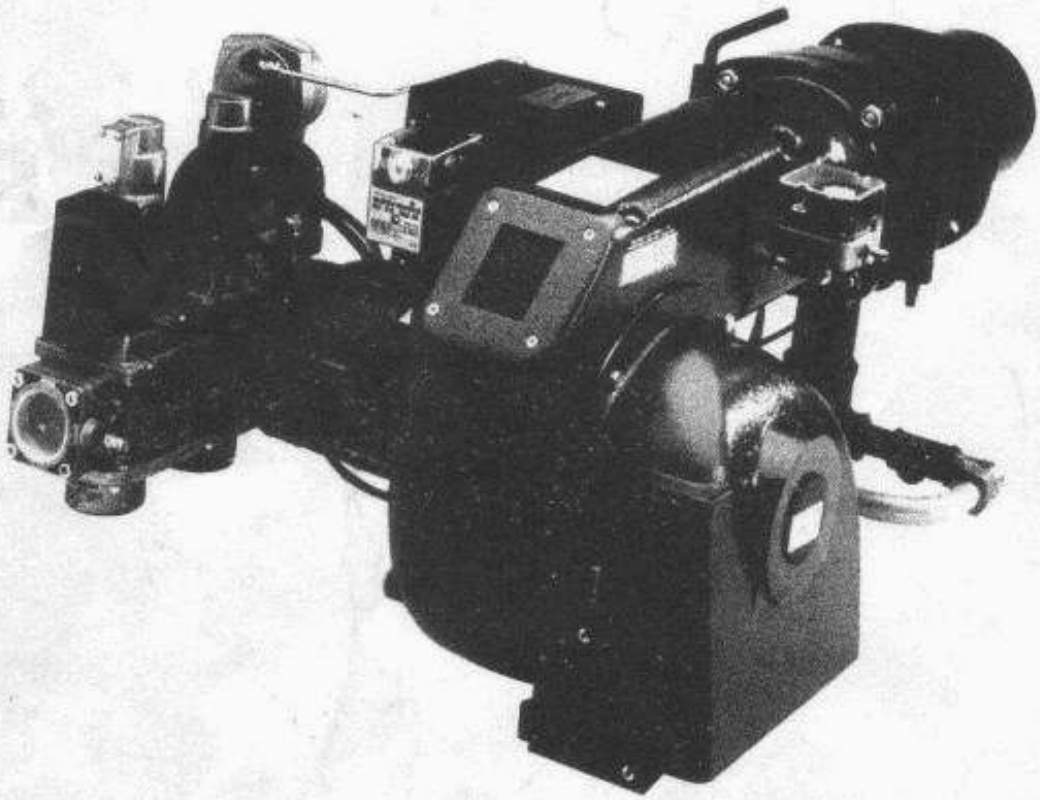
Burner Supplement



# Models PC/GS25
# PC/GS fully automatic gas burners

powrmatic

POWRMATIC LIMITED, WINTERHAY LANE, ILMINSTER, SOMERSET TA19 9PQ
TELEPHONE 04605 3535 TELEX 46323 POWRIL G FAX No. 04605 2341

# Contents

# Introduction

Powrmatic PC/GS25 fully automatic forced draught burners with ON/OFF gas control. The burners are supplied complete with a gas control assembly to the latest specification which provides control of both the start/pilot gas and main gas supply through a main gas govenor and safety shut-off valves. The start gas expands to the main gas rate after the start gas flame is established.

Flame safeguard, based on a U.V. detection system, is provided by the integral full-sequence control box:- in the event of flame failure the safety shut-off valves are de-energised and the gas supply is cut-off within one second.

The burners as supplied by Powrmatic will perform the following functions:

a) Providing that the air-pressure switch is proved in the 'no-air' position prior to start-up, the combustion air fan will run.

b) Providing that adequate air flow is proved there will be a pre-purge period of 40 seconds.

c) At the end of this time;

The ignition transformer and start-gas valves will be simultaneously energised and the start-gas flame established. Providing that the start-gas flame presence is proved within 10 seconds the main gas safety shut-off valve will be energised and the main gas flame will be established. Failure to establish a flame, loss of flame signal thereafter will result in the burner going to lockout. This state requires a manual reset to once again initiate the start sequence.

