Document Number: DOC-00668

SIMPLEX®

Insight Onsite

110 KW POWERSTAR

125 KW NORTHSTAR

150 KW NORTHSTAR

DIGITAL LOAD BANK

SIMPLEX®
Insight Onsite

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Last Revision Date: March 15, 2016

For the most up-to-date information for this product and others, please contact Simplex, Inc. at 1-800-637-8603 or visit us on the web at http://www.simplexdirect.com.

1.0 WARNINGS AND CAUTIONS

Four commonly used safety symbols accompany the DANGER, WARNING, and CAUTION blocks. The type of information each indicates is as follows:

This General warning symbol points out important safety information that, if not followed, could endanger personal safety and/or property of others.

This Explosion warning symbol points out potential explosion hazard(s).

This Fire warning symbol points out potential fire hazard(s).

This Electrical warning symbol points out potential electrical shock hazard(s).

Improper operation of this equipment such as neglecting its maintenance or being careless can cause possible injury or death. Permit only responsible and capable persons to install, operate, and/or maintain this equipment.

Potentially lethal voltages and amperages are present in these machines. Ensure all steps are taken to render the machine safe before attempting to work on the equipment.

ELECTRICAL WARNING

- All hardware covered by this manual have dangerous electrical voltages and can cause fatal electrical shock. Avoid contact with bare wires, terminals, connections, etc., on the hardware, if applicable. Ensure all appropriate covers, guards, grounds, and barriers are in place before operating the equipment. If work must be done around an operating unit, stand on an insulated dry surface to reduce shock hazard.
- Do not handle any kind of electrical device while standing in water, while barefoot, or while hands or feet are wet. DANGEROUS ELECTRICAL SHOCK MAY RESULT.
- If trained personnel must stand on metal or concrete while installing, servicing, adjusting, or repairing this equipment, place insulative mats over a dry wooden platform. Work on the equipment only while standing on such insulative mats.
- The National Electrical Code (NEC), Article 250 requires the frame of the equipment to be connected to an approved earth ground and/or grounding rods. This grounding will help prevent dangerous electrical shock that might be caused by a ground fault condition or by static electricity. Never disconnect the ground wire.
- Wire gauge sizes of electrical wiring, cables, and cord sets must be adequate to handle the maximum electrical current (ampacity) to which they will be subjected.

- Before installing or servicing this (and related) equipment, make sure that all power voltage supplies are completely turned off at their source. Failure to do so will result in hazardous and possibly fatal electrical shock.
- In case of accident caused by electric shock, immediately shut down the source of electrical power. If this is not possible, attempt to free the victim from the live conductor. AVOID DIRECT CONTACT WITH THE VICTIM. Use a nonconducting implement, such as a dry rope or board, to free the victim from the live conductor. If the victim is unconscious, apply first aid and seek immediate medical attention.
- Never wear jewelry when working on this equipment. Jewelry can conduct electricity resulting in electric shock or may get caught in moving components causing injury.

FIRE WARNING

- Keep a fire extinguisher near the hardware at all times. Do NOT use any carbon tetra-chloride type extinguisher. Its fumes are toxic, and the liquid can deteriorate wiring insulation. Keep the extinguisher properly charged and be familiar with its use. If there are any questions pertaining to fire extinguishers, please consult the local fire department.

