



JT19-25 Mk 2 WARM AIR HEATER (MODAIRFLOW & Conventional Control)

Installation & Maintenance **Instructions**

(56.53)
UDC 697.3
Publication ZZ 302/5

The JT19-25 Mk2 is a Gas Fired Warm Air Heater for open flue application. Output is adjustable between 5.6kW — 7.3kW (20MJ/h, 19,000 — 26.4MJ/h; 25,000 Btu/h) and there is 5 speed fan adjustment. CIRCULATOR WATER HEATERS — all air heaters have provision for the internal fitting of a JANUS 3, or ELJAN or a HIJAN circulator.

If a water heater is provided factory fitted, the heater designation is JT19-25 Mk2 JAN ELJ or HIJ depending on requirement.

To fit a water heater on site, obtain from Johnson & Starley Ltd. a Janus 3 Water Heater and LK19 Fittings Kit.

To fit HIJAN order a HIJAN S and LK19 and HEI192 Fittings Kit.

To fit ELJAN order an ELJAN S and LK19 and HEI192 Fittings Kit.

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1. COMPONENTS CHECK NB: Check that Gas Group on heater data plate is as required

JT19-25 Mk 2 AIR HEATER

- 1 Air Filter
- 2 Air Circulating Fan
- 3 Fan Speed Regulator (Modairflow model)
- 4 Balancing Knob (Modairflow model)
- 5 Fan Override Switch (Modairflow model)
- 6 Heat Exchanger Access Cover
- 7 Data Plate
- 8 Time Control
- 9 Multifunctional Gas Control
- 10 Pressure Test Point
- 11 Fan Switch and Cover (Basic model)
- 11A Air Flow Sensor (Modairflow model)
- 12 Overheat Limit Switch
- 13 Lighting Port
- 14 Pilot Burner
- 15 Burner Bar Assembly
- 16 Thermosta-stat (Modairflow model)
- 17 Fan Speed Selector (Basic model)
- 18 3A Fuse (Basic model)
- 18A 1.5A Fuse (Modairflow model)
- 19 Electrical Panel (Basic model)
- 19A Electronic Panel (Modairflow model)

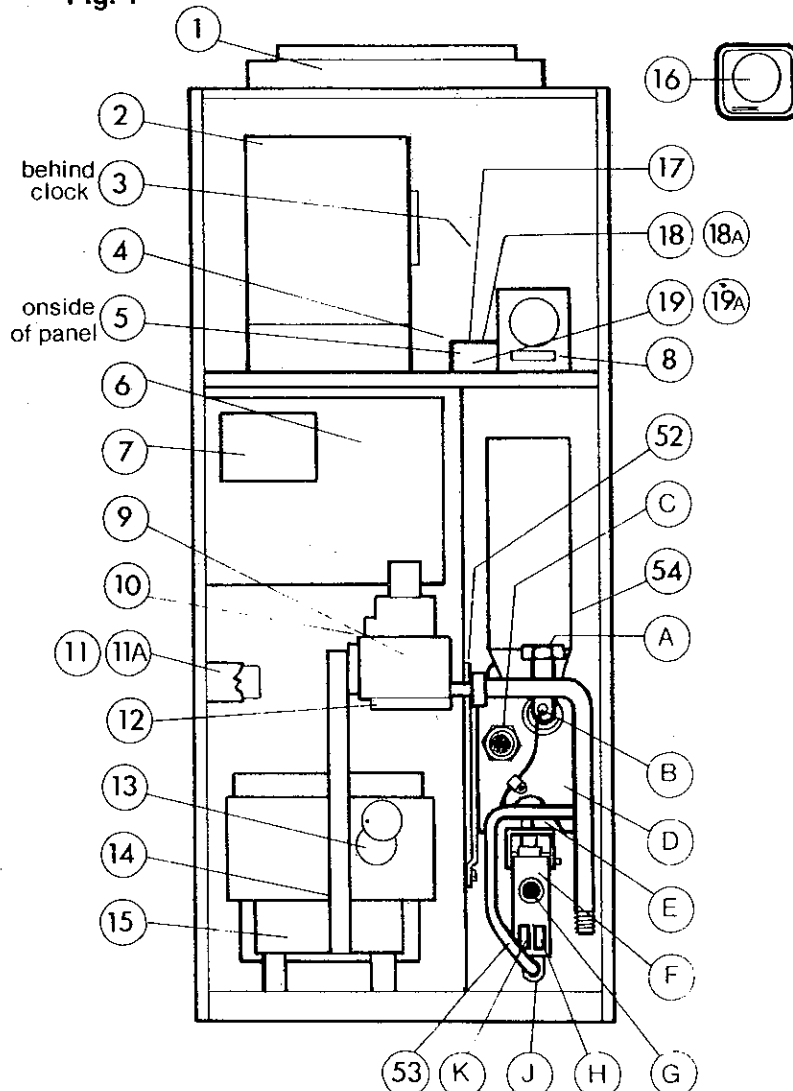
LK19 WATER HEATER FITTINGS KIT

- 52 Water Heater Mounting Bracket
- 53 Gas Feed to water heater
- 54 Flue Cap and Connection

JANUS WATER HEATER

- A 'Flow' connection — 3/4" B.S.P. female
- B Thermostat Phial
- C 'Return' connection — 3/4" B.S.P. female
- D Water Heater Body
- E Pilot Burner
- F Burner and Controls
- G Water Temperature Control Knob
- H 'START' Button
- J Gas Connection
- K 'OFF' Button

Fig. 1



IMPORTANT: It is the law that all gas appliances are installed by competent persons eg Corgi dealers, in accordance with the Gas Safety (Installation and Use) Regulations 1984. Failure to install appliances correctly could lead to prosecution.



Items:—		
Gas Tap	1	} supplied in linen bag
Draught Diverter		
Fixing Screws	2	
Draught Diverter	1	

2. WARM AIR INSTALLATION REQUIREMENTS

Installation shall be in accordance with:

Building Standards (Scotland) (Consolidation) Regulations
Building Regulations
Gas Safety (Installation and Use) Regulations (1984)

Institute of Electrical Engineers (I.E.E. Regs.)
British Standard Code of Practice CP331 Pt. 3
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"

(a) Ventilation of Heater Compartment

	Ventilation from inside building	Ventilation from outside building
Low Level Grille	free area 269cm ² (41in ²)	135cm ² (21in ²)
High Level Grille	free area 135cm ² (21in ²)	67cm ² (10in ²)

The above area allow for combustion air for HIJAN water heater.

Combustion air may be introduced, if required, via a dampered 100mm (4in) nominal bore pipe, connected to a ventilated area. The damper should be adjusted to control combustion air flow to 0.0083m³/s (17.6cfm) i.e. 1.06m/s (210 ft/min) velocity in a 100mm bore pipe). If this arrangement is used, a non-closeable 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.

(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 36 cm² (5 in²).

(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 cm² per MJ/h (1 in² per 250 Btu/h) of designed heat input to the rooms they serve.

3. PREPARATION

(a) **Flues.** A single 100mm (4") 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 0.75mm²) and can leave the heater from either side or top. This cable, suitable for 240V, 50 Hz, single phase supply, must be protected by a 3A fuse and the earth wire connected. A double pole switch 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. A 24 volt thermostat should be connected to terminals 4 and 5 as indicated on the wiring diagram fig. 8.

IMPORTANT MODAIRFLOW Models only

When connecting the thermista-stat, correct polarity must be observed, i.e. + connections on thermista-stat to connect to + terminal on terminal block (5).

(c) Gas Supply

The gas connection should be in 1/2" 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 of the cabinet. A 1/2" B.S.P. Union Gas Tap is supplied for external fitting. The leg of the internal tee not used must remain plugged. *Installation should conform to British Gas requirements and Building Regulations.*

(d) Heater Installation Clearances

Sides— 50mm (2in) total
15mm (9/16in) at only one side
Front— 25mm (1in) minimum
Back— 15mm (9/16in) minimum behind draught diverter

Note:- When gas and water connections are made at the side, a clearance of 75mm (3in) is required.

Servicing access required to the front of the heater is 350mm (13 3/4 in). 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 J & S Base Tray BT19. See Figs. 2 and 3.

