



# JT19-25 WARM AIR HEATER

## Installation & Maintenance Instructions

(56-53)

UDC 697.3

Publication JA 193/4

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

The JT19-25 is a Gas Fired Warm Air Heater for open flue application. Output is adjustable between 5.6 kW – 7.3 kW (20 MJ/h, 19,000 Btu/h – 26.4 MJ/h, 25,000 Btu/h) and there is 4 speed fan adjustment. JANUS 3 CIRCULATOR WATER HEATER – all air heaters have provision for the internal fitting of a JANUS 3 water heater.

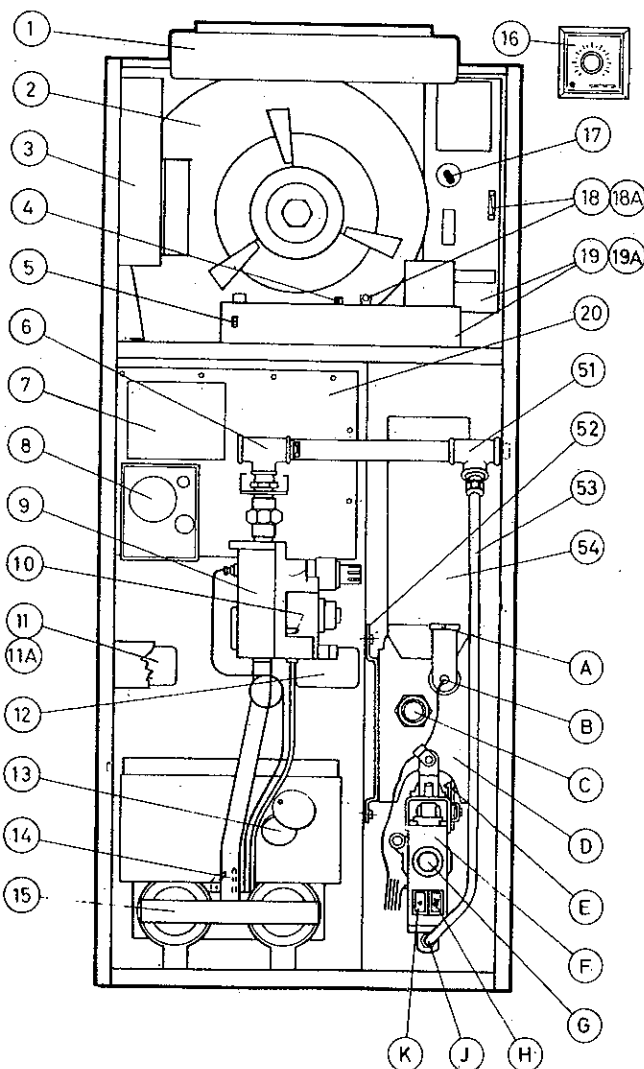
If a JANUS is provided factory fitted, the heater designation is JT19-25/JAN.

To fit a JANUS water heater on site, obtain from Johnson & Starley Ltd. a JANUS 3 Water Heater and KK19 Fittings Kit.

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

#### JT19-25 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 Gas Connection Tee with blanking plug
- 7 Data Plate
- 8 Time Control
- 9 Combination 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)
- 20 Heat Exchanger Access Cover Plate

#### KK19 WATER HEATER FITTINGS KIT

- 51 Gas Pipe and Tee
- 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

Items:—

|                  |   |                          |
|------------------|---|--------------------------|
| Gas Tap          | 1 | supplied in<br>linen bag |
| Draught Diverter | 1 |                          |
| Fixing Screws    | 1 |                          |
| Draught Diverter | 1 |                          |

For safety, use a competent installer to install this appliance. CORGI (The Confederation for the Registration of Gas Installers) requires its registered installer to work to satisfactory standards.



