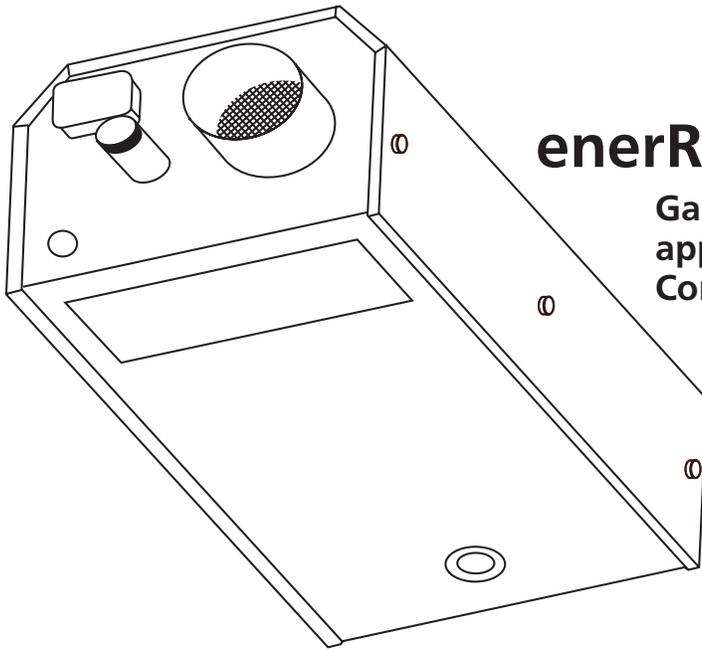


OPERATING INSTRUCTIONS AND OWNER'S MANUAL

READ INSTRUCTIONS CAREFULLY: Read and follow all instructions. Place instructions in a safe place for future reference. Do not allow anyone who has not read these instructions to assemble, light, adjust or operate the heater.

HEATSTAR

MODEL	ERXL-60	
	ERXL-80	ERXL-80S
	ERXL-100	ERXL-100S
	ERXL-125	ERXL-125S
	ERXL-150	ERXL-150L
	ERXL-175	ERXL-175L



enerRADIANT®

**Gas-Fired, Low-Intensity Infrared Heaters
approved for residential Garage/
Commercial Applications**

WARNING: Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency or the gas supplier.

– WHAT TO DO IF YOU SMELL GAS

- Open Windows
- **DO NOT** try to light any appliance.
- **DO NOT** use electrical switches.
- **DO NOT** use any telephone in your house. Immediately call your local gas supplier from a neighbor's telephone. Follow the gas supplier's instructions.
- **Do not** touch any electrical switch; do not use any phone in your building.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.
- If you cannot reach your gas supplier, call the Fire Department.

FOR YOUR SAFETY:

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WARNING: If the information in these instructions are not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

WARNING:

⚠ YOUR SAFETY IS IMPORTANT TO YOU AND TO OTHERS, SO PLEASE READ THESE INSTRUCTIONS BEFORE YOU OPERATE THIS HEATER.

L'AVERTISSEMENT:

⚠ Votre surete est importante a vous et donc s'il vous plait lire ces instructions avant d'operer cet appareil de chauffage.

GENERAL HAZARD WARNING:

⚠ FAILURE TO COMPLY WITH THE PRECAUTIONS AND INSTRUCTIONS PROVIDED WITH THIS HEATER, CAN RESULT IN DEATH, SERIOUS BODILY INJURY AND PROPERTY LOSS OR DAMAGE FROM HAZARDS OF FIRE, EXPLOSION, BURN, ASPHYXIATION, CARBON MONOXIDE POISONING, AND/OR ELECTRICAL SHOCK.

⚠ ONLY PERSONS WHO CAN UNDERSTAND AND FOLLOW THE INSTRUCTIONS SHOULD USE OR SERVICE THIS HEATER.

⚠ IF YOU NEED ASSISTANCE OR HEATER INFORMATION SUCH AS AN INSTRUCTIONS MANUAL, LABELS, ETC. CONTACT THE MANUFACTURER.

L'AVERTISSEMENT GENERAL DE DANGER:

⚠ L'Echec pour se conformer aux precautions et aux instructions a fourni avec cet appareil de chauffage, avoir pour resultat la mort blessure et la perte de propriete ou les dommages physiques serieuses du danger de feu, l'explosion, la brulure l'asphyxie, monoxyde de carbone empoisonant, et/ou le choc electrique.

⚠ Seulement les personnes qui peuvent comprendre et peut suivre les instructions doivent utiliser ou doivent entretenir cet appareil de chauffage.

⚠ Si vous avez besoin de l'information d'assistance ou appareil de chauffage telle qu'un manuel d'instruction, les etiquettes,etc, contactez le fabricant

WARNING:

⚠ FIRE, BURN, INHALATION, AND EXPLOSION HAZARD. KEEP SOLID COMBUSTIBLES, SUCH AS BUILDING MATERIALS, PAPER OR CARDBOARD, A SAFE DISTANCE AWAY FROM THE HEATER AS RECOMMENDED BY THE INSTRUCTIONS NEVER USE THE HEATER IN SPACES WHICH DO OR MAY CONTAIN VOLATILE OR AIRBORNE COMBUSTIBLES, OR PRODUCTS SUCH AS GASOLINE, SOLVENTS, PAINT THINNER, DUST PARTICLES OR UNKNOWN CHEMICALS.

L'AVERTISSEMENT:

⚠ Le feu, les brulures, le danger d'inhalation et explosion garder combustibles solide tel que les materiels de papier ou le carton.

⚠ Une distance sure eloigne de l'appareil chauffage comme recommande.

⚠ Par les instructions, ne utiliser l'appareil de chauffage dans les espaces qui forme contenir combustibles volatil ou aeroporte, ou les produit qu'essence, les disolvants, peindre plus mines, les particles de poussiere ou les produits chimiques inconnus

WARNING:

⚠ **The State of California requires the following warning:** COMBUSTION BY-PRODUCTS PRODUCED WHEN USING THIS PRODUCT CONTAIN CARBON MONOXIDE, A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS (OR OTHER REPRODUCTIVE HARM).

L'AVERTISSEMENT:

⚠ **L'etat de Californie exige les avertissement suivants.** Derives de combustion ont produit en utilisant ce produit contient monoxyde de carbone, un chimique/gaz connu dans l'etat de californie pour causer les defauts de cancer et naissance (ou autre le mal reproducteur)

CONTENTS

Section 1 INTRODUCTION.....	3
Section 2 PLANNING	3
Section 3 INSTALLATION & ASSEMBLY	12
Section 4 VENTING/DUCTING.....	16
Section 5 GAS PIPING	19
Section 6 WIRING	20
Section 7 OPERATION MAINTENANCE	21
Section 8 TROUBLESHOOTING	23
Section 9 REPLACEMENT PARTS.....	24
Section 10 ENGINEERING SPECIFICATIONS.....	25

SECTION 1

Introduction

Ener-Radiant ERXL models are low-cost, field assembled infrared heaters that are easy to install and require only minimal maintenance. They are designed to provide years of economical operation and trouble-free service.

Checking Shipment

Check the shipment against the *Bill of Lading* for shortages. Also, check for external damage to cartons. Note any shortages, and/or external damage to cartons on the *Bill of Lading* in the presence of the delivery trucker. The delivery trucker should acknowledge any shortages or damage by initializing this "noted" *Bill of Lading*. Immediately report any claims for damaged material, or shortages that were not evident at the time of shipment, to the carrier and your ENERCO Factory Representative.

Installer Responsibility

All heaters and associated gas piping should be installed in accordance with applicable specifications and this installation made only by firms (or individuals) well qualified in this type of work. Consult local building inspectors, Fire Marshals or your local ENERCO Factory Representative for guidance.

Ener-Radiant ERXL heaters are installed on the basis of information given in a layout drawing, which together with the cited codes and regulations, comprise the basic information needed to complete the installation. The installer must furnish all needed material that is not furnished as standard equipment, and it is his responsibility to see that such materials, as well as the installation methods he uses result in a job that is workmanlike and in compliance with all applicable codes.

ENERCO Factory Representatives have had training and experience in the application of this equipment and can be called on for suggestions about installation which can save material and money.

SECTION 2

Planning

The following codes and instructions should be followed when planning the installation of the Ener-Radiant ERXL heater. In addition to these instructions, the warnings in (Section 1) must be carefully adhered to since improper installation may lead to property damage, injury, or death.

National Standards and Applicable Codes

Gas Codes: The type of gas appearing on the nameplate must be the type of gas used. Installation must comply with local codes and recommendations of the local gas company, and the *National Fuel Gas Code, ANSI Z223.1 – latest revision*, (same as NFPA Bulletin 54).

- Clearance between the heater and its vent and adjacent combustible material (which is part of the building or its contents) shall be maintained to conform with the *Standard for Installation of Gas Appliances and Gas Piping, NFPA-54 / ANSI Z223.1 – latest revision, National Fuel Gas Code*.

Aircraft Hangers: Installation in aircraft hangers must be in accordance with the *Standard for Aircraft Hangers, ANSI / NFPA-409 – latest revision*.

- Heaters in aircraft storage or service areas shall be installed at a height of 10 feet above the upper surface of wings or engine enclosures of the highest aircraft which may be housed in the hanger. (This should be measured from the bottom of the heater to the wing or engine enclosure, whichever is highest from the floor.)
- In other sections of aircraft hangers, such as shops or offices, heaters must not be installed less than 8 feet above the floor.
- Heaters installed in aircraft hangers shall be located so as not to be subject to damage by aircraft, cranes, moveable scaffolding or other objects.

Public Garages: Installations in garages must be made in accordance with the *Standard for Parking Structures, NFPA-88A – latest revision* or the *Standard for Repair Garages, NFPA-88B – latest revision*.

- Heaters must not be installed less than 8 feet 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 uppermost point on the hoist.

Electrical: The heater must be electrically grounded in accordance with the *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.

Venting: The venting must be installed in accordance with *NFPA-54 / ANSI Z223.1 – latest revision, National Fuel Gas Code*. Partial information with regard to this code is provided in (Section 5) of this installation manual with regard to size and configurations for venting arrangements.

- Any portion of flue pipe passing through a combustible wall must be dual insulated or have an approved thimble. Refer to *ANSI-Z223.1 – latest revision*.

Hazardous

Locations: Where there is the possibility of exposure to combustible airborne material or vapor, consult the local Fire Marshal, the fire insurance carrier or other authorities for approval of the proposed installation.

Critical Considerations

Ener-Radiant ERXL is a suspended heater. Therefore, its stability, flexibility, and safety are very important. Before starting installation, be sure the system can meet the following requirements.

- Maintain specified clearances to combustibles, and safe distance from the heat-sensitive material, equipment and work stations.
- Provide a suspension with vertical length of chain or swinging rod which has at least 2 inches of horizontal travel for each burner in a straight run. Be sure the suspension system is sufficiently flexible to accommodate thermal expansion which occurs as the system heats up (see Figure 5 on page 15).
- Provide access to burners for servicing, preferable on both sides, above and behind the burner for removal.
- Provide a minimum of 18 inches of clearance between burners and building walls. (Always observe minimum clearances to combustibles.)

- Be sure the heater has a downward pitch of one-half inch per 20 feet away from the burner.
- Provide signs in storage areas to specify maximum stacking height to maintain required clearances to combustibles.
- Plan location supports (see Figure ?). Locate a support near all elbows.

Installation Procedure

Take maximum advantage of the building upper structure, beams, joists, purlins, etc., from which to suspend the heater. There is no unique sequence for installation of the tubing. On-site observation will usually reveal a logical sequence. Begin the installation at the most critical dimension. This could save time. Watch for swinging doors, overhead cranes, car lifts, etc. Reflectors and tubing can be installed as you move along. Carefully adjust system pitch at each position to level the heater. Pitch down one-half inch in 20 feet (away from burner).

Don't Pressure test the gas line using high pressure (greater than ½ PSIG) without closing the high-pressure shutoff cocks. Failure to do so will result in damage to the burners.

DO Familiarize yourself with local and national codes.

Develop a planned procedure which will conserve material and labor on the job.

Check to see that all material and equipment is on the job before starting installation.

Allow for thermal expansion of the hot tube.

Install the gas connector only as shown in instructions (see Figure 17).

Have slip joints where required between reflectors to keep them from buckling or coming apart.

Provide 1 sq. inch of free air opening to each 1,000 BTU/hr. of heater input (but not less than 100 sq. inches) in enclosed spaces. One opening should be within 12 inches of the top and one within 12 inches of the bottom of the enclosure.

