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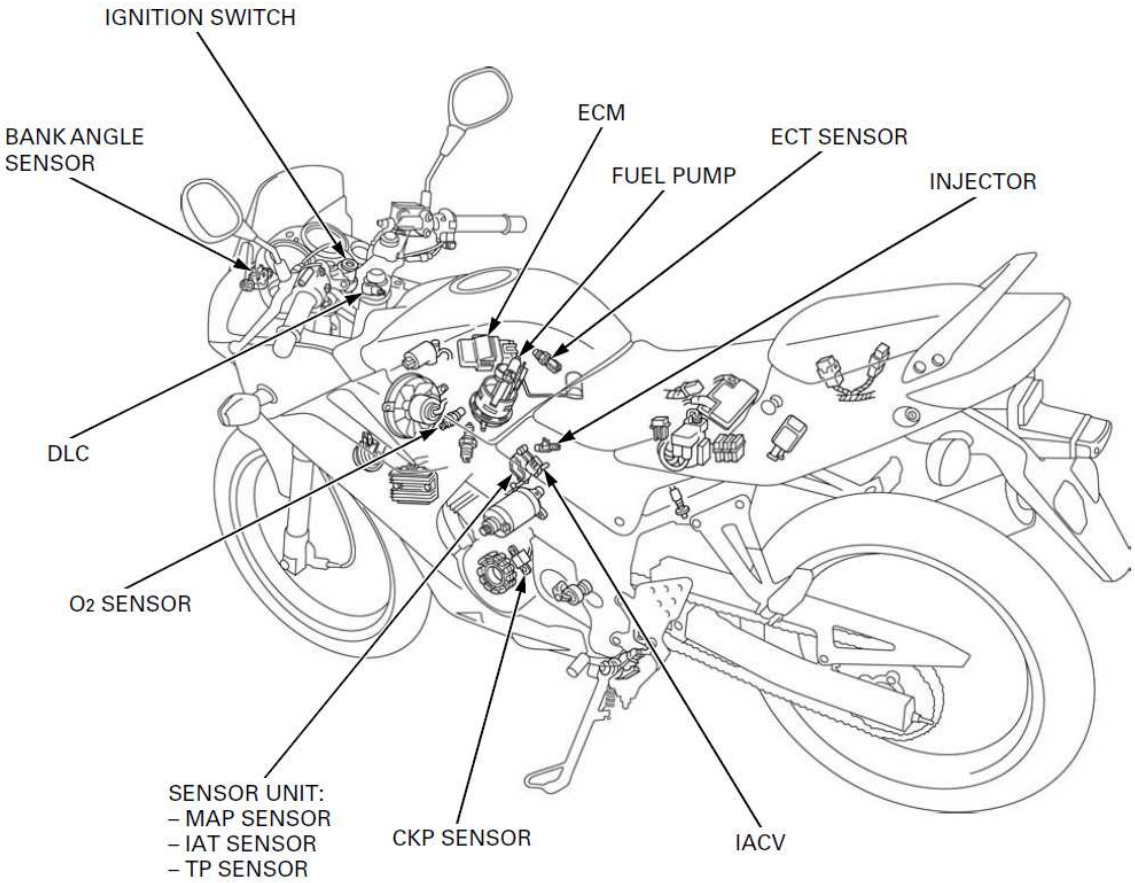
Fuelino Proto3 installation manual on Honda CBR125R

System layout

The electronic components related to electronic fuel injection are located according to the scheme below. The components which can be interfaced with Fuelino are:

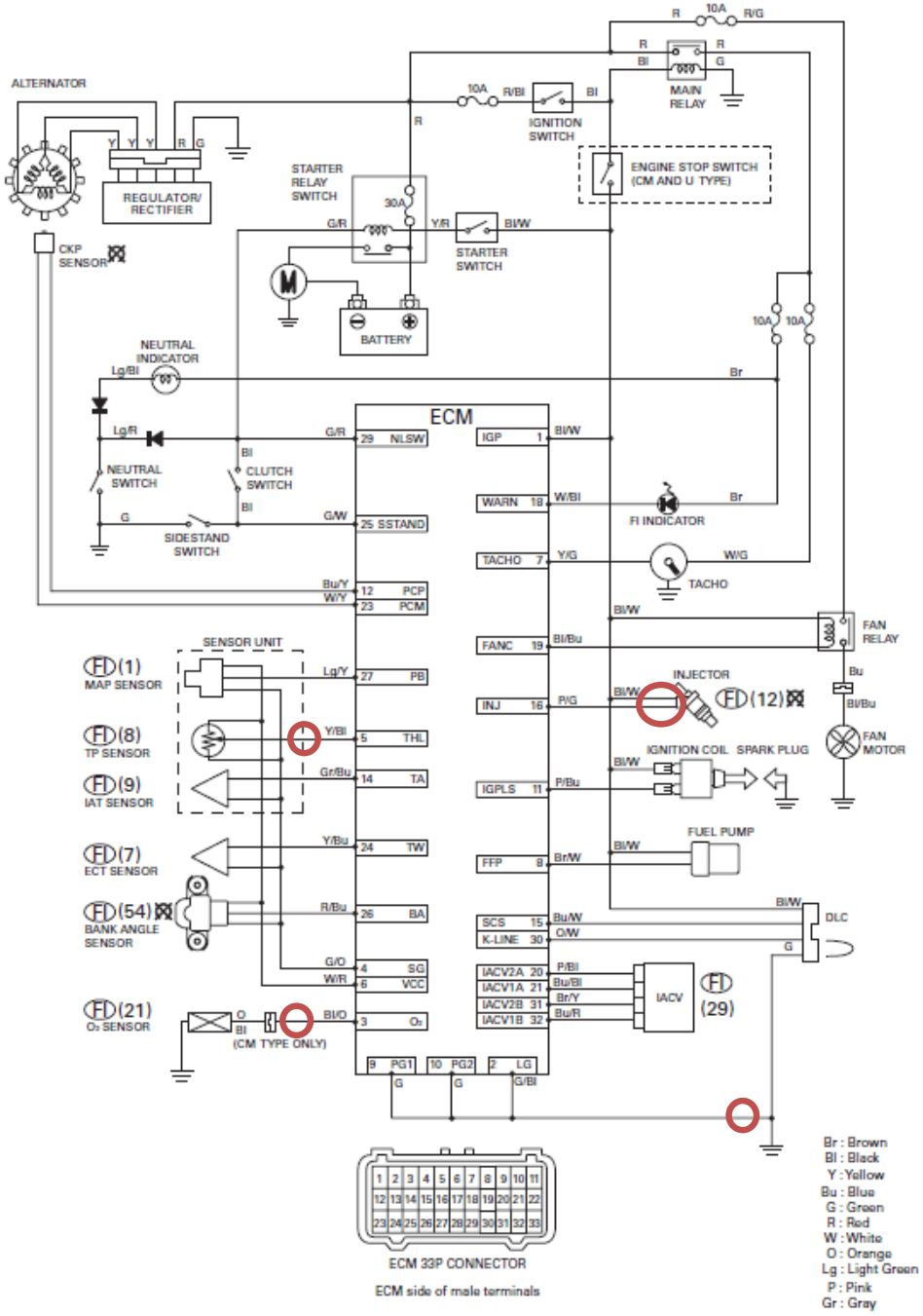
- Injector
- O2 Sensor (Lambda sensor), optionally. This signal might be used, optionally, by Fuelino software strategy, to regulate the injector command, or for logging.
- TP Sensor (Throttle position sensor), optionally. This signal might be used, optionally, by Fuelino software strategy, to regulate the injector command, or for logging.



