

Fuel Zapp FSA

1 Fuel Pressure Gauge



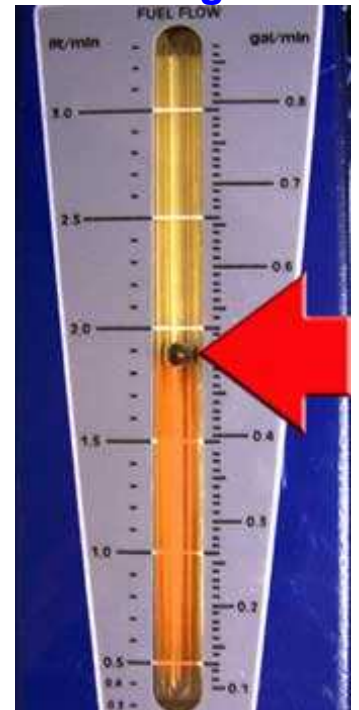
2 Engine Vacuum Gauge



3 Exhaust Pressure Gauge



4 Fuel Volume Gauge



1 Fuel Pressure Gauge



The fuel pressure gauge is calibrated in both psi (0-100) and bar (0-7). Use it as you would any other fuel system pressure gauge.

2 Engine Vacuum Gauge



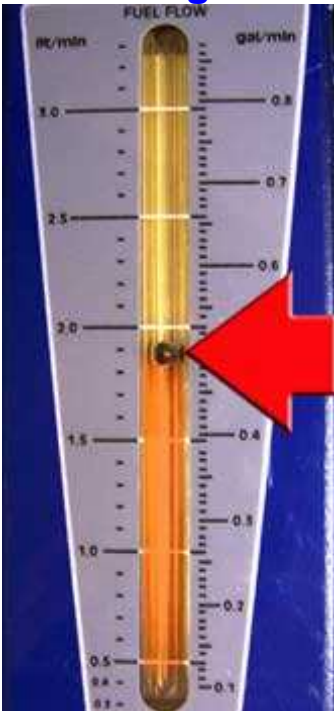
The **manifold vacuum gauge** is calibrated in both inches of mercury (0 to 30) and kPa (0 to 100).

3 Exhaust Pressure Gauge



The **exhaust pressure gauge** is calibrated in psi (0-15) and kPa (0-100). Use the special adapter included in the kit to to sample exhaust backpressure.

4 Fuel Volume Gauge



Arguably its most distinguishing feature, the Fuel Zapp flow meter contains a clear tube, calibrated to measure fuel flow in both liters/minute (0.3-3.3) and gallons per minute (0.1-0.87).

When connected to the vehicle fuel system, fuel flow to the injector rail passes through the Fuel Zapp. As it does, it raises a floating ball inside the clear flow tube. The point at which the ball height intersects the scale indicates fuel flow volume.

This fuel system is delivering about one half gallon per minute (almost two liters per minute). This is equal to about one ounce per second, more fuel than most systems need, even when the injectors are open to the max!

While not shown here, the pressure gauge on this vehicle showed system pressure being regulated at its recommended level. With both fuel pressure and volume at recommended specs, we know this system is supplying enough fuel for all engine operating conditions.

Use the clear tube to identify air bubbles, water, or floating debris in the fuel.

5 Pinch Pliers



Use these plastic locking pinch pliers to create a calibrated restriction for some flow tests, and for sealing off fuel lines when testing system rest pressures.

6 Hose Adapters



Screw this adapter into the exhaust in place of an oxygen sensor to sample exhaust backpressure. Any readings greater than 1 psi at idle or 3 psi at 2500 rpm, suggest a clogged exhaust.



All adapters are fitted with quick disconnect couplers for quick installation on the main Fuel Zapp test hoses.



Vacuum gauge and exhaust pressure gauges have barbed nipples for a secure sample hose fit.



Screw-in and banjo fitting adapters are also included for vehicles that require them.



The kit includes hose adapters to fit most common fuel line quick connects, as well as three “universal” hose diameters for systems with clamp-on hose connections.

Fuel Zapp Q&A

1) What kind of fuel systems can be tested?

Use the tester on conventional gas fuel injection systems operating at pressures below 100 psi. The tester can also be used to test supply pump pressures below 100 psi in diesel and gasoline direct injection (GDI) vehicles. Do not use the tester for any fuel other than gasoline, E85, or diesel; do not attempt to test any fuel system or part of a system where pressure exceeds 100 psi. Doing so is dangerous and will damage the tester.

