

# Regulator Box & Dynamo Fault Diagnosis Notes.

## Symptoms.

Cutout will not cut in, but when the points are held closed manually the regulator functions normally. When the cutout points are released they open and the regulator ceases to function. Adjustment of cutout spring tension did nothing.

## Fault.

This fault occurred on an MCR1 and was found to be caused by a break or bad joint in the fine voltage winding on the cutout bobbin, in this case it was internal, but it can also happen where the two wires join the **E** terminal post.

## Remedy.

If there is a break or bad joint at the **E** terminal, repair. If internal then replace regulator.

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## Symptoms.

Ammeter wired up correctly but dynamo not charging. Manual closing of cutout points without engine running showed a discharge on ammeter, manual closing of cutout points with engine running at charging speed showed a greater discharge on ammeter.

## Fault.

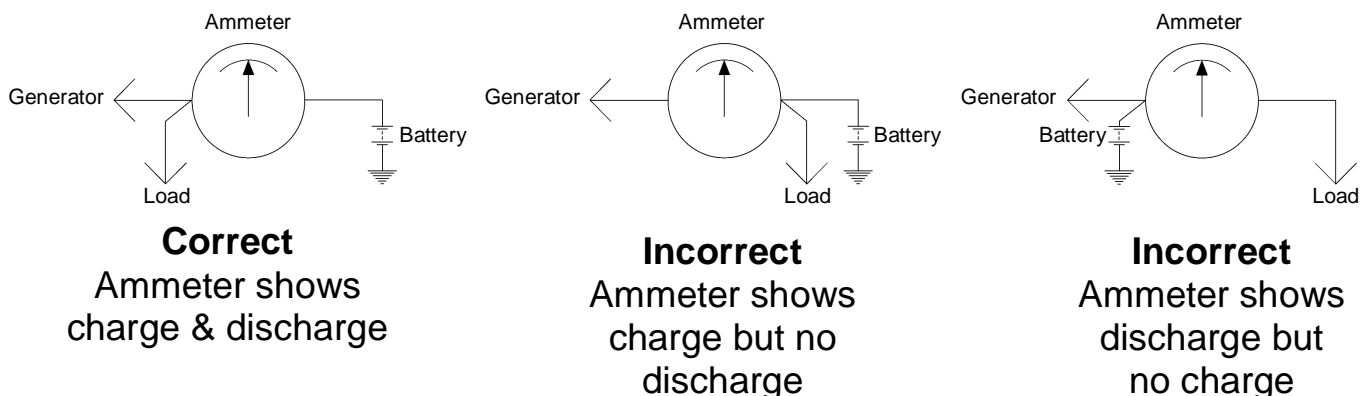
Dynamo wired for opposite rotation.

## Remedy.

Change field connections over **OR** change the brush connections over.

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## Ammeter readings – correct and incorrect



**Symptoms.**

With the engine stopped, and lights turned on, ammeter shows correct discharge. When the engine is running at charging speed with no lights the ammeter shows an incorrect discharge, when the lights are turned on the ammeter shows an even greater discharge, further increase in engine speed dims the lights slightly.

**Fault.**

The dynamo polarity is the wrong way round.

**Remedy.**

Re-flash the dynamo to reverse polarity by holding the cutout points closed manually for several seconds; you should also hear a little 'tick' noise.

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**Symptoms.**

The system charges flat out regardless of regulator spring tension adjustment. If the regulator points are opened manually charging ceases as expected. The cutout functions as normal.

**Fault.**

Broken or corroded voltage winding (long fine inner wire) on the regulator bobbin, usually where it is soldered onto the **E** terminal post or alternatively in the winding itself. Sometimes the first few turns of the winding may not be making contact with the bobbin core post due to corrosion.

**Remedy.**

If the fault is at the **E** terminal, repair. If internal then replace regulator.

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**Symptoms**

Ammeter shows only a small charge with engine running, and regulator chassis gets hot. The source of the heat seems to be the regulator points and the insulating washers screwed to the regulator chassis. The cutout points vibrate rapidly (buzzing) and sparks when the engine speed is increased, and quite often the cutout points have excess erosion. A slight variation on these symptoms occurs as follows; when the engine is first started a charge is shown on the ammeter, but this drops off as the regulator heats up until charging stops completely (probably the bi-metal thermal overload activating), allowing the regulator to cool allows charging to recommence.

**Fault.**

The dynamo **D** and **F** connections are reversed which causes the full charging current from the dynamo to go through regulator points, and when the points are open the current and voltage regulator windings are both disconnected. This explains the buzzing cutout points.

**Remedy.**

Reverse the **D** and **F** connections on the dynamo so they are connected correctly.