Honda CBR125R Electrical Wiring Diagram

The signals which have to be acquired by Fuelino are highlighted below, with red circles.
Injector signal (+12V, injector command IN, injector command OUT), and ground, must be connected. Optional signals are: throttle position sensor signal, and O2 sensor (lambda).

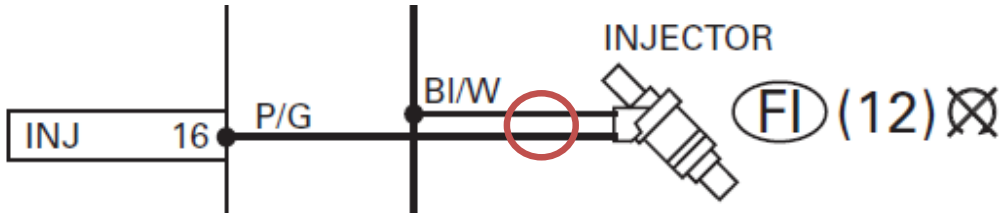
PGM-FI SYSTEM DIAGRAM



Fuel Injector signal

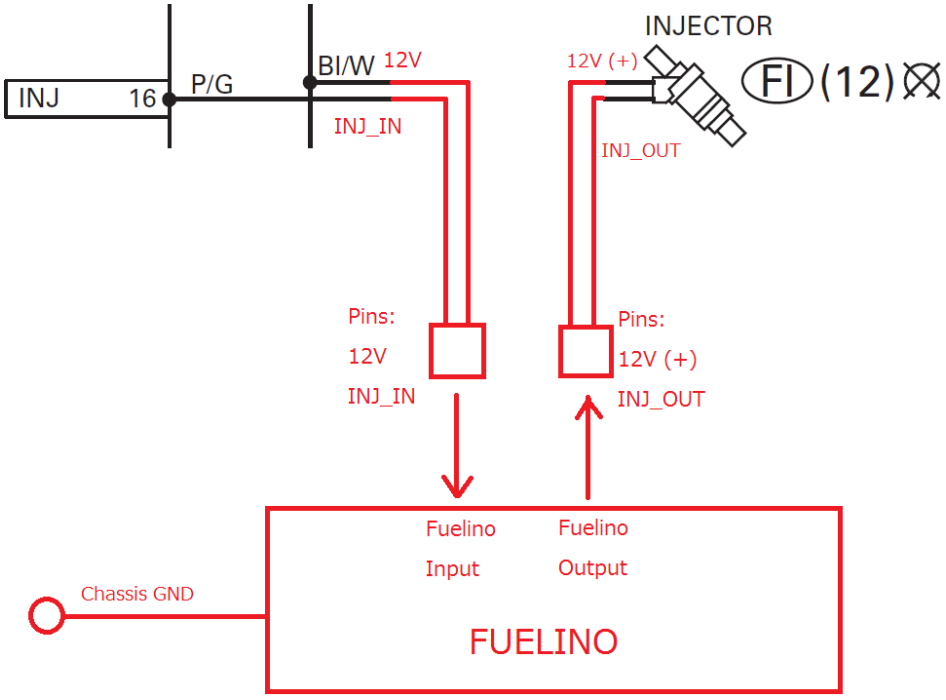
The injector connector has 2 pins, as shown in the figure below. We can call them, simply, “plus” (+) and “minus” (-).

- “+” pin is constantly connected to the +12V. This signal becomes 12V (battery voltage) when the motorcycle key is turned ON. → Cable color: Bl/W.
- “-“ pin is connected to the original ECU (manufacturer: Keihin). The ECU closes this pin to ground, by a MOSFET, to command the injector “ON”. In other words, when the injector is controlled “closed”, no gasoline flows, and “INJ” voltage is 12V (because no current flows into the injector electrical circuit); on opposite, when the original ECU commands ON to the injector, the injector “opens”, gasoline flows, and INJ pin voltage becomes 0V (MOSFET is closed to GND). → Cable color: P/G.



