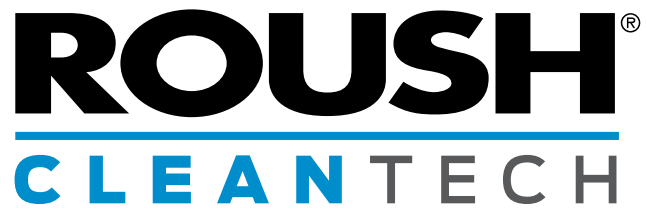




Ford E-Series and F-Series Gen 4 Propane

Diagnostic Manual





2016-2018

Ford E-Series and F-Series Products

Liquid Propane Autogas Fuel System (4th Generation)

Includes:

E-350/E-450 Custom Body

F-59

F-450/550

F-650/750

Revision History		
-BA	Initial Release	5/2015
-CA	Revisions	4/2017
-DA	Revisions	7/2018

**DIAGNOSTIC MANUAL
P-01B101-DA**

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INTRODUCTION

SAFETY INFORMATION

The National Fire Protection Association (NFPA) publishes a code book of rules that apply to the storage, handling, transportation and use of liquefied petroleum gas (LP-Gas or LPG). The book is known as NFPA 58. It is revised as necessary and published every other year. This code is adopted as law in virtually every political subdivision in the United States. Check with your local authorities for regulations applicable to liquid propane.

Alert Messages

The following alert messages may appear from time to time in appropriate places in this manual. Ensure that all personnel read and adhere to these alert messages.

DANGER

Although propane is nontoxic, nonpoisonous, has the lowest flammability range of any alternative fuel and dissipates quickly when released into the atmosphere, propane vapor is heavier than air and seeks the lowest point. When the ratio of propane to air is between 2.2% and 9.6%, propane will burn in the presence of an ignition source at 940°F (504°C) or hotter. Keep away from heat, sparks, flames, static electricity or other sources of ignition. Failure to heed this danger may result in severe personal injury or death.

DANGER

The fuel supply lines remain pressurized after engine shutdown. Keep away from heat, sparks, flames, static electricity or other sources of ignition. Do NOT enter storage areas or confined space unless they are adequately ventilated. Failure to heed this danger may result in severe personal injury or death.

DANGER

Do NOT carry lighted smoking materials or smoke while working on fuel system components. Failure to heed this danger could result in severe personal injury or death.

DANGER

Disconnect the battery ground at the battery to ensure that the vehicle electrical system has no current. Failure to heed this danger could result in severe personal injury or death.

DANGER

Propane is heavier than air and seeks the lowest available level when released to the atmosphere. Keep heat, sparks, flames, static electricity or other sources of ignition out of the area when venting or purging the fuel lines or tank. Failure to heed this danger can result in severe personal injury or property damage.

DANGER

Technicians working with, or around, fuel systems should be properly trained to utilize extreme care and caution at all times. Failure to exercise extreme caution and care may lead to serious accidents which can result in property damage, personal injury and/or death.

WARNING

Liquid propane is cold. The temperature of propane in its liquid state at atmospheric pressure is -44°F (-42°C). Wear eye and ear protection during venting and repair operations. Keep moisture away from the valves. Failure to heed this warning can result in personal injury.

Installation, Garaging and Training

Chapter 11 of NFPA 58 applies to engine fuel systems using LP-Gas in internal combustion engines, including containers, container appurtenances, carburetion equipment, piping, hose and fittings and their installation. Additionally, this chapter applies to garaging of vehicles and to the training of personnel.

Paragraph 11.2 specifies that each person engaged in installing, repairing, filling or otherwise servicing an LP-Gas engine fuel system shall be trained and possess all local certifications to work on propane-powered vehicles. Contact the Propane Education and Research Council to learn more about your local propane technician requirements.

Purging and Venting (Tanks and Lines)

Venting of LP-Gas to the atmosphere is covered by paragraphs 7.3.1, General, and 7.3.2, Purging of NFPA 58, 2008 edition. Refer to NFPA 58, Local Codes and Proper Training for specific information relating to safe venting of LPG.

TROUBLESHOOTING

DIAGNOSTIC TROUBLE CODES

About Diagnostic Trouble Codes

All diagnostic trouble codes (DTCs) known to be affected by the liquid propane autogas (LPA) system are covered in this manual. For all other

DTCs, refer to the *Ford Powertrain Control/Emissions Diagnosis Service Manual* at www.motorcraft.com.

System and Diagnostic Terminology

Acronym or Abbreviation	Description
BS	Bleed Solenoid
CAN	Controller Area Network
DTC	Diagnostic Trouble Code
EFPR	Electronic Fuel Pump Relay
ERFS	Electronic Returnless Fuel System
EVAP	Evaporative
FCS	Flow Control Solenoid
FLS	Fuel Level Sender
FP	Fuel Pump
FPCM	Fuel Pump Control Module
FRP	Fuel Rail Pressure
FRPCM	Fuel Rail Pressure Control Module
FTS	Fuel Temperature Sensor
GRD	Ground
HEGO	Heated Exhaust Gas Oxygen
IPC	Instrument Panel Cluster
IPTS	Injection Pressure Temperature Sensor
KOEO	Key On Engine Off
KOER	Key On Engine Running
LPA	Liquid Propane Autogas
MAF	Mass Air Flow
OEM	Original Equipment Manufacturer
OPD	Overfill Protection Device
PCM	Powertrain Control Module
PID	Parameter Identification
PWR GND	Power Ground
SIG RTN	Signal Return
SRM	Smart Relay Module
SS	Supply Solenoid
TPTS	Tank Pressure Temperature Sensor
TS	Tank Solenoid
VMV	Vapor Management Valve
VPWR	Voltage Power
VREF	Voltage Reference
WOT	Wide Open Throttle

Diagnostic Trouble Code List

Code	Description
P0005	Fuel Shutoff Valve "A" Control Circuit/Open
P0090	Fuel Pressure Regulator Circuit/Open
P009B	Fuel Pressure Relief Control Circuit/Open
P009E	Fuel Pressure Relief Control Performance/Stuck Off
P0148	Fuel Delivery Error
P0171	System Too Lean (Bank 1)
P0172	System Too Rich (Bank 1)
P0174	System Too Lean (Bank 2)
P0175	System Too Rich (Bank 2)
P0181	Fuel Temperature Sensor "A" Circuit Range/Performance
P0182	Fuel Temperature Sensor "A" Circuit Low
P0183	Fuel Temperature Sensor "A" Circuit High
P0190	Fuel Rail Pressure Sensor Circuit (Bank 1)
P0192	Fuel Rail Pressure Sensor Circuit Low (Bank 1)
P0193	Fuel Rail Pressure Sensor Circuit High (Bank 1)
P01A0	Alternate Fuel Tank "A" Pressure Sensor Circuit Low
P01A1	Alternate Fuel Tank "A" Pressure Sensor Circuit High
P01A2	Alternative Fuel Tank "A" Pressure Sensor Circuit Intermittent/Erratic
P01AC	Alternate Fuel Tank Temperature Sensor Circuit Low
P01AD	Alternate Fuel Tank Temperature Sensor High
P01AE	Alternate Fuel Tank Temperature Sensor Circuit Intermittent/Erratic
P025A	Fuel Pump Module "A" Control Circuit/Open
P025B	Fuel Pump Module "A" Control Circuit Range/Performance
P027B	Fuel Pump Module "B" Control Circuit Range/Performance
P03xx	Misfire
P0442	EVAP System Leak Detected (small leak)
P0443	EVAP System Purge Control Valve "A" Circuit
P0446	EVAP System Vent Control Circuit
P0451	EVAP System Pressure Sensor/Switch Range/Performance
P0452	EVAP System Pressure Sensor/Switch Low
P0453	EVAP System Pressure Sensor/Switch High
P0454	EVAP System Pressure Sensor/Switch Intermittent
P0455	EVAP System Leak Detected (large leak)
P0456	EVAP System Leak Detected (very small leak)
P0461	Fuel Level Sender "A" Circuit Range/Performance
P0462	Fuel Level Sender "A" Circuit Low
P0463	Fuel Level Sender "A" Circuit High
P0627	Fuel Pump "A" Control Circuit Open
P064A	Fuel Pump Control Module "A"

Code	Description
P116E	Fuel Pressure Relief Valve Actuated
P1453	Fuel Tank Pressure Relief Valve Malfunction
P2195	Heated Exhaust Gas Oxygen Sensor Stuck
P2197	Heated Exhaust Gas Oxygen Sensor Stuck
P25B0	Fuel Level Sensor "A" Stuck
P25B1	Fuel Level Sensor "B" Stuck
P2632	Fuel Pump "B" Control Circuit/Open
P2665	Fuel Shutoff Valve "B" Control Circuit/Open
P26B3	Fuel Shutoff Valve "A" Control Circuit Performance/Stuck Off
P26B5	Fuel Shutoff Valve "B" Control Circuit Performance/Stuck Off
P26EA	Fuel Pump Control Module "B"
U0108	Lost Communication with Alternative Fuel Control Module
U0109	Lost Communication with Fuel Pump Control Module "A"
U016C	Lost Communication with Fuel Pump Control Module "B"
U210B	Lost Communication Between Fuel Pump Control Module "A" and Restraint Control Module
U210C	Lost Communication Between Fuel Pump Control Module "B" and Restraint Control Module

2016-2017 Calibration Release OBD Summary Chart

		6.8L 2V LPG E-450 Custom Body	6.8L 3V LPG F-650 (dual tank)	6.8L 3V LPG F-53 (Motorhome) F-59 (Step Van)
Code	Description	2016-2017	2016-2017	2016-2017
c05d7		N/A	N/A	non-MIL
P0005	Fuel Shutoff Valve "A" Control Circuit/Open	non-MIL	non-MIL	non-MIL
P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	MIL	MIL	MIL
P0036	HO2S Heater Control Circuit (Bank 1 Sensor 2)	MIL	MIL	MIL
P0040	Oxygen Sensor Signals Swapped Bank 1 Sensor 1/Bank 2 Sensor 1	non-MIL	non-MIL	non-MIL
P0050	HO2S Heater Control Circuit (Bank 2 Sensor 1)	MIL	MIL	MIL
P0068	MAP/MAF - Throttle Position Correlation	MIL	MIL	MIL
P0090	Fuel Pressure Regulator Control Circuit/Open	non-MIL	non-MIL	non-MIL
P009B	Fuel Pressure Relief Control Circuit/Open	MIL	MIL	MIL
P009E	Fuel Pressure Relief Control Performance/Stuck Off	MIL	MIL	MIL
P0100	Mass or Volume Air Flow Sensor "A" Circuit	MIL	MIL	MIL
P0102	Mass or Volume Air Flow Sensor "A" Circuit Low	MIL	MIL	MIL
P0103	Mass or Volume Air Flow Sensor "A" Circuit High	MIL	MIL	MIL
P0104	Mass or Volume Air Flow Sensor "A" Circuit Intermittent	MIL	MIL	MIL
P0111	Intake Air Temperature Sensor 1 Circuit Range/Performance (Bank 1)	MIL	MIL	MIL
P0112	Intake Air Temperature Sensor 1 Circuit Low (Bank 1)	MIL	MIL	MIL
P0113	Intake Air Temperature Sensor 1 Circuit High (Bank 1)	MIL	MIL	MIL
P0116	Engine Coolant Temperature Sensor 1 Circuit Range/Performance	MIL	MIL	MIL
P0122	Throttle/Pedal Position Sensor "A" Circuit Low	MIL	MIL	MIL
P0123	Throttle/Pedal Position Sensor "A" Circuit High	MIL	MIL	MIL

		6.8L 2V LPG E-450 Custom Body	6.8L 3V LPG F-650 (dual tank)	6.8L 3V LPG F-53 (Motorhome) F-59 (Step Van)
Code	Description	2016-2017	2016-2017	2016-2017
P0125	Insufficient Coolant Temp For Closed Loop Fuel Control	MIL	MIL	MIL
P0131	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 1)	MIL	MIL	MIL
P0132	O2 Sensor Circuit High Voltage (Bank 1 Sensor 1)	MIL	MIL	MIL
P0135	O2 Sensor Heater Circuit (Bank 1 Sensor 1)	MIL	MIL	MIL
P0137	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 2)	MIL	MIL	MIL
P0138	O2 Sensor Circuit High Voltage (Bank 1 Sensor 2)	MIL	MIL	MIL
P0141	O2 Sensor Heater Circuit (Bank 1 Sensor 2)	MIL	MIL	MIL
P0148	Fuel Delivery Error	non-MIL	non-MIL	non-MIL
P0151	O2 Sensor Circuit Low Voltage (Bank 2 Sensor 1)	MIL	MIL	MIL
P0152	O2 Sensor Circuit High Voltage (Bank 2 Sensor 1)	MIL	MIL	MIL
P0155	O2 Sensor Heater Circuit (Bank 2 Sensor 1)	MIL	MIL	MIL
P0171	System Too Lean (Bank 1)	MIL	MIL	MIL
P0172	System Too Rich (Bank 1)	MIL	MIL	MIL
P0174	System Too Lean (Bank 2)	MIL	MIL	MIL
P0175	System Too Rich (Bank 2)	MIL	MIL	MIL
P0181	Fuel Temperature Sensor "A" Circuit Range/Performance	non-MIL	non-MIL	non-MIL
P0182	Fuel Temperature Sensor "A" Circuit Low	MIL	MIL	MIL
P0183	Fuel Temperature Sensor "A" Circuit High	MIL	MIL	MIL
P0190	Fuel Rail Pressure Sensor Circuit (Bank 1)	MIL	MIL	MIL
P0192	Fuel Rail Pressure Sensor Circuit Low (Bank 1)	MIL	MIL	MIL
P0193	Fuel Rail Pressure Sensor Circuit High (Bank 1)	MIL	MIL	MIL
P01A0	Alternate Fuel Tank "A" Pressure Sensor Circuit Low	non-MIL	non-MIL	non-MIL
P01A1	Alternate Fuel Tank "A" Pressure Sensor Circuit High	non-MIL	non-MIL	non-MIL
P01A2	Alternative Fuel Tank "A" Pressure Sensor Circuit Intermittent/ Erratic	non-MIL	non-MIL	non-MIL
P01AC	Alternate Fuel Tank Temperature Sensor Circuit Low	non-MIL	non-MIL	non-MIL
P01AD	Alternate Fuel Tank Temperature Sensor High	non-MIL	non-MIL	non-MIL
P01AE	Alternate Fuel Tank Temperature Sensor Circuit Intermittent/Erratic	non-MIL	non-MIL	non-MIL
P0201	Cylinder 1 Injector "A" Circuit/Open	MIL	MIL	MIL
P0202	Cylinder 2 Injector "A" Circuit/Open	MIL	MIL	MIL
P0203	Cylinder 3 Injector "A" Circuit/Open	MIL	MIL	MIL
P0204	Cylinder 4 Injector "A" Circuit/Open	MIL	MIL	MIL
P0205	Cylinder 5 Injector "A" Circuit/Open	MIL	MIL	MIL
P0206	Cylinder 6 Injector "A" Circuit/Open	MIL	MIL	MIL
P0207	Cylinder 7 Injector "A" Circuit/Open	MIL	MIL	MIL
P0208	Cylinder 8 Injector "A" Circuit/Open	MIL	MIL	MIL
P0209	Cylinder 9 Injector "A" Circuit/Open	MIL	MIL	MIL
P0210	Cylinder 10 Injector "A" Circuit/Open	MIL	MIL	MIL
P0217	Engine Coolant Over Temperature Condition	non-MIL	non-MIL	non-MIL

		6.8L 2V LPG E-450 Custom Body	6.8L 3V LPG F-650 (dual tank)	6.8L 3V LPG F-53 (Motorhome) F-59 (Step Van)
Code	Description	2016-2017	2016-2017	2016-2017
P0218	Transmission Fluid Temperature Sensor "A" Over Temperature Condition	non-MIL	non-MIL	non-MIL
P0219	Engine Overspeed Condition	non-MIL	non-MIL	non-MIL
P0222	Throttle/Pedal Position Sensor/Switch "B" Circuit Low	MIL	MIL	MIL
P0223	Throttle/Pedal Position Sensor/Switch "B" Circuit High	MIL	MIL	MIL
P025A	Fuel Pump Module "A" Control Circuit/Open	non-MIL	non-MIL	non-MIL
P025B	Fuel Pump Module "A" Control Circuit Range/Performance	non-MIL	non-MIL	non-MIL
P027B	Fuel Pump Module "B" Control Circuit Range/Performance	non-MIL	non-MIL	N/A
P0297	Vehicle Overspeed Condition	non-MIL	non-MIL	non-MIL
P0298	Engine Oil Over Temperature Condition	non-MIL	non-MIL	non-MIL
P03xx	Misfire	non-MIL	non-MIL	non-MIL
P0339	Crankshaft Position Sensor "A" Circuit Intermittent	MIL	MIL	MIL
P0340	Camshaft Position Sensor "A" Circuit (Bank 1 or single sensor)	MIL	MIL	MIL
P0351	Ignition Coil "A" Primary Control Circuit/Open	MIL	MIL	MIL
P0352	Ignition Coil "B" Primary Control Circuit/Open	MIL	MIL	MIL
P0353	Ignition Coil "C" Primary Control Circuit/Open	MIL	MIL	MIL
P0354	Ignition Coil "D" Primary Control Circuit/Open	MIL	MIL	MIL
P0355	Ignition Coil "E" Primary Control Circuit/Open	MIL	MIL	MIL
P0356	Ignition Coil "F" Primary Control Circuit/Open	MIL	MIL	MIL
P0357	Ignition Coil "G" Primary Control Circuit/Open	MIL	MIL	MIL
P0358	Ignition Coil "H" Primary Control Circuit/Open	MIL	MIL	MIL
P0359	Ignition Coil "I" Primary Control Circuit/Open	MIL	MIL	MIL
P0360	Ignition Coil "J" Primary Control Circuit/Open	MIL	MIL	MIL
P03xx	Misfire	non-MIL	non-MIL	non-MIL
P0443	EVAP System Purge Control Valve "A" Circuit	MIL	MIL	MIL
P0460	Fuel Level Sensor "A" Circuit	N/A	non-MIL	N/A
P0461	Fuel Level Sensor "A" Circuit Range/Performance	non-MIL	non-MIL	non-MIL
P0462	Fuel Level Sensor "A" Circuit Low	non-MIL	non-MIL	non-MIL
P0463	Fuel Level Sensor "A" Circuit High	non-MIL	non-MIL	non-MIL
P0504	Brake Switch "A"/"B" Correlation	non-MIL	non-MIL	non-MIL
P0505	Idle Control System	non-MIL	non-MIL	non-MIL
P0506	Idle Control System - RPM Lower Than Expected	MIL	MIL	MIL
P0507	Idle Control System - RPM Higher Than Expected	MIL	MIL	MIL
P0532	A/C Refrigerant Pressure Sensor "A" Circuit Low	non-MIL	non-MIL	non-MIL
P0533	A/C Refrigerant Pressure Sensor "A" Circuit High	non-MIL	non-MIL	non-MIL
P0562	System Voltage Low	non-MIL	non-MIL	non-MIL
P0563	System Voltage High	non-MIL	non-MIL	non-MIL
P0572	Brake Switch "A" Circuit Low	non-MIL	non-MIL	non-MIL
P0573	Brake Switch "A" Circuit High	non-MIL	non-MIL	non-MIL
P0579	Cruise Control Multi-Function Input "A" Circuit Range/Performance	non-MIL	N/A	non-MIL

		6.8L 2V LPG E-450 Custom Body	6.8L 3V LPG F-650 (dual tank)	6.8L 3V LPG F-53 (Motorhome) F-59 (Step Van)
Code	Description	2016-2017	2016-2017	2016-2017
P0581	Cruise Control Multi-Function Input "A" Circuit High	non-MIL	N/A	non-MIL
P0600	Serial Communication Link	MIL	MIL	MIL
P0602	Powertrain Control Module Programming Error	MIL	MIL	MIL
P0604	Internal Control Module Random Access Memory (RAM) Error	MIL	MIL	MIL
P0605	Internal Control Module Read Only Memory (ROM) Error	MIL	MIL	MIL
P0607	Control Module Performance	MIL	MIL	MIL
P060A	Internal Control Module Monitoring Processor Performance	MIL	MIL	MIL
P060B	Internal Control Module A/D Processing Performance	MIL	MIL	MIL
P060C	Internal Control Module Main Processor Performance	MIL	MIL	MIL
P060D	Internal Control Module Accelerator Pedal Position Performance	non-MIL	non-MIL	non-MIL
P0610	Control Module Vehicle Options Error	MIL	MIL	MIL
P061A	Internal Control Module Torque Performance	non-MIL	non-MIL	non-MIL
P061B	Internal Control Module Torque Calculation Performance	MIL	MIL	MIL
P061C	Internal Control Module Engine RPM Performance	MIL	MIL	MIL
P061D	Internal Control Module Engine Air Mass Performance	MIL	MIL	MIL
P0620	Generator Control Circuit	non-MIL	non-MIL	non-MIL
P0625	Generator Field/F Terminal Circuit Low	non-MIL	non-MIL	non-MIL
P0626	Generator Field/F Terminal Circuit High	non-MIL	non-MIL	non-MIL
P0627	Fuel Pump "A" Control Circuit Open	non-MIL	non-MIL	non-MIL
P062F	Internal Control Module EEPROM Error	N/A	non-MIL	N/A
P0630	VIN Not Programmed or Incompatible - ECM/PCM	N/A	non-MIL	N/A
P0642	Sensor Reference Voltage "A" Circuit Low	MIL	MIL	MIL
P0643	Sensor Reference Voltage "A" Circuit High	MIL	MIL	MIL
P0645	A/C Clutch Relay Control Circuit	non-MIL	non-MIL	non-MIL
P064A	Fuel Pump Control Module "A"	non-MIL	non-MIL	N/A
P064D	Internal Control Module O2 Sensor Processor Performance (Bank 1)	MIL	MIL	MIL
P064E	Internal Control Module O2 Sensor Processor Performance (Bank 2)	MIL	MIL	MIL
P0657	Actuator Supply Voltage "A" Circuit/Open	MIL	MIL	MIL
P065B	Generator Control Circuit Range/Performance	non-MIL	non-MIL	non-MIL
P06B8	Internal Control Module Non-Volatile Random Access Memory (NVRAM) Error	MIL	MIL	MIL
P06E4	Control Module Wake-up Circuit Performance	N/A	non-MIL	N/A
P06E9	Engine Starter Performance	non-MIL	non-MIL	non-MIL
P0701	Transmission Control System Range/Performance	non-MIL	non-MIL	non-MIL
P0702	Transmission Control System Electrical	non-MIL	non-MIL	non-MIL
P0706	Transmission Range Sensor "A" Circuit Range/Performance	MIL	MIL	MIL
P0707	Transmission Range Sensor "A" Circuit Low	MIL	MIL	MIL
P0708	Transmission Range Sensor "A" Circuit High	MIL	MIL	MIL
P0710	Transmission Fluid Temperature Sensor "A" Circuit	non-MIL	non-MIL	non-MIL

		6.8L 2V LPG E-450 Custom Body	6.8L 3V LPG F-650 (dual tank)	6.8L 3V LPG F-53 (Motorhome) F-59 (Step Van)
Code	Description	2016-2017	2016-2017	2016-2017
P0711	Transmission Fluid Temperature Sensor "A" Circuit Range/Performance	MIL	MIL	MIL
P0712	Transmission Fluid Temperature Sensor "A" Circuit Low	MIL	MIL	MIL
P0713	Transmission Fluid Temperature Sensor "A" Circuit High	MIL	MIL	MIL
P0715	Input/Turbine Shaft Speed Sensor "A" Circuit	MIL	MIL	MIL
P0717	Input/Turbine Shaft Speed Sensor "A" Circuit No Signal	non-MIL	non-MIL	non-MIL
P0718	Input/Turbine Shaft Speed Sensor "A" Circuit Intermittent	MIL	MIL	MIL
P0720	Output Shaft Speed Sensor Circuit	MIL	MIL	MIL
P0722	Output Shaft Speed Sensor Circuit No Signal	non-MIL	non-MIL	non-MIL
P0729	Gear 6 Incorrect Ratio	non-MIL	non-MIL	non-MIL
P0731	Gear 1 Incorrect Ratio	non-MIL	non-MIL	non-MIL
P0732	Gear 2 Incorrect Ratio	non-MIL	non-MIL	non-MIL
P0733	Gear 3 Incorrect Ratio	non-MIL	non-MIL	non-MIL
P0734	Gear 4 Incorrect Ratio	non-MIL	non-MIL	non-MIL
P0735	Gear 5 Incorrect Ratio	non-MIL	non-MIL	non-MIL
P0740	Torque Converter Clutch Solenoid Circuit/Open	MIL	MIL	MIL
P0741	Torque Converter Clutch Solenoid Circuit Performance/Stuck Off	MIL	MIL	MIL
P0742	Torque Converter Clutch Solenoid Circuit Stuck On	MIL	MIL	MIL
P0743	Torque Converter Clutch Solenoid Circuit Electrical	non-MIL	non-MIL	non-MIL
P0744	Torque Converter Clutch Solenoid Circuit Intermittent	MIL	MIL	MIL
P0748	Pressure Control Solenoid "A" Electrical	non-MIL	non-MIL	non-MIL
P0750	Shift Solenoid "A"	MIL	MIL	MIL
P0751	Shift Solenoid "A" Performance/Stuck Off	MIL	MIL	MIL
P0752	Shift Solenoid "A" Stuck On	MIL	MIL	MIL
P0753	Shift Solenoid "A" Electrical	non-MIL	non-MIL	non-MIL
P0754	Shift Solenoid "A" Intermittent	MIL	MIL	MIL
P0755	Shift Solenoid "B"	MIL	MIL	MIL
P0756	Shift Solenoid "B" Performance/Stuck Off	MIL	MIL	MIL
P0757	Shift Solenoid "B" Stuck On	MIL	MIL	MIL
P0758	Shift Solenoid "B" Electrical	non-MIL	non-MIL	non-MIL
P0759	Shift Solenoid "B" Intermittent	MIL	MIL	MIL
P0760	Shift Solenoid "C"	MIL	MIL	MIL
P0761	Shift Solenoid "C" Performance/Stuck Off	MIL	MIL	MIL
P0762	Shift Solenoid "C" Stuck On	MIL	MIL	MIL
P0763	Shift Solenoid "C" Electrical	non-MIL	non-MIL	non-MIL
P0764	Shift Solenoid "C" Intermittent	MIL	MIL	MIL
P0765	Shift Solenoid "D"	MIL	MIL	MIL
P0766	Shift Solenoid "D" Performance/Stuck Off	MIL	MIL	MIL
P0767	Shift Solenoid "D" Stuck On	MIL	MIL	MIL
P0768	Shift Solenoid "D" Electrical	non-MIL	non-MIL	non-MIL

		6.8L 2V LPG E-450 Custom Body	6.8L 3V LPG F-650 (dual tank)	6.8L 3V LPG F-53 (Motorhome) F-59 (Step Van)
Code	Description	2016-2017	2016-2017	2016-2017
P0769	Shift Solenoid "D" Intermittent	MIL	MIL	MIL
P0770	Shift Solenoid "E"	MIL	MIL	MIL
P0771	Shift Solenoid "E" Performance/Stuck Off	MIL	MIL	MIL
P0772	Shift Solenoid "E" Stuck On	MIL	MIL	MIL
P0773	Shift Solenoid "E" Electrical	non-MIL	non-MIL	non-MIL
P0774	Shift Solenoid "E" Intermittent	MIL	MIL	MIL
P0882	TCM Power Input Signal Low	MIL	MIL	MIL
P0883	TCM Power Input Signal High	MIL	MIL	MIL
P0885	TCM Power Relay Control Circuit /Open	non-MIL	non-MIL	non-MIL
P0960	Pressure Control Solenoid "A" Control Circuit/Open	MIL	MIL	MIL
P0961	Pressure Control Solenoid "A" Control Circuit Range/Performance	MIL	MIL	MIL
P0962	Pressure Control Solenoid "A" Control Circuit Low	MIL	MIL	MIL
P0963	Pressure Control Solenoid "A" Control Circuit High	MIL	MIL	MIL
P0973	Shift Solenoid "A" Control Circuit Low	MIL	MIL	MIL
P0974	Shift Solenoid "A" Control Circuit High	MIL	MIL	MIL
P0976	Shift Solenoid "B" Control Circuit Low	MIL	MIL	MIL
P0977	Shift Solenoid "B" Control Circuit High	MIL	MIL	MIL
P0979	Shift Solenoid "C" Control Circuit Low	MIL	MIL	MIL
P0980	Shift Solenoid "C" Control Circuit High	MIL	MIL	MIL
P0982	Shift Solenoid "D" Control Circuit Low	MIL	MIL	MIL
P0983	Shift Solenoid "D" Control Circuit High	MIL	MIL	MIL
P0985	Shift Solenoid "E" Control Circuit Low	MIL	MIL	MIL
P0986	Shift Solenoid "E" Control Circuit High	MIL	MIL	MIL
P1001	KOER Not Able to Complete, KOER Aborted	non-MIL	non-MIL	non-MIL
P1002	KOER Not Able to Complete, KOER Aborted	non-MIL	N/A	non-MIL
P1101	Mass Air Flow Sensor Out Of Self Test Range	non-MIL	non-MIL	non-MIL
P1124	Throttle Position Sensor "A" Out Of Self Test Range	non-MIL	non-MIL	non-MIL
P1127	Exhaust Temperature Out of Range, O2 Sensor Tests Not Completed	non-MIL	non-MIL	non-MIL
P115E	Throttle Actuator Control Throttle Body Air Flow Trim at Max Limit	non-MIL	non-MIL	non-MIL
P116E	Fuel Pressure Relief Valve Actuated	non-MIL	non-MIL	non-MIL
P1260	Theft Detected, Vehicle Immobilized	non-MIL	N/A	N/A
P1285	Cylinder Head Over Temperature Condition	non-MIL	non-MIL	non-MIL
P1288	Cylinder Head Temperature Sensor Out Of Self Test Range	non-MIL	non-MIL	non-MIL
P1289	Cylinder Head Temperature Sensor Circuit High	MIL	MIL	MIL
P1290	Cylinder Head Temperature Sensor Circuit Low	MIL	MIL	MIL
P1336	Crankshaft/Camshaft Sensor Range/Performance	non-MIL	non-MIL	non-MIL
P1397	System Voltage Out Of Self Test Range	non-MIL	non-MIL	non-MIL
P1453	Fuel Tank Pressure Relief Valve Malfunction	non-MIL	non-MIL	non-MIL
P1464	A/C Demand Out Of Self Test Range	non-MIL	non-MIL	non-MIL

		6.8L 2V LPG E-450 Custom Body	6.8L 3V LPG F-650 (dual tank)	6.8L 3V LPG F-53 (Motorhome) F-59 (Step Van)
Code	Description	2016-2017	2016-2017	2016-2017
P1501	Vehicle Speed Sensor Out Of Self Test Range	non-MIL	non-MIL	non-MIL
P1561	Brake Line Pressure Sensor Circuit	non-MIL	N/A	non-MIL
P1575	Pedal Position Out Of Self Test Range	non-MIL	non-MIL	non-MIL
P1594	Forced Engine Shutdown - Remote Start System Fault, No Unattended Vehicle Timeout	N/A	non-MIL	non-MIL
P1595	Forced Engine Shutdown - Remote Start System Fault, Transmission Range Not In Park Position	N/A	non-MIL	non-MIL
P1602	Immobilizer/ECM Communication Error	non-MIL	N/A	N/A
P160A	Control Module Vehicle Options Reconfiguration Error	N/A	non-MIL	N/A
P161A	Incorrect Response from Immobilizer Control Module	N/A	non-MIL	N/A
P1622	Immobilizer ID Does Not Match	non-MIL	N/A	N/A
P162E	Internal Control Module PTO Control Performance	non-MIL	non-MIL	non-MIL
P162F	Starter Motor Disabled - Engine Crank Time Too Long	non-MIL	non-MIL	non-MIL
P1633	Keep Alive Power Voltage Too Low	non-MIL	N/A	non-MIL
P1635	Tire/Axle Out of Acceptable Range	non-MIL	N/A	non-MIL
P1636	Inductive Signature Chip Communication Error	MIL	MIL	MIL
P1639	Vehicle ID Block Corrupted, Not Programmed	N/A	non-MIL	N/A
P1646	Linear O2 Sensor Control Chip (Bank 1)	MIL	MIL	MIL
P1647	Linear O2 Sensor Control Chip (Bank 2)	MIL	MIL	MIL
P1674	Control Module Software Corrupted	MIL	MIL	MIL
P1702	Transmission Range Sensor Circuit Intermittent	non-MIL	non-MIL	non-MIL
P1703	Brake Switch Out Of Self Test Range	non-MIL	non-MIL	non-MIL
P1705	Transmission Range Circuit Not Indicating Park/Neutral During Self Test	non-MIL	non-MIL	non-MIL
P1711	Transmission Fluid Temperature Sensor Out Of Self Test Range	non-MIL	non-MIL	non-MIL
P1744	Torque Converter Clutch Solenoid Circuit Performance	non-MIL	non-MIL	non-MIL
P177F	Unable To Fully Engage Neutral	non-MIL	non-MIL	non-MIL
P1780	Transmission Control Switch (O/D Cancel) Circuit Out Of Self Test Range	non-MIL	N/A	non-MIL
P1783	Transmission Overtemperature Condition	non-MIL	non-MIL	non-MIL
P1921	Transmission Range Signal	non-MIL	non-MIL	non-MIL
P1934	Vehicle Speed Signal	N/A	MIL	N/A
P193E	A/C Clutch Request Signal	N/A	non-MIL	N/A
P2067	Fuel Level Sensor "B" Circuit Low	N/A	non-MIL	N/A
P2068	Fuel Level Sensor "B" Circuit High	N/A	non-MIL	N/A
P2096	Post Catalyst Fuel Trim System Too Lean (Bank 1)	MIL	MIL	MIL
P2097	Post Catalyst Fuel Trim System Too Rich (Bank 1)	MIL	MIL	MIL
P2098	Post Catalyst Fuel Trim System Too Lean (Bank 2)	MIL	MIL	MIL
P2099	Post Catalyst Fuel Trim System Too Rich (Bank 2)	MIL	MIL	MIL
P2101	Throttle Actuator "A" Control Motor Circuit Range/Performance	MIL	MIL	MIL
P2107	Throttle Actuator "A" Control Module Processor	MIL	MIL	MIL

