

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. Leave the building.
6. Immediately call your local gas supplier after leaving the building. Follow the gas supplier's instructions.
7. If you cannot reach your gas supplier, call the Fire Department.

DO NOT store or use petrol or other flammable vapors and liquids in the vicinity of this or any other appliance.

Vantage[®] TF

The Twin Fire Unitary Infrared Heater

Installation, Operation & Service Manual

TF-120	TF-300
TF-160	TF-350
TF-200	TF-380
TF-250	

⚠ 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 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 to provide your serviceman with information should it become necessary.



Quality in Any Language™

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► 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.

⚠ WARNING

Installation, Service and Annual Inspection of heater must be done by a contractor qualified in the installation and service of gas-fired heating equipment.

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

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

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.

► 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 not use heater as support (i.e. ladder) or hanging device.


► **SECTION 3: CRITICAL CONSIDERATIONS**

3.1 Minimum Required Clearances to Combustibles

Clearances are the required distances that combustible objects must be away from the heater to prevent serious fire hazards. 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 your safety.**

Clearances for all heater models are located on the burner of the heater and on *Pages 3-5, Section 3, Figures 1-9* 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 gasoline or other combustible materials including flammable objects, liquids, dust or vapors away from this heater or any other appliance.
- Maintain clearances from heat sensitive material, equipment and workstations.
- Maintain clearances from vehicles parked below the heater.
- Maintain clearances from swinging doors, overhead cranes, vehicle lifts, partitions, storage racks, hoists, 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.
- Consult local Fire Marshal, Fire Insurance Carrier or other authorities for approval of proposed installation when there is a possibility of exposure to combustible airborne materials or vapors.
- Hang heater in accordance to the minimum suspension requirements on *Page 13, Section 8, Step 8.1.*

⚠ WARNING	
	
Fire Hazard	Burn Hazard
<p>Some objects will catch fire or explode when placed close to heater.</p> <p>Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from heater.</p> <p>Failure to follow these instructions can result in death or injury.</p>	<p>Keep all persons, especially children, away from heater.</p> <p>Do not touch any part of the heater.</p> <p>Heater is very hot.</p> <p>Failure to follow these instructions can result in severe injury.</p>
⚠ ATTENTION	
Risque d'incendie	Risque de brûlure
<p>Certains objets placés près du radiateur peuvent s'enflammer ou exploser.</p> <p>Tenir tous les objets, liquides et vapeurs inflammables à la distance de sécurité requise du radiateur.</p> <p>Le non-respect de ces consignes peut causer mort, blessures ou dommage matériel.</p>	<p>Ne laisser personne, en particulier des enfants, s'approcher du radiateur.</p> <p>Ne toucher aucune partie du radiateur.</p> <p>Le radiateur est brûlant.</p> <p>Le non-respect de ces consignes peut entraîner des blessures graves.</p>

- NOTE:** 1. All dimensions are from the Heat Exchanger Tube surface.
 2. Clearances B, C and D can be reduced by 50% after 25' (7 m) of tubing downstream from where the burner and transition tube connect.

STANDARD REFLECTOR

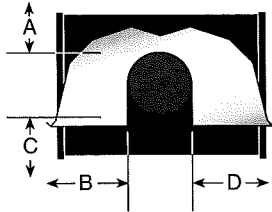


FIGURE 1

Inches					Metric (cm)				
Model	A	B	C	D	Model	A	B	C	D
TF-120	6	35	63	35	TF120	15	88	158	88
TF-160	6	38	66	38	TF160	15	95	165	95
TF-200	6	40	71	40	TF200	15	100	178	100
TF-250	6	46	77	46	TF250	15	115	193	115
TF-300	6	50	80	50	TF300	15	125	200	125
TF-350	8	52	82	52	TF350	20	130	205	130
TF-380	8	52	82	52	TF380	20	130	205	130

ONE SIDE REFLECTOR

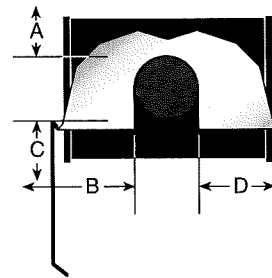


FIGURE 2

Inches					Metric (cm)				
Model	A	B	C	D	Model	A	B	C	D
TF-120	6	9	63	47	TF120	15	23	158	118
TF-160	6	9	70	54	TF160	15	23	175	135
TF-200	6	9	77	59	TF200	15	23	193	148
TF-250	6	9	83	65	TF250	15	23	208	163
TF-300	6	9	86	69	TF300	15	23	215	173
TF-350	8	9	88	73	TF350	20	23	220	183
TF-380	8	9	88	73	TF380	20	23	220	183

TWO SIDE REFLECTORS

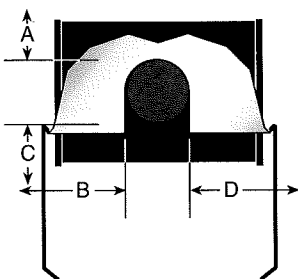
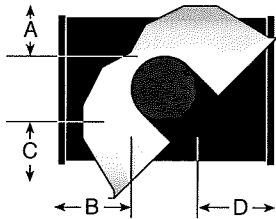


FIGURE 3

Inches					Metric (cm)				
Model	A	B	C	D	Model	A	B	C	D
TF-120	6	23	66	23	TF120	15	58	165	58
TF-160	6	25	72	25	TF160	15	63	180	63
TF-200	6	27	78	27	TF200	15	68	195	68
TF-250	6	32	84	32	TF250	15	80	210	80
TF-300	6	35	88	35	TF300	15	88	220	88
TF-350	8	40	91	40	TF350	20	100	228	100
TF-380	8	40	91	40	TF380	20	100	228	100

- NOTE:** 1. All dimensions are from the Heat Exchanger Tube surface.
 2. Clearances B, C and D can be reduced by 50% after 25' (7 m) of tubing downstream from where the burner and transition tube connect.

45° TILT REFLECTOR

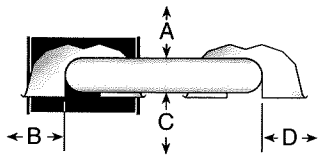


Inches				
Model	A	B	C	D
TF-120	8	8	60	54
TF-160	8	8	66	60
TF-200	10	8	74	64
TF-250	10	8	78	69
TF-300	12	8	84	74
TF-350	12	8	85	79
TF-380	12	8	85	79

Metric (cm)				
Model	A	B	C	D
TF120	20	20	150	135
TF160	20	20	165	150
TF200	25	20	185	160
TF250	25	20	195	173
TF300	30	20	210	185
TF350	30	20	213	198
TF380	30	20	213	198

FIGURE 4

U-TUBE, STANDARD REFLECTORS

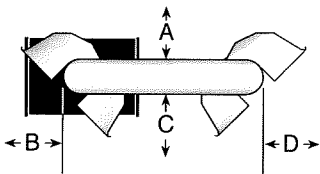


Inches				
Model	A	B	C	D
TF-120	6	35	63	30
TF-160	6	38	69	37
TF-200	6	40	76	39
TF-250	6	46	79	43
TF-300	6	50	84	47
TF-350	8	54	87	51
TF-380	8	54	87	51

Metric (cm)				
Model	A	B	C	D
TF120	15	88	158	75
TF160	15	95	173	93
TF200	15	100	190	98
TF250	15	115	198	108
TF300	15	125	210	118
TF350	20	135	218	128
TF380	20	135	218	128

FIGURE 5

U-TUBE, OPPOSITE, 45° REFLECTORS



Inches				
Model	A	B	C	D
TF-120	8	54	60	22
TF-160	8	60	66	22
TF-200	10	64	74	22
TF-250	10	70	78	22
TF-300	12	74	84	22
TF-350	12	76	85	22
TF-380	12	76	85	22

Metric (cm)				
Model	A	B	C	D
TF120	20	135	150	55
TF160	20	150	165	55
TF200	25	160	185	55
TF250	25	175	195	55
TF300	30	185	210	55
TF350	30	190	213	55
TF380	30	190	213	55

FIGURE 6

- NOTE:** 1. All dimensions are from the Heat Exchanger Tube surface.
2. Clearances B, C and D can be reduced by 50% after 25' (7 m) of tubing downstream from where the burner and transition tube connect.

U-TUBE, FULL, 45°

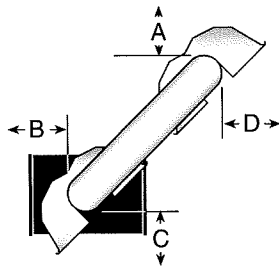


FIGURE 7

United States (inches)

Model	A	B	C	D
TF-120	8	8	60	42
TF-160	8	8	66	46
TF-200	8	8	74	52
TF-250	8	8	78	61
TF-300	8	8	84	66
TF-350	8	8	85	70
TF-380	8	8	85	70

Metric (cm)

Model	A	B	C	D
TF120	20	20	150	105
TF160	20	20	165	115
TF200	20	20	185	130
TF250	20	20	195	153
TF300	20	20	210	165
TF350	20	20	213	175
TF380	20	20	213	175

2 FOOT DECO GRILLE

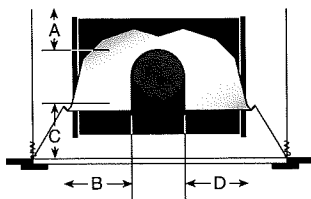


FIGURE 8

United States (inches)

Model	A	B	C	D
TF-120	6	35	63	35
TF-160	6	38	66	38
TF-200	6	40	71	40
TF-250	6	46	77	46
TF-300	6	50	80	50
TF-350	8	52	82	52
TF-380	8	52	82	52

Metric (cm)

Model	A	B	C	D
TF120	15	88	158	88
TF160	15	95	165	95
TF200	15	100	178	100
TF250	15	115	193	115
TF300	15	125	200	125
TF350	20	130	205	130
TF380	20	130	205	130

VENTING

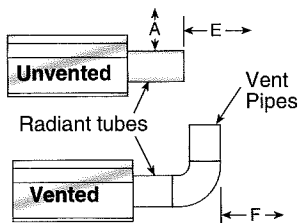


FIGURE 9

United States (inches)

Model	A	E	F
TF-120	14	18	18
TF-160	20	24	18
TF-200	20	24	18
TF-250	20	24	18
TF-300	20	30	18
TF-350	20	30	18
TF-380	20	30	18

Metric (cm)

Model	A	E	F
TF120	35	45	45
TF160	50	60	45
TF200	50	60	45
TF250	50	60	45
TF300	50	75	45
TF350	50	75	45
TF380	50	75	45

►SECTION 4: NATIONAL STANDARDS AND APPLICABLE CODES

4.1 Gas Codes

The type of gas appearing on the nameplate must be the type of gas used. Installation must comply with national and local codes and requirements of the local gas company.

United States: Refer to National Fuel Gas Code, ANSI Z223.1 - latest revision, (same as NFPA Bulletin 54).

Canada: Refer to CAN/CGA B149.1 and B149.2: Installation Codes for Gas Burning Appliances.

4.2 Aircraft Hangars

Installation in aircraft hangars must be in accordance with the following codes:

United States: Refer to Standard for Aircraft Hangars, ANSI/NFPA-409 - latest revision.

Canada: Refer to Standard CAN/CGA B149.1 and B149.2.

- In aircraft storage and servicing areas, heaters shall be installed at least 10' (3 m) above the upper surface of wings or of engine enclosures of the highest aircraft which may be housed in the hangar. The measurement shall be made from the wing or engine enclosure whichever is higher from the floor, to the bottom of the heater.

- In shops, offices and other sections of aircraft hangars communicating with aircraft storage or servicing areas, heaters shall be installed not less than 8' (2.4 m) above the floor.

- Suspended or elevated heaters shall be so located in all spaces of aircraft hangars that they shall not be subject to injury by aircraft, cranes, movable scaffolding or other objects. Provisions shall be made to assure accessibility to suspended heaters for recurrent maintenance purposes.

4.3 Public Garages

Installation in garages must be in accordance with the following codes:

United States: Standard for Parking Structures NFPA-88A - latest revision or the Standard for Repair Garages, NFPA 88B - latest revision.

Canada: Refer to CAN/CGA B149.1 and B149.2: Installation Codes for Gas Burning Appliances.

- Heaters must not be installed less than 8' (2.4m) above the floor. Minimum clearances to combustibles must be maintained from vehicles parked below the heater.

- When installed over hoists, minimum clearances to combustibles must be maintained from the upper most point of objects on the hoist.

4.4 Electrical

The heater must be electrically grounded in accordance with the following codes:

United States: Refer to *National Electrical Code®*, ANSI/NFPA-70 - latest revision. Wiring must conform to the most current *National Electrical Code®*, local ordinances, and any special diagrams furnished.

Canada: Refer to Canadian Electrical Code, CSA C22.1 Part 1 - latest revision.

4.5 Venting

The venting must be installed in accordance with the requirements within this manual and the following codes:

United States: Refer to NFPA-54/ANSI Z223.1 - latest revision, National Fuel Gas Code.

Canada: Refer to CAN/CGA B149.1 and B149.2: Installation Codes for Gas Burning Appliances.

►SECTION 5: STANDARD PARTS LIST


Table 1. Contents of VANTAGE® TF Burner Carton

Part No.	Description	TF-120	-160	-200	-250	-300	-350	-380
	TF Burner Assembly (input and fuel varies)	1	1	1	1	1	1	1
02568200	Gaskets	2	2	2	2	2	2	2
190100NA	Installation, Operation and Service Manual	1	1	1	1	1	1	1
94273914	Hex Head Bolts 5/16-18	8	8	8	8	8	8	8
96411600	Split Lockwashers	8	8	8	8	8	8	8
91412203	Flexible Gas Connector Assembly - 3/4" NPT	1	1	1	1	1	1	1
03051503	Turbulator Adapters	2	2	2	-	-	-	-
03051504	Turbulators 2.5' (76 cm) Aluminized	8	8	4	-	-	-	-
91412800	Flexible Boots	2	2	2	2	2	2	2
91901300	Boot Clamps	4	4	4	4	4	4	4
09080000	Vent Sleeve	2	2	2	2	2	2	2

Table 2. Contents of Core and Extension Packages

Part No.	Description	Core Packages (2 required per heater)			Extension Packages		
		Hot Rolled with Aluminum Reflector	Aluminized with Aluminum Reflector	Aluminized with Stainless Steel Reflector	Hot Rolled with Aluminum Reflector	Aluminized with Aluminum Reflector	Aluminized with Stainless Steel Reflector
		20' 30' 40' (6m) (9m) (12m)	20' 30' 40' (6m) (9m) (12m)	20' 30' 40' (6m) (9m) (12m)	10' 20' 30' 40' (3m) (6m) (9m) (12m)	10' 20' 30' 40' (3m) (6m) (9m) (12m)	10' 20' 30' 40' (3m) (6m) (9m) (12m)
91409300	Heat Exch. Tube, Hot Rolled Steel, 10' (3 m)	1 2 3	- - -	- - -	1 2 3 4	- - - -	- - - -
91409408	Heat Exch. Tube, HT Aluminized, 10' (3 m)	- - -	1 2 3	1 2 3	- - - -	1 2 3 4	1 2 3 4
03051101	Transition Tube, Alum., 10' (3 m)	1 1 1	1 1 1	1 1 1	- - - -	- - - -	- - - -
01312700	Coupling Assembly	1 2 3	1 2 3	1 2 3	1 2 3 4	1 2 3 4	1 2 3 4
02750303	Standard 8' Reflector	3 4 6	3 4 6	- - -	2 3 4 6	2 3 4 6	- - - -
02750800	End Cap	2 2 2	2 2 2	- - -	- - - -	- - - -	- - - -
027503SS	Stainless Steel 8' Reflector	- - -	- - -	3 4 6	- - - -	- - - -	2 3 4 6
027508SS	Stainless Steel End Cap	- - -	- - -	2 2 2	- - - -	- - - -	- - - -
03090100	Heat Exchanger Tube and Reflector Hanger	3 4 5	3 4 5	3 4 5	1 2 3 4	1 2 3 4	1 2 3 4
91907302	S Hook	6 8 10	6 8 10	6 8 10	2 4 6 8	2 4 6 8	2 4 6 8
03050010	Reflector Support Package (Strap, Wire Form, Screws)	2 3 5	2 3 5	4 5 7	2 3 4 6	2 3 4 6	2 3 4 6
91107720	U-Clip Package	1 1 1	1 1 1	1 1 1	1 1 1 1	1 1 1 1	1 1 1 1
90502700	Vent Adapter (Not required for TF Models)	1 1 1	1 1 1	1 1 1	- - - -	- - - -	- - - -
01318901	Tube Clamp Package	1 1 1	1 1 1	2 2 2	- - - -	- - - -	- - - -
	PART NUMBER	CP20HRS CP30HRS CP40HRS	CP20ALUM CP30ALUM CP40ALUM	CP20ALUMSS CP30ALUMSS CP40ALUMSS	EXP10HRS EXP20HRS EXP30HRS EXP40HRS	EXP10ALUM EXP20ALUM EXP30ALUM EXP40ALUM	EXP10ALUMSS EXP20ALUMSS EXP30ALUMSS EXP40ALUMSS

⚠ WARNING



Fire Hazard

Install heaters only within the parameters of minimum or maximum heat exchanger tube lengths listed in Table 3 (below) in this installation manual.

Shorter lengths are a serious fire hazard.

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

Table 3. VANTAGE® TF Component Package Guide

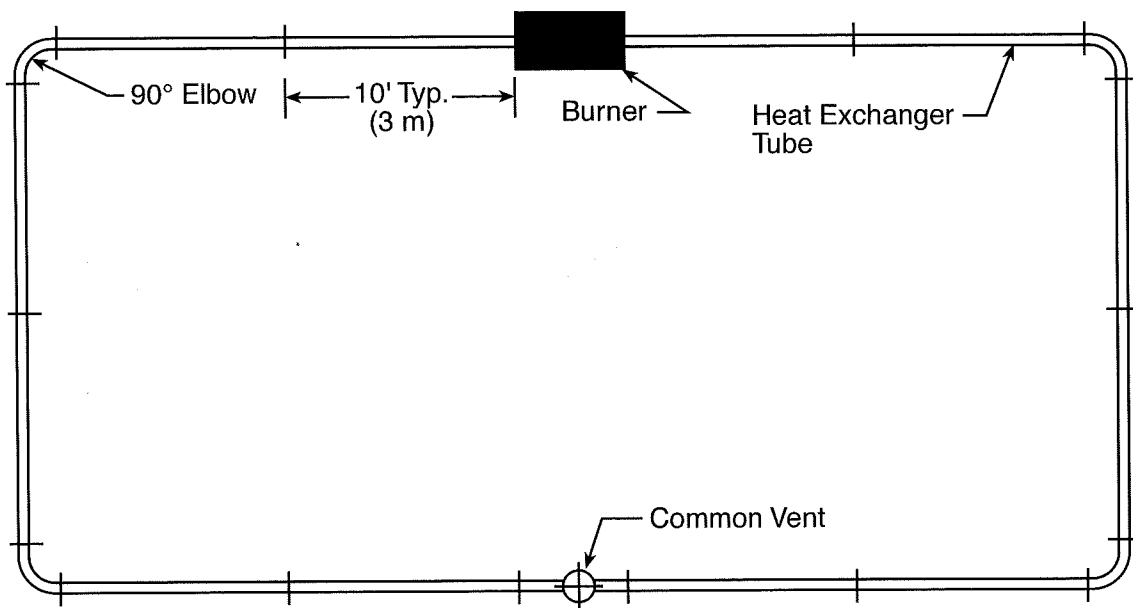
Model	Heat Exchanger Tubing Length Each Side		Core Packages (2 Required)		
	Minimum	Maximum	Hot Rolled with Aluminum Reflector	Aluminized with Aluminum Reflector	Aluminized with Stainless Steel Reflector
TF-120	20' (6 m)	-	CP20HRS	CP20ALUM	CP20ALUMSS
TF-160	20' (6 m)	-	CP20HRS	CP20ALUM	CP20ALUMSS
	-	30' (9 m)	CP30HRS	CP30ALUM	CP30ALUMSS
TF-200	30' (9 m)	-	CP30HRS	CP30ALUM	CP30ALUMSS
	-	40' (12 m)	CP40HRS	CP40ALUM	CP40ALUMSS
TF-250	40' (12 m)	-	CP40HRS	CP40ALUM	CP40ALUMSS
	-	50' (15 m)	CP30HRS + EXP20HRS	CP30ALUM + EXP20ALUM	CP30ALUMSS + EXP20ALUMSS
TF-300	50' (15 m)	-	CP30HRS + EXP20HRS	CP30ALUM + EXP20ALUM	CP30ALUMSS + EXP20ALUMSS
	-	60' (18 m)	CP30HRS + EXP30HRS	CP30ALUM + EXP30ALUM	CP30ALUMSS + EXP30ALUMSS
TF-350	50' (15 m)	-	CP30HRS + EXP20HRS	CP30ALUM + EXP20ALUM	CP30ALUMSS + EXP20ALUMSS
	-	60' (18 m)	CP30HRS + EXP30HRS	CP30ALUM + EXP30ALUM	CP30ALUMSS + EXP30ALUMSS
	-	70' (21 m)	CP40HRS + EXP30HRS	CP40ALUM + EXP30ALUM	CP40ALUMSS + EXP30ALUMSS
TF-380	60' (18 m)	-	CP30HRS + EXP30HRS	CP30ALUM + EXP30ALUM	CP30ALUMSS + EXP30ALUMSS
	-	70' (21 m)	CP40HRS + EXP30HRS	CP40ALUM + EXP30ALUM	CP40ALUMSS + EXP30ALUMSS
	-	80' (24 m)	CP40HRS + EXP40HRS	CP40ALUM + EXP40ALUM	CP40ALUMSS + EXP40ALUMSS

►SECTION 6: SUGGESTED LAYOUTS

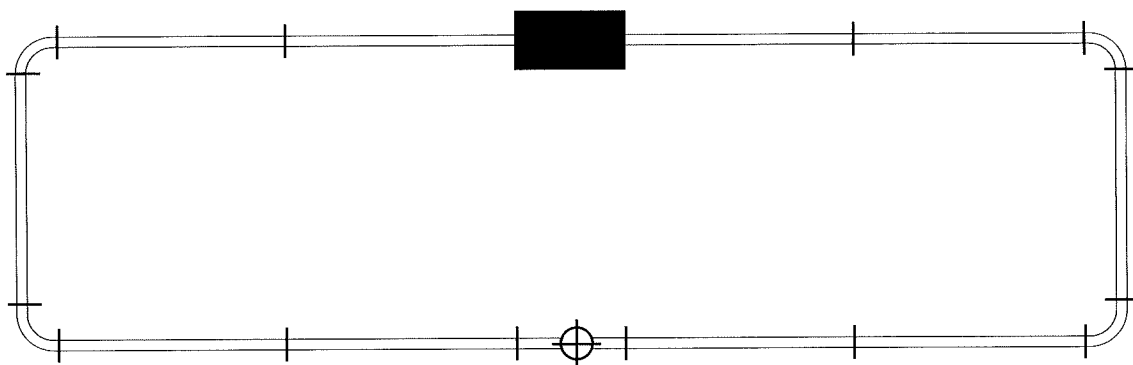
The following are suggested layouts for the VANTAGE® TF. These layouts are effective in maximizing the heat pattern and overall performance of the heater. All heaters can be common vented or individually vented (see *Page 28, Section 10.1*) depending on the building requirements. These are only suggested layouts. The VANTAGE® TF heater can be designed in various configurations provided they are in the guidelines of this manual. When designing a U Tube or Elbow configuration, the following rules must be adhered to:

- A minimum of 10' (3 m) of heat exchanger tubing on TF-120/160 and/or a minimum of 15' (4.5 m) of tubing on the TF-200/250/300/350/380 is required between the burner and the Elbow or U Tube.
- The design and installation must adhere to the rules and guidelines located in this manual (see *Pages 13-18, Section 8* and *Pages 28-33, Section 10*).
- Review venting options before selecting a layout.

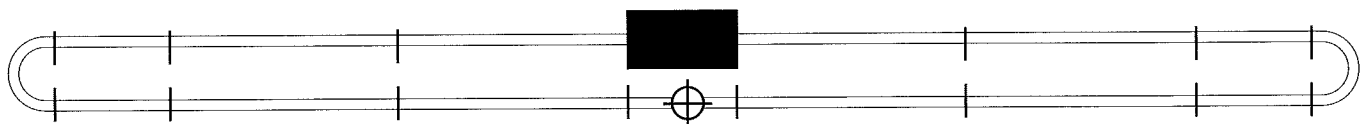
6.1 TF-380 – 4 Elbow Design (Common Vent)



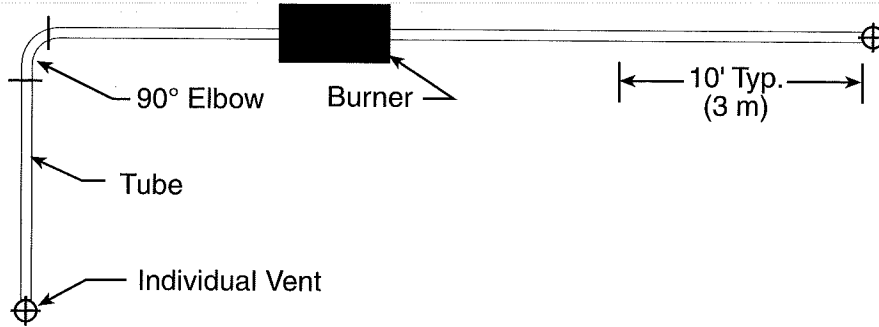
6.2 TF-350 – 4 Elbow Design (Common Vent)



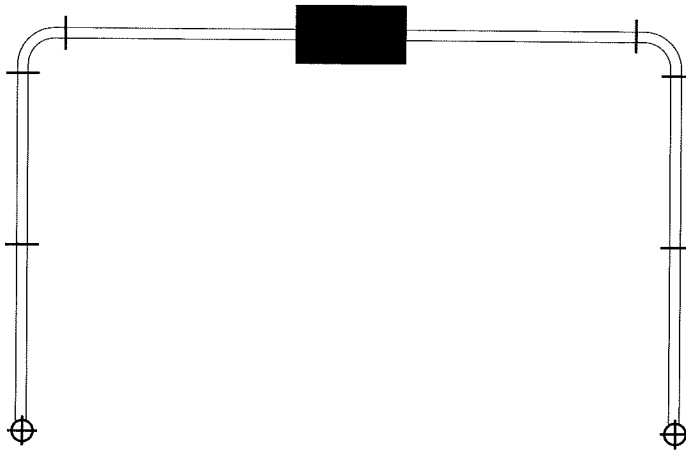
6.3 TF-300 – Double "U" Design (Common Vent)



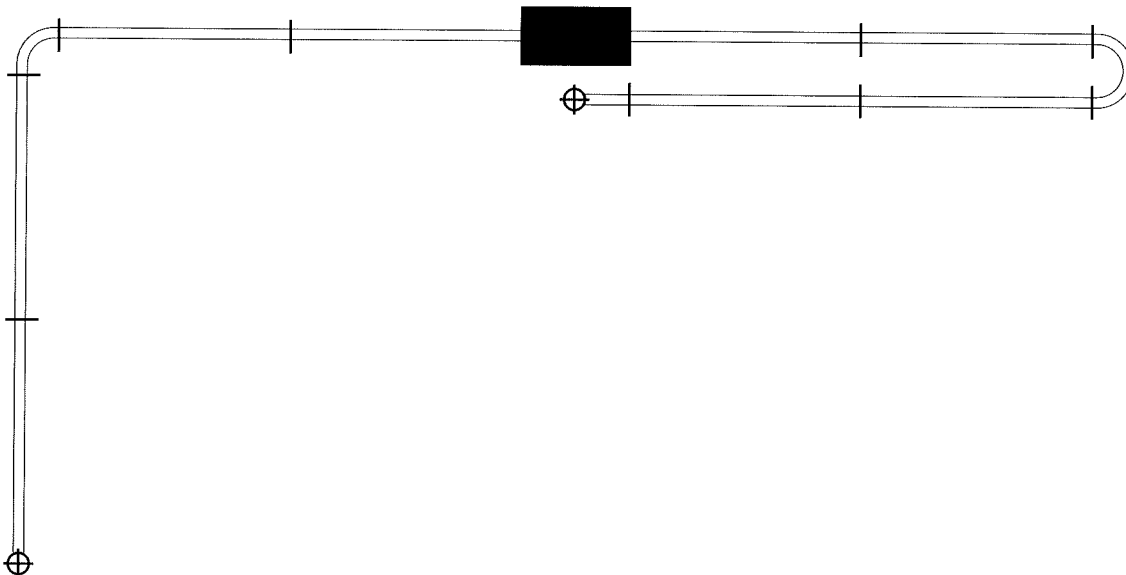
6.4 TF-160 – Single Elbow Design (Individual Vents)



6.5 TF-160 – Double "L" Design (Individual Vents)



6.6 TF-250 – Combination "L" and "U" Design (Individual Vents)



► SECTION 7: ASSEMBLY OVERVIEW

The figures in this section provide a general overview of component placement in a VANTAGE® TF system. The location of some components such as supports and couplings is crucial for proper installation. Assemble the heater components as shown on *Page 12, Section 7, Figure 11*.

Optional reflector configurations are shown on *Pages 3-5, Section 3, Figures 1-9*. Install appropriate suspension hardware, beam clamps, chain or rod at predetermined locations. Adjustments of chain length will provide uniform pitch.

FIGURE 10 – Major Component Descriptions

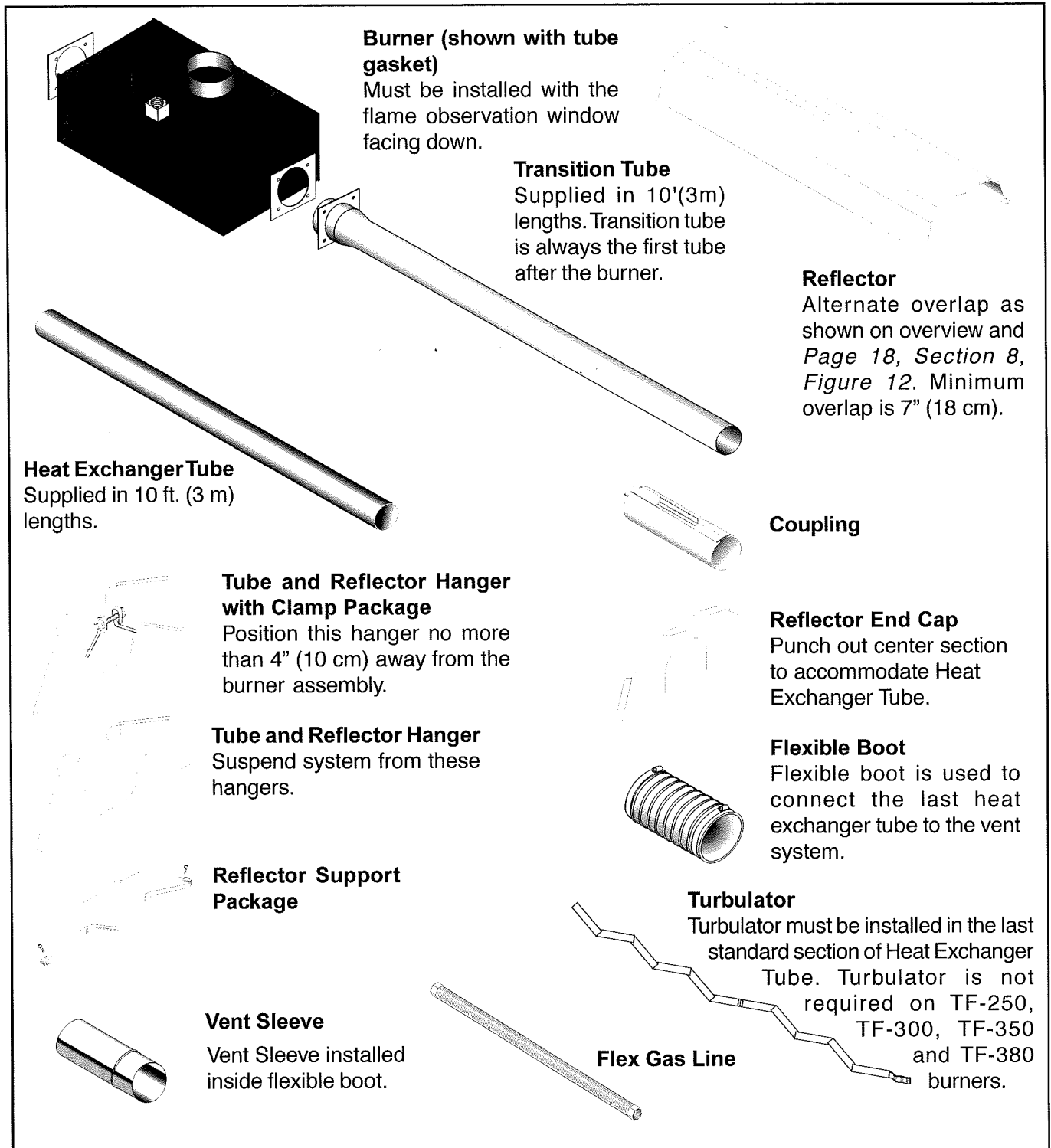
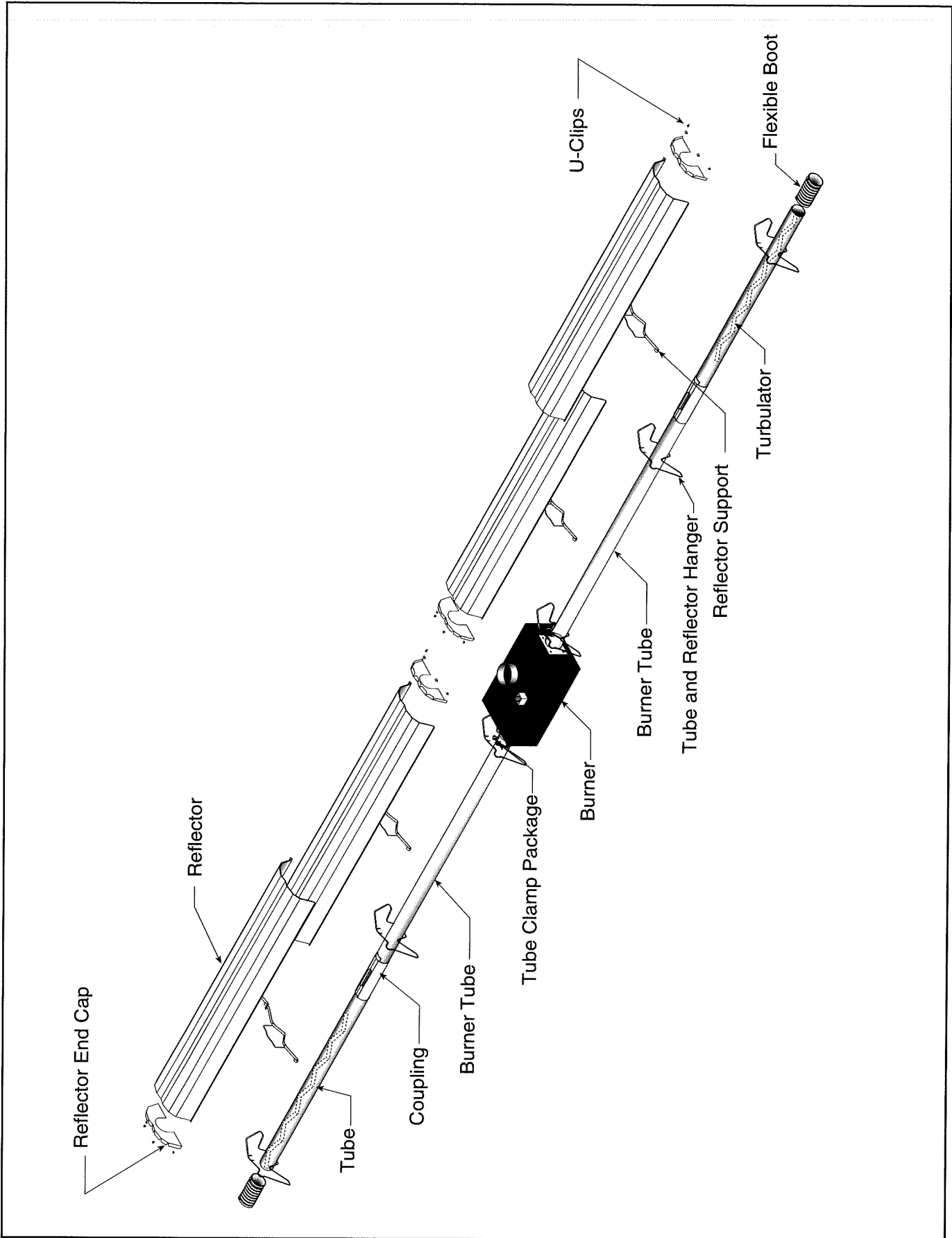


FIGURE 11 – TF Assembly Overview



►SECTION 8: HEATER INSTALLATION

⚠ WARNING

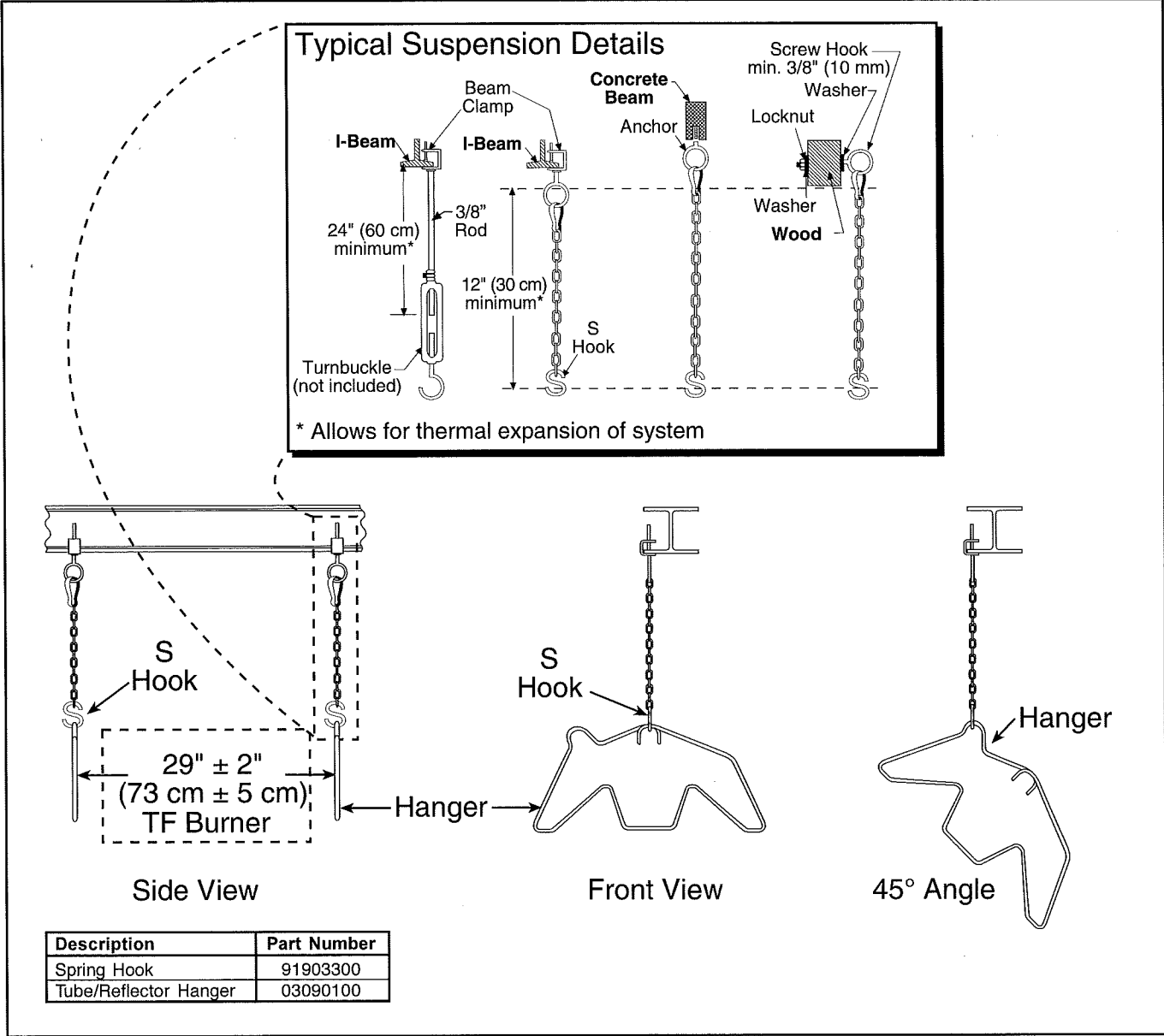
Suspension Hazard

Hang heater with materials with a minimum working load of 750 lbs (340 Kg).

Failure of the supports can result in death, injury or property damage.

Sections 8 - 13 show the logical sequence of heater installation, pictorially. Follow these steps in order and if any questions arise, refer to the assembly overview (Page 12, Section 7, Figure 11) for guidance. If any step is unclear, please contact your ROBERTS GORDON® independent distributor or Roberts-Gordon at (716) 852-4400 or (800) 828-7450 in the U.S., (905) 945-5403 or (800) 663-9025 in Canada or at www.rg-inc.com.

Step 8.1 – Determine Critical Hanger Placement



Step 8.2 – Heat Exchanger (Transition Tube) Installation

NOTE:
 Tubing requires a downward slope of 1/2" (13 mm) per 20' (6 m) away from burner.

Description	Part Number
Transition Tube	03051101
Spring Hook	91903300
Tube/Reflector Hanger	03090100

Step 8.3 – Burner Installation

⚠ WARNING

Bolts must be torqued to 120 in/lbs as shown below to secure burner tube to burner.

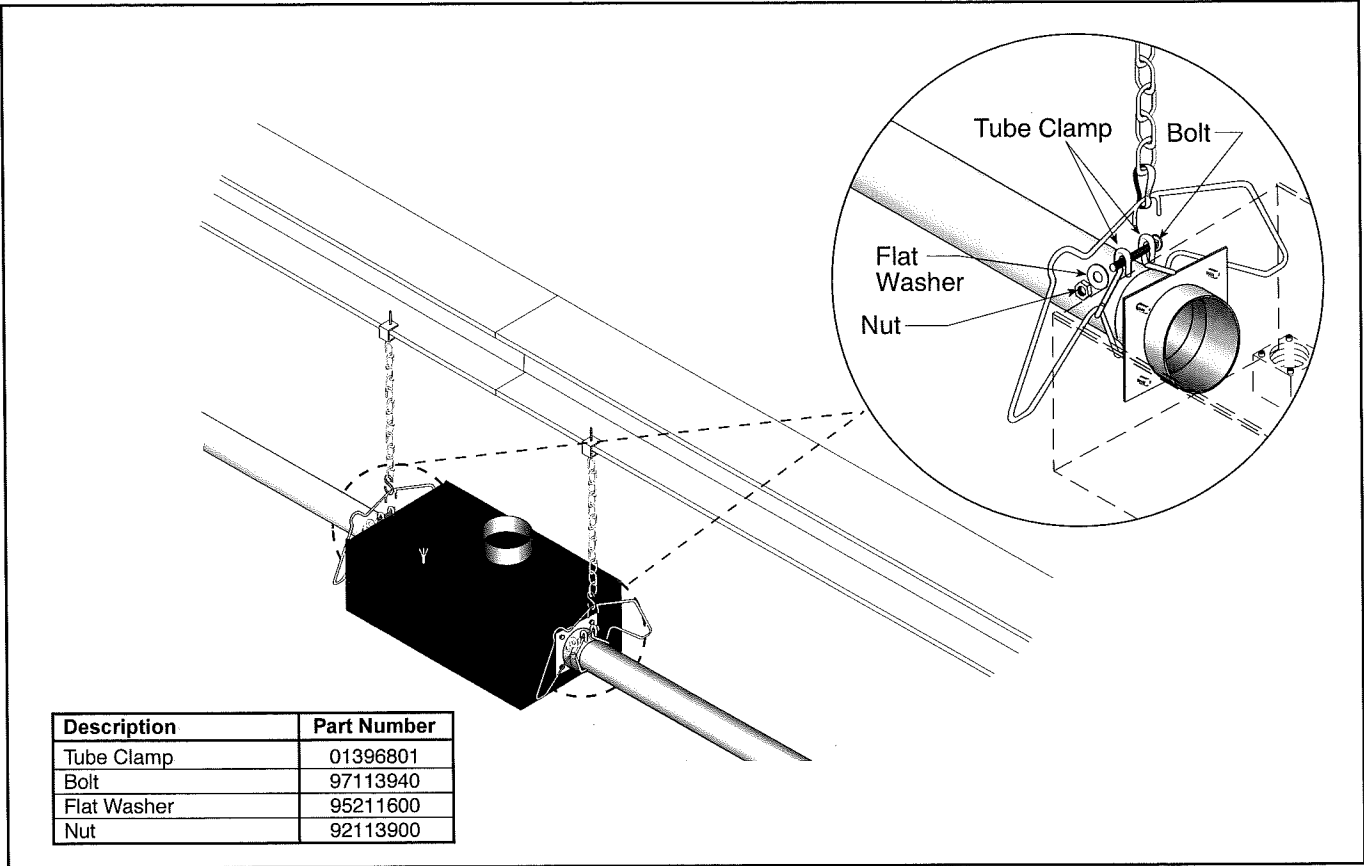
Burner tube will separate from burner if not torqued properly.

Locate first hangers no more than 4" (10cm) from the burner.

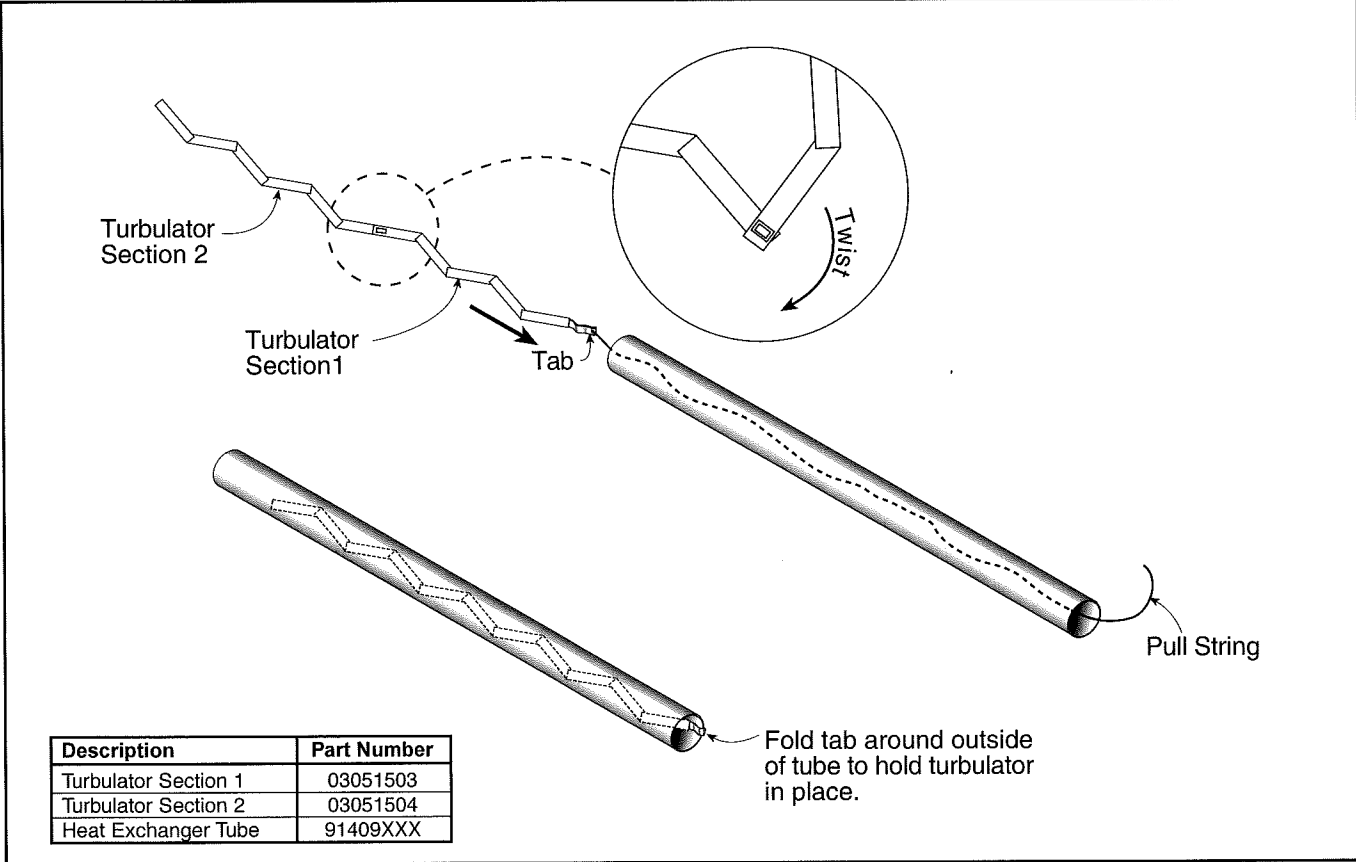
Failure to follow these instructions can result in death, injury or property damage.

Description	Part Number
Bolt	94273914
Lock Washer	96411600
Gasket	02568200
Burner	090XXXXX

Step 8.4 – Tube Clamp Package Installation



Step 8.5 – Turbulator Installation



Step 8.6.1 – Coupling and Heat Exchanger Tube Assembly

A Close coupling with tab

B Start sidebar onto coupling

C Insert Heat Exchanger Tubes into coupling

D Tighten coupling to join Heat Exchanger Tubes

Description	Part Number
Coupling & Lock Assy.	01312700
Coupling	01329600
Slidebar	01329700
Heat Exchanger Tube	91409XXX

Step 8.6.2 – Coupling and Heat Exchanger Tube Assembly (Continued)

⚠ WARNING

Tighten sidebar as shown below.

Tubes will fall down if sidebar is incorrect.

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

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

Correct Slidebar dimensions

Incorrect Slidebar position

• Repeat steps 8.6.1 A-D, page 16 until all tubes are assembled, see Step 8.6.3 on page 17.

Step 8.6.3 – Coupling and Heat Exchanger Tube Assembly (Continued)

Model	Heat Exchanger Tubing Length Per Side	
	Minimum	Maximum*
TF-120	20' (6 m)	20' (6 m)
TF-160	20' (6 m)	30' (6 m)
TF-200	30' (9 m)	40' (12 m)
TF-250	40' (12 m)	50' (15 m)
TF-300	50' (15 m)	60' (18 m)
TF-350	50' (15 m)	70' (21 m)
TF-380	60' (18 m)	80' (24 m)


* See recommended venting lengths, Page 28, Section 10, 10.1 when using maximum Heat Exchanger Tube lengths.

7' 6" ± 1'
(229 cm ± 25 cm)

10' Typ. ± 1'
(254 cm Typ ± 25 cm)

Step 8.7.1 – Reflector Installation

⚠ WARNING



Fire Hazard
Reflectors must be installed over tubes.

Operating heater without reflectors properly installed over heat exchanger tubing is a serious fire hazard.

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

Burner

Hanger

Burner Tube

Reflector

Description	Part Number
Burner	090XXXXX
Hanger	03090100
Transition Tube	03051101
Reflector	027503XX

Step 8.7.2 – Reflector Installation

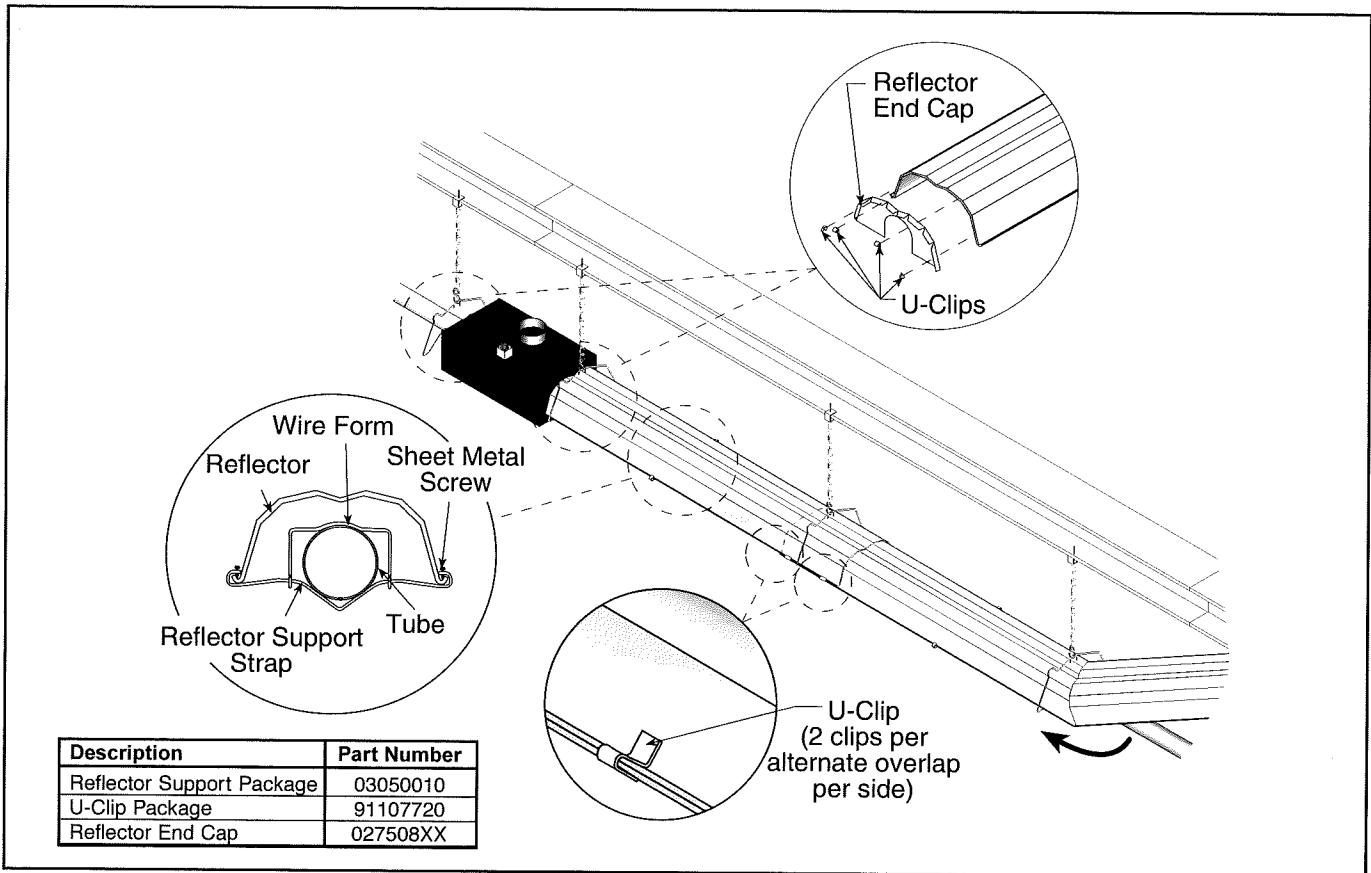
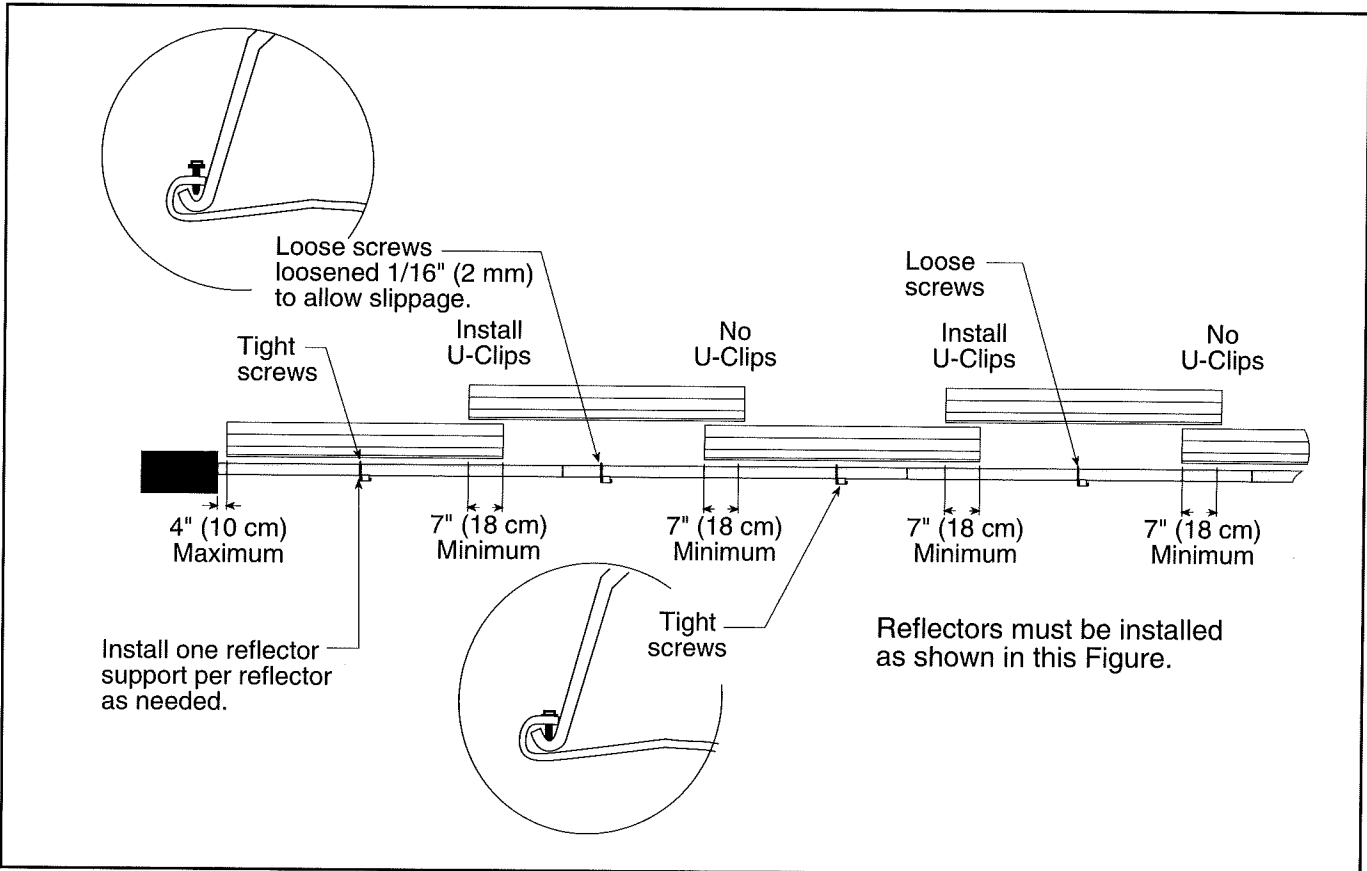


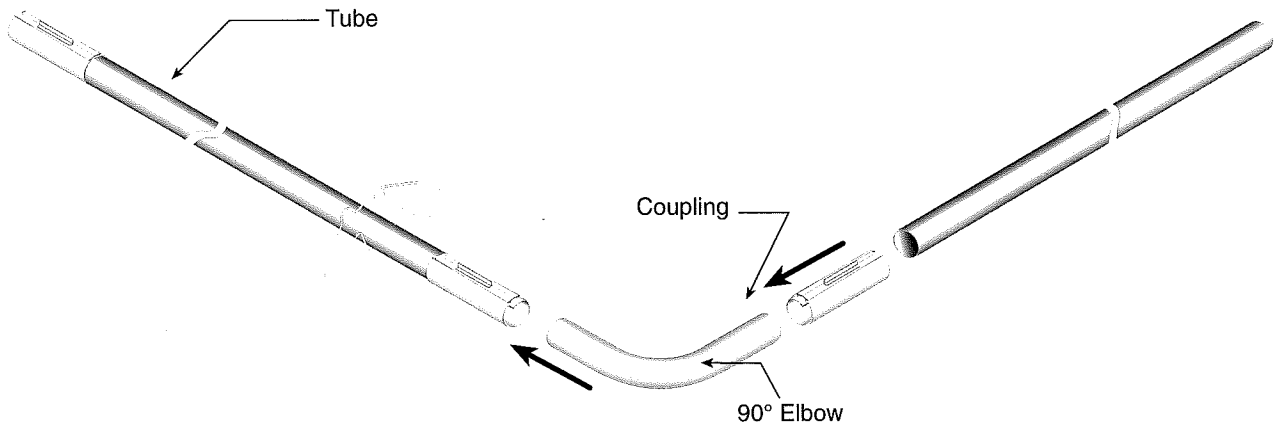
FIGURE 12 – Reflector Overlap Detail



► SECTION 9: OPTIONAL HEATER ACCESSORIES

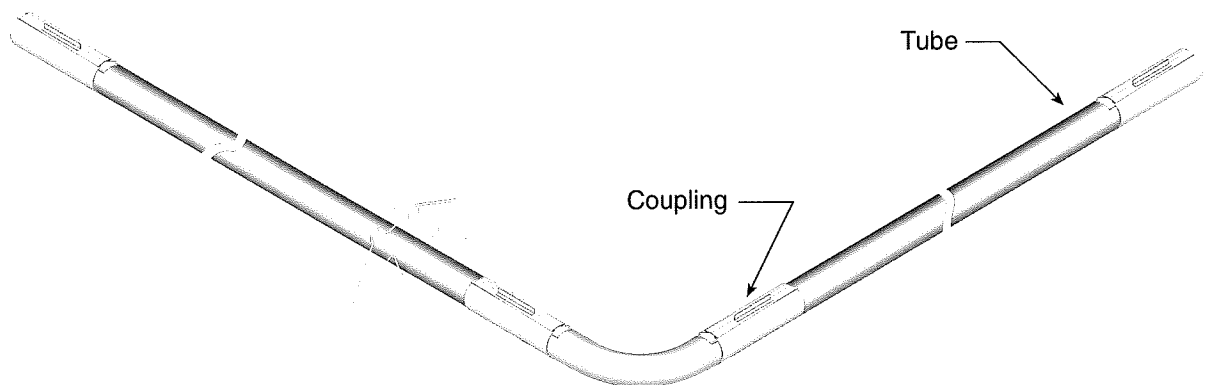
9.1 Elbow Package Configuration

Step 9.1.1 – Elbow Installation

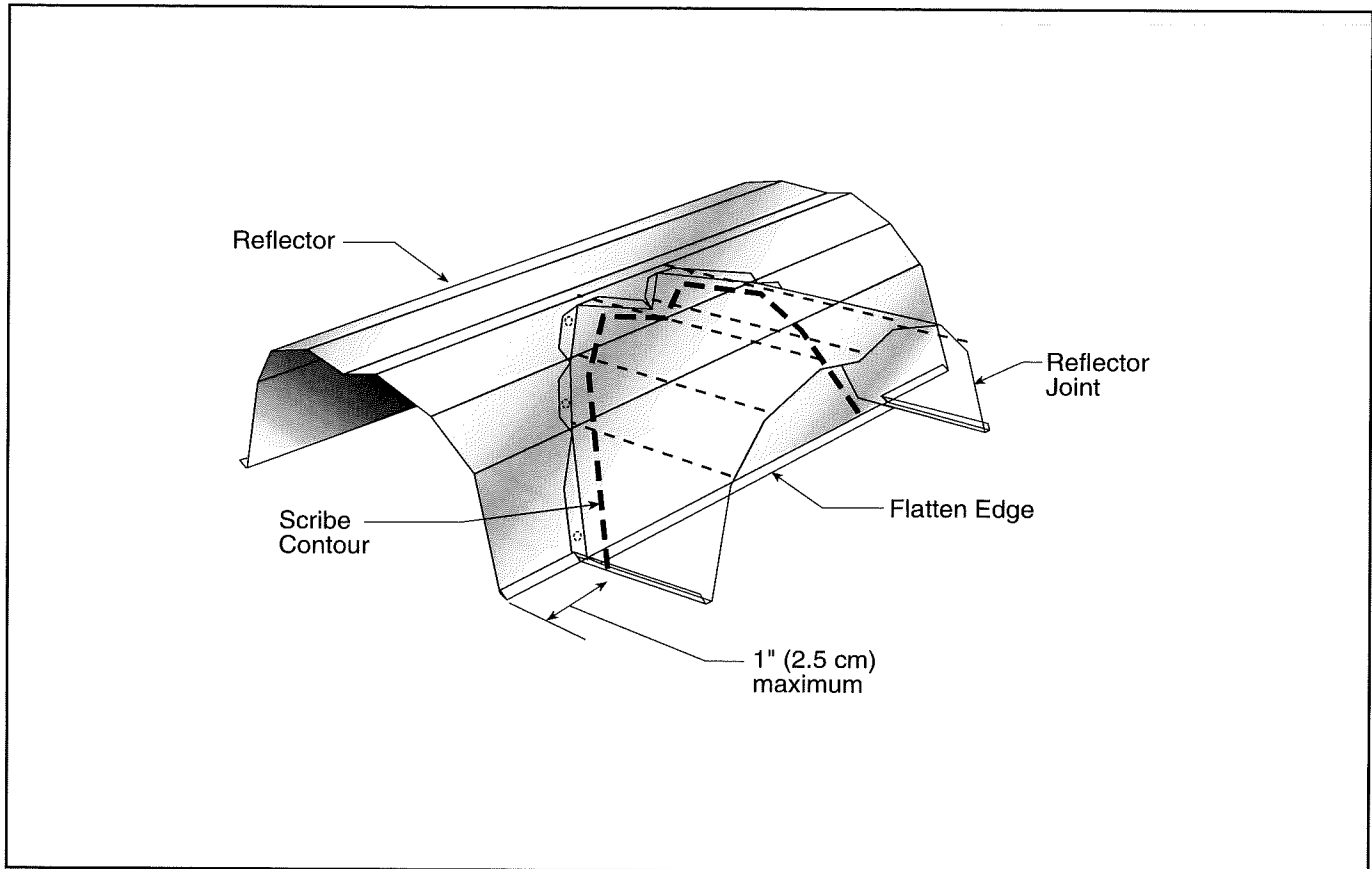


Description	Part Number
Elbow Package	02718702
90° Elbow	01335801
Coupling	01312700
Reflector End Cap	02750800
Reflector Joint	02750900
U-Clip Package	91107720

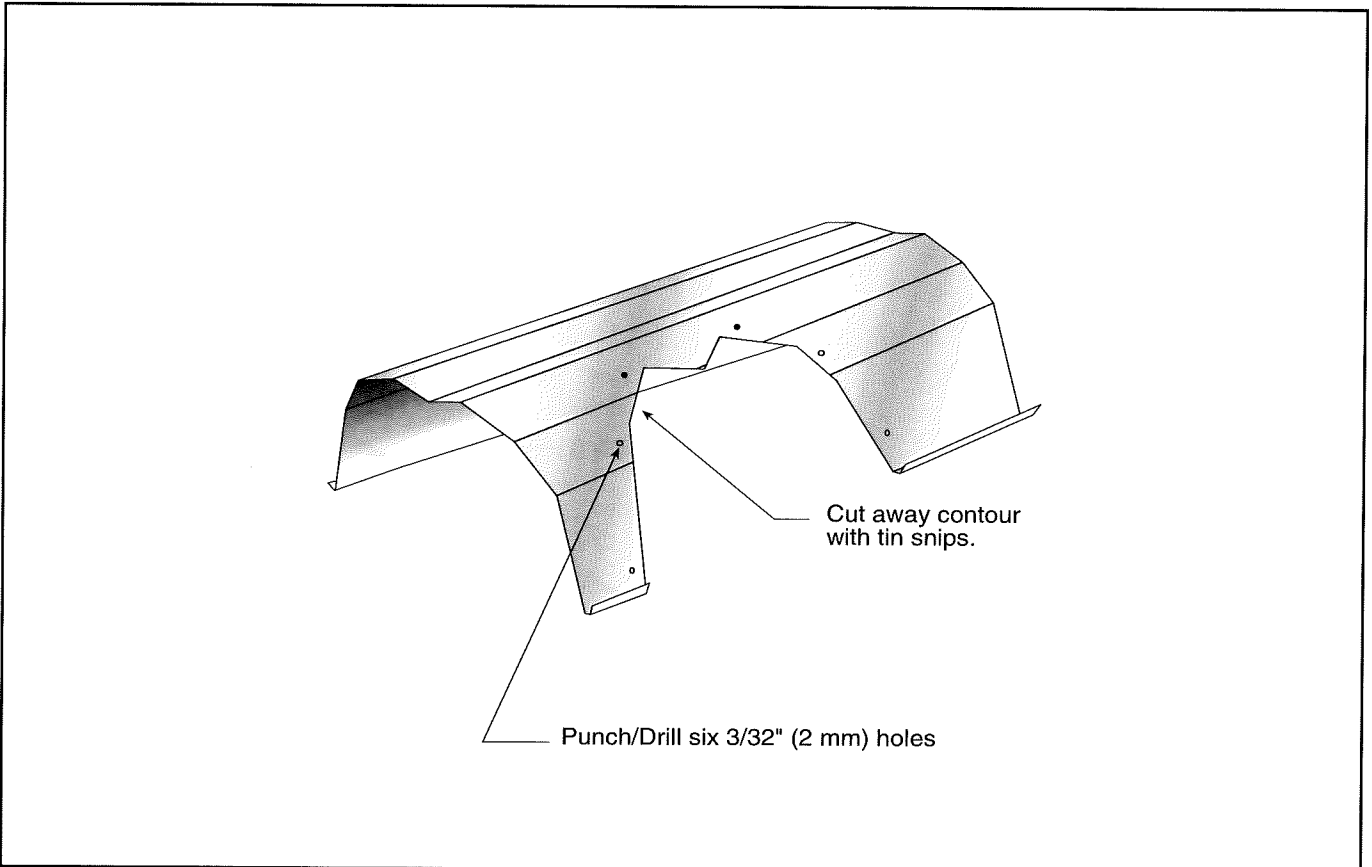
Step 9.1.2 – Elbow Installation



Step 9.1.3 – Reflector Joint Installation



Step 9.1.4 – Reflector Joint Installation



Step 9.1.5 – Reflector Joint Installation

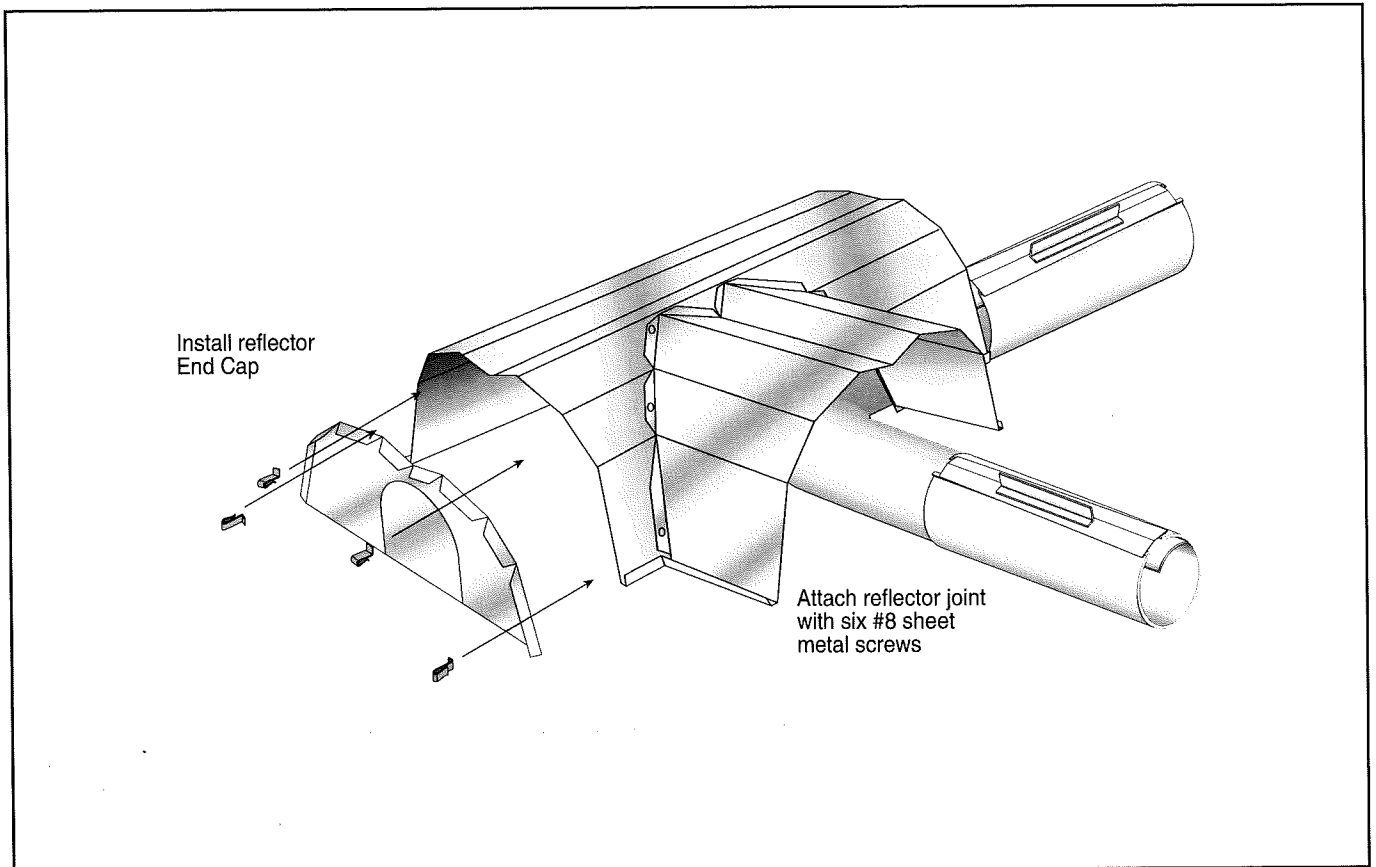
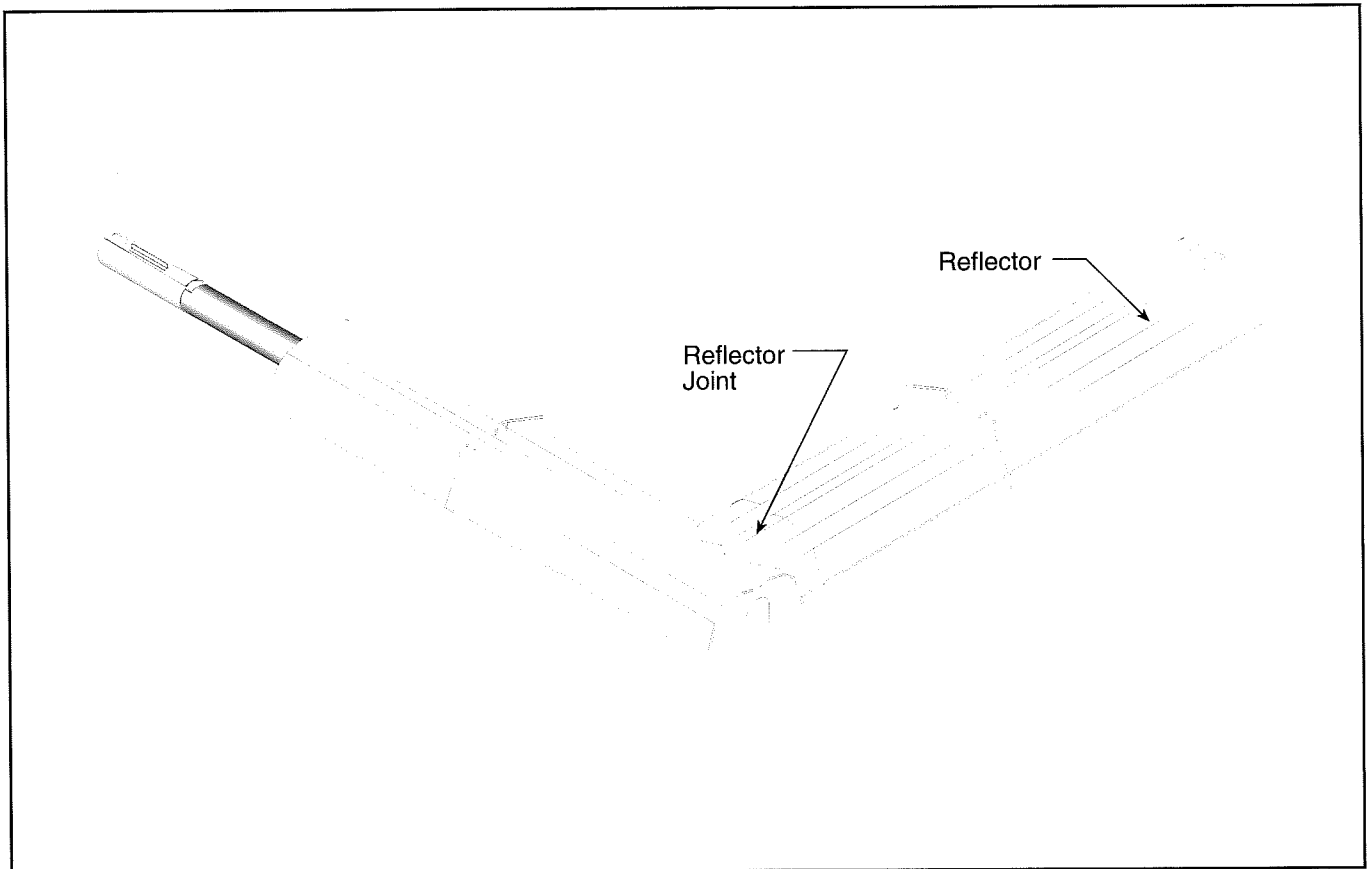


FIGURE 13 – Reflector Joint Detail



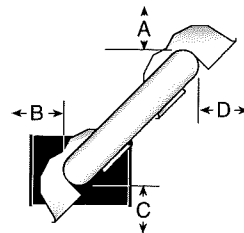
9.2 U-Tube Configuration

VANTAGE® TF heaters are approved for optional U-Tube configurations. This installation requires 1 or 2 U-Tube packages depending on configuration desired.

Shown below is an example of a typical 80' (24 m) U-Tube configuration. The U-Tube may be installed in either a standard horizontal position or in an opposite 45° position as shown below. When designing a U-Tube configuration, the following additional rules must be adhered to:

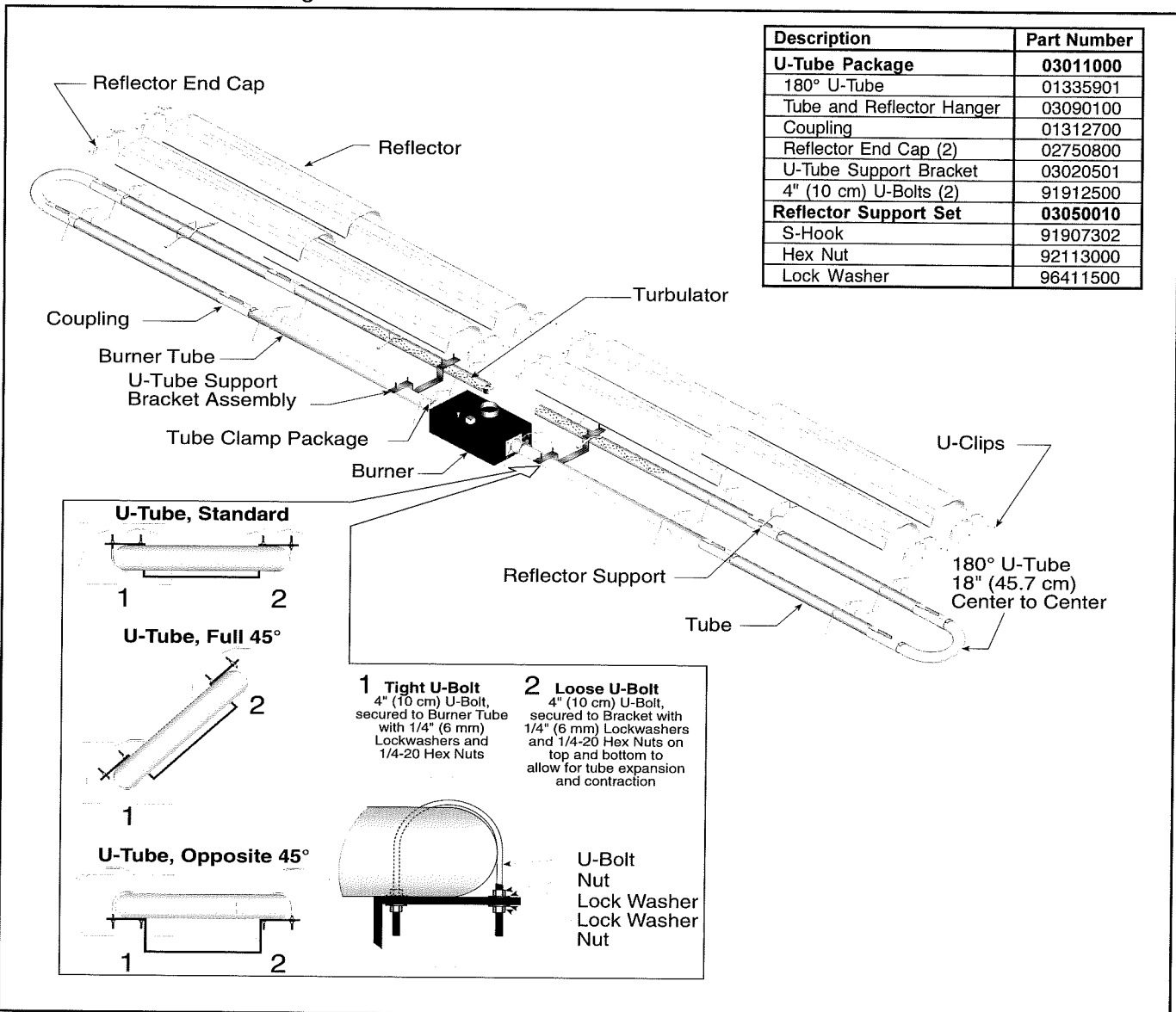
- A minimum of 10' (3 m) on TF-120/160 and a minimum of 15' (4.5 m) on TF-200/250/300/ 350/380 is required between the burner and the U-Tube.

- The correct turbulator (refer to *Page 17, Section 8, Step 8.5*) must be installed in the last standard section of Heat Exchanger Tube.
- The burner must never be operated in a tilted position.
- The heater must be properly supported at all locations. *See Pages 13 thru 15 Sections 8.1 thru 8.4.*



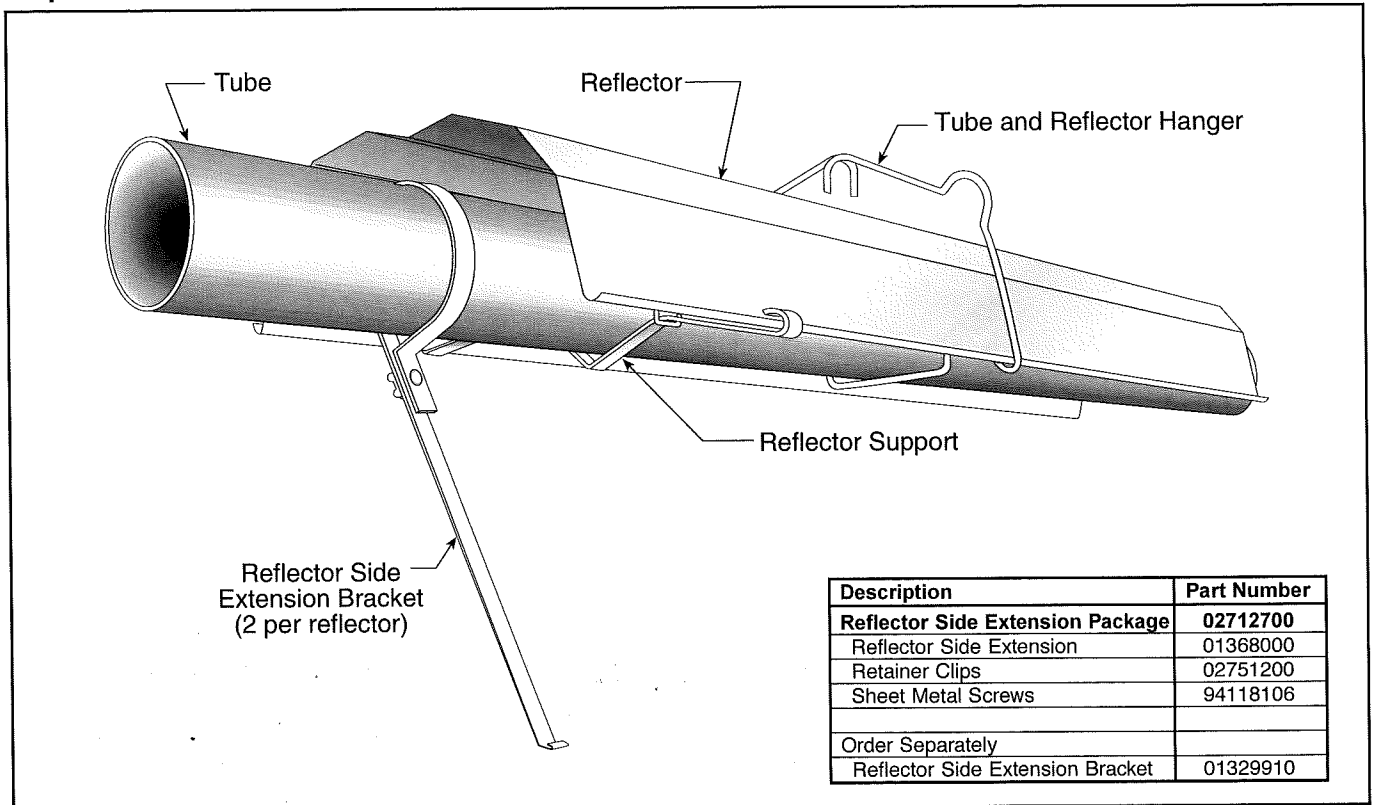
- Where heat exchanger is tilted, the burner must be installed on the lower side.

FIGURE 14 – U-Tube Configuration Overview

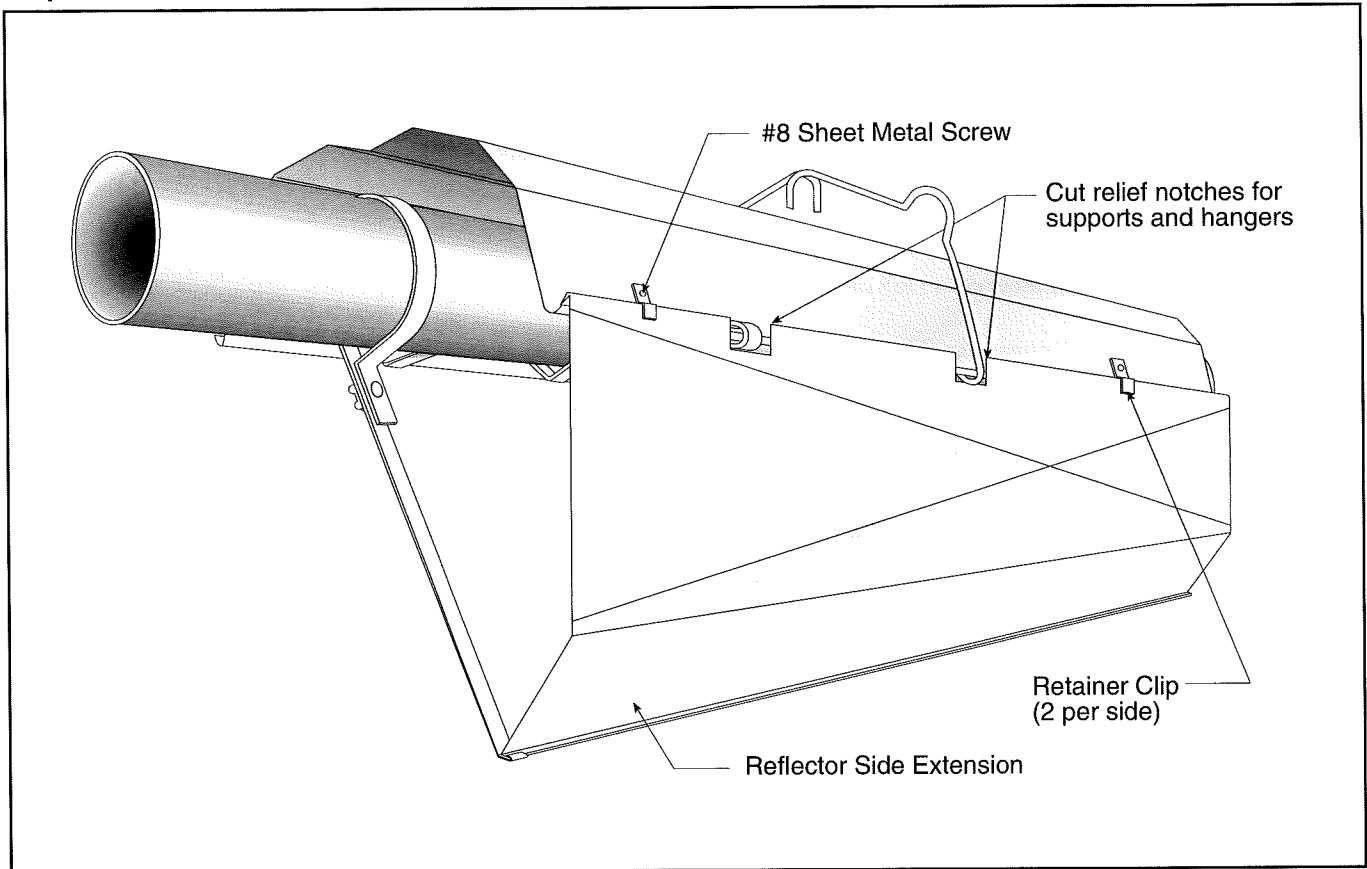


9.3 REFLECTOR SIDE EXTENSION INSTALLATION

Step 9.3.1 – Bracket Installation

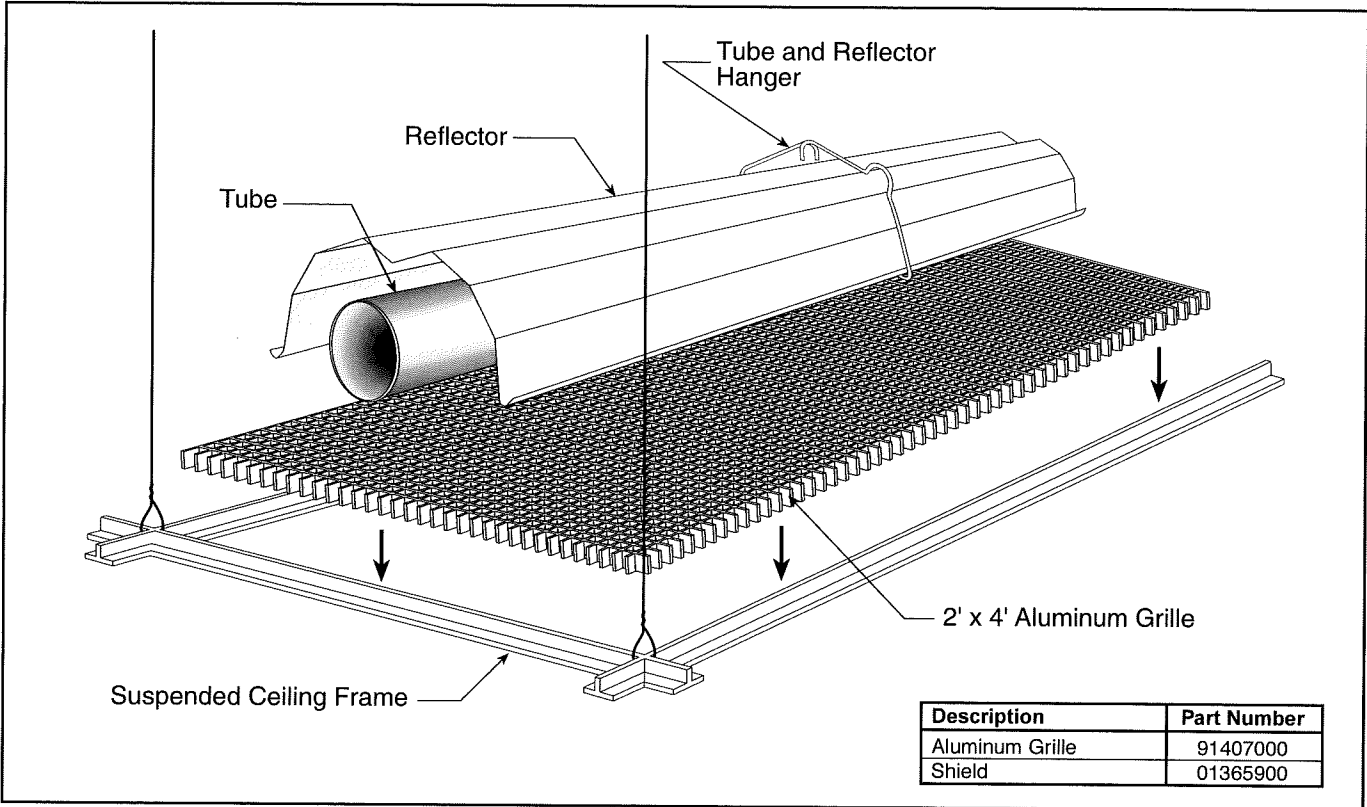


Step 9.3.2 – Side Reflector Installation

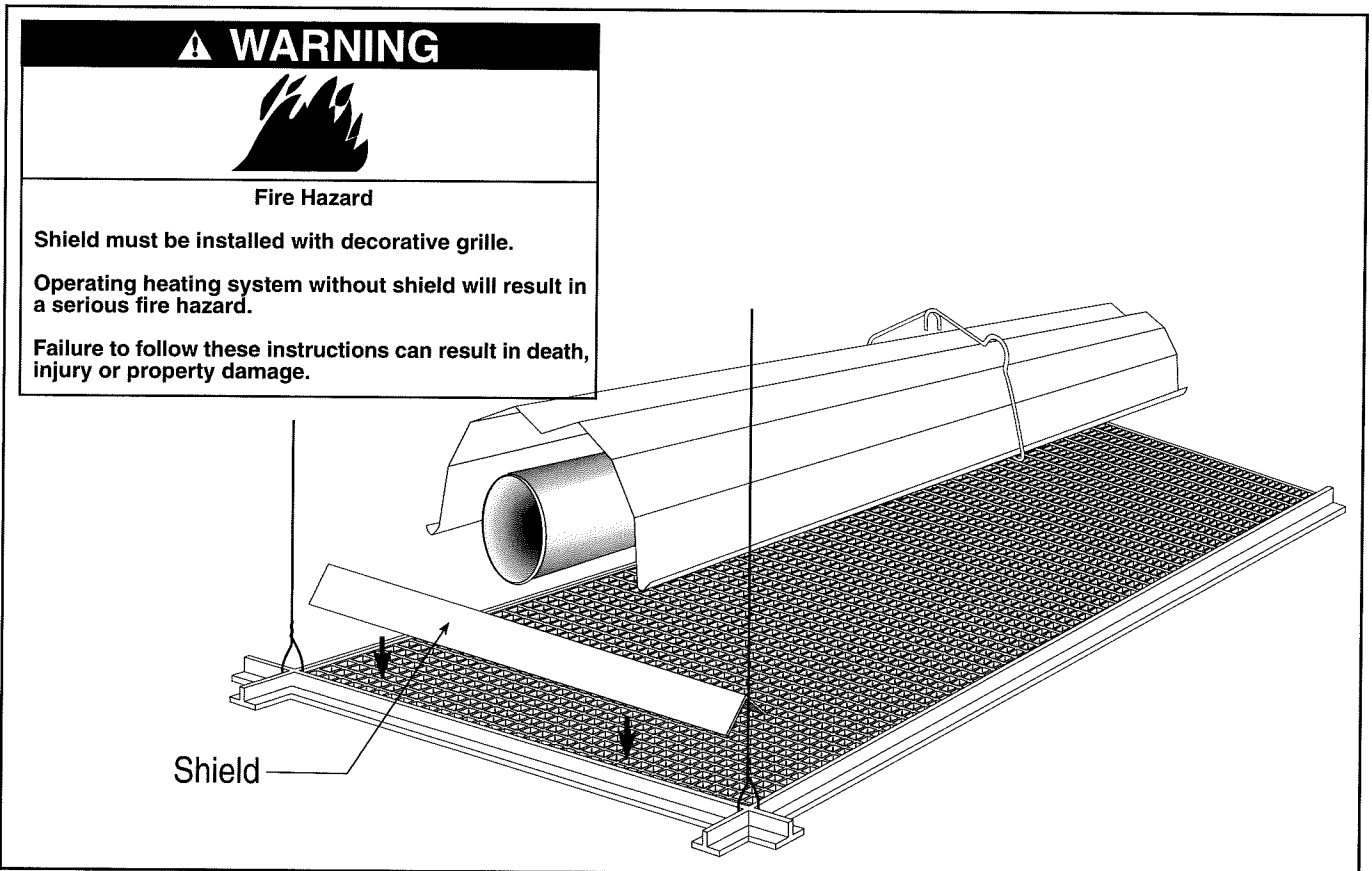


9.4 Decorative Grille Installation


Step 9.4.1 – Grille Installation



Step 9.4.2 – Frame Shield Installation



⚠ WARNING



Fire Hazard

Reflector extension must be used with decorative grille to direct all heat down through the grille.

Install reflector extension according to installation manual.

Using decorative grille without reflector extension is a serious fire hazard.

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

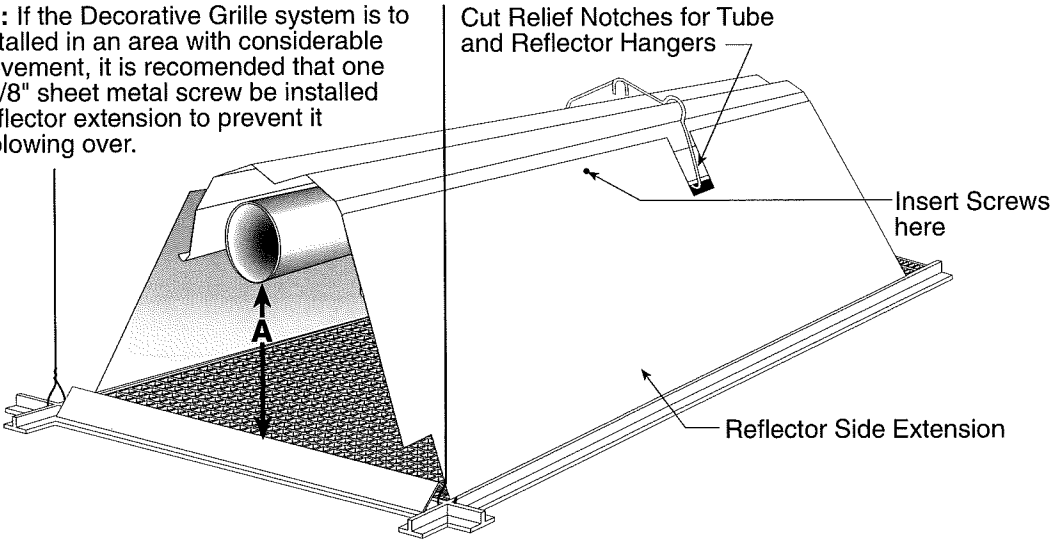
Step 9.4.3 – Reflector Side Extension Installation

NOTE: If the Decorative Grille system is to be installed in an area with considerable air movement, it is recommended that one #8 x 3/8" sheet metal screw be installed per reflector extension to prevent it from blowing over.

Cut Relief Notches for Tube and Reflector Hangers

Insert Screws here

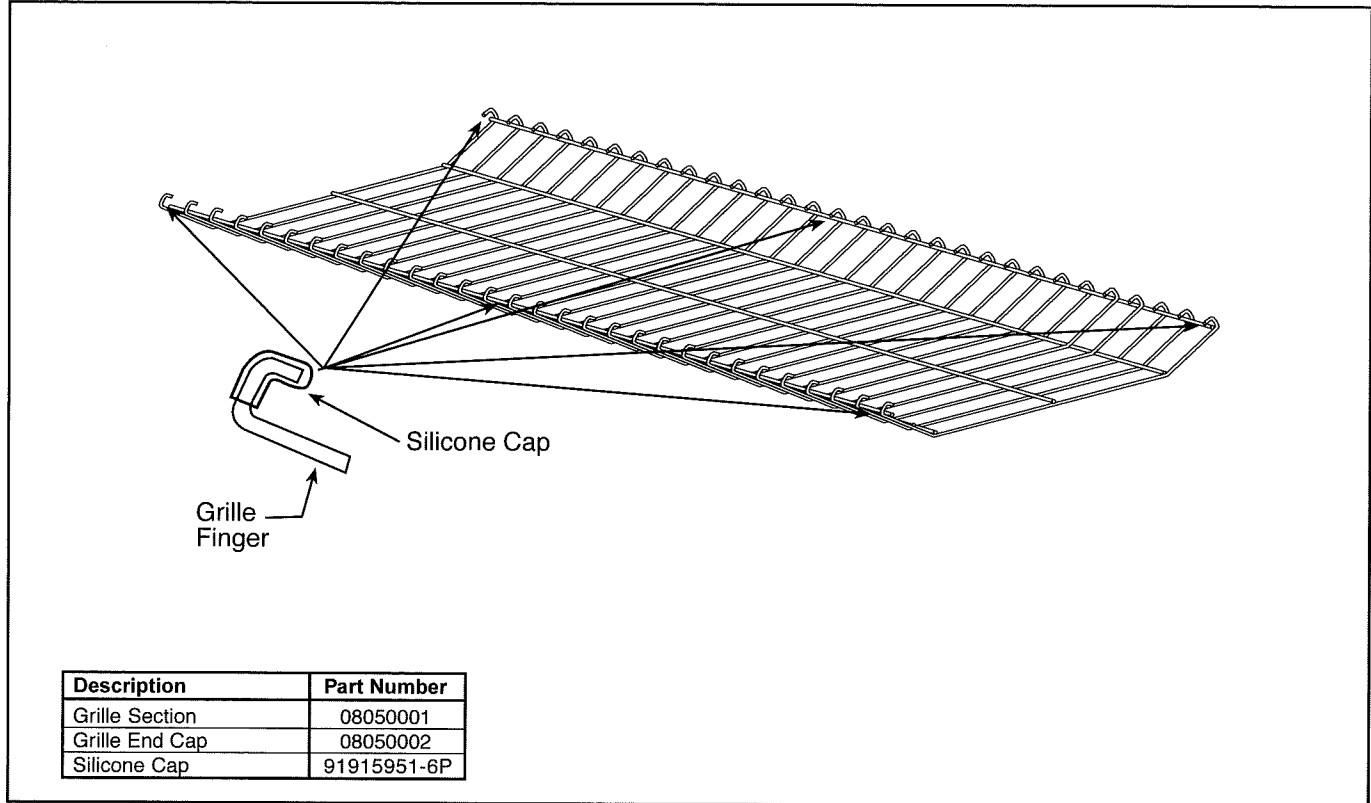
Reflector Side Extension



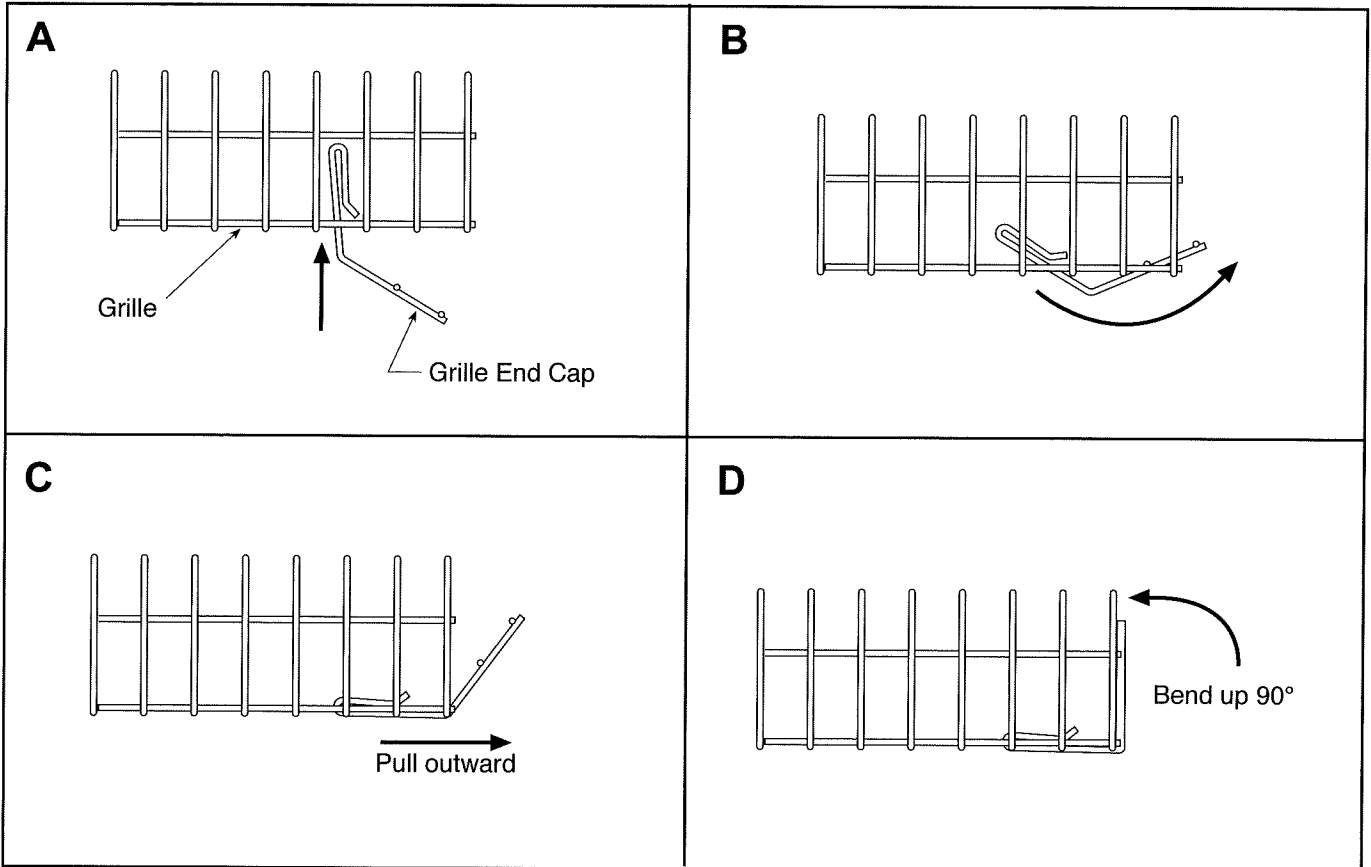
Distance "A"		Extension	
Minimum	Maximum	Part No.	Width
1.6" (4.1 cm)	5.8" (14.6 cm)	01370408	8" (20 cm)
5.8" (14.6 cm)	10.1" (25.7 cm)	01370412	12" (30 cm)
10.1 (25.7 cm)	14.4 (36.6 cm)	01370416	16" (40 cm)

9.5 Protective Grille Installation

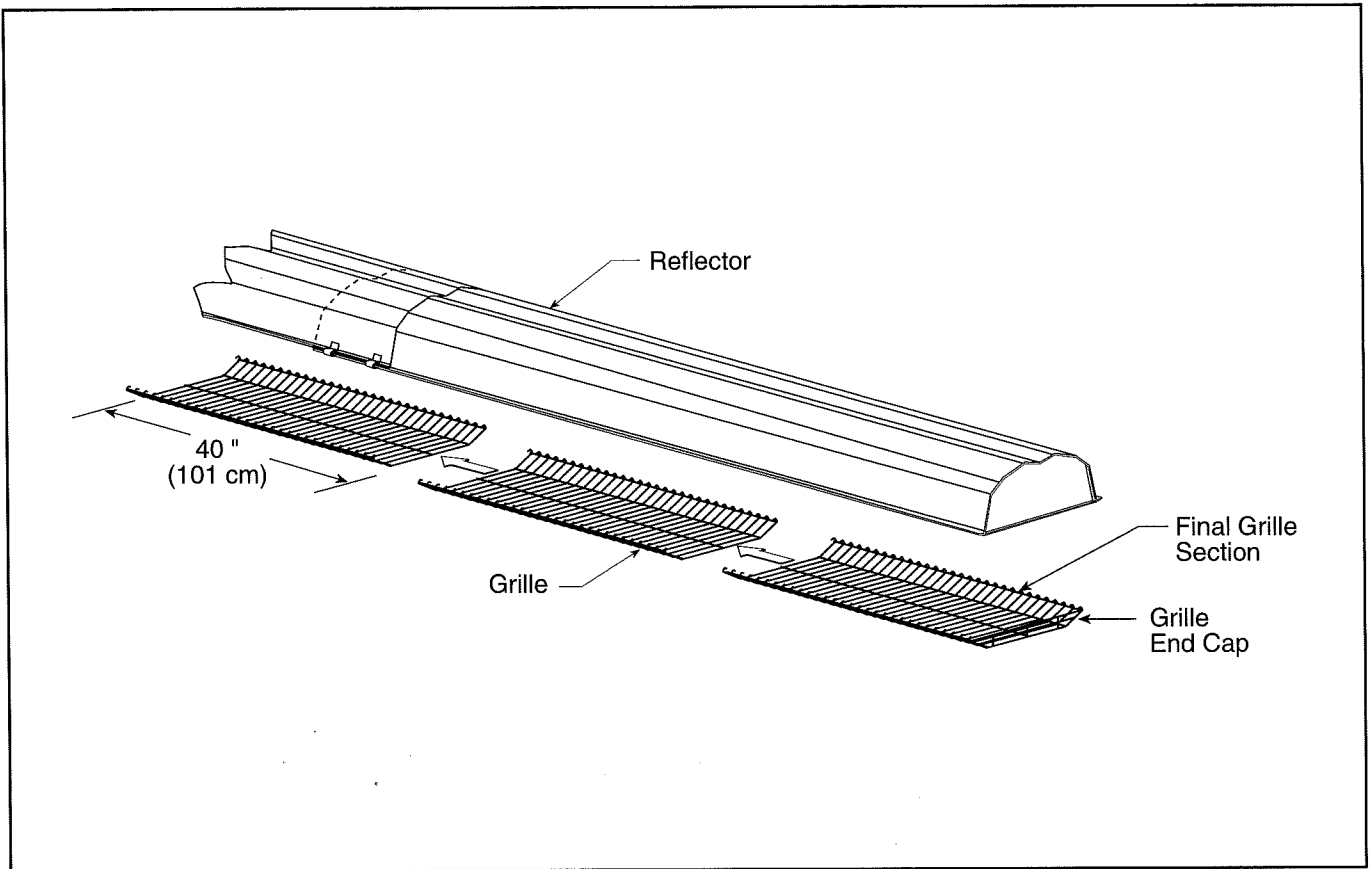
Step 9.5.1 – Silicone Cap Installation



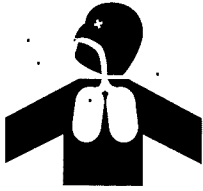
Step 9.5.2 – Grille End Cap Installation



Step 9.5.3 – Grille Installation



▶ SECTION 10: VENTING

⚠ WARNING	
	Carbon Monoxide Hazard
	Heaters installed unvented must be interlocked with sufficient building exhaust.
	Heaters must be installed according to the installation manual.
Failure to follow these instructions can result in death or injury.	

10.1 GENERAL VENTING REQUIREMENTS

This heater must be vented in accordance with the following national codes and any local codes which may apply:

United States: Refer to ANSI Z223.1 - latest revision
Canada: Refer to CAN/CGA-B149.2 and B149.2

In brooder installations, affix Brooder Ventilation Wall Tag (P/N 91039300) adjacent to the heater thermostat. In the absence of a thermostat, the wall tag must be posted in a conspicuous location.

Any portion of vent pipe passing through a combustible wall must be dual insulated (Type B) vent pipe and have an approved thimble (P/N 90505600) to conform with the above listed codes.

Vent pipe must be sloped downward away from the burner, 1/2" (1 cm) in 20' (6 m).

The heater may also be installed unvented in certain circumstances according to building ventilation codes. Refer to the above codes for further information. Unvented operation also requires compliance with the clearances to combustibles given on *Page 5, Section 3, Figure 9*.

Both sides of the VANTAGE® TF heater may be individually vented, or the two sides may be brought together into a common 6" (15 cm) vent.

Vent must be at least 6' (2 m) from the combustion air opening of this unit, or any other appliance.

Secure all joints with #8 x 3/8 sheet metal screws.

Seal all joints with high temperature silicone sealant.

Horizontal Venting

In noncombustible walls only, vent terminal (P/N 02537801-1P) may be used.

For 6" (15 cm) common vents in either combustible or noncombustible walls, use P/N 90502101 (Tjernlund

VH1-6) or equivalent, insulated vent terminal. Follow the manufacturer's instructions for proper installation.

Vertical Venting

For 4" (10 cm), an approved vent cap (P/N 90502300) must be used.

For 6" (15 cm) common vent, an approved vent cap (P/N 90502302) must be used.

United States Requirements

Vent terminal must be installed at a height sufficient to prevent blockage by snow, and building materials protected from degradation by flue gasses.

Vent must exit a building not less than 7' (2 m) above grade when located adjacent to public walkways.

Vent must terminate at least 3' (1 m) above any forced air inlet located within 3' (1 m).

Vent must terminate at least 4' (1.3 m) below, 4' (1.3 m) horizontally from, or 1' (.3 m) above any door, window, or gravity inlet into any building.

Vent terminal shall be located at least 1' (.3 m) from any opening through which vent gasses could enter a building.

Canadian Requirements

Vent terminal must not be installed less than 3' (1 m) from any building opening.

Vent terminal must be installed at least 3' (1 m) above grade.

Length Requirements

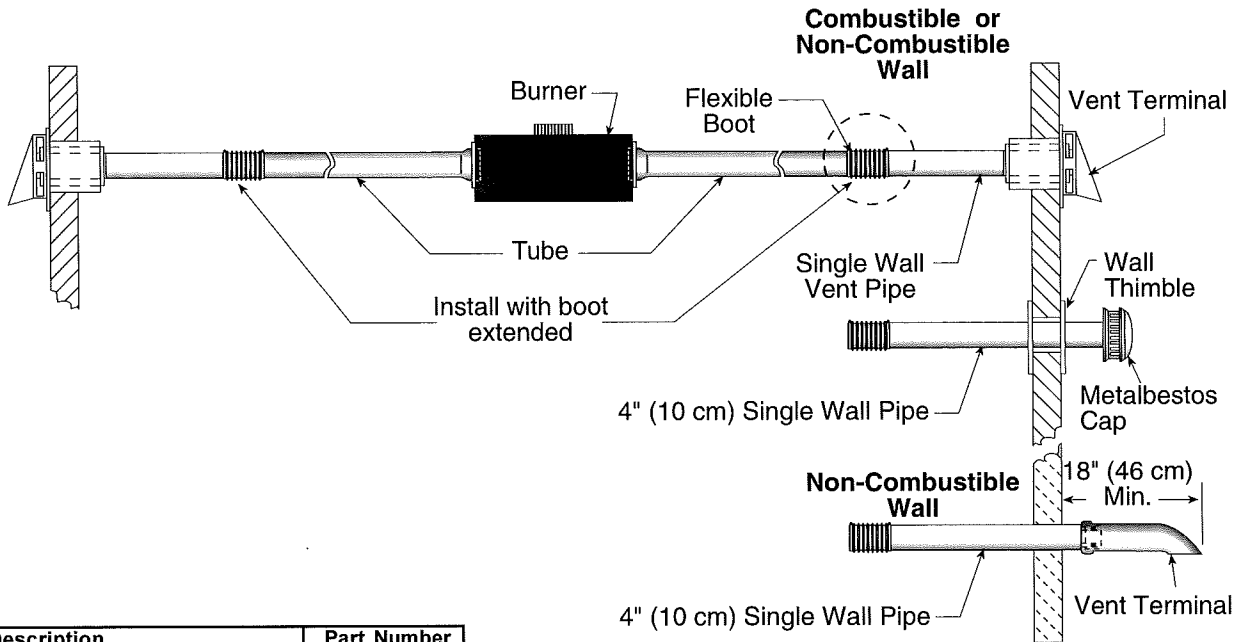
The maximum total vent length, where both heat exchangers are vented together is 45' (11 m) of 6" (15 cm) diameter duct. The maximum total vent length, where the heat exchangers are vented individually is 45' (11 m) of 4" (10 cm) duct, or 22.5' (7 m) on each heat exchanger.

It is recommended that vent length should be limited to less than 20' (6 m). If using vent lengths greater than 20' (6 m), condensation will form in the vent pipe. Insulation and additional sealing measures will be required. Optional heat exchanger lengths are considered as vent length for length determination.

The total vent length, plus outside air duct length, plus any extensions to minimum heat exchanger lengths, cannot exceed 65' (17 m).

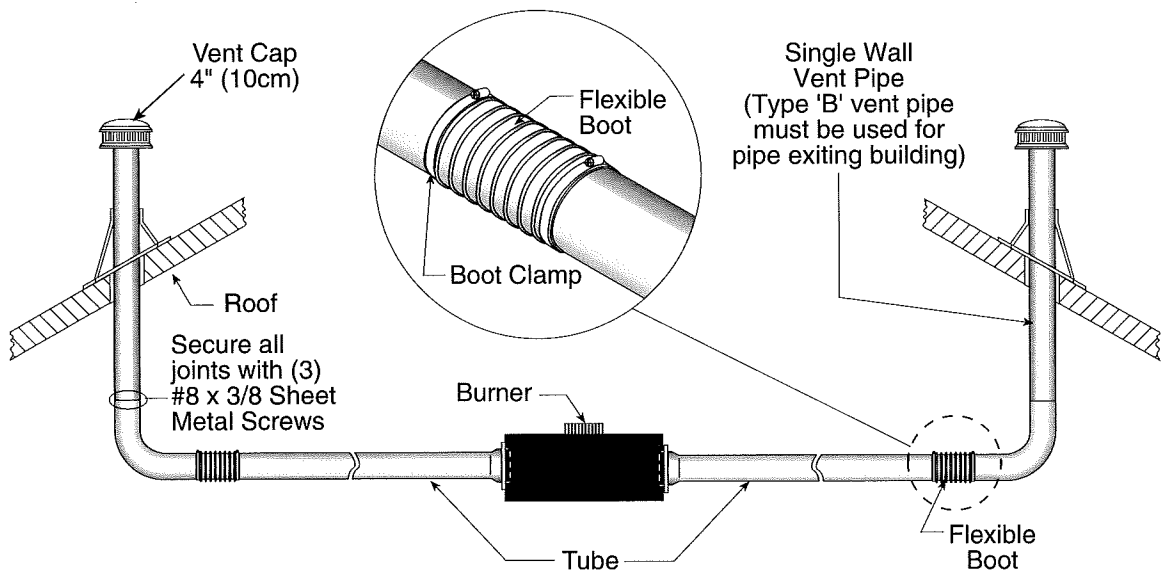
Subtract 15' (4 m) of maximum allowed vent or duct length per vent elbow if more than two are used.

10.2 – Horizontal Ventilation 4" (10 cm) Pipe



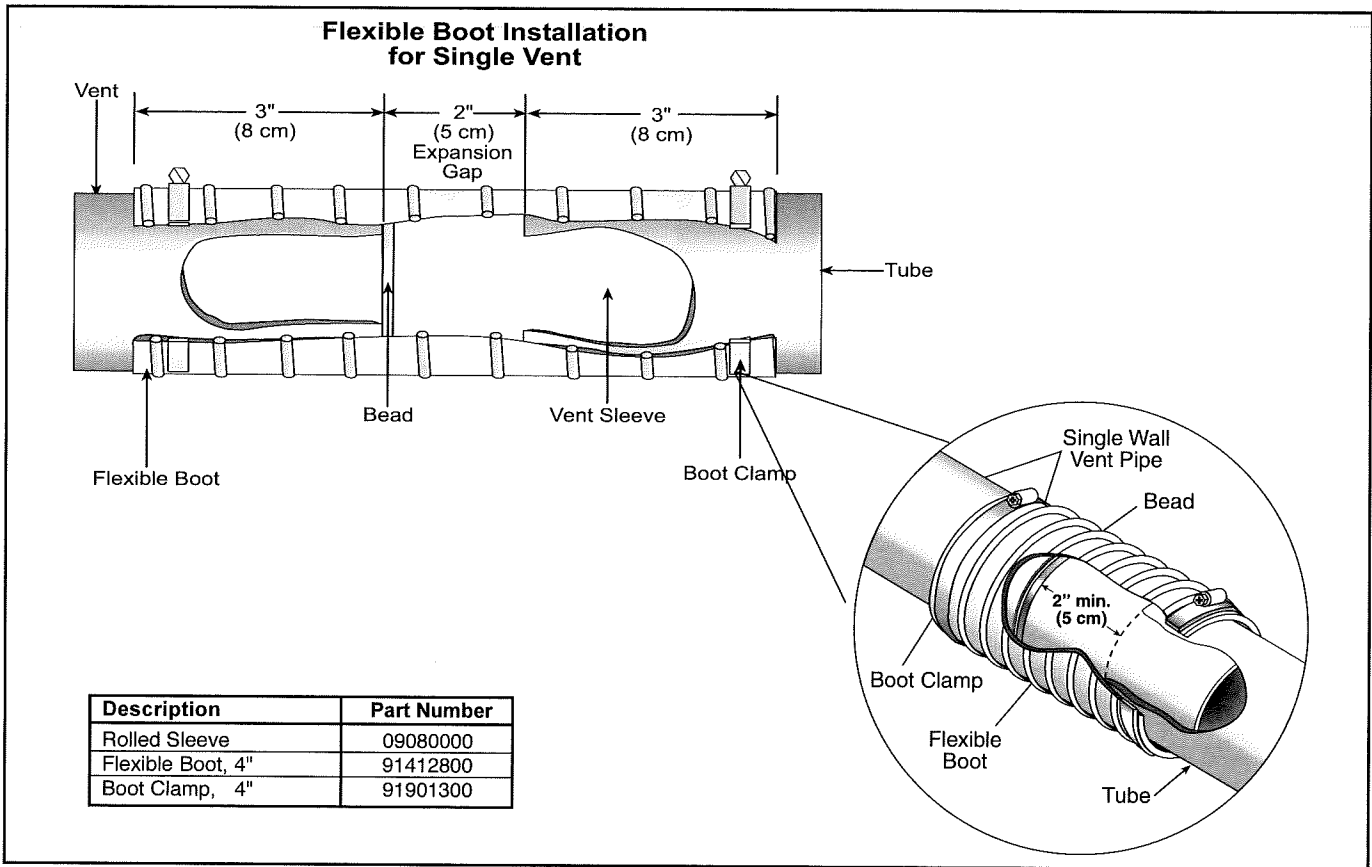
Description	Part Number
Flexible Boot	91412800
Boot Clamp	91901300
Vent Terminal (Comb. Wall)	90502100
Vent Terminal (Non. Comb. Wall)	02537801-1P
Wall Thimble	90505600
Vent Sleeve	09080000

10.3 – Vertical Ventilation 4" (10 cm) Pipe

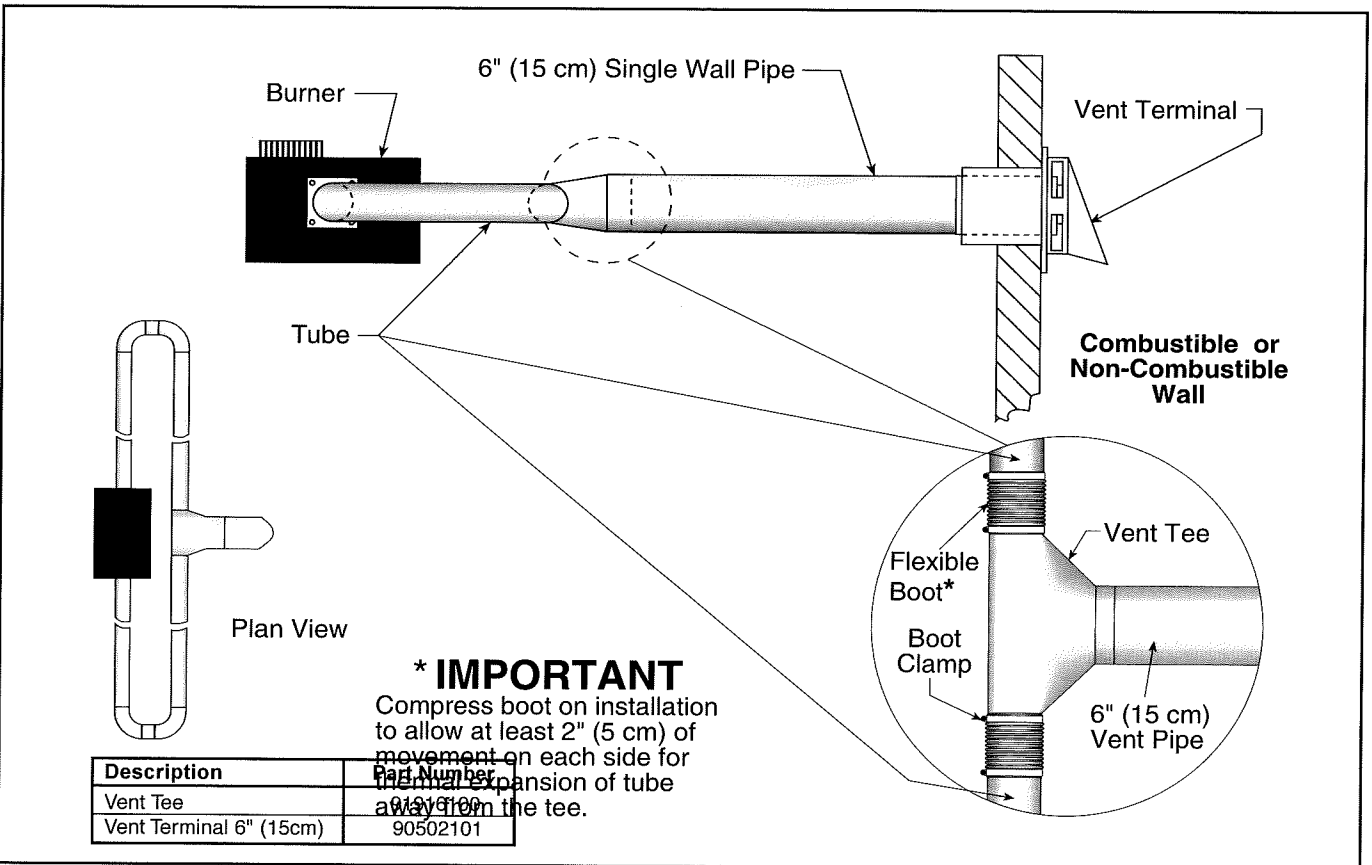


Description	Part Number
Vent Cap 4" (10 cm)	90502300

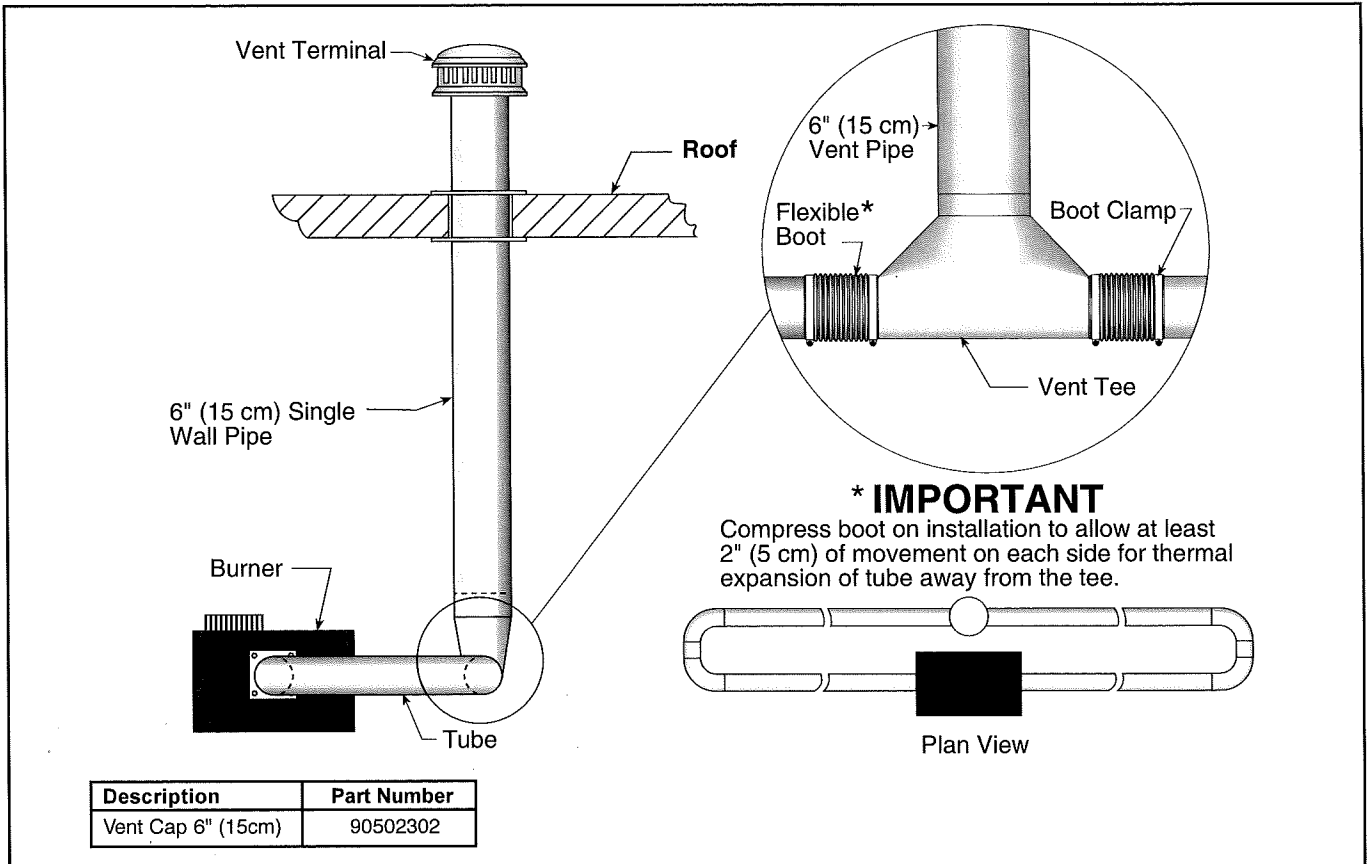
10.4 – Flexible Boot Installation (Single Vent)



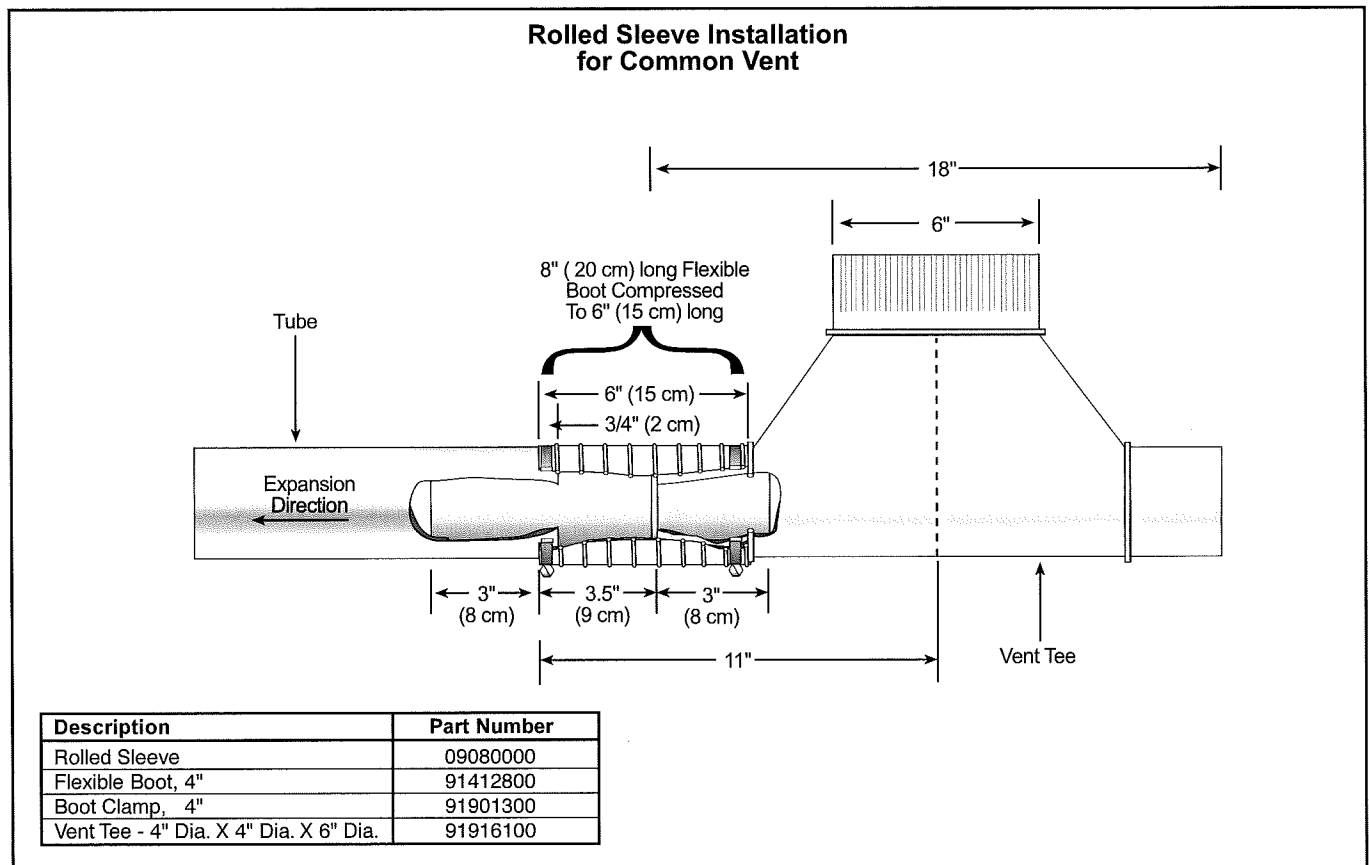
10.5 – Horizontal Ventilation 6" (15 cm) Pipe



10.6 – Vertical Ventilation 6" (15 cm) Pipe



10.7 – Flexible Boot Installation (Common Vent)



10.8 Outside Combustion Air Supply

IMPORTANT: If the building has a slight negative pressure or corrosive contaminants such as halogenated hydrocarbons are present in the air, an outside combustion air supply to the heater is required.

It is recommended to vent heaters when utilizing the outside air option.

For TF-120 4" (10 cm) single wall pipe or for TF-160/200/250/300/350/380 5" (13 cm) single wall pipe, PVC pipe, aluminum flex duct, or equivalent may be used for outside air supply.

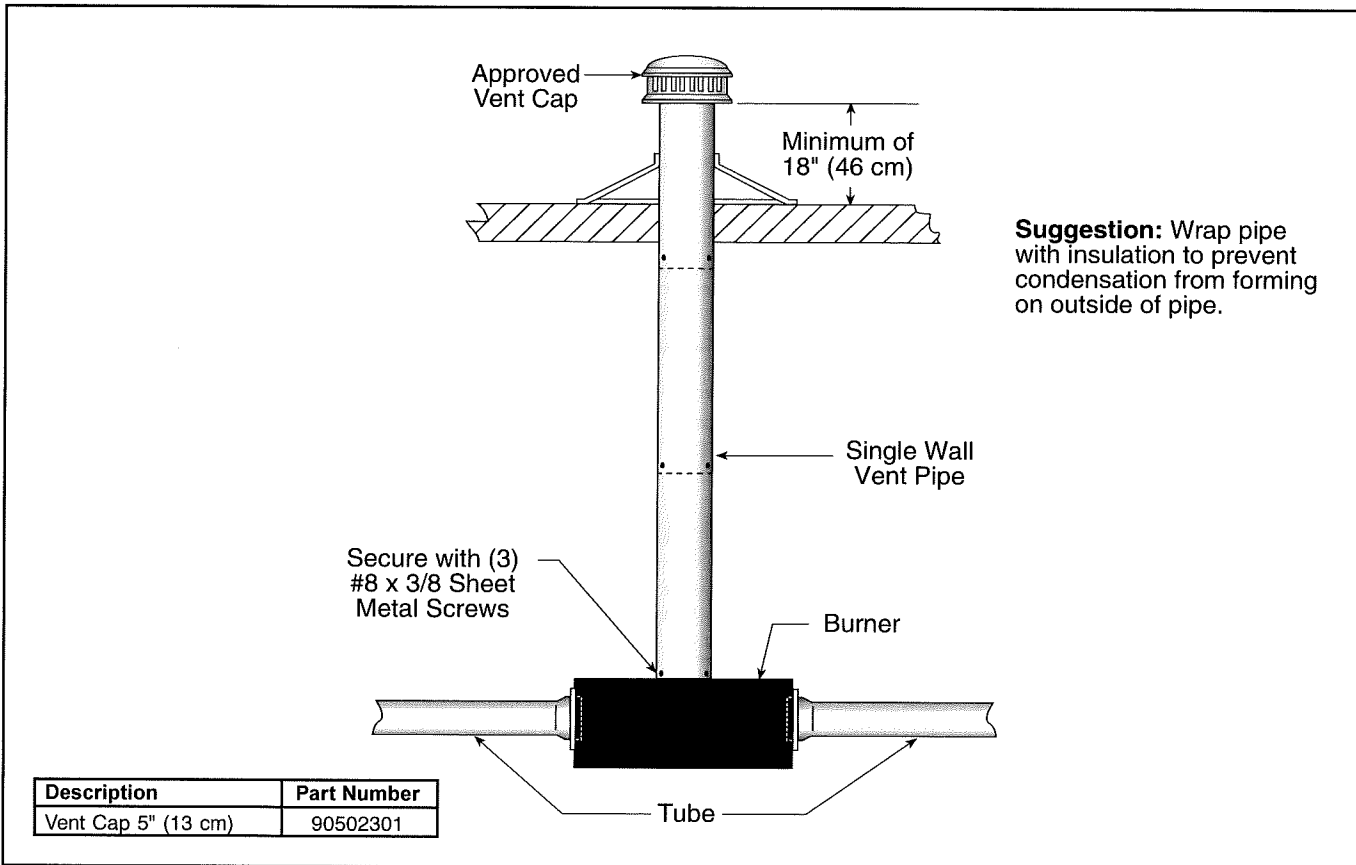
The air supply duct may have to be insulated to prevent condensation on the outer surface.

The outside air terminal must not be more than 1' (3 cm) above the vent terminal.

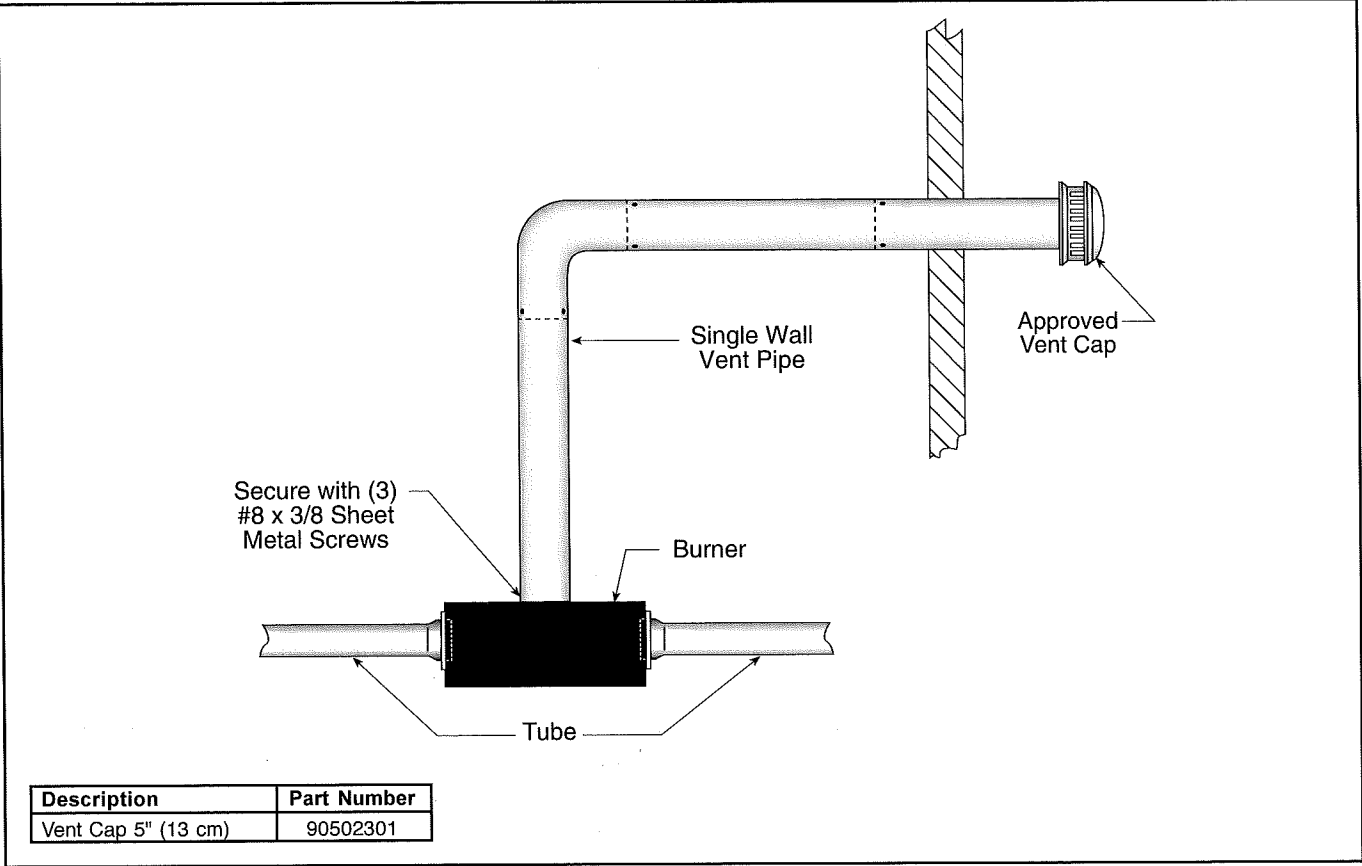
10.8.1 – Length Requirements

The maximum length of outside air supply duct is 45' (11 m) of either 4" (10 cm) or 5" (13 cm) diameter however, the maximum length does depend on the venting arrangement used. Follow the constraints listed on Page 28, Section 10.1.



10.8.2 – Outside Combustion Air (Vertical)



10.8.3 – Outside Combustion Air (Horizontal)



► SECTION 11: GAS PIPING

⚠ WARNING	
	
Fire Hazard	Explosion Hazard
<p>Tighten gas line fittings to connect gas supply according to <i>Figure 15</i>.</p> <p>Flex gas line can crack when twisted.</p> <p>Gas line moves during normal operation.</p> <p>Failure to follow these instructions can result in death, injury or property damage.</p>	<p>Do not high pressure test the gas piping with the burner connected.</p> <p>Failure to follow these instructions can result in death, injury or property damage.</p>

to the supply system, verify that all high pressure testing of the gas piping has been completed.

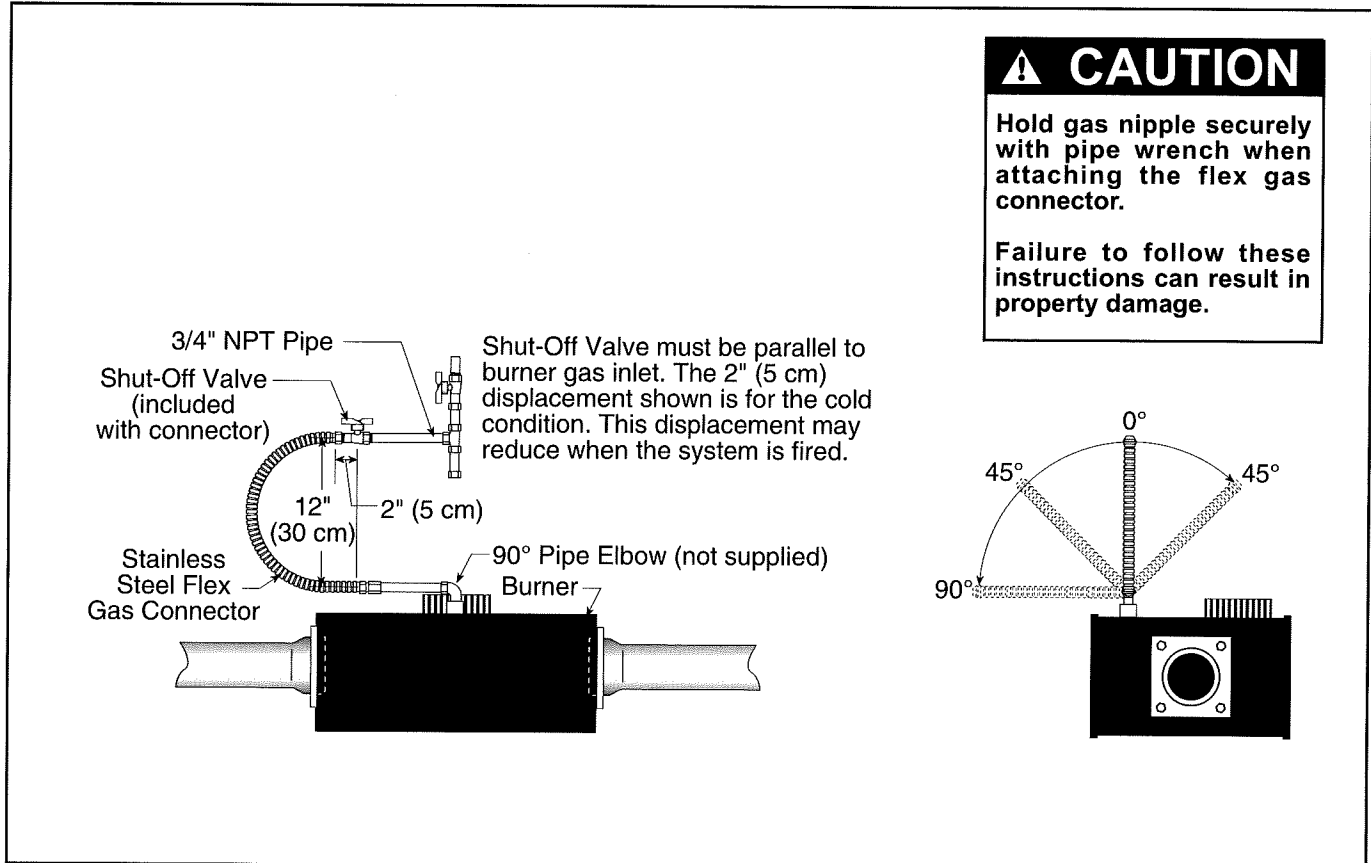
There is an expansion of the Heat Exchanger Tube with each firing cycle, this will cause the burner to move with respect to the gas line. This can cause a gas leak resulting in an unsafe condition if the gas connection is not made strictly in accordance with Figure 15 on this page of these instructions.

Meter and service must be large enough to handle all the burners being installed plus any other connected load. The gas line which feeds the system must be large enough to supply the required gas with a maximum pressure drop of 1/2" w.c. When gas piping is not included in the layout drawing, the local gas supplier will usually help in planning the gas piping.

- Check the pipe and tubing ends for leaks before placing heating equipment into service. When checking for gas leaks, use a soap and water solution; never use an open flame.

Install the flex gas connector as shown. The flex gas connector accommodates expansion of the heating system and allows for easy installation and service of the burner. A 90° pipe elbow (not supplied) must be installed into the gas valve to ensure proper orientation of the flex gas connector. Before connecting the burners

FIGURE 15 – Gas Connection with Stainless Steel Flex Gas Connector



▶ SECTION 12: WIRING

⚠ WARNING**Electrical Shock Hazard**

Disconnect electrical power before servicing.

Replace door before operating.

Failure to follow these instructions can result in death or electrical shock.

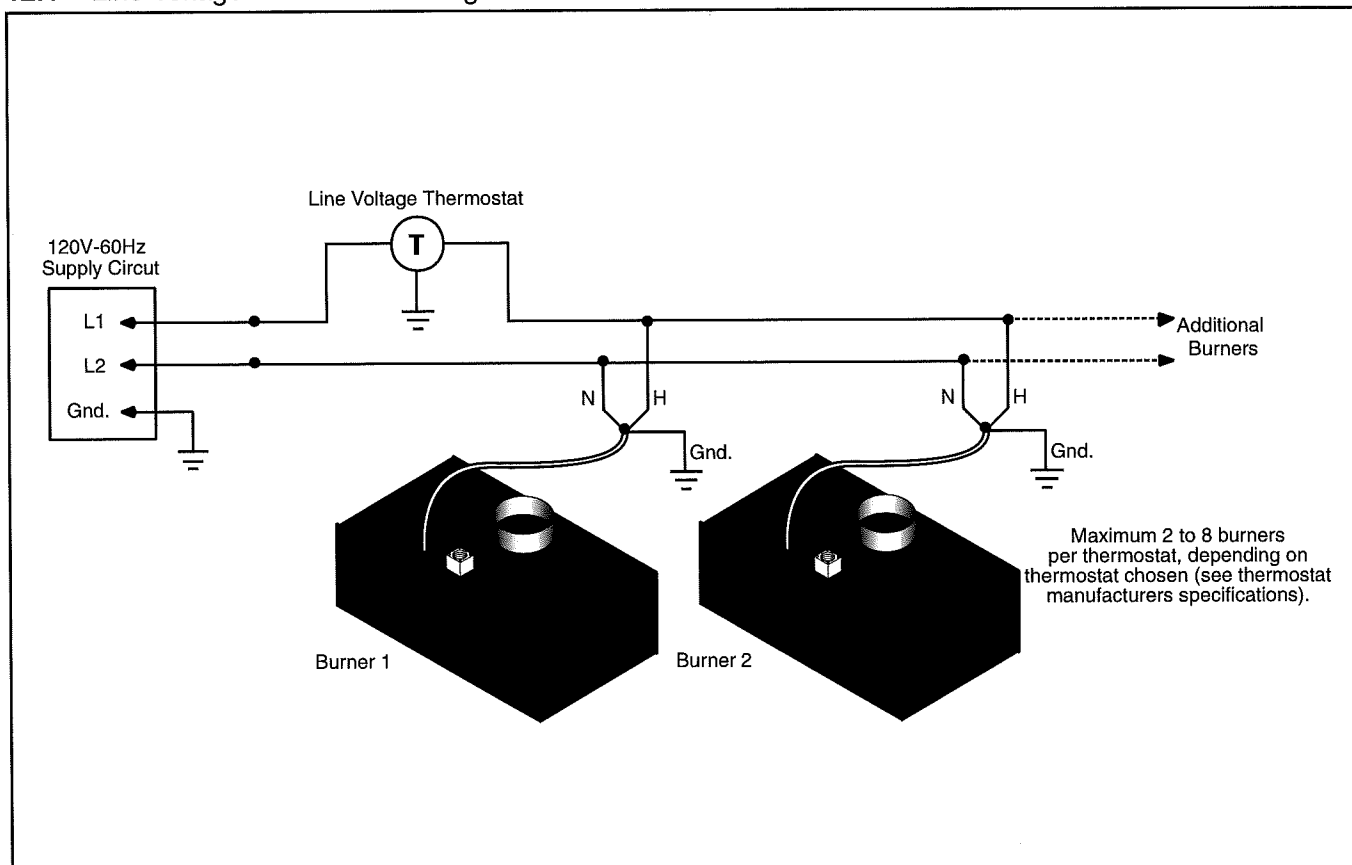
**⚠ ATTENTION****Risque d'électrocution**

Débranchez le courant électrique avant toute révision.

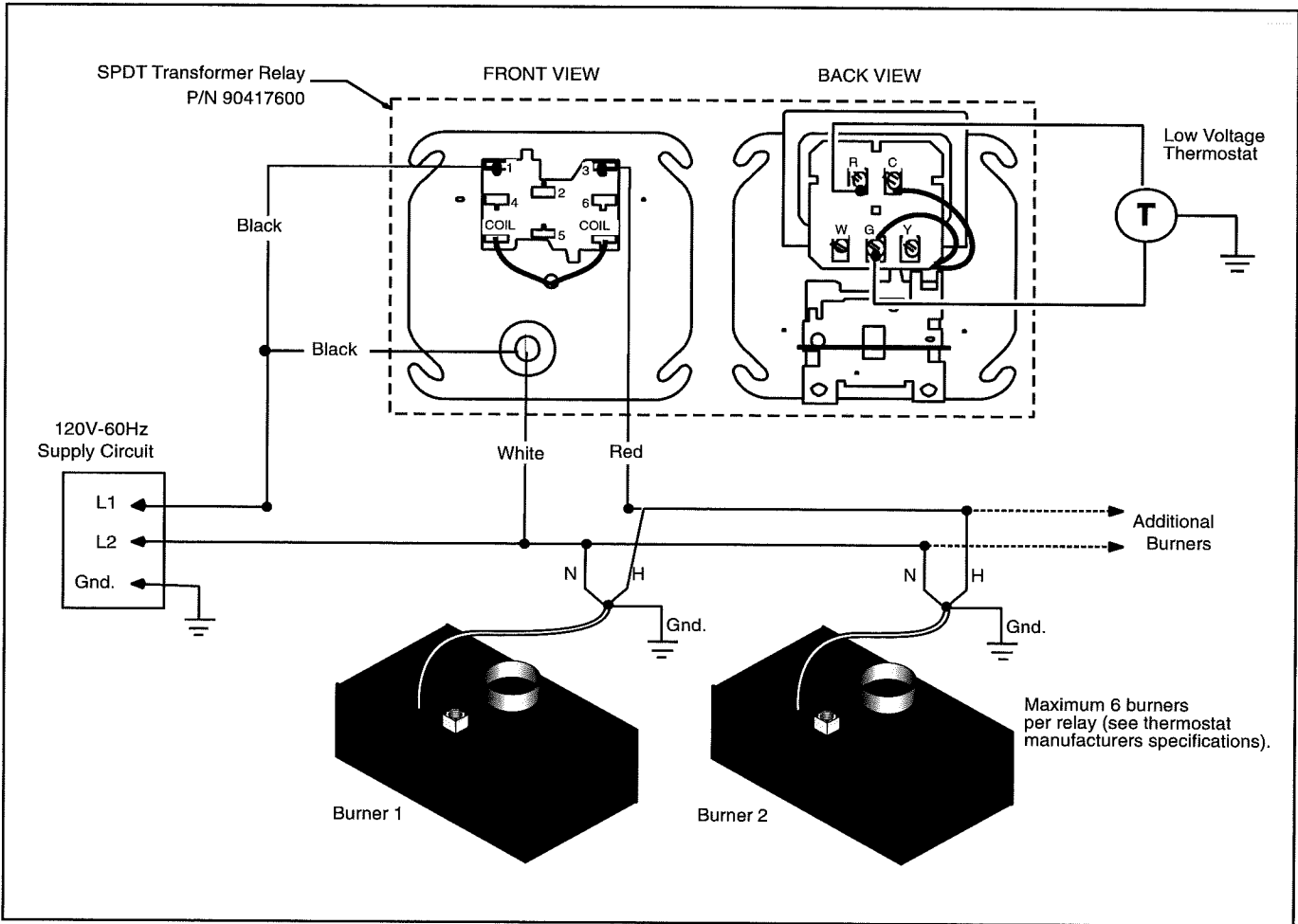
Remplacez la porte avant la mise en marche.

Le non-respect de ces consignes peut entraîner mort ou électrocution.

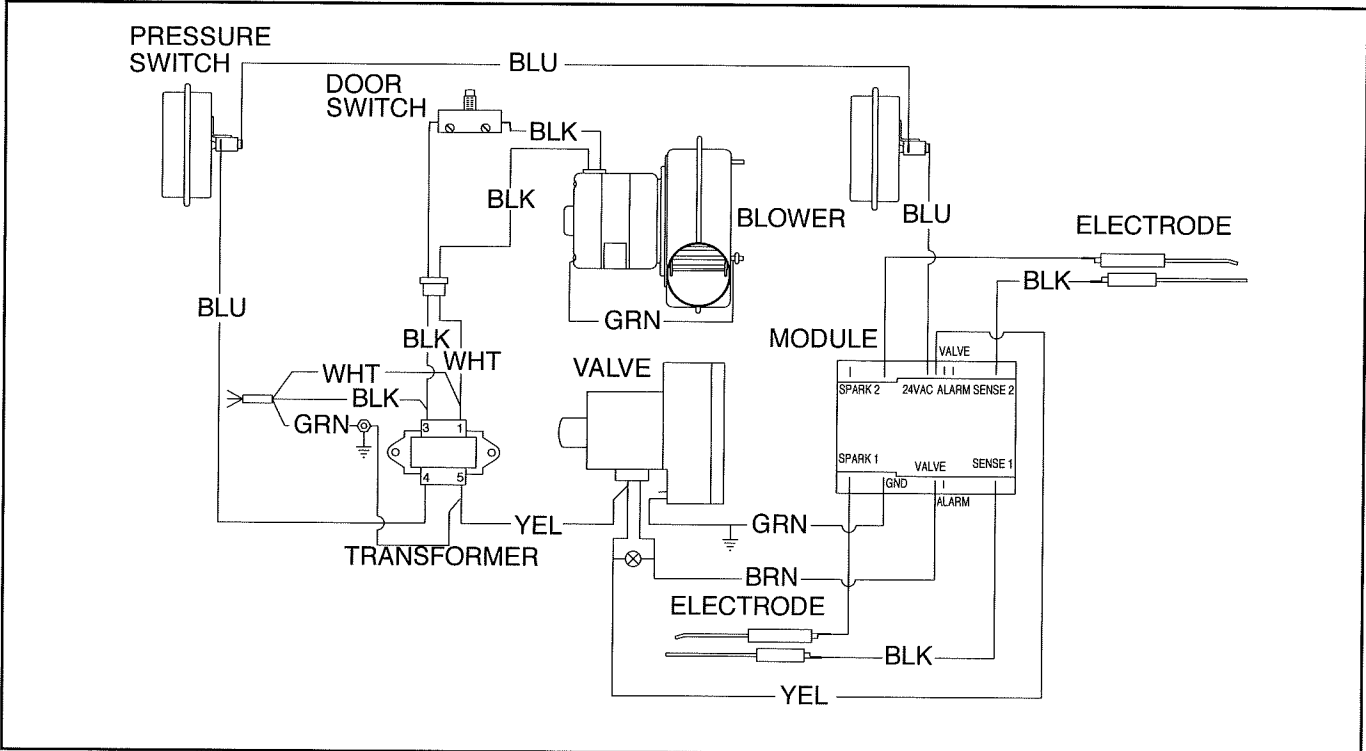
Heaters are normally controlled by thermostats. Line voltage thermostats are wired directly (see *Section 12.1* shown below); the recommended 24V thermostats use a relay (see *Page 36, Section 12.2*). Heaters may also be controlled with a manual line voltage switch or timer switch in place of the thermostat. Heaters must be grounded in accordance with applicable codes: **United States:** refer to *National Electrical Code®* ANSI/NFPA 70 - latest revision **Canada:** refer to Canadian Electrical Code CSA C22.1 Part I - latest revision.

12.1 – Line Voltage Thermostat Wiring

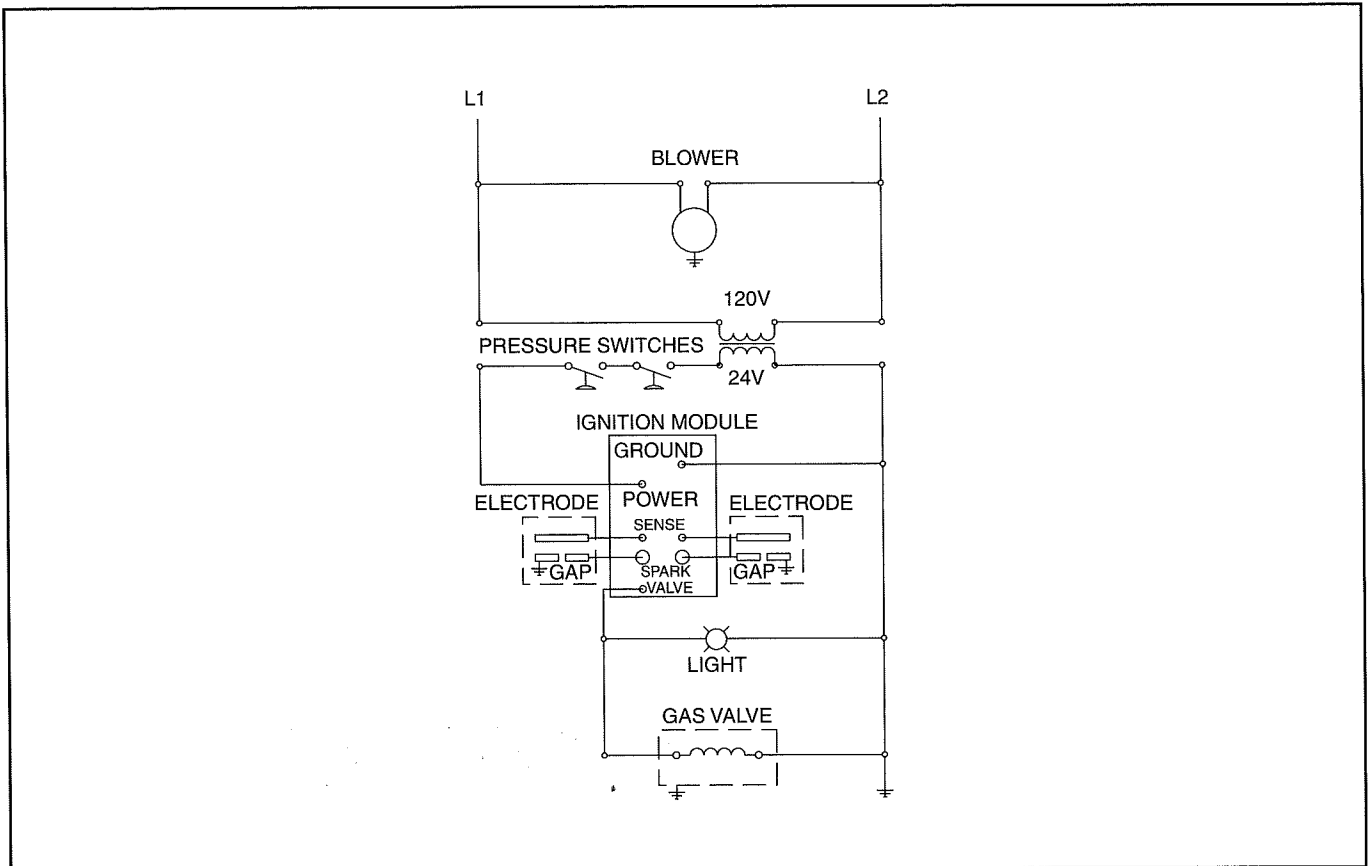
12.2 – Low Voltage Thermostat and Relay Wiring



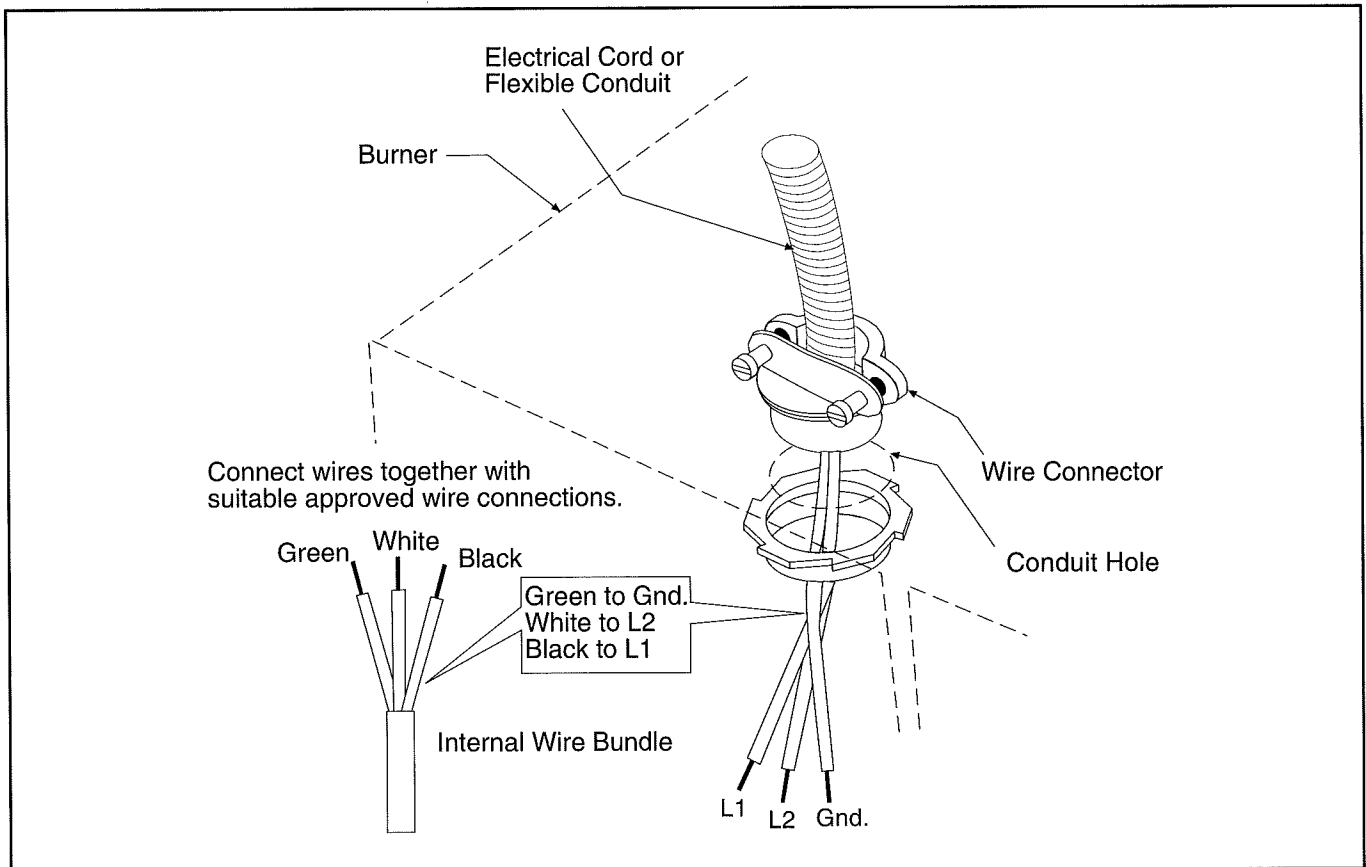
12.3 – VANTAGE® TF Internal Wiring



12.4 – VANTAGE® TF Ladder Diagram



12.5 – Electrical Connection to the Burner



► **SECTION 13: OPERATION AND MAINTENANCE**

⚠ WARNING



Fire Hazard

Do not remove door while operating heater.

No user servicable parts inside.

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

⚠ ATTENTION

Risque d'incendie

Ne pas retirer porte lors du fonctionnement du radiateur.

No contient aucune pièce révisable par l'utilisateur.

Le non-respect de ces consignes peut causer mort, blessures ou dommage matériel.

The VANTAGE® TF series heater is equipped with a dual direct spark ignition system.

13.1 Sequence of Operation

Turn the thermostat up, the blower motor will energize.

When the motor reaches nominal operating RPM, the pressure switches will close and activate the ignition module.

After a 45 second purge period, the ignition module then opens the gas valve and energizes both spark igniters. The light will be illuminated at any time the gas valve is energized.

When both flames are established, the sparking sequence ceases.

If both flames are not established during the ignition sequence, the ignition module closes the gas valve and purge begins. The module will try two additional times for ignition with purge between trials. If ignition is not established during either of these trials, the module will lock out.

After lock out has occurred, the ignition module must be re-set by turning down the thermostat (disconnecting power) for five seconds, and raising it again to the desired temperature.

When the thermostat is satisfied, all power to the heater is shut off.

13.2 Pre-Season Maintenance and Annual Inspection

⚠ WARNING

Service and annual inspection must be done by a contractor qualified in the installation and service of gas-fired heating equipment.

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

⚠ WARNING

Disconnect gas and electrical supplies before performing service or maintenance.

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

To ensure your safety and years of trouble-free operation of the heater, annual inspections by owner and a contractor qualified in the installation and service of gas-fired heating equipment are essential.

Before every heating season, a contractor qualified in the installation and service of gas-fired heating equipment must perform a thorough safety inspection of the heater. For best performance, the gas, electrical, thermostat connections, tubing, venting, suspensions and overall heater condition are some of the areas requiring inspection.

Please see the chart on *Pages 39 and 40, Section 13* for suggested items to inspect.

REMEMBER TO CHECK:**⚠ WARNING**

Installation, Service and Annual Inspection of heater must be done by a contractor qualified in the installation and service of gas-fired heating equipment.

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

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

The Vicinity of the Heater Do not store or use flammable objects, liquids or vapors near the heater. Immediately remove these items if they are present.

See Page 2, Section 3.

Vehicles and Other Objects Maintain the clearances to combustibles.
Do not hang anything from, or place anything on, the heater.
Make sure nothing is lodged underneath the reflector, in between the heat exchanger tubes or in the decorative or protective grilles (included with select models).

Immediately remove objects in violation of the clearances to combustibles.

See Page 2, Section 3.

Reflector Make sure there is no dirt, sagging, cracking or distortion.
Make sure reflectors are correctly overlapped. *See Page 18, Figure 12.*
Clean outside surface with a damp cloth.
Contact a contractor qualified in the installation and service of gas-fired heating equipment for repair.

Vent Pipe Venting must be intact. Using a flashlight, look for obstructions, cracks on the pipe, gaps in the sealed areas or corrosion.
The area must be free of dirt and dust.
Remove any carbon deposits or scale using a wire brush.
Contact a contractor qualified in the installation and service of gas-fired heating equipment for repair.
See Pages 28-33, Section 10.

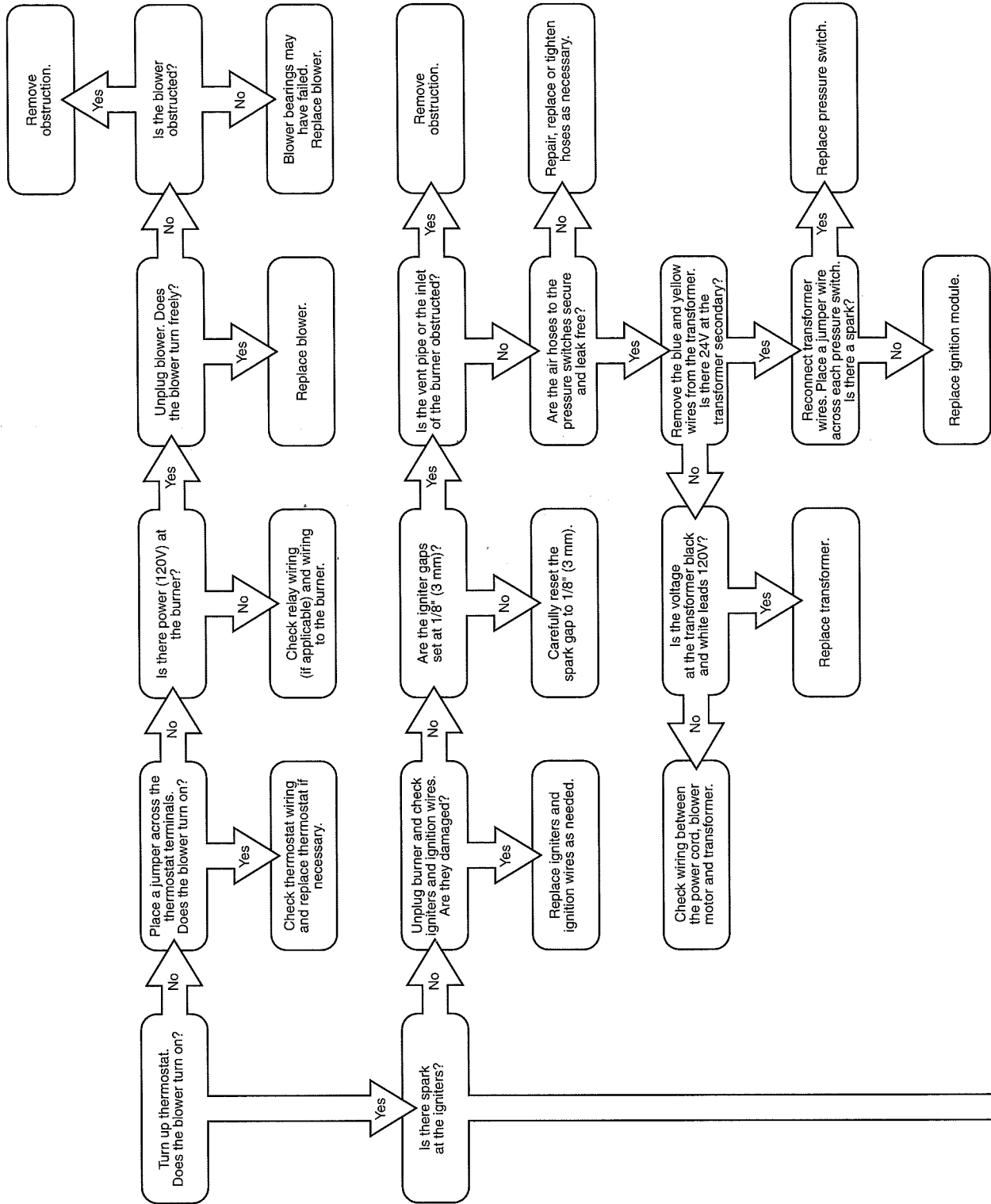
Outside Air Inlet Inlet must be intact. Look for obstructions, cracks on the pipe, gaps in the sealed areas or corrosion.
The area must be free of dirt and dust.
Clean and reinstall as required.
Contact a contractor qualified in the installation and service of gas-fired heating equipment for repair.

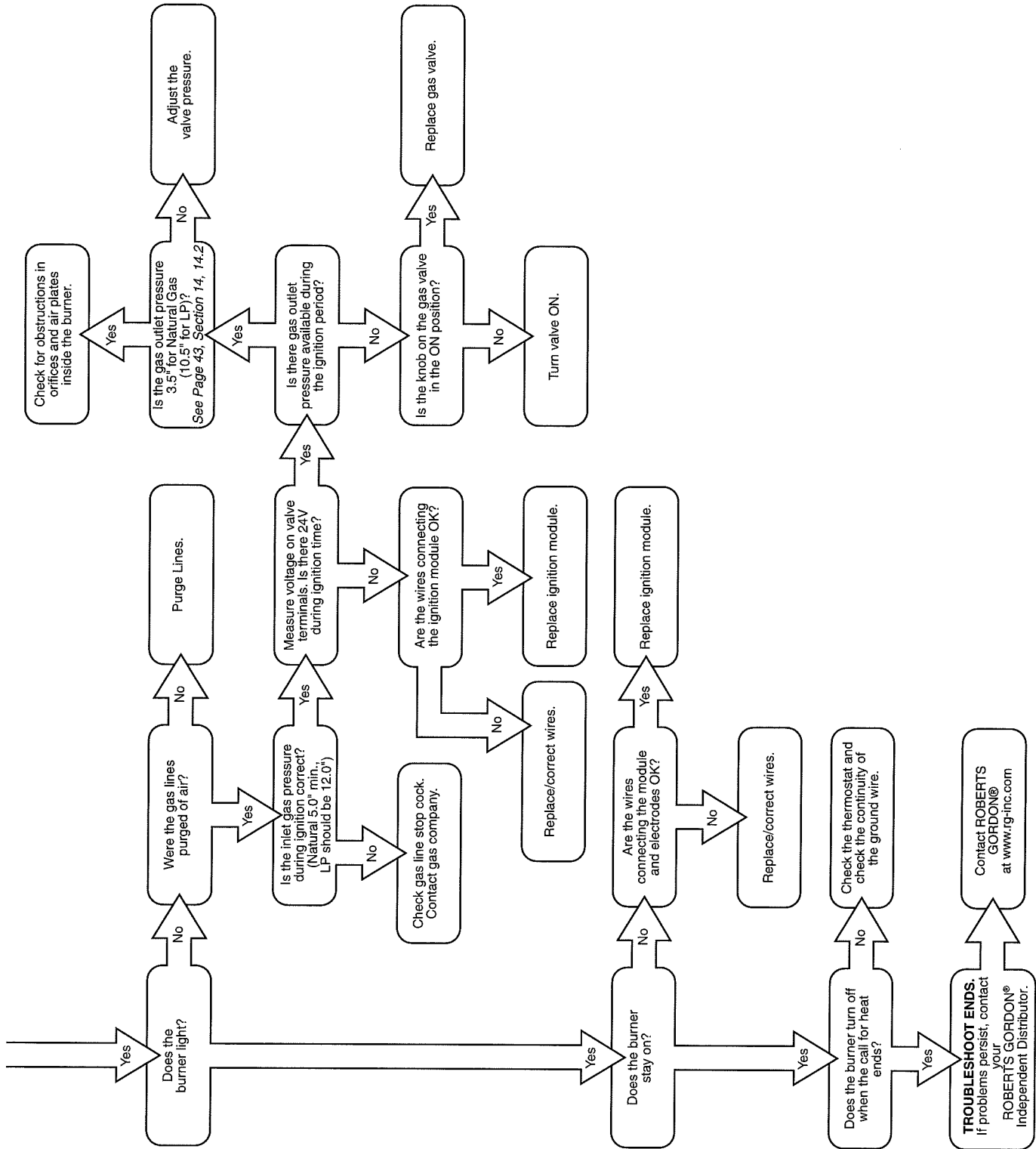
Heat Exchanger Tubes Make sure there are no cracks.
Make sure tubes are connected and suspended securely.
See Pages 13-16, Section 8.
Make sure there is no sagging, bending or distortion.
Contact a contractor qualified in the installation and service of gas-fired heating equipment for repair.

Gas Line	<p>Check for gas leaks according to <i>Page 34, Section 11</i>. Contact a contractor qualified in the installation and service of gas-fired heating equipment for repair.</p>
Burner Observation Window	<p>Make sure it is clean and free of cracks or holes. Clean and replace as required. Contact a contractor qualified in the installation and service of gas-fired heating equipment for repair.</p>
Blower Scroll, Wheel and Motor	<p>Compressed air or a vacuum cleaner may be used to clean dust and dirt. Contact a contractor qualified in the installation and service of gas-fired heating equipment for repair.</p>
Burner Cup and Orifice	<p>Clear of obstructions (even spider webs will cause problems). Carefully remove any dust and debris from the burner. Contact a contractor qualified in the installation and service of gas-fired heating equipment for repair.</p>
Electrodes	<p>Replace if there are cracked ceramics, excessive carbon residue, or erosion of the electrodes. The electrode gap should be .125" (32 mm). Contact a contractor qualified in the installation and service of gas-fired heating equipment for repair.</p>
Thermostat	<p>There should be no exposed wire or damage to the thermostat. Contact a contractor qualified in the installation and service of gas-fired heating equipment for repair. <i>See Pages 35-37, Section 12.</i></p>
Suspension Points	<p>Make sure the heater is hanging securely. Look for signs of wear on the chain or ceiling. Contact a contractor qualified in the installation and service of gas-fired heating equipment for repair. <i>See Pages 13-14, Section 8 and Page 18, Section 8, Figure 12.</i></p>
Decorative and Protective Grille (optional)	<p>The grille must be securely attached. If the grille is loose or off, contact a contractor qualified in the installation and service of gas-fired heating equipment for repair. Check that side reflector extensions are installed correctly and secured in place if necessary (decorative grille only). <i>See Pages 24-27, Sections 9.4 and 9.5.</i> Make sure shield is installed correctly and secured in place if necessary. (Decorative grille only.) <i>See Page 24, Section 9, Step 9.4.2.</i></p>

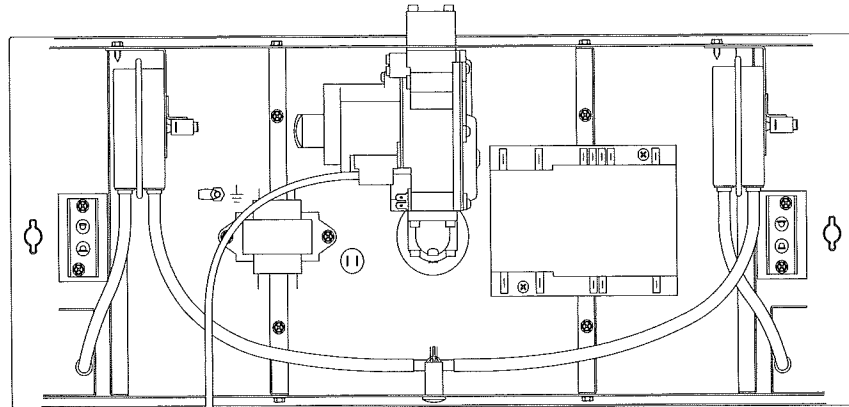
► SECTION 14: TROUBLESHOOTING

14.1 Troubleshooting Flow Chart

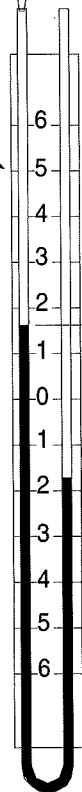




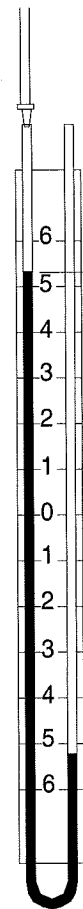
14.2 Manifold Gas Pressure Setting



Manometer



Natural Gas

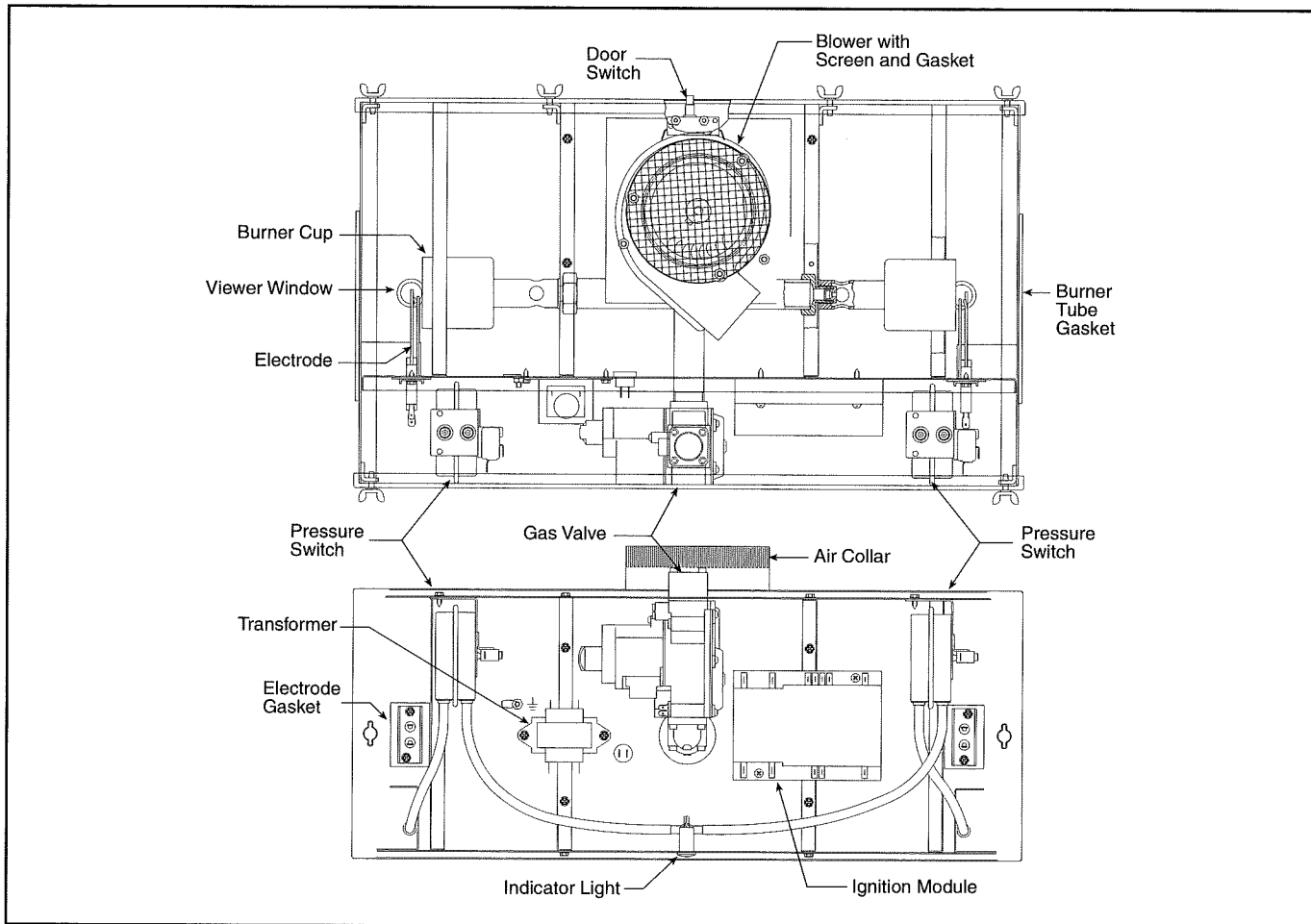


L.P. Gas

► SECTION 15: REPLACEMENT PARTS

⚠ WARNING

Use only genuine ROBERTS GORDON® replacement parts.
 Use of parts not specified by Roberts-Gordon voids warranty.
 Failure to follow these instructions can result in death, injury or property damage.

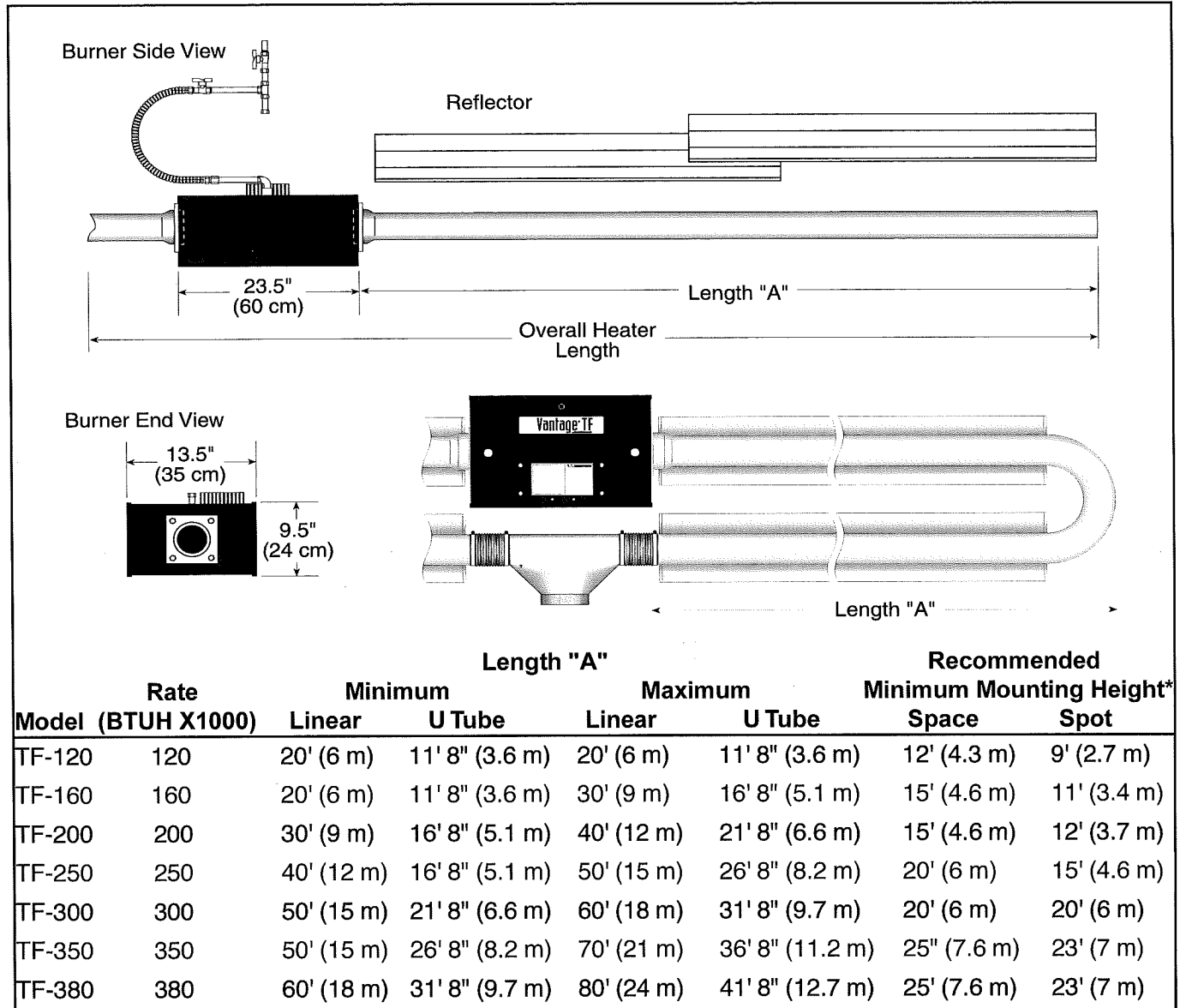


Description	Part Number
Gas Valve (Natural)	90033700
Gas Valve (LP)	90033701
Gasket	
TF-160/200/250/300/350/380	09060000
TF-120	03050900
Screen	
TF-160/200/250/300/350/380	09050000
TF-120	03050800
Blower	
TF-160/200/250/300/350/380	90710400
TF-120	90708600
Burner Cup	03020100
Viewer Window	02553203
Electrode	90427403
Ignition Module	90434007

Description	Part Number
Electrode Gasket	02558501
Indicator Light	91316102
Transformer	90436900K
Snap Switch	90436800
Air Collar	
TF-200/250/300/350/380/160	91911701
TF-120	91911700
TransitionTube Gasket	02568200
Pressure Switch	
TF-120/380	90436717
TF-160/200	90439806
TF-250	90436718
TF-300	90436718
TF-350	90439804

►SECTION 16: GENERAL SPECIFICATIONS

General Specifications for VANTAGE® TF heaters are as follows



* See Pages 3-5, Section 3 for clearances to combustibles.

GAS PRESSURE AT MANIFOLD:

Natural Gas: 3.5" w.c.
LP Gas: 10.5" w.c.

PIPE CONNECTION:

3/4" NPT

DIMENSIONS:

Vent Connection Size: 4" or 6" (10 or 15 cm)
Outside Air Connection Size: 4" or 5" (10 or 13 cm)
Refer to figure above for dimensional information.

GAS INLET PRESSURE:

Natural Gas: 5.0" w.c. Minimum 16.0" w.c. Maximum
LP Gas: 12.0" w.c. Minimum 16.0" w.c. Maximum

ELECTRICAL RATING:

120V - 60 Hz., 1.0 Amp

►SECTION 17: LIMITED WARRANTY**ROBERTS-GORDON WILL PAY FOR:**

For 36 months from the date of purchase by the original consumer or 42 months from the date of shipment by Roberts-Gordon, whichever occurs first: we will provide, free of charge, replacement parts for any part of the VANTAGE® TF that fails because of a manufacturing or material defect.

ROBERTS GORDON® replacement parts are warranted for the period of the original heater Warranty.

ROBERTS-GORDON WILL NOT PAY FOR:

Service trips, service calls and labor charges.

Shipment of Replacement Parts.

Damage due to:

Failure to install, operate or maintain heater as directed in the Installation, Operation and Service Manual. You must follow requirements printed in this Manual.

Misuse, abuse, neglect or modification of heater in any way.

Improper service, use of replacement parts or accessories that are not specified by Roberts-Gordon.

Improper installation, or any relocation of heater after initial installation.

Incorrect gas or electrical supply, accident, fire, flood, acts of God or other casualty.

Use of heater for other than its intended purpose.

Use of heater in a corrosive atmosphere or any atmosphere containing contaminants.

Shipping. Claim must be filed with carrier.

WARRANTY IS VOID IF:

Heater is not installed by a contractor qualified in the installation and service of gas-fired heating equipment.

You cannot prove original purchase date and required annual maintenance history.

The data plate and/or serial number are removed, defaced, modified or altered in any way.

The heater is transferred. This Warranty is nontransferable.

Roberts-Gordon is not permitted to inspect the damaged heater and/or component parts.

READ YOUR INSTALLATION, OPERATION AND SERVICE MANUAL

If you have questions about your heater, contact your installing professional. Should you need replacement parts or have additional questions, call or write Roberts-Gordon:

U.S.A.

1250 William Street
P.O. Box 44
Buffalo, New York 14240-0044
Telephone: 716.852.4400
Fax: 716.852.0854

Canada

241 South Service Road, West
Grimsby, Ontario L3M 1Y7
Telephone: 905.945.5403
Fax: 905.945.0511

On the web at:

www.rg-inc.com

Roberts-Gordon's liability, and your exclusive remedy, under this Warranty or any implied warranty (including the implied warranties of merchantability and fitness for a particular purpose) is limited to providing replacement parts during the term of this Warranty. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you. There are no rights, warranties or conditions, expressed or implied, statutory or otherwise, other than those contained in this Warranty.

Roberts-Gordon shall in no event be responsible for incidental or consequential damages or incur liability for damages in excess of the amount paid by you for the heater. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so this limitation or exclusion may not apply to you. This Warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction.

Roberts-Gordon shall not be responsible for failure to perform under the terms of this warranty if caused by circumstances out of its control, including but not limited to fire, flood, strike, government or court orders, unavailability of supplies, parts or power. No person is authorized to assume for Roberts-Gordon any other warranty, obligation or liability.

LIMITATIONS ON AUTHORITY OF REPRESENTATIVES:

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

