JWD 38/50
WARM AIR HEATER
Installation & Maintenance Instructions

(56·53)
UDC 697·3
Publication JA 151/4

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

The JWD 38/50 is a Gas-Fired Warm Air Heater for open flue application. Output is adjustable between 11.1-14.6 kW (40.1 MJ/h, 38,000 Btu/h to 52.7 MJ/h, 50,000 Btu/h) and there is 4 speed fan adjustment. It has internal provision for the optional fitting of a Johnson & Starley JANUS 3 Water Heater. Water heaters may be provided factory-fitted by Johnson & Starley Ltd. or fitted on site.

To fit a Water Heater on site:—Obtain from Johnson & Starley Ltd. a JANUS 3 Water Heater and KK 50 Fittings Kit.

JWD 38/50/JAN denotes an Air Heater with JANUS 3 Water Heater and KK50 Fittings Kit factory fitted.

When the air heater is to be used in a Top Closure application (TC50) a special draught diverter is required. This is supplied against heater order code JWD 38/50/0SD. CHECK FOR CORRECT DRAUGHT DIVERTER BEFORE FITTING.

1. COMPONENTS CHECK

N.B. Check that Gas Group on heater data plate is as required.

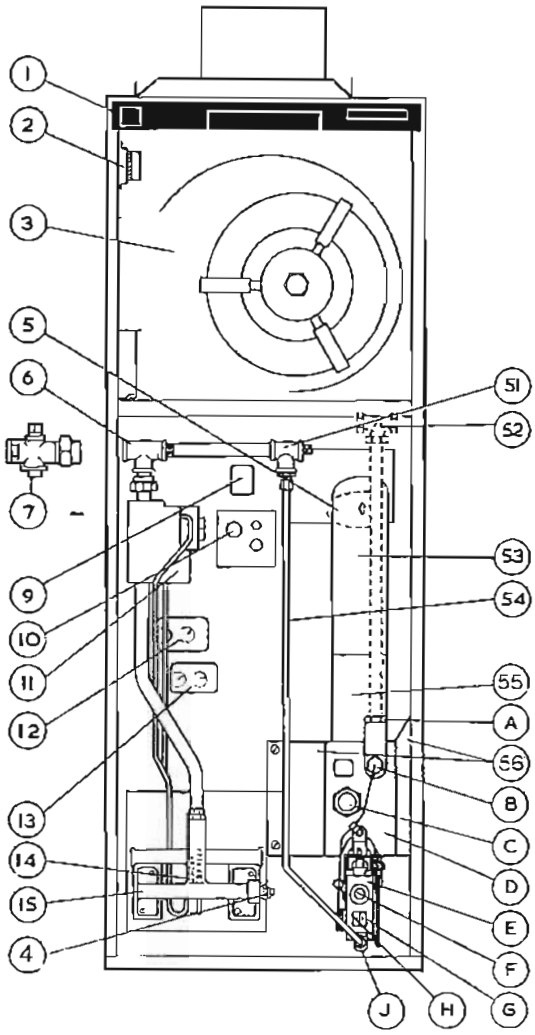


Fig. 1

These items are supplied loose:—
Draught Diverter — *fixing screws in heater top*
Thermostat Plug, Gas Tap } *supplied in linen bag*

JWD 38/50 AIR HEATER

1 Air Filter
2 Electrical Panel
3 Air Circulating Fan
4 Pressure Test Point
5 Flue spigot for water heater (with blanking cap)
6 Gas connection tee with blanking plug
7 Union gas tap ½" (supplied loose)
9 Data plate
10 Time Control
11 Combination Gas Control
12 Overheat Limit Control
13 Fan Control (basic model)
14 Safety Pilot Burner
15 Burner Bar assembly

KK50 WATER HEATER FITTINGS KIT

51 Gas Pipe and Tee
52 22mm flow pipe and elbow (not provided)
53 Flue connection sleeve (and insulating sleeve)
54 Gas feed to water heater
55 Flue Cap and Connection (casting)
56 Water Heater Mounting Plate

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 Burner and Controls
F Water Temperature Control Knob
G START Button
H OFF Button
J Gas Connection

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.

