# Pazon

IGNITIONS WITH THE 7½ YEAR WARRANTY

# Smart-Fire™

TRIUMPH BSA Norton Velocette A.J.S M

## MAGNETO REPLACEMENT

## HIGH PERFORMANCE

### ELECTRONIC IGNITION SYSTEM FOR 4 STROKE

### BRITISH SINGLE CYLINDER MOTORCYCLES

**WITH 12 VOLT ELECTRICS, POS/NEG GROUND**



**SYSTEM TYPE: PDMS1**

## **Smart-Fire** Applications

- **BRITISH 4 STROKE PRE-UNIT SINGLE CYLINDER MOTORCYCLES WITH 12 VOLT ELECTRICS, POS OR NEG GROUND**
- **TO REPLACE MAGNETOS WITH 3 BOLT FLANGE TYPE MOUNTING (LUCAS K-SERIES / BTH)**
  **CLOCKWISE / COUNTER-CLOCKWISE ROTATION OF MAGNETO**

## FEATURES

- **HIGH-POWER DIGITAL IGNITION MODULE (FULLY ENCAPSULATED)**
- **FULLY MAPPED IGNITION TIMING & PROGRAMMED COIL ENERGY CONTROL**
- **LOW POWER CONSUMPTION, AIDS POOR CHARGING SYSTEMS AND OFFERS LONG BATTERY LIFE ON TOTAL-LOSS BATTERY SYSTEMS**
- **USER-PROGRAMMABLE REV.LIMITER BUTTON**
- **RELIABLE & RUGGED HALL-EFFECT SENSOR , INCLUDES ON-BOARD STATIC TIMING LIGHT, FOR EASY SETTING OF IGNITION TIMING**
- **MINIATURE HIGH-ENERGY IGNITION COIL**
- **ELECTRONIC TACHO DRIVE OUTPUT**
- **NON-WASTED SPARK (720° FIRING) SYSTEM FOR MAXIMUM EFFICIENCY**
- **LESS MAINTENANCE**
- **IMPROVED ENGINE PERFORMANCE**
- **FOR RACING OR HIGHLY TUNED APPLICATIONS:**
  **SPECIAL ADVANCE CURVES & REV-LIMITERS AVAILABLE**
- **COVERED BY MANUFACTURER'S FIVE-YEAR WARRANTY**
- **MODULE SIZE(mm): 90 LONG x 65 WIDE (95 INC. MOUNTING BRACKETS) x 30 DEEP, WEIGHT: 400g (INC. WIRES)**

## IGNITION SYSTEM COMPRISES:

- **ALUMINIUM BILLET MAGNETO REPLACEMENT HOUSING**
- **IGNITION MODULE (ALUMINIUM HOUSING WITH MOUNTING BRACKETS) & WIRING**
- **DIGITAL HALL-EFFECT TRIGGER UNIT**
- **ELECTROPLATED STEEL ROTOR, 1/4" FIXING BOLT & WASHER**
- **DIGITAL IGNITION COIL (SINGLE OUTPUT)**
- **H.T. LEAD (COPPER-CORED)**
- **PLUG CAP (5K RESISTOR TYPE)**
- **MODULE & COIL FIXING SCREWS, WASHERS & NUTS**
- **CRIMP TERMINAL CONNECTORS & INSULATORS**
- **RED GROUNDING WIRE**
- **LARGE & SMALL CABLE TIE-STRAPS**

# **Smart-Fire** Fitting Instructions

**WARNING: THIS SYSTEM PRODUCES VERY HIGH VOLTAGES, ALWAYS SWITCH OFF BEFORE WORKING ON THE SYSTEM.**

## IMPORTANT NOTES:

## BEFORE FITTING, PLEASE READ THESE INSTRUCTIONS CAREFULLY, INCLUDING THE NOTICE ON PAGE 16.

This system is designed to work only with the special digital ignition coil provided with the system. A 5K resistor plug cap as supplied with the system should be fitted to the h.t. lead. Alternatively, a resistor spark plug can be used. A resistor plug & resistor cap can be used, although it is not necessary to use both. Attempting to run the system without a resistor type cap or plug will result in excessive radio frequency interference (r.f.i.), which may cause bad running, misfiring and loss of ignition. For reliability, copper or steel cored h.t. lead should be used, we do not recommend using carbon fibre lead.

