

**“Do business in the
right atmosphere”**

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PC/OL 6 & 9 Issue 2 6/97

**Burner
Supplement**

**Models PC/OL6 & PC/OL9
PC/OL fully automatic oil burners**

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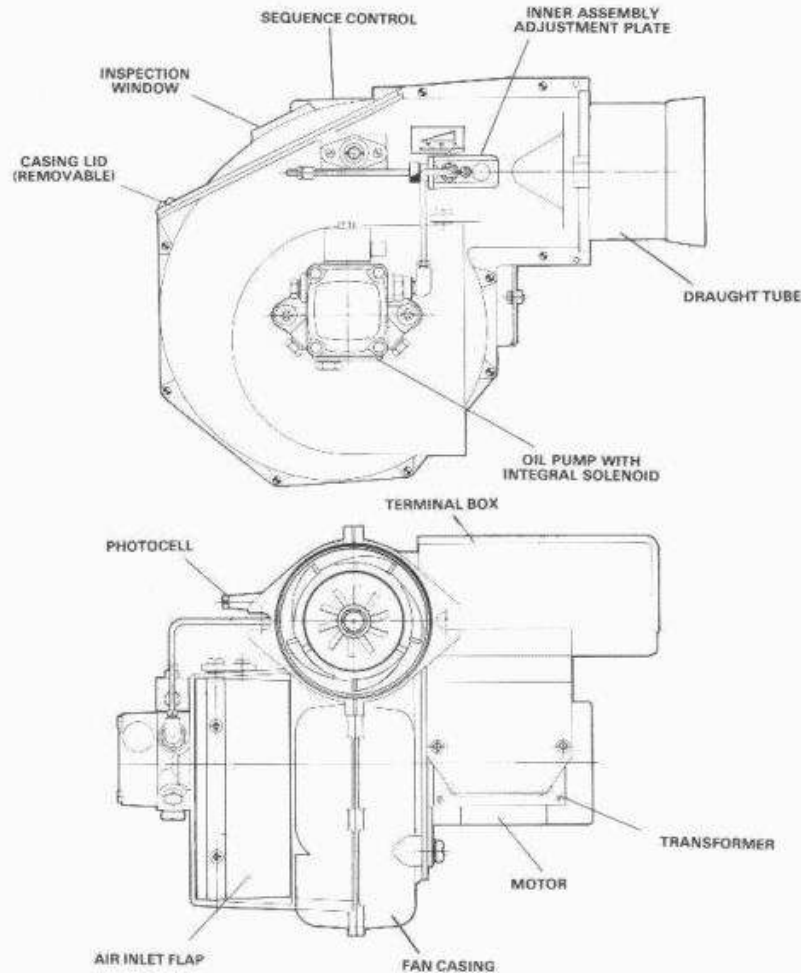
Introduction

The Powmatic PC/OL range of light oil burners are, in principle, fully-automatic forced draught burners with oil pressure-jet atomisers. They are of monobloc design i.e. having all of the parts required for functioning of the burner comprised in one unit or block. Flame safeguard – using a photo-cell to monitor the flame – is provided by the integral full-sequence control box and in the event of flame failure the oil solenoid valve is de-energised and the oil supply is shut-off within one second. The burners have a high air pressure performance throughout their operating range.

The PC/OL6 & 9 model has a variable output range of 88-237kW/hr

1 Technical Data/Components

Fig. 1 Principal Components of the PC/OL9



Main Components

- Full sequence control box
- Burner body, incorporating fan housing and suction box
- High capacity burner fan
- Burner motor
- Oil pressure pump with integral filter, solenoid valve and oil pressure regulator
- Draught Tube
- Firing head with nozzle, diffuser and electrodes
- Flame monitoring cell
- High voltage ignition transformer
- Burner mounting flange and gasket

Basic Technology Data

Output/Fuel Consumption -
 PC/OL6 & 9 - 88 - 237kW/hr 8.2 - 22.3kg/hr
 Type of oil - light or extra light
 Control Box - TF830B (both burner models)
 Motor - 240v, 50Hz, 1 PH, 250w, 2700rpm
 1.7 amps (both burner models)
 Ignition Transformer - 20mA, 2 x 5000v, 33% ED
 (both burner models)
 Pump SUNTEC AS47-7451-2FRK65
 (Both burner models)
 Weight - PC/OL6 & 9 23kg.
 Air regulation - on suction and pressure sides by
 manual adjustment of air flap and diffuser respectively

12 Commissioning Sheet

The details below are to be completed by the commissioning engineer.

Contractors Name: _____

Address: _____

Installed at:- Name: _____

Address: _____

Heater Size _____ Type _____ Serial No. _____

Burner Size _____ Type _____ Serial No. _____

Commissioning Date _____

Guarantee Expiry Date _____

Oil Type _____

Burner Nozzle - Size _____ U . S . gall

Degree _____

Pump Pressure _____ p.s.i.

_____ bar

CO² _____ %

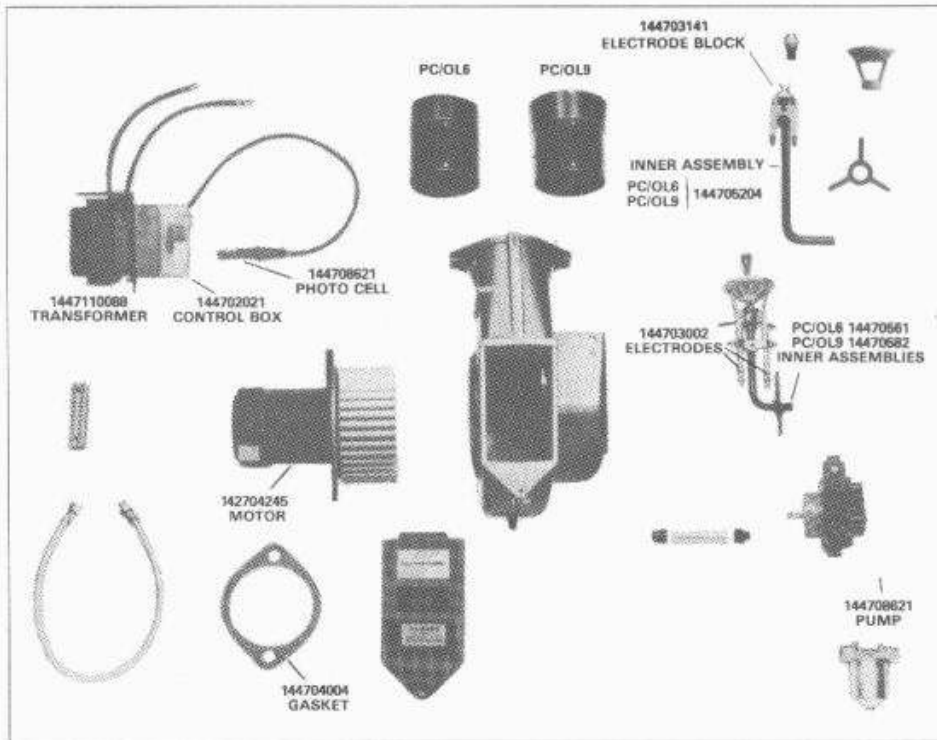
Smoke No. _____

Gross Flue Temperature _____ °C

Ambient Temperature _____ °C

Efficiency _____ %

10 Parts List



11 Fault Finding

Symptom	Check that
Burner will not start:	<ul style="list-style-type: none"> - External controls are calling for heat - Limit thermostat has not tripped - Burner is not at lockout - Electrical supply fuse is intact - Burner fan motor is operative
Burner goes through pre-purge period but flame fails to establish:	<ul style="list-style-type: none"> - Oil supply is present - All oil valves are open - Oil solenoid valve is operative - Oil pressure is correct - Live and Neutral leads are not reversed - The ignition spark is present at the required time - Electrodes are in good condition - Flame signal is present - That the burner settings are correct

2 Mounting the Burner

NOTE: The following procedure only applies when the burner has not been fitted to the appliance in the factory. In this case the burner will be supplied with a mounting flange and gasket.

MOUNTING

1. Remove the nuts and washers from the burner mounting on the appliance.
2. Offer the complete burner to the appliance and locate the draught tube in the burner port at the same time engaging the burner flange over the studs.
3. Push the flange fully home, replace washers and resecure nuts.

3 Oil Connection

This must generally be in accordance with BS 779 Part 3 and must terminate not more than 18" from the burner. The final connection to the burner being by means of the flexible oil pipe supplied with the burner.

4 Electrical Connection

The electrical connection to the burner (i.e. positive, neutral and earth) is wired direct to the burner terminal strip as shown on wiring diagram on page 9.

5 Commissioning and Testing

5.1 Electrical Installations

In the event of any electrical fault after installation in the appliance preliminary electrical system checks should be carried out; these including earth continuity, polarity and resistance to earth checks.

Checks to ensure electrical safety should be carried out by a competent person.

5.2 Oil Installation

The oil system should be commissioned generally in accordance with BS5410, Part 2, Section 59, paragraphs 59.1.1.1. to 59.1.1.6.

5.3 Sequence Check

1. Ensure main oil supply is closed; also any intermediate valves and that main electricity is switched OFF.
2. Check that:
 - i. 'The room thermostat is turned to 'ON' or 'Maximum'.
 - ii. The time clock (if fitted) is in an 'ON' period.
 - iii. The appliance control thermostat is turned to its maximum setting.
3. Turn 'ON' the main electricity supply and check that the following sequence of events occurs:
 - i. Burner Fan runs
 - ii. Ignition spark is heard
 - iii. Burner oil solenoid valve opens. (first stage).
 - iv. Burner goes to lockout as there is no oil supply.
4. Re-set the control box by pressing the reset button.

5.4 Initial Adjustment (setting up)

5.4.1 Air Flow

1. The air is regulated in two places on the PC/OL range of burners: firstly on the suction side by means of an air flap and secondly within the burner head (on the pressure side) via the diffuser. The latter moves backwards and forwards with the firing head. The suction damper governs the main airflow whilst the fine-tuning is via the diffuser.

2. **MAIN AIRFLOW:-** The suction damper has a simple manual adjustment situated on the top of the air suction box. Using a pozidrive screw driver turn anti-clockwise to open damper and increase airflow and vice-versa.

3. **FINE TUNING:-** The diffuser attached to the firing head assembly within the burner head is adjusted by sliding the firing head assembly backwards or forwards as required. Before any adjustment, slacken the allen screw securing the inner assembly adjustment plate to the burner body. With the locking nut loosened the firing head assembly with ignition electrodes and diffuser can be adjusted by turning the knurled nut. Move the diffuser forwards for more air and backwards for less air. After adjustment the allen screw must be re-tightened. The setting place is now butted up to the repositioned adjuster strip and the allen key re-tightened – thus giving a setting point to which the firing head assembly can be returned following its movement for maintenance purposes.

5.4.2 Oil Flow

1. Initial Bleeding

1. After the burner is correctly connected the oil pipework has to be bled of any air trapped during installation. As supplied ex works the fuel pump is rigged for single pipe operation.

2. If the burner is to be used for two pipe operation, the bypass plug should be fitted to the fuel pump (Fig. 2 Ref. 4).

3. To enable air to escape as quickly as possible from the oil line and the pump, release the union on the oil feed pipe situated at its entry to the first-stage solenoid valve (adjacent to the firing head) and connect a 'T' piece.

4. Run the burner until bubble-free oil comes from the 'T' piece.

5. Stop the burner, disconnect the 'T' piece, reconnect the union on the oil-feed pipe.

2. Oil Pressure Adjustment

The oil pressure is adjusted by turning the pressure regulation screw, to be found opposite the nozzle pipe outlet (Fig. 2 Ref. 2). Turn clockwise to increase the pressure and anti-clockwise to decrease.

