Pazon
IGNITIONS WITH THE 7½ YEAR WARRANTY

Altair™

Electronic Ignition System for

TRIUMPH BSA Norton

Twin Cylinder Motorcycles (12 Volt)

System# AL2

Altair Electronic Ignition System for

- **Triumph/Bsa/Norton unit twins (incl. e-start models) with 12 volt electrics, positive or negative ground**

Features

- **Fully digital design**
- **Compact digital ignition module (fully encapsulated) - module size: 80x40x20mm**
- **Fully mapped ignition timing, featuring idle stabilisation**
- **Programmed coil energy control**
- **Electronic tachometer drive output**
- **Reliable and rugged hall-effect sensor includes on-board static timing light for easy setting of ignition timing**
- **Works with two standard 6 volt ignition coils or one 12 volt dual output coil (available separately)**
- **Very low voltage operation - ideal for electric starters and kick starters**
- **Extremely efficient operation: high spark energy and low power consumption**
- **Wasted spark system for simplicity of fitting, wiring and timing**
- **Very low maintenance**
- **Improved starting, idling and overall performance**
- **Covered by manufacturer's 7½ Year Warranty**

System Contents

- **Ignition module (black rectangular unit with wiring)**
- **Digital hall-effect trigger unit (circular printed circuit board with components)**
- **Electroplated steel rotor,**
- **¼" UNF (Triumph) + ¼" BSF cap head screws + flat washer**
- **Two NGK 5K suppressor plug caps**
- **Black ignition coil link wire**
- **Red grounding wire**
- **Adhesive cable tie mounting base (for ignition module)**
- **Crimp terminal connectors & insulators**
- **Black sleeving (for protecting wiring)**
- **Large & small cable ties**

Important notes

Warning: this ignition system produces very high voltages.
Always switch the ignition off before working on the bike.

- This system is designed to give optimum results with two 6 volt ignition coils or one 12 volt dual output coil with a primary resistance of 3 to 4.5 ohms. Running with two 12 volt coils will not give good results.
- 5k suppressor/resistor plug caps (as supplied) should be used with this system. Resistor spark plugs can also be used. Attempting to run the system without any suppressors will result in excessive radio frequency interference (r.f.i.), which may cause misfiring, bad running, loss of ignition and interference with other electronic/electrical items.
- For reliability, copper or steel plug wires (h.t. leads) should be used. Carbon fibre plug wires should be avoided.
- If you are using the correct type/grade or spark plugs, you do not need to change them when running with this system. Standard plug types B8ES/B8EV (NGK) or W24ES-U/W24ES-ZU (Denso) or equivalent. Recommended plug gap range: 0.028"-0.035" (0.7-0.9mm).
- This is a wasted spark system, therefore both plugs spark at the same time, every 360° of crankshaft rotation.
- All electrical connections should be made using good quality crimped or soldered connectors. Twisted wires will not give satisfactory results.
- Wiring should be cut to the correct length. Excess wire should not be coiled up, as this can affect the correct operation of the system.
- If electric welding is to be carried out on the bike, the ignition module should be disconnected and removed.

