

12. SHORT LIST OF SPARE PARTS

G.C.No.	MAKERS No.	DESCRIPTION	QTY	JB16-20	JB25-30
381 732	1000-0500130	Fan assembly - Sifan	1	X	X
244 925	B300-0182000	Filter tray assembly	1	X	X
232 962	CL2S	Time control CL2	1	X	X
244 926	1000-0000070	Time control cover	1	X	X
384 739	BOS 00105	Overheat (limit) control Honeywell L4069C	1	X	X
393 412	BOS 01301	Multifunctional control Honeywell V8600C	1	X	X
232 903	BOS 02061	Sealing ring (for multifunctional control)	2	X	X
379 873	1000-0704250	Pilot assembly ASD (Serial No. 08984 et seq)	1	-	X
391 734	1000-0700060	Pilot burner (target pilot)	1	X	X
390 210	BOS 00036	Thermocouple (target pilot)	1	X	X
244 977	B300-0701000	Burner assembly	1	X	X
245 035	1000-0700230	Main burner Bray Mk9	1	X	X
398 525	1000-0700110	Main injector (JB16-20) Bray Cat. 33/560	1	X	-
398 398	1000-0700220	Main injector (JB25-30) Bray Cat. 33/850	1	-	X
245 036	B300-0300005	Heat exchanger exchange kit	1	X	X
386 571	1000-0701160	Piezo unit	1	X	X
245 091	1000-0700020	Piezo electrode (target pilot)	1	X	X
244 957	1000-2500010	Rope ring seal (heat exchanger access cap)	1	X	X

ADDITIONAL ITEMS FOR MODAIRFLOW MODELS

244 929	B300-0530005	Control panel (with transformer, but excluding electronics module)	1	X	X
244 932	1000-0500150	Wiring harness	1	X	X
244 930	R002	Electronics module	1	X	X
230 496	S 00076	Airflow temperature sensor	1	X	X
244 933	1000-0500170	Fuse 1A, 1 1/4 in long glass	1	X	X
386 475	BOS 01242	Thermista-stat	1	X	X

ADDITIONAL ITEMS FOR NON-MODAIRFLOW MODELS

244 927	B300-0500000	Control panel	1	X	X
244 928	1000-0500120	Wiring harness	1	X	X
385 103	BOS 00104	Fan control Honeywell L4068C	1	X	X
230 267	BOS 00689	Fuse 3A, 1 in long BS 1352	1	X	X
230 157	BOS 00566	Fan speed selector plug	1	X	X

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.

Telephone: (01604) 762881

Telefax: (01604) 767408

JOHNSON AND STARLEY LTD.,
Rhosili Road,
Brackmills,
Northampton NN4 7LZ.



Leave these Instructions with the User or adjacent to the Gas Meter

JB16-20 & JB25-30 WARM AIR HEATERS

MODAIRFLOW and non-MODAIRFLOW Control

Installation, Commissioning & Servicing Instructions

JB16-20 G.C. No. 42 416 94
JB25-30 G.C. No. 42 417 44

Publication No. ZZ 622/4
May 1996

WARNING: THIS APPLIANCE MUST BE EARTHED

These appliances have been tested and certified by British Gas for use with natural gas

1. COMPONENTS CHECK

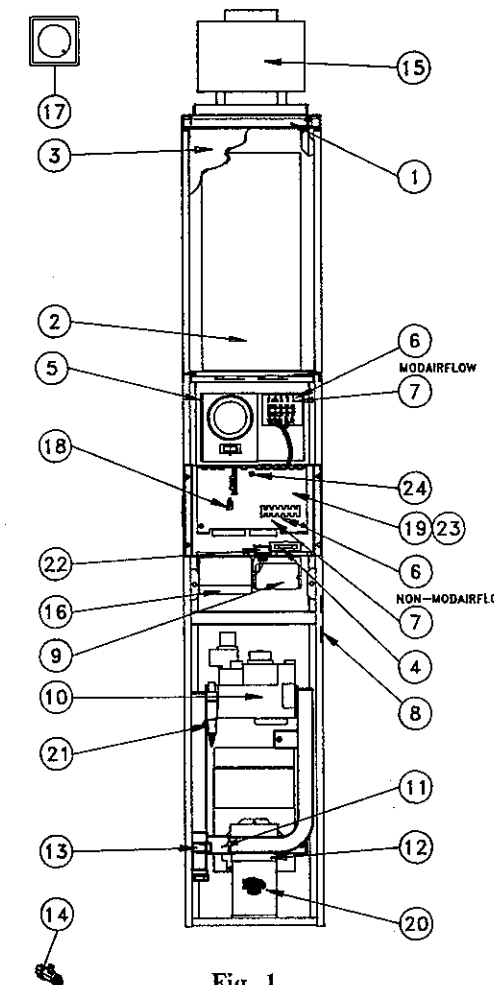


Fig. 1

1. Air filter
2. Air circulating fan
3. Fan chamber door
4. Fuse
5. Time control (if fitted)
6. Connection for Thermista-stat/thermostat
7. Terminal strip
8. Data plate
9. Overheat (limit) control
10. Multifunctional control
11. Pilot burner
12. Main burner assembly
13. Gas connection
14. Gas service cock (supplied loose)
15. Draught diverter
16. Airflow sensor (Modairflow models) OR Fan control (non-Modairflow models)
17. Thermista-stat (Modairflow only - supplied loose)
18. Fan selector switch (Modairflow) OR Fan selector plug (non-Modairflow)
19. Control panel (Modairflow) OR Control panel (non-Modairflow).
20. Lint arrester
21. Piezo unit
22. Summer air circulation switch

Modairflow models only:-

23. Electronics module
24. Balancing screw

JB16-20 and JB25-30 are open-flued, fan assisted, downflow ducted warm air heaters, which may be supplied with Modairflow controls.

NON-MODAIRFLOW CONTROL IS AVAILABLE AS AN OPTION ON JB25-30 HEATERS ONLY.

A pilot burner incorporating an atmosphere sensing device (ASD) is fitted to JB25-30 Modairflow models Serial No. 08984 and later which responds to the presence of flue gases and shuts down the appliance.

Air heater output is adjustable:-

JB16-20 - 4.7kW (16.9MJ/h, 16,000Btu/h) or 5.9kW (21.1MJ/h, 20,000Btu/h).

JB25-30 - 7.3kW (26.4MJ/h, 25,000Btu/h) or 8.8kW (31.7MJ/h, 30,000Btu/h).

Free-Standing Kit TCB30 and Slot Fit Kits TS30 and TSA30 are available for these appliances.

THESE APPLIANCES CONFORM TO BS 800

2. GENERAL REQUIREMENTS

2.1 Related Documents (refer to latest issues):-

These appliances MUST BE installed in accordance with the relevant requirements of the Gas Safety (Installation and Use) Regulations (current edition), the Building Regulations and the I.E.E. Wiring Regulations for electrical installations. The installation shall be in accordance also with any relevant requirements of the local Region of British Gas and Local Authority and the relevant recommendations of the following:-

Building Standards (Scotland) Regulations

BS 5440:Pt.1 (Flues for Gas Appliances)

BS 5440:Pt.2 (Air Supply for Gas Appliances)

BS 5546 Installation of Domestic Hot Water Supplies

BS 5864 Installation of Gas Fired Ducted Air Heaters

BS 6891 Specification for Installation of Low Pressure Gas Pipework of up to 28mm (R1) in domestic premises (2nd family gases).

British System Design Manual 'Gas Fired Warm Air Heating'.

