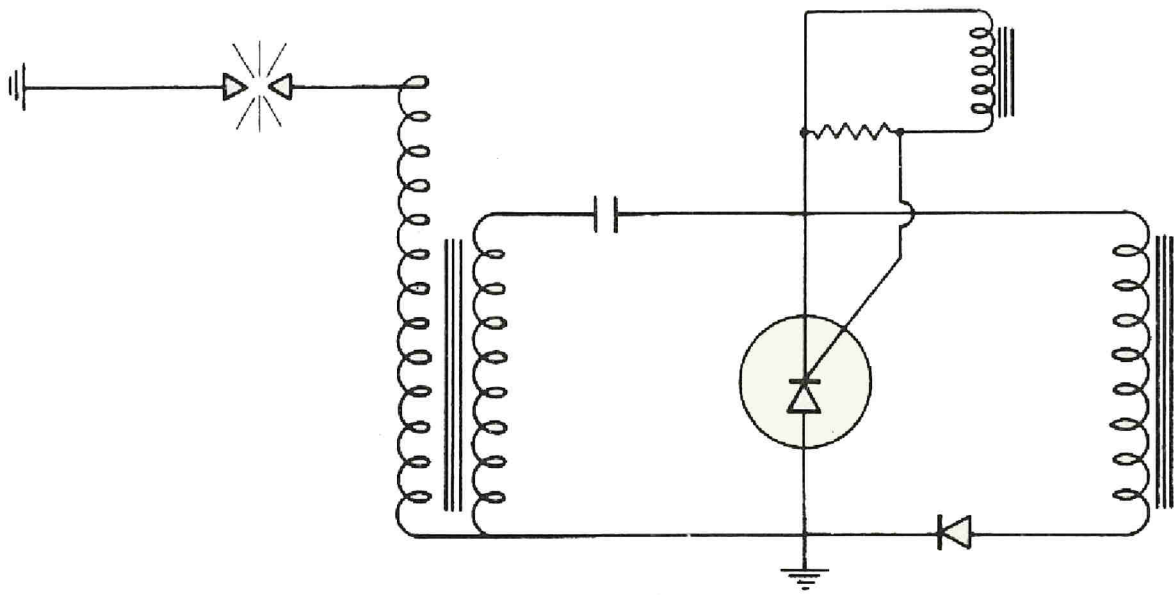


electronic ignition system



MOTORCYCLES

DUCATI

250 - 350 cc.

electronic ignition system

MOTORCYCLES DUCATI 250 - 350 cc.

ELECTRONIC IGNITION BY FLYWHEEL MAGNETO

As result of the particular engineering techniques as applied to the Internal Combustion Engine, MOTOTRANS have adopted this system for assembly in respect of the Motorcycles "DUCATI" as manufactured under licence.

ADVANTAGES

One of the characteristics best known of the flywheel Magneto for Electronic Ignition is the absence of the rubbing friction parts as are the breaker and the grease cup which, actioning above the cam lever create problems of certain importance.

The "MOTOPLAT" Electronic Ignition with which the Motorcycles "DUCATI" are fitted presents new techniques in every aspect which, is to say better mechanical resistance, better quality of spark in every revolution cycle of the engine and complete protection of the electrical components and connections against humidity, dust and vibrations, which is obtained by its compact construction.

In summary, the improvements and advantages of this application as achieved in use with the Internal Combustion Engine are:

- Improvement of starting
- Boosts the power
- Prolongs the life of the engine
- Decreases the consumption of the carburant
- Decreases the maintenance and breakdown
- Insures the operation in humid and, or dusty conditions.

OPERATION

In order to demonstrate the advantages as mentioned before we continue by looking at the operation of an Internal Combustion Engine equipped with the conventional Flywheel Magneto and on this occasion with Electronic Ignition.

The cycle of combustion in the engine starts with the firing ignition of the mixture, which must be compressed to achieve

this, thus causing a point of ignition in combustion chamber in which is brought into being by the electric spark which in turn is produced by the jumping of a current between the electrodes of the spark plug.

With a conventional flywheel, with breaker the spark jumps the precise moment according to the action of the cam lever but, besides during the cycle of 360° of the Flywheel Magneto, appears a series of "perturbed sparks" which produce an alteration in the carburant mixture and, by extension, impoverish the same, the result of which loses the ability of combustion.

Likewise these sparklets also cause a premature wearing of the electrodes on the spark plug which necessitates an adjustment or replacement of the same.

On the contrary, using an Electronic Ignition it gives the complete assurance that in every cycle of operation of the engine, appears only one spark in the complete cycle in which it follows automatically, that the gases conserve all their efficiency until the moment of combustion, which develops the maximum power.

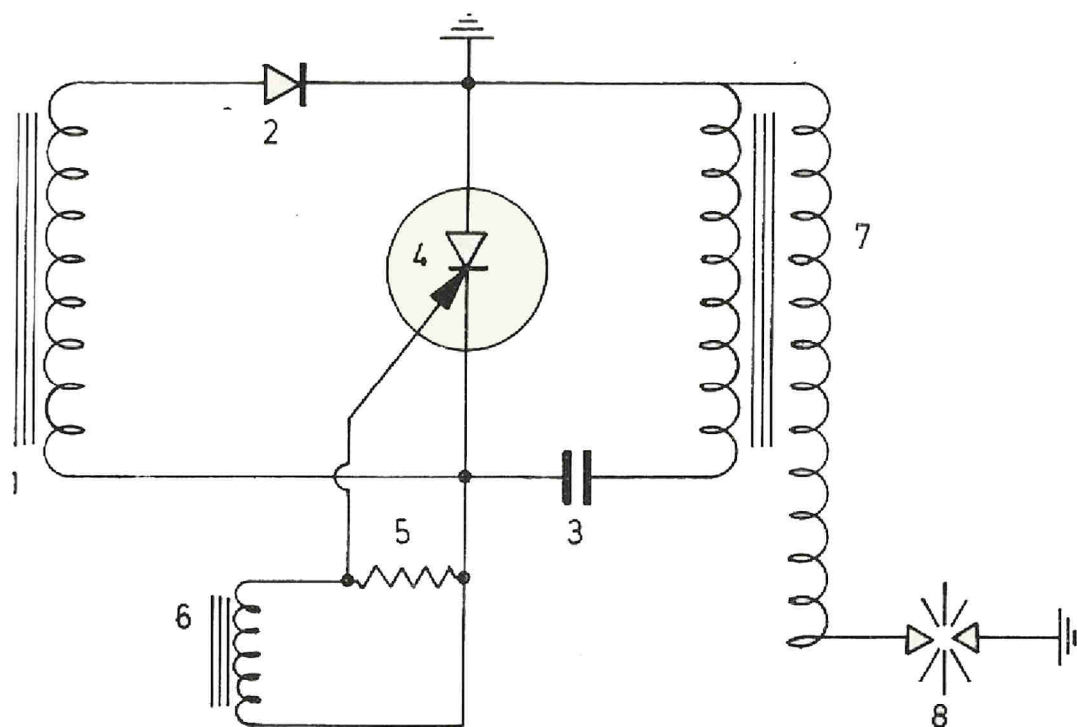
With respect to the spark it agrees to have in account one of the most important characteristics of the Electronic Ignition, whilst the necessary tension/stress to ionize the electrodes of the spark plug grows to the rate of $7000 \div 9000$ volts/ μs in the conventional system of the breaker the increase is of $300 \div 500$ volts/ μs . This indicates that the first reach of 25,000 volts which is the half value indispensable for producing the spark in the time of $2.77 \div 3.57 \mu s$ in place of $50 \div 83 \mu s$, which appraises the conventional flywheel. It results that if the gases fired are ignited quicker it results that the strength of combustions is more efficient.

On the other part it is deduced that, for the combustion to be produced with a difference in speed and useful power, the moment of ignition must be modified in accordance with the maximum yield, in this case it retards the value which corresponds to the classic ignition of the engine.

Another important observation to have in account is, that in some cases the engine can operate correctly reducing the payment of the carburant, modifying the adjustments that correspond (the jet or the conical needle) in the carburetor.

In account of the assurance of operation in severe conditions of temperature and humidity, the equipment of Electronic Ignition can operate in places having a high degree of humidity and or dust and within a temperature range that may oscillate between $+30^{\circ}$ to $+120^{\circ}$ centigrade being the temperature at the flywheel.

We continue to describe the operation of all the fundamental points.



In the coil/bobbin No. 1 is induced an alternative current generated by the passage of repeat the earth/ground pole appertaining to the rotor. This current is rectified by means of the diode No. 2 loading the condenser No. 3. The thyristor (SCR) No. 4 it is found in position of blocking, avoiding the discharge from the condenser. A positive current signal appears in the electrode of door or control of the thyristor, unblocking the passage wich instantly produces the discharge of energy it accumulates in the condenser to the first through the coil/bobbin No. 7 originating an overcurrent to reflect a high tension through the secondary, producing the jump of spark in the electrodes of the spark plug No. 8.

The assembly No. 6 (Pick up) generates and sends the signal to the electrode of control of thyristor No. 4, giving the exact cycle in phase with the engine.

The resistance No. 5 acts as the limiter.

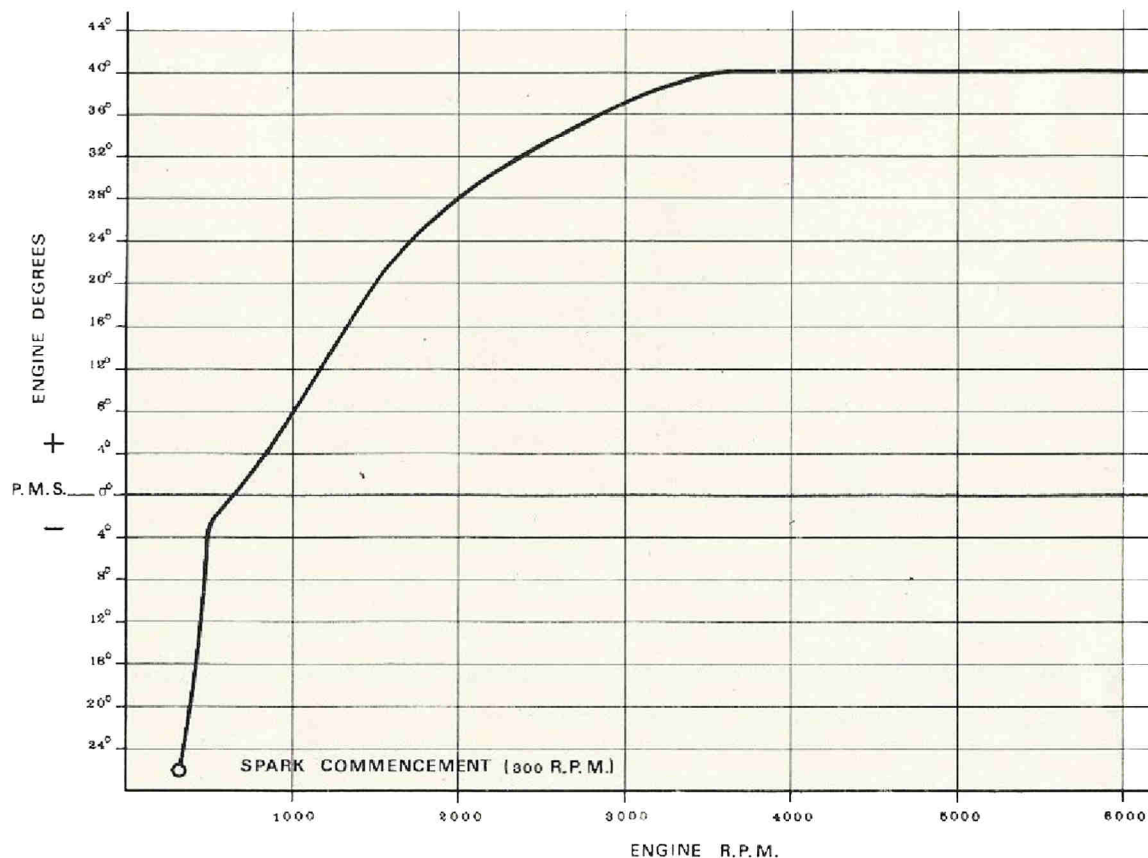
The characteristic of the spark is a succession of waves in temper of high frequency.

ADJUSTING

The lack of distributor to the breaker which is comprised in the conventional equipment makes necessary a method of adjustment completely different.

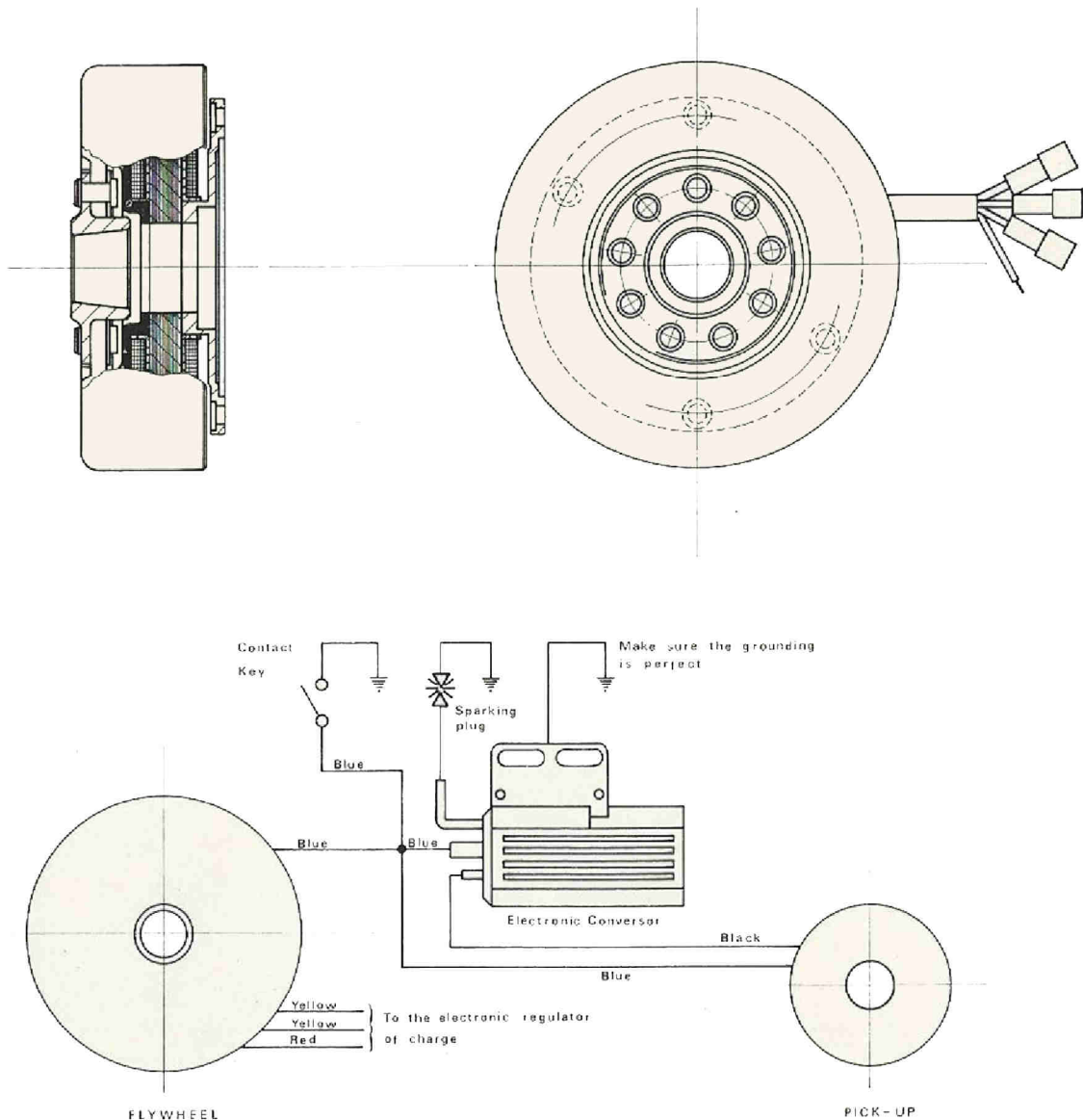
This will be effected by making to coincide the two signals marked in the rotor and stator of the "Pick up" situated in the top of the casing to the right side. The coincidence of both will indicate the instant in which the spark is produced to the maximum advance.

The magnetic "Pick up" has by mission to cause the firings which will be produced instantly the spark is in perfect phase with the necessity of the engine, in every number of the revolutions. It follows that by means of the electro-magnet being the values of the advance of the ignition, which it is indicated in the following graph/chart.



As it has indicated the correspondence of the two signals (rotor - stator) in the "Pick up" it gives us the maximum advance of the ignition. However, it can modify or correct conveniently displacing. Each division it corresponds to 10° of advance from the engine putting however, check exactly in every moment the correct advance.

To continue it shows the diagram of assembly of the Electronic Ignition as fitted to the Motorcycles "DUCATI-MOTO-TRANS".



For the general connections of the installations of the vehicle the diagram is duplicated to each vehicle.

BREAKDOWNS

In case of that during the operation of the Electronic Ignition a breakdown is produced, proceed to trace the fault as follows.

- Check that all the cables are well connected.
- Check that the support of the converter has been well connected with the earth of the frame.
- Check if the spark exits, disconnect the spark plug and place the cable some 5 to 6 mm. from the cylinder head. Rotate the engine with a *strong impulse* using the starting handle (to make this test effective the engine must be rotated to a minimum of 500 r.p.m.). If the spark jumps it is operating correctly and other points must be checked.
- In order to check the converter or the Flywheel Magneto arrange to use a professional oscilloscope. However it is recommended that a practical test, in case of breakdown, can be carried out by replacement, which is to say, change the converter with the same part number, and if this does not eliminate the fault continue by exchanging the complete Flywheel Magneto (rotor & stator).

If a electrical component has deteriorated it is likely that this has been caused by a bad connection, incorrect use or a faulty earth. All the components have been previously controlled by a rigorous inspection, by scientific means, which guarantees the quality reliability of the components.

RECOMMENDATIONS

Whilst the electronic equipment is very superior in all aspects to the conventional system of the breaker, there exists certain standards which must be respected in every circumstance.

- Under no circumstances must the spark plug cable be disconnected to stop the engine. To check the spark follow the procedure as has been mentioned before. (The distance of the cable must not be more than 8 m/m.) It is even better to effect the test when having earthed the spark plug.
- The equipment is immune to water and humidity, however, it must not be subjected to these forms unnecessarily, by tests of this type. It should always be maintained as clean and dry as possible.

— The high tension coil – convertor – must be treated in the same manner as with the conventional types, making sure that there are no weak connections especially the earth to the frame.

IMPORTANT

DO NOT RUN THE ENGINE WITH THE BATTERY DISCONNECTED AND AVOID IT TO CIRCULATE WITHOUT IT. THIS CAN AFFECT SERIOUSLY THE INSTALATION.



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