



Leave these instructions with the user or with the appliance

## JU40-55 WARM AIR HEATER

### MODAIRFLOW and Conventional Control

#### Installation, Commissioning & Servicing Instructions

Publication No. ZZ394/3  
June 1994

#### WARNING: THIS APPLIANCE MUST BE EARTHED

This appliance has been tested and certified by British Gas for use with natural gas

G.C. No.42 417 63

JU40-55 is an open-flued, fanned circulation, upflow, ducted warm air heater, which is supplied with Modairflow controls. A basic (non-Modairflow) control is available as an option.

Air heater output can be adjusted between 11.72kW(42.2MJ/h, 40000Btu/h) and 16.12kW(58.03MJ/h, 55000Btu/h).

#### 1. COMPONENTS CHECK

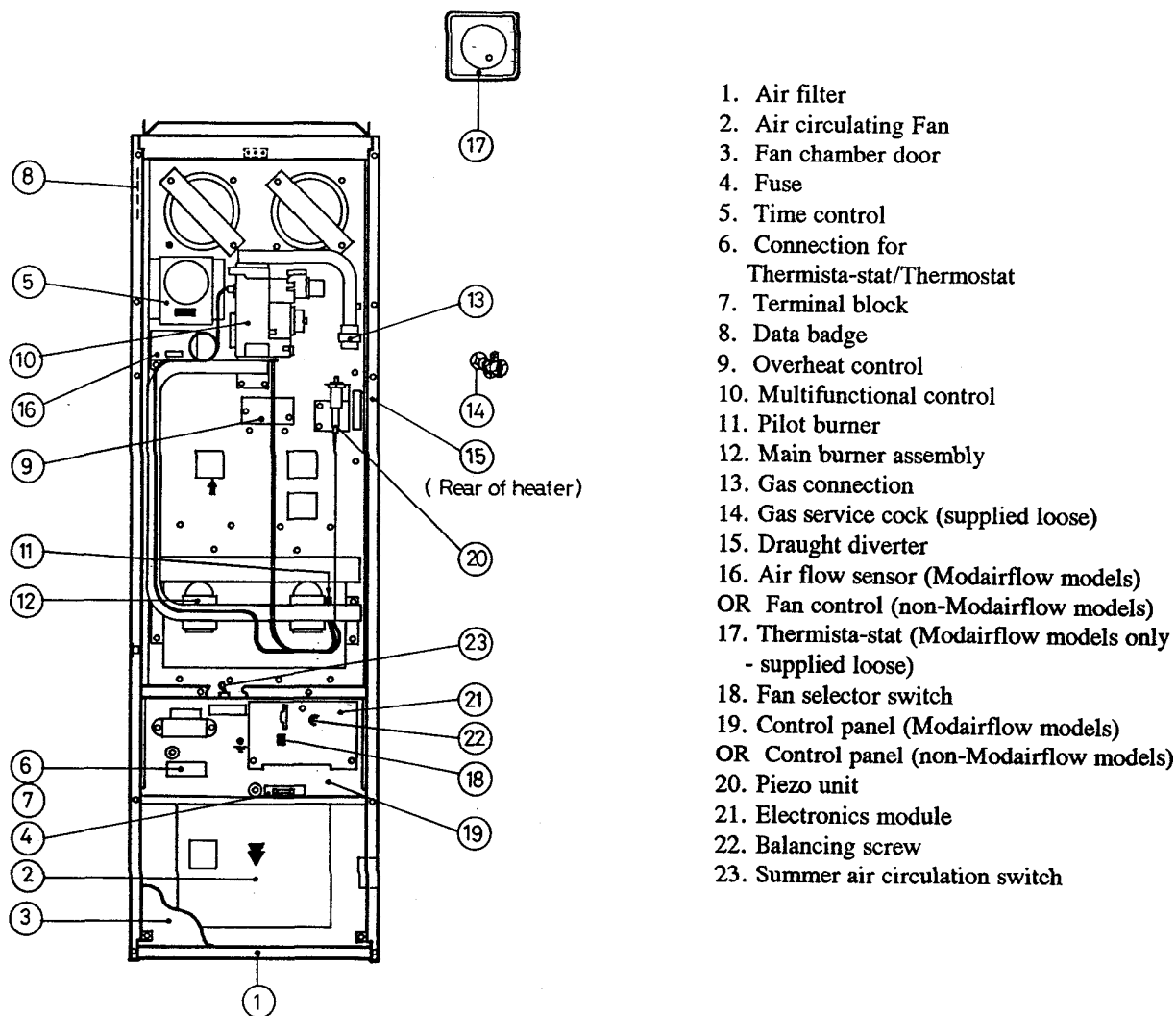


Fig. 1

THIS APPLIANCE CONFORMS TO BS800.

## 2. GENERAL REQUIREMENTS

### 2.1 Related Documents (refer to latest issues):-

This appliance **MUST BE** installed in accordance with the relevant requirements of the Gas Safety (Installation and Use) Regulations (as amended), the Building Regulations and the I.E.E. Wiring Regulations for electrical installations. It should be in accordance also with any relevant requirements of the local Region of British Gas and Local Authority and the relevant recommendations of the following British Standard Codes of Practice:-

Building Standards (Scotland)(Consolidation) Regulations.

Building Regulations.

Gas Safety (Installation and Use) Regulations (as amended).

Institute of Electrical Engineers (I.E.E.) Regulations.

BS6891 Specification for Installation of Low Pressure Gas Pipework of up to 28mm (R1) in Domestic Premises (2nd family gases).

BS5440:Pt.1 (Flues for Gas Appliances).

BS5440:Pt.2 (Air Supply for Gas Appliances).

BS5864 Installation of Gas Fired Ducted Air Heaters.

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

Local Authority Bylaws.

**IMPORTANT: It is the law that all gas appliances are installed by competent persons e.g. Corgi dealers, in accordance with the Gas Safety (Installation and Use) Regulations (current edition). Failure to install appliances correctly could lead to prosecution.**

### 2.2 Heater Compartment and Clearances (see BS5864)

When the heater is fitted into a compartment, a minimum clearance from the compartment walls of 25mm(1in) at the sides and rear and 75mm(3in) at the front must be left. Consideration should also be given to the space required for the removal and replacement of the filter tray, and the entry of the gas and electrical supplies.

For service access, a minimum of 450mm(18ins) is required at the front of the heater. Space must also be allowed, in a compartment installation, to permit the removal of the heater. The compartment must be of a fixed rigid structure and the internal construction must be half-hour-fire-resistant from internal fire; the inside lining or finishing of the enclosure must be non-combustible or a class 1 finish - see also BS476.

In airing cupboard installations, the part used as the air heater compartment must comply with the relevant section of BS5864, and must be completely separated by either a non-combustible partition or a perforated metal partition with the perforations not exceeding 13mm(½in). The secondary flue must be a tight fit where it passes through the partition, and must be suitably protected (see BS5440:Part 1).

In under-stairs installations, the compartment must comply with the relevant section of BS5864, provided that, in addition, all internal surfaces, including the base, are non-combustible or lined with non-combustible material. This requirement is applicable only to dwellings of not more than two storeys.

