



## Rex's 12 Volt Solid State Regulator Rectifier: RR12V-14

Rex's solid state regulator/rectifier is designed and correctly rated to control the modern high output Lucas 2 wire alternator as well as the standard output version. In addition it can be used to successfully convert the 6 volt, 3 wire Lucas alternators (with encapsulated windings) to 12 volts.

The solid state unit can also be used to replace later 12 volt zener diodes to give modern standards of voltage control.

### Fitting guide

Fitting is straightforward providing you follow some basic guidelines. In all cases you remove the old rectifier and connection to the zener diode (if fitted) and connect the new solid state unit between the alternator and battery. There are different ways of achieving this, the best one for your application will depend on the system you have. None of the lighting wiring or switches are altered. Wiring must be done to high standards using the correct tooling for forming any crimped connections. Nothing in this guide overrides any safety precautions given in the shop manual.

*Warning: Incorrectly connecting the new solid state unit to the battery will destroy it in a second. Units returned with burnt out rectifiers caused by incorrect polarity connection or short circuiting will not be replaced as defective under warranty. Basic precautions and thorough checks are your friends here.*

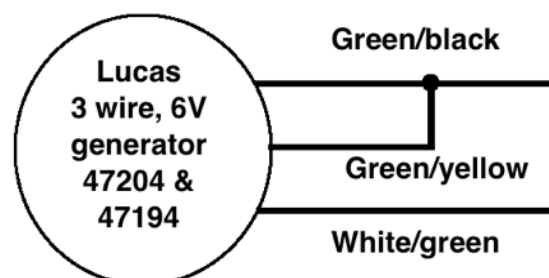
**The red wire is positive. The black wire is negative.**

Can be used on either positive or negative earth vehicles provided the polarity is observed.

1. Disconnect and remove the battery while working on the machine. This is a great time to determine if your system is positive or negative earth if you are unsure. Many times it will be found that a previous owner has changed the vehicle's earth connection, so check for yourself - don't assume.
2. Connection directly to the alternator & battery: In the case of modern 2 wire Lucas alternators this is simple. The two yellow wires from the solid state unit connect to the green/yellow wires from the alternator stator. The yellow wires can be connected to either of the alternator outputs, there is no special way they have to go.

Where a 3 wire 6V, stator is being converted to 12 volts the green/yellow and green/black wires are first joined to give two wires. A simple double connector will effect this.

The old 6 volt system relied on the lighting switch to switch in and out windings to reduce or increase output as the lights were switched on or off. The solid state unit requires the full output and regulates it depending on the load it senses on the system.



## 12 volt conversion continued

Again it makes no difference which way the yellow wires are connected the alternator. However Lucas have created a fair amount of confusion in not only changing the wire colours but adding a 3-phase unit with the same colour coding as the old 6 volt alternator.

The way to spot a 3-phase unit is that these have 3 wires but 9 metal poles in there centre where the rotor runs. The 6 volt system also has 3 wires but has 6 poles.

