

Chromalox®

Installation, Operation and **RENEWAL PARTS IDENTIFICATION**

SERVICE REFERENCE

DIVISION 4	SECTION SDR
SALES REFERENCE (Supersedes PF499)	PF499-1
161-304812-003	
DATE	NOVEMBER, 2006

Portable Industrial Unit Blower Air Heater Types SDR



Specifications – Table 1

Model	Electrical Data (60 Hz)					Dimensions (In)		
	Volts	kW	Phase	Amps	BTU	Height	Width	Depth
SDRA-30-43	480	30	3	37.2	102,360	38.5	26	44
SDRA-30-93	600	30	3	30.0	102,360	38.5	26	44
SDRA-48-43	480	48	3	58.9	163,776	38.5	30-1/4	44
SDRA-48-93	600	48	3	47.3	163,776	38.5	30-1/4	44
SDRA-60-43	480	60	3	73.3	204,720	38.5	30-1/4	44
SDRA-60-93	600	60	3	58.9	204,720	38.5	30-1/4	44

GENERAL

IMPORTANT: SAVE THESE INSTRUCTIONS

⚠ WARNING

RISK OF FIRE. Do not use as a residential or household heater

⚠ WARNING

Hazard of Fire or Discoloration of Temperature Sensitive Fabrics. Do not use as a residential or household heater. Keep combustible material and

such fabrics away from heater. Do not operate heater where flammable vapors, gases or liquids are present. Heaters in the heat mode should not be operated in room temperatures above 130°F. Fan motor is not designed to operate in ambients below -10°F.

To avoid personal injury read "IMPORTANT INSTRUCTIONS" on page 2 before installation or operation of heater.

⚠ WARNING

Keep electrical cords and combustible materials, such as drapes and other furnishings, away from heater.

IMPORTANT INSTRUCTIONS

When using electrical appliances, basic precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Read all instructions before using this heater.
2. This heater is hot when in use. To avoid burns, do not let bare skin touch hot surfaces. If provided, use handles when moving this heater. Keep combustible materials, such as furniture, pillows, bedding, papers, clothes, and curtains at least 3 feet (0.9m) from the front of the heater and keep them away from the sides and rear.
3. Extreme caution is necessary when any heater is used by or near children or handicapped individuals and whenever the heater is left operating and unattended.
4. Always disconnect heater when not in use.
5. Do not operate any heater with a damaged cable or plug or after the heater malfunctions, has been dropped or damaged in any manner. Return heater to authorized service facility for examination, electrical or mechanical adjustments, or repair.
6. Do not use outdoors.
7. This heater is not intended for use in bathrooms, laundry areas and similar indoor locations. Never locate heater where it may fall into a bathtub or other water container.

8. Do not run cord under carpeting. Do not cover cord with throw rugs, runners or the like. Arrange cord away from traffic area and where it will not be tripped over.
9. To disconnect heater, turn thermostat off, then remove plug from outlet.
10. Connect to properly grounded outlets only.
11. Do not insert or allow foreign objects to enter any ventilation or exhaust opening as this may cause an electric shock, fire or damage the heater.
12. To prevent a possible fire, do not block air intakes or exhaust in any manner. Do not use on soft surfaces, like a bed, where opening may become blocked.
13. A heater has hot and arcing or sparking parts inside. Do not use it in areas where gasoline, paint, flammable liquids are used or stored.
14. 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.
15. This heater is not intended for use with an extension cord.
16. **SAVE THESE INSTRUCTIONS.**

WIRING

⚠ WARNING

ELECTRIC SHOCK HAZARD. Disconnect all power before installing or servicing heater. Failure to do so could result in personal injury or property damage. Heater must be effectively grounded in accordance with the National Electrical Code, NFPA 70.

1. Use heater only on the voltage and frequency specified on the nameplate.
2. All wiring should be done in accordance with local codes and the National Electrical Code by a qualified person.
3. Branch circuit wire for connection to heater must be at least 90°C wire.
4. The top access panel is secured by 4 screws that must be loosened to gain access.

5. A ground terminal is provided near the power terminal board. The ground wire should be connected before other connections are made.
6. Refer to Table A for proper size "SO" grade of cable.
7. A proper strain relief must be used with "SO" grade cable.
8. Dragon heaters are factory pre-wired for 3-phase delta operation. Some units can be converted to single phase operation by changing the wiring. The appropriate wiring diagram is also located on the back of the wiring compartment cover.

Cord Preparation for Chromalox Portable Heaters

1. Determine the gage and number of conductors from the tabulation below using amps and phase from the heater nameplate. It is not recommended that cord exceed 50 feet in length.

