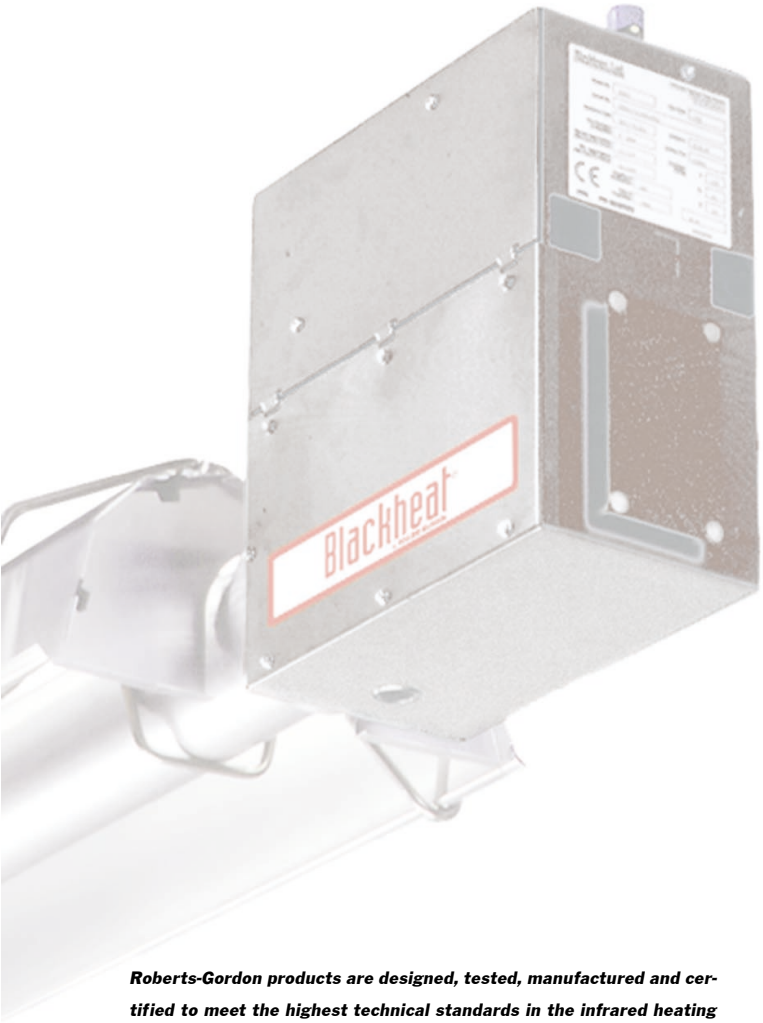
ROBERTS GORDON

Blackheat®



Vacuum Assisted Single-burner and Double Linear Systems

Installation & Servicing Instructions

BH15 UT
BH20 UT
BH25 UT
BH30 UT
BH35 UT
BH40 UT
BH45 UT
BH50 UT

BH15 ST
BH20 ST
BH25 ST
BH30 ST
BH35 ST
BH40 ST
BH45 ST
BH50 ST
BH2 15 ST
BH2 20 ST
BH2 25 ST
BH2 30 ST
BH2 35 ST

Roberts-Gordon products are designed, tested, manufactured and certified to meet the highest technical standards in the infrared heating industry. To ensure safe operation it is essential that systems using Roberts-Gordon products be installed and commissioned in accordance with the manufacturer's instructions and other applicable codes and regulations. Failure to inspect and maintain equipment properly constitutes a serious safety hazard.

Installer

Please take the time to read and understand these instructions prior to any installation. Installer must give a copy of this manual to the owner.

Owner

Keep this manual in a safe place to provide your serviceman with information should it become necessary.

CE
0063

Quality in Any Language™

Roberts-Gordon Europe, Ltd.
12 Cobham Road,
Ferndown Industrial Estate
Wimborne, Dorset BH21 7PS
Telephone: +44 (0) 1202 896510
Fax: +44 (0) 1202 861397

http://www.rg-inc.com

P/N 170101UK Rev.F 8/99

▶ *Table of Contents*

▶ *List of Figures:*

▶ Section 1. Introduction

1.1 WHAT IS A BLACKHEAT UNITARY HEATER SYSTEM?

The Blackheat BH is a gas-fired, vacuum-assisted, low-intensity radiant heating system. The BH was developed by Blackheat in partnership with Roberts-Gordon, who pioneered low-intensity heating in 1962 with their revolutionary CoRayVac system.

Please note that the Blackheat BH is available in several configurations. This manual describes the single burner and double linear versions. The single burner systems are available in both linear tube and U-tube configurations. The double linear systems are comprised of two linear heaters with a common fan assembly.

Optionally, HiLo models are available that incorporate an extra solenoid valve to operate at a low (approx 80%) rate. Linked to a secondary thermostat, this provides a low rate at an intermediate setting below the "off" stat. These models are described in manual 174900UK.

Multi-burner systems are covered in manual 172101UK. These systems manifold several heaters to a single vacuum pump.

1.2 ABOUT RADIANT HEAT

Radiant heat is the most effective way of providing comfortable environmental conditions in large open spaces. Radiant energy operates like light, travelling in straight lines and can be directed to specific individuals and areas which require heating. Comfort levels are created when the radiant energy is absorbed by the floor, plant and machinery, and lower walls without initially losing energy to the air space between.

The objects which have absorbed the radiant energy in turn release heat to the air and act as low power radiators. In this way, all useable energy is absorbed and utilised in the occupied zone – the lower 2 metres – not in the entire structure and roof space. Comfort conditions are achieved using ***lower air temperatures*** and as a result ***lower heat losses*** with a subsequently ***lower fuel bill***.

1.3 USE OF ACCREDITED INSTALLER

Installation of this equipment must only be carried out by a registered installer. (In the United Kingdom, installer must be CORGI registered.)

1.4 GENERAL REQUIREMENTS

PLEASE NOTE THAT FAILURE TO COMPLY STRICTLY WITH THESE INSTALLATION AND SERVICING INSTRUCTIONS MAY INVALIDATE THE LIMITED WARRANTY SET OUT IN SECTION 11 OF THESE INSTRUCTIONS.

BEFORE PROCEEDING WITH THE INSTALLATION OF THE BLACKHEAT UNITARY SYSTEM IT WILL BE HELPFUL TO CHECK THAT THE FOLLOWING POINTS HAVE BEEN CAREFULLY CONSIDERED.

1.4.1 ***Highly elevated installations:***

1. Do you have the proper equipment to install and maintain the system in the proposed location?
2. Do you have suitable equipment to access the system for maintenance after the system is installed?
3. Will the proposed location allow future access to the system (i.e., will machinery be erected at a later date that may make access to the system difficult or impossible)?

   NOTE: ***DO NOT*** lean ladders against a suspended heater system. The BH unitary systems employ a non-rigid attachment system that will not support external apparatus.

4. Is the installed height within the parameters specified by the manufacturer?

1.4.2 ***Ventilation/Air Supply:***

1. Will a flue be added to the system? If so, have you checked the flue recommendations specified by the manufacturer?
2. Is there an adequate supply of fresh air to support combustion

1.4.3 ***Environment of the Facility:***

1. Are there halogenated hydrocarbons* and/or other combustible materials (i.e., cleaning agents, wood, paper, rubber, etc.) within the area to be heated?- If so, is there adequate exhaust ventilation and clearances?

   NOTE: In poorly vented, dusty areas, fresh outside air should be provided to prevent premature aging of the equipment.

   In very dusty areas (i.e., woodworking facilities) regular dusting of the tubes and reflectors is essential as a fire preventative measure.

1.4.4 ***Clearances to Combustibles:***

1. Be sure that the clearances (as recommended by the manufacturer) to halogenated hydrocarbons and/or other combustible materials is observed.
2. Be sure that the manufacturer recommended clearances between the heater system and vehicles parked below are maintained.
3. Be sure that signs are posted in storage areas to specify maximum stacking height below the heater system.
4. If the radiant tubes must pass through the building structure, be sure that adequate sleeving and fire stop is installed to prevent scorching and/or risk of

* **Halogenated Hydrocarbons** are a family of chemical compounds characterized by the presence of halogen elements (fluorine, chlorine, bromine, etc.). These compounds are frequently used in refrigerants, cleaning agents, solvents, etc. If these compounds enter the air supply of the burner, the lifespan of the heater components will be greatly reduced. An outside air supply must be provided to the burners whenever the presence of these compounds is suspected. Warranty may be invalidated if the heater is exposed to halogenated hydrocarbons.

▶ Section 2. Specifications

2.1 MATERIAL SPECIFICATIONS

2.1.1 ***Combustion and Emitter Tubes***

100 mm dia. 16 gauge heat treated aluminised mild steel

2.1.2 ***Reflectors***

NS3 H14 aluminium or 1.4016 2R stainless steel (option)

2.2 HEATER SPECIFICATIONS

2.2.1 ***Sequence Controller***

Fully automatic direct spark 100% shut off ignition flame rectification module

2.2.2 ***Electrical***

Rating: 230V, 50 Hz, single phase, 1 amp
Connection: 3 pin moulded plug

2.2.3 ***Gas Supply***

Connection: Rc1/2 (1/2" BSP int)

Natural G20:
Minimum - Inlet 15.00 mbar (6 in wg)
Maximum - Inlet 50.00 mbar (20 in wg)

Natural G25:
Minimum - Inlet 17.50 mbar (7 in wg)
Maximum - Inlet 50.00 mbar (20 in wg)

LP Gas (propane or butane):
Minimum - Inlet 32.50 mbar (13 in wg)
Maximum - Inlet 50.00 mbar (20 in wg)

2.3 VENTING SPECIFICATIONS

2.3.1 ***Fans***

BH-15, 20, 25, 30	Model: Airflow 45BTFR
BH-35, 40, 45	Model: Torin AU075871
BH-35, 40, 45, 50	Model: Magnetek JF1G
BH2-15, 2-20	Model: Airflow 45BTFR
BH2-25, 2-30	Model: Torin AU075871
BH2-25, 2-30, 2-35	Model: Magnetek JF1G

Note: ***For Models BH-35, BH-40, BH-45, BH2-25 and BH2-30, the Magnetek fan is provided as standard, and the Torin fan is available as an alternate.***

2.3.2 ***Flue***

When fitted, the flue must be 100 mm , or greater in diameter, and must conform to National Codes. The flue must be self supporting. Inlet must be 100 mm diameter.

2.4 SUSPENSION SPECIFICATIONS

Galvanised straight link welded chain.

2.5 CONTROLS SPECIFICATIONS

Time switches, thermostats etc. can be wired into the electrical supply. External controls supplied as an optional extra.

Table 1. U-Tube Heater Specifications

U-Tube Heater	BH15UT	BH20UT	BH25UT	BH30UT	BH35UT	BH40UT	BH45UT	BH50UT
Rate - Gross (kW)	15 kW	20 kW	25 kW	30 kW	35 kW	40 kW	45kW	50kW
Rate - Net (kW)	13.5 kW	18 kW	22.5 kW	27 kW	31.5 kW	36 kW	40.5kW	45kW
Heat Exchanger Length (mm)	3323	4843	4843	6363	6363	6363	7998	7998
Overall Heater Length (mm)	3406	5236	5236	6456	6456	6456	8328	8328
Weight (kg)	39 kg	54 kg	54 kg	65 kg	65 kg	66 kg	96kg	96kg
Heated Area (m^2)	20-160	30-210	40-265	50-315	55-370	65-420	70-475	80-525
Min. Installed Ht (m)	3.5 m	3.5 m	4.0 m	4.7 m	5.0 m	5.0 m	5.0m	5.0m
Clearances to Combustibles								
Above (mm)	100	100	100	100	100	100	100	100
Side (mm)	760	840	840	840	910	910	1140	1140
Below (mm)	1520	1600	1600	1600	1680	1680	1980	1980

Table 2. Linear Heater Specifications

Linear Heater	BH15ST	BH20ST	BH25ST	BH30ST	BH35ST	BH40ST	BH45ST	BH50ST
Rate - Gross (kW)	15 kW	20 kW	25 kW	30 kW	35 kW	40 kW	45 kW	50 kW
Rate - Net (kW)	13.5 kW	18 kW	22.5 kW	27 kW	31.5 kW	36 kW	40.5 kW	45 kW
Heat Exchanger Length (mm)	6096	9144	9144	12192	12192	12192	15240	15240
Overall Heater Length (mm)	6685	9739	9739	12785	12826	12826	15876	16120
Weight (kg)	41 kg	55 kg	55 kg	68 kg	68 kg	68 kg	81 kg	81 kg
Heated Area (m^2)	20-160	30-210	40-265	50-315	55-370	65-420	70-475	80-525
Min. Installed Ht (m)	3.5 m	3.5 m	3.5 m	3.5 m	4.6 m	5.0 m	5.0 m	5.0 m
Clearances to Combustibles								
Above (mm)	100	100	100	100	100	100	100	100
Side (mm)	760	840	840	840	910	910	1140	1140
Below (mm)	1520	1600	1600	1600	1680	1680	1980	1980

Table 3. Double Linear Heater Specifications

Double Linear Heater	BH2-15ST	BH2-20ST	BH2-25ST	BH2-30ST	BH2-35ST
Rate - Gross (kW)	30 kW	40 kW	50 kW	60 kW	70 kW
Rate - Net (kW)	27 kW	36 kW	45 kW	54 kW	63 kW
Heat Exchanger Length (mm)	12802	18898	18898	24994	24994
Overall Heater Length (mm)	13630	19738	19738	25030	25030
Weight (kg)	82 kg	110 kg	110 kg	136 kg	136 kg
Heated Area (m^2)	50-315	65-420	80-525	100-630	110-740
Min. Installed Ht (m)	3.5 m	3.5 m	3.5 m	3.5 m	4.6 m
Clearances to Combustibles					
Above (mm)	100	100	100	100	100
Side (mm)	760	840	840	840	910
Below (mm)	1520	1600	1600	1600	1680

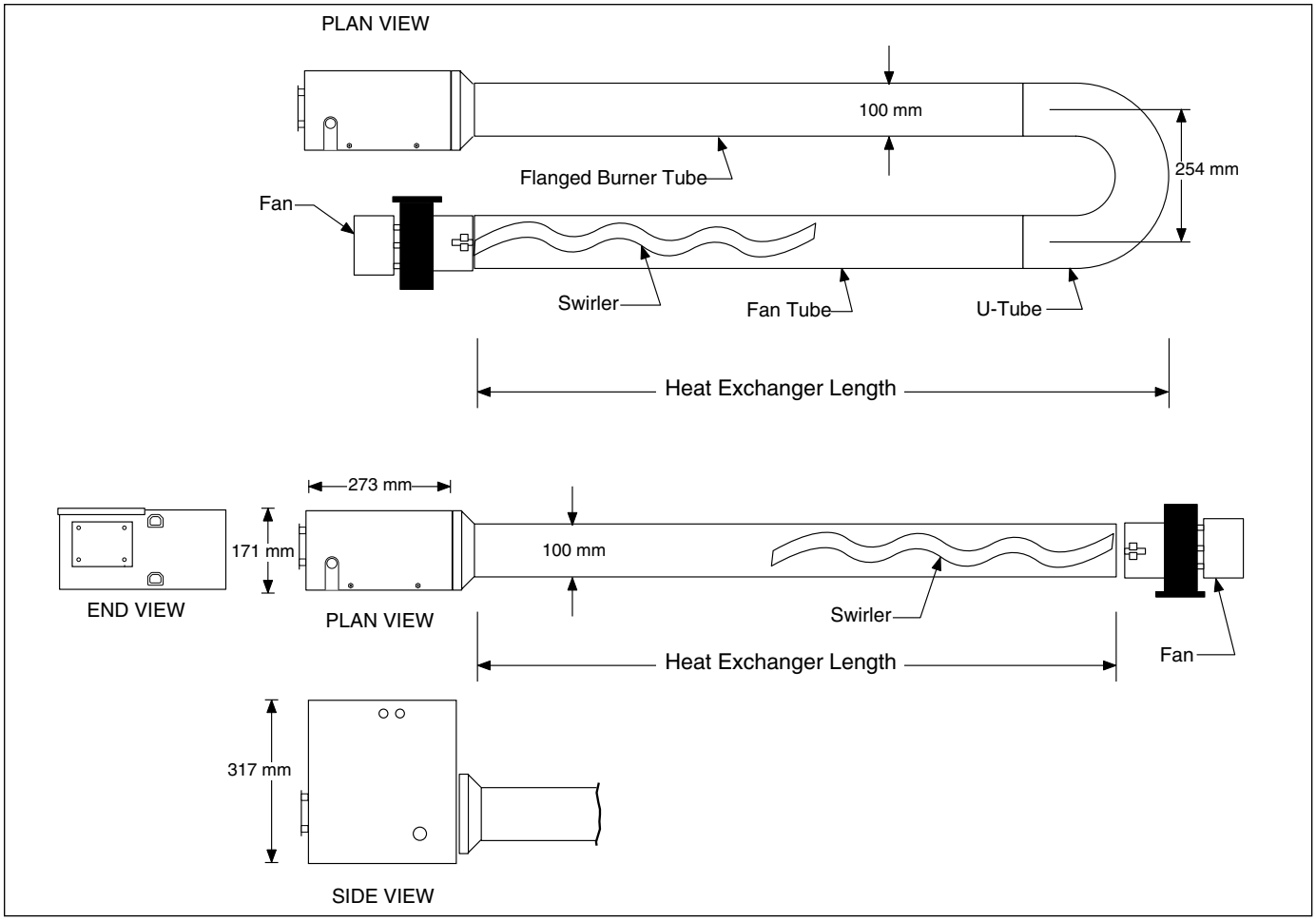


Figure 1. Blackheat U-Tube and Linear Tube Configurations

2.6 BURNER SPECIFICATION

Burner Air Plate	BH15	BH20	BH25	BH30	BH35	BH40	BH45	BH50
Identification Number:	14	15	12	6	7	9	10	11

