



# J54-64 WARM AIR HEATER

## Installation & Maintenance Instructions

(56-53)

UDC 697.3

Publication ZZ115/8

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

The J54-64 is a Gas-Fired Warm Air Heater for open flue application. Output is adjustable between 15.8 – 18.8 kW (57 MJ/h, 54,000 Btu/h to 67.5 MJ/h, 64,000 Btu/h) and there is 5 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 KK64 Fittings Kit.

J54-64/JAN denotes an Air Heater with JANUS 3 Water Heater and KK64 Fittings Kit factory fitted.

The Air Heater has an internal mounting for easy on-site installation of a Time Control. Order from Johnson & Starley Ltd. an X-A2 Time Control, this is complete with wiring tail and plug.

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### 1. COMPONENTS CHECK N.B. Check that Gas Group on heater data plate is as required.

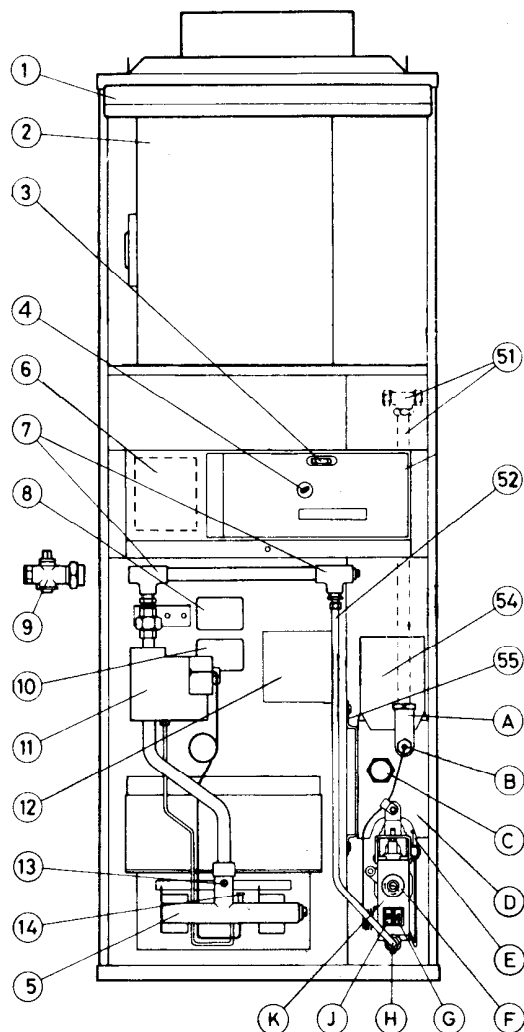


Fig. 1

#### J54-64 AIR HEATER

- 1 Air Filter.
- 2 Air Circulating Fan.
- 3 3A Fuse.
- 4 Fan Speed Selector.
- 5 Burner Bar Assembly.
- 6 Position of X-A2 Time Control (when fitted)
- 7 Gas Connection Tee — ½" BSP (with blanking plug)
- 8 Overheat Limit Control.
- 9 Union Gas Tap — ½" BSP Female.
- 10 Fan Control (basic model)
- 11 Combination Gas Control.
- 12 Data Plate.
- 13 Pressure Test Point.
- 14 Safety Pilot Burner.
- 15 Burner Bar Assembly.

#### KK64 WATER HEATER FITTINGS KIT

- 51 22mm water 'flow' elbow and pipe (not provided)
- 52 Gas feed pipe to water heater
- 53 Flue cap and connection
- 54 Water heater mounting bracket

#### JANUS 3 WATER HEATER

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

These items are supplied loose:—

- Draught Diverter — fixing screws in heater top
- Gas Tap — supplied in linen bag

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.

Building Standards (Scotland) (Consolidation) Regulations.

British Standard Code of Practice BS 5864: 1980 Installation of gas fired ducted air heaters.

Institute of Electrical Engineers Regulations.

British Standard 440 Parts 1 & 2 Flues and Air Supply for gas appliances.