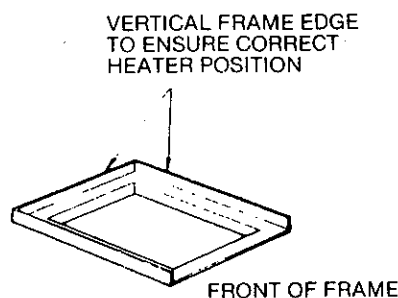


Fig. 2

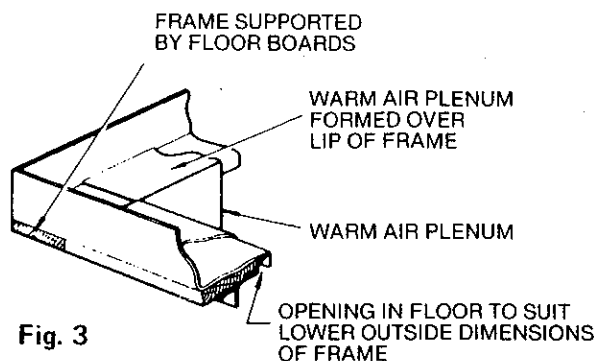


Fig. 3

4. AIR HEATER FIXING

Note: If side return air is used, fit before fixing heater.

Return Air Ducting may be connected to either side of the heater.

Procedure:

Undo screws from around filter frame and remove from top of heater, retain screws.

Undo screws from around side blanking panel and remove, retain screws.

Fix filter frame to side of heater and blanking panel to top of heater using screws removed.

- (a) FIT DRAUGHT DIVERTER over heater flue spigot on back of heater and secure with screws provided in linen bag.
- (b) POSITION HEATER ON BASE DUCT OR PLENUM — Ensure 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. WATER CONNECTIONS

NB: Water connections (flow and return) to the water heater may be from either side of the air heater.

If the 'return' is made from left hand side, pipe must be set to pass behind gas feed pipe to allow burner bar removal.

Refer to Publication JA187
for Janus water heater.

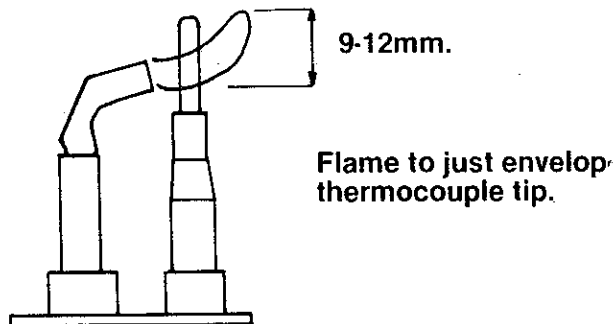


Fig. 4 Pilot flame adjustment.

6. COMMISSIONING

- (a) Check that WARM AIR DELIVERY OUTLETS are open.
- (b) Set room thermostat anticipator to 0.2 and set thermostat pointer to OFF or lowest setting.
- (c) FAN and LIMIT controls are factory set:—
FAN 110°F OFF — 150°F ON (40°F DIFF.) and can be adjusted if necessary.
LIMIT 200°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 envelops thermocouple tip. To adjust flame, identify adjustment point (see Fig. 7) and turn screw *clockwise to decrease, anti-clockwise to increase flame*. See Fig. 4.
- (h) Switch on ELECTRICITY.
- (j) Turn thermostat to MAXIMUM setting and ensure Time Control is at an ON period — Burner should light.
- (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. 5). Heaters are factory set to a pressure giving maximum output at gas group specified. To adjust pressure, remove cover from adjustment point (see Fig. 7) and turn screw *clockwise to increase, anti-clockwise to decrease pressure*. Enter pressure in blank space provided on Data Plate.
- (ii) With Fan Chamber Door in place, 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 1.5m/s (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.
- (m) Check for gas soundness.

JT19-25 Mk 2 AIR HEATER							
INPUT OUTPUT		kW	MJ/h	Btu/h	kW	MJ/h	Btu/h
		7.6	27.1	25,780	8.7	31.2	29,560
		5.6	20.0	19,000	6.5	23.2	22,000
GAS	INJECTOR	BURNER BAR GAS PRESSURES (measured hot)					
NAT	Bray Cat. 33/700	10 mbar 4.0in. wg			14 mbar 5.6in. wg.		
		kW	MJ/h	Btu/h	kW	MJ/h	Btu/h
INPUT		9.7	35.1	33,250			
OUTPUT		7.3	26.4	25,000			
GAS	INJECTOR	BURNER BAR GAS PRESSURES (measured hot)					
NAT	Bray Cat. 33/700	17 mbar 6.8in. wg					