**IMPORTANT: When the heater is installed in a compartment, the 'SAFETY' label, supplied with the heater, MUST BE AFFIXED in a prominent position on the inside of the compartment door.**

### 2.3 Ventilation and Combustion Air

The room or internal space in which the heater is installed requires a permanent air vent of minimum effective area 67cm<sup>2</sup>(10in<sup>2</sup>). The air vent should be either direct to outside air or to an adjacent room or internal space (other than a bedroom, toilet or bathroom) that itself has an equivalent air vent direct to outside.

Combustion air may be introduced into the return air duct, if required, via a dampered 125mm(5in) nominal bore pipe, connected to a ventilated area. The damper should be adjusted to control combustion air flow to 0.0121m<sup>3</sup>/s(25.6cfm), i.e.0.98m/s(195ft/min) velocity in a 125mm bore pipe). If this arrangement is used, a non-closable warm air register **MUST** be provided in the same area as the front of the air heater or heater compartment if a return air grille is not located in that area.

**2. GENERAL REQUIREMENTS (cont.)**

When installed in a compartment, two permanent ventilation openings into the compartment are required, one at high level and one at low level, both communicating either directly with outside air or with a ventilated room or space. The minimum effective areas specified in Table 1 are related to the rated heat input.

If any room or area from which air is drawn for ventilation or combustion contains an extractor fan, the permanent vents must be sized to ensure that the operation of the appliance at full rate is not adversely affected. A spillage test as specified in Section 6.12 (Safety Checks) should be carried out, and any remedial work undertaken.

TABLE 1

Ventilated from inside building	Low level grille	392cm <sup>2</sup> (60in <sup>2</sup> )
	High level grille	196cm <sup>2</sup> (30in <sup>2</sup> )
Ventilated from outside building	Low level grille	196cm <sup>2</sup> (30in <sup>2</sup> )
	High level grille	98cm <sup>2</sup> (15in <sup>2</sup> )

**2.4 Duct System (See British Design Manual - Gas fired Warm Air Heating).**

**2.4.1 Return Air**

All return air must be POSITIVELY ducted from outside the compartment to the bottom of the unit, either via a plenum, or, if appropriate, using Side Return Kit SR55. The plenum must be constructed to support the weight of the heater, and the heater must be secured to the plenum with screws on at least two sides, and sealed using self-adhesive foam strip, ducting tape or sealing compound. It is recommended that the return air duct is not ducted directly from the main living area, but from a convenient central area serving the remainder of the dwelling.

The return air system should be constructed of fire-resistant material. The flue must not be run through an area serving as a return air path. It is extremely important that the correct size of return air grilles and ducting is used. For heaters on maximum output, the return air duct size should be not less than 300mm x 300mm(12in x 12in). If flexible duct is used, the duct diameter should not be less than 400mm(16in) dia. The return air grille should have a free area of not less than 1365cm<sup>2</sup>(212in<sup>2</sup>).

An adequate and unobstructed return air path is essential from areas not served by a directly ducted return, and to which warm air is delivered. All such rooms should be fitted with relief grilles which have a free area of 0.0088m<sup>2</sup>/kW (1in<sup>2</sup>/250Btu/h) of heat supplied to the room. The only exceptions are kitchens, bathrooms and w.c.'s.

All ductwork in the room or internal space in which the heater is installed must be secured, and sealed with ducting tape.

**2.4.2 Warm Delivered Air**

All ductwork, including riser ducts, should be fully insulated with 50mm(2in) glass fibre or similar. If short extended duct runs are taken below floor level these should be similarly insulated, and in addition wrapped with a sound vapour-proof barrier, and protected from crushing.

The duct system should be carefully designed (as given in the guidelines in the British System Design Manual) to suit the needs of its specific heating requirements and building layout. The type of duct system, i.e. radial/extended plenum/stepped, should be installed using the least number of fittings, to minimise air flow resistance.

The warm air plenum should allow for ease of removal for access to the flue.

### 3. FLUES (see BS5440 Pt.1 Flues)

- 3.1 All joints must be soundly sealed.
- 3.2 The flue should be kept as short and as warm as possible.
- 3.3 Sufficient support brackets must be installed to bear the weight of the total flue system.
- 3.4 The spigot connection of the heater draught diverter will accept internally the spigot end of a non asbestos flue to BS567 or twin wall metal flue to BS715 of nominal 100mm(4in) diameter.
- 3.5 A split collar should be fitted to provide for flue maintenance or inspection.
- 3.6 The flue must be in accordance with the Building Regulations and British Gas Materials and Installations Specification (3rd edition) with regard to clearance and shielding from combustible materials.
- 3.7 All materials must be in accordance with local Gas Region and Building Regulations requirements.
- 3.8 The flue should run as vertically as possible, and under no circumstances should there be any horizontal run. A directional change should be as gentle as possible; for every 0.3m(1ft) run of offset (measured horizontally) there must be 1m(3ft) of vertical flue.
- 3.9 Special consideration must be given to external flues with a view to prevention of condensation and weathering problems.
- 3.10 An approved terminal should always be used; a ridge terminal or "GC1" terminal is specifically recommended. The latter should be positioned in a free air space where it is not shielded by any structure. A minimum of 1m(3ft) from any vertical or inclined roof structure must be allowed for.
- 3.11 Where flue blocks are used, builders should ensure that no obstruction is created during erection. The installer should ensure that the connection flue does not project beyond the internal wall of the flue blocks.

### 4. ELECTRICAL

#### 4.1 Mains

The heater is supplied with mains cable (PVC sheathed, high temperature resistant, 3-core Brown-Blue-Green/Yellow 5A rated 0.75mm<sup>2</sup>), connected to a terminal strip. The cable may exit through either side of the fan compartment via a Heyco universal bush. The cable is suitable for a 240V 50Hz single phase supply, and must be protected by a 3 amp fuse, and earth wire connected. A double pole switch or fused spur box should be used. All wiring must be to I.E.E regulations.

Note: If a Side Return Kit SR55 is fitted, the mains cable should exit from the opposite side of the appliance.

#### 4.2. Thermista-stat/Room Thermostat and its location

A Thermista-stat is provided with all Modairflow models; this acts as a room thermostat.

For non-Modairflow models, a 24V Room Thermostat which complies with BS800, BS3955 and BS4201 must be supplied, and is essential to ensure close control of comfort conditions. An anticipator is located within the thermostat, and is graded in amps. The amp reading should correspond with that of the multifunctional control, i.e. 0.2amp. The anticipator should be checked and adjusted as necessary.

The Thermista-stat/Room Thermostat should be located where there is free air circulation, and approximately 1.5m(5ft) from the floor.

Avoid the following locations:-

- i) In a room where temperature is greatly affected by the sun or any other heat source, e.g. radiant fire, wall light fittings or TV set.
- ii) Near an outside door or window, or on an outside wall.
- iii) Where it would be affected by warm air ducts, diffusers, waste pipes or the heater itself.
- iv) Where it would be subject to vibration.

For Modairflow units, connect the Thermista-stat wires to terminals numbered 4 and 5 on the control panel. When connecting the Thermista-stat, correct polarity must be observed, i.e. + side on control panel to + side on Thermista-stat.

