



These instructions are to be left with the User or adjacent to the Gas Appliance

# JB25P MK 5 WARM AIR HEATER

## INSTALLATION, COMMISSIONING & SERVICING INSTRUCTIONS

G.C. No 42 416 13

Publication No. ZZ 1031/4  
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### WARNING: THIS APPLIANCE MUST BE EARTHED

This appliance is for use with liquid petroleum gas G31, and is approved for use in GB, IE, FR, NL BE & NO,

**IMPORTANT: STATUTE LAW DEFINES THAT ALL GAS APPLIANCES MUST BE INSTALLED, COMMISSIONED AND MAINTAINED BY COMPETENT PERSONS, (ie CORGI REGISTERED INSTALLERS) IN ACCORDANCE WITH THE GAS SAFETY (INSTALLATION AND USE) REGULATIONS (CURRENT EDITION). FAILURE TO COMPLY WITH THESE REGULATIONS MAY LEAD TO PROSECUTION.**

### 1. BRIEF DESCRIPTION

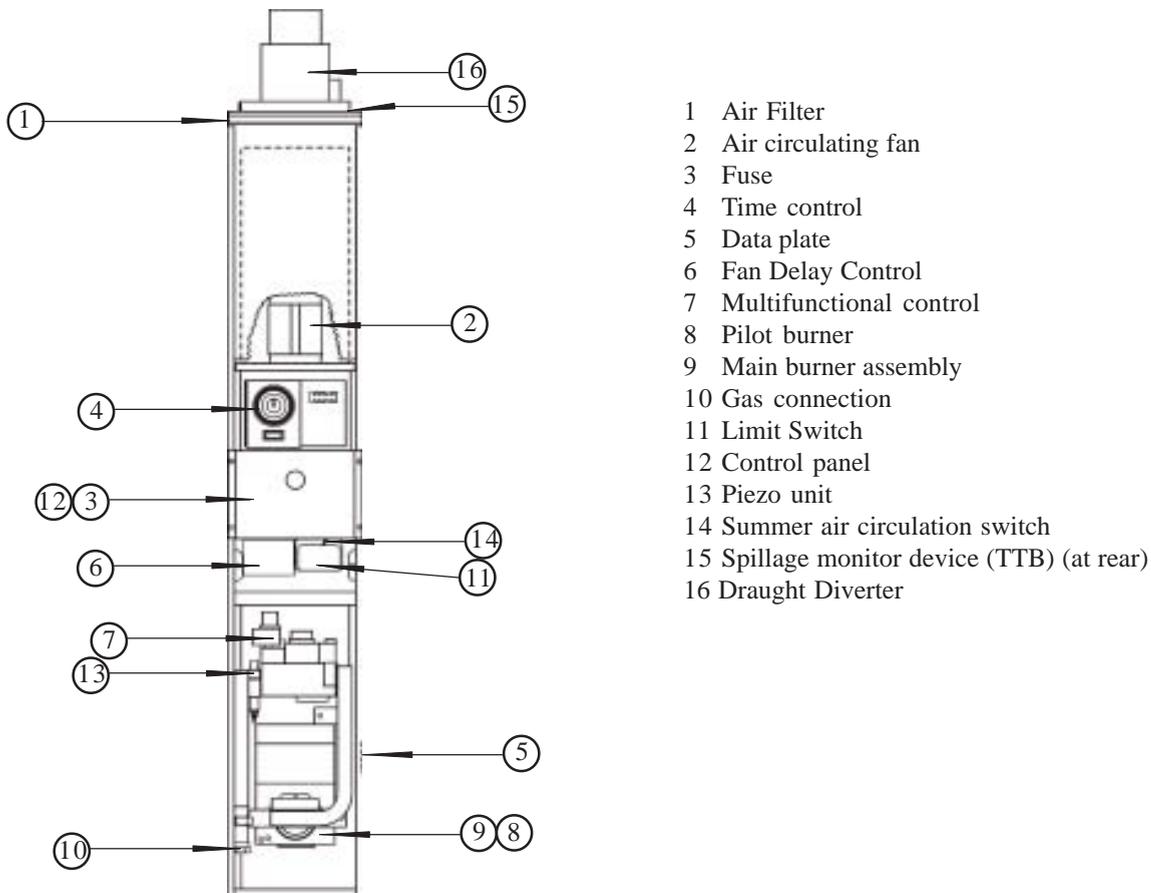


Fig. 1

- 1.1 JB25P is an open-flued, fan assisted downflow, ducted warm air heater. A Spillage Monitoring Device is fitted which senses the temperature around the draught diverter, and shuts down the appliance when this temperature rises due to the presence of flue gases.
- 1.2 The Air heater output is 7.6kW (27.5MJ/h, 26,000Btu/h). "Summer air circulation" of unheated air is available by manual selection (see User's Instructions).
- 1.3 For Caravan installations, Slot Fit Kit ATL30 is available for this appliance. For Permanent Dwellings, Free-Standing Kit TC30 and Slot Fit Kits TS30 and TSA30 are available for this appliance.

**THIS APPLIANCE CONFORMS TO BS EN 55014**

Installation shall be in accordance with the current editions of:

Building Standards (Scotland) (Consolidation) Regulations  
 Building Regulations  
 Gas Safety (Installation and Use) Regulations (as amended)  
 BS 7671 Institute of Electrical Engineers (I.E.E) Wiring Regulations  
 BS 6891 Installation of Low Pressure Gas Pipework of up to 28mm (R1) in domestic premises (2nd family gases).  
 BS 5440 Pt.1 (Flues for Gas Appliances)  
 BS 5440 Pt.2 (Air Supply for Gas Appliances)  
 BS 5864 Installation of Gas Fired Ducted Air Heaters  
 BS 5482 Pt.1 Installation of LPG appliances in permanent dwellings  
 BS 5482 Pt.2 Installation of LPG appliances in caravans and non-permanent dwellings  
 British System Design Manual "Gas Fired Warm Air Heating"  
 Model and Local Authority Bye-laws

## 2. **HEATER COMPARTMENT AND CLEARANCES** (See BS 5864)

- 2.1 When the heater is fitted into a compartment, a minimum clearance from the compartment walls of 6mm (1/4 in ) at the sides and rear, and 25mm (1 in) at the front must be left. Consideration should be given to the space required for the removal and replacement of the filter tray and the entry of the gas and electrical supplies.
- 2.2 For service access, a minimum of 450mm (18ins) is required at the front of the heater. Space must also be allowed, in a compartment installation, to permit the removal of the heater. The clearance between the appliance and the compartment should be not less than 75mm (3 in). However, if clearances are less than 75mm, the internal surface of the compartment must be lined with noncombustible material. The compartment must be of a fixed rigid structure.
- 2.3 In airing cupboard installations, the part used as the air heater compartment must comply with the relevant section of BS 5864 and must be completely separated by either a noncombustible partition or a perforated metal partition with the perforations not exceeding 13mm (1/2in). The secondary flue must be a tight fit where it passes through the partition and must be suitably protected (see BS 5440: Part 1).
- 2.4 In under-stairs installations, the compartment must comply with the relevant section of BS 5864, provided that in addition, all internal surfaces, including the base, are noncombustible or lined with noncombustible material. This requirement is applicable only to dwellings of more than two storeys. Combustible floors must be insulated from the heater.
- 2.5 In slot fit installations (for caravan installations see instructions packed with Slot Fit Kit TS30 or TSA30), the slot fit compartment must comply with the appropriate section of BS 5864. Side and rear clearances should be no less than 6mm (1/4in).
- 2.6 In freestanding installations (see instructions packed with the Top Closure kit TCB30), only one or two walls will be in contact with the air heater; and therefore must comply with the appropriate sections of BS 5864.
- 2.7 The base duct on which the air heater stands must be placed on a noncombustible floor.
- 2.8 **IMPORTANT:** When the heater is installed in a compartment, the Safety Label supplied with the heater **MUST BE AFFIXED** in a **PROMINENT POSITION** on the **INSIDE** of the **COMPARTMENT DOOR**.

## 3. **VENTILATION AND COMBUSTION AIR**

- 3.1 The room or internal space in which the heater is installed requires a permanent air vent of minimum effective area 13cm<sup>2</sup> (2 in<sup>2</sup>). The air vent should be either direct to outside air or to an adjacent room or internal space (other than a toilet or bathroom) that itself has an equivalent air vent direct to outside.
- 3.2 Combustion air may be introduced, via a 100mm (4in) nominal bore pipe, connected to a return air duct or plenum from a ventilated area and fitted with a lockable damper. The damper should be adjusted to control combustion airflow to 0.0064m<sup>3</sup>/s (13.6cfm), (i.e. 0.86m/s [160ft/min] velocity in a 100mm [4in] bore pipe). If this arrangement is used, a non-closeable warm air register **MUST** be provided in the same area as the front of the air heater or heater compartment if a return air grille is not located in that area.
- 3.3 When installed in a compartment, two permanent ventilation openings into the compartment are required, one at high level and one at low level, both communicating either directly with outside air or with a ventilated room or space. The minimum effective areas specified in Table 1 are related to the rated heat input of the Air Heater.
- 3.4 If any room or area from which air is drawn for ventilation or combustion contains an extract fan, the permanent vents must be sized to ensure that the operation of the appliance at full rate is not adversely affected. A spillage test as specified in sub-para 6.7 (Safety Checks) is carried out and any remedial work undertaken.

VENTILATED FROM INSIDE BUILDING	Low level grille	184cm <sup>2</sup> (28in <sup>2</sup> )
	High level grille	92cm <sup>2</sup> (14in <sup>2</sup> )
VENTILATED FROM OUTSIDE BUILDING	Low level grille	92cm <sup>2</sup> (14in <sup>2</sup> )
	High level grille	46cm <sup>2</sup> (7in <sup>2</sup> )

**Table 1: Minimum Effective Areas**

#### 4.

#### DUCT SYSTEM

(See British Design Manual - Gas fired Warm Air Heating)

##### 4.1 RETURN AIR

- 4.1.1 All return air shall be POSITIVELY ducted from outside the compartment to the top of the unit via a return air duct, and mechanically secured. It is recommended that the return air duct be not routed directly from the main living area, but from a convenient central area serving the remainder of the dwelling.
- 4.1.2 The return air system should be constructed of fire-resistant material. The flue shall not be run through an area serving as a return air path. It is extremely important that the correct size of return air grilles and ducting is used. The return air duct size should not be less than the equivalent of 200mm x 200mm (8" x 8"). If flexible duct is used the duct diameter should not be less than 254mm (10") dia. The return air grille should have a free area of not less than 650cm<sup>2</sup> (100in<sup>2</sup>).
- 4.1.3 An adequate and unobstructed return air path is essential from areas not served by a directly ducted return and to which warm air is delivered. All such rooms should be fitted with relief grilles which have a free area of 0.0088m<sup>2</sup>/kW (1in<sup>2</sup>/250Btu/h) of heat supplied to the room. The only exceptions are kitchens, bathrooms and WC.'s.
- 4.1.4 The return air duct should allow for ease of removal for access to the flue.
- 4.1.5 All duct work in the room or internal space in which the heater is installed shall be mechanically secured, and sealed with ducting tape.

##### 4.2 WARM DELIVERED AIR

- 4.2.1 All duct work, including riser ducts, should be fully insulated with 50mm (2in) fibreglass or similar. If short extended duct runs are taken below floor level these should be similarly insulated, and in addition wrapped with a sound vapour proof barrier, and protected from crushing.
- 4.2.2 The duct system should be carefully designed (as given in the guidelines in the British System Design Manual) to suit the needs of its specific heating requirements and building layout. The type of duct system, (i.e. radial/extended plenum/stepped) should be installed using the least number of fittings to minimize airflow resistance. The base duct, which equalizes the air pressure to supply ducts, shall be constructed to support the weight of the heater, which shall be secured to the plenum with screws on at least two sides, and sealed using self-adhesive foam strip, ducting tape or sealing compound. All ducting and blanking plates shall be mechanically secured and sealed.

#### 5.

#### INSTALLATION REQUIREMENTS

##### 5.1 FLUES (see British Standards BS 5440 Pt.1 Flues)

- 5.1.1 All joints shall be soundly sealed.
- 5.1.2 The flue should be kept as short and warm as possible, but must have a minimum equivalent height of 1m..
- 5.1.3 Sufficient support brackets shall be installed to bear the weight of the total flue system.
- 5.1.4 The spigot connection of the heater draught diverter will internally accept the spigot end of a non-asbestos flue to BS 567 or twin wall metal flue to BS 715 of nominal 100mm (4in) diameter.
- 5.1.5 A split collar should be fitted to provide for flue maintenance or inspection.
- 5.1.6 The flue shall be in accordance with the Building Regulations and British Gas Materials and Installations specification (3rd edition) with regard to clearance and shielding from combustible materials.
- 5.1.7 All materials shall be in accordance with Building Regulations requirements.
- 5.1.8 The flue should run as vertically as possible. Horizontal runs should be avoided if at all possible and any directional change should be as gentle as possible. If there is any doubt about the flue configuration, the equivalent flue height should be determined (see 5.1.10).
- 5.1.9 If the appliance to be fitted is a replacement, the old appliance should be checked for signs of spillage prior to commencement of the installation and appropriate action taken, (i.e. check flue system and renew as necessary).

5.1.10 It is recommended that at least 600mm of vertical flue should be provided from the top of the draught diverter (for new installations this shall be incorporated into the flue design). However, when carrying out replacement installations, an existing flue system may be encountered, where the vertical flue above the appliance to the first bend is less than 600mm. In the first instance, the installer must judge whether this distance can be achieved practicably by some means. Where this is not practicable, the existing flue system may be used, providing there is no evidence of spillage from the old appliance (see 5.1.9 above). Every effort must be made, however, to ensure that the existing flue complies in every other way with BS 5440 Part 1, including the visual inspection, flue flow and spillage test described in clause 4.3.2 of the above standard. Flue configurations may be assessed in terms of equivalent vertical height - details. For air heaters, the minimum equivalent vertical height is 1 metre. The installer must make a judgement based on his knowledge and experience and the examination and testing described above as to whether an existing flue system can be used.

**Note:** Ventilation of the compartment, room or internal space in which the appliance is to be installed must be checked for compliance with the requirements of BS 5440 Part 2 ( Ref. Section 3 of these instructions) and upgraded as necessary.

5.1.11 **Calculation method for flue sizing: (BS 5440: Part 1, Appendix A)**

- a. This appendix provides a procedure for estimating whether a given flue design is likely to ensure full clearance of combustion products.
- b. The procedure is based on calculating the 'equivalent height' of the flue under consideration, i.e. that height of the straight vertical circular flue pipe of specific size which will produce the same flow rate as the flue under consideration. The equivalent height is calculated from the formula:

$$H_e = H_a \times \frac{(K_i + K_o)_e}{(K_i + K_o)_a - K_e H_a + \text{SumK}}$$

where:

$H_e$  is the height of the equivalent flue;

$H_a$  is the vertical height of the actual or proposed flue;

$K_i$  is the inlet resistance of the flue;

$K_o$  is the outlet resistance from the flue;

subscript e refers to the equivalent flue diameter;

subscript a refers to the actual or proposed flue diameter;

$K_e$  is the resistance per unit length of the equivalent flue;

SumK is the resistance (other than the inlet and outlet resistance) of the actual or proposed flue.

**Note:** K and SumK are obtained from Table 2.  $K_o$  and  $K_i$  are obtained from Table 3.

- c. Table 2 gives resistance factors for common flue components for use in the formula. Table 3 contains the appropriate inlet and outlet flue resistances. The flue is likely to be satisfactory if its equivalent height exceeds 1 metre.

Component	Internal Size (mm)	Resistance Factor	Component	Internal Size (mm)	Resistance Factor	
Flue Blocks	197 x 67	0.85 per metre	45° Bend	100 mm pipe	0.61 per	
	231 x 65	0.65 run		125 mm pipe	0.25 fitting	
	317 x 63	0.35		150 mm pipe	0.12	
	140 x 102	0.60		197 x 67	0.30	
	200 x 75	0.60		231 x 65	0.22	
	183 x 90	0.45		317 x 63	0.13	
Pipe	100	0.78	Raking block	Any	0.30 per block	
	125	0.25		Adaptor block	Any	0.50
	150	0.12			Terminal	100 mm ridge
Chimney	213 x 213	0.02	125 mm ridge	1.0		
	90° Bend	100 mm pipe	1.22 per	150 mm ridge		0.48
		125 mm pipe	0.50 fitting	100 mm GCI		0.6
150 mm pipe		0.24	125 mm GCI	0.25		
			150 mm GCI	0.12		

**Table 2**  
**Resistance factors for use in calculating equivalent heights**

Appliance	Inlet Resistance ( $K_i$ )	Flue	Outlet Resistance ( $K_o$ )
100 mm dia spigot	2.5	100 mm flue	2.5
125 mm dia spigot	1.0	125 mm flue	1.0
150 mm dia spigot	0.48	150 mm flue	0.48

**Table 3**  
**Inlet and outlet resistance**

d. **Worked Calculation Example:**

A warm air unit with a 100 mm diameter flue spigot, fitted with a prefabricated flue system leading to a ridge tile (refer Fig. 2):

**From table 3:**

$K_{ia}$	Inlet resistance of actual flue	= 2.5
$K_{oa}$	Outlet resistance of actual flue	= 2.5
$K_{ie}$	Inlet resistance of equivalent flue	= 2.5
$K_{oe}$	Outlet resistance of the actual flue	= 2.5

**From table 2:**

Other resistances of actual flue:

Terminal	= 2.5
Pipe bend ( 2 x 0.61)	= 1.22
Pipe (4 x 1m @ 0.78)	= 3.12
(5 x 0.3m @ 0.78)	= 1.17

**SumK = 8.01**

Equivalent height :

From the formula

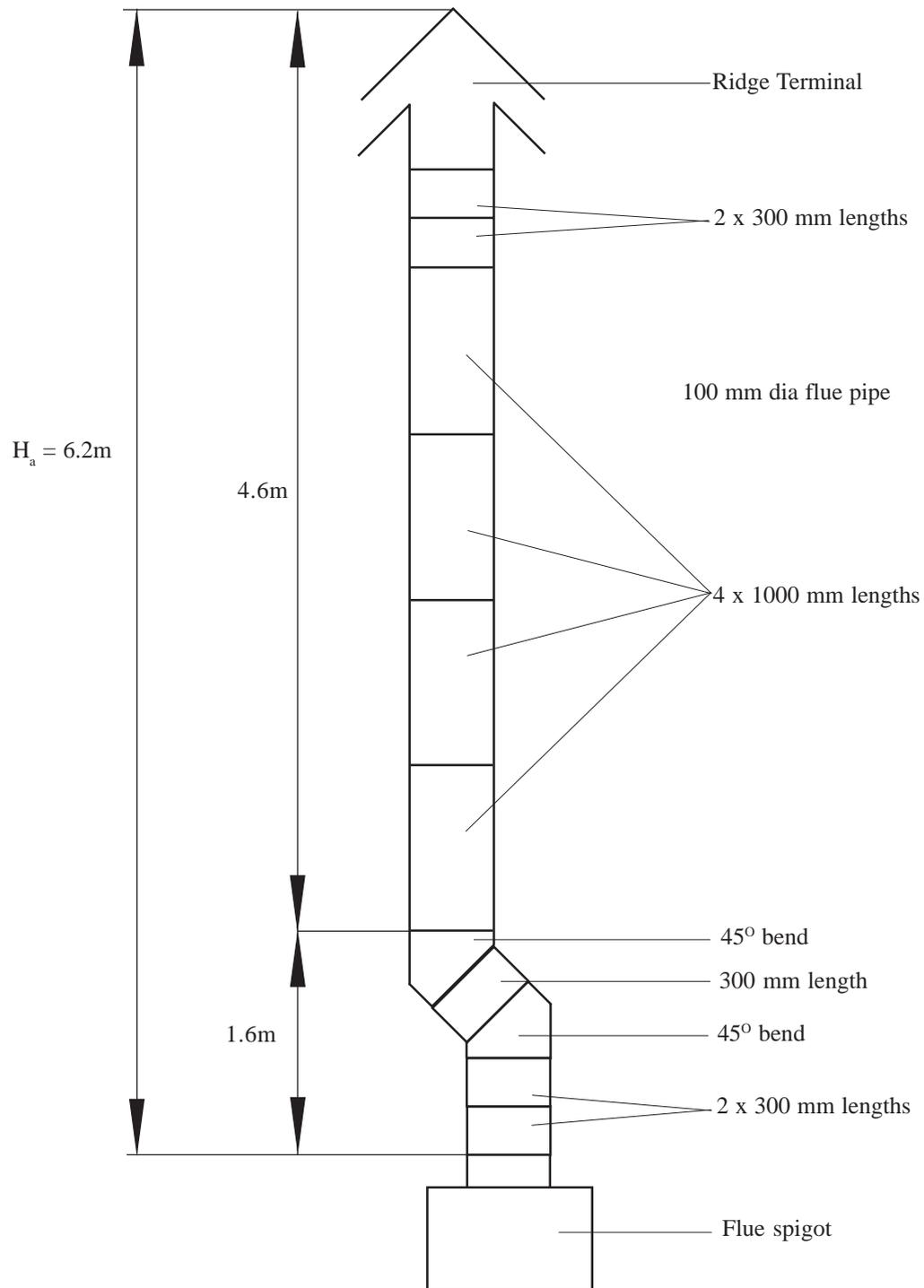
$$H_e = 6.2 \times \frac{(2.5 + 2.5)}{(2.5 + 2.5) - (0.78 \times 6.2) + 8.01}$$

**$H_e = 3.793$**  This flue exceeds 1.0m equivalent height and is therefore satisfactory.

5.1.12 Where flue blocks are used, builders should ensure that no obstruction is created during erection. The installer should ensure that the connection flue does not project beyond the internal wall of the flue blocks and that there is provision for examination and servicing.

5.1.13 **Important:** Before installing the appliance, carry out a visual check of the flue system as directed in the relevant section of BS 5440 Pt.1, then check the flue performance as follows:-

- Close all doors and windows in the room in which the appliance is to be installed.
- Introduce some heat into the flue, using a blow torch or other means.
- Carry out a flow visualization check with a smoke pellet at the intended position for the appliance. Ensure that there is discharge of smoke from the correct terminal only, and no spillage into the room. Smoke coming out of other than the correct terminal only, or a down draught or 'no flow' condition, indicates that the flue has failed the test, and the appliance shall not be connected until the defect has been found and rectified, and the test satisfactorily completed.



**Fig. 2**  
Worked example of equivalent flue height

## 5.2 ELECTRICAL:

### 5.2.1 Mains.

- The heater is supplied with mains cable (PVC sheathed, heat resisting to  $85^{\circ}\text{C}$ ), 3-core Brown-Blue-Green/Yellow, 5A,  $0.75\text{mm}^2$ , connected to a terminal block and exiting through the heater at the right hand top. The cable is suitable for a 230V 50Hz supply and shall be connected to the fixed wiring using a double pole switched, fused spur, incorporating a protective earth link. The fuse fitted shall be rated 5A to BS 1362. Connections shall be in accordance with the current edition of I.E.E. Regulations BS 7671.
- A 24V room thermostat (not supplied), that complies with BS 800, BS 3955 and BS 4201 is essential to ensure close control of comfort conditions. An anticipator is located within the thermostat and is graded in amps. The anticipator should be checked and adjusted to 0.2A.

### 5.2.2 Room Thermostat and its location.

- a. The Room Thermostat should be located where there is free air circulation approx. 1.5m (5ft) from the floor.
- b. Avoid the following locations:-
  - i) In a room where temperature is greatly affected by the sun or any other heat source, e.g. radiant fire, wall light fittings or TV set.
  - ii) Near an outside door or windows, or on an outside wall.
  - iii) Where affected by warm air ducts, diffusers, waste pipes or the heater itself.
- c. Connect room thermostat wires control panel terminals '5' and '6'

### 5.3 GAS (See BS 5864 and BS 6891)

- 5.3.1 An independent gas supply pipe is to be preferred wherever possible. When this is not possible, the pipe must be capable of taking the complete input of the heater and all other gas appliances being served by this same pipe. This supply should be suitably sized to conform to British Standards requirements of no more than 2.5 mbar (1.0 in wg) pressure drop (see table of discharge in BS 5482).
- 5.3.2 The 1/2in union gas cock (supplied) must be fitted to the gas inlet of the heater for easy isolation during servicing. The gas pipe should be so fitted and installed as to be durable, substantial and gas tight. To assist in determining where a gas connection may not be tight, a leak detection fluid should be applied around the connection. Under no circumstances should a flame be used to locate a gas leak. Gas entry to the air heater is through either side to a Rc1/2 (1/2in BSP. external [taper] thread).

## 6. COMMISSIONING

### 6.1 PREPARATION:

- 6.1.1 Ensure that:
  - a. Gas and Electrical supplies are **OFF**.
  - b. Filter, fan and fan compartments are free from obstructions.
  - c. All registers or grilles are open and conform to design specifications.
  - d. Return, relief and ventilation air installations are adequate.

### 6.2 SYSTEM BALANCING:

- 6.2.1 Set the heater electrical supply ON.
- 6.2.2 Set the SUMMER AIR CIRCULATION switch to 'ON'.
- 6.2.3 Balance the system to provide required volume proportions at warm air outlets.

**NOTE:** If the system includes ceiling diffusers, air velocities through these should be NOT LESS THAN 1.5m/s (300ft/min), except for very small rooms (ie. bathrooms etc.). Outlet faces may require partial blanking in order to achieve this.

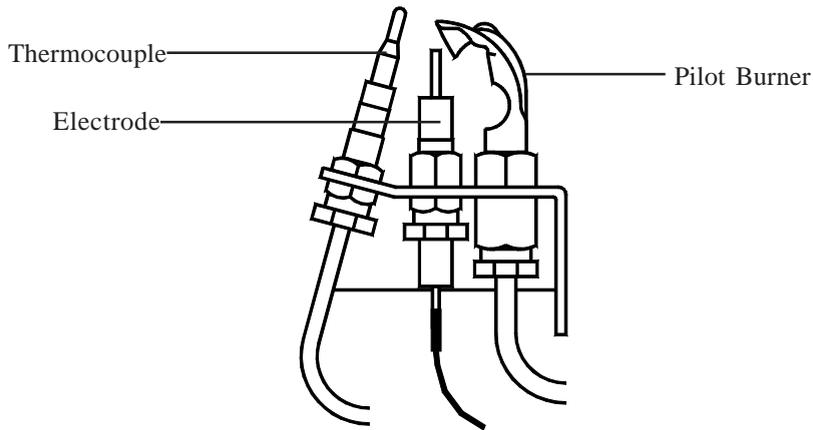
- 6.2.4 Set the SUMMER AIR CIRCULATION switch to 'OFF'.

### 6.3 IGNITION OF PILOT AND MAIN BURNERS:

**WARNING:** If the pilot light is extinguished either intentionally or unintentionally, no attempt should be made to relight the gas for a minimum of 3 minutes. Ensure that the Electrical supply, Time Control and Selector switches are set to 'OFF'.

- 6.3.1 Set the Room Thermostat to its lowest or **OFF** setting.
- 6.3.2 On the Multifunctional Control, slacken the pressure test point screw, and fit a pressure test gauge (refer fig. 4).
- 6.3.3 Turn the heater Gas supply **ON**, test for gas soundness and purge the whole gas pipe as described in BS 6891.
- 6.3.4 Referring to Fig. 4, press and hold the OPERATING CONTROL, and whilst observing the Pilot Burner, repeatedly press the Piezo igniter button until the Pilot Burner ignites.
- 6.3.5 After 20 seconds release the OPERATING CONTROL and let it spring out; ensure that the Pilot Burner remains alight. If the Pilot Burner extinguishes, wait three minutes and repeat steps 6.3.4 and 6.3.5 until the Pilot Burner remains alight.
- 6.3.6 Ensure that the pilot flame envelops the Thermocouple tip, adjusting the Multifunctional Control Pilot Adjuster as required (refer Fig. 4).
- 6.3.7 Set the Heater Electricity supply **ON**.
- 6.3.8 Set the Time Control to required Heating On periods.
- 6.3.9 Set the Selector switch to 'TIMED'.

- 6.3.10 Set the thermostat to MAXIMUM.
- 6.3.11 Ensure that the Main Burner has now ignited.
- 6.3.12 Test for gas leakage at the supply, Multifunctional Control, Pilot and Main burners using a proprietary detection fluid, and sealing any leaks found.
- 6.3.13 Allow the heater to operate for a minimum of 15 minutes to ensure stability.

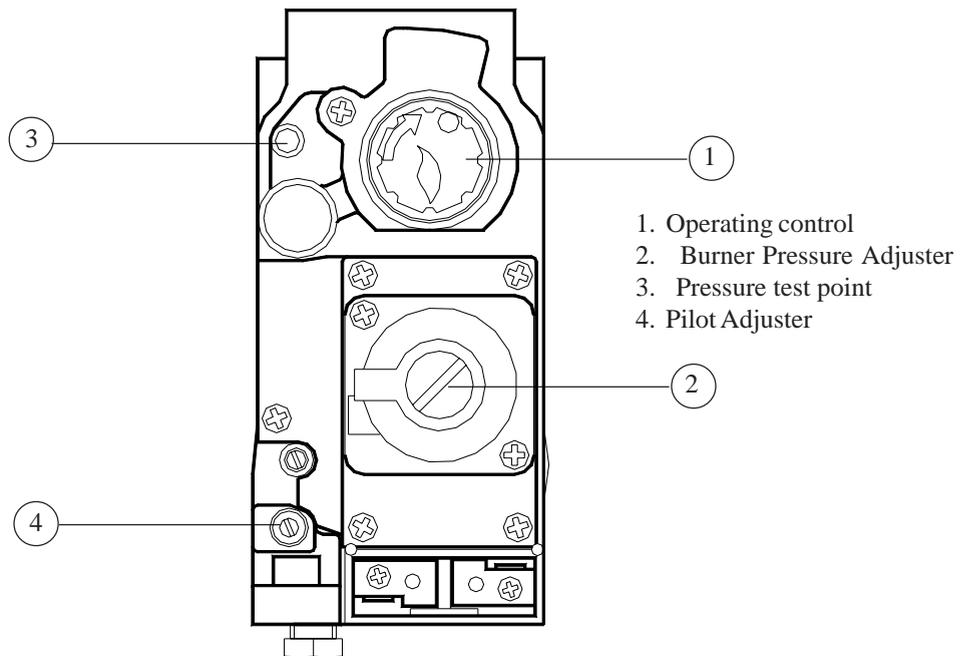


**Fig. 3**  
**Pilot Burner Assembly**

**6.4 MAIN BURNER PRESSURE TEST AND TEMPERATURE RISE CHECK:**

- 6.4.1 Referring to Table 4 and Fig. 4 below, ensure that the pressure test gauge indicates correct pressure, adjusting the supply pressure if required.
  - a. **At the Multifunctional control:**
    - i. Remove the Burner Pressure Adjuster cover.
    - ii. Set the Burner Pressure Adjuster to provide a pressure test gauge indication for the correct burner pressure as detailed in Table 4.
    - iii. Refit the Burner Pressure Adjuster cover.
- 6.4.2 Check that the temperature rise across heater is between 45°C - 55°C, setting the fan speed accordingly by alteration of the voltage selection at the tap changer on the control panel, (decrease voltage to decrease fan speed thus increase temperature).

**Note: Tapping 1 = 150V, Tapping 2 = 170V, Tapping 3 = 190V, Tapping 4 = 210v and Tapping 5 = 230V.**



**Fig. 4**  
**Multifunctional Control**

## 6.5 EXTINGUISHING OF PILOT AND MAIN BURNERS:

- 6.5.1 On the Multifunctional Control, rotate the OPERATING CONTROL clockwise to the '1' position and ensure that the OPERATING CONTROL fully resets, and both Pilot and Main Burners are extinguished.
- 6.5.2 On the Multifunctional Control, remove the pressure test gauge and secure the Pressure test point screw.

## 6.6 AUTOMATIC CONTROLS CHECK

- 6.6.1 Ignite the Pilot burner.
- 6.6.2 Set the TIME CONTROL to 'ON'.
- 6.6.3 Set the Room Thermostat slowly clockwise until the Main Burner ignites.
- 6.6.4 Ensure that the fan starts to operate after a short period.
- 6.6.5 When the temperature reaches the control setting, check that the Main Burner extinguishes followed by the fan switching off after a short period.
- 6.6.6 When the temperature falls below the control setting, ensure that the Main Burner re-ignites followed by fan operation.