		6.8L 2V LPG E-450 Custom Body	6.8L 3V LPG F-650 (dual tank)	6.8L 3V LPG F-53 (Motorhome) F-59 (Step Van)
Code	Description	2016-2017	2016-2017	2016-2017
P2111	Throttle Actuator "A" Control System - Stuck Open	MIL	MIL	MIL
P2112	Throttle Actuator "A" Control System - Stuck Closed	MIL	MIL	MIL
P2122	Throttle/Pedal Position Sensor/Switch "D" Circuit Low	non-MIL	non-MIL	non-MIL
P2123	Throttle/Pedal Position Sensor/Switch "D" Circuit High	non-MIL	non-MIL	non-MIL
P2127	Throttle/Pedal Position Sensor/Switch "E" Circuit Low	non-MIL	non-MIL	non-MIL
P2128	Throttle/Pedal Position Sensor/Switch "E" Circuit High	non-MIL	non-MIL	non-MIL
P2135	Throttle/Pedal Position Sensor/Switch "A"/"B" Voltage Correlation	MIL	MIL	MIL
P2138	Throttle/Pedal Position Sensor/Switch "D"/"E" Voltage Correlation	non-MIL	non-MIL	non-MIL
P2195	Heated Exhaust Gas Oxygen Sensor Stuck	MIL	MIL	MIL
P2196	O2 Sensor Signal Biased/Stuck Rich (Bank 1 Sensor 1)	2	MIL	MIL
P2197	Heated Exhaust Gas Oxygen Sensor Stuck	2	MIL	MIL
P2198	O2 Sensor Signal Biased/Stuck Rich (Bank 2 Sensor 1)	2	MIL	MIL
P219A	Bank 1 Air-Fuel Ratio Imbalance	N/A	MIL	MIL
P219B	Bank 2 Air-Fuel Ratio Imbalance	N/A	MIL	MIL
P2237	O2 Sensor Positive Current Control Circuit/Open (Bank 1 Sensor 1)	MIL	MIL	MIL
P2240	O2 Sensor Positive Current Control Circuit/Open (Bank 2 Sensor 1)	MIL	MIL	MIL
P2243	O2 Sensor Reference Voltage Circuit/Open (Bank 1 Sensor 1)	MIL	MIL	MIL
P2247	O2 Sensor Reference Voltage Circuit/Open (Bank 2 Sensor 1)	MIL	MIL	MIL
P2251	O2 Sensor Negative Current Control Circuit/Open (Bank 1 Sensor 1)	MIL	MIL	MIL
P2254	O2 Sensor Negative Current Control Circuit/Open (Bank 2 Sensor 1)	MIL	MIL	MIL
P2535	Ignition Switch Run/Start Position Circuit High	non-MIL	non-MIL	non-MIL
P25B0	Fuel Level Sensor "A" Stuck	non-MIL	non-MIL	non-MIL
P25B1	Fuel Level Sensor "B" Stuck	N/A	non-MIL	N/A
P2610	ECM/PCM Engine Off Timer Performance	MIL	MIL	MIL
P2632	Fuel Pump "B" Control Circuit/Open	non-MIL	non-MIL	N/A
P264F	Engine Serial Number Not Programmed or Incompatible	MIL	MIL	MIL
P2665	Fuel Shutoff Valve "B" Control Circuit/Open	non-MIL	non-MIL	non-MIL
P2669	Actuator Supply Voltage "B" Circuit/Open	MIL	MIL	MIL
P26B3	Fuel Shutoff Valve "A" Control Circuit Performance/Stuck Off	non-MIL	non-MIL	non-MIL
P26B5	Fuel Shutoff Valve "B" Control Circuit Performance/Stuck Off	non-MIL	non-MIL	non-MIL
P26EA	Fuel Pump Control Module "B"	non-MIL	non-MIL	N/A
P2700	Transmission Friction Element "A" Apply Time Range/Performance	non-MIL	non-MIL	non-MIL
P2701	Transmission Friction Element "B" Apply Time Range/Performance	non-MIL	non-MIL	non-MIL
P2702	Transmission Friction Element "C" Apply Time Range/Performance	non-MIL	non-MIL	non-MIL
P2703	Transmission Friction Element "D" Apply Time Range/Performance	non-MIL	non-MIL	non-MIL
P2704	Transmission Friction Element "E" Apply Time Range/Performance	non-MIL	non-MIL	non-MIL
P2705	Transmission Friction Element "F" Apply Time Range/Performance	non-MIL	non-MIL	non-MIL
P2758	Torque Converter Clutch Pressure Control Solenoid Stuck On	MIL	MIL	MIL
P2760	Torque Converter Clutch Pressure Control Solenoid Intermittent	MIL	MIL	MIL

		6.8L 2V LPG E-450 Custom Body	6.8L 3V LPG F-650 (dual tank)	6.8L 3V LPG F-53 (Motorhome) F-59 (Step Van)
Code	Description	2016-2017	2016-2017	2016-2017
U0108	Lost Communication with Alternative Fuel Control Module	MIL	MIL	MIL
U0109	Loss of Communication on Fuel Pump Control Module "A"	non-MIL	non-MIL	non-MIL
U0121	Lost Communication With Anti-Lock Brake System (ABS) Control Module	non-MIL	non-MIL	non-MIL
U0140	Lost Communication With Body Control Module	N/A	non-MIL	N/A
U016C	Loss of Communication on Fuel Pump Control Module "B"	non-MIL	non-MIL	N/A
U0212	Lost Communication With Steering Column Control Module	N/A	non-MIL	N/A
U0300	Internal Control Module Software Incompatibility	MIL	MIL	MIL
U0415	Invalid Data Received from Anti-Lock Brake System (ABS) Control Module	N/A	non-MIL	N/A
U0422	Invalid Data Received from Body Control Module	N/A	non-MIL	N/A
U210B	Lost Communication Between Fuel Pump Control Module "A" and Restraint Control Module	non-MIL	N/A	N/A
U210C	Lost Communication Between Fuel Pump Control Module "B" and Restraint Control Module	non-MIL	N/A	N/A

N/A	Code not present
non-MIL	DTC – non MIL
MIL	DTC – MIL (two trips)

NOTE: For any DTCs not specific to the ROUSH CleanTech fuel system, please reference the Ford PC/ED manual.

2018 Diagnostic Codes

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
B1342	ECU is Faulted	non-MIL	non-MIL	N/A	OFF	N/A	OFF
C05D7		N/A	N/A	N/A	non-MIL	N/A	OFF
P0005	Fuel Shutoff Valve "A" Control Circuit/Open	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0030	HO2S Heater Control Circuit (Bank 1 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0036	HO2S Heater Control Circuit (Bank 1 Sensor 2)	MIL	MIL	MIL	MIL	MIL	MIL
P0040	Oxygen Sensor Signals Swapped Bank 1 Sensor 1/Bank 2 Sensor 1	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0041	Oxygen Sensor Signals Swapped Bank 1 Sensor 2 / Bank 2 Sensor 2	non-MIL	OFF	OFF	OFF	OFF	OFF
P0050	HO2S Heater Control Circuit (Bank 2 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0056	HO2S Heater Control Circuit (Bank 2 Sensor 2)	MIL	OFF	OFF	OFF	OFF	OFF
P0068	MAP/MAF - Throttle Position Correlation	MIL	MIL	MIL	MIL	MIL	MIL

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
P0071	Ambient Air Temperature Sensor Circuit "A" Range/Performance	N/A	N/A	MIL	N/A	N/A	N/A
P0072	Ambient Air Temperature Sensor Circuit "A" Low	N/A	N/A	MIL	N/A	N/A	N/A
P0073	Ambient Air Temperature Sensor Circuit "A" High	N/A	N/A	MIL	N/A	N/A	N/A
P0090	Fuel Pressure Regulator Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P009B	Fuel Pressure Relief Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P009E	Fuel Pressure Relief Control Performance/Stuck Off	MIL	MIL	MIL	MIL	MIL	MIL
P009F	Fuel Pressure Relief Control Performance/Stuck On	MIL	MIL	MIL	MIL	MIL	MIL
P0100	Mass or Volume Air Flow Sensor "A" Circuit	MIL	MIL	MIL	MIL	MIL	MIL
P0102	Mass or Volume Air Flow Sensor "A" Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0103	Mass or Volume Air Flow Sensor "A" Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P0104	Mass or Volume Air Flow Sensor "A" Circuit Intermittent	MIL	MIL	MIL	MIL	MIL	MIL
P0111	Intake Air Temperature Sensor 1 Circuit Range/Performance (Bank 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0112	Intake Air Temperature Sensor 1 Circuit Low (Bank 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0113	Intake Air Temperature Sensor 1 Circuit High (Bank 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0116	Engine Coolant Temperature Sensor 1 Circuit Range/Performance	non-MIL	non-MIL	MIL	MIL	MIL	MIL
P0122	Throttle/Pedal Position Sensor "A" Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0123	Throttle/Pedal Position Sensor "A" Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P0125	Insufficient Coolant Temp For Closed Loop Fuel Control	MIL	MIL	MIL	MIL	MIL	MIL
P0128	Coolant Thermostat (Coolant Temp Below Thermostat Regulating Temperature)	MIL	MIL	MIL	MIL	MIL	MIL
P0131	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0132	O2 Sensor Circuit High Voltage (Bank 1 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0133	O2 Sensor Circuit Slow Response (Bank 1 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0135	O2 Sensor Heater Circuit (Bank 1 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0137	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 2)	MIL	MIL	MIL	MIL	MIL	MIL
P0138	O2 Sensor Circuit High Voltage (Bank 1 Sensor 2)	MIL	MIL	MIL	MIL	MIL	MIL
P013A	O2 Sensor Slow Response - Rich to Lean (Bank 1 Sensor 2)	MIL	MIL	MIL	MIL	MIL	MIL

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
P013C	O2 Sensor Slow Response - Rich to Lean (Bank 2 Sensor 2)	MIL	OFF	OFF	OFF	OFF	OFF
P013E	O2 Sensor Delayed Response - Rich to Lean (Bank 1 Sensor 2)	MIL	MIL	MIL	MIL	MIL	MIL
P0141	O2 Sensor Heater Circuit (Bank 1 Sensor 2)	MIL	MIL	MIL	MIL	MIL	MIL
P0148	Fuel Delivery Error	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P014A	O2 Sensor Delayed Response - Rich to Lean (Bank 2 Sensor 2)	MIL	OFF	OFF	OFF	OFF	OFF
P0151	O2 Sensor Circuit Low Voltage (Bank 2 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0152	O2 Sensor Circuit High Voltage (Bank 2 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0153	O2 Sensor Circuit Slow Response (Bank 2 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0155	O2 Sensor Heater Circuit (Bank 2 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0157	O2 Sensor Circuit Low Voltage (Bank 2 Sensor 2)	MIL	OFF	OFF	OFF	OFF	OFF
P0158	O2 Sensor Circuit High Voltage (Bank 2 Sensor 2)	MIL	OFF	OFF	OFF	OFF	OFF
P0161	O2 Sensor Heater Circuit (Bank 2 Sensor 2)	MIL	OFF	OFF	OFF	OFF	OFF
P0171	System Too Lean (Bank 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0172	System Too Rich (Bank 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0174	System Too Lean (Bank 2)	MIL	MIL	MIL	MIL	MIL	MIL
P0175	System Too Rich (Bank 2)	MIL	MIL	MIL	MIL	MIL	MIL
P0181	Fuel Temperature Sensor "A" Circuit Range/Performance	MIL	MIL	MIL	MIL	MIL	MIL
P0182	Fuel Temperature Sensor "A" Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0183	Fuel Temperature Sensor "A" Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P0192	Fuel Rail Pressure Sensor Circuit Low (Bank 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0193	Fuel Rail Pressure Sensor Circuit High (Bank 1)	MIL	MIL	MIL	MIL	MIL	MIL
P019F	Alternative Fuel Tank "A" Pressure Sensor Range/Performance	MIL	MIL	MIL	MIL	MIL	MIL
P01A0	Alternate Fuel Tank "A" Pressure Sensor Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P01A1	Alternate Fuel Tank "A" Pressure Sensor Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P01A2	Alternative Fuel Tank "A" Pressure Sensor Circuit Intermittent/ Erratic	MIL	MIL	MIL	MIL	MIL	MIL
P01A9	Alternative Fuel Rail/System Pressure - Too High	MIL	MIL	MIL	MIL	MIL	MIL
P01AC	Alternate Fuel Tank Temperature Sensor Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P01AD	Alternate Fuel Tank Temperature Sensor High	MIL	MIL	MIL	MIL	MIL	MIL
P01AE	Alternate Fuel Tank Temperature Sensor Circuit Intermittent/Erratic	MIL	MIL	MIL	MIL	MIL	MIL

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
P0201	Cylinder 1 Injector "A" Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0202	Cylinder 2 Injector "A" Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0203	Cylinder 3 Injector "A" Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0204	Cylinder 4 Injector "A" Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0205	Cylinder 5 Injector "A" Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0206	Cylinder 6 Injector "A" Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0207	Cylinder 7 Injector "A" Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0208	Cylinder 8 Injector "A" Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0209	Cylinder 9 Injector "A" Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0210	Cylinder 10 Injector "A" Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0217	Engine Coolant Over Temperature Condition	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0218	Transmission Fluid Temperature Sensor "A" Over Temperature Condition	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0219	Engine Overspeed Condition	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0222	Throttle/Pedal Position Sensor/Switch "B" Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0223	Throttle/Pedal Position Sensor/Switch "B" Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P025A	Fuel Pump Module "A" Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P025B	Fuel Pump Module "A" Control Circuit Range/Performance	MIL	MIL	MIL	MIL	MIL	MIL
P027B	Fuel Pump Module "B" Control Circuit Range/Performance	MIL	MIL	MIL	MIL	MIL	MIL
P0297	Vehicle Overspeed Condition	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0298	Engine Oil Over Temperature Condition	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0300	Random Misfire Detected	MIL	MIL	MIL	MIL	MIL	MIL
P0301	Cylinder 1 Misfire Detected	MIL	MIL	MIL	MIL	MIL	MIL
P0302	Cylinder 2 Misfire Detected	MIL	MIL	MIL	MIL	MIL	MIL
P0303	Cylinder 3 Misfire Detected	MIL	MIL	MIL	MIL	MIL	MIL
P0304	Cylinder 4 Misfire Detected	MIL	MIL	MIL	MIL	MIL	MIL
P0305	Cylinder 5 Misfire Detected	MIL	MIL	MIL	MIL	MIL	MIL
P0306	Cylinder 6 Misfire Detected	MIL	MIL	MIL	MIL	MIL	MIL
P0307	Cylinder 7 Misfire Detected	MIL	MIL	MIL	MIL	MIL	MIL
P0308	Cylinder 8 Misfire Detected	MIL	MIL	MIL	MIL	MIL	MIL
P0309	Cylinder 9 Misfire Detected	MIL	MIL	MIL	MIL	MIL	MIL
P0310	Cylinder 10 Misfire Detected	MIL	MIL	MIL	MIL	MIL	MIL
P0313	Misfire Detected With Low Fuel	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0315	Crankshaft Position System Variation Not Learned	MIL	MIL	MIL	MIL	MIL	MIL
P0316	Misfire Detected On Startup (First 1000 Revolutions)	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0339	Crankshaft Position Sensor "A" Circuit Intermittent	MIL	MIL	MIL	MIL	MIL	MIL
P0340	Camshaft Position Sensor "A" Circuit (Bank 1 or single sensor)	MIL	MIL	MIL	MIL	MIL	MIL

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
P0351	Ignition Coil "A" Primary Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0352	Ignition Coil "B" Primary Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0353	Ignition Coil "C" Primary Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0354	Ignition Coil "D" Primary Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0355	Ignition Coil "E" Primary Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0356	Ignition Coil "F" Primary Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0357	Ignition Coil "G" Primary Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0358	Ignition Coil "H" Primary Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0359	Ignition Coil "I" Primary Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0360	Ignition Coil "J" Primary Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0420	Catalyst System Efficiency Below Threshold (Bank 1)	MIL	MIL	MIL	MIL	MIL	MIL
P0430	Catalyst System Efficiency Below Threshold (Bank 2)	MIL	OFF	OFF	OFF	OFF	OFF
P0442	EVAP System Leak Detected (small leak)	OFF	MIL	MIL	MIL	MIL	MIL
P0443	EVAP System Purge Control Valve "A" Circuit	MIL	MIL	MIL	MIL	MIL	MIL
P0446	EVAP System Vent Control Circuit	MIL	MIL	MIL	MIL	MIL	MIL
P0451	EVAP System Pressure Sensor/Switch Range/Performance	MIL	MIL	MIL	MIL	MIL	MIL
P0452	EVAP System Pressure Sensor/Switch Low	MIL	MIL	MIL	MIL	MIL	MIL
P0453	EVAP System Pressure Sensor/Switch High	MIL	MIL	MIL	MIL	MIL	MIL
P0454	EVAP System Pressure Sensor/Switch Intermittent	MIL	MIL	MIL	MIL	MIL	MIL
P0455	EVAP System Leak Detected (large leak)	MIL	MIL	MIL	MIL	MIL	MIL
P0456	EVAP System Leak Detected (very small leak)	MIL	OFF	OFF	OFF	OFF	OFF
P0460	Fuel Level Sensor "A" Circuit	N/A	N/A	N/A	N/A	non-MIL	N/A
P0461	Fuel Level Sensor "A" Circuit Range/Performance	MIL	OFF	OFF	OFF	OFF	OFF
P0462	Fuel Level Sensor "A" Circuit Low	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0463	Fuel Level Sensor "A" Circuit High	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0496	EVAP System High Purge Flow	MIL	N/A	N/A	N/A	N/A	N/A
P0504	Brake Switch "A"/"B" Correlation	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0505	Idle Control System	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0506	Idle Control System - RPM Lower Than Expected	MIL	MIL	MIL	MIL	MIL	MIL
P0507	Idle Control System - RPM Higher Than Expected	MIL	MIL	MIL	MIL	MIL	MIL

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
P050A	Cold Start Idle Control System Performance	MIL	MIL	MIL	MIL	MIL	MIL
P050B	Cold Start Ignition Timing Performance	MIL	MIL	MIL	MIL	MIL	MIL
P050E	Cold Start Engine Exhaust Temperature Too Low	MIL	MIL	MIL	MIL	MIL	MIL
P0532	A/C Refrigerant Pressure Sensor "A" Circuit Low	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0533	A/C Refrigerant Pressure Sensor "A" Circuit High	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0562	System Voltage Low	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0563	System Voltage High	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0572	Brake Switch "A" Circuit Low	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0573	Brake Switch "A" Circuit High	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0579	Cruise Control Multi-Function Input "A" Circuit Range/Performance	non-MIL	non-MIL	N/A	non-MIL	N/A	non-MIL
P0581	Cruise Control Multi-Function Input "A" Circuit High	non-MIL	non-MIL	N/A	non-MIL	N/A	OFF
P0600	Serial Communication Link	MIL	MIL	MIL	MIL	MIL	MIL
P0602	Powertrain Control Module Programming Error	MIL	MIL	MIL	MIL	MIL	MIL
P0604	Internal Control Module Random Access Memory (RAM) Error	MIL	MIL	MIL	MIL	MIL	MIL
P0605	Internal Control Module Read Only Memory (ROM) Error	MIL	MIL	MIL	MIL	MIL	MIL
P0607	Control Module Performance	MIL	MIL	MIL	MIL	MIL	MIL
P060A	Internal Control Module Monitoring Processor Performance	MIL	MIL	MIL	MIL	MIL	MIL
P060B	Internal Control Module A/D Processing Performance	MIL	MIL	MIL	MIL	MIL	MIL
P060C	Internal Control Module Main Processor Performance	MIL	MIL	MIL	MIL	MIL	MIL
P060D	Internal Control Module Accelerator Pedal Position Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0610	Control Module Vehicle Options Error	MIL	MIL	MIL	MIL	MIL	MIL
P061A	Internal Control Module Torque Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P061B	Internal Control Module Torque Calculation Performance	MIL	MIL	MIL	MIL	MIL	MIL
P061C	Internal Control Module Engine RPM Performance	MIL	MIL	MIL	MIL	MIL	MIL
P061D	Internal Control Module Engine Air Mass Performance	MIL	MIL	MIL	MIL	MIL	MIL
P0620	Generator Control Circuit	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	OFF
P0625	Generator Field/F Terminal Circuit Low	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0626	Generator Field/F Terminal Circuit High	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0627	Fuel Pump "A" Control Circuit Open	MIL	MIL	MIL	MIL	MIL	MIL
P062C	Internal Control Module Vehicle Speed Performance	OFF	OFF	non-MIL	OFF	OFF	OFF
P062F	Internal Control Module EEPROM Error	N/A	N/A	non-MIL	N/A	non-MIL	N/A

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
P0630	VIN Not Programmed or Incompatible - ECM/PCM	N/A	N/A	non-MIL	N/A	non-MIL	N/A
P0642	Sensor Reference Voltage "A" Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0643	Sensor Reference Voltage "A" Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P0645	A/C Clutch Relay Control Circuit	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P064A	Fuel Pump Control Module "A"	MIL	MIL	MIL	MIL	MIL	MIL
P064D	Internal Control Module O2 Sensor Processor Performance (Bank 1)	MIL	MIL	MIL	MIL	MIL	MIL
P064E	Internal Control Module O2 Sensor Processor Performance (Bank 2)	MIL	MIL	MIL	MIL	MIL	MIL
P0657	Actuator Supply Voltage "A" Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P065B	Generator Control Circuit Range/ Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	OFF
P068A	ECM/PCM Power Relay De-Energized - Too Early	MIL	MIL	MIL	MIL	MIL	MIL
P06B8	Internal Control Module Non-Volatile Random Access Memory (NVRAM) Error	MIL	MIL	MIL	MIL	MIL	MIL
P06E4	Control Module Wake-up Circuit Performance	OFF	OFF	non-MIL	OFF	non-MIL	OFF
P06E9	Engine Starter Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0701	Transmission Control System Range/ Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0702	Transmission Control System Electrical	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0706	Transmission Range Sensor "A" Circuit Range/Performance	MIL	MIL	MIL	MIL	MIL	MIL
P0707	Transmission Range Sensor "A" Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0708	Transmission Range Sensor "A" Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P0710	Transmission Fluid Temperature Sensor "A" Circuit	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0711	Transmission Fluid Temperature Sensor "A" Circuit Range/ Performance	MIL	MIL	MIL	MIL	MIL	MIL
P0712	Transmission Fluid Temperature Sensor "A" Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0713	Transmission Fluid Temperature Sensor "A" Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P0715	Input/Turbine Shaft Speed Sensor "A" Circuit	MIL	MIL	MIL	MIL	MIL	MIL
P0717	Input/Turbine Shaft Speed Sensor "A" Circuit No Signal	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0718	Input/Turbine Shaft Speed Sensor "A" Circuit Intermittent	MIL	MIL	MIL	MIL	MIL	MIL
P0720	Output Shaft Speed Sensor Circuit	MIL	MIL	MIL	MIL	MIL	MIL
P0721	Output Shaft Speed Sensor Circuit Range/Performance	OFF	OFF	MIL	OFF	OFF	OFF
P0722	Output Shaft Speed Sensor Circuit No Signal	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0729	Gear 6 Incorrect Ratio	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0731	Gear 1 Incorrect Ratio	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
P0732	Gear 2 Incorrect Ratio	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0733	Gear 3 Incorrect Ratio	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0734	Gear 4 Incorrect Ratio	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0735	Gear 5 Incorrect Ratio	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0740	Torque Converter Clutch Solenoid Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0741	Torque Converter Clutch Solenoid Circuit Performance/Stuck Off	MIL	MIL	MIL	MIL	MIL	MIL
P0742	Torque Converter Clutch Solenoid Circuit Stuck On	MIL	MIL	MIL	MIL	MIL	MIL
P0743	Torque Converter Clutch Solenoid Circuit Electrical	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0744	Torque Converter Clutch Solenoid Circuit Intermittent	MIL	MIL	MIL	MIL	MIL	MIL
P0748	Pressure Control Solenoid "A" Electrical	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0750	Shift Solenoid "A"	MIL	MIL	MIL	MIL	MIL	MIL
P0751	Shift Solenoid "A" Performance/Stuck Off	MIL	MIL	MIL	MIL	MIL	MIL
P0752	Shift Solenoid "A" Stuck On	MIL	MIL	MIL	MIL	MIL	MIL
P0753	Shift Solenoid "A" Electrical	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0754	Shift Solenoid "A" Intermittent	MIL	MIL	MIL	MIL	MIL	MIL
P0755	Shift Solenoid "B"	MIL	MIL	MIL	MIL	MIL	MIL
P0756	Shift Solenoid "B" Performance/Stuck Off	MIL	MIL	MIL	MIL	MIL	MIL
P0757	Shift Solenoid "B" Stuck On	MIL	MIL	MIL	MIL	MIL	MIL
P0758	Shift Solenoid "B" Electrical	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0759	Shift Solenoid "B" Intermittent	MIL	MIL	MIL	MIL	MIL	MIL
P0760	Shift Solenoid "C"	MIL	MIL	MIL	MIL	MIL	MIL
P0761	Shift Solenoid "C" Performance/Stuck Off	MIL	MIL	MIL	MIL	MIL	MIL
P0762	Shift Solenoid "C" Stuck On	MIL	MIL	MIL	MIL	MIL	MIL
P0763	Shift Solenoid "C" Electrical	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0764	Shift Solenoid "C" Intermittent	MIL	MIL	MIL	MIL	MIL	MIL
P0765	Shift Solenoid "D"	MIL	MIL	MIL	MIL	MIL	MIL
P0766	Shift Solenoid "D" Performance/Stuck Off	MIL	MIL	MIL	MIL	MIL	MIL
P0767	Shift Solenoid "D" Stuck On	MIL	MIL	MIL	MIL	MIL	MIL
P0768	Shift Solenoid "D" Electrical	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0769	Shift Solenoid "D" Intermittent	MIL	MIL	MIL	MIL	MIL	MIL
P0770	Shift Solenoid "E"	MIL	MIL	MIL	MIL	MIL	MIL
P0771	Shift Solenoid "E" Performance/Stuck Off	MIL	MIL	MIL	MIL	MIL	MIL
P0772	Shift Solenoid "E" Stuck On	MIL	MIL	MIL	MIL	MIL	MIL
P0773	Shift Solenoid "E" Electrical	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P0774	Shift Solenoid "E" Intermittent	MIL	MIL	MIL	MIL	MIL	MIL
P0882	TCM Power Input Signal Low	MIL	MIL	MIL	MIL	MIL	MIL
P0883	TCM Power Input Signal High	MIL	MIL	MIL	MIL	MIL	MIL
P0885	TCM Power Relay Control Circuit /Open	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
P0960	Pressure Control Solenoid "A" Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P0961	Pressure Control Solenoid "A" Control Circuit Range/Performance	MIL	MIL	MIL	MIL	MIL	MIL
P0962	Pressure Control Solenoid "A" Control Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0963	Pressure Control Solenoid "A" Control Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P0973	Shift Solenoid "A" Control Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0974	Shift Solenoid "A" Control Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P0976	Shift Solenoid "B" Control Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0977	Shift Solenoid "B" Control Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P0979	Shift Solenoid "C" Control Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0980	Shift Solenoid "C" Control Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P0982	Shift Solenoid "D" Control Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0983	Shift Solenoid "D" Control Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P0985	Shift Solenoid "E" Control Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P0986	Shift Solenoid "E" Control Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P1001	KOER Not Able to Complete, KOER Aborted	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1002	Fuel Shutoff Valve "C" Control Circuit/Open	OFF	OFF	OFF	OFF	non-MIL	OFF
P1070		non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1101	Mass Air Flow Sensor Out Of Self Test Range	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1124	Throttle Position Sensor "A" Out Of Self Test Range	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1127	Exhaust Temperature Out of Range, O2 Sensor Tests Not Completed	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P115E	Throttle Actuator Control Throttle Body Air Flow Trim at Max Limit	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P116E	Fuel Pressure Relief Valve Actuated	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1260	Theft Detected, Vehicle Immobilized	non-MIL	non-MIL	N/A	OFF	N/A	OFF
P1285	Cylinder Head Over Temperature Condition	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1288	Cylinder Head Temperature Sensor Out Of Self Test Range	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1289	Cylinder Head Temperature Sensor Circuit High	MIL	MIL	MIL	MIL	MIL	MIL
P1290	Cylinder Head Temperature Sensor Circuit Low	MIL	MIL	MIL	MIL	MIL	MIL
P1299	Cylinder Head Over Temperature Protection Active	MIL	MIL	MIL	MIL	MIL	MIL
P1336	Crankshaft/Camshaft Sensor Range/Performance	MIL	MIL	MIL	MIL	MIL	MIL
P1397	System Voltage Out Of Self Test Range	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P143D	A/C Clutch Relay Control "B" Circuit	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1450	Unable to Bleed Up Fuel Tank Vacuum	N/A	MIL	MIL	MIL	MIL	MIL
P1453	Fuel Tank Pressure Relief Valve Malfunction	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
P1456	Fuel Tank Temperature Sensor Circuit	MIL	MIL	MIL	MIL	MIL	MIL
P1464	A/C Demand Out Of Self Test Range	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1501	Vehicle Speed Sensor Out Of Self Test Range	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1561	Brake Line Pressure Sensor Circuit	non-MIL	non-MIL	N/A	non-MIL	N/A	non-MIL
P1575	Pedal Position Out Of Self Test Range	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1594	Forced Engine Shutdown - Remote Start System Fault, No Unattended Vehicle Timeout	OFF	OFF	OFF	OFF	OFF	non-MIL
P1595	Forced Engine Shutdown - Remote Start System Fault, Transmission Range Not In Park Position	OFF	OFF	non-MIL	non-MIL	non-MIL	non-MIL
P1602	Immobilizer/ECM Communication Error	non-MIL	non-MIL	N/A	OFF	N/A	OFF
P160A	Control Module Vehicle Options Reconfiguration Error	N/A	N/A	non-MIL	N/A	non-MIL	N/A
P161A	Incorrect Response from Immobilizer Control Module	N/A	N/A	non-MIL	N/A	non-MIL	N/A
P1622	Immobilizer ID Does Not Match	non-MIL	non-MIL	N/A	OFF	N/A	OFF
P162E	Internal Control Module PTO Control Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P162F	Starter Motor Disabled - Engine Crank Time Too Long	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1633	Keep Alive Power Voltage Too Low	non-MIL	non-MIL	OFF	non-MIL	OFF	non-MIL
P1635	Tire/Axle Out of Acceptable Range	non-MIL	non-MIL	N/A	non-MIL	N/A	non-MIL
P1636	Inductive Signature Chip Communication Error	MIL	MIL	MIL	MIL	MIL	MIL
P1639	Vehicle ID Block Corrupted, Not Programmed	MIL	MIL	non-MIL	MIL	non-MIL	MIL
P163E	Transmission Control Module Programming Error	MIL	MIL	MIL	MIL	MIL	MIL
P163F	Transmission ID Block Corrupted, Not Programmed	MIL	MIL	MIL	MIL	MIL	MIL
P1646	Linear O2 Sensor Control Chip (Bank 1)	MIL	MIL	MIL	MIL	MIL	MIL
P1647	Linear O2 Sensor Control Chip (Bank 2)	MIL	MIL	MIL	MIL	MIL	MIL
P166A	Restraints Deployment Communication Circuit	N/A	N/A	non-MIL	N/A	N/A	N/A
P1674	Control Module Software Corrupted	MIL	MIL	MIL	MIL	MIL	MIL
P1702	Transmission Range Sensor Circuit Intermittent	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1703	Brake Switch Out Of Self Test Range	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1705	Transmission Range Circuit Not Indicating Park/Neutral During Self Test	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1711	Transmission Fluid Temperature Sensor Out Of Self Test Range	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1744	Torque Converter Clutch Solenoid Circuit Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P177F	Unable To Fully Engage Neutral	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
P1780	Transmission Control Switch (O/D Cancel) Circuit Out Of Self Test Range	non-MIL	non-MIL	OFF	non-MIL	OFF	OFF
P1783	Transmission Overtemperature Condition	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1921	Transmission Range Signal	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P1934	Vehicle Speed Signal	OFF	OFF	MIL	OFF	MIL	OFF
P193C	Steering Wheel Angle Signal	OFF	OFF	non-MIL	OFF	OFF	OFF
P193E	A/C Clutch Request Signal	OFF	OFF	non-MIL	OFF	non-MIL	OFF
P2067	Fuel Level Sensor "B" Circuit Low	OFF	OFF	OFF	OFF	non-MIL	OFF
P2068	Fuel Level Sensor "B" Circuit High	OFF	OFF	OFF	OFF	non-MIL	OFF
P2096	Post Catalyst Fuel Trim System Too Lean (Bank 1)	MIL	MIL	MIL	MIL	MIL	MIL
P2097	Post Catalyst Fuel Trim System Too Rich (Bank 1)	MIL	MIL	MIL	MIL	MIL	MIL
P2098	Post Catalyst Fuel Trim System Too Lean (Bank 2)	MIL	MIL	MIL	MIL	MIL	MIL
P2099	Post Catalyst Fuel Trim System Too Rich (Bank 2)	MIL	MIL	MIL	MIL	MIL	MIL
P2101	Throttle Actuator "A" Control Motor Circuit Range/Performance	MIL	MIL	MIL	MIL	MIL	MIL
P2107	Throttle Actuator "A" Control Module Processor	MIL	MIL	MIL	MIL	MIL	MIL
P2111	Throttle Actuator "A" Control System - Stuck Open	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2112	Throttle Actuator "A" Control System - Stuck Closed	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2119	Throttle Actuator "A" Control Throttle Body Range/Performance	MIL	MIL	MIL	MIL	MIL	MIL
P2122	Throttle/Pedal Position Sensor/Switch "D" Circuit Low	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2123	Throttle/Pedal Position Sensor/Switch "D" Circuit High	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2127	Throttle/Pedal Position Sensor/Switch "E" Circuit Low	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2128	Throttle/Pedal Position Sensor/Switch "E" Circuit High	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2135	Throttle/Pedal Position Sensor/Switch "A"/"B" Voltage Correlation	MIL	MIL	MIL	MIL	MIL	MIL
P2138	Throttle/Pedal Position Sensor/Switch "D"/"E" Voltage Correlation	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2195	Heated Exhaust Gas Oxygen Sensor Stuck	MIL	MIL	MIL	MIL	MIL	MIL
P2196	O2 Sensor Signal Biased/Stuck Rich (Bank 1 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P2197	O2 Sensor Signal Biased/Stuck Lean (Bank 2 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P2198	O2 Sensor Signal Biased/Stuck Rich (Bank 2 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P219A	Bank 1 Air-Fuel Ratio Imbalance	MIL	MIL	MIL	MIL	MIL	MIL
P219B	Bank 2 Air-Fuel Ratio Imbalance	MIL	MIL	MIL	MIL	MIL	MIL

