

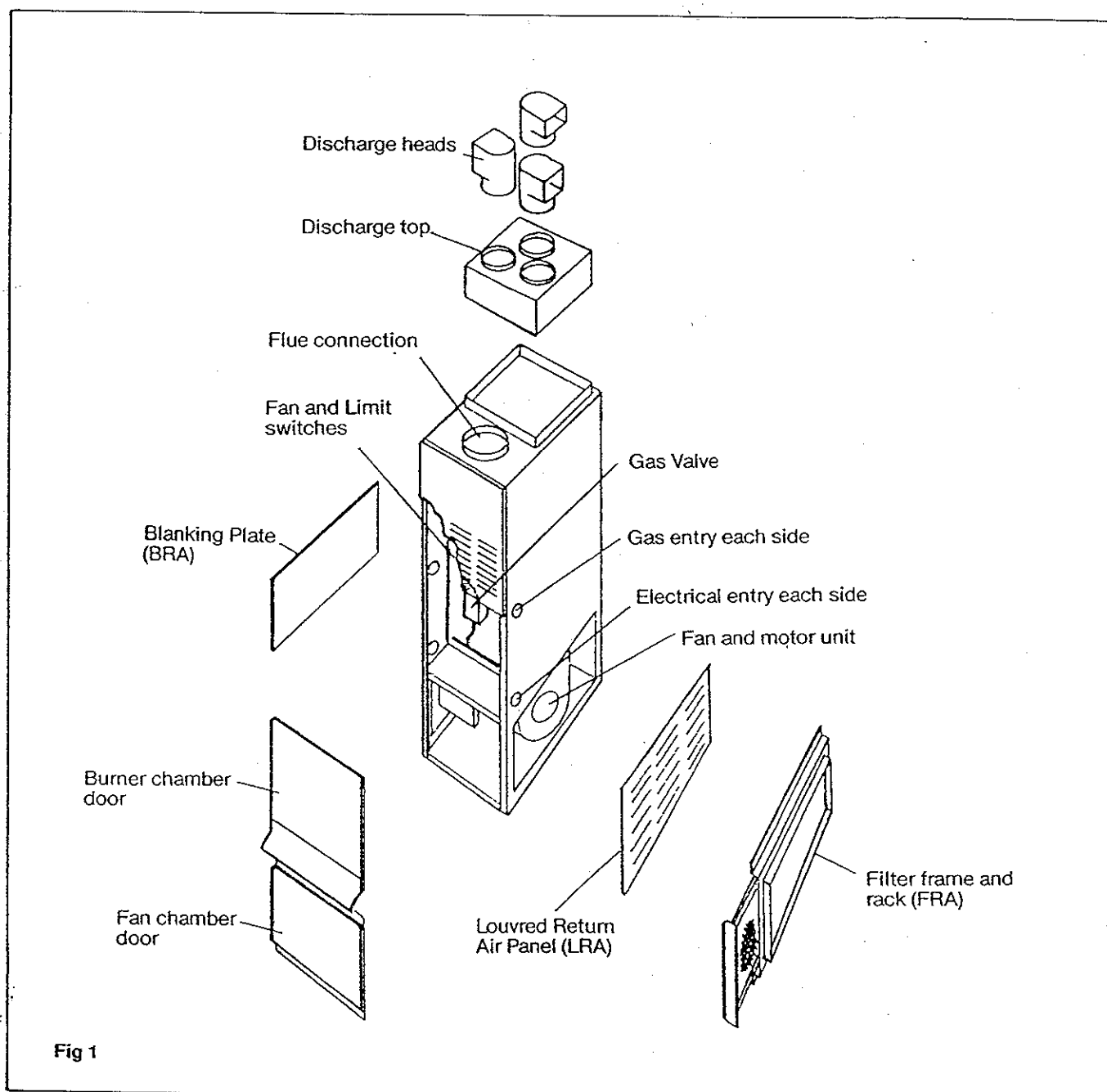


JAH MK2 SERIES

Gas Fired Warm Air Heaters (UPFLOWS)

Publication ZZ266/5

Installation, Commissioning & Servicing Instructions



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.

Installation shall be in accordance with the following where they apply:-

These appliances MUST BE installed in accordance with the relevant requirements of the Gas Safety (Installation and Use) Regulations (as amended), the Building Regulations and the I.E.E. Wiring Regulations for electrical installations.

They should 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) (Consolidation) Regulations.

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

BS 6230 Installation of Gas-fired Forced Convection Air Heaters for Commercial and Industrial Space Heating (2nd family gases).

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

Model and Local Authority Bylaws.

and the following Codes of Practice:-

IM/2 Purging procedures for non-domestic gas installations.

IM/5 Soundness testing procedures for industrial and commercial gas installations.

IM/11 Flues for commercial and industrial gas fired boilers and air heaters.

IM/16 Notes on installation of pipework (excluding domestic installations of 25mm and below).

AIR HEATER MODELS

Basic air heaters are supplied with specific features designated by model number and its suffixes. This is stamped on the data plate which is mounted in the front compartment (Burner Chamber).

MODEL NO	Output	SUFFIXES (one only for each version of a heater)		
JAH 82 MK2	81600 Btu/h 23.9 KW	FS	LF	HF
JAH 122 MK2	122,400 Btu/h 35.8 KW	FS	LF	HF
JAH 163 MK2	163,200 Btu/h 47.8 KW	FS	LF	HF

Key to features designated by Suffixes:

	Power of Fan	Fan Speed Selector	Fan Operation	Room Thermostat	Gas Cock
LF	Standard	Electronic Selector	ON/OFF	24 volt type required, not supplied	¾" Union Cock supplied in heater, but not fitted.
HF	High	Electronic Selector	ON/OFF		
FS	Standard	No selection	ON/OFF		

	Air Discharge Fittings	Return Air Fittings
LF	None: all to be specified and supplied by installer.	None supplied: heater supplied with open Return Air apertures. Optional filter frame and rack (FRA) and blanking plate (BRA) available.
HF		
FS	Following supplied (packed separately): Air discharge top with discharge heads (2 for JAH 82/FS, 3 for JAH 122/FS, 4 for JAH 163/FS.	Louvred Return Air panels fitted on both sides.

OUTSIDE DIMENSIONS

	JAH 82 Mk2	JAH 122 Mk2	JAH 163 Mk2
Height (without air discharge top or swivel discharge heads)	1830mm 72 in	1830mm 72 in	1830mm 72 in
Width (without filter frame or rack)	375mm 14 ¾ in	525mm 10 ½ in	657mm 26 ½ in
Depth	778mm 30 ¾ in	778mm 30 ¾ in	778mm 30 ¾ in
Weight	110kg 242lb	140kg 308lb	220kg 484lb
Flue diameter	125mm 5 in	150mm 6 in	150mm 6 in

MINIMUM INSTALLATION CLEARANCES:

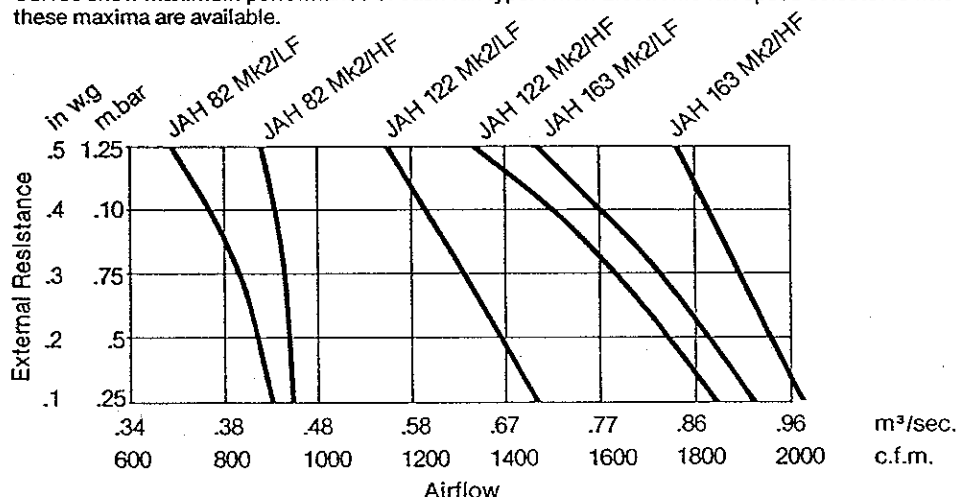
	JAH 82 Mk2	JAH 122 Mk2	JAH 163 Mk2
From rear, or a side with a Blanking Plate (BRA), to combustible material (allow extra space if a gas supply pipe enters this side.	12mm ½ in	12mm ½ in	12mm ½ in
From louvred Return Air Side Panel	600mm 24 in	600mm 24 in	600mm 24 in
From Front	230mm	230mm	230mm
(a) For air supply for combustion and draught diverter	9 in	9 in	9 in
(b) For Maintenance	750mm 30 in	760mm 30 in	760mm 30 in

RATINGS AND INJECTOR PRESSURES — NATURAL GAS AND PROPANE

Input	31,7 KW 108,200 Btu/h	47.6 KW 162,300 Btu/h	63.4 KW 216,400 Btu/h
Output	23.9 KW 81,600 Btu/h	35.8 KW 122,400 Btu/h	47.8 KW 163,200 Btu/h
Burner Setting Pressure	All Models: 13.0mbar 5.2 in.wg.	NATURAL GAS 37.0mbar 14.2 in.wg.	PROPANE
Injector Marking	All Models: Bray Cat. 23/1250 Amal Cat. 187/001/540	NATURAL GAS PROPANE	

FAN PERFORMANCE

Curves show maximum performance of each fan type. When Electronic fan speed selector is fitted, fan performance below these maxima are available.

**PREPARATION****General**

The JAH Series are upflow heaters designed to operate (a) free standing or (b) connected to Warm Air and Return Air Ducting Systems.

- For free standing use, Return Air enters the heater directly from the space being heated and the Warm Air is distributed at high velocity from the swivel discharge heads.
- When used with ducting systems the heater may be installed in a compartment or in an open area. When it is in a compartment, the return air and warm air must be ducted to and from the heater. Measures such as flexible connectors should be considered, to avoid transmission of noise. Ducting must be constructed of materials which will not contribute to a fire.

Air for Combustion and Ventilation

When the heater is used free-standing, or ducted but in an open area, there must be an adequate supply of air for combustion. Ensure that the space in which the heater stands is connected to outside air by openings having a total free area of at least the amount shown??

	JAH 82 Mk2	JAH 122 Mk2	JAH 163 Mk2
Minimum free area of openings to outside	111cm² (17 in²)	183cm² (28 in²)	254cm² (38 in²)

The openings should be sited so that they cannot easily be blocked.

If the heater is installed in a compartment, the compartment must be ventilated either directly to outside air or connected with a well ventilated space. The compartment ventilation must be at both high and low levels and must have at least the free areas as given in the table below.

The ventilated internal space supplying air for compartment ventilation must be supplied in its turn with air from outside via a purpose designed permanent opening having a free area as shown on the table overleaf.

Minimum Effective areas of Ventilation Paths to Heater
(Requirements of BS5440 Part 2)

		JAH 82 Mk2	JAH 122 Mk2	JAH 163 Mk2
Compartment Ventilation	When ventilation of heater compartment is directly from outside building	High Level	143cm ² (22in ²)	214cm ² (33in ²)
		Low Level	286cm ² (44in ²)	428cm ² (65in ²)
	When ventilation of heater compartment is from ventilated space inside building	High Level	286cm ² (44in ²)	428cm ² (65in ²)
		Low Level	571cm ² (88in ²)	857cm ² (130in ²)
	Opening supplying outside air to ventilated internal space from which heater compartment is ventilated	Any Level*	111cm ² (17 in ²)	183cm ² (28in ²)
				254cm ² (38in ²)

* Care should be taken to avoid draughts where they would cause discomfort.

FLUES:

Can be run in suitable twin wall or stainless steel pipe. Ensure adequate support of those parts over 2m (6ft) above the heater flue connection. Flues must conform with BS5440 Part 1.

GAS SUPPLY:

Gas supply must be in ¾" BSP pipe or larger. A ¾" BSP female/female union cock is supplied with each heater. The gas supply can enter the heater cabinet on either side via gas entry holes 1160mm (45½in) from the floor. Gas installations must conform with CP331, Building Regulations and Gas Safety Regulations.

ELECTRICAL CONNECTIONS

Mains: Single phase 240V 50Hz required. A fuse spur box with double pole switch or a 3-pin fused plug into an unswitched socket outlet should be used. Fuse rating should be 5A except in case of JAH 163 Mk2/HF (High Power Fan) where 7A is needed. Locations of connections to the heater are shown on the wiring diagram. Mains can be brought into the heater via electrical entry holes on either side of the heater 600mm (23½in) from the floor. Conduit should be used in industrial installations. A Heyco bush is supplied for use with cable connection.

Room Thermostat (must be suitable for 24V): This should be mounted on an internal wall or structural column about 1.5metres (5ft) from the floor and away from direct sunlight, draughts and local sources of warmth. Wiring suitable for 24V should be used to connect the thermostat to the heater. This can enter the heater cabinet on either side via a grommet in an electrical entry hole 600mm (23½in) from the floor. Locations of connections to the heater are shown in the wiring diagram (Fig.3). The room thermostat anticipator must be adjusted to 0.6.

TIME CONTROLS:

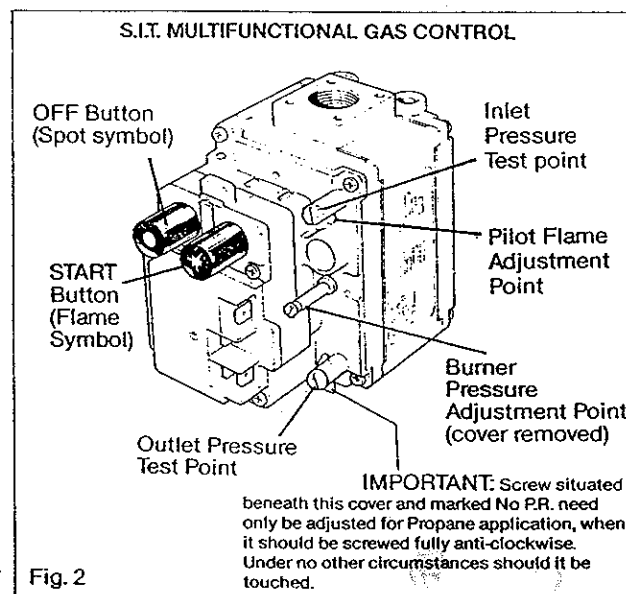
See wiring diagram (Fig.3) for connection details. The time control contacts must be voltage-free.

INSTALLATION:

For clearances and weights see table. Ensure floor can support weight of heater, flue and ducting.

HEATER FIXING:

1. Check heater is as specified, and that separately packed equipment is with it.
2. Remove Burner door and Fan Chamber door from heater.
3. Remove aluminium rail from inside of Burner Chamber Door and fit it to bottom outside edge of door so that it hangs downwards and forwards when door is fitted to heater.
4. Fit separate items such as Discharge Top and Heads or Filter Rack to heater. Fix Discharge Top to heater with self tapping screws. Fit Filter Rack and Blank Return Air Panel using self tapping screws.
5. Position heater.
6. Run gas and electric supplies into heater and connect. Connect Thermostat to heater. Fit time control if required.
7. Run Flue.
8. Make duct connections as required.
9. Replace fan chamber door.
10. Carryout commissioning procedure.



COMMISSIONING MODELS JAH 82 Mk2/FS JAH 122 Mk2/FS and JAH 163 Mk2/FS

Set thermostat to lowest setting.

Check fan switch is set to 100°F OFF (40 °F DIFF).

Check limit switch is set to 200°F.

Fit gas pressure gauge to test point.

Turn on gas supply and purge.

Light pilot burner, SEE INSTRUCTIONS ON HEATER.

Adjust pilot flame so that it envelopes thermocouple. To adjust pilot, find adjustment point (Fig 2) and turn screw clockwise to decrease, anti-clockwise to increase pilot flame size.

Switch on electricity.

Check burner pressure and reset if necessary. Adjust by removing cover from adjustment point (Fig 2) and turning screw clockwise to increase pressure and anti-clockwise to decrease pressure. Replace cover. Turn off gas by setting thermostat to lowest setting. Disconnect gas pressure gauge and replace test-point screw.

Turn on gas by moving room thermostat to maximum.

When fan comes on, turn discharge heads to direct warm air flow as required.

Check for gas soundness.

Check 'fail-safe' operation of Multifunctional Control. With main burner off, extinguish pilot burner flame by turning screw at pilot flame adjustment point clockwise. After 50-90 seconds, a loud click should be heard i.e. control has failed safe. Unscrew pilot adjustment screw, re-light burner and adjust flame to correct size.

Check Limit Switch operation by operating heater with main burner alight and fan disconnected — main burner must extinguish within 3-5 minutes. Reconnect fan.

Check that flue is operating properly while heating system is on, all doors are closed and extractor fan(s), if fitted, are running.

Replace burner chamber door.

Set thermostat and time control as required.

COMMISSIONING MODELS JAH 82 Mk2/LF and HF, JAH 122 Mk2/FS and JAH 163 Mk2/FS

Set thermostat to lowest setting.

Fit gas pressure gauge to test point.

Turn on gas supply and purge.

Light pilot burner, SEE INSTRUCTIONS ON HEATER.

Adjust pilot flame so that it envelopes thermocouple. To adjust pilot, find adjustment point (Fig 2) and turn screw clockwise to decrease, and anti-clockwise to increase pilot flame size.

Switch on electricity.

Check that warm air delivery outlets are open.

Turn room thermostat to maximum and ensure any Time Control is in an ON period. Burner should light.

Check burner pressure and reset if necessary. Adjust by removing cover from adjustment point (Fig 2) and turning screw clockwise to increase pressure and anti-clockwise to decrease pressure. Replace cover. Turn off gas by setting thermostat to lowest setting. Disconnect gas pressure gauge and replace test point screw.

Turn on gas by moving room thermostat to maximum.

After burner has been firing for 15 minutes, check the temperature rise of the air passing through the heater. This should be between 45 and 55°C (80 and 100°F). The temperature rise is adjusted by altering the fan speed by

means of the Electronic Fan Speed Selector which is fitted to the electrical panel in the fan chamber. Remove the fan chamber door for access. Turning the adjusting screw anti-clockwise gives slower fan speeds. During checking of temperature rise ensure that fan chamber door is in place. Balance the warm air system by checking air velocities at the registers with fan chamber door in place.

Re-check the temperature rise across the heater and adjust the fan speed if necessary.

Check that the flue is operating properly while the heating systems is on, all doors are closed and extractor fan(s), if fitted, are running.

Check 'fail safe' operation of Multifunctional control. With main burner off, reduce pilot burner flame by turning screw at pilot flame adjustment point clockwise until it is extinguished. After 50-90 seconds, a loud click should be heard i.e. control has failed safe. Unscrew pilot adjustment screw, re-light burner and adjust flame to correct size.

Check Limit Switch operation by operating heater with main burner alight and fan disconnected — main burner must extinguish within 3-5 minutes. Reconnect fan.

Turn off burner and check temperature of air at farthest register at the moment fan switches off. Adjust fan switch OFF setting to give temperature required.

Check for gas soundness.

Replace burner chamber door.

Set thermostat and time control as required.

SERVICING

Switch off electricity and turn off service gas cock.

Removal of front panels of heater gives complete access for servicing.

REMOVAL OF BURNER ASSEMBLY

Remove electrical connections from Multifunctional control. Disconnect union at input side of control and remove burner assembly fixing screws.