Table A

Model Number	Volts	kW	Phase	Amps	Min Wire Size
SDRA-30-43	480	30	3	37.2	6 Ga
SDRA-30-63	600	30	3	30.0	8 Ga
SDRA-48-43	480	48	3	58.9	4 Ga
SDRA-48-63	600	48	3	47.3	4 Ga
SDRA-60-43	480	60	3	73.3	2 Ga
SDRA-60-63	600	60	3	58.9	4 Ga

SET-UP AND OPERATION

The SDRA SuperDragon is designed to be used with 20" diameter flexible duct. A feature of the heater is that the fan speed can be easily adjusted from 1500 to 2300rpm, (SDRA heaters are shipped from the factory with the fan speed set at 1800 rpm). The maximum external static load for the blower is .38" H₂O, regardless of the fan speed selected. The outlet temperature is controlled by a built-in thermostatic control; the maximum outlet temperature is a function of the kW rating and the amount of air (cfm) flowing through the heater. The addition of flexible duct will provide additional static load, resulting in a lower cfm, the lower air flow will raise maximum outlet temperature until the static load reaches .38"H₂O. Exceeding the maximum static load will result in the tripping of the overtemperature control. The performance range of the SDRA units is as shown in table B.

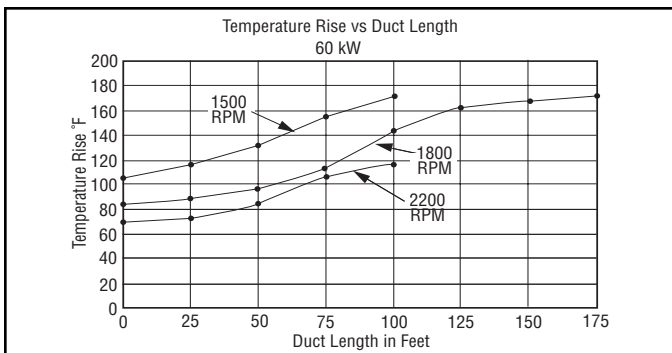
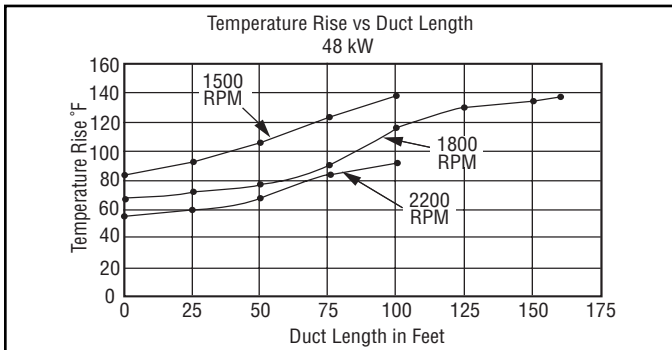
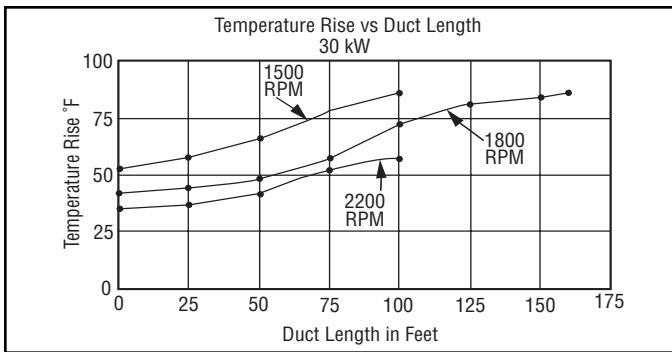
The motor and fan have variable pitch pulleys for changing the air flow and the ΔT. Graphs 1, 2 and 3 provide the performance data for

Table B

kW	Fan RPM	CFM	Δ T No Load	Max. Static Load	ΔT at Max. Static Load
30	1800	2200	42°F	.38" H ₂ O	86°F
48	1800	2200	68°F	.38" H ₂ O	144°F
60	1800	2200	88°F	.38" H ₂ O	170°F

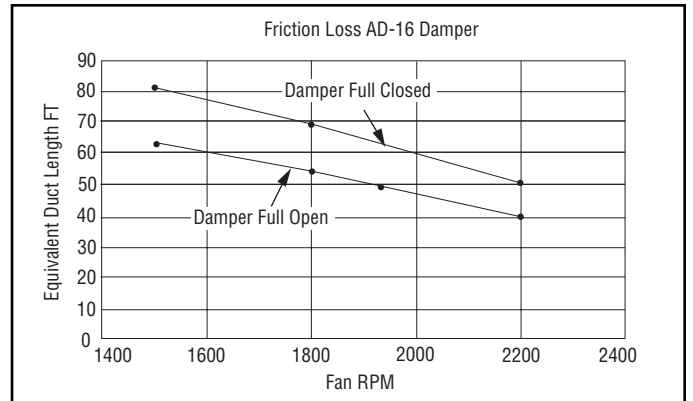
each size heater at the recommended minimum, medium and maximum fan speeds. The curves end at the point where the .38" H₂O static load has been reached. The temperature rise is based on using Chromalox 20" diameter FX-20 flexible duct. The performance curves were determined by actual testing; therefore using flexible duct not supplied by Chromalox may vary the results. The introduction of bends in the ducting will add static load equivalent to adding 15 feet of duct length for each 90° bend and 25 feet of duct length for each 180° bend.

