

A MOTORCYCLE MCOMPONENTS

www.mcomp.co.za

Tel: 073 750 9897 Fax: 086 884 1544

PO Box 59 Pennington 4184

E-mail: mcomp@mweb.co.za

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Boyer Bransden Ignitions
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Importer & Distributor for

Boyer Bransden, Electrex World, Keyster & SUDCO

The Advantages of Electronic Ignition

Electronic Ignition is now standard for the majority of new vehicles. It offers easier starting, smoother running, improved fuel economy and lower emissions when compared with traditional systems.

On certain types of older or high mileage vehicles, distributor wear may affect the timing and cause a loss of performance, whilst sparking at the points burns the contacts and wastes energy.

Some classic vehicles suffer from "fragile" electrics which may be affected by vibration or damp. An electronic ignition system will eliminate these problems allowing the machine to be used with greater confidence and to its full potential.

Legislation against pollution is set to become even tougher. Electronic ignition systems allow most of the available energy to reach the spark plug and improve combustion. As such, they are an important and simple weapon in the war on pollutants, helping to keep classic machines where they belong - out on the road, not in museums!



Product Information

The Boyer Bransden **Micro MarkIII**

The Boyer-Bransden Micro MKIII is a contact-less ignition system utilising an advanced and patented trigger switching system and featuring electronic, advance and retard. Engines function best with a retarded spark for starting and low revs, but need ignition advance to run at high speed. The Micro MKIII's analogue system simply advances the spark at a set rate from fully retarded to maximum advance, as engine speed rises from zero to 4,000 revs. Thus eliminating the inaccuracy of mechanical advance/ retard units.

The Boyer Bransden MarkIV

Currently available in MKIV versions:

KIT00051 Triumph/BSA Single Side Points 12v

KIT00052 Triumph/BSA Twin 12v

KIT00053 Norton Atlas/Commando 12v

KIT00054 Triumph/BSA 3 cylinder

KIT00064 Enfield India Bullet 350/500

The Boyer Bransden range of Analogue MKIII ignition units are being progressively changed to improved MKIV versions. The changes are designed to improve the timing stability if an engine is being started with a very low or variable battery voltage. The design changes are internal and do not affect the external appearance of the unit. Identified by the 'MKIV' caption on the label the new units are fully interchangeable with previously produced MK3 and MK1a units, and offer improved performance for both electric and kick start machines. All Digital and Power designs remain as before.

The Micro Digital and Micro Power System

The Micro Digital ignition provides almost total control over ignition functions. In common with the MKIII, it offers electronic control of advance and retard functions. The Micro Digital features a built in computer, the size of a postage stamp, it can make more than a million ignition calculations per second, to constantly monitor engine speed and time the spark precisely. The programming of this micro processor also gives control over ignition coil energy, starting speed, tickover stabilisation and rev limits!

The Micro-Digital system is designed to use the original coils where possible, the time these coils are switched during the ignition cycle is programmed into the microchip. With older machines, the coils have a high primary resistance and require a long switch on time. If the coils are replaced, it is important that coils of a similar resistance are used.

Consider upgrading to the Micro-Power system which is supplied complete with its own Digital Power coils.

How The Boyer-Bransden Micro Digital and Micro Power Ignition System Came Into Being

Boyer-Bransden make one of the most efficient ignition systems in the world. In 1969 Ernie Bransden designed and patented a miniature electronic ignition; one that was a fraction of the size and far more efficient than any of its competitors. Both Bosch and Lucas technicians looked at the system, and were amazed that this could have been developed by a twenty five year old in his bedroom, with no multimillion pound budget. At this time, the German engine designer Helmut Fath had been trying to obtain an electronic ignition from Bosch for his 500cc 4 cylinder racing motorcycle engine. Bosch had some equipment that could be used, but it required so much power, and was so large that he would have had to tow it, and the batteries it needed around on a trailer!

John Blanchard, one of the first men to lap the Isle of Man at 100 miles per hour was already using one of Ernie's electronic ignitions, being a good friend of Helmut's he persuaded him to try it. Helmut's high revving engine was transformed and his machine beat all the BMWs to win the World Sidecar Championship. Since then, Ernie Bransden's company, Boyer-Bransden, have produced many thousands of miniature ignition units for motorcycles and other applications. In 1996, Ernie set about improving and updating the very popular analogue MK3 system, by introducing a microcomputer into it. This would control all the ignition functions undertaken by the components of the Mk3 system, plus a lot more that were not previously possible.

This development led to the production of the Micro-Digital ignition system with digital coil control, rev limiting and programmed ignition timing, still driving standard ignition coils. With so much control over the ignition function, it was soon apparent that standard ignition coils are far from efficient. They normally work with a simple mechanical switch (the contact breaker) and power supply (battery), the only control of the energy being the primary winding resistance and the time the contact breaker cam holds the points open.

A coil that has been custom designed for electronic ignition can have a much lower primary resistance, since the computer can control the current pulse for every spark, and at any rpm. In

practical terms this means only a third of the power is consumed, with more spark energy available when hot or cold.



The Mk3 system is now superseded by the Micro-Digital and Micro-Power units. Both are contact-less systems and advance the timing electronically, featuring a microprocessor which can compute more than a million decisions every second. These units constantly monitor engine speed and time the spark precisely to suit. In addition, the programming of the 'mini computer' offers control over ignition coil energy, starting speed, tickover stabilisation and rev limits if

required.

In both systems, ignition timing is controlled - in bands of 50 rpm over the entire speed range, this gives the ability to programme any firing angle required. To help engine power at idle, the timing can be advanced, on and below the idle speed, this stabilises and reduces the chance of stalling. From idle, the advance can be sharper than provided by the previous Mk3 system, giving even better throttle response. The Micro-Digital system makes the best possible use of standard coils, whilst the latest Micro-Power system is supplied with miniature digital coils matched to the unit, for incredible performance.

This system is designed to work only with our special digital power ignition coils (type 00007 single output, or 00008 dual output). Up to three of these coils may be run from one ignition box, providing very high energy sparks for single, or twin plug cylinder heads. The ignition cycle is produced by a high current pulse lasting for a short period of time; this is controlled by the microprocessor program. The total current consumption is reduced by over a half and the spark energy is greater; average current consumption is less than 1.5 amps at maximum r.p.m.

The Micro Power Coils

The miniature digital ignition coils have a very low primary resistance and a very high quality iron core. Single and dual output types are available as mentioned previously. The HT cables are detachable and the primary connections are by spade terminals. As these coils are controlled by current input and not voltage, up to four coils can be run in series from one ignition unit. With most dual output coils it is good practice to have only one output feeding a compressed cylinder, but with 35,000 volts it is possible to have both outputs feeding a compressed cylinder at one time.

The Inductive Discharge Electronic Ignition

Both the Boyer-Bransden MKIII and the Micro Digital are intended primarily for motorcycle use. However the Inductive Discharge Unit which is inexpensive to buy and extremely simple to fit is ideal for anyone wishing to improve the running of older, classic or high mileage cars, or motorcycles, with traditional coil and distributor ignition, 6 or 12 volts, positive or negative earth. Just four connections and timing worries and sparking at the points are a thing of the past. Points life is extended beyond 30,000 miles and more energy reaches the spark plug for improved combustion and fuel consumption. Often the improvement in efficiency is made immediately apparent by an increase in idle speed. This can be corrected by simply turning down the idle adjustment on the carburettor. Normal electronic rev counters are unaffected.

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. In each case a charging lamp control, or lighting delay circuit, which prevents the lights being turned on until after the engine is started, is available. 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 two, or three wire. 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

(ALSO SEE SPECIFIC WIRING DIAGRAM)

Input - ANY PERMANENT MAGNET ALTERNATOR TWO OR THREE WIRE (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)

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.

6 To 12 Volt Conversions Using a Single Phase Power Box Regulator - The Advantages of 12 Volt Conversion

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 TO MACHINES WITH THIS TYPE OF 6 VOLT CHARGING SYSTEM.

Converting to 12 volts will 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 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 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.

Dynamo Regulator

The dynamo regulator unit is designed to replace the mechanical voltage regulator and cut-out used on many motorcycles using the LUCAS E3 TWO BRUSH DYNAMO. This dynamo is designed to charge a 6 volt system, but when connected to a Boyer Bransden Dynamo Regulator Unit it will charge 12 volts at over 120 watts without placing undue load on the dynamo windings. It will also replace the electronic aftermarket direct current regulator units.

The dynamo regulator unit uses a very efficient switching device controlled at over 500 times/sec., it's on/off ratio is adjusted electronically by a circuit measuring the dynamo voltage, this switch controls the magnetic field of the dynamo stator without the power loss in the stator coil winding present with a normal direct current system. Also incorporated is a method of maintaining the magnetic field when the switching device is in the off condition. This control is so good that even without a battery, lighting circuits and horn can be run direct from the dynamo without flicker. (Ignition can only be fed when a battery is fitted as no voltage is available at kick-start speeds).

With a 6 volt system, charging will start at 1200 RPM; on a 12 volt system 1600-1800 RPM is required. Reduced output voltage will be available from 500 RPM upwards. If lighting is run direct without a battery then the bulbs will be at half brilliance at tick over and full output at 2500 RPM. Battery charging is by voltage control with current regulation, if higher charging currents are prolonged. Stability is maintained by internal thermistor control.

A dynamo that has been rewound for 12 volts will start charging at a lower RPM and will work well with this unit.

Four units are available - 6 volt positive earth, 6 volt negative earth, 12 volt positive earth and 12 volt negative earth. Size: 66mm x 62mm x 35mm. Weight: 200 grams. 4 x 6mm mounting holes. The Lucas voltage control cover can be fitted over the regulator box to give an original appearance.