Installation, Commissioning & Servicing Instructions

Models covered by these instructions

42-417-65 JB40-50

WARM AIR HEATER MODAIRFLOW and Conventional Control

Publication No.ZZ384/I

Installation Instructions

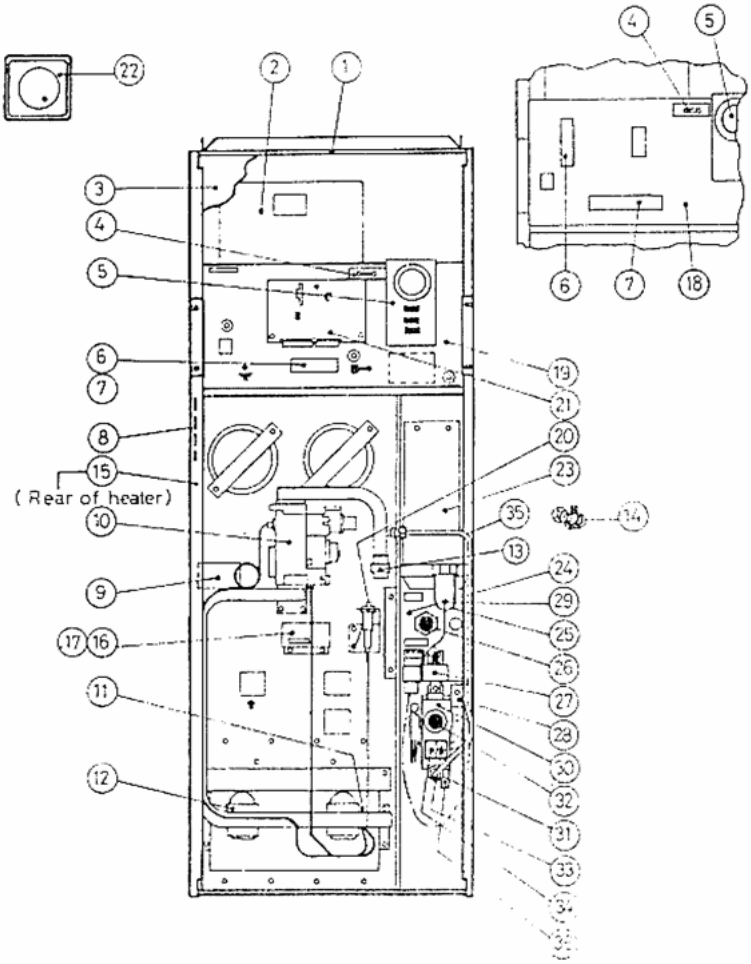
This appliance has been tested and certified by British Gas for use with natural gas

NOTE:

If a water heater is fitted, the Installation, Commissioning and Servicing Instructions for the water heater (Publication No. ZZ360) must also be observed.

1. COMPONENTS CHECK

Fig. 1



JB40-50 is an open-flued, fan assisted downflow, ducted warm air heater, which may be supplied with Modairflow controls and in combination with an Eljan (electrically switched) or Janus water heater. A basic (non-Modairflow) control is available as an option.

Air heater output can be adjusted between 11.72kW (42.2MJ/h, 40,000Btu/h) and 14:65kW (52.75MJ/h, 50,000Btu/h).

Eljan/Janus output is 3.32kW (11.5MJ/h, 1l,340Btu/h).

1. Air filter

2. Air circulating fan
3. Fan chamber door
4. Fuse
5. Time control
6. Connection for Thermista-stat/room thermostat
7. Terminal block
8. Data badge
9. Overheat (limit) control
10. Multifunctional control
11. Pilot burner
12. Main burner assembly
13. Gas connection
14. Gas service cock (supplied loose)
15 Draught diverter
16. Airflow sensor (Modairflow models)
17. Fan control (non-Modairflow models)
18. Control panel (non-Modairflow models)
19. Control panel (Modairflow models)
20. Piezo unit

Modairflow uodels only:-

21. Electronics module
22. Thermista-stat (supplied loose)

WATER HEATER (Eljan or Janus)

23. Flue cap connection
24. Water heater body
25. Flow connection Rp¾ female
26. Return connection Rp¾ female
27. Solenoid valve (Eljan only)
28. Pilot burner
29. Thermostat capillary/phial
30. Burner and controls assembly
31. Gas connection
32. Water temperature control knob
33. Start button
34. OFF button
35. Gas feed pipe
36. Data plate

THIS APPLIANCE CONFORMS TO BS800

Installation shall be in accordance with:-

Building Standards (Scotland) (Consolidation) Regulations

Building Regulations

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

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

BS6891 Specification for Installation of Low Pressure Gas Pipework of up to 28mm (RI) 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“

Model and Local Authority Byelaws

BS5546 Installation of Domestic Hot Water Supplies

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. HEATER COMPARTMENT AND CLEARANCES (See BS5864)

When the heater is fitted into a compartment, a minimum clearance from the compartment walls of 25mm(lin) at the sides and rear and 25mm(lin) 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 I 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 lit 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. In slotfit installations (see instructions packed with the Slotfit Kit TS40), the slot fit compartment must comply with the relevant section of BS5864.

In slotfit installations (see instructions packed with Slot Fit Kit TS40), the slot fit compartment must comply with the appropriate sections of BS 5864. Side and rear clearances should be no less than 6mm(¼in).

In free-standing installations (see instructions packed with Top Closure Kit TCS40), only one or two walls will be in contact with the air heater and therefore this must comply with the relevant section of BS5864.

The base duct on which the air heater stands must be placed only on a non-combustible floor. A BT50 Base Tray is available for fitting the heater directly onto combustible floors.

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 81cm^2 (12in^2). 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, via a 125mm(5in) nominal bore pipe, connected to a return air duct or plenum from a ventilated area and fitted with a lockable damper. The damper should be adjusted to control combustion air flow to 0.0137m^3/s(29cfm) i.e. 1.1lm/s(220ft/min) velocity in a 125nim(5in) 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.

