

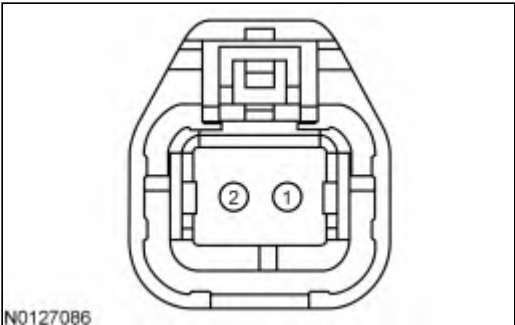
MC: Fuel Temperature Sensor

Note: Regeneration may occur during normal operation. During regeneration, diagnostic procedures may display biased values. If a regeneration occurs during diagnostic procedures, allow the process to complete before continuing diagnostics.

This pinpoint test is intended to diagnose the following:

- FRT sensor (9F951)
- fuel pressure and temperature sensor
- harness circuits: FRT and SIGRTN
- PCM (12A650)

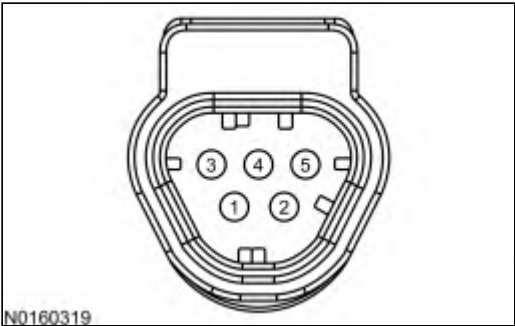
Fuel Rail Temperature (FRT) Sensor Connector



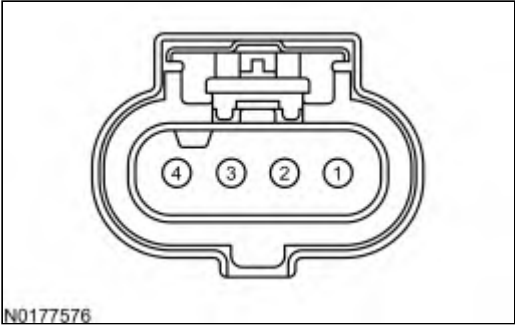
Pin	Circuit
2	SIGRTN (Signal Return)
1	FRT (Fuel Rail Temperature)

Fuel Pressure And Temperature Sensor Connector

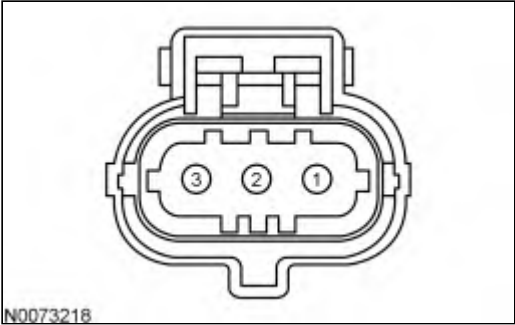
A



B



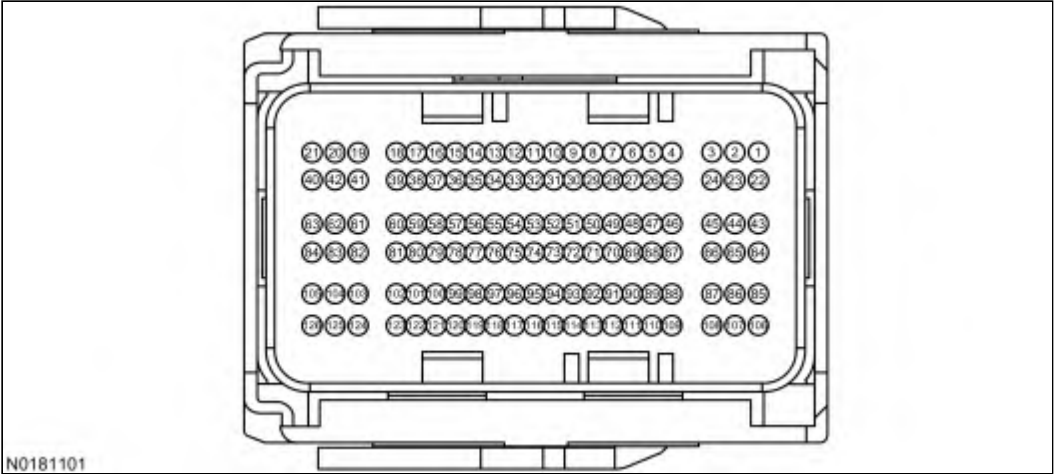
C



Vehicle	Connector	Pin	Circuit
F-650 / F-750	A	4	SIGRTN
		5	FRT
F-150	B	3	SIGRTN
		4	FRT
F-Series Super Duty	B	1	SIGRTN
		4	FRT
Transit Connect	C	3	SIGRTN
		2	FLPT

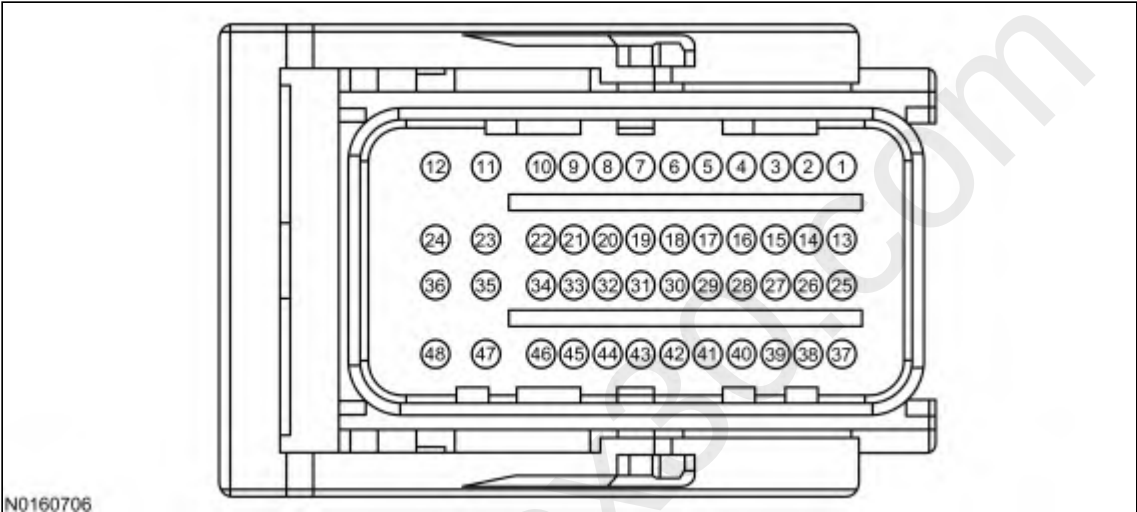
Powertrain Control Module-E (PCM-E) Connector

A



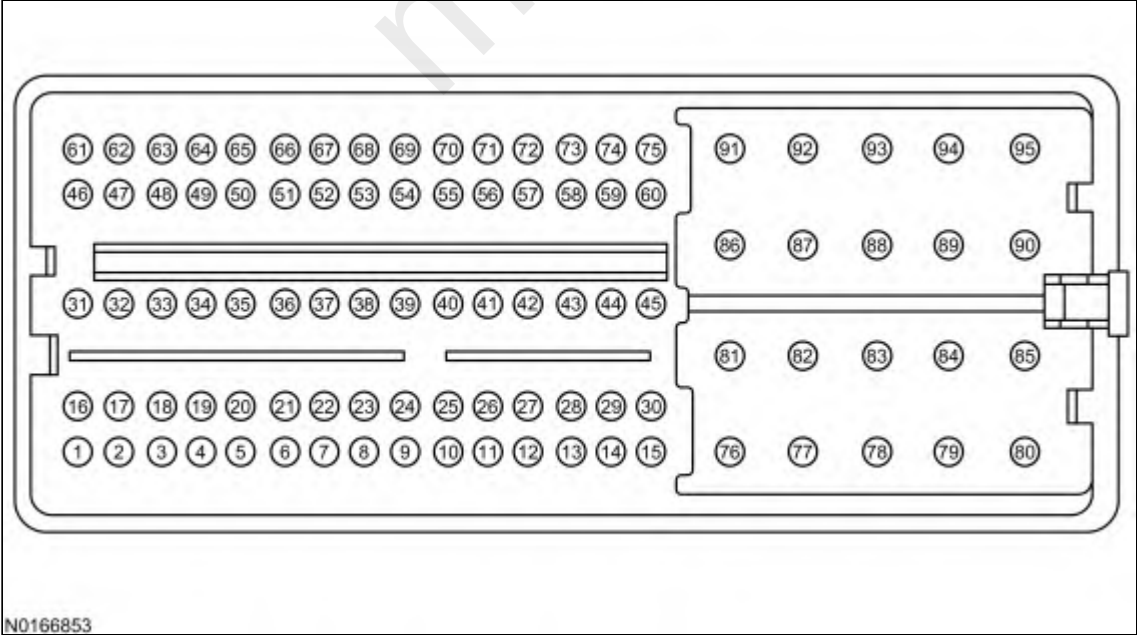
N0181101

B



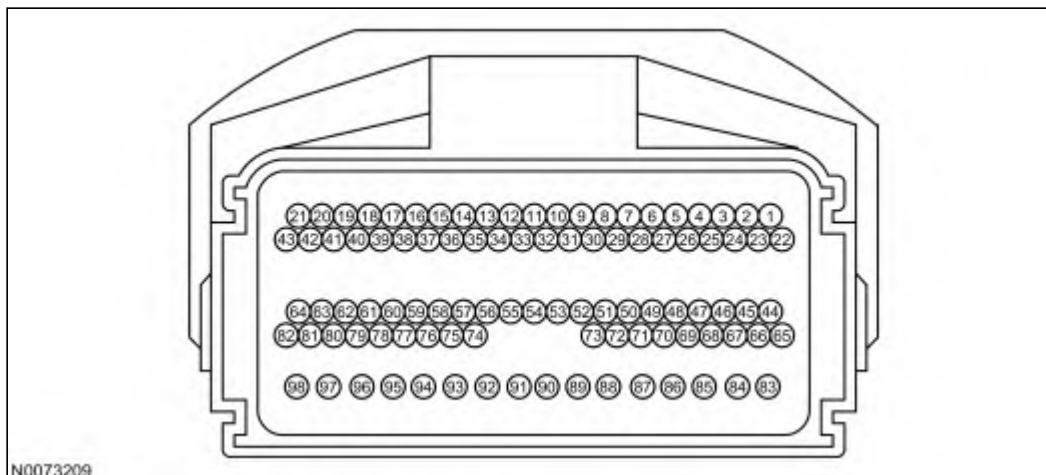
N0160706

C



N0166853

D



Vehicle	Connector	Pin	Circuit
F-Series Super Duty	A	116 92	SIGRTN FRT
Transit	B	6 31	SIGRTN FRT
Transit Connect	C	53 4 53	FLPT SIGRTN FRT
All other vehicles	D	35	FRT

MC1 CHECK FOR DTCS

Are DTCs P0180, P0181, P0182, P0183 or P0184 present?

Yes	For F-650 / F-750 and F-Series Super Duty with DTC P0181, GO to MC2 . For all others, GO to MC4 .
No	Unable to duplicate the condition. CHECK for a loose connection, and damaged or corroded terminals. WIGGLE the harness attempting to recreate the concern. REPAIR as necessary. RETURN to Section 3, Symptom Charts for further direction.

MC2 VISUAL INSPECTION OF FUEL COOLER AND ENGINE COOLING SYSTEMS

Note: Repair any engine cooling system concerns before proceeding.

- Visually inspect the fuel cooler system for the following:
 - leaks
 - pinched hoses
 - restricted radiator air flow
 - correct coolant level
 - coolant flow at the fuel cooler reservoir

Are any concerns present?

Yes	Refer to the Workshop Manual Section 303-03, Engine Cooling, to continue diagnosis.
No	GO to MC3 .

MC3 CHECK THE FUEL PRESSURE AND TEMPERATURE SENSOR OPERATION

- Verify the engine temperature is at ambient room temperature before continuing with this test. A soak period of 6 hours may be required.
- Ignition ON, engine OFF.
- For F150 and F-650 / F-750,
- Access the PCM and monitor the FRT (TEMP) PID.
- For all others,
- Access the PCM and monitor the FRT_A (TEMP) PID.

Is the PID temperature within 11°C (20°F) of ambient temperature?

Yes	GO to MC9 .
No	INSTALL a new Fuel Pressure And Temperature sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls. Clear the PCM DTCs. REPEAT the self-test.

MC4 CHECK THE FRT SENSOR CIRCUITS FOR AN OPEN

- Ignition OFF.
- For Transit,
- FRT Sensor connector disconnected.
- PCM-E connector disconnected.
- Measure the resistance between:

(+) FRT Sensor Connector, Harness Side	(-) PCM-E Connector, Harness Side
FRT - Pin 1	FRT
SIGRTN - Pin 2	SIGRTN

- For Transit Connect,
- Fuel Pressure And Temperature Sensor connector disconnected.
- PCM-E connector disconnected.
- Measure the resistance between:

(+) Fuel Pressure And Temperature Sensor Connector, Harness Side	(-) PCM-E Connector, Harness Side
FLPT	FLPT
SIGRTN	SIGRTN

- For all others,
- Fuel Pressure And Temperature Sensor connector disconnected.
- PCM-E connector disconnected.
- Measure the resistance between:

(+) Fuel Pressure And Temperature Sensor Connector, Harness Side	(-) PCM-E Connector, Harness Side
FRT	FRT
SIGRTN	SIGRTN

Are the resistances less than 5 ohms?

Yes	GO to MC5 .
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No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.
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MC5 CHECK THE FRT SENSOR CIRCUITS FOR A SHORT TO GROUND

- For Transit,
- Measure the resistance between:

(+) FRT Sensor Connector, Harness Side	(-)
FRT - Pin 1	Ground
SIGRTN - Pin 2	Ground

- For Transit Connect,
- Measure the resistance between:

(+) Fuel Pressure And Temperature Sensor Connector, Harness Side	(-)
FLPT	Ground
SIGRTN	Ground

- For all others,
- Measure the resistance between:

(+) Fuel Pressure And Temperature Sensor Connector, Harness Side	(-)
FRT	Ground
SIGRTN	Ground

Are the resistances greater than 10K ohms?

Yes	GO to MC6 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

MC6 CHECK THE FRT SENSOR CIRCUITS FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- For Transit,
- Measure the voltage between:

(+) FRT Sensor Connector, Harness Side	(-)
FRT - Pin 1	Ground
SIGRTN - Pin 2	Ground

- For Transit Connect,
- Measure the voltage between:

(+) Fuel Pressure And Temperature Sensor Connector, Harness Side	(-)

(+) Fuel Pressure And Temperature Sensor Connector, Harness Side	(-)
FLPT	Ground
SIGRTN	Ground

- For all others,
- Measure the voltage between:

(+) Fuel Pressure And Temperature Sensor Connector, Harness Side	(-)
FRT	Ground
SIGRTN	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	For F150, F-650 / F-750, and Transit Connect with KOEO or KOER DTCs P0182 and P0183, or F-Series Super Duty with KOEO DTCs P0182 and P0183, GO to MC9 . For all others, GO to MC7 .

MC7 INTERMITTENT CHECK

- Ignition ON, engine OFF.
- Access the PCM and monitor the FRT (VOLT) PID.
- While observing the PID, carry out the following:
 - Wiggle all accessible harness from the sensor to the PCM and lightly tap on the sensor.
 - Wiggle the sensor connector.
 - Look for sudden changes in the voltage when the harness and connector are wiggled or when the sensor is tapped.

Is a concern present?

Yes	REPAIR as necessary. Clear the PCM DTCs. REPEAT the self-test.
No	For Transit and Transit Connect, GO to MC8 . For all others, Unable to duplicate the condition. CHECK for a loose connection, and damaged or corroded terminals. REPAIR as necessary. REFER to Section 3, No Diagnostic Trouble Codes (DTCs) Present Symptom Chart Index , if a driveability concern exists.

MC8 VERIFY THE FRT SENSOR OPERATION

- Access the PCM and monitor the FRT (TEMP) PID.
- Record the FRT PID value.
- Ignition ON, engine running.
- Allow the engine to reach normal operating temperature.
- Access the PCM and monitor the FRT (TEMP) PID.
- Record the FRT PID value.

Did the PID value increase?

Yes	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.
No	INSTALL a new FRT sensor. REFER to the Workshop Manual Section 303-14, Electronic Engine Controls.

Clear the PCM DTCs. REPEAT the self-test.

MC9 CHECK FOR CORRECT PCM OPERATION

- Disconnect all the PCM connectors.
- Visually inspect for:
 - pushed out pins
 - corrosion
- Connect all the PCM connectors and make sure they seat correctly.
- Carry out the PCM self-test.
- Verify the concern is still present.

Is the concern still present?

Yes	INSTALL a new PCM. REFER to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM) .
No	The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.

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