DODGE 68RFE DIAGNOSTICS

- Presented by:
- David Chalker
- ATRA Technical Advisor

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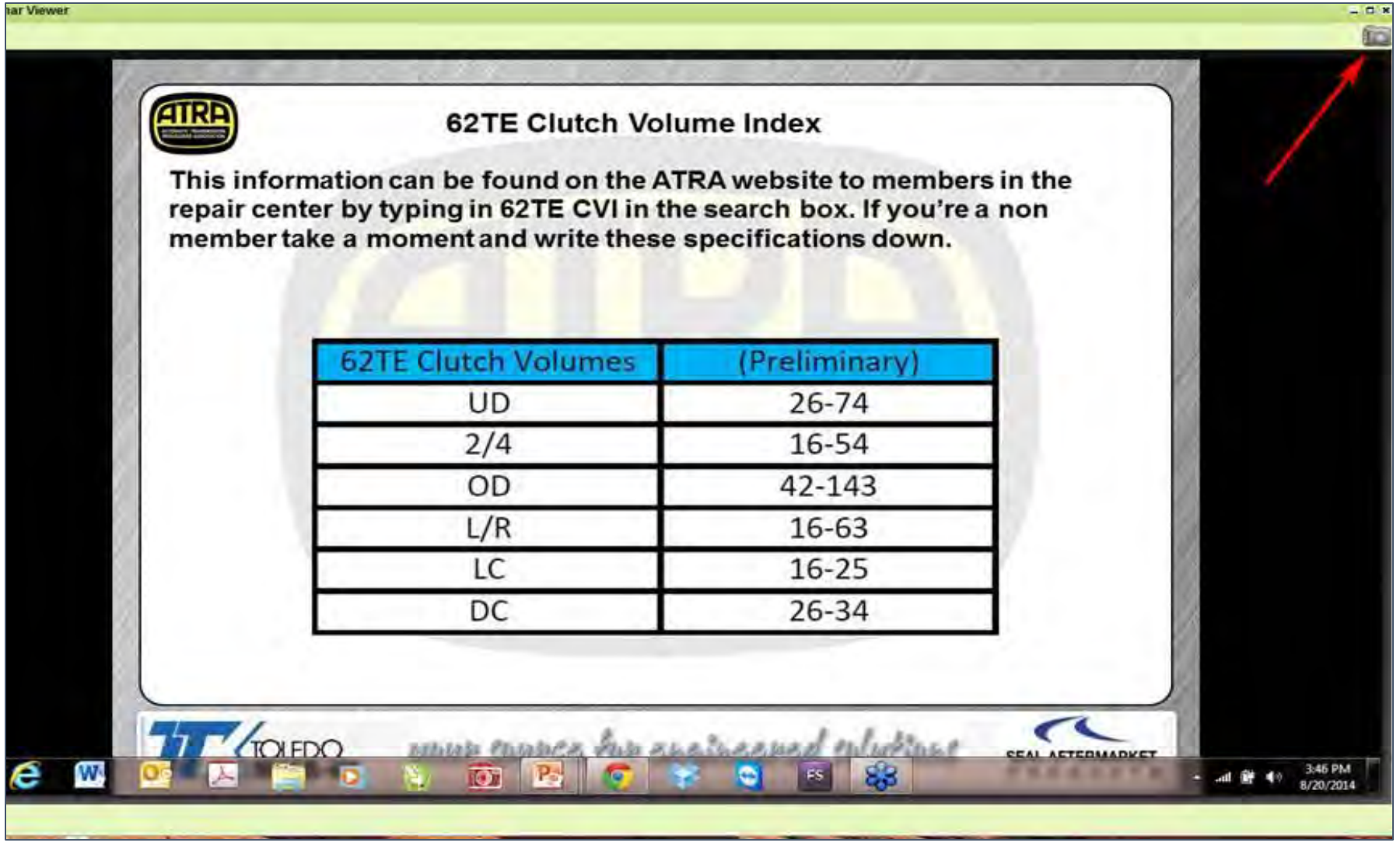

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July	11	RE0F11A (CVT) Intro
July	25	09G
Aug	8	6L80/90 Diagnostics
Aug	22	RE0F10A/B (CVT) Intro
Sep	5	68RFE (covers 42RLE w/VLP) Diagnostics
Sep	19	6R80 Updates
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CHRYSLER/DODGE 68RFE

The 68RFE was introduced for model year 2007 Ram 2500 and 3500 Pickups with the 6.7L Cummins Turbo Diesel engine. The basic design and operation is similar to the 45RFE/545RFE predecessors with some exceptions:

- The 68RFE utilizes a larger bellhousing with a different bolt pattern and cutout to accommodate Cummins 6.7 diesel engine
- The 68RFE has modified internal components to handle increased torque of the 6.7 diesel engine
- The 68RFE uses optimized gear ratios with a wide ratio capability to deliver precise ratio steps for optimum drivability, an increase in responsive performance, improved efficiency features, and reduced NVH (Noise, Vibration, Harshness)
- No 2nd Gear Prime ratio during downshifting like previous model 45RFE and 545RFE transmissions

RFE FAMILY GEAR RATIOS

45RFE

GEAR	RATIO
1st	3.00:1
2nd	1.67:1
2nd Prime	1.50:1
3rd	1.00:1
4th	0.75:1
Reverse	3.00:1

65RFE

GEAR	RATIO
1st	3.00:1
2nd	1.67:1
3rd	1.50:1
4th	1.00:1
5th	0.75:1
6th	0.67:1
Reverse	3.00:1

68RFE

GEAR	RATIO
1st	3.23:1
2nd	1.83:1
3rd	1.41:1
4th	1.00:1
5th	0.81:1
6th	0.62:1
Reverse	4.44:1

Different gear ratios indicate different planetary gears internally

545RFE

GEAR	RATIO
1st	3.00:1
2nd	1.67:1
2nd Prime	1.50:1
3rd	1.00:1
4th	0.75:1
5th	0.67:1
Reverse	3.00:1

66RFE

GEAR	RATIO
1st	3.23:1
2nd	1.83:1
3rd	1.41:1
4th	1.00:1
5th	0.81:1
6th	0.62:1
Reverse	4.44:1

68RFE CVI NOMINAL VALUES

FRICTION ELEMENT	CLUTCH VOLUME INDEX NOMINAL VALUES	CLUTCH VOLUME INDEX UPDATE DETAIL
LOW/REVERSE	45 - 134	During Downshifts, 2-1, 3-1, 4-1
2C CLUTCH	25 - 85	During Downshifts, 4-3, 3-2
2C CLUTCH ALT	25 - 85	During Upshift 5-6
OD CLUTCH	30 - 100	During Upshift 3-4
4C CLUTCH	30 - 85	During Upshift 4-5
4C CLUTCH ALT	30 - 85	During Upshift 2-3
UD CLUTCH	30 - 100	During Forced Downshift 5-4, 6-4

68RFE CLUTCH APPLICATION CHART

RANGE/GEAR	UD	OD	REV	2C	4C	L/R	SPRAG	TCC
Park/Neutral						ON		
Reverse			ON			ON		
Drive 1st	ON					*ON	HOLD	
Drive 2nd	ON			ON				
Drive 3rd	ON				ON			*ON
Drive 4th	ON	ON						*ON
Drive 5th		ON			ON			*ON
Drive 6th		ON		ON				*ON
Drive Limp-In	ON	ON						

- *L/R clutch is ON when output shaft speed is below 150 rpm.
- *TCC can be engaged in all gear ranges except first gear depending on the Tow/Haul switch state and ERS status. During normal driving operation, the L/R solenoid is modulated for TCC apply. TCC will engage after the shift to fourth gear. Note: If the Tow/Haul mode is enabled, the clutch will engage after the shift to third gear.

68RFE PRESSURE SWITCH CHART

RANGE/GEAR	LOW/REV SWITCH	2ND CLUTCH SWITCH	4TH CLUTCH SWITCH	UNDERDRIVE CLUTCH SWITCH	OVERDRIVE CLUTCH SWITCH
Park/Neutral	CLOSED	OPEN	OPEN	OPEN	OPEN
Reverse	OPEN	OPEN	OPEN	OPEN	OPEN
Drive 1st	*CLOSED	OPEN	OPEN	CLOSED	OPEN
Drive 2nd	OPEN	CLOSED	OPEN	CLOSED	OPEN
Drive 3rd	OPEN	OPEN	CLOSED	CLOSED	OPEN
Drive 4th	OPEN	OPEN	OPEN	CLOSED	CLOSED
Drive 5th	OPEN	OPEN	CLOSED	OPEN	CLOSED
Drive 6th	OPEN	CLOSED	OPEN	OPEN	CLOSED

*L/R clutch is ON when output shaft speed is below 150 rpm. Above 150 rpm, L/R clutch is turned OFF, and the pressure switch will then be open

LIMP-IN MODE DIFFERENCES

- 2007 – 2008 Models with Manual 2 and Manual 1 positions will provide for the capability of 2nd gear limp-in. No power to the transmission provides 4th gear and reverse.

- 2009 – LATER Models with ERS (Electronic Range Select) do not provide for 2nd gear limp-in because the selector lever does not have Manual 2 or Manual 1 positions. Limp mode on these vehicles will be 4th gear. No power to the transmission provides 4th gear and reverse. Sometimes the technician may experience vehicle shifting from 1 to 4 then remain in 4th. This occurs because the transmission has gone into a limp mode.

2008 - EARLIER 68RFE SOLENOID APPLICATION CHART

RANGE/GEAR	LR Normally Vented	2C Normally Vented	4C Normally Vented	UD Normally Applied	OD Normally Vented	MS Normally Applied	PCS Normally Vented
Park/Neutral	*ON	X	X	X	X	ON	MOD
Reverse	X	X	X	X	X	X	MOD
Reverse Inhibit	X	X	X	X	X	ON	MOD
First Gear	*ON	X	X	X	X	ON	MOD
Second Gear	*MOD	ON	X	X	X	ON	MOD
Third Gear	*MOD	X	ON	X	X	ON	MOD
Fourth Gear	*MOD	X	X	X	X	X	MOD
Fifth Gear	*MOD	X	ON	ON	X	X	MOD
Sixth Gear	*MOD	ON	X	ON	ON	ON	MOD
Limp Mode	X	X	X	X	X	X	X

- *L/R clutch is ON when output shaft speed is below 150 rpm.
- *ON: In first gear with output shaft above 100 rpm L/R solenoid is turned OFF.
- *MOD: When conditions are satisfactory for TCC operation, L/R solenoid is modulated for TCC apply.

2009 – UP 68RFE SOLENOID APPLICATION CHART

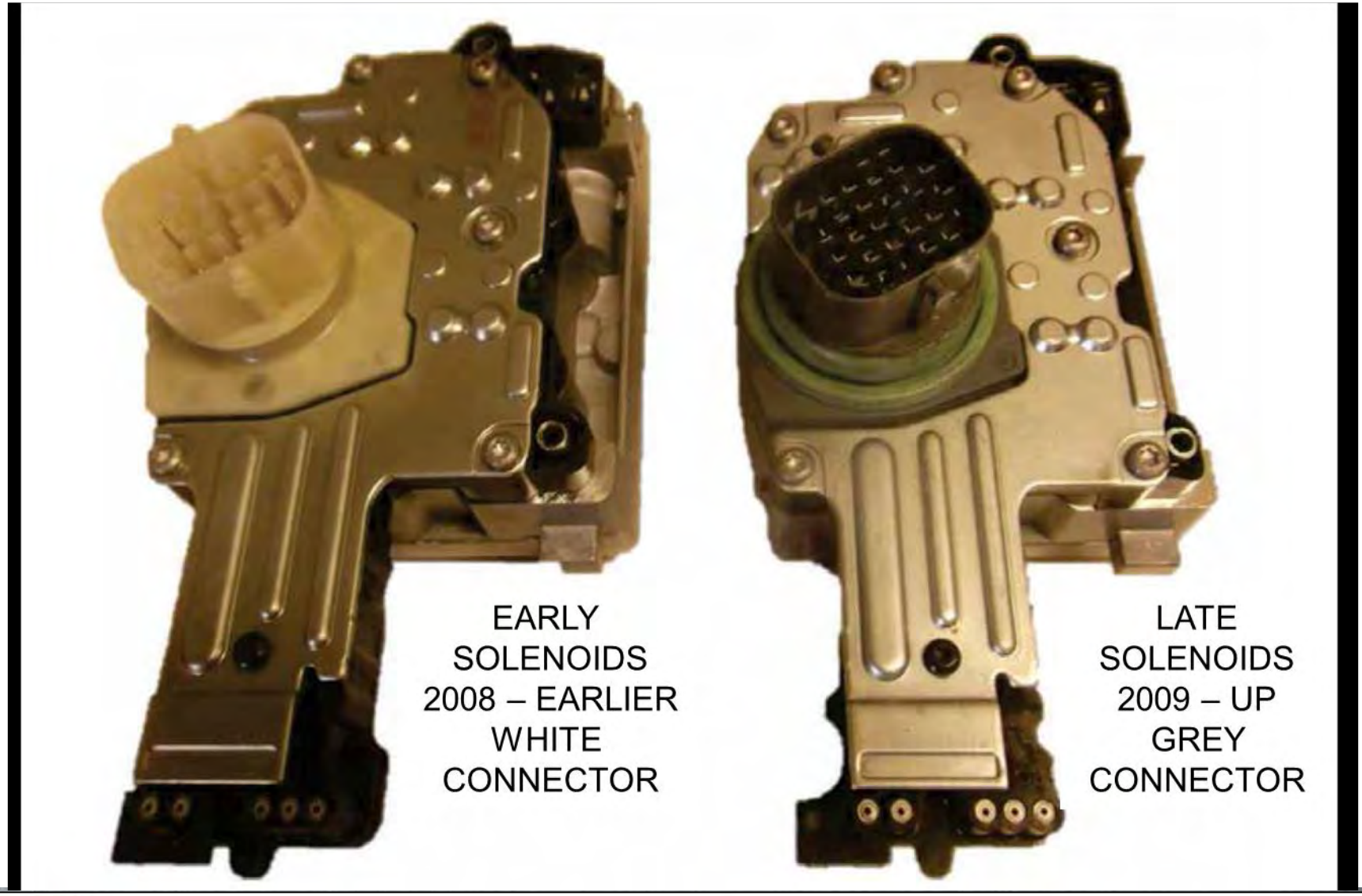
RANGE/GEAR	LR Normally Vented	2C Normally Vented	4C Normally Vented	UD Normally Applied	MS Normally Applied	PCS Normally Vented
Park/Neutral	*ON	X	X	X	ON	MOD
Reverse	X	X	X	X	X	MOD
Reverse Inhibit	X	X	X	X	ON	MOD
First Gear	*ON	X	X	X	ON	MOD
Second Gear	*MOD	ON	X	X	ON	MOD
Third Gear	*MOD	X	ON	X	ON	MOD
Fourth Gear	*MOD	X	X	X	X	MOD
Fifth Gear	*MOD	X	ON	ON	X	MOD
Sixth Gear	*MOD	ON	X	ON	X	MOD
Limp Mode	X	X	X	X	X	MOD

- *L/R clutch is ON when output shaft speed is below 150 rpm.
- *ON: In first gear with output shaft above 100 rpm L/R solenoid is turned OFF.
- *MOD: When conditions are satisfactory for TCC operation, L/R solenoid is modulated for TCC apply.