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, and assume that an Eljan (or Janus) water heater is fitted.

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(s) 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	448cm^2(69in^2)
	High level grille	224cm^2(34in^2)
Ventilated from outside building	Low level grille	224cm^2(34in^2)
	High level grille	112cm^2(17in^2)

4.DUCT SYSTEM

(See British Design Manual - Gas fired Warm Air Heating)

4.1 Return Air

All return air must he POSITIVELY ducted from outside the compartment to the top of the unit, either via a plenum or, if appropriate, using Side Return Air Kit SR50. It is recommended that the return air duct is not routed 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 not be less than 300mm × 250mm(12" × 10"). If flexible duct is used the duct diameter should not be less than 350mm(14”) dia. The return air grille should have a free area of not less than 1195cm^2(185in^2).

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^2/kw (Iin^2/250Btu/h) of heat supplied to the room. The only exceptions are kitchens, bathrooms and w.c. ’s.

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

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

4.2 Warm Delivered Air.

All ductwork, including riser ducts, should be fully insulated with 50mm(2in) fibreglass 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, which equalises the air pressure to supply ducts, must be constructed to support the weight of the heater, which 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.

5. INSTALLATION REQUIREMENTS

NOTE:

For water heater Installation Instructions see separate instructions ZZ360 (Eljan) or ZZ180 (Janus).

5.1 FLUES

(see British Standards BS5440 Pt. 1 Flues)

a) All joints must be soundly sealed.

b) The flue should be kept as short and warm as possible.

c) Sufficient support brackets must be installed to bear the weight of the total flue system.

d) 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.

e) A split collar should be fitted to provide for flue maintenance or inspection.

f) 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.

g) All materials must be in accordance with local Gas Region and Building Regulations requirements.

h) 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(lft) run of offset (measured horizontally) there must be lm(3ft) of vertical flue.

i) Special consideration must be given to external flues with a view to prevention of condensation and weathering problems.

j) 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 lm(3ft.) from any vertical or inclined roof structure must be allowed for.

k) 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 and that there is provision for examination and servicing.

IMPORTANT:

Before installing the appliance, carry out a visual check of the flue system as directed in the relevant section of BS5440 Pt. 1, then check the flue performance as follows:-

a) Close all doors and windows in the room in which the appliance is to be installed.

b) Introduce some heat into the flue, using a blow torch or other means.

c) Carry out a flow visualisation check with a smoke pellet at the intended position for the appliance. Ensure that there is discharge of smoke from the correct terminal only, and no spillage into the room.

Smoke coming out of other than the correct terminal only, or a downdraught or ‘no flow’ condition, indicates that the flue has failed the test, and the appliance shall not be connected until the defect has been found and rectified, and the test satisfactorily completed.

5.2 ELECTRICAL

Mains.

The heater is supplied with mains cable (PVC sheathed, high temperature resistant, 3-core Brown-Blue-Green/Yellow, 5A, 0.75mm^2), connected to a terminal block and exiting through the heater at the top right hand front. The cable is suitable for a 240V 50Hz single phase supply and must be protected by a 3 amp fuse, and an earth wire must be connected. A double pole switch or fused spur box should be used. All wiring must be to IEE regulations.

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.

Thermista-stat/room thermostat and its location.

a) The Thermista-stat/room thermostat should be located where there is free air circulation approx. 1.5m(5ft) from the floor.

b) 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 windows, or on an outside wall.

iii) Where affected by warm air ducts, diffusers, waste pipes or the heater itself,

iv) Where subject to vibration.

For Modairflow units, connect the Thermista-stat wires to terminals numbered 4 and 5 on the control panel (see Fig. 6a). When connecting the Thermista-stat, correct polarity must be observed i.e. + side on control panel to + side on Thermista-stat.

For conventional (non-Modairflow) controls, connect the room thermostat wires to terminals numbered 16 and 17 on the control panel (see Fig. 6b).

5.3 GAS (Set; BS5864 and BS6891)

An independent gas supply pipe from the meter is to be preferred wherever possible. However, when this is not possible, the pipe must be capable of taking the complete input of the heater and all other gas appliances being served by this same pipe. This supply should be suitably sized to conform to British Standards requirements of no more than 1.0 mbar (0.4in wg) pressure drop (See table of discharge in BS6S91).

The ½in union gas cock (supplied loose) 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 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 Rc½ (½in B.S.P. external (taper) thread).

6. COMMISSIONING

6.1

Ensure that gas and electrical supplies are off.

6.2

Test for soundness and purge the whole gas pipe as described in BS6891. To assist in determining where a gas connection may not be tight, a leak detection fluid should be brushed around the connection. Under no circumstances should a flame used to locate a gas leak.

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 conform to design specifications.

6.5

Check that return air, relief air and ventilation air installation is adequate.

6.6

Check that both the fan and overheat (limit) 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 (limit) control setting is 200°F and must NOT be adjusted.

6.7

With the fan chamber door and air filter removed:-

Modairflow models: Set the fan selector switch to CONTINUOUS and turn the balancing screw fully clockwise (maximum speed).

Non-Modairflow models: Set the fan speed selector plug to a number appropriate to the desired heater output e.g. for maximum output set plug to number 5.

6.8

Replace the fan chamber door and filter, then test the pilot connection for soundness and light the pilot as follows:-

6.8.1

Test the pilot connection for soundness thus:-

a) Disconnect the igniter connection at the piezo unit, and the two electrical connections to the multifunctional control.

b) Disconnect the pipe union at the multifunctional control inlet, remove the two screws securing the burner tees and remove the burner assembly.

c) Reconnect the burner outside the combustion chamber to give access to the pilot connection.

d) Reconnect the igniter to the piezo unit, then turn on the gas supply (not the electrical supply).

e) Light the pilot burner as described in 6.8.2 d) and e) below and test the pilot gas connection for soundness, using a proprietary leak detection fluid.

f) If any leakage occurs, turn off the gas, remove the piezo electrode and, if necessary, the thermocouple. Seal the leak, refit the thermocouple and electrode and repeat from e).

g) Refit the burner assembly into the combustion chamber.