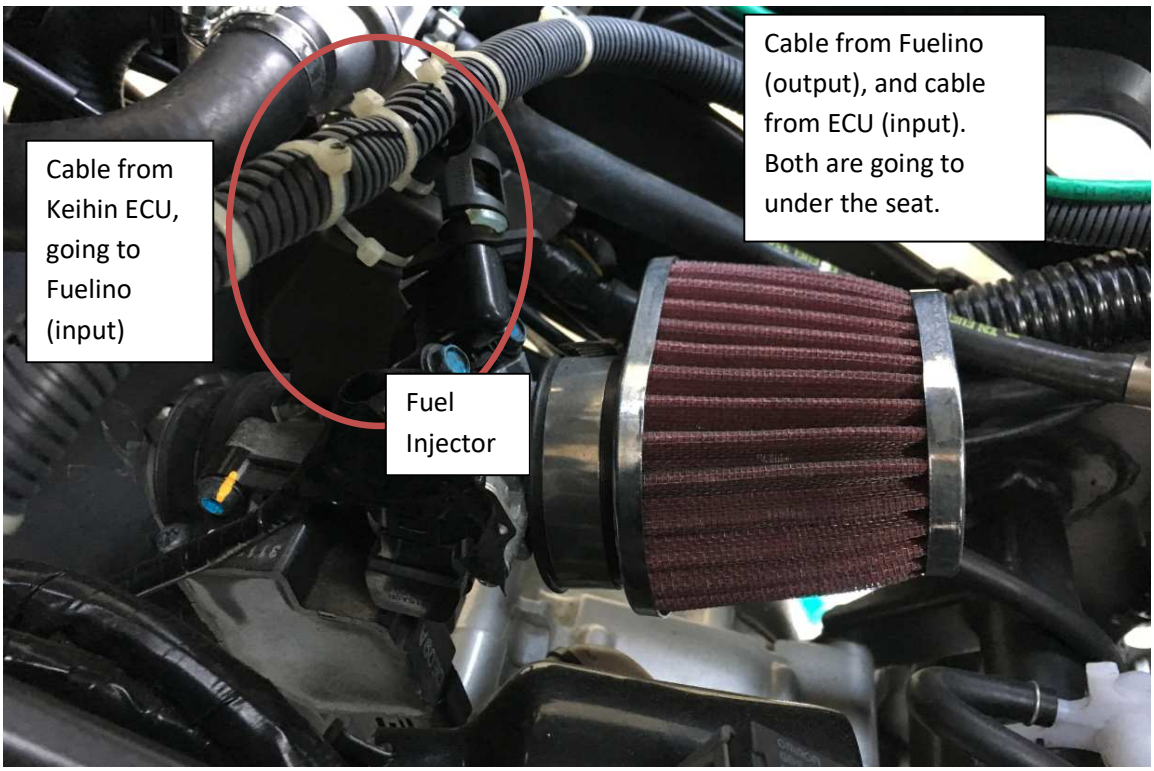
At first, you should cut the 2 pins on the injector cable, and connect them to Fuelino as below. Basically, Fuelino will work as a “man in the middle” between the original ECU circuitry, and the physical injector. In order to perform this step, you will need some cables, cutters, and 2-poles connectors. There is much flexibility in doing this, so you can do as you wish. I recommend you to solder the contacts, after cutting, so that the vibrations will not cut the electrical connections after using the motorcycle for many kilometers.

The scheme below is the most minimal installation of Fuelino: just injector signals, and ground, are connected.

