CITY DIESEL
DECATUR AL
800-950-2489
2215 Gordon Terry Pkwy
Decatur, Al 35601
Mon. - Fri. 8:00-5:00

Reference Materials Below:

Cylinder Number to position reference

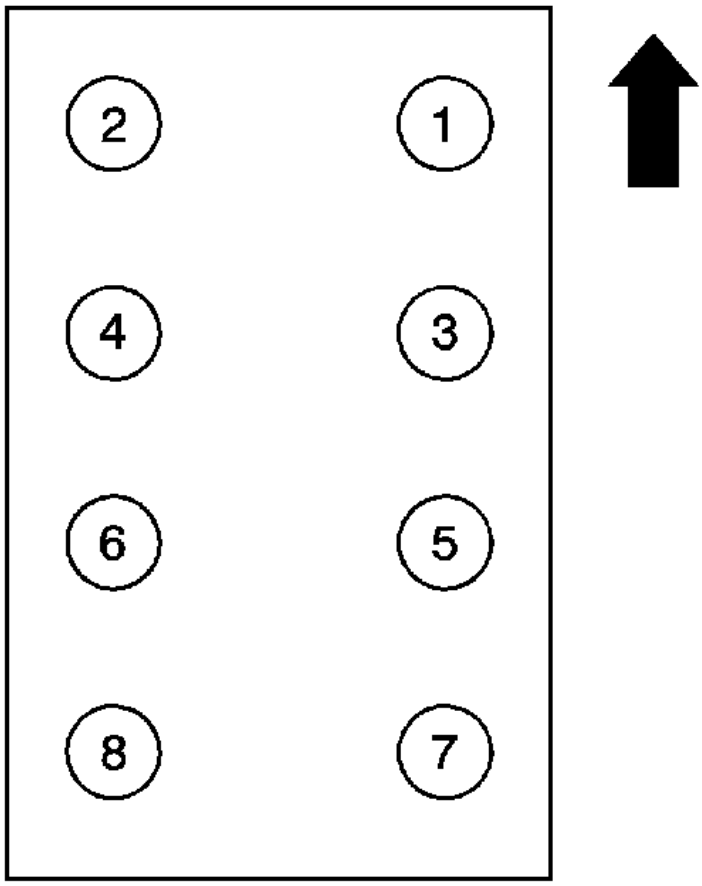
Connector view with circuit description and wire color C1

Connector view with circuit description and wire color C2

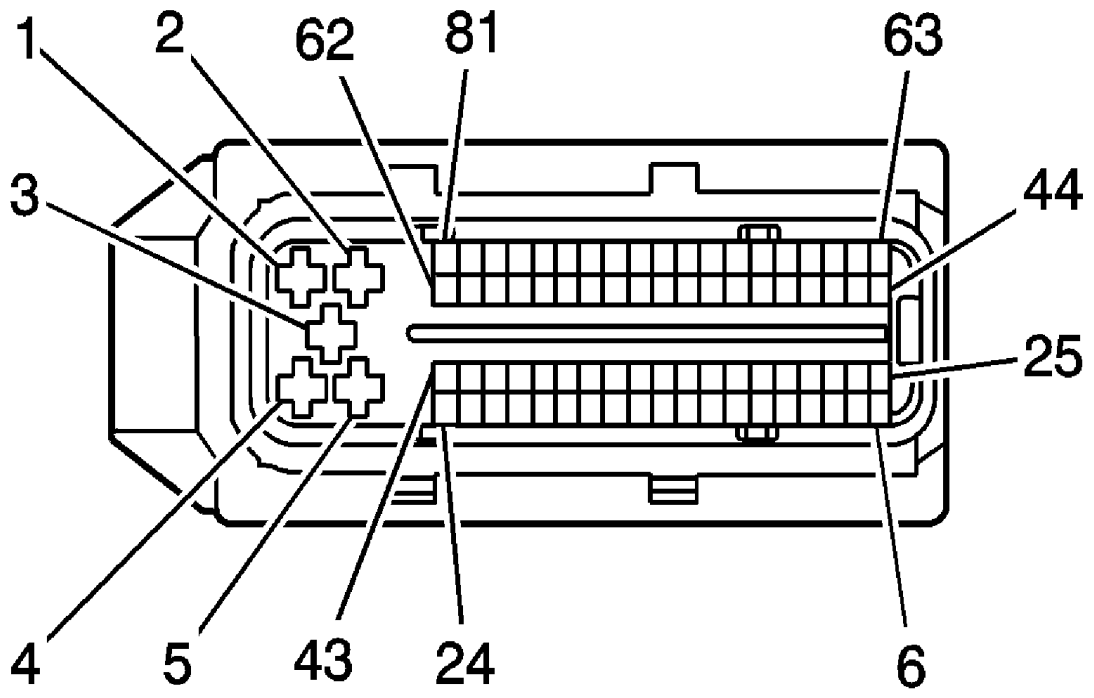
Troubleshooting information and decision trees for specific codes

Please proceed past the pictures below for the guided diagnostics.

