

CEM + P212

Lumenition PERFORMANCE IGNITION SYSTEM

90201

CEM

Lumenition PERFORMANCE IGNITION SYSTEM

How it works

The Lumenition Performance Ignition system is an electronic ignition conversion, principally for cars originally fitted with distributors using contact breakers.

The Lumenition system contains no wearing parts, requires no adjustment or maintenance during service and once the ignition timing is set it will remain so, permanently. Its constant energy operation gives a guaranteed coil energy at all engine speeds and battery voltages. This will improve engine efficiency giving better starting, running and greater economy.

There are four components that make up the system.

1. The Fitting Kit contains the chopper and necessary adaptors to fit the Lumenition parts into your distributor. The chopper fits onto the distributor shaft and rotates interrupting the infra-red beam of the optical switch. It usually has one blade for each engine cylinder.
2. The Optical Switch has a LED and Photo Transistor which can detect the passing of a chopper blade. When the chopper blade passes through the beam a signal is sent to the power module.
3. The Power Module switches the coil on and off to produce a spark. The spark occurs when the chopper blade cuts the infra-red beam. The engine speed and coil current are measured to calculate the exact dwell angle required to produce the same coil energy, each time the spark is fired. Hence the name 'Constant Energy'. The circuitry also compensates for low battery voltage encountered during starting. If the ignition is on but the engine is not turning, the module will shut down to prevent coil damage.

4. The Lumenition Coil is designed for use with the constant energy power module. It has a low primary resistance so that fast charging times can be achieved, allowing constant energy operation over a wide range of speeds.

Vehicles already fitted with a constant energy system may have an ignition coil suitable for use with the Lumenition Performance Ignition system. It is important to check these coils for similar qualities to the Lumenition coil given the following specification.

N.B. It is highly recommended that at the point of installation an inspection is made of the ignition secondary hardware to ensure the following:

- a) that all ignition leads are of suppressed type providing a typical impedance of 5K Ohm per cylinder.
- b) that the distributor cap is clean and serviceable, i.e. no cracks and bright metal showing on segments.
- c) that the rotor arm is not excessively worn.

In general any parts which appear suspect should be replaced. Non-adherence to these requirements may result in reduced system performance and possibly module failure.

NOTES

90212

SPECIFICATION

The important performance parameters of Lumenition are given below as a guide to its correct use:—

OPTICAL SWITCH

Operating Temperature -40 to +125°C
 Operating Voltage 5 to 10 Volts at 25mA
 Optics Narrow angle (18°)
 Infra Red Gallium Arsenide

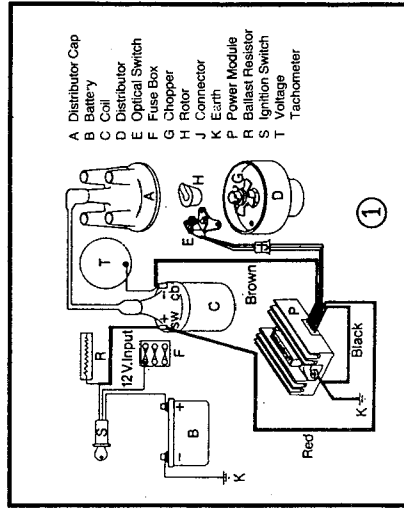
Reverse and over voltage protected
 Light Loss Will operate with 70% loss

POWER MODULE

Operating Temperature -40 to +105°C
 Operating Voltage +6 to +16 Volts
 Over Voltage +24 for 5 mins.
 Load Dump 120 Volts
 Min. Speed (Engine) 30 r.p.m. 4 cyl.
 Max. Speed (Engine) >16000 r.p.m. 4 cyl.
 Output Current 5.5 Amps ± 10%
 Auto Shut-Down 1 Second

COIL

Primary Resistance 0.77 ± 0.5 ohms
 Primary Inductance $3.7 \pm .15$ mH
 Operating Temperature 115°C Max.
 Energy 56 mJ
 Max. Output Voltage 37 kV
 Internal Thermal Fuse 144°C



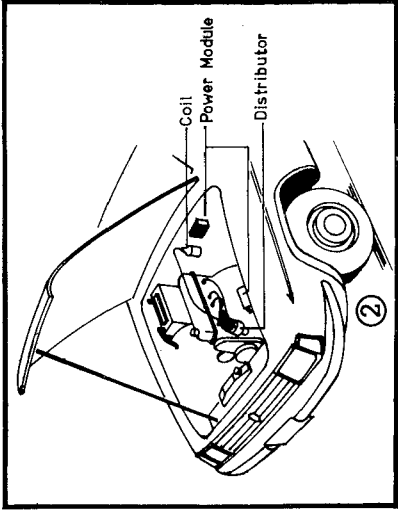
Typical Circuit Diagram

FITTING PROCEDURE

Before carrying out any work disconnect the battery negative terminal.

Select a suitable position for the power module and coil. Normally a flat surface on the wheel arch or bulkhead, away from the battery, aerial and exhaust. See illustration 2.

Care must be taken to ensure that the connections can be made between the coil, power module and distributor without stress on the wires.



1) COIL

If mounted in a suitable position the original coil and bracket may be disconnected and replaced by the Lumenition parts.

Or, drill two holes 4.8mm (3/16") and using the self-tapping screws supplied fix the coil firmly to the bulkhead.

2) POWER MODULE

Drill two holes 3.5mm (9/64") diameter. Fit power module using self-tapping screws supplied locating eyelet of short black wire beneath screwhead. Tighten down securely to ensure a good electrical earth connection.

Note: A good electrical earth connection is essential for system operation.

If the earth is in doubt or where the power module is fitted to a fibre glass body, run a heavy duty earth wire or braid from mounting screw of power module direct to the battery negative terminal or good earth point.

For the CEK 150 the wires should be passed through the rubber boots supplied before mounting onto the coil terminals. The boots should then be seated firmly over the coil terminals.

3) IGNITION FEED

Referring to illustration 1.

The red wire from the coil must be connected to an ignition switched 12V supply. If your system included a ballast resistor the original connection of this resistor to the coil must not be re-made. The ignition feed may be taken from either.

- a) Feed side of ignition terminal (F) of fuse box
- b) Ignition switch side of ballast resistor (R) (NOT COIL SIDE).
- c) Ignition terminal of ignition switch (S). DO NOT connect to auxiliary terminals which switches "off" in start or cranking position.

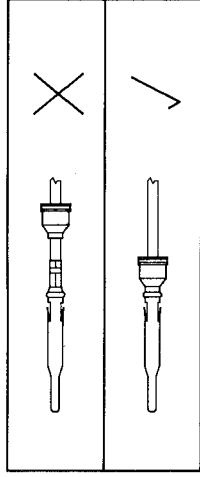
4) OPTICAL SWITCH

In order to fit the optical switch into the distributor the correct Fitting Kit is required. The instructions therein give details for that assembly.

Note: The waterproof connector supplied differs from that of our standard kit and it is recommended that the following procedure is used to assemble the connector at the appropriate time.

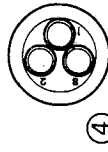
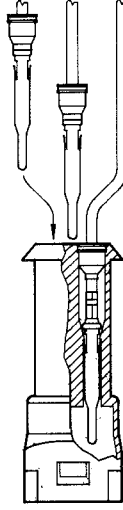
a) Carefully remove the three grommets from the rear of the housing.

b) Push a grommet over each optical switch wire, so that it is located on the crimped part of the pin. See Illustration 3.



③

c) Insert each pin into its hole in the housing. (The numbers are marked on the rear face. See Illustration 4).



PIN ASSIGNMENTS

- 1, RED
- 2, BLACK
- 3, BLUE

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d) The pins must be pulled home (until they click) using a pair of thin nosed pliers. Ensure that the wires will not pull out and that the grommets are seated snugly in the housing.

To dismantle the connector a special tool is required which allows the pins to be extracted from the housing.

5) FINAL ASSEMBLY

Join and lock connectors of power module assembly and optical switch. Neatly trace wires avoiding belts, pulleys, manifolds and hinges. Strap is supplied in the CEK150 to help achieve a tidy installation.

The vehicle is now ready for tuning to manufacturer's specification.

TUNING & PREPARATION

With competition engines follow normal procedures where the ignition timing is set using an engine dyno or rolling road to give maximum performance.

Where this facility is not available follow engine/vehicle manufacturer's tuning specification using either static or dynamic (strobe) timing. It is essential to observe the engine speed at which the timing should be set and whether advance and/or vacuum pipes should be connected or disconnected.

Settings will vary according to the quality or octane rating of the fuel and the lead content.

NOTE: The use of the Lumenition Performance Ignition system does not restrict your choice of suitable spark plugs, gaps or H.T. leads.

STATIC IGNITION TIMING:

For initial engine start after conversion:

Turn engine to align timing marks if this was not set before starting work and make sure the rotor tip is centralised on the position of the pick-up segment in the distributor cap of the firing H.T. lead (usually No. 1). With the engine set in this position turn the distributor body so that the leading edge of the chopper blade is 2/3rds across the lensed units of the optical switch in the direction of rotation. Always finish with the distributor being moved in the direction of rotor rotation to eliminate back lash.

It is now safe to start the engine and to carry out final tuning preparation.

FAULT FINDING

If the newly installed system appears not to work, first recheck all connections then carry out the following tests:—

All tests are carried out with the ignition switched on and the centre H.T. lead removed from the distributor and held approximately 6.5mm (1/4 inch) from an earth point such as the engine, but away from the carburettor region.

1) To test the complete system:

With the distributor cap removed and out of strong sunlight, a piece of opaque material such as card, is passed between the lenses of the optical switch. This should produce a spark from the H.T. lead to earth.

Particular attention should be paid to the quality of the earth connection to the power module. This may be determined by measuring the resistance or voltage between the power module earth connection and the battery negative terminal. A reading of zero in either case indicates a good connection.

2) To test the power module (and coil):

- a) Unplug the 3-way connector leading to the distributor.
- b) Using a small piece of wire, make and break a connection between the blue and black wires leading to the power module, several times. As this procedure is carried out a series of sparks should be produced at the H.T. lead. If no spark is produced, the power module is suspect. If a weak spark is produced, the coil, battery or earth may be suspect.

3) To test the optical switch:

The optical switch must be connected to a good power module. With a sensitive voltmeter measure the voltage between the blue and black leads.

When the infra-red beam is not interrupted the voltage is approximately 7.5V. This drops to 1.0V when the beam is interrupted.

N.B. The voltage on the red lead is approximately 7.5V.

NOTES

CAUTION: H.T. can be dangerous and can jump 25mm (1 inch). Leads should be handled carefully.

SUPPRESSION can be fitted if necessary between coil positive (switch terminal) and earth, usually 1.5 to 2.0 μfd.

THIS LUMENITION UNIT IS APPROVED FOR ROAD AND MARINE USE ONLY AND MUST NOT BE USED IN AIRCRAFT OF ANY KIND