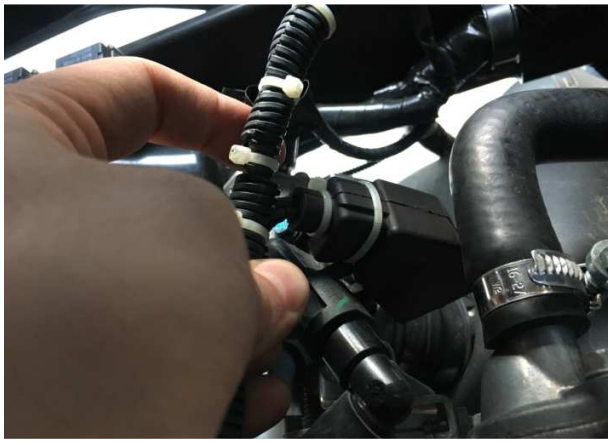


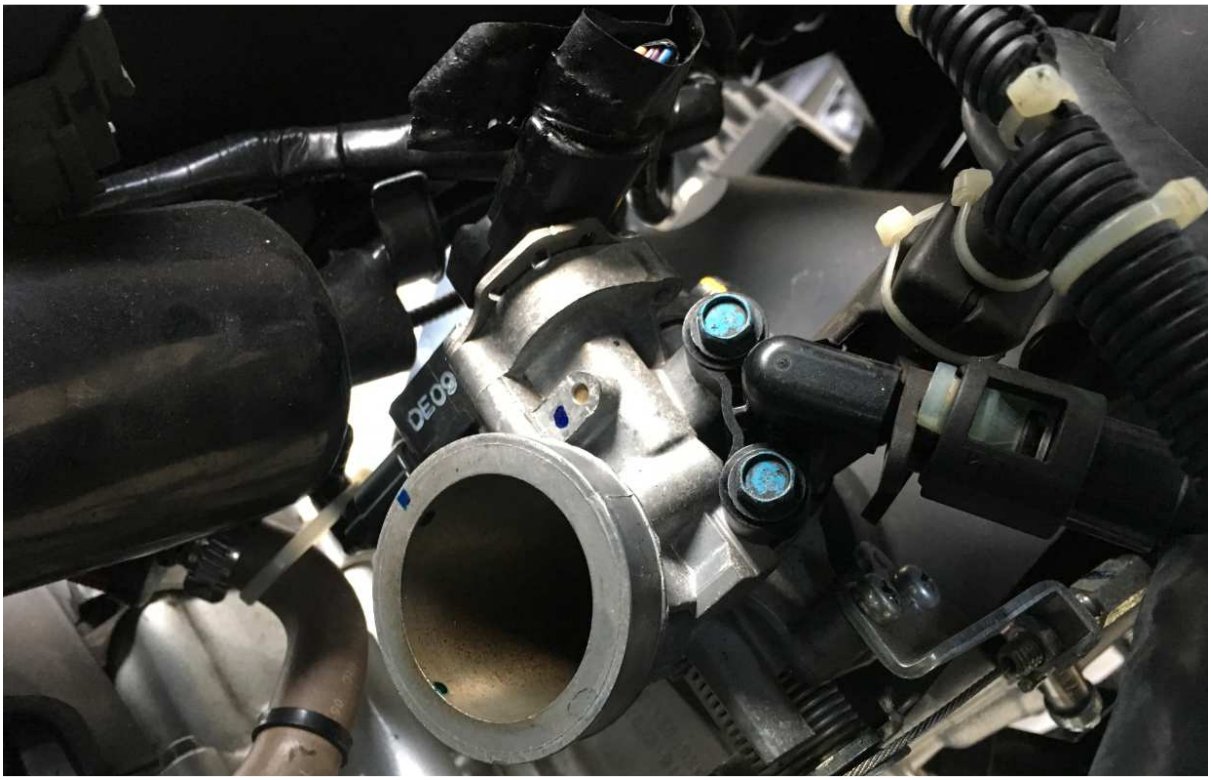
For this modification, you can intervene directly on the Keihin ECU connector cables.

Or you can intervene as below, which is the same as visible in the theoretical scheme in the previous page. There are 2 cables: one is from the original Keihin ECU (12V, INJ_IN), and one is Fuelino output (12V, INJ_OUT). Both cables are going under the seat, so they can be easily connected to Fuelino. To summarize, there are 2 cables, each one with 2 pins, going under the seat.



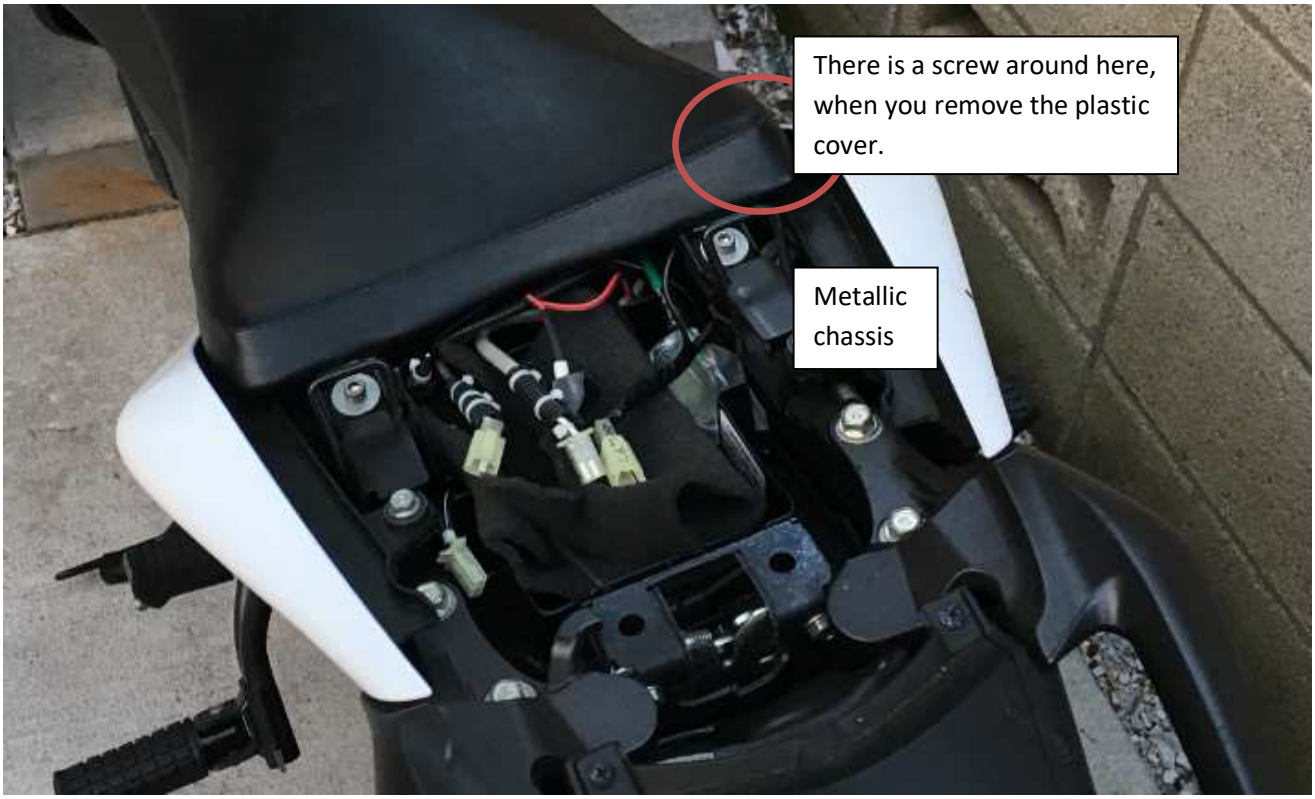
Some other pictures of this installation example are shown below.





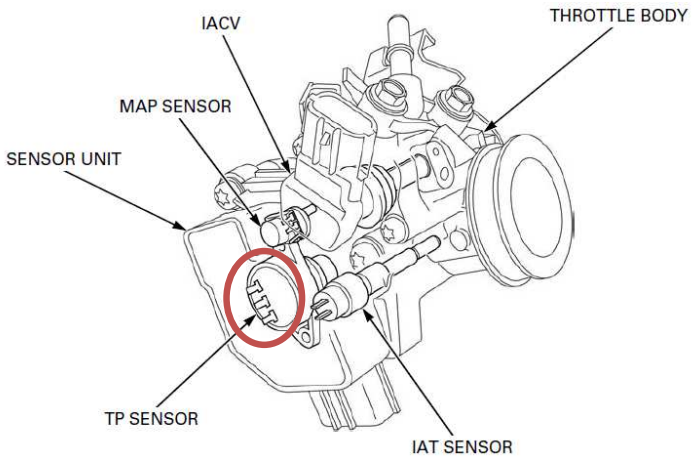
Ground cable connection

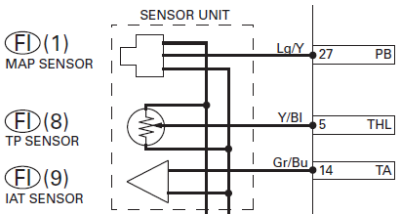
As the “ground” connection (0V), you have many options.
For example, you can connect Fuelino directly on the Keihin ECU wiring harness, but it requires a long cable. Or you can connect it to the battery “minus” (black) pole.
In my opinion the best choice, to save cable and to reduce electrical noise, is to connect Fuelino ground pin directly to the motorcycle chassis, as shown in the picture below (red circle).
You should remove the plastic, and behind it there is a screw. You can connect there.
Make sure that the ground connection is good. A bad ground connection might cause noise, due to ground shifts.



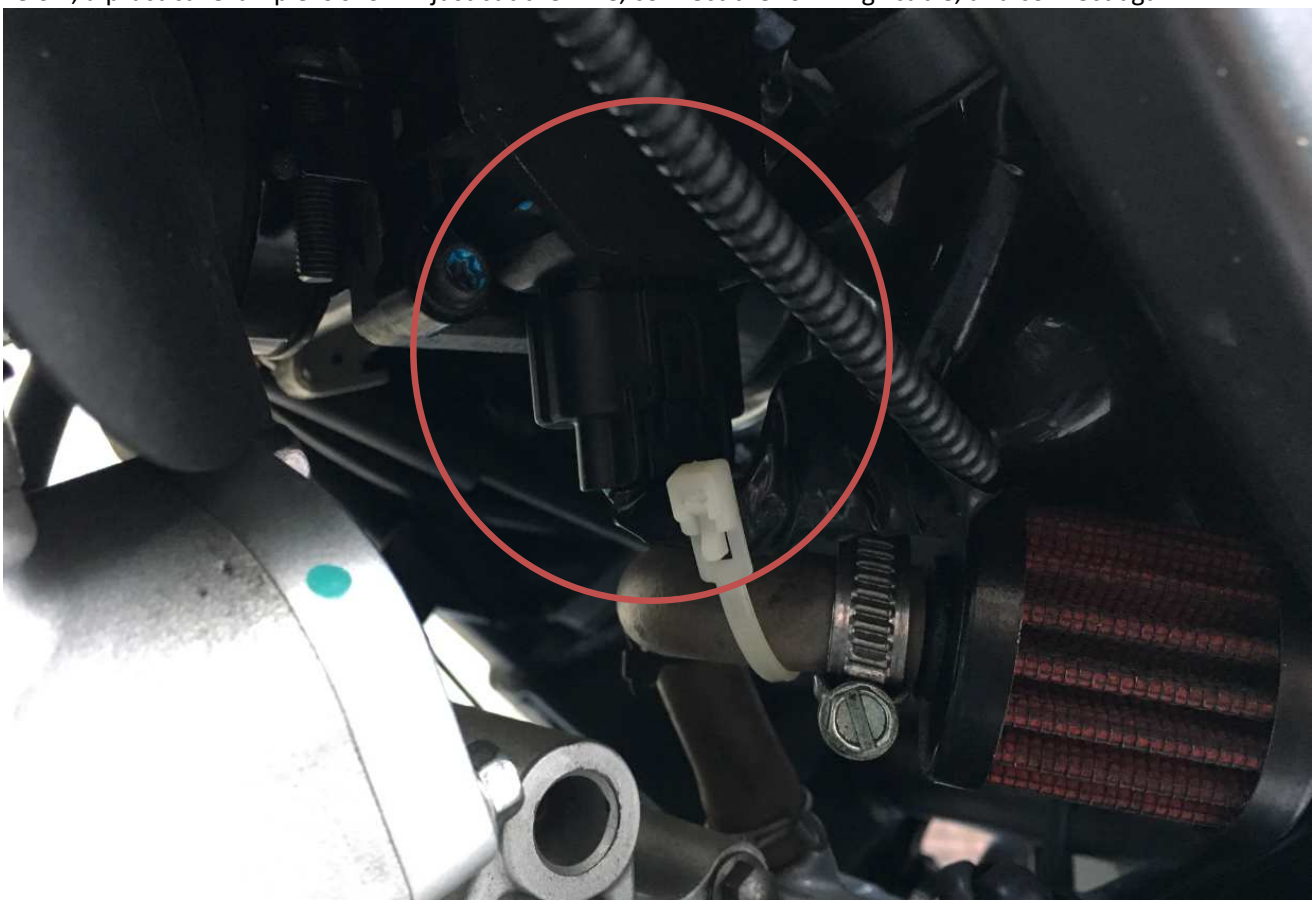
Throttle Position Sensor, and Lambda Sensor signals (optional)

The signal of Throttle Position Sensor can be obtained from the connector below (or directly on the cables coming out from the Keihin original ECU). The signal is named “THL” and the cable color is Y/Bl.

