USMW
PROFESSIONAL SERIES
A US Motor Works Brand

CERTIFIED • OEM QUALITY • RELIABILITY

SUCCESS IN FUEL DELIVERY SYSTEMS

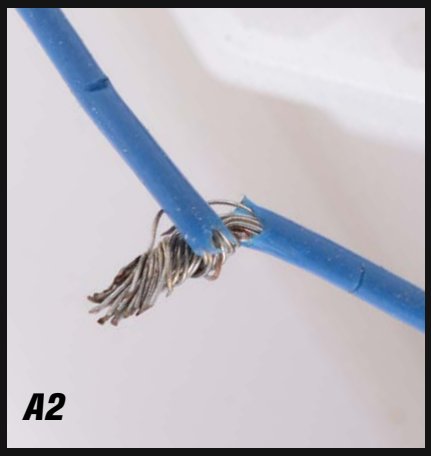
PART 3

USMW PROFESSIONAL SERIES
A US Motor Works Brand

WARRANTY EXCLUSIONS

- ***A.*** Modified parts
- ***B.*** Broken parts
- ***C.*** Dark, clogged, or contaminated strainers
- ***D.*** Units with corrosion, rust, or discoloration from contamination
- ***E.*** Units with burned wiring or connector
- ***F.*** Units showing severe damage from lack of lubrication or maintenance

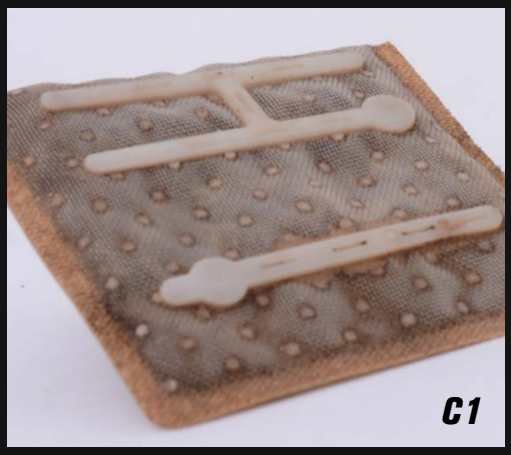

A1


A2

US Motor Works warrants products to be free from defects in material and manufacturing, under normal use and service. The following images are indications of damage caused by improperly maintained systems and modifications.


B2 ***Over Torqued***


B1


C1


D1

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E1


E2


F1

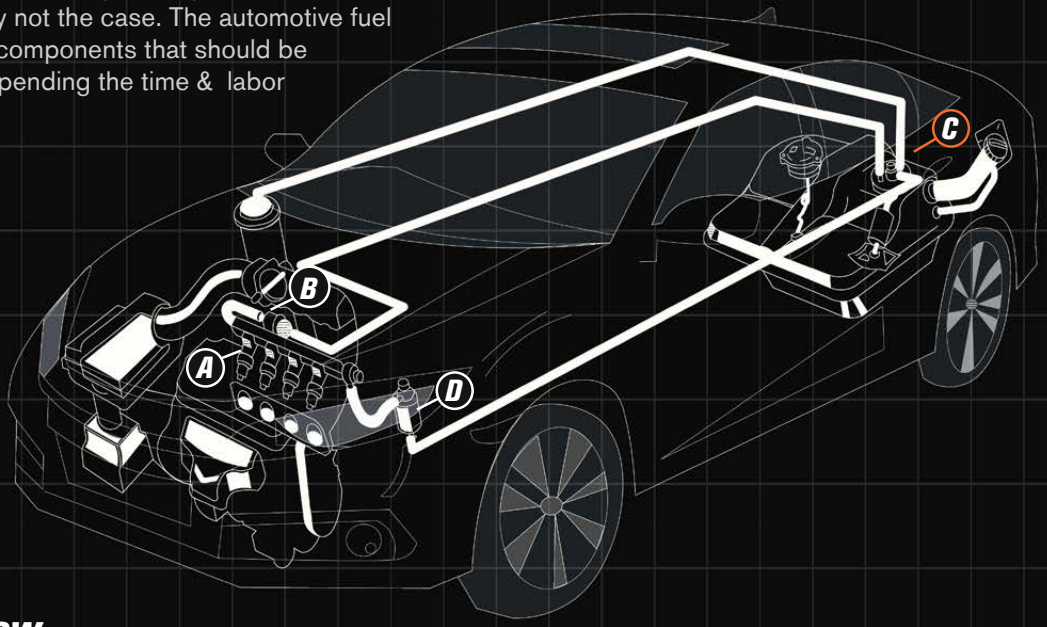

F2

BEST PRACTICES

TROUBLESHOOTING YOUR FUEL SYSTEM & REPLACING YOUR FUEL PUMP

Low fuel pressure and low fuel flow-rate at the engine are the most common characteristics that are found in a faulty fuel system. It is a common misconception that these are caused by a faulty fuel pump or fuel pump module, which is usually not the case. The automotive fuel system is made up of several components that should be checked and tested before expending the time & labor to replace the fuel pump.

