

Lumenition®

49 - 51 Tiverton Street
London SE1 6NZ
Tel: (44) 20 7403 4334
Fax: (44) 20 7368 1270

Section A3

OPTRONIC^â & PERFORMANCE IGNITION SYSTEMS

Technical Bulletins

Technical bulletins on the installation and operation of Optronic contact breaker replacement ignition systems.

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*Please check for updated technical information
at the end of this Section.*

Lumenition Optronic^â and Performance Ignition System

Guidance on Fitting Kit Design

Introduction

Lumenition Ignition system fitting kits have been designed for a considerable number of distributors and are available for over 500 makes and models of vehicle. However, there are a number of less common distributor models for which Lumenition have not created fitting kits.

This guidance sheet has been created for people who wish to make their own fitting kit for distributors not covered by the Lumenition application list. It briefly describes the issues to be considered when creating a fitting kit using the optical switch from the Optronic ignition PMA50 kit or the Performance Ignition CEK150 kit.

Some basic engineering skills and facilities are normally necessary to produce a satisfactory solution.

Please note that Lumenition is part of Autocar Electrical Equipment Co. Ltd and that Autocar cannot provide any assistance in the creation of a fitting kit other than these guidance notes. Please also note that Autocar cannot accept any responsibility for any damage to customer's property or other problems that might arise from the application of these guidance notes.

Main Considerations

The three main areas that need to be considered are as follows:

- The "Chopper" materials and fitment over the distributor shaft
- The provision of an adaptor plate
- The fitment of the optical switch.

The Chopper

The "chopper" is the fan-like blade which fits over the distributor cam and breaks the optical switch's beam of light to fire the coil.

CHOPPER MATERIAL:

Chopper material must be opaque to infra red light, remain rigid to 150 C and be resistant to Ozone, Petrol, Oil, Brake Fluid etc.

CHOPPER BARREL:

The wall thickness of the barrel of the chopper (which fits over the distributor shaft) should be the maximum possible and give a clearance of at least 1 mm from optical switch.

BLADE TO CYLINDER RELATIONSHIP:

This is normally 1 blade per cylinder.

BLADE DIAMETER:

This should be long enough to completely obscure the beam of light from the optical switch
BLADE HEIGHT:

BLADE LOCATION:

Wall thickness above cam shoulder should be maximum achievable without raising rotor arm. Chopper should be positively located, free from Radial or Axial movement and have a minimum clearance of 1 mm between the top and bottom of the blade and the optical switch lenses

Blades should pass perpendicular to, and through middle of, the optical switch lenses.

Note: Where excessive end float on a distributor shaft is evident, position the blade to give appropriate clearance of both top and bottom lenses.

THE RATIO OF BLADE TO GAP

This is generally 2/3rds gap to 1/3rd blade. This is not applicable to 1 or 2 cylinder engines where ratio is decided by coil duty cycle.

ANGULAR ACCURACY BETWEEN BLADES:

Variation should be no greater than 15 minutes (1/4 degree).

PHASING:

This is the position of the rotor arm with respect to the distributor cap pick up segment when coil switches off.

With Lumenition Optronic Systems the coil switches off when the leading edge of the chopper blade travelling in the direction of distributor rotation has obscured 2/3rds of the optical switch lenses. At this point the centre of the rotor tip should be pointing to the centre of a pick up segment on the distributor cap.

Phasing position can be adjusted by changing the radial position of the chopper blade relative to the rotor arm or changing the mounting position of the optical switch if adjustment of chopper blade is not possible. See the section "Adaptor or Mounting Plate" below.

Adaptor or Mounting Plate**PLATE ATTACHMENT**

The mounting plate should be positively located with two screws or one screw and one pin. Screw lengths should not obstruct vacuum advance plate movement or interfere with any other component in the distributor.

PLATE LOCATION

To minimise the possibility of the optical switch metal casing earthing the ignition spark, the plate position should allow the optical switch to be fitted between the H.T. segments on the distributor cap. The optical switch should only be mounted directly below an HT segment when absolutely necessary - in which case the maximum clearance must be obtained by using the thinnest possible mounting plate.

PLATE MATERIALS

Plate material ideally should be electro plated steel, plastic (to a similar specification as the chopper) or aluminium. The material used should be capable of being threaded to allow screw fixing of the optical switch.

To allow a secure optical switch fixing the plate thickness should be the maximum possible and should not be less than 2 complete threads of the optical switch fixing screw. Wherever possible fixing holes should be tapped to a standard thread. On most Lumenition fitting kits the optical switch is secured by a No. 2 British Association (2BA) screw.

