

Pazon
IGNITIONS WITH THE 7½ YEAR WARRANTY

Smart-Fire™

BSA UNIT TWIN

Norton COMMANDO

**HIGH-PERFORMANCE
IGNITION SYSTEM**

12 VOLT



SYSTEM TYPE: PD2B

Smart-Fire Applications

- **BSA UNIT TWIN / NORTON COMMANDO
WITH 12 VOLT ELECTRICS
ANTI-CLOCKWISE ROTATION OF CAMSHAFT / TIMING DISC**

FEATURES

- **HIGH-POWER DIGITAL IGNITION MODULE
(FULLY ENCAPSULATED)**
- **FULLY MAPPED IGNITION TIMING & PROGRAMMED COIL ENERGY CONTROL**
- **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 DUAL IGNITION COIL**
- **ELECTRONIC TACHO DRIVE OUTPUT**
- **WASTED SPARK SYSTEM FOR SIMPLICITY**
- **LESS MAINTENANCE**
- **IMPROVED ENGINE PERFORMANCE**
- **FOR RACING OR HIGHLY TUNED APPLICATIONS:
SPECIAL ADVANCE CURVES & REV-LIMITERS AVAILABLE**
- **COVERED BY MANUFACTURER'S 7½ YEAR WARRANTY**
- **MODULE SIZE(mm):
90 LONG x 65 WIDE (95 INC. MOUNTING BRACKETS)
x 30 DEEP , WEIGHT: 400g (INC. WIRES)**

IGNITION SYSTEM COMPRISES:

- **IGNITION MODULE (ALUMINIUM HOUSING WITH MOUNTING BRACKETS) & WIRING**
- **DIGITAL HALL-EFFECT TRIGGER UNIT**
- **STEEL TIMING DISC, 1/4" FIXING BOLTS (BSF & UNF) & WASHER**
- **DIGITAL IGNITION COIL (DUAL OUTPUT)**
- **H.T. LEADS (COPPER-CORED)**
- **PLUG CAPS (5K RESISTOR TYPE)**
- **FIXING SCREWS, WASHERS & NUTS**
- **CRIMP TERMINAL CONNECTORS & INSULATORS**
- **YELLOW-GREEN EARTHING 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 ignition coil provided with the system. 5K resistor plug caps as supplied with the system should be fitted to the h.t. leads. Alternatively, resistor spark plugs can be used. resistor plugs & resistor caps can be used, although it is not necessary to use both. Attempting to run the system without resistor type caps or plugs 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 leads. This ignition is a wasted spark system, therefore both plugs fire at the same time.

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 timing cover.
3. Disconnect the wires from the contact-breaker assembly. Remove the contact-breaker/condenser assembly; retain the fixing screws for later.
4. Remove the auto-advance mechanism.
5. Remove the petrol tank and/or seat to gain access to the ignition coils, condensers and wiring.

6. Make a note of all existing wire colours & connections on the ignition coils. Remove the two wires & sleeving that connected between the coils & contact-breakers (usually coloured black/white & black/yellow). Disconnect the remaining wires from the ignition coils. These come from the ignition switch supply. On the Norton Commando, remove the White-Blue wire from the ballast resistor between the two ignition coils. The ballast resistor is no longer required. The colour of this ignition supply wire may vary between machines; check using a test lamp or meter to find the live wire when the ignition is switched on.
7. Remove the coils, h.t. leads & any mounting brackets. If there are separate condensers fitted, these are no longer required & can be removed.
8. 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. The module casing acts as a shield for the internal electronics, therefore it is recommended that the case is connected to the frame. This can be achieved by direct contact between the mounting brackets & screws, but if the mounting surface is non-metallic, plastic-coated or not connected directly to the frame, then an earthing wire should be provided. This would be a short wire with a ring/fork terminal at one end (placed under one of the mounting screw heads or nuts, or under the head of one of the module end plate screws) and a ring terminal at the other end connected to the frame earth. A short yellow/green wire is provided for this.
9. 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. leads by pushing the brass connectors fully into the h.t. outlets of the coil, along with the rubber boots. Small tie-straps can be placed around the rubber boots & tightened to give extra security, if desired. The h.t. leads should now be cut to length, if necessary, & the plug caps screwed onto the ends of the h.t. leads. Push the plug caps onto the plugs (either way around), they should click into place.



10. Remove timing inspection cover from alternator side of engine. Set the engine to the full advance timing mark on the compression stroke (note: the other cylinder will be on the exhaust stroke). Either cylinder can be used, since both fire together (wasted spark system). For Norton Commando 1972/73 models, there are two marks; use the mark indicating TDC with the pistons at the top of the stroke. If a timing mark is unavailable, the engine will need to be set using either a dial guage down the bore or a degree disc. See table 1 (page 11) for the recommended full advance figures for engines in a standard state of tune.
11. Fit the steel timing disc into the end of the camshaft in the place of the auto-advance mechanism; it has a male taper that mates with the end of the camshaft. Without turning the engine, set the disc so that the two holes are positioned relative to the pillar fixing holes as shown in fig.2 (page 12), at approximately 1 o'clock & 7 o'clock. Using one of the two bolts provided (Norton requires the BSF bolt). Pass the 1/4" cap head screw & washer through the centre of the timing disc & into the thread in the end of the camshaft; tighten the cap head screw. Recheck the timing disc position. The timing disc centre thread (metric M8) is provided for attaching a puller, if the

rotor should need to be removed for engine servicing, etc. If preferred (e.g. for ease of cable routing), the trigger assembly can be fitted at 90° to that shown, provided that the timing disc is also rotated by 90° in the same direction.

12. Take the ignition trigger assembly (round green printed circuit board) & pass two small tie-straps through the two sets of holes in front of the 4-way connector block; leave unfastened at this stage. Fit the trigger assembly (connector block facing outwards) into the contact-breaker housing. Fit the pillar fixing screws removed in step 3, finger tighten so that the trigger can be turned by hand. Note that the trigger has two pairs of slots, enabling it to be fitted in the most convenient position for routing of the trigger wires to the connector block. Note if fitting in a different position to that shown, please ensure that the timing disc is positioned accordingly (see previous step).

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

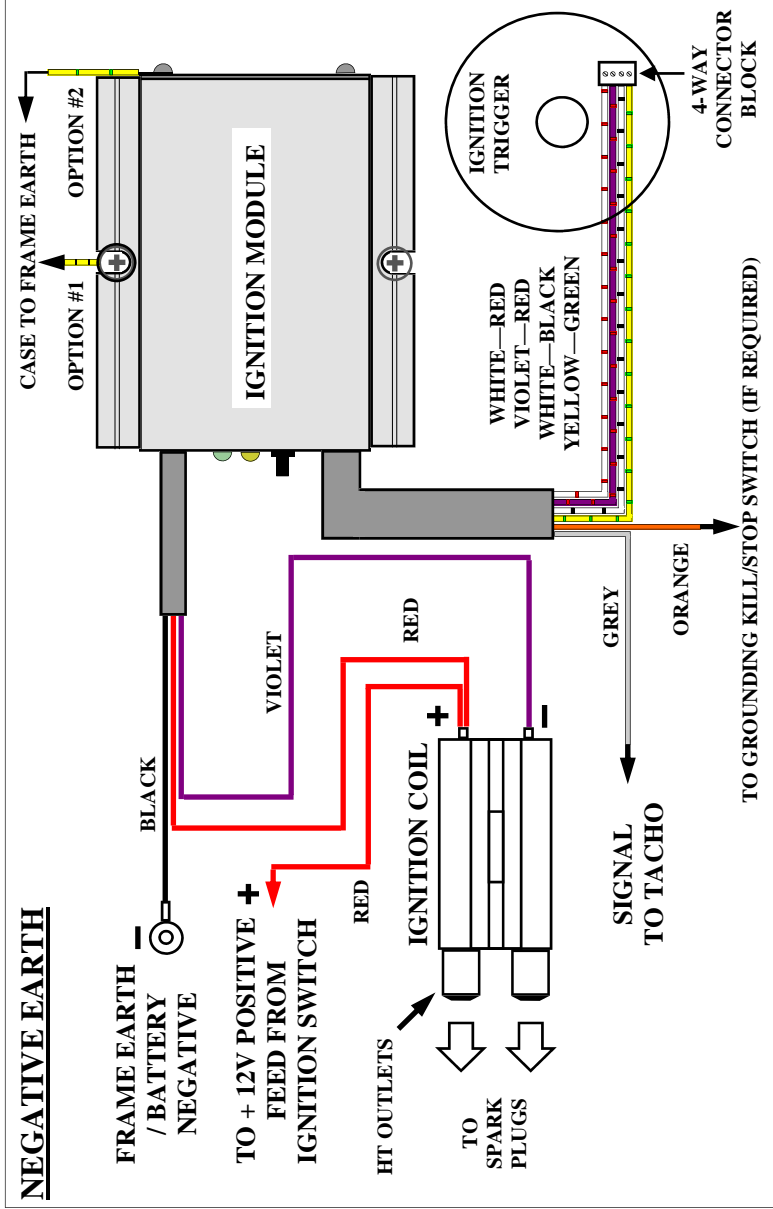
1. The ignition trigger wires (sleeved) are coloured white—red, violet—red, white—black, & yellow-green. Allowing some slack in the cable (for ignition timing adjustment), route these wires from the ignition module down to the trigger in the points housing. If passing through holes in metalwork, use grommets or sleeving. Cut the trigger cable & sleeving to length. Route the sleeved wires to the trigger connector block, passing over the two small tie-straps inserted earlier. Carefully strip back a small amount of insulation (4-5mm) from the ends of the four wires. Insert the wires into the connector block on the trigger in order (from left to right): white—red, violet—red, white—black & yellow-green. See fig.3, p.12. Tighten the terminal screws. Secure the sleeved wires to the trigger by fastening the two tie-straps; 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.

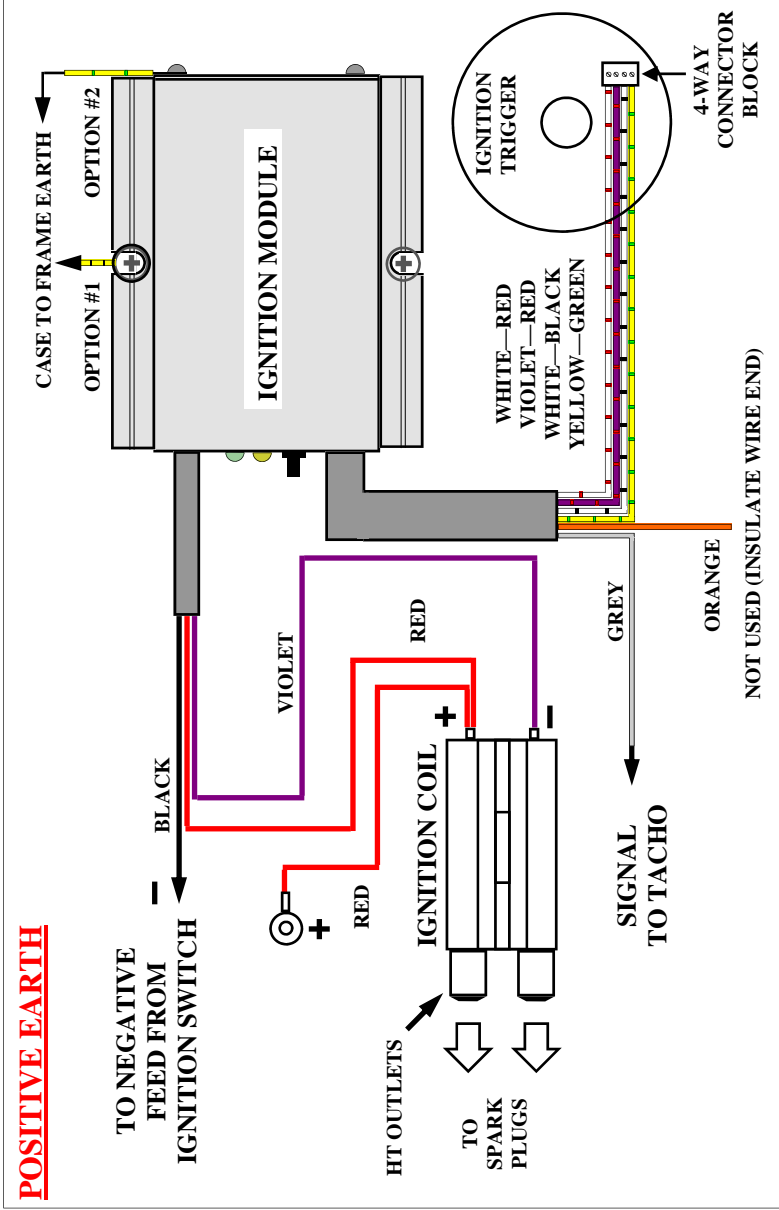
For positive earth electrics (standard), go to step 5.

4. For negative earth electrics (see page 8): connect the black wire from the ignition module to a good earth 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 6.
5. For positive earth electrics (see page 9): connect the spare terminal on the piggyback connector (on the positive side of the ignition coil), to a good earth point on the frame or directly to the battery positive (+), using the red earthing wire provided. Connect this wire to the coil end using a female spade connector and insulating cover. Connect the other end to earth using a ring terminal. Connect the black wire from the ignition module, to a switched negative supply, preferably via a fuse (8 amp. Recommended) and through the ammeter, if fitted.
6. 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.
7. The **ORANGE** wire is an IGNITION INHIBIT input, and only functions with NEGATIVE EARTH 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.
8. 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. 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 (or no tacho) then leave unconnected and insulate the wire end.
9. Any remaining wires which may be present on the ignition module are for factory use and should remain unconnected and insulated, as supplied.

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



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HIGH VOLTAGES CAN KILL**



TIMING (see figs. 4-7, page 13)

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 leads, caps & plugs

3. The following operations may produce a spark from the plugs, therefore it is recommended that the spark plugs be removed and grounded onto the cylinder head (with the plug caps & h.t. leads connected to them). Alternatively, the violet wire can be temporarily removed from the negative terminal of the ignition coil, place insulating tape over the end of the connector to prevent shorting to earth. This will prevent any undesired sparks whilst timing.
4. (Reconnect the battery).
 - a) Position the trigger plate in the fully anti-clockwise position.
See fig. 4, page 13
 - b) Switch the ignition on, the small green light on the ignition module should flash once then stay ON.
The red static timing light on the trigger should turn ON.
 - c) Turn the trigger plate clockwise until the timing disc hole is approximately in the middle of the inspection window, stop turning. See fig. 5 on page 13
 - d) Turn the trigger plate fully anti-clockwise, back to the start position (the timing led may blink OFF⇒ON briefly).
See fig. 6 on page 13
 - e) Finally, turn the trigger plate slowly clockwise until the red timing light turns OFF; STOP TURNING. This is the timing point for full advance. See fig. 7 on page 13
 - f) Keeping the trigger in position, tighten the fixings.
 - Note the final position of the lower timing hole visible through the inspection window.
 - If you make a mistake, switch the ignition off and restart from the beginning of step 4 (above).
 - If the timing light does not turn off in step 4e, reposition the timing disc slightly anti-clockwise and restart from step 4 (above).

5. Switch off the ignition.
6. Refit spark plugs, if removed earlier. Reconnect the violet wire to the ignition coil, if disconnected in step 3 (above).
7. If removed earlier, push the plug caps firmly onto the plugs, they should click into place.
8. Refit the fuel tank and/or seat. 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).
9. Strobe timing is not essential, but if desired, proceed as follows:
 - Warm engine for 4-5 mins.
 - Using a white light strobe, time the engine to the full advance mark (standard: 34° BTDC for BSA, 31° for NORTON) @ 4000+ RPM
 - To advance the timing, rotate the trigger clockwise
 - To retard the timing, rotate the trigger anti-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**

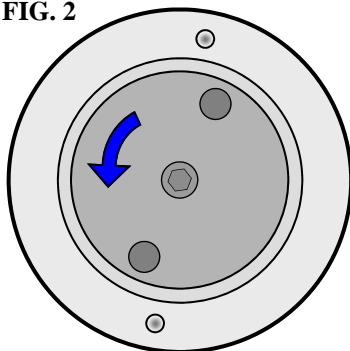
TABLE 1

MOTORCYCLE	CAM. ROTATION	FULL ADVANCE TIMING
BSA TWIN	ANTI-CLOCKWISE	34°
NORTON COMMANDO	ANTI-CLOCKWISE	31° (28° STANDARD*)