For basic (non-Modairflow) controls, connect the Room Thermostat wires to terminals numbered 4 and 5 on the control panel.

**5. GAS (see BS5864 and BS6891)**

- 5.1 An independent gas supply line from the meter is to be preferred wherever possible. However, when this is not possible, the line must be capable of taking the complete input of the heater and all other gas appliances being served by this same line. This supply should be suitably sized to conform to British Standards requirements of no more than 1.0mbar(0.4in w.g.) pressure drop (see table of discharge in BS6891).
- 5.2 The ½in union gas cock (supplied) must be fitted in the gas inlet of the heater for easy isolation during servicing. The gas pipe should be so fitted and installed as to be durable, substantial and gas tight. To assist in determining where a gas connection may not be tight, a proprietary leak detection fluid should be brushed around the connection. Under no circumstances should a flame be used to locate a gas leak. Gas entry to the air heater is through either side to a R½ (½in B.S.P. external (taper) thread).

**6. COMMISSIONING**

- 6.1 Ensure that the gas and electrical supplies are off.
- 6.2 Purge the whole gas line and check for soundness as described in BS6891.
- 6.3 Make sure that the filter, fan and fan compartment are free of obstructions.
- 6.4 Check that all of the registers or grilles are open, and that they conform to design specifications.
- 6.5 Check that the return air, relief air and ventilation air installation is adequate.
- 6.6 Check that both the fan and overheat controls are set correctly. (Remove the cover from the fan control by removing the two securing screws).

(non-Modairflow models only)      **Fan control setting is 100°F OFF, 40°F Diff..**  
**Overheat control setting is 200°F and must NOT be adjusted.**

- 6.7 With the fan chamber door and air filter removed,
  - 6.7.1 Modairflow models - set the fan selector switch to CONTINUOUS and turn the balancing screw fully clockwise (maximum speed).
  - 6.7.2 Non-Modairflow models - set the fan speed selector plug to a number appropriate to the desired heater output, e.g. for maximum output set the plug to number 5.
- 6.8 Replace the fan chamber door and filter, then light the pilot as follows:-
  - 6.8.1 Turn the Thermista-stat/Room Thermostat to the lowest or OFF setting.
  - 6.8.2 Remove the cover from the adjustment point on the multifunctional control (see Fig.3), release the pressure test point screw and attach a pressure test gauge.
  - 6.8.3 Ensure that the gas supply to the heater is turned on.

**WARNING: If the pilot light is extinguished, either intentionally or unintentionally, no attempt should be made to relight the gas until at least 3 mins. has elapsed. Ensure that the electrical supply is off, that the time control is in an off position and that the selector switch is in the off position.**

- 6.8.4 Push the START button (marked with a flame symbol) on the multifunctional control (see Fig.3) fully in and hold. Repeatedly press and release the piezo unit until the pilot burner lights. Note: If the piezo unit should fail to spark, the pilot burner may be lit by applying a lighted taper to the pilot burner whilst the START button is pushed in.
- 6.8.5 After 20 seconds release the START button and let it spring out. The pilot should remain alight; if it does not, twist the START BUTTON clockwise as indicated by the arrow (about ¼ turn) and wait three minutes before repeating from para. 6.8.4.

6. COMMISSIONING (cont.)

- 6.8.6 Adjust the pilot flame if necessary (a low energy pilot is fitted, which requires the pilot adjustment screw to be screwed four full turns anti-clockwise from closed).
- 6.8.7 Switch on the mains electrical supply to the heater. Set the time control to the required 'Heating On' periods and set the selector switch to the 'Timed' position. Adjust the Thermista-stat or Room Thermostat to maximum; the main burner will now operate.

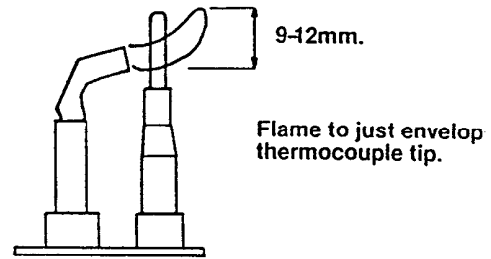


Fig. 2 Pilot flame adjustment

- 6.9 Allow the heater to operate for 15 min, then adjust the burner pressure to the output required (see Table 2).

NOTE: Heaters are factory set to a burner setting pressure giving high rate output i.e. 16.12kW (55,000Btu/h) at 17.1mbar(6.8in w.g.)

- 6.9.1 To adjust the burner pressure, remove the cover and turn the gas pressure adjusting screw (Fig.3) clockwise to increase, anticlockwise to decrease.
- 6.9.2 Enter the pressure set arrow under the appropriate column on the data badge.
- 6.9.3 Turn off the heater before removing the pressure test gauge and tightening the pressure test point screw. Replace the adjustment point cover.

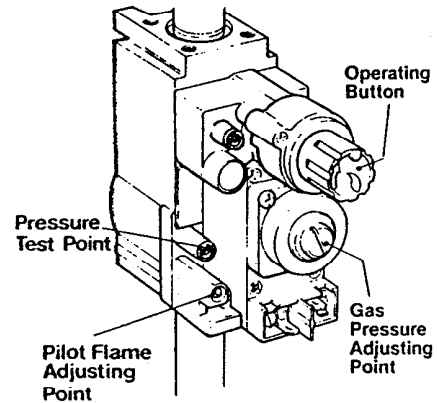


Fig 3. Multifunctional control

- 6.10 Balance the Warm Air System as follows:-

With fan chamber door in place,

- 6.10.1 Check that the temperature rise across the heater is 45°-55°C. Adjust the fan speed if necessary; increase speed to reduce temperature rise, decrease to increase temperature rise.
- 6.10.2 On Modairflow units, maximum fan speed is altered by adjusting the balancing screw (see Fig.1), clockwise to increase).
- 6.10.3 On non-Modairflow units, fan speed is altered by changing the position of the fan speed selector plug on the control panel.

Note: The numbered curves in Fig.4 refer to the fan speeds available at the corresponding positions of the fan speed selector plug.

- 6.10.4 Balance the system to give the required volume proportions at the warm air outlets.
- 6.10.5 Modairflow units only: set the fan selector switch to 'AUTO'.

NOTE: If the system includes ceiling diffusers, it is important that the velocities of air through these (except in very small rooms like bathrooms etc.) are at least 1.5m/s(300ft/min). To achieve this, it may be necessary to blank off part of the outlet face.

- 6.11 Automatic controls check - lighting the heater and allowing it to run for a short time checks these controls.

6.11.1 Modairflow controls:-

With time control on, turn the Thermista-stat control knob slowly clockwise until the main burner ignites. Shortly afterwards, the fan will start at a low speed and gradually build up to top speed. When the room temperature is under control, the main burner will cycle on and off at approximately 1 ¼ to 2 minute intervals. The fan will run continuously at lower speeds.

6.11.2 Non-Modairflow controls:-

With time control on, increase the Room Thermostat setting slowly until the main burner ignites. Shortly afterwards, the fan will start. When the room temperature is under control, the main burner will switch off, followed shortly afterwards by the fan. After the room temperature has fallen slightly, the burner will re-ignite again followed by fan operation.

**6. COMMISSIONING (cont.)**

**6.12 Safety checks**

- 6.12.1 Check the 'fail safe' section of the multifunctional control by turning off the gas at the gas service cock and checking that the control fails safe (loud click heard from control) within 60 seconds.
- 6.12.2 Check the over-heat control by operating the heater with the main burner alight and the fan disconnected - the main burner must extinguish within 2-3 minutes. To disconnect the fan, turn off the electrical supply, remove the fan chamber door and unplug the fan connection from the socket on the electrical control panel.
- 6.12.3 With heating system on:-  
Check for gas soundness within the appliance.
- 6.12.4 Check that the flue operates effectively - with all doors closed and extractor fans, if fitted, running, use the following procedure to test for spillage:-

**A. FOR APPLIANCES WITH DRAUGHT DIVERTER ACCESSIBLE:-**

After connection to the flue system, check the appliance for clearance of combustion products as follows:-

Follow the lighting procedure and then run the appliance for twenty minutes to pre-heat the flue. Hold a lighted taper just below, or a smoke match just inside, the lower edge of the draught diverter. Spillage is indicated by displacement of the flame or smoke outwards from the draught diverter.

**B. FOR APPLIANCES WITH DRAUGHT DIVERTER WHICH MAY NOT BE VISIBLE OR ACCESSIBLE WHEN INSTALLED:-**

After connection to the flue system, check the appliance for clearance of combustion products as follows:-

Follow the lighting procedure and then run the appliance for twenty minutes to pre-heat the flue. Turn off the appliance. Place a smoke pellet, or part of a pellet, on a non-combustible support within, but not in direct contact with the combustion chamber. Ignite the smoke pellet and observe whether smoke emerges from the vicinity of the draught diverter.

TABLE 2

JU40-55 AIR HEATER

	Low Rate			High rate		
	kW	MJ/h	Btu/h	kW	MJ/h	Btu/h
Input	16.75	60.3	57,150	21.78	78.42	74,350
Output	11.72	42.2	40,000	16.12	58.03	55,000
Gas Rate (1037cv)	1.56m <sup>3</sup> /h, 55.11ft <sup>3</sup> /h			2.03m <sup>3</sup> /h, 71.7ft <sup>3</sup> /h		

**BURNER PRESSURES (measured hot)**

Gas: Natural  
Main injector: 23/700

10.0 mbar (4.0in.w.g.)	17.1mbar (6.8in.w.g.)
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Pilot Injector: HONEYWELL 0.30A

## 7. INSTRUCTIONS FOR USER

If the building is unoccupied, ensure that the User Instructions are left at or near the meter for the user. Leave also these Installation Instructions at or near the meter for use on future service calls.

If the building is occupied, hand the User Instructions over and make sure the user knows:-

- a) How to light the pilot burner.
- b) How to operate the room thermostat, Thermosta-stat, time switch and heater ON/OFF switch.
- c) How to turn off the pilot and main burner at the gas control, and switch off the electricity supply to the heater.
- d) How to remove, clean and re-fit the air filter at regular intervals.
- e) How to control the heating system by opening and closing warm air outlets.
- f) That the air grilles on the heater or heater compartment or any grilles or ventilators in the walls, windows and doors of the building must not be obstructed.
- g) That the heater must be serviced at least once a year by a competent person to ensure efficient and safe operation.
- h) That the red instructions for safe use have been pointed out and understood.

## 8. SERVICING (refer to Fig.1 for parts layout)

**IMPORTANT:** Before commencing any servicing or exchange of components, ALWAYS turn off the gas supply and isolate the electricity supply. After completing any service work, always test for gas soundness.

Operate the appliance and check for correct function of the burner and controls.

Remove the burner and controls assembly, inspect and clear main burners and injector as necessary. Examine the main burner for cracks, including hairline cracks at the burner ports, and exchange burners if necessary.

Inspect and clear the pilot burner and injector as necessary.

Check the condition of the thermocouple and spark electrode/leads. Clean or replace as necessary.

Inspect the heat exchange flueways. Clean by brushing thoroughly from above and below.

Reassemble all items in reverse order, and carry out recommissioning procedure as detailed in Section 6.

Test for gas soundness and check that the appliance and controls are functioning correctly. Finally ensure that the flue products are clearing satisfactorily.

### 8.1 Removal of burner assembly

Remove the upper louvre door

Disconnect the electrode lead from the piezo unit.

Remove the electrical connections from the multifunctional control.

Disconnect the union service cock at the input side of the control. Remove the six burner assembly fixing screws from the manifold assembly, and withdraw the burner.

### 8.2 For access to control panel, fuse and air circulating fan:-

Remove the air filter, remove the two screws at the bottom of the fan chamber door and lift the door to remove.

### 8.3 Main burner cleaning

With burner assembly removed,

Unscrew the two pilot bracket securing screws, and disconnect the pilot assembly.

Remove the burners from the manifold assembly.

Unscrew the two screws securing the burner end caps, and remove.

Brush lightly both inside and out. Under no circumstances should the burner holes be enlarged, distorted or brushed strongly.

### 8.4 To remove pilot injector

With burner assembly removed,

Disconnect the pilot supply pipe and thermocouple from the multifunctional control.

Unscrew the two pilot bracket securing screws and remove the pilot assembly.

Disconnect the pilot pipe from the pilot assembly. Remove the pilot injector by lightly tapping the side of the pilot assembly - the injector should drop out.



**8. SERVICING (cont.)**

**8.5 Thermocouple**

Ensure that the thermocouple connection to the multifunctional control is tight (quarter turn past finger tight). Remove the burner assembly and disconnect the thermocouple from the multifunctional control. Disconnect the thermocouple from the pilot assembly and withdraw it.

**8.6 To remove multifunctional control**

With burner assembly removed,

Disconnect the inlet pipe and remove (make sure that the sealing ring is retained).

Disconnect the thermocouple and the pilot burner supply pipe.

Unscrew the four screws securing the manifold assembly and remove the multifunctional control (make sure that the sealing ring is retained).

Before refitting, check that the sealing rings are in good condition, and replace if necessary.

**8.7 To remove piezo unit**

Disconnect the electrode lead from the unit.

Unscrew and remove the two screws securing the piezo unit bracket to the bulkhead.

Remove the bracket and turn it upside down. Undo the piezo unit fixing nut with a large spanner, and remove the unit.

**8.8 To remove pilot burner**

With burner assembly removed,

Disconnect the thermocouple and the pilot supply pipe from the multifunctional control. Unscrew the two electrode assembly bracket securing screws and remove the electrode assembly. Disconnect the pilot pipe and the thermocouple from the pilot assembly, and remove the pilot. NOTE: be careful not to lose or damage the pilot injector, and after reassembly to check that the gap between the spark electrode and the burner tip is approximately 2.5mm.

**8.9 Gas pressure check**

Attach a gas pressure gauge to the burner setting pressure test point on the multifunctional control (see Fig.3). Light the heater, check the pressure and confirm by a gas rate check at the meter.

**8.10 Control panel removal - Modairflow and Conventional**

Ensure that the mains supply is off.

With the lower door removed,

Disconnect the mains lead from the terminal block.

Disconnect the Thermosta-stat/Room Thermostat wires from the terminal block.

