

# "Do business in the right atmosphere"

Models PC/GS7 & PC/GS8
PC/GS fully automatic gas burners

## **Powrmatic Limited**

Winterhay Lane, Ilminster, Somerset TA19 9PQ Telephone: 014605 3535 Fax No: 014605 2341



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Principal Components of the PC/GS7-8

**Firing Head Assembly** 

# **Commissioning Sheet**

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

Address:				
Site Address:				
Appliance: Type	_ Size _		Serial No	
Burner: Type	_ Size _		Serial No	
Commissioning Date:				
Guarantee Expiry Date:				
Gas Type:				
Gas Pressure upstream of ma	in Gas g	overnor:-		
Gas Pressure upstream of ma			9	mbar
			9	mbar
	mbar	b) Runnin	igin.w.g.	
a) Standing	mbar	b) Runnin		
a) Standing Gas pressure at burner head	mbar	b) Runnin mbar	in.w.g.	
a) Standing  Gas pressure at burner head  Gas rate	mbar	b) Runnin mbar	in.w.g. ft <sup>p</sup> /h	
a) Standing Gas pressure at burner head Gas rate Heat input	mber	b) Runnin  mbar m² MJ/h	in.w.g. ft <sup>8</sup> /h Btu/h	
a) Standing Gas pressure at burner head Gas rate Heat input CO	mbar	b) Runnin  mbar .  my .  MJ/h .  % .	in.w.g. ft <sup>2</sup> /h Btu/h	
Gas pressure at burner head Gas rate Heat input CO CO <sup>2</sup>	mbar	b) Runnin  mbar .  my .  MJ/h .  % .	in.w.g. ft <sup>0</sup> /h Btu/h %%	
Gas pressure at burner head Gas rate Heat input CO CO² Gross Flue Gas Temperature	mbar	b) Runnin  mbar .  m³ .  MJ/h .  % .  "C °C	in.w.g.  tt²/h  Btu/h  %  %  %	

## **Fault Finding**

# Symptom Burner will not start Burner goes through fails to establish flame

### - 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
- Air pressure switches are operative.
- pre-purge period, but
- Gas supply is present.
- Live and neutral leads are not inverted.
- Earth connection is sound.
- The air pressure switches are operative.
- The ignition spark is present at the required time.

### Symptom

### Check that:-

pre-purge period, but start gas fails to establish

- Burner goes through Electrodes are in good condition.
  - Flame signal is present (see below)
  - The burner head is correctly set

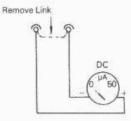
#### To check the Flame Current:

- 1. Remove the terminal box lid via the two posidrive
- 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 1µA or over is sufficient to energise the control box.
- 6. Remove the meter, working in reverse order to that above and replace terminal box.

### Test Link 1 Test Link 2 (Brown Wire) (Brown Wire) Multi-Meter

All Current ratings relate to 230v. All main fuses must be to BS.88

Minimum Flame Signal: 1µA Typical Signal: Probe 10µA U.V.25uA



**Detector Current Measuring Circuits** 

### Introduction

### PC/GS 7 & 8

The Powrmatic PC/GS7 & 8 fully automatic draught burners with ON/OFF gas control. The burners are supplied complete with a gas control assembly to the latest specification which provides for control of both the start gas and main gas supply through a main gas governor and safety shut-off valve. The start gas expands to the main gas rate after the start gas flame is established.

Flame safeguard, based on a rectification 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.
- 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 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.

# **Technical Data/Components**

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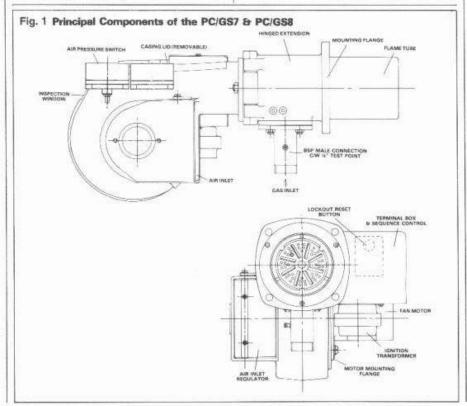
PC/GS7	PC/GS8
230V	230V
50Hz	50Hz
1.7A 1.1A	1.7A 1.1A
PC/GS8S	
PC/GS7T PC/GS8T	
PC/GS7M PC/GS8M	
	230V 50Hz 1.7A 1.1A PC/GS7S PC/GS8S PC/GS7T PC/GS8T PC/GS7M