CORGI

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.	442 cm^2 (69 in^2)	221 cm^2 (34 in^2)
High Level grille	free area.	221 cm^2 (34 in^2)	111 cm^2 (17 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 79 cm^2 (12 in^2).

The above areas allow combustion air for Janus water heater.

(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. Openings must have minimum areas of 25 cm^2 per MJ/h (1 in^2 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, 0.75mm^2) connected to the terminal strip and can leave the heater from either side or the 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 of 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 dependent upon length of pipe run from the meter. The gas pipe may enter the heater from either side, or through the floor 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 (all dimensions are minimum)

(i) CUPBOARD INSTALLATION Sides and back — 25 mm (1 in), Front — 75 mm (3 in)

(ii) SLOT FIX INSTALLATION

Method ONE using SS50 Side Closure Strips.
Back — 60 mm (2.4 in), Sides — 56 mm (2.2 in). The space around the heater must be unobstructed (apart from pipes and cables serving the heaters) from the level of its base to:—

(a) the level of its top, and

(b) 100 mm (4 in) above its top to rearward of the return air opening.

Method TWO using air relief grille opposite draught diverter.
Sides — 25 mm (1 in), Back — 64 mm (2.5 in),

(iii) SERVICING ACCESS 460 mm (18 in) to front of heater. Access should be sufficient to allow 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 underfloor warm air plenum is used, insulation can be provided by using a J & S Base Tray BT 45-50, see Figs. 2 and 3.

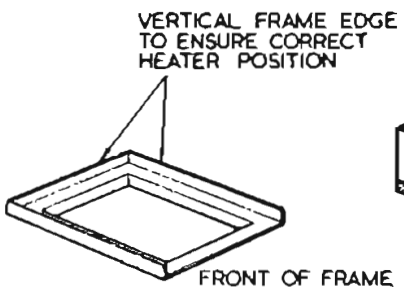


Fig. 2

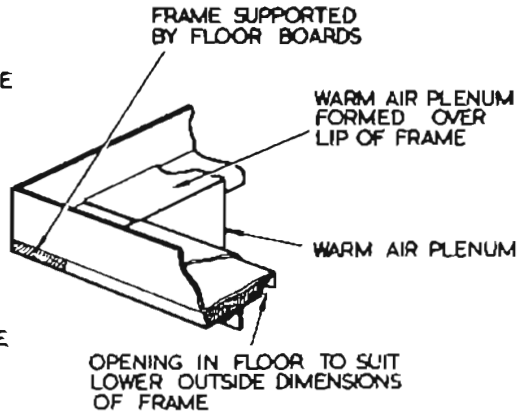


Fig. 3

4. AIR HEATER FIXING

NB: For Top Closure (TC50) or Slot Fix (TS50) applications refer to appropriate instructions provided with fittings kits.

(a) FIT DRAUGHT DIVERTER over heater flue spigot on top of heater and secure with two screws.

(b) POSITION HEATER ON BASE DUCT OR PLENUM. Make sure 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. COMMISSIONING

(a) Check that WARM AIR DELIVERY OUTLETS are open.

(b) Set room thermostat anticipator to 0.2 and set the thermostat pointer to 'OFF' or lowest setting.

(c) FAN and LIMIT controls are factory set:–
FAN 100°F OFF (30°F DIFF.) (HONEYWELL), FAN OFF 100°F (FIXED DIFF.) (THERMODISC).
LIMIT 180°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 PILOT BURNER.

(g) Adjust pilot flame if necessary so that it just envelopes thermocouple tip. To adjust flame, identify adjustment point (see Fig. 5) 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.