Fig. 5

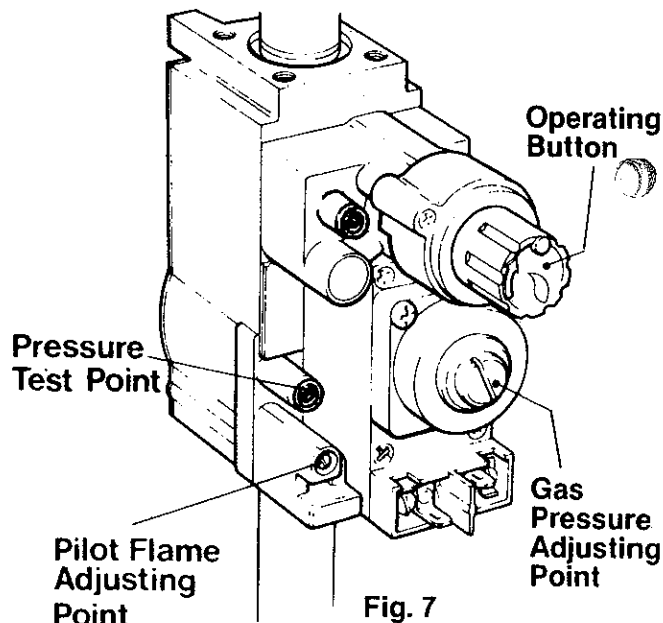
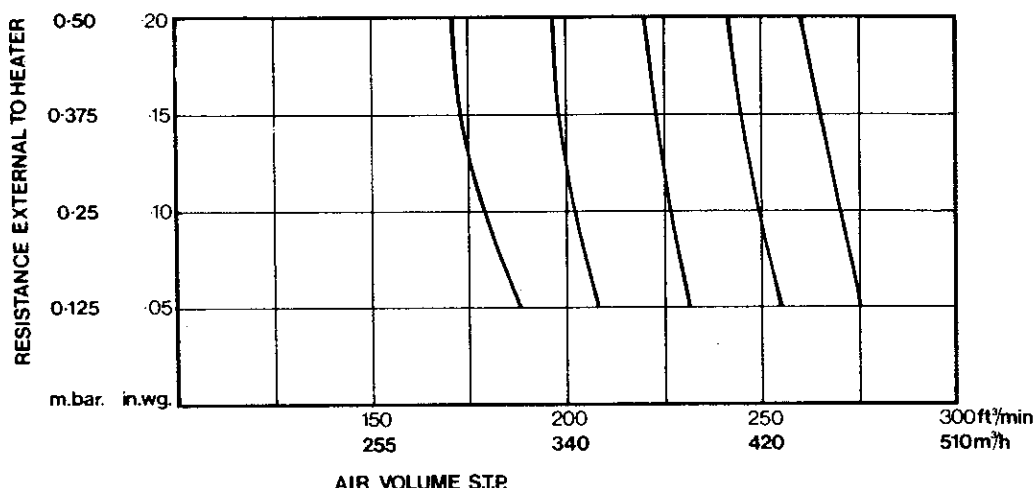


Fig 6.



7. MAINTENANCE (Recommended Annually) (For Janus maintenance see publication JA180)

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

(a) Main Burner Cleaning — with Burner Assembly removed

- Remove burner and crosslighter assembly from burner assembly.
- Undo six screws and remove cover plate.
- Carefully brush out any deposits. Clean outside of assembly.
- Replace cover plate and re-assemble burner and crosslighter assembly to burner assembly.

(b) Injector Cleaning — (Main Injector, Pilot Burner 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 and type.

(c) Thermocouple

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

(d) Fan and Fan Motor Cleaning (See Section 7 (l) for removal procedure).

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. NOTE: Recessed screw must be retightened after pressure check.

Attach a gas pressure gauge to gas pressure test point on gas control, light heater, check pressure and confirm by gas rate check at meter (see pressure table, Fig. 5). If gas pressure needs adjustment, refer to Section 6 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. 7) 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 6 (g)).

(h) Automatic Controls Inspection

Lighting the heater and allowing to run for a short time checks these controls. For access to Electrical Panel, 3A Fuse and Air Circulating Fan, remove Fan Chamber Door.

(j) Time Control Removal

Loosen fixing screw in bottom of Time Control casing, withdraw casing and disconnect leads.

(k) Electrical Panel Removal

- (i) Disconnect 3 way plug.
- (ii) Disconnect all leads from terminal block.
- (iii) Remove two fixing screws.

(l) Air Circulating Fan Removal

- (i) Disconnect 3 way plug at Electrical Panel.
- (ii) Remove fan retaining screw.
- (iii) Withdraw fan assembly, handling with care.

(m) Heat Exchanger Access

Note: Should access to the heat exchanger be necessary, proceed as follows:—

- (i) Remove access panel from bulkhead.
- (ii) Remove cover plate from front of heat exchanger together with gasket.
- (iii) Withdraw internal baffles from top of heat exchanger. Heat exchanger can be brushed through and inspected.

IMPORTANT: Replace baffles by sliding under retaining straps and push fully home. Refit cover plate complete with gasket.

8. 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.

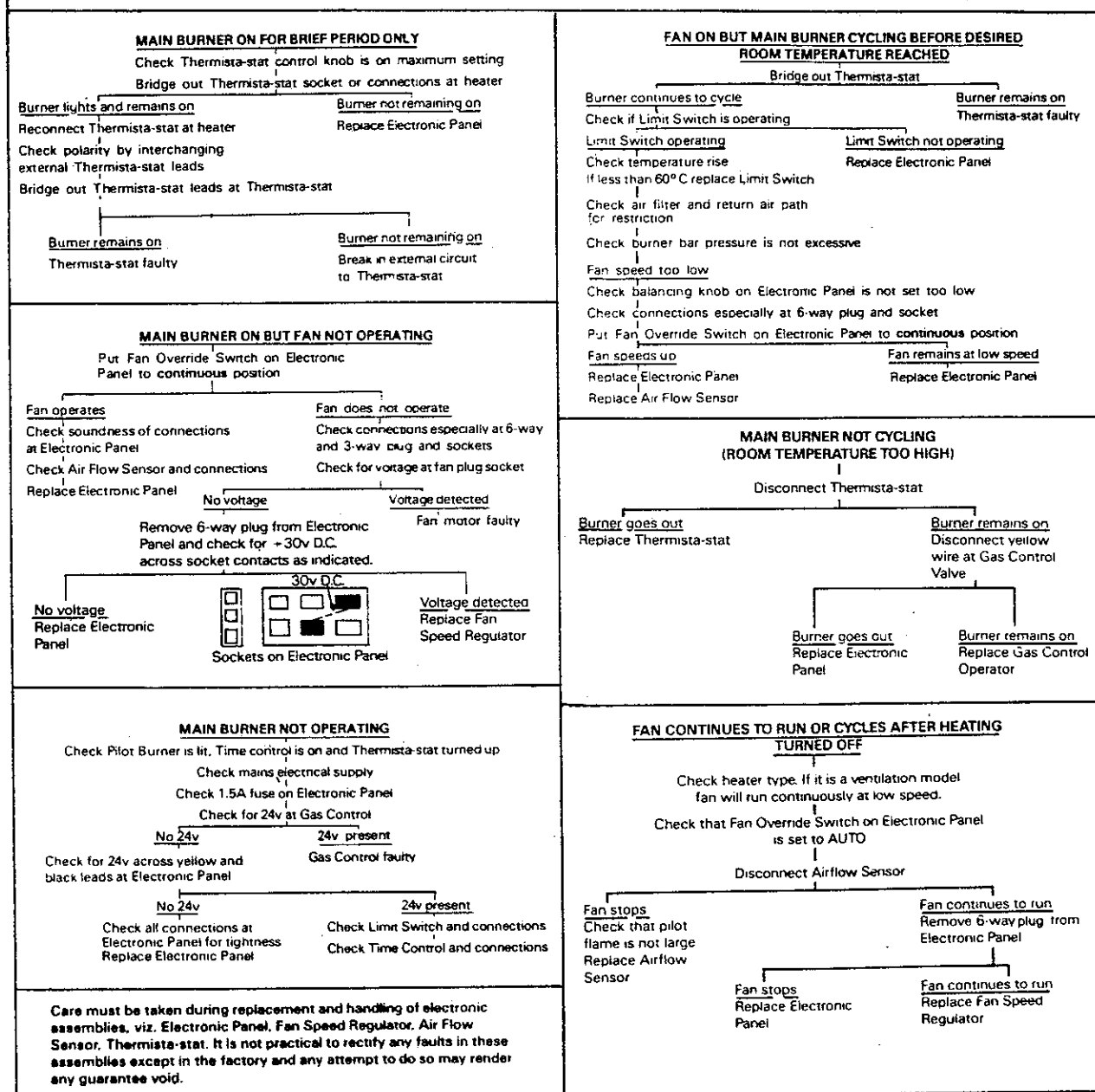
MODAIFLOW Models only:

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

Care must be taken during replacement and handling of electronic assemblies, viz Electronic Panel, Fan Speed Regulator, 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. (ii) Gas supply pipe not purged. (iii) Pilot orifice restricted.	Break service cock union and listen for escape. Break service cock union until gas is detected. Clear pilot orifice carefully or replace injector.
(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. (ii) Faulty power unit on gas control. (iii) Faulty thermocouple. (iv) Pilot flame of insufficient length.	Check connection is secure. Replace power unit. Replace thermocouple. Adjust.
Conventional Control Heaters only:		
(c) 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, Limit control, gas control head, Time control or transformer. (v) Transformer open circuited. (vi) Gas control operator faulty. (vii) Gas control governor faulty. (viii) Faulty Limit control (ix) Faulty room thermostat or external wiring.	Check mains supply. Check that time control (if fitted) and room thermostat are calling for heat. 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 operator. Replace governor. Short across control and replace if necessary. Fit temporary loop across thermostat connections on terminal block. If heater fires, external circuit or room thermostat is faulty.
(d) Main burner lights but fan fails to run.	(i) Loose electrical connection on fan control or fan plug and socket. (ii) Fan control settings incorrect (iii) Faulty fan assembly. (iv) Faulty Fan control. (v) Burner bar pressure not correct.	Check connections for soundness. Check settings. Replace, taking care not to damage impeller. Replace. Adjust pressure if necessary.
(e) Main burner operating intermittently with fan running.	(i) Gas rate or burner pressure high. (ii) Temperature rise 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 is clean and return air path is clear. Open additional outlets.
(f) Main burner operating with intermittent fan operation.	(i) Gas rate or burner pressure low. (ii) Fan control settings incorrect.	Check gas rate and burner bar pressure. Check settings.
(g) Fan runs for excessive period or operates intermittently after main burner shuts down.	Fan control settings incorrect.	Check settings
(h) 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.