These instructions are a general guide for installing the system to various machines and therefore it may be necessary to modify the length or routing of some wires in order to complete the installation. All connections should be made using good quality crimped or soldered connections; twisted wires will not give satisfactory operation. Wiring should be trimmed to the correct length, excess wire should not be coiled up as this can affect the correct running of the ignition system. If electric welding is to be carried out, the ignition module should be disconnected and its connectors covered with insulation, to help prevent stray sparks from damaging the module. If in doubt, remove the unit from the machine.

1. For safety, disconnect the battery (preferably both terminals).
2. Remove the magneto cover/cowling (if fitted). Undo the fixings and remove the magneto, if fitted.
3. Remove the ATD (automatic timing device), if fitted. This ignition system has built-in automatic electronic advance/retard, therefore if you wish to retain the original ATD and drive gear/sprocket, it must be welded or locked in position by whatever means available (e.g. by drilling a hole and inserting a rod or pin). If necessary, contact your dealer for the appropriate fixed drive gear/sprocket for your engine.
4. Fit the magneto replacement body in place of the removed

magneto using the original fixings.

5. Fit the ignition module in a convenient place. This could be under (or on the side of) the battery platform, inside the toolbox (if available) or secured to the frame using a suitable mounting bracket. The unit can be orientated in any position, but this should be onto a flat surface, if possible. the module can be secured by the mounting flanges using the two M5 bolts, washers & nuts. Alternatively, the mounting flanges can be removed by slackening the bracket securing screws and sliding the brackets out of the dovetail slots. The module can then be mounted using large tie-straps, with a small sheet of rubber between the case & the frame.
6. Fit the ignition coil in a convenient place. Suspend the coil by the two mounting lugs, using the M5 bolts, washers & nuts. Alternatively, to avoid the need for drilling or a mounting bracket, the coil can be rubber mounted using two small pieces of rubber tubing (such as fuel pipe or heater hose) & two large tie-straps, see figs. 1 / 1a. The coil can then be secured to the frame tube by fully tightening the tie-straps. Fit the new h.t. lead by pushing the brass connector fully into the h.t. outlet of the coil, along with the rubber boot. Small tie-straps can be placed around the rubber boot & tightened to give extra security, if desired. The h.t. lead should now be cut to length, if necessary, & the plug cap screwed onto the ends of the h.t. lead. Push the plug cap onto the plug, it should click into place.
7. Remove the spark plug. Set the engine to the recommended <u>full advance</u> timing position for your engine, on the compression stroke (e.g. 38° BTDC for Velocette). Methods for setting this include using a dial gauge down the bore or a degree disc. Note: if using a degree disc attached to a half-engine speed shaft (e.g. magneto drive), the full advance figure on the disc must be halved. E.G. for 38° BTDC, set the engine to TDC, zero disc and rotate engine backwards until the degree disc has travelled 19°.
8. Undo the two screws and remove the cap from the magneto replacement body.
9. Take the ignition trigger assembly (round green printed circuit board) and pass a small tie-strap through the set of holes in front of the 3-way connector block; leave unfastened at this stage. Remove the pillar fixings & washers and fit the trigger assembly (connector block facing outwards) into the magneto replacement housing. Refit the pillar fixing screws & washers, finger tighten so that the trigger can be rotated by hand.

10. Fit the steel rotor into the end of the shaft in the centre of the magneto replacement housing; the steel rotor has a male taper that mates with the end of the shaft. Determine the direction of rotation of the steel rotor (as viewed from outside)—this is **clockwise** for most magnetos — and rotate the assembly as per fig. 3 (clockwise) or fig. 6 (counter-clockwise), pages 12-13. Then, without turning the engine, set the rotor so that the slot is positioned relative to the centre of the black sensor on the trigger as shown in fig.3 or fig. 6. Pass the cap head screw & washer through the centre of the rotor & into the thread in the end of the shaft; tighten the cap head screw with an M5 allen (hex) key. Recheck the rotor position. The rotor centre thread (metric M8) is provided for attaching a puller, if the rotor should need to be removed for engine servicing, etc.

