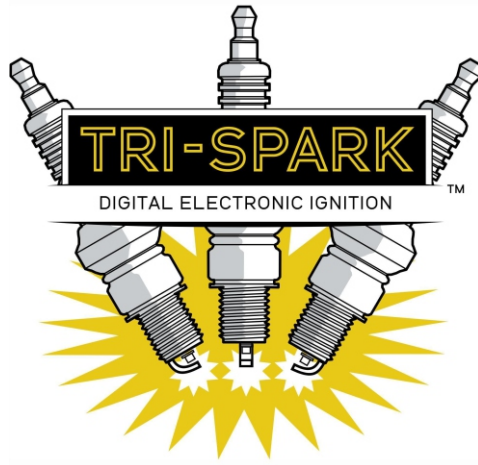


Tri-Spark - Compass Ignition

Moto Guzzi Twin Points 1970 - 1990

Installation Instructions

CS 0081 Twin Plug Heads



Thank you for purchasing the Tri-Spark Compass 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.

Manual Contents	Page
Preparation	2
Remove the points plate and advancer	3
Install trigger rotor and pickup plate	4
Connect Control box wiring	5
Wiring Diagram	6
Static Timing	7
Strobe Timing	7
Engine pickup notes	8
Specifications	9
Troubleshooting	10
Warranty policy	12

The Tri-Spark Compass system for the Guzzi is a wasted spark system. This configuration is NOT compatible with the original ignition coils. We recommend the Tri-Spark dual lead ignition coils for the installation (IGC-2006).

Step 1: Preparation

Read all installation instructions before you begin. Disconnect the battery. Remove the side covers, distributor cap, alternator cover and the fuel tank in preparation.

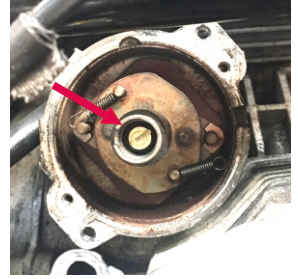
Caution: A general inspection and tidy up of all wiring including inside the headlight shell is highly recommended. Inspection and testing of the charging system prior to installing the system is also highly recommended.

Caution: Use the recommended Tri-Spark ignition coils. The use of incompatible coils will burn out the components and void the warranty.

Step 2 - Remove the contact breaker base plate and points cam



Remove the contact breaker (points) plate by removing the two screws indicated and the condensers. It may be necessary to rotate the distributor to gain access to the condenser screws. Do this by loosening the two retaining bolts at the base of the distributor. Unplug the contact breaker wires from the loom and set the assembly aside.



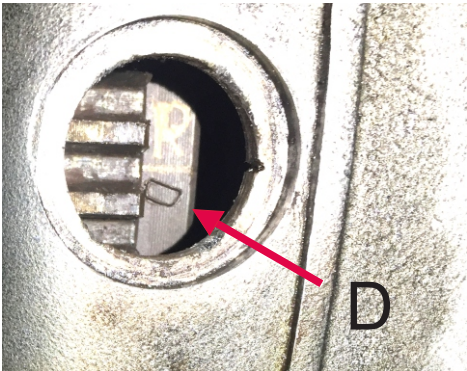
Undo the screw retaining the points cam and remove the cam along with the springs and bob weights and any other spacers and washers. The auto advancer should now look like the second photo on the right.



If an electronic ignition has been fitted previously - remove the ignition trigger rotor and pickup from inside the points distributor and remove the associated control box.

Step 3 - Rotate the engine to the fully advanced timing position

Remove the rubber plug on the right side of the engine to enable viewing the timing marks on the engine.



With the engine in gear, rotate the engine forward using the rear wheel until the RIGHT piston is at top dead centre on the compression stroke. Both valves should be closed and the piston at the top of stroke. The 'D' mark should be in view as shown here.

Now rotate the engine BACKWARD until the fully advanced mark is in view. This should be 9 teeth above the 'D' mark.

This is the fully advanced timing position for your engine in this position while fitting the Tri-Spark trigger rotor and pickup in the next steps.



Step 4 & 5 - Install the Tri-Spark Trigger Rotor and Pickup

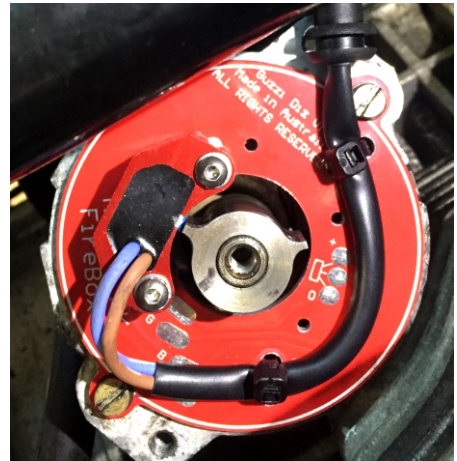
Install the Tri-Spark trigger rotor and pickup assembly into the distributor as shown here.

Route the cable back under the frame tubes to the control box location behind the left side cover.



