

# SOLID STATE IGNITION MANAGEMENT SYSTEM

For Turbocharged, Supercharged, High-Compression and Multi-Fuel use.

- Designed for use with retro-fit turbocharger installations and boost upgrades on production turbo engines.
- Provides the corrections to the original ignition timing that are required for many types of performance upgrade.
- The EMS5 systems work in addition to the engine's original ignition timing system which is left as standard for ease of maintenance and maximum off-boost flexibility and fuel economy.
- One standard kit suits all inductive ignition types, both contact breaker and contactless electronic ignition.
- May also be used in non-turbo applications to avoid detonation on full load.
- Simply wires to the vehicles ignition coil without the need to interfere with the original engine management.

## **FEATURES -**

- **HIGH ENERGY IGNITION**  
Enhanced FCD Ignition for improved combustion under boost conditions.
- **OVER-REV LIMITER**  
To protect engine from damage caused through over-revving.
- **BOOST RETARD**  
To provide optimum on-boost timing whilst retaining the maximum original off-boost performance.
- **TIMING RE-ADVANCE**  
To give a programmed retard reduction for higher power at rpm's above the engines peak torque.

## **EMS OPERATION -**

The EMS5 receives input signals representing engine speed from the distributor (or ignition unit) and boost pressure from a manifold pressure sensor; it calculates the correct amount of ignition retard for the engine's load requirements and produces the high-energy drive signals to fire the ignition coil.

## **IMPORTANT NOTE -**

EMS5 units are suitable for use with all inductive ignition systems (either electronic or contact breaker) with all coil types having a 4 to 5 amp running current. IF IN DOUBT ABOUT THE ORIGINAL COIL ALWAYS FIT A NEW MICRODYNAMICS MS2 COIL AND BR1 BALLAST. Operation from C.D. or Multi Spark Ignition is not possible - contact MicroDynamics for more information on combined CD/Retard systems.

## **INSTALLATION -**

Mount the unit as close to the vehicle's ignition coil as is practicable and keep the white and blue wires as short as possible. Do not mount directly onto the engine or close to sources of extreme heat such as exhaust manifolds or turbos. Always use a separate screw for the blue (earth) wire - DO NOT attach this wire to the unit mounting screws.

## **CONNECTIONS -**

1. **CHASSIS (earth) - Blue wire.**  
A good earth connection is essential for correct operation. Do not use one of the box mounting screws but make a direct connection to the body with the extra screw provided.
2. **POWER SUPPLY FEED - Brown wire.**  
Use the brown lead to connect to the ignition coil supply feed. (DO NOT connect direct to the coil positive (+) or (15) terminal unless you are sure that a "contact breaker" type non-ballasted coil is being used). If in doubt connect direct to the ignition switch.
3. **IGNITION COIL DRIVE - White wire.**  
Connect this wire to the ignition coil negative (-), CB or 1 terminal. Any original wires for Tachometers, Fuel Injection or Pump Relays should be left on this terminal. THE ORIGINAL WIRE FROM THE DISTRIBUTOR (contact breakers) SHOULD BE REMOVED.
4. **TRIGGER INPUT - Black wire.**  
Connect to the contact breaker terminal on the distributor AFTER REMOVING THE ORIGINAL COIL WIRE.
5. **OVER-BOOST Sense - Mauve wire. NOT USED ON CURRENT PRODUCTION UNITS.**
6. **BOOST SENSE - Orange Wire.**  
Connect to the pressure sensor. Ignition timing retards when orange wire is connected to earth.

## **EMS5 - ADDITIONAL APPLICATION INFORMATION**

### **Throttle Actuation**

An optional Throttle Switch with normally open contacts may be connected in series with the Pressure Sensor (orange wire) to enable the system to only operate at throttle openings beyond a certain limit (typically 60% to 80% of full open). The retard angle is then controlled by:- Boost Pressure, Engine R.P.M. and Throttle Opening.