## 2. WARM AIR INSTALLATION REQUIREMENTS

Installation should be in accordance with:—

Building Regulations

British Standard Code of Practice CP 332 Part 4

Institute of Electrical Engineers Regulations

British Standard Code of Practice CP337 : 1963 (Flues for Gas Appliances)

British Gas Material and Installation Spec. Latest Edition.

### (a) Ventilation of Heater Compartment

|                   | Ventilation from<br>inside building                  | Ventilation direct<br>from outside building |
|-------------------|--|---|
| Low Level Grille  | free area. 232 cm <sup>2</sup> (36 in <sup>2</sup> ) | 116 cm <sup>2</sup> (18 in <sup>2</sup> )   |
| High Level Grille | free area. 116 cm <sup>2</sup> (18 in <sup>2</sup> ) | 58 cm <sup>2</sup> ( 9 in <sup>2</sup> )    |

### (b) Ventilation of Building

A purpose designed ventilation opening must be provided in an outside wall. This opening must be either:

- Into the room containing the heater, or
  - Into an adjacent room which has a purpose designed opening into the room containing the heater.
- Openings must have minimum effective areas of 97 cm<sup>2</sup> (15 in<sup>2</sup>).

### (c) Return Air

Return Air Grille/s must be connected to the return air opening of the air heater by duct/s. Each heated room with the exception of Kitchens, Bathrooms and W.C.s, must have either a return air grille or purpose made relief opening communicating with a collection area served by a return air grille. Openings must have minimum areas of 25 cm<sup>2</sup> per MJ/h (1 in<sup>2</sup> per 250 Btu/h) of designed heat input to the rooms they serve.

## 3. PREPARATION

a) **Flues.** A single 4 in. lightweight asbestos or suitable twin wall flue is required.

### b) Electrical Connections

- MAINS.** The heater is supplied complete with mains cable (P.V.C. sheathed, high temp. resistant, 3 core, 5A 0.75mm<sup>2</sup>) 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.
- ROOM THERMOSTAT.** Should be positioned on an internal wall approximately 1.5 metres (5 ft.) from the floor away from direct sunlight, draughts and local warmth. A 24 volt two pin socket is provided on the right hand top face of the heater. The two pin plug provided should be connected to the 24 volt room thermostat wires brought to the heater and plug fitted to heater socket. Alternatively the thermostat wires may enter either side of the heater but must then be connected directly to the terminal strip (terminals 4 & 5).

### c) Gas Supply

The gas connection should be in ½" B.S.P. pipe or larger dependant upon length of pipe run from the meter. The gas pipe may enter the heater from either side of the cabinet. A ½" B.S.P. Union Gas Tap is supplied for external fitting. The leg of the internal tee not used must remain plugged. *Installation should conform to British Gas requirements and Building Regulations.*

### d) Heater Installation Clearances — from Combustible Materials

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 (13¾in.). It is recommended that the access door to the heater cupboard be large enough to permit heater removal.

### e) Installation on Suspended Floors:

Combustible floors must be insulated from the heater.

When a base duct is used, the base duct provides sufficient insulation and no insulation is needed underneath the base duct

When an underfloor warm air plenum is used, insulation can be provided by using a J & S Base Tray BT19. See Figs. 2 and 3.

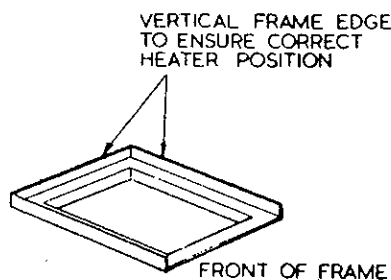


Fig. 2

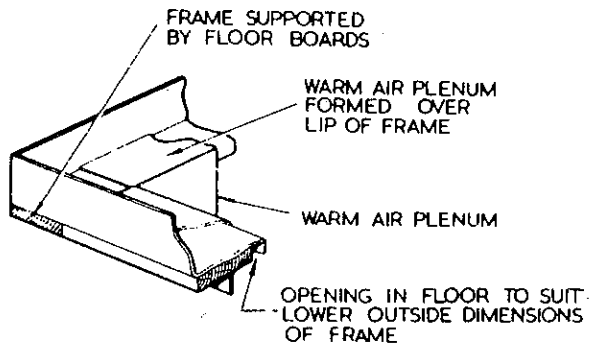


Fig. 3

#### 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.**

Remove Air Filter, Burner Chamber Door and Fan Chamber Door.

