MOSEBACH MANUFACTURING COMPANY

X100LT Load Bank Operation and Service Manual

Read all instructions before using the load bank

Contents

Figure list:

IMPORTANT INSTRUCTIONS

1. Components

Figure 1a

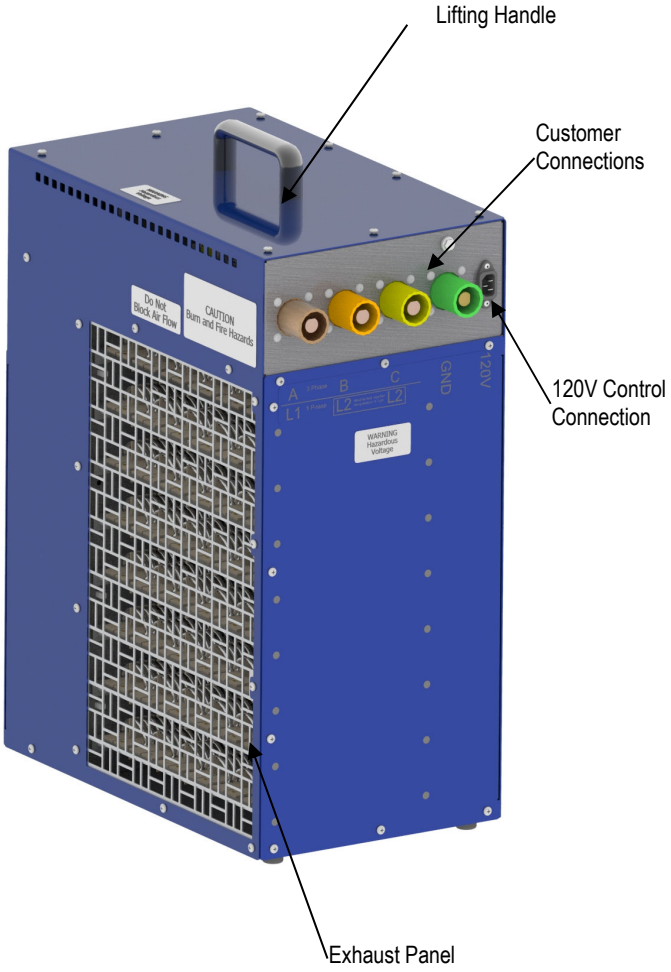


Figure 1b

Total Assembly

X100LT

Figure 1a

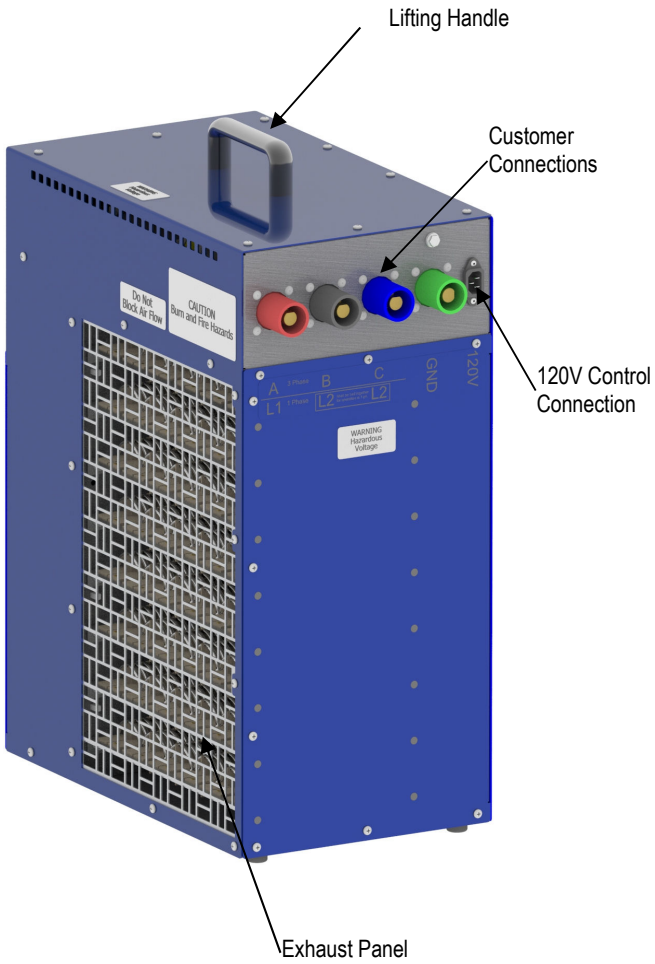


Figure 1b

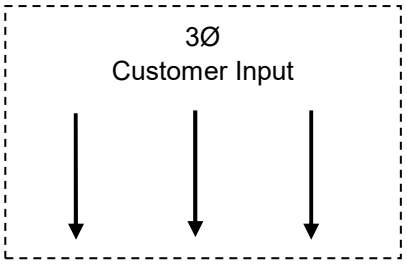
Total Assembly

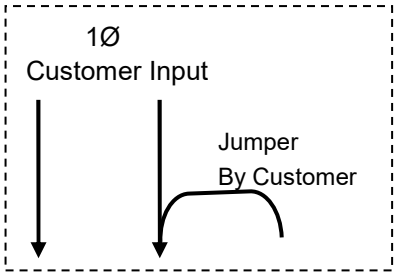
X100LT-600

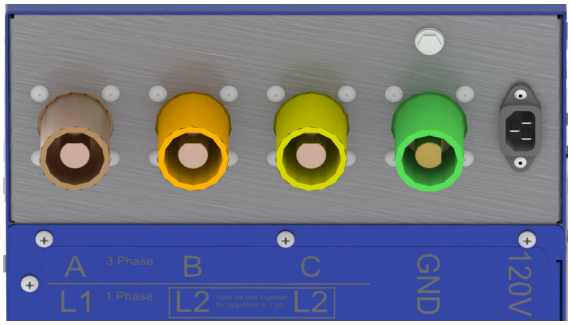
2) Specifications

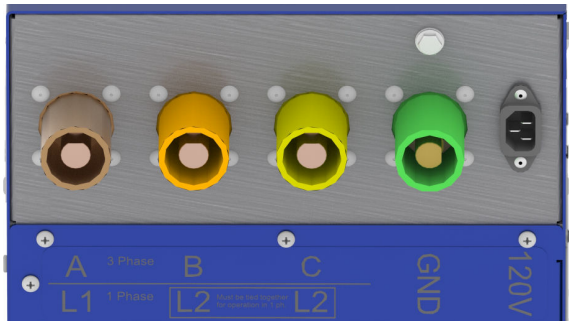
Blower	120VAC, single phase, 60Hz powered from control
Control power	120VAC, single phase, 60 Hz
Rating	Continuous duty
Power factor	1.0
Load elements	Each circuit is connected in delta. The kW at each step is subject to a manufacturing tolerance of ±5%.
Enclosure	Electro-statically powder coat, Blue: 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.
Environmental	8 x 24V, 420CFM fans to bring outside air into the load bank.