### **Alternative Applications**

EMS units can also be manually switched for such applications as automatic timing control for DUAL FUEL ENGINES. The normal timing should be set-up for gas operation and the EMS wired such that it operates when the engine is running on petrol.

In these applications the orange wire is earthed to activate the retard. This can usually be done with a spare contact on the fuel change-over relay.

## **EMS5 ELECTRONIC IGNITION**

The MicroDynamics Ignition System built into the EMS5 has three unique features:

1. Leading Edge Triggering which means that only the first opening action of the points is used to initiate a complete firing cycle, guaranteeing pin-point timing accuracy under all conditions.
2. Contact Bounce Suppression to eliminate the effects of all bounce-induced contact breaker openings, thus controlling timing scatter and other unwanted high-rpm effects.
3. Feedback Controlled Dwell (FCD), the patented MicroDynamics system which ensures full spark energy with faster rise time and longer duration at all engine speeds.

Any type of standard or sports coil with up to 6-7 amps static current (4-5 running) can be used, if required - but, for best performance, use a MicroDynamics MS2 coil, which is ideally matched to this type of ignition. All models are fully encapsulated in rugged diecast cases for all-weather protection and are fitted with replaceable wiring harnesses.

## **TRIGGERING EMS5**

The EMS5 has a universal trigger interface capable of being triggered directly from any type of existing ignition or trigger pick-up.

**Contact Breaker Triggering** is suitable for most 4 cylinder engines operating up to about 7500 RPM and in some cases higher. For 6 and 8 cylinder engines the maximum is usually slightly lower. In addition, these units take the coil load away from the points by using a low triggering current at low voltage to relieve contact breaker burn.

**Contactless Triggering** direct from reluctor or hall effect (or opto) pick-up is possible using a suitable interface module. IFR01 - Reluctor, IFH01 - Hall-Effect.

**Triggering from existing electronic ignition** is possible by reconnecting the original ignition drive wire (from the coil neg terminal) and connecting it to the EMS5 Black wire, the EMS5 white wire is then connected to the coil neg in place of the original (see diagram).

**Triggering from existing engine management** is accomplished by the same method as above.

## **ADJUSTING EMS5**

All adjustments on current models are located under the removable lid. All adjusters rotate clockwise to increase with a range of 10 turns (no end stops).

**Over-Rev Limiter** set to the maximum rpm required by turning clockwise to raise. All rev limiters are factory set to 6000 rpm (4 cyl) prior to despatch - unless otherwise specified).

**Boost Retard Gradient** set to required retard angle by turning clockwise to increase. Retard is factory set to 2 degrees/1000 rpm (prior to despatch - unless otherwise specified). Retard angle at any rpm can be checked with a timing light by earthing the orange wire to cause the EMS5 to retard. When the retard is operating the retard led will light.

**Re-Advance RPM** set to required rpm by turning clockwise to increase. Re-advance rpm is factory set to 4500 rpm/4cyl (prior to despatch - unless otherwise specified). When the re-advance is operating the re-advance led will light.

