COMMON CAUSES OF ELECTRIC IN-TANK FUEL PUMP FAILURES

CONTAMINATED FUEL

Fuel tank contamination is the number one cause of in-tank electric fuel pump failures. This contamination is often the result of moisture in the fuel tank leading to fuel tank oxidation, causing rust to form in the fuel tank. The rust is then ingested by the fuel pump, ultimately bringing about pump failure.

A widespread misconception is that the fuel pump strainer or sock on the inlet side of the fuel pump will prevent these contaminates from entering the pump. WRONG! Fuel pump strainers will not stop moisture or particles of contamination smaller than 70 microns (on average). Why not simply use a finer filter strainer and eliminate these problems? If a strainer was made fine enough to keep out all of the contaminates and still allow proper fuel flow volume, it would be too large to fit in the fuel tank. The strainers used today are a middle-of-the-road balance between allowing adequate fuel flow and maximum fuel filtering. Original Equipment and Aftermarket replacement pumps are built to supply high pressure fuel to injection systems and are engineered with the assumption of a clean, cool, fuel supply to the pump at all times.

Injection systems are even more sensitive to contaminants; that's why the industry standard is in-line fuel filters that capture, on average, particles approximately 30 microns or larger. Further downstream in the fuel system, fuel injector filters capture particles as small as 10 microns.

So it becomes obvious that any contamination in the fuel tank can cause premature fuel pump failure. (See TEC Bulletin #1620 for proper fuel tank removal and cleaning procedures.) If you find you are replacing a fuel pump that has a discolored strainer, properly dispose of the fuel you drained; it is contaminated too. If you put the same fuel back into the tank after the pump is replaced, you are reintroducing contaminants immediately! Always replace the fuel pump strainer and fuel filter with new units when replacing a fuel pump.

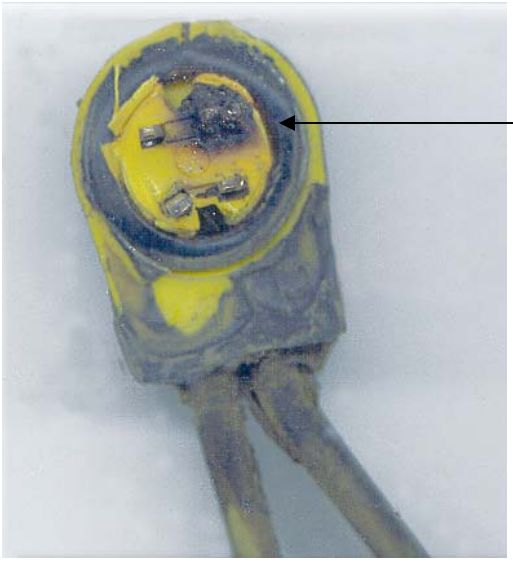
ELECTRICAL CONNECTIONS

Electrical connections are the second most common causes of fuel pump replacement. In reality, the fuel pump is still quite capable of providing pressure and flow well within specifications, but because of poor electrical connections the output is diminished, giving the appearance of a failed pump.

To identify fuel pump electrical problems, use a high quality digital volt/ohm/meter to test for voltage drops and continuity. This test must be done with the pump running. (See TEC Bulletin #1620 for how to test for voltage drop.) NOTE: In a 12-volt system, fuel pumps are designed to run at 13.5 volts. Maximum voltage drop of more than .2 volts will affect the fuel pump operation.

CHRYSLER APPLICATIONS:

The most common failure mode will be complete loss of continuity on most Chrysler applications. Some may have partial continuity loss, creating an excessive voltage drop. The pump will be energized, but not enough to fuel the system. Always inspect the electrical connections on the outside of the fuel pump hanger assembly and on the hanger to the fuel pump itself. If there is any evidence of a black sooty deposit, melted wires/connectors or eroded connector pins, the connector must be replaced.



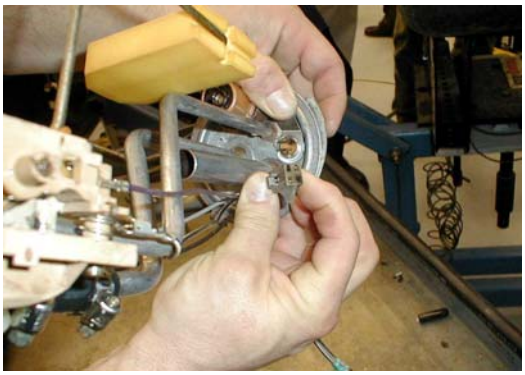
This terminal is on the underside of the connector attached to the hanger cover. Notice the black soot, evidence of arcing, at this terminal

An overheated electrical connector

Carter® Part No. 888-159 Hanger Assembly Wire Harness
1991-93 Dodge Caravan and Plymouth Voyager FWD 3.0 and 3.3 V6

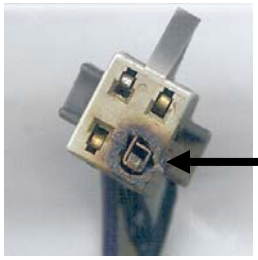
GENERAL MOTORS APPLICATIONS:

On GM applications from the mid-1980s to late 1990s the most common failure mode of electrical connections is a partial loss of continuity. In some cases a total loss of continuity may occur. An inspection of the connector between the pump and the underside of the hanger must be made. If there is any evidence of a black sooty deposit, melted wires/connectors or eroded connector pins, the connector must be replaced.

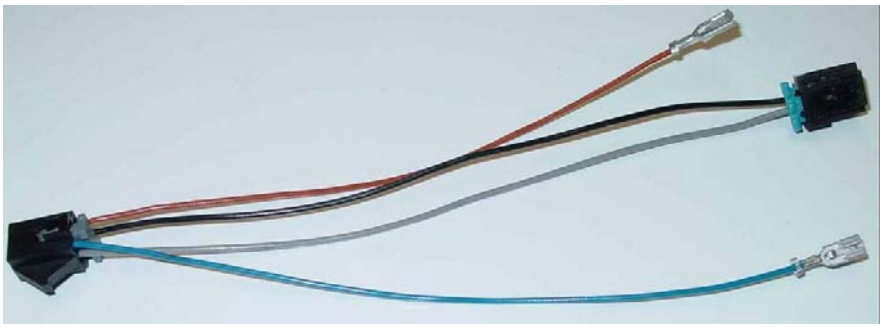


Inspecting the hanger wire connections

Notice wire insulation is only melted close to connector



Melted connector caused by heat generated from arcing at connection



Carter Harness Part No.888-536

Carter's solution to the issue of electrical continuity in GM connectors is our "Problem Solver" electrical harness, part no.888-536. This connector contains the modular plug and wire terminals that can be easily installed on the hanger, replacing the failed harness that contributed to the original pump failure. SEE CARTER FUEL TECH SOLUTION #1 for additional information.

It is recommended to always replace these connectors when replacing the fuel pump for two reasons. The first is the high failure rate of connectors. The second is because you can only test the connections while the pump is running in fuel, however the hanger assembly must be removed from the tank to access the test points. Removing the pump from the fuel prevents a proper test. *DO NOT ATTEMPT TO RUN A FUEL PUMP IN FUEL OUTSIDE OF THE GAS TANK FOR TESTING.*