### (a) Ventilation of Heater Compartment

	Ventilation from inside building	Ventilation direct from outside building
Low Level Grille	free area 548 cm <sup>2</sup> (85 in <sup>2</sup> )	274 cm <sup>2</sup> (42 in <sup>2</sup> )
High Level Grille	free area 274 cm <sup>2</sup> (42 in <sup>2</sup> )	137 cm <sup>2</sup> (21 in <sup>2</sup> )

### (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 105 cm<sup>2</sup> (19 in<sup>2</sup>).

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<sup>2</sup> per MJ/h (1 in<sup>2</sup> per 250 Btu/h) of designed heat input to the rooms they serve.

## 3. PREPARATION

(a) **Flues.** A single 5 in. 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<sup>2</sup>) connected to the terminal strip and can leave the heater from either side. This cable, suitable for 240V, 50 Hz, single phase supply, must be protected by a 3A fuse and the earthwire 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. The room thermostat should be suitable for use on a 24 volt supply. The thermostat wires should enter the heater through grommet item 4 (fig. 7) on either the left or connected to terminals 4 and 5 on the electrical panel.
- (iii) **TIME CONTROL** A plug-in time control facility is provided on the air heater. Use X-A2 Time Control Kit obtainable only from Johnson & Starley Ltd. If a remote time control is required it is important that reference is made to the wiring diagram (see Section 9), and an independent power supply is used.

(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. A ½" B.S.P. 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**

Sides — 75mm (3") total.  
          25mm (1") minimum at only one side.  
Front — 75mm (3") minimum.  
Back — 25mm (1") minimum.

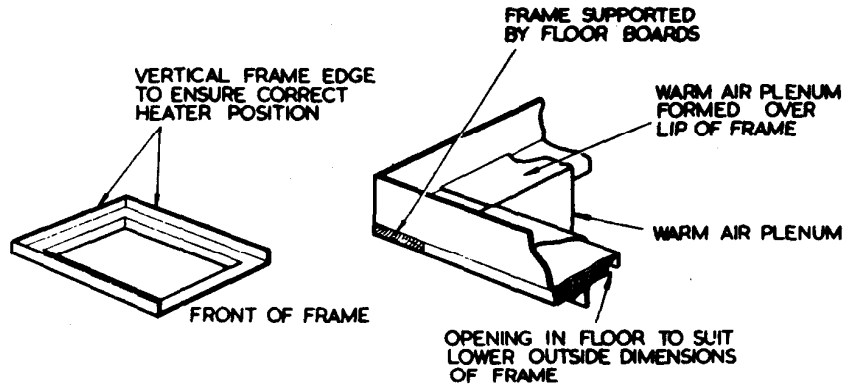
Servicing access required to the front of the heater is 560mm (22"). It is recommended that the access door to the heater cupboard be large enough to permit heater removal.

**(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 underfloor warm air plenum is used, insulation can be provided by using a J & S Base Tray BT 64 (see Figs. 2 and 3).



**Fig. 2**

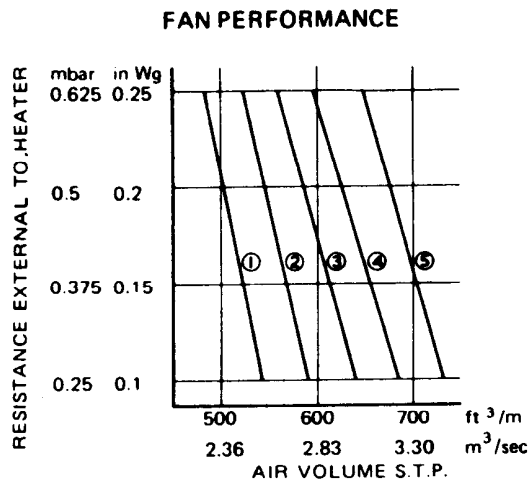
**Fig. 3**

**4. AIR HEATER FIXING**

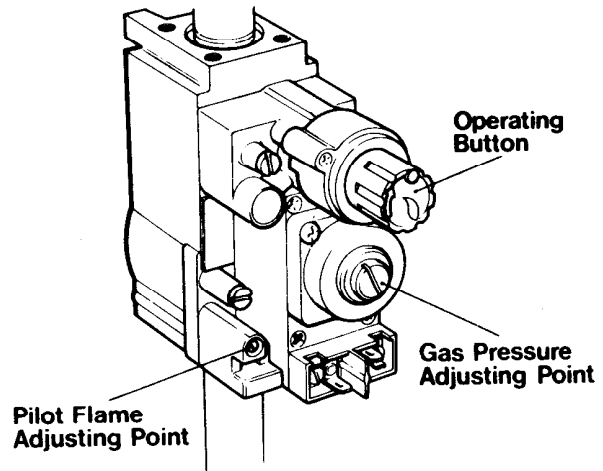
- (a) FIT DRAUGHT DIVERTER over heater flue spigot on the top of heater and secure with three screws.
- (b) POSITION HEATER ON BASE DUCT OR PLENUM – Make sure no air leakage can occur.
- (c) CONNECT FLUE – Use split clip above draught diverter and complete before return air plenum is fitted (flue must 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 (40°F DIFF.) (HONEYWELL), FAN OFF 100°F (FIXED DIFF.) (THERMODISC).  
LIMIT 210°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, remove screw cap from 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:  
Remove Electrical Panel Cover for access to fan speed selector plug
- (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 (50°-55°C) 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	Btu/h	MJ/h	kW	Btu/h	MJ/h	kW	Btu/h	MJ/h	
<b>INPUT</b>	22.4	76,500	80.7	24.6	84,000	88.6	26.0	88,500	93.4	
<b>OUTPUT</b>	15.8	54,000	57.0	17.6	60,000	63.3	18.8	64,000	67.5	
<b>GAS RATE (500cv)</b>	4.33 m <sup>3</sup> /h		(153ft <sup>3</sup> /h)	4.75 m <sup>3</sup> /h		(168ft <sup>3</sup> /h)	5.01 m <sup>3</sup> /h		(177ft <sup>3</sup> /h)	
<b>GAS RATE (1000cv)</b>	2.16 m <sup>3</sup> /h		(76.5ft <sup>3</sup> /h)	2.38 m <sup>3</sup> /h		(84ft <sup>3</sup> /h)	2.50 m <sup>3</sup> /h		(88.5ft <sup>3</sup> /h)	
<b>GAS</b>	<b>INJECTOR dia.mm</b>	<b>BURNER BAR PRESSURES (measured hot)</b>								
G4	5.2	3.7mbar	1.5in	4.5mbar	1.8in	5.2mbar	2.1in			
G5	5.2	4.5mbar	1.8in	5.2mbar	2.1in	6.0mbar	2.4in			
G6	5.7	3.7mbar	1.5in	4.5mbar	1.8in	5.2mbar	2.1in			
NATURAL	2.65	12.4mbar	5.0in	14.9mbar	6.0in	16.5mbar	6.7in			
PROPANE	1.7	Lower rates not available					35.0mbar	14.0in		

**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 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 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**  
Reduce flame of pilot burner by turning screw clockwise at pilot flame adjusting point (see Fig. 5) 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 5 (g)).
- (h) **Automatic Controls Inspection**  
Lighting the heater and allowing to run for a short time checks these controls.

**N.B.** For access to Electrical Panel, Time Control (if fitted) and 3A fuse, remove Electrical Panel Cover. To remove Electrical Panel or for access to Air Circulating Fan, remove Electrical Panel Cover, Air Filter and Fan 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) Disconnect fan plug and remove socket from fan chamber floor.
- (ii) Disconnect all leads from terminal block.
- (iii) Undo three screws and remove panel from chassis.

