

Multi-Port Fuel Injector Grand Master Test Kit

User Guide

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Safety Information

Before using this tester, carefully read, understand and follow instructions and safety messages on equipment and in this manual.

The manual cannot anticipate or provide advice and cautions for all situations encountered by technicians. With this in mind, always follow and refer to the manuals provided by the manufacturer or the vehicle or equipment being tested or used for all information and testing procedures whenever diagnosing, repairing or operating such vehicle or equipment.

Failure to follow the instructions, cautions and warnings provided here as well as those provided by the vehicle and equipment manufacturers can result in fire, explosion, bodily injury and property damage.

In addition to the information listed below, additional warnings and cautions are listed throughout the manual. Please read them carefully.

⚠ Fuel vapors are toxic and explosive, which can cause severe injury or death.

- Use proper ventilation to avoid breathing fuel vapors.
- Methanol fuel and gasoline mixed with methanol are highly poisonous and chemically active. Blindness and death are possible if exposure to these substances is extensive.
- Minimize prolonged exposure to methanol as a liquid or vapor. Remember, symptoms of methanol exposure can occur after a delay of several days.
- Minimize contact with the skin with the use of gloves (such as nitrile gloves) when there is possibility of getting methanol fuel on your hands. If the skin is directly exposed, wash the area immediately and change any clothes that have become wet with fuel.
- Always wear appropriate protective glasses when testing the pressure of the fuel system or gas caps. Should fuel get into eyes, flush eyes immediately with water and consult your physician.
- Follow all federal, state and local regulation for the safe storage and use of the compressed nitrogen gas used or stored at site.

⚠ Vehicles emit flammable vapors which can ignite.

- Keep flames, sparks, cigarettes and other ignition sources away from the vehicle at all times.
- In case of fire, never use water to fight flames caused by gasoline or methanol

Safety Information

blended gasoline. This will cause the flames to spread instead of extinguishing them.

- Use a dry chemical extinguisher to fight flames (preferably one marked ABC, though BC is acceptable). A foam extinguisher is acceptable only if it is ARF grade, which is resistant to alcohol.

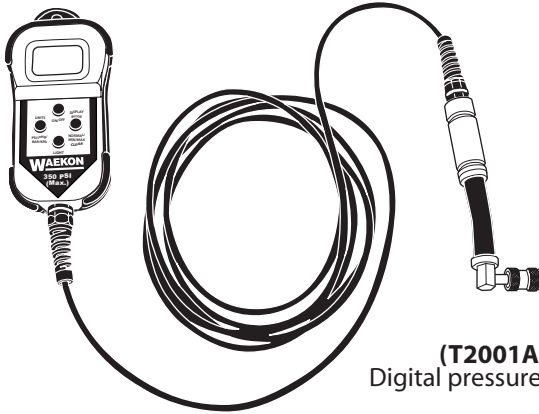
⚠ Before beginning any tests, make sure the equipment and the test environment are safe.

- Test area should be well ventilated.
- When working on and underneath the vehicle, make sure it is properly supported on a hoist or jack stands.
- When removing the fuel cap, make sure to turn the vehicle off.
- When removing the fuel cap, do so slowly. Allow any pressure to decay before fully removing the cap.
- When connecting or disconnecting to a fuel line, always make sure to relieve the system fuel pressure.

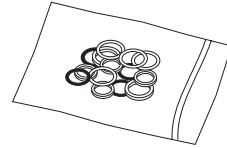
⚠ Ensure you have proper leak-free connections.

- Check all equipment connections before, during, and after testing.
- Do not pinch or kink tubing.
- Secure hose clamps when using hose adapters.
- Before connecting fuel lines and hose fittings, apply a few drops of clean engine oil to male ends to ensure proper connection with female connectors.
- Tug firmly on quick-connect fittings to check for proper connection.
- Make sure the safety catch is seated in the adapter groove of any quick-connect couplers.