**FIG. 1**

**FIG. 1a**

# WIRING

*(PLEASE SEE WIRING SCHEMATICS ON PAGES 8 & 9)*

1. The ignition trigger wires (sleeved) are coloured: White—Black, Violet—Red & White—Red. Allowing some slack in the cable, route these wires from the ignition module down to the trigger in the magneto replacement housing, passing through the grommet in the the cap. If passing wiring through holes in metalwork, use grommets or sleeving. Route the wires to the 3-way connector block. Allowing some movement in the cable (for setting the ignition timing), cut the cable & sleeving to length. Carefully strip back 4-5mm of insulation from the ends of the three wires. Insert the three wires into the connector block (from left to right) as follows: White—Black, Violet—Red, White—Red. See fig.2, page 11. Tighten the three screws with a small screwdriver. Secure the sleeved wires to the trigger plate with a small tie-strap, using the set of holes provided in front of the connector block; cut off the excess from the tie-straps.
2. Connect the violet wire from the ignition module to the negative (—) terminal of the ignition coil (left-hand spade connector), using a female crimp connector and insulating cover.
3. Connect the red wire from the ignition module to the positive (+) terminal of the ignition coil (right-hand spade connector), using a female piggyback crimp connector and insulating cover.

***Re-check the connections to the ignition coil; reverse polarity may damage the coil.***

*For positive ground electrics (standard), go to step 5.*

4. For *negative ground* electrics (see page 9): connect the black wire from the ignition module to a good grounding point on the frame or directly to the battery negative (—), using a ring terminal. Connect the spare terminal on the piggyback connector (on the positive side of the ignition coil), to a switched positive supply (+12 volts), preferably via a fuse (8 amp recommended) and through the ammeter, if fitted. Go to step 7.
5. For *positive ground* electrics (see page 8): connect the spare terminal on the piggyback connector (on the positive side of the ignition coil), to a good grounding point on the frame or directly to

the battery positive (+), using the red grounding wire provided. Connect this wire to the coil end with the female spade connector and insulating cover. Connect the other end to ground/battery positive using a ring terminal.

6. Connect the black wire from the ignition module, to a switched negative supply, preferably via a fuse (8-10 amp. Recommended) and through the ammeter, if fitted.
7. Suggestions for the choice of switch can be a spare position on the headlamp switch (if available), a second dip switch on the handle-bars or a key switch located in the headlamp shell. It is important that the switch is in good condition; corroded or dirty contacts will cause misfiring/cutting out.
8. The **ORANGE** wire is an IGNITION INHIBIT input, and only functions with NEGATIVE GROUND electrics.
   This can be connected to a grounding kill switch or a hidden security switch. If not required, place insulating tape over the end of the wire to prevent accidental shorting out.
9. The **GREY** wire is a tacho output signal for driving an electronic tachometer, if fitted. This is a 12 volt output and provides 1 pulse per engine revolution (1 pulse/rev). If your tacho requires a different pulse rate, contact Pazon Ignitions. Connect to the tacho signal input terminal/wire. If you have a mechanical tacho, an inductive pickup tacho (e.g. Scitsu) or no tacho, then leave unconnected; cut short the wire & and insulate the wire end.
10. Any remaining wires which may be present on the ignition module are for factory use and should remain unconnected and insulated, as supplied.
11. Remove any redundant wires or insulate bare ends. Re-check all connections are good and tight; any loose crimps should be removed, slightly closed up and refitted, or preferably replaced.

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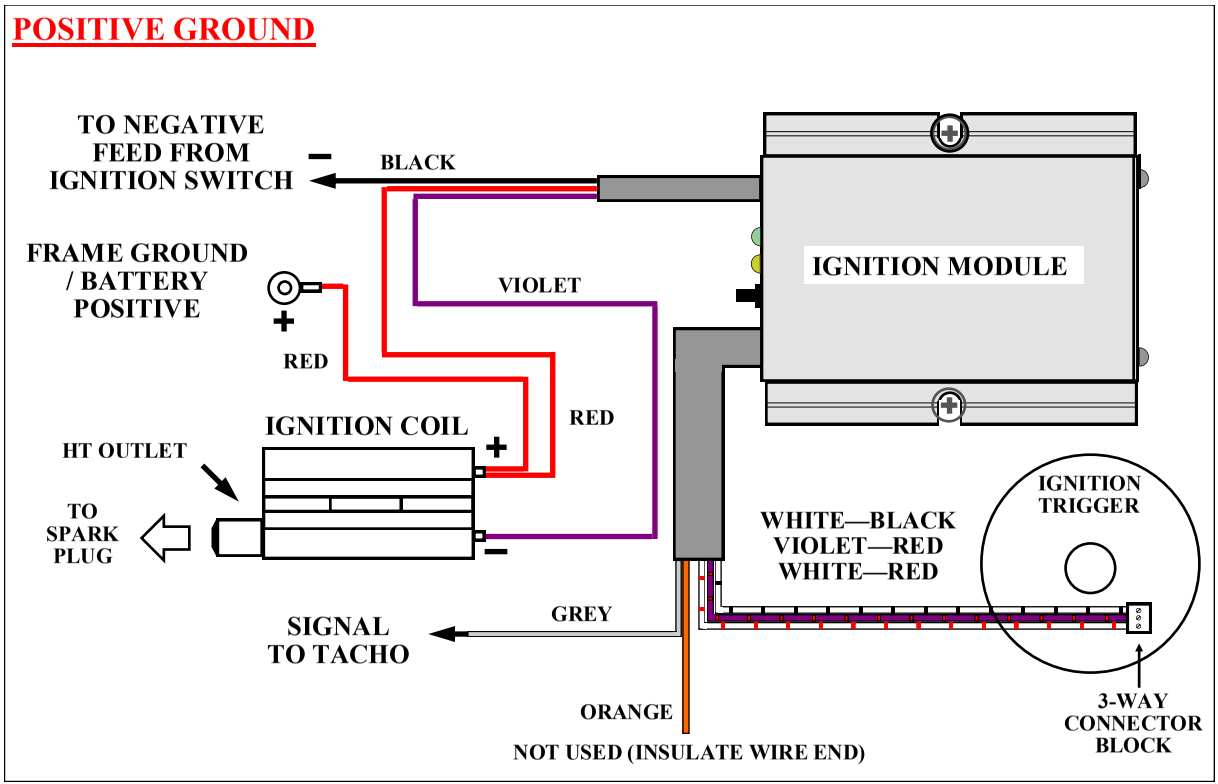
*WARNING: TURN OFF/DISCONNECT THE BATTERY*
*BEFORE WORKING ON THE SYSTEM*
*HIGH VOLTAGES CAN KILL*

## POSITIVE GROUND



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*WARNING: TURN OFF/DISCONNECT THE BATTERY*
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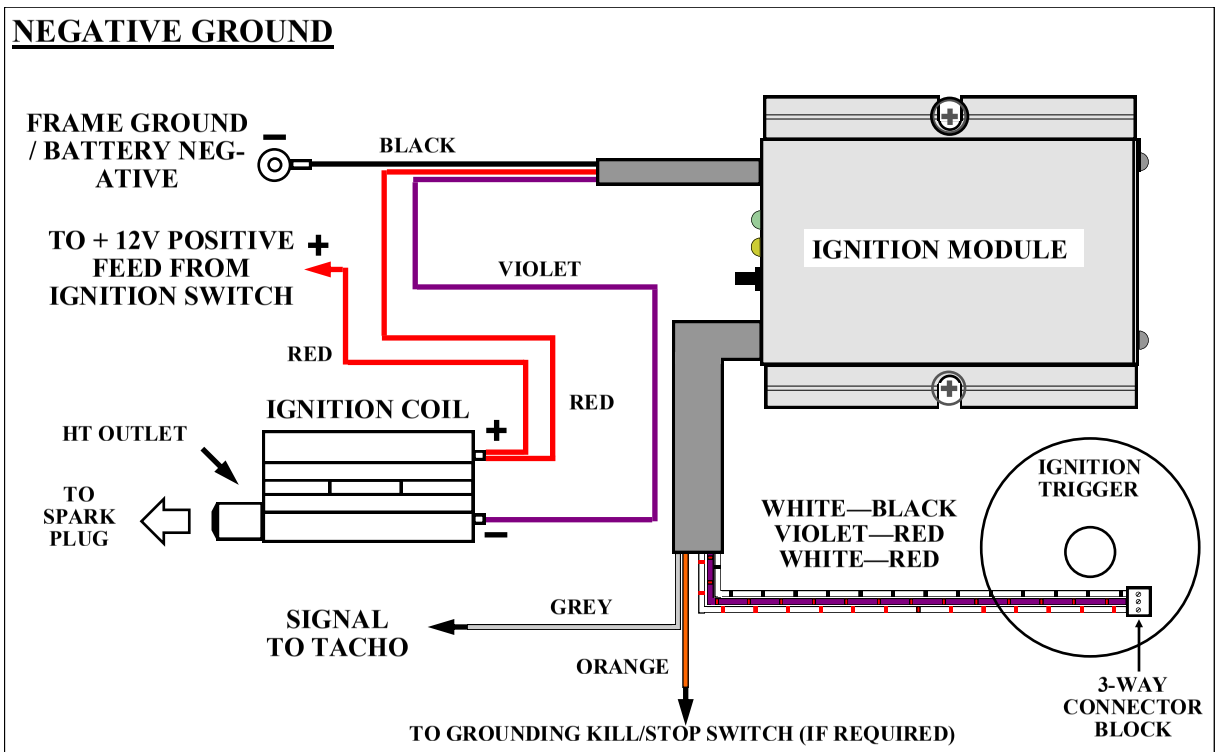
## NEGATIVE GROUND



## TIMING (see figs. 3-5, page 12)

1. Switch off ignition.
2. If necessary, slightly loosen the ignition trigger fixings so that it can be rotated by hand.

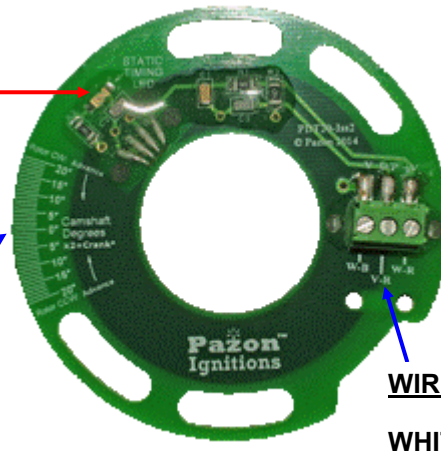
**Warning: risk of electric shock, keep hands & body away from coil, ht lead, cap & plug**

3. The following operations may produce a spark from the plug, therefore it is recommended that violet wire be temporarily removed from the negative terminal of the ignition coil, place insulating tape over the end of the connector to prevent shorting to ground. Alternatively, the spark plug can be removed and grounded onto the cylinder head (with the plug cap & h.t. lead connected). This will prevent any undesired sparks whilst timing.
4. (Reconnect the battery).
   **Clockwise rotor rotation (standard for most magnetos):**
   - If not already done, rotate the trigger to the fully clockwise position, as per fig. 3
   - Switch the ignition on (the red timing light will normally be OFF)
   - Rotate the trigger slowly counter-clockwise until the red timing led turns ON, stop rotating. See fig. 4
   - Rotate the trigger very slowly clockwise until the red timing led turns OFF, See fig. 5
   - Tighten the two pillar fixing screws with a nut driver or spanner (do not over-tighten, or the board may become distorted)
5. Switch off the ignition.
6. Reconnect the violet wire to the ignition coil, if disconnected in step 3 (above). Refit spark plug, if removed earlier.
7. The engine should now start and after warming up should tick over well, provided everything else is correctly adjusted. The ignition will advance as per the pre-programmed curve (see advance graph, page 15). Note: the graph shows a full advance timing figure of 38° BTDC. If using a different figure for your engine, the line will be shifted up or down, according to the full advance timing figure used.
8. If strobe timing is desired and you have a suitable timing mark or degree disc, proceed as follows:
   - Warm engine for 4-5 mins.
   - Using a white light strobe, time the engine to the recommended full advance timing mark

- For clockwise rotor rotation (standard for most magnetos):
  to advance the timing, rotate the trigger counter-clockwise
  to retard the timing, rotate the trigger clockwise
- Make very small adjustments; 1° of trigger movement equals 2° of crankshaft movement
- The trigger has calibration marks on the outer edge to assist with timing adjustment
- For safety, switch ignition off between adjustments

9. Refit the cap on the magneto replacement housing, sliding the sleeved wires back through the grommet in the side of cap. Refit the two fixing screws and washers.

