



J25-32 & J25-32R WARM AIR HEATERS

SfB (56)
UDC 697.3

Installation & Maintenance Instructions

Publication JA 91/2

- J25-32** Gas Fired, Downflow Warm Air Heater for conventional flue applications. Output adjustable 25,000 – 32,000 Btu/h. (6,300 kcal/h 7.3 kW to 8,000 kcal/h 9.4 kW).
- J25-32R** Similar to J25-32 but with built-in rising air supply duct in rear of cabinet.
- JANUS 2** Hot Water Circulator can be optionally fitted inside J25-32 and J25-32R. It can be factory fitted by Johnson & Starley or added on site.

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PART A J25-32 and J25-32R AIR HEATERS

- 1 Components Check
Gas Cock, Bolts (2), Washers (4) for fixing heater to base duct. (These items in linen bag). Check that Gas Group on heater information plate is as required.
- A. 2 Warm Air Heater Installation Requirements
Installation should be in accordance with:
Building Regulations.
British Standard Code of Practice CP332 Part 4.
Institute of Electrical Engineers Regulations.
Information in the following paragraphs has been extracted from the regulations and related to the requirements of J25-32 and J25-32R.
 - (a) Ventilation of Heater Compartment

	Ventilation from inside building free area	Ventilation direct from outside building free area.
Air Heater only	32 sq. ins.	16 sq. ins.
	16 sq. ins.	8 sq. ins.
Air Heater and Water Heater	43 sq. ins.	21.5sq. ins.
	21.5sq. ins.	11 sq. ins.
 - (b) Ventilation of Building
There must be a purpose made ventilation opening in the outside wall of the building. This opening may be either (i) into the room in which the heater is installed or (ii) into an adjacent room which has a purpose made opening in to the room in which the heater is installed. Openings must have minimum effective areas of:

Air Heater only.	8 sq. ins.
Air Heater and Water Heater.	11 sq. ins.
 - (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 must have either a return air grille or purpose made relief opening communicating with a collection area served by a return air grille.

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J25-32 AND J25-32R AIR HEATERS WITH JANUS 2 HOT WATER CIRCULATOR FITTED.

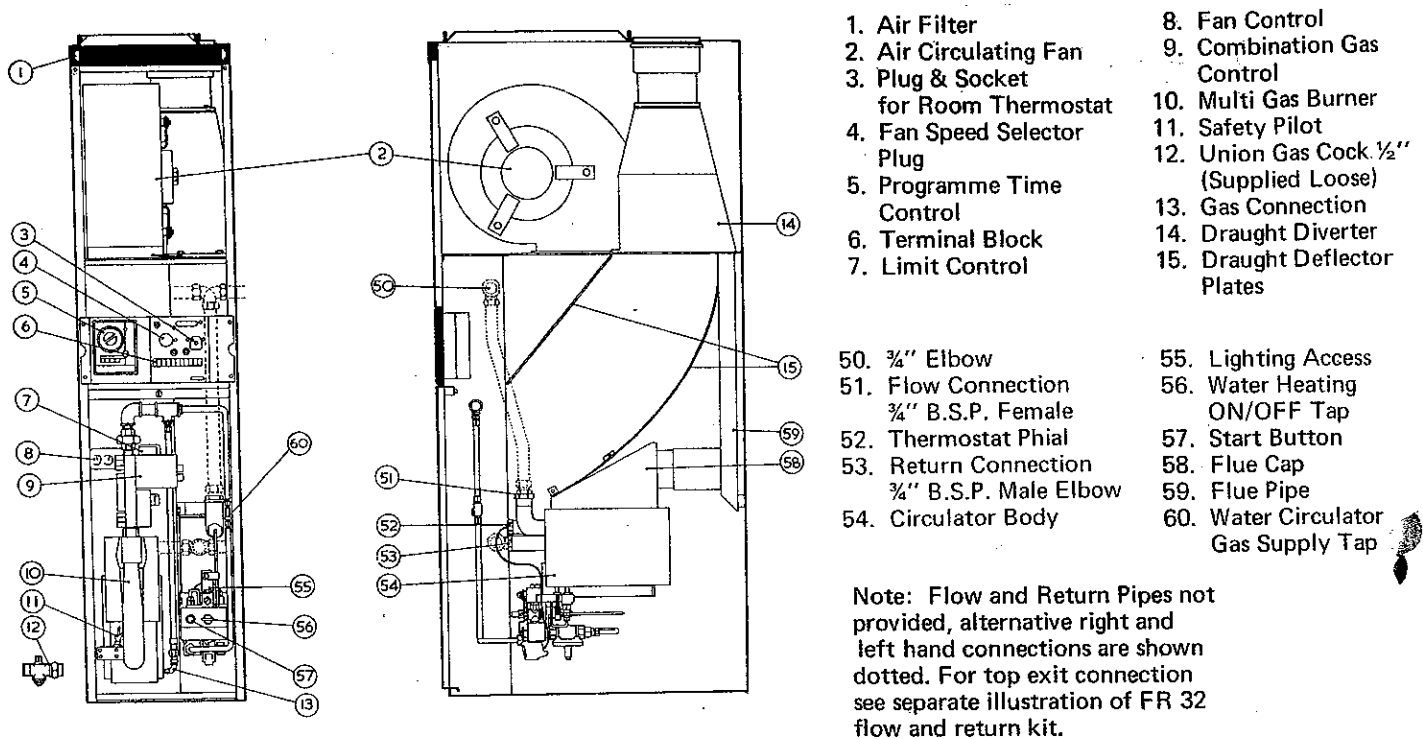
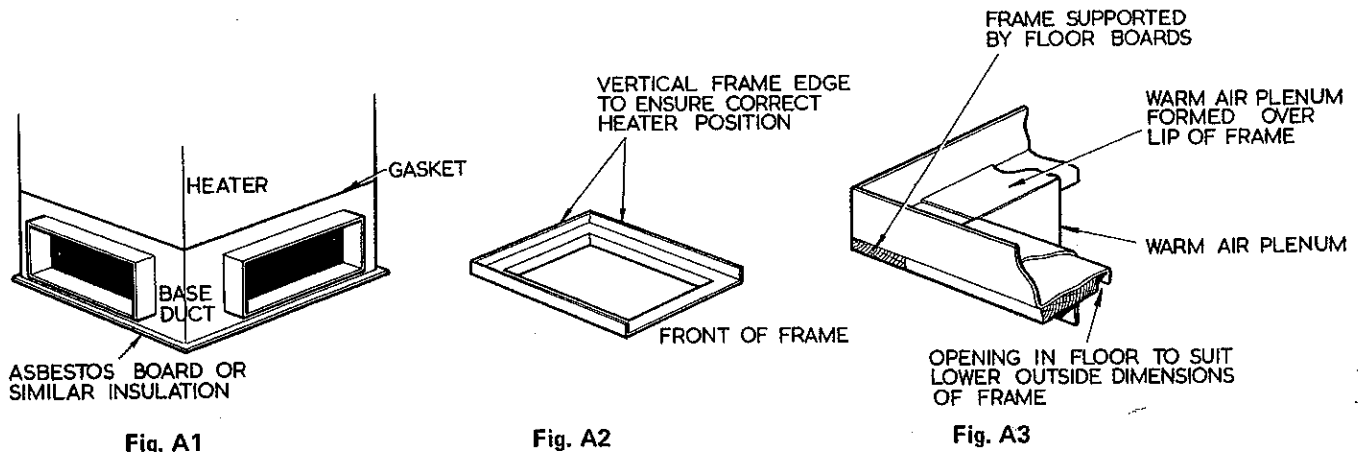


Fig. A

A. 3 Preparation

- FLUES:** A single 4" flue is required; light weight asbestos treated with vinyl is recommended. Untreated asbestos **MUST NOT** be used if a water circulator is fitted or the flue is less than 20 ft. long.
- ELECTRICAL:** 220/250V. 50C. supply at socket adjacent to air heater (6ft. Lead attached to air heater). Provide 24V. wire for connection from room thermostat to heater electrical panel.
- GAS SUPPLY:** Provide supply (½" minimum, or more dependant on resistance of run from meter) at position required. (Entry to heater can be through either side or base.).
- HEATER INSTALLATION CLEARANCES** from combustible material.
Sides and back ½" (3 mm) minimum. 3" (77mm) clearance if side gas and water connections required.
Front 3" (77mm) minimum.
Service access to front of heater 18" (457mm). Access door of heater cupboard should be large enough to permit heater removal.
- INSTALLATION ON SUSPENDED FLOORS:** Combustible floors must be insulated from the heater. When a base duct is used, insulation can be provided by a suitable non-combustible material i.e. asbestos board. (See Fig. A1).

Note:- When an underfloor warm air plenum is used, insulation can be provided by using a J. & S. Base Tray — BT32 (J25-32). See Figs. A2 and A3.



A. 4 Fixing Air Heater

- (a) FIT SIDE RETURN AIR KIT (SR32) if required. For fitting instructions see Page 9
- (b) FOR TOP CLOSURE (TC32 or TC32R) OR SLOT FIX (TS32) INSTALLATIONS see Pages 10 and 12 respectively.
- (c) REMOVE APPROPRIATE KNOCK-OUT DISCS required for gas, water flow and return entries.
- (d) POSITION HEATER ON BASE DUCT OR PLENUM (in case of base duct fix with bolts provided).
Make sure no air leakage can occur.
- (e) J25–32R ONLY – fix rising duct.
- (f) CONNECT FLUE – using split clip. (Note that if top closure kit is used, extension skirt should be positioned before connecting flue).
- (g) CONNECT RETURN AIR DUCT.
- (h) MAKE GAS CONNECTION. Fit the ½" gas cock provided.
- (j) ELECTRICAL CONNECTIONS
 - (i) Remove electrical panel cover.
 - (ii) Mains lead may leave heater and 24V. Room Thermostat wires may enter, either through grommet in heater top or at either side of electrical panel cover. Position leads. Remove appropriate plastic knock-outs from inside of electrical panel cover.
 - (iii) Connect plug to mains lead – fuse 5 amp.
 - (iv) Connect 24V. Room Thermostat wires to plug provided.

PART A. AIR HEATERS – Commissioning**A. 5 Commissioning J25–32 and J25–32R Air Heaters**

- (a) Check that REGISTERS are open.
- (b) Set room thermostat anticipator.
0.3 for Bi-metal Gas Valve.
- Set thermostat pointer to "off" or lowest setting.
- (c) Check setting of FAN control and LIMIT control.
Fan Control 100°F OFF – 40°F DIFFERENTIAL.
Limit Control 200°F.
- (d) Fit GAS PRESSURE GAUGE to test point.
- (e) Turn on Gas supply and bleed off air.
- (f) Switch on electricity.
- (g) Light Heater. See instructions mounted on inside of lower door of heater.
- (h) Adjust burner bar pressure (See table below). Heaters are factory set to pressure giving maximum output at gas group specified. To adjust pressure, remove screw cap from adjustment point, turn the screw clockwise to increase, anti-clockwise to decrease pressure.

INJECTOR SIZES, BURNER BAR PRESSURES & GAS RATES J25-32 and J25-32R.

		Btu/h	kcal/h	kW	Btu/h	kcal/h	kW	Btu/h	kcal/h	kW
INPUT		34,500	8,550	9.95	39,500	9,800	11.4	43,200	10,700	12.5
OUTPUT		25,000	6,300	7.3	29,000	7,300	8.5	32,000	8,050	9.4
GAS RATE (500cv)		69 Cu ft/h			79 Cu ft/h			86 Cu ft/h		
GAS RATE (1,000cv)		34.5 Cu ft/h			39.5 Cu ft/h			43 Cu ft/h		
GAS	INJECTOR dia. mm.	BURNER BAR GAS PRESSURES (measured hot)								
G 4	5.0	1.3in.	33 mm.	3.2 mb	1,7 in.	43 mm.	4.2 mb	2.0 in.	51 mm.	5.0mb
G 5	5.0	1.6	41	4.0	2.0	51	5.0	2.4	60	6.0
G 6	5.4	1.3	33	3.2	1.7	43	4.2	2.0	51	5.0
Natural	2.7	4.1	104	10.2	5.1	130	12.7	6.1	155	15.2
Propane	1.8	Lower rates not available.						14.0	356	35

Fig. A 4.

- (j) Set Time Control if fitted.
- (k) Balance Warm Air System.
 - (i) Remove electrical panel cover and adjust circulating air fan speed by means of selector plug on front of electrical panel to give temperature difference between the warm air in duct close to heater and the return air as required by system design.
 - (ii) Adjust each register/diffuser damper to obtain designed *cfm* for each room, set damper positioning screws.
 - (iii) Re-check the temperature rise across the heater.
 - (iv) Re-adjust each register/diffuser damper if necessary.
 - (v) Adjust Fan Control to suit system.

NOTE: CHECK THAT FLUE OPERATES EFFECTIVELY WITH HEATING SYSTEM ON, all doors closed, and EXTRACT FAN/S if fitted, running.

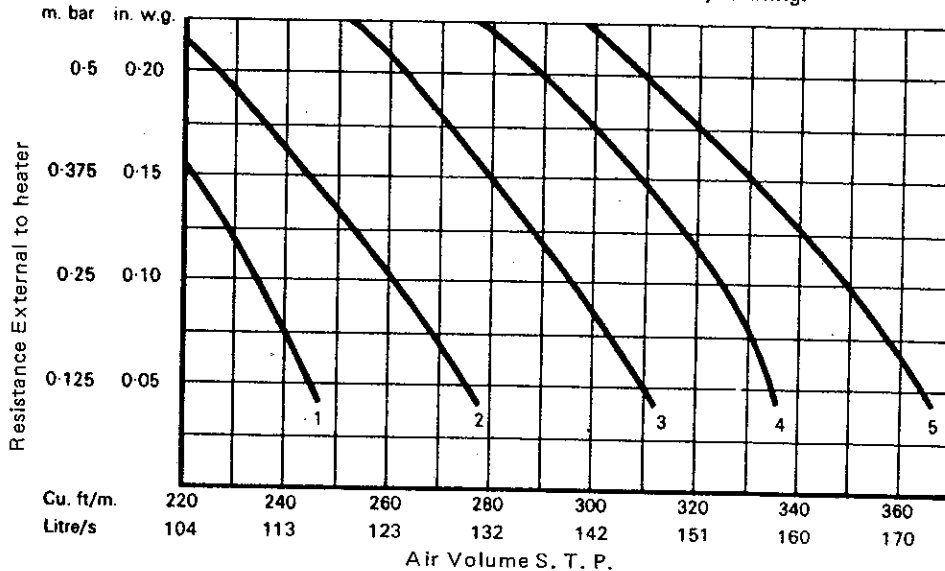


Fig. A5

A.6 Maintenance J25-32 and J25-32R Air Heaters

PART A. AIR HEATERS – Maintenance

SWITCH OFF ELECTRICITY. REMOVE MAINS PLUG AND TURN OFF HEATER GAS COCK.
Maintenance is recommended annually and should cover the following:-

(a) **Main Burner Cleaning**

Remove Burner. Upon removal the burner merely requires a gentle removal of any dust which may have accumulated. *Under no circumstances should burner holes be enlarged or distorted, or brushed strongly.*

(b) **Main Injector Cleaning**

Remove main injector. When the injector has been removed, clean the orifice by passing soft copper fuse wire through. This is sufficient to remove any foreign matter which may have gathered in the orifice. *Great care must be taken when cleaning the orifice that it is not damaged or enlarged.*

(c) **Pilot Injector Cleaning**

Remove Injector. To clean, pass soft copper fuse wire through orifice, ensuring that orifice is not damaged or enlarged.

(d) **Thermocouple**

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

(e) **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.*

(f) **Gas Pressure Check**

Attach a gas pressure gauge to gas pressure test point below control valve, light heater and check pressure and confirm by gas rate check at meter. See pressure table Fig. A.4. If gas pressure needs adjustment refer to para A.5 (h).

(g) **Pilot Flame Check**

Pilot flame should just surround thermocouple probe: adjust if necessary.

(h) **Automatic Controls Inspection**

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

A. 7 Servicing and Fault Finding

SWITCH OFF ELECTRICAL SUPPLY TO HEATER BEFORE SERVICING.

- (a) **Electrical Panel Cover** is removed by releasing the two screws — one on either side of front face.
 - (b) **Time Control Removal**
 - (i) With the electrical panel removed as in (a) above, loosen the fixing screw in the bottom wall of the time control casing and withdraw the casing.
 - (ii) Disconnect leads from time control terminal block, noting their respective positions.
 - (iii) Release the mounting screw (situated centrally on the rear top face of the mechanism), lift slightly and withdraw mechanism.
 - (iv) Position replacement mechanism on to the lugs of the mounting plate and lock by a downward movement of about $\frac{1}{8}$ ". Tighten mounting screw and remake electrical connections.
 - (c) **Electrical Panel Removal**
 - (i) Remove electrical panel cover as in (a) above.
 - (ii) Slide out filter tray. Undo two retaining screws from fan compartment door, lift door upwards and remove.
 - (iii) Disconnect fan plug and remove socket from fan compartment floor.
 - (iv) Withdraw thermostat plug and disconnect leads from terminal block, noting their respective positions.
 - (v) Remove time control casing and leads as in (b) above.
 - (vi) Undo four retaining screws and remove panel.
 - (vii) For replacement of electrical panel reverse above procedure.
- Note: If it should be necessary to fit a replacement electrical panel, the removal and refitting of which is described in (c) above, the time control must be retained.
- (d) **Fuse** Remove electrical panel cover for access to 2 amp fuse.
 - (e) **Air Circulating Fan**
Remove filter tray, electrical panel cover and fan compartment door for access to air circulating fan.

Fault Finding

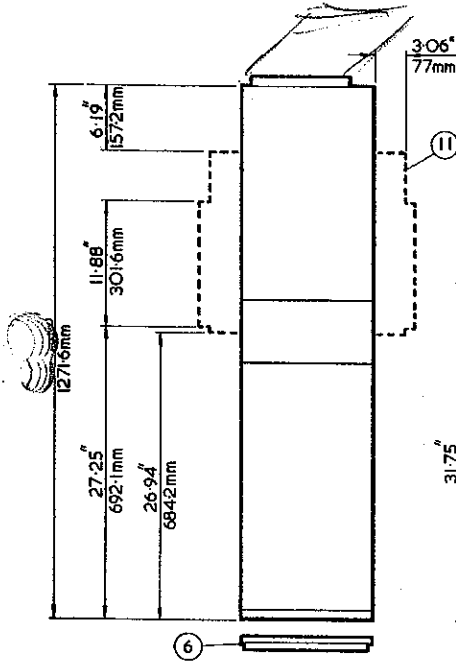
Symptom	Possible Cause	Remedy
(a) Pilot will not light	(i) No gas supply to heater. (ii) Gas supply pipe not purged. (iii) Pilot orifice restricted.	Break gas cock union and listen for escape. Break gas cock union until gas is detected. Clear pilot orifice carefully with soft copper fuse wire.
(b) Pilot lights but goes out on releasing control button.	(i) Connection between thermocouple and gas control not secure. (ii) Faulty Pilotstat on Gas Control. (iii) Faulty Thermocouple. (iv) Pilot flame not sufficient.	Check connection is secure. Replace Pilotstat Replace Thermocouple. 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. (ii) Controls not calling for heat. (iii) 2 amp. 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) Limit control faulty. (ix) Faulty room thermostat or external wiring.	Check mains supply. Check time control and room thermostat are calling for heat. Replace and if failure occurs again check external room thermostat leads for shorting to earth. Check all connections for soundness. Check with test meter and replace electrical panel if necessary (para A.7. (c)) Replace operator.* Replace governor. Check operation by shorting across control connections. Fit temporary loop in heater room thermostat socket. If heater fires, external circuit or room thermostat is faulty.

* N.B. The field replacement for a faulty bi-metal operator (Head of Honeywell V8301) is a solenoid operator (Honeywell V8254A). Solenoid operators are supplied as free replacements for bi-metal operators which fail within guarantee period.

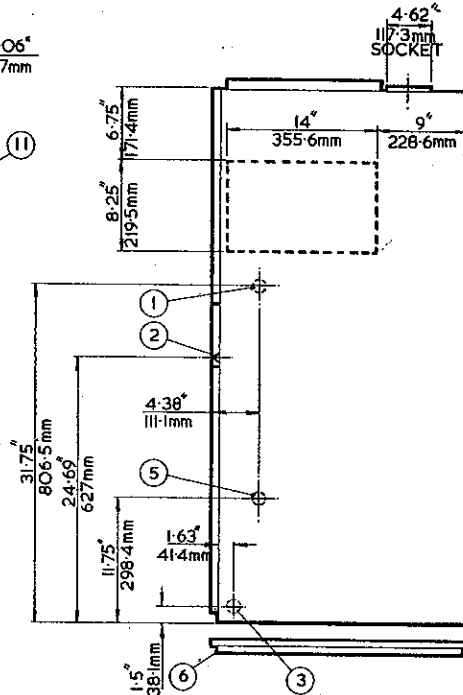
Symptom	Possible Cause	Remedy
(e) Main burner lights but fan fails to operate.	(i) Loose electrical connection on fan control or fan plug and socket. (ii) Fan control settings incorrect. (iii) Faulty fan assembly. (iv) Faulty fan control. (v) Burner bar pressure not correct.	Check connections for soundness. Check settings suit system. Replace assembly ensuring that pressure is not placed on impeller or motor, or balance of assembly may be distorted. Replace component. Adjust pressure if necessary.
(f) Main burner operating intermittently with fan operating.	(i) Gas rate and burner bar pressure high (ii) Temperature rise across unit excessive. (iii) Air filter or return air path restricted. (iv) Excessive number of registers closed.	Check gas rate and burner bar pressure. Adjust fan speed or gas rate accordingly. Check filter for cleanliness and return air for obstruction. Open additional registers.
(g) Main burner operating with intermittent fan operation.	(i) Gas rate or burner bar pressure low. (ii) Fan control settings incorrect.	Check gas rate and burner bar pressure. 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. (ii) Noisy fan motor. (iii) Fan speed setting too high.	Check burner bar pressure. Replace fan motor. Adjust fan speed.
(j) Room temperatures too high or too low.	(i) Incorrect siting of room thermostat. (ii) Room thermostat out of calibration. (iii) Heater gas rate low. (iv) Insufficient return air or relief.	Re-position room thermostat if necessary. Re-calibrate. Check and adjust gas rate if necessary. Check return air path for size and obstruction. Fit relief grille to areas with no positive return air collection.
(k) Heater switches on and off.	(i) Time control motor running slowly. (ii) Time control tappets slipping. (iii) Time control tappets not set in correct sequence.	Replace time control (para A7 (b)). Replace time control (para A7 (b)). Refer to time control operating instructions and set tappets accordingly.

A. 8 Dimensions & Data

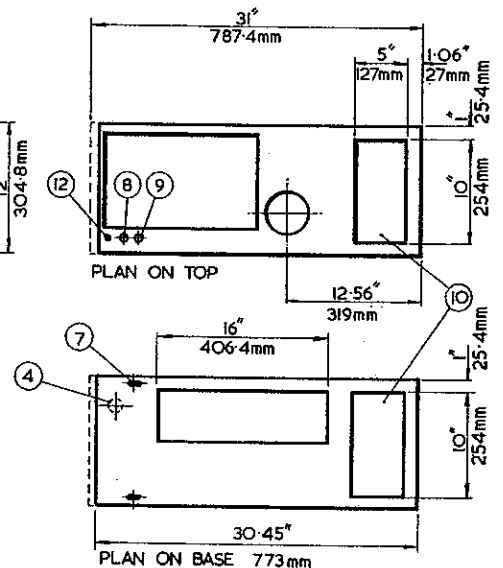
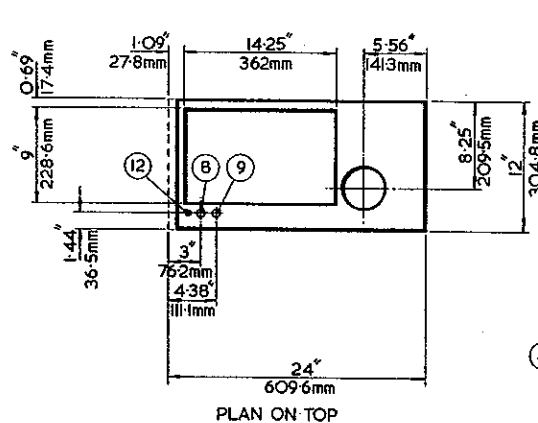
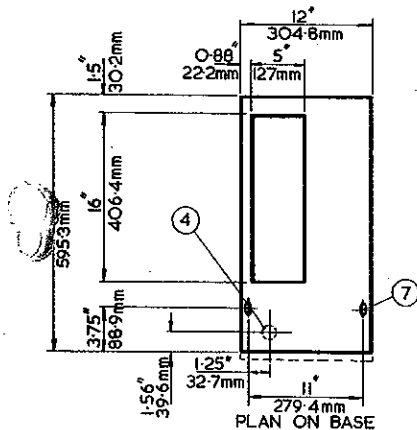
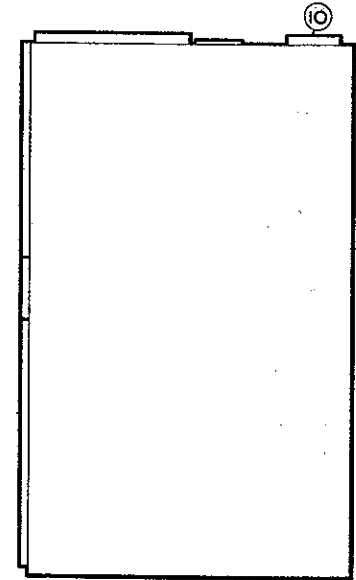
J 25-32 FRONT



J 25-32 SIDE



J 25-32R SIDE



KEY TO DIMENSION DRAWINGS

- | | |
|---|--|
| 1. Knock-out for "Flow" connection (both sides) | 8. Aperture for top return connection, dia 0.92" (23 mm) with plug |
| 2. Knock-out for electrical connection (both sides) | 9. Aperture for top flow connection, dia 0.92" (23 mm) with plug |
| 3. Knock-out for Gas Connection (both sides) | 10. Rising duct |
| 4. Knock-out for Bottom Gas Connection | 11. Optional side return air fitting (SR 32) |
| 5. Knock-out for "Return" connection (both sides) | 12. Grommet for top electrical connection |
| 6. BT 32 base tray (extra) | |
| 7. Slots for base duct fixing bolts $2\frac{3}{32} \times \frac{9}{32}$ (9.97 x 7.1 mm) | |

Fig. A6

A 9. Wiring Diagram

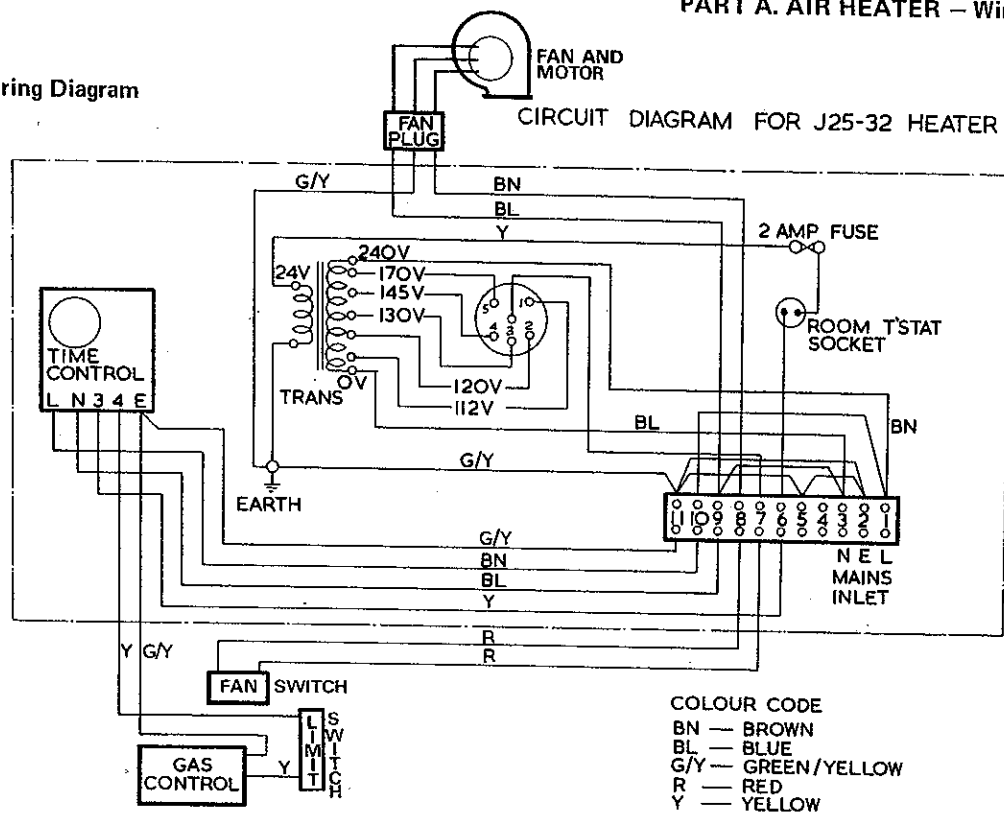


Fig. A7

PART A. AIR HEATER – Parts List.

A. 10 Spare Parts Short List For Models J25-32 & J25-32R Warm Air Heaters

G. C. Number	Makers' Number	Description	Qty.
38 88 53	CCA A06 858 E	Airflow Developments Ltd. Blower with integral Motor and Amp-lok cap and earth wire BOS 528	1
23 01 50	BOS 527	Polyurethane washable Filter Size 15" x 8 ⁵ / ₈ " x 1/2" x 20 porosity.	1
23 01 47	BOS 499	Filter Tray Assembly	1
23 01 76	BOS 467/1	Electrical Cover Plate	1
23 01 77	BOS 467/2	Time Control Cover	1
23 01 52	BOS 531	Electrical Plate less Time Control	1
38 51 02	L4069C 1066	Honeywell Limit Control BOS 105	1
38 51 03	L4068C 1026	Honeywell Fan Control BOS 104	1
39 24 35	V8301A 1000	Honeywell Adatrol Gas Control BOS 522	1
39 04 20	Q314A	Honeywell Pilot Burner Assembly BOS 311	1
39 02 10	Q309A/1236	Honeywell Thermocouple BOS 36	1
23 01 46	BOS 384	Fuse 2 amp Ceramic 1"	1
23 00 61	L1495/P/S	Thermostat plug and socket BOS 457	1
39 60 68	Emerald 423	Horstmann Time Control BOS 310	1
23 02 12	J25-32/700W	Burner Bar Assy. complete with Gas Control	1
23 02 28	J25-32/715A.	Main Injector. Gas Groups, 4, 5, (5 m/m).	1
23 02 29	J25-32/715B.	Main Injector Gas Group 6 (5.4 m/m).	1
23 01 53	BOS 533	Wiring Harness	1
23 01 57	BOS 566	Fan Speed Selector Plug	1
23 00 34	BOS 305/1	Union Washer	1

Additional Spares For Natural Gas Heaters

23 01 78	BOS 523/3	Main Injector (2.7 m/m)	1
39 07 94	390686/4	Pilot Injector BCR.18 BOS 371/1	1
38 11 08	42000233/001	Gas Governor Spring BOS 296	1

PART B.- Side Return Air Kit SR32 Fitting Instructions

Component Check

Designation in Fig. B. 2.	Description	No. Off
E	Filter Retaining Wire	1
F	Side Return Air Box Assembly	1
A	Heater top return air blanking tray	1
D	Front Aperture Cover Assembly	1
C	Cover Plate	1
B	Phillips Recess Head Self Tapping Screws No. 8 x $\frac{3}{8}$ "	6
Not shown	Plastic 'W' Buttons	6