ACCESSORY PARTS LIST

Stock Number	Description
10371	Thermostat 24 volt
10392.....	Thermostat 120 volt
17370.....	Chain Kit
03445.....	Turbulator 10' Section
03447.....	Turbulator 5' Section
16401	24" Stainless Steel Flexible Gas Connector
18677A.....	Installation Manual
F106414.....	180° U-Tube Accessory Kit
F106415.....	90° Elbow Accessory Kit
19021.....	Vent Adaptor
06430.....	Vent Cap
F111751	Installation kit for 20' tube heater
F111752	Installation kit for 30' tube heater
F111753	Installation kit for 40' tube heater
F111754	Installation kit for 50' tube heater
F111755	Installation kit for 60' tube heater

Installation kit includes 24-volt thermostat, vent cap, 24" stainless steel flexible gas connector, gas shutoff valve, and chair kits required to hang heater.

Clearances To Combustibles

TABLE 1: Minimum Clearances to Combustibles (Use Figure 1 on page 10 as a Guide)

Reflector Type	Position	ERXL-60	ERXL-80	ERXL-100	ERXL-125	ERXL-150	ERXL-175
Standard Reflector (Horizontal)	A	6"	6"	6"	6"	6"	8"
	B	30"	36"	36"	36"	36"	36"
	C	55"	55"	74"	87"	87"	87"
	D	30"	36"	36"	36"	36"	36"
45° Reflector Tilt	A	12"	18"	18"	18"	18"	18"
	B	30"	36"	36"	36"	36"	36"
	C	55"	55"	74"	87"	87"	87"
	E	36"	36"	36"	36"	36"	36"
	F	60"	60"	60"	60"	60"	60"
U-Tube Standard (Horizontal)	A	6"	6"	6"	6"	6"	8"
	B	30"	36"	36"	36"	36"	36"
	C	55"	55"	74"	87"	87"	87"
	D	30"	36"	36"	36"	36"	36"
U-Tube Opposite 45°	A	12"	18"	18"	18"	18"	18"
	B	30"	36"	36"	36"	36"	36"
	C	55"	55"	74"	87"	87"	87"
	F	60"	60"	60"	60"	60"	60"
U-Tube Full 45°	A	12"	18"	18"	18"	18"	18"
	B	30"	36"	36"	36"	36"	36"
	C	55"	55"	74"	87"	87"	87"
	E	36"	36"	36"	36"	36"	36"
	F	60"	60"	60"	60"	60"	60"
Unvented	Above A	36"	36"	36"	36"	36"	36"

WARNING:

 FIRE OR EXPLOSION HAZARD

CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY OR DEATH.

In all situations, clearances to combustibles must be maintained. Failure to observe clearances to combustibles may result in property damage, severe injury, or death.

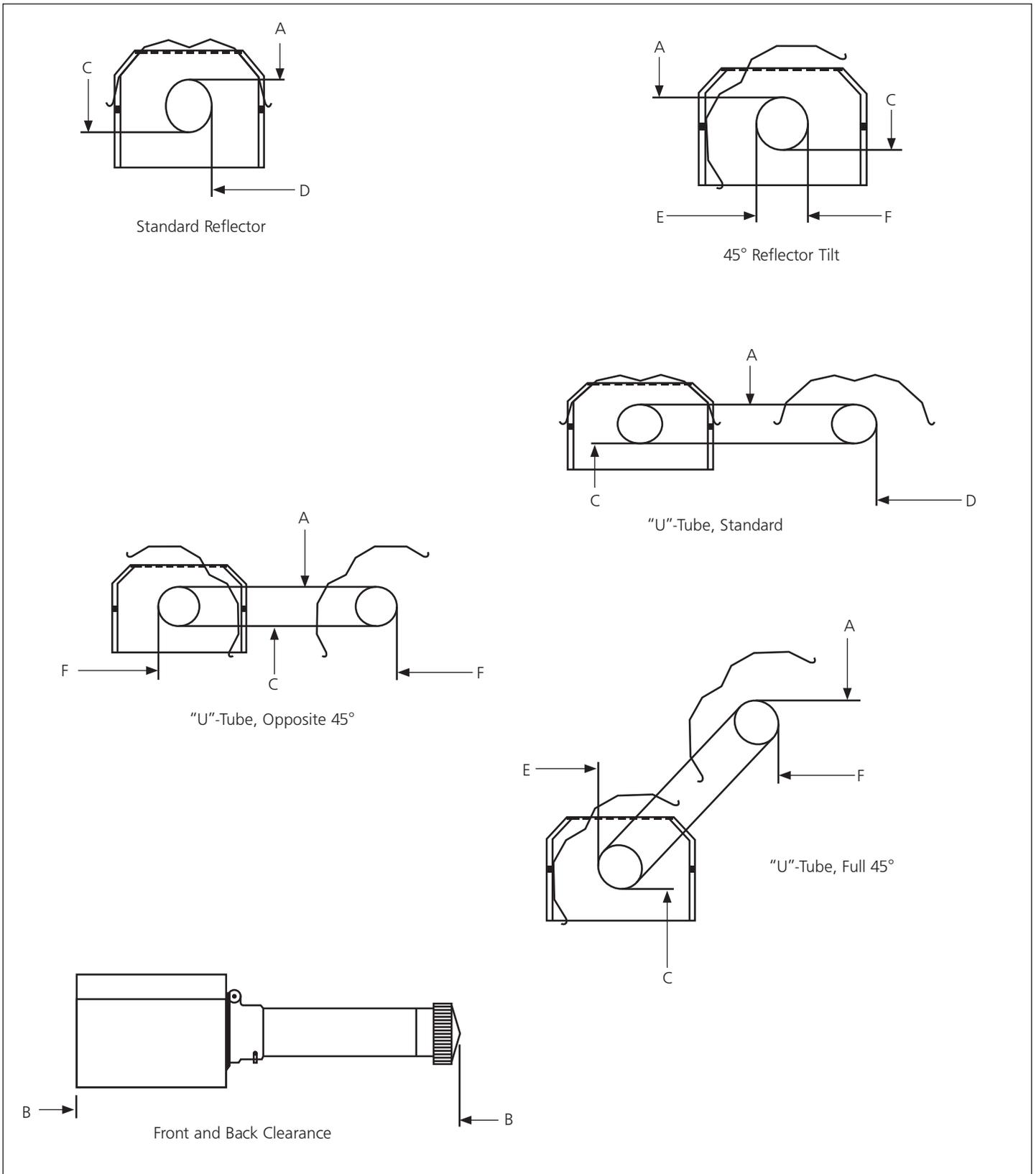
Minimum clearances must be maintained from vehicles parked below the heater. Signs should be posted in storage areas to specify maximum stacking height to maintain required clearances to combustibles.

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.

TABLE 1 gives minimum acceptable clearances to combustibles. Clearances as shown in TABLE 1 are not for use in four-sided enclosures.

Clearances To Combustibles

FIGURE 1: Clearances To Combustibles (Refer to TABLE 1 on page 9)



Parts List for Packaged Ener-Radiant XL Tube Heaters

Item	Stock#	Description	Number Required							
1	F107400XL	ERXL-60 NG COMP / 20'	X							
2	F107401XL	ERXL-60 LP COMP / 20'		X						
3	F107402XL	ERXL-80 NG COMP / 30'			X					
4	F107403XL	ERXL-80 LP COMP / 30'				X				
5	F107412XL	ERXL-80S, NG COMP / 20'					X			
6	F107413XL	ERXL-80S, LP COMP / 20'						X		
7	F107414XL	ERXL-100S, NG COMP / 30'							X	
8	F107415XL	ERXL-100S, LP COMP / 30'								X
9	F102650XL	ERXL-60 NG / BRN & Cont Box	1							
10	F102651XL	ERXL-60 LP / BRN & Cont Box		1						
11	F102652XL	ERXL-80S, ER3-80 LP / BRN & Cont Box			1	1				
12	F102653XL	ERXL-80S, ER3-80 LP / BRN & Cont Box				1	1			
13	F102654XL	ERXL-100S / BRN & Cont Box / NG							1	
14	F102655XL	ERXL-100S / BRN & Cont Box / LP								1
15	F106401XL	ERXL-100S / TUBE SYS ONLY / 30'							1	1
16	F106404XL	ERXL-60, 80S / TUBE SYS ONLY / 30'	1	1		1	1			
17	F106405XL	ERXL-80 / TUBE SYS ONLY / 30'			1	1				
18	00418A	REFLECTOR / T.H.	2	2	3	3	2	2	3	3
19	03445	TURBULATOR BAFFLE 10'	1	1	1	1	1	1		
20	03447	TURBULATOR BAFFLE 5'							1	1
21	06413	TUBE H.E. 4" O.D. X 10'	1	1	2	2	1	1	2	2
22	14585	HANGER / TUBE & REFLECTOR	4	4	6	6	4	4	6	6
23	02753	FRONT CASING	1	1	1	1	1	1	1	1
24	14312	TUBE COUPLING ASSEMBLY	1	1	2	2	1	1	2	2

*Items 15, 16, 17 include the following items: 18, 19, 20, 21, 22, 24.

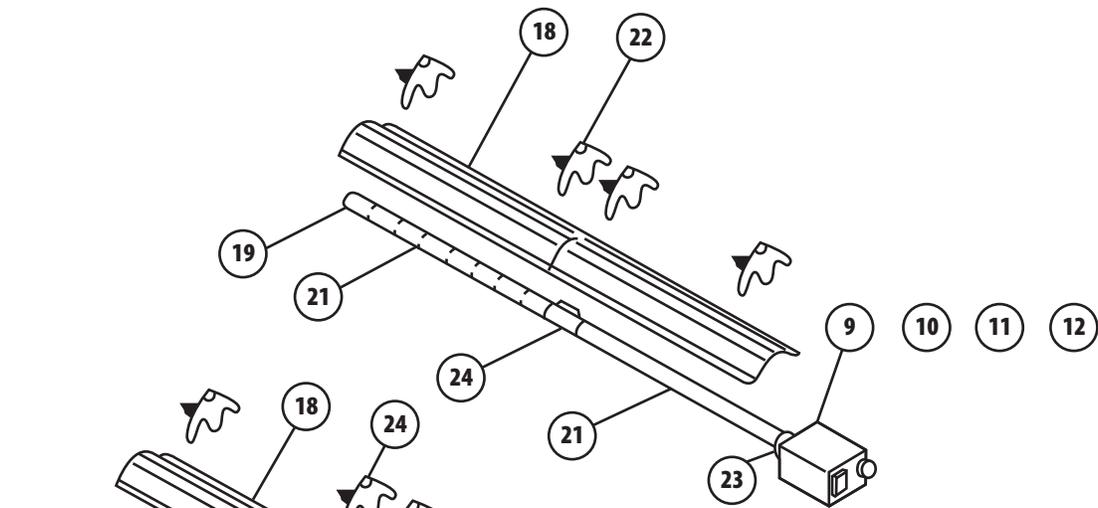


Figure "A" - Assembly
Model ERXL-60, ERXL-80S

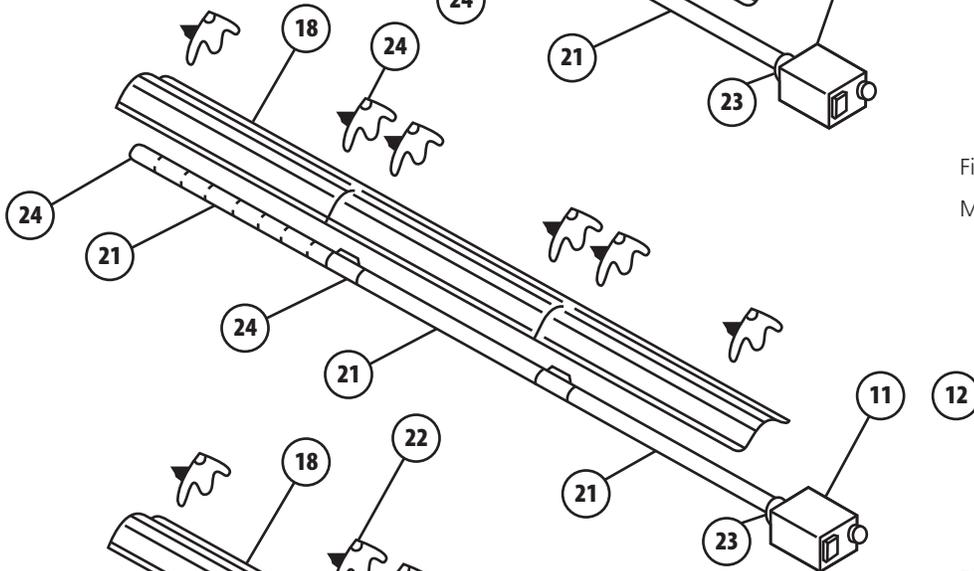


Figure "B" - Assembly
Model ERXL-80

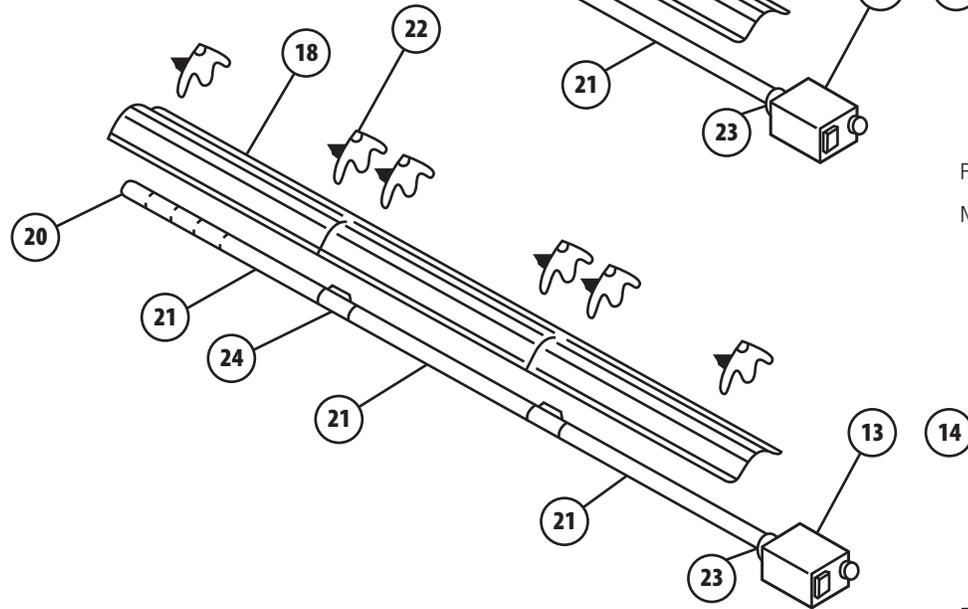


Figure "C" - Assembly
Model ERXL-100s

Parts List for Packaged Ener-Radiant XL Tube Heaters

Item	Stock#	Description	Number Required											
1	F107404XL	ERXL-100 NG COMP / 40'	X											
2	F107405XL	ERXL-100 LP COMP /40'		X										
3	F107406XL	ERXL-125 NG COMP / 50'			X									
4	F107407XL	ERXL-125 LP COMP / 50'				X								
5	F107408XL	ERXL-150, NG COMP / 50'					X							
6	F107409XL	ERXL-150, LP COMP / 50'						X						
7	F107420XL	ERXL-175, NG COMP / 50'					X							
8	F107421XL	ERXL-175, LP COMP / 50'						X						
9	F107416XL	ERXL-125S, LP COMP / 40'							X					
10	F107417XL	ERXL-125S, LP COMP / 40'								X				
11	F107418XL	ERXL-150L, LP COMP / 60'									X			
12	F107419XL	ERXL-150L, LP COMP / 60'										X		
13	F107422XL	ERXL-175L, LP COMP / 60'									X			
14	F107423XL	ERXL-175L, LP COMP / 60'										X		
15	F102654XL	ERXL-100 NG / BRN & Cont Box	1											
16	F102655XL	ERXL-100 LP / BRN & Cont Box		1										
17	F102656XL	ERXL-125S, ERXL-125 NG / BRN & Cont Box			1				1					
18	F102657XL	ERXL-125S, ERXL-125 LP / BRN & Cont Box				1				1				
19	F102658XL	ERXL-150L, ERXL-150 NG / BRN & Cont Box					1				1			
20	F102659XL	ERXL-150L, ERXL-125 LP / BRN & Cont Box						1					1	
21	F102660XL	ERXL-175L, ERXL-175 NG / BRN & Cont Box						1						
22	F102661XL	ERXL-175L, ERXL-175 LP / BRN & Cont Box				1			1					
23	F106403	ERXL-150L / TUBE SYS / 60'										1	1	
24	F106406	ERXL-100, ERXL-125S / TUBE SYS / 40'	1	1					1	1				
25	F106407	ERXL-125, ERXL-150 / TUBE SYS / 50'			1	1	1	1						
26	00418A	REFLECTOR / T.H.	4	4	5	5	5	5	4	4	6	6		
27	06413	TUBE H.E. 4" O.D. X 10'	3	3	4	4	4	4	3	3	5	5		
28	06423	TRANSITION TUDE ASSEMBLY	1	1	1	1	1	1	1	1	1	1		
29	14585	HANGER / TUBE & REFLECTOR	8	8	10	10	10	10	8	8	12	12		
30	14587	TUBE SUPPORT - 5'	1	1	1	1	1	1	1	1	1	1		
31	14612	TUBE COUPLING ASSEMBLY	3	3	4	4	4	4	3	3	5	5		

*Items 23, 24,25 include the following items: 26, 27, 28, 29, 30.

Figure "D" - Assembly
Model ERXL-100, ERXL-125S

Figure "E" - Assembly
Model ERXL-125, ERXL-150,
ERXL-175

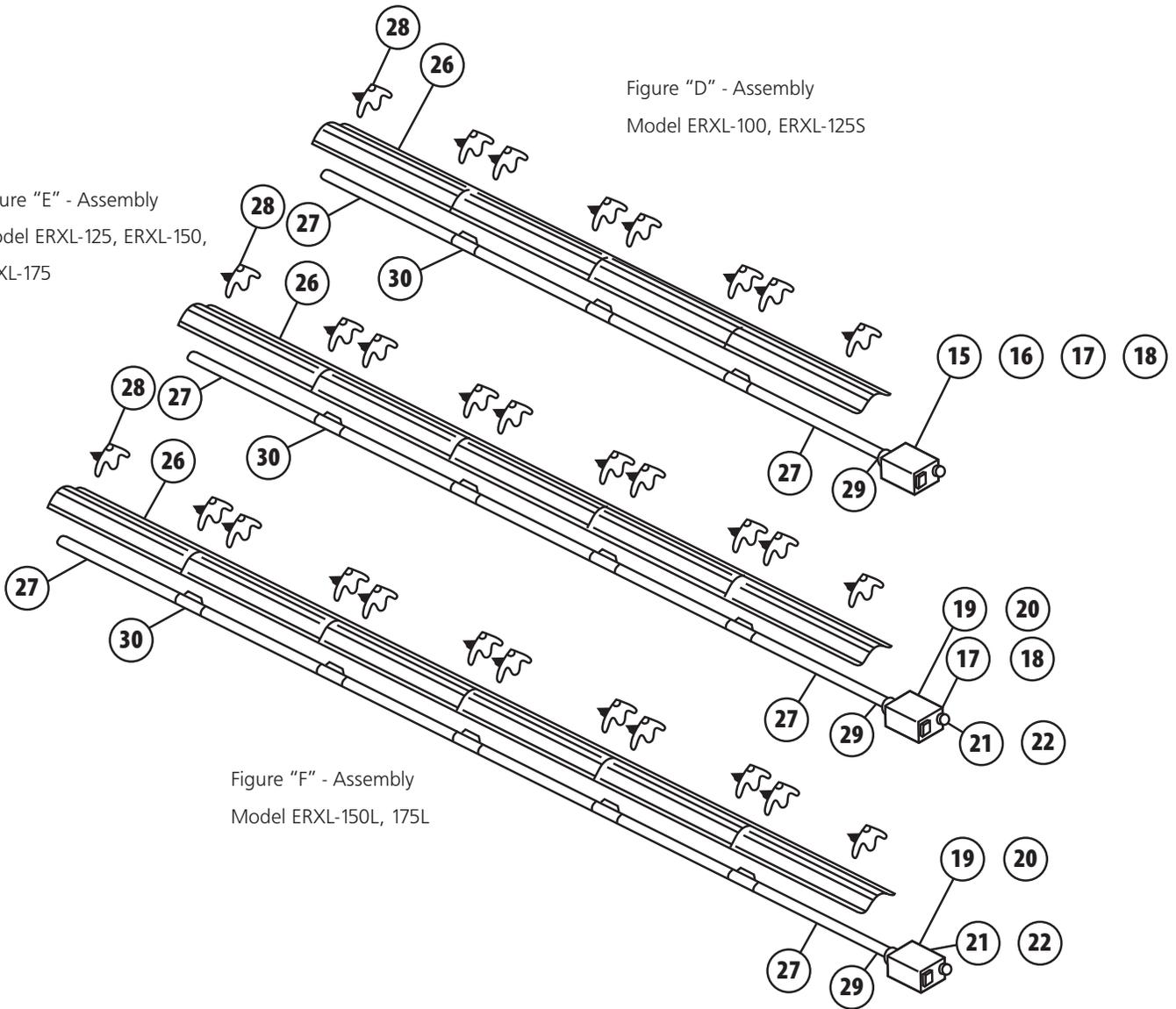


Figure "F" - Assembly
Model ERXL-150L, 175L

SECTION 3

Installation & Assembly

FIGURE 2: Ener-Radiant XL Overview Key

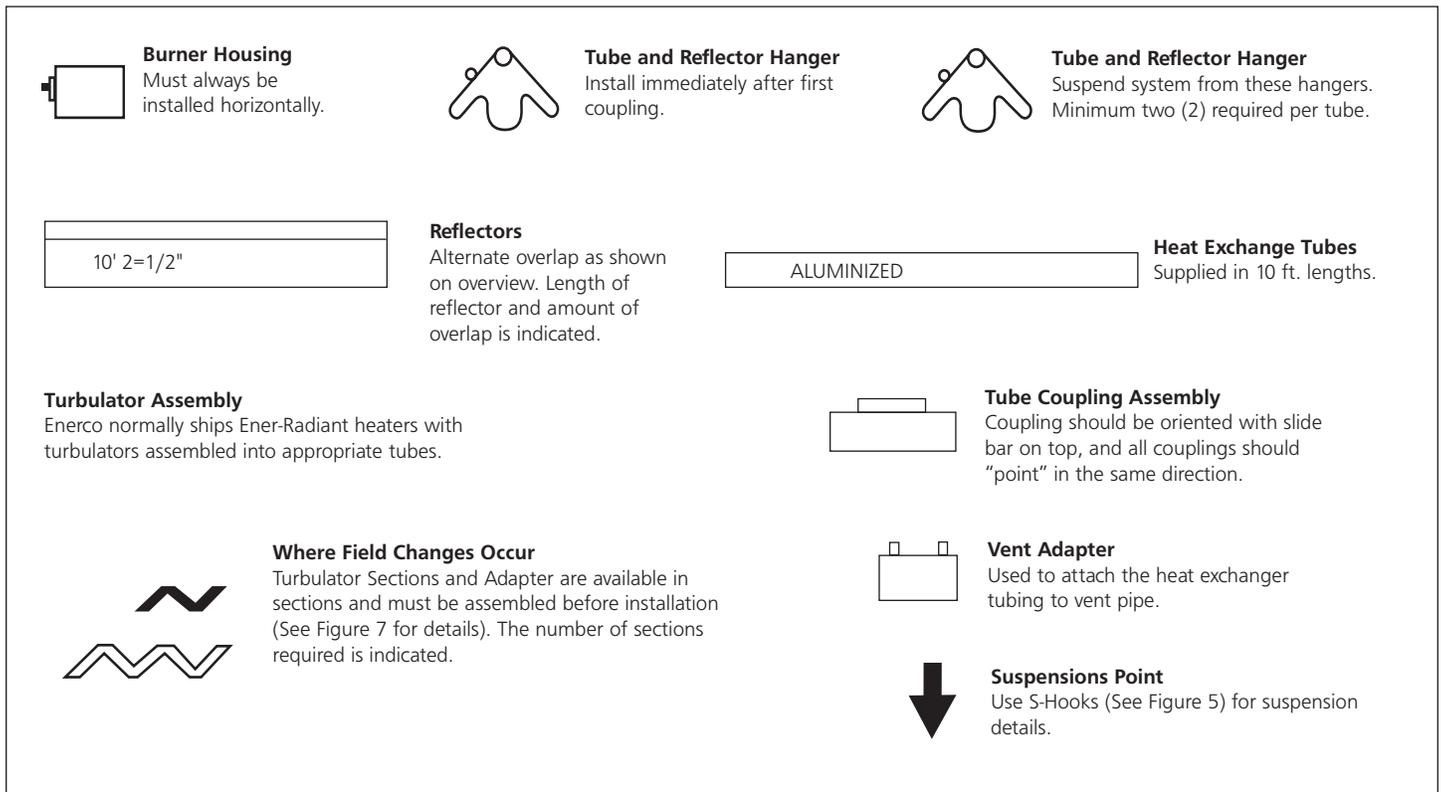


FIGURE 2a: Ener-Radiant XL Model ERXL-60, ERXL-80S, Assembly Overview

20 ft. Exchanger length. 21 ft. - 4 in. Total Heater length. 4 Suspension points indicated.

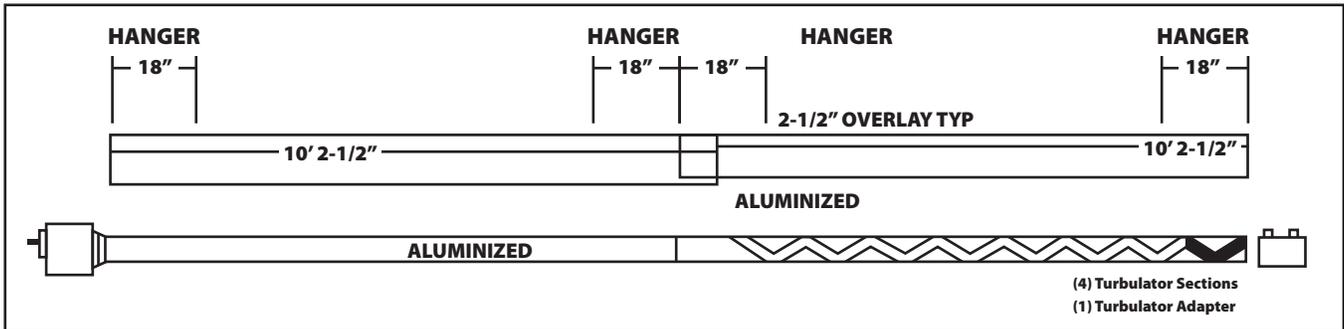


FIGURE 2b: Ener-Radiant XL Model ERXL-80, Assembly Overview

30 ft. Exchanger length. 31 ft. - 4 in. Total Heater length. 6 Suspension points as indicated

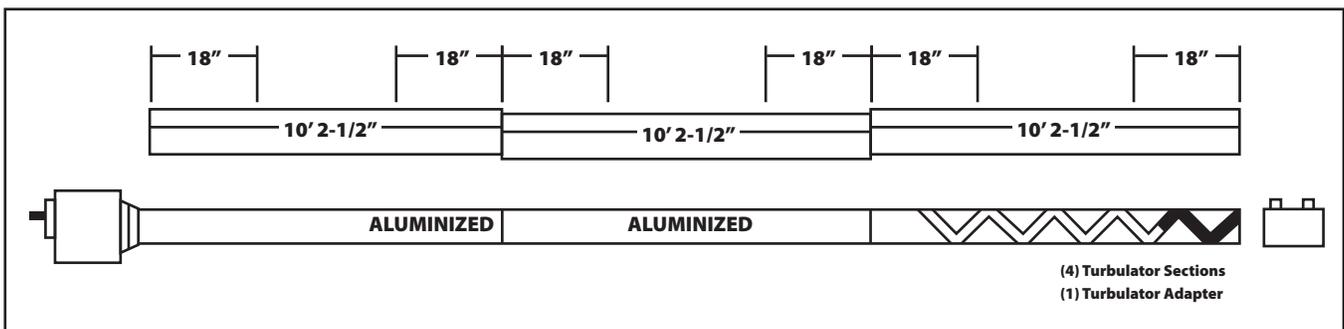


FIGURE 2c: Ener-Radiant XL Model ERXL-100S Assembly Overview

30 ft. Exchanger length. 31 ft. - 4 in. Total Heater length. 6 Suspension points as indicated.

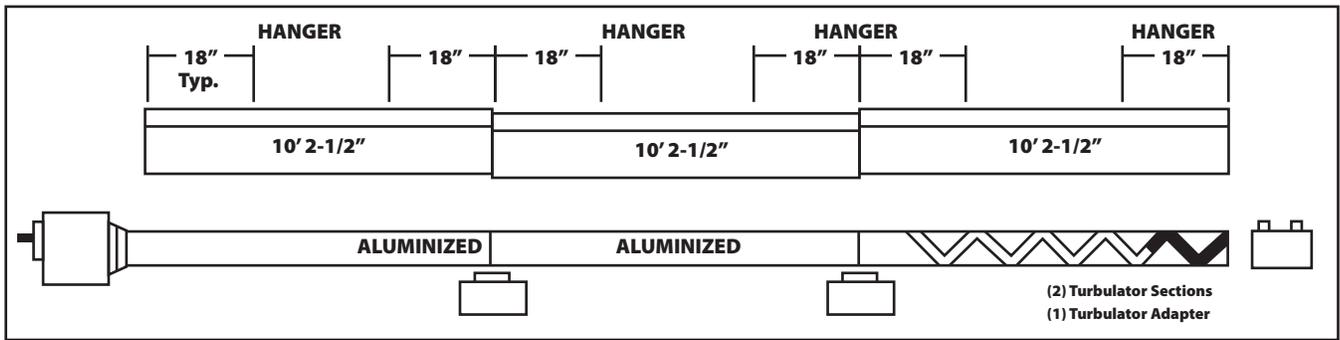


FIGURE 2d: Ener-Radiant XL Model ERXL-100, ERXL-125S

40 ft. Exchanger length. 41 ft. - 4 in. Total Heater length. 8 Suspension points as indicated.

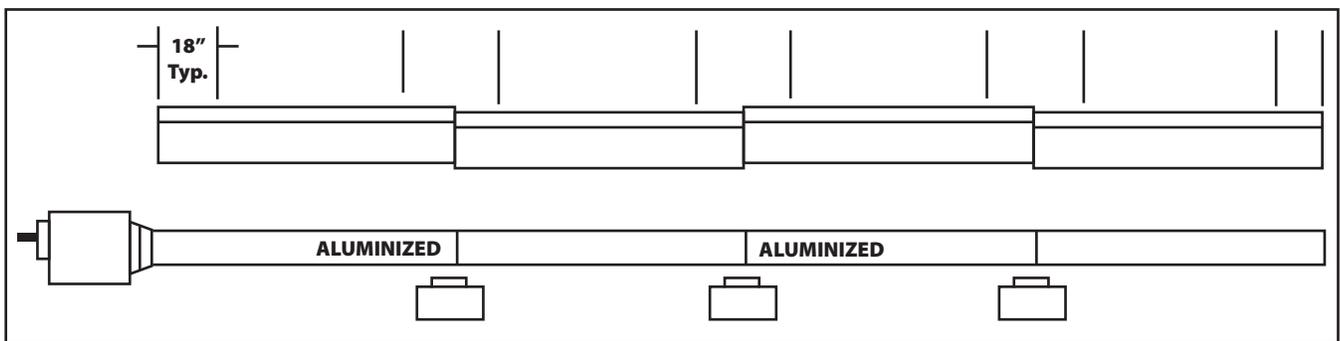


FIGURE 2e: Ener-Radiant XL Model ERXL-125, ERXL-150, ERXL-175

50 ft. Exchanger length. 51 ft. - 4 in. Total Heater length. 10 Suspension points as indicated.

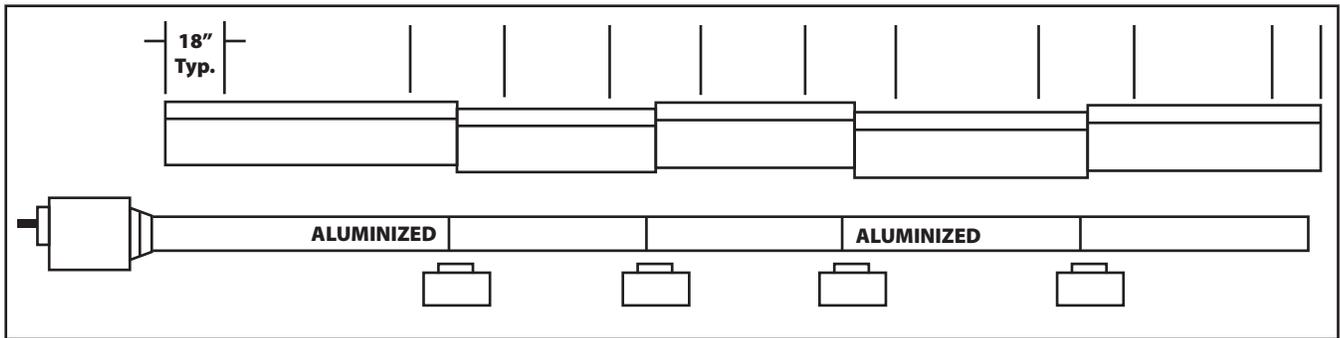
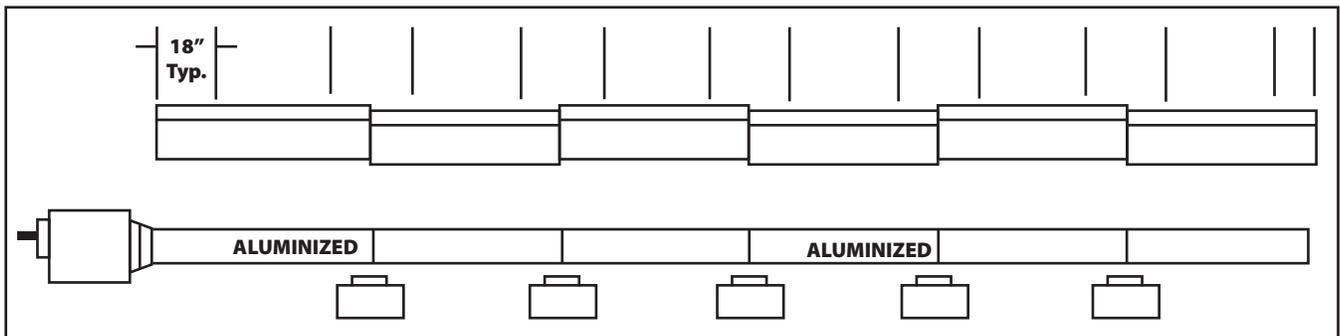


FIGURE 2f: Ener-Radiant XL Model ERXL-150L, ERXL-175L

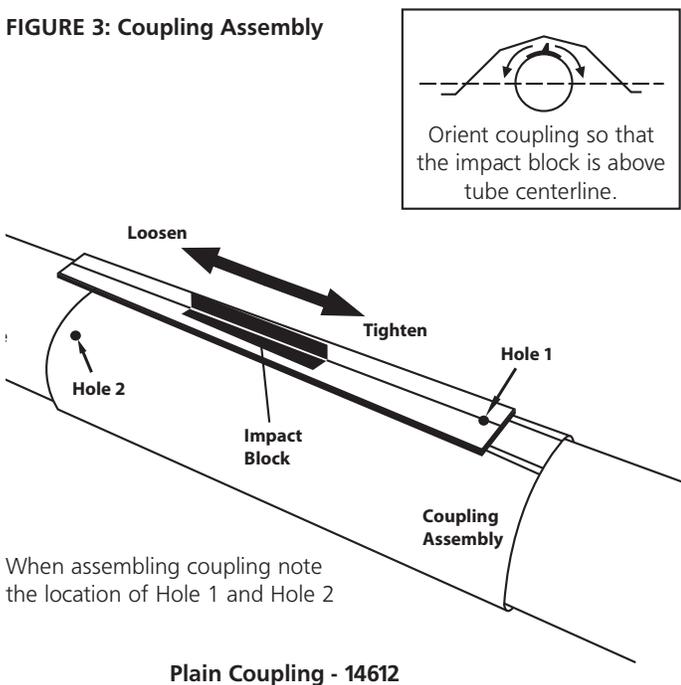
60 ft. Exchanger length. 61 ft. - 4 in. Total Heater length. 12 Suspension points as indicated.



Assemble the heater components as shown in Figures 2a, 2b, 2c, 2d, 2e, and 2f. Optional reflector configurations are shown in (Figure 1). Install appropriated suspension hardware, beam clamps, chain or rod at predetermined locations. Adjustment of chain length will provide uniform pitch.

Couplings: Tube and tube fittings are connected by wrap-around couplings which clamp by means of a tapered, hammer-driven lock member. The starting ends of the coupling and lock member are identified by 1/4" holes which are put together when starting assembly. Be sure the tube ends are in line and tube ends butt against stop pin(s) inside coupling. The slide bar is to be hammer-driven to a point of securing the coupling snugly to the tubes. Over-driving will result in distortion of the coupling or slide bar lip to a point decreasing the holding the capability of the coupling. Coupling should be tight when the slide bar is +/- 2" from the end of the coupling. (See Figure 3)

FIGURE 3: Coupling Assembly



When assembling coupling note the location of Hole 1 and Hole 2

TURBULATOR BAFFLE ASSEMBLY INSTRUCTIONS

For ease of field installation, the turbulator should be installed in the tube before hanging the system.

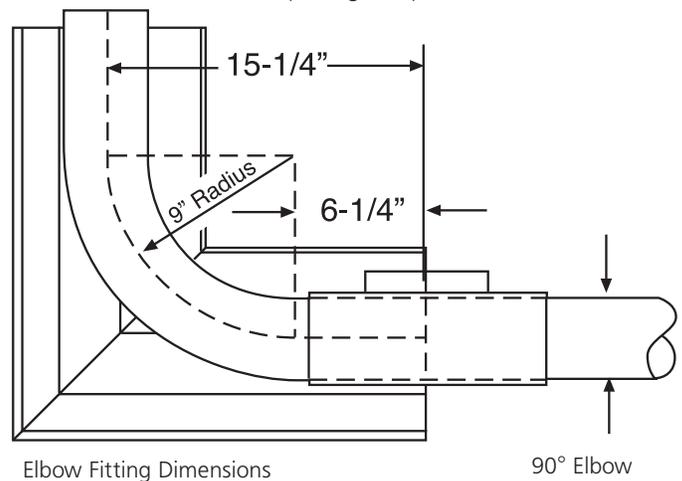
Use the following procedure:

- 1) Assemble turbulator pieces by "twisting" matching ends together.
- 2) Insert a long wire (11 ft. minimum) down the length of the tube.

- 3) Attach the wire to the hole in the tab on the adapter piece.
- 4) Using the wire, pull the assembled turbulator into the tube from the opposite side.
- 5) Pull the turbulator through until just the tab comes out. Detach the wire.
- 6) Bend the tab around the tubing. When installing the tube, the tab will be locked in place by the adapter.

FIGURE 4: Installation of Elbow & Coupling (optional equipment)

Elbow Package: Stk. # F106415 Elbow Package includes: (1) elbow, (1) coupling and (1) reflector. Install elbow into radiant tube sequence where plans indicate a 90° bend (see Figure 4).



Stk. # F106414 U-Tube Package includes:

(1) U-tube, (1) coupling and (2) reflectors. Install U-tube elbow into radiant tube sequence where plans indicate a 180° bend (see Figure 4).

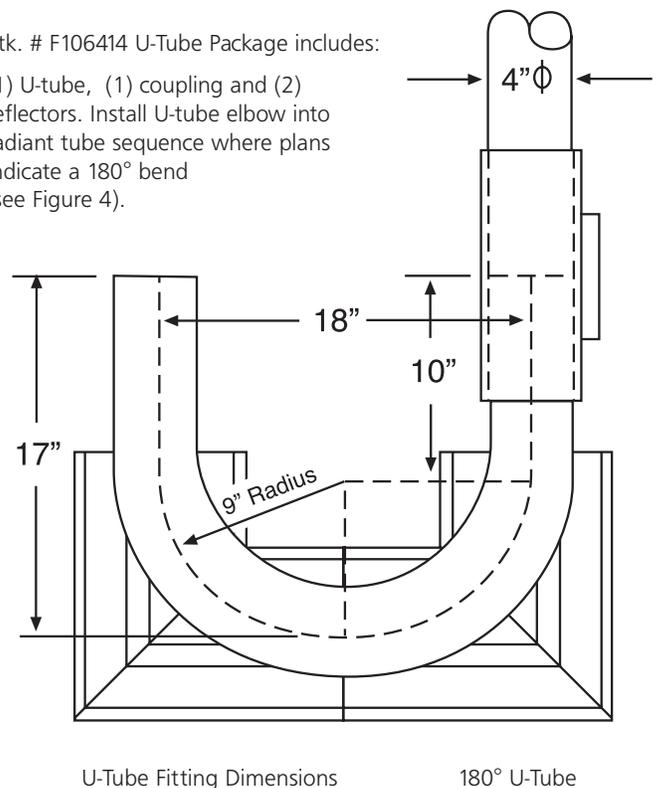
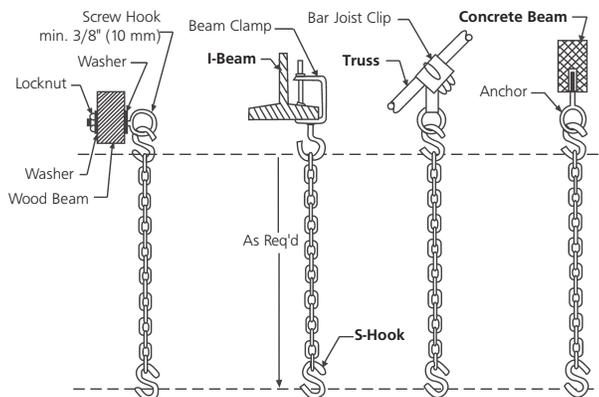


FIGURE 5: Typical Suspension Details



Chain kit - Stk. #17370

One chain kit will suspend one 10 ft. section of tube and one 10 ft. section of reflector.

FIGURE 6: Tube and Reflector Hanger

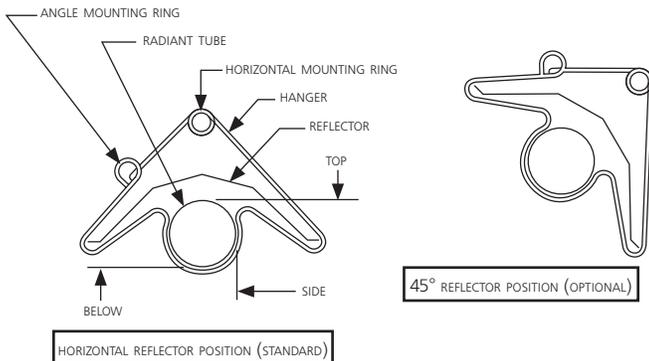
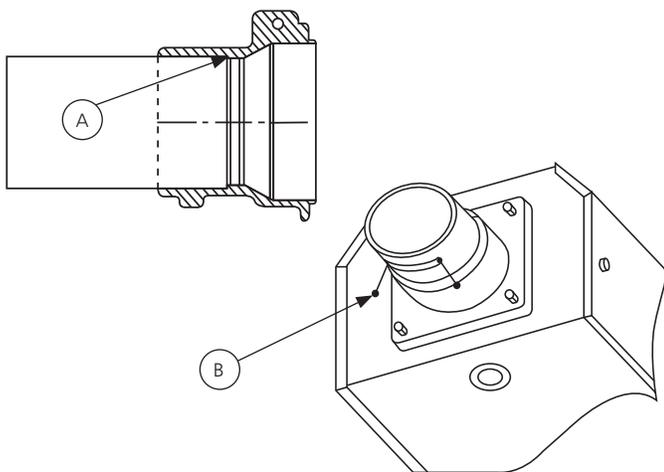
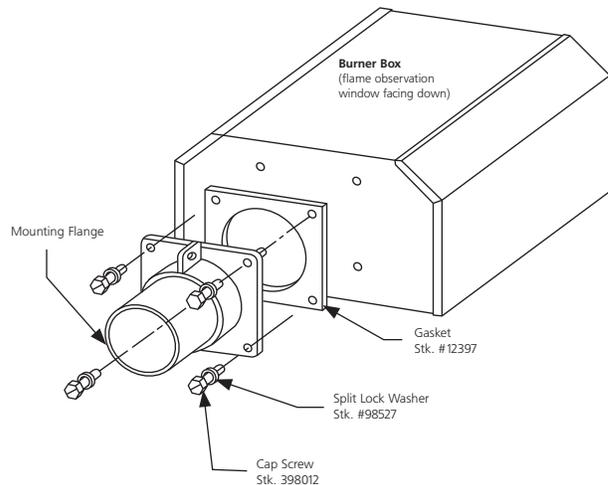


FIGURE 7: Mounting Flange / Tube Detail



- 1) Insert tube 06413 into front casting to point (A).
- 2) Tighter set screws marked (B) until snug.
- 3) After both set screws are snug, turn each additional 1/4 turn to secure tube in place.

FIGURE 8: Burner Box / Transition Tube Detail



SECTION 4

Venting / Ducting

General Requirements

Heater must be vented in accordance with specification ANSI Z223.1 - latest revisions. Partial information relating to this specification is provided in this section with regard to size and configurations for venting arrangements (see Figures 12, 13, 14, 15, 16). For complete information consult ANSI Z223.1 - latest revision and applicable local codes. Use the following guidelines to help insure an adequate, safe venting arrangement.

- a) Be sure that method selected for venting heater complies with all codes as required for each particular location.
- b) Exhaust end of heater will accept a four (4") inch flue pipe using the flue pipe adapter.
- c) Heater may be vented to the outdoors either vertically or horizontally.
- d) If heater is to be vented horizontally:
 - 1) *Vent must exit building not less than seven (7') feet above grade when located adjacent to public walkways.*
 - 2) *Vent must terminate at least three (3') feet above any forced air inlet located within ten feet (10').*
3) Vent must terminate at least four (4') feet below, four (4') feet horizontally from, or one (1') foot above any door, window, or gravity inlet into any building.
 - 4) *Vent terminal shall be located at least twelve (12") inches from any opening through which vent gases could enter the building.*
- e) Vent terminal must be beyond any combustible overhang.
- f) If condensation in the flue is a problem, the flue length should be shortened or insulated.
- g) For vent specifications all of the following conditions must be met.
 - 1) *Maximum total vent length allowed in forty-five (45') feet.*
 - 2) *Maximum outside air supply duct allowed forty-five (45') feet.*
 - 3) *Maximum total vent length plus outside air supply length plus extension package shall not exceed sixty-five (65') feet.*
 - 4) *Under length conditions 1) through 3) above — a total of two (2) elbows are allowed for vent and outside air supply together. Subtract fifteen (15') feet per additional elbow from maximum length allowed if more than two (2) elbows are used.*

Alternative Arrangements / Optional Equipment for Venting

Unvented Operation

- a) Sufficient ventilation must be provided in the amount of 4 CFM per 1,000 BTU/hr. firing rate.
- b) Refer to ANSI Z223.1 - latest revision, NFPA-54 and local codes for additional information.
- c) Use of optional outside combustion air is not

recommended with unvented heaters due to pressure considerations.

Horizontal Venting

- a) In combustible or noncombustible walls, use Tjerblund VH1-4" (Stk. #19022). Follow vent manufacturer's instructions for proper installation. (Alternative vent Enerco Stk. #19023).
- b) Four (4") inch O.D. flue pipe is required. Thirty (30') feet maximum length is recommended. Up to forty-five (45') feet maximum may be used if insulated to prevent excess condensation. (See General Requirements on page 21 for additional information).
- c) All flue joints should be sealed using suitable product such as General Electric RTV106 or Permatex Form-A-Gasket Red High Temperature Silicone Adhesive Sealant.
- d) Vent terminal should be installed at a height sufficient to prevent blockage by snow.
- e) Building materials should be protected from degradation by flue gases.

Vertical Venting

- a) Four (4") inch O.D. flue pipe, maximum forty-five (45') feet in length may be used as shown with approved vent cap. (See General Requirements on page 21 for additional information.)
- b) An insulated thimble may be required to pass through combustible structures (check local codes).
- c) All flue joints should be sealed using suitable products (see recommendation for horizontal venting.)

Draft Hood Venting

- a) Refer to ANSI Z223.1 - latest revision, NFA-54 for heights and vent sizes recommended for proper venting. (Check local codes for additional information.)
- b) Minimum six (6") inch O.D. vent is recommended.

Common Venting

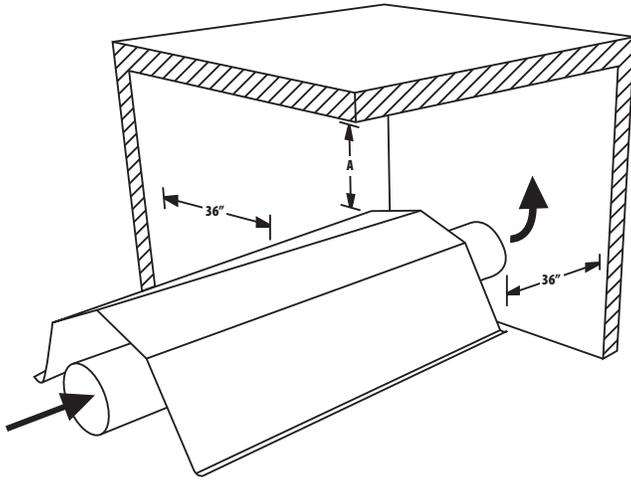
- a) Horizontal run to vent must never exceed 75% of the vertical height of the vent. Refer to ANSI Z223.1 - latest revision, NFA-54 for proper vent sizes and installation.
- b) Open area of common vent must equal the sum of the open area of individual vents connected to it. (See chart and diagrams - page 25.)
- c) Use double wall vent as required (check codes.)
- d) Heaters sharing a common vent must be controlled by the same thermostat.
- e) All joints must be sealed using suitable products (see recommendation for horizontal vent - page 24.)
- f) Connections to common stack must be positioned to avoid direct opposition between

streams of combustion gases.

Outside Air Supply

- a) See procedure and diagram on page ??.

FIGURE 12: Unvented Operation



- 1) Ventilation equal to 4 CFM per 1,000 BTU/hr. firing rate must be provided in unvented heater installations.
- 2) For dimensions A "unvented" refer to (Figure 1 – Minimum Clearances to Combustibles.)

FIGURE 13a: Single Wall

Single wall vent run

Single wall terminal end

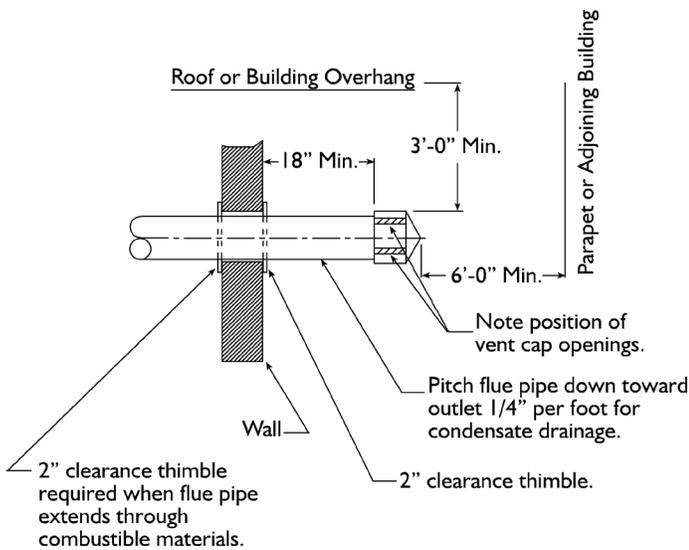


FIGURE 13b: Double Wall

Double wall vent run and

Double wall terminal end

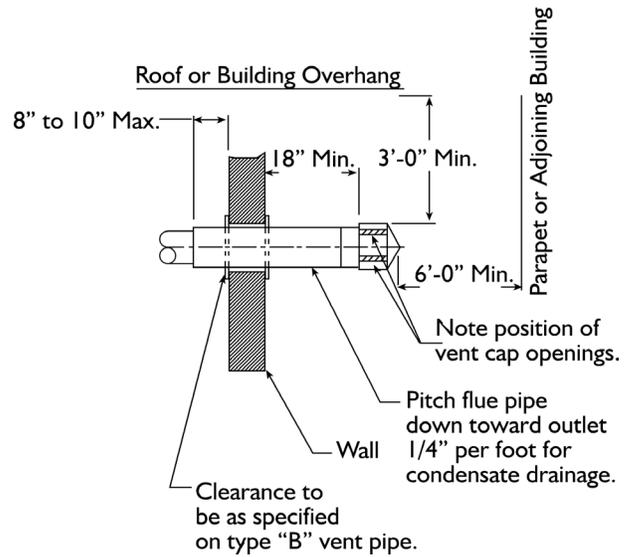


FIGURE 14: Vertical Venting

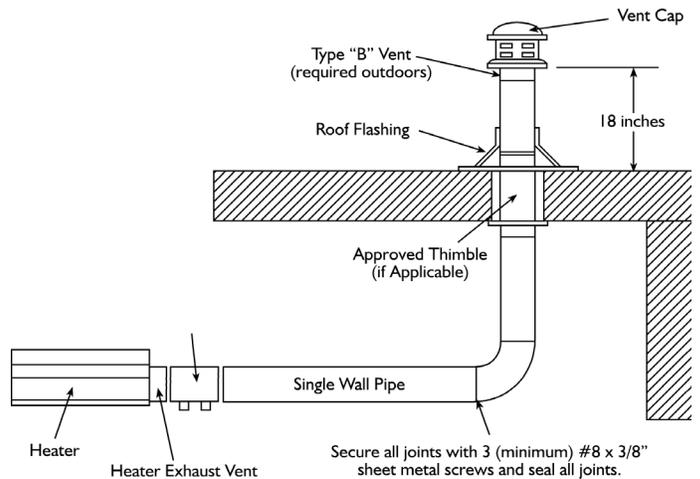
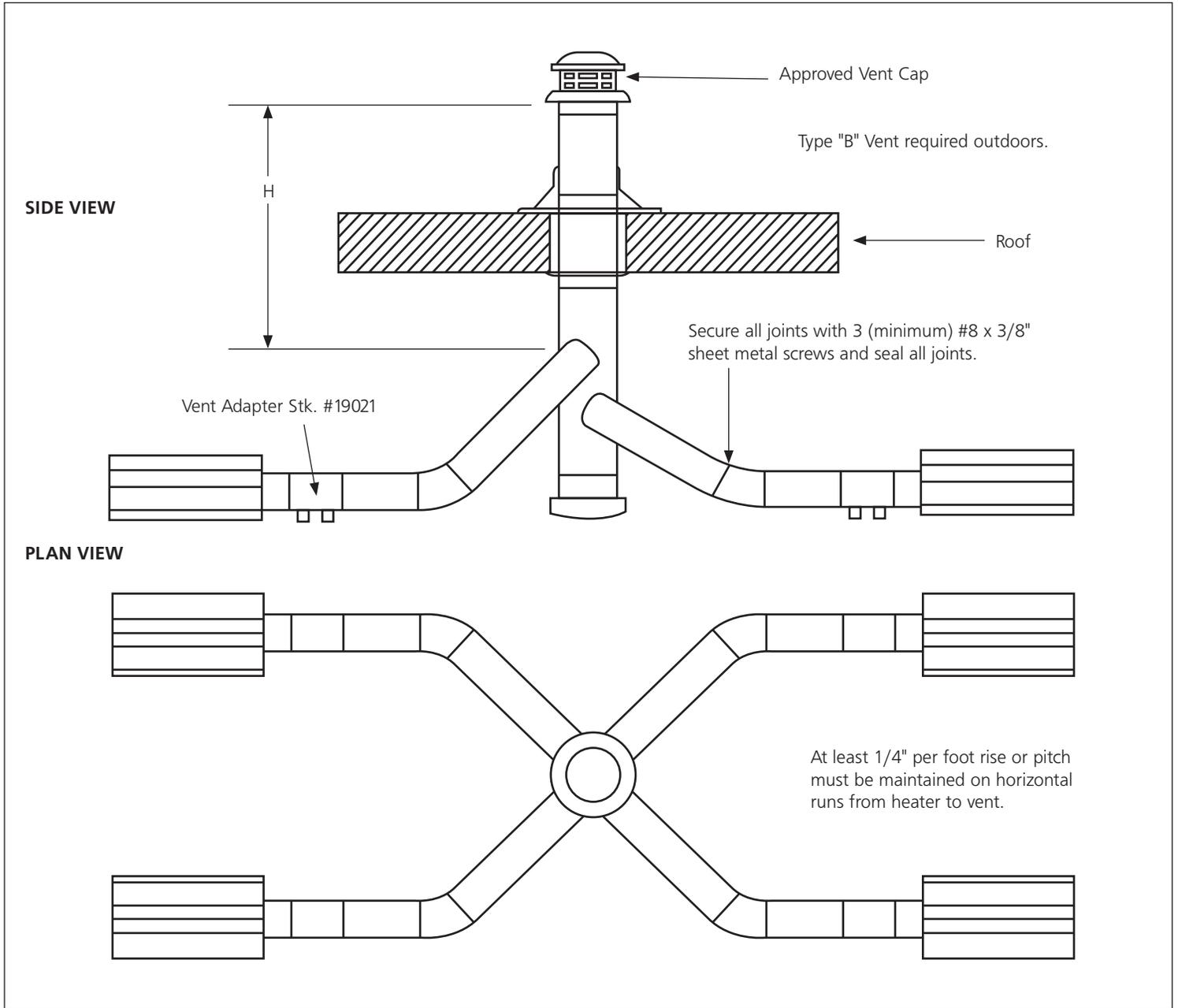


FIGURE 15: Common Roof Venting



COMMON VENTING - (2) Heaters

Model #	H = 6 ft.	H = 8 ft.	H = 15 ft.
ERXL-60	D = 7"	D = 6"	D = 6"
ERXL-80	D = 8"	D = 7"	D = 6"
ERXL-100	D = 8"	D = 8"	D = 7"
ERXL-125	D = 10"	D = 10"	D = 8"
ERXL-150	D = 10"	D = 10"	D = 8"
ERXL-175	D = 10"	D = 10"	D = 8"

COMMON VENTING - (4) Heaters

Model #	H = 6 ft.	H = 8 ft.	H = 15 ft.
ERXL-60	D = 10"	D = 10"	D = 8"
ERXL-80	D = 10"	D = 10"	D = 10"
ERXL-100	N/A	D = 12"	D = 10"
ERXL-125	N/A	D = 12"	D = 10"
ERXL-150	N/A	N/A	D = 12"
ERXL-175	N/A	N/A	D = 12"

Outside Combustion Air Supply

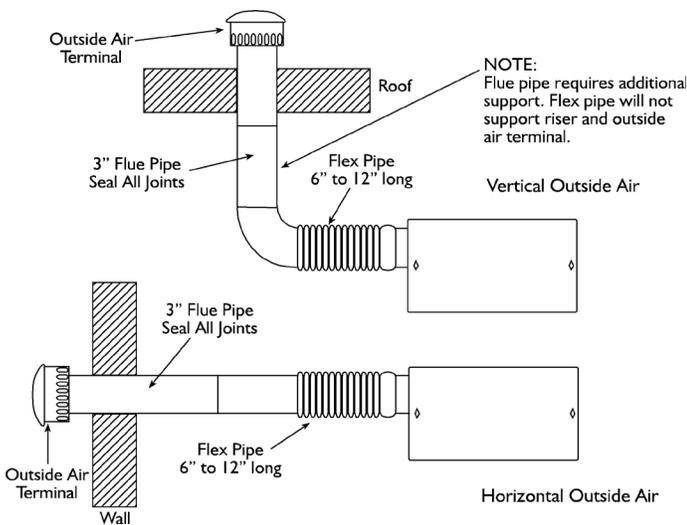
The Ener-Radiant XL heater is approved for installation with an outside air supply system. Some compounds such as halogenated hydrocarbons or other corrosive chemicals in the air can be drawn into the equipment and cause an accelerated rate of corrosion of some of the heater components. The use of such chemical compounds near the enclosure should be avoided.

IMPORTANT: If the building has a slight negative pressure or contaminants are present in the air, an outside combustion air supply to the heaters is strongly recommended.

For an outside air supply, a four (4") inch O.D. single wall pipe may be attached to the heater. The duct may be up to forty-five (45') ft. maximum length or two (2') ft. minimum length with no more than two (2) elbows. (See General Requirements in page 21 for additional information.) An outside air supply should not be used with the draft hood venting configuration.

The air supply duct may have to be insulated to prevent condensation on the outer surface. The outside air terminal should be securely fastened to the outside wall by drilling four (4) 1/4" diameter holes in the outside flange; wood screws or bolts and expansion sleeves may be used to fasten terminal.

FIGURE 16: Non-Pressurized Outside Air Supply Duct



Outside Air Terminal: Use ACME #104 Enerco Stk. #19030.

PVC Pipe, "Dryer Hose", or equivalent may be used instead of standard vent pipe.

SECTION 6

Gas Piping

Read applicable warnings in (Section 1) before proceeding with Gas Pipe installation. Improper installation may result in property damage, severe injury, or death.

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

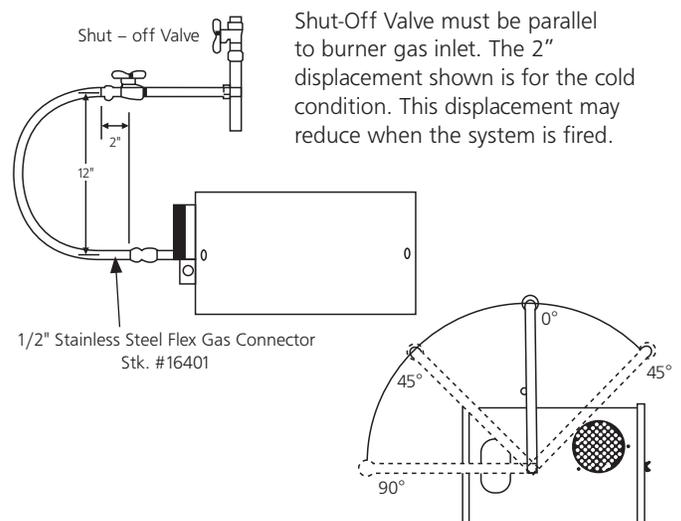
A 1/2" tapping at each burner location must be located and oriented as shown in (Figure 17). To check system pressure, put a plugged 1/8" NPT tapping in the gas line at the connection to the burner farthest from the supply. Before connecting the burners to the supply system, verify that all high pressure testing of the gas piping has been completed. Do not high pressure test the gas piping with the burners connected.

Follow these instructions to ensure a professional gas supply installation:

- Support all gas piping with suitable pipe hanging materials.
- Use wrought iron or wrought steel pipe and malleable iron fitting. All pipe fittings should be new and free from defects. Carefully ream the pipe and tubing ends to remove obstructions and burrs.
- Use L.P. gas-resistant joint compound on all pipe threads.
- Check the pipe and tubing ends for leaks before placing heating equipment into service. When checking for gas leaks, use soap and water solution: NEVER USE AND 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.

FIGURE 17: Gas Line Connection with Stainless Steel Flex Gas Connector



SECTION 6

Wiring

Heaters are normally controlled by thermostats. Line voltage thermostats are wired directly (see Figure 18a), the recommended 24V thermostats use a relay (see Figure 18b). Heaters must be grounded in accordance with the National Electric Code ANSI/NFPA - 70 - latest version. Heaters may also be controlled with a manual line voltage switch or timer switch in place of the thermostat.

