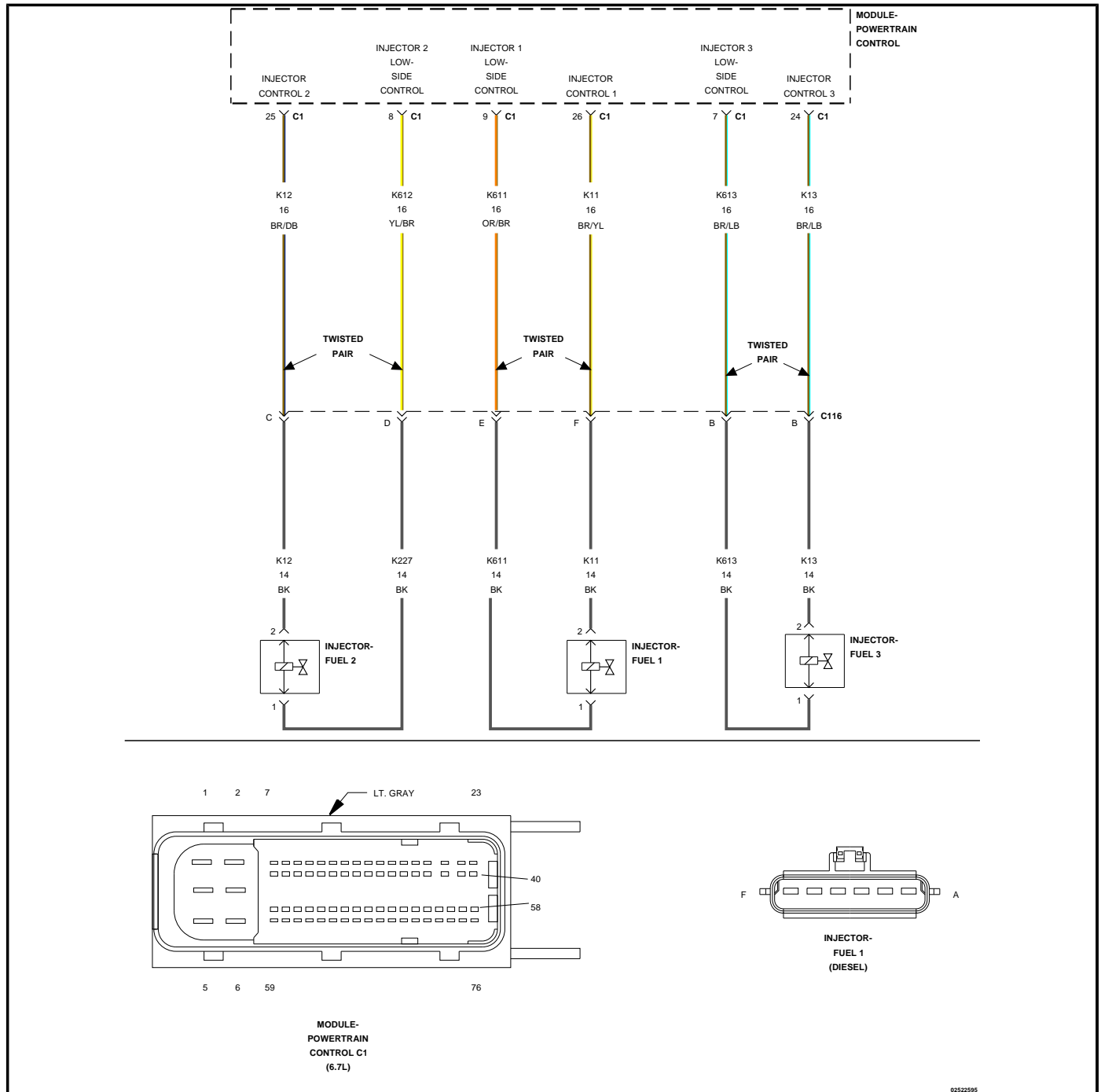


P0202-FUEL INJECTOR 2 CIRCUIT/OPEN



For a complete wiring diagram, refer to the **Wiring Information**.

