

Installation & Maintenance Instructions

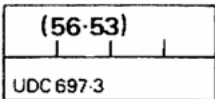
Models covered by these instructions

JT19-25



WARM AIR HEATER

Publication JA 193



These instructions do not apply if your heater is fitted with MODAIRFLOW control.

The JT19-25 is a Gas Fired Warm Air Heater for open flue application. Output is adjustable between 5.6 kW — 7.3 kW (20 MJ/h, 19,000 Btu/h — 26.4 MJ/h, 25,000 Btu/h) and there is 4 speed fan adjustment. JANUS 3 CIRCULATOR WATER HEATER — all air heaters have provision for the internal fitting of a JANUS 3 water heater.

If a JANUS is provided factory fitted, the heater designation is JT 19-25/JAN.

To fit a JANUS water heater on site, obtain from Johnson & Starley Ltd. a JANUS 3 Water Heater and KK19 Fittings Kit.

Installation Instructions

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1. COMPONENTS CHECK

NB: Check that Gas Group on heater data plate is as required

Fig. 1



Items:—		
Gas Tap	1	} supplied in linen bag
Thermostat Plug	1	
Draught Diverter	8	
Fixing Screws	1	

JT19-25 AIR HEATER

- 1 Air Filter
- 2 Air Circulating Fan
- 3 Fan Speed Regulator (Modairflow model)
- 4 Balancing Knob (Modairflow model)
- 5 Fan Override Switch (Modairflow model)
- 6 Gas Connection Tee with blanking plug
- 7 Data Plate

- 8 Time Control
- 9 Combination Gas Control
- 10 Pressure Test Point
- 11 Fan Switch and Cover (Basic model)
- 11A Air Flow Sensor (Modairflow model)
- 12 Overheat Limit Switch
- 13 Lighting Port
- 14 Pilot Burner
- 15 Burner Bar Assembly
- 16 Thermist-stat (Modairflow model)
- 17 Fan Speed Selector (Basic model)
- 18 3A Fuse (Basic model)
- 18A 1.5A Fuse (Modairflow model)
- 19 Electrical Panel (Basic model)
- 19A Electronic Panel (Modairflow model)
- 20 Heat Exchanger Access Cover Plate