(k) Balance Warm Air System:
For access to fan speed selector plug (on electrical panel), remove Fan Chamber Door.

(i) Adjust burner bar pressure to output required (see Table Fig. 6). Heaters are factory set to a pressure giving maximum output at gas group specified. To adjust pressure, remove cover from adjustment point (see Fig. 5) and turn screw *clockwise to increase, anti-clockwise to decrease pressure.*

(ii) 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.

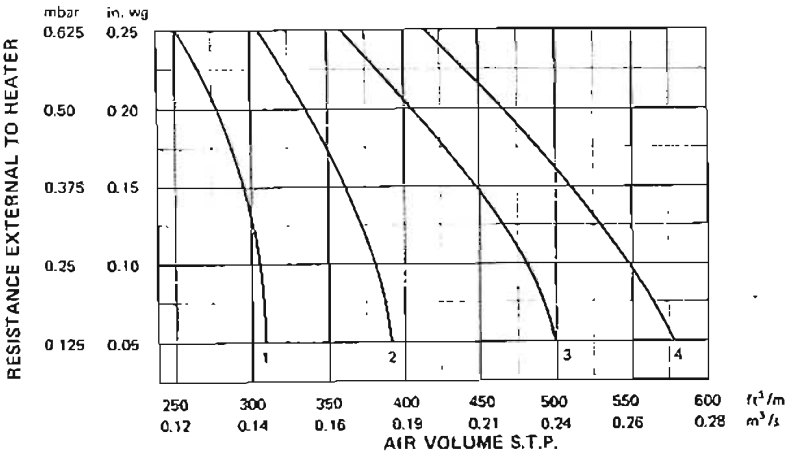


Fig. 4

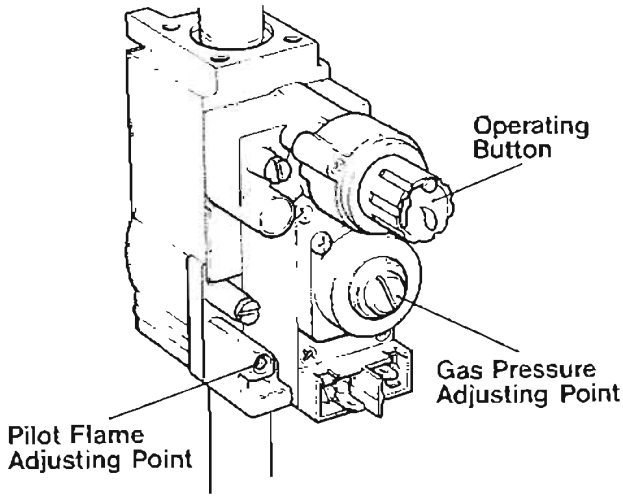


Fig. 5

		kW	MJ/h	Btu/h	kW	MJ/h	Btu/h	kW	MJ/h	Btu/h	kW	MJ/h	Btu/h
INPUT		15.7	56.4	53,500	17.0	61.2	58,000	18.7	67.5	64,000	20.2	72.8	69,000
OUTPUT		11.1	40.1	38,000	12.3	44.3	42,000	13.5	48.5	46,000	14.6	52.8	50,000
GAS RATE (500 cv)		3.03m³/h (107ft³/h)			3.28m³/h (116ft³/h)			3.62m³/h (128ft³/h)			3.91m³/h (138ft³/h)		
GAS RATE (1000 cv)		1.51m³/h (53.5ft³/h)			1.64m³/h (58ft³/h)			1.81m³/h (64ft³/h)			1.95m³/h (69ft³/h)		
GAS	INJECTOR dia. mm	BURNER BAR GAS PRESSURES (measured hot)											
G4	4.7	2.7 mbar		1.1 in wg	3.5 mbar		1.4 in wg	4.2 mbar		1.7 in wg	4.7 mbar		1.9 in wg
G5	4.7	3.5		1.4	4.2		1.7	5.0		2.0	5.8		2.3
G6	5.1	2.7		1.1	3.5		1.4	4.2		1.7	4.7		1.9
NATURAL	2.35	11.3		4.5	13.7		5.5	16.5		6.6	18.3		7.3
PROPANE	1.6	lower rates not available									35.0		14.0

