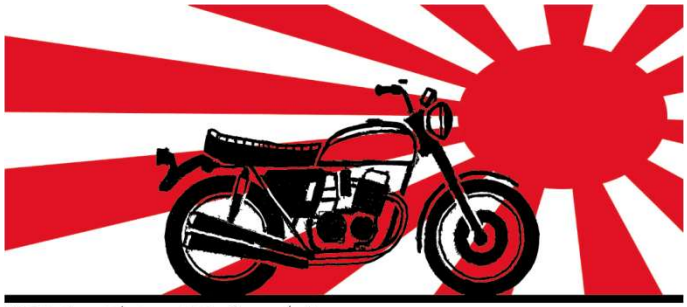


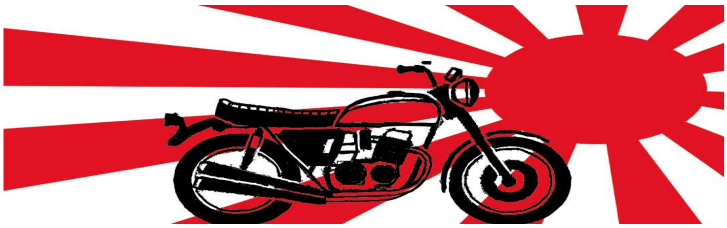
V4.0 Hall For Ignitech

Installation Manual

Draft_A

Rae-San

24/4/2021



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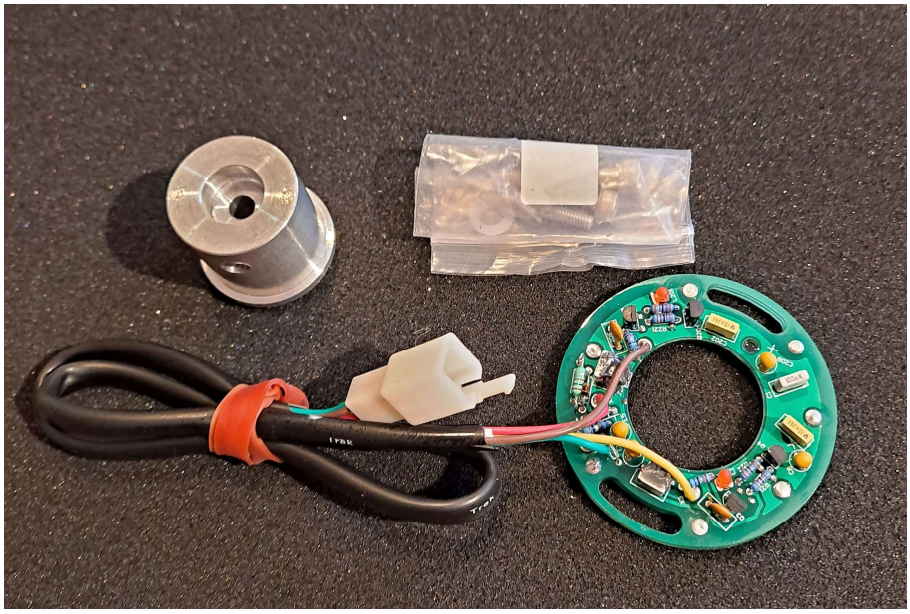
Rae-San V4.0 Hall for Ignitech

Congratulations on your purchase of a new ignition setup for your CX motorcycle.

Your Kit should be similar to the picture below.



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Installation – Hall Effect Sensor

The process is easiest if starting with the engine out of the bike. It is possible to do the install in the bike with a lot of fiddling and removal of the water bottle – or swinging the engine down at the rear maybe – but I'll show he process with the engine removed as this allows for easy access and photography.

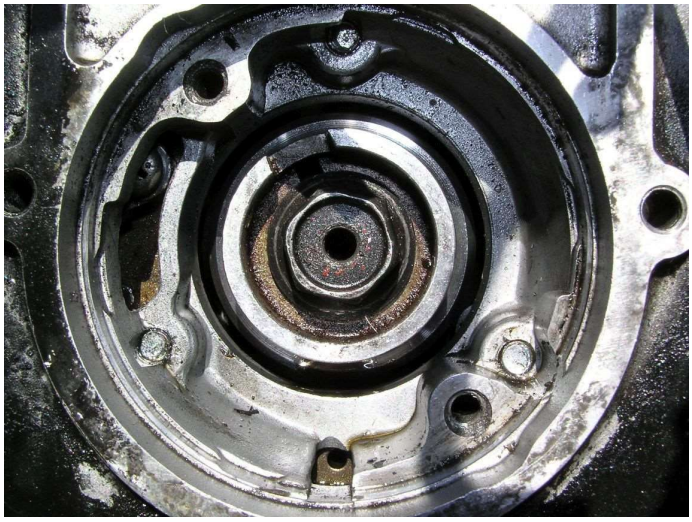
It's recommended that a dry run of the installation be performed first – without thread-locker or epoxies, so you can get a feel for the adjustment and see how the alignment stacks up.

Once you've done the dry run it will only take a few minutes to perform the final installation.

Lets begin:

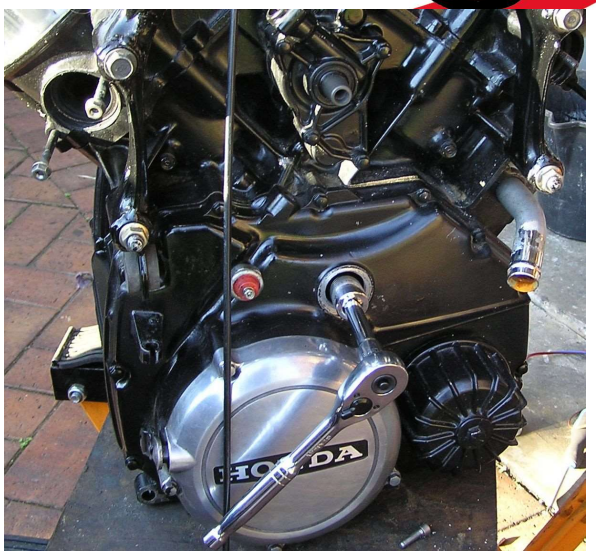
The photo below shows the rear of the engine, ready for the installation. To get to this stage :

- Remove the engine from the bike – see the service manual if you need to
- Remove the ignition advance cover plate
- Remove the Advance sensor coils – unplug the two bullet connectors and then the two Philips head screws – pull out the assembly.
- Remove the bolt in the centre of the rotor and remove the rotor –
- Sell the Removed rotor and advance pickup on ebay ;)



The next picture shows the crank access needed to be able to set the timing

- Unscrew the 17mm bolt on the access cover on the front of the engine
- Attach a 17mm ratchet or similar to the front of the crank.
- Unscrew the timing access port on the side of the engine – depending on the year of manufacture this may be just a cover the same as the front or may be a breather arrangement.



The next step is to install the rotor onto the rear of the crankshaft.

First set the timing to the FL mark.

