

F/I Spy™

Your secret agent under the hood™

Wondering what really goes on in there in there?

What's your engine up to?

Are those fuel injectors injecting?

Find out with F/I Spy™!



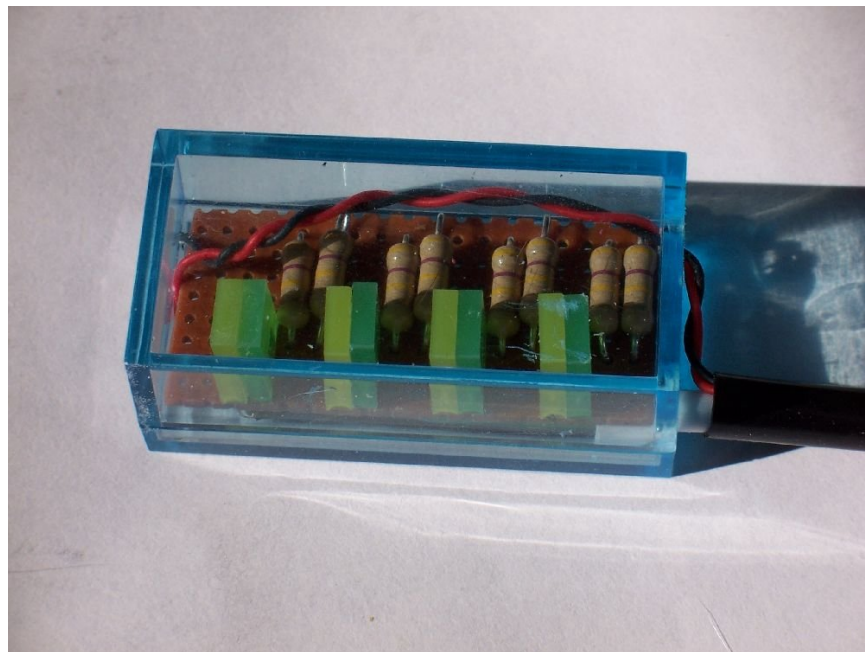
Introduction

F/I Spy™ is a very simple but very useful addition to your cars instrumentation. If you're a serious automotive enthusiast looking for a more insight into your engine or a hobbyist looking for something to impress your friends, F/I Spy™™ will give you a new driving experience.

F/I Spy™ provides a continuous, real-time display of the state of your Fuel Injectors. There is one pair of LED indicator lights for each of your Fuel Injectors. If you have a four-cylinder engine you should have an F/I Spy-4™. If you have a six-cylinder engine you should have an F/I Spy-6™. And, if you have an eight-cylinder engine you should have an F/I Spy-8™.

These LEDs show the state of each Fuel Injector. When the Fuel Injector is off, the yellow LED is illuminated. When the Fuel Injector is on, the green LED is illuminated.

When your engine is running the LEDs will flicker. Their rate of flicker depends upon the engine RPM. The on time of the green LED depends upon the on time of the fuel injector. As you accelerate, your engine computer or ECU (Engine Control Unit) will hold the injectors open for a longer period so that more fuel flows into the engine. You will observe a change in the relative on time of the yellow and green LEDs.



Installation

Installation consists of three steps:

1. Mounting F/I Spy™
2. Connecting F/I Spy™ to your engine's wiring
3. Connecting F/I Spy™ to vehicle power.

1 Mounting F/I Spy™

F/I Spy™ can be easily mounted in a wide variety of locations and positions. F/I Spy™ is shipped with a convenient Velcro™ strip. However, you may use any attachment method you choose. Please note that certain adhesives can dissolve, discolor, or craze F/I Spy's plastic housing.

You should choose a location out of direct sunlight to enhance the visibility of the display in daylight.

Choose a location that keeps all wires from interfering with the steering wheel and foot peddles.

Don't place F/I Spy™ so that it blocks your existing instruments – especially the speedometer!

Finally, don't place F/I Spy™ too far below your normal line of vision. You don't want to be looking down at the display instead of watching the road.

2 Connecting F/I Spy™ to Engine Wiring

The white cable contains the sense wires. These wires must be connected to the Fuel Injector wiring. Use the supplied blue “T-tap™” connectors. Follow the instructions on the “T-Tap™” package.

- a. Pass the white sensor cable through your vehicle’s firewall. You may need to drill a ¼ inch hole in the firewall. If so, be certain to use a grommet (not supplied) to protect the sensor cable from being cut by the hole’s sharp edges.

A better method is to thread the cable through the existing watertight bulkhead connector. Using a piece of piano wire attached to the end of the cable will make this easier. On some vehicles, the wrapping is too tight to pass another wire. Try piercing a small hole through the rubber membrane just large enough to pass the sensor cable.

- b. Route the sensor cable through the existing wire loom where ever possible. Plastic wire wraps are useful. Ensure that the sensor wire is not exposed to the exhaust manifold or other hot surfaces. Also ensure that the sensor wire is not exposed to belts or other moving components.
- c. Strip the white cable sheath to expose the sensor wires.
The sense wires are color coded as follows:

Four Cylinder F/I Spy-4™		Six Cylinder F/I Spy-6™		Eight Cylinder F/I Spy-8™	
Cylinder #	Wire Color	Cylinder #	Wire Color	Cylinder #	Wire Color
1	Red	1	Red	1	Red
2	Yellow	2	Yellow	2	Yellow
3	Green	3	Green	3	Green
4	Black	4	Black	4	Black
		5	Yellow	5	Red
		6	Green	6	Yellow
				7	Green
				8	Black

- d. Two methods of attaching the sensor wires to the Fuel Injector lines are possible.
 - I. Attach the sensor wires to the F/I wiring at the fuel injector.
 - II. Attach the sensor wires to the F/I wiring at the ECU.