Disconnect the wires from the airflow sensor/fan control, the overheat control, the multifunctional control and the time control (if fitted) at the terminal block (non-Modairflow heaters only).

Disconnect the leads at the terminal block (non-Modairflow heaters only).

Detach the summer air circulation switch from the floor of the burner compartment.

Unscrew the three securing screws (top screw last) and remove the control panel assembly.

(There is sufficient slack in the harness on Modairflow heaters to make complete disconnection of the panel for servicing purposes unnecessary).

**8.11 Electronics module removal (Modairflow model only)**

Ensure that the mains supply is off.

Unscrew the three securing screws and remove the electronic module.

Disconnect fittings 'C' and 'D' (see Fig.5a) from electronic module.

**8.12 Air circulating fan removal and cleaning**

With the fan chamber door and control panel removed,

Handling with care, withdraw the fan assembly from the fan guides. Remove all dust from both impeller and motor, taking care not to disturb the balance of the fan.

To replace, reverse the above procedure, ensuring that the fan supply lead is not trapped between the fan casing and the filter runners.

**SERVICING (cont.)**

**8.13 Removal of time control**

Ensure that the electrical supply is off.

Unscrew the fixing screw in the bottom of the time control assembly, then carefully lift the assembly off its mounting bracket.

Disconnect the wiring harness from the terminal block in the rear of the time control.

To reassemble time control,

Remake the electrical connections, then locate the top rear flange of the time control assembly over the top edge of the mounting plate and press down firmly.

Press in the bottom edge of time control assembly and secure with the fixing screw.

**8.14 To replace transformer (Modairflow models only)**

With control panel removed,

Disconnect the wires from the terminal block.

Remove the two retaining screws.

Remove the transformer.

To replace, reverse the above procedure.

On non-Modairflow heaters, if the transformer fails, it is necessary to replace the control panel assembly - see Section 10 for ordering details.

**8.15 Heat exchanger access**

Ensure that the gas and electrical supplies are turned off.

Remove the burner assembly (see Section 8.1).

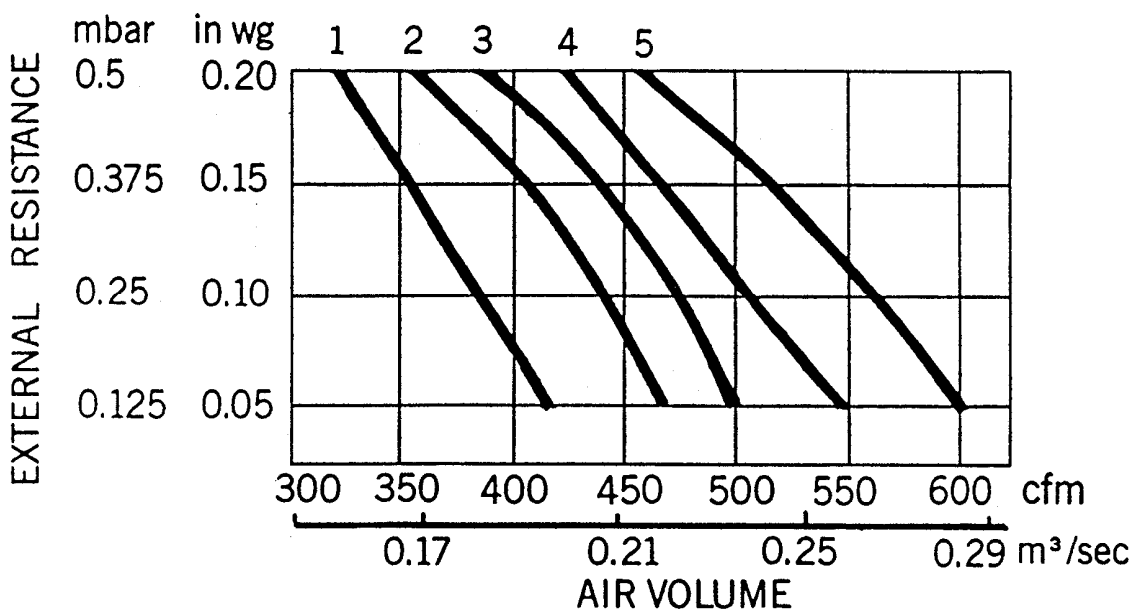
Remove the two screws securing each access cap at the top front of the heat exchanger, and remove the access caps together with their gaskets.

Remove the heat exchanger baffles.

The heat exchanger can now be inspected and brushed through.

**IMPORTANT:** When reassembling, ensure that the baffles are pushed fully home. Refit the gaskets and access caps, and ensure that the caps are sealed soundly.

Recommission the heater, carrying out checks as detailed in Section 6. In the event of heat exchanger or burner replacement being necessary, contact Johnson and Starley Service Department.



**Fig. 4 Fan performance curves**

9. FAULT FINDING

**IMPORTANT:** If an electrical fault occurs after installation of the appliance, preliminary electrical systems checks with a Multimeter should be carried out. On completion of any service/fault-finding task which has required the breaking and remaking of electrical connections, then checks of continuity, polarity and resistance to earth must be carried out.

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

**MODAIRFLOW Models only:** See page 15 for fault diagnostic chart.

Before commencing fault finding, turn the Thermista-stat to maximum setting, turn the mains supply on and check that the time control is at an ON position.

Care must be taken during replacement and handling of the electronic assemblies, viz electronic panel, air flow sensor, Thermista-stat. It is not practical to rectify any faults in these assemblies except in the factory, and any attempt to do so may render any guarantee or factory replacement arrangement void.

SYMPTOM	POSSIBLE CAUSE	REMEDY
(a) Pilot will not light.	(i) No gas supply to heater.	Break service tap union and listen for escape.
	(ii) Gas supply pipe not purged.	Loosen service tap union until gas is detected.
	(iii) Pilot orifice restricted.	Clear pilot orifice carefully or replace injector.
	(iv) Piezo unit defective.	Check electrode/lead/igniter.
(b) Pilot lights but goes out on releasing 'START' button during initial light-up or after normal operation.	(i) Connection between thermocouple and gas control not secure.	Check that connection is secure.
	(ii) Faulty power unit on gas control.	Replace gas control.
	(iii) Faulty thermocouple.	Replace thermocouple.
	(iv) Pilot flame of insufficient length.	Adjust.
	(v) Pilot orifice restricted.	Replace pilot injector.
(c) Main burner lights but fan fails to run after approx. 3 min.	(i) Loose electrical connection on fan control.	Check connections for soundness.
	(ii) Fan control settings incorrect.	Check settings.
	(iii) Faulty fan assembly.	Replace, taking care not to damage impeller.
	(iv) Faulty fan control.	Replace.
	(v) Burner setting pressure not correct.	Adjust pressure as necessary.
(d) Main burner operating intermittently with fan running.	(i) Gas rate or burner setting pressure high.	Check gas rate and burner setting pressure.
	(ii) Temperature rise excessive.	Adjust fan speed or gas rate accordingly.
	(iii) Air filter or return air path restricted.	Check filter is clean and return air path is clear.
	(iv) Excessive number of outlets closed.	Open additional outlets.

## 9. FAULT FINDING (cont.)

SYMPTOM	POSSIBLE CAUSE	REMEDY
(e) Main burner operating with intermittent fan operation.	(i) Gas rate or burner setting pressure low. (ii) Fan control settings incorrect.	Check gas rate and burner setting pressure. Check settings.
(f) Fan runs for excessive period or operates intermittently after main burner shuts down.	(i) Fan control settings incorrect.	Check settings.
(g) Noisy operation.	(i) Gas pressure high. (ii) Noisy fan motor. (iii) Fan speed setting too high.	Check burner setting pressure. Replace fan motor. Adjust fan speed.
Modairflow Control Heaters only:-		
(h) Incorrect operation of fan or main burner.	(i) Fault related to Modairflow control system.	Consult diagnostic chart and follow recommended procedure.
Non Modairflow Control Heaters only:-		
(j) Pilot alight but main burner not igniting.	(i) Mains electrical supply not connected to heater. (ii) Controls not calling for heat. (iii) 3A fuse failed.  iv) Loose connection on room thermostat, overheat control, gas control lead, time control or transformer. (v) Transformer open circuit.  (vi) Gas control valve faulty. (vii) Gas control governor faulty. (viii) Faulty overheat control. (ix) Faulty room thermostat or external wiring.	Check mains supply.  Check that time control (if fitted) and room thermostat are operating correctly. Replace. If failure occurs again, check external room thermostat leads for short to earth. Check connections for soundness.  Check with test meter and replace electrical panel if necessary. Replace gas control. Replace gas control.  Short across control and replace if necessary. Fit temporary loop in heater room thermostat socket. If heater fires, external circuit or room thermostat is faulty.

