WERKZEUG

Art. 1208-ww

Engine Fuel Pressure Gauge Set
0-8 bar

Information

- All purpose set with precision manometer: 0.03-8 bar with tolerance +-2%.
- For mechanic and electronic fuel injection systems.
- 30 adaptors make this set suitable for cars including:
Mercedes, BMW, Audi, Honda, Mazda, Renault, Peugeot etc.
- Makes checking of leak tightness easier, system and control pressure due to 3-way valve.
- Can be used for nearly all injection systems, e.g.: K-Jettronic, L/LH-Jetronic, Motronic, Motronic-Jetronic, MPFI, TBI, EFI, DIGIFANT 1/2, CIS-Digital, Weber CFI, Spi, Single point, Multipoint.

Precautions

Always wear safety gear.
Working in a clean and safe environment.
This task should be carried out by trained personnel.
Make sure to consult manufacturers manual.
Do NOT use with air tools.

Pre-Test Information

- Clean the connections before loosening as the system can be damaged if dirt gets inside.
- Wrap a cloth around the fittings when loosening in case of the fuel spilling.
- Ensure proper ventilation of gasoline and exhaust fumes.
- Use hose clamps with hose adaptors.
- Ensure all quick disconnect couplers snap into their proper position and that the locking sleeve is fully in the lock position.
- Ensure the battery is fully charged and the fuel supply is adequate.
- Use two wrenches to loosen and tighten fuel line to avoid damaging or twisting the fuel lines.
- Check the condition of the overall engine and fuel system as well as the tank filler cap and venting system.
- After testing, drain the tester of any excess fuel. Place the hose ends with adaptors into a container. Disconnect the gauge head. Any fuel remaining in the hoses and adaptors will drain.
- If a leak or spill occurs, switch off the ignition and disable the fuel pump. Clean immediately.

NOTE:
- There are two basic types of fuel injection systems:
1. Port Fuel Injection (PFI): uses separate injectors for the fuel to be supplied to each cylinder.
2. Throttle Body Injection (TBI): injects the fuel from a piston above the throttle plate on the intake manifold. There is a supply side for both systems which brings the fuel to the injectors, as well as a return side which brings the unused fuel back to the tank.

There are three ways to check fuel pressure:
1. Many vehicles with PFI have a special test port. Simply connect the proper adaptor to the gauge assembly. Thread the adaptor to the test port and run the test.
2. End of Hose Connection: Some older PFI systems have a flexible hose connection at the cold start injector. Connect the single barb fitting supplied in the set with a hose clamp to run the test. Some systems may have a fuel bolt or banjo type fittings as an access point.
3. In-Line Connecting: Installing the proper adaptors in series with the fuel line.

NOTE:
- Most vehicles require that you relieve the fuel pressure prior to entering or leaving the system.
- To relieve the pressure you may need to remove the fuel connector, relay, or fuse.
- Some models might have two fuel pumps. Ensure both are disabled. After they are disabled, run the engine until it stalls. Then, try to restart it for five to ten seconds. The system should now be ready for testing.
- Once the proper adaptors and gauge are in place, reactivate the fuel pump and run tests. When finished, repeat the above procedure before removing tester.

Basic Diagnosis

- **NOTE:** Fuel injected engines require accurate fuel pressure and adequate volume. Otherwise, the performance and the fuel economy can suffer. Check the correct pressure and volume prior to carrying out the procedure.
- Fuel is pumped from the tank to the fuel regulator and injectors, while the unused fuel is returned to the tank. The fuel regulator acts as a divider between the supply and return side.
- Pressure that is lower than recommended usually indicates a problem on the supply side of the circle. The causes may include a damaged or restricted fuel line, clogged fuel filter, defective fuel pump or regulator, or improper tank ventilation.
- Pressure that is higher than normal indicates a problem on the return side. The causes may include damaged or restricted fuel line, poor venting of the tank, or a defective fuel regulator.
- You can double check the problem areas on the return side by retesting.
i.e. Removing the faulty regulator. If the reading drops into the normal range, you can determine that the problem is further down the return line or the tank.
- When testing is complete, ensure the fuel line is reassembled correctly. Replace any o-rings or washers, follow the manufacturer's manual recommendations for proper torque on any bolts or connections. Check the system thoroughly for any leaks.