Cylinder/Injector Identification. Arrow points to the front bumper of Truck

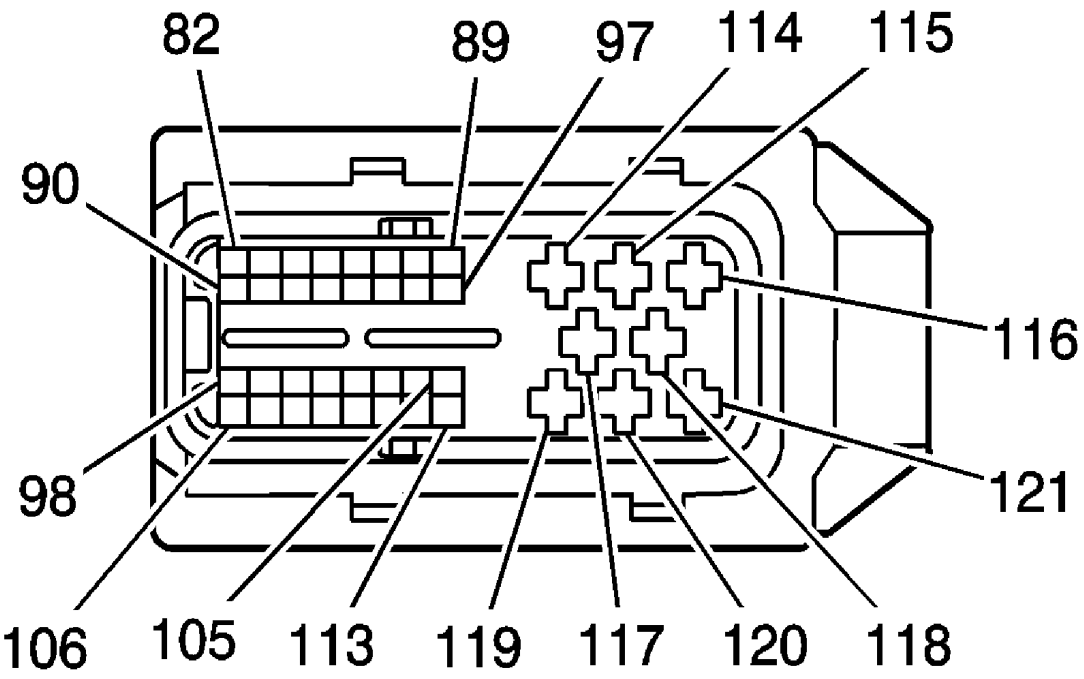


Fuel Injection Control Module (FICM) Connector – C1



Connector Part Information	• 1928403454 • 81-Way F Bosch Series (BK)

Pin	Wire Color	Circuit No.	Function
1	WH/L-GN	IC18	Fuel Injector 4 Command
2	YE/BK	IZ17	Ground
3	OG	IC13	Injector Supply Voltage
4	RD/L-GN	IC15	Fuel Injector 1 Command
5	PK	339	Ignition 1 Voltage
6–43	—	—	Not Used
44	L-BU/BK	844	Fuel Injector 4 Control
45	BK/WH	845	Fuel Injector 5 Control
46	—	—	Not Used
47	PK/BK	1746	Fuel Injector 3 Control
48	RD/BK	877	Fuel Injector 7 Control
49–58	—	—	Not Used
59	D-BU/WH	IC20	Fuel Injector 6 Command
60	D-BU/WH	IC520	Fuel Injector 6 Command
61	WH/RD	IC21	Fuel Injector 7 Command
62	WH/RD	IC521	Fuel Injector 7 Command
63	D-BU/WH	878	Fuel Injector 8 Control
64	YE/BK	846	Fuel Injector 6 Control
65	—	—	Not Used
66	BK	1744	Fuel Injector 1 Control
67	L-GN/BK	1745	Fuel Injector 2 Control
68–81	—	—	Not Used