## 6.7 SAFETY CHECKS:

- 6.7.1 Check for gas soundness within the appliance.
- 6.7.2 **Spillage test:** Carry out a full spillage test as follows, and ensure that the flue operates effectively with all doors closed and any extractor fans in operation.

**NOTE:** If an extractor fan is situated in an adjoining or adjacent room, carry out the spillage test with the interconnecting doors open.

### **If the draught diverter is accessible:**

- a. Introduce smoke into the draught diverter adjacent to an exit from the heat exchanger, by means a smoke match or puffer.
- b. Ensure that there is no spillage present (indicated by displacement of smoke downwards and out of the draught diverter).

### **If the Draught Diverter is not accessible:**

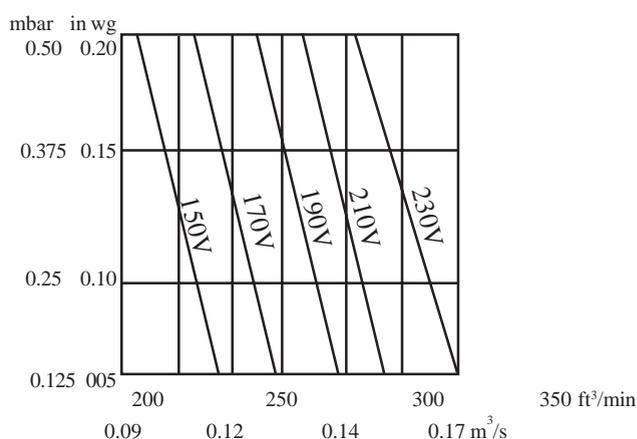
- a. Introduce smoke, by means of **part** of a smoke pellet on a non-combustible support, into the heat exchanger.
- b. Extinguish the Main and Pilot burners.
- c. Ensure that there is no spillage evident by visually observing the draught diverter location on the air heater.
- d. If spillage is evident, further investigation and rectification is required before re-testing the appliance.

**WARNING: The appliance shall not be left connected to the gas supply unless it has successfully passed the above spillage test.**

- 6.7.3 Turn OFF the gas supply at the service cock and ensure that the Multifunctional Control fail-safe operates within 60 secs (indicated by loud click from Multifunctional Control).
- 6.7.4 Turn gas supply ON at service cock.
- 6.7.5 Switch the appliance electrical supply OFF.
- 6.7.6 Disconnect the fan at the fan flying lead connection.
- 6.7.7 Switch the appliance electrical supply ON.
- 6.7.8 Ignite the Pilot and Main Burners as detailed in sub paras 6.3.4 and 6.3.5
- 6.7.9 Ensure that the Limit Switch operates, indicated by the Main Burner extinguishing, within 120 and 180 seconds.
- 6.7.10 Switch the appliance electrical supply OFF.
- 6.7.11 Reconnect the Air Heater Fan at the flying lead.
- 6.7.12 Switch the appliance electrical supply ON.
- 6.7.13 Ensure that the Main Burner re-ignites when the appliance temperature reduces.

	<b>kW</b>	<b>MJ/h</b>	<b>Btu/h</b>
<b>INPUT</b>	<b>9.7</b>	<b>34.9</b>	<b>33,100</b>
OUTPUT	7.6	27.5	26,000
	PROPANE G31		
Gas rate cv	0.705kg/h		
Gas	G31 cv(gross) 95.65MJ/m <sup>3</sup>		
Gas Pressure	26mbar (10.2 in wg)		
Main Injector	BRAY Cat 23/380		

**Table 4**  
**Main Burner Pressure Settings**



**Table 5**  
**Fan Performance Curve**

## 7. INSTRUCTIONS FOR USERS

- 7.1 If the dwelling is unoccupied, ensure that the Instructions for User are left with the air heater for the User, and the Installation Instructions are left at or near the air heater for use on future service calls.
- 7.2 If the dwelling is occupied, hand the User Instructions over and ensure that the User understands:
- 7.2.1 How to ignite the pilot and burner.
  - 7.2.2 How to operate the Room Thermostat, time control, heater ON/OFF switch and summer air circulation switch, and that the time control must be reset following a power failure.
  - 7.2.3 How to extinguish the pilot and main burner at the Multifunctional control, the sequence of actions when switching off the gas supply and the subsequent delay in relighting the pilot burner if these actions are not followed, and switch off electrical supply to the heater.
  - 7.2.4 How to remove, clean and refit the air filter and at what intervals (i.e. fortnightly, or weekly for new houses).
  - 7.2.5 How to control the heating system by opening and closing warm air outlets.
  - 7.2.6 How to obtain summer air circulation.
  - 7.2.7 That the air grilles on the heater or heater compartment; grilles and ventilators in the walls, windows or doors of the building must not be obstructed.
  - 7.2.8 The heater must be serviced at least once a year by a competent person to ensure efficient and safe operation.
  - 7.2.9 That the red instructions for safe use have been pointed out and understood.
  - 7.2.10 That expert help must be obtained if persistent failure of the pilot burner occurs.

## 8.

MAINTENANCE

**IMPORTANT: Ensure that the gas and electricity supplies are isolated before commencing any maintenance or replacement of components. After completion of any maintenance, always test for gas soundness and carry out a complete functional test of the appliance in accordance with Commissioning Instructions at Sect 6.1 to 6.7 inclusive.**

8.1 **ROUTINE MAINTENANCE:**

- 8.1.1 Operate the appliance and check for the correct function of the burner and controls.
- 8.1.2 Turn OFF the gas and electrical supplies to the appliance.
- 8.1.3 Remove the air heater front panel.
- 8.1.4 Remove and check the return air filter/cleaner for cleanliness, remove and clean the Air Circulation fan as detailed in para 8.8.
- 8.1.5 Remove the Burner and Controls Assembly as detailed in para 8.2. Inspect and clean the main burner and injector as necessary. Examine the main burner for cracks, including hairline cracks, exchanging the burner as necessary.
- 8.1.6 Inspect and clear the pilot burner orifice.
- 8.1.7 Clean the heat exchanger flueways by thoroughly brushing from above and below.
- 8.1.8 By viewing through the Fan Aperture, and using a torch or similar, examine the heat exchanger externally for signs of cracks or holes, particularly around welded joints.
- 8.1.9 Using a torch or similar, introduce a light source into the heat exchanger burner aperture and upper access port, and again examine the heat exchanger for signs of cracks or holes, particularly around welded joints, whilst again viewing through the Fan Aperture.
- 8.1.10 Refit the Air Circulation fan, Burner and Controls Assembly, and air filter/air cleaner.
- 8.1.11 Light the appliance and note the main burner flame profile. If the flame profile is affected when the Air Circulation fan switches on, check for any air leaks between the air heater and the base plenum, paying particular attention to heaters with rear draught diverters. Rectify any air leaks before continuing with this procedure.
- 8.1.12 Allow the air heater to operate for approximately 15 minutes to ensure stability, and with the main burner lit, ensure that the operation of Air Circulation fan does not affect the main burner flame profile.
- 8.1.13 If no defects are found, fully commission the air heater in accordance with the Installation, Commissioning and Maintenance instructions applicable to the appliance.

8.2 **BURNER AND CONTROL ASSEMBLY REMOVAL:**

- 8.2.1 Ensure that the Gas and Electrical supplies are switched OFF
- 8.2.2 Remove the appliance lower front door.
- 8.2.3 Disconnect the Multifunctional Control electrical connection.
- 8.2.4 Disconnect the gas supply by breaking the union at the input side of the Multifunctional Control.
- 8.2.5 Remove the Burner Assembly fixing 3 x screws and withdraw the Burner Assembly.
- 8.2.6 Refit the Burner and Control Assembly in reverse order.

8.3 **BURNER ARM REMOVAL AND CLEANING:**

- 8.3.1 Remove the Burner and Control Assembly as detailed in 8.2.
- 8.3.2 Remove the Pilot Burner Assembly as detailed in para 8.5
- 8.3.3 Remove the 2 x screws and lock washers securing burner arm to Main Burner Assembly, and remove the burner.
- 8.3.4 Clean the burner thoroughly both inside and out with a soft brush. **DO NOT ENLARGE, DISTORT OR DAMAGE THE BURNER HOLES.**
- 8.3.5 Reassembly or replacement is in reverse order.

