# FORD 5R110W *("TorqShift")*
## PRELIMINARY INFORMATION

**FORD 5R110W *("TorqShift")***

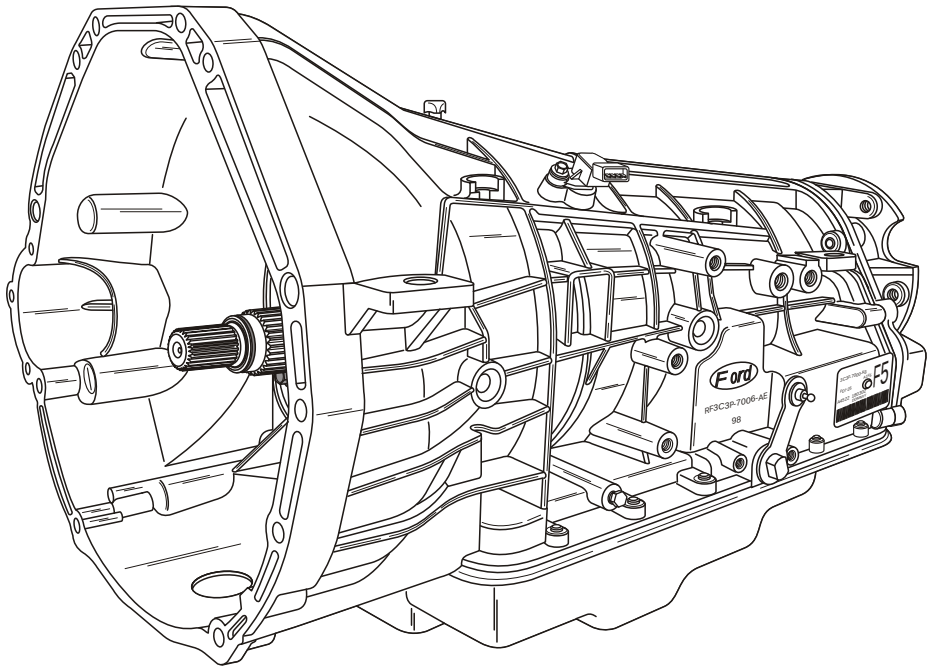



Figure 1

The new Ford 5R110W, referred to by Ford Motor Company as the "TorqShift" transmission, is a redesign of the 4R100 transmission with some previous strategy applied. This unit was introduced in model year 2003 in the F Series Trucks and the Excursion vehicles that are equipped with the new 6.0L diesel engine. The "TorqShift" (5R110W) is a 5 speed, rear wheel drive unit that actually has six forward speeds available, depending on hot or cold mode operation. The gear ratio for 1st gear was lowered from 2.71 to 3.09. For 2nd gear the overdrive clutch is applied to provide a ratio of 2.20. 3rd gear provides a ratio of 1.54, which is the same ratio as the previous second gear. All sound familiar? When in cold mode operation, below -15°C (5°F), determined by the TFT sensor, the overdrive clutch is engaged in 3rd gear to provide a ratio of 1.09 for 4th gear, and the transmission will shift directly into 6th gear (overdrive), which is a ratio of 0.71. In cold mode the transmission shifts 1st gear, 2nd gear, 3rd gear, 4th gear, 6th gear. When in hot mode the transmission will shift 1st gear, 2nd gear, 3rd gear, 5th gear (ratio 1.00), 6th gear. Either way it is still a five speed unit with six forward gear ratios available, depending on cold mode or hot mode of operation.

**Continued on next Page**

The component application chart for each gear is provided for you in Figure 5, and the identification tag location and description is provided in Figure 4. Notice also in the component application chart that there are two freewheel diodes, one for overdrive and one for first gear, These are actually built into the coast clutch pressure plate and the low/reverse clutch pressure plate. Hopefully Ford has found a way to make this type of freewheel device more durable. They have been on the road for 1 year now and so far, no calls.

ATSG's perception of the 2003 Super Duty vehicle that we test drove was, the shift performance has been greatly improved over the 4R100 transmission. There were no lags between the shifts and every shift was very positive. This was accomplished with a total redesign of the control valve body. There is a solenoid and a pressure switch dedicated to the function of each clutch pack, except the forward clutch, which is controlled by the manual valve. There are no other shuttle valves in the solenoid body. All shifts are controlled by five solenoids. Line pressure and the torque converter clutch each have their own dedicated solenoid. Four of the solenoids, TCC, OD Clutch, Intermediate Clutch and the Low/Reverse Clutch, are ***directly proportional*** which means the pressure output is directly proportional to the applied DC amps. The current is varied between 0 and 1 amp from the PCM, and 1 amp equals maximum pressure in the oil circuit. Three of the solenoids, Line Pressure, Coast Clutch and Direct Clutch, are ***inversely proportional*** which means the pressure output is inversely proportional to the applied DC amps. The current is varied between 0 and 1 amp from the PCM, and 0 amp equals maximum pressure in the oil circuit. Refer to Figure 6 for solenoid and switch locations in the solenoid body.

There has also been added to the instrument cluster, a transmission temperature gauge that we think is long over-due. There is also another new feature on this unit called the Tow/Haul Mode (See Figure 3). The Tow/Haul feature was designed to assist the driver when towing a trailer or a heavy load. All transmission gear ranges, including all five forward gears, are available when using the Tow/Haul feature. The Tow/Haul Switch is located on the end of the manual shift lever and is a momentary contact switch. The Tow/Haul Switch provides a signal to the PCM when pressed by the operator, resulting in a change in shift and TCC scheduling. When the Tow/Haul Switch has been turned on, the indicator lamp that is located at the end of the manual shift lever will illuminate "Tow/Haul - ON". When Tow/Haul is activated, upshifts will now occur at a higher vehicle speed, and when decelerating, the downshifts will also occur at a higher vehicle speed, providing some added engine braking. When the switch is pressed again, Tow/Haul will be canceled and the Transmission Control Indicator Lamp (TCIL) will turn off. The PCM controls the operation of the TCIL. The PCM may also flash the TCIL on and off, to alert the driver that a transmission operational error has occured, when certain faults in monitored sensors, solenoids or other transmission components are detected.

The new Ford 5R110W "TorqShift" transmission also uses a new transmission fluid called Mercon®SP, and ***is not interchangeable*** with Mercon® or Mercon®V. The use of any other transmission fluid than Mercon®SP, can result in the transmission failing to operate in a normal manner and/or transmission failure. Ford recommends the transmission fluid and bottom pan filter be changed every 48,000 km (30,000 miles) regardless of normal or special operating conditions.

This transmission is also equipped with a new remote transmission fluid filter, as shown in Figure 18. This filter passes ten percent of the transmission fluid from the transmission through a small orifice into a servicable screw-on filter element. The filtered fluid is then directed back into the rear lube circuit through the large opening in the remote filter manifold. The remote filter in the cooler lines should also be changed at all service intervals. Notice also in Figure 18 that this unit is equipped with an Oil-To-Air (OTA) in front of the radiator. Fords recommends replacing the OTA transmission fluid cooler as part of any overhaul or exchange. Do Not attempt to backflush and clean the OTA transmission fluid cooler.

Everything considered, this writer feels that Ford Motor Company is on to something with this new design 5R110W "TorqShift" transmission along with the very sophisticated electronics.

We have provided you with 26 pages of operational and preliminary diagnostic information to assist you in the diagnostic process, when one of these vehicles comes into your shop.

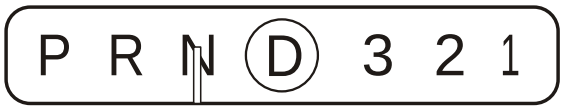


**Continued on next Page**

***Refer to Figure 2 for transmission temperature gage location.***
***Refer to Figure 3 for Tow/Haul button Location.***
***Refer to Figure 4 for identification tag location and information.***
***Refer to Figure 5 for Internal Component Application Chart.***
***Refer to Figure 6 for internal electronic component locations and identification.***
***Refer to Figure 7 for illustration of the pressure switches.***
***Refer to Figure 8 for differences and identification of the seven solenoids.***
***Refer to Figure 9 for TSS/ISS sensor illustrations and connector information.***
***Refer to Figure 10 for OSS sensor illustrations and connector information.***
***Refer to Figure 11 for Transmission Range Sensor duty cycle and connector information.***
***Refer to Figure 12 for Transmission Fluid Temperature sensor information.***
***Refer to Figure 13 for transmission case connector pin identification and functions.***
***Refer to Figure 14 for PCM location, connector pin identification and functions.***
***Refer to Figure 15 for internal wiring schematic from transmission to PCM.***
***Refer to Figure 16 for internal electronic component resistance chart.***
***Refer to Figure 17 for transmission line pressure tests and procedures.***
***Refer to Figure 18 for remote transmission filter location and cooler information.***
***Refer to Figure 19 for abbreviation descriptions.***
***Refer to Figure 20 through 25 for Diagnostic Trouble Code (DTC) description.***

## GENERAL TRANSMISSION DESCRIPTION AND OPERATION

The Ford 5R110W "TorqShift" transmission has seven range positions that can be selected with the manual shift lever, P, R, N, (D), 3, 2, 1. Following is a description of each range.




**P** When the Park position is selected, there is no powerflow through the transmission. The parking pawl is engaged which locks the output shaft to the transmission case. The engine can be started and the ignition key can be removed.

**R** When the Reverse position is selected, the vehicle can be operated in a rearward direction at a reduced gear ratio.

**N** When the Neutral position is selected, there is no powerflow through the transmission. The output shaft is not held and is free to turn and the engine can be started. This position can also be selected while vehicle is moving, to restart the engine if that becomes necessary.

**(D)** The Overdrive position is the normal position for most forward gear operations. The Overdrive position provides automatic upshifts and downshifts, apply and release of the converter clutch, and maximum fuel economy during normal operation.

**3** The 3rd Gear position provides third gear start and hold, for improved traction on slippery roads. This position can also be selected at any vehicle speed for improved engine braking. Transmission will not downshift if it will cause an engine overspeed condition.

**2** The 2nd Gear position provides second gear start and hold, for improved traction on slippery roads. This position can also be selected at any vehicle speed for improved engine braking. If this position is selected at higher speeds, the transmission will downshift to the next lower gear, and will downshift into second gear after the vehicle decelerates to a vehicle speed that will not create an engine overspeed condition.

**1** The Manual Low Gear position provides 1st gear operation only. This position can also be selected at any vehicle speed to provide improved engine braking for descending steep grades. If this position is selected at higher speeds, the transmission will downshift to the next lower gear, and will downshift into first gear after the vehicle decelerates to a vehicle speed that will not create an engine overspeed condition.

***Transmission Temperature Gage***

There has also been added to the instrument cluster, a transmission temperature gauge that we think is long over-due, and should be on all vehicles.

