

Power Box

The power box is a self regulating rectifier with an internal current and voltage storing capacitor. Connecting directly to the alternator the output is approximately 15 volts with no current being drawn and 14.5 volts with some load. These values are just right for charging a 12 volt battery or running the electrics direct. The unit has been designed using the latest power technology semi-conductors to provide stable, direct current from standard permanent magnet alternators. Three types are available: Single phase, Bi phase and Three phase. Some come with a charging lamp control, or lighting delay circuit, which prevents the lights being turned on until after the engine is started. Ensure you have the desired unit before fitting. Single phase and Bi phase units control 200 watts and three phase units control 300 watts.

As a rule of thumb Single phase power boxes are suitable for use with most British Bikes, pre 1975 with alternators of two or three wires. Bi phase are suitable for use with most Italian and French machines equipped with three wire alternators. Three phase will suit some British machines post 1975 with three wire alternators and the majority of Japanese three wire machines.



General Instructions

Input – Can be used with any permanent magnet alternator with two or three wires (wattage refer above). **NOTE POWER BOXES ARE NOT COMPATIBLE WITH 5 WIRE BRUSH AND SLIP RING ALTERNATORS (BATTERY EXCITED)**

Output -13/14 volts DC (charging 12 volts). You should mount the unit in free air - this may be in the battery box as long as there is some air around the unit for cooling. Use rubber mountings where severe vibration may cause damage. Never connect the battery the wrong way round. A fuse must be placed in one of the battery connections. When running without

a battery no fuse is required. Under these circumstances it is permissible to short the output in order to stop the engine. This will not damage the power box.

Fitting

- Single phase/Bi phase: Mounting 4 x 5mm holes at 45mm x 77mm spacing. Unit height 35mm. Weight 200gms.
- Three phase: Mounting 4 x 6mm holes at 70mm x 70mm spacing. Unit height 64mm weight 350gms.
- Connections red positive, black negative.
- FOR FULL DETAILS SEE WIRING DIAGRAM SUPPLIED WITH UNIT.

The Advantages of 6 to 12 Volt Conversion using a single phase power box

Most 6 volt permanent magnet alternator charging systems have no regulator to control the voltage output. Some use the headlight switch to change over the charging coils when the lights are used. The load provided by the battery and bulbs holds the voltage to approximately 7.5 volts, the value of a charged 6 volt battery.

If the battery becomes faulty or disconnected the output of the alternator will rise to peak at over 200 volts, the rectifier and/or electronic ignition will be destroyed. We therefore recommend that no electronic ignition be fitted with this type of 6 volt charging system.

Converting to 12 volts is going to provide more stable and reliable electrics, it will also improve lighting. Current through the cables is halved and the output from the alternator will be up by at least 25% with no extra load to itself. A typical alternator at 2000 rpm will charge approximately 8 amps into a 6 volt battery - 48 watts (volts x current).

If the battery is replaced with a 12 volt unit the current will drop to 6 amps giving 72 watts. In practice this is closer to 84 watts as the battery voltage on charge is nearer 14 volts. At just under 15 volts the battery is fully charged. At this point, without a regulator, the current is no longer stored by the battery and is lost as heat. The battery would eventually boil dry or explode. This will not occur with a correctly fitted Boyer Bransden power box in place. In addition it is possible to start the machine despite a discharged battery.

What to Do

The change to 12 volts is carried out by: fitting 12 volt bulbs, not forgetting instrument and warning lights, fitting a 12 volt battery with in line 15-25 amp fuse, fitting 12 volt ignition coils (6 volt coils can be used with some electronic systems or by fitting a 1.5 ohm ballast resistor in series). The horn will work on 12 volts. Remove the rectifier and disconnect the wires. The power box can be connected to these. The two yellow wires connect directly to the alternator. Two of the original wires can be used and any connection to the headlight switch can be disconnected, some machines have a resistor wire in the wiring harness, this can also be disconnected at one end and is no longer needed. The third wire on the alternator is connected to one of the other two (see wiring diagram).

The earth terminal on the rectifier is normally the centre bolt, the wires on this can be bolted back to the chassis, along with the red wire if positive earth, or black wire if negative earth from the power box. The opposite wire is then the main power feed to the ammeter or battery and connects to the appropriate wire removed from the rectifier. The conversion is now complete. For starting with a flat battery remove the fuse and kick, or bump start, rev up and while running fast replace the fuse. The battery will then start to charge, if healthy.