Installation

1. All connections must be of the highest quality, using crimped or soldered connectors. Twisted wires will not give satisfactory operation.
2. Open the seat to gain access to the ignition coils, wiring and battery.
3. For safety, disconnect the battery by removing the fuse from the negative battery terminal (positive terminal if the electrics are negative ground).
4. Remove timing cover. (The Norton Atlas engine has the points housing behind the cylinder head).
5. Disconnect the two wires (usually black-white & black-yellow) and remove the complete contact-breaker assembly, retaining the pillar fixings for later. At the other end, these two wires must be disconnected from the ignition coils & condensers. These two wires (black-white & black-yellow are not required with this ignition system and should be removed) - see wiring section. The condensers are no longer required and can be removed. They should not connected to the electronic ignition system.
6. Remove the complete auto-advance timing unit (ATU). If stuck it can be removed from its taper by using a puller or by inserting a small piece of steel rod down the centre and tapping it around until it frees from the taper.
7. Mount the ignition module in a convenient place, e.g. under the seat or tank, but mount away from direct sources of heat. Allow some air space around the module. Do not wrap in foam rubber or similar. A thin sheet of rubber can be placed between the module and frame, to minimise movement and vibration effects. If mounting close to the ignition coils, allow some space between the module and coils (as these get warm). Secure the ignition module to the frame using one or more large cable ties. An adhesive cable-tie mounting base is provided, which can be affixed to the side or back of the module case, and the cable tie passed through and around the module and frame.
8. 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). 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. Note: if using a degree disc attached to the camshaft, unless your disc is calibrated to show crankshaft degrees, the full advance figure on the disc must be halved, e.g. for 38°, set the engine to TDC, zero the degree disc and rotate engine backwards until the degree disc has travelled 19°. See Table 1 (page 9) for the recommended full advance figures for engines in a standard state of tune. Note: the timing figure for Norton twins is normally in the range 28-31° btdc. As a guide, we suggest 30°. The figure that works best for your engine will depend on various factors, including quality/grade of fuel used. With lower octane/ron fuels, lowering the full advance figure by 2-3° may be beneficial for all models (Triumph/Bsa/Norton).

9. Take the ignition trigger assembly (round green printed circuit board) and pass a small cable tie through one of the two sets of holes in front of the 3-way connector block; leave unfastened at this stage. The lower set of holes are for routing the wires through an aperture at approx 5 o'clock position (e.g. Triumph); the upper set are for routing the wires through an aperture at approx 3 o'clock position (e.g. Norton Commando). Fit the trigger assembly (connector block facing outwards) into the contact-breaker housing. Note: for some models (e.g. BSA A65), the trigger may line up in a different position to that shown in figs. 2/4 on pages 10-11. Refit the original pillar fixings removed in step 5, finger tighten so that the trigger can be turned by hand.
10. Fit the steel rotor 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. Determine the direction of rotation of the steel rotor (see Table 1, page 9) and rotate the trigger assembly as per fig. 2 (clockwise) or fig. 4 (counter-clockwise), pages 10-11.
11. Then, **without turning the engine**, set the rotor so that one of the two slots is positioned relative to the centre of the black sensor on the trigger as shown in fig.2 or fig. 4, i.e. with the leading edge of the slot approx ¼-⅓ across the face of the black sensor. Some Triumph models have a locating pin fitted into the end of the camshaft. If this applies to your bike and the pin fouls on the rotor, you will need to cut a small notch into the taper of the rotor, to allow it to seat fully into the camshaft [mark the position of where the locating pin will be on the rotor taper, and then remove sufficient metal using a file or small hacksaw]. Using one of the two bolts provided (Norton requires the BSF bolt, Triumph requires the UNF bolt), pass the 1/4" cap head screw & washer through the centre of the rotor and into the thread in the end of the camshaft.
12. Recheck that the rotor is seated fully in the taper and as central as possible. Excessive wobble of the rotor can give symptoms that include running on one cylinder, mistiming and/or misfiring. Tighten the rotor bolt with a 3/16" allen (hex) key and re-check engine position and rotor alignment. It's important that the rotor bolt is correctly tightened, otherwise the engine may run poorly, or even refuse to start. The rotor centre thread (metric M8) is provided for attaching a puller, if the rotor should need to be removed for engine servicing, etc.

