

radiant

gas fired tube heaters

B E Y P Q W R M A T I C

Double linear tube models

PTDS 09, 12, 15, 25, 30, 35, 40, 45

Installation, servicing & operating instructions



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INSTALLATION, SERVICING AND OPERATING INSTRUCTIONS

Before installation, check that the local distribution conditions, nature of gas and pressure, and adjustment of appliance are compatible.

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INSTALLATION, SERVICING & OPERATING INSTRUCTIONS

1. TECHNICAL DATA

Table 1

MODEL	PTDS 09 (N)	PTDS 09 (L)
Heat Input	18.0kW Hs	16.22kW Hi
Appliance Type	B ₂₂	
Appliance Category	II _{2H3+}	
Adjusted for	2H G20 20mbar	3+ G30/G31 29/37mbar
Setting Pressure	12.5mbar	None
Injector	Ø2.4mm x 2	Ø1.45mm x 2
Pre-injector	None	None
Electrical Supply	230V~50Hz 125W	
Fuse Externally	3A	
Dimensions	15.506m x 0.34m	
Weight	60Kg	
Gas Connection	R - ½	
Flue Size	Ø150 (6")	Note: Ø125 (5") allowable

Table 2

MODEL	PTDS 12 (N)	PTDS 12 (L)
Heat Input	22.8 kW Hs	20.54 kW Hi
Appliance Type	B ₂₂	
Appliance Category	II _{2H3+}	
Adjusted for	2H G20 20mbar	3+ G30/G31 29/37mbar
Setting Pressure	12.5mbar	None
Injector	No. 36 x 2	Ø1.65mm x 2
Pre-injector	None	None
Electrical Supply	230V~50Hz 125W	
Fuse Externally	3A	
Dimensions	15.506m x 0.34m	
Weight	60Kg	
Gas Connection	R - ½	
Flue Size	Ø150 (6")	Note: Ø125 (5") allowable

Table 3

MODEL	PTDS 15 (N)	PTDS 15 (L)
Heat Input	30.0 kW Hs	27.03 kW Hi
Appliance Type	B ₂₂	
Appliance Category	II _{2H3+}	
Adjusted for	2H G20 20mbar	3+ G30/G31 29/37mbar
Setting Pressure	12.5mbar	None
Injector	No. 31 x 2	Ø1.9mm x 2
Pre-injector	None	None None
Electrical Supply	230V~50Hz 125W	
Fuse Externally	3A	
Dimensions	15.506m x 0.34m	
Weight	60Kg	
Gas Connection	R - ½	
Flue Size	Ø150 (6")	Note: Ø125 (5") allowable

Table 4

MODEL	PTDS 25 (N)	PTDS 25 (L)
Heat Input	46.0 kW Hs 41.44 kW Hi	
Appliance Type	B ₂₂	
Appliance Category	II _{2H3+}	
Adjusted for	2H G20 20mbar	3+ G30/G31 29/37mbar
Setting Pressure	12.5mbar	None
Injector	Ø3.8mm X 2	Ø2.3mm X 2
Pre-injector	None	None
Electrical Supply	230V~50Hz 125W	
Fuse Externally	3A	
Dimensions	20.078m X 0.34m	
Weight	92Kg	
Gas Connection	R - ½	
Flue Size	Ø150 (6")	

Table 5

MODEL	PTDS 30 (N)	PTDS 30 (L)
Heat Input	58.4kW Hs 52.6kW Hi	
Appliance Type	B ₂₂	
Appliance Category	II _{2H3+}	
Adjusted for	2H G20 20mbar	3+ G30/G31 29/37mbar
Setting Pressure	12.5mbar	None
Injector	No. 19 x 2	Ø2.6mm x 2
Pre-injector	None	None None
Electrical Supply	230V~50Hz 125W	
Fuse Externally	3A	
Dimensions	19.858m x 0.34m	
Weight	124Kg	
Gas Connection	R - ½	
Flue Size	Ø150 (6")	

Table 6

MODEL	PTDS 35 (N)	PTDS 35 (L)
Heat Input	69.0kW Hs 62.16kW Hi	
Appliance Type	B ₂₂	
Appliance Category	II _{2H3+}	
Adjusted for	2H G20 20mbar	3+ G30/G31 29/37mbar
Setting Pressure	12.5mbar	None
Injector	No. 15 x 2	No. 35 x 2
Pre-injector	None	None
Electrical Supply	230V~50Hz 125W	
Fuse Externally	3A	
Dimensions	19.858m x 0.34m	
Weight	124Kg	
Gas Connection	R - ½	
Flue Size	Ø150 (6")	

Table 7

MODEL	PTDS 40 (N)	PTDS 40 (L)
Heat Input	84.4kW Hs 76.04kW Hi	
Appliance Type	B ₂₂	
Appliance Category	II _{2H3+}	
Adjusted for	2H G20 20mbar	3+ G30/G31 29/37mbar
Setting Pressure	12.5mbar	None
Injector	Ø5.0mm x 2	Ø3.2mm x 2
Pre-injector	None	None None
Electrical Supply	230V~50Hz 125W	
Fuse Externally	3A	
Dimensions	25.948m x 0.34m	
Weight	158Kg	
Gas Connection	R - ½	
Flue Size	Ø150 (6")	

Table 8

MODEL	PTDS 45 (N)	PTDS 45 (L)
Heat Input	94.0kW Hs 84.7kW Hi	
Appliance Type	B ₂₂	
Appliance Category	II _{2H3+}	
Adjusted for	2H G20 20mbar	3+ G30/G31 29/37mbar
Setting Pressure	12.5mbar	None
Injector	Ø5.4mm x 2	Ø3.3 x 2
Pre-injector	None	None
Electrical Supply	230V~50Hz 125W	
Fuse Externally	3A	
Dimensions	25.948m x 0.34m	
Weight	158Kg	
Gas Connection	R - ½	
Flue Size	Ø150 (6")	

2. UN-PACKING

2.1 PTDS 09/12/15
PTDS 25

The appliances are supplied as follows:-

Table 9

MODEL	REF	PTDS 09/12/15	PTDS 25
Carton (containing the following)		3	3
Control Box Assembly	1	2	2
Duplex Fan assembly	2	1	1
Hanger Brackets	3	6	8
Torcrite Coupling	4	4	6
Fastenings Pack		1	1
Radiant Tube (Ø76.2 x 4572)	5	2	4
Reflector Panel (1511 long)	6	2	-
Reflector Panel (3035 long)	7	2	6
Reflector End Panel	8	4	4

PTDS 09/12/15

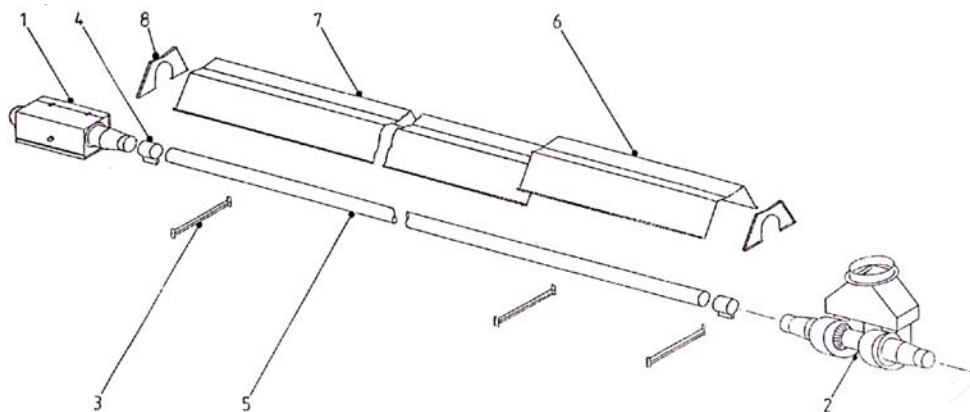


Fig 1

PTDS 25

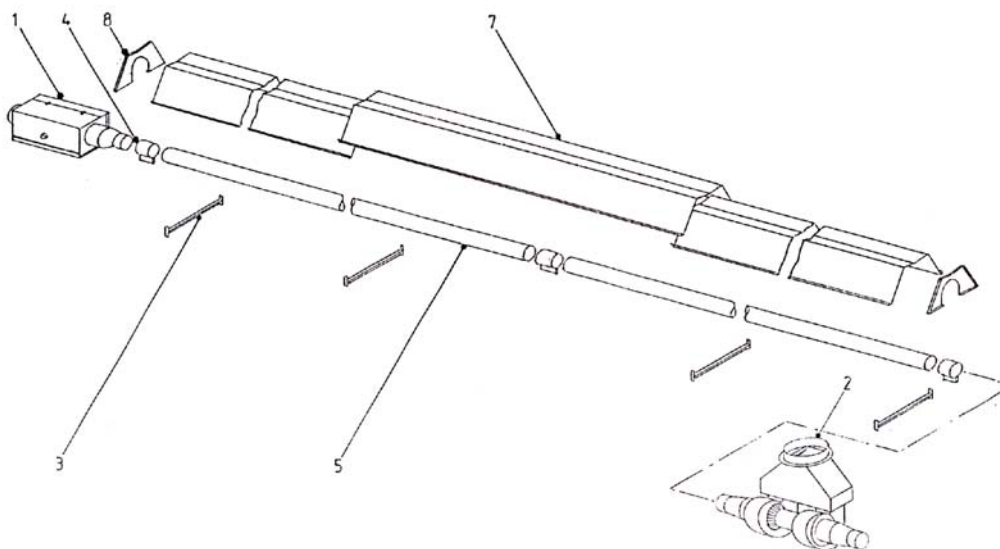


Fig 2

2.2 PTDS 30/35/40/45

The appliances are supplied as follows:-

Table 10

MODEL	REF	PTDS 30/35	PTDS 40/45
Carton (containing the following)		3	3
Control Box Assembly	1	2	2
Duplex Fan Assembly	2	1	1
Hanger Brackets	3	8	10
Torcite Coupling	4	6	8
Fastenings Pack		1	1
Radiant Tube (Ø101.6 x 4572)	5	2	2
Radiant Tube (Ø101.6 x 3048)	6	-	2
Radiant Tube Assy (turbulator)	7	2	2
Reflector Panel (3035 long)	8	6	8
Reflector End Panel	9	4	4

PTDS 30/35

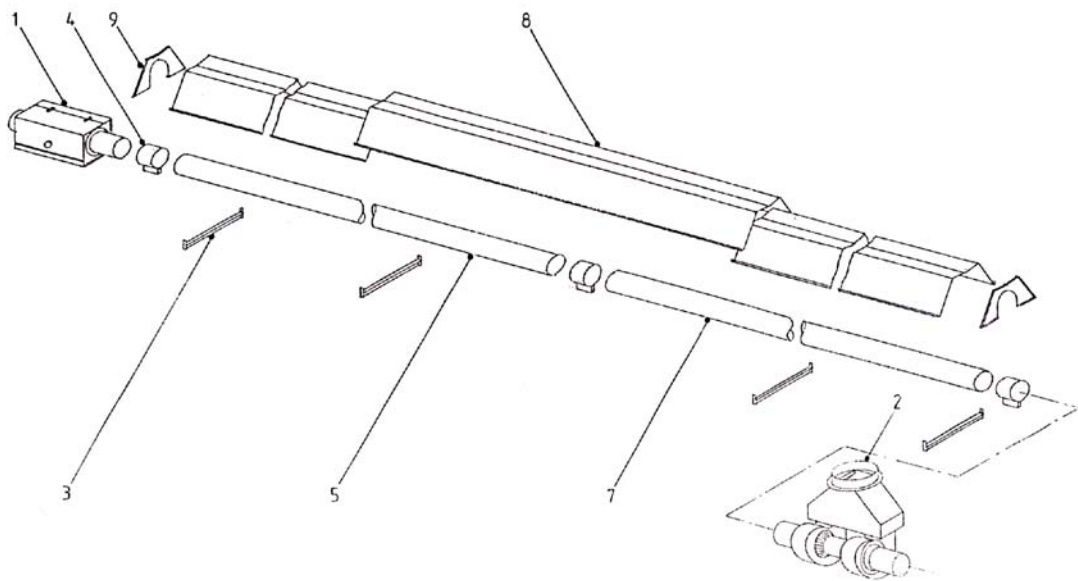


Fig 3

PTDS 40/45

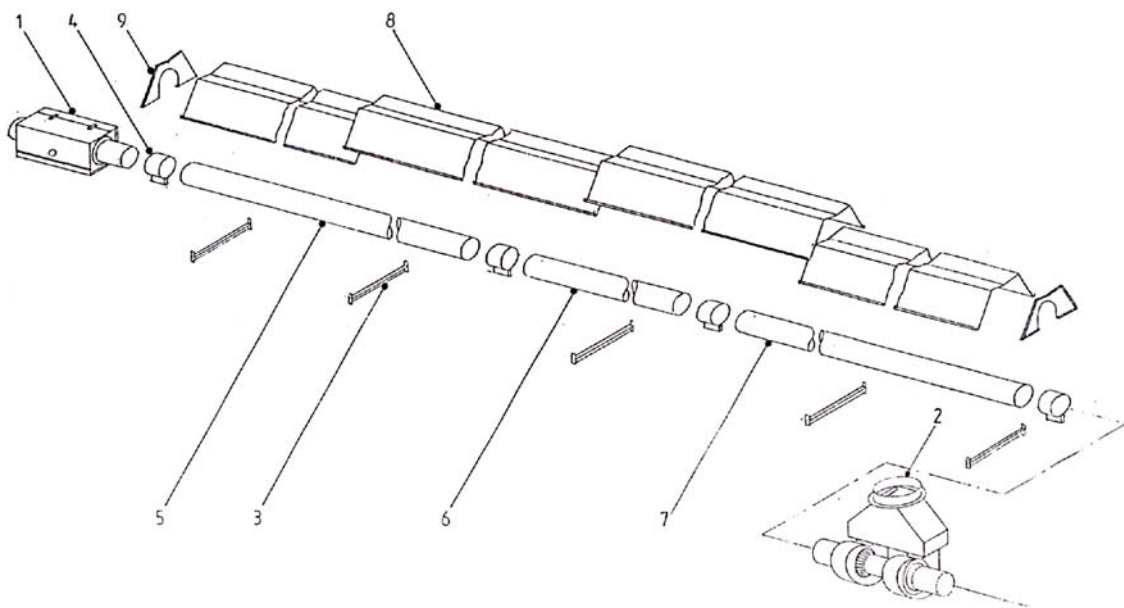


Fig 4

3. INSTALLATION

Notwithstanding their limited scope, the appliance should be installed in accordance with the relevant provisions of any National Gas Safety (Installation and Use) Regulations. Due account should also be taken of any obligations arising from any National Health and Safety at Work Regulations, National and Local Building Regulations and National Electrical Wiring Regulations. The appliance must be installed, and where necessary, converted for use on other gases, by a qualified installer.

3.1 Suspension

- 3.1.1 The appliance should be located with respect to building construction and other equipment to permit access to the appliance for servicing etc.
- 3.1.2 For suspending the appliance it is recommended that suitable protected welded chain (Ø3mm x 65 links per m) or Ø8mm min mild steel drop rods and suitable brackets are used. Attach the chains or drop rods to the hanger brackets where shown (see section 4). Providing at least Ø5mm closed link hooks are used chains may be attached directly to the hanger brackets.
- 3.1.3 The appliances may be mounted horizontally or at a recommended angle of 30° maximum to the horizontal as shown below.

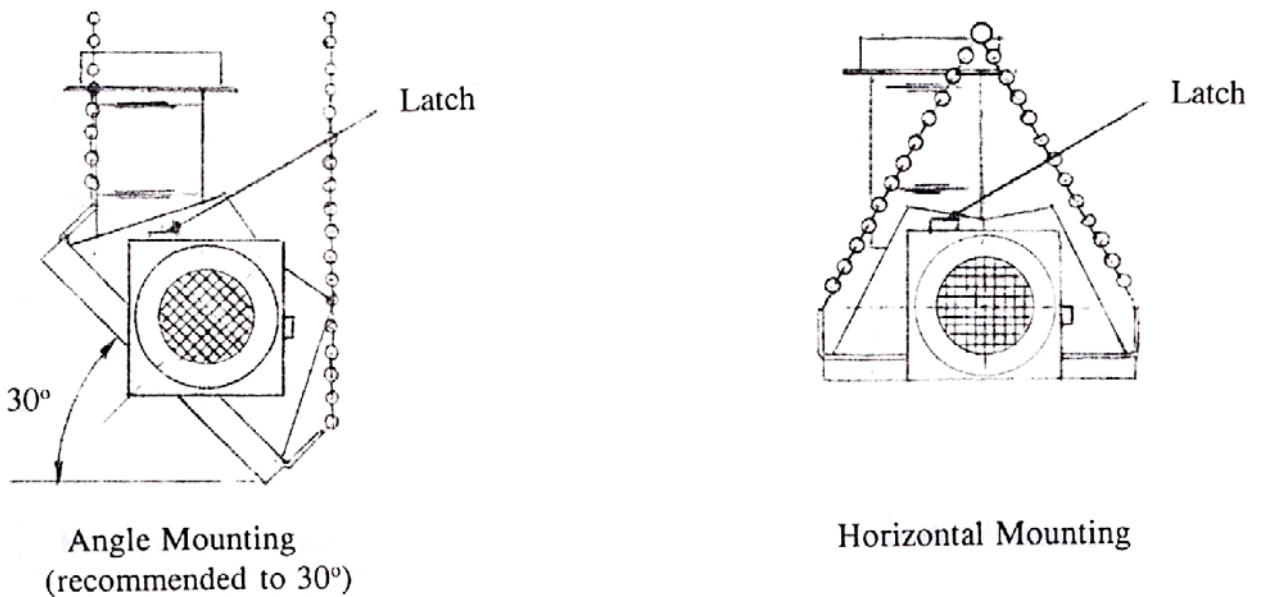


Fig. 5

3.1.4 Minimum clearance from combustibles:-

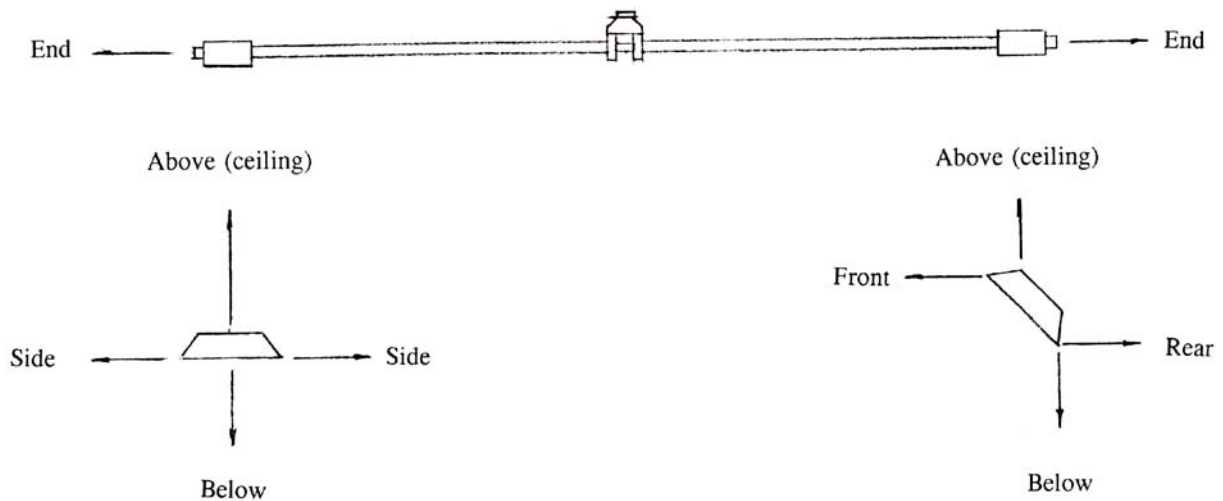


Fig 6

Table 11

MODEL	SIDE	ABOVE	BELOW	END	FRONT	REAR
PTDS 09/12/15	450mm	450mm	1220mm	450mm	575mm	305mm
PTDS 25	510mm	450mm	1220mm	510mm	610mm	305mm
PTDS 30/35/40/45	760mm	610mm	2285mm	610mm	760mm	380mm

3.2 Gas Supply

3.2.1 Natural Gas - G20 at 20mbar supply pressure (appliance cat 2H)

Maximum supply pressure (Pmax)	25mbar
Minimum supply pressure (Pmin)	17mbar
Setting pressure	12.5mbar
Gas connection	R - ½

3.2.1.1 Installation pipes should be fitted in accordance with National and Local Regulations. Pipes of a smaller size than the heater connection (R - ½) should not be used and the pipe work must be designed to achieve a gas supply pressure between the maximum and minimum values stated above, measured at the appliance inlet pressure test point.

A union service cock MUST be fitted as close as practicable upstream of the heater to enable the gas train to be removed for maintenance or repair.

It is essential to provide a flexible metallic hose, which must conform, to national or Local Regulations, to connect the appliance to the gas supply. Minimum size to be ½" (12.7mm) bore.

3.2.2 LPG - G30/G31 at 29/37mbar supply pressure (appliance cat. 3+).

Maximum supply pressure (Pmax):	G30 - 35mbar G31 - 45mbar
Minimum supply pressure (Pmin):	G30 - 20mbar G31 - 25mbar

Note:- for appliance cat 3+ the governor is not operational

Gas connections: R - ½

3.2.2.1 The appliance should be connected to a permanent piped supply of LPG with pipes of adequate size to achieve a gas supply pressure between the maximum and minimum values stated above, measured at the appliance inlet pressure test point.

3.2.3 The complete installation MUST be tested for soundness in accordance with National or Local Regulations.

3.3 Electrical Supply

WARNING: THIS APPLIANCE MUST BE EARTHED

3.3.1 The electrical wiring to each heater must be installed in accordance with the latest or current National Regulations and any Local Regulations which apply.

Electrical supply	230V~50Hz 125W
Current rating	0.55
Fuse externally	3A

3.3.2 Twin core and earth PVC covered flexible supply cable (0.5mm²-to National or Local standard specification) must be used, with connection made as follows:-

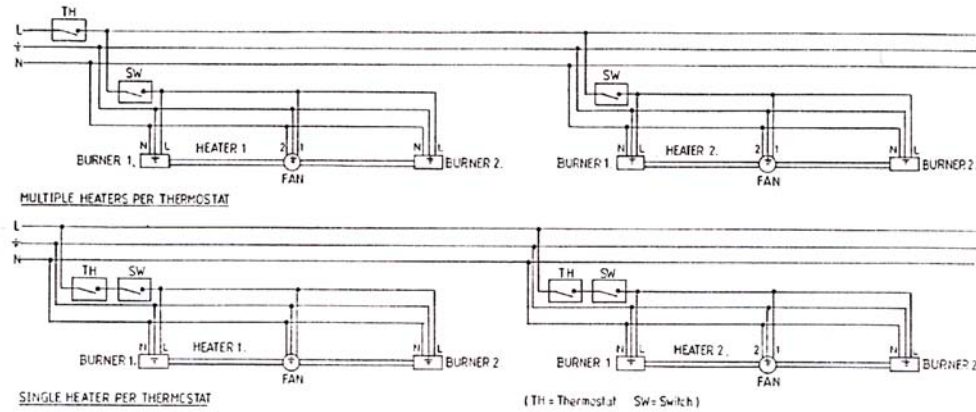


Fig. 7

Notes:-

The method of connection to the electrical supply must facilitate complete isolation and should preferably be via a fused double pole isolator having a constant separation of at least 3mm in all poles and supplying the appliance ONLY.

Alternatively, connection may be made via a fused 3 pin plug and unswitched, shuttered socket, both complying with the requirements of National or Local Regulations. Neither thermostat nor switch are supplied as standard equipment but are available at extra cost.

N.B. In the event of an electrical fault after installation of the appliance, preliminary system checks are required to be carried out i.e. earth continuity, polarity and resistance to earth.

3.3.3 Internal Wiring Diagram

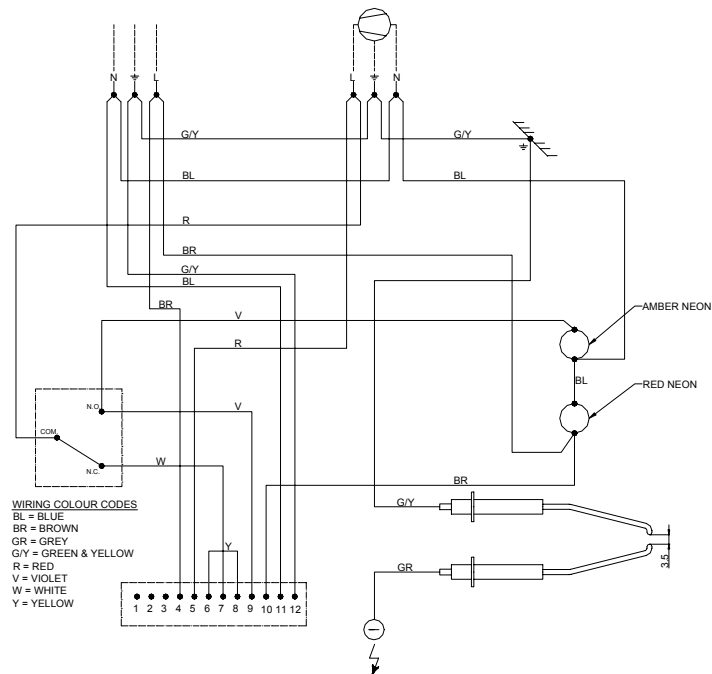


Fig 8

3.4 Ventilation

These appliances may be installed with an exhaust flue fitted **or** without an exhaust flue fitted.