GENERAL WARNING

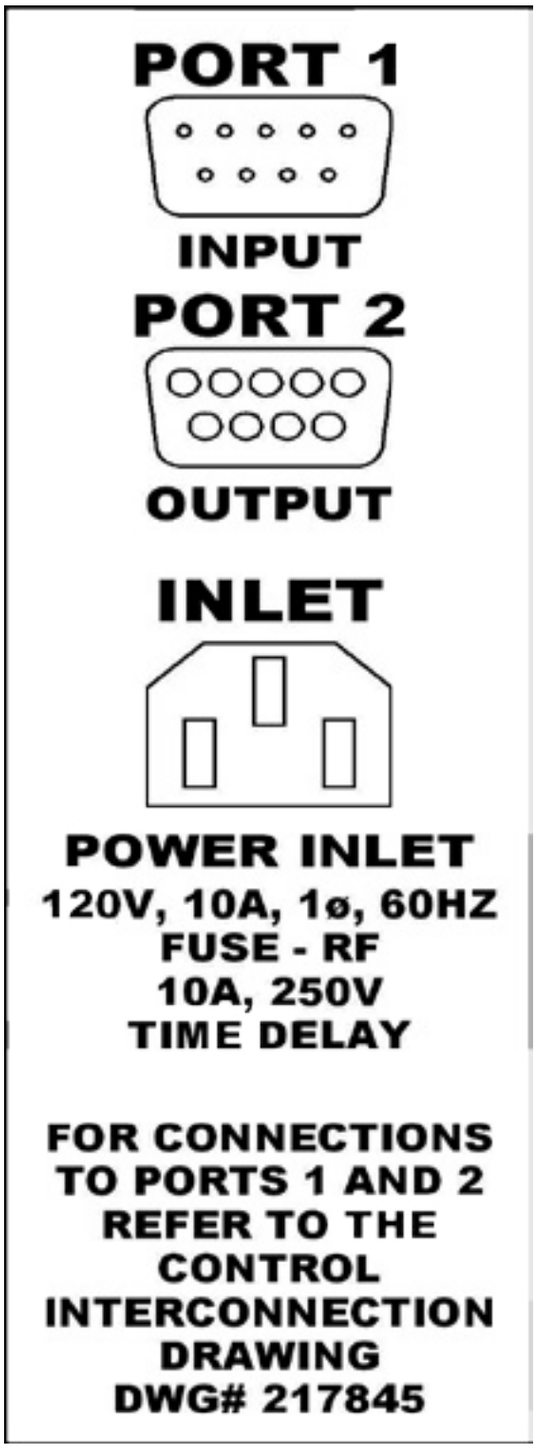
- The illustrations in this manual are examples only and may differ from your load bank.

2.0 NAMEPLATES AND PLACARDS

2.1 Introduction

This section will provide copies of the nameplates and placards for this Load Bank in the event that the current nameplates and placards become unreadable.

2.2 Instruction Placards



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Aø	Bø	Cø	GND

SIMPLEX®
POWERSTAR

SIMPLEX™
NORTHSTAR 125

SIMPLEX™
NORTHSTAR 150

SIMPLEX® Insight Onsite

SIMPLEX® FORCED AIR-COOLED RESISTIVE LOAD BANK

MODEL: POWERSTAR 100
CAPACITY: 100KW AT 1.0 P.F.
COOLING: FORCED AIR
AIRFLOW: 2400 CFM @ 0.0" SP
MAXIMUM AIR INTAKE TEMP.: 120°F
NOMINAL AIR TEMP. RISE: 90°F-500°F MAX.
TEMPERATURE RISE: °F = $\frac{KW \times 3000}{CFM}$
DUTY CYCLE: CONTINUOUS
SHORT CIRCUIT CURRENT RATING: 5kA

LOAD/CONTROL POWER CIRCUIT:
VOLTAGE: 240/480VAC
CONNECTION: 3-PHASE, 3-WIRE
FREQUENCY: 60HZ
FAN POWER: EXTERNAL 120VAC
CONTROL POWER: EXTERNAL 120VAC
FULL LOAD AMPS: 241A@240V, 120A@480V
FAN MOTOR CURRENT: 4)@0.7A, 2)2@0.14A
ENVIRONMENTAL: TYPE 1

SERIAL NO.
ATLPSBXXXXXX.XX

WARNING

High Voltage: Turn off and disconnect power source before opening any compartment
High Temperature: Allow equipment to cool before servicing or opening any compartment
Rotating Equipment: Assure that fan has stopped before opening any compartment
For Operator Safety: Make sure this equipment is properly grounded when in use

All compression type connections on fuse blocks, load blocks, and contactors where used, should be checked for tightness frequently. This check should be established as a part of routine maintenance.

