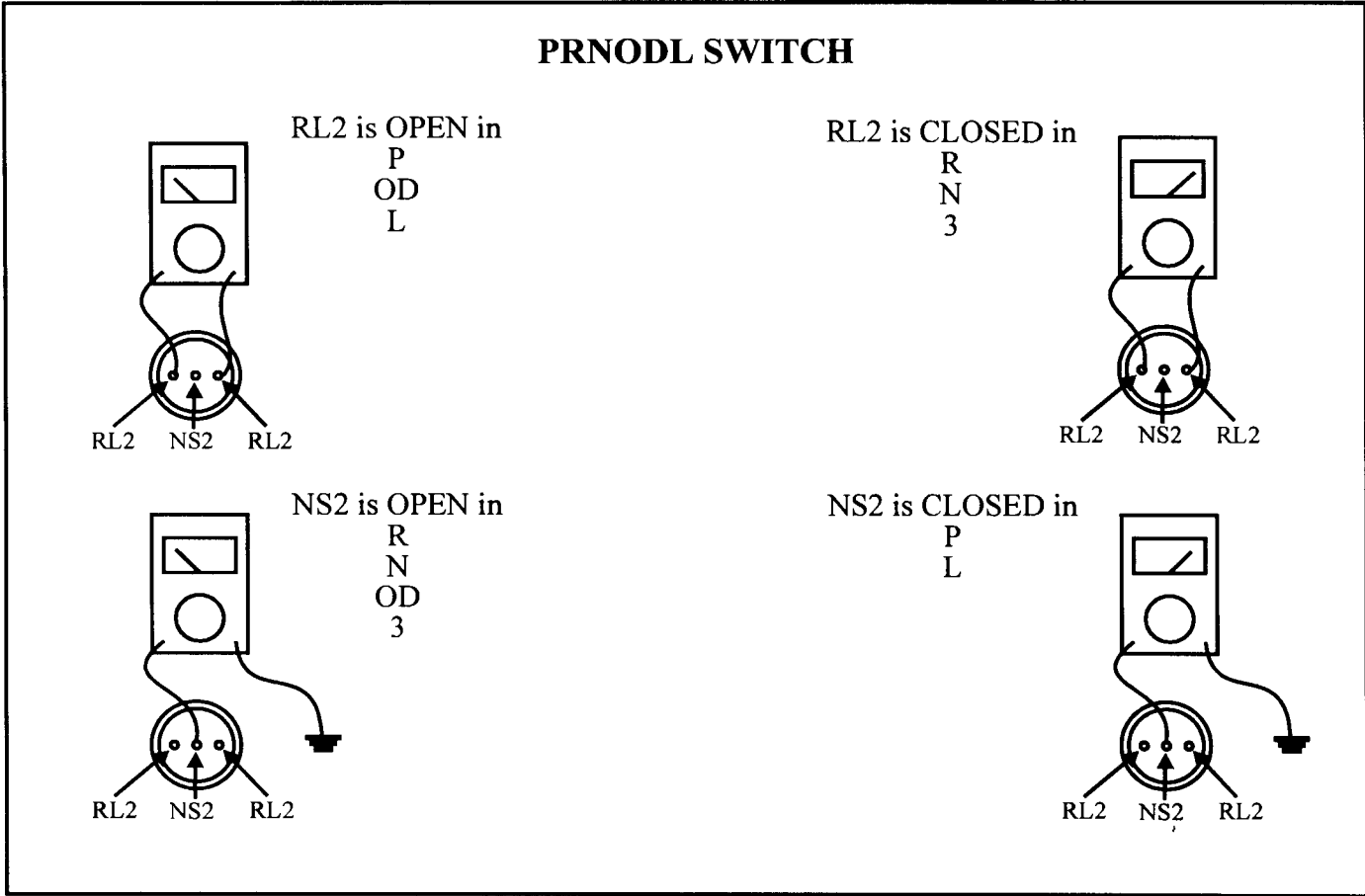


Figure 37

## CHECK SHIFTER SIGNAL *28 continued*

### DIAGNOSTIC STEPS



- If a code 28 comes up due to a bad shift lever position signal and both the PRNODL and Neutral switch are known to be good, then a circuit check will have to be performed. This will require the use of an ohmmeter in order to check for continuity across each individual wire going from the switch to the controller. Use the chart and illustrations below to assist you in making the check. It has been ATSG's experience that the majority of open circuits have been traced down to bad connectors. Chrysler has a connector repair kit available for the PRNODL and Neutral Switches under part number 4638996

CIRCUIT NAME	PRNODL SWITCH	CONTROLLER TERMINAL #	POSSIBLE CODES
RL2/T01	1	1	28
NS2/T42	2	42	28
RL2/Z13	3	GROUND	28
CIRCUIT NAME	NEUTRAL SWITCH	CONTROLLER TERMINAL #	POSSIBLE CODES
RL1/A21	4	IGNITION FEED	28
NS1/T41	5	41	28
RL1/T03	6	3	28

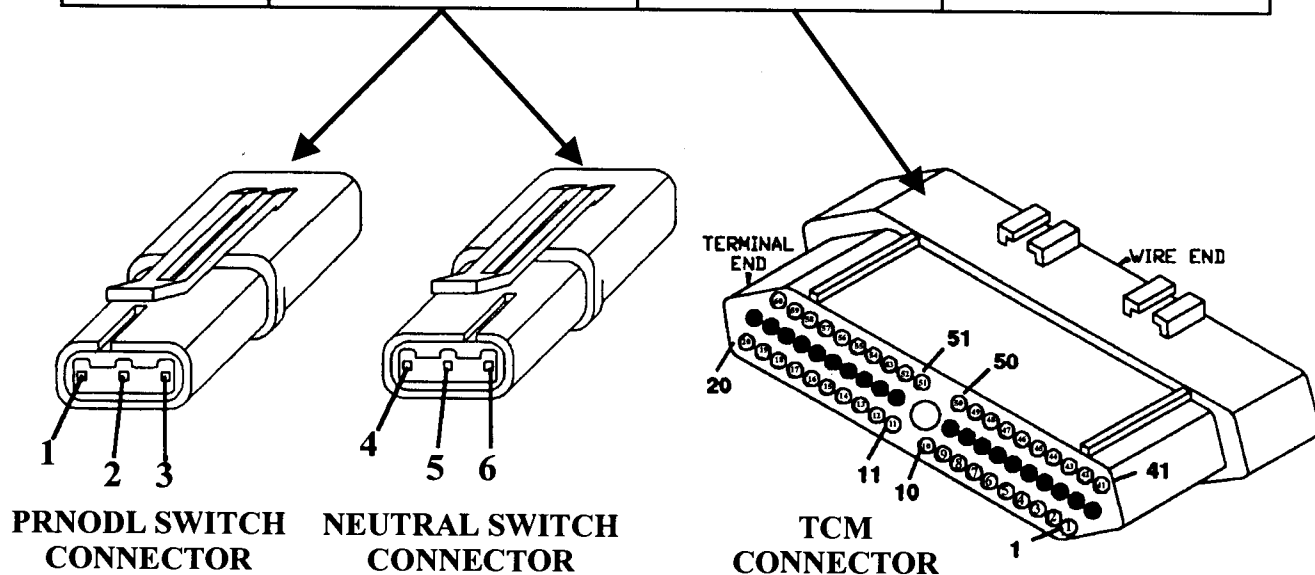


Figure 38



# Technical Service Information BULLETIN

## CHRYSLER 41TE DELAYED FORWARD ENGAGEMENT AND/OR NO FIRST GEAR AND FAILSAFES WITH DTC's 24, 28, 36 & 51

**COMPLAINT:** After overhaul vehicle exhibits delayed and/or a shuddering condition, when shift lever is engaged into any forward range, followed by an immediate abort to "Limp Mode."

**CAUSE:** The cause may be, that during the valve body cleaning process, retainer No.3 and/or one of the small "Buttons" in the solenoid switch valve train was not installed during reassembly. These parts can usually be found in the bottom of the solvent tank.

**CORRECTION:** Install the solenoid switch valve train and retainer No.3 as shown in Figure 39.  
**NOTE:** Retainer location No.4 and Torque Converter Clutch Switch Valve Train shown in Figure 39 are for "92" and later only!

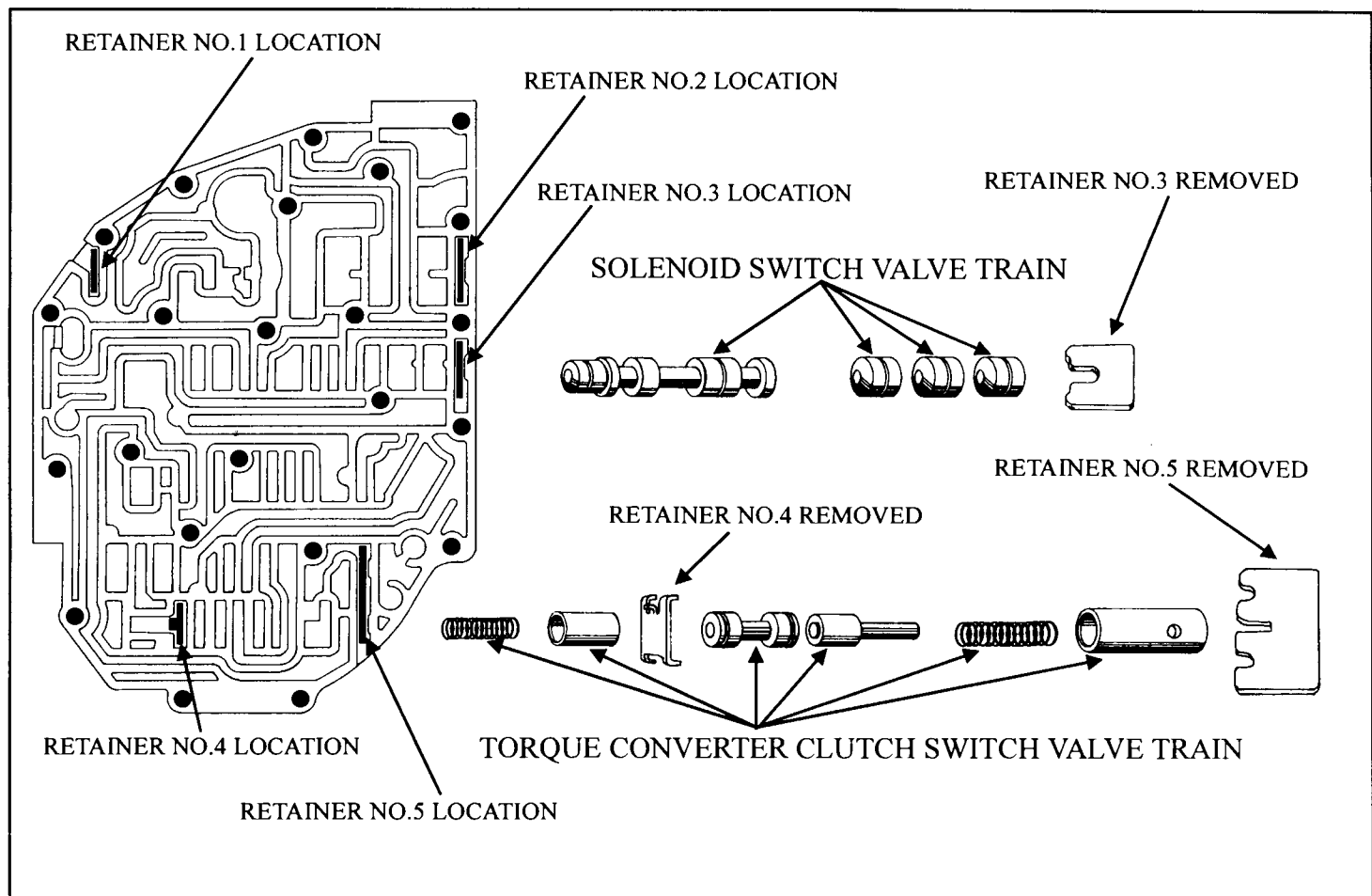


Figure 39

## CHECK SHIFTER SIGNAL

### 28 continued

### DIAGNOSTIC STEPS FOR 1995 AND LATER VEHICLES WITH A TRS

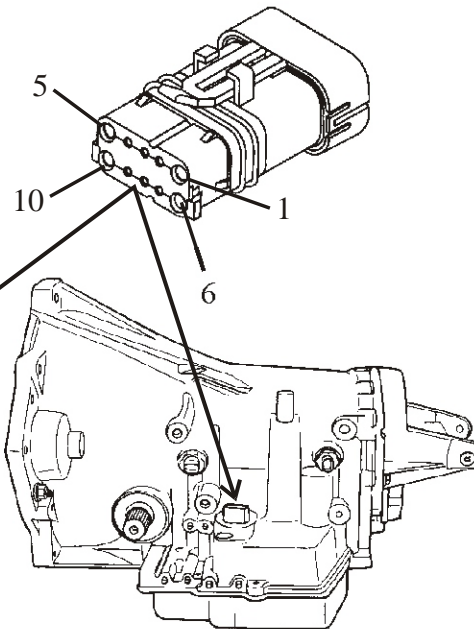
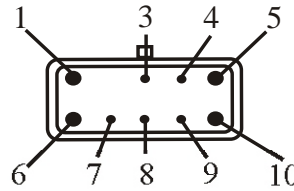


- A scanner can be used to observe the OPEN/CLOSED state of the C1/T41, C2/T42, C3/T3 and the C4/T1 circuits. This can be especially helpful in determining which exact circuit is malfunctioning. Refer to Figure 40 for the OPEN/CLOSED status chart and circuit identification.

CAVITY	COLOR	FUNCTION
1	WT	FUSED IGNITION SWITCH OUTPUT
3	DB/BK *	SPEED SENSOR GROUND
4	VT *	TRANS. TEMP. SENSOR SIGNAL
5	BK/LG	PARK/NEUT. POSITION SWITCH SENSE
6	VT/BK	REVERSE LAMP SENSE
7	LG/BK	TRS T1 SENSE
8	VT	TRS T3 SENSE
9	VT/WT	TRS T42 SENSE
10	BR/YL	TRS T41 SENSE To PCM (Terminal 5 signals the TCM)

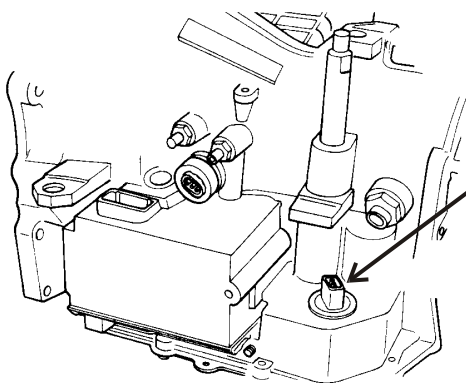
RANGE	T42 (C2)	T41 (C1)	T3 (C3)	T1 (C4)
P	CL	CL	CL	OP
R	CL	OP	OP	OP
N	CL	CL	OP	CL
OD	OP	OP	OP	CL
3	OP	OP	CL	OP
1	CL	OP	CL	CL

OP = SWITCH IS OPEN  
CL = SWITCH IS CLOSED

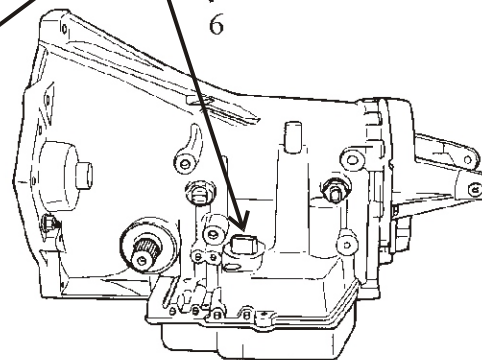


\* 1996-97 LH

### TRANSMISSION RANGE SENSOR TRS



**41TE**



**42LE**

Figure 40

# CHECK SHIFTER SIGNAL

## 28 continued

### DIAGNOSTIC STEPS



- Once the circuit which malfunctioned has been identified, a continuity check should be made on that circuit. Use the chart found in Figure 41 to assist in identifying the specific circuit or circuits in question. For example, if the scanner reveals that the T3 (C3) circuit does not close when the selector lever is placed in Park, 3 or 1, that specific circuit will need to be checked. In the chart below circuit T3 is the wire which runs from the number eight cavity in the TRS connector to the number three cavity in the TCM connector.

CIRCUIT NAME	TRANSMISSION RANGE SENSOR	CONTROLLER TERMINAL #	POSSIBLE CODES
C1/T41	5	41	28
C2/T42	9	42	28
C3/T03	8	3	28
C4/T01	7	1	28

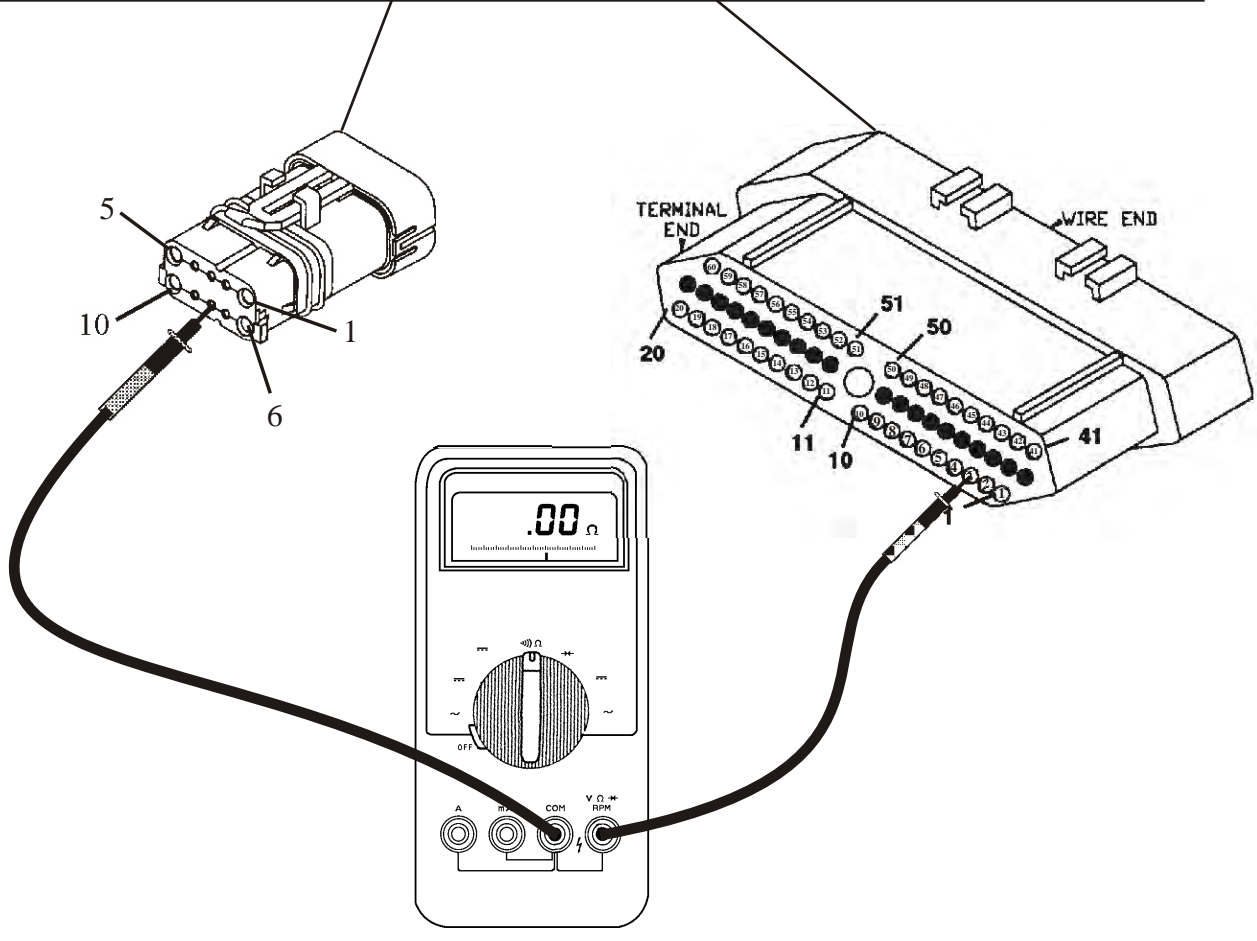


Figure 41

## CHECK SHIFTER SIGNAL

### 28 continued

### DIAGNOSTIC STEPS



- If an open circuit is seen when checking for continuity across any one of the Transmission Range Sensor wires, repair or replace the wire or wires. If continuity is seen, go to the next step.
- Inspect both the TCM and TRS connector cavities for drag and that they have not been pushed back into the connector. Page 25 provides a tip on checking the TCM connector using the shank end of a drill bit. The same tip may be employed with the TRS connector. For cavities 7, 8 and 9, use a .035" wire gauge or a # 65 drill bit. For cavity 10, use an .089" wire gauge or a # 43 drill bit. If pin cavities are not pushed back and they have a good drag on the wire gauge test, go to the next step.
- Remove the valve body from the transmission. With the TRS still mounted to the valve body, place the manual valve in the park position. Fasten the negative meter lead to the metal portion of the rooster comb (See Figure 42). While pushing the switch down onto the rooster comb with one hand, use the positive meter lead to make contact with pins 7, 8, 9 and 10 individually. Approximately .5 to 1.5 ohms should be seen on each pin except # 7, it should read open. Use the chart in Figure 42 to check the TRS in each manual valve selection. Replace the TRS sensor if necessary. If all ranges test good, go to the next step.
- Replace the TCM.