Wiring

See wiring diagrams on pages 6 & 7

1. Make a note of all existing wire colours and connections on the ignition coils. If not already done, remove the two wires and sleeving that connected between the coils & contact-breakers (usually coloured black/white & black/yellow).
2. 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 be different on some machines; if so check using a test lamp or meter to find the live wire when the ignition is switched on.
3. The ignition trigger wires are coloured: White-Black, Violet-Red and White-Red. Route these wires

and sleeving from the ignition module down to the ignition trigger assembly in the contact-breaker housing. Allow a minimum of 50mm/2" of excess wire between the trigger and ignition module. This is especially important on rubber-mounted engines (e.g. Norton), where engine vibration can lead to internal fracturing of the trigger wires. If passing through holes in metalwork use grommets and/or sleeving to protect the wiring. Route the wires to the 3-way connector terminal block. Allowing some movement in the wiring (allowing for trigger movement to set the ignition timing), cut the wiring and sleeving to length. Carefully strip back 4-5mm of insulation from the ends of the three wires. Insert the stripped ends of the three wires into the connector terminal block (from left to right) as follows: White-Black, Violet-Red & White-Red. See pages 6-7.

4. Tighten the three screws with a small screwdriver. Secure the sleeved wires to the trigger plate with a small cable-tie, using the set of holes provided in front of the connector block. Cut off the excess from the end of the tie.
5. Take the supplied black ignition coil link wire and connect the positive (+) terminal of coil#1 to the negative (–) terminal of coil#2. Both ignition coils produce sparks at the same time. Therefore it is not important which coil is taken as #1, provided the coils connected as described here and as shown in the wiring diagrams. If using a dual output coil, the link wire is not required.
6. Take the violet wire from the ignition module, cut to length and fit a female crimp connector and insulator to the end of the wire. Connect the violet wire to the negative (–) terminal of coil#1.
7. Take the red wire from the ignition module, cut to length and fit a piggyback female crimp connector and insulator to the end of the wire. Connect the red wire to the positive (+) terminal of coil#2.

For **NEGATIVE GROUND** electrics, ***goto step 10.***

For **POSITIVE GROUND** electrics (standard):