FIG. 2




**STATIC TIMING LED**

**CALIBRATION MARKS**

**EQUIVALENT TO CAMSHAFT DEGREES**

**X2 = CRANKSHAFT DEGREES**

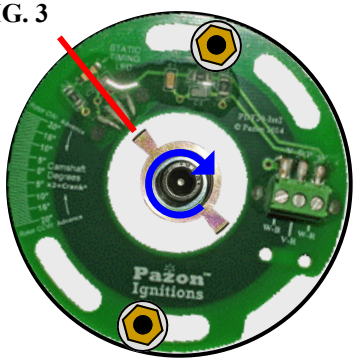
**WIRING (left to right):**

**WHITE—BLACK**
**VIOLET—RED**
**WHITE—RED**

# STATIC IGNITION TIMING
# **CLOCKWISE** ROTOR ROTATION
# **(MOST MAGNETOS)**

(WIRING NOT SHOWN FOR CLARITY)

**FIG. 3**

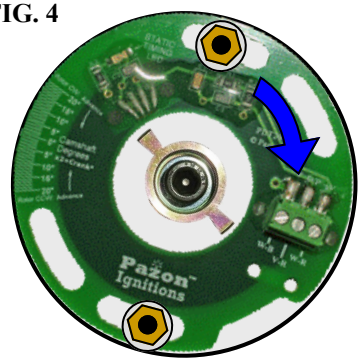



**START POSITION**

Trigger fully counter-clockwise on adjustment slots.

Align centre of rotor tab with static timing led, tighten rotor cap head screw

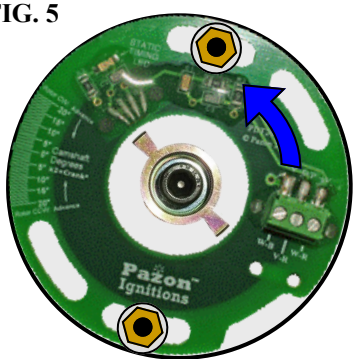
**FIG. 4**




SWITCH IGNITION ON

Rotate trigger slowly CLOCKWISE, until red static timing led turns ON

**FIG. 5**




Rotate trigger very slowly COUNTER-CLOCKWISE, until red static timing led turns OFF

Stop rotating

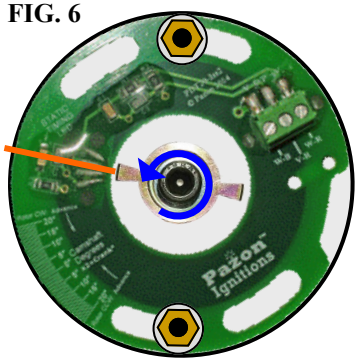
Tighten pillar fixings

* **See accompanying text on page 10 for a full description of the static timing led operation**

**Please note: when fitted on the motorcycle, the orientation of the magneto replacement housing (& pillar fixings) may be different to that shown in these pictures.**

# STATIC IGNITION TIMING
# **COUNTER-CLOCKWISE** ROTOR ROTATION
(WIRING NOT SHOWN FOR CLARITY)

**FIG. 6**



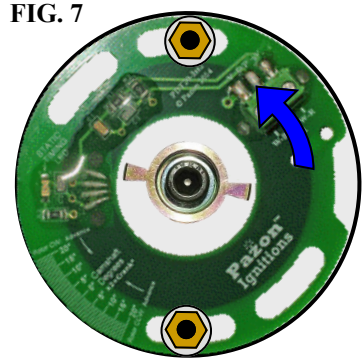

**START POSITION**

Trigger fully clockwise on adjustment slots.

