

**HX150
OPERATOR'S MANUAL**

150 kW HEATER

NOTICE: To reduce the risk of injury or equipment damage, the user must read and understand the Operator's Manual before using this product. Save these instructions for future reference.

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READ ALL INSTUCTIONS!

⚠️ WARNING: This unit operates with high voltage and has the ability to produce extreme temperatures. Failure to follow all instructions shown in this manual may result in serious injury or death.

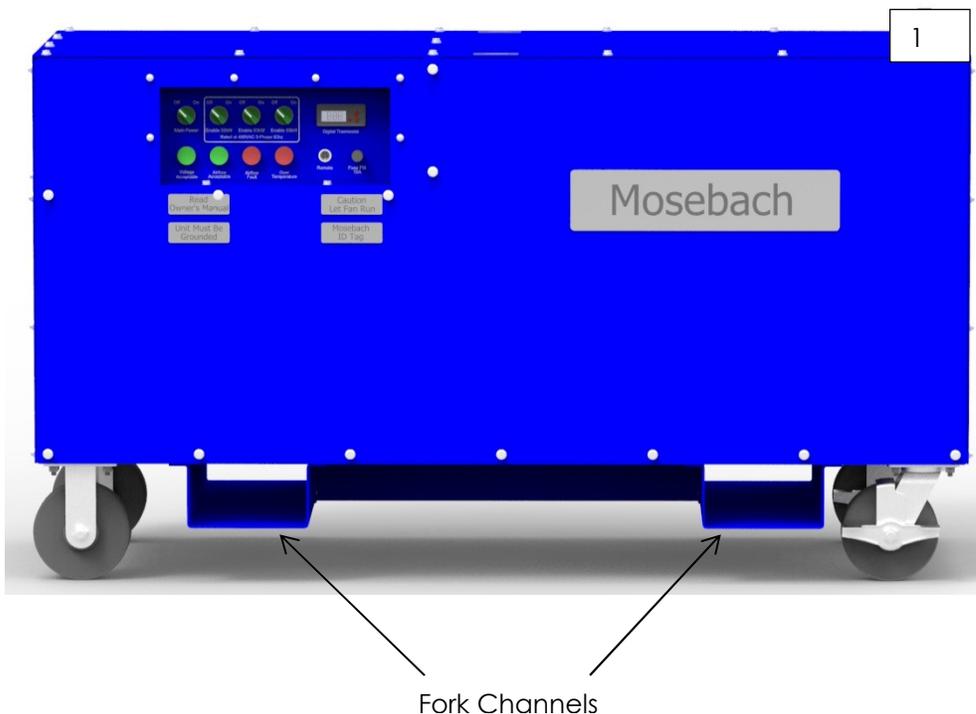
RECEIVING

INSPECTING

1. Check the exterior of the shipping container or packaging material for obvious damage.
2. Document and report any exterior damage to the carrier immediately.
3. Check if casters turn freely and that locks work.

LIFTING AND MOVING

⚠️ CAUTION: Use proper lifting devices or methods. Inadequate lifting devices or methods can damage the heater.



SAFETY SYMBOLS

The purpose of safety symbols is to attract your attention to possible dangers. The safety symbols and the explanations with them deserve your careful attention and understanding. The symbol warnings do not, by themselves, eliminate any danger. The instructions and warnings they give are no substitutes for proper accident prevention measures.

⚠ WARNING: Be sure to read and understand all safety instructions in the Operator's Manual, including all safety alert symbols such as **"DANGER," "WARNING,"** and **"CAUTION"** before using this unit.

SYMBOL MEANING

	DANGER	Indicates a hazardous situation that, if not avoided, will result in death or serious injury. This symbol is limited to the most extreme situations.
	WARNING	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
	CAUTION	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
	NOTICE	Indicates a situation that, if not avoided, could result in misuse of or damage to the load bank.
	NOTICE - Wear Eye Protection	Always wear safety goggles or safety glasses when operating this unit.
	NOTICE - Read Operator's Manual	To reduce risk of injury, read and understand entire operator's manual before operating unit.
	NOTICE - Let Fans Run	Let fans run for at least 3 minutes after turning off test power before turning fans off.
	NOTICE - Do Not Block Airflow	Unit may overheat without proper airflow

	<p>CAUTION – Blown Debris</p>	<p>To reduce risk of injury to persons or damage to the unit, remove objects that can be moved by the cooling fans of the unit.</p>
	<p>WARNING – Electrical Shock</p>	<p>This unit can potentially operate at high voltage and current. Improper use can lead to electrocution, causing serious injury or death.</p>
	<p>CAUTION – Burn and fire hazard</p>	<p>Exhaust air and surfaces may be hot</p>
	<p>CAUTION – Moving Parts</p>	<p>Moving parts can cut or crush. Keep hands clear. Do not operate with guards removed.</p>

SAFETY

⚠️ WARNING: This heater is designed to handle only one specified voltage. Work on heater internal systems should only be attempted by highly-trained technicians and only when power has been disconnected and cannot be reconnected to the unit.

⚠️ CAUTION: Heaters must be installed and used in accordance with local codes. Cables must be able to safely handle the voltages and current expected. Size cables for a voltage drop of 2% or less. Insulation on the cabling must be suitable for the conditions that the cables will be subjected to.

NOTICE: IMPORTANT INSTRUCTIONS

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

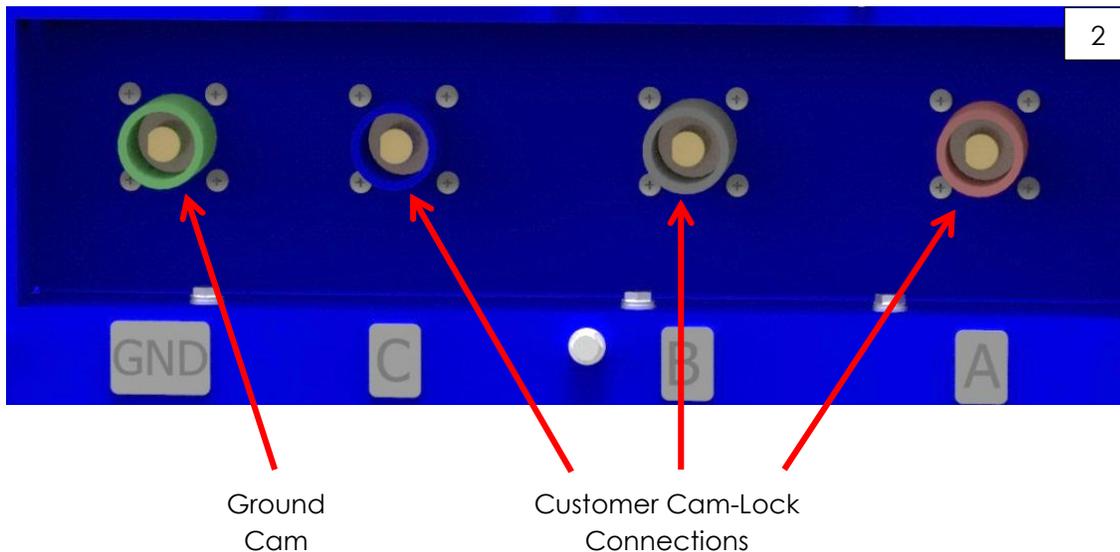
1. Read all instructions before using this heater.
2. This heater is hot when in use. To avoid burns, do not let bare skin touch hot surfaces. Use handles when moving this load bank. Keep combustible materials, such as furniture, pillows, bedding, papers, clothes, and curtains at least 20 feet from all sides of the heater

3. Extreme caution is necessary when any heater is used by or near children or invalids and whenever the heater is left operating and unattended.
4. Always unplug heater when not in use.
5. Do not operate any heater with a damaged cord or plug or after the heater malfunctions or has been dropped or damaged in any manner. Discard heater or return to authorized service facility for examination and/or repair.
6. Do not run cord under carpeting. Do not cover cord with throw rugs, runners, or similar coverings. Do not route cord under furniture or appliances. Arrange cord away from traffic areas and where it will not be tripped over.
7. Connect to properly grounded outlets only.
8. Do not insert or allow foreign objects to enter any ventilation or exhaust opening as this may cause an electric shock or fire, or damage the heater.
9. 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 openings may become blocked.
10. The heater has hot parts inside. Do not use it in areas where gasoline, paint, or flammable liquids are used or stored.
11. 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.
12. Always plug heaters directly into a wall outlet/receptacle. Never use with a relocatable power tap (outlet/power strip).
13. "SAVE THESE INSTRUCTIONS"

DEFINITIONS

VAC	Volt	Alternating Current Voltage
A	Amperes	Current
kW	Kilowatt	Power
Min	Minutes	Time
Sec	Seconds	Time
CFM	Cubic Feet per Minute	Volumetric Air Flow
FPM	Feet per Minute	Air Speed

POWER AND GROUND CONNECTIONS



WARNING: ELECTRIC SHOCK HAZARD. All power connections must be connected or covered. Failure to do so will expose operators to possible shock and the possibility of grounding-out or shorting-out of the test power source.

All power connections must be covered or connected. Failure to do so will allow applied voltages to be present on exposed metal parts of the connectors. Operators could receive an electrical shock if they come in contact with these exposed conductors. If a loose conductor contacts an exposed metal part of a “hot” receptacle, it could lead to rounding-out or shorting-out of the source generator.

WARNING: ELECTRIC SHOCK HAZARD. The grounding lug must be connected to earth ground. Operating without a grounding connection could lead to injury or death.

When the Heater is in operation the grounding cam must be firmly and electrically connected to earth ground. Failure to do so could allow deadly voltage to be present on the surface of the enclosure. The grounding connection provides a low resistance path to ground. This grounding protects the operator from the possibility of electrical shock.

AIR INTAKES AND EXHAUST PORTS

CAUTION: All air intakes and exhaust ports must be clear and fully open. Each Heater has one or more air intakes designed for proper air flow. Reducing or blocking air flow will lead to overheating and Heater failure.

High volumes of cooling air are needed to prevent load elements from overheating. By their very nature, resistors under load change electrical energy to heat. This heat must be removed from the unit. The fans, intake, and exhaust ports are sized to provide the proper amount of cooling air. Preventing or limiting air flow will allow the Heater to overheat.

Keep intake at least four feet away from walls and obstructions.

NOTICE: To increase the life of the load elements, allow the fans to run at least 3 minutes after the load is removed or until exhaust air is cool.

CAUTION: Good air flow keeps the Heater cool but can very easily move light debris such as paper, cardboard, and dust with great velocity. Loose materials around the Heater, especially near the intake and exhaust, must be secured to prevent movement. Material on the exhaust side may be blown into and injure a bystander. Material near the intake may be taken into the Heater damaging internal components.

INTAKE AND EXHAUST DUCTING

NOTICE: Ducting will cause some air flow reduction. Incorrect ducting can severely reduce air flow to the heating elements. Severe reduction in air flow will lead to heater failure.

Some important considerations when installing ducting with your heater:

Only use ducting that can connect to the intake or exhaust adapters designed by Mosebach Manufacturing. Other adapter designs may allow you to connect incorrectly sized ducting which may result in heater failure.

Use ducting with a 20" diameter that can be attached to the adapters supplied by Mosebach Manufacturing.

Keep the ducting as straight as possible. If bends are required, ensure the bend radius is larger than 40".

NOTICE: All ducting should be secured. Unsecured ducting on the intake end may collapse, reduce air flow and cause the heater to fail. Unsecured ducting on the exhaust may move to an undesired location and cause damage.

Use no more than 50' of ducting.

EXHAUST TEMPERATURE

⚠️ WARNING: FIRE AND BURN HAZARD. Keep flammable material at least 40 feet away from the Heater. A great deal of heat is expelled from the Heater. Temperatures inside the Heater are sufficient to ignite flammable fumes or materials. Failure to maintain proper housekeeping and properly securing flammable material could lead to fire, burns, and/or injury.

Even with sufficient air flow, internal component temperature will exceed 400 degrees F. Air and material several feet from the Heater can be heated to temperatures in excess of 150 degrees F. Flammable materials must not be kept around the Heater. Heat from the Heater could ignite this material.

Flammable fumes or material such as paper could be drawn into the Heater, ignited, and expelled from the exhaust port. Operators standing on the exhaust side of the Heater may be exposed to high temperatures or possibly burning materials. Unless proper housekeeping is practiced in the vicinity of the Heater while it is in operation, fire could result.

CONNECTING AND DISCONNECTING

⚠️ WARNING: BURN HAZARD. Attempting to connect or disconnect leads while Heater is in operation can lead to injury or death. Connecting or disconnecting plugs and receptacles while current is flowing or voltage is present may cause an electrical arc.

Before making or breaking any connections to the heater, it should be confirmed that the source is de-energized and no voltage or current is present.

SPECIFICATIONS

Cooling Fan	480VAC, 3 phase, 60Hz, 5.0 HP, 6500 CFM
Control Power	120VAC, 1 phase, 60 Hz from step down transformer
Rating	Continuous duty
Power Factor	1.0
Load Elements	The current at each step is subject to a manufacturing tolerance of $\pm 5\%$.
Enclosure	Light-weight metal enclosure with casters for easy maneuvering. Electro-statically painted powder coat, Blue: PPG PCTZ50108 Touch up paint is Pantone 280-c color. Plastikote custom color universal blend. Air inlet and outlet are covered by metal screens. Heat is discharged horizontally.

Optional Equipment	20" flexible duct. Exhaust and Intake duct transitions for 20" flexible duct. Wired remote temperature control with thermistor ports.
Unit Weight	450 lbs.
Outer-Most Dimensions	57 7/16" x 22 5/8" x 34 5/16" without duct transitions.

OPERATION

PRE-STARTUP

1. Check housekeeping in the operational area and correct all unsafe conditions. Failure to do this may result in debris being blown around and may cause a fire hazard.
2. Connect the Heater's grounding cam to a known earth ground at the job site. Failure to do this may result in a fatal electrical shock.
3. Check the control panel and move all switches to the OFF position.

NOTICE: All air intakes and exhaust ports must be clear and fully open. Reducing or blocking air flow will lead to overheating and Heater failure.

4. Position Heater so that air will flow freely into the intakes and out of the exhaust ports. Ensure that there are no flammable materials close to the exhaust.
5. Make power connections via cam-locks. The unit will only operate at 480VAC±5%.

STARTUP AND OPERATION

1. Energize upstream source of power.
2. Turn the Main Power switch on.

The blower will start and the green air flow light will come on.

NOTICE: Failure to have proper air flow will cause unit to overheat and fail. Operating the heater with a flickering green lamp will lead to damage.

3. Check your fan for air flow.

Air should be coming from the exhaust port and the green air flow light should come on.

4. Check to see that only green lamps are lit. Operating heater with flickering green lamp will lead to damage.

NOTICE: If you apply a voltage that is higher or lower than the Heater is designed to operate, it will not operate.

5. Set the Thermostat to the desired temperature.
6. Turn Heating Power selector switches to the desired positions to select the desired operating power (50kW, 100kW, or 150kW). Hot air should now be coming from exhaust grill.

CAUTION: Exhaust grill will rise to a temperature high enough to cause burns. Flammable material in the path of the exhaust air can reach a temperature where the materials will combust.

NOTICE: Panel Thermostat will not control the temperature of the enclosure being heated unless the heater is completely within the enclosed area. If you wish to keep the heater outside of the enclosure either another means of monitoring and controlling temperature must be used or you must use a remote thermostat.

REMOTE OPERATION

An option available for the HX150 is a remote thermostat. Ensure that when a remote thermostat is used that the thermostat is completely within the enclosure that is to be heated. If the remote thermostat is not within the enclosure to be heated, then another means of monitoring and controlling temperature must be used.

1. Connect remote thermostat to the heater provided. Ensure that the twist lock is fully engaged.
2. Place the remote thermostat in the enclosure to be heated.
3. Thermostat installed on the heater will not function when the remote thermostat is connected.
4. Connect remote thermostat and place it within the area to be heated.
 - Using a remote thermostat will control heater based on the temperature in the location of that thermostat.

- When placing the remote thermostat, keep it ten feet from the unit and not in the direct exhaust of the unit.

SHUTDOWN

1. Place all of the Heating Power switches in the OFF position.
2. Allow fan to operate at least 3 minutes or until exhaust air is cool before shutting Main Power switch off.

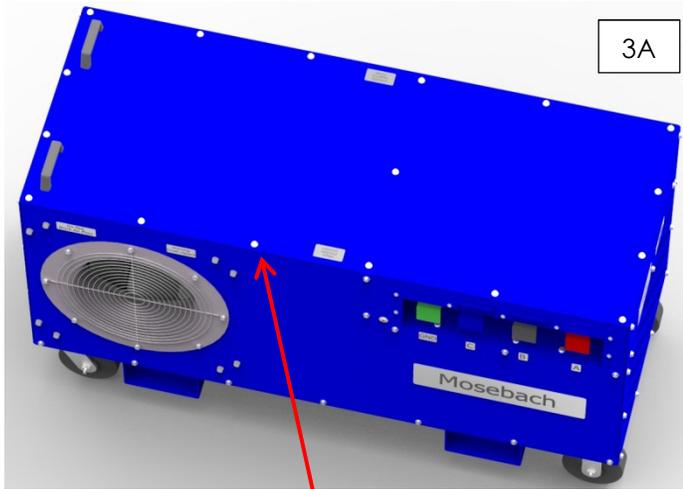
NOTICE: This cooling period will extend the life of your Heater.

3. Turn the Main Power switch to the off position.
5. Disconnect upstream power source.
6. Disconnect A, B, and C cam-locks.
7. Disconnect ground cam-lock
8. Move unit to storage.

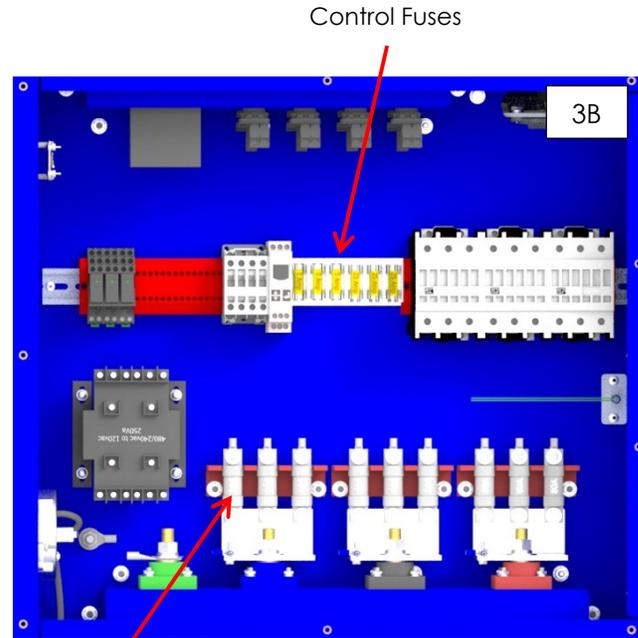
TROUBLESHOOTING

Heater Will Not Turn On	Make sure the correct voltage is applied via cam-locks. Ensure MAIN POWER switch is ON Ensure thermistors are connected.
Blower Will Not Turn On	Check for debris preventing fan from turning. Check control fuse (FM). See Figure 4.
Load Steps Will Not Turn On	Check if OVER TEMPERATURE red light is on. Check control fuse (FM). See Figure 4. Check resistor continuity. See schematic. Check resistor step fuses. See figure 3
Over Temperature Light	This is an indication that the internal cabinet temperature has exceeded 150°F. Make sure the cabinet is ventilated. Check over temperature sensors (OTS) see figure 3.
Voltage Acceptable Light Will Not Turn On	The heater has a built in voltage sensing system to protect itself. If the voltage is not within $\pm 5\%$ of 480VAC it will not operate. The voltage sensing system also protects the unit from a phase loss or phase imbalance of $\pm 10\%$.
Airflow Light Stays Red	Check to see if blower is on. Check air path for obstruction that may prevent proper air flow. Ensure that the blower is turning in the proper direction
Green Air Flow Light Flickers	Air flow is very low and intermittently falls below the acceptable level. Continuing to operate the heater with a flickering green lamp will lead to damage. Check without ductwork on. Then ensure duct is clear.

REPLACING FUSES



1/4"-20 Hex Head Screws



Step Fuses

1. Loosen the 17 hex head screws that secure the lid of the load bank. Remove all 17 screws.
2. Remove the lid, as shown in Figure 3A.
3. Locate the defective fuse. All internal step and control fuses are located in the area called out in figure 3B. Remove the fuse and replace it with an identical fuse.



Fuse FM

4. To replace fuse FM, locate the fuse holder cap on the far right of the switch panel. Turn the fuse holder cap counter-clockwise and pull the cap with the fuse attach out of the panel. Replace the fuse with an identical 15A fuse (MMC Part #EC-9500-1971). After the fuse has been replaced, insert the fuse cap into the appropriate hole and twist clockwise to lock in place.

REPLACING RESISTORS

Contact Mosebach Manufacturing Co.

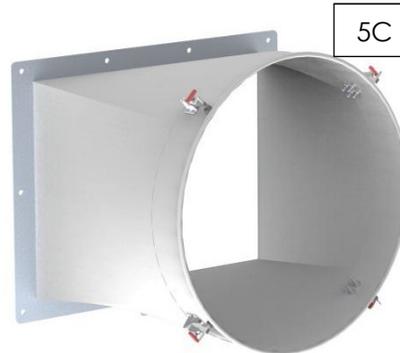
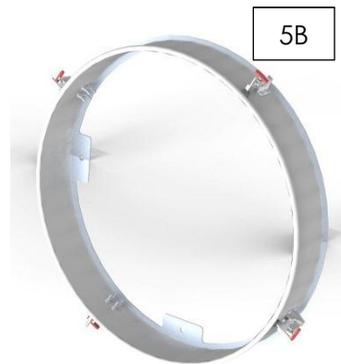
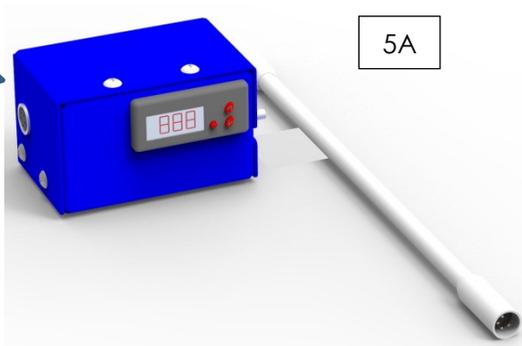
PREVENTATIVE MAINTENANCE OF HEATER

NOTICE: Do not use a power washer to clean off the exterior of the unit. It is high voltage electrical equipment.

Component	Action	Frequency
Entire Unit	Walk around the load bank and inspect for : a) Obvious Damage b) Loose hardware	Check every use
All exterior bolts that hold the sheet metal.	Tighten the ¼-20 hardware to 5 ft.-lbs.	Check monthly.
Resistance readings	Using an ohm meter, check each step for the correct resistance. The reactors should have continuity between input and output. These values are part of Appendix A wiring schematic.	Check every 6 months
Electrical Components/ Wiring	Check throughout the unit for loose wires, or electrical components that are no longer secure to their mounting plate.	Check every 6 months
Fan	Check the fan for damage that could cause the airflow to change such as damaged or missing bearing, or damaged blades.	Check Annually
Contactors	Ensure contacts are opening and closing	Check Annually

OPTIONAL EQUIPMENT

Description	Part Number
20" \varnothing Exhaust Transition	FR-0400-0419
20" \varnothing Intake Transition	FR-0400-0421
25' Long 20" \varnothing Duct	HW-9000-0730
Remote Control Kit	RC-HX60



SERVICE PARTS

Part Description	Part Label	Mosebach Part Number
Fan - 450mm	B	BLWR-0055-0113
Fuse 5A Type CC	FVSA, FVSB	EC-9500-0245
Fuse 1A Type CC	FVSC	EC-9500-0247
Fuse 25A Type CC	FBA, FBB, FBC	EC-9500-0307
Fuse 15A, 1/4 x 1-1/4	FM	EC-9500-1971
Fuse 80A Class "T"	FA1, FA2, FA3, FB1, FB2, FB3, FC1, FC2, FC3	EC-9500-0741
480/240 to 120V AC 250vA Transformer	TX	EC-9500-0585
3 Phase VS Relay	VS	EC-9500-1744
100C Thermal Cutout Switch	OTS	EC-9500-1791
Contactor 90A, 120VAC Coil	C1, C2, C3	EC-9500-1887
IEC Contactor - 25A, 120VAC Coil	CB	EC-9500-1968
2PDT Relay 120VAC Coil	PR, OTR,REM	EC-9500-1923
Differential Pressure Sensor	PS	EC-9500-1970
Flexible Tubing 160 deg. F	None	HW-9000-1037
Switch Panel Overlay	None	CPO-HX150
4 Pin Connector, 5A, 250VAC, IP68	CON-P, PLUG	EC-9500-1549
Temperature Controller 110V - Dwyer	DT, R-DT	EC-9500-1872
Thermistor - Flange Mounted 4"	TM, R-TM	EC-9500-1871
22mm Green LED, 120VAC	G-POK, G-VOK	EC-9500-1903
22mm Red LED, 120VAC	R-TEMP, R-PF	EC-9500-1904
Illuminated 22mm Selector Switch - Actuator (Also order parts listed below)	SM, S1, S2, S3	EC-9500-1906
LED Contact Block, 120VAC	Part of Selector Switch	EC-9500-1907
Mounting Base	Part of Selector Switch	EC-9500-1908
NO Contact Block	Part of Selector Switch	EC-9500-1909
50kW Resistor Assembly	None	RA-0400-0041
50kW End Resistor Assembly	None	RA-0400-0042
6" Rigid Caster	None	HW-9000-0621
6" Swivel Caster w/Brake	None	HW-9000-0622
50 Ft. Remote Cable Assembly	None	CS50-RC-HX150

0	Initial Release	TLS	10/27/16
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“SAVE THESE INSTRUCTIONS”