3.4.1 Flueless (Unflued)

The installation room should have a volume of at least 10m³/kw of installed nominal heat input of the radiant heater.

The ventilation requirements and calculation methods for unflued appliances are set out in the European Standard **EN 13410:2001** and must be applied. The following is guidance to the standard:

Ventilation may be achieved by any of the three following different means:

- a) thermal evacuation of the products of combustion/air mixture
- b) mechanical evacuation of the products of combustion/air mixture
- c) natural air change

3.4.1.1 Ventilation by Thermal Evacuation

Ventilation by thermal evacuation is sufficient if **10m³/h of exhaust air per kW of operating heat input** are ventilated out of the installation room.

The air/products of combustion mixture must be evacuated above the radiant heaters, if possible near the ridge, by means of exhaust mixture opening(s), (vents).

Where the exhaust mixture opening(s) can be closed, it shall only be possible to operate the radiant heaters when they are open.

The maximum horizontal distance between a radiant heater and a vent opening shall be:

- 6 (six) times the vent height in the case of **wall** openings
- 3 (three) times the vent height in the case of **roof** openings

3.4.1.2 Ventilation by Mechanical Evacuation

Ventilation by mechanical evacuation is sufficient if **10m³/h of exhaust air per kW of operating heat input** are ventilated out of the installation room.

The air/products of combustion mixture must be evacuated above the radiant heaters using fan(s).

It shall only be possible to operate the radiant heaters whilst the exhaust airflow is proven.

The maximum horizontal distance between a radiant heater and a fan shall be:

- 6 (six) times the fan mounting height in the case of **wall** openings
- 3 (three) times the fan mounting height in the case of **roof** openings

Total minimum proven ventilation airflow in **m³/h** will be:

Total installed kW input X 10

Note: Mechanical exhaust air openings must be positioned such that the burner stability of the nearest appliance is unaffected.

3.4.1.3 Ventilation by Natural Air Change

Gas-fired radiant heaters may be operated without any special exhaust system if the exhaust gases are discharged to the outside atmosphere by a sufficient natural air change in the installation room.

Furthermore, no provision for thermal or mechanical ventilation is required in the following particular cases:

- buildings with natural air change greater than 1.5 volumes per hour
- buildings with a density of operating heat input not greater than 5W/m³

3.4.1.4 Air Supply

Air supply openings are required to admit air and shall be located below the radiant heaters.

The total area of the unobstructed cross-sections of all the air supply openings shall not be smaller than the total area of the unobstructed cross-sections of all the exhaust openings.

Slits and gaps of **fixed** cross-section can also be used as air supply openings.

Where the air supply openings can be closed, it shall only be possible to operate the radiant heaters when they are open.

3.4.2 Flued

If the appliance is to be flued externally, then flue pipe of diameter stated in Section 1 - Technical Data, and complying with National and Local regulations should be used. Maximum length should be 13m with a maximum of two 90° bends.

IMPORTANT: When flued horizontally, the flue pipe must be arranged to provide a continuous rise from the appliance of 25 mm per 1m length.

The ventilation requirements for flued appliances is set out in **BS 6896:1991** and must be applied. The following is guidance to the standard:

3.4.2.1 Natural Ventilation

Low level ventilation shall be provided in all cases below the level of the heater(s).

Up to and including	60kW - 4.5cm ² /kW
Over	60kW - 270cm ² + 2.25cm ² /kW in excess of 60kW total rated heat input.

Where the air supply openings can be closed, it shall only be possible to operate the radiant heaters when they are open.

3.4.2.2 Mechanical Ventilation

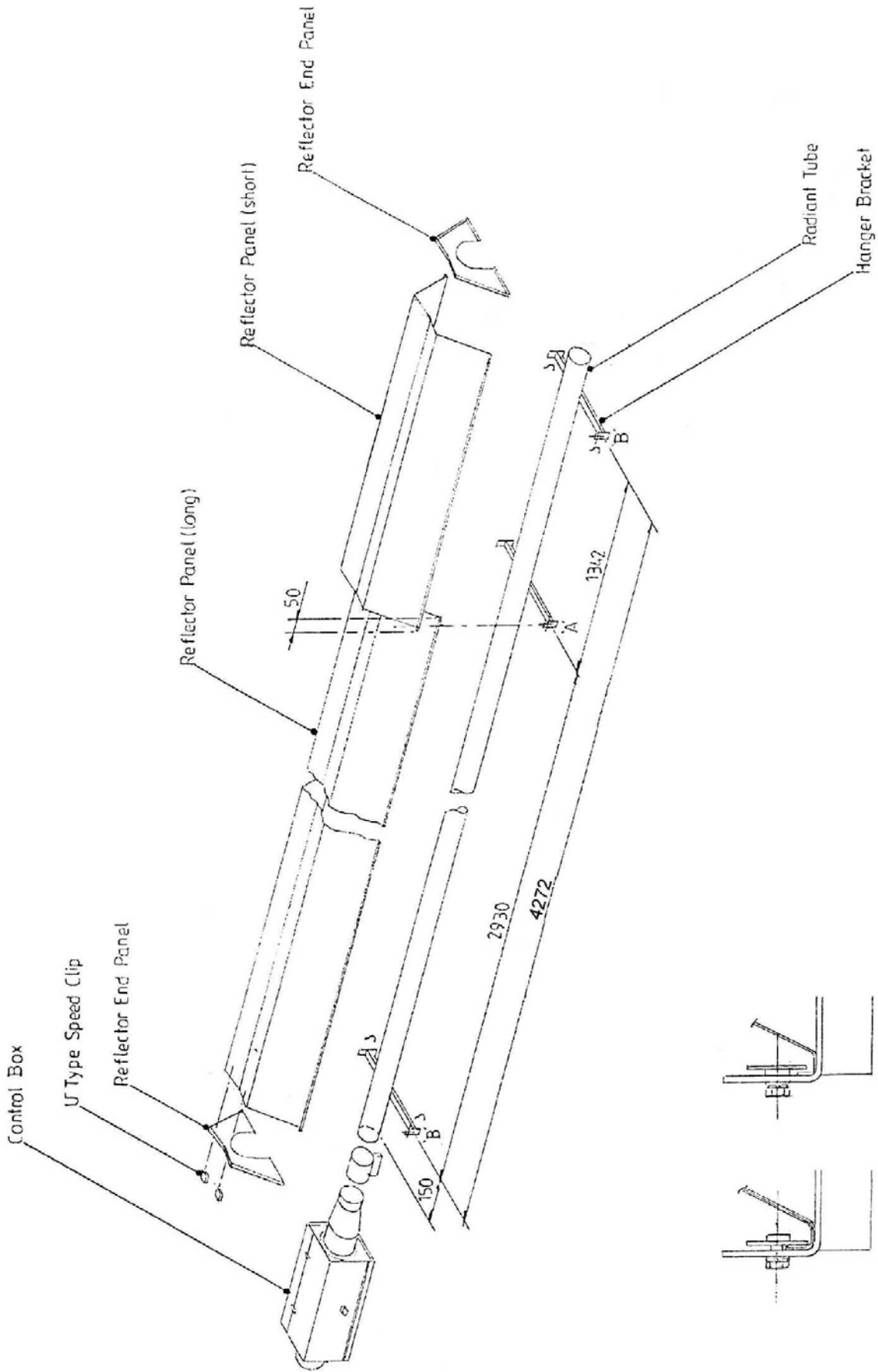
Ventilation shall be provided in all cases at or below the level of the heaters.

Minimum proven air flow - 2.35m³/h/kW of total rated heat input.

It shall only be possible to operate the radiant heaters whilst the ventilation airflow is proven.

3.4.2.3 Outside (ducted) combustion air supply. When installed in a dusty or polluted atmosphere, the heater should be fitted with a ducted supply of clean fresh air. A length of 100mm flexible ducting should be installed between the Control Box Air Inlet and any rigid ducting and be secured to the Air Inlet with hoseclips. The maximum length of ducting should be 15m with a maximum of two 90° bends.

Where outside combustion air is ducted directly to the burner(s) the low level **natural** ventilation openings shall be not less than 50% of the areas given in 3.4.2.1.above.



A Reflector Clamp B Reflector Location S = Suspension Point

Fig. 9

- 4.1.1 Remove the packaging/protection from one Radiant Tube and ensure it is clear internally. The appliance should be assembled prior to being suspended and due consideration must be given to the means by which the appliance is to be safely raised into position.
- 4.1.2 Place the Radiant Tube on trestles, providing 150mm minimum clearance above the floor and assemble the three Hanger Brackets to the Radiant tube using one U bolt per bracket (fastening pack) and position along the Radiant Tubes as shown in Fig. 9. Ensure that the welded seam of the tube is in contact with the Hanger Bracket, i.e. facing away from the reflector. Tighten the nuts sufficiently to retain the Hanger Brackets. Do not overtighten.
- IMPORTANT:** Failure to assemble the Radiant Tube with its welded seam facing away from the reflector will void the manufacturers warranty.
- 4.1.3 Place a Torcrite Coupling over one end of the Radiant Tube ensuring that it engages fully up to the stop. Assemble a Control Box to the Radiant Tube ensuring that it engages fully into the Torcrite Coupling (up to the stop) and is positioned vertically with the door latch uppermost (see Fig. 5). Tighten the screws of the Torcrite Coupling to secure the Control Box to the Radiant Tube, taking care to support the Control Box in line with the axis of the tube.
- NOTE:** Tighten the Torcrite Coupling screws alternately whilst continually checking for slackness of the joint.
- 4.1.4 Place the two Reflector Panels onto the Hanger Brackets and position to provide a 50mm overlap, arranged equally about the inner Hanger Bracket (see Fig 9.). Clamp the two Reflector Panels to the inner Hanger Bracket using two Retainers and M6 setscrews and washers (fastening pack). Screw the remaining (4) Retainers to the two outer Hanger Brackets to provide location for the Reflector Panel ends as shown in Fig. 9.
- NOTE:** The outer ends of the Reflector Panels will be free to move and compensate for expansion and contraction caused by temperature variation.
- 4.1.5 Position one Reflector End Panel over the Radiant Tube and into one end of the Reflector Panels, with the end panel flange flush with the end of the Reflector Panel. Secure the Reflector End Panel to the Reflector Panel by use of six 'U' type speed clips provided (fastening pack): as shown in Fig. 9.
- Repeat the procedure to attach the second Reflector End Panel to the opposite end of the reflector.
- 4.1.6 Construct the second section of the appliance by again following procedures 4.5.1 to 4.5.5 above.
- 4.1.7 The two sections of the appliance should now be raised and suspended from previously fixed chains or drop rods as detailed in Section 3.1., at suspension points indicated in Fig. 9 & 10. Rope or webbing should be used when lifting from above. If using a forklift to position the appliance, ensure that it is balanced on the forks prior to lifting.