SIMPLEX® FORCED AIR-COOLED RESISTIVE LOAD BANK

MODEL: NORTHSTAR 125
CAPACITY: 125KW AT 1.0 P.F.
COOLING: FORCED AIR
FAN AIRFLOW: 2400 CFM @ 0.0" SP
MAXIMUM AIR INTAKE TEMP.: 120°F
NOMINAL AIR TEMP. RISE: 90°F-500°F MAX.
TEMPERATURE RISE: °F = $\frac{KW \times 3000}{CFM}$
DUTY CYCLE: CONTINUOUS
SHORT CIRCUIT CURRENT RATING: 5kA

LOAD/CONTROL POWER CIRCUIT:
VOLTAGE: 208VAC
CONNECTION: 3-PHASE, 3-WIRE
FREQUENCY: 60HZ
FAN POWER: EXTERNAL 120VAC
CONTROL POWER: EXTERNAL 120VAC
FULL LOAD AMPS: 347V
FAN MOTOR CURRENT: 4)@0.7A, 2)2@0.14A
ENVIRONMENTAL: TYPE 1

SERIAL NO.
XXXXXXXXXX

WARNING

High Voltage: Turn off and disconnect power source before opening any compartment
High Temperature: Allow equipment to cool before servicing or opening any compartment
Rotating Equipment: Assure that fan has stopped before opening any compartment
For Operator Safety: Make sure this equipment is properly grounded when in use

All compression type connections on fuse blocks, load blocks, and contactors where used, should be checked for tightness frequently. This check should be established as a part of routine maintenance.

SIMPLEX® FORCED AIR-COOLED RESISTIVE LOAD BANK

MODEL: NORTHSTAR 150
CAPACITY: 150KW AT 1.0 P.F.
COOLING: FORCED AIR
FAN AIRFLOW: 2400 CFM @ 0.0" SP
MAXIMUM AIR INTAKE TEMP.: 120°F
NOMINAL AIR TEMP. RISE: 90°F-500°F MAX.
TEMPERATURE RISE: °F = $\frac{KW \times 3000}{CFM}$
DUTY CYCLE: CONTINUOUS
SHORT CIRCUIT CURRENT RATING: 5kA

LOAD/CONTROL POWER CIRCUIT:
VOLTAGE: 600VAC
CONNECTION: 3-PHASE, 3-WIRE
FREQUENCY: 60HZ
FAN POWER: EXTERNAL 120VAC
CONTROL POWER: EXTERNAL 120VAC
FULL LOAD AMPS: 144V
FAN MOTOR CURRENT: 4)@0.7A, 2)2@0.14A
ENVIRONMENTAL: TYPE 1

SERIAL NO.
ATLNSB120000.01

WARNING

High Voltage: Turn off and disconnect power source before opening any compartment
High Temperature: Allow equipment to cool before servicing or opening any compartment
Rotating Equipment: Assure that fan has stopped before opening any compartment
For Operator Safety: Make sure this equipment is properly grounded when in use

All compression type connections on fuse blocks, load blocks, and contactors where used, should be checked for tightness frequently. This check should be established as a part of routine maintenance.