Standard Operating Pressures:

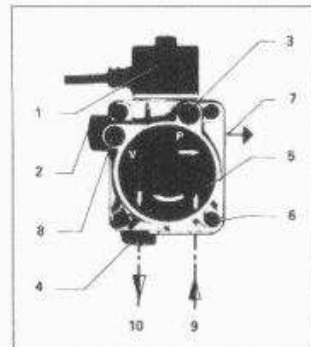
CA400	CA500 CA600 CP600 2R10 2R12	CA700	1R9 2R11	2R6	2R7	2R8	2R9
13.6 bar (200psi)	14.3 bar (210psi)	12.9 bar (190psi)	11 bar (160psi)	12.2 bar (180psi)	15.0 bar (220psi)	12.9 bar (190psi)	10.2 bar (150psi)

A pressure gauge must be connected to the pressure gauge connection (Fig. 2 Ref. 3) when checking the oil pressure.

NOTE: Until all air is removed and oil is present the burner will go to lockout during venting at the end of each pre-purge. In such cases press the illuminated red lock-out button to restart the burner.

3. When venting is complete allow the burner to run for a minimum of five minutes. Check that the oil pressure is as stated above.

Fig. 2 Suntec AS47 Fuel Pump



1. Solenoid valve
2. Oil pressure regulator
3. Pressure gauge connection
4. By-pass plug for two pipe operation
5. Pump cover
6. Cover fixing screws
7. Nozzle connection
8. Vacuummeter connection
9. Suction connection
10. Return connection
(only for two pipe installation)

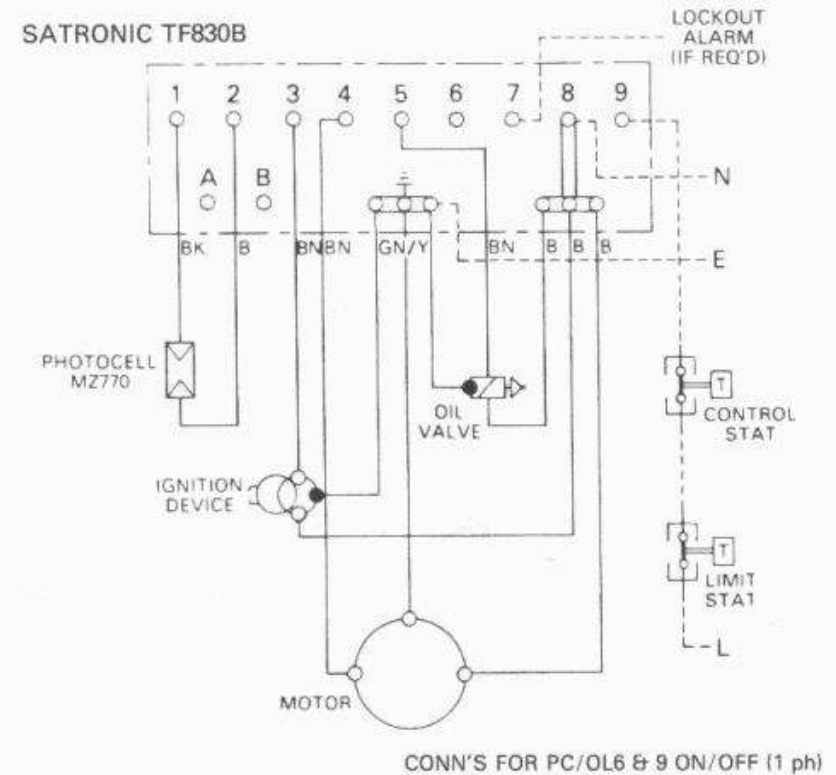
4. All thermostats may now be adjusted to the required temperatures. The correct air adjustment and combustion quality can be determined by means of CO₂ and smoke measurements.

5. Two Pipe Installations

Where the level of the burner pump is above the level of the oil tank, a 2 pipe oil supply is required to prevent air collecting at the system highest point, i.e. the pump. The small screw, provided with each burner, should be fitted into the return port (item 10) to prevent internal pump circulation. Two pipe systems should be installed in accordance with the pump manufacturer's instructions.

9 Wiring Diagram

PC/OL6 & 9 – Wiring Diagram



8.8 Solenoid Valves (Oil Line)

1. Remove control box as step 8.1.
2. Disconnect the appropriate solenoid valve wiring from the control box terminals. The valve situated on the top of the pump disconnects from terminals nos. 5 (live), 8 (neutral) and the earthing block.
3. Pull appropriate valve wiring sheath out of control box.
4. Replace faulty valve and re-assemble in reverse order.

8.9 Electrodes

1. Release the fastening screw and remove cover plate from the top of the burner body.
2. Disconnect the union on the oil feed line pipe from the firing head oil pipe where it enters the burner body.
3. Before attempting to withdraw the inner assembly withdraw the photo-electric cell.
4. Pull off the two electrode leads noting their orientation.
5. Push tail of disconnected oil pipe through into burner body and withdraw complete firing head assembly from the front end of the burner.
6. Using a 3mm allen key slacken the electrode clamping screw and slide-out electrode(s) as required.
7. Replace electrode, taking care to position correctly (see fig. 3) and re-tighten clamping screw.
8. Re-assemble in reverse order.

8.10 Burner Nozzle

1. To gain access to the burner nozzles (situated on end of firing head assembly) proceed as steps 7.2.1 - 7.2.6.
2. To avoid damaging electrodes use a 3mm allen key to slacken electrode clamping screw and slide-out electrodes.
3. Slacken the diffuser clamping screw and slide off diffuser.
4. Using a 19mm spanner to grip the firing head body release the nozzle using a 16mm spanner.
5. Replace nozzle, refit diffuser and electrodes - taking care with their positioning - and re-assemble in reverse order.

6 Handing Over To The User

Ensure that the user understands the basic operating procedure of the burner. The engineer should also be satisfied that the connection of the mains electricity and oil supply has been undertaken in a competent and approved manner so as to allow totally safe operation of the burner unit. Refer to the previous sections of this supplement covering Connection and Commissioning. Refer also to the Appliance Installation, Commissioning and Servicing Instructions.

7 Servicing

WARNING: ALWAYS switch off and disconnect electricity supply and close oil line valves before carrying out any servicing work or replacement of failed components.

7.1 General

Full maintenance should be undertaken not less than once per year. After servicing work has been completed or any component replaced, the burner must be fully commissioned and tested for soundness as in Section 5. In the event of the burner breakdown the following basic checks must be carried out before undertaking any service or repair work:

- Is there sufficient oil in the tank?
- Are all of the oil pipeline valves open?
- Check that the switches and thermostats are in the normal operating positions.
- Check all fuses.

7.2 Firing Head Assembly

1. Using a posidrive screwdriver release and remove the fastening screws and remove the cover plate from the top of the burner body.
2. Pull-off the two electrode leads noting their orientation.
3. Disconnect the unions on the oil feed pipe from the firing head oil pipe where it enters the burner body.
4. Before attempting to withdraw the inner assembly withdraw the photo-electric cell.
5. Slacken and remove the allen screw to release the firing head oil pipes and assembly. Slide whole assembly back to its rearmost position.
6. Push tail of disconnected oil pipe through into burner body and withdraw complete firing head assembly from the front end of the burner body.
7. Using a stiff brush clean off any accumulated deposits from around the nozzle and diffuser taking care not to disturb the ignition electrodes.

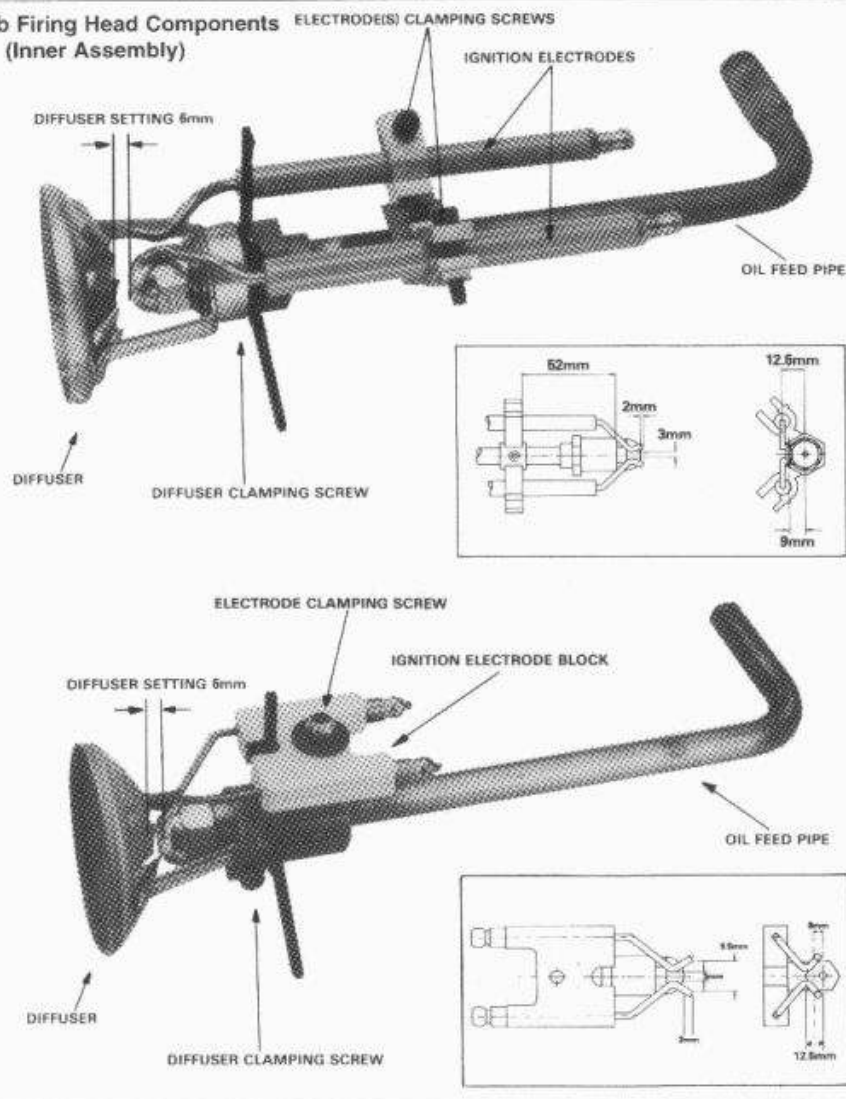
6. Should the burner nozzles need a more thorough clean, proceed as follows:

1. Using a 3mm allen key slacken the electrode clamping screw and pull electrodes clear of burner nozzle noting their exact orientation.
2. Slacken diffuser clamping screw again noting its exact orientation.
3. Using a 19mm spanner grip the firing head body and with a 16mm spanner release the burner nozzle.
4. Clean nozzle in petrol or thinner.
5. Re-assemble nozzle, diffuser and electrodes onto the firing head.
9. Check the condition and positioning of the ignition electrodes and if not damaged, eroded or dirty the firing head assembly may be refitted in reverse order.

7.3 Burner Fan

1. Remove burner top cover plate as described in 7.2.1.
2. Clean the fan blades with a stiff brush to remove any accumulated deposits.
3. Check that the fan is rigidly fixed to the motor shaft and that the assembly turns freely.
4. Re-assemble in reverse order.

Fig. 3b Firing Head Components
(Inner Assembly)



7.4 Oil Pump Filter

1. The filter is located under the front cover of the pump. To remove the cover undo the four securing screws (see Fig. 2 Ref. 6) and lift off.
2. Remove the filter and wash-out in petrol or burner oil.
3. Refit filter and re-assemble in reverse order.

