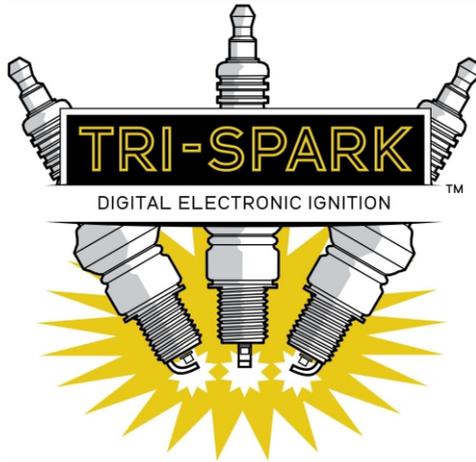


# Tri-Spark - Classic Twin Magneto Replacement Installation Instructions



Part Number MRK-0001



Revised Nov 2020

Thank you for purchasing the Tri-Spark Classic Twin Magneto Replacement ignition system for your machine. 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 with the installation.

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Please note - The components supplied with this kit are intended to replace the K2F Lucas magneto on certain motorcycles such as the pre-unit Triumph and BSA twins and some Norton machines. A 12 volt battery supply is required to power the ignition. The installation will also require a solid magneto drive gear not included. Please check with your mechanic for suitability before commencing the conversion.

**Caution: Use the recommended Tri-Spark coils - wrong coils will damage. For twins use our dual output ignition coil with 3.6 Ohm primary resistance. Part number IGC-2012 included in the kit**

**Kit Contents:**



Tri-Spark Classic Twin 'A' stator unit, Trigger Rotor, Alloy Housing, IGC-2012 dual output ignition coil, Spark plug caps, sundry hardware and wiring parts.

## Step 1: Preparation

Read all of the installation instructions before you begin. Disconnect the battery, remove the magneto cover and spark plugs.

**Important:** A general inspection and tidy up of all the wiring is highly recommended. Inspection and testing of the charging system prior to installation is also highly recommended.

## 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 K2F magneto is often 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.

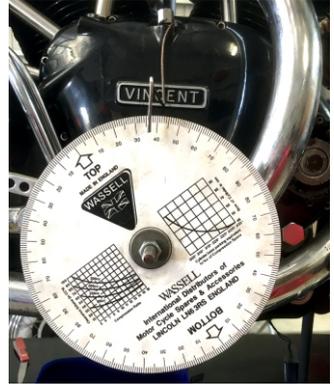
## Step 3 - Install the Alloy housing for the ignition module

The alloy housing takes the place of the magneto to support the electronic ignition module 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 either 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 - Installing the Trigger Rotor and Stator Unit



Loosely install the stator unit in the housing so that the holes for the pillar bolts are in the centre of the adjustment slots as shown here. Mark the housing with a pen next to the 'A' and then remove the stator unit.

Install the trigger rotor using the socket head screw and washer provided. Check the fit of the taper into the shaft and ensure the rotor is 1 to 2mm below the ledge that supports the stator unit. Use the plastic strip provided as a guide. Ensure the magnets in the rotor are aligned as shown in the photo below before tightening it up. Make sure the crankshaft has not moved from the fully advanced position set in step 4.

**Caution:** shorten the screw if it bottoms out in the threads.



## Step 5 - continued

Once the rotor has been fitted check that the face of the rotor is below the ledge that the stator unit sits on by 1 to 2 millimetres using the plastic strip provided.

Install the stator unit using the pillar bolts and washers. Do not tighten the pillar bolts at this time - adjustment will be made later on.

The ring terminal on the RED wire coming from the stator unit should be held in place by the top pillar bolt. This assumes the bike is wired positive to earth/ground. Refer to the wiring diagram.

## Step 6 - Install the ignition coil and connect the wiring

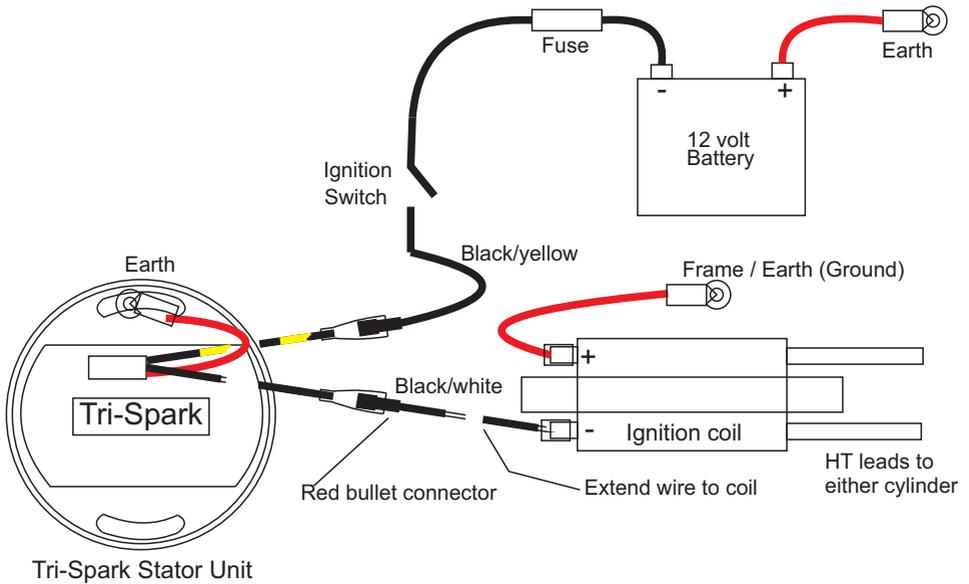
Find a suitable place to mount the ignition coil. Under the fuel tank may be a good option. Use the holes in the central core of the coil as fixing points. Use washers to spread the pressure and do not overtighten.