For the Rotor with Tang :

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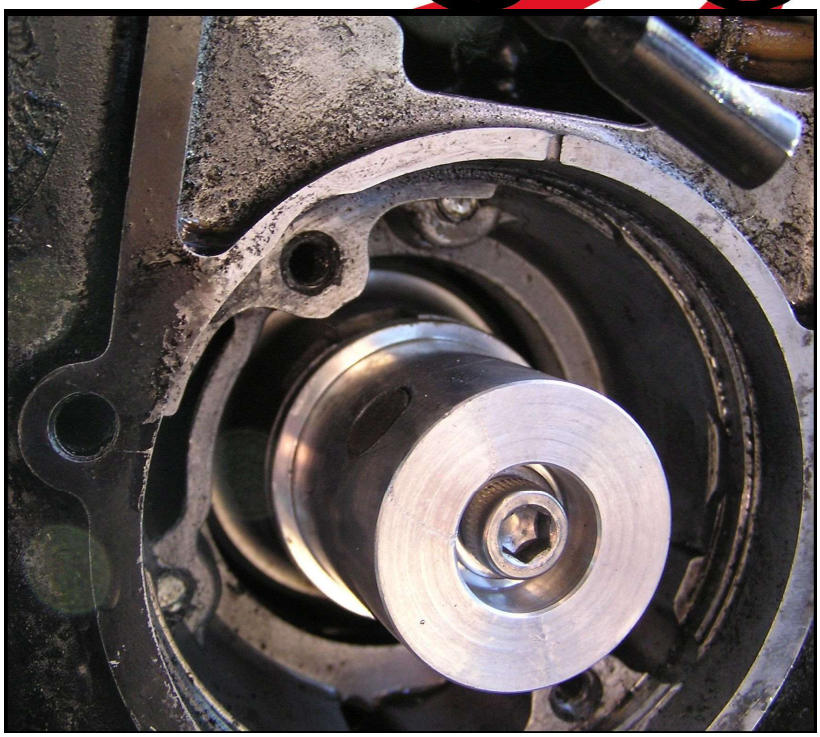
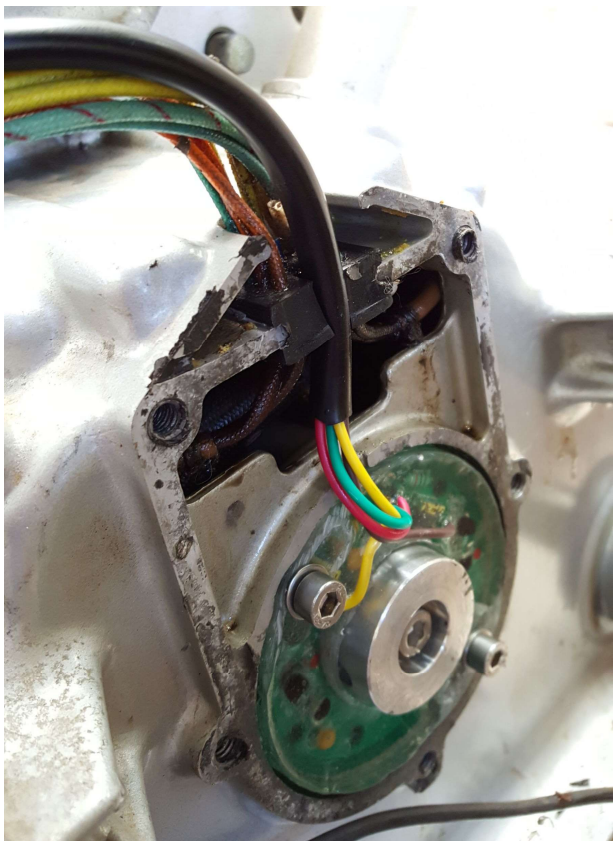
- **If there is not already a line marked on the top of the rotor – in line with the trailing edge of the magnet – then it will make things easier if one is marked now – just use a felt tip marker.**
- **Place the rotor on the rear of the crank with the tang in the slot – It will only fit in one position.**
- **Put a small amount of thread-locker on the bolt and screw into place with a washer fitted.**
- **Do up snug with an hex key/ socket as appropriate.**

Note - the rotor has two postions where the magnet can be fitted into it – only one will be filled – this is correct and normal – the other postion is for an alternate arrangement not relevant here.

Below shows another angle of the magnet.

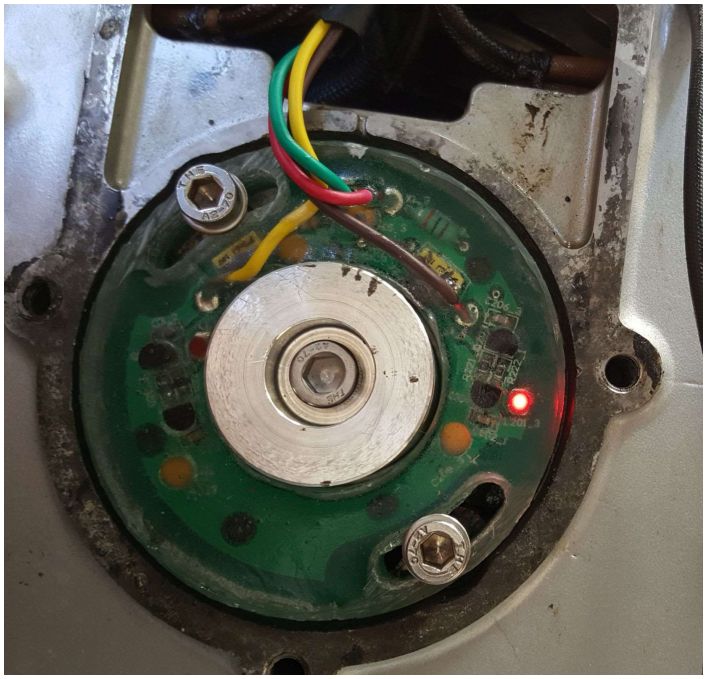


The next step is to put the hall pickup in place -



The rotor is in a fixed location so it is necessary to rotate the Hall Advancer circuit to achieve the required timing result.

- Mount the board as shown below
- Put some thread-locker on the screws before doing the two M5 screws up – only gently at this stage –
- Note the orientation – the power wires should be close to the centre top.
- The trailing edge of the magnet in the rotor – should line up with the hall effect pickup – You can see the two black lines aligned in the photo above.



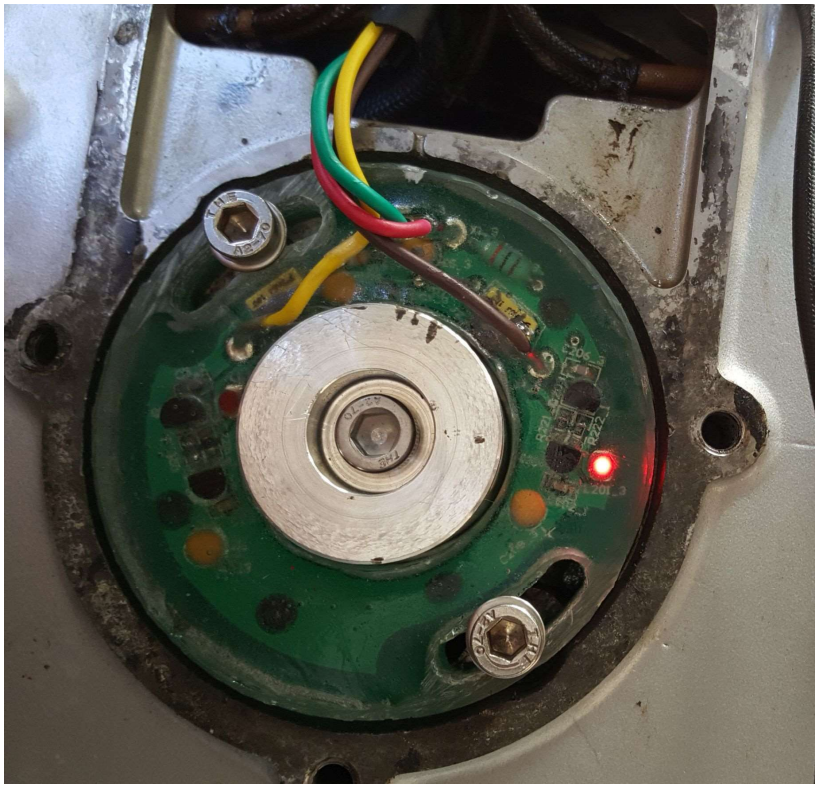
Now it is time to apply power to the Hall Advancer so we can observe the LEDS and set the timing up

- If the bikes battery is available then connection can be made to it
- If not an external battery can be used as shown below
- **RED –**is **POSITVE**
- **GREEN** is **NEGATIVE/GROUND**
- **TRIPLE CHECK THE POLARITY**

Once again – RED = +ve GREEN = -ve

Don't get it wrong or the unit will be damaged.

As a final check before setting the timing – check that the rotor and the Hall Advancer are centred with consistent end gaps all the way around – the rotor should rotate without touching anything.



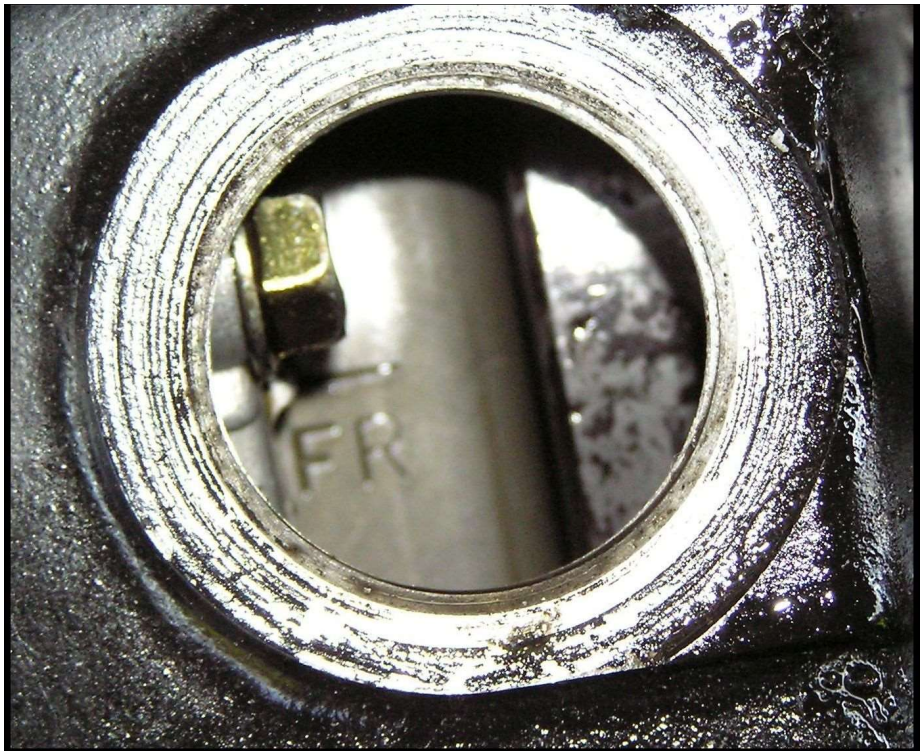
There are two LEDS on the Hall Advancer – ONE for each side –Red LED Left and RED Led Right.

- **RED LED** – This lights to show when the magnet is detected by the Hall effect pickup – so the aim is that this led should be ON between the full advance and the FR/FL marks – It should turn off as close as possible to the FR mark for the RIGHT side and as close as possible to the FL mark for the LEFT side.

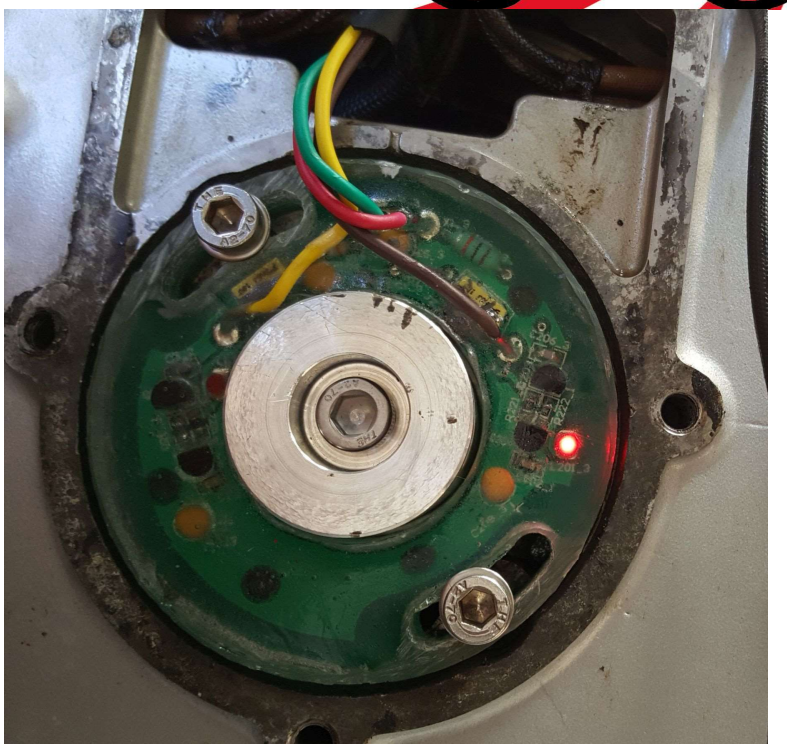
Set the Timing

Lets start with the Right Cylinder.

- Set the crank to the FR position as shown in the photo below.