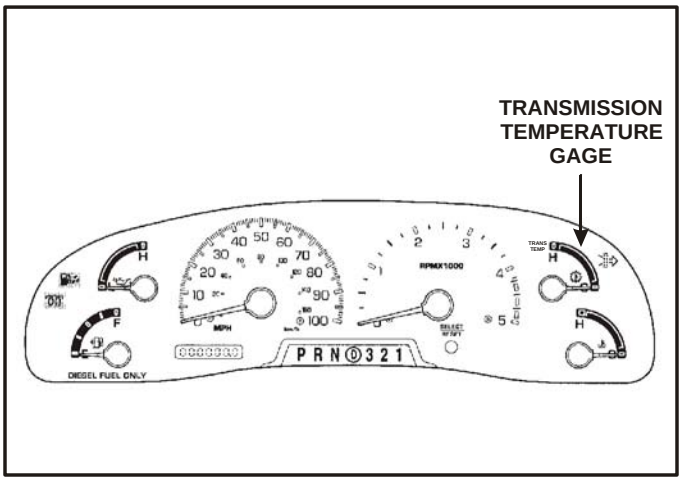



Figure 2

***Tow/Haul Feature***

The Tow/Haul feature was designed to assist the driver when towing a trailer or a heavy load. All transmission gear ranges, including all five forward gears, are available when using the Tow/Haul feature. The Tow/Haul Switch is located on the end of the manual shift lever, (See Figure 3) and is a momentary contact switch. The Tow/Haul Switch provides a signal to the PCM when pressed by the operator, resulting in a change in shift and TCC scheduling. When the Tow/Haul Switch has been turned on, the indicator lamp that is located at the end of the manual shift lever will illuminate "Tow/Haul - ON". When Tow/Haul is activated, upshifts will now occur at a higher vehicle speed, and when decelerating, the downshifts will also occur at a higher vehicle speed, providing some added engine braking. When the switch is pressed again, Tow/Haul will be cancelled and the Transmission Control Indicator Lamp (TCIL) will turn off. The PCM controls the operation of the TCIL. The PCM may also flash the TCIL on and off, to alert the driver that a transmission operational error has occured, when certain faults in monitored sensors, solenoids or other transmission components are detected.

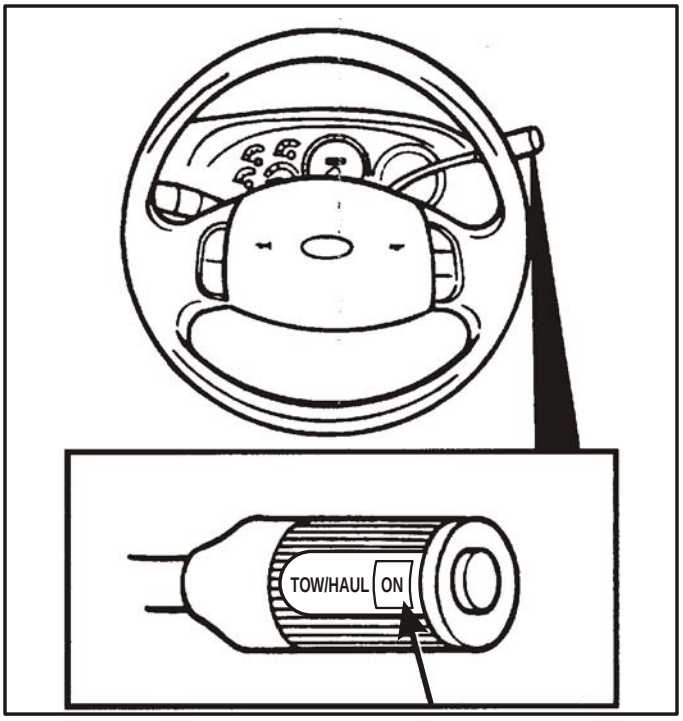



Figure 3

***Battery Disconnect, Dead Battery***

***Any time*** the battery is disconnected for ***any*** reason, a new PCM has been installed, or the calibration has been reflashed, the adaptive strategy for the "Engagement Schedule" ***must*** be updated.

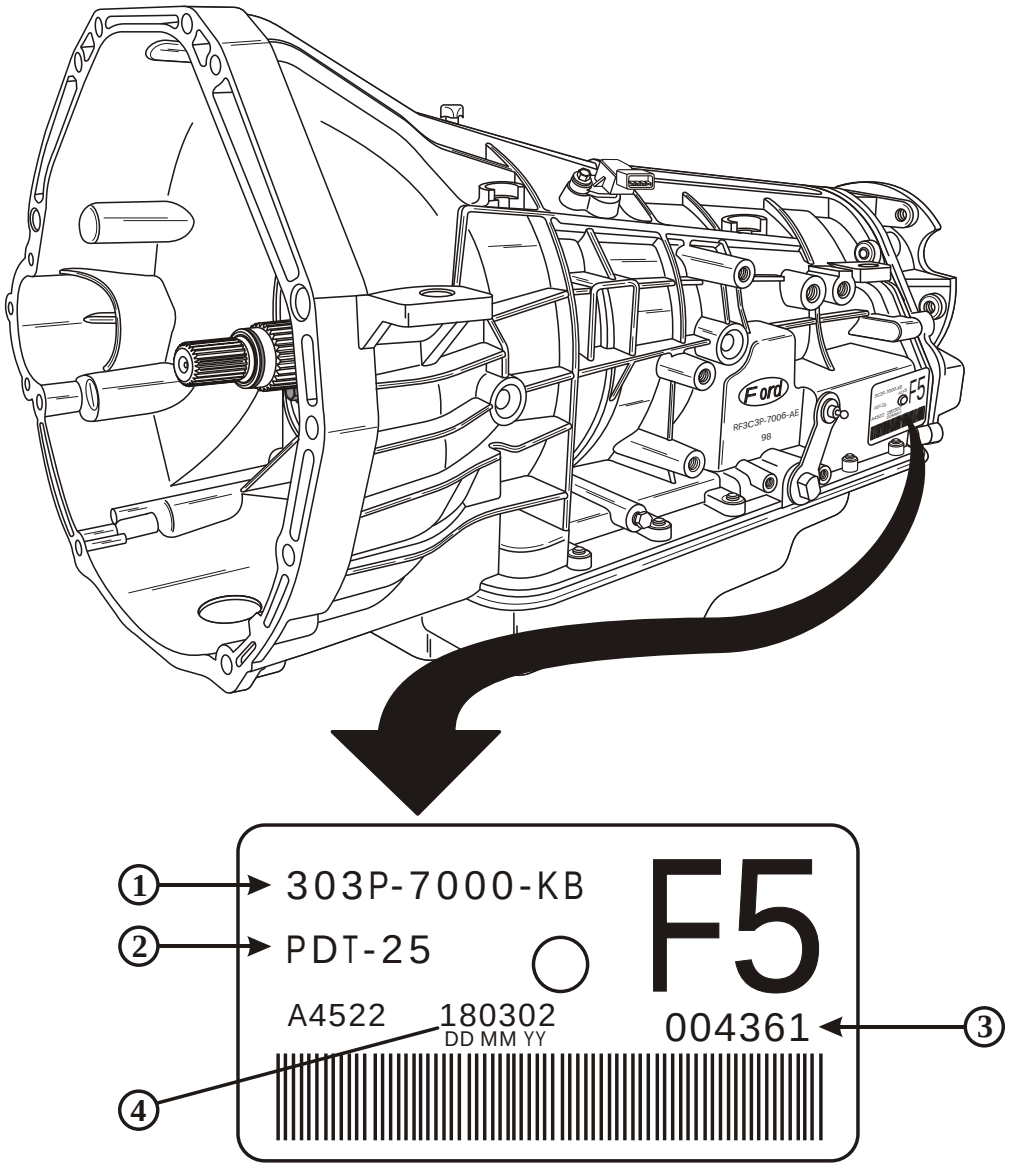
***This procedure will prevent the customer from returning with firm or harsh engagement complaints.***

***Procedure is as follows:***

***Note:*** ***All*** of the following engagements ***must*** be performed, in order for engagement pressures to correctly adapt with the new calibration.

1. Install diagnostic equipment and monitor TFT.
2. Warm the transmission fluid to 54°C (130°F) as indicated by the TFT.
3. Perform 5 engagements from ***Park to Reverse.*** Each engagement must be five seconds apart.
4. Perform 5 engagements from ***Drive to Reverse.*** Each engagement must be five seconds apart.
5. Perform 5 engagements from ***Reverse to Drive.*** Each engagement must be five seconds apart.
6. Perform 5 engagements from ***Neutral to Drive.*** Each engagement must be five seconds apart.

**IDENTIFICATION TAG LOCATION AND DESCRIPTION**

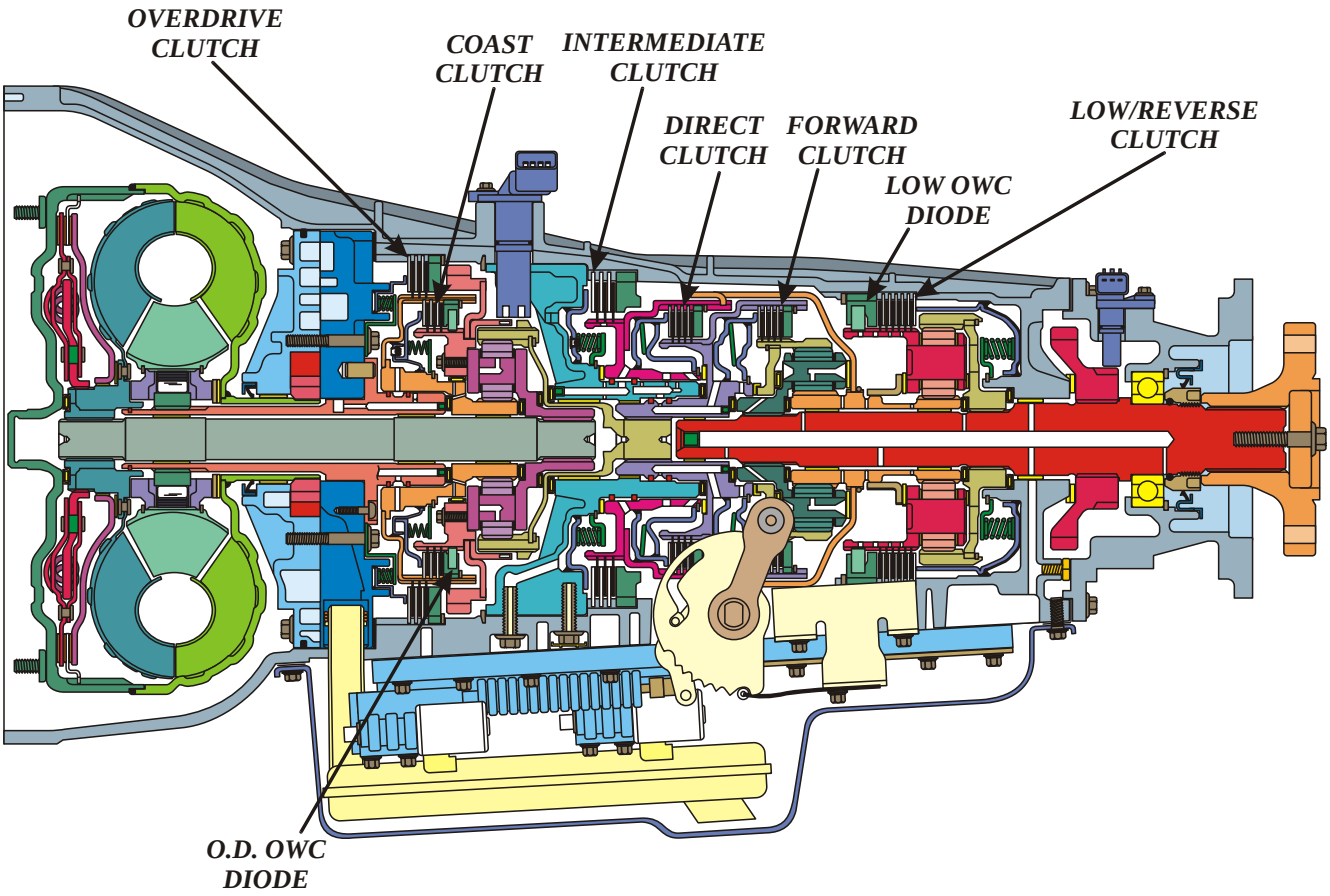



| | |
|---|---|
| **1** | ***Assembly Part Number, Prefix And Suffix*** |
| **2** | ***Transmission Model*** |
| **3** | ***Serial Number*** |
| **4** | ***Build Date: DD = Day, MM = Month, YY = Year*** |