To prevent distortion of the plate or the optical switch housing, the screws securing the optical switch to the adaptor plate should not protrude below the base of the plate. Lock washers should be used where possible.

Note: Where specified in instruction leaflets for particular items and applications, the mounting faces of the adaptor plate should be coated with heat sink compound.

Fitting the Optical Switch

Optical Switches should be positioned and mounted as stated in the adaptor plate section above and conform to the following instructions:

1. All wires should be routed clear of any moving or rotating parts.
2. To prevent fouling all wires should be held down by "P" Clips, cable ties or some similar method which will allow for movement of vacuum advance etc.
3. Wires must not be tightly bent back upon themselves or stretched during fitment or during vacuum advance movement in normal operation
4. Where the wires exit the distributor body a suitable grommet should be fitted to prevent the insulation from chafing.
Note: the silicone wire used on optical switches is operational to 270 C but has poor cut-through resistance.
5. The optical switch should not foul anything when stationary or throughout movement of the vacuum advance plate.

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Lumenition Optronic^â and Performance Ignition System**Lumenition Optronic Ignition Installation Hints****Introduction**

This technical bulletin indicates possible problem areas and offers solutions to difficulties which may be encountered when fitting a Lumenition Optronic ignition system to a vehicle

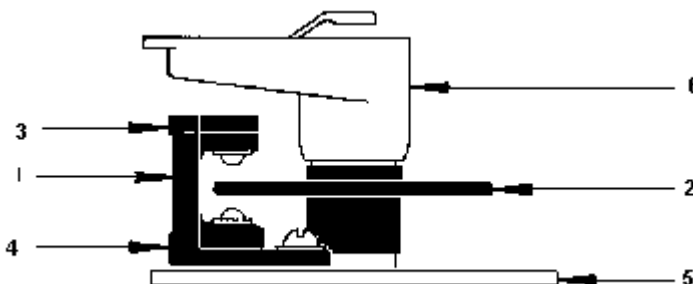
These notes are divided into following sections:-

1. Installation of fitting kit.
2. Installing and wiring Lumenition.
3. Checking for ballast resistor in circuit.
4. Tachometers.
5. Ignition coils.

Fault diagnosis on start-up**INSTALLATION OF FITTING KIT.**

Full instructions are included with each fitting kit. There are however some general rules that should be remembered.

Ensure that the chopper (2) is fully seated onto the distributor shaft and located so that the chopper blades are approximately mid-way between the optical switch lenses (3 & 4).



1	Optical Switch	2	Chopper	3	Photo Transistor
4	Light Emitting Diode	5	Base Plate	6	Rotor

Make sure the optical switch wires are clear of the chopper blades and suitably secured. **ESPECIALLY** when the vacuum advance is fully operated. As the vacuum advance moves the wires slightly in operation, take care to make sure the wires are kept away from chopper blade but do not interfere with movement of the advance mechanism.

Tighten all screws securely and check that nothing has dropped into the speed advance bob-weights under the baseplate.

Replace the rotor and distributor cap ensuring that they are both aligned correctly. (if in doubt refer to owner's handbook).

Check the optical switch is not damaged.

Check that the pins are correctly positioned in the connector as per optical switch fitting instruction and that the pins are properly located.

INSTALLATION AND WIRING OF LUMENITION SYSTEM

The Optronic Ignition system's reliability depends on good electrical connections, especially as they can be subjected to large temperature changes, high relative humidity and high levels of vibration. A high proportion of the Optronic ignitions returned to Lumenition for checking have functioned perfectly under test leading us to believe the most likely cause of ignition problems is poor electrical installation.

This section highlights some of the areas where electrical problems can arise and suggests simple ways of eliminating them before they can cause ignition failure.

These notes covers :-

- PMA 50, PMA 60 (Optronic Ignition system)
- CEK 150, CEA 150 (Performance Ignition System)
- Engine Rev. Limiters

Earth connection (Black wire)

The black wire is the path for all coil current. Care must be taken to make sure this connection provides a sound, low-resistance electrical path to the negative terminal of the battery.

The earth ring-tag can be located under one of the self-tapping screws which secure the power module to the vehicle body. However better earthing may be achieved if the ring-tag is secured with it's own nut and bolt to a bare metal surface.

Where a sound bodywork earth cannot be guaranteed, i.e. with a fibre-glass vehicle, then a separate wire should be fed via a suitable in-line fuse directly to the negative terminal of the battery.

Module power connection (red wire)

It is vital that this supply to the power module is taken from a point on the vehicle that guarantees a continuous supply. Poor choice of this connection can result in intermittent operation which is often difficult to trace (and can lead to users wrongly identifying a failing Optronic system as reverting to points seems to 'cure' the problem).

