

FUEL INJECTOR CIRCUIT

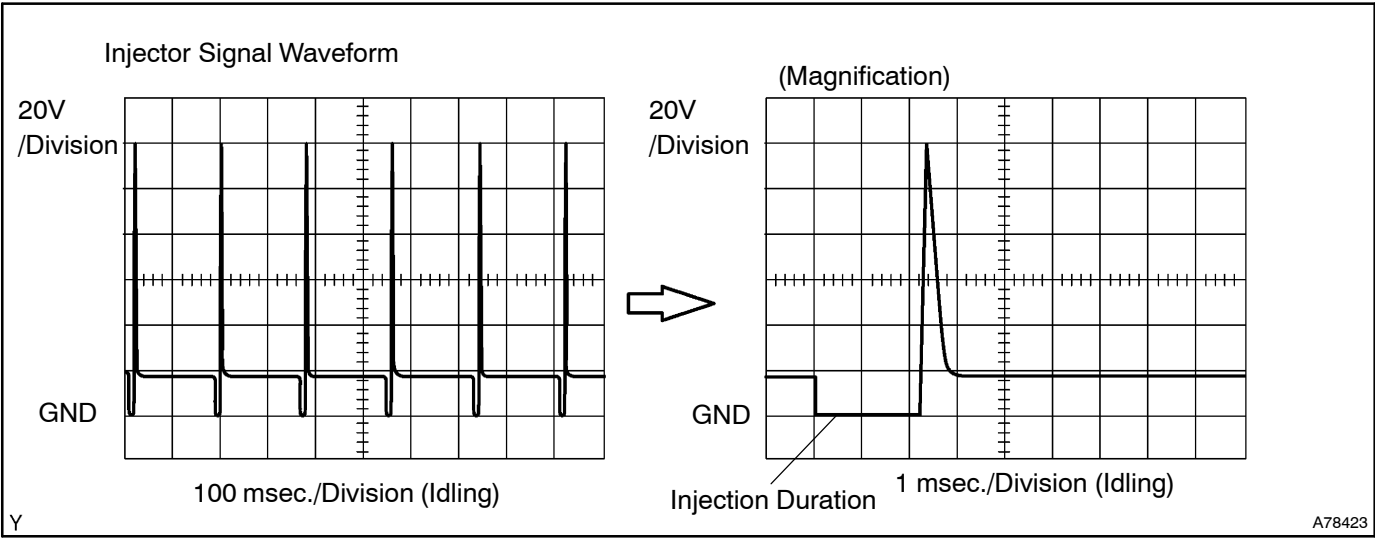
CIRCUIT DESCRIPTION

The fuel injectors are located on the intake manifold. They inject fuel into the cylinders based on the signals from the ECM.

Reference: Inspection using the oscilloscope  
With the engine idling, check the waveform between terminals #10 to #40 and E01 of the ECM connectors.

Item	Contents
Terminal	#10 to #40 - E01
Equipment Setting	20V/Division, 100 or 1 ms/Division
Condition	Idling

HINT:  
The correct waveform is as shown in the diagram below.

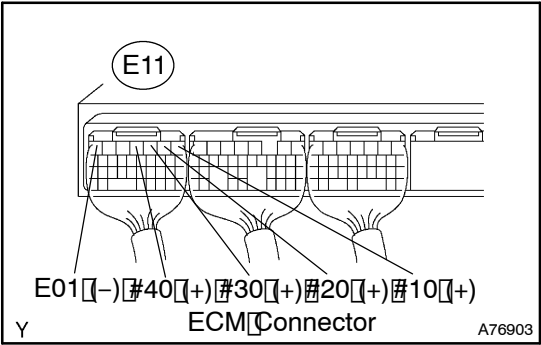


This wiring diagram illustrates the electrical system for the 1997-2000 Ford F-150 4.6L V8 engine. The diagram is organized into several functional blocks:

- Ignition Switch (I14):** Features terminals AM2 and IG2. The IG2 line (B-R) provides power to the Ignition (IH) and Ignition Lock (IL) solenoids in the Instrument Panel J/B.
- Instrument Panel J/B:** Contains terminals 6 (IH), 2 (IH), 3 (IP), and 16 (IL). It also shows the Ignition (IGN) solenoid.
- Engine Room R/B:** Contains terminals 2, 1, 2, 3, 2, 2, 2, and 2. It includes the AM2 solenoid, IG2 solenoid, and the IG2 Relay. The relay is controlled by the IG2 line from the Ignition Switch and provides power to the Ignition (IH) and Ignition Lock (IL) solenoids.
- Battery:** Connected to the main power line (W) and the FL (Fuel Line) terminal.
- Fuel Injectors (I5, I6, I7, I8):** Four injectors (No. 1, 2, 3, 4) are shown. Each injector has a solenoid controlled by a specific line (B, B-L, B-W, B-B) and a return line (R, R-L, R-W, R-B) connected to the ECM.
- ECM (Engine Control Module):** The central control unit, showing terminals #10, #20, #30, #40, E01, and E02. It is connected to the return lines of the fuel injectors and the E01 and E02 lines.
- Other Components:** The diagram also shows the W-R (Water Return) line, the W-B (Water Bypass) line, and the W (Water) line.