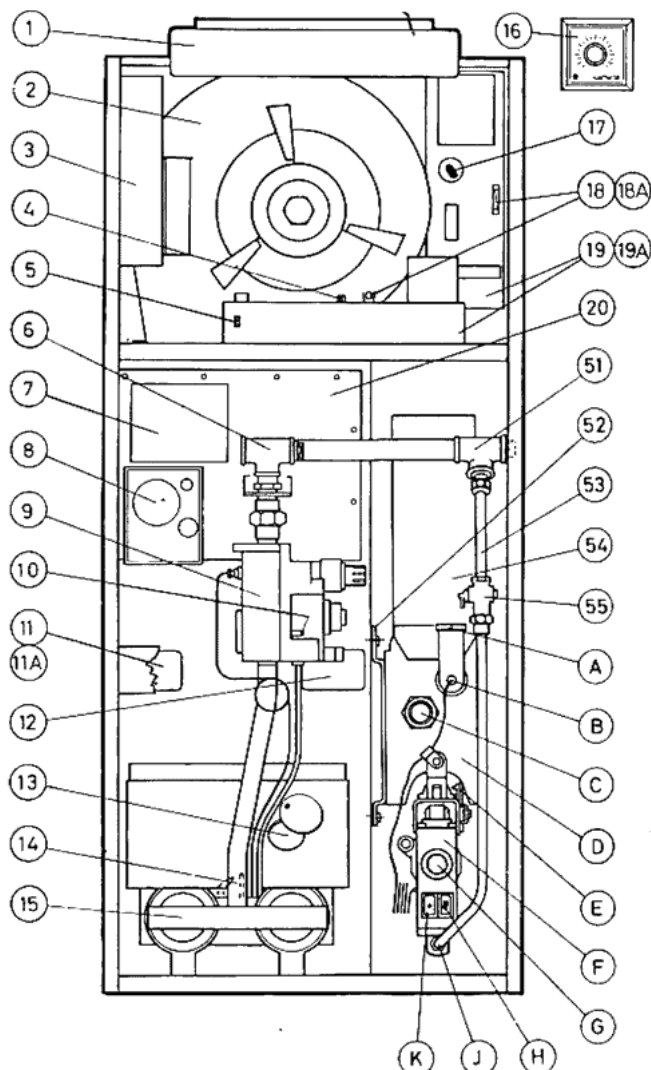
KK19 WATER HEATER FITTINGS KIT

- 51 Gas Pipe and Tee
- 52 Water Heater Mounting Bracket
- 53 Gas Feed to water heater
- 54 Flue Cap and Connection
- 55 Water Heater Gas Supply Tap

JANUS WATER HEATER

- A 'Flow' connection — ¾" B.S.P. female
- B Thermostat Phial
- C 'Return' connection — ¾" B.S.P. female
- D Water Heater Body
- E Pilot Burner
- F Burner and Controls
- G Water Temperature Control Knob
- H 'START' Button
- J Gas Connection
- K 'OFF' Button

For safety, use a competent installer to install this appliance. CORGI (The Confederation for the Registration of Gas Installers) requires its registered installer to work to satisfactory standards.



2. WARM AIR INSTALLATION REQUIREMENTS

Installation should be in accordance with: —

Building Regulations

British Standard Code of Practice CP 332 Part 4

Institute of Electrical Engineers Regulations

British Standard Code of Practice CP337 : 1963 (Flues for Gas Appliances)

British Gas Material and Installation Spec. Latest Edition.

(a) Ventilation of Heater Compartment

		Ventilation from inside building	Ventilation direct from outside building
Low Level Grille	free area.	232cm ² (36 in ²)	116 cm ² (18 in ²)
High Level Grille	free area.	116 cm ² (18 in ²)	58 cm ² (9 in ²)

(b) Ventilation of Building

A purpose designed ventilation opening must be provided in an outside wall. This opening must be either:

- (i) Into the room containing the heater, or
- (ii) Into an adjacent room which has a purpose designed opening into the room containing the heater.

Openings must have minimum effective areas of 97 cm² (15 in²).

(c) Return Air

Return Air Grille/s must be connected to the return air opening of the air heater by duct/s. Each heated room with the exception of Kitchens, Bathrooms and W.C.s, must have either a return air grille or purpose made relief opening communicating with a collection area served by a return air grille.¹ Openings must have minimum areas of 25 cm² per MJ/h (1 in² per 250 Btu/h) of designed heat input to the rooms they serve.

3. PREPARATION

a) Flues.

A single 4 in. lightweight asbestos or suitable twin wall flue is required.

b) Electrical Connections

- (i) MAINS. The heater is supplied complete with mains cable (P.V.C. sheathed, high temp, resistant, 3 core, 5A 0.75mm²) and can leave the heater from either side or top. This cable, suitable for 240V, 50 Hz, single phase supply, must be protected by a 3A fuse and the earth wire connected. A double pole switch or fused spur box should be used or, a 3 pin plug into an unswitched socket outlet.
- (ii) ROOM THERMOSTAT. Should be positioned on an internal wall approximately 1.5 metres (5 ft.) from the floor away from direct sunlight, draughts and local warmth. A 24 volt two pin socket is provided on the right hand top face of the heater. The two pin plug provided should be connected to the 24 volt room thermostat wires brought to the heater and plug fitted to heater socket. Alternatively the thermostat wires may enter either side of the heater but must then be connected directly to the terminal strip (terminals 4 & 5),

c) Gas Supply

The gas connection should be in ½" B.S.P. pipe or larger dependant upon length of pipe run from the meter. The gas pipe may enter the heater from either side of the cabinet. A ½" B.S.P. Union Gas Tap is supplied for external fitting. The leg of the internal tee not used must remain plugged.
Installation should conform to British Gas requirements and Building Regulations.

d) Heater Installation Clearances — from Combustible Materials

Sides — 50mm (2in) total 15mm (9/16in) at only one side

Front — 25mm (1 in) minimum

Back — 15mm (9/16in) minimum behind draught diverter

NOTE:

When gas and water connections are made at the side, a clearance of 75mm (3in.) is required.

Servicing access required to the front of the heater is 350mm (13¾in.). It is recommended that the access door to the heater cupboard be large enough to permit heater removal.

e) Installation on Suspended Floors:

Combustible floors must be insulated from the heater.

When a base duct is used, the base duct provides sufficient insulation and no insulation is needed underneath the base duct

When an undertloor warm air plenum is used, insulation can be provided by using a J & S Base Tray BT19. See [Fig.2](#) and [Fig.3](#).

Fig. 2

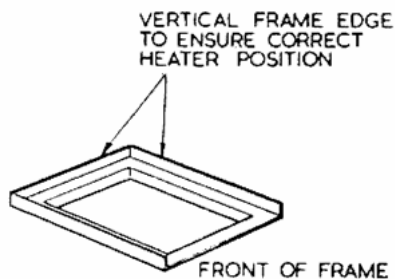
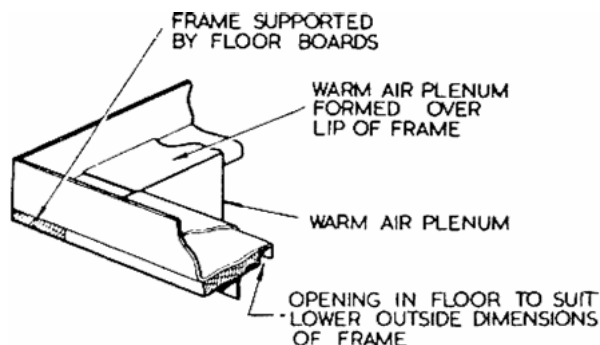


Fig. 3



4. AIR HEATER FIXING

NOTE:

If side return air is used, fit before fixing heater.

Return Air Ducting may be connected to either side of the heater.

Remove Air Filter, Burner Chamber Door and Fan Chamber Door.

Cut hole in chosen side of heater in the position shown in [Fig. 8](#).

Undo screws from around filter frame and remove from top of heater, retain screws and discard the two packing strips.

Place frame centrally over prepared hole so that the top front is flush with the front of the heater.

Mark through from frame the position of the fixing screw holes and drill No. 30 dia.

Screw frame to side of heater using retained screws and replace door and filter.

Make a cover plate for the original filter opening in top of heater and make secure.

(a) FIT DRAUGHT DIVERTER over heater flue spigot on back of heater and secure with screws provided in linen bag.

(b) POSITION HEATER ON BASE DUCT OR PLENUM - Ensure no air leakage can occur.

(c) CONNECT FLUE - Use split clip above draught diverter and complete before return air plenum is fitted. (flue must be supported to relieve weight from heater).

(d) CONNECT RETURN AIR DUCT.

(e) MAKE GAS CONNECTION — Fit union gas tap provided.

(f) MAKE ELECTRICAL CONNECTIONS - see [Section 3 \(b\)](#).

5. WATER CONNECTIONS

NB: Water connections (flow and return) to the water heater may be from either side or the top of the air heater

Side Exit Fitting Instructions —

See [Fig. 8](#) for 'flow' and 'return' holes in heater sides. If the 'return' is made from left hand side, pipe must be set to pass behind gas feed pipe to allow burner bar removal.

Top Exit Fitting Instructions —

(a) Withdraw Air Filter and remove Burner Chamber Door (lower)

(b) Remove Fan Chamber Door (upper)

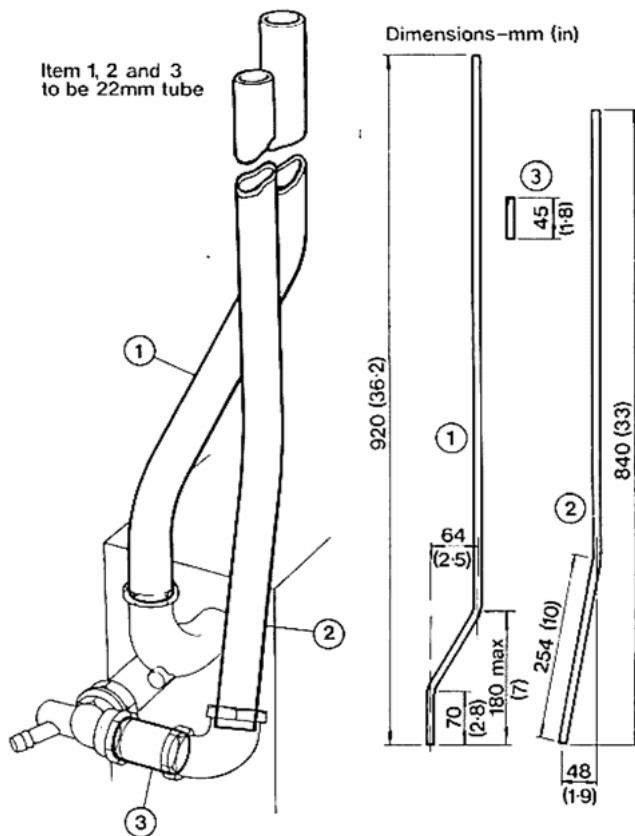
(c) Remove blanking plate from 'flow' and 'return' holes in fan compartment floor and plugs from top of heater and retain

(d) Tighten Male Adaptor into 'flow' connection and Male Drain Elbow into 'return' connection of water heater (note position from [Fig. 4](#))

(e) Pass pipe (1) up through rear holes in fan compartment floor and top of heater and connect to Male Adaptor — tighten fully.

- (f) Insert pipe (3) into Drain Elbow and tighten
- (g) Loosely fit elbow to (3). Pass straight end of pipe (2) up through fan compartment floor and top of heater, locate in elbow and tighten all joints.
- (h) Refit blanking plate to fit around flow and return pipes and seal around pipes with good quality duct tape where they pass through top of heater.
- (j) Check for leaks
- (k) Refit air heater components

Fig. 4



6. COMMISSIONING

- (a) Check that WARM AIR DELIVERY OUTLETS are open.
 - (b) Set room thermostat anticipator to 0.2 and set thermostat pointer to OFF or lowest setting.
 - (c) FAN and LIMIT controls are factory set:-
FAN 90°F OFF - 130°F ON (40°F DIFF.) and can be adjusted if necessary.
LIMIT 200°F and MUST NOT be adjusted.
 - (d) Fit GAS PRESSURE GAUGE to test point.
 - (e) Turn on GAS supply and bleed off air.
 - (f) Light PI LOT BURNER.
 - (g) Adjust pilot flame if necessary so that it just envelopes thermocouple tip. To adjust flame, remove screw cap from adjustment point (see [Fig. 7](#)) and turn screw *clockwise to decrease, anti-clockwise to increase* flame.
 - (h) Switch on ELECTRICITY.
 - (j) Turn thermostat to MAXIMUM setting and ensure Time Control is at an ON period — Burner should light.
 - (k) Balance Warm Air System.
- Remove electrical panel cover for access to fan speed selector plug.
- (i) Adjust burner bar pressure to output required (see Table [Fig. 5](#)). Heaters are factory set to a pressure giving maximum output at gas group specified. To adjust pressure, remove cover from adjustment point (see [Fig. 7](#)) and turn screw *clockwise to increase, anti-clockwise to decrease* pressure. Enter pressure in blank space provided on Data Plate.
 - (ii) With Fan Chamber Door in place, check velocities to design figures and adjust fan speed if necessary by the fan speed selector plug.

