



AltairTM Electronic Ignition System for TRIUMPH

Unit Twin Cylinder Motorcycles
Lucas 18D2 Distributor Models (6 Volt)



System# AL18D2-6

Altair Electronic Ignition System for

- **Triumph 350 & 500 Unit Twins (T21, 3TA, 5TA, T100SS, T100A, T100SC & TR100SR) from 1957-1962. Triumph 6T from 1960-1962.**
- **Only suitable for models fitted with the Lucas 18D2 distributor**
- **6 volt electrics (can be wired for positive or negative ground)**

Features

- **Fully digital design**
- **Compact digital ignition module (fully encapsulated) - module size: 80x40x20mm**
- **Fully mapped ignition timing, featuring idle stabilisation**
- **System includes a high-performance 6 volt dual output ignition coil**
- **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**
- **Very low voltage operation**
- **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 (green circular printed circuit board with components & connector terminal block)**
- **Two-part electroplated steel rotor assembly & 4BA fixing screw/washer**
- **Blanking piece and rubber grommet**
- **6 volt dual output ignition coil, aluminium spacers, fixing screws/washers/nuts**
- **H.T. (plug) leads**
- **Two 5K suppressor plug caps**
- **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.**

- Before fitting this ignition system, it is essential that the distributor is in good condition. Specifically, the shaft/bearings should not show signs of excessive wear (obvious signs of side-play or end-float). Side-play in particular may result in uneven/wandering ignition timing and/or running on one cylinder. This ignition system will not overcome serious mechanical wear in the distributor.
- This system is designed to give optimum results with one 6 volt dual output coil with a primary resistance of 1.5 to 2.5 ohms.
- 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 of 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. Note: some models may use a different grade to this, so please check Workshop/Owners Manual for correct type. Recommended plug gap range: 0.025"-0.028" (~0.7mm).
- 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 connections. 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 one battery terminal (or remove the main fuse).
4. Pull the plug caps off the spark plugs. Remove the h.t. lead from the centre of the ignition coil.
5. Disconnect the wire from the terminal on the distributor. Remove the Lucas 18D2 distributor from the engine, and take to a work bench.
6. Remove the distributor cap. Remove the rotor arm.
7. Slacken the distributor clamp bolt and remove the nut & washer. Slide the condensor off the bolt. See fig. 6, page 7. Refit the washer & nut, and tighten the bolt.
8. Undo and remove the two fixing screws & washers, and lift out the complete contact-breaker assembly & condensor from the distributor body. See fig. 7, page 7.
9. Undo and remove the screw from the top of the distributor shaft. Disconnect the two (bob weight) springs from the posts. See fig. 8, page 7. Remove the points cam, bob weights & springs. See fig. 9, page 7.
10. The rotor arm, contact-breaker assembly, condensor, points cam, bob weights & springs are not required with the electronic ignition and should be stored away in a safe place.

11. Check for end play in the distributor shaft and, if necessary, shim above drive gear. Check for excessive side-play in the distributor and, if necessary, replace/overhaul bearings and/or shaft.
12. The ignition system steel rotor consists of two parts. Take the larger part, and slide over distributor centre shaft; rotate so that the two small holes locate over the posts (originally used for holding the bob weight springs). Push the part down until it is fully seated (you may hear a slight 'click' when the parts is fully seated onto the shaft). See fig. 10, page 7. Take the smaller rotor part (this has two small fins). Slide the part over the distributor shaft so that the taper mates with the taper in the previously installed part. Fit the 4BA x 1/4" screw & washer into the top of the distributor shaft, but **do not tighten the screw at this stage**. See fig. 11, page 7. If the screw has been fully tightened, the top part of the rotor can be freed by loosening the screw and inserted a thin flat screwdriver between one of the fins and the shoulder section of the lower rotor part, to free it from the taper.
13. Take the green circular trigger assembly board and (if not already fitted) insert a small cable tie through the set of holes in front of the green connector terminal block. This will be used later, to secure the wiring to the board. Fit the trigger assembly into the distributor body (the rotor top part will pass through the centre hole). When fitted correctly, the green 3-way connector terminal block should be facing towards the cut-out section of the distributor. Secure the trigger assembly board with two 4BA screws & washers.
14. Disconnect the wires from the ignition coil terminals. The original ignition coil is not required and can be removed.
15. Using the supplied aluminium spacers, fixing bolts, nuts & washers, mount the supplied ignition coil in a ventilated position, via each end of the laminated metal bar. The mounting centres are @ 90mm/102mm. We recommend using the 102mm centres, as it provides easier access to the low tension terminals. Ideally the coil should be bolted to a sheet of metal (preferably aluminium). This will allow heat to be drawn away from the centre of the coil. Fit the supplied h.t. (plug) leads into the two outlets on the coil, and slide over the rubber covers. Route the leads to the spark plugs (either way around), cut to length (as required) and fit the supplied plug caps to the ends. The caps are designed to screw onto the copper cored leads.
16. Mount the ignition module in a convenient place (reasonably close to the ignition coil), e.g. under the seat or tank, but 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 coil, allow some space between the module and coil (as this will 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.

Wiring

See wiring diagrams on pages 8 & 9

1. Note: the low tension terminals on the supplied dual ignition coil are not marked plus/minus. It does not matter which terminal is taken as positive/negative. Take the violet wire from the ignition module, route to one of the ignition coil terminals (this will become 'negative'), cut to length and fit a small ring crimp connector to the end of the wire. Connect the violet wire to one of the ignition coil terminals, using the fixing screw, spring & flat washers provided.
2. Take the red wire from the ignition module, route to the other terminal on the ignition coil (this will become 'positive'), cut to length and fit a small ring crimp connector to the end of the wire. Do not fit to the coil terminal (see next step).

For **NEGATIVE GROUND** electrics, *goto step 5*

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

3. Take the red grounding wire, fit a small ring crimp connector on one end and connect to the 'positive' terminal on the ignition coil, **together with the red wire from the ignition module**,

using the fixing screw, spring & flat washers provided. You should now have two ring terminals on the 'positive' terminal of the coil. Cut the red grounding wire 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. See page 8.

4. 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 a negative feed from the ignition switch. The wire that was connected to the original ignition coil (SW terminal) can be used for this. This wire is typically white. If desired, an in-line fuse can be fitted here (minimum 5 amp recommended). See page 8.
Goto step 7.

For **NEGATIVE GROUND** electrics:

5. Find a positive feed wire, coming from the ignition switch. The wire that was connected to the original ignition coil (SW terminal) can be used for this. This wire is typically white. Route to the 'positive' terminal of the ignition coil, cut to length (if required). Fit a small ring crimp connector on the end of the wire. Connect to the 'positive' terminal on the ignition coil, **together with the red wire from the ignition module**, using the fixing screw, spring & flat washers provided. You should now have two ring terminals on the 'positive' terminal of the coil. If desired, an in-line fuse can be fitted here (minimum 5 amp recommended). See page 9.
6. Take the black wire from the ignition module, route to a good grounding point on the frame, ideally the battery negative (—) terminal. Cut the wire to length and fit a suitable crimp connector (e.g. ring terminal). Connect the black wire onto the grounding point. See page 9.
7. 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 distributor. Allow a minimum of 50mm/2" of excess wire between the trigger assembly and ignition module. If passing through holes in metalwork use grommets and/or sleeving to protect the wiring. Take the small blanking plate with grommet, and slide the grommet over the sleeved wires. See fig. 1, below. Route the wires to the green connector terminal block. Cut the wiring and sleeving to length. Carefully strip back 4-5mm of insulation from the ends of the three wires. See fig. 2, below. 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 fig. 3, page 6.
8. Tighten the three screws with a small screwdriver. Slide the black sleeving up close to the connector block, see fig. 4, page 6. Secure the sleeved wires to the trigger plate with the small cable-tie (inserted earlier). Cut off the excess from the end of the cable tie. See fig. 4, page 6.
9. The GREY wire provides 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 mechanical tacho or an incompatible type (e.g. Scitsu or Krober), leave the wire unconnected and insulate the end of the wire.
10. Refit the main fuse/reconnect the battery.
11. Goto the IGNITION TIMING section, on page 10.

Fig. 1



Fig. 2

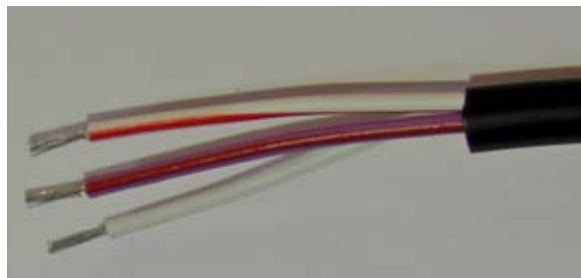


Fig. 3



Fig. 4



Fig. 5



Fig. 6

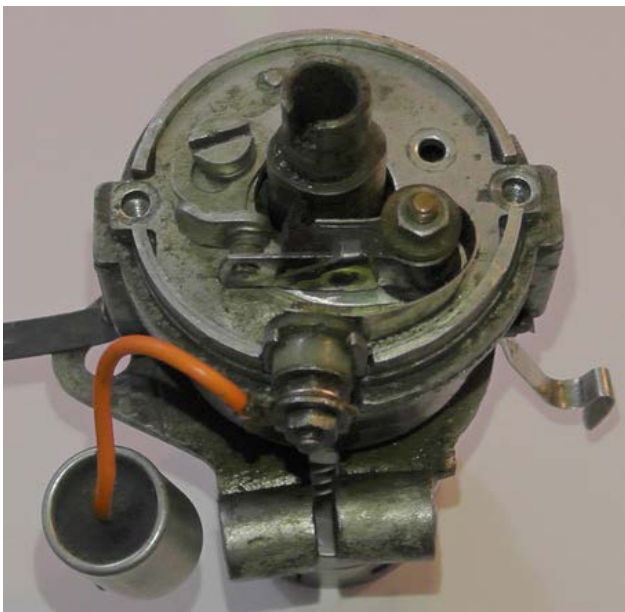


Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11



WIRING DIAGRAM

POSITIVE GROUND (STANDARD)

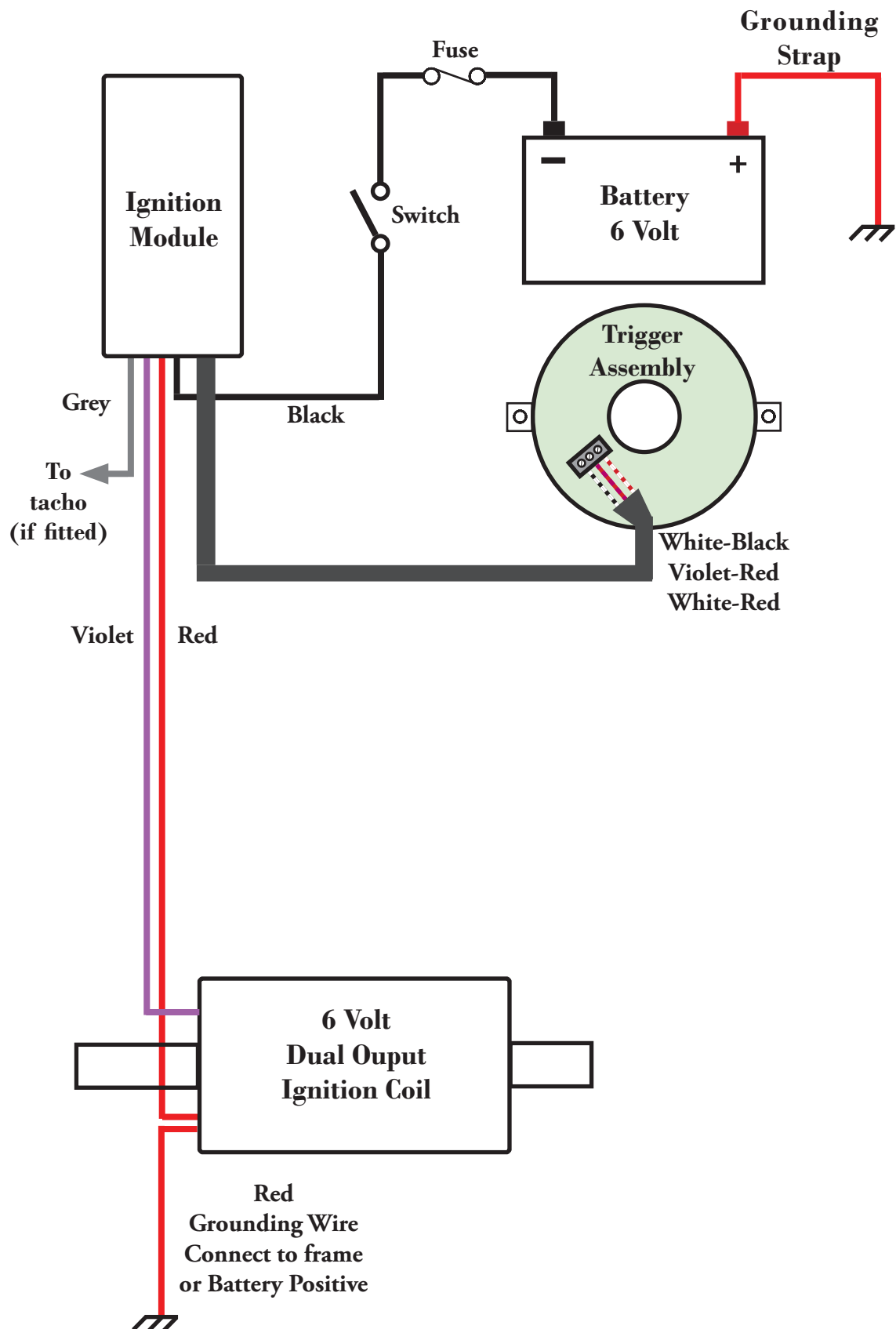


Fig. 12

WIRING DIAGRAM

NEGATIVE GROUND

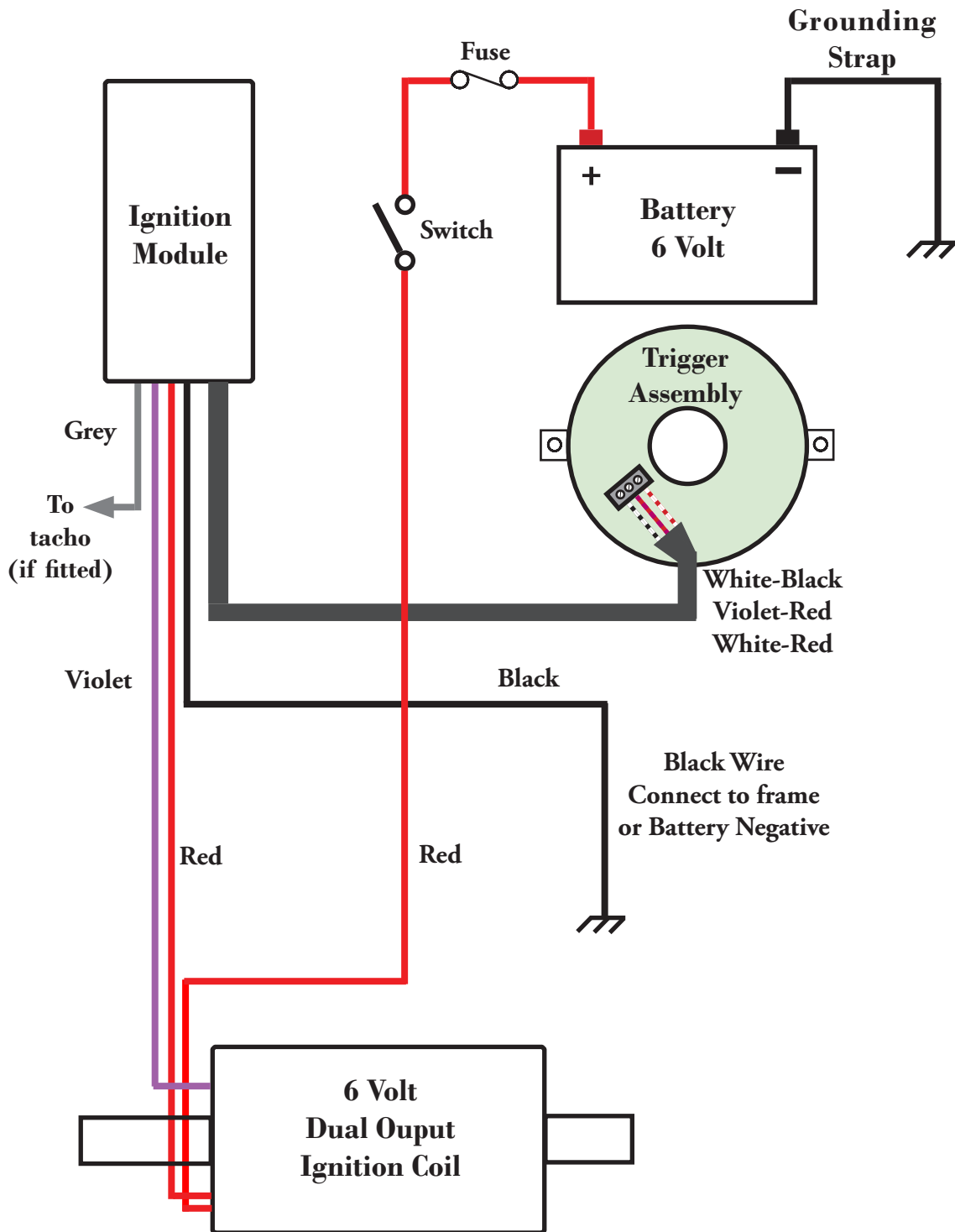


Fig. 13

Ignition Timing

See figs. 17-19 on pages 12-13

1. Set the engine to the required full advance timing mark on the compression stroke Either cylinder can be used, since both fire together (wasted spark system). Note: the other cylinder will be on the exhaust stroke. Typical figures are 36-38° BTDC. If in doubt, consult a Workshop/Owners Manual for the correct full advance timing figure for your model. Note: the timing method is different to that used with the original points & mechanical advance, where the timing will usually be set at the starting/ idle timing figure (e.g. 12° BTDC). Positioning the engine to the full advance timing position is best done using a degree disc, or a dial gauge down the bore. 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 36°, set the engine to TDC, zero the degree disc and rotate engine backwards until the degree disc has travelled 18°. The final timing 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.

Warning: risk of electric shock.

Keep hands & body away from coils, h.t. leads, caps and plugs

2. The following operations may produce sparks from the plugs. For safety, the violet wire may be temporarily disconnected from the ignition coil; 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 still applies.*
3. Reconnect the battery, if not already done.

Static timing method (with engine set at full advance, as per step 1, above).

- Position the rotor so that the centre of one of the tabs is aligned approximately with the centre of the black sensor (at the top of the trigger assembly), as shown in fig.17, page 12.
- Switch the ignition on (the red timing light will normally be OFF, but you may see it blink briefly when the ignition is first switched on).
- Rotate the rotor **slowly counter-clockwise** until the red timing light turns ON, stop rotating. See fig. 18, page 12.
- Rotate the trigger **very slowly clockwise** until the red timing light turns OFF, stop rotating. See fig. 19, page 13. Tighten the rotor centre screw. As this is fully tightened, the part will clamp onto the distributor shaft.
- Switch the ignition off.