Align centre of rotor tab with static timing led,

tighten rotor cap head screw

**FIG. 7**

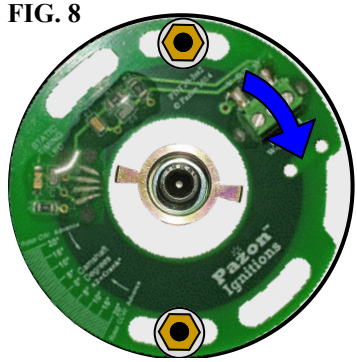



SWITCH IGNITION ON

Rotate trigger slowly

COUNTER-CLOCKWISE, until red static timing led turns ON

**FIG. 8**




Rotate trigger very slowly CLOCKWISE, until red static timing led turns OFF

Stop rotating

Tighten pillar fixings

*** See accompanying text on page 10 for a full description of the static timing led operation**

**Please note: when fitted on the motorcycle, the orientation of the magneto replacement housing (& pillar fixings) may be different to that shown in these pictures.**

# REV-LIMITER

***USE OF THIS FUNCTION IS AT YOUR OWN RISK, SINCE IT IS POSSIBLE TO SET THE REV-LIMITER TO BEYOND THE DESIGNED UPPER RPM LIMIT FOR YOUR ENGINE.***

The **Smart-Fire** ignition module features a function button that enables the user to set/reset the ignition rev-limiter. Unless specified when purchasing the system, the rev-limiter is not preset, allowing your engine to rev to its maximum (unrestricted).

To set the rev-limiter

To accurately set the rev-limiter you will need a rev. Counter/tachometer to monitor the engine rpm. Rev the engine to one-half the desired rev-limit rpm, press & hold the function button for a minimum of 3 seconds. The ignition module will take a snapshot of the engine rpm at the instant the button is pressed, therefore it is not essential to maintain a precise rpm whilst the button is pressed. The yellow indicator led on the module will flash 5 times Release the button. The rev-limiter is now set. When your engine reaches the preset rpm the ignition will turn off the ignition coil, cutting all sparks. Thus, the engine rpm will fall and, once below the rev-limit setting, ignition will resume.

The minimum rev-limiter setting is 3000 rpm (i.e. set with the engine running at 1500 rpm).

To reset the rev-limiter

To reset (disable) the ignition rev-limiter, press & hold the function button for a minimum of 3 seconds, with the engine below 1500 rpm (or stationary). The yellow indicator led on the module will flash 5 times. Release the button. The rev-limiter is now reset.

The rev-limiter setting is retained in the ignition module memory & will be recalled when the ignition is turned on.

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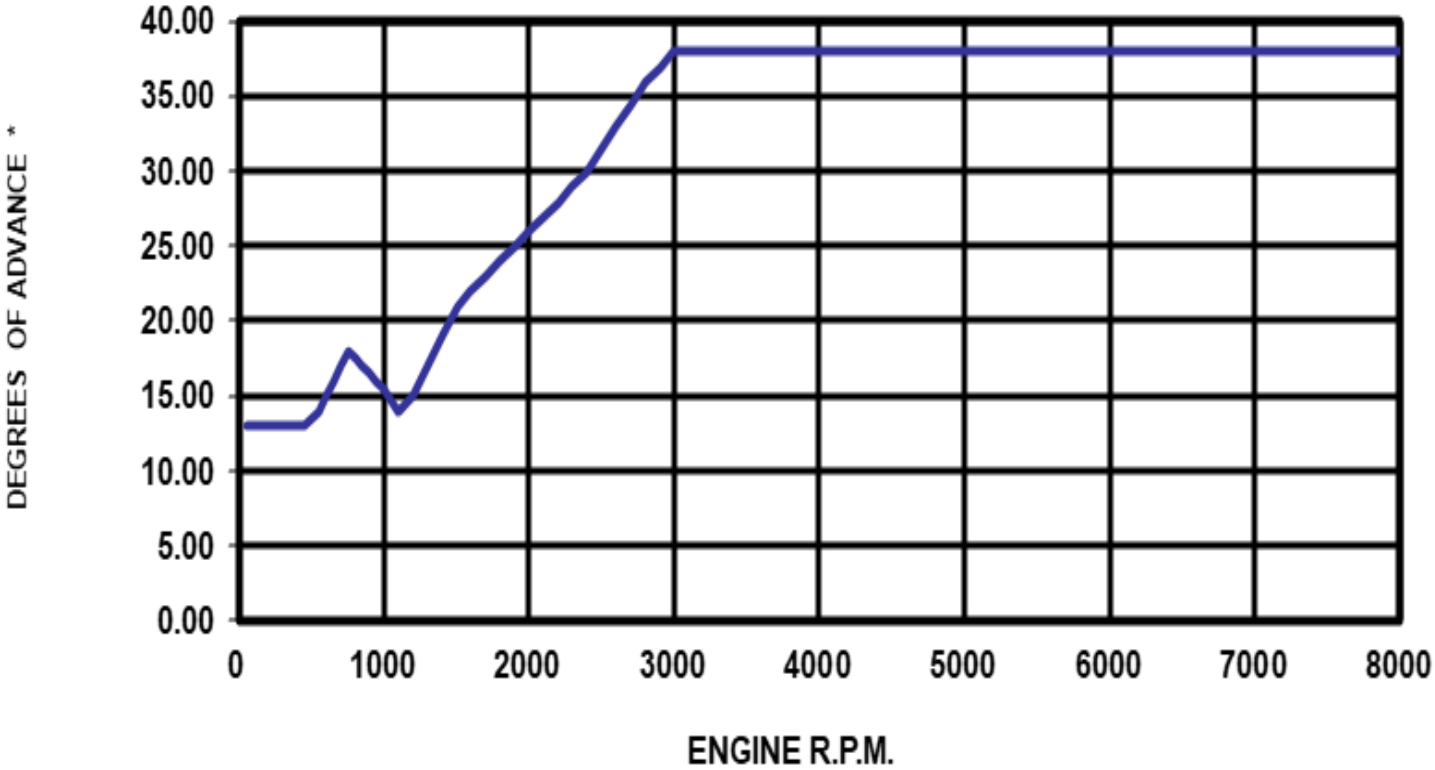
## Smart Fire Ignition Timing
## British Singles