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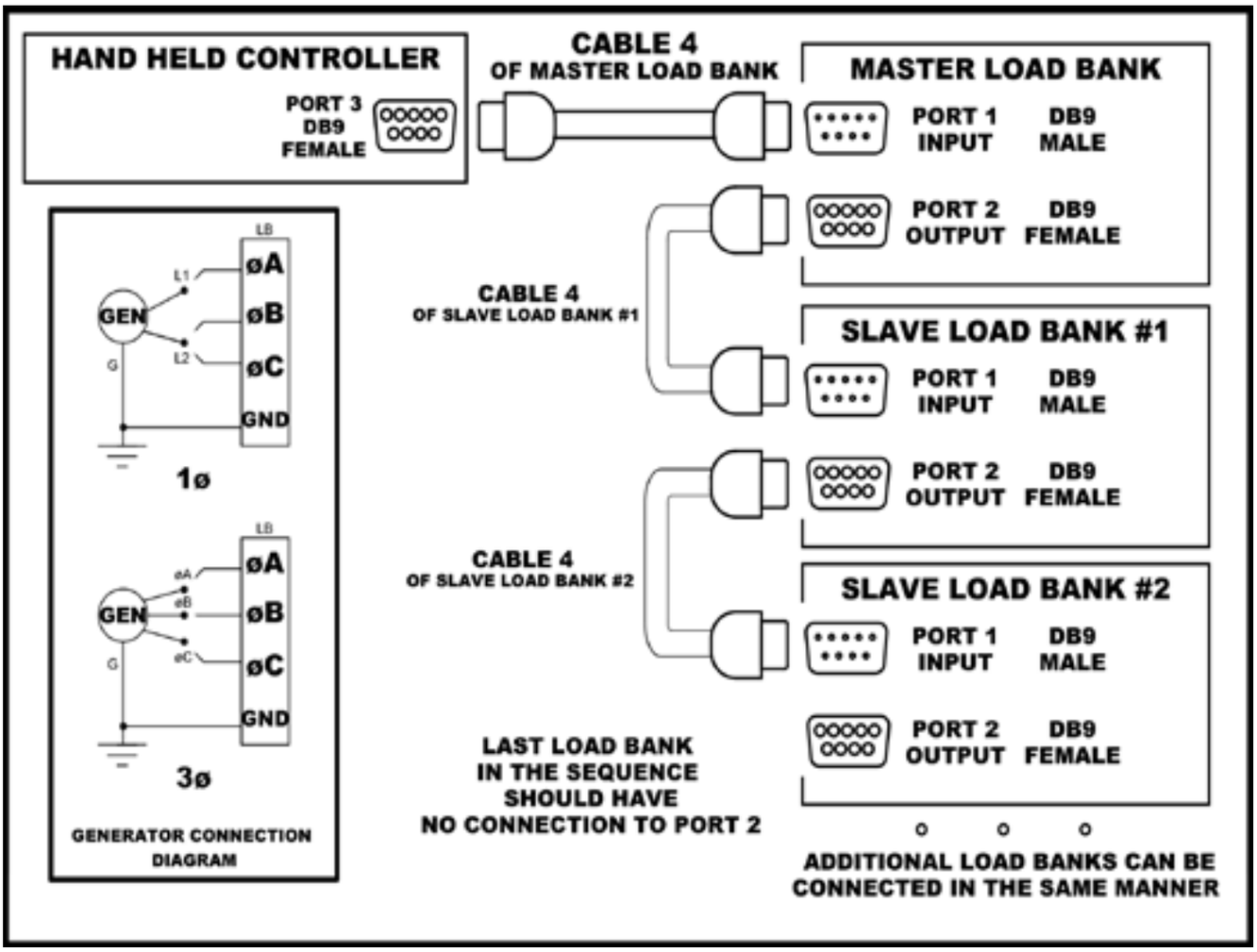
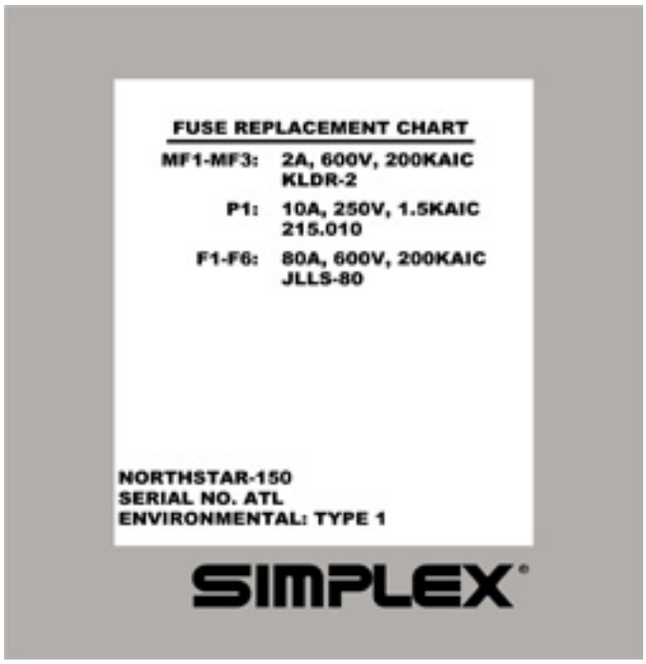
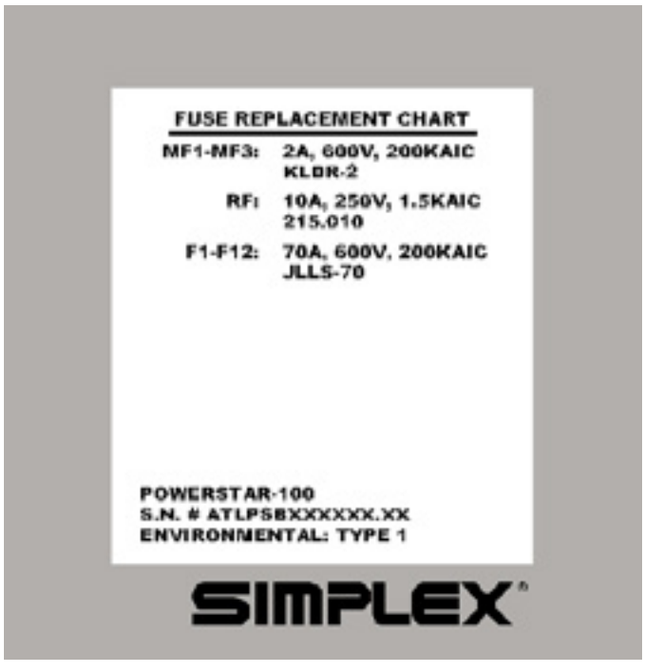
INPUT

OUTPUT







DANGER - HOT AIR EXHAUST
MAINTAIN 20FT CLEARANCE

3.0 DESCRIPTION AND SPECIFICATION

3.1 Introduction

This section will provide a brief synopsis of the use of the load bank. Simplex, Inc. reserves the right to change this synopsis, and this section should only serve as a brief concept of the device.

In this section, you will find:

— An overview of normal usage of the load bank.

— An overview of hardware capabilities.

— An overview of safety functions.

3.2 Overview of Use

The Simplex Portable Load Bank is an ultra-compact, lightweight, and versatile test instrument specially designed for manufacturers, dealers, and users of AC power systems. The load bank also provides routine maintenance exercise in order to assure the long-term reliability and readiness of the standby generator. Exercise load banks eliminate the detrimental effects of unloaded operation of diesel engine generators. It is suitable for testing engine generators, wind generators, UPS systems, ground power units, auxiliary power units, static inverters, or virtually any other AC power source in the production line in the service shop or in the field. The load of the unit can be applied to all common AC voltages. See Table 1 under “3.5 Specifications” on page 12 for a list of specifications for each type of load bank.

This fully self-contained load bank includes test instrumentation, cooling system, rugged load elements, load-application control devices, and automatic system protection devices. The resistive load elements in the load bank are cooled by a horizontal forced air system. The load system is connected to the test source via the load cables.

3.3 Capabilities

The load bank is a digitally controlled load bank with network capability. The unit is controlled via a hand-held touchscreen controller that is connected to the load bank by a supplied RS-232 network cable. It includes a digital power transducer with meter displays on the touchscreen. