

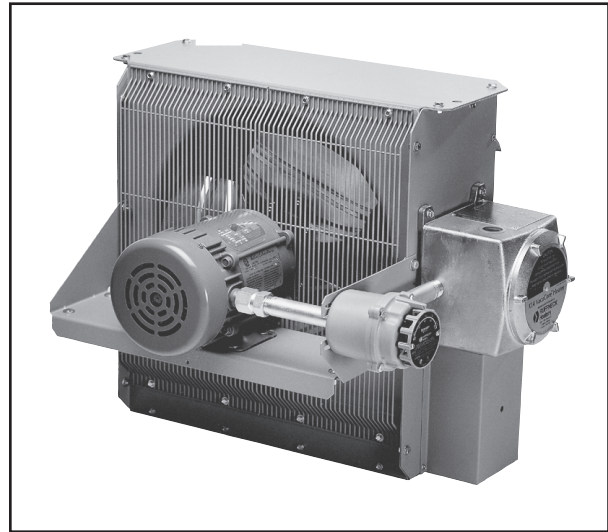
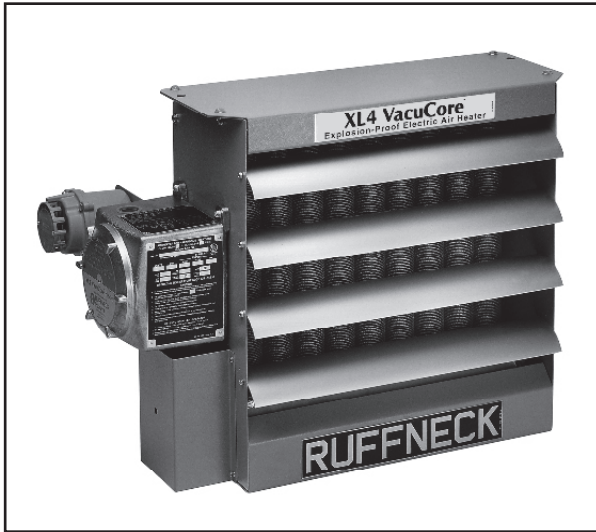
Ruffneck™

Heaters for the Harshest Environments

Owner's Manual

XL4 VacuCore® Series

Electric Forced Air Heaters for Hazardous Locations



This manual covers the installation, maintenance, repair and replacement parts.

APPROVED LOCATIONS

RUFFNECK XL4 VacuCore® Series Electric Air Heaters are CSA certified or UL listed for the following locations:

Class I, Divisions 1 & 2, Group D;
Class II, Division 1, Groups E, F, & G;
Class II, Division 2, Groups F & G;
Class I, Zones 1 & 2, Group IIA
Temperature Code T3B 165°C (329°F);
(50 Hz & 60 Hz Models)

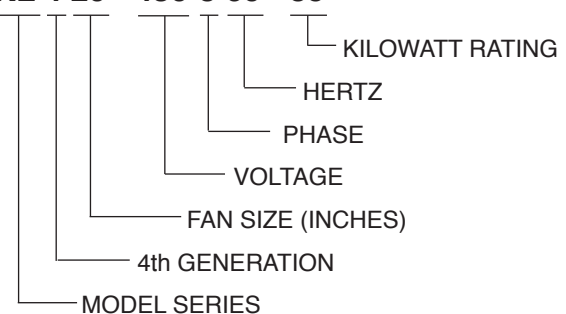
or

Class I, Divisions 1 & 2, Groups C & D;
Class II, Divisions 1 & 2, Groups F & G;
Class I, Zones 1 & 2, Groups IIA & IIB
Temperature Code T3B 165°C (329°F);
(60 Hz Models Only)

For details of hazardous locations with potential for explosion, refer to the Canadian Electrical Code, Part 1, Section 18 or National Electrical Code articles 500-516.

MODEL CODING

XL 4 20 - 480 3 60 - 35



CERTIFIED

Part No. 6702-1

WARNING!
READ ALL IMPORTANT NOTICES ON PAGE 3.

Printed in Canada



LISTED

Thermon Heating Systems, Inc.

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HEATER MAINTENANCE CHECKLIST

For Electric Forced Air Heaters



Heater Model: _____ Serial No.: _____

Date of Maintenance: _____ Maintenance Done By: _____

Comments: _____

WARNING

Disconnect heater from the power supply before opening enclosures or servicing heater.
Lock the switch in the "OFF" (open) position and/or tag the switch to prevent unexpected power application.
This heater should only be serviced by personnel with heating and hazardous location equipment experience.

PERIODIC (before and as required during heating season)

- | | | | |
|----------|---------------------------------------|----------|---|
| 1. CLEAN | <input type="checkbox"/> Finned Tubes | 2. CHECK | <input type="checkbox"/> Motor for smooth, quiet operation |
| | <input type="checkbox"/> Fan | | <input type="checkbox"/> Louvers for proper angle and tightness |
| | <input type="checkbox"/> Fan Guard | | <input type="checkbox"/> All explosion-proof covers for tightness |
| | <input type="checkbox"/> Motor | | |
| | <input type="checkbox"/> Louvers | | |

Remove dust using compressed air. Do not spray with water or solvents.
Do not immerse in water or solvents.

ANNUAL (before heating season)

- ELECTRICAL**
 - Check all terminal connections and conductors. Tighten loose connections. Conductors with damaged insulation must be replaced.
 - Inspect contactor contacts. If badly pitted, burned or welded shut, replace with factory supplied contactor.
 - Check fuses. Fuse rating and type are on printed circuit board. Correct fuse must be in the active fuse clip. It is recommended that a spare fuse be stored in the spare fuse clip.
 - Check all explosion-proof conduits. Replace damaged conduits. All threaded conduit connections must have a minimum 5 turns engagement. Straight threaded conduit must protrude a minimum of 1/16" (1.6mm) inside enclosures. Taper threaded connections must be at least hand tight.
 - Check electrical resistance on all load side legs. Reading should be balanced ($\pm 5\%$).
- MECHANICAL**
 - Check for fluid leakage. The heater core is vacuum charged and contains ethylene glycol which is poisonous. If any fluid leakage occurs from the heater, disconnect it from the power supply and have the core replaced. A factory supplied exchange core can be shipped immediately from stock. Refer to the "Repair and Replacement" section for details.
 - Check all enclosures. Interior of enclosures must be clean, dry and free of foreign materials. Threaded covers must be installed and hand tight.
Note: Enclosure joints are metal to metal. Do not use gasket material or sealant in joints. A grease is applied to the joints at the factory and should be left intact.
 - Check motor shaft bearing play. Replace motor if play is excessive, or if motor does not run quietly and smoothly. Motor bearings are permanently lubricated.
 - Check fan. Replace immediately if cracked or damaged.
 - Check louvers. Louver screws should be tight. Louvers shall not be fully closed or override stops.
 - Check the tightness of all hardware. All nuts and bolts, including mounting hardware, must be tight.
 - Turn heater on for a minimum of five minutes. Check for warm air exiting heater through louvers. Crackling or pinging noises within heater during start-up are normal.



For assistance, please call
Toll Free: 1-800-661-8529
U.S. & Canada

IMPORTANT NOTICES

WARNING

Read and adhere to the following. Failure to do so may result in severe or fatal injury.

1. Read and follow all instructions in this manual.
2. Heater is to be used only in atmospheres having an ignition temperature higher than the heater's maximum rated operating temperature as shown on the heater data plate. Refer to applicable electrical codes for additional information.
3. Heater to be used only in the hazardous locations indicated on the heater's data plate.
4. Heater is for dry indoor use only. Do not immerse in water. Do not store or use in areas exposed to rain or snow.
5. Heater is to be connected and serviced only by a qualified electrician experienced with hazardous location equipment.
6. Installation and wiring of the heater must adhere to all applicable codes.
7. Before opening any enclosures, disconnect the heater from the power supply. Lock the switch in the "OFF" (open) position and/or tag the switch to prevent unexpected power application.
8. This heater is equipped with a single bimetal overtemperature high-limit. It is of the automatic reset type and therefore the heater may restart without warning. The heater is not to be operated with the high-limit disabled or disconnected from the control circuit.
9. Venting pressure of the pressure relief valve is factory set. Do not tamper with lock nut.
10. Operate the heater only while it is permanently mounted in an upright position. Refer to the "Installation - Mechanical" section for details.
11. Heater must be kept clean. When operating in a dirty environment, regularly clean the finned tubes, fan, and fan guard. Follow the recommended maintenance procedures. Refer to the "Heater Maintenance Checklist" section for details.
12. The heater core is vacuum charged and contains ethylene glycol which is poisonous. If any fluid leakage occurs from the heater, disconnect it from the power supply and have the core replaced with a factory supplied core. Refer to the "Repair and Replacement" section for details.
13. Do not operate the heater with any of the louvers fully closed or overriding their stops.
14. Do not operate the heater in atmospheres corrosive to steel or aluminum.
15. Do not operate heater in ambient temperatures above 40°C (104°F).
16. Use factory approved replacement parts only.
17. See applicable electrical codes for seal requirements in field installed conduits. Factory installed conduits require no further sealing.
18. Crackling or pinging noises within the heater core during start up may occur. This is normal.
19. Air discharge near the bottom of the heater may be warmer than the top. This is normal.
20. If there are any questions or concerns regarding the heater, contact the factory. Refer to the last page of this manual for details.