* RELATIVE TO STATIC SETTING

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Terms & Conditions and Warranty

- Use of this product indicates your acceptance of this notice.
- The product design, firmware & literature is Copyright © PAZON IGNITIONS LTD. 2005-2024, and is protected under international copyright, trademark & treaty provisions.
- To provide the best ignition systems possible, Pazon Ignitions Ltd. reserves the right to alter and improve the specifications of its products without prior notice.

Ignition Systems

- Pazon Ignitions warrants to the original purchaser that the Pazon Ignition System be free from defects in workmanship & parts under normal use for a period of 7½ years from date of purchase.

Ignition Spares

- Spares are defined as item(s) not purchased as part of a complete ignition system. Pazon Ignitions warrants to the original purchaser that these item(s) be free from defects in workmanship & parts under normal use for a period of one year from date of purchase.
- Ignition coils will only be covered by the warranty if it can be proved that the fault is due to a manufacturing fault within the coil.

Limitation of Liability

- In no event shall Pazon Ignitions' liability related to the product exceed the purchase price actually paid for the product.
- Neither PAZON nor its suppliers shall in any event be liable for any damages whatsoever arising out of or related to the use or inability to use the product, including but not limited to the direct, indirect, special, incidental or consequential damages, or other pecuniary loss.
- This warranty will be void if the product or parts have been altered, damaged, abused or installed incorrectly.
- This warranty will be void if parts supplied by Pazon Ignitions are used with other makes of ignition. Your statutory rights are not affected.

Warranty Claims

- To make a claim under warranty, the product must be returned to Pazon Ignitions or its authorized representative, with a copy of your receipt (or evidence of date and place of purchase), within the warranty period.
- Include a detailed description of the problem and why you believe there is a fault within the ignition system.
- The system must be returned postage paid. Proof of posting is not proof or receipt, therefore we recommend using a recorded mail service.
- Upon receipt we will thoroughly test the returned items and repair or replace any items found to be faulty and covered by the warranty.
- Please allow seven working days from receipt of the returned parts before contacting us, to allow sufficient time for a thorough test and evaluation.
- PLEASE CONTACT PAZON IGNITIONS FOR RETURN INSTRUCTIONS.

✉ **Pazon Ignitions Ltd, 274 Hot Springs Road, RD 2, Katikati 3178, Bay of Plenty, New Zealand**
☎ **TELEPHONE: +64 (0) 7549 5878** 🖷 **FAX: +64 (0) 7549 5879**
**EMAIL: ignition@pazon.com WEB: www.pazon.com**