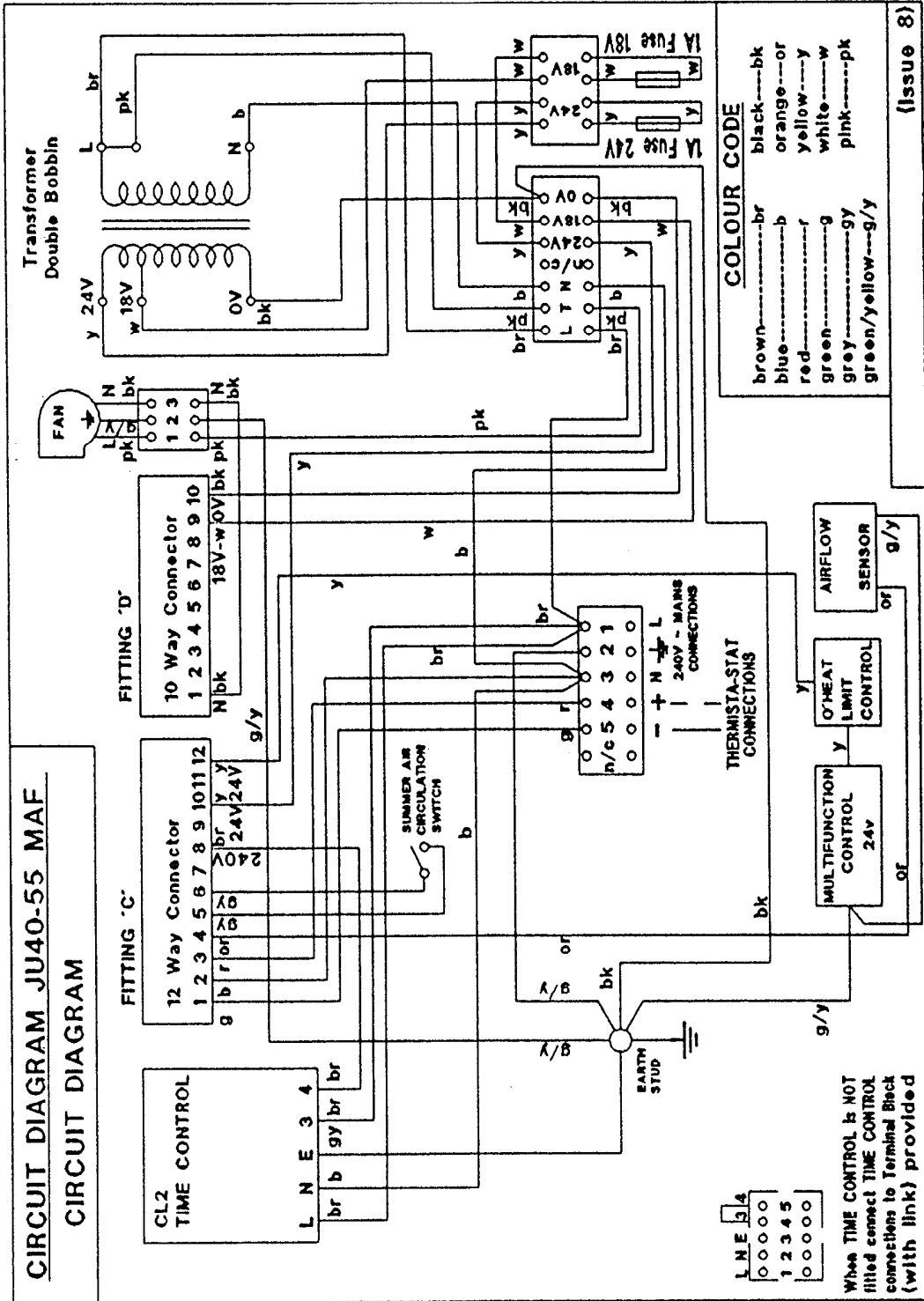


Fig. 5a JU40-55 Modairflow circuit diagram

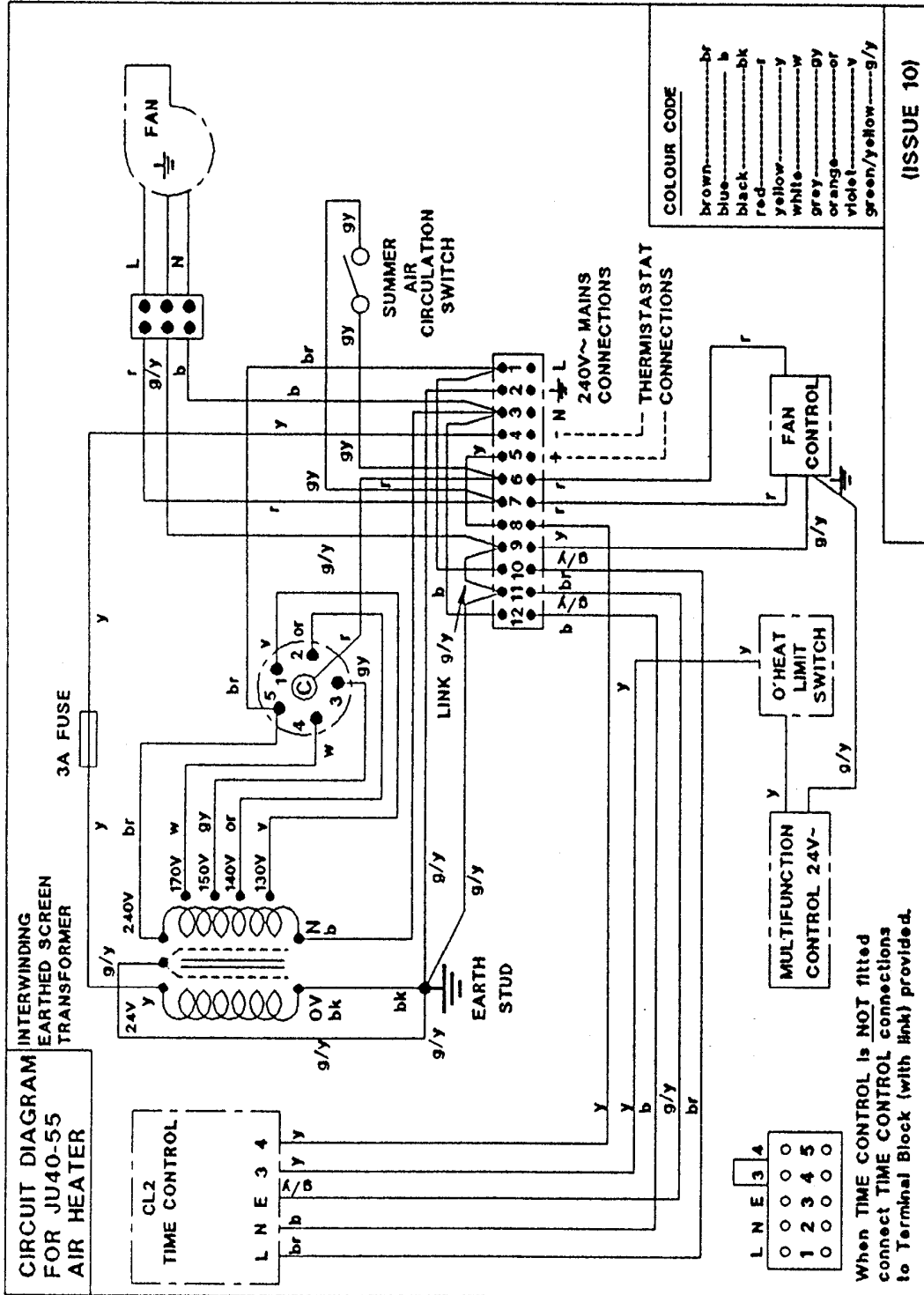


Fig. 5b JU40-55 non-Modairflow circuit diagram

**MODAIRFLOW SERIES 2 OPERATIONAL CHECKS**

**MAIN BURNER NOT OPERATING**

Check pilot burner is lit, time control is on and Thermista-stat turned up.  
Check mains electrical supply.  
Check fuses on electronic panel.  
Check for 24V at multifunctional control.

**No voltage**  
Bridge out Thermista-stat terminals on heater.

**Burner remains OFF**  
Check for voltage at terminal D9 (18V).

**Voltage detected**  
Multifunctional control faulty.

**Burner lights**  
Check polarity by interchanging external Thermista-stat leads.

**Bridge out Thermista-stat**

**Burner remains OFF**  
External Thermista-stat circuit faulty.

**Burner lights**  
Thermista-stat faulty.

**No voltage**  
Check output from time control at terminal C8 (240V).

**No 240V**  
Check mains supply and operation of time control.

**Voltage detected**  
Check overheat control connections and operation.

**240V detected at C8**  
Check for 24V at C10.

**24V detected at C10**  
Replace electronics module.

**No voltage**  
Replace transformer.

**FAN ON, BUT BURNER CYCLING BEFORE DESIRED ROOM TEMPERATURE REACHED**

Bridge out Thermista-stat.

**Burner continues to cycle**  
Check if overheat control is operating.

**Burner remains on**  
Thermista-stat fault.

**Overheat control operating**  
Check temperature rise. if less than 60°C, replace overheat control.

**Overheat control not operating**  
Replace electronics module.

Check air filter and return air path for restriction.  
Check burner pressure is not excessive.

**Fan speed too low**

Check that balancing screw on electronics module is not set too low. Put fan selector switch on electronics module to CONTINUOUS position.

**Fan speeds up**  
Bridge airflow sensor and return fan selector switch to AUTO.

**Fan remains at low speed**  
Replace electronics module.

**Fan attains maximum speed**  
Replace airflow sensor.

**Fan attains low speed only**  
Replace electronics module.

**MAIN BURNER NOT CYCLING (ROOM TEMPERATURE TOO HIGH)**

Disconnect Thermista-stat

**Burner goes out**  
Replace Thermista-stat.

**Burner remains ON**  
Disconnect wire at multifunctional control.

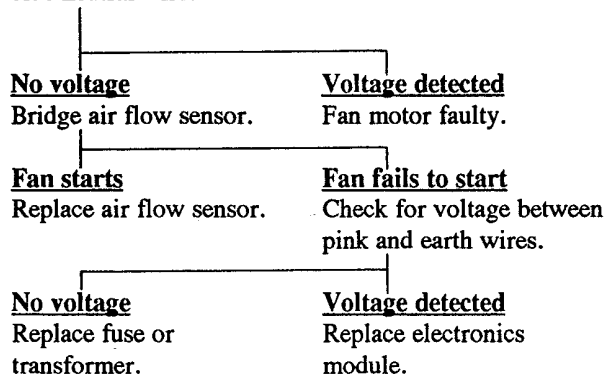
**Burner goes out**  
Replace electronics module.

**Burner remains ON.**  
Replace multifunctional control

**MODAIRFLOW SERIES 2 OPERATIONAL CHECKS (cont.)**

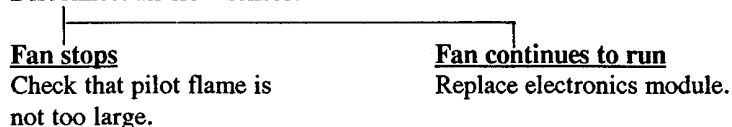
**MAIN BURNER ON, BUT FAN NOT OPERATING**

Check for voltage across pink lead at fan and any blue neutral wire.



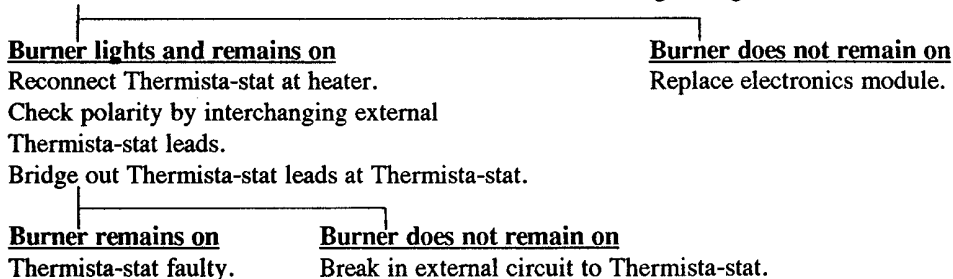
**FAN CONTINUES TO RUN OR CYCLES AFTER HEATING TURNED OFF**

Check fan selector switch on electronics module  
If it is set to 'ventilation', fan will run continuously at low speed.  
Check that fan selector switch is set to AUTO and summer air circulation switch is OFF.  
Disconnect air flow sensor.