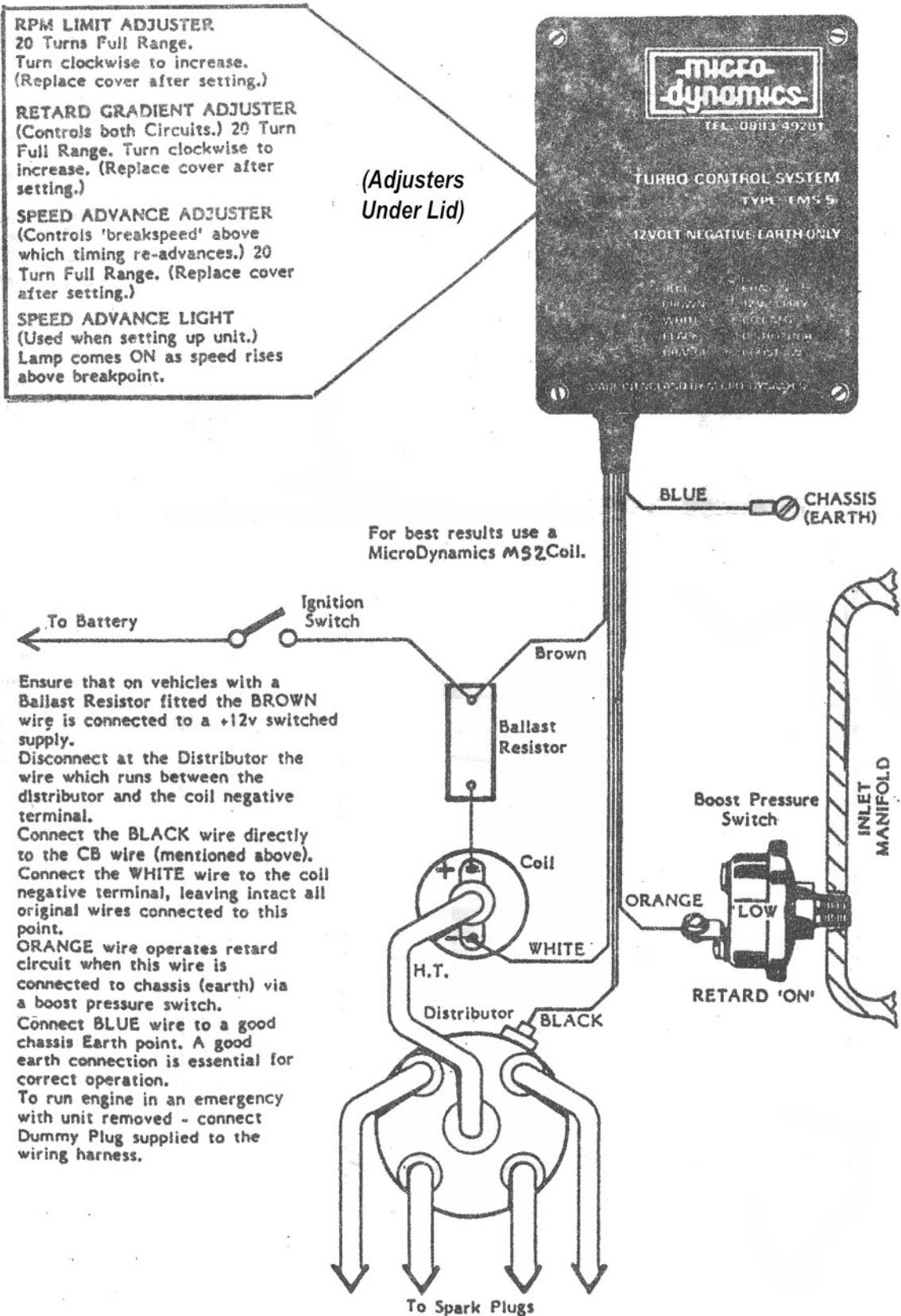
**Re-Advance Angle** set to required retard reduction % by turning clockwise to increase. Re-advance angle is factory set to 60% (prior to despatch - unless otherwise specified). When re-advance rpm is reached retard gradient is reduced by required %. Retard angle at any rpm can be checked with a timing light by earthing the orange wire to cause the EMS5 to retard.

**WARNING - READ INSTRUCTIONS CAREFULLY - EMS units are fully encapsulated for reliability and protection from moisture and vibration. This renders units unrepairable if damaged. Wrong connection will result in permanent harm to the circuitry. We cannot accept responsibility for damage so caused.**

# EMS5 Mk3 Contact Breaker Installation

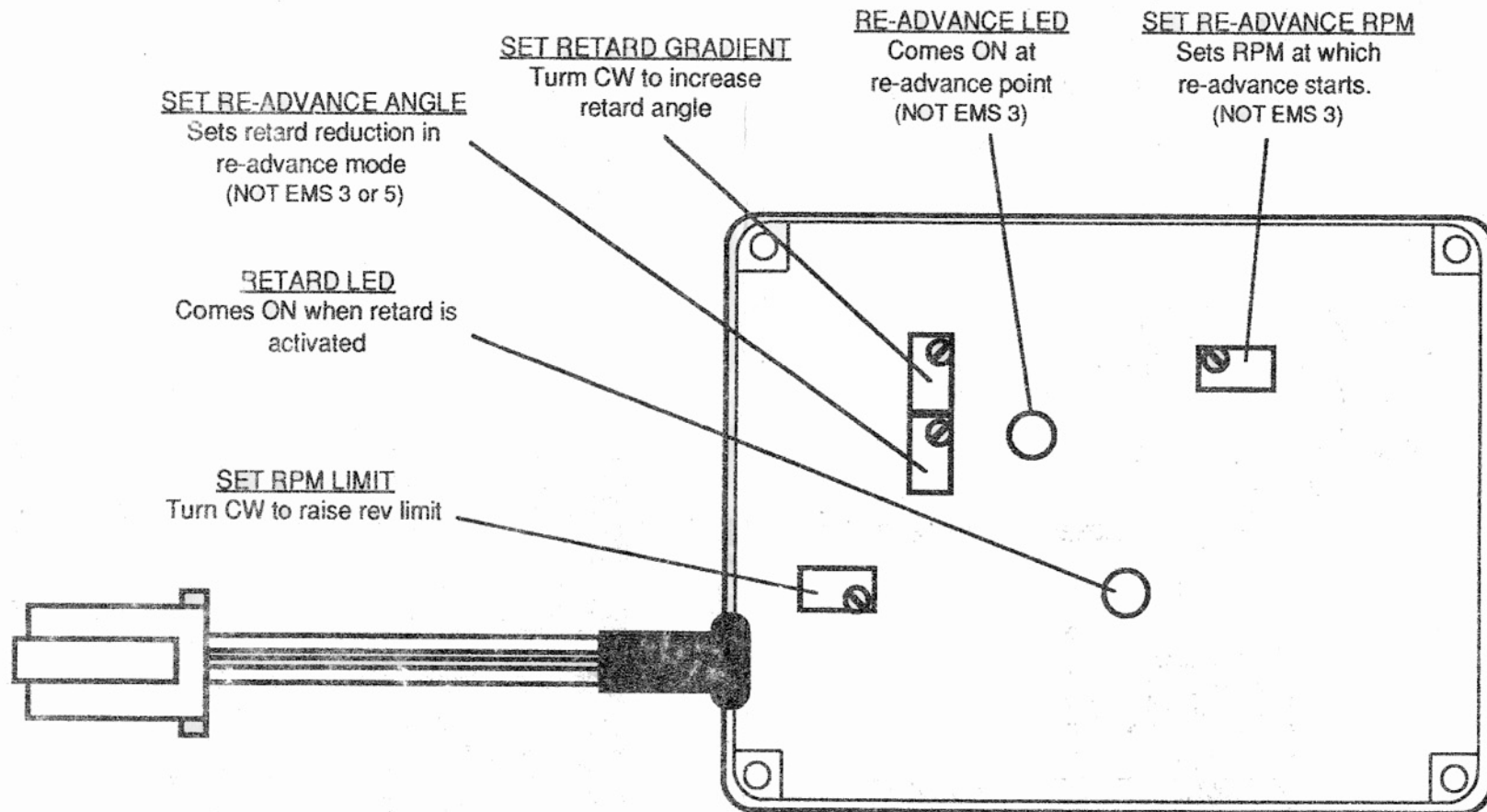
INSTALLATION INFORMATION FOR FITTING MICRODYNAMICS EMS 5. NEGATIVE EARTH ONLY.

A similar installation procedure also applies to EMS 3.