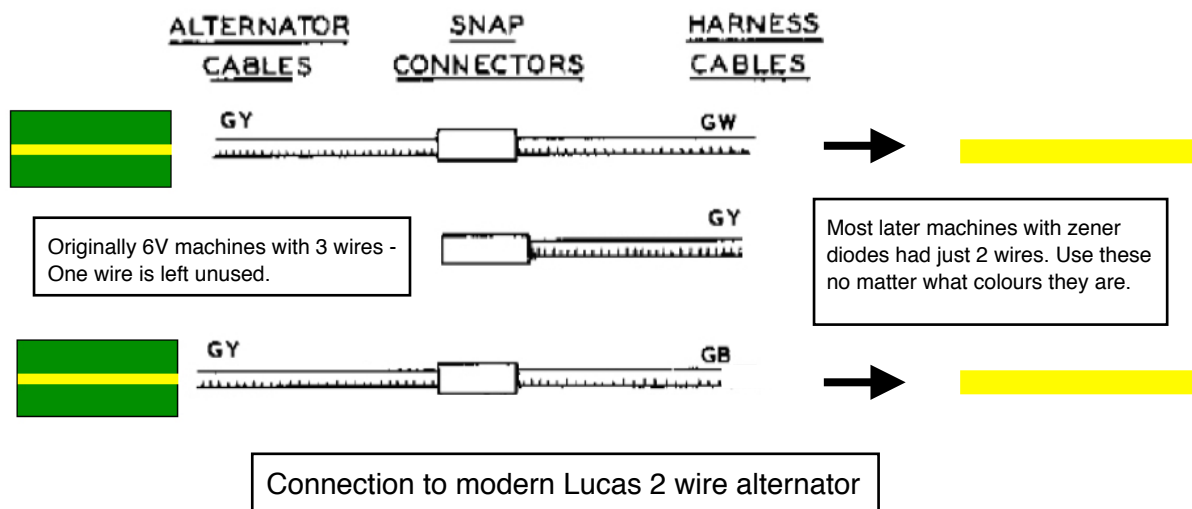
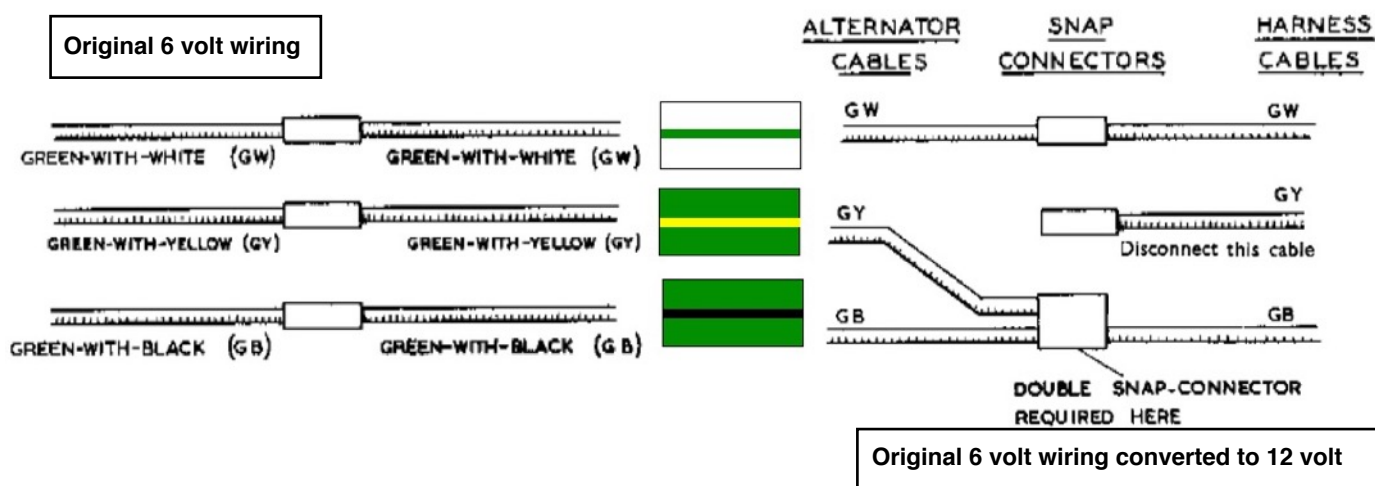
Earlier colours used by Lucas: light green, mid green & dark green wires. Join the mid and dark green wires for 12 volts.

Wipac: These had orange, light green & white. Join the light green and orange for 12 volts.

Once connection to the alternator has been made, connect the DC wires directly to the battery as shown in the basic wiring diagrams.

### 3. Connection at the rectifier wiring

In all cases the old rectifier is removed. It is entirely possible to connect your new solid state unit at the wires here. In fact if the machine has an ammeter doing so ensures the ammeter shows a charge. Using this point makes a neat job of wiring in the new unit.



Connection at the rectifier wiring, continued.

The DC connections are made at the rectifier connection as well as the connection to the alternator.