Alternative static timing method (with engine set at full advance, as per step 1, above).

If the rotor screw has been fully tightened (top part clamped in position), the timing can be set by rotating the distributor body. Proceed as follows:

- Loosen the distributor clamp, so that the distributor can be rotated.
- Rotate the distributor, so that the centre of one of the rotor tabs is aligned approximately with the centre of the black sensor (at the top of the trigger assembly), as shown in fig.17, page 12.
- Switch the ignition on (the red timing light will normally be OFF, but you may see it blink briefly when the ignition is first switched on).
- Rotate the distributor **slowly clockwise** until the red timing light turns ON, stop rotating.
- Rotate the distributor **very slowly counter-clockwise** until the red timing light turns OFF, stop rotating. Tighten the distributor clamp.
- Switch the ignition off.

4. Reconnect the violet wire to the ignition coil, if disconnected in step 2 (above).
5. Refit spark plugs, if removed earlier.
6. If removed earlier, push the plug caps firmly onto the plugs, they should click into place.

7. Refit the fuel tank and/or seat. 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 20, page 15). The graph shows lines for full advance timing @ 36° & 38° BTDC (other figures may be used, to suit your engine and tuning preferences).
8. If you have strobe timing facilities, 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 can be adjusted by rotating the distributor body a small amount at a time. Proceed as follows:
 - Warm engine for 4-5 mins
 - Connect a Xenon (white light) strobe lamp. It is recommended that a separate battery be used to power the strobe. Using the strobe, time the engine to the full advance mark with the engine running above 3000 rpm
 - 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
 - To advance the timing, rotate the distributor counter-clockwise
 - To retard the timing, rotate the distributor clockwise
 - Make very small adjustments; 1° of distributor movement equals 2° of crankshaft movement
9. Slide the small blanking plate with grommet forward and down into the cut-out section of the distributor body. See fig. 14, below.
10. Refit the distributor cap. When fitting the cap, ensure that the upper section of the small blanking plate is on the inside of the cut-out section of the distributor cap. Whilst pushing the cap fully down, pull gently on the grommet, so that the outer part of the grommet sits fully over the top part of the cut-out section. See figs. 15 & 16. Note: for an original appearance, the original high tension leads may be left attached to the cap, but they are not required with the electronic ignition system. If left in place, the ends should be secured safely using (for example) cable ties.
11. The timing is now set for life. The system requires no maintenance, but for satisfactory and reliable operation the wiring, battery, charging system, coil, plug wires, plugs and carburettor must be maintained in good order.