Cut hole in chosen side of heater in the position shown in Fig. 8.

Undo screws from around filter frame and remove from top of heater, retain screws and discard the two packing strips.

Place frame centrally over prepared hole so that the top front is flush with the front of the heater.

Mark through from frame the position of the fixing screw holes and drill No. 30 dia.

Screw frame to side of heater using retained screws and replace door and filter.

Make a cover plate for the original filter opening in top of heater and make secure.

- FIT DRAUGHT DIVERTER over heater flue spigot on back of heater and secure with screws provided in linen bag.
- POSITION HEATER ON BASE DUCT OR PLENUM — Ensure no air leakage can occur.
- 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).
- CONNECT RETURN AIR DUCT.
- MAKE GAS CONNECTION — Fit union gas tap provided.
- 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 or the top of the air heater.

**Side Exit Fitting Instructions —**

See Fig. 8 for 'flow' and 'return' holes in heater sides.

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

**Top Exit Fitting Instructions —**

- Withdraw Air Filter and remove Burner Chamber Door (lower)
- Remove Fan Chamber Door (upper)
- Remove blanking plate from 'flow' and 'return' holes in fan compartment floor and plugs from top of heater and retain
- Tighten Male Adaptor into 'flow' connection and Male Drain Elbow into 'return' connection of water heater (note position from Fig. 4)
- Pass pipe (1) up through rear holes in fan compartment floor and top of heater and connect to Male Adaptor — tighten fully.
- Insert pipe (3) into Drain Elbow and tighten
- Loosely fit elbow to (3). Pass straight end of pipe (2) up through fan compartment floor and top of heater, locate in elbow and tighten all joints.
- Refit blanking plate to fit around flow and return pipes and seal around pipes with good quality duct tape where they pass through top of heater.
- Check for leaks
- Refit air heater components

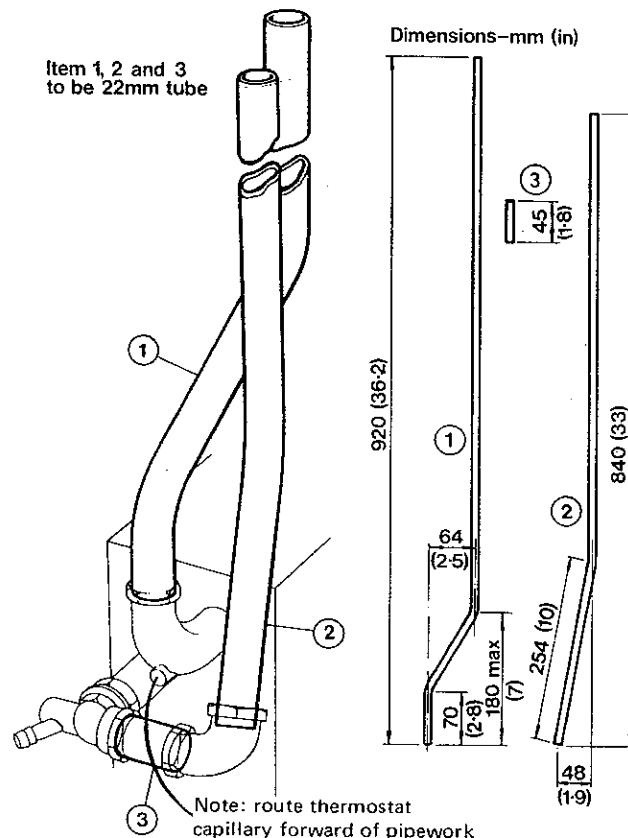


Fig. 4

#### 6. COMMISSIONING

- Check that WARM AIR DELIVERY OUTLETS are open.
- Set room thermostat anticipator to 0.2 and set thermostat pointer to OFF or lowest setting.
- FAN and LIMIT controls are factory set:—  
FAN 100°F OFF — 130°F ON (30°F DIFF.) (HONEYWELL) FAN 100°F OFF (fixed diff) THERMODISC.  
LIMIT 200°F and MUST NOT be adjusted.
- Fit GAS PRESSURE GAUGE to test point.
- Turn on GAS supply and bleed off air.
- Light PILOT BURNER.
- 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*.
- Switch on ELECTRICITY.
- Turn thermostat to MAXIMUM setting and ensure Time Control is at an ON period — Burner should light.
- Balance Warm Air System.  
Remove electrical panel cover for access to fan speed selector plug.
- 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.
- 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 300ft./m. To achieve this, it may be necessary to blank-off part of the outlet face.
- Check temperature rise (85°-100°F) across heater and adjust fan speed if necessary.
- CHECK THAT FLUE OPERATES EFFECTIVELY with heating system on, all doors closed and extractor fan/s if fitted, running.
- Check for gas soundness.

|                    |                      | kW   | MJ/h | Btu/h     | kW   | MJ/h  | Btu/h     | kW   | MJ/h | Btu/h     |
|--------------------|----------------------|--|------|-----------|--|-------|-----------|--|------|-----------|
| INPUT              |                      | 7.7  | 28.1 | 26,600    | 8.8  | 31.65 | 30,000    | 9.9  | 35.3 | 33,900    |
| OUTPUT             |                      | 5.6  | 20.0 | 19,000    | 6.5  | 23.2  | 22,000    | 7.3  | 26.4 | 25,000    |
| GAS RATE (1000 cv) |                      | 0.75m <sup>3</sup> /h (26.5ft <sup>3</sup> /h) |      |           | 0.85m <sup>3</sup> /h (30ft <sup>3</sup> /h) |       |           | 0.95m <sup>3</sup> /h (33.5ft <sup>3</sup> /h) |      |           |
| GAS                | INJECTOR<br>dia. mm. | BURNER BAR GAS PRESSURES (measured hot) mbar   |      |           |  |       |           |  |      |           |
| NATURAL            | 1.88                 | 5.2 mbar                                       |      | 2.1 in wg | 7.4 mbar                                     |       | 3.0 in wg | 9.5 mbar                                       |      | 3.8 in wg |
| PROPANE            |                      | Lower rates not available                      |      |           |  |       |           | 35.0   |      | 14.0      |