MAIN BURNER CLEANING — with Burner assembly removed. Release split pins at rear of burner bar and remove end cap. Brush lightly both inside and out. Under no circumstances should burner holes be enlarged, distorted or brushed strongly.

INJECTOR CLEANING — (Main Burner and Pilot Burner)

Unscrew to remove and clean carefully to avoid damage in each case. When injector replacement is a preferred alternative to cleaning, ensure that replacement injectors are of the correct orifice size.

THERMOCOUPLE

Ensure that thermocouple connection to Multifunctional control is tight (finger tight plus quarter turn).

REMOVAL OF AIR CIRCULATING FAN

Remove control panel assembly. (See below) Undo single screw in flange of flexible connector. Position head of screw in large hole in keyhole slot. Pull flange forward to disengage. Undo two screws at base of fan. Disconnect fan lead. Slide fan out of heater. Carefully clean fan impeller and clear any motor ventilation holes.

GAS PRESSURE CHECK

Attach a gas pressure gauge to outlet pressure test point on Multifunctional control. Light heater, check pressure and confirm by gas rate at meter.

CONTROL PANEL REMOVAL

Disconnect all leads from terminal block. Undo two screws in burner chamber floor whilst supporting panel.

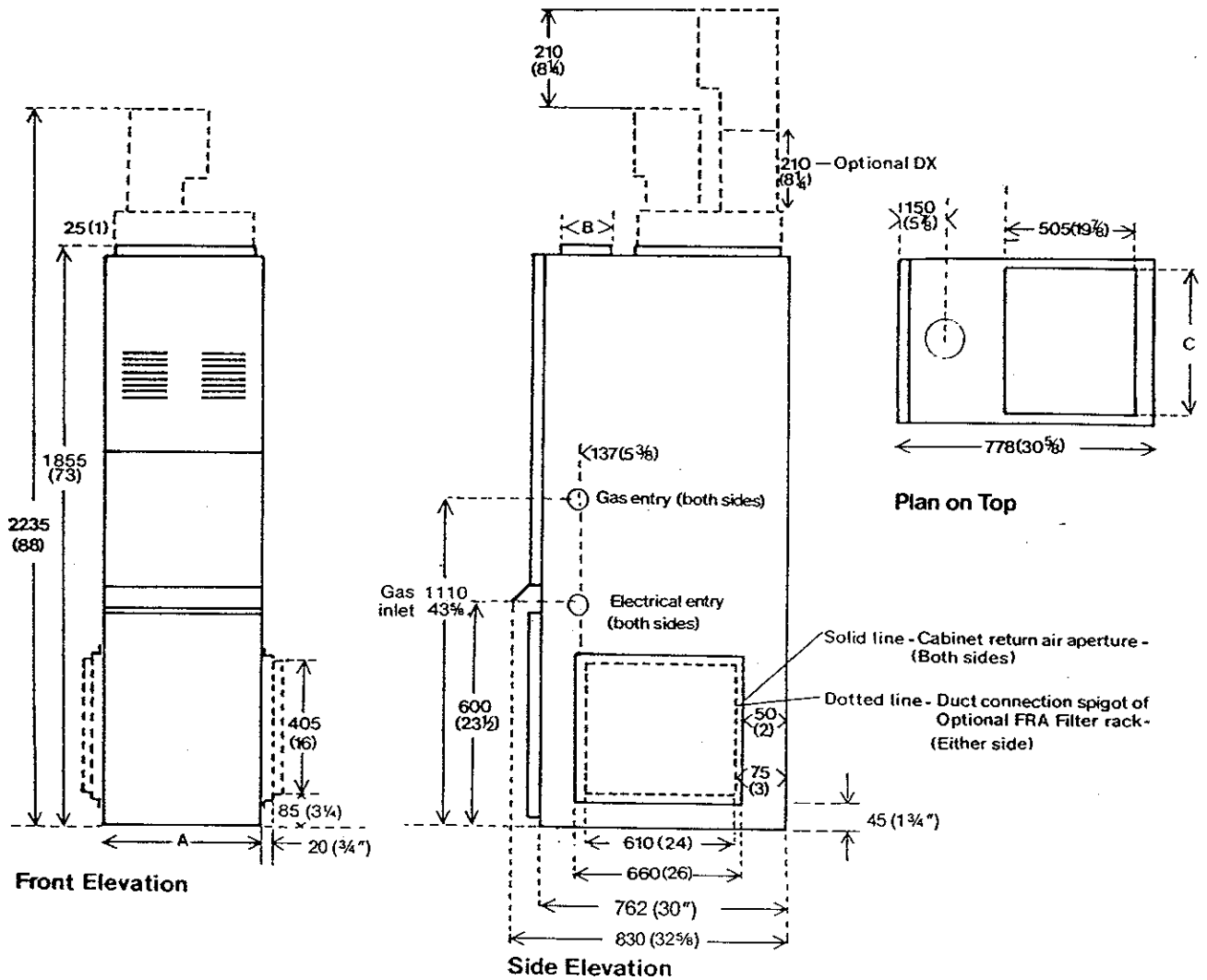
HEAT EXCHANGER ACCESS

Remove burner assembly. Remove top front panel of heater and then remove inspection panel on front of draught diverter. Heat exchanger can now be inspected and brushed through. If it is necessary to remove baffle strip this must be re-assembled before draught diverter inspection panel is replaced.

FAULT FINDING

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

SYMPTOM	POSSIBLE CAUSE	REMEDY
a) Pilot will not light.	I. No gas supply to heater. II. Gas supply pipe not purged. III. Pilot orifice restricted.	Break service tap union listen for escape. Break service tap union until gas is detected. Clear pilot orifice carefully or replace injector.
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. II. Faulty power unit on gas control. III. Faulty thermocouple. IV. Pilot flame of insufficient length.	Check connection is secure. Replace gas control. Replace thermocouple. Adjust pilot.
c) Pilot alight but main burner not igniting.	I. Mains electrical supply not connected to heater. II. Controls not calling for heat. III. Fuse failed. IV. Loose connection on room thermostat. Limit control, gas control head, Time control or transformer. V. Transformer open circuited. VI. Gas control operator faulty. VII. Gas control governor faulty. VIII. Faulty Limit control. IX. Faulty room thermostat or external wiring.	Check mains supply Check that time control (if fitted) and room thermostat are calling for heat. Replace. If failure occurs again check external room thermostat leads for short to earth. Check connections for soundness. Check with test meter and replace electrical panel if necessary. Replace operator. Replace gas control. Short across control and replace if necessary. Fit temporary loop in heater room thermostat socket. If heater fires, external circuit or room thermostat is faulty.
d) Main burner lights but fan fails to run.	I. Loose electrical connection on fan control. II. Fan control settings incorrect. III. Faulty fan assy. IV. Faulty Fan Control. V. Burner bar pressure not correct.	Check connections for soundness. Check settings. Replace, taking care not to damage impeller. Replace. Adjust pressure if necessary.
e) Main burner operating intermittently with fan running.	I. Gas rate or burner 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 bar pressure. Adjust fan speed or gas rate accordingly. Check filter is clean and return air path is clear. Open additional outlets.
f) Main burner operating with intermittent fan operation.	I. Gas rate or burner pressure bw. II. Fan control settings incorrect.	Check gas rate and burner bar pressure. Check settings.
g) Fan runs for excessive period or operates intermittently after main burner shuts down.	Fan control settings incorrect.	Check settings.



Dimensions that vary with model:

	JAH 82 Mk2	JAH 122 Mk2	JAH 163 Mk2
A. Width	375 (14 3/4)	525 (20 5/8)	675 (26 1/2)
B. Flue socket (dia.)	145 (5 3/4)	172 (6 3/4)	172 (6 3/4)
C. Warm air spigot — width	320 (12 5/8)	470 (18 1/2)	620 (24 3/8)
Flue size (nom.)	127 (5)	152 (6)	152 (6)

Dimensions mm (in)

Fig. 4