# 1 Technical Data/Components

## 1.1 Burner

| Operation | |
|---|---|
| Single Stage, On/Off | PC/GS25S |
| Two Stage, High/Low | PC/GS25T |
| Modulating | PC/GS25M |

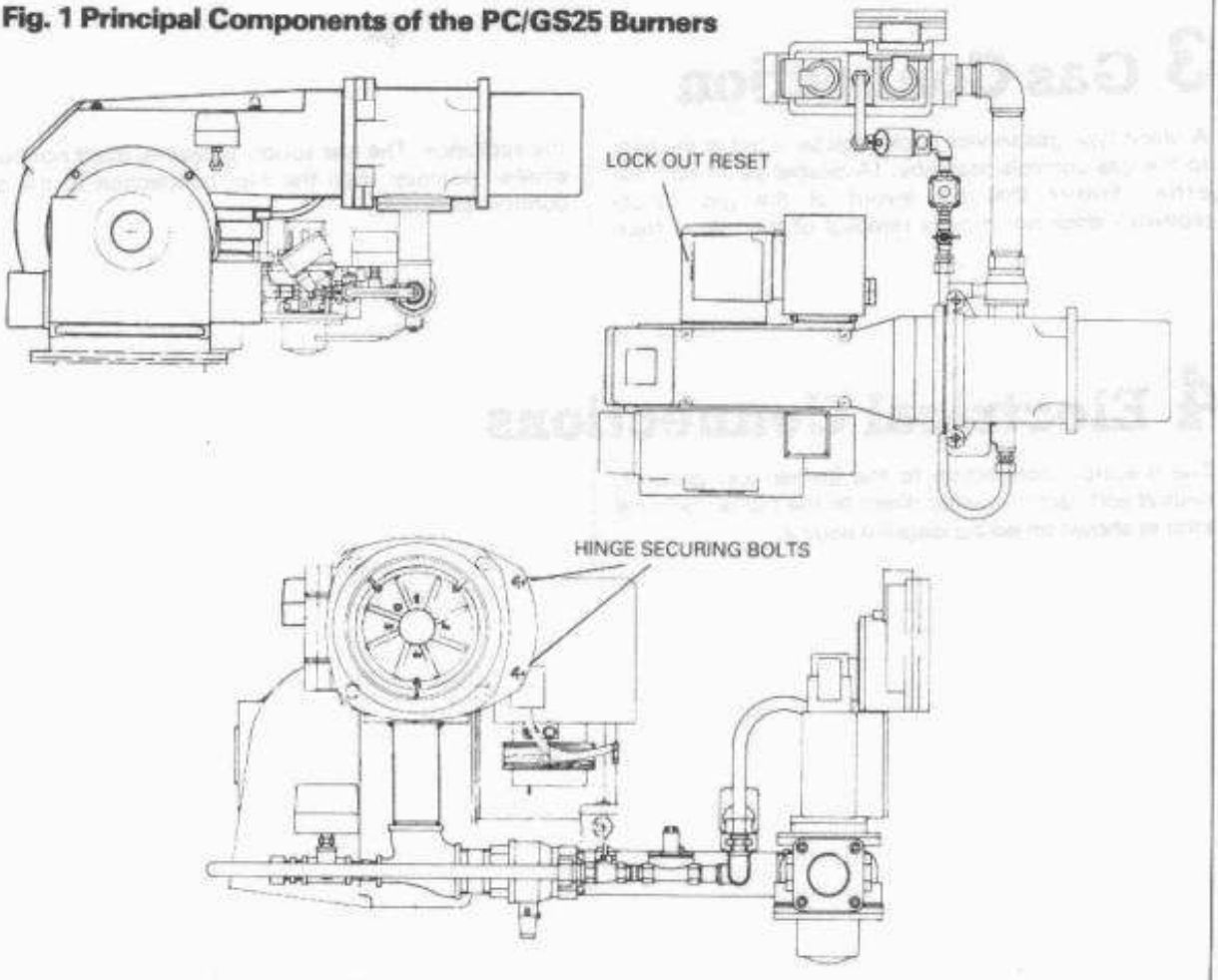
For High/Low and Modulating Burners, refer to relevant handbook supplement.

| | |
|---|---|
| Type Burner | PC/GS25 |
| Voltage | 240V |
| Phase | 1 |
| Frequency | 50Hz |
| Current Consumption | |
| - Motor | 6.2A |
| - Ignition Transformer | 1.1A |

## 1.2 Control Box

| Type | Satronic MMG810 mod 45 | Satronic TMG740-2 mod 45 |
|---|---|---|
| Electrical Consumption | 10 va | 15va |
| Pre-purge Time | 40 secs | 40 secs |
| Pre-ignition Time | Nil | 3 secs |
| Post-ignition Time | 4 secs | 5 secs |
| Total Start-up Cycle | 50 secs | 75 secs |
| Minimum Normal Flame Signal Current | 5.0 µA | 5.0 µA |

**Fig. 1 Principal Components of the PC/GS25 Burners**



### 1.3 Control Box Cam Function

**COLOURED PROGRAMME INDICATOR**

A coloured programme indicator is incorporated on the cam assembly, and the approximate colour positions indicate the following steps in the sequence.

| | |
|---|---|
| Blue line on White | — Start position |
| Start of Blue Sector | — Start of pre-purge |
| Red line in Blue sector | — Air supply proved. See under fault finding note 3. |
| Blue sector | — Pre-purge |
| End of Blue | — End of pre-purge |
| End of Blue /Start of Yellow | — Start of ignition safety time, and initial fuel release |
| End of Yellow/Start of Red | — Lockout position, due to ignition or detection failure |
| Red sector | — Start flame proving period |
| End of Red/Start of Green | — Main flame stage |
| End of Green/Start of White | — "Run" position |

# 2 Mounting the Burner

NOTE: The following procedures only apply when the burner has not been fitted to the appliance in the factory.

### 2.1 Burner with fitted gas controls assembly

1. Remove the nuts and washers from the burner mounting studs on the appliance.
2. Offer the complete burner and gas controls assembly up to the appliance and locate the blast tube in the burner port at the same time engaging the burner flange over the studs.
3. Push fully home and secure with the nuts and washers.

# 3 Gas Connection

A union type gas service cock must be fitted at the inlet to the gas controls assemby. (Available as an optional extra.) Ensure that the layout of the gas supply pipework does not impede removal of the burner from the appliance. The gas supply pipework must not be of smaller diameter than the inlet connection to the gas controls assembly.

# 4 Electrical Connections

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 page 9.

# 5 Commissioning and Testing

## 5.1 Electrical Installations

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

In the event of any electrical fault after installation of the appliance, preliminary electrical systems checks shall be carried out. These shall include earth continuity, polarity and resistance to earth checks, as described in the British Gas Multimeter handbook.

## 5.2 Gas Installations

The whole of the gas installation including the meter should be inspected, tested for soundness and purged in accordance with the recommendations of CP 331/ Part 3.

## 5.3 Gas Controls Assembly — Soundness Test

Refer to Fig. 2

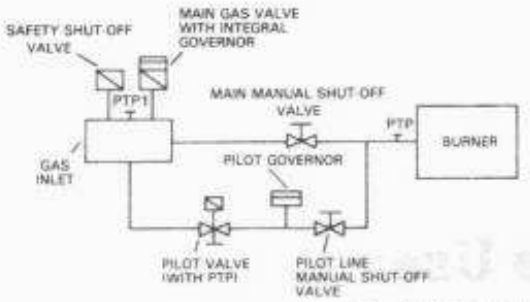
1. Check gas service valve is shut.

2. To prove soundness of safety shut-off valve:-

a) Connect pressure gauge to P.T.P.1 (pressure test point no. 1).

b) Open gas service valve and check gauge. If no pressure is indicated, valve is sound.

**Fig. 2 Gas Controls - Double Block Main Valve**




## 5.4 Sequence Check

1. Ensure that the gas service valve, main gas and pilot gas isolation valves are closed and that the mains electricity is switched off.

2. Check that:-

i. the room thermostat is turned '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 electrical supply and check that the following sequence of events occurs.

i. Burner fan runs
ii. Ignition spark is heard
iii. Main gas valve opens
iv. Burner goes to lockout as there is no gas supply

4. Reset the control box by pressing the reset button (see Fig. 1).

5. Switch OFF main electricity supply.

6. Remove the sealing screw of the pressure test point located on the side of the gas inlet to the burner head, and attach a pressure gauge. Open pilot gas isolation valve.

7. Turn 'ON' the main electrical supply, and check that the following sequence of events occurs.

i. Burner fan runs
ii. Ignition spark is heard
iii. Safety and start gas valves open
iv. Start gas flame should be established. Once the start gas flame is established, the burner should be switched 'OFF'.

8. Open main gas ilosation valve. Turn 'ON' the main electrical supply, and the burner should run through its sequence until main frame is established.

Check that the main gas pressure indicated on the pressure gauge is as stated in the Appliance Installation, Commissioning and Servicing Instructions.

9. Remove pressure gauge and refit sealing screw.

**NOTES:** 1. First attempts to light may result in the burner going to lockout, owing to air in the gas controls assembly, this being indicated by the reset button in the burner control box being illuminated. Press this button to restart the burner sequence.
2. The burner has been test fired and adjusted in the factory. The references to checking pressures are to ensure that settings have not been disturbed in transit.

### 5.5 Soundness Test — Final

After making final gas rate checks all joints on the gas controls assembly must be tested for leaks using leak detection fluid.