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
P2237	O2 Sensor Positive Current Control Circuit/Open (Bank 1 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P2240	O2 Sensor Positive Current Control Circuit/Open (Bank 2 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P2243	O2 Sensor Reference Voltage Circuit/Open (Bank 1 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P2247	O2 Sensor Reference Voltage Circuit/Open (Bank 2 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P2251	O2 Sensor Negative Current Control Circuit/Open (Bank 1 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P2254	O2 Sensor Negative Current Control Circuit/Open (Bank 2 Sensor 1)	MIL	MIL	MIL	MIL	MIL	MIL
P2535	Ignition Switch Run/Start Position Circuit High	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P25B0	Fuel Level Sensor "A" Stuck	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P25B1	Fuel Level Sensor "B" Stuck	OFF	OFF	OFF	OFF	non-MIL	OFF
P2610	ECM/PCM Engine Off Timer Performance	MIL	MIL	MIL	MIL	MIL	MIL
P2632	Fuel Pump "B" Control Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P264F	Engine Serial Number Not Programmed or Incompatible	MIL	MIL	MIL	MIL	MIL	MIL
P2665	Fuel Shutoff Valve "B" Control Circuit/Open	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2669	Actuator Supply Voltage "B" Circuit/Open	MIL	MIL	MIL	MIL	MIL	MIL
P26B3	Fuel Shutoff Valve "A" Control Circuit Performance/Stuck Off	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P26B5	Fuel Shutoff Valve "B" Control Circuit Performance/Stuck Off	MIL	MIL	MIL	MIL	MIL	MIL
P26EA	Fuel Pump Control Module "B"	MIL	MIL	MIL	MIL	MIL	MIL
P2700	Transmission Friction Element "A" Apply Time Range/Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2701	Transmission Friction Element "B" Apply Time Range/Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2702	Transmission Friction Element "C" Apply Time Range/Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2703	Transmission Friction Element "D" Apply Time Range/Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2704	Transmission Friction Element "E" Apply Time Range/Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2705	Transmission Friction Element "F" Apply Time Range/Performance	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL	non-MIL
P2758	Torque Converter Clutch Pressure Control Solenoid Stuck On	MIL	MIL	MIL	MIL	MIL	MIL
P2760	Torque Converter Clutch Pressure Control Solenoid Intermittent	MIL	MIL	MIL	MIL	MIL	MIL
U0108	Lost Communication with Alternative Fuel Control Module	MIL	MIL	MIL	MIL	MIL	MIL
U0109	Loss of Communication on Fuel Pump Control Module "A"	MIL	MIL	MIL	MIL	MIL	MIL
U0121	Lost Communication With Anti-Lock Brake System (ABS) Control Module	non-MIL	non-MIL	non-MIL	OFF	non-MIL	OFF

Code	Description	2018 E-350	2018 E-450	2018 F-450/ F-550	2018 F53/ F59	2018 F-650/ F-750	2018 Blue Bird Vision (Propane)
U0126	Lost Communication With Steering Angle Sensor Module	N/A	N/A	non-MIL	N/A	N/A	N/A
U0140	Lost Communication With Body Control Module	OFF	OFF	non-MIL	OFF	non-MIL	OFF
U016C	Loss of Communication on Fuel Pump Control Module "B"	MIL	MIL	MIL	MIL	MIL	MIL
U0212	Lost Communication With Steering Column Control Module	N/A	N/A	non-MIL	N/A	non-MIL	N/A
U0300	Internal Control Module Software Incompatibility	MIL	MIL	MIL	MIL	MIL	MIL
U0415	Invalid Data Received from Anti-Lock Brake System (ABS) Control Module	OFF	OFF	non-MIL	OFF	non-MIL	OFF
U0422	Invalid Data Received from Body Control Module	N/A	N/A	non-MIL	N/A	non-MIL	N/A
U210B	Lost Communication Between Fuel Pump Control Module "A" and Restraint Control Module	MIL	MIL	OFF	OFF	OFF	OFF
U1012	Invalid Internal Control Module Monitoring Data Received from Anti-Lock Brake System (ABS) Control Module	OFF	OFF	non-MIL	OFF	OFF	OFF
U210C	Lost Communication Between Fuel Pump Control Module "B" and Restraint Control Module	MIL	MIL	OFF	OFF	OFF	OFF

N/A & OFF	Code not present
non-MIL	DTC – non MIL
MIL	DTC – MIL (two trips)

NOTE: For any DTCs not specific to the ROUSH CleanTech fuel system, please reference the Ford PC/ED manual.

EVAP System

P0442 - EVAP System Leak Detected (small leak)

Description	The Ford PCM has detected a leak in the Evaporative Emissions System (EVAP).
Possible Causes	<ul style="list-style-type: none"> Defective vapor management valve Damaged EVAP canister Leak in the EVAP system Defective fuel tank pressure transducer
Symptom	Check engine light.
Diagnostic Aid	The fuel tank pressure transducer has been moved to a bracket near the EVAP canister. The system monitors the lines that go from the FRPCM bleed port to EVAP canister and purge valve. This system is used to depressurize the fuel rails after shutdown. The propane tank is sealed and is not part of this system.
Action	Test the EVAP system for leaks or damage.

P0443 - EVAP System Purge Control Valve "A" Circuit

Description	This DTC sets when the signal moves outside the minimum or maximum limit for the commanded state.
Possible Causes	<ul style="list-style-type: none"> • VPWR circuit open • EVAPCP circuit open • EVAPCP circuit short to ground • EVAPCP circuit short to voltage • Damaged EVAP purge valve • Damaged PCM
Symptom	Check engine light.
Diagnostic Aid	Purge control valve is located near the rear of the intake manifold. To verify normal function, monitor the EVMV PID or EVAPCP PID and the signal voltage (PCM control side). With the valve closed, the EVMV indicates 0 mA (0% duty cycle for EVAPCP) and voltage approximately equal to battery voltage. When the valve is commanded fully open, EVMV indicates 1,000 mA (100% duty cycle for EVAPCP) and a voltage drop of 3 volts minimum is normal.
Action	Refer to the Ford PC/ED manual for P0443 diagnostics.

P0446 - EVAP System Vent Control Circuit

Description	This DTC sets when the signal moves outside the minimum or maximum limit for the commanded state.
Possible Causes	<ul style="list-style-type: none"> • VPWR circuit open • KAPWR circuit open • CANV circuit open • CANV circuit short to ground • CANV circuit short to voltage • CANV circuit short to KAPWR • Damaged EVAP canister vent valve • Damaged PCM
Symptom	Check engine light.
Diagnostic Aid	Vent control circuit is in the EVAP canister. To verify normal function, monitor the EVAP canister vent valve signal PID EVAPCV and the signal voltage (PCM control side). With the valve open, EVAPCV indicates 0% duty cycle and a voltage approximately equal to battery voltage. When the valve is commanded fully closed, EVAPCV indicates 100% duty cycle, and a minimum voltage drop of 4 volts is normal.
Action	Refer to the Ford PC/ED manual for P0446 diagnostics.

P0451 - EVAP System Pressure Sensor/Switch Range/Performance

Description	This DTC sets when a fuel tank pressure (FTP) sensor range (offset) concern is detected. The FTP sensor output is offset by greater than 1.7 inches of water or less than -1.7 inches of water.
Possible Causes	<ul style="list-style-type: none"> • FTP circuit intermittent open • FTP circuit intermittent short • FTP sensor intermittent open • FTP sensor intermittent short • Contaminated FTP sensor • Damaged FTP sensor • Damaged PCM
Symptom	Check engine light.
Diagnostic Aid	The FTP sensor is located on a bracket near the EVAP canister. With the FTP sensor at atmospheric pressure, the FTP PID normally indicates 0 inches of water. Remove the quick connect hose at the canister that goes to the FTP sensor, wait one minute to allow the pressure to equalize with the ambient air pressure before accessing the PID.
Action	Refer to ROUSH CleanTech wiring schematics.

P0452 - EVAP System Pressure Sensor/Switch Low

Description	This DTC sets when the fuel tank pressure (FTP) sensor signal average drops below a minimum allowable calibrated parameter.
Possible Causes	<ul style="list-style-type: none"> • Contamination internal to the FTP sensor connector • FTP circuit open • VREF circuit open • FTP circuit short to ground • FTP circuit short to SIGRTN • Damaged FTP sensor
Symptom	Check engine light.
Diagnostic Aid	The FTP sensor is located on a bracket near the EVAP canister. An FTP voltage PID reading less than 0.22 volt in ignition ON, engine OFF or ignition ON, engine running indicates a concern is present.
Action	Refer to ROUSH CleanTech wiring schematics.

P0453 - EVAP System Pressure Sensor/Switch High

Description	This DTC sets when the fuel tank pressure (FTP) sensor signal average jumps above a maximum allowable calibrated parameter.
Possible Causes	<ul style="list-style-type: none"> • Contamination internal to the FTP sensor connector • FTP circuit open • VREF circuit open • FTP circuit short to ground • FTP circuit short to SIGRTN • Damaged FTP sensor
Symptom	Check engine light.
Diagnostic Aid	The FTP sensor is located on a bracket near the EVAP canister. An FTP voltage PID reading more than 4.85 volt in ignition ON, engine OFF or ignition ON, engine running indicates a concern is present.
Action	Refer to ROUSH CleanTech wiring schematics.

P0454 - EVAP System Pressure Sensor/Switch Intermittent

Description	This DTC sets when the fuel EVAP system pressure changes greater than 14 inches of water in 0.1 seconds.
Possible Causes	<ul style="list-style-type: none"> • Contamination internal to the FTP sensor connector • FTP circuit open • VREF circuit open • FTP circuit short to ground • FTP circuit short to SIGRTN • Damaged FTP sensor
Symptom	Check engine light.
Diagnostic Aid	The FTP sensor is located on a bracket near the EVAP canister. Monitor the FTP PID and note if it changes +/- 15 inches of water multiple times in 1 minute.
Action	Refer to ROUSH CleanTech wiring schematics.

P0455 - EVAP System Leak Detected (large leak)

Description	The PCM monitors the complete evaporative emission (EVAP) control system for no purge flow, the presence of a large fuel vapor leak, or multiple small fuel vapor leaks. This DTC sets when no purge flow, which is attributed to fuel vapor blockages or restrictions, a large fuel vapor leak, or multiple fuel vapor leaks are detected by the EVAP running loss monitor test with the engine running, but not at idle.
Possible Causes	<ul style="list-style-type: none"> • Disconnected or cracked fuel EVAP canister tube, EVAP canister purge outlet tube, or EVAP return tube • EVAP purge valve stuck closed • Slow responding EVAP purge valve • Blockages or restrictions in the fuel vapor hoses or tubes • Loose fuel vapor hose or tube connections to the EVAP system components • EVAP canister vent valve stuck open • Damaged fuel tank pressure (FTP) sensor • Damaged EVAP canister
Symptom	Check engine light.
Diagnostic Aid	The fuel tank pressure transducer has been moved to a bracket near the EVAP canister. The system monitors the lines that go from the FRPCM bleed port to EVAP canister and purge valve. This system is used to depressurize the fuel rails after shutdown. The propane tank is sealed and is not part of this system.
Action	Check for audible vacuum noise in the engine compartment or near the EVAP canister with engine running.

P0456 - EVAP System Leak Detected (very small leak)

Description	The Ford PCM has detected a leak in the Evaporative Emissions System (EVAP).
Possible Causes	<ul style="list-style-type: none"> • Very small holes or breaks in the fuel vapor hoses or tubes • Loose fuel vapor hose or tube connections to the EVAP system components • EVAP system component seals leaking • Damaged wiring to the EVAP purge control valve
Symptom	Check engine light.
Diagnostic Aid	The fuel tank pressure transducer has been moved to a bracket near the EVAP canister. The system monitors the lines that go from the FRPCM bleed port to EVAP canister and purge valve. This system is used to depressurize the fuel rails after shutdown. The propane tank is sealed and is not part of this system.
Action	Check for loose or damaged vapor hoses. Visually inspect the EVAP canister inlet port, EVAP canister vent valve filter, and EVAP canister vent hose assembly for contamination or debris.

Flow Control Solenoid

P0090 — Fuel Pressure Regulator Circuit Open

Description	FCS circuit fault. SRM monitors FCS circuit for open and short circuit faults.
Possible Causes	<ul style="list-style-type: none"> • Short to voltage • Water in the harness connector • Open power circuit • GND circuit • Low battery voltage • Corrosion • Incorrect connections • Damaged FCS coil • Blown fuse
Symptom	Fuel pressure in the rail does not change when commanded. Extended fuel rail flush time.
Diagnostic Aid	Check the FRPCM and SRM electrical connector for damage, corrosion and water intrusion.
Action	Refer to the Flow Control Solenoid procedure in Tank Solenoid Electrical Check.

Bleed Solenoid

P009E/P26B3 — Fuel Pressure Relief Control Performance Stuck Off/Fuel Shutoff Valve “A” Control Circuit Performance Stuck Off

Description	Fuel rail failed to bleed. The PCM measures fuel rail pressure on key-up to determine if fuel rail has been properly bled.
Possible Causes	<ul style="list-style-type: none"> • BS did not open • FRPCM check valve leaked (P26B3) • FRPCM supply solenoid leaked (P26B3) • Bleed port (bleed rate restrictor in outlet to VMV) clogged • EVAP line kinked • Blown fuse
Symptom	Fuel pressure present in the fuel rail after bleed event should have occurred; this may result in hard starts.
Diagnostic Aid	Check that FRPCM bleeds fuel from rail. Leaks to FRPCM can also trigger a fault.
Action	Refer to the Fuel System Fails to Bleed procedure in <i>Diagnostic Tests and Procedures</i> .

P009B — Fuel Pressure Relief Control Circuit Open

Description	Bleed solenoid circuit fault. The SRM monitors bleed solenoid circuit for open and short circuit faults.
Possible Causes	<ul style="list-style-type: none"> • Short to voltage • Water in the harness connector • Open power circuit • Open GND circuit • Low battery voltage • Corrosion • Incorrect connections • Damaged BS coil
Symptom	Fuel rail bleed system does not operate correctly. There is a potential for fuel odor or hard start.
Diagnostic Aid	Check the FRPCM and SRM electrical for damage, corrosion and water intrusion.
Action	Refer to the Fuel Rail Pressure Control Module Electrical Check procedure in <i>Diagnostic Tests and Procedures</i> .

Tank Solenoid

P0005 — Fuel Shutoff Valve “A” Control Circuit Open

Description	TS circuit fault. The SRM monitors tank solenoid circuit for open and short circuit faults.
Possible Causes	<ul style="list-style-type: none"> • Short to voltage • Water in the harness connector • Open power circuit • Open GND circuit • Low battery voltage • Corrosion • Incorrect connections • Damaged TS coil • Blown fuse
Symptom	Vehicle does not start. The pumps run but no pressure builds in the fuel rail.
Diagnostic Aid	Check the FRPCM and SRM electrical connectors for damage, corrosion and water intrusion.
Action	Refer to the Tank Solenoid Electrical Check procedure in <i>Diagnostic Tests and Procedures</i> .

Fuel Rail Pressure Control Module Supply Solenoid and Wiring

P26B5 — Fuel Shutoff Valve “B” Control Circuit Performance/Stuck Off

Description	The SRM monitors fuel rail pressure before and after the start sequence is initiated. If the fuel rail pressure rise is below a threshold, the fault is set.
Possible Causes	<ul style="list-style-type: none"> • Excess flow valve activated • Fuel pumps weak or inoperable • Manual shutoff valve not fully open • Tank supply solenoid not opening • FRPCM supply solenoid not opening • Restricted supply line filter • Kinked or restricted fuel lines • IPTS or TPTS signal inaccurate • Blown fuse
Symptom	The vehicle will crank no start or start and run poorly. Start sequence will be extended and fuel pumps and supply solenoids will be commanded on and off multiple times, attempting to build rail pressure.
Diagnostic Aid	Check Measuring Fuel Rail and Fuel Tank Pressure procedure.
Action	Refer to the Engine Cranks, No Start procedure in <i>Diagnostic Tests and Procedures</i> .

P2665 — Fuel Shutoff Valve “B” Control Circuit/Open

Description	FRPCM supply solenoid circuit fault. SRM monitors supply solenoid circuit for open and short circuit faults.
Possible Causes	<ul style="list-style-type: none"> • Short to voltage • Water in the harness connector • Open power circuit • Open GND circuit • Low battery voltage • Corrosion • Incorrect connections • Damaged SS coil • Blown fuse
Symptom	Vehicle does not start. The pumps run but no pressure builds in the fuel rail.
Diagnostic Aid	Check the FRPCM and SRM electrical connectors for damage, corrosion and water intrusion.
Action	Refer to the Fuel Rail Pressure Control Module Electrical Check procedure in <i>Diagnostic Tests and Procedures</i> .

SRM, CAN Bus Circuit Wiring

U0108 — Lost Communication with Alternative Fuel Control Module

Description	Lost communication with SRM. The PCM monitors CAN bus communication for missing messages from the SRM. If the messages are continuously missing, a fault is set.
Possible Causes	<ul style="list-style-type: none"> • Wiring between the SRM and PCM • SRM lacks power • Blown fuse • SRM loses power or ground
Symptom	Rough idle.
Diagnostic Aid	Check the FRPCM and SRM electrical connectors for damage, corrosion and water intrusion. Check for power at the SRM.
Action	Refer to the Smart Relay Module Electrical Check procedure in <i>Diagnostic Tests and Procedures</i> .

Fuel System

P0148 — Fuel Delivery Error

Description	To maintain target fuel rail pressure increase, the fuel pump voltage has been increased to a maximum adaptive limit and the fuel trims have gone lean.
Possible Causes	<ul style="list-style-type: none"> • Severely restricted fuel filter • Severely restricted fuel supply line • Damaged or worn fuel pump • Fuel pump wiring or fuse faults • Excess flow valve tripped • Tank supply solenoid or FRPCM supply solenoid closed • Tank manual shutoff valve not completely open
Symptom	Vehicle hesitation or stall condition.
Diagnostic Aid	This is a non-MIL setting DTC to aid the technician in diagnosing a possible fuel system fault. Do not diagnose if no symptoms or other fault codes are present.
Action	If other fault codes are present, diagnose those first. If symptoms are present, refer to diagnostic flow chart for that vehicle symptom.

P116E — Fuel Pressure Relief Valve Actuated

Description	Maximum injection pressure reached. The PCM monitors fuel rail pressure and battery voltage. Based on these measurements, the PCM adjusts fuel pump speed to stay below the maximum operating pressure of the injectors.
Possible Causes	<ul style="list-style-type: none"> • Operating the vehicle in high ambient conditions • Vehicle operated in a low voltage condition
Symptom	Vehicle hesitation, stall, rough idle, misfire or no start.
Diagnostic Aid	The P116E code is meant as an indication that the fuel system was operated at the limits of the system. The customer may have experienced drive issues although the system is performing as expected.
Action	Refer to the Maximum Pressure Check procedure in <i>Diagnostic Tests and Procedures</i> .

P0171, P0174 — System Too Lean (Bank 1 and Bank 2 respectively)

Description	Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for more descriptive information.
Possible Causes	<ul style="list-style-type: none"> The LPA system was operated in the vapor region Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for a list of other causes.
Symptom	—
Diagnostic Aid	Verify that no LPA system faults are present and then follow the Ford service manual procedure.
Action	Refer to the Fuel Pressure Drop Check procedure in <i>Diagnostic Tests and Procedures</i> .

P0172, P0175 — System Too Rich (Bank 1 and Bank 2 respectively)

Description	Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for more descriptive information.
Possible Causes	<ul style="list-style-type: none"> The LPA system was operated in the vapor region Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for a list of other causes.
Symptom	—
Diagnostic Aid	Verify that no LPA system faults are present and then follow the Ford service manual procedure.
Action	Refer to the Fuel Pressure Drop Check procedure in <i>Diagnostic Tests and Procedures</i> .

P1453 — Fuel Tank Pressure Relief Valve Malfunction

Description	The SRM reads the TPTS and passes the voltage reading over the CAN bus to the PCM. If the pressure value of the propane fuel tank approaches the Pressure Relief Valve “pop-off” pressure, a fault is set.
Possible Causes	<ul style="list-style-type: none"> High ambient temperature operation Propane tank fill is contaminated with nitrogen or other constituents Vehicle is parked over heat source Tank Pressure Temperature Sensor shorted or reading higher than expected values Overfill prevention device allowed tank to overfill
Symptom	The driver is alerted with a coolant gauge High setting until the fault condition clears.
Diagnostic Aid	Use mechanical pressure gauge to check tank pressure and an inferred temp gun to check tank temperature.
Action	Check for other diagnostic fault codes such as Tank Pressure or Temperature P01A1 or P01AD and correct them first. Refer to the Maximum Pressure Check procedure in <i>Diagnostic Tests and Procedures</i> .

P03xx — Misfire

Description	Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for more descriptive information.
Possible Causes	<ul style="list-style-type: none"> The LPA system was operated in the vapor region Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for a list of other causes.
Symptom	—
Diagnostic Aid	Verify that no LPA system faults are present and then follow the Ford service manual procedure.
Action	Refer to the Fuel Pressure Drop Check procedure in <i>Diagnostic Tests and Procedures</i> .

Heated Exhaust Gas Oxygen Sensor

P2195, P2197 — Heated Exhaust Gas Oxygen Sensor Stuck

Description	Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for more descriptive information.
Possible Causes	<ul style="list-style-type: none"> • The LPA system was operated in the vapor region • Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for a list of other causes.
Symptom	—
Diagnostic Aid	Verify that no LPA system faults are present and then follow the Ford service manual procedure.
Action	Refer to the Fuel Pressure Drop Check procedure in <i>Diagnostic Tests and Procedures</i> .

Electronic Fuel Pump Relay (A/B)

U0109, U016C — Lost Communication with Fuel Pump Control Module A/B

Description	The SRM repeats the signal from the second EFPR to the PCM over the CAN bus. The PCM monitors this communication. If there is a lack of communication for a long enough period of time, a fault is set.
Possible Causes	<ul style="list-style-type: none"> • Wire fault between the EFPR and SRM • Wire fault between SRM and PCM • No power to the EFPR • SRM fault • CAN bus fault • Faulty EFPR • Blown fuse • Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for a list of other causes.
Symptom	Crank, no start, rough idle or lack of power.
Diagnostic Aid	—
Action	Refer to the Fuel Pump Control Module Electrical Continuity Test procedure and also the Smart Relay Module Electrical Test procedure in <i>Diagnostic Tests and Procedures</i> .

P025A — Fuel Pump Module “A” Control Circuit/Open

Description	The Fuel Pump Control Module (FPCM) A receives control commands from the PCM on a Fuel Pump Command (FPC) pin. The FPCM A passes diagnostic information on the CAN bus to the PCM. If the FPCM A does not receive a control command from the PCM on the FPC, it sends a corresponding signal to the PCM on the CAN bus and the fault is set.
Possible Causes	Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for a list of other causes.
Symptom	Poor starts, rough idle, hesitation/surge.
Diagnostic Aid	—
Action	Refer to the Fuel Pump Control Module Electrical Continuity Test procedure in <i>Diagnostic Tests and Procedures</i> .

P025B — Fuel Pump Module “A” Control Circuit Range/Performance

Description	The Fuel Pump Control Module (FPCM) A receives control commands from the PCM on a Fuel Pump Command (FPC) pin. The FPCM A passes diagnostic information on the CAN bus to the PCM. If the FPCM A receives an invalid control command from the PCM on the FPC, it sends a corresponding signal to the PCM on the CAN bus and the fault is set.
Possible Causes	Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for a list of other causes.
Symptom	—
Diagnostic Aid	
Action	Refer to the Fuel Pump Control Module Electrical Continuity Test procedure in <i>Diagnostic Tests and Procedures</i> .

P027B — Fuel Pump Module “B” Control Circuit Range/Performance

Description	The SRM receives the output of the second fuel pump monitor line and repeats the output over the CAN bus to the PCM. The PCM monitors the commanded output versus the monitor’s feedback. If the monitor is out-of-range, a fault is set.
Possible Causes	Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for a list of other causes.
Symptom	—
Diagnostic Aid	
Action	Refer to the Fuel Pump Control Module Electrical Continuity Test procedure in <i>Diagnostic Tests and Procedures</i> .

U210B — Lost Communication Between Fuel Pump Control Module “A” and Restraint Control Module

Description	The FPCM A constantly receives either an OK signal or a disable signal from the RCM on a dedicated “disable” wire. The FPCM A passes diagnostic information on the CAN bus to the PCM. If the FPCM A fails to receive a signal from the RCM, the FPCM A passes a signal, indicating it lost communication with the RCM, to the PCM and the fault is set.
Possible Causes	<ul style="list-style-type: none"> • Wire fault between EFPR “A” and RCM • Wire fault between SRM and PCM • No power to the EFPR “A” • SRM fault • CAN fault • Blown fuse • RCM failure • EFPR “A” failure
Symptom	
Diagnostic Aid	
Action	

U210C — Lost Communication Between Fuel Pump Control Module “B” and Restraint Control Module

Description	The FPCM B constantly receives either an OK signal or a disable signal from the RCM on a dedicated “disable” wire. The FPCM B passes diagnostic information on the CAN bus to the SRM. The SRM passes that diagnostic information on the CAN bus to the PCM. If the FPCM B fails to receive a signal from the RCM, the FPCM B passes a signal, indicating it lost communication with the RCM, to the SRM. The SRM passes that signal on the CAN bus to the PCM and the fault is set.
Possible Causes	<ul style="list-style-type: none"> • Wire fault between EFPR “B” and RCM • Wire fault between SRM and PCM • No power to the EFPR “B” • SRM fault • CAN fault • Blown fuse • RCM failure • EFPR “B” failure
Symptom	
Diagnostic Aid	
Action	

P0627 — Fuel Pump “A” Control Circuit Open

Description	The Fuel Pump Control Module (FPCM) A diagnoses faults of fuel pump A. The FPCM A passes diagnostic information on the CAN bus to the PCM. If the PCM receives a FPCM A signal indicating a fuel pump problem, the fault is set.
Possible Causes	<ul style="list-style-type: none"> • Wiring fault between FPCM A and fuel pump A • Open circuit • FPCM A fault • CAN fault • Faulty fuel pump
Symptom	—
Diagnostic Aid	
Action	Refer to the Fuel Pump Control Module Electrical Continuity Test procedure in <i>Diagnostic Tests and Procedures</i> .

P064A — Fuel Pump Control Module “A”

Description	The Fuel Pump Control Module (FPCM) A has its own internal diagnostics. The FPCM A passes diagnostic information on the CAN bus to the PCM. If the PCM receives a FPCM A signal indicating an internal problem, the fault is set.
Possible Causes	<ul style="list-style-type: none"> • FPCM A fault • CAN fault
Symptom	—
Diagnostic Aid	
Action	Refer to the Fuel Pump Control Module Electrical Continuity Test procedure in <i>Diagnostic Tests and Procedures</i> .

P2632 — Fuel Pump “B” Control Circuit/Open

Description	The Fuel Pump Control Module (FPCM) B diagnoses faults of fuel pump B. The FPCM passes the information to the SRM on a dedicated circuit. The SRM then sends the diagnostic information to the PCM over the CAN network.
Possible Causes	<ul style="list-style-type: none"> • Wiring fault between FPCM A and fuel pump A • Open circuit • FPCM A fault • CAN fault • Faulty fuel pump
Symptom	—
Diagnostic Aid	
Action	Refer to the Fuel Pump Control Module Electrical Continuity Test procedure in <i>Diagnostic Tests and Procedures</i> .

P26EA — Fuel Pump Control Module “B”

Description	The Fuel Pump Control Module (FPCM) B diagnoses faults of fuel pump B. The FPCM passes the information to the SRM on a dedicated circuit. The SRM then sends the diagnostic information to the PCM over the CAN network.
Possible Causes	<ul style="list-style-type: none"> • FPCM B fault • CAN fault • Open fuel pump monitor 2 circuit (FPM2)
Symptom	—
Diagnostic Aid	
Action	Refer to the Fuel Pump Control Module Electrical Continuity Test procedure in <i>Diagnostic Tests and Procedures</i> .

Integrated Pressure Temperature Sensor

P0181 — Fuel Temperature Sensor “A” Circuit Range/Performance

Description	The SRM reads the IPTS and passes the voltage reading over the CAN bus to the PCM. The PCM monitors the voltage as if the sensor were plugged into the vehicle.
Possible Causes	<ul style="list-style-type: none"> • CAN bus fault between the SRM and PCM • Wiring fault between IPTS and SRM • Short in harness • Short in harness • Open circuit • Open or short to voltage in harness • Incorrect harness connection • Damaged IPTS • IPTS failure • SRM failure
Symptom	—
Diagnostic Aid	Verify the fuel rail temperature PID value to determine open or short.
Action	Refer to the Injection Pressure Temperature Sensor Electrical Check procedure in <i>Diagnostic Tests and Procedures</i> .

P0182 — Fuel Temperature Sensor “A” Circuit Low

Description	The SRM reads the IPTS and passes the voltage reading over the CAN to the PCM monitors the voltage as if the sensor were plugged into the vehicle.
Possible Causes	<ul style="list-style-type: none"> • CAN bus fault between the SRM and PCM • Wiring fault between IPTS and SRM • Short in harness • VREF open or short • Low ambient temperature operation • Incorrect harness connection • Damaged IPTS (or FTS) • IPTS failure • SRM failure
Symptom	—
Diagnostic Aid	Verify the fuel rail temperature PID value to determine open or short.
Action	Refer to the Injection Pressure Temperature Sensor Electrical Check procedure in <i>Diagnostic Tests and Procedures</i> .

P0183 — Fuel Temperature Sensor “A” Circuit High

Description	The SRM reads the IPTS and passes the voltage reading over the CAN bus to the PCM. The PCM monitors the voltage as if the sensor were plugged into the vehicle.
Possible Causes	<ul style="list-style-type: none"> • CAN bus fault between the SRM and PCM • Wiring fault between IPTS and SRM • Open circuit • Open or short to voltage in harness • Incorrect harness connection • Damaged IPTS (FTS) • IPTS failure • SRM failure
Symptom	—
Diagnostic Aid	Verify the fuel rail temperature PID value to determine open or short.
Action	Refer to the Injection Pressure Temperature Sensor Electrical Check procedure in <i>Diagnostic Tests and Procedures</i> .

P0190 — Fuel Rail Pressure Sensor Circuit

Description	The SRM reads the IPTS and passes the voltage reading over the CAN bus to the PCM. The PCM monitors the voltage as if the sensor were plugged into the vehicle.
Possible Causes	<ul style="list-style-type: none"> • CAN bus fault between the SRM and PCM • Wiring fault between IPTS and SRM • VREF open in harness • VREF open in sensor • Vacuum leaks • IPTS failure • SRM failure
Symptom	—
Diagnostic Aid	VREF should be between 4.5-5.5 volts.
Action	Refer to the Injection Pressure Temperature Sensor Electrical Check procedure in <i>Diagnostic Tests and Procedures</i> .

P0192 — Fuel Rail Pressure Sensor Circuit Low

Description	The SRM reads the IPTS and passes the voltage reading over the CAN bus to the PCM. The PCM monitors the voltage as if the sensor were plugged into the vehicle.
Possible Causes	<ul style="list-style-type: none"> • CAN bus fault between the SRM and PCM • Wiring fault between IPTS and SRM • IPTS FRP signal short to SIG RTN or PWR GND • Damaged IPTS (or FRP) • IPTS failure • SRM failure
Symptom	—
Diagnostic Aid	A FRP PID value during ignition ON, engine OFF, or ignition ON, engine running is less than 0.3 volt. This indicates a concern is present.
Action	Refer to the Injection Pressure Temperature Sensor Electrical Check procedure in <i>Diagnostic Tests and Procedures</i> .

P0193 — Fuel Rail Pressure Sensor Circuit High

Description	The SRM reads the IPTS and passes the voltage reading over the CAN bus to the PCM. The PCM monitors the voltage as if the sensor were plugged into the vehicle.
Possible Causes	<ul style="list-style-type: none"> • CAN bus fault between the SRM and PCM • Wiring fault between IPTS and SRM • IPTS FRP signal short to VREF or VPWR • IPTS (or FRP) open signal • Damaged IPTS (or FRP) • IPTS failure • SRM failure
Symptom	—
Diagnostic Aid	Verify the FRP PID value to determine open or short.
Action	Refer to the Injection Pressure Temperature Sensor Electrical Check procedure in <i>Diagnostic Tests and Procedures</i> .