**(l) Air Circulating Fan Removal**

- (i) Disconnect fan plug and remove fan retaining screw.
- (ii) 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. (ii) Gas Supply pipe not purged. (iii) Pilot orifice restricted.	Break gas tap union and listen for escape. Break gas tap union until gas is detected. 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. (ii) Faulty power unit on Gas Control. (iii) Faulty thermocouple. (iv) Pilot flame not sufficient.	Check connection is secure. Replace Gas Control. 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) 3 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 (if fitted) and room thermostat are calling for heat. Replace and if failure occurs again check external room thermostat leads for shorting to earth. Check connections for soundness. Check with test meter and replace electrical panel if necessary. Replace operator Replace governor Check operation by shorting across control connections. Fit temporary loop across room thermostat terminals 4 and 5. 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. (ii) Fan control settings incorrect. (iii) Faulty fan assembly.	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.	(iv) Faulty fan control. (v) Burner bar pressure not correct. (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 outlets 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 outlets.
(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) Insufficient heating.	(i) Heater gas rate low.  (ii) Limit control operation due to: (a) Temperature rise set too high. (b) Air filter or return-air path restricted. (c) Excessive number of outlets closed. (d) Limit Control out of calibration. (iii) Incorrect siting of Thermostat (iv) Thermostat out of calibration. (v) Insufficient return-air relief.  (vi) Substandard installation e.g. Poor insulation, faulty duct connections or damaged ductwork.	Check and adjust gas rate accordingly.  Adjust fan speed and/or gas rate accordingly. Check filter for cleanliness and return-air path for obstruction. Open additional outlets.  Replace Limit Control.  Reposition. Replace Thermostat.  Check for relief and where no provision has been made, fit grilles to area/s where no positive return-air collection is made. 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. (ii) Time Control tappets slipping. (iii) Time Control tappets not set in correct sequence.	Replace Time Control.  Replace Time Control. Refer to Time Control operating instructions and set tappets.

## 8. DIMENSIONS & DATA

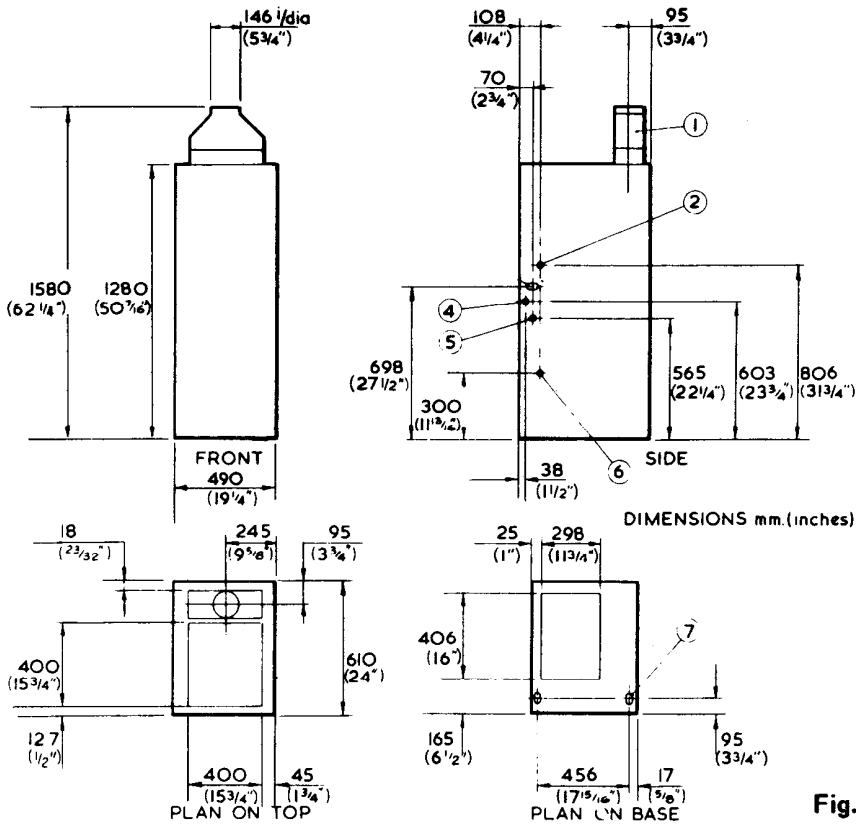


Fig. 7

- 1 Draught diverter.
- 2 'Flow' connection aperture—both sides of heater.
- 4 Grommets for electrical connections—both sides of heater.
- 5 Gas connection aperture—both sides of heater.
- 6 'Return' connection aperture (JANUS)—both sides of heater.
- 7 Slots for base duct fixing bolts (7 x 19mm) 9/32" x 3/4".

Thermostat connected to terminals 4 & 5 on electrical panel.  
 Thermostat wires enter through grommet Item 4.

## 9. WIRING DIAGRAM

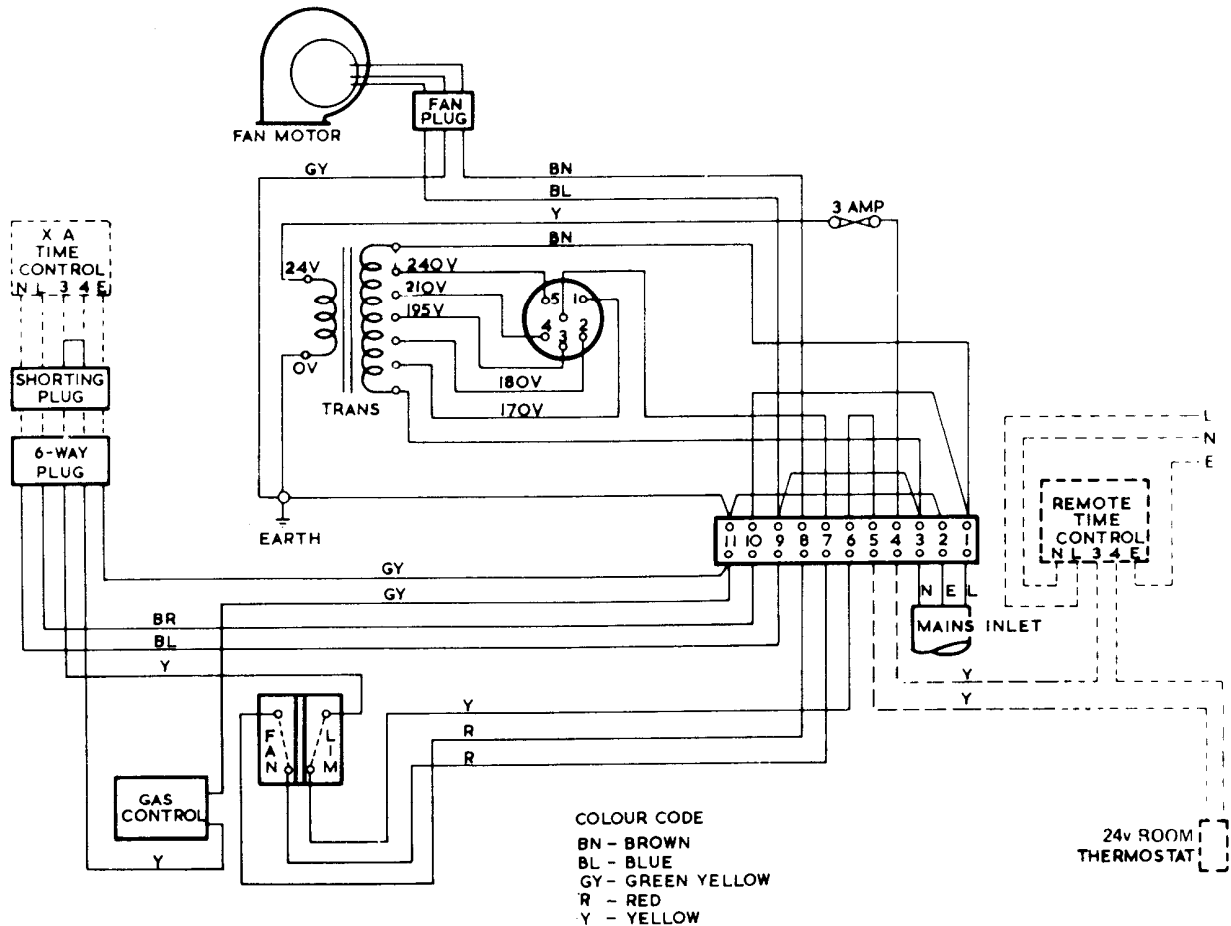


Fig. 8