Theory of Operation

The Powertrain Control Module (PCM) actuates the solenoid in the Fuel Injector causing the needle valve to rise and fuel flows through the spray holes in the nozzle tip into the combustion chamber. The PCM has a common internal driver circuit to all three Fuel Injectors on each bank. If any injector circuit on a given bank has a failure, a DTC will be set for all three Fuel Injectors on that bank. Fuel Injectors 1,2,3 are grouped together on bank 1. Fuel Injectors 4,5,6 are

grouped together on bank 2. The MIL lamp will light immediately after the diagnostic runs and fails. During this time the customer may experience engine surge or stumble. The MIL lamp will turn off once the diagnostic runs and passes in four consecutive drive cycles.

- **When Monitored:**

While the engine is running.

- **Set Condition:**

When the Fuel Injector current falls below a calibrated threshold.

Possible Causes
HIGH SIDE DRIVER CIRCUIT OPEN/HIGH RESISTANCE
LOW SIDE DRIVER CIRCUIT OPEN/HIGH RESISTANCE
HIGH SIDE DRIVER CIRCUIT SHORTED TO GROUND
LOW SIDE DRIVER CIRCUIT SHORTED TO GROUND
HIGH SIDE DRIVER CIRCUIT SHORTED TO VOLTAGE
LOW SIDE DRIVER CIRCUIT SHORTED TO VOLTAGE
DRIVER CIRCUITS SHORTED TOGETHER
FUEL INJECTOR
POWERTRAIN CONTROL MODULE (PCM)

Always perform the Pre-Diagnostic Troubleshooting procedure before proceeding. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

1. ACTIVE DTC

1. Ignition on, engine not running.
2. With the scan tool check for active DTCs.

Is the DTC active?

Yes • Go To 2

No • Perform the INTERMITTENT CONDITION diagnostic procedure. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

2. CHECK EACH FUEL INJECTOR CIRCUIT FOR AN OPEN/HIGH RESISTANCE

1. Turn the ignition off.
2. Disconnect the PCM C1 harness connector.
3. Measure the resistance between the:
 - (K11) Fuel Injector 1 High Side Driver circuit and the (K611) Fuel Injector 1 Low Side Driver circuit at the PCM C1 harness connector.
 - (K12) Fuel Injector 2 High Side Driver circuit and the (K612) Fuel Injector 2 Low Side Driver circuit at the PCM C1 harness connector.

- (K13) Fuel Injector 3 High Side Driver circuit and the (K613) Fuel Injector 3 Low Side Driver circuit at the PCM C1 harness connector.

NOTE: Be sure to zero the Ohm meter prior to checking the Fuel Injector circuit. Resistance reading should be between 0-1 Ohm.

Is the resistance between 0-1 Ohm on all circuits?

Yes • Go To 3

No • Go To 8

3. CHECK EACH FUEL INJECTOR CIRCUIT FOR A SHORT TO GROUND

1. Measure the resistance between ground and the:
 - (K11) Fuel Injector 1 High Side Driver circuit at the PCM C1 harness connector.
 - (K12) Fuel Injector 2 High Side Driver circuit at the PCM C1 harness connector.
 - (K13) Fuel Injector 3 High Side Driver circuit at the PCM C1 harness connector.

NOTE: There should be no continuity between the circuit and ground.

Is the resistance below 10k Ohms on any circuits?

Yes • Go To 4

No • Go To 12

4. CHECK EACH FUEL INJECTOR CIRCUIT FOR A SHORT TO VOLTAGE

1. Turn the ignition on.
2. Measure the voltage on the:
 - (K11) Fuel Injector 1 High Side Driver circuit at the PCM C1 harness connector.
 - (K12) Fuel Injector 2 High Side Driver circuit at the PCM C1 harness connector.
 - (K13) Fuel Injector 3 High Side Driver circuit at the PCM C1 harness connector.

NOTE: There should be no voltage present.

Is there voltage present on any circuit?

Yes • Go To 6

No • Go To 5

5. CHECK FOR THE DRIVER CIRCUITS SHORTED TOGETHER

1. Turn ignition off.
2. Disconnect all bank 1 Fuel Injector wires at the Fuel Injectors.
3. Measure the resistance between all bank 1 Driver circuits at the PCM C1 harness connector.

Is the resistance below 10k Ohms between any Driver circuits?

Yes • Repair the Driver circuits that are shorted together.

- Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

- No**
- Replace the Powertrain Control Module in accordance with the service information.
 - Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

6. HIGH SIDE DRIVER SHORTED TO VOLTAGE

NOTE: Perform the following tests on the Fuel Injector circuit which was faulty.

1. Turn the ignition off.
2. Disconnect Fuel Injector wires at the Fuel Injector.
3. Turn the ignition on.
4. Measure the voltage of the High Side Driver circuit at the PCM C1 harness connector.

Is there any voltage present?

- Yes**
- Repair the High Side Driver circuit for a short to voltage.
 - Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

- No**
- Go To [7](#)

7. CHECK THE LOW SIDE DRIVERS FOR A SHORT TO VOLTAGE

1. Measure the voltage of the Low Side Driver circuit at the PCM C1 harness connector.

Is there any voltage present?

- Yes**
- Repair the Low Side Driver circuit for a short to voltage.
 - Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

- No**
- Test complete. Perform the INTERMITTENT CONDITION diagnostic procedure. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

8. CHECK THE VALVE COVER PASS THROUGH HARNESS CIRCUIT

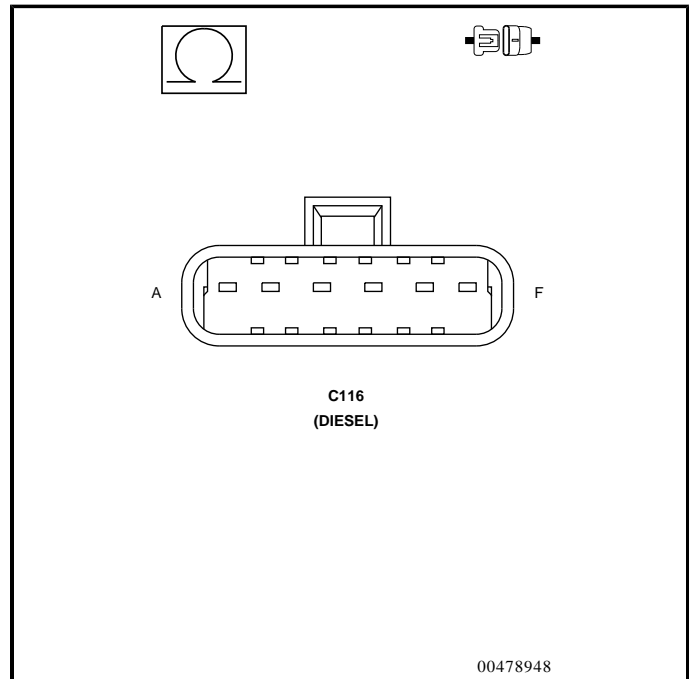
NOTE: Perform the following tests on the Fuel Injector circuit which was faulty.

1. Turn the ignition off.
2. Disconnect the Valve Cover Pass Through harness connector.
3. Measure the resistance between Low Side Driver circuit and the High Side Driver circuit of the Valve Cover Pass Through connector terminals.

NOTE: Be sure to zero the Ohm meter prior to checking the Fuel Injector circuit.

Is the resistance between 0-1 Ohm?

- Yes** • Go To [9](#)
- No** • Go To [11](#)



9. CHECK THE HIGH SIDE CIRCUITS IN ENGINE HARNESS

1. Measure the resistance of the High Side Driver circuit between the Valve Cover Pass Through harness connector and the PCM C1 harness connector.

NOTE: Be sure to zero the Ohm meter prior to checking the Fuel Injector circuit.

Is the resistance between 0-1 Ohm?

- Yes** • Go To [10](#)
- No** • Repair the High Side Driver circuit for an open or high resistance.
- Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

10. CHECK THE LOW SIDE CIRCUITS IN ENGINE HARNESS

1. Measure the resistance of the Low Side Driver circuit between the Valve Cover Pass Through harness connector and the PCM C1 harness connector.

NOTE: Be sure to zero the Ohm meter prior to checking the Fuel Injector circuit.

Is the resistance between 0-1 Ohm?

- Yes** • Test complete. Perform the INTERMITTENT CONDITION diagnostic procedure. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).
- No** • Repair the Low Side Driver circuit for an open or high resistance.
- Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

11. CHECK THE FUEL INJECTORS

1. Disconnect all bank 1 Fuel Injector wires at the Fuel Injectors.
2. Measure the resistance across the terminals at the Fuel Injector.