6.8.2 Light the pilot burner thus:-

a) Turn the Thermista-stat/room thermostat to the lowest or OFF setting.

b) 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.

c) 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 electrical supply is OFF, that the time control is in an OFF position and that the selector switch is in the OFF position.

d) Push the START BUTTON (marked with the flame symbol) on the multi-functional control (see Fig. 3) fully in and hold it in. Repeatedly push and release the lighting button until the pilot is alight. N.B. If the piezo unit should fail to spark, the pilot burner may be lit by applying a lighted taper to the pilot whilst the START BUTTON is pushed in.

e) 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 step d).

f) Adjust the pilot flame if necessary (a low energy pilot is fitted, which requires the pilot adjustment screw to be screwed four full turns anticlockwise from closed (see Fig. 2 and Fig. 3)).

g) When the pilot is alight, 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.

h) Using a proprietary leak detection fluid, test for gas soundness the supplies and connections from the multifunctional control to the pilot and main burners. Seal any leakages after turning off the heater.

Fig. 2

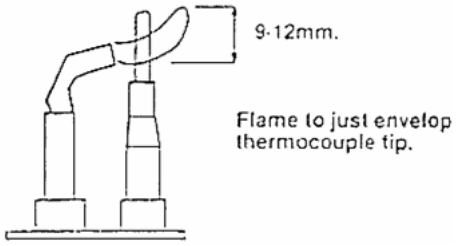
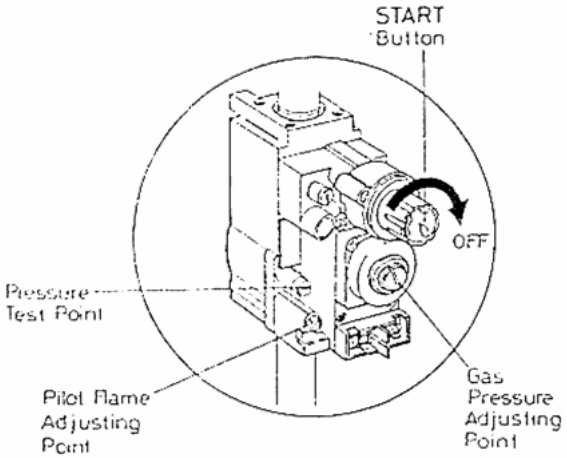


Fig. 3



6.9

Allow the heater to operate for 15 min., then adjust the burner pressure to the output required (see Fig. 3 and Table 2).

NOTE:

Heaters are factory set to a burner setting pressure giving high rate output i.e. 14.65kW(50.000Btu/h) at 14.2mbar(5.7in.wg).

To adjust the burner pressure, remove the cover from the gas pressure adjusting point (see Fig. 3) and turn the flow rate screw clockwise to increase, anticlockwise to decrease.

Fix the pressure set arrow under the appropriate column on the data badge.

Turn off the heater before removing the pressure test gauge and retightening the pressure test point screw. Test the pressure test point for gas soundness, using a proprietary leak detection fluid, and replace the cover on the adjustment point.

6.10 Balance the warm sir system as follows:-

Light the main burner and leave it to operate for at least 15 minutes.

With the fan chamber door in place, 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 speed to increase temperature rise.

On Modairflow units, maximum fan speed is altered by adjusting the balancing screw on the Modairflow control module (clockwise to increase).

On non-Modairflow units, the fan speed is altered by changing the position of the fan speed selector plug on the control panel. (See Fig. 5 for fan performance curves).

Balance the system to give the required volume proportions at the warm air outlets.

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.

a) Modairflow controls:-

With the 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 room temperature is under control, the main burner will cycle on and off at approximately 1¼ to 2 minute intervals. The fan will run continuously at lower speeds.

b) Non-Modairflow controls:-

With the time control on, increase the room thermostat setting slowly until the main burner ignites. Shortly afterwards the fan will start. When 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, followed by fan operation.

6.12 Safety checks

Check (he '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.

Check the overheat (limit) 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.

With heating system on:-

Check for gas soundness within the appliance.

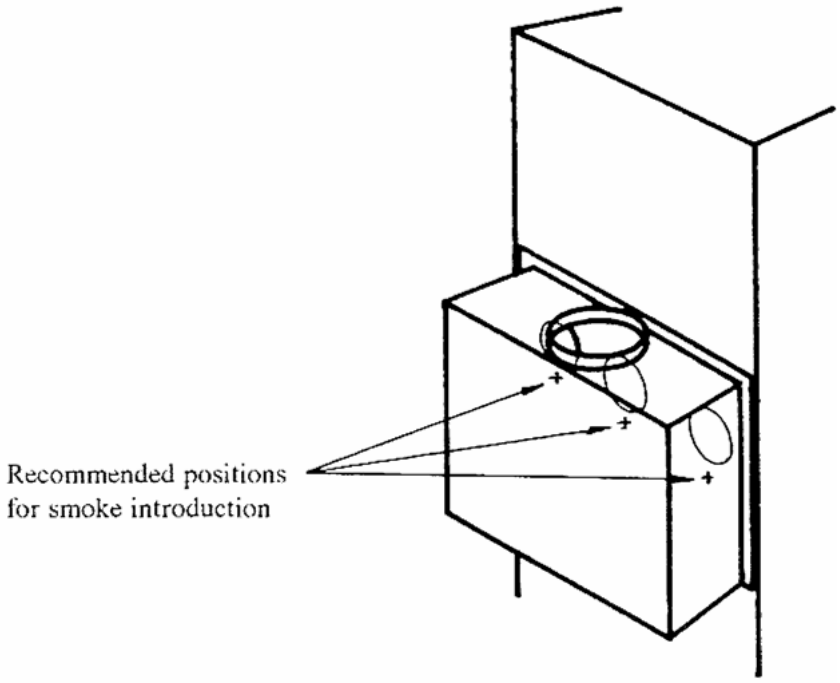
Check that the flue operates effectively with heating system on, all doors closed and extractor fans, if fitted, running, then, after connection to the flue system, follow the lighting procedure and run the appliance for twenty minutes to preheat the flue. Use the following procedure to test for spillage:-

a) **If the draught diverter is accessible**, introduce smoke, e.g. by means of a puffer or smoke match, into the draught diverter adjacent to an exit from the heat exchanger (see Fig. 4). Spillage is indicated by displacement of smoke downwards and out of the draught diverter.

b) **If access to the draught diverter is not possible, or if it is not visible,** insert a lighted smoke pellet, or part of a pellet, on a non-combustible support into, but not in contact with, the heal exchanger. Turn off the appliance. Spillage is indicated by the discharge of smoke from the draught diverter. In a compartment this would be indicated by the presence of smoke within the compartment.

c) In the case of a fan in an adjoining or adjacent room, the spillage test procedure must be carried out with interconnecting doors open.

Fig. 4



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8.8 To remove pilot burner and spark electrode:-

With burner assembly removed (see 8.1),

Disconnect the thermocouple and pilot supply tube from the multifunctional control. Unscrew the two electrode assembly bracket securing screws and remove the electrode assembly. Disconnect the pilot tube and thermocouple from the pilot assembly and remove the pilot.

NOTE:

be careful a) not to lose or damage the pilot injector, and b) after reassembly, to check that the gap between the spark electrode and the burner tip is 2.5mm approx.

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 non Modairflow: -

Ensure that the mains supply is off.

Disconnect the mains lead from the terminal block.

Disconnect the Thermista-stat/room thermostat wires from the terminal block.

Disconnect the wires from the airflow sensor/fan control (note - remove the fan control cover), overheat (limit) switch and multifunctional control.

Disconnect the electrical supply to the Eljan water heater (if fitted).

Disconnect the fan leads at the terminal block on the fan.

Remove the grommet and pull the wires through the fan compartment floor.

Unscrew the four securing screws and remove the control panel assembly.

8.11 Electronics module removal - Modairflow model only:-

Ensure that the mains supply is off.

Unscrew the three securing screws and remove the electronics module.

Disconnect fittings ‘C’ and ‘D’ (see Fig. 6a) from the electronics module.

8.12 Air circulating fan removal and cleaning:-

With the fan chamber door and control panel removed:-

Remove the fan retaining screws.

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.

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.

8.13.1 To replace time control:-

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

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

8.14 To replace the transformer (Modairflow models only):-

With control panel removed (see 8.10),

Disconnect the wires from the terminal block on the rear of the panel.

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.

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 exchange 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.

9. FAULT FINDING

IMPORTANT:

If an electrical fault occurs after installation of the appliance, preliminary earth continuity, polarity, and resistance to earth checks should he carried out with a multimeter. 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 repeated.

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 pages 13 & 14 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 electronic assemblies, viz. electronics module, airflow sensor and 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.	Check for gas at inlet pressure test point on multi-functional control.
	(ii) Gas supply pipe not purged.	Purge gas supply pipe in accordance with BS 6891.
	(iii) Pilot orifice restricted.	Clean pilot injector orifice carefully, or replace injector.
	(iv) Piezo system faulty.	Check/replace piezo unit, lead or electrode.
(b) Pilot lights but goes out on releasing START button during initial light-up, or after normal operation.	(i) Connection between thermocouple and multi-functional control not secure.	Check connection is secure.
	(ii) Faulty power unit on multifunctional control.	Replace multi-functional control.
	(iii) Faulty thermocouple.	Replace thermocouple.
	(iv) Pilot flame too small.	Adjust.
	(v) Pilot orifice restricted.	Clean pilot injector orifice carefully or replace 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 pressure setting high.	Check gas rate and burner pressure setting.
	(ii) Temperature rise excessive.	Adjust fan speed or gas rate accordingly.
	(iii) Air filter or return air path restricted.	Check filter is clean and air path is clear.
	(iv) Excessive number of outlets closed.	Open additional outlets.
(e) Main burner operating with intermittent fan operation.	(i) Gas rate or burner pressure setting.	Check gas rate and burner pressure setting.
	(ii) Fan control settings incorrect.	Check settings.
(f) Fan runs for excessive period or operates intermittently after main burner shuts down.	Fan control settings incorrect.	Check settings.
(g) Noisy operation	(i) Gas pressure too high.	Check burner pressure setting.
	(ii) Noisy fan motor.	Replace fan.
	(iii) Fan speed setting too high.	Adjust fan speed.
Modairflow Control Heaters only:-		
(h) Incorrect operation of fan or main burner.	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.	Check mains supply.
	(ii) Controls not calling for heat.	Check that time control (if fitted) and room thermostat are operating correctly.
	(iii) 3A fuse failed.	Replace. If failure occurs again, check external room thermostat leads for short to earth.
	(iv) Loose connection on room thermostat, overheat control, gas control lead, time control, or transformer.	Check connections for soundness.
	(v) Transformer open circuit.	Check with test meter and replace electrical panel if necessary.
	(vi) Multi-functional control faulty.	Replace multi-functional control.
	(vii) Multi-functional control governor faulty.	Replace multi-functional control.
	(viii) Overheat control faulty.	Short across control and replace if necessary.
	(ix) Room thermostat or external wiring faulty.	Fit temporary loop in heater thermostat socket. If heater fires, external circuit or room thermostat is faulty.

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).

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

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

24V detected at C10
Replace electronics module.

No voltage
Replace transformer.

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.

Voltage detected
Check overheat control connections and operation.

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

Voltage detected
Multifunctional control faulty.

FAN ON, BUT BURNER CYCLING BEFORE DESIRED R TEMPERATURE REACHED

Bridge out Thermista-stat.

Burner continues to cycle
Check if overheat control is operating.

Overheat control operating
Check temperature rise.
if less than 60°C, replace overheat control.
Check air filter and return air path for restriction.
Check burner pressure is not excessive.

Fan speed too low
Check 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 attains maximum speed
Replace airflow sensor.

Fan attains low speed
Replace electronics mo

Overheat control not
Replace electronics mo

Burner remains on
Thermista-stat fault.

Fan remains at low sp
Replace electronics mo

MAIN BURNER NOT CYCLING (ROOM TEMPERATUR HIGH)

Disconnect Thermista-stat

Burner goes out
Replace Thermista-stat.

Burner goes out
Replace electronics module.

Burner remains ON
Disconnect wire at mul functional control.

Burner remains ON.
Replace multifunctional

MAIN BURNER ON, BUT FAN NOT OPERATING

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

- **No voltage** — Bridge air flow sensor.
  - **Fan starts** — Replace airflow sensor.
  - **Fan fails to start** — Check for voltage between pink and earth wires.
    - **No voltage** — Replace fuse or transformer.
    - **Voltage detected** — Replace electronics module.
- **Voltage detecteds** — Fan motor faulty.

FAN CONTINUES TO RUN OR CYCLES AFTER HEA 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 airflow sensor.

- **Fan stops** — Check that pilot flame is not too large.
- **Fan continues to ru** — Replace electronics

MAIN BURNER FIRES FOR BRIEF PERIOD ONLY

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

- **Burner lights and remains on**
  Reconnect Thermista-stat at heater.
  Check polarity by interchanging external Thermista-stat leads.
  Bridge out Thermista-stat leads at Thermista-stat.
  - **Burner remains on** — Thermista-stat faulty.
  - **Burner does not remain on** — Break in external circuit to Thermista-stat.
- **Burner does not remain on** — Replace electronics module.

