



Rex's Speed Shop

Robertsbridge - England

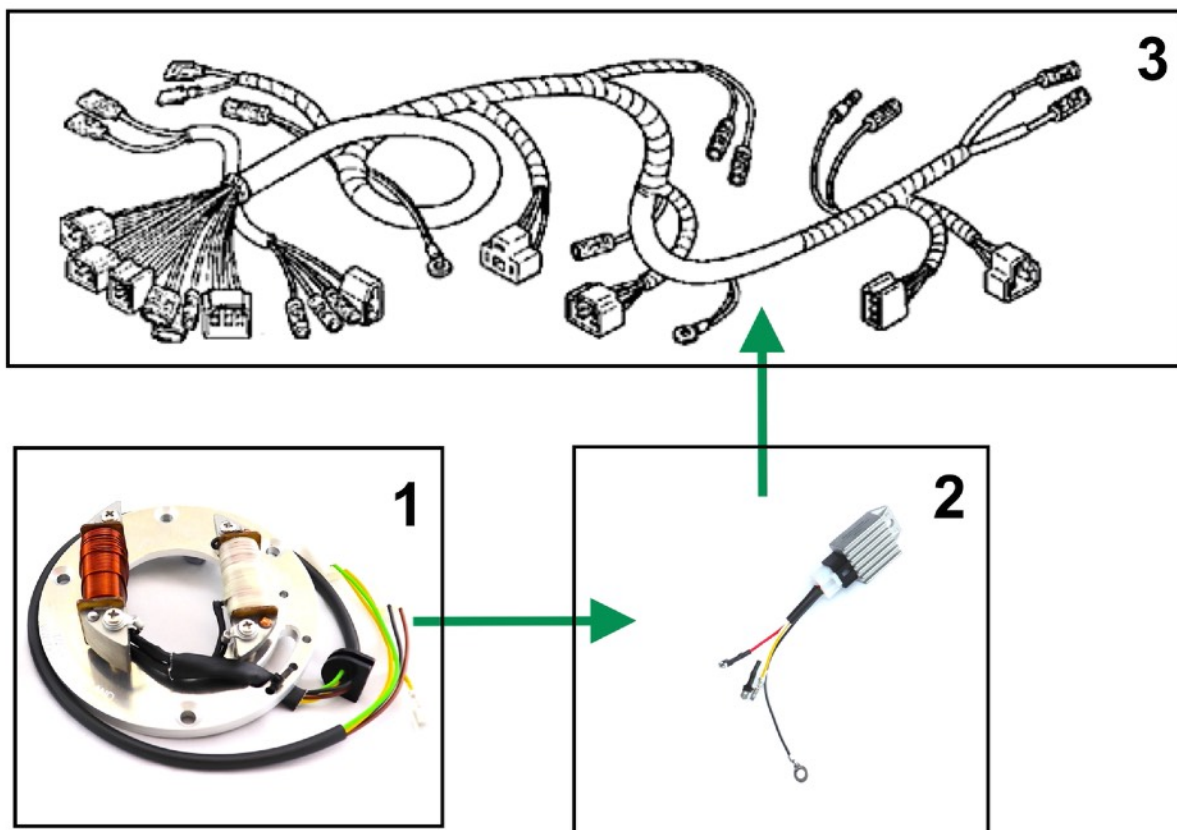
XT & DT AC/DC 12V conversion - Help Sheet

System Philosophy

We have designed our 12 volt conversion to be a simple plug-in modification without changes to the bike's original wiring. Our systems are extremely popular as there are no complicated wiring diagrams to follow and excellent results are easy to obtain with very little electrical knowledge. Rex's 12 volt conversion has been developed to be native to the bike's electrical system using either a specially made 12V lighting coil, or in some cases the OEM lighting coil to supply power to a modern regulator which in turn gives a 12 volt AC and DC output. Increasing the system voltage brings noticeable improvement to reliability and the brightness of the lights. Other benefits include the use of a regulator unit which can be run with a capacitor connected in place of a battery, which is not recommended for road bikes but removes the need for a battery on competition machines.