Figure 4

## COMPONENT APPLICATION CHART




**COMPONENT APPLICATION CHART *WITH TOW/HAUL "OFF"***

| *Range/Gear* | *Fwd. Clutch* | *Int. Clutch* | *Direct Clutch* | *O.D. Clutch* | *Coast Clutch* | *Lo/Rev Clutch* | *O.D. Diode* | *Low Diode* | *Gear Ratio* | *Eng Brake* |
|---|---|---|---|---|---|---|---|---|---|---|
| *Park/Neut* | | | | | | *ON (a) (c)* | | | | |
| *Reverse* | | | *ON (d)* | | *ON* | *ON (a)* | | | *2.88* | |
| *O.D.- 1st* | *ON* | | | | | *ON (a) (c)* | *HOLD* | *HOLD* | *3.09* | |
| *O.D.- 2nd* | *ON* | | | *ON* | | | *O/R* | *HOLD* | *2.20* | |
| *O.D.- 3rd* | *ON* | *ON* | | | | | *HOLD* | *O/R* | *1.54* | |
| *O.D.- 4th (b)* | *ON* | *ON* | | *ON* | | | *O/R* | *O/R* | *1.09* | |
| *O.D.- 5th* | *ON* | | *ON* | | | | *HOLD* | *O/R* | *1.00* | |
| *O.D.- 6th* | *ON* | | *ON* | *ON* | | | *O/R* | *O/R* | *0.71* | |
| *Man- 3rd* | *ON* | *ON* | | | *ON* | | *HOLD* | *O/R* | *1.54* | *YES* |
| *Man- 2nd* | *ON* | | | *ON* | | *ON (a)* | *O/R* | *HOLD* | *2.20* | *YES* |
| *Man- 1st* | *ON* | | | | *ON* | *ON (a)* | *HOLD* | *HOLD* | *3.09* | *YES* |

*(a) PCM Calibration Controlled*
*(b) Cold Strategy*
*(c) 30 psi Until 5 kmh (3 mph)*
*(d) Clutch Applied Through Manual Valve Position*



Figure 5

## INTERNAL ELECTRONIC COMPONENT LOCATIONS AND IDENTIFICATION

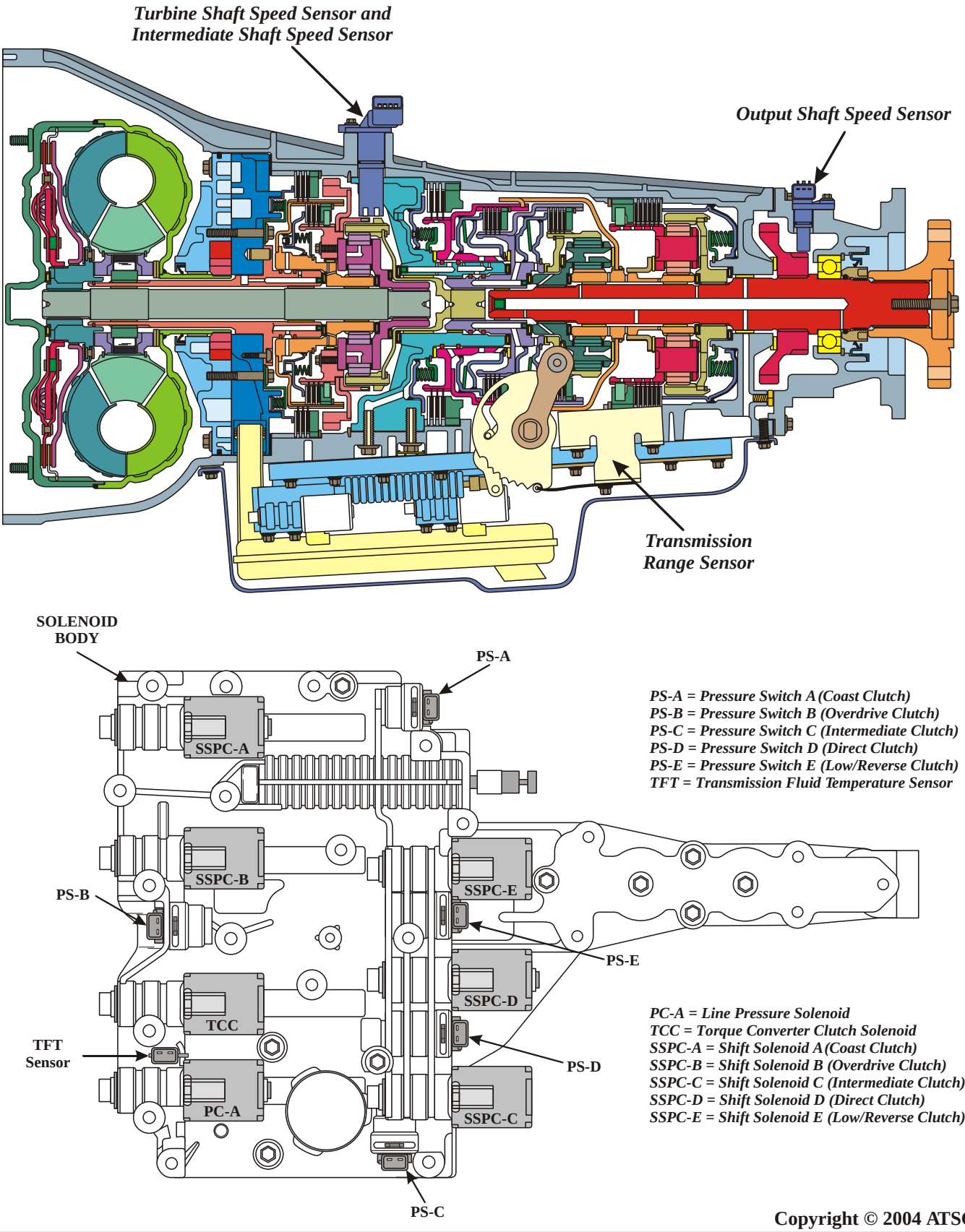





Figure 6

## ELECTRICAL COMPONENT DESCRIPTION AND OPERATION

The following provides a brief description of each of the sensors and actuators used by the PCM for proper transmission operation

### *Powertrain Control Module (PCM)*

The operation of the transmission is controlled by the Powertrain Control Module (PCM). Many input sensors provide information to the PCM. The PCM then uses this information to control actuators which determine transmission operation. Refer to Figure 14 for PCM location and connector terminal information and identification.

### *Engine Coolant Temperature (ECT) Sensor*

The engine coolant temperature (ECT) sensor is a thermistor in which resistance changes when the temperature changes. The resistance of the sensor increases as engine temperature decreases and the voltage sent to the PCM increases. The PCM uses this information to help determine TCC operation.

### *Intake Air Temperature (IAT) Sensor*

The intake air temparature (IAT) sensor is a thermistor in which the resistance changes with temperature. The resistance decreases as the intake air temperature increases. The IAT provides air temperature information to the PCM, which is used to help determine transmission line pressure and shift scheduling.

### *Accelerator Pedal Position (APP) Sensor*

The accelerator pedal position (APP) sensor is mounted on the accelerator pedal on 6.0L diesel applications. The APP sensor detects the position of the accelerator pedal and inputs this information, as a voltage to the PCM. The PCM uses APP sensor information to help in determining line pressure, shift scheduling and TCC operation.

Failure of the APP sensor will cause transmission to operate at a higher than normal line pressure to help avoid damage to the transmission. This will result in harsh upshifts and harsh engagements.

### *Brake Pedal Position (BPP) Switch*

The brake pedal position (BPP) switch supplies battery voltage to the PCM, that the brake pedal is applied. The PCM uses this information to release the torque converter clutch, speed control, and auxiliary idle (if equipped).

### *Tow/Haul Switch*

The Tow/Haul Switch is located on the end of the manual shift lever and is a momentary contact switch. The Tow/Haul Switch provides a signal to the PCM when pressed by the operator, resulting in a change in shift and TCC scheduling. When the Tow/Haul Switch has been pressed, the indicator lamp that is located at the end of the manual shift lever will illuminate "Tow/Haul - ON". When the switch is pressed again, Tow/Haul will be cancelled and the TCIL will turn off (See Figure 3).

### *Transmission Control Indicator Lamp (TCIL)*

The TCIL is used along with the Tow/Haul Switch. The TCIL is located near the end of the manual shift lever and will illuminate "Tow/Haul - ON" when the Tow/Haul switch has been pressed. The PCM controls the operation of the TCIL. The PCM may also flash the TCIL on and off, to alert the driver that a transmission operational error has occured, when certain faults in monitored sensors, solenoids or other transmission components are detected (See Figure 3).

### *4 X 4 Low Switch*

The 4X4 Low Switch, located on the dash on the right hand side of the driver, sends a ground signal to the instrument cluster when the vehicle is in 4X4 Low. The PCM then recieves 4X4 Low status from the instrument cluster and adjusts the transmission shift schedule accordingly. Four wheel "High" can be selected while moving at any speed up to 55 MPH.

## ELECTRICAL COMPONENT DESCRIPTION AND OPERATION (Cont'd)

***Transmission Solenoid Body Assembly***

The Solenoid Body Assembly is bolted to the transmission case inside the bottom pan and looks similar to what we have previously referred to as a valve body. The Solenoid Body Assembly contains the following:

- ***Seven Variable Force Solenoids***
- ***Five Normally Closed Pressure Switches***
- ***Transmission Fluid Temperature Sensor***
- ***Manual Shift Valve***
- ***Over-Pressurization Relief Ball***

There is a solenoid and a pressure switch dedicated to the function of each clutch pack, except the forward clutch, as it is controlled by the manual valve. There are no other valves in the solenoid body except for the pressure relief ball and spring. All shifts are controlled by five solenoids. Line pressure and the torque converter clutch each have their own solenoid. Four of the solenoids, TCC, OD Clutch, Intermediate Clutch and the Low/Reverse Clutch, are ***directly proportional*** which means the pressure output is directly proportional to the applied DC amps. The current is varied between 0 and 1 amp from the PCM, and 1 amp equals maximum pressure in the oil circuit. Three of the solenoids, Line Pressure, Coast Clutch and Direct Clutch, are ***inversely proportional*** which means the pressure output is inversely proportional to the applied DC amps. The current is varied between 0 and 1 amp from the PCM, and 0 amp equals maximum pressure in the oil circuit.

The different design solenoids are keyed differently to prevent mis-assembly in the solenoid body and all are retained with a large "E" clip. The "Natural" colored wire connectors connect to the solenoids. The "Black" colored connectors connect to the pressure switches. There are separate connectors for the TFT sensor and for the TR-P sensor. All of the solenoids except the line pressure solenoid can be serviced without removing the solenoid body from the case. Refer to Figure 6 for location and identification of the solenoids and switches on the solenoid body. Refer to Figure 8 for the differences and how to identify between the direct and inversely proportional solenoids.

***Line Pressure Control Solenoid (PC-A)***

The Line Pressure Control Solenoid (PC-A) is an ***inversley proportional*** three port solenoid. The pressure output is inversely proportional to the applied DC current supplied through an electronically controlled driver. The current is varied between 0 amp and 1 amp from the PCM, and 0 amp equals maximum pressure in the oil circuit. The PC-A Solenoid controls the line pressure oil circuits (See Figure 8)

***Torque Converter Clutch (TCC) Solenoid***

The Torque Converter Clutch (TCC) Solenoid is a ***directly proportional*** three port solenoid. The pressure output is directly proportional to the applied DC current supplied through an electronically controlled driver. The current is varied between 0 amp and 1 amp from the PCM, and 1 amp equals maximum pressure in the oil circuit. The TCC Solenoid controls the apply and release rates of the converter clutch (See Figure 8).

***Shift Solenoid Pressure Control Solenoids (SSPC-B, SSPC-C, SSPC-E)***

The overdrive (SSPC-B), intermediate (SSPC-C), and low/reverse (SSPC-E) clutches are each controlled by a ***directly proportional*** three port solenoid. The pressure output is directly proportional to the applied DC current supplied through an electronically controlled driver. The current is varied between 0 amp and 1 amp from the PCM, and 1 amp equals maximum pressure in the particular clutch oil circuit. The Shift Solenoid controls the apply and release rates of the particular clutch pack (See Figure 8).

***Shift Solenoid Pressure Control Solenoids (SSPC-A, SSPC-D)***

The coast (SSPC-A), and low/reverse (SSPC-E) clutch packs are each controlled by an ***inversely proportional*** three port solenoid. The pressure output is inversely proportional to the applied DC current supplied through an electronically controlled driver. The current is varied between 0 amp and 1 amp from the PCM, and 0 amp equals maximum pressure in the particular clutch oil circuit. The Shift Solenoid controls the apply and release rates of the particular clutch pack. Refer to Figure 8.

## ELECTRICAL COMPONENT DESCRIPTION AND OPERATION (Cont'd)

***Pressure Switches***
***(PS-A, PS-B, PS-C, PS-D, PS-E)***

Each of the five shift pressure control solenoids has a corresponding pressure switch, which is normally closed. The pressure switch is designed to open when shift solenoid control pressure exceeds 40 psi. All five of the pressure switches are identical and will interchange in the solenoid body, as shown in Figure 7. Their particular functions are as follows:

PS-A = Coast Clutch
PS-B = Overdrive Clutch
PS-C = Intermediate Clutch
PS-D = Direct Clutch
PS-E = Low/Reverse Clutch

Refer to Figure 6 for their particular locations in the solenoid body.

***Pressure Switches***
***(PS-A, PS-B, PS-C, PS-D, PS-E)***

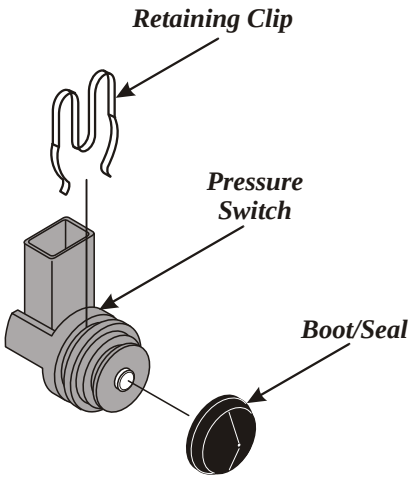
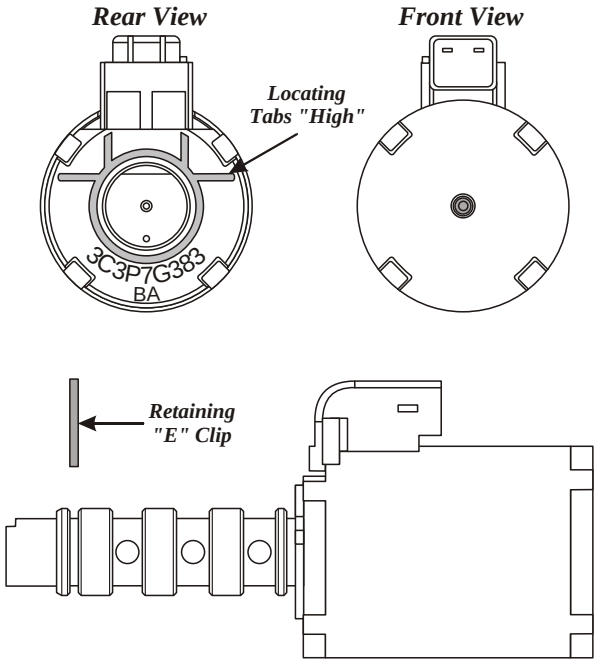





Figure 7

***TCC, SSPC-B, SSPC-C, SSPC-E***
***"Directly" Proportional Solenoids***
***(1 Amp = Maximum Pressure)***




***PC-A, SSPC-A, SSPC-D***
***"Inversely" Proportional Solenoids***
***(0 Amp = Maximum Pressure)***

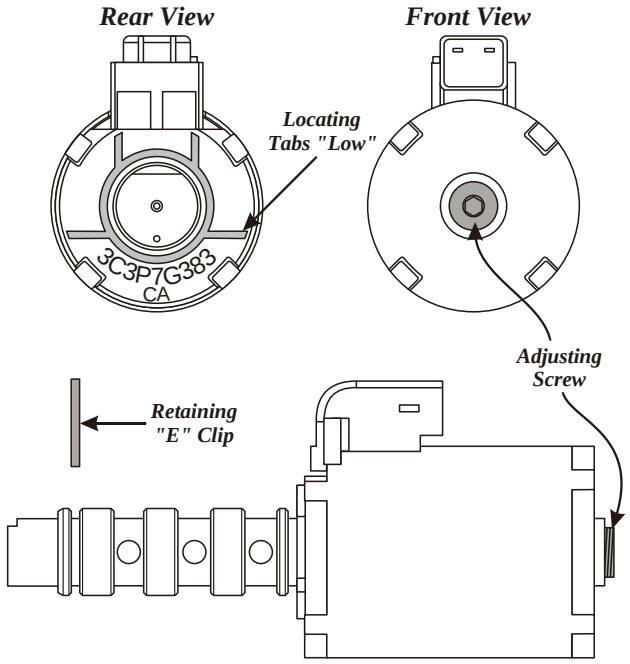





Figure 8

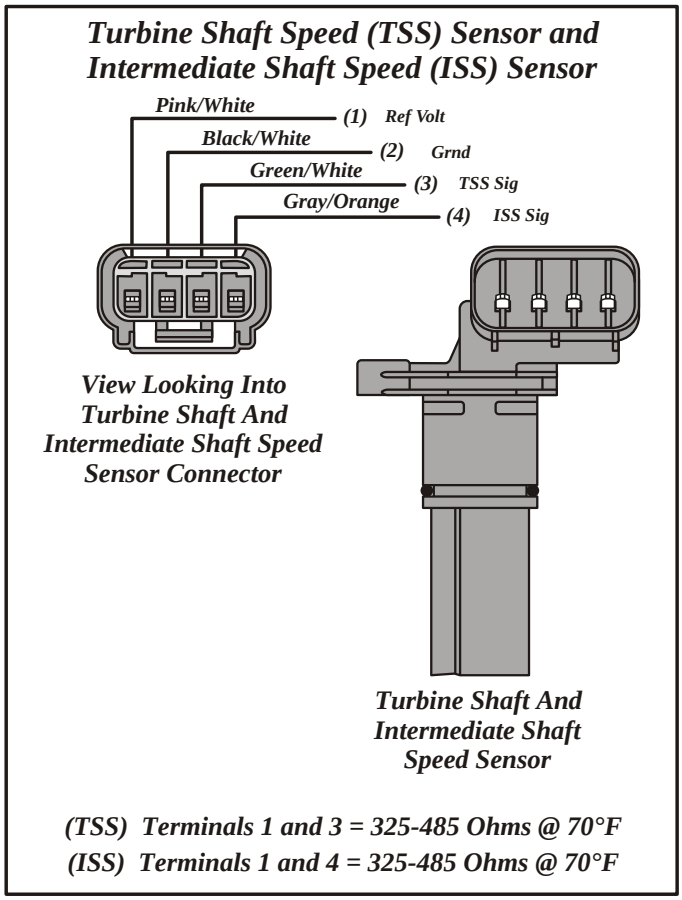



Figure 9

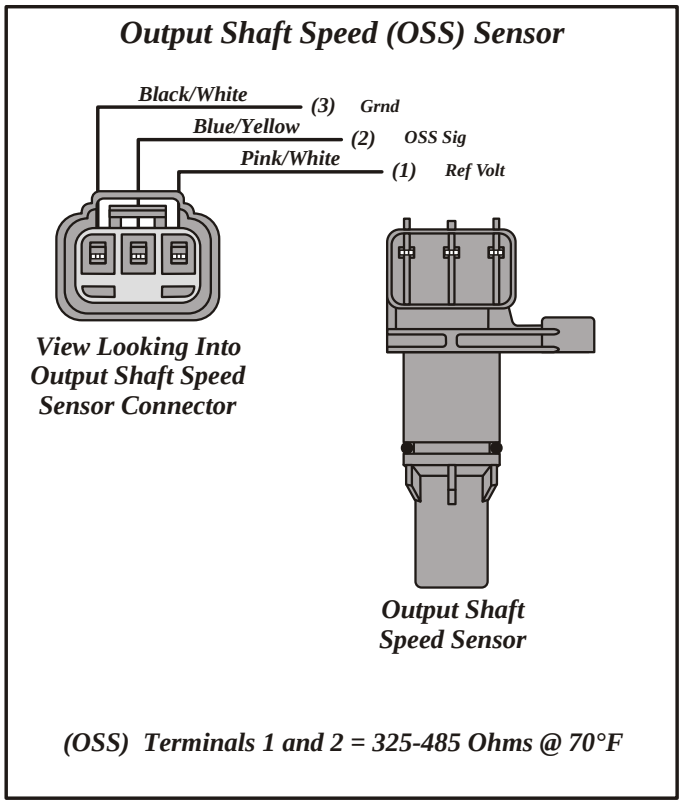



Figure 10

## ELECTRICAL COMPONENT DESCRIPTION AND OPERATION (Cont'd)

### *Turbine Shaft Speed (TSS) Sensor and Intermediate Shaft Speed (ISS) Sensor*

The turbine shaft speed (TSS) and intermediate shaft speed (ISS) sensors are hall effect sensors requiring a 12-volt supply and a ground. In this unit both sensors are incorporated into one housing. The other two terminals at the sensor are for TSS and ISS signals to the PCM. The sensor detects teeth on the coast clutch input hub for TSS signal, and the adjacent overdrive ring gear teeth for the ISS signal. Both sensors read 30 teeth per revolution. The TSS/ISS sensor's are mounted externally on the transmission case (See Figure 6). The TSS/ISS sensors imput to the PCM is digital and used to determine line pressure, shift timing and TCC operation. Refer to Figure 9 for TSS/ISS sensor illustrations and connector information.