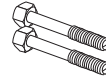
Components



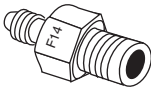
(T2001A)
Digital pressure gauge



(11400-244)
FIGMAB washer/o-ring kit



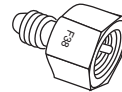
(19093-034)
2 metric 6 x 1 x 50 hex bolts



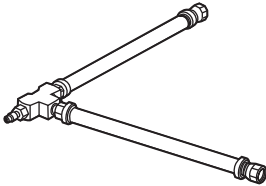
(06325-143)
F14B 7/16" JICxM14 fitting



(06325-144)
F15B 7/16" JICxM14 fitting



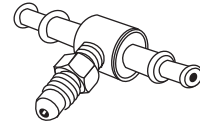
(06325-145)
F38 7/16" JICxM12 fitting



(08865-098)
Fuel access hose assembly



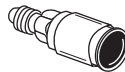
(F2-AS)
Valved thumbhose adapter



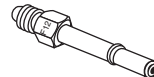
(F3-AS)
Stepped tee adapter



(F4-AS)
5/8" male spring
lock adapter



(F5)
5/8" female spring
lock adapter



(F12A)
5/16" male quick
connect adapter

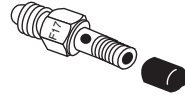
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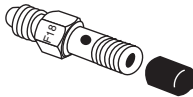
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5/16" female quick
connect adapter



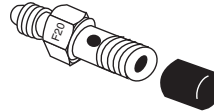
(F16-AS)
M6x1.0 male
adapter w/O-ring



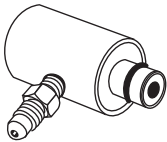
(F17-AS)
M8x1.0 male
banjo adapter



(F18-AS)
M10x1.0 male banjo adapter



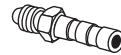
(F20-AS)
M12x1.5 male banjo adapter



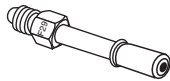
(F26)
M16 inline adapter



(F27)
1/4" slip on hose
barb fitting



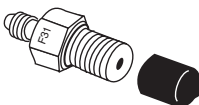
(F28)
3/8" slip on hose
barb fitting



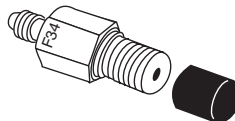
(F29A)
3/8" male quick connect adapter



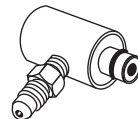
(F30-AS)
3/8" female quick connect adapter



(F31-AS)
M14x1.5 male adapter



(F34-AS)
M12x1.25 male banjo adapter



(F39-AS)
M11 inline adapter

Hookup & Testing

Step 1—Perform Preliminary Checks

In order to ensure accurate test results, you need to inspect each component in the fuel system. Any unfavorable conditions can result in failed or inaccurate results. Check these area to determine whether you should continue with the test procedure:

- Check the entire fuel system for leaks or other damage such as pinched or kinked fuel lines, damage to the fuel tank, and a plugged filter.
- Check the fuel cap and venting system—these components can cause fuel starvation if they are plugged.
- Check the engine control module for any service codes—they may verify a fuel system related symptom, such as a system that always runs rich or lean. Service any fuel pump electrical codes before testing the vehicle.
- Check for the manifold vacuum at the regulator vacuum hose on vehicles with vacuum controlled fuel pressure regulators.
- Verify the battery is fully charged and capable of running the fuel pump.
- Verify there is sufficient fuel in the tank—the fuel gauge can be inaccurate.
- Verify the fuel pump inertia switch (if equipped) is not tripped if the fuel pump does not run.

If you find any unfavorable conditions, repair or replace components as necessary **before** continuing with the test procedure.

Step 2—Select Adapter(s)

Before you begin, it is best to determine how you will connect to the vehicle's fuel system and which adapters you may need to use. *Note: The digital gauge is equipped with a 7/16" x 20 JIC fitting. Many vehicles use a test fitting with this standard and will not require any additional adapters.*

1. Determine the vehicle's year, make, model, and engine type.
2. Using the vehicle's shop manual, determine how you will access the vehicle's fuel system and if any adapters are required.
Note: Some example diagrams are included at the back of this user guide. These examples are for reference only and are not to be used in place of the shop manual.

Step 3—Release System Pressure

Before connecting to, disconnecting from, or opening a fuel system line, fuel pressure in the system must be released. Follow the vehicle manufacturer's recommended procedure which typically include these steps:

1. Remove the fuel cap to release fuel tank pressure.
2. Remove the fuel pump fuse or relay to disable the fuel pump(s)—**do not** disable the injectors.
3. Run the engine until it stalls.
4. Crank the vehicle for 30 seconds
5. With the key off, reinstall the fuel pump fuse or relay that you removed.