### 5.6 Flame Safeguard

Whilst burner is still in operation the flame failure safeguard should be checked as follows:-

1. Close gas service valve.

2. The burner should go to lockout within 1 second.

3. Reset the control box by pressing the reset button (see Fig. 1).

### 5.7 Adjusting the Air Pressure Switch

1. While the burner is firing, increase the pressure setting by slowly turning the regulating knob clockwise until the main safety shut-off valves are closed.

**NOTE:** The burner will lockout.

2. Turn the regulating knob two segments clockwise.

3. Reset lockout and replace air pressure switch cover.

### 5.8

Complete the commissioning sheet at the rear of this booklet.

# 6 Handing Over To The User

Refer to Appliance Installation, Commissioning and Servicing Instructions.

# 7 Servicing

WARNING: ALWAYS switch off and disconnect electricity supply and close the gas service valve before carrying out any servicing work or replacement of failed components.

### 7.1 General

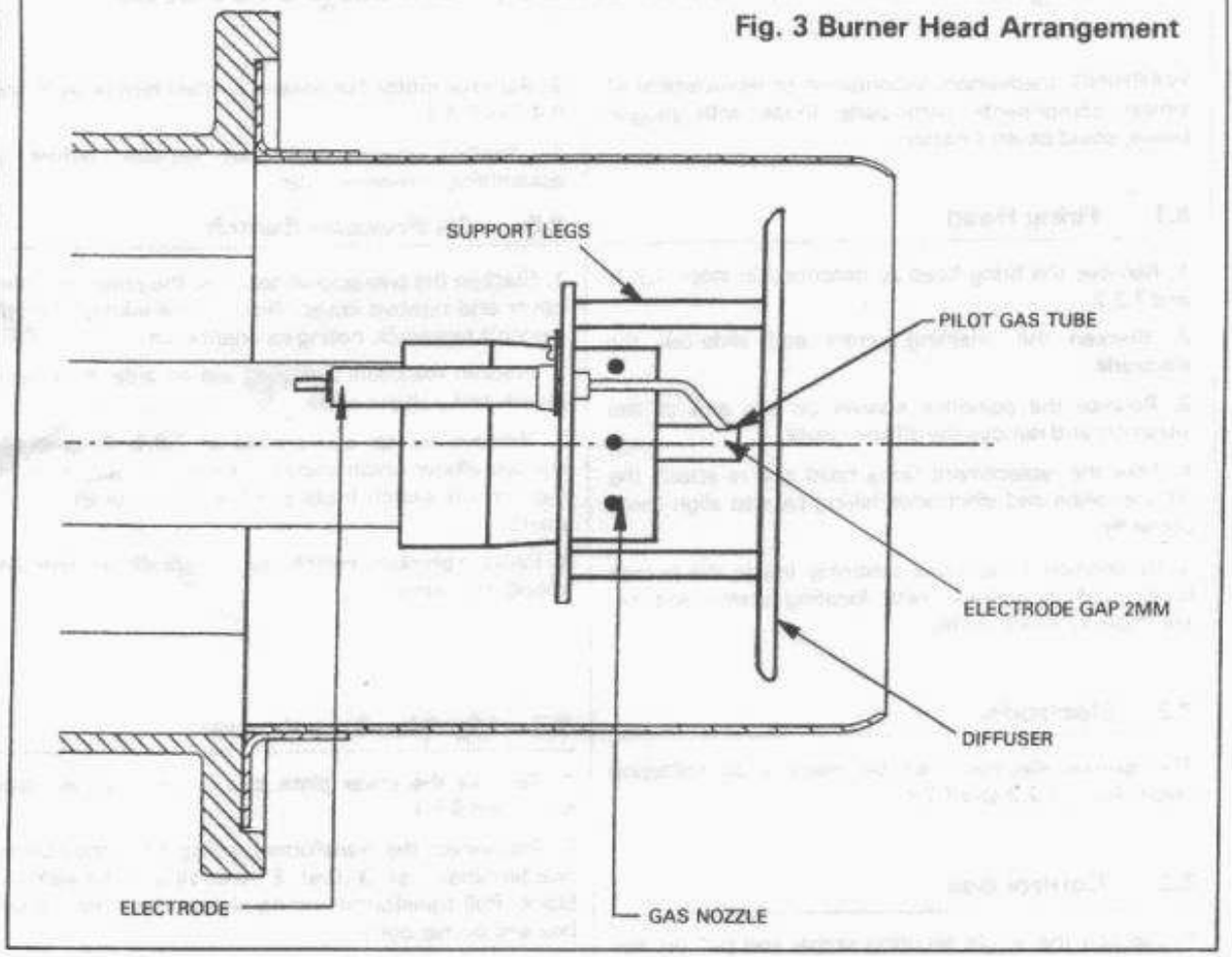
Full maintenance should be undertaken not less than once per year. After any servicing work has been completed or any component replaced the burner must be fully commissioned and tested for soundness as described in Section 5.

