

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

Powrmatic Limited

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PC/OL1/2/3/3HR Issue 3 98

**Burner
Supplement**

**Models PC/OL1 PC/OL2, PC/OL3
& PC/OL3HR
PC/OL fully automatic oil burners**

 powrmatic

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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 _____ %

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/OL model has a variable output range of 14.5 to 117kW with three different blast tube assemblies available according to oil throughput.

1 Technical Data/Components

Main Components

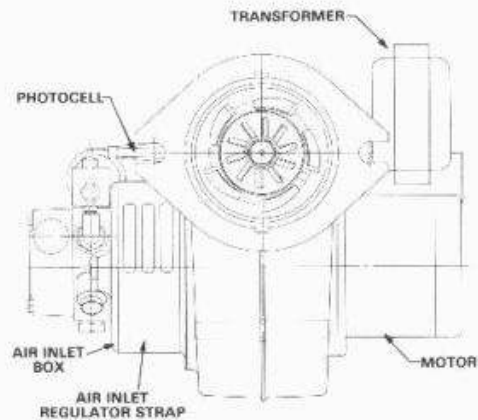
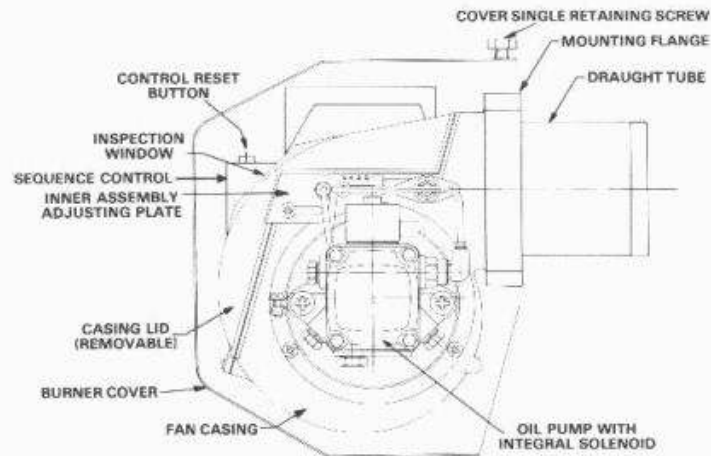
- Burner body, incorporating fan housing and suction box
- High capacity burner fan
- Burner motor
- Oil pressure pump with integral filter, oil valve and oil pressure regulator
- Draught tube
- Firing head with nozzle, diffuser and electrodes
- Flame monitoring cell
- High voltage ignition transformer / Igniter
- Burner mounting flange and gasket
- Shock-resistant plastic cover

Basic Technology Data

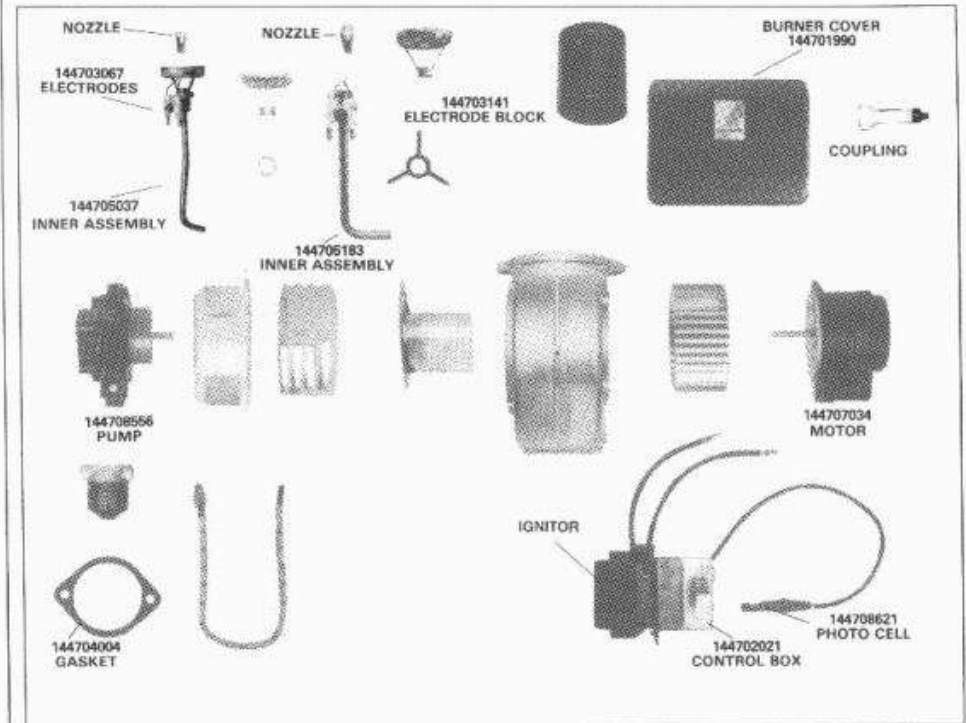
Output/Fuel Consumption -

PC/OL1 - 14.5 - 55kW 1.4 - 5.2kg/hr
 PC/OL2 - 31 - 75kW 2.9 - 7.1kg/hr
 PC/OL3 - 55 - 110kW 5.2 - 10.4kg/hr
 PC/OL3HR - 55 - 117kW 5.2 - 11.06kg/hr
 Type of oil - light or extra light
 Control Box - TF830B
 Motor - 240v, 50Hz, 1 PH, 0.7A, 75w, 2750rpm
 240v, 50Hz, 1PH, 0.9A, 90W, 2750 rpm (for PC/OL3HR)
 Ignition Transformer / Igniter - 20mA, 2 x 5000v.
 Pump - SUNTEC AS47 7451-2FRK 65
 Weight approx. 11kg (13kg for PC/OL3HR)
 Air regulation - on suction and pressure sides by manual adjustment of air damper and diffuser respectively.

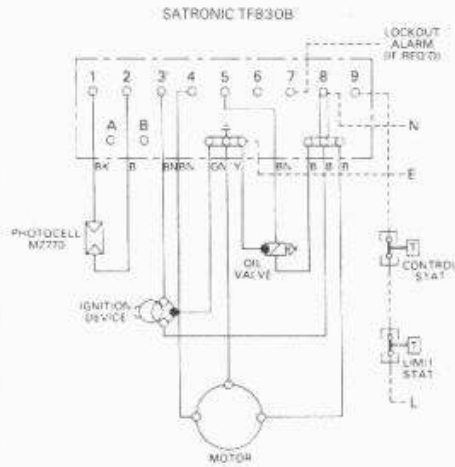
Fig. 1A Principal Components of the PC/OL1, PC/OL2 & PC/OL3 Burners