ALL UNITS SUPPLIED WITH FITTING KIT AND INSTALLATION INSTRUCTION LEAFLET.

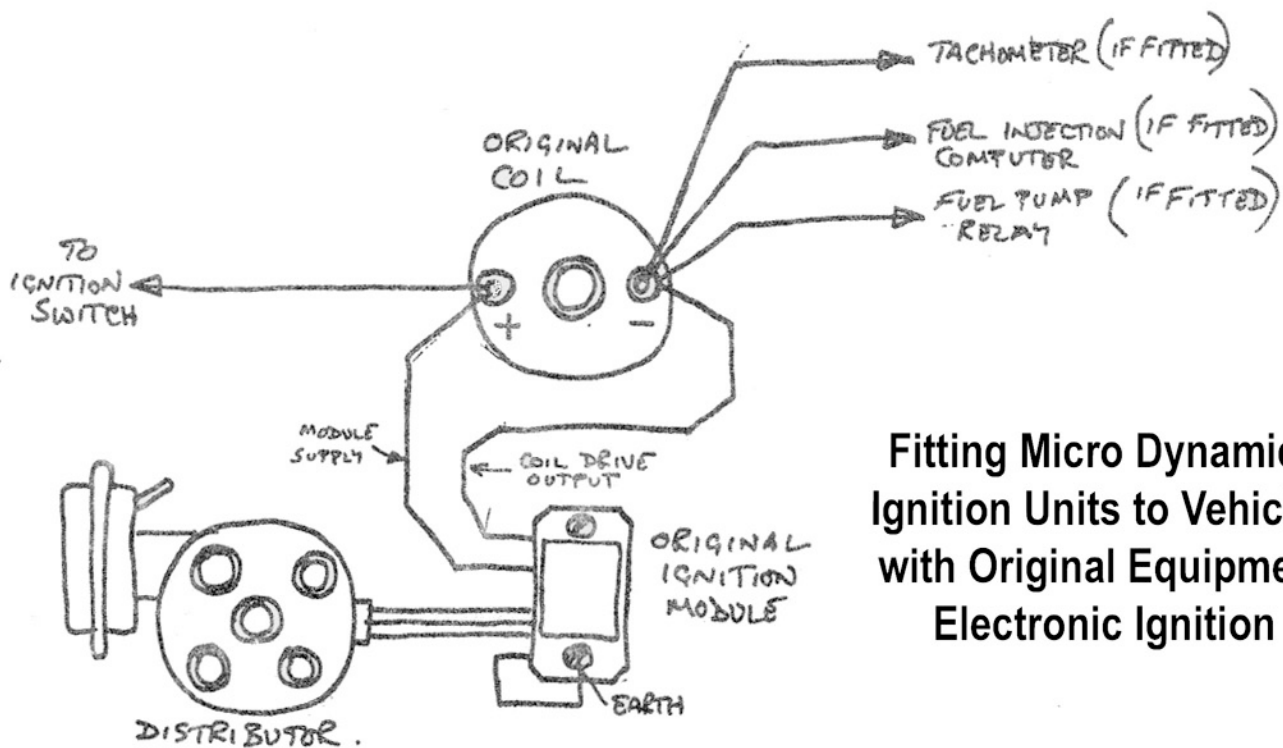
# EMS 3 & 5 MkIII (and variants) Controls Layout