7.5 Re-adjustment of Firing Head

After any service work necessitating the movement or removal of the firing head inner assembly check and re-adjust the setting as described in step 5.4.1.

8 Replacement of Faulty Components

WARNING: ALWAYS switch off and disconnect electricity supply and close oil line valves before carrying out any servicing work or replacement of failed components.

8.1 Control Box

1. Release the single retaining screw and remove burner cover.
2. Release central retaining screw from the control box and pull off.
3. Push on new control box and refit retaining screw.

8.2 Burner Fan

1. Using a 10mm spanner remove left hand transformer set screw and remove transformer by moving to the left (do not electrically disconnect).
2. Slacken off and remove the two motor fixing screws to allow fan to be withdrawn with motor, remove flexible pump coupling.
3. To remove fan from motor insert 4mm allen key through appropriate fan blade and remove fan.
4. Replace fan and re-assemble in reverse order.

8.3 Burner Fan Motor

1. Remove terminal box cover plate and control box.
2. Disconnect the motor wiring from the control box terminal nos. 4 (live), 8 (neutral) and the earthing block. Pull motor wiring sheath out of control box and burner body.
3. Remove the motor fan assembly from the burner as in step 8.2.2.
4. Pull off flexible pump coupling and remove impeller as described in step 8.2.3.
5. Replace motor, refit fan impeller and flexible coupling before reassembling in reverse order.

8.4 Capacitor (Single Phase Model)

1. If it is possible to use a soldering iron at the location of the burner then the capacitor can be replaced with the burner motor remaining in situ. To do this:
 1. Pull end cap off capacitor to reveal wiring connections.
 2. Snip through wiring at capacitor terminals or alternatively, using a soldering iron, melt through wiring connections at terminals.
 3. Using a 13mm spanner release the nut securing capacitor to its mounting bracket and pull capacitor free.
 4. Replace capacitor, resolder terminal connections and refit onto mounting bracket.

2. Should a soldering iron only be available at the workbench then remove motor/fan assembly as described in steps 8.3.1, 8.3.2 and 8.2 and proceed on workbench as steps 8.4.1.1.-8.4.1.4. above.

Refit motor/fan assembly in reverse order of steps 8.3.1, 8.3.2. and 8.2.

8.5 Ignition Transformer

1. Remove the control box as step 8.1.2.
2. Disconnect the transformer wiring from the control box terminals nos. 3 (live), 8 (neutral) and earthing block. Pull transformer wiring from control box.
3. Release the fastening screw and remove cover plate from the top of burner body. Pull off ignition leads noting their orientation.
4. Using a 10mm spanner release the screw securing the transformer to the burner body and remove transformer as 8.2. 1.
5. Replace transformer passing the ignition leads through their respective openings in the burner body side and re-assemble in reverse order.

8.6 Photo-cell

1. Remove control box as step 8.1.
2. Disconnect photo-cell wiring from control box terminals nos. 1 and 2. Pull photo-cell wiring sheath out of control box.
3. Pull out faulty photo-cell from its locating socket in burner body.
4. Replace photo-cell, reconnect wiring and refit control box.

8.7 Oil Pump and Coupling

1. Disconnect pipe unions at bottom of pump and remove flexible oil feed pipes.
2. Disconnect single pipe union on right hand side of pump releasing oil feed pipe to firing head.
3. Release knurled nut and lift off solenoid valve from top of pump.
4. Using a pozidrive screwdriver remove the locking screws, situated each side of the pump on the air box and pull out faulty pump.
5. Removal of the pump will reveal the flexible pump drive coupling which can be either re-used or, if worn or damaged replaced on re-assembly. The nylon coupling is a push-fit onto both the pump and motor spindles.

6. Replace pump, first ensuring that the nylon coupling is located on the end of the motor spindle (inside burner body) and taking care to correctly locate pump spindle into coupling end. Re-assemble in reverse order.