### 7.2 Firing Head Assembly

1. Using a 10mm spanner release the nuts securing the burner body to the burner hinge extension (see Fig. 1) so that the burner body may be swung aside to reveal the electrode connections and firing head assembly.

2. Disconnect electrode leads and with a 6mm allen key remove the retaining screw from the burner tube flange. The firing head assembly can now be withdrawn.

Fig. 3 Burner Head Arrangement




3. Using a stiff brush clean-off any accumulated deposits from the firing head, paying particular attention to the nozzle ports and diffuser.

4. Before the firing head is re-assembled into the burner tube check that the electrode is not damaged, eroded or dirty. If electrode requires replacing slacken the retaining screw and slide out. Replace with the new electrode ensuring that it is repositioned correctly (see Fig.3).

## 7.3 Burner Fan

1. Release and remove the four fastening screws and remove the cover plate from the top of the burner casing.

2. Clean the fan blades (as required) with a brush to remove any accumulated deposits.

3. Check that the impeller is rigidly fixed to the motor shaft and that the assembly turns freely.

4. Check that the air pressure switch impulse pipe (situated immediately above the impeller) is not blocked.

5. Re-assemble in reverse order remembering to re-connect the electrode lead before closing and securing the burner body.

# 8 Replacement of Faulty Components

WARNING: Inadvertent substitution or replacement of similar components particularly those with plug-in bases, could cause a hazard.

## 8.1 Firing Head

1. Remove the firing head as described in steps 7.2.1. and 7.2.2.

2. Slacken the retaining screw and slide-out the electrode.

3. Release the pozidrive screws on the end of the assembly and remove the diffuser plate.

4. Take the replacement firing head and re-attach the diffuser plate and electrodes taking care to align them correctly.

5. Re-position firing head assembly inside the burner tube, hold in position with locating screw and re-assemble in reverse order.

## 8.2 Electrode/

The ignition electrode can be replaced by following steps: 7.2.1, 7.2.2 and 7.2.4.

## 8.3 Control Box

1. Slacken the single securing screw and pull-off the faulty control box.

2. Push on new control box and re-tighten securing screw.

## 8.4 Burner Fan

1. Using pozidrive screw driver slacken single screw holding control pack to bracket. Lift off complete control pack (do not electrically disconnect). Support on top of burner casing.

2. Remove the four pozidrive screws securing motor adaptor plate to burner casing to allow fan to be withdrawn with motor.

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.

## 8.5 Burner Fan Motor

1. Release the two pozidrive screws to remove terminal box cover plate, also remove control box as 8.3.1.

2. Disconnect the motor wiring from the contactor terminals nos. 4 (live), 6 (neutral) and the earthing block. Pull motor wiring sheath from contactor box.

3. Remove motor fan assembly from burner as in step 8.4.1 to 8.4.3.

4. Replace motor, refit fan impellor before re-assembling in reverse order.

## 8.6 Air Pressure Switch

1. Slacken the two screws securing the pressure switch cover and remove cover. Release the wiring from the switch's terminals, noting its orientation.

2. Slacken the cable clamping nut on side of pressure switch and pull out cable.

3. Remove burner cover plate as 7.3.1. Release and remove elbow union securing switch to burner casing then lift off switch (note position of elbow air pick-up point).

4. Replace pressure switch , reconnect elbow union and wiring, refit cover.

## 8.7 Ignition Transformer

1. Remove the cover plate and control box as steps 8.3.1. and 8.5.1.

2. Disconnect the transformer wiring from the control box terminals nos. 3 (live), 8 (neutral) and the earthing block. Pull transformer wiring sheath nut from control box and burner body.

3. Release the four fastening screws and remove cover plate from top of burner body. Pull off ignition lead.

4. Using a 10mm spanner release the two nuts securing the transformer to the control package and remove transformer.

5. Replace transformer passing the ignition lead through opening in the burner body side and re-assemble in reverse order.

### 8.8 Safety Shut-Off Valves

MAIN OR SAFETY GAS VALVE

1. To replace a faulty actuator on either of above, disconnect wiring from terminal box on the side of the actuator.

2. Remove 4 screws attaching flange at base of actuator to valve body, and lift off.

3. New actuator should be re-assembled in reverse order.

IMPORTANT. On no account should any attempt be made to dismantle the actuators themselves.