The triggering rotor has 2 points on it that must be aligned with the pickup as shown here. Tighten the 2 grub screws to hold the rotor in position.

Check for clearance between the trigger rotor tips and pickup and adjust if necessary to maintain a small gap of approximately 0.5mm. A small amount of adjustment is possible by loosening the two retaining screws and shifting the pickup as necessary.

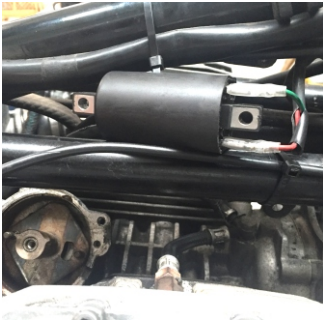


When replacing the distributor cap, ensure that the cable grommet is fitted in the slot in the cap as shown here. Make sure the cable is away from hot surfaces and moving parts.

Step 6 - Install the Control box and connect the wiring

Ensure that the battery is disconnected.

Disconnect the two white wires and the green and red wires from the original ignition coils. Remove the ignition coils and their brackets from the bike as they are not compatible with the Tri-Spark electronic ignition.



Fit the Tri-Spark dual lead ignition coils (IGC-2006) securely to the frame tube under the fuel tank as shown. Connect the Red and Green wires that were originally going to the distributor points to the ignition coils primary terminals as shown. The wires may be connected either way around as the polarity is not important. There is also a link wire required to connect the 2 coils - see diagram pg 6.

Fit the Tri-Spark control box inside the left side cover where the original coils were located.

Connect the Brown and blue wires to the brown and blue wires conning from the pickup in the distributor.

Connect the Black / yellow wire from the box to the frame. Scrape off all the paint near the connection and clean the metal for a good connection.

Connect the Black / White wire from the control box to the Green wire.

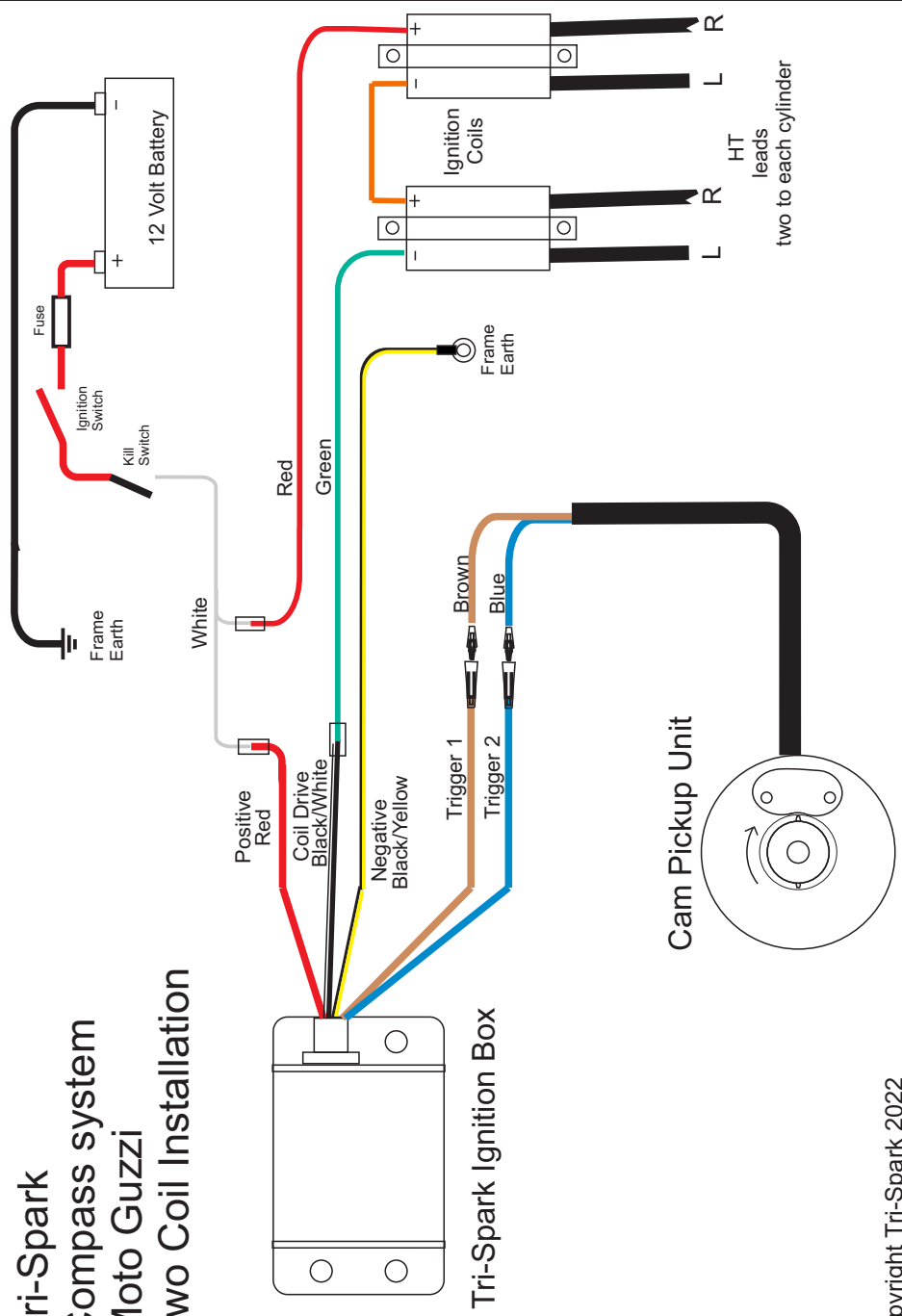
Connect the Red wire from the control box to one of the white wires.