A. Fuel injectors
B. Fuel pressure regulator
C. Fuel pump
D. Fuel filter



Fuel System Overview

The fuel system begins with power being sent to the ECU from the battery.

With a low or dead battery, lack of proper voltage to the system may cause the vehicles electric fuel pump to appear as if it has stopped working.

This power distribution is normally switched on by a relay or controlled directly by the ECU.

The wires from the relay or ECU carry the power to the fuel pump. These wires may have several connections before actually reaching the fuel pump.

The fuel pump is the heart of the fuel system! Its job is to deliver fuel from the tank to the engine.

The fuel pump sends fuel out of the fuel tank at the proper flow rate and correct pressure for the engine to run at all RPMs and throttles positions.

Depending on the type of fuel system that the vehicle has, (return vs. non-return) there will be differences in configuration at this point.

For return type fuel systems, the fuel will be pumped through fuel lines and an external fuel filter before reaching the engine.

For non-return type systems, the fuel will be pumped through a built in pressure regulator contained in the module, and then through the fuel lines and external fuel filter before reaching the engine.

Once at the engine the fuel is fed into the fuel rails or throttle body before being supplied to the fuel injectors.

At this point we will also see additional differences between a return and non-return type fuel system.

For a return type fuel system, the fuel pressure regulator will be found after the fuel rail.

An additional fuel line will “return” bypassed fuel from the pressure regulator back to the fuel tank.

On a non-return fuel system, there will only be a feed line to the fuel rail.

There is no additional return line back to the tank since the fuel pressure has already been regulated at the fuel pump module before reaching the engine.

SAFETY FIRST!

A. Work on a level surface

B. Use safety stands for support, not a jack

C. Keep an ABC fire extinguisher close by

D. Wear approved safety glasses

E. Work in a well-ventilated area

F. Do not smoke or allow open flames near vehicle

G. Disable fuel pump before servicing by removing fuse or battery cables

H. Relieve fuel system pressure before servicing pump

WARNING!

Gasoline is extremely flammable, so take extra precautions when you work on any part of the fuel system. Don't smoke or allow open flames or bare light bulbs near the work area, and don't work in a garage where a natural gas appliance is located. Gasoline is also carcinogenic, take the proper precautions and wear latex gloves when spills are possible. If fuel does come into contact with your skin, rinse it off immediately with soap and water. Mop up all fuel spills and do not store any fuel-soaked rags where they could ignite.

FUEL

This is the first thing you should check if you are having problems with your fuel delivery system. Make sure that your fuel tank is at least ½ full of fuel when diagnosing any fuel delivery problems.

VOLTAGE

This is the second thing to check when you are having issues with fuel delivery. Without the proper voltage reaching the fuel pump you will immediately have a low or no flow and/or pressure situation. It is important to check the voltage drop directly at the fuel pump connector. There should be less than .5 volt voltage drop from the battery to the positive fuel pump terminal.

Things to check if you find no or low voltage at the pump connector:

A. Check that battery and alternator are in proper working condition

B. Verify that ECU is properly functioning

C. Check fuel pump fuse

D. Check fuel pump and/or ASD relay for proper function

E. Check wiring harness for loose or broken connections

F. Check fuel pump ground location for good contact

FLOW

Next thing to check is to see that the fuel pump is actually sending fuel out of the tank. You can verify this by removing the test port cover from the fuel rail or disconnecting the fuel line from the in-line filter. Switch the ignition to the "ON" position and the fuel pump should operate for a few seconds. At this time you can look at the disconnected fuel line or open test port to verify if there is any flow from the fuel pump.

Some common causes of low or no flow other than a faulty fuel pump are:

A. Leak in the fuel line

B. Clogged fuel line

C. Clogged in-line filter

D. Crimped or smashed metal fuel lines

PRESSURE

After you have confirmed that you have flow in the fuel system then you can move on to checking if there is proper pressure in the system. The best way to check fuel pump output pressure is to connect a pressure gauge to the fuel pump output line before the in-line fuel filter. This will allow you to test the direct output pressure of the fuel pump without additional components in the system such as a fuel pressure regulator.

Some common reasons for low pressure other than a faulty fuel pump are:

A. Low voltage at the pump

B. Bad fuel pressure regulator

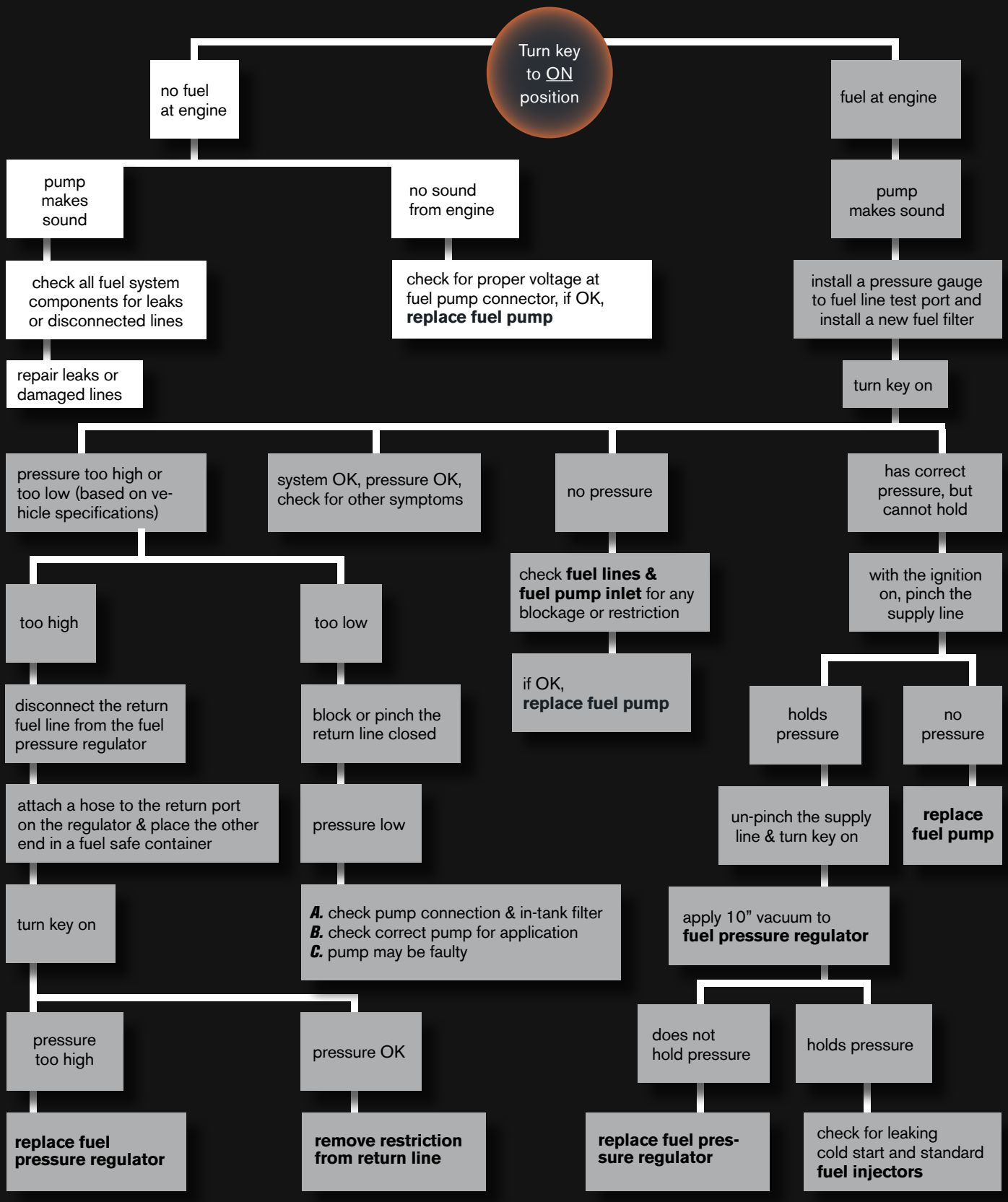
C. Clogged in-line fuel filter

D. Leaking injectors

E. Leaking fuel line connectors

F. Clogged or damaged fuel lines

SYSTEM TROUBLESHOOTING



Keep your work area clean!

The number 1 cause of fuel pump failures is from fuel pump contaminants such as dirt, rust, & moisture.If the fuel system is not cleaned, then these contaminants will cause the replacement fuel pump to fail prematurely. Make sure to clean your fuel tank & keep your work area clean to prevent this type of contamination.

FUEL PRODUCTS

The ***USMW*** line can handle all of your fuel system needs with pumps containing high quality, economically minded fuel system components. All products are built to OE Standards for fit, form and function.

Our engineering team has reviewed failure points of many OE units, and has made improvements for a long life of trouble-free performance in your fuel system.
Our direct-fit replacement pumps, modules and hanger assemblies are built using modern materials that are compatible with today's fuel blends.

UNIVERSAL FUEL PUMPS

Our universal fuel pumps are compatible with a range of modern fuels, for carbureted and fuel injection applications.

FUEL PUMP KITS

USMW uses OE style fuel pumps rather than less expensive turbine units (where applicable). This ensures quality and performance that meets or exceeds OE standards.

A. New wiring
B. New strainer
C. New fuel lines

FUEL PUMP MODULES

A. Drop-in replacement
B. OE style internal fuel pumps
C. Palladium silver fuel level sensor
D. Made with modern materials that are compatible with today's fuel blends

MECHANICAL FUEL PUMPS

All mechanical fuel pump kits include gaskets and hardware necessary for installation.

GDI HIGH PRESSURE FUEL PUMPS

All GDI replacement pumps include O-ring or gasket where applicable.

Regular oil changes using quality oil and filters, will ensure a long life of trouble free operation.

STRAINERS

Quality made strainers help protect your fuel pump from contamination, this helps ensure longer lasting fuel pump performance.