Fuel Injection Control Module (FICM) Connector – C2			
			
Connector Part Information	• 1928403462 • 40-Way F Bosch Series (BK)		
Pin	**Wire Color**	**Circuit No.**	**Function**
82–89	—	—	Not Used
90	D-GN	2362	SAE J1939 Serial Data Bus -
91	YE	2361	SAE J1939 Serial Data Bus +
92–93	—	—	Not Used
94	L-BU	2832	Engine Speed Signal
95–113	—	—	Not Used
114	BK/GN	IZ18	Ground
115	WH/L-BU	IC17	Fuel Injector 3 Command
116	RD/L-GN	IC19	Fuel Injector 5 Command
117	—	—	Not Used
118	RD/WH	IC60	Injector Supply Voltage
119	PK	339	Ignition 1 Voltage
120	WH/GN	IC22	Fuel Injector 8 Command
121	WH/YE	IC16	Fuel Injector 2 Command

LB7/LLY U0105 No-Start Troubleshooting Tree Blown FUSE Tree

This tree assumes that the codes are active and the condition is not intermittant. If the code is intermittant or associtated with a P0090 code and the FICM intermittantly cutting out pay special attention to step 5 especially make sure the relay is making good tight contact.

1. Does the truck have a U0105 code and a no-start condition or a blown FICM fuse?

- **Yes** → Check the FICM fuse.
    - **Fuse is blown** → Go to Step 2.
    - **Fuse is not blown** → Go to Step 4.

---

2. Replace the FICM fuse.

With the FICM connected, turn the key to the **RUN** position.

- **Fuse blows again** → Go to Step 3.
- **Fuse does not blow** → Go to Step 6.

---

3. Isolate the FICM.

1. Turn the key **OFF**.
2. Wait at least **2 minutes**.
3. Unplug the FICM.
4. Replace the fuse.
5. Turn the key to the **RUN** position.

- **Fuse blows again**
    - Repair the short-to-ground on the FICM power wires (pink wires).
    - **Troubleshooting complete.**
- **Fuse does not blow**
    - Replace the FICM.
    - **Troubleshooting complete.**

---

4. Check power at the FICM fuse.

With the key in the **RUN** position, verify power is present on both sides of the FICM fuse.

- **No power on both sides of the fuse** → Go to Step 5.
- **Power present on both sides of the fuse** → Go to Step 8.

---

5. Check the EDU relay.

Verify:

- The relay coil has a good power source.
- The relay coil has a good ground.
- The relay supply side has a good 12-volt source.
- The relay fits tightly in the relay sockets.

Repair any issues found.

- **Troubleshooting complete.**

---

6. Attempt to start the engine.

Crank the engine for several seconds.

- **Engine starts**
    - Road test and verify the concern is resolved.
    - **Troubleshooting complete.**
- **Engine does not start** → Go to Step 7.

---

7. Check FICM output voltage and recheck the FICM fuse.

- **Fuse is blown again**

  A blown fuse during cranking is most commonly caused by an injector with a failed solenoid coil. Less commonly, it can be caused by a failure of the high-voltage section of the FICM.

  Verify FICM high-voltage output:

    - Turn the key to the **RUN** position.
    - Measure voltage on the large **Red/White** wire and large **Orange** wire at the FICM.
    - **50 volts is present on either wire**

        - Replace the FICM.
        - Troubleshooting complete.
    - **50 volts is not present on either wire**
        - Continue diagnosis of the injector solenoid coils using one of the following methods.

    Preferred Method – LCR Meter

    - Measure each injector solenoid coil with an LCR meter.
    - Compare readings across all injectors.
    - Replace any injector with a reading significantly different from the others.

    Alternate Method – Digital Multimeter

    - Measure resistance directly at each injector solenoid coil using the lowest resistance range.
    - Compare readings across all injectors.
    - Replace any injector with a reading lower than the others. Even a small difference can be significant.

    Isolation Method

    - Disconnect all injector connectors.
    - Reconnect injectors one at a time.
    - Crank the engine after each reconnection.
    - The injector that causes the fuse to blow is the likely fault.
    - Troubleshooting complete.
- **Fuse is not blown**
    - Continue diagnosis using standard no-start procedures.
    - Troubleshooting complete.

8. Check power at the FICM.

With the key in the **RUN** position, measure voltage on the large pink power wires at the FICM connector.