* STANDARD REFERS TO ORIGINAL IGNITION SETTING WITH MECHANICAL ADVANCE

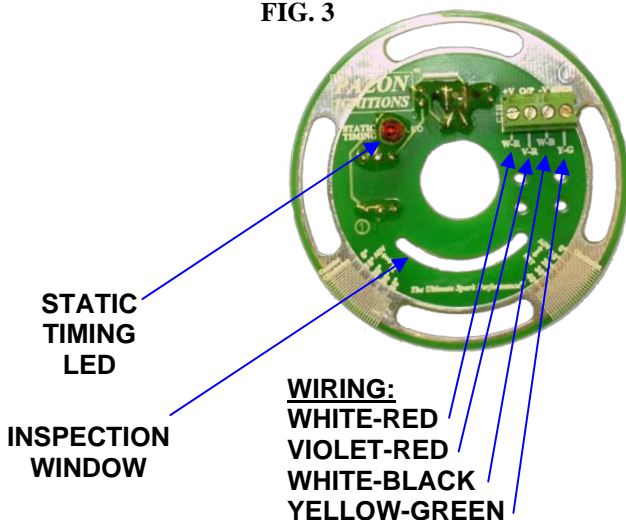
NOTE: IF USING A DEGREE DISC ATTACHED TO THE CAMSHAFT, THE FULL ADVANCE FIGURE READING ON THE DISC MUST BE HALVED. E.G. FOR 34°, SET ENGINE TO T.D.C., ZERO DEGREE DISC AND ROTATE ENGINE BACKWARDS UNTIL DEGREE DISC HAS TRAVELLED 17°

FIG. 2



TIMING DISC
STATIC TIMING POSITION,
EITHER PISTON AT
FULL ADVANCE POSITION
ON COMPRESSION

FIG. 3



**STATIC
TIMING
LED**

**INSPECTION
WINDOW**

WIRING:
WHITE-RED
VIOLET-RED
WHITE-BLACK
YELLOW-GREEN

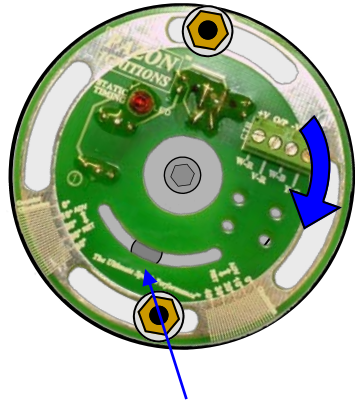
STATIC IGNITION TIMING
ANTI-CLOCKWISE TIMING DISC ROTATION
(WIRING NOT SHOWN FOR CLARITY)

FIG. 4



START POSITION
FULLY ANTI-CLOCKWISE.
IGNITION ON
RED TIMING LIGHT ON

FIG. 5



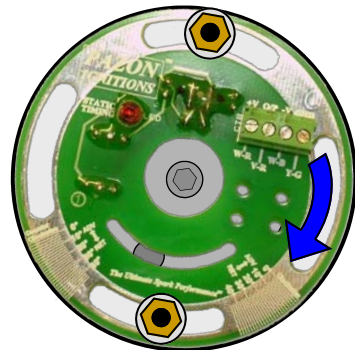
TURN CLOCKWISE
UNTIL TIMING HOLE
IS IN THE MIDDLE OF THE
INSPECTION WINDOW,
STOP TURNING