Note the coil has no particular polarity for the spade connections to the primary. The High tension leads may be connected to either cylinder.

Connect the wiring using the diagram on the following page as a guide. The ignition switch and kill switch if fitted should both be an on/off type switch - NOT SHORT TO EARTH (GROUND)

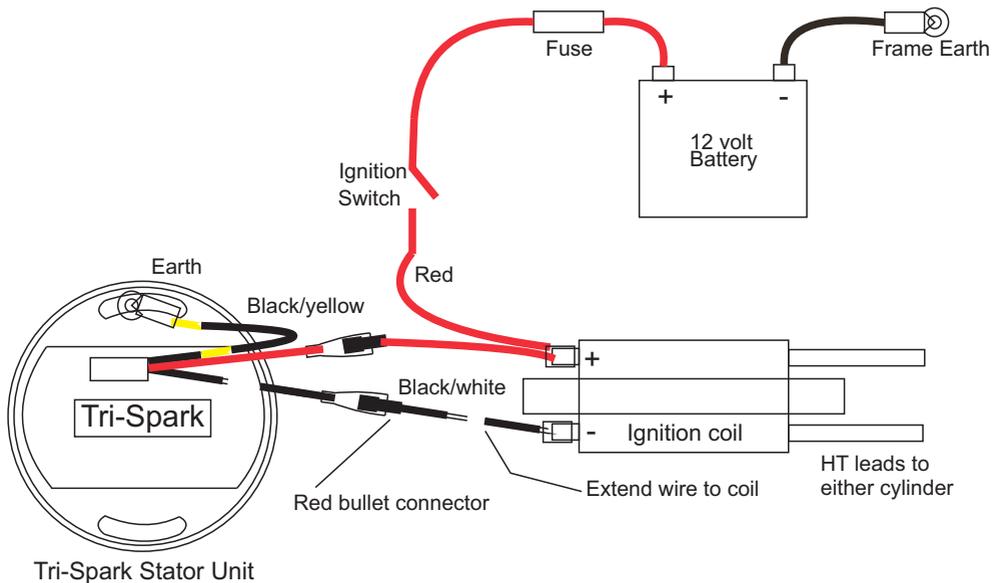


# Wiring Diagram - Tri-Spark Classic Twin Positive Earth and One 12 Volt Ignition Coil



## Wiring Diagram - Tri-Spark Classic Twin Negative Earth and One 12 Volt Coil

Please Note: This drawing is provided for reference only - Use the positive earth connection drawing on the previous page for positive earth bikes.



## **Step 7 - Setting the timing statically using the LED**

Note: The engine must be in its fully advanced timing rotation - See Step 4. Once the wiring from Step 6 has been double checked, reinstall the battery and fuse and switch on the ignition.

Begin by rotating the stator unit fully clockwise in the slots then slowly rotate it counter-clockwise to the position where the red LED on the stator unit just comes on. Tighten up the pillar bolts at this position and switch off the ignition.

Note: If the LED is on when the stator is fully clockwise, the rotor will need to be moved slightly further counter-clockwise.

This procedure sets the static timing so that the engine will fire at the current crank position when fully advanced ( above 3000 revs) . The timing should be confirmed with a strobe light before riding if possible.

This is the final step - replace all covers and parts that were removed for the installation process.

## **Notes about strobe timing**

Refer to your workshop manual for detailed instructions regarding strobe timing - these are intended as general notes only.

To check the ignition timing with a strobe light, warm up the engine and aim your strobe light at the timing marks. You should see an image of the timing marks that advances as the revs are increased. At 3500 RPM the image will appear to stop advancing. Watch for the fully advanced timing marks to align at 3500 RPM and faster to confirm the timing is correctly set.

If the timing marks do not align at 3500 RPM you must change the position of the stator unit by loosening the pillar bolts and rotating the stator unit slightly to the required position. This should be done with the engine stopped. Recheck as above.