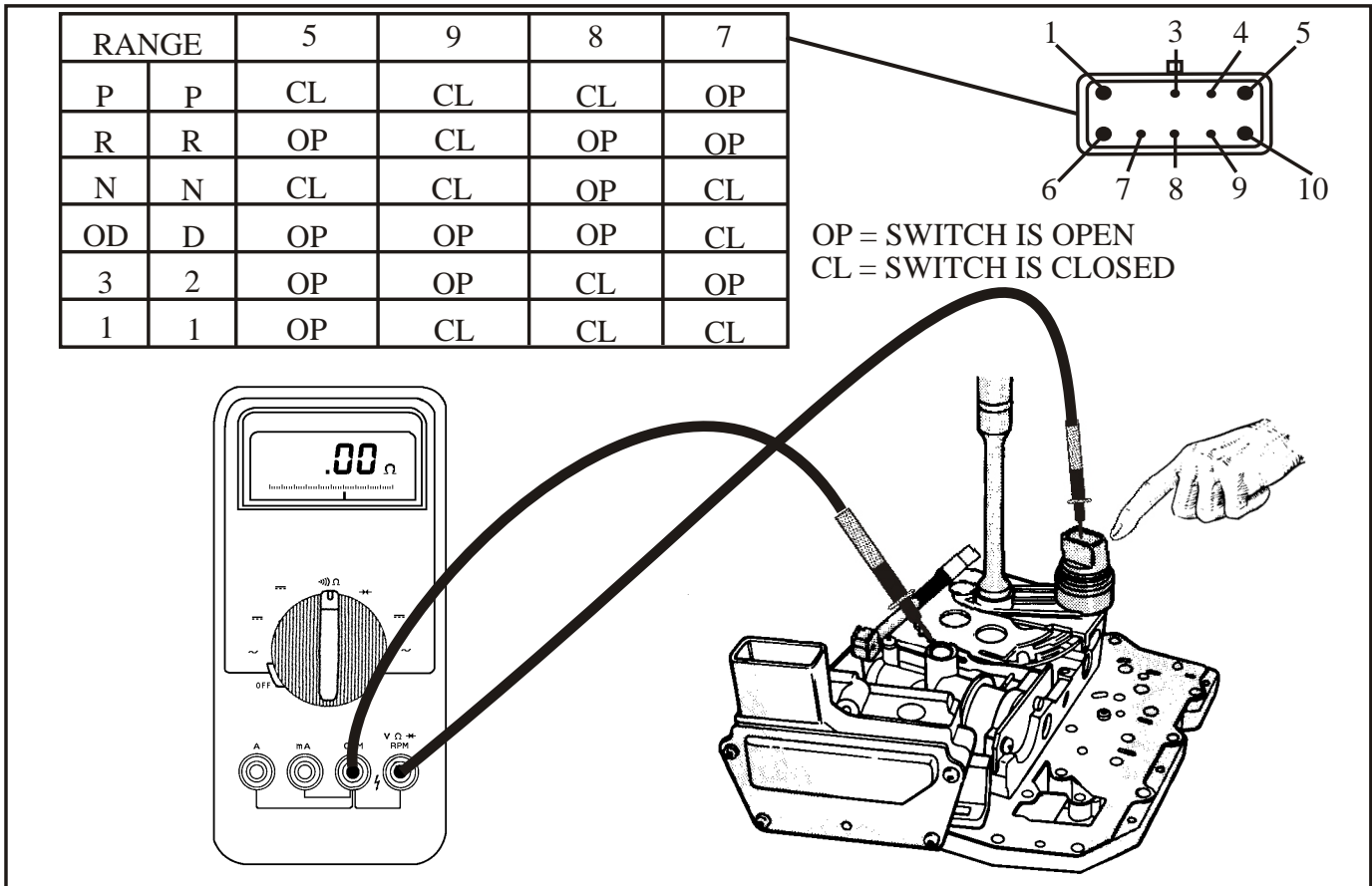


Figure 42

# THROTTLE POSITION SENSOR 29

CODE	FAULT	LIMP-IN
29	Throttle Position Sensor	NO

### POSSIBLE CAUSES



- *Throttle Position Sensor*
- *Corroded or defective throttle position sensor connector (or installed backwards)*
- *Open throttle position sensor ground wire*
- *Open or shorted signal return wire*
- *Open or shorted 5 volt power wire*
- *Corroded or defective TCM connector*
- *Corroded or defective PCM connector*
- *Defective TCM*
- *Defective PCM*

### DIAGNOSTIC STEPS



- Compare the TPS voltage seen through a scanner display to a volt meter attached to the number 12 TPS signal wire at the TCM (See Figure 43). With the engine off, place the ignition to the “ON” position. At closed throttle, approximately .50 to .78 volts should be observed. As the throttle is opened the voltage should increase proportionally. When wide open throttle is reached, approximately 3.8 to 4.0 volts should be seen. **NOTE: Both readings should be relatively the same however, the TPS voltage change observed through the scanner will be slightly delayed to that seen on the volt meter.** If the voltage change observed through the volt meter is correct while the scanner provides unusual and incorrect readings, the TCM will need to be replaced. If both the scanner and volt meter reveal a no volt reading, a fixed volt reading, an erratic or incorrect volt reading, go to the next step.

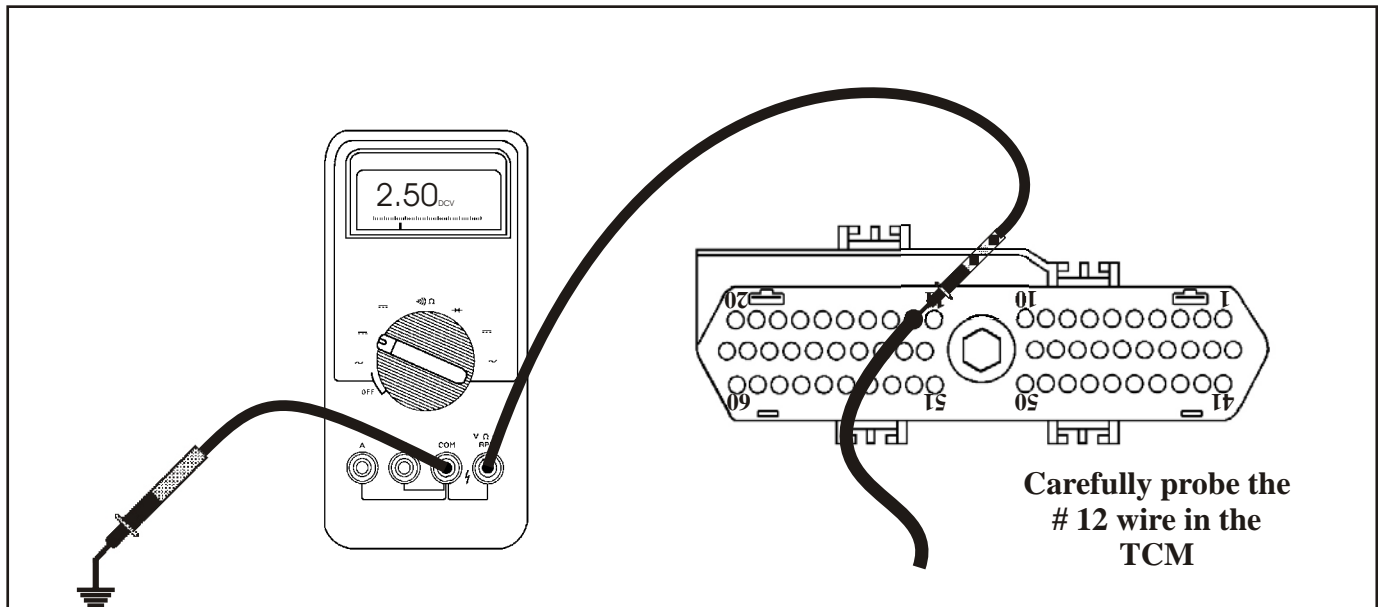


Figure 43

## THROTTLE POSITION SENSOR

### *29 continued*

#### DIAGNOSTIC STEPS



- Locate and unplug the TPS on the throttle body as shown in Figure 44. With the engine off, turn the ignition to the "ON" position. Set the meter to DC volts and place the negative lead to the negative battery post. With the positive lead check terminal A in the harness connector for approximately 5 volts as seen in Figure 44. If voltage is not seen, a bad PCM (Engine Computer) may be the problem as it supplies the 5 volt feed to the TPS. It would be wise to first verify that the wire itself is not severed from the PCM to the TPS by performing a continuity check across the wire. All vehicles up to and including model year 1995 the check should be made from terminal 6 in the PCM connector to terminal A in the TPS connector. For 1996 and later vehicles the check should be made from terminal 61 at the PCM to terminal A in the TPS connector. If continuity is seen across the wire and there is not 5 volts going to the TPS, the PCM will need to be replaced. If 5 volts is seen at the TPS connector, go to the next step.
- With a meter set to ohms, place the negative lead to the negative post of the battery and the positive lead to terminal C in the TPS connector (See Figure 45). Approximately 0 to 5 ohms should be seen. If the resistance is greater than 5 ohms or the meter displayed an open circuit, the ground wire will need to be repaired. A quick and simple method would be to splice into the wire with another wire and run it to a good known ground (See Figure 46). If the ground wire is good and the TPS is still malfunctioning, go to the next step.

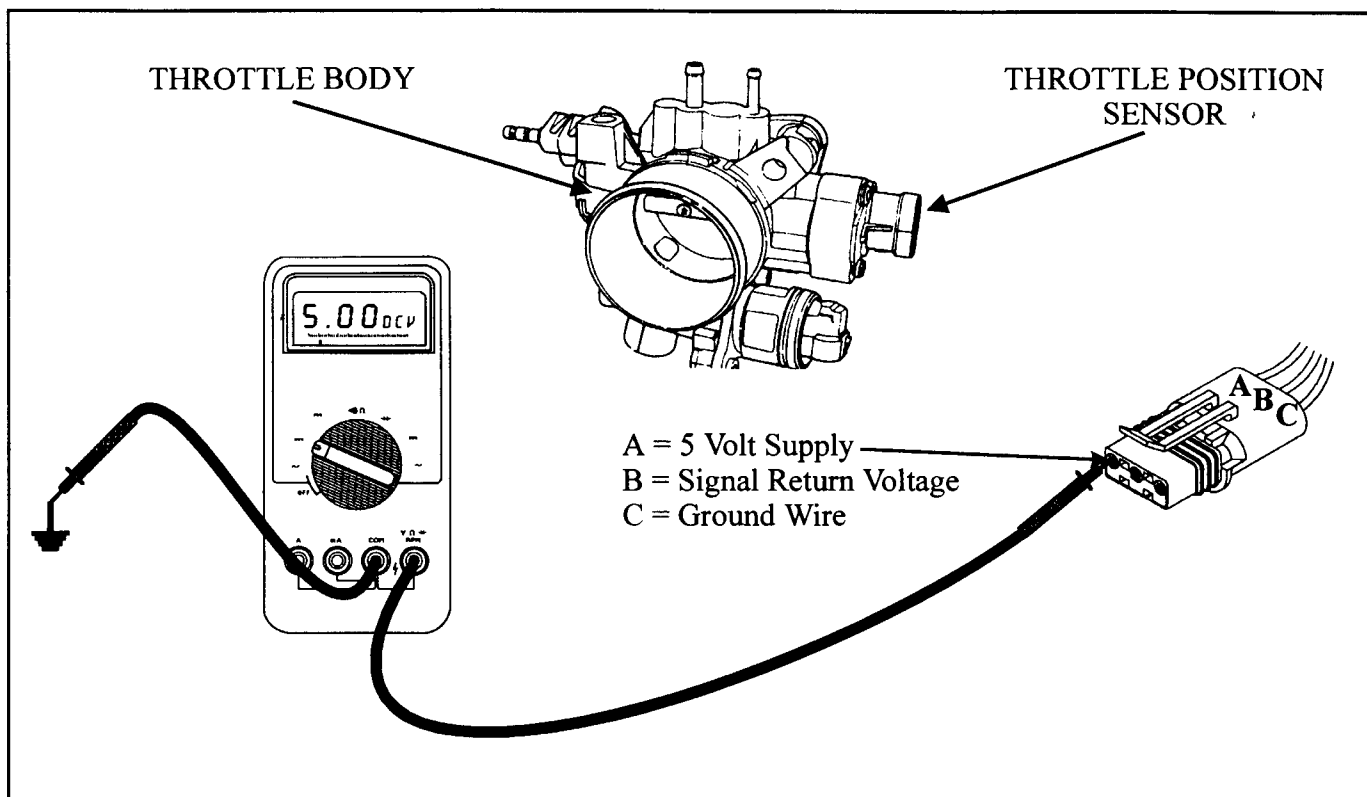


Figure 44

# THROTTLE POSITION SENSOR

*29 continued*

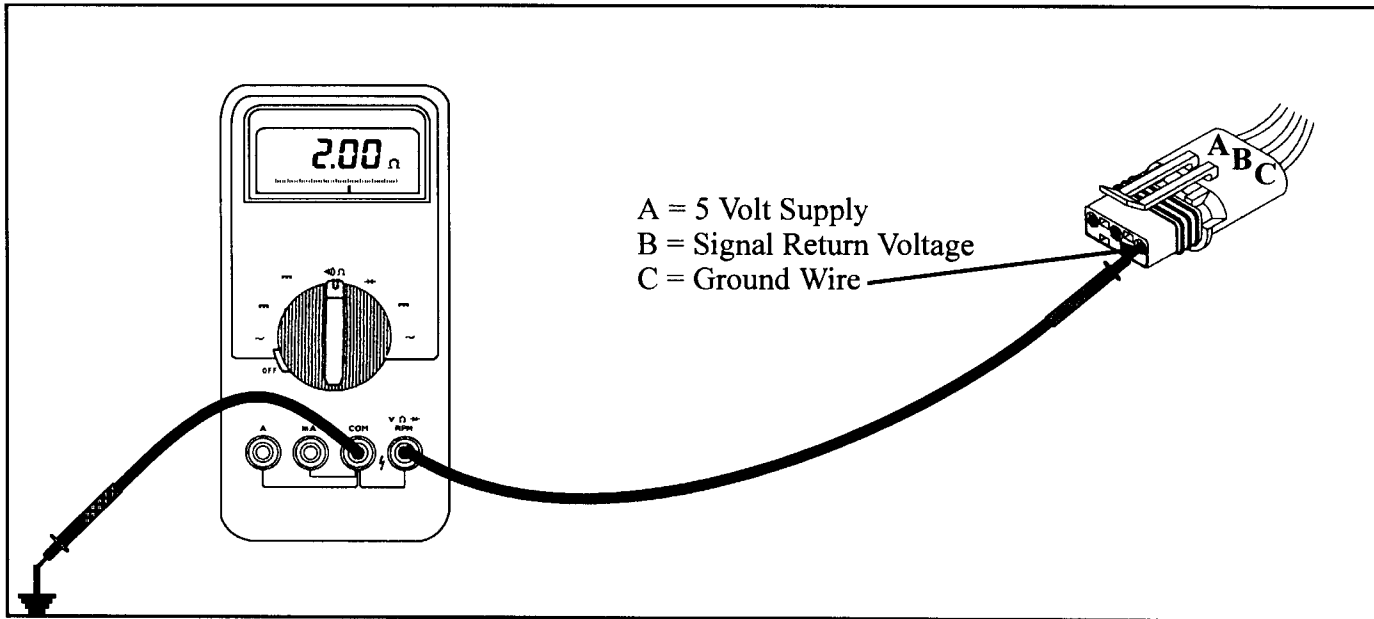


Figure 45

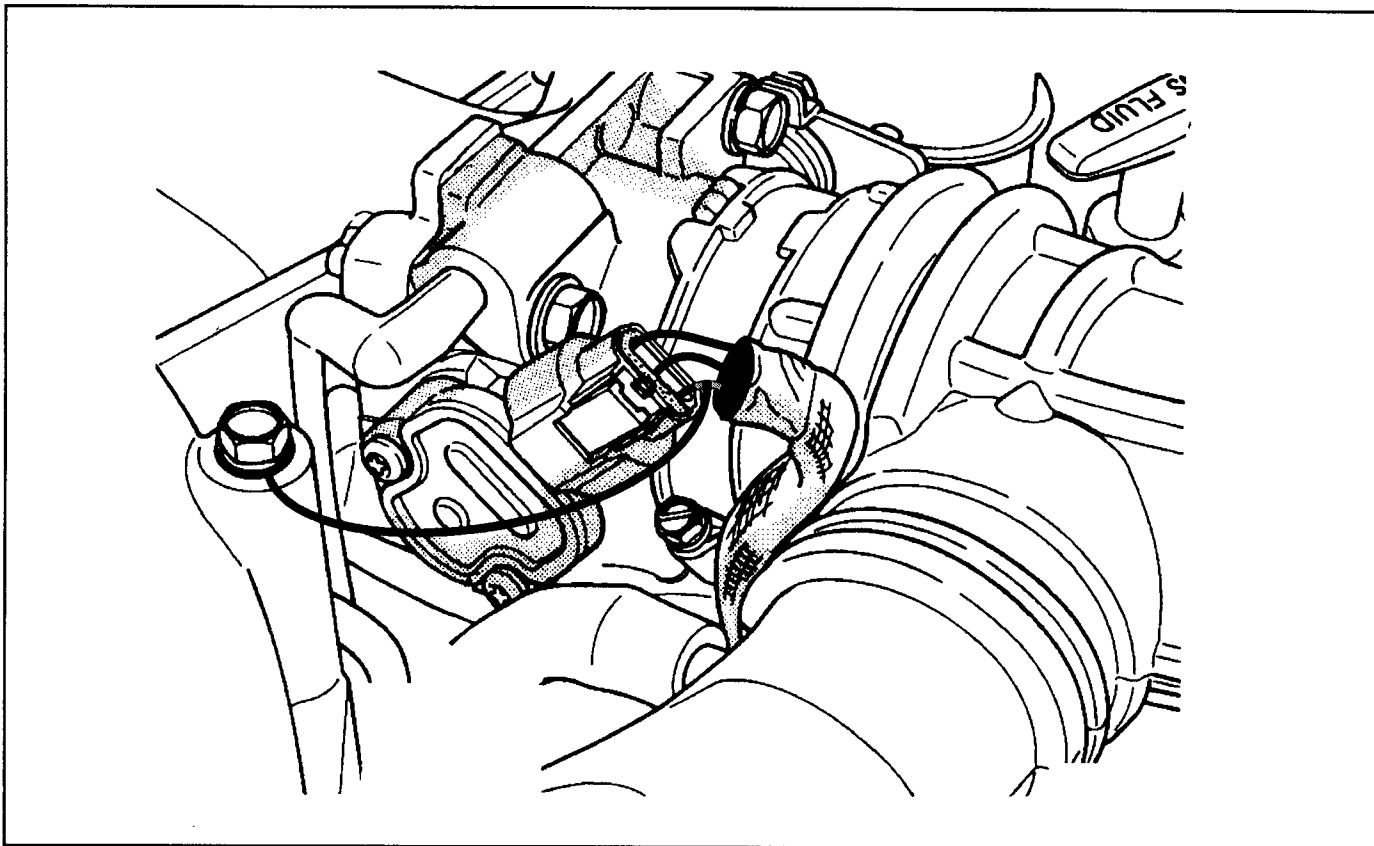


Figure 46

## THROTTLE POSITION SENSOR

### 29 continued

#### DIAGNOSTIC STEPS



- Unplug both the TCM and TPS. Perform a continuity check from terminal B in the TPS connector to terminal 12 in the TCM connector (See Figure 47). If continuity is not seen, repair the severed wire. If continuity is seen, replace the TPS.

**TIP:** View the TPS with the scanner from the engine connector. If the TPS operates correctly and there is not a code stored in the PCM for the TPS, the TPS is not bad. If all the previous checks have been performed and a problem has not been located, the TCM will need to be replaced.

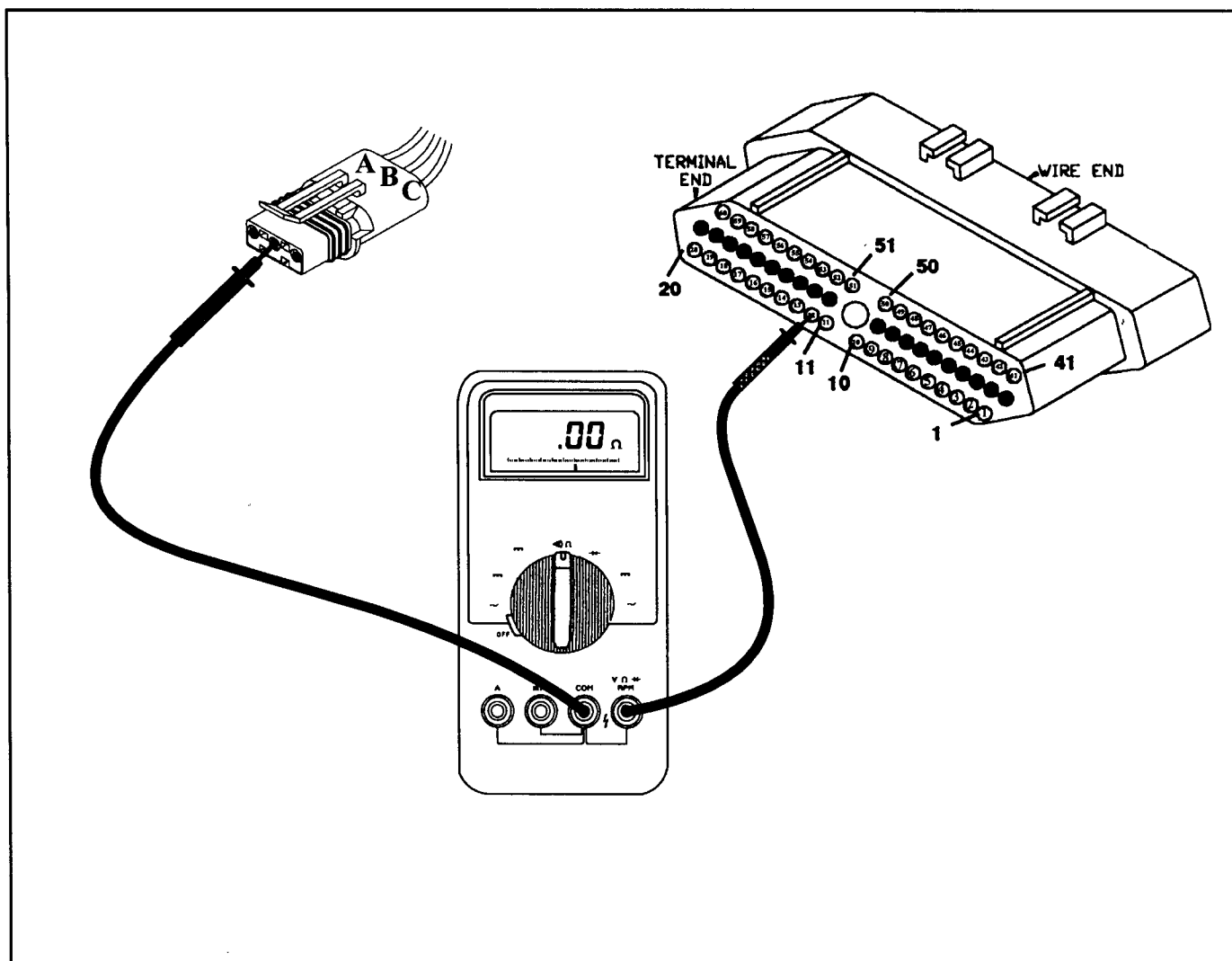


Figure 47



## SOLENOID SWITCH VALVE STUCK

### 37, 47

CODE	FAULT	LIMP-IN
37	Solenoid Switch Valve Stuck in the TCC Position	NO
47	Solenoid Switch Valve Stuck in the L/R Position	YES

### POSSIBLE CAUSES FOR CODES 37 or 47



- *A PRNODL Switch indicating an OD position while in reverse*
- *The Solenoid Switch Valve in the valve body is stuck*
- *The Solenoid Switch Valve reatiner No. 3 missing*
- *High engine idle*
- *L/R Solenoid or L/R pressure switch malfunction*
- *Defective TCM*

### DIAGNOSTIC STEPS



- Use a scanner to observe the Shift Lever Position. If OD is displayed while in the Reverse position the PRNODL switch may be defective. Refer to pages 45 to 52 for step by step diagnosis.
- Inspect the valve body for a stuck Solenoid Switch Valve or a missing # 3 retainer (See Figure 48).