OVERDRIVE SOLENOID ELIMINATED
VB CHANGES

- In 2009 Chrysler/Dodge removed the overdrive solenoid from the solenoid pack and changed the connector color from white to gray.
- Pre-2009 vehicles used the white solenoid pack that includes the OD solenoid. The OD solenoid was used to control the apply and release of the OD clutch, but only in 6th gear. In 4th and 5th gear, OD clutch control is completed through the MS (Multi-select) solenoid.
- With the overdrive solenoid removed from the solenoid pack, additional changes were needed internally in the valve body to accommodate the removal of the overdrive solenoid.
- Check ball number 6 and check ball number 7 were removed from the valve body.
- Spacer plates were also changed to accommodate the check ball and overdrive solenoid removal.

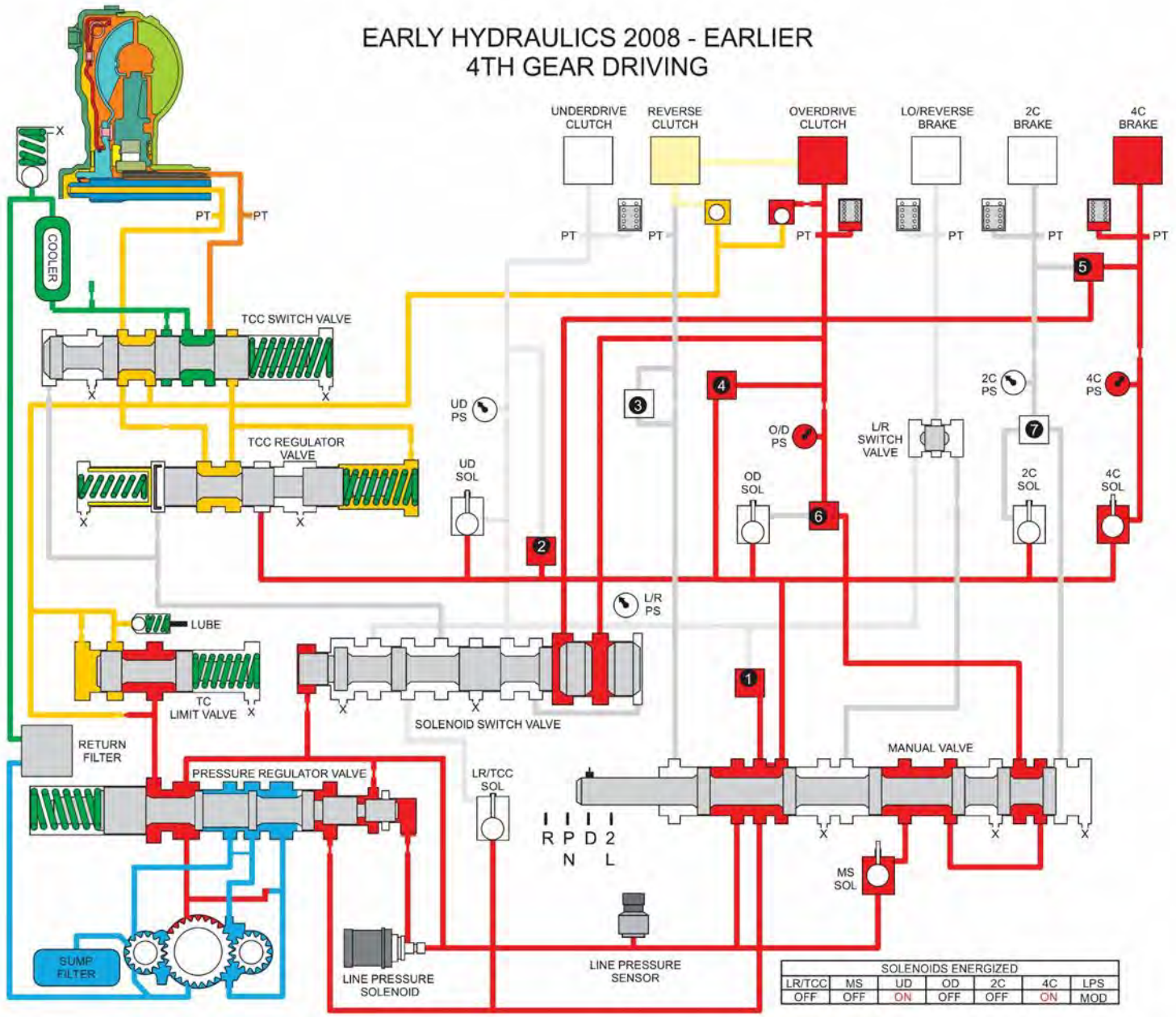
EARLY/LATE SOLENOID PACKS



EARLY SOLENOIDS 2008 – EARLIER WHITE CONNECTOR

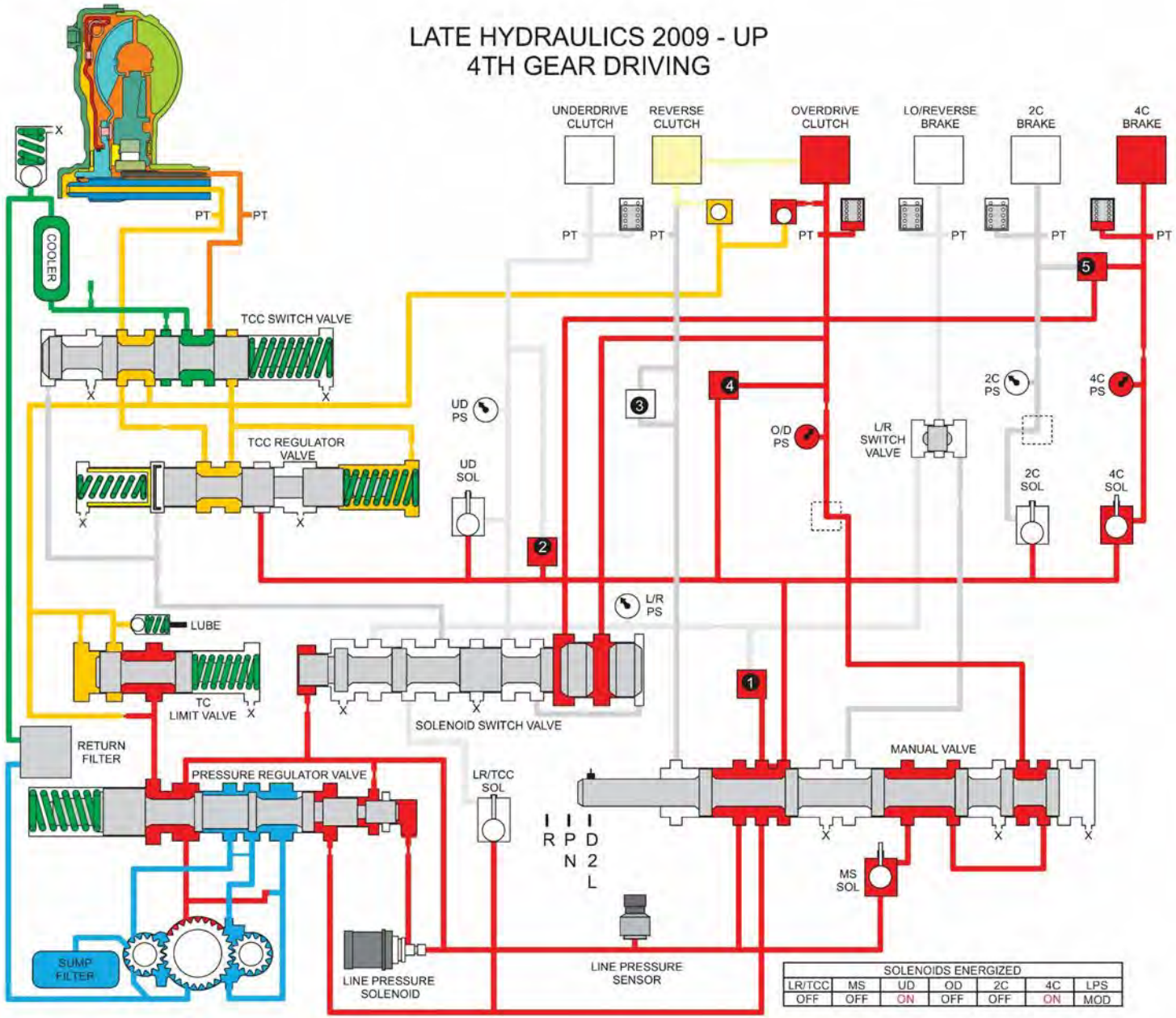
LATE SOLENOIDS 2009 – UP GREY CONNECTOR

EARLY HYDRAULICS 2008 - EARLIER
4TH GEAR DRIVING

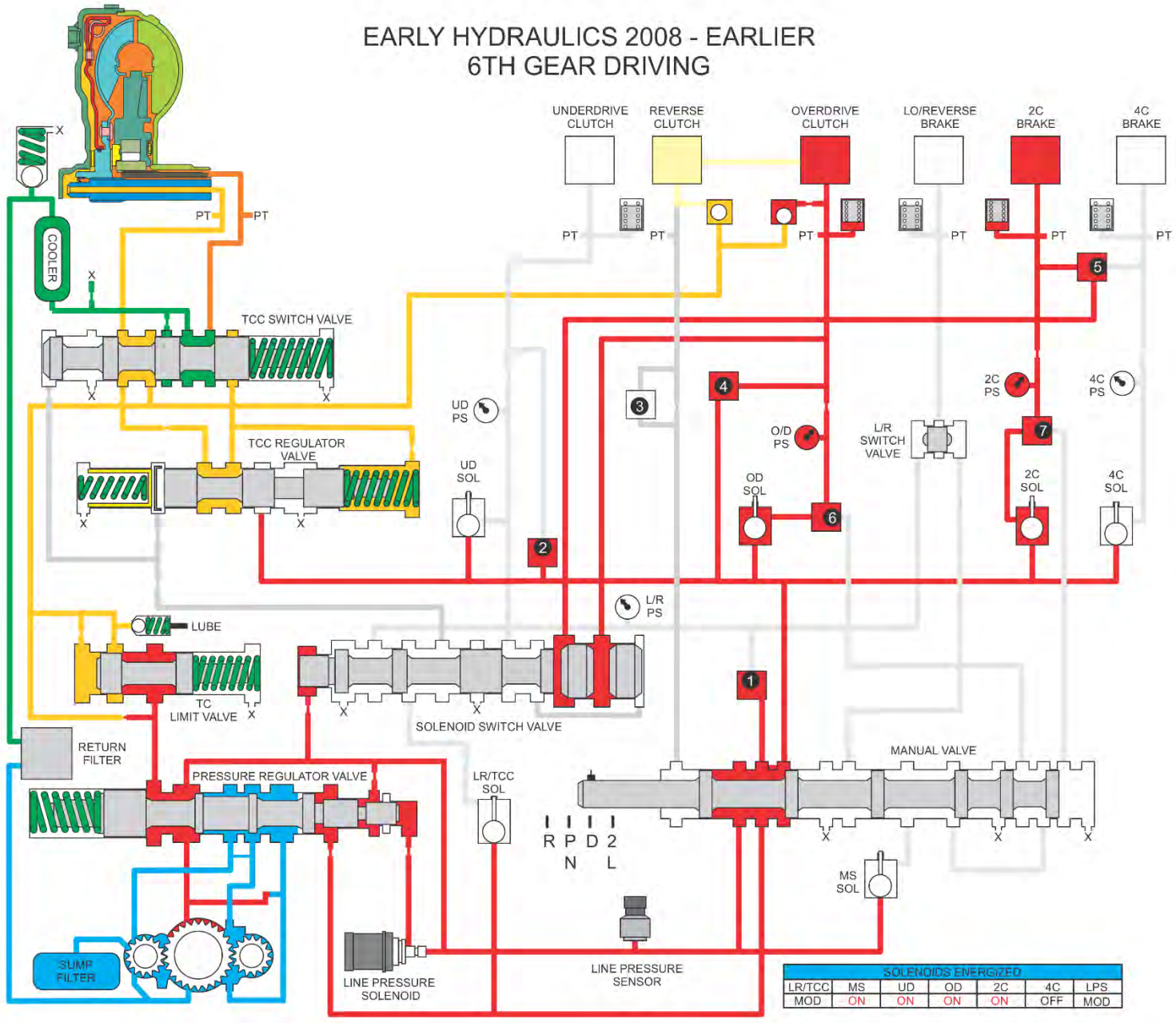


SOLENOIDS ENERGIZED						
LR/TCC	MS	UD	OD	2C	4C	LPS
OFF	OFF	ON	OFF	OFF	ON	MOD

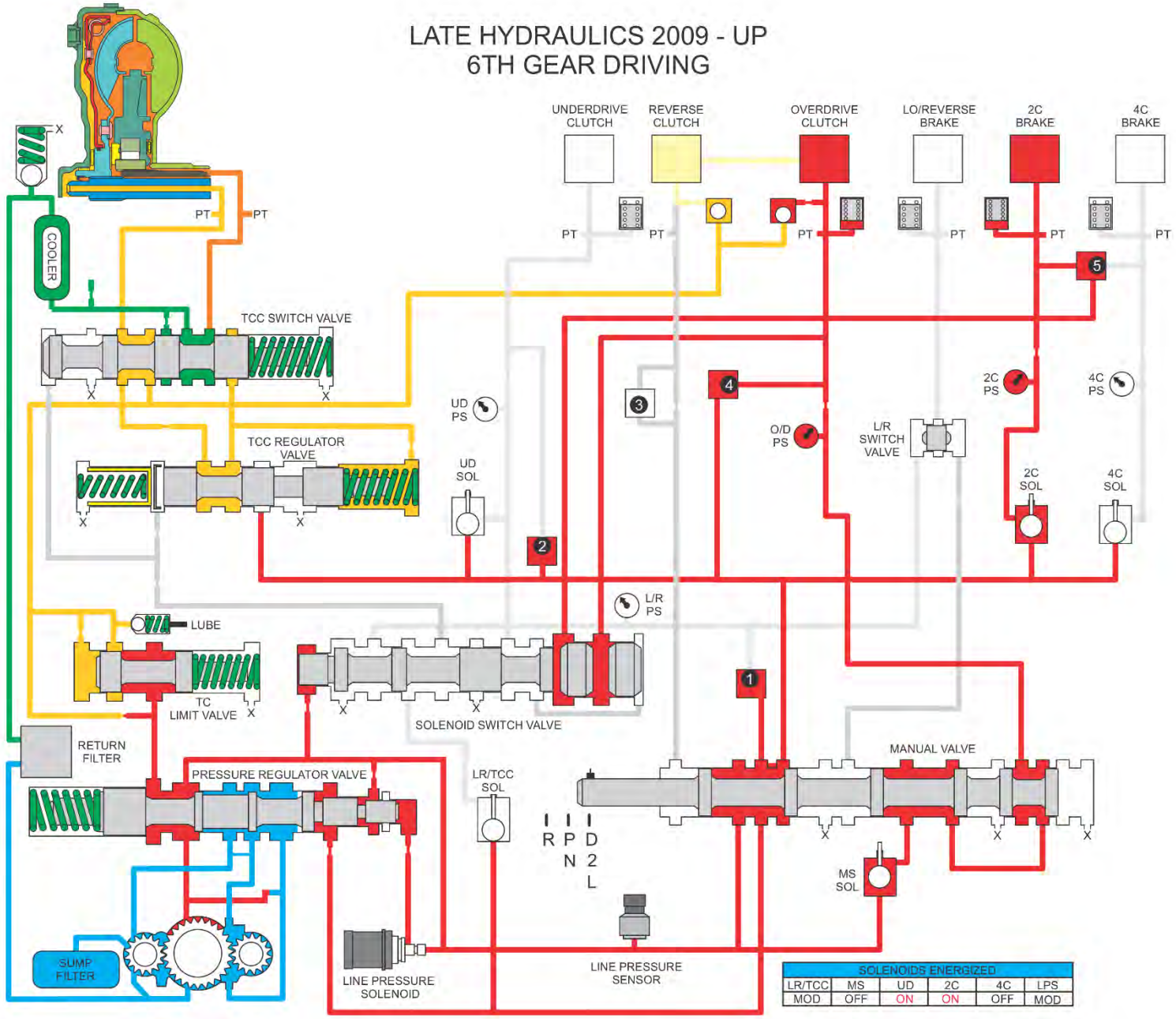
LATE HYDRAULICS 2009 - UP
4TH GEAR DRIVING



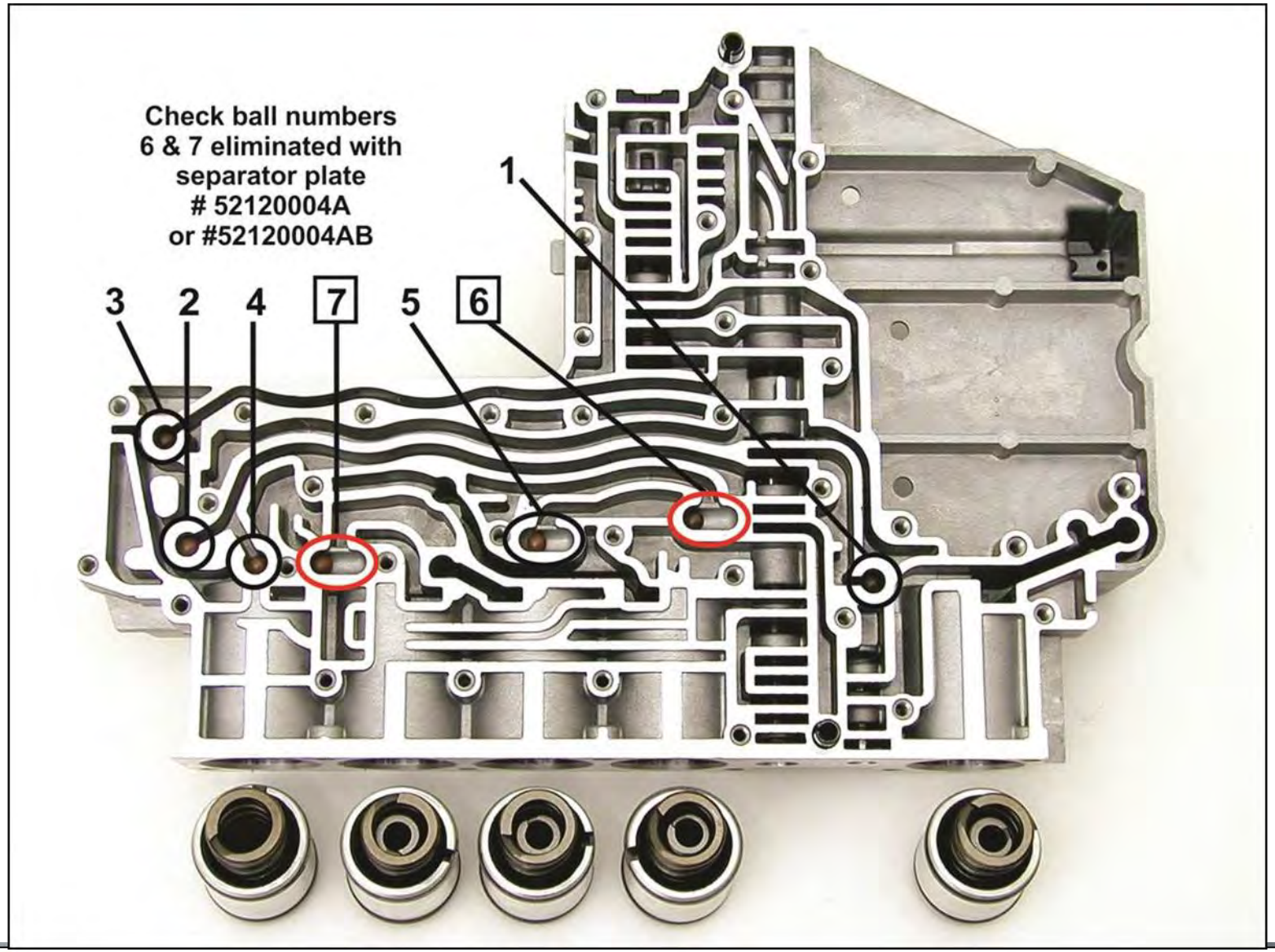
EARLY HYDRAULICS 2008 - EARLIER
6TH GEAR DRIVING



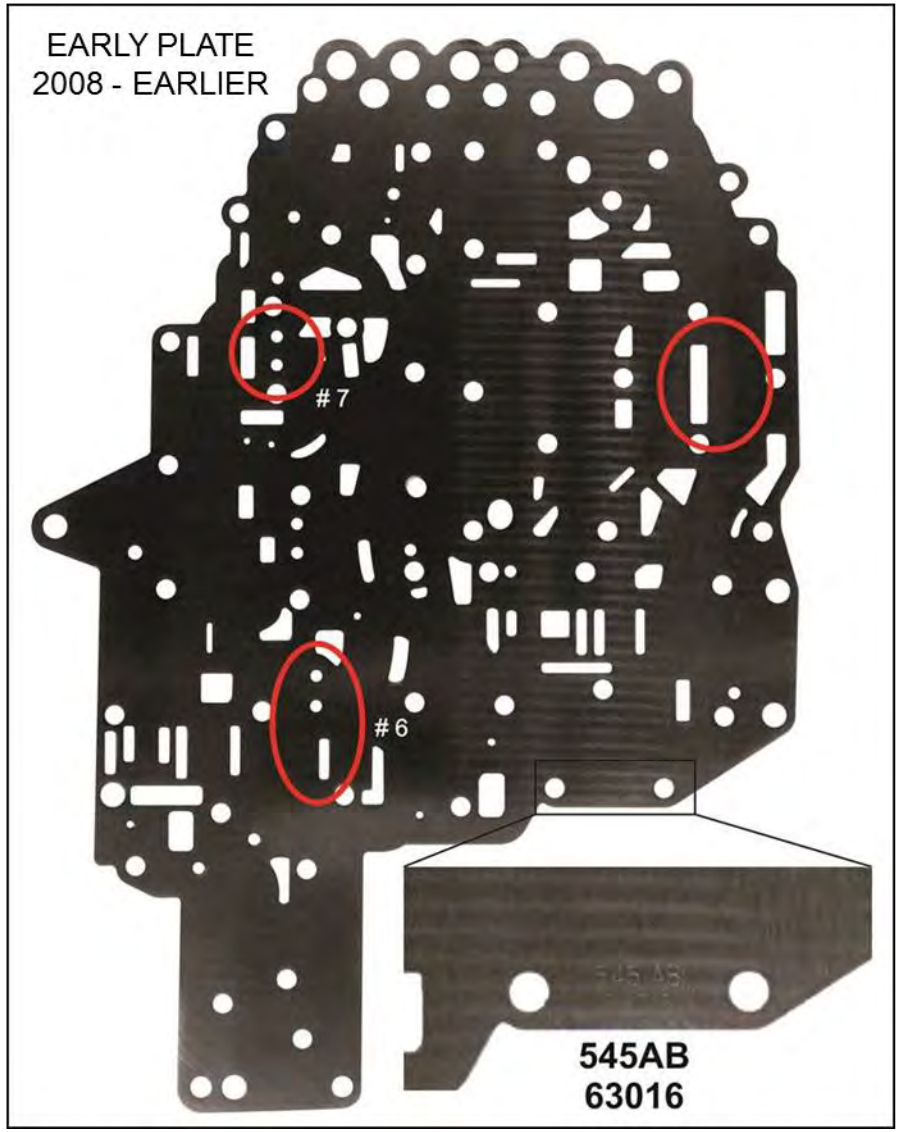
LATE HYDRAULICS 2009 - UP
6TH GEAR DRIVING