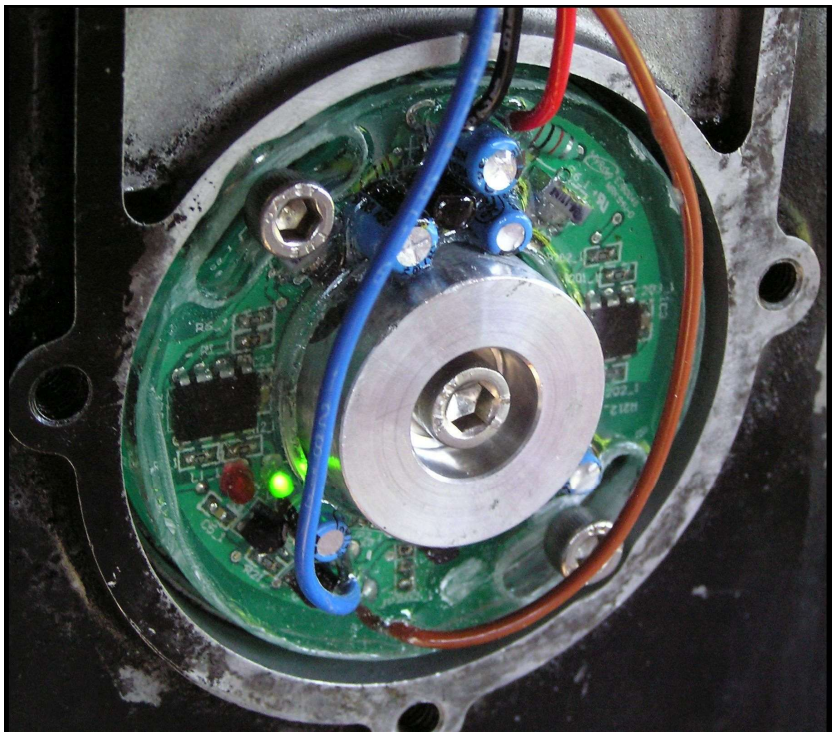
- Loosen the M5 bolt(s) to adjust the timing –
- By moving the Hall Assembly back and forth slightly – set the position so that the RED Led for the RIGHT side turns OFF as near as possible the current position.
- The picture below show the RIGHT RED Led on, and the magnet passing the Hall pickup (small black dot near the magnet on the rotor)
- Tighten the bolt(s) slightly – just enough to hold.



Next set the crank to the FL postion – as shown below.

- Loosen the M5 bolt(s) to adjust the timing –

- By moving the rotor or Hall Assembly back and forth slightly – set the position so that the RED Led for the LEFT side turns OFF as near as possible the current position -.
- The picture below show the LEFT RED Led on, and the magnet passing the Hall pickup (small black dot near the magnet on the rotor)
- Aim to have any errors shared equally around the FR and FL marks – Usually the RIGHT side will need to extinguish slighty before the FR mark and the LEFT Side extinguish slightly after the FL mark, due to the polarity of the flywheel magnets, which distort the magnetic fields around the rotor slightly.
- LEFT RED led is shown on below – and the magnet can be seen on the Left Hall pickup.

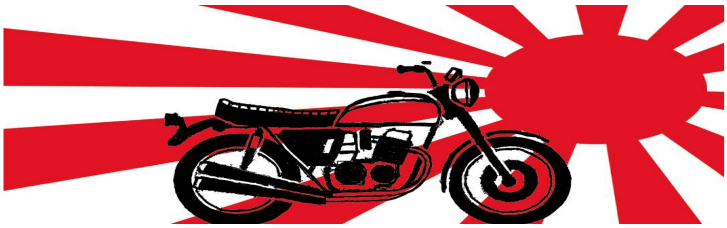


Once the first pass timing has been done as above – it should be checked and fine tuned a little more.

To Summarise:

Rotate the engine and note where the left and right RED LEDs turn OFF with regard to the FL and FR marks. Due to the residual magnetism of the flywheel there is some variation – the best approach is to ensure that the LED turn off points are equally spaced either side of the FR and LR marks.

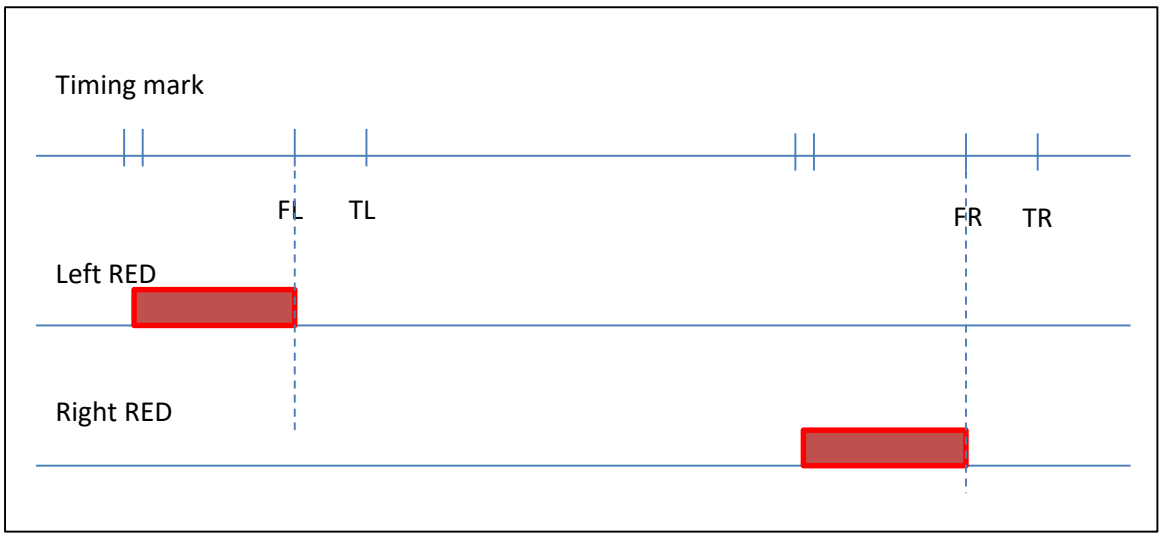
- if the Left LED turns off a bit before the FL mark then try to get the Right LED to turn off a bit after the FR mark.
- if the Right LED turns off a bit before the FR mark then try to get the Left LED to turn off a bit after the FR mark.



- **the two m5 screws can be loosened and the Hall Advancer assembly rotated slightly.**

This can take a couple of goes and is not super critical – reasonably close is fine.

What you are trying to achieve is shown in the diagram below. Where the RED blocks show where the RED leds are on.



Rotate the engine and check that the turn on of the RED LED occurs near the Full Advance marks – these are a pair of lines before the FL and FR marks that indicate the stock full advance range.

When happy with the location – do the screw (bolt(s)) up snug – but not too forcefully that the potting breaks – be gentle – the thread-locker will help ensure things stay done up.

Notes:

1 Due to the slight asymmetry in the turn off position – you might need to tweak the idle up slightly – to get back to the stock idle speed – this is because one cylinder will be firing a touch late at idle. You may also notice a bit of additional vibration at idle as a result – <u>neither of these is harmful and once you move off idle all is smoothed out</u>.

If you really need to smooth this out –then rotating the pickup slightly so that the latest turn off is on the FL or FR mark is an option. Rather than ½ late ½ early balance between the sides around the FL and FR marks, put the latest one on the respective FR/FL mark and the other in advance of its mark.

2 With the fitting of the Hall effect sensor – the internal pickup coils become redundant and may be removed if the engine is open to perform other work. PLEASE note that the Right Hand Side pickup provides the TIMING MARK. If you remove the pickup

then a template must be used to allow you to set the timing. Such a template has been prepared by a couple of forum members and may be found on the Rae-San Ignition Support page. It is a pdf that can be printed out onto some card or thick paper and provides a pointer that is aligned to provide the correct timing mark.

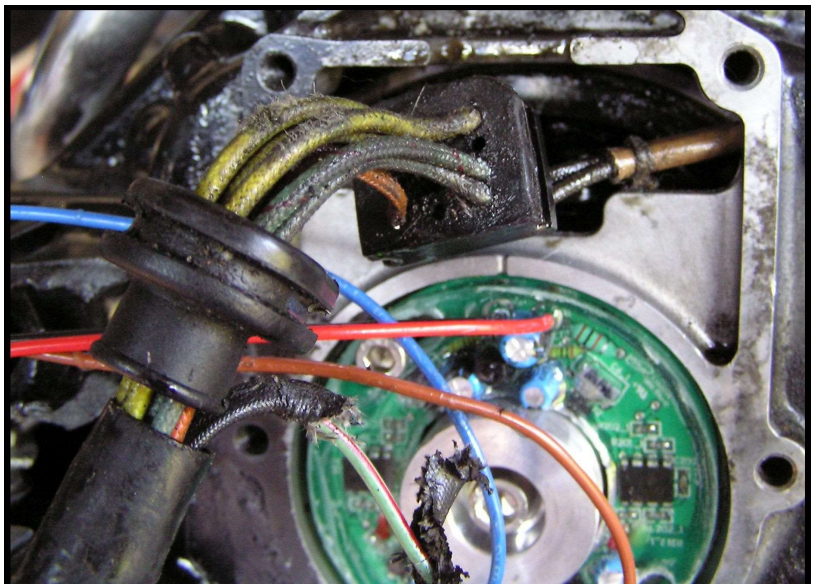
If you do remove the pickups – don't cut the leads off as if they are still functional they could be used to keep another bike on the road.

Run the Wires

Now that the timing position is set, the next step is to run the wires.

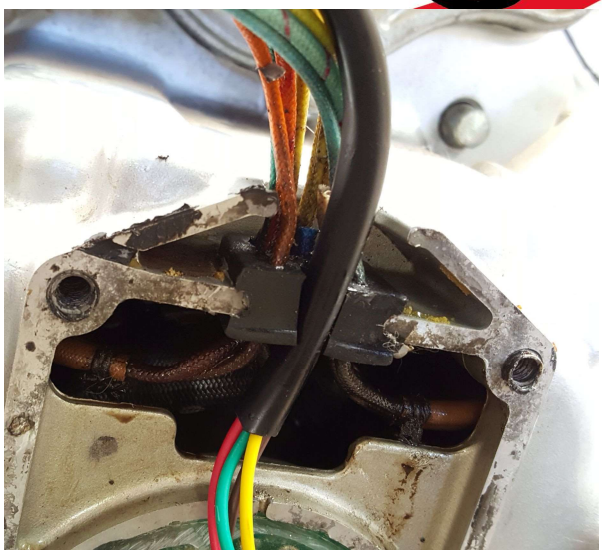
Note I'm assuming the High voltage coils on the Stator are no good – or possibly a G8 type stator has been fitted if desired. If the high voltage windings are still desired then two of the wires might need to be squeezed through each hole rather than run individually.

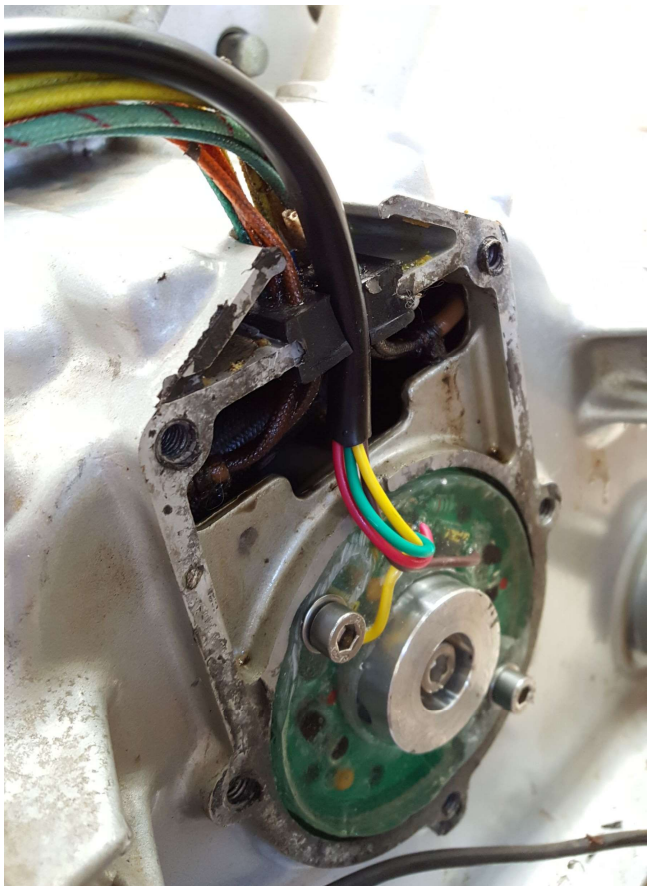
- Remove the two advance pickup wires with their bullet connectors and pull the wires out of the rubber bung.
- Cut the Blue and white wires from the stator high voltage coils – and remove these from the rubber bung also.
- Run the wires through the second rubber bung and up to the top as shown in the photos below.



Position the wires out of the way of the spinning rotor and clear of sharp edges on the case.

Below is shown an option if you don't want to individual feed the wires through due to the bullet connectors and would rather cut a section out of the "grommet"





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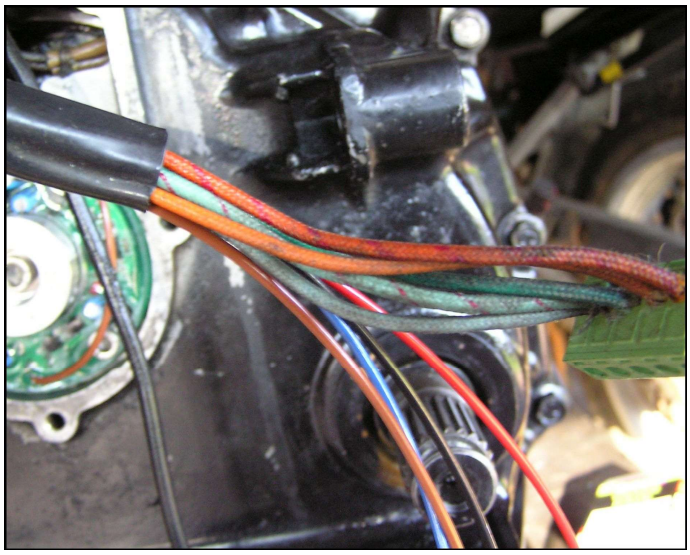
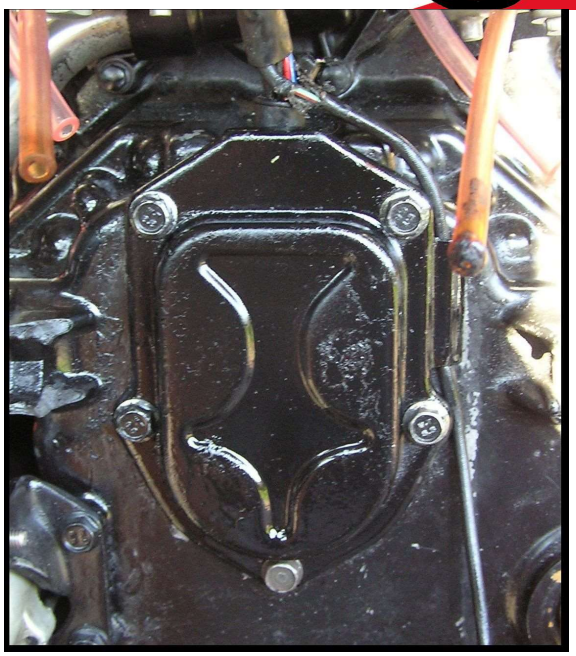
Below shows the wires exiting a the upper connector – ready for connection.



