

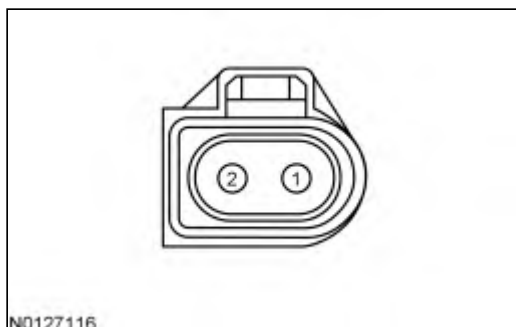
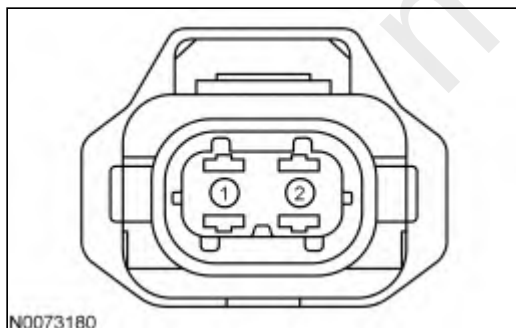
P: Fuel Injector

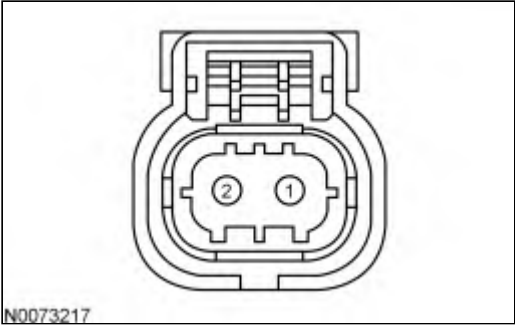
⚠ WARNING: Contact with exposed fuel injector wiring, if energized, may result in electric shock. Use care when working on or around energized fuel injector wiring. Fuel injector wiring supplies high voltage to operate the fuel injectors. Failure to follow this instruction may result in serious personal injury.

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:

- harness circuits: INJ, INJRTN and VPWR
- fuel injector (9E527)
- PCM (12A650)

