

# Troubleshooting & Electrical Checks

## *Troubleshooting*

Check the following areas if the engine is not starting:

- Power at the fuel pump fuse/relay (Note: Do not replace the fuse with a higher amperage fuse as this will induce further problems.)
- A good ground from the fuel pump to chassis
- Fuel in the tank (Is the tank damaged or bent upwards near the reservoir well causing restriction of fuel flow to the filter/pump?)

## *Electrical Checks*

Include a circuit integrity check and proper power and ground testing.

### *Testing for System Voltage*

Test battery open circuit voltage for reference.

- Connect the meter red (+) lead to the Battery Positive Terminal.
- Connect the meter black (-) lead to the Battery Negative Terminal.
- Record Voltage with no electrical loads on the vehicle.
- System voltage should be 12.6 volts or above. If voltage is less than 12.6 volts, further testing of the battery and charging system is indicated.



(continued)

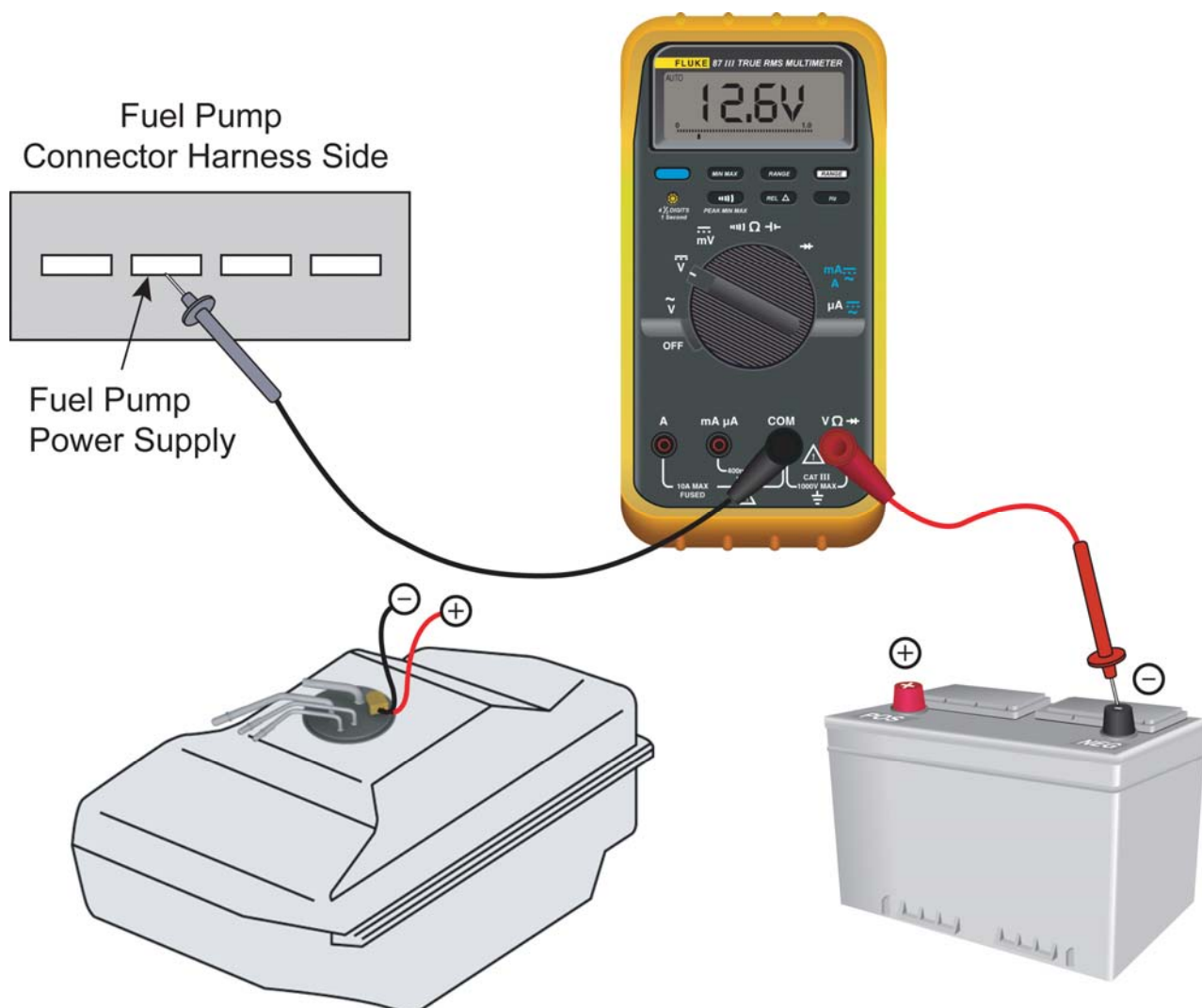
# Troubleshooting & Electrical Checks (continued)