- **Battery voltage is NOT present**
    - Repair or replace the wiring between the fuse box and the FICM power wires.
    - **Troubleshooting complete.**

- **Battery voltage IS present**
    - Replace the FICM.
    - **Troubleshooting complete.**

P2146/P2149/P1261/P1262 with 3 or Fewer Injector Circuit Codes

Applies to the Following Conditions

LLY

- P2146 with three or fewer of the following:
    - P0201
    - P0204
    - P0206
    - P0207
- P2149 with three or fewer of the following:
    - P0202
    - P0203
    - P0205
    - P0208

LB7

- P1261 with three or fewer of the following:
    - P0201
    - P0204
    - P0206
    - P0207
- P1262 with three or fewer of the following:
    - P0202
    - P0203
    - P0205
    - P0208

Important

These fault combinations are very unlikely to be caused by a FICM failure. The easiest way to verify this is to first rule out the FICM and then proceed to the more common injector and wiring faults.

---

1. Verify the FICM is not shorted internally.

Using the injector code(s) present, identify the corresponding injector command wire at the FICM connector reference chart.

Using a digital multimeter, measure resistance between:

- The Fuel Injector Command wire for the affected injector.
- Ground.

Example: For a P0201 code, measure resistance between Pin 4 (Red/Green wire) and the Pin 2 (Yellow/Black wire) on the larger FICM connector.

- **Resistance is less than 10,000 ohms**
    - Replace the FICM.
    - Troubleshooting complete.
- **Resistance is 10,000 ohms or higher, or OL**
    - Repeat the test for each injector code present.
    - If all affected circuits pass, proceed to Step 2.

---

2. Verify injector solenoid coils.

Diagnose the injector coils using one of the following methods.

Preferred Method – LCR Meter

- Measure each injector solenoid coil with an LCR meter.
- Compare readings across all injectors.
- Replace any injector with a reading significantly different from the others.

Alternate Method – Digital Multimeter

- Measure resistance directly at each injector solenoid coil using the lowest resistance range.
- Compare readings across all injectors.
- Replace any injector with a reading lower than the others. Even a small difference can be significant.
- **Fault found**
    - Repair as necessary.
    - Retest vehicle.
    - Troubleshooting complete.

- **No fault found**
    - Proceed to Step 3.

---

3. Verify injector pigtails.

For each injector associated with a fault code:

1. Disconnect the injector pigtail.
2. Inspect terminals for discoloration, overheating, corrosion, or damage.
3. Inspect wiring for cracked or broken conductors.
4. Verify terminal tension and carefully tighten loose terminals as necessary.
5. Replace any pigtail that appears questionable.

- **Fault found**
    - Repair or replace the affected pigtail.
    - Retest vehicle.
    - If the concern is resolved, troubleshooting is complete.
    - If the concern remains, proceed to Step 4.
- **No fault found**
    - Proceed to Step 4.

---

4. Verify wiring between the FICM and injector.

For each injector associated with a fault code:

Injector Command Wire Test

Measure continuity between:

- The injector command wire at the FICM.
- The matching command wire at the injector pigtail.

Expected reading:

- Less than 1 ohm.

Repair any wiring concerns found.

Injector Supply Voltage Wire Test

Measure continuity between:

- The injector supply voltage wire at the FICM.
- The matching supply voltage wire at the injector pigtail.

Expected reading:

- Less than 1 ohm.

Repair any wiring concerns found.

Injector Supply Voltage Circuits

- Large Orange wire supplies injectors 1, 4, 6, and 7.
- Large Red/White wire supplies injectors 2, 3, 5, and 8.

After repairs are completed:

- Retest the vehicle.
- **Concern resolved**
    - Troubleshooting complete.
- **Concern remains**
    - Consider replacing injector pigtails if they were not previously replaced.
    - Consider running new injector command and injector supply voltage wires to the affected injector circuits.
    - Troubleshooting complete.

P2146 / P2149 / P1261 / P1262 with 4 or More Injector Circuit Codes

Applies to the Following Conditions

LLY

- **P2146** with all of the following:
    - P0201
    - P0204
    - P0206
    - P0207
- **P2149** with all of the following:
    - P0202
    - P0203
    - P0205
    - P0208

LB7

- **P1261** with all of the following:
    - P0201
    - P0204
    - P0206
    - P0207
- **P1262** with all of the following:
    - P0202
    - P0203
    - P0205
    - P0208

Important

This combination of codes indicates a fault affecting an entire injector supply circuit. Possible causes include:

- A shorted injector coil
- A shorted injector supply wire
- Multiple injector pigtail failures
- A failed FICM

The FICM is a likely cause, but it is not the only possible cause. Follow the steps below to isolate the fault.