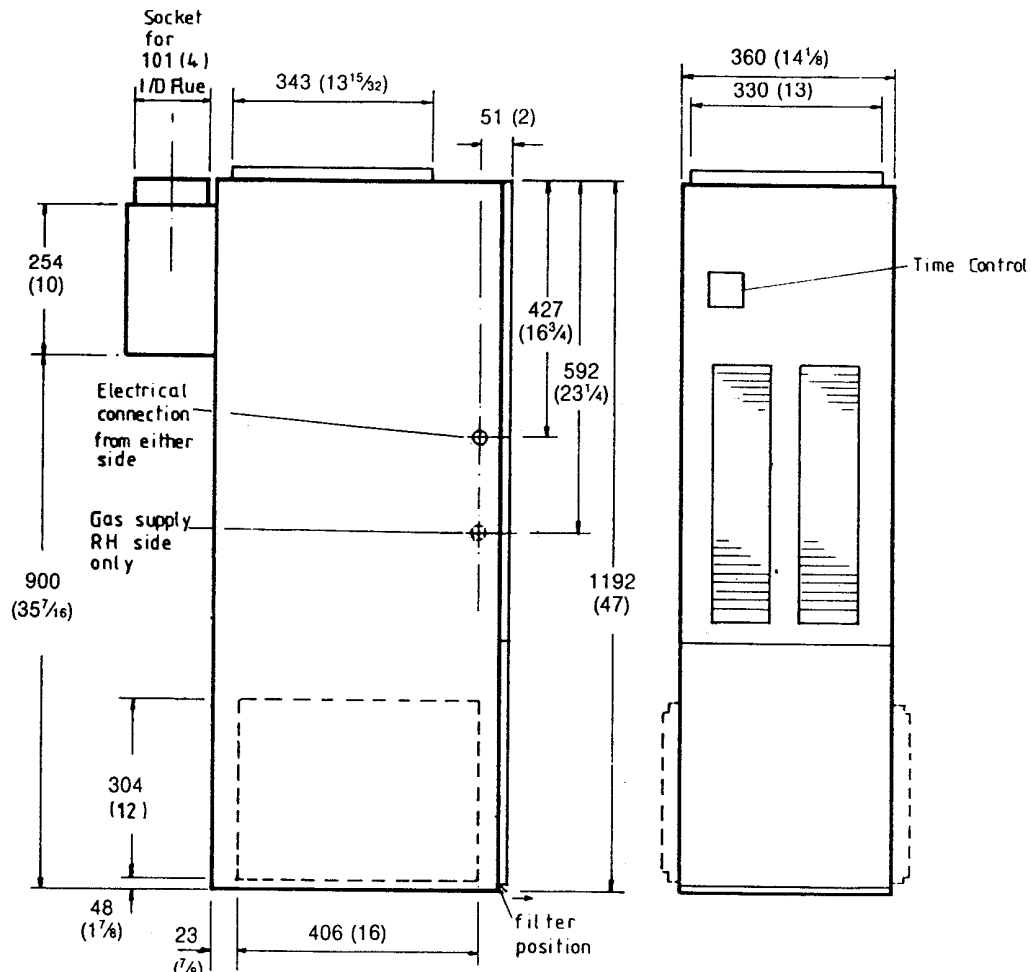


**MAIN BURNER FIRES FOR BRIEF PERIOD ONLY**

Check that Thermista-stat control knob is on maximum setting. Bridge out Thermista-stat socket or connections at heater.

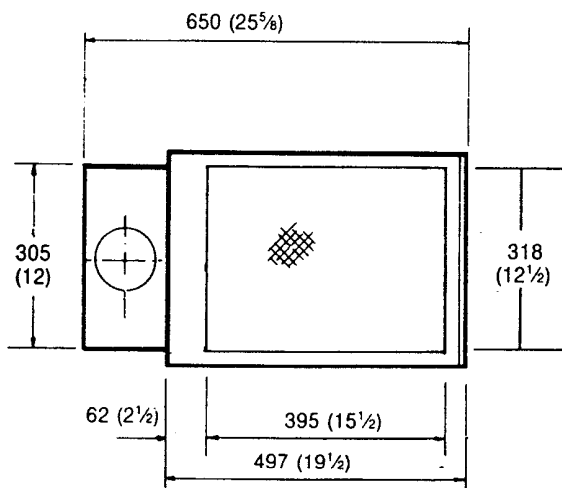






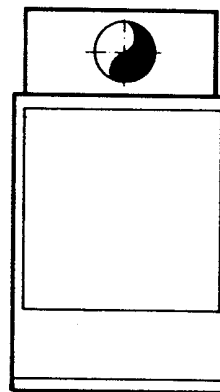
SIDE VIEW

FRONT VIEW



BASE VIEW

TOP VIEW



JU40-55 Principal dimensions mm (ins)

## 10. SHORT LIST OF SPARES

G.C.No.	MAKERS No.	DESCRIPTION	QTY	JU40-55 MAF	JU40-55
382 758	1000-0500720	Fan assembly Sifan FFB 0815-0032	1	X	X
245 227	U550-0182000	Filter tray assembly	1	X	X
232 962	CL2S	Time control CL2	1	X	X
244 926	1000-0000070	Time control cover	1	X	X
385 012	BOS 00105	Overheat control Honeywell L4069C	1	X	X
393 412	BOS 01301	Multifunctional control Honeywell V8600C	1	X	X
232 903	BOS 02061	Sealing ring (for gas control)	2	X	X
382 760	1000-0700400	Pilot burner Honeywell 0359A 8515	1	X	X
390 210	BOS 00036	Thermocouple Honeywell 0309A	1	X	X
245 042	1000-0700370	Burner assembly (R/H) Robinson FT2	1	X	X
245 043	1000-0700380	Burner assembly (L/H)	1	X	X
398 280	1000-0700430	Main injector Bray Cat.23/700	2	X	X
245 183	1000-0703150	Pilot injector Honeywell 36/38A	1	X	X
245 210	U550-0300005	Heat exchanger exchange kit	1	X	X
244 957	1000-2500010	Rope ring seal (heat exchanger)	2	X	X
<u>Modairflow models only</u>					
245 217	U550-0530005	Control panel(excluding time control & electronics module)	1	X	-
245 220	1000-0501000	Wiring harness	1	X	-
245 219	1000-0500980	Transformer module	1	X	-
245 218	R006	Electronics module	1	X	-
230 496	S 00076	Air flow sensor	1	X	-
244 933	1000-0500170	Fuse 1amp 1 ¼ "long glass	2	X	-
386 475	BOS 01242	Thermista-stat	1	X	-
<u>Conventional (non-Modairflow) models only</u>					
245 222	1000-0500810	Control panel (excluding time control)	1	-	X
245 223	1000-0500890	Wiring harness	1	-	X
385 013	BOS 00104	Fan control Honeywell L4068C	1	-	X
230 267	BOS 00689	Fuse 3amp 1"long BS1362	1	-	X
230 157	BOS 00566	Fan speed selector plug	1	-	X

Johnson and Starley prides itself on its ability to supply spare parts quickly and efficiently. If you have a problem in obtaining a spare part, please contact Johnson and Starley Spares Department at the address below.

Telephone: (0604) 762881

Telefax: (0604) 767408

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