



SE-EFI

Small Engine Electronic Fuel Injection
– Conversion Kit

Junior 206

Installation Manual

ECOTRONS LLC

V1.4

COPY RIGHTS ECOTRONS

ALL RIGHTS RESERVED

Note: this manual is written based on a conversion with a Junior206 engine, but it can also be used as guidelines for other similar engines. Some common sense shall be used to convert different engines. If you are not sure about any specific details, please contact us at info@ecotrons.com.

Junior 206 Engine Fuel Injection kit



**ECOTRONS**



Software and Documents



SE-EFI Kit

| | |
|--|----|
| Introduction | 2 |
| Chapter1 Installation Procedures..... | 5 |
| 1 Install the throttle body assembly..... | 5 |
| 2 Fuel tank modification..... | 10 |
| 3 Install fuel supply system..... | 12 |
| 4 Install ECU harness..... | 14 |
| 5 Electronic Control Unit..... | 16 |
| 6 Harness Routing..... | 16 |
| 7 Hall sensor wire splices..... | 17 |
| 8 KEY ON Switch..... | 29 |
| 9 Install the IAT sensor..... | 30 |
| 10 Install the ECT sensor..... | 30 |
| 11 Connect the injector..... | 31 |
| 12 Connect the MAP Sensor..... | 31 |
| 13 Connect Tps sensor..... | 32 |
| 14 NB O2 sensor installation..... | 33 |
| 15 Connect 12V +/- wire..... | 34 |
| Chapter 2 Initial test and diagnostics after the installation..... | 35 |
| Chapter 3 How to install the provided EcoCAL software to your computer?..... | 38 |
| Chapter 4 How does the performance switch work?..... | 45 |
| Appendix I: Wiring harness diagram..... | 46 |
| Appendix II: ECU main connector pin-out..... | 48 |

Introduction

SE-EFI is an Electronic Fuel Injection conversion kit for small engines. This install procedure is a customized version for the Junior 206. It is only a hardware installation guide. It does not cover any tuning or ECU Programming. The locations of the components are up to you, the ones shown here are preferred locations by some early adopters.

This EFI kit has below features:

- Electronic fuel injection (EFI)
- Quick engine start even at cold temperatures
- More power and torque than the carbureted version
- High fuel efficiency and low carbon emissions
- Decel-fuel-cut-off
- OBD - on board diagnosis
- Performance tuning for advanced users.

Parts:

1. ECU
2. Harness (including the connectors)
3. Throttle Body and Intake manifold Assembly
 - Throttle body (including TPS sensor)
 - Intake manifold
 - Fuel injector
4. Fuel pump assembly
 - Fuel pump assembly (outside of the tank)
 - Fuel filter
 - High pressure fuel line
 - Fuel hoses T-Pipes Clamps

5. MAP sensor
6. Engine temperature sensor
7. Intake air temperature sensor
8. Hall Effect sensor (S-pole)
9. Serial communication cable (to a computer)
10. USB adaptor – included
11. Oxygen sensor and bungs (optional)
12. CDI – ECU controlled (optional, you can use your own CDI).
13. Ignition Coil –CDI driven type coil (optional)
14. CD for tuning software (downloadable from our website)

Note: **the kit needs 12V charging system for power supply.** The charging requirement is 3A current max or 45W power as the minimum. This kit may need tuning to achieve some desired results.

Though the EFI is meant to reduce the emissions than a carb system, this kit is not certified for any emission regulations. It is the user's responsibility to find out whether it's legal to use it.

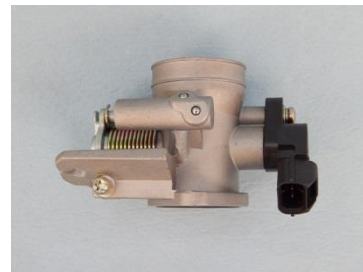
Major components:



ECU



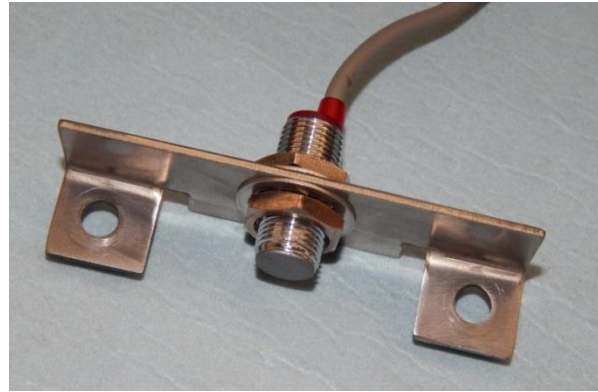
Harness



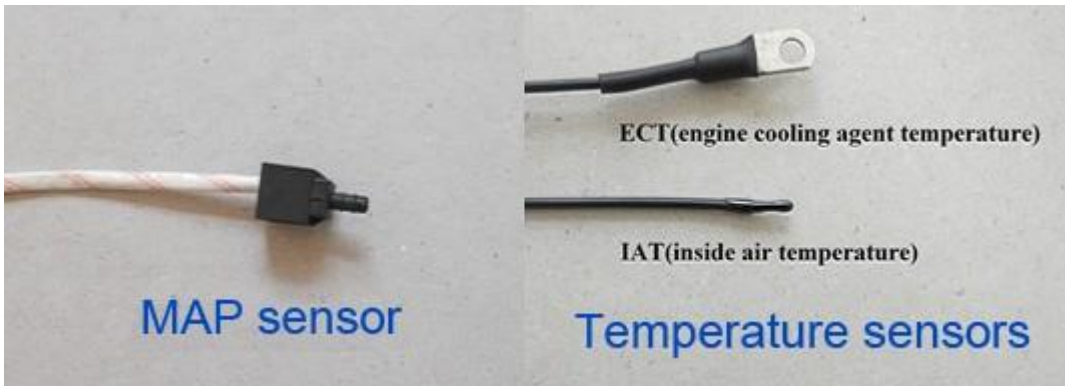
Throttle body



Adapter



Hall Effect sensor



MAP sensor

ECT(engine cooling agent temperature)

IAT(inside air temperature)

Temperature sensors

MAP sensor

Temperature sensors



Fuel pump assembly

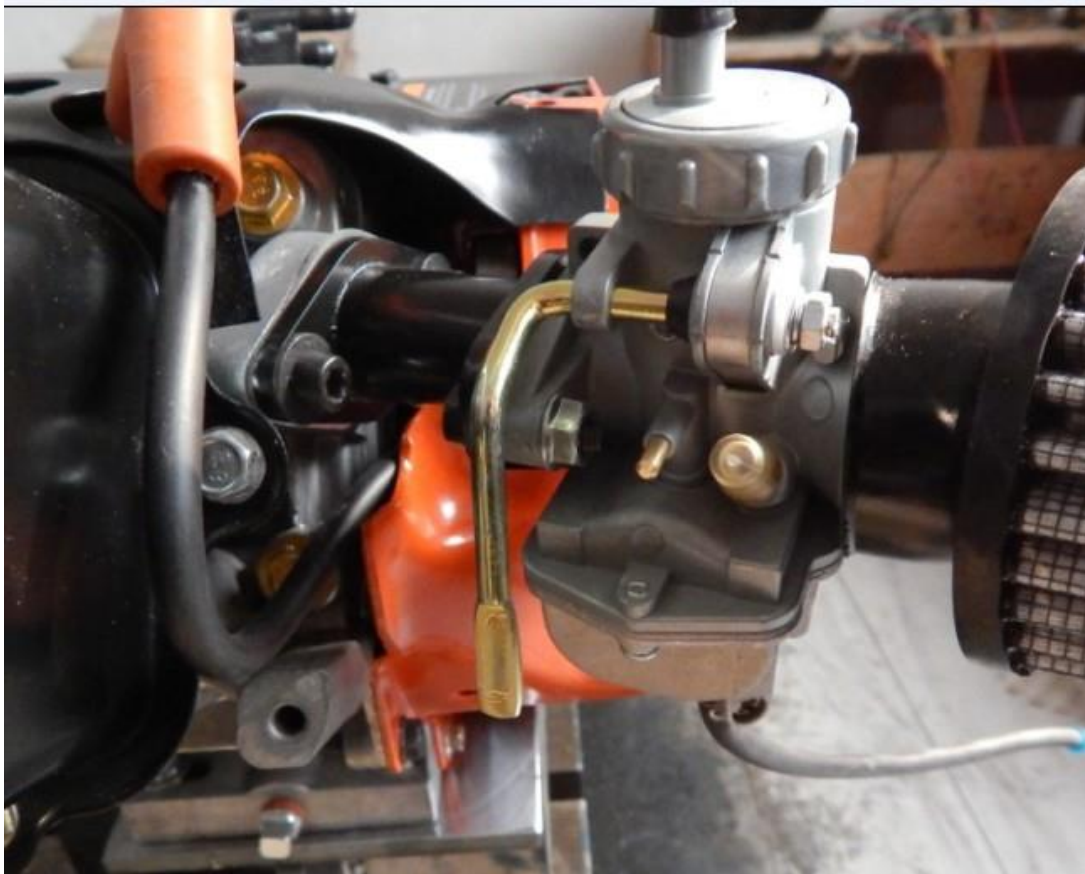
Chapter1 Installation Procedures

1 Install the throttle body assembly

1.1 Remove the carburetor from the engine;

1.1. 1 Disconnect and remove the battery if you have.

1.1. 2 Remove the air filter and the carburetor.





1.2 Install the throttle body.

Install the throttle body at the same location of the carburetor; you may need an adapter if there is no such manifold that can fit.

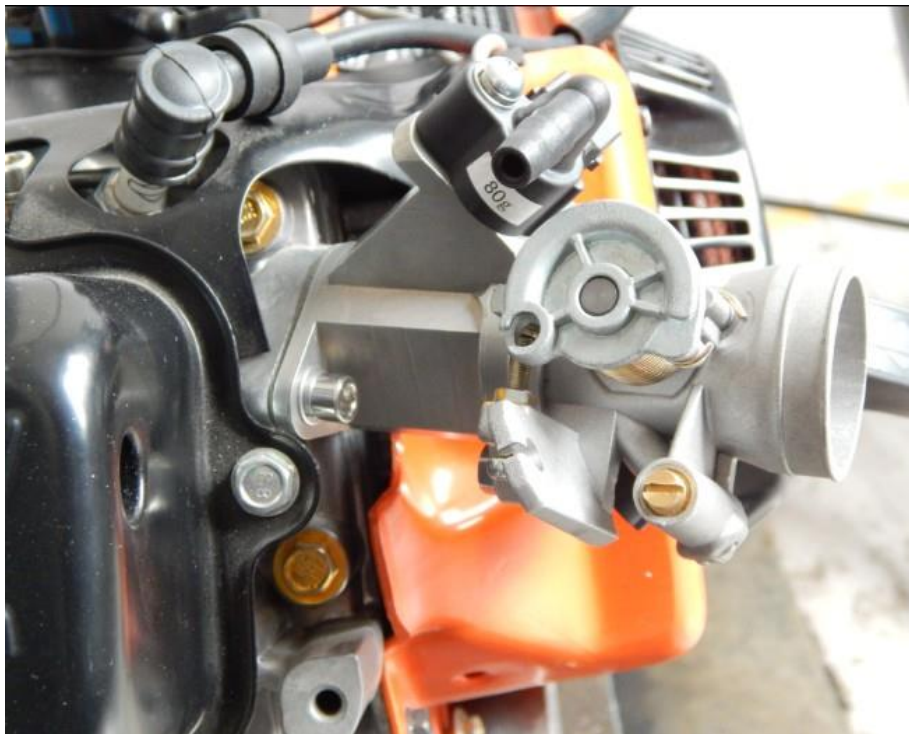
1.2.1 Install the adaptor



1.2.2 Install the fuel injector



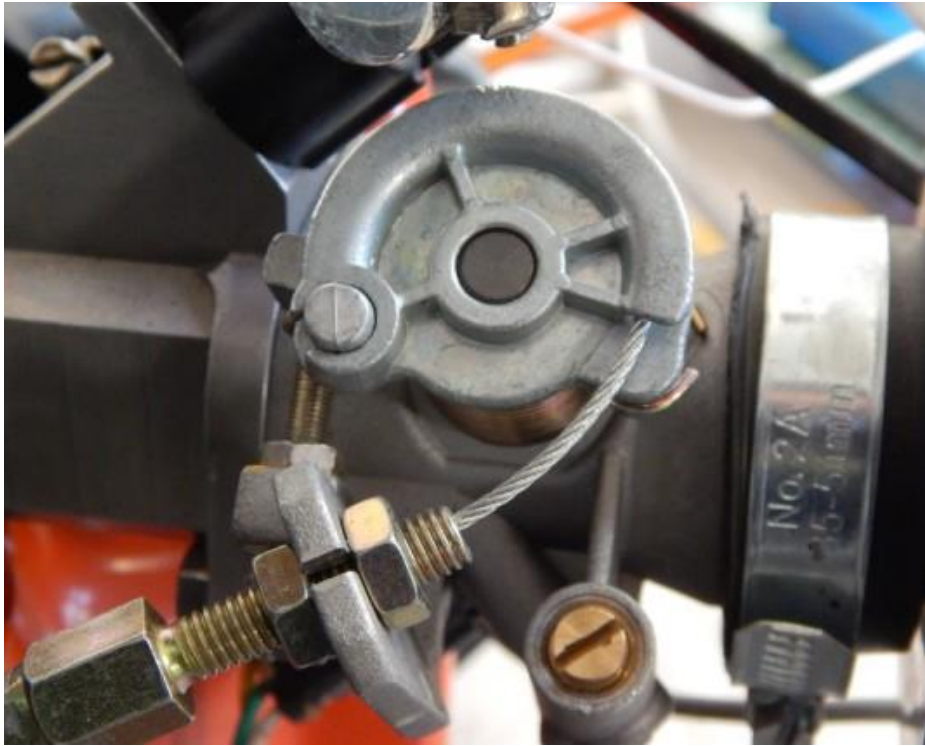
1.2.3 Install the throttle body.



1.2.4 Connecting the throttle body inlet to the air hose from the air filter;

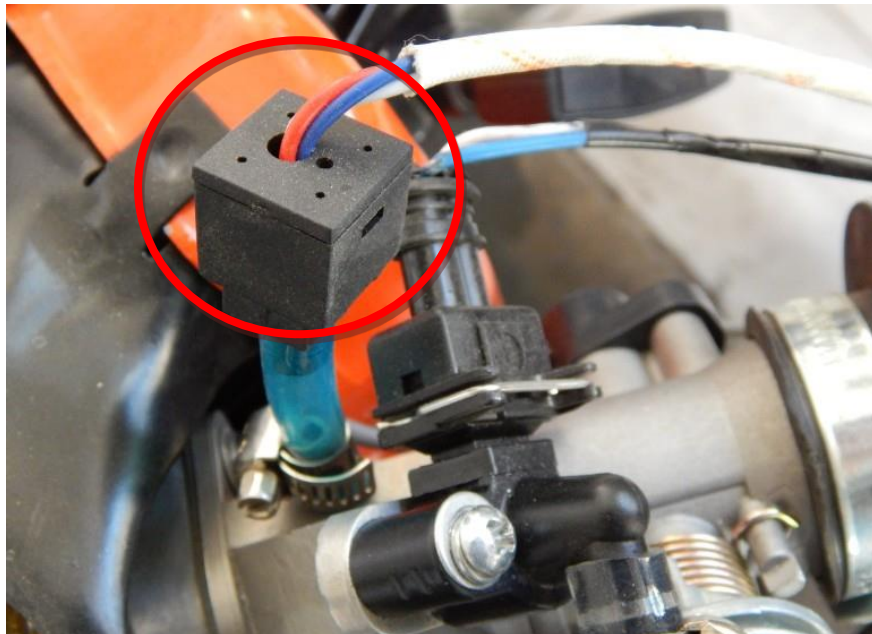


1.2.5 Install one suitable throttle cable to the throttle body. The stock exiting cable can't be used on the throttle body.



Note: The TPS sensor had been installed on the throttle.

1.2.5 Find a secure place to install the MAP sensor. You'd better fix it to the frame which can protect it from hot engine. And Connect the MAP sensor to the intake manifold with the small pipe.



NOTE: For the Map sensor, you need install it on throttle body with using a short hose; 5cm long is good, not longer than 10cm, and not is closed to engine block to avoid damage the Map sensor because of high temperature.

NOTE: make sure the MAP sensor hose is not severely bent, or not routed in circle; so that there could be a pocket that the fuel puddle is formed. Fuel puddle could damage the MAP sensor.

Too long a hose can cause big deviation of the sensor reading.

Incorrect installation of the MAP sensor can cause not-able-to-start engine, or it can short the MAP sensor life.

2 Fuel tank modification

2.1 This kit has a fuel return line which needs to be somehow feed-back to the tank. If your tank has an existing hole on the top (for example the vent hose between the tank and charcoal canister, or a possible hole through the fuel sender fixture). You can take advantage of that, and connect the fuel return line to that hole and make sure the fuel can be returned to the tank from the pressure regulator. (A T-pipe can be used here).

2.3 You need to drill a hole on the tank. First, drain the fuel tank completely! (WARNING: modifying the fuel tank with any fuel in it can cause fire!!!)

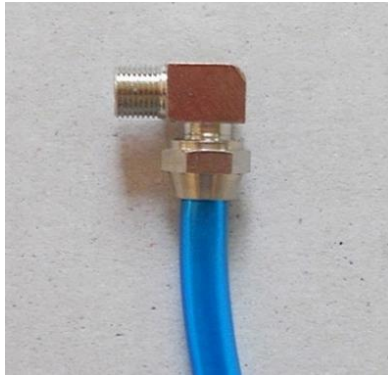
2.4 Take the fuel tank off, if necessary.

2.5 Drill a hole (diameter: **5mm~6mm**) on the upper wall of fuel tank, or just below the fuel tank cap.

2.6 Use provided fuel return-line nipple to fit to the tank and tighten it with a nut. And seal it.

2.7 Clean the fuel tank if any debris falling into it.

2.8 Install the fuel tank back.

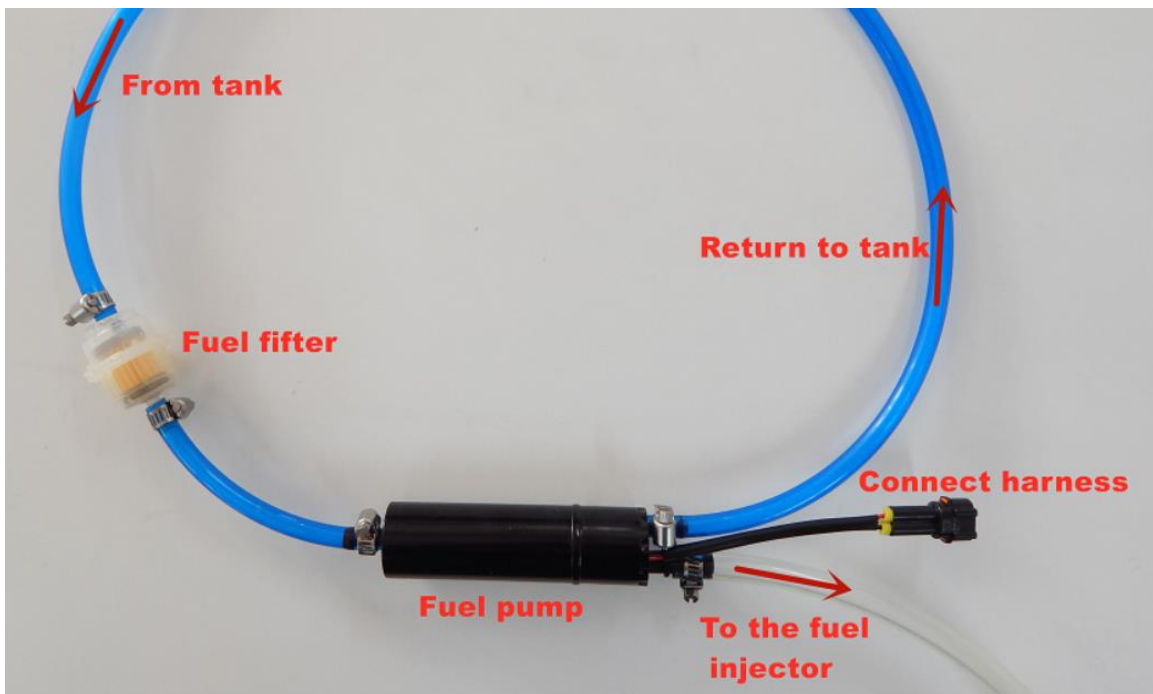


Fit the fuel returns line to the tank with the fuel tap.



3 Install fuel supply system

- 3.1 Find a **safe place** to install the fuel pump: it should be between the fuel tank and the throttle body, so that both the fuel feed line and the fuel return lines can be short; and it should be tied to the inside of the frame, so that it is protected by the frame. It should NOT be exposed to any external scratch or bump. It should not touch the ground when the motorcycle lies on the ground.
- 3.2 Connect the fuel feed line from the fuel tank outlet to the inlet of the fuel filter (fuel filter, by default, has been connected to the inlet of the fuel pump).
- 3.3 Connect the high pressure fuel lines from the fuel pump to the fuel injector, which is located on the intake manifold or throttle body, and the fuel pressure regulator.
- 3.4 Make the fuel return line return the fuel to the tank.
- 3.5 Secure all fuel lines with supplied clamps, make sure no leak.





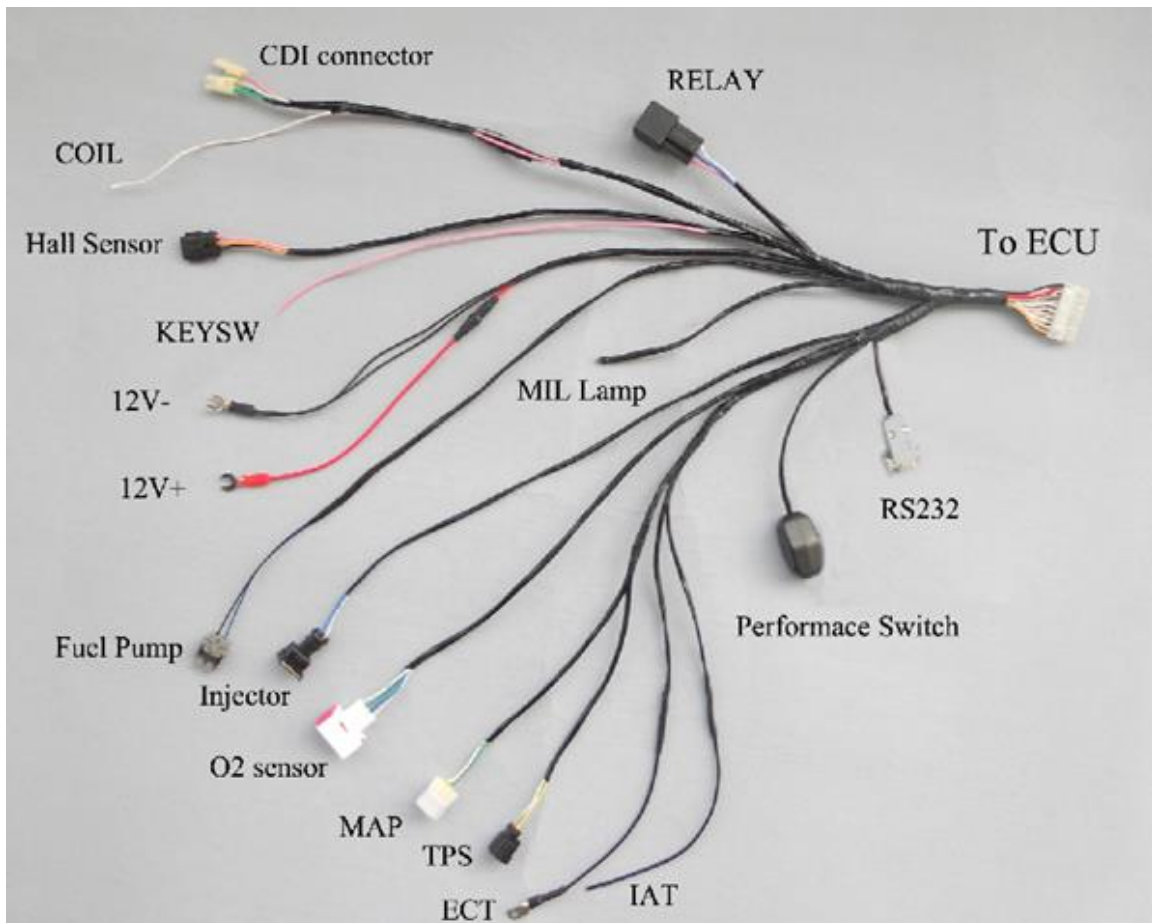
The fuel pump is a rotor type, has 25L/h flow rate. It has only limited sucking power. If there are too many air bubbles in the fuel lines, the pump will not work.

Air must be FULLY purged from all fuel lines before attempting startup. Any air bubbles will impede fuel flow and cause reduced performance or “No Start” condition.

4 Install ECU harness

Note: The only wire that can be connected to the +12V directly is the RED 12V+ wire. NONE of other individual wires should be connected to +12V battery directly. Otherwise the ECU could be damaged!

Here is a real harness picture:



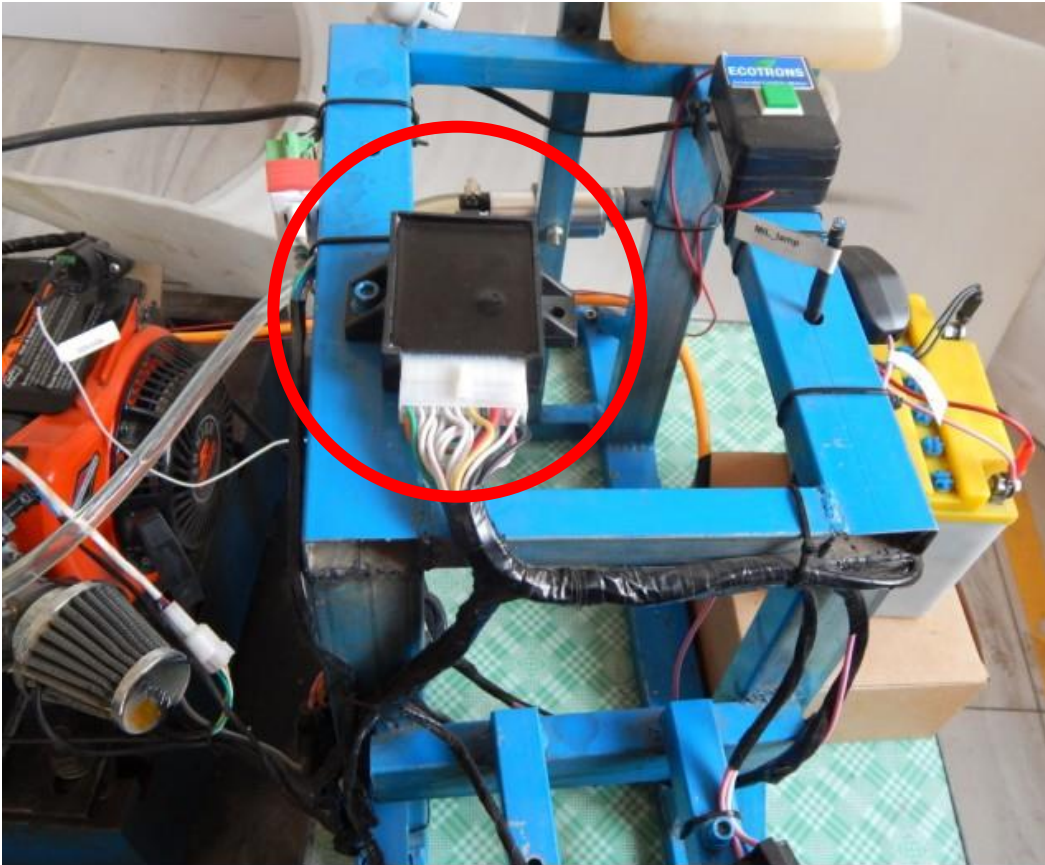
Label descriptions

| label | Descriptions | Notes |
|--------------------|---|--------------|
| ECU | Electronic Control Unit | |
| RS232 | Serial comm. cable to a PC computer | |
| O2 sensor | Oxygen sensor | |
| Fuel Pump | Fuel pump power and ground | |
| 12V- | Battery 12V- | |
| 12V+ | Battery 12V+ | |
| IAT | Intake Air Temperature sensor | |
| ECT | Engine (Coolant) Temperature sensor | |
| Performance switch | Manual switch to select fuel tables: ECO mode vs. Rich mode | |
| TPS | Throttle position sensor | |
| MAP | Manifold absolute pressure | |
| INJ | Injector | |
| Hall sensor | Connect HALL sensor | |
| CDI Connector | CDI unit | |
| Coil | Coil control wire from CDI | White |
| KEYSW | Key On switch (previously called IGNSW) | Pink |

Note: the wire color scheme may be different for old versions. If your harness looks different than the one in the picture, please contact us for exact wiring info.

5 Electronic Control Unit

Install Ecotrons' ECU unit at a suitable place, such as fixed it on the frame.



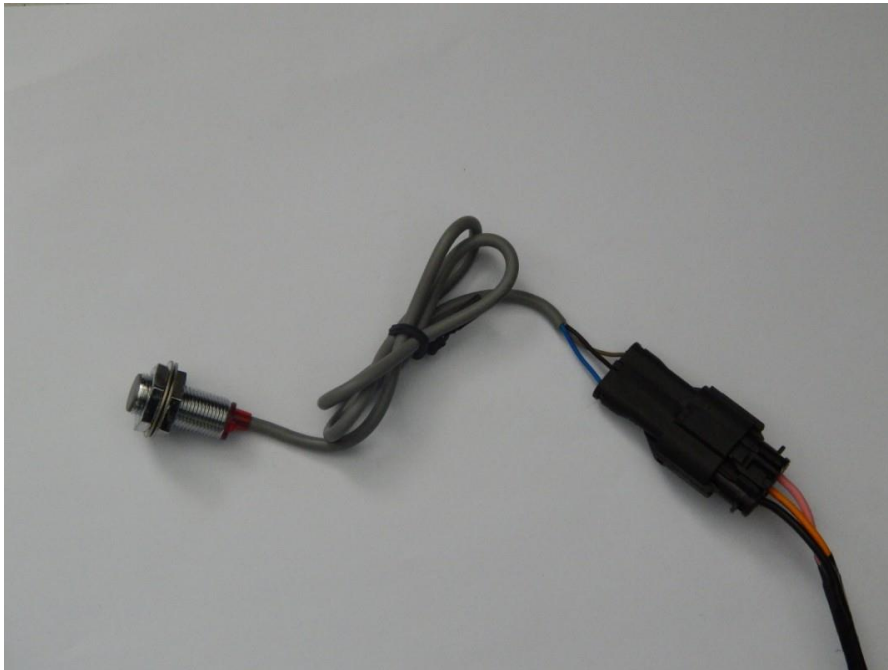
6 Harness Routing

Find suitable locations for the harness, see above the pictures as a reference.

7 Hall sensor wire splices

Ecotrons supplies hall sensor as your pick up sensor. So you need install it first. If ECU needs control the CDI to fire, you need replace the original ignition coil with the hall sensor and Ecotrons CDI. If not, only install the hall sensor, and do not remove the original ignition coil.

7.1 The hall sensor connector has been included in the harness.



7.2 Use Ecotrons' CDI to control ignition

In this case, ECU controls CDI to fire, and controls fuel injection too. You need replace the original ignition coil with Ecotrons' CDI and Coil.

7.2.1 Remove the cover.

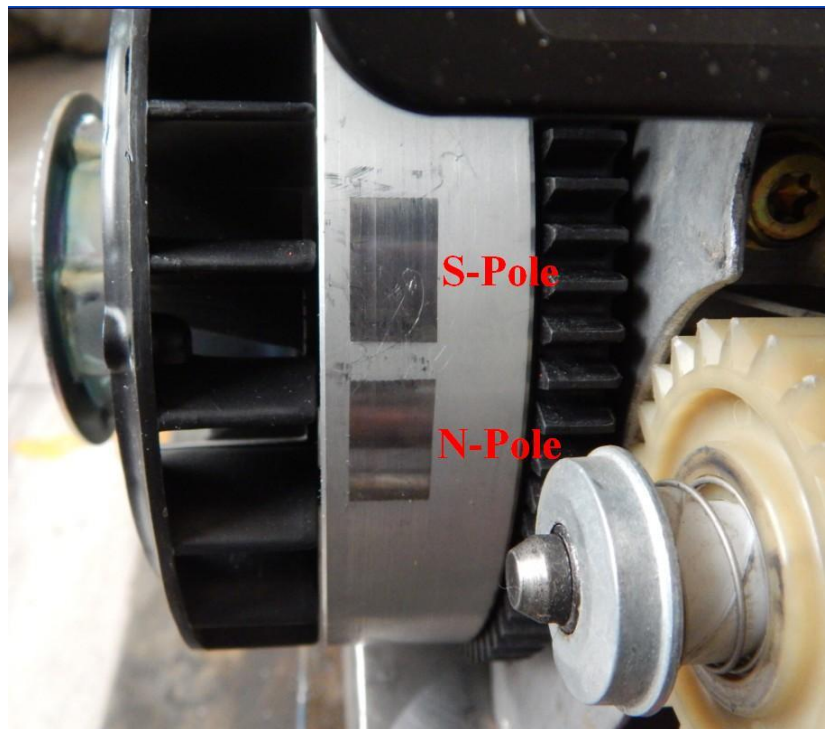


7.2.2 Remove the stock ignition coil

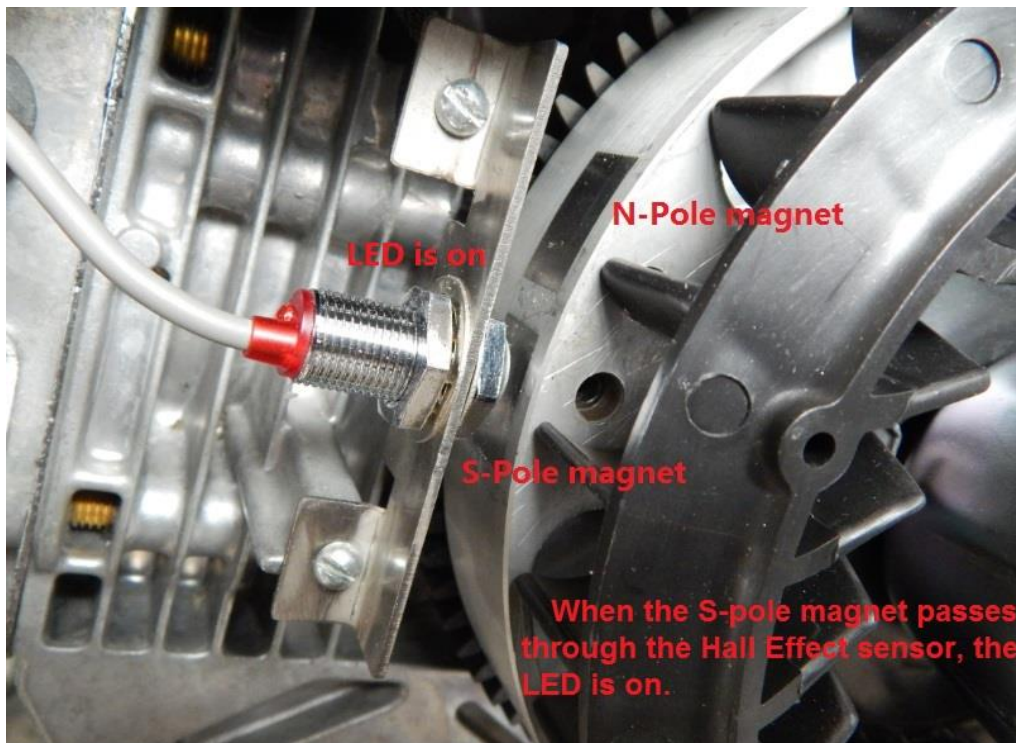


7.2.3 Install the hall sensor like below pictures.

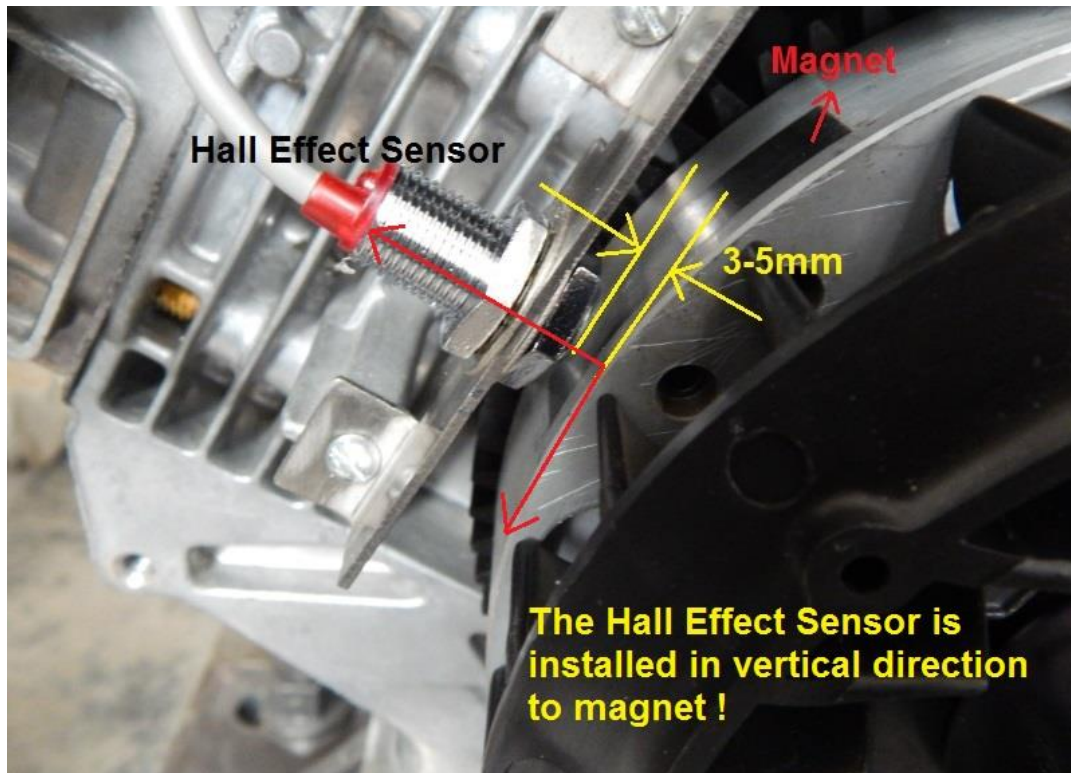
There are two magnets on the flywheel, one is N-pole magnet, and another is S-pole magnet.



Our Hall Effect Sensor is S-Pole Magnet triggered by default.



Note: when the S-pole magnet passes through the Hall Effect sensor, the LED of hall sensor is on.

**Note:**

1. The distance between Hall Effect Sensor and magnet is 3~5mm recommended.
2. The Hall Sensor should face to the center of the fly wheel
3. Also the Hall Sensor should face to the center of the magnet.

Why the ECU doesn't work when finished installing Hall Effect Sensor?

Q: When install the Hall sensor, the LED is flashing when it passes through the magnet, but ECU can't read any signal.

A: Step 1: Please check the A2I and CAL file whether is suitable for Hall Sensor. Or connect us and send back the A2I and CAL file, we will help you to check it.

Step 2: check the wire connection, the power of Hall sensor, and the signal wire is wired to CKP (Orange) from harness. Check the CKP (Orange wire) pin whether loosed from the ECU connector?

Or take some photos and send to us.

Note: If it has a connector in the harness, you just need plug it.

Step 3: Further Check: use an oscilloscope to measure the signal from the CKP wire.

When the Hall sensor is aligned the magnet, the LED is on, the voltage is 0V (low voltage); and when the Hall sensor is not aligned the magnet, the LED is off, the voltage of signal is 12V (high voltage).

If it doesn't have the pulse, the Hall sensor is broken, please change a new one and send the broken sensor to us.

Q: when install the Hall sensor, ECU can read RPM signal, but it is not easy to start or running unstable

A: the installation of Hall sensor is not right or suitable, please install the Hall sensor in the right way, and please install the Hall sensor according the sample picture in strict way.

Note: The clearance between Hall sensor and Magnet is better at 3-5mm

Hall sensor is installed in vertical direction to magnet.

Also the sensor should face to the center of the magnet.

Both length and width of the magnet must be 12mm at least.

1) Q: I use the stock magnet, but it has two or more magnets on the flywheel, the engine can't start

A: if you use the stock magnet, and it has more two magnets, it may produce more noise signal, the ECU can't read it.

So, please use the corresponding Hall sensor to match the stock magnet, for example, the stock magnet is N-pole, you need use an N-pole Hall sensor; the stock magnet is S-pole, you need use a S-pole Hall sensor. Other way, you erase the stock magnet, and use the magnet comes with EFI kits. If more than two magnets, I advise you use the magnet from us and erase the stock magnet.

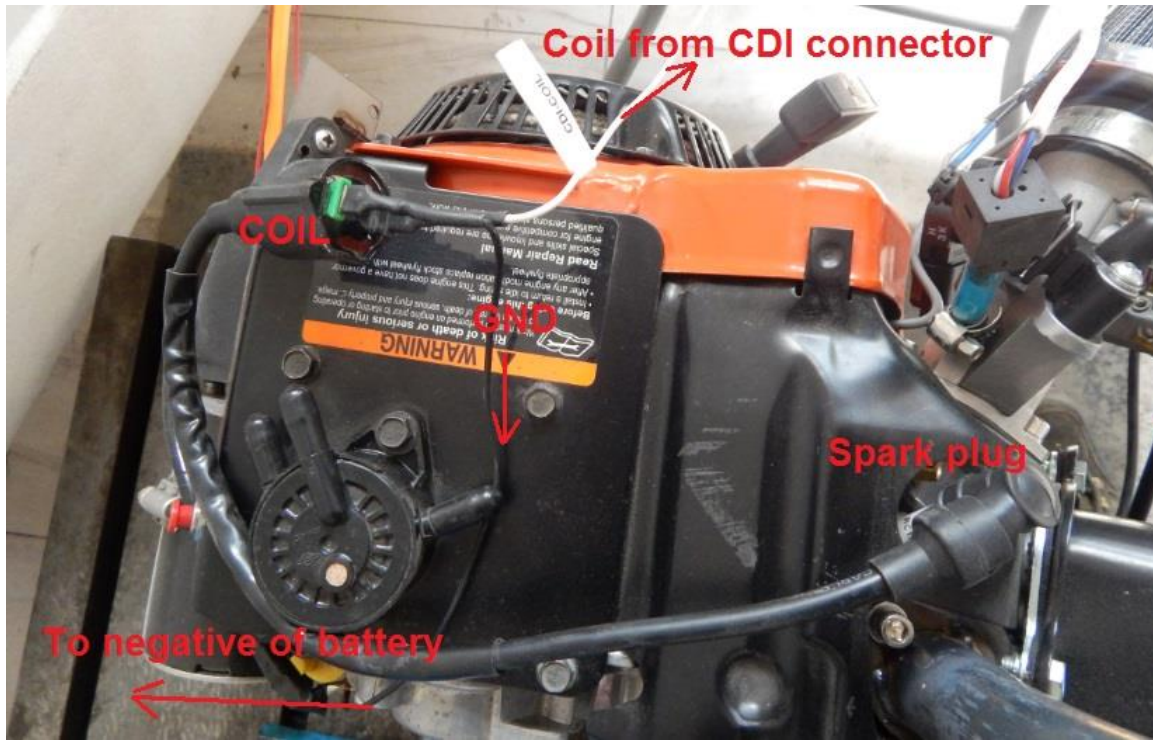
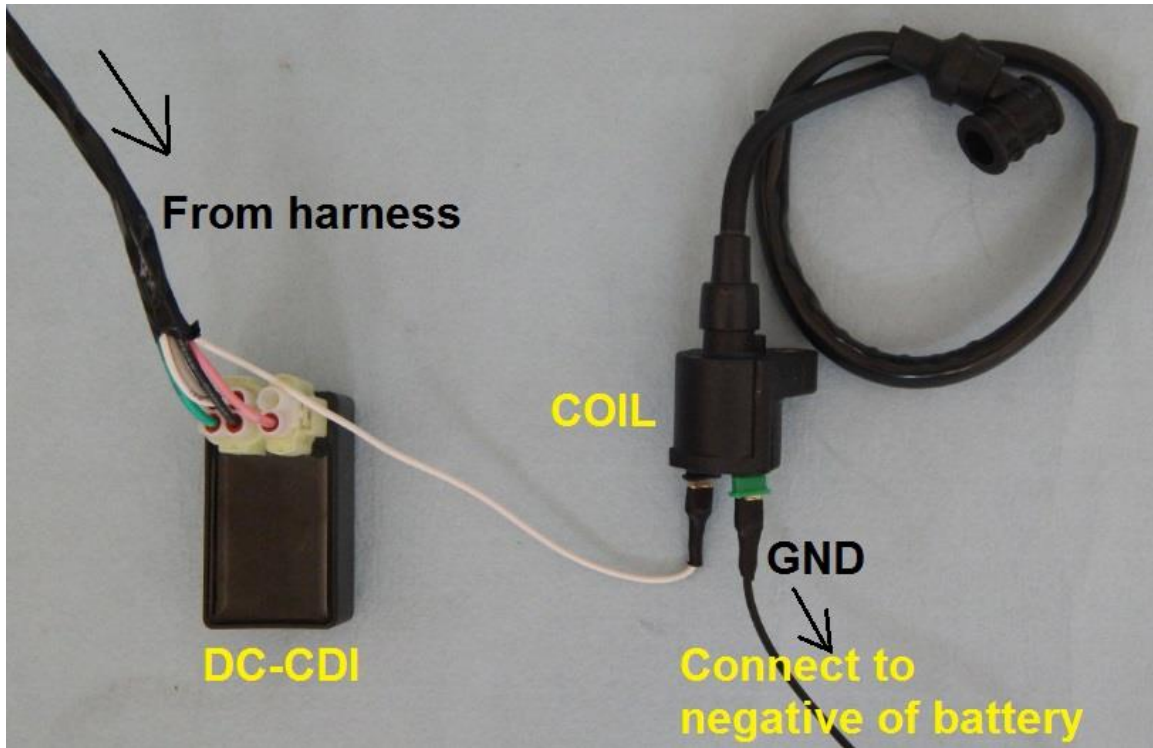
Q: I didn't order a Hall sensor, but I install a Hall sensor later

A: please install the Hall sensor in the correct method, and connect us, we will send the software for the Hall sensor system.

7.2.4 Install the CDI and Coil

We will provide the Hall Effect sensor, DC-CDI, and Coil on the EFI kits for ignition system.

Find suitable locations for the CDI installation. Connect them as the following pictures.