a) X100LT Load Bank



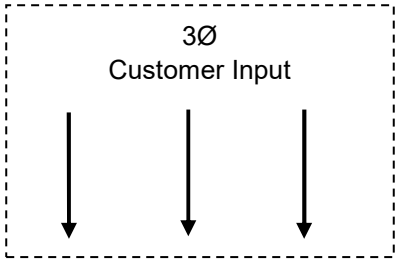


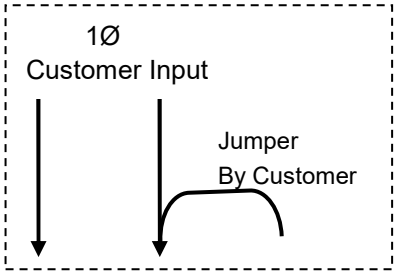


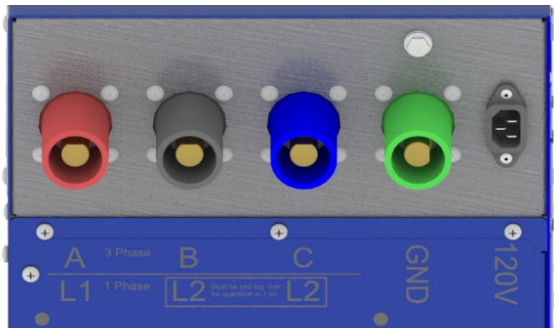


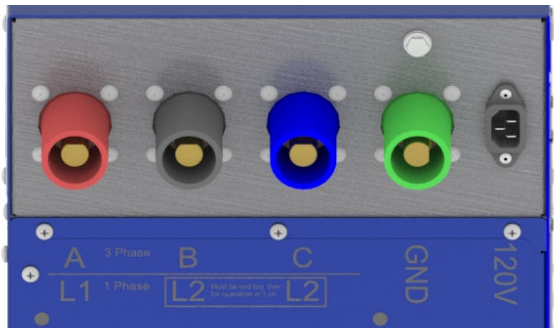
Input Voltage	Volt. Mode	kW Steps	kW Steps	kW Steps	kW Steps	kW Steps	kW Steps	Total Power	Amps
480vAC, 3Ø Resistive	480	5	10	10	15	30	30	100	120.3
240vAC, 3Ø Resistive	240	5	10	10	15	30	30	100	240.6
208vAC, 3Ø Resistive	208	3.76	7.51	7.51	11.27	22.53	22.53	75.11	208.5
240vAC, 1Ø Resistive	240	3.33	6.67	6.67	10.00	20.00	20.00	66.67	277.8
120vAC, 1Ø Resistive	120	0.83	1.67	1.67	2.50	5.00	5.00	16.67	138.9

b) X100LT-600 Load Bank









Input Voltage	Volt. Mode	kW Steps	kW Steps	kW Steps	kW Steps	kW Steps	kW Steps	Total Power	Amps
600vAC, 3Ø Resistive	600	5	10	10	15	30	30	100	96.23
480vAC, 3Ø Resistive	480	3.2	6.4	6.4	9.6	19.2	19.2	64	76.98
240vAC, 3Ø Resistive	240	3.2	6.4	6.4	9.6	19.2	19.2	64	153.96
208vAC, 1Ø Resistive	208	2.4	4.81	4.81	7.21	14.42	14.42	48.07	133.43
240vAC, 1Ø Resistive	240	2.13	4.27	4.27	6.4	12.8	12.8	42.67	177.78
120vAC, 1Ø Resistive	120	0.53	1.07	1.07	1.60	3.2	3.2	10.67	88.89

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 that 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 cannot 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.
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) This load bank is not intended for use in wet environments.
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/load bank.
9) To prevent equipment failure or a possible fire, do not block air intakes or exhaust in any manner.
10) A load bank has hot parts inside. Do not use it in areas where gasoline, paint, or flammable liquids are used or stored.
11) 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.
12) "SAVE THESE INSTRUCTIONS"

a) Grounding

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 load bank is in operation the grounding cam must be firmly and electrically connected to earth ground. The grounding connection provides a low resistance path to ground. This grounding protects the operator from the possibility of electrical shock.

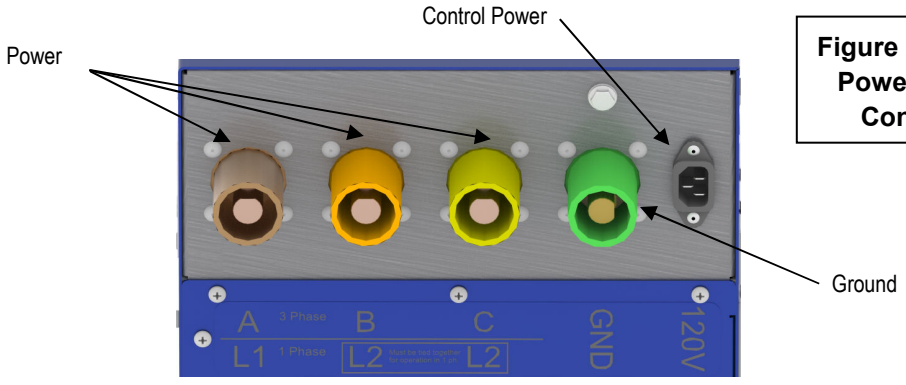


Figure 2. Ground and Power Cam-locks, Control Power

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.

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.)

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. Keep exhaust at least 10 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 which may be harmful to 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.

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 may exceed 400 °C. Exhaust temperatures of 90°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-lock 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.

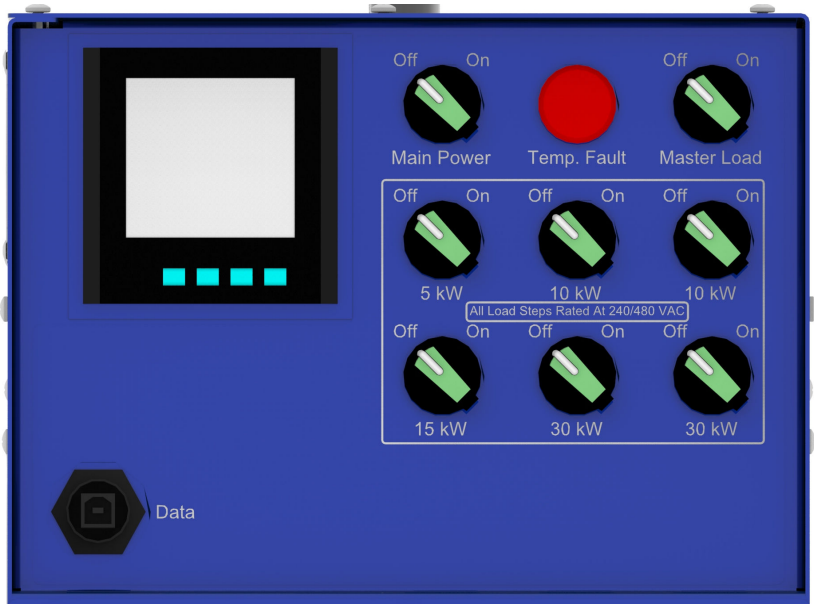


Figure 3. Switch Panel

b) Startup

1. Connect 120VAC control power plug to the unit.
2. Connect cam-locks 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 with the voltage required. Your unit is equipped with a voltage sensor, that will allow it to operate with either 208/240V or 480V applied. Check the voltage lights on the switch panel to see that the proper voltage light comes on. The unit will not run if an acceptable voltage is not supplied. The blowers, meter and green power light will turn on when an acceptable voltage is supplied.

   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 with the required voltage and Master in the OFF position.
2. To load instantaneously to a specific value: turn Master switch to OFF position, turn desired load switches to ON position, and then turn Master switch to ON position.
3. To load to individual steps: turn Master switch to ON position, turn desired load switches to ON position.
4. Repeat tests as needed.

d) Acuvim II Power Meter

1. Press the “VA” button on the front of the meter to view and cycle through the line voltage and current options.
2. Press the “P’ button on the front of the meter to view and cycle through the Power Reading and Power Factor options.

   Software instructions can be found in Section 6 of this manual.

   You will find more detailed instructions on the use of your meter by visiting the “accuenergy.com” website.

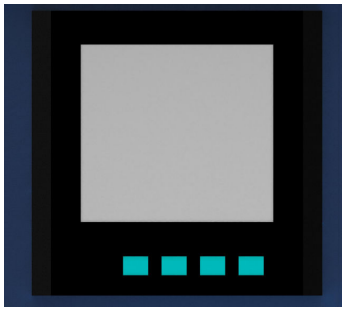


Figure 4.

Acuvim II Power Meter

e) 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 connections.
7. Move the unit to storage.

6) USB Communication Port

This load bank is equipped with a Acuvim II Power Meter that has a USB communications port. This port enables the user to connect the meter to a PC and read the test parameters from a remote location. The communications software can be downloaded at accuenergy.com.

Downloading Communications Software:

Under the Products tab under Power Meters, click Acuvim II Series. Then under Downloads, click Software.

Run **Acuview.exe** to load the software on your computer.

After loading the software, connect the cable between the PC and the load bank.

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

Start the Acuview program and take the following steps:

Create a connection:	Click **Settings** > **Connection Manager** > **New**
	Type in a name that you want to use for your connection
	Check **Serial Port**
	Select the Com Port that your computer is set up to use for USB
	Select the Baud Rate – (default for the meter is 19200)
	Set Parity to **None 1**
Add a device:	Click **Operation** > **Add Device**
	Select **Acuvim II** for the device type
	Select the Com Port name that you configured above
	Select 1 for the **Device Address** (should match meter settings)
	Enter the description that you want to use for this device.
Connect:	Click **Operation** > **Connect**

You should now be able to view the power meter readings from the load bank.

You will find more detailed instructions on the set-up and use of your software by visiting the “accuenergy.com” website.

7) Troubleshooting

Meter/Load Bank Will Not Turn On	Make sure main switch is in the ON position with correct voltage. Make sure 120v control power is connected.
Blower will not turn on.	Check for debris preventing fan from turning. Check blower fuse. See Figure 6.
Load steps will not turn on.	Check if over temp red light is on. Make sure that test source is on. Check control fuses. See Figures 6. Check resistor continuity. See Figure 10 and schematic. Check resistor step fuses. See figure 6 Check Voltage/Main Switch.
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 7.
Voltage Lights	Check that applied voltage is in agreement with selected voltage. Check that applied voltage is no more than 5% in the particular voltage mode that the unit is set in. If the limit is exceeded then the unit will not operate. Check the power cord loss if the cable is long.

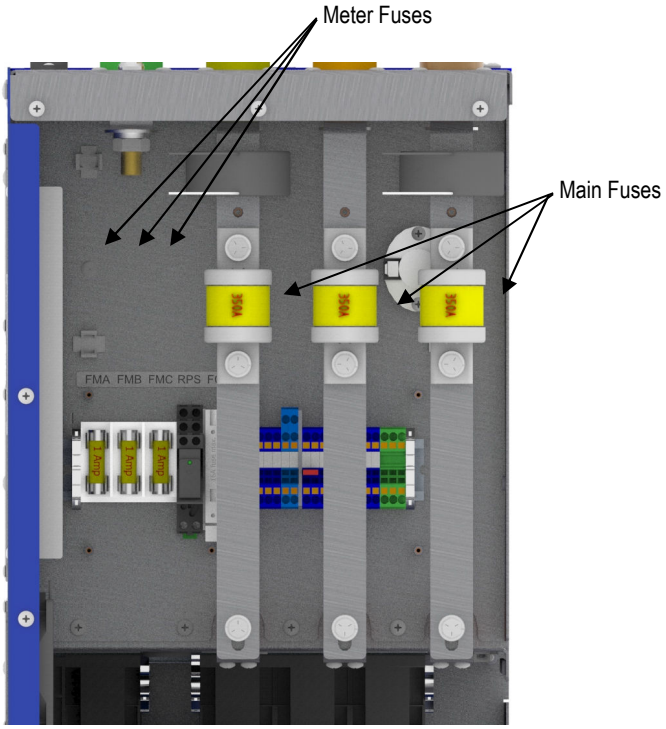


Figure 6 Blower/Control/Main Fuses in the Switch Panel

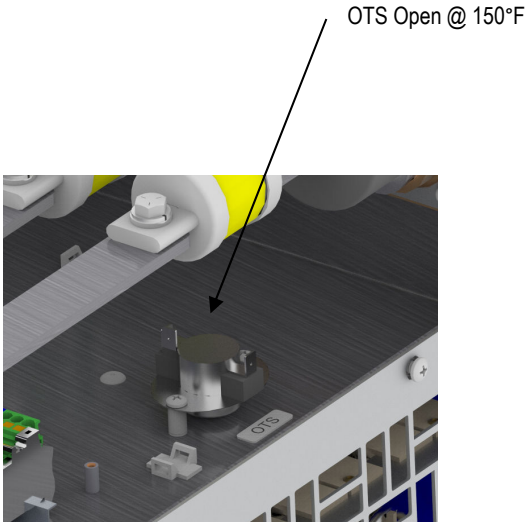


Figure 7. Thermal

8) Replacing Fuses

1. Using a #2 Phillips head screwdriver, remove the ten #10 screws from the lid. Carefully remove the panel from the unit. Fuses are located of the main. Service on fuses can now be performed. (See Figure 8)

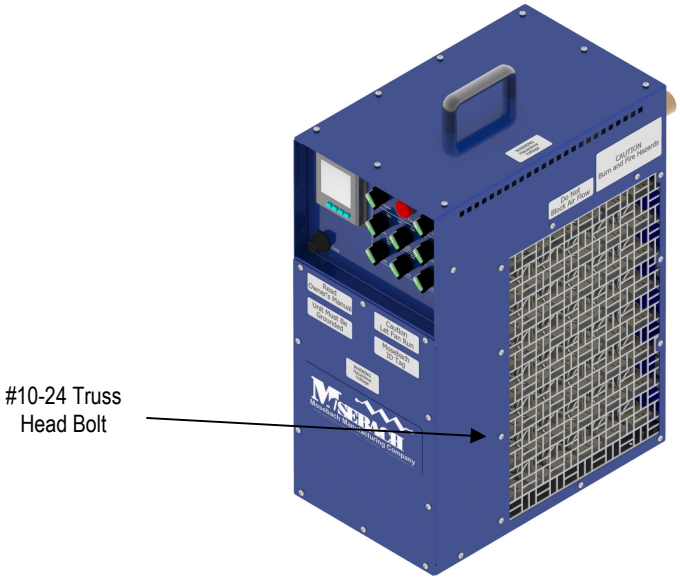


Figure 8a

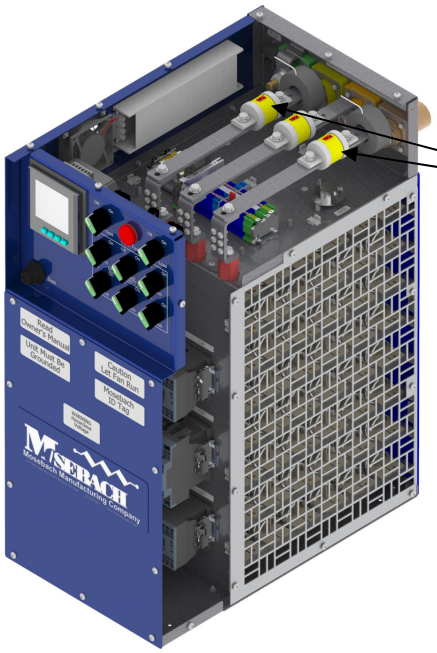


Figure 8b

9) Replacing Resistors

1. Using a #2 Phillips head screwdriver, remove the twenty #10 screws from the lid. Carefully remove the panel from the unit. (See Figure 9a)

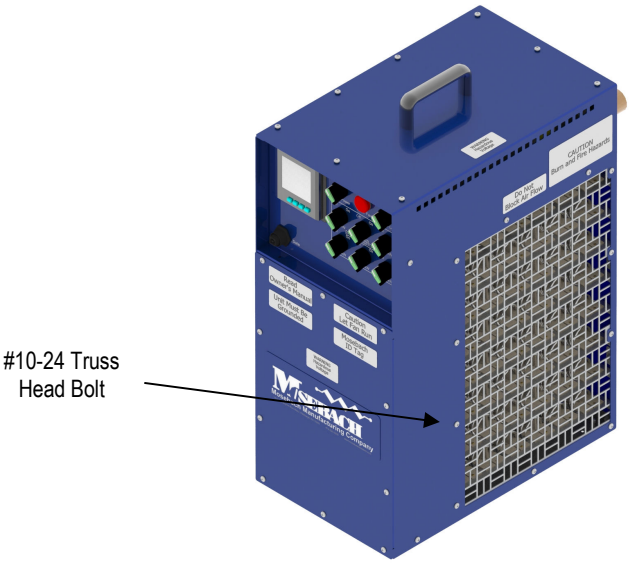


Figure 9a

2. Using a #2 Phillips head screwdriver, remove the ten #10 screws from the Front Panel. Carefully remove the panel from the unit. (See Figure 9b)