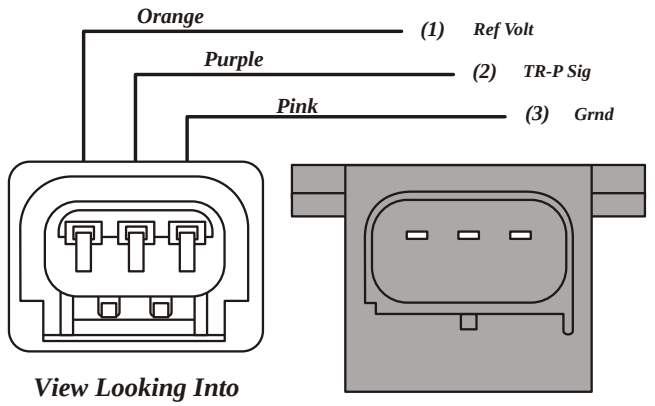
### *Output Shaft Speed (OSS) Sensor*

The transmission output shaft speed (OSS) sensor is located on the extension housing (See Figure 6). The OSS is a hall effect type sensor. The OSS reads a set of gear teeth on the park gear, that are different than the teeth used for the park function. The OSS signal to the PCM is used for vehicle speed signal, shift scheduling and TCC operation. The OSS has bi-directional capability and uses a digital output. Refer to Figure 10 for OSS sensor illustrations and connector information.

### *Cold Mode/Hot Mode Operation*

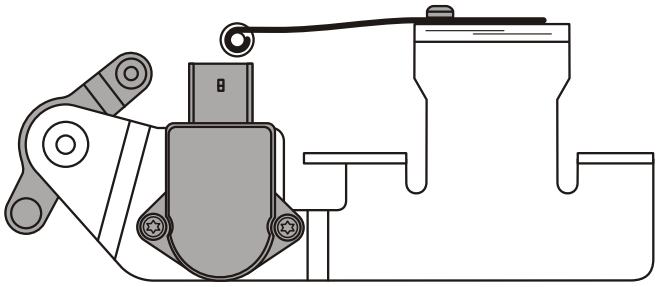
When the transmission is in cold mode operation, below -15°C (5°F), ***determined by the TFT sensor,*** the transmission shifts 1st gear, 2nd gear, 3rd gear, 4th gear (ratio 1.09), 6th gear. When in hot mode the transmission will shift 1st gear, 2nd gear, 3rd gear, 5th gear (ratio 1.00), 6th gear. Either way it is still a five speed unit with six forward gear ratios available, depending on cold mode or hot mode of operation.

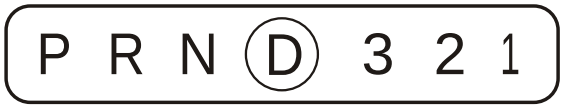
*Transmission Range Sensor Assembly*




*View Looking Into Transmission Range Sensor Connector*

*View Looking Into Transmission Range Sensor Assembly*






| *TR-P Duty Cycle Chart* | | |
|---|---|---|
| *Position* | *Min % Duty Cycle* | *Max % Duty Cycle* |
| *P* | *7.13* | *22.93* |
| *R* | *22.94* | *36.64* |
| *N* | *36.65* | *48.55* |
| *D* | *48.56* | *58.82* |
| *3* | *58.83* | *68.08* |
| *2* | *68.09* | *77.96* |
| *1* | *77.97* | *90.34* |



Figure 11

## ELECTRICAL COMPONENT DESCRIPTION AND OPERATION (Cont'd)

### *Transmission Range (TR-P) Sensor Assembly*

The transmission range (TR-P) sensor assembly, shown in Figure 11, is an internally mounted sensor that includes the detent spring, rooster comb lever and bracket, located next to the solenoid body and bolted to the transmission case. The transmission range sensor is non-adjustable and is not serviced independently. The TR-P sensor contains electronic circuitry that provides the PCM a fixed frequency, at a duty cycle, for each of the seven positions of the manual shift lever. Refer to Figure 11 for the duty cycle specifications for the various positions. The PCM uses the TR-P sensor signal for starting in Park and Neutral only, reverse lamp operation, and for line pressure control, shift scheduling and TCC operation.

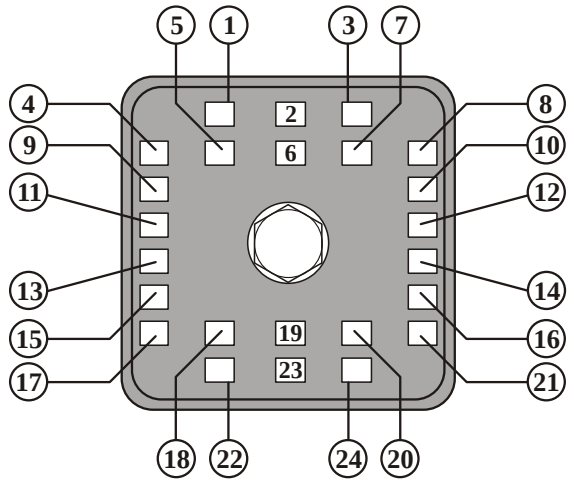
### *Transmission Fluid Temperature (TFT) Sensor*

The transmission fluid temperature (TFT) sensor twist-locks into the solenoid body and is a temperature sensitive device called a thermistor. As the fluid temperature increases, the TFT resistance decreases, as shown in the chart in Figure 12. The PCM uses the TFT signal as an input to determine ***cold and hot temperature shift scheduling*** and for TCC apply and release scheduling.

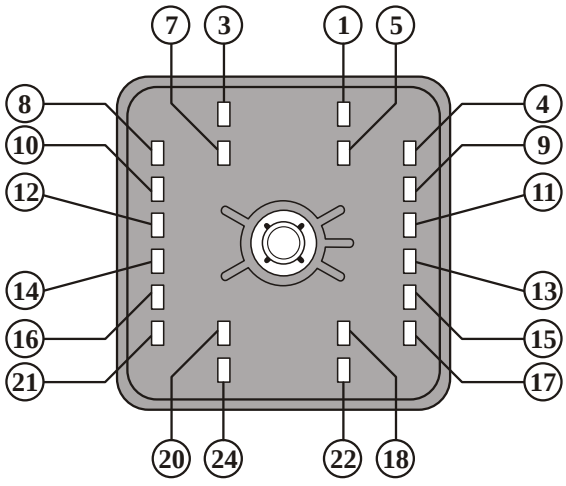
| *Transmission Fluid Temperature (TOT)* | | |
|---|---|---|
| *Degrees C* | *Degrees F* | *Resistance (Ohms)* |
| *-40 to -20* | *-40 to -4* | *967k to 284k* |
| *-19 to -2* | *-3 to 31* | *284k to 100k* |
| *0 to 20* | *32 to 68* | *100k to 37k* |
| *21 to 40* | *69 to 104* | *37k to 16k* |
| *41 to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

Figure 12

| 5R110W TRANSMISSION CASE CONNECTOR PIN FUNCTIONS | |
|---|---|
| ***Pin Number*** | ***Description*** |
| ***1*** | ***Ground signal to Shift Solenoid Pressure Control "E" (SSPC-E)*** |
| ***3*** | ***Ground signal to Shift Solenoid Pressure Control "B" (SSPC-B)*** |
| ***4*** | ***Ground signal to Shift Solenoid Pressure Control "D" (SSPC-D)*** |
| ***5*** | ***Ground signal to Shift Solenoid Pressure Control "C" (SSPC-C)*** |
| ***7*** | ***VPWR to Pressure Control (PC-A) Solenoid and TCC Solenoid*** |
| ***8*** | ***Ground signal to Torque Converter Clutch (TCC) Solenoid*** |
| ***9*** | ***Pressure Switch "C" (PS-C), Intermediate Clutch Signal to PCM*** |
| ***10*** | ***Ground signal to Pressure Control (PC-A) Solenoid (Line Pressure)*** |
| ***11*** | ***Pressure Switch "D" (PS-D), Direct Clutch Signal to PCM*** |
| ***12*** | ***Ground signal to Shift Solenoid Pressure Control "A" (SSPC-A)*** |
| ***13*** | ***Pressure Switch "E" (PS-E), Low/Reverse Clutch Signal to PCM*** |
| ***14*** | ***Pressure Switch "A" (PS-A), Coast Clutch Signal to PCM*** |
| ***15*** | ***Transmission Range - Park (TR-P) Sensor, Signal to PCM*** |
| ***16*** | ***Pressure Switch "B" (PS-B), Overdrive Clutch Signal to PCM*** |
| ***17*** | ***Transmission Range - Park (TR-P) Sensor, Ground*** |
| ***18*** | ***Transmission Fluid Temperature (TFT) Sensor signal to PCM*** |
| ***20*** | ***VPWR to SSPC-A and SSPC-B Solenoids*** |
| ***21*** | ***VPWR to Transmission Range - Park (TR-P) Sensor Only*** |
| ***22*** | ***Ground for All Pressure Switches and TFT*** |
| ***24*** | ***VPWR to SSPC-C, SSPC-D and SSPC-E Solenoids*** |
| ***Special Note: Pin Numbers 2, 6, 19, and 23 are not used.*** | |