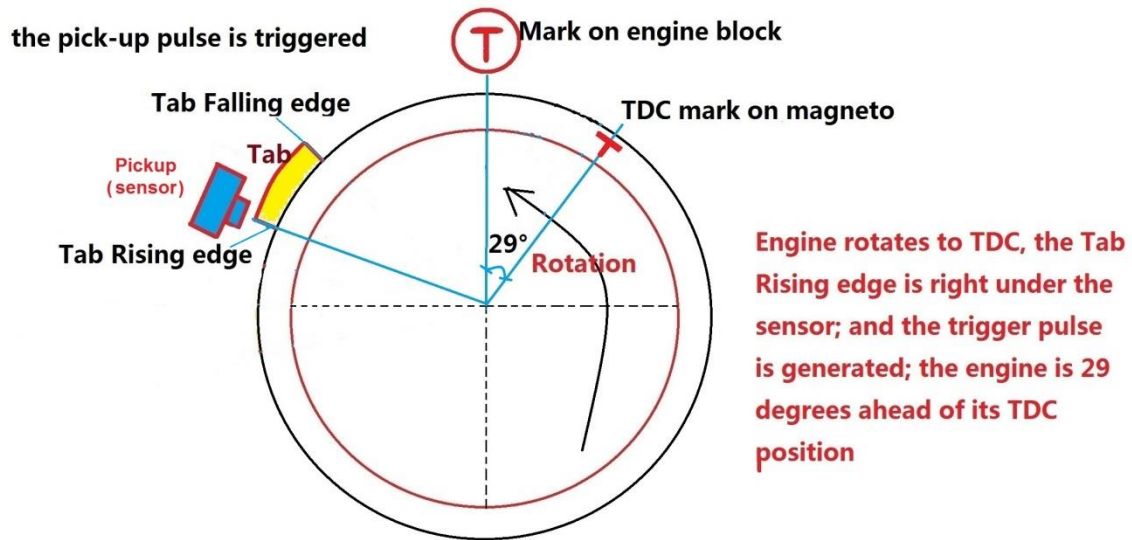


Details of ignition coil.

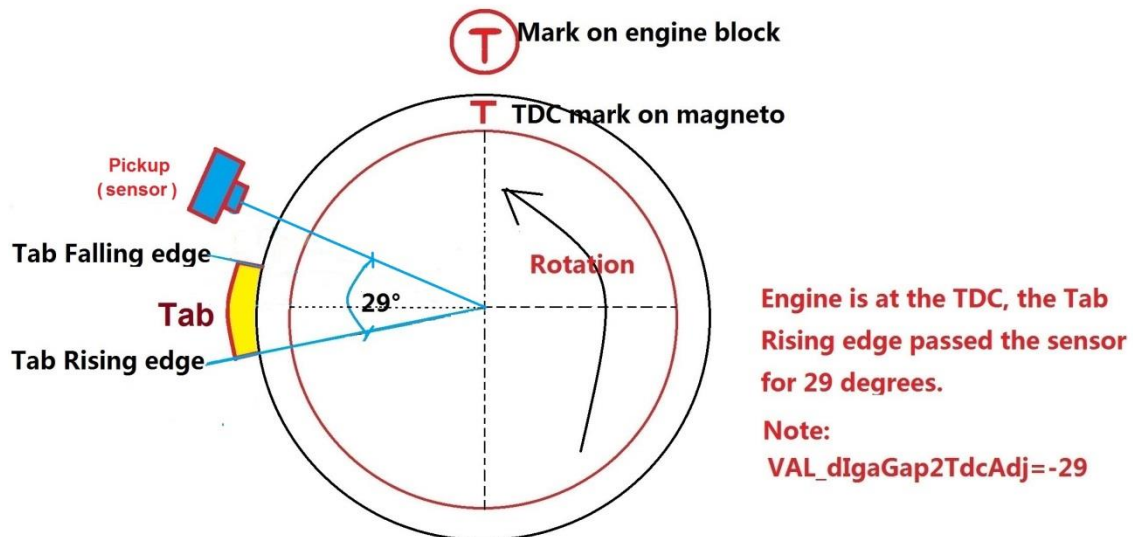


Ignition system is controlled by ECU

If you use ECU to control ignition you need to find the angle from Trigger pulse (magnet) to TDC for ignition control



Engine is at the TDC



Note: It is a negative value. It is different than the ignition angle table, where the negative means after TDC.

We have measured the angel of Junior 206 engines. This default value (-43) is OK for Junior 206 engines with S-pole Hall Effect Sensor, that you don't need to change it.

For example, when you command 0 degree ignition angle, you should see the 43 degree between the trigger pulse and the ignition fire pulse.

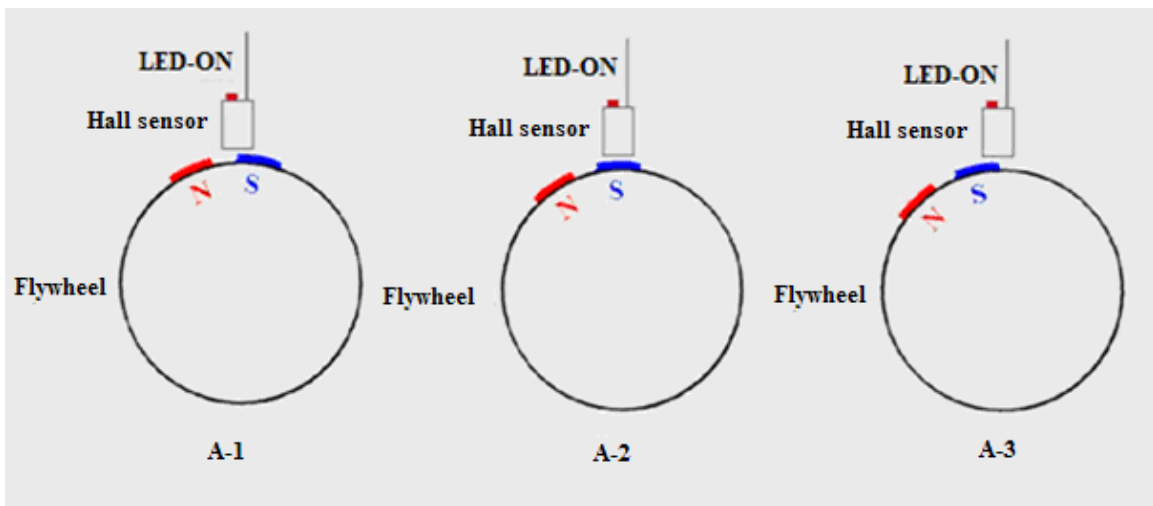
[More details, please read the Tuning Guide Manual.](#)

7.3 Does the magnet match with the Hall sensor?

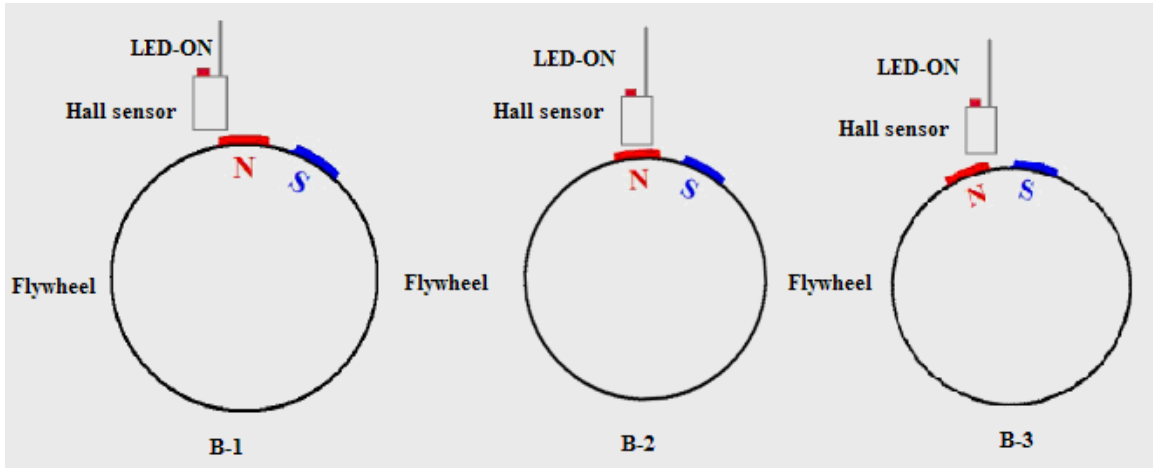
The hall-effect sensor which comes from Ecotrons works with S polarity of magnet acquiescently. When you get one hall sensor, you need test it to make sure whether it can work with your magnet.

After installed, key on please, and then the sensor will be powered on. Revolve the flywheel slowly. When the hall sensor is trigged by magnet, the LED of the sensor will light. **Usually the LED turns on only once per circle.**

7.3.1 If the LED lights at the center and the edges of the S magnet, is off at any other place, it means the hall sensor works with S polarity of magnet. It is acquiescent for Junior 206.



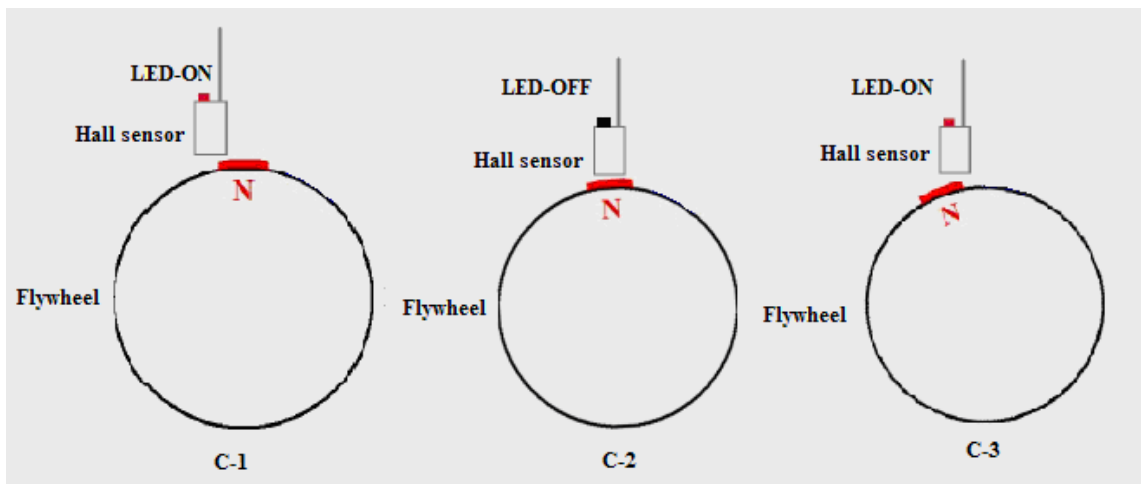
7.3.2 If the LED lights at the center and the edges of the N magnet, but is off at any other place, it means the hall sensor works with N of magnet, please change VAL_dIgaGap2TdcAdj= -63 for Junior 206.



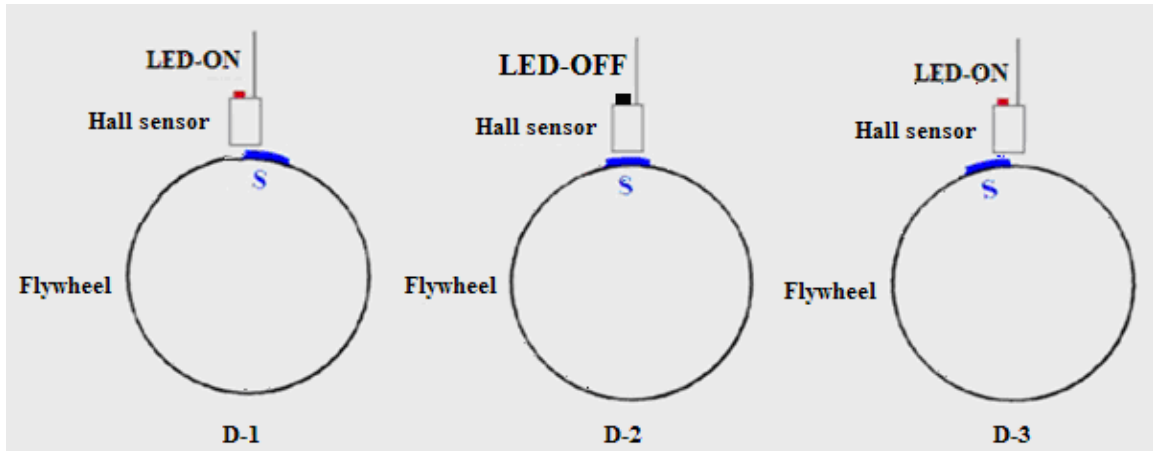
7.3.3 If your engine may be Honda GX390, Briggs engine or other engine. No matter how many magnets there are in the flywheel, if the sensor turns on only at the edge of one magnet, and turns off at the center or any other place, please change VAL_ignore_second_tooth_enable=1, and VAL_ignore_second_tooth_x_apart=2 .