FIG. 6



TURN FULLY
ANTI-CLOCKWISE
(BACK TO START POSITION),
TRIGGER IS NOW CALIBRATED

FIG. 7



TURN SLOWLY CLOCKWISE
UNTIL
RED TIMING LIGHT
TURNS OFF
TIGHTEN TRIGGER FIXINGS

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

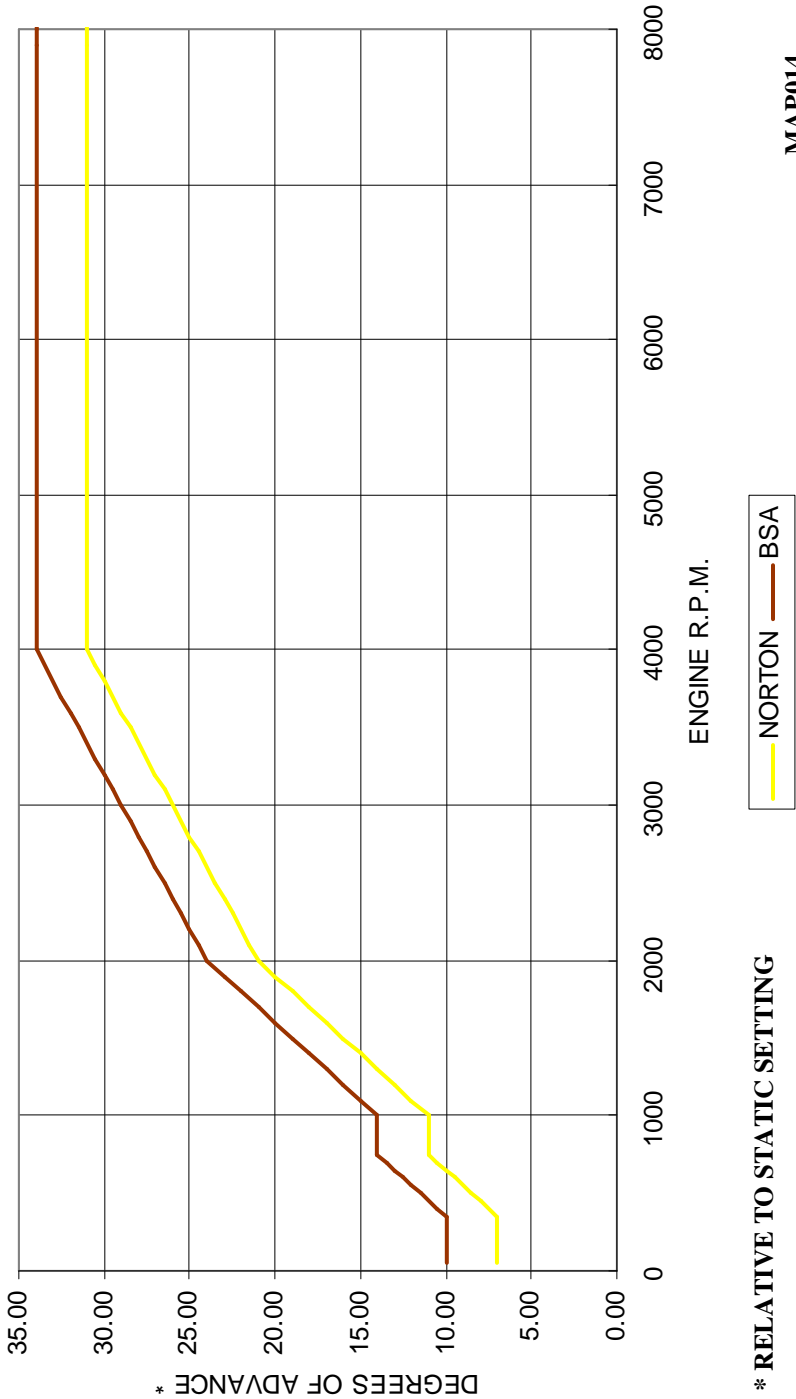
To accurately set the rev-limiter you will need a rev. Counter/tachometer to monitor the engine rpm. Rev the engine to one-half the desired rev-limit rpm, press & hold the function button for a minimum of 3 seconds. The ignition module will take a snapshot of the engine rpm at the instant the button 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.



Terms & Conditions and Warranty

- Use of this product indicates your acceptance of this notice.
- The product design, firmware & literature is Copyright © PAZON 2005-2006, and is protected under international copyright, trademark & treaty provisions.
- To provide the best ignition systems possible, PAZON IGNITIONS reserves the right to alter & improve the specifications of its products without prior notice.

Ignition Systems

- Pazon 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 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's 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 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 or its authorized representative, with a copy of your receipt (or evidence of date & 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, 30 DOUBLEDAY DRIVE, BAPCHILD,
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