



PROVIDING RESISTOR AND LOAD BANK TECHNOLOGY... TO THE WORLD



PortaBank™ Load Banks
95KW/100KW



Operation and
Service Manual

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Control drawings, photos, and additional information attached.

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PortaBank™ Load Banks

Mosebach PortaBank™ Load Banks are available in two models with many options including types of power connectors, choices of meters, PLC operation, 60/50Hz operation, and single- or three-phase operation. Options for your load bank are on your bid sheet. Contact your Mosebach Manufacturing application engineer for a full list of options.

Components



Typical PB2F Shown

Enclosure — protects the internal parts and shields the operator.

Electrical power connections — bring the test load into the load bank. Cam lock receptacles are provided on standard units. Aviation and other types of connectors are provided when specified.

Control and cooling fan connections — provide power for control relaying and cooling. Flange receptacles are standard. Special types of connectors are provided when requested. Some units are internally powered (see your control and power drawings).

Grounding lug — essential for safety.

Resistor assemblies — Slimline™ or WeldlessWeave™.

Cooling fans — prevent overheating.

Digital meters — monitor the parameters. See your control and power drawings for specific meters and meter connections.

Indicating lights — show the status of the load bank. See your specific control drawing to determine how these lights function.

Control switches or devices (such as a PLC) — for selecting various test functions.

Specifications

Load Power	Three phase 240 VAC, 480 VAC, 208 VAC may be applied – 120 VAC and 240 VAC single phase
Cooling fans	120V, 1 phase, 60Hz
Control power	120V, 1 phase, 60Hz
Rating	Continuous duty

PortaBank™ Load Banks

Power factor	1.0
Load elements	<p>Each resistor is connected in wye. Our WeldlessWeave™ and Slimline™ technologies use a continuous stainless steel ribbon to eliminate all welds. By eliminating welds, hot spots are eliminated.</p> <p>To reduce the operating temperature, no through-bolts are used.</p> <p>Parallel element system reduces the watt density.</p> <p>Our resistors are design to withstand vibration. Breakable parts, such as ceramics insulators, are not used. All this results in maximum operating life of our resistors.</p> <p>The kW at each step is subject to a manufacturing tolerance of ±5%.</p>
Enclosure	<p>Light-weight electro-statically painted metal enclosure with wheels for easy maneuvering.</p> <p>Air inlet and outlet are covered by metal screens.</p> <p>Heat is discharged horizontally.</p>

Load steps and load capacity

PB2F 100 Kw Series

Power	kW Steps	kW Steps	Total kW	Total Amps
480 VAC, 3Φ	2 x 12.5	3 x 25	100	120
240 VAC, 3Φ	2 x 12.5	3 x 25	100	240
208VAC, 3Φ	2 x 9.3	3 x 18.6	74.4	207
240 VAC, 1Φ	2 x 9.3	3 x 18.6	74.4	310
120 VAC, 1Φ	2 x 9.3	3 x 18.6	74.4	620

PB2F 95 Kw Series

Power	kW Steps	kW Steps	kW Steps	kW Steps	Total kW	Total Amps
480 VAC, 3Φ	1 x 5	1 x 10	2 x 20	1 x 40	95	114
240 VAC, 3Φ	1 x 5	1 x 10	2 x 20	1 x 40	95	228
208VAC, 3Φ	1 x 3.5	1 x 7	2 x 15	1 x 30	70.5	196
240 VAC, 1Φ	1 x 3.5	1 x 7	2 x 15	1 x 30	70.5	294
120 VAC, 1Φ	1 x 3.5	1 x 7	2 x 15	1 x 30	70.5	590

Receiving

Your load bank is ready to run when you receive it.

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 it can be operated safely.

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. If wheels or casters are provided, check they turn freely and that brakes, if provided, work.

CAUTION! Even with the brakes set on, do not leave the load bank unattended on a ramp without first blocking the wheels.

4. Verify the doors, if provided, open and close properly.
5. Verify that door latches are functional and secure the door.

Note: Doors may be provided as options on weather resistant units.

6. Check the control panel for any obvious damage.

Lifting

CAUTION! Use proper lifting devices or methods. Inadequate lifting devices or methods can damage the load bank. Only units shipped with eyebolts can be safely lifted from above. Only units provided with lifting channels may be safely lifted using fork lift or lift truck.