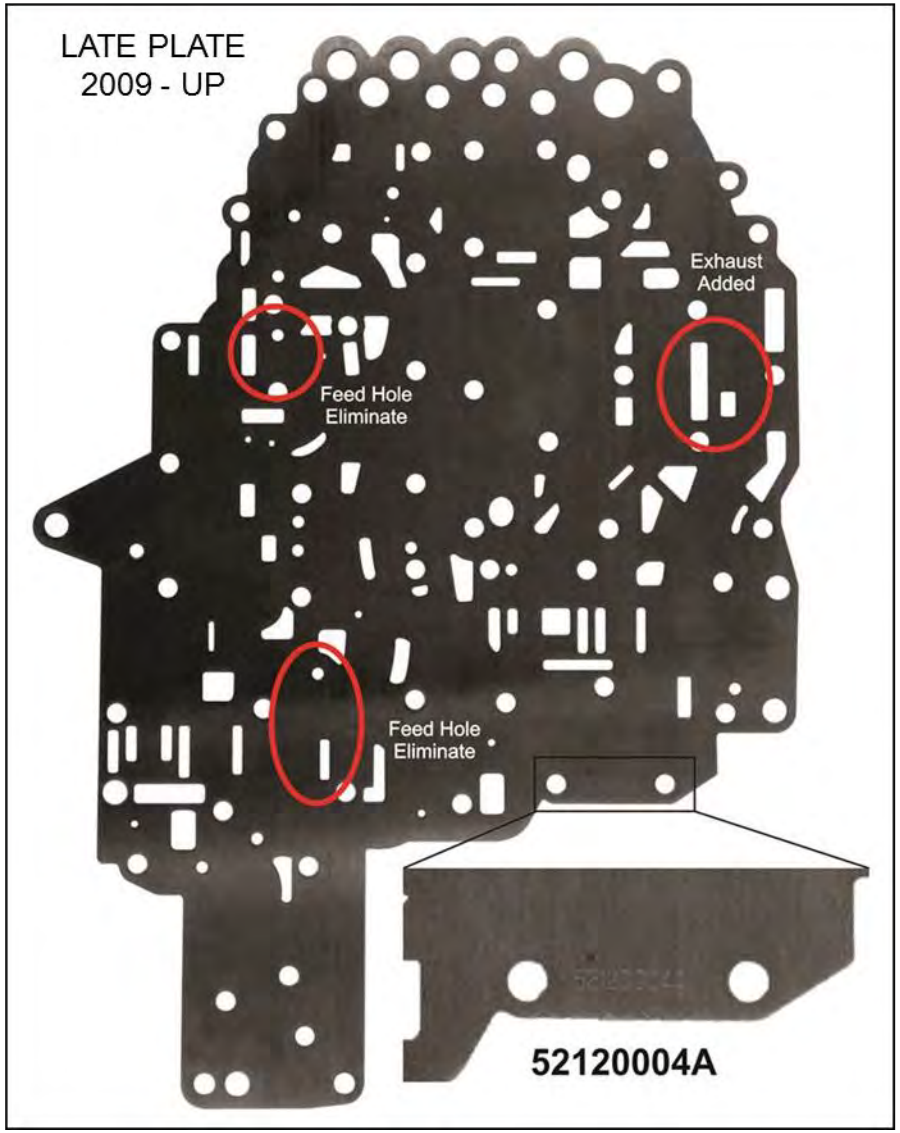


VALVE BODY CHECK BALL LOCATIONS



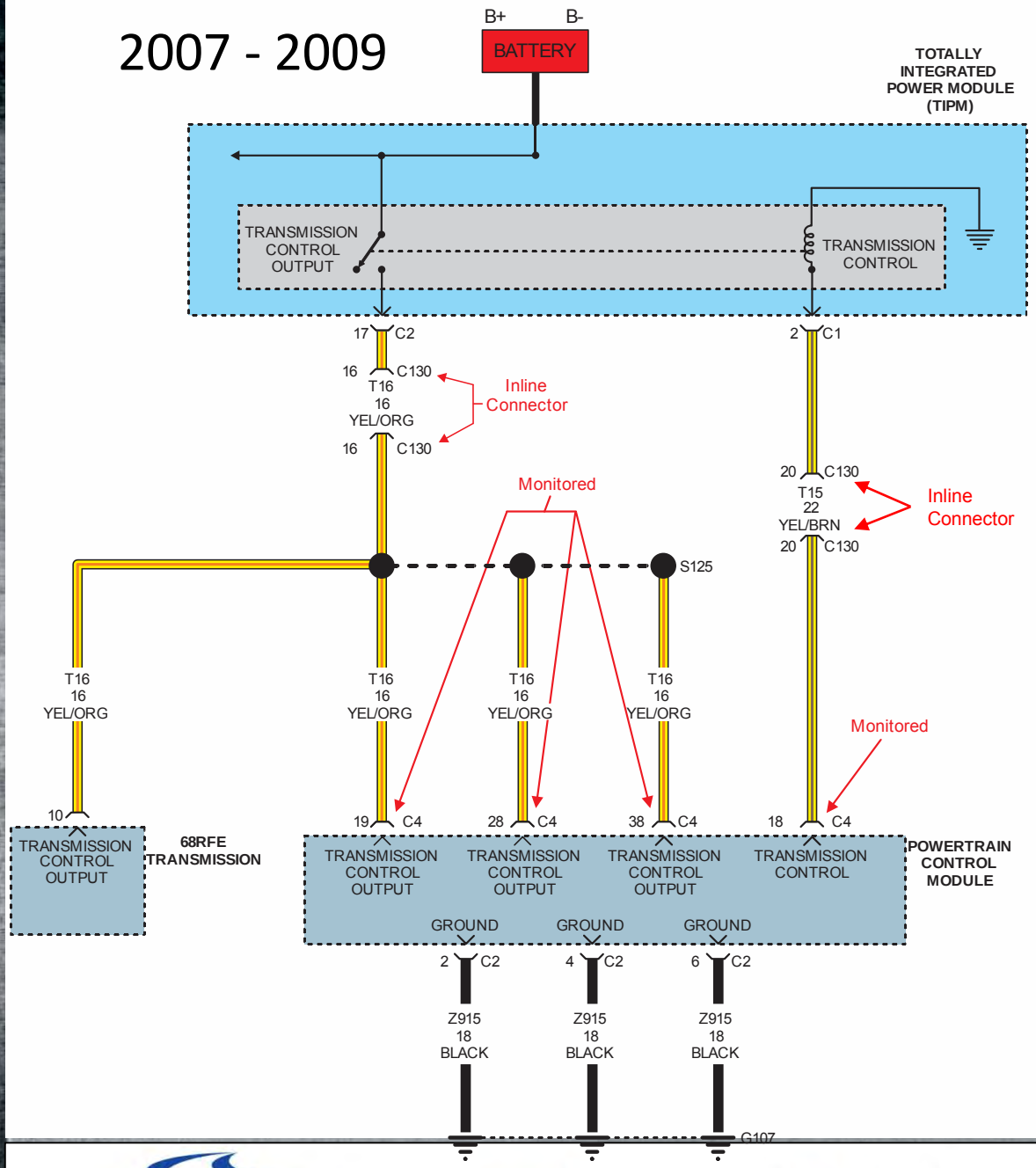
EARLY AND LATE SEPARATOR PLATE





P0882 TCM Power Input Low

2007 - 2009



The Transmission Control Relay is used to supply power to the Transmission Solenoid/TRS Assembly and to the PCM when in normal operating mode. The purpose of the Transmission Output circuit is to allow the Transmission Control System to turn off the power to the Transmission Solenoid/TRS Assembly in event that the transmission should need to be placed into "limp-in" mode due to a DTC.

After a PCM reset, (ignition switch turned to the run position, or after cranking the engine) the Transmission Control System verifies that the Transmission Output circuit is open by checking for voltage on the Transmission Output circuits before the Transmission Control System request for the circuit to be powered up. The request is sent by a direct circuit control from the PCM to the TIPM. If the Transmission Control System detects less than 3.0 volts when the output is commanded on, DTC P0882 will set after two consecutive failed tests. The MIL will turn off after two consecutive passing tests.

Note: Insufficient Transmission Control Output voltage can also cause DTCs P0846, P0869, P0871, P0876 or P0988 to set. Repairing the P0882 fault should also eliminate the related DTCs.

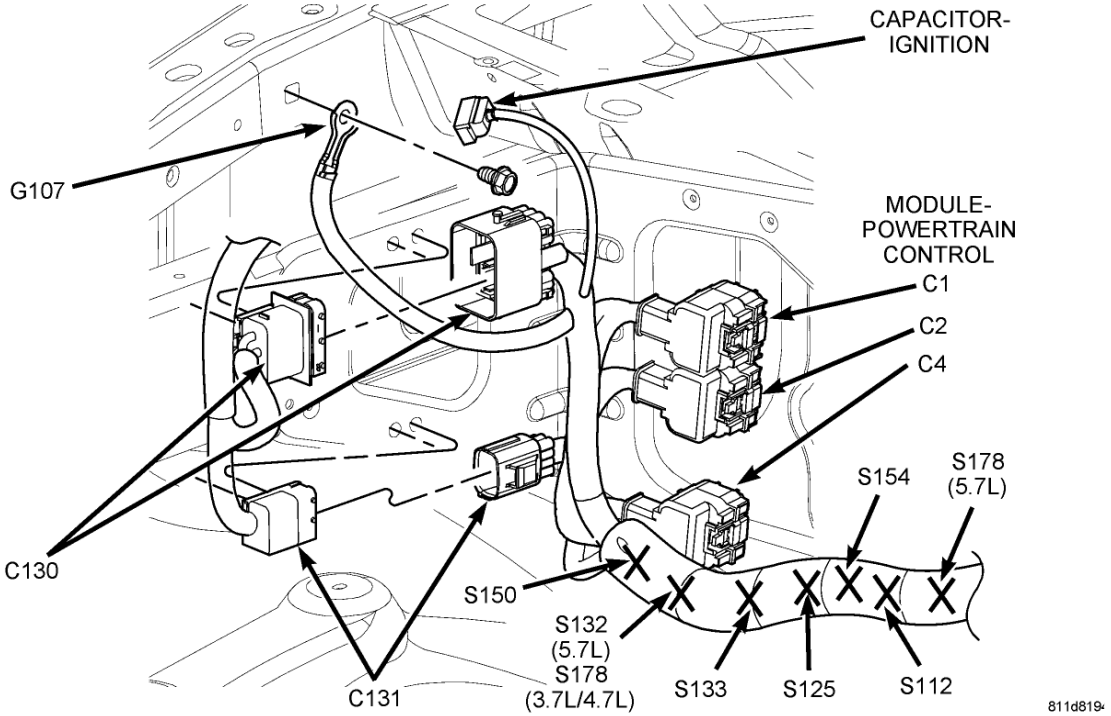
Possible Causes:

(T16 circuit) Circuit Open
(T16 circuit) Circuit Shorted to Ground
(T15 circuit) Circuit Shorted to Ground
(T15 circuit) Circuit Open
PCM/TCM Relay
TIPM
PCM

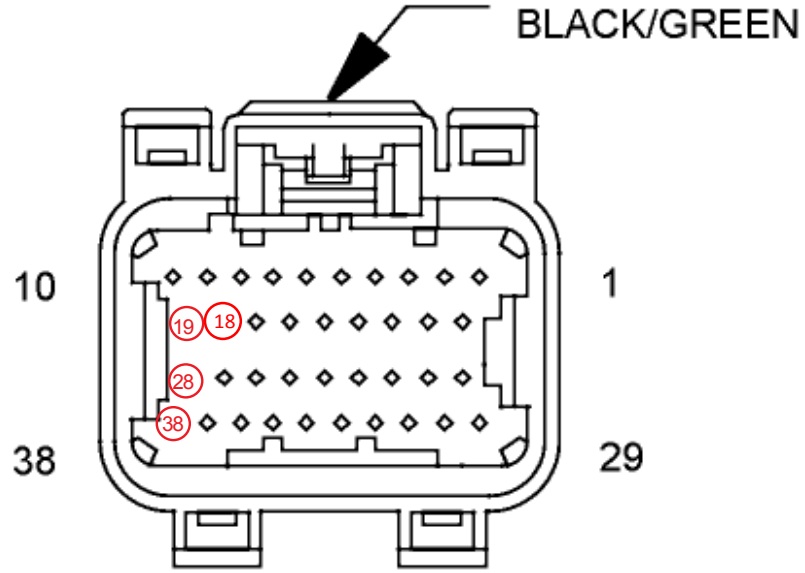
2007 - 2009

View of PCM C4 connector location as well as the C130 Inline connector in the engine compartment.

Check the voltage at the PCM terminals 18, 19, 28, 38. Check The C130 connector pins 16 and 20 for voltage, corrosion and loose pin contacts.

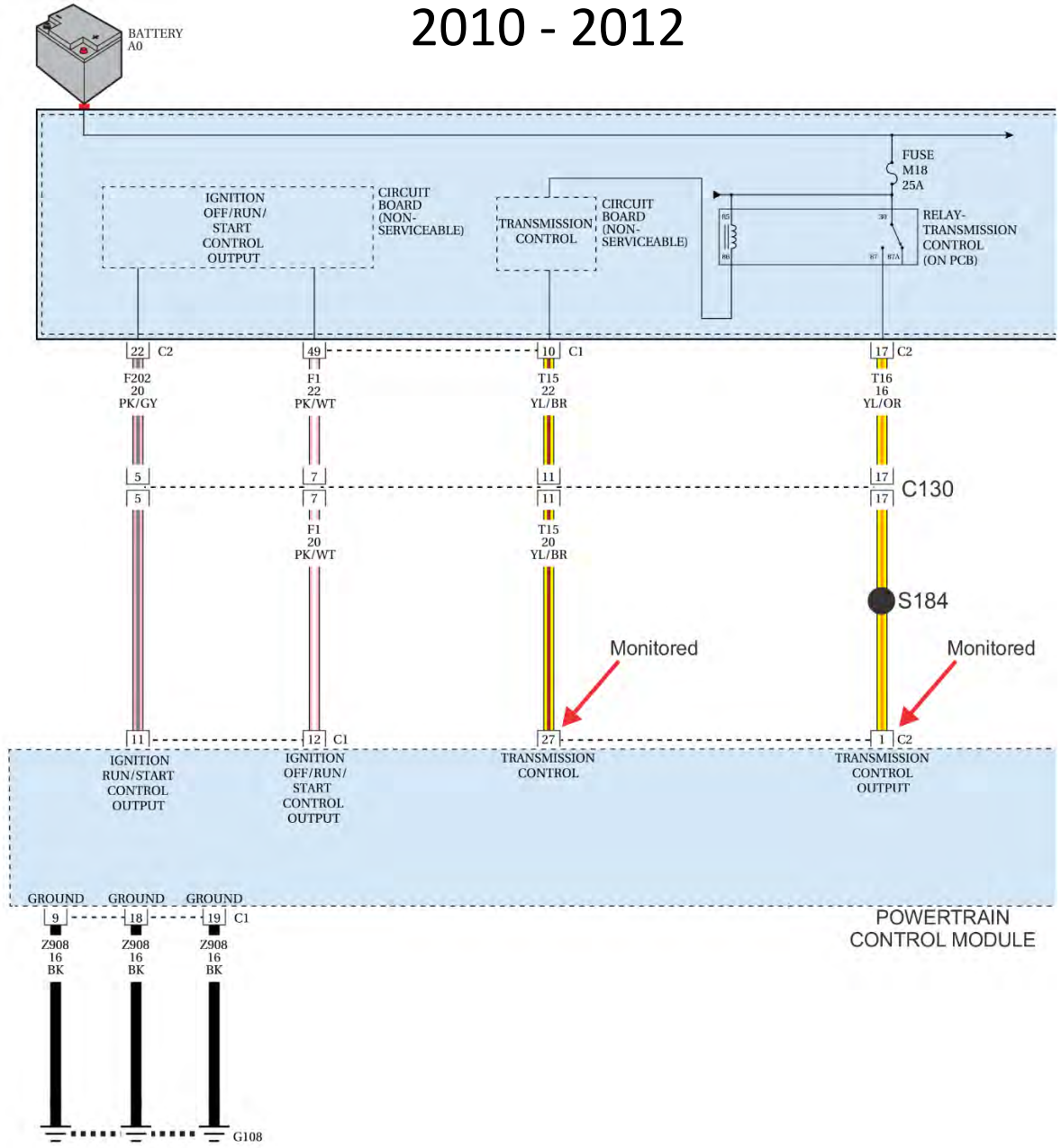


RIGHT REAR ENGINE COMPARTMENT (NGC)



MODULE-POWERTRAIN CONTROL C4 (DIESEL)

2010 - 2012



P0882 TCM Power Input Low (Cont'd)

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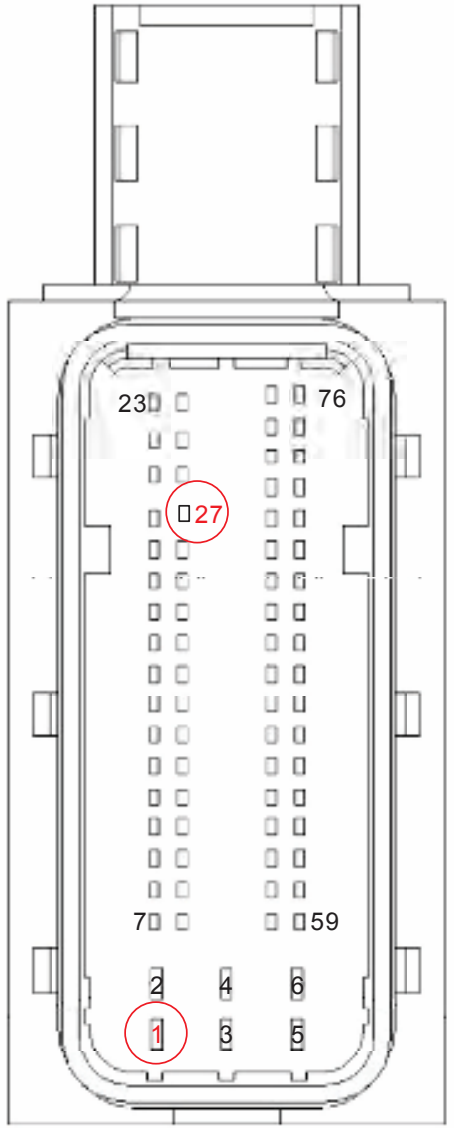
Possible Causes:
(T16 circuit) Circuit Open
(T16 circuit) Circuit Shorted to Ground
(T15 circuit) Circuit Shorted to Ground
(T15 circuit) Circuit Open
PCM/TCM Relay, TIPM, PCM