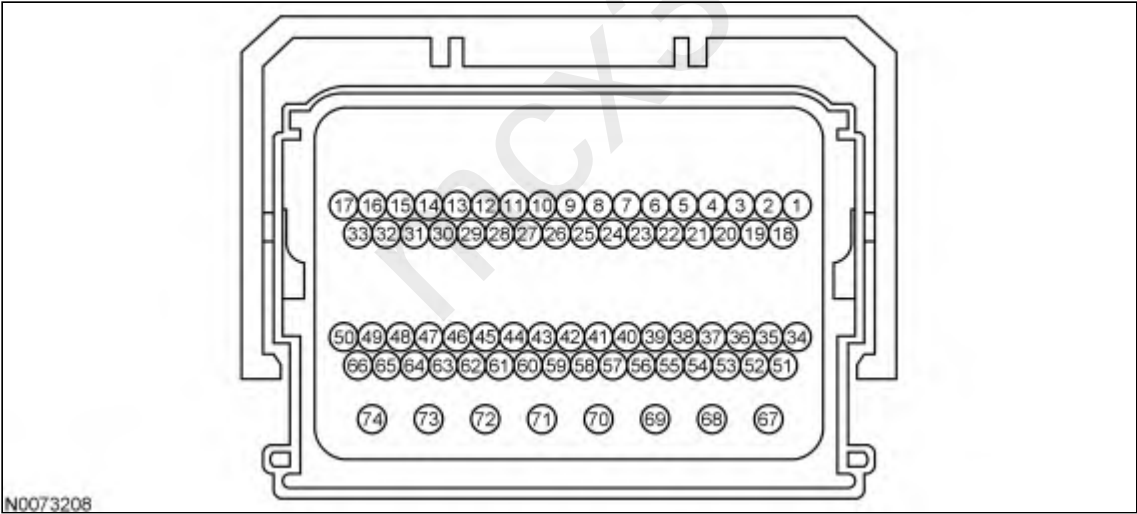
Fuel Injector Connector**A****B****C**



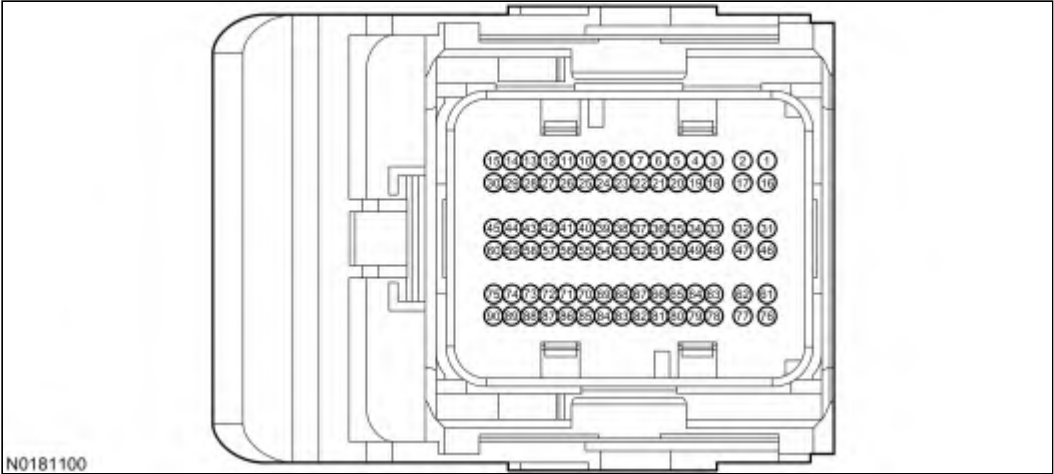
Vehicle	Connector	Pin	Circuit
Transit	A	1	INJRTN
		2	INJ
Transit Connect	B	2	INJRTN
		1	INJ
All other vehicles	C	1	INJRTN
		2	INJ

Powertrain Control Module-B (PCM-B) Connector

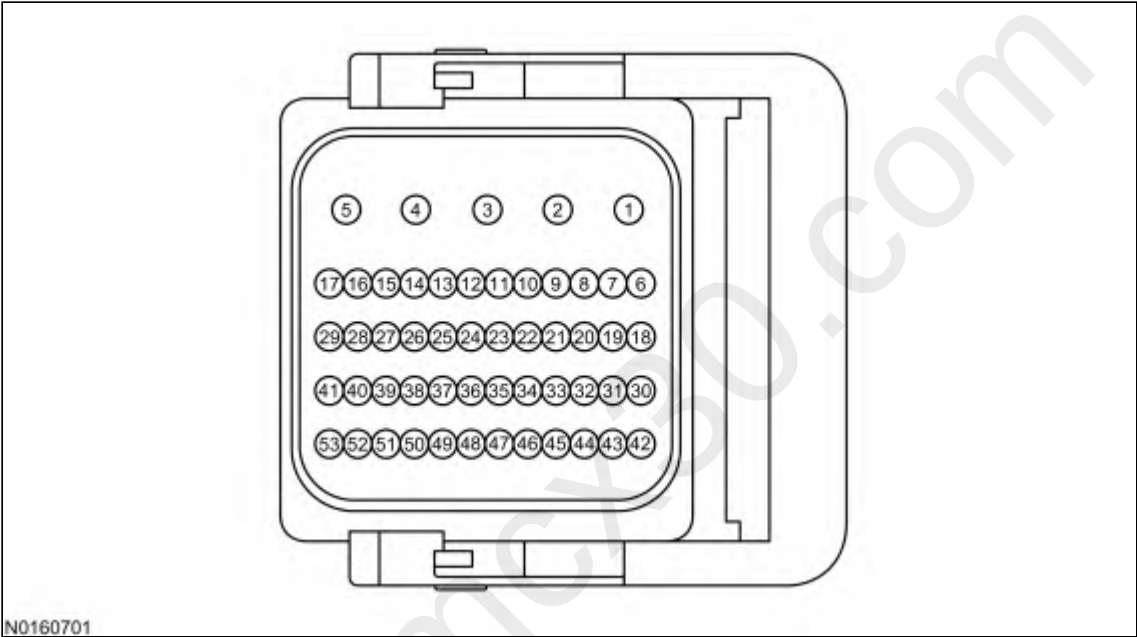
A



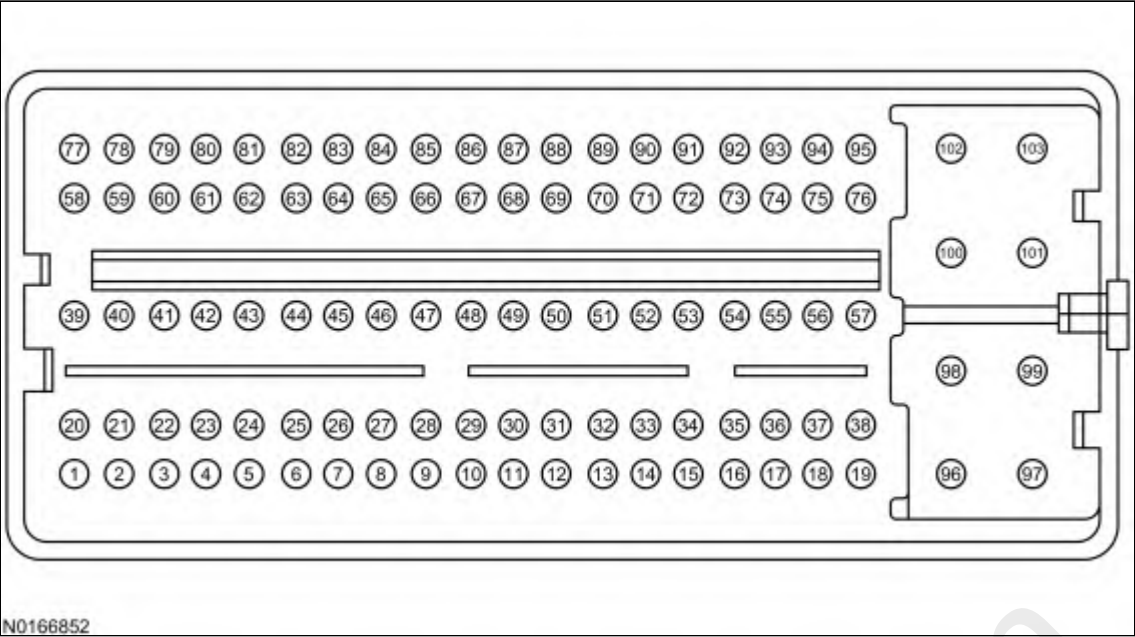
B



C



D



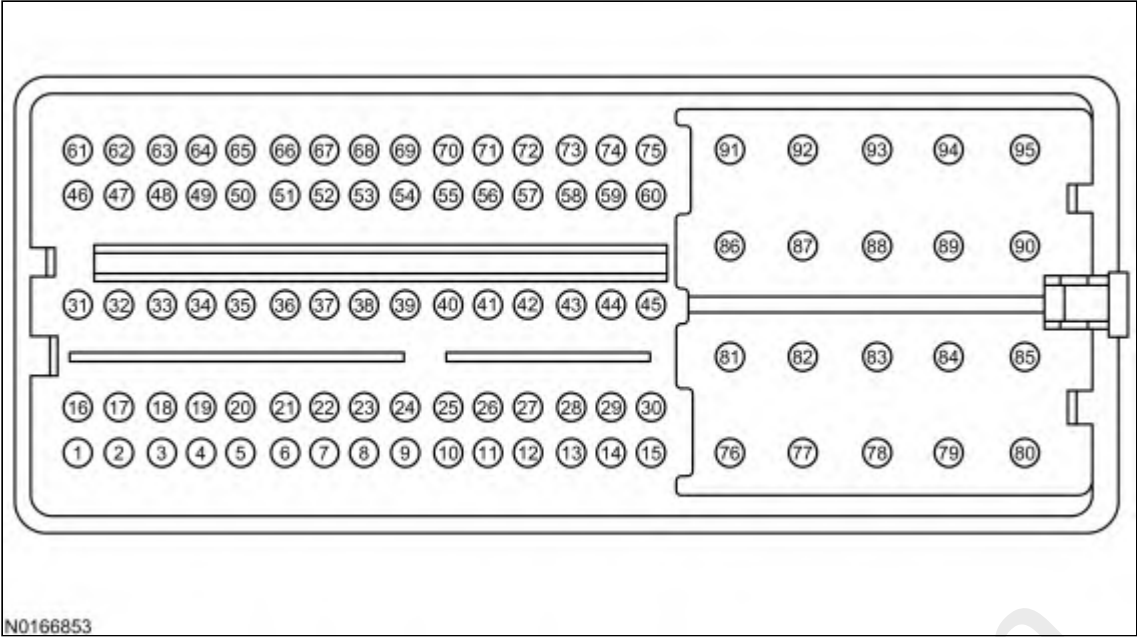
Vehicle	Connector	Pin	Circuit
F-650 / F-750	A	67, 68, 69 38	VPWR PCMRC
F-Series Super Duty	B	1, 16, 17, 2 50	VPWR PCMRC
Transit	C	17, 29, 5 48	VPWR PCMRC
Transit Connect	D	101, 102, 103 42	VPWR PCMRC
All other vehicles	A	69, 68, 67 38	VPWR PCMRC