Connect the other white wire to the red coil wire as shown. Refer to the wiring diagram on the next page.



This completes the wiring. Take care to locate the wires away from pinch points, moving parts and hot surfaces.

Tri-Spark Compass system Moto Guzzi Two Coil Installation



Step 7 - Setting the timing statically

The ignition timing is initially set to the engine's fully advanced timing marks for the right side cylinder. These can be seen by removing the rubber plug on the right side of the engine and following the procedure in step 3. The trigger rotor is then aligned as shown here. Matching these two settings will set the ignition timing close enough to start and run the engine but it will need to be checked with a strobe light as detailed in step 8.

Note: The Tri-Spark system is not set with any reference to the Idle or TDC marks on the engine.

It does not use the mechanical auto advance unit but instead calculates the timing according to the RPM using a mathematical process which is 100% reliable and does not vary from one system to another.



Step 8 - Checking the timing using a strobe timing light

Reassemble the motorcycle fully with all the parts except the timing hole cover plug. Start and warm up the engine ready for timing with a strobe timing light. Clip the pickup from the strobe light onto the right side cylinder spark plug wire and aim the light into the strobe timing port.

As the revs are increased the timing should appear to smoothly shift and line up with the fully advanced timing mark in the centre of the viewing port at 3500 RPM and above.

Adjustment can be made to the rotation of the distributor housing to fine tune the timing if it does not line up exactly at 3500 RPM. Always adjust for full advance timing not the idle.

If the correct adjustment cannot be achieved within the expected range it may be necessary to adjust the position of the trigger rotor slightly.

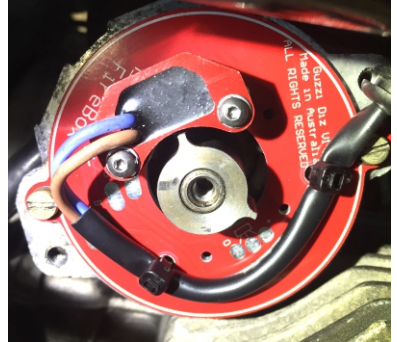
Once the timing is correctly set you can fully assemble the machine.

Engine pickup unit notes

The clearance between the trigger rotor tips and the pickup is very small. To avoid early failure of the pickup you must ensure that the trigger rotor has the correct clearance of approximately 0.5mm. A small amount of adjustment is possible by loosening the screws holding the pickup to the backing plate. **DO NOT OVERTIGHTEN** the screws.

The pickup has a strong magnet inside and will therefore pick up iron filings easily. Check for filings and debris on the pickup tip and remove.

The pickup can be tested for continuity and resistance with a multimeter. A reading of 10-12 ohms across the pickup wires indicates it is connected up and working internally.



The Rotor / Pickup position as shown is the fully advanced timing position for the system. This is how the parts will align at 3500 RPM and above with the engine running.

Coil bracket notes

A suggested location for the Tri-Spark dual lead coils is under the top frame tube in about the centre of the petrol tank. They may be held in place with strong cable ties.

Alternatively, bolts and spacers can be used to hold the coils by the two holes in the core that extends out both ends of the coil. The core does not need to be grounded to the frame.

Rubber mounting the coils is recommended for optimum reliability.

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: 15mA

Coil primary resistance minimum: 1.5 Ohms per coil

Dwell time: 8.0 mS nominal

Advance range: 24 degrees at crank

Fully Advanced: at 3500 RPM

Idle stabilisation range: 500 to 1400 RPM

Advancing timing range: 1400 to 3500 RPM

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

Absolute maximum voltage: 24 volts DC for 1 minute

Maximum load dump voltage spike: 400 Volts DC for 5mS

RPM range: 150 to 10000 RPM

Control Box Size: 70 x 50 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 battery 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 carburettors, 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 carburettors
- Ensure that the battery is fully charged and in good condition
- Ensure that there is compression – 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. Getting the rotor out of sync is a common installation error.
- Check that the clearance between the rotor and the pickup is 0.5 mm.

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.
- Turn over the engine, the plugs should spark.
- If 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.

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 ignition?

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 compass ignition (part number CS-0081) only and should not be applied to any other product.

Tri-Spark Compass Ignition 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 primary resistance (under 1.5 ohms per coil)
- 2) the rotor contacting the pickup as evidenced by 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 \$50AUD 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 or any other reason then only that statement shall be deemed invalid. The Laws of South Australia shall apply to purchases made directly from the Manufacturer.