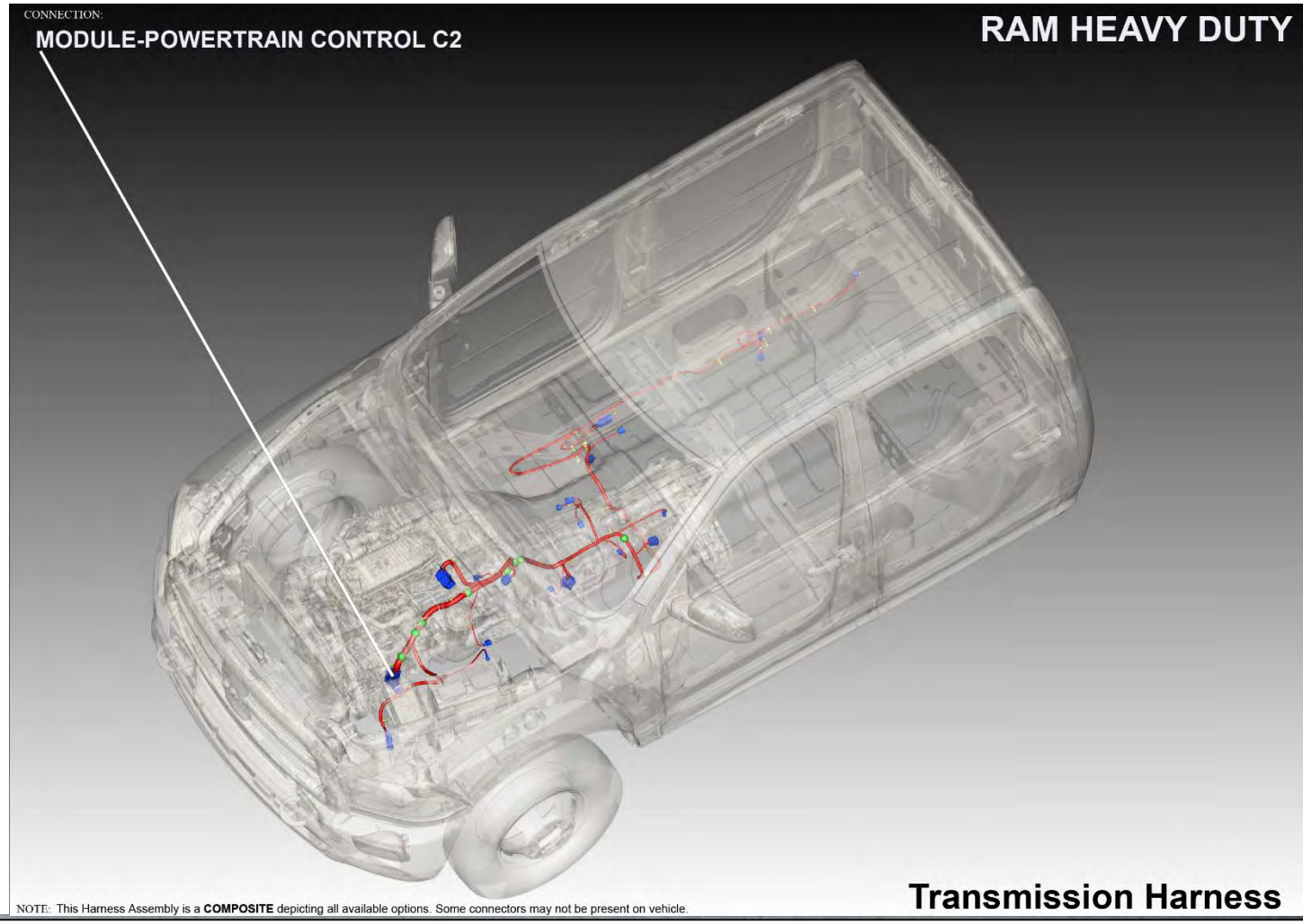
2010 - 2012

P0882 TCM Power Input Low (Cont'd)

PCM C2 CONNECTOR

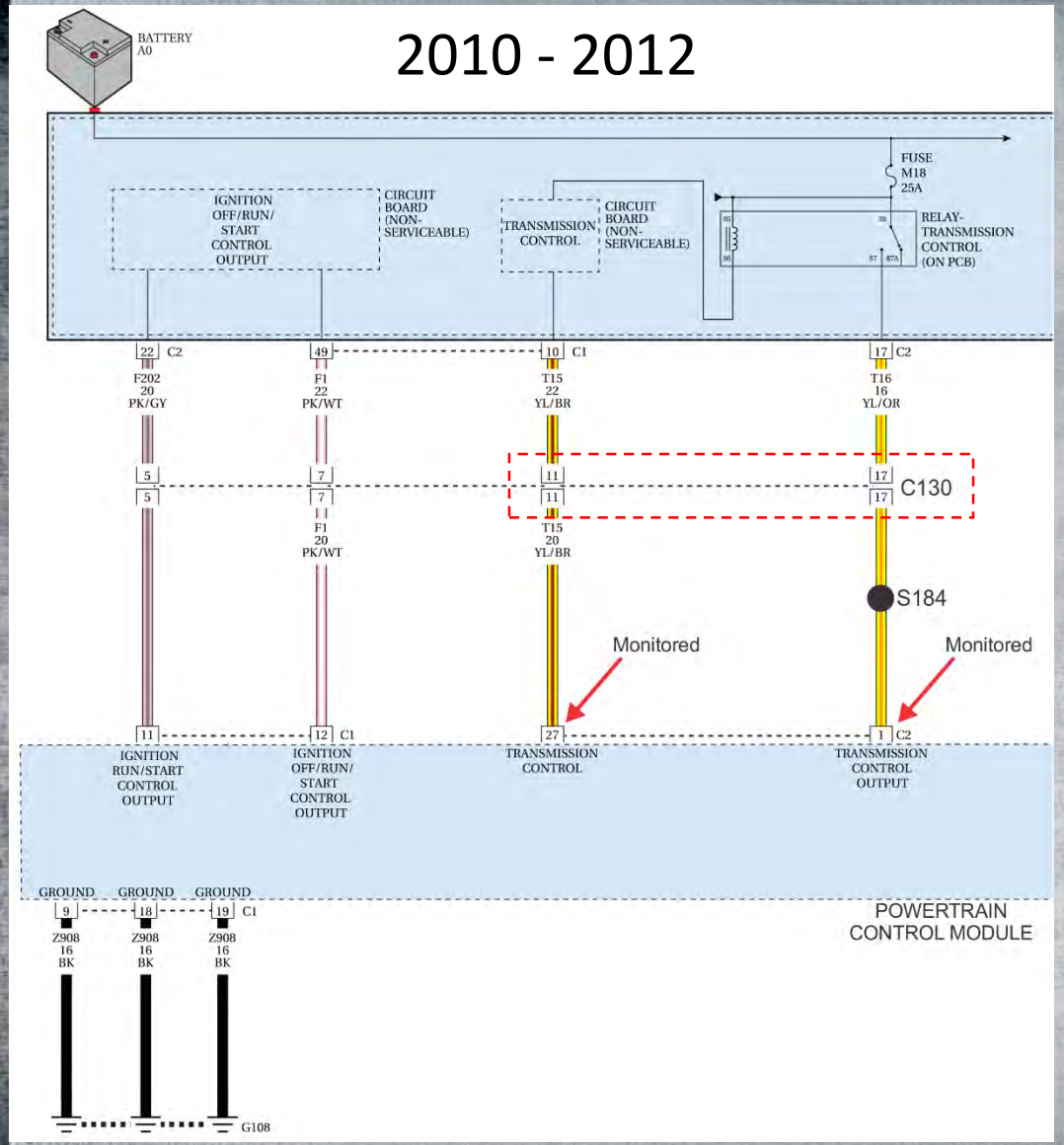


Measure voltage on terminals 1 (transmission control relay output) And terminal 27 (transmission control). Check connector pins for evidence of any corrosion.



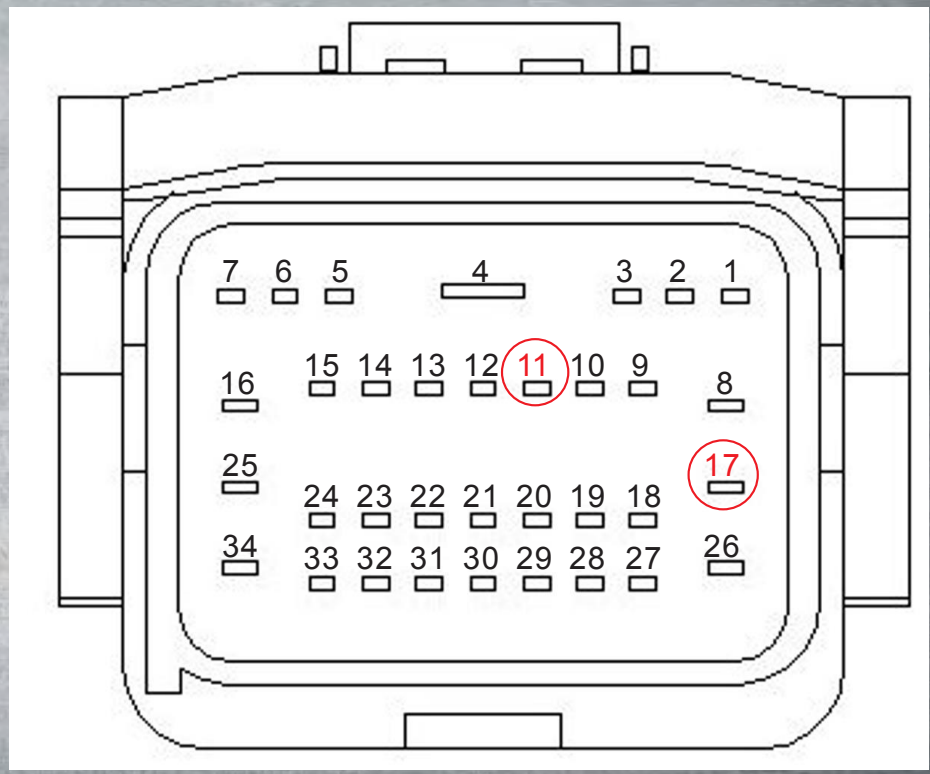
P0882 TCM Power Input Low (Cont'd)

2010 - 2012



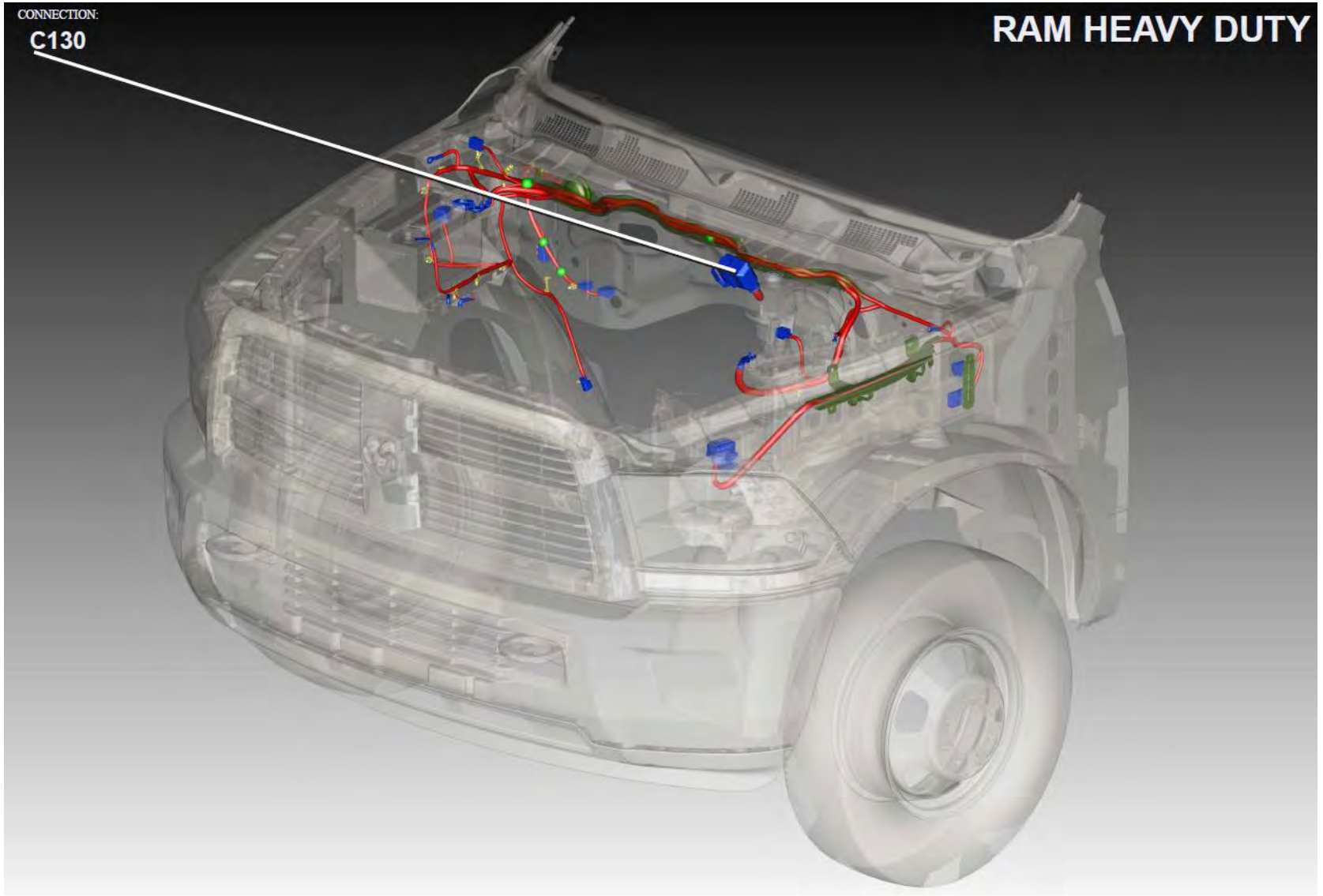
C130 INLINE CONNECTOR

Check pins 11 and 17 on both sides of the connector for corrosion or issues that may cause poor connection.

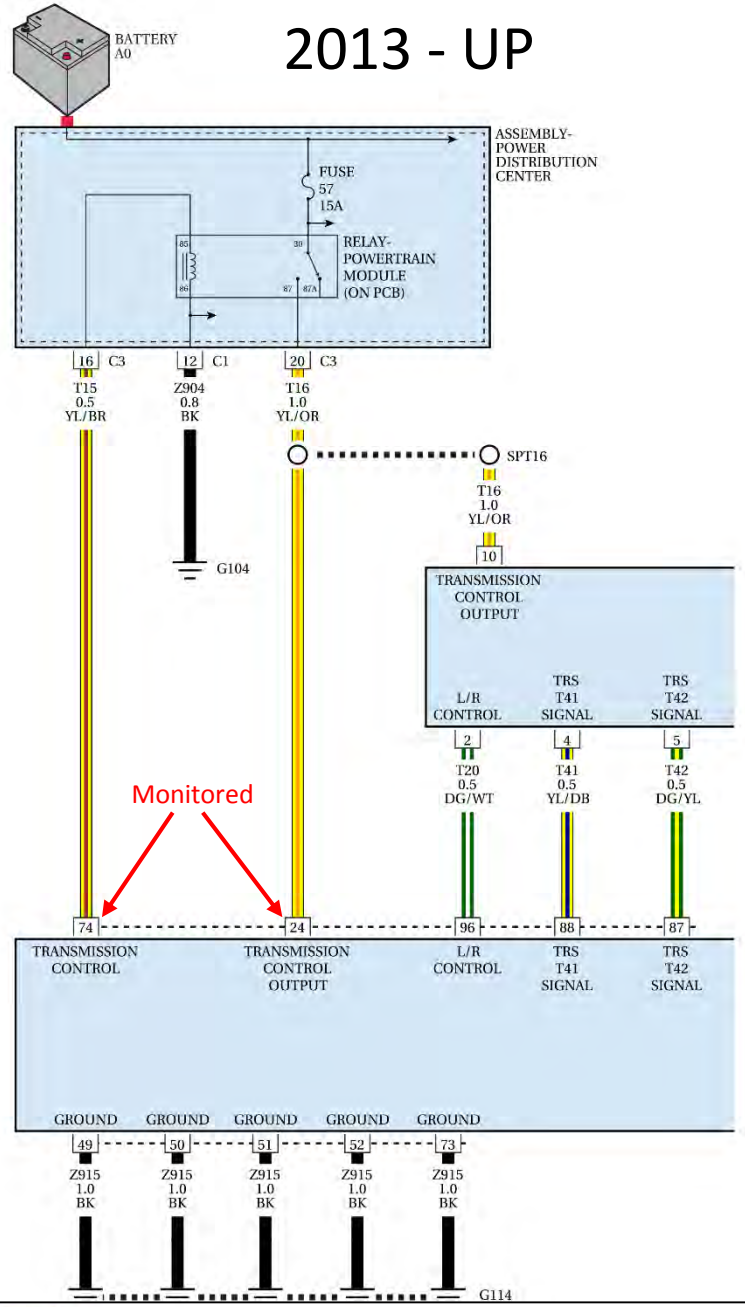


2010 - 2012 P0882 TCM Power Input Low (Cont'd)

C130 INLINE CONNECTOR LOCATION



2013 - UP



P0882 TCM Power Input Low (Cont'd)

The Transmission Control Relay is used to supply power to the Transmission Solenoid/TRS Assembly and to the PCM when in normal operating mode. The purpose of the Transmission Output circuit is to allow the Transmission Control System to turn off the power to the Transmission Solenoid/TRS Assembly in event that the transmission should need to be placed into "limp-in" mode due to a DTC.

After a PCM reset, (ignition switch turned to the run position, or after cranking the engine) the Transmission Control System verifies that the Transmission Output circuit is open by checking for voltage on the Transmission Output circuits before the Transmission Control System request for the circuit to be powered up. The request is sent by a direct circuit control from the PCM to the TIPM. If the Transmission Control System detects less than 3.0 volts when the output is commanded on, DTC P0882 will set after two consecutive failed tests. The MIL will turn off after two consecutive passing tests.

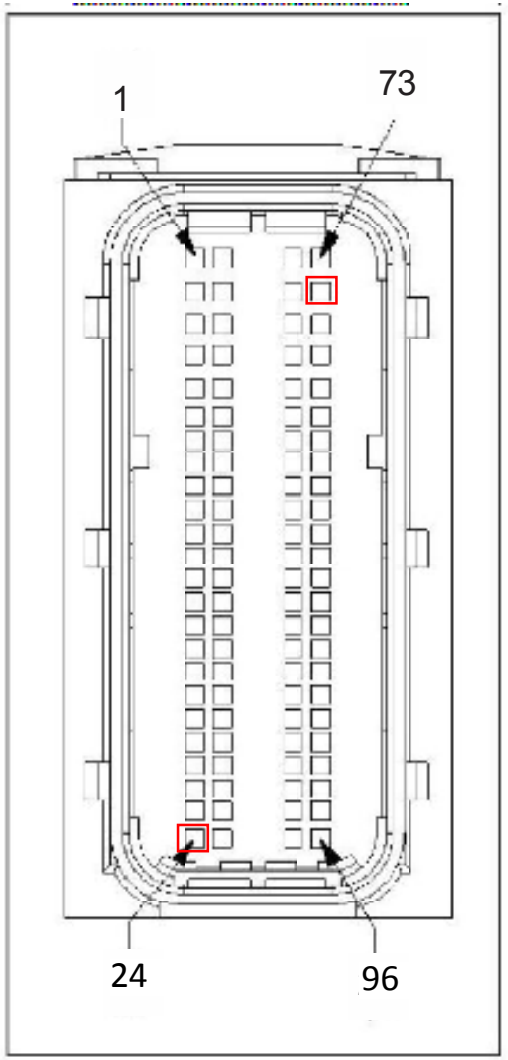
Note: Insufficient Transmission Control Output voltage can also cause DTCs P0846, P0869, P0871, P0876 or P0988 to set. Repairing the P0882 fault should also eliminate the related DTCs.

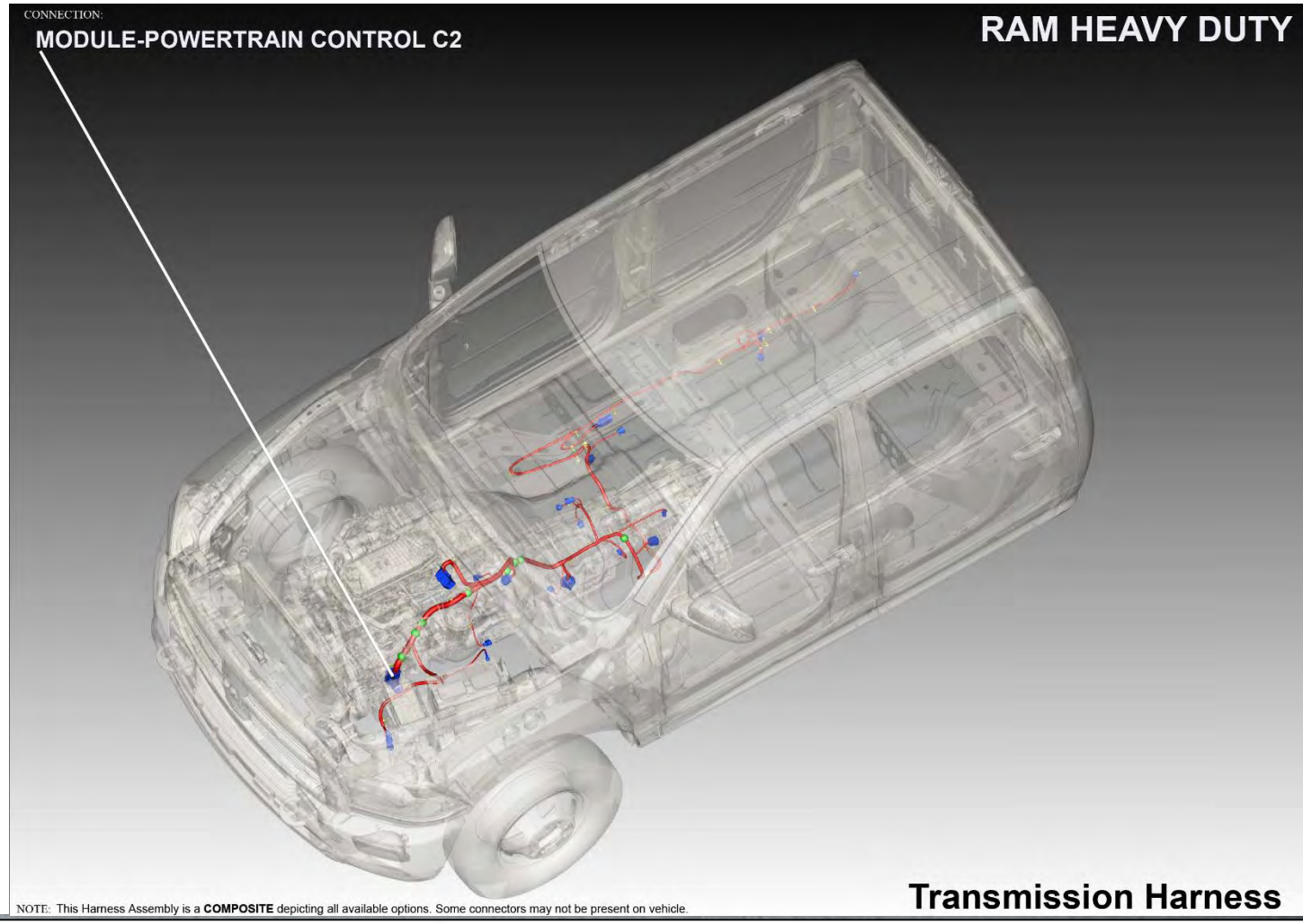
Possible Causes:
(T16 circuit) Circuit Open
(T16 circuit) Circuit Shorted to Ground
(T15 circuit) Circuit Shorted to Ground
(T15 circuit) Circuit Open
PCM/TCM Relay, TIPM, PCM

2013 - UP

Measure voltage on terminals 24 (transmission control relay output) And terminal 74 (transmission control). Check connector pins for evidence of any corrosion.

PCM C2 CONNECTOR





LINE PRESSURE RELATED CODES

P0868-LINE PRESSURE LOW
When Monitored: Continuously while driving in a forward gear.

Set Conditions: The PCM continuously monitors Actual Line Pressure and compares it to Desired Line Pressure. If the Actual Line Pressure is more than 15 PSI below Desired Line Pressure, this DTC will set.

P0869-LINE PRESSURE HIGH
When Monitored: Continuously while driving in a forward gear.

Set Conditions: The PCM continuously monitors Actual Line Pressure. If the Actual Line Pressure reading is greater than the highest Desired Line Pressure ever used in the current gear, while the Pressure Control Solenoid duty cycle is at or near its maximum value (which should result in minimum line pressure), the DTC will set.

P0933-HYDRAULIC PRESSURE SENSOR RANGE/PERFORMANCE
When Monitored: Continuously with the ignition on, engine running, with the transmission in gear.

Set Conditions: The PCM continuously monitors Actual Line Pressure and compares it to Desired Line Pressure. If the Actual Line Pressure reading is more than 172.4 kPa (25 psi) higher than the Desired Line Pressure, but is less than the highest Line Pressure ever used in the current gear, the DTC sets

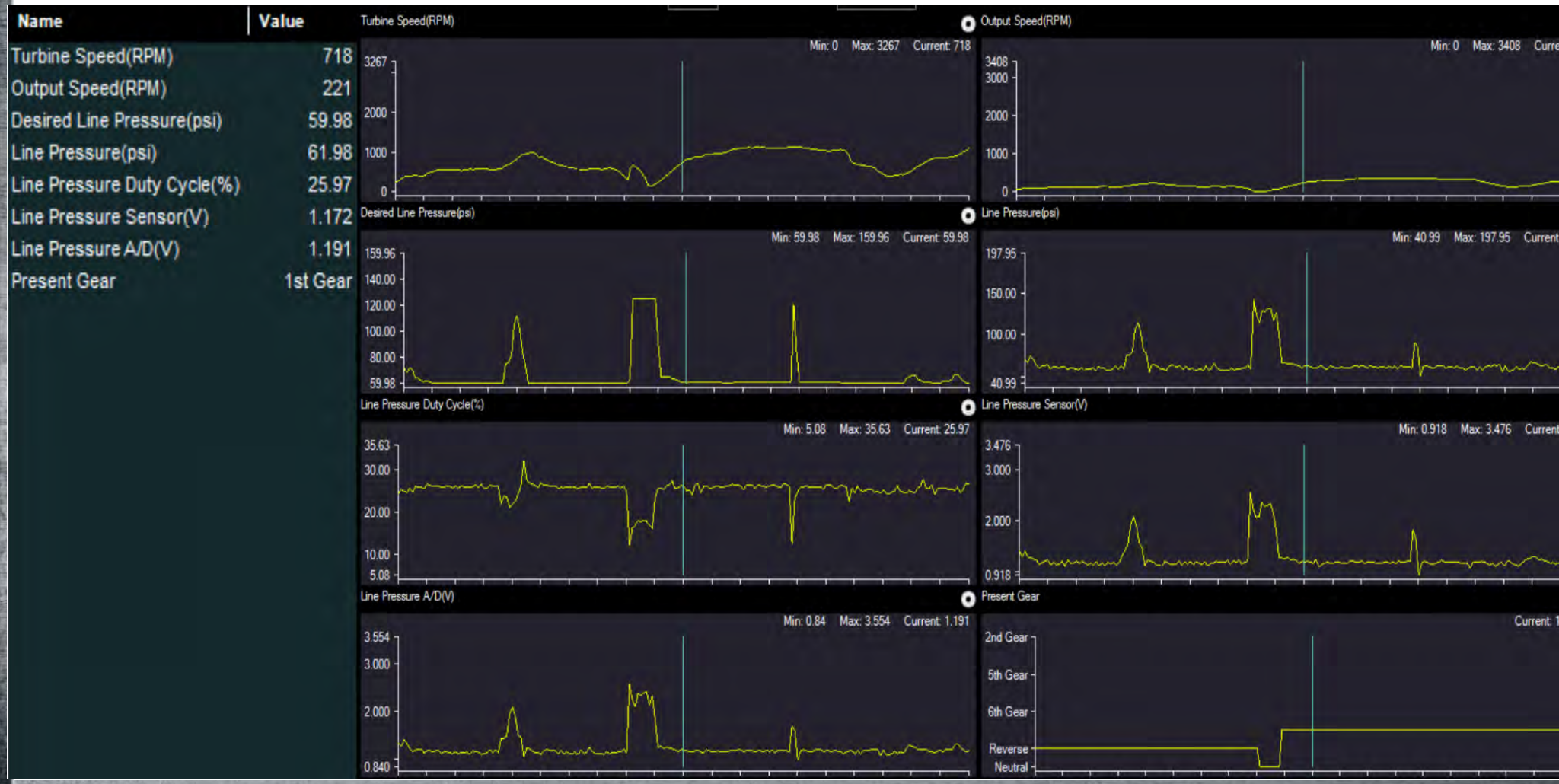
P0934-LINE PRESSURE SENSOR CIRCUIT LOW
When Monitored: Continuously with the ignition on and engine running.

Set Conditions: This DTC will set when the monitored Line Pressure Sensor voltage is less than or equal to 0.35 volts for 0.18 seconds.

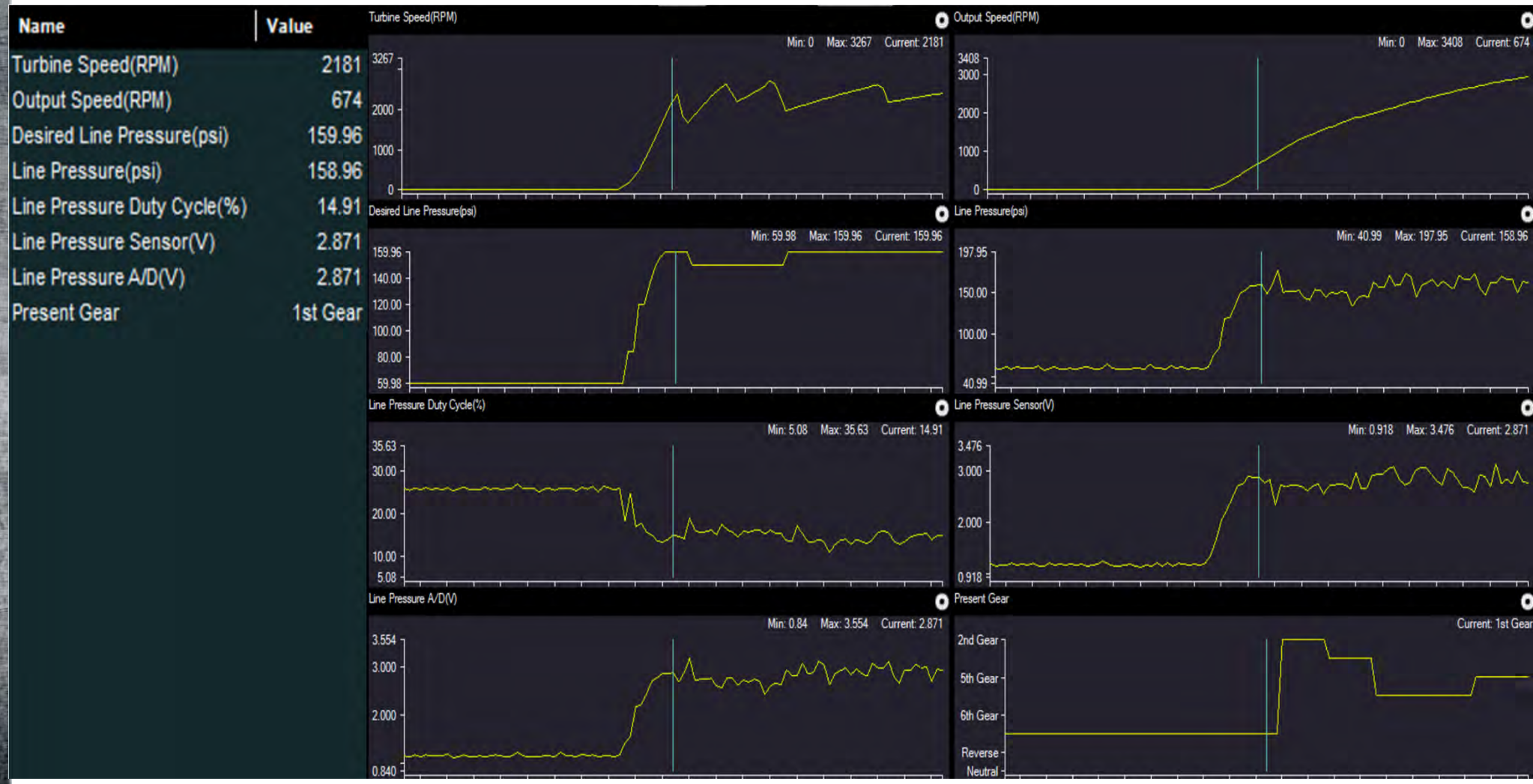
P0935-LINE PRESSURE SENSOR CIRCUIT HIGH
When Monitored: Continuously with ignition on and engine running.

Set Conditions: This DTC will set if the monitored Line Pressure Sensor voltage is greater than or equal to 4.75 volts for the period of 0.18 seconds.

FIRST GEAR MINIMUM PRESSURE



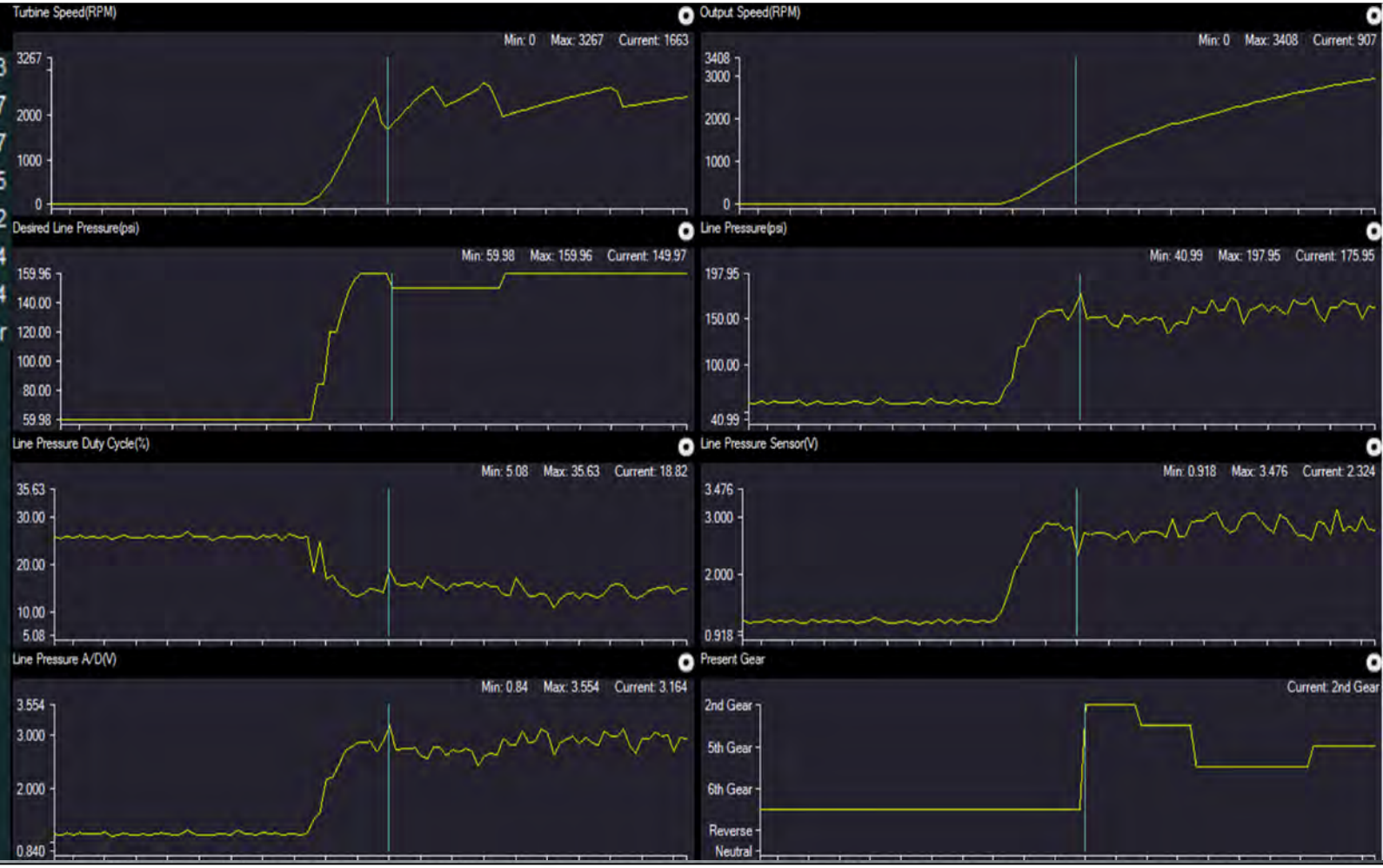
FIRST GEAR MAXIMUM PRESSURE



LINE PRESSURE GREATER THAN DESIRED

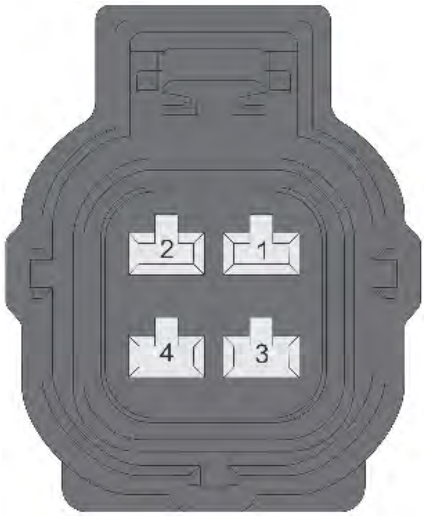
Actual line pressure is higher than desired by 10 psi, so line pressure solenoid duty cycle is increased to 18.82% in order to reduce line pressure back down to the desired range.

Name	Value
Turbine Speed(RPM)	1663
Output Speed(RPM)	907
Desired Line Pressure(psi)	149.97
Line Pressure(psi)	175.95
Line Pressure Duty Cycle(%)	18.82
Line Pressure Sensor(V)	2.324
Line Pressure A/D(V)	3.164
Present Gear	2nd Gear

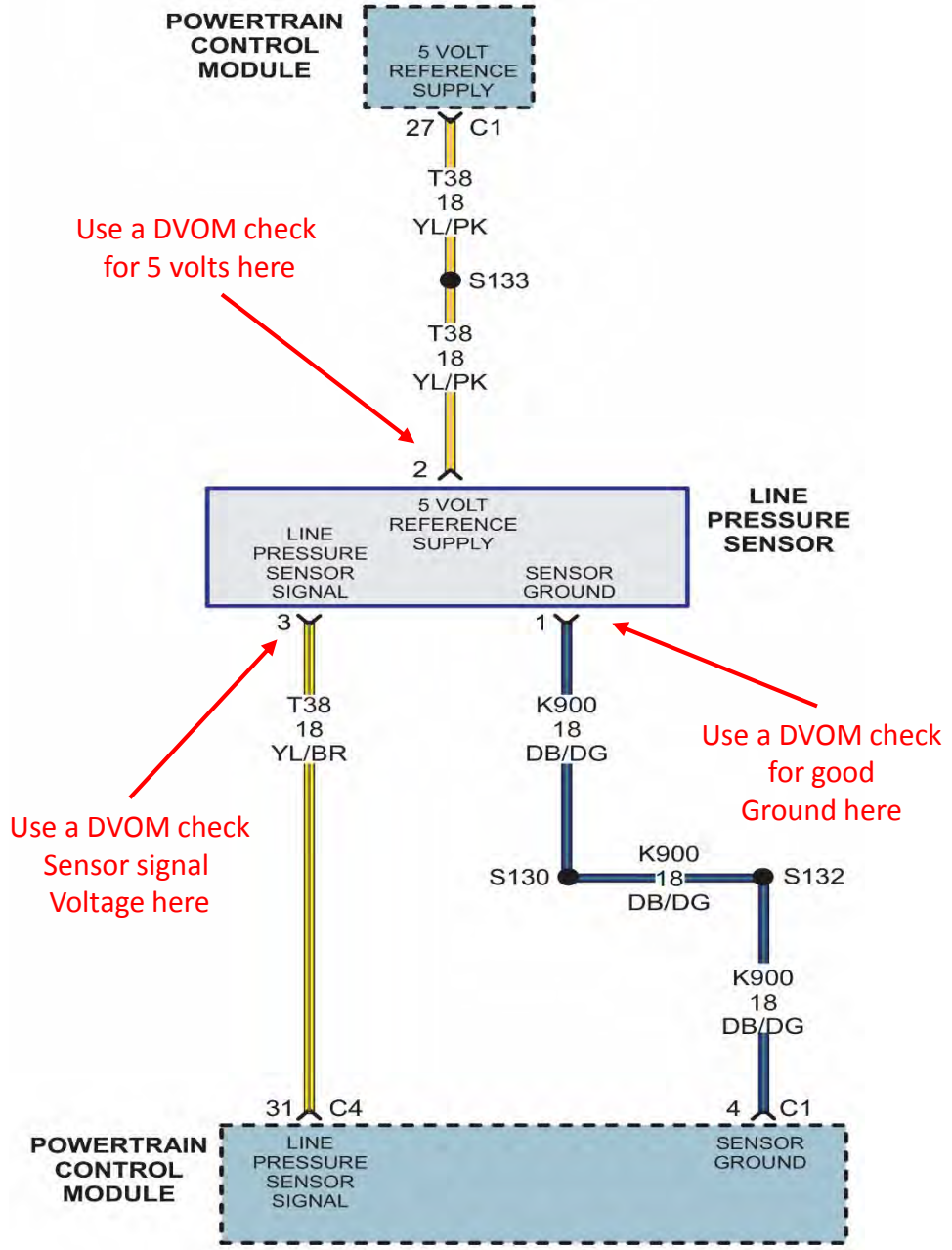


2007 - 2009
LINE PRESSURE RELATED CODES (Cont'd)

Line Pressure Sensor Connector

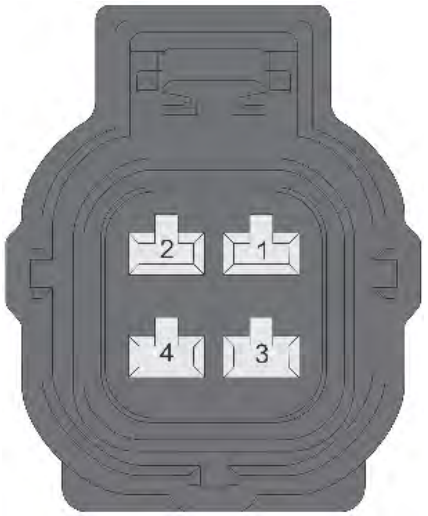


Pin 1 = Sensor Ground
Pin 2 = 5 Volt Reference
Pin 3 = Pressure Sensor Signal
Pin 4 = Blank