Fig. 14



Fig. 15

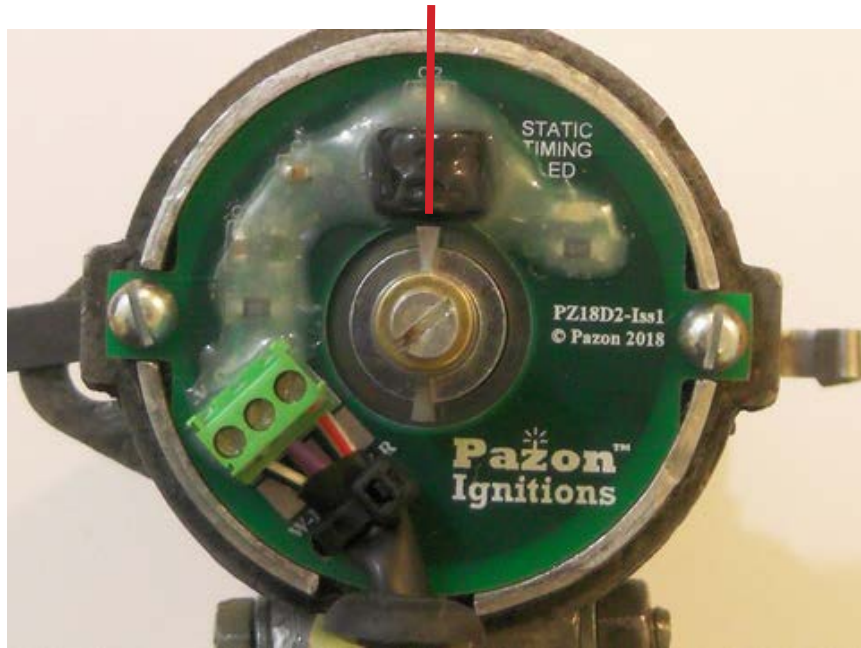


Fig. 16



Static Ignition Timing (engine @ full advance timing position)

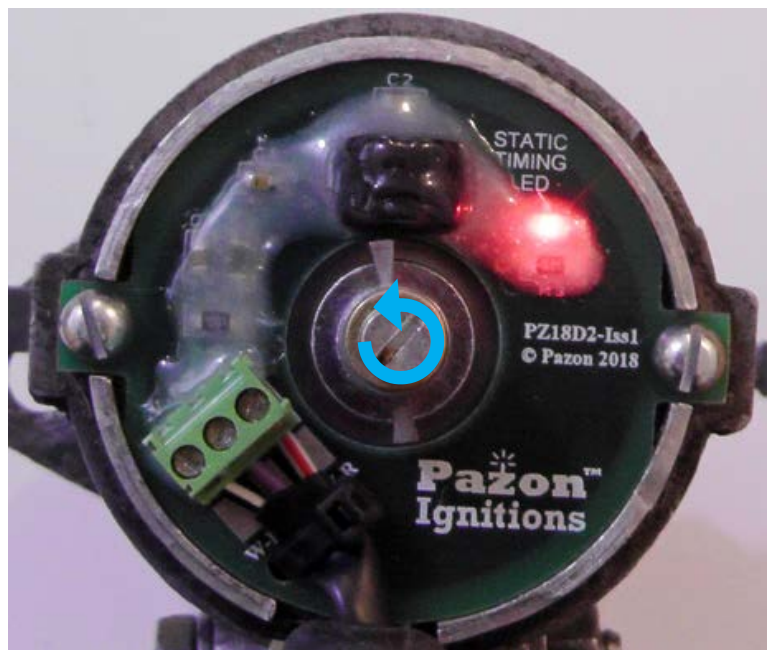
Fig. 17



START POSITION

Align centre of
rotor tab
with centre of
black sensor

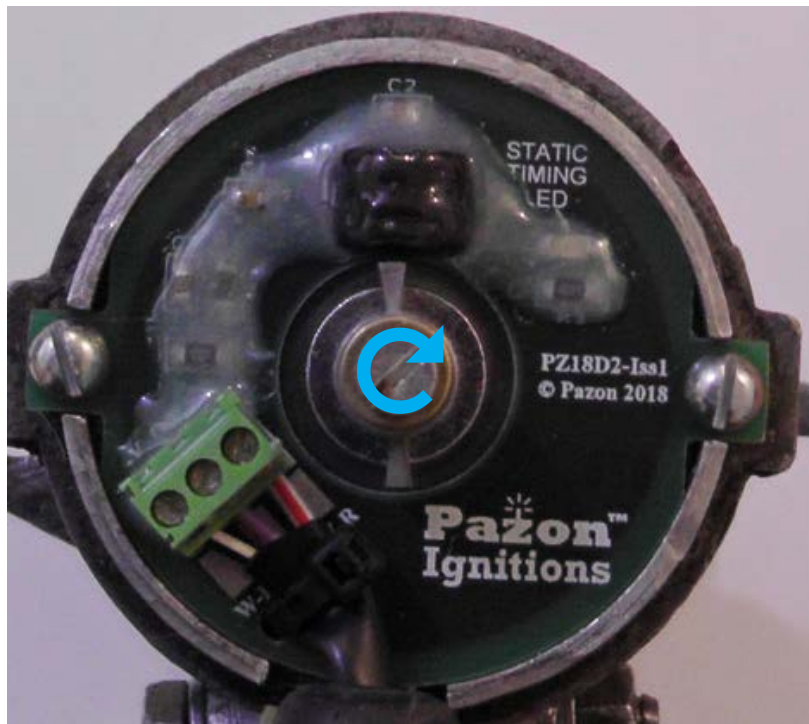
Fig. 18



SWITCH IGNITION ON

Rotate rotor
slowly COUNTER-CLOCKWISE
until red static timing led
turns ON,
stop rotating