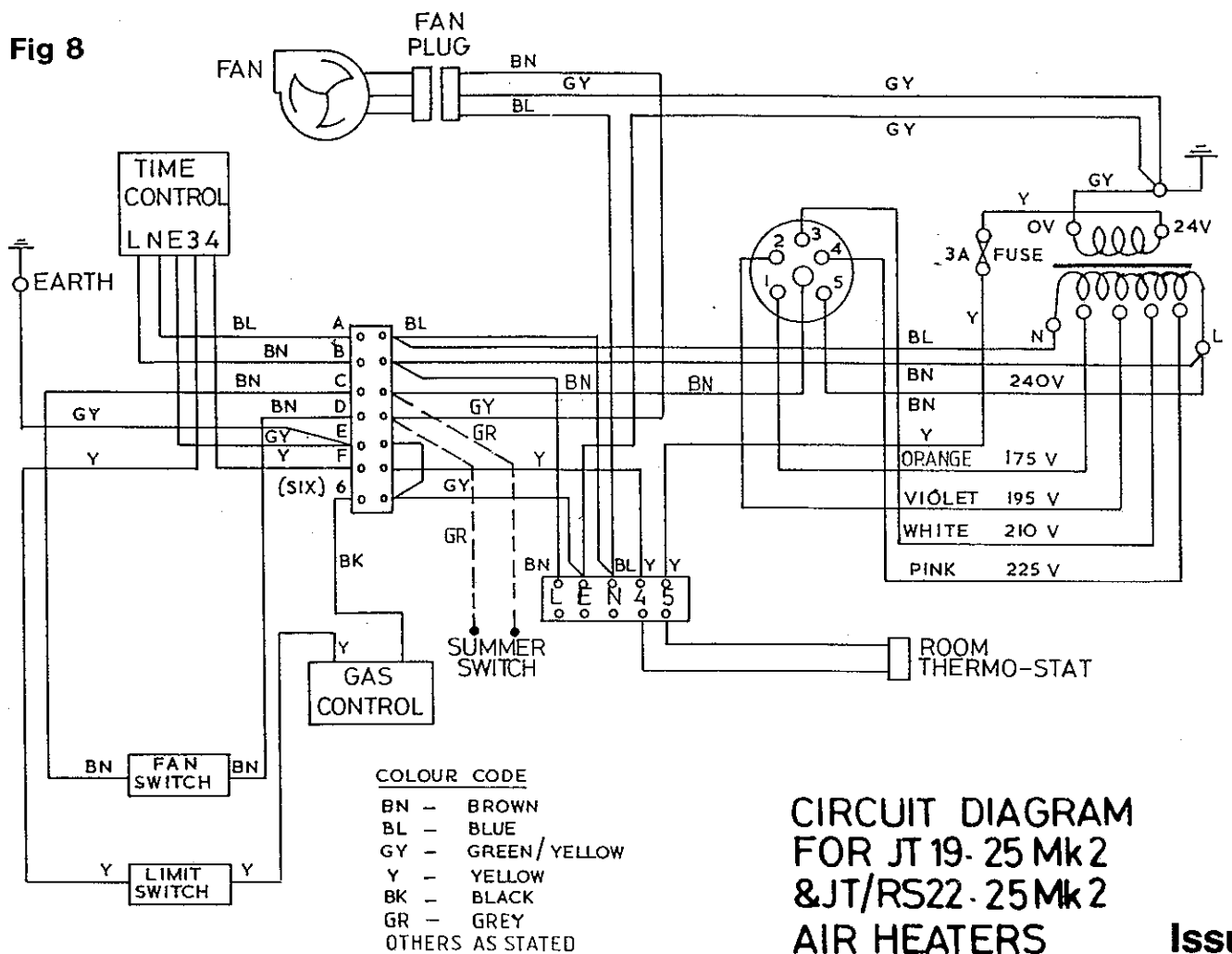
Modairflow operational checks



All Heaters:

- | | | |
|--|--|---|
| (i) Main burner remains ON with controls set to OFF. | (i) Multifunctional control fails to close down. | Disconnect wire from control. If burner does not extinguish, replace control. |
| (j) Insufficient heating. | (i) Heater gas rate low. | Check and adjust gas rate accordingly. |
| | (ii) Limit control operation due to | |
| | (a) Temperature rise set too high. | Adjust fan speed and/or gas rate accordingly. |
| | (b) Air filter or return air path restricted. | Check filter is clean and return air path is clear. |
| | (c) Excessive number of outlets closed. | Open additional outlets. |
| | (d) Limit control out of calibration. | Replace Limit control. |
| | (iii) Incorrect siting of Thermista-stat. | Reposition. |
| | (iv) Thermista-stat out of calibration. | Replace Thermista-stat. |
| | (v) Insufficient return air relief. | Check for relief and where no provision has been made, fit grilles to area/s where no positive return air collection is made. |
| | (vi) Substandard installation e.g. poor insulation, faulty duct connections or damaged ductwork. | Check velocities and underfloor heat losses. |
| (k) Heater operates outside required periods. Applicable only when equipped with Time Control. | (i) Time Control motor running slowly. | Replace Time-Control. |
| | (ii) Time Control tappets slipping. | Replace Time Control. |
| | (iii) Time Control tappets not set in correct sequence. | Refer to Time Control section in User's Instructions and set tappets accordingly. |