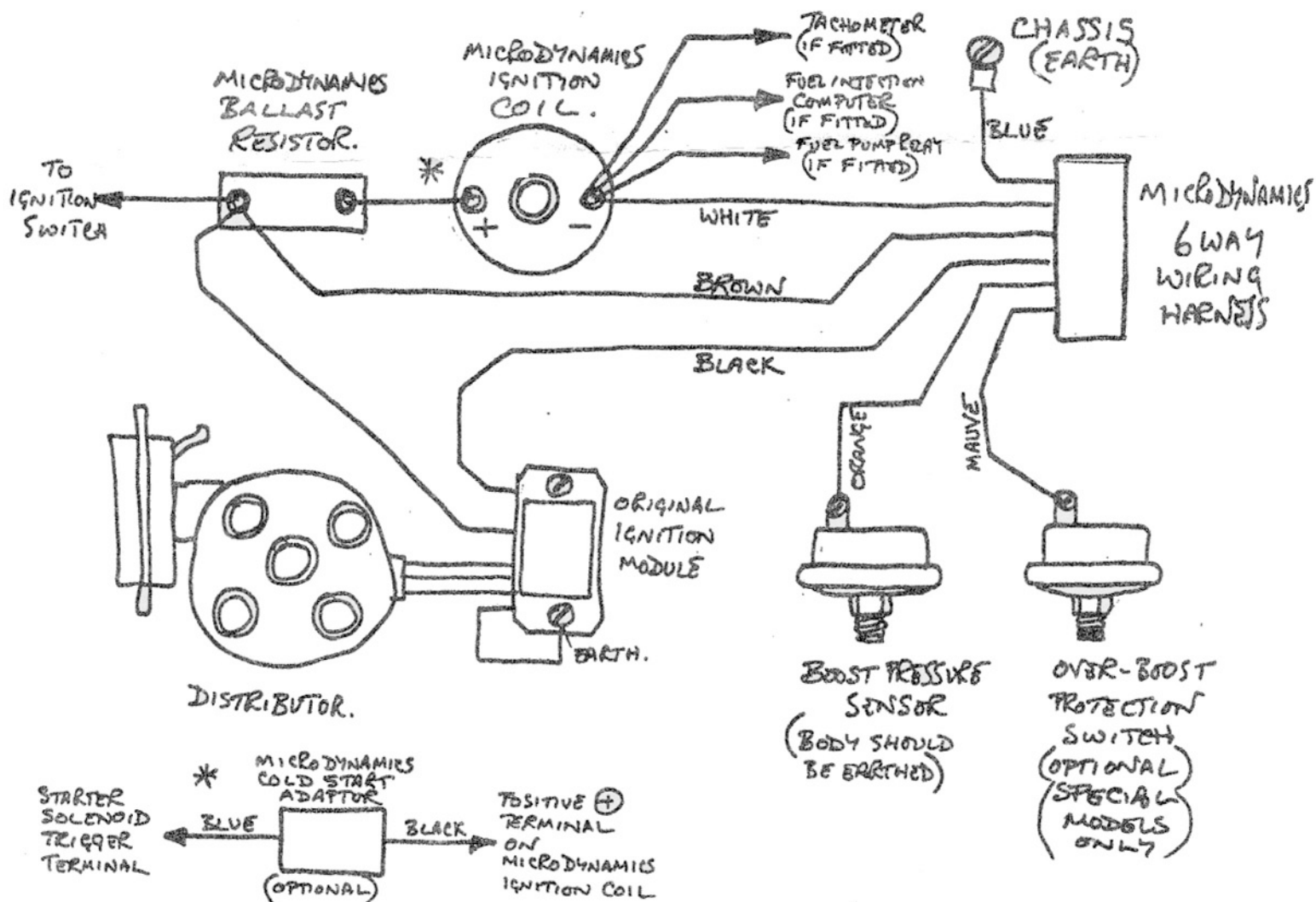
REPLACE LID AFTER ADJUSTMENT

product distributed by:

Autocar Equipment Ltd.  
77-85 Newington Causeway, London SE1 6BJ



## Fitting Micro Dynamics Ignition Units to Vehicles with Original Equipment Electronic Ignition



1. COIL MUST BE CHANGED TO A MICRODYNAMICS 'MACRO SPARK' TYPE.
2. DO NOT MAKE ANY CONNECTION TO WIRING BETWEEN DISTRIBUTOR & MODULE.
3. 'TACHOMETER' AND 'FUEL INJECTION' WIRING MUST BE CONNECTED AS SHOWN.