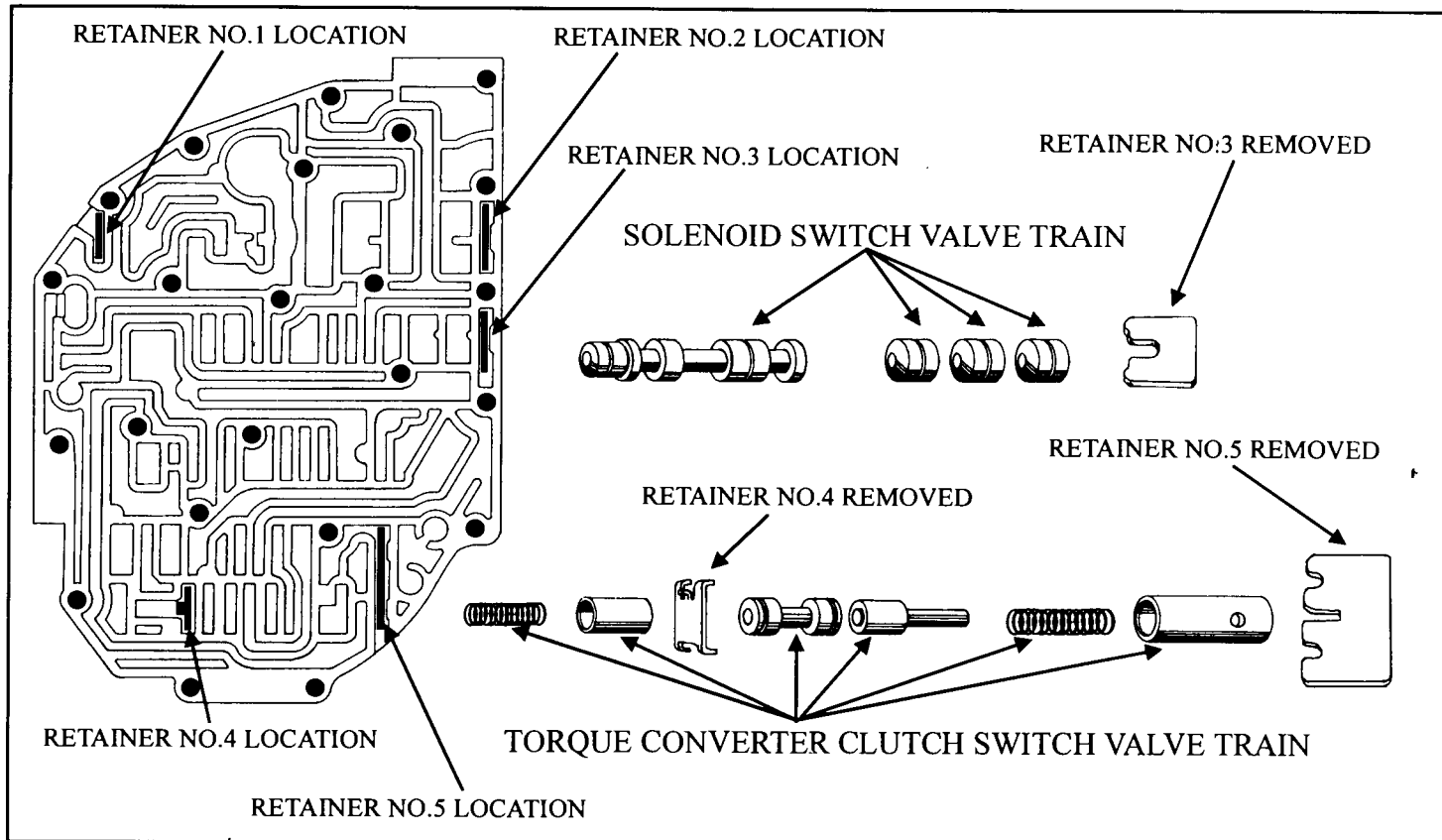


Figure 48

## SOLENOID SWITCH VALVE STUCK 37, 47 continued

### DIAGNOSTIC STEPS



- Use a scanner to verify engine idle. Engine idle must be below 1100 RPM's. If it is not, the idle will need to be corrected.
- A malfunctioning L/R solenoid mechanically may prevent the L/R clutch to apply. This mechanical failure of the solenoid may not produce a solenoid code. However, it may produce a L/R pressure switch code. If a L/R pressure switch code is present, refer to pages 38 to 43 for the diagnostic steps. If a L/R pressure switch code is not present, perform a bench check of the L/R solenoid using a 9 volt battery and compressed air as seen in Figure 49. Replace the solenoid body if necessary. If the L/R solenoid is good, go to the next step.
- Change the TCM

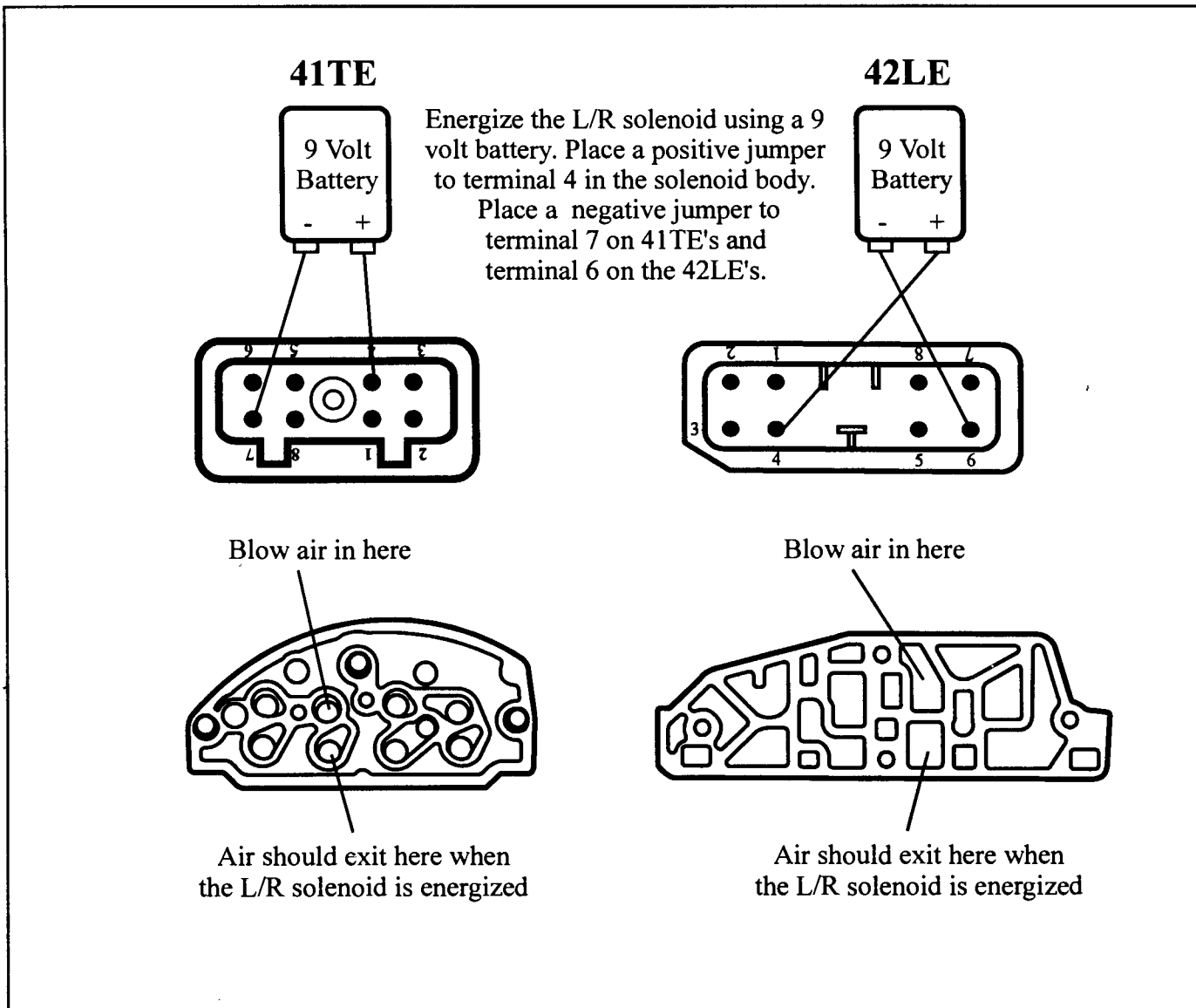


Figure 49

## TORQUE CONVERTER APPLY ERROR

### 38

CODE	FAULT	LIMP-IN
38	Torque Converter Apply Error	NO

#### POSSIBLE CAUSES



- *Torque Converter*
- *Turbine Shaft or Turbine Shaft Rings*
- *Pump or Pump Bushing*
- *Valve Body*
- *Auxiliary Cooler*
- *TCM*

#### DIAGNOSTIC STEPS



- Record and clear all codes with a scanner via the diagnostic BUS connector. Use the scanner to then observe both engine RPM and Turbine Shaft RPM. Install a pressure gauge onto the converter clutch off tap (See Figure 50). Take the vehicle for a road test. When the scanner indicates full lock up, both the engine RPM and Turbine Shaft RPM should read the same. The pressure gauge should also drop to 5 psi or less. The following results would indicate the different possibilities.
- The Engine and Turbine Shaft RPM's are considerably different but the pressure gauge dropped to 0 psi. The Torque Converter Clutch is slipping or there is low converter clutch apply pressure due to the primary use of an auxiliary cooler or or a defective valve body. Low apply pressure can be determined by observing converter clutch off pressure before lock up. It should be between 60 to 110 psi.
- If full lock up is commanded and pressure drops slightly, inspect the valve body, pump bushing, pump stator and turbine shaft sealing rings for excessive wear or damage.
- If both the Engine RPM and Turbine RPM are the same with a pressure gauge reading 0 psi, the converter clutch is fully locked up. If a code is stored under these conditions, the TCM would be misinterpreting information producing a false code. Replace the TCM.

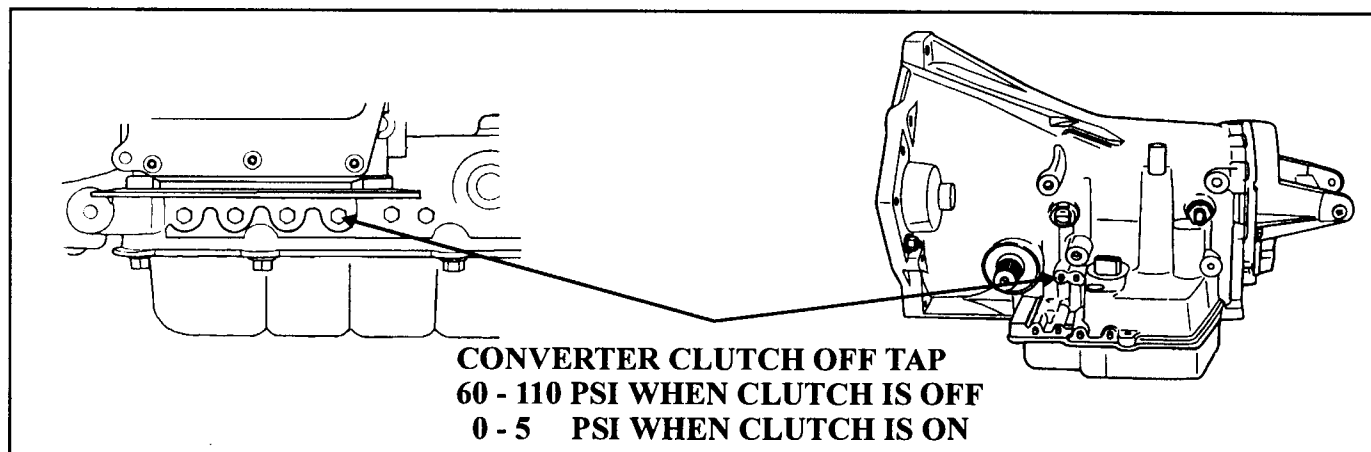


Figure 50

## SOLENOID CIRCUIT ERROR 41, 42, 43 & 44

CODE	FAULT	LIMP-IN
41	Low/Reverse Solenoid Circuit Error	YES
42	2/4 Solenoid Circuit Error	YES
43	Overdrive Solenoid Circuit Error	YES
44	Underdrive Solenoid Circuit Error	YES

### POSSIBLE CAUSES



- *Defective Solenoid Body*
- *Corroded or defective 8 way solenoid body connector*
- *Severed solenoid wires*
- *Defective or corroded 60 way controller connector.*
- *Defective EATX Controller.*

### DIAGNOSTIC STEPS (41TE ONLY - See Page 63 for 42LE procedures)



- Unplug the TCM's 60 way connector. Using a DVOM check the resistance of all four solenoid circuits by placing the positive lead onto pin 16 or 17 as seen in Figure 51. With the negative lead, carefully touch pins 19, 20, 59 and 60 one at a time. Each solenoid should measure approximately 1.5 to 2.0 ohms. If the solenoid providing the code reads considerably higher or lower from the other three solenoids, change the solenoid body. If all the readings are the same, wiggle the solenoid wires with the meter still attached and see if the readings behave erratic. If so, the solenoid connector is bad and will need to be replaced with part 4419476.
- If when performing the above check an open is seen on one of the solenoid wires, use Figure 52 to perform a continuity check on the wire in question. If it is determined that the wire is severed, a new wire can be run and spliced in outside the harness.
- If when making the above checks and the meter reads infinite on all solenoids, the power wire going to the # 4 pin in the solenoid body has been known to break below the splice as shown in Figure 53. Check for continuity between terminal 16 in the TCM connector to terminal 4 in the solenoid body connector.
- Repeat the test but from terminal 17 to terminal 4. If an open is found, either the harness will need to be replaced or the break has to be located and repaired. This will require peeling back the harness from the solenoid body connector until the break is located.
- If it has been determined that the solenoids are within their proper resistance values and the wiring is good all the way up to the TCM. Inspect terminal cavities 19, 20, 59 and 60 in the TCM connector (See Page 25 ). Repair or replace if necessary.
- If the TCM cavities are good, change the TCM

**SOLENOID CIRCUIT ERROR**  
**41, 42, 43 & 44 continued**

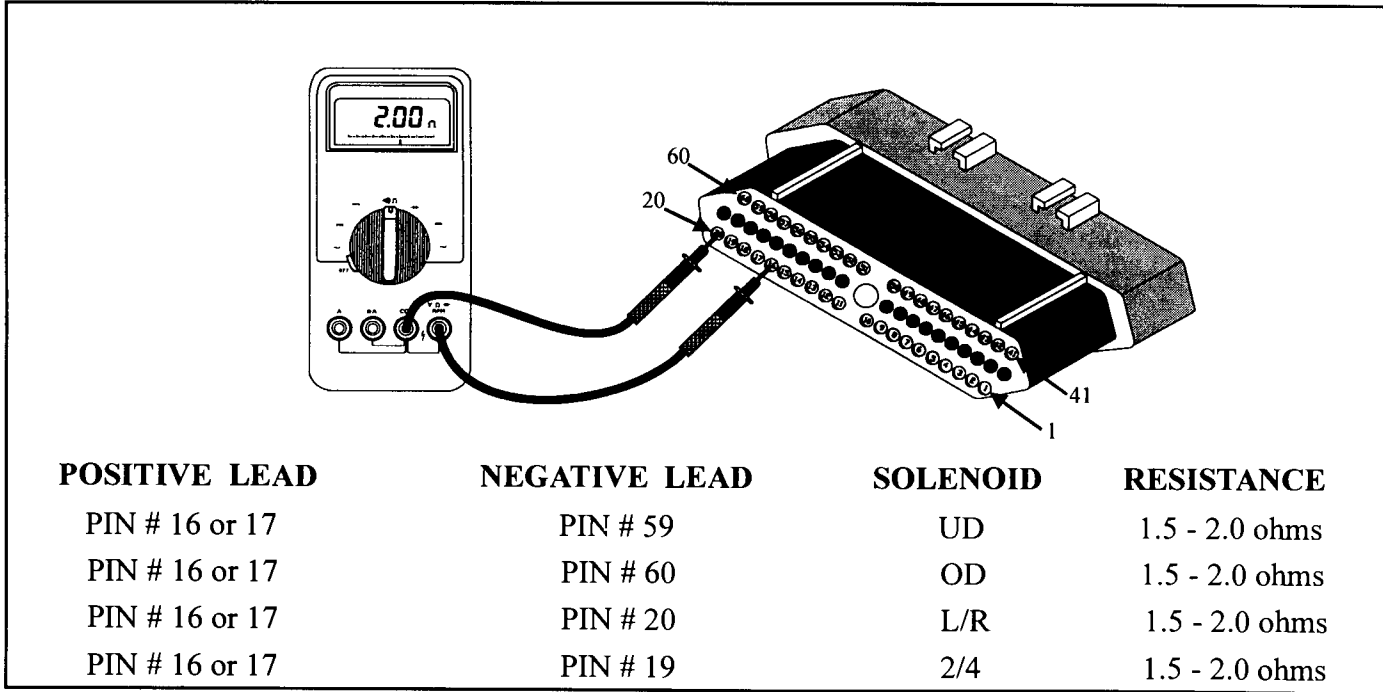


Figure 51

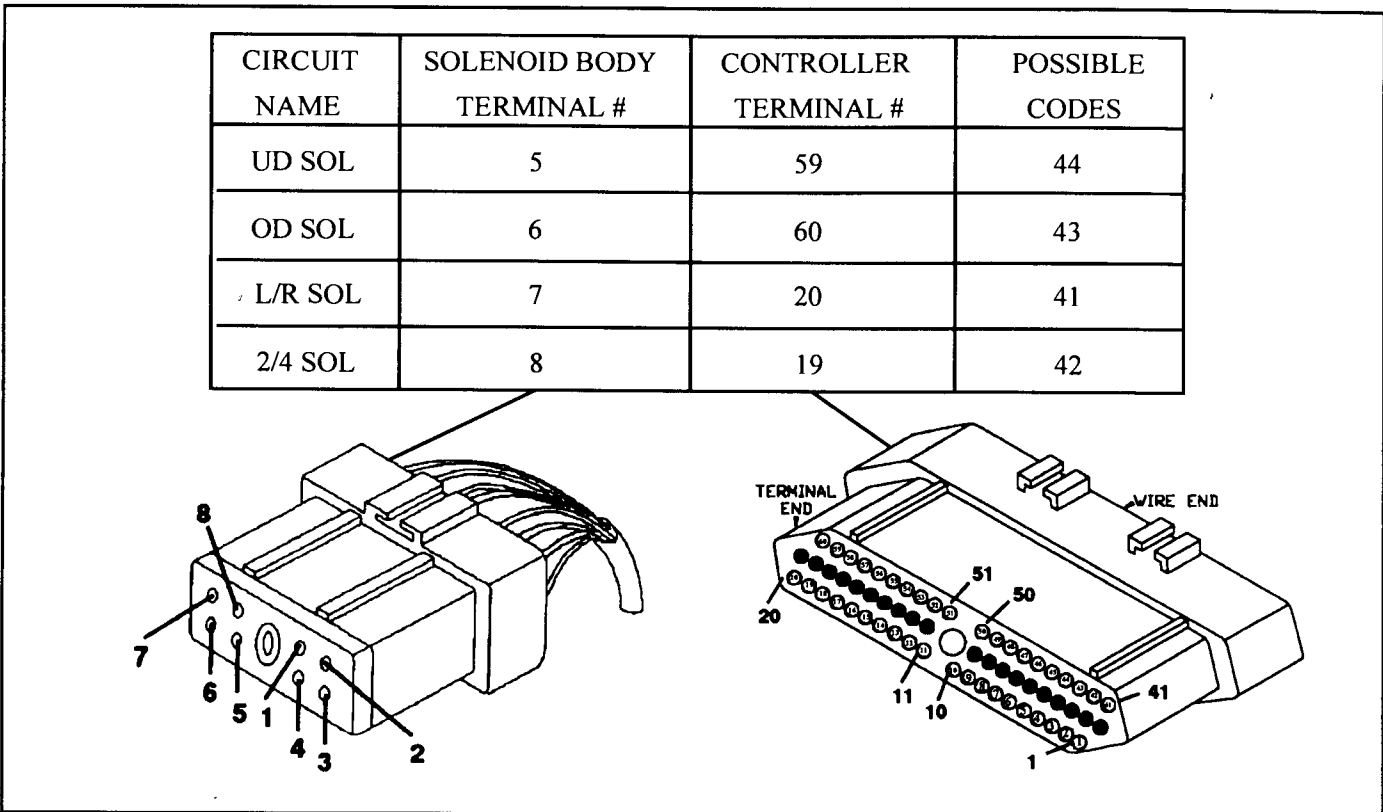


Figure 52

# SOLENOID CIRCUIT ERROR

## 41, 42, 43 & 44 *continued*

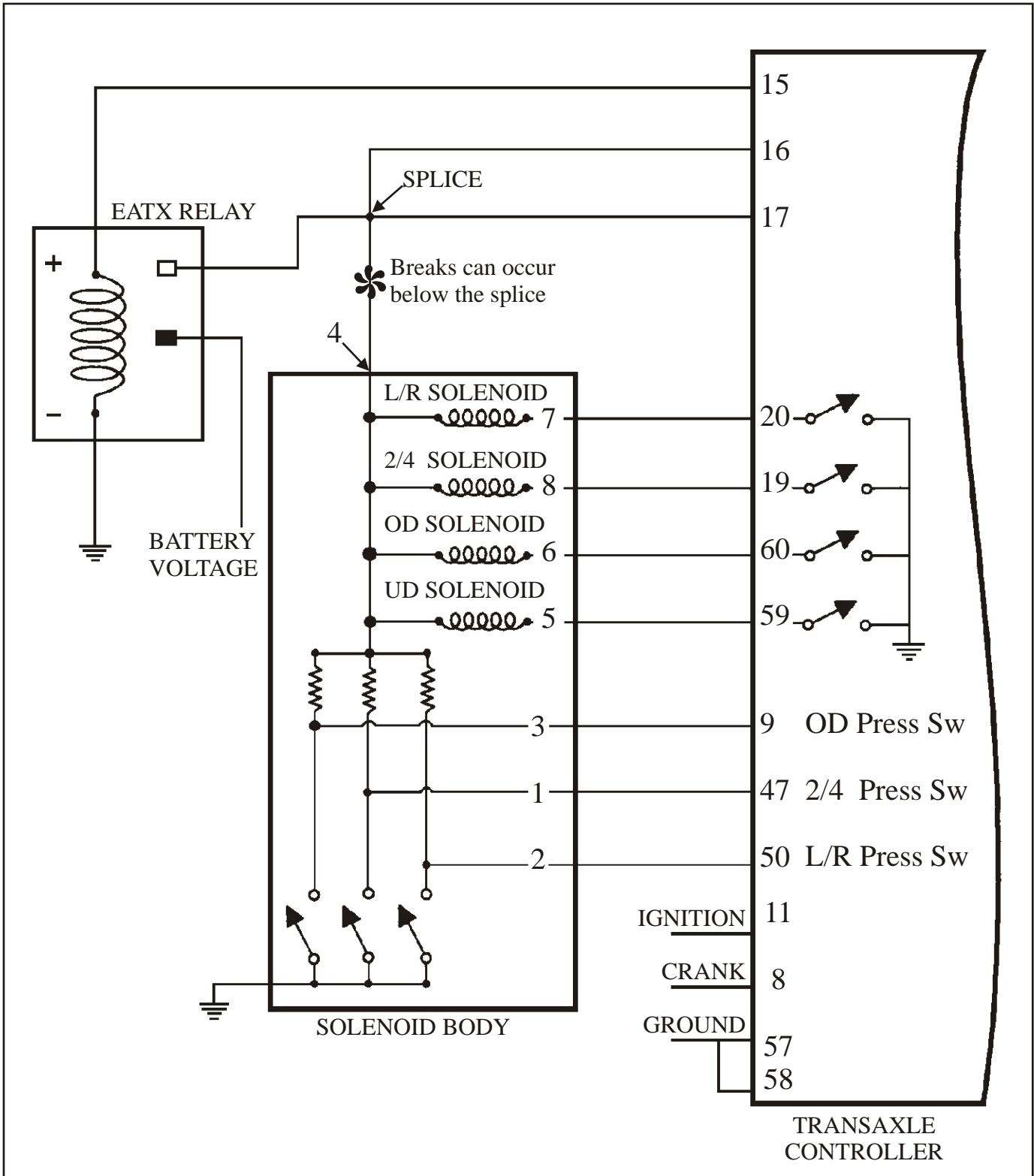


Figure 53

## SOLENOID CIRCUIT ERROR 41, 42, 43 & 44

CODE	FAULT	LIMP-IN
41	Low/Reverse Solenoid Circuit Error	YES
42	2/4 Solenoid Circuit Error	YES
43	Overdrive Solenoid Circuit Error	YES
44	Underdrive Solenoid Circuit Error	YES