P01A0 — Alternate Fuel Tank “A” Pressure Sensor Circuit Low

Description	The SRM reads the TPTS and passes the voltage reading over the CAN bus to the PCM. The PCM monitors the voltage as if the sensor were plugged into the vehicle.
Possible Causes	<ul style="list-style-type: none"> • CAN bus fault between the SRM and PCM • Wiring fault between TPTS and SRM • VREF open in harness • VREF open in sensor • Vacuum leaks • TPTS failure • SRM failure
Symptom	—
Diagnostic Aid	VREF should be between 4.5-5.5 volts.
Action	Refer to the Tank Pressure Temperature Sensor Electrical Check procedure in the <i>Diagnostic Tests and Procedures</i> .

P01A1 — Alternate Fuel Tank "A" Pressure Sensor Circuit High

Description	The SRM reads the TPTS and passes the voltage reading over the CAN bus to the PCM. The PCM monitors the voltage as if the sensor were plugged into the vehicle.
Possible Causes	<ul style="list-style-type: none"> • CAN bus fault between the SRM and PCM • Wiring fault between TPTS and SRM • TPTS Fuel Pressure signal short to SIG RTN or PWR GND • TPTS (or Fuel Pressure) open signal • Damaged TPTS • TPTS failure • SRM failure
Symptom	—
Diagnostic Aid	Verify the Propane Tank Fuel Pressure PID value to determine open or short.
Action	Refer to the Tank Pressure Temperature Sensor Electrical Check procedure in the <i>Diagnostic Tests and Procedures</i> .

P01A2 — Alternative Fuel Tank “A” Pressure Sensor Circuit Intermittent/Erratic

Description	The SRM reads the TPTS and passes the voltage reading over the CAN bus to the PCM. The PCM monitors the voltage as if the sensor were plugged into the vehicle.
Possible Causes	<ul style="list-style-type: none"> • CAN bus fault between the SRM and PCM • Intermittent wiring fault between TPTS and SRM • TPTS Fuel Pressure intermittent signal short to SIG RTN or PWR GND • TPTS (or Fuel Pressure) intermittent open signal • VREF intermittent open in harness • VREF intermittent open in sensor • Vacuum leaks • Damaged TPTS • TPTS failure • SRM failure
Symptom	—
Diagnostic Aid	Verify the Propane Tank Fuel Pressure PID value to determine open or short.
Action	Refer to the Tank Pressure Temperature Sensor Electrical Check procedure in the <i>Diagnostic Tests and Procedures</i> .

P01AC — Alternate Fuel Tank Temperature Sensor Circuit Low

Description	The SRM reads the TPTS and passes the voltage reading over the CAN bus to the PCM. The PCM monitors the voltage as if the sensor were plugged into the vehicle.
Possible Causes	<ul style="list-style-type: none"> • CAN bus fault between the SRM and PCM • Wiring fault between TPTS and SRM • Short in harness • VREF open or short • Low ambient temperature operation • Incorrect harness connection • Damaged TPTS • TPTS failure • SRM failure
Symptom	—
Diagnostic Aid	Verify the Propane Tank Fuel Pressure PID value to determine open or short.
Action	Refer to the Tank Pressure Temperature Sensor Electrical Check procedure in the <i>Diagnostic Tests and Procedures</i> .

P01AD — Alternate Fuel Tank Temperature Sensor Circuit High

Description	The SRM reads the TPTS and passes the voltage reading over the CAN bus to the PCM. The PCM monitors the voltage as if the sensor were plugged into the vehicle.
Possible Causes	<ul style="list-style-type: none"> • CAN bus fault between the SRM and PCM • Wiring fault between TPTS and SRM • Open circuit • Open or short to voltage in harness • Incorrect harness connection • Damaged TPTS • TPTS failure • SRM failure
Symptom	—
Diagnostic Aid	Verify the Fuel Temperature PID value to determine open or short.
Action	Refer to the Tank Pressure Temperature Sensor Electrical Check procedure in the <i>Diagnostic Tests and Procedures</i> .

P01AE — Alternative Fuel Tank Temperature Sensor Circuit Intermittent/Erratic

Description	The SRM reads the TPTS and passes the voltage reading over the CAN bus to the PCM. The PCM monitors the voltage as if the sensor were plugged into the vehicle.
Possible Causes	<ul style="list-style-type: none"> • CAN bus fault between the SRM and PCM • Intermittent wiring fault between TPTS and SRM • TPTS Fuel Pressure intermittent signal short to SIG RTN or PWR GND • TPTS (or Fuel Pressure) intermittent open signal • VREF intermittent open in harness • VREF intermittent open in sensor • Vacuum leaks • Damaged TPTS • TPTS failure • SRM failure
Symptom	—
Diagnostic Aid	Verify the Propane Tank Fuel Pressure PID value to determine open or short.
Action	Refer to the Tank Pressure Temperature Sensor Electrical Check procedure in the <i>Diagnostic Tests and Procedures</i> .

Fuel Level Sender

P0461 — Fuel Level Sender “A” Circuit Range/Performance

Description	Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for more descriptive information.
Possible Causes	Refer to the Ford service manual. Causes are the same except that communication is between the sender and the SRM and not the IPC.
Symptom	—
Diagnostic Aid	The SRM reads fuel level sender input and broadcasts it to the IPC and PCM.
Action	Refer to the Fuel Level Indication System Check procedure in <i>Diagnostic Tests and Procedures</i> .

P0462 — Fuel Level Sender “A” Circuit Low

Description	This DTC sets when the Fuel Level Gauge signal is electrically less than the minimum allowable sender value.
Possible Causes	<ul style="list-style-type: none"> • Fuel level sender wiring shorted to ground • Damaged Fuel Level Sender • Smart Relay Module
Symptom	<p>P0462 — Fuel gauge may read empty all the time</p> <p>P2067 — Fuel gauge will only show primary tank</p>
Diagnostic Aid	Smart Relay Module (SRM) reads fuel level sender and broadcasts to the PCM and Instrument Cluster.
Action	<p>Refer to the following tests located later in this manual.</p> <ul style="list-style-type: none"> • SRM Electrical Test • Fuel Level Sender Test

P0463 — Fuel Level Sender “A” Circuit High

Description	This DTC sets when the Fuel Level Gauge signal is electrically less than the minimum allowable sender value.
Possible Causes	<ul style="list-style-type: none"> • Fuel level sender wiring is disconnected or shorted to above 5 volts • Damaged Fuel Level Sender • Smart Relay Module
Symptom	<p>P0463 — Fuel gauge may read full all the time</p> <p>P2068 — Fuel gauge will only show primary tank</p>
Diagnostic Aid	Smart Relay Module (SRM) reads fuel level sender and broadcasts to the PCM and Instrument Cluster.
Action	<p>Refer to the following tests located later in this manual.</p> <ul style="list-style-type: none"> • SRM Electrical Test • Fuel Level Sender Test

P25B0 — Fuel Level Sensor “A” Stuck

Description	The SRM reads Fuel Level Sender (FLS) input and broadcasts it to the IPC and PCM. If the vehicle is driven a considerable distance and the FLS value doesn't change, the fault is set.
Possible Causes	<ul style="list-style-type: none"> • Wire fault between FLS and SRM • Defective fuel level sender or sender twin site • SRM fault
Symptom	The driver is unaware of a low fuel condition.
Diagnostic Aid	
Action	Refer to the Fuel Level Indication System Check procedure in <i>Diagnostic Tests and Procedures</i> .

P25B1 — Fuel Level Sensor “B” Stuck

Description	The SRM monitors the fuel level position on the driver and passenger side fuel tanks while commanding a fuel transfer to occur. If the SRM sees that the fuel level in the driver side tank is not increasing while the passenger side tank fuel level is decreasing, it will stop the transfer, set a P25B1 code and try again. After three failed attempts, the fuel level on the cluster will decrease to its usable amount (driver's side tank only) to notify the driver there is an issue with the transfer system.
Possible Causes	<ul style="list-style-type: none"> • Defective fuel level sender or sender twin site • Transfer OPD stuck closed • Passenger tank supply valve fault • Weak or defective fuel pump • SRM fault • Wiring concern
Symptom	The driver will notice the fuel gauge on the dash drop to approximately half of its previous amount or the fuel gauge in the IPC only goes to half after the vehicle is filled.
Diagnostic Aid	Smart Relay Module (SRM) reads both fuel level signals and determines when to set the fault based on changes in fuel level.
Action	Refer to the F-650/F-750 Dual Tank Transfer Pin Point Test procedure.

Secondary Tank – Fuel Will Not Transfer

F-650 vehicles can be equipped with a unique ROUSH CleanTech liquid propane autogas storage system which includes two fuel tanks. The system operates as if it were just one large tank. A few key points about the system:

- The engine is always running from the driver's side tank. All fuel to the engine, and the excess fuel returning to the tank, is only connected to this tank.
- The passenger's side tank is used to store extra fuel only. When the driver's side tank fuel level drops, the system will activate fuel pumps in passenger's side tank to transfer fuel automatically.

- Both tanks are filled at the same time from the single fuel filler located on the driver's side. There is a ball valve on the fill line for the right-hand tank, which is used for periodic inspections only. It should always be open during normal operation in order to use the full system capacity.

The ROUSH CleanTech control system reads the usable fuel level in each tank and adds them together to provide a single reading for the instrument cluster. However, if the system detects a failure in the fuel transfer system which may interfere with the ability to transfer fuel, it will provide a reading based on the driver's side tank only. This ensures that the driver is warned before the vehicle runs out of fuel. If this occurs, the vehicle is fully usable, but should be serviced in order to restore full function and use of the full system fuel capacity.

The fuel transfer line from the passenger's side tank is connected to a dedicated overfill prevention device (OPD) on the driver's side tank. This is a safety device which ensures that even if there is a fault in the control system, it is not possible for the driver's side tank to overfill during transfers.

Fuel Tank Maximum Pressure Reached

While the propane system is under normal operation, the tank pressure and temperature are monitored by the smart relay module (SRM). The SRM is used to ensure that the fuel system provides the proper pressure to the fuel rails based on the pressure and temperature of the tank. If the fuel tank pressure is close to the maximum pressure allowed where the pressure relief valve could vent to atmosphere for eight seconds, the SRM will send a level 1 signal to the Ford PCM to trigger the OEM "Failsafe Cooling" feature. This means that the coolant gauge on the cluster will move into the red zone and turn on a coolant temp light as an indication that the driver should discontinue use of the vehicle. A P1453 diagnostic trouble code will also be stored in the PCM when this condition is activated. Please see the Ford PCED manual for further information in regards to the "Failsafe Cooling" feature for your specific application. If this feature is activated on your vehicle, discontinue use of the vehicle and allow the fuel system to cool until the coolant gauge on the cluster returns to a normal operation.

Fuel Level Indication Check

The ROUSH CleanTech fuel level indication system differs from the gasoline system as the fuel level sender is not wired directly to the instrument cluster. Instead, the fuel level sender is wired to the SRM, which reads the fuel level and transmits the signal to the PCM via the CAN bus, which in turn simulates the resistance the instrument cluster expects to see for a given fuel level.

NOTE

The gauge on the sending unit must not be used for any diagnostics. The gauge is not accurate. Only voltage outputs should be used for diagnostic purposes.

Symptom	Cause/Action to be taken
Fuel gauge does not move on a partial fill	This behavior is not uncommon. The fuel level sender may not move far enough to trigger movement on the gauge if only a small amount of fuel is added to the tank. Once driven, the gauge may move to reflect the fill.
Malfunction Indicator Lamp (MIL)	There is a circuit fault that has been identified by the PCM. If customer fills vehicle with key ON this could cause the gauge not to move. Customer should drive vehicle for some time to allow gauge to move and fill with key OFF in the future. Initially follow the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> , whenever a circuit check is called for, refer to the Fuel Level Sender Electrical Check procedure.
Gauge points below E	This is an indication of an error state. Initially follow the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> , whenever a circuit check is recommended, refer to the Fuel Level Sender Electrical Check procedure.
Doesn't read full after a fill <ul style="list-style-type: none"> a. Tank should be filled on a level surface both front-to-back and side-to-side (a level needs to be placed on the vehicle to verify this). b. Tank pressure and sending unit voltage should be recorded prior to the fill and when the fuel station shuts off along with number of gallons filled. c. Differential and bypass pressure settings need to be confirmed on the fuel station and verified by fueling provider (station output pressure must be at least 25 psi greater than the vehicle tank pressure at time of filling. Recommended differential pressure settings are greater than 135 psi). d. HP rating of the pump on the station needs to be verified. (5 hp pump recommended.) <p>Note: Fueling provider can fill unit on level ground with a bobtail to eliminate any issues that may be present with the fueling station.</p> e. Fuel level electrical checks and SRM checks can be performed per the diagnostic manual. 	This could be the result of either a fuel level sender fault or an OPD valve triggering prematurely. Refer to fill issues and the Fuel Level Sender Electrical Check procedure for more information.

DIAGNOSTIC TESTS AND PROCEDURES

General Information

Measuring Fuel Rail and Fuel Tank Pressure

Measuring Fuel Tank Pressure — Fuel tank pressure can be measured two ways: Refer to *Tools and Equipment, Special Tools in the 2012 Ford E-150/250/350/450 or 2013 F-250/350 Liquid Propane Autogas Fuel System Service Manual Supplement* for more information regarding the tools required.

Method 1 — Install a 0–500 psi (0–3447 kPa) fuel pressure gauge on the bleeder valve at the tank, or to the remote bleeder valve location. Open the valve to monitor the fuel tank pressure. Record the value.

Method 2 — If a 0–500 psi (0–3447 kPa) fuel pressure gauge is not available, fuel rail pressure can be used to infer fuel tank pressure. Refer to *Method 1 of Measuring Fuel Rail Pressure*. Monitor fuel rail pressure with the engine running. Turn the engine off and continue to monitor fuel rail pressure. When the pressure has stabilized, record the value as fuel tank pressure.

Measuring Fuel Rail Pressure — Fuel rail pressure can be measured two ways: Refer to *Tools and Equipment, Special Tools in the 2012 Ford E-150/250/350/450 or 2013 F-250/350 Liquid Propane Autogas Fuel System Service Manual* for more information regarding the tools required.

Method 1 — Using an OBD-II scan tool, read the fuel rail pressure PID. If using the Ford IDS tool, select the toolbox tab > select Powertrain > OBD Test Modes > Mode 1 Powertrain Data. Then select FRP (pressure) from PID selection table. Alternately you can select manual vehicle entry and enter PCM part number PBBB-AA. This will ID the vehicle as a Vision bus, and offer additional PIDs in datalogger.

Method 2 — Empty the fuel rails and fuel lines. Refer to the *Fuel Line Purging Procedure in the 2012 Ford E-150/250/350/450 or 2013 F-250/350 Liquid Propane Autogas Fuel System Service Manual Supplement* for more information. Disconnect the fuel supply line at the rear of the RH fuel rail. Install the ROUSH service port adapter between the fuel line and the fuel rail. Attach 0–500 psi (0–3447 kPa) fuel pressure gauge to the service port on the adapter. Record the value.

Expected Fuel Tank Pressure — On a tank at ambient temperature conditions, the following pressures can be expected:

Temperature (°F)	Pressure (psi)		
	Min.	Nominal	Max.
0	15	25	35
5	19	29	39
10	23	33	43
15	28	38	48
20	33	43	53
25	38	48	58
30	43	53	63
35	49	59	69
40	55	65	75
45	62	72	82
50	69	79	89
55	77	87	97
60	84	94	104
65	93	103	113
70	102	112	122
75	111	121	131
80	121	131	141
85	131	141	151
90	142	152	162
95	153	163	173
100	165	175	185
105	178	188	198
110	191	201	211
115	205	215	225
120	219	229	239

NOTE

On vehicles that have been operated for extended periods of time, the tank (fuel) can be much warmer and so higher pressures are to be expected.

Expected Fuel Rail Pressure — Under normal operating conditions, the fuel pump will operate at variable speeds. The fuel pump duty cycle will vary to maintain liquid in the fuel rails under different temperatures and operating conditions.

The fuel pressure controls are designed to keep the rails at a certain pressure over tank pressure, therefore, it is important to measure tank pressure prior to collecting fuel rail pressure data. For example, if the fuel tank is at 150 psi (1034 kPa) and pressure in the rail is measured at 200 psi (1379 kPa), the rail is running at 50 psi (345 kPa) over tank.

Fuel rail pressure should maintain a minimum of 30 psi over tank under normal operating conditions, and will increase based on fuel system demand.

Pinpoint Test A: No Fill

Step	Procedure	Action
1	Inspect vehicle to check for kinked fill lines. Are fill lines kinked?	Yes — Replaced kinked fill lines. No — Go to Step 2.
2	Determine the location of the overflow protection device (OPD). Is the OPD located in the end cap of the fuel tank?	Yes — Go to Step 3. No — Go to Step 6.
3	Check the fuel gauge in the instrument cluster. Is the gauge indicating less than 1/4 full?	Yes — Go to Step 4. No — Go to Step 6.
4	<p>Check to see if the OPD is being activated.</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;">NOTE</div> <p>Fuel splashing off the sides of the empty tank could be activating the OPD float and shutting off the fuel fill line.</p> <ol style="list-style-type: none"> a. Loosen the fuel fill line at the fill valve or at the inlet to the fuel filter to relieve any pressure in the fill line and release the OPD valve. Retighten the fill line. b. Install a fuel fill pressure tester on the fill valve and close the ball valve. c. Connect the fuel dispensing nozzle to the pressure tester and turn on the pump. Slightly open the ball valve to slowly add approximately 10 gal (38 L) of fuel. d. Did the tank fill? 	Yes — Go to Step 5. No — Go to Step 6.
5	Remove the fuel fill pressure tester and attempt to fill the vehicle fuel tank to full 80% capacity. Does the vehicle fuel tank fill to capacity?	Yes — Diagnostic is complete. No — Go to Step 6.
6	Check the fuel gauge in the instrument cluster. Is the gauge indicating more than 1/2 full?	Yes — Go to Step 7. No — Go to Step 11.
7	Reverse direction of vehicle at the pump and try to fill the vehicle. Does the vehicle fuel tank fill?	Yes — Vehicle not on level ground. Diagnostic is complete. No — Drive vehicle until fuel gauge indicates less than 1/2 full and go to Step 8.
8	Attempt to fill the vehicle fuel tank. Does the fuel tank fill?	Yes — Go to Step 9. No — Go to Step 11.
9	Open bleeder valve. Does liquid fuel vent?	Yes — Go to Step 10. No — Go to Step 12.
10	Check fuel gauge. Does fuel gauge read full?	Yes — Diagnostic complete. No — Refer to Fuel Level Indication Check .

Step	Procedure	Action
11	<p>Check for sufficient fill station pressure.</p> <ol style="list-style-type: none"> Connect pressure gauge service tool to the fuel tank bleeder valve and record pressure. Using a fuel fill pressure tester installed on the fill valve, attempt to fill the vehicle. With the dispensing pump on and dispensing nozzle open, measure and record fill station pump pressure. Is fill station pump pressure at least 20 psi (138 kPa) greater than tank pressure? 	<p>Yes — Go to Step 12. No — Fill station may not be providing enough pressure to fill. Go to Step 19.</p>
12	<p>Check body side fuel fill valve; it may be stuck closed.</p> <ol style="list-style-type: none"> Loosen the fuel fill line connection at the fill valve or at the inlet to the fuel filter to relieve any pressure in the fill line. Attempt to push open the piston in the fill valve to determine if it is stuck closed. Is the fill valve piston stuck closed? 	<p>Yes — Replace body-side fill valve and go to Step 13. No — Replace filter in the fuel fill line and go to Step 15.</p>
13	<p>Attempt to fill the vehicle fuel tank. Does the fuel tank fill?</p>	<p>Yes — Diagnostic is complete. No — Go to Step 14.</p>
14	<p>Replace the filter in the fuel fill line and then attempt to fill the vehicle fuel tank. Does the vehicle fuel tank fill?</p>	<p>Yes — Diagnostic is complete. No — Go to Step 16.</p>
15	<p>Attempt to fill the vehicle fuel tank. Does the fuel tank fill?</p>	<p>Yes — Diagnostic is complete. No — Go to Step 16.</p>
16	<p>Replace the OPD valve in the vehicle fuel tank. Is the OPD valve located in the end cap of the fuel tank?</p>	<p>Yes — Go to Step 17. No — Go to Step 18.</p>
17	<p>Attempt to fill the vehicle fuel tank as follows:</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <p>NOTE</p> </div> <p>When filling a new tank that has the OPD valve mounted in the end cap of the fuel tank, fuel splashing off the sides of the empty tank could be activating the OPD float and shutting off the fuel fill line.</p> <ol style="list-style-type: none"> Install a fuel fill pressure tester on the fill valve and close the ball valve. Connect the fuel dispensing nozzle to the pressure tester and turn on the pump. Slightly open the ball valve to slowly add approximately 10 gal (38 L) of fuel. Remove the fuel fill pressure tester. Attempt to fill the remaining tank volume (to 80% full capacity) at full flow from the dispensing nozzle. Did the tank fill? 	<p>Yes — Diagnostic is complete. No — Call ROUSH CleanTech Customer Service at 800-597-6874.</p>
18	<p>Attempt to fill the vehicle fuel tank. Does the fuel tank fill?</p>	<p>Yes — Diagnostic is complete. No — Call ROUSH CleanTech Customer Service at 800-597-6874.</p>
19	<p>Fill station is not providing enough pressure to fill.</p> <ol style="list-style-type: none"> Using the tables provided at the front of this section, determine expected propane tank pressure based on ambient temperature. Is the vehicle fuel tank pressure greater than 20 psi (138 kPa) over the nominal expected pressure? 	<p>Yes — Go to Step 20. No — Locate a dispensing facility with pump output capacity in excess of 100 psi (689 kPa) (preferably an Auto Gas-type facility). Then, go to Step 12.</p>

Step	Procedure	Action
20	<p>Vehicle fuel tank is at a higher pressure.</p> <p>a. Higher pressure is likely caused by heavy vehicle usage heating the fuel.</p> <p>b. Allow the vehicle (fuel tank) to cool and then recheck pressure in the fuel tank.</p>	When tank pressure is within 10 psi (69 kPa) of expected tank pressure, go to Step 21.
21	<p>Measure and compare vehicle fuel tank and fill station pressures.</p> <p>a. Connect a pressure gauge service tool to the fuel tank bleeder valve and record fuel tank pressure.</p> <p>b. Using a fuel fill pressure tester installed on the fill valve, attempt to fill the vehicle.</p> <p>c. With the dispensing pump on and dispensing nozzle open, measure and record fill station pump pressure.</p> <p>d. Is fill station pump pressure at least 20 psi (138 kPa) greater than fuel tank pressure?</p>	<p>Yes — Go to Step 22.</p> <p>No — Fill station is not providing enough pressure to fill vehicle tank. Go to Step 22. Locate a dispensing facility with pump output capacity in excess of 100 psi (689 kPa) (preferably an Auto Gas-type facility).</p>
22	<p>Attempt to fill the vehicle fuel tank.</p> <p>Does the fuel tank fill?</p>	<p>Yes — Diagnostic is complete.</p> <p>No — Go to Step 12.</p>

Pinpoint Test B: Slow Fill

Step	Procedure	Action
1	<p>Inspect vehicle to check for kinked fill lines.</p> <p>Are fill lines kinked?</p>	<p>Yes — Replaced kinked fill lines.</p> <p>No — Go to Step 2.</p>
2	<p>Determine flow rate at which the vehicle fuel system fills.</p> <p>a. Time the fill station pump for 10 seconds and record the number of gallons dispensed.</p> <p>b. Multiply the gallons dispensed by six to determine the flow rate in gallons per minute.</p> <p>c. Is the fill station pump flow rate at least 6 gal (23 L) per minute?</p>	<p>Yes — System fill rate is OK; diagnostic is complete.</p> <p>No — Fill station is not providing enough pressure to fill vehicle tank. Go to Step 3.</p>
3	<p>Measure and compare vehicle fuel tank and fill station pressures.</p> <p>a. Connect a pressure gauge service tool to the fuel tank bleeder valve and record fuel tank pressure.</p> <p>b. Using a fuel fill pressure tester installed on the fill valve, attempt to fill the vehicle.</p> <p>c. With the dispensing pump on and dispensing nozzle open, measure and record fill station pump pressure.</p> <p>d. Is fill station pump pressure at least 50 psi (345 kPa) greater than fuel tank pressure?</p>	<p>Yes — Go to Step 4.</p> <p>No — Fill station is not providing enough pressure to fill vehicle tank. Go to Step 11.</p>
4	<p>Check fuel fill valve; it may not be opening completely.</p> <p>a. Loosen the fuel fill line connection at the fill valve or at the inlet to the fuel filter to relieve any pressure in the fill line.</p> <p>b. Attempt to push open the piston in the fill valve to determine if it is opening completely. Piston should travel 1/4 inch.</p> <p>c. Is the fill valve piston opening completely?</p>	<p>Yes — Replace the filter in the fuel fill line and then go to Step 7.</p> <p>No — Replace the fuel fill valve and then go to Step 5.</p>
5	<p>Attempt to fill the vehicle fuel tank.</p> <p>Does the fuel tank fill at greater than six gal (23 L) per minute?</p>	<p>Yes — Diagnostic is complete.</p> <p>No — Go to Step 6.</p>
6	<p>Replace the filter in the fuel fill line.</p> <p>Does the vehicle fuel tank fill at greater than six gal (23 L) per minute?</p>	<p>Yes — Diagnostic is complete.</p> <p>No — Go to Step 7.</p>
7	<p>Attempt to fill the vehicle fuel tank.</p> <p>Does the fuel tank fill at greater than six gal (23 L) per minute?</p>	<p>Yes — Diagnostic is complete.</p> <p>No — Go to Step 8.</p>

Step	Procedure	Action
8	<p>Replace the overfill protection device (OPD) valve in the vehicle fuel tank.</p> <p>Is the OPD valve located in the end cap of the fuel tank?</p>	<p>Yes — Go to Step 9.</p> <p>No — Go to Step 10.</p>
9	<p>Attempt to fill the vehicle fuel tank as follows:</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <p>NOTE</p> </div> <p>When filling a new tank that has the OPD valve mounted in the end cap, fuel splashing off the sides of the empty tank could be activating the OPD float and shutting off the fuel fill line.</p> <hr style="width: 50%; margin-left: 0;"/> <ol style="list-style-type: none"> a. Install a fuel fill pressure tester on the fill valve and close the ball valve. b. Connect the fuel dispensing nozzle to the pressure tester and turn on the pump. Slightly open the ball valve to slowly add approximately 10 gal (38 L) of fuel. c. Remove the fuel fill pressure tester. d. Attempt to fill the remaining tank volume (to 80% full capacity) at full flow from the dispensing nozzle. <ol style="list-style-type: none"> a. Did the tank fill? 	<p>Yes — Diagnostic is complete.</p> <p>No — Call ROUSH CleanTech Customer Service at 800-597-6874.</p>
10	<p>Attempt to fill the vehicle fuel tank.</p> <p>Does the fuel tank fill at greater than six gal (23 L) per minute?</p>	<p>Yes — Diagnostic is complete.</p> <p>No — Call ROUSH CleanTech Customer Service at 800-597-6874.</p>
11	<p>Fill station is not providing enough pressure to fill.</p> <ol style="list-style-type: none"> a. Using the tables provided at the front of this section, determine expected propane tank pressure based on ambient temperature. b. Is the vehicle fuel tank pressure greater than 20 psi (38 kPa) over the nominal expected pressure? 	<p>Yes — Go to Step 12.</p> <p>No — Locate a dispensing facility with pump output capacity in excess of 100 psi (689 kPa) (preferably an Auto Gas-type facility). Then, go to Step 2.</p>
12	<p>Vehicle fuel tank is at a higher pressure.</p> <ol style="list-style-type: none"> a. Higher pressure is likely caused by heavy vehicle usage heating the fuel. b. Allow the vehicle (fuel tank) to cool and then recheck pressure in the fuel tank. 	<p>When tank pressure is within 10 psi (69 kPa) of expected tank pressure, go to Step 13.</p>
13	<p>Measure and compare vehicle fuel tank and fill station pressures.</p> <ol style="list-style-type: none"> a. Connect a pressure gauge service tool to the fuel tank bleeder valve and record fuel tank pressure. b. Using a fuel fill pressure tester installed on the fuel fill valve, attempt to fill the vehicle. c. With the dispensing pump on and dispensing nozzle open, measure and record fill station pump pressure. d. Is fill station pump pressure at least 50 psi (345 kPa) greater than fuel tank pressure? 	<p>Yes — Go to Step 14.</p> <p>No — Fill station is not providing enough pressure to fill vehicle tank. Go to Step 14. Locate a dispensing facility with pump output capacity in excess of 100 psi (689 kPa) (preferably an Auto Gas-type facility).</p>
14	<p>Attempt to fill the vehicle fuel tank.</p> <p>Does the fuel tank fill at greater than six gal (23 L) per minute?</p>	<p>Yes — Diagnostic is complete.</p> <p>No — Go to Step 4.</p>

Pinpoint Test C: Over Fill

Step	Procedure	Action
1	<p>Suspect overfill because fuel fill volumes achieved during refueling exceed the rated fuel capacity or excessive vehicle range between refueling.</p> <p>a. Check the fuel gauge. b. Is the gauge reading below 1/2 tank?</p>	<p>Yes — Go to Step 2. No — Drive vehicle until gauge reads below 1/4 tank.</p>
2	<p>Open bleeder valve located on the tank or remotely mounted on the vehicle.</p> <p>a. Listen at valve to verify propane vapor is venting. b. Is propane vapor venting?</p>	<p>Yes — Go to Step 3. No — Bleeder valve is not functioning properly. Replace the valve.</p>
3	<p>Park the vehicle at the refueling station.</p> <p>a. Check to determine if the vehicle is level using the vehicle frame as reference. b. Does the vehicle sit level?</p>	<p>Yes — Go to Step 4. No — Using a jack, raise the vehicle to obtain a level condition. Then, go to Step 4.</p>
4	<p>Locate the American Society of Mechanical Engineers (ASME) inspection plate on the fuel tank.</p> <p>a. Note the tank water capacity listed on the plate. b. Multiply the listed capacity by 0.05 (5%) and record the value.</p>	<p>With the value recorded, go to Step 5.</p>
5	<p>Refuel the vehicle as follows:</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <p>NOTE</p> </div> <p>If the key is on during refueling, it will take the fuel level gauge in the instrument cluster longer to register full.</p> <p>a. Verify that the ignition is in the OFF position. b. Install the fuel fill pressure tester on the fill valve and close the ball valve. c. Connect the fuel dispensing nozzle to the pressure tester. Verify that the bleeder valve is open. d. With the bleeder valve open, turn on the pump. Open the ball valve slightly to very slowly refuel the vehicle. e. While refueling, observe the bleeder valve for fuel discharge. f. Stop filling when a solid stream of liquid fuel flows from the bleeder valve or the dispensing pump stops automatically. g. Did a solid stream of liquid flow from the bleeder valve?</p>	<p>Yes — Record the volume of fuel dispensed and then go to Step 6. No — Go to Step 7.</p>
6	<p>Resume filling until the dispensing pump stops automatically.</p> <p>a. Record the total volume of fuel dispensed and subtract the amount from the volume recorded in Step 5. b. Is the additional amount of fuel dispensed less than 5% of the tank water capacity determined in Step 4?</p>	<p>Yes — Tank does not overfill. Diagnostic is complete. No — Tank is overfilling. Replace the OPD fill valve in the fuel tank; then, go to Step 8.</p>
7	<p>The dispensing pump stopped automatically and a liquid fuel stream was not observed flowing from bleeder valve.</p>	<p>Tank does not overfill. Diagnostic is complete.</p>

Step	Procedure	Action
8	<p>Refuel the vehicle as follows:</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <p>NOTE</p> </div> <p>If the key is ON during refueling, it will take the fuel level gauge in the instrument cluster longer to register full.</p> <ol style="list-style-type: none"> a. Verify that the ignition is in the OFF position. b. Install the fuel fill pressure tester on the fill valve and close the ball valve. c. Connect the fuel dispensing nozzle to the pressure tester. Verify that the bleeder valve is OPEN. d. With the bleeder valve open, turn ON the pump. Open the ball valve slightly to very slowly to refuel the vehicle. e. While refueling, observe the bleeder valve for fuel discharge. f. Stop filling when a solid stream of liquid fuel flows from the bleeder valve or the dispensing pump stops automatically. g. Did a solid stream of liquid flow from the bleeder valve? 	<p>Yes — Record the volume of fuel dispensed and then go to Step 9.</p> <p>No — Go to Step 7.</p>
9	<p>Resume filling until the dispensing pump stops automatically.</p> <ol style="list-style-type: none"> a. Record the volume of fuel dispensed and subtract the amount from the volume recorded in Step 8. b. Is the additional amount of fuel dispensed less than 5% of the tank water capacity determined in Step 4? 	<p>Yes — Tank does not overflow. Diagnostic is complete.</p> <p>No — Tank is overflowing. Replace the fuel tank assembly.</p>

Pinpoint Test D: Engine Does Not Crank

Step	Procedure	Action
1	<p>Is battery voltage above 10 volts?</p>	<p>Yes — Go to Step 2.</p> <p>No — Determine cause of low battery voltage.</p>
2	<p>Verify that the smart relay module (SRM) has communication.</p> <p>Can fuel rail pressure and temperature be read with a scan tool?</p>	<p>Yes — Go to Step 3.</p> <p>No — Go to the Smart Relay Module Electrical Test procedure.</p>
3	<p>Refer to the <i>Ford Powertrain Control/Emission Diagnosis Service Manual</i>.</p> <p>Is the problem corrected?</p>	<p>Yes — Diagnostic is complete.</p> <p>No — Call ROUSH CleanTech Customer Service at 800-597-6874.</p>