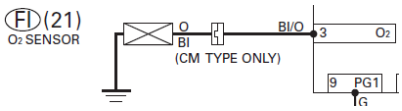


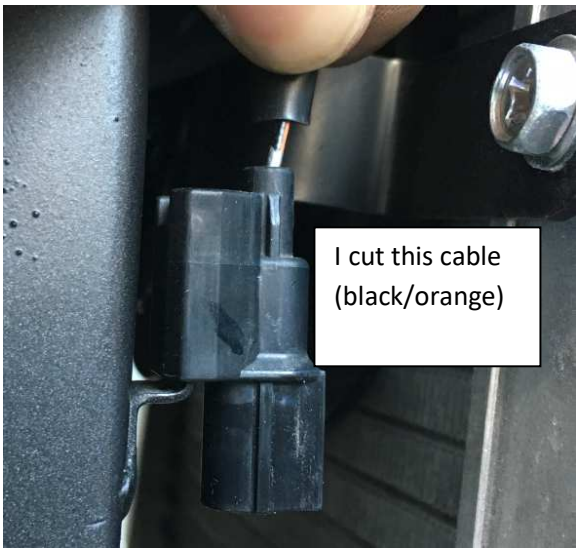


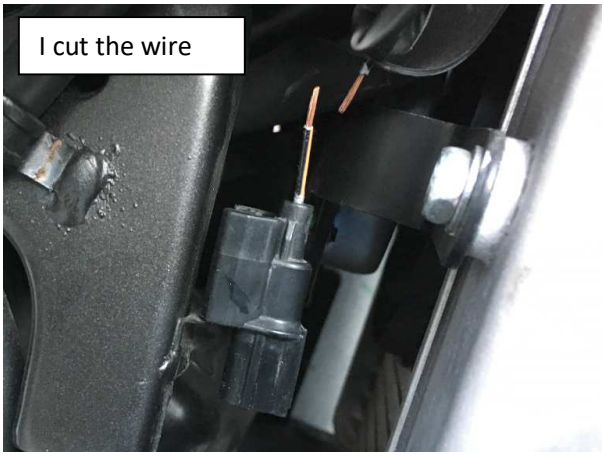
Below, a practical example is shown: just cut the wire, connect the “sniffing” cable, and connect again.



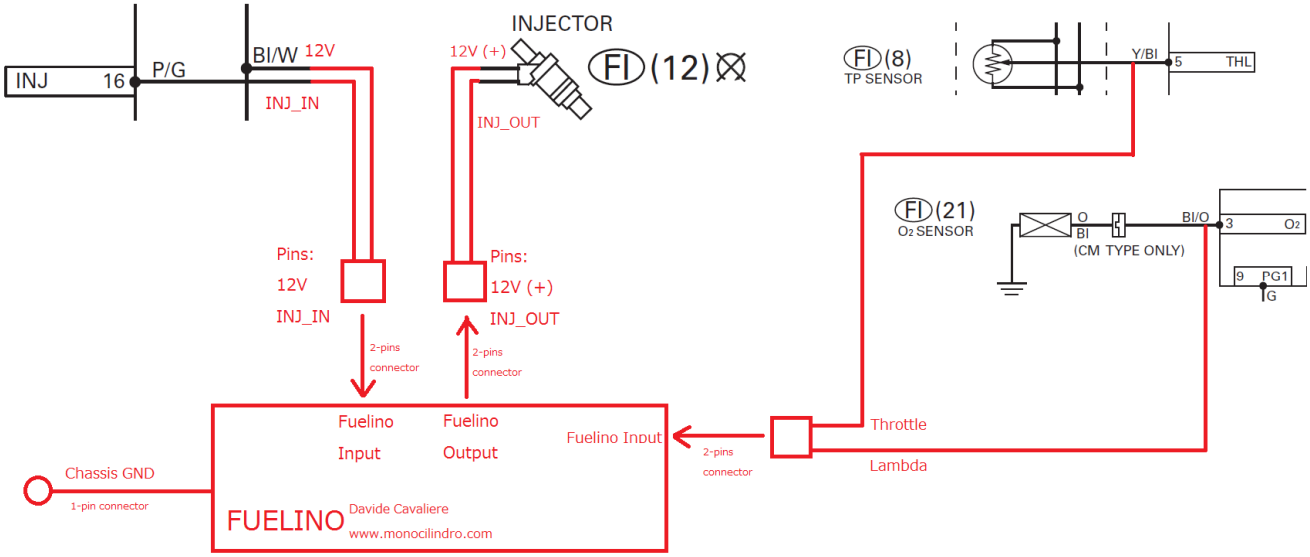
For the Lambda sensor (O2 sensor), it is quite the same as for the throttle signal: it is necessary to “sniff” the signal coming out from the Lambda sensor. You can just cut the lambda sensor wire, connect a sniffing cable, and crimp again, as shown below.