10(B) Short List of Parts - PC/OL3HR



9 Wiring Diagrams



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

10(a) Short List of Parts

- PC/OL1, PC/OL2 & PC/OL3

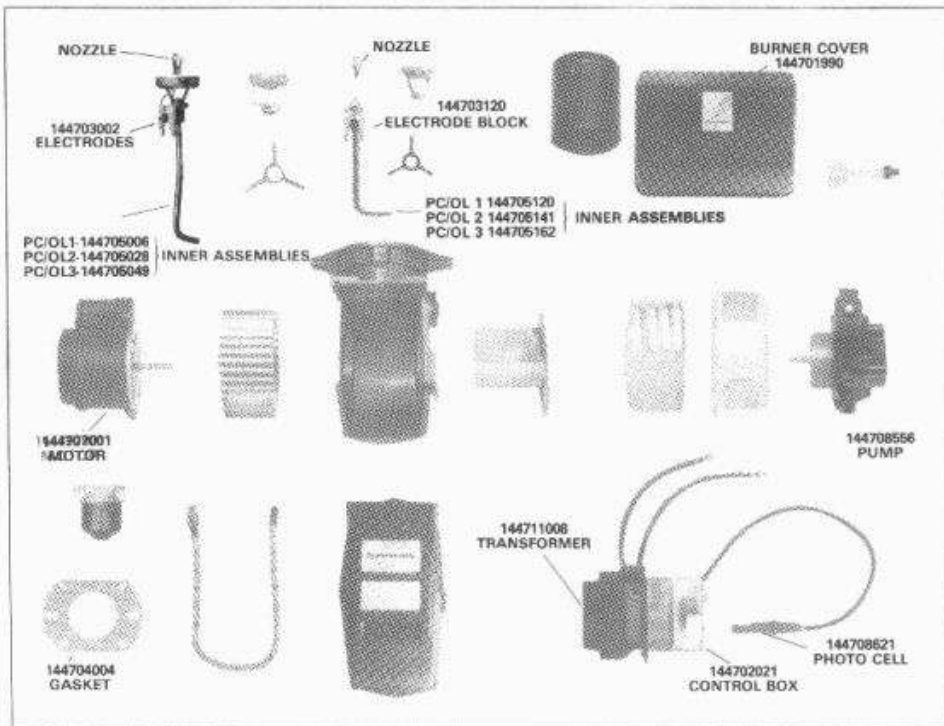
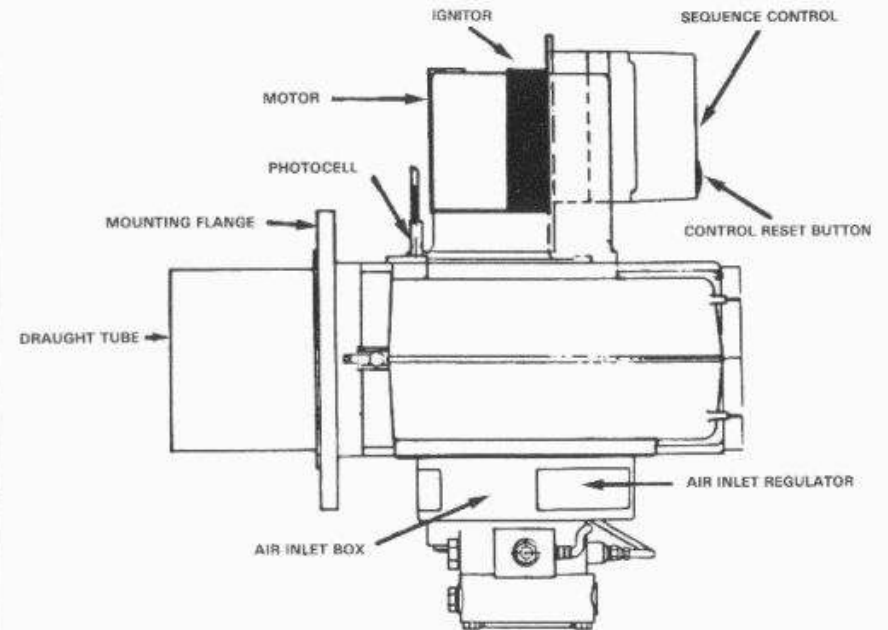
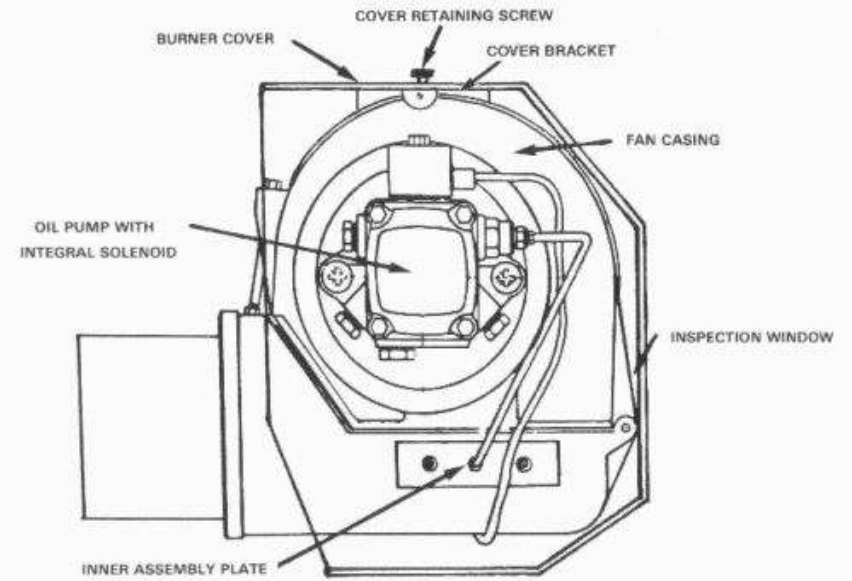


Fig. 1b Principal Components of the PC/OL3HR Burner



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 assembly 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 control box as shown on wiring diagram on page 10.

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. The oil pump is factory set for single pipe operation installation, to alter the pump to two pipe refer to Fig. 2 on page 5.

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.
 - 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)

1. The air is regulated in two places on the PC/OL1, 2, 3 & 3HR burners: firstly on the suction side by means of a rotating air strap 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:- Release central retaining screw and remove burner cover to adjust.

The suction damper has a simple manual adjustment which is calibrated. Using a pozidrive screw driver slacken off air strap fixing screw, turn clockwise to open damper and increase air flow and vice-versa.

2. When a soldering iron is only available at the workbench then proceed thus:

1. Remove motor/fan assembly as described in steps 8.3.1, 8.3.2 and 7.3.2
2. At the workbench, remove and replace the capacitor as in steps 8.4.1.1 - 8.4.1.3 above.
3. Refit motor/fan assembly to burner in reverse order (i.e. follow steps 7.3.2, 8.3.2 and 8.3.1).

8.5 Ignition Transformer / Ignitor

1. Remove burner cover and pull-off control box.

2. Disconnect the transformer/ignitor wiring from the control box terminals nos. 3 (live), 8 (neutral) and earthing block. Pull transformer/ignitor wiring sheath out of control box and unclip from other cables.

3. Using a pozidrive screwdriver release the fastening screw and remove the cover plate from the top of the burner body. Pull off electrode leads (noting their orientation).

4. Using a 10mm spanner release the two screws securing the transformer/ignitor to the control box bracket and remove transformer/ignitor.

5. Replace transformer/ignitor 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 burner cover and pull-off control box.

2. Disconnect photo-cell wiring from control box terminals nos. 1 and 2. Pull photo-cell wiring sheath out of control box and unclip from other cables.

3. Pull out the 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. Remove burner cover.

2. Disconnect pipe unions and remove flexible oil feed pipes.

3. Disconnect single pipe union on side of pump releasing oil feed pipe to firing head.

4. Release knurled nut and lift off solenoid valve from top of pump.

5. Using a pozidrive screwdriver remove the two fixing screws each side of the pump on the air box and pull out faulty pump.

6. 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.

7. Replace pump and re-assemble in reverse order.

8.8 Solenoid Valve (Oil Line)

1. Remove burner cover and pull-off control box.

2. Disconnect the solenoid valve wiring from the control box terminals nos. 5 (live), 8 (neutral) and from the earthing block.

3. To remove solenoid valve, release knurled nut and lift off valve.

4. Replace solenoid valve and re-assemble in reverse order.

8.9 Electrode Block

1. Remove burner cover.

2. Using a pozidrive screwdriver release the fastening screw and remove the cover plate from the top of the burner body.

3. Disconnect the tubing nut and lock nut on the 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. Pull off the two electrode leads noting their orientation.

6. Push tail of disconnected oil pipe through into burner casing and withdraw complete firing head assembly from front end of the burner body.

7. Using a 3mm allen key slacken the electrode clamping screw as required.

8. Replace electrode block, taking care to position correctly (see fig. 3) and retighten clamping screw.

9. Re-assemble in reverse order.

8.10 Burner Nozzle

1. To gain access to the burner nozzle (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 remove 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 - re-assemble in reverse order.

7.2 Firing Head Assembly

1. Release single retaining screw and remove burner cover.
2. Using a pozidrive screw driver release and remove the fastening screw and remove the cover plate from the top of the burner body.
3. Disconnect the tubing nut and lock nut 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. Pull-off the two electrode leads noting their orientation.
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.
8. Should the burner nozzle need a more thorough clean, slacken 3mm screw and slide-off diffuser before removing the nozzle (using two spanners). Clean nozzle with petrol or thinners and re-assemble.
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. Release central retaining screw and remove burner cover.
2. Remove burner top cover plate as described in 7.2.2.
3. Clean the fan blades with a stiff brush to remove any accumulated deposits.
4. Check that the fan is rigidly fixed to the motor shaft and that the assembly turns freely.
5. Re-assemble in reverse order.

7.4 Oil Pump Filter

1. Release central retaining screw and remove burner cover.
2. 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.
3. Remove the filter and wash-out in petrol or burner oil.
4. 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 assembly check and re-adjust the setting as described in step 5.4.3.

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

8.2 Burner Fan

1. To gain access to the fan follow steps 7.2.1 and 7.2.2.
2. To remove fan insert a 3mm allen key through the appropriate fan blade and locate the allen screw in the centre boss. Slacken screw and remove fan from motor shaft, also pull off flexible pump coupling.
3. Slacken off motor fixing screw to allow fan to be removed from casing.
4. Replace fan and re-assemble in reverse order.

8.3 Burner Fan Motor

1. Remove burner cover and pull-off 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 unclip from other cables.
3. Remove the motor, via 5mm fixing screws, from the burner casing. Remove fan as in 8.2.2.
4. Pull off flexible pump coupling and remove impeller as described in step 8.2.2.
5. Taking replacement motor, refit fan impeller and flexible coupling before refitting assembly to burner in reverse order of steps 8.3.2 and 8.3.3, taking care to engage flexible coupling onto pump spindle.

8.4 Capacitor

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. In which case proceed as follows:
 1. Release screw holding capacitor locating bracket to the end of the motor and gently pull capacitor out of its socket to reveal wiring.
 2. Snip through wiring at capacitor terminals or alternatively, using a soldering iron, melt through wiring connections to free.
 3. Replace capacitor, resolder terminal connections and resecure mounting brackets to motor end.

3. FINE TUNING:- The diffuser (within the burner head) is adjusted via the screw on the right hand side of the burner body adjacent to the air strap. Before any adjustment, slacken the two screws securing the oil feed pipe at its entry to the burner body. With the screws loosened the firing head assembly with ignition electrodes can be adjusted.

Move the inner assembly with the diffuser forward for more air and back for less air.

After the adjustment the two screws must be re-tightened. A scale on the side of the burner inner assembly plate gives the distance adjusted.

NOTE: The PC/OL3HR has a fixed head arrangement. Air is regulated on the suction side by means of a rotating air strap.

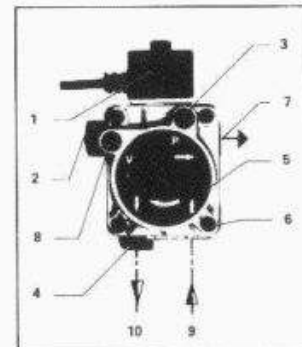
5.4.2 Oil Flow

1. Initial Bleeding
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.

Fig. 2 Oil Pump details

SUNTEC AS47C OIL 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)



2. Oil Pressure Adjustment

The oil pressure is adjusted by turning the pressure regulation screw, on the top of the pump (fig. 2 Ref. 2). Turn clockwise to increase the pressure and anti-clockwise to decrease.

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.

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

7. 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.

5.4.3 Standard Operating Pressures:

CA100 OUH30	CA150 OUH45	CA200	CA300 AR4 IR6	AR3	AR5	17R	IR8	OUH60
14.3 bar (210psi)	12.2 bar (180psi)	12.9 bar (190psi)	13.6 bar (200psi)	11 bar (160psi)	11.6 (150psi)	11.9 bar (175psi)	11.2 bar (165psi)	14.6 bar (230psi)

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.

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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 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.

Fig. 3a Firing Head Components – PC/OL1B

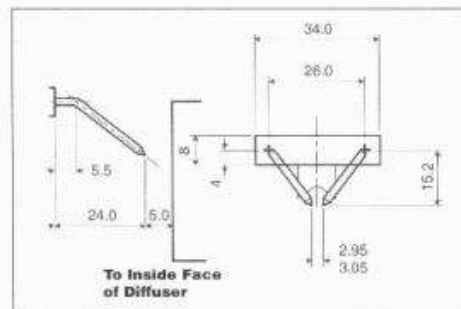
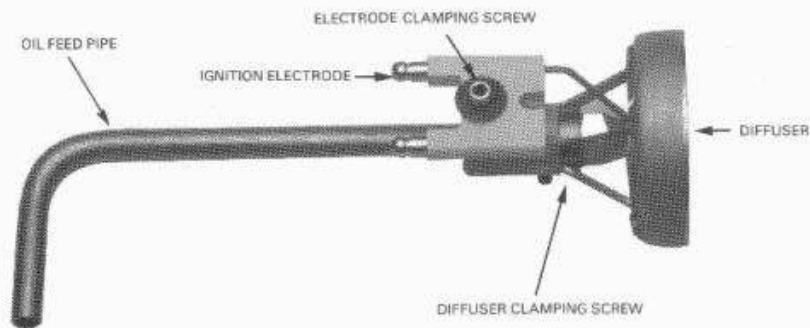


Fig. 3b Firing Head Components – PC/OL2, & PC/OL3

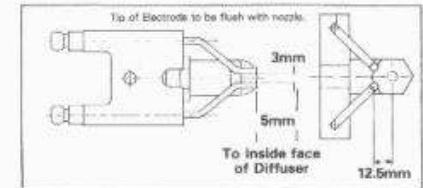
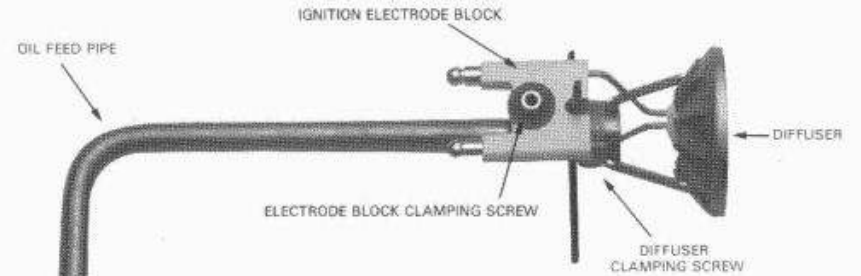


Fig. 3c Firing Head Components – PC/OL3HR