Pinpoint Test E: Engine Cranks, No Start

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

Step	Procedure	Action
1	<p>Verify the following:</p> <ul style="list-style-type: none"> a. Is there is at least 1/8 tank of fuel or more? (add fuel if necessary). b. Is the tank supply manual shutoff valve fully open? c. Is battery voltage above 10 volts? d. Are fuel lines free of kinks or damage? e. Inspect all fuses in both the Ford and ROUSH fuse boxes. 	<p>Yes — Go to Step 2. No — Correct fault and retest.</p>
2	<p>Record any Diagnostic Trouble Codes (DTCs). Are any codes present?</p>	<p>Yes — If circuit faults or non-fuel system related faults are set, correct condition and retest. If symptom continues go to step 3. No — Go to Step 3.</p>
3	<p>Measure and record fuel tank and fuel rail pressure at during start sequence.</p> <div style="border: 1px solid black; text-align: center; padding: 5px; margin: 10px 0;"> <p>NOTE</p> </div> <p>If the key is ON during refueling, it will take the fuel level gauge in the instrument cluster longer to register full.</p> <hr/> <p>Is fuel rail pressure 55 psi or greater over tank?</p>	<p>Yes— Refer to the Ford Powertrain Control/Emissions Diagnosis Service Manual. No — Go to step 4.</p>
4	<p>During start sequence, test voltage across terminal A and B (harness side) of each fuel pump connector located at the fuel pump access plate. Do both connectors have at least 6 volts?</p> <div style="border: 1px solid black; text-align: center; padding: 5px; margin: 10px 0;"> <p>NOTE</p> </div> <p>For warranty submission record amp draw of each fuel pump (if possible), and resistance across pin A and B of the fuel pump connectors, tank side.</p> <hr/>	<p>Yes — Go to Step 4. No — Perform Fuel Pump Electrical Test and repair wiring concern.</p>
5	<p>Is fuel rail pressure greater than 25 psi over tank during start sequence?</p>	<p>Yes — Go to Step 6. No — Replace fuel pump assembly.</p>
6	<p>Disconnect Tank Supply Solenoid electrical connector, and perform circuit load test, using a test light during a start sequence. Repeat with fuel rail pressure control module supply solenoid. Do both circuits light a test light?</p>	<p>Yes — Go to Step 7. No — Perform Tank Solenoid Electrical Test or Fuel Rail Pressure Control Module Electrical Test.</p>

Step	Procedure	Action
7	<p>With ignition off, activate the tank supply solenoid and the fuel rail pressure control module (FRPCM) supply solenoid by unplugging the connector and supplying 12v power and ground to the solenoid coil terminals.</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <p>NOTE</p> </div> <p>If you have access for Ford IDS this can be done through manual solenoid activation. Actuate shutoff valve A (tank supply solenoid) and shutoff valve B (FRPCM supply solenoid).</p> <hr/> <p>Is there an audible click when the solenoid is activated?</p>	<p>Yes — Refer to the Ford Powertrain Control/Emissions Diagnosis Service Manual.</p> <p>No — Replace defective solenoid coil. If symptom continues call 800-59-ROUSH.</p>

Pinpoint Test F: Engine Stumble, Stall, Rough Idle

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

Step	Procedure	Action
1	<p>Verify the following:</p> <ul style="list-style-type: none"> a. Is there is at least 1/8 tank of fuel or more? (add fuel if necessary). b. Is the tank supply manual shutoff valve fully open? c. Is battery voltage above 12.5 volts with engine running? d. Are fuel lines free of kinks or damage? 	<p>Yes — Go to Step 2.</p> <p>No — Correct the fault and retry.</p>
2	<p>Record any Diagnostic Trouble Codes (DTCs).</p> <p>Are any codes present?</p>	<p>Yes — If ROUSH circuit faults are present, refer to the DTC Chart. If non-fuel system related circuit faults are set, refer to the Ford Powertrain Control/Emissions Diagnosis Service Manual. Correct condition and retest. If symptom continues, go to step 3.</p> <p>No — Go to Step 3.</p>
3	<p>Measure and record fuel tank and fuel rail pressure at idle.</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <p>NOTE</p> </div> <p>Refer to Measuring Fuel Tank and Fuel Rail Pressure to read these values.</p> <hr/> <p>Is fuel rail pressure 55 psi or greater over tank?</p>	<p>Yes — Refer to the Ford Powertrain Control/Emissions Diagnosis Service Manual.</p> <p>No — Go to Step 4.</p>
4	<p>Disconnect Tank Supply Solenoid electrical connector, and perform circuit load test, using a test light during a start sequence.</p> <p>Repeat with fuel rail pressure control module supply solenoid.</p> <p>Do both circuits light a test light?</p>	<p>Yes — Go to Step 5.</p> <p>No — Perform Tank Solenoid Electrical Test or Fuel Rail Pressure Control Module Electrical Test.</p>

Step	Procedure	Action
5	<p>With engine running, test voltage across terminal A and B (harness side) of each fuel pump connector located at the fuel pump access plate. Do both connectors have at least 6 volts?</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <p>NOTE</p> </div> <p>For warranty submission record amp draw of each fuel pump (if possible), and resistance across pin A and B of the fuel pump connectors, tank side.</p>	<p>Yes — Go to Step 6. No — Perform <i>Fuel Pump Electrical Test</i> and repair wiring concern.</p>
6	<p>Is fuel rail pressure greater than 25 psi over tank at idle?</p>	<p>Yes — Go to step 7. No — Replace fuel pump assembly.</p>
7	<p>Using a scan tool, measure fuel pump duty cycle. Is fuel pump duty cycle greater than 0.9 at idle?</p>	<p>Yes — Replace fuel pump assembly. No — Go to Step 8.</p>
8	<p>Drive the vehicle with an assistant. Monitor fuel rail pressure and fuel pump duty cycle. During a hard acceleration, does the fuel rail pressure drop more than 10 psi while fuel pump duty cycle is at 1.0?</p>	<p>Yes — Replace fuel pump assembly. No — Refer to the Ford Powertrain Control/Emissions Diagnosis Service Manual.</p>

Pinpoint Test G: Excess Flow Valve Check

The excess flow valve (EFV) is designed to restrict fuel exiting the tank if the pump is energized while the fuel lines are not connected to the fuel tank. Under normal circumstances, the EFV should not trip. The EFV will reset itself after the fuel pumps have been off for about one minute.

It is common to trip the EFV after the fuel lines have been serviced and contain no pressure. If the EFV trips, turn the vehicle off, wait one minute, and restart. This may take more than one attempt.

If the fuel lines have not been serviced recently and the problem persists, there may be a leak in the supply side fuel line. If the problem is only present after the vehicle has been sitting for a length of time, but not present during a short soak, or there is a propane odor when the vehicle is running, refer to the *Fuel Line Leak Detection* procedure.

To manually reset the EFV, with the vehicle off, close the manual shutoff valve and wait one minute. Then key the vehicle to start and slowly open the manual shutoff valve.

Pinpoint Test H: Maximum Pressure Check

The LPA system operates over a wide range of pressures depending on ambient temperature, driving mode, etc. When the vehicle is subjected to a severe drive cycle in high ambient temperatures, the fuel rail pressure can rise to the limit of the injectors capabilities. This limit is a function of injector voltage and fuel rail pressure. The PCM protects for this condition by reducing the fuel pump speed when the condition is sensed, however, there still may be drive concerns. When the PCM starts controlling the fuel pump a P116E code is set. While this condition can occur in a normally functioning

vehicle, it can also be exacerbated by several factors. If the fuel tank was not properly bled during the first fill, trapped air in the vapor space can increase tank pressure. In this condition there is often only a faint smell of propane when the bleeder valve is opened. The tank should be vented until there is a strong propane odor coming from the bleeder valve. The tank pressure should be confirmed against the expected pressure.

Allow the fuel tank to cool to ambient temperature before performing the following procedure.

Step	Procedure	Action
1	<p>Measure tank pressure and tank surface temperature. Is tank pressure more than 15 psi (103 kPa) over expected tank pressure?</p>	<p>Yes — Vent the tank until pressure is within the expected range. No — Vehicle is working properly; inform and explain operating characteristics to customer.</p>

Pinpoint Test I: Fuel System Fails to Bleed

Step	Procedure	Action
1	<p>Check for diagnostic trouble codes (DTC).</p> <p>a. Are both DTC 26B3 and P009E present?</p>	<p>Yes — Go to Step 8.</p> <p>No — Go to Step 2.</p>
2	<p>Check for oil contamination at vapor port/EVAP line.</p> <p>a. Disconnect EVAP line from vapor port.</p> <p>b. Is oil present in EVAP line or vapor port?</p>	<p>Yes — Replace vapor port and perform Step 3.</p> <p>No — Go to Step 3.</p>
3	<p>Determine if fault condition repeats.</p> <p>a. START the engine and allow it to run for a few minutes.</p> <p>b. Turn OFF the engine and wait one minute.</p> <p>c. Measure and record the fuel rail pressure, fuel rail temperature and fuel tank pressure with the Key ON Engine OFF (KOEO).</p> <p>d. Energize the bleed solenoid. Refer to the Manual Solenoid Activation Procedure. Verify wiring integrity and voltage to solenoid.</p> <p>e. With the engine OFF, monitor fuel rail pressure for 15 minutes.</p> <p>f. Does fuel rail pressure drop more than 20 psi (138 kPa)?</p>	<p>Yes — Potential intermittent fault. Return vehicle to customer and see if problem persists.</p> <p>No — Go to Step 4.</p>
4	<p>Verify vapor port function.</p> <p>a. Disconnect the EVAP line from the FRPCM port.</p> <p>b. Energize the bleed solenoid. Refer to the Manual Solenoid Activation Procedure. Verify wiring integrity and voltage to solenoid.</p> <p>c. Is there propane flowing from the port?</p>	<p>Yes — Go to Step 7.</p> <p>No — Go to Step 5.</p>
5	<p>Verify bleed solenoid function.</p> <p>a. Remove the vapor port.</p> <p>b. Energize the bleed solenoid. Refer to the Manual Solenoid Activation Procedure. Verify wiring integrity and voltage to solenoid.</p> <p>c. Is there propane flowing from the port?</p>	<p>Yes — Replace vapor port and repeat Step 3.</p> <p>No — Go to Step 6.</p>
6	<p>Verify that wiring is in good condition and functioning.</p> <p>a. Perform wiring checks of the FRPCM harness.</p> <p>b. Is the wiring OK?</p>	<p>Yes — Bleed solenoid stuck closed. Replace the FRPCM.</p> <p>No — Repair wiring and repeat Step 3.</p>
7	<p>Check for a kinked EVAP line.</p> <p>a. Inspect the EVAP line between the FRPCM and EVAP canister.</p> <p>b. Are there kinks in the line?</p>	<p>Yes — Replace the kinked EVAP line and then repeat Step 3.</p> <p>No — Go to Step 8.</p>
8	<p>Check for leaks to the FRPCM.</p> <p>a. START the engine and allow it to run for a few minutes.</p> <p>b. Turn OFF the engine.</p> <p>c. Measure and record fuel rail pressure.</p> <p>d. Activate bleed solenoid to bleed pressure from fuel rail until fuel pressure drops more than 50 psi (345 kPa). Refer to the Manual Solenoid Activation Procedure.</p> <p>e. De-energize bleed solenoid.</p> <p>f. Disconnect the FRPCM and wait 120 minutes.</p> <p>g. Measure fuel rail pressure and fuel tank pressure.</p> <p>h. Does fuel rail pressure rise more than 10 psi (69 kPa)?</p>	<p>Yes — FRPCM leaks at either supply solenoid or return check valve. Replace FRPCM.</p> <p>No — Potential intermittent fault. Return vehicle to customer and see if problem persists.</p>

Pinpoint Test J: Fuel Pressure Drop

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

Step	Procedure	Action
1	<p>Verify the following:</p> <ul style="list-style-type: none"> a. Is there fuel in the tank of at least 1/8 tank? b. Is the tank supply manual shutoff valve fully open? c. Is battery voltage above 10 volts? 	<p>Yes — Go to Step 2. No — Correct the fault condition and retry.</p>
2	<p>Determine fuel pressure.</p> <ul style="list-style-type: none"> a. Measure and record fuel tank pressure. b. Measure and record fuel rail pressure with Key ON Engine Running (KOER). c. Subtract the tank measurement from the KOER measurement. d. Is the resulting fuel pressure in the expected range? 	<p>Yes — Go to Step 4. No — Go to Step 3.</p>
3	<p>Determine if the excess flow valve is tripped.</p> <ul style="list-style-type: none"> a. Turn OFF the engine. b. Wait one minute and then restart the engine. c. Is the problem resolved? 	<p>Yes — Refer to the Excess Flow Valve Check procedure. No — Go to Step 4.</p>
4	<p>Check fuel pump operation.</p> <ul style="list-style-type: none"> a. Using a current clamp, check current draw on both fuel pump power wires at the fuel tank. Refer to <i>In-Tank Harness</i> for correct circuits. b. Turn ignition switch to START position and release. Vehicle will start the flush cycle and pumps should be running. Check current draw. A minimum of 2 amps should be recorded on both fuel pump circuits. c. Do fuel pumps draw current? 	<p>Yes — Go to Step 5. No — If both circuits are showing no current, check the OEM fuel pump (FP) fuse. If only one fuel pump circuit shows current, check the ROUSH CleanTech fuel pump fuse. (See ROUSH CleanTech fuse box for location.) If both fuel pump fuses (OEM and ROUSH CleanTech) are good, go to Step 6.</p>
5	<p>Check tank solenoid (TS) and supply solenoid (SS) fuses.</p> <ul style="list-style-type: none"> a. Locate the TS (E3-E4) and SS (F1-F2) fuses. b. Are the fuses blown? 	<p>Yes — Find and repair the short; replace the fuse. No — Go to Step 8.</p>
6	<p>Verify that there is power and ground in the wiring circuit to the tank.</p> <ul style="list-style-type: none"> a. Check for >5 volts at the fuel pump 1 (FP1) and fuel pump 2 (FP2) connectors. Refer to the Fuel Rail Pressure Control Module Electrical Check procedure. b. Is >5 volts present at the FP1 connector? c. Is >5 volts present at the FP2 connector? 	<p>Yes — Refer to Engine Stumble, Stall, Rough Idle Step 9. No — Check for an open/short in the wiring circuit and repair.</p>
7	<p>Injection Pressure Temperature Sensor Rationality Does temperature and pressure make sense to verification? See the Injection Pressure Temperature Sensor Electrical Check procedure.</p>	<p>Yes — Go to Step 8. No — Verify that wiring in circuit is OK. If not, repair wiring. If OK, replace sensor.</p>
8	Refer to the appropriate <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> at www.motorcraft.com .	—

Pinpoint Test K: Tank Solenoid Electrical Check

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

CONNECTORS

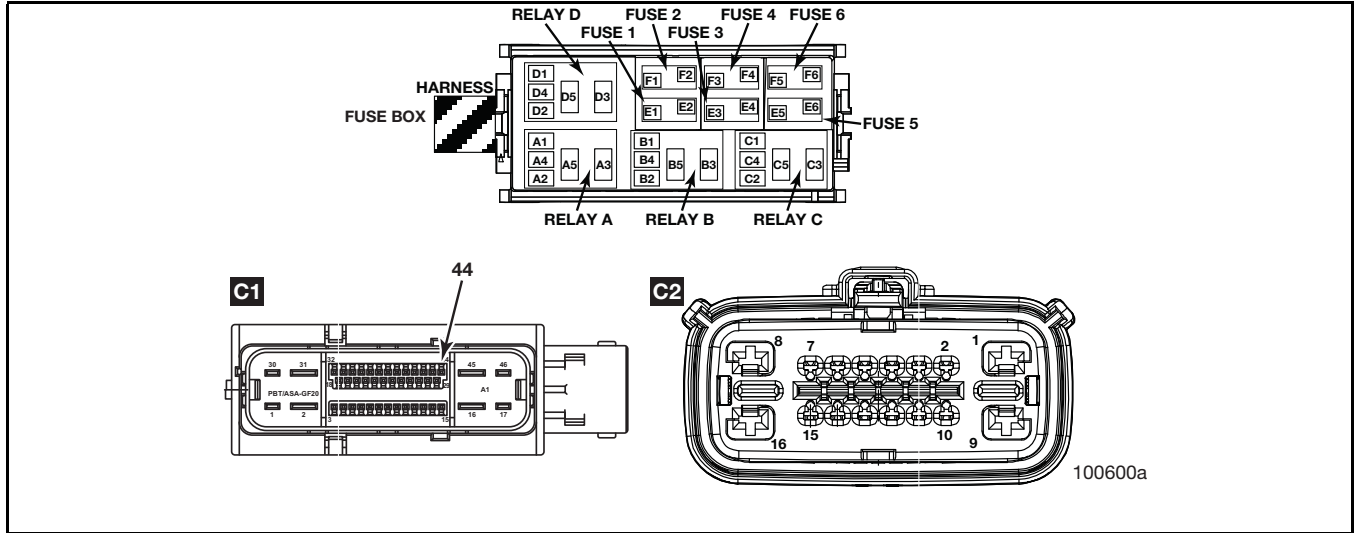


Figure 1 — Underhood Harness Connectors

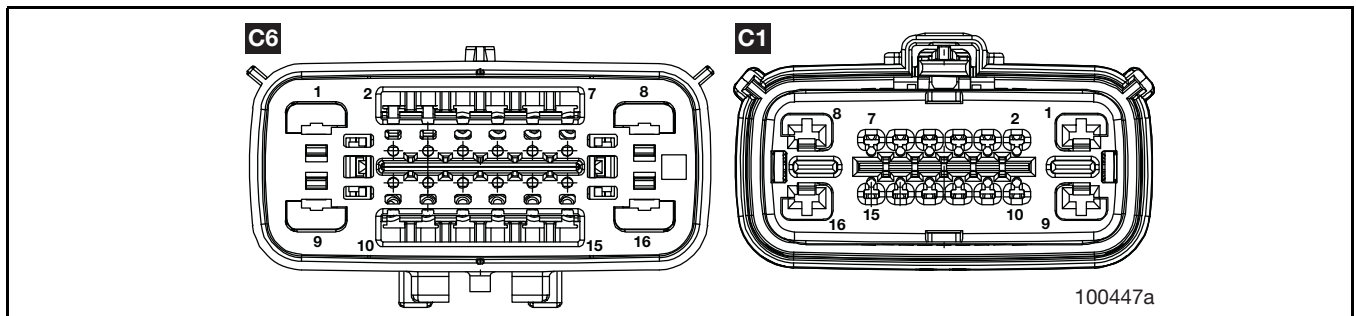


Figure 2 — Rear Frame Harness Connectors

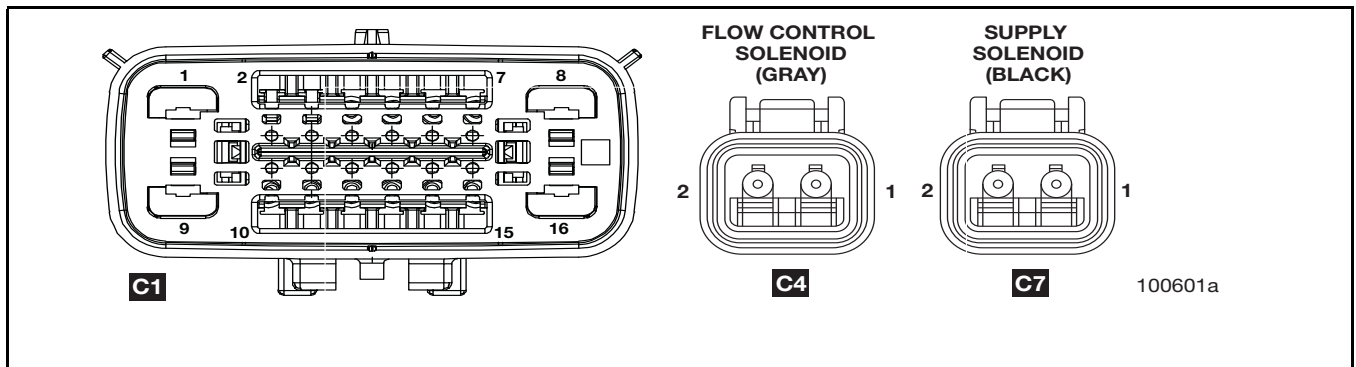


Figure 3 — Tank Harness Connectors

PROCEDURE

Step	Procedure	Action
1	Unplug the solenoid harness connector C7 from the tank solenoid.	Go to Step 2.
2	Using a multimeter, measure resistance of the solenoid. Is the measured resistance within 6-11 ohms?	Yes — Go to Step 3. No — Replace the tank solenoid.
3	Using a multimeter, measure voltage at the tank solenoid as follows: a. With the ignition key ON, check for voltage present at pin-1, connector C7 (tank harness). Use the body as the reference ground. b. Is battery (B+) voltage present?	Yes — Supply circuit OK. No — Go to Step 4.
4	Check fuse (E3-E4, 20A) in auxiliary fuse box. Is fuse blown?	Yes — Replace fuse and locate the short. No — Fuse OK; go to Step 5.
5	Check relay. Is relay functioning properly?	Yes — Go to Step 6. No — Replace relay.
6	Check supply circuit continuity from solenoid harness to fuse box. a. Check continuity between: <ul style="list-style-type: none"> • Pin-1, connector C7 and pin-10, connector C1 (tank harness) • Pin-1, connector C6 and pin-10, connector C1 (rear frame harness) • Pin-1, connector C2 and cavity A5, fuse box (underhood harness) b. Is there good continuity in the circuit?	Yes — Go to Step 7. No — Repair supply circuit wiring.
7	Check ground circuit continuity from tank harness to smart relay module (SRM) connector. a. Check continuity between: <ul style="list-style-type: none"> • Pin-2, connector C7 and pin-7, connector C1 (tank harness) • Pin-7, connector C6 and pin-7, connector C1 (rear frame harness) • Pin-7, connector C2 and pin-1, connector C1 (underhood harness) b. Is there good continuity in the circuit?	Yes — Refer to the Smart Relay Module Electrical Test procedure. No — Repair ground circuit wiring.

Pinpoint Test L: Return Valve Procedure

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

PROCEDURE

Step	Procedure	Action
1	Unplug the solenoid harness connector C4 from the tank solenoid.	Go to Step 2.
2	Using a multimeter, measure the resistance of the solenoid. Is the measured resistance within 6-35 ohms?	Yes — Go to Step 3. No — Replace the tank solenoid.
3	Using a multimeter, measure the voltage at the tank solenoid as follows: a. With the ignition key ON, check for voltage present at pin-1, connector C4 (tank harness). Use the body as the reference ground. b. Is battery (B+) voltage present?	Yes — Supply circuit OK. No — Go to step 4.
4	Check fuse (F1-F2, 10A) in auxiliary fuse box. Is fuse blown?	Yes — Replace the fuse. No — Fuse OK. Go to Step 5.
5	Check relay. Is relay functioning properly?	Yes — Go to Step 6. No — Replace the relay.
6	Check supply circuit continuity from the solenoid harness to the fuse box. a. Check continuity between: <ul style="list-style-type: none"> • Pin 1, connector C4 and Pin 12, connector C1 (tank harness). • Pin 12, connector C6 and Pin 12, connector C1 (rear frame harness). • Pin 12, connector C2 and Cavity F2, fuse box (underhood harness). b. Is there good continuity in the circuit?	Yes — Go to Step 7. No — Repair supply circuit wiring.
7	Check ground circuit continuity from the tank harness to the Smart Relay Module (SRM) connector. a. Check continuity between: <ul style="list-style-type: none"> • Pin 2, connector C4 and Pin 11, connector C1 (tank harness). • Pin 11, connector C6 and Pin 11, connector C1 (rear frame harness). • Pin 11, connector C2 and Pin 30, connector C1 (underhood harness). b. Is there good continuity in the circuit?	Yes — Refer to the Smart Relay Module Electrical Test procedure. No — Repair ground circuit wiring.

Pinpoint Test M: Fuel Rail Pressure Control Module Electrical Check

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

CONNECTORS

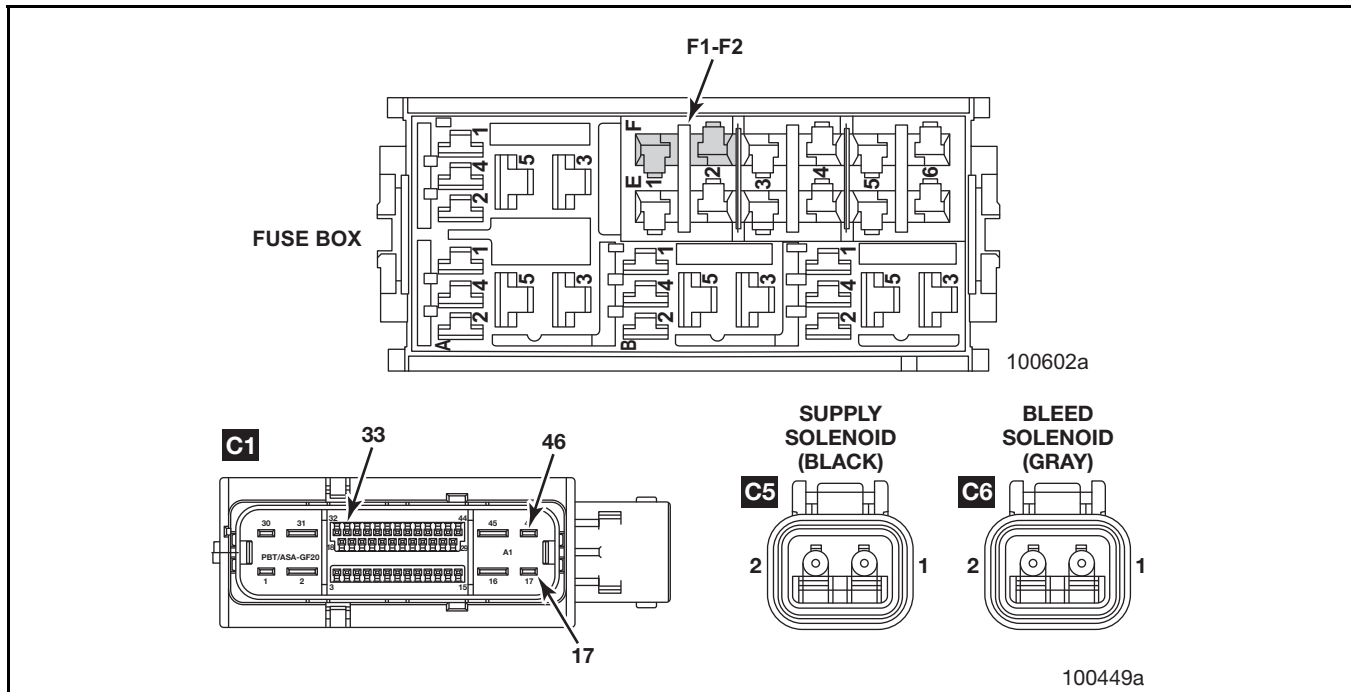


Figure 4 — Underhood Harness Connectors

PROCEDURE

Step	Procedure	Action
1	Unplug the fuel rail pressure control module (FRPCM) connector from connector 11 of underhood harness.	Go to Step 2.
2	Using a multimeter, check the resistance of each solenoid. a. Check resistance across the terminals of the FRPCM solenoid in sequence as follows: • Supply Solenoid — Pin-1 and pin-2 • Bleed Solenoid — Pin-1 and pin-2 b. Are both solenoids between 6-11 ohms?	Yes — Go to Step 3. No — Replace the FRPCM if resistance for any one of the solenoids is not within the specified range.
3	Check supply voltage to FRPCM solenoids. Using a multimeter, measure voltage between the terminal for each solenoid at the harness side connectors and ground as follows:	Go to Steps 4–6.
4	Supply Solenoid — Pin-1 and body ground	B+ Voltage — Go to Step 5. No Voltage — Go to Step 5.

Step	Procedure	Action
5	Bleed Solenoid — Pin-1 and body ground	B+ Voltage — Continue with Step 8. No Voltage — If Step 4 has voltage, go to Step 7. If Step 4 has no voltage, go to Step 6.
6	Check fuses (F1-F2, 10A) in auxiliary fuse box. Is a fuse blown?	Yes — Replace fuse and locate the short. No — Go to Step 7.
7	Check solenoid supply circuit continuity. a. Check continuity between: <ul style="list-style-type: none"> • Supply Solenoid — Pin-1, connector C5 (underhood harness) and cavity F2 (auxiliary fuse box) • Bleed Solenoid — Pin-1, connector C6 (underhood harness) and cavity F2 (auxiliary fuse box) b. Is there good continuity in all three circuits?	Yes — Go to Step 8. No — Repair wiring circuit.
8	Check solenoid ground circuit continuity. a. Check continuity in the underhood harness between: <ul style="list-style-type: none"> • Supply Solenoid — Pin-2, connector C5 and pin-32, connector C1 at SRM • Bleed Solenoid — Pin-2, connector C6 and pin-33, connector C1 at SRM b. Is there good continuity in all three circuits?	Yes — Refer to the Smart Relay Module Electrical Test procedure. No — Repair wiring circuit.

Pinpoint Test N: Injection Pressure Temperature Sensor Electrical Check

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

CONNECTORS

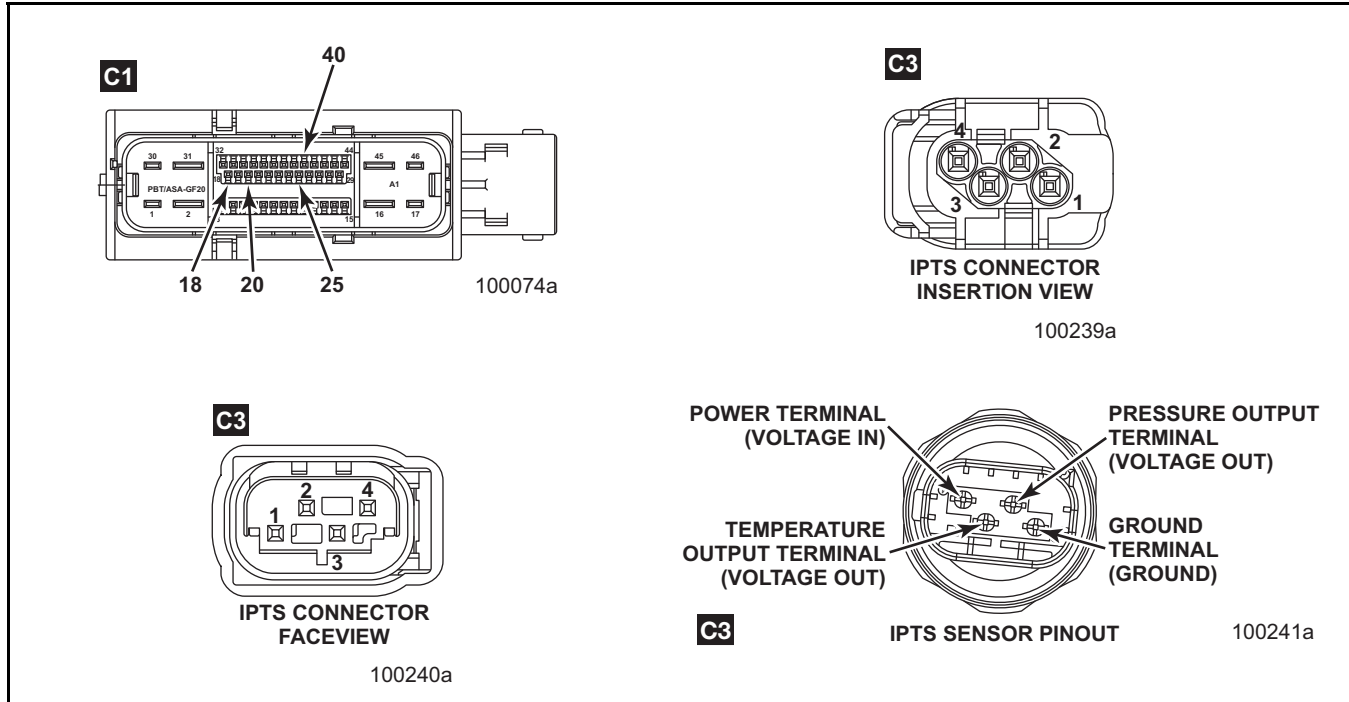


Figure 5 — Underhood Harness Connectors

PROCEDURE

Step	Procedure	Action
1	Unplug the connector C3 (underhood harness) to the IPTS.	Go to Step 2.
2	Check resistance of the injection pressure temperature sensor (IPTS). a. With vehicle at ambient room temperature (20–30°C, 68–86°F) and using a multimeter, measure resistance across the IPTS terminals (between pin-1 and pin-3). b. Is the resistance value between 8K–12K ohms?	Yes — Go to Step 3. No — Replace the IPTS.
3	Check circuit continuity between the IPTS and the smart relay module (SRM). a. Using a multimeter, check continuity in the underhood harness between: • Pin-1, connector C3 and pin-40, connector C1 • Pin-2, connector C3 and pin-20, connector C1 • Pin-3, connector C3 and pin-18, connector C1 • Pin-4, connector C3 and pin-25, connector C1 b. Is there good continuity in the circuits?	Yes — Refer to the Smart Relay Module Electrical Test procedure. No — Repair circuit wiring.

