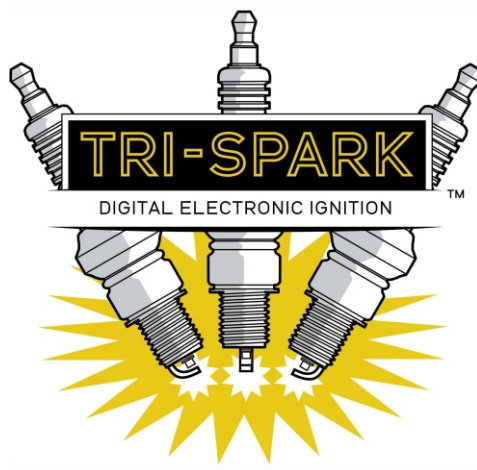


# Tri-Spark - Classic Twin Installation Instructions



TRI-0006



Revised Sept 2021

Thank you for purchasing the Tri-Spark Classic Twin 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 with the installation.

**Note: Avoid Damaging your Tri-Spark Classic Twin ignition**

Do Not ever connect the Black and white wire to positive as this will blow your ignition. The Black and white wire must be connected to the ignition coil negative only.

Double check all the connections carefully before applying power to the ignition system.

**IMPORTANT:** The ignition unit is pre-wired for positive earth connection. If your bike is wired for negative earth, you **must swap the terminals** on the black/yellow and red wires and follow the negative earth wiring diagrams on pages 6 and 7.

Please note - The Classic Twin TRI-0006 suits clockwise AND anticlockwise turning trigger rotor installations. Instructions for both are included here - watch for the **colour coding** and follow the instructions for your engine. See page 9 for more engine compatibility details.

**suits clockwise turning trigger rotor:  
Triumph unit construction twin engines, RE interceptor 2, 68 Norton Atlas**

**suits anticlockwise turning trigger rotor:  
Norton Commando, BSA unit twins, BSA unit singles, triumph unit singles.**

## Step 1: Preparation

Read all installation instructions before you begin. Disconnect the battery, remove fuse, seat, side cover, points cover, spark plugs, strobe timing port cover and rocker covers. Remove the condensers and ballast resistor and do not reconnect them to the electrical system - they are not required with electronic ignition.

**Important:** 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 installation is also highly recommended.

**Caution: use the recommended Tri-Spark coils - wrong coils will cause damage.**

**For Twins use two of our IGC-1006 six volt coils, 1.8 Ohm primary resistance. For Singles use our IGC-1012 twelve volt coil, 3.6 Ohm primary. Alternative for twins is our IGC-2012 dual output coil, 3.6 Ohm primary.**

## Step 2 - Remove the original points base plate and auto advance unit

The points plate is retained by the two pillar bolts. The wiring to the points plate should be disconnected from the points. The auto-advance unit is removed by threading in a correct sized bolt and giving this bolt a tap or by inserting a steel rod and gentle taping it around until the auto advance unit drops off its taper. **Caution:** It may be a tight fit.

## Step 3 - Rotate the engine to correct timing position

With the engine in gear rotate the engine forward using the rear wheel until the correct strobe timing mark lines up with the pointer, one of the cylinders should be on its compression stroke. This should be the fully advanced timing position for your engine. For example 29 Degrees BTDC for Norton or 38 Degrees BTDC for Triumph

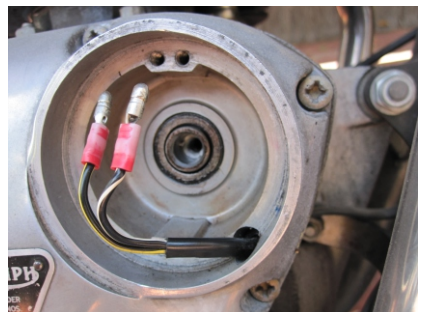


## Step 4 - Terminate the two black wires

Trim the points wires to the same length, cut back the black sheath if necessary to expose about 60mm of the black/white and black/yellow wires.

Adjust the wire route up near the coil area if necessary in order to pull through 80mm of wire into the points area.

Terminate the black/white and black/yellow wires with the bullet connectors as shown.



## Step 5 - Installing the Tri-Spark rotor and Stator

Loosely install the stator unit so that the holes for the pillar bolts are in the centre of the adjustment slots as shown.