Step 4—Connect to the Vehicle

1. With the fuel system pressure relieved, remove the fitting from the fuel delivery access point.

IMPORTANT! Make sure to wrap a shop towel around the fitting to absorb any fuel spray.

2. If using any adapters, connect them to the digital gauge.
3. Connect the digital gauge to the vehicle. If using adapters:
 - A drop of engine oil on the adapter threads will aid in tightening. Tighten just enough to prevent leaks.
 - Adapter hoses with knurled nuts should be finger tightened only. Over tightening the adapter can damage the o-ring seal, requiring you to replace it.
 - Adapter hoses with hex nuts can be moderately tightened using a flare nut wrench. Use a back-up wrench on the mating component to prevent turning.
4. Pressurize the fuel system appropriately (see the vehicle's shop manual for pressurization methods).
5. Thoroughly check all fittings and connections for fuel leaks. If a leaks exists in the fuel system, turn the vehicle (or fuel pump) off and repair before testing.

Hookup & Testing

Step 5—Perform Pressure Test

1. See the vehicle's shop manual for specific test procedures.

Step 6—Interpret Test Results

Once you have completed the pressure test, you will need to use the results to help pinpoint the source of the condition. The table below provides some information on symptoms and possible causes for four different pressure test results. Refer to the vehicle's shop manual for additional details.

Condition	Symptoms	Causes
No fuel pressure	<ul style="list-style-type: none">• No start• Symptoms may turn check engine lamp on (electrical fuel pump problem)	<ul style="list-style-type: none">• Plugged fuel filter• Plugged fuel line (fuel delivery line)• Fuel pump—electrical or mechanical failure• Fuel pump—also, electrical connections and vehicle harness, fuse, control relay or relay control circuits, fuel pump shut down or inertia switch• No fuel in tank
Low fuel pressure (low side of or below minimum specifications)	<ul style="list-style-type: none">• Hard start• Lack of Power• Surging (lean run)• Pinging (engine lean)• Engine runs hot (engine lean)• Symptoms can turn check engine lamp on	<ul style="list-style-type: none">• Restricted fuel filter• Restricted fuel line (fuel delivery line)• Fuel pressure regulator• Fuel pump—mechanical• Fuel pump—electrical connections and vehicle harness or control relay
High fuel pressure (high side of or above maximum specifications)	<ul style="list-style-type: none">• Hard start (flooding)• Lack of power (fouling)• Poor fuel economy• Symptoms may turn check engine lamp on	<ul style="list-style-type: none">• Vacuum source to regulator• Restricted or plugged fuel line (fuel return line)• Fuel pressure regulator• Fuel pump and regulator—mechanical (mechanical returnless fuel systems)• Fuel pump—electrical (electronic returnless fuel systems)

Disconnecting the Tester

Condition	Symptoms	Causes
Fuel pressure leak down (pressure drops with pump off—key on, engine off)	<ul style="list-style-type: none">• Hard start (long cranking times)• System running rich conditions (if injectors or regulator diaphragm leaking)	<ul style="list-style-type: none">• Fuel pressure regulator• Fuel pump—mechanical (check valve)• Fuel pump and regulator—mechanical (mechanical returnless fuel systems)• Leaking fuel injector• Leaking fuel pressure regulator diaphragm (checks for fuel in vacuum hose)

Follow these steps to disconnect the tester after completing the pressure test.

1. Before disconnecting the tester or opening any fuel system lines, relieve system fuel pressure (see *Step 3—Release System Pressure* under **Hookup & Testing**).
2. Wrap a shop towel around the fittings to absorb any fuel spray.
3. Disconnect the digital gauge from the adapter(s), tee, or test port
4. If used, disconnect the adapters(s) or tee from the vehicle.
5. Clean or replace any worn or damaged o-rings or washers used in the vehicle fuel line connections.
6. Reconnect the vehicle fuel lines.
7. Pressurize the fuel system.
8. Check for leaks and repair as needed.
9. Clean and dry all fittings, hoses, and adapters before storing.