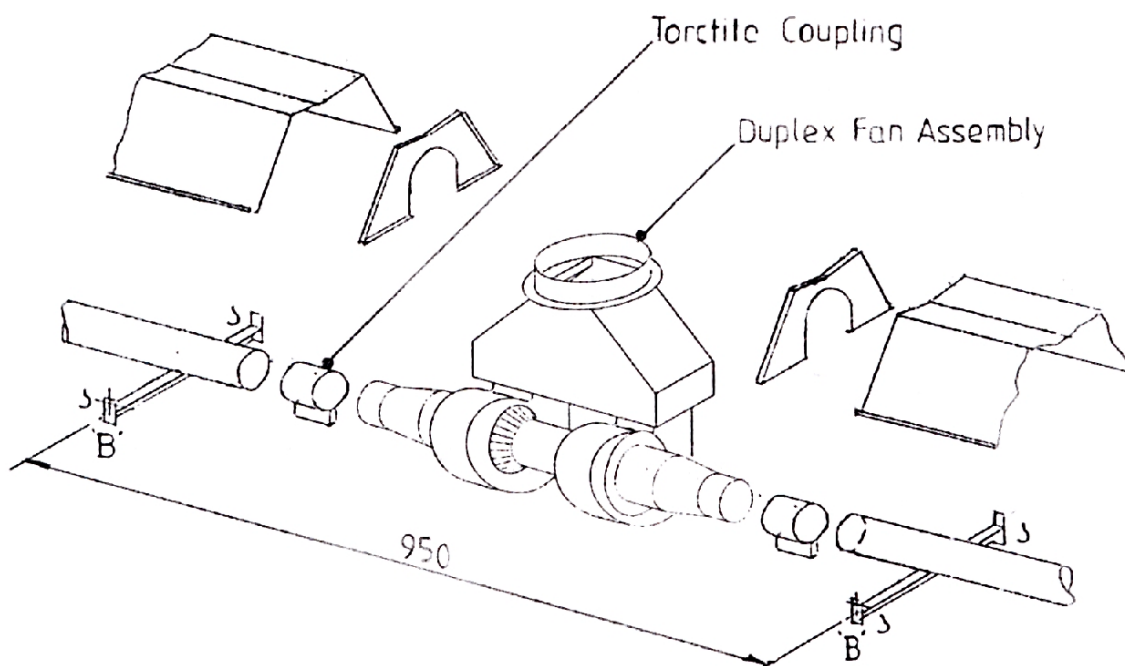


Fig. 10

- 4.1.8 Place one Torctite Coupling over the open end of each Radiant Tube, ensuring that they engage fully (up to the stop). Assemble the Duplex Fan Assembly to the Radiant Tubes, ensuring that it engages fully into each Torctite Coupling (up to the stops) and has the exhaust outlet positioned to suit the flue requirement, i.e. either vertical or horizontal to either side. Tighten the screws of the Torctite Couplings to secure the Duplex Fan Assembly to the two Radiant Tubes, taking care to support the Duplex Fan Assembly in line with the axis of the tubes. (see Fig. 10)

NOTE: Tighten the Torctite Coupling screws alternately whilst continually checking for slackness of the joint.

- 4.1.9 If combustion air is to be ducted to the appliance attach a length of flexible ducting to the Air Inlet Adaptor of each Control Box by the use of a suitable hoseclip. Attach the inlet end of the hoses to any fixed ducting, also by use of suitable hoseclips, allowing adequate movement of the appliance.
- 4.1.10 Connect the gas supply in accordance with Section 3.3. - Gas Supply, of the installation instructions.
- 4.1.11 Using twin core and earth PVC covered flexible supply cable, (as specified in Section 3.3.2, suitable for 230V~50Hz 125W) connect the DIN type electrical socket (fastenings pack) as follows:-

Brown (Red)	-	to terminal marked 1
Blue (Black)	-	to terminal marked 2
Green/Yellow	-	to terminal marked \perp

Connect this electrical socket to the electrical plug (marked 230V~50Hz) mounted on the terminal box attached the Fan Adapter.

- 4.1.12 Using twin core and earth PVC covered flexible supply cable, (as specified in Section 3.3.2, suitable for 230V~50Hz 125W supply), connect the two remaining 3 pin electrical sockets (fastenings pack) as follows:-

Brown (Red)	-	to terminal marked L
Blue (Black)	-	to terminal marked N
Green/Yellow	-	to terminal marked \perp

Connect these electrical sockets to the 3 pin plugs (marked 230V~50Hz) mounted in the side of each Control Box.

External fuse rating required - 3A
See Section 3.3 for electrical supply requirements.

NOTE: It is important for the correct function of the appliance for the polarity of the electrical supply to be correct.

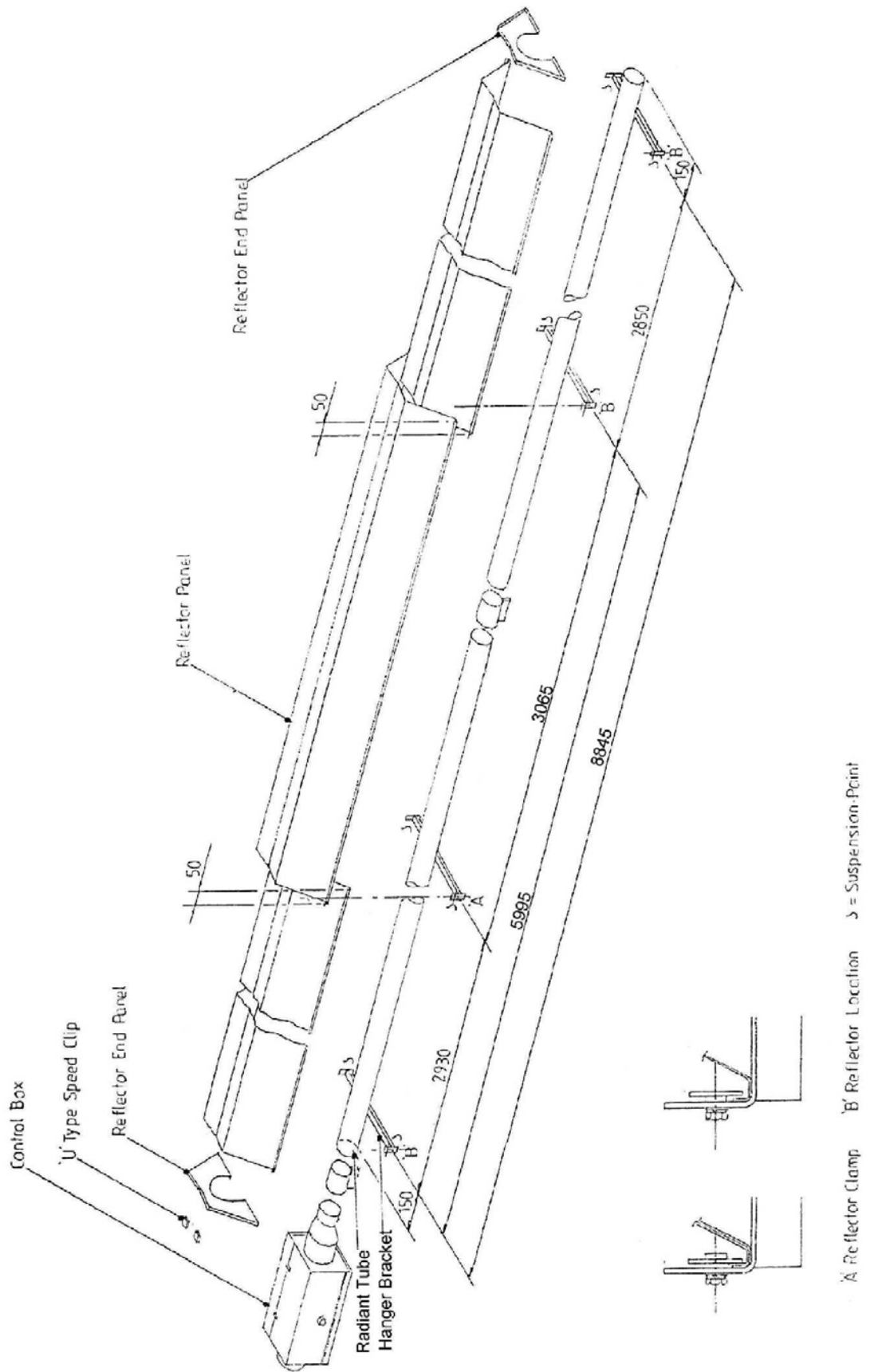


Fig. 11

- 4.2.1 Remove the packaging/protection from two Radiant Tubes and ensure that they are clear internally. It is recommended that the appliance is suspended in sections which are joined by the use of a Torctite Coupling once in position.
- 4.2.2 Place two Radiant Tubes on trestles, providing 150mm minimum clearance above the floor and assemble two Hanger Brackets to each of the Radiant Tubes using one U bolt per bracket (from fastenings pack) and position along the Radiant Tubes as shown in Fig. 11 Ensure that the welded seam of the tubes is in contact with the Hanger Bracket i.e. facing away from the reflector. Tighten the nuts sufficiently to retain the Hanger Brackets. Do not overtighten.

IMPORTANT: Failure to assemble the Radiant Tubes with their welded seam facing away from the reflector will void the manufactures warranty.

- 4.2.3 Place one Torctite Coupling over the end of the relevant Radiant Tube ensuring that it engages fully up to the stop. Assemble the Control Box to the Radiant Tube ensuring that it engages fully into the Torctite Coupling (up to the stop) and is positioned vertically with the door latch uppermost (see fig.5). Tighten the screws of the Torctite Coupling to secure the Control Box to the Radiant Tube, taking care to support the Control Box in line with the axis of the tube.

NOTE: Tighten the Torctite Coupling screws alternately whilst continually checking for slackness of the joint.

- 4.2.4 The two sections should now be raised and suspended from previously fixed chains or drop rods as detailed in Section 3.1, at suspension points indicated in Fig. 11 & 12. Rope or webbing should be used when lifting from above. If using a forklift to position the appliance sections, ensure that they are balanced on the forks prior to lifting.

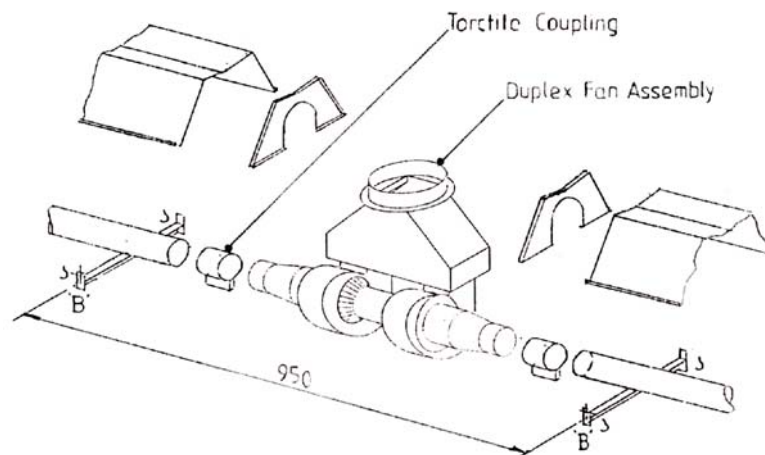


Fig. 12

- 4.2.5 Place a Torctite Coupling over the open end of one Radiant Tube ensuring that it engages fully, up to the stop. Assemble the second Radiant Tube into the Torctite Coupling ensuring that it engages fully, (up to the stop), with the Hanger Brackets aligned with those of the first Radiant Tube section (see Fig. 11). Tighten the screws of the Torctite Coupling to secure the two sections of Radiant Tube to one another, taking care to maintain the tubes in a straight line.
NOTE: Tighten the Torctite Coupling screws alternately whilst continually checking for slackness of the joint.
- 4.2.6 Place two of the Reflector Panels onto the Hanger Brackets and position their outer edges such that they overhang the outer Hanger Bracket by 80mm (see Fig. 11). Place the third Reflector Panel over the two previously positioned Reflector Panels to provide a 50mm overlap at each end. Clamp the first and second Reflector Panels, where they overlap, to the second Hanger Bracket, (from Control Box) using two retainers and M6 setscrews and washers (fastenings pack). Secure the outer end of the centre Reflector Panel to the Reflector Panel furthest from the Control Box, using two 'U' type speed clips (from fastenings pack) as shown in Fig. 11. Screw the remaining (6) retainers to each of the other Hanger Brackets to provide **location** for the Reflector Panels as shown in Fig.11.
NOTE: the Reflector Panels, where located but not clamped, will be free to move and compensate for expansion and contraction caused by temperature variation.

- 4.2.7 Position one Reflector End Panel over the Radiant Tube and into one end of the Reflector Panels with the End Panel flange flush with the end of the Reflector Panel. Secure the Reflector End Panel to the Reflector Panel by the use of six 'U' type speed clips provided (fastenings pack); as shown in Fig. 11.

Repeat the procedure to attach the second Reflector End Panel to the opposite end of the Reflector.

- 4.2.8 Construct and suspend the second section of the appliance by again following procedure 4.2.1 to 4.2.7.
- 4.2.9 Place one Torctite Coupling over the open end of each Radiant Tube, ensuring that they engage fully (up to the stop). Assemble the Duplex Fan Assembly to the Radiant Tubes, ensuring that it engages fully into each Torctite Coupling (up to the stops) and has the exhaust outlet positioned to suit the flue requirement, ie. either vertical or horizontal to either side. Tighten the screws of the Torctite Coupling to secure the Duplex Fan Assembly to the two Radiant Tubes, taking care to support the Duplex Fan Assembly in line with the axis of the tubes. (see Fig. 12)

NOTE: Tighten the Torctite Coupling screws alternately whilst continually checking for slackness of the joint.

- 4.2.10 If combustion air is to be ducted to the appliance, attach a length of flexible ducting to the Air Inlet Adaptor of each Control Box by use of a suitable hoseclip. Attach the inlet end of the hoses to any fixed ducting, also by use of suitable hoseclips, allowing adequate movement of the appliance.
- 4.2.11 Connect the gas supply in accordance with Section 3.3 - Gas supply, of the installation instructions.
- 4.2.12 Using twin core and earth PVC covered flexible supply cable, (as specified in Section 3.3.2, suitable for 230V~50Hz 125W supply), connect the DIN Type electrical socket supplied (fastenings pack) as follows:-

Brown (red)	-	to terminal marked 1
Blue (Black)	-	to terminal marked 2
Green/Yellow	-	to terminal marked ↓

Connect this electrical socket to the electrical plug (marked 230V~50Hz) mounted on the terminal box attached to the Fan Adapter.

- 4.2.13 Using twin core and earth PVC covered flexible supply cable, (as specified in Section 3.3.2, suitable for 230V~50Hz 125W supply), connect the two remaining 3 pin electrical sockets provided (fastenings pack) as follows:-

Brown (red)	-	to terminal marked L
Blue (Black)	-	to terminal marked N
Green/Yellow	-	to terminal marked ↓

Connect these electrical sockets to the 3 pin plugs (marked 230V~50Hz) mounted in the side of each Control Box.

External fuse rating required - 3A
See Section 3.3 for electrical supply requirements.

NOTE: It is important for the correct function of the appliance for the polarity of the electrical supply to be correct.

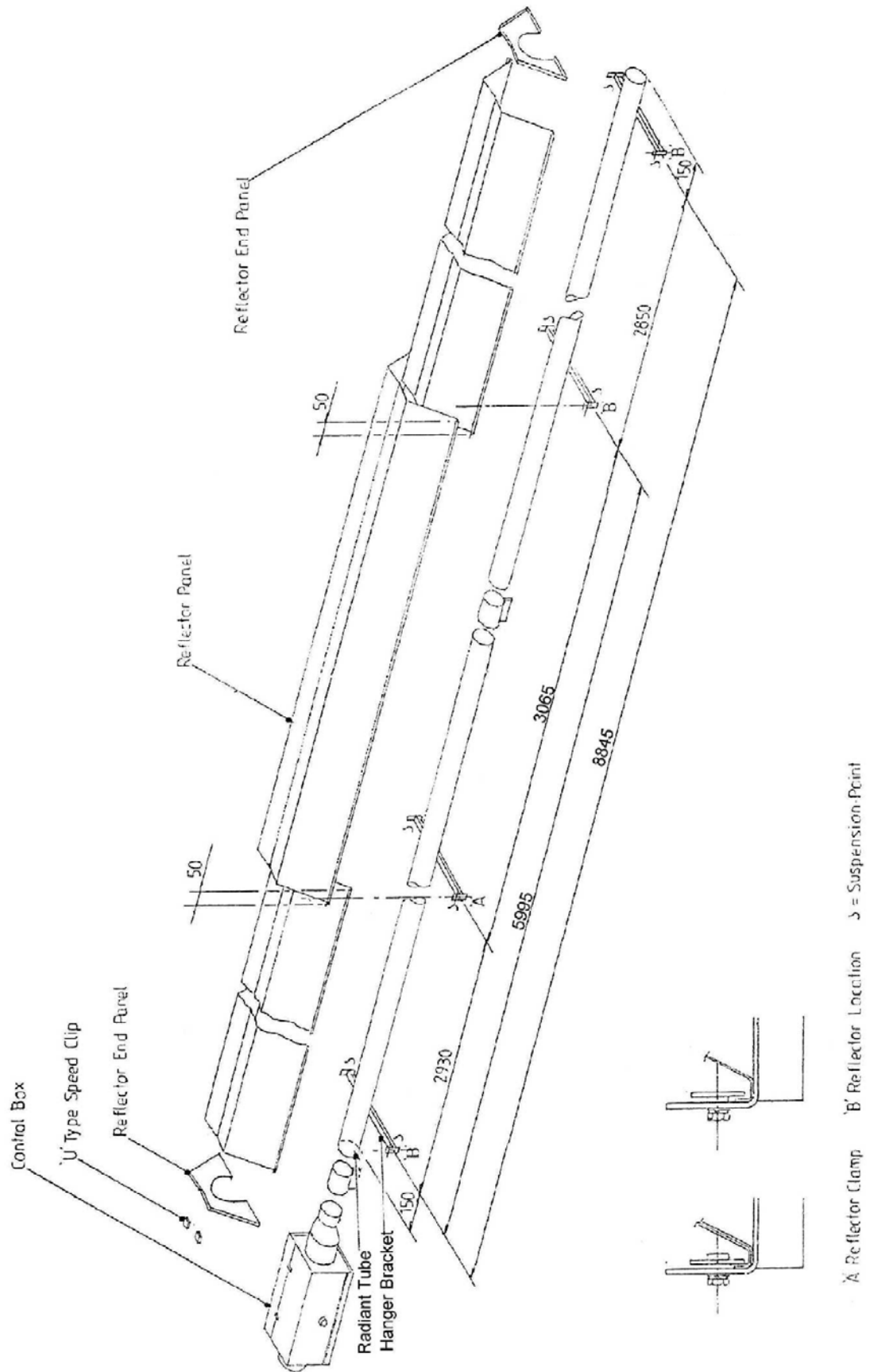


Fig. 13

- 4.3.1 Remove the packaging/protection from the Radiant Tubes and ensure that they are clear internally. It is recommended that the appliance be suspended in sections, which are joined by the use of a Torctite Coupling once in position.
- 4.3.2 Place one Radiant Tube and one Radiant Tube Assembly (containing turbulator) on trestles, providing 150mm minimum clearance above the floor and assemble two Hanger Brackets to both the Radiant Tube and Radiant Tube Assembly, using one 'U' bolt per bracket (from fastenings pack). Ensure that the welded seam of the tubes is in contact with the hanger brackets i.e. facing away from the reflector. Position the Hanger Brackets along the Radiant Tube and Radiant Tube Assembly as shown in Fig. 13. Tighten the 'U' bolt nuts sufficiently to retain the Hanger Brackets. Do not overtighten.

IMPORTANT: ensure that the turbulator is positioned adjacent to the Duplex Fan Assembly and orientated as shown in Fig. 14. Failure to assemble the Radiant Tubes with their welded seams facing away from the reflector will void the manufacturers warranty.

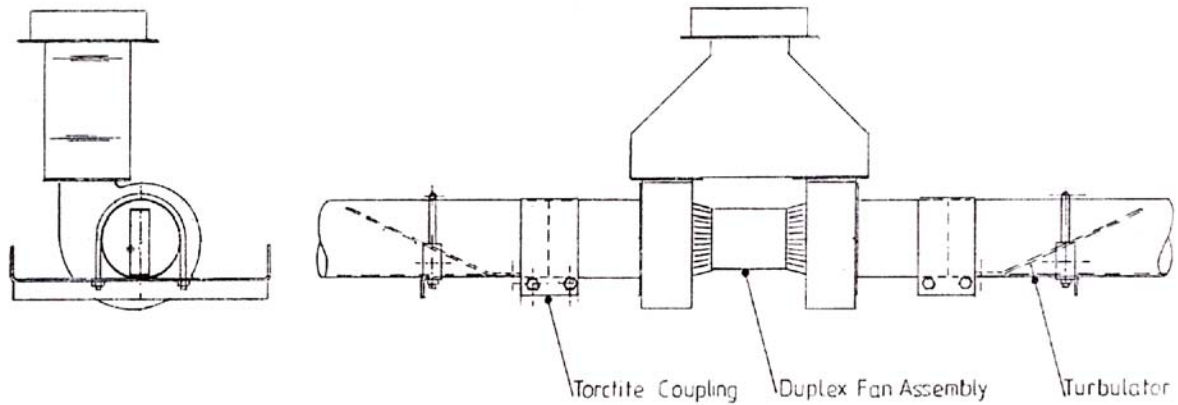


Fig. 14

- 4.3.3 Place one Torctite Coupling over the end of the Radiant Tube (see Fig. 13) ensuring that it engages fully, up to the stop. Assemble the Control Box to the Radiant Tube ensuring that it engages fully into the Torctite Coupling (up to the stop) and is positioned vertically with the door latch uppermost (see Fig. 5). Tighten the screws of the Torctite Coupling to secure the Control Box to the Radiant Tube, taking care to support the Control Box in line with the axis of the tube.
NOTE: Tighten the Torctite Coupling screws alternately whilst continually checking for slackness of the joint.
- 4.3.4 The two sections should now be raised and suspended from previously fixed chains or drop rods as detailed in Section 3.1, at suspension points indicated in Fig. 13 & 15. Rope or webbing slings should be used when lifting from above. If using a forklift to position the appliance sections, ensure that they are balanced on the forks prior to lifting.

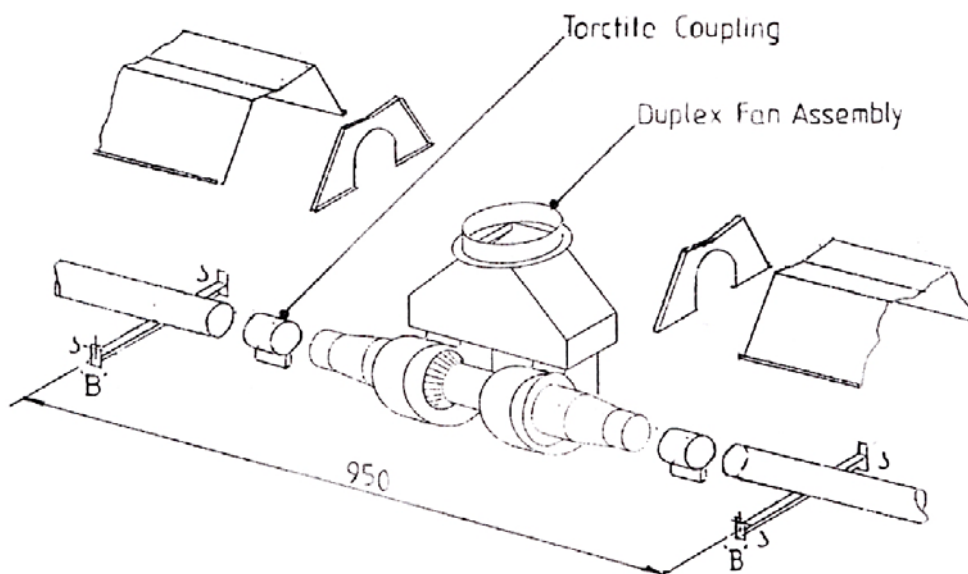


Fig. 15

- 4.3.5 Place a Torctite Coupling over the open end of the Radiant Tube carrying the Control Box ensuring that it engages fully, up to the stop. Assemble the second Radiant Tube into the Torctite Coupling ensuring that it engages fully, up to the stop with the Hanger Brackets aligned with those of the first Radiant Tube section (see Fig. 13). Tighten the screws of the Torctite Coupling to secure the two sections of Radiant Tube to one another, taking care to maintain the tubes in a straight line.

NOTE: Tighten the Torctite Coupling screws alternately whilst continually checking for slackness of the joint.

- 4.3.6 Place two of the Reflector Panels onto the Hanger Brackets and position their outer edges such that they overhang the outer Hanger Brackets by 80mm (see Fig. 13). Place the third Reflector Panel over the two previously positioned Reflector Panels to provide a 50mm overlap at each end. Clamp the first and second Reflector Panels, where they overlap, to the second Hanger Bracket (from Control Box end) using two retainers and M6 setscrews and washers (fastenings pack). Secure the outer end of the centre Reflector Panel to the Reflector Panel furthest from the Control Box using two U type speed clips (from fastenings pack) as shown in Fig. 13. Screw the remaining (6) retainers to each of the other Hanger Brackets to provide **location** for the Reflector Panels as shown in Fig. 13.

Note: the Reflector Panels, where located but not clamped will be free to move and compensate for expansion and contraction caused by temperature variation.

- 4.3.7 Position one Reflector End Panel over the Radiant Tube and into one end of the Reflector Panels with the End Panel flange flush with the end of the Reflector Panel. Secure the Reflector End Panel to the Reflector Panels by use of six 'U' type speed clips provided (fastenings Pack); as shown in Fig. 13.

Repeat the procedure to attach the second Reflector End Panel to the opposite end of the Reflector.

- 4.3.8 Construct and suspend the second section of the appliance by again following procedure 4.3.1 to 4.3.7.

- 4.3.9 Place one Torctite Coupling over the open end of each Radiant Tube, ensuring that they engage fully (up to the stop). Assemble the Duplex Fan Assembly to the Radiant Tubes, ensuring that it engages fully into each Torctite Coupling (up to the stops) and has the exhaust outlet positioned to suit the flue requirement, i.e. either vertical or horizontal to either side. Tighten the screws of the Torctite Coupling to secure the Duplex Fan Assembly to the two Radiant Tubes, taking care to support the Duplex Fan Assembly in line with the axis of the tubes. (see Fig. 15)

NOTE: Tighten the Torctite Coupling screws alternately whilst continually checking for slackness of the joint.