*View Looking Into Wire Side Of Vehicle Harness Connector*

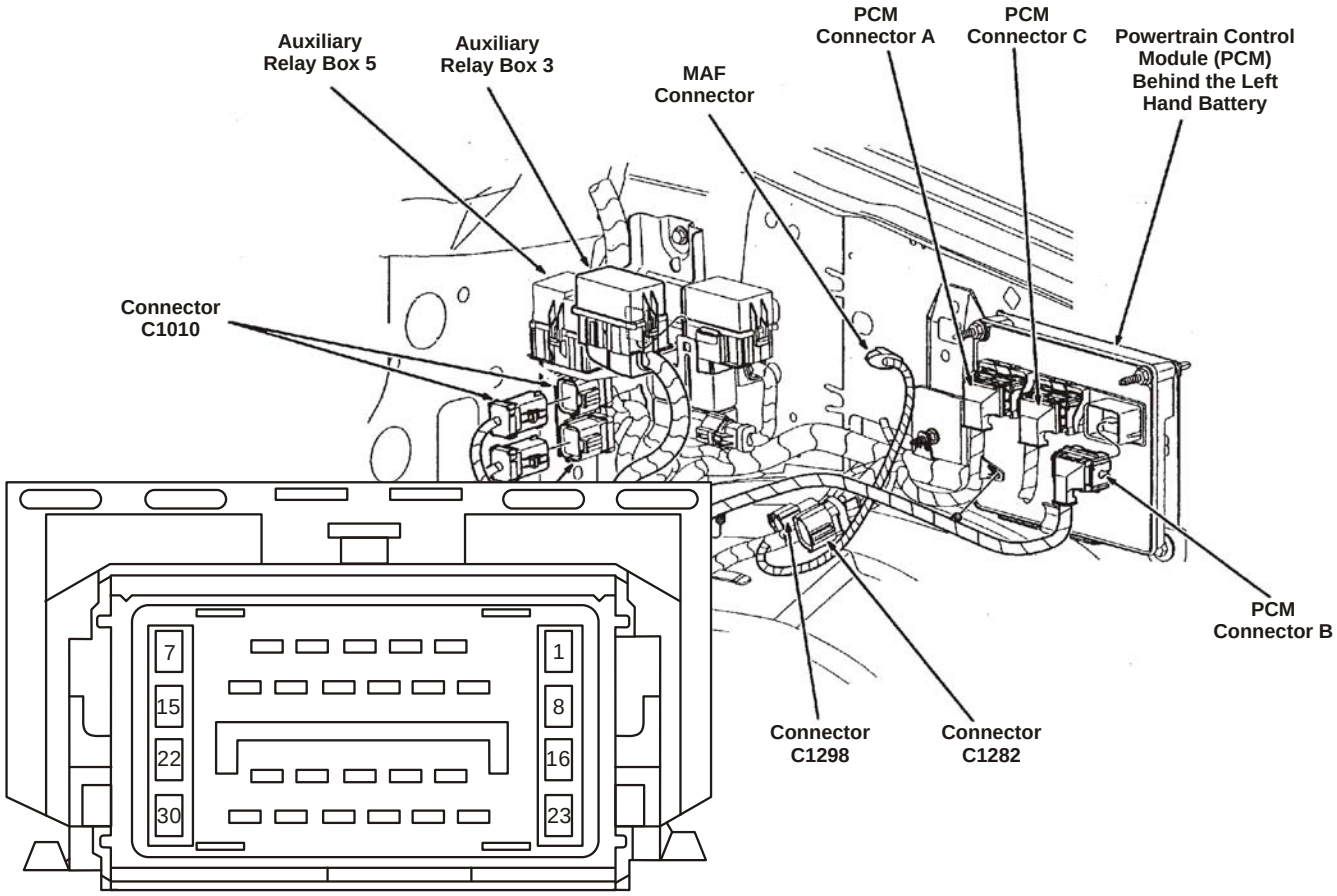



*View Looking Into Face Side Of Vehicle Harness Connector*



Figure 13

## 5R110W PCM CONNECTOR "B" PIN IDENTIFICATION AND FUNCTIONS AND PCM LOCATION




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

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



Figure 14

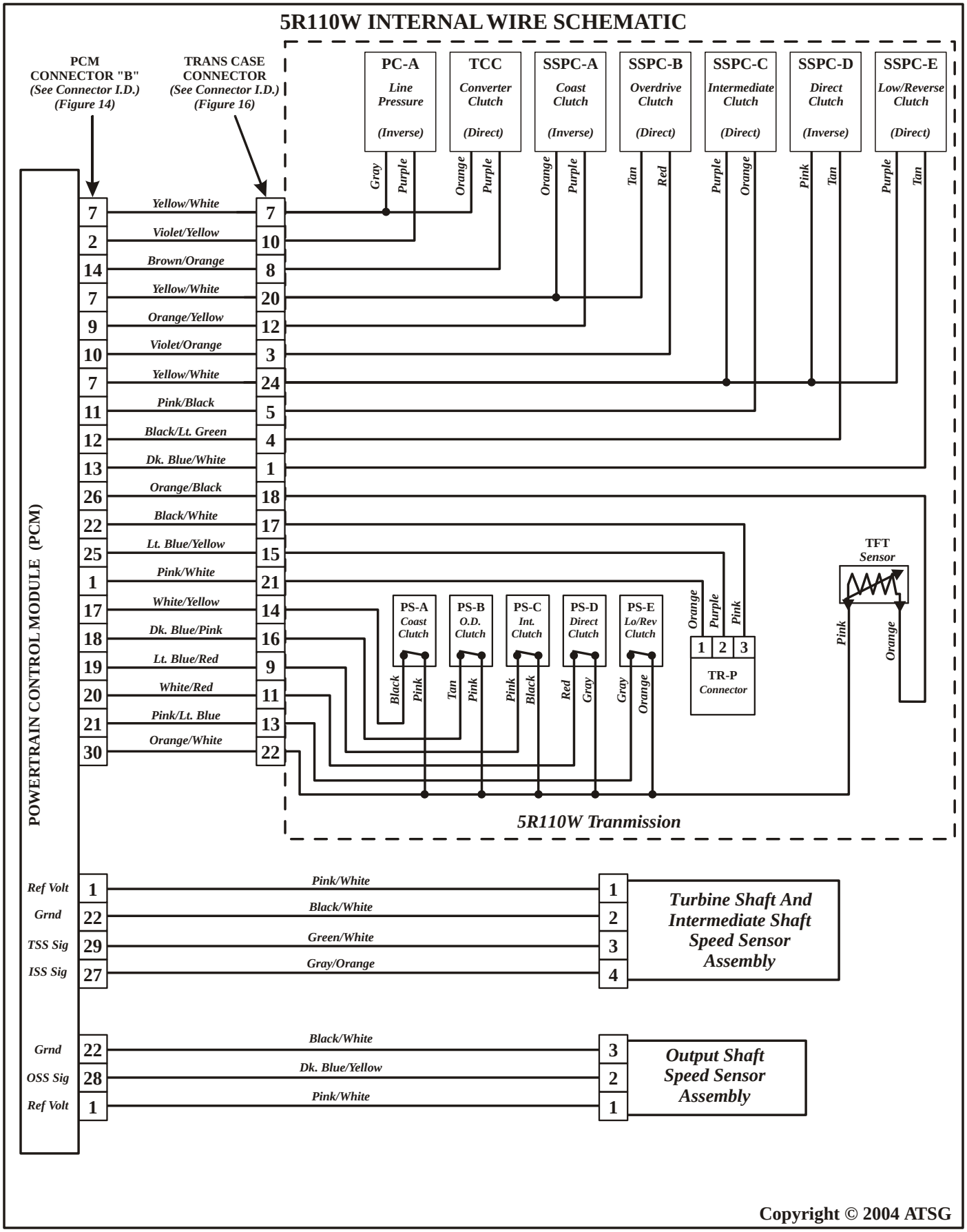
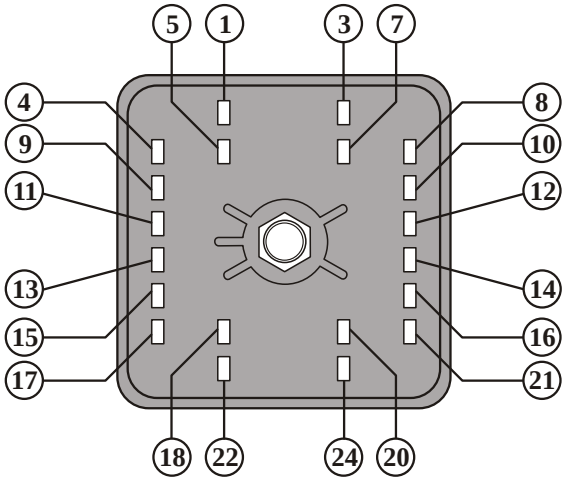





Figure 15

| INTERNAL COMPONENT RESISTANCE CHART | | | |
|---|---|---|---|
| **INTERNAL COMPONENT** | **CASE CONNECTOR PIN NUMBERS** | **OHMS RESISTANCE** | ***** Internal Wire Colors At Component Connector*** |
| *SSPC-A Soleniod* | *12 and 20* | *4.1 to 4.7 @ 72° F* | *Purple and Orange* |
| *SSPC-B Soleniod* | *3 and 20* | *4.1 to 4.7 @ 72° F* | *Red and Tan* |
| *SSPC-C Soleniod* | *5 and 24* | *4.1 to 4.7 @ 72° F* | *Orange and Purple* |
| *SSPC-D Soleniod* | *4 and 24* | *4.1 to 4.7 @ 72° F* | *Tan and Pink* |
| *SSPC-E Soleniod* | *1 and 24* | *4.1 to 4.7 @ 72° F* | *Tan and Purple* |
| *PC-A Solenoid (Early)* | *7 and 10* | *4.1 to 4.7 @ 72° F* | *Gray and Purple* |
| *PC-A Solenoid (Late)* | *7 and 10* | *5.1 to 5.8 @ 72° F* | *Gray and Purple* |
| *TCC Solenoid* | *7 and 8* | *4.1 to 4.7 @ 72° F* | *Purple and Orange* |
| *PS-A* | *14 and 22* | *0.5 Ohms @ 72° F* | *Black and Pink* |
| *PS-B* | *16 and 22* | *0.5 Ohms @ 72° F* | *Tan and Pink* |
| *PS-C* | *9 and 22* | *0.5 Ohms @ 72° F* | *Pink and Black* |
| *PS-D* | *11 and 22* | *0.5 Ohms @ 72° F* | *Red and Gray* |
| *PS-E* | *13 and 22* | *0.5 Ohms @ 72° F* | *Gray and Orange* |
| *TFT* | *18 and 22* | *See Chart Below* | *Orange and Pink* |
| *TR-P Sensor* | | *See Figure 11* | |
| *TSS/ISS Sensor* | | *See Figure 9* | |
| *OSS Sensor* | | *See Figure 10* | |

***** Wire colors may vary.***



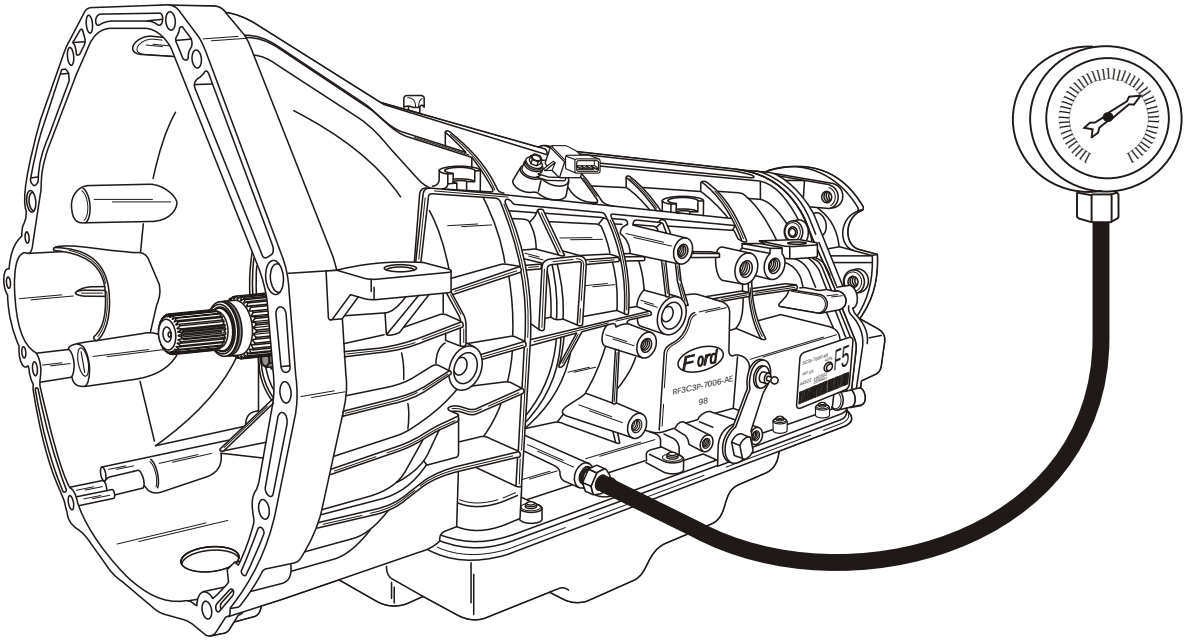

*View Looking Into Transmission Case Connector*

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



Figure 16

**LINE PRESSURE TESTS**




| *LINE PRESSURE CHART* | | |
|---|---|---|
| ***Range*** | ***Idle Speed*** | ***Stall Speed*** |
| ***P/N*** | ***50 psi*** | ——— |
| ***R*** | ***100 psi*** | ***320 psi*** |
| ***(D)*** | ***70 psi*** | ***320 psi*** |
| ***3*** | ***80 psi*** | ***260 psi*** |
| ***2*** | ***80 psi*** | ***215 psi*** |
| ***1*** | ***80 psi*** | ***270 psi*** |

***All Pressures Listed Are Approximate***

***PRECAUTIONS:***

***(1) Certain sensor failures may cause high line pressure and Failure Mode Effect Management (FMEM) actions. Ensure that on-board diagnostic and electrical repairs have been carried out first, or test results may be incorrect.***