General Motors (Typical)
WARNING: The fuel system test begins first by checking the fuel injection system pressure. There may be high fuel pressure in the fuel lines and components. Relieve the fuel pressure prior disconnecting any fuel system components.

Fuel Pressure Check for TBI
Step 1
- Disconnect the negative battery cable. Remove the fuel filler cap. As the TBI contain an internal bleed-down feature, the system fuel pressure should dissipate after a short time.

Step 2
- Remove the air cleaner and plug the thermal vacuum port on throttle body. Always use two wrenches when removing the fuel line. Install the fuel pressure gauge and adaptor in fuel between the steel line and flexible hose.
WARNING: Do NOT pinch off the fuel return line completely. Do NOT exceed pressure build-up of more than 13 psi as the regulator may be damaged.

Step 3
- Start the engine and observe the fuel pressure reading. It should read 9-13 psi. If the fuel pressure is good, proceed to step 4.
- If the pressure is low, pinch off the fuel return line to fuel tank gradually. If the pressure is still low, check and replace the fuel filter or fuel pump if needed.
- If the pressure increases to more than 13 psi, replace the fuel pressure regulator.

Step 4
- Allow the fuel pressure to dissipate. Remove the pressure the gauge and reconnect fuel line. Start the engine and check for fuel system leaks.

Fuel Pressure Check for PFI
Step 1
- Disconnect the fuel pump at the rear body connector. Start and run the engine until it stalls. Switch on the starter for 3 seconds to remove the remaining fuel from the fuel lines. Reconnect the rear body connector.

Step 2
- Connect the fuel pressure gauge to the fuel pressure fitting on fuel rail.
- Reconnect the fuel pump.

Step 3
- Turn the ignition on with the gauge installed at the fuel rail connector. The pressure should read with specifications with the ignition on and the engine off.

Step 4
- Start the engine. The pressure should drop 3-10 psi.

Fuel Pressure Tests for FORD (Typical)
WARNING: High fuel pressure may be present in fuel lines and component parts. Relieve the pressure prior to attempting to open the system for testing or component replacement. Do NOT allow fuel to run onto the engine or electrical parts. Do NOT use an open flame while testing fuel system components.

Fuel Pressure Check for PFI
Step 1
- On 2.2L and 2.2L Turbo models, disconnect the fuel pump relay and start the engine to relieve the fuel line pressure. After the engine stalls, switch the ignition off. Reconnect the fuel pump relay.

Step 2
- For all other models, remove the fuel tank cap. Use the fuel pressure gauge, release the pressure from the system at the pressure relieve valve on the fuel injection manifold rail.

Step 3
- The fuel pump may be activated by grounding the fuel pump lead at the self test connector. Use a jumper lead and ground the FP terminal with the ignition on. This activates the fuel pump.
WARNING: Inspect the fuel system for leaks or damage before testing the fuel pump.

Fuel Pressure Test for TBI
Step 1
- Disconnect the wiring at the inertia switch. (The inertia switch is located behind the trim panel in the right rear side of the cargo area on Sable and Taurus station wagons, and behind the trim panel on the left side of the trunk on all other models). Crank the engine on for at least 15 seconds to reduce the system fuel pressure.

Step 2
- Disconnect the fuel supply line at throttle body. Install the in-line adaptor and fuel pressure gauge at the fuel filter. Reconnect the inertia switch and start the engine. Check the fuel pressure at idle and when accelerating the engine. The pressure should remain stable through the entire period of acceleration.

Step 3
- If gauge readings are correct, disconnect the inertia switch. Crank the engine for 15 seconds to reduce the fuel pressure. Remove the gauge and the in-line adaptor. Install the original fuel line and connect the inertia switch. Switch the engine on and check for fuel leaks.

Fuel Pressure Tests for Chrysler (Typical)
WARNING: The fuel system test begins first by checking the fuel injection system pressure. There may be high fuel pressure in the fuel lines and components. Relieve the fuel pressure prior disconnecting any fuel system components.

Fuel Pressure Release
Step 1
- The fuel pressure must be fully released prior to opening the fuel system or removing any fuel carrying components. To release the pressure in the tank, open the fuel tank cap slowly.

Step 2
- To release the remaining pressure in system, disconnect the fuel pump connector in the trunk.

Step 3
- Crank the engine to relieve the remaining pressure.

TBI Fuel Pump Test
Step 1
- Release the fuel pressure. Disconnect the 5/16” fuel supply hose, and connect the fuel system pressure gauge between the fuel supply hose and engine fuel line.

Step 2
- Switch the ignition on and activate the fuel pump. If the fuel pump pressure is at the required specification, the fuel system is functioning properly.
- If the fuel pump pressure is not at the required specification, take note of the pressure, and install the fuel pressure gauge in the fuel supply line at the rear of the vehicle between the fuel tank and the fuel filter.

Step 3

- Activate the fuel pump. Take note of the pressure reading. If the pressure is 5 psi higher than the first pressure reading, replace the fuel filter.
- If there is no change in the pressure reading, gently squeeze the fuel return hose. If the pressure increases, replace the fuel pressure regulator. If the pressure remains unchanged, it is likely that the problem is the plugged fuel pump filter sock or a defective fuel pump.

Step 4

- If the fuel pressure is more than the required specification, remove the fuel return hose at the rear of the vehicle. Connect an extension hose to the return hose. Place the hose in an adequate container with a minimum capacity of 2 gallons.
- Activate the fuel pump. If the fuel pressure is within specification, check the in-tank return fuel hose for kinking. Replace the fuel tank assembly if the in-tank reservoir check valve or aspirator jet is plugged.
- If the fuel pressure remains more than the required specification, remove the fuel return hose from the throttle body. Connect a substitute hose to the throttle body's return nipple. Place the other end of the hose in an adequate container.
- Activate the fuel pump. If the fuel pressure is within specification, check for a restricted fuel return line between the throttle body and the fuel tank. If no change was observed, then replace the fuel pressure regulator.

NOTE: Carry out the fuel pump test with the fuel tank at least half full. Before disconnecting a fuel line during testing, repeat the fuel pressure release procedure.

PFI Fuel Pump Test

Step 1

- Release the fuel pressure. Remove the cap from the service valve on the fuel rail. Connect the fuel system pressure gauge to the service valve.

Step 2

- Turn the ignition on and activate the fuel pump. If the fuel pump pressure is at the required specification, the fuel system is functioning properly.
- If the fuel pressure is not at the required specification, take note of the pressure and remove the gauge. Activate the pump and ensure there are no fuel leaks from the service valve. Install the cap on the service valve.
- If the fuel pressure is not at the required specification, install the pressure gauge in the fuel supply line between the fuel tank and fuel filter at the rear of the vehicle. Activate the fuel pump.
- Take note of the pressure reading. If it is 5 psi higher than the first pressure reading, replace the fuel filter. If the pressure reading remains unchanged, gently squeeze the fuel return hose.
- If the fuel pressure increases, replace the fuel pressure regulator. If the fuel pressure is unchanged, the problem is likely a plugged fuel pump filter sock or a defective fuel pump.
- If the fuel pressure is more than the required specification, remove the fuel return hose at the rear of the vehicle. Connect an extension hose to the return hose. Place the hose in an adequate container with a minimum capacity of 2 gallons.
- Activate the fuel pump. If the fuel pressure is within specification, check the in-tank return fuel hose for kinking. Replace the fuel tank assembly if the in-tank reservoir check valve or aspirator jet is plugged.
- If the fuel pressure remains more than the required specification, remove the fuel return hose from the throttle body. Connect a substitute hose to the throttle body's return nipple. Place the other end of the hose in an adequate container.
- Activate the fuel pump. If the fuel pressure is within specification, check for a restricted fuel return line between the throttle body and the fuel tank. If there is no change, then replace the fuel pressure regulator.

NOTE: Carry out the fuel pump test with the fuel tank at least half full. Before disconnecting a fuel line during testing, repeat the fuel pressure release procedure.

Fuel Pressure Tests for Honda/Acura (Typical)
WARNING: High fuel pressure may be present in the fuel lines and component parts. Relieve the pressure prior to attempting to open the system for testing or component replacement. Do NOT allow the fuel to spill onto the engine or electrical parts. Do NOT use an open flame while testing fuel system components.
- The diagnosis of the fuel system should begin by determining the fuel system pressure. If the fuel pump fails to run, inspect the power supply to the main relay. If all the power supplies are present (i.e. battery, ignition, and starter switch during cranking), carry out the functional test of the main relay.

Relieving Fuel Pressure
- Remove negative battery cable. Loosen the fuel tank filler cap. Place a clean cloth around the fuel filter. Slowly loosen the 6mm service bolt on top of the fuel filter one complete turn to relieve the system pressure. Always replace the washer underneath the 6mm bolt after loosening.

Pressure Testing
Step 1
- After relieving the fuel pressure, connect the fuel pressure gauge at the 6mm service bolt's location. Reconnect the negative battery cable. Start the engine and note the pressure. If the vehicle will not start or has a spark, and there is no fuel pressure; inspect the fuel pump main relay.

Step 2
- Disconnect the vacuum hose from the pressure regulator and inspect for manifold vacuum. If there is no vacuum, check for a restriction in the vacuum port or hose. Plug the vacuum hose and take note of the fuel gauge reading. The gauge reading should be 36-41 psi. The pressure should have increased slightly when the vacuum hose was disconnected from the pressure regulator.
-If the pressure is higher than the required specification, inspect for pinched or clogged fuel return line between the fuel rail and the fuel tank. If there are no problems in the fuel line, replace the pressure regulator.
- If the pressure is lower than the required specification, inspect for plugged fuel filter. If the filter is not plugged, gently pinch off the fuel return line. If the fuel pressure does not rise, replace the fuel pump. If the fuel pressure does not increase, replace the pressure regulator.

Fuel Pressure Tests for Toyota (Typical)
WARNING: High fuel pressure may be present in the fuel lines and component parts. Relieve the pressure prior to attempting to open the system for testing or component replacement. Do NOT allow the fuel to spill onto the engine or electrical parts. Do NOT use an open flame while testing fuel system components.

Fuel Pump Quick Test
Step 1
- Switch the ignition on, with the engine off.
- For everything except Van, place a jumper wire across +B and FP terminals of the engine check connector in the engine compartment. For Van, place the jumper wire across 2-wire fuel pump check connector (white/black and green wires) located underneath the driver's seat.

Step 2
- On all models, listen for the sound of fuel pump running. Feel for the pressure in the fuel line between the filter and the fuel rail. Switch the ignition off. Remove the jumper wire. If the fuel pump sound is present and the fuel hose shows pressure, refer to the Fuel System Pressure Test.
- If there is no pressure or fuel pump sound present on all except Van, connect a jumper wire from the battery sources to FP terminal of the engine check connector. If the fuel pump does not run or no pressure is felt in the line (on all except Van), check for a defective fuel pump. Check for an open circuit between the engine and fuel pump. Check the connection for poor fuel pump ground.
NOTE: All models use an in-tank pump. Fuel pump contains an internal valve and check valve.

Step 3
- If the fuel pump runs after the battery source is connected to FP terminal in the previous step, check EFI main relay and relating wiring. Check EFI and IGN fuses.

Fuel System Pressure Test
NOTE: Before testing the fuel pressure, check all fuel delivery and return lines for leaks.
Step 1
- Ensure the battery is fully charged. Switch the ignition off. On all except Pickup and 4Runner with 3VZ-E, place a container or cloth under the cold start injector. Slowly loosen the cold start injector delivery pipe. Remove the union bolt and two gaskets.

Step 2
- Install the fuel pressure gauge to the cold start injector delivery pipe. Wipe off the excess gas.
- On all except Van, install the jumper wire between the engine. Check connector FP and B pins. On Van, place the jumper wire across the 2 wire fuel pump and check the connector (white/black and green wires).

Step 3
- On all models switch the ignition on, with the engine off. Measure the fuel pressure. It should be the same as the regulated pressure.
- If the fuel pressure is high, replace the fuel pressure regulator. If the fuel pressure is low, check: Fuel hoses and connections, fuel filter, fuel pump, and the fuel pressure regulator.

Step 4
- Remove the jumper wire installed in Step 2. Start the engine and run for 2 minutes. Disconnect the vacuum sensing hose from the fuel pressure regulator and the plug hose end. Fuel pressure regulator is mounted on fuel rail.
NOTE: On Celica (3S-GTE), Corolla (4A-GE), MR2, Pickup/4Runner, and Van, it is necessary to allow the engine to idle for 2 minutes to stabilize the fuel pressure. These models are equipped with a fuel pressure up system which temporarily increases the fuel pressure after a hot start.

Step 5
- Measure the regulated fuel pressure at idle speed.
- With the engine still idling, reconnect the fuel pressure regulator sensing hose. Measure the regulated pressure at idle.
- If the regulated pressure was not specified, check the vacuum sensing hose fuel pressure regulator. Where possible, check the fuel pressure up system.

Step 6
- Stop the engine. Take note of the fuel pressure. Leave the fuel pressure gauge attached to the engine for at least 5 minutes. Residual fuel pressure after 5 minutes should be at least 21 psi (1.5 kg/cm 2). If the pressure is not as specified check for leaking injectors, fuel pressure regulator or valve in fuel pump.

Step 7
- Relieve the fuel system pressure. Remove the fuel pressure gauge. Install the cold start injector. Run the engine and check for fuel leaks,

Bosch Fuel Pressure Tests (Typical)
WARNING: High fuel pressure may be present in the fuel lines and component parts. Relieve the pressure prior to attempting to open the system for testing or component replacement. Do NOT allow the fuel to spill onto the engine or electrical parts. Do NOT use an open flame while testing fuel system components.

Fuel Pump Circuit
- Remove the fuel tank cap. Turn the ignition on and listen for the fuel pump operating sound for approximately 2 seconds. If there is no sound, check the fuse, fuel pump relay, fuel pump, and all electrical connections.

Visual Check
Step 1
- Remove the air cleaner and check for any visible fuel leaks. Push airflow sensor plate down manually. Uniform resistance should be felt throughout the travel after a slight amount of free travel. No binding should be felt when the sensor plate is released.

Step 2
- Upward movement of the sensor plate should be slow with slight resistance from the control piston adjusting lever. No binding should be felt. Push the airflow sensor plate down and hold briefly. Slight fuel seepage past control is acceptable.

Fuel Pressure Test for CIS
NOTE: Control pressure is measured with the valve open and system pressure is measured with the valve closed.

Step 1
- Install the fuel pressure gauge and adaptor between the fuel distributor test port and cold start valve.
- Ensure the control lever is in the closed position. Bleed the excess air from the system by cycling the control valve with the gauge upside down.

Step 2
- Using a jumper wire, connect the terminals number 30 and 87 on the fuel pump relay. Open the fuel pressure gauge control lever. The fuel pressure should be within specification. If the fuel pressure is low, carry out the fuel volume check. If the fuel volume is good, replace the fuel pressure regulator.
- If the fuel pressure is more than the required specification, remove the return hose from the pressure regulator and repeat the test. Fuel pressure should be within specification. If it is, check for restricted fuel return line. If the pressure is incorrect, replace the fuel pressure regulator.