## Electrical Checks (continued)

### Open Circuit Voltage Test

Using factory service information or equivalent, locate the Fuel Pump supply circuit.

- Disconnect the fuel pump connector and connect the meter red (+) lead to the fuel pump power supply connector cavity.
- Connect the meter black (-) lead to the Battery Negative Terminal or known good ground.
- With the ignition in the ON position, the reading should be open circuit battery voltage. If the reading is less, check for resistance in the power supply circuit to the fuel pump.



# Troubleshooting & Electrical Checks (continued)

## Electrical Checks (continued)

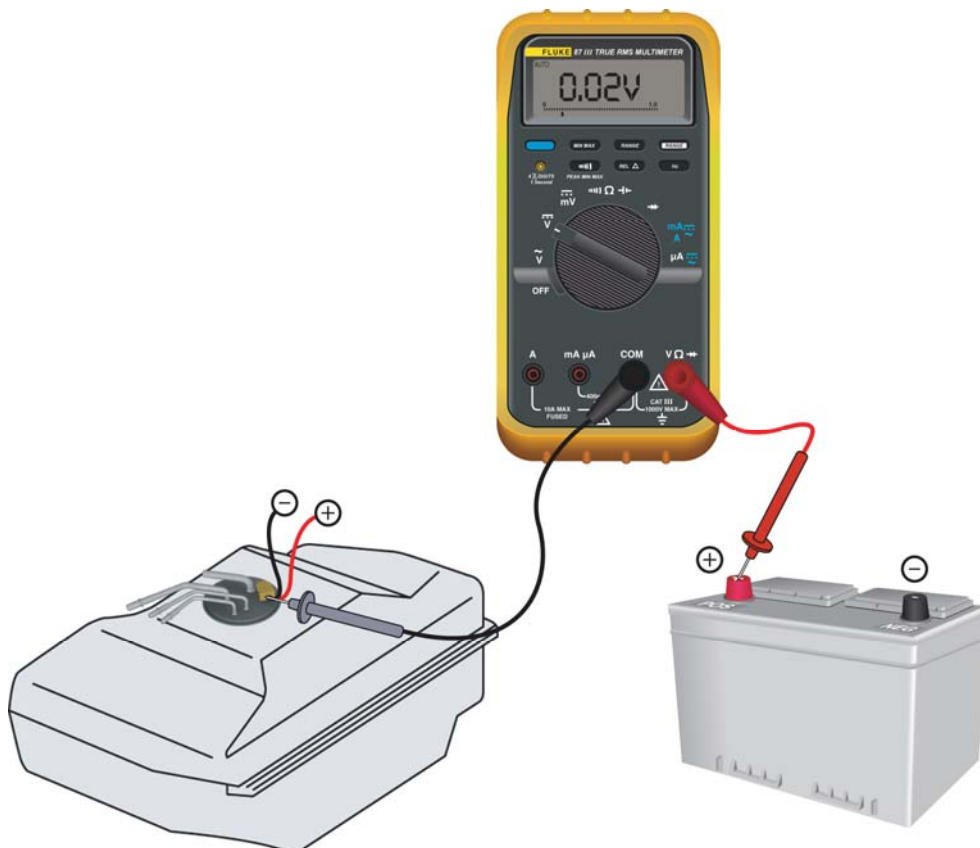
### *Voltage Drop Testing*

Test both the power and ground circuits for voltage drops. Ideally these circuits should have voltage drops less than 0.2v DC each.

### **Voltage Drop Power Side:**

- Set your meter to 20v DC scale or DC on meters with auto-range capabilities.
- Connect the meter red (+) lead to the Battery Positive Terminal.
- Connect the meter black (-) lead to the power feed wire at the fuel pump connector.
- With the ignition in the ON position, the reading should be less than 0.2v DC. If the reading is greater, check for resistance in the power supply circuit to the fuel pump.

**NOTE:** Pumps only run for approximately 2 seconds while the relay is energized to prime the system or until an RPM signal is received.



# Troubleshooting & Electrical Checks (continued)

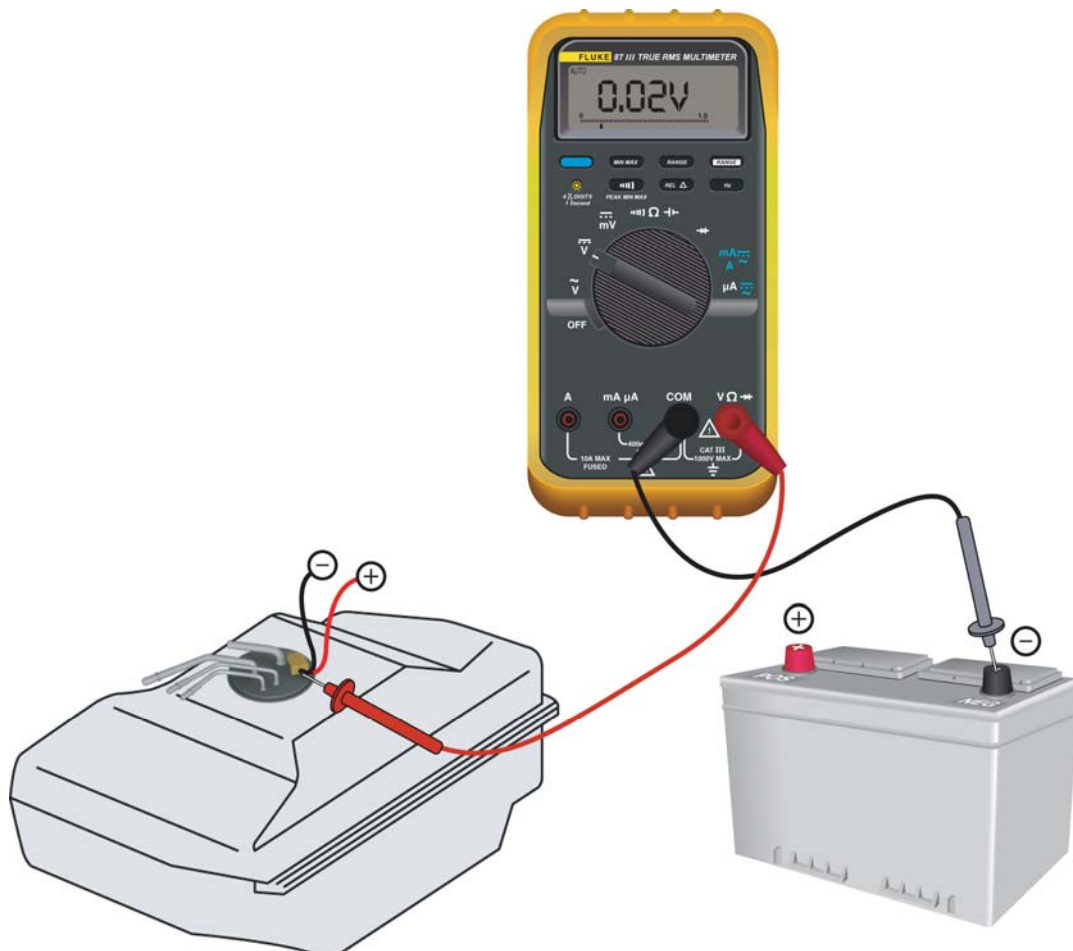
## Electrical Checks (continued)

### Voltage Drop Testing (continued)

#### Voltage Drop Ground Side:

- Set your meter to 20v DC scale or DC on meters with auto-range capabilities.
- Connect the meter red (+) lead to the ground wire at the fuel pump connector.
- Connect the meter black (-) lead to the Battery Negative Terminal.
- With the ignition in the ON position, the reading should be less than 0.2v DC. If the reading is greater, check for resistance in the ground circuit to the fuel pump.