WIRING (cont'd.)



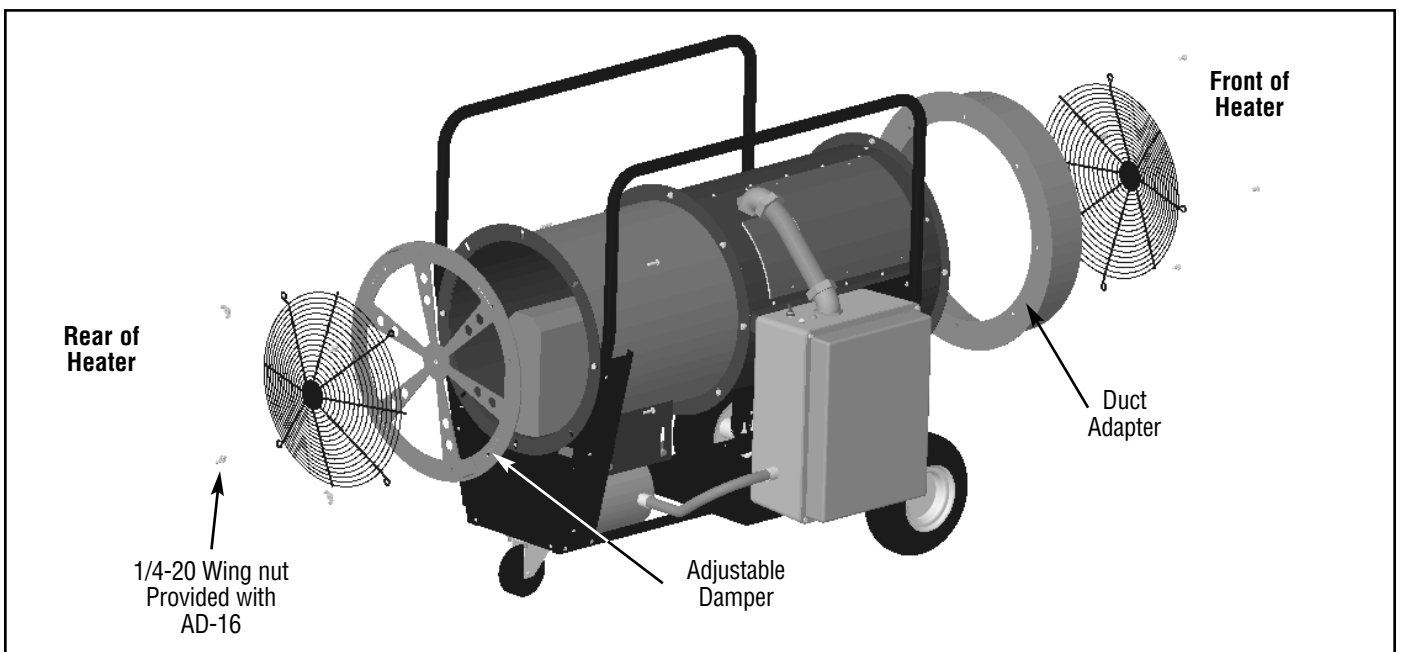
SDRA heaters can be easily field if modified to vary the fan speed. There may be some circumstances where the use of short lengths of duct may not create sufficient pressure drop to achieve the desired temperature rise. This may also be the case of using the unit without a duct. This insufficient static pressure drop may result in high air flow, with the maximum temperature rise below the desired level, (even after the fan speed has been reduced to the minimum rpm). An accessory AD-16, adjustable damper, is available and can be attached to the heater to produce a static load, ranging from .1" to .19" H₂O which will act to reduce the amount of air flow.

The "Friction Loss" Graph 4 provides the actual test data on the friction loss for the AD-16 damper attachment. The losses are stated as the equivalent length in feet of 20" duct.



The SDRA Dragon includes 2 thermostats. The thermostat on the air inlet end of the unit is for the minimum air temperature desired. The thermostat on the discharge end of the heater is for the maximum air temperature desired. The two thermostats are wired in series with the heating element contactor coil. The temperature range of both thermostats is 60 - 180°F.