NOTE:

if the system includes ceiling diffusers, it is important that the velocities of air through these (except in very small rooms e.g. bathrooms etc.) is at least 300ft./m. To achieve this, it may be necessary to blank-off part of the outlet face.

(iii) Check temperature rise (85° - 100°F) across heater and adjust fan speed if necessary.

(l) CHECK THAT FLUE OPERATES EFFECTIVELY with heating system on, all doors closed and extractor fan/s if fitted, running.

(m) Check for gas soundness.

Fig. 5

	kW	MJ/h	Btu/h	kW	MJ/h	Btu/h	kW	MJ/h	Btu/h
INPUT	7.7	28.1	26,600	8.8	31.65	30,000	9.9	35.3	33,900
OUTPUT	5.6	20.0	19,000	6.5	23.2	22,000	7.3	26.4	25,000
GAS RATE (1000 cv)	0.75m ³ /h (26.5ft ³ /h)			0.85m ³ /h (30ft ³ /h)			0.95m ³ /h (33.5ft ³ /h)		
GAS	INJECTOR dia. mm.	BURNER BAR GAS PRESSURES (measured hot) mbar							
NATURAL	1.88	5.2 mbar	2.1 in wg	7.4 mbar	3.0 in wg	9.5 mbar	3.8 in wg		
PROPANE	Lower rates not available						35.0	14.0	

Fig. 6

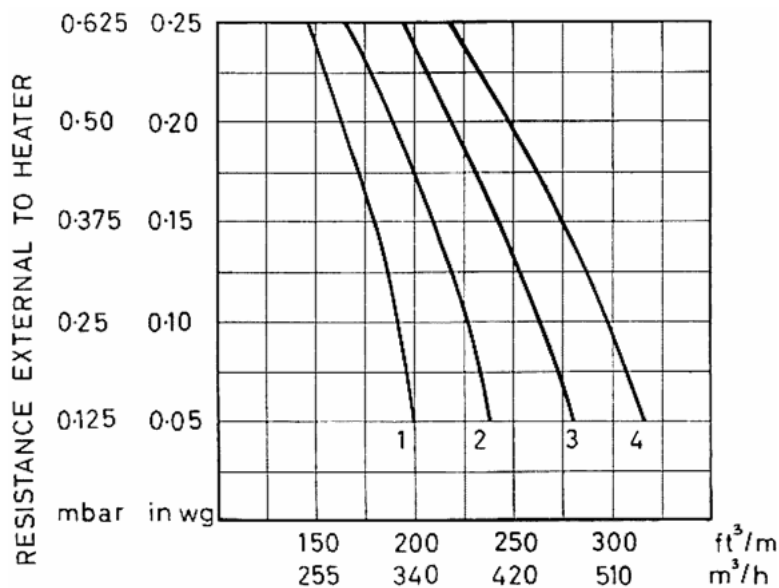
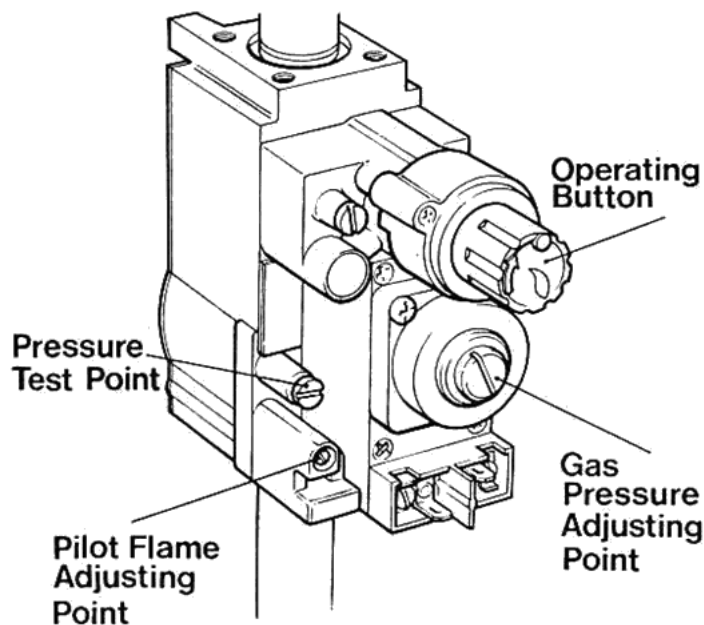


Fig. 7



7. MAINTENANCE (Recommended Annually)

SWITCH OFF ELECTRICITY, REMOVE MAINS PLUG AND TURN OFF HEATER GAS TAP.

(a) Main Burner Cleaning - with Burner Bar Assembly removed

NB: To remove assy, it is first necessary to remove heat shield.

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 or distorted, or brushed strongly.*

(b) Injector Cleaning - (Main Injector, Pilot Burner Injector and Cross Lighting Injector)

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

(c) Thermocouple

Ensure thermocouple connection to Gas Control is tight (finger tight + quarter turn).

(d) Fan and Fan Motor Cleaning

Remove fan and fan motor. Remove all dust, etc, from both fan impeller and fan motor. *Great care must be taken whilst cleaning both items that the fan balance is not disturbed.*

(e) Gas Pressure Check

Attach a gas pressure gauge to gas pressure test point on gas control, light heater, check pressure and confirm by gas rate check at meter (see pressure table. [Fig. 5](#)). If gas pressure needs adjustment, refer to [Section 6 k](#) (i).

(f) Gas Control 'fail-safe' Operation Check

Reduce flame of pilot burner by turning screw clockwise at pilot flame adjusting point (see [Fig. 7](#)) until it extinguishes. Check that main burner extinguishes i.e. gas control 'fails safe'.

(g) Pilot Flame Check

Pilot flame should just surround thermocouple probe. Adjust if necessary (see [Section 6 \(g\)](#)).

(h) Automatic Controls Inspection

Lighting the heater and allowing to run for a short time checks these controls.

For access to Electrical Panel, 3A Fuse and Air Circulating Fan, remove Fan Chamber Door.

For access to Time Control remove lower door.

(j) Time Control Removal

(i) Loosen fixing screw in bottom of Time Control casing, withdraw casing and disconnect leads.

(ii) Release mounting screw (situated centrally on the rear top face of the mechanism), lift slightly and withdraw mechanism.

(iii) Position replacement mechanism onto the lugs of the mounting plate and lock by a downward movement. Tighten mounting screw, remake electrical connections and replace casing.

(k) Electrical Panel Removal

(i) Disconnect 3 way plug.

(ii) Disconnect all leads from terminal block.

(iii) Remove two fixing screws.

(l) Air Circulating Fan Removal

(i) Disconnect 3 way plug at Electrical Panel.

(ii) Remove fan retaining screw.

(iii) Withdraw fan assembly, handling with care.

(m) Heat Exchanger Access

NOTE:

Should access to the heat exchanger be necessary, proceed as follows: —

(i) Remove burner bar assembly and Time Control from its mounting plate.

(ii) Remove access panel from bulkhead.

(iii) Remove cover plate from front of heat exchanger together with gasket.

(iv) Withdraw internal baffles from top of heat exchanger. Heat exchanger can now be brushed through and inspected.

IMPORTANT:

Replace baffles by sliding under retaining straps and push fully home. Refit cover plate complete with gasket.

8. FAULT FINDING

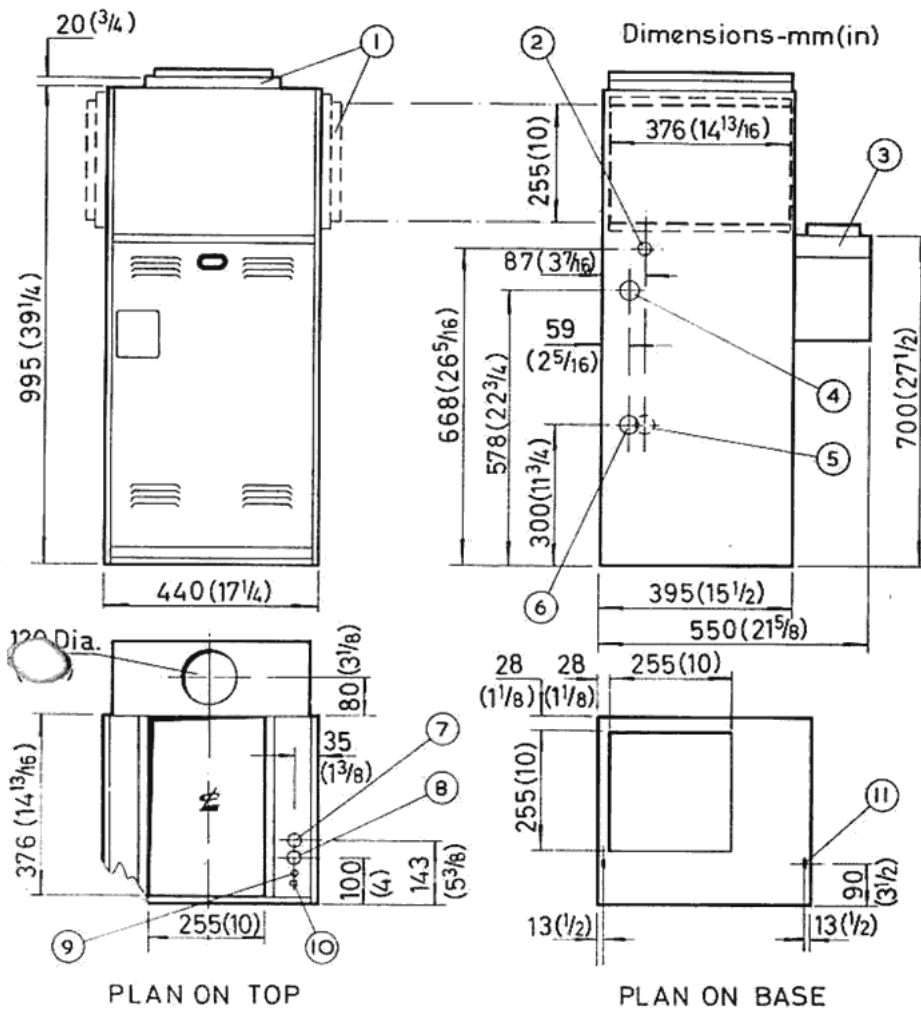
NOTE:

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.	Break gas tap union and listen for escape.
	(ii) Gas Supply pipe not purged.	Break gas tap union until gas is detected.
	(iii) Pilot orifice restricted.	Clear pilot orifice carefully or replace injector.
(b) Pilot lights but goes out on releasing 'START' button.	(i) Connection between thermocouple and gas control not secure.	Check connection is secure.
	(ii) Faulty power unit on Gas Control.	Replace power unit.
	(iii) Faulty thermocouple.	Replace thermocouple.
	(iv) Pilot flame not sufficient.	Adjust.
(c) Pilot lights but goes out after normal operation.	As above in (b).	As above in (b).
(d) Pilot alight but main burner not igniting.-	(i) Mains electrical supply not connected to heater.	Check mains supply.
	(ii) Controls not calling for heat.	Check time control (if fitted) and room thermostat are calling for heat.
	(iii) 3 amp fuse failed.	Replace and if failure occurs again check external room thermostat leads for shorting to earth.
	(iv) Loose connection on room thermostat, limit control, gas control head, time control or transformer.	Check connections for soundness.
	(v) Transformer open circuited.	Check with test meter and replace electrical panel if necessary.
	(vi) Gas Control operator faulty.	Replace operator.
	(vii) Gas Control governor faulty.	Replace governor.
	(viii) Limit control faulty.	Check operation by shorting across control connections.
	(ix) Faulty room thermostat or external wiring.	Fit temporary loop in heater room thermostat socket, if heater fires, external circuit or room thermostat is faulty.
(e) Main burner lights but fan fails to operate.	(i) Loose electrical connection on fan control or fan plug and socket.	Check connections for soundness.
	(ii) Fan control settings incorrect.	Check settings suit system.
	(iii) Faulty fan assembly.	Replace assembly ensuring that pressure is not placed on impeller or motor, or balance of assembly may be distorted.
	(iv) Faulty fan control.	Replace component.
	(v) Burner bar pressure not correct.	Adjust pressure if necessary.
(f) Main burner operating intermittently with fan operating	(i) Gas rate and burner bar pressure high.	Check gas rate and burner bar pressure.
	(ii) Temperature rise across unit excessive.	Adjust fan speed or gas rate accordingly.
	(iii) Air filter or return air path restricted.	Check filter for cleanliness and return air for obstruction.
	(iv) Excessive number of outlets closed.	Open additional outlets.
(g) Main burner operating with intermittent fan operation.	(i) Gas rate or burner bar pressure low.	Check gas rate and burner bar pressure.
	(ii) Fan control settings incorrect.	Check settings suit system.
(h) Fan continues running for excessive period or operates intermittently after main burner shuts down.	(i) Fan control settings incorrect.	As g (ii).
(i) Noisy operation.	(i) Gas pressure high.	Check burner bar pressure.
	(ii) Noisy fan motor.	Replace fan motor.
	(iii) Fan speed setting too high.	Adjust fan speed.
(j) Insufficient heating.	(i) Heater gas rate low.	Check and adjust gas rate accordingly.
	(ii) Limit control operation due to:	
	(a) Temperature rise set too high	Adjust fan speed and/or gas rate accordingly.
	(b) Air filter or return-air path restricted.	Check filter for cleanliness and return-air path for obstruction.
	(c) Excessive number of outlets dosed.	Open additional outlets.
	(d) Limit Control out of calibration.	Replace Limit Control.
	(iii) Incorrect siting of Thermostat.	Reposition.
	(iv) Thermostat out of calibration.	Replace Thermostat.
	(v) Insufficient return-air relief.	Check for relief and where no provision has been made, fit grilles to area/s where no positive return air collection is made.
	(vi) Substandard installation e.g.Poor insulation, faulty duct connections or damaged ductwork.	Check velocities and underfloor heat losses.
(k) Heater operates outside required periods (applicable only when equipped with a Time Control).	(i) Time Control motor running slowly.	Replace Time Control.
	(ii) Time Control tappets slipping.	Replace Time Control.
	(iii) Time Control tappets not set in correct sequence.	Refer to Time Control operating instructions and set tappets accordingly.

9. DIMENSIONS & DATA

Fig. 8



- 1 Return Air Filter Frame — top or side.
- 2 Flow Connection — both sides.
- 3 Draught Diverter.
- 4 Gas Connection — both sides.
- 5 Return Connection — L.H. side.
- 6 Return Connection — R.H. side.
- 7 Flow Connection — top.
- 8 Return Connection — top.
- 9 Grommet for electrical connection — top.
- 10 Thermostat Connection.
- 11 Slots for base duct fixing.

10. WIRING DIAGRAM

Fig. 9