It is suitable for following conditions.

The hall sensor can work with an S polarity of magnet, but the magnet is N polarity.



Or the hall sensor can work with N polarity of magnet, but the magnet is S polarity.

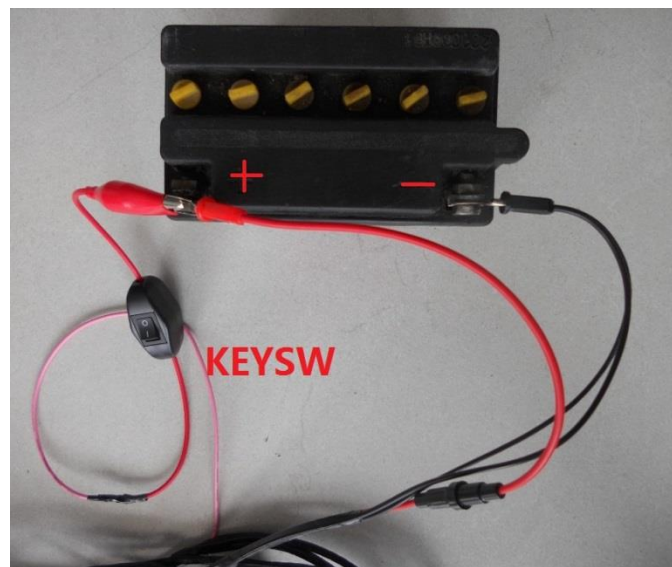


Note: if the LED turns on more than once per circle, please contact us at info@ecotrons.com for more information.

8 KEY ON Switch

Splice the “key on switch” wire, and connect it to ECU “KEYSW” input (Pink wire). The “key on switch” is the 12V+ signal coming from the key-on signal; for some motorcycles, it also goes through “stop switch / kill switch”. The location of the splice should be after the “stop switch” on the motorcycle, or after the “key switch” if there is no “stop switch”. This is the ECU power-on trigger. Without this wire connected, ECU will not power on.

"KEYSW" wire can be connected to the 12V+ if there is no key-switch on the vehicle. But you must insert a manual switch between 12V+ and KEYSW input. For some customers, we pre-install a manual switch between KEYSW wire and 12V+ wire as requested.

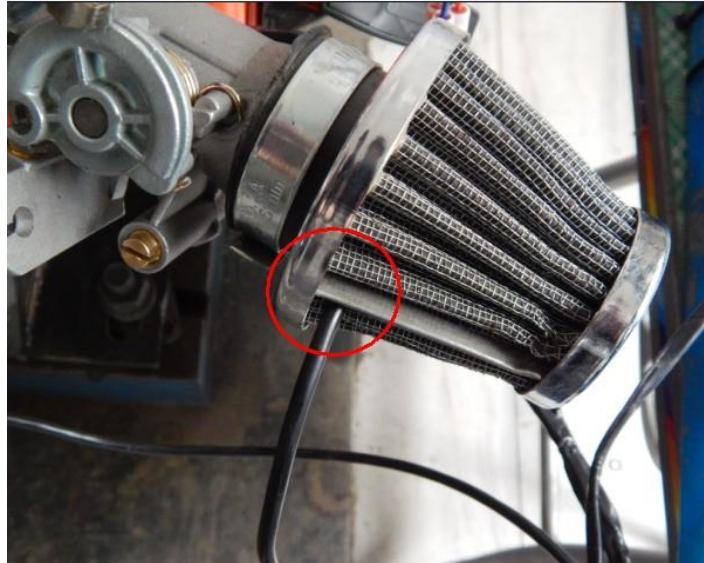


NOTE: the Junior 206 engine does not have a “key on switch”, please add one, which can accept 5A current.

9 Install the IAT sensor

It can be placed between the Throttle Body and Air Filter, or any convenient location where the intake air flows through.

Drill a small hole and insert the Sensor. Bond it with silicon sealer or other sealing agent.



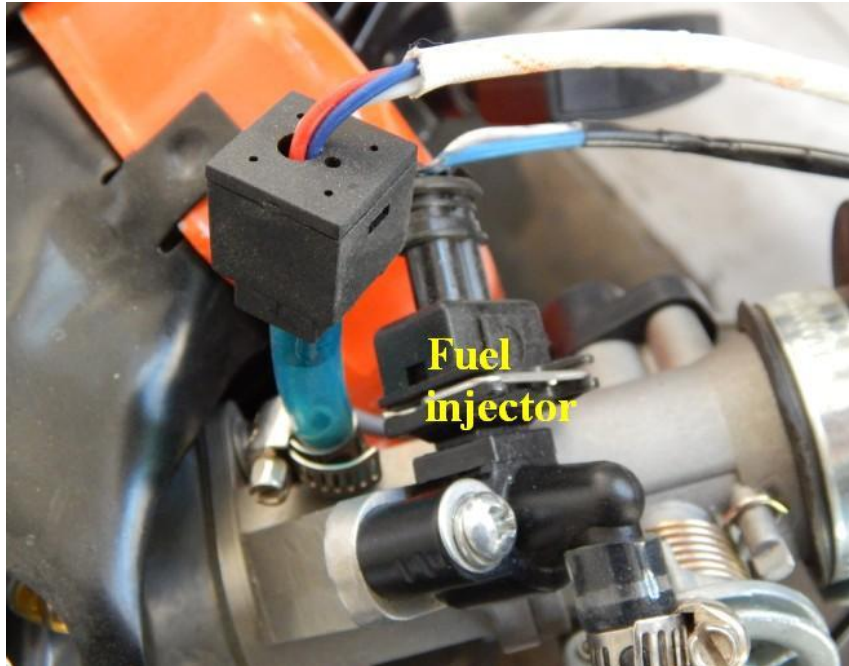
10 Install the ECT sensor

Find a place on the cylinder header, where it has the lowest air flow (usually the backside of the engine), attach the sensor to a bolt and fix it.



11 Connect the injector

The injector connector connects to the injector. Be sure connector is locked in it.

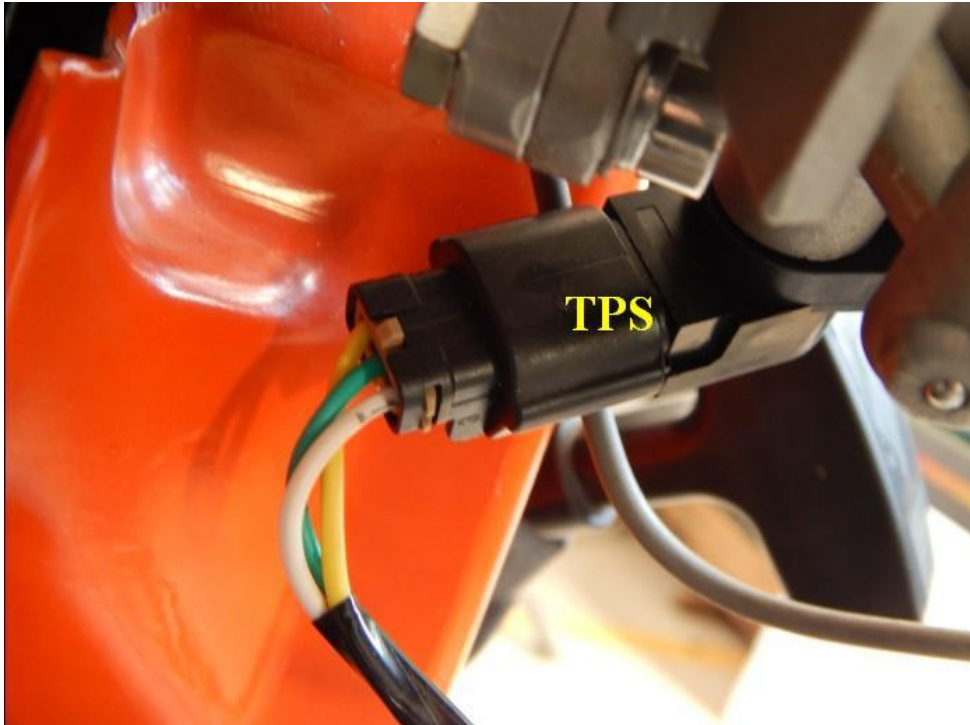


12 Connect the MAP Sensor



13 Connect Tps sensor

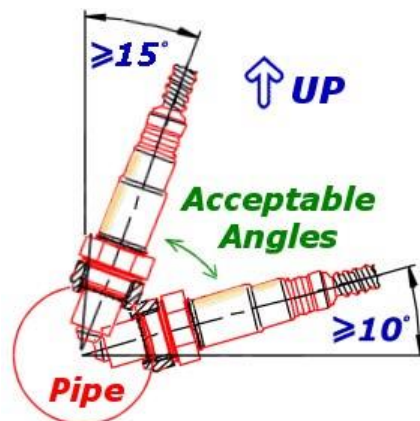
Attach the Throttle Position Sensor. The TPS connector connects to the TPS.



14 NB O2 sensor installation

If your kit includes an O2 sensor, please follow the below steps to install the O2 sensor:

- 1) Find the correct the location to install the O2 sensor. It needs to be close to the exhaust port, but not too close (3-5" away). Rule of thumb: the O2 sensor can take the advantage of the exhaust heat, so it does not have to be heated all by itself. But you don't want it to be heated too much, because the good temperature range is 300C to 900C.
- 2) The sensor needs to install with a tilt angle, meaning **the sensor head must point down with certain degree**, see the picture below. Otherwise the condensation could damage the sensor.



- 3) Drill a hole on the exhaust pipe. Weld the O2 sensor bung (provided) on the hole. Make sure the sensor head can be fully exposed to the exhaust gas; yet NOT to block the exhaust pipe.
- 4) Install the sensor in the bung. Connect the O2 sensor cable.



15 Connect 12V +/- wire

Make sure the negative of battery is connected to the chassis ground! If your engine or vehicle did not have a 12V battery before, and you need add one good charging battery, in this case, you must connect the negative of battery to chassis.

You must connect the 12V – to chassis ground.

Double check and make sure all wires are connected as they should be.

You have finished all installation with the initial hardware installation of the Junior 206 Ecotrons EFI kit.

Chapter 2 Initial test and diagnostics after the installation

1. Before you do the initial test of the EFI kit, make sure the installation is done as the previous section.
2. Key-on and **KEY-ON ONLY!**
3. You should hear fuel pump noise running for a few seconds, if this is not happening, you must have some wiring problem. Re-check all your wires! If every wire is sure correctly connected, then the ECU may have a problem.
4. If you hear the fuel pump running and then stop, this indicates the ECU is working. Now you can fill the fuel tank with the regular gasoline.
5. Repeat the above step 3 times, to make sure the fuel supply lines are filled up with fuel. No air pocket! No bubbles!
6. Sometime, you have to manually purge out all the air bubbles in the fuel supply system, because it is possible that if the fuel pump itself has a lot bubbles in there, it could not pump fuel at all, it is only spinning like idle without load. In this case the noise of fuel pump is little higher pitch than with fuel pumping. In this case you will not be able to start no matter what, because no fuel pumping. If you have any doubt that the fuel supply system has some air pocket or air bubbles, you can un-plug the high pressure fuel line, pointing it into a bottle, and key-on, you should see fuel sprout out if fuel pump is working and no air bubbles.
7. In many cases, you can visually see the fuel flow out of the fuel pressure regulator and return back to the tank if the fuel supply system is working normally. This is another indication you can check.
8. After you make sure the fuel supply system is working normally, try to key-start the engine.
9. First time you start the engine, there may be still some air bubbles in the fuel supply system needs to be purged. So don't be surprised that the first start takes longer, or even you need to start multiple times to be successful.

