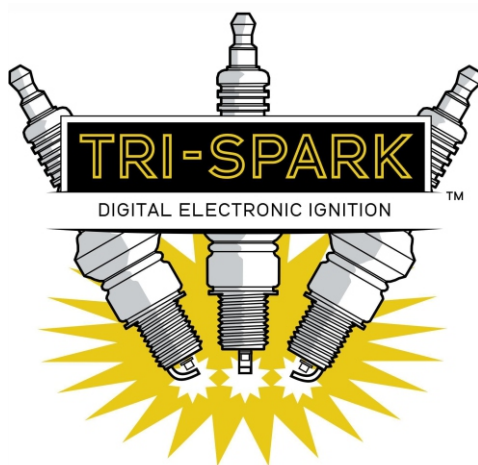


Tri-Spark - FireBox Pro

Installation Instructions

Vincent Twin FB-0050



Thank you for purchasing the Tri-Spark FireBox Pro Ignition system for your Classic bike. For your own safety and success with the installation we strongly recommend that you engage a qualified technician to install your new ignition system. The following information is provided to assist them in the installation and setup.

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Please note - The FireBox Ignition is available in several versions which are not interchangeable due to internal differences.

Step 1: Preparation

Read the installation instructions before you begin. Disconnect the battery, remove fuse and spark plugs.

Caution: A general inspection and tidy up of all wiring including inside the headlight shell and rear mud guard is highly recommended. Inspection and testing of the charging system prior to installing the system is also highly recommended.

Caution: Use the recommended Tri-Spark coils or compatible ignition coils. For Twins use two of our IGC-1012 twelve volt coils, 3.6 Ohm primary resistance. Use of wrong coils can cause failure of the control box.

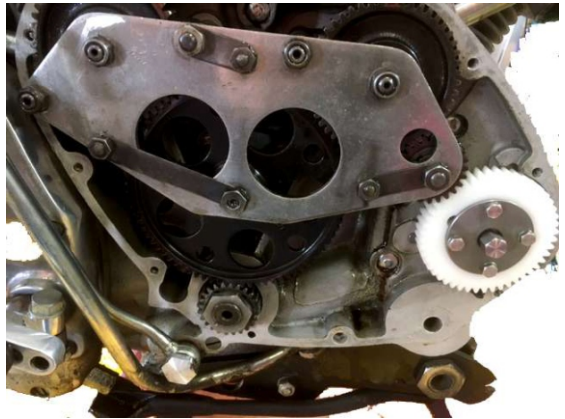
Step 2 - Remove the original magneto and magneto drive gear

Follow the instructions in your workshop manual to remove the magneto and drive gear. This will involve removing the timing cover to gain access to the gear. The drive gear for the Vincent magneto is a spring loaded type that advances the timing as the revs increase.

The **electronic conversion requires a SOLID drive gear** (not included in the kit) with no advance mechanism as the timing will advance and retard according to the curve programmed into the electronic unit.

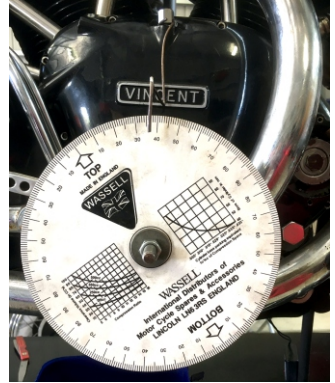
Step 3 - Install the alloy ignition housing

The alloy housing takes the place of the magneto to support the electronic ignition sensor onto the side of the engine. It should be fitted in much the same way as the original magneto using the hardware specified for fitting the magneto in your workshop manual. Fit the solid drive gear onto the tapered shaft of the housing using any hardware deemed necessary to hold it firmly in place. See photo below



Step 4 - Rotate the engine to the fully advanced timing position

A timing disk and spindle suited to your engine should be fitted as shown here. Align the disk for Top Dead Centre on the REAR cylinder on the compression stroke and then rotate the crank BACKWARD until you reach the fully advanced timing position required for your installation. This should be 38 degrees Before Top Dead Centre or as advised for your particular installation.



Step 5 - Install the sensor plate and trigger rotor

Install the sensor plate first as shown with a small amount of slack in the cable. Keep the wires clear of the centre where the rotor is to be installed. Loosely fit the pillar bolts and rotate the plate so the pillar bolts are roughly in the middle of the adjustment slots.

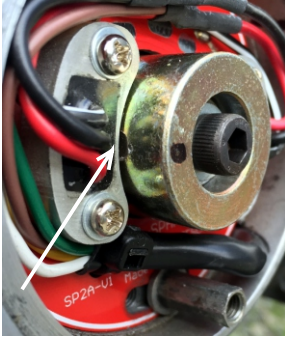
Run the cable along the frame to the position where the control box will be installed. Keep the cable well away from the exhaust pipes and moving parts. Leave a little slack in the cable.

Install the trigger rotor as shown using the 6mm hex head bolt and washer supplied in the kit but **do not tighten yet**. **Caution:** shorten the bolt if it bottoms out in the threads.



Step 6 - Adjust The Height Of The Trigger Rotor

Check the position of the trigger magnet which is embedded in the face of the rotor. For best results about 1/3 of the magnet should be above the sensor as shown in the photo below. If adjustment is necessary, remove the rotor and loosen the two grub screws indicated before sliding the inner shaft in or out to obtain the correct alignment.



Check for the correct clearance between the rotor and sensors. Keep the wires away from the rotor.

Step 7 - Install The control box and ignition coils.

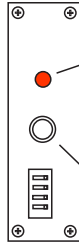
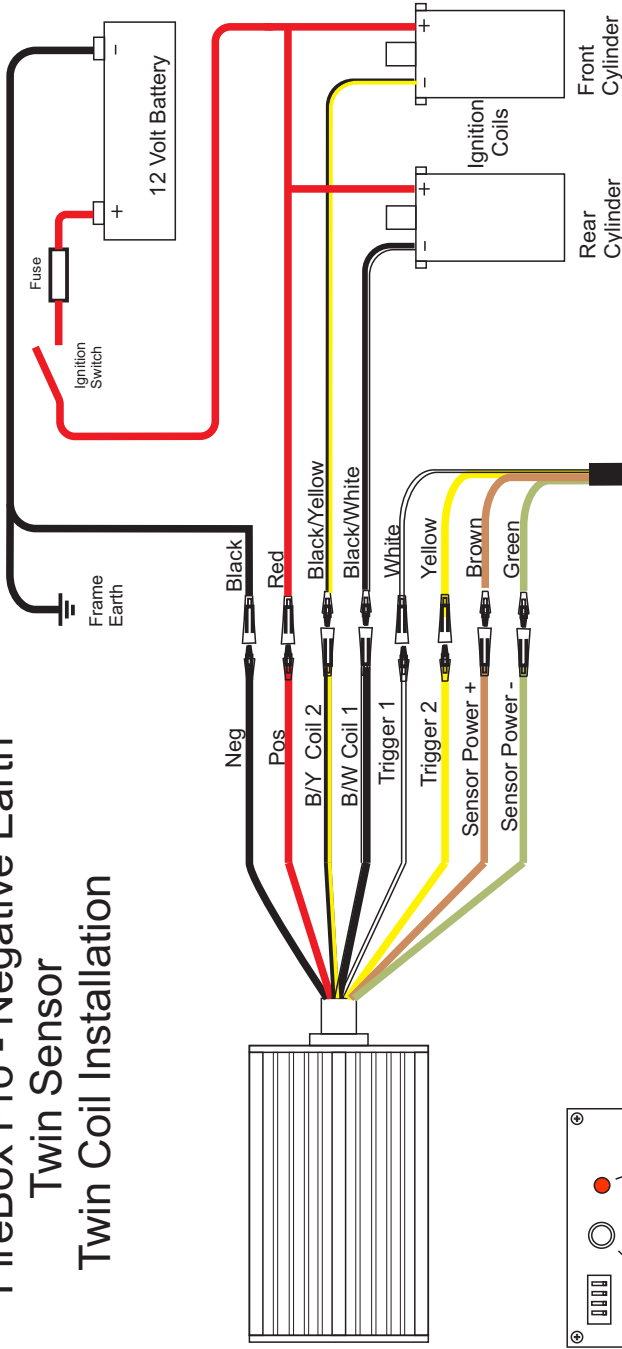
Fit the FireBox control box and ignition coils in a protected location away from heat sources.



Connect the wiring according to the diagram on page 6 for negative earth (ground) installations.

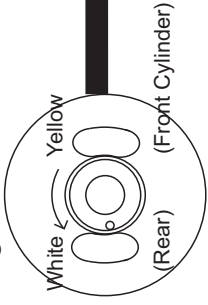
If the cable coming from the sensor plate is too long it may be cut to length and then connected as shown above using the supplied connectors. Run the wires in an “S” bend as shown above to reduce the effect of vibration on the wiring.

FireBox Pro - Negative Earth Twin Sensor Twin Coil Installation



Program Socket
LED
Switches must be in DOWN position for normal operation

Engine Sensor Unit



Step 8 - Setting the timing statically using the LED

Once the wiring from Step 7 has been double checked, reconnect the battery and main fuse.