Model and Local Authority Bylaws

IMPORTANT: It is the law that all gas appliances are installed by competent persons e.g. Corgi dealers, in accordance with the Gas Safety (Installation and Use) Regulations (current edition). Failure to install appliances correctly could lead to prosecution.

3. HEATER COMPARTMENT AND CLEARANCES (see BS 5864)

- 3.1 When the heater is fitted into a compartment, a minimum clearance from the compartment walls of 6mm (1/4in) at the sides and rear and 25mm (1in) at the front must be left. Consideration should also be given to the space required for the removal and replacement of the filter tray and the entry of the gas and electrical supplies.
- 3.2 For service access, a minimum clearance of 450mm (18in) 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 compartment must be of a fixed rigid structure and the internal construction must be half-hour-fire-resistant from internal fire; the inside lining or finishing of the enclosure must be non-combustible or a class 1 finish - see also BS 476.
- 3.3 In airing cupboard installations, the part used as the air heater compartment must comply with the relevant sections of BS 5864 and must be completely separated by either a non-combustible 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).
- 3.4 In under-stairs installations in dwellings of not more than two storeys, the compartment must comply with the appropriate sections of BS 5864 provided that, in addition, all internal surfaces, including the base, are non-combustible or lined with non-combustible material.
- 3.5 In slotfit installations (see instructions packed with Slot Fit Kit TS30 or TSA30), the slot fit compartment must comply with the appropriate sections of BS 5864. Side and rear clearances should be no less than 6mm (1/4in).
- 3.6 In free standing installations (see instructions packed with Top Closure Kit TCB30), only one or two walls will be in contact with the air heater, and therefore this must comply with the appropriate sections of BS 5864.
- 3.7 The base duct on which the air heater stands must be placed only on a non-combustible floor.
- 3.8 **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.

4. VENTILATION AND COMBUSTION AIR

- 4.1 The room or internal space in which the heater is installed requires a permanent air vent of minimum effective area 21cm² (3in²). The air vent should be either direct to outside air or to an adjacent room or internal space (other than a bedroom, toilet or bathroom) that itself has an equivalent air vent direct to outside.
- 4.2 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 air flow to not less than 0.0064m³/s (13.6cfm) i.e. 0.86m/s (160ft/min) velocity in a 100mm (4in) bore pipe. If this arrangement is used, a non-closable 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.

GENERAL DIMENSIONS

All dimensions in mm

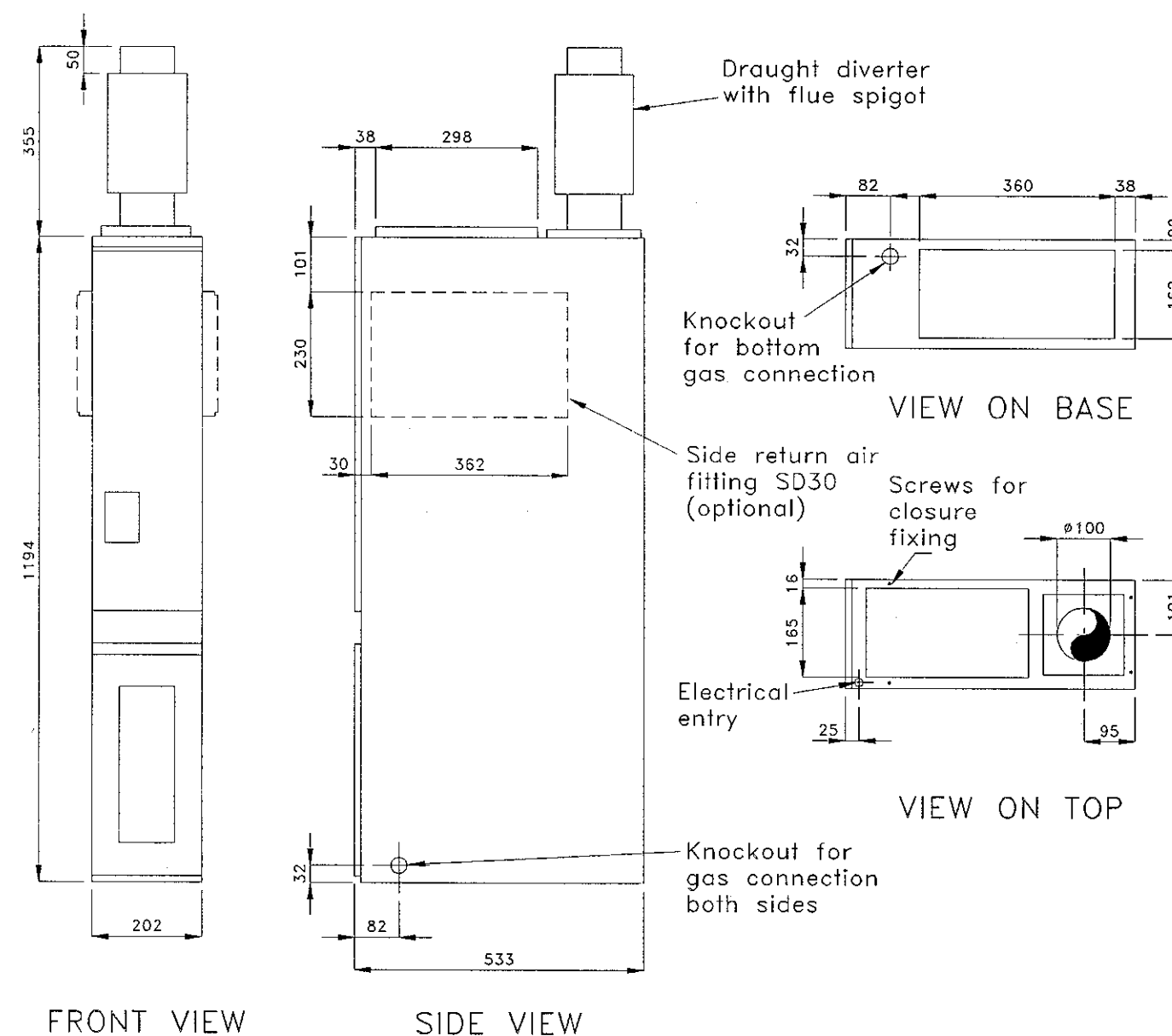


Fig. 6 Principal dimensions

CIRCUIT DIAGRAM

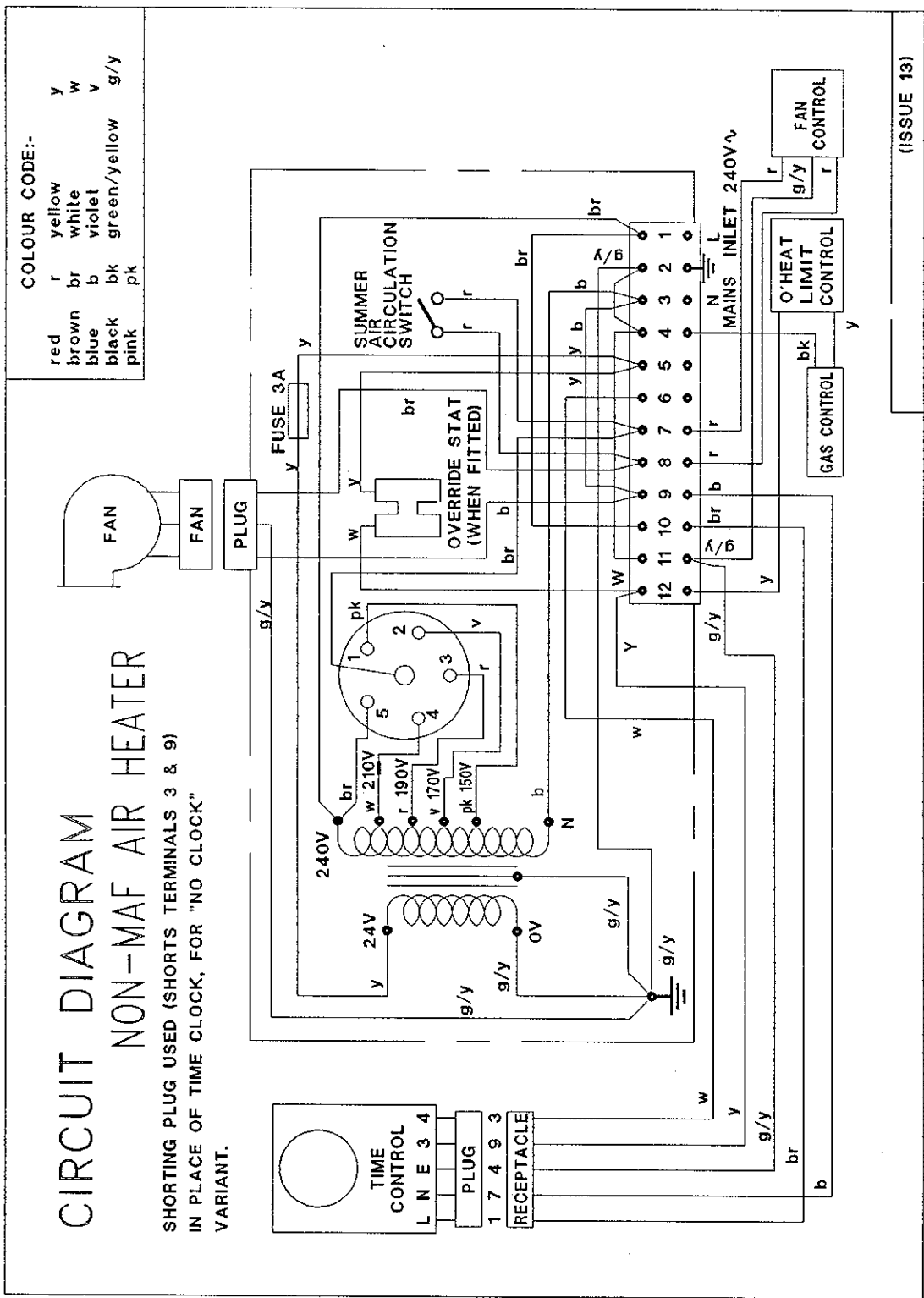


Fig. 5 b Non-Modairflow circuit diagram

- 4.3 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.
- 4.4 If any room or area from which air is drawn for ventilation or combustion contains an extractor fan, the permanent vents must be sized to ensure that the operation of the appliance(s) at full rate is/are not adversely affected. A spillage test as specified in sub-section 7.16 (Safety Checks) should be carried out and any remedial work undertaken.

TABLE 1

Ventilated from inside building	Low level grille	210cm ² (32in ²)
	High level grille	105cm ² (16in ²)
Ventilated from outside building	Low level grille	105cm ² (16in ²)
	High level grille	53cm ² (8in ²)

5. DUCT SYSTEM(see British Design Manual - Gas Fired Warm Air Heating)

5.1 Return Air

- 5.1.1 All return air must be POSITIVELY ducted from outside the compartment to the top of the unit. It is recommended that the return air duct is not routed directly from the main living area, but from a convenient central area serving the remainder of the dwelling.
- 5.1.2 The return air system should be constructed of fire-resistant material. The flue must 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 are used. For heaters on maximum output the return air duct size should not be less than 250mm x 200mm (10in x 8in). If flexible duct is used the duct diameter should not be less than 300mm(12in) dia. The return air grille should have a free area of not less than 761cm² (118in²).
- 5.1.3 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 0.0088m²/kW(1in²/250Btu/h) of heat supplied to the room. The only exceptions are kitchens, bathrooms and WC'S.

5.1.4 The return air plenum should allow for ease of removal for access to the flue.

5.1.5 All ductwork in the room or internal space in which the heater is installed must be secured, and sealed with ducting tape.

5.2 Warm Delivered Air.

- 5.2.1 All ductwork, 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.
- 5.2.2 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 minimise air flow resistance. The warm air plenum, which equalises the air pressure to supply ducts, must be constructed to support the weight of the heater, which must be secured to the plenum with screws on at least two sides, and sealed using self-adhesive foam strip, ducting tape or sealing compound.

6. INSTALLATION REQUIREMENTS

6.1 Flues (see BS 5440 Pt.1)

- 6.1.1 All joints must be soundly sealed.
- 6.1.2 The flue should be kept as short and as warm as possible.
- 6.1.3 Sufficient support brackets must be installed to bear the weight of the total flue system.
- 6.1.4 The spigot connection of the heater draught diverter will accept internally the spigot end of a non-asbestos flue to BS 567 or twin wall metal flue to BS 715 of nominal 100mm(4in) diameter.

- 6.1.5 A split collar should be fitted to provide for flue maintenance or inspection.
- 6.1.6 The flue must 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.
- 6.1.7 All materials must be in accordance with local Gas Region and Building Regulations requirements.
- 6.1.8 The flue should run as vertically as possible and under no circumstances should there be any horizontal run. A directional change should be as gentle as possible; for every 0.3m(1ft) run of offset (measured horizontally) there must be 1m(3ft) of vertical flue.
- 6.1.9 Special consideration must be given to external flues with a view to prevention of condensation and weathering problems.
- 6.1.10 An approved terminal should be used always; a ridge terminal or 'GC1' terminal is specifically recommended. The latter should be positioned in a free air space where it is not shielded by any structure. A minimum of 1m(3ft) from any vertical or inclined roof structure must be allowed for.
- 6.1.11 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.
- 6.1.12 To assemble the draught diverter (supplied loose), slide out the air filter and remove and retain the screw and nut at the rear of the return air aperture. Remove and retain also the two screws in the vertical face of the flue spigot attachment bracket. Position the draught diverter over the flue spigot and line up its three screw holes with those in the heater. Insert and tighten the two rear screws, and the screw and nut at the front of the diverter. Replace the air filter.
- 6.2 Electrical connections**
- 6.2.1 Mains**
Heaters are supplied with mains cable (PVC sheathed, heat resisting (85°C), 3-core Brown-Blue-Green/Yellow, 5A, 0.75mm²), connected to a terminal block and exits through the heater at the top right hand front. The cable is suitable for a 240V, 50Hz, single phase supply and must be protected by a 3A fuse and earth wire connected. A double pole switch or fused spur box should be used. All wiring must be to I.E.E. regulations for electrical installations.
- 6.2.2 Thermista-stat/room thermostat and its location.**
A Thermista-stat is provided with all Modairflow models and this acts as a Room Thermostat.
- 6.2.3 For non-Modairflow models, a 24V room thermostat, which complies with BS 800, BS 3955 and BS 4201 must be supplied and is essential to ensure close control of comfort conditions. An anticipator is located within the thermostat and is graded in amps. The amp reading should correspond with that of the multifunctional control, i.e. 0.2A. The anticipator should be checked and adjusted as necessary.
- 6.2.4 The Thermista-stat/room thermostat should be located where there is free air circulation approximately 1.5m(5ft) from the floor. Avoid the following locations:-
i) In a room where temperature is greatly affected by the sun, any other heat source, e.g. radiant fire, wall light fittings or TV set.
ii) Near outside door or windows, or on outside walls.
iii) Where affected by warm air ducts, diffusers, waste pipes or the heater itself.
iv) Where subject to vibration.
- 6.2.5 For Modairflow units, connect the Thermista-stat wires to terminals numbered 4 and 5 on the control panel (see Fig.5a). When connecting the Thermista-stat, correct polarity must be observed i.e. + side on control panel to + side on Thermista-stat.
- 6.2.6 For non-Modairflow units, connect the room thermostat wires to terminals numbered 5 and 6 on the control panel (see Fig.5b).
- 6.3 Gas Supply (see BS 5864 and BS 6891)**
- 6.3.1 An independent gas supply pipe from the meter is to be preferred wherever possible. However, 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 1.0mbar(0.4in wg) pressure drop (see table of discharge in BS 6891).
- 6.3.2 The ½in union gas cock (supplied) must be fitted in 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. Gas entry to the air heater is through either side to a Rc½ (½ BSP external (taper) thread).

CIRCUIT DIAGRAM

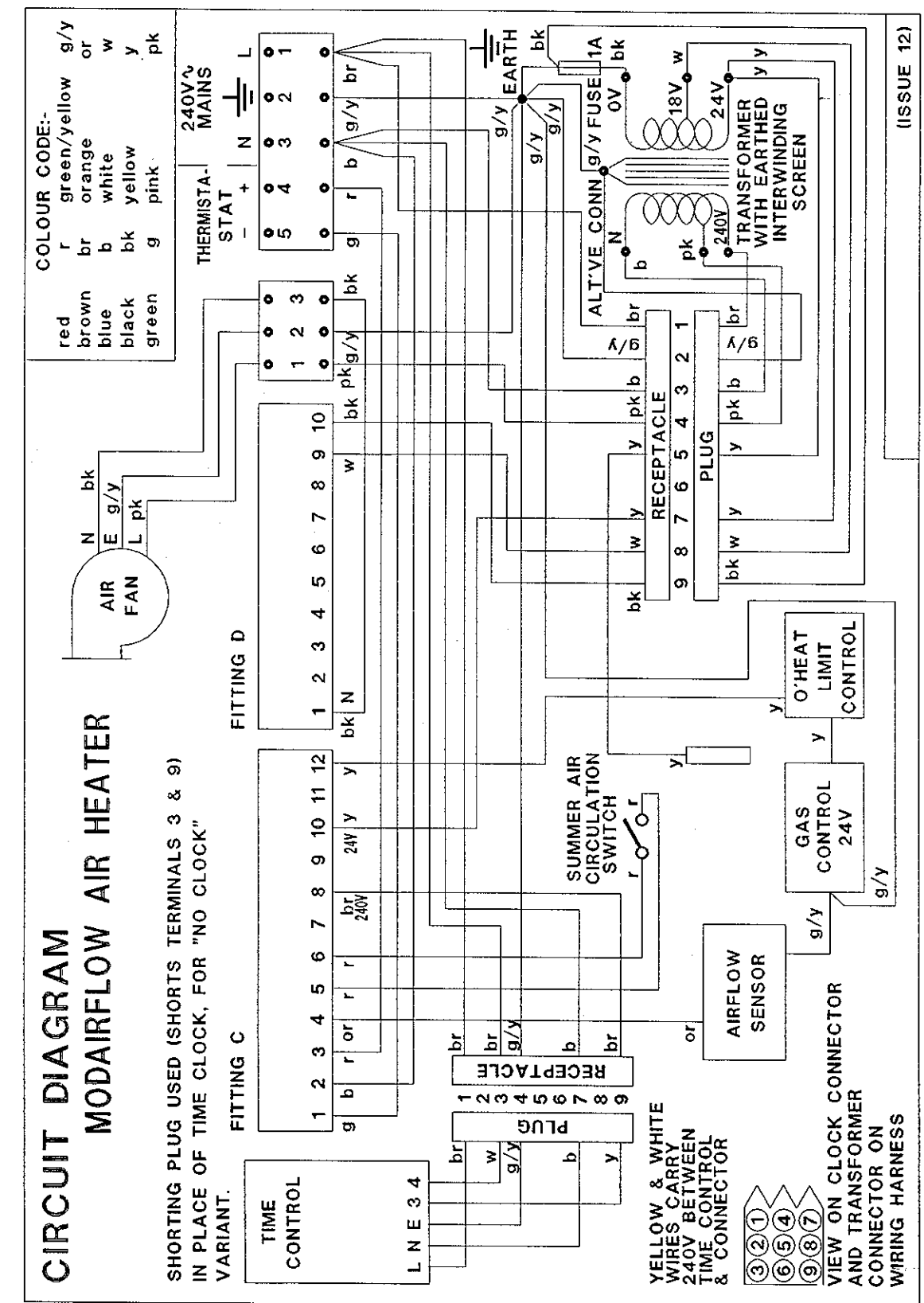
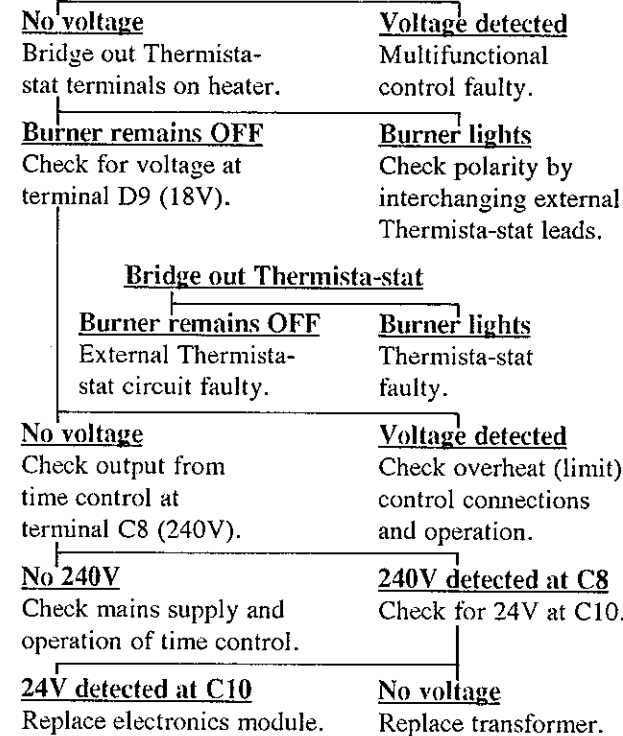


Fig. 5 a Modairflow circuit diagram

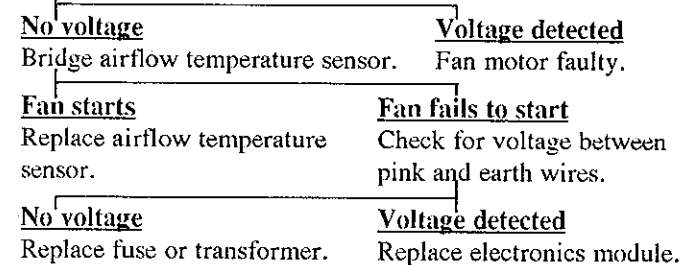
MODAIFLOW SERIES 2 OPERATIONAL CHECKS

MAIN BURNER NOT OPERATING

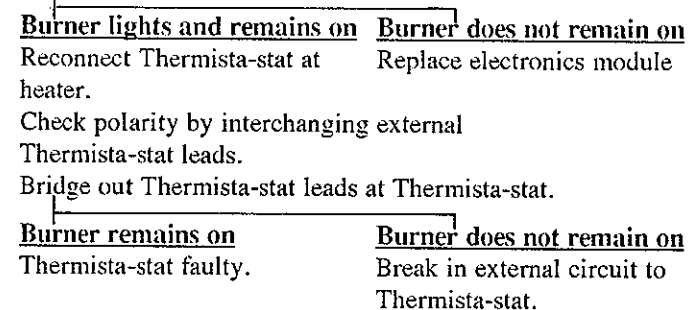
Check pilot burner is lit, time control is on and Thermista-stat turned up.
Check mains electrical supply.
Check fuses on electronic panel.
Check for 24V at multifunctional control.

**MAIN BURNER ON BUT FAN NOT OPERATING**

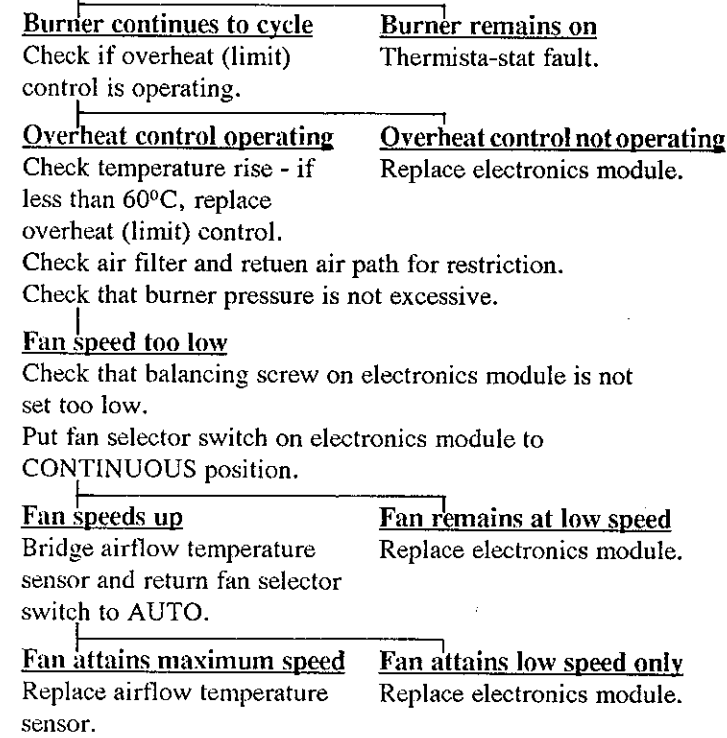
Check for voltage across pink lead at fan and any blue neutral wire.

**MAIN BURNER FIRES FOR BRIEF PERIOD ONLY**

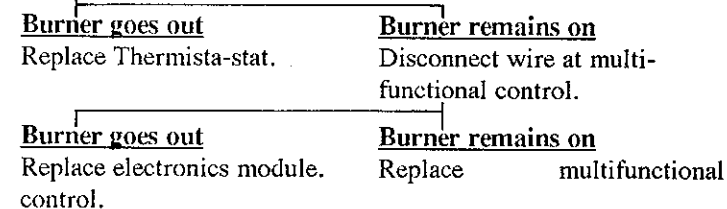
Check that Thermista-stat control knob is on maximum setting.
Bridge out Thermista-stat socket or connections at heater.

**FAN ON BUT BURNER CYCLING BEFORE DESIRED ROOM TEMPERATURE IS REACHED**

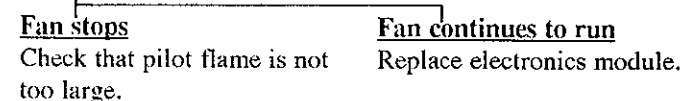
Bridge out Thermista-stat.

**MAIN BURNER NOT CYCLING (ROOM TEMPERATURE TOO HIGH)**

Disconnect Thermista-stat.

**FAN CONTINUES TO RUN OR CYCLES AFTER HEATING TURNED OFF**

Check fan selector switch on electronics module - if set to 'ventilation' fan will run continuously at low speed.
Check that fan selector switch is set to AUTO and summer air circulation switch is OFF.
Disconnect airflow temperature sensor.



7. COMMISSIONING

Note: The pilot burner fitted to this appliance may be of the oxygen depletion type. If the level of oxygen in the combustion air is significantly reduced, the shape of the pilot flame will change, allowing the thermocouple to cool, thus shutting down the gas supply. The relationship of the pilot burner to the thermocouple is therefore critical and must not be altered.

- 7.1 Ensure that gas and electrical supplies are off.
- 7.2 Test for soundness and purge the whole gas pipe as described in BS 6891. To assist in determining where a gas connection may not be tight, a leak detection fluid should be brushed around the connection. Under no circumstances should a flame be used to locate a gas leak.
- 7.3 Make sure that the filter, fan and fan compartment are free of obstructions.
- 7.4 Check that all of the registers or grilles are open and conform to design specifications.
- 7.5 Check that the return air, relief air and ventilation air installation is adequate.
- 7.6 Check that both the fan control and overheat (limit) control are set correctly - remove the cover from the fan control by removing the two securing screws.

Non-Modairflow models only:- Fan control setting is 100° OFF, 40° Diff..

Overheat (limit) control setting is 200°F and must NOT be adjusted.

- 7.7 With fan chamber door and air filter removed:-
Modairflow models - set the fan selector switch to CONTINUOUS and turn the balancing screw fully clockwise (maximum speed).
Non-Modairflow models - set the fan speed selector plug to a number appropriate to the desired heater output e.g. for maximum output set plug to number 5.

- 7.8 Replace the fan chamber door and the filter, then test the pilot connection for soundness, and light the pilot as follows:-
- 7.9 Test the pilot burner connections for gas soundness as follows:-

- 7.9.1 Turn on the gas supply (not the electrical supply).
- 7.9.2 Light the pilot burner (see Lighting Instruction Label) and test for gas soundness, using a proprietary leak detection fluid.
- 7.9.3 If any leakage is present, turn off the gas, seal the leak and repeat from 7.9.1.

WARNING:- If the pilot light is extinguished either intentionally or unintentionally, no attempt should be made to relight the gas until at least 3 minutes has elapsed. Ensure that the electrical supply is off, that the time control is in an off position and that the selector switch is in the off position.

- 7.10 ASD pilot: The pilot flame has been preset, and must not be adjusted.

Target (non-aerated) pilot: Adjust the pilot flame if necessary. The low energy pilot requires the pilot adjusting screw to be screwed four full turns anticlockwise from closed (see Figs.2 & 3).

- 7.11 When the pilot is alight, switch on the mains electrical supply to the heater. Set the time control (if fitted) to the required 'Heating On' periods and set the selector switch to the 'Timed' position. Adjust the Thermista-stat or room thermostat to maximum; the main burner will now operate.

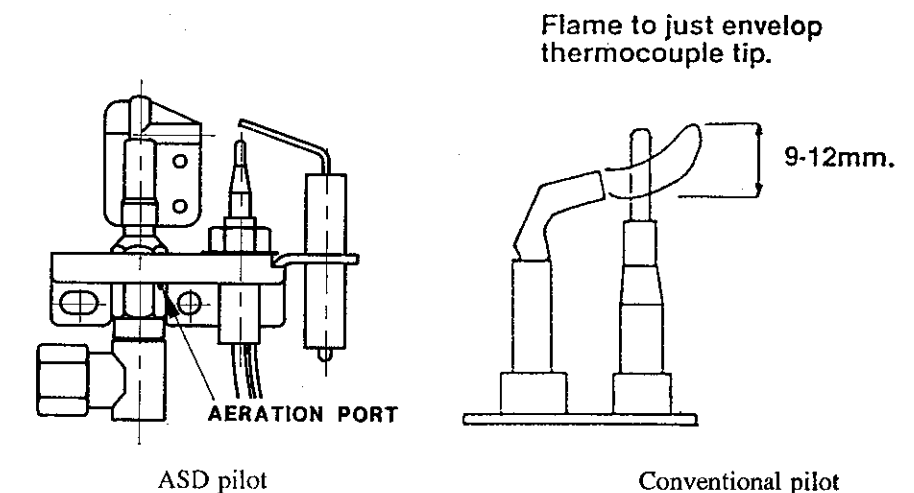


Fig. 2 Pilot burner assemblies

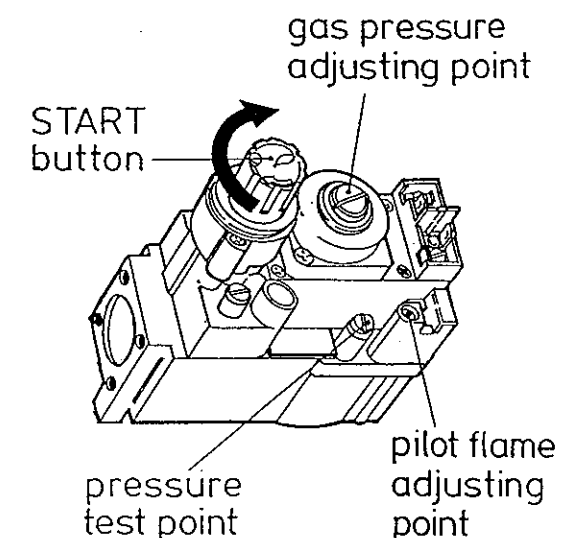


Fig. 3 Multifunctional control

- 7.12 Test the supply connections from the multifunctional control to the main burner for gas soundness, using a proprietary leak detection fluid.
If any leakage is present, turn off the gas supply, seal the leak and repeat para. f).
- 7.13 Allow the heater to operate for 15 minutes, then adjust the burner pressure to the output required (see Fig.3 and Table 2).
NOTE: Heaters are factory set to a burner setting pressure giving a high rate output of:-
JB16-20: 5.9kW(20,000Btu/h) at 14.0mbar(5.6in wg)
JB25-30: 8.8kW(30,000Btu/h) at 15.6mbar(6.3in wg).
- 7.13.1 To check the burner setting pressure:-
Loosen the bleed screw at the pressure test point on the multifunctional control (see Fig.3), attach a gas pressure gauge and check the pressure. Confirm by gas rate check at the meter.
- 7.13.2 To adjust the burner setting pressure (if necessary):-
Remove the cover from the gas pressure adjusting point on the multifunctional control (see Fig.3) and turn the adjustment screw clockwise to increase the burner setting pressure, anticlockwise to decrease.
Fix the pressure set arrow under the appropriate column on the data plate.
Turn off the heater. Remove the pressure test gauge and replace the cover on the adjustment point.
- 7.14 Balance the warm air system as follows:-
- 7.14.1 Light the main burner and leave to operate for at least 15 minutes.
- 7.14.2 With fan chamber door in place:-
Check that the temperature rise across the heater is 45°-55°C. Adjust the fan speed if necessary; increase to reduce temperature rise, decrease to increase temperature rise.
- 7.14.3 On Modairflow units, maximum fan speed is increased by adjusting the balancing screw (Fig.1, Item 24) clockwise.
- 7.14.4 On non-Modairflow units, fan speed is altered by changing the position of the fan speed selector plug (Fig.1, Item 18) on the control panel, (see Fig.4 for fan performance envelope). Maximum speed is at Setting 5.
- 7.14.5 Balance the system to give the required volume proportions at the warm air outlets.
- 7.14.6 Modairflow units only - set the fan selector switch to 'Auto', or to 'Ventilation' if a permanent supply of ventilation air is required (when air heater time control is ON only).
- 7.14.7 NOTE: If the system includes ceiling diffusers it is important that the velocities of air through these (except in very small rooms like bathrooms etc.) are at least 1.5m/s (300ft/min). To achieve this, it may be necessary to blank off part of the outlet face.
- 7.15 Automatic controls check - lighting the heater and allowing it to run for a short time checks these controls.
- 7.15.1 Modairflow controls:-
With time control (if fitted) on, turn the Thermista-stat control knob slowly clockwise until the main burner ignites. Shortly afterwards, the fan will start at a low speed and gradually build up to top speed. When room temperature is under control, the main burner will cycle on and off at approximately 1¼ to 2 minute intervals. The fan will run continuously at lower speeds.
- 7.15.2 Non-Modairflow controls:-
With time control (if fitted) on, increase the Room Thermostat setting slowly until the main burner ignites. Shortly afterwards, the fan will start. When room temperature is under control, the main burner will switch off, followed shortly afterwards by the fan. After the room temperature has fallen slightly, the burner will re-ignite followed by fan operation.
- 7.16 Safety checks
- 7.16.1 Check the 'fail safe' section of the multifunctional control by turning off the gas at the gas service cock and checking that the control fails safe (loud click heard from control) within 60 seconds.
- 7.16.2 Check the overheat (limit) control by operating the heater with the main burner alight and the fan disconnected - the main burner must extinguish within 2-3 minutes. To disconnect the fan, turn off the electrical supply, remove the fan chamber door and unplug the fan connection from (on Modairflow models) the flying socket, or (on non-Modairflow models) the socket on the electrical control panel.
- 7.16.3 With the heating system on:-
Check for gas soundness within the appliance.
Check that the flue operates effectively - with all doors closed and extractor fans, if fitted, running, use the following procedure to test for spillage:-

11. FAULT FINDING (cont.)

SYMPTOM	POSSIBLE CAUSE	REMEDY
(b) cont.	(iv) ASD pilot: Draughts affecting pilot flame. (v) ASD pilot: Combustion air contaminated.	Eliminate draughts. Conduct spillage test and rectify.
(c) Main burner lights but fan fails to run after approx. 3 minutes.	(i) Loose electrical connection on fan control. (ii) Fan control settings incorrect. (iii) Faulty fan assembly. (iv) Faulty fan control. (v) Burner setting pressure incorrect.	Check connections for soundness. Check settings. Replace, taking care not to damage impeller. Replace. Adjust pressure as necessary.
(d) Main burner operating intermittently with fan running.	(i) Gas rate or burner setting pressure high. (ii) Temperature rise excessive. (iii) Air filter or return air path restricted. (iv) Excessive number of outlets closed.	Check gas rate and burner setting pressure. Adjust fan speed or gas rate accordingly. Check filter is clean and path is clear. Open additional outlets.
(e) Main burner operating with intermittent fan operation.	(i) Gas rate or burner setting pressure low. (ii) Fan control settings incorrect.	Check gas rate and burner setting pressure. Check settings.
(f) Fan runs for excessive period or operates intermittently after main burner shuts down.	(i) Fan control settings incorrect.	Check settings.
(g) Noisy operation.	(i) Gas pressure high. (ii) Noisy fan motor. (iii) Fan speed setting too high.	Check burner setting pressure. Replace fan motor. Adjust fan speed.
Modairflow Control Heaters only:-		
(h) Incorrect operation of fan or main burner.	(i) Fault related to Modairflow control system (see page 12).	Consult diagnostic chart and follow recommended procedure.
Non-Modairflow Control Heaters only:-		
(i) Pilot alight but main burner not igniting.	(i) Mains electrical supply not connected to heater. (ii) Controls not calling for heat. (iii) 3A fuse failed. (iv) Loose connection on room thermostat, overheat (limit) control, multifunctional control lead, time control or transformer. (v) Transformer open circuit. (vi) Multifunctional control faulty. (vii) Multifunctional control faulty. (viii) Faulty overheat (limit) control. (ix) Faulty room thermostat or external wiring.	Check mains supply. Check that time control (if fitted) and room thermostat are operating correctly. Replace. If failure occurs again, check external thermostat leads for short to earth. Check connections for soundness. Check with test meter and replace electrical panel if necessary. Replace multifunctional control. Replace multifunctional control. Short across control and replace if necessary. Fit temporary loop in heater thermostat socket. If heater fires, external circuit or room thermostat is faulty.

10.16.5 Remove the heat exchange baffle.

10.16.6 The heat exchanger can now be inspected and brushed through.

IMPORTANT: When reassembling, ensure that the baffle is pushed fully home. Ensure also that the cap is sealed soundly. Recommission the heater, carrying out checks as detailed in Section 7. In the event of heat exchanger or burner replacement being necessary, contact Johnson and Starley Service Department.

10.17 Airflow temperature sensor (Modairflow models only), fan control (non-Modairflow models only) and overheat (limit) control replacement

With electrical supply turned off and bottom door removed (see 10.2),

10.17.1 Remove the fan control cover.

10.17.2 Remove the electrical connections to the control/sensor.

10.17.3 Remove the two securing screws and withdraw the control/sensor.

11. FAULT FINDING

IMPORTANT: If an electrical fault 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 service/fault-finding task which has required the breaking and remaking of electrical connections, then checks of continuity, polarity, and resistance to earth must be repeated.

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

MODAIRFLOW Models only: See page 12 for fault diagnostic chart.

Before commencing fault finding, turn the Thermista-stat to maximum setting, turn the mains supply on and check that the time control (if fitted) is at an ON position.

Care must be taken during replacement and handling of electronic assemblies, viz. electronic panel, airflow temperature sensor, Thermista-stat. It is not practical to rectify any faults in these assemblies except in the factory, and any attempt to do so may render any guarantee or factory replacement arrangement void.

NOTE (ASD pilot ONLY): If a fault occurs concerning the pilot burner, thermocouple or spark electrode, then the complete pilot assembly **MUST** be replaced.

SYMPTOM	POSSIBLE CAUSE	REMEDY
(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.	ASD pilot: Clear pilot orifice or replace pilot assembly (see note above). Target pilot: Clear pilot orifice carefully or replace injector.
	(iv) ASD pilot: Aeration port obstructed.	Clear aeration port or replace pilot assembly (see note above).
	(v) Piezo unit defective.	Check electrode /lead /igniter.
	(vi) Excessive gas supply pressure.	Check that mains gas supply pressure is 20mbar, and reduce if necessary.
(b) Pilot lights but goes out on releasing 'START' button during initial light-up or after normal operation.	(i) Connection between thermocouple and multifunctional control not secure.	Check connection is secure.
	(ii) Faulty power unit on multifunctional control.	Replace multifunctional control.
	(iii) Faulty thermocouple.	ASD pilot: Replace pilot assembly (see note above). Target pilot: Replace thermocouple.

A. FOR APPLIANCES WITH DRAUGHT DIVERTER ACCESSIBLE:-

After connection to the flue system, check the appliance for clearance of combustion products as follows:-

Follow the lighting procedure and then run the appliance for twenty minutes to pre-heat the flue. Hold a lighted taper just below, or a smoke match just inside, the lower edge of the draught diverter. Spillage is indicated by displacement of the flame or smoke outwards from the draught diverter.

B. FOR APPLIANCES WITH DRAUGHT DIVERTER WHICH MAY NOT BE VISIBLE OR ACCESSIBLE WHEN INSTALLED:-

After connection to the flue system, check the appliance for clearance of combustion products as follows:-

Spillage is indicated by displacement of the flame or smoke outwards from the draught diverter.

Follow the lighting procedure and then run the appliance for twenty minutes to pre-heat the flue. Turn off the appliance. Place a smoke pellet, or part of a pellet, on a non-combustible support within, but not in direct contact with, the combustion chamber. Ignite the smoke pellet and observe whether smoke emerges from the vicinity of the draught diverter.

TABLE 2

	JB25-30 AIR HEATER						JB25-30 AIR HEATER					
	Low Rate			High rate			Low rate			High rate		
	kW	MJ/h	Btu/h	kW	MJ/h	Btu/h	kW	MJ/h	Btu/H	kW	MJ/h	Btu/h
Input	6.2	22.5	21,200	7.6	27.2	25,780	9.8	35.2	33,400	11.6	41.7	39,500
Output	4.7	16.9	16,000	5.9	21.1	20,000	7.3	26.4	25,000	8.8	31.7	30,000
Gas rate cv 1037 Btu/ft³	0.53m³/h(18.7ft³/h)			0.7m³/h(25.0ft³/h)			0.91m³/h(32.2 ft³/h)			1.08m³/h(38.1 ft³/h)		
Burner setting pressures (hot)	9.7mbar(3.9in wg)			14.0mbar(5.6in wg)			11.0mbar(4.4in wg)			15.6mbar(6.3in wg)		
Main injector:	Bray Cat. 33/560						Bray Cat. 33/850					

Gas: Natural G20

Gas supply pressure: 20mbar(8.00in wg)

8. INSTRUCTIONS FOR USER

If the building is unoccupied, ensure that the 'Instructions for Use' are left at or near the meter for the User. Leave also these instructions at or near the meter for use on future service calls.

If the building is occupied, hand the User Instructions over and make sure the User knows:-

- 8.1 How to light the pilot burner.
- 8.2 How to operate the Thermista-stat/Room Thermostat, time and heater ON/OFF switch and summer air circulation switch. Also that the User knows that, after a power failure, the time control (if fitted) may need to be reset.
- 8.3 How to turn off the pilot and main burner at the multifunctional control, and switch off the electricity supply to the heater.
- 8.4 How to remove, clean and re-fit the air filter, and at what intervals i.e. fortnightly, except for new houses where it is weekly.
- 8.5 How to control the heating system by opening and closing warm air outlets.
- 8.6 How to obtain summer air circulation.
- 8.7 That the air grilles on the heater or heater compartment, or any grilles or ventilators in the walls, windows and doors of the building must not be obstructed.
- 8.8 That the heater must be serviced at least once a year by a competent person to ensure efficient and safe operation.
- 8.9 That the red instructions for safe use have been pointed out and understood.

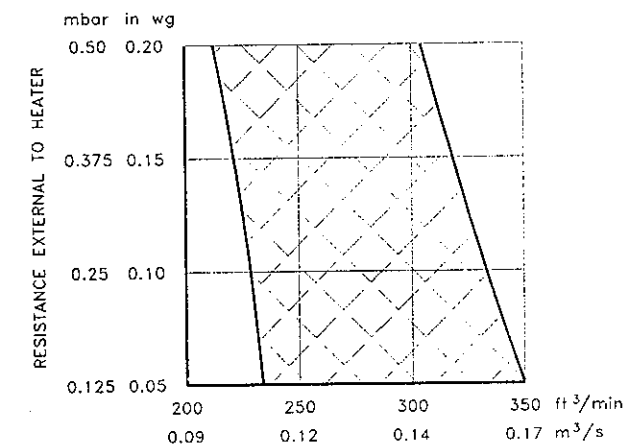


Fig. 4 Fan performance graph

9. SERVICING (refer to Fig.1 for parts layout)

IMPORTANT: Before commencing any servicing or exchange of components, always turn off the gas supply and isolate the electrical supply. After completing any service work always test for gas soundness.