PILOT GAS VALVE

1. To replace faulty solenoid coil, release spring clip on top of valve with small screwdriver.

2. Lift off cover and disconnect wires from terminals. Coil can now be removed.

3. Fit new coil and re-assemble in reverse order.

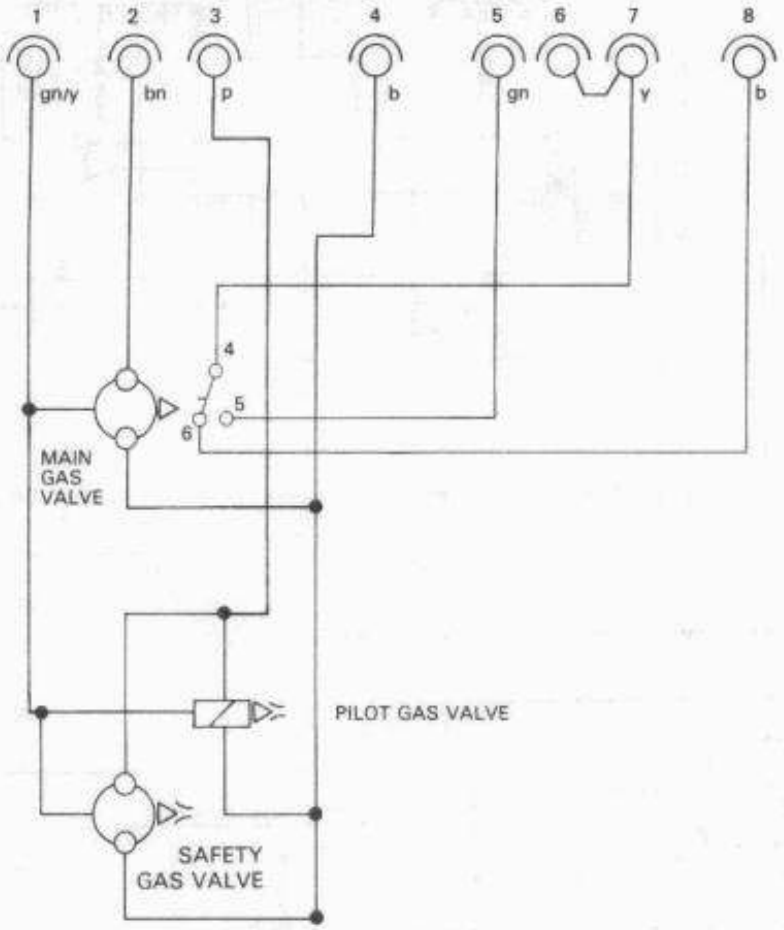
# 9 Wiring Diagrams

**NOTES**

1. A plug and socket has been used to facilitate electrical connection of the gas assembly to the burner control pack.

2. Terminal 5 on the socket is used only if an indication that the CPI switch is in the open position is required.

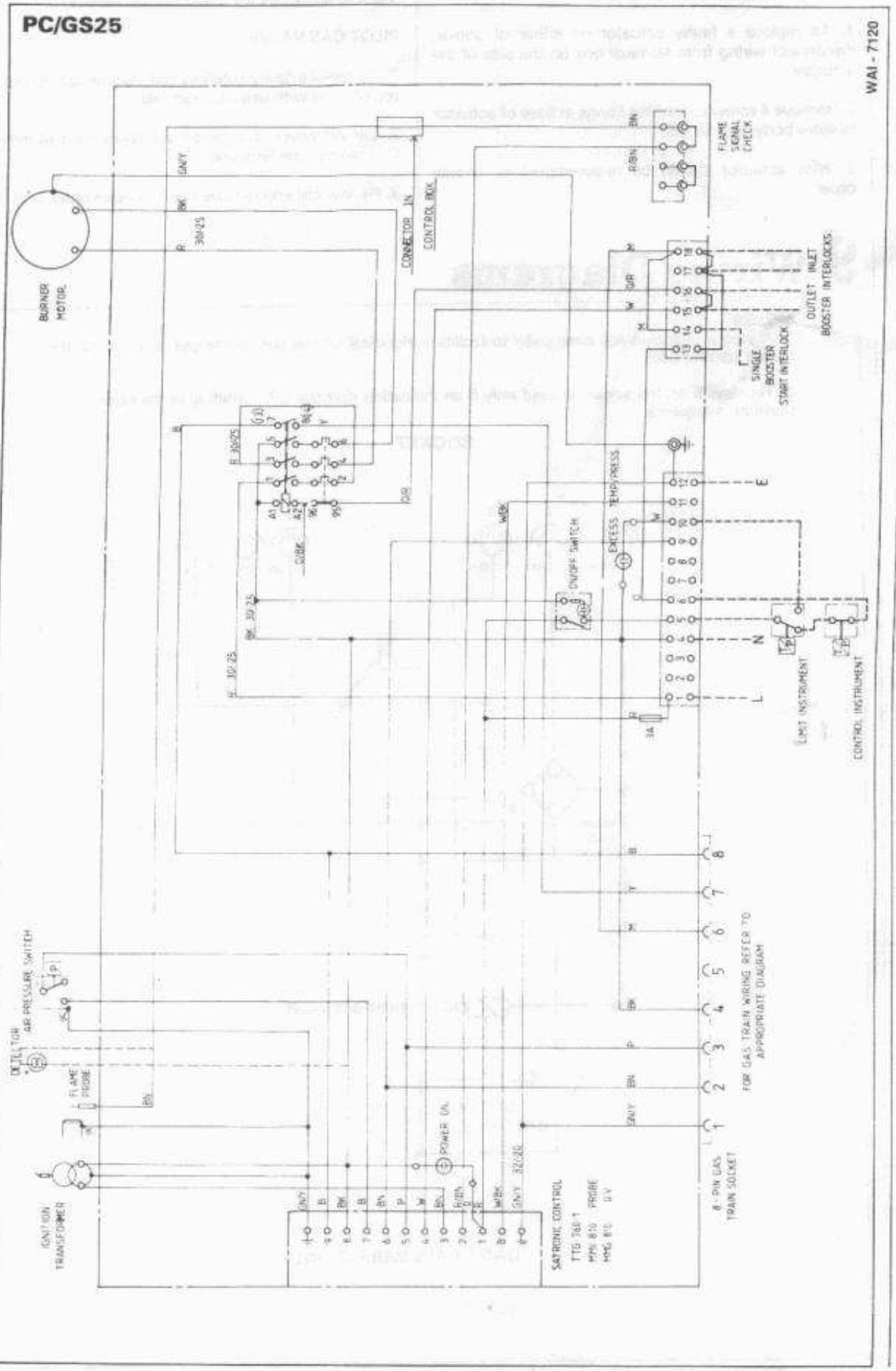
**SOCKET**



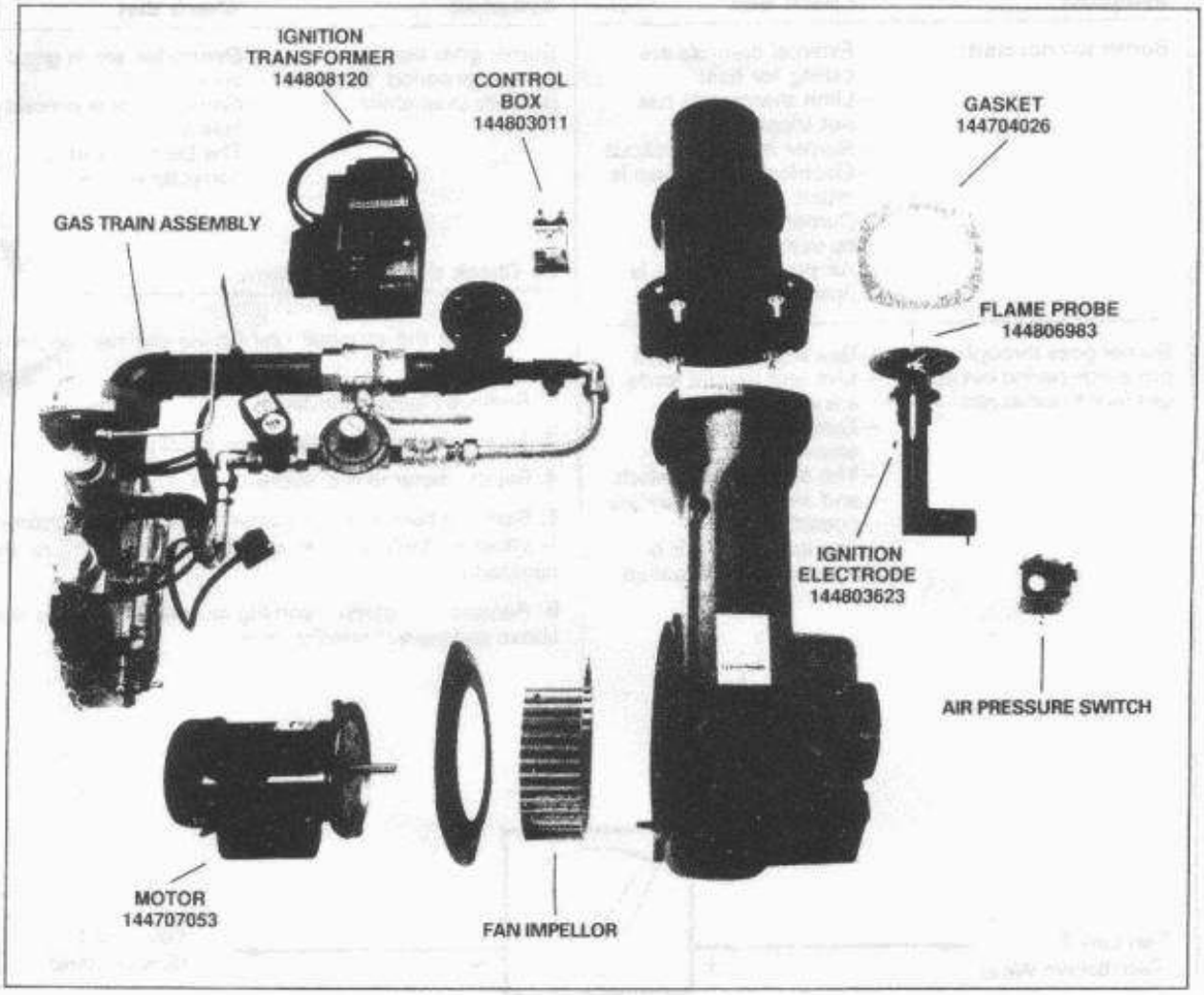

GAS TRAIN WIRING ONLY

# 9 Wiring Diagram

## PC/GS25



# 10 Parts List

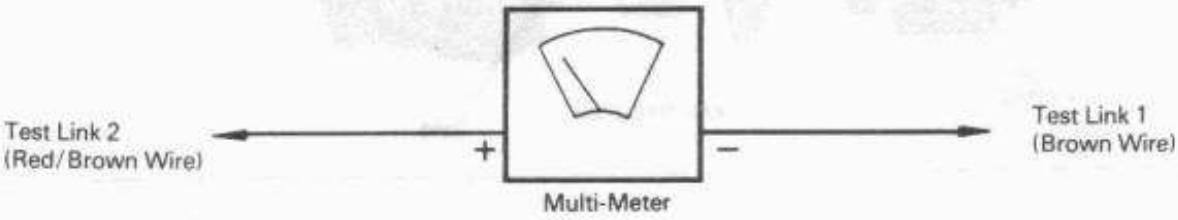


# 11. Fault Finding

| Symptom | Check that |
|---|---|
| Burner will not start: | — External controls are calling for heat<br>— Limit thermostat has not tripped<br>— Burner is not at lockout<br>— Electrical supply fuse is intact<br>— Burner fan motor is operative<br>— Air pressure switch is operative |