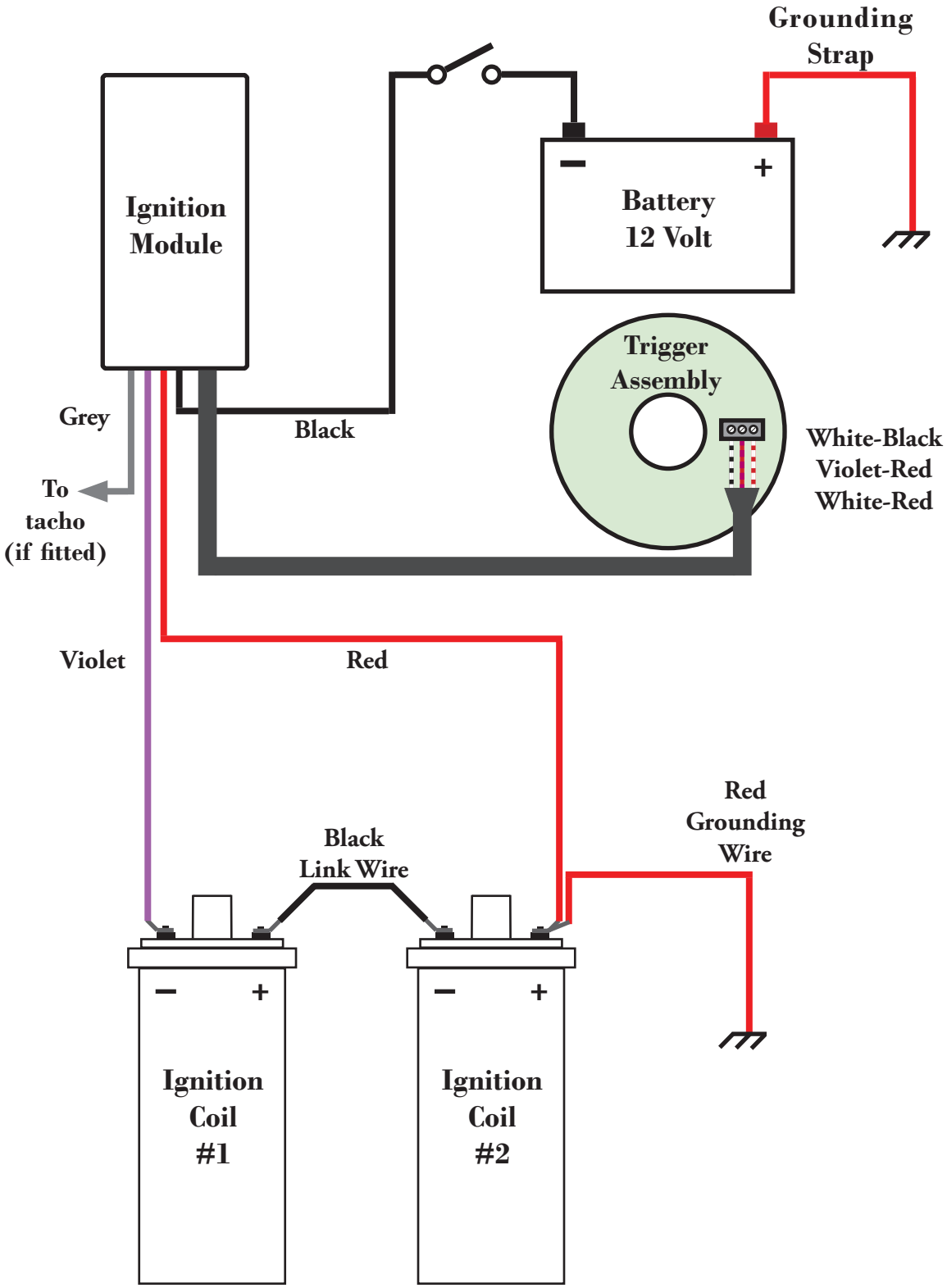
8. Take the red grounding wire, fit an insulator and female spade (or piggyback) connector on one end and connect to the positive (+) terminal on ignition coil #2. Cut to length and fit a ring terminal on the other end and connect to a good grounding point on the frame, ideally the battery positive (+) terminal. For the Norton Commando, the grounding tag on the end of the condenser pack can be used (fit a female spade connector to the end of the red grounding wire). See page 6.
9. Take the black wire from the ignition module, cut to length and fit an insulator and male spade crimp connector to the end. Connect to one of the negative ignition feed wires previously removed in step 2 (white-blue wire for Norton Commando). The other wire(s) are spare and should be covered with insulation to prevent shorting to the frame etc. If desired, an in-line fuse can be fitted here (minimum 5 amp recommended). See page 6. ***Goto step 12.***

For **NEGATIVE GROUND** electrics:

10. Take one of the positive ignition feed wires previously removed from the ignition coils and connect to ignition coil#2 positive (+) terminal. If desired, an in-line fuse can be fitted here (minimum 5 amp recommended). The other wire(s) are spare and should be covered with insulating tape to prevent shorting to the frame, etc. See page 7.
11. Take the black wire from the ignition module, cut to length and fit a suitable crimp connector. Connect the black wire to a good grounding point point on the frame, ideally the battery negative (—) terminal. For the Norton Commando, the grounding tag on the end of the condenser pack can be used. See page 7.
12. The GREY wire is provided an output signal to drive an electronic tachometer, if fitted. This is a 12 volt output and provides 1 pulse per engine revolution. If required, connect the grey wire to the tachometer signal input wire/terminal. If you have a mechnical tacho or and incompatible type (e.g. Scitsu or Krober), leave the wire unconnected and insulate the end of the wire.
13. Screw the new (supplied) suppressor plug caps onto the original spark plug wires.
14. Refit the main fuse/reconnect the battery.
15. Goto the IGNITION TIMING section.