8.4 **MAIN INJECTOR REMOVAL, CLEANING AND REPLACEMENT:**

- 8.4.1 Remove the Burner and Control Assembly as details in 8.2
- 8.4.2 Unscrew the main injector from the extension fitted to the housing.
- 8.4.3 Clean as necessary. **DO NOT ENLARGE, DISTORT OR DAMAGE THE MAIN INJECTOR HOLE.**
- 8.4.4 If the injector is to be replaced, ensure that it is correctly marked, referring to the Data Badge for details.
- 8.4.5 Refit or replace injector in reverse order.

**8.5 PILOT BURNER ASSEMBLY, REMOVAL AND REPLACEMENTS:**

- 8.5.1 Remove the Burner and Control Assembly as detailed in 8.2
- 8.5.2 Disconnect the Igniter lead from the Piezo unit.
- 8.5.3 Release the Thermocouple locking nuts from the Pilot Assembly and Multifunctional Control, and withdraw the Thermocouple, taking care to avoid damaging the capillary.
- 8.5.4 Release the Pilot Feed Pipe from the Pilot Burner.
- 8.5.5 Remove the 2 x 4mm screws, locking washers and nuts securing the Pilot Burner Assembly to the Main Burner, and withdraw the Pilot Burner Assembly.
- 8.5.6 Release and remove the 2 x 4mm screws securing the Igniter electrode to the Pilot Burner and withdraw the electrode.
- 8.5.7 Refitting or replacement is in reverse order.

**NOTE: When refitting or replacing Thermocouple, tighten only to FINGER TIGHT + 1 FLAT.**

**8.6 MULTIFUNCTIONAL CONTROL REMOVAL:**

- 8.6.1 Remove the Burner and Control Assembly as detailed in 8.2
- 8.6.2 Disconnect the Thermocouple at the Multifunctional Control, avoiding damage to the capillary.
- 8.6.3 Disconnect the Pilot Feed Pipe from the Multifunctional Control.
- 8.6.4 Disconnect the Multifunctional Control input and output supply feeds.
- 8.6.5 Refitting or replacement is in reverse order.

**8.7 PIEZO UNIT REMOVAL:**

- 8.7.1 Disconnect the 2 x conductors from Piezo unit.
- 8.7.2 Unscrew the Piezo retaining nut and remove the unit from its mounting bracket.
- 8.7.3 Refitting or replacement is in reverse order.

**8.8 AIR CIRCULATING FAN, REMOVAL AND CLEANING:**

- 8.8.1 Ensure that the electrical supply is isolated.
- 8.8.2 Remove the appliance lower and upper doors.
- 8.8.3 Disconnect the Fan Assembly flying lead.
- 8.8.4 Remove the Fan Assembly securing screw and withdraw the Fan Assembly from the Heater cabinet, avoiding damage to the fan blades.
- 8.8.5 Remove all dust from the impeller and motor, avoiding damage to the fan blades.
- 8.8.6 Refitting or replacement is in reverse order.

**8.9 CONTROL PANEL REMOVAL:**

- 8.9.1 Ensure that the electrical supply is isolated.
- 8.9.2 Remove the appliance lower and upper doors.
- 8.9.3 Release the 2 x 4mm screws securing the Limit Switch cover and withdraw the cover.
- 8.9.3 Disconnect the following:
  - a. Fan Assembly flying lead,
  - b. 230V mains 'L', 'N' and 'E' from connection block terminals '1' and '3', and earth stud respectively,
  - c. Room thermostat from connection block terminals '5 and '6',
  - d. Limit Switch 'LOAD' and 'COMMON' connections,
  - e. Fan Control 'LOAD', 'COMMON' and 'EARTH' connections,
  - f. 2 x Override-stat connectors (if fitted),
- 8.9.4 Disconnect the 2 x TTB connections.
- 8.9.5 Release the Multifunctional Control solenoid cover retaining screw, remove the solenoid cover and disconnect the solenoid wiring.
- 8.9.6 Release the 4 x 4mm screws securing the Electrical Assembly to the heater cabinet and remove the Electrical assembly.
- 8.9.7 Refitting or replacement is in reverse order.

**8.10 TIME CONTROL REMOVAL:**

- 8.10.1 Remove the Electrical Assembly as detailed in sect 8.9.
- 8.10.2 Disconnect the wiring from the Time Control connection block terminals as follows:
  - a. **BROWN** conductor from terminal marked 'L',
  - a. **BLUE** conductor from terminal marked 'N',
  - a. **GREEN/YELLOW** conductor from terminal marked 'E',
  - a. **YELLOW** conductor from terminal marked '3',
  - a. **WHITE** conductor from terminal marked '4',
- 8.10.3 Release the 2 x securing screws situated on the lower face of the Time Control and remove by partially withdrawing the bottom of the Time Control and then lifting upwards
- 8.10.3 Refitting or replacement is in reverse order.
- 8.10.4 Set the Time Control to the required ON and OFF times.
- 8.10.5 Set the Time Control to the correct time.

**8.11 SUMMER CIRCULATION SWITCH REMOVAL:**

- 8.11.1 Ensure that the electrical supply is isolated.
- 8.11.2 Remove the appliance upper and lower doors.
- 8.11.3 Disconnect the Summer circulation switch.
- 8.11.4 Release the switch securing bezel, and the remove switch.
- 8.11.5 Refitting or replacement is in reverse order.

**8.12 FAN DELAY CONTROL AND LIMIT SWITCH REMOVAL:**

- 8.12.1 Ensure that the electrical supply is isolated.
- 8.12.2 Remove the appliance lower and upper doors.
- 8.12.3 Release the 2 x 4mm screws securing the Limit Switch cover and withdraw the cover.
- 8.12.4 Disconnect the required control/switch.
- 8.12.5 Release the 2 x securing screws and remove the required control/switch.
- 8.12.6 Refitting or replacement is in reverse order.

**8.13 TTB REMOVAL:**

- 8.13.1 Ensure that the electrical supply is isolated.
- 8.13.2 Remove the appliance lower and upper doors.
- 8.13.3 Disconnect the Fan plug from the Electrical Assembly flying lead.
- 8.13.4 Release and remove the Fan securing screw and remove the Fan from the fan compartment.
- 8.13.5 Cover the aperture to the heat exchanger in the top shelf to prevent objects falling into the heat exchanger.
- 8.13.6 Release and remove the 6 x self tapping screws securing the fan compartment rear plate, and withdraw the rear plate.
- 8.13.7 Hold the TTB mounting bracket and release the securing screw, rotate the bracket counter clockwise and remove.
- 8.13.8 Disconnect the TTB, taking care to avoid pulling the wires through the grommet in the top of the heater cabinet.
- 8.13.9 Release the 2 x 4mm screws and remove the TTB.
- 8.13.10 Refitting or replacement is in reverse order.

**8.14 HEAT EXCHANGER ACCESS:**

- 8.14.1 Remove the Burner and Control Assembly as detailed in sect 8.2
- 8.14.2 Remove the Electrical Assembly and Time Control as detailed in sects 8.9 and 8.10.
- 8.14.3 Release the 2 x securing screws and remove the heat exchanger access cap and gasket.
- 8.14.4 Remove the heat exchanger baffle.
- 8.14.5 Reassembly is in reverse order.

**NOTE: When reassembling, ensure that the baffle is pushed fully home and the access cap is fully sealed. In the event of heat exchanger replacement being necessary, contact Johnson and Starley Service Department.**

## 9.

**DEFECT DIAGNOSIS**

9.1 **IMPORTANT: If an electrical defect occurs after installation of the appliance; preliminary earth continuity, polarity, and resistance to earth checks should be carried out with a multimeter. On completion of any maintenance/fault-finding task that has required the breaking and remaking of electrical connections, then checks of continuity, polarity, and resistance to earth must be repeated.**

9.2 **WARNINGS:**

9.2.1 When purging or checking gas supplies, ensure that the ventilation to the room or cupboard is adequate, and that all naked lights are extinguished.