1. Make sure the lifting eye bolts, if provided, are fully inserted and securely fastened to the unit.
When eyebolts are used to move a load bank, the lifting devices attached to the eyebolts must be rated and designed for the type of lift being made. Consult with the lifting device manufacturer before making this type of lift.
2. On units with lifting channels,
 - a. Make sure the fork lift or lift truck type lifting device is rated for the size and weight of the load bank.
 - b. Before making a move, make sure the lift is balanced and secure.
 - c. Follow all of the directions provided by the lifting device manufacturer.
3. On units that are moved manually, insure you are physically capable of lifting or pushing the unit without injuring yourself. At least two people are needed to lift a load bank. Use the handles provided, proper lifting techniques and body mechanics to reduce the potential of injury. Even with proper techniques you might injure yourself while lifting or moving your load bank.

Safety

PortaBank™ Load Banks are designed to handle various voltages, currents, and loads, and may have both resistive and reactive elements. 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. Refer to your company lock out / tag out program for proper procedures.

Grounding lug

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 lug 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.

Power 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.

On many units, multiple connections for the same phase and polarity are provided so the individual connections are not over powered. Exposed metal on these connectors may have voltage on them.

Depending on specifications, various types, frequencies, and amplitudes of voltages can be applied to your load bank. All power connections must be covered or connected. Failure to do so will allow test voltages or in some cases voltages higher than test 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 grounding-out or shorting-out of the source generator.

Air intakes and exhaust ports

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

Multiple fans are provided as a source of cooling air. 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 load bank to overheat.

Wind may reduce air flow. Place the load bank so the exhaust ports face away from prevailing winds. Mosebach Manufacturing does not recommend load banks be used in wind conditions above 5 mph.

Keep the air 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 3 minutes after the load is removed or until exhaust air is cool.

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 and injure a bystander. Material near the intake may be pulled into the load bank and damage the internal components.

Exhaust temperature

WARNING! FIRE AND BURN HAZARD. Keep flammable material at least 40 feet away from the load bank. A tremendous amount 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.

Load resistors generate a good deal of heat. Even with sufficient air flow, internal component temperature will exceed 600 degrees F. Exhaust temperatures of 500 degrees F are common. Air and material several feet from the load bank can be heated to temperatures in excess of 150 degrees F. Flammable materials must not be kept near the load bank. Heat from the load bank could ignite this material.

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

Connecting and disconnecting

WARNING! BURN HAZARD. Attempting to connect or disconnect leads while load bank is in operation can lead to burns and/or blindness. 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 and heat.

Load banks use high-powered resistor elements that have very small ohmic values. Even at low voltages, large currents may be flowing through connectors. Attempting to couple or uncouple electrical connection under load may lead to arcing. Arcing can cause eye damage or burns.

Operation

Your load bank should operate smoothly and without problems for a very long time.

NOTE: Contact Mosebach Manufacturing if you are planning operations in ambient temperatures above 115 degrees Fahrenheit.

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 it can be operated safely.

The grounding lug must be connected to earth ground. Operating without a grounding connection could lead to injury or death.

WARNING! FIRE AND BURN HAZARD. Keep flammable material at least 40 feet away from the load bank.

Caution! Unless your load bank has been designed as a weather resistant unit, do not operate in rain or snow.

Caution! Test points (optional) provided on the switch panel are for voltage testing only. Attempting to monitor current will cause fuses to fail.

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 grounding lug to a known earth ground at the testing facility.
Failure to do this may result in a fatal electrical shock.



Connect grounding lug Typical PB2F Shown

3. Check control panel and move all switches to the OFF position.



All switches to OFF position Typical PB2F Shown

Caution! Select the highest possible expected test voltage during startup. Selecting a lower voltage than the voltage expected during operation may lead to damage to the load bank.

4. Where multiple voltages may be manually selected, move selector switch to the highest voltage.

Failure to do so may expose components to voltages they are not able to handle.

Note: Automatic voltage selection is available as an option.

Caution! All air intakes and exhaust ports must be clear and fully open. Reducing or blocking the air flow will lead to overheating and load bank failure.

5. Position the load bank so air will flow freely into the intakes and out of the exhaust ports.

Failure to do so may restrict air flow through the load bank.