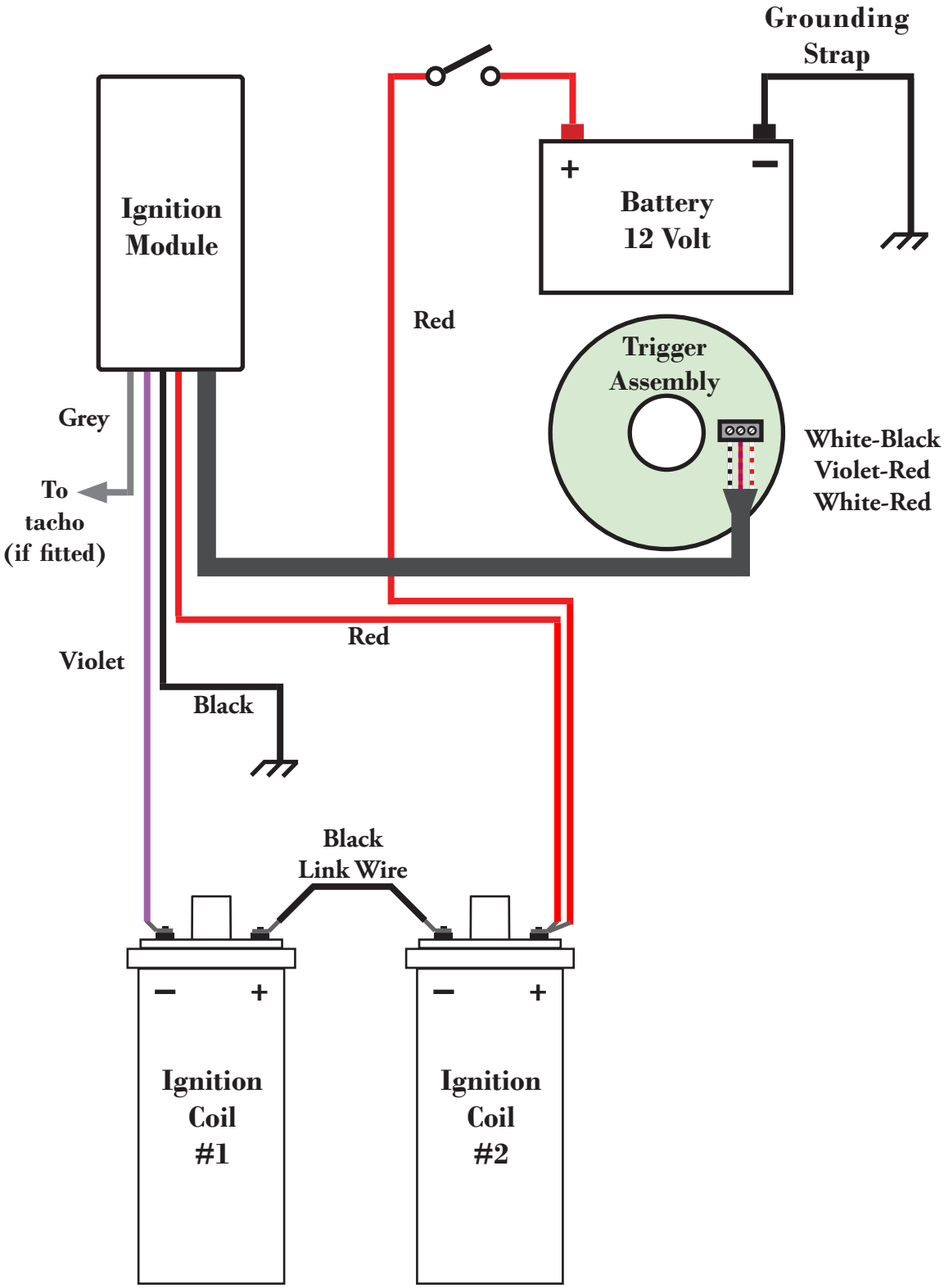
WIRING DIAGRAM

POSITIVE GROUND (STANDARD)



WIRING DIAGRAM

NEGATIVE GROUND



Ignition Timing See figs 2-5 on pages 10-11

1. Switch off the ignition.
2. If necessary, slightly loosen the trigger pillar fixings so that the trigger can be rotated by hand.
   Warning: risk of electric shock.
   Keep hands & body away from coils, ht leads, caps and plugs
3. The following operations may produce sparks from the plugs. It is recommended that the violet wire be temporarily disconnected from the negative terminal of ignition coil #1; place insulating tape over the end of the connector to preventing shorting to ground or other connections. This will prevent any undesired sparks whilst timing. Alternatively, the spark plugs can be removed, inserted into the plug caps and grounded onto the cylinder head, ***but note that the warning above applies.***
4. Reconnect the battery.
5. **Clockwise rotor rotation:**
   - If not already done, rotate the trigger to the fully clockwise position, as per fig. 2
   - Switch the ignition on (the red timing light will normally be OFF)
   - Rotate the trigger slowly counter-clockwise until the red timing light turns ON, see fig. 3
   - If the red timing light does not turn ON, leave the ignition switched on and repeat the previous steps (figs. 2 & 3) as required, until the trigger is calibrated (light turns ON in fig. 3).
6. **Counter-Clockwise rotor rotation:**
   - If not already done, rotate the trigger to the fully counter-clockwise position, as per fig. 4
   - Switch the ignition on (the red timing light will normally be OFF)
   - Rotate the trigger slowly clockwise until the red timing light turns ON, see fig. 5
   - If the red timing light does not turn ON, leave the ignition switched on and repeat the previous steps (figs. 4 & 5) as required, until the trigger is calibrated (light turns ON in fig.5).
7. Note: the most accurate method of static timing is as described above. Rotating the trigger from side to side about the leading edge of the slot (red timing light flashes off/on) will result in timing that is approx 4° retarded from the static figure you used.
8. Switch off the ignition.
9. Reconnect the violet wire to the ignition coil, if disconnected in step 3 (above). Refit spark plugs, if removed earlier.
10. If removed earlier, push the plug caps firmly onto the plugs, they should click into place.
11. 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 programmed curve (see advance graph, page 15).
12. The final timing can be checked and (if required) fine-tuned with a strobe timing light. This process will ensure that the timing has been set accurately, for best performance. The ignition timing is adjusted by moving the trigger assembly a small amount at a time on its adjustment slots. Proceed as follows:
    - Warm engine for 4-5 mins.
    - Connect a Xenon (white light) strobe lamp. It is recommend that a separate battery be used to power the strobe. Using the strobe, time the engine to the full advance mark (standard: 38° BTDC for Triumph, 34° BTDC for BSA, 30° BTDC for Norton)
    - Both plugs fire at the same time (wasted spark system), therefore it does not matter which spark plug wire is used to trigger the strobe
    - **For safety, switch the ignition off between adjustments**
    - To advance the timing, rotate the trigger the opposite way to the direction of rotor rotation
    - To retard the timing, rotate the trigger in the same direction as the direction of rotor rotation
    - Make very small adjustments; 1° of trigger movement equals 2° of crankshaft movement
    - The trigger has two sets of calibration marks (clockwise and counter-clockwise) on the outer edge to assist with timing adjustment

12. Reconnect the violet wire to ignition coil #1, if disconnected earlier. Refit the spark plugs/caps, if removed earlier.
13. Refit the battery cover, seat, contact-breaker cover, etc.
14. The engine should now start, and after warming up should idle well, provided everything else is in good order and correctly adjusted. The ignition will advance as per the programmed advance map (see fig 1, below).
15. The timing is now set for life. The system requires no maintenance, but for satisfactory and reliable operation the wiring, battery, charging system, coils, plug wires, plugs and carburettors must be maintained in good order.