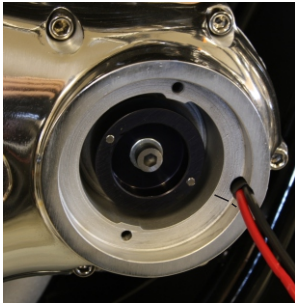
OR

### Clockwise only



Mark the engine casing adjacent the "CW" line on the outer rim of the stator unit, then remove stator unit.

Install the Tri-Spark rotor with its two magnets in line with your mark as shown here.

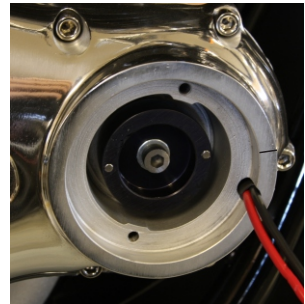


### Anticlockwise only



Mark the engine casing adjacent the "AC" line on the outer rim of the stator unit, then remove stator unit.

Install the Tri-Spark rotor with its two magnets in line with your mark as shown here



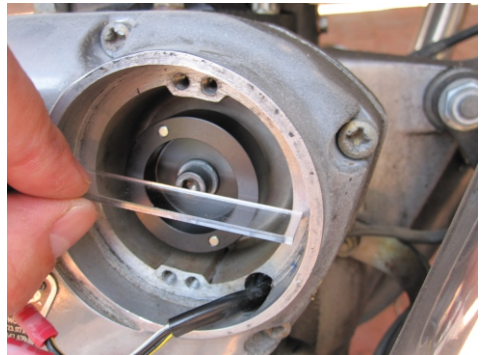
Install the Tri-Spark rotor using the correct socket head bolt for your engine. Two are provided (1/4 UNF and 1/4 BSF) for use with the earlier and later engine models. When tightening the bolt ensure correct torque and check the fit of the taper inside the cam.

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

## Step 5 - continued

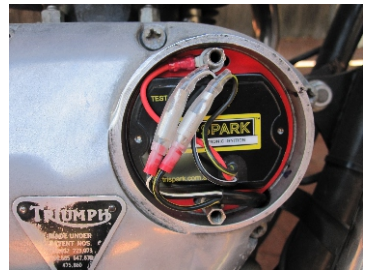
Once the rotor has been fitted check that the face of the rotor is back from the ledge that the stator unit sits on by two millimetres using a straight edge as shown in the following photograph. (2mm +/- 0.6)

Check for end float in the cam and ensure that the rotor cannot move forward to close this air gap.



Install the stator unit using the original pillar bolts and washers. Use additional washers if the pillar bolts bottom out. 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 is to be held in place by the top pillar bolt as shown, except in negative earth installations. Please refer to the wiring diagram on the next page for negative earth connections.



Connect the black/white and black/yellow wires as shown in the photograph above forming the wires in a bend to reduce the strain on the wires caused by vibration.

## Step 6 - Connecting the coil wiring on positive earth machines

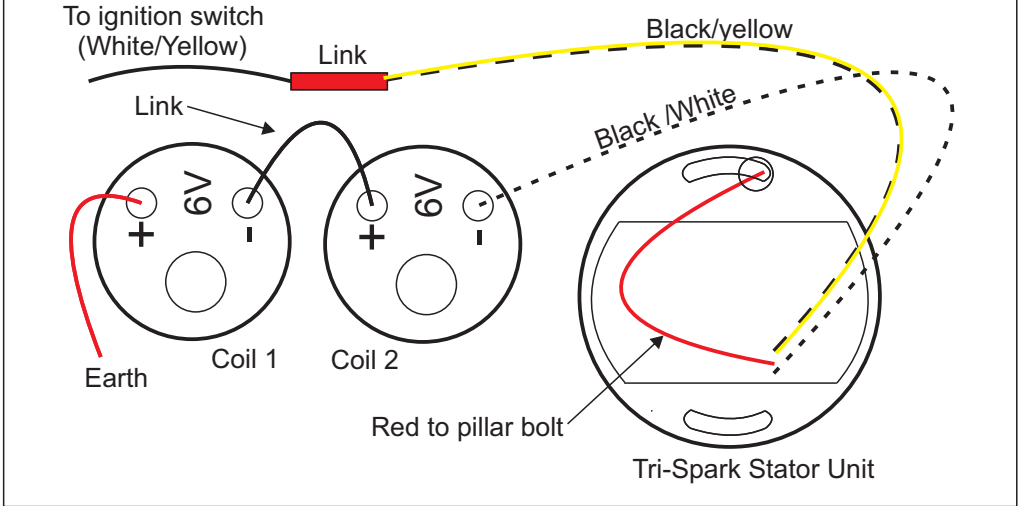
The black/white and black/yellow wires that originally connected to the coils and condensers must be disconnected completely from the condensers and the coils as they now serve a new purpose. Also disconnect any other wires from the coils.