There are several 12 volt sources available in most vehicles e.g.

- Ignition switch. Check that the position used gives 12 volts when turning the engine over and when the engine is running, but no supply when the ignition switch is off.
- On a non-ballast system the supply can be taken from the positive (+) side of the coil. Check that the vehicle does not have a hidden ballast wire.

Note: *If in doubt check for the full battery voltage with a meter as described in section 3 or seek professional advice. Don't rely on there being a label on the coil stating if a ballast resistor is fitted, it may not be the original coil.*

- The feed side of the fuse box which becomes live with the ignition is switched on. Check that the position used is NOT live when the ignition switch is off.

Note: *Other than for quick testing, never leave a power module connected to a live power feed which is switched on, as this can lead to a flat battery.*

Coil negative connection (Violet Wire, Brown on older units)

The brown wire must **only** be connected to the negative terminal of the coil. **It must not** touch any point which will connect it to a 12 volts positive feed from the battery.

WARNING: Connecting the violet (or brown) wire or the negative terminal of the coil to a positive 12 volt feed will instantly destroy the power module!

This will invalidate any warranty claims.

Checking For a Ballast Resistor

Note: This test involves the use of a voltmeter suitable for reading voltages from 0-15 volts.

Step 1: Disconnect the lead or leads connected to the negative (-ve) or earth terminal of the coil.

Step 2: Connect the voltmeter between the positive (+ve) or B terminal and a negative or earth point on vehicle.

Step 3: Switch on the ignition.

- The voltmeter should read battery voltage..

Step 4: With a suitable length of wire, connect the Coil Negative (-ve) to an earth point.

- If the voltage on the voltmeter remains at battery voltage there is no ballast resistor present in circuit.
- If the ballast resistor is present in the circuit, the voltage will drop to approximately 6-7 volts.

Step 5: Immediately switch off ignition.

Note: Never leave the earthing lead connected to the coil for more than is required for the test, as continued connection will result in an overheated, damaged coil and a drained battery.

TACHOMETERS

There are three main types of tachometer which are as follows:

Voltage Sensing tachometers

Most modern tachometers are of this type. These connect directly to the contact breakers or to the negative terminal of the ignition coil. When installing an Optronic system the tachometer should only be connected to the negative terminal of the ignition coil. No further wiring adjustment should be necessary.

Note: On some vehicles, dual contact breakers are sometimes replaced by a single Optronic optical switch. In this case the tachometer may need to be recalibrated.

Current or 'in-line' tachometers

These tend to be used on older or classic cars and are seldom used elsewhere. Difficulties can be experienced when installing electronic ignition with in line tachometers.

Two options are available to make the tachometer function correctly:-

a: Change to a conventional voltage type tachometer.

b: Convert your existing tachometer to the voltage type. Various companies specialise in this, one such company is:-

Speedy Cables Ltd.
Abercrave,
Swansea
SA9 1SQ
Telephone: +44 (0) 1639 732213
Fax: +44 (0) 1639 732238

Race tachometers

There are a number of race types that are compatible with Optronic systems. The following have been assessed as being completely compatible (models may vary)

Stack.
Raceparts.

IGNITION COILS

There are three major types of ignition coil - Conventional un-ballasted, conventional ballasted and constant energy. Lumenition have ignition system compatible with all three coils types however the correct coil must be used on each system. Failure to select the correct coil may lead to poor performance or even premature failure of the power module.

Lumenition technical bulletin No.3 describes in detail each type of coil but the following can be used as a general rule.

Conventional un-ballasted coils.

These are for use in ignition system that do not have a ballast resistor. The coils usually have a resistance in the range of 2.5 to 3 ohms. These coils are suitable for use with PMA 50, PMA 60 and PMAZ.

Note: *for these systems the coil MUST NOT have a resistance less than 2.5 ohms. Coils with lower resistance will induce premature failure of the Optronic power module*

Conventional ballasted coils

These have a resistance in the range of 1.2 - 1.5 ohms and MUST be used with a 1.5 ohm ballast resistor. They are suitable for use with PMA 50 PMA 60 and PMAZ.

Consent energy coils

These are often referred to as 'electronic' coils i.e.a coil for use with an electronic ignition system. They have a resistance of about 0.7 ohms. The low resistance gives a very fast recharge time and is therefore excellent for performance and high speed running. These coils are compatible with Lumenition Performance Ignition system CEK 150, CEK160, CEA150 and CEA160 products.