2) Is the Fuel Zapp guaranteed?

The unit comes with a three year guarantee, and that includes the tester's two fuel tube Viton® seals. If you have an old fuel system analyzer that sprung multiple leaks like mine did, this is important! Thompson Auto Labs told us that after the warranty period, flow tubes and seals will both be available for the Fuel Zapp as repair parts.

3) Are there any special safety concerns when using this tester?

Fuel is flammable, especially fuel under pressure! Always wear approved safety gear, including eye protection, whenever you open a fuel system for testing; and make sure your fire extinguisher is properly rated, fully charged, and accessible in an instant. No smoking; no sparks; no lightning strikes. You know the drill!

4) How Do I Know If Volume is Sufficient?

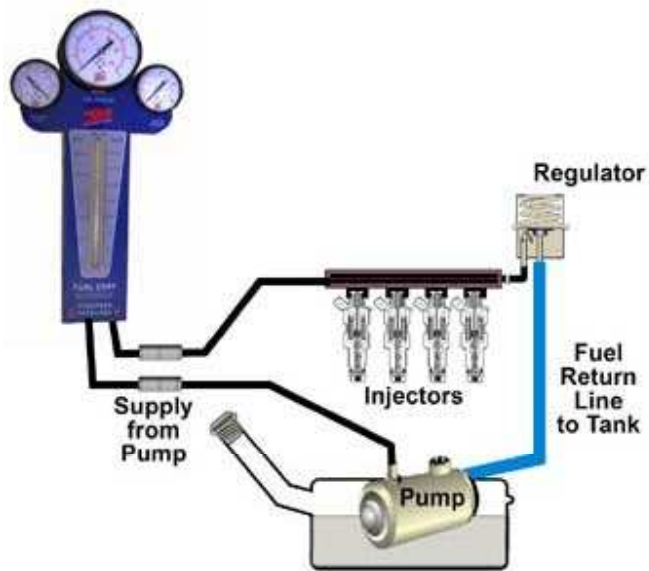
Rule of thumb: most passenger vehicle gas fuel injection systems that deliver 0.5 gallon per minute, or more — while maintaining correct rail pressure — are good. If you want a more accurate number for reference, the Fuel Zapp includes a CD with a fuel delivery calculator. Just enter the engine displacement in cubic inches or liters, and the maximum engine rpm. The calculator does the rest, providing you with all the information about how much air and fuel are required for any engine displacement at a given rpm.



Our example shows a 3.0L engine operating at 5500 rpm. The calculator tells us that the system must provide 0.25 gallon per minute at this speed. If the fuel system flows 0.5 gallon per minute—at the correct pressure—it's providing twice the engine's maximum consumption at peak engine speed; clearly enough for all operating conditions.

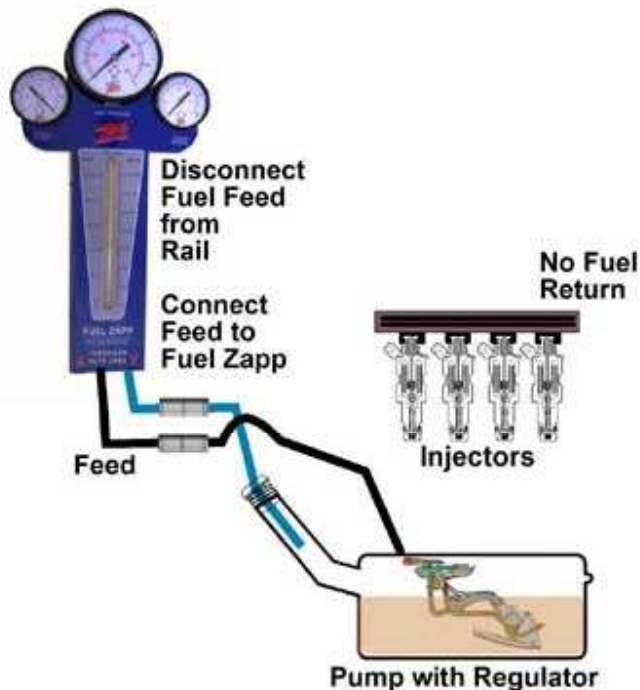
The CD also includes a volumetric efficiency calculator, plus a lambda calculator authored by Jay Nardolillo. For more on using the lambda calculator, see Sam Bell's article, [Lambda](#), the **May** issue of [Autofixworld.com](#).

Can I Test Fuel Loops?