Startup

1. Determine source voltage.
2. If a selector switch is provided on your load bank, move the switch to the voltage and phase configuration you plan to test.
3. If an external fan/control connection is provided, make that mechanical connection at this time.
4. Refer to attached schematics for proper connections.

Caution! Neutral provided for WYE Source connection only. Do not hook up neutral from a Delta configured source or from a source of unknown configuration. The neutral from a delta source is a single phase neutral and will damage the load bank.

5. Cover any unconnected receptacles.
 6. Mechanically make the test load connection at this time
 7. Electrically turn on control power at the source
 8. Electrically turn on test power at the source
- Steps will not energize when over-temperature lamp is lit.
9. Insure all step switches are in the OFF position. Turn the MAIN ON/OFF power switch to the ON position.

The blower will start.

If an indicator light is provided, the ON light will illuminate and the digital meter indicators will light and go through a start-up cycle.

If a switch is provided for the fan, turn the FAN ON/OFF switch to the ON position.

This switch is an option. See your control and power drawing.

Caution! Failure to have proper air flow will cause the unit to overheat and fail

10. Check your fans for air flow.
- Air should be coming from the exhaust port and the green air flow light (where provided) should come on. On high powered units you will hear the movement of a lot of air. However, be alert to any unexpected loud mechanical sounds.
11. Check to see that only green or amber lights are lit.

Caution! If you apply a voltage that is higher than the load bank is designed to handle, it will fail. If you have an incorrect voltage or phase configuration selected, your load bank may fail.

12. Check the digital meter for voltage.

The voltage on the meter must match or be lower than the load bank's designed voltage (or voltage that is selected on units with a voltage selector switch). Digital voltage meters are

wired across line the voltage and should indicate applied voltage even with all step switches in the OFF position.

Testing

1. Place the desired test step toggle switch in the ON position.
Current will start to flow and be measured through a CT sensor. The digital meter will report voltage, current, and/or power depending on the type of meter you selected.
2. Perform all of the loading tests that you need.

Shutdown

1. Place all toggle switches in the OFF position.
2. Move selector switches to the highest voltage position.
3. Allow fans to operate at least 3 minutes or until the exhaust air is cool before turning them off.
This cooling period will extend the life of your load bank
4. Turn Off the MAIN ON/OFF Switch
5. Electrically disconnect Control Voltage from unit.
6. Electrically disconnect Test Voltage from unit.
7. Mechanically disconnect Test Power Connections and Control Power Connections.
8. Move the unit to storage.

Changing Voltage on Multiple Voltage Units

Some voltage sag is expected and is normal. The load bank can accommodate normal voltage sag without problems.

Some units are designed to automatically sense incoming test voltage, determine the internal setting of the load bank and turn on the appropriate contactors. On other units, the voltage and phase combinations must be manually selected. Do not attempt to change the voltage selection manually while the unit is under load.

CAUTION! Never attempt to change test voltage/phase configuration while under load as this can cause a load imbalance or higher than expected currents and damage the load bank or test source. Severe changes in the incoming voltage or attempting to change voltage/phase combinations under load may cause some contactors to be caught in mid change causing high current conditions. These high current conditions could result in equipment failure.

CAUTION! All steps must be in the off position when changing test voltage. Failure to do so can cause a load imbalance that could damage the load bank and the test source.

1. Electrically shut off the incoming test voltage (let the voltage go to zero).
2. Allow the fan or blower to continue running.
3. Shut all step switches to OFF.
4. After 3 minutes turn Main ON/OFF Switch to the OFF position
5. Move selector switch(es) to the desired voltage and phase combination.
6. Electrically turn on incoming test voltage
7. Turn Main ON/OFF Switch to the ON position
8. Perform required testing.

USB Communication Port for Shark Meter:

Some load banks come equipped with a Shark Meter also have 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. The large disk contains communications software and the small disk provides drivers for the USB connection. Both disks must be load on the remote PC in order for the meter to properly communicate with the PC.

The USB cable is not provided. These cables come in various lengths and can be purchased from department stores and electronic specialty stores. You can purchase the length that suits your particular location.

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 start up 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.

Meter Configurations

On special orders our load resistors are wired with a “DELTA” configuration. On those load banks the meters are calibrated and wired to correctly read “DELTA” parameters.

On standard load banks the resistors are wired in a “WYE” configuration. Regardless of the generator configuration the meter will display “WYE” parameters.