---

1. Determine if the injector supply wire is shorted to ground.

With the FICM unplugged and the key OFF, measure resistance between:

- The injector supply voltage wire at the FICM connector.
- A known good chassis ground.

Injector Supply Voltage Circuits

- Large Orange wire supplies injectors 1, 4, 6, and 7.
- Large Red/White wire supplies injectors 2, 3, 5, and 8.

Expected Reading

- Greater than 10,000 ohms.
- **Reading is greater than 10,000 ohms**
    - Proceed to Step 3.
- **Reading is less than 10,000 ohms**
    - Proceed to Step 2.

---

2. Rule out a shorted injector coil.

Disconnect all injectors supplied by the affected injector supply circuit.

Orange Supply Circuit

- Injectors 1, 4, 6, and 7

Red/White Supply Circuit

- Injectors 2, 3, 5, and 8

Repeat the resistance test from Step 1.

- **Reading remains less than 10,000 ohms**
    - Repair the injector supply wire shorted to ground.
    - Troubleshooting complete.
- **Reading is now greater than 10,000 ohms**
    - Reconnect the injectors one at a time.
    - Repeat the resistance test after each injector is connected.
    - **Resistance drops below 10,000 ohms**
        - Replace the injector that caused the failure.
        - Troubleshooting complete.

---

3. Determine if the FICM injector supply circuit is shorted to ground.

With the FICM unplugged, measure resistance between:

- The affected injector supply pin on the FICM.
- A ground pin of the FICM on the same connector.

Examples

Injectors 1, 4, 6, and 7

- Pin 3 (Orange wire)
- Pin 2 (Yellow/Black wire)
- Connector C1

Injectors 2, 3, 5, and 8

- Pin 118 (Large Red/White wire)
- Pin 114 (Large Black/Green wire)

Expected Reading

- Greater than 5,000 ohms.
- **Reading is less than 5,000 ohms**

    - Replace the FICM.
    - Troubleshooting complete.
- **Reading is greater than 5,000 ohms**
    - Proceed to Step 4.

---

4. Determine if an injector command circuit inside the FICM is shorted to ground.

With the FICM unplugged, measure resistance between:

- The injector command pin (on the FICM itself)for each injector with a fault code.
- A ground pin (on the FICM itself) on the same connector.

Example

For injector 6:

- Pin 59 (Dark Blue/White wire)
- Pin 2 (Yellow/Black wire)
- Connector C1

Expected Reading

- Greater than 5,000 ohms.
- **Any reading is less than 5,000 ohms**
    - Replace the FICM.
    - Troubleshooting complete.
- **All readings are greater than 5,000 ohms**
    - Proceed to Step 5.

---

5. Determine if the injector supply circuit is open.

With the FICM unplugged, place the multimeter on the lowest resistance range.

For each injector with a fault code, measure resistance between:

- The injector supply wire at the FICM connector. (Truck Harness side)
- The corresponding injector supply terminal at the injector pigtail. (Truck Harness side)

Expected Reading

- Less than 1.5 ohms.

Injector Supply Voltage Circuits

- Large Orange wire supplies injectors 1, 4, 6, and 7.
- Large Red/White wire supplies injectors 2, 3, 5, and 8.
- **Any reading exceeds 1.5 ohms**
    - Repair the affected circuit.
    - Pay close attention to injector pigtails, terminal tension, and broken wires.
    - Troubleshooting complete.
- **All readings are less than 1.5 ohms**
    - Proceed to Step 6.

---

6. Additional Injector Testing

At this point, replacing the FICM is reasonable. However, injector coils can fail in a manner that is not detectable with a standard multimeter because the failure only occurs under higher operating voltage.

Before replacing the FICM, its recommended to perform the following tests.

Preferred Method – LCR Meter

- Measure each injector solenoid coil with an LCR meter.
- Compare readings across all injectors.
- Replace any injector with a reading significantly different from the others.
- **Isolation Method**
    - Disconnect each injector that you have code for 1 at a time.
    - Crank the engine after each injector is disconnected.
    - You should only have 1 injector unhooked at a time.
    - If you find an injector that when unplugged that lets the engine fire with 7 out of 8 cylinders instead of 4 replace that injector
    - Troubleshooting complete.
- **No injector changes the symptom**
    - Replace the FICM.

- Troubleshooting complete.