

# V4.0 TAI PULSER Ignition Module

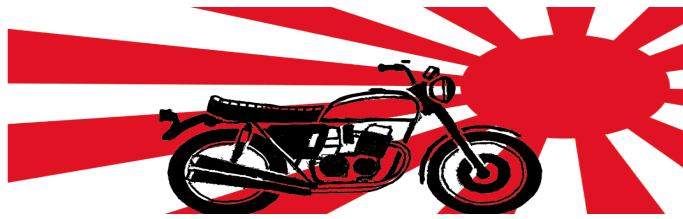
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Installation Manual

DRAFT

Rae-San

12/12/2019



## *Rae-San V4.0 PULSER TAI Ignition Module*

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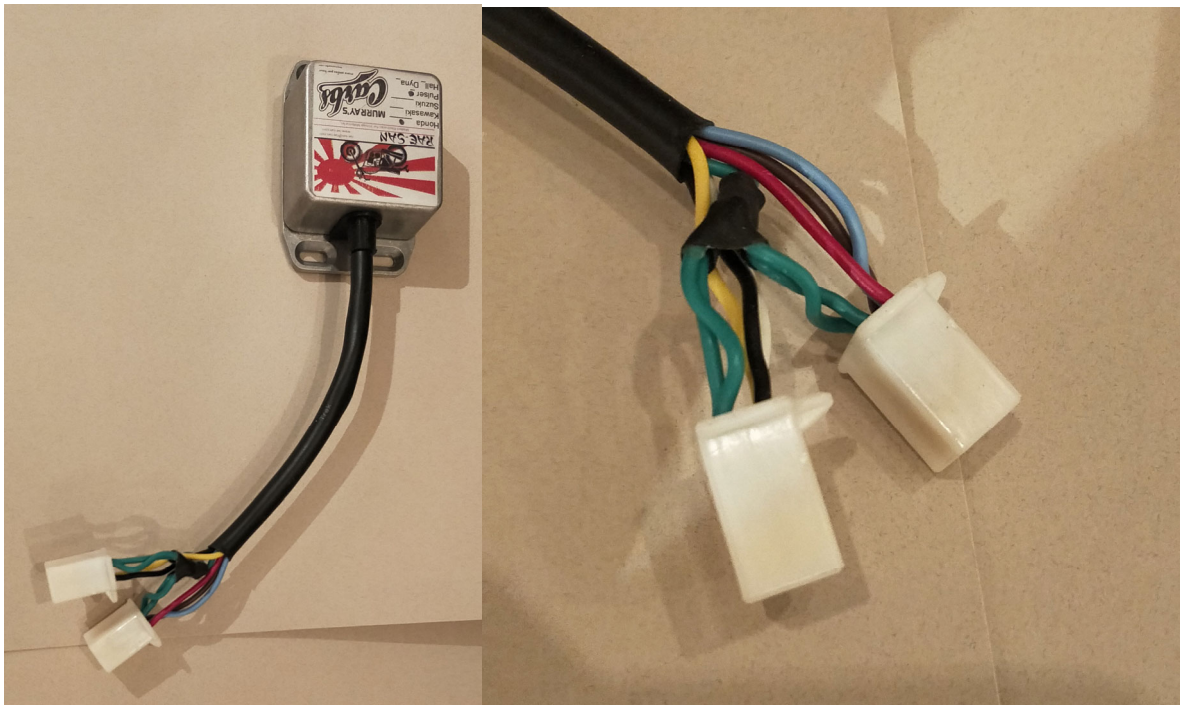
Congratulations on your purchase of a new ignition setup for your motorcycle.

Your Kit should be similar to one of the pictures below.

Depending on the actual bike selected the connectors on the end may vary slightly.

The Pulser version uses the bikes normal ignition pickups and trigger rotor to generate timing like the original ignition did. It however offers some customisation of the timing and lower resistance output drivers, along with additional protection, and of course replaces the original units if they have failed.

Some kits may include an optional Relay and wiring if that option was selected at purchase.