- 4.3.10 If combustion air is to be ducted to the appliance, attach a length of flexible ducting to the Air Inlet Adaptor of each Control Box by use of a suitable hoseclip. Attach the inlet end of the hoses to any fixed ducting, also by use of suitable hoseclips, allowing adequate movement of the appliance.

- 4.3.11 Connect the gas supply in accordance with Section 3.3 - Gas supply, of the installation instructions.

- 4.3.12 Using twin core and earth PVC covered flexible supply cable (as specified in Section 3.3.2., suitable for 230V~50Hz 125W supply), connect the DIN Type electrical socket provided (fastenings pack) as follows:-

Brown (Red)	-	to terminal marked 1
Blue (Black)	-	to terminal marked 2
Green/Yellow	-	to terminal marked \perp

Connect this electrical socket to the plug (marked 230V~50Hz) mounted on the terminal box attached to the Fan Adaptor.

- 4.3.13 Using twin core and earth PVC covered flexible supply cable (as specified in Section 3.3.2., suitable for 230V~50Hz 125W supply), connect the two remaining 3 pin electrical sockets provided (fastenings pack) as follows:-

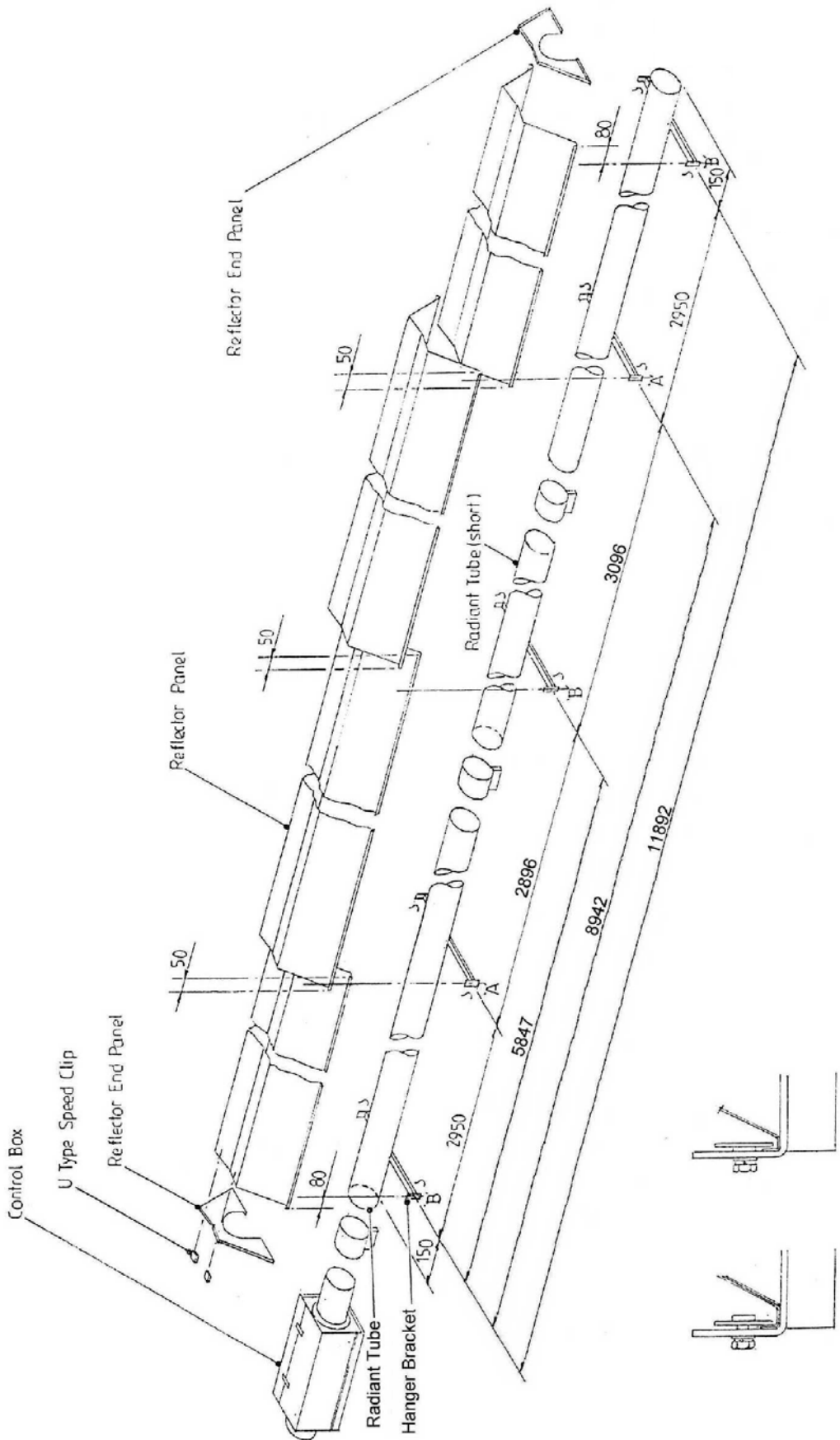
Brown (Red)	-	to terminal marked L
Blue (Black)	-	to terminal marked N
Green/Yellow	-	to terminal marked \perp

Connect these electrical sockets to the 3 pin plug (marked 230V~50Hz) mounted in the side of each Control Box.

External fuse rating required - 3A

See Section 3.3 for electrical supply requirement.

NOTE: It is important for the correct function of the appliance for the polarity of the electrical supply to be correct.



'A' Reflector (Clamp) 'B' Reflector Location 'J' = Suspension Point

Fig. 16

- 4.4.1 Remove the packaging/protection from the Radiant Tubes and ensure that they are clear internally. It is recommended that the appliance is suspended in sections which are joined by the use of Torctite Couplings once in position.
- 4.4.2 Place one Radiant Tube (long), one Radiant Tube (short) and one Radiant Tube Assy (containing turbulator) on trestles providing 150mm minimum clearance above the floor, and assemble the five Hanger Brackets to the Radiant Tubes and Radiant Tube Assy using one 'U' bolt per bracket (from fastenings pack). Position the Hanger Brackets along the Radiant Tubes and Radiant Tube Assy as shown in Fig. 16. Ensure that the welded seams of the tubes are in contact with the Hanger Brackets. i.e. facing away from the reflector. Tighten the nuts sufficiently to retain the Hanger Brackets. Do not overtighten.

IMPORTANT: ensure that the turbulator is positioned adjacent to the Duplex Fan assembly and orientated as shown in Fig. 17. Failure to assemble the Radiant Tubes with their welded seams facing away from the reflector will void the manufacturers warranty.

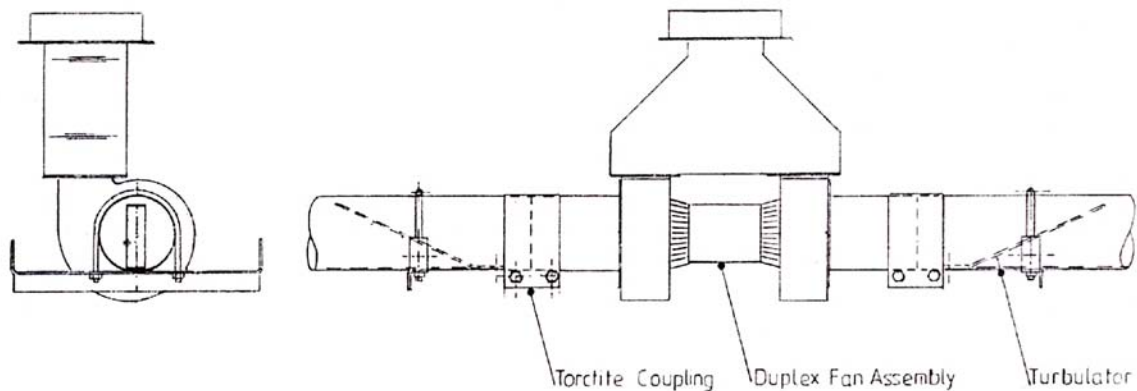


Fig. 17

- 4.4.3 Place one Torctite Coupling over the relevant end of the long Radiant Tube (see Fig. 16) ensuring that it engages fully, up to the stop. Assemble the Control Box to the Radiant Tube ensuring that it engages fully into the Torctite Coupling (up to the stop) and is positioned vertically with the door latch uppermost (Fig. 5). Tighten the screws of the Torctite Coupling to secure the Control Box to the Radiant Tube, taking care to support the control box in line with axis of the tube.
NOTE: Tighten the Torctite Coupling screws alternately whilst continually checking for slackness of the joint.
- 4.4.4 The three sections should now be raised and suspended from previously fixed chains or drop rods as detailed in Section 3.1, at suspension points indicated in Fig. 16 & 18. Rope or webbing slings should be used when lifting from above. If using a forklift to position the appliance sections, ensure that they are balanced on the forks prior to lifting.

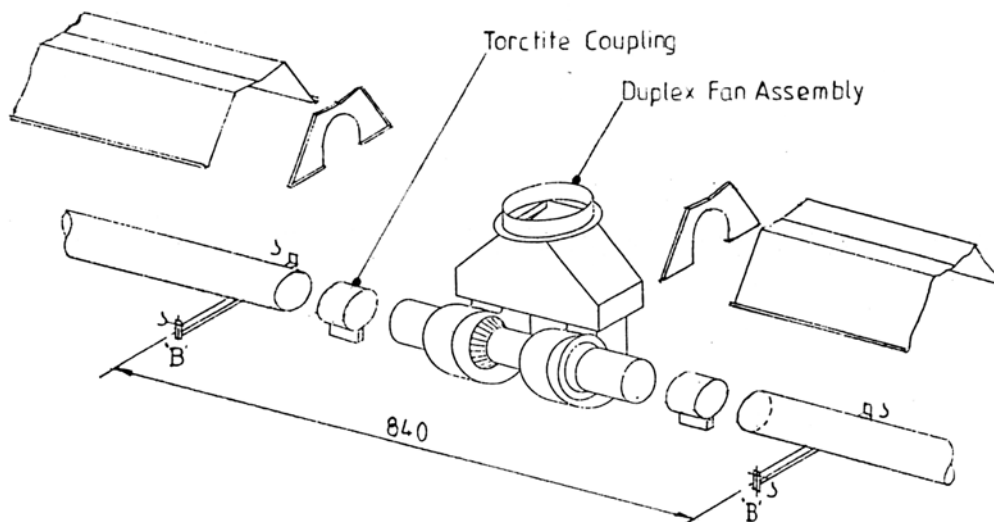


Fig. 18

- 4.4.5 Place a Torctite Coupling over the open end of the Radiant Tube carrying the Control Box ensuring that it engages fully, (up to the stop). Assemble the centre (short) Radiant Tube into the Torctite Coupling, ensuring that it engages fully (up to the stop) and with the Hanger Brackets aligned with those of the first Radiant Tube section (see Fig. 16). Tighten the screws of the Torctite Coupling to secure the two sections of Radiant Tube to one another, taking care to maintain the tubes in a straight line.
NOTE: Tighten the Torctite Coupling screws alternately whilst continually checking for slackness of the joint.
- 4.4.6 Place a Torctite Coupling over the open end of the Radiant Tube (and turbulator) Assembly furthest from the turbulator, ensuring that it engages fully, (up to the stop). Assemble the previously assembled section of Radiant Tubes into the Torctite Coupling ensuring that it engages fully (up to the stop) and with all the appliance Hanger Brackets correctly aligned with each other (see Fig. 16). Tighten the screws of the Torctite Coupling to secure the two sections of Radiant Tube to one another, taking care to maintain the tubes in a straight line.
NOTE: Tighten the Torctite Coupling screws alternately whilst continually checking for slackness of the joint.
- 4.4.7 Place one Reflector Panel onto the two Hanger Brackets adjacent to the Control Box and a second Reflector Panel onto the two Hanger Brackets adjacent to the Fan Assembly. Position the Reflector Panels such that their outer edges overhang the Hanger Brackets by 50mm (see Fig. 16). Place the remaining two Reflector Panels over the two outer Reflector Panels, ensuring that the centre overlap is as shown in Fig. 16, thus providing a 50mm overlap at each joint. Clamp the first and second Reflector Panels, where they overlap, to the second Hanger Bracket (from Control Box end) using two retainers and M6 setscrews and washers (fastenings pack). Clamp also, the third and fourth Reflector Panels where they overlap, to the fourth Hanger Bracket (from Control Box end) end using two retainers and M6 setscrews and washers (fastenings pack). Secure the two Reflector Panels that overlap adjacent to the centre Hanger Bracket, to each other using two 'U' type speed clips (from fastening pack) as shown in Fig. 16. Screw the remaining (6) retainers to each of the other Hanger Brackets to provide **location** for the Reflector Panels.
Note: the Reflector Panels, where located but not clamped, will be free to move and compensate for expansion and contraction caused by temperature variation.
- 4.4.8 Position one Reflector End Panel over the Radiant Tube and into one end of the Reflector Panels, with the End Panel flange flush with the end of the Reflector Panel. Secure the Reflector End Panel to the Reflector Panel by use of six 'U' type speed clips provided (fastenings pack); as shown in Fig. 16. Repeat the procedure to attach the second Reflector End Panel to the opposite end of the Reflector.
- 4.4.9 Construct and suspend the second section of the appliance by again following procedure 4.4.1 to 4.4.8.
- 4.4.10 Place one Torctite Coupling over the open end of each Radiant Tube, ensuring that they engage fully (up to the stop). Assemble the Duplex Fan Assembly to the Radiant Tubes, ensure that it engages fully into each Torctite Coupling (up to the stops) and has the exhaust outlet positioned to suit the flue requirement, i.e. either vertical or horizontal to either side. Tighten the screws of the Torctite Coupling to secure the Duplex Fan Assembly to the two Radiant Tubes, taking care to support the Duplex Fan Assembly in line with the axis of the tubes.
NOTE: Tighten the Torctite Coupling screws alternately whilst continually checking for slackness of the joint.
- 4.4.11 If combustion air is to be ducted to the appliance attach a length of flexible ducting to the Air Inlet Adaptor of each Control Box by use of a suitable hoseclip. Attach the inlet end of the hoses to any fixed ducting, also by use of suitable hoseclips, allowing adequate movement of the appliance.
- 4.4.12 Connect the gas supply in accordance with Section 3.3. - Gas supply, of these Installation Instructions.
- 4.4.13 Using twin core and earth PVC covered flexible supply cable, (as specified in Section 3.3.2, suitable for 230V~50Hz 125W supply), connect the DIN Type electrical socket supplied (fastenings pack) as follows:-
- | | | |
|--------------|---|----------------------------|
| Brown (Red) | - | to terminal marked 1 |
| Blue (Black) | - | to terminal marked 2 |
| Green/Yellow | - | to terminal marked \perp |

Connect this electrical socket to the socket (marked 230V~50Hz) mounted on the terminal box attached to the Fan Adapter.

- 4.4.14 Connect the gas supply in accordance with Section 3.2. - Gas supply, of these Installation Instructions.
- 4.4.15 Using twin core and earth PVC covered flexible supply cable, (as specified in Section 3.3.2, suitable for 230V~50Hz 125W supply), connect the two remaining 3 pin electrical sockets provided (fastenings pack) as follows:-

Brown (Red)	-	to terminal marked L
Blue (Black)	-	to terminal marked N
Green/Yellow	-	to terminal marked \perp

Connect these electrical sockets to the 3 pin plugs (marked 230V~50Hz) mounted in the side of each Control Box.

External fuse rating required - 3A

See Section 3.4 for electrical supply requirements.

NOTE: It is important for the correct function of the appliance for the polarity for the electrical supply to be correct.

5. COMMISSIONING

It is essential that all new pipework be purged and tested for soundness with a suitable leak detection fluid prior to attempting to ignite any appliance. This work should be carried out in accordance with National or Local regulations.

NB. DO NOT TEST FOR SOUNDNESS BY USE OF NAKED FLAMES

5.1 Ignition

- 5.1.1 Close and secure each Control Box door. The appliance will not operate unless the doors are secured.
- 5.1.2 Turn on the gas supply to the appliance.
- 5.1.3 Set the system time clock and thermostat to demand heat.
- 5.1.4 Switch on the electricity supply to the appliance. The appliance red neon indicator will be illuminated, the system fan will commence rotating and the air proving switch will sense an adequate air flow condition. The amber neon indicator will be illuminated.
- 5.1.5 After a purge period of 10 seconds minimum, the solenoid valves and ignition spark electrode will be energised simultaneously.
- 5.1.6 Upon successful ignition, the flame sensor will detect the flame, and the ignition spark electrode will be de-energised.
- 5.1.7 Should the flame fail to permanently establish during the 12 second ignition period the solenoid valves and ignition spark electrode will be de-energised, the amber neon indicator extinguished, and the appliance ignition control go to "lockout" condition.
- 5.1.8 To repeat the ignition sequence it will be necessary to switch off the electricity supply to the appliance for a period of 10 seconds to reset the ignition control. If a first reset is not successful, wait at least 15 seconds before repeating the procedure. After reset, an extended waiting time will occur.
- 5.1.9 If the burner fails to ignite following a second ignition sequence, switch off the electricity supply to the appliance, turn off the gas supply at the gas isolation valve and investigate the fault.
- 5.1.10 If gas failure occurs after successful ignition, the appliance ignition control will attempt one re-ignition before going to "lockout" condition.

5.2 Shut Down

- 5.2.1 To shut down the appliance for short periods of time, switch off the electricity supply to the appliance.
- 5.2.2 To shut down the appliance for a period of time in excess of one week, switch off the electricity supply to the appliance and turn off the gas supply at the gas isolation valve.

Note: Concise operating instructions are contained on Instruction Label (4260440), which should be affixed, adjacent to a low level user control.

5.3 Checking Gas Pressures

5.3.1 Switch off the electricity supply to the zone or system.

5.3.2 Connect a manometer to the test nipple protruding from the rear panel of the Control Box (adjacent to the Air Inlet Adaptor) see Fig. 19.

5.3.3 Open the Control Box door after releasing the two toggle latches.

5.3.4 To check the gas supply pressure to each burner:-

5.3.4.1 Unscrew the sealing screw (two turns) of the Control Valve test nipple marked 'IN' and connect the free end of the manometer tube (permanently connected to the manometer test nipple inside the rear panel of the control box) to this test nipple (See Fig. 19). Close the control box door and secure with the two toggle latches.

5.3.4.2 Ignite the appliance burner by switching on the electricity supply to the appliance and check that the manometer reading is as stated below for the gas type the appliance is "adjusted for" (see the Data Label affixed to the Control Box door).

category 2H: gas type G20 (natural): supply pressure	20mbar nom 17mbar min 25mbar max
--	--

category 3+: gas type G30 (butane): supply pressure	29mbar nom 25mbar min 35mbar max
---	--

category 3+: gas type G31 (propane): supply pressure	37mbar nom 25mbar min 45mbar max
--	--

5.3.4.3 Switch off the electricity supply to the appliance open the control box door and remove the manometer tube from the control valve test nipple marked IN. Screw in the test nipple sealing screw.

5.3.5 To check the setting pressure at each burner:-

5.3.5.1 Unscrew the sealing screw (two turns) of the Control Valve test nipple marked OUT and connect the free end of the manometer tube (permanently connected to the manometer test nipple inside the rear panel of the control box) to this test nipple (See Fig. 19). Close the control box door and secure with the two toggle latches.

5.3.5.2 Ignite the appliance burner by switching on the electricity supply to the appliance and check that the manometer reading is as stated below for the gas type the appliance is adjusted for (see the Data Label affixed to the control box door).

Category 2H: gas type G20 (natural): setting pressure	12.5mbar
---	----------

5.3.5.3 In the event that the burner setting pressure is incorrect, switch off the electricity supply to the appliance and remove the cap from the integral pressure governor for the Control Valve. Close the control box door and switch on the electricity supply to the appliance to ignite the burner. Remove the plug from the boss in the control box door and insert a suitable screwdriver through the exposed hole in the box to locate the governor adjusting screw. Adjust the pressure by turning the pressure governor adjusting screw clockwise to increase or anti-clockwise to decrease the burner setting pressure. See Fig. 19.

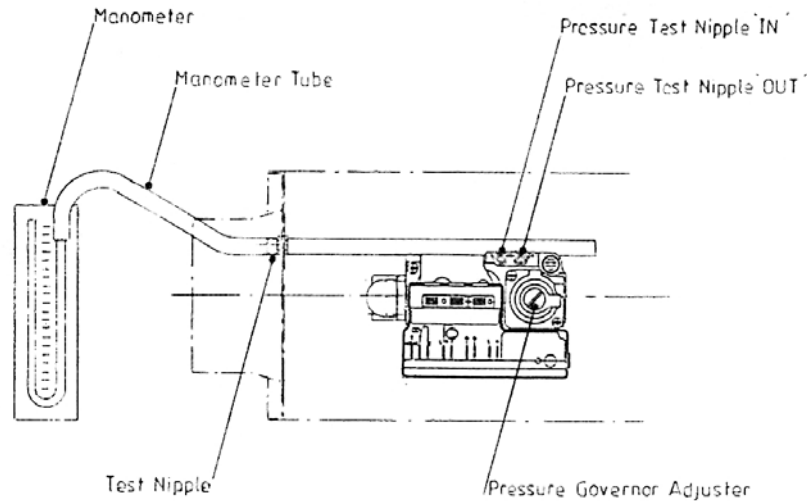


Fig. 19

- 5.3.5.4 Upon obtaining the correct burner setting pressure switch off the electricity supply to the appliance, remove the screwdriver, replace the plug into the boss in the control box door and open the door. Remove the manometer tube from the Control Valve test nipple marked 'OUT' and screw in the test nipple sealing screw. Close the control box door and secure it with the two toggle latches.

5.4 Flame Supervision

- 5.4.1 To check the operation of the flame supervision equipment, run the appliance normally, turn off the gas supply at the gas isolation valve and observe that the amber neon indicator remains illuminated after the burner flame is extinguished (2 seconds)
- 5.4.2 After a purge period of 10 seconds (minimum) the solenoid valves and the ignition spark electrode will be re-energised and with the gas still turned off, the ignition control will go to "lockout" condition after a further 12 seconds (maximum). Observe that the amber neon indicator is extinguished.
- 5.4.3 Switch off the electricity supply to the appliance for a period of 10 seconds before attempting to re-ignite the burner. (See section 5.1.11).

5.5 Air Proving Switch

- 5.5.1 With the appliance running normally, disconnect the DIN type socket from the electrical plug mounted on the Terminal Box attached to the Fan Adaptor. The burner should extinguished within 3 seconds.
- 5.5.2 Leave the DIN type disconnected for 30 seconds to ensure that there is no attempt at re-ignition.
- 5.5.3 Switch off the electrical supply to the appliance and re-connect the DIN type socket to the electrical plug mounted on the terminal box attached to the Fan Adaptor.

6. SERVICING

It is essential that at least once a year, preferably before the heating season, a qualified person services the appliance. In exceptionally dirty conditions, such as may occur in a foundry, more frequent servicing may be desirable.

IMPORTANT:-

1. Do not rest anything, especially ladders, against the appliance.
2. Gas and Electricity supplies must be isolated before commencing servicing work or replacement of components.
3. Unless instructed to the contrary, re-assemble components in reverse order.
4. Check all joints for gas soundness after carrying out any servicing of the appliance.
5. On completion of a service/fault finding task which has required the breaking and remaking of electrical corrections, the following checks, using a multimeter must be made.
 - 5.1 Earth continuity check
 - 5.2 Polarity check
 - 5.3 Resistance to earth check

6.1 Duplex Fan

- 6.1.1 Disconnect the electrical socket on the fan leads from the plug (marked 230V~50Hz mounted on the terminal box attached to the Fan Adaptor.
- 6.1.2 If a flued installation, disconnect the flue from the fan.
- 6.1.3 Slacken the screws of the Torctite Couplings securing the two Fan Connectors to the Radiant Tubes and draw the Duplex Fan off the Radiant Tubes.
- 6.1.4 Inspect the main impeller and secondary cooling impellers and remove any dust by brushing with a soft brush. Check that the impeller rotates freely, and there is no excessive play in the bearings. The ball bearings are sealed and require no attention.

6.2 Control Box

The control box can be removed from the appliance and serviced at ground level.