Fig. 6

6. MAINTENANCE (Recommended Annually)

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

(a) **Main Burner Cleaning – with burner assembly removed.**
Detach burners. For cleaning access, remove internal blanking piece by releasing top screw. Brush gently 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 that 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 inpeller 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 burner manifold, light heater, check pressure and confirm by gas rate check at meter (see pressure table, Fig. 6). If gas pressure needs adjustment, refer to Section 5 k (i).

(f) **Gas Control 'fail-safe' Operation Check**
With main burner off reduce flame of pilot burner by turning screw clockwise at pilot flame adjusting point (see Fig. 5) until it extinguishes. After 50-90 secs. a loud click should be heard i.e. gas control has failed safe.

(g) **Pilot Flame Check**
Pilot flame should just surround thermocouple probe. Adjust if necessary (see Section 5 (g)).

(h) **Automatic Controls Inspection**
Lighting the heater and allowing to run for a short time checks these controls.

NB: For access to Electrical Panel, 3A fuse and Air Circulating Fan, remove Fan Chamber Door.
For access to Time Control (if fitted), remove Burner Chamber 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) Disconnet 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.

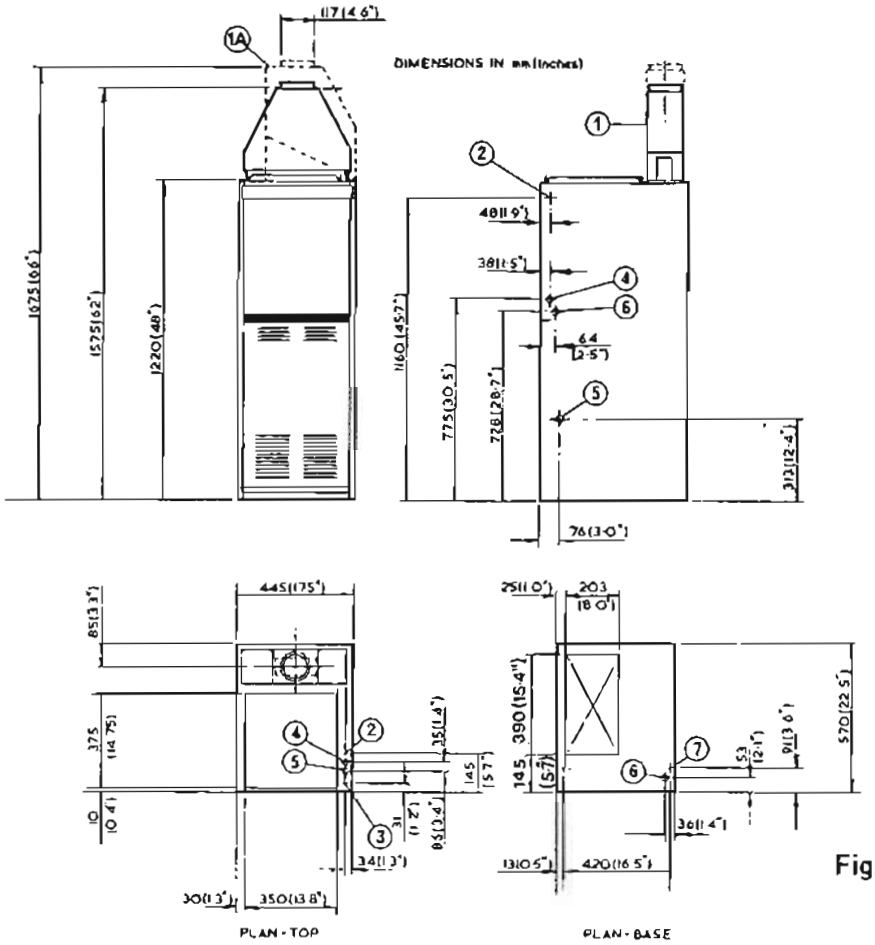
7. FAULT FINDING

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 thermo-couple 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 re-place 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 closed.	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.