<b>SYMPTOM</b>	<b>POSSIBLE CAUSE</b>	<b>REMEDY</b>
a. Pilot will not light.	i. No gas supply to heater.	Check for gas at inlet pressure test point on Multifunctional Control.
	ii. Gas supply pipe not purged.	Purge gas supply pipe in accordance with BS 6891.
	iii. Pilot orifice restricted.	Clear pilot orifice or replace pilot injector.
	iv. Piezo system faulty.	Check igniter, lead, and electrode.
b. Pilot lights but goes out on releasing START button during initial light-up, or after normal operation.	i. Connection between thermocouple and gas control not secure.	Check connection is secure.
	ii. Faulty power unit on Multifunctional Control.	Replace Multifunctional Control.
	iii. Faulty thermocouple.	Replace Thermocouple.
	iv. Pilot flame too small.	Adjust Pilot flame
	v. Pilot orifice restricted.	Replace pilot injector.
c. Main burner lights but fan fails to run after approx. 3 min.	i. Loose electrical connection fan control.	Check fan connections.
	ii. Fan control set incorrectly.	Check for correct settings.
	iii. Faulty fan assembly.	Replace, taking care not to damage impeller.
	iv. Faulty fan control.	Replace.
d. Main burner operating intermittently with fan running.	i. Gas rate high.	Check gas rate.
	ii. Temperature rise excessive.	Adjust fan speed.
	iii. Air filter or return air path restricted.	Check filter is clean and air path is clear.
	iv. Excessive number of outlets closed.	Open additional outlets.
	v. Spillage of flue gases.	Carry out spillage test and rectify.
	vi. Spillage monitor device (TTB) faulty.	Replace Spillage device (TTB)
e. Main burner operating with intermittent fan operation.	i. Fan control set incorrectly.	Check for correct settings.
f. Fan runs for excessive period or operates intermittently after main burner shuts down.	i. Fan control set incorrectly.	Check for correct settings.
g. Noisy operation.	i. Noisy fan motor.	Replace fan assembly.
	ii. Fan speed setting too high.	Adjust fan speed.

- |   |  |   |
|---|--|---|
| h. Pilot alight but main burner not igniting. | i. Mains electrical supply not connected to heater.  | Check mains supply.   |
|   | ii. Controls not demanding heat  | Check that time control (if fitted) and room thermostat are operating correctly.                                  |
|   | iii. T3.15A fuse failed.   | Replace. If failure occurs again, check wiring for short circuits.  |
|   | iv. Loose connection to room thermostat, Limit Switch, gas control lead, time control, or transformer. | Check connections.  |
|   | v. Transformer open circuit.   | Check with test meter electrical assembly.  |
|   | vi. Multifunctional control faulty.  | Replace Multifunctional control.  |
|   | vii. Limit Switch faulty.  | Short circuit switch and replace if necessary.  |
|   | viii. Spillage of flue gasses.   | Carry out spillage test and rectify.  |
|   | ix. Spillage monitor device (TTB) defective  | Replace   |
|   | x. Room thermostat or external wiring faulty.  | Fit temporary loop in heater thermostat socket. If heater ignites, external circuit or room thermostat is faulty. |

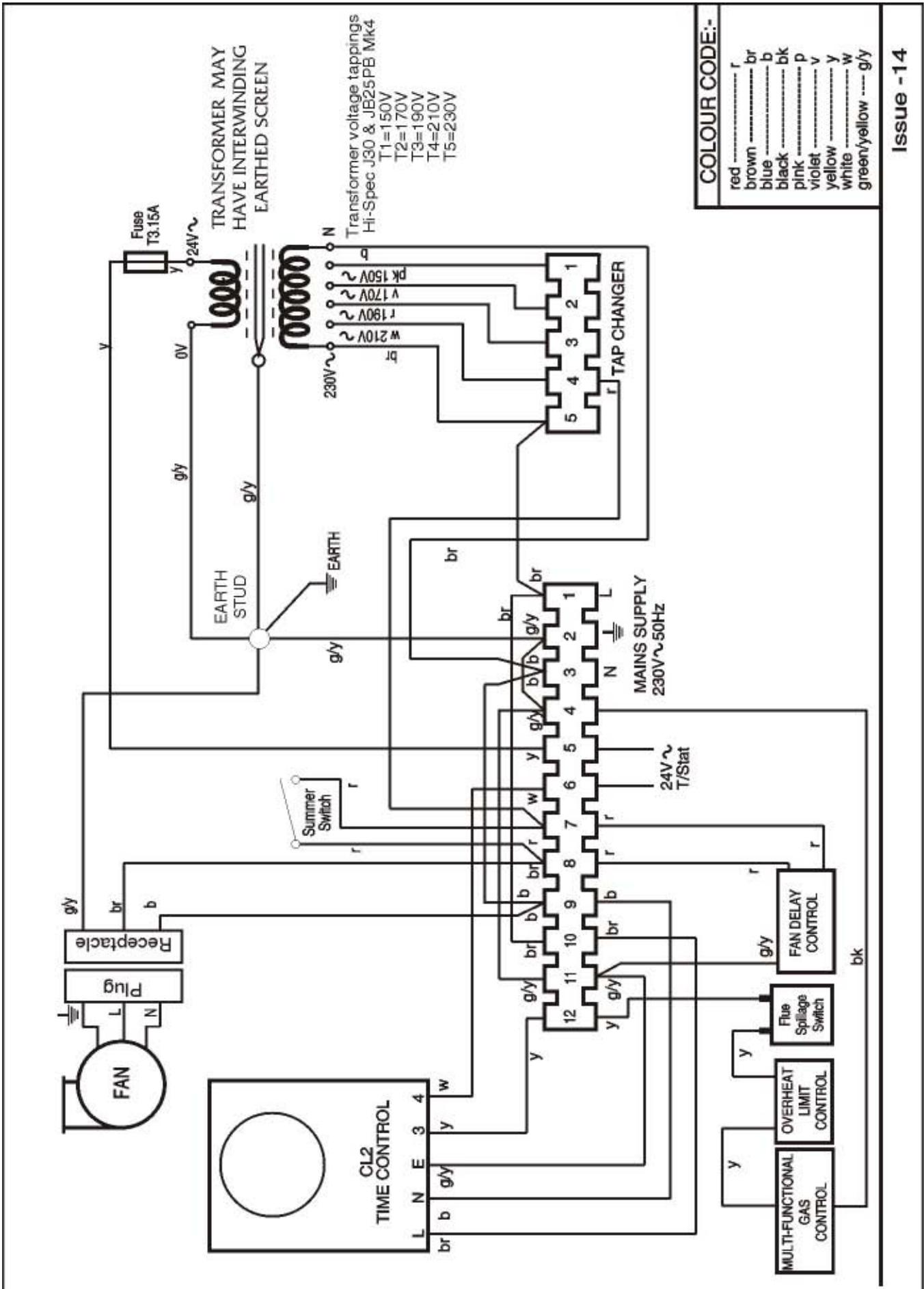
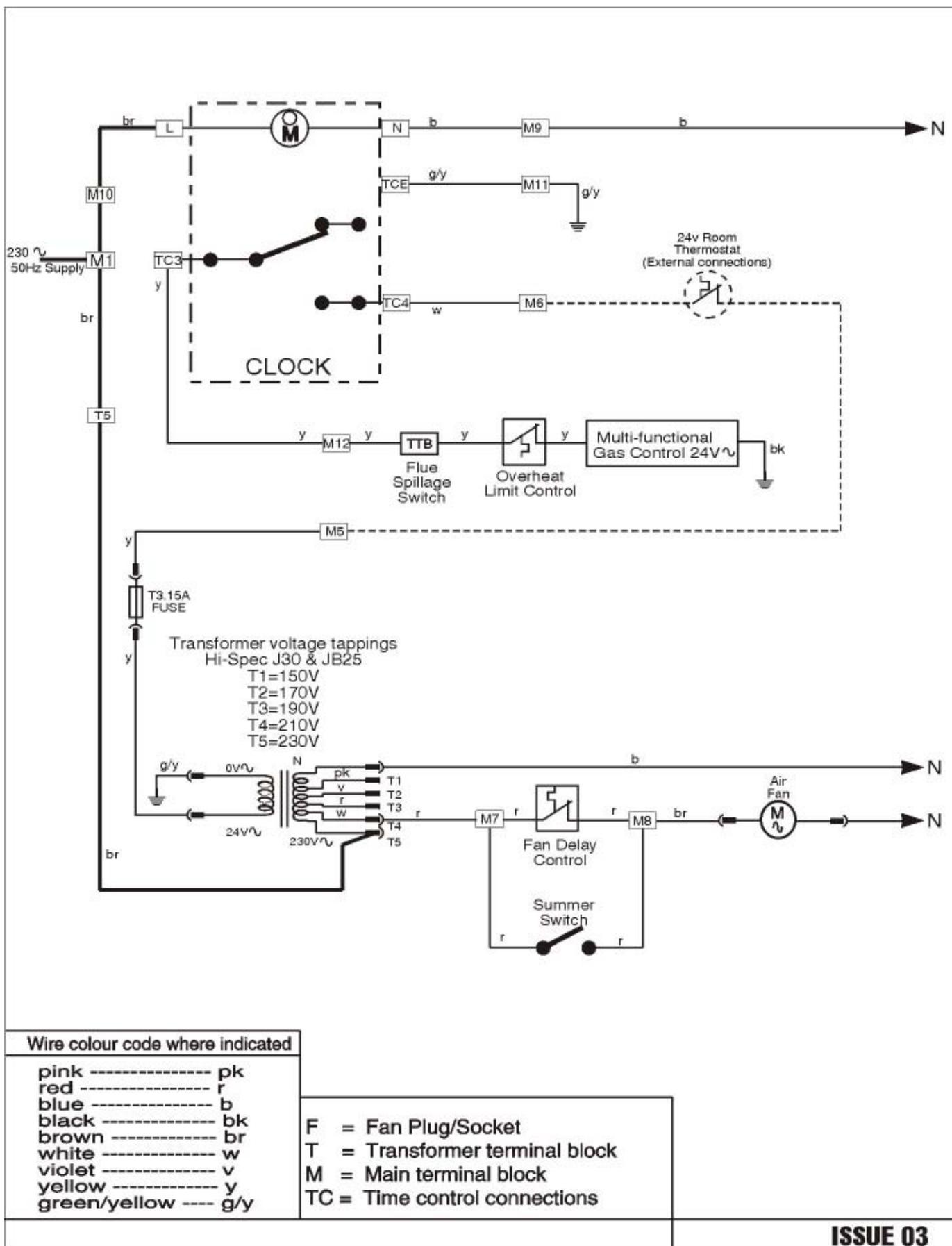