Our 12 volt conversion is simple and reliable in operation, the generator (1) supplies power to the regulator (2) which controls and divides the power in to regulated AC and DC. This is connected to the motorcycle's OEM wiring (3) via the rectifier and regulator connectors. Because the conversion changes nothing within the original wiring (3) it is not likely to cause issues within the wiring. It should also be noted that adding a 12 volt conversion is unlikely to solve pre-existing wiring problems.

The ignition is a completely separate system that provides its own power. The charging & lighting system neither provides power for, nor effects the ignition.



Newly Installed Kits: No Power to the Battery or Lights

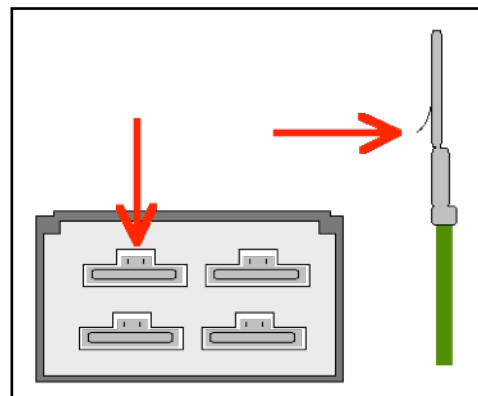
The engine must be running for the headlamp to work as the headlamp is supplied by AC power!

Check the plug at the new stator and the wiring loom. The wires must connect across this connector, check they do.

If they do not, release the pins from the housing and replace them so the wires connect across the connector.

A small barb on the metal terminal (indicated by arrow) retains the metal part in the plastic housing. A small Jeweller's screw driver is all that is needed to release the terminal from the housing. It can then be re-positioned so it connects to the appropriate wire.

Match the basic colours IE yellow to yellow, green to green or white to white. This is true even when the wire on the bike has an additional stripe of colour on it.



Connectors found not as expected on the bike's wiring loom are extremely common, DT models prior to 1978 suffer a high number of different variations within each model. Another issue is that connectors have been replaced at some point, this is most common at the rectifier and regulator terminals due to corrosion. We include an opposite set of rectifier and regulator terminals in all 12 volt RMK electronic ignition kits in case your bike is found to have different terminals here.

Lights or Battery Charging Suddenly Stop Working on Newly Installed Kits

If the lights and battery charging worked, then suddenly stopped after a short time and there is no other obvious cause such as a loose connector, you must remove the flywheel and check for wires on the stator that have been pinched or are rubbing on something. This check is extremely important.

Remove the flywheel and then the stator and carefully inspect all the wires, especially where they pass through or behind the stator.

Check the Lighting Coil for Correct Output. Warning - Risk of electric shock!

Warning: The unregulated alternator output is sufficient to cause electric shocks. You must not carry out these tests if you have a heart condition or wear a pacemaker.

To check the lighting coil output the engine has to be running. Using a multimeter set to measure AC volts measure the voltage between the engine case and the wire colours in the table. Look to see if your kit uses a white or a green wire, XTs use white, DT models use green, all have a yellow wire.

If your meter is not an 'auto ranging' type, set it to 200 volts AC, or the next nearest scale. If you set it to a higher scale, the readings will be confusing, too low and you may get an 'off scale' error.

Please refer to the manual for your meter if you are unsure how to set it.

Measuring Voltage Output.

Disconnect the wire at the generator to wiring loom connector and measure the voltage at the pins with the red probe. Place the black probe to the engine case, ensure a good connection to the engine, an unpainted area is best.

If there is an additional wire to the regulator disconnect it as shown.

| Engine RPM | Engine case - Yellow | Engine case - White or green | Yellow - White or green |
|------------|----------------------|------------------------------|-------------------------|
| 1,100 | 11V | 20V | 8V |
| 2,500 | 24V | 40V | 16V |
| 5,000 | 48V | 80V | 32V |