All Rae-San versions have the following features:

- Operates of 12V only.
- Provides electronically adjusted advance.
- Provides extra delay during cranking - START ASSIST for easier starting and less stress on the engine. Particularly important for the CX 650and GL700 in cold weather.

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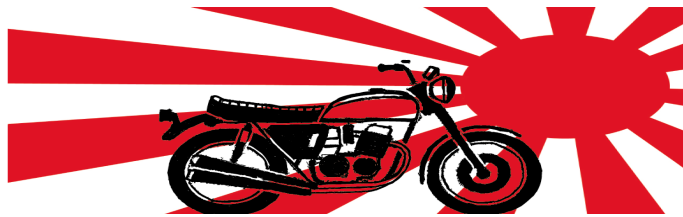
**RAE-SAN**

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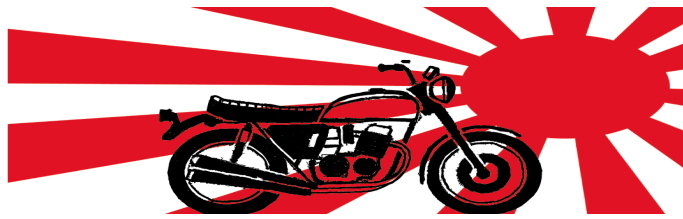
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Modern Electronics For Vintage Motorcycles

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- Provides ability to choose from 4 standard advance profiles for the bike chosen.
- Provides adjustability of the profiles via reprogramming.
- Provides 2 stage RPM limit - progressively retards timing over 2000 rpm - then stops firing >2000 rpm over selected limit.
- Provides pre-set RPM limiter to protect your engine.
- Provides 4 selectable advance/RPM limit profiles.
- Fully electronic.
- Contains two completely independent circuits - one for each cylinder to provide failsafe redundancy.
- Provides power cut-out to protect ignition coils in the event of stalling.
- Provides higher spark energy than original due to 0.25 ohm output resistance driver.
- Existing kill switch functionality is retained so there is no need to rewire switches.
- Dwell limiting - provides coil protection for any stop position
- Coil Protection -if engine stops on a trigger - coil will be disabled after 20mS
- Delayed startup - 2 revolutions required before spark starts to ensure lubrication.
- Comes in a waterproof metal box with harness to pretty much plug and play



## Installation

### Hall Plate Installation

- Nothing to see here – using the OEM pulser triggers

### Control Unit Installation and test

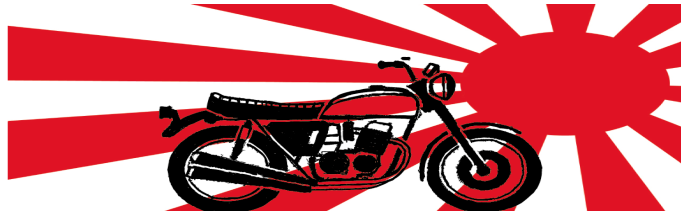
- Mount the control unit in a suitable location – preferably under a sidecover or in the location of the original ignition controller ( remove the Controller cover first so the LEDS are visible ready for testing).
- The controller case forms the GROUND connection for the ignition coil current so it needs to be a **GOOD SOLID, SHORT** connection to the bike frame, negative earth.
  - IF a direct screwd conection to the chassis is not available then a SHORT lead capable of carrying multiple amps should be made using lugs and bolts to the controller case.
- Plug the Controller into the connectors for the OEM ignition
- Connect the Red wire power from the Controller though the fuse to switched power – either from the bike or the relay as appropriate.
- Run the wires to the coils but do not connect at this time until after checks are performed.
- Remove the Controller cover over removal / diagnostic leds / timing
- **Double check Power connections and polarity**
- Switch on bike power –
- Rotate motor and ensure that the Red LEDS on the hall plate illuminate when the magnet is passing and that the Green LEDS on the controller mirror them.
- Set the desired timing / rev limit value according to the section below and the timing table.
- Turn **off** the bike power
- Connect the coil wires to the coils.
- Replace the cover on the Controller
- Re-secure the controller.

### Optional Relay Installation

- See schematic –
- Pins on the relay as per numbering

### Coils

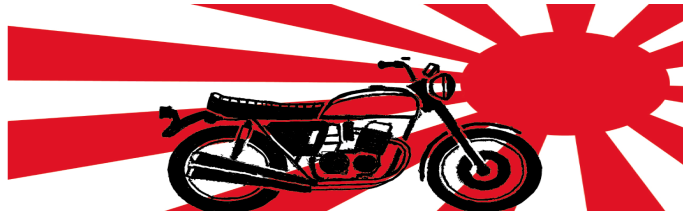
- OEM coil
  - Connect the supplied leads (blue and yellow) to the coils on the side opposite to the 12V connection.
- Aftermarket Coils
  - Depending on the coils chosen you might need to make some mounting modifications



- In general the +12V from the switched power of the bike ignition or via the relay will go to the + side of the coil (if marked) and the lead to the Controller to the other side of the coil – just like the OEM arrangement.
- Coil Pack
  - Mount as per needs – suggestions to come
  - Plug in numbered leads to the appropriate cylinder
  - Run to the coil pack corresponding output – trim to length and re-terminate if required by unscrewing the plug cap – cutting the lead to the desired length and rescrewing the plug cap on – ensuring that the screw thread engages the copper wires in the core.
  - Connect the coil pack lead to the Controller unit (blue and yellow)
  - Connect plug to the coil pack.
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### Settings

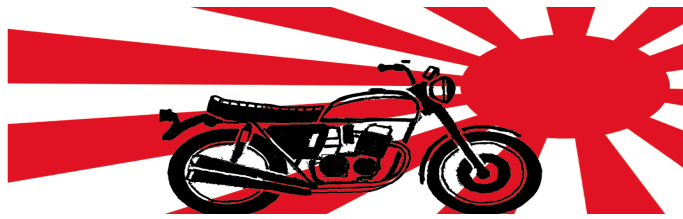
- Refer to the timing sheet and jumper position diagrams at the end of this document.



## *Powerup*

- All checks passed above –
- Ensure suitable fuse 5 -10 Amp installed
- Switch bike power on
- Press start button
- You should see the lights on the Controller flashing to indicate trigger pulses from the pulser.
- If all is good – connect the coils up and try again
- With if timing is correct and coils are not crossed over bike should fire up
- If coils are crossed – backfiring will likely occur – swap wires blue – yellow at coils.
- Leads can be pulled and a spark plug inserted to check for spark as per normal
- Timing lights can be used.
- **Note that a spark will not occur if the engine is being cranked at less than 180 RPM**
  - Cranking is generally 300RPM +
- **Spark will not be seen until 2 or 3 revolutions of the crank have occurred at at least 180 RPM. This is part of the protection and not a defect.**

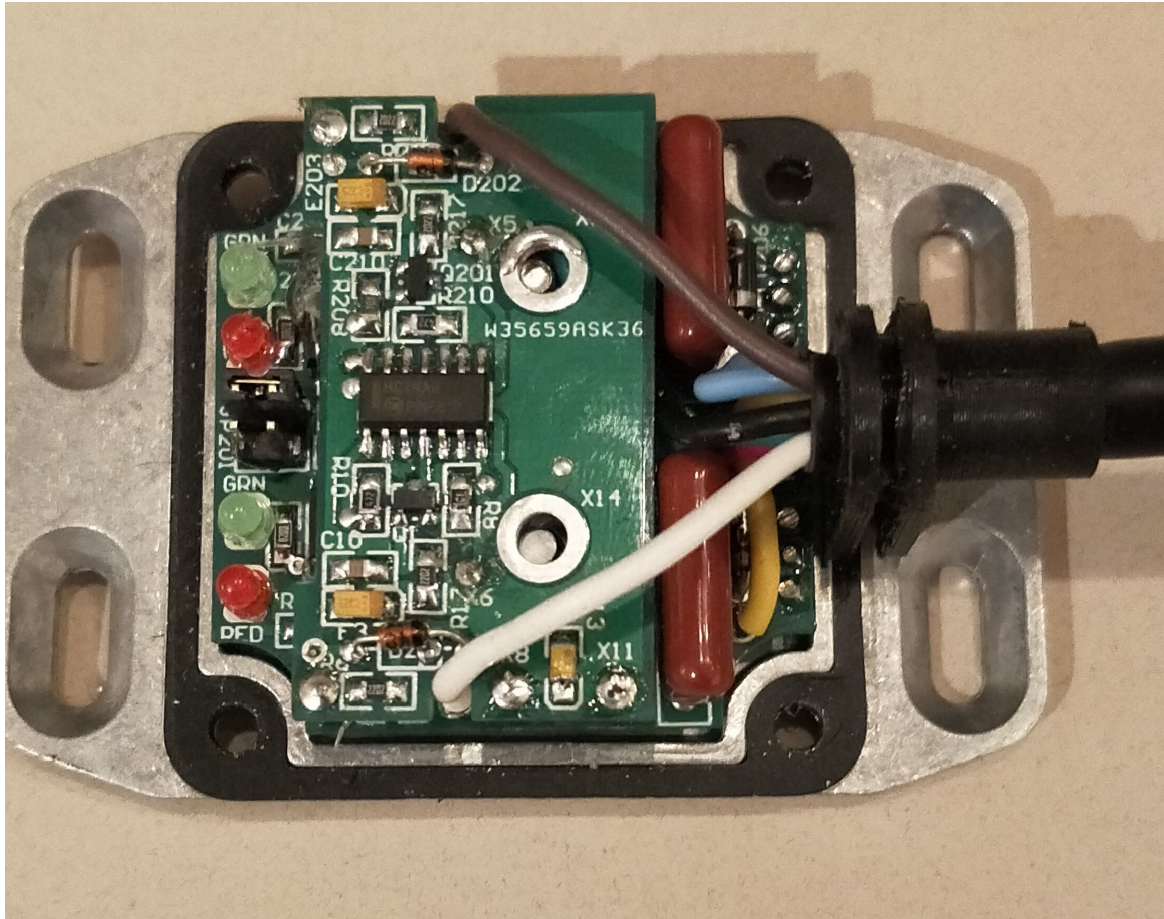




## ***Under the Lid – Profile change and Diagnostics.***

4 screws hold the lid in place with a rubber edge seal – undo these 4 screws and then slide the cable grommet out of the slot in the lid to remove the lid. Reverse process to assemble.

The Rae-San ignition Module contains a small number of configuration options and diagnostic LEDS

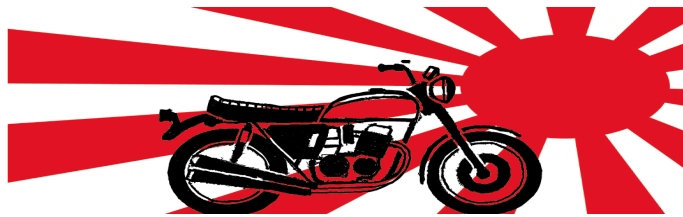


AS can be seen there are two pairs of red and green LEDS at the LHS with a jumper block in between.

A pair of red and green LEDS on one side of the jumper block indicate a “channel” which goes from one input hall sensor though to driving one Coil.

The Green led illuminates when the hall sensor is triggered. The Red illuminates to indicate firing of the coil.

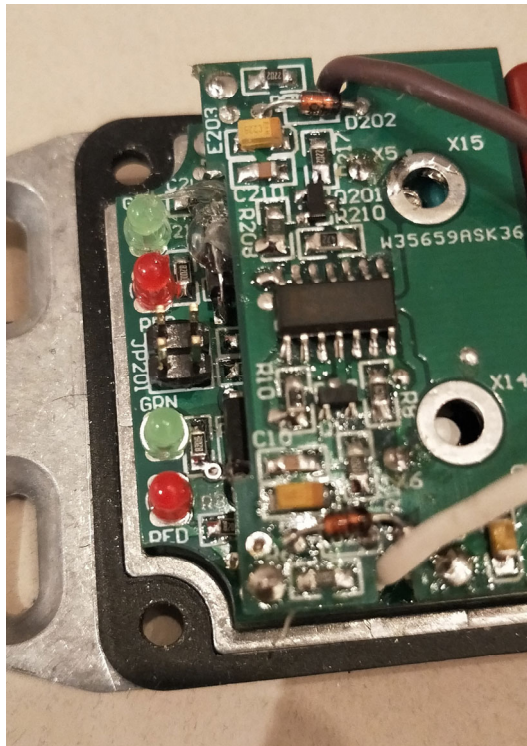
For the TAI version there are 4 ignition timing curves and rev limits that may be selected from on the board.



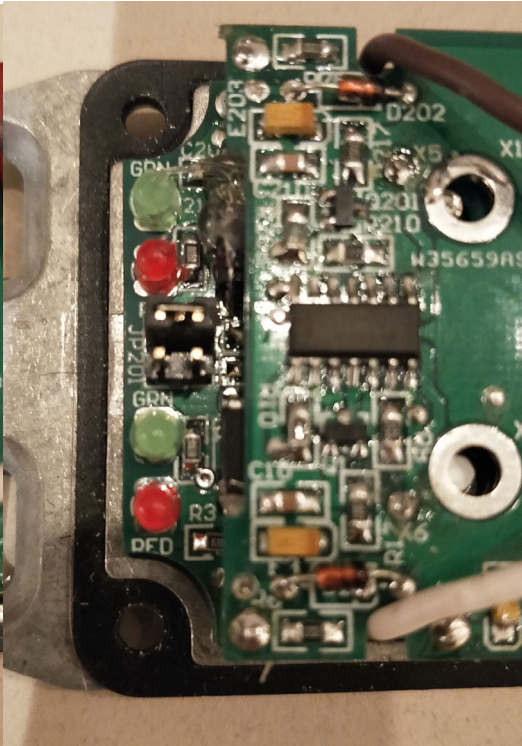
Please refer to the timing sheet at the rear of the document that will have the values programmed for your bike listed against the jumper positions.

Images below illustrate the jumper positions .

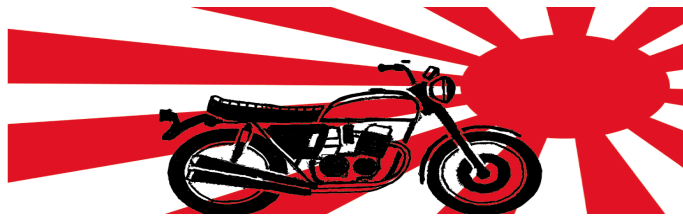
POS A



POS B

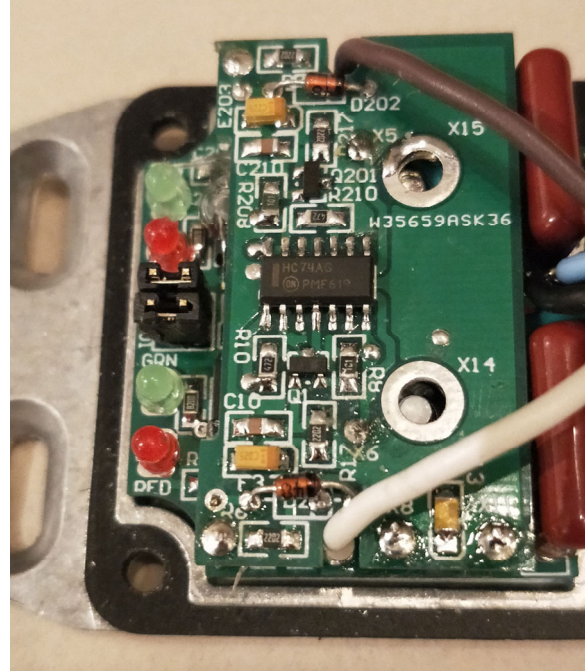
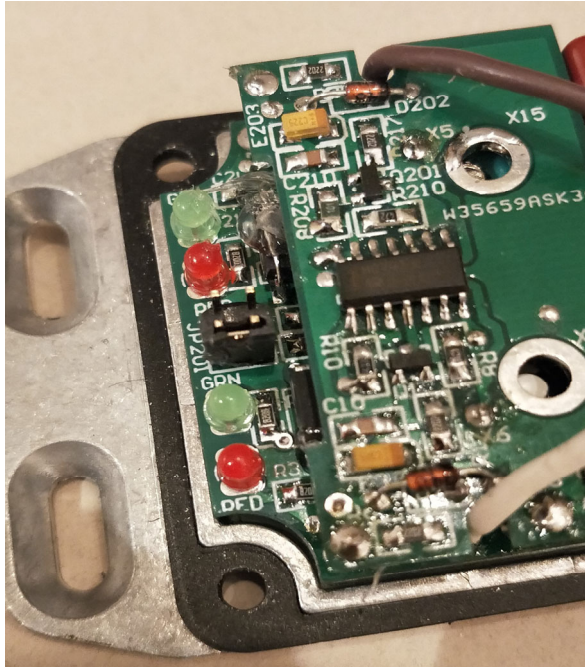






POS C

POS D



## Operation

In operation there should be nothing to do – the module should behave similarly to the original ignition. (or better)

## Recommended Coils

The OEM coils are about 3.3 ohms – many aftermarket coils are also available in the 4.0 to 3.0 ohm range and are suitable – High output coils are available down to about 2.3 ohms – lower than this should not be used with TAI output as unnecessarily high current will result – the dwell has been set on the system around the 4.5 – 6 mS mark to give best results with OEM or similar coils.