Fig. 6a Modairflow circuit diagram

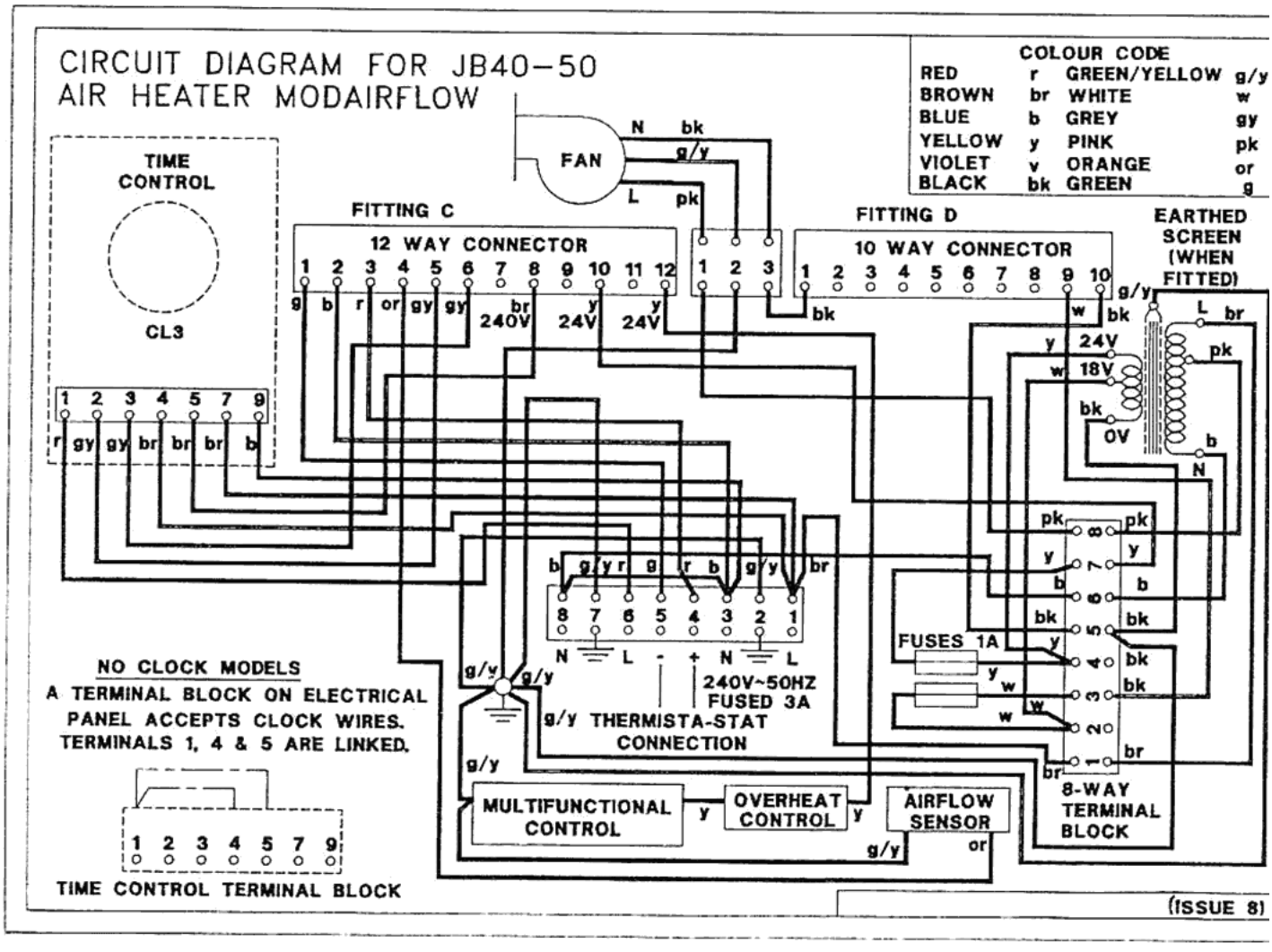
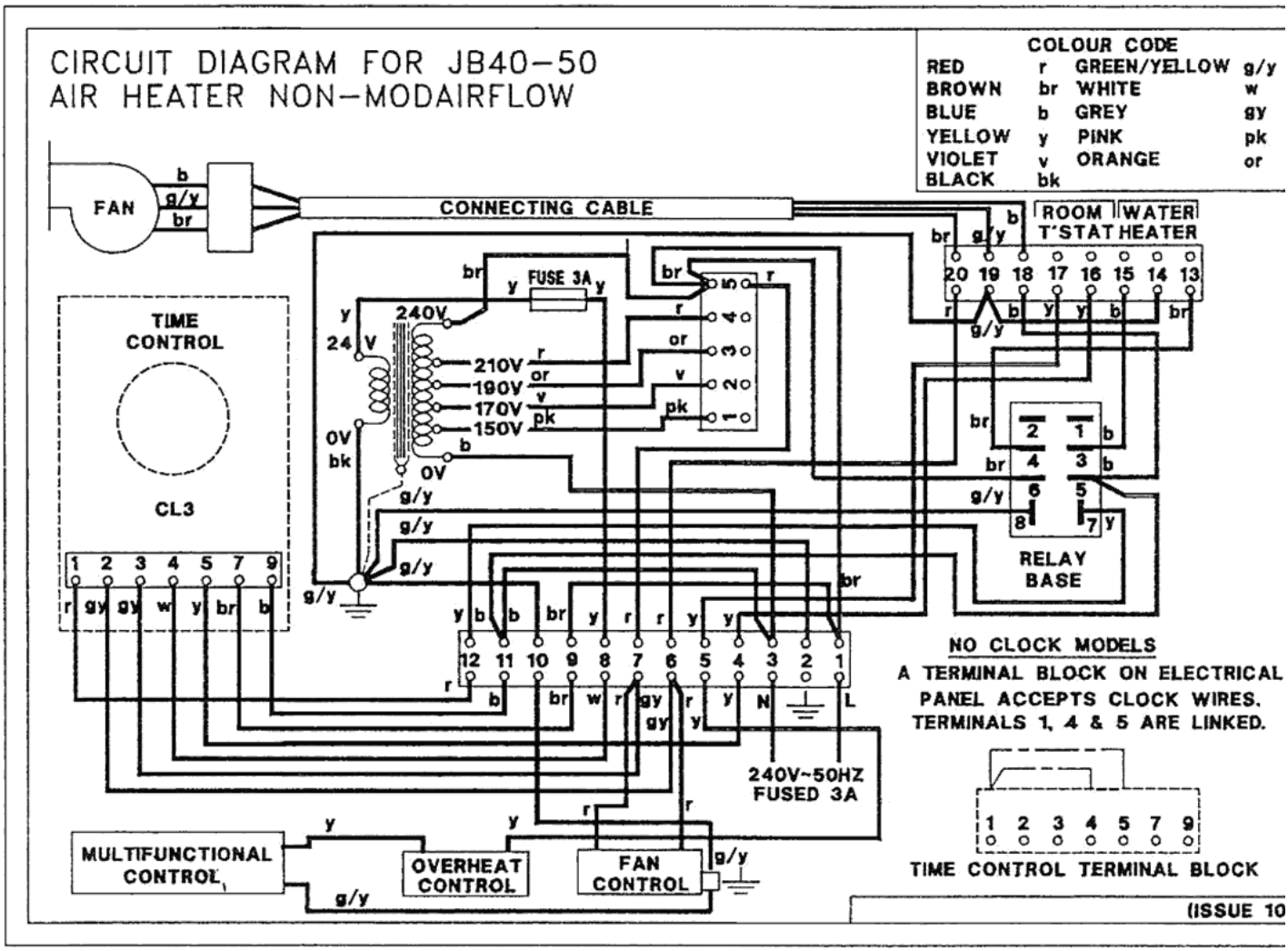
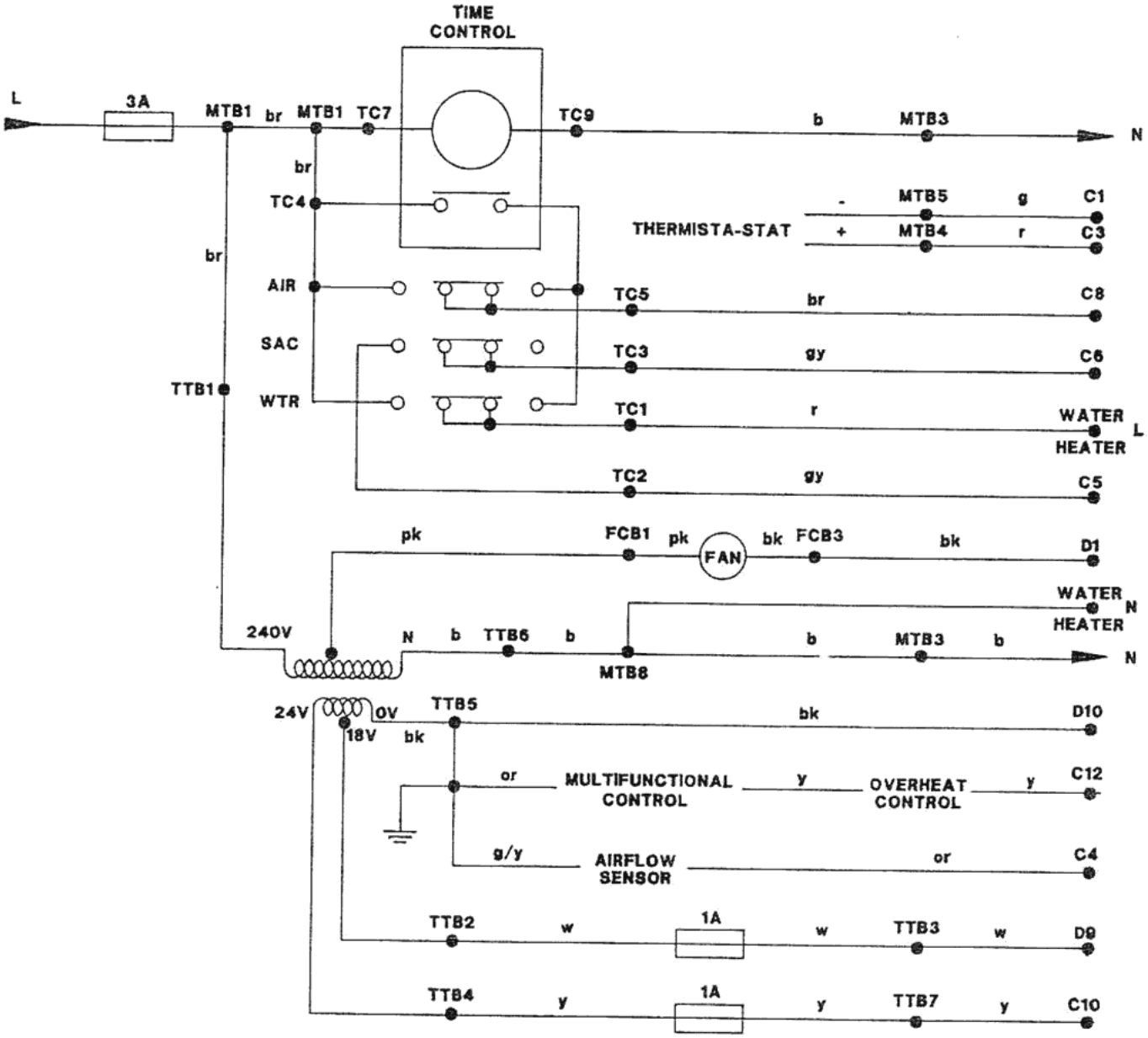