8. DIMENSIONS & DATA



1 Draught Diverter — standard type used with Compartment or Slot-Fix installations.

1A Special Draught Diverter which MUST be used with Top Closure Sets ONLY. Diverter vents from one side only, and must be mounted with vent to exposed side of heater.

2 Grommets for electrical connection — both sides and top of heater.

3 Socket for room thermostat connection (plug also provided).

4 Knockouts for Flow connection — both sides and top of heater.

5 Knockouts for Return connection — both sides and top of heater.

6 Knockouts for gas connections — both sides and bottom of heater.

7 Slots for base duct fixing bolts 7 x 19 mm (9/32 x ¾").

Fig. 7

9. WIRING DIAGRAM

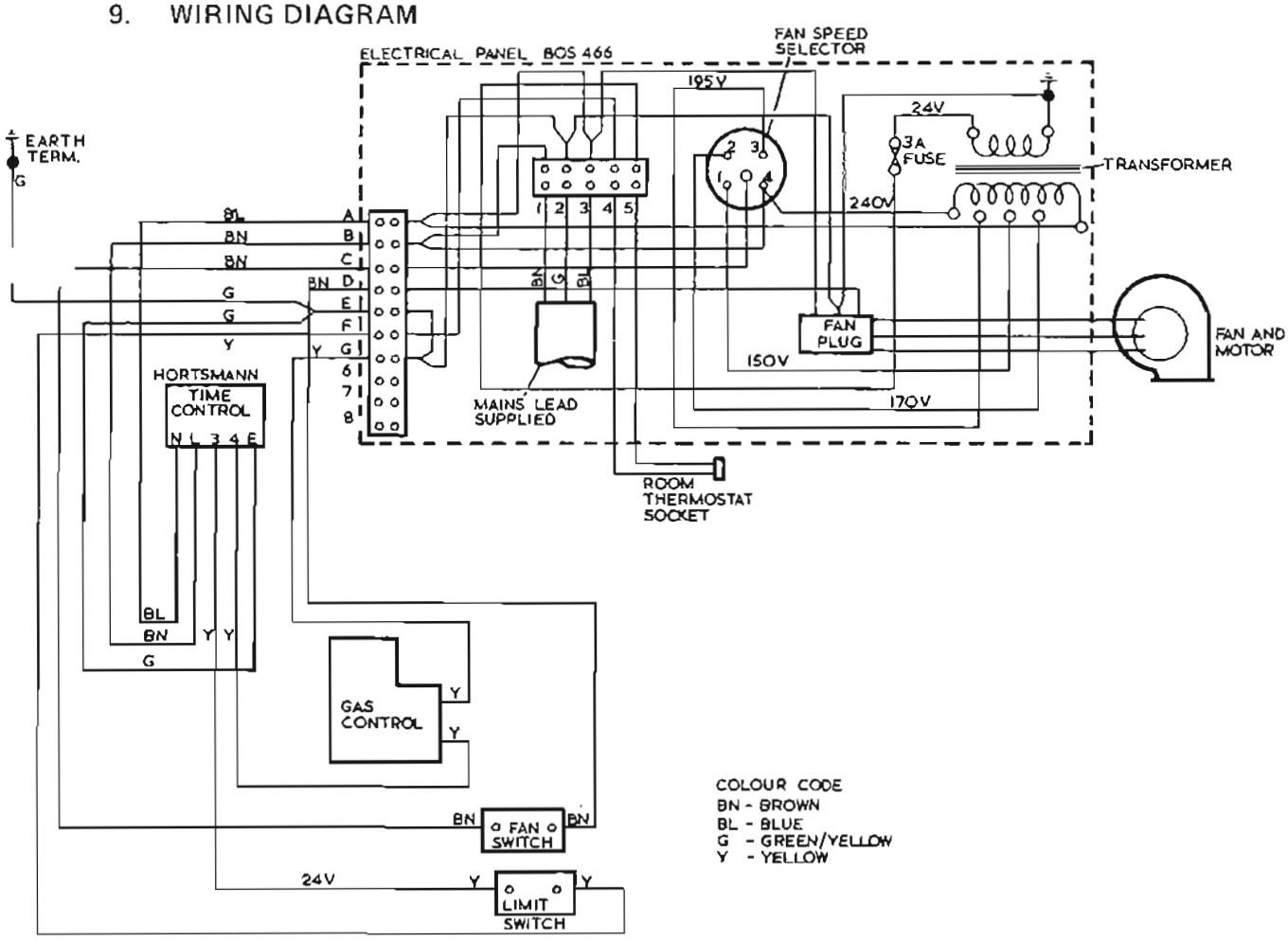


Fig. 8

10. SHORT LIST OF SPARE PARTS FOR MODEL JWD 38/50 AIR HEATER

G.C. Number	Makers	Description	Qty.
389 185	BOS 227	Air Circulating Fan with integral motor, amp-lok connection and earthwire. (Torin Corporation ref. DDN 913-700)	1
388 968	S.0016	Replacement Fan Motor Kit with brackets – Torin Corporation ref. U52010	1
–	JWD 38/153Y	Filter Assembly, including filter element and tray.	1
230 072	BOS 466	Electrical Control Panel.	1
230 157	BOS 566	Fan Speed Selector Plug.	1
385 102	BOS 105	Honeywell Limit Control L4069C 1066.	1