- 9.1 Operate the appliance and check for correct function of the burner and controls.
- 9.2 Remove the burner and controls assembly, inspect and clear the main burners and injector as necessary. Examine the main burner for cracks, including hairline cracks, at the burner ports and exchange the burner if necessary.
- 9.3 Inspect and clear the pilot burner orifices and aeration port as necessary, but see Section 7.10.
- 9.4 Check the condition of the thermocouple and spark electrode/leads. Clean or replace as necessary.
- 9.5 Clean the lint arrester gauze.
- 9.6 Inspect the heat exchanger flueways. Clean by brushing thoroughly from above and below.
- 9.7 Reassemble all items in reverse order and carry out the recommissioning procedure as detailed in Section 7.
- 9.8 Test for gas soundness and check that the appliance and controls are functioning correctly. Finally ensure that the flue products are clearing satisfactorily.

10. REMOVAL OF COMPONENTS FOR SERVICING/REPLACEMENT

10.1 To remove the burner and controls Assembly

- 10.1.1 Remove the lower louvre door.
- 10.1.2 Remove the electrical connections from the multifunctional control, and the electrode lead from the piezo unit (if fitted).
- 10.1.3 Disconnect the union at the input side of the control.
- 10.1.4 Remove the three burner assembly fixing screws from the manifold assembly and withdraw the burner. Remove the four screws securing the spillage hood and lift the hood whilst removing the burner assembly.

10.2 For access to the control panel, fuse, time control and air circulating fan

- 10.2.1 Remove the air filter, remove the two screws at the bottom of the fan chamber door and lift the door to remove.

10.3 Main burner cleaning - with burner assembly removed (see 10.1)

- 10.3.1 Unscrew the two pilot burner securing screws and disconnect the pilot assembly from the main burner.
- 10.3.2 Unscrew the two screws securing the manifold assembly to the burner assembly and remove.
- 10.3.3 Brush lightly both inside and out. Under no circumstances should the burner holes be enlarged, distorted or brushed strongly.
- 10.3.4 Clean the lint arrester gauze with a soft brush.

10.4 To remove the pilot assembly (ASD pilot ONLY)

With burner and controls assembly removed (see 10.1),
Disconnect the thermocouple, piezo lead and pilot supply tube from the multifunctional control. Unscrew the pilot assembly securing screws and remove the pilot assembly. Remove the piezo lead, and disconnect the pilot supply tube from the pilot assembly by unscrewing the tubing nut.

NOTE: Do NOT attempt to dismantle the pilot assembly. The relationship between the pilot and thermocouple is critical and must not be disturbed.

Reassembly is the reverse of this procedure. Do not over tighten the thermocouple connection at the multifunctional control (finger tight + quarter turn).

10.5 To remove the pilot burner injector and piezo electrode (target pilot ONLY)

With burner assembly removed (see 10.1),

- 10.5.1 Disconnect the thermocouple lead at the pilot assembly and at the multifunctional control.
- 10.5.2 Disconnect the pilot tube from the pilot assembly. Remove the pilot injector by lightly tapping the side of the pilot assembly - the injector should drop out.
- 10.5.3 After servicing, check for correct pilot flame length and adjust if necessary (see 7.10 and Fig.2 in Section 7).

10.6 Thermocouple (target pilot ONLY)

- 10.6.1 Remove the burner assembly (see 10.1). Disconnect the thermocouple from the pilot assembly and multifunctional control, and withdraw it. When replacing, ensure that the thermocouple connection to the multifunctional control is tight (quarter turn past finger tight), and that there are no sharp bends in the thermocouple lead.

10.7 To remove the multifunctional control

With burner assembly removed (see 10.1),

- 10.7.1 Disconnect the inlet pipe and remove it. (Make sure that the sealing ring is retained.)
- 10.7.2 Disconnect the thermocouple and the pilot burner supply tube.
- 10.7.3 Unscrew the four screws securing the manifold assembly and remove the multifunctional control. (Make sure that the sealing ring is retained).
- 10.7.4 Before refitting, check that the sealing rings are in good condition, and replace if necessary.

10.8 To remove the piezo unit

With burner assembly removed (see 10.1),

- 10.8.1 Disconnect the electrode lead from the unit.
- 10.8.2 Unscrew and remove the two screws securing the piezo unit bracket to the multifunctional control.
- 10.8.3 Remove the bracket and turn it upside down. Undo the piezo unit fixing nut with a large spanner and remove the unit.

10.9 Gas pressure check (see Fig.3 and Table 2)

- 10.9.1 Attach a gas pressure gauge to the burner setting pressure test point on the multifunctional control (see Fig.3). Light the heater, check the pressure and confirm by a gas rate check at the meter. Adjust, if necessary, at the gas pressure adjusting point after removing the cap. Turn clockwise to increase the burner pressure and vice versa. Replace the cap.

10.10 Control panel removal (Modairflow and non-Modairflow models)

- 10.10.1 Ensure that the mains supply is off.
- 10.10.2 Remove the fan chamber door (see 10.2).

Modairflow models:-

- 10.10.3 Disconnect all conductors from the lower side of the terminal block beside the time control, noting their positions.
- 10.10.4 Remove the four screws securing the control panel, and swing the panel downwards.
- 10.10.5 Disconnect the fan and time control connectors and remove the control panel assembly.

Non-Modairflow models:-

- 10.10.6 Disconnect the fan plug, then disconnect the mains lead and Room Thermostat connections from the terminal block. Release the clamp retaining the mains lead.
- 10.10.7 Disconnect the wires from the fan control, overheat (limit) control and multifunctional control.
- 10.10.8 Unscrew the four screws and remove the control panel assembly.

10.11 Electronics module removal (Modairflow model only)

- 10.11.1 Ensure that the mains supply is off.
- With fan chamber door removed (see 10.2):-
- 10.11.2 Unscrew the three securing screws and release the electronics module.
- 10.11.3 Disconnect fittings 'C' and 'D' (see Fig.5a) from the electronics module.

10.12 Air circulating fan removal and cleaning

- 10.12.1 Ensure that the mains supply is off.
- With fan chamber door removed (see 10.2),
- 10.12.2 Disconnect the fan plug. Remove the split grommet and pull the fan fly lead out through the diaphragm.
- 10.12.3 Remove the fan retaining screw.
- 10.12.4 Handling with care, withdraw the fan assembly. Remove all dust from both impeller and motor, taking care not to disturb the balance of the fan.
- 10.12.5 To replace, reverse the above procedure.

10.13 Removal of time control (if fitted)

- 10.13.1 Ensure that the mains supply is off.
- With fan chamber door removed (see 10.2),
- 10.13.2 Remove the control panel (see 10.10).
- 10.13.3 Unscrew the fixing screw in the bottom of the time control assembly, then carefully lift the assembly off its mounting plate.
- 10.13.4 Disconnect the wiring harness from the terminal block in the rear of the time control.

10.14 To replace the time control

- 10.14.1 Remake the electrical connections, then locate the top rear flange of the time control assembly over the top edge of the mounting plate and press down firmly.
- 10.14.2 Press in the bottom edge of the time control assembly and secure with the fixing screw.

10.15 To replace the transformer

It is necessary to replace the control panel (see 10.10) if the transformer fails.

10.16 Heat exchanger access

- 10.16.1 Ensure that the gas and electrical supplies are turned off.
- 10.16.2 Remove the burner assembly, air filter, fan chamber door and control panel (see 10.1, 10.2 and 10.10).
- 10.16.3 Remove the time control (see 10.13), undo the two screws and remove the time control mounting plate.
- 10.16.4 Working through the clearance hole in the time control mounting bracket, remove the two screws securing the cap at the top front of the heat exchanger, and remove the access cap together with its gasket.