Fuel Pressure Test for L-JETRONIC
Step 1
- Install the fuel pressure gauge at the fuel supply hose 3-way T connector. Switch the ignition on.

Step 2
- With the fuel pump operating, minimum pressure should be within specification. If the fuel pressure is incorrect, inspect for restricted fuel lines, defective fuel pump or weak pressure regulator.

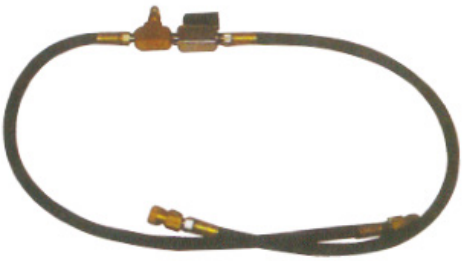
Fuel Pressure Check

Always ensure that the quick couplers on all gauge and fitting firmly snap into place with the locking sleeve in a proper position.

A

B

D



G

Basic Test

A: 3-1/2" gauge head with dual readings - 0-145 psi and 0-1000 KPA (10 Bar). Can be used for all tests.
B: Low pressure 2-1/2" gauge with dual readings - 0-15 psi and 0-1 kg/cm2 (1 Bar). Use for tests where an accurate reading below 15 psi is required.
D: Gauge hose assembly with blow-down valve. Can be used on all tests between the gauge and adaptors. Provides a clean and convenient method of relieving pressure after testing, or for a retest. Can be used for observing steadiness and volume of fuel. Simply put end of clear tubing into a proper container and push the side button.
G: CIS/TBI Test Hose. Use when testing CIS or TBI systems where in line connections are needed. Includes shut off valve for both control & primary system pressure checks. It is recommended that the D hose is used with CIS testing, as most manufacturers require that all air be purged from the tester when running tests.