### POSSIBLE CAUSES



- *Defective Solenoid Body*
- *Corroded or defective 8 way solenoid body connector*
- *Severed solenoid wires*
- *Defective or corroded 60 way controller connector.*
- *Defective EATX Controller.*

### DIAGNOSTIC STEPS (42LE Only) See also page 89



- Unplug the TCM's 60 way connector. Using a DVOM check the resistance of all four solenoid circuits by placing the positive lead onto pin 16 or 17 as seen in Figure 54. With the negative lead, carefully touch pins 19, 20, 59 and 60 one at a time. Each solenoid should measure approximately 1.5 to 2.0 ohms. If the solenoid providing the code reads considerably higher or lower from the other three solenoids, change the solenoid body. If all the readings are the same, wiggle the solenoid wires with the meter still attached and see if the readings behave erratic. If so, the solenoid connector is bad and will need to be repaired.
- If when performing the above check an open is seen on one of the solenoid wires, use Figure 55 to perform a continuity check on the wire in question. If it is determined that the wire is severed, a new wire can be run and spliced in outside the harness.
- If it has been determined that the solenoids are within their proper resistance values and the wiring is good all the way up to the TCM. Inspect terminal cavities 19, 20, 59 and 60 in the TCM connector (See Page 25 ). Repair or replace if necessary.
- If the TCM cavities are good, change the TCM

## SOLENOID CIRCUIT ERROR

### 41, 42, 43 & 44 *continued*

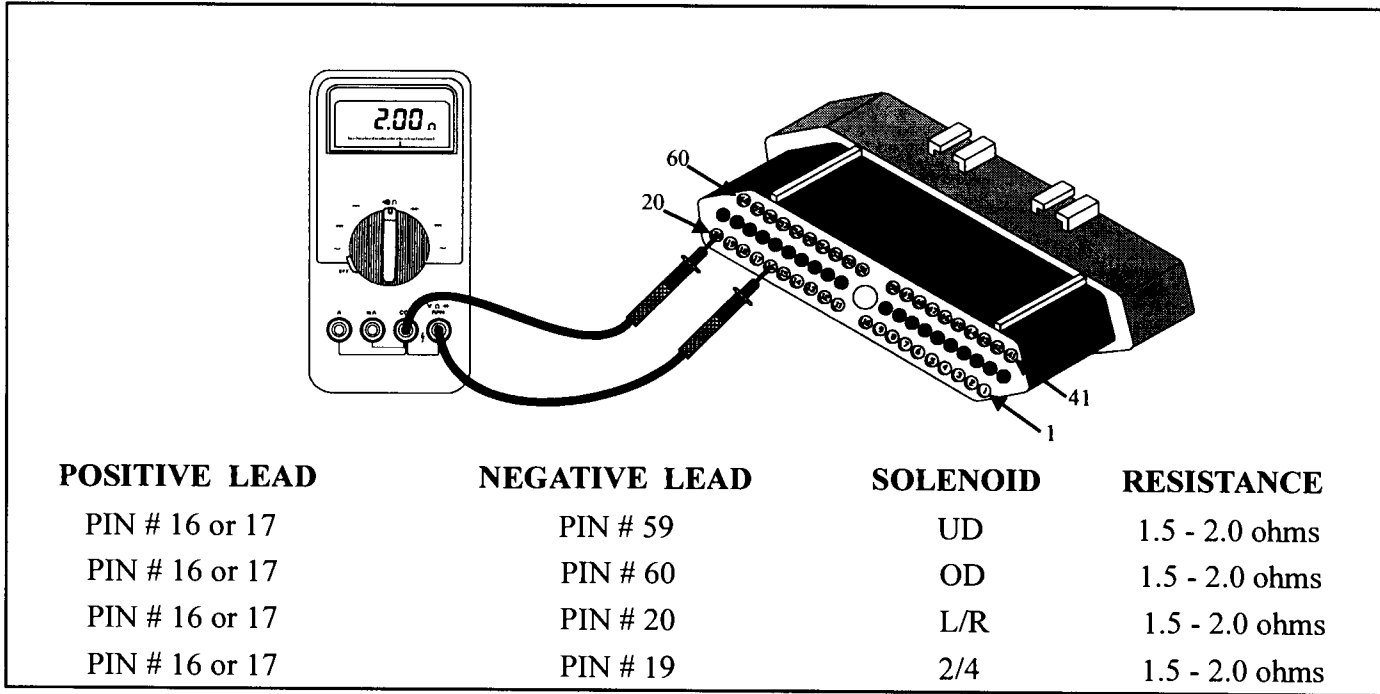


Figure 54

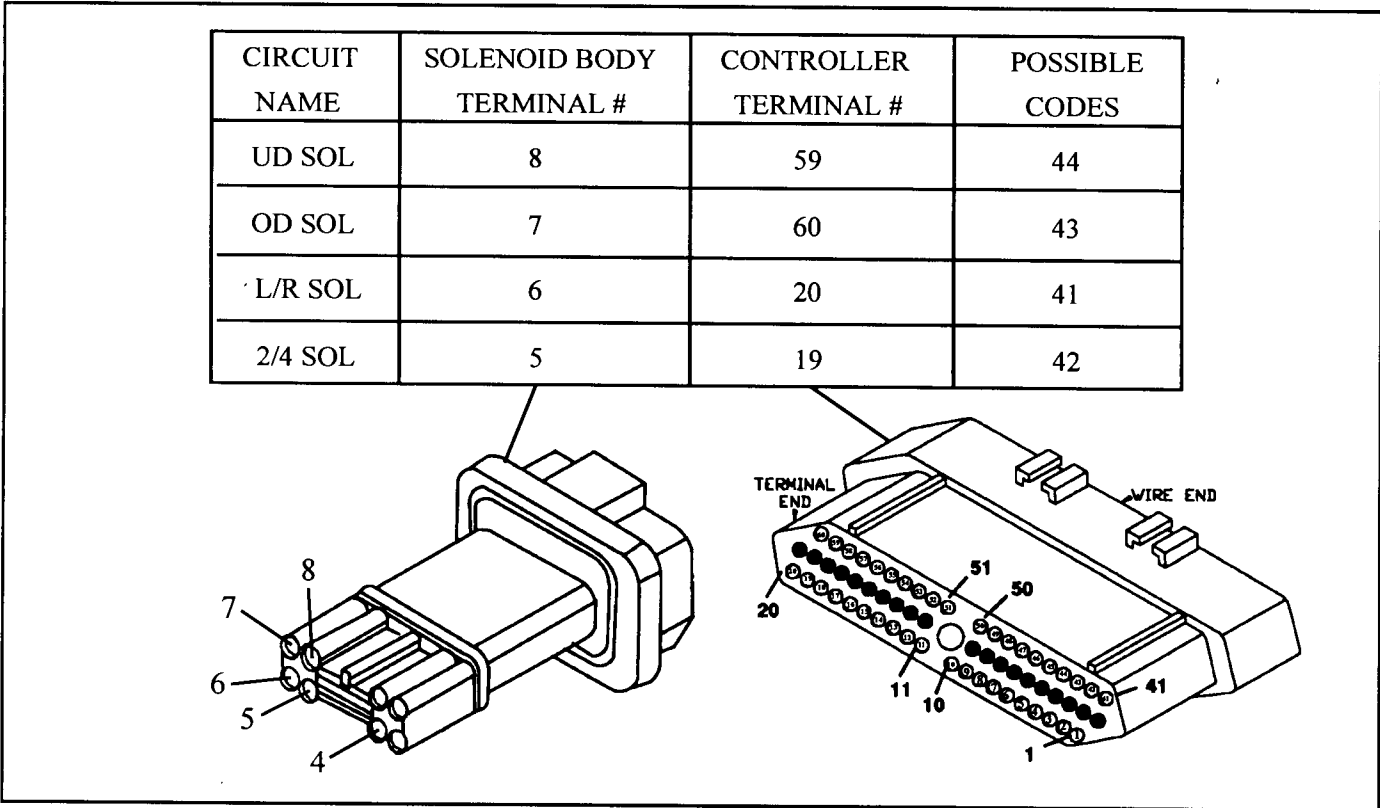


Figure 55



## 3-4 SHIFT ABORT 46

CODE	FAULT	LIMP-IN
46	3-4 Shift Abort	NO

### POSSIBLE CAUSES



- *Overdrive Clutch Failure*
- *Mis-assembly of the Underdrive/Overdrive Clutch Stack Up*
- *Pump or Pump Sealing Rings*
- *2/4 Clutch Leak (Piston Seals, VB Seal, Accumulator Seals)*
- *Solenoid Body*
- *Valve Body*

### QUALIFICATION



- When the transaxle makes a 3-4 shift, the controller looks at the rate of change in the gear ratio via the turbine and output shaft speed sensors. If the rate of change is not within a predetermined time frame, the controller will attempt to make a 3-4 shift 3 times. If all three attempts fail the predetermined time frame, a code 46 is set and 4th gear is prohibited. In some cases, the three attempts into 4th gear can be very radical (harsh). At times it may even failsafe to a limp in mode with a code 53 (Gear ratio error in third) or 54 (Gear ratio error in 4th) accompanied with 46 (3-4 shift abort) and or 36 (Aborts immediately after shift). Code 46 all on its own will not cause a failsafe condition. Only 4th gear will be prohibited.

There are several possibilities for a 3-4 shift abort. To understand the possibilities, when a 3-4 shift takes place, the Overdrive clutch remains on while the Underdrive clutch is released and the 2-4 clutch is applied. This allows three clutch packs and hydraulic circuits to be suspect. Since there are three clutch elements to consider which can malfunction hydraulically or mechanically, an orderly diagnostic routine must be followed to eliminate the many possibilities. The first place to start is with a pressure gauge. Pressures are at 3 predetermined settings or levels. They are as follows:

First and Second Gear = 120 - 145 psi.  
 Third and Fourth Gear = 75 - 95 psi.  
 Reverse Gear = 175 - 235 psi.

Notice that there is a pressure cut back when a shift into third is made. If there were severe problems in the UD or OD clutch circuit, with this type of pressure cut back a code 53 will occur and an abort to second gear would take place. A 3-4 shift would never be reached. However, if there are mechanical problems in either the UD or OD clutch pack, a problem may not occur at this time.

## 3-4 SHIFT ABORT

### 46 *continued*

#### DIAGNOSTIC STEPS



- With the pressure specifications given on page 65, the UD, OD and 2/4 hydraulic circuits should be checked with a pressure gauge (See Figure 56). The 2/4 clutch pressure should be checked in 2nd gear. 120-145 psi should be seen and 0 psi in first and third. Since the transaxle is experiencing a 3-4 shift abort, the full 75-95 psi may not be seen at the 2/4 tap when attempting to go to fourth and should be considered as normal. If the pressure in the 2/4 clutch circuit is substantially low in second gear or pressure is seen in first or third, this hydraulic circuit needs to be investigated.
- The OD clutch circuit is next to check. It should show 0-5 psi in first and second and 75-95 in third. If excessive pressure is seen in first and second, or substantially low pressure in third, this hydraulic circuit needs to be investigated.
- The UD clutch circuit is next and can be the most likely hydraulic problem causing the 3-4 shift abort. This clutch circuit should show 120-145 psi in first and second and 75-95 in third. There should be 0 psi in this circuit when in 4th gear. Since the transaxle will not fully go into 4th gear, a 0 psi reading may be hard to detect. To get around this problem, when the transaxle is in third gear, step heavy into the throttle and bring the vehicle up to speed so as to be able to do an OFF throttle upshift into 4th gear. If a 3-4 shift takes place without being on the throttle, the controller will allow a 3-4 shift to take place. While in 4th gear, read the UD pressure gauge. If pressure is seen, this hydraulic circuit needs to be investigated. A bad solenoid body, valve body or pump can cause this type of cross leak.
- If all pressure readings are within specifications, then an internal problem exists such as a clutch pack mis-assembly or broken snap rings.

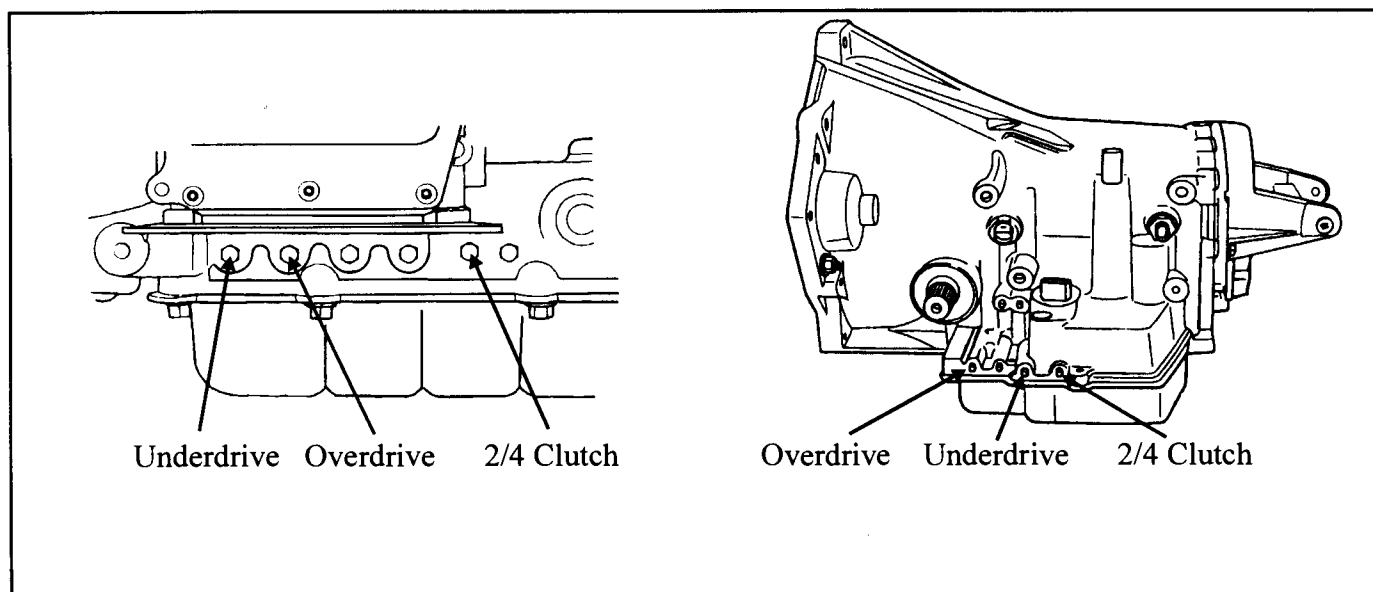


Figure 56

## TORQUE REDUCTION COMMUNICATION ERROR 48

CODE	FAULT	LIMP-IN
48	Torque Reduction (TRD) Link Communication Error	NO

### POSSIBLE CAUSES



- *EATX Relay*
- *Throttle Position Sensor*
- *Open or shorted Torque Management Request Circuit*
- *TCM*
- *PCM*

### DIAGNOSTIC STEPS



- If a code 15 is set with code 48, change the EATX relay or perform the checks as explained starting on page 28.
- Check the TPS as explained starting on page 53.
- Unplug the TCM connector with the ignition off. Once disconnected, turn the ignition on and check terminal 10 for 7 to 10 DC volts (See Figure 57). If 7 to 10 volts is observed, replace the TCM. If there is not, go to the next step.
- Turn the ignition off. With the meter still on terminal 10, change to an ohms setting (See Figure 58). If the resistance is below 5 ohms, the wire is shorted to ground and will need to be repaired or replaced. If resistance is above 5 ohms, go to the next step.
- Keep the ignition off and unplug the PCM and perform a continuity check across the wire. Place one meter lead to cavity 63 in the PCM connector and 10 in the TCM connector (See Figure 59). If resistance is below 5 ohms change the PCM. If an open is seen, repair or replace the severed wire.

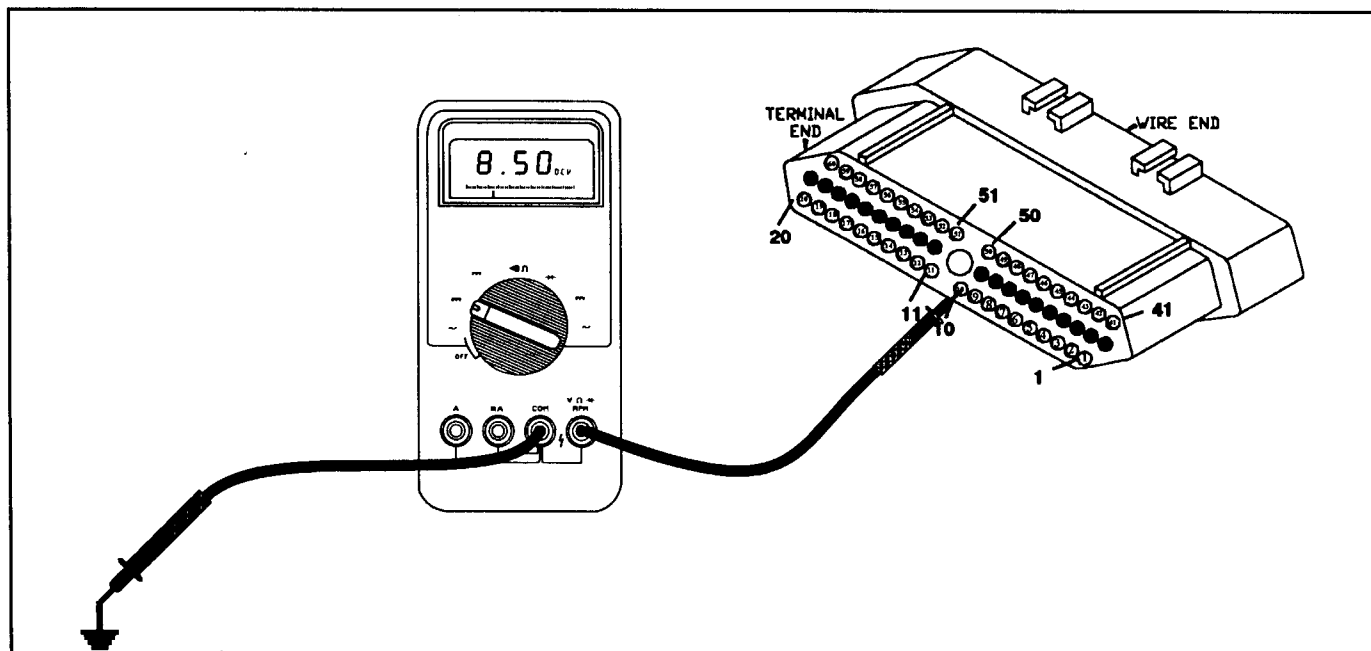


Figure 57

**TORQUE REDUCTION COMMUNICATION ERROR**  
*48 continued*

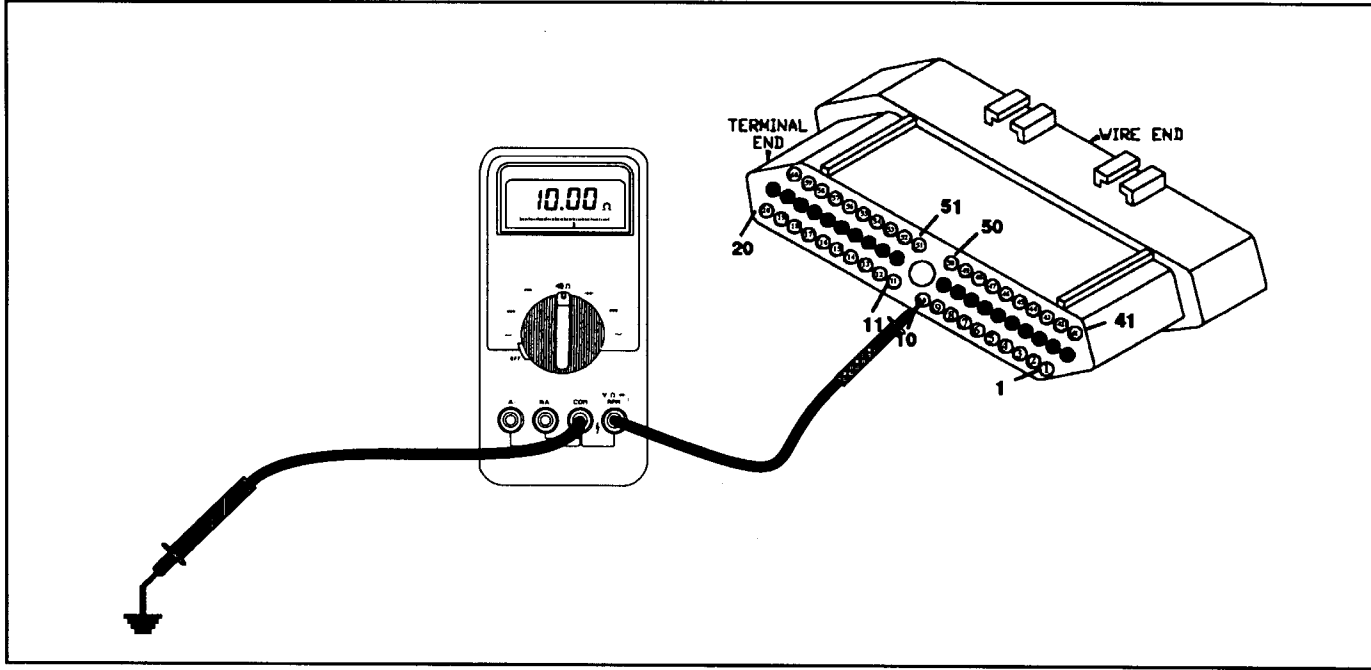


Figure 58

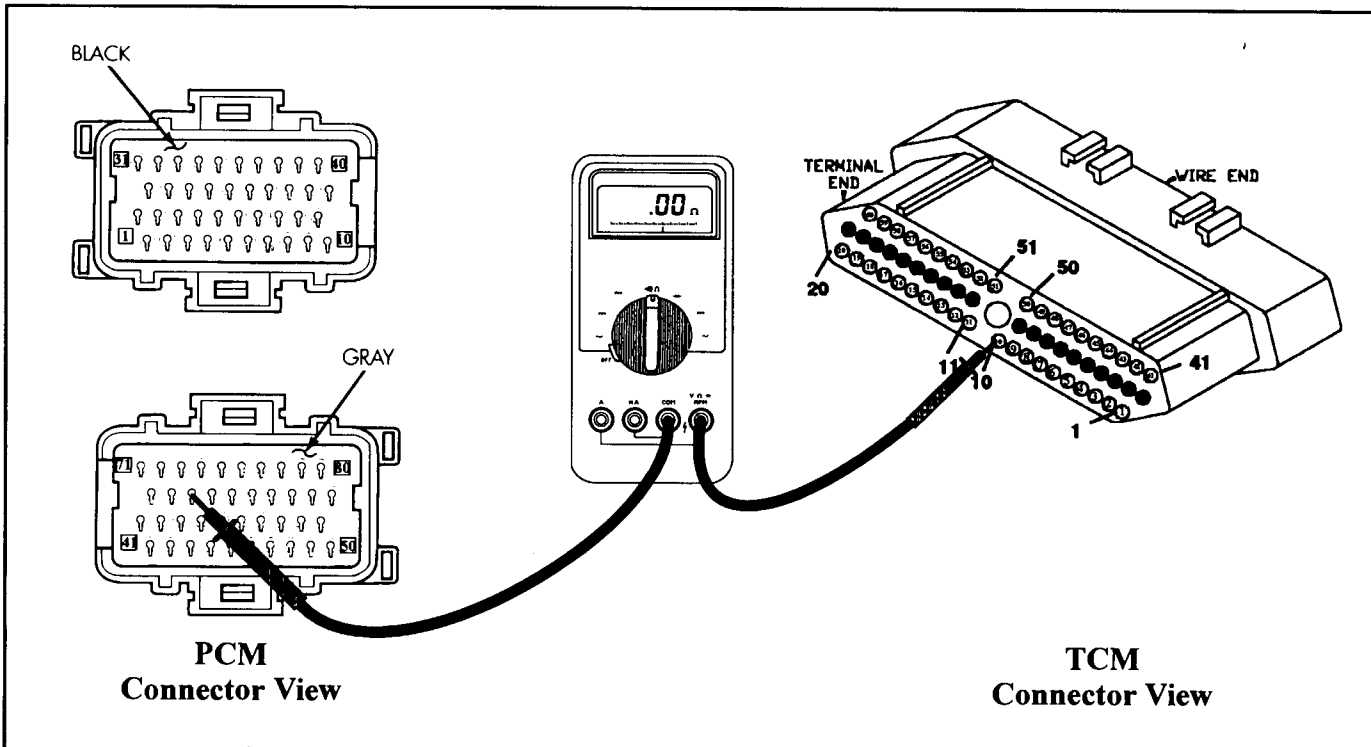


Figure 59

## GEAR RATIO ERROR 36, 39, 50, 51, 52, 53 & 54

CODE	FAULT	LIMP-IN
36	Aborts Immediately After the Shift	NO
39	Gear Ratio Error (Any Gear Range)	YES
50	Gear Ratio Error in Reverse	YES
51	Gear Ratio Error in First	YES
52	Gear Ratio Error in Second	YES
53	Gear Ratio Error in Third	YES
54	Gear Ratio Error in Fourth	YES

### POSSIBLE CAUSES



- *PRNODL Switch*
- *Internal Seal Leaks*
- *Worn Clutches*
- *Broken Snap Rings*
- *Clutch Pack Mis-assembly*
- *Turbine/Output RPM sensors*
- *Solenoid Body*
- *TCM*

### DIAGNOSTIC STEPS



- Verify proper Shift Lever Position with the use of a scanner. If the shift lever position does not indicate the actual range the selector lever is in, repair or replace the PRNODL or TRS switch. Refer to pages 28 to 52 for PRNODL and TRS information.
- Very rarely will the solenoid body or a TCM cause a gear ratio code as the majority of the time a gear ratio error indicates an internal slip in the transmission. It has been a common practice to swap solenoid bodies and/or TCM's as a quick method in solving the problem. Obviously if the problem has been eliminated there would not be a need to go any further. If the problem remains after a TCM change and/or a solenoid body change, move on to the next step.
- A code 36 is stored any time a 50 series code is produced. It indicates that the problem is mechanical in nature. When this code exists, diagnosing the transmission should be based on the associated speed ratio code and only mechanical causes should be considered. If a 50 series code is set without a code 36, the turbine/output rpm sensors or TCM would be suspect. Refer to page 73 for turbine and output RPM check.