Powertrain Control Module-E (PCM-E) Connector

A

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Vehicle	Connector	Pin	Circuit
F-650 / F-750	A	90	INJ8RTN
		89	INJ8
		98	INJ7RTN
		97	INJ7
		95	INJ6RTN
		96	INJ6
		87	INJ5RTN
		88	INJ5
		94	INJ4RTN
		93	INJ4
		86	INJ3RTN
		85	INJ3
		83	INJ2RTN
		84	INJ2
		91	INJ1RTN
		92	INJ1

Vehicle	Connector	Pin	Circuit
F-Series Super Duty	B	82 61 41 20 83 62 40 19 124 103 84 63 126 105 125 104	INJ8RTN INJ8 INJ7RTN INJ7 INJ6RTN INJ6 INJ5RTN INJ5 INJ4RTN INJ4 INJ3RTN INJ3 INJ2RTN INJ2 INJ1RTN INJ1
Transit	C	11 12 23 24 23 47 11 36 35 48	INJ5RTN INJ5 INJ4RTN INJ4 INJ3RTN INJ3 INJ2RTN INJ2 INJ1RTN INJ1
Transit Connect	D	80 85 90 95 89 94 79 84	INJ4RTN INJ4 INJ3RTN INJ3 INJ2RTN INJ2 INJ1RTN INJ1
All other vehicles	A	87 88 86 85 83 84 95 96 94 93 91 92	INJ6RTN INJ6 INJ5RTN INJ5 INJ4RTN INJ4 INJ3RTN INJ3 INJ2RTN INJ2 INJ1RTN INJ1

P1 PRELIMINARY DIAGNOSIS

- Retrieve and record all DTCs.
- Access the freeze frame data (if available) and record the DTC conditions.
- Clear the PCM DTCs.
- For F-Series Super Duty,
- Carry out the PCM self-test.
- For all others,
- Carry out the PCM KOEO self-test.
- Carry out the PCM KOER self-test.

Are any DTCs retrieved?

Yes	For DTCs P062D or P062E, GO to P8 . For all others, GO to P2 .
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.

P2 CHECK THE SUSPECT FUEL INJECTOR INTERNAL RESISTANCE

Note: Only the suspect fuel injector or bank of fuel injectors indicated by the DTC needs to be diagnosed. For F-150, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2 and 3, bank 2 refers to cylinder numbers 4, 5 and 6. For Transit, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2, 3, 4 and 5. For Transit Connect, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2, 3 and 4. For all others, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 4, 6 and 7, bank 2 refers to cylinder numbers 2, 3, 5 and 8.

- Ignition OFF.
- Suspect Fuel Injector connector disconnected.
- Measure the resistance between:

(+) Suspect Fuel Injector Connector, Component Side	(-) Suspect Fuel Injector Connector, Component Side
INJRTN	INJ

Is the resistance between 150K - 210K ohms?

Yes	GO to P3 .
No	For Transit, INSTALL a new Fuel Injector. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. CARRY OUT the Reset And Clear The Specified Function Reset Minimum Fuel Mass Adaptions For Cylinder X on the scan tool for the affected cylinder. REFER to Section 2, Clear The Continuous Diagnostic Trouble Codes (DTCs) And Reset The Emission Monitors Information in The Powertrain Control Module (PCM). Clear the PCM DTCs. REPEAT the self-test. For all others, INSTALL a new Fuel Injector. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. Clear the PCM DTCs. REPEAT the self-test.

P3 CHECK THE SUSPECT FUEL INJECTOR FOR A SHORT TO THE CASE

Note: Only the suspect fuel injector or bank of fuel injectors indicated by the DTC needs to be diagnosed. For F-150, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2 and 3, bank 2 refers to

cylinder numbers 4, 5 and 6. For Transit, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2, 3, 4 and 5. For Transit Connect, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2, 3 and 4. For all others, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 4, 6 and 7, bank 2 refers to cylinder numbers 2, 3, 5 and 8.

- Measure the resistance between:

(+) Suspect Fuel Injector Connector, Component Side	(-)
INJ	Ground
INJRTN	Ground

Are the resistances greater than 10K ohms?

Yes	GO to P4 .
No	For Transit, INSTALL a new Fuel Injector. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. CARRY OUT the Reset And Clear The Specified Function Reset Minimum Fuel Mass Adaptions For Cylinder X on the scan tool for the affected cylinder. REFER to Section 2, Clear The Continuous Diagnostic Trouble Codes (DTCs) And Reset The Emission Monitors Information in The Powertrain Control Module (PCM). Clear the PCM DTCs. REPEAT the self-test. For all others, GO to P9 .

P4 CHECK THE SUSPECT INJ AND INJRTN CIRCUITS FOR AN OPEN

Note: Only the suspect fuel injector or bank of fuel injectors indicated by the DTC needs to be diagnosed. For F-150, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2 and 3, bank 2 refers to cylinder numbers 4, 5 and 6. For Transit, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2, 3, 4 and 5. For Transit Connect, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2, 3 and 4. For all others, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 4, 6 and 7, bank 2 refers to cylinder numbers 2, 3, 5 and 8.

- PCM-E connector disconnected.
- Measure the resistance between:

(+) Suspect Fuel Injector Connector, Harness Side	(-) PCM-E Connector, Harness Side
INJ	INJ
INJRTN	INJRTN

Are the resistances less than 5 ohms?

Yes	GO to P5 .
No	REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

P5 CHECK THE SUSPECT INJ AND INJRTN CIRCUITS FOR A SHORT TO GROUND

Note: Only the suspect fuel injector or bank of fuel injectors indicated by the DTC needs to be diagnosed. For F-150, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2 and 3, bank 2 refers to cylinder numbers 4, 5 and 6. For Transit, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2, 3, 4 and 5. For Transit Connect, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2, 3 and 4. For all others, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 4, 6 and 7, bank 2 refers to cylinder numbers 2, 3, 5 and 8.

- Measure the resistance between:

(+) Suspect Fuel Injector Connector, Harness Side	(-)
INJ	Ground
INJRTN	Ground

Are the resistances greater than 10K ohms?

Yes	GO to P6 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

P6 CHECK THE SUSPECT INJ AND INJRTN CIRCUITS FOR A SHORT TO VOLTAGE

Note: Only the suspect fuel injector or bank of fuel injectors indicated by the DTC needs to be diagnosed. For F-150, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2 and 3, bank 2 refers to cylinder numbers 4, 5 and 6. For Transit, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2, 3, 4 and 5. For Transit Connect, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2, 3 and 4. For all others, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 4, 6 and 7, bank 2 refers to cylinder numbers 2, 3, 5 and 8.

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

(+) Suspect Fuel Injector Connector, Harness Side	(-)
INJ	Ground
INJRTN	Ground

Is any voltage present?

Yes	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.
No	GO to P7 .

P7 CHECK FOR THE INJ AND INJRTN CIRCUITS SHORTED TOGETHER

Note: Only the suspect fuel injector or bank of fuel injectors indicated by the DTC needs to be diagnosed. For F-150, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2 and 3, bank 2 refers to cylinder numbers 4, 5 and 6. For Transit, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2, 3, 4 and 5. For Transit Connect, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 2, 3 and 4. For all others, when diagnosing a fuel injector or fuel injector circuit concern, bank 1 refers to cylinder numbers 1, 4, 6 and 7, bank 2 refers to cylinder numbers 2, 3, 5 and 8.

- Ignition OFF.
- Measure the resistance between:

(+) Suspect Fuel Injector Connector, Harness Side	(-) Suspect Fuel Injector Connector, Harness Side
INJ	INJRTN

Is the resistance greater than 10K ohms?

Yes	GO to P8 .
No	REPAIR the short circuit. Clear the PCM DTCs. REPEAT the self-test.

P8 CHECK THE VPWR CIRCUIT FOR VOLTAGE

- Ignition OFF.
- PCM-B connector disconnected.
- Connect a 5 amp fused jumper wire between the following:

Point A PCM-B Connector, Harness Side	Point B
PCMRC	Ground

- Measure the voltage between:

(+) PCM-B Connector, Harness Side	(-)
VPWR	Ground

Is the voltage greater than 10.5 V?

Yes	GO to P9 .
No	CHECK the generator circuitry and operation. REFER to the Workshop Manual Section 414-00, Charging System to diagnose any generator related concerns. If there are no generator system concerns, REPAIR the open circuit. Clear the PCM DTCs. REPEAT the self-test.

P9 CHECK THE FUEL FOR CONTAMINATION

- Check the fuel for contamination. Refer to Section 4, [Diagnostic Procedures](#) and carry out the Sufficient Clean Fuel Test.

Is the fuel contaminated?

Yes	CARRY OUT the Diesel Fuel System Contamination Repair/Flushing procedure. REFER to the Workshop Manual Section 310-00, Fuel System, General Procedures. Clear the PCM DTCs. REPEAT the self-test.
No	For DTCs P1291 or P1292, INSTALL new Fuel Injectors for all cylinders and a new Fuel Return Line. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. Clear the PCM DTCs. REPEAT the self-test. For all others, INSTALL a new Fuel Injector as necessary. REFER to the Workshop Manual Section 303-04, Fuel Charging and Controls. Clear the PCM DTCs. REPEAT the self-test.

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