Fig. 6b Non-Modairflow circuit diagram



Functional flow wiring diagram - Modairflow

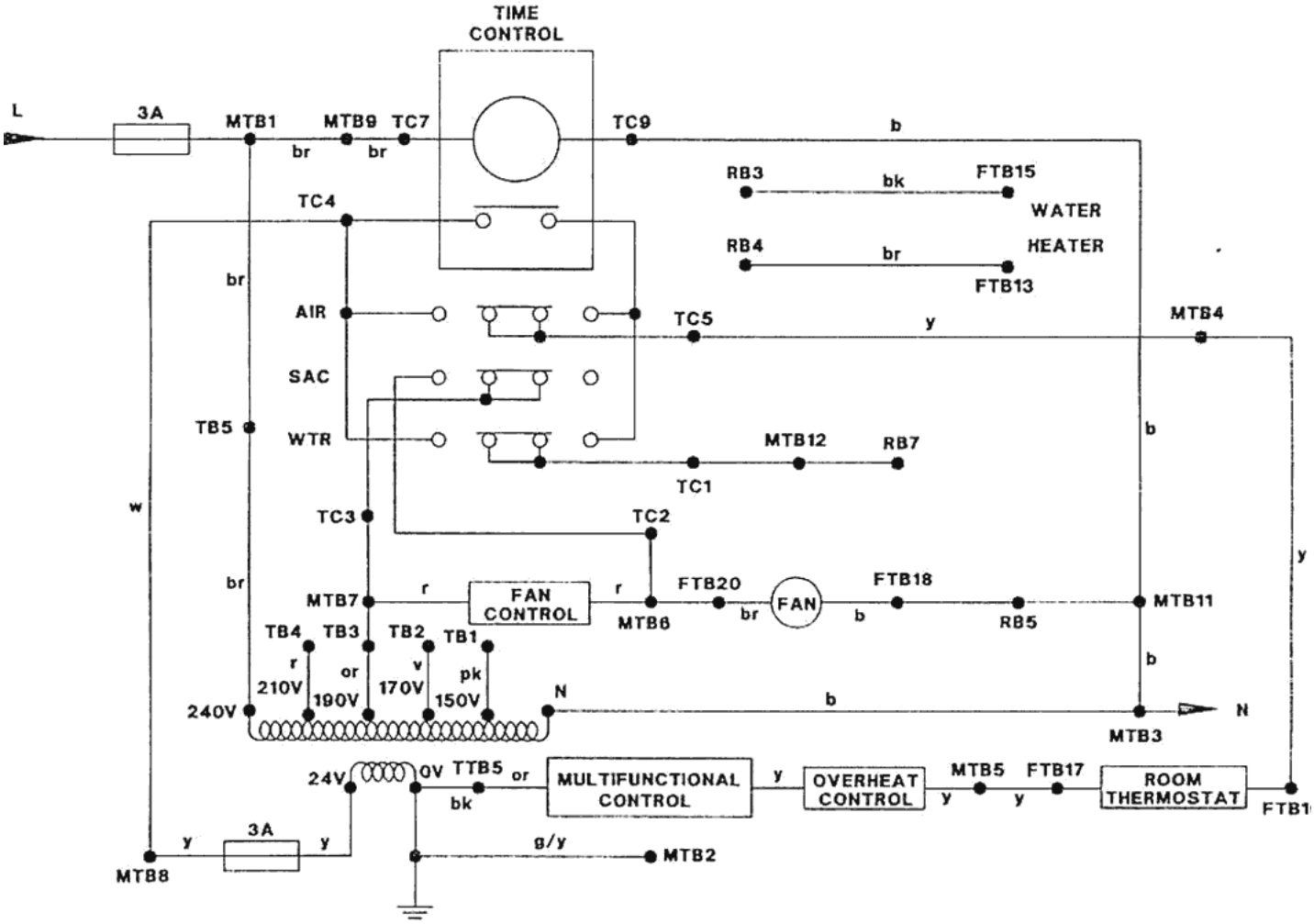


C	MODAIRFLOW 'C' FITTING
D	MODAIRFLOW 'D' FITTING
MTB	MAINS TERMINAL BLOCK
TC	TIME CONTROL
TTB	TRANSFORMER TERMINAL BLOCK