| Burner goes through pre-purge period but start gas fails to establish: | — Gas supply is present<br>— Live and neutral leads are correct polarity<br>— Earth connection is sound<br>— The air pressure switch and associated relay are operative<br>— The ignition spark is present at the required time |
| Burner goes through pre-purge period, but start gas fails to establish | — Electrodes are in good condition<br>— Flame signal is present (see below)<br>— The burner head is correctly set |

**To Check the Flame Current:**

1. Remove the terminal box lid via the two pozidrive screws.
2. Remove Flame signal link.
3. Fit multi-meter into Test Link terminals.
4. Set the meter to d.c. micro-amps.
5. Start the burner and read the flame current obtained. A value of 5$\mu$A or over is sufficient to energise the control box.
6. Remove the meter, working in reverse order to that above and replace terminal box .



# 12 Commissioning Sheet

**The details below are to be completed by the Commissioning Engineer.**

Installers Name: _____

Address: _____

_____

_____

Site Address: _____

_____

_____

Appliance: Type _____ Size _____ Serial No. _____

Burner: Type _____ Size _____ Serial No. _____

Commissioning Date: _____

Guarantee Expiry Date: _____

Gas Type: _____

Gas Pressure upstream of main Gas governor:-

a) Standing _____ mbar b) Running _____ mbar

| | | |
|---|---|---|
| Gas pressure at burner head | _____ mbar | _____ in.w.g. |
| Gas rate | _____ $m^3$ | _____ $ft^3/h$ |
| Heat input | _____ MJ/h | _____ Btu/h |
| CO | _____ % | _____ % |
| $CO^2$ | _____ % | _____ % |
| Gross Flue Gas Temperature | _____ °C | _____ °F |
| Ambient Temperature | _____ °C | _____ °F |
| Nett Flue Gas Temperature | _____ °C | _____ °F |
| Efficiency | _____ % | _____ % |

# "Do business in the right atmosphere"

**Powrmatic Limited**
Winterhay Lane, Ilminster, Somerset TA19 9PQ
Telephone 04605 3535 Telex 46323 POWRIL G
Fax No. 04605 2341

PC/GS25 ISSUE 1 2/92