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**Symptoms.**

Ammeter shows only a small charge with engine running and the carbon brush holders become hot, especially the live brush holder. Also sparking occurs where the brushes make contact with the commutator. With the dynamo removed from the motorcycle and given the 'motor' test, sparking occurs under the Paxolin plate near the brush holders.

**Fault.**

The three small screws holding the Paxolin plate to the end yoke of the dynamo may have come loose, allowing one of the brush holder retaining rivets to touch the end yoke causing arcing and burning a track across the Paxolin plate. In this state the Dynamo is often still generating a full charge nearly all of which is shorting to earth worsening the problem.

**Remedy.**

Remove the Paxolin plate and scrap off the carbon track(s) that have burned into the surface. If very badly burned it may not be possible to remove track(s) completely without gouging the surface deeply in which case the plate should either be replaced or the gouges build up with Araldite. It is also advisable to relieve some of the Mazac alloy from around the brush holders until, when viewed from the inside, there is increased space around the rivets. Then make sure the Paxolin plate is correctly replaced and the three small retaining screws are done up correctly.

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**Symptoms.**

The system charges flat out regardless of regulator spring tension adjustment. If the regulator points are opened manually charging still continues flat out. The cutout functions as normal.

**Fault.**

Insulating washer broken where the fixed contact of the regulator bobbin is fastened with two 4BA screws.

**Remedy.**

Replace insulating washer.

**Fault.**

Contact has become bent allowing power to the field to bypass the regulator points, so they have no effect.

**Remedy.**

Straighten bent contact.

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**Symptoms.**

Ammeter shows no charge going into battery, but dynamo is found to be in working order when tested independently. The cutout points pulse as engine speed increases (but do not stay closed) accompanied by a small amount of sparking (which is not abnormal).

**Fault.**

Regulator points adjusting spring having too little tension set.

**Remedy.**

Adjust regulator points adjusting spring until correct charge is achieved.

**Fault.**

The regulator points have been disassembled and then reassembled with too large a gap which causes the regulator points to open under the least amount of power and cut off the field supply current.

**Remedy.**

Close the regulator points gap by loosening the two small screws that hold the moving contact to the chassis and adjust the gap.

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**Symptoms.**

Ammeter shows no charge or discharge (no needle movement whatsoever). Closing the cutout points manually (flashing the dynamo) does not produce the 'tick' noise and ammeter needle still shows no movement.

**Fault.**

The wire from the regulator box **A** terminal to the ammeter is broken or disconnected; therefore no charge could reach the battery.

**Remedy.**

Reconnect, repair or replace wire from regulator **A** terminal to the ammeter.

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**Symptoms.**

Ammeter shows no charge or discharge (no needle movement). Cutout points work correctly closing as engine speed rises and opening when engine speed drops below charging level. Operating regulator points manually does not make any difference.

**Fault.**

Broken regulator current winding, possibly internally but usually at one of the two ends; either the **A** terminal end or the other end where it joins to the cutout current winding.

**Remedy.**

Repair if broken at either end, or replace regulator if broken internally.

**Fault.**

Cutout points not meeting properly when the cutout closes.

**Remedy.**

Bend the stationary contact to rectify the problem (be careful to bend the contact only a little as it can break).

**Fault.**

Break in the connections where **D** terminal is connected to the regulator box chassis. On MCR 1 and MCR2 regulator boxes a small metal strap from the **D** terminal is held captive under a screw which can be seen from underneath the regulator box, sometime the strap is soldered to the head of the screw. On RB107 and RB108 regulator boxes there is a long copper strap from the **D** terminal running around to the rear of the chassis where it is soldered on.

**Remedy.**

Repair by replacing strap and / or re-soldering as required.

**Fault.**

Corrosion causing breaks in the connections where **D** terminal is connected to the regulator box chassis, usually occurring where the strap is riveted to the terminal post.

**Remedy.**

Clean off the corrosion using a sharp knife, needle file, emery paper etc. and re-solder.

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# Alternator Oddities.

## **Symptoms.**

On a Royal Enfield 700cc twin with a 6 volt alternator converted to two wire 12 volt operation, it can deliver up to 25 volts ac when measured between the alternator two wires, but when connected through a rectifier with +ve earth and measured between the -ve and the +ve rectifier terminals, only approximately 5 volts dc is recorded. At the same time the rectifier gets hot, especially around the centre mounting bolt. With the system is wired up correctly on the motorcycle with an ammeter in series, and an auxiliary voltmeter connected in parallel, the ammeter registered a reading of about 0.5 amps and the voltmeter barely registered at all.

## **Fault.**

Alternator coils are shorting to earth.

## **Remedy.**

Replace alternator.