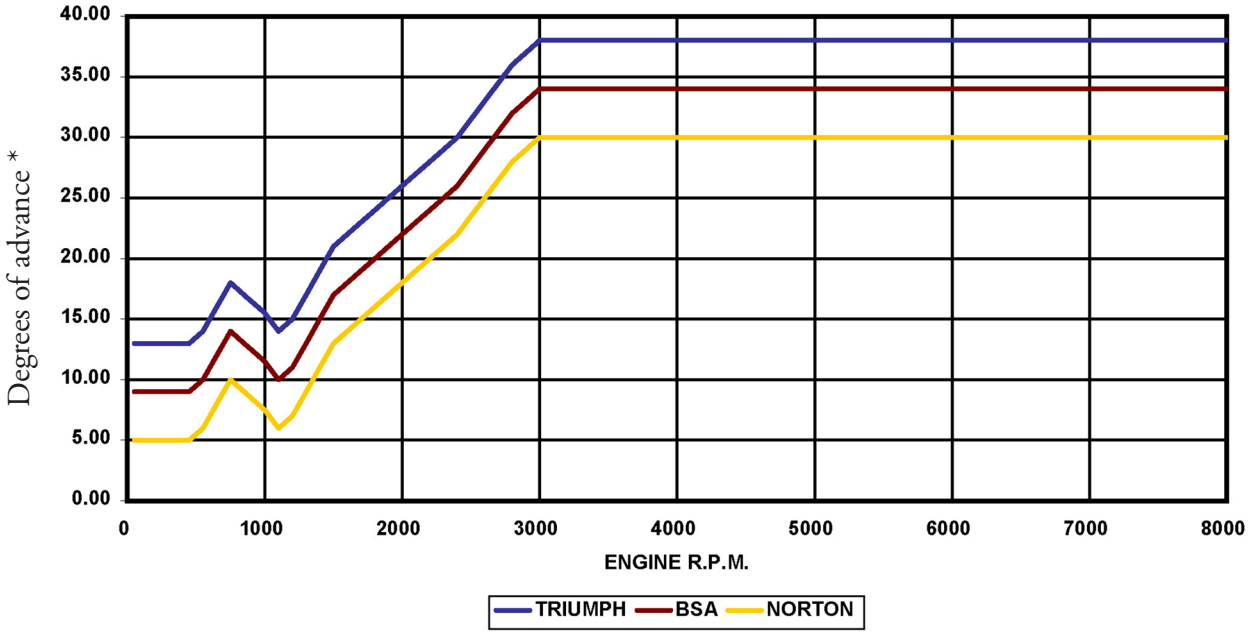
Table 1

Motorcycle	Camshaft Rotation	Full Advance Timing *
Triumph	Clockwise	38°
Bsa	Counter-Clockwise	34°
Norton Commando	Counter-Clockwise	28-30°
Norton Atlas	Clockwise	28-30°

* See notes on page 4

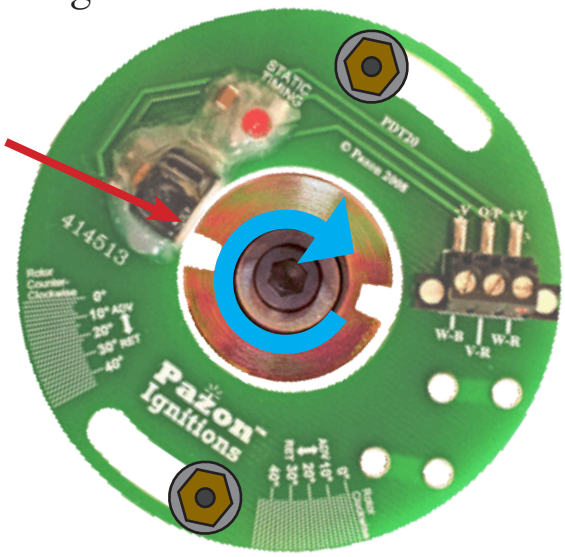
Fig. 1

Altair Triumph/Bsa/Norton Twin Ignition Advance: MAP061



Static Ignition Timing
CLOCKWISE Rotor Rotation
(Wiring not shown)