**NOTE:** Pumps only run for approximately 2 seconds while the relay is energized to prime the system or until an RPM signal is received.





TECHSOURCE

### ***Fuel Pump Noise/Vibration in Tank***

Often, fuel pump noise that did not exist prior to pump replacement has more to do with installation than it does with the pump installed. Proper installation and mounting are key.

Perform the following steps to prevent noise and vibration after pump installation:

- Read the installation instructions.
- Use all the necessary hardware and mounting gear provided in the package.
- Inspect your repair prior to reinstalling the fuel tank.
- Verify that none of your lines are bent or grounded (rubbing against other metal parts of the vehicle).
- Verify that all sound-deadening materials and insulation are reinstalled during completion of the repair (replace as needed if damaged or missing).

It has been found that most noise complaints stem from metal-to-metal contact between the pump and related components.



TECHSOURCE

## Extending the Life of the Fuel Pump

Most carmakers today no longer specify a replacement interval for the fuel filter. Those that do so will typically specify a replacement interval of once every five years or 50,000 miles.

Some manufacturers don't recommend replacing the filter during the first 100,000 miles of "normal" driving. If you wait that long to change the fuel filter, you may be asking for trouble. The situation may be worse if vehicle owners buy gas from off brand stations, use gas with alcohol in it or if the vehicle is more than six or seven years old and may have developed rust or scale in the tank.

It is a good practice to replace the filter at least every two years or 24,000 miles. A contaminated filter can restrict fuel flow from the car's fuel pump, eventually taking a toll on pump life. Frequent filter replacements remove all doubt about whether the filter will cause other problems down the road.

Fuel injection filters clean the fuel whenever the pump runs (unless the fuel system is a "returnless" design without a self-contained filter).

On a conventional system, fuel moves continuously up the supply side, through the filter to the fuel rail or throttle body. The fuel that doesn't make it through the injectors returns to the tank. The whole process then starts over again. With a full tank of gas, the fuel in the tank will be filtered many times before it is all consumed.

Due to continued contamination problems throughout the country, filtration designs are continually being improved. In fact, some OEMs have enhanced the filtration to twice what it was just a short time ago. In addition, the latest high-pressure "gerotor" pumps require tighter filtration to prevent a short life cycle. To protect these pumps, some OEMs have tightened their overall filtration requirements.

With the latest offerings in returnless fuel systems, filter service is not suggested as a separate service item like it was in the past. Some applications service the filter unit as a non-replacement item. These units require a total fuel pump modular replacement with built-in regulator and filtration. Since this is a direct emission item, look for more and more of these units to appear on the next generation of automobiles.

***SERVICE NOTE:*** *It is strongly recommended that the fuel filter and fuel strainers (if equipped) be replaced at the time pump service is being performed.*



## Where is the Fuel Filter?

Fuel filters are located in many different locations on the vehicle depending on the manufacturers design and needs. See vehicle service information for particular locations.

In some cases, you will not have a serviceable fuel filter on the vehicle. Newer vehicles have incorporated the fuel filter into the Modular Reservoir Assembly (MRA). These filters are currently not available for service, but rather have been designed to 8 times the filtering capacity of the filters previously used in gasoline-injected systems. For service purposes, filtering capacity refers to the ability of the filter to hold and store fuel contaminants.

	<b>New In-Tank Filter</b>	<b>Previous In-Line Filter</b>
<b>Filter Capacity</b>	12 grams	1.5 grams (Approximately)
<b>Filter Efficiency</b>	10-12 Microns @ 98%	10-12 Microns @ 98%
<b>Filter Media</b>	Multiple Depth Media Layers and Cellulose Media	Cellulose Media
<b>Serviceability</b>	Possible, but no service parts are available at this time.	Yes

Improved filter capacity ratings are due to the addition of depth media layers. The outside media layer provides coarse filtering (capacity) while the inside media layers provides fine filtering (efficiency).

## Where is the Fuel Filter? (continued)

At the present time, the fuel filter, strainer and fuel pressure regulator are not serviceable. This is primarily due to issues with obtaining an accurate diagnosis of these parts while they are still on the vehicle.



*High-Capacity In-Tank Filter*



*Standard Fuel Filter  
(Cut-Away View)*