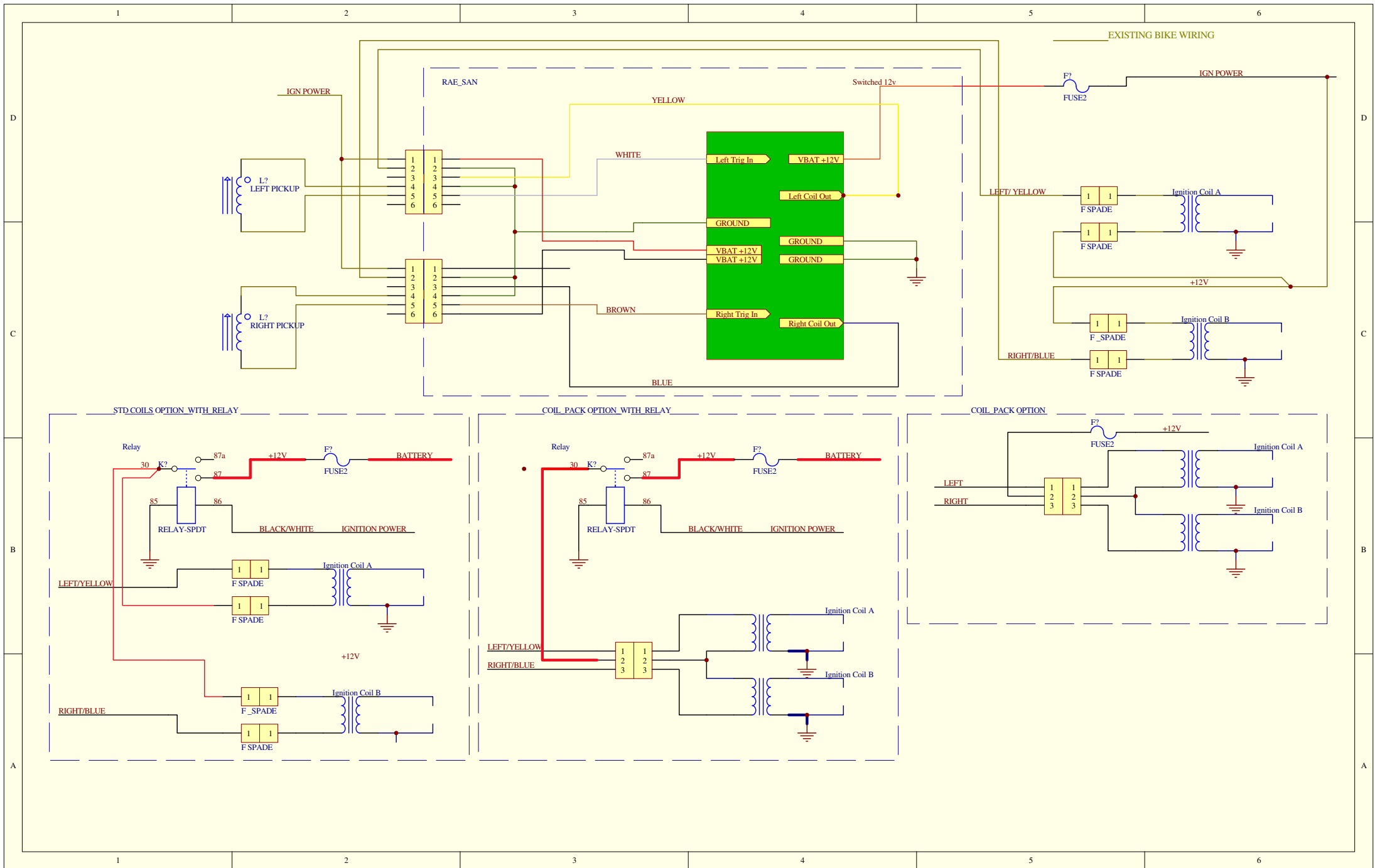
Points type coils have higher resistance and often a series resistor to limit the current. They are not really suitable for a dwell controlled setup – as they will result in a lower spark energy.

For 4 cylinder engines – dual output coils are used, for 2 cylinder single output coils are needed.

LS2 coils may be used with the Rae-San LS2 Adaptor module.

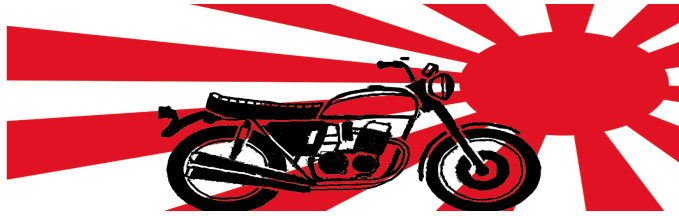
## Connections

The connection information is shown on the diagrams – note that a GOOD ground to chassis should be provided to the main power connection – this carries the coil current and the shorter the better.



[illegible]





implied warranties, including but not limited to those warranties of fitness and merchant accountability, are limited in the total duration to 12 months from the original purchase date. If the warranty occurs within 30 days from the date of purchase, please contact the dealer the product was purchased from. Over 30 days from the date of purchase, please contact Rae-San (and/or Entities Trading as Rae-San) direct at [Rae-San@Rae-San.com](mailto:Rae-San@Rae-San.com). Customer must contact Rae-San (and/or Entities Trading as Rae-San) prior to sending warranty product. Claims for lost shipment, damaged shipments, or other problems regarding freight must be made directly to the responsible carrier. Warranty is solely through Rae-San (and/or Entities Trading as Rae-San). Service to our products by anyone other than Rae-San (and/or Entities Trading as Rae-San) authorized installation centers voids warranty. Rae-San (and/or Entities Trading as Rae-San) disclaims any and all liability for consequential or incidental damages. Rae-San (and/or Entities Trading as Rae-San) will not be held responsible for personal damage, bodily harm or any other legal matters.