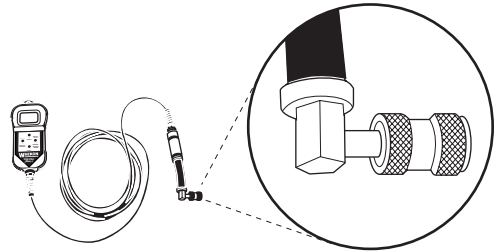
Example Hookups

The following pages contain example diagrams of how to access the vehicle's fuel system and the different type of adapters typically used.

IMPORTANT! These examples are for reference only and are not to be used in place of the shop manual.

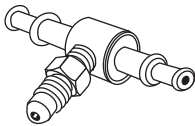
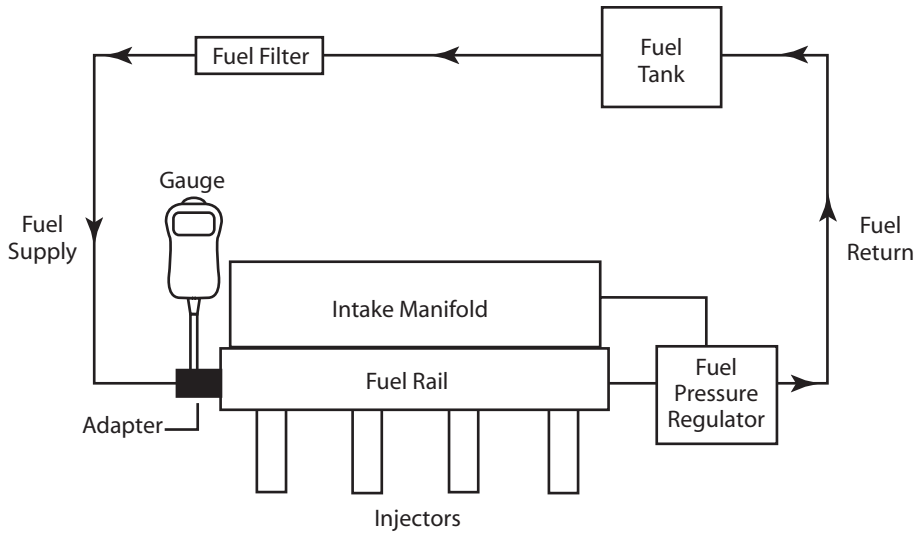
Also Note:

The digital gauge is equipped with a 7/16" x 20 JIC fitting. Many vehicles use a test fitting with this standard and will not require any additional adapters.