Fig. 5, JB25P Mk 5 CIRCUIT DIAGRAM



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Fig. 6, JB25P Mk 5 FUNCTIONAL DIAGRAM

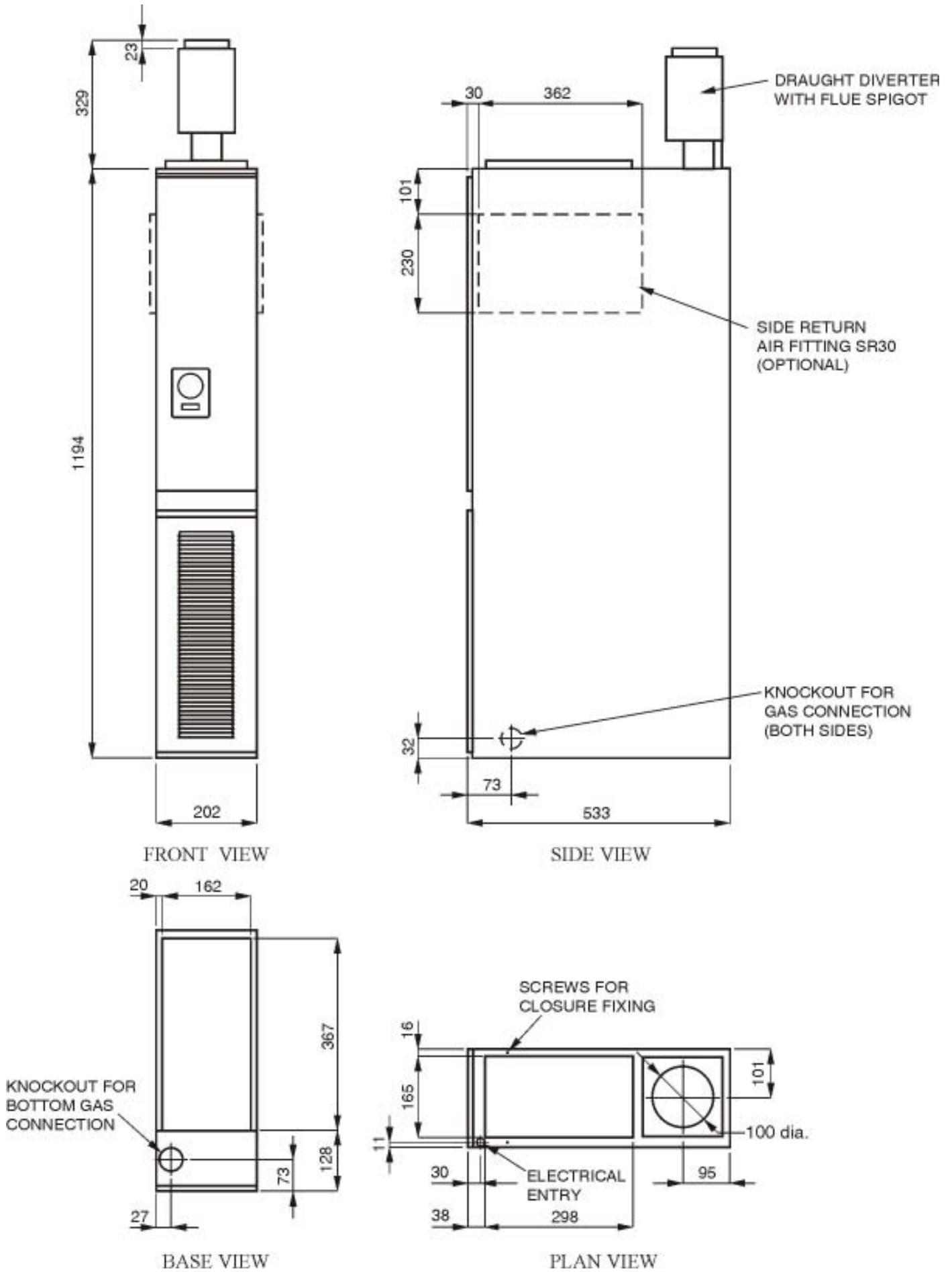


Fig. 7, PRINCIPAL DIMENSIONS (mm)

10.

SHORT LIST OF SPARES

ITEM No	G.C. No	MAKER'S No	DESCRIPTION	QTY
1	381 732	1000-0500130	Fan assembly	1
2	244 925	B300-0182000	Filter tray assembly	1
3	232 962	CL2S	Time control CL2	1
4	244 926	1000-0000070	Time control cover	1
5	384 739	BOS 00105	Limit Switch	1
6	H26-712	1000-0709640	Honeywell L4069C Multifunctional control	1
7	232 903	BOS 02061	Honeywell V8600C 1129 Sealing ring (for item 6)	2
8	173 096	1000-0704810	Pilot assembly	1
9	E01 088	1000-0703070	Pilot Injector SIT 0.977.149-(15)	1
10	386820	1000-0703870	Thermocouple SIT 0.290.174	1
11	386 775	BOS 01970	Electrode	1
12	397 819	1000-0705400	Electrode lead	1
13	244 898	BOS 02406	Electrode Nut	1
14	E02 398	B302-0116000	Spillage switch (TTB)	1
15		B265-0800000	Burner and Control Assembly	1
16	E00 411	1000-0705070	Main Burner Arm Furigas 174.500.016	1
17		1000-0708140	Main Injector Bray Cat 23/380	1
18	E02 399	B264-0300005	Heat Exchanger exchange kit	1
19	386 571	1000-0700570	Piezo Unit	1
20	E02 391	B302-0707000	Igniter Bracket	1
21	244 957	1000-2500010	Rope Ring Seal (heat exchanger access cap)	1
22	244 927	1000-0500275	Control Panel	1
23	E02 392	1000-0517730	Wiring Harness	1
24	385 159	BOS 00104	Fan Control Honeywell L4068C-1125	1
25	245 504	1000-0513820	Fuse 3.15A, (T)	1

Johnson and Starley prides itself on its ability to supply spare parts quickly and efficiently. If you have a problem in obtaining a spare part, please contact Johnson and Starley Spares Department at the address below.

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