385 103	BOS 104	Honeywell Fan Control – L4068C 1026. or Thermodisc Fan Control 40 TC3	1
230 267	BOS 689	Fuse 3 amp 1" long ceramic.	1
–	BOS 1301	Honeywell 'Compact' Gas Control – ½" BSP V8600C 1020	1
390 210	BOS 36	Honeywell Thermocouple – Q309A 1236.	1
390 420	BOS 311	Honeywell Pilot Burner with BCR 18 orifice – Q314A	1
230 399	BBA 3640X	Burner Arm.	2
229 814	BOS 3825/KM	Main Injector – 2.35mm dia.	2
399 382	BOS 377/2	Cross Lighting Injector – Bray size 236/0.	1
230 061	BOS 457	Thermostat Plug and Socket – Belling & Lee L1495/P/S	1
		ADDITIONAL SPARES FOR TOWN GAS HEATERS	
230 417	BBA 3825/JM	Main Injector – Groups 4 & 5 – 4.7mm dia.	2
230 269	BBA 3825/AM	Main Injector – Group 6 – 5.2mm dia.	2
399 385	BOS 377/3	Cross Lighting Injector – Bray size 236/2	1
	BOS 371/4	Pilot Orifice – Honeywell CAR 22.	1
		ADDITIONAL SPARES FOR PROPANE GAS HEATERS	
	BBA 3825/MM	Main Injector – 1.60mm dia.	2
	BOS 377/4	Cross Lighting Injector – Bray size 236/00.	1
	BOS 371/3	Pilot Orifice – Honeywell BBR 10.	1
	BOS 847	Honeywell Gas Control Blanking Plate Kit:–	1
		WHEN A TIME CONTROL IS FITTED (optional extra) THE FOLLOWING SPARE IS AVAILABLE	
390 068	BOS 310	Horstmann Time Control – type 'Emerald' 423/J&S4W.	1

Johnson & Starley Ltd

Rhosili Road, Brackmills, Northampton NN4 0LZ.
Telephone 0604 62881 Telex 312461

PRINTED IN ENGLAND