

Blackheat®

Vacuum Assisted Linear, Double Linear, U-Tube, and Multi-Burner Gas Fired Heating Systems

Installation, Operation & Service Manual

FOR YOUR SAFETY

If you smell gas:

1. Open windows.
2. DO NOT try to light any appliance.
3. DO NOT use electrical switches.
4. DO NOT use any telephone in your building.
5. Extinguish any open flame.
6. Leave the building.
7. Immediately call your local gas supplier after leaving the building. Follow the gas supplier's instructions.
8. If you cannot reach your gas supplier, call the Fire Department.

⚠ WARNING



Fire Hazard

Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from heater.

Some objects will catch fire or explode when placed close to heater.

Failure to follow these instructions can result in death, injury or property damage.

- | | | |
|-----------|-----------|-----------|
| BH15UT | BH15ST | BH30DL |
| BH20UT | BH20ST | BH40DL |
| BH25UT/EF | BH25ST/EF | BH50DL/EF |
| BH30UT/EF | BH30ST/EF | BH60DL/EF |
| BH35UT/EF | BH35ST/EF | BH70DL/EF |
| BH40UT/EF | BH40ST/EF | |
| BH45UT/EF | BH45ST/EF | |
| BH50UT/EF | BH50ST/EF | |
| | BH55ST | |

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can result in death, injury or property damage. Read the installation, operation and service manual thoroughly before installing or servicing this equipment.

Installation must be done by a registered installer/contractor qualified in the installation and service of gas-fired heating equipment or your gas supplier.

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 in order to provide your serviceman with necessary information.



Authorised User No. 00184

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TABLE OF CONTENTS

SECTION 1: Heater Safety	2	SECTION 11: Venting	50
1.1 Manpower Requirements	2	11.1 General Venting Requirements	50
1.2 Safety Labels and Their Placement	2	11.2 Ventilation Requirements.....	50
SECTION 2: Installer Responsibility	4	11.3 Outside Combustion Air Supply.....	51
2.1 Low Level User Instructions.....	4	11.4 Common Duct	52
2.2 Corrosive Chemicals.....	4	SECTION 12: Gas Piping	53
2.3 National Standards and Applicable Codes	4	SECTION 13: Wiring	55
SECTION 3: Clearances to Combustibles	5	13.1 Typical External Wiring Diagram (Linear or U-Tube).....	55
3.1 Required Clearances to Combustibles	5	13.2 Typical External Wiring Diagram (Double Linear Option 1)	55
3.2 Clearance Data - Linear and Double Linear	6	13.3 Typical External Wiring Diagram (Double Linear Option 2)	56
3.3 Clearance Data -U Tube	8	13.4 Typical External Wiring Diagram (Multiburner)	56
SECTION 4: Major Component Descriptions	10	13.5 Internal Wiring Diagram	57
SECTION 5: General Suspension Details	11	SECTION 14: Operation	58
SECTION 6: Linear & Double Linear Heater Installation	13	14.1 Heater Lockout Indication (Optional)	58
6.1 Linear Standard Parts List	13	14.2 Testing	59
6.2 Double Linear Standard Parts List.....	16	14.3 Commissioning (Multiburner).....	59
6.3 Burner Tube Installation	19	14.4 System Checks	59
6.4 Coupling and Tube Assembly.....	19	14.5 User Instructions.....	59
6.5 Tube Clamp Package Installation.....	21	14.6 ECA Approved Systems (Multiburner only).....	60
6.6 Reflector Installation	22	SECTION 15: Servicing Instructions	61
6.7 Double Linear Tee Installation (for double linear heaters only)	24	15.1 Annual Procedure	61
SECTION 7: U-Tube Heater Installation	25	15.2 Component Removal.....	61
7.1 U-Tube Standard Parts List	25	15.3 Maintenance Checklist.....	62
7.2 U-Tube Hanger Placement.....	29	SECTION 16: Troubleshooting	64
7.3 Burner Tube and Fan Tube Installation	29	16.1 Troubleshooting Flow Chart (Linear, Double Linear and U-Tube).....	65
7.4 U-Tube Support Bracket Assembly Installation	30	16.2 Troubleshooting Flow Chart (Multiburner)	67
7.5 Coupling and Tube Assembly.....	31	16.3 Manifold Gas Pressure Setting	69
7.6 Tube Installation	32	SECTION 17: Replacement Parts	70
7.7 U-Tube Installation	32	SECTION 18: Specifications	72
7.8 Reflector Installation	33	18.1 Material Specifications.....	72
SECTION 8: Multiburner Configuration & Installation	35	18.2 Heater Specifications.....	72
8.1 Initial Assembly.....	35	18.3 Venting Specifications.....	72
SECTION 9: Burner & Fan Installation	37	18.4 Suspension Specifications.....	72
9.1 Burner Installation.....	37	18.5 Controls Specifications	72
9.2 Fan Assembly.....	37	18.6 Linear Heater.....	73
9.3 Linear & U-Tube Fan Installation	38	18.7 Double Linear Heater.....	73
9.4 Double Linear Fan Installation.....	38	18.8 U-Tube Heater	73
9.5 Multiburner 83/90 BWLG Fan Assembly (Horizontal and Vertical Outlets)	39	18.9 Burner Specifications.....	74
9.6 Condensate Drain Assembly	40		
SECTION 10: Optional Heater Accessories	41		
10.1 Reflector Side Extension Installation.....	42		
10.2 U-Tube Cover Installation.....	43		
10.3 Decorative Grille Installation	44		
10.4 Protective Grille Installation.....	45		
10.5 Sports Hall Guard Installation	46		
10.6 Undershield Installation.....	47		
10.7 Wall Mounting	48		

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TABLE OF FIGURES

Figure 1: Side and Back Panel Label Placement	2
Figure 2: Top Panel Label Placement	3
Figure 3: Linear & Double Linear, Horizontal Mounts.....	6
Figure 4: Linear & Double Linear, One Side Reflector	6
Figure 5: Linear & Double Linear, Two Side Reflectors ...	6
Figure 6: Linear & Double Linear, 45° Mount	6
Figure 7: Linear & Double Linear, 2 Foot Deco Grille.....	7
Figure 8: Linear & Double Linear, Protective Grille.....	7
Figure 9: Undershield	7
Figure 10: Linear & Double Linear, Venting.....	7
Figure 11: U-Tube, Horizontal Mount	8
Figure 12: U-Tube, One Side Reflector	8
Figure 13: U-Tube, Two Side Reflectors	8
Figure 14: U-Tube, Full 45° Mount.....	8
Figure 15: U-Tube, Opposite 45° Tilt	9
Figure 16: U-Tube, Protective Grille.....	9
Figure 17: U-Tube, Venting.....	9
Figure 18: Critical Hanger Placement	12
Figure 19: Linear General Assembly Overview	14
Figure 20: Linear Layout Overview	15
Figure 21: Double Linear General Assembly Overview	17
Figure 22: Double Linear Layout Overview	18
Figure 23: U-Tube Assembly Overview	27
Figure 24: U-Tube Layout Overview	28
Figure 25: Multiburner Damper Flange Installation	35
Figure 26: Typical Manifold Layout (Linear and U-Tube Configuration).....	36
Figure 27: U-Tube (Horizontal)	48
Figure 28: U-Tube (Angle Mounted)	49
Figure 29: Linear	49
Figure 30: Individual Flue Connection Detail.....	51
Figure 31: Flue Connection Dimensions	51
Figure 32: Fresh Air Intake Spigot.....	52
Figure 33: Air Supply with Flue Configurations	52
Figure 34: Gas Connection with Stainless Steel Flex Connector.....	54
Figure 35: Sequence of Operation Chart	58
Figure 36: Burner Cup Position	61
Figure 37: Linear and U-Tube Specifications	74

Product Approval

ROBERTS GORDON® appliances have been tested and CE certified as complying with the essential requirements of the Gas Appliance Directive, the Low Voltage Directive, the Electromagnetic Compatibility Directive and the Machinery Directive for use on natural gas and LPG when installed, commissioned and maintained in accordance with these instructions.

These instructions refer to appliances designed to operate in the European Union.

Appliances designed for other countries (Non-European Union) are available on request.

This appliance must be installed in accordance with the local and national codes in force and used only in a sufficiently ventilated space, as specified in these instructions.

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

SECTION 1: HEATER SAFETY



Your Safety is Important to Us!
 This symbol is used throughout the manual to notify you of possible fire, electrical or burn hazards. Please pay special attention when reading and following the warnings in these sections.

Installation, service and annual inspection of heater must be done by a registered installer/contractor qualified in the installation and service of gas-fired heating equipment.

Read this manual carefully before installation, operation or service of this equipment.

This heater is designed for heating nonresidential indoor spaces. Do not install in residential spaces. These instructions, the layout drawing, local codes and ordinances, and applicable standards that apply to gas piping, electrical wiring, venting, etc., must be thoroughly understood before proceeding with the installation.

Protective gear is to be worn during installation, operation and service. Thin sheet metal parts, such as the reflector portion of the heater and the various venting

components, have sharp edges. To prevent injury, the use of work gloves is recommended. The use of gloves will also prevent the transfer of body oils from the hands to the surface of the reflector.

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

For additional copies of the Installation, Operation and Service Manual, please contact Roberts-Gordon LLC.

1.1 Manpower Requirements

To prevent personal injury and damage to the heater, two persons will be required for installation.

1.2 Safety Labels and Their Placement

Product safety signs or labels should be replaced by the product user when they are no longer legible. Contact Roberts-Gordon for obtaining replacement signs or labels. See Page 2, Figure 1 through Page 3, Figure 2.

Figure 1: Side and Back Panel Label Placement

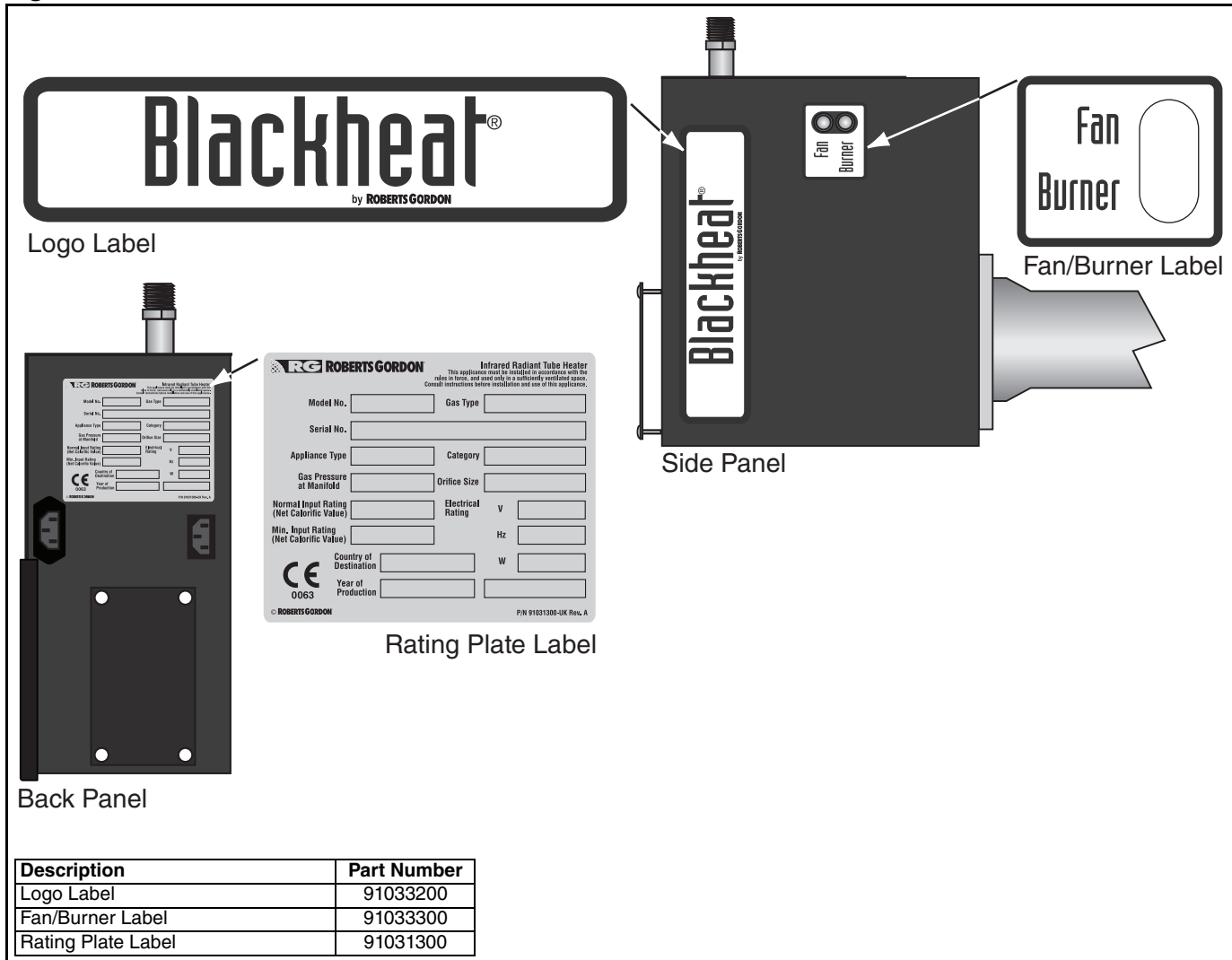
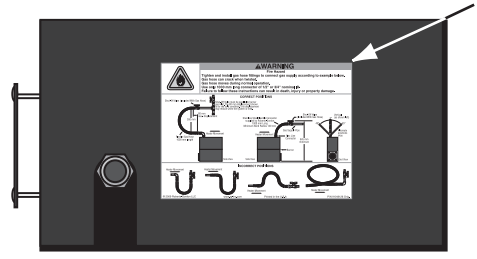
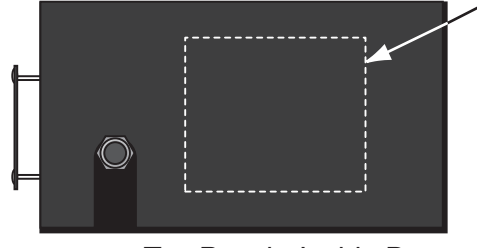


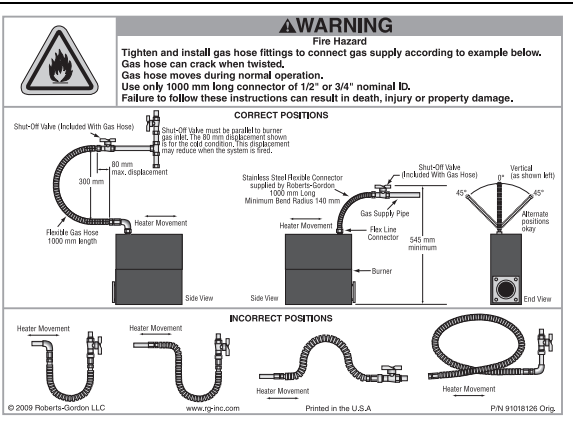
Figure 2: Top Panel Label Placement



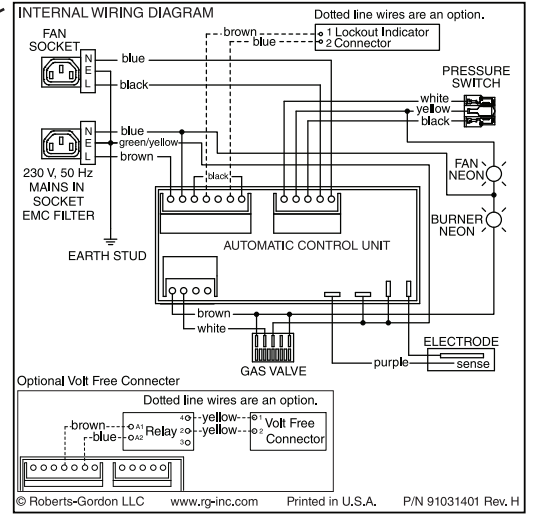
Top Panel



Top Panel - Inside Door



Gas Connection Label



Internal Wiring Label

Description	Part Number
Gas Connection Label	91018126
Internal Wiring Label	91031401

SECTION 2: INSTALLER RESPONSIBILITY

- To install the heater, as well as the gas and electrical supplies, in accordance with applicable specifications and codes. Roberts-Gordon recommends the installer contact a local Building Inspector or Fire Marshal for guidance.
- To use the information given in a layout drawing and in the manual together with the cited codes and regulations to perform the installation.
- To install the heater in accordance with the clearances to combustibles.
- To furnish all needed materials not furnished as standard equipment.
- To plan location of supports.
- To provide access to burners for servicing on all sides, for burner removal.
- To provide the owner with a copy of this installation, operation and service manual.
- To never use heater as support for a ladder or other access equipment and never hang or suspend anything from heater.
- To ensure there is adequate air circulation around the heater and to supply air for combustion, ventilation and distribution in accordance with local codes.
- To safely and adequately install heater using materials with a minimal working load of 33 kg.
- To ensure the heater is placed in an approved application.

2.1 Low Level User Instructions

In all situations, clearances to combustibles must be maintained. Signs should be posted in storage areas to specify the maximum stacking height of items placed below heater to maintain required clearances to combustibles. Minimum clearances must be maintained from vehicles parked below the heater. Caution should be used when running the system near combustible materials such as wood, paper, rubber, etc. Consideration should be given to partitions, storage racks, hoists, building construction, etc.

A laminated wall tag is available for the heater as a permanent reminder of the safety instructions and the importance of the required clearances to combustibles. Please contact Roberts-Gordon or your ROBERTS GORDON® independent distributor to obtain the wall tag. Affix the tag by peeling off the backing of the adhesive strips on the rear surface and position the tag on a wall near the heater (e.g. thermostat or ROBERTS GORDON® Controller).

A copy of the wall tag (P/N 91037912) is illustrated on the back cover. This copy of the wall tag can be affixed on the wall near the heater. Know your model number and installed configuration. Model number and installed configuration are found on the burner and in the Installation, Operation and Service Manual. Write the largest clearance dimensions with permanent ink according to your model number and configuration in the open spaces on the tag.

2.2 Corrosive Chemicals


<p>Product Damage Hazard</p> <p>Do not use heater in area containing corrosive chemicals.</p> <p>Refer to appropriate Material Safety Data Sheets (MSDS).</p> <p>Failure to follow these instructions can result in product damage.</p>


Roberts-Gordon cannot be responsible for ensuring that all appropriate safety measures are undertaken prior to installation; this is entirely the responsibility of the installer. It is essential that the contractor, the sub-contractor, or the owner identifies the presence of combustible materials, corrosive chemicals or halogenated hydrocarbons* anywhere in the premises.

** **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 will be invalid if the heater is exposed to halogenated hydrocarbons.*

2.3 National Standards and Applicable Codes

All appliances must be installed in accordance with the latest revision of the applicable standards and national codes. This refers also to the electric, gas and venting installation. Note: Additional standards for installations in public garages, aircraft hangars, etc. may be applicable.

SECTION 3: CLEARANCES TO COMBUSTIBLES

! WARNING

Fire Hazard
Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from heater.
Some objects will catch fire or explode when placed close to heater.
Failure to follow these instructions can result in death, injury or property damage.

- Consult local Building Inspector, Fire Insurance Carrier or other authorities for approval of proposed installation when there is a possibility of exposure to combustible airborne materials or vapours.
- Hang heater in accordance to the minimum suspension requirements on *Page 73, Section 18.6 through Section 18.8.*
- 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 fire hazard.

3.1 Required Clearances to Combustibles

Clearances are the required distances that combustible objects must be away from the heater to prevent fire hazards. Caution should be used when running the system near combustibles. Combustibles are materials, which may catch on fire and include common items such as wood, paper, rubber, fabric, etc. **Maintain clearances to combustibles at all times for safety.**

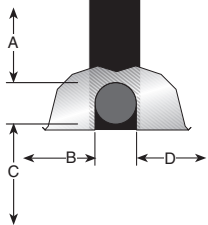
Clearances for all heater models are located on *Page 6, Figure 3 through Page 9, Figure 17* in this manual. Check the clearances on each burner for the model heater being installed to make sure the product is suitable for your application and the clearances are maintained. Read and follow the safety guidelines below:

- Keep petrol or other combustible materials including flammable objects, liquids, dust or vapours away from this heater or any other appliance.
- The stated clearances to combustibles represents a surface temperature of 32°C (90° F) above room temperature. Building materials with a low heat tolerance (such as plastics, vinyl siding, canvas, tri-ply, etc) may be subject to degradation at lower temperatures. It is the installer's responsibility to assure that adjacent materials are protected from degradation.
- Maintain clearances from heat sensitive equipment and workstations.
- Maintain clearances from vehicles parked below the heater.
- Maintain clearances from swinging and overhead doors, overhead cranes, vehicle lifts, partitions, storage racks, hoists, building construction, etc.
- In locations used for the storage of combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain required clearances from the heater to the combustibles. Signs must be posted adjacent to the heater thermostat. In the absence of a thermostat, signs must be posted in a conspicuous location.

3.2 Clearance Data - Linear and Double Linear

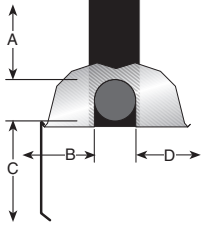
- NOTE:** 1. All dimensions are from the surfaces of all tubes, couplings, tees, elbows and crosses.
 2. Clearances B, C and D can be reduced by 50% after 7500 mm of tubing downstream from the burner.
 3. All measurements are in millimeters.

FIGURE 3: LINEAR & DOUBLE LINEAR, HORIZONTAL MOUNTS



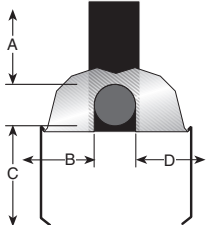
Model	BH15ST BH30DL	BH20ST BH40DL	BH25ST/EF BH50DL/EF	BH30ST/EF BH60DL/EF	BH35ST/EF BH70DL/EF	BH40ST/EF	BH45ST/EF	BH50ST/EF & BH55ST*
A	150	150	150	150	150	150	200	200
B	890	970	970	1020	1170	1220	1280	1330
C	1570	1650	1650	1780	1930	1970	2010	2080
D	890	970	970	1020	1170	1220	1280	1330

FIGURE 4: LINEAR & DOUBLE LINEAR, ONE SIDE REFLECTOR



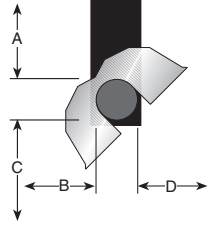
Model	BH15ST BH30DL	BH20ST BH40DL	BH25ST/EF BH50DL/EF	BH30ST/EF BH60DL/EF	BH35ST/EF BH70DL/EF	BH40ST/EF	BH45ST/EF	BH50ST/EF & BH55ST*
A	150	150	150	150	150	150	200	200
B	230	230	230	230	230	230	230	230
C	1580	1760	1760	1930	2090	2130	2160	2240
D	1200	1380	1380	1500	1660	1710	1760	1860

FIGURE 5: LINEAR & DOUBLE LINEAR, TWO SIDE REFLECTORS



Model	BH15ST BH30DL	BH20ST BH40DL	BH25ST/EF BH50DL/EF	BH30ST/EF BH60DL/EF	BH35ST/EF BH70DL/EF	BH40ST/EF	BH45ST/EF	BH50ST/EF & BH55ST*
A	150	150	150	150	150	150	200	200
B	590	640	640	690	820	860	890	1020
C	1660	1810	1810	1960	2110	2160	2210	2320
D	590	640	640	690	820	860	890	1020

FIGURE 6: LINEAR & DOUBLE LINEAR, 45° MOUNT



Model	BH15ST BH30DL	BH20ST BH40DL	BH25ST/EF BH50DL/EF	BH30ST/EF BH60DL/EF	BH35ST/EF BH70DL/EF	BH40ST/EF	BH45ST/EF	BH50ST/EF & BH55ST*
A	200	200	200	250	250	275	300	300
B	200	200	200	200	200	200	200	200
C	1500	1660	1660	1860	1960	2030	2110	2160
D	1370	1520	1520	1630	1750	1820	1880	2000

* BH55ST only available in multiburner.

- NOTE:**
1. All dimensions are from the surfaces of all tubes, couplings, tees, elbows and crosses.
 2. Clearances B, C and D can be reduced by 50% after 7500 mm of tubing downstream from the burner.
 3. All measurements are in millimeters.

FIGURE 7: LINEAR & DOUBLE LINEAR, 2 FOOT DECO GRILLE

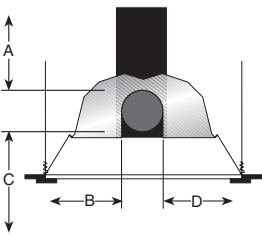
	Model	BH15ST BH30DL	BH20ST BH40DL	BH25ST/EF BH50DL/EF	BH30ST/EF BH60DL/EF	BH35ST/EF BH70DL/EF	BH40ST/EF	BH45ST/EF	BH50ST/EF & BH55ST*
	A	150	150	150	150	150	150	150	200
B	890	970	970	970	1020	1170	1220	1280	1330
C	1570	1650	1650	1650	1780	1930	1970	2010	2080
D	890	970	970	970	1020	1170	1220	1280	1330

FIGURE 8: LINEAR & DOUBLE LINEAR, PROTECTIVE GRILLE

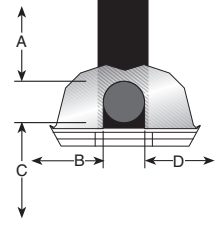
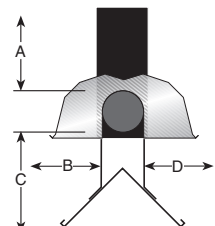
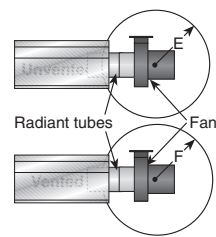
	Model	BH15ST BH30DL	BH20ST BH40DL	BH25ST/EF BH50DL/EF	BH30ST/EF BH60DL/EF	BH35ST/EF BH70DL/EF	BH40ST/EF	BH45ST/EF	BH50ST/EF & BH55ST*
	A	150	150	150	150	150	150	150	200
B	890	970	970	970	1020	1170	1220	1280	1330
C	1570	1650	1650	1650	1780	1930	1970	2010	2080
D	890	970	970	970	1020	1170	1220	1280	1330

FIGURE 9: UNDERSHIELD **

	Model	BH15ST BH30DL	BH20ST BH40DL	BH25ST/EF BH50DL/EF	BH30ST/EF BH60DL/EF	BH35ST/EF BH70DL/EF	BH40ST/EF	BH45ST/EF	BH50ST/EF & BH55ST*
	A	150	150	150	150	150	150	150	-
B	990	1020	1020	1270	1270	1370	1400	-	-
C	840	965	965	1120	1120	1220	1270	-	-
D	990	1020	1020	1270	1270	1370	1400	-	-

** When installed in the first 6 m - Not for use on EF models.

FIGURE 10: LINEAR & DOUBLE LINEAR, VENTING

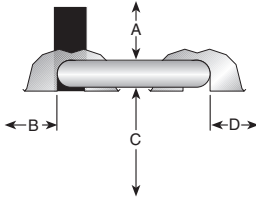
	Model	BH15ST BH30DL	BH20ST BH40DL	BH25ST/EF BH50DL/EF	BH30ST/EF BH60DL/EF	BH35ST/EF BH70DL/EF	BH40ST/EF	BH45ST/EF	BH50ST/EF & BH55ST*
	E	1000	1000	1000	1000	1000	1000	1000	1000
F	500	500	500	500	500	500	500	500	500

* BH55ST only available in multiburner.

3.3 Clearance Data -U Tube

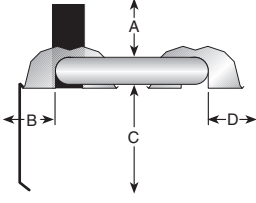
- NOTE:**
1. All dimensions are from the surfaces of all tubes, couplings, tees, elbows and crosses.
 2. Clearances B, C and D can be reduced by 50% after 7500 mm of tubing downstream from the burner.
 3. All measurements are in millimeters.
 4. Add 60 mm clearance to uncovered U-tube.

FIGURE 11: U-TUBE, HORIZONTAL MOUNT



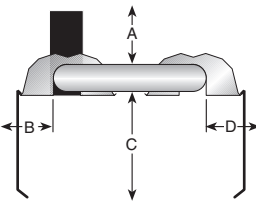
Model	BH15UT	BH20UT	BH25UT/EF	BH30UT/EF	BH35UT/EF	BH40UT/EF	BH45UT/EF	BH50UT/EF
A	150	150	150	150	150	150	200	200
B	890	970	970	1020	1170	1220	1270	1380
C	1580	1730	1730	1910	1980	2050	2110	2210
D	760	940	940	1000	1090	1150	1200	1300

FIGURE 12: U-TUBE, ONE SIDE REFLECTOR



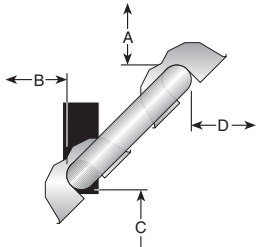
Model	BH15UT	BH20UT	BH25UT/EF	BH30UT/EF	BH35UT/EF	BH40UT/EF	BH45UT/EF	BH50UT/EF
A	150	150	150	150	150	150	200	200
B	230	230	230	230	230	230	230	230
C	1580	1760	1760	1930	2090	2130	2160	2240
D	1200	1380	1380	1500	1660	1710	1760	1860

FIGURE 13: U-TUBE, TWO SIDE REFLECTORS



Model	BH15UT	BH20UT	BH25UT/EF	BH30UT/EF	BH35UT/EF	BH40UT/EF	BH45UT/EF	BH50UT/EF
A	150	150	150	150	150	150	200	200
B	590	640	640	690	820	860	890	1020
C	1660	1810	1810	1960	2110	2160	2210	2320
D	590	640	640	690	820	860	890	1020

FIGURE 14: U-TUBE, FULL 45° MOUNT



Model	BH15UT	BH20UT	BH25UT/EF	BH30UT/EF	BH35UT/EF	BH40UT/EF	BH45UT/EF	BH50UT/EF
A	200	200	200	200	200	200	200	200
B	200	200	200	200	200	200	200	200
C	1500	1650	1650	1860	1960	2040	2110	2160
D	1070	1170	1170	1320	1550	1620	1680	1780

- NOTE:**
1. All dimensions are from the surfaces of all tubes, couplings, tees, elbows and crosses.
 2. Clearances B, C and D can be reduced by 50% after 7500 mm of tubing downstream from the burner.
 3. All measurements are in millimeters.
 4. Add 60 mm clearance to uncovered U-tube.

FIGURE 15: U-TUBE, OPPOSITE 45° TILT

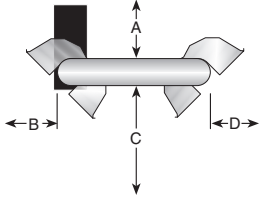
	Model	BH15UT	BH20UT	BH25UT/EF	BH30UT/EF	BH35UT/EF	BH40UT/EF	BH45UT/EF	BH50UT/EF
	A		200	200	200	250	250	275	300
B		1370	1530	1530	1630	1780	1830	1880	1930
C		1500	1650	1650	1860	1960	2040	2110	2160
D		560	560	560	560	560	560	560	560

FIGURE 16: U-TUBE, PROTECTIVE GRILLE

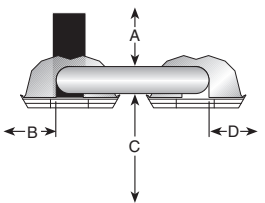
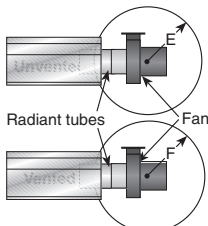
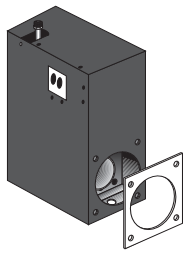
	Model	BH15UT	BH20UT	BH25UT/EF	BH30UT/EF	BH35UT/EF	BH40UT/EF	BH45UT/EF	BH50UT/EF
	A		150	150	150	150	150	150	200
B		890	970	970	1020	1170	1220	1270	1380
C		1580	1730	1730	1910	1980	2050	2110	2210
D		760	940	940	1000	1090	1150	1200	1300

FIGURE 17: U-TUBE, VENTING

	Model	BH15UT	BH20UT	BH25UT/EF	BH30UT/EF	BH35UT/EF	BH40UT/EF	BH45UT/EF	BH50UT/EF
	E		1000	1000	1000	1000	1000	1000	1000
F		500	500	500	500	500	500	500	500

SECTION 4: MAJOR COMPONENT DESCRIPTIONS

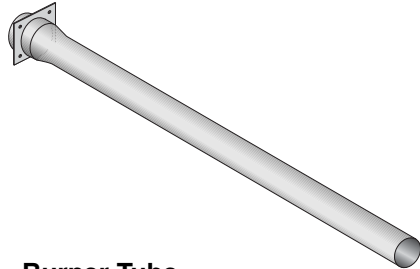
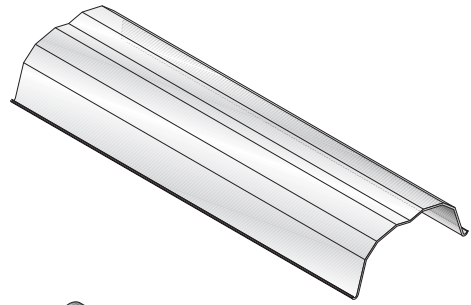


Burner (shown with Tube Gasket)

Must be installed with the flame observation window facing down.

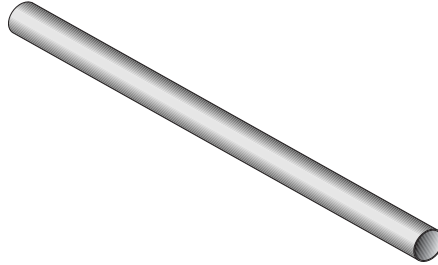
Reflector (Aluminium or Stainless Steel)

Alternate overlap as shown on overview. Minimum overlap is 160 mm.



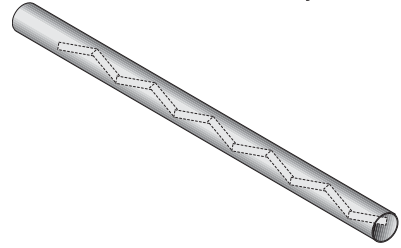
Burner Tube

Supplied in 3,000 mm lengths. Burner tube is always the first tube after the burner.



Tube

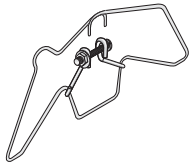
Heat treated aluminised tube supplied in 3,000 mm lengths.



Fan Tube with Internal Swirler

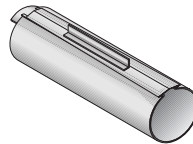
Supplied in 3,000 mm lengths. Fan tube is always the last tube on the heater where the fan is attached.

The swirler is welded to the inside of the tube end.

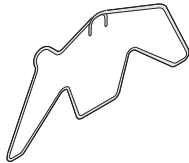


Tube and Reflector Hanger with Clamp Package

Position this hanger no more than 100 mm away from the burner assembly.

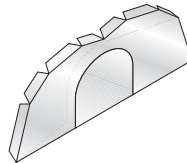


Coupling Assembly with Lock



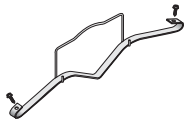
Tube and Reflector Hanger

Suspend system from these hangers.

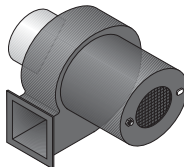


Reflector End Cap

Punch out center section to accommodate tube.

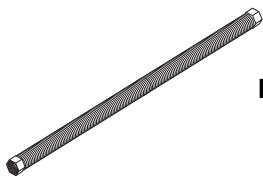


Reflector Support Strap, Wire Form & #8 x 3/4 (3.9 x 19mm) Screw

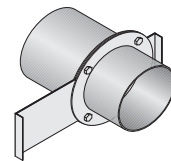


Fan Assembly (Includes Flange)

Fan Assembly is attached to the last section of heat exchanger tubing (Fan Tube).

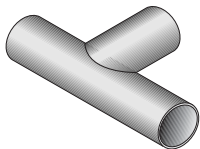


Flex Gas Line

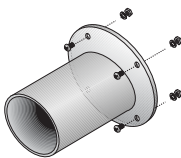


Damper Flange Assembly

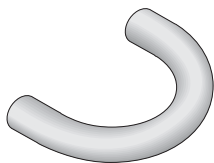
For use on Multiburner Systems.



Tee Assembly



Fan Flange Assembly and Screws



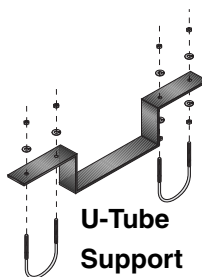
U-Tube



S-hook



Height Adjuster



U-Tube Support Bracket



Spring Hook



Bow Shackle

SECTION 5: GENERAL SUSPENSION DETAILS

⚠ WARNING**Severe Injury Hazard**

Secure burner to burner tube with bolts and lockwashers.

Hang heater with materials with a minimum working load of 75 lbs (33 kg).

Failure to follow these instructions can result in death, injury or property damage.

⚠ WARNING**Cut/Pinch Hazard**

Wear protective gear during installation, operation and service.

Edges are sharp.

Failure to follow these instructions can result in injury.

To ensure your safety, and comply with the terms of the warranty, all units must be installed in accordance with these instructions.

The gas or the electrical supply lines must not be used to support the heater.

Do not locate the gas or electric supply lines directly over the path of the flue products from the heater.

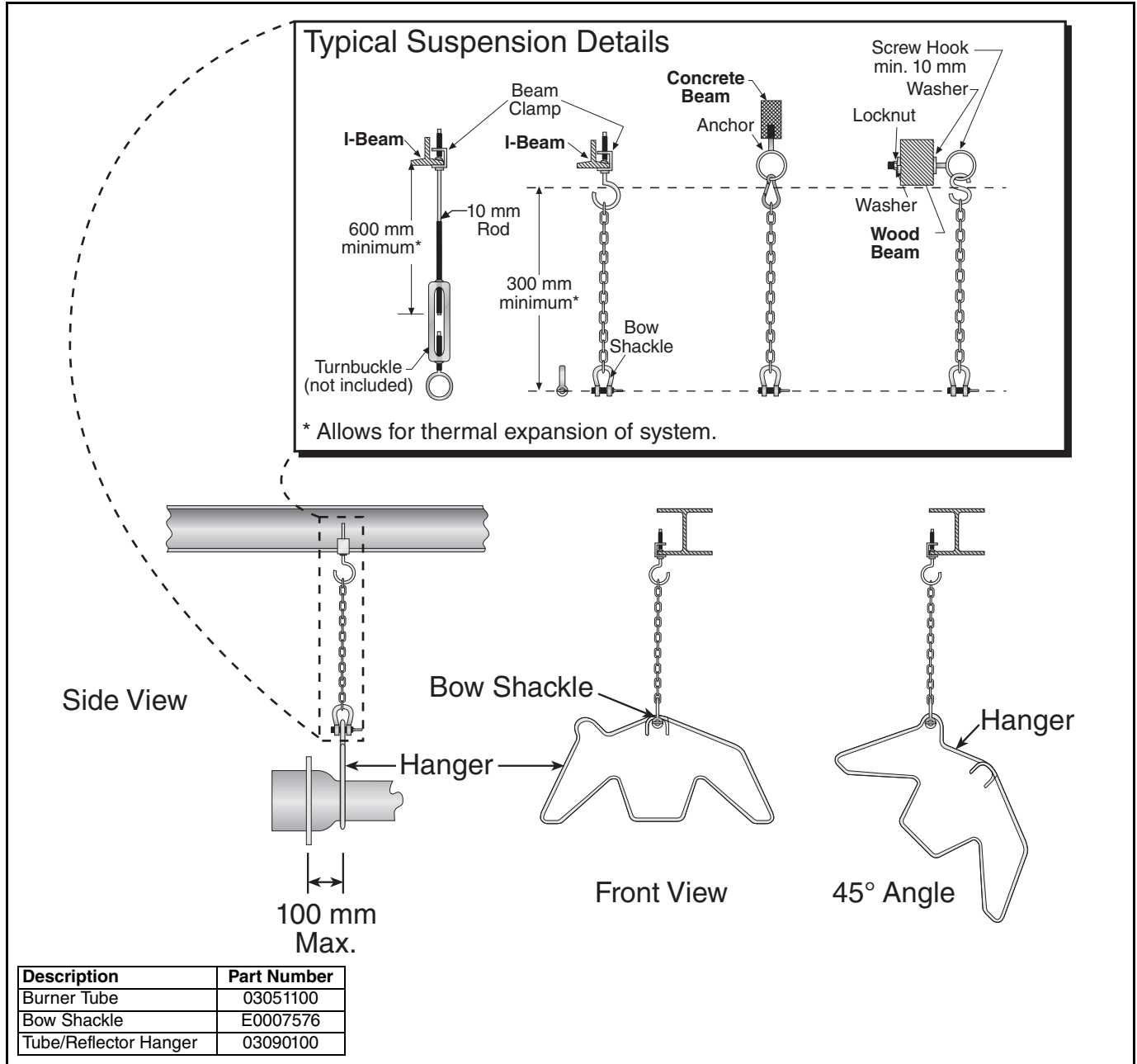
The heater must be installed in a location that it is readily accessible for servicing.

The heater must be installed in accordance with clearances to combustibles as indicated in this manual.

The minimum and maximum gas inlet pressures must be maintained as indicated on the rating plate. Typical installation configurations are shown on *Page 12, Figure 18*.

Note: Some modles will receive S-hooks (P/N 91907302) or spring hooks (P/N 91903300), rather than bow shackles.

Figure 18: Critical Hanger Placement



SECTION 6: LINEAR & DOUBLE LINEAR HEATER INSTALLATION

WARNING**Cut/Pinch Hazard**

Wear protective gear during installation, operation and service.

Edges are sharp.

Failure to follow these instructions can result in injury.

The figures in this section provide a general overview of component placement in a BLACKHEAT® Linear and Double Linear system. The location of some components such as supports and couplings is crucial for proper installation. Assemble the heater components as shown on Page 14, Figure 19.

For optional reflector configurations for linear heaters see Page 6, Figure 3 through Page 7, Figure 10. Install appropriate suspension hardware, beam clamps, chain or rod at predetermined locations. Adjustments of chain length will provide uniform pitch.

If any step is unclear, please contact Roberts-Gordon at +44 (0)121 506 7700.

6.1 Linear Standard Parts List

Part No.	Description	BH15ST	BH20ST	BH25ST	BH25ST/EF	BH30ST	BH30ST/EF	BH35ST	BH35ST/EF	BH40ST	BH40ST/EF	BH45ST	BH45ST/EF	BH50ST	BH50ST/EF	BH55ST
		072XXXXX	Burner Assembly (Input and Fuel Varies)	1	1	1	1	1	1	1	1	1	1	1	1	1
07260001	Fan Package XP 1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-
07260002	Fan Package XP2	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1
07260003	Fan Package XP 3	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
03051100	Burner Tube, 100 mm x 3048 mm	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
91409408	Tube, 100 mm x 3048 mm	-	1	1	2	2	2	2	2	2	2	3	3	3	3	4
S5127W	Fan Tube, 100 mm x 3048 mm, with 3048 mm Swirler	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S5134W	Fan Tube, 100 mm x 3048 mm, with 2134 mm Swirler	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
01329600	Standard Coupling Assembly	1	2	2	3	3	3	3	3	3	3	4	4	4	4	5
01329700	Coupling Lock	1	2	2	3	3	3	3	3	3	3	4	4	4	4	5
02750303	Reflector, Aluminium, 2439 mm	3	4	4	6	6	6	6	6	6	6	7	7	7	7	8
027503SS	Reflector, Stainless Steel, 2439 mm (Optional)*	3	4	4	6	6	6	6	6	6	6	7	7	7	7	8
02750800	Reflector End Cap, Aluminium	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
027508SH	Reflector End Cap, Stainless (Optional)*	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
03090100	Tube and Reflector Hanger	3	4	4	5	5	5	5	5	5	5	6	6	6	6	7
01318901	Tube Clamp Package (including Nut, Washer & Bolt)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
91908004	Wire Form	2	3	3	5	5	5	5	5	5	5	6	6	6	6	7
94320812	Screw #8 x 3/4 (3.9mm x 19mm), (goes with 03050000)	4	6	6	10	10	10	10	10	10	10	12	12	12	12	14
03050000	Reflector Support Strap	2	3	3	5	5	5	5	5	5	5	6	6	6	6	7
E0007576	Bow Shackle**	3	4	4	5	5	5	5	5	5	5	6	6	6	6	7
91107720	U-Clip Package (20 Pieces)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S7199K	Damper Flange Assembly (For use on Multiburner Systems)	1 Per Heater														

* PVC coating must be removed prior to installation.

** Some models may receive S-hooks (P/N 91907302) or spring hooks (P/N 919003300), rather than bow shackles.

Figure 19: Linear General Assembly Overview

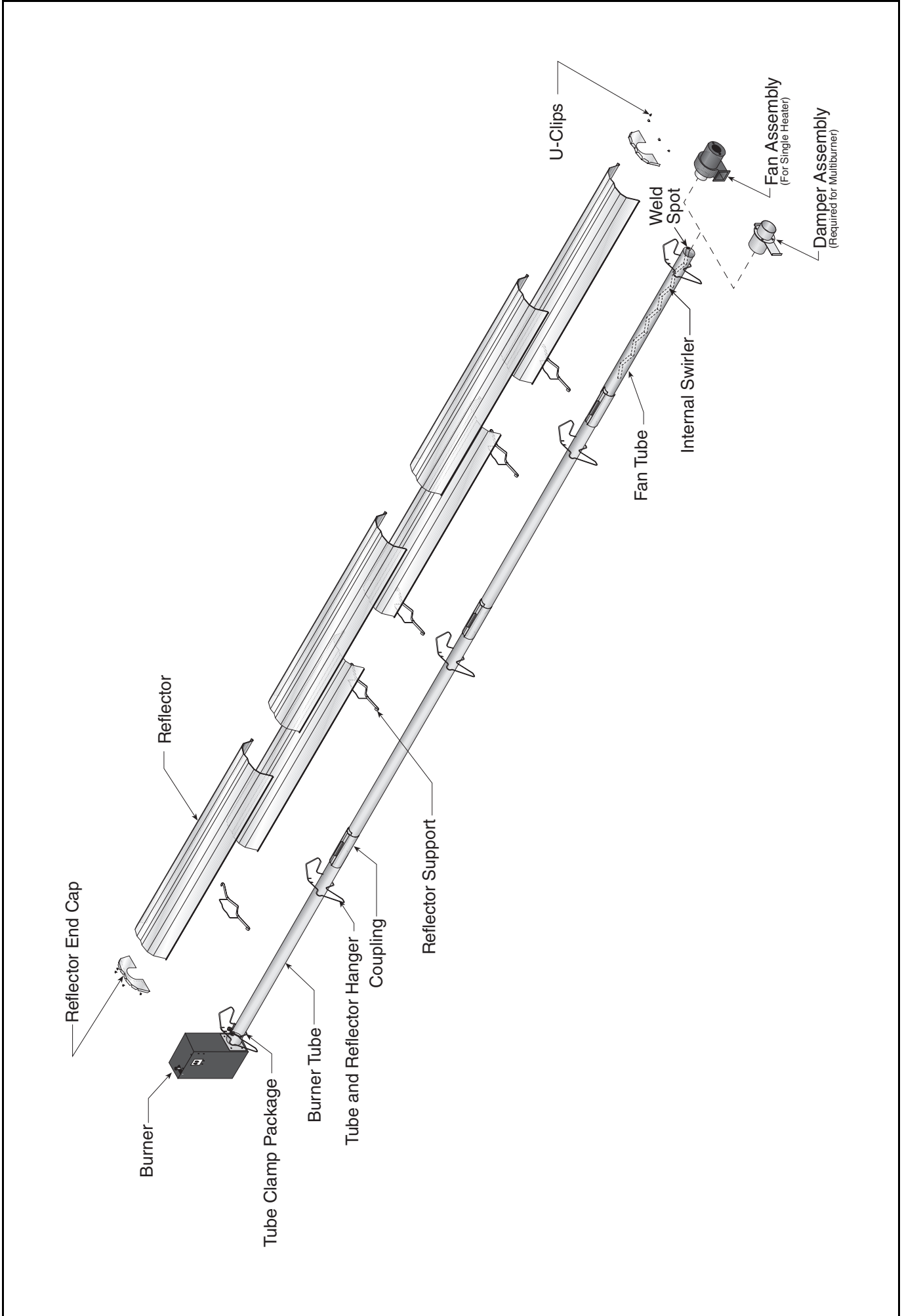
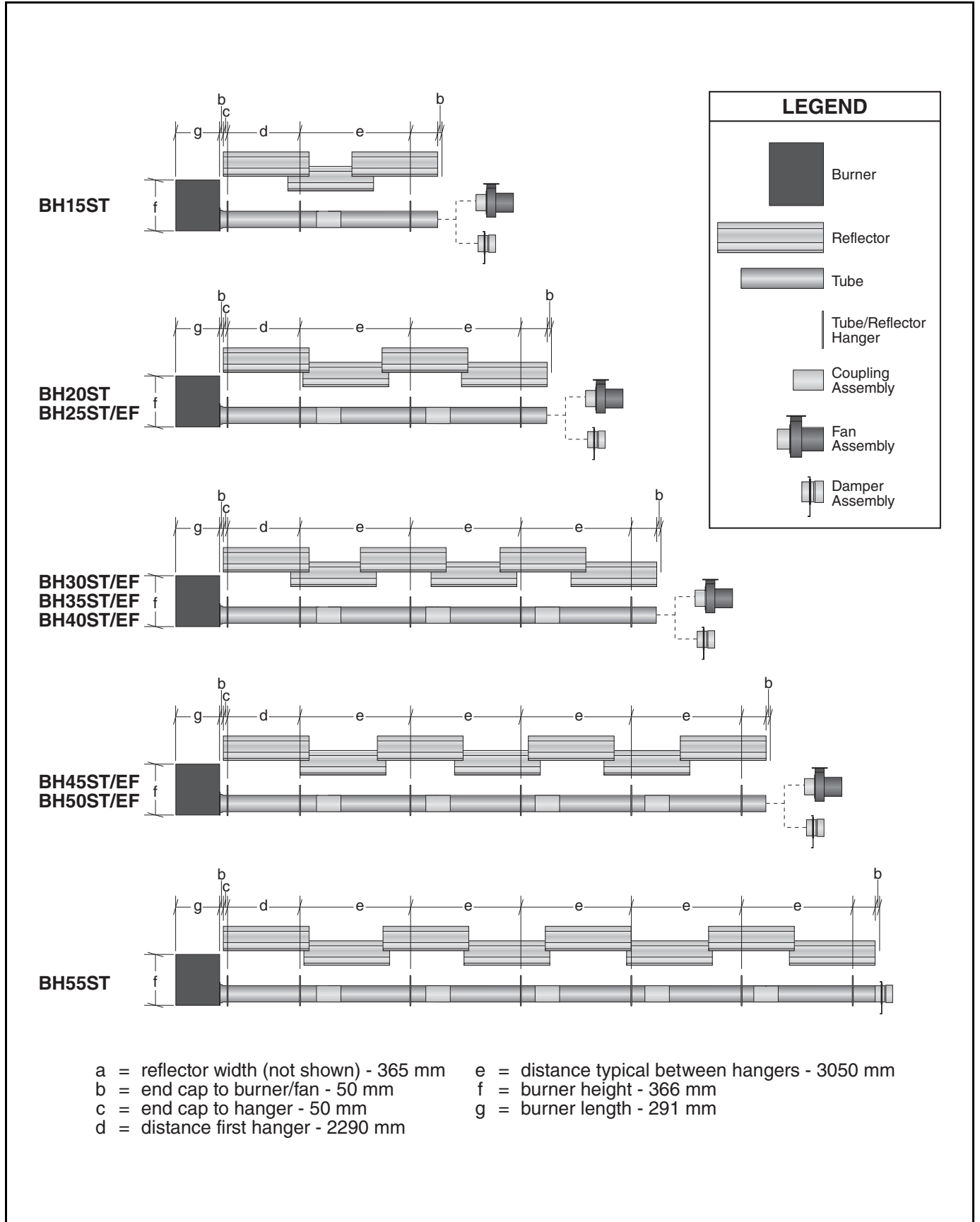


Figure 20: Linear Layout Overview



- a = reflector width (not shown) - 365 mm
- b = end cap to burner/fan - 50 mm
- c = end cap to hanger - 50 mm
- d = distance first hanger - 2290 mm
- e = distance typical between hangers - 3050 mm
- f = burner height - 366 mm
- g = burner length - 291 mm

Model	BH15ST	BH20ST	BH25ST/EF	BH30ST/EF	BH35ST/EF	BH40ST/EF	BH45ST/EF	BH50ST/EF	BH55ST
Reflector Overlap (approx.)	700 mm	250 mm	250 mm	530 mm	530 mm	530 mm	330 mm	330 mm	200 mm

6.2 Double Linear Standard Parts List

Part No.	Description	BH30DL	BH40DL	BH50DL BH50DL/EF	BH60DL BH60DL/EF	BH70DL BH70DL/EF
072XXXXX	Burner Assembly (Input and Fuel Varies)	2	2	2	2	2
07260002	Fan Package XP2	1	1	-	-	-
07260003	Fan Package XP 3	-	-	1	1	1
03051100	Burner Tube, 100 mm x 3048 mm	2	2	2	2	2
91409408	Tube, 100 mm x 3048 mm	-	2	2	4	4
S5127W	Fan Tube, 100 mm x 3048 mm, with 3048 mm Swirler	-	2	2	2	2
S5134W	Fan Tube, 100 mm x 3048 mm, with 2134 mm Swirler	2	-	-	-	-
E0009170	Tee, 100 mm x 100 mm x 100 mm	1	1	1	1	1
01329600	Standard Coupling Assembly	4	6	6	8	8
01329700	Coupling Lock	4	6	6	8	8
02750303	Reflector, Aluminium, 2439 mm	6	8	8	12	12
027503SS	Reflector, Stainless Steel, 2439 mm (Optional)*	6	8	8	12	12
02750800	Reflector End Cap, Aluminium	4	4	4	4	4
027508SH	Reflector End Cap, Stainless (Optional)*	4	4	4	4	4
03090100	Tube and Reflector Hanger	6	8	8	10	10
01318901	Tube Clamp Package (including Nut, Washer & Bolt)	2	2	2	2	2
91908004	Wire Form	4	6	6	10	10
03050000	Reflector Support Strap	4	6	6	10	10
E0007576	Bow Shackle**	6	8	8	10	10
91107720	U-Clip Package (20 Pieces)	2	2	2	2	2
E0007582	Height Adjuster	6	8	8	10	10
94320812	Screw #8 x 3/4 (3.9mm x 19mm), (goes with 03050000)	8	12	12	20	20

* PVC coating must be removed prior to installation.

**Some models may receive S-hooks (P/N 91907302) or spring hooks (P/N 91903300), rather than bow shackles

Figure 21: Double Linear General Assembly Overview

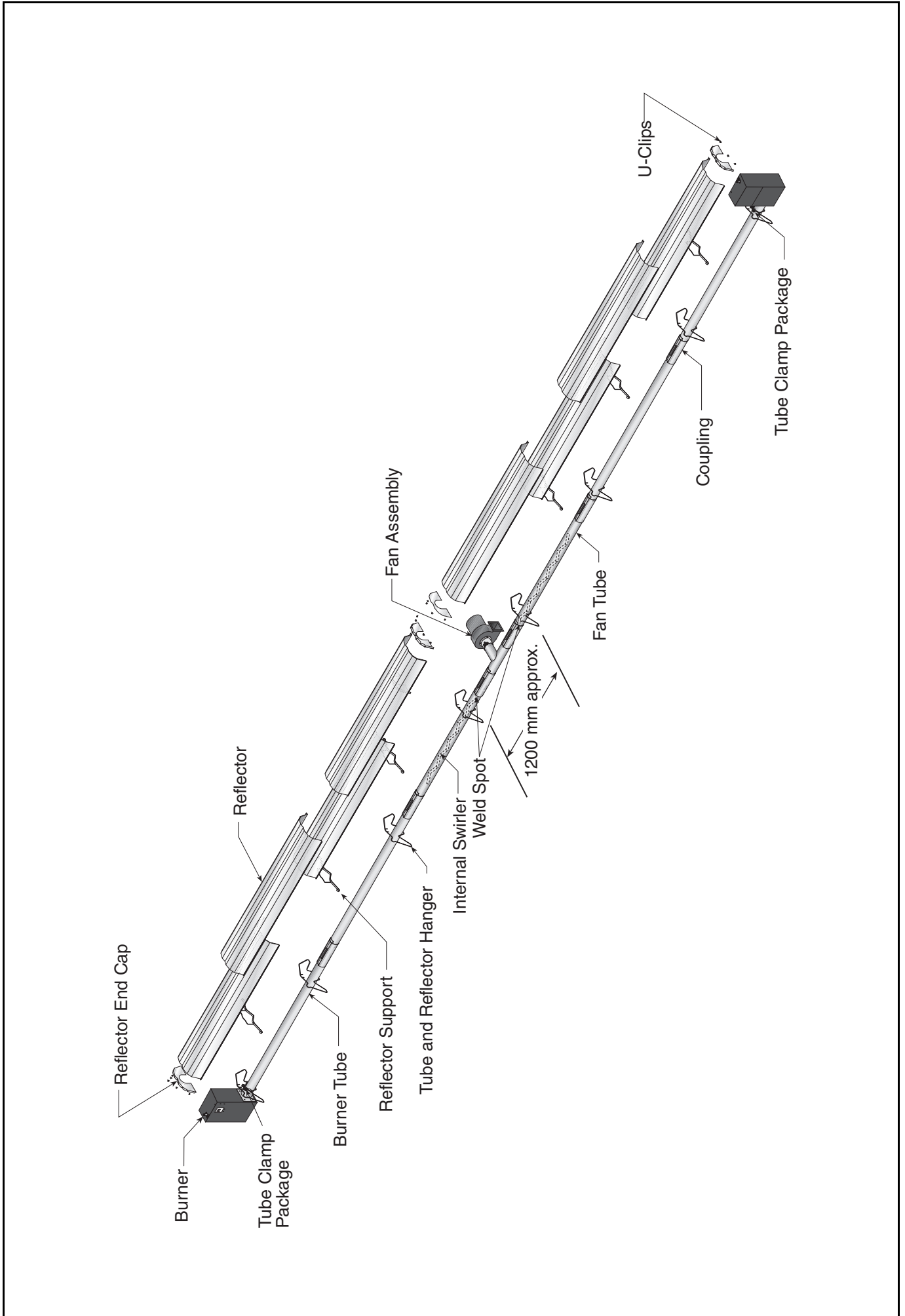
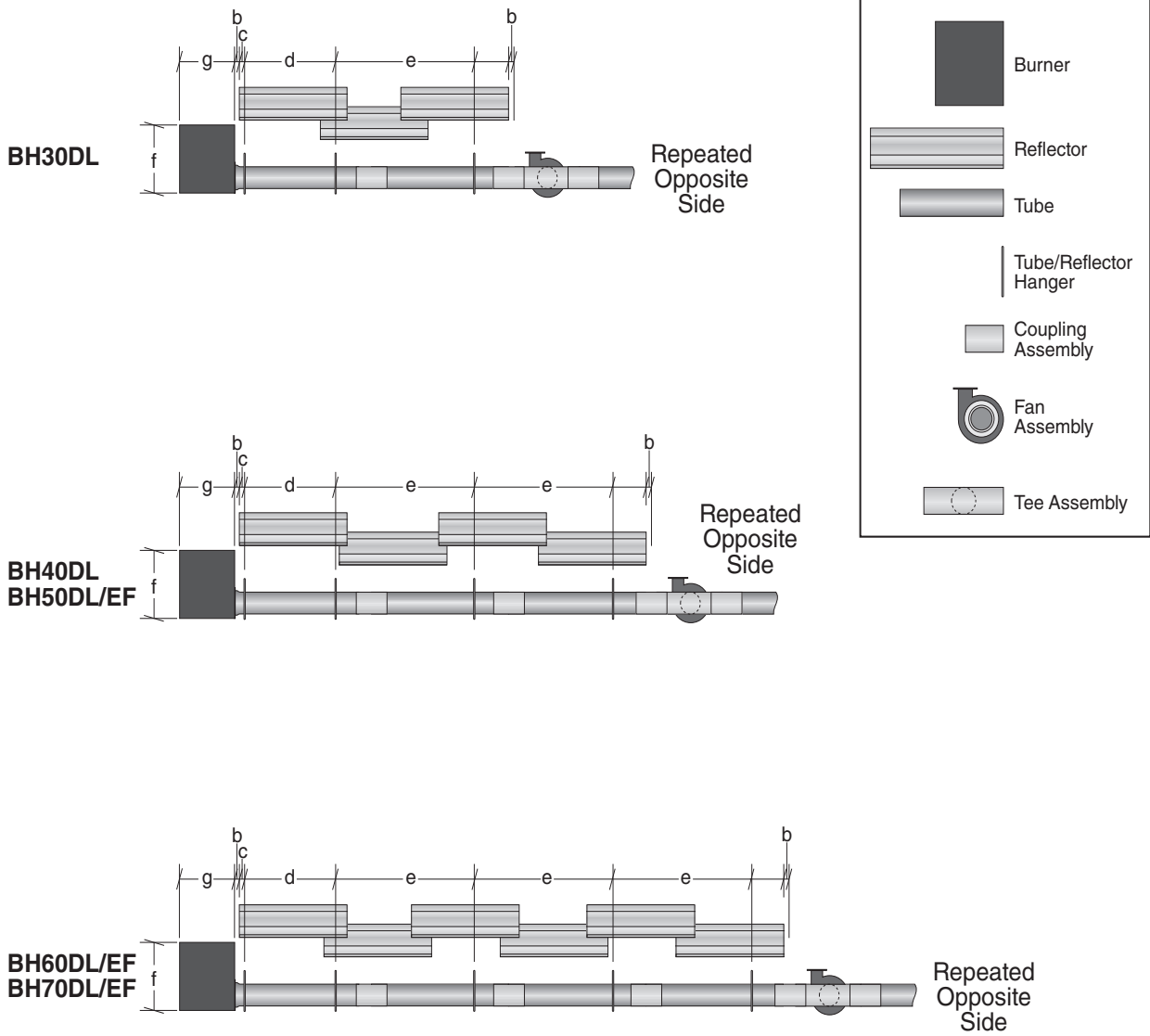


Figure 22: Double Linear Layout Overview



- a = reflector width (not shown) - 365 mm
- b = end cap to burner/fan - 50 mm
- c = end cap to hanger - 50 mm
- d = distance first hanger - 2290 mm
- e = distance typical between hangers - 3050 mm
- f = burner height - 366 mm
- g = burner length - 291 mm

Model	BH30DL	BH40DL	BH50DL/EF	BH60DL/EF	BH70DL/EF
Reflector Overlap (approx.)	700 mm	250 mm	250 mm	530 mm	530 mm

Step 6.3 Burner Tube Installation

Note:
Tubing requires a downward slope of 13 mm per 6000 mm away from burner.

Bow Shackle
Hanger
Burner Tube
2290 mm ± 250 mm
Offset mounting hole must be to the top.
Weld seam must be to the bottom of the tube.

Description	Part Number
Burner Tube	03051100
Bow Shackle	E0007576
Tube/Reflector Hanger	03090100

Step 6.4 Coupling and Tube Assembly

A Close coupling with tab.

Open
Closed
Tab

B Start slide bar/coupling lock onto coupling.

Slide Bar
Wide End Coupling
76 mm to 101 mm

C Insert tubes into coupling.

Tube
Tube
Orient coupling so that the impact block is in the 2:00 or 10:00 o'clock positions

D Tighten coupling to join tubes.

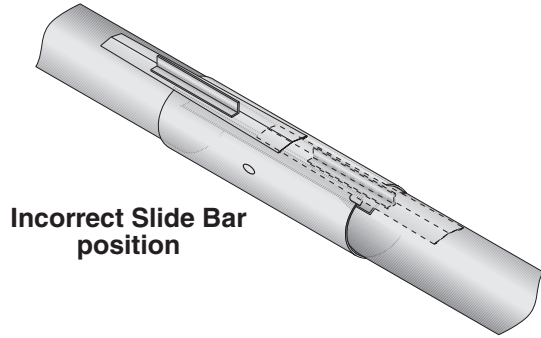
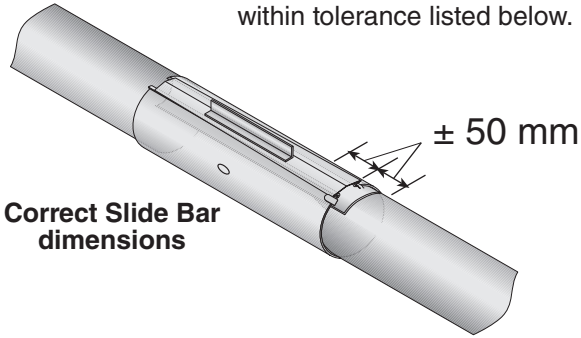
Slide Bar
Coupling
Tube

Description	Part Number
Coupling	01329600
Slide Bar/Coupling Lock	01329700
Tube	91409408

Step 6.4.1 Coupling and Tube Assembly (Continued)

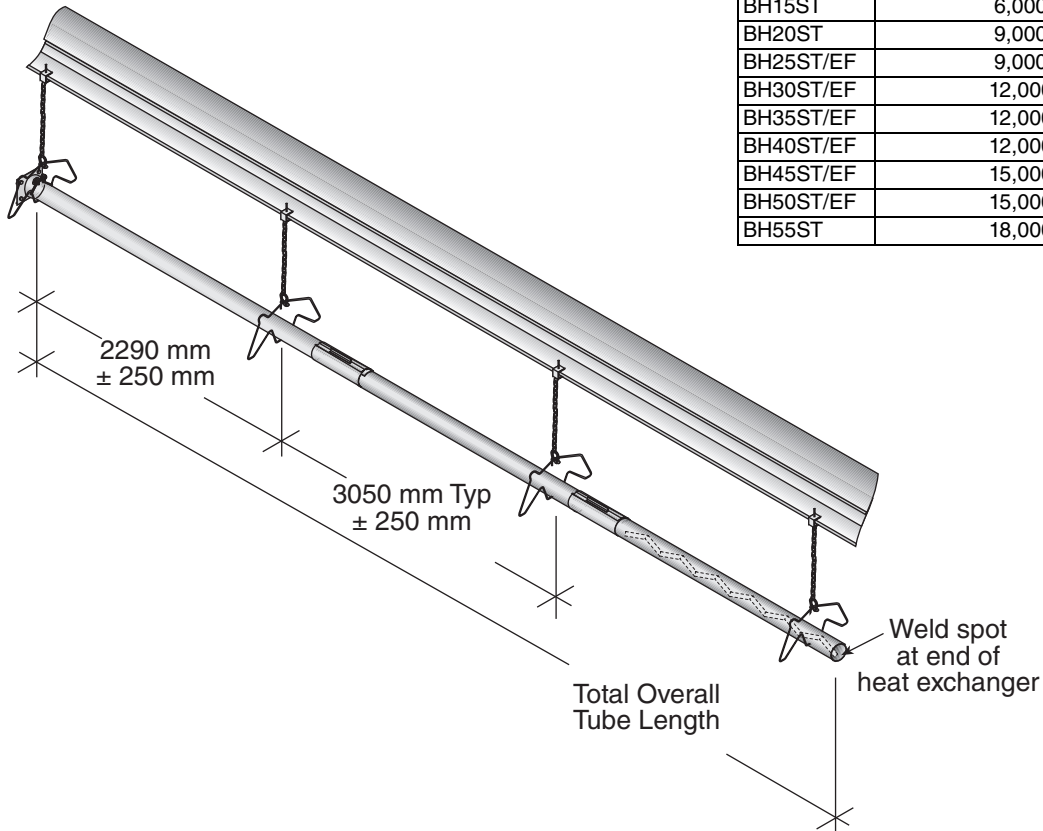
Tighten slide bar as shown below.

Drive slide bar until tight.
End of slide bar should be
within tolerance listed below.



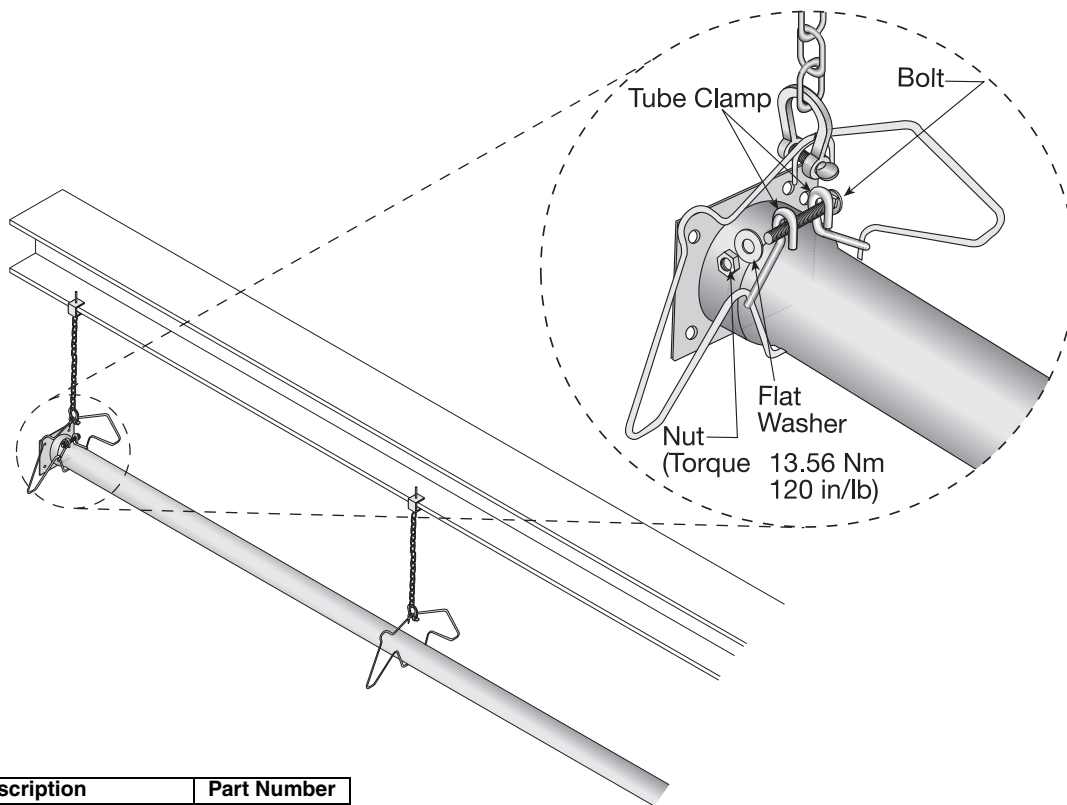
- Repeat Step 6.4 A - D until all tubes are assembled. See Page 20, Section 6.4.2 shown below.

Step 6.4.2 Coupling and Tube Assembly (Continued)



Model	Overall Tube Length (mm)	Number of Tubes
BH15ST	6,000	2
BH20ST	9,000	3
BH25ST/EF	9,000	3
BH30ST/EF	12,000	4
BH35ST/EF	12,000	4
BH40ST/EF	12,000	4
BH45ST/EF	15,000	5
BH50ST/EF	15,000	5
BH55ST	18,000	6

Step 6.5 Tube Clamp Package Installation



Description	Part Number
Tube Clamp Package	01318901
Tube Clamp	01396801
Bolt	97113940
Flat Washer	95211600
Nut	92113900

Step 6.6 Reflector Installation

⚠ WARNING

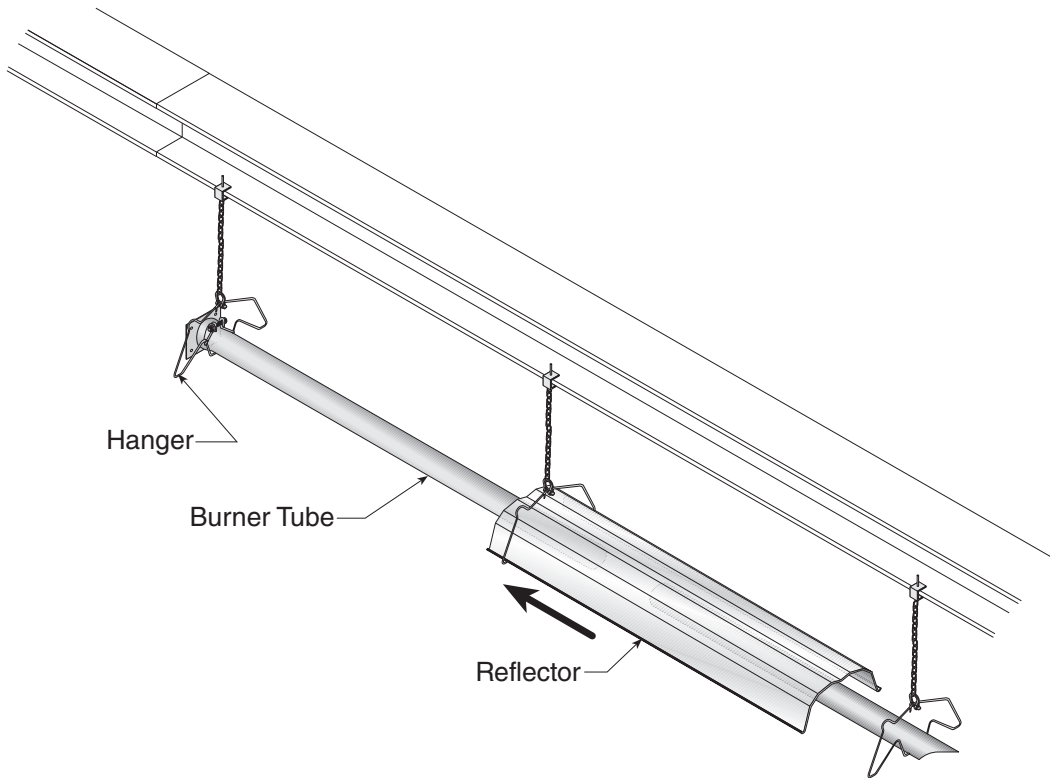


Fire Hazard

Support reflector with reflector hanger and support strap.

Reflector must not touch tube.

Failure to follow these instructions can result in death, injury or property damage.



Description	Part Number
Tube/Reflector Hanger	03090100
Burner Tube	03051100
Reflector	02750303

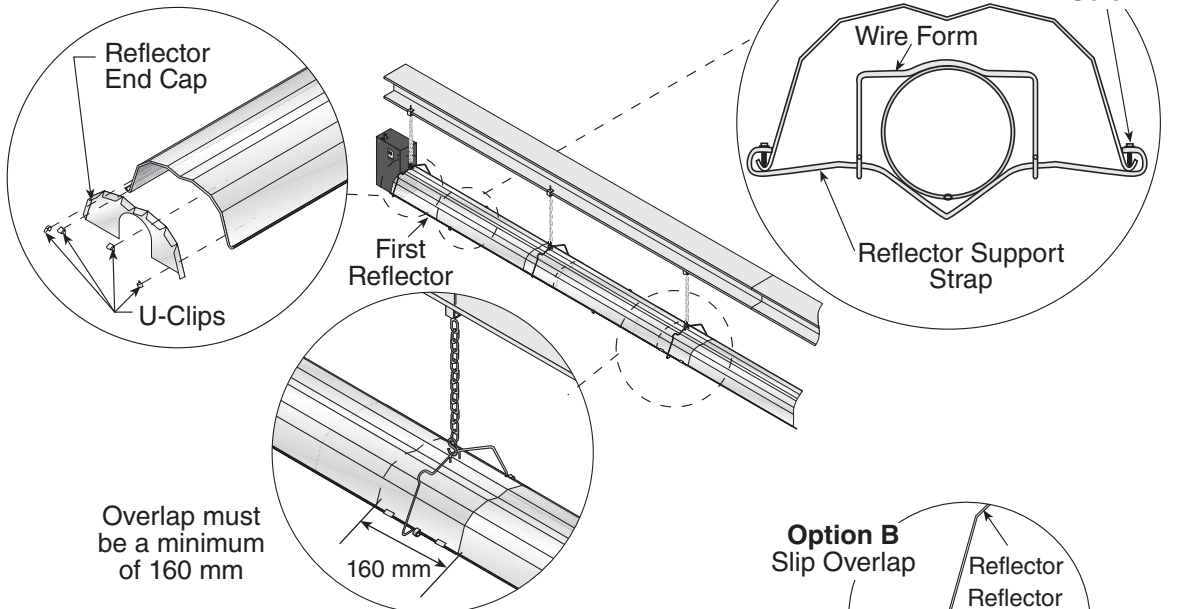
Step 6.6.1 Reflector, U-Clip and Reflector Support Installation

The pictorial drawings of the heater construction in *Section 6* are schematic only and provide a general guideline of where hangers, reflector supports and U-clips are to be installed.

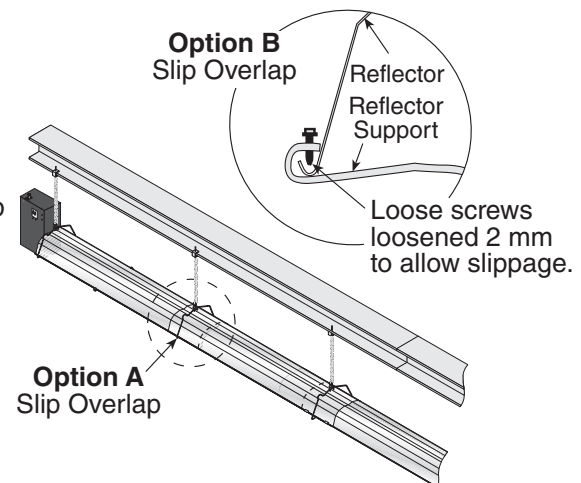
To ensure proper expansion and contraction movement of the reflectors, a combination of U-clips and reflector

supports are used. The positioning of reflector supports and U-clips depend on the individual installation. Use either pop rivets or sheet metal screws instead of U-clips when installing end caps and joint pieces in areas where impact and high wind may be a factor. The following rules must be observed:

1. The first reflector after the burner must be affixed in the middle of the reflector with a reflector support and tight screws.

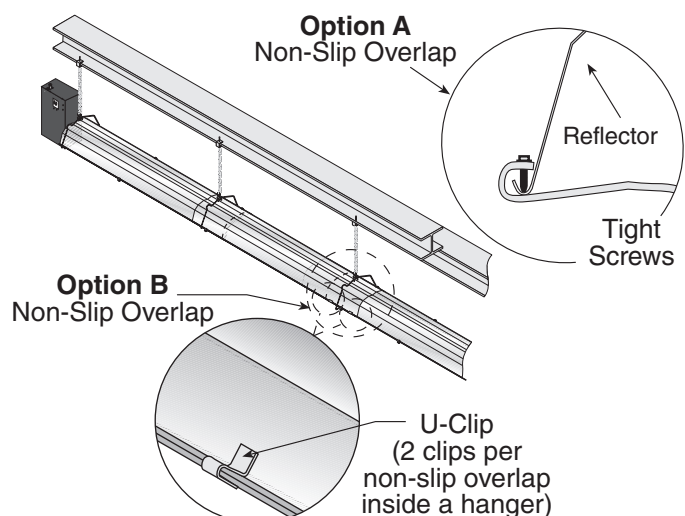


2. The overlap at the first and second reflector is a slip overlap. Thereafter, every third reflector joint is a slip overlap. A slip overlap is achieved by either:
 - a.) both reflectors lay inside a hanger. (no reflector support needed).
 - b.) using a reflector support with loose screws at the reflector overlap.



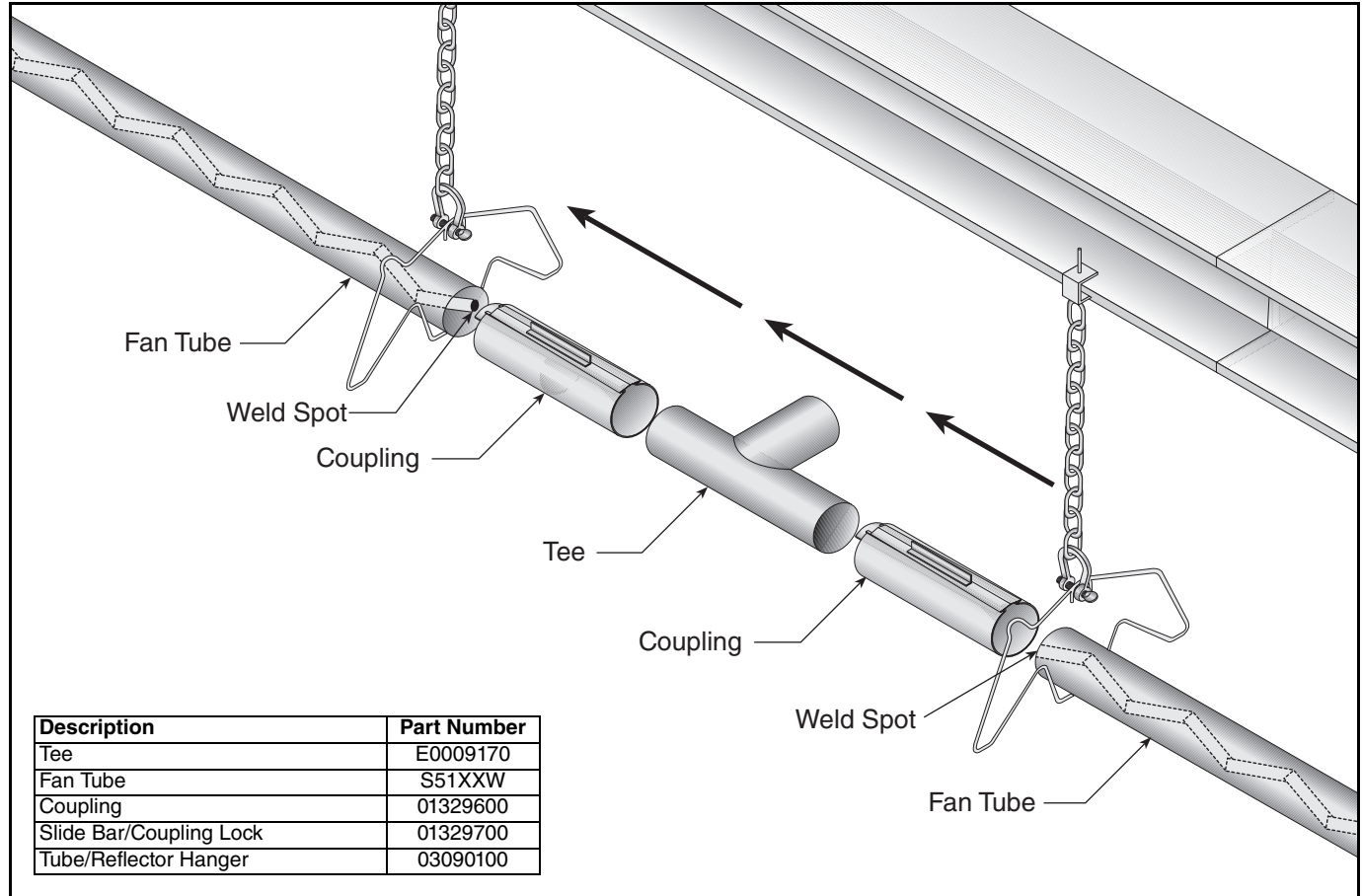
3. The remaining reflector overlaps require a non-slip overlap connection. To affix the reflectors together in a non-slip overlap either:
 - a.) use reflector support and tight screws.
 - b.) if both reflectors lay inside a hanger, u-clips or sheet metal screws may be used.

This section of three reflectors joined together must be affixed to the tube with at least one reflector support with tight screws.



Description	Part Number
Reflector Support Package	03050010
Wire Form	91908004
Reflector Support Strap	03050000
Screw #8 x 3/4	94320812
U-Clip Package	91107720
Reflector End Cap	027508XX

Step 6.7 Double Linear Tee Installation (for double linear heaters only)



SECTION 7: U-TUBE HEATER INSTALLATION

WARNING**Cut/Pinch Hazard**

Wear protective gear during installation, operation and service.

Edges are sharp.

Failure to follow these instructions can result in injury.

The figures in this section provide a general overview of component placement in a BLACKHEAT® U-tube system. The location of some components such as supports and couplings is crucial for proper installation. Assemble the heater components as shown on Page 27, Figure 23.

For optional reflector configurations for U-tube heaters, See Page 8, Figure 11 through Page 9, Figure 17. Install appropriate suspension hardware, beam clamps, chain or rod at predetermined locations. Adjustments of chain length will provide uniform pitch.

If any step is unclear, please contact Roberts-Gordon at +44 (0)121 506 7700.

7.1 U-Tube Standard Parts List

Part No.	Description	BH15UT	BH20UT	BH25UT BH25UT/EF	BH30UT BH30UT/EF	BH35UT BH35UT/EF	BH40UT BH40UT/EF	BH45UT BH45UT/EF	BH50UT BH50UT/EF
072XXXXX	Burner Assembly (Input and Fuel Varies)	1	1	1	1	1	1	1	1
07260001	Fan Package XP1	1	1	1	1	-	-	-	-
07260002	Fan Package XP2	-	-	-	-	1	1	1	-
07260003	Fan Package XP3	-	-	-	-	-	-	-	1
03051100	Burner Tube, 100 mm x 3048 mm	1	1	1	1	1	1	1	1
91409408	Tube, 100 mm x 3048 mm	-	-	-	2	2	2	2	2
91409423	Tube, 100 mm x 1524 mm	-	2	2	-	-	-	2	2
S5127W	Fan Tube, 100 mm x 3048 mm, with 3048 mm Swirler	-	1	1	1	1	1	1	1
S5134W	Fan Tube, 100 mm x 3048 mm, with 2134 mm Swirler	1	-	-	-	-	-	-	-
01335901	U-Bend	1	1	1	1	1	1	1	1
01329600	Standard Coupling Assembly	2	4	4	4	4	4	6	6
01329700	Coupling Lock	2	4	4	4	4	4	6	6
02750303	Reflector, Aluminium, 2439 mm	4	4	4	6	6	6	8	8
027503SS	Reflector, Stainless Steel, 2439 mm (Optional)*	4	4	4	6	6	6	8	8
02750800	Reflector End Cap, Aluminium	4	4	4	4	4	4	4	4
027508SH	Reflector End Cap, Stainless (Optional)*	4	4	4	4	4	4	4	4
03090100	Tube and Reflector Hanger	4	6	6	6	6	6	8	8
01318901	Tube Clamp Package (including Nut, Washer & Bolt)	1	1	1	1	1	1	1	1
91908004	Wire Form	2	4	4	4	4	4	6	6
03050000	Reflector Support Strap	2	4	4	4	4	4	6	6
03020501	U-Bend Support Bracket	1	1	1	1	1	1	1	1
E0007576	Bow Shackle**	4	6	6	6	6	6	8	8
91107720	U-Clip Package (20 Pieces)	2	2	2	2	2	2	2	2
91912501	U-Bolt M6	2	2	2	2	2	2	2	2
C0090B	Nut M6	6	6	6	6	6	6	6	6
96411500	Lockwasher 6mm	6	6	6	6	6	6	6	6

Part No.	Description	BH15UT	BH20UT	BH25UT BH25UT/EF	BH30UT BH30UT/EF	BH35UT BH35UT/EF	BH40UT BH40UT/EF	BH45UT BH45UT/EF	BH50UT BH50UT/EF
94320812	Screw #8 x 3/4 (3.9mm x 19mm), (goes with 03050000)	4	8	8	8	8	8	12	12
S7199K	Damper Flange Assembly (For use on Multiburner Systems)	1 Per Heater							

**PVC coating must be removed prior to installation.*

***Some models may receive S-hooks (P/N 91907302) or spring hooks (P/N 91903300), rather than bow shackles*

Figure 23: U-Tube Assembly Overview

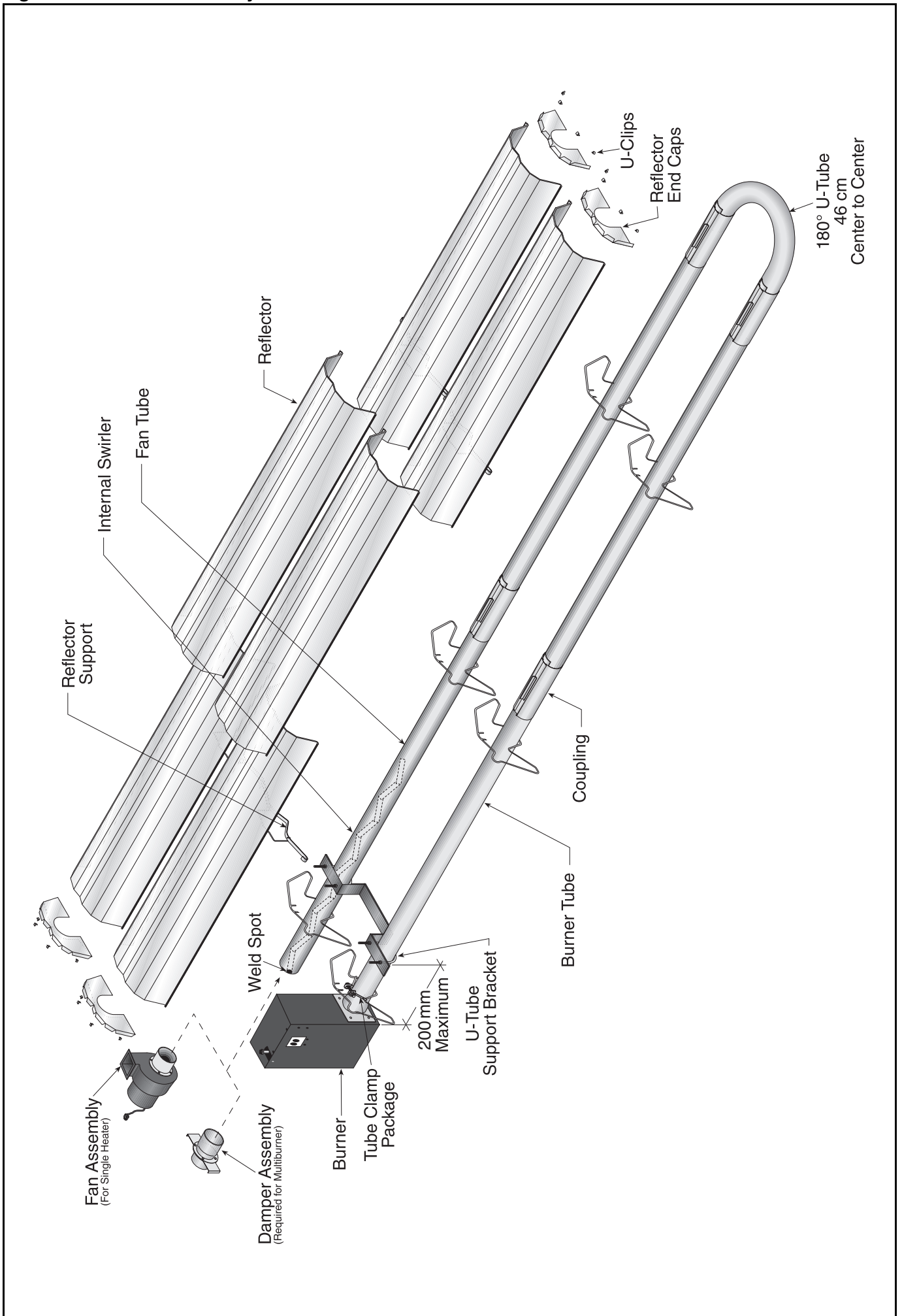
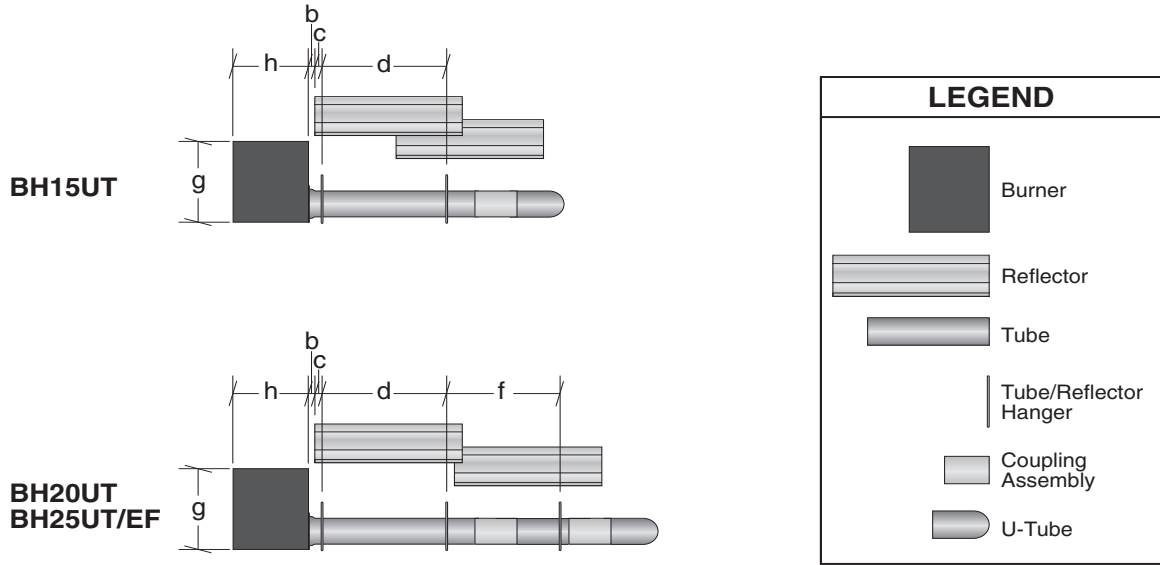


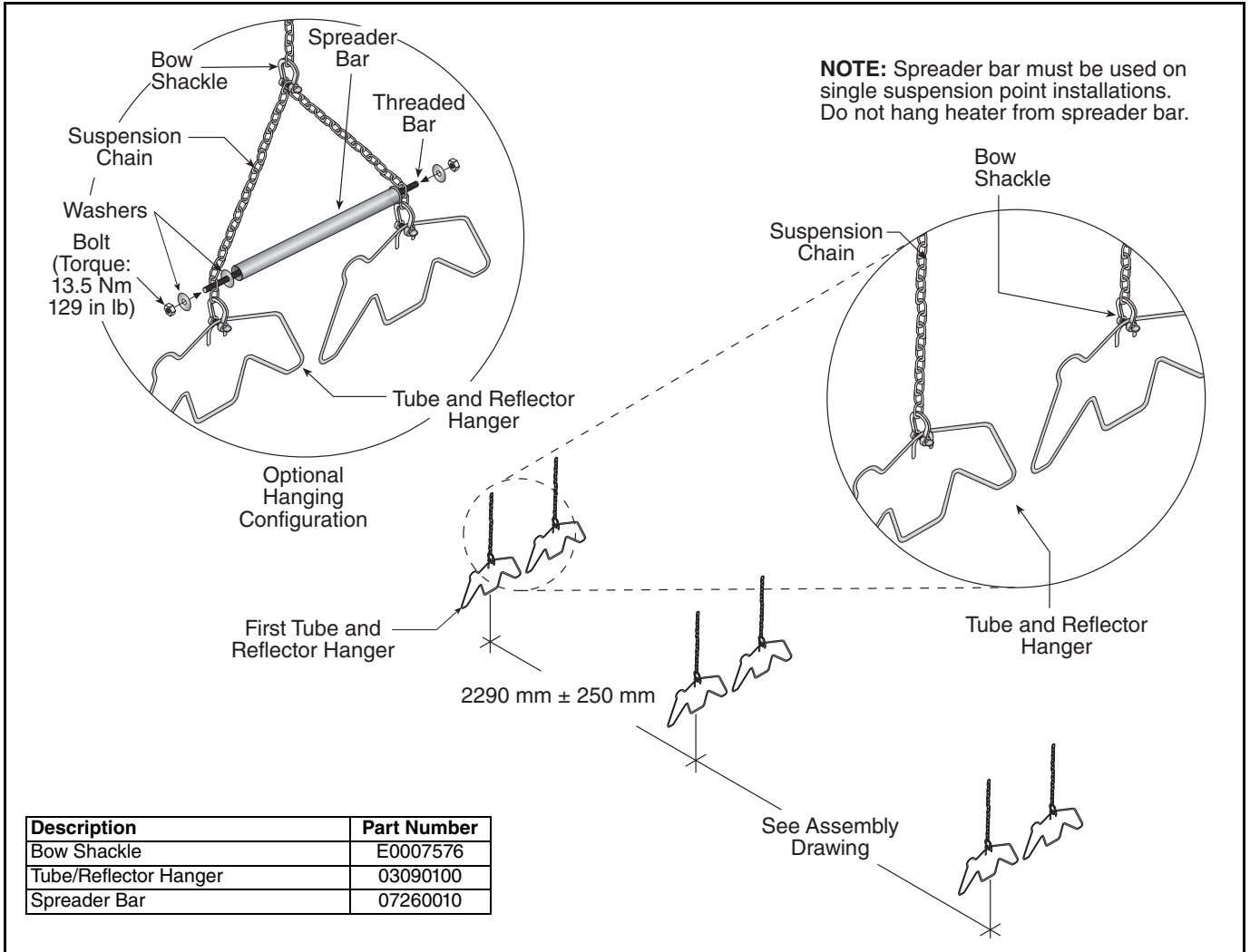
Figure 24: U-Tube Layout Overview



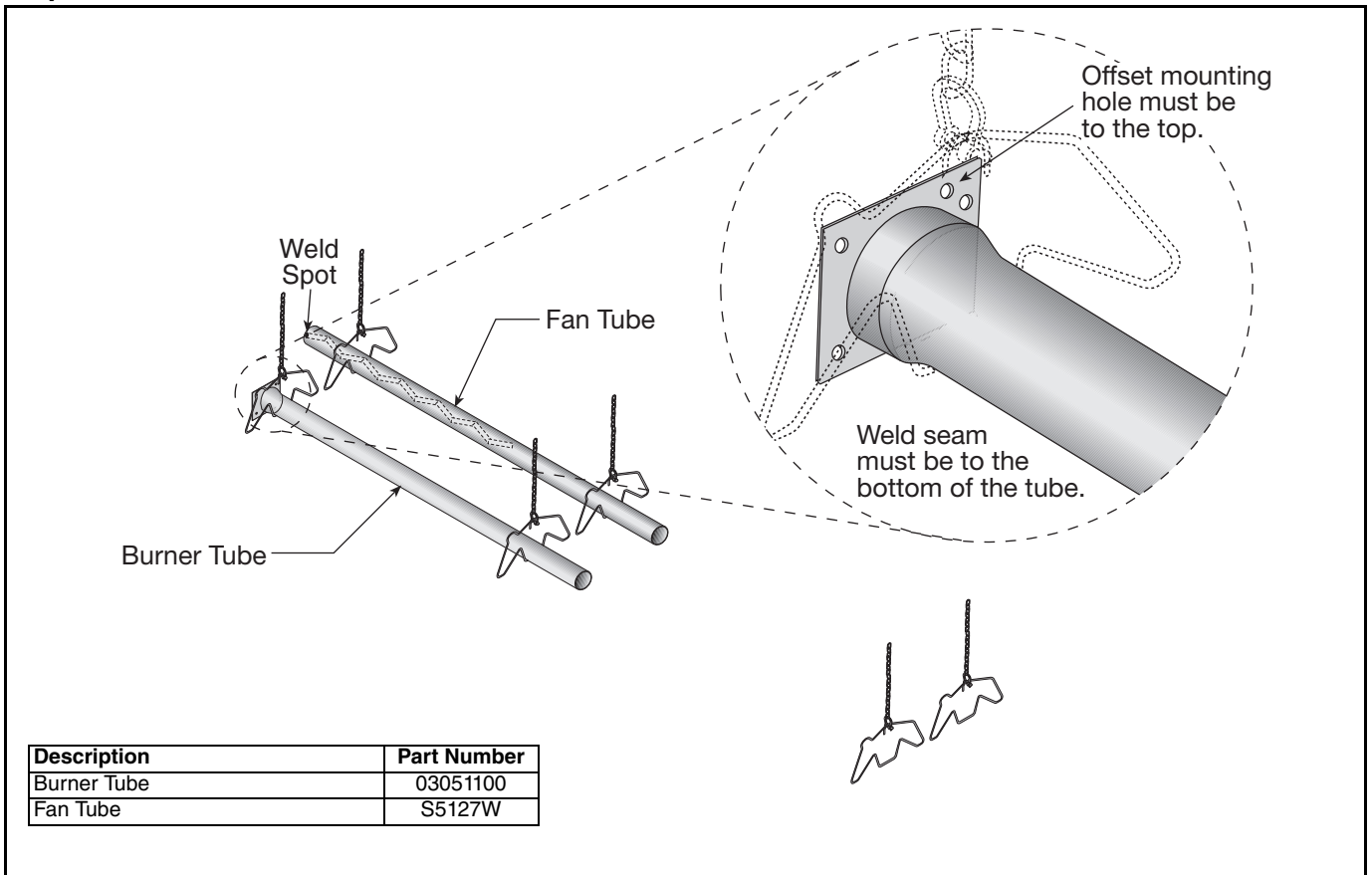
- a = overall width (not shown) - 850 mm e = distance typical between hangers - 3050 mm
 b = end cap to burner/fan - 50 mm f = distance between last full tube
 c = end cap to hanger - 50 mm hanger and half tube hanger - 1900 mm
 d = distance first hanger - 2290 mm g = burner height - 366 mm
 h = burner length - 291 mm

Model	BH15UT	BH20UT	BH25UT/EF	BH30UT/EF	BH35UT/EF	BH40UT/EF	BH45UT/EF	BH50UT/EF
Reflector Overlap (approx.)	1780 mm	250 mm	250 mm	580 mm	580 mm	580 mm	690 mm	690 mm

Step 7.2 U-Tube Hanger Placement



Step 7.3 Burner Tube and Fan Tube Installation



Step 7.3.1 Tube Clamp Package Installation

Description	Part Number
Tube Clamp Package	01318901
Tube Clamp	01396801
Bolt	97113940
Flat Washer	95211600
Nut	92113900

Step 7.4 U-Tube Support Bracket Assembly Installation

U-tube, Standard

Tight U-bolt
100 mm u-bolt, secured to burner tube with M6 lockwashers and M6 nuts. TIGHT.

Loose U-bolt
100 mm u-bolt, secured to bracket with M6 lockwashers and M6 nuts on top and bottom to allow for tube expansion and contraction.

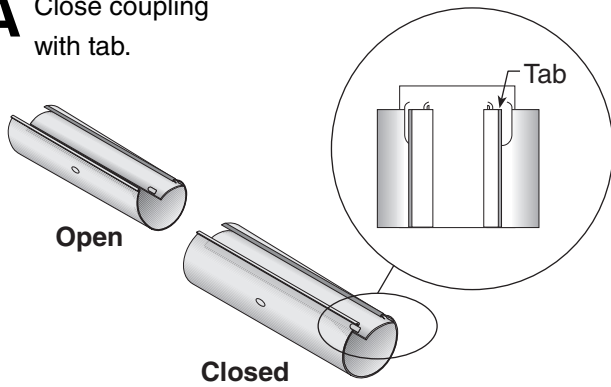
U-tube, Opposite 45°

Tight U-bolt
100 mm u-bolt, secured to burner tube with M6 lockwashers and M6 nuts. TIGHT.

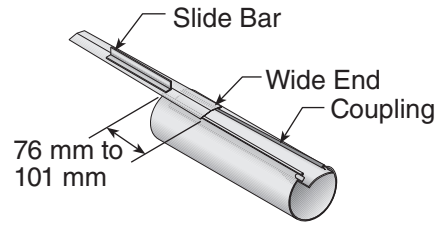
Loose U-bolt
100 mm u-bolt, secured to bracket with M6 lockwashers and M6 nuts on top and bottom to allow for tube expansion and contraction.

Step 7.5 Coupling and Tube Assembly

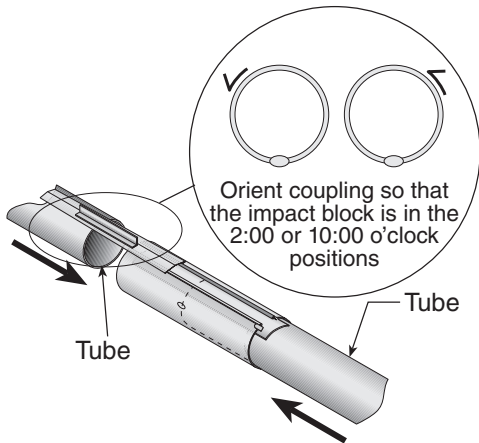
A Close coupling with tab.



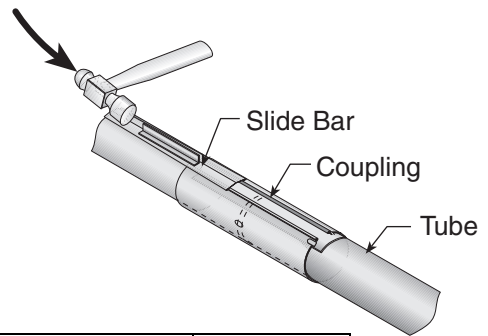
B Start slide bar/coupling lock onto coupling.



C Insert tubes into coupling.



D Tighten coupling to join tubes.

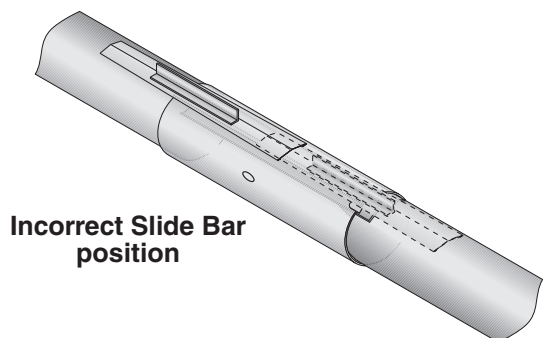
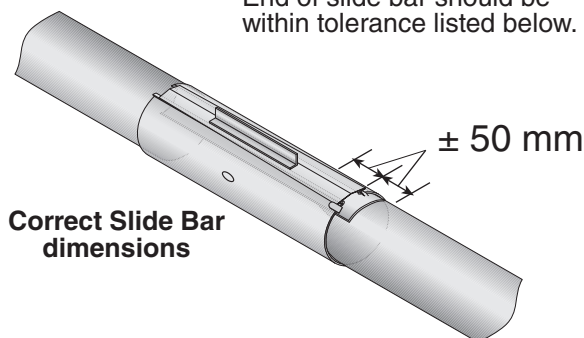


Description	Part Number
Coupling	01329600
Slide Bar/Coupling Lock	01329700
Tube	91409408

Step 7.5.1 Coupling and Tube Assembly (Continued)

Tighten slide bar as shown below.

Drive slide bar until tight. End of slide bar should be within tolerance listed below.



• Repeat Step 7.5 A - D until all tubes are assembled.