

Operations and Service Manual

X30208 Load Bank



Read all instructions before using the load bank

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IMPORTANT INSTRUCTIONS

1. Components



Figure 1a



Figure 1b



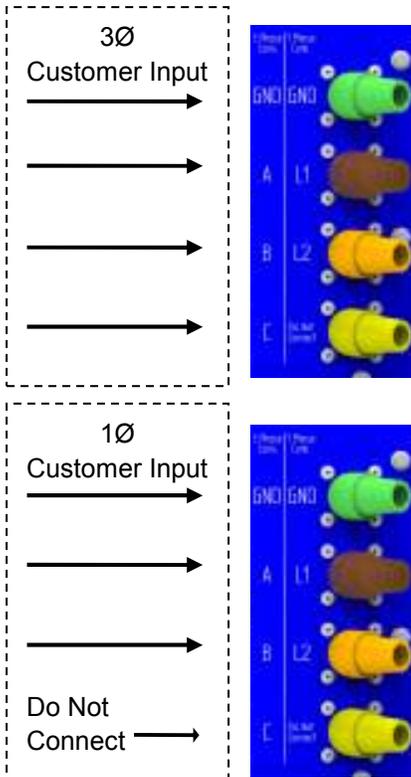
Figure 1c

Total Assembly X30208

2) Specifications

Blower	120VAC, single phase, 60Hz powered from control
Control power	120VAC, single phase, 60 Hz
Rating	Continuous duty
Power factor	1.0
Load elements	Each circuit is connected in wye. The kW at each step is subject to a manufacturing tolerance of $\pm 5\%$.
Enclosure	Electro-statically powder coat. For touch up paint consult factory. Air inlet and outlet are covered by metal screens. Heat is discharged horizontally.
Environmental	Quantity three 120V, 470CFM fans to bring outside air into the load bank.

a) X30208 Load Bank



Input Voltage	kW Steps	Total Power	Amps					
208vAC, 3Ø Resistive	1	2	2	5	10	10	30	83.3
240vAC, 1Ø Resistive	.67	1.33	1.33	3.34	6.67	6.67	20	83.3
120vAC, 1Ø Resistive	.17	.33	.33	.83	1.67	1.67	5	41.7

3) Receiving

WARNING! ELECTRIC SHOCK HAZARD. Electric shock can lead to severe injury or death. If the load bank has been damaged in transit, do not operate until a competent technician inspects the unit and determines that it can be operated safely.

1. Check the equipment for obvious damage.
2. Document and report any exterior damage to the carrier immediately.

4) Safety

This Load Bank is designed for a variety of loads. Because of this, it is possible that voltages higher than those applied can be present inside the load bank and at external connections of the load bank. Work on load bank internal systems should only be attempted by highly trained technicians and only when power has been disconnected and can not be reconnected to the unit.

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/load bank.
- 2) This load bank 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 6 feet (1.8 meters) from the front of the load bank and keep them away from the sides and rear.
- 3) Extreme caution is necessary when any load bank is used by or near children or invalids and whenever the load bank is left operating and unattended.
- 4) Always unplug load bank when not in use.
- 5) Do not operate any load bank with a damaged cord or plug or after the load bank malfunctions or has been dropped or damaged in any manner. Discard load bank or return to authorized service facility for examination and/or repair.
- 6) Do not use outdoors.
- 7) Do not use in wet or moist locations
- 8) This load bank is not intended for use in wet indoor environments.
- 9) 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.
- 10) To disconnect load bank, turn controls off, then remove plug from outlet.
- 11) Connect to properly grounded outlets only.

- 12) 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/load bank.
- 13) 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.
- 14) A load bank has hot and arcing or sparking parts inside. Do not use it in areas where gasoline, paint, or flammable liquids are used or stored.
- 15) Use this load bank only as described in this manual. Any other use not recommended by the manufacturer may cause fire, electric shock, or injury to persons.
- 16) Always plug load banks directly into a wall outlet/receptacle. Never use with a relocatable power tap (outlet/power strip).
- 17) This load bank includes a visual alarm to warn that parts of the load bank are getting excessively hot. If the alarm light goes on, immediately turn the load bank off and inspect for any objects on or adjacent to the load bank that may cause high temperatures. DO NOT OPERATE THE LOADBANK WITH THE ALARM LIGHT ON.
- 18) "SAVE THESE INSTRUCTIONS"

a) Ground Cam

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

When the load bank is in operation the ground 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.

b) Power connections

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

c) Control Power

Use 120V type S or type SJ jacketed cord to a wall connection. Cord and service rated to 10 AMP minimum. (see figure 2.)

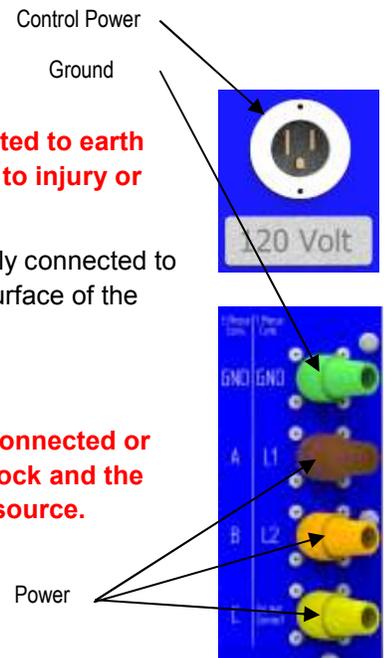


Figure 2. Ground, Power and Control Power

d) Air intakes and exhaust ports

Caution! All air intakes and exhaust ports must be clear and fully open. This load bank has one air intake designed for proper air flow. Reducing or blocking air flow will lead to overheating and load bank failure.

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

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

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

No ductwork is permitted on intake or exhaust of this load bank as this will cause a backpressure and ruin the resistors.

Caution! Material can be moved by intake air or exhaust air. Failure to secure material could cause injury to bystanders or damage to the load bank.

Good air flow keeps the load bank cool but can very easily move light debris such as paper, cardboard, and dust with great velocity. Loose materials around the load bank, 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 load bank damaging internal components.

e) Exhaust temperature

WARNING! FIRE AND BURN HAZARD. Keep flammable material at least 40 feet away from the load bank. A great deal of heat is expelled from the load bank. Temperatures inside the load bank 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 600 °C. Exhaust temperatures of 300°C are common. Flammable materials must not be kept around the load bank. Heat from the load bank could ignite this material.

f) Connecting and disconnecting

WARNING! BURN HAZARD. Attempting to connect or disconnect leads while load bank is in operation can lead to severe injury or death. Connecting or disconnecting plugs and receptacles while current is flowing or voltage is present may cause arcing. Arcing can generate a great deal of light, heat and possibility of electrocution.

5) Operation

NOTE: Contact Mosebach Manufacturing if you are planning operations in ambient temperatures above 46 °C.

Ambient plus heat generated by the resistor can cause electrical components to possibly malfunction.

a) 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 load bank's ground cam to a known earth ground.
3. Check the switch panel and move all switches to the OFF position. (see figure 3)
4. Position load bank so that air will flow freely into the intakes and out of the exhaust port.
5. All air intakes and exhaust ports must be clear.
6. **Caution! Test points provided on the switch panel are for voltage testing only. Attempting to monitor current will cause fuses and meter to fail.**



FC 120V control fuse

Figure 3. Switch Panel

b) Startup

1. Connect 120VAC to unit.
2. Connect camlocks to the unit.

Ensure cable size is sufficient to carry the expected current. Failure to size conductors properly will lead to conductor overheating, which will damage conductors and may pose a fire hazard.

3. Turn the MAIN on/off power switch to the ON position. Blowers, meter and green power light will turn on.

Caution! **Make sure air is flowing from the exhaust port.** Failure to have proper air flow will cause unit to overheat and fail.

c) Testing

1. Start with the Main Power located in the ON position and Master in the OFF position.
2. Place the desired test step switches in the ON position.
3. Put the Master ON to engage the resistors.
4. Repeat tests as needed.

d) Shutdown

1. Place all step switches in the OFF position. Put Master in the OFF position.
2. Allow fans to operate at least three minutes or until exhaust air is cool before shutting them off.
This cooling period will extend the life of your load bank.
3. Turn Main Power Switch to the OFF Position and remove 120v control power.
4. Turn off source power and customer is to confirm prior to disconnection of power cables.
5. Put cables back into the storage box. (Not supplied by Mosebach)
6. Remove ground cam connections.
7. Move the unit to storage.

6) USB Communication Port for Meter:

This load bank is equipped with a Meter that has a USB communications post. This port enables the user to connect the meter to a PC and read the test parameters from a remote location.

A USB cable is not provided. It should be purchased separately. See Figure 5 for an example.



Figure 5. Typical USB A to USB B male

The PC should always be off prior to making any connections with the load bank. Connect the cable between the PC and the load bank. Turn on the load bank and wait for the meter to go through its startup cycle. Once the meter is on, turn on the PC.

7) Troubleshooting

Meter/Load Bank Will Not Turn On	Make sure main switch is in the ON position. Make sure 120v control power is connected.
Blower will not turn on.	Check for debris preventing fan from turning.
Load steps will not turn on.	Check if overtemp red light is on. Make sure that test source is on. Check control fuse. See Figure 3. Check resistor continuity. See Figure 14 and schematic. Check resistor step fuses. See figure 7
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 sensor (OTS) see figure 8.

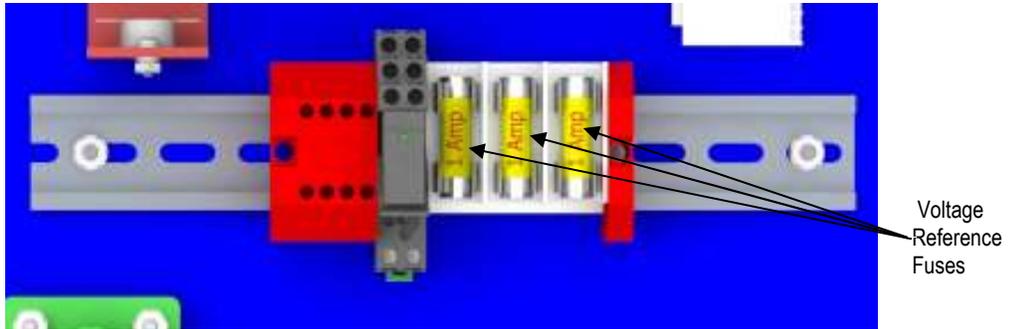


Figure 6 Voltage Reference/Control Fuses in the Switch Panel

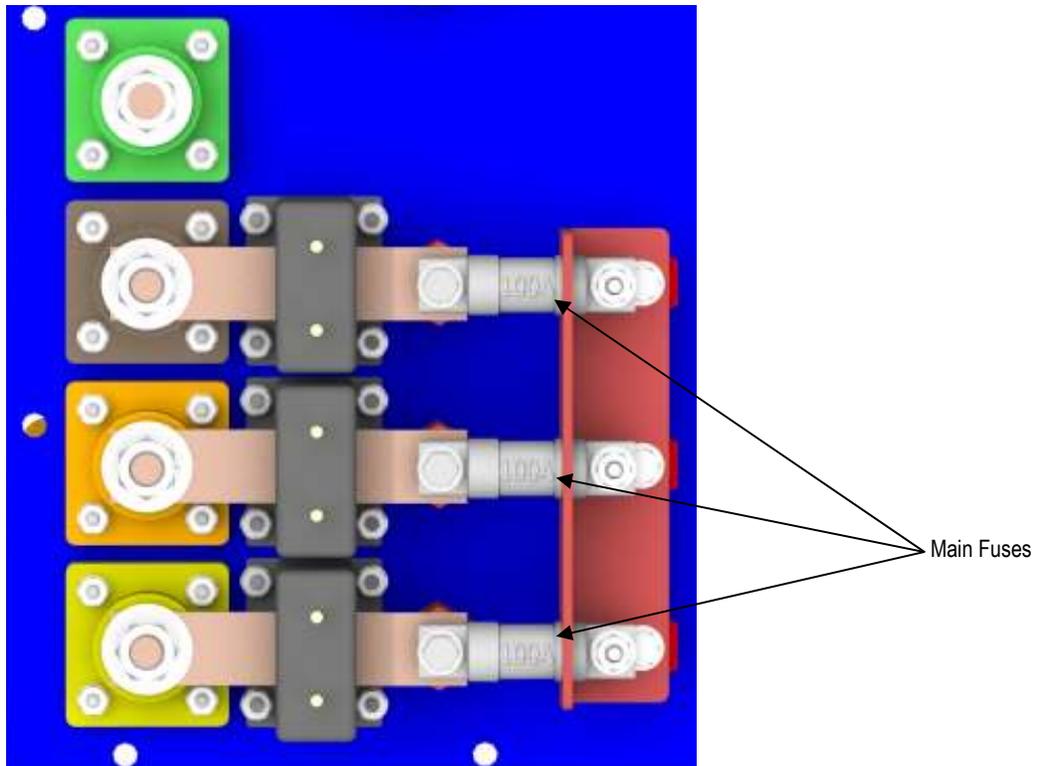
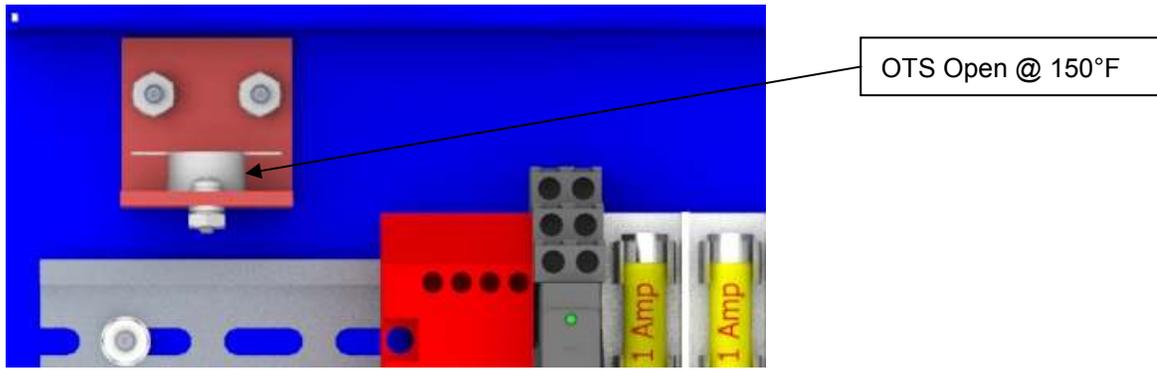


Figure 7 Main Fuses



OTS Open @ 150°F

Figure 8. Thermal Switch

8) Replacing Fuses

1. Using a 7/16" socket or wrench, remove the top three and 9 lowest bolts that line the outer perimeter of the switch panel, while leaving the two bolts shown in figure 9 in place.

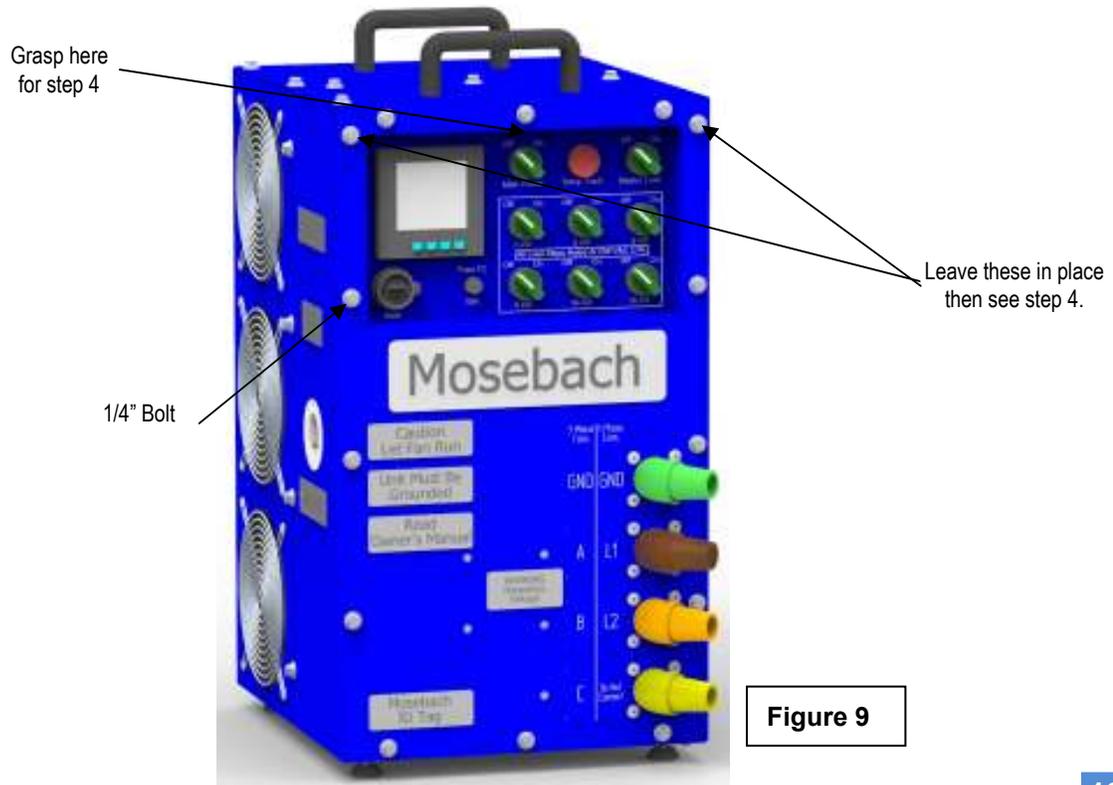


Figure 9

2. Support the switch panel by grabbing the top of the panel with a firm grip.
3. Using a 7/16" socket or wrench, remove the last 2 top corner bolts from the switch panel.
4. Rotate the switch panel open away from the cable service loops as shown in Figure 10.
5. Using a 7/16" socket or wrench, screw one bolt in to the top hole and one bolt into the middle hole.
6. Service on fuses can then be performed.

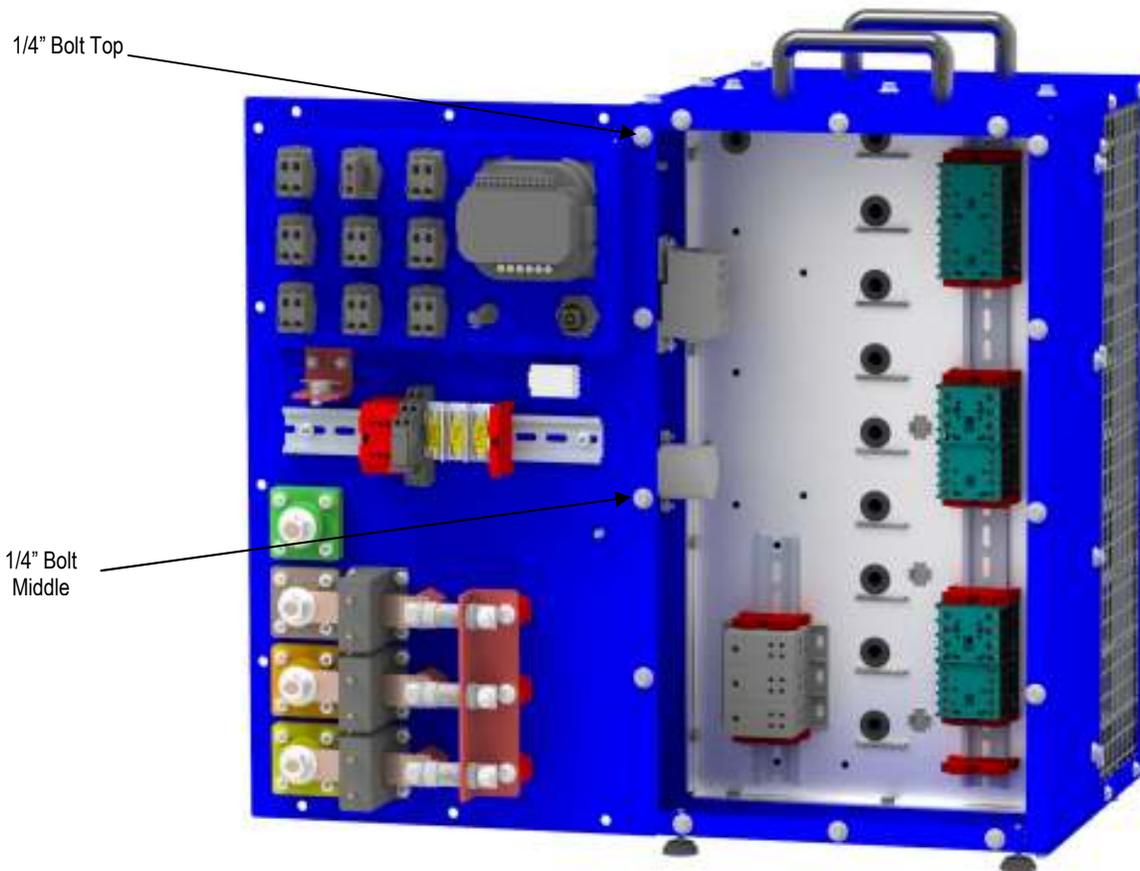


Figure 10

9) Replacing Resistors

1. Open the unit exactly as described under "Replacing Fuses" (see Figures 9 & 10)
2. Using a 7/16" socket or wrench, remove all 14 bolts from the back panel keeping a firm grip on the top of the panel.

- Carefully rotate the back panel as shown in figure 11b making sure not to damage the ground wire.
- Attach one bolt to the second and fourth hole down on the load bank as shown in figure 11b.

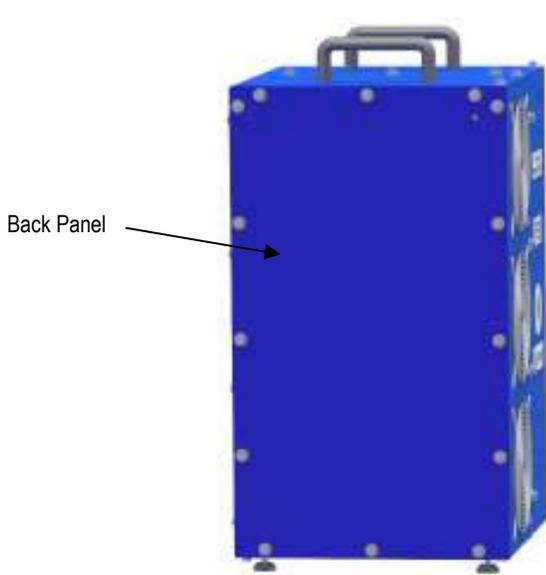


Figure 11a

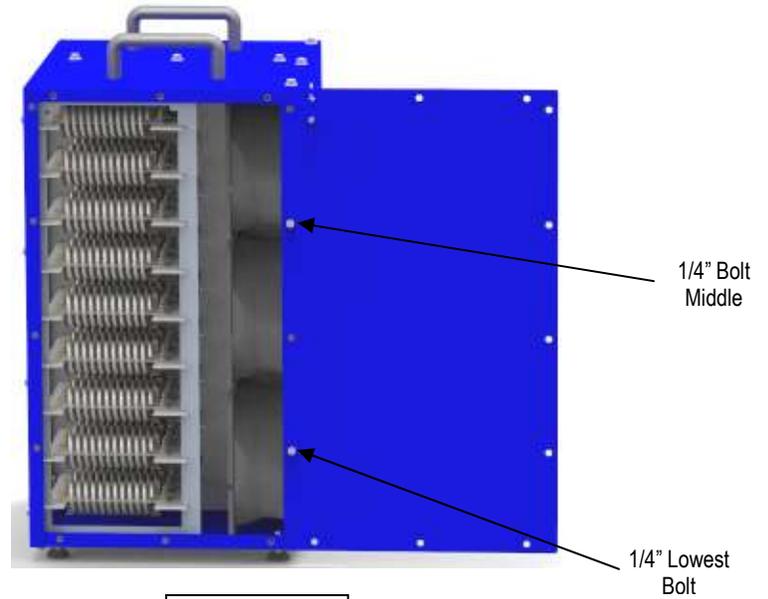


Figure 11b

- Disconnect the bad resistor wires from the contactors shown in figure 12b. Do not disconnect the wires from the resistor side. Each wire is labeled on both ends for easy location.

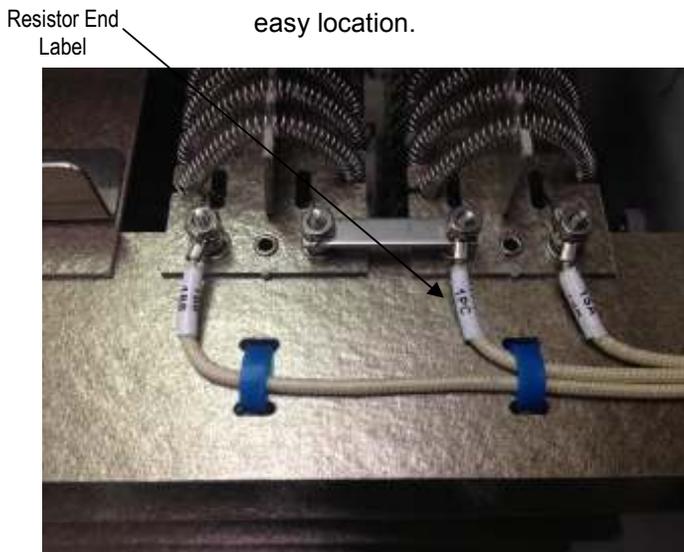


Figure 12a

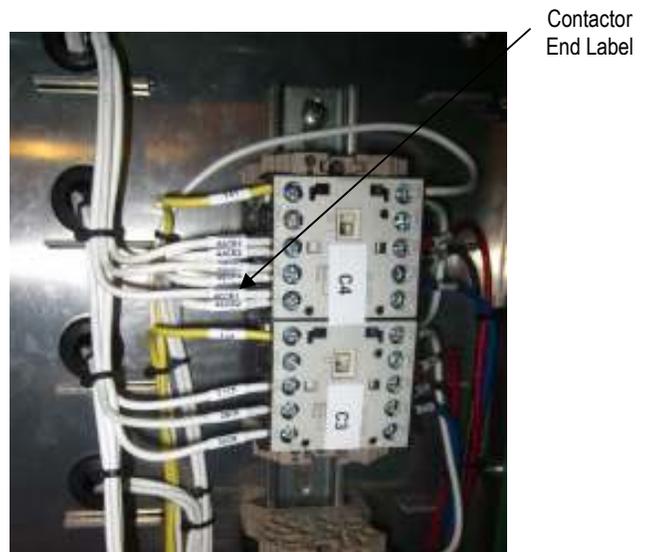


Figure 12b

6. Pull out the bad resistor cassette.
7. Slide new resistor cassette into the same slots as the old resistor cassette.
8. Run the wires through the corresponding hole in the control panel. The part number of each resistor cassette is stamped on the top of them.
9. Connect the three wires back into the proper contactor location.
10. Using a 7/16" socket or wrench, close the switch panel and fasten it back into place with the bolts.
11. Using a 7/16" socket or wrench, close the back panel and fasten it back into place with the bolts.

10) Preventative Maintenance of the Load Bank

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

Action	Frequency
Walk around the unit and inspect for obvious damage or loose hardware.	Every Rental Return
Megger Test	Every Rental Return
Cold Resistance Check	Every Rental Return
Air Flow Test	Every Rental Return
Power Test	Every Rental Return
Open Control Panel and Inspect for: a) Loose wire connections b) Visually damaged components	Every 6 months
Inspect Bearings	Annually
Inspect Fan	Annually
Inspect Resistors for: a) Damage to coils b) Delamination of the mica	Annually
Contactors are opening and closing	Annually
Meter Calibration	Annually

11) Service Parts

Power	Part Number
Fan	EC-9500-1434
Resistor Elements	RA-0055-0183-1
	RA-0055-0183-2
	RA-0055-0183-3
	RA-0055-0183-4
	RA-0055-0183-5
	RA-0055-0183-6
	RA-0055-0183-7
	RA-0055-0183-8
	RA-0055-0183-9
Fuses	1A = EC-9500-0247 100A = EC-9500-0963 10A Type AGC = AGC-10-R
Meter	EC-9500-1460

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MOSEBACH MANUFACTURING COMPANY
1417 McLaughlin Run Road • Pittsburgh, PA 15241-3103 USA
T: 412.220.0237 Customer Care

F: 412-220-0236

www.mosebachresistors.com

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2	ECN-3840 – Updated to match new design	TLS	1/5/17
1	ECN 3799 - Updated Views	PPS	11/17/16