- 6.2.1 Disconnect the electrical supply socket from the plug (marked 230V~50Hz) mounted in the side of the Control Box. Turn off the gas supply to the appliance at the gas isolation valve and disconnect the gas supply pipe from the control box, leaving the R - ½ nipple screwed into the Control Valve flanged elbow.
 - 6.2.2 Slacken the nuts of the Torctite Coupling securing the Control Box Connector to the Radiant Tube and draw the Control Box Assembly off the Radiant Tube.
- ### 6.2.3 Ignition Electrodes
- 6.2.3.1 Open the Control Box door after releasing the two toggle latches.
 - 6.2.3.2 Disconnect the grey HT ignition/flame sensor lead and the green/yellow earth lead from the electrodes by gently pulling the connectors, using pliers.
 - 6.2.3.3 Unscrew the M6 x 16 setscrew securing the electrode carrier to the Control Box and remove the Electrode Assembly.
 - 6.2.3.4 Remove any foreign matter from the Electrode tips and check that the spark gap is 3.5mm. If the Electrode rods are badly oxidised, replace the Electrodes (see section 7.2).
 - 6.2.3.5 Upon re-assembly, ensure that the HT lead and earth lead connectors are securely attached to the Electrodes.
- ### 6.2.4 Burner
- 6.2.4.1 Unscrew the two M4 x 25 setscrews from the Burner Bracket and remove the Burner Clamp. Unscrew the Burner from the Injector Fitting and lift out of the Control Box. Clean by use of a stiff brush to remove any deposits.
 - 6.2.4.2 Inspect the Injector and clean as necessary with a soft bristle brush.

DO NOT DAMAGE THE INJECTOR ORIFICE BY USE OF SOLID OBJECTS.

- 6.2.4.3 To remove or replace the Injector, unscrew it from the Injector Fitting using a spanner, whilst retaining the Injector Fitting with a second spanner.

6.2.5 Electrical Wiring

- 6.2.5.1 Check that all the electrical connections are sound and that the wiring is undamaged. Replace damaged wires as necessary.

6.2.6 Air Inlet/Baffle Plate

- 6.2.6.1 Check that the air inlet holes in the Baffle Plate, which is clamped between the Control Box end panel and the Air Inlet flange, are clear from obstructions. Check also, that the wire mesh panel of the Air Inlet is clean. Clean as necessary using a soft brush.

6.2.6.2 In the case of an appliance having a ducted air supply, it will be necessary to disconnect the flexible ducting from the Air Inlet by first releasing the hoseclip.

6.2.6.3 If it is necessary to remove the Air Inlet to adequately clean the Baffle Plate it will be necessary to replace the gasket seal (see section 7.10 - Replacement Parts).

6.2.7 Door Seal

6.2.7.1 Check the condition of the seal around the Control Box door and replace as necessary (see section 7.10 - Replacement Parts)

IMPORTANT: The appliance will not function unless the seal around the control box door is sound and the door secured with the two toggle latches.

6.3 Reflector

6.3.1. If necessary, the Reflector can be dismantled by removing the Clamps, and where applicable the U type speed clips, and sliding the Reflector Panels out of the Hanger Brackets after first removing the Reflector End Panels. Dust accumulated on top of the Reflector should be brushed off and the reflective surface cleaned with a soft cloth and detergent in water. A mild non-abrasive metal polish may be used where extreme discolouration has occurred.

6.4 Flue Pipes

6.4.1 For Flued appliances it is important that periodic sweeping of the flue is carried out according to the National or Local regulations in force.

6.5 Re-assemble and Commission

6.5.1 Re-assemble the appliance in reverse order and commission in accordance with the instructions contained in Section 5.

6.6 Auxiliary Controls

6.6.1 Room thermostats, time switches, frost thermostats etc should be checked to ensure correct functioning, and are set to the users requirements.

7. REPLACING COMPONENTS

IMPORTANT: Disconnect gas and electricity supplies to the appliances (and system) before carrying out any repair work. This work can be carried out at high level using a purposes designed access tower, but it is preferable that this work should be carried out at ground level.

7.1 Duplex Fan

7.1.1 To remove the Duplex Fan from the Radiant Tubes, carry out operations 6.1.1, 6.1.2 and 6.1.3 of the Servicing Section.

7.1.2 Unscrew the three M6 x 12 setscrews from each side of the fan, securing the two Connectors and Orifice Plates to the fan.

7.1.3 When re-assembling the Orifice Plates and Connectors, new Gaskets must be fitted between the Fan case and each Orifice Plate. (See section 7.10).

IMPORTANT: Model PTDS 15 ONLY

The 3 air bleed holes in the cylindrical portion of the connector must be positioned such that they are below the horizontal centre line of the radiant Tube.

7.1.4 Unscrew the 8 - M5 x 10 setscrews securing the Fan Adaptor to the two fan case flanges and remove the Fan Adaptor. When reassembling the Fan Adaptor, new Gaskets must be fitted between the Fan Adapter and the two fan case flanges (see section 7.10).

7.2 Electrodes

Note: This range of radiant tube heaters employs a single probe electrode system whereby both the spark generation and flame supervision operations are carried out via a common electrode. The second electrode provides the earth path for the ignition spark. The two electrodes are identical, therefore either lead (grey HT or green/yellow - earth) may be connected to either electrode.

- 7.2.1 Disconnect the grey HT ignition/flame sensor lead and the green/yellow earth lead from the electrodes by gently pulling the connectors, using pliers.
- 7.2.2 Unscrew the M6 x 16 setscrew securing the Electrode Assembly to the Control Box end panel and remove the Electrode Assembly.
- 7.2.3 Unscrew the M3 setscrews securing the Electrodes to the Carrier and withdrawn the Electrodes.
- 7.2.4 After assembling replacement Electrodes to the Carrier, check that the spark gap is 3.5mm before inserting the Electrode Assembly into the Control Box and securing to the Control Box end panel with the M6 x 16 setscrews.

7.3 Ignition Control (Honeywell S4565R1006)

- 7.3.1 Unscrew the two screws securing the cable clamp to the ignition control and remove the cable clamp.
- 7.3.2 Disconnect the 12 way Molex electrical connector and the grey HT ignition spark/flame sensor lead from the Ignition Control.
- 7.3.3 Unscrew the M3 screw securing the Ignition Control to the Control Valve and lift out the Ignition Control.

7.4 Air Proving Switch

- 7.4.1 Remove the Air Tube Assembly from the Air Proving Switch pressure connection marked 'H' and from the Test Nipple located in the centre of the Air Inlet Baffle Plate.
- 7.4.2 Unscrew the two No. 8 x 12 self-tapping screws securing the Air Proving Switch to the floor of the Control box and lift out with the electrical leads attached.
- 7.4.3 Disconnect the three electrical leads from the Air Proving Switch by gently pulling the connectors, using pliers.
- 7.4.4 Remove the restrictor from the Air Switch Pressure connection marked L.
- 7.4.5 When installing a replacement Air Pressure Switch, take care to connect the electrical leads in accordance with the wiring diagram shown in Section 3.4.3 - Fig. 14 and replace the Restrictor on the pressure connection marked L. The appliance will not function unless this Restrictor is in place.

7.5 Burner Assembly

- 7.5.1 To replace the Burner, unscrew the two M4 x 25 setscrews from the Burner Bracket and remove the Burner Clamp. Unscrew the Burner from the Injector Fitting and lift out of the Control Box.

7.6 Injector

- 7.6.1 Remove the Burner as described at 7.5 above. Unscrew the Injector from the Injector Fitting, using a spanner, whilst retaining the Injector Fitting with a second spanner.

7.7 Pre-Injector

- 7.7.1 For models PTDS - 30,35,40,45, appliance category 2E+ only, there is a Pre-injector fitted into the Injector Fitting. In the unlikely event that it should be necessary to replace this Pre-injector, first unscrew the Injector Fitting from the straight flange attached to the Control Valve outlet port, and then unscrew the pre-injector from the Injector Fitting using a spanner. Whilst retaining the Injector Fitting with a second spanner or by holding in a vice.

7.8 Twin solenoid Control Valve

- 7.8.1 Remove the Ignition Control (see section 7.3) and the Burner (see section 7.5) and disconnect the gas supply pipe from the Control Box, leaving the R - ½ nipple screwed into the Control Valve elbow flange. Unscrew the two M4 setscrews securing the Valve Bracket to the floor of the Control Box and lift out the Control Valve Assembly.
- 7.8.2 Unscrew the four M4 screws securing the elbow flange to the Control Valve inlet port and remove the elbow flange and R - ½ nipple, complete.
- 7.8.3 Unscrew the four M4 screws securing the straight flange to the Control Valve outlet port and remove the straight flange and injector fitting, complete.
- 7.8.4 Unscrew the two M4 screws securing the Valve Bracket to the Control Valve mounting boss and remove the Valve Bracket.
- 7.8.5 After replacing the Control Valve, check the gas pressures in accordance with Section 5.3 of this manual.

IMPORTANT: TEST FOR GAS SOUNDNESS USING A SUITABLE LEAK DETECTION FLUID.

7.9 Neon Indicator

- 7.9.1 Disconnect the electrical leads from the Neon Indicators by gently pulling the connectors, using pliers.
- 7.9.2 Press the Neon Indicator out through the mounting hole in the floor of the Control Box. Remove the spring fixing washer from the Control Box.
- 7.9.3 When replacing a Neon Indicator, pass it through the mounting hole in the floor of the Control Box and press the spring fixing washer over the body of the Neon Indicator and up against the Control Box floor panel to secure the Neon Indicator. Connect the electrical leads in accordance with the wiring diagram shown in Section 3.3.3 Fig. 8.

7.10 Replacement Parts List

The following is a list of replacement parts, which may be required during the life of the appliance.

Part	Part Number	Part	Part Number
Gasket (Control Box)	4260132	Duplex Fan	4262259
Electrode	4260368	Air Proving Switch	4262278
Gasket (D.L. Adapter Outlet)	4260520	Neon Indicator-Red	4262280
Gasket (D.L. Adapter Inlet)	4260521	Neon Indicator-Amber	4262281
Ignition Control	4262197	Sealing Strip/Control Box door	4262409
Control Valve	4262240	Capacitor (Fan Motor)	4262522

8. CONVERSION INSTRUCTIONS

8.1 Conversion from cat. 2H (Natural Gas) to cat 3+ (LPG).

- 8.1.1 Remove the Injector from the Injector Fitting (see section 7.6) and replace it with the alternative Injector supplied (fastenings pack). Check that the size reference marked on the Injector agrees with that listed in the Technical Data table (Section 1) for the appliance model in question.
- 8.1.2 Remove the pressure governor cap from the integral pressure governor of the Control Valve and screw the adjuster clockwise up to the stop, to put the governor out of action. Replace the pressure governor cap.
- 8.1.3 Affix the gas adjustment label (3+ G30/G31, 29/37mbar) supplied (fastenings pack) onto the Data Label, adjacent to the headings "Adjusted For" and "Setting Pressure", to cover the original gas adjustment label (2H, G20, 20mbar).
- 8.1.4 Carry out checks in accordance with Section 5.4 of this manual to ensure correct supply pressure relative to the gas type being used (G30 - Butane or G31 - Propane).

8.2 Conversion from cat 3+ (LPG) to cat 2H (Natural Gas)

- 8.2.1 Remove the Injector from the Injector Fitting (see Section 7.6) and replace it with the alternative Injector supplied (fastenings pack). Check that the size reference marked on the Injector agrees with that listed in the Technical Data table (Section 1) for the appliance model in question.
- 8.2.2 Remove the pressure governor cap from the integral pressure governor of the Control Valve and unscrew the adjuster anti-clockwise 3 complete turns.
- 8.2.3 Affix the gas adjustment label (2H, G20, 20mbar) supplied (fastenings pack) onto the Data Label adjacent to the headings, "Adjusted For" and "Setting Pressure" to cover the original gas adjustment label (3+, G30/G31, 29/37mbar).
- 8.2.4 Carry out checks in accordance with Section 5.4 of this manual to ensure correct supply pressure and setting pressure, relative to the gas type being used (G20 - Natural Gas).

9 OPERATING INSTRUCTIONS

- 9.1. Ensure that the Control Box doors are closed and secured with the two toggle latches. The heater will not operate with the doors open.
- 9.2 Turn on the gas supply to the appliance.
- 9.3 Set any time switches or thermostats to demand heat.
- 9.4 Switch on the electricity supply to the appliance. The red neon indicators will be illuminated.
- 9.5 The fan will commence rotating and the air pressure switch will sense an adequate air flow condition. The amber neon indicator will be illuminated.
- 9.6 The burner should ignite within 20 seconds. Both red and amber neon indicators will remain illuminated.
- 9.7 Failure to ignite will result in the ignition controller going to "lockout" condition. The red neon indicator will remain illuminated. The amber neon indicator will be extinguished.
- 9.8 If lockout occurs on one burner or both burners, switch off the electricity supply to the appliance, wait for 10 seconds before switching on the electricity supply to the appliance to repeat the ignition sequence.
- 9.9 If the appliance fails to ignite after a second sequence switch off the electrical supply to the appliance and call the service engineer.
- 9.10 If gas failure occurs after successful ignition the appliance will attempt one re-ignition before going to lockout condition.
- 9.11 To shut down the appliance for short periods of time, switch off the electricity supply to the appliance.
- 9.12 To shut down the appliance for longer periods of time, switch of the electricity supply to the appliance and turn off the gas supply at the gas isolation valve.

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