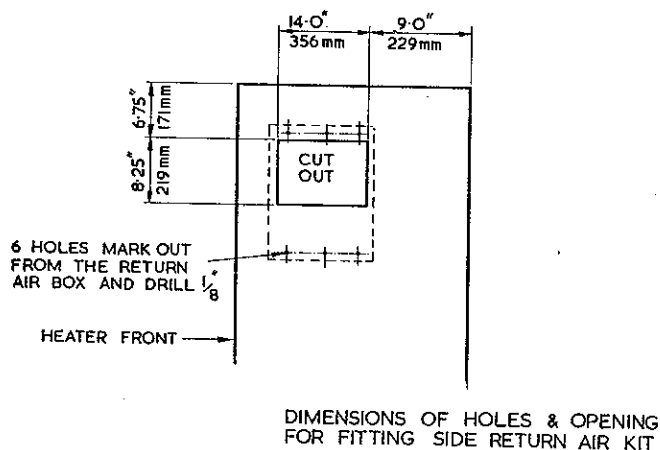


Fig. B1

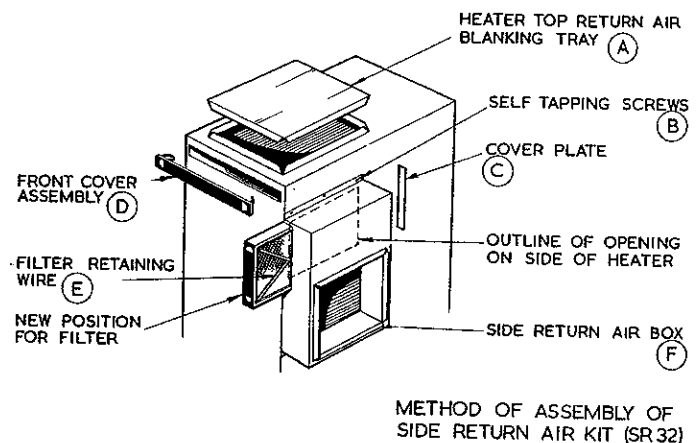


Fig. B2

- Remove filter tray from top of heater.
- Mark outline of opening for return air on the required side of the heater to the dimensions shown in Fig. B1, noting that the opening is towards the front of the heater.
- Cut out opening.
(When left hand side return air is required, remove fan before cutting).
- With doors removed, position the opening of the side return air box (F) in line with the opening in side of heater, ensuring that the front edge of the side return air box is in line with the front of the heater.
- Mark out on the side of the heater the positions of the fixing holes of the side return air box.
- Drill $\frac{1}{8}$ " dia. fixing holes.
- Fit the side return air box to the heater using the self tapping screws (B) provided in the kit.
- Fit front aperture cover assembly (D) into original filter slot. Fit cover plate (C) using three of the plastic 'W' buttons.
- Fit the heater top return air blanking tray (A) over the top return air inlet and tape.
- Fit the filter retaining wire (E) to the filter tray.
- Fit remaining three plastic buttons into holes in front of side return air box.
- Insert filter tray assembly into the side return air box as shown in Fig. B2.

PART C – TC32 & TC32R Top Closure Fitting Instructions

Components Check

Designation in Fig C 1	Description	No. off
C	* Extension Skirt Assembly	1
D	** Support Studs	2 Short 3 Long
E	* Side/Rear Panel	1
F	Vertical Splitter Plate	1
G	* Side Panel	1
J	Horizontal Splitter Plate Assy.	1
L	Front Panel	1
Not shown	Bag containing:-	
	2B.A. Pozidriv Screws-mushroom head.	12
P	(2B.A. Spire captive nuts)	12

* Both TC32 and TC32R Kits contain all the above items.

TC32 and TC32R contain items marked thus *, to suit either J25-32 or J25-32R.

** For ceilings 7' 9" to 8' 1" use long studs.

** For ceilings 7' 6" to 7' 9" use long stud and two short.

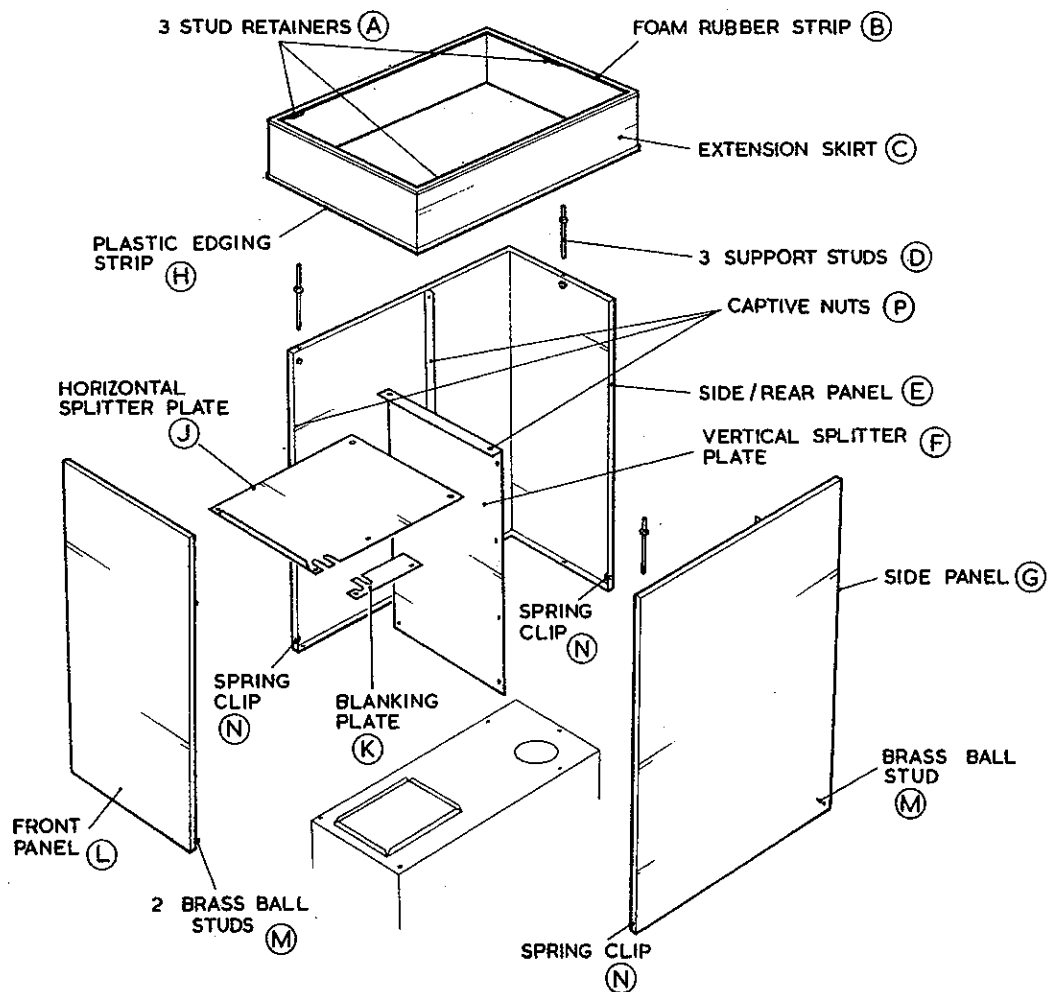


Fig. C1

- (a) Remove parts carefully from packing and dismantle those parts which have been attached for transit.
- (b) Stand Side/Rear panel (E) on floor in position it will be fitted to heater — long side against wall. (Panel will suit either hand if turned over).
- (c) Cut return air opening in panel if required.
- (d) Fix one 8½" support stud in centre slot in rear panel (E) top flange. Do this by removing one nut, positioning stud and then replacing nut on under side of flange.
- (e) Fix another stud in front slot in top flange of Side/Rear panel (E). Use a long stud (8½") if ceiling height 7' 9" to 8' 1"; short stud for lower ceiling.
- (f) Adjust height from bottom of panel (E) to top of studs to measure 1½" less than the distance from top of air heater (not return air flange) to ceiling. Leave nuts finger tight.
- (g) Place extension skirt (C) with sponge seal uppermost over Side/Rear panel so that studs are located in stud retainers on under-side of skirt flange.
- (h) Remove 5 screws from heater top and retain.
- (i) Lift Side/Rear panel and skirt assembly onto top of heater and align with rear and side of heater.
- (j) Insert three screws (h above) to fix Side/Rear panel to heater.
- (k) Adjust extension skirt to ceiling by side and rear support studs, lock with nuts.
- (l) *(J25—32R model only)* — fit rising duct.
- (m) Build flue.
- (n) Fit FR32 top exit flow and return pipes if required.

NOTE: If a return air duct is to be fitted through the ceiling to the horizontal splitter plate (J) the duct (to appropriate length) should be fitted at this stage.

- (o) Fit side panel (G). This may be fitted either hand by turning over. Spring clips (N) must face forward, brass ball stud (M) must be at bottom rear corner — move to this position if necessary.
- (p) Fix support stud in top front slot of side panel (see d above): adjust height (as in e above).
- (q) Position side panel on heater by sliding under skirt, engage ball stud in spring clip on rear panel, and support stud in retainer of skirt flange.
- (r) Fix side panel to heater with screw.
- (s) Adjust support stud and lock.
- (t) Fit captive nuts (P) in required positions for corresponding screws.
- (u) Fit vertical splitter plate (F) with flange at top facing forward. Bottom of plate must meet heater top. Fix with screws.
- (v) Make only electrical connections that run through top closure.
- (w) Complete only side return air connection to top closure.
- (x) Remove blanking plate (K) from horizontal splitter plate (J). Fit horizontal splitter plate (J) to under side of flange on vertical splitter plate (F) to under side of flange on vertical splitter plate and under side of brackets at front of side panels.
- (y) Fit blanking plate (K) in appropriate position.
 - (i) to cover slots in horizontal splitter plate or,
 - (ii) to fit round vertical flow and return pipes if used.
- (z) Seal joints between splitter plate and side panels with duct tape.
- (aa) Remove filter frame.
- (ab) Fit front panel (L) with brass ball studs at bottom. Slide panel under skirt and engage ball studs in spring clips in side panel flanges.
- (ac) Replace filter frame.

PART D.— Slot Fix Panel TS. 32 Fitting Instructions

Designation in Fig. D1.	Description	Qty.
A	Slot fix panel front panel	1
B	2BA. Screw. Pozidriv Head. (From Top of Heater).	2
C	Panel locating angle.	1

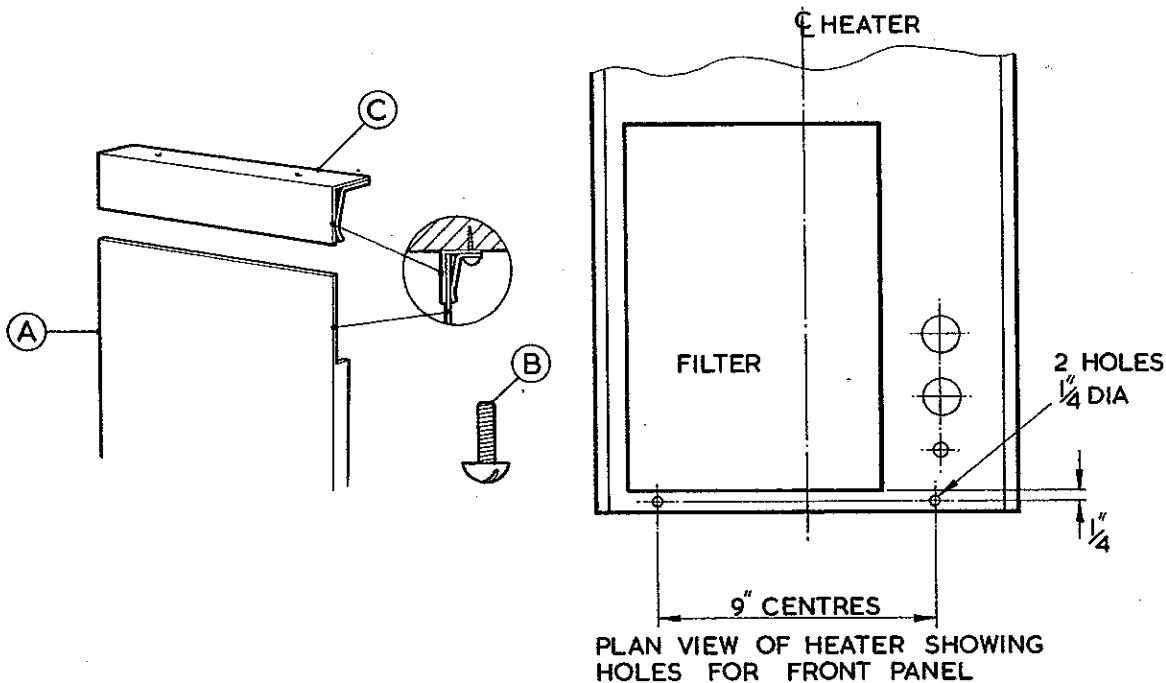


Fig. D1

- Measure the height from the top of the heater (not the top of the return air flanges) to ceiling, cut panel (A) to this length less $\frac{1}{2}$ ". (cut at non-flanged end).
- Remove filter tray, electrical cover plate, and front upper door of heater.
- Mark 2 holes out on top of heater as shown above and drill $\frac{1}{4}$ " dia. (Use panel A as drilling template).
- Remove 2 — 2BA. Pozidriv screws from top front of heater and retain.
- Fit panel locating angle on the ceiling so that its front face is flush with front of heater.
- Lift front panel on to top of heater, pushing top of panel into Panel Locating Angle.
- Put the 2 screws retained in (d) up through the drilled holes in the top of the heater to pick up the captive nuts on the bottom of the front panel flange and tighten.
- Replace top front door, electrical cover plate and filter tray.

PART E.—Janus 2 Hot Water Circulator

E.1 Applications

The Janus 2 Circulator serves a hot water storage cylinder (tank). It may be used efficiently with either DIRECT or INDIRECT storage systems but indirect systems are recommended for hard water areas. (If in doubt consult the Local Water Authority).

Diagrams of examples of Direct and Indirect Systems are shown in Figs. E.1 & E.2.

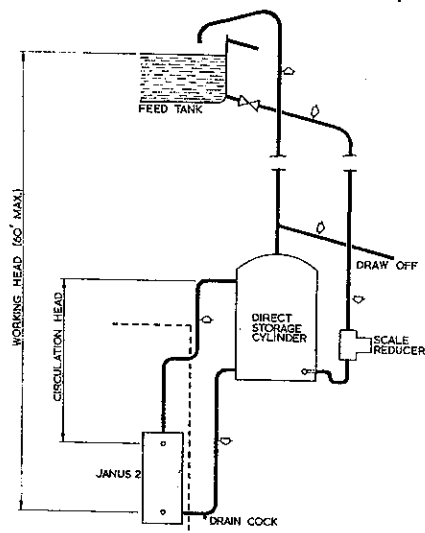


Fig. E1 Direct System

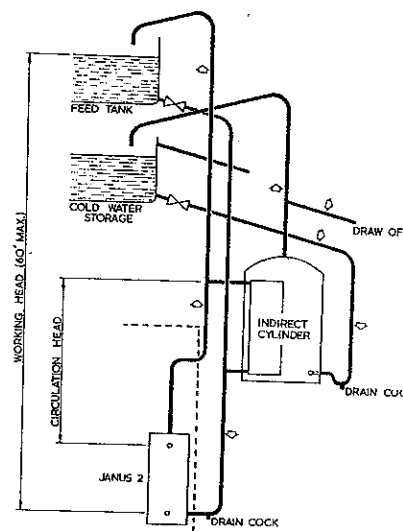


Fig. E2 Indirect System

WORKING HEAD — 60ft. maximum CIRCULATION HEAD — 14" minimum (See table below)

When the circulation head (vertical distance from the flow connection of the circulator to the flow connection of the cylinder) is high, it may be necessary to fit a restrictor washer. The washer, selected in accordance with the following table from those provided with the circulator, must be fitted in the fitting to the return connection of the circulator.

Recommended Flow Restrictors for use with Direct Systems
(Not Required on Indirect Systems)

Circulation Head	Horizontal run of ¾" pipe from water heater to cylinder or tank					
	1	2	4	6	12	16 ft.
14 in.	0	—	—	—	—	—
20 in.	0	0	—	—	NOT TO BE USED WITH ¾" PIPES	—
26 in.	0	0	0	—	—	—
32 in.	0	0	0	—	—	—
38 in.	0	0	0	0	—	—
4 ft.	A	0	0	0	—	—
5 ft.	A	A	0	0	—	—
6 ft.	A	A	A	0	0	—
7 ft.	A	A	A	0	0	—
8 ft.	A	A	A	A	0	—
9 ft.	A	A	A	A	A	0
10 ft.	A	A	A	A	A	A
12 ft.	A	A	A	A	A	A
14 ft.	B	A	A	A	A	A
16 ft.	B	B	A	A	A	A
18 ft.	B	B	B	B	B	B
20 ft.	B	B	B	B	B	B

0 — No restrictor required.

A & B — use appropriately marked restrictor provided with circulator.

N.B. If there are more than 6 elbows in the circulator circuit use size A instead of size B. And no restrictor instead of size A.

Fig. E3

When installed in Johnson & Starley Air Heaters and recommended side flow connections are used, the flow pipe rises 19½" inside the air heater.

To ensure good circulation, flow pipes should be designed to run vertically from the circulator before running horizontally. The vertical rise should not be less than half the length of the following horizontal run.

A drain cock must be fitted at the lowest point of the circulator circuit and, in the case of an indirect system another must be fitted at the lowest point of the cold feed.

A spreader should be used at the cold feed connection in the cylinder and a dip formed in the cold feed to prevent back flow.

Water Temperature Control:

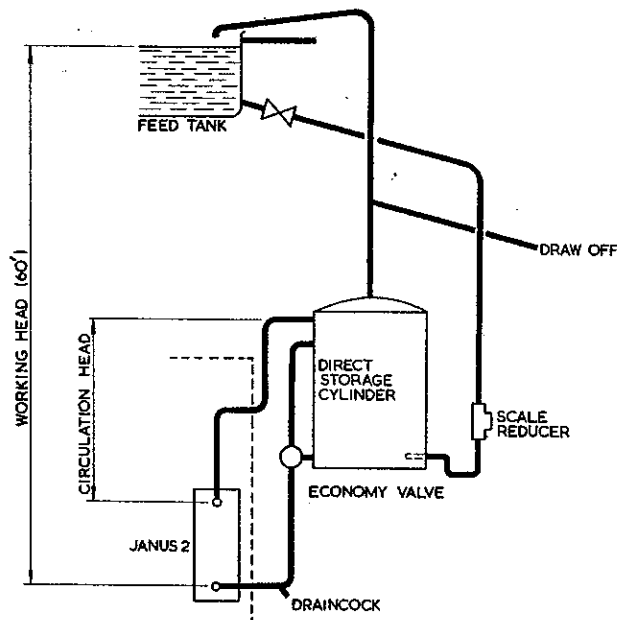
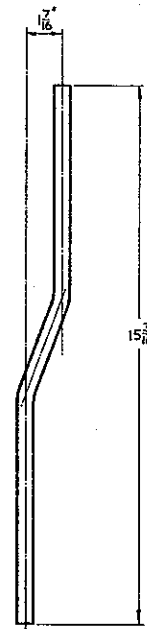
The thermostat sensing phial is located in the circulator flow pipe. Thermostats are factory set to give a water flow temperature of 160°F. The thermostat can be adjusted to control at lower temperature down to 130°F.

Adjustment is by rotation of the cam positioned behind the front plate of the burner controls. Cam settings are as follows:-

Cam	Temperature
Factory setting—fully anti-clockwise	160°F
Rotate 90° clockwise	145°F
Rotate 180° clockwise	130°F

Economy Valves

Economy Valves can only be used on a direct installation. The system should be as shown in Fig. E5 when the Economy Valve is incorporated.

**Fig. E5****Fig. E6****E.2 Installation****Water Connections**

- Remove Circulator thermostat phial from pocket to avoid damage.
- Connect flow and return pipes as required for alternative right or left hand connection as shown in Fig. A. Use knock out openings in cabinet side as appropriate for external pipe fixing. Flow pipe (Fig. E6.) fits into coupling (51) and has elbow (50) fitted on its top end. Elbow (50) can point in either left or right direction and is in line with upper pair of knock-outs in cabinet wall. Elbow (53) is screwed into horizontal thread and left pointing in required direction.
- For top exit connection, alternative kit available (FR32) for this application. (See Section E.3.).
- Complete flow and return connections, insert water circulator thermostat phial into pocket of water circulator and fix with rubber bung so that phial and at least 4" of capillary is in pocket.

E. 3. FR32 Flow & Return Kit For Top Exit From Air Heater Fitting Instructions

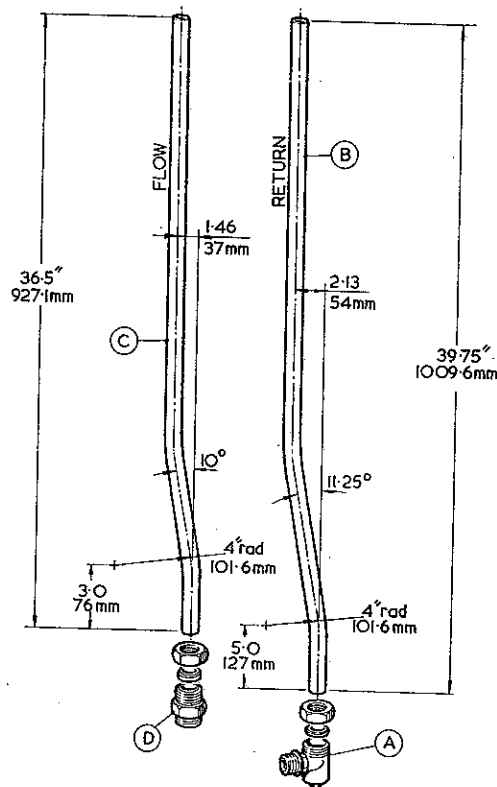


Fig. E. 7.

Fitting Sequence

- Remove electrical cover plate from Air Heater by removing two securing screws. Remove fan chamber door by removing two securing screws located on bottom edge. Lift door upwards then outwards.
- Remove two white plastic plugs from holes in Air Heater top, and two from holes in fan compartment floor.
- Screw adaptor (D) into flow (upper) connection on water circulator using hemp and jointing compound.
- Screw drain cock elbow (A) into return (lower) connection of water circulator using hemp and jointing compound.
- Insert the straight end of flow pipe up through the rear hole in the fan compartment floor and feed upwards through the rear hole in the top of air heater, and locate in adaptor (D).
- Insert the straight end of the return pipe up through the front hole in the fan compartment floor and feed through the front hole in the top of the air heater and locate in drain elbow (A).
- Firmly tighten and then complete connections to top ends of flow and return pipes. Seal around pipes where they pass through fan compartment floor and top of air heater. Use good quality duct tape.
- Check for leaks.