**GEAR RATIO ERROR****36, 39, 50, 51, 52, 53 & 54 continued****DIAGNOSTIC STEPS**

- 1989 and 1990 transaxle controllers would produce a code 39 if it had monitored a ratio problem in either reverse, first, second, third or fourth gear. 1991 and up controllers were updated to produce a specific code indicating which gear the ratio error was actually seen. The new speed error codes are as follows:

50 - Gear Ratio In Reverse

51 - Gear Ratio In First

52 - Gear Ratio In Second

53 - Gear Ratio In Third

54 - Gear Ratio In Fourth

55 - Gear Ratio In Neutral (Will not be stored; reserved for future use).

56 - Turbine Speed Sensor

57 - Output Speed Sensor

58 - Speed Sensor Ground

Speed or Gear Ratio Errors occur when either the turbine and output shaft RPM sensors do not compare to a known gear ratio or that an excessive change in the turbine or output shaft RPM sensors has taken place. Both the turbine shaft and output shaft RPM sensors are looking at the gear ratio within the gear box itself. In other words, it is looking at the ratio of the different gears via the planetary system and not the outside drive and driven gears, pinion shaft and ring gear. All 41TE and 42LE transaxles have a planetary gear ratio of approximately 2.84:1 in first, 1.57:1 in second, 1:1 in third and 0.69:1 in fourth. The drive and driven gears, pinion and ring gears change the overall gear ratio outside the main gear box. If the wrong overall gear ratio transaxle was installed into the vehicle, it would not have an effect on the turbine and output RPM sensor ratio readings. It would however, affect vehicle speed which would in turn affect shift and converter clutch strategy.

The transaxle controller compares the turbine and output RPM readings and calculates the gear ratio by dividing the output RPM into the turbine RPM. For example, let's say that you have a scanner attached to the vehicle so that you can see both the turbine and output RPM readings. The scanner also lets you see what gear the transaxle is in and it says first gear. You are traveling at approximately 10 mph and the turbine sensor reads 1570 RPM's and the output sensor reads 553 RPM's. With these readings and a calculator, a simple math procedure can be performed to determine if the first gear ratio is good. Simply divide the output RPM reading into the turbine RPM reading:

1570 divided by 553 = 2.839 - This is close enough to 2.84:1 to be good.

Second gear example: 1606 divided by 1020 = 1.575:1

Third gear example: 1575 divided by 1575 = 1:1

Fourth gear example: 1225 divided by 1785 = 0.686:1

This can be helpful when you have an earlier transaxle controller that only stores a code 39. If you record a movie with the use of a scanner before, during and after the moment the transaxle goes into limp, you can review the movie and calculate each gear to determine which gear the ratio error took place. The later models as previously stated provide a specific code that indicates which gear had a ratio error. The following page is an example of a movie which had a 4th gear ratio problem.



## Technical Service Information

### GEAR RATIO ERROR

**36, 39, 50, 51, 52, 53 & 54 continued**

LINE	FRAME:	-3	-2	-1	+0	+1	+2	+3
1	ENGINE RPM	2650	1426	1793	2934	1345	2012	1528
2	GEAR	3RD	4TH	4TH	4TH	4TH	4TH	3RD
3	TURBINE RPM	2253	1552	1602	2678	1583	2686	
4	PRNODDL	O-D	O-D	O-D	O-D	O-D	O-D	O-D
5	OUTPUT RPM	2258	2259	2306	2301	2268	1690	
6	TPS (V)	1.29	1.56	0.51	2.42	0.49	0.49	
7	TCC LOCKED	NO	NO	NO	NO	NO	NO	NO
8	TPS ANGLE ( °degrees )	18	29	0	63	0	0	
9	LIMP-IN	NO	NO	NO	NO	NO	YES	YES
10	OD PRESS SW	CLSD	CLSD	CLSD	CLSD	CLSD	CLSD	CLSD
11	REV LIGHT 1	13.4	13.2	13.3	13.4	13.4	13.4	13.3
12	2-4 PRESS SW	CLSD	CLSD	CLSD	CLSD	CLSD	CLSD	CLSD
13	REV LIGHT 2	13.5	13.3	13.5	13.4	13.4	13.2	13.0
14	L-R PRESS SW	OPEN	OPEN	OPEN	OPEN	OPEN	CLSD	CLSD
15	SWITCH BATT (V)	13.4	13.2	13.3	13.3	13.3	0.0	0.0
16	IGN CYCLES	1	1	1	0	0	0	0
17	J2 CIRCUIT (V)	13.2	13.2	13.4	13.4	13.2	13.2	13.2
18	NEUTRAL SW 1	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN
19	NEUTRAL SW 2	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN
20	REV LIGHT SW 1	CLSD	CLSD	CLSD	CLSD	CLSD	CLSD	CLSD
21	REV LIGHT SW 2	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN

## GEAR RATIO ERROR

### 36, 39, 50, 51, 52, 53 & 54 *continued*

#### DIAGNOSTIC STEPS



- Once you have determined which gear is causing the ratio error, you still do not know which clutch pack caused the error. It is possible to determine which clutch pack is slipping by checking the CVI values through the scanner, however, this method may not be helpful 100% of the time. You may have even experienced removing the transaxle for inspection and found no evidence of a slipping clutch. One test that most scanners make available which takes out all of the guess work is called a CLUTCH TEST. This feature allows the technician to apply two clutch packs of his choosing and bring the throttle up to a 30% opening and view the turbine RPM sensor for a reading. This test is to be performed with the wheels stationary. The turbine RPM sensor should not provide a reading if the clutches are holding tight. If an RPM reading is seen, one of the two clutch packs is slipping. To determine which of the two is slipping, a different clutch combination can be selected and the test is then repeated. It is by the process of elimination that a clutch pack that is slipping can be located.

The different clutch combinations are as follows:

- 1 - 1st GR (UD/LR)
- 2 - 2nd GR (UD/24)
- 3 - 3rd GR (UD/OD)
- 4 - Rev GR (REV/LR)

Once a combination has been selected, the scanner will display the following:

Engine RPM 1489  
Turbine RPM 0  
Output RPM 0

TPS: 25% GEAR: 2

If the UD/LR clutch pack combination was chosen and the turbine sensor read 0 RPM's when the throttle was opened to 30 %, then neither the UD or LR clutch pack is slipping. If the next test is performed using the UD/24 clutch pack combination and a turbine RPM reading is seen, then the 24 clutches are slipping. This is how by the process of elimination a specific clutch pack can be identified to determine the cause of a code 39.

**NOTE:** On late model vehicles with the Autostick feature, a clutch test can be performed without the command of a scanner. Obviously this will be especially helpful with scanners that do not have a clutch test option. The vehicle can be launched in 1st, 2nd or 3rd gear while in the Autostick mode. This will allow the technician to use this option in conjunction with a scanner to perform a clutch test. Use the scanner to observe the turbine RPM and TPS angle while placing the Autostick in each of the gear ranges as previously described.



## RPM SENSOR CODES 56, 57 & 58

CODE	FAULT	LIMP-IN
56	Input (Turbine) RPM Sensor Circuit Error	YES
57	Output RPM Sensor Circuit Error	YES
58	Speed Sensor Ground Circuit Error	YES

### POSSIBLE CAUSES



- **RPM Sensor**
- **RPM Sensor Connectors**
- **Open or shorted RPM Sensor Circuit**
- **TCM Connector or TCM**

### DIAGNOSTIC TIPS - For 42LE's see also page 89



- Both the Turbine Shaft and Output Shaft RPM sensors are AC voltage generators (Permanent Magnet Sensors [PM]). They produce their own AC voltage which could be measured in Hertz (Hz) using a DVOM. However, it is recommended to first observe these sensor readings with the use of a scanner. Especially in third gear if possible as both sensors should produce the same RPM reading. This step could immediately reveal if both sensor are in fact sending a signal to the TCM. If only one sensor reading is observed, the other sensor and its wiring would need to be investigated. Should both sensors not work, it is possible the common ground wire is bad. If both sensors provide a reading through the scanner, wiggle the connectors. If the readings remain, the TCM is most likely defective. If the readings drop to 0 rpm's while wiggling the connector, the connectors will need to be replaced.  
If it is desired to observe the Hertz readings using a DVOM, the best method would be to purchase the connector repair kit which provides replacement connectors for both sensors already wired. These replacement connectors will allow easier attachment of the meter into the sensors. Hertz readings should increase in proportion to the rotation of the turbine shaft and out put shaft.

### DIAGNOSTIC STEPS



- With the ignition off, unplug the TCM. With an ohm meter, place the negative lead to terminal 13. With the positive lead, the turbine shaft RPM sensor's resistance can be measured by placing the lead onto terminal 52. The output shaft RPM can be measured by placing the positive meter lead to terminal 14. Both RPM sensor should measure between 500 to 600 ohms (See Figure 60).  
*Note: Factory repair manuals specify 300 to 1200 ohms. It has been ATSG's experience that this is to broad of a range. However, if a sensor measures 1200 ohms, the other sensor should be within the same range otherwise it should be determined defective.* Replace RPM Sensor or Sensors if necessary.
- If an open is observed, use Figure 61 to perform individual continuity checks on each wire. Repair the open wire if necessary. If continuity is seen on each wire, check connector cavities. RPM Sensor Connector repair kit part number is 4419478. See page 25 for the TCM connector check. If connectors are good,
- Replace the TCM.

**RPM SENSOR CODES**  
*56, 57 & 58 continued*

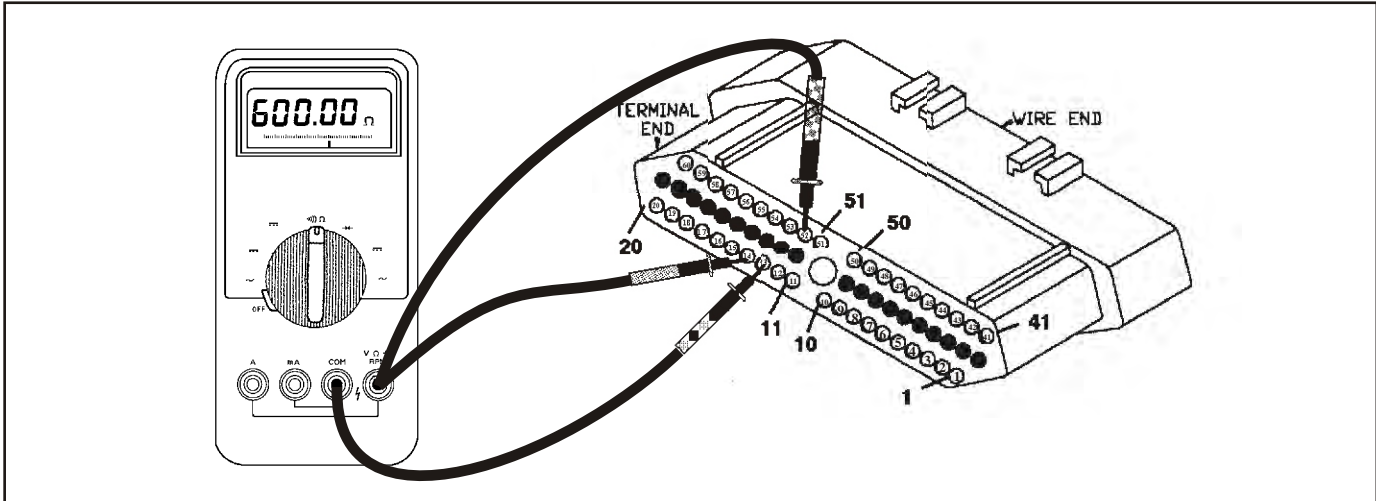


Figure 60

CIRCUIT NAME	TURBINE SHAFT SPEED SENSOR TERMINAL #	CONTROLLER TERMINAL #	POSSIBLE CODES
ST1/T52	1	52	56
SG5/T13	2	13	58
CIRCUIT NAME	OUTPUT SHAFT SPEED SENSOR TERMINAL #	CONTROLLER TERMINAL #	POSSIBLE CODES
SO1/T14	3	14	57
SG5/T13	4	13	58

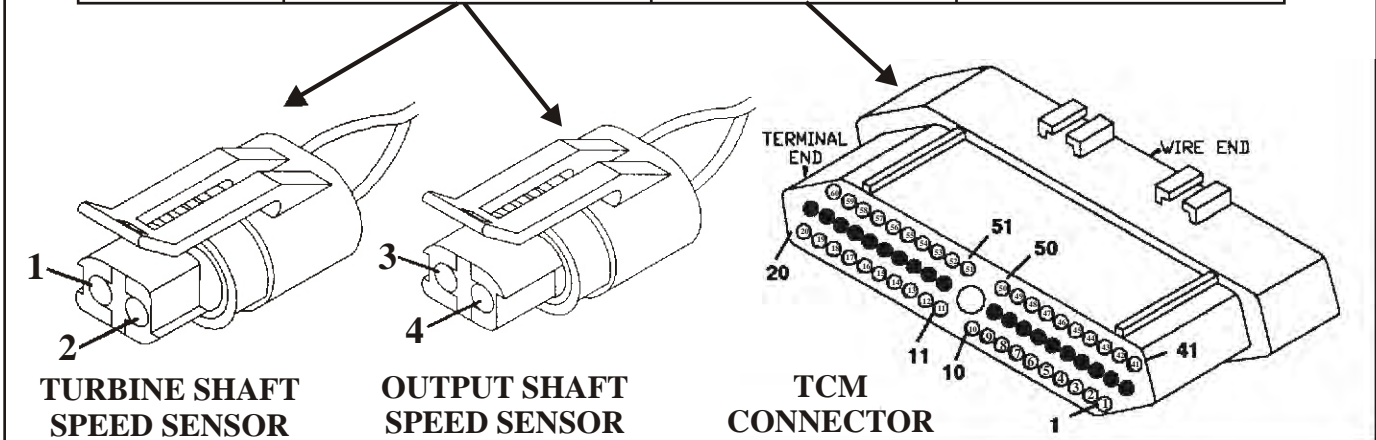


Figure 61

## RPM SENSOR CODES

### 56, 57 & 58 *continued*

#### DIAGNOSTIC STEPS - Special procedure for 1996 and later vehicles



- 1996 and later vehicles have a Transmission Fluid Temperature Sensor built into the Transmission Range Sensor. The ground wire for this sensor is shared with the Turbine and Output RPM sensor at pin 13 in the TCM connector. Should this ground wire become severed, a code 58 and 72 may be set. A continuity check can be performed by placing one meter lead to terminal 3 in the TRS connector and terminal 13 in the TCM (See Figure 62). For further TFT sensor checks, refer to page 84.

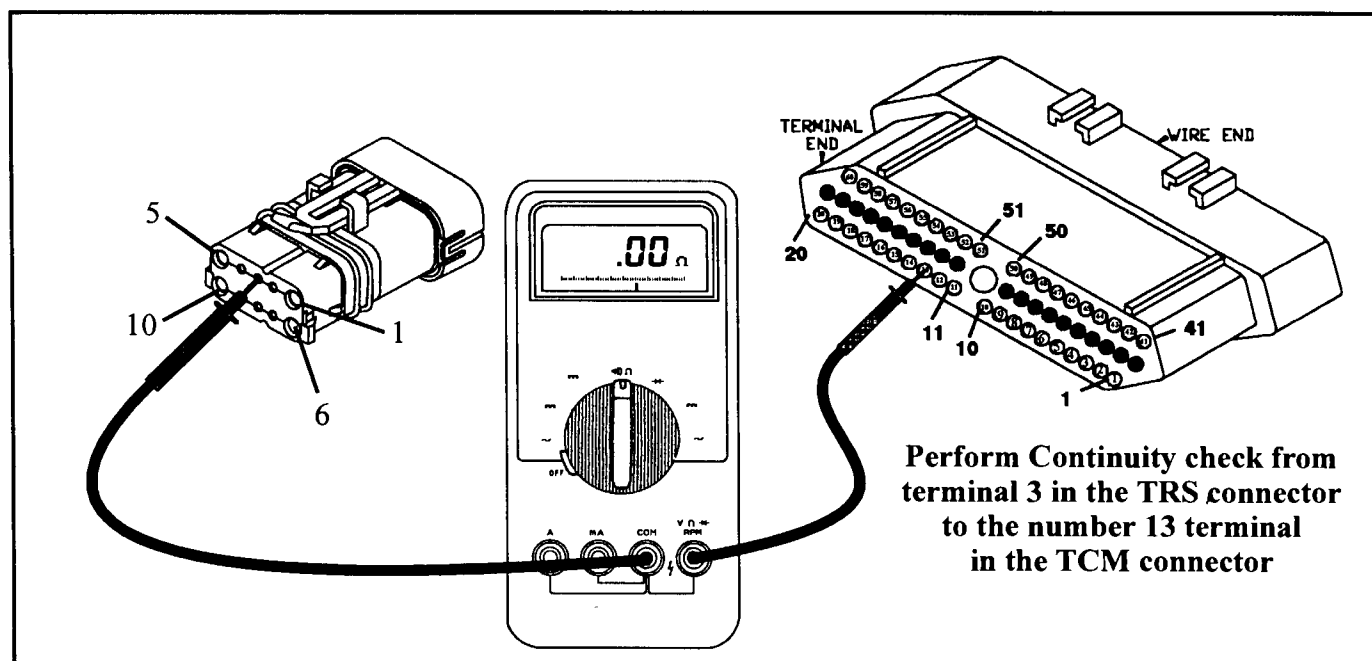


Figure 62

## INADEQUATE CLUTCH VOLUME 60, 61 & 62

CODE	FAULT	LIMP-IN
60	Inadequate L/R Clutch Volume	NO
61	Inadequate 2/4 Clutch Volume	NO
62	Inadequate OD Clutch Volume	NO

### POSSIBLE CAUSES



- **High Line Pressure**
- **Cross Leaks**
- **Clutch Pack Mis-assembly**
- **Broken Snap Ring**
- **Bad alternator (spike voltage), Bad battery or Bad TCM**

### DIAGNOSTIC TIPS



- Clutch Volume Index (CVI) is a calculated numerical value to indicate how much volume of transmission fluid was needed to apply a friction element without stroking the accumulator piston. The L/R, 2/4 and OD clutch elements are continuously monitored and learned for adaptive controls. As the friction material wears, the volume of fluid needed to apply the element increases. The following numerical values are Chrysler's suggested acceptable tolerances for A-604 clutch volumes:

L/R: 35 to 83                                      2/4: 20 to 77  
 OD: 75 to 150                                    UD: 24 to 70

If the battery has been disconnected, some models will lose the learned CVI values. In such cases, the EATX Controller will go to a default setting until the new CVI values are learned. The default settings used are:

L/R: 64    2/4: 48  
 OD: 89    UD: 45

Late model vehicles as well as updated controllers will remember the learned CVI values even if the battery has been disconnected. These controllers will also allow you to utilize a QUICK LEARN feature through a scan tool to update new CVI values after an overhaul. Earlier transaxle controllers require what is called an "Upshift Learn Procedure" otherwise known as the "Dumb Method". This means that you have to first bring the vehicle up to operating temperature before road testing. During this road test, you must maintain constant throttle opening during the shifts and do not move the accelerator pedal during these shifts. Make 15 to 20 1-2, 2-3 and 3-4 upshifts.

Accelerate from a stop each time to approximately 45 mph at an approximate throttle angle of 20-25 degrees. Next, perform what is called the "Kickdown Learn Procedure" by making 5 to 8 wide open throttle kickdowns to first gear from speeds below 25 mph. With vehicle speeds greater than 25 mph, make 5 to 8 part throttle to wide open throttle kickdowns to either 3rd or 2nd gear. The clutch volumes will update during the following shift sequence:

- The L/R clutch volume updates during a 2-1 or 3-1 downshift.
- The 2/4 clutch volume updates during a 1-2 upshift.
- The OD clutch volume updates during a 2-3 upshift.
- The UD clutch volume updates during a 4-3 or 4-2 downshift.