INSPECTION PROCEDURE

1 INSPECT ECM (#10, #20, #30 OR #40) VOLTAGE



- (a) Turn the ignition switch to ON.
- (b) Measure the voltage between the terminals of the E11 ECM connector.

Standard:

Tester Connection	Specified Condition
#10 (E11-1) – E01 (E11-7)	9 to 14 V
#20 (E11-2) – E01 (E11-7)	9 to 14 V
#30 (E11-3) – E01 (E11-7)	9 to 14 V
#40 (E11-4) – E01 (E11-7)	9 to 14 V

OK Go to step 7

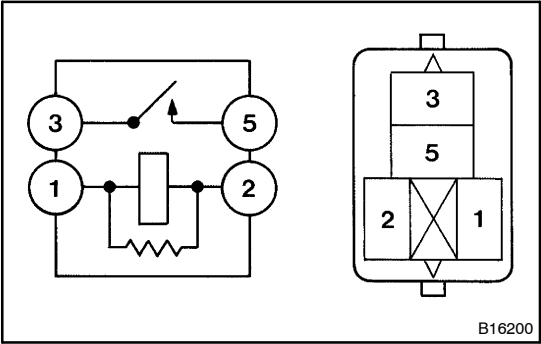
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2 INSPECT FUEL INJECTOR ASSY (CHECK RESISTANCE) (See page 11-8)

NG REPLACE FUEL INJECTOR ASSY

OK

3 INSPECT IG2 RELAY



- (a) Remove the IG2 relay from the engine room R/B and J/B.
- (b) Check the IG2 relay resistance.

Standard:

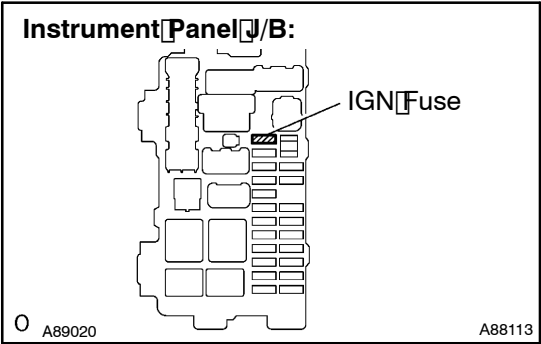
Tester Connection	Specified Condition
3 – 5	10 kΩ or higher
3 – 5	Below 1 Ω (Apply battery voltage to terminals 1 and 2)

- (c) Reinstall the IG2 relay.

NG REPLACE IG2 RELAY

OK

4 CHECK FUSE (IGN FUSE)



- (a) Remove the IGN fuse from the instrument panel J/B.
- (b) Check the IGN fuse resistance.

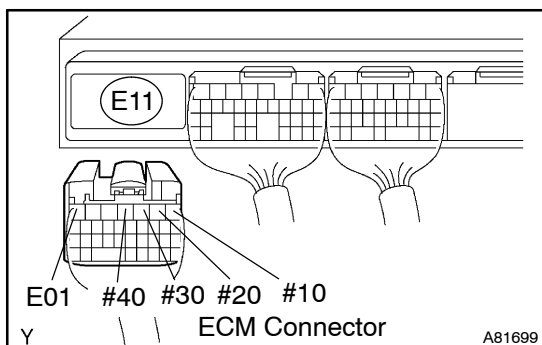
Standard: Below 1 Ω

- (c) Reinstall the IGN fuse.

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**CHECK FOR SHORT IN ALL HARNESSES AND COMPONENTS CONNECTED TO FUSE**

OK

**5 CHECK HARNESS AND CONNECTOR OF MISFIRING CYLINDER(INJECTOR - ECM, INJECTOR - IG2 RELAY)**

(a) Check the harness and connectors between the injector and ECM.

- (1) Disconnect the I5, I6, I7 or I8 injector connector.
- (2) Disconnect the E11 ECM connector.
- (3) Check the resistance.