Figure 9b

3. Using a #2 Phillips head screwdriver, remove the six #10 screws from the Exhaust Mesh. Carefully remove the panel from the unit. Service on resistors can now be performed. (See Figures 9b and 10)

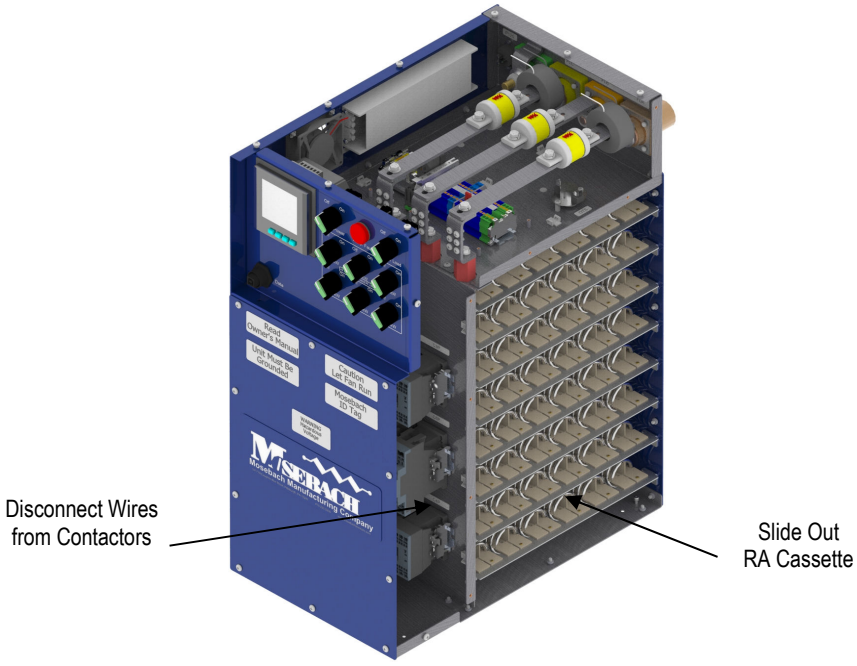


Figure 10

4. Disconnect the bad resistor wires from the contactors. Do not disconnect the wires from the resistor side. Each wire is labeled on both ends for easy identification.
5. Pull out the bad resistor cassette.
6. Replace the old resistor cassette with a new one. Run the lead through the corresponding hole in the control panel. The part number of each resistor cassette is stamped on the top of them.
7. Connect the lead back into the proper contactor location.
8. Carefully place the Exhaust Mesh back into its proper position. Using a #2 Phillips head screwdriver, replace the six #10 screws.
9. Carefully place the Front Panel back into its proper position. Using a #2 Phillips head screwdriver, replace the ten #10 screws.
10. Carefully place the lid back into its proper position. Using a #2 Phillips head screwdriver, replace the twenty #10 screws.

10) Preventative Maintenance of the Load Bank

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: a) Obvious damage b) Loose hardware	Every use
Megger Test	Every 6 months
Cold Resistance Check	Every 6 months
Air Flow Test	Every 6 months
Power Test	Every 6 months
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

X100LT

	Part Number
Fan	EC-9500-2177 EC-9500-2178
Resistor Elements	RA-0055-0519-1 RA-0055-0519-2 RA-0055-0519-3 RA-0055-0519-4 RA-0055-0519-5 RA-0055-0519-6 RA-0055-0519-7 RA-0055-0519-8
Fuses	1A = EC-9500-0247 10A = EC-9500-0363 350A = EC-9500-1169
Meter	EC-9500-1690
Contactors	EC-9500-2143 EC-9500-2174

X100LT-600

	Part Number
Fan	EC-9500-2177 EC-9500-2178
Resistor Elements	RA-0055-0478-1 RA-0055-0478-2 RA-0055-0478-3 RA-0055-0478-4 RA-0055-0478-5 RA-0055-0478-6 RA-0055-0478-7 RA-0055-0478-8
Fuses	1A = EC-9500-0247 10A = EC-9500-1577 250A = EC-9500-1664
Meter	EC-9500-1690
Contactors	EC-9500-2143 EC-9500-2174

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“SAVE THESE INSTRUCTIONS”