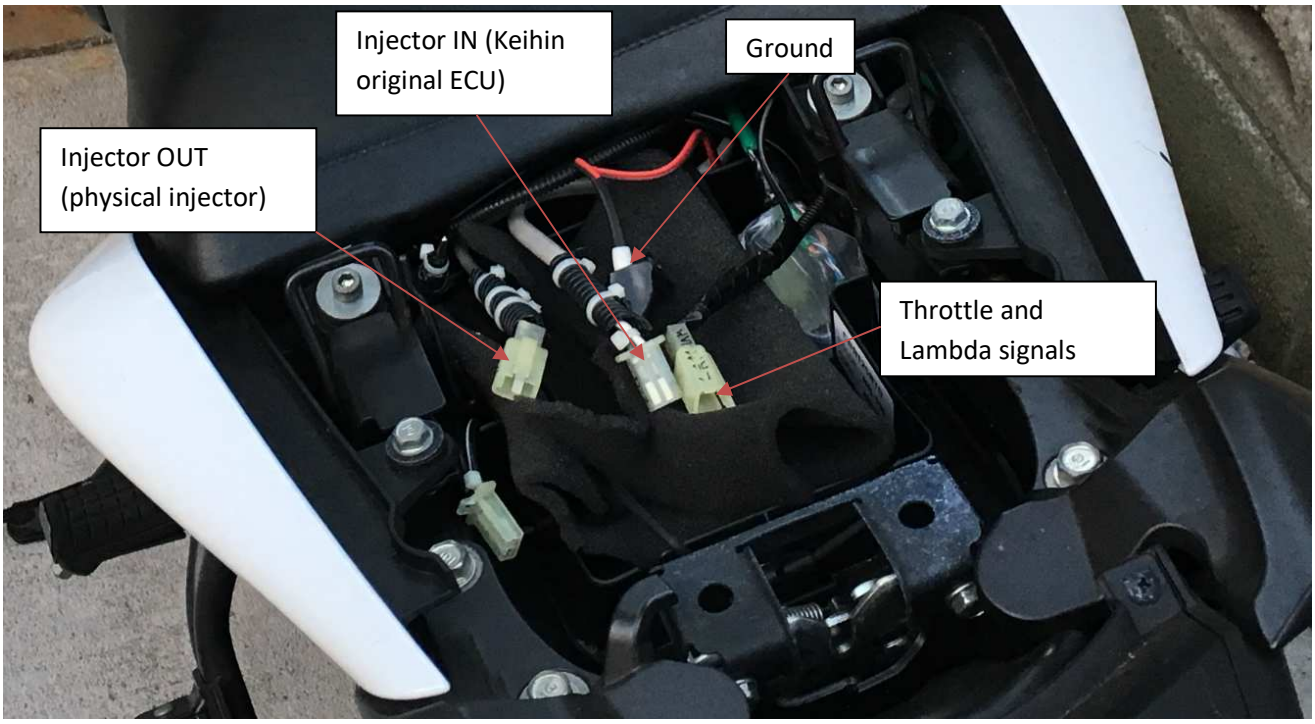


In case you connect also these 2 optional signals (Throttle and Lambda), the complete connection scheme becomes as following.



Connection with Fuelino

As an example of installation, all the wires needed by Fuelino are going under the passenger seat, which is the place in which Fuelino is installed. Therefore, Fuelino can be easily installed and removed in less than 1 minute.

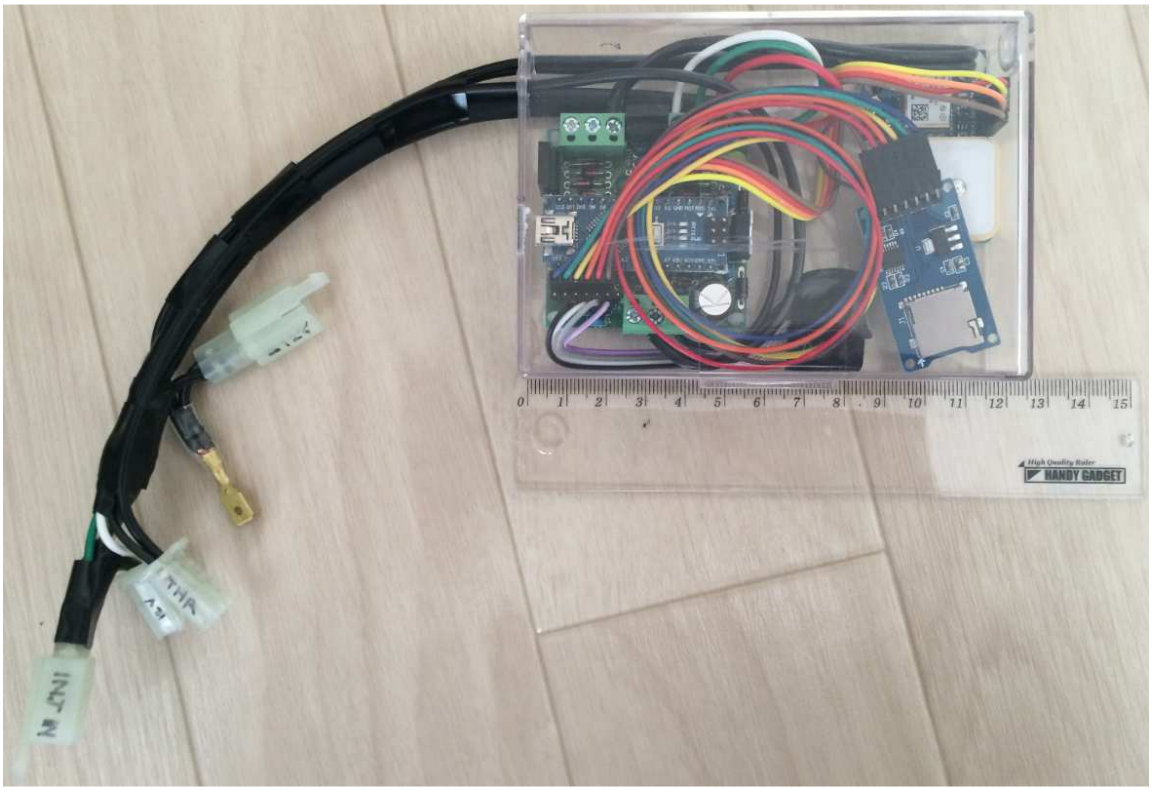


The picture below shows an example of complete Fuelino Proto3 system. It has the following connectors:

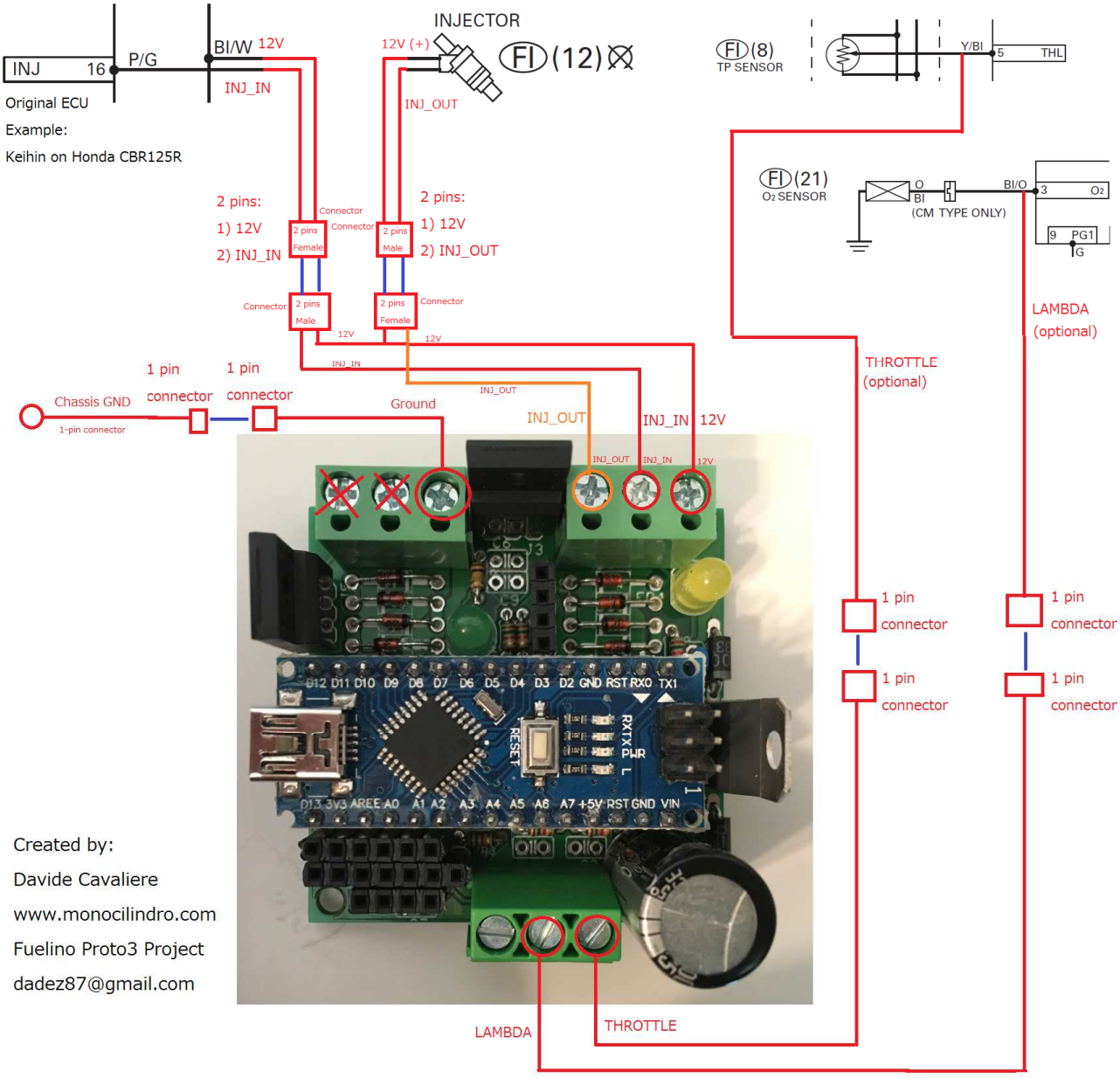
- Injector IN (from Keihin original ECU)
- Injector OUT (to CBR125R injector)
- Ground (0V)
- Throttle Position Sensor, and Lambda (O2) Sensor signals. 2 pins on the same connector.
- Output power supply (+12V, GND) in case you want to connect an external load, for example a 12V to USB converter. [this is not really needed, it is just something that you can add optionally]

Inside the plastic cover, the following units are connected to Fuelino Proto3 board (5cm x 5cm):

- Catalex Micro SD card module, via SPI communication protocol.
- MPU6050 IMU (Inertial Measurement Unit), to acquire acceleration and gyro signals, via I2C communication protocol.
- Ublox NEO 6M GPS (Global Positioning System), to acquire UTC time, and position (latitude and longitude) for real speed calculation (km/h). Connected via USART communication protocol.



The following picture shows the electrical wiring on a Fuelino Proto3. The schematic is general: of course it is valid for a Honda CBR125R, but it may be extended also to other motorcycles equipped with Electronic Fuel Injection, such as: Kawasaki Ninja 250R, Kawasaki D-Tracker 250, Honda CBR250R, Honda CRF250L, Yamaha R125, Yamaha R25, Aprilia RS4 125, KTM Duke 125, KTM Duke 250, KTM Duke 390, and so on.



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