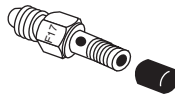


(T2001A) Digital pressure gauge

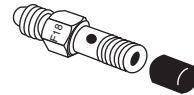
Example Hookups



(F3-AS)
Stepped tee adapter



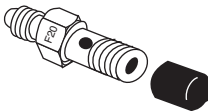
(F17-AS)
M8x1.0 male
banjo adapter



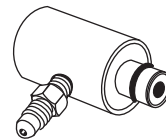
(F18-AS)
M10x1.0 male
banjo adapter



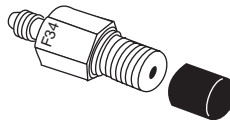
(F39-AS)
M11 inline adapter



(F20-AS)
M12x1.5 male
banjo adapter

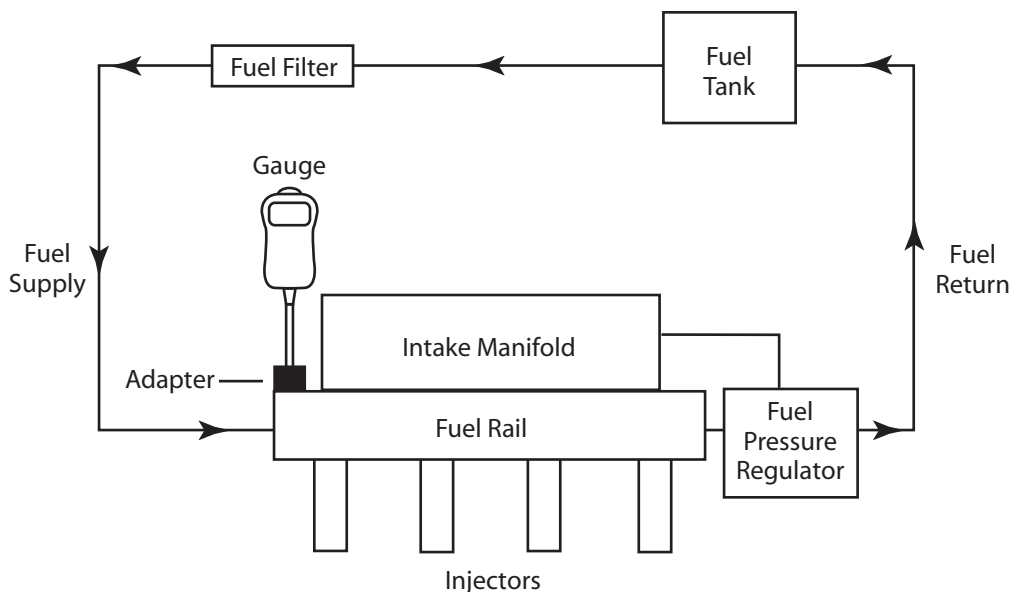


(F26)
M16 inline adapter



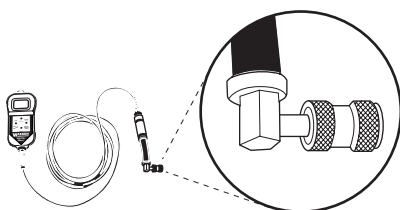
(F34-AS)
M12x1.25 male banjo adapter

Example Hookups



Note:

- If the test vehicle has a 7/16" x 20 JIC fitting at the point of access, you can connect the digital gauge directly to the vehicle.
- Some vehicles may require removing a plug or a fuel pulse dampener to access the test point.



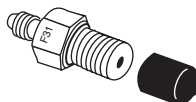
(T2001A) Digital pressure gauge



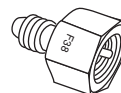
(F2-AS)
Valved thumbhose adapter



(F16-AS)
M6x1.0 male
adapter w/O-ring

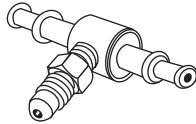
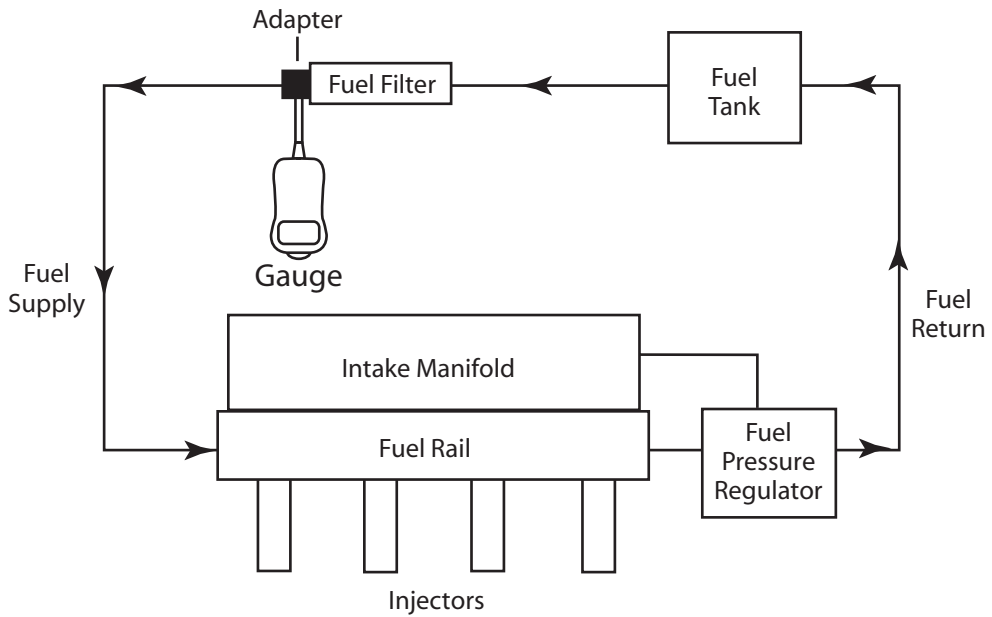