Pinpoint Test O: Tank Pressure Temperature Sensor Electrical Check

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

CONNECTORS

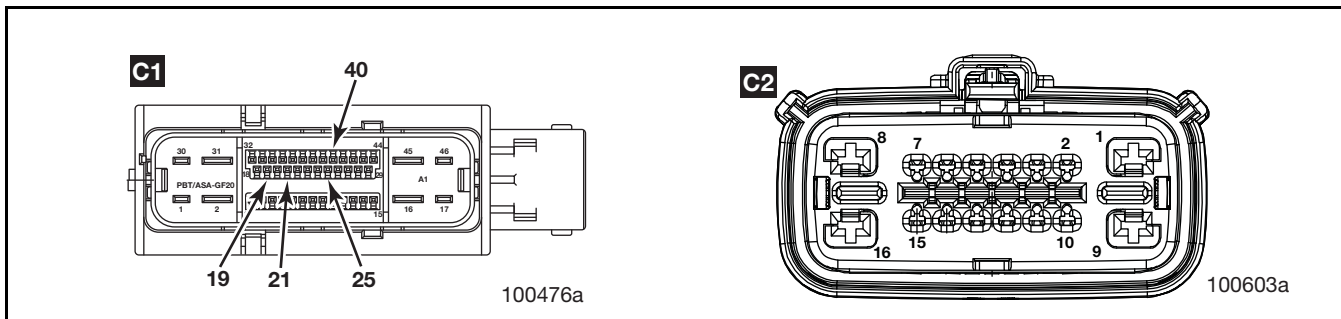


Figure 6 — Underhood Harness Connectors

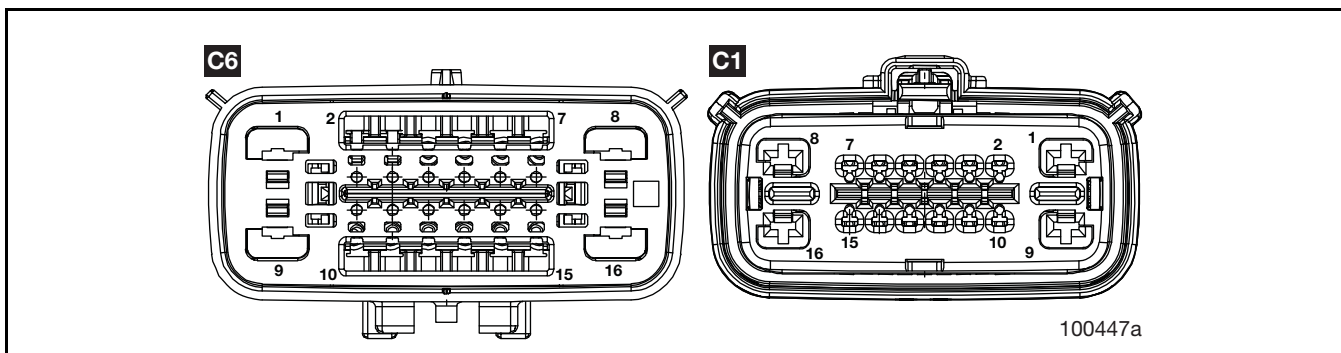


Figure 7 — Rear Frame Harness Connectors

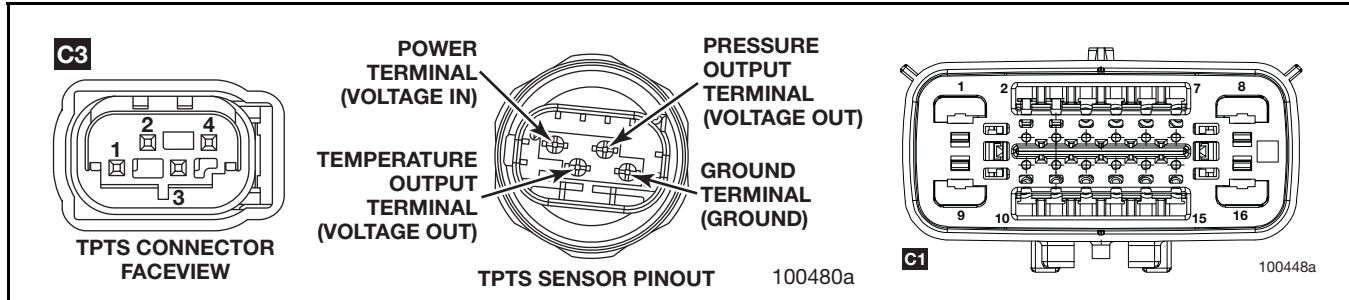


Figure 8 — Fuel Tank Connectors

PROCEDURE

Step	Procedure	Action
1	Unplug the connector C3 (fuel tank harness) to the TPTS.	Go to Step 2.
2	Check resistance of the fuel pressure temperature sensor (TPTS). a. With vehicle at ambient room temperature (20–30°C, 68–86°F) and using a multimeter, measure resistance across the FPTS terminals (between pin-1 and pin-3). b. Is the resistance value between 8K–12K ohms?	Yes — Go to Step 3. No — Replace the TPTS.
3	Check circuit continuity between the TPTS and the smart relay module (SRM). a. Using a multimeter, check continuity in the underhood harness between: <ul style="list-style-type: none"> • Pin-3, connector C2 and pin-40, connector C1 • Pin-6, connector C2 and pin-21, connector C1 • Pin-5, connector C2 and pin-19, connector C1 • Pin-4, connector C2 and pin-25, connector C1 b. Is there good continuity in the circuits?	Yes — Refer to the <i>Smart Relay Module Electrical Test</i> procedure. No — Repair circuit wiring.

Pinpoint Test P: Fuel Pump Function/Electrical Test Procedure

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

CONNECTORS

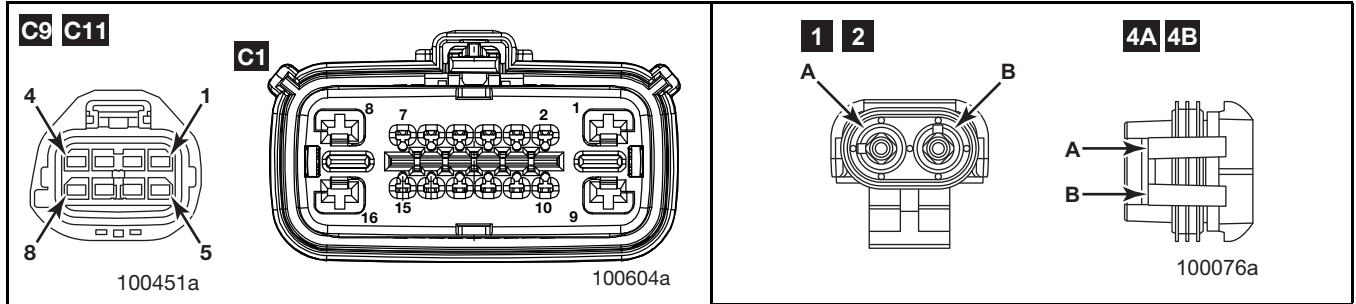


Figure 9 — Rear Frame Harness Connectors

Figure 10 — In-Tank Harness Connectors

PROCEDURE

Step	Procedure	Action
1	<p>With vehicle at idle (during start procedure if it will not start) read fuel rail and fuel tank pressure at the same time using a scan tool or manual pressure gauge.</p> <p>Is rail pressure greater than 25psi over tank pressure?</p>	<p>Yes — Go to Step 2.</p> <p>No — Go to Step.</p>
2	<p>Using the ROUSH Diagnostic Tool.</p>	

Pinpoint Test Q: Fuel Pump Control Module Electrical Continuity Test

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

CONNECTORS

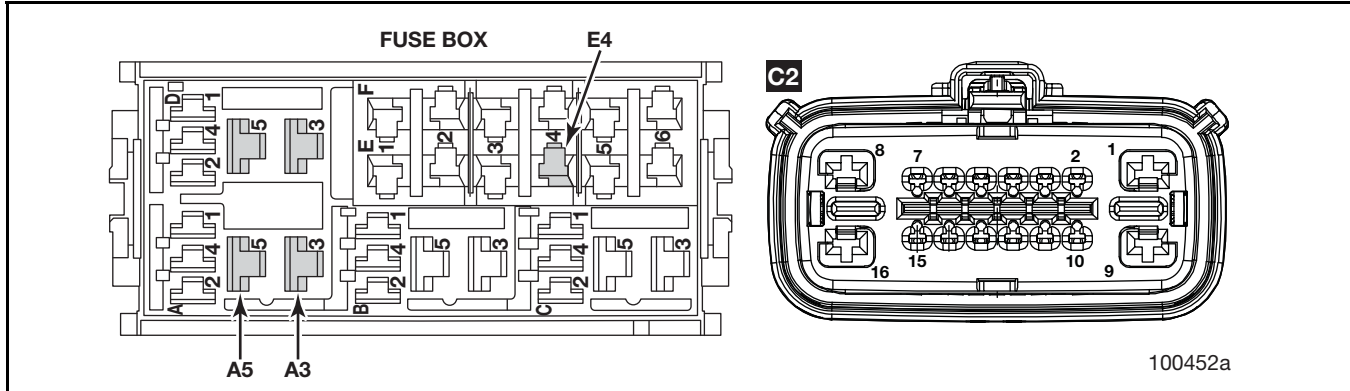


Figure 11 — Underhood Harness Connectors

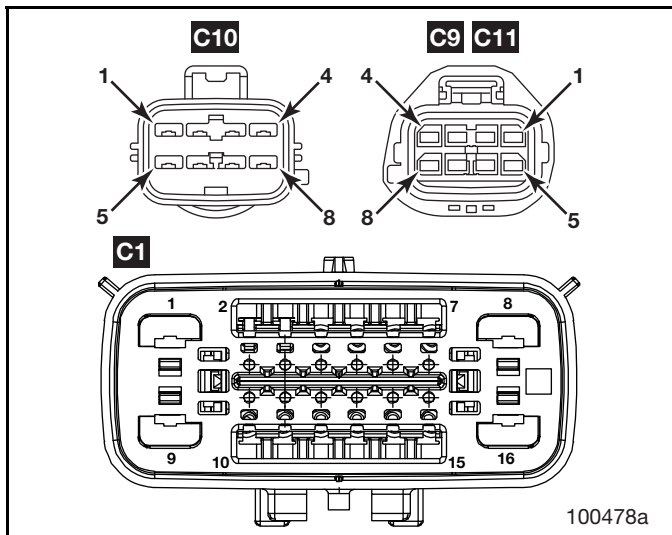


Figure 12 — Rear Frame Harness Connectors

PROCEDURE

Step	Procedure	Action
	For fuel pump control module (FPCM) functional testing and diagnostic trouble codes, refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> at www.motorcraft.com .	
1	<p>Check Ford FPCM circuit continuity to Ford harness.</p> <p>a. Disconnect rear frame harness connectors C10 and C11.</p> <p>b. Check for continuity in the rear frame harness across:</p> <ul style="list-style-type: none"> • Pin-1, connector C10 and pin-1, connector C11 • Pin-3, connector C10 and pin-3, connector C11 • Pin-4, connector C10 and pin-4, connector C11 • Pin-5, connector C10 and pin-5, connector C11 • Pin-6, connector C10 and pin-6, connector C11 • Pin-7, connector C10 and pin-7, connector C11 <p>c. Is there good continuity in each circuit?</p>	<p>Yes — Go to Step 2.</p> <p>No — Repair circuit wiring.</p>
2	<p>Check FPCM circuit continuity to Ford harness.</p> <p>a. Disconnect rear frame harness connector C9.</p> <p>b. Check wire VPWR (V+) for continuity across:</p> <ul style="list-style-type: none"> • Pin-1, connector C9 (rear frame harness) and pin-1, connector C6 (rear frame harness) • Pin-1, connector C2 (underhood harness) and cavity-A5, fuse box (underhood harness) • Cavity-A3, fuse box (underhood harness) and cavity-E4, fuse box (underhood harness) <p>c. Is there good continuity in each circuit?</p>	<p>Yes — Go to Step 3.</p> <p>No — Repair circuit wiring.</p>
3	<p>Check fuse condition (E3-E4).</p> <p>Is the fuse blown?</p>	<p>Yes — Inspect for shorted wire and replace fuse.</p> <p>No — Go to Step 4.</p>
4	<p>Check ROUSH CleanTech FPCM circuit continuity to Ford harness.</p> <p>a. Check for continuity in the rear frame harness across:</p> <ul style="list-style-type: none"> • Pin-1, connector C6 and pin-1, connector C9 • Pin-4, connector C10 and pin-4, connector C9 • Pin-1, connector C1 and pin-5, connector C9 • Pin-6, connector C10 and pin-6, connector C9 • Pin-9, connector C1 and pin-8, connector C9 • Pin-15, connector C6 and pin-7, connector C9 <p>b. Is there good continuity in each circuit?</p>	<p>Yes — Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for functional testing of the FPCM.</p> <p>No — Repair circuit wiring.</p>

Pinpoint Test R: Smart Relay Module Electrical Test

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

CONNECTORS

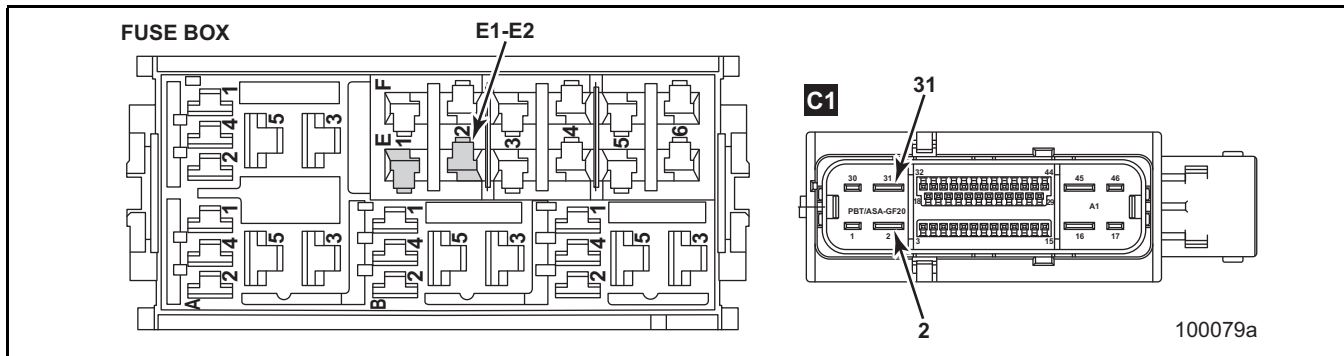


Figure 13 — Underhood Harness Connectors

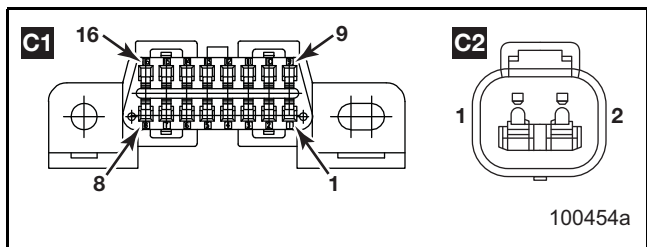


Figure 14 — CAN Harness Connectors

PROCEDURE

Step	Procedure	Action
1	Disconnect the smart relay module (SRM) connector C1 (underhood harness).	Go to Step 2.
2	Check for battery voltage (B+) to the SRM. a. Using a multimeter, check for B+ voltage at pin-2, connector C1. Use a body ground for reference. b. Is there voltage (B+)?	Yes — Go to Step 5. No — Go to Step 3.
3	Check for battery voltage (B+) to the SRM. a. Check circuit continuity between pin-2, connector C1 and cavity E2, auxiliary fuse box. b. Is there good continuity in the circuit?	Yes — Go to Step 4. No — Repair circuit wiring.
4	Check for battery voltage (B+) to the SRM. a. Check condition of SRM power fuse (E1-E2, 5A) in the auxiliary fuse box. b. Is fuse blown?	Yes — Replace fuse. No — Go to Step 5.

Step	Procedure	Action
5	<p>Check the SRM ground circuit for continuity.</p> <p>a. Using a multimeter, check ground at pin-31, connector C1 (underhood harness). Use a body ground for reference.</p> <p>b. Is there good continuity?</p>	<p>Yes — Go to Step 6.</p> <p>No — Repair circuit wiring.</p>
6	<p>Check CAN and underhood harness continuity.</p> <p>a. Check CAN-H(+) continuity across:</p> <ul style="list-style-type: none"> • Pin-28, SRM connector C1 (underhood harness) and pin-1, connector 23 (underhood harness) • Pin-1, connector C2 (CAN harness) and pin-6, connector C1 (CAN harness) <p>b. Is there good continuity in the circuits?</p>	<p>Yes — Go to Step 7.</p> <p>No — Repair circuit wiring.</p>
7	<p>Check CAN and underhood harness continuity.</p> <p>a. Check CAN-H(-) continuity across:</p> <ul style="list-style-type: none"> • Pin-43, SRM connector C1 (underhood harness) and pin-2, connector 23 (underhood harness) • Pin-2, connector C2 (CAN harness) and pin-14, connector C1 (CAN harness) <p>b. Is there good continuity in the circuits?</p>	<p>Yes — Refer to the <i>Ford Powertrain Control/Emissions Diagnosis Service Manual</i> for functional testing of the CAN bus.</p> <p>No — Repair circuit wiring.</p>

Pinpoint Test S: Fuel Level Sender Electrical Check

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

CONNECTORS

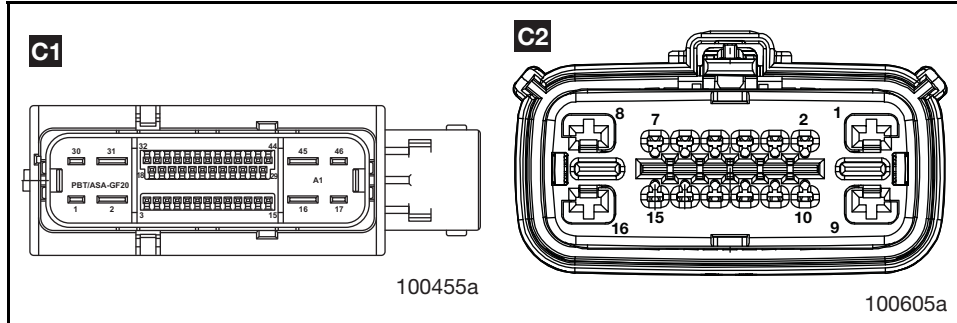


Figure 15 — Underhood Harness Connectors

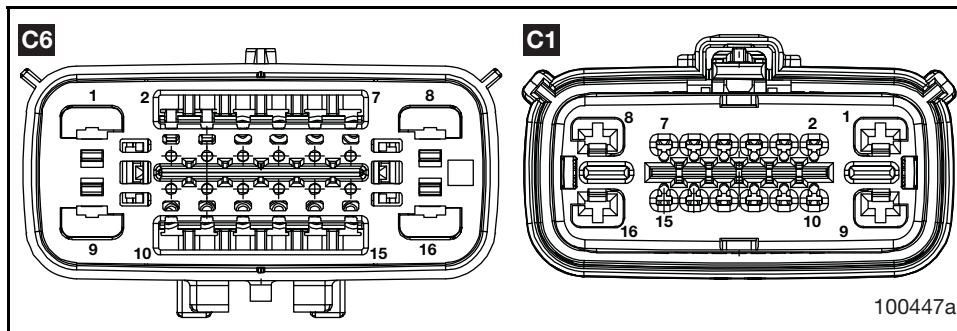


Figure 16 — Rear Frame Harness Connectors

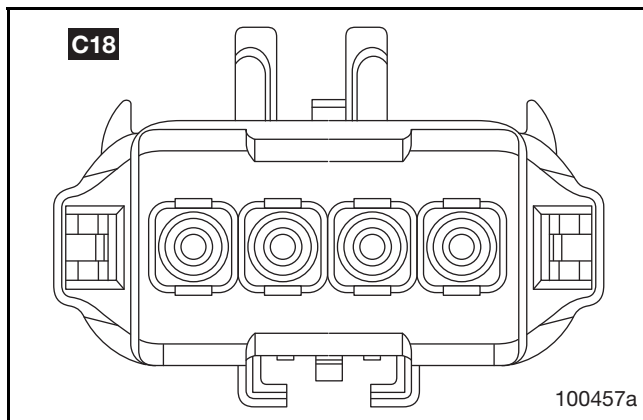


Figure 17 — Rear Frame Harness Connector

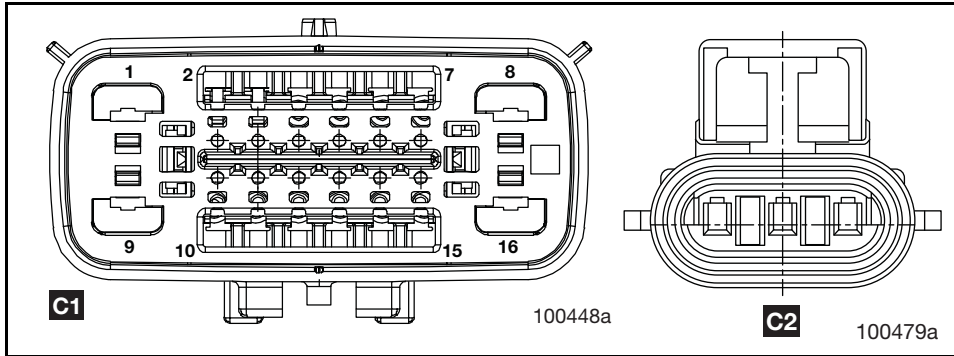


Figure 18 — Tank Harness Connectors

PROCEDURE

Step	Procedure	Action
	<p>Note: The fuel level indication system is calibrated to the voltage output from the fuel level sender. The needle position on the sending unit twin sight is a raw reading of the sender arm position and is not an accurate representation of the fuel level in the tank. The fuel level gauge on the cluster should display the correct fuel level.</p> <p>All continuity (OHMS) readings should be less than 0.5 OHMS</p>	
1	<p>If any SRM or TPTS DTC's present go to Pin Point test and resolve those faults prior to diagnosing the Fuel Level Sender fault.</p>	<p>Yes — Go to SRM or TPTS PPT. No — Go to Step 2.</p>
2	<p>Turn key to on position. Check for 5-volt reference present across pin-A and pin-C harness side of the FLS connector. Is 5v power present?</p>	<p>Yes — Go to Step 5. No — Go to Step 3.</p>
3	<p>Check for continuity of harness for 5v vref circuit and ground circuit of Fuel Level Sender.</p> <p>a. Check for continuity from FLS pin-A frame side harness to pin-4 of SRM connector: Continuity present - Yes, go to Step 3b.</p> <p>b. Check for continuity from FLS pin-C frame harness at FLS and pin-40 of SRM connector.</p> <p>c. Is there good continuity in each circuit?</p>	<p>Yes — Go to Step 4. No — Locate and repair open circuit or replace harness.</p>
4	<p>a. Check for continuity from SRM connector C1, pin-3 to connector C2, pin-10 (under-hood harness). Continuity present - Yes, go to Step 4b.</p> <p>b. Check for continuity from connector C6, pin-10 to connector C18, pin-2 (rear frame harness).</p>	<p>Yes — Go to Step 5. No — Repair circuit issues or replace harness.</p>
5	<p>Perform output voltage check using a universal probe on Pin B and Pin C at FLS connector.</p> <p>a. With harness fully connected, place the universal probes into pin-B and pin-C of sending unit connector and monitor for voltage.</p> <p>b. Is voltage present?</p>	<p>Yes — Go to Step 6. No — Replace electronic portion of sending unit.</p>
6	<p>Perform sending unit range voltage test.</p> <p>a. With your probe still on pin-B and pin-C, remove the sending unit electronic portion from the sender body by removing the 2 phillips screws securing it. Leave the wire harness connected. Using a non-magnetic socket or other steel/iron object, move sender from full to empty. Make sure the voltage smoothly changes between 0.1 volts min. to 4.98 volts max.</p> <p>b. Was there any concern with voltage range output test?</p>	<p>Yes — Replace electronic portion of sending unit clear faults and test. No — Refer to the tank draining and in-tank sending unit replacement procedure to replace the in-tank sending unit.</p>

Pinpoint Test T: Manual Solenoid Activation Procedure

NOTE

For harness and connector layout diagrams and system electrical schematics, refer to [Wiring Diagrams and Electrical Schematics](#).

CONNECTOR

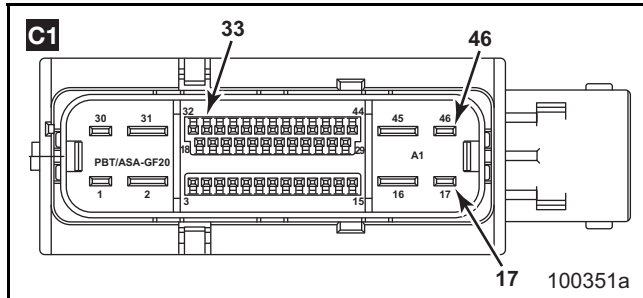


Figure 19 — Connector End View

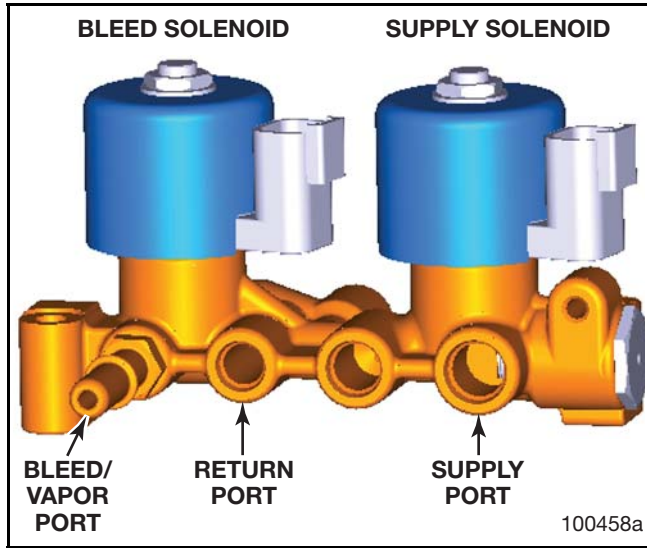


Figure 20 — FRPCM Solenoid Locations

PROCEDURE

Step	Procedure	Action
1	Turn ignition to off. Disconnect the smart relay module (SRM) wire harness connector.	—
2	<p>Energize the individual solenoids by providing a ground to the following pins in the SRM connector:</p> <p>Note: Use caution not to damage SRM connector terminals. Always connect lead to the connector then to ground.</p> <ul style="list-style-type: none"> • Pin 33 – Bleed Solenoid • Pin 32 – Supply Solenoid • Pin 30 – Flow Control Solenoid <p>Note: The tank supply solenoid cannot be actuated from the SRM. 12v power and ground must be applied to the solenoid connector.</p>	—

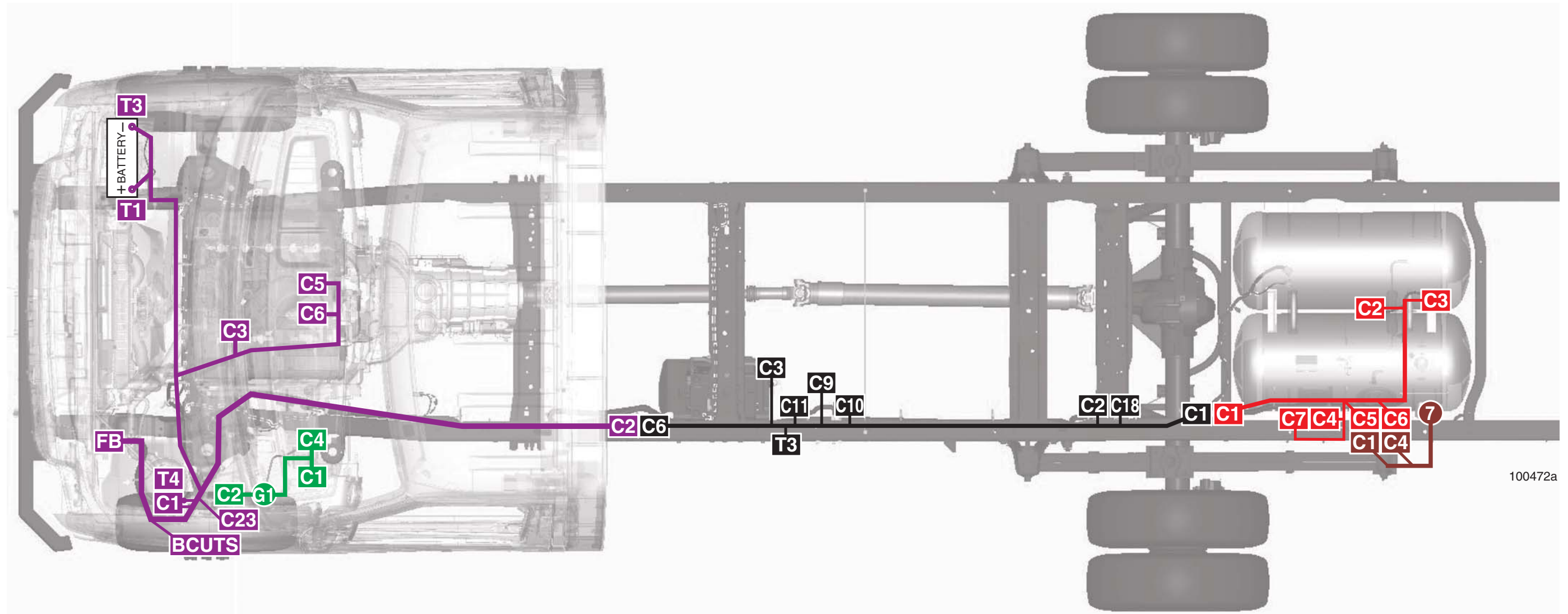
Pinpoint Test U: F-650/F-750 Dual Tank Transfer Pinpoint Test (P25B1 DTC)

Step	Procedure	Action
1	Determine if any other DTCs that could contribute to a failure to transfer are stored in the PCM (fuel pump faults, slave tank solenoid fault, fuel level sending unit faults).	Yes — Resolve DTCs and retest. No — Continue to Step 2.
2	Perform visual inspection of the fuel transfer line which connects the passenger side tank supply valve to the transfer OPD located in-board of the driver's side fuel tank assembly to ensure there are no restrictions or damage to the transfer line assembly. Are any restrictions present?	Yes — Repair/replace transfer line and retest. No — Continue to step 3.
3	The OPD should have a notch or the word TOP stamped into the part on the face of the brass on the OPD and this should be oriented at the 12 o'clock position. Is the transfer OPD located inboard on the driver's side fuel tank assembly oriented properly?	Yes — Continue to step 4. No — See OPD installation instructions from the service manual to determine if OPD can be reused or replaced.
4	Perform the sending unit voltage range test on both sending unit dials to ensure they are properly functioning before continuing the pin point test. Are the fuel level senders reading properly? Remove the sending unit twinsite by removing the 2 small phillips head screws. Leave wire harness connected. Read voltage between pins B and C of the sending unit twinsite connector. Sender voltages and corresponding fuel levels: Master: [V] 0.413 1.073 1.764 2.391 2.972 3.266 3.650 3.977 4.120 4.255 [%] 0.0 8.0 18.9 33.4 47.2 56.6 70.9 84.9 92.0 100.0 Slave: [V] 0.351 0.641 1.443 1.982 2.613 3.111 3.536 3.868 4.120 4.255 [%] 0.0 1.0 14.6 24.0 37.7 52.1 66.1 80.2 92.0 100.0	Yes — If yes: Continue to step 5. No — If No: Replace fuel gauge and retest.
5	Attempt a fuel transfer by ensuring the driver's side fuel tank level is under 30% and the passenger side tank is above 25% fuel level. Start the vehicle and listen for the transfer to attempt to occur. After the vehicle has started, the system should command the passenger side tank supply solenoid open and fuel pumps to run after approximately 60 seconds of run time. Did the unit attempt to command the transfer? Determine fuel level in each tank by viewing the parameters in the ROUSH Diagnostic Tool (driver side - MUX_FUELLVL_ACTV_SIDE, passenger side - MUX_FUELLVL_PSSV_SIDE) or performing the voltage test. DO NOT use the needle on the sending units as reference.	Yes — Continue to step 7. No — Continue to step 6.
6	Using the wiring diagrams from the diagnostic manual, ensure the sending unit voltages are present at pins of the SRM connector. The driver side tank sender output is pin 40 of the SRM connector measured to chassis ground, the passenger side tank is pin 40 of the SRM connector measured to chassis ground. Ensure these voltages are the same as listed in step 4. If still no resolution, contact tech support at 1-800-59-ROUSH (Opt 2).	
7	Is 12 volts present at the passenger side tank supply solenoid when the transfer is commanded?	Yes — Continue to step 8. No — Repair circuit wiring.
8	Is voltage present to the fuel pumps while the transfer is being commanded? NOTE: The fuel pump should have resistance through each motor of less than 1.0 ohm and should draw a minimum of 2 amps when running. If pumps are out of spec, replace fuel pump assembly and retest. Tank supply solenoid should have resistance value of 6-11 ohms. If out of spec, replace tank supply solenoid and retest.	Yes — Continue to step 9. No — Repair circuit wiring.

Step	Procedure	Action
9	<p>Depressurize the transfer line and drivers side fuel tank using the depressurization procedures in the service manual. Replace the OPD and retest the transfer operation.</p> <p>Does vehicle transfer successfully?</p> <p>NOTE: Once tank is refilled after repair, it will be necessary to purge the tank of air using the fuel tank purging procedure located within the service manual. The fuel levels will need to be set back to the values listed in step 5 above.</p>	<p>Yes — Repair complete.</p> <p>No — Contact 1-800-58-ROUSH (Opt 2) for assistance.</p>

WIRING DIAGRAMS AND ELECTRICAL SCHEMATICS

E-450 GEN4 Wiring Harnesses and Connector Layout



100472a

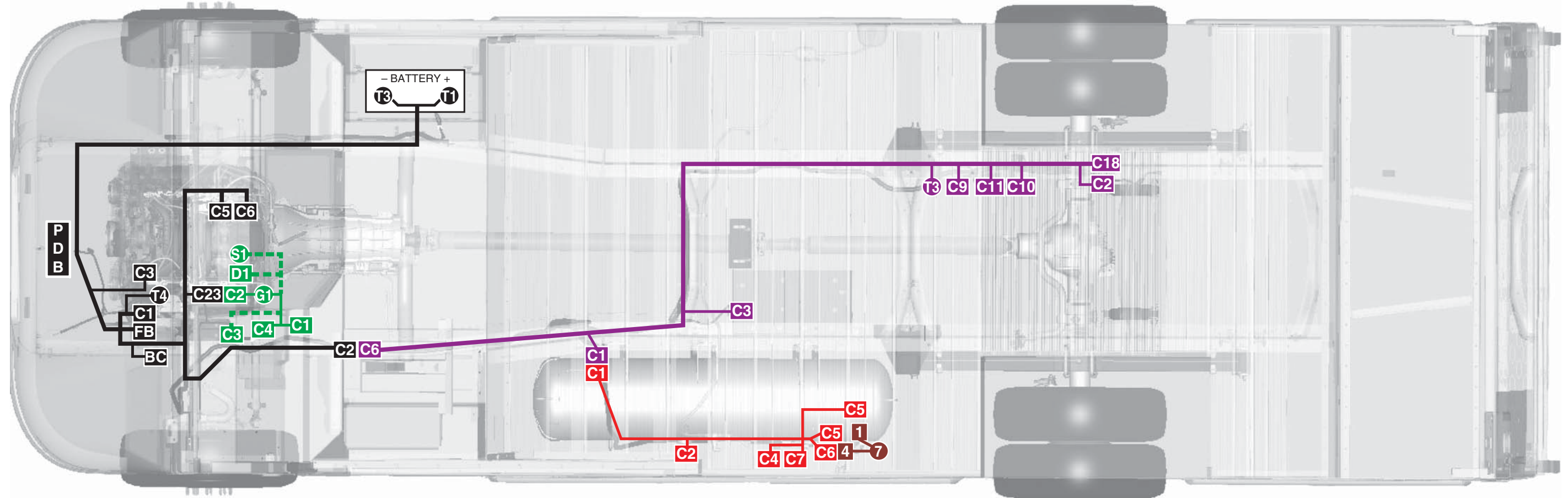
- UNDERHOOD HARNESS
- CAN HARNESS
- REAR FRAME HARNESS
- TANK HARNESS
- IN-TANK HARNESS

- UNDERHOOD HARNESS**
 BCUTS – BLUNT CUTS FOR CRANK WARNING, FUEL COOLER, AC2 REQ, AND A/C CLUTCH2
- C1 SRM, 46-PIN
 - C2 UNDERHOOD / TANK INLINE, 16-PIN
 - C3 IPTS, 4-PIN
 - C5 SUPPLY SOLENOID, 2-PIN
 - C6 BLEED SOLENOID, 2-PIN
 - C23 UNDERHOOD / CAN HARNESS INLINE, 2-PIN
 - FB FUSE BOX
 - T1 BATTERY PWR, RING TERMINAL
 - T3 BATTERY GROUND, RING TERMINAL
 - T4 SRM CASE GROUND, RING TERMINAL

- CAN HARNESS**
- C1 OBD FLANGE MOUNT, 16-PIN
 - C2 CAN / UNDERHOOD INLINE, 2-PIN
 - C4 OBD INLINE TO FORD HARNESS, 16-PIN
 - G1 PASS-THRU GROMMET
- REAR FRAME HARNESS**
- C1 REAR FRAME / TANK HARNESS INLINE, 16-PIN
 - C2 FORD FTPT HARNESS INLINE, 3-PIN
 - C3 FORD FTPT SENSOR, 3-PIN
 - C6 REAR FRAME / UNDERHOOD INLINE, 16-PIN
 - C9 RCT EFPR, 8-PIN
 - C10 FORD FPCM HARNESS INLINE, 8-PIN
 - C11 FORD EFPR, 8-PIN
 - C18 FORD FUEL TANK HARNESS INLINE, 4-PIN
 - T3 FRAME GROUND, RING TERMINAL

- TANK HARNESS**
- C1 TANK / REAR FRAME HARNESS INLINE, 16-PIN
 - C2 FUEL LEVEL SENDER, 3-PIN
 - C3 IPTS #2, 4-PIN
 - C4 FLOW CONTROL SOLENOID (GRAY), 2-PIN
 - C5 TANK / IN-TANK FP #1 INLINE, 2-PIN
 - C6 TANK / IN-TANK FP #2 INLINE, 2-PIN
 - C7 SUPPLY SOLENOID (BLACK), 2-PIN
- IN-TANK HARNESS**
- C1 FUEL PUMP #1 INLINE, 2-PIN
 - C4 FUEL PUMP #2 INLINE, 2-PIN
 - 7 TANK PASS-THRU GROMMET

F-59 Wiring Harnesses and Connector Layout



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- UNDERHOOD HARNESS
- CAN HARNESS
- REAR FRAME HARNESS
- TANK SOLENOID HARNESS
- IN-TANK HARNESS

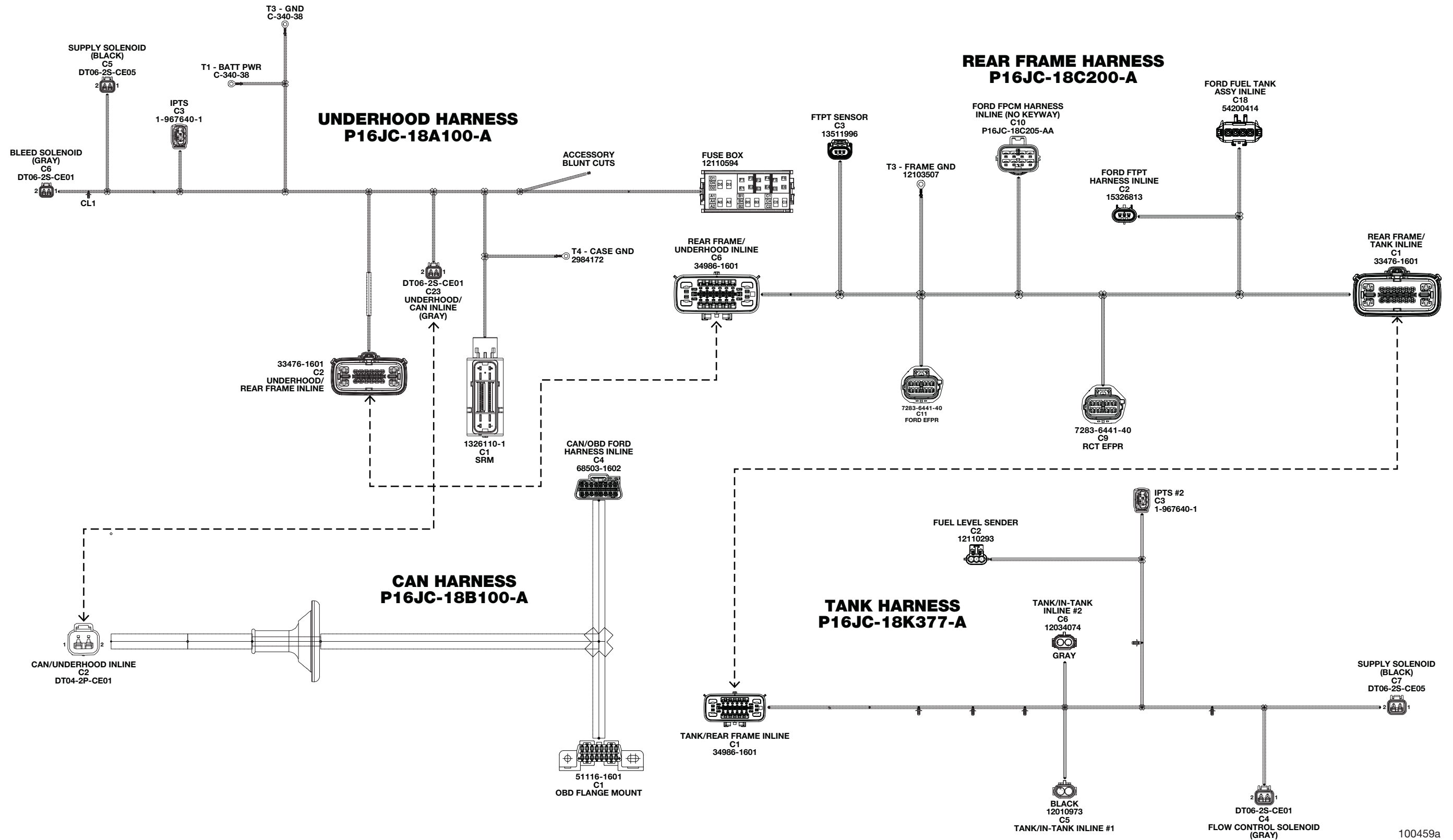
- UNDERHOOD HARNESS**
- C1 SRM, 46-PIN
 - C2 UNDERHOOD / REAR FRAME INLINE CONNECTOR, 16-PIN
 - C3 IPTS, 4-PIN
 - C5 SUPPLY SOLENOID, 2-PIN
 - C6 BLEED SOLENOID, 2-PIN
 - C23 UNDERHOOD / CAN INLINE CONNECTOR, 4 -PIN
 - FB AUX FUSE BOX
 - T1 BATT POWER, RING TERMINAL
 - T3 BATT GROUND, RING TERMINAL
 - T4 SRM CASE GROUND, RING TERMINAL
 - BC BLUNT CUTS FOR CK WRNG, FU CLR, A/C CL2, A/C CL3, AC2 REQ, AC3 REQ

- CAN HARNESS**
- C1 OBD FLANGE MOUNT, 16-PIN
 - C2 CAN / UNDERHOOD INLINE, 4-PIN
 - C3 CAN / MORGAN INLINE CONNECTOR, 1-PIN (UPS ONLY)
 - C4 OBD INLINE CONNECTOR TO FORD HARNESS, 16-PIN
 - D1 DIODE (UPS ONLY)
 - G1 GROMMET
 - S1 SPLICE TO MORGAN OLSON IP HARNESS (UPS ONLY)

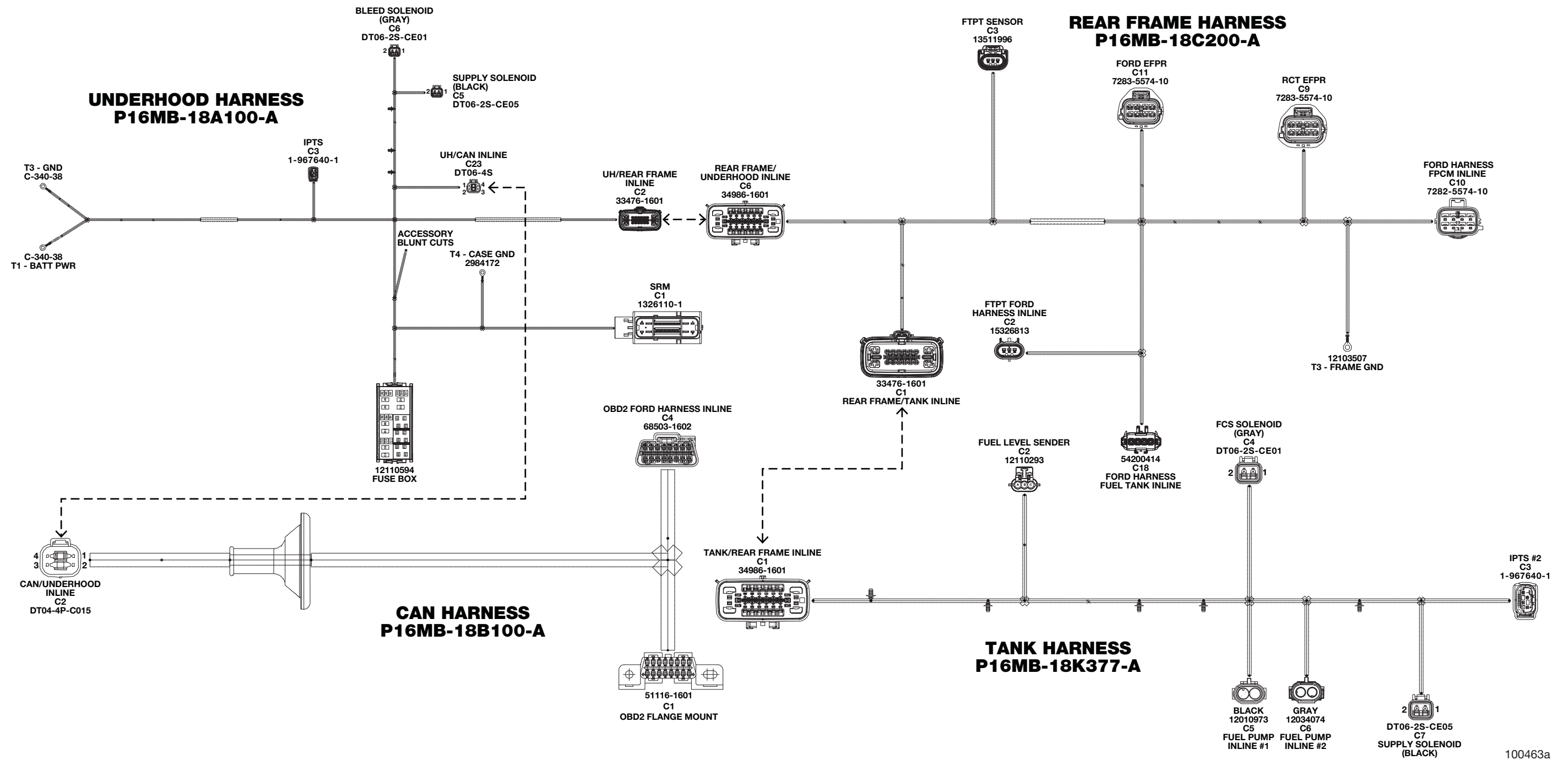
- REAR FRAME HARNESS**
- C1 REAR FRAME / TANK INLINE, 16-PIN
 - C2 FTPT FORD HARNESS INLINE, 3-PIN
 - C3 FTPT SENSOR, 3-PIN
 - C6 REAR FRAME / UNDERHOOD INLINE, 16-PIN
 - C9 RCT EFPR, 8-PIN
 - C10 FORD FPCM INLINE, 8-PIN
 - C11 FORD EFPR, 8-PIN
 - C18 FORD FUEL TANK HARNESS INLINE, 4-PIN
 - T3 FRAME GROUND (FP SHIELD), RING TERMINAL

- TANK SOLENOID HARNESS**
- C1 TANK / REAR FRAME INLINE, 16-PIN
 - C2 FUEL LEVEL SENDER, 3-PIN
 - C3 IPTS #2, 4-PIN
 - C4 FLOW CONTROL SOLENOID VALVE, 2-PIN
 - C5 TANK / FUEL PUMP #1 INLINE, 2-PIN (BLK)
 - C6 TANK / FUEL PUMP #2 INLINE, 2-PIN (GRAY)
 - C7 SUPPLY SOLENOID VALVE, 2-PIN
- IN-TANK HARNESS**
- C1 FUEL PUMP #1 INLINE CONNECTOR
 - C4 FUEL PUMP #2 INLINE CONNECTOR
 - 7 GROMMET

E-450 Roush Wiring Harnesses

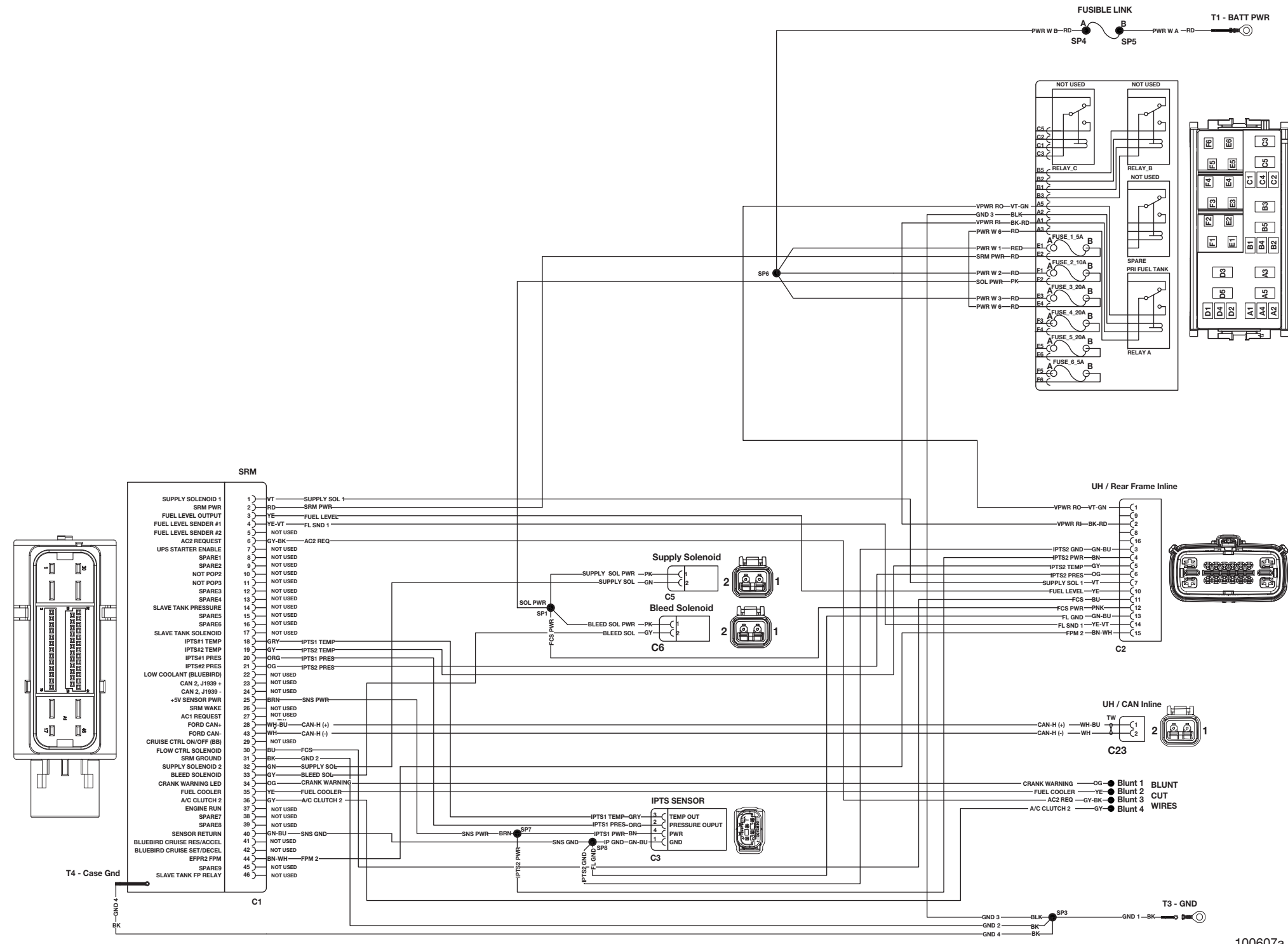


F-59 Roush Wiring Harnesses



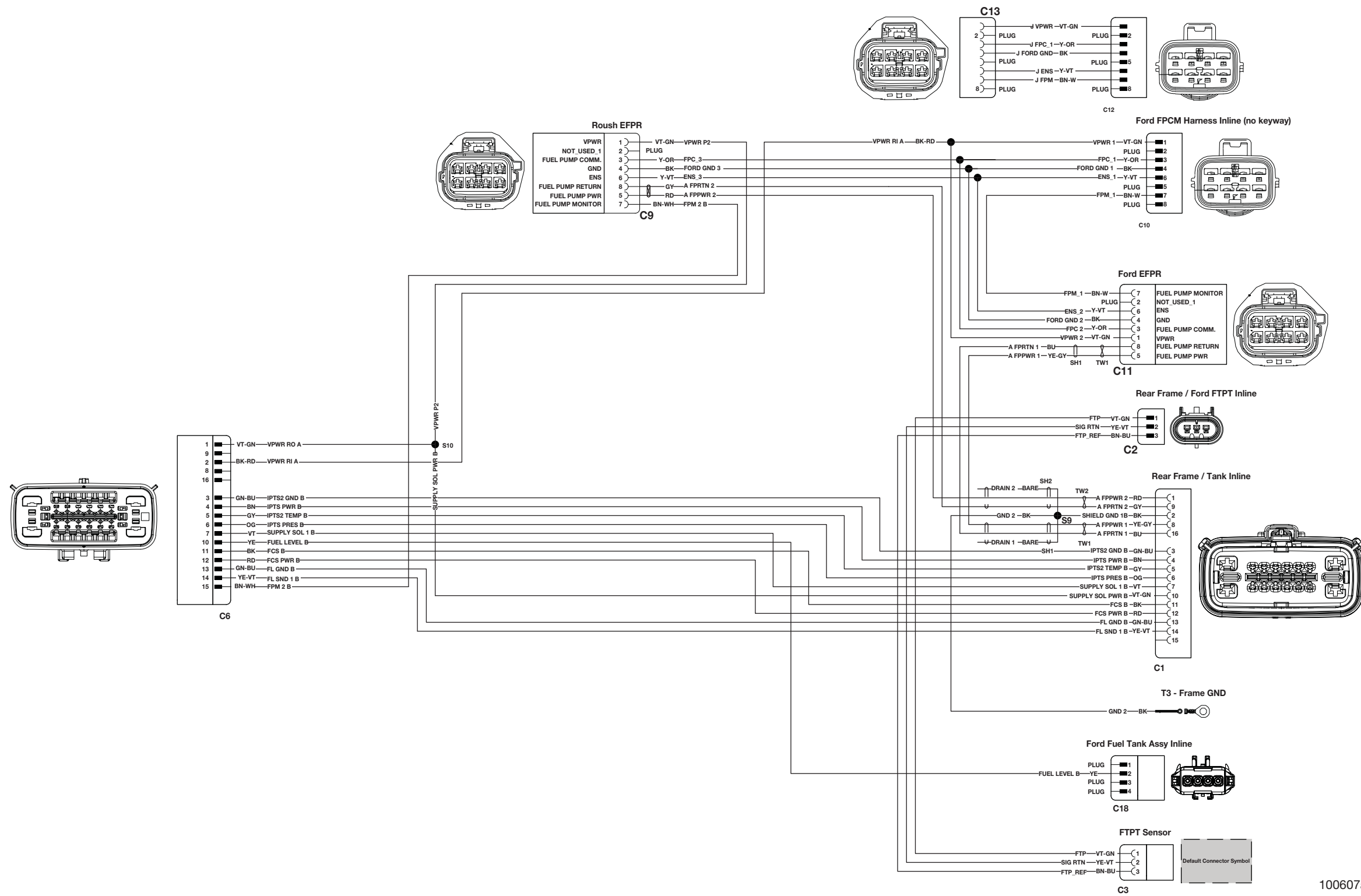
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E-450 Electrical Schematic — Underhood Harness



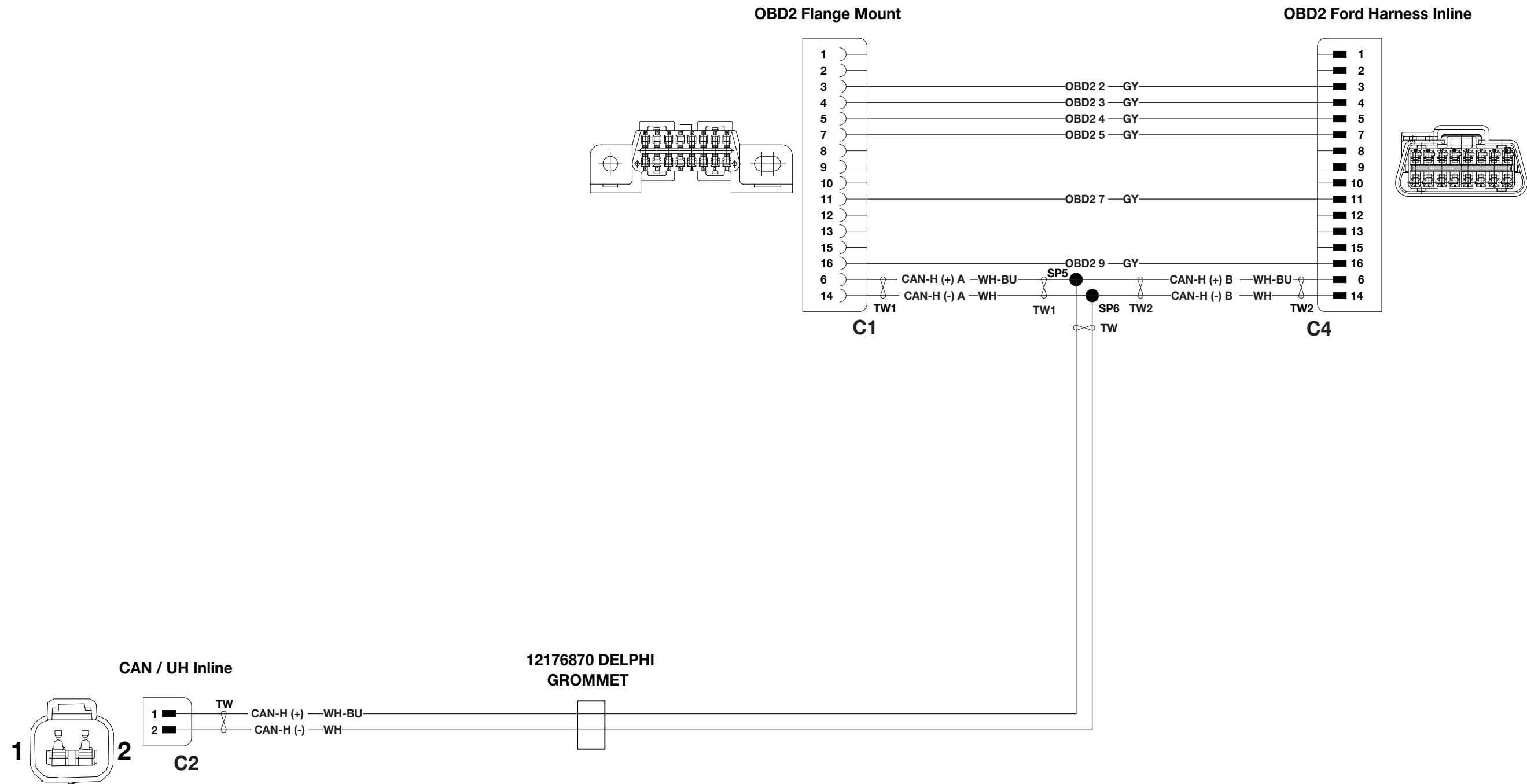
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E-450 Electrical Schematic — CAN Bus Harness



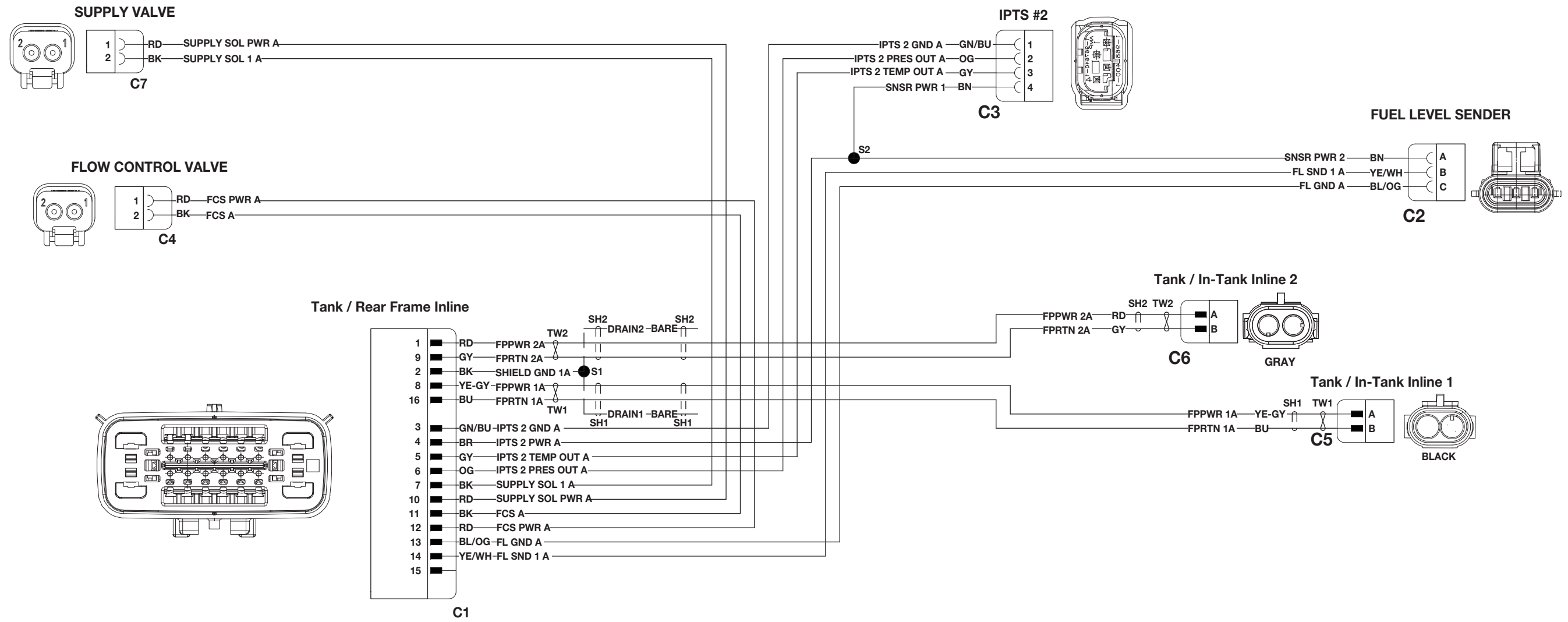
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E-450 Electrical Schematic — Rear Frame Harness



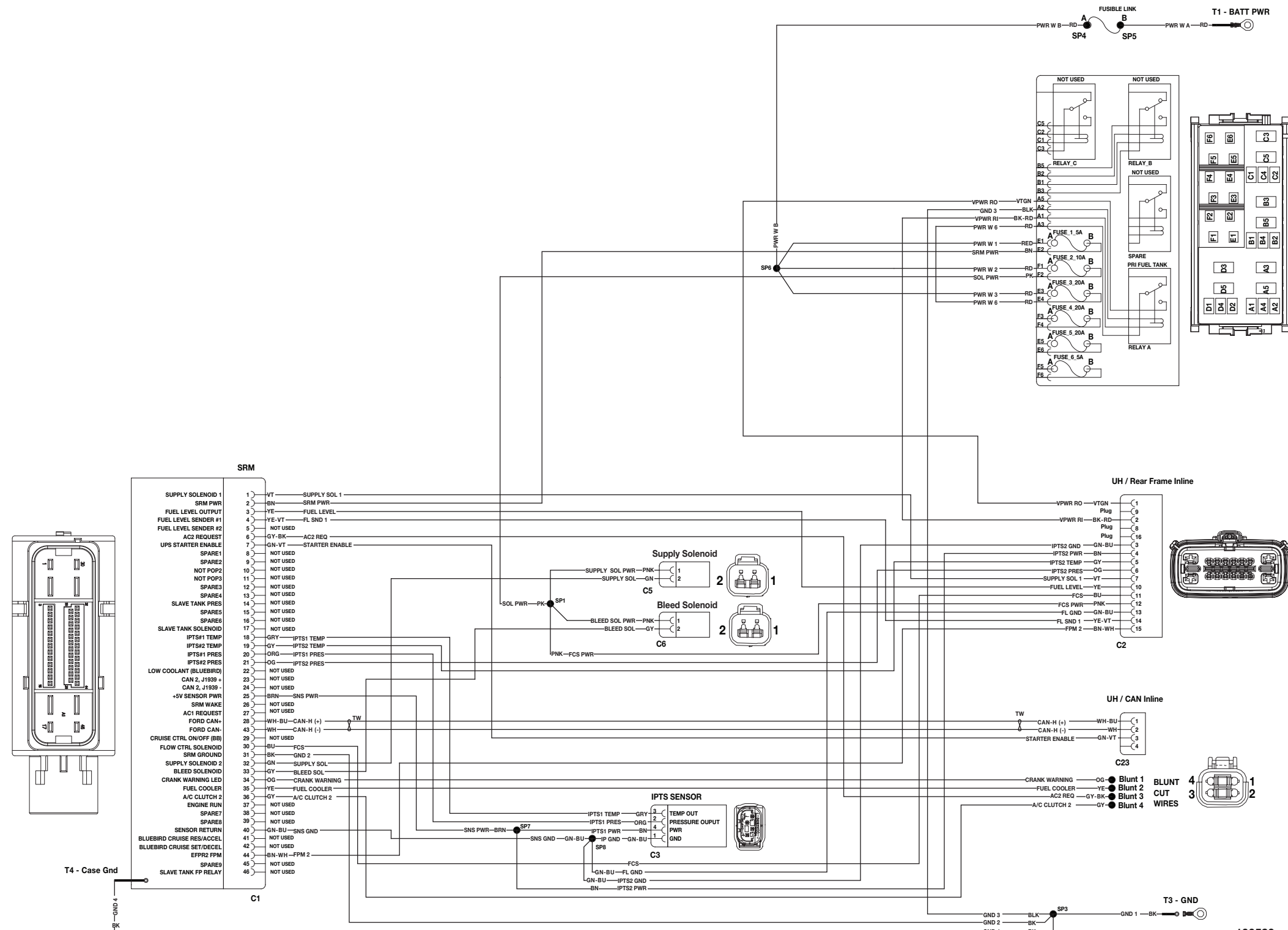
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E-450 Electrical Schematic — Tank Harness