NOTE, *Low resistance electronic coils are totally unsuitable for use with Lumenition PMA50, PMA 60 and PMAZ. Use of a low resistance coil on these systems will cause the power module or the coil to fail – or both!*

FAULT DIAGNOSIS ON START-UP

FAULT:	Ignition system does not appear to function
REMEDY:	Check 12 volt positive supply to power module input (red wire) If the 12v supply has been taken from the positive terminal, (+) of the coil, check that the harness does not contain a hidden ballast resistor. (see sect 3). Check that the power has not been taken from a supply that switches off in cranking mode. Check power module and optical switch as detailed in installation instructions. Check earth connection (black wire) if in doubt run an additional wire back to battery negative terminal. (at least 15 amp rating).
FAULT:	Ignition appears to operate but engine will not start.
REMEDY	Check ignition timing conforms to manufacturers specification. The coil should produce a spark when leading edge of the chopper blade is 2/3 the way across the optical switch.</TD< tr>
FAULT:	Bad starting.
REMEDY:	Check as for non-starting plus also:- Check plug gaps and condition of plugs.

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Lumenition Optronic^â and Performance Ignition System

Use of Lumenition Optronic Ignition on Positive Earth Vehicles

Introduction

Lumenition Optronic PMA50 and PMA60 assemblies manufactured after 1991 permit the system to be used on vehicles with positive earth wiring configuration.

This instruction applies to vehicles fitted with 12v coils and without an electronic tachometer.

Note:

This instruction does NOT apply to Lumenition CEK150 Performance Ignition units where positive earth working is not recommended.

Positive Earth Vehicle Wiring.

Where vehicles have a ballast resistor fitted for "cold start" operation the facility can only be retained if a separate relay is fitted. Should you wish to retain a cold start option Lumenition cannot supply any wiring diagrams or additional components that may be required. In practice the improved efficiency of the Lumenition Optronic system usually makes cold start facilities unnecessary

Installation Procedure

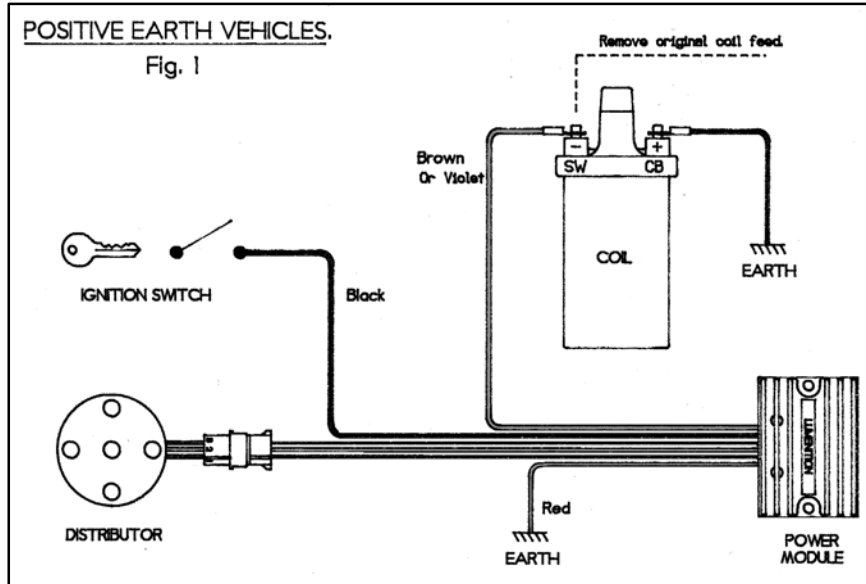
The electrical connections to the ignition system need to be provided in accordance with Figure 1.

- 1) Remove the original ignition switch feed from the coil SW or negative terminal.
- 2) The Black wire from the Lumenition module should not be fitted under the mounting screw but instead is connected to the ignition switched feed. Usually the wire removed from the coil in 1).
- 3) The Red wire from the Lumenition module can be connected to the chassis or vehicle positive earth.
- 4) The Violet wire (newer units) or Brown wire (older units) from the Lumenition module should be connected to the coil SW or Negative terminal.
- 5) The CB or Positive terminal of the coil must be connected to the chassis or vehicle positive earth using an extra wire or by re-terminating the original contact breaker wire. If a ballast resistor is present it should be wired between this terminal and vehicle Earth.

NOTE

The total resistance between the SW (negative) terminal of the coil and the Earth of the vehicle, including ballast resistor if fitted, should be between 3.0 and 3.5 ohms for effective operation of the Optronic Ignition. A resistance higher than this will give a weaker spark. A resistance lower than this may lead to longer term damage to the Optronic Ignition.

- 6) The Optical switch three-pin connector is fitted as usual to the module with no changes.
- 7) The alloy body of the Lumenition module is electrically isolated from the internal circuitry and so can be mounted directly to the vehicle chassis as usual.



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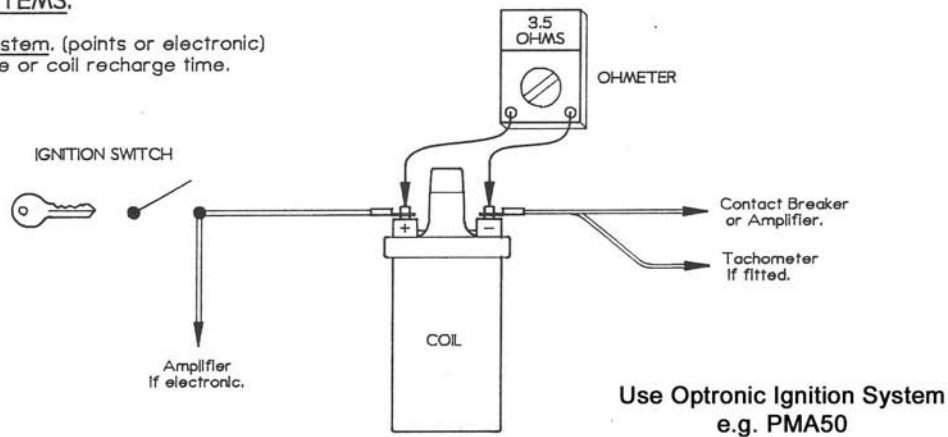
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Lumenition Optronic^â and Performance Ignition System

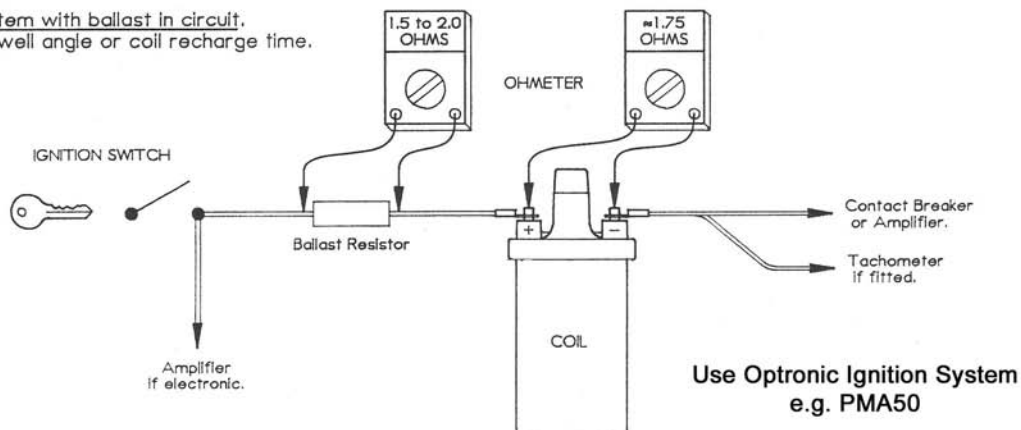
IDENTIFICATION OF LUMENITION IGNITION SYSTEM TYPE BY INSTALLATION AN COIL PRIMARY RESISTANCE

INDUCTIVE SYSTEMS.

1. Standard 12v system. (points or electronic)
Fixed dwell angle or coil recharge time.

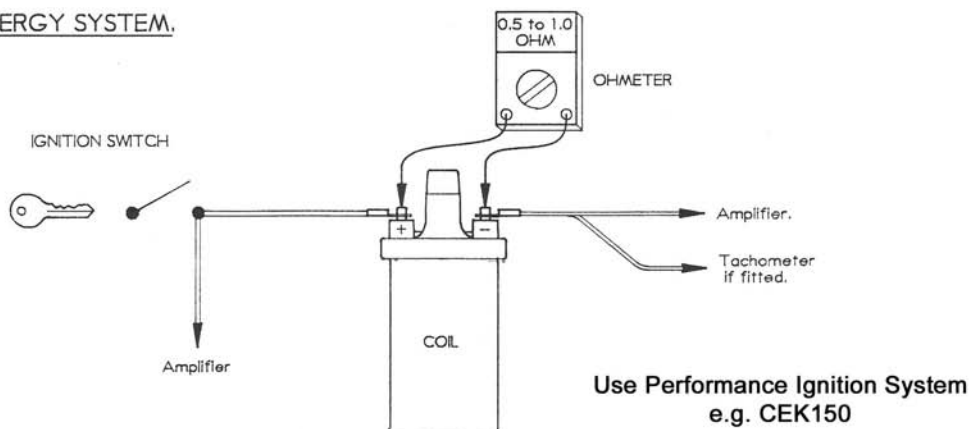


2. 12v system with ballast in circuit.
Fixed dwell angle or coil recharge time.



CONSTANT ENERGY SYSTEM.

Variable dwell.



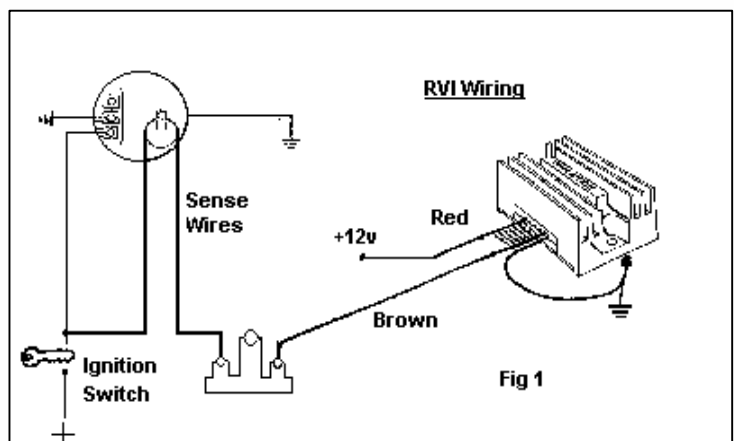
Lumenition Optronic^â and Performance Ignition System

Smiths Tachometers and Lumenition Ignition Systems

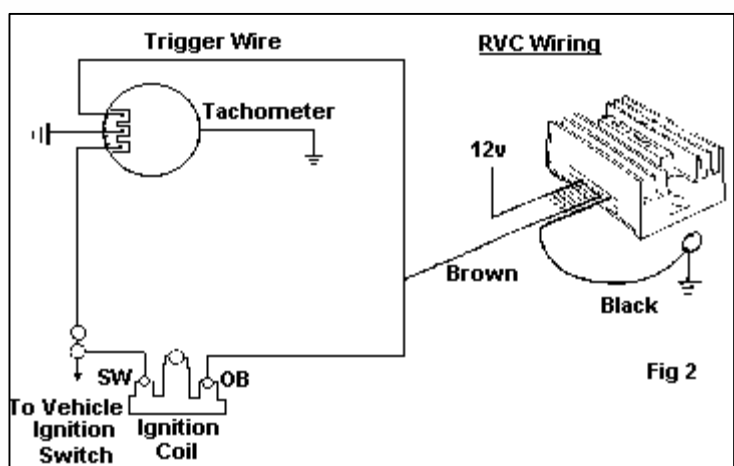
Introduction

Most British vehicles that were fitted with a tachometer as standard were fitted with a Smiths Instruments device. These units come in three general types depending upon their triggering method. The first is mechanical and usually driven from the distributor shaft and has no electrical interface. Common in sports cars of the 50's and 60's.

Before 1974 (approx.) the electronic tachometer were current impulse triggered. This means the tachometer sense wire is connected in series with the ignition coil, usually between the ignition switch and coil/ballast positive as in Fig 1. Sometimes the power for the tachometer was shared internally with the ignition switch end of the sense wire giving only three terminals. Smiths unit of this type can be identified by the letters RVI on the face of the tachometer. Designed in the days of contact breakers, they give inconsistent results when used with electronic ignitions. Many installations will work but some will produce erratic or no movement of the indicating needle. Some suggestions for rewiring the ignition circuit to eliminate the problem have been tried with limited success.



Later electronic tachometers are voltage pulse triggered and the single sense wire is connected directly to coil negative as in Fig 2. Smith unit have the designation RVC printed on the face. As far Lumenition are aware there are no problems using this type of tachometer with our Optronic ignition.



It is important that owners can tell the difference between the two types of tachometer as incorrect wiring of the unit can cause damage to the electronic ignition module. If used the tachometer sensing wire(s) must be connected as appropriate for that particular design of tachometer.

Solution

NOTE: All of the following refers to negative earth vehicles.

As mentioned above some owners have tried alternative wiring for the sense wires with RVI tachometers with limited success. Lumenition's recommended solution is either to:

- Replace the RVI tachometer with a later RVC model if available or aftermarket equivalent or
- Convert the existing RVI tachometer to new internal electronics.

In both cases a minor wiring change must be made to the vehicles normal ignition circuit.

A number of companies can carry out the internal conversion of the tachometer. A company Lumenition can recommend is:

SPEEDY Cables, Instrument Division
Abercrave
Swansea
SA9 1SQ
UNITED KINGDOM

Phone +44 (0) 1639 732213
Fax +44 (0) 1639 732238

Optronic Ignition Systems

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Tests and Checks for Optronic and Performance Ignition systems

Introduction

Every year a significant number of Optronic systems are returned to Autocar as faulty which pass perfectly all Autocar's tests and are then returned to the customer.

Consequently Autocar recommend the following checks are carried out on the installation before presuming an Optronic system to be faulty.

Identification of Ignition type

There are two main types of Lumenition Optical switching systems - the **Optronic** and **Performance Ignition** system. The easiest way to identify which system you have is the power module colour.

- If the power module is unpainted alloy it's an **Optronic** system.
- If it has a black painted alloy case it's a **Performance Ignition** system which operates in a different way to the Optronic and needs slightly different testing.

Identification of Optronic Power Module type

(i.e. is it the current Mk17 model or the earlier Mk16)

PLEASE NOTE:

The **Optronic** system has been manufactured for well over 30 years. However replacement parts are available only for the current Mk17 design, first manufactured in 1983. It says a lot about the quality of the **Optronic** system that Autocar commonly receives requests to replace Mk16 power modules that are at least 20 years old !!!

Optronic power modules have a plastic insert which holds the wires coming out of the alloy module casing.

- If this insert is White plastic, it is a Mk17 module and replacements are available.
- If the insert is Red or Black plastic it is a Mk16 or earlier power module and replacements are **NOT** available.

Please also be aware that the Mk16 optical switch cannot be used with a Mk17 power module, so if a Mk16 optical switch or power module fails a complete new **Optronic** system will have to be purchased.

This issue does not apply to the black coloured **Performance Ignition system** power modules or optical switches for which spare parts are available for all models.

General Installation Check for all systems

The quality of the vehicle Earth connection of the power module Black wire is very important. Check you have a good, low resistance connection to the negative terminal of the battery – test with a temporary direct connection from the Black wire to the negative terminal of the battery if necessary. It may help future earthing if the black wire is connected to vehicle earth with a separate nut, bolt and locking washer.

It is also a good idea to check the battery-to-chassis and chassis-to-engine earthing straps are sound and in good condition.

The power feed from the Ignition switch to the Red wire of the Power module should be checked in a similar manner.

If the unit is an **Optronic system** check that the three pin socket on the power module is making a good connection to the pins on the optical switch. Uncouple the connector and if necessary close up slightly the sockets on the power module connector with a sharp instrument to make sure the pins are gripped tightly.

Make sure your ignition leads are fully suppressed, are in good order and that the rotor arm and distributor cap are clean and working effectively.

Power Module Check - General

If all of the above check OK and the symptoms persist, check the power module can spark the coil (the power modules usually either work every time or it doesn't work at all, so an intermittent problem is unlikely to be caused by a power module fault).

The easiest method of checking power modules is as follows:

Unplug the king lead from the distributor cap and hold it close to the engine block so it can spark to earth. Unplug the optical switch from the power module and turn on the ignition. In the connector attached to the power module join together the blue and the black wires with a piece of wire several times in quick succession. The coil should fire a spark each time the wires are joined (for the Performance power module it will fire each time the wires are joined after the first time).

If there is no spark check the power and earth connections and re-test. If there is still no spark it is possible that the coil has failed. Substitute a known working coil and retest (make sure the coil has a resistance of about 3 ohms across the primary terminals including the ballast resistor if one is fitted).

If there is still no spark it is likely the power module has failed and needs to be replaced. Power modules cannot be repaired and a part number PMAZ should be ordered from your dealer.

Power Module Check – Performance Ignition system

The Black coated power module for the **Performance Ignition System** – the constant energy module or CEM - works differently from the **Optronic** Power module. Unlike the Optronic power module the CEM is affected by electromagnetic interference (EMI) and **MUST** be used with fully suppressed ignition leads. Copper leads or leads using just suppressed caps are NOT suitable for this system.

Excessive EMI within the engine bay (and ignition leads are not the only potential source) will cause the CEM to miss-operate. The symptoms of this might include poor running through miss-timed ignition events, coil overload through increased dwell angle or premature failure of the CEM.

Optical switch issues and testing

If spark is irregular on first fitting either for normal running or under acceleration it might be that the optical switch and chopper are not in phase with the rotor and/or the distributor cap. There can be several reasons for this:

1. The optical switch has been installed in the wrong position.

- Re-check the fitting instructions and make sure they have been followed correctly. On fitting kits which contain a full replacement baseplate or advance plate, make sure that has also been installed in accordance with the instructions.

2. The wrong fitting kit has been installed for the fitted distributor.

- Check the distributor model actually fitted to your vehicle is the distributor identified in the Optronic vehicle application list
- Check the fitting kit used to install the optical switch is the one identified for the fitted distributor in the Optronic application list.

3. The wrong distributor cap or rotor arm has been fitted and is out of phase with the rotor position when the spark is generated.

- Some models of distributor can be used with either clockwise or anti-clockwise rotation, depending on the vehicle on which they are fitted. Different distributor caps are required for each direction of rotation and whilst the wrong cap will appear to fit the distributor, the position of the plug turrets will be different and out of phase with the rotor arm. It is important you check you have the correct cap for the distributor model as fitted on your vehicle. If unsure you can check the phasing by using the phase check method detailed in paragraph 4 below.
- Rotor arm phasing can vary in a similar way and you must make sure the correct model of rotor arm has been fitted.

4. The distributor has a vernier adjustment on the vacuum advance plate and static timing has been carried out with the vernier fully adjusted to one end of the scale.

- Using a vernier adjuster on a vacuum advance plate changes the phasing between the optical switch and the rotor arm. If the Vernier screw is fully adjusted before static timing takes place, at speed or on acceleration the rotor arm may be too far away from the distributor cap plug turret for the spark to jump to the plug lead when the coil fires. Under this condition the spark may jump straight to vehicle earth causing a miss-fire.
- **Phase Check Method**
To check the rotor arm phasing, set up the Optronic for static timing as described in the installation leaflet. Mark the mid-point of the rotor arm on the outside of the distributor body. Replace the cap and check that the mark is directly opposite a plug lead turret on the distributor cap.
- If it is not, turn the Vernier screw to the middle of its adjustment, repeat static timing by loosening off the distributor retaining bolt and rotating the body of the distributor. re-check the rotor arm phasing.

5. The distributor has been assembled with parts from other distributor models which has altered the phasing between the rotor and the distributor cap.

- This may include the rotor arm, distributor cap or distributor cam shaft. A way to check this is by substituting a distributor with the same model from another vehicle.

6. The Optical Switch is not working effectively.

- This is covered below under optical switch testing.

Optical Switch Testing

NOTE: The following guidance presumes all the above checks have been performed first !

If the Power module is sparking the coil as identified under "Power Module Check" above, reconnect the optical switch, rotate the distributor until the optical switch beam is not obscured by the chopper blade and with the ignition switched on break the beam rapidly several times with a good size piece of card or other opaque material. If the coil doesn't spark at all it is likely the optical switch has failed and the unit will need to be replaced.

Intermittent Spark problems

Intermittent ignition failure is not likely to be due to a failing power module (they tend to either work perfectly or never work again) but it **can** be due to a failing optical switch **but please be aware this is not a common problem !**

1. Intermittent operation can be due to a **failing ignition coil** where the heating and cooling of the coil in normal use can induce intermittent operation. If possible substitute another known working coil (if only for testing) and see if the problem clears.
2. Intermittent operation can also be due to **intermittent connections in earth or power wiring** (including a failing ignition switch), earthing arrangements or in the optical switch to power module connector. Please see "General Installation Check for all systems" above for the tests and checks to be performed to eliminate these issues.
3. There is a *possibility* that the optical switch is failing. If so, there is likely to be a very definite pattern to the intermittency which will be as follows:

The ignition system works perfectly when the engine is cold but misfires or stalls as the optical switch is heated by the rising engine temperature. If the engine is stopped and left to cool for a few minutes (also cooling the optical switch) the engine will start and run perfectly but fail again a few minutes later when the optical switch heats up - and so on.

No repairs can be made to Optical Switches and replacement will be necessary. If the optical switch is currently connected to a Mk16 power module (or an earlier version, see above for identification) a replacement optical switch is not available and a complete replacement Optronic system will be required.

In Conclusion

If after all the above checks have been done you have not cured or satisfactorily identified a problem the complete system can be returned to Autocar for testing.

If the unit is within warranty return the components to the shop where you bought them. The dealer will then deal with us directly to determine any fault and the resolution.

If the unit is out of warranty you may return the units directly to Autocar Electrical Equipment Co. Ltd. There is a service charge for testing and return of the unit to an address in the UK. Return of the unit overseas or to outlying parts of the UK will be charged at a higher rate depending on carriage costs.

Optronic Ignition Systems

A BRITISH INVENTION

Manufactured by

LUMENITION

A Division of Autocar Equipment Ltd.

49-51 Tiverton St. London SE1 6NZ England

Parent Nos. 1219833. 1252324. 1252559. 1279385. 1330453

1410782. 1417857. 1420814, 1437770.

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