Control Box

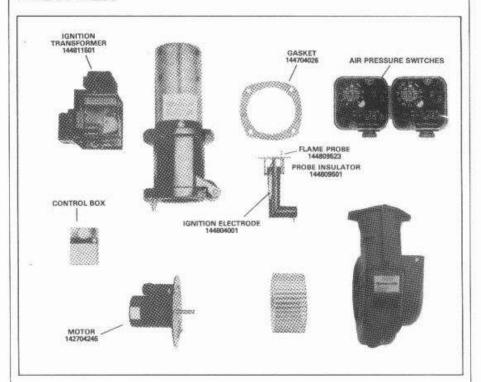
SECTION AND INCIDENCE.		
	Satronic	
Туре	MMI 810	
	mod 43	
Electrical Consumption	10 va	
Pre-purge Time	40 secs	
Pre-ignition time	Nil	
Start Gas Safety Time	3 secs	
Total Start-up Cycle	50 secs	
Minimum Normal		
Ionisation	1.0 µA	
Current		
External Fuse	10A (rapid)	6A(slow

PC/GS8 (Complete Assembly) Part No. 141376345

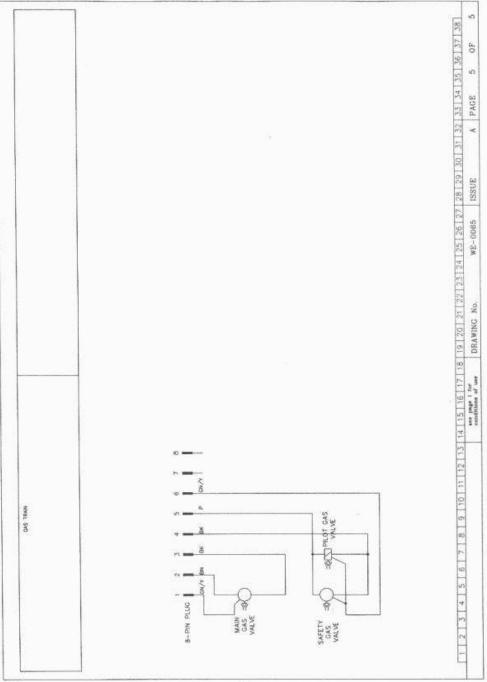
Gas Controls Assembly - 3/4" or 11/2" B.S.P.



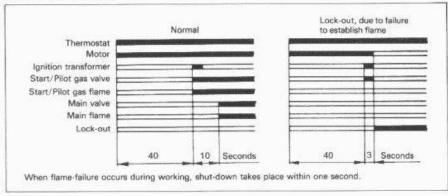
# **Parts List**



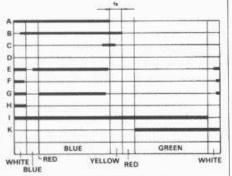
# Wiring Diagram



### **Burner Start-up Cycle**



### Control Box Cam Function MM1 810



### Coloured Programme Indicator

### **CAM SWITCHES**

- A Initial fuel release, start of Ignition safety time
- B Air proving period, and termination on safety time
- C Ignition
- E Start of flame simulation, whilst 'B' is on
- F Contact position proving at start of programme
- G Lockout, during pre-purge
- H Programme "start"
- I Programme "stop"
- K Main Gas Valve V2

Note: 1. Cam switches are shown on the diagram in their relaxed position, indicated by the thin line on cam development sketch above

#### 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 pre-purge Start of Blue sector

Line in Blue sector - Air supply proved.

Blue sector - Pre-purge

End of Blue - End of pre-purge

End of Blue/Start of of - Start of ignition safety time,

Yellow and initial fuel release

End of Yellow/Start of - Lockout position, due to

ignition or detection failure

- Start flame proving period Red sector - Main flame stage

End of Red/Start of Yellow

Green

End of Yellow/Start of - End of main flame establishment

End of Green/Start of - Run position

# Mounting the Burner

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

### 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.

### **Electrical Connections**

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

# **Handing Over To The User**

Refer to Appliance Installation, Commissioning and Servicing Instructions.