WARRANTY WILL BE VOID
IF INSTRUCTIONS ARE NOT FOLLOWED
INSTALLATION

The installation instructions provide a general guideline for the installation and wiring of the heater.
All applicable codes must be adhered to.

MECHANICAL

LOCATION

For optimum heating, the heater should be installed as follows:

1. There are no obstructions that may impede the heater's air inlet or discharge.
2. The air discharge is directed into open areas and not at occupants.
3. The air discharge is not directed at a thermostat.
4. The air discharge is directed across areas of heat loss, such as doors and windows (see Figure 1).
5. The air discharge is directed along and at a slight angle toward exterior walls (see Figure 1).
6. If equipment freeze protection is important, direct air discharge at equipment.
7. Air discharge streams support each other and create a circular air flow. It is not required that the heater's air throw reaches the next heater (see Figure 1).

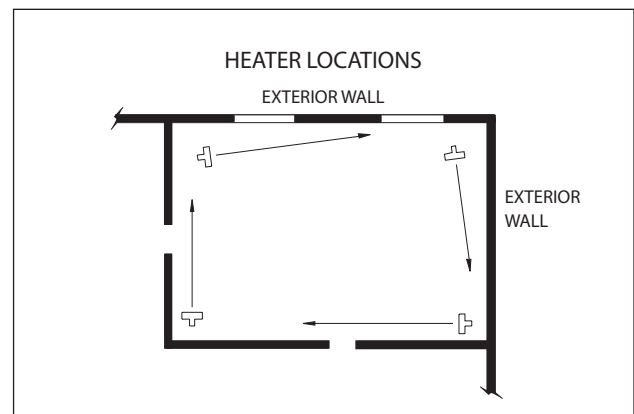


FIGURE 1

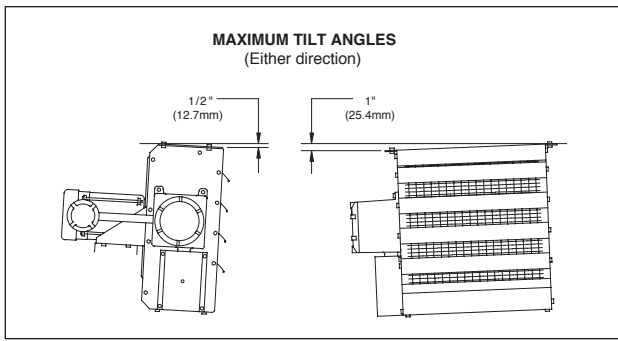


FIGURE 2

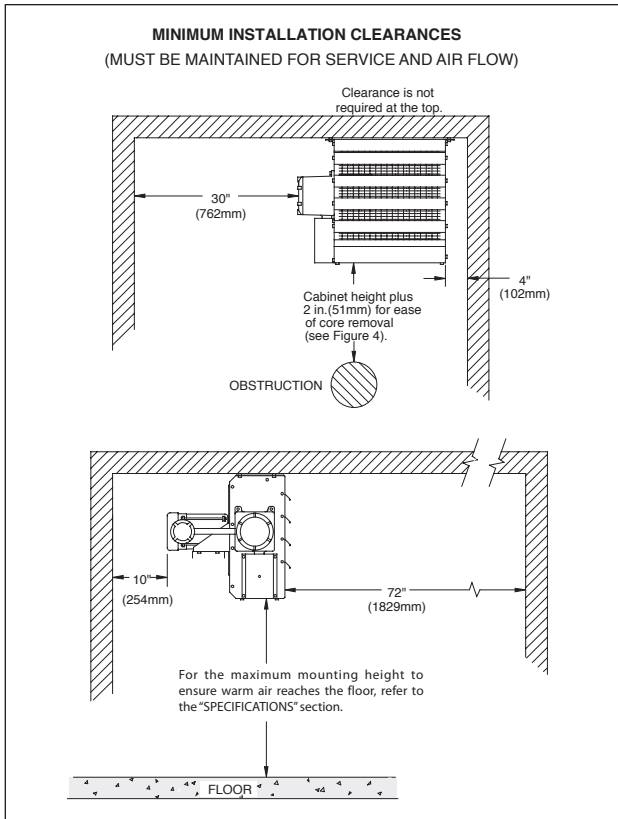


FIGURE 3

MOUNTING

1. The heater must be permanently mounted in a level, upright position for operation. See Figures 2, 3, and 4 for maximum tilt angles, installation clearances, and physical dimensions.

For ease of installation, a variety of mounting kits are available from the factory.

2. The mounting structure must be strong enough to:
 - a. support the heater's weight, refer to the "Specifications" section,
 - b. provide sufficient stiffness to prevent excessive vibration, and
 - c. withstand harsh situations such as transportable installations.

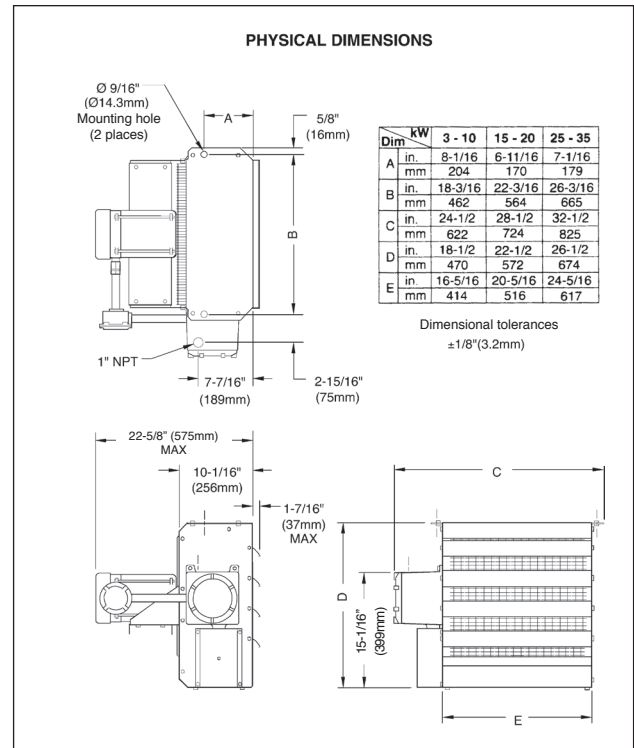


FIGURE 4

ELECTRICAL

WARNING

Disconnect the power supply before installation of the heater. Lock the switch in the "OFF" (open) position and/or tag the switch to prevent unexpected power application. Installation and wiring of the heater must adhere to all applicable codes.

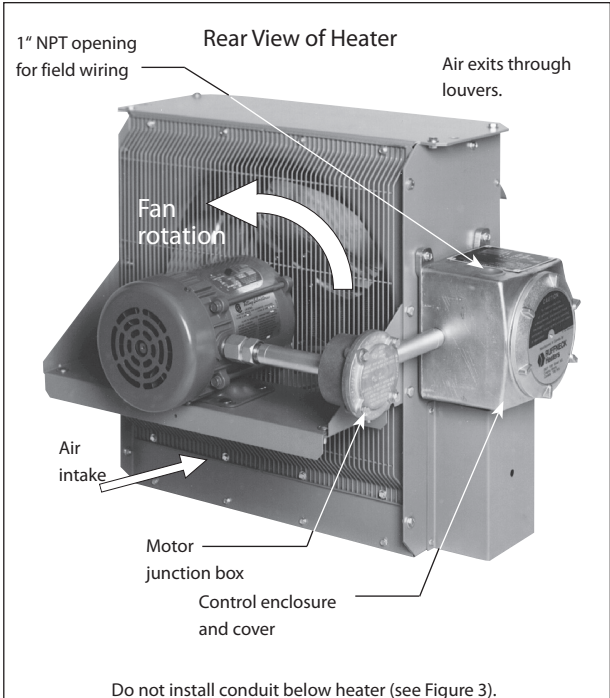
GENERAL

1. Use only copper conductors and approved explosion-proof wiring methods during installation. Refer to the "Technical Data" table and heater data plate for conductor rating.
2. External overcurrent protection is required. Refer to the "Technical Data" table and heater data plate for voltage, frequency, amperage, and phase. Supply voltage is to be within 10% of the data plate voltage.

FIELD WIRING

1. The supply conductors, ground conductor, and room thermostat conductors (see point 2, page 5) all pass through the 1" NPT opening (see Figure 5) and are to be wired into the control enclosure (see Figure 6).

(continued next page)



Do not install conduit below heater (see Figure 3).

FIGURE 5

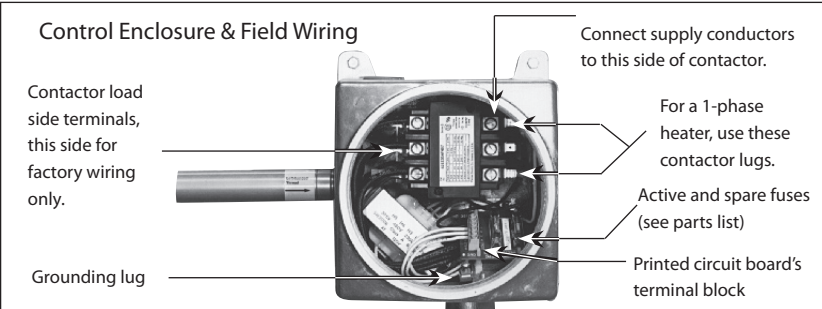


FIGURE 6

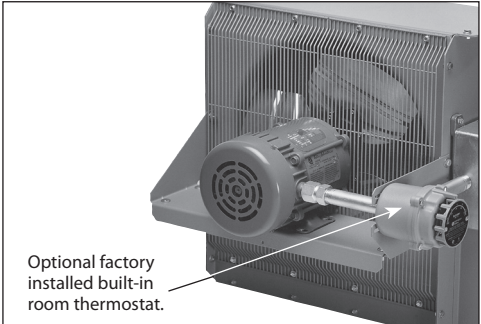


FIGURE 7

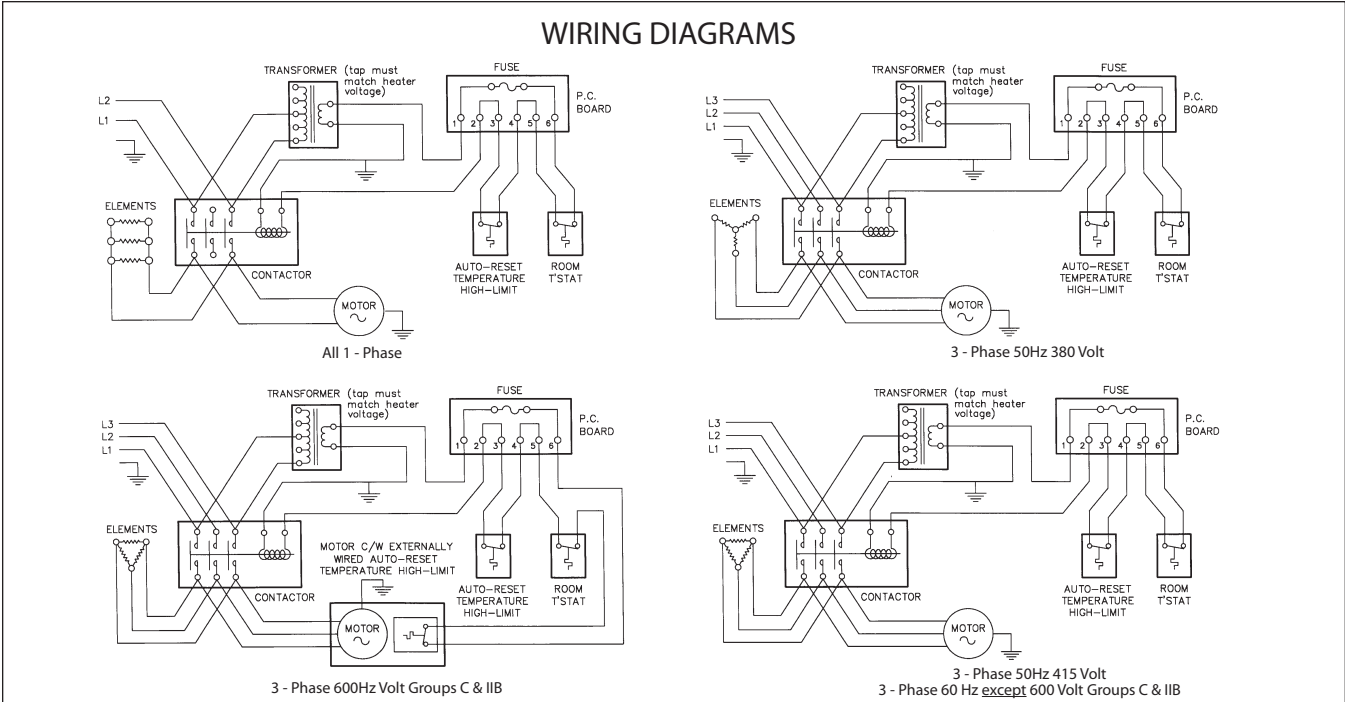


FIGURE 8

REPAIR & REPLACEMENT

WARNING

Disconnect power supply before opening enclosures or servicing heater. Lock the switch in the "OFF" (open) position and/or tag the switch to prevent unexpected power application. Heater surfaces may be hot.

1. After repairing any component:
 - a. check that electrical connections are correct and secure (see Figure 8),
 - b. remove any foreign material from enclosures,
 - c. install and secure all covers,
 - d. ensure that all fasteners are tight,
 - e. remove all foreign objects from heater, and
 - f. ensure air exits through louvers and fan rotates counterclockwise when viewed from rear of heater (see Figure 13).

CORE

The heater core is vacuum charged and not field repairable. For core removal:

1. Remove cabinet bottom and element enclosure cover.
2. Disconnect all wires entering element enclosure (see Figure 9).
3. Slightly loosen all cabinet bolts shown in Figure 9, to prevent the core from binding.
4. With an assistant supporting the weight of the core, remove the 3 core mounting bolts. Carefully lower the core out of the cabinet (see Figure 10).
5. To return core to factory, use crate supplied with exchange core to protect the element terminals and plate threads.
6. To reinstall, lift the core up into cabinet while an assistant guides the element wires into the element enclosure conduit.
7. Position the core and tighten the 3 core mounting bolts. Tighten the remaining cabinet bolts.

TEMPERATURE HIGH-LIMIT

1. Remove temperature high-limit assembly and clean the inside of the thermowell (see Figure 11). A clean thermowell will ensure good thermal contact.
2. Use only a factory supplied temperature high-limit to ensure safe operation.
3. Apply a small drop, 3/32" (2mm) diameter, of heat sink compound to the center of the metal cap but do not spread. This is critical for proper thermal contact between the temperature high-limit and the thermowell (see Figure 11).
4. Reinstall the temperature high-limit assembly with the snap ring and spring into the thermowell without damaging the insulating tube. Secure in place with the cotter pin (see Figure 12).

MOTOR, FAN & FAN GUARD

1. Remove bolts holding the motor to the motor mount. On units with a built-in thermostat, remove the bolts on the back of the thermostat enclosure.
2. Remove conduit #1 located between motor junction box and control enclosure by turning it in the direction illustrated (see Figure 13). Note conduits #1 and

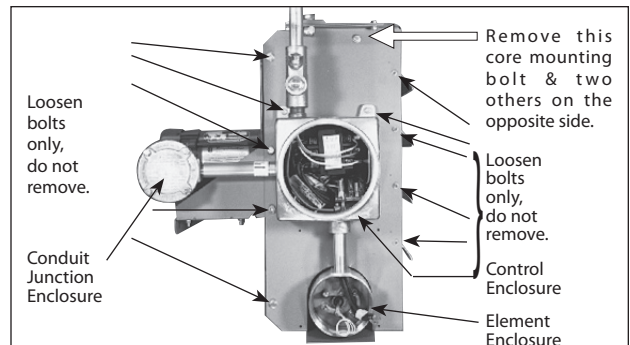


FIGURE 9

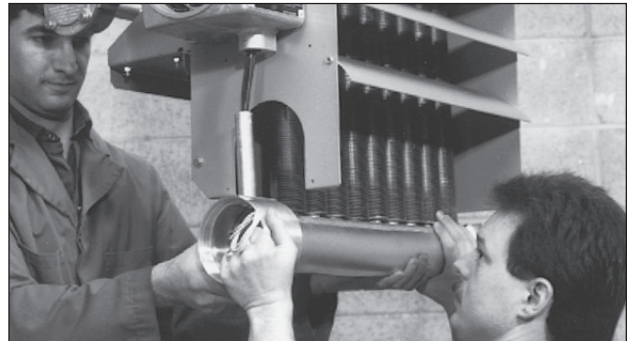


FIGURE 10

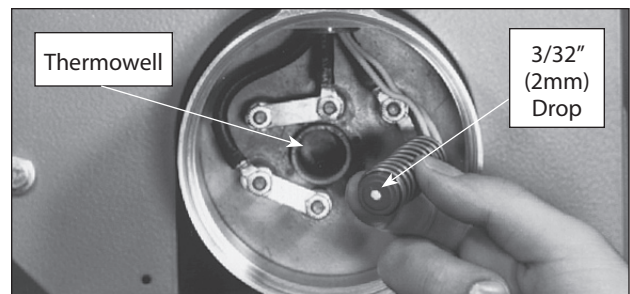


FIGURE 11



FIGURE 12

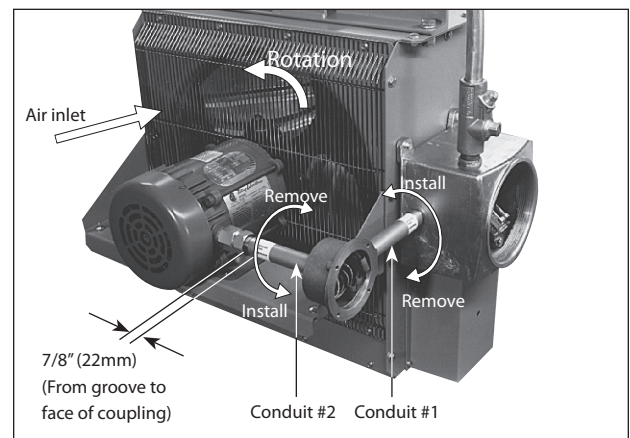


FIGURE 13

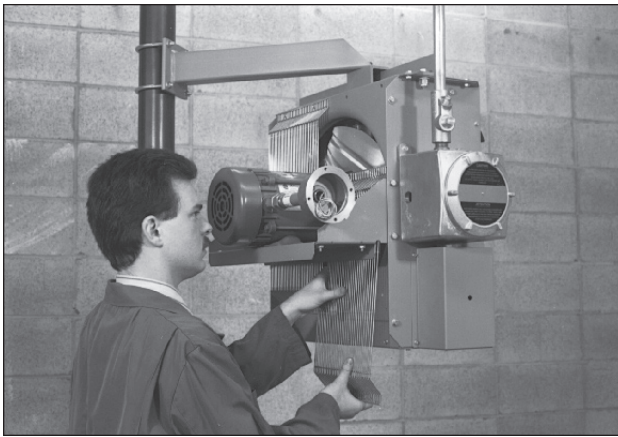


FIGURE 14

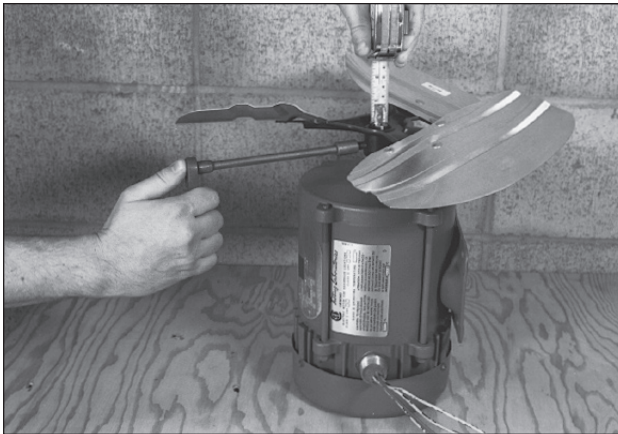


FIGURE 15

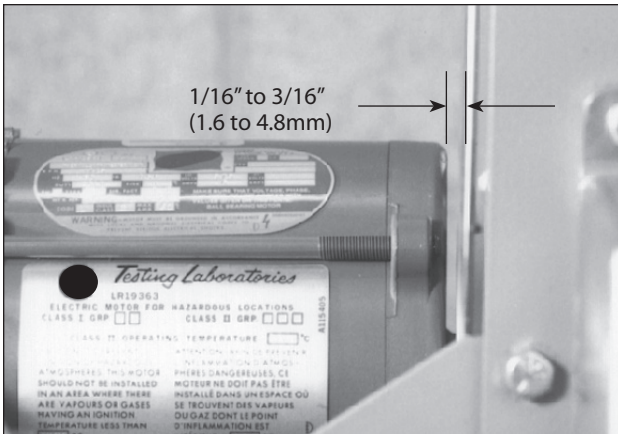


FIGURE 16

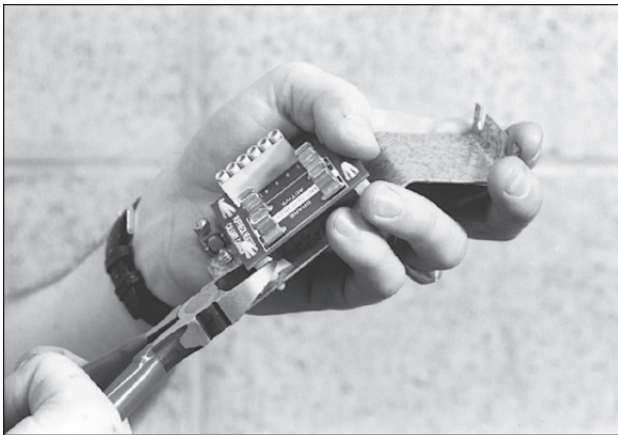


FIGURE 17

#2 are not interchangeable and have left hand threads on one end, this end is indicated by a machined groove.

3. Remove the 2 piece fan guard assembly (see Figure 14).
4. Lift the motor assembly off the motor mount.
5. Before removing the fan, measure and record the location of the fan hub on the motor shaft (see Figure 15). If difficult to remove, use a gear puller on the fan hub.
6. To reassemble, place motor assembly onto motor mount and fasten the fan guard to cabinet.
7. Simultaneously engage and tighten both ends of conduit #1 into enclosures. Leave a 1/16" to 3/16" (1.6 to 4.8 mm) gap between the motor and fan guard (see Figure 16). Adjust conduit #2 to center the fan in the shroud.
8. To ensure a minimum 5 thread engagement, threaded ends of conduits must protrude a minimum of 1/16" (1.6mm) into enclosures. The groove on conduit #2 must not be more than 7/8" (22mm) from motor coupling (see Figure 13).
9. Bolt motor to motor mount. Manually spin the fan blade to ensure fan rotates freely.
10. Air must exit through louvers and fan must rotate counterclockwise when viewed from rear of heater (see Figure 13).

PRINTED CIRCUIT BOARD

1. After removing the printed circuit board (P.C. Board) bracket assembly from the control enclosure, separate the P.C. Board from the bracket by cutting off the plastic spacers (see Figure 17).
2. Reinstall a new factory supplied P.C. Board onto the mounting bracket using new non-conducting spacers of the same length. Spacers are supplied with a new P.C. Board. Reinstall the control circuit ground wire to the printed circuit board bracket (see Figure 8).

CONTACTOR

1. Loosen, but do not remove contactor mounting screws. Slide contactor off mounting screws.
2. Replace with a factory supplied contactor of the same rating.

TRANSFORMER

1. Replace with a factory supplied transformer of the same rating.
2. On the new transformer, select primary wires to match heater voltage. Ensure that the correct transformer secondary lead is grounded (see Figure 8). Individually terminate all unused wires using closed end connectors.

FUSE

Replace fuse with one of the same type and rating as indicated on P.C. Board or refer to parts list. An extra fuse should be stored in the clips marked "SPARE".

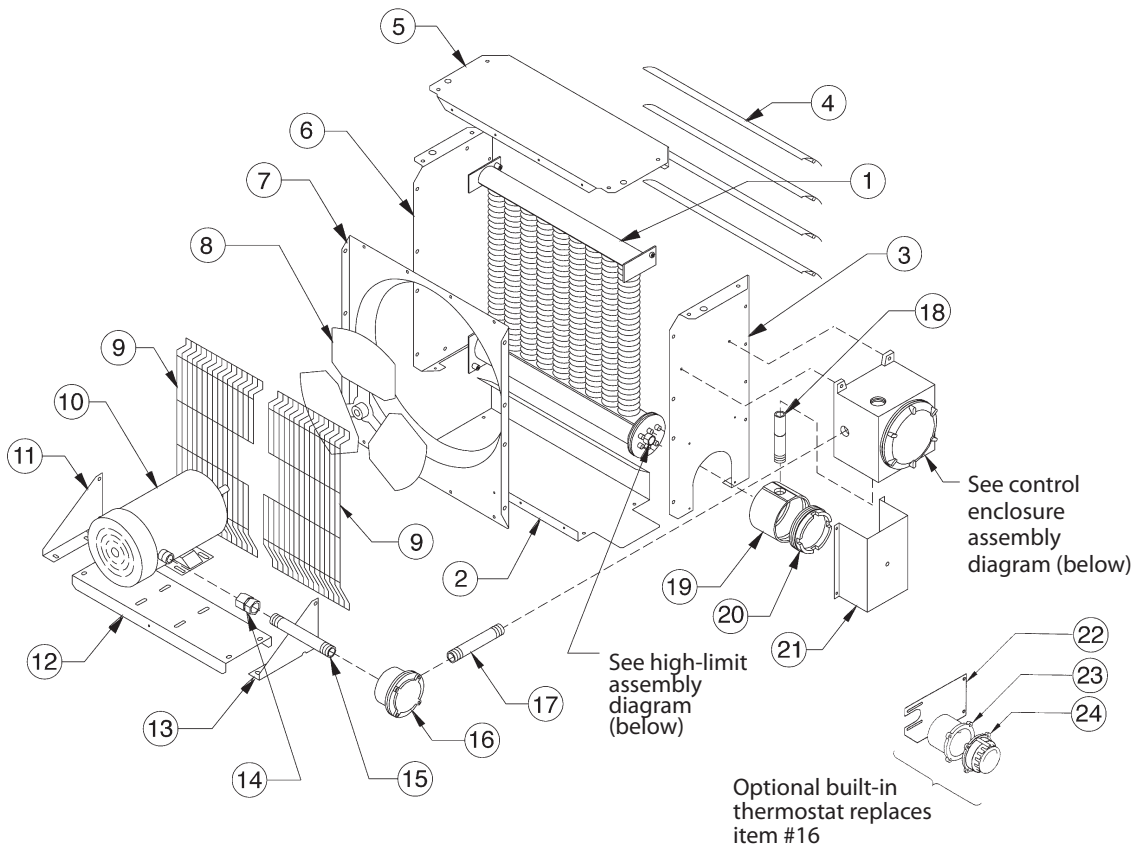
HEATING ELEMENTS

Heating elements are an integral part of the vacuum charged core. A factory exchange core can be shipped immediately from stock. Refer to "Core" section for details.

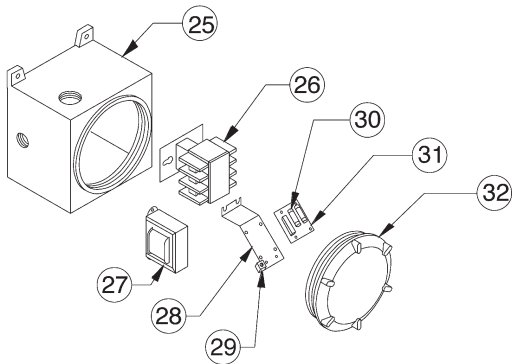
CABINET PANELS

Bolt-on cabinet panels are individually replaceable.

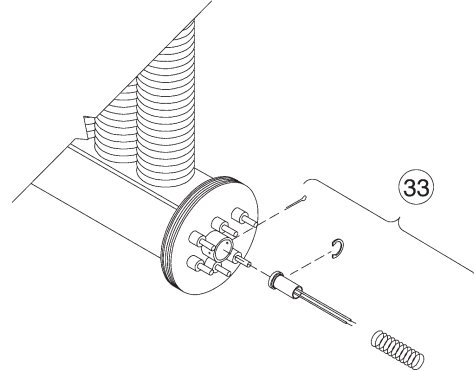
HEATER ASSEMBLY DIAGRAM



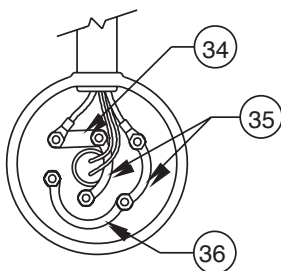
CONTROL ENCLOSURE ASSEMBLY DIAGRAM



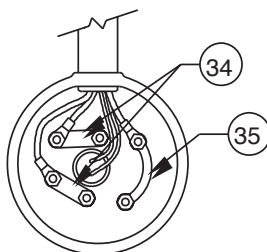
HIGH LIMIT ASSEMBLY DIAGRAM



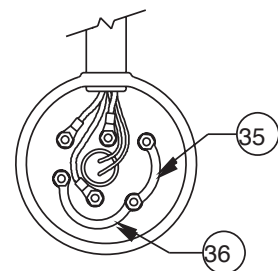
BUS-BAR CONFIGURATION
ALL 1-PHASE MODELS



BUS-BAR CONFIGURATION
ALL 3-PHASE MODELS (EXCEPT 380 VOLT 50 HERTZ)



BUS-BAR CONFIGURATION
3-PHASE 380 VOLT 50 HERTZ MODELS ONLY



PARTS LIST

FORCED AIR ELECTRIC HEATERS

PART NUMBER				Please have model and serial number available before calling.
ITEM	2.5-10 kW	12.5-20 kW	20.9-35 kW	DESCRIPTION
1	**	**	**	Core
2	3773	3774	3775	Panel, Bottom
3	3776	3777	3778	Panel, Left Side
4	4075	4076	4077	Louver Kit, c/w Screws
5	3770	3771	3772	Panel, Top
6	3779	3780	3781	Panel, Right Side
7	3782	3783	3784	Fan Shroud
8	2.5 - 5.0 kW: 4022 6.3 - 10 kW: 4023	12.5 - 20 kW: 4024	20.9-30 kW: 4025 35kW: 4026	Fan
9			4078 4079	4080 F a n
10	Groups D, E, F, & G; IIA 208/240V 60 HZ 1 PH: 1377 220V 50 HZ 1 PH: 1377 c/w 4953 480V 60 HZ 1 PH: 2396 208/240/480V 60HZ 3PH: 1862 380/415V 50 HZ 3 PH: 1862 600V 60HZ 3 PH: 1861 Groups C, D, F, & G; IIA & IIB 208/240V 60HZ 1 PH: 4593 208/240/480V 60HZ 3PH: 4594 600V 60 HZ 3 PH: 4595	1377 1377 c/w 4953 2396 1862 1862 1861	Groups D, E, F, & G; IIA 240/480V 60 HZ 3 PH: 1699 380/415V 50 HZ 3 PH: 1699 600V 60 HZ 3 PH: 2433 Groups C, D, F, & G; IIA & IIB 240/480V 60 HZ 3 PH: 4596 600V 60HZ 3 PH: 4597	Motor, Explosion-Proof
37893789				
3789Bracket, Motor Mount Right				
12	3785	3786	3787	Channel, Motor Mount
13	3788	3788	3788	Bracket, Motor Mount Left
14	Groups D, E, F, & G; IIA : 3737	Groups C, D, F, & G; IIA & IIB: 4590	4590	Coupling, Motor
15	3811	3812	3813	Conduit, Motor
16	Groups D, E, F, & G; IIA : 3838 Groups C, D, F, & G; IIA & IIB: 4983 C/W 5027	208/240V 60 HZ 1PH: 3815 220V 50 HZ 1PH: 3815 480V 60 HZ 1PH: 3813 ALL 3PH: 3814 ALL: 3815 Enclosure, Conduit Junction	Groups D, E, F, & G; IIA ALL: 3813 Groups C, D, F, & G; IIA & IIB ALL: 3815	Conduit, Control Enclosure
18	3810	3810	3810	Conduit, Element Enclosure
19	3793	3793	3793	Enclosure, Element
20	3510	3510	3510	Cover, Element Enclosure
21	3790	3790	3790	Panel, Element Enclosure Guard
22	3791	3791	3791	Bracket, Thermostat
23	4983	4983	4983	Enclosure, Thermostat
24	5032	5032	5032	Thermostat, Built-in Kit
25	3524	3525	3526	Enclosure, Control
26	**	**	**	Contactor
27	60 HERTZ: 3612	50 HERTZ: 4416		Transformer
28	3809	3809	3809	Bracket, Printed Circuit Board
29	1876	1876	1876	Terminal, 6-14 ga. Screw Lug
30	3519	3519	3519	Fuse, Buss MDQ-1/4 Amp
31	3514	3514	3514	Printed Circuit Board Assembly
32	3516	3516	3516	Cover, Control Enclosure
33	4082	4082	4082	Temperature High-Limit Kit
34	3816	3816	3816	Bus-Bar, Straight

SPECIFICATIONS FOR ALL 60 HZ MODELS

Nominal kW		3	5	7.5	10	15	20	25	30	35
Max. Altitude	(ft.) (m)	12,000 3,658	8,000 2,438	10,000 3,048	7,000 2,134	10,000 3,048	7,000 2,134	10,000 3,048	7,000 2,134	6,000 1,829
Air Flow	@ 70°F (CFM) @ 21°C (m ³ /hr.)	500 850	850 1444	1750 2973	3600 6116	3950 6711				
Horizontal Air Throw	(ft.) (m)	15 4.6	30 9.1	40 12.2	70 21.3					
Max. Mounting Height (to underside)	(ft.) (m)	7 2.1	10 3.0	10 3.0	20 6.1					
Motor Power	(HP) (kW)	1/4 0.187			1/4 0.187		1/2 0.373			
Fan Diameter	(in.) (mm)	12 305			16 406		20 508			
Net Weight	(lbs.) (kg)	111 50			133 61		154 70			
Shipping Weight	(lbs.) (kg)	151 69			173 79		204 93			
Enclosures	NEMA Type 7 & 9. For dry, indoor use only. Do not immerse in water. Do not store or use in areas exposed to rain or snow.									
Motor Type	Explosion-proof. Thermally protected. Permanently lubricated ball bearings. 1725 RPM									
Fan	Aluminum blade. Steel spider and hub with 5/8 in. (15.875 mm) bore.									
Fan Guard	Split design with close wire spacing. 1/4 in. (6.3 mm) dia. probe will not enter.									
Mounting Holes	Two 9/16 in. (14.3 mm) diameter holes at top of heater.									
Heating Elements	Three long-life, low watt-density, high grade metal-sheathed elements.									
Temperature High-Limit	Automatic reset type, snap-action bimetal, open on temperature rise. Rated 100,000 cycles at 10 amps, handles 0.128 amps.									
Control Circuit	120 Volts, 0.128 amps, 15VA. (Grounded)									
Optional Built-in Thermostat	Explosion-proof. 36°F to 82°F (2°C to 28°C)									
Control Transformer	Multi-tap primary, 120 V secondary, 25 VA.									
Contactors	40 or 75 amp. Rated for 500,000 mechanical operations. 120 Volts, 15VA coil (separately fuse-protected).									
Heat Transfer Fluid	Long life formulated ethylene glycol and water, freeze protected to -49°F (-45°C).									
Cabinet Material	14 ga. (0.075 in.) (1.90 mm) steel. Epoxy coated with five-stage pretreatment, including iron phosphate.									
Core	Steel with integral aluminum fins, vacuum charged and hermetically sealed.									
Conduit Material	Heavy walled, 0.122 in. (3.1 mm) steel, cadmium plated.									
Overpressure Protection	Preset 100 psig (690 kPa) seep pressure relief valve, aluminum body, no field serviceable parts.									
Temperature Code Rating	T3B 165°C (329°F) Class I & II.									
Temperature Limitations	-49°F to 104°F (-45°C to 40°C).									
Storage Limitations use	-49°F to 176°F (-45°C to 80°C), short term to 248°F (120°C). Do not store or in areas exposed to rain or snow. Do not immerse in water.									

SPECIFICATIONS FOR ALL 50 HZ MODELS

Nominal kW		25	37&42	63&75	84	125&126	149&167	209	224
Max. Altitude	(ft.) (m)	12,000 3,658	8,000 2,438	10,000 3,048	7,000 2,134	10,000 3,048	7,000 2,134	10,000 3,048	7,000 2,134
Air Flow @ 70°F @ 21°C	(CFM) (m ³ /hr.)	400 679		700 1189		1450 2463		3000 5096	
Horizontal Air Throw	(ft.) (m)	13 4.0		25 7.6		35 10.7		60 18.2	
Max. Mounting Height (to underside)	(ft.) (m)	7 2.1		10 3.0		10 3.0		20 6.1	
Fan Diameter	(in.) (mm)	12 305				16 406		20 508	
Net Weight	(lbs.) (kg)	111 50				133 61		154 70	
Shipping Weight	(lbs.) (kg)	151 69				173 79		204 93	
Enclosures	NEMA Type 7 & 9. For dry, indoor use only. Do not immerse in water. Do not store or use in areas exposed to rain or snow.								
Motor Type	Explosion-proof. Thermally protected. Permanently lubricated ball bearings. 1425 RPM								
Fan	Aluminum blade. Steel spider and hub with 5/8 in. (15.875 mm) bore.								
Fan Guard	Split design with close wire spacing. 1/4 in. (6.3 mm) dia. probe will not enter.								
Mounting Holes	Two 9/16 in. (14.3 mm) diameter holes at top of heater.								
Heating Elements	Three long-life, low watt-density, high grade metal-sheathed elements.								
Temperature High-Limit	Automatic reset type, snap-action bimetal, open on temperature rise. Rated 100,000 cycles at 10 amps, handles 0.130 amps.								
Control Circuit	115 Volts, 0.130 amps, 15VA. (Grounded)								
Optional Built-in Thermostat	Explosion-proof. 36°F to 82°F (2°C to 28°C)								
Control Transformer	Multi-tap primary, 115 V secondary, 25 VA.								
Contactors	40 or 75 amp. Rated for 500,000 mechanical operations. 120 Volts, 15VA coil (separately fuse-protected).								
Heat Transfer Fluid 45°C).	Long life formulated ethylene glycol and water, freeze protected to -49°F (-								
Cabinet Material including iron phosphate.	14 ga. (0.075 in.) (1.90 mm) steel. Epoxy coated with five-stage pretreatment,								
Core	Steel with integral aluminum fins, vacuum charged and hermetically sealed.								
Conduit Material	Heavy walled, 0.122 in. (3.1 mm) steel, cadmium plated.								
Overpressure Protection	Preset 100 psig (690 kPa) seep pressure relief valve, aluminum body, no field serviceable parts.								
Temperature Code Rating	T3B 165°C (329°F) Class I & II.								
Temperature Limitations	-49°F to 104°F (-45°C to 40°C).								
Storage Limitations or	-49°F to 176°F (-45°C to 80°C), short term to 248°F (120°C). Do not store use in areas exposed to rain or snow. Do not immerse in water.								

TECHNICAL DATA FOR ALL CSA CERTIFIED 60 HZ ELECTRIC AIR HEATERS

MODEL	VOLTAGE (V)	NOMINAL WATTAGE (kW)	PHASE	TOTAL CURRENT (A)	TEMPERATURE RISE		MAXIMUM FUSE SIZE (A)	CORE PART NUMBER	CONTACTOR PART NUMBER
					°F	°C			
XL412-208160-3	208	3	1	14.4	19	10.5	20	4044	3618
XL412-240160-3	240	3	1	12.5	19	10.5	20	4045	3618
XL412-208360-3	208	3	3	8.3	19	10.5	15	4044	3618
XL412-240360-3	240	3	3	7.2	19	10.5	15	4045	3618
XL412-480160-3	480	3	1	6.3	19	10.5	15	4046	3618
XL412-480360-3	480	3	3	3.6	19	10.5	15	4046	3618
XL412-600360-3	600	3	3	2.9	19	10.5	15	4047	3618
XL412-208160-5	208	5	1	24	31.6	17.6	35	4048	3618
XL412-240160-5	240	5	1	20.8	31.6	17.6	30	4049	3618
XL412-208360-5	208	5	3	13.9	31.6	17.6	20	4048	3618
XL412-240360-5	240	5	3	12	31.6	17.6	20	4049	3618
XL412-480160-5	480	5	1	10.4	31.6	17.6	15	4050	3618
XL412-480360-5	480	5	3	6	31.6	17.6	15	4050	3618
XL412-600360-5	600	5	3	4.8	31.6	17.6	15	4051	3618
XL412-208160-7.5	208	7.5	1	36.1	27.9	15.5	50	4052	3619
XL412-240160-7.5	240	7.5	1	31.3	27.9	15.5	40	4053	3618
XL412-208360-7.5	208	7.5	3	20.8	27.9	15.5	30	4052	3618
XL412-240360-7.5	240	7.5	3	18	27.9	15.5	25	4053	3618
XL412-480160-7.5	480	7.5	1	15.6	27.9	15.5	20	4054	3618
XL412-480360-7.5	480	7.5	3	9	27.9	15.5	15	4054	3618
XL412-600360-7.5	600	7.5	3	7.2	27.9	15.5	15	4055	3618
XL412-208160-10	208	10	1	48.1	37.2	20.6	70	4056	3619
XL412-240160-10	240	10	1	41.7	37.2	20.6	60	4057	3619
XL412-208360-10	208	10	3	27.8	37.2	20.6	35	4056	3618
XL412-240360-10	240	10	3	24.1	37.2	20.6	35	4057	3618
XL412-480160-10	480	10	1	20.8	37.2	20.6	30	4058	3618
XL412-480360-10	480	10	3	12	37.2	20.6	20	4058	3618
XL412-600360-10	600	10	3	9.6	37.2	20.6	15	4059	3618
XL416-240160-15	240	15	1	62.5	27.1	15	80	4061	3619
XL416-208360-15	208	15	3	41.6	27.1	15	60	4060	3619
XL416-240360-15	240	15	3	36.1	27.1	15	50	4061	3619
XL416-480160-15	480	15	1	31.3	27.1	15	40	4062	3618
XL416-480360-15	480	15	3	18	27.1	15	25	4062	3618
XL416-600360-15	600	15	3	14.4	27.1	15	20	4063	3618
XL416-208360-20	208	20	3	55.5	36.1	20.1	70	4064	3619
XL416-240360-20	240	20	3	48.1	36.1	20.1	70	4065	3619
XL416-480160-20	480	20	1	41.7	36.1	20.1	60	4066	3619
XL416-480360-20	480	20	3	24.1	36.1	20.1	35	4066	3618
XL416-600360-20	600	20	3	19.2	36.1	20.1	25	4067	3618
XL420-240360-25	240	25	3	60.1	21.9	12.2	80	4068	3619
XL420-480360-25	480	25	3	30.1	21.9	12.2	40	4069	3618
XL420-600360-25	600	25	3	24.1	21.9	12.2	35	4070	3618
XL420-480360-30	480	30	3	36.1	26.3	14.6	50	4071	3619
XL420-600360-30	600	30	3	28.9	26.3	14.6	40	4072	3618
XL420-480360-35	480	35	3	42.1	28	15.6	60	4073	3619

NOTES:

1. Heater is functioning normally if at rated voltage the amp draw is within 10% of the value in this table.
2. Operation at lower voltages will result in reduced heat output and amp draw.

TECHNICAL DATA FOR ALL CSA CERTIFIED 50 HZ ELECTRIC AIR HEATERS

MODEL	VOLTAGE (V)	NOMINAL WATTAGE (KW)	PHASE	TOTAL CURRENT (A)	TEMPERATURE RISE		MAXIMUM FUZE SIZE (A)	CORE PART NUMBER	CONTACTOR PART NUMBER
					°F	°C			
XL412-220150-2.5	220	2.5	1	11.4	19.7	11	15	4045	3618
XL412-220150-4.2	220	4.2	1	19.1	33.2	18.4	25	4049	3618
XL412-220150-6.3	220	6.3	1	28.6	28.4	15.8	40	4053	3618
XL412-220150-8.4	220	8.4	1	38.2	37.9	21.1	50	4057	3619
XL416-220150-12.6	220	12.6	1	57.3	27.5	15.3	80	4061	3619
XL412-380350-2.5	380	2.5	3	3.8	19.7	11	15	4045	3618
XL412-380350-4.2	380	4.2	3	6.4	33.2	18.4	15	4049	3618
XL412-380350-6.3	380	6.3	3	9.6	28.4	15.8	15	4053	3618
XL412-380350-8.4	380	8.4	3	12.8	37.9	21.1	20	4057	3618
XL416-380350-12.5	380	12.5	3	19	27.2	15.1	25	4061	3618
XL416-380350-16.7	380	16.7	3	25.4	36.4	20.2	35	4065	3618
XL420-380350-20.9	380	20.9	3	31.8	22	12.2	40	4068	3618
XL412-415350-3.7	415	3.7	3	5.1	29.2	16.2	15	4050	3618
XL412-415350-7.5	415	7.5	3	10.4	33.9	18.8	15	4058	3618
XL416-415350-14.9	415	14.9	3	20.7	32.5	18	30	4066	3618
XL420-415350-22.4	415	22.4	3	31.2	23.6	13.1	40	4071	3618

NOTES:

1. Heater is functioning normally if at rated voltage the amp draw is within 10% of the value in this table.
2. Operation at lower voltages will result in reduced heat output and amp draw.

XL4 TECHNICAL DATA FOR UL LISTED 60 HZ, GROUPS D, E, F, & G; IIA MODELS

MODEL	VOLTAGE (V)	NOMINAL WATTAGE (kW)	PHASE	MOTOR CURRENT (A)	HEATER ELEMENT CURRENT (A)	TOTAL CURRENT (A)	MINIMUM CIRCUIT AMPACITY (A)	SUPPLY WIRE SIZE (AWG.)	MAX. CIRCUIT FUSE (A)	TEMPERATURE RISE		CORE PART NUMBER	CONTACTOR PART NUMBER
										°F	°C		
XL412-208160-3	208	3.0	1	2.3	13.0	15.3	19.1	12	20	19.0	10.5	4044	3618
XL412-240160-3	240	3.0	1	2.3	11.2	13.5	16.9	12	20	19.0	10.5	4045	3618
XL412-208360-3	208	3.0	3	1.4	7.5	8.9	11.1	14	15	19.0	10.5	4044	3618
XL412-240360-3	240	3.0	3	1.4	6.5	7.9	9.9	14	15	19.0	10.5	4045	3618
XL412-480360-3	480	3.0	3	0.7	3.2	3.9	4.9	14	15	19.0	10.5	4046	3618
XL412-208160-5	208	5.0	1	2.3	22.6	24.9	31.1	8	35	31.6	17.6	4048	3618
XL412-240160-5	240	5.0	1	2.3	19.6	21.9	27.4	10	30	31.6	17.6	4049	3618
XL412-208360-5	208	5.0	3	1.4	13.0	14.4	18.1	12	20	31.6	17.6	4048	3618
XL412-240360-5	240	5.0	3	1.4	11.3	12.7	15.9	12	20	31.6	17.6	4049	3618
XL412-480360-5	480	5.0	3	0.7	5.7	6.4	8.0	14	15	31.6	17.6	4050	3618
XL412-208160-7.5	208	7.5	1	2.3	34.6	36.9	46.1	8	50	27.9	15.5	4052	3619
XL412-240160-7.5	240	7.5	1	2.3	30.0	32.3	40.4	8	45	27.9	15.5	4053	3618
XL412-208360-7.5	208	7.5	3	1.4	20.0	21.4	26.8	10	30	27.9	15.5	4052	3618
XL412-240360-7.5	240	7.5	3	1.4	17.3	18.7	23.4	10	25	27.9	15.5	4053	3618
XL412-480360-7.5	480	7.5	3	0.7	8.7	9.4	11.8	14	15	27.9	15.5	4054	3618
XL412-240160-10	240	10.0	1	2.3	40.4	42.7	53.4	6	60	37.2	20.6	4057	3619
XL412-208360-10	208	10.0	3	1.4	26.9	28.3	35.4	8	40	37.2	20.6	4056	3618
XL412-240360-10	240	10.0	3	1.4	23.3	24.7	30.9	8	35	37.2	20.6	4057	3618
XL412-480360-10	480	10.0	3	0.7	11.7	12.4	15.5	12	20	37.2	20.6	4058	3618
XL416-208360-15	208	15.0	3	1.4	40.0	41.4	51.8	6	60	27.1	15.0	4060	3619
XL416-240360-15	240	15.0	3	1.4	34.6	36.0	45.0	8	45	27.1	15.0	4061	3619
XL416-480360-15	480	15.0	3	0.7	17.3	18.0	22.5	10	25	27.1	15.0	4062	3618
XL416-480360-20	480	20.0	3	0.7	23.3	24.0	30.0	10	30	36.1	20.1	4066	3618
XL420-480360-25	480	25.0	3	1.0	29.1	30.1	37.6	8	40	21.9	12.2	4069	3618
XL420-480360-30	480	30.0	3	1.0	35.1	36.1	45.1	8	50	26.3	14.6	4071	3619
XL420-480360-35	480	35.0	3	1.0	41.1	42.1	52.6	6	60	28.0	15.6	4073	3619

NOTES:

1. Minimum conductor size for 30°C (86°F) ambient. Derate conductor for ambient temperature. Use minimum 90°C (194°F) insulation.
2. Heater is functioning normally if at rated voltage the amp draw is within 10% of the value in this table.
3. Operation at lower voltages will result in reduced heat output and amp draw.



XL4 TECHNICAL DATA FOR UL LISTED 60 HZ, GROUPS C, D, F, & G; IIA & IIB MODELS

MODEL	VOLTAGE (V)	NOMINAL WATTAGE (kW)	PHASE	MOTOR CURRENT (A)	HEATER ELEMENT CURRENT (A)	TOTAL CURRENT (A)	MINIMUM CIRCUIT AMPACITY (A)	SUPPLY WIRE SIZE (AWG.)	MAX. CIRCUIT FUSE (A)	TEMPERATURE RISE		CORE PART NUMBER	CONTACTOR PART NUMBER
										oF	oC		
XL412-208160-3	208	3.0	1	2.7	13.0	15.7	19.1	12	20	19.0	10.5	4044	3618
XL412-240160-3	240	3.0	1	2.7	11.2	13.9	16.9	12	20	19.0	10.5	4045	3618
XL412-208360-3	208	3.0	3	1.4	7.5	8.9	11.1	14	15	19.0	10.5	4044	3618
XL412-240360-3	240	3.0	3	1.4	6.5	7.9	9.9	14	15	19.0	10.5	4045	3618
XL412-480360-3	480	3.0	3	0.7	3.2	3.9	4.9	14	15	19.0	10.5	4046	3618
XL412-208160-5	208	5.0	1	2.7	22.6	25.3	31.1	8	35	31.6	17.6	4048	3618
XL412-240160-5	240	5.0	1	2.7	19.6	22.3	27.4	10	30	31.6	17.6	4049	3618
XL412-208360-5	208	5.0	3	1.4	13.0	14.4	18.1	12	20	31.6	17.6	4048	3618
XL412-240360-5	240	5.0	3	1.4	11.3	12.7	15.9	12	20	31.6	17.6	4049	3618
XL412-480360-5	480	5.0	3	0.7	5.7	6.4	8.0	14	15	31.6	17.6	4050	3618
XL412-208160-7.5	208	7.5	1	2.7	34.6	37.3	46.1	8	50	27.9	15.5	4052	3619
XL412-240160-7.5	240	7.5	1	2.7	30.0	32.7	40.4	8	45	27.9	15.5	4053	3618
XL412-208360-7.5	208	7.5	3	1.4	20.0	21.4	26.8	10	30	27.9	15.5	4052	3618
XL412-240360-7.5	240	7.5	3	1.4	17.3	18.7	23.4	10	25	27.9	15.5	4053	3618
XL412-480360-7.5	480	7.5	3	0.7	8.7	9.4	11.8	14	15	27.9	15.5	4054	3618
XL412-240160-10	240	10.0	1	2.7	40.4	43.1	53.4	6	60	37.2	20.6	4057	3619
XL412-208360-10	208	10.0	3	1.4	26.9	28.3	35.4	8	40	37.2	20.6	4056	3618
XL412-240360-10	240	10.0	3	1.4	23.3	24.7	30.9	8	35	37.2	20.6	4057	3618
XL412-480360-10	480	10.0	3	0.7	11.7	12.4	15.5	12	20	37.2	20.6	4058	3618
XL416-208360-15	208	15.0	3	1.4	40.0	41.4	51.8	6	60	27.1	15.0	4060	3619
XL416-240360-15	240	15.0	3	1.4	34.6	36.0	45.0	8	45	27.1	15.0	4061	3619
XL416-480360-15	480	15.0	3	0.7	17.3	18.0	22.5	10	25	27.1	15.0	4062	3618
XL416-480360-20	480	20.0	3	0.7	23.3	24.0	30.0	10	30	36.1	20.1	4066	3618
XL420-480360-25	480	25.0	3	1.0	29.1	30.1	37.6	8	40	21.9	12.2	4069	3618
XL420-480360-30	480	30.0	3	1.0	35.1	36.1	45.1	8	50	26.3	14.6	4071	3619
XL420-480360-35	480	35.0	3	1.0	41.1	42.1	52.6	6	60	28.0	15.6	4073	3619

NOTES:

1. Minimum conductor size for 30°C (86°F) ambient. Derate conductor for ambient temperature. Use minimum 90°C (194°F) insulation.
2. Heater is functioning normally if at rated voltage the amp draw is within 10% of the value in this table.
3. Operation at lower voltages will result in reduced heat output and amp draw.



Ruffneck™

Heaters for the Harshest Environments

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PLEASE ADHERE TO INSTRUCTIONS PUBLISHED IN THIS MANUAL.

Failure to do so may be dangerous and may void certain provisions of your warranty.

For further assistance, please call:

24 Hr. Hotline: 1-800-661-8529

(U.S.A. and Canada)

Please have model and serial numbers available before calling.



WARRANTY: Under normal use the Company warrants to the purchaser that defects in material or workmanship will be repaired or replaced without charge for a period of 18 months from date of shipment, or 12 months from the start date of operation, whichever expires first. Any claim for warranty must be reported to the sales office where the product was purchased for authorized repair or replacement within the terms of this warranty.

Subject to State or Provincial law to the contrary, the Company will not be responsible for any expense for installation, removal from service, transportation, or damages of any type whatsoever, including damages arising from lack of use, business interruptions, or incidental or consequential damages.

The Company cannot anticipate or control the conditions of product usage and therefore accepts no responsibility for the safe application and suitability of its products when used alone or in combination with other products. Tests for the safe application and suitability of the products are the sole responsibility of the user.

This warranty will be void if, in the judgment of the Company, the damage, failure or defect is the result of:

- vibration, radiation, erosion, corrosion, process contamination, abnormal process conditions, temperature and pressures, unusual surges or pulsation, fouling, ordinary wear and tear, lack of maintenance, incorrectly applied utilities such as voltage, air, gas, water, and others or any combination of the aforementioned causes not specifically allowed for in the design conditions or
- any act or omission by the Purchaser, its agents, servants or independent contractors which for greater certainty, but not so as to limit the generality of the foregoing, includes physical, chemical or mechanical abuse, accident, improper installation of the product, improper storage and handling of the product, improper application or the misalignment of parts.

No warranty applies to paint finishes except for manufacturing defects apparent within 30 days from the date of installation.

The Company neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with the product(s).

The Purchaser agrees that all warranty work required after the initial commissioning of the product will be provided only if the Company has been paid by the Purchaser in full accordance with the terms and conditions of the contract.

The Purchaser agrees that the Company makes no warranty or guarantee, express, implied or statutory, (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE) written or oral, of the Article or incidental labour, except as is expressed or contained in the agreement herein.

LIABILITY: Technical data contained in the catalog or on the website is subject to change without notice. The Company reserves the right to make dimensional and other design changes as required. The Purchaser acknowledges the Company shall not be obligated to modify those articles manufactured before the formulation of the changes in design or improvements of the products by the Company.

The Company shall not be liable to compensate or indemnify the Purchaser, end user or any other party against any actions, claims, liabilities, injury, loss, loss of use, loss of business, damages, indirect or consequential damages, demands, penalties, fines, expenses (including legal expenses), losses, obligations and causes of action of any kind arising wholly or partly from negligence or omission of the user or the misuse, incorrect application, unsafe application, incorrect storage and handling, incorrect installation, lack of maintenance, improper maintenance or improper operation of products furnished by the Company.