If your engine does not have strobe timing marks you will need to rely on the static timing and any other techniques available to ensure that the timing is set correctly.

# Classic Twin Specifications

Nominal operating voltage: 12 volts (min 8V max 16V) positive or negative earth (ground)

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

Power consumption at idle: under 1 Amp

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

Dwell time: 8 mS nominal with peaks on acceleration and starting

Advance range: 12.5 degrees cam or 25 degrees at the crank

Fully Advanced: at 3500 RPM

Starting range: up to 500 RPM

Idle stabilisation range: 500 to 1200 RPM

Advancing timing range: 1200 to 3500 RPM

Operating temperature range: -20 to 100 degrees Celsius

Absolute maximum: 24 volts DC for 1 minute

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

Air Gap (rotor to stator unit clearance): 2mm +/- 0.6mm

RPM range: 150 to 8000 RPM

Size: Stator unit 68mm diameter 10mm thick excluding wires

Specifications subject to change without notice.

## Using the built in self-test function

By switching the unit into test mode it is possible to check the operation of the stator unit, trigger rotor, coils, HT leads and spark plugs.

**Warning:** the system is capable of sparking the coils in this mode - extreme care must be taken to ensure there is no risk of fire or electric shock that can arise from switching on the test mode. Make sure there is no fuel in the vicinity of the spark plugs. Keep children and pets well away.

**We strongly advise engaging a technician to perform these tests in the safety of a fully equipped motorcycle workshop.**

**TEST 1:** Start by removing the spark plugs from the engine and laying them on the cylinder head.

### READ THE FOLLOWING CAREFULLY

## HOLD DOWN

the test button very gently with the tip of a pen

## WHILE SWITCHING ON

THE POWER TO THE IGNITION (ignition key switch). The test button is located beside the word 'TEST' on the stator as shown.



**The test button MUST be held down WHILE the power is switched on to begin the testing.**

The spark plugs should begin sparking immediately at a rising rate for 10 seconds and then stop. The test can be repeated by pressing the test switch again. The LED should light during the 10 seconds while the system is sparking.

**TEST 2: WITHOUT SWITCHING OFF THE IGNITION** a second test should be performed to check the triggering of the position sensors in the stator unit by rotating the engine slowly until the red LED on the stator unit is seen to light. The LED should light when the trigger magnet is between the "A" and "B" marks on the rim of the stator unit.

The LED lights to indicate that the magnets in the rotor are triggering the sensors in the stator unit.

The system is expected to function normally on an engine if **BOTH** tests pass.

**EXIT TEST MODE** - The ignition switch must be switched off to power down the stator unit in order to exit the test mode before attempting to start the engine.

## 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 run the engine without all spark plugs connected as this can damage the Tri-Spark system and/or the ignition coils.
- There are two versions of the Tri-Spark Classic Twin: clockwise (A) and counter-clockwise (B). These are identified by a marking on the front label and are NOT interchangeable. Ensure that you have the correct system for your engine.
- We recommend the use of spark plug suppressor caps with this system. Use 5k Ohm caps such as NGK LB05EP. Use Suppressor (resistor) caps or resistor spark plugs - not both together. An 'R' in the part number denotes resistor.
- Ensure that the battery is fully charged and in good condition. If the battery dips below 12 volts when the headlamp is switched on then it needs replacing.
- Check that the air gap between the trigger rotor and stator unit is 2mm +/- 0.6
- Check for 12 volts reaching the stator unit. Measure for 12 volts between the RED and BLACK/YELLOW wires at the stator unit using a voltmeter.
- Perform BOTH tests as detailed on the previous page. The system should spark the coils for 10 seconds at the start of TEST 1.
- Perform TEST 2 IMMEDIATELY after the coils stop sparking from test 1 WITHOUT switching off the ignition. Ensure that the LED lights in the firing position.
- If the system passes test 1 and test 2 from the previous page it should be able to start and run the engine as these tests are designed to fully test the system.
- If the engine runs but misfires at certain revs check out the charging system. Try running the system briefly with the alternator disconnected to see if that clears the problem.
- Always try a fresh set of spark plugs. Most ignition problems are related to fouled spark plugs. Try a new set right out of the boxes.
- This is a wasted spark system - it fires both coils together therefore if a fault exists on one cylinder only it must relate to the coil, HT lead or spark plug on the faulty cylinder - not the ignition module in general.
- Please note the above information relates only to the TRI-0005 Classic Twin and should not be applied to any other product.

# Tri-Spark Classic Twin Warranty Policy

The Manufacturer Tri-Spark extends a Warranty to the original purchaser of this kit covering the Stator Unit 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 determined 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 stator unit 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 \$45AUD 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. Recorded delivery is recommended.

## Statutory rights

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