# **Burner Servicing**

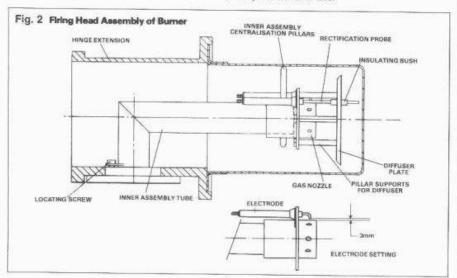
WARNING: ALWAYS switch off and disconnect electricity supply and close the gas service valve before carrying out any servicing work or replacement of failed components.

#### 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.

#### Burner Fan and Motor

- Release and remove the single fastening screw and remove the cover plate from the top of the burner casing.
   Clean the fan blades (as required) with a brush to remove any accumulated deposits.
- Check that the impeller is rigidly fixed to the motor shaft and that the assembly turns freely.
- Check that the air pressure switch impulse pipe (situated immediately above the impeller) is not blocked.
- Re-assemble in reverse order remembering to re-connect the electrode leads before closing the burner body onto the burner tube.



#### Firing Head Assembly

- Using a 16mm spanner release the ruts securing the burner body to the burner hinge extension so that the burner body may be swung aside to reveal the electrode connections and fring head assembly
- Disconnect electrode leads and with a 5mm allen key remove the locating screw of the burner tube at the gas entry point. The firing head assembly can now be withdrawn.
- Using a stiff brush clean-off any accumulated deposits from the firing head, paying particular attention to the nozzle ports.
- 4. Before the firing head is re-assembled into the burner tube check that the electrodes are not damaged, eroded or dirty. If either electrode requires replacing slacken the 3mm clamping screw and slide out the electrode. Replace with the new electrode ensuring that it is repositioned correctly.

NOTE: The rectification electrode has a flanged insulating bush where it passes through the diffuser plate. When replacing the rectification electrode ensure that the insulating bush locates in the diffuser plate from the burner port side.

5. Re-assemble in reverse order.

#### Note

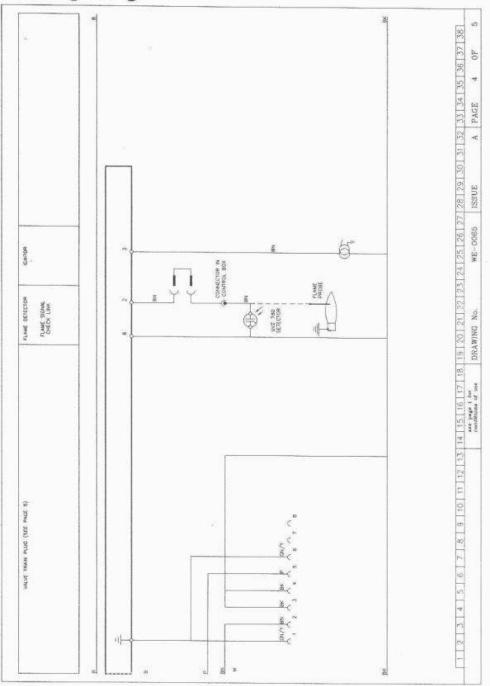
Please refer to the following for setting pressure switches:-

Combustion Air Pressure Switch (GW3 A4 0.4 - 3.0mbar)
The combustion air pressure switch is set after all other
adjustments have been made. Set the dial to 0.4mbar and
then with the burner working at the minimum rated output
of the heater adjust the dial clockwise increasing its value
until the burner locks out. Now reduce the value by one set
point turning the dial anti-clockwise. Re-start burner, if
burner does not light reduce the value by a further set point
and reneat.