Fig. 2

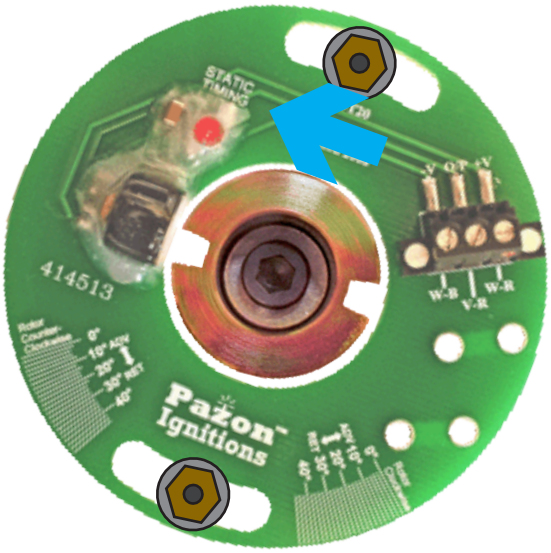


START POSITION

Turn trigger fully clockwise.
Start of rotor slot is approx ¼-⅓ across the face of the black sensor,

SWITCH IGNITION ON

Fig. 3



Turn trigger slowly counter-clockwise, until the red timing light turns on*,

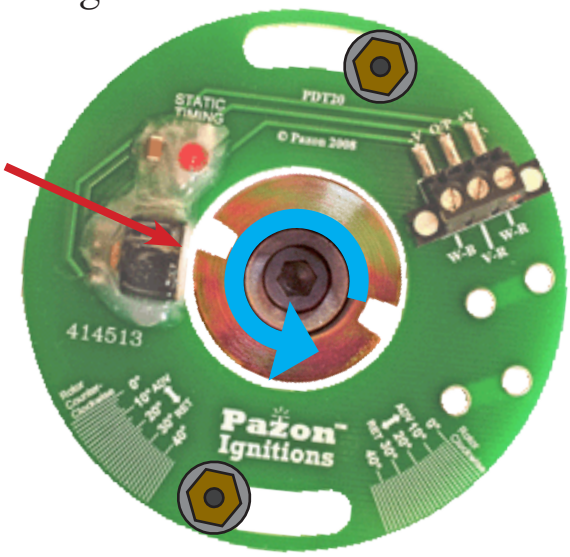
STOP TURNING

tighten trigger pillar fixings

* See accompanying text on page 8 for a full description of the static timing light operation

Static Ignition Timing
COUNTER-CLOCKWISE Rotor Rotation
(Wiring not shown)

Fig. 4

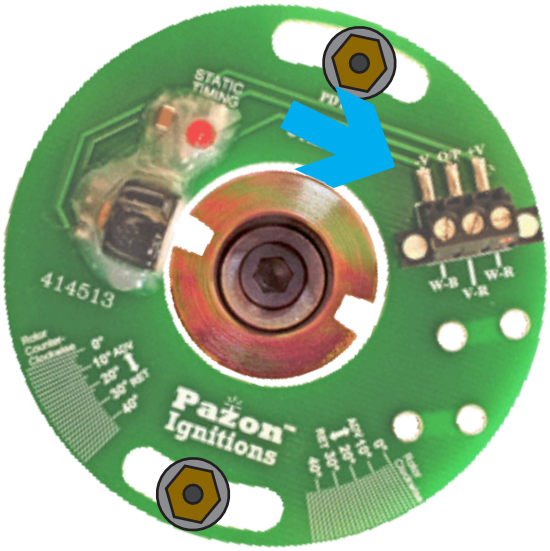


START POSITION

Turn trigger fully counter-clockwise.
Start of rotor slot is approx ¼-⅓
across the face of the black sensor,

SWITCH IGNITION ON

Fig. 5



Turn trigger slowly clockwise,
until the red timing light turns on*,

STOP TURNING

tighten trigger pillar fixings

* See accompanying text on page 8 for a full description of the static timing light operation

Terms, Conditions and Warranty

- Use of this product indicates your acceptance of this notice.
- The product design, firmware & literature is Copyright © 2011 PAZON IGNITIONS LTD. 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

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