**Standard (Check for open):**

Tester Connection	Specified Condition
Injector (I5-2) - #10 (E11-1)	Below 1 $\Omega$
Injector (I6-2) - #20 (E11-2)	Below 1 $\Omega$
Injector (I7-2) - #30 (E11-3)	Below 1 $\Omega$
Injector (I8-2) - #40 (E11-4)	Below 1 $\Omega$

**Standard (Check for short):**

Tester Connection	Specified Condition
Injector (I5-2) or #10 (E11-1) - Body ground	10 k $\Omega$ or higher
Injector (I6-2) or #20 (E11-2) - Body ground	10 k $\Omega$ or higher
Injector (I7-2) or #30 (E11-3) - Body ground	10 k $\Omega$ or higher
Injector (I8-2) or #40 (E11-4) - Body ground	10 k $\Omega$ or higher

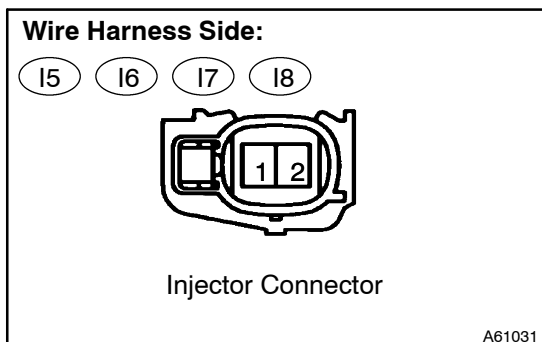
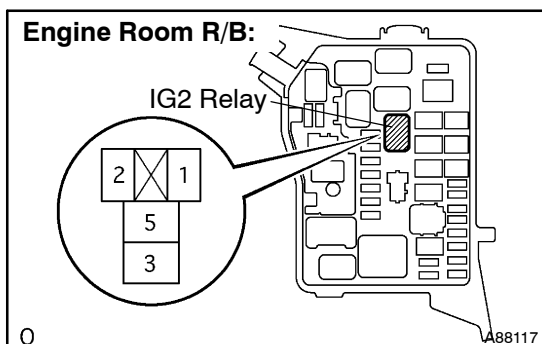
- (4) Reconnect the injector connector.
- (5) Reconnect the ECM connector.

(b) Check the harness and connectors between the injector and IG2 relay.

- (1) Disconnect the I5, I6, I7 or I8 injector connector.
- (2) Remove the IG2 relay from the engine room R/B.
- (3) Check the resistance.

**Standard (Check for open):**

Tester Connection	Specified Condition
Injector (I5-1) - Engine room R/B (IG2 relay terminal 3)	Below 1 $\Omega$
Injector (I6-1) - Engine room R/B (IG2 relay terminal 3)	Below 1 $\Omega$
Injector (I7-1) - Engine room R/B (IG2 relay terminal 3)	Below 1 $\Omega$
Injector (I8-1) - Engine room R/B (IG2 relay terminal 3)	Below 1 $\Omega$



Standard (Check for short):

Tester Connection	Specified Condition
Injector (I5-1) or Engine room R/B (IG2 relay terminal 3) - Body ground	10 kΩ or higher
Injector (I6-1) or Engine room R/B (IG2 relay terminal 3) - Body ground	10 kΩ or higher
Injector (I7-1) or Engine room R/B (IG2 relay terminal 3) - Body ground	10 kΩ or higher
Injector (I8-1) or Engine room R/B (IG2 relay terminal 3) - Body ground	10 kΩ or higher

- (4) Reconnect the injector connector.  
(5) Reinstall the IG2 relay.

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REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6 CHECK HARNESS AND CONNECTOR (IGNITION SWITCH - IG2 RELAY)

Wire Harness Side:

Ignition Switch Connector

I14

1 2 3 4

5 6 7 8

IG2

Front View

A61075

- (a) Disconnect the I14 ignition switch connector.  
(b) Remove the IG2 relay from the engine room R/B.  
(c) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
IG2 (I14-6) - Engine room R/B (IG2 relay terminal 1)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
IG2 (I14-6) or Engine room R/B (IG2 relay terminal 1) - Body ground	10 kΩ or higher

- (d) Reconnect the ignition switch connector.  
(e) Reinstall the IG2 relay.

Engine Room R/B:

IG2 Relay

1 2

5 3

0

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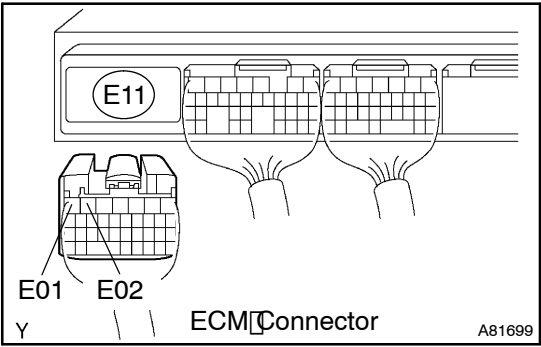
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REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK ECM POWER SOURCE CIRCUIT (See page 05-399)

7 INSPECT ECM



- (a) Disconnect the E11 ECM connector.  
(b) Check the resistance.

Standard (Check for open):

Tester Connection	Specified Condition
E01 (E11-7) - Body ground	Below 1 Ω
E02 (E11-6) - Body ground	Below 1 Ω

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REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

8 INSPECT FUEL INJECTOR ASSY (CHECK FUEL INJECTION VOLUME)  
(See page 11-8)

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REPLACE FUEL INJECTOR ASSY

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE  
(See page 05-262)