The black/white wire should be connected to the negative terminal of the closest coil or the most convenient coil. A link wire must be installed from the positive terminal of this coil to the negative terminal of the other coil. This should leave one coil with its positive terminal unconnected. This terminal should now be connected to positive frame earth (ground).

The black/yellow wire should now be linked to the "switched ignition" wire. This wire will vary in colour depending on the model. Please refer to your wiring diagram for the bike to locate the wire switched at the ignition switch and designated for the ignition system. Refer to the wiring diagrams on the next page for further details.

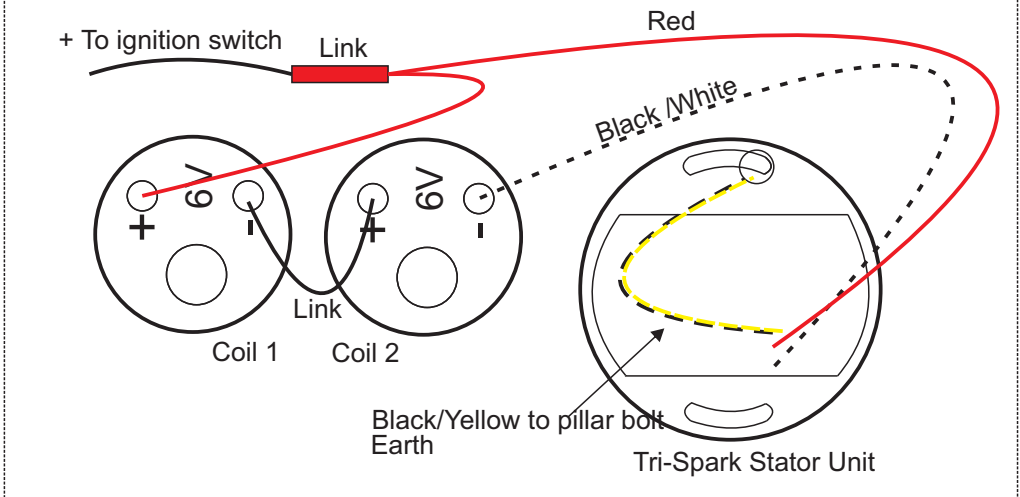
**Important:** For **negative earth** follow the alternative wiring diagram on the next page