Method I:

Fuel injectors have two wires. One wire is attached to the positive supply. The other wire is connected to the ECU. Attach the sense wire to the ECU wires using the supplied blue T-tap connectors.

Method II:

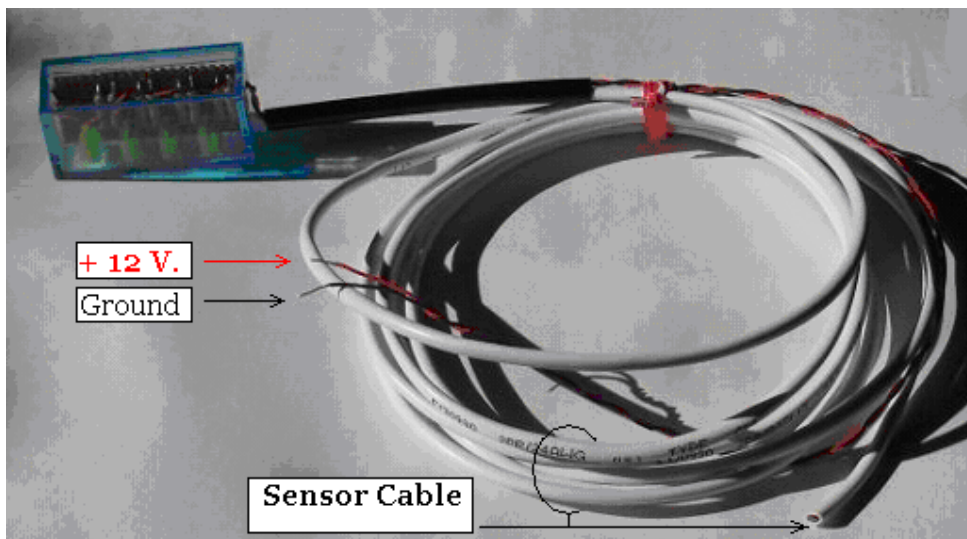
You must have the wiring code for your vehicle to identify the wire color code and connector location of the Fuel Injector wires. Attach the sense wire to the ECU's F/I wires using the supplied blue T-tap connectors.

3 Connecting F/I Spy™ to Vehicle Power

The F/I Spy has two small power wires. One wire is red and the other wire is black. These wires exit the case near the white sensor cable. They share a short piece of black shrink tubing with the white sensor cable, which acts as a strain relief.

The red wire should be connected to a source of switched +12 volt power. Use the red plastic wire splice provided.

The black wire should be connected to chassis ground. Make certain that the connection point you choose is electrically attached to chassis ground.



Checking Your Wiring and Initial Operation

a. Turn on your vehicle but do not start it.

All of the Yellow LEDs should illuminate.
All of the Green LEDs should remain dark.

b. If you see just the Yellow LEDs illuminate, then start your engine.

The Yellow LEDs should be brightly illuminated with only brief off flickering
The Green LEDs should flicker on very briefly.

c. If you see the above flickering then drive your vehicle.

On acceleration, the Green LEDs should brighten and stay on longer.
On deceleration the Green LEDs should go off or flicker on very briefly.
The Yellow LEDs should have an inverse appearance to the Green LEDs.

Trouble Shooting

1. No LEDs illuminate when vehicle is running
 - Check power and ground connections.
 - Check vehicle fuses and your wiring.
2. Yellow LEDs do not illuminate when key is turned on.
 - Check connection from sensor wire to Fuel Injector wires.
 - Check vehicle fuses and your wiring.
 - ECM Failure
 - No ECM power
 - Dead battery
3. Green LEDs illuminate when key is turned on.
 - Vehicle Fuel Injectors operate on reverse logic
 - Sensor wires connected to ground or shorted to ground
 - ECM Failure.
4. Yellow LEDs illuminate but do not flicker when engine is running AND Green LEDs do not flicker on.
 - Sense wires attached to wrong Fuel Injector wire.

Cautions

It is always advisable when working on an automobile equipped with airbags to remove the ground wire from the battery prior to performing maintenance. This *may* cause your automobile to act differently for the first few miles as your ECU (computer) readjusts.

Incorrect wiring can prevent your vehicle from starting or running.

Since F/I Spy™ requires very little current for operation, no fuse is supplied. However, incorrect wiring can cause an existing fuse to blow.

It is unlikely, but possible, that incorrect wiring could cause one or more F/I Spy™ wires to burn open. The small wire size is very unlikely to start a fire.

If you are unsure of your technical knowledge, have a professional mechanic or electronics specialist install your F/I Spy™.

Limited Liability

SD Electronics Design, LLC is not responsible for damages caused by improper installation of the F/I Spy™. Liability is strictly limited to product replacement or reimbursement of the purchase price of F/I Spy™. We are not responsible for misuse. We explicitly make no claims as to usefulness or diagnostic capability of F/I Spy™

Trademarks

T/I Spy™ is a trademarked product of SD Electronics Design, LLC a South Dakota Limited Liability Corporation.
Patent applications are pending.

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Warranty

F/I Spy™ is warranted to be free of defects for a period of 30 days. We may repair or replace the device if it fails for any reason other than installation error. Return the unit to your point of purchase or mail in a suitable box to:

Attention: Warranty Services
SD Electronics Design, LLC
Street Address
City, State Zip

Statement of Origin

F/I Spy™ is assembled in the United States of America from parts manufactured in the USA and several foreign countries.