Fig. 5

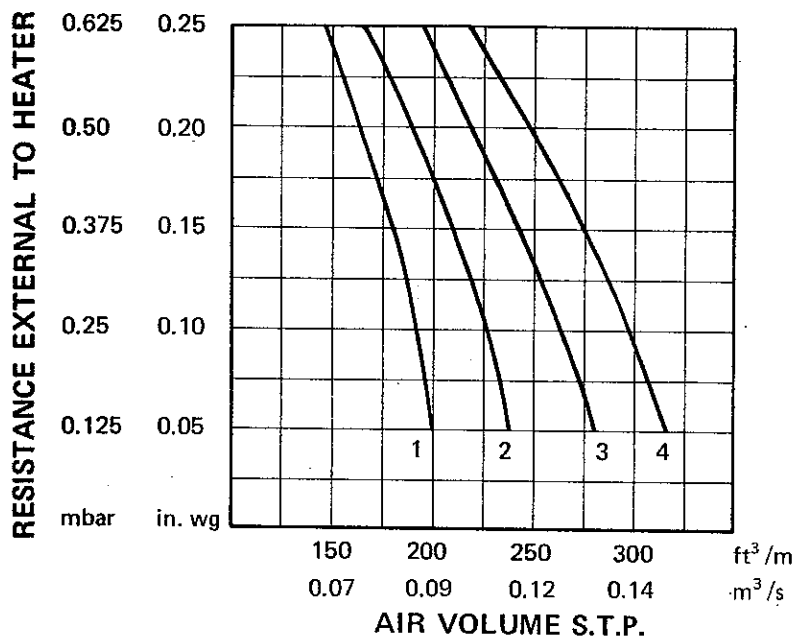


Fig. 6

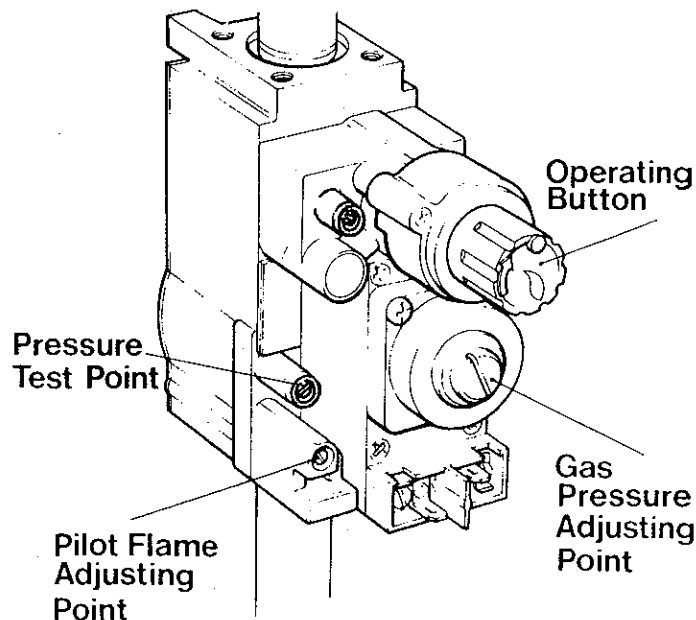


Fig. 7

## 7. MAINTENANCE (Recommended Annually)

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

### (a) Main Burner Cleaning – with Burner Bar Assembly removed

NB: To remove assy:- Remove Heat Shield and bottom fixing screws. Disconnect electrical connections and gas union. Release split pins at rear of burner bar and remove end cap. Brush lightly both inside and out. *Under no circumstances should burner holes be enlarged or distorted, or brushed strongly.*

### (b) Injector Cleaning – (Main Injector, Pilot Burner Injector and Cross Lighting Injector)

Remove injectors and clean carefully avoiding damage to orifice in each case. When injector replacement is a preferred alternative to cleaning, ensure that replacement injectors are of the correct orifice size.

### (c) Thermocouple

Ensure 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.

For access to Time Control remove lower door.

### (j) Time Control Removal

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

(ii) Release mounting screw (situated centrally on the rear top face of the mechanism), lift slightly and withdraw mechanism.

(iii) Position replacement mechanism onto the lugs of the mounting plate and lock by a downward movement.

Tighten mounting screw, remake electrical connections and replace casing.

- (k) **Electrical Panel Removal.**
  - (i) Disconnect 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 burner bar assembly. Release bracket above gas union and remove Time Control from its mounting.
  - (ii) Remove access panel from bulkhead.
  - (iii) Remove cover plate from front of heat exchanger together with gasket.
  - (iv) Withdraw internal baffles from top of heat exchanger. Heat exchanger can now 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.

| Symptom  | Possible Cause  | Remedy   |
|--|---|--|
| (a) Pilot will not light.                                  | <ul style="list-style-type: none"> <li>(i) No gas supply to heater.</li> <li>(ii) Gas Supply pipe not purged.</li> <li>(iii) Pilot orifice restricted.</li> </ul>   | <p>Break gas tap union and listen for escape.</p> <p>Break gas tap union until gas is detected.</p> <p>Clear pilot orifice carefully or replace injector.</p>  |
| (b) Pilot lights but goes out on releasing 'START' button. | <ul style="list-style-type: none"> <li>(i) Connection between thermocouple and gas control not secure.</li> <li>(ii) Faulty power unit on Gas Control.</li> <li>(iii) Faulty thermocouple.</li> <li>(iv) Pilot flame not sufficient.</li> </ul>   | <p>Check connection is secure.</p> <p>Replace power unit.</p> <p>Replace thermocouple.</p> <p>Adjust.</p>  |
| (c) Pilot lights but goes out after normal operation.      | As above in (b).  | As above in (b).   |
| (d) Pilot alight but main burner not igniting.             | <ul style="list-style-type: none"> <li>(i) Mains electrical supply not connected to heater.</li> <li>(ii) Controls not calling for heat.</li> <li>(iii) 3 amp fuse failed.</li> <li>(iv) Loose connection on room thermostat, limit control, gas control head, time control or transformer.</li> <li>(v) Transformer open circuited.</li> <li>(vi) Gas Control operator faulty.</li> <li>(vii) Gas Control governor faulty.</li> <li>(viii) Limit control faulty.</li> <li>(ix) Faulty room thermostat or external wiring.</li> </ul> | <p>Check mains supply.</p> <p>Check time control (if fitted) and room thermostat are calling for heat.</p> <p>Replace and if failure occurs again check external room thermostat leads for shorting to earth.</p> <p>Check connections for soundness.</p> <p>Check with test meter and replace electrical panel if necessary.</p> <p>Replace operator.</p> <p>Replace governor.</p> <p>Check operation by shorting across control connections.</p> <p>Fit temporary loop in heater room thermostat socket, if heater fires, external circuit or room thermostat is faulty.</p> |

|   |   |  |
|---|---|--|
| (e) Main burner lights but fan fails to operate.  | <ul style="list-style-type: none"> <li>(i) Loose electrical connection on fan control or fan plug and socket.</li> <li>(ii) Fan control settings incorrect.</li> <li>(iii) Faulty fan assembly.</li> </ul>  | <p>Check connections for soundness.</p> <p>Check settings suit system. Replace assembly ensuring that pressure is not placed on impeller or motor, or balance of assembly may be distorted. Replace component. Adjust pressure if necessary.</p>   |
| (f) Main burner operating intermittently with fan operating   | <ul style="list-style-type: none"> <li>(iv) Faulty fan control.</li> <li>(v) Burner bar pressure not correct.</li> <li>(i) Gas rate and burner bar pressure high.</li> <li>(ii) Temperature rise across unit excessive.</li> <li>(iii) Air filter or return air path restricted.</li> <li>(iv) Excessive number of outlets closed.</li> </ul>   | <p>Check gas rate and burner bar pressure. Adjust fan speed or gas rate accordingly. Check filter for cleanliness and return air for obstruction. Open additional outlets.</p>   |
| (g) Main burner operating with intermittent fan operation.  | <ul style="list-style-type: none"> <li>(i) Gas rate or burner bar pressure low.</li> <li>(ii) Fan control settings incorrect.</li> </ul>  | <p>Check gas rate and burner bar pressure. Check settings suit system.</p>   |
| (h) Fan continues running for excessive period or operates intermittently after main burner shuts down. | <ul style="list-style-type: none"> <li>(i) Fan control settings incorrect.</li> </ul>   | <p>As g (ii).</p>  |
| (i) Noisy operation.  | <ul style="list-style-type: none"> <li>(i) Gas pressure high.</li> <li>(ii) Noisy fan motor.</li> <li>(iii) Fan speed setting too high.</li> </ul>  | <p>Check burner bar pressure. Replace fan motor. Adjust fan speed.</p>   |
| (j) Insufficient heating.   | <ul style="list-style-type: none"> <li>(i) Heater gas rate low.</li> <li>(ii) Limit control operation due to: <ul style="list-style-type: none"> <li>(a) Temperature rise set too high</li> <li>(b) Air filter or return-air path restricted.</li> <li>(c) Excessive number of outlets closed.</li> <li>(d) Limit Control out of calibration.</li> </ul> </li> <li>(iii) Incorrect siting of Thermostat.</li> <li>(iv) Thermostat out of calibration.</li> <li>(v) Insufficient return-air relief.</li> <li>(vi) Substandard installation e.g. Poor insulation, faulty duct connections or damaged ductwork.</li> </ul> | <p>Check and adjust gas rate accordingly.</p> <p>Adjust fan speed and/or gas rate accordingly. Check filter for cleanliness and return-air path for obstruction. Open additional outlets.</p> <p>Replace Limit Control.</p> <p>Reposition. Replace Thermostat.</p> <p>Check for relief and where no provision has been made, fit grilles to area/s where no positive return-air collection is made. Check velocities and underfloor heat losses.</p> |
| (k) Heater operates outside required periods (applicable only when equipped with a Time Control).       | <ul style="list-style-type: none"> <li>(i) Time Control motor running slowly.</li> <li>(ii) Time Control tappets slipping.</li> <li>(iii) Time Control tappets not set in correct sequence.</li> </ul>  | <p>Replace Time Control.</p> <p>Replace Time Control. Refer to Time Control operating instructions and set tappets accordingly.</p>  |