Install the rear cover plate with gasket – as shown below and the process is complete.

NOTE - there might be a bracing bracket across the rear cover plate - THIS SHOULD BE BENT BACK FLAT out of the way - otherwise it can trap and cut the wires - or rub on them and cut them. Please check this before bolting the cover on.



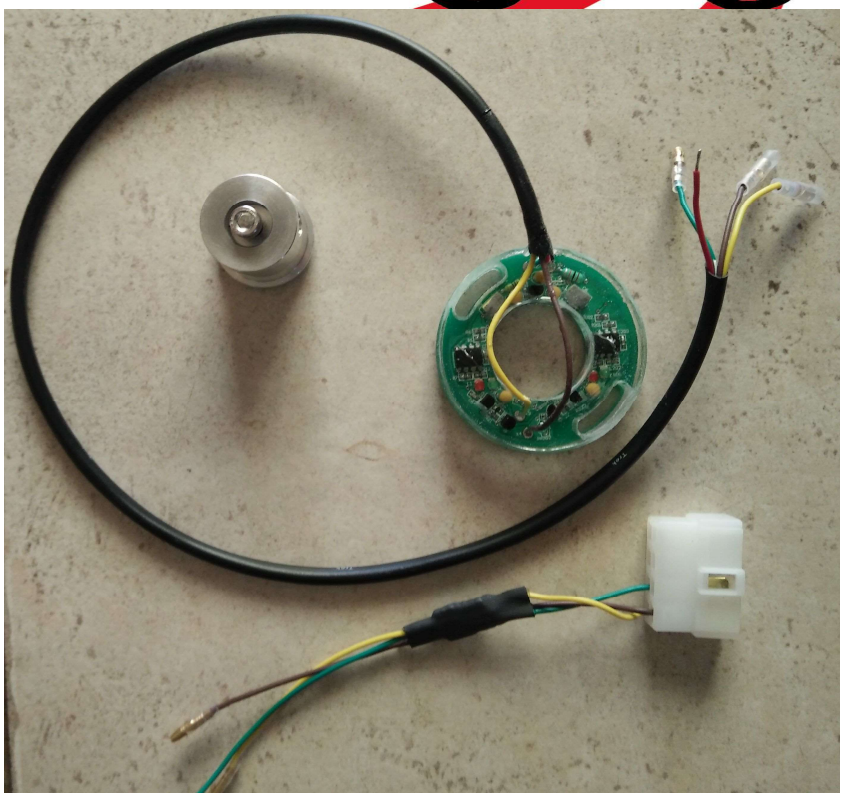
You may now install the engine back into the frame and proceed to the installation of the CDI Coil Driver.

IgniTech Pickup Installation

Installation of the system to trigger an Ignitech is quite simple.

Install the Hall Effect sensor and Rotor as per the Hall Effect Installation earlier.

Connect the Hall Effect to the Ignitech Adaptor as shown below and plug the in Ignitech into the adaptor. You will need to provide 12V to the RED wire of the Hall, and ensure that the ground on pin 5 of the 8 pin connector is connected to the bike ground.

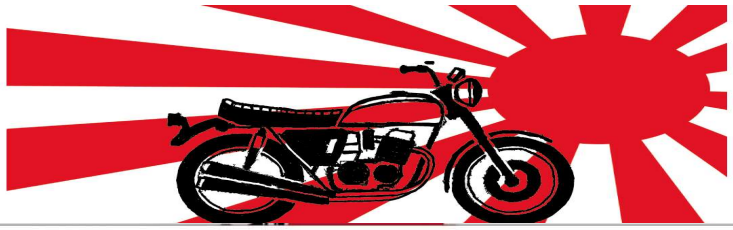


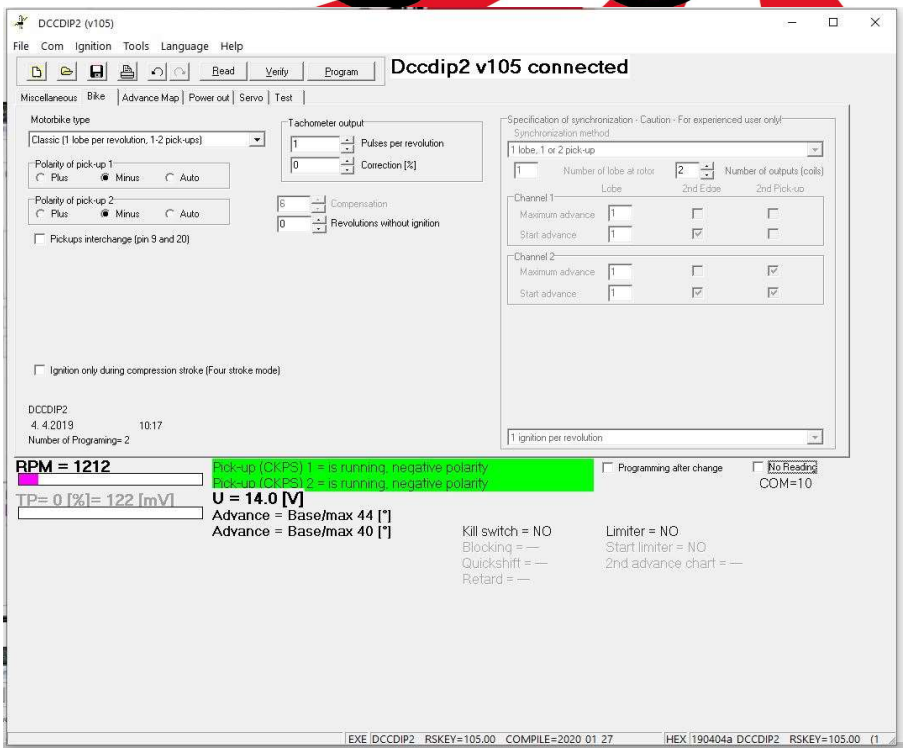
Ignitech Configuration

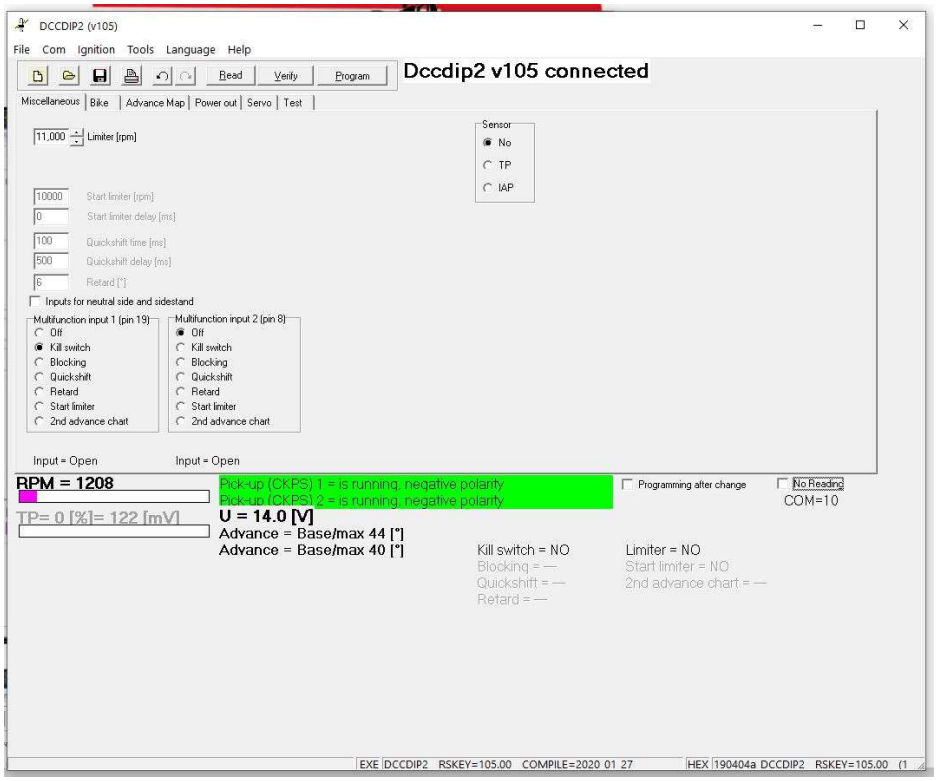
Connect the Ignitech to a serial connection and your computer –

Start the appropriate Ignitech Software (eg DCCDIP2_91,exe) and connector the Ignitech.

The input configuration of the needs to be changed to set the inputs to use standard type triggers – this is found on the bike tab: setup for Classic 1 lobe, 2 pickup, **NEGATIVE** polarity.







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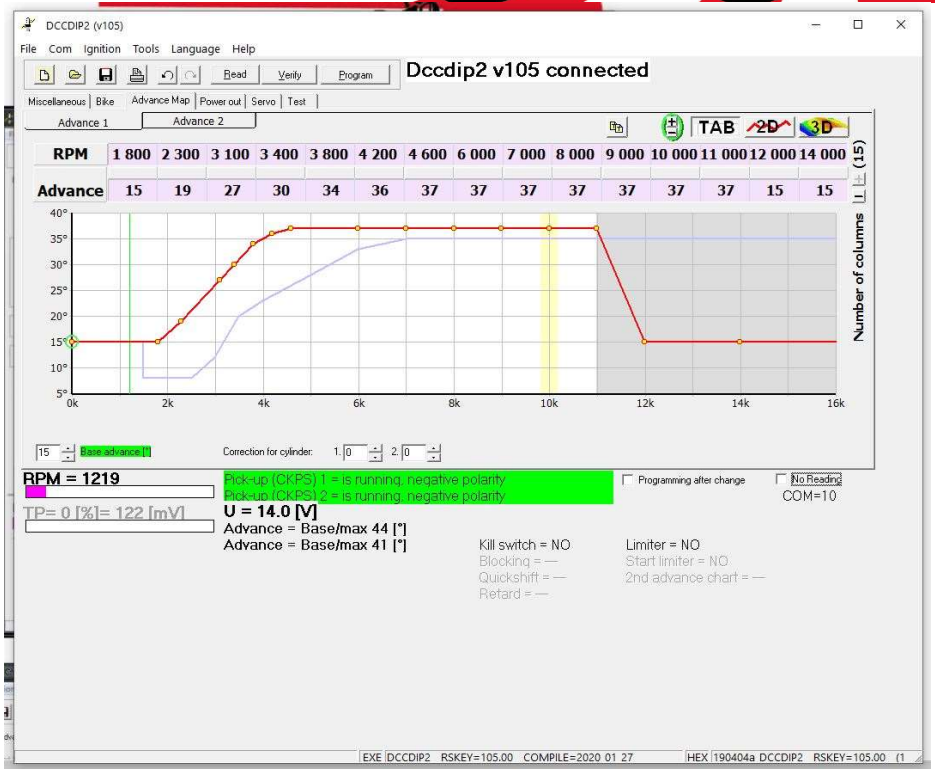