ACCESSORIES



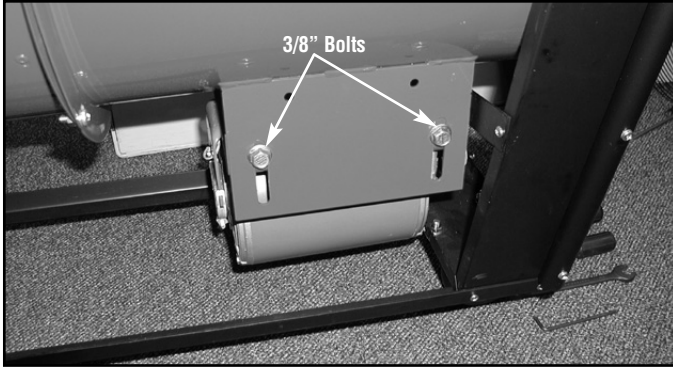
Adjustable Damper and Duct Adaptor

FAN SPEED ADJUSTMENTS

Changing the Pitch Diameter of the Sheaves:

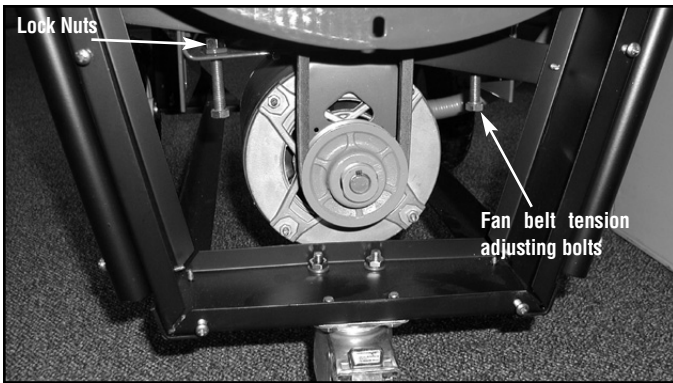
1. Tools required: 5/32" allen wrench, 3/8" nut driver, 9/16" box wrench and a medium size phillips screwdriver.
2. Remove the lower belt cover by removing the (5) sheet metal screws.
3. Remove the rear grille by removing the (4) 1/4" bolts and nuts.
4. Remove the belt cover inside the blower by removing the (4) sheet metal screws.
5. Loosen the (4) bolts, (2) on each side. See Fig. 1.

Figure 1



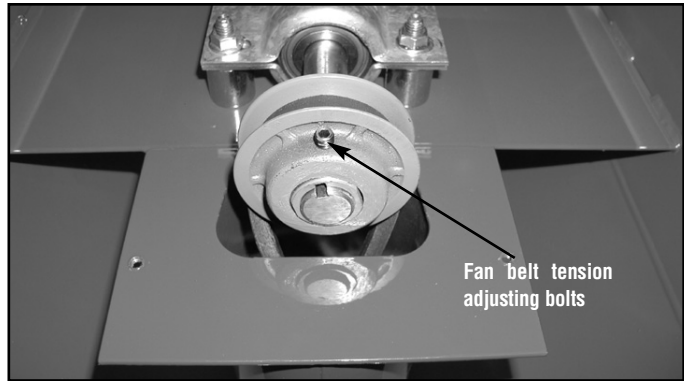
6. Loosen the (2) motor tension lock nuts and the fan belt tension adjusting bolts. See Fig.2

Figure 2



7. Loosen the set screw on the fan pulley or motor pulley. Fig. 3 shows the construction of the fan pulley, the motor pulley is the same construction.

