# Operations and Service Manual

## *XE400D-SB Load Bank*

SUNBELT® RENTALS

PUMP & POWER SERVICES

MOSEBACH MANUFACTURING COMPANY

Read all instructions before using the load bank

# Contents



Figure list:

IMPORTANT INSTRUCTIONS

# 1. Components

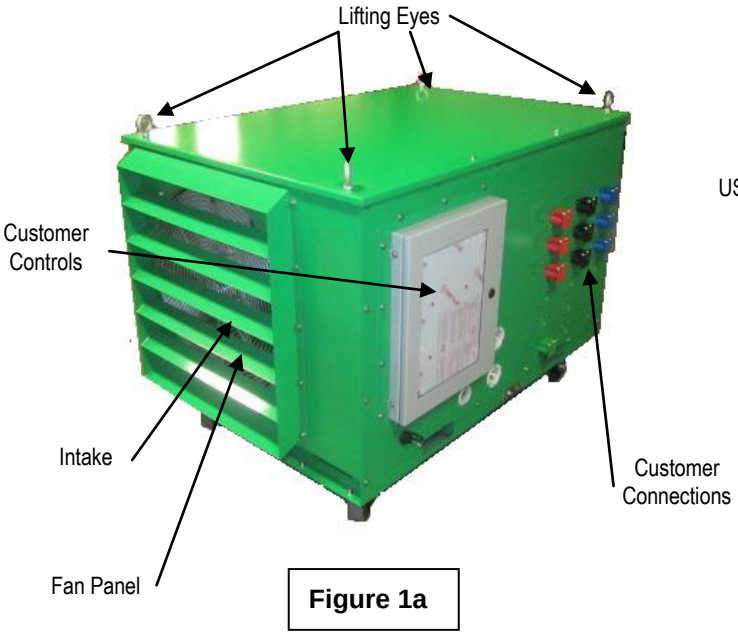


**Figure 1a**

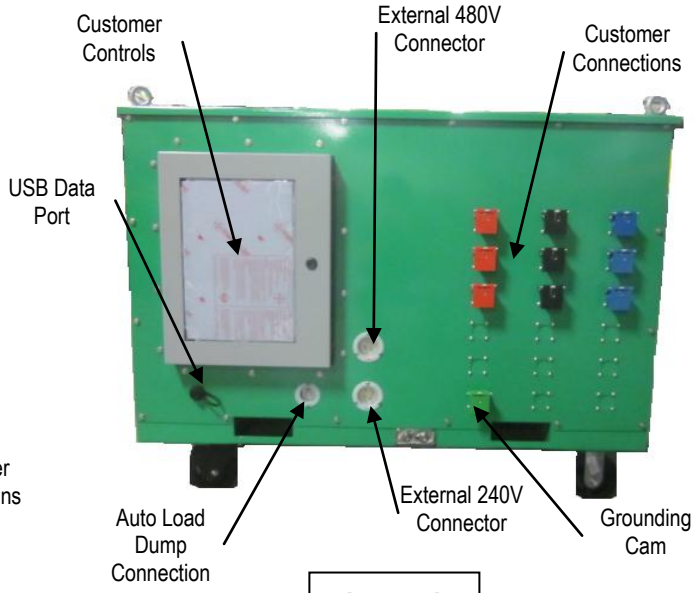


**Figure 1b**

## Total Assembly

**XE400D-SB**

# 2) Specifications

| | |
|---|---|
| Blower | (480VAC/240VAC , three phase, 60 Hz) – internally powered off of the cam locks<br>Or (480VAC/240VAC , three phase, 60 Hz) – externally powered |
| Control power | 120VAC, single phase, 60 Hz – internally powered |
| Rating | Continuous duty |
| Power factor | 1.0 |
| Load elements | The kW at each step is subject to a manufacturing tolerance of ±5%. |
| Enclosure | Air inlet and outlet are covered by metal screens.<br>Heat is discharged horizontally. |

**a) XE400D-SB Load Bank**

| Power | Step 1 (kW) | Step 2 (kW) | Step 3 (kW) | Step 4 (kW) | Step 5 (kW) | Step 6 (kW) | Step 7 (kW) | Step 8 (kW) | Total Power (kW) | Amps / Phase (Line) |
|---|---|---|---|---|---|---|---|---|---|---|
| 480VAC | 5 | 10 | 10 | 25 | 50 | 100 | 100 | 100 | 400 | 278 (481) |
| 240VAC | 5 | 10 | 10 | 25 | 50 | 100 | 100 | 100 | 400 | 556 (962) |

# 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 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 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) Use outdoors only if equipped with rain doors.
7) Do not use in wet or moist locations if not equipped with rain doors.
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 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 the control power of the load banks directly into a wall outlet/receptacle. Never use with a re-locatable 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 Pad

**WARNING! ELECTRIC SHOCK HAZARD. The ground 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 camlock 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.

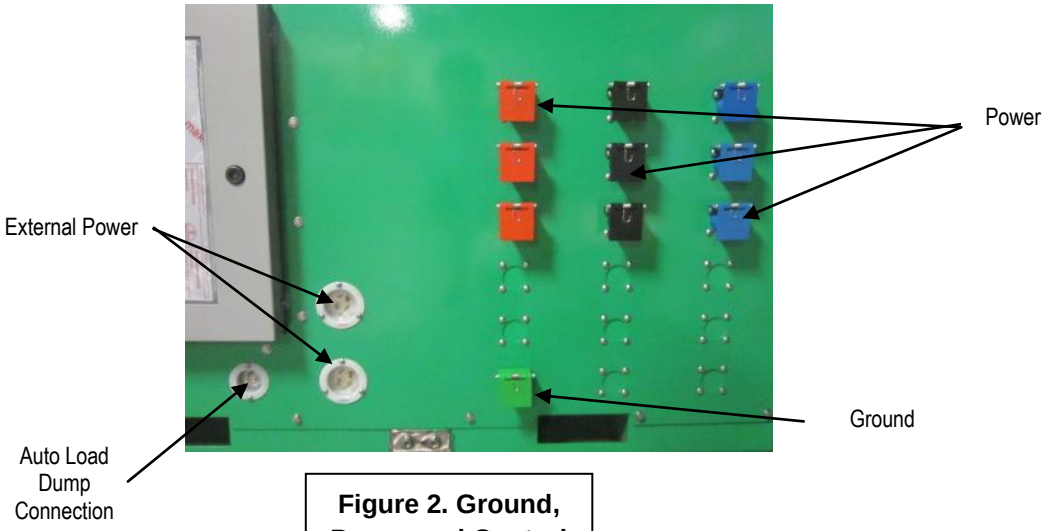


**Figure 2. Ground, Power and Control Power**

### 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 and the possibility of grounding-out or shorting-out of the test power source.**

### c) External Power

Any plugs or cords used with the XE400D-SB load bank shall be in compliance with NFPA 70E guidelines.

### 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 so could cause debris to interfere with the operation of the load bank, potentially causing safety hazards.
2. Connect the load bank's grounding camlock 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. If desired, connected a 120VAC cord into the Auto Load Dump port (for Auto Load Dump purpose and function, see section 5-d "Auto Load Dump").
6. Connect 480/240V external plugs if desired.
7. Connect the 480/240VAC cam locks. **Caution! Ensure the cable size is sufficient to handle the high current entering the load bank. Undersized cable may lead to electrical failure or fire, causing injury or death.**


**Figure 3. Switch Panel**

## b) Startup

1. Turn the MAIN on/off power switch to the correct voltage position. To operate the blower with external 480V power turn the main switch to 480V Ext. To operate the blower with external 240V power turn the main switch to 240V Ext. To operate the blower internally off of the camlocks turn the switch to Int. The meter and RED airflow lights will turn on.
2. If the Auto Load Dump is to be used, place the switch in the OFF position. If not, place the switch in the LOAD DUMP BYPASS position.
3. Turn the blower switch to ON and check the direction of the airflow. If the blower is spinning clockwise, causing the air to enter the exhaust end exit the intake, turn the blower switch to off. Once the blower has stopped turn the switch to the other on position.
4. Once air is flowing through the unit, the GREEN air flow light should turn on after no more than 30 seconds, indicating the load bank blower is operating properly. If the GREEN air flow light does not turn on, or there is no airflow though the intake or exhaust ports, do not proceed to the next step. Immediately turn the blower off and visually inspect for any blockage to the intake or exhaust ports. Remove all power sources before removing any blockage, or undergoing any further inspection. **Caution! Attempting to operate the load bank without proper air flow will cause the unit to become dangerously hot. Overheating of the load bank can cause fire and electrical hazards.**

## c) Applying load

1. Place the desired step switches in the ON position.
2. If two or more step switches are engaged, the power dissipated by the load bank will be the sum of those step switches.

   Example: desired power = 80 kW, step switches engaged = 5, 25, 50
3. Put the Master Load toggle ON to engage the resistors.
4. Repeat tests as needed.

## d) Auto Load Dump Operation

To protect the stand-by generator from overload during a power grid outage an Auto Load Dump Circuit may be installed as an option.

Connect the Auto Load Dump control receptacle to a 110 VAC source. This source must be powered when the power grid is operating normally and must remain in a de-energized state when the stand by generator is on. As long as there's incoming power applied to the Auto Load Dump receptacle, contactor CALD will remain energized.

When the (SALD) Auto Load Dump By-Pass marked switch is in the normally closed position, the CALD relay is by-passed. The outcome is whether power is applied to the Auto Load Dump Bypass control receptacle or not, the load bank will continue to operate normally.

With SALD (Auto Load Dump By-Pass) switch in the open or "off" position, control power will be lost when power to the 110 VAC connected to the Auto Load Dump control receptacle is not applied.

Note that if power is restored to the control receptacle when the stand by generator comes on line the load bank will draw a load. To function properly the power supplied to the Auto Load Dump control receptacle must not be restored when the stand by generator comes on line. The only time that power should be present on the Auto Load Dump control receptacle is when the power grid is functioning normally.

## e) Shutdown

1. Place all step switches in the OFF position.
2. Put the Master Load switch in the OFF position.
3. Allow blower to operate at least three minutes, or until exhaust air is cool, before shutting it off. This cooling period will extend the life of your load bank.
4. Once cooling period is complete, turn blower switch OFF.
5. Turn Main Power Switch to the OFF Position.
6. Remove the 480/240VAC cam locks. **Caution! Removing any high power source from the unit without turning the source power off first may cause**

**arcing when the cam locks are being removed. This can lead to electrocution.**

7. Remove external plugs.
8. Remove Auto Load Dump 120VAC power source, if applicable.
9. Remove ground connections.

# 6) USB Communication Port for Shark Meter:

This load bank is equipped with a Shark 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. Two CD-ROM disks are provided to the user with this manual. The large disk contains communications software and the small disk provides drivers for the USB connection. Both disks must be loaded on the remote PC in order for the meter to properly communicate with the PC.

A USB cable is not provided. It should be purchased separately. See Figure 4 for an example.

**Figure 4. Typical USB A to USB B male**

After loading the software, shut the PC off. 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.

Start the Shark Meter program. Follow the directions in the pop-up menu. The PC will display a representation of the meter and will show what the meter is reading. For more detailed information please read the meter manual which is on the larger disk supplied with the load bank.

For additional information go to http://www.electroind.com/

# 7) Troubleshooting

| | |
|---|---|
| Meter/Load Bank Will Not Turn On | Make sure main switch is in the ON position.<br>Make sure that the 120VAC plug is connected and powered or the Auto Load Dump Bypass toggle is turned off if the Load Dump functionality is not desired<br>Check voltage selector switch to ensure it's in the proper mode |
| Blower will not turn on. | Check for debris preventing fan from turning.<br>Check blower fuse. See Figure 5. |
| Load steps will not turn on. | Check if overtemp red light is on.<br>Make sure that test source is on.<br>Check control fuses. See Figure 7a and 7b.<br>Check resistor continuity. See schematic.<br>Check resistor step fuses. See figure 6.<br>Check voltage selector switch to ensure it's in the proper mode.<br>Check blower rotation. |
| Over temperature light. | This is an indication that the internal cabinet temperature has exceeded 150°F.<br>Make sure the cabinet is ventilated.<br>Check over temperature sensor (OTS) see figure 8. |