## INADEQUATE CLUTCH VOLUME

### 60, 61 & 62 *continued*

#### DIAGNOSTIC TIPS



- 1991 and up vehicles or newly replaced updated controllers will provide the following codes in regard to inadequate clutch volume:

Code 60 Inadequate LR Element Volume

Code 61 Inadequate 24 Element Volume

Code 62 Inadequate OD Element Volume

Clutch Volume Index's are best used in a diagnostic procedure when there are shift problems associated with the transaxle. If the transaxle does not exhibit any shift concerns, a below minimum or above maximum Clutch Volume Index's does not indicate transaxle removal. At best, it may be a warning sign of future concerns. In other words, if out of range CVI values do not interfere with the quality of the shift, transaxle removal may be a premature diagnosis. However, when diagnosing excessive CVI values in relationship to flared shifts, keep in mind that they are usually due to excessive clutch pack clearance, leaks or broken snap rings. If inadequate clutch volumes exist and a code has been set, the transaxle may be accompanied with harsh shifts. There are several possibilities as to the cause of inadequate or below minimum CVI's. Too tight of a clutch pack or a broken snap ring jamming the clutch pack would be the obvious possibilities. The not so obvious would be cross leaks. For example, in Figure 63 a view of both the early and late stators are shown. The earlier 3 ring stator would allow UD clutch oil to cross over into the OD clutch circuit in first and second gears. This would keep the OD clutch circuit partially charged with oil. The result would be low OD clutch volume readings since not much oil was required to put the OD clutches on during a 2-3 shift. This was usually accompanied with a low clutch volume reading in the UD clutch circuit as well. The reason for this is that when the transaxle made a shift into fourth gear, OD clutch oil would now cross over the ring and keep the UD clutch circuit partially charged with pressure. When the transaxle would make a 4-3 or a 4-2 downshift, not much volume of oil was required to put the UD clutch back on. This obviously was the reason why Chrysler redesigned the stator to 4 rings adding an exhaust between the two circuits.

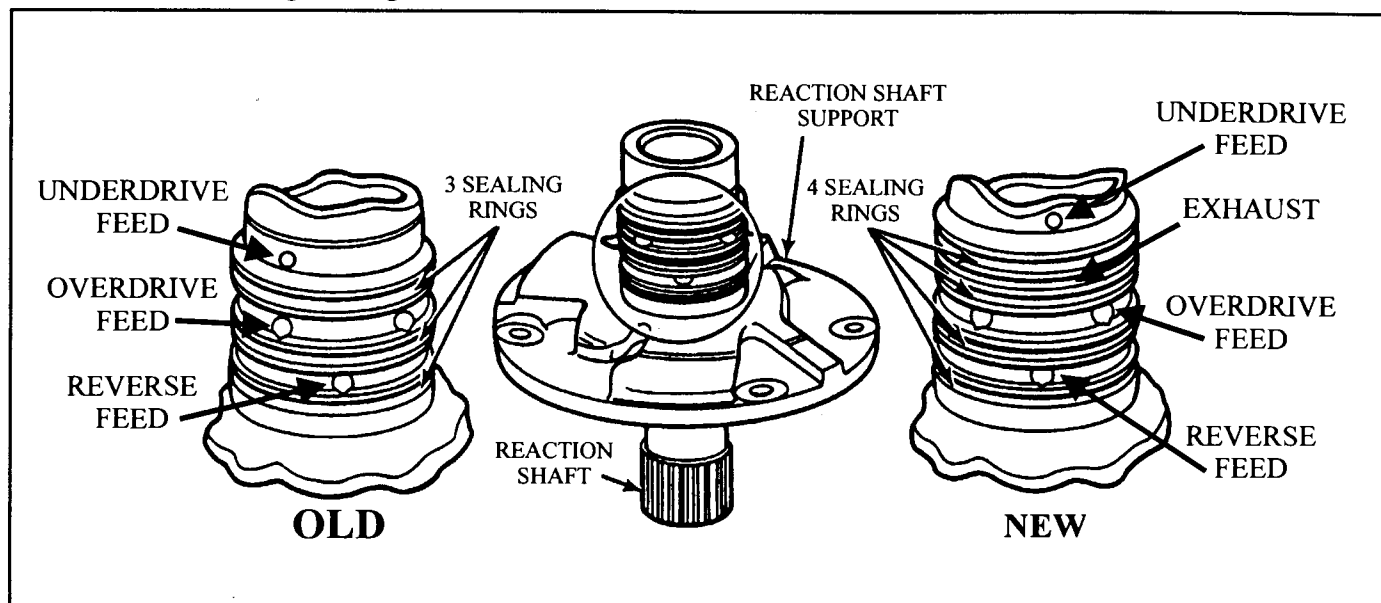
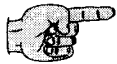


Figure 63

## INADEQUATE CLUTCH VOLUME 60, 61 & 62 continued

### DIAGNOSTIC TIPS



A low clutch volume reading in just the OD clutch circuit has been commonly caused by a defective O ring on the # 5 check ball capsule in the transfer plate as shown in Figure 64. This blocks controlled line pressure from entering the OD clutch circuit. If the O ring or the capsule itself fails to hold back this pressure, the low OD clutch volume reading will vary depending upon the severity of the leak. If the leak is slight, most of the oil will exhaust past the OD solenoid and the OD clutch volume may appear to be normal. As the leak gets worse, the OD solenoid is flooded and the OD circuit becomes charged with oil causing below minimum CVI. *Note: The # 5 check ball capsule has been eliminated in late model 41TE's and all 42LE's.*

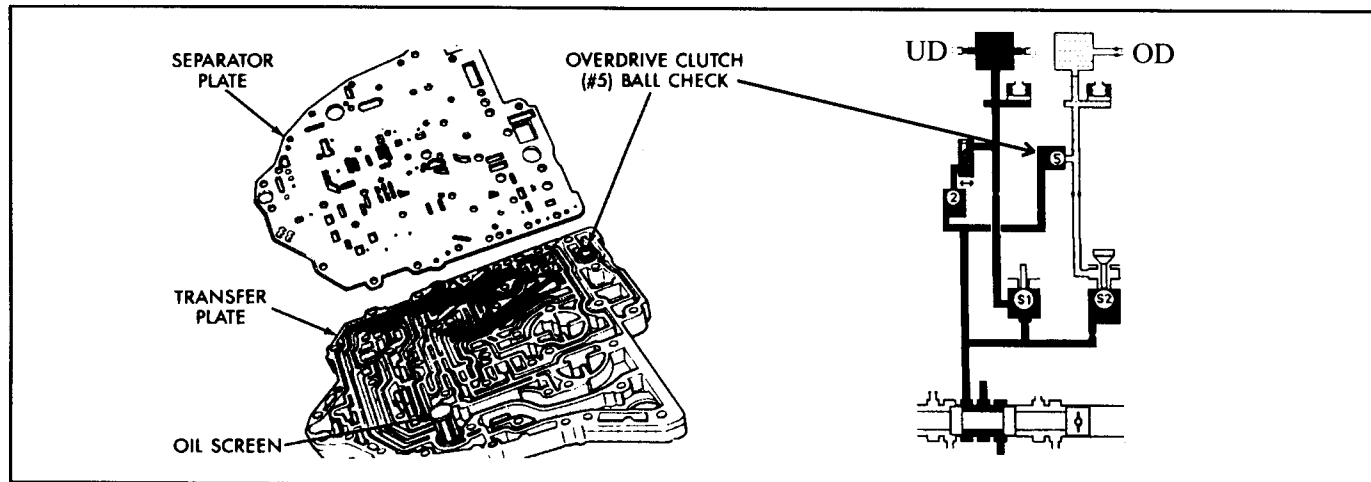


Figure 64

### DIAGNOSTIC TIPS



Another cause of low CVI that is often overlooked is high line pressure. There are three predetermined line pressure settings in an A604 transaxle. First and second gears have 120 to 145 psi. Third and fourth have 75 to 95 psi, while reverse is calibrated to have 175 to 235 psi. The controller for the transaxle has no way of knowing or checking what the actual line pressure is in the transaxle. Therefore, the controller controls the solenoid pulse rate based on these predetermined line pressure settings. If a mechanical problem occurs in the valve body causing high line pressure, the controller will be pulsing a clutch on through a solenoid based on a lower value pressure. With line pressure being much higher than what the controller thinks it is, a higher volume of oil is allowed to pass through the solenoid which results in a below minimum CVI reading. One common cause for this is either a worn sleeve in the pressure regulator valve system or a stuck pressure regulator valve (See Figure 65). Both cross leaks and high line pressure problems causing the below minimum CVI values can be easily checked with a pressure gauge. For example, if you have a below minimum CVI value in the OD clutch circuit, attach a pressure gauge on the OD clutch tap. There should NOT be any pressure in that port in first and second gear. If there is, you have a cross leak. At the same time, when you shift into third and fourth, your OD clutch pressure should be 75 to 95 psi. If you have 110 psi or higher, you have a high line pressure problem most likely caused by a worn sleeve in the pressure regulator valve.

**INADEQUATE CLUTCH VOLUME**  
**60, 61 & 62 *continued***

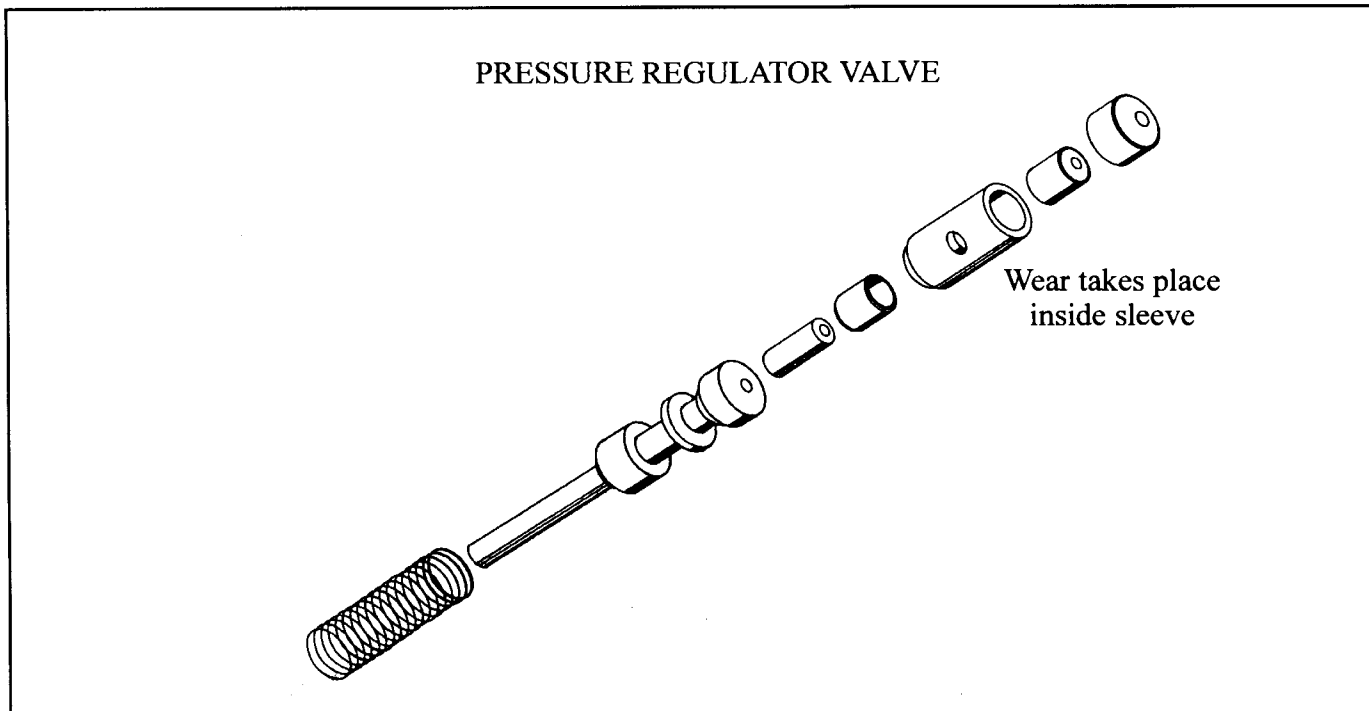


Figure 65

**DIAGNOSTIC TIPS**



- If clutch clearances are good, snap rings are not broken, line pressures are to spec and there is not a possibility of a cross leak and you are still being plagued with below minimum CVI values in either the L/R, 2/4 or OD circuit, the TCM may be defective.
- A method in determining a bad controller is to watch the CVI values through the scanner. The L/R value should only change after a 3-1 or 2-1 downshift. The UD changes only after a 4-3 or a 4-2 downshift. The 2/4 changes only after a 1-2 upshift and the OD only changes after a 2-3 upshift. If these values should change at any other time, the TCM is defective.

## AUTOSTICK SENSOR CIRCUIT

### 70

CODE	FAULT	LIMP-IN
70	Autostick Sensor Circuit Error	NO

### POSSIBLE CAUSES



- *Wiring or Connector Problems*
- *Autostick Switch Failure*
- *TCM*

### DIAGNOSTIC STEPS



- Locate and unplug the Autostick Switch in the center console (See Figure 66). Using a volt meter, turn the ignition ON and place the negative lead to ground. With the positive lead check for battery voltage at pin 1 in the Autostick connector (See Figure 67). If voltage is seen go to the next step. If voltage is not seen, check for a blown fuse. LH vehicles check fuse # 17, all others check fuse # 11. If the fuse is good, the wire from the fuse to pin 1 is severed and will need to be repaired or replaced.

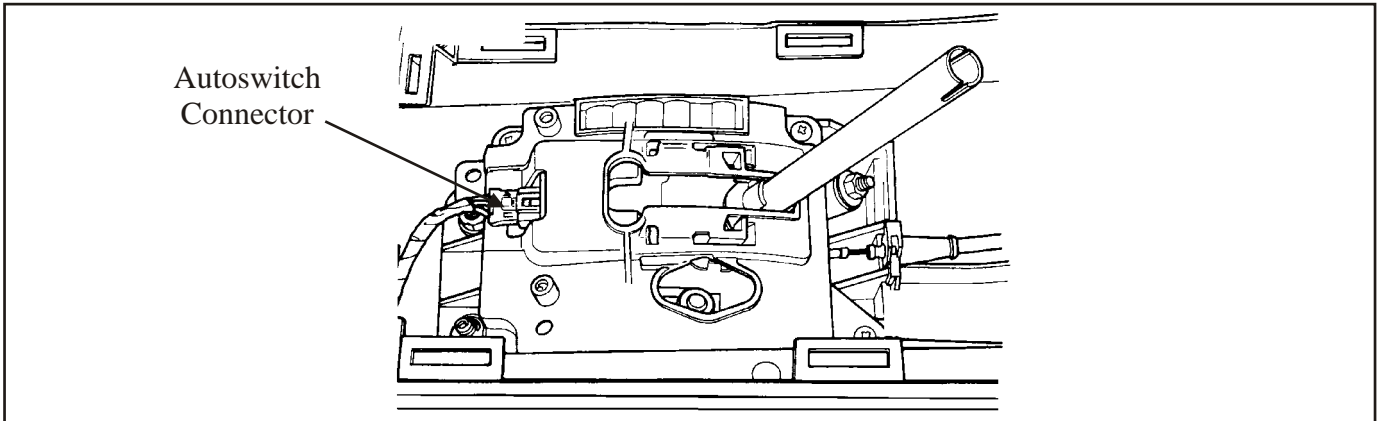


Figure 66

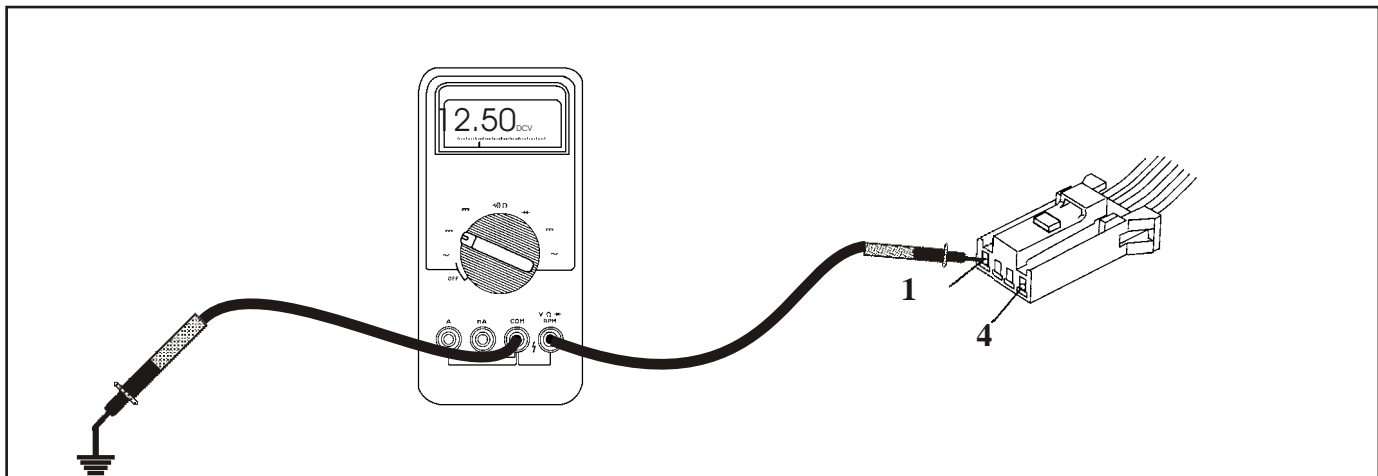


Figure 67



## AUTOSTICK SENSOR CIRCUIT

### 70 *continued*

#### DIAGNOSTIC STEPS



- Turn the ignition off and change the meter to read ohms. Keep the negative lead to ground and place the positive lead into terminal 2 of the Autostick connector (See Figure 68). If continuity (5 ohms or less) is observed, go to the next step. If continuity is not seen, the ground wire is severed or corroded. Repair or replace the wire.
- Unplug the TCM and perform a continuity check from terminal 3 in the Autostick connector to terminal 5 in the TCM (See Figure 69). If continuity is seen, move to the next step. If continuity is not seen, the wire is severed. Repair or replace the wire.
- Perform a continuity check from terminal 4 in the Autostick connector to terminal 44 in the TCM (See Figure 70). If continuity is seen, move to the next step. If continuity is not seen, the wire is severed. Repair or replace the wire.

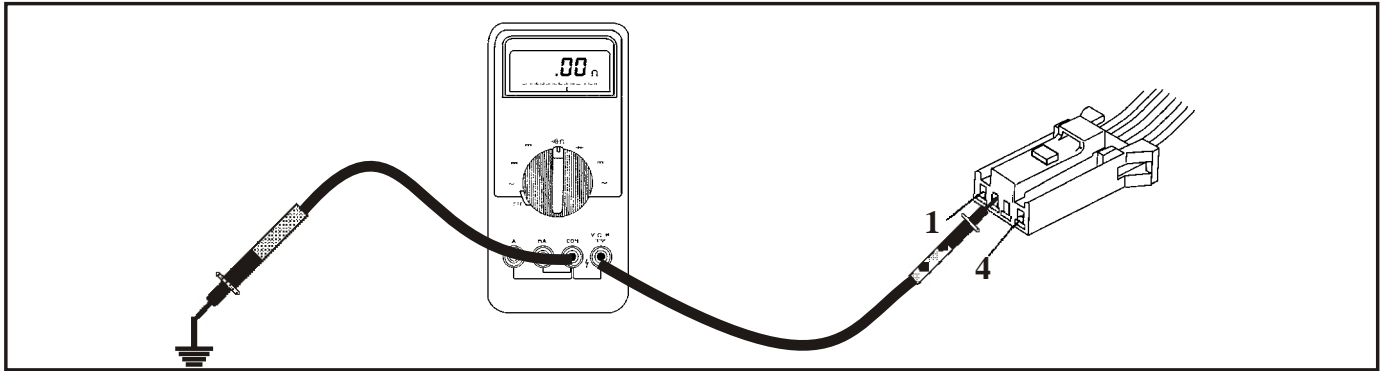


Figure 68

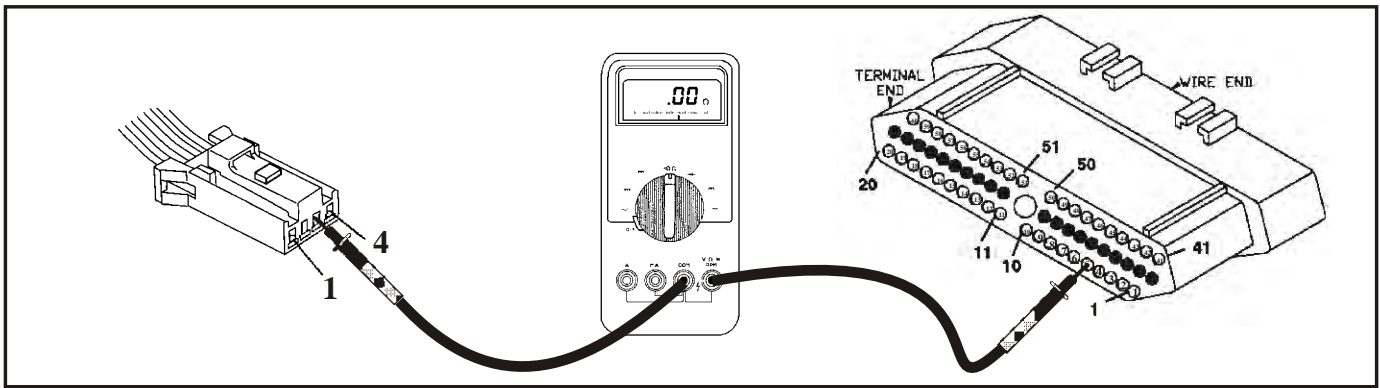


Figure 69

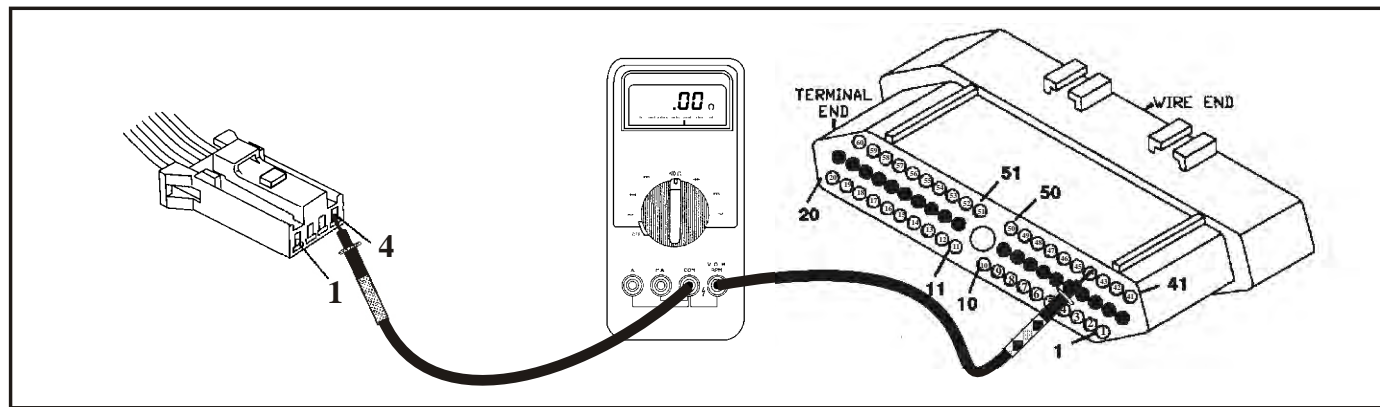


Figure 70

## AUTOSTICK SENSOR CIRCUIT

### 70 *continued*

**NEW FOR 1996:** Beginning in 1996, some models have an Autostick feature built into the gear shift lever (See Figure 1). Autostick is a driver-interactive transaxle feature that offers manual gear shift capability. When the shifter is moved into the Autostick position, the transaxle remains in whatever gear it was using before Autostick was activated. Moving the shifter to the left (towards the driver) causes a downshift, and moving it to the right (towards the passenger) causes an upshift. The instrument cluster will illuminate the selected gear (See Figure 72). The vehicle can be launched in 1st, 2nd or 3rd gear while in the Autostick mode. Speed control will be deactivated if the transaxle is shifted to 2nd gear. Shifting into OD position cancels the Autostick mode, and the transaxle resumes the OD shift schedule. Some shifts are executed automatically or prevented. Automatic shifts will occur under the following conditions:

TYPE OF SHIFT	APPROXIMATE SPEED
4-3 coast downshift	13 mph
3-2 coast downshift	9 mph
2-1 coast downshift	5 mph
1-2 upshift	6300 engine rpm
2-3 upshift	6300 engine rpm
4-3 kickdown shift	13-47 mph w/sufficient throttle

Additionally, under certain circumstances, the TCM may take over and override the autostick features when one of the following conditions occur: There are autostick errors detected, error over speed, engine overheating or transmission over heating.

Autostick shifts are not permitted under the following conditions:

TYPE OF SHIFT	APPROXIMATE SPEED
3-4 upshift	Below 15 mph
3-2 downshift	Above 74 mph @ closed throttle or 70 mph otherwise
2-1 downshift	Above 41 mph @ closed throttle or 38 mph otherwise

Figure 71

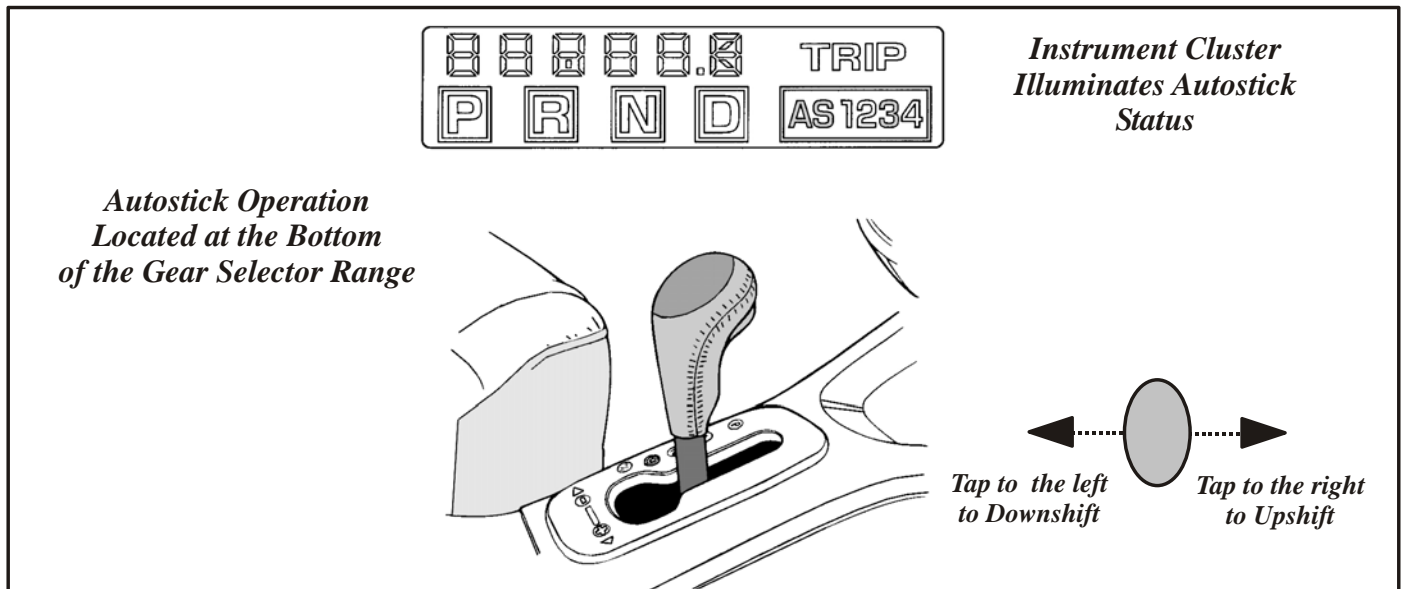


Figure 72

## OVERHEAT/HIGH TEMPERATURE 71, 75

CODE	FAULT	LIMP-IN
71	Manual Shift Overheat	NO
75	High Temperature Operations Activated	NO

### POSSIBLE CAUSES



- *Engine Overheat - Defective Thermostat etc.*
- *Transmission Overheat - Defective TFT etc.*
- *Restricted Transmission Cooling System*
- *Transmission Fluid Overfilled*
- *Radiator Fan Not Functioning Properly*
- *Extended Driving in Low Gear*

### DIAGNOSTIC TIPS



- The transmission and engine temperatures are constantly monitored during the operation of the vehicle. If overheating occurs with either the engine or transmission, the Autostick feature will be canceled and code 71 will be set. The conditions the TCM looks for to set this code is engine temperature exceeding 255°F while operating in the Autostick mode. Or, the transmission fluid temperature exceeding 275°F while in the Autostick mode. Strenuous driving may cause high temperatures to occur in both the engine and transmission. If Autostick is selected when these temperatures are high, code 71 will set.

*Note: If code 74 is set along with 71, refer to code 74 in this manual for diagnostic procedures.*

### DIAGNOSTIC STEPS



- Observe engine coolant temperature with a scanner. If temperatures exceed 200°F, check fan, engine coolant temp sensor and thermostat for proper operation.
- Observe the transmission fluid temperature with a scanner. If temperatures exceed 250°F, check the fluid temperature sensor (See Code 74).
- Check converter clutch operation. When lock up is full, both engine and turbine RPM should be the same. If the converter clutch does not have full apply while driving in fourth gear, a code 38 should be set. If there is not a full converter clutch apply, fluid temperature will rise dramatically.
- Ensure that a minimum of one quart per 20 seconds is being pumped out of the return cooling line idling in the drive range. The return line for the 41TE is the front line while the 42LE is the bottom line.
- Check fluid lever and adjust if necessary.
- Identify the style of driving that the vehicle was operating under when the code was set. If it was during lengthy aggressive driving, this would be the reason for the code.

## TEMPERATURE SENSOR/CALCULATED OIL TEMP 72, 74

CODE	FAULT	LIMP-IN
72	Temperature Sensor	NO
74	Calculated Oil Temperature in Use	NO

### POSSIBLE CAUSES



- *Gear Ratio Codes Stored*
- *RPM Sensor Codes Stored*
- *Transmission Range Sensor*
- *Wiring or Connector Problems in the Temperature Sensor Circuit*
- *TCM*

### DIAGNOSTIC STEPS



- If codes 51-54, or 56-58, or code 28 accompanies code 74, perform the appropriate diagnostic routine for these codes first before going through the following steps. Once gear ratio codes, speed sensor codes and TRS code has been eliminated, road test the vehicle. If code 74 reappears without other codes, go to the next step.
- Unplug the TRS connector. Place the ignition to the "ON" position. With a volt meter placed to DC volts, put the negative lead to a good known ground. With the positive lead, check terminal 4 for voltage (See Figure 73). If voltage is above 4.5 volts move to the next step. If less than 4.5 volts is observed, turn the ignition off and unplug the TCM. Change the meter to an ohms setting and check for continuity between terminal 54 in the TCM connector to terminal 4 in the TRS connector (See Figure 74). If continuity (5 ohms or less) is seen, replace the TCM. If continuity is not seen, repair or replace the wire.

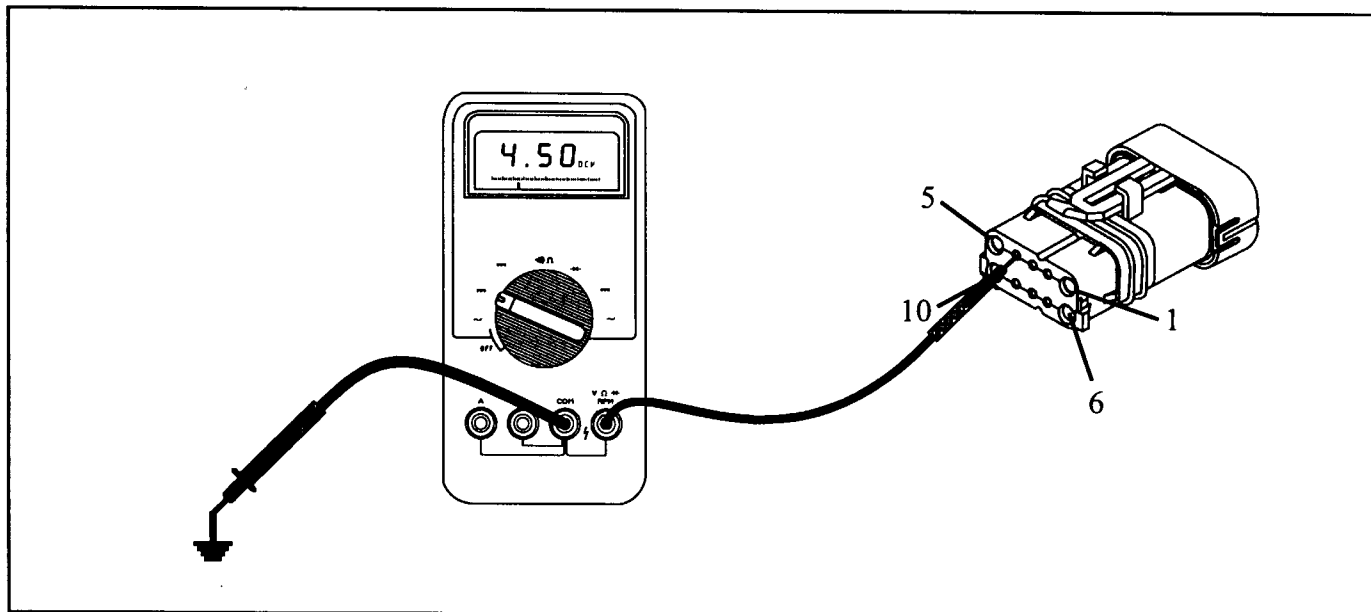


Figure 73

**TEMPERATURE SENSOR/CALCULATED OIL TEMP**  
**72, 74 continued**

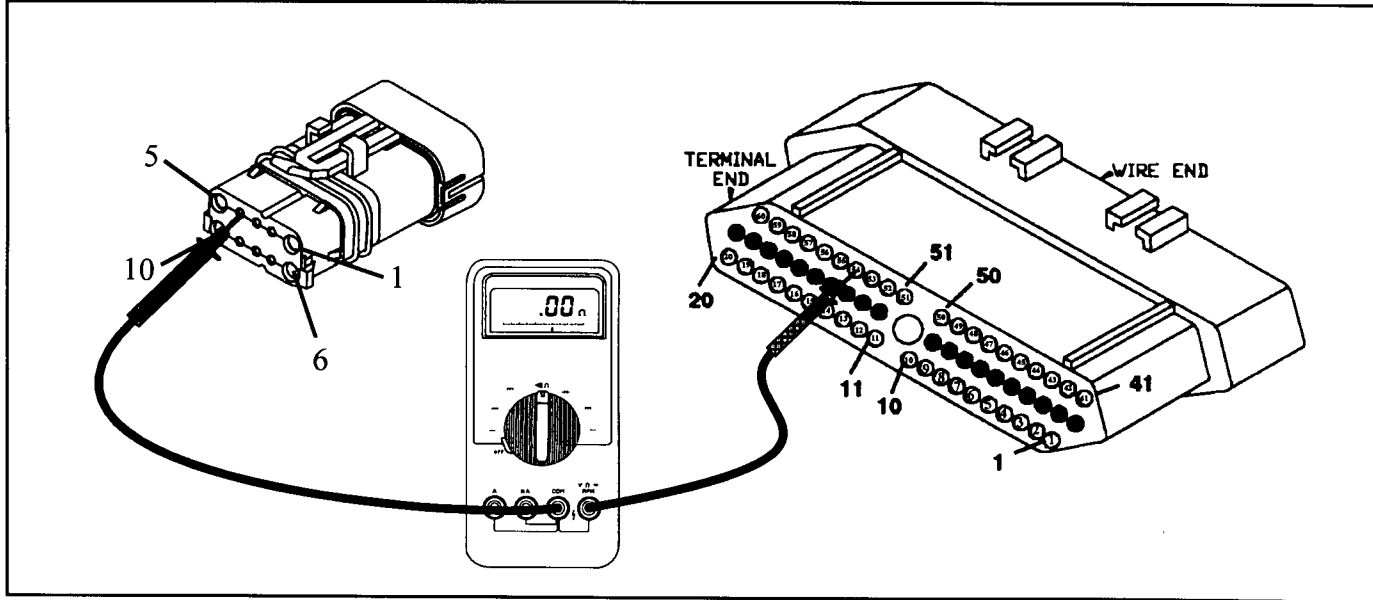


Figure 74

**DIAGNOSTIC STEPS**



- Perform a continuity check on the TFT's ground wire by placing one meter lead to terminal 3 in the TRS connector and terminal 13 in the TCM as shown in Figure 75. If continuity is seen, go to the next step. If continuity is not seen, repair or replace wire. If the wire is to be replaced, the turbine and output RPM sensor also uses this wire for ground. Be sure to include them in the new wire (See Page 74).

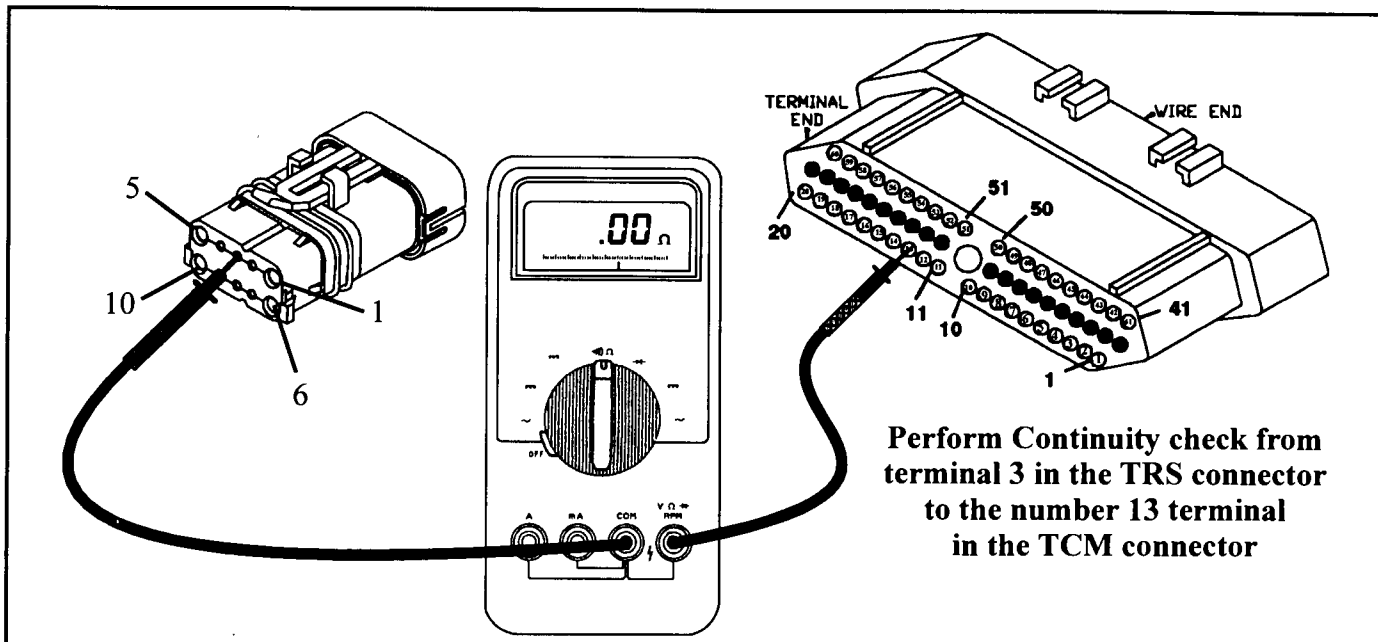


Figure 75

## TEMPERATURE SENSOR/CALCULATED OIL TEMP 72, 74 *continued*

### DIAGNOSTIC STEPS



- Re-connect the TRS sensor and perform a resistance check on the TFT sensor from the TCM connector. Place one meter lead into terminal 13 and the other meter lead into terminal 54 (See Figure 76). The range for the sensor from cold to hot is 100,000 ohms to 150 ohms (See Table Below). If the change in resistance is proportional to the change in the transmission fluid temperature and the resistance remains within specification, change the TCM. If the resistance is out of specification or does not change in resistance proportional to temperature, change the TRS.

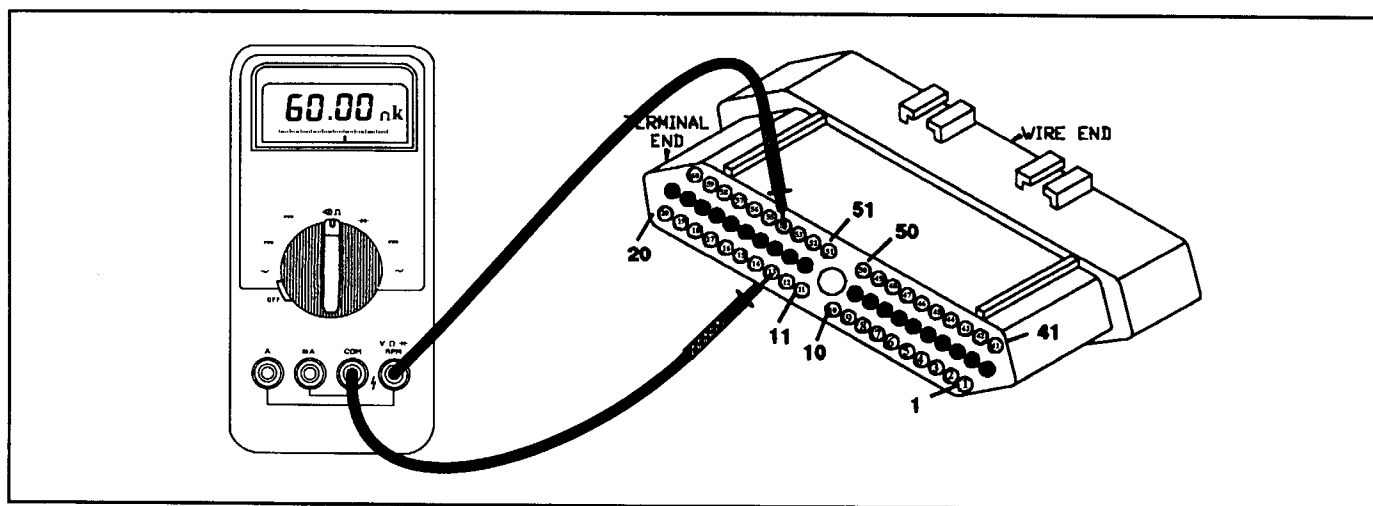


Figure 76

### DIAGNOSTIC TIP



- Another test method that can be employed at this point is to have the TCM and the TRS connected. Carefully back probe the number 54 wire at the TCM with positive meter lead. Place the negative lead to ground and have the meter set to DC volts. Start the vehicle after it has set a while so the transmission fluid is at room temperature. Once the vehicle is running observe the voltage reading. The voltage should change proportionally with temperature. As it warms, the voltage should drop. Voltage values should always remain with 4.96 to 0.07 DC volts. If the voltage observed exceeds these values or never changes at all, change the TRS. If voltage values change proportionally to temperature and does not exceed the specified values, change the TCM.

**Approximate Temperature Resistance Specification Table**

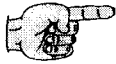
Temperature	Resistance	Temperature	Resistance
14°F	61.3K ohms	108°F	5.5K ohms
40°F	20.1K ohms	150°F	2.7K ohms
70°F	11.2K ohms	160°F	1.9K ohms
88°F	8.5K ohms	175°F	1.3K ohms
		180°F	1.2K ohms

## WORN OUT/BURNT TRANSAXLE FLUID

### 73

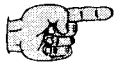
CODE	FAULT	LIMP-IN
73	Worn out/Burnt Transaxle Fluid	NO

### POSSIBLE CAUSES



- *Degraded Transmission Fluid (Use Only MS7176)*
- *Wheels Severely out of Alignment*
- *Internal Torque Converter Problem*

### DIAGNOSTIC TIP



- While in 3rd or 4th gear during full converter clutch and prior to the engagement of the A/C clutch, the PCM requests the TCM to momentarily establish partial lock up operation. If a shudder is detected during the transition from full lock up to partial lock up, a counter is incremented. If the count reaches 20, the trouble code is set. The driver may notice harsh bumps when the A/C clutch is being cycled, but vehicle shudder will be eliminated. After 35 OBDII warm-up starts or if the code is cleared, partial lock up will be reactivated to see if the shudder is still present. If one shudder event occurs, the code will reset. Clearing the code by performing a battery disconnect routine with a scanner is the only way to reset the shudder counter from 20 back to 0.

### DIAGNOSTIC STEPS



- Inspect tires for abnormal wear. If evidence of tread wear exists, have the alignment checked. Repair if necessary.
- If code 38 is set indicating converter clutch problems drop the pan for inspection. If excessive clutch material is found in the pan or filter, the unit will need to be removed for repairs. If very little clutch material is observed, perform the diagnostic procedures for code 38 on page 59.
- If no other code is set and the pan is clean, change the fluid and filter.



## Repairing Power-Up At Speed 76

CODE	FAULT	LIMP-IN
76	Repairing Power-Up At Speed	NO

### POSSIBLE CAUSES



- *Blown Direct Battery Feed Fuse or Fusible Wire*
- *Open or Corroded Main TCM Ground*
- *TCM*

### DIAGNOSTIC TIP



- If a vehicle loses power to the TCM the vehicle will go to the 2nd gear mode since there is no power available to control the transmission solenoids. However if power is restored, the TCM will power-up and normal operation will be restored. All 41TE applications built before 97 model year will not set a fault code which may result in great difficulty for the technician to try to diagnose the problem. New for 97 model year code 76 was added which identifies that power to the TCM was restored when the gear selector was in a "Drive" position while the vehicle was moving at speeds above 20 MPH. Unfortunately, if a person shifts to Neutral and cycles the ignition key and quickly shifts to the Drive position while moving before the TCM comes out of its START ROUTINE, the fault code can be set. Therefore it is critical that this fault code diagnosis repair procedure should only be used if the vehicle is experiencing intermittent 2nd gear operation and subsequently a return to normal operation during normal driving.

### DIAGNOSTIC STEPS



- Perform diagnostic procedures as outlined on pages 16 through 19 and pages 26 and 27.
- Check main TCM ground wires as outlined on pages 4 and 5.
- Perform diagnostic procedures for the EATX relay starting on page 28
- If direct battery feed is good, the ground is good and the EATX relay is good, change the TCM.