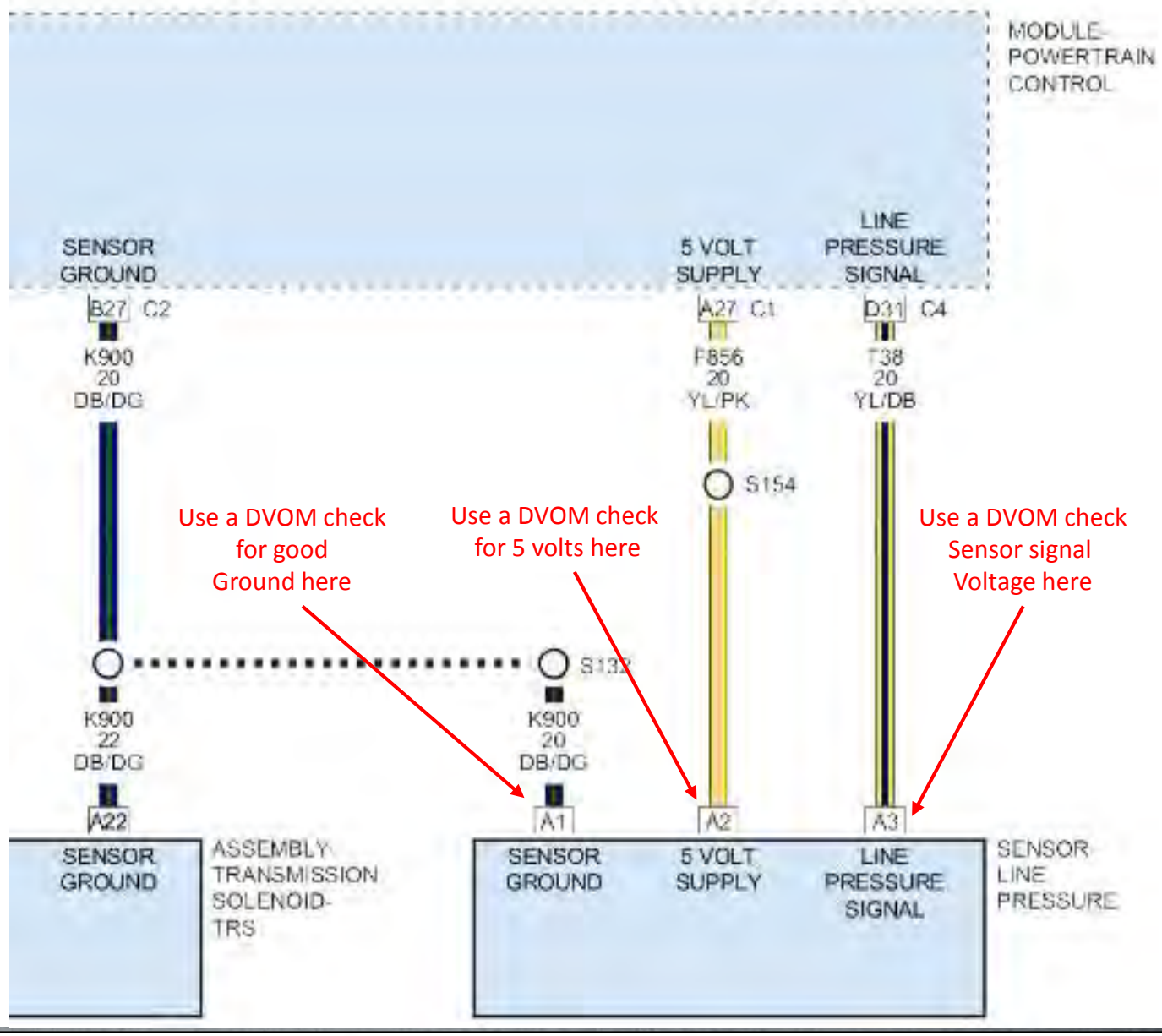


2010 - 2012
LINE PRESSURE RELATED CODES (Cont'd)

Line Pressure
Sensor Connector

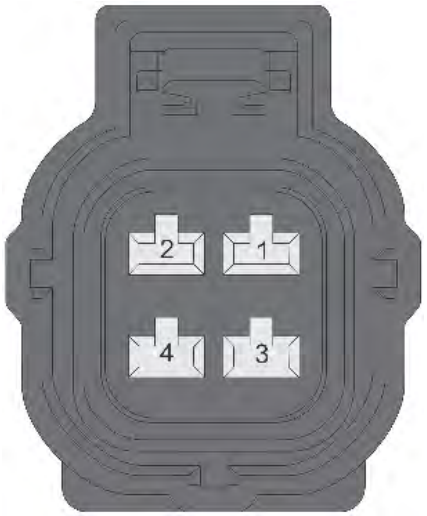


Pin 1 = Sensor Ground
Pin 2 = 5 Volt Reference
Pin 3 = Pressure Sensor Signal
Pin 4 = Blank

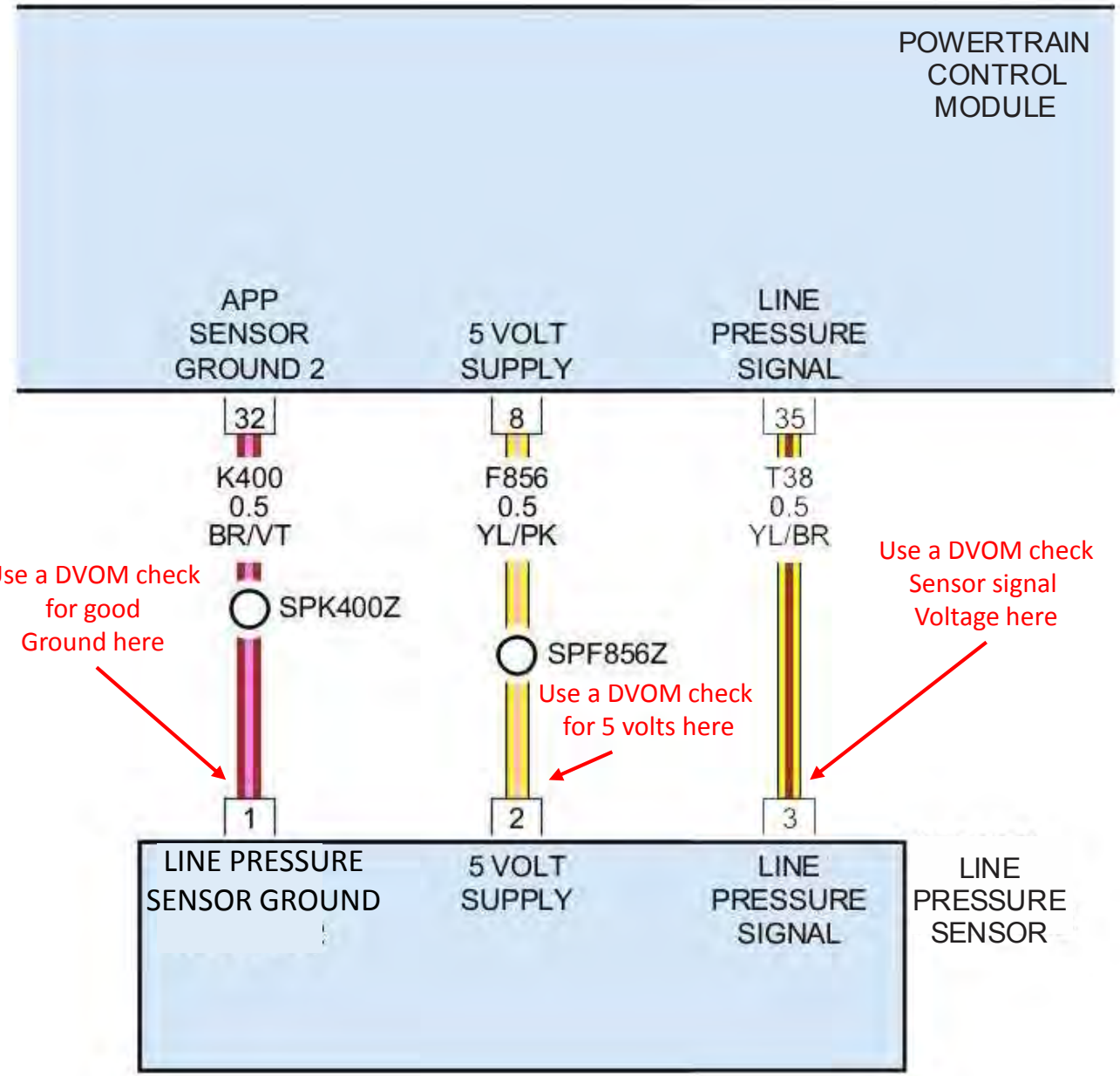


2013 - UP
LINE PRESSURE RELATED CODES (Cont'd)

Line Pressure Sensor Connector



Pin 1 = Sensor Ground
Pin 2 = 5 Volt Reference
Pin 3 = Pressure Sensor Signal
Pin 4 = Blank



TRANSMISSION TEMPERATURE SENSOR RELATED CODES

P0218-TRANSMISSION HIGH TEMPERATURE OPERATION ACTIVATED
The DTC is intended as an informational DTC to aid the technician in determining the root cause of a customer driveability issue. The DTC is also intended to alert the technician to determine if a cooling system malfunction has occurred or if an additional transmission air to oil cooler is needed to support the customers driving behavior.

When Monitored: Whenever the engine is running.
Set Condition: Immediately after a Overheat shift schedule is activated when the Transmission temperature exceeds 116°C or 240°F.

P0711-TRANSMISSION TEMPERATURE SENSOR PERFORMANCE
The Transmission Temperature Sensor is a variable resistor that changes with temperature, or otherwise known as a thermistor. The temperature of the transmission fluid can affect a variety of electronically controlled transmission operations such as shift quality, torque converter clutch engagement, and when and/or if certain OBDII or system self-diagnostic test are performed. The Powertrain Control Module (PCM) substitutes a calculated transmission temperature value if a fault is detected in the Transmission Temperature Sensor circuit.

When Monitored: Continuously with the ignition on and engine running.
Set Condition: This DTC will set when the desired transmission temperature does not reach a normal operating temperature within a given time frame. Time is variable due to ambient temperature. Approximate times are starting temperature to warm up time: (-40°F / -40°C - 35 min) (-20°F / -28°C - 25 min) (20°F / -6.6°C - 20 min) (60°F / 15.5 °C - 10 min)

TRANSMISSION TEMPERATURE SENSOR RELATED CODES *(CONTINUED)*

P0712-TRANSMISSION TEMPERATURE SENSOR LOW

When Monitored: Continuously with the ignition on and engine running.
Set Condition: The DTC will set when the monitored Temperature Sensor voltage drops below 0.078 of a volt for the period of 0.45 of a second.

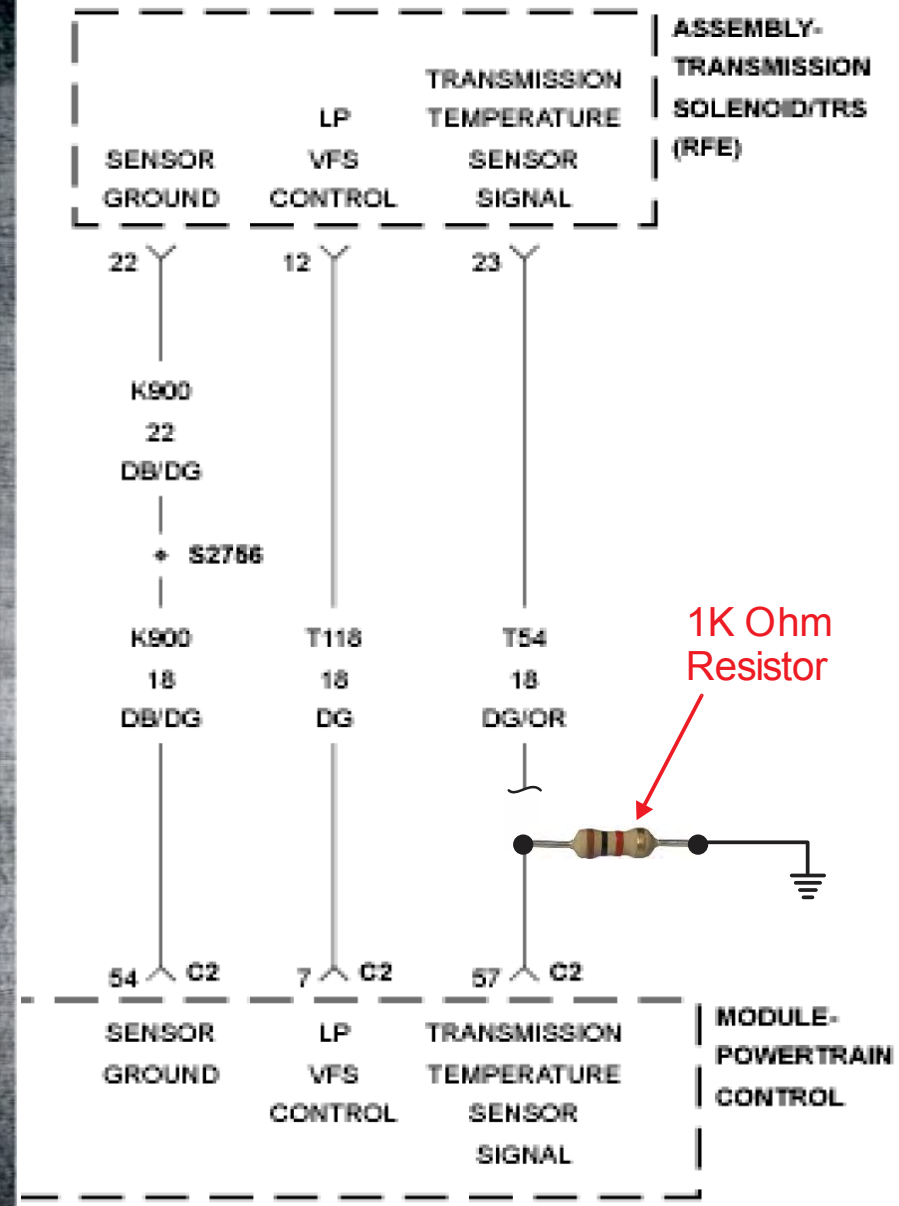
P0713-TRANSMISSION TEMPERATURE SENSOR HIGH

When Monitored: Continuously with the ignition on and engine running.
Set Condition: The DTC will set when the monitored Temperature Sensor voltage rises above 4.94 volts for the period of 0.45 of a second.

P0714-TRANSMISSION TEMPERATURE SENSOR INTERMITTENT

When Monitored: Continuously with the ignition on and engine running.
Set Condition: The DTC will set when the monitored Temperature Sensor voltage fluctuates or changes abruptly within a predetermined period of time.

Transmission Temperature Sensor Related Codes (Continued)



P0218: Can occur normally, under very strenuous driving conditions. This is a very common code typically combined with DTC P0712. This code may also be caused by an overheating transmission. Use an infrared thermometer to check trans temp.

P0711: This code is typically a sensor code, but can also be caused by cooler flow issues. This is not a common code.

P0712: This code is caused by low voltage in the circuit. This is usually a high side code, not caused by a faulty ground, or connector issues. The low voltage is indicative of an issue with either the sensor, or a short to ground on the sensor signal wire *(5 volt reference wire).* This code may also be caused by an overheating transmission. Use an infrared thermometer to check trans temp.

P0713: This code is caused by high voltage in the circuit. This is usually a low side code, associated with connector issues, or a faulty ground contact with the sensor ground wire. However, this code can be caused by the sensor signal wire if it is severed in front of the sensor. Always advisable to splice a wire into the ground circuit and run a redundant ground.

P0714: This code is caused by sudden and rapid fluctuation of the circuit voltage. This is not a common code, but can be caused by a poor ground.

With any intermittent code condition, especially where over-temp issues occur. It is good idea to wire in a 1K ohm resistor into the sensor signal wire, as depicted in the diagram, then drive the vehicle and see if code returns. If there is a circuit problem, the code WILL NOT return, and the circuit will need to be repaired. If the code does return, the PCM is at fault. *Do not deliver a vehicle with the resistor wired into the sensor signal circuit, always repair and correct the issue properly*.

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Any Questions?
Thank You For Attending