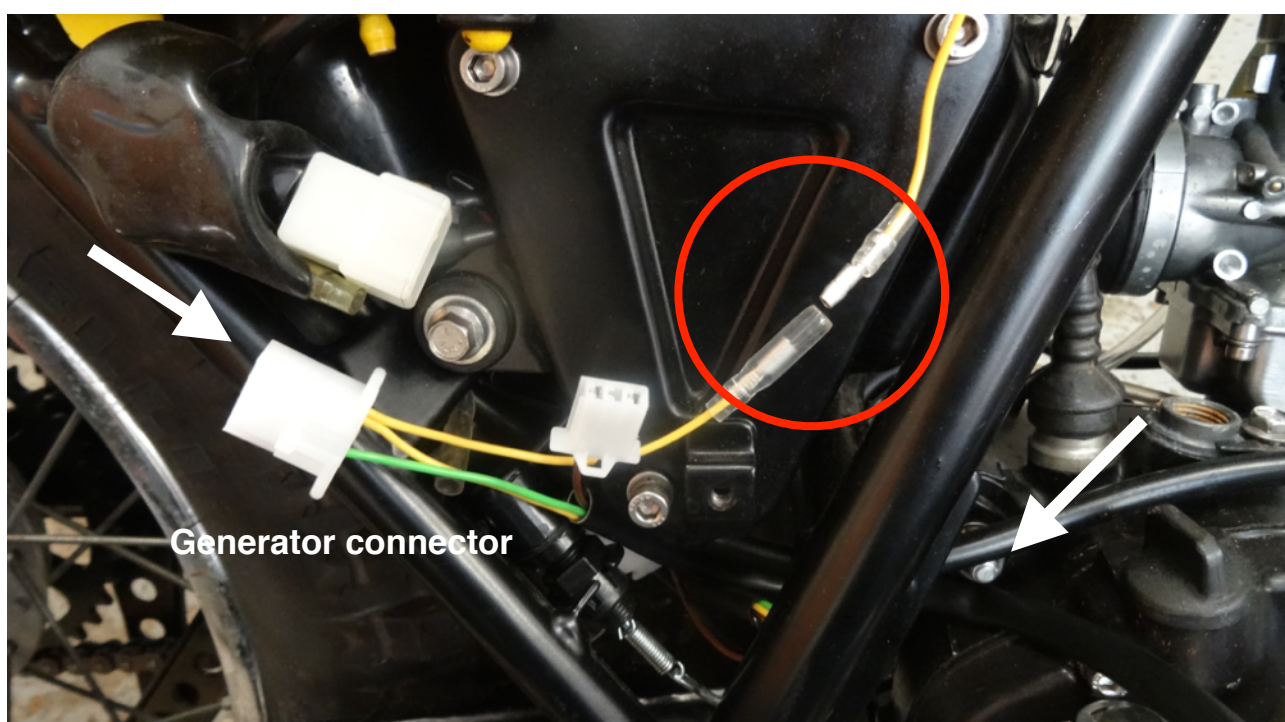
A 5% tolerance applies. The figures given are the RMS AC values. XT models = white wire, DT models = green wire.

Readings that are similar to the ones in the table above show that the lighting coil is working normally.

If there is no reading or one substantially lower you must remove the flywheel and check for wires on the stator that have been pinched or are rubbing on something. This check is extremely important

Blank table to record your own results

| Engine RPM | Engine case - Yellow | Engine case - White or green | Yellow - White or green |
|------------|----------------------|------------------------------|-------------------------|
| 1,100 | | | |
| 2,500 | | | |
| 5,000 | | | |



Testing the battery voltage.

This is done with the engine running and the lights on. First check the following:

- Battery is a lead acid type IE wet cell, sealed, gel or AGM.
- Battery is fully charged (12.7- 12.8 volts) and holds a charge
- Headlamp is a standard bulb between 35-45 watts

Set your meter to the DC 20 volt range if it is not an auto ranging type. Start the engine and select the headlamp on. Rev the engine over 2,500 and measure the voltage at the battery terminals.

Correct reading: 14.5V +/- 0.75V at 2,500 - 5,000 RPM

This system design dictates a very wide tolerance on the charging rate. The system is based on AC power regulated to supply the largest load, IE the headlamp, the DC section is secondary.

If the voltage is in the specified range the system is working normally.