Fig. 19



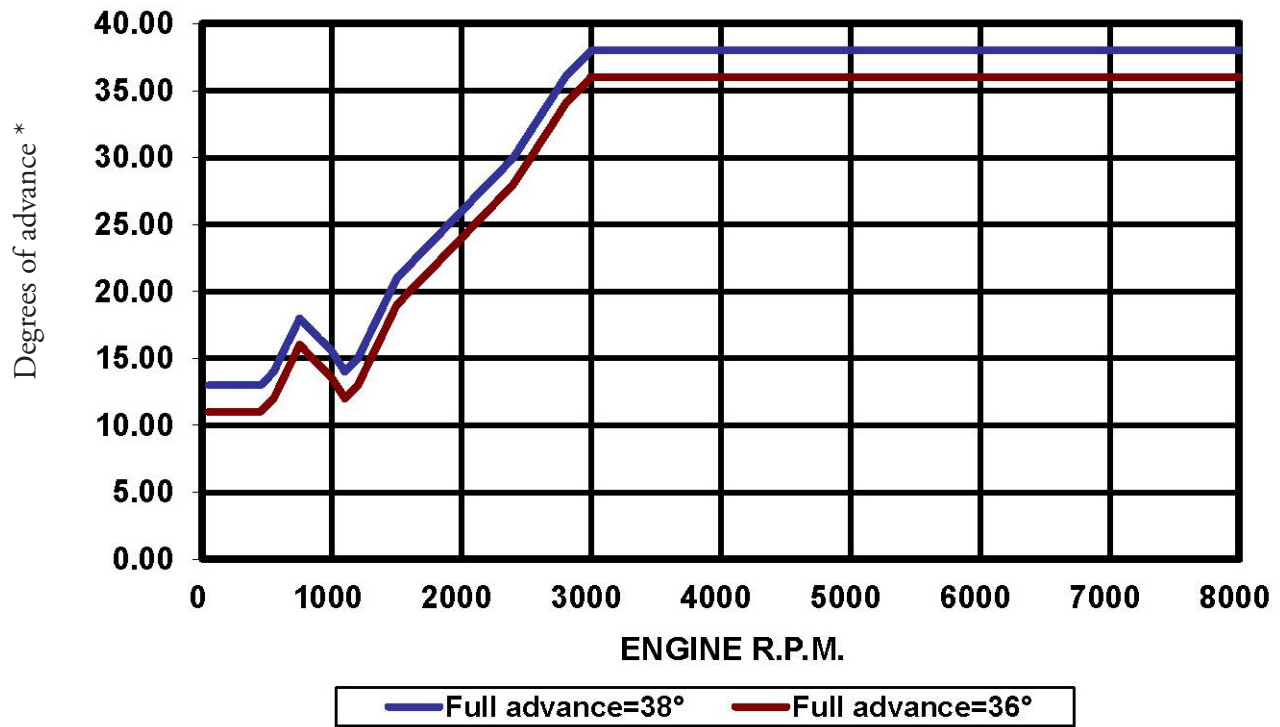
Rotate rotor
very slowly CLOCKWISE
until red static timing led
turns OFF,
stop rotating.
Tighten centre screw.

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

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Fig. 20

Altair Triumph Twin Ignition Advance: MAP061



* Relative to static ignition timing

Terms, Conditions and Warranty

- Use of this product indicates your acceptance of this notice.
- The product design, firmware & literature is Copyright © 2018 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 of 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.

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