## Wiring Diagram - Tri-Spark Classic Twin Positive Earth and Two 6 volt Ignition Coils

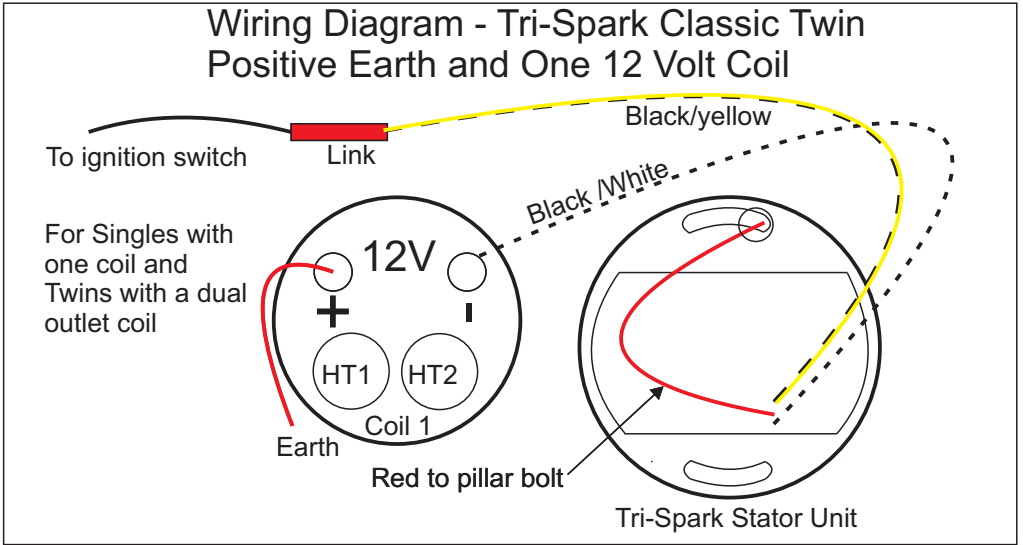


## Wiring Diagram - Tri-Spark Classic Twin Negative Earth and Two 6 volt Ignition Coils

Note: The terminals for the Red and Black/Yellow wires must be swapped

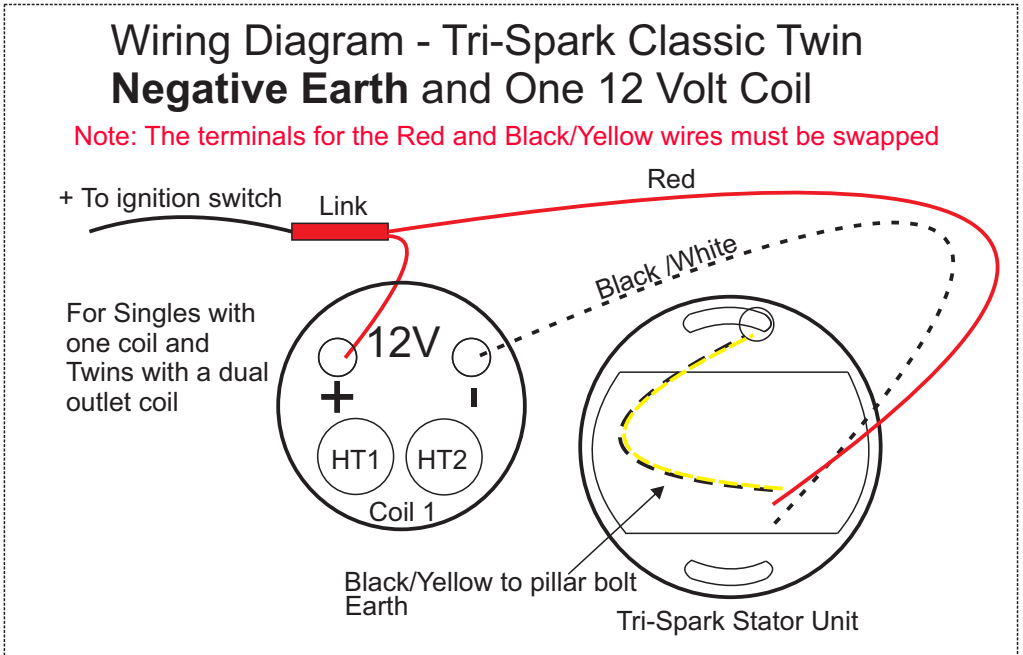


## Wiring Diagram - Tri-Spark Classic Twin Positive Earth and One 12 Volt Coil



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

Note: The terminals for the Red and Black/Yellow wires must be swapped



Note: 'To ignition switch' means make connection with the wire intended for switching the ignition on/off at a convenient point. This is often a white/yellow wire that was originally connected to the negative side of the ignition coil(s) when running on points. Normally this connection is switched by the ignition and kill switches.



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

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

OR

### Clockwise only

Begin by rotating the stator unit fully anticlockwise then rotate it slowly 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. This procedure sets the timing to within just a couple of degrees of the final setting. The timing should be confirmed with a strobe light before riding.

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

### Anticlockwise only

Begin by rotating the stator unit fully clockwise in the slots then rotate it anticlockwise 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. This procedure sets the timing to within just a couple of degrees of the final setting. The timing should be confirmed with a strobe light before riding.

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

## Check the timing with a timing light

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 timing 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. Repeat the above.

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



# 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

Clockwise for Triumph Bonneville T140, T140E, T140V, T120, T100, Tiger TR7RV, TR6, Norton Atlas, Enfield Interceptor series 2. 12 volt only with twin points including electric start

Anticlockwise for Norton Commando 750 and 850, BSA A50, A65, B50, B44, B25, Triumph Tiger cub, Enfield interceptor series 1. 12 volt only with single or twin points including electric start.

Specifications subject to change without notice.

## **Using the built in Self Test, troubleshooting tips, 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.
- 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 spark plug part number denotes resistor type.
- 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.

## **Five steps to checking the Classic Twin stator unit**

1. Check coil compatibility
2. Check the air gap
3. Check power to the unit
4. Run the self-test
5. interpret the test results

## Step 1 Check Coil Compatibility

Ensure that you have the correct coils for your installation. Wrong coils can damage the electronics!

### **Twin Cylinder engines:**

Installing the TRI-0006 generally requires two 6 volt Lucas style ignition coils (aluminium canisters). Tri-Spark p/n IGC-1006.

These coils should measure 1.8 to 2.0 Ohm primary resistance across the two metal tab terminals on the top of the coil. The secondary resistance is not critical but it will often measure between 5 to 10k ohms from the high voltage terminal to either of the primary terminals.

Alternatively a dual lead ignition coil may be used for twin cylinder installations. In this case the primary resistance should measure between 3.0 to 5.0 Ohms. Tri-Spark p/n IGC-2012.

Many of the British twins were originally fitted with 12 volt Lucas coils. These must NOT be used with the Classic Twin as poor performance and misfiring will result.

### **Single Cylinder engines**

For single cylinder installations a 12 volt Lucas style ignition coil should be used. Tri-Spark p/n IGC-1012. These typically measure 3.6 to 4 Ohms primary resistance.

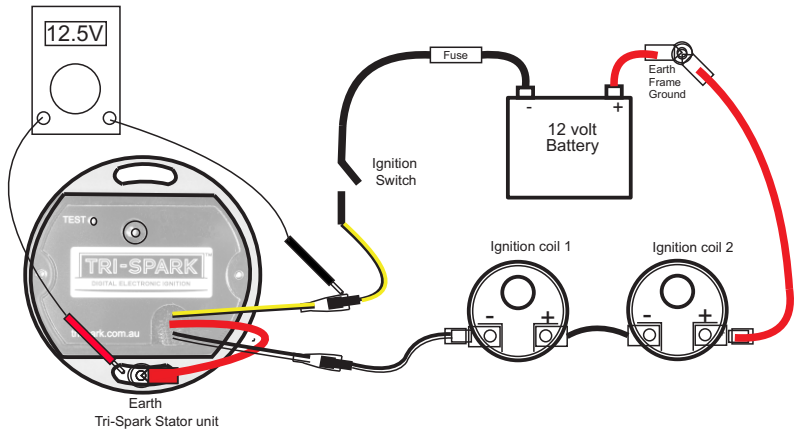
## Step 2 - Check the Air Gap

Ensure that you have the correct air gap between the trigger rotor and the stator unit. the gap should be 2mm +/- 0.5mm

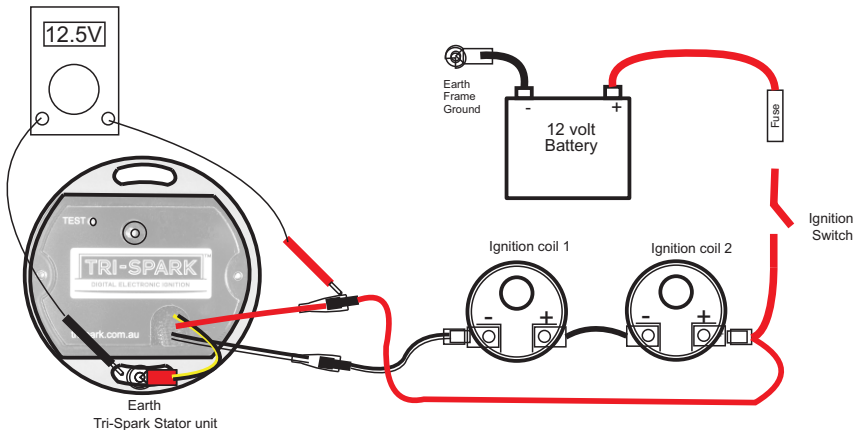
### Step 3 - Check Power to the Unit

Check that the battery voltage is reaching the stator unit. Switch on the power and check for voltage at the stator unit with a voltmeter as shown below. The voltage should stay up over 12 volts with the headlight switched on - replace battery if faulty.