Figure 3



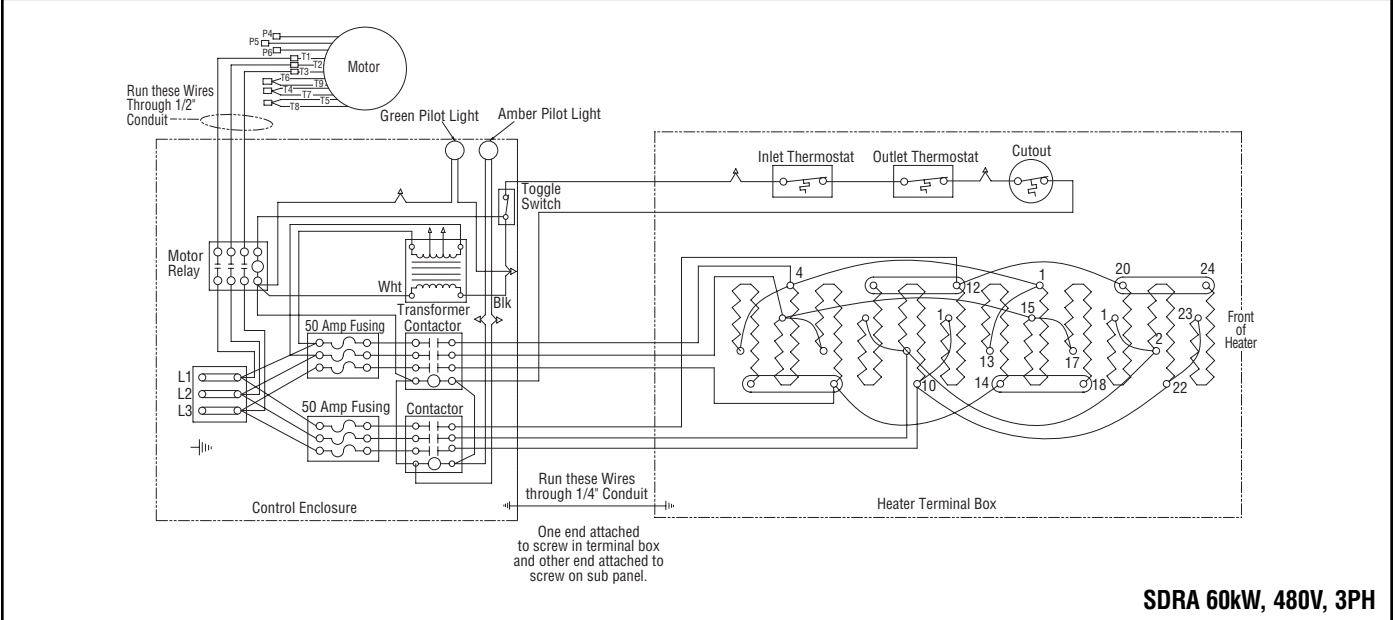
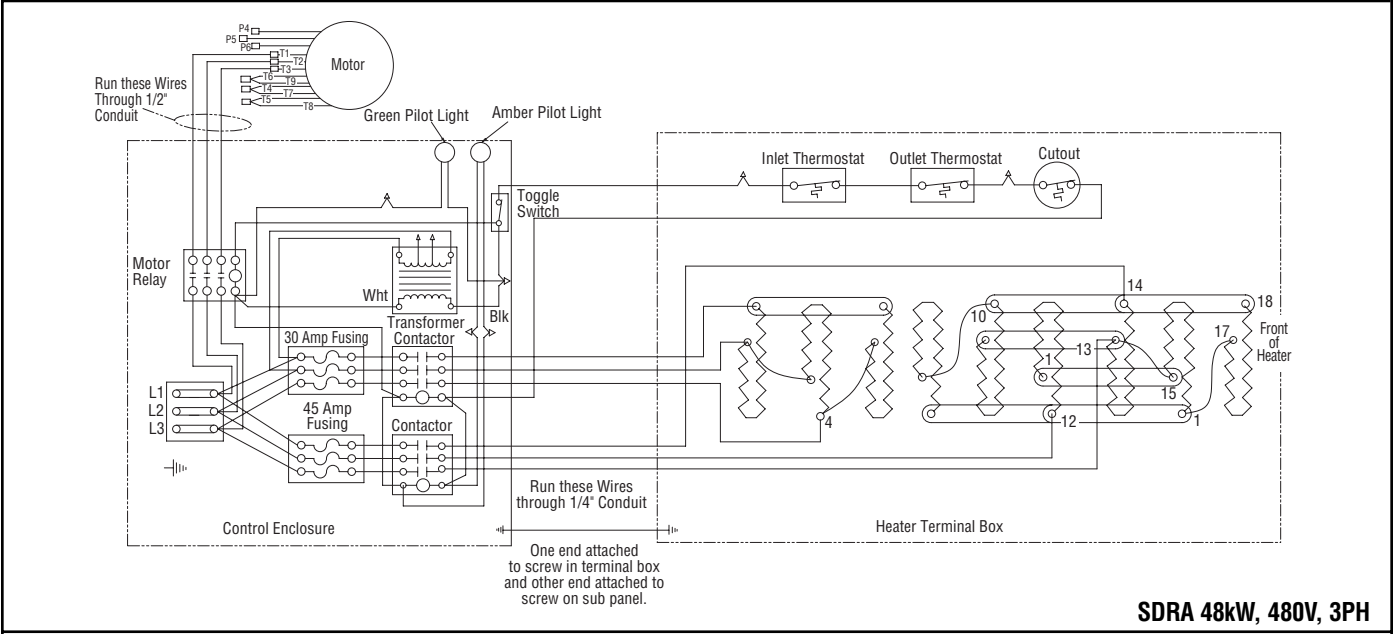
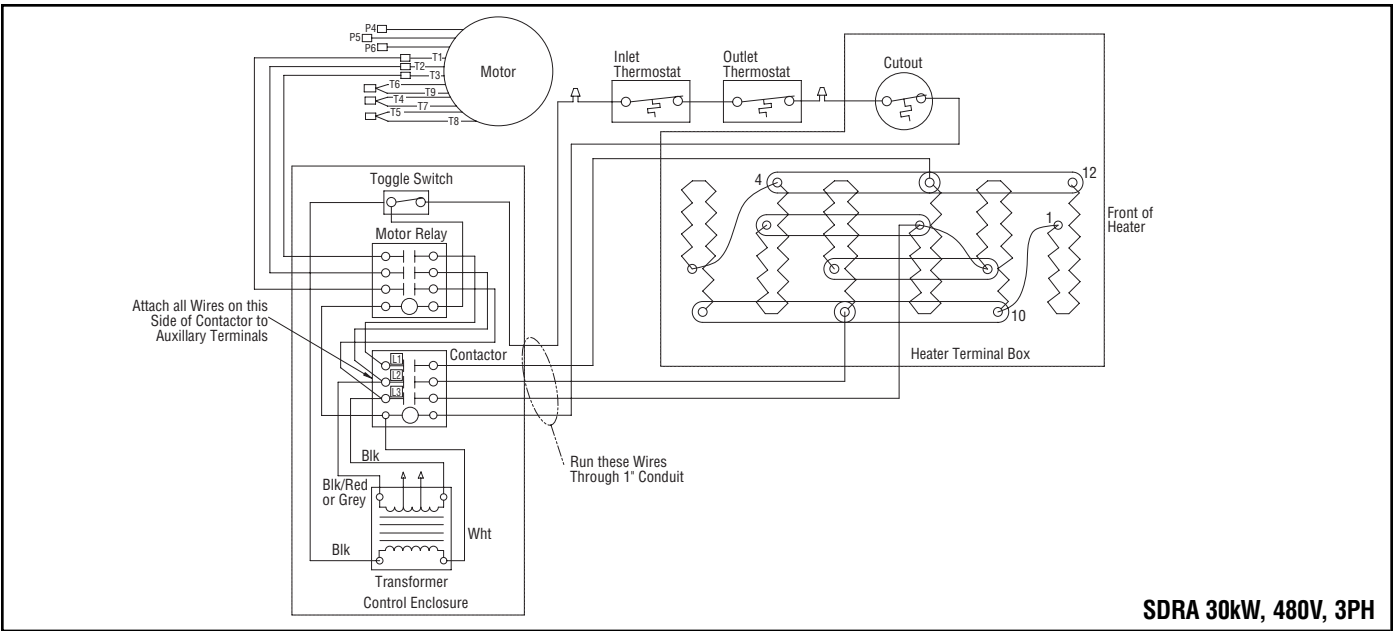
8. Rotate the front half of the pulley clockwise until it bottoms, then rotate counter clockwise until the set screw aligns with the flat in the threaded half of the pulley. The pulley is now in position for adjustment. See Table 1 for the number of turns out. **Tip:** Leave allen wrench in set screw and use free hand to fold fan blade.