Jet Number	BH15	BH20	BH25	BH30	BH35	BH40	BH45	BH50
Natural G20 & G25	3.4 mm	3.8 mm	4.3 mm	4.7 mm	4.9 mm	5.4 mm	5.8 mm	6.0 mm
Propane/Butane	2.1 mm	2.35 mm	2.7 mm	3.0 mm	3.2 mm	3.4 mm	3.6 mm	3.75 mm
Pressure Couple	1.95 mm	2.25 mm	2.5 mm	2.7 mm	2.9 mm	3.2 mm	3.25 mm	3.4 mm

Gas Consumption *	BH15	BH20	BH25	BH30	BH35	BH40	BH45	BH50
Natural G20 (m^3/h)	1.43	1.91	2.38	2.86	3.34	3.81	4.29	4.77
Natural G25 (m^3/h)	1.66	2.22	2.77	3.32	3.88	4.43	4.99	5.54
Propane (m^3/h)	0.56	0.75	0.94	1.13	1.32	1.51	1.69	1.88
Butane (m^3/h)	0.43	0.57	0.72	0.86	1.00	1.15	1.29	1.43

(*) Based on Gross Caloric Value

Governor Pressure	BH15	BH20	BH25	BH30	BH35	BH40	BH45	BH50
Butane (mbar)	21.4	19.7	19.2	17.4	18.2	17.9	16.9	18.4
Butane (in wg)	8.6	7.9	7.7	7.0	7.3	7.2	6.8	7.4

Natural G20:	8.7 mbar	3.5 in wg
Natural G25:	11.1 mbar	4.5 in wg
Natural G20 Hi/Lo :	8.7/5.0 mbar	3.5/2.0 in wg
Natural G25 Hi/Lo :	11.1/6.5 mbar	4.5/2.6 in wg
Propane:	27 mbar	10.5 in wg

▶ Section 3. U-Tube Heater Installation

3.1 HEALTH AND SAFETY

Blackheat cannot be responsible for ensuring that all appropriate safety measures are undertaken prior to installation; this is entirely the responsibility of the installer. If Blackheat installs the appliance, it is essential that the contractor, the sub-contractor, or the owner indicate the presence of combustible materials or halogenated hydrocarbons anywhere in the premises.

3.2 RELATED DOCUMENTS

Notwithstanding their limited scope, the appliance should be installed in accordance with relevant National Codes.

3.3 CLEARANCES TO COMBUSTIBLES

Before proceeding with installation, ensure that proper clearances to combustible materials will be observed in the final installed position of the heater. Clearance distances may be found in Section 2 of these instructions.

3.4 INITIAL ASSEMBLY

3.4.1 Prepare a work area corresponding to the size of heater selected. The area should be clear and free of debris. The manufacturers approved layout drawing should be referred to so that the work area is convenient for the final system position.

3.4.2 Layout the appropriate Figure (3, 4, or 5 depending on heater model) and keep it at a convenient place for frequent reference. Pull out every part from the package and lay them out roughly at the position shown in the assembly drawings. For BH35UT and BH40UT make sure that the end of the fan tube with the swirler points away from the U-bend. Keep the bolts and screws at a convenient place for later usage.

3.4.3 With the suspension holes uppermost, slide the first and intermediate brackets onto the fan and burner tubes. For Model BH15, there is no intermediate bracket. In the following assembly procedures, please pay attention to this point.

3.4.4 Use two bolts to connect the U-bend and end bracket together with the suspension holes uppermost. Insert the plain ends of the burner tube and fan tube into the two legs of the U-bend, and secure them with four bolts.

3.4.5 Place intermediate bracket over the ends of the tubes. Slide bracket onto tubes approximately 500 mm.

3.4.6 Join the burner tube and the remaining plain end tube using the couplings and bolts provided. See section 4.4.5 for details.

3.4.7 Place the reflectors over the brackets as shown in the assembly diagrams, and secure them using six screws at each end. Seal the seam on top of the reflectors using U-clips at least every 300 mm.

NOTE: Remove PVC coat from stainless steel reflectors.

3.4.8 Insert the quick-links into the holes at the top edges of the end, intermediate and first brackets.

3.4.9 Prepare the hanging chains at the position where the heater will be located. Suspend the heating system as recommended below. Use the center holes of the end and first bracket to lift the heating system into position. Chains used should have 100 kg minimum breaking load and preferably should be galvanised finish. Figure 2 shows two suspension methods. Method A is recommended because it provides a semi-rigid suspension. Method B is acceptable.

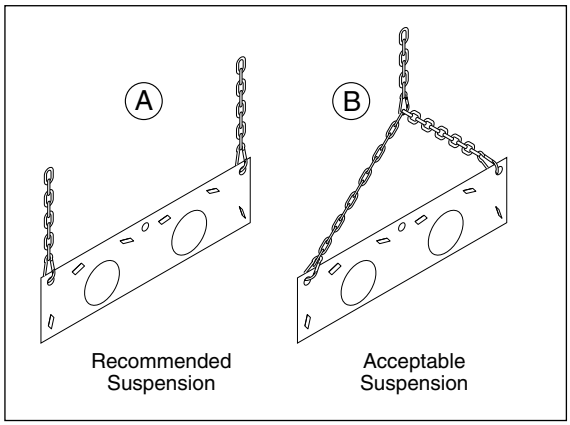


Figure 2. Bracket Suspension

3.4.10 Never lift the assembled heater by passing ropes around the reflector which would cause severe damage to the reflectors.

3.4.11 When angle mounting the heater, the burner tube must be the tube nearest the floor and the fan tube is always furthest from the wall (when suspended adjacent to a wall). It is recommended wherever possible that the heater is suspended from above from unequal length chains to effect the necessary angle (maximum 20° from horizontal). Always allow extra lengths of chain so that adjustment of angle can be made to provide the best heat distribution for your customer.

3.5 FINAL ASSEMBLY

3.5.1 Place the gasket on the flange of the burner tube. Carefully insert the flanged end into the burner box. Secure the burner on the burner tube using the four mounting bolts and washers. Use a spanner to tighten the bolts evenly.

3.5.2 Place the fan assembly onto the end of the last fan tube. Slide the fan assembly up to its stop. Tighten the pinch screw on the assembly making sure that the fan outlet is positioned as required.

Table 4. Blackheat U-Tube Heater Parts List

	Part No.	Description	BH15UT	BH20UT	BH25UT	BH30UT	BH35UT	BH40UT	BH45UT	BH50UT
1		Burner Assembly with Gasket	1	1	1	1	1	1	1	1
2	S7340K	Fan Assembly (includes flange) - Airflow 45 BTFR	1	1	1	1	-	-	-	-
3	S7104K	Fan Assembly (includes flange) - Torin	-	-	-	-	1	1	1	-
4	S7320K	Fan Assembly (includes flange)- Magnetek	-	-	-	-	-	-	-	1
5	03051100	Burner Tube, 100 mm x 3048 mm	1	1	1	1	1	1	1	1
6	91409408	Heat Treated Aluminised Tube, 100 mm x 3048 mm	-	-	-	2	2	2	2	2
7	S5127W	Fan Tube, 100 mm x 3048 mm with 3048 mm Swirler	-	1	1	1	1	1	1	1
8	S5140W	Heat Treated Aluminised Tube, 1702 mm	-	2	2	-	-	-	2	2
9	S5134W	Fan Tube, 100 mm x 3048 mm with 2134 mm Swirler	1	-	-	-	-	-	-	-
10	S7302K	Reflector Kit, 2439 mm, 4 pcs, Alum.	-	1	1	-	-	-	-	-
11	S7301K	Reflector Kit, 3048 mm, 2 pcs, Alum.	1	-	-	-	-	-	-	-
12	S7303K	Reflector Kit, 3048 mm, 4 pcs, Alum.	-	-	-	1	1	1	-	-
13	S7318K	Reflector Kit, 2430 mm, 4 pcs, 3048mm Long, 2pcs,Alum	-	-	-	-	-	-	1	1
14	S7338K	Reflector Kit, 2439 mm, 4 pcs, Stls Steel (optional)	-	1	1	-	-	-	-	-
15	S7337K	Reflector Kit, 3048 mm, 2 pcs, Stls Steel (optional)	1	-	-	-	-	-	-	-
16	S7339K	Reflector Kit, 3048 mm, 4 pcs, Stls Steel (optional)	-	-	-	1	1	1	-	-
17	S7440K	Reflector Kit, 2430mm, 4 pcs, 3048mm Long 2pcs Stls Steel (optl)	-	-	-	-	-	-	1	1
18	07290000	U-Bend Assembly	1	1	1	1	1	1	1	1
19	C0176B	Quick Link	6	9	9	9	9	9	12	12
20	07281000	First Bracket	1	1	1	1	1	1	1	1
21	07282000	End Bracket	1	1	1	1	1	1	1	1
22	07283000	Intermediate Bracket	-	1	1	1	1	1	2	2
23	91107720	U-Clip Package (20 per package)	1	1	1	1	1	1	2	2
24	S7311K	Screw Kit	1	1	1	1	1	1	-	-
25	S7317K	Screw Kit	-	-	-	-	-	-	1	1
26	S7401K	Support Bracket Package	-	-	-	1	1	1	-	-
27	S7402K	Support Bracket Package	-	-	-	-	-	-	1	1
28	01329600	Standard Coupling Assembly	-	2	2	2	2	2	4	4
29	01329700	Coupling Lock	-	2	2	2	2	2	4	4
30	S7402K	Support Bracket Package	1	-	-	-	-	-	1	1

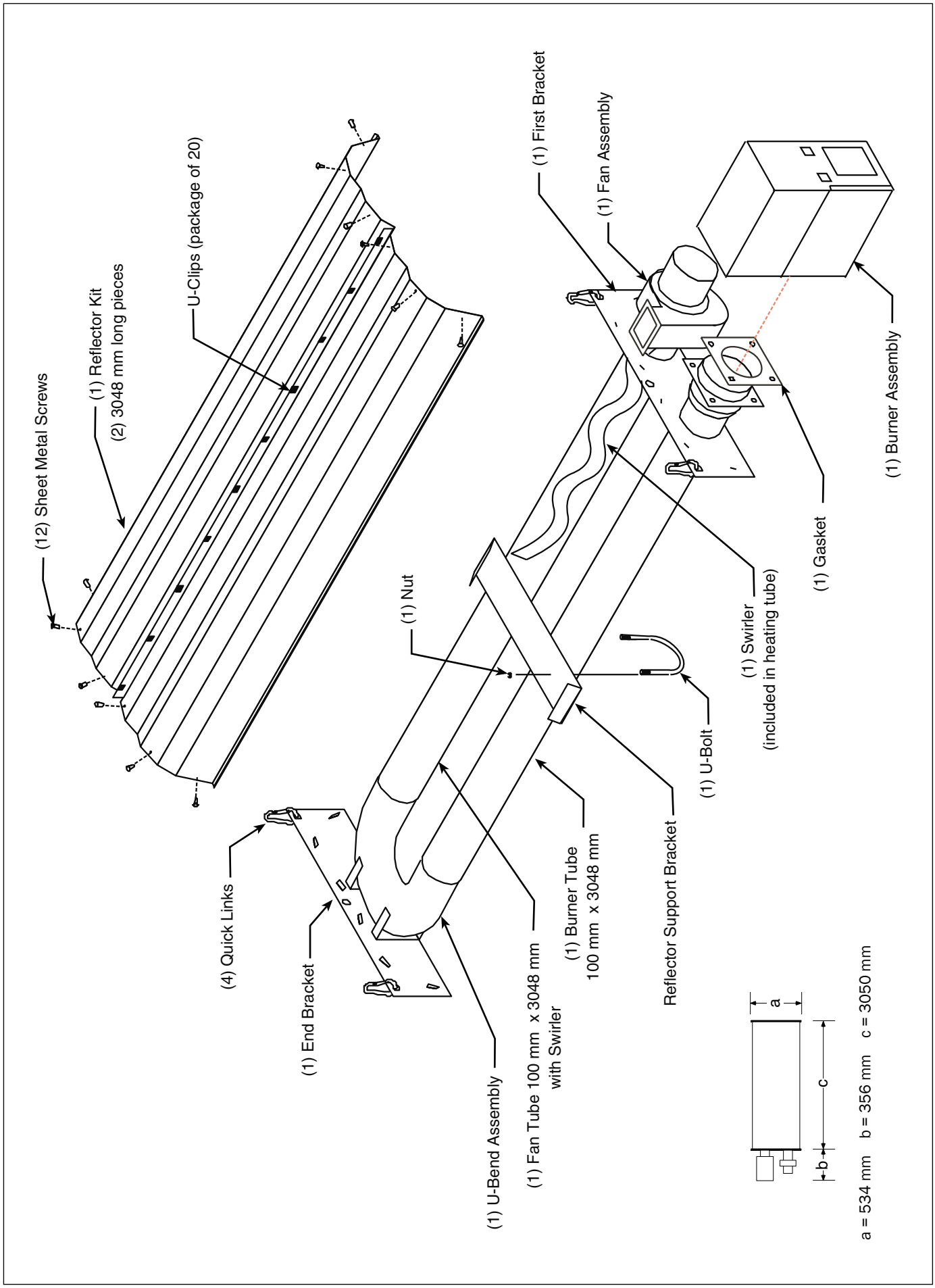


Figure 3. Model BH15UT U-Tube Assembly

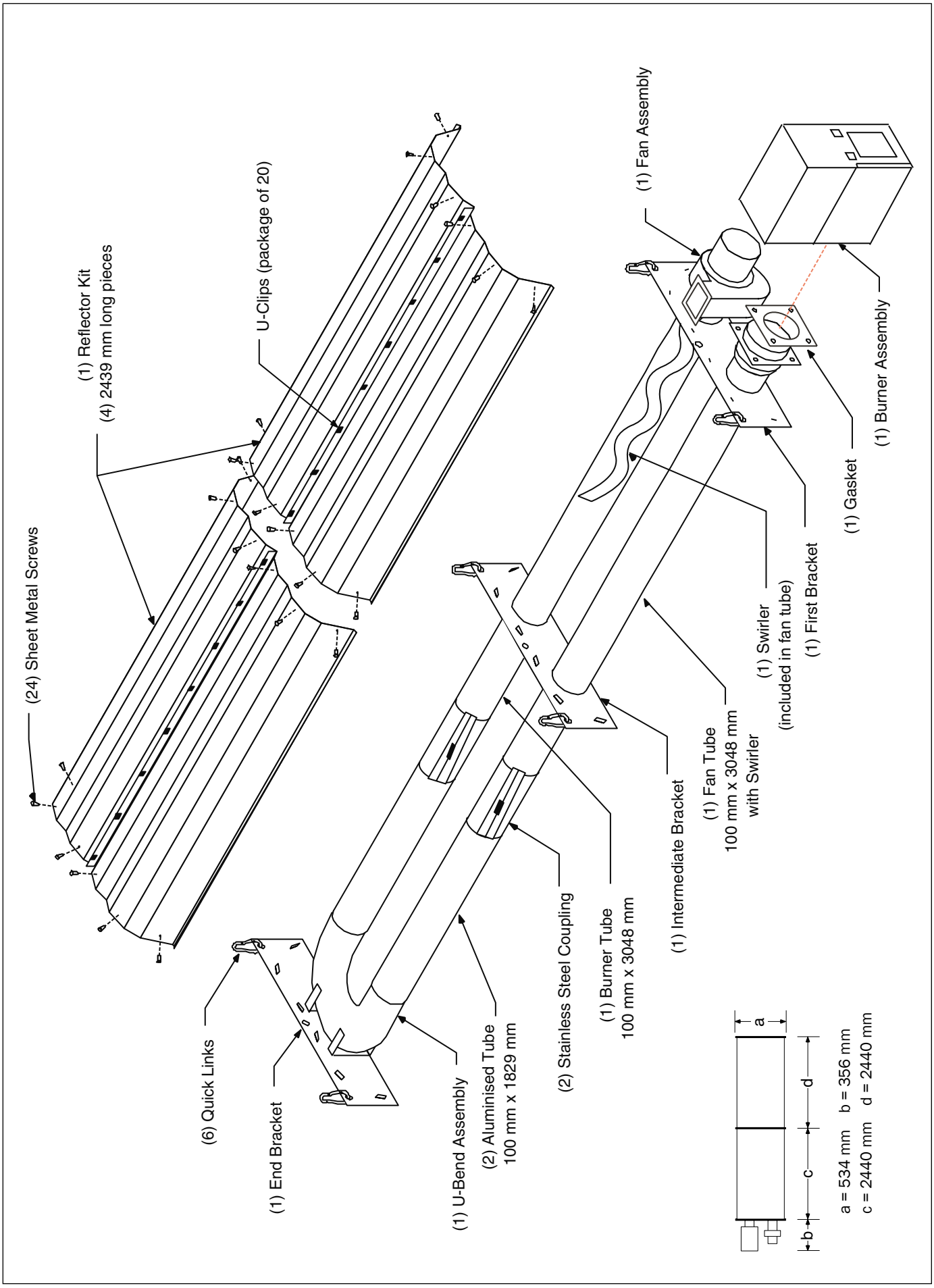


Figure 4. Model BH20UT/BH25UT U-Tube Assembly

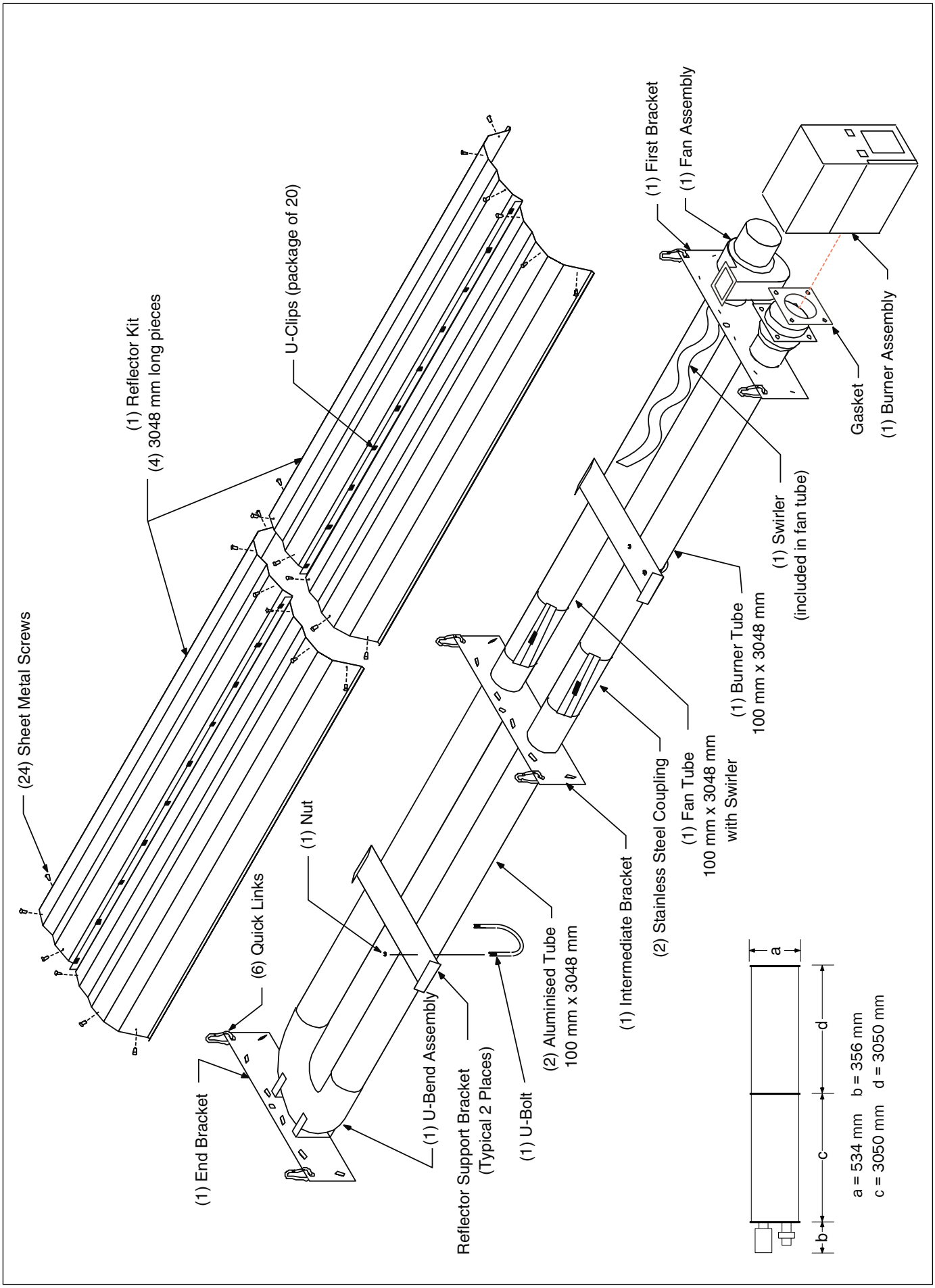


Figure 5. Model BH30UT/BH35UT/BH40UT U-Tube Assembly

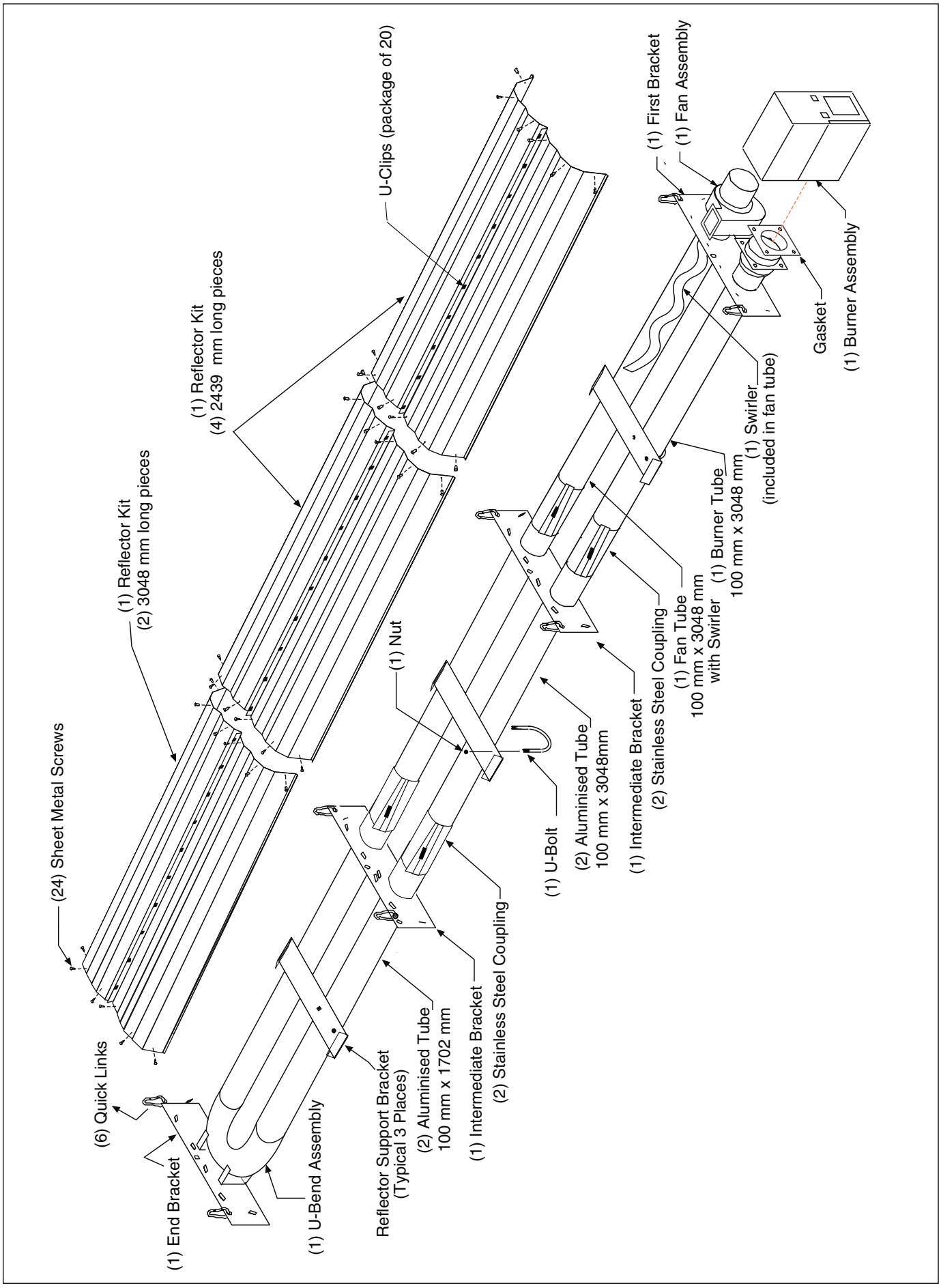


Figure 6. Model BH45UT/BH50UT U-Tube Assembly

▶ Section 4. Linear Heater Installation

4.1 HEALTH AND SAFETY

Blackheat cannot be responsible for ensuring that all appropriate safety measures are undertaken prior to installation; this is entirely the responsibility of the installer. If manufacturer installs the appliance, it is essential that the contractor, the sub-contractor, or the owner indicate the presence of combustible materials or halogenated hydrocarbons anywhere in the premises.

4.2 RELATED DOCUMENTS

Notwithstanding their limited scope, the appliance should be installed in accordance with relevant National Codes.

4.3 CLEARANCES TO COMBUSTIBLES

Before proceeding with installation, ensure that proper clearances to combustible materials will be observed in the final installed position of the heater. Clearance distances may be found in Section 2 of these instructions.

4.4 INITIAL ASSEMBLY

4.4.1 Prepare a work area corresponding to the size of heater selected. The area should be clear and free of debris. The manufacturers approved layout drawing should be referred to so that the work area is convenient for the final system position.

4.4.2 Layout the appropriate Figure (9, 10, 11, or 12, depending on heater model) and keep it at a convenient place for frequent reference. Pull out every part from the package and lay them out roughly at the position shown in the assembly drawing. Keep the bolts and screws at a convenient place for later usage.

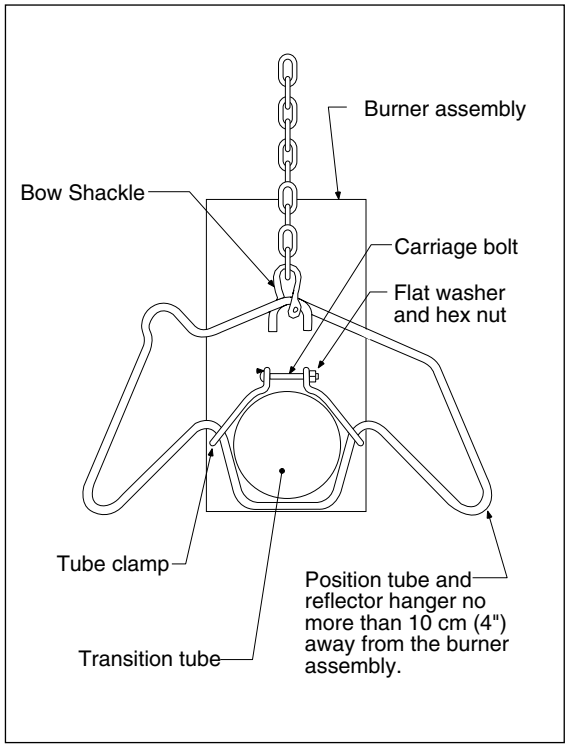


Figure 7. General Arrangement Using Tube Clamp Package

4.4.3 Prepare the hanging chains at the position where the heater will be located. Chains used should have 100 kg minimum breaking load and preferably should be galvanised finish. Assemble the two halves of the tube clamp package using the hex carriage bolt, hex nut and flat washer. Attach the clamp to the tube and reflector hanger, and slide the hanger into place on the burner tube (see Figure 6).

4.4.4 The hanger must be located within 150 mm of the flange. Slide the next tube and reflector hanger onto the end of the burner tube. Making sure that the suspension hooks of the hangers are uppermost, lift the burner tube into the position required. Suspend the burner tube by connecting the tube and reflector hangers to chains using the quick links provided.

4.4.5 Slide another tube and reflector hanger onto the next tube and locate it according to the appropriate Figure. Lift the tube into its position and connect it with the burner tube using a stainless steel coupling. Repeat this procedure to suspend the remaining tube(s) and connect them to the heater one by one.

4.4.6 For details of the coupling connection, see the following diagram:

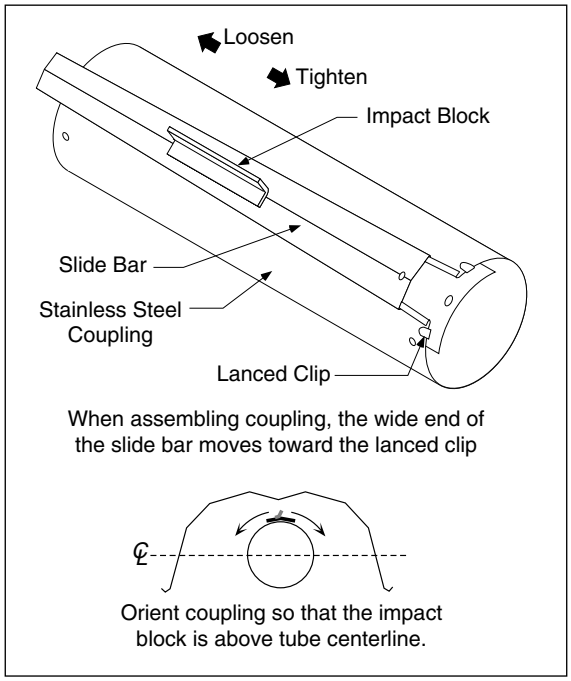


Figure 8. Coupling Assembly

To assemble the coupling, hook the free end of the coupling sleeve into the lanced clip. Place the wide end of the tapered slide bar on the coupling so that it moves toward the lanced clip. Insert the two tube ends into the coupling. Be sure the tube ends are in line and are flush against the stop pins inside the coupling.

Hammer-drive the slide bar until the coupling is secured snugly to the tubes. Overdriving the slide bar will distort the coupling or slide bar lip and will decrease the holding capability of the coupling.

Coupling should be tight when the slide bar is ±50 mm from the end of the coupling.

4.4.7 Place a reflector over the flanged burner tube and slide it inside the first tube and reflector hanger. Slide the next reflector under the first reflector. Overlap the reflectors using the distance specified in the assembly drawings. Secure the two reflectors in place using the reflector support straps. Assemble the reflector support strap according to the following figure:

NOTE: Remove PVC coat from stainless steel reflectors.

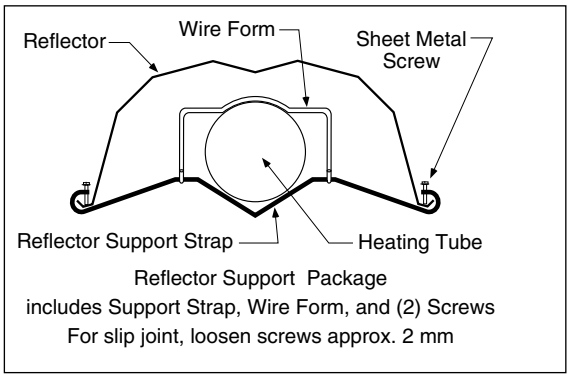


Figure 9. Reflector Support Package

4.4.8 Attach the remaining reflectors to the heater using the same method. Be sure to alternate the overlap of the reflectors as shown in the assembly drawings. Starting at the first reflector support, and alternating every other support down the length of the heater, the screws should be loosened 2 mm to allow for expansion of the heating tubes during operation.

4.4.9 After assembling the reflectors, attach the reflector end caps to the open ends of the reflectors. Punch out the center section of the end cap, and attach the end cap to the reflector using at least 6 of the U-clips provided.

4.5 FINAL ASSEMBLY

4.5.1 Place the gasket on the flange of the burner tube. Carefully insert the flanged end into the burner box. Secure the burner on the burner tube using the four mounting bolts and washers. Use a spanner to tighten the bolts evenly.

4.5.2 Place the fan assembly onto the end of the last fan tube. Slide the fan assembly up to its stop. Tighten the pinch screw on the assembly making sure that the fan outlet is positioned as required.

4.5.3 Carefully adjust system pitch at each support to level the heater. Pitch down (away from burner) 6 mm in 1000 mm.

Table 5. Blackheat Linear Heater Parts List

	Part No.	Description	BH15	BH20	BH25	BH30	BH35	BH40	BH45	BH50
1		Burner Assembly with Gasket	1	1	1	1	1	1	1	1
2	S7353K	Fan Assembly (includes flange) - Airflow 45 BTFR	1	1	1	1	-	-	-	-
	S7103K	Fan Assembly (includes flange) - Torin	-	-	-	-	1	1	1	-
	S7105K	Fan Assembly (includes flange) - Magnetek	-	-	-	-	-	-	-	1
3	03051100	Burner Tube, 100 mm x 3048 mm	1	1	1	1	1	1	1	1
4	S5127W	Fan Tube, 100 mm x 3048 mm, with 3048 mm Swirler	-	1	1	1	1	1	1	1
5	91409408	Heat Treated Aluminised Tube, 100 mm x 3048 mm	-	1	1	2	2	2	3	3
6	S5134W	Fan Tube, 100 mm x 3048 mm, with 2134 mm Swirler	1	-	-	-	-	-	-	-
7	02750303	Aluminium Reflector, 2439 mm	3	4	4	6	6	6	7	7
8	S5163W	Stainless Steel Reflector, 2439 mm	3	4	4	6	6	6	7	7
9	03090100	Tube and Reflector Hanger	3	4	4	5	5	5	6	6
10	01318901	Tube Clamp Package	1	1	1	1	1	1	1	1
11	01329600	Standard Coupling Assembly	1	2	2	3	3	3	4	4
12	01329700	Coupling Lock	1	2	2	3	3	3	4	4
13	03050000	Reflector Support Strap	2	3	3	5	5	5	6	6
14	02750800	Reflector End Cap	2	2	2	2	2	2	2	2
15	E0007576	Bow Shackle	3	4	4	5	5	5	6	6
16	91107720	U-Clip Package	1	1	1	1	1	1	1	1
17	91908004	Wire Form	2	3	3	5	5	5	6	6

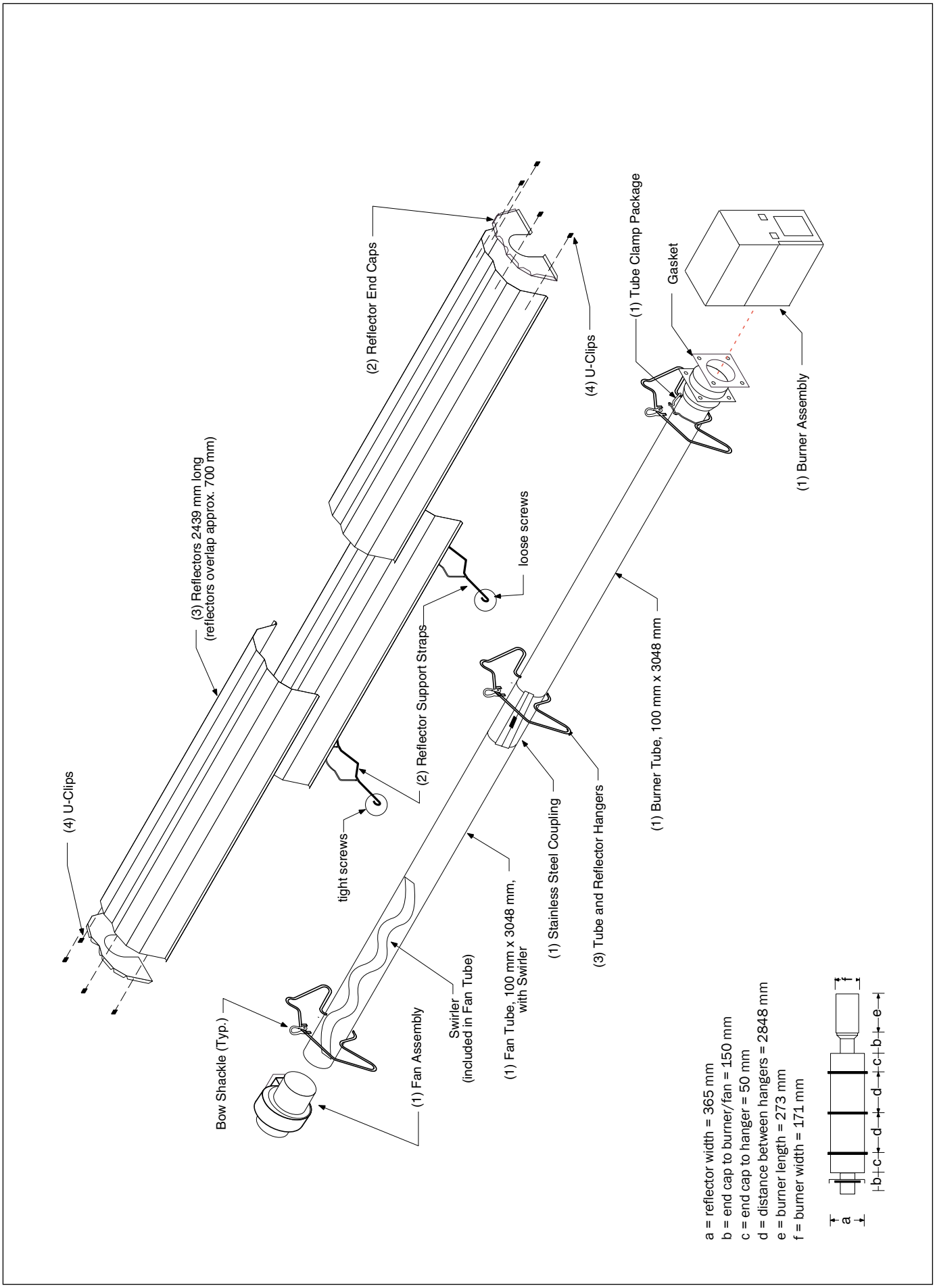


Figure 10. Model BH15ST Assembly

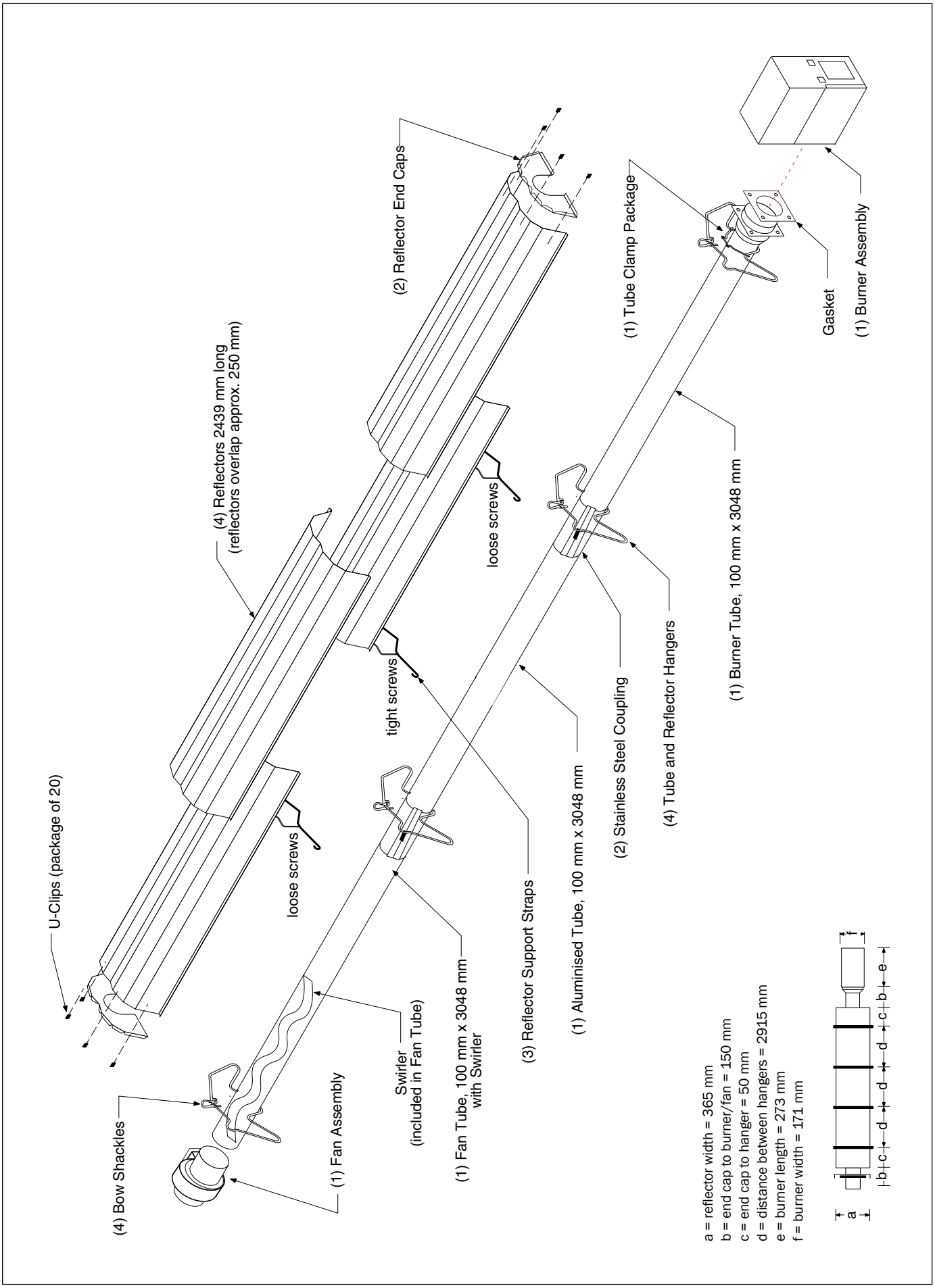


Figure 11. Model BH20ST and BH25ST Assembly

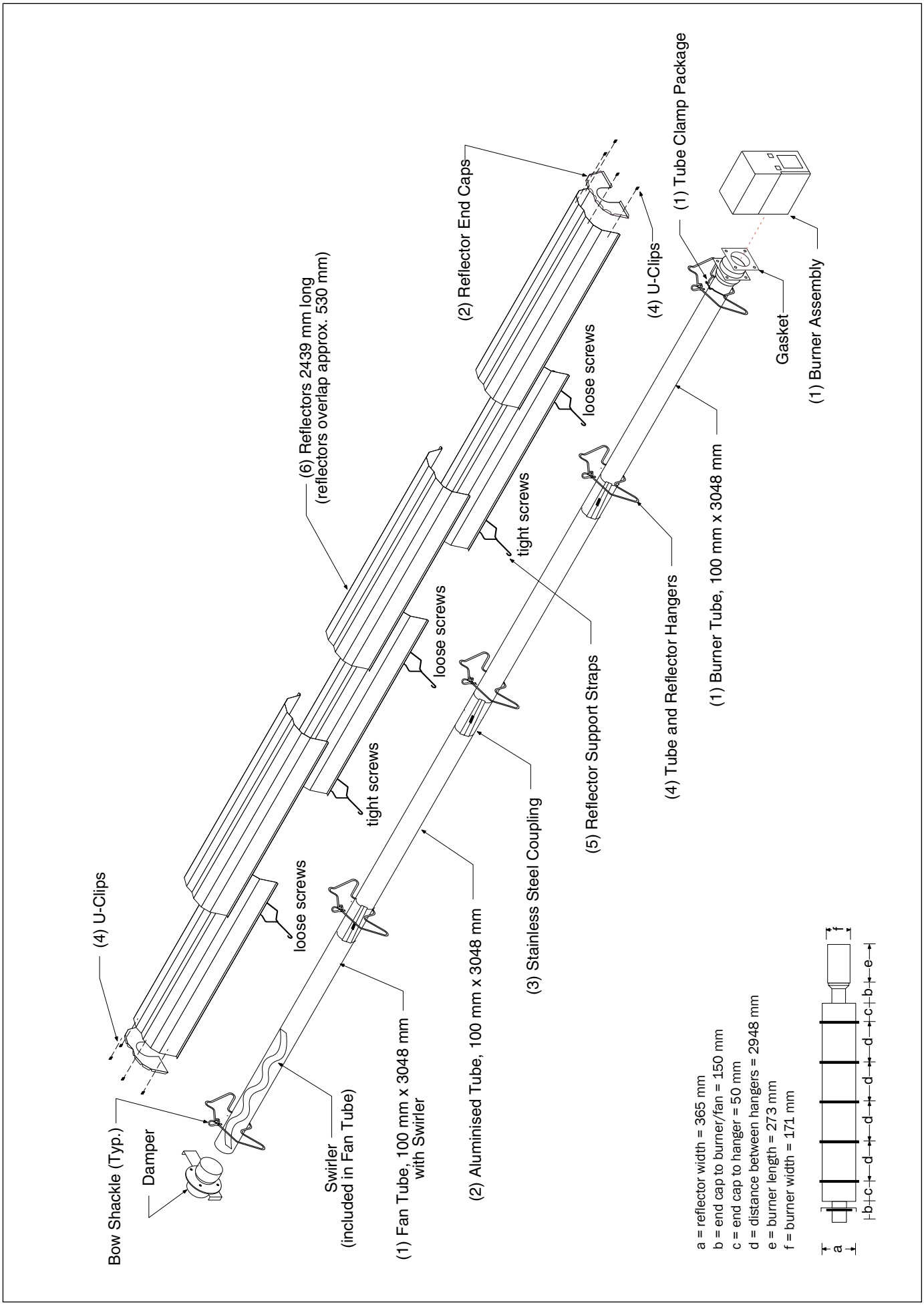


Figure 12. Model BH30ST, BH35ST and BH40ST Assembly

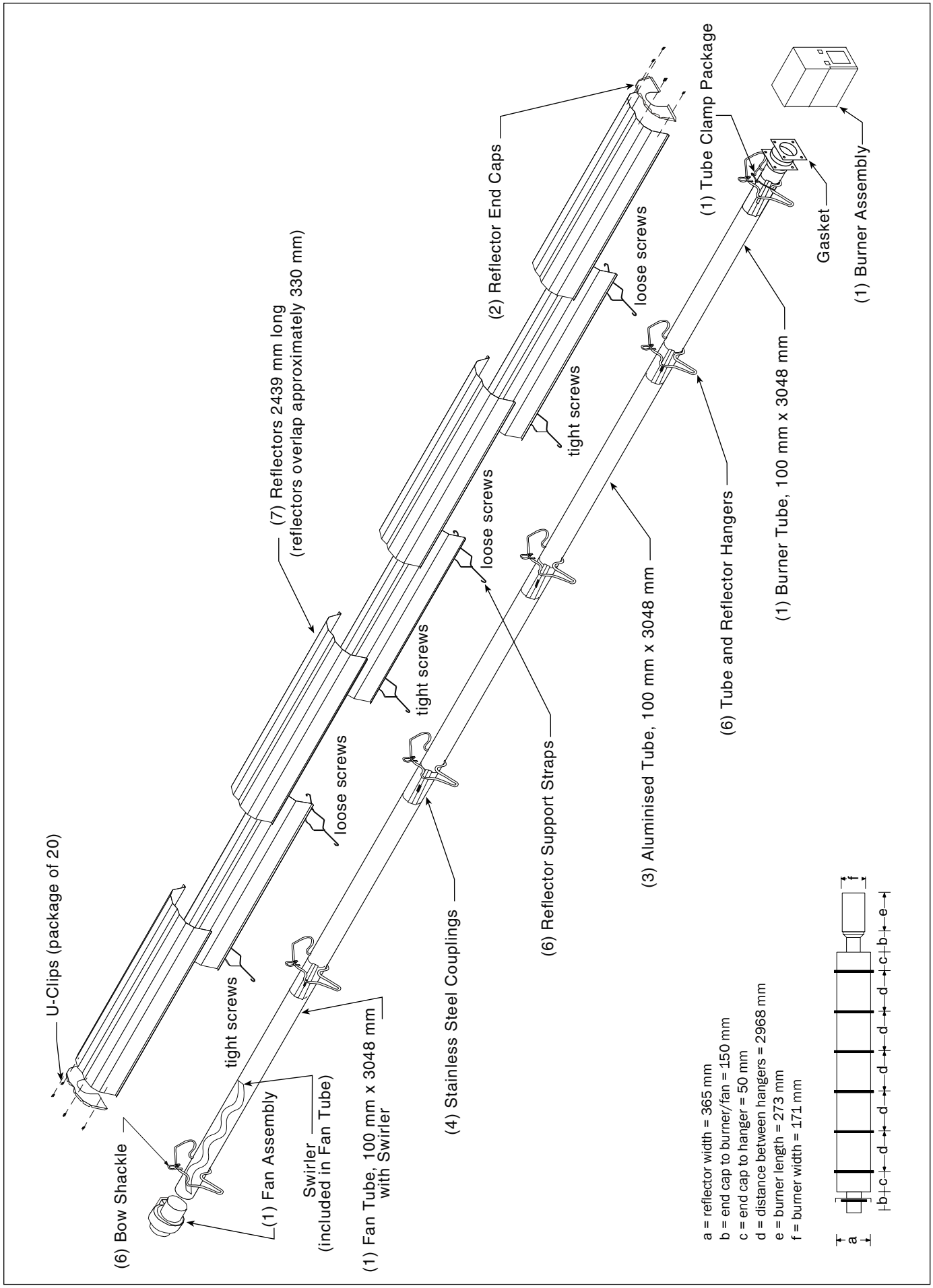


Figure 13 Model BH45ST and BH50ST Assembly

▶ *Section 5. Double Linear Heater Installation*

5.1 HEALTH AND SAFETY

Blackheat cannot be responsible for ensuring that all appropriate safety measures are undertaken prior to installation; this is entirely the responsibility of the installer. If the manufacturer installs the appliance, it is essential that the contractor, the sub-contractor, or the owner indicate the presence of combustible materials or halogenated hydrocarbons anywhere in the premises.

5.2 RELATED DOCUMENTS

Notwithstanding their limited scope, the appliance should be installed in accordance with relevant National Codes.

5.3 CLEARANCES TO COMBUSTIBLES

Before proceeding with installation, ensure that proper clearances to combustible materials will be observed in the final installed position of the heater. Clearance distances may be found in Section 2 of these instructions.

5.4 INITIAL ASSEMBLY

5.4.1 Prepare a work area corresponding to the size of heater selected. The area should be clear and free of debris. The manufacturers approved layout drawing should be referred to so that the work area is convenient for the final system position.

5.4.2 Establish both the centre point for the unit, and the centre line of the heater run within the area to be heated. Along the established centre line of the heating run, layout two of the appropriate heater configurations (Figure 9, 10 or 11). The burner assemblies should be at opposite ends of the heater run and should be configured as shown in Figure 13.

5.4.3 At a point directly above the established centre of the heater system, install a suspension chain for the fan assembly. Moving outward from this point, and along the established centre line, establish the remainder of the chain suspension locations.

5.4.4 Suspend the tube and reflector hangers for the fan tube, and raise the fan tubes into position.

5.4.5 Assemble the two halves of the tube clamp package using the hex carriage bolt, hex nut and flat washer. Attach the clamp to the tube and reflector hanger, and slide the hanger into place on the burner tube (see Figure 6).

5.4.6 The hanger must be located within 150 mm of the flange. Slide the next tube and reflector hanger onto the end of the burner tube. Making sure that the suspension hooks of the hangers are uppermost, lift the burner tube into the position required. Suspend the burner tube by connecting the tube and reflector hangers to chains using the bow shackles provided. Repeat procedure for the burner tube at the other end.

5.4.7 Connect the burner and fan tubes using the stainless steel couplings. Raise the centre tee into position between the end of the fan tubes and secure using the damper couplings provided.

5.4.8 Slide another tube and reflector hanger onto the next tube and locate it according to the appropriate Figure. Lift the tube into its position and connect it with the burner tube using a stainless steel coupling. Repeat this procedure to suspend the remaining tube(s) and connect them to the heater one by one. For details of the coupling connection, see Figure 7.

5.4.9 To assemble the coupling, hook the free end of the coupling sleeve into the lanced clip. Place the wide end of the tapered slide bar on the coupling so that it moves toward the lanced clip. Insert the two tube ends into the coupling. Be sure the tube ends are in line and are flush against the stop pins inside the coupling.

Hammer-drive the slide bar until the coupling is secured snugly to the tubes. Overdriving the slide bar will distort the coupling or slide bar lip and will decrease the holding capability of the coupling. Coupling should be tight when the slide bar is ±50 mm from the end of the coupling.

5.4.10 Place a reflector over the flanged burner tube and slide it inside the first tube and reflector hanger. Slide the next reflector under the first reflector. Overlap the reflectors using the distance specified in the assembly drawings. Secure the two reflectors in place using the reflector support straps. Assemble the reflector support strap (see Figure 8).

NOTE: Remove PVC coat from stainless steel reflectors.

5.4.11 Attach the remaining reflectors to the heater using the same method. Be sure to alternate the overlap of the reflectors as shown in the assembly drawings. Starting at the first reflector support, and alternating every other support down the length of the heater, the screws should be loosened 2 mm to allow for expansion of the heating tubes during operation.

5.4.12 After assembling the reflectors, attach the reflector end caps to the open ends of the reflectors. Punch out the center section of the end cap, and attach the end cap to the reflector using at least 6 of the U-clips provided.

5.5 FINAL ASSEMBLY

5.5.1 Place the gasket on the flange of the burner tube. Carefully insert the flanged end into the burner box. Secure the burner on the burner tube using the four mounting bolts and washers. Use a spanner to tighten the bolts evenly.

5.5.2 Place the fan assembly onto the branch of the tee; slide the fan assembly up to its stop. Tighten the pinch screw on the assembly making sure that the fan outlet is positioned as required. Attach hanging chain to the flange.

Table 6. Blackheat Double Linear Heater Parts List

	Part No.	Description	BH2-15ST	BH2-20ST	BH2-25ST	BH2-30ST	BH2-35ST
1		Burner Assembly with Gasket	2	2	2	2	2
2	S7353K	Fan Assembly (including flange) - Airflow	1	1	-	-	-
	S7105K	Fan Assembly (including flange) - Magnatek	-	-	1	1	1
3	03051100	Burner Tube, 100 mm x 3048 mm	2	2	2	2	2
4	91409408	Heat Treated Aluminised Tube, 100 mm x 3048 mm	-	2	2	4	4
5	S5127W	Fan Tube, 100 mm x 3048 mm, with 3048 mm Swirler	-	2	2	2	2
6	S5134W	Fan Tube, 100 mm x 3048 mm, with 2134 mm Swirler	2	-	-	-	-
7	E0009170	Tee, 100 mm x 100 mm x 100 mm	1	1	1	1	1
8	02750303	Aluminium Reflector, 2439 mm	6	8	8	12	12
9	S5163W	Stainless Steel Reflector, 2439 mm (optional)	6	8	8	12	12
10	03090100	Tube and Reflector Hanger	6	8	8	10	10
11	01318901	Tube Clamp Package	2	2	2	2	2
12	01329600	Standard Coupling Assembly	4	6	6	8	8
13	01329700	Coupling Lock	4	6	6	8	8
14	03050000	Reflector Support Strap	4	6	6	10	10
15	02750800	Reflector End Cap	4	4	4	4	4
16	E0007576	Bow Shackle	6	8	8	10	10
17	91107720	U-Clip Package	2	2	2	2	2
18	91908004	Wire Form	4	6	6	10	10

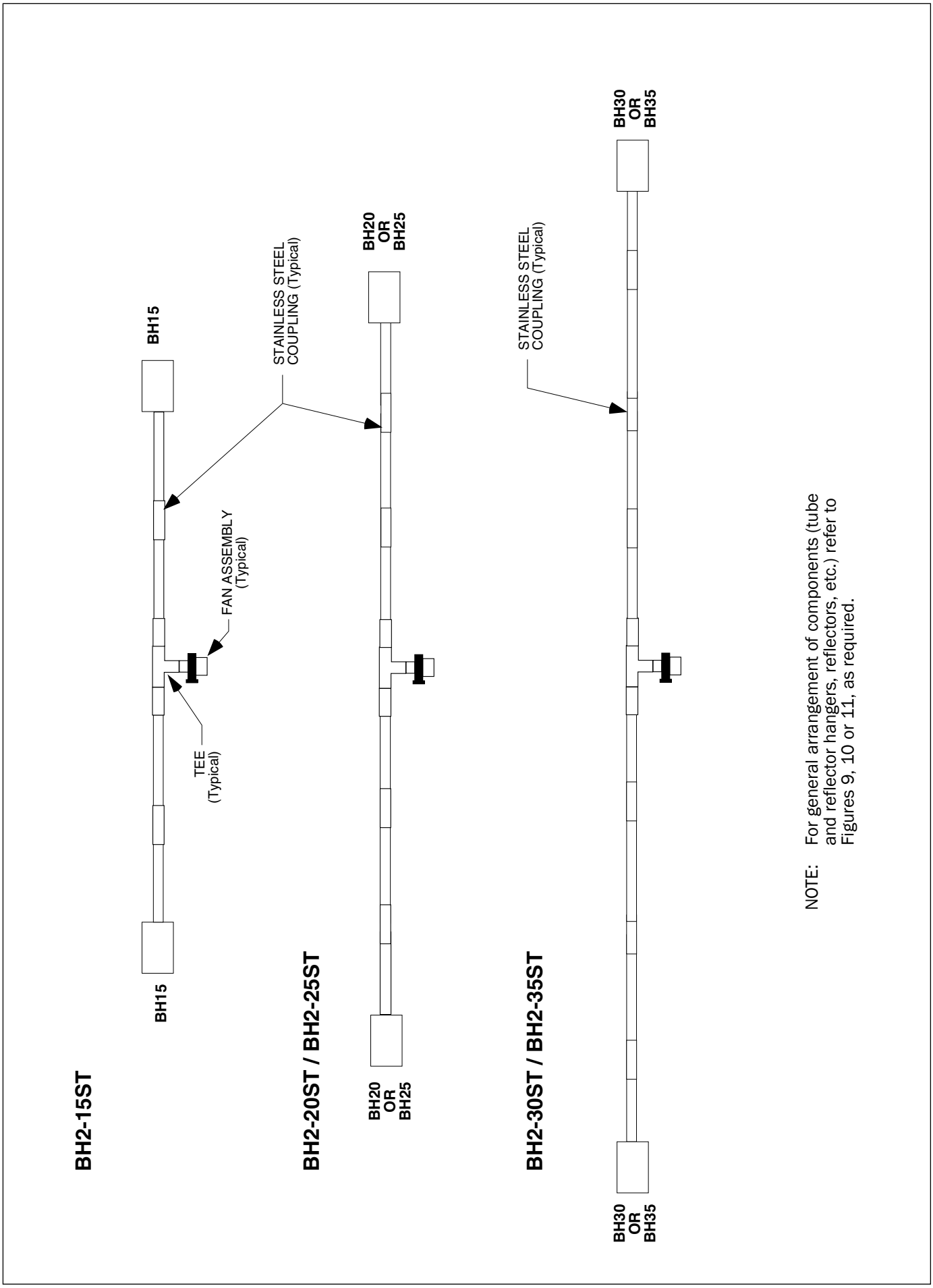


Figure 14. Typical Installation Layouts (Double Linear Heaters)

▶ Section 6. Gas and Electric Supply

6.1 GAS SUPPLY

6.1.1 A gas meter is connected to the service pipe by the Gas Supply Company. An existing meter should be checked, preferably by the Company to ensure that the meter is adequate to deal with the rate of gas supply required.

6.1.2 Installation pipes should be fitted in accordance with National Standards. Pipework from the meter to the heater(s) must be of adequate size. Pipes of smaller size than the heater inlet gas connection should not be used.

6.1.3 Connect the heater to the gas supply ensuring that the final connections are as follows:

a) Gas supply pipework is run in medium or heavy gauge tubing to National Standards terminating in a Rc1/2 (1/2") BSP thread within 300 mm of the heater gas inlet.

b) An Rc1/2 (1/2" BSP) mm union cock should be used and fitted into the supply adjacent to the heater.

c) A flexible metal hose is connected directly to the Rc1/2 (1/2" BSP int) connection on the burner. This metallic hose must conform to National Standards.

6.1.4 **IMPORTANT** - The complete installation must be tested for gas soundness in accordance with National Standards.

6.2 ELECTRIC SUPPLY

6.2.1 Connect to the electrical supply using a 3 pin plug via a locally mounted double pole fused switch having a minimum disconnection of 3 mm on each pole. This switch should be fused to 3 amps. The burner is fused at 2 amps. There are no control connections in the standard burner. Control is affected by interruption of the main power inlet. See Figures 15 and 16 for the external wiring details for the single-burner and double linear heater systems.

6.2.2 All wiring must comply with current I.E.E. Wiring Regulations and any local regulations which may apply. Always switch off the supply to the burner and disconnect by removing the plug before removing the burner side panel.

6.2.3 In compliance with EN416 clause 4.1.9 Electrical Operational Safety, any temperature and time control must be located in the heated area.

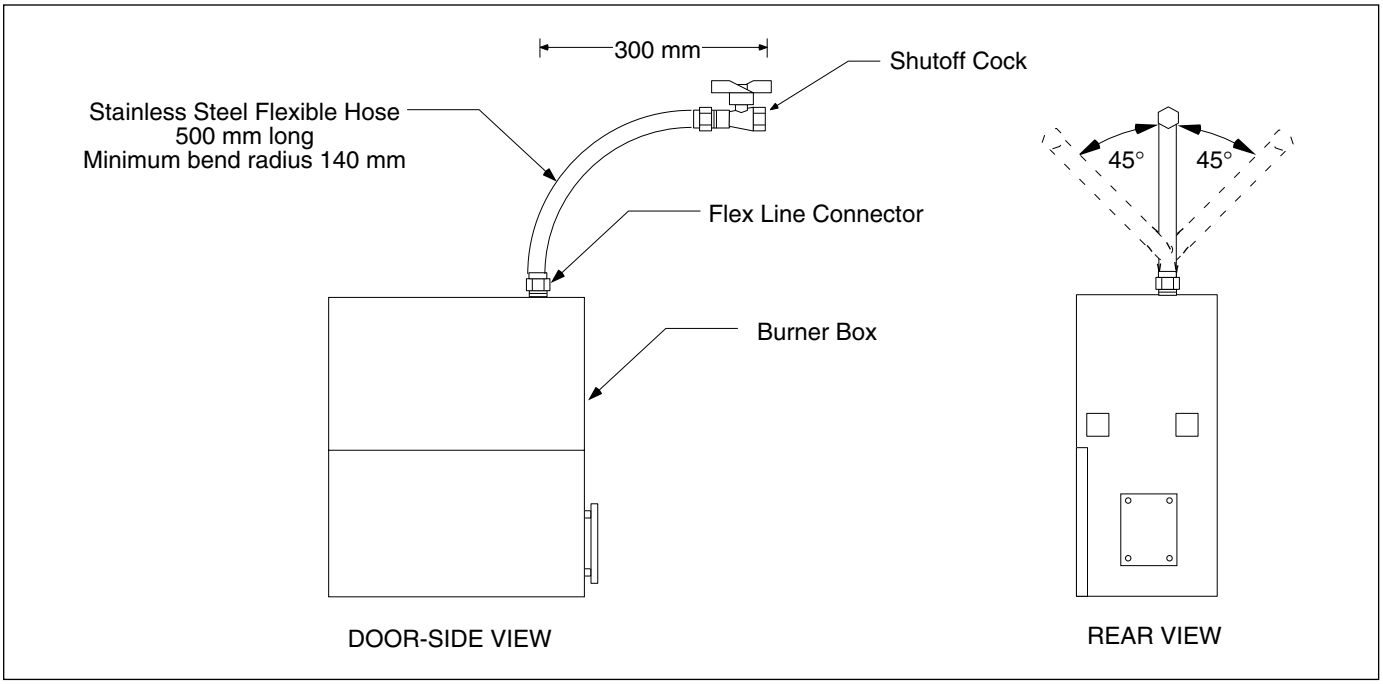


Figure 14. Typical Gas Line Installation (Install According to National Standards)

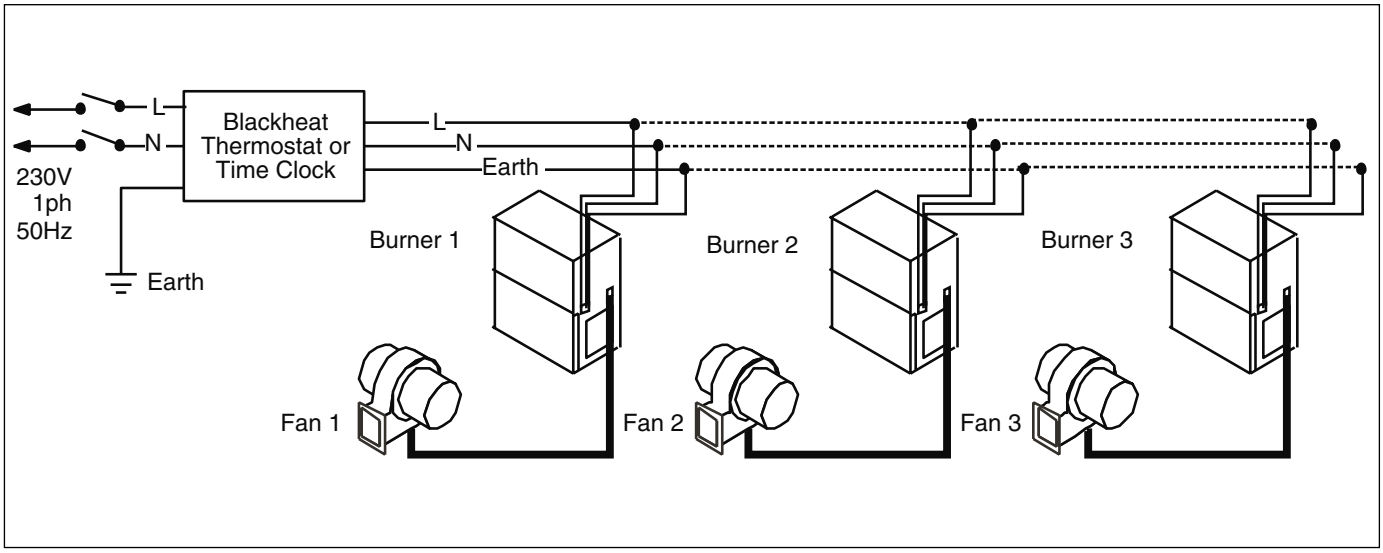


Figure 15. Typical External Wiring Diagram (Single-burner Systems)

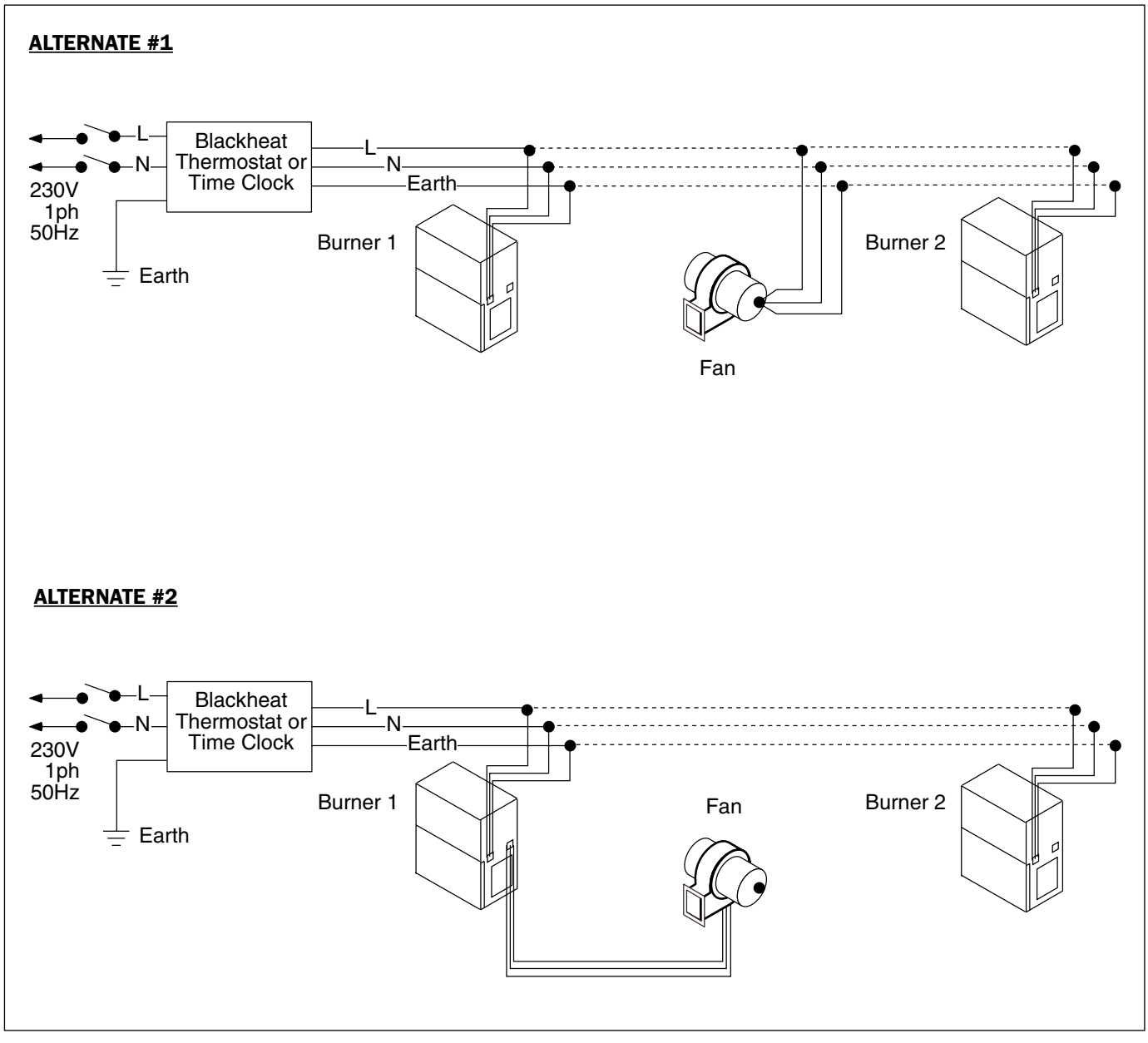


Figure 16. Typical External Wiring Diagram (Double Linear Systems)

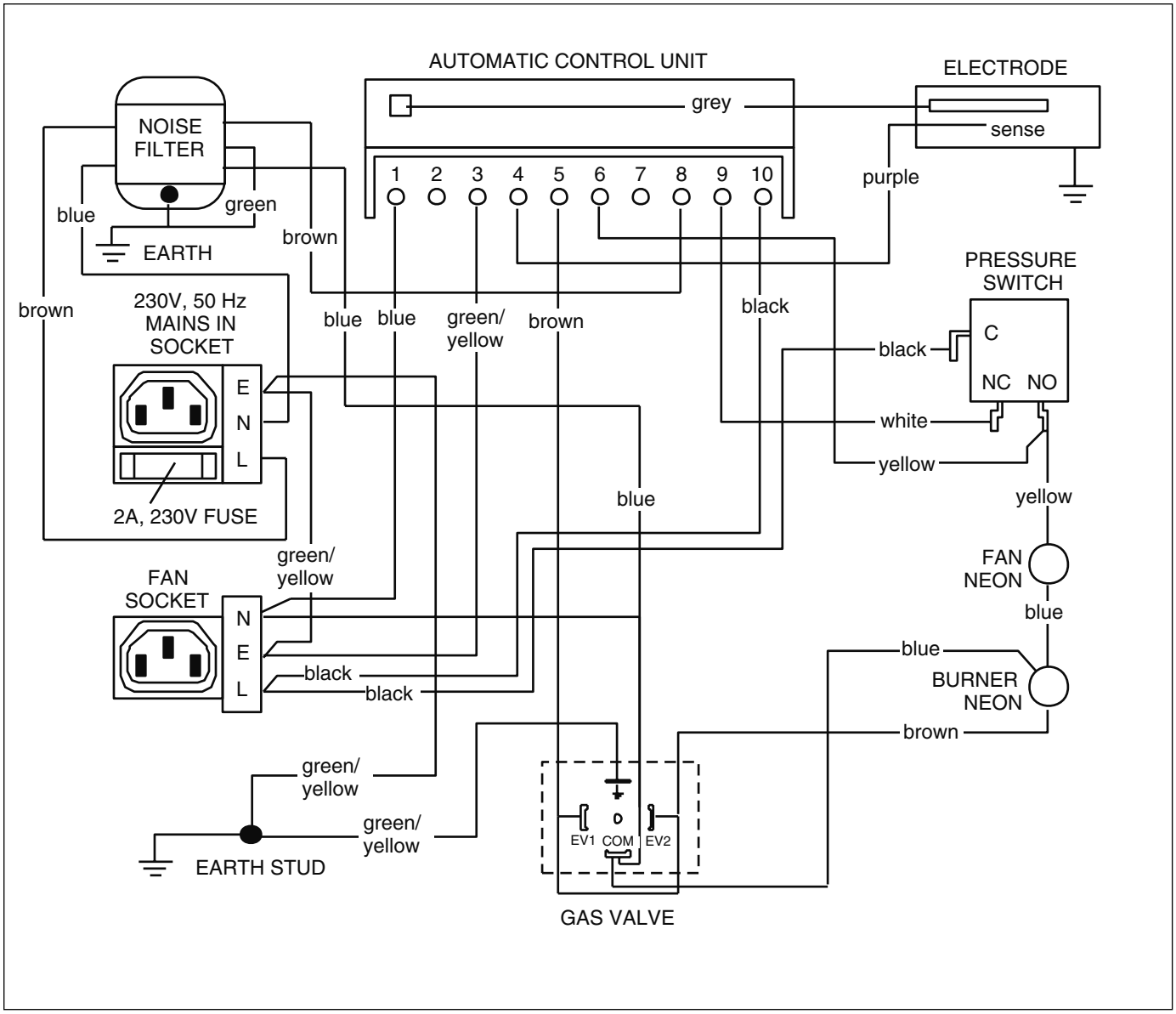


Figure 17. Burner Internal Wiring Diagram

▶ Section 7. Discharge of Combustion Products

7.1 GENERAL REQUIREMENTS

Heater must be vented in acc
national and local codes. The f
doors either vertically or horizontally (see Figure 20).
For horizontal venting:

1. Vent must exit building not less than 2.1 m above grade when located adjacent to public walkways.
2. Vent must terminate at least 1 m above any forced air inlet located within 3 m.
3. Vent shall terminate at least 1.2 m below, 1.2 m horizontally from, or 0.3 m above any door, window or air inlet into building.
4. Vent terminal at least 3 m from any opening which vent gases could enter a building.
5. Use only corrosion resistant materials for the discharge line from the fan to the point of discharge.
6. Vent terminal or must extend beyond any combustible overhang.
7. terminal at a height sufficient to prevent by snow.
8. ding materials from degradation by flue gases.
9. Any portion of flue pipe passing through a combustible wall mus ual insulated or an approved thimble m sed.

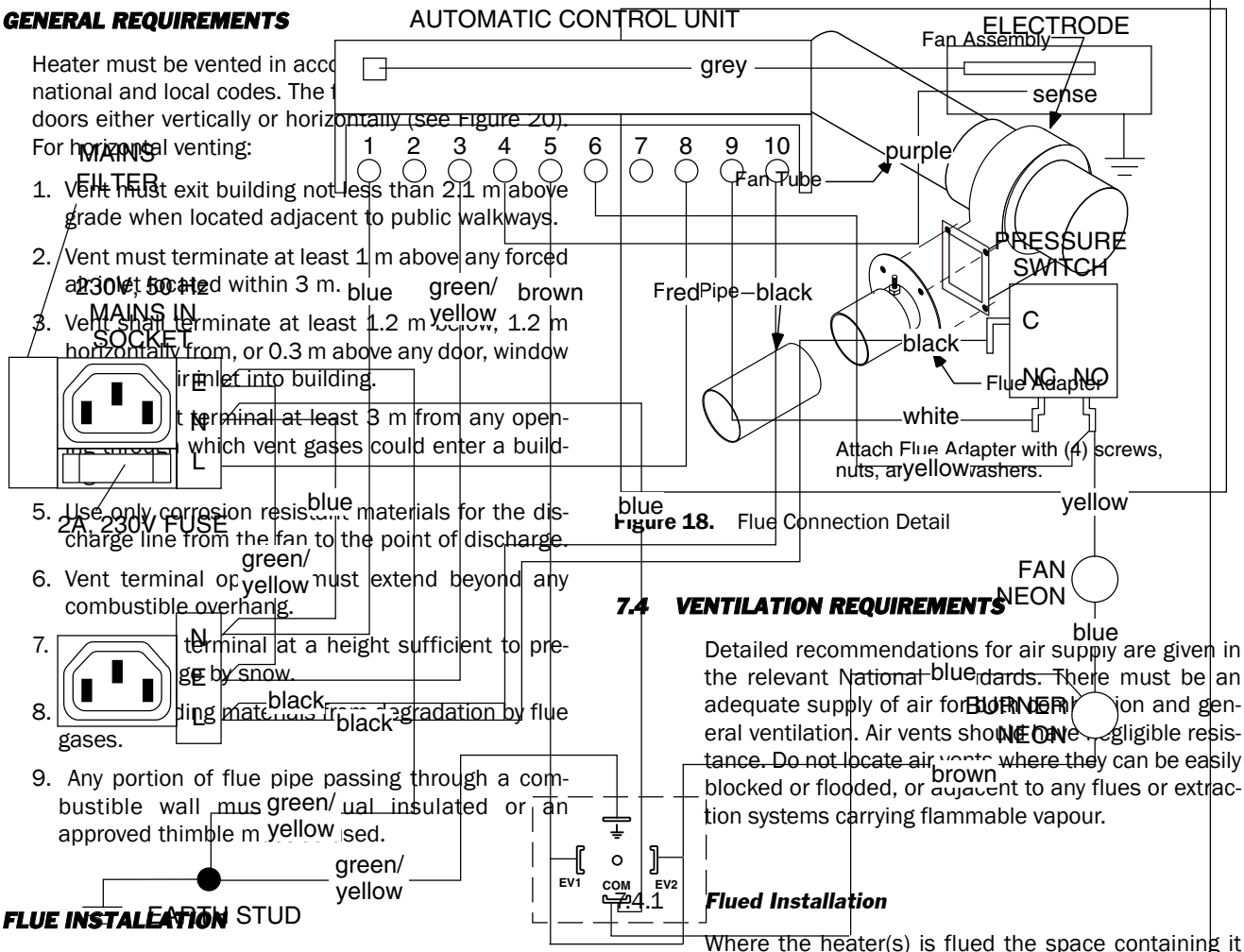


Figure 18. Flue Connection Detail

7.2 FLUE INSTALLATION

The fan outlet may discharge vertically or horizontally. Connection should be made using 100 mm minimum diameter Aluminium or Stainless Steel flue material to National Standard and must be adapted to insert into the 100 mm flue adapter. The combined length of flue run plus fresh air inlet duct should not exceed 16000 mm. Do not use bends in excess of 45°. Consult the manufacturer if more than 2 x 45° offset bends are necessary. The flue must be self supporting.

7.3 FLUELESS INSTALLATION (U.K. ONLY)

If the heater is being installed in an area where combustion products can be dissipated within the building, ensure that the fan outlet is horizontal and away from the burner. Where installation is close to a wall (Perimeter system) or other obstruction close to the fan outlet or wall angle mounted, install the heater so that the fan tube is the tube furthest from the wall or obstruction, i.e. the fan will always blow into the building or away from the obstruction.

7.4 VENTILATION REQUIREMENTS

Detailed recommendations for air supply are given in the relevant National
dards. There must be an adequate supply of air for
tion and general ventilation. Air vents should have negligible resistance. Do not locate air vents where they can be easily blocked or flooded, or adjacent to any flues or extraction systems carrying flammable vapour.

7.4.1 *Flued Installation*

Where the heater(s) is flued the space containing it must have a permanent outside air vent with a minimum effective area of 4.5 cm^2 per kW of heat input. If mechanical ventilation is employed, the minimum proven airflow rate shall be 2.35m^3/h per kW of heat input.

If the flue is to be horizontally vented through a wall, a wind-proof terminal must be fitted to outdoor vent pipe to prevent a back draught.

7.4.2 *Flueless Installation*

Minimum airflow rate shall be 37.5m^3/h per kW of total rated heat input where mechanical ventilation is used. Where the air change rate is below this minimum, provide additional openings equal to 52 cm^2 per kW total rated heat input; or 1.45 cm^2 for each 1m^3/h per kW below 37.5m^3/h per kW of total rated heat input.

7.5 AIR SUPPLY TO BURNER

Where necessary, clean air may be ducted into the burner box through an added spigot on top of the burner replacing the existing dust arrest baffle plate.

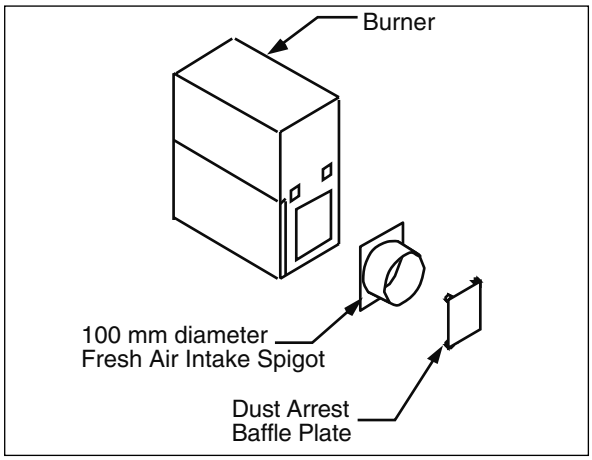


Figure 19. Fresh Air Intake Spigot

See section 7.2 for recommendations on duct length. Air duct should be as straight as possible. Do not use bends in excess of 45°. Consult the manufacturer if more than 2 x 45° offset bends are necessary. The fresh air duct must be self supporting.

7.6 AIR SUPPLY REQUIREMENTS

When fresh air duct is used, follow one of these rules:

A. The flue must penetrate the roof while the fresh air can penetrate any wall.

B. The flue and fresh air supply must penetrate the same roof, at a minimum of one meter apart.

C. The flue must penetrate one meter higher than the fresh air inlet on the same wall.

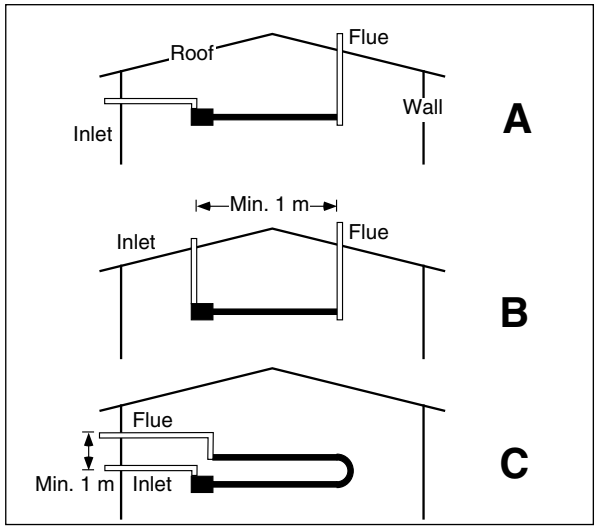


Figure 20. Air Supply with Flue Configurations

7.7 COMMON DUCT

When using a common air inlet duct, always ensure that the area of the common air inlet duct exceeds the total area of all air ducts by 20%.

▶ Section 8. Operating the System

8.1 DETAILED SEQUENCE

On connection of power supply the fan motor will start creating a suction in the tube. Power is also supplied, via a relay safety circuit, to the fan proving switch and when suction is created, changes contacts to feed power to the Automatic Control Unit. At this stage one neon will light up.

8.1.1 Power to the control causes initiation of an approximate ten (10) seconds purge period following which the solenoid valves open passing gas at a full rate to the burner. At the same time a spark is created and ignition should take place. If ignition of the gas is not successful the spark will cease and the solenoid will close after approximately ten (10) seconds. Lockout will occur. If the gas is ignited, the detection circuit is energised and switches off the ignition circuit. Both neons will now light up indicating full running condition.

8.1.2 The heater will continue to run until the power supply or gas supply is interrupted. Interruption of the electrical supply results in the shutdown of the heater. Restoration will restart the whole sequence. Interruption of the gas supply results in loss of flame followed by one attempt at reignition followed by lockout if unsuccessful.

8.2 TESTING

Establish that a satisfactory purged gas supply and an electrical supply is available to the heater. Ensure that all time clocks and thermostats are set to call for heat.

8.2.1 With the gas supply cut off at the appliance isolating cock and the electrical supply isolated by switching off at the local switch and removing the appliance inlet plug, open the control chamber secured by the centre screw. Remove the sealing screw from the pressure test point and remove the cover cap from the governor.

8.2.2 Turn on appliance isolating cock and connect appliance electrical plug. Ensure that the timer or thermostat, if fitted, are set to call for full gas rate. Switch on at the local switch. The sequence as described should take place. If not, refer to detailed fault finding sequence. When flame is established, check the gas pressure reading and adjust if necessary. See data label.

8.2.3 Check the gas pressure at the outlet of the gas valve to ensure minimum 8.7 mbar (3.5 in. w.g.) pressure for G20 natural gas or 27 mbar (10.5 in. w.g.) pressure for propane. See Section 2 for G25 and Butane settings.

8.2.4 Switch off the electrical supply (shutting down the heater), remove pressure gauge - refit pressure testpoint screw, ensuring a tight gas seal. Replace governor cover cap. Close burner side cover.

8.3 SYSTEM CHECKS

Switch on again at the local switch to ensure smooth ignition. Carry out the following system checks.

8.3.1 When running turn off the gas supply at the appliance isolating cock. The heater will immediately shut down followed by one attempt at restoration followed by lockout.

8.3.2 When running disconnect the fan plug from the burner. The unit should shut down within three seconds proving operation of the pressure switch.

8.4 USER INSTRUCTIONS

Having satisfactorily tested these Blackheat units ensure that the client is fully aware of the operation of the system. Bring this manual to the attention of the user or purchaser; instruct them in the safe operation of the heater(s). Advise the user that if the system is unflued, any reduction in the natural ventilation of the building may require a flue to be fitted, or additional ventilation grills will be required.

▶ Section 9 Servicing Instructions

IMPORTANT: Never use the heater as a support for ladders or other access equipment. Always test for gas soundness with a suitable detection fluid after completing any servicing or exchange of gas carrying component. On completion of any service/fault finding tasks which require the breaking and remaking of electrical connections then the checks:- A:Earth Continuity, B:Polarity and C:Resistance to Earth must be repeated.

9.1 ANNUAL PROCEDURE

Carry out the following procedure annually. The preferred time would be immediately before the winter heating period. If very dirty conditions arise it may be necessary to carry out this procedure more often. If the unit takes in air through an air duct or filter assembly, more frequent service may be necessary.

9.1.1 Isolate the heater from the gas and electricity supply by shutting off the appliance cock and disconnecting the union connector, switching off the local electrical supply and removing the appliance plug.

9.1.2 Remove the fan plug from the burner. Unscrew the securing screws on the burner flange. The burner can now be removed. Unscrew the securing screw on the fan flange spigot. The fan can now be removed.

9.1.3 Remove the fan and burner independently to floor level and clean both items internally using a soft brush and compressed air if available. Take care not to damage the internal parts of the burner. Check fan impeller for cleanliness and that free rotation is available. When removing burner take care not to disturb the gasket on the flanged burner tube.

9.1.4 The electrodes are an integral part of the Burner Head. To check spark gap remove the securing screws on the electrode and withdraw it ensuring the gasket is not damaged. Spark gap on electrode should be approximately 3 mm.

9.1.5 With burner and fan removed, clean the outer surfaces of the tubes using a brush and wipe the inner surface of the reflector with a soft damp cloth - use a household detergent if necessary. Never use abrasive cleaners on the the reflectors.

9.1.6 Re-assemble the burner and fan in reverse order. Carry out the Testing Procedure 8.2.

9.2 COMPONENT REMOVAL

First isolate the heater from the gas and electricity supply; shut off the appliance cock, disconnect the gas union connection; switch off the local electrical supply and remove the appliance plug.

Entry to the burner assembly is gained by removing the two (2) door screws and opening the hinged side cover. Entry to the combustion chamber is gained by removing the combustion chamber cover (7 screws).

9.2.1 ***Electrode (see section 9.1.4)***

9.2.2 ***Burner Head/Injector Jet***

When the cover is removed completely, the burner assembly is exposed. Unscrew the burner cup. Remove brass injector jet (orifice). Replace in reverse sequence.

9.2.3 ***Solenoid Valve/Governor***

Remove burner head as 9.2.2. Unscrew 4 mm slotted screws on top of burner securing the solenoid/governor body. Withdraw the four wires tagged to the solenoid (TEKNIGAS), or the four wires between the solenoids (SIT). The solenoid/governor and fittings can now be withdrawn from the compartment.

The solenoid(s) can be removed from the body by extracting the circlip and sliding (TEKNIGAS), unscrewing central screw (SIT). Replace in reverse sequence. Note: Earth is green/yellow.

9.2.4 ***Automatic Flame Control Unit***

Remove grey ignition lead. Withdraw the 10 point edge connector. Unscrew four (4) screws from the cover. Replace if faulty. Refit in reverse sequence.

9.2.5 ***Pressure Switch***

Disconnect the two (2) rubber tubes. Remove wires from the three blades. Remove two (2) screws which secure the pressure switch to the burner. Remove pressure switch.

Replace pressure switch if faulty and refit in reverse sequence ensuring that the rubber tubes are reconnected to the switch correctly.

Note: Wires fitted as follows:
NO - Yellow
NC - White
Common - Black

9.2.6 ***Neons***

Remove the two push on connectors and remove the neons by pushing downwards. Replace in reverse sequence.

9.2.7 ***Fuse***

Pull out drawer containing fuse in the panel mounted mains socket.

▶ Section 10. Gas Conversion Instructions

It is the installer's responsibility to follow these instructions and to insure that all local and national codes are followed. Insure that you are capable of performing all steps and read the entire section before beginning this procedure.

NOTE: For conversion between G20 and G25, or Propane and Butane, no change in jet size is necessary; remove (2) screws from control side door, open and proceed to step 10.3.5.

10.1 GAS CONVERSION KITS INCLUDE:

- Jet as required; see burner specifications (pg. 4)
* - Governor spring. (Propane/Butane: Green)
  (Natural: Silver)
- Valve/governor label.
- Burner unit label for gas conversion (to natural G20, G25, propane or butane).

(*) TEKNIGAS valves ***only***

10.2 REQUIRED TOOLS:

- Spanner 13 mm (1/2") - to remove jet.
- Manometer - minimum 0-28 mBar (0-11" W.G.)
- Phillips screwdriver (#2)
  -or-
- 1/4" Nut Driver
- Flat blade screwdriver.
- Spanner 8mm - to adjust Governor (SIT valve only)

10.3 CONVERSION PROCEDURE:

10.3.1 Isolate gas and electric supply; remove fresh air duct if necessary.

10.3.2 Remove cover screws; withdraw the edge connector and the ignition lead from the automatic control unit; set cover aside.

10.3.3 This step is for the TEKNIGAS model valve only. Remove governor screw and spring; replace with spring included in kit and refit governor screw. See Figure 21 - Governor Spring Replacement.

10.3.4 Remove burner cup and jet; replace with the jet provided in the kit. Reinstall the burner cup. See Figure 24 for proper position of cup relative to the air plate.

10.3.5 Attach valve/governor label to side of valve body.

10.3.6 Attach gas conversion label indicating gas type to burner housing adjacent to data plate; fill in governor pressure setting.

10.3.7 Replace door assembly and refit edge connector and ignition lead to the automatic control unit; do not attach screws to control side door at this time.

NOTE: For propane/butane pressure couple (TEKNIGAS valve, Italy only): turn governor screw down (clockwise) until the regulator is at the bottom; replace the plastic capscrew over the governor spring; proceed to step 10.3.12.

10.3.8 Attach one end of hose to the governor pressure tap and the other end to the pressure side of a manometer.

10.3.9 Turn on gas and electrical supply, operate unit.

10.3.10 Set governor pressure according to the burner specifications (pg. 4) by turning the governor screw until the proper pressure is read on the manometer.

10.3.11 Shut off unit and remove manometer. Return the shut off screw in the governor pressure tap to the off position and replace the screw cap over the governor spring (TEKNIGAS valve only).

10.3.12 Reinstall screws to the control side door and refit the fresh air duct if necessary.

10.3.13 Review section 9.1 servicing instructions: annual procedure. Return unit to service.

10.4 ADJUSTMENT OF STEP-OPENING FLOW RATE (SIT VALVE ONLY):

10.4.1 To adjust, gradually turn screw marked "I Step" until ignition is prompt and silent. Clockwise rotation: start flow decreases. (see Figure 22). The step-open flow rate should allow 2.5 mbar (1.0 in wg) gas pressure to the jet. After proper adjustment of the step-open flow rate, the valve will fully open within a few seconds and the governor pressure may then be set.

10.4.2 Wait at least 40 seconds after deenergization of solenoids before checking for proper ignition.

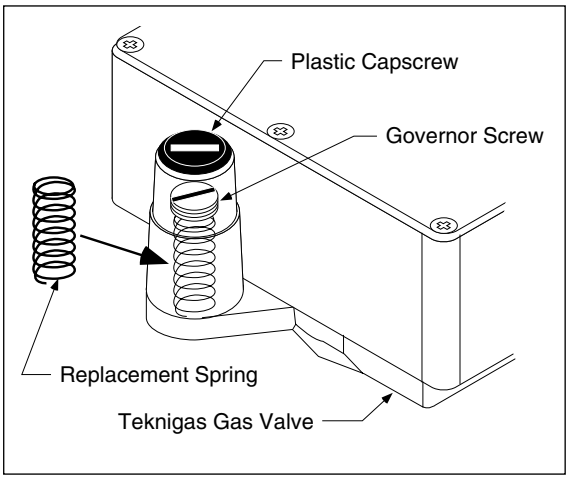


Figure 21 TEKNIGAS Valve Spring Replacement

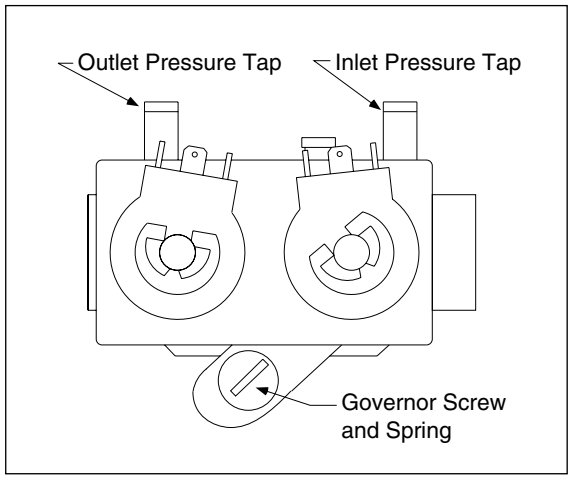


Figure 23 TEKNIGAS Valve Detail

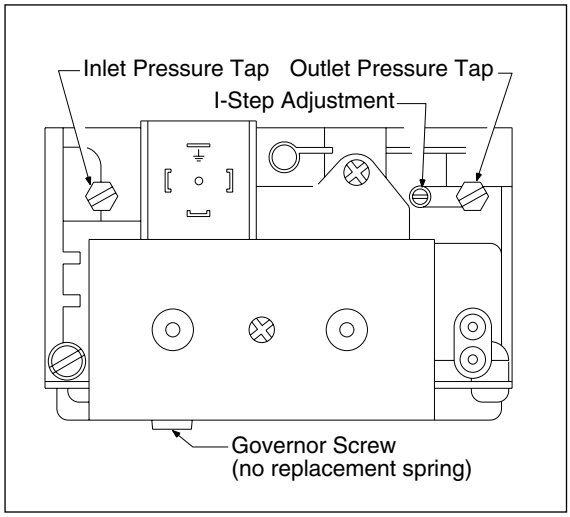


Figure 22 SIT Valve Detail

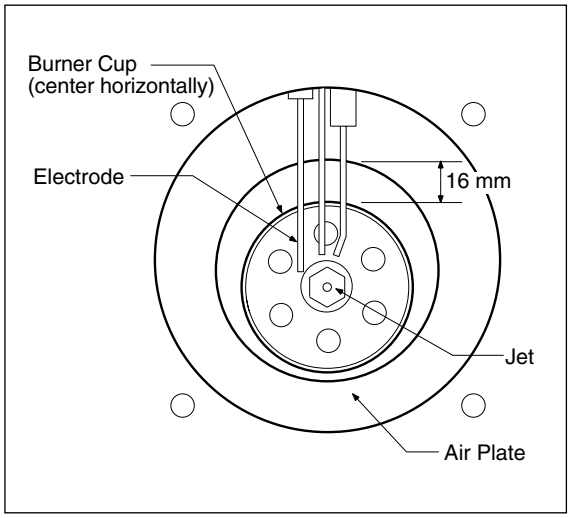


Figure 24 Burner Cup Position

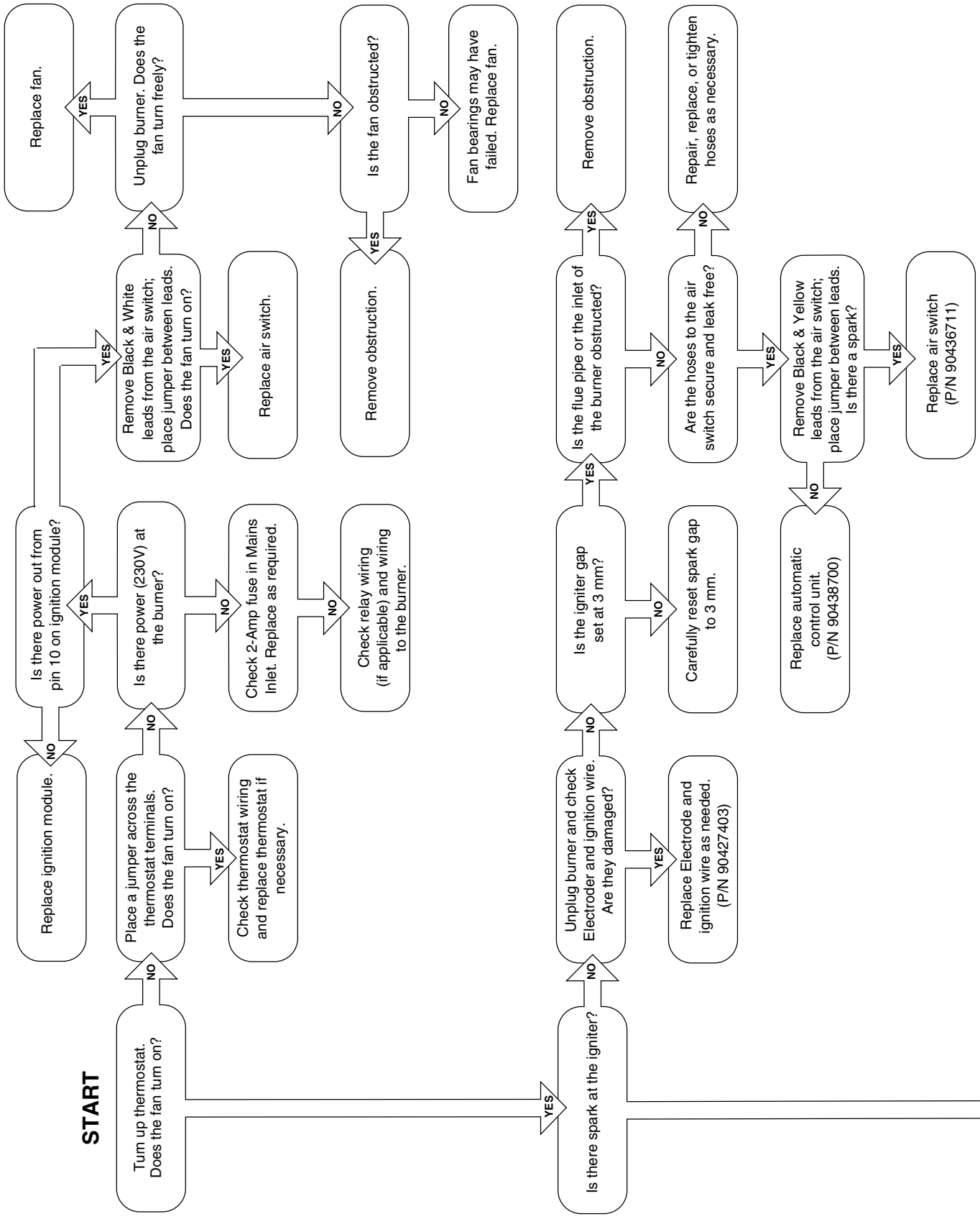


Figure 25. Troubleshooting Flow Chart

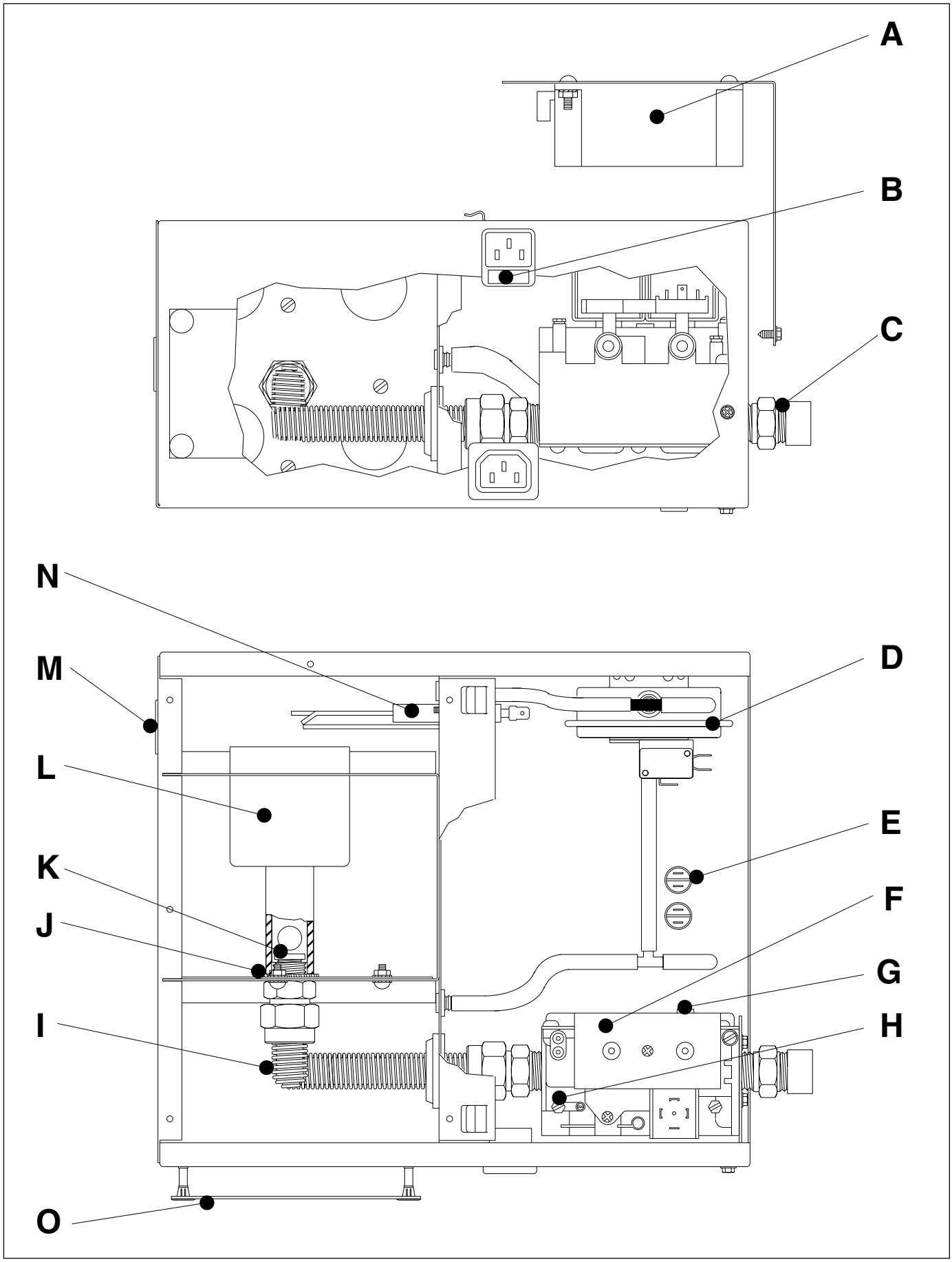


Figure 26. Burner Internal Components

Table 7. Replacement Parts

Item	Part Number	Description
A	90438700	Automatic Control Unit
B	91319900	Fuse, 2 amp, 5 mm x 20 mm
C	91220700	Flex Line Adapter
D	90436711	Air Switch
E	91320602	Amber Neon Lamp
F	90033100	Gas Valve
G		Regulator Spring and Governor Screw
H		Governor Pressure Tap
I	03090702T	Flex Manifold
J	96212100	Star Washer
K		Jet (see section 2 of these instructions) - Orifice
L	03020100	Burner Cup Assembly
M	02553203	Mica Window Assembly
N	90427403	Electrode Assembly
not shown	02558501	Electrode Gasket
O	07230000	Dust Arrest Baffle Plate
not shown	90438900	Filter, Noise - RFI
not shown	91319601	Edge Connector - 10 way
not shown	90427704	Ignition Wire
not shown	07260000	Outside Alr Kit 91911700 100 mm Collar 07261000 Outside Air Mounting Plate 94118106 #8 x 3/8 Washer Head Screws
not shown	02568200	Burner Tube Gasket

▶ *Section 12. The Blackheat Warranty*

All Blackheat product bear CE marking signifying that they comply with all relevant CE directives.

The Blackheat Warranty means that only the best material and workmanship are employed in the manufacture of Blackheat products.

WARRANTY COVERAGE:

Blackheat Ltd. ("Seller") warrants that entire heating systems sold by it (individually a "System") and any replacement parts which it sells relating to any System ("Parts") shall be free from defects in workmanship and material for the time periods described as follows. With respect to a System this warranty shall apply for a period of one year from delivery to the original purchaser ("Buyer"). With respect to Parts, this warranty shall apply for the longer of the original System warranty period or for a period of one year. ("Systems" and "Parts" are hereinafter collectively referred to as "Products".) This warranty extends only to the original purchaser of Products.

Seller manufactures products which are designed only to provide predetermined ranges of heat rises in various enclosures when properly used in systems designed by purchaser or others and installed by others. Seller makes no representation or warranty with respect to the effect upon enclosure, or upon any of the contents of the enclosure, including, without limitation, all plant or animal life, kept or processed in the enclosure subject to the limitations outlined below.

WARNING:

This warranty is void if the products have been damaged due to accident, abuse, mishandling or any other cause whatsoever other than defects in material or workmanship. Specifically, Seller's warranty shall not apply: (a) to damage to Products when used in an atmosphere containing halogenated hydrocarbons or other corrosive chemicals. Some compounds in the air can be ingested into the equipment and can cause an accelerated rate of corrosion of some of the Products. The use of such chemical compounds in or near the enclosure should be avoided where: (a) longer life of the burner, tubing and other parts is desirable; (b) to any damage when used in the vicinity of any combustible or explosive materials; (c) to Products which have been repaired or replaced with other than factory parts, modified in any way, misused or damaged, or which have been installed or used contrary to Seller's written instructions or manuals; (d) to any damage resulting from improper service or a lack of proper maintenance; or (e) to any damage resulting from failure to comply strictly with these Installation and Servicing Instructions in all respects.

LIMITATIONS OF WARRANTY:

Other than as stated herein or in any other warranty of Seller, there are no other warranties of any kind whatsoever, express or implied, and all other express and all implied warranties of merchantability and/or fitness for any particular purpose are hereby specifically disclaimed.

EXCLUSIVE REMEDY:

The sole and exclusive remedy for any loss, damage or liability, or otherwise, is limited to the obligation of Seller to repair or replace parts, at its factory, of any product owned by original buyer and returned to the Seller's factory within one year after invoice, with transportation charges prepaid, which examination reveals to have been defective. Under no circumstances shall Seller be liable for any loss, damage, cost, expenses, or incidental or consequential damages of any kind, in connection with the sale, installation, use, maintenance, or repair of any Product.

BUYER RESPONSIBLE FOR DATA:

Seller and its representative may furnish Buyer, upon Buyer's request, data relating to the function and use of Products. Seller shall not be liable for loss, damage, cost, expenses or incidental or consequential damages of any kind, sustained directly or indirectly, by any person, or to any property, if Buyer adopts and uses such data in whole or in part.

LIMITATIONS ON AUTHORITY OF REPRESENTATIVES:

No representative of Seller, other than an Executive Officer, has authority to change or extend these provisions. Changes or extension shall be binding only if confirmed in writing by Seller's duly authorized Executive Officer.

Direct any question or warranty claims to the original installer:

Company:_____
Address:_____
_____
Phone: _____

Or to: Blackheat Ltd.
12 Cobham Road
Ferndown Industrial Estate
Wimborne, Dorset BH21 7PS

BLACKHEAT SERVICE AGREEMENT:

The Blackheat Warranty may be further extended by the customer entering into a Blackheat Service Agreement whereby Blackheat or an appointed Blackheat Service Agent carries out routine inspection and service work in return for an annual premium payable by the owner. In this way, Blackheat customers can continue to enjoy the full benefit and value of Blackheat products for many years to come.

Due to a policy of continuous development, we reserve the right to change specifications without notice.

Printed in UK