A

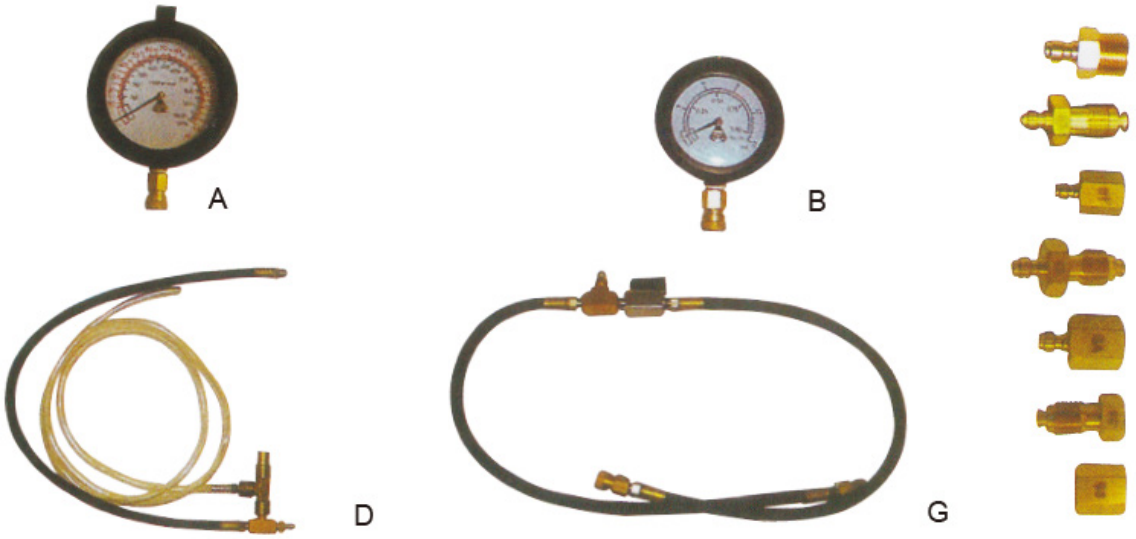
D

C

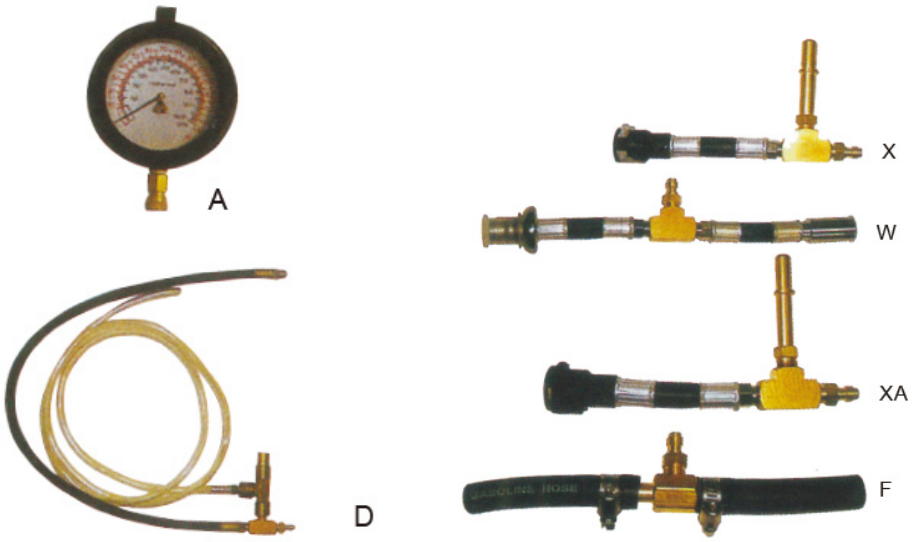
E

Test Port Adaptors

C: Small schrader type test hose with .308 x 32 thread.
Common applications - Ford EFI.
E: Large schrader type test hose with 7/16 x 20 thread.
Common applications include Chrysler, Jeep, and GM test ports.



In Line Test TBI



In Line Test TBI - Special Connections
X: Hair Pin Hose 5/16" - Common application Ford EFI.
W: Spring Lock Hose - Common application Ford EFI.
XA: Hair Pin Hose 3/8" - Common application GM, Chrysler.
F: Double ended barb fitting- Common application - where 5/16-3/8 fuel line hose can be entered for testing- AMC, Chrysler, w/TBI, Fiat, GM w/Bosch L-Jetr, Jaguar, Mazda, Nissan, Peugeotand Porsche w/ Bosch L-Jetr, Renault, Subaru, Triumph, and VW and Volvo w/Bosch L-Jetr.

Fuel Pressure Check

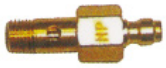
A

D

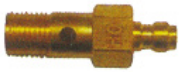
HE: Single end hose connection - 1/4” x 3/8”

HN: 6 mm x 1.0 Thread

HO: 8mm x 1.0 Thread

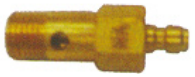


HP: 10mm x 1.0 Thread



HQ: 12mm x 1.25 Thread

HR: 12mm x 1.5 Thread



HA: 14mm x 1.50 Thread

End of Line, Banjo-Fuel Bolt Adaptors

HE: Common applications - Older port systems with hose connection, and where the rubber hose fuel lines from 1/4”-3/8” can be accessed.

Fuel bolt common applications - Accura, Honda, Hyundai, Mazda, Suzuki, Toyota.

Warranty

If you are unsure on how to use the item please contact us. If it were to fail due to a manufacturing fault or poor workmanship we will repair or replace it. Please contact your local dealer in the event you need to send the item back. You can also make a repair/replacement request on our website and download & complete the form online. Normal wear and tear along with misuse will void any warranty. Consumables are not covered under warranty.

www.welzh.com

Limited ***12 month*** warranty

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