Table 1

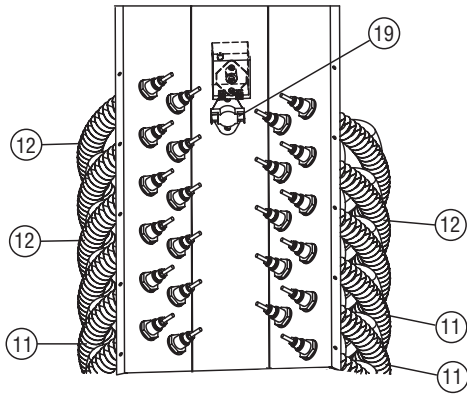
Fan RPM	No. of turns from full closed		Fan RPM	No. of turns from full closed	
	Motor Pulley	Fan Pulley		Motor Pulley	Fan Pulley
1500	3	1-1/2	1950	1-1/2	3
1600	2-1/2	1-1/2	2000	1-1/2	3-1/2
1650	2	1-1/2	2100	1-1/2	4
1725	1-1/2	1-1/2	2200	1-1/2	4-1/2
1800	1	1-1/2	2300	1	4-1/2
1850	1/2	1-1/2			

9. Retighten set screw, use of thread locking compound is recommended.
10. Adjust fan belt tension, see Fig. 2. A 1/2" of belt deflection is recommended. Tighten lock nuts.
11. Tighten the 3/8" bolts, see Fig. 1
12. Rotate fan blade to make sure the fan belt does not rub.
13. Reinstall top belt cover, grille and lower belt cover. **Tip:** Installing the grille before installing the lower cover makes it easier to access the two lower grille bolts.

