

TCC ENABLE SOLENOID ELECTRICAL CIRCUIT FAULT 67/90/P0740/P1864/P2769/P2770 (4L60E/70E ONLY)

CODE	FAULT	MIL ON
67	Torque Converter Clutch (TCC) Solenoid Circuit Failure (Trucks & Vans Only)	NO
90	Torque Converter Clutch (TCC) Solenoid Circuit Failure (Passenger Cars Only)	NO
P0740/P1864	TCC Enable Solenoid Electrical Circuit Fault	YES
P2769	TCC Enable Solenoid Electrical Circuit Voltage Low	YES
P2770	TCC Enable Solenoid Electrical Circuit Voltage High	YES

CODE DEFINITIONS: Torque Converter Clutch Enable Solenoid Circuit Fault:



- **Code 67/90:** *When the PCM commands the TCC Enable Solenoid "ON", but voltage on Circuit 422 remains HIGH, (system voltage) for two seconds or longer. TCC will be inhibited.*
When the PCM commands the solenoid "OFF", but voltage on Circuit 422 remains LOW, (Less than 1 volt), for two seconds or longer. TCC will be inhibited.
- **Code P0740/P1864:**
When the PCM/TCM commands the TCC Enable Solenoid "ON", but voltage on Circuit 422 remains HIGH, (system voltage) for five seconds or longer. TCC will be inhibited.
When the PCM/VCM commands the solenoid "OFF", but voltage on Circuit 422 remains LOW, (Less than 1 volt), for five seconds or longer. TCC will be inhibited.
- **Code P2769:** *The PCM detects an open or a short to ground on Circuit 422 when the solenoid is commanded "ON".*
- **Code P2770:** *The voltage on Circuit 422 remains high when the solenoid is commanded "ON".*

DIAGNOSTIC NOTES:



- The Normally Open 4L60E TCC Enable Solenoid is an ON/OFF solenoid which has a resistance value of 20 to 30 Ohms.
- The TCC Enable solenoid is supplied "Key On" power through case connector terminal "E". The PCM/VCM controls the solenoid through the ground side on Circuit 422 at case connector terminal "T".
- Vehicles built for the 1993 to 1994 model years had only the TCC Enable Solenoid.
- When the brake pedal is depressed, the ground signal will be canceled and system voltage will now return to circuit 422. The ground signal will also be canceled when the throttle is released or heavy throttle is applied.
- TCC apply will not occur until engine temperature has reached above approximately 68° Fahrenheit (20° Celsius).
- TCC apply will not occur until transmission temperature has reached above approximately 84° Fahrenheit (29° Celsius).
- There are times when the scan tool will indicate that the command to turn the solenoid on has been sent, when in reality it has not. Use a volt meter on Circuit 422 to insure that less than one volt exists, indicating that the computer has in fact grounded Circuit 422. Voltage on the circuit over one volt means the computer cannot pull the circuit all the way to ground.
- Circuit numbers may vary, especially in "P" Vans, Chevy Forwards, GMC Tiltmasters and vehicles that were built as "Incomplete".
- Transmission wiring on "G" Vans is routed between the floor of the van and a sheet metal plate, wiring can deteriorate in this area, check for bulk head connector damage as well.

TCC ENABLE SOLENOID ELECTRICAL CIRCUIT FAULT 67/90/P0740/P1864/P2769/P2770 (4L60E/70E ONLY)...continued

POSSIBLE CAUSES: Code 67/90/P0740/P1864/P2769/P2770: TCC Enable Solenoid Electrical Circuit Fault:



- The TCC Enable Solenoid is faulty.
- A short to power or ground on Circuit 422, (Refer to Figure 108).
- An open in Circuit 422, (Refer to Figure 108).
- A Blown Fuse, causing power loss to case connector terminal “E”,(Other solenoid codes should be stored).
- A faulty ignition switch, Causing intermittent power loss to case connector terminal “E”, See Figure 109 for terminal “E” location. (Other solenoid codes should be stored, use relay harness to bypass ignition switch as shown in Code 81,82, P0753 & P0758 diagnostics.
- Damaged terminal ends, Refer to Code 81,82, P0753 & P0758 diagnostics on how to check terminal cavities, See Figure 109 for terminal”T” location.
- A faulty computer.