Fault Finding

| Symptoms | Possible cause |
|---|--|
| DC charging voltage is low. -Lighting coils output test is good | <ol style="list-style-type: none">1. DT models. A low DC voltage only when the lights are off: Ballast resistor connected. If the voltage is low, when the lights are on or off, a 6 volt regulator is probably installed. Yamaha used many different configurations on DT models, in addition previous owners often fitted these parts to stop bulbs blowing. Check for ballast resistors (Yamaha p/n 458-85370-10) and 6V regulators left installed. Disconnect and remove any ballast resistor or regulator found.2. Headlamp bulb incorrect wattage. A 55/60watt head lamp bulb will cause the battery voltage to be low3. Rear brake light stuck on or wired on all the time.4. Faulty battery, check and replace if faulty.5. Poor condition of wiring loom/switches. Replace wiring loom and worn switches.6. Failed battery eliminator, replace and retest. |
| DC charging voltage is high or fluctuates -Lighting coils output test is good Note: With a battery eliminator fitted the DC voltage can be as much as 1 volt higher than normal when a battery is fitted | <ol style="list-style-type: none">1. A fluctuating DC voltage can be caused by a failed battery eliminator. Replace the eliminator (p/n BE1) and re-test.2. Faulty battery. Check and replace if faulty.3. Incorrect battery IE lithium. Replace for lead acid battery.4. A high DC voltage or blowing bulbs can be due to poor earthing between engine and wiring loom. The best fix is to add a jumper wire between the engine and wiring main earth point. Never rely on the frame for earthing.5. LED lamp in AC circuit. Remove and replace for standard filament bulb.6. If the above items have not fixed the issue, replace the voltage regulator. |

| | |
|---|--|
| AC voltage at head lamp low -Lighting coils output test is good -DC battery level is correct | 1. Incorrect bulb wattage or type of bulb. Check and replace. 2. Faulty wiring or switches. Check and repair as per OEM shop manual. Wiring looms 40 years old often have numerous poor connections. Even NOS items can be found to be faulty and have broken internal connections. |
| Bulbs blowing AC & DC voltage normal | 1. Check connections and switches for wear. Contacts that vibrate and are no longer tight cause the voltage to surge and be unsteady. 2. Poor earth - Install a jumper wire between engine case and main earthing point. |
| Headlamp dims when engine is revved | 1. Poor connections or worn switch contacts 2. Poor earthing |