(F31-AS)
M14x1.5 male adapter



(06325-145)
3/8 7/16" JICxM12 fitting

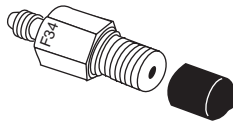
Example Hookups



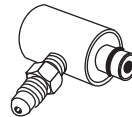
(F3-AS)
Stepped tee adapter



(F16-AS)
M6x1.0 male
adapter w/O-ring

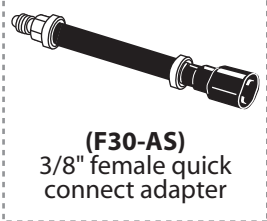
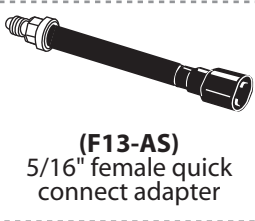
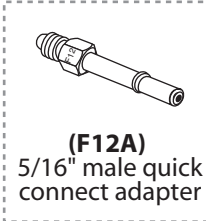
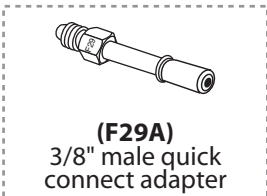
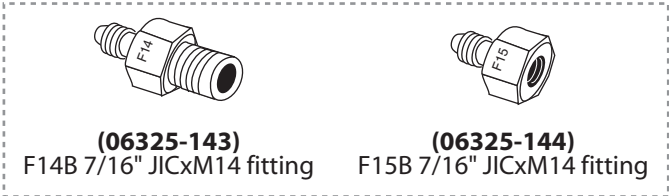
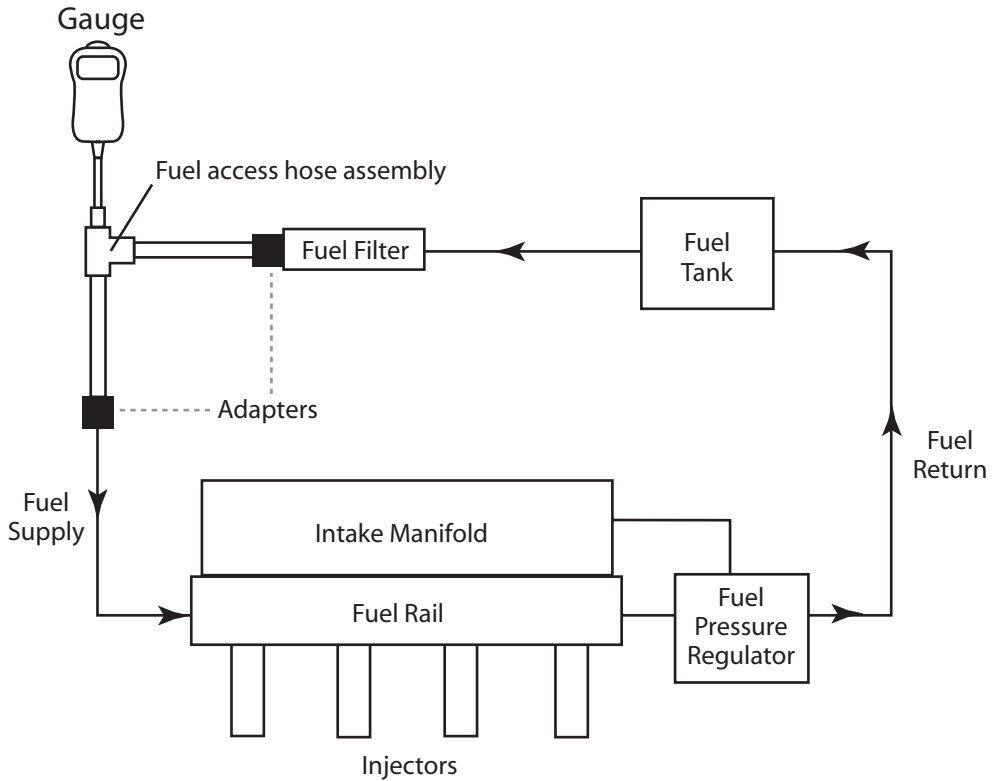


(F34-AS)
M12x1.25 male banjo adapter

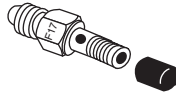
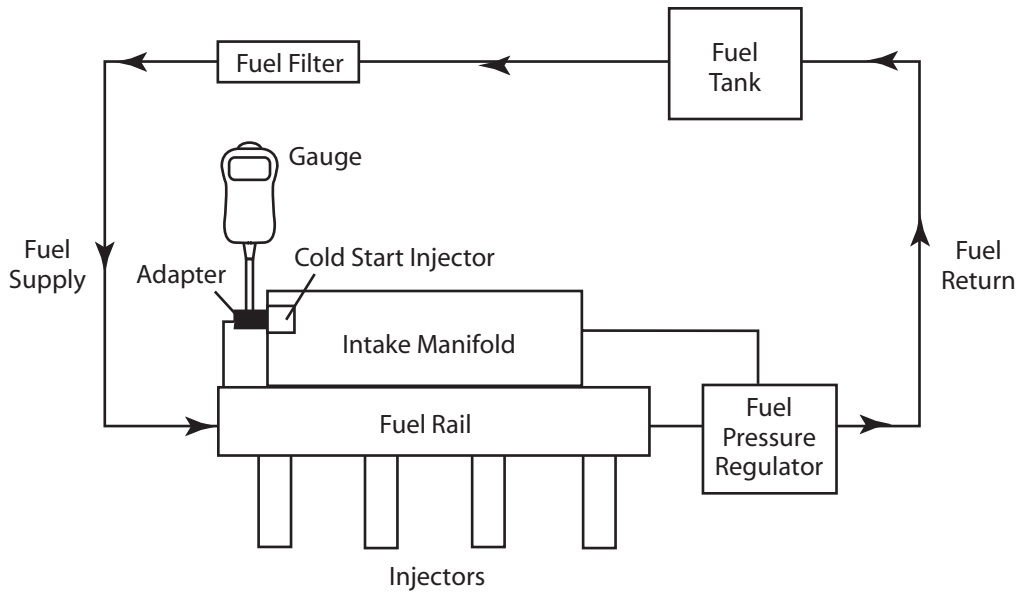


(F39-AS)
M11 inline adapter

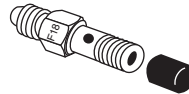
Example Hookups



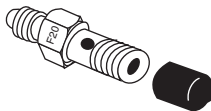
Example Hookups



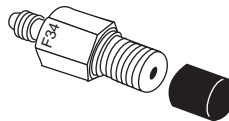
(F17-AS)
M8x1.0 male
banjo adapter



(F18-AS)
M10x1.0 male banjo adapter

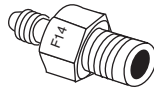
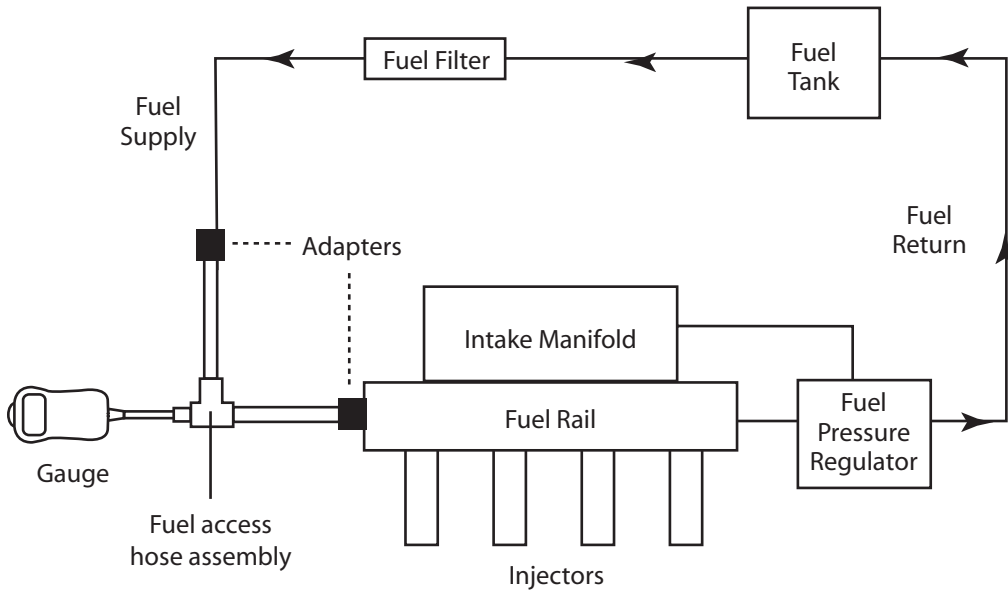


(F20-AS)
M12x1.5 male banjo adapter



(F34-AS)
M12x1.25 male banjo adapter

Example Hookups



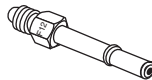
(06325-143)
F14B 7/16" JICxM14 fitting



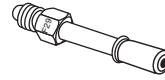
(06325-144)
F15B 7/16" JICxM14 fitting



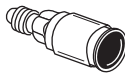
(F4-AS)
5/8" male spring lock adapter



(F12A)
5/16" male quick connect adapter



(F29A)
3/8" male quick connect adapter



(F5)
5/8" female spring lock adapter



(F13-AS)
5/16" female quick connect adapter



(F30-AS)
3/8" female quick connect adapter

Warranty

Subject to the conditions that follow and are noted below, this product is warranted to be free from defects in material and workmanship, under proper use and in accordance with the manufacturer's written recommendation and specifications, for a period designated below on all products:

- For all electronic parts and for the FPT series of evaporative equipment (both mechanical and electronic parts), a one-year limited warranty is in effect from the time of the purchase of the new product by the initial end user.
- For all hard parts (including mechanical and machined parts), other than listed in the preceding paragraph, a lifetime limited warranty is in effect from the time of the purchase of the new product by the initial end user.

The manufacturer's obligation under this warranty is limited to unaltered products returned to the manufacturer by the initial end user of the new products. Therefore, this warranty does not cover any products resold by the end user to third parties, nor any reconditioned products sold as such, by the manufacturer. The sole remedy for any such defect shall be the repair, or replacement, of the product at the sole discretion of the manufacturer. This warranty does not cover expendable parts, such as batteries, nor does it cover shipping or handling. In addition, manufacturer is not liable for any loss or damage to product during shipping.

In the event it is determined that the product has been tampered with, or altered in any way, this warranty is void and all claims against the product will not be honored. All warranty claims must be submitted as outlined by the manufacturer and shall be processed in accordance with the manufacturer's established warranty claim procedures. These procedures include provisions that proof of purchase must be established (by either warranty card from the seller or by point of purchase receipt) and that the manufacturer will make every attempt to return ship the product within one business day from receipt of the returned product, freight prepaid.

In addition, all maintenance procedures, as outlined by the product manuals, should be followed for the warranty to be kept in force. Should the product not be used in accordance with procedures as specified, or if the product otherwise fails outside of the warranty, the manufacturer reserves the right to make such judgment and the party returning the product will be notified that written notification will be necessary to repair the product at a cost which the manufacturer deems as reasonable. The product will then be shipped back to the customer, COD; or as the manufacturer deems appropriate.

This is the only authorized manufacturer's warranty and is in lieu of all other expressed, or implied, warranties or representations, including but not limited to any implied warranties of merchantability or fitness or any other obligations on the part of the manufacturer. In no event will the manufacturer be liable for business interruptions, loss of profit, personal injury, costs of delays, or any special, indirect, incidental or consequential damages, costs or losses.

100% Adapter Coverage Guarantee

Adapter coverage is 100% guaranteed for one (1) year from the date of purchase by the user. If the purchaser identifies an adapter for foreign or domestic application that is not available in the kit, Waekon will provide the adapter free of charge. Guarantee applies only to the North American passenger vehicle and light truck fleet.

- Warranties and Guarantees require proof of purchase or warranty registration.

Contact Information

If you have any questions about our products including technical assistance, call our customer care department during standard business hours EST. If a customer care representative directs you to return any equipment, be sure to include these items:

- a written description of the problem;
- the name and telephone number of your contact person;
- your shipping address, and
- our return authorization number (from customer care)

Customer care and tech support:	800/342-5080
Service and repair center:	662/453-6212
Fax:	216/761-9879
E-mail:	support@hickok-inc.com repaircenter@hickok-inc.com
Service address:	Hickok Inc. Automotive Group 1716 Carrollton Avenue Dock E Greenwood, MS 38930

Don't forget to check out other testers, equipment and parts at our websites. Access our Quick-n-E-Z Parts and Service from any of these sites 24/7 for ordering parts or service.