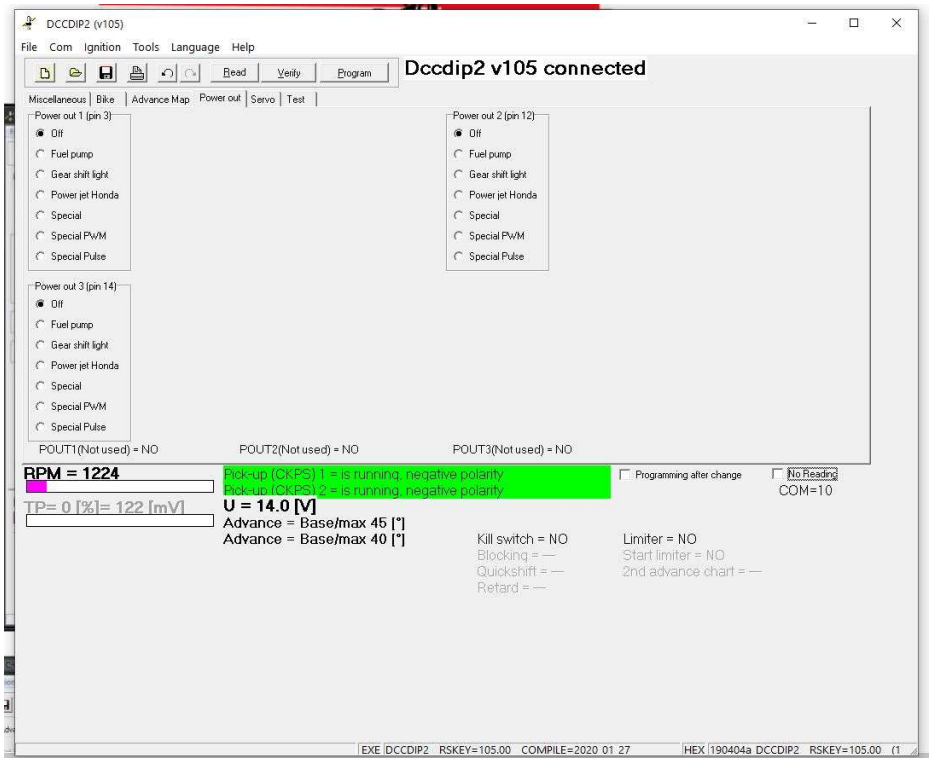

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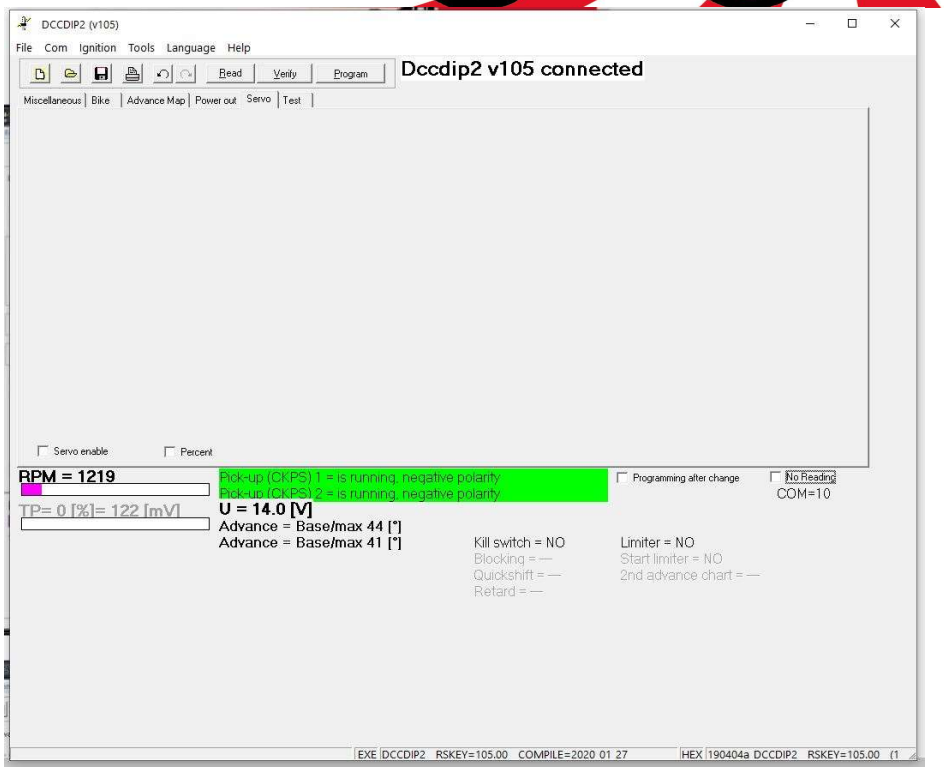

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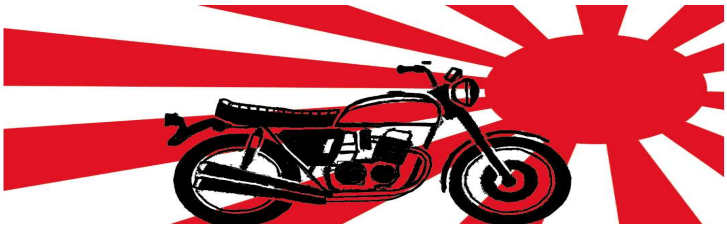

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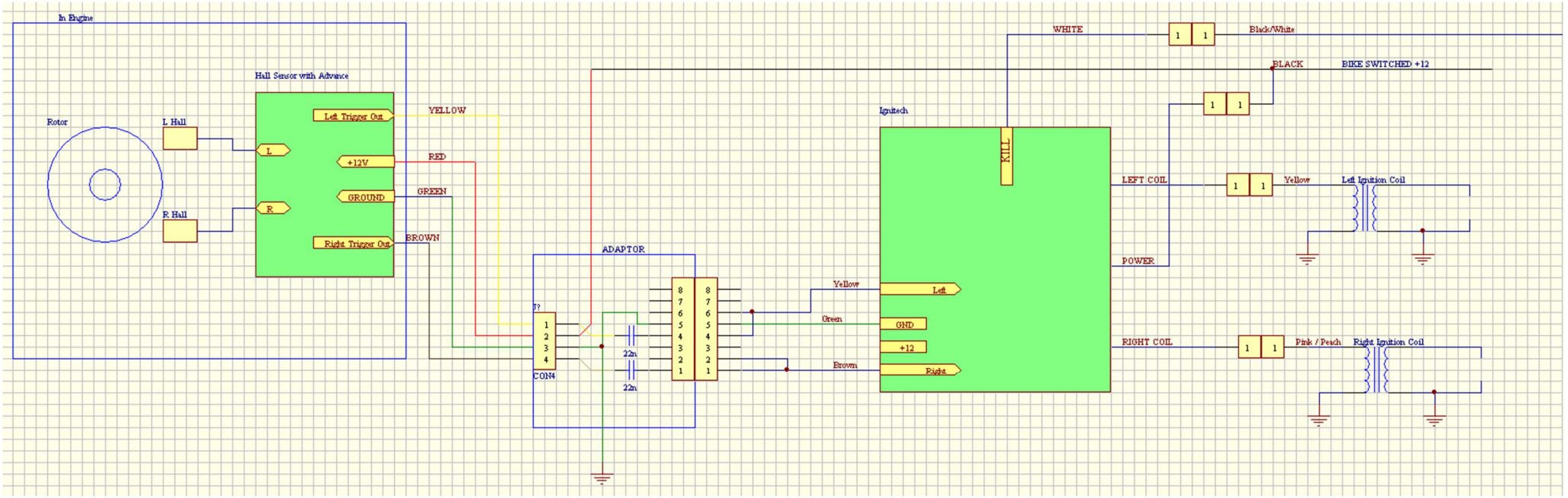
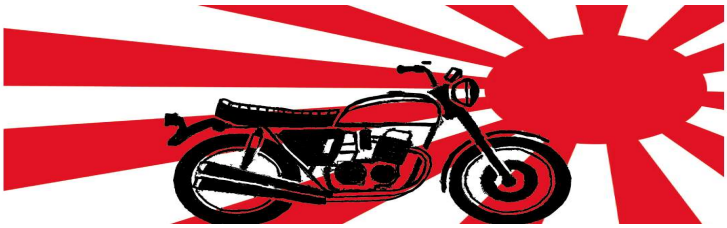
Ignitech with Hall





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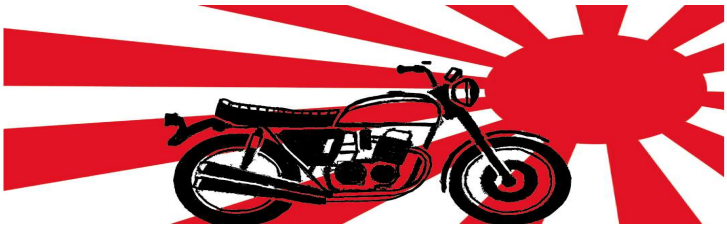

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