Rotate the engine to the fully advanced timing position for the rear cylinder as shown in step 4. Make sure the rear cylinder is on its compression stroke. The rotor should be aligned as shown in step 5 with the magnet facing the rear cylinder sensor.

Loosen the pillar bolts retaining the sensor plate and rotate the sensor plate anticlockwise as far as it will go. Switch on the ignition and monitor the LED on the end of the FireBox which should be off. Rotate the sensor plate clockwise to the position where the LED just turns on and tighten it up there. Now switch off the ignition.

If the LED is always on or does not switch on within the range of the adjustment slots, an adjustment to the position of the Trigger Rotor may be required. Make sure all the screws are tightened including the rotor and grub screws.

Step 9 - Checking the timing using a strobe timing light

Reassemble the motorcycle fully with all the parts that were removed during the installation. Start and warm up the engine ready for timing with a strobe timing light. Clip the pickup from the timing light onto the rear cylinder spark plug wire and aim the light onto the timing marks.

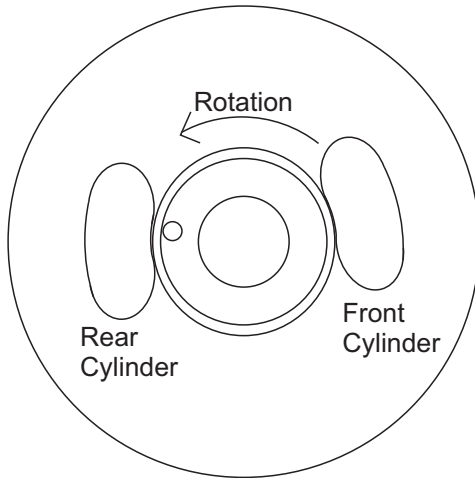
As the revs are increased the timing mark should appear to smoothly shift and line up with the pointer at 3500 RPM and above.

Adjustment can be made to the position of the sensor plate to fine tune the timing if it does not line up with the pointer at 3500 RPM. Always adjust for full advance timing not the idle.

If the correct adjustment cannot be achieved within the range of the adjustment slots, adjust the position of the rotor slightly.

Finally, replace the covers and tighten all the fasteners as required.

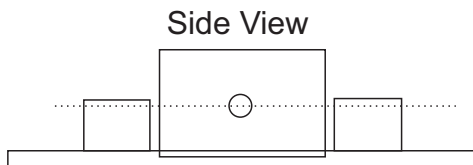
Engine sensor unit notes



Front View

An air gap of 0.3 to 0.5mm must be maintained between the rotor and each sensor. The wiring must be kept clear of the rotor. Check for runout of the rotor.

To set the timing, first rotate the crankshaft to the full advanced position (38 degrees BTDC) for the rear cylinder and then align the trigger rotor so that the magnet is just above the middle of the rear cylinder sensor (see above) at the position where the LED on the FireBox just switches ON.



The trigger magnet height should align with the sensors as shown for optimum triggering. About 1/3 of the magnet should be visible above the sensors.

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Specifications

Nominal operating voltage: 12 volts min 8V max 16V

Power consumption including coils: 3A Max (typically 2A)

Power consumption at idle: under 1 Amp

Power Consumption box only: 75mA

Coil circuit resistance range: 3.0 to 5.0 Ohms (3.0 absolute minimum)

Dwell time: 8 mS nominal

Advance range: 24 degrees at crank (14 to 38 degrees BTDC)

Fully Advanced: at 3500 RPM

Idle stabilisation range: 500 to 1200 RPM

Advancing timing range: 1200 to 3500 RPM

Operating temperature range (box): -20 to 60 degrees Celsius

Absolute maximum: 24 volts DC for 1 minute

Maximum load dump voltage spike: 180 Volts DC for 50mS

Air Gap (rotor to sensor clearance): 0.4mm +/- 0.1mm

RPM range: 150 to 10000 RPM

Box Size: 89 x 52 x 20 mm

Safety - Coils are always off when engine stopped

Specifications subject to change without notice.

- **General troubleshooting tips, installation notes, and cautions.**
- Take care! Do not probe around the wiring with the power on. Disconnect the fuse before attempting any adjustments or disassembly.
- Do not attempt to test for spark by 'hot wiring' or 'sparking' the coils as this can damage the Tri-Spark ignition.
- Do not run the bike without all spark plugs connected as this can damage the Tri-Spark system. If you wish to run the engine without all plugs firing, such as for tuning the carburetors, connect and earth a spare plug outside of the engine.
- It is recommended that resistor type spark plugs or spark plug suppressor caps be used with this system. Use 5k Ohm plug caps such as NGK.