Yes, just connect the Fuel Zapp in series at the fuel loop supply. Engine off, activate the fuel pump and measure the fuel pressure and volume.

Can I Test Returnless Fuel Systems?



Returnless fuel systems can also be tested, but require a slightly different approach. Some returnless systems use a spring/diaphragm regulator located inside the fuel tank. To test these, disconnect the fuel supply line from the fuel rail and connect it to the Fuel Zapp inlet hose.

(Note: On some returnless systems, you can simply connect the Fuel Zapp inlet hose to the test port on the fuel rail, using a special adapter supplied in the Fuel Zapp test kit.) Run the Fuel Zapp outlet hose to a safe fuel container, or back to the vehicle fuel filler neck. (Basically, you're creating a fuel loop for test purposes.)

Using a scan tool, jumper wire, or other suitable power source, operate the vehicle electric fuel pump with the engine off; gradually restricting the vehicle fuel supply hose with a suitable clamping device. Watch the fuel gauge: when the Fuel Zapp registers the specified fuel system pressure, record the fuel flow and compare actual volume to vehicle requirements.

Note: An increasing number of vehicles have fuel pumps that run at different speeds, controlled by commands from the PCM. Pump speed may be limited at low load operating conditions by a simple ballast resistor.

Others, may run at infinitely variable speeds, controlled by pulsewidth modulated voltage signals. Identify these systems by type, and use appropriate procedures to operate the pumps at maximum speed during flow tests.

Some fuel pumps can be operated by a scan tool output or actuator tests, while others must be powered at the fuel pump relay or at some point in the wiring harness, by applying power and ground with jumpers or a Power Probe. Please consult a wiring diagram/schematic and OEM repair data before doing this.

Case Study

The Thompson Auto Labs website has a user forum where Fuel Zapp owners and others can post their thoughts, and share case studies. One such case study at the site demonstrates how one tech test drives a problem vehicle while monitoring the Fuel Zapp. Test drives aren't practical for everyone and, although they are often an effective way to catch problems as they occur, we'll caution that road testing is riskier than tests performed inside the shop. Test pilots should file a flight plan, and take a designated driver, mobile phone, and fire extinguisher. Stuff happens.

A Closer Look at Fuel Line Adapters Included with the Fuel Zapp



European Adapters

14x1

16x1.5



Ford 1/2 inch



Ford 3/8 inch



Chrysler/GM



Chrysler/GM



Fuel Rail Test Port Adapter



Plain Hose Adapters (6.0, 7.5, and 9.5 mm)

Fuel Zapp Overview

1. Test gasoline fuel systems.
2. Test flex fuel systems
3. Test diesel fuel supply pumps
4. Gauges and flow meter are mounted in an all metal body
5. Flow tube made is shatter-proof polycarbonate
6. Wide assortment of fuel line adapters
- 7) Fuel pressure gauge
- 8) Fuel volume gauge
- 9) Vacuum gauge
- 10) Exhaust Backpressure gauge
- 11) Fuel Volume, Volumetric Efficiency, and Lambda calculator software.
- 12) 3 year warranty

Kit Contents

- Fuel Zapp Pressure and Flow Meter
 - Diagnostic Testing Manual
- TA Labs Fuel Volume Calculator Software
 - (2) Locking Hose Crimping Pliers
 - FTC-14.1 Female Thread Connector
 - FTC-16.15 Female Thread Connector
 - HFL-6 Adapter Hose
 - HFL-75 Adapter Hose
 - HFL-95 Adapter Hose
 - Ret-less Hose Connector RTL-1
 - Ret-less Hose Connector RTL-2
 - BF-10 Banjo Fitting
 - BF-12 Banjo Fitting
 - MTC-14.15 Male Thread Connector
 - GM/CHRYSLER 5/16" Snap-Lock Male Adapter
 - GM/CHRYSLER 5/16" Snap-Lock Female Adapter
 - GM/CHRYSLER 3/8" Snap-Lock Male Adapter
 - GM/CHRYSLER 3/8" Snap-Lock Female Adapter
 - FORD 1/2 " Snap-Lock Male Adapter
 - FORD 1/2" Snap-Lock Female Adapter
 - FORD 3/8" Snap-Lock Male Adapter
 - FORD 3/8" Snap-Lock Female Adapter
 - QC-8A Quick Connector
 - QC-8B Quick Connector
 - QC-95B Quick Connector
 - Adapt-BF Universal Banjo Adapter Fitting
- Adapt-EXH Threaded Exhaust Pressure Adapter
 - H-4 Hose
 - Blow molded case