#### POSITIVE EARTH / GROUND TESTING



#### NEGATIVE EARTH / GROUND TESTING

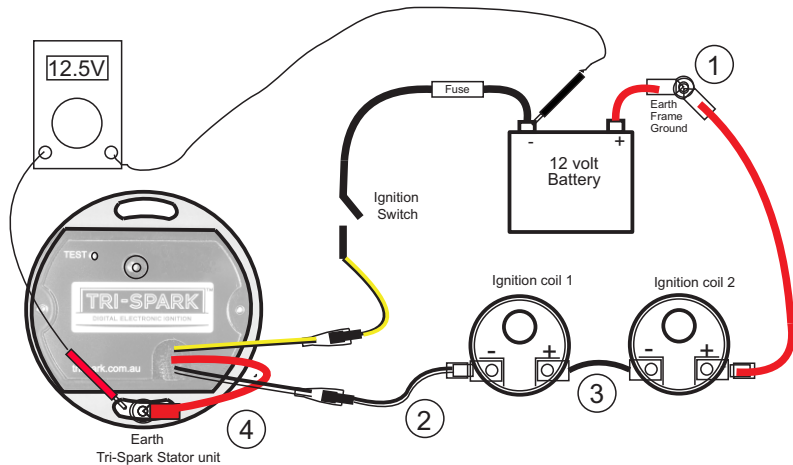


## Step 3 - Continued

If the battery voltage is not reaching the unit check for faulty electrical components such as switches and fuses. The following tests will help to isolate the faulty components.

If you can measure battery voltage as shown in the following diagram but not when probed at the stator unit then the fault is with the switches or fuses or somewhere in the negative supply to the unit.

### POSITIVE EARTH / GROUND TESTING



### Additional wiring checks

1. Check continuity from the coil earth to the battery Positive
2. Check continuity from the Black /white at the stator unit to the coils
3. Check continuity of the coil link wire
4. Check continuity from the stator unit red wire to battery positive

Note: Connections to the frame, engine and other metal parts are often faulty due to corrosion.

Once you have established power to the unit proceed to step 4 and run the self test checks on the stator unit.

## Step 4 - Run The Self Test

The built-in test mode makes it possible to check the operation of the stator unit, trigger rotor, coils, HT leads and spark plugs. Read the following carefully.

**Warning:** the system is capable of sparking the coils in this mode - extreme care must be taken.

**We recomend 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.

The test button is located beside the word 'TEST' on the unit as shown. It is activated by pressing gently with a pen as shown here.

To begin the self test:

1. Press and HOLD DOWN the TEST button.
2. Switch on the power to the ignition (ignition key switch).



The TEST button MUST be HELD DOWN WHILE the power is switched on to begin the testing.

Once the test starts release the TEST button. The unit will stay in the test mode until the power is switched off.

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

### **DO NOT SWITCH OFF THE POWER - GO STRAIGHT TO TEST 2**

**TEST 2: WITHOUT SWITCHING OFF THE IGNITION** rotate the engine slowly until the red LED on the stator unit is seen to light. The LED should light when the triggering magnet is between the "CW" and "AC" marks on the rim of the stator unit.

This is the ONLY test of the magnets in the rotor triggering BOTH position sensors in the stator unit. LED operation in normal operating mode is not the same. Checking the triggering must be done within the test mode.

**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.

## **Step 5 - Interpret the test results**

If the LED does not light during Test 1 and there is no sparking at the coils - repeat checks for power reaching the unit. If you are absolutely certain there is power reaching the unit - arrange to return the unit for factory testing.

If the LED lights for 10 seconds at the start of test 1 but there is no sparking at the coils - have the wiring and the coils checked by an automotive electrician. If the coils and wiring check out OK then arrange to return the unit for factory testing.

If the LED lights and the coils spark during test 1 but the LED does not light during test 2 when the magnet in the trigger rotor is aligned with the sensors check the air gap. If the Air gap is 2mm then arrange to return the unit for factory testing.

If the Coils spark in test 1 and the LED lights during test 2 then the unit is fully functional and should work on the engine. We would expect that when the engine is cranked over it should be sparking. No need to return for testing. There may be some other issues with the installation that can be remedied by a mechanic. The following checklist may assist your mechanic.

### **General troubleshooting Tips**

1. an engine not starting may not be timed correctly - repeat static timing procedure.
2. Lack of power may relate to incorrect static timing - too retarded.
3. Pinging may also relate to static timing - too far advanced.
4. Misfiring under load can relate to fouled spark plugs, faulty HT leads, faulty or incorrect ignition coils.
5. Poor idling is often related to tuning issues or worn out carburetors.
6. Poor connections (often concealed by layers of tape) should be repaired by a specialist or the wiring loom replaced (recommended)
7. Misfiring at 3000 to 4000 RPM but not at idle can sometimes be caused by problems with the charging system. Run the engine with the alternator disconnected briefly to see if the problem clears. If this fixes the problem try a different brand of voltage regulator.



# 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 \$50 AUD 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.