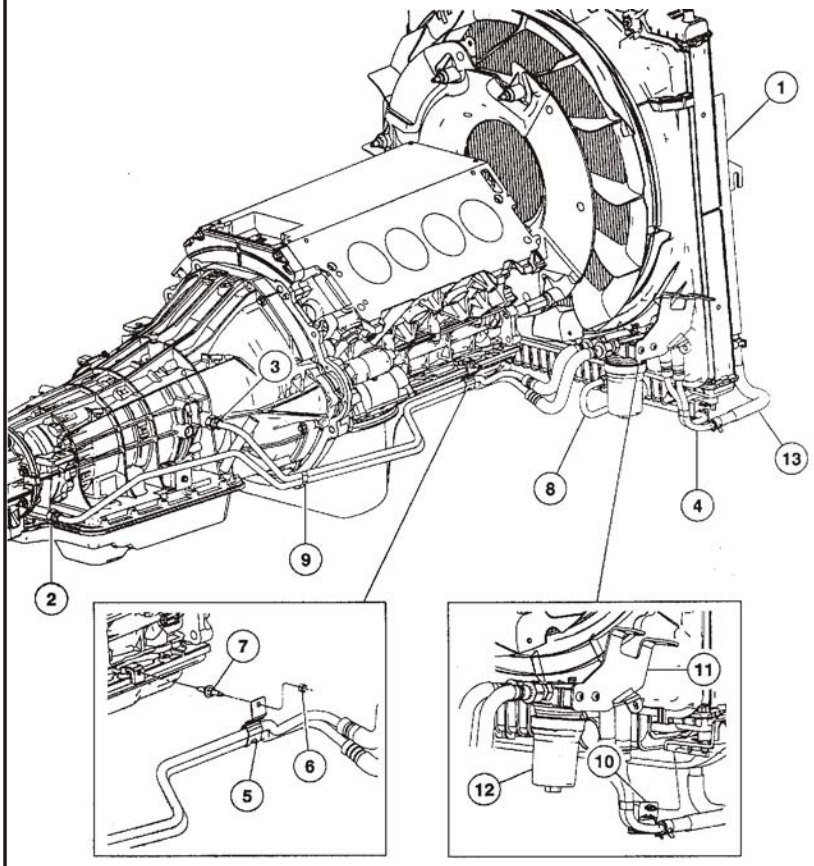
***(2) Perform the line pressure test in all ranges prior to performing the Stall Speed Test. If line pressure is low at idle, "Do Not" carry out the Stall Speed Test or additional transmission damage will occur. Do not maintain wide open throttle (WOT) in any range for more than 5 seconds or transmission damage may occur.***

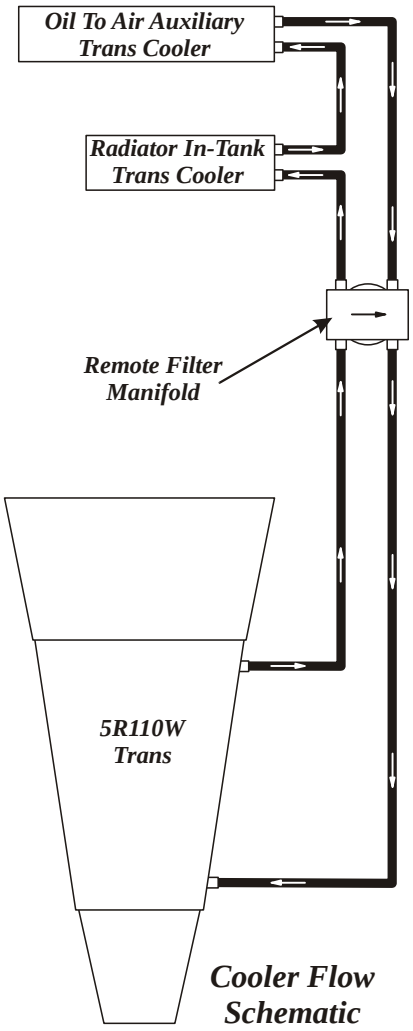
***(3) Apply the parking brake and block wheels during the line pressure test. Vehicle movement during the test may cause personal injury or damage to the vehicle and equipment.***



Figure 17

**REMOTE TRANSMISSION FILTER IN COOLER LINES**




1 OIL TO AIR TRANSMISSION FLUID AUXILIARY COOLER
2 REAR "FROM COOLER" LINE CASE FITTING
3 FRONT "TO COOLER" LINE CASE FITTING
4 REMOTE FILTER "IN" LINE
5 COOLER LINE BRACKET
6 NUT
7 STUD
8 RADIATOR COOLER "IN" LINE
9 COOLER LINE "C" CLIP
10 COOLER LINE CLIP
11 REMOTE FILTER MANIFOLD BRACKET
12 REMOTE TRANSMISSION FLUID FILTER
13 HOSE ASSEMBLY

Figure 18

***Remote Transmission Filter***

This transmission is equipped with a remote fluid filter, as shown in Figure 18. This filter passes ten percent of the transmission fluid from the transmission through a small orifice into a servicable screw-on filter element. The filtered fluid is then directed back into the rear lube circuit through the large opening in the remote filter manifold.

***CAUTION: The transmission cooler lines must be disconnected prior to flushing out the cooler lines. Do Not attempt to flush the remote filter housing because of the internal orifice.***

| FORD 5R110W<br>*Abbreviation Description* | | | |
|---|---|---|---|
| ***Abbreviation*** | ***Description*** | ***Abbreviation*** | ***Description*** |
| **4X4L** | **4X4 Low Switch** | **PC-A** | **Pressure Control Solenoid "A"** |
| **ABS** | **Antilock Brake System** | **PCM** | **Powertrain Control Module** |
| **A/C** | **Air Conditioning** | **PS-A** | **Pressure Switch "A"** |
| **ACCS** | **Air Conditioning Clutch Status** | **PS-B** | **Pressure Switch "B"** |
| **APGND** | **Accelerator Pedal Sensor Ground** | **PS-C** | **Pressure Switch "C"** |
| **APP** | **Accelerator Pedal Position Sensor** | **PS-D** | **Pressure Switch "D"** |
| **BARO** | **Barometric Pressure Sensor** | **PS-E** | **Pressure Switch "E"** |
| **BPP** | **Brake Pedal Position** | **ROM** | **Read Only Memory** |
| **BUS +** | **Data Link Connector** | **RPM** | **Engine Speed** |
| **BUS -** | **Data Link Connector** | **SCCS** | **Speed Control Command Switch** |
| **CASE GND** | **Case Ground** | **SSPC-A** | **Shift Solenoid Pressure Control A** |
| **CID** | **Cylinder Identification** | **SSPC-B** | **Shift Solenoid Pressure Control B** |
| **CMP** | **Camshaft Position Sensor** | **SSPC-C** | **Shift Solenoid Pressure Control C** |
| **DLC** | **Data Link Connector** | **SSPC-D** | **Shift Solenoid Pressure Control D** |
| **DTC** | **Diagnostic Trouble Code** | **SSPC-E** | **Shift Solenoid Pressure Control E** |
| **DTC CNT** | **Diagnostic Trouble Code Count** | **TAC** | **Tachometer Signal** |
| **ECT** | **Engine Coolant Temperature** | **TCC** | **Torque Converter Clutch** |
| **EOT** | **Engine Oil Temperature** | **TCIL** | **Trans Control Indicator Lamp** |
| **FEPS** | **Flash EPROM Power Supply** | **TCS** | **Transmission Control Switch** |
| **FUEL PW** | **Fuel Pulse Width** | **TFT** | **Transmission Fluid Temperature** |
| **GP** | **Glow Plug** | **TR-P** | **Transmission Range Sensor** |
| **GPC** | **Glow Plug Control Duty Cycle** | **TP** | **Throttle Position Sensor** |
| **GPL** | **Glow Plug Lamp** | **TSS** | **Turbine Shaft Speed Sensor** |
| **IAT** | **Intake Air Temperature** | **VPWR** | **Vehicle Power Supply** |
| **ICP** | **Injector Control Pressure Sensor** | **VREF** | **Vehicle Reference Voltage** |
| **IPR** | **Injector Pressure Regulator** | **VSS** | **Vehicle Speed Sensor** |
| **ISS** | **Interm. Shaft Speed Sensor** | **WOT** | **Wide Open Throttle** |
| **IVS** | **Idle Validation Switch** | | |
| **KAM** | **Keep Alive Memory** | | |
| **KAPWR** | **Keep Alive Power** | | |
| **KOEO** | **Key On Engine Off** | | |
| **KOER** | **Key On Engine Running** | | |
| **MAF** | **Mass Air Flow Sensor** | | |
| **OSS** | **Output Shaft Speed Sensor** | |  |

Figure 19

| *5R110W Diagnostic Trouble Code Chart* | | |
|---|---|---|
| ***Diagnostic Code*** | ***Symptom*** | ***Description*** |
| **P0102<br>P0103<br>P1100<br>P1101** | ***Mass Air Flow (MAF) sensor*** | **MAF sensor system fails to operate in a normal manner, which may cause a transmission concern.** |
| **P0112** | ***Intake Air Temperature (IAT) sensor*** | **IAT sensor exceeds the scale set for temperature of 254°F.** |
| **P0113** | ***Intake Air Temperature (IAT) sensor*** | **IAT sensor exceeds the scale set for temperature of minus 40°F.** |
| **P0114** | ***Intake Air Temperature (IAT) sensor*** | **IAT sensor higher or lower than expected during KOEO and KOER test.** |
| **P0116** | ***Engine Coolant Temp (ECT) sensor*** | **ECT sensor temperature higher or lower than expected during KOEO or KOER** |
| **P0117** | ***Engine Coolant Temp (ECT) sensor*** | **ECT sensor exceeds the scale set for temperature of 254°F.** |
| **P0118** | ***Engine Coolant Temp (ECT) sensor*** | **ECT sensor exceeds the scale set for temperature of minus 40°F.** |
| **P0121<br>P0122<br>P0123<br>P1120<br>P1121<br>P1124<br>P1125** | ***Throttle Position (TP) or (APP) sensor*** | **(TP) Throttle Position sensor or (APP) Accelerator Pedal Position sensor above or below normal specifications during normal operation.** |
| **P0300<br>P0308<br>P0320<br>P0340<br>P1351-1364** | ***(EI) Systems*** | **(DI) Distributor Ignition circuit concern or (CKP) Crankshaft Position sensor failure.** |
| **P0500** | ***Antilock Brake Systems (ABS)*** | **PCM detected a loss of VSS signal through SCP link from ABS.** |
| **P0503** | ***Antilock Brake Systems (ABS)*** | **PCM detected an intermittent loss of VSS signal through SCP link from ABS.** |
| **P0706** | ***Transmission Range (TR-P) Sensor*** | **Transmission Range sensor signal frequency is out of normal range** |



Figure 20

| *5R110W Diagnostic Trouble Code Chart* | | |
|---|---|---|
| ***Diagnostic Code*** | ***Symptom*** | ***Description*** |
| **P0707** | ***Transmission Range (TR-P) Sensor*** | **Transmission Range sensor signal duty cycle is below threshold, sensor/circuit elect. malfunction.** |
| **P0708** | ***Transmission Range (TR-P) Sensor*** | **Transmission Range sensor signal duty cycle is above threshold, sensor/circuit elect. malfunction.** |
| **P1705** | ***Transmission Range (TR-P) Sensor*** | **Transmission Range sensor circuit failure, or KOEO or KOER not run in P or N positions.** |
| **P0711** | ***Trans Fluid Temp (TFT) Sensor*** | **PCM has detected no TFT change during operation. Stuck at some normal reading.** |
| **P0712** | ***Trans Fluid Temp (TFT) Sensor*** | **Voltage drop across TFT sensor exceeds scale set for temperature of 315°F.** |
| **P0713** | ***Trans Fluid Temp (TFT) Sensor*** | **Voltage drop across TFT sensor exceeds scale set for temperature of minus 40°F.** |
| **P1711** | ***Trans Fluid Temp (TFT) Sensor*** | **Transmission not operating at normal temperature during On-Board diagnostics.** |
| **P1783** | ***Trans Fluid Temp (TFT) Sensor*** | **Transmission over temp condition indicated.** |
| **P0715** | ***Turbine Shaft Speed (TSS) Sensor*** | **PCM detected a loss of TSS signal during normal operation.** |
| **P0717** | ***Turbine Shaft Speed (TSS) Sensor*** | **PCM has not detected a TSS signal.** |
| **P0718** | ***Turbine Shaft Speed (TSS) Sensor*** | **PCM has detected a noisy TSS signal.** |
| **P0720** | ***Output Shaft Speed (OSS) Sensor*** | **PCM detected a loss of OSS signal during normal operation.** |
| **P0721** | ***Output Shaft Speed (OSS) Sensor*** | **PCM has detected a noisy OSS signal.** |
| **P0722** | ***Output Shaft Speed (OSS) Sensor*** | **PCM has detected no OSS signal.** |
| **P0730** | ***Clutch Control Solenoid or Internal Problem*** | **PCM has detected a gear ratio error.** |
| **P0740** | ***TCC Solenoid*** | **TCC Solenoid, Electrical, Open Circuit.** |
| **P0741** | ***TCC Solenoid*** | **TCC slippage detected during engagement. Mechanical or Hydraulic concern.** |



Figure 21

| *5R110W Diagnostic Trouble Code Chart* | | |
|---|---|---|
| ***Diagnostic Code*** | ***Symptom*** | ***Description*** |
| **P0742** | ***TCC Solenoid*** | **TCC Solenoid circuit, shorted to ground.** |
| **P0743** | ***TCC Solenoid*** | **TCC Solenoid circuit failure.** |
| **P0744** | ***TCC Solenoid*** | **TCC Solenoid circuit, shorted to power.** |
| **P1744** | ***TCC Solenoid*** | **TCC slippage detected during engagement. Mechanical or Hydraulic concern.** |
| **P0748** | ***Line Pressure Control (PC-A) Solenoid*** | **PC-A Solenoid circuit failure.** |
| **P0960** | ***Line Pressure Control (PC-A) Solenoid*** | **PC-A Solenoid circuit open failure.** |
| **P0962** | ***Line Pressure Control (PC-A) Solenoid*** | **PC-A Solenoid circuit, shorted to ground.** |
| **P0963** | ***Line Pressure Control (PC-A) Solenoid*** | **PC-A Solenoid circuit, shorted to power.** |
| **P0750** | ***SSPC-A Solenoid (Coast Clutch)*** | **SSPC-A Solenoid circuit open failure.** |
| **P0751** | ***SSPC-A Solenoid (Coast Clutch)*** | **SSPC-A Solenoid circuit, or solenoid failure OFF.** |
| **P0752** | ***SSPC-A Solenoid (Coast Clutch)*** | **SSPC-A Solenoid circuit, or solenoid failure ON.** |
| **P0753** | ***SSPC-A Solenoid (Coast Clutch)*** | **SSPC-A Solenoid circuit failure.** |
| **P0972** | ***SSPC-A Solenoid (Coast Clutch)*** | **SSPC-A Solenoid circuit, or solenoid failure OFF.** |
| **P0973** | ***SSPC-A Solenoid (Coast Clutch)*** | **SSPC-A Solenoid circuit, shorted to ground.** |
| **P0974** | ***SSPC-A Solenoid (Coast Clutch)*** | **SSPC-A Solenoid circuit, shorted to power.** |
| **P0755** | ***SSPC-B Solenoid (Overdrive Clutch)*** | **SSPC-B Solenoid circuit open failure.** |
| **P0756** | ***SSPC-B Solenoid (Overdrive Clutch)*** | **SSPC-B Solenoid circuit, or solenoid failure OFF.** |
| **P0757** | ***SSPC-B Solenoid (Overdrive Clutch)*** | **SSPC-B Solenoid circuit, or solenoid failure ON.** |



Figure 22

| *5R110W Diagnostic Trouble Code Chart* | | |
|---|---|---|
| ***Diagnostic Code*** | ***Symptom*** | ***Description*** |
| **P0758** | ***SSPC-B Solenoid (Overdrive Clutch)*** | **SSPC-B Solenoid circuit failure.** |
| **P0975** | ***SSPC-B Solenoid (Overdrive Clutch)*** | **SSPC-B Solenoid circuit, or solenoid failure OFF.** |
| **P0976** | ***SSPC-B Solenoid (Overdrive Clutch)*** | **SSPC-B Solenoid, or shorted to ground.** |
| **P0977** | ***SSPC-B Solenoid (Overdrive Clutch)*** | **SSPC-B Solenoid, or shorted to power.** |
| **P0760** | ***SSPC-C Solenoid (Intermediate Clutch)*** | **SSPC-C Solenoid circuit open failure.** |
| **P0761** | ***SSPC-C Solenoid (Intermediate Clutch)*** | **SSPC-C Solenoid circuit, or solenoid failure OFF.** |
| **P0762** | ***SSPC-C Solenoid (Intermediate Clutch)*** | **SSPC-C Solenoid circuit, or solenoid failure ON.** |
| **P0978** | ***SSPC-C Solenoid (Intermediate Clutch)*** | **SSPC-C Solenoid circuit, or solenoid failure OFF.** |
| **P0979** | ***SSPC-C Solenoid (Intermediate Clutch)*** | **SSPC-C Solenoid, or circuit shorted to ground.** |
| **P0980** | ***SSPC-C Solenoid (Intermediate Clutch)*** | **SSPC-C Solenoid, or circuit shorted to power.** |
| **P0765** | ***SSPC-D Solenoid (Direct Clutch)*** | **SSPC-D Solenoid circuit open failure.** |
| **P0766** | ***SSPC-D Solenoid (Direct Clutch)*** | **SSPC-D Solenoid circuit, or solenoid failure OFF.** |
| **P0767** | ***SSPC-D Solenoid (Direct Clutch)*** | **SSPC-D Solenoid circuit, or solenoid failure ON.** |
| **P0768** | ***SSPC-D Solenoid (Direct Clutch)*** | **SSPC-D Solenoid circuit failure.** |
| **P0981** | ***SSPC-D Solenoid (Direct Clutch)*** | **SSPC-D Solenoid circuit, or solenoid failure OFF.** |
| **P0982** | ***SSPC-D Solenoid (Direct Clutch)*** | **SSPC-D Solenoid, or circuit shorted to ground.** |
| **P0983** | ***SSPC-D Solenoid (Direct Clutch)*** | **SSPC-D Solenoid, or circuit shorted to power.** |



Figure 23

| *5R110W Diagnostic Trouble Code Chart* | | |
|---|---|---|
| ***Diagnostic Code*** | ***Symptom*** | ***Description*** |
| **P0770** | ***SSPC-E Solenoid (Low/Reverse Clutch)*** | **SSPC-E Solenoid circuit open failure.** |
| **P0771** | ***SSPC-E Solenoid (Low/Reverse Clutch)*** | **SSPC-E Solenoid circuit, or solenoid failure OFF.** |
| **P0772** | ***SSPC-E Solenoid (Low/Reverse Clutch)*** | **SSPC-E Solenoid circuit, or solenoid failure ON.** |
| **P0773** | ***SSPC-E Solenoid (Low/Reverse Clutch)*** | **SSPC-E Solenoid circuit failure.** |
| **P0984** | ***SSPC-E Solenoid (Low/Reverse Clutch)*** | **SSPC-E Solenoid circuit, or solenoid failure OFF.** |
| **P0985** | ***SSPC-E Solenoid (Low/Reverse Clutch)*** | **SSPC-E Solenoid, or circuit shorted to ground.** |
| **P0986** | ***SSPC-E Solenoid (Low/Reverse Clutch)*** | **SSPC-E Solenoid, or circuit shorted to power.** |
| **P0791** | ***Intermediate Shaft Speed Sensor (ISS)*** | **Insufficient input from ISS.** |
| **P0793** | ***Intermediate Shaft Speed Sensor (ISS)*** | **No input from ISS.** |
| **P0794** | ***Intermediate Shaft Speed Sensor (ISS)*** | **ISS signal intermittent.** |
| **P0840** | ***Pressure Switch A (PS-A)*** | **Pressure Switch A circuit error, stuck open or closed, shorted to power or ground.** |
| **P0841** | ***Pressure Switch A (PS-A)*** | **Pressure Switch A circuit error, stuck open or closed, shorted to power or ground.** |
| **P0845** | ***Pressure Switch B (PS-B)*** | **Pressure Switch B circuit error, stuck open or closed, shorted to power or ground.** |
| **P0846** | ***Pressure Switch B (PS-B)*** | **Pressure Switch B circuit error, stuck open or closed, shorted to power or ground.** |
| **P0870** | ***Pressure Switch C (PS-C)*** | **Pressure Switch C circuit error, stuck open or closed, shorted to power or ground.** |
| **P0871** | ***Pressure Switch C (PS-C)*** | **Pressure Switch C circuit error, stuck open or closed, shorted to power or ground.** |
| | |  |

Figure 24

| *5R110W Diagnostic Trouble Code Chart* | | |
|---|---|---|
| ***Diagnostic Code*** | ***Symptom*** | ***Description*** |
| **P0875** | ***Pressure Switch D (PS-D)*** | **Pressure Switch D circuit error, stuck open or closed, shorted to power or ground.** |
| **P0876** | ***Pressure Switch D (PS-D)*** | **Pressure Switch D circuit error, stuck open or closed, shorted to power or ground.** |
| **P0987** | ***Pressure Switch E (PS-E)*** | **Pressure Switch E circuit error, stuck open or closed, shorted to power or ground.** |
| **P0988** | ***Pressure Switch E (PS-E)*** | **Pressure Switch E circuit error, stuck open or closed, shorted to power or ground.** |
| **P1124** | ***Throttle Position (TP) or (APP) sensor*** | **Throttle position was not in the proper position for the On-Board diagnostics.** |
| **P1460** | ***A/C Switch*** | **A/C pressure cycling switch error.** |
| **P1572** | ***Brake Pedal Position (BPP) Switch*** | **Brake Pedal Position Switch, circuit failure.** |
| **P1636** | ***SSx ISIG*** | **PCM detected an error with the Inductive Signature Communication chip.** |
| **P1703** | ***Brake Pedal Position (BPP) Switch*** | **Brake Pedal not cycled during KOER test, or brake ON circuit failure during KOEO.** |
| **P1780** | ***Transmission Control Switch (TCS)*** | **Transmission Control Switch voltage incorrect.** |
| **P1729** | ***4X4 Low Switch*** | **4X4 Low Switch circuit or switch failure.** |
| **P1781** | ***4X4 Low Switch*** | **4X4 Low Switch or circuit, out of self test range.** |
| **P2700** | ***Coast Clutch System Error*** | **Friction element apply time, range, or functional error detected.** |
| **P2701** | ***Overdrive Clutch System Error*** | **Friction element apply time, range, or functional error detected.** |
| **P2702** | ***Intermediate Clutch System Error*** | **Friction element apply time, range, or functional error detected.** |
| **P2703** | ***Direct Clutch System Error*** | **Friction element apply time, range, or functional error detected.** |
| **P2704** | ***Low/Reverse Clutch System Error*** | **Friction element apply time, range, or functional error detected.** |
| | | |



Figure 25