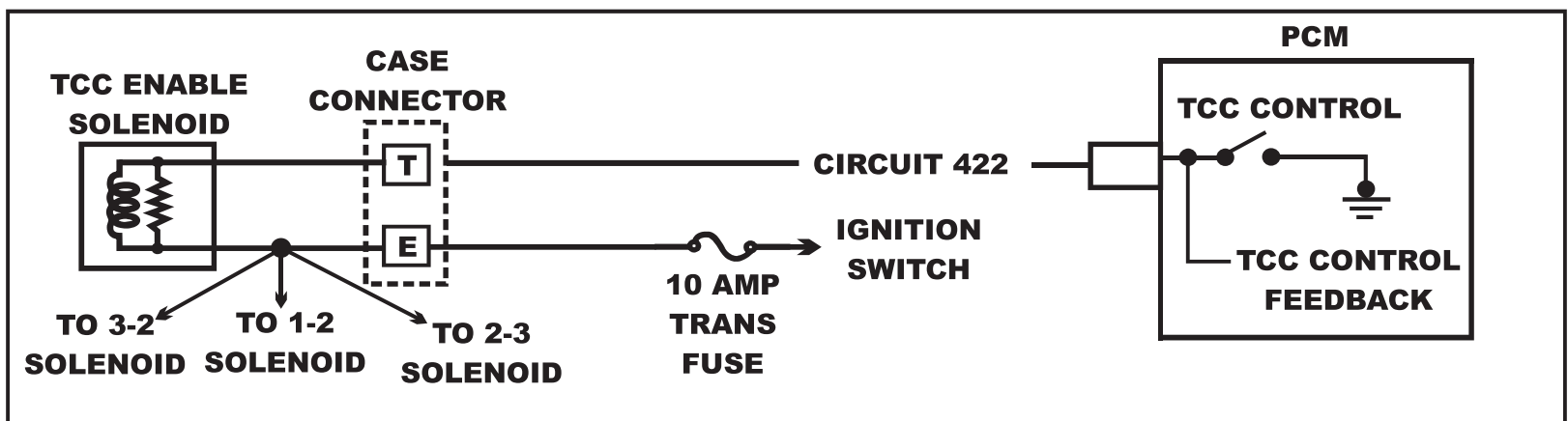


Figure 108

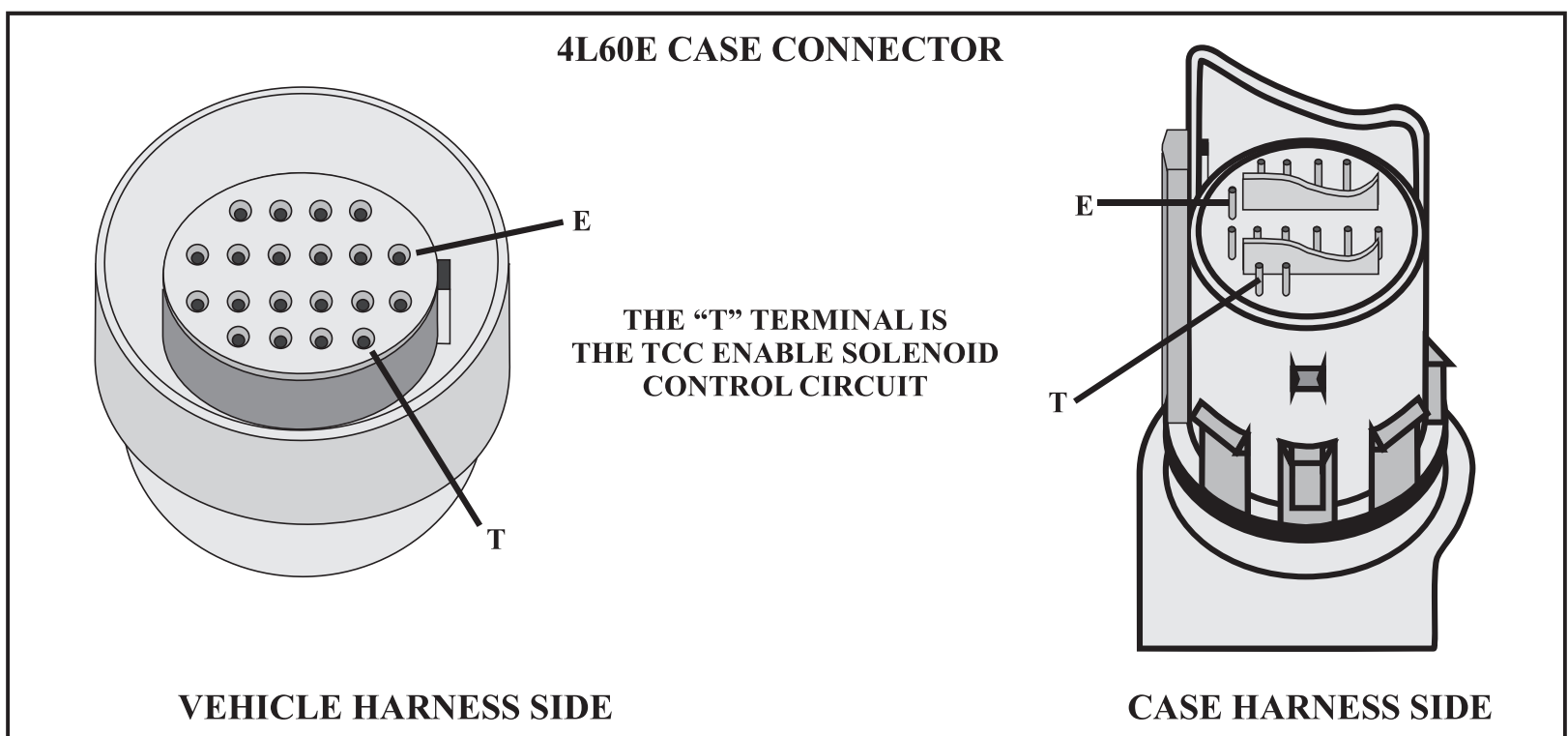


Figure 109

3-2 SOLENOID ELECTRICAL CIRCUIT FAULT 66/84/P0785/P0787/P0788/P1886 (4L60/65/70/75E ONLY)

CODE	FAULT	MIL ON
66	3-2 Solenoid Circuit Electrical Malfunction (Trucks & Vans Only)	NO
84	3-2 Solenoid Circuit Electrical Malfunction (Passenger Cars Only)	NO
P0785/P1886	3-2 Solenoid Electrical Circuit Fault	YES
P0787	3-2 Solenoid Electrical Circuit Voltage Low	YES
P0788	3-2 Solenoid Electrical Circuit Voltage High	YES

CODE DEFINITIONS: 3-2 Solenoid Electrical Circuit Malfunction:



- **Code 66:** *When the PCM commands the 3-2 Solenoid "ON", but the voltage on Circuit 897 remains high for longer than 4 seconds.*
- **Code 84:** *When the PCM commands the 3-2 Solenoid "ON", but the voltage on Circuit 687 or 897 remains high for longer than 5 seconds.*
- **Code: P0785/P0787/P1886:**
When the PCM commands the 3-2 Solenoid "ON", but the voltage on Circuit 687 remains high for longer than 5 seconds. The PCM commands the 3-2 Solenoid "OFF", but the voltage on Circuit 687 remains low.
- **Code P0788:** *When the PCM commands the 3-2 Solenoid "ON", but the voltage on Circuit 687 remains high.*


DIAGNOSTIC NOTES:



- The Normally Closed 4L60E 3-2 Solenoid is responsible for a controlled 3-2 downshift by regulating the timing between the application of the 2-4 band and the release of the 3-4 clutch.
 - In model years 1993 to 1995 the 3-2 solenoid was a pulse width modulated (PWM) solenoid with a resistance value of 10-15 ohms. The PCM would keep the duty cycle at 90% in 2nd, 3rd and 4th gears, in all other gears the duty cycle is zero. During the 3-2 down shift the duty cycle would be regulated by the PCM to control the 3-2 down shift.
 - Beginning with the 1996 model year, the 3-2 Solenoid changed to an ON/OFF Solenoid with a resistance of 20-30 ohms. The ON/OFF Solenoid operated in much the same way as the PWM Solenoid did, except now the PCM would turn the solenoid on in 2nd, 3rd and 4th gears and keep it off in all others. On a 3-2 down shift the PCM would turn the solenoid on and off to regulate the timing of 2-4 band application and 3-4 clutch release. Obviously the two solenoids and their respective valve bodies and spacer plates were not interchangeable. Electrically, the solenoid circuits were confusing due to a lack of standardization.
- Because the 4L60E is used in both passenger cars and trucks and vans, wire colors as well as circuit numbers were not consistent, not to mention PCM terminal locations. The PCM controlled ground circuit could be circuit 897 or 687, depending on year and model. The wire color could be Brown if it is in a "B" or "D" body, or White if it is in a "C", "K", "M", "G", "Y" or "F" body. However, it is always case connector terminal "S".
- The 3-2 Solenoid is, like most other 4L60E solenoids, is fed power through case connector terminal "E". This circuit is always Pink but it could be Circuit 1149, 539, 239, 1020 or 139, depending on year and model.
- The PWM 3-2 Solenoid can be checked on the scan tool by viewing the percentage of duty cycle or with a DVOM voltage setting or with it set to duty cycle similar to the illustration in Figure 115.
 - The ON/OFF Solenoid can be checked on the scan tool as an on/off parameter or with a DVOM for system voltage when it is off, or less than a volt when the PCM is pulling the circuit to ground as seen in Figure 124.


3-2 SOLENOID ELECTRICAL CIRCUIT FAULT 66/84/P0785/P0787/P0788/P1886...continued

IMPORTANT NOTES:




- A 3-2 solenoid that is leaking, either due to the solenoid itself or under sized o-rings, can cause slipping in any forward gear with flares on the shifts.
- Switching a PWM TCC solenoid (1993-1995) will cause a 2-3 shift only condition. The transmission will take off in 2nd even in the manual low position.

POSSIBLE CAUSES: Code 66/84/P1886/P0785/P0787/P0788: 3-2 Solenoid Electrical Circuit Malfunction:

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- The 3-2 Solenoid is faulty.
 - Switching the 3-2 ON/OFF Solenoid with the TCC PWM Solenoid (1996 & Later).
 - Faulty internal wire harness.
 - A short to power or ground on Circuit 897 or 687, (Bulkhead connector damage).
 - An open in Circuit 897 or 687.
 - Damaged terminal ends.
 - Water or oil intrusion of the case connector.
 - A Blown Fuse, causing power loss to case connector terminal "E", (Other solenoid codes should be stored).
 - A faulty ignition switch, causing intermittent power loss to case connector terminal "E". (Other solenoid codes should be stored).
 - A faulty computer.

DIAGNOSTIC STEPS:

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- Replace 3-2 solenoid.
 - Make certain the correct 3-2 solenoid is used for the application, PWM 1993-1995(10-15 Ohms), ON/OFF 1996 and later, (20-30 Ohms), Refer to Figure 117.
 - Replace wire harness, aftermarket parts are available.
 - Repair wiring as necessary by referring to the diagram in Figure 116.
 - Check terminal end cavities with a #59 wire gauge drill bit. Refer to Figure 118 for terminal location. Transmission wiring on "G" Vans is routed between the floor of the van and a sheet metal plate, wiring can deteriorate in this area, check for bulk head connector damage as well.
 - Repair short and replace fuse.
 - Replace ignition switch or use relay wire harness as shown in Figure 125.
 - Replace computer, new or rebuilt computers must be programmed or vehicle will not start.

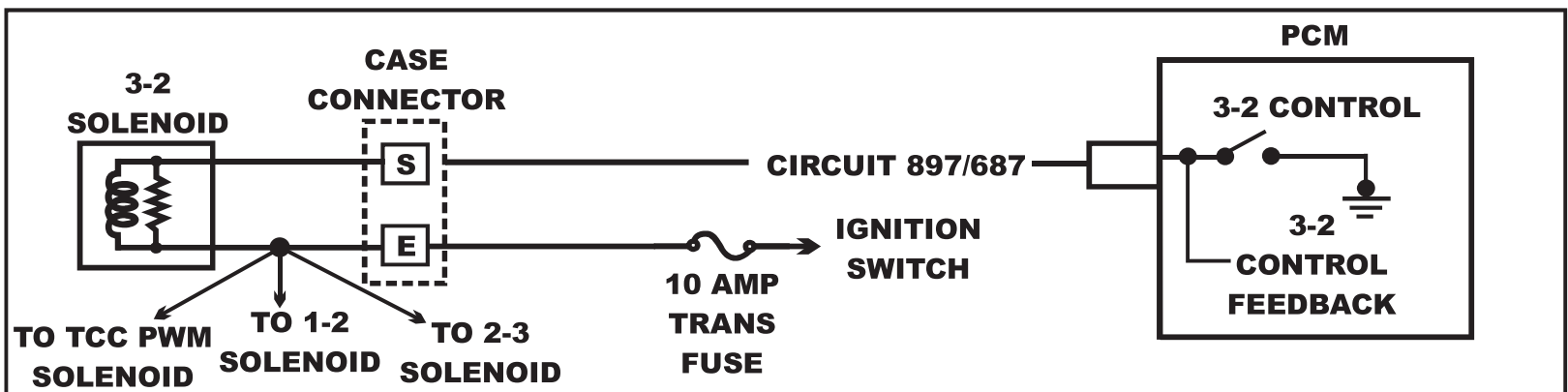


Figure 116

3-2 SOLENOID ELECTRICAL CIRCUIT FAULT
66/84/P0785/P0787/P0788/P1886...continued

DIAGNOSTIC STEPS *continued*:

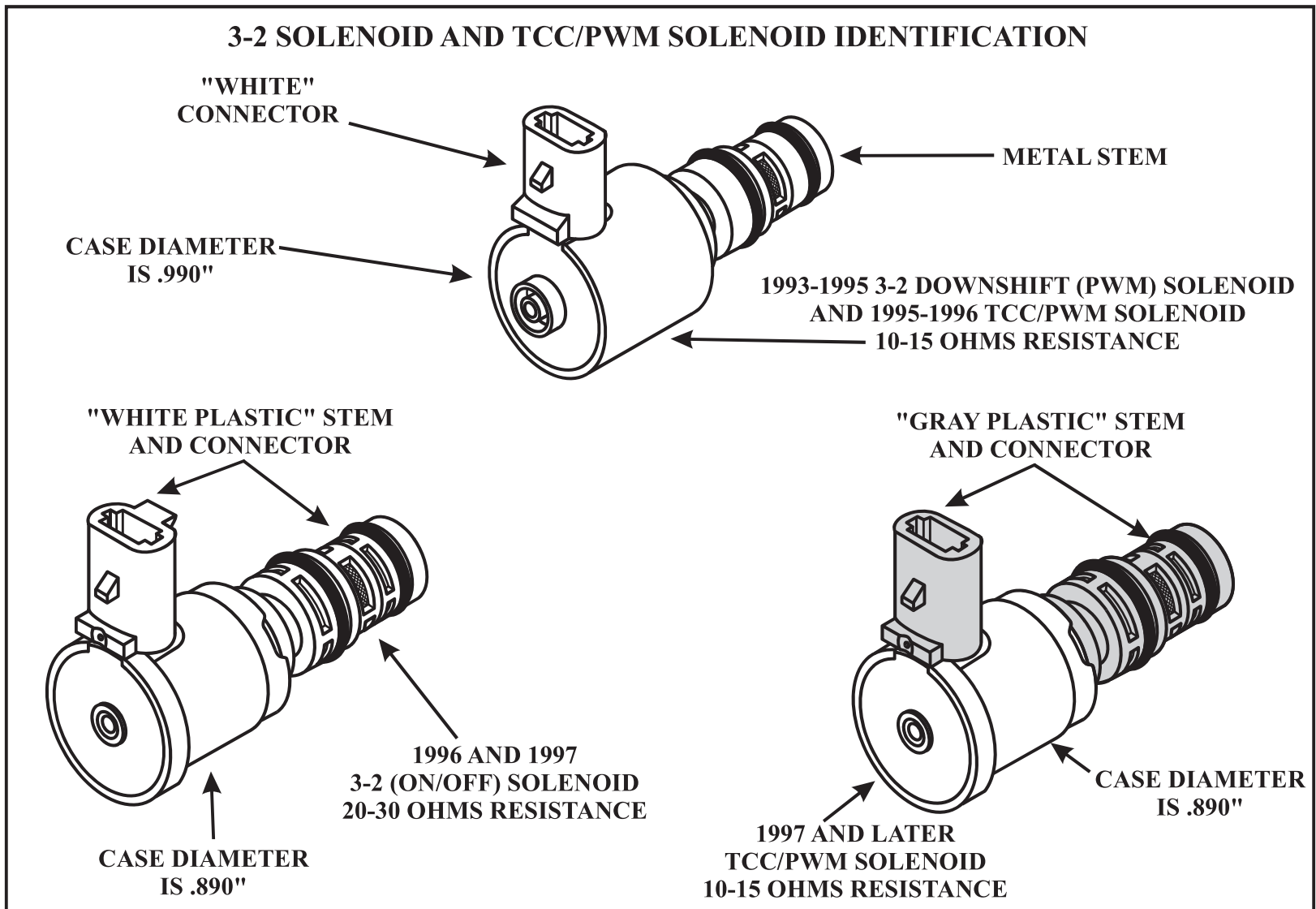


Figure 117

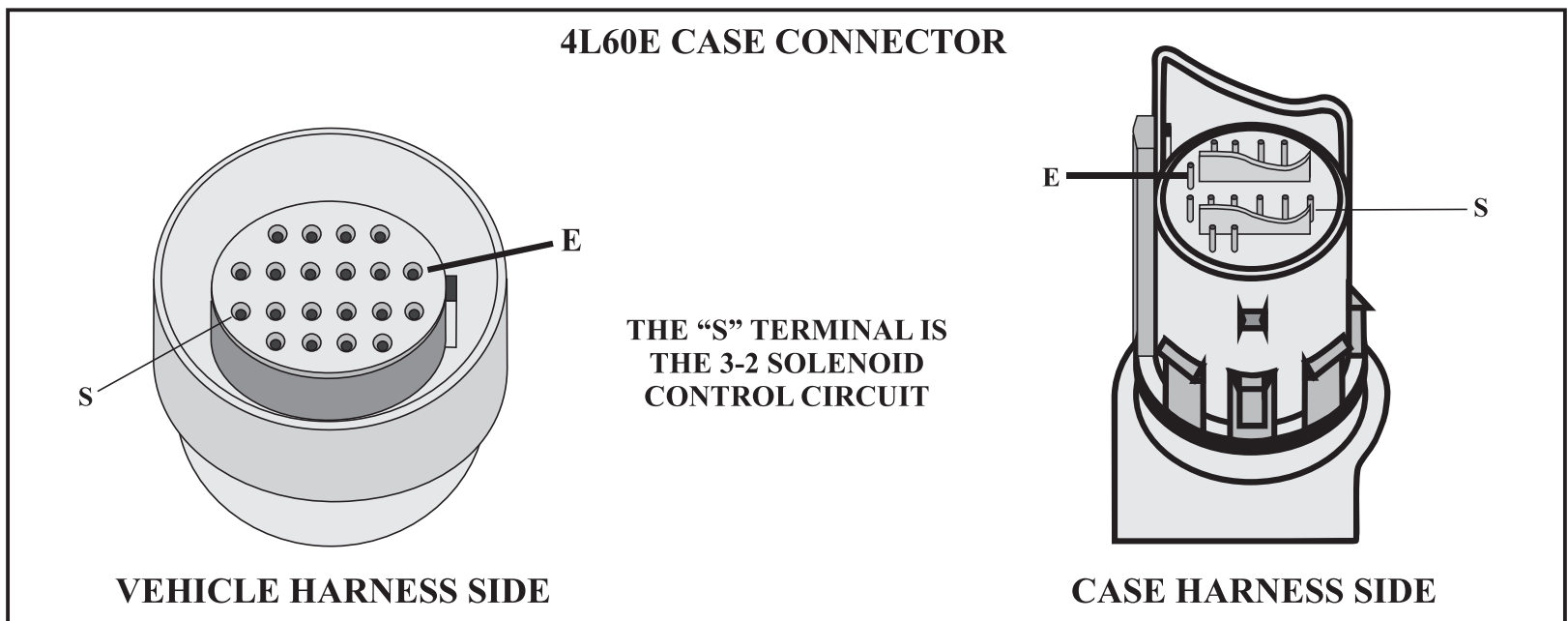


Figure 118