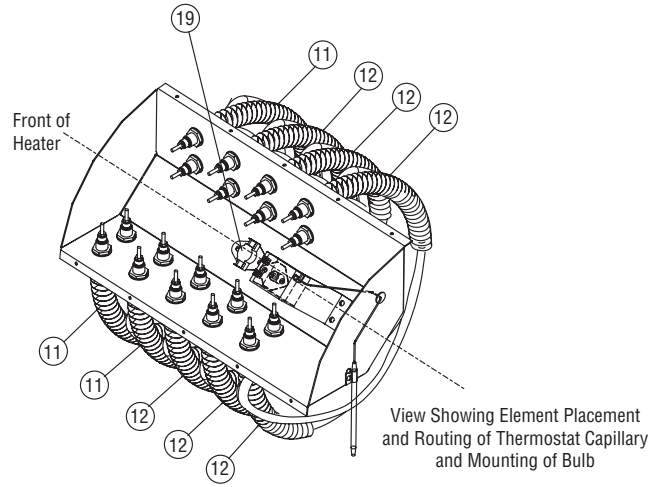
WIRING DIAGRAMS



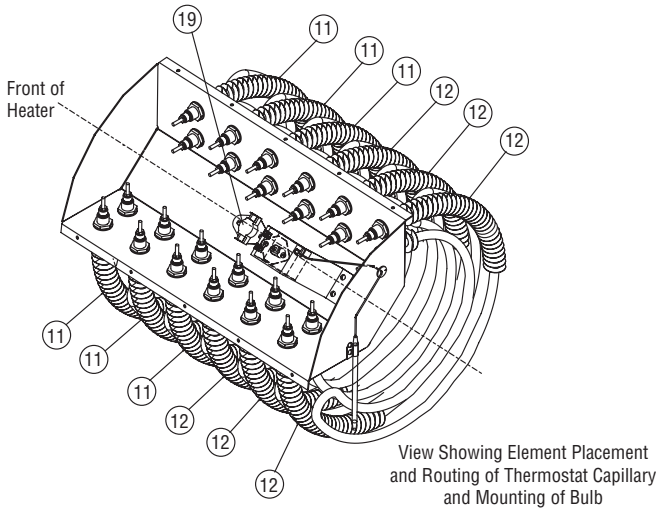
PARTS LOCATION



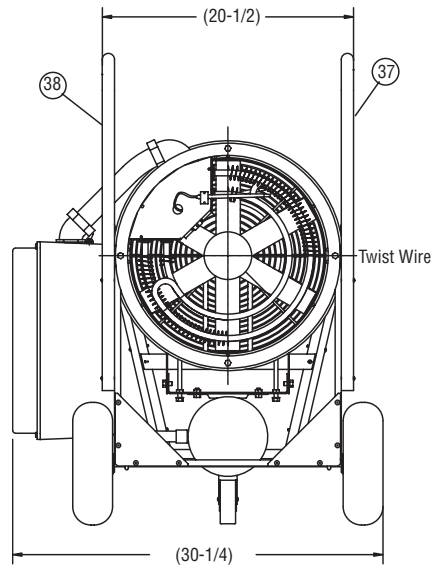
Element Assembly 30kW



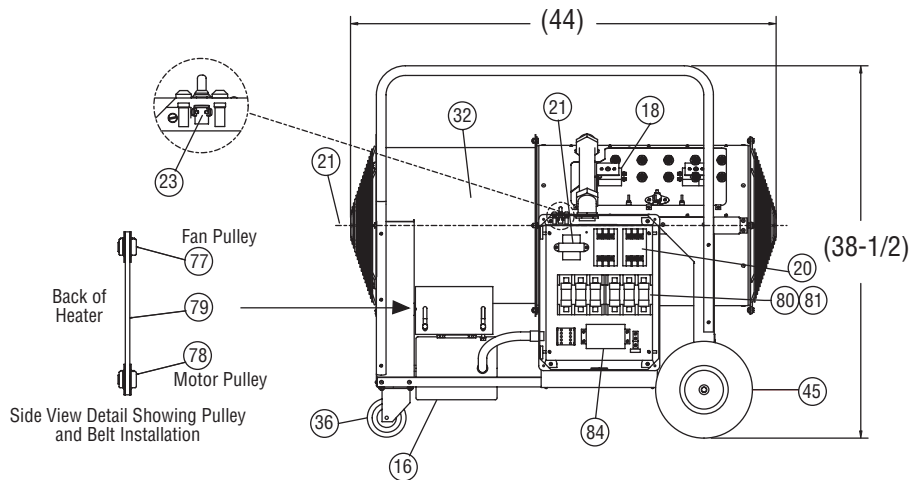
Element Assembly 48kW



Element Assembly 60kW



Front View with Grille Removed (All Sizes)



**Side View shown with Heater and Control Terminal Box Covers Removed
All Sizes**

MAINTENANCE

⚠ WARNING

ELECTRIC SHOCK HAZARD. Disconnect heater from power supply before servicing and/or inspecting the heater; failure to do so may result in electrical shock.

Replace or repair damaged cords or plugs immediately. Check tightness of all electrical connections prior to energizing Dragon. Blow out or vacuum away any dirt or debris that may have accumulated around the control enclosure fan motor or heating elements.