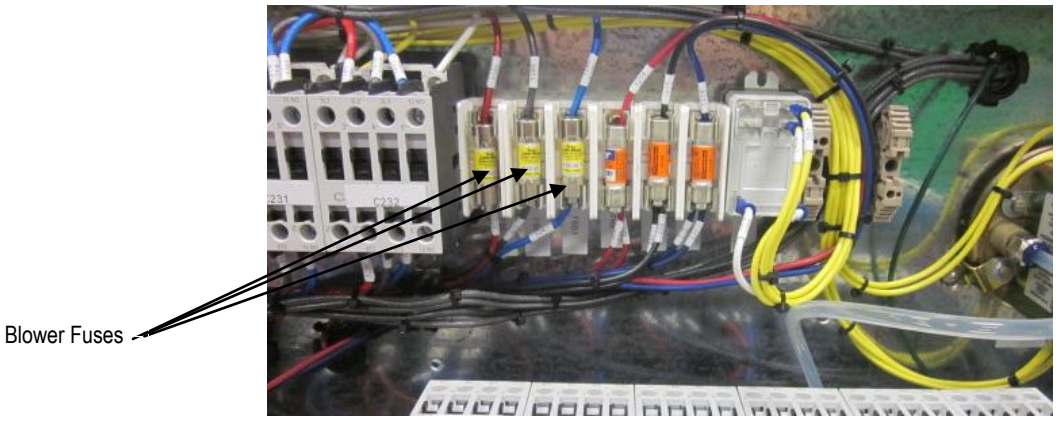


**Figure 5 Blower Fuses in the Main Panel**

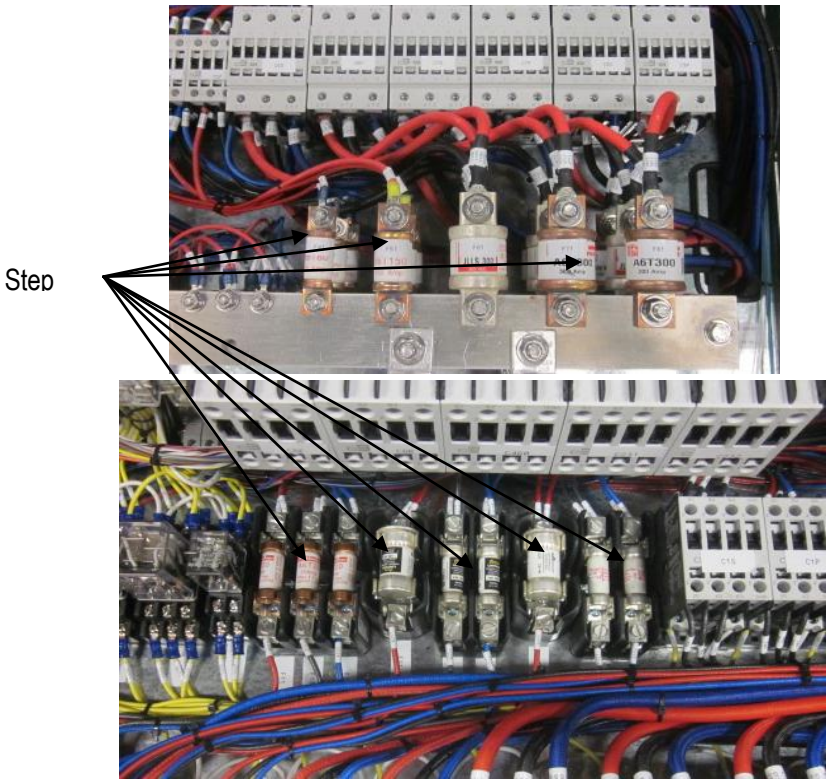


**Figure 6 Step Fuses**


**Figure 7a. Control Fuses (Operator Enclosure)**

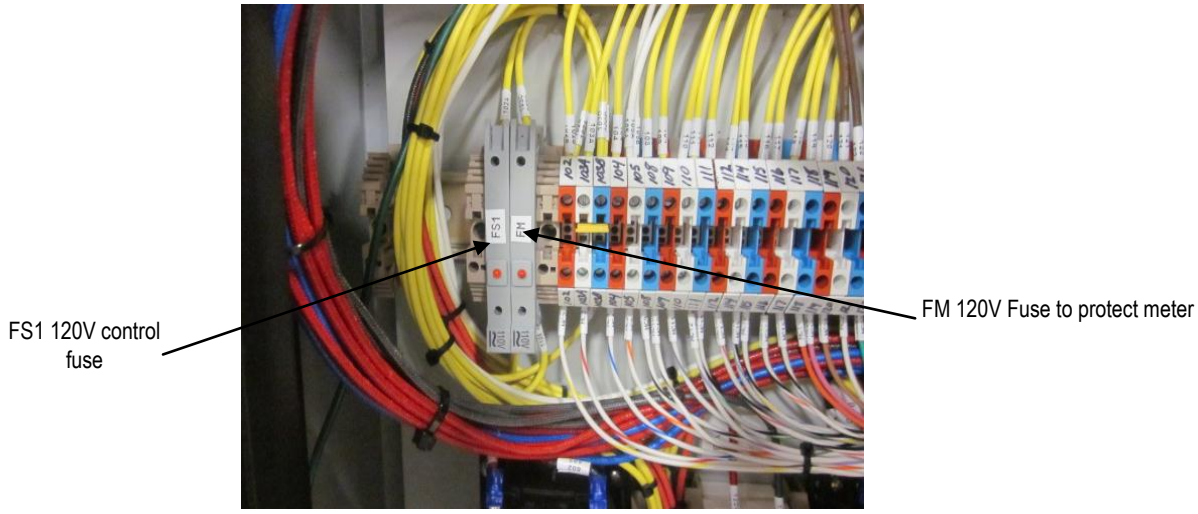


**Figure 7b. Control Fuses (Operator Enclosure)**

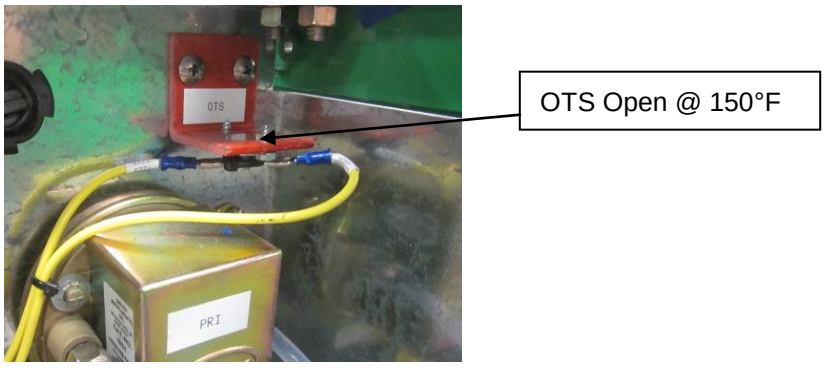


**Figure 8. Thermal Switch**

# 8) Replacing Fuses

1. Using a ½ inch wrench, remove the 4 lifting bolts from the load bank
2. Using a 7/16 inch wrench, remove the 4 bolts from the lid of the load bank. (See figure 9)

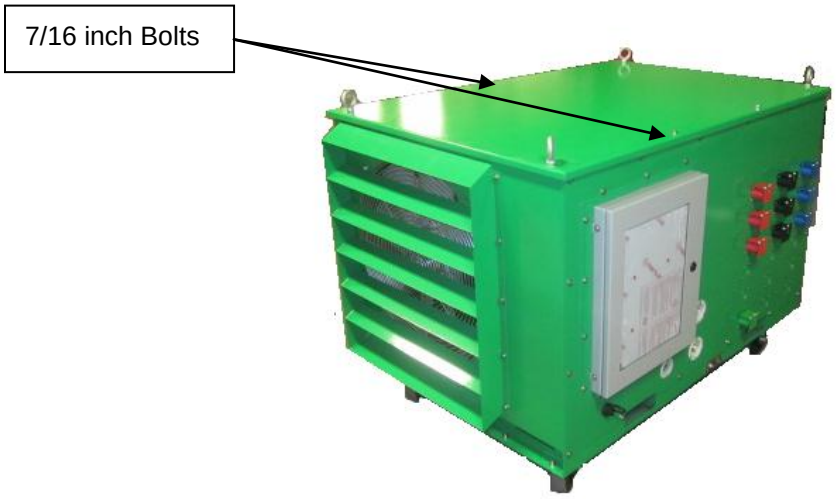


**Figure 9.**

3. Gently remove the lid from the unit by lifting it by the edges.
4. Service on fuses can then be performed.

# 9) Replacing Resistors

Contact Mosebach Manufacturing Co. if there is a problem with the resistors or if a resistor needs to be replaced.

# 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:<br>a) Loose wire connections<br>b) Visually damaged components | Every 6 months |
| Inspect Bearings | Annually |
| Inspect Fan | Annually |
| Inspect Resistors for:<br>a) Damage to coils<br>b) Delamination of the mica | Annually |
| Contactors are opening and closing | Annually |
| Shark Meter Calibration | Annually |

# 11) Service Parts

| | Part Number |
|---|---|
| Fan | BLWR-0055-0085 |
| Resistor Elements | RA-0055-0149 RA-0055-0150<br>RA-0055-0151<br>RA-0055-0146-1 RA-0055-0146-2<br>RA-0055-0146-3 RA-0055-0146-4<br>RA-0055-0146-5 RA-0055-0146-6 |
| Fuses | 1A Type AGC = AGC-1-R<br>10A Type AGC = AGC-10-R<br>1A CC = EC-9500-0247<br>6A CC = EC-9500-0352<br>15A CC = EC-9500-0145<br>15A = EC-9500-0731<br>30A = EC-9500-0734<br>80A = EC-9500-0741<br>150A = EC-9500-0744<br>300A = EC-9500-0849 |
| Meter | Shark Meter = EC-9500-0314 |



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**"SAVE THESE INSTRUCTIONS"**