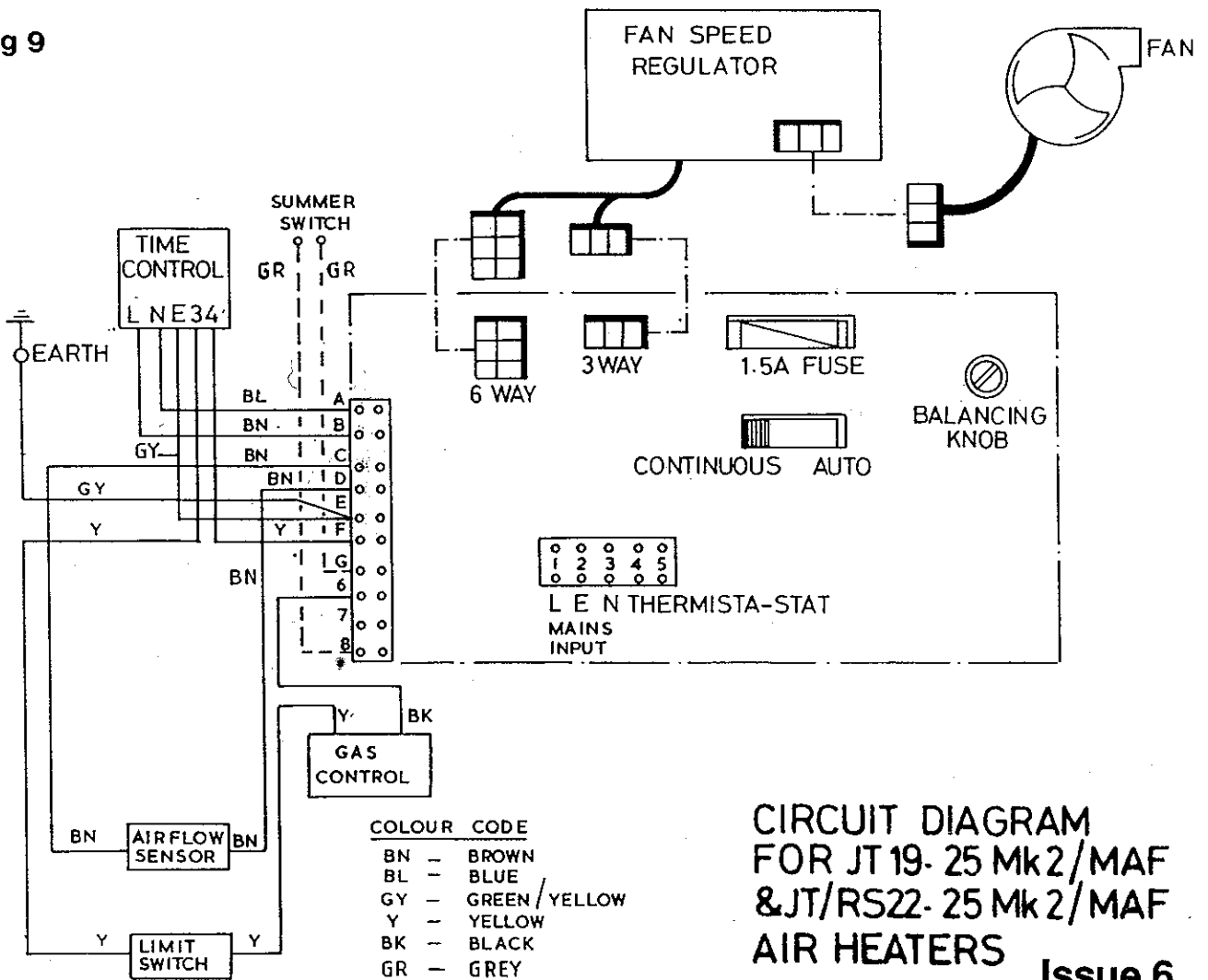
Fig 8



CIRCUIT DIAGRAM
FOR JT 19.25 Mk 2
& JT/RS22.25 Mk 2
AIR HEATERS

Issue 6

Fig 9



CIRCUIT DIAGRAM
FOR JT 19.25 Mk 2/MAF
& JT/RS22.25 Mk 2/MAF
AIR HEATERS

Issue 6

SHORT LIST OF SPARE PARTS FOR JT19-25 MK 2

G.C. Number	Makes Number	Description	Qty.
232 878	BOS 2064	Air Circulating Fan	1
385 102	BOS 105	Limit Control Honeywell L 4069 C	1
385 103	BOS 104	Fan Control Honeywell L 4068 C	1
393 412	BOS 1301	Gas Control Honeywell V8600 C	1
390 420	BOS 311	Pilot Assy Honeywell Q314A	1
390 210	BOS 36	Thermocouple Honeywell Q309A	1
232 881	BOS 02028	Electrical Panel	1
232 962	CL2 S	Time Control	1
232 883	JT19-25 MK2/700	Burner and Crosslighter Assy	1
398 388	BOS 2060	Main Injector Bray Cat. 33/700	1
230 267	BOS 00689	Fuse 3A 1" LG Ceramic	1

PARTS FOR MODAIRFLOW HEATERS

393 239	S. 0078	Electronic Panel	1
232 735	S. 0080	Air Flow Sensor	1
230 495	S. 0075	Fan Speed Regulator (MAF)	1
386 475	BOS 1242	Thermista-stat	1
389 297	S. 0135	Fan Speed Regulator (MAFVI)	1

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