Incompatible Items

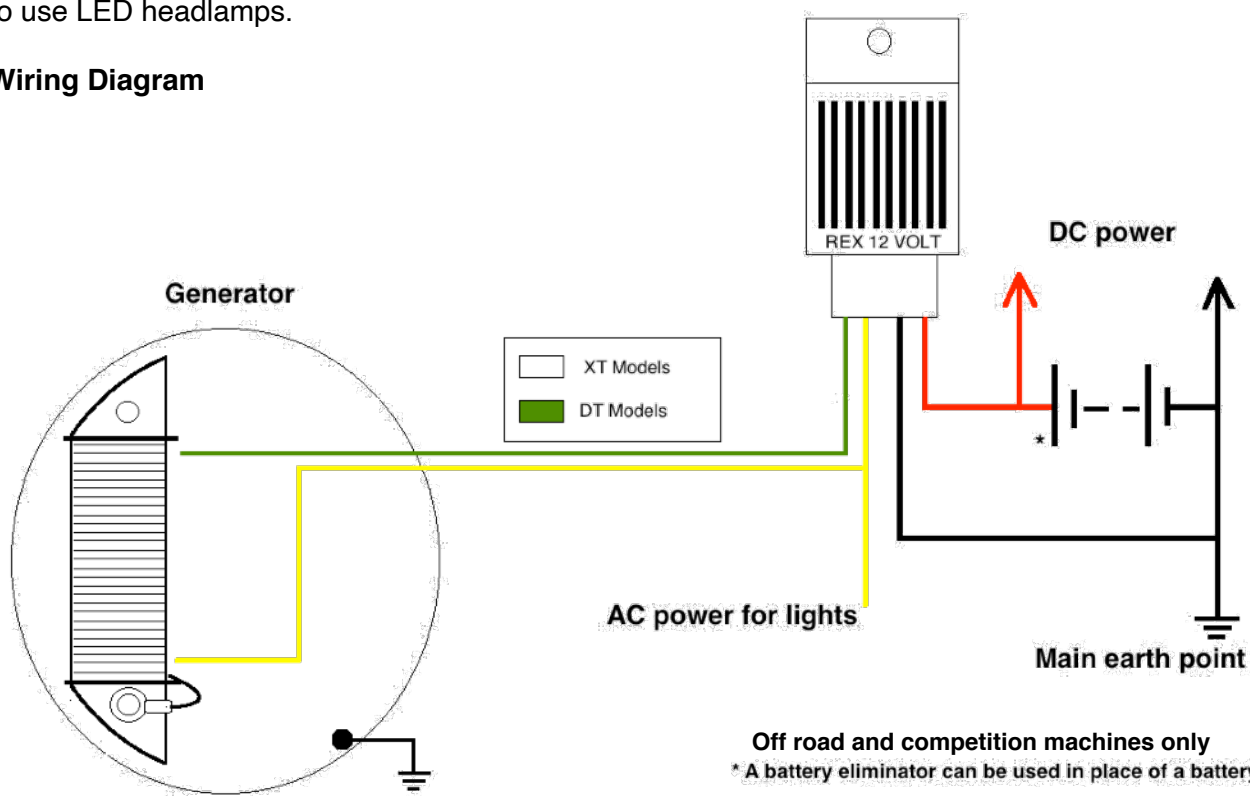
Lithium batteries must not be used with this 12 volt conversion, reputable lithium battery manufacturers will echo this advice as lithium batteries are not suitable for many older vehicles. In our experience lithium batteries cause a high level of customer dissatisfaction as there are downsides to lithium technology that are only discovered once the battery is in service.

Damage to your vehicle, new conversion kit or personal injury may occur if a lithium battery is used with this equipment. The warranty on your conversion kit will also be invalidated if connected to a lithium battery.

LED Headlamps

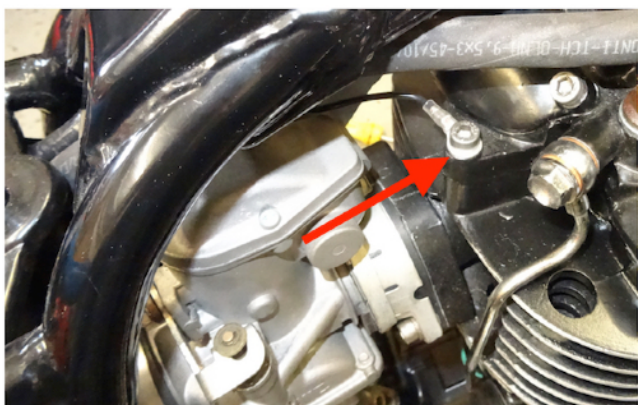
LEDs require DC power and therefore are not suitable with electrical systems that use AC power for the headlamp. You can use LEDs on the bike's DC circuits IE those that operate when the engine is not running. Rex's offer a specific LED charging system version for customers who wish to use LED headlamps.

Wiring Diagram



Fitting a Jumper Wire

A simple wire bolted to the engine and the main wiring loom earth point saves having to remove paint and solves many common bulb blowing and charging faults



Common Problems Not Related To The 12V Conversion

Other lights not working

If connections inside the headlamp or where many single bullet connectors meet have been disturbed, check carefully that all the wires have gone back in their correct connectors. Crossing similar looking wires in the headlamp is the main cause of confusing electrical faults. Wire colours can and do change over time, they can fade, darken or take on colours from materials in close proximity. It is always worth going back over the connections and checking carefully.

All four LED indicators lighting up.

This is common issue when fitting LED indicators, the problem is that the indicator warning lamp in the instruments flows sufficient current to light the opposite set of indicators.

The fix is simple Rex's manufacture a "Tweak" kit - part number ITK1, that can be added to the warning lamp. This fixes the problem and prevents the non selected indicators illuminating.