10. If the engine does not start, go to the next section for diagnosis.
11. After the engine starts, if it's rough idling; let it warm up, and let the ECU self-adapting to the engine for a while.
12. After the idle stabilizes, drive the vehicle in a steady state (constant throttles or constant speeds) at different throttle/speeds. Let the ECU self-adapting further.
13. Then you can try different transient conditions, like fast opening of the throttle, etc.

My engine does not start, why?

Please follow the below trouble shooting procedures:

- 1) Have you followed the installation manual completely?
 - 1.1) Can you tell that the ECU is controlling the fuel pump?
 - 1.1.1) when you turn on the key, do you hear the fuel pump running for a few seconds, and then stop? If not, you have wiring issues.
 - 1.1.2) Key-off for 3s, and key-on, do you hear the fuel pump running for a few seconds, and then stop? If not, you have wiring issues.
 - 1.1.3) Every time when you try to start the engine (engine spins), do you hear the fuel pump running until engine stalls? If not, your wiring has issues.
 - 1.1.4) If you have key on and off too many times without engine starts, you need to do this: with Key-ON only, disconnect the ECU from the harness, and connect it back. This is to give a power reset of the ECU, so some counters are reset

to 0.

1.2) Do you have the fuel pump installed correctly?

1.2.1) is the fuel pump lower than the tank? The fuel pump must be lower than the tank to avoid fuel starvation. The fuel pump can be higher than the injector, if limited by the space.

1.2.2) Have you replaced the “petcock” tank valve with a manual valve? EFI does not work with the petcock that does not have a PRIME position.

1.2.3) Do you have a fuel return line back to the fuel tank? Our EFI kit currently needs a way to return the fuel to the tank.

1.2.4) Is there impurity in the gasoline? Check your fuel filter.

1.3) Do you have the ignition pick up sensor connected correctly?

1.3.1) Do you have a correct pick up signal input to ECU (CKP wire on the harness)?

1.3.2) Do you have the ground wire of pickup sensor connected to ECU ground wire (GREEN wire on the harness)?

1.3.3) Are you using the stock ignition system (to isolate the starting problem, please use the stock ignition system)?

1.3.4) Can you tell the spark plug is firing when you try to start?

1.4) Do you have the MAP sensor installed correctly?

1.4.1) is the MAP sensor connected to the throttle body tube via the small hose (included in the kit)?

1.4.2) is the intake air system air tight (no other way for free air going into the cylinder except through the throttle)?

2) Do you have the MIL Lamp on (if your harness comes with a MIL Lamp installed)? If yes, go to install the EcoCAL software and read the DTC.

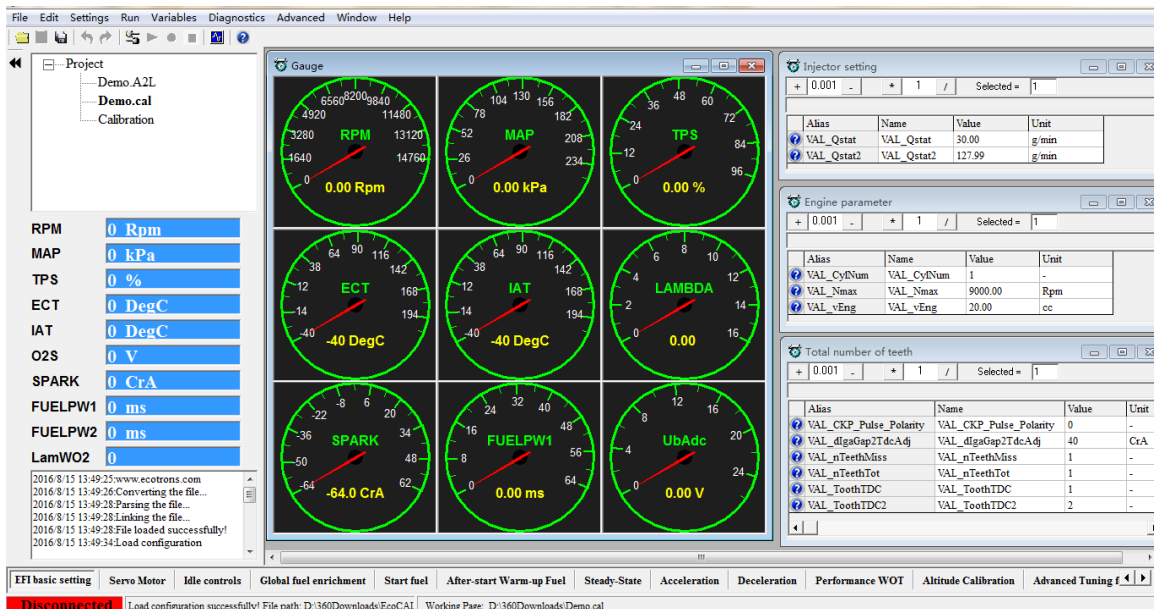
Chapter 3 How to install the provided EcoCAL software to your computer?

For details on how to use EcoCAL software, please refer to the EcoCAL Manual, downloadable here:

www.ecotrons.com/support

Run EcoCAL, you will see below windows:

When you start the EcoCAL at the first time when you finish installation, the EcoCAL will load the Demo files automatically with the default page settings.

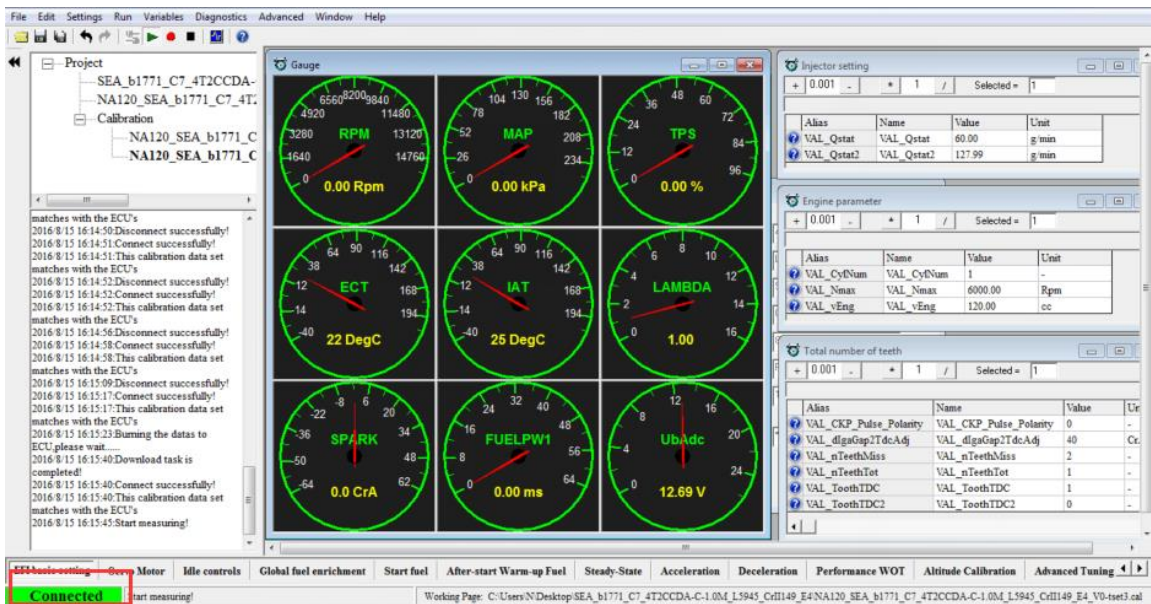


Note: if EcoCAL does NOT automatically load the default configuration, likely you do not have the necessary A2L file and CAL file, in the installation folder of "C:\EcoCAL". You should copy and paste the necessary A2L file and CAL file into that folder, if the folder contains no such files.

Connect ECU to laptop:

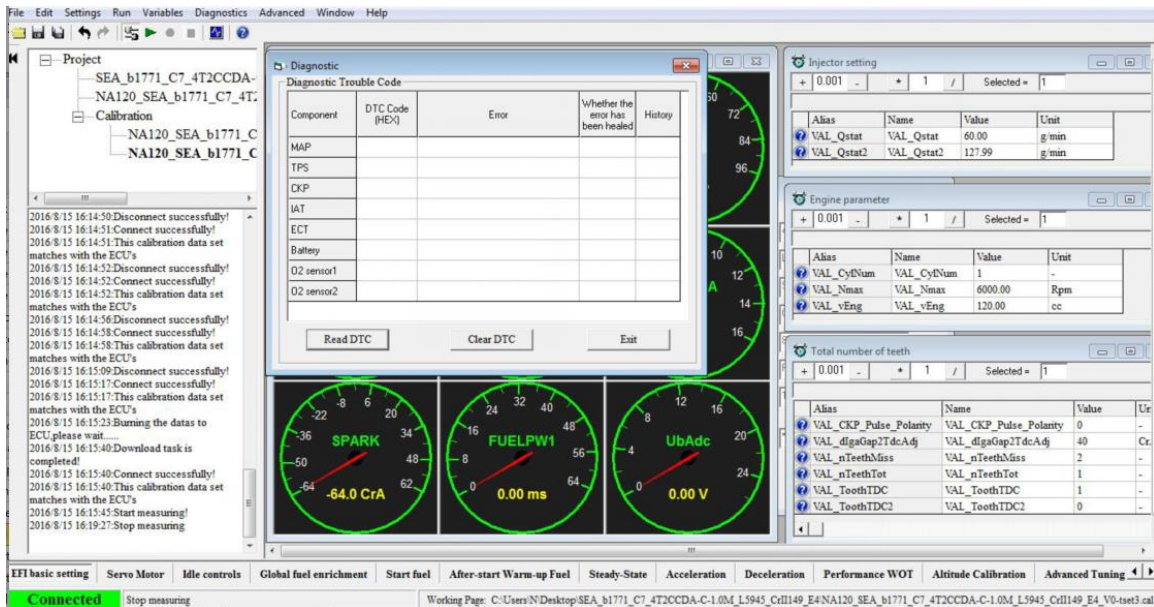
Go to menu->Run->Connect

You also can use the shortcut button () of “Connect” to Connect to ECU

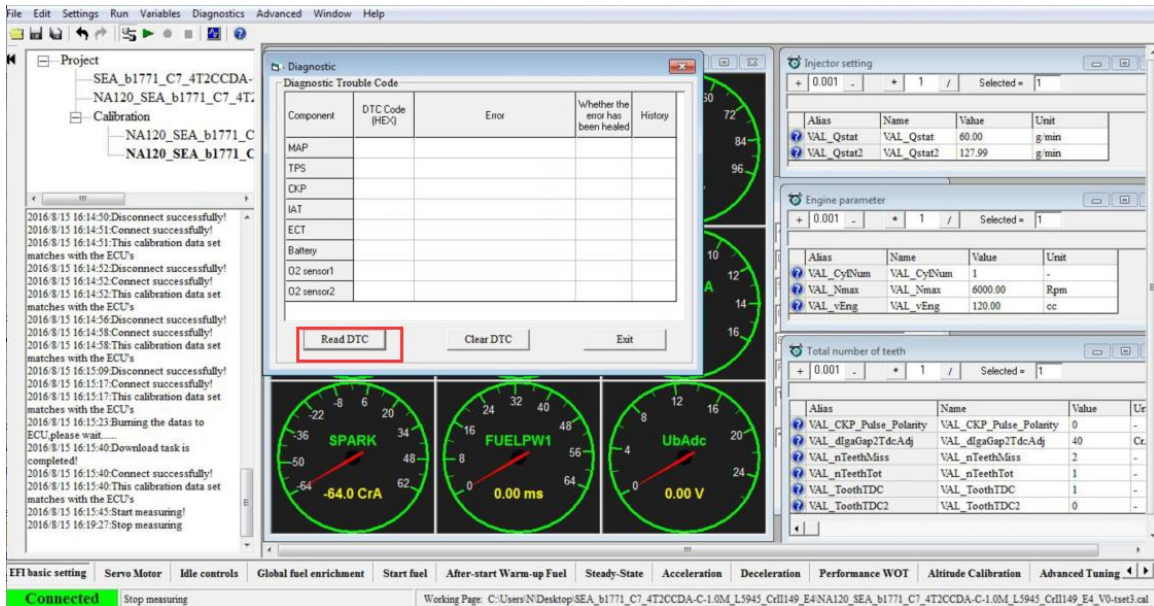


Read DTC:

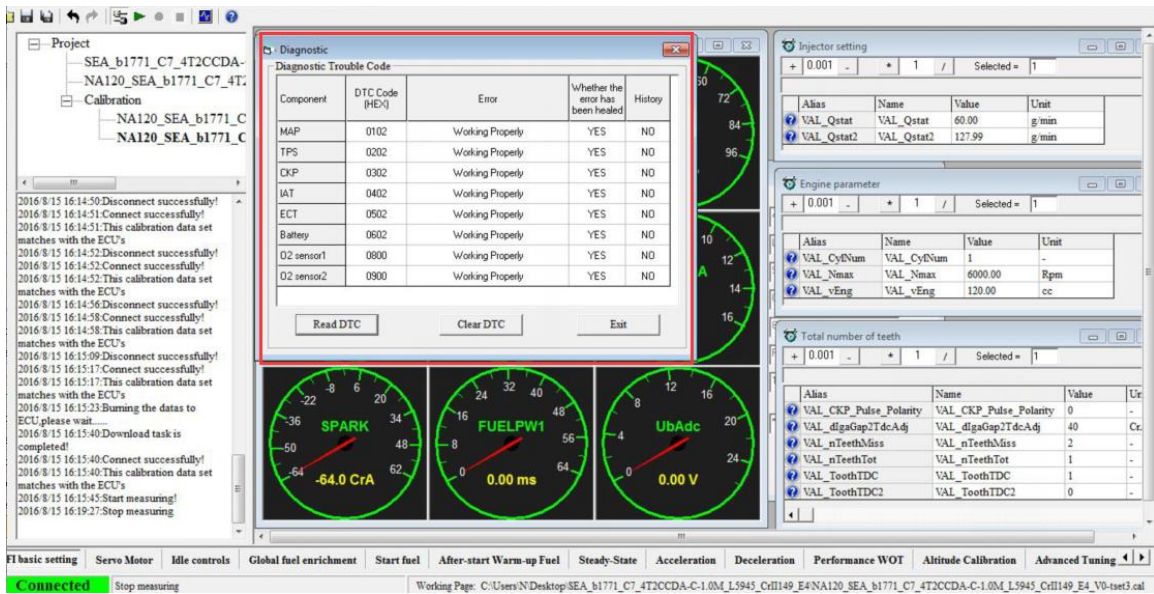
Go to menu->Diagnostics->ECU Diagnostics



Click "Read DTC":



Supported DTC list (TBD)



Diagnosis of the communications between your laptop and ECU:

- 1.1 Check your serial communication cable; make sure the cable is plugged in completely.
- 1.2 Check your USB adaptor; make sure it is fully plugged into your laptop.
- 1.3 If your laptop has a built-in COM port (many old laptops have that); you can use the COM port directly without the USB adaptor.
- 1.4 Go to "Menu → setting → communication settings" select correct port: USB or COM port or other.
- 1.5 Click "Connect" button in EcoCAL.

How to use EcoCAL to log data:

- 1) Run EcoCAL (load the correct A2L and CAL file).
- 2) Key-on; and Key-on only;

- 3) Go to menu -> run -> connect
- 4) Go to menu -> run -> start measuring (the numbers in the window should change now...)
- 5) Go to menu -> run -> start recording

Start the engine, do you test.

Note: You must keep your laptop awake all the time for logging.

- 1) When you done the test, go to menu -> run -> stop recording
- 2) Go to menu -> Run -> Play Back
- 3) In Data Analyzer, click "Open", it will pop up a window, show the folder: "xxx\record"; that's where the logged files are.

Or you can go to: "**C:\EcoCAL\Record**"

- 4) When you click down the button, EcoCAL will record the data automatically. And save the record file at the installation path of EcoCAL, "C:\EcoCAL\record", and it is named with the time of recording. For example, the record named "2015-7-25-9-31-35-986" is the record file in record. If you need us to help you on tuning, please send the recorded files to us. (**Don't change the file names**)

Diagnosis of the communications between your laptop and ECU:

- 1.1 Check your serial communication cable; make sure the cable is pushed in completely.
- 1.2 Check your USB adaptor; make sure it is fully plugged into your laptop.
- 1.3 If your laptop has a built-in COM port (many old laptops have that); you can use the COM port directly without the USB adaptor.
- 1.4 **Go to menu->Settings->Communication Settings:** select correct port: USB or COM port.

1.5 Click "Connect" button in EcoCAL.

Advanced Diagnosis:

The advanced diagnosis documentations are still under development; contact us for specific questions... It is always helpful if you can log the data with EcoCAL and send us with your questions:

How to use EcoCAL to log data:

- 1) Run EcoCAL (load the correct A2L and CAL file).
- 2) Key-on; and Key-on only;
- 3) go to menu -> run -> connect
- 4) Go to menu -> run -> start measuring (the numbers in the window should change now...)
- 5) Go to menu -> run -> start recording
Start the engine, do you test....
Note, you must keep your laptop awake all the time for logging....
- 6) When you do the test, go to menu -> run -> stop recording
- 7) Go to menu -> run -> play back
- 8) In Data Analyzer, click "File → open", it will pop up a window, show the folder:

"...\record"; that's where the logged files are.

Chapter 4 How does the performance switch work?

"Performance Switch" has 2 positions: ECO vs RICH. In ECO position, the EFI will run the base fuel "map", or stoic metric AFR (normal cases), which gives the best fuel economy, and least emissions. In RICH mode, the EFI will run the enriched "map", or rich AFR (at high load, high RPM, esp. at WOT), which gives more power.

ECO mode: close loop fuel with O2 sensor feedback, with ECU self-tuning capability.

RICH mode: open loop fuel, fixed map, no ECU self-tuning capability.

RICH mode is only good if you have a well tuned engine mapping.

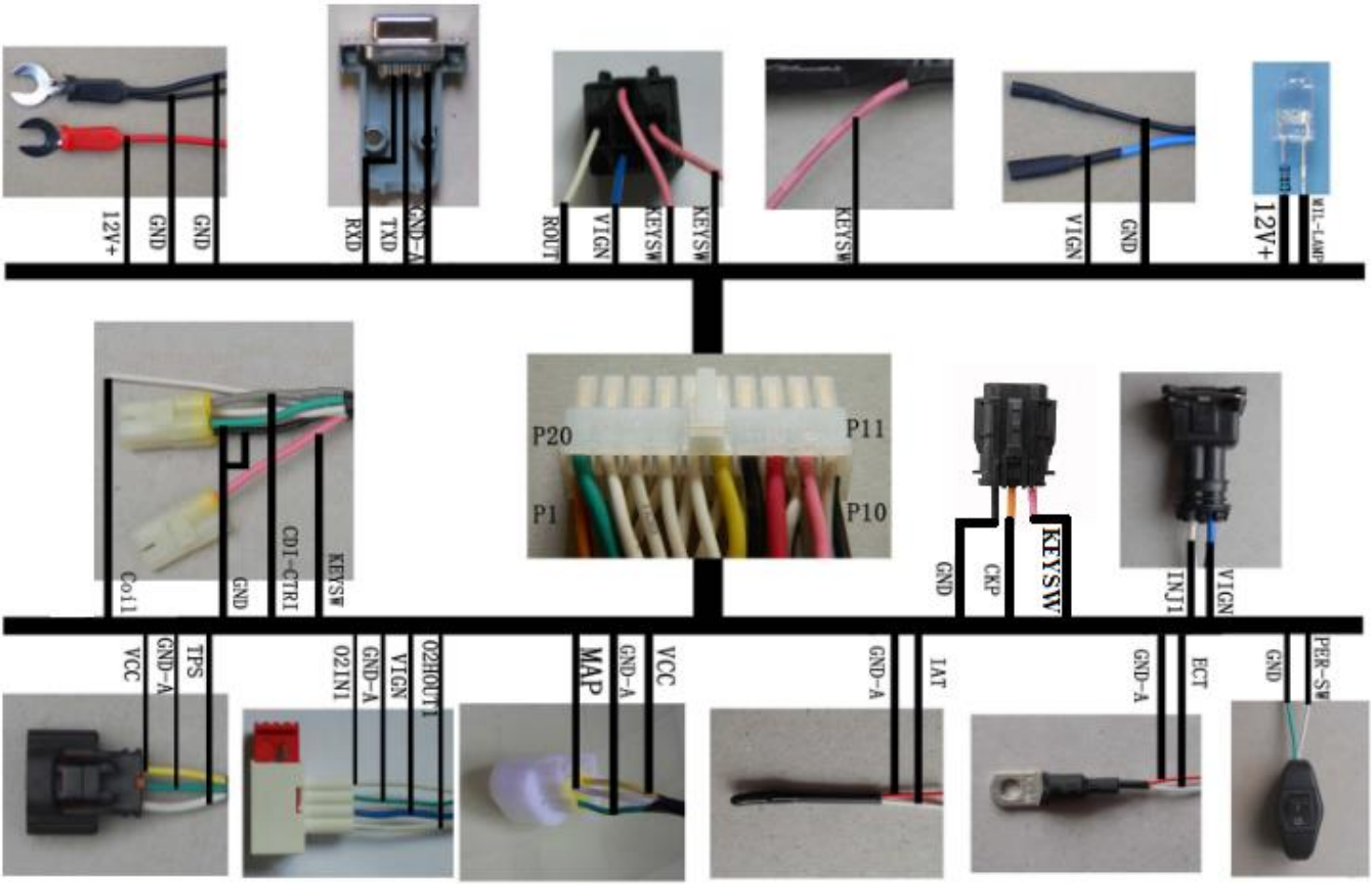
Recommend to use ECO mode most of time, and only use RICH mode for temporary fuel enrichment to gain some extra power.

"Performance Switch" is meant to let the user's easily switch between the economy and enrichment modes in real-time, so that he can run for economy when cruising around the town; and can immediately switch to performance mode as he wants.

OFF -> ECO -> STOIC

ON->RICH -> POWER

Appendix I: Wiring harness diagram



Appendix II: ECU main connector pin-out

| | | | |
|-----|--|-----|-------------------------------------|
| P1 | CKP | P11 | O2HOUT1 |
| | -- Crank Position Sensor, connect to ignition pickup sensor signal | | --O2 Sensor Heater LS Driver output |
| P2 | MIL-LAMP | P12 | KEYSW |
| | --Malfunction Indicator Lamp | | --Key On Switch |
| P3 | MAP | P13 | 12V+ |
| | -- Manifold Air Pressure Sensor input | | --Reverse Battery Protected Supply |
| P4 | IAT | P14 | GND |
| | --intake air temp | | --Power Ground |
| P5 | RXD | P15 | VCC |
| | --Send Data to RS232 | | -- +5 Volt supply output |
| P6 | TXD | P16 | ECT |
| | --Receive Data from RS232 | | -- engine (coolant) temp |
| P7 | ROUT | P17 | TPS |
| | --Power Relay LS Driver output | | --Throttle Position Sensor input |
| P8 | CDI-CTRL | P18 | O2IN |
| | --CDI control output from ECU | | -- Oxygen Sensor input |
| P9 | INJ1 | P19 | PER-SW |
| | --Injector 1 LS Driver output | | -- Performance Switch |
| P10 | GND | P20 | GND-A |
| | --Power Ground | | -- Analog Ground |