If your vehicle is positive earth the red wire from the solid state unit can be attached to the frame at the rectifier stud mounting position.

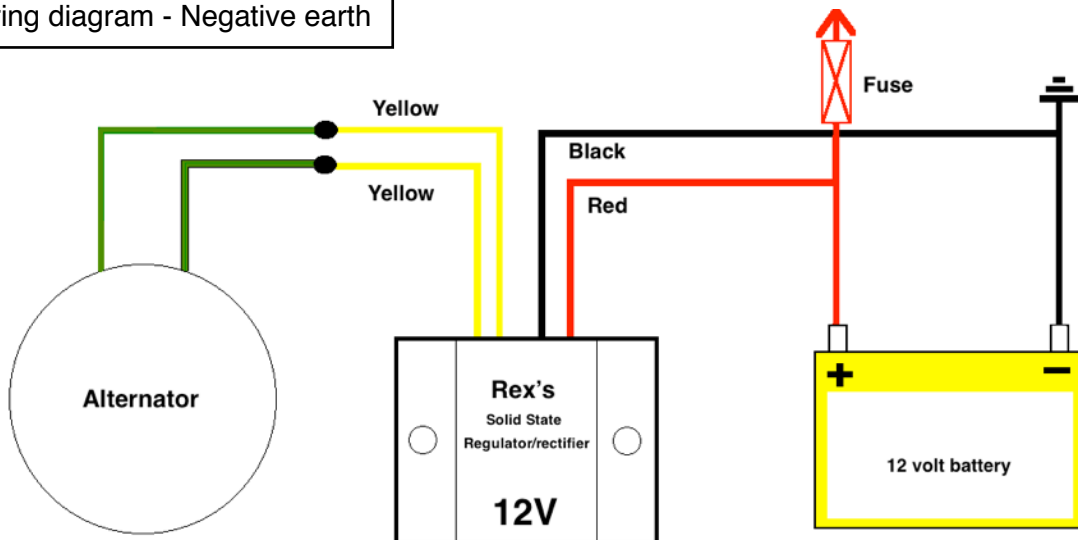
The black is connected to the negative DC wire from the old (now removed) rectifier.

If the vehicle is negative earth, the red is connected to the positive wire the connected to the rectifier and the black attached to the frame.

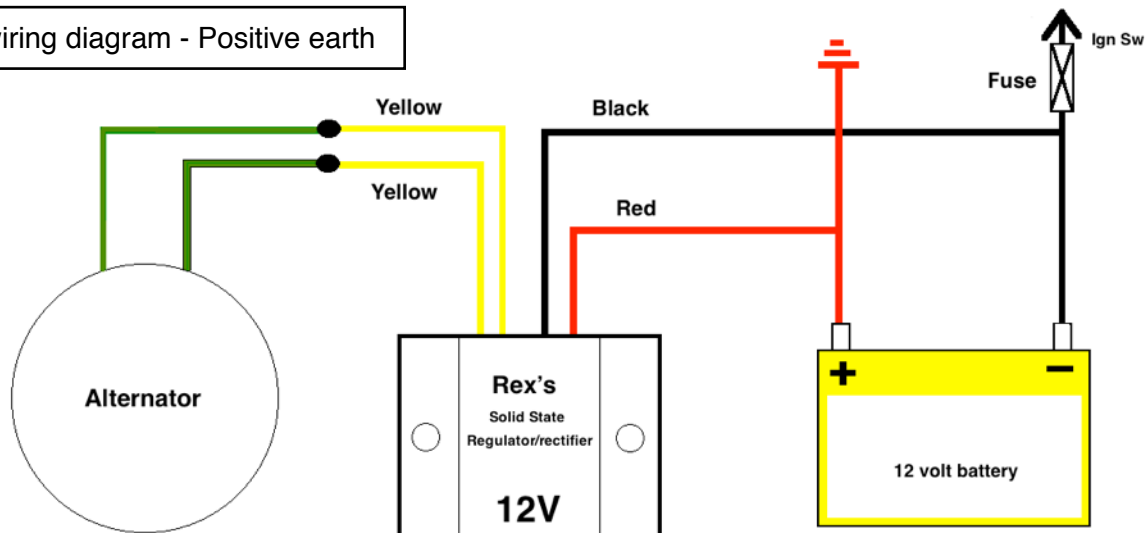
**Double check you have made connection to the battery correctly before connecting it.**