RENEWAL PARTS IDENTIFICATION

Model No.	Volts	kW	Phase	Element (11) Part No.	Element (12) Part No.	Motor (16) Part No.	Contactora (20) Part No.	Transformer (21) Part No.	Fuse Block (80) Part No.	Fuse (81) Part No.	Term. Block (84) Part No.
SDRA-30-43	480	30	3	118-304793-011(3)	118-304793-013(3)	193-121843-232	072-304551-008	315-304252-001	N/A	N/A	N/A*
SDRA-30-93	600	30	3	118-304793-012(3)	118-304793-014(3)	193-121843-233	072-304551-008	315-304252-003	N/A	N/A	N/A*
SDRA-48-43	480	48	3	118-304793-011(3)	118-304793-013(6)	193-121843-232	072-304551-008(2)	315-304252-001	129-025643-001	128-026510-005(3)	303-047468-004
SDRA-48-93	600	48	3	118-304793-012(3)	118-304793-014(6)	193-121843-233	072-304551-008(2)	315-304252-003	129-025643-001	128-026510-005(3)	303-047468-004
SDRA-60-43	480	60	3	118-304793-011(6)	118-304793-013(6)	193-121843-232	072-304551-008(2)	315-304252-001	129-025643-001(2)	128-026510-006(6)	303-047468-004
SDRA-60-93	600	60	3	118-304793-012(6)	118-304793-014(6)	193-121843-233	072-304551-008(2)	315-304252-003	129-025643-001(2)	128-026510-006(6)	303-047468-004

* Wired directly to contactor.

All units contain two sets of elements. The ratings of the elements on the discharge end have a lower wattage than the elements on the inlet end of heater. The ends of the elements are color coded, the lower wattage are color coded yellow and the higher wattage are color coded blue.

- a. Lower wattage elements, discharge end, yellow coded
- b. Higher wattage elements, fan end, blue coded

PARTS COMMON TO ALL UNITS		
Item	Description	Part No.
18	Temperature Control	300-019560-002
19	Hi-Limit Cut-out	300-049200-004
23	Toggle Switch	292-046123-001
32	Blower Assembly	021-304823-009
33	Inlet & Outlet Grille	134-304780-002(2)
36	Caster / Locking	375-122535-007
37	Handle - Right Side	139-304779-003
38	Handle - Left Side	139-304779-004
45	Semipneumatic Wheel	333-557518-004(2)
77	Pulley Var. Pitch 7/8"	225-305091-004
78	Pulley Var. Pitch 5/8"	225-305091-003
79	Pulley Belt	017-049702-009
86	Pilot Light - Green	213-122066-043
87	Pilot Light - Amber	213-122066-042
94	Thermostat Knob	169-017949-004
95	Thermostat Label	220-019122-010

WARRANTY AND LIMITATION OF REMEDY AND LIABILITY

Chromalox warrants only that the Products and parts manufactured by Chromalox, when shipped, and the work performed by Chromalox when performed, will meet all applicable specification and other specific product and work requirements (including those of performance), if any, and will be free from defects in material and workmanship under normal conditions of use. All claims for defective or nonconforming (both hereinafter called defective) Products, parts or work under this warranty must be made in writing immediately upon discovery, and in any event, within one (1) year from delivery, provided, however all claims for defective Products and parts must be made in writing no later than eighteen (18) months after shipment by Chromalox. Defective and nonconforming items must be held for Chromalox's inspections and returned to the original f.o.b. point upon request. THE FOREGOING IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES WHATSOEVER, EXPRESS, IMPLIED AND STATUTORY, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Notwithstanding the provisions of this WARRANTY AND LIMITATION Clause, it is specifically understood that Products and parts not manufactured and work not performed by Chromalox are warranted only to the extent and in the manner that the same are warranted to Chromalox by Chromalox's vendors, and then only to the extent that Chromalox is reasonably able to enforce such warranty, it being understood Chromalox shall have no obligation to initiate litigation unless Buyer undertakes to pay all cost and expenses therefor, including but not limited to attorney's

fees, and indemnifies Chromalox against any liability to Chromalox's vendors arising out of such litigation.

Upon Buyer's submission of a claim as provided above and its substantiation, Chromalox shall at its option either (i) repair or replace its Products, parts or work at the original f.o.b. point of delivery or (ii) refund an equitable portion of the purchase price.

THE FOREGOING IS CHROMALOX'S ONLY OBLIGATION AND BUYER'S EXCLUSIVE REMEDY FOR BREACH OF WARRANTY, AND IS BUYER'S EXCLUSIVE REMEDY AGAINST CHROMALOX FOR ALL CLAIMS ARISING HEREUNDER OR RELATING HERETO WHETHER SUCH CLAIMS ARE BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES, BUYER'S FAILURE TO SUBMIT A CLAIM AS PROVIDED ABOVE SHALL SPECIFICALLY WAIVE ALL CLAIMS FOR DAMAGES OR OTHER RELIEF, INCLUDING BUT NOT LIMITED TO CLAIMS BASED ON LATENT DEFECTS. IN NO EVENT SHALL BUYER BE ENTITLED TO INCIDENTAL OR CONSEQUENTIAL DAMAGES AND BUYER SHALL HOLD CHROMALOX HARMLESS THEREFROM. ANY ACTION BY BUYER ARISING HEREUNDER OR RELATING HERETO, WHETHER BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES, MUST BE COMMENCED WITHIN ONE (1) YEAR AFTER THE DATE OF SHIPMENT OR IT SHALL BE BARRED.

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Chromalox®

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