If the engine fails to start, you should check the following:

- Spark plug leads (high tension leads) connected and tight
- Earth connections to the engine and frame are sound
- Check that fuel is getting through to carburetors
- Ensure that the battery is fully charged and in good condition
- Ensure that there is compression, there should be resistance felt on the kick start lever – pay particular attention to the valve clearances.

If there seems to be an ignition problem from first installation, reinstall the trigger rotor from the beginning of the installation procedure. Make certain that the timing is in sync with the compression stroke of the engine.

- The red LED on the FireBox should go on and off as you turn over the engine. The LED should come on as the piston rises on the compression stroke.
- Check that the clearance between the rotor and sensors is 0.5 mm.
- The LED should switch on/off as the rotor magnet passes each sensor.

Troubleshooting Continued.....

- To find a misfire issue, the spark plugs can be tested individually
- It is possible to check for spark from the plugs by having the plugs resting on the head, or similarly earthed position.
- Kick over the engine, the plugs should spark, along with the LED pulsing.
- If the LED lights as it should but the plug does not spark, first ensure the plug body is earthed correctly. If there is still no spark, try installing a new plug, then try swapping the high tension leads.
- If the either of these swaps corrects the problem, replace the offending part.
- If only one spark plug is firing there may be a fault with an ignition coil.

Troubleshooting FAQ

Q: My engine's running badly - what should I do?

A: Try a new set of spark plugs (really new - out of the box) before anything else. If the problem clears even temporarily it was probably due to fouled plugs.

Q: The engine runs but doesn't idle smoothly - is this the ignition?

A: A variable idle and stalling out are often indications of worn out carburettors.

Q: What causes some of the most commonly reported faults?

A: Wiring faults are common with old bikes. Battery trouble too. Common places to look for a fault are, the main fuse (melted, bent or dirty contacts), inside the headlight shell (particularly the nylon connector blocks), ignition switch, kill switch, wire chaffing (look under the fuel tank, inside the rear mudguard, behind side covers), wires melted on the exhaust system, ignition coil connections and earth connections (frame and engine).

Q: How do I test for signals within the sensors?

A: Apart from the power connections, all other signals are electronic pulses and should not be tested for with simple lamp testers and meters.

Please note: the information in this document relates to the Tri-Spark system (p/n FB-0050) only and should not be applied to any other product.

Tri-Spark FireBox Warranty Policy

The Manufacturer Tri-Spark extends a Warranty to the original purchaser of this kit covering the control box and rotor components of the system (not sundry items) under normal use for a period of **three years from the date of purchase**. Only those parts which are deemed by Us to be defective due to faulty materials or workmanship in manufacturing shall be repaired or replaced under this Warranty. Conditions apply.

Limitation of liability

It is the sole responsibility of the purchaser to determine the suitability of the product for a particular installation or purpose. Under no circumstances shall the Manufacturer Tri-Spark be liable for any consequential, special, incidental, direct or indirect damages arising from the use or lack of ability to use this product. The Manufacturer's liability under this Warranty is limited to the replacement of the product or its parts and no other obligations, expressed or implied are assumed by the manufacturer Tri-Spark. A refund option is not offered as part of this Warranty.

Conditions

This Warranty will be void if the product or parts have been in any way misused, abused, altered or installed incorrectly as deemed by Us.

This Warranty will be void if faults are caused by but not limited to:

- 1) operation with incorrect coil circuit resistance (under 3 ohms)
- 2) the rotor contacting the sensors as evidenced by circular scratches
- 3) bending, cutting or any other physical damage to the parts
- 4) the ingress of oil, water or other liquid into the parts
- 5) exposure of the parts to solvents or chemicals
- 6) damaged or broken wires connecting to the parts
- 7) any modification to the parts not authorised by the Manufacturer
- 8) any electrical damage to the parts caused by voltage spiking from the battery, charging system, jump starting or any other devices connected to the electrical system.

The manufacturer reserves the right to charge a testing fee of \$55AUD and a return freight fee of \$30AUD in cases where parts returned to Us are found to be functional.

The purchaser is responsible for the cost of freight, customs duties, taxes and tariffs to and from the point of purchase where the part or parts shall be assessed for possible replacement. Recorded delivery is recommended to protect against loss.

To make a claim under this Warranty the purchaser is requested to contact the point of purchase for instructions. The purchaser may be asked to perform certain tests to determine the nature of the problem. The suspected faulty part(s) must be returned with proof of purchase and a detailed account of the problem experienced to the point of purchase or the Manufacturer for testing and possible replacement. Returned parts must be sent with freight prepaid.

Statutory rights

Your statutory rights are unaffected. Additionally, if any statement herein is deemed to be invalid because it contravenes the purchasers statutory rights then only that statement shall be deemed invalid. The Laws of South Australia shall apply to purchases made directly from the Manufacturer.