If your generator is in a “DELTA” configuration do not connect the neutral on the load bank. Do not ground the neutral on the load bank. Ground the load bank through the grounding stud provided.

For additional information you can go to one of the following WEB PAGES listed below:

Shark Meter <http://www.electroind.com/>

Intergra Meter <http://www.crompton-instruments.com/integra.html>

Troubleshooting

Blower will not turn on.	Check external power source. Check for debris preventing fan from turning. Check blower fuses and/or starter.
Airflow light stays red.	Check to see if blower is on. Check air path for obstruction that may prevent proper air flow.
Load steps will not turn on.	Check if any red light is on. Eliminate cause of red indicator. Make sure that test source is on. On some units, steps will not engage unless test power is applied.

Part Numbers

Component Item	Component Description	Component Item	Component Description
1100-A1	PLASTIC STANDOFF	EC-9500-0363	Fuse-holding Terminal Block
BLWR-0055-0023	Fan , 10 Panel for SC type LB's"	EC-9500-0365	Banana Jack (black)
EC-9500-0124	Sw itch, 2 pos.	EC-9500-0472	Cam-lock Panel Mt
EC-9500-0142	Indicating Light (Red)	EC-9500-0473	Cam-lock Panel Mt.
EC-9500-0143	Indicating Light (Green)	EC-9500-0492	Mini Pressure Sw itch
EC-9500-0166	Contacto r, 60/75A , 600V Rated,	EC-9500-0712	300:5 Current Transformer
EC-9500-0243	Fuseholder fuse block	EC-9500-0714	Cam-Type Connector, Panel
EC-9500-0247	Fuse, LP-CC-1	EC-9500-0715	Cam-Type Connector, Panel
EC-9500-0248	Toggle Sw itch	EC-9500-0732	20A 600V Fast Acting Fuse
EC-9500-0259	Contacto r, 25/35A	EC-9500-0735	35A 600V Fast Acting Fuse
EC-9500-0265	Flanged Pow er Inlet	EC-9500-0740	70A 600V Fast Acting Fuse
EC-9500-0314	Shark Meter w /Datalog, Model 1	EC-9500-0746	1-30A 3 Pole Fuse Block
EC-9500-0323	Square Base Relay , 14 pin, 4PD	EC-9500-0748	35-60A 3 Pole Fuse Block
EC-9500-0324	Relay Socket for EC-9500-0323,	SWIT-003	Overtemp Sw itch (150-30 deg)

Phase Connections

Improper Single Phase Neutral on Source Connected to Three Phase Neutral on Load Bank.

Improper Single Phase Neutral on Source Connected to Three Phase Neutral on Load Bank.

Acceptable Three Phase Neutral on Source Connected to Three Phase Neutral on Load Bank.

Acceptable Three Phase Neutral on Source Connected to Three Phase Neutral on Load Bank.

Acceptable Single Phase Test.

Acceptable Single Phase Test.

Unknown Configuration

Unknown Configuration

No Neutral

No Neutral

Acceptable Single Phase Test.

Acceptable Single Phase Test.

Caution: Load Bank Neutral Should Never Be Tied To Ground On Load Bank Side.

Caution: Single Phase Neutral On Voltage Source Should Not Be Tied To Three Phase Neutral Except In Single Phase Testing. Improper Connection Will Lead To Load Bank Failure.

Caution: Load Bank Should Always Be Electrically Connected To Earth Ground Failure To Do So Could Allow Deadly Voltage To be Present On Load Bank Enclosure.

DATE:	REVISION:	DATE:	REVISION:	DATE:	REVISION:

DRAWN BY:	DATE:	SIZE:	PART NO.:	REV:
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Additional information

For the latest operating manuals and software down loads please visit to the following web sites:

For Crompton and Integra

http://www.crompton-instruments.com/installation_operation.html#integra

For the Shark Meter

http://www.electroind.com/dl_page.html

For Simpson Meters

http://www.simpsonelectric.com/main/index.asp?p=Download_and_Request_Literature&s=Data sheets

The attached power and control drawings provide detailed operating conditions and parameters. Please refer to your bid sheet for additional information about your unit.

Operating information about the meters is provided separately from this manual.

Any modification to the power circuit wiring may void your warranty. Any modification to the control circuit wiring that changes the intended operation of the power contactors may void your warranty.

For additional assistance please contact our warranty or customer service department.
[412.220.0237]