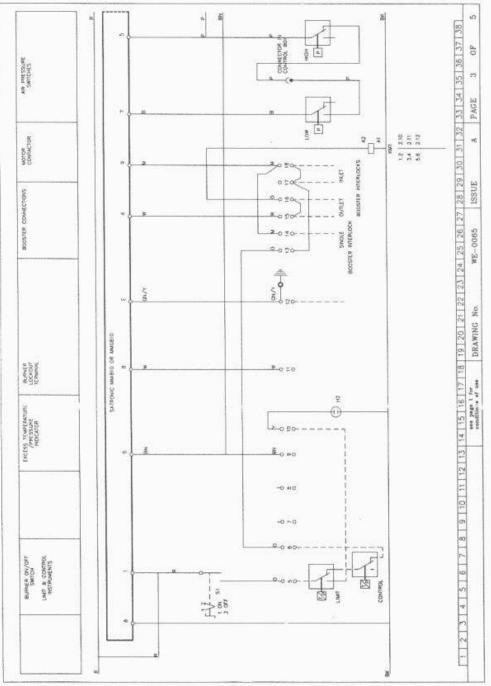
#### Over Pressure Switch (GW10A4 1.0 - 10.0mbar)

The over pressure switch is set after the combustion air pressure switch. Its purpose is to shut down the burner if the combustion chamber pressure increases significantly. Turn the dial to 10.0mbar and then with the burner working at the maximum rated output of the heater adjust the dial anti-clockwise decreasing its value until the burner locks out. Increase value by 1 point and restart the burner. If the burner shuts down due to the slight pressure surge in the combustion chamber during burner ignition increase the value on the over pressure switch by a further set point and repeat.

# Wiring Diagram



# Wiring Diagram



# Replacement of Faulty Components

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

#### Firing Head

- 1. Remove the firing head as described.
- 2. Stacken the clamping screw(s) and slide-out the electrodes.
- Release the pozidrive screws on the end of the assembly and remove the diffuser plate.
- With a 3mm allan key remove the grub screws on the gas nozzle thus releasing firing head assembly from the inner assembly tube.

#### NOTE --

Mark inner assembly tube before removal of nozzle to ensure same is re-fitted in correct position.

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

NOTE. The rectification probe has a flanged insulating bush where it passes through the diffuser plate. When replacing the rectification electrode ensure that the insulating bush locates in the diffuser plate from the burner port side.

Re-position firing head assembly inside the burner tube, hold in position with locating screw and re-assemble in reverse order. Remembering to secure earth connection under inner assembly fixing screw.

#### Electrodes

The ignition and/or rectification electrode can be replaced by following appropriate steps, listed under firing head.

#### Control Box

- Slacken the single securing screw and pull-off the faulty control box.
- 2. Push on new control box and re-tighten securing screw.

#### Burner Fan

- 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.
- Slacken off and remove the two motor fixing screws to allow fan to be removed with motor.
- 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.

#### Burner Fan Motor

- Release the two pozidrive screws to remove terminal box cover plate, also remove control box.
- Disconnect the motor wiring from the control box terminals and the earthing block. Pull motor wiring sheath from control box and terminal box.
- 3. Remove motor fan assembly from burner.
- Replace motor, refit fan impeller before re-assembling in reverse order.

Capacitor (Single phase motors only)

NOTE: A soldering iron is required for the replacement of the capacitor. If this is available at the location of the burner then proceed as below: - if not, remove the motor/flan assembly to the workbench and proceed as

- Pull end cap off of capacitor to reveal wiring connections.
- 2. Snip through wiring connections.
- Release securing nut on opposite end to wining and remove faulty capacitor.
- Replace capacitor, resecure with nut and resolder wiring connections before refitting end cap.

#### Air pressure switches

- Slacken the screws securing the pressure switch covers and remove. Release the wiring from the switches terminals, noting orientation.
- Stacken the cable clamping nut on side of pressure switch and pull out cable.
- Remove burner cover plate. Release and remove ebow union securing switch to burner casing then lift off switches (note position of elbow air pick-up point).
- Replace pressure switches re-connect elbow union and wiring, refit cover.
- Re-set Air Pressure Switches as described under Burner Servicing.

#### Ignition Transformer

- 1. Remove the cover plate and control box.
- 2. Open burner body and remove electrode lead.
- Disconnect assitians/corner wiring from the control box terminals and the earthing block, Pull transformer wiring sheath nut from control box and burner body.
- Using a 10mm spanner release the two nuts securing the transformer to the control package and remove transformer.
- Replace transformer passing the ignition lead through respective opening in the burner body side and re-assemble in reverse order.