COLOUR CODE

RED	R
BROWN	Br
BLUE	b
YELLOW	Y
VIOLET	V
BLACK	Bk
GREEN/YELLOW	g/y
WHITE	w
GREY	gy
PINK	pk
ORANGE	or

Functional flow wiring diagram - non-Modairflow



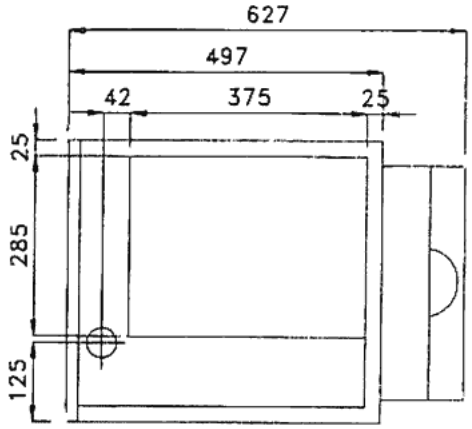
FTB	FAN TERMINAL BLOCK
RB	RELAY BASE
MTB	MAINS TERMINAL BLOCK
TC	TIME CONTROL
TB	TRANSFORMER TERMINAL BLOCK

COLOUR CODE

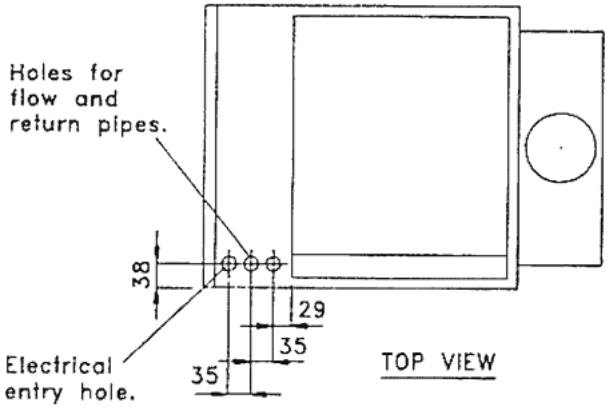
RED	R
BROWN	Br
BLUE	b
YELLOW	Y
VIOLET	V
BLACK	Bk
GREEN/YELLOW	g/y
WHITE	w
GREY	gy
PINK	pk
ORANGE	or

Dimensions in millimeters

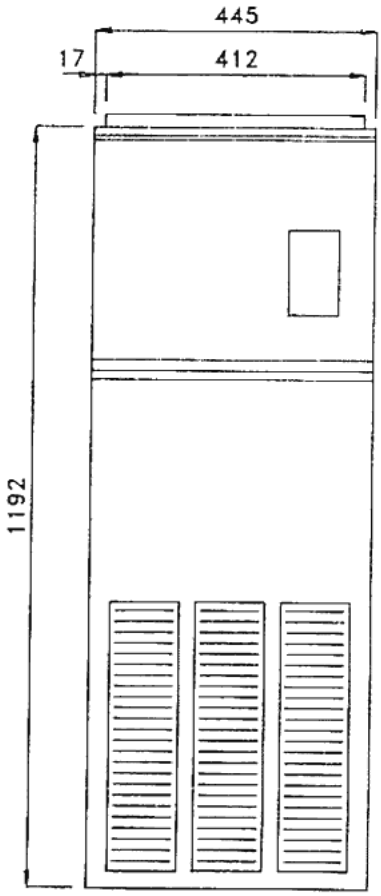
JB40-50 Principal Dimensions



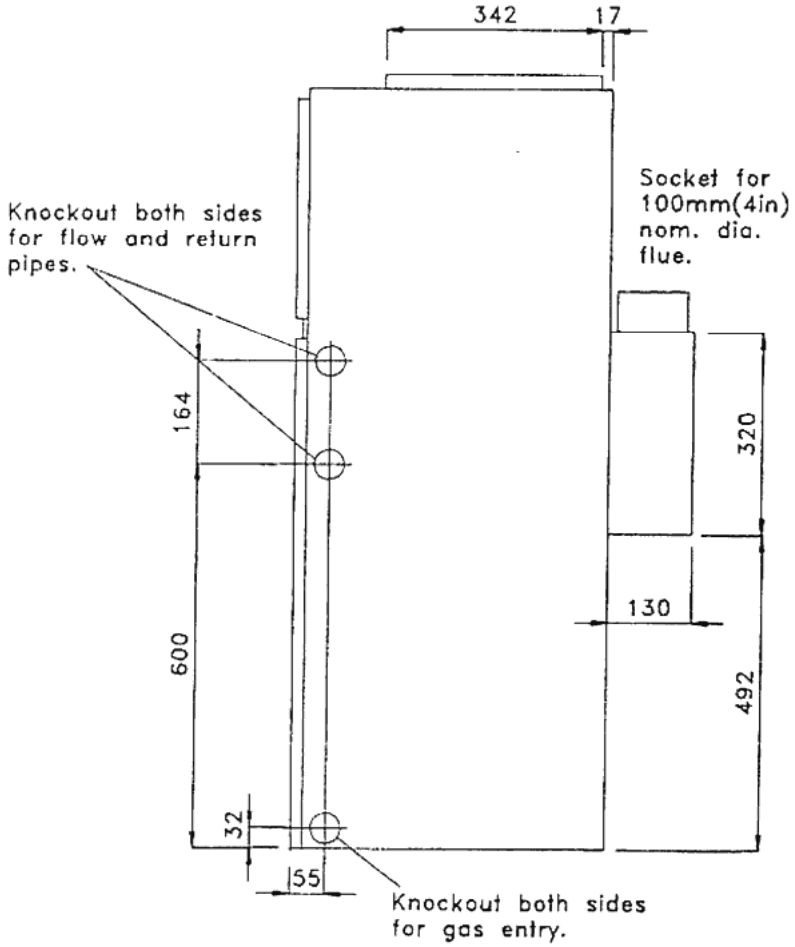
BASE VIEW



TOP VIEW



FRONT VIEW



SIDE VIEW