*Please ensure you have access to the bike's wiring diagram or shop manual to look up wire colours or other information. We do not hold a library for the hundreds of different bikes made.*

Basic wiring diagram - Negative earth



Basic wiring diagram - Positive earth



#### 4. Testing

Refit the battery. To test the system is working correctly simply measure the battery voltage using a suitable multimeter with the engine running.

The voltage should rise above the battery's terminal voltage and settle between 13.8 and 14.7 volts.

An ideal figure is 14.2 volts +/- 0.5V.

The exact figure will depend on the alternator's power output, the load on the system, the condition and state of charge of the battery

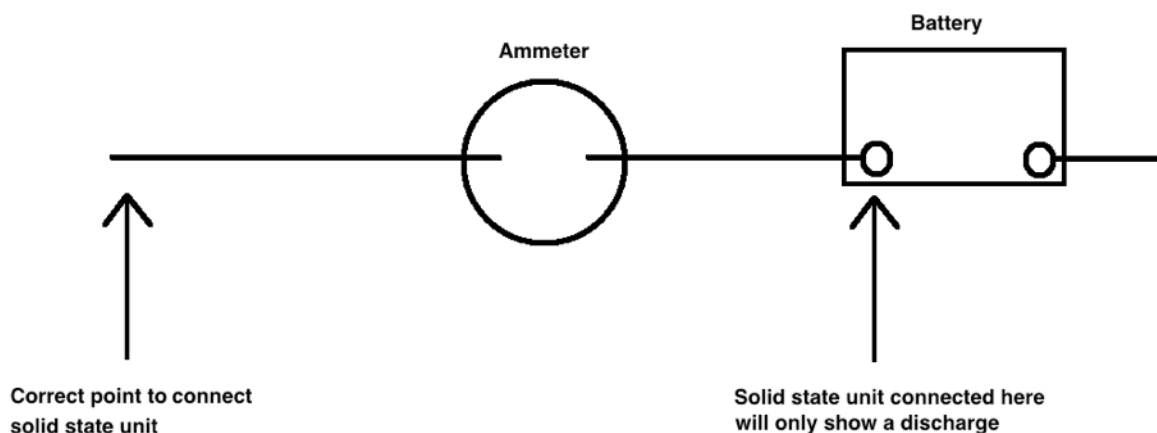
Excessive charging is over 14.7 volts. Under charging is below 13.8 volts.

Running with a battery eliminator and no battery will cause higher readings, 15 volts with the lights off is not uncommon. This is because the capacitor stores surges caused by the piston accelerating on the power stroke.

*Note: A slight drift away from ideal is never caused by a faulty solid state unit. You will see a marked departure from the nominal value if there is a fault. Alternator output or load on the system causes small variations in observed voltage readings. A multimeter that has been calibrated and is within certification date is required before declaring a fault. Reported faults will have to be verified by own technicians.*

#### **Ammeter shows the system is discharging.**

If you have conducted the tests above and the battery voltage shows the system is charging, the likely cause of the ammeter showing otherwise is that the new unit is connected to the wrong side of the ammeter.



#### **Tips**

-NEVER interrupt the DC connections between the solid state unit and the battery while the engine is turning. This will damage the regulator circuit inside the unit.

-Fit a fuse of 15 to 20 amps as shown in the basic wiring diagrams. This will protect your electrical system in the event of a fault developing.

-Use a quality battery such as the yellow Motobatt or a Cyclon cell of between 5 and 14 Ah capacity. These brands receive very positive feedback from customers year after year. Both have a long life when not used. A normal motorcycle charger can be used to charge both types.

- Avoid lithium batteries. Your solid state regulator/rectifier is not designed to for them.