## 11. SHORT LIST OF SPARE PARTS FOR JT19-25 SERIES WARM AIR HEATERS

| G. C. Number | Makers Number | Description  | Qty. |
|--------------|---------------|--|------|
| 388 555      | BOS 1295      | Torin Corp. Ltd. Air Circulating Fan with integral Motor Amp-lok cap and earth wire DDN816-700 056259. | 1    |
|              | S.0072        | Replacement Motor Kit.   | 1    |
| 242 211      | JT19-25/145Y  | Filter Tray Assembly.  | 1    |
| 230 177      | BOS 467/2     | Time Control Cover.  | 1    |
| 242 212      | BOS 1230      | Electrical Plate Assy., less time control.   | 1    |
| 385 102      | BOS 105       | Honeywell Limit Control — L4069C 1066.   | 1    |
| 385 103      | BOS 104       | { Honeywell Fan Control — L4068C 1026 or }<br>{ Thermodisc Fan Control — 40 TC3. }                     | 1    |
| 393 412      | BOS 1301      | Honeywell 'Compact' Gas Control — ½" B.S.P. V8600C 1020  | 1    |
| 390 420      | BOS 311       | Honeywell Pilot Burner Assy. Q314A   | 1    |
| 390 210      | BOS 36        | Honeywell Thermocouple Q309A 1236.   | 1    |
| 396 068      | BOS 310       | Horstmann Time Control — 'Emerald' 423/J&S 4W  | 1    |
| 230 061      | BOS 457       | Belling Lee Thermostat Plug L1495/P.   | 1    |
| 230 146      | BOS 384       | Fuse 3 amp 1" long ceramic.  | 1    |
| 242 213      | JT19-25/700X  | Burner Bar Assy. complete with Gas Control.  | 1    |
| 242 214      | JT19-25/702X  | Burner Bar Assembly.   | 1    |
| 398 385      | BOS 1300      | Main Injector Bray Cat. No. 23/480.  | 2    |
| 230 157      | BOS 566       | Fan Speed Selector Plug.   | 1    |
| 230 034      | BOS 305/1     | Union Washer.  | 1    |

### ADDITIONAL SPARES FOR PROPANE HEATERS

|           |   |   |
|-----------|---|---|
| BOS 371/3 | Pilot Orifice Honeywell BBR 10390686.     | 1 |
|           | Main Injector.                            | 2 |
| BOS 847   | Honeywell Gas Control Blanking Plate Kit. | 1 |

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