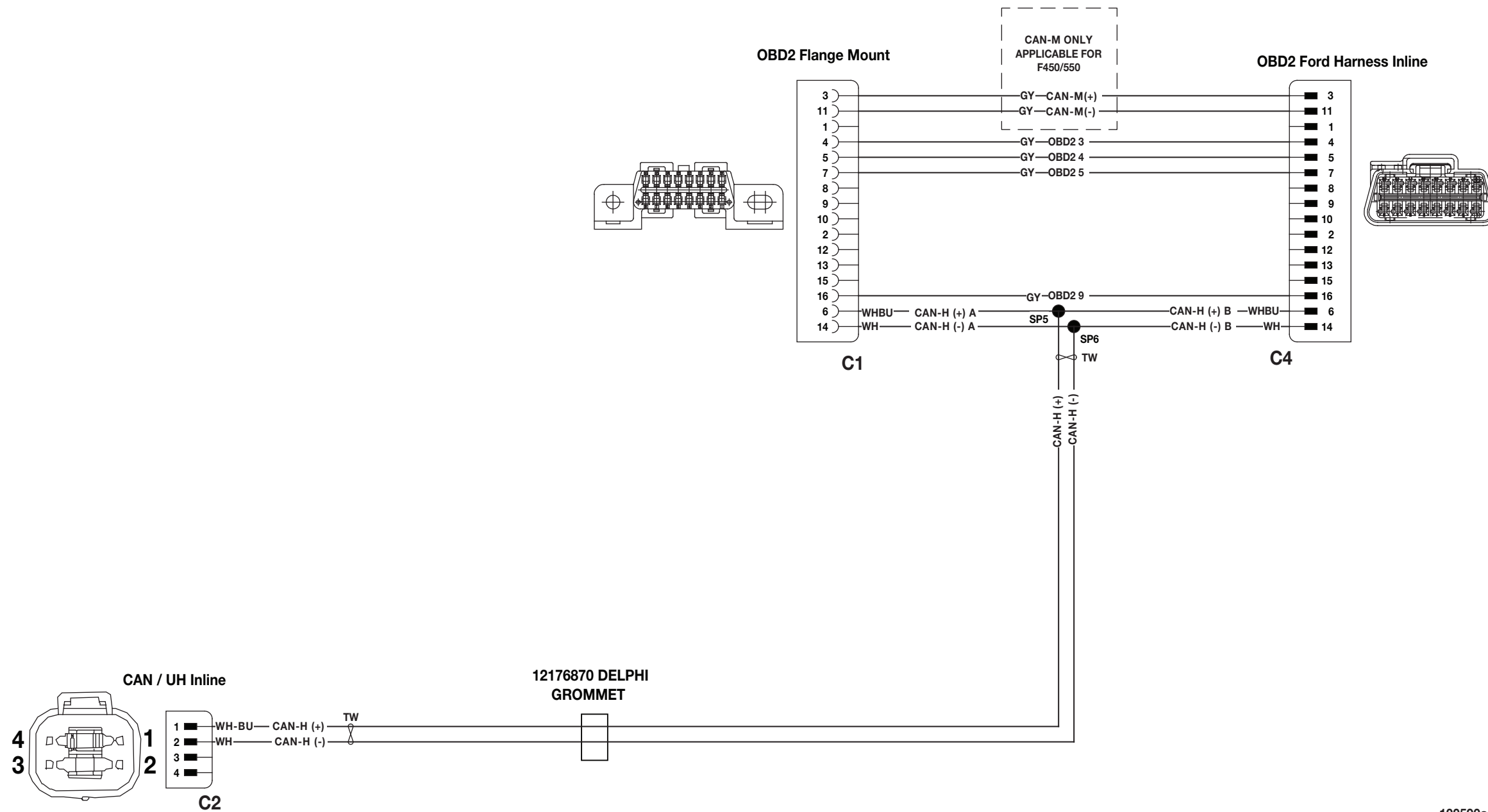
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F-59 F-450 F-550 Electrical Schematic — Underhood Harness



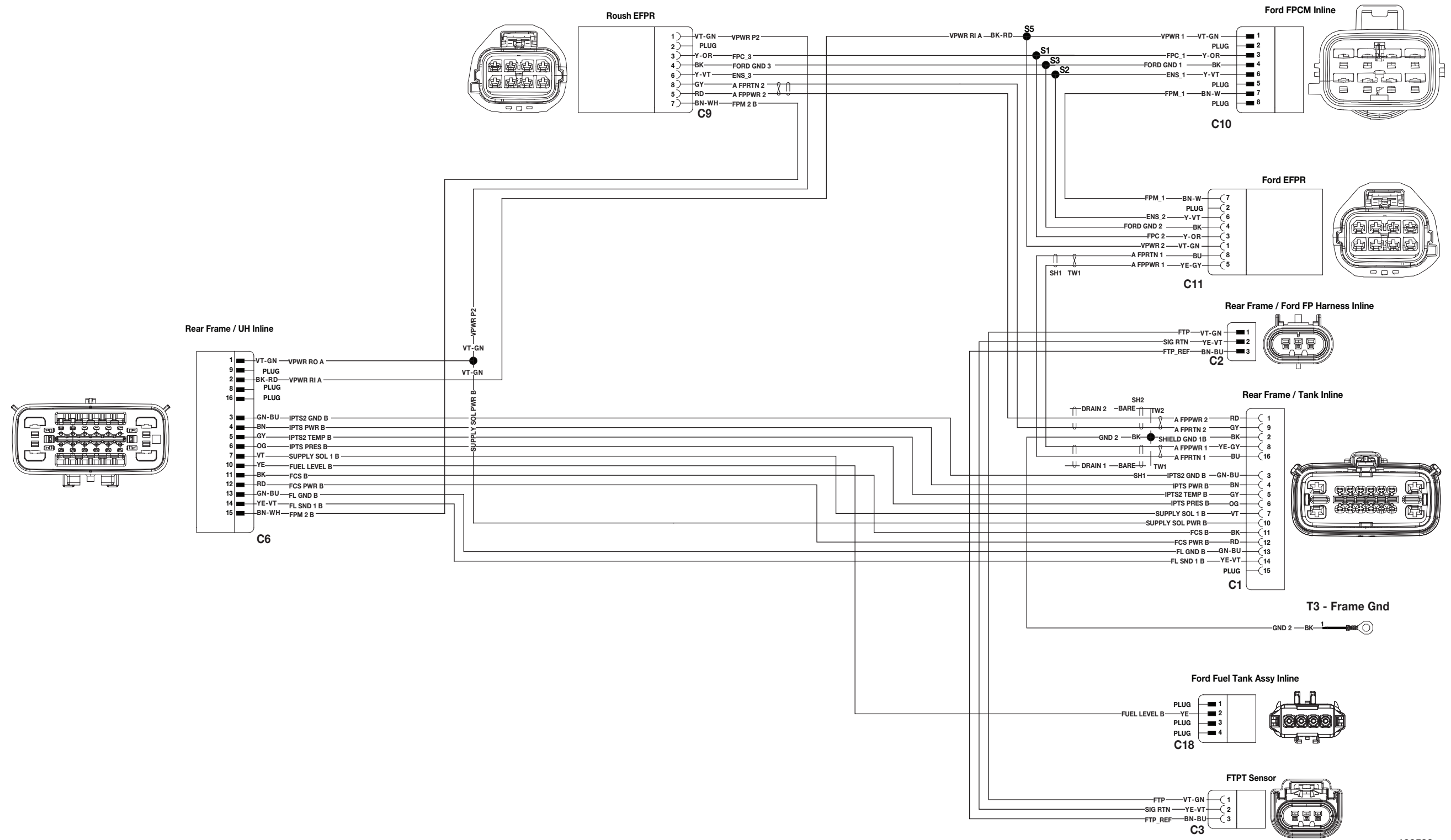
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F-59 F-450 F-550 Electrical Schematic — CAN Bus Harness



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F-59 F-450 F-550 Electrical Schematic — Rear Frame Harness



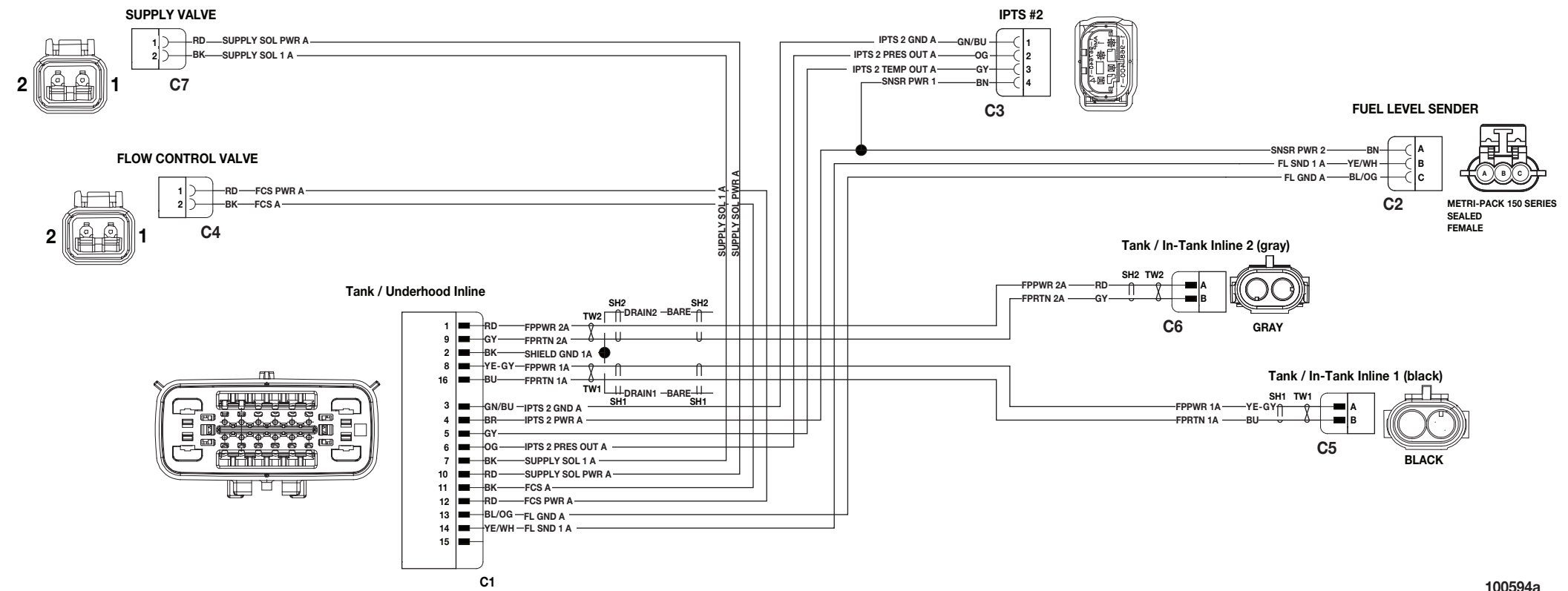
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F-59 F-450 F-550 Electrical Schematic — Tank Harness

WIRE TABLE												
Index	Wire	Color	Spec.	CSA	MAT	From	Connector	Cavity	To	Connector	Cavity	Multicore
1	DRAIN1	BARE	22	0		S1	-	-	-	-	-	SH1
2	DRAIN2	BARE	22	0		S1	-	-	-	-	-	SH2
3	FPPWR 1A	YE-GY	12	3.31	GXL	Tank / In-Tank Inline 1 (black)	C5	A	Tank / Underhood Inline	C1	8	TW1
4	FPRTN 1A	BU	12	3.31	GXL	Tank / In-Tank Inline 1 (black)	C5	B	Tank / Underhood Inline	C1	16	TW1
5	FPPWR 2A	RD	12	3.31	GXL	Tank / Underhood Inline	C1	1	Tank / In-Tank Inline 2 (gray)	C6	A	TW2
6	FPRTN 2A	GY	12	3.31	GXL	Tank / In-Tank Inline 2 (gray)	C6	B	Tank / Underhood Inline	C1	9	TW2
7	FCS A	BK	18	0.82	GXL	FLOW CONTROL VALVE	C4	2	Tank / Underhood Inline	C1	11	
8	FCS PWR A	RD	18	0.82	GXL	FLOW CONTROL VALVE	C4	1	Tank / Underhood Inline	C1	12	
9	FL GND A	BL/OG	18	0.82	GXL	Tank / Underhood Inline	C1	13	FUEL LEVEL SENDER	C2	C	
10	FL SND 1 A	YE/WH	18	0.82	GXL	Tank / Underhood Inline	C1	14	FUEL LEVEL SENDER	C2	B	
11	IPTS 2 GND A	GN/BU	20	0.52	GXL	Tank / Underhood Inline	C3	1	Tank / Underhood Inline	C1	3	
12	IPTS 2 PRES OUT A	OG	20	0.52	GXL	IPTS #2	C3	2	Tank / Underhood Inline	C1	6	
13	IPTS 2 PWR A	BR	20	0.52	GXL	S2	-	-	Tank / Underhood Inline	C1	4	
14	IPTS 2 TEMP OUT A	GY	20	0.52	GXL	IPTS #2	C3	3	Tank / Underhood Inline	C1	5	
15	SHIELD GND 1A	BK	20	0.52	GXL	Tank / Underhood Inline	C1	2	S1	-	-	
16	SNSR PWR 1	BN	20	0.52	GXL	S2	-	-	IPTS #2	C3	4	
17	SNSR PWR 2	BN	20	0.52	GXL	S2	-	-	FUEL LEVEL SENDER	C2	A	
18	SUPPLY SOL 1 A	BK	18	0.82	GXL	SUPPLY VALVE	C7	2	Tank / Underhood Inline	C1	7	
19	SUPPLY SOL PWR A	RD	18	0.82	GXL	SUPPLY VALVE	C7	1	Tank / Underhood Inline	C1	10	

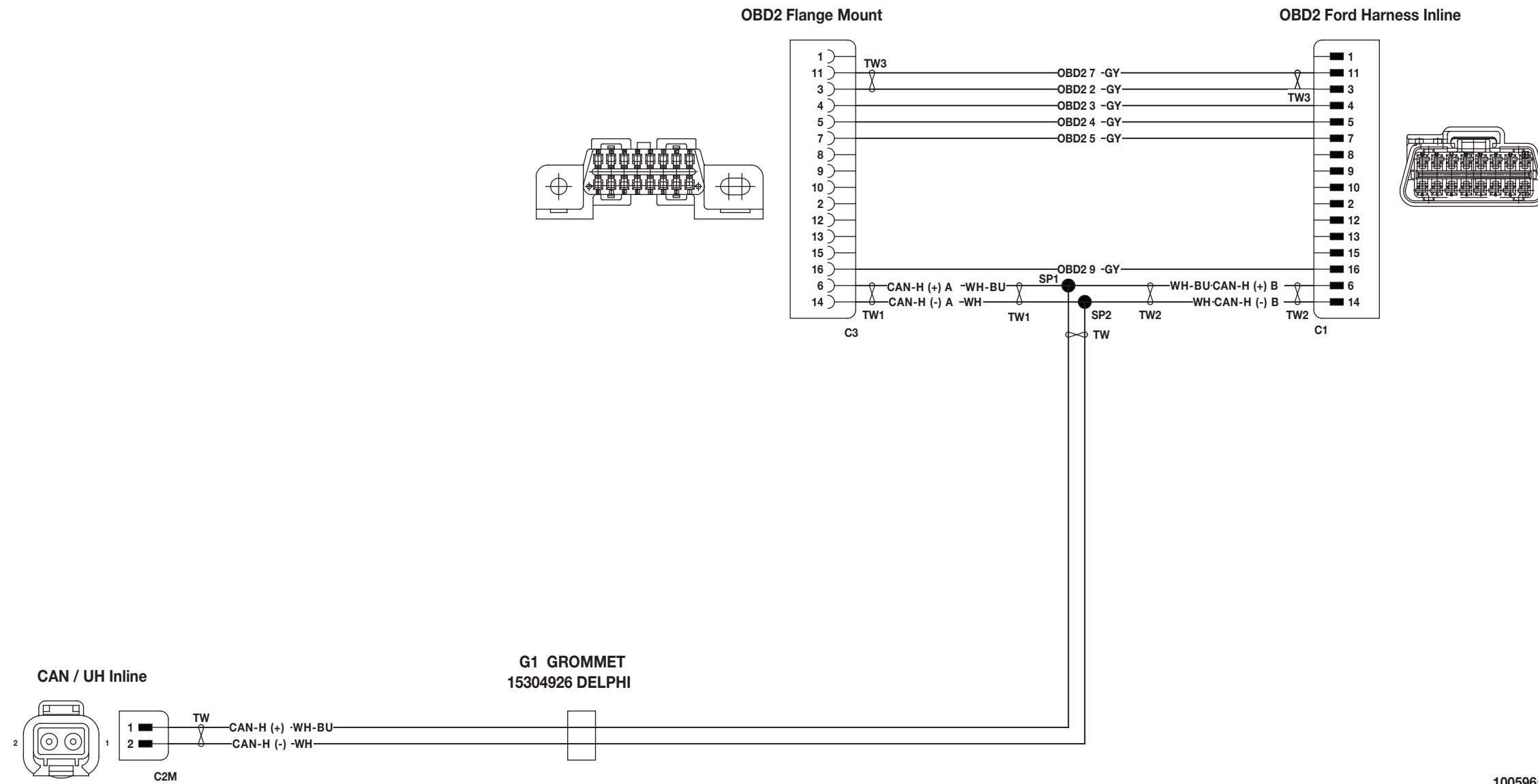
TWISTED PAIR			
Index	Multicore Name	Contents	Type
1	TW1	FPPWR 1A	Twisted
2	TW1	FPRTN 1A	Twisted
3	TW2	FPPWR 2A	Twisted
4	TW2	FPRTN 2A	Twisted

SHIELD TABLE		
Index	Shield Name	Contents
1	SH1	DRAIN1
2	SH1	TW1
3	SH2	DRAIN2
4	SH2	TW2



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F-650 F-750 Electrical Schematic — CAN Bus Harness



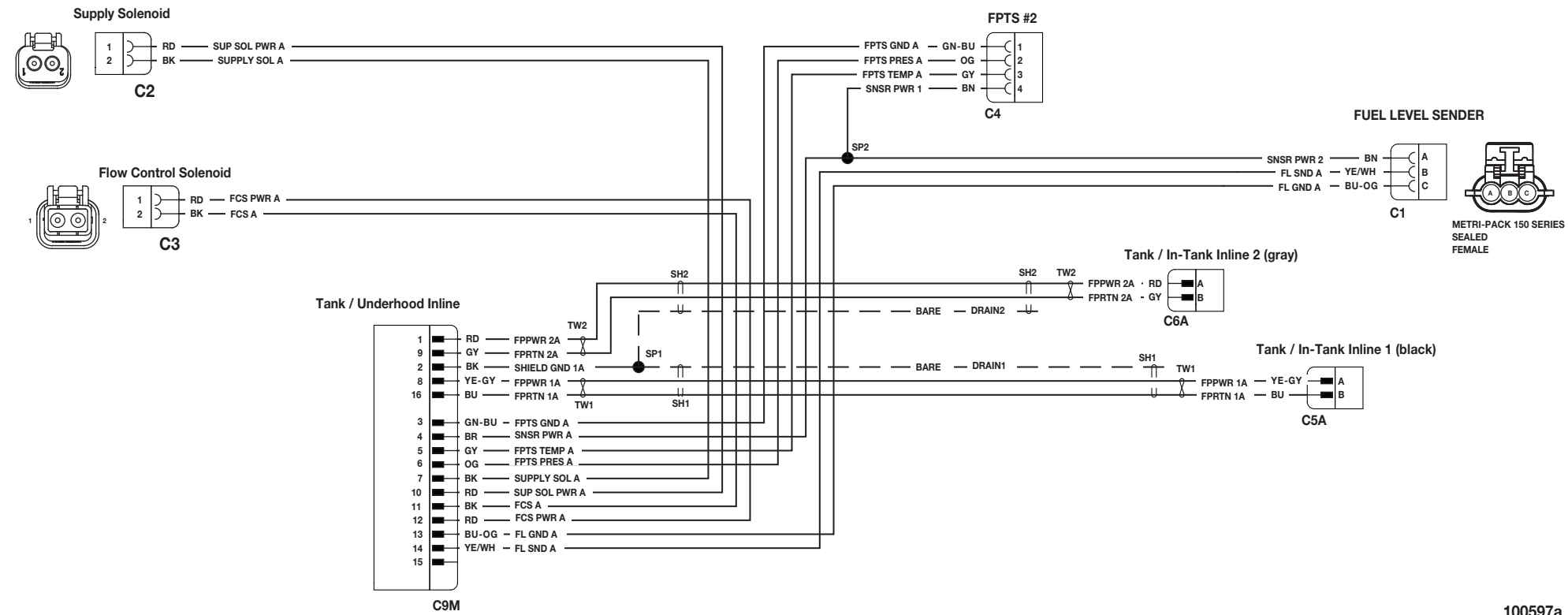
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F-650 F-750 Electrical Schematic — Left Tank Harness

WIRE TABLE												
Index	Wire	Color	Spec.	CSA	MAT	From	Connector	Cavity	To	Connector	Cavity	Multicore
1	DRAIN1	BARE	22	0.35	BSTW	SP1	-	-	-	-	-	SH1
2	DRAIN2	BARE	22	0.35	BSTW	SP1	-	-	-	-	-	SH2
3	FPPWR 1A	YE-GY	12	3.31	GXL	Tank / In-Tank Inline 1 (black)	C5A	A	Tank / Underhood Inline	C9M	8	TW1
4	FPRTN 1A	BU	12	3.31	GXL	Tank / In-Tank Inline 1 (black)	C5A	B	Tank / Underhood Inline	C9M	16	TW1
5	FPPWR 2A	RD	12	3.31	GXL	Tank / Underhood Inline	C9M	1	Tank / In-Tank Inline 2 (gray)	C6A	A	TW2
6	FPRTN 2A	GY	12	3.31	GXL	Tank / In-Tank Inline 2 (gray)	C6A	B	Tank / Underhood Inline	C9M	9	TW2
7	FCS A	BK	18	0.82	GXL	Flow Control Solenoid	C3	2	Tank / Underhood Inline	C9M	11	
8	FCS PWR A	RD	18	0.82	GXL	Flow Control Solenoid	C3	1	Tank / Underhood Inline	C9M	12	
9	FL GND A	BU-OG	18	0.82	GXL	Tank / Underhood Inline	C9M	13	FUEL LEVEL SENDER	C1	C	
10	FL SND A	YE/WH	18	0.82	GXL	Tank / Underhood Inline	C9M	14	FUEL LEVEL SENDER	C1	B	
11	FPTS GND A	GN-BU	20	0.52	GXL	FPTS #2	C4	1	Tank / Underhood Inline	C9M	3	
12	FPTS PRES A	OG	20	0.52	GXL	FPTS #2	C4	2	Tank / Underhood Inline	C9M	6	
13	FPTS TEMP A	GY	20	0.52	GXL	FPTS #2	C4	3	Tank / Underhood Inline	C9M	5	
14	SHIELD GND 1A	BK	20	0.52	GXL	Tank / Underhood Inline	C9M	2	SP1	-	-	
15	SNSR PWR 1	BN	20	0.52	GXL	SP2	-	-	FPTS #2	C4	4	
16	SNSR PWR 2	BN	18	0.82	GXL	SP2	-	-	FUEL LEVEL SENDER	C1	A	
17	SNSR PWR A	BR	18	0.82	GXL	SP2	-	-	Tank / Underhood Inline	C9M	4	
18	SUP SOL PWR A	RD	18	0.82	GXL	Supply Solenoid	C2	1	Tank / Underhood Inline	C9M	10	
19	SUPPLY SOL A	BK	18	0.82	GXL	Supply Solenoid	C2	2	Tank / Underhood Inline	C9M	7	

TWISTED PAIR			
Index	Multicore Name	Contents	Type
1	TW1	FPPWR 1A	Twisted
2	TW1	FPRTN 1A	Twisted
3	TW2	FPPWR 2A	Twisted
4	TW2	FPRTN 2A	Twisted

SHIELD TABLE		
Index	Shield Name	Contents
1	SH1	DRAIN1
2	SH1	TW1
3	SH2	DRAIN2
4	SH2	TW2



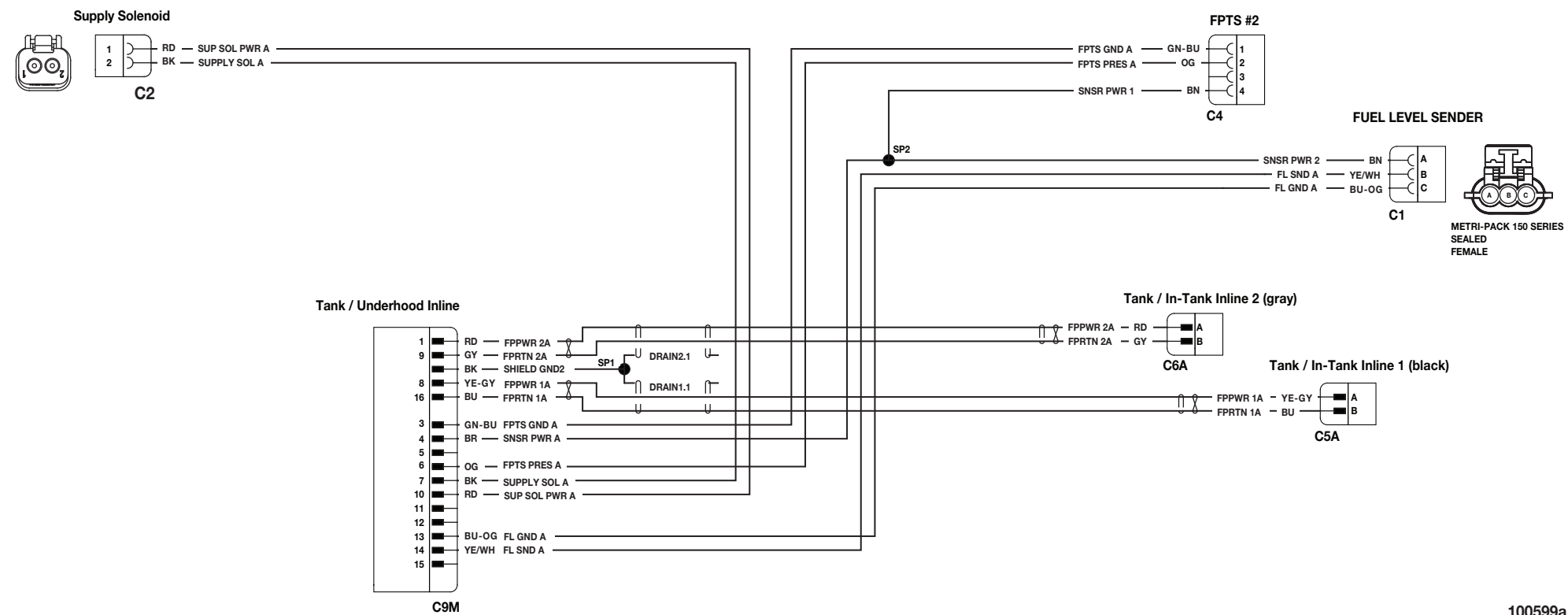
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F-650 F-750 Electrical Schematic — Right Tank Harness

WIRE TABLE												
Index	Wire	Color	Spec.	CSA	MAT	From	Connector	Cavity	To	Connector	Cavity	Multicore
1	DRAIN1.1	BARE	22	0.35	BSTW	SP1	-	-	-	-	-	SH1
2	DRAIN2.1			0		SP1	-	-	-	-	-	SH2
3	FPPWR 1A	YE-GY	12	3.31	GXL	Tank / In-Tank Inline 1 (black)	C5A	A	Tank / Underhood Inline	C9M	8	TW1
4	FPRTN 1A	BU	12	3.31	GXL	Tank / In-Tank Inline 1 (black)	C5A	B	Tank / Underhood Inline	C9M	16	TW1
5	FPPWR 2A	RD	12	3.31	GXL	Tank / Underhood Inline	C9M	1	Tank / In-Tank Inline 2 (gray)	C6A	A	TW2
6	FPRTN 2A	GY	12	3.31	GXL	Tank / In-Tank Inline 2 (gray)	C6A	B	Tank / Underhood Inline	C9M	9	TW2
7	FL GND A	BU-OG	18	0.82	GXL	Tank / Underhood Inline	C9M	13	FUEL LEVEL SENDER	C1	C	
8	FL SND A	YE/WH	18	0.82	GXL	Tank / Underhood Inline	C9M	14	FUEL LEVEL SENDER	C1	B	
9	FPTS GND A	GN-BU	20	0.52	GXL	FPTS #2	C4	1	Tank / Underhood Inline	C9M	3	
10	FPTS PRES A	OG	20	0.52	GXL	FPTS #2	C4	2	Tank / Underhood Inline	C9M	6	
11	SHIELD GND2	BK	20	0.52	GXL	SP1	-	-	Tank / Underhood Inline	C9M	2	
12	SNSR PWR 1	BN	20	0.52	GXL	SP2	-	-	FPTS #2	C4	4	
13	SNSR PWR 2	BN	18	0.82	GXL	SP2	-	-	FUEL LEVEL SENDER	C1	A	
14	SNSR PWR A	BR	18	0.82	GXL	SP2	-	-	Tank / Underhood Inline	C9M	4	
15	SUP SOL PWR A	RD	18	0.82	GXL	Supply Solenoid	C2	1	Tank / Underhood Inline	C9M	10	
16	SUPPLY SOL A	BK	18	0.82	GXL	Supply Solenoid	C2	2	Tank / Underhood Inline	C9M	7	

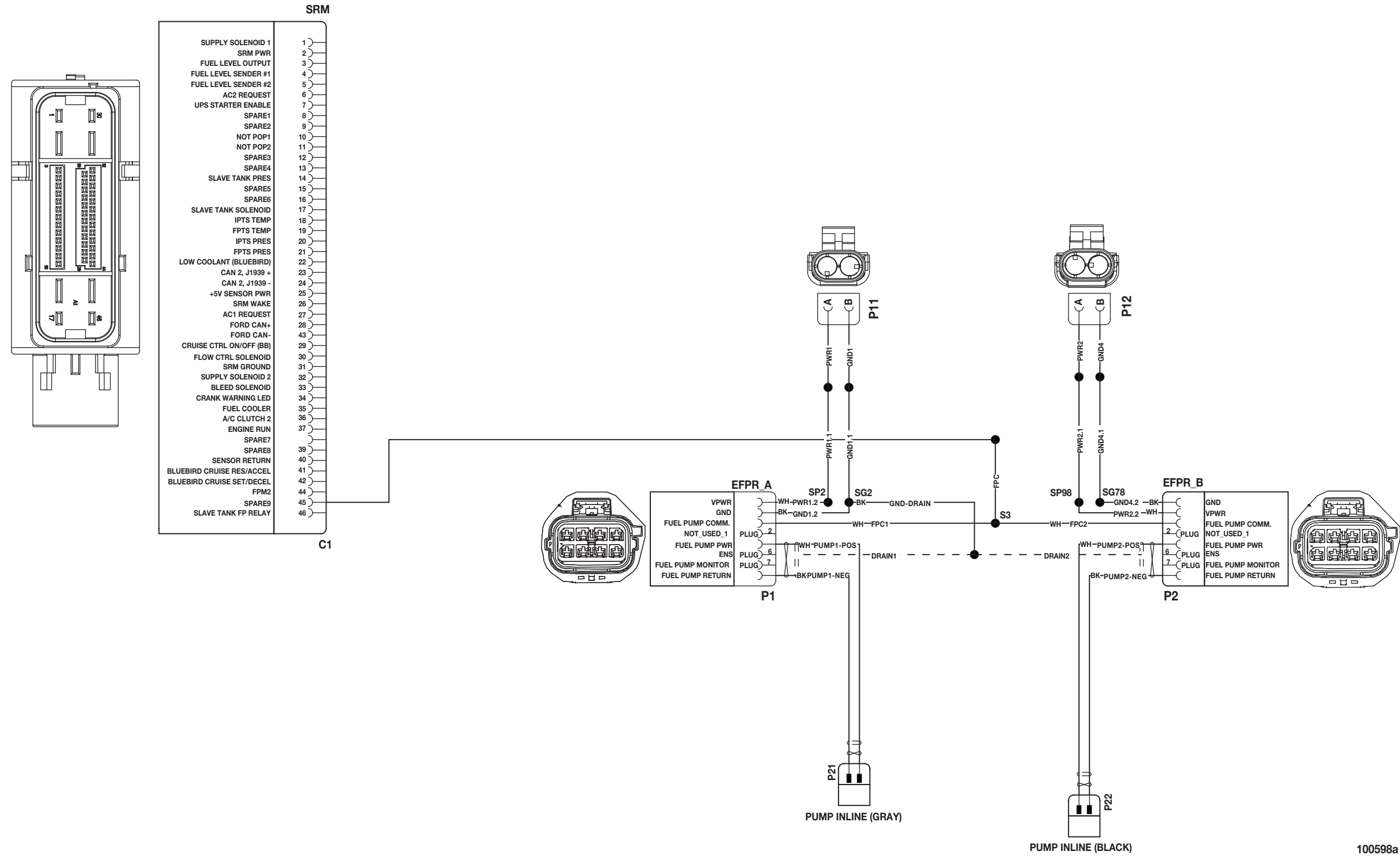
TWISTED PAIR			
Index	Multicore Name	Contents	Type
1	TW1	FPPWR 1A	Twisted
2	TW1	FPRTN 1A	Twisted
3	TW2	FPPWR 2A	Twisted
4	TW2	FPRTN 2A	Twisted

SHIELD TABLE		
Index	Shield Name	Contents
1	SH1	DRAIN1.1
2	SH1	TW1
3	SH2	DRAIN2.1
4	SH2	TW2



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F-650 F-750 Electrical Schematic — Transfer Overlay Harness



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