Hall Effect Sensor

Technical Spec

ECOTRONS LLC

Note: If you are not sure about any specific details, please contact us at info@ecotrons.com.

Product: Hall Effect Sensor

S-pole Hall Effect sensor **Part#: EHS02CS**

N-pole Hall Effect sensor **Part#: EHS02CN**

Comment: All data given in this document are nominal values and might be subject of change at any time

Index	Page	Revision	Date	Note
1	----	**First Edition**	9.3.2013	V1.2
2	----	**Second Edition**	12.20.2013	V1.3
3	----	**Third Edition**	1.3.2014	V1.3.1
4	----	**Fourth Edition**	4.11.2014	V1.3.2
5	----	**Fifth Edition**	7.11.2014	V1.3.3
6	----	**Sixth Edition**	2.16.2017	V1.3.5

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General Description

This Hall Effect sensor works with magnet. If sensor is triggered by N-Pole magnet, the Hall Effect sensor is N-pole sensor. If sensor is triggered by S-Pole magnet, the Hall Effect sensor is S-pole sensor.

1 Characteristic

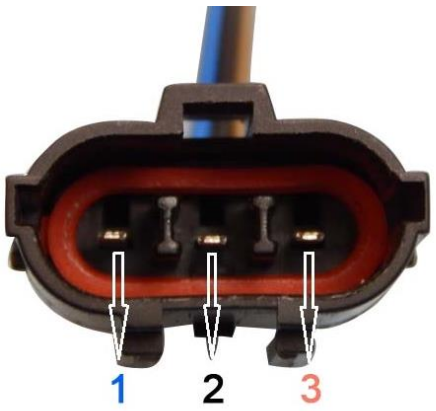
1.1 Sensor picture

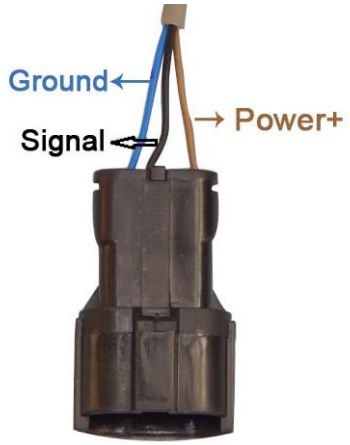
Note: the mechanical dimensions of S-pole and N-pole are the same.

1.2 Characteristics Parameters

Supply voltage…….. (+5~24)VDC
Diameter of Column Sensor…… ……...10mm
Detecting Distance…… (1~10) mm
Current output……<300mA
Operating temperature…… (-25~+70) °C
Output type……...….OC (OPEN COLLECTOR)
Weight……..……..30g

1.3 Wires Color and Pin-out definitions





Pin1: Ground wire **Blue**

Pin2: Signal wire **Black**

Pin3: Power + wire **Brown**

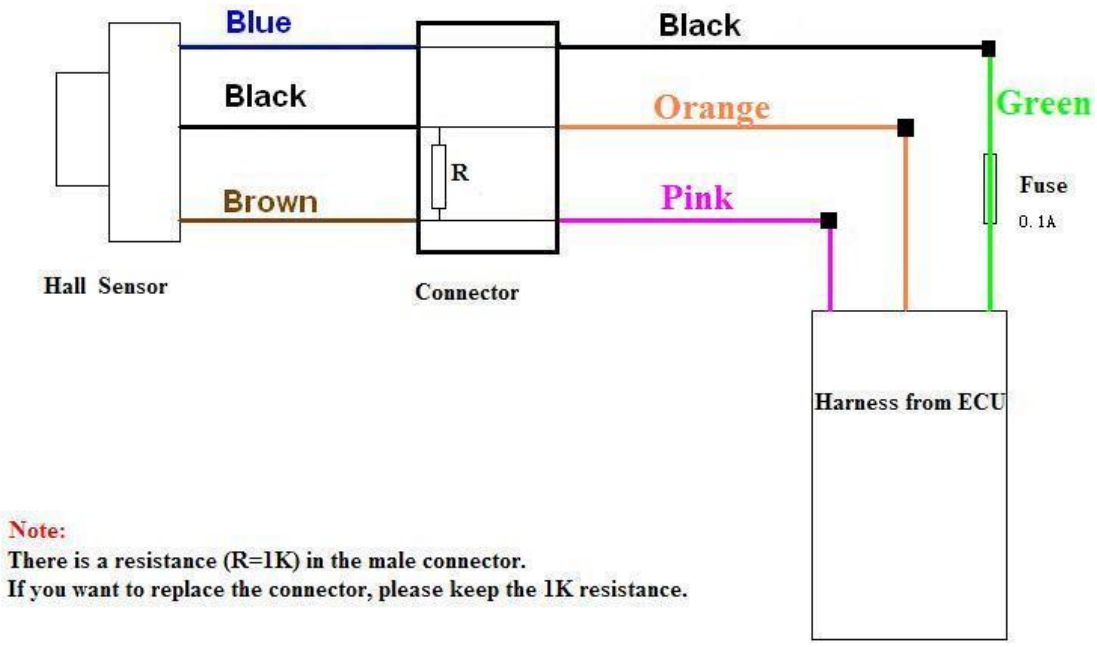
2 Applications

2.1 Typical application

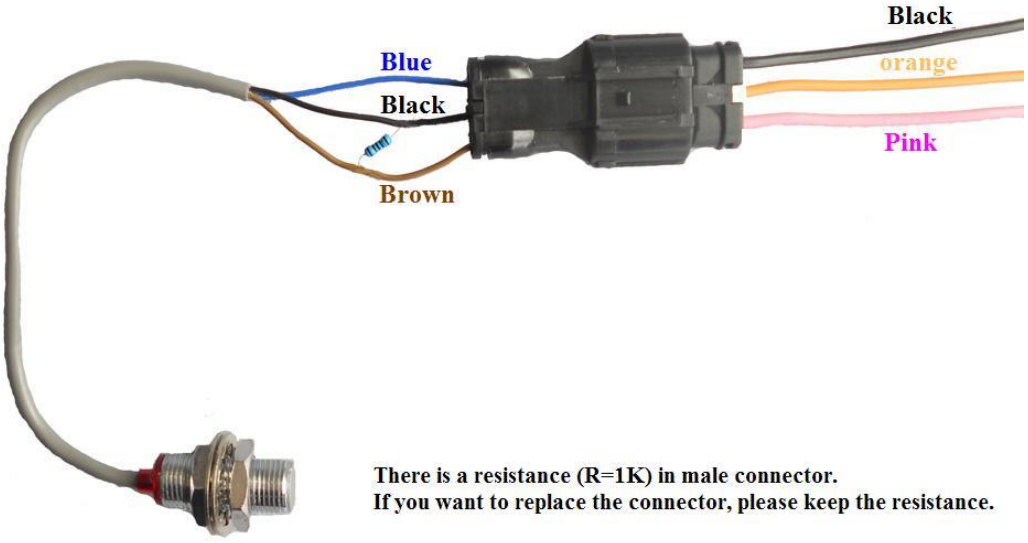
A: Used to detect vehicle speed
B: Used as crankshaft sensor to input pick-up signal to ECU in EFI system
C: Used as Cam sensor

2.2 Applications with Ecotrons EFI

Schematic diagram:



Connection with ECU harness:



Pin-outs definition from ECU harness:

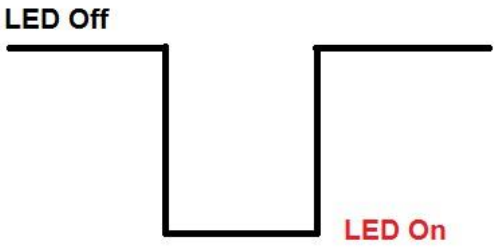
Pink wire (+12V): power +

Black wire (GND): power –)

Orange wire (CKP): signal wire

Note: when the Hall Effect sensor is used with Ecotrons EFI system, there must be a resistance (1KΩ) in the wires

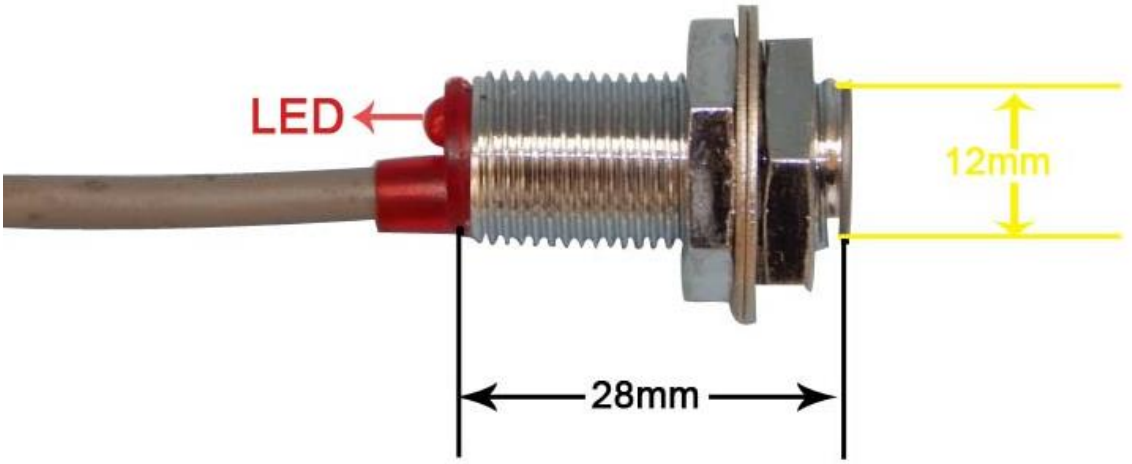
Hall Effect sensor works with magnet, when it works, the LED will be on and the voltage of signal will be low.



Typical signal

3 Installation instructions

3.1 Mechanical Dimensions



3.2 Installations

Note: This chapter mainly introduces the Hall Effect Sensor installations in Ecotrons EFI system.

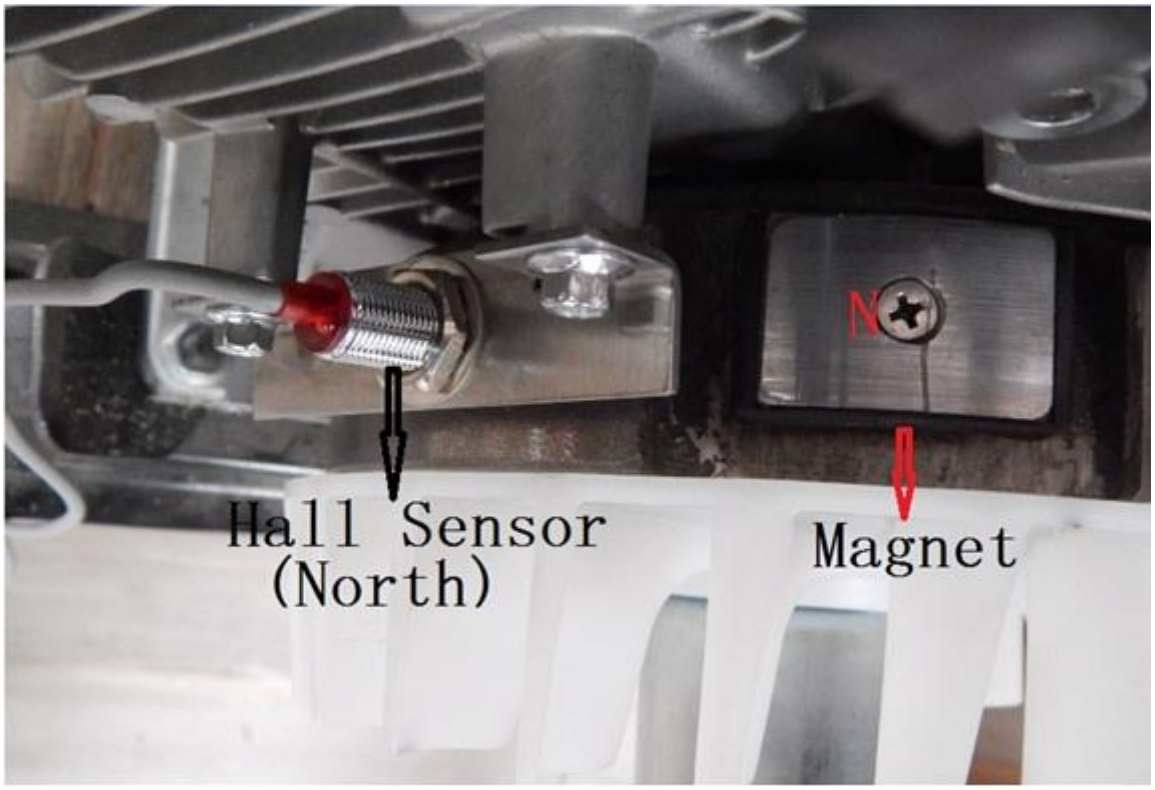
For some engines, such as Honda GX160, GX390, or similar, the stock magnet is North polarity. But for other engines, such as Gx35, 3.5HP Briggs and Stratton engines, there are two stock magnets, one is South polarity, another is North polarity. There are other engines with one South magnet still. So you must tell us the magnet polarity before we ship the EFI kit with hall sensor, so that we provide the corresponding hall effect sensor for the stock magnet.

Also it is critical to install the Hall Effect sensor correctly!

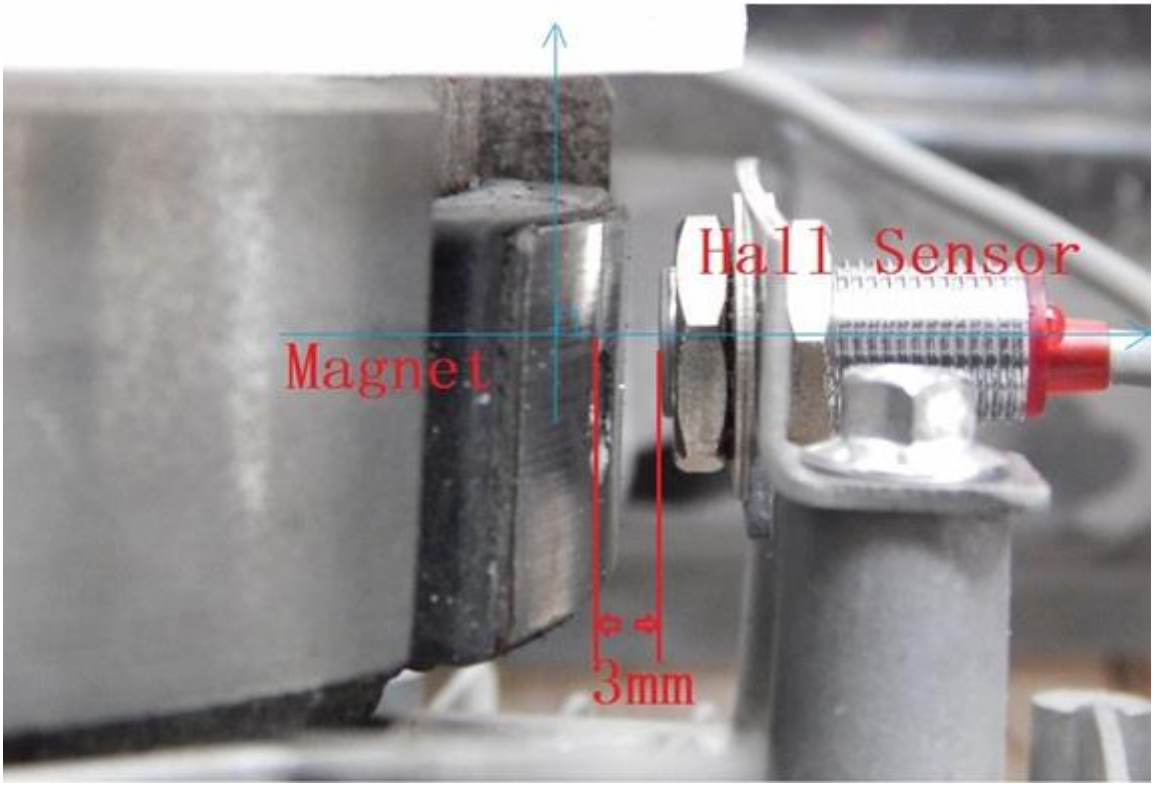
Now we install the Hall Effect sensor on Gx35 and Gx390 with different stock polarity magnet and as an example.

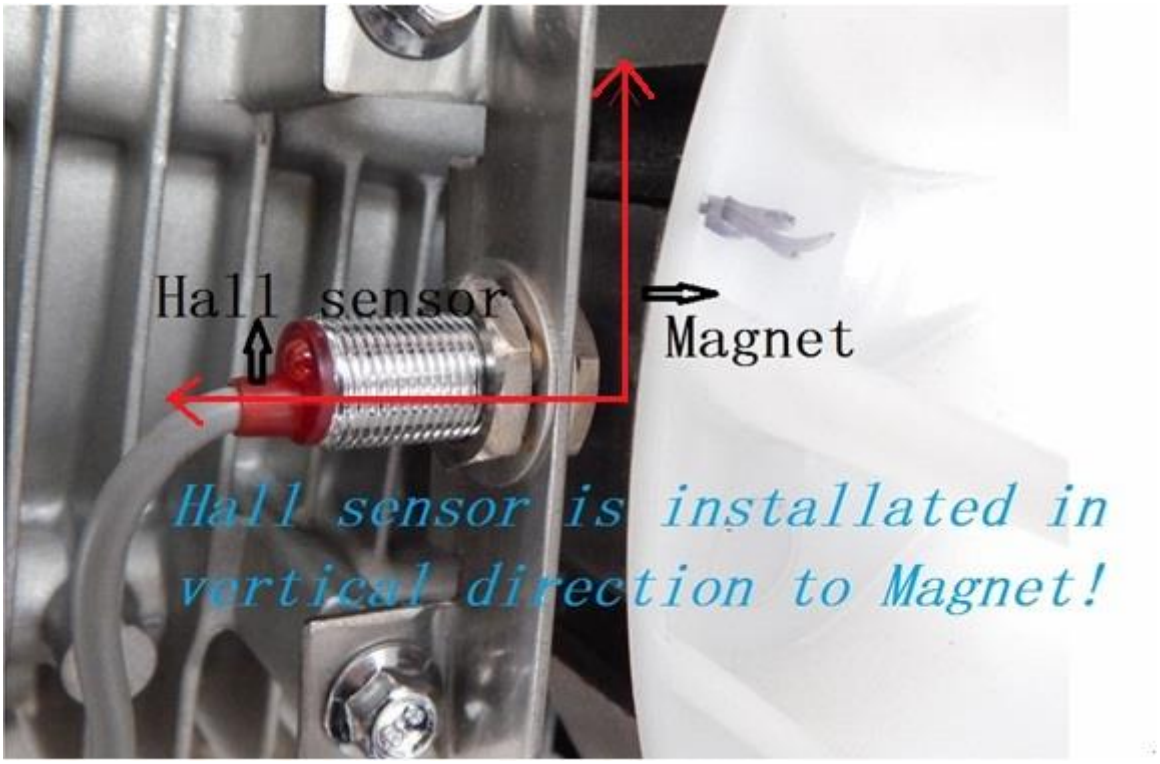
Use GX390 as an example:

The stock magnet is N-pole magnet on the flywheel.



Install Hall Sensor:

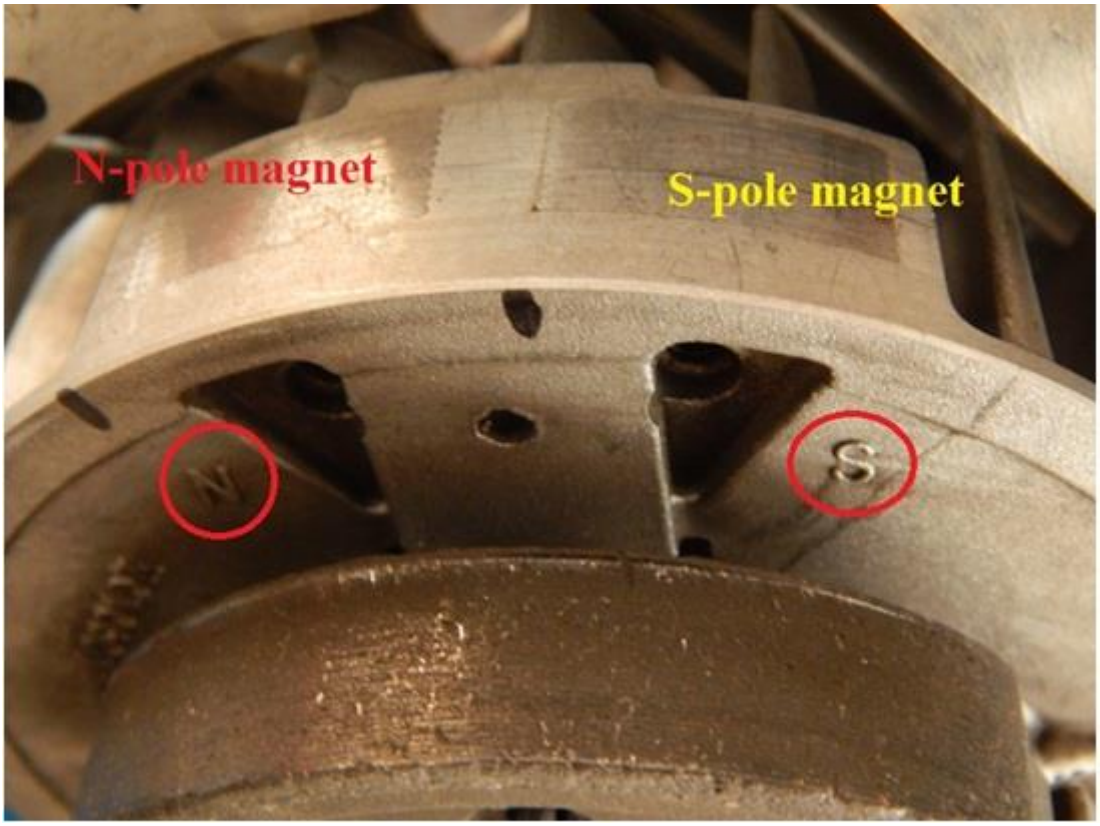




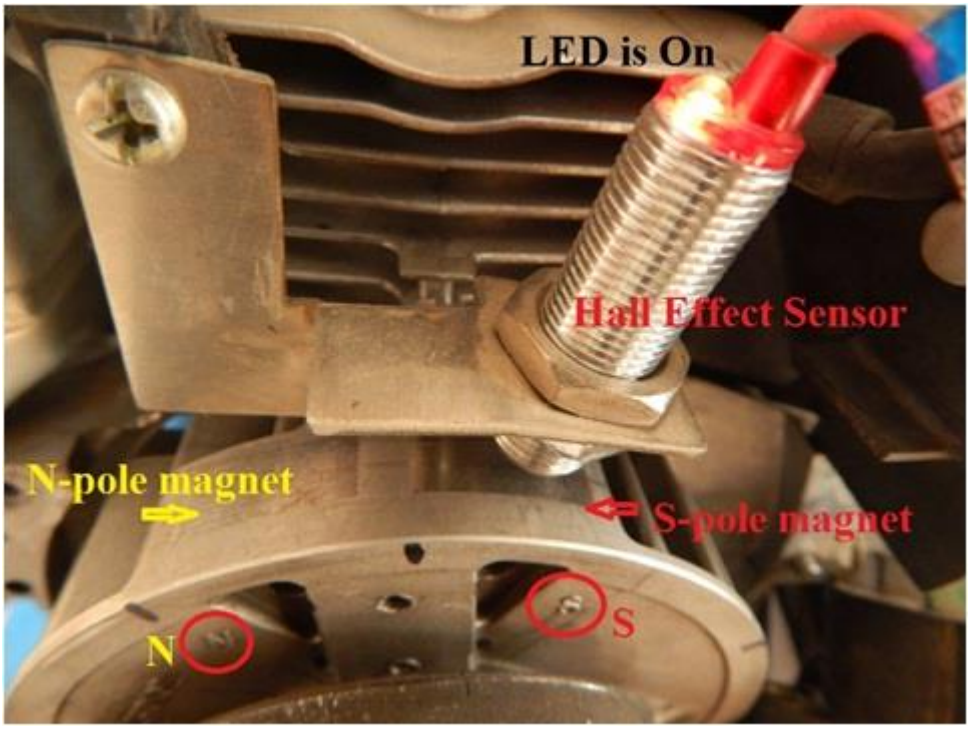
Note: The clearance between Hall sensor and Magnet is better at 3-5mm.

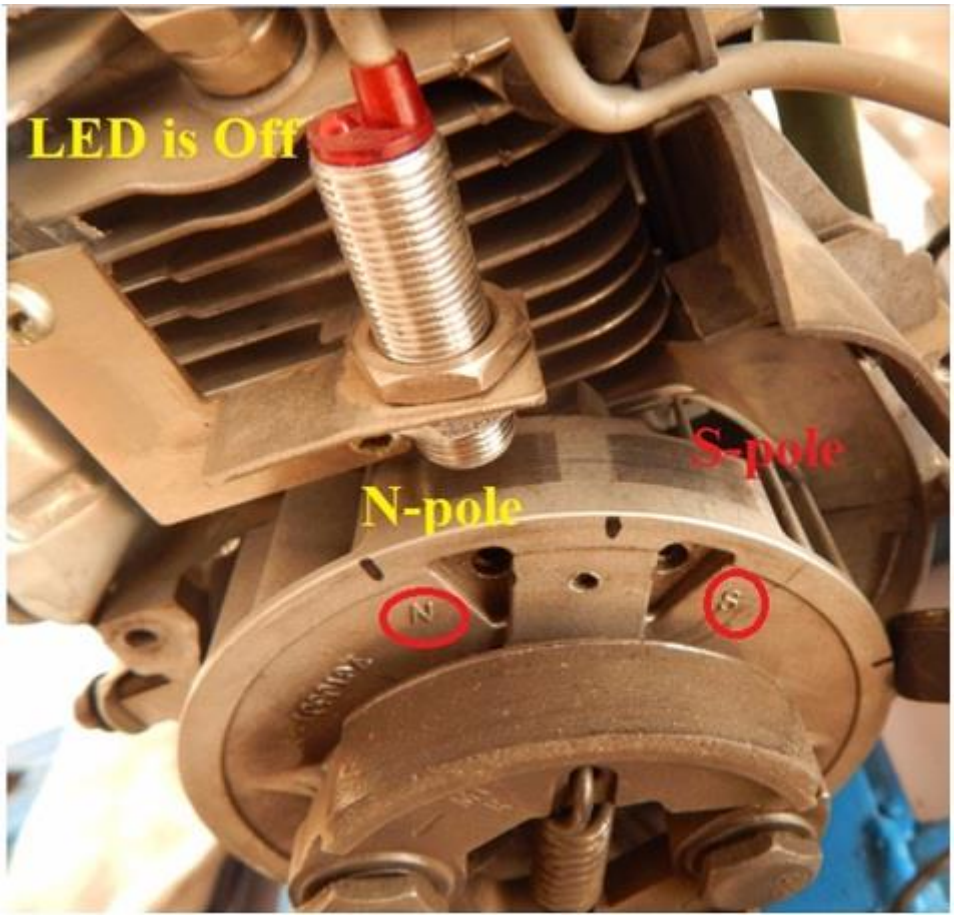
Use Honda GX35 as an example:

There are two magnets on the Gx35 flywheel, one is N-pole magnet, and another is S-pole magnet.

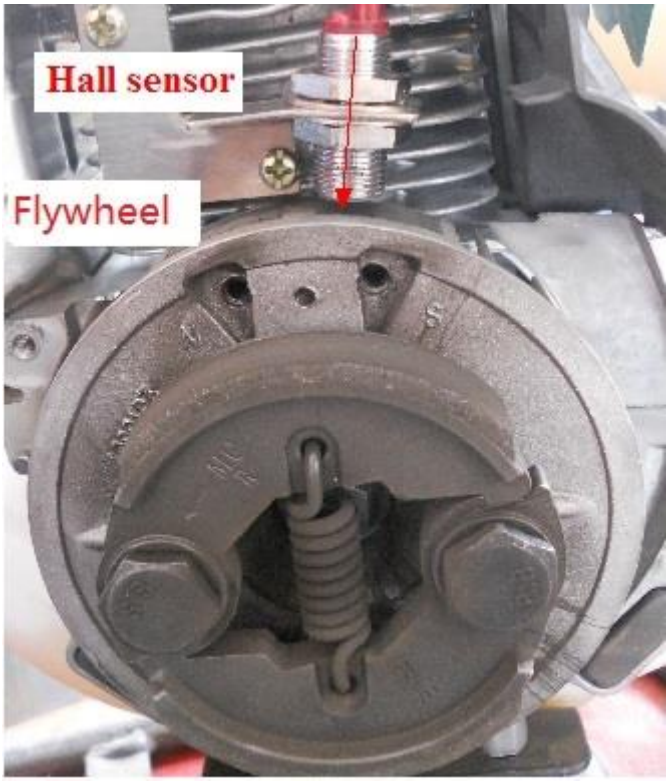


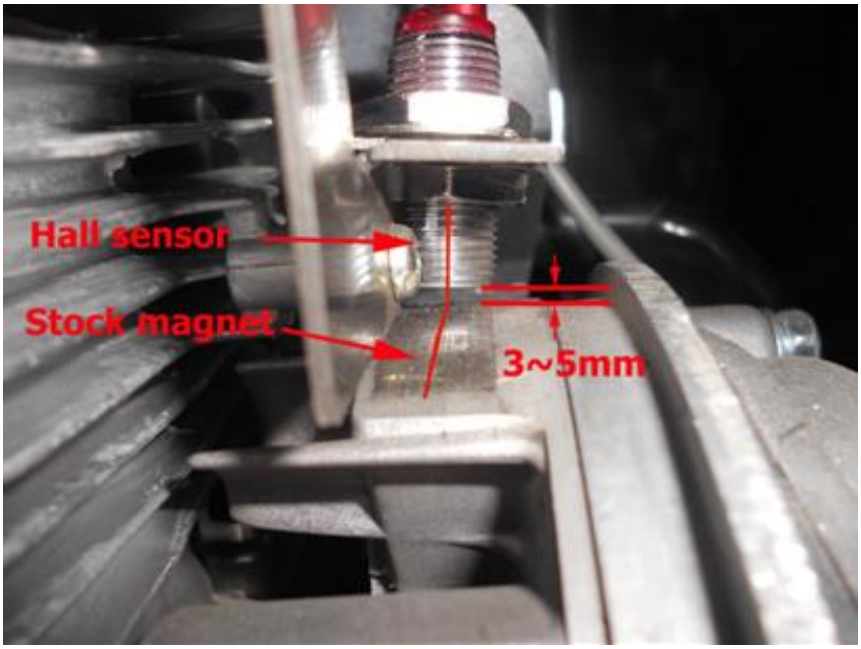
We will provide S-pole Hall Effect sensor for Gx35 EFI system.
When the S-pole magnet passes through Hall sensor, the Hall sensor will be trigged and the LED will be on. When the N-pole magnet passes through the Hall sensor, the Hall sensor will not be trigged and the LED is off.



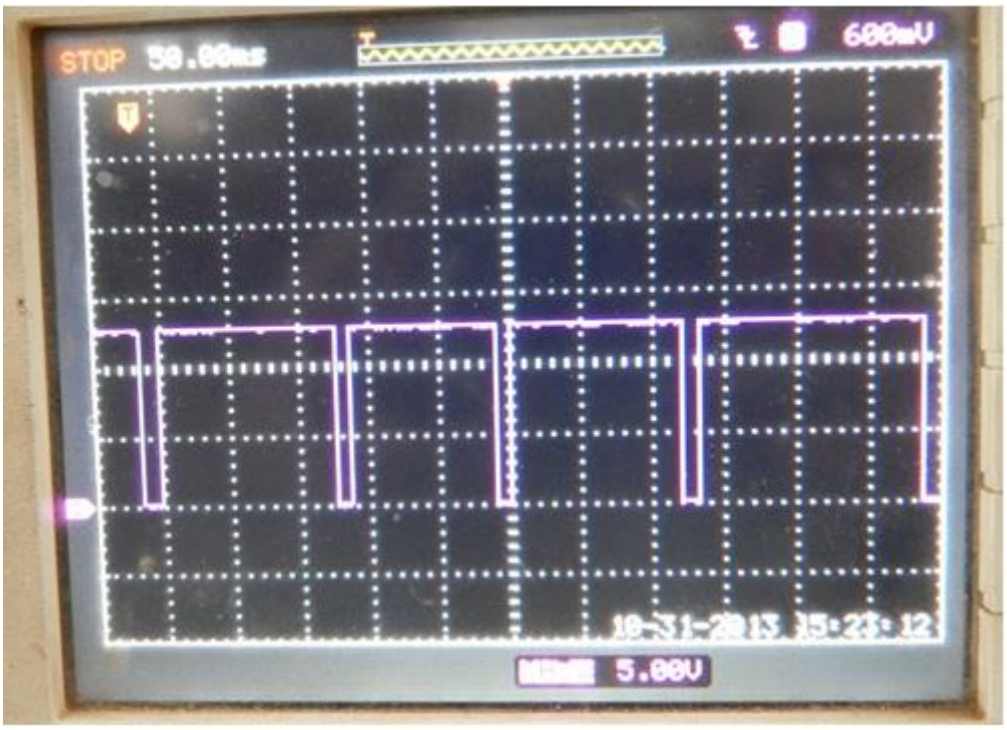


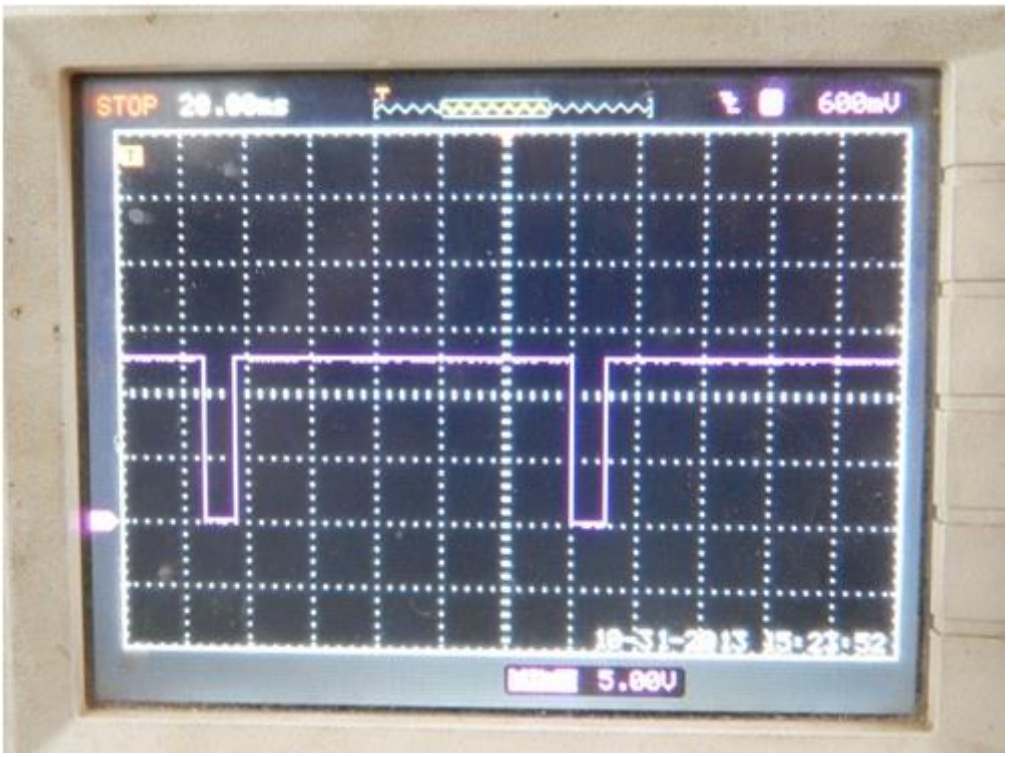
Install Hall sensor on Gx35:





Advanced: You can verify the Signal of Hall Effect sensor with an Oscilloscope when cranking to start:

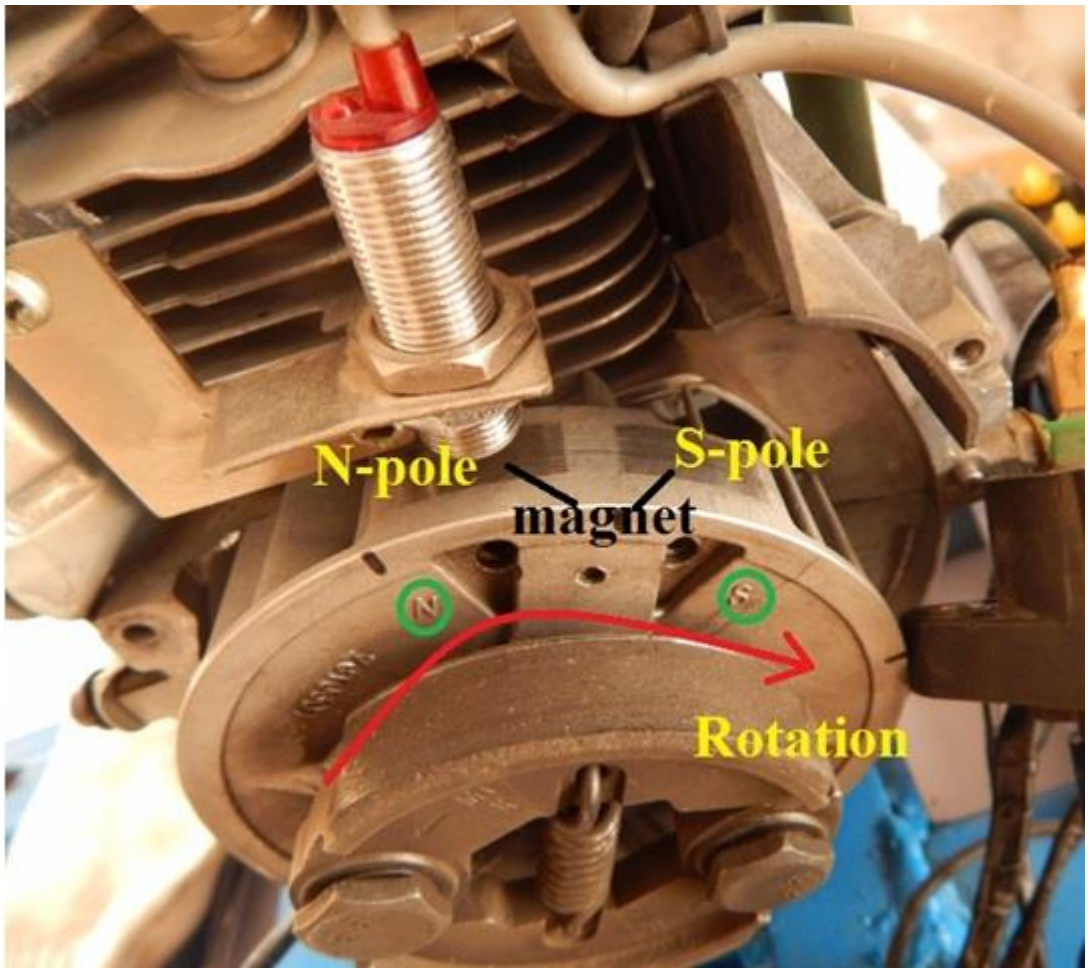




How to choose a suitable Hall Effect Sensor if there are two magnets on the flywheel?

A usual and easy method:

Rotate the flywheel in the real direction of engine running, if the S-pole magnet is closed to TDC, we advise you to use an S-pole Hall sensor; and if the N-pole is near to TDC, an N-pole Hall sensor is OK.
In the below picture, we choose S-pole Hall Effect Sensor.



And if there are two different length magnets, we advise that you use the small magnet as trigged magnet.

Note:

a) The distance between hall sensor and magnet is 3~5mm recommended.
b) The hall sensor should face to the center of the flywheel

c) Also the sensor should face to the center of the magnet.
d) Both length and width of the magnet must be 12mm at least.

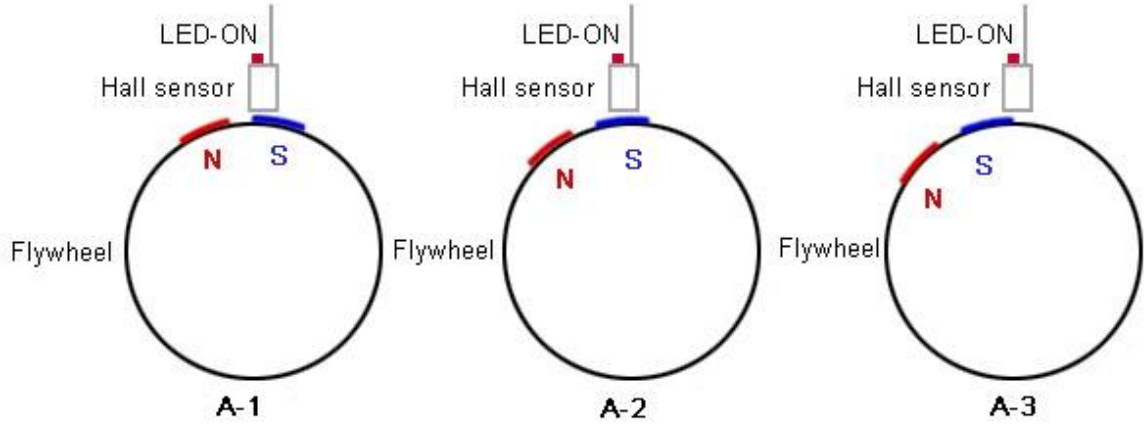
Further instruction:

Does the magnet match with the hall sensor?

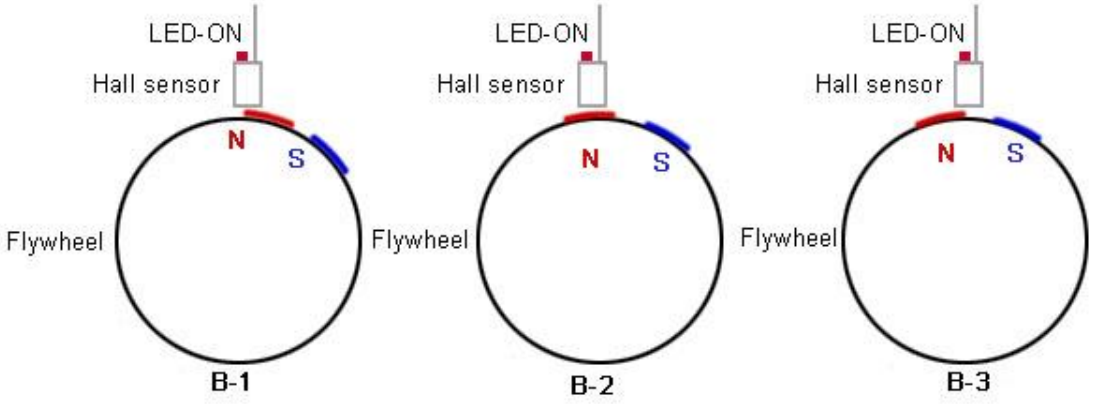
The hall-effect sensor which comes from Ecotrons works with S polarity of magnet acquiescently. When you get one hall sensor, you need to test it to make sure whether it can work with your magnet.

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

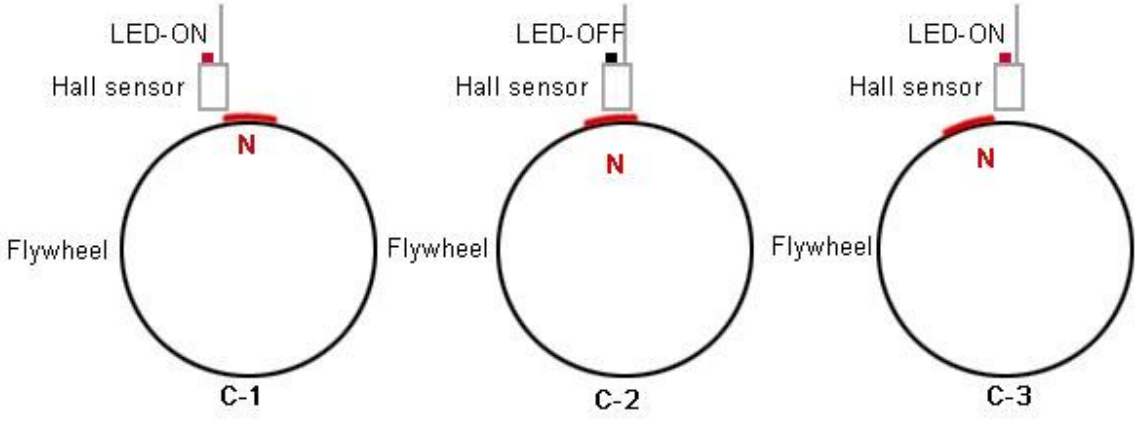
a) If the LED lights at the center and the edges of the S magnet, but is off at any other place, it means the hall sensor works with S polarity of magnet.



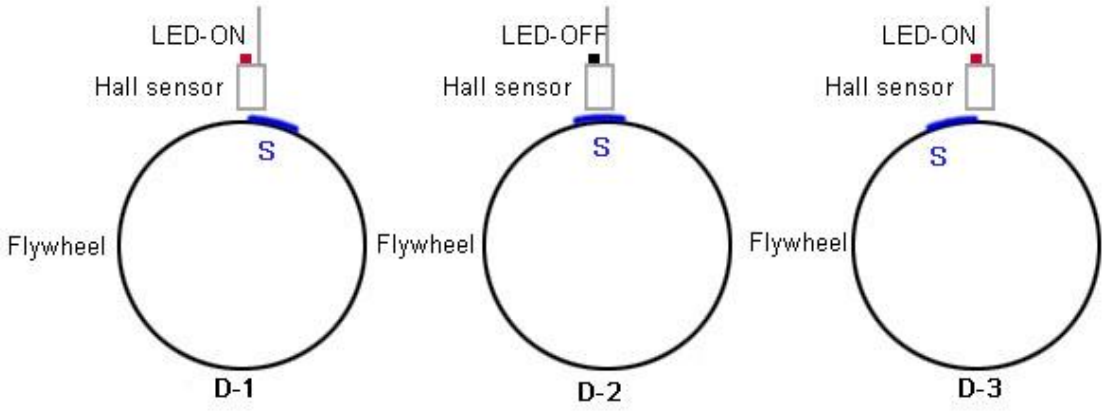
b) If the LED lights at the center and the edges of the N magnet, but is off at any other place, it means the hall sensor works with N of magnet.



c) If your engine may be Honda GX200, Briggs engines or other engines. No matter how many magnets there are on the flywheel, if the sensor turns on only at the edge of one magnet, and turns off at the center or any other place.
It is suitable for the following conditions.
The hall sensor can work with one 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 **support@ecotrons.com** for more information.

4 Hall Effect sensor calibrations

If you use the Hall Effect sensor, you need to do some tuning (**usually, we will pre-set the setting when you order the EFI system with Hall Effect sensor**).

VAL_CKP_Pulse_Polarity=1
VAL_ignore_second_tooth_enable=1
VAL_ignore_second_tooth_x_apart=2

5 Diagnostics and Service (with Ecotrons EFI)

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

1) 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 A2l and CAL file to get whether it is suitable for Hall Sensor. Or contact us and send back the A2l and CAL files, we will help you to check it.
Step 2: check the wires connection, the signal wire of hall sensor is connected to CKP (Orange) from harness. Check if the CKP (Orange wire) pin loosed from the ECU connector?
Or take some photos and send them 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 one new and send the broken sensor to us.

2) Q: when you install the Hall sensor, ECU can read RPM signal, but engine is not easy to start or unstable to run.
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.

3) 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, so 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 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 that you use the magnet from Ecotrons and erase the stock magnet.

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

A: please install the Hall sensor with the correct method, and contact us, we will send the software for the Hall sensor system to you.

Note: If you have other problems, please contact us, **support@ecotrons.com** **http://www.ecotrons.com**

6 Appendixes: Mechanical CAD Drawing