FIGURE 18a: Line Voltage Thermostat Wiring

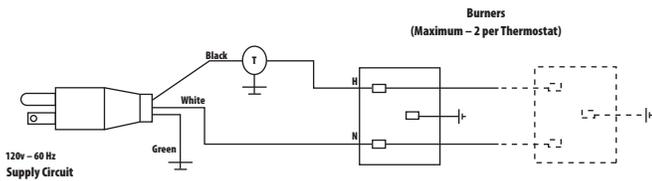


FIGURE 18b: Low Line Voltage Thermostat Wiring

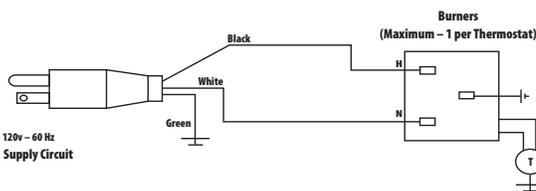


FIGURE 19: Wiring of Low Voltage Thermostat and Relay

When using 1-2 burners, use SPDT Transformer Relay / Stk. # 00172
 When using 3-4 burners, use DPDT Transformer Relay / Stk. # 00183
 Wires marked with an asterisk (*) are for use only with DPDT Transformer Relay.

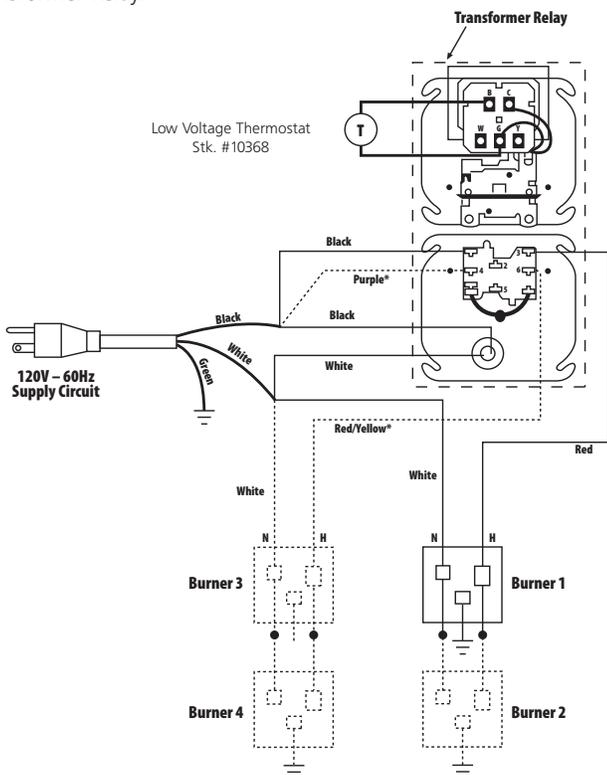
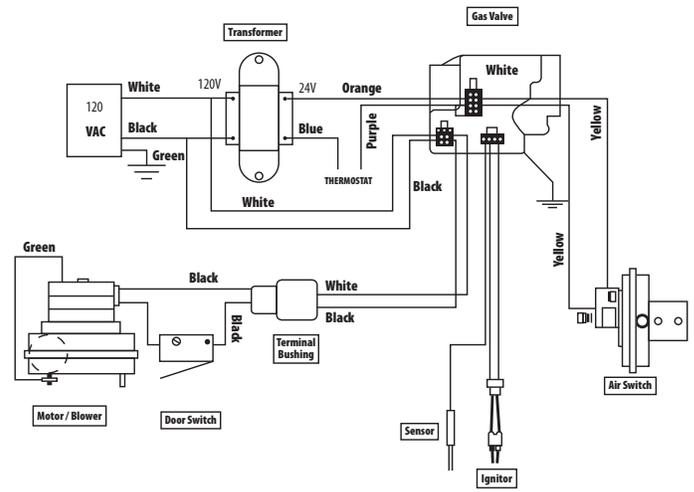
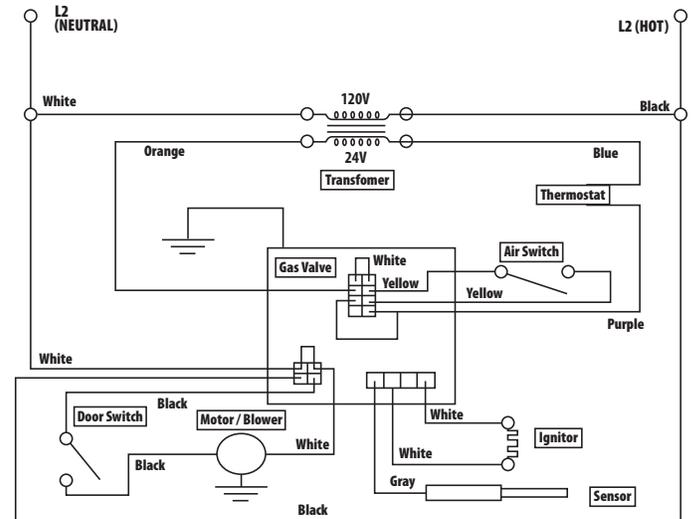


FIGURE 20: Ener-Radiant XL Burner Internal Wiring



- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C and 600 volts.
- Each burner must be electrically grounded in accordance with the National Electric Code ANSI/NFPA - 70 - latest version.

FIGURE 21: Ener-Radiant XL Burner Internal Wiring Ladder Diagram



SECTION 7

Operation & Maintenance

Sequence of Operation

1. Turn the thermostat up. When the thermostat calls for heat, blower motor will energize.
2. When the motor approaches nominal running RPM, the air proving switch closes and activates the ignition module.
3. The ignition module then energizes the hot surface igniter for a timed warm-up period (approximately 45 to 60 seconds.)
4. After the warm-up period, the gas valve is energized.
5. During the last part of the sequence, the igniter is de-energized and is converted to a flame sensing rod.
6. If a flame is detected, the gas valve remains open. When the call for heat is satisfied, and the system control mechanism de-energizes the burner line voltage supply, the gas valves are turned off.
7. If no flame is detected on a single-try module, the gas valve is closed, and the module will lockout until it is reset. Reset is accomplished by removing power from the module for at least five (5) seconds (thermostat cycle required.)
8. If no flame is detected on a three-trial module, the gas valve is closed, and a purge period begins. After the purge, the module acts to power the igniter for a second warm-up period, and a second trial for ignition period. If flame is still not established, a third and final purge, warm-up, and trial cycle begins. After three trials, the module will lockout until reset. Reset is accomplished by removing power from the module for at least five (5) seconds (thermostat cycle required.)
9. On a three-trial module, if flame is established and lost on the first or second trial, the gas valve is turned off, a purge, warm-up, and trial for ignition will occur on a three-trial module, only three trials for ignition are allowed per thermostat cycle.

Maintenance

For best performance, the following maintenance procedures should be performed before each heating season:

1. Be sure gas and electrical supply to heater are off before performing any service or maintenance.
2. Check condition of blower scroll and motor. Dirt and dust may be blown out with compressed air, or a vacuum cleaner may be used.
3. Check condition of burner. Carefully remove any dust or debris from inside the burner box or burner cup.
4. Inspect the igniter. Replace igniter if there is excessive carbon residue, erosion, breakage or other defects.
5. Check the inside of the firing tube with a flashlight. If carbon or scale are present, scrape out the deposits with a wire brush or rod, or metal plate attached to a wooden pole.
6. Check to see that the burner observation window is clean and free of cracks or holes. Clean or replace as necessary.

7. Check the flue pipe for soot or dirt. After cleaning as necessary, re-attach the flue pipe to the heater.
8. Outside surfaces of heater may be cleaned by wiping with a damp cloth.
9. A qualified service agency should be contacted for service other than routine maintenance.
10. Check vent terminal and fresh air inlet to see that they have not been blocked during the non-heating season. If either pipe is restricted, the air switch won't close, resulting in a no-heat situation.

Troubleshooting

CAUTION: Before opening the Ener-Radiant XL burner door for any type of service, be sure the gas supply has been shut off at the heater and the electrical cord from the burner box has been unplugged.

- | | |
|----------------------------|--|
| Blower Motor Fails to Run: | <ol style="list-style-type: none">1. Is the thermostat calling for heat? Is there 115V at the burner receptacle?2. Check blower side door for seal. Check door switch. Replace if necessary/3. Check blower for obstructions. Replace blower if necessary. |
| Igniter Does Not Glow: | <ol style="list-style-type: none">1. Check igniter for damage. Replace if necessary.2. Check voltage and resistance at igniter. (Voltage should be 115V. Resistance should be 40-75 ohms.)3. Check for obstructions to the air inlet and outlet.4. Check wiring and hose connections to the air switch. Replace if necessary.5. Check voltages at transformer primary and secondary. Replace transformer or module if necessary. |
| Valve Does Not Come On: | <p>Gas pressure downstream of gas control can be measure by using a manometer and connecting to pressure tap on control/</p> <ol style="list-style-type: none">1. Check to see if manual valve heater is ON.2. Check to see if manual valve knob on heater gas control in ON.3. Supply gas pressure can be checked at 1/8" NPT pressure tapping on heater external manual valve.4. Check to see if gas control is opening: no manifold pressure indicates valve is closed. <p>If the valve is closed, either the gas valve or the ignition module is faulty.</p> <p>WARNING: Do not disconnect ground leads inside heater. Do not interchange grounded and ungrounded leads on transformer or ignition module.</p> |
| Burner Does Not Light: | <ol style="list-style-type: none">1. Check to see if gas lines were properly purged of air.2. Check inlet and outlet gas pressure during ignition period. <p>Natural inlet pressure should be 4.6"</p> |

Natural outlet pressure should be 3.5"

LP inlet pressure should be 11.0"

LP outlet pressure should be 10.25"

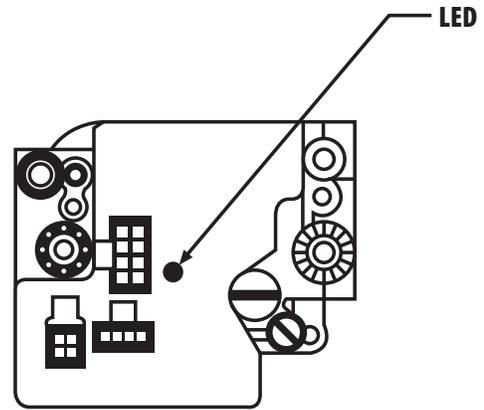
3. Check for proper orifice and air plate.

- Burner Does Not Stay Lit:
1. Check ground wire continuity.
 2. Check burner internal wiring for reversed leads.
 3. Check insulation on the igniter leads.
 4. Replace module if necessary.

Honeywell Valve LED Status

The Ener-Radiant XL series Tube Heater is equipped with a honeywell Smart Valve. This valve has a built-in diagnostic program, which will assist in troubleshooting in the event of a valve-related problem. The LED or (Light Emitting Diode) is located on the top of the valve as shown in diagram below. The LED status indications are listed below to help with the troubleshooting.

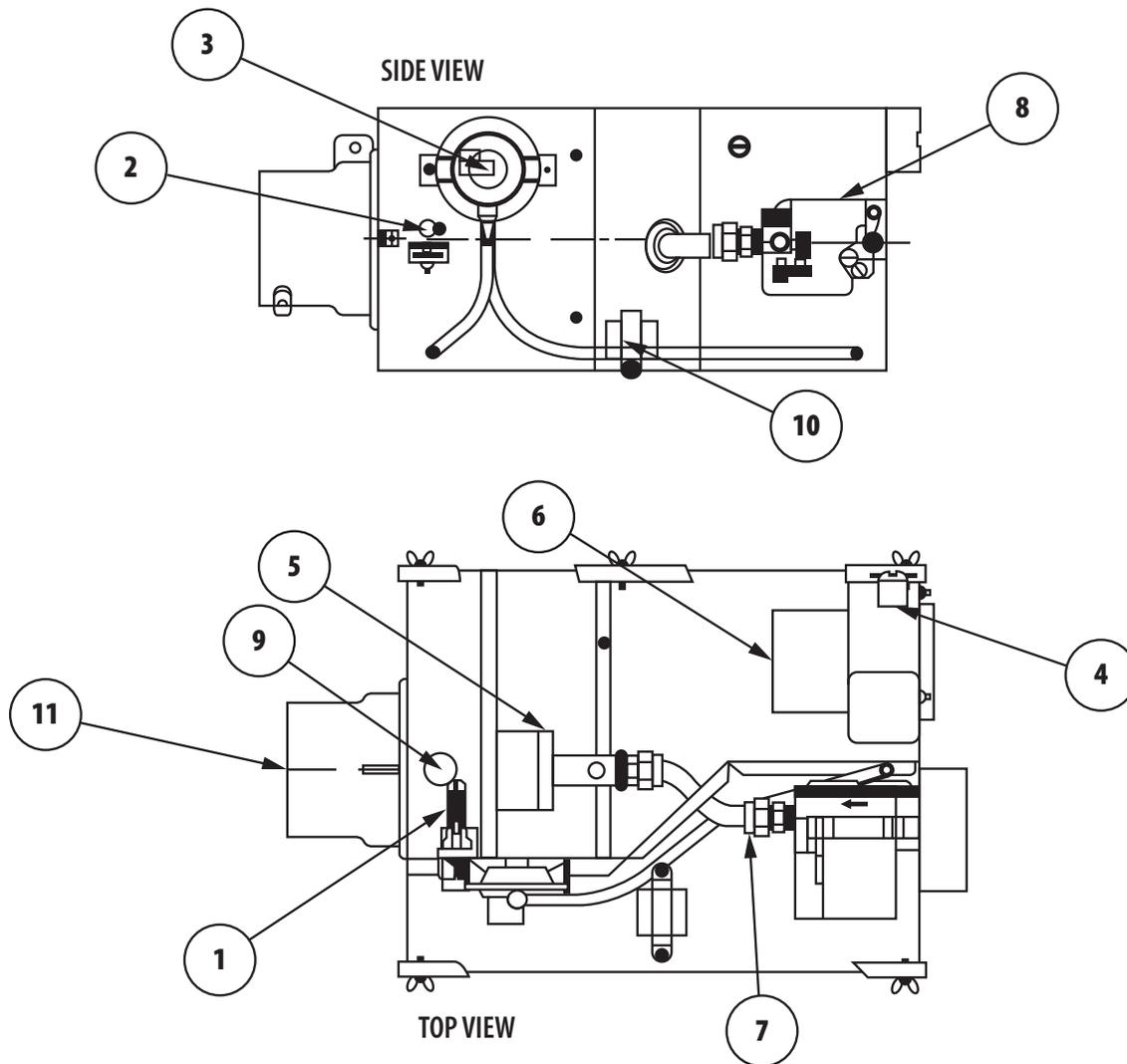
FIGURE 22:



OFF	INDICATED
Off	No power to the control
Bright-Dim	Normal operation. This indication shows whenever the system is powered, unless some abnormal event has occurred.
2-Flashes 30 switch	Airflow providing switch remains closed longer than seconds after call for heat begins (air providing stuck closed.)
3-Flashes	Airflow providing switch remains open longer than 30 seconds after combustion air blower is energized - or blower does not energize.
4-Flashes	White jumper wire is loose.
5-Flashes	Flame signal sensed out of proper sequence.
6-Flashes	System Lockout.

SECTION 9

Replacement Parts



Item	Part Number	Description
1	02731	Hot Surface Igniter
2	02730	Flame Sensor
3	10413A	Air Sensing Switch (ERXL-60, 80, 100, 125)
	10414A	Air Sensing Switch (ERXL-150, 175)
4	01391A	Door Switch
5	02371	Burner Cup Assembly
6	07376	Motor and Blower Assembly
7	17376	Manifold
8	00016	Gas Valve - Natural Gas
	00017	Gas Valve - LP Gas
9	12404	Inspection Window
10	08364A	Transformer
11	02729	Tube Flange Casting

SECTION 10

Engineering Specifications

The total heating system supplied shall be design certified by the American Gas Association and the Canadian Gas Association.

A. Burner & Burner Controls

- Burners shall be capable of firing with one of the fuel options as specified on the purchase documents: Natural Gas or LP.
- Burners shall be supplied to fire at any one of the input rates as specified.

ERXL-60	60,000 BTU/Hr.	ERXL-125	125,000 BTU/Hr.
ERXL-80	80,000 BTU/Hr.	ERXL-150	150,000 BTU/Hr.
ERXL-100	100,000 BTU/Hr.	ERXL-175	175,000 BTU/Hr.
- Burner shall be equipped with a direct sense silicon-carbide hot surface ignition control system with 100% shut-off ignition device. Power supplied to each heater shall be 120V, 60Hz, single phase. Burners shall be rated for 1.0 Amp (run) and 5.0 Amp (start.)
- Burner shall be equipped with thermal overload motor protection, balanced air rotor, combustion air proving safety pressure switch, and viewing window for flame observation.
- When specified, in contaminated environments, the burner shall be capable of supplying outside air to each burner for the support of combustion.
- All burners shall be pre-wired with a grounded electrical cord and plug.
- At customer's choice, burners may be controlled with either an optional line voltage thermostat or by optional low voltage thermostats with an appropriate low voltage transformer relay.
- Gas supply to the burners shall conform to the following:
 1/2" NPT gas connector size
 Natural Gas: 4.6" W.C. MIN, 14.0" W.C. MAX
 LP Gas: 11" W.C. MIN, 14.0: W.C. MAX

B. Heat Exchanger

- Radiant tubing shall be 4" diameter aluminized steel supplied in 10 ft. sections. Sections shall be joined with stainless steel wrap-around couplings.
- Reflector to be of aluminum material and designed to direct all radiant output below horizontal centerline of radiant tube.
- Heaters shall be vented according to manufacturer's recommendations.

Burner Ratings and Heat Exchanger Lengths: (Natural and LP)

Model #	Rate (BTU/Hr.)	Heat Exchanger Length	Turbulator
ERXL-60	60,000	20 ft.	10 ft.
ERXL-80S	80,000	20 ft.	10 ft.
ERXL-80	80,000	30 ft.	10 ft.
ERXL-100S	100,000	30 ft.	5 ft.
ERXL-100	100,000	40 ft.	None
ERXL-125S	125,000	40 ft.	None
ERXL-125	125,000	50 ft.	None
ERXL-150	150,000	50 ft.	None
ERXL-150L	150,000	60 ft.	None
ERXL-175	175,000	50 ft.	None
ERXL-175L	175,000	60 ft.	None

Gas pressure at MANIFOLD:

Natural Gas: 3.5" W.C.

LP Gas: 10.5" W.C.

1/2" NPT Gas Connector Size

Gas INLET pressure:

Natural Gas: 4.6" W.C. Min

11.0" W.C. Max

LP Gas: 11.0" W.C. Min

14.0" W.C. Max

1/2" NPT Gas Connector Size

Electrical Rating: (All Models)

120V - 60Hz

1.0 AMP (Run) 5.0 AMP (Start)

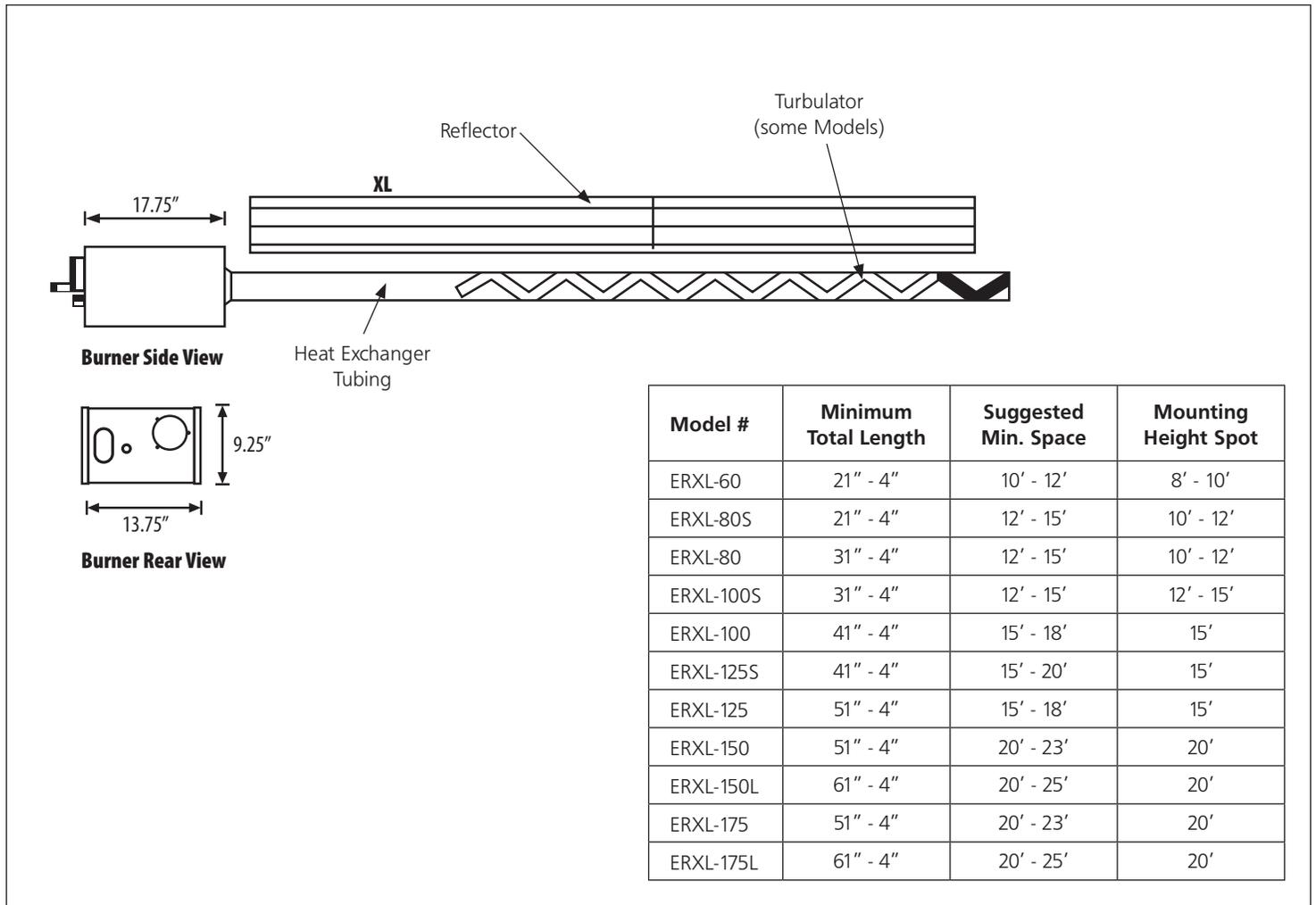
Dimensions:

Flue Connection Size: 4"

Outside Air Connection Size: 4"

FIGURE 25: Ener-Radiant XL Dimensions & Suggested Mounting Heights

Minimum Total Length (see chart below)



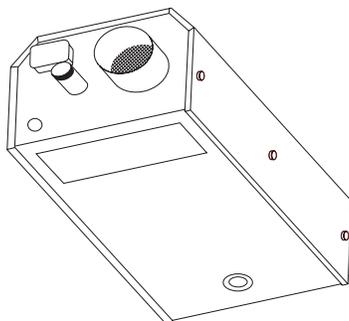
THIS PAGE INTENTIONALLY LEFT BLANK.

OPERATING INSTRUCTIONS AND OWNER'S MANUAL

HEATSTAR

MODEL

ERXL-60
ERXL-80 ERXL-80S
ERXL-100 ERXL-100S
ERXL-125 ERXL-125S
ERXL-150 ERXL-150L
ERXL-175 ERXL-175L



WARNING:

USE ONLY MANUFACTURER'S REPLACEMENT PARTS. USE OF ANY OTHER PARTS COULD CAUSE INJURY OR DEATH. REPLACEMENT PARTS ARE ONLY AVAILABLE DIRECT FROM THE FACTORY AND MUST BE INSTALLED BY A QUALIFIED SERVICE AGENCY.

FOR INFORMATION REGARDING SERVICE OR PARTS:

Contact your local heating service technician or dealer.

FOR ADDITIONAL INFORMATION:

Please call Toll-Free 800-251-0001—www.enerco.com

Our office hours are 8:30 AM — 5:00 PM, EST, Monday through Friday.

Please have the model number, serial number and date of purchase ready.

LIMITED WARRANTY

The company warrants this product to be free from imperfections in material or workmanship, under normal and proper use in accordance with instructions of The Company, for a period of one year from the date of delivery to the buyer. The Company, at its option, will repair or replace products returned by the buyer to the factory, transportation prepaid within said one year period and found by the Company to have imperfections in material or workmanship.

If a part is damaged or missing, call our Customer Service Department at 800-251-0001.

Address any Warranty Claims to the Customer Service Department, ENERCO, 4560 W. 160TH ST., CLEVELAND, OHIO 44135. Include your name, address and telephone number and include details concerning the claim. Also, supply us with the purchase date and the name and address of the dealer from whom you purchased our product.

The foregoing is the full extent of the responsibility of the Company. There are no other warranties, express or implied. Specifically there is no warranty of fitness for a particular purpose and there is no warranty of merchantability. In no event shall the Company be liable for delay caused by imperfections, for consequential damages, or for any charges of the expense of any nature incurred without its written consent. The cost of repair or replacement shall be the exclusive remedy for any breach of warranty. There is no warranty against infringement of the like and no implied warranty arising from course of dealing or usage of trade. This warranty will not apply to any product which has been repaired or altered outside of the factory in any respect which in our judgment affects its condition or operation.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This Warranty gives you specific legal rights, and you may have other rights which vary from state to state.

Enerco reserves the right to make changes at any time, without notice or obligation, in colors, specifications, accessories, materials and models.

Enerco, 4560 W. 160TH ST., CLEVELAND, OHIO 44135 • 216-881-5500
© 2003, Enerco/Mr. Heater. All rights reserved



CSA REQUIREMENT 7-89
ANSI Z21.86B 2002
ANS Z83.20 • CSA 2.34-2003