#### Safety Shut-Off Valves

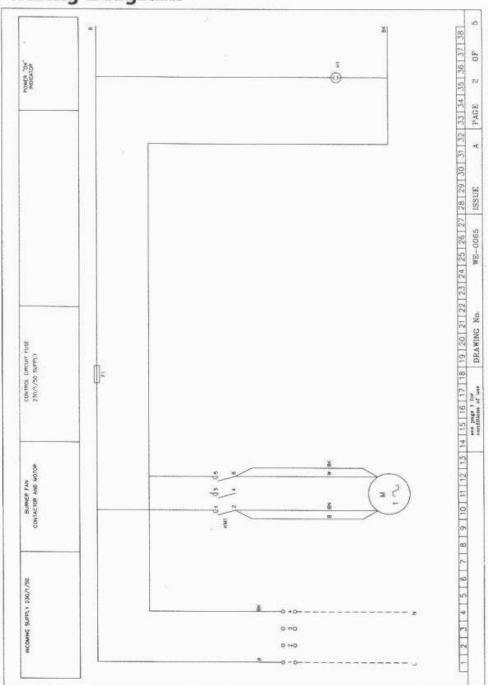
NOTE: Plugs have been used to facilitate electrical connection of the safety shut-off valves to the burner.

- 1. Remove all plugs from coils of safety shut-off valves.
- 2. Undo the union of the gas service valve.
- Undo the union situated at the junction of the gas train with the burner blast tube and remove gas control assembly complete.
- Disconnect pipework as appropriate to allow exchange of the faulty valve noting the orientation of fittings and components.
- 5. Fit replacement valve and re-assemble in reverse order.

# Wiring Diagram

	NOTES	1. ANY INTERLOCK DESIGNED TO SWATCH OR CONTROL. BUHNER SUCHES TIME SWITCH, DAMPER OR 1D, FAN INTERLOCK ETC, TO BE WIRED IN SERIES WITH CONTROL AND LIMIT INSTRUMENTS.	IF BUNNER IS USED ON STEAM BOXLER, WATER LEVEL. INTERLOCKS SHOULD BE WINED BETWEEN 13 & 17. RIBMOVE LING IF AOTC PANEL IS USED (SEE WAS-7029 FOR STANDARD AFRANGEMENT) TEHNINGS & & 83 REFER.	ON BOOSTED GAS SUPPLY WHE IN ET GAS PRESSURE INTERHOCK TO THE MASHINGAS IT AS BANDOUTET GAS PRESSURE INTERLOCK TO TERMINALE 16 & 16. IF NO BOOSTER IS USED LIM TERMINALS 16 & 16. IF NO	. REMOTE BURNER RUNT INDICATION FROM TERMINAL 9.	REMOTE EXCESS TEMPERATURE OF PHESSURE ALARM FROM TERMINAL 10.	REMOTE 'BURNER LOCKCUT' ALASM FROM TERMINAL II.					CONNS, FOR PC/GS7,8,9 & 13 ON OFF		ESSUE A PAGE 1 OF 5
					S 6 4 6 9			CABLE SIZE	1,00mm 1,00mm 1,00mm 1,00mm			DATE 7	DATE	WE-0065 IS
CONDITIONS OF USE	RICHT	READ FROM LEFT TO RICHT ALL WIRING 18/20 UNLESS OTHERWISE STATED DAMES WIRING	MLESS OTHERWISE ST					OVERLOAD C		PROTECTING	CONTROL DIRCUIT	DRAWN BY NLASHFORD	CHECKED	DRAWING No.
00	READ FROM LEFT TO RICHT	IG 16/20 U			EXTERNAL WIRING MODEL MOTOR KW	0 25 0 25 0 25 0 25	AMPAGE	m	C 00	OB.	1 **			
	READ FR	ALL WRING 16 PANEL WRING EXTERNAL WR					MODEL	PC/GS/7 PC/GS/9 PC/GS/13	FUSE	T.				
REMSIONS	REF DATE ACTION													

# Wiring Diagram



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