## 42LE DIAGNOSTIC TIP

### DIAGNOSTIC TIP



The 42LE transaxle has both the solenoid body and transmission range sensor mounted on the valve body. Each have their own connector coming through the case both of which are not easily accessible with the unit installed in the vehicle. To perform resistance checks of the solenoids, voltage checks on the pressure switches, resistance or volt checks on the Transmission Range Sensor (TRS) is near impossible at the case connector. The harness plugging into the solenoid body and the Transmission Range Sensor runs up to the top of the case above the bell housing where it plugs into the main vehicle harness (See Figure 77). This short wiring harness from the bell housing down to the solenoid body and TRS will allow for checks to be performed with ease. Figure 78 shows the top two connectors in this short pig tail harness. Each pin in these two connectors are numbered and identified. Should a resistance check need to be made on the solenoid body, rather than unplugging the solenoid body at the case (which could fill up with fluid if the unit is full), locate the 8 pin connector above the bell housing and unplug it. Place the positive meter lead of an ohm meter to pin 7. With the negative lead, touch pins 1, 2, 3 and 8 to obtain all 4 solenoid resistance values (See Figure 79). The chart in Figure 79 also provides checks that can be made through the 12 pin connector on the Turbine Shaft RPM sensor, the Output RPM sensor and the Transmission Fluid Temperature sensor.

SHORT HARNESS

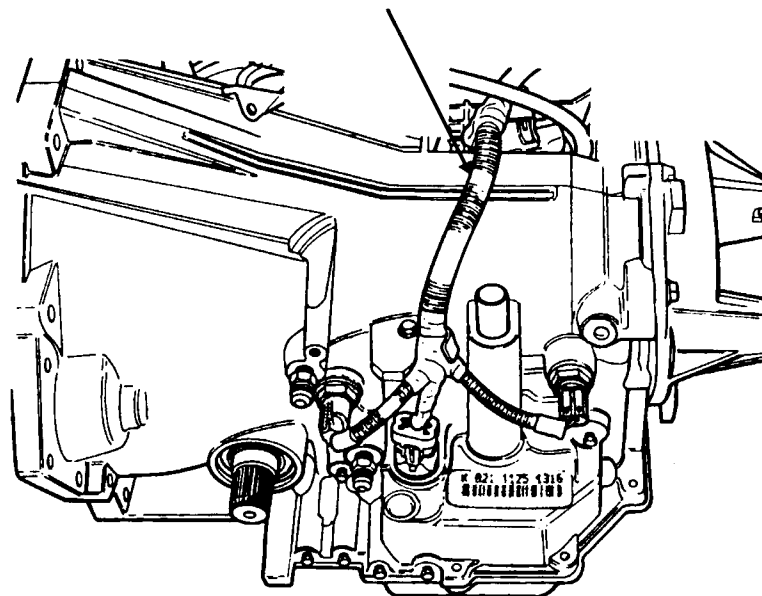
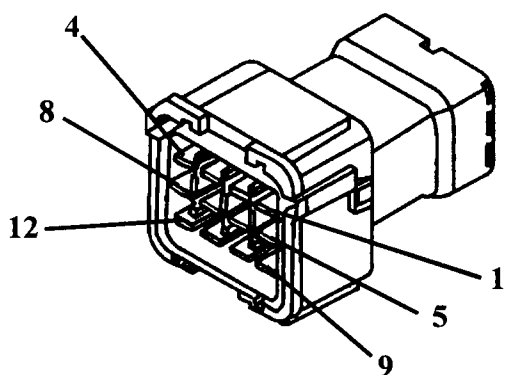


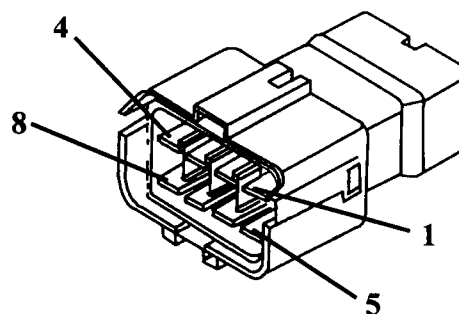
Figure 77

**42LE DIAGNOSTIC TIP**  
*continued*

**12 PIN CONNECTOR  
(TRANSMISSION SIDE)**



**8 PIN CONNECTOR  
(TRANSMISSION SIDE)**



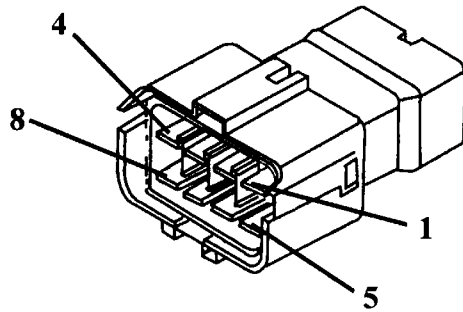
CAVITY	COLOR	FUNCTION
1	RD/BK	INPUT SPEED SENSOR SIGNAL
2	DB/BK	SPEED SENSOR GROUND
3	LG/WT	OUTPUT SPEED SENSOR SIGNAL
4	BR/YL	TRS-T1 SENSE
5	VT/WT	TRS-T2 SENSE
6	VT	TRS-T3 SENSE
7	LG/BK	TRS-T4 SENSE
8	VT *	TRANS TEMP. SENSOR SIGNAL
9	DG/OR *	AUTOMATIC SHUT DOWN RELAY
10	VT/BK	REVERSE LAMP SENSE
11	WT	FUSED IGNITION SWITCH OUTPUT
12	BK/LG	FUSED IGNITION SWITCH OUTPUT

CAVITY	COLOR	FUNCTION
1	BR	O.D. SOLENOID
2	WT	2-4 SOLENOID
3	PK	U.D. SOLENOID
4	DG	L-R PRESSURE SWITCH
5	YL/BK	2-4 PRESSURE SWITCH
6	OR/BK	O.D. PRESSURE SWITCH
7	RD	TRANS CONTROL RELAY OUTPUT
8	LB	L-R SOLENOID

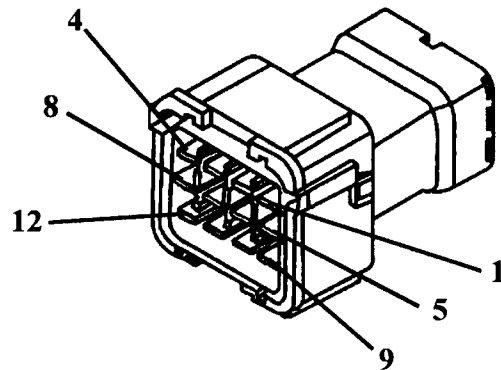
\* 1996-97 LH

Figure 78

**42LE DIAGNOSTIC TIP**  
*continued*



<u>TEST</u>	<u>POSITIVE LEAD</u>	<u>NEGATIVE LEAD</u>	<u>RESISTANCE</u>
L/R SOLENOID		8	1.5-2.0 OHMS
2-4 SOLENOID	7	2	1.5-2.0 OHMS
UD SOLENOID		3	1.5-2.0 OHMS
OD SOLENOID		1	1.5-2.0 OHMS



<u>TEST</u>	<u>POSITIVE LEAD</u>	<u>NEGATIVE LEAD</u>	<u>RESISTANCE</u>
TURBINE RPM	1		300-1200 OHMS
OUTPUT RPM	3	2	300-1200 OHMS
TEMP. SENSOR	8		VARIES (See Page 86)

Figure 79

## SPEED PROPORTIONAL STEERING JA/JX/LH Vehicles

### THEORY OF OPERATION



- The Speed Proportional Steering Module regulates the amount of power steering assistance used based on vehicle speed. The Transmission Control Module (TCM) sends the Vehicle Signal (VSS) to the Speed Proportional Module in the form of a 5 volt square wave signal. The Speed Proportional Steering Module has an Ignition feed input and ground. The output of the Speed Proportional Steering Module is the duty cycle solenoid, which controls fluid flow to the reaction disc inside the steering. When a malfunction occurs, the transmission does NOT go to the limp-in mode. There are no diagnostic code for this malfunction either. Steering effort will become slightly difficult when this system malfunctions.

### POSSIBLE CAUSES



- *Vehicle Speed Sensor Circuit Problem*
- *Defective Speed Proportional Steering Module*
- *Speed Proportional Steering control valve failure*
- *Speed Proportional Steering Module open/short circuit*

### DIAGNOSTIC STEPS



- Locate the Speed Proportional Steering Module on the steering rack as shown in Figure 80 and unplug it. Terminal 1 is battery feed from the ignition switch through either fuse 6 or 20. If battery voltage is not seen with the ignition ON, repair or replace fuse, ignition switch or severed wire. If voltage is seen go to the next step.

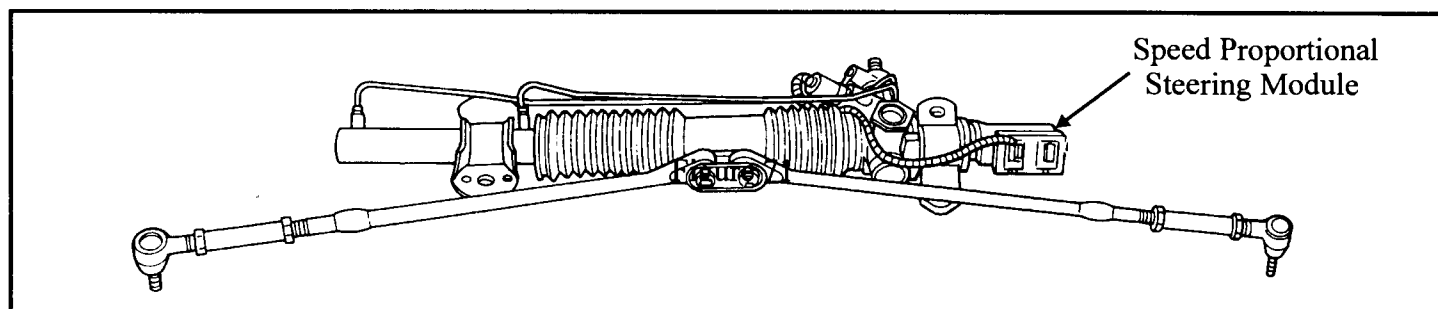


Figure 80

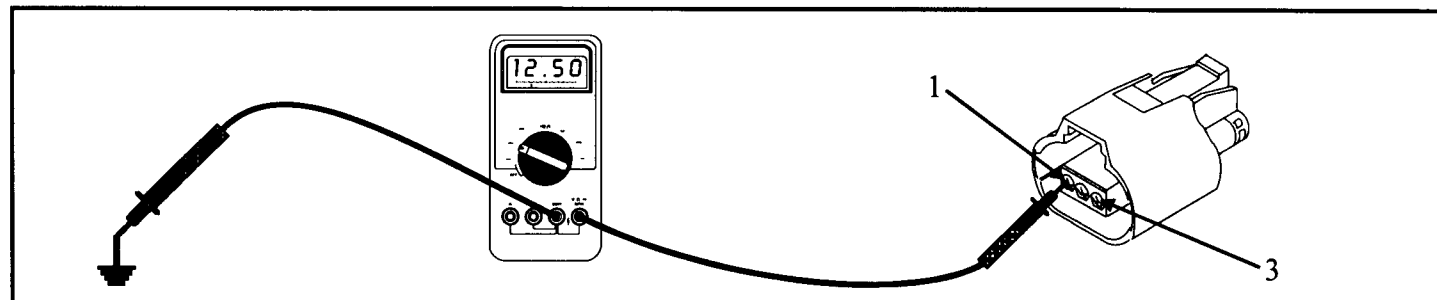


Figure 81

## SPEED PROPORTIONAL STEERING JA/JX/LH Vehicles *continued*

### DIAGNOSTIC STEPS



- Set meter to ohms and check the middle terminal for continuity as the middle wire goes to ground (See Figure 82). If continuity is seen (5 ohms or less), go to the next step. If continuity is not seen, repair or replace the wire.
- Perform a continuity check from terminal 3 in the Speed Proportional Steering Module connector to terminal 58 in the TCM connector (See Figure 83). If continuity is seen, go to the next step. If an open is seen repair or replace the wire.
- Plug the module and TCM back in and carefully back probe the # 3 wire with the meter set to DC volts. Start the vehicle and allow to the wheel to spin slowly. A 5 volts pulse should be seen. If there is, replace the Speed Proportional Steering Module. If there is not, either the TCM has not been flash with pinion factor information or the TCM is defective. Flash or replace the TCM.

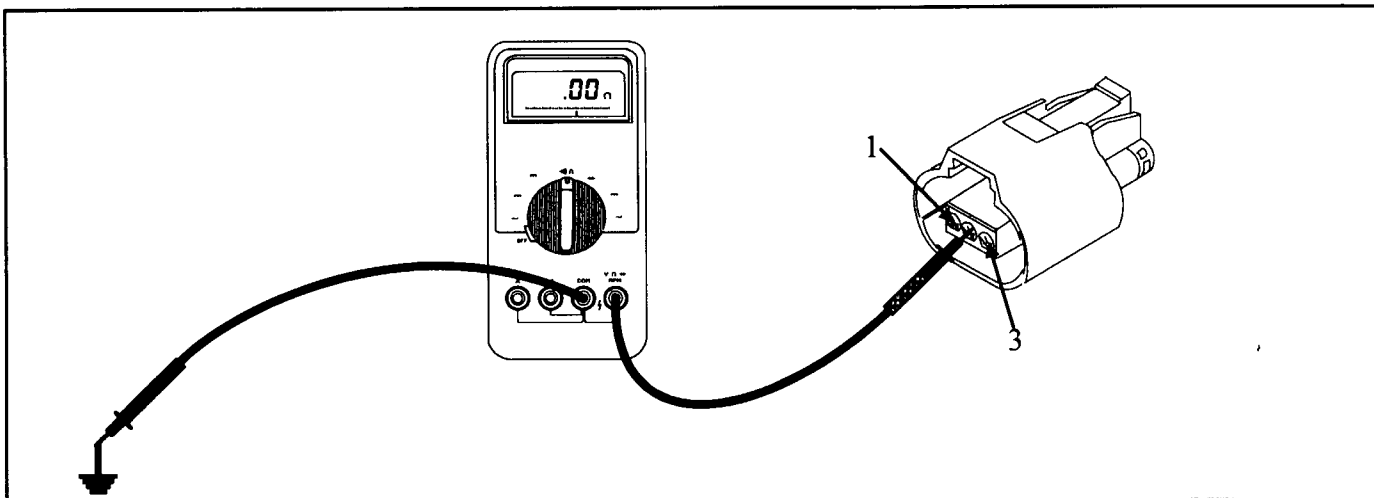


Figure 82

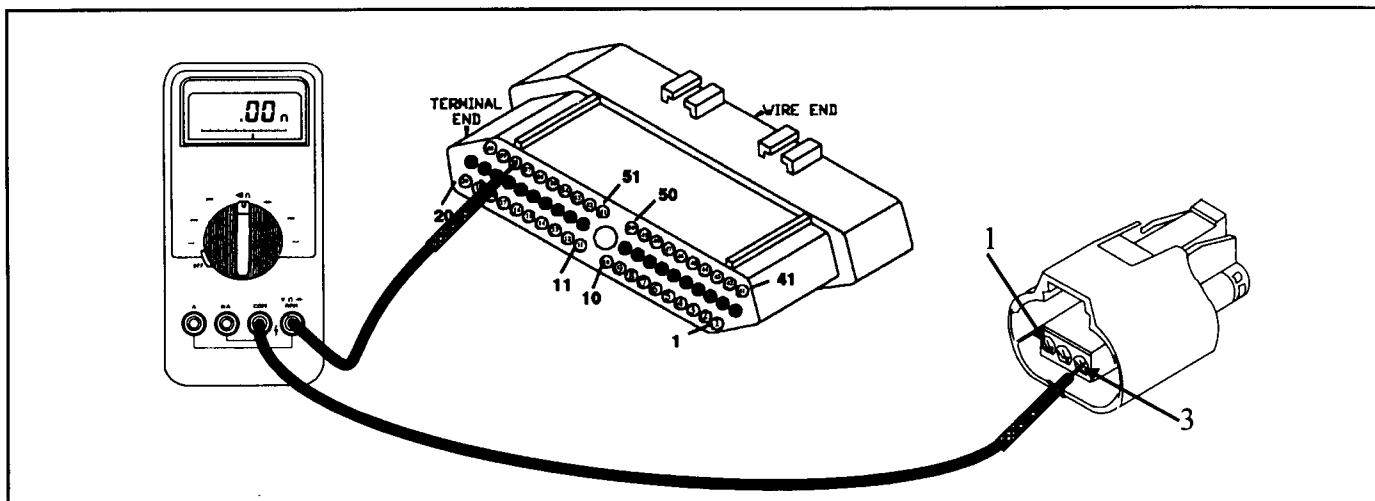


Figure 83

## GENERAL INFORMATION

### TRANSMISSION SHIFT SCHEDULING

Once the engine is started, the TCM updates the transmission oil temperature based on the following to determine an estimated oil temperature during vehicle operation:

- Torque converter slip speed
- Vehicle speed
- Engine coolant temperature
- Battery/ambient temperature

Vehicles with "calculated oil temperature" track oil temperature reasonably accurate during normal operation. However, if a transmission oil cooler is added, or a transmission is over filled, or a transmission oil cooler becomes restricted, or if a customer drives aggressively in low gear, the calculated oil temperature will be inaccurate. Consequently, the shift schedule selected may be inappropriate for the current conditions. The key highlights of the various shift schedules are as follows:

**Extreme Cold:** Oil temperature at start up below -16°F

- Goes to "Cold" schedule above -12°F oil temperature
- Park, Reverse, Neutral and 2nd gear only (prevents shifting which may fail a clutch with frequent operation under these conditions)

**Cold:** Oil temperatures at start up above - 12° F and below 36°F

- Goes to "Warm" schedule above 40°F oil temperature
  - Delayed 2-3 up shift (approximately 22-31 MPH)
  - Delayed 3-4 up shift (45-53 MPH)
  - Early 4-3 coast down shift (approximately 30 MPH)
  - Early 3-2 coast down shift (approximately 17 MPH)
  - High speed 4-2, 3-2, 2-1 kick down shifts are prevented
- No EMCC

**Warm:** Oil temperature at start up above 36°F and below 80° F

- Goes to "Hot" schedule above 80°F oil temperature
- Normal operation (up shift kick downs and coast downs)
- No EMCC

**Hot:** Oil temperature at start up above 80° F

- Goes to "Overheat" schedule. above 240° F oil temperature (250° F for 96 and prior)
- Normal operations (up shifts, kick downs)
- Full EMCC, no PEMCC except to engage FEMCC (Except at closed throttle tl speeds above 70- 83 MPH)

**Overheat:** 96 and prior Oil temperature above 250° F or engine coolant

- Goes to "Hot" below 240°F oil temperature or "Super Overheat" above 260° F oil temperature
- Delayed 2-3 up shift (25-32 MPH)
- Delayed 3-4 up shift (41-48 MPH)
- 3rd gear FEMCC from 30-48 MPH
- 3rd gear FEMCC from 27-31 MPH



## GENERAL INFORMATION

97 - Oil temperature above 240°F or engine coolant temperature above 244°F

- Goes to "Hot" below 230° F oil temperature or "Super Overheat" above 240°F oil temperature
- Delayed 2-3 upshift (25-32 MPH)
- Delayed 3-4 upshift (41-48 MPH)
- 3rd gear FEMCC from 30- 48 MPH
- 3rd gear PEMCC from 27- 31 MPH

**Super Overheat:** 97 Oil temperature above 240° F

- Goes back to "Overheat" below 240°F oil temperature
- All "Overheat" shift schedules features apply
- 2nd gear PEMCC above 22 MPH
- Above 22 MPH the torque converter will not unlock unless the throttle is closed (i.e. at 50 MPH a 4th FEMCC to 3rd FEMCC shift will be made during a part throttle kick down or a 4th FEMCC to 2nd PEMCC shift will be made at wide open throttle) or if a wide open throttle 2nd PEMCC to 1 kick down is made.

96 and prior - Oil temperature above 260°F

- Goes back to "Overheat" below 260°F oil temperature
- All "Overheat" shift schedule features apply
- 2nd gear PEMCC above 22 MPH
- Above 22 MPH the torque converter will not unlock unless the throttle is closed (i.e. at 50 MPH a 4th FEMCC to 3rd FEMCC shift will be made during a part throttle kickdown or a 4th FEMCC to 2nd PEMCC shift will be made at wide open throttle) or if a wide open throttle 2nd PEMCC to 1 kick down is made.

### **Causes for operation in the wrong temperature shift schedule:**

Extreme Cold or Cold shift schedule at start up:

- Defective Engine Coolant Temperature Sensor (calculated oil temperature vehicles only)
- Defective Battery/Ambient Temperature Sensor (calculated oil temperature vehicles only)
- Defective PCM (calculated oil temperature vehicles only)
- Defective temperature sensor circuit

Overheat or Super Overheat shift schedule after extended operation:

- Operation in city traffic or stop and go traffic
- Engine idle speed to high - stuck AIS motor
- Aggressive driving in low gear
- Trailer driving in OD gear position (use "3" position if frequent shifting occurs)
- Cooling system failure causing engine to operate over 230°F
- Engine coolant temperature stays too long - If engine coolant temperature drops below 150°F, the transmission will disengage EMCC. Extended operation with the EMCC disengaged will cause the transmission to overheat.
- A defective brake switch will cause the EMCC to disengage. Extended operation with the EMCC disengaged will cause the transmission to overheat.
- Transmission fluid overfilled
- Transmission cooler or cooler lines restricted
- Defective temperature sensor

## ACRONYMS/GLOSSARY

### ACRONYMS

**AC** - Alternating Current  
**BCM** - Body Control Module  
**CCD** - Chrysler Collision Detection System  
**DC** - Direct Current  
**DRB III** - Diagnostic Readout Box Version 3 - Chrysler's dedicated scanner  
**DVOM** - Digital Volt Ohm Meter  
**EATX** - Electronic Automatic Transaxle  
**EMCC** - Electronic Modulated Converter Clutch  
**FEMCC** - Full Electrical Modulated Converter Clutch  
**OBDII** - On Board Diagnostic Generation 2  
**PCM** - Powertrain Control Module  
**PEMCC** - Partial Electronic Modulated Converter Clutch  
**SDB** - Serial Data BUS System  
**TCM** - Transmission Control Module  
**TPS** - Throttle Position Sensor  
**TRS** - Transmission Range Sensor  
**VSS** - Vehicle Speed Sensor

### GLOSSARY

**Ampere** - The unit used to measure the rate of current flow  
**Continuity** - Uninterrupted connection with little or no resistance known as a closed circuit.\*  
**Ohms** - The unit used to measure resistance to the flow of an electrical current.  
**Resistance** - Opposition to the flow of current measured in ohms.  
**Volt** - The unit used to measure the electromotive force or the potential difference causing it.

#### \* CLARIFICATION

Continuity can be seen with a meter set to an Ohms position as indicated by a symbol similar in appearance to a horse shoe. Some meters provide an actual continuity setting that when continuity exists, a beeping sound will go off. For meters that do not have a continuity setting, set the meter to the lowest ohm scale (Rx1 or Rx10 or Rx 200). For 18 gauge wire, the spec value at 77°F is 6.51 ohms per 1,000 feet. At 147°F it is 7.51 ohms per 1,000 feet. As a rule of thumb 0 to 5 ohms would be considered acceptable resistance indicating that continuity does in fact exist. 0 ohms should not be confused with an open circuit. An open circuit for all intent and purposes would be extremely high resistance as a circuit has been interrupted with a break. Some meters reveal an open circuit as **O.L** meaning overload indicating an unmeasurable amount of resistance. Some meters actually spell out the word **O U C H** for an open circuit. To easily determine the difference between an open circuit and a closed circuit, put the two meter leads together. This is a closed circuit or a completed circuit providing continuity. Then separate the two meter leads so that they are not touching. This is an open circuit. Observe the readings in the meter to become familiar with open and closed circuits.