NOTE: Be sure to zero the Ohm meter prior to checking the Fuel Injector circuit.

Is the resistance between 0-1 Ohm?

- Yes**
- Replace the Valve Cover Pass Through harness in accordance with the service information.
 - Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).
- No**
- Replace the Fuel Injector in accordance with the service information.
 - Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).

12. CHECK FOR THE DRIVER CIRCUITS SHORTED TOGETHER

1. Disconnect all bank 1 Fuel Injector wires at the Fuel Injectors.
2. Measure the resistance between all bank 1 Driver circuits at the PCM C1 harness connector.

Is the resistance below 10k Ohms between any circuits?

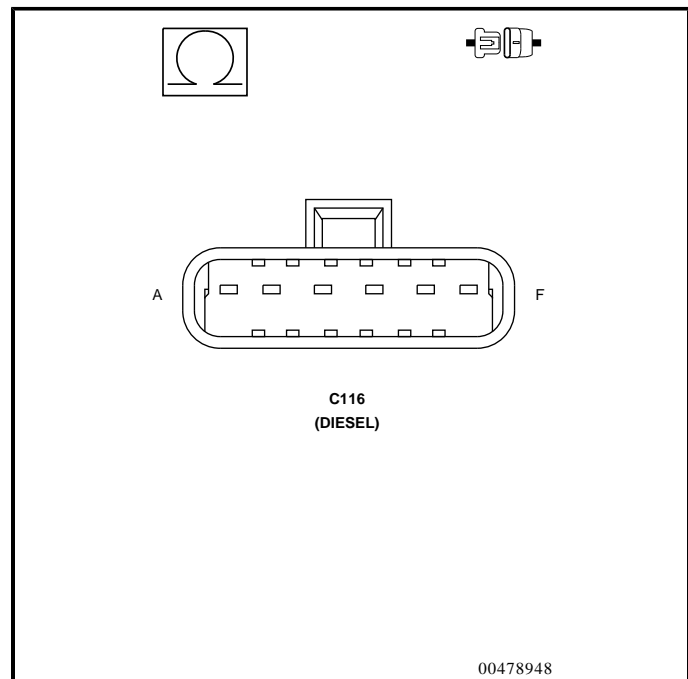
- Yes**
- Go To 13
- No**
- Go To 14

13. CHECK THE VALVE COVER PASS THROUGH HARNESS CIRCUIT

1. Disconnect the Valve Cover Pass Through harness connector.
2. Measure the resistance between all bank 1 Driver circuits of the Valve Cover Pass Through harness.

Is the resistance below 10k Ohms between any circuits?

- Yes**
- Replace the Valve Cover Pass Through harness in accordance with the service information.
 - Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).
- No**
- Repair the short between the bank 1 Driver circuits in the engine harness.
 - Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).



14. CHECK THE HIGH SIDE DRIVER CIRCUIT FOR A SHORT TO GROUND

NOTE: Perform the following tests on the Fuel Injector circuit which was faulty.

1. Disconnect the Valve Cover Pass Through harness connector.
2. Measure the resistance between ground and the High Side Driver circuit at the PCM C1 harness connector.

Is the resistance below 10k Ohms?

- Yes**
- Repair the High Side Driver circuit for a short to ground.
 - Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).
- No**
- Go To 15

15. CHECK THE LOW SIDE DRIVER CIRCUIT FOR A SHORT TO GROUND

1. Measure the resistance between ground and the Low Side Driver circuit at the PCM C1 connector.

Is the resistance below 10k Ohms?

- Yes**
- Repair the Low Side Driver circuit for a short to ground.
 - Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).
- No**
- Go To 16

16. CHECK THE FUEL INJECTORS

1. Measure the resistance between ground and one of the Fuel Injector terminals.

Is the resistance below 10k Ohms?

- Yes**
- Replace the Fuel Injector in accordance with the service information.
 - Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).
- No**
- Replace the Valve Cover Pass Through harness in accordance with the service information.
 - Perform the POWERTRAIN VERIFICATION TEST - 6.7L. (Refer to 28 - DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure).