Fuel Injection Fitting Kits

Reference Guide for:
Domestic Kit
Import Kit
Master Kit
Safety Precautions

WARNING: The following safety precautions must be observed to reduce the risk of fire and personal injury:

- Read and understand all instructions and safety precautions before servicing fuel injection systems. If the operator cannot read English, operating instructions and safety precautions must be read and discussed in the operator's native language.
- Have a Class B fire extinguisher nearby when working on fuel injection systems. Observe normal precautions for working with flammable liquids: no smoking, open flames, electrical sparks, etc.
- Use fuel injection fitting kits on gasoline engines only.
- Release fuel system pressure before servicing fuel system components.
- Residual line pressure can cause fuel spray. Wrap a shop towel around pressure tap fittings when connecting and disconnecting adapters or removing the gauge assembly hose. Wipe up fuel spills immediately; protect painted surfaces from fuel spills. Clean or dispose of towels according to local, state, and federal regulations.
- Tighten all connections before checking fuel pressure.
- Use the vehicle manufacturer's recommended procedures to service injectors. Replace injector o-rings whenever injectors are removed. Keep dirt out of the system.

- Wear eye protection that meets ANSI Z87.1 and OSHA requirements.
- Keep tools, electrical cords, and hoses away from moving engine parts.
- Do not modify any components of the gauge assembly, adapters, or accessories. If it is necessary to replace parts, use only OTC replacement parts.
- Vent exhaust to the outside while running the vehicle.

- Si el operador no puede leer el inglés, las instrucciones de operación y las precauciones de seguridad deberán leerse y comentarse en el idioma nativo del operador.
- Si l'utilisateur ne peut lire l'anglais, les instructions et les consignes de sécurité doivent lui être expliquées dans sa langue maternelle.

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Kit Components

Import Kit
Kit Components

Master Kit
## Components / Applications

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About Fuel Systems and Testing

A vehicle’s fuel delivery and return system consists of a circular system of components. Fuel is pumped from the fuel tank by the fuel pump. The fuel flows through the hoses, through the fuel filter, and to the fuel regulator and injection system. The fuel injection system delivers the fuel to the engine and returns unused fuel to the fuel tank.

For an engine to run properly, the fuel system must maintain precise fuel pressure and adequate fuel volume. The fittings in the Fuel Injection Fittings Kit let you connect a pressure gauge into the fuel system to test the pressure of the fuel pump, supply (delivery) lines, and return lines. You can also use the Kit to test the fuel pump output volume.

**NOTE:** When connecting to a fuel system, use the illustrations provided in this Guide. Some vehicles and/or adapters have more than one connection option. If so, use the option with the easiest access to the fuel line.

Although manufacturers use various acronyms and names for fuel injection systems (MPI, EFI, etc.), there are two basic types of fuel injection systems: throttle body injection and port injection. Throttle body injection delivers fuel into an engine throttle body. Port injection delivers fuel separately to each engine cylinder through fuel injectors that are connected to either a fuel rail or a fuel distributor. The next column lists the various injection systems.

**Throttle Body Injection Systems (Domestic)**
- CFI – Central Fuel Injection: Ford
- TBI – Throttle Body Injection: AMC, Chrysler, GM

**Port Injection Systems (Domestic and Import)**
**Systems with a Fuel Rail (Domestic)**
- MPFI – Multi-Port Fuel Injection: AMC, Chrysler, Jeep
- MPI – Multi-Port Injection: Ford, GM
- PFI – Port Fuel Injection: Ford, GM
- SFI – Sequential Fuel Injection: AMC, Chrysler, Ford, GM, Jeep

**Systems with a Fuel Rail (Import)**
- AFC – Air Flow Control: Asian vehicles (Datsun, Mazda, Nissan, Subaru, Toyota), and European vehicles (BMW, VW)
- EFI – Electronic Fuel Injection: Asian vehicles (such as Daihatsu, Honda, Mazda, Nissan, Subaru, Toyota, etc.)
- MFI – Multiple Fuel Injection: Asian vehicles (such as Honda, Mazda, Nissan, Subaru, Toyota, etc.)
- PGM – Programmable: Acura, Honda

**Single Point:** Subaru

**Systems with a Fuel Distributor (Import)**
- CIS – Constant Injection System: European vehicles (with a warm-up regulator in the return line)
- CISE – Constant Injection System Electronic: European vehicles (warm-up regulator built into fuel distributor)
General Test Instructions

Use the following instructions as a general guideline. For specific steps, always refer to the vehicle’s service manual.

1. Loosen vehicle’s fuel filler cap.
2. Remove fuel pump fuse from fuse block.
3. Turn ignition to START/RUN and idle engine until fuel in fuel line is consumed (engine stops).
   **NOTE:** For some 1991 and newer GMs, if engine does not start and run: replace pump fuse, raise and safely support vehicle, disconnect fuel pump electrical connector(s), lower vehicle, repeat step 3. (Refer to vehicle’s service manual.)
4. To release remaining pressure, turn ignition to START/RUN for 3 seconds and then turn to OFF (engine should not run).
5. Replace fuel pump fuse [or electrical connector(s)].
6. Determine adapters required for testing and make connections: Connect gauge (No. 10) to hose assembly (No. 11); if required, connect 11 to TBI/CIS hose assembly (No. 12); connect adapters to 11 or 12 (as required) and to vehicle at testing location. (For assistance, use the applications list and illustrations provided in this Guide.)
   **NOTE:** If using TBI/CIS hose assembly (12), make sure shutoff valve is open.
7. Turn ignition to START/RUN. Wait until fuel pump stops (takes about 1.5 to 3 seconds). Then turn ignition to OFF.
   **NOTE:** Gauge pressure should stabilize. If pressure does not stabilize, or if pump does not run properly, refer to vehicle’s service manual.
8. Place loose end of clear plastic hose on hose assembly (11) into approved drain container. Press and hold (open) relief valve (on 11) until fuel drains and air bubbles are no longer visible in hose, then release (close) valve.
9. Wait 10 seconds; turn ignition to START/RUN (engine should start unless “dead head” testing).
10. Do the specific tests on the next two pages:
   - **CFI, TBI, AFC, PGM, and Single Point** – static (running) fuel pressure, fuel volume, or fuel pressure leak down (for GM TBI can also do primary system pressure “dead head” test)
   - **MPFI, MPI, PFI, SFI, EFI, and MFI** – static (running) fuel pressure, fuel volume, fuel pressure leak down, or fuel pump output pressure
   - **CIS** – fuel volume, cold control pressure, hot control pressure, primary system pressure, or rest pressure
   - **CISE** – fuel volume, system pressure, residual pressure
11. After testing, remove test components and replace vehicle components as follows: turn ignition to OFF; repeat steps 2, 3, 4, and 5; disconnect test components; reconnect vehicle components; repeat steps 7 and 8; tighten fuel filler cap.
Follow the General Test Instructions on the previous page. At step 10, do the following tests as necessary.

NOTE: For all tests, refer to the vehicle’s service manual for specifications and diagnostic/repair procedures.

**Static (Running) Fuel Pressure**
1. Run engine at idle until gauge pressure stabilizes.
2. Compare gauge pressure to pressure specified in vehicle’s service manual.

**Fuel Volume**
1. Run engine at idle and place loose end of clear plastic hose (on No. 11) into approved drain container.
2. Press and hold (open) relief valve (on 11) while keeping engine at idle; monitor fuel output for 30 seconds; release (close) valve.
   Fuel pump should maintain engine idle and output a minimum of one pint of fuel in 30 seconds. (For CIS and CISE, output should be one quart in 30 seconds).

### Fuel Pressure Leak Down

NOTE: For GM low pressure TBI, test does not work because of pressure drop caused by pressure regulator design.
1. Run engine at idle and compare gauge pressure with pressure specified in vehicle’s service manual.
2. Turn ignition to OFF, wait 15 to 20 minutes, check gauge pressure. Pressure should not drop more than specified in vehicle’s service manual (if it does, pressure may be leaking down).

   NOTE: If necessary, turn ignition to START/RUN to restart engine for other tests.

### Fuel Pump Output Pressure (“Dead Head”)
1. Turn ignition to OFF.
2. Compare gauge pressure with pressure specified in vehicle’s service manual.
Follow the General Test Instructions on page 13. At step 10, do the following tests as necessary.

**NOTE:** For all tests, refer to the vehicle’s service manual for specifications and diagnostic/repair procedures.

### Cold Control Pressure (CIS)

**NOTE:** Engine must be cold for this test.
1. Run engine at idle until gauge pressure stabilizes.
2. Disconnect electrical connector from fuel control pressure regulator. **Do not run engine for more than 1 minute with regulator disconnected.**
3. Compare gauge pressure with pressure specified in vehicle’s service manual.
4. Turn ignition to OFF and reconnect electrical connector to fuel control pressure regulator. **NOTE:** If necessary, turn ignition to START/RUN to restart engine for other tests.

### Hot Control Pressure (CIS)
1. Run engine at idle until it reaches operating temperature.
2. Compare gauge pressure with pressure specified in vehicle’s service manual.

**Rest Pressure (CIS)**

Same as **Fuel Pressure Leak Down** on page 14.

**Primary System Pressure (CIS/GM TBI)**

[Fuel Pump Output - “Dead Head”]
1. Run engine at idle until it reaches operating temperature.
2. Close shutoff valve on TBI/CIS hose assembly (No. 12). This “dead heads” fuel pump. **Do not close valve for more than 10 seconds**; closed valve creates very high fuel pressure.
3. Compare gauge pressure with pressure specified in vehicle’s service manual.

**System Pressure (CISE)**

Same as **Static (Running) Fuel Pressure** on page 14.

**Residual Pressure (CISE)**

Same as **Fuel Pressure Leak Down** on page 14.
Domestic Vehicle Connections

CFI Vehicles – Ford
Connecting at the Throttle Body
using 10 and 11
with 32
Domestic Vehicle Connections

TBI Vehicles – AMC and Chrysler

Connecting at the Throttle Body using 10 and 11 with 14

*Use No. 14 with hose and clamp in Kit’s Accessory Compartment; use hose that fits vehicle’s fuel line.
Domestic Vehicle Connections

TBI Vehicles – GM
Connecting at the Fuel Filter Location
using 10 and 11
with 41

*Replace Fuel Filter with No. 41

*Replace Fuel Filter with No. 41
Domestic Vehicle Connections

TBI Vehicles – GM
Connecting at the Throttle Body
using 10, 11, and 12
with 34 and 35 or 36 and 37

NOTE: This connection is for supply line pressure testing.
Domestic Vehicle Connections

TBI Vehicles – GM

Connecting to the Supply Line End
using 10, 11, and 12
with 36 and 37, and plug 40

NOTE: This connection is for fuel pump pressure (dead head) testing.
Domestic Vehicle Connections

TBI Vehicles – GM

*Connecting into the Return Line using 10, 11, and 12 with 38 and 39*

NOTE: This connection is for return line pressure testing.
Domestic Vehicle Connections

MPFI, MPI, PFI, and SFI Vehicles

Connecting at the Fuel Filter Location using 10 and 11 with 14, 32, or 33

*Use No. 14 with hose and clamp in Kit’s Accessory Compartment; use hose that fits vehicle’s fuel line.
Domestic Vehicle Connections

MPFI, MPI, PFI, and SFI Vehicles
Connecting into the Supply Line using 10 and 11
with 14, 32, 33, or 42

*Use No. 14 with hose and clamp in Kit’s Accessory Compartment; use hose that fits vehicle’s fuel line.
Domestic Vehicle Connections

MPFI, MPI, PFI, and SFI Vehicles

Connecting at the Fuel Rail using 10 and 11 with 30 or 31
Domestic Vehicle Connections

MPFI, MPI, PFI, and SFI Vehicles

*Connecting to the Supply Line End using 10 and 11 with 15*

**NOTE:** This connection is for fuel pump pressure (dead head) testing.

![Diagram of fuel system connections](image)
Import Vehicle Connections – Asian

AFC, EFI, MFI, and PGM Vehicles
Connecting at the Fuel Filter Location
using 10 and 11
with 66 or 70

Diagram:
- Fuel Supply
- Fuel Filter
- Adapter 66 or 70
- Gauge Hose Ass’y 11
- Gauge 10
- Intake Manifold
- Fuel Rail
- Engine
- Fuel Return
- Fuel Tank
- Fuel Pump
- Filter

Numbers and symbols:
- 66
- 70
Import Vehicle Connections – Asian

AFC, EFI, and MFI Vehicles

*Connecting at the Cold Start Injector using 10 and 11 with 67, 68, 69, 70, or 71*
Import Vehicle Connections – Asian

AFC, EFI, MFI, and Single Point Vehicles

Connecting at the Fuel Rail using 10 and 11
with 14, 67, 68, 69, 70, or 71

*Use No. 14 with hose and clamp in Kit’s Accessory Compartment; use hose that fits vehicle’s fuel line.

NOTE: Vehicle may have a cold start injector (not shown); connection is the same as shown above.
Import Vehicle Connections – Asian

EFI and MFI Vehicles
Connecting to the Supply Line End using 10 and 11 with 15

NOTE: This connection is for fuel pump pressure (dead head) testing.
Import Vehicle Connections – European

AFC Vehicles
Connecting at the Fuel Filter Location
using 10 and 11
with 70
Import Vehicle Connections – European

AFC Vehicles
Connecting at the Cold Start Injector
using 10 and 11
with 67, 68, 69, or 70
Import Vehicle Connections – European

AFC Vehicles
Connecting at the Fuel Rail
using 10 and 11
with 14, 67, 68, 69, or 70

*Use No. 14 with hose and clamp in Kit’s Accessory Compartment; use hose that fits vehicle’s fuel line.

NOTE: Vehicle may have a cold start injector (not shown); connection is the same as shown above.
Import Vehicle Connections – European

CIS Vehicles

Connecting into the Return Line using 10, 11, and 12 with 67, 68, 69, 70, 72, 73, 74, 75, 76, 77, 78, 79, 80, or 81
Import Vehicle Connections – European

CISE Vehicles

Connecting at the Fuel Distributor using 10 and 11 with 67, 68, 69, 70, 72, 73, 74, 75, 76, 77, 78, 79, 80, or 81

Access Point: remove plug from top of fuel distributor’s chamber or disconnect cold start injector, if applicable.