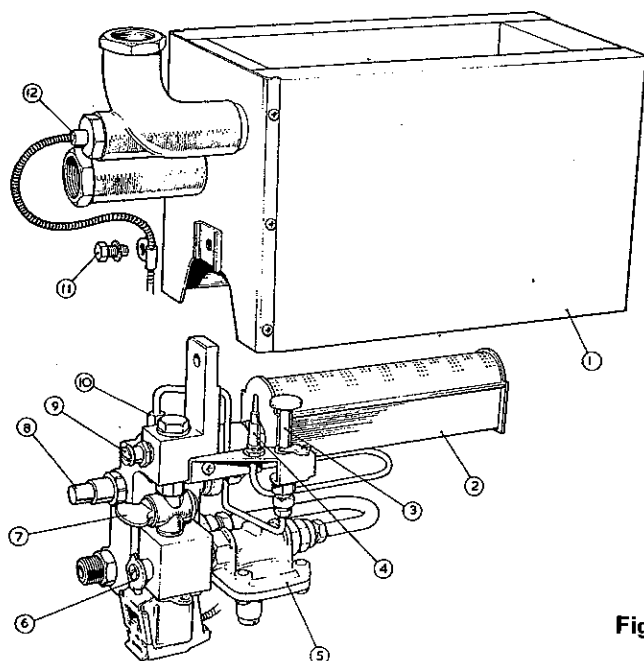
E. 4 Commissioning

- The water circulator gas governor is pre-set and should not be altered.
- Adjust thermostat cam if necessary.
- Ensure that circulator gas tap is off and turn on cold water supply from cistern. Open all hot water taps until all air has been displaced from the system. Close taps—the lowest first working upwards. Check the system for leaks.
- Light pilot according to Lighting Instructions.
- Test for gas soundness.
- Turn Water Heating ON/OFF tap to ON. Circulator will now operate automatically under thermostatic control.
- The nominal input of the JANUS 2 circulator is 15,000 B.tu/h. (3780 kcal/h. 4.4kW). The governor is pre-set and sealed for the appropriate gas group and no further adjustment of the gas rate is necessary. For checking purposes the average pressure settings for the various gas groups are given in Fig. E8. Pressure measurements should only be taken when the main burner is alight and hot.
- Propane burning circulators are supplied for operating on a standard 14" w.g. (356 mm H₂O) supply. Adjust gas governor (5 on Fig. E9) to 9" w.g. (220 mm H₂O).

GAS	MAIN BURNER	
	INJECTOR	PRESSURE" wg (mmH ₂ O)
G4	BRAY 21/1350	1.3 (33)
G5	" " "	1.5 (38)
G6	BRAY 21/1500	1.3 (33)
NATURAL	BRAY 21/380	5.6 (142)
PROPANE	BRAY 21/180	9.0 (228)

INPUT		15000 Btu/h	3780 kcal/h	4.4 kW
OUTPUT		11000 Btu/h	2770 kcal/h	3.2 kW
RATE	TOWN	30ft ³ /h	ON G4 GAS	
	NATURAL	15ft ³ /h		

Fig. E. 8.



- 1 HOT WATER CIRCULATOR BODY
- 2 MAIN BURNER
- 3 PILOT BURNER
- 4 THERMOCOUPLE
- 5 GAS GOVERNOR
- 6 THERMOSTAT ADJUSTER
- 7 ON/OFF TAP
- 8 START BUTTON
- 9 PRESSURE TEST POINT
- 10 PILOT FILTER HOUSING
- 11 BURNER MOUNTING SCREW
- 12 THERMOSTAT CAPILLARY

Fig. E. 9.

E. 5 Servicing

(a) Burner Removal

- (i) Turn off gas supply to circulator.
- (ii) Withdraw thermostat phial from its pocket by pulling gently on the capillary where it enters the pocket.
- (iii) Remove circulator gas supply pipe.
- (iv) Remove circulator burner mounting screw (see Fig. E9) and gently withdraw burner assembly.

(b) **Replacing Burner**

- (i) With burner assembly removed, disconnect pilot feed pipe from base of pilot; disconnect thermocouple lead from connection on main block; remove pilot bracket fixing screw and move pilot clear of burner. Release nut locking burner bar to controls assembly and unscrew burner bar.
- (ii) Apply sealant to screwed thread of burner bar and with the lock nut screwed fully back, screw burner bar into controls assembly. Tighten lock nut with the burner flame ports pointing directly upwards. Refit pilot bracket; connect pilot feed pipe to base of pilot and connect thermocouple lead to connection on main block.

(c) **Refitting Burner Controls Assembly to Circulator**

- (i) Position burner so that the square projection plug at the rear of the burner engages with the locating hole situated on the rear underside of the circulator body.
- (ii) Refit and secure the burner mounting screw, using screw to hold capillary clip.
- (iii) Replace circulator gas supply pipe.
- (iv) Insert into pocket in flow pipe thermostat phial and at least 4" of capillary. Fix with rubber bung.
- (v) Light and commission circulator (see Section E. 4).

(d) **Circulator Body Removal**

- (i) Remove Burner assembly (see Section E.5. (a)).
- (ii) Drain down water system.
- (iii) Remove circulator flue retaining screw located on top front edge of circulator
- (iv) Disconnect water connections.
- (v) Remove circulator mounting screws from the left hand side casing of circulator compartment and remove circulator body.
- (vi) Refitting is the reversal of the above.

E. 6 Fault Finding

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. (iv) Blocked filter.	Break gas cock union and listen for escape. Break gas cock union until gas is detected. Clear pilot orifice carefully with soft copper fuse wire. Filter is located inside nut (10 in fig. E9) and can be replaced by a RIZLA cigarette filter.
(b) Pilot will not stay lit after Start button is released	(i) Thermocouple faulty. (ii) Solenoid faulty.	Replace. Replace.
(c) Main burner will not light.	(i) ON/OFF tap is OFF. (ii) Thermostat phial is hot. (iii) Thermostat is faulty.	Turn tap ON. Draw off hot water and check burner comes on when thermostat phial is cool. Replace controls assembly.
(d) Domestic water temperature outside usable range.	(i) Thermostat out of calibration. (ii) Gas rate incorrect. (iii) Incorrect restrictor in return connection.	Set thermostat higher or lower or replace as necessary. Check burner pressure, if correct clear main injector orifice carefully with soft copper fuse wire. Drain system. Check restrictor and replace with larger size.

E. 7. Maintenance**(a) Burner Bar Cleaning**

- (i) Remove burner assembly (see Section E.5. (a)). Move pilot as in Section E.5. (b).
- (ii) Slacken off lock nut between burner bar and gas manifold and unscrew burner bar from manifold.
- (iii) Lightly brush the top surface of the burner bar.

(b) Main Injector Cleaning

Unscrew injector from burner bar and clean orifice with soft copper wire taking care that the orifice is not damaged or enlarged. On refitting injector ensure that seal is well made.

(c) Pilot Jet Cleaning

Undo hexagon nut at base of pilot. Jet is contained in this nut. Clean jet with fine fuse wire ensuring no damage to jet. Refit and reconnect.

(d) Circulator Heat Exchanger Cleaning (with burner bar removed)

- (i) Switch off electrical supply to heater.
- (ii) Remove electrical panel cover, filter tray, fan compartment door and disconnect fan plug (see Section A.7.).
- (iii) Loosen electrical panel fixing screws and disengage panel. Allow panel to drop forward and engage bottom fixing slots with bottom pair of fixing screws.
- (iv) Release fasteners holding convex draught deflector plate (15 in fig. A.) slide draught deflector plate up and back for retention by spring clip
- (v) Loosen flue cap lid fixing screw.
- (vi) Lift front of cap lid to disengage screw, and pull lid forward to disengage rear tongue. Remove flue cap lid to allow access to circulator top.
- (vii) Thoroughly clean fins on circulator heat exchanger from above and below with a flat strip such as a hacksaw blade.
- (viii) Refit flue cap lid ensuring that its rear tongue engages top of flue cap. (58 in fig. A.). Secure fixing screw.
- (ix) RETURN DRAUGHT DEFLECTOR PLATE TO ITS ORIGINAL POSITION AND SECURE WITH FASTENERS.
- (x) Refit burner (See Section E.5 (c)).

E. 8 JANUS 2 HOT WATER CIRCULATOR SHORT LIST OF SPARE PARTS

G.C. Number	Makers Number	Description	Qty.
—	JAN2/2W	Controls Assembly	1
—	TBY/SA229	Teddington Pilot BOS 668	1
—	TBX/P1262	Teddington Thermocouple BOS 665	1
—	BOS 669/T	Teddington Pilot Injector	1
—	BOS 557/-	Bray Ltd. Main Injector	1
—	1900-AB2183	Bray Ltd. Burner BOS 562	1
—	BOS 625	Rizla Standard Filter Tip.	1

ADDITIONAL SPARES FOR NATURAL GAS

—	BOS 557/2	Bray Ltd. Main Injector. 21/380	1
—	BOS 669/N	Teddington Pilot Injector	1

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