

IMPORTANT INSTRUCTIONS - SAVE THESE INSTRUCTIONS

Read all instructions before installing or using the heater. Please adhere to instructions published in this manual. Failure to do so may be dangerous and may void certain provisions of your warranty.



Corrosion-Resistant Washdown Unit Heaters

CR1 Triton™ Series

Owner's Manual

For Installation, Operation, Maintenance, Repair, and Replacement Parts



CR1	-	480	3	60	-	200	-	T
Model Series		Heater Voltage	Phase	Hertz		Heater Kilowatts		
1st Generation		208V, 240V, 480V, 600V	1, 3	60		030 - 3 kW 050 - 5 kW 075 - 7.5 kW 100 - 10 kW 150 - 15 kW 200 - 20 kW 250 - 25 kW 300 - 30 kW 390 - 39 kW		T – Built-in room thermostat P – Built-in pilot light F – Built-in 3-position fan switch ("ON", "OFF", "FAN ONLY") D – Built-in door interlocking disconnect switch M – Built-in manual reset temperature high-limit E – Monel® elements



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A. Important Notices



WARNING

Read and adhere to the following. Failure to do so may result in a risk of fire, electrical shock, or injury to persons. Warranty will be void.

1. Read and follow all instructions in this manual.



WARNING

Heater is not to be used in hazardous atmospheres where flammable vapors, gases, liquids or other combustible atmospheres are present.

2. Heater is to be connected and serviced only by a qualified electrician.
3. Installation and wiring of the heater must adhere to all applicable codes.
4. Before opening any enclosures, disconnect the heater from the power supply. Lock the switch in the "OFF" position and/or tag the switch to prevent unexpected power application.
5. The heater does not operate with the high-limit disconnected from the control circuit.
6. The heater does not to be operate if the bulb or capillary of the high-limit is damaged.

7. Do not operate the heater in atmosphere corrosive to type 304 stainless steel.
8. Use factory replacement parts only.
9. Maximum ambient operating temperature is 40°C (104°F).



WARNING

Elements get hot during operation. Contact can cause burns.



WARNING

To prevent risk of fire, install heater according to minimum clearances stated in Figure 1 below.

10. Type 4X conduits must be used for field connection in order to maintain watertightness of the enclosure.
11. Do not operate the heater with the louvers deformed from their factory preset positions.
12. Wash with water pressure less than 70 psi.
13. Complies with U.S. Coast Guard regulations only when indicated on heater data plate and when the discharge grille directs airflow downward.
14. If there are any questions or concerns regarding the heater, please refer to contact info on page 14.

B. Installation General Guideline for Installation and Wiring

All applicable codes must be adhered to. For optimum performance, the heater should be installed as follows:

B.1 Location

1. Ensure there are no obstructions that may impede the heater's air inlet or discharge (see Figure 1 for minimum clearances).
2. Ensure the air discharge is not directed at a thermostat.
3. Ensure the air discharge is not directed towards areas of heat loss, such as windows.
4. Ensure the air discharge is directed along and at a slight angle toward exterior walls.
5. If equipment freeze protection is important, direct air discharge at equipment while maintaining minimum clearances.

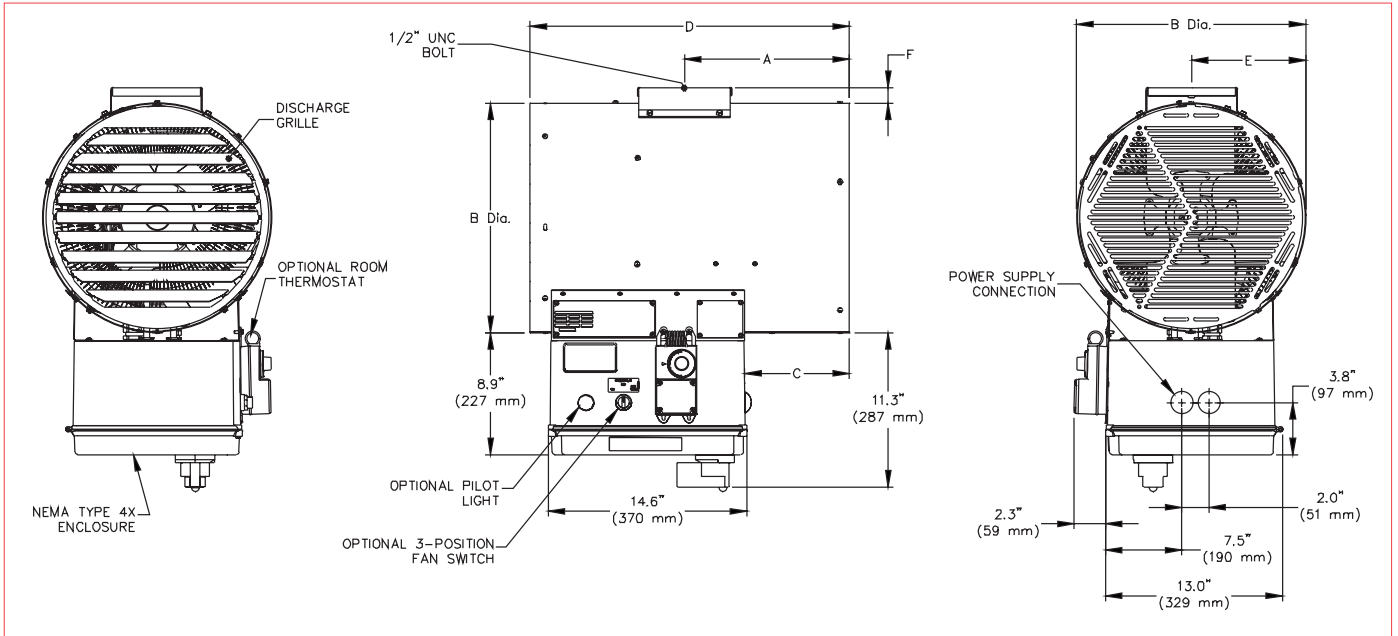


Figure 1

Table 1 - Heater Dimensions

DIMENSIONS	A	B	C	D	E	F
3 to 10 kW	318 mm (12.5")	325 mm (12.8")	216 mm (8.5")	620 mm (24.4")	162.5 mm (6.4")	23 mm (0.9")
15 and 20 kW	307 mm (12.1")	425 mm (16.7")	190 mm (7.5")	595 mm (23.4")	212.5 mm (8.4")	30 mm (1.2")
25 to 39 kW	307 mm (12.1")	525 mm (20.7")	190 mm (7.5")	595 mm (23.4")	262.5 mm (10.3")	32 mm (1.3")

Table 2 - Installation Minimum Clearances

Minimum clearances for service and airflow:	
Front	1829 mm (72")
Back	152 mm (6")
Right Side	254 mm (10")
Left Side	25 mm (1")
Top	203 mm (8")
Bottom	1829 mm (72")

B.2 Mounting

1. The heater must be permanently mounted with the control box at the bottom.
2. The mounting surface must be strong enough to:
 - a. Support the heater's weight.
 - b. Provide sufficient stiffness to prevent excessive vibration.
 - c. Withstand harsh situations such as transportable installations.
 - d. The single bolt mounting is not designed in contemplation of high dynamic loads that can occur during transportation. For heaters that are to be installed prior to transportation it is recommended that temporary blocking or strapping be used to limit movement of the heater with respect to the mounting structure. Inspection of the mounting bolt for correct tensioning is also recommended after arrival at site to ensure no loosening has occurred in transportation.
3. Install the heater at least 6 ft (1.8 m) from the floor.
4. Install the bracket (see Figure 2 - 5 for installation instructions).
 - a. Orient the heater to its final position before tightening all hardware.
 - b. In higher vibration installations use of a removable thread locking compound such as Loctite® 243 Blue Threadlocker is recommended.
 - c. Correct tensioning of the mounting bolt will include full compression of the split lock washer and inspection for correct thread engagement. The mounting bolt/nut should be torqued to 65 - 75 ft-lbs.
 - d. Ensure that all safety pins are installed in the bolt(s) and clevis pin(s).
5. Louvered discharge grille can be rotated in 45° increments. Heater only complies with U.S. Coast Guard regulations when the grille is installed such that the airflow is directed downward.
6. For maximum tilt angles, see Figure 2. For maximum mounting height, see general specifications table on page 11.

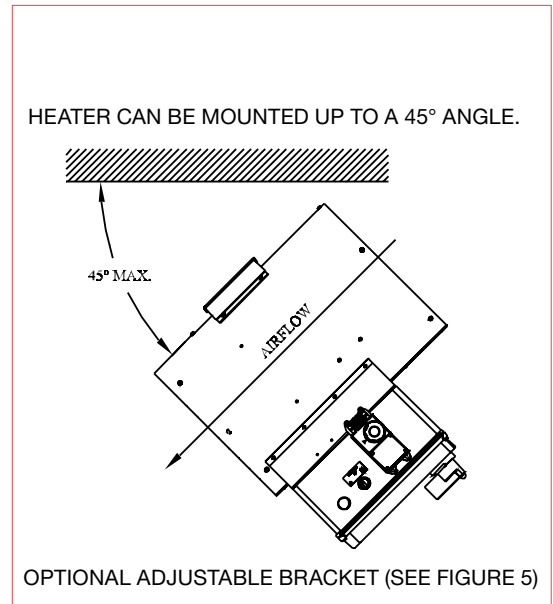


Figure 2

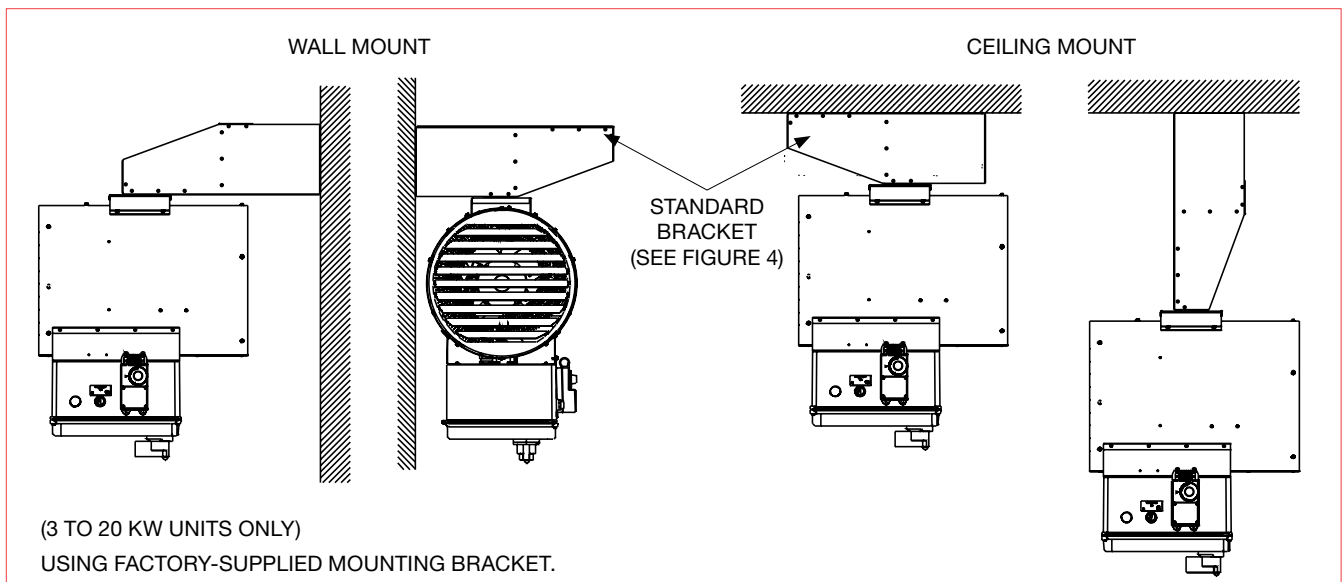


Figure 3

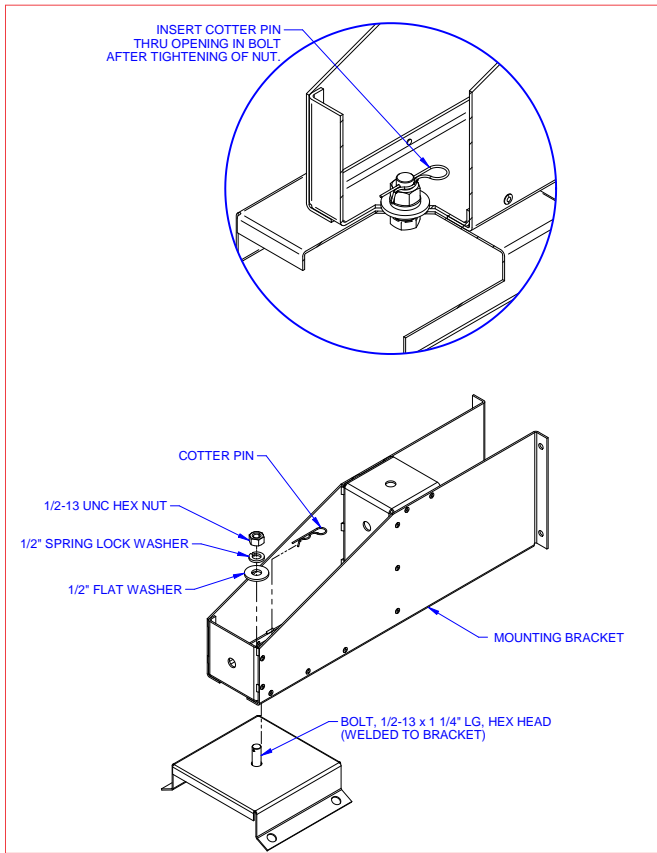


Figure 4 - Standard Bracket

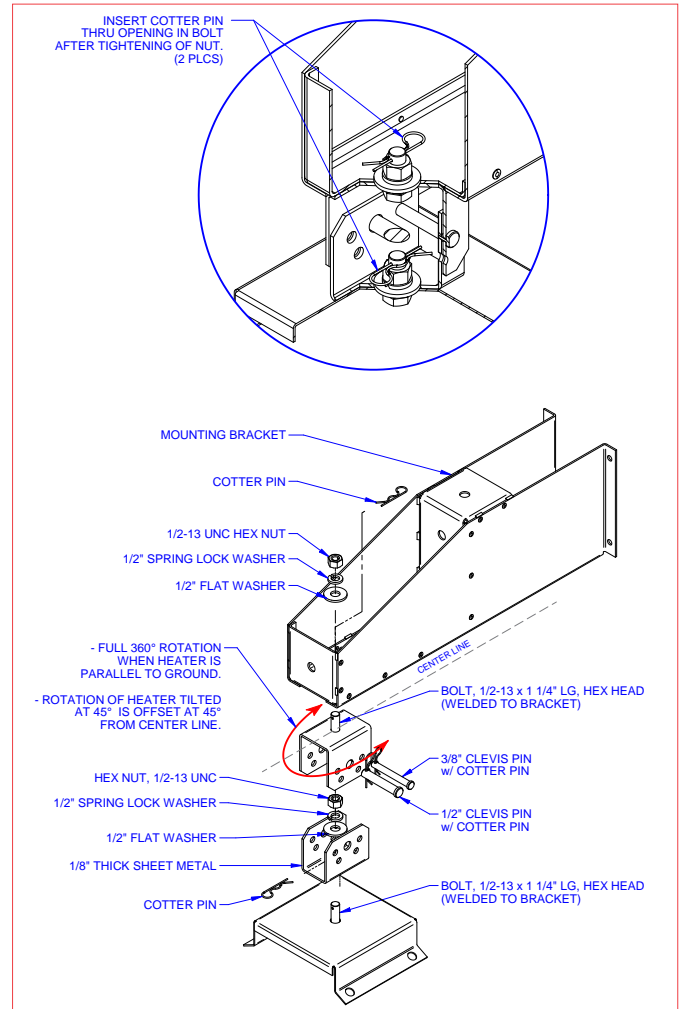


Figure 5 - Optional Adjustable Bracket

B.3 Electrical



WARNING

Disconnect heater from 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 application codes.

B.3.1 General

1. Use only copper conductors and approved Type 4X 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, amperage, and frequency. Supply voltage is to be within 10% of the data plate voltage.

B.3.2 Field Wiring

1. Heater is supplied with an enclosure that has 2 standard 3/4" trade size conduit openings to accommodate the line conductors or external thermostat connection.

2. Heater may be supplied with a factory-installed built-in room thermostat. On heaters not supplied with this option, a remote thermostat is required. Connect the remote thermostat conductors to the terminal block marked T1, T2 and Ground. Any thermostat used with this heater must be:
 - a. Listed or Approved
 - b. Type 4X rated*, and
 - c. Rated at 120 volt minimum and 5 amp minimum.
 - d. *An appropriate Type 4X rated room thermostat is available from the factory.

B.3.3 Final Inspection

1. Before application of electrical power:
 - a. Check that all connections are secured and comply with the applicable code requirements.
 - b. Confirm that the supply voltage is compatible with the data plate specifications.
 - c. Remove any foreign objects from the heater.
 - d. Ensure all external fittings and enclosure covers are secured.
 - e. Ensure that the fan rotates freely.
 - f. If equipped, ensure manual reset high-limit has been reset.

Wiring Schematics

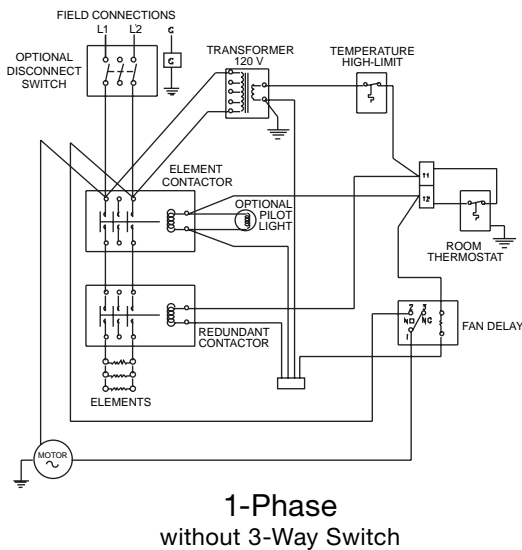
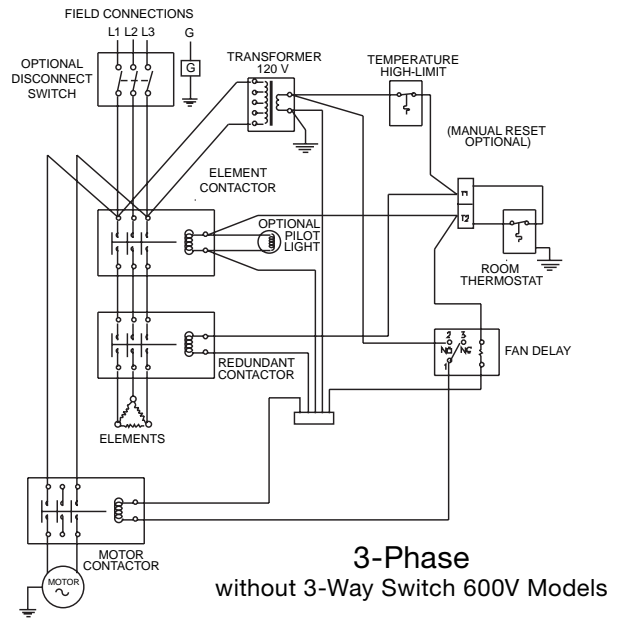
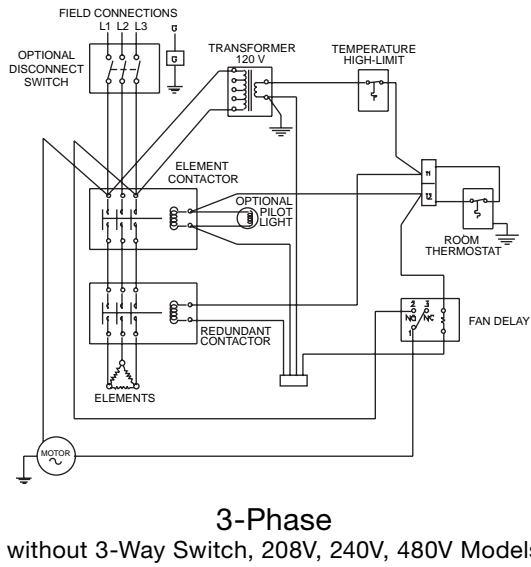
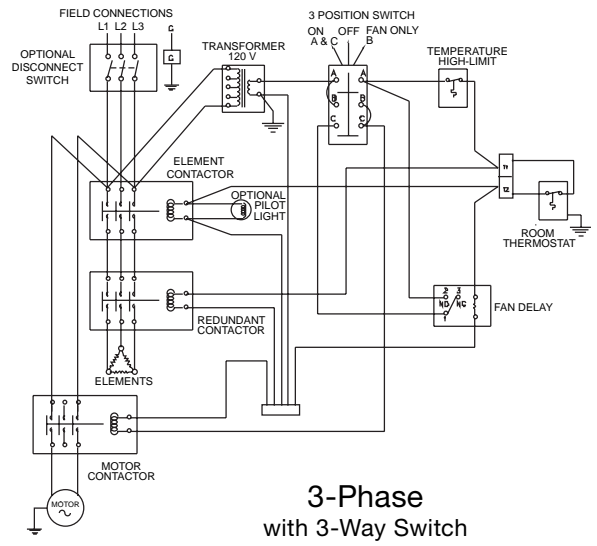
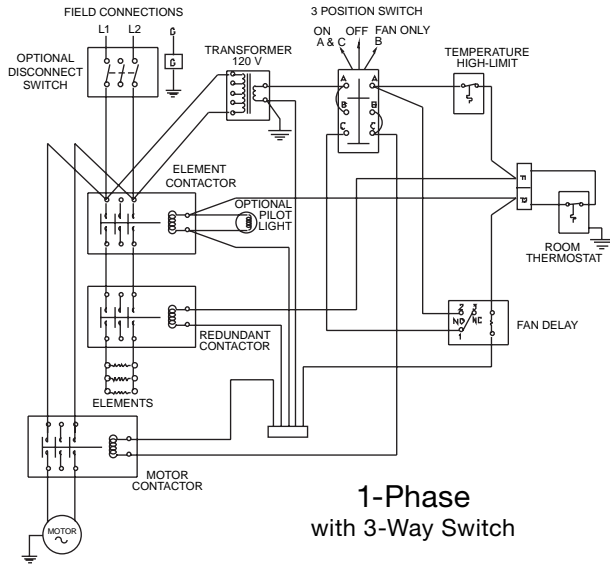


Figure 6

C. Operation

C.1 General

1. To operate heater, ensure power supply is properly connected as specified in the wiring schematic (see figure 6 on page 6).
2. Ensure the thermostat controlling the heater is set above the ambient temperature.
3. If the heater is provided with the optional door interlocking disconnect switch, ensure the switch is in the "ON" position.
4. If the heater is provided with the optional 3-position fan switch, ensure the switch is in the "ON" position. Note: If the switch is in the "FAN ONLY" position, only the fan will energize, not the elements.
5. If the heater is provided with the optional pilot light, the light will illuminate only when the elements are energized.
6. The heater is provided with a fan delay relay. The fan will energize approximately 20 seconds after the elements are energized. The fan will remain in operation for approximately 2 minutes after the thermostat de-energizes the elements. If the 3-position fan switch is turned to the "OFF" position, the fan will de-energize immediately.
7. During normal operation, the high-limit control should not cycle the heater ON and OFF. If cycling occurs, check to see if there is an airflow blockage. If there are no obstructions, the heater must be examined by qualified personnel to determine the cause of the high-limit cycling.
8. The heater is moisture resistant and can be externally washed down with low pressure water. High pressure washing or direct internal pressure washing of the heater may result in damage or failure. (Refer to Important Notices Section - 14).

D. Repair & Replacement



WARNING

Disconnect heater from 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. The heater should only be serviced by qualified personnel with electrical heating equipment experience.

NOTE:

ONLY USE FACTORY SUPPLIED REPLACEMENT PARTS OF THE SAME SPECIFICATION.

FOLLOW STEP BY STEP INSTRUCTIONS SUPPLIED IN HEATING ELEMENT REPLACEMENT PARTS PACKAGE.

D.1 Heating Elements

1. Disconnect all wires connected to the element terminals and remove all bus bars. Remove discharge grille from heater. If equipped, remove element brackets from heater.
2. Remove elements, noting their proper placement.
3. Install factory-supplied replacement elements such that the smallest loop of the spiral element is closest to the discharge end of the heater (see Figure 7).
 - a. Ensure that the element gaskets are in place and in good condition.
 - b. Tighten the element bushing nuts until the gaskets are snug between the bushing shoulders and enclosure.
 - c. Compress the gaskets by turning the nuts 1 to 1-1/4 additional turns.
 - d. Check that the elements are not in contact with the cabinet or each other.
4. Reinstall all bus bars, wires, brackets, and discharge grille.

D.2 Fan

1. Remove inlet grille from heater. Remove the three screws securing the fan to the fan hub attached to the motor.
2. Replace fan with factory-supplied fan. Install the fan such that the "spider" of the fan (see Figure 8) faces the outside of the heater (i.e., facing away from the motor). The spider should be visible from the rear of the heater (as shown in Figure 8).

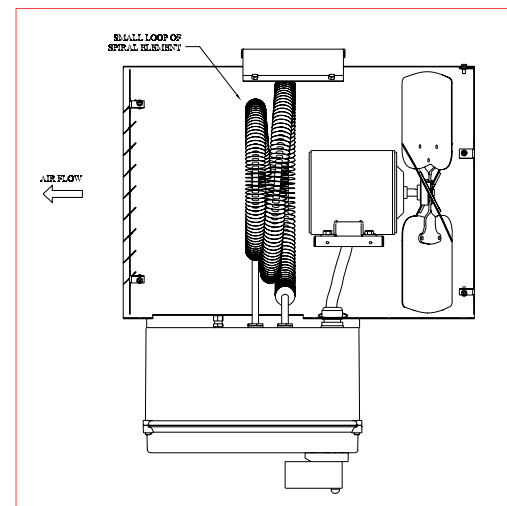


Figure 7

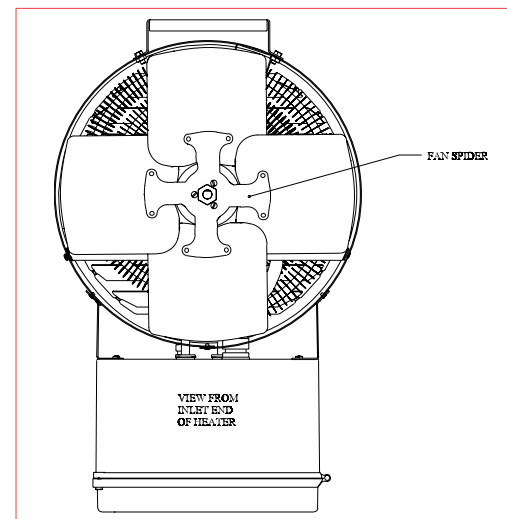


Figure 8

D.3 Temperature High-Limit

1. Remove discharge grille from heater. Remove clips securing bulb and capillary to cabinet.
2. Inside electrical enclosure, remove lock nut from high-limit compression fitting and remove fitting from enclosure.
3. Remove compression nut from the fitting (see Figure 9). Remove seal from fitting. Remove fitting from capillary.
4. Remove high-limit switch from the enclosure.
5. Replace high-limit with factory-supplied replacement high-limit.
6. Reinstall high-limit switch to bracket in the control enclosure.
7. Slip capillary sleeve over capillary. Note: For 25 to 39 kW heaters, the sleeve must be cut to 8.25 in. (210 mm). For 15 and 20 kW heaters, the sleeve must be cut to 14.125 in. (360 mm). For 3 to 10 kW heaters, sleeve does not have to be cut to length.
8. Slide lock nut over bulb and capillary. Insert bulb and capillary through the enclosure opening.
9. Place compression fitting body over capillary. Install seal on capillary and insert seal into body of fitting (see Figure 9).
10. Loosely install top nut onto compression seal body. Secure fitting to enclosure with lock nut on the inside of the enclosure. Tighten lock nut to ensure watertight seal.
11. Reinstall the bulb and capillary using the original clips. Ensure the bulb is in the same position as the previous high-limit. The bulb tip should be 3.94 in. (100 mm) from the discharge edge of the cabinet.
12. Tighten top nut on compression seal.

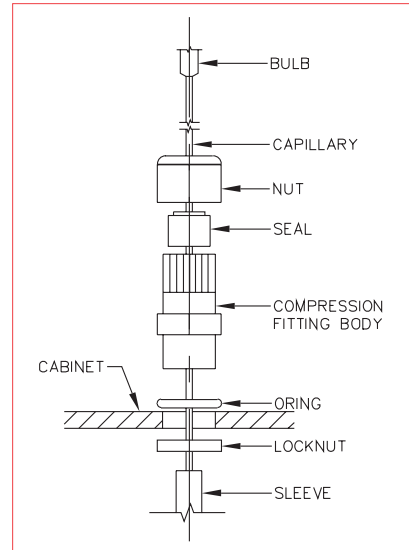


Figure 9

E. Parts List

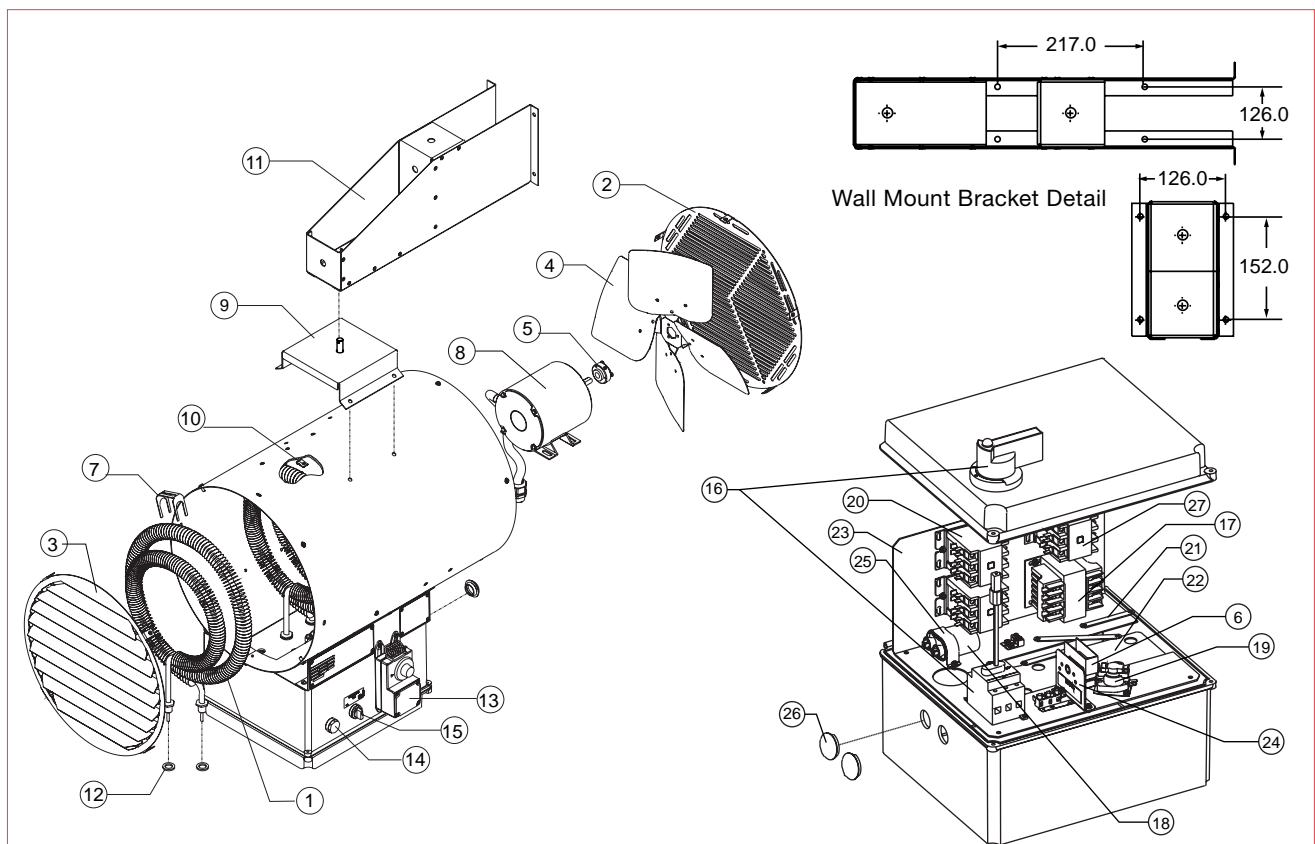


Figure 10

Item #	Description		3 kW	5 kW	7.5 kW	10 kW	15 kW	20 kW	25 kW	30 kW	35 kW	39 kW		
1	Elements	208V	Stainless Steel	8365	7747	7752	7758	7761	-	-	-	-	-	
			Monel®	8382	8109	8112	8115	8118	-	-	-	-	-	
		240V	Stainless Steel	8366	7748	7753	7759	7762	-	-	-	-	-	-
			Monel®	8383	8110	8113	8116	8119	-	-	-	-	-	-
		480V	Stainless Steel	8367	7751	7756	7760	7763	7764	8357	8358	8359	8360	8360
			Monel®	8384	8111	8114	8117	8120	8121	8374	8375	8376	8377	8377
		600V	Stainless Steel	8368	8369	8370	8371	8372	8373	8361	8362	8363	8364	8364
			Monel®	8385	8386	8387	8388	8389	8390	8378	8379	8380	8381	8381
2	Inlet Grille		7485				7484		8251					
3	Discharge Grille		7487				7486		8252					
4	Fan Blade		7522				7523		8304					
5	Fan Hub						7519							
6	High-Limit Kit	Auto Reset					7740							
		Manual Reset					7741							
7	Element Bracket		N/A						7589					
8	Motor Kit	208-480V					7742							
		600V					8302							
9	Attachment Bracket						7490							
10	High-Limit Clip						7656							
11	Mounting Bracket						7501							
12	Element Gasket						7579							
13	Built-in Thermostat Kit						7743							
14	Pilot Light Kit						7744							
15	3-Position Fan Switch						7745							
16	Disconnect Switch Kit						7746							
17	Transformer	208-480V					7478							
		600V					8260							
18	Motor Capacitor						7502							
19	Fan Delay Relay						7470							
20	Contactors	40 Amp					3618							
		75 Amp					3619							
21	Bus Bars	1ø					7475							
		3ø Short					7476							
		3ø Long					7477							
22	Element Plate						7488							
23	Controls Bracket						7493							
24	Hi-Limit Switch Bracket						7654							
25	Capacitor Bracket						7492							
26	Knock-out Plugs						7639							
27	Contactor (Motor)						3618							

F. CR1 Technical Data

Model	Heater Watts (kW)	Volts (V)	Phase	Line Amps (Amps)	Air Temperature Rise		BTU/HR
					(°C)	(°F)	
CR1-208160-030	3	208	1	17.4	7.5	13.5	10250
CR1-240160-030	3	240	1	15.5	7.5	13.5	10250
CR1-208360-030	3	208	3	11.3	7.5	13.5	10250
CR1-240360-030	3	240	3	10.2	7.5	13.5	10250
CR1-480360-030	3	480	3	5.1	7.5	13.5	10250
CR1-600360-030	3	600	3	3.9	7.5	13.5	10250
CR1-208160-050	5	208	1	27.0	12.5	22.5	17050
CR1-240160-050	5	240	1	23.8	12.5	22.5	17050
CR1-208360-050	5	208	3	16.9	12.5	22.5	17050
CR1-240360-050	5	240	3	15.0	12.5	22.5	17050
CR1-480360-050	5	480	3	7.5	12.5	22.5	17050
CR1-600360-050	5	600	3	5.8	12.5	22.5	17050
CR1-208160-075	7.5	208	1	39.1	18.8	33.8	25600
CR1-240160-075	7.5	240	1	34.3	18.8	33.8	25600
CR1-208360-075	7.5	208	3	23.8	18.8	33.8	25600
CR1-240360-075	7.5	240	3	21.0	18.8	33.8	25600
CR1-480360-075	7.5	480	3	10.5	18.8	33.8	25600
CR1-600360-075	7.5	600	3	8.2	18.8	33.8	25600
CR1-240160-100	10	240	1	44.7	25.0	45.0	34100
CR1-208360-100	10	208	3	30.8	25.0	45.0	34100
CR1-240360-100	10	240	3	27.1	25.0	45.0	34100
CR1-480360-100	10	480	3	13.5	25.0	45.0	34100
CR1-600360-100	10	600	3	10.6	25.0	45.0	34100
CR1-208360-150	15	208	3	44.6	18.1	32.6	51200
CR1-240360-150	15	240	3	39.1	18.1	32.6	51200
CR1-480360-150	15	480	3	19.5	18.1	32.6	51200
CR1-600360-150	15	600	3	15.4	18.1	32.6	51200
CR1-480360-200	20	480	3	25.6	24.2	43.6	68250
CR1-600360-200	20	600	3	20.3	24.2	43.6	68250
CR1-480360-250	25	480	3	31.6	20.9	37.5	85300
CR1-600360-250	25	600	3	25.1	20.9	37.5	85300
CR1-480360-300	30	480	3	37.6	25.0	45.1	102350
CR1-600360-300	30	600	3	29.9	25.0	45.1	102350
CR1-480360-350	35	480	3	43.6	29.2	52.6	119400
CR1-600360-350	35	600	3	34.7	29.2	52.6	119400
CR1-480360-390	39	480	3	48.0	32.5	58.6	133100
CR1-600360-390	39	600	3	38.5	32.5	58.6	133100

G. General Specifications

Nominal kW		3	5	7.5	10	15
Fan Diameter	in. (mm)	12 (305)	12 (305)	12 (305)	12 (305)	16 (406)
Air Delivery	CFM (m ³ /hr)	700 (1190)	700 (1190)	700 (1190)	700 (1190)	1450 (2460)
Approx. Air Velocity	ft/min (m/s)	785 (4.0)	785 (4.0)	785 (4.0)	785 (4.0)	950 (4.8)
Horizontal Throw	ft. (m)	22 (6.7)	22 (6.7)	22 (6.7)	22 (6.7)	35 (10.7)
Max. Mounting Height* horizontal (to underside)	(ft.)	8.5	8.5	8.5	8.5	11.5
	(m)	2.6	2.6	2.6	2.6	3.5
Max. Mounting Height* 45° decline (to underside)	(ft.)	12.8	12.8	12.8	12.8	18.0
	(m)	3.9	3.9	3.9	3.9	5.5
Min. Mounting Height	(ft.)	6.0	6.0	6.0	6.0	6.0
	(m)	1.8	1.8	1.8	1.8	1.8
Net Weight	lbs. (kg)	75.0 (34.1)	75.0 (34.1)	75.0 (34.1)	75.0 (34.1)	90.0 (40.9)
Shipping Weight	lbs. (kg)	125.0 (56.8)	125.0 (56.8)	125.0 (56.8)	125.0 (56.8)	140.0 (63.6)
High-Limit Kit		Storage: -45°C to 60°C (-49°F to 140°F)				
		Operating: -45°C to 40°C (-49°F to 104°F)				

Nominal kW		20	25	30	35	39
Fan Diameter	in. (mm)	16 (406)	20 (508)	20 (508)	20 (508)	20 (508)
Air Delivery	CFM (m ³ /hr)	1450 (2460)	2100 (3570)	2100 (3570)	2100 (3570)	2100 (3570)
Approx. Air Velocity	ft/min (m/s)	950 (4.8)	900 (4.6)	900 (4.6)	900 (4.6)	900 (4.6)
Horizontal Throw	ft. (m)	35 (10.7)	44 (13.4)	44 (13.4)	44 (13.4)	44 (13.4)
Max. Mounting Height* horizontal (to underside)	(ft.)	11.5	12.3	12.3	12.3	12.3
	(m)	3.5	3.7	3.7	3.7	3.7
Max. Mounting Height* 45° decline (to underside)	(ft.)	18.0	18.8	18.8	18.8	18.8
	(m)	5.5	5.7	5.7	5.7	5.7
Min. Mounting Height	(ft.)	6.0	6.0	6.0	6.0	6.0
	(m)	1.8	1.8	1.8	1.8	1.8
Net Weight	lbs. (kg)	90.0 (40.9)	130 (59.1)	130 (59.1)	130 (59.1)	130 (59.1)
Shipping Weight	lbs. (kg)	140 (63.6)	180 (81.8)	180 (81.8)	180 (81.8)	180 (81.8)
High-Limit Kit		Storage: -45°C to 60°C (-49°F to 140°F)				
		Operating: -45°C to 40°C (-49°F to 104°F)				

*Maximum mounting height to ensure warm air reaches the floor.

H. Heater Maintenance Checklist

Washdown Unit Heaters

Photocopy
this page
for reuse.

Heater Model _____ Date of Maintenance _____

Serial Number _____ Maintenance Done By _____

Comments _____

Periodic (before and as required during heating season)

H.1 Clean

- Finned Tubes
- Discharge Grille
- Motor
- Inlet Grille
- Fan

H.3 Seals & Motor Check

- All watertight seals for condition and tightness
- Motor for smooth, quiet operation

Annual (before heating season)

H.2 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.
- All watertight fittings. Replace damaged seals with factory supplied seals.
- Electrical resistance on all load side legs. Reading should be balanced ($\pm 5\%$).

H.4 Mechanical Check

- Check for leakage inside the control enclosure. The electrical enclosure should be dry inside.
- Check enclosure seal. Seal should be free of nicks and cuts.
- Check motor shaft bearing play. Replace motor if play is excessive, or if motor does not run quietly and smoothly. Bearings are permanently lubricated.
- Check fan. Replace immediately if cracked or damaged.
- Check high-limit bulb and capillary. Replace immediately if damaged.
- Check tightness of all hardware. All fasteners must be tight.
- Turn heater on for a minimum of five minutes. Check for warm air exiting heater through discharge grille.



WARNING

Disconnect heater from power supply at integral disconnect or fuse box before opening enclosures or servicing heater.

Lock the switch in the "OFF" (open) position and/or tag the switch to prevent unexpected power application.

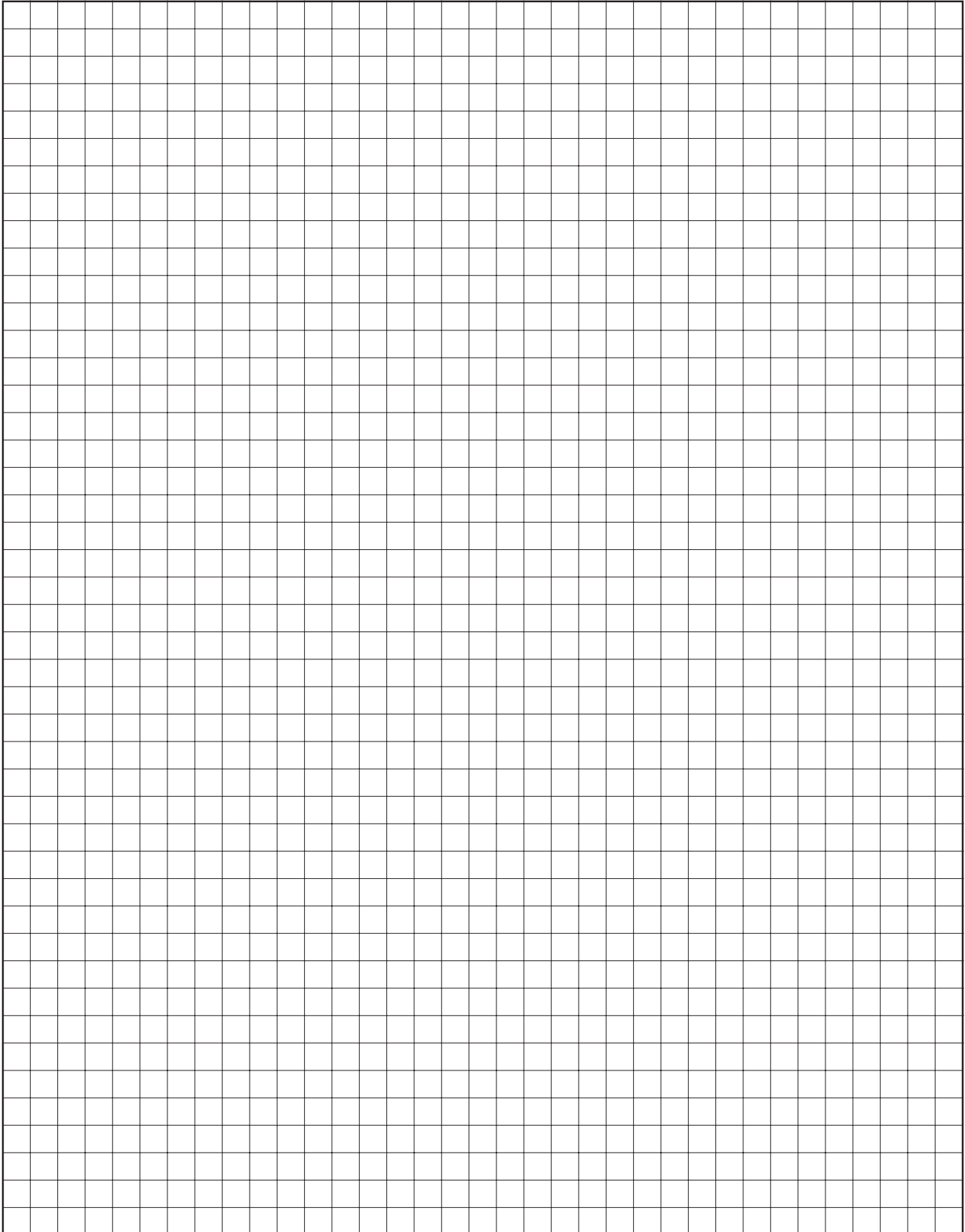
This heater should only be serviced by qualified personnel with electrical heating equipment experience.



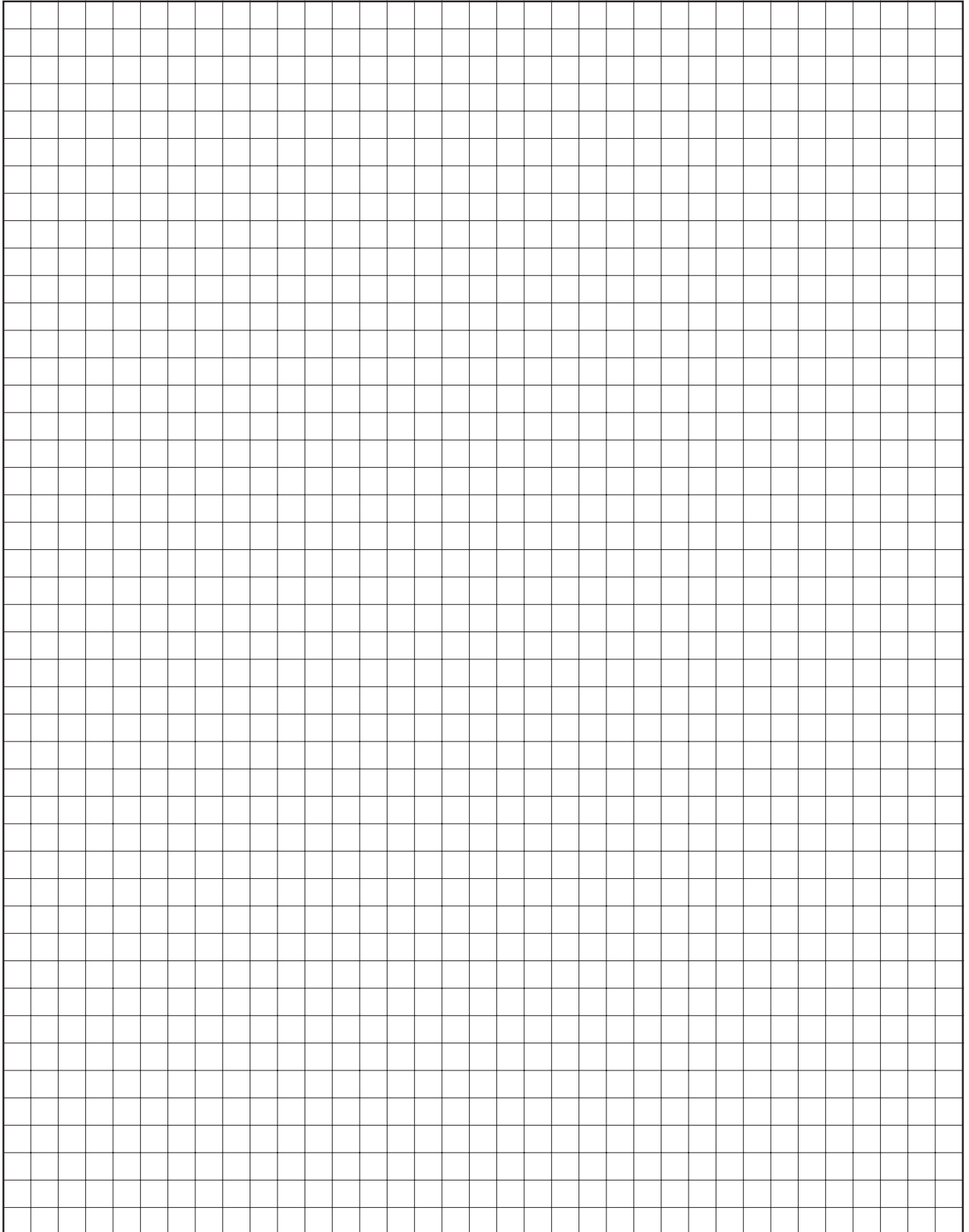
WARNING

Use this heater only as described in this manual. Any other use not recommended by the manufacturer may cause fire, electric shock, or injury to persons.

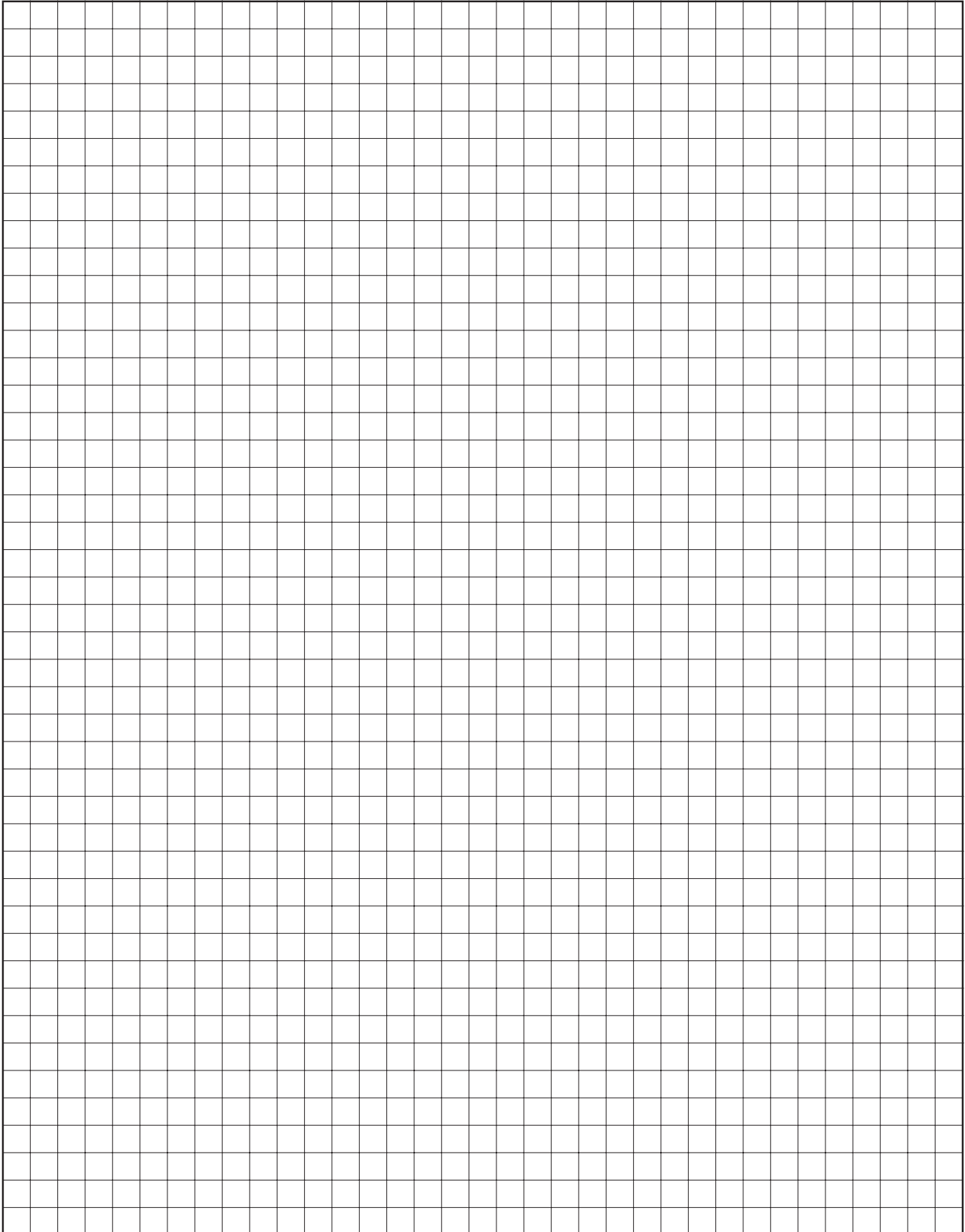
NOTES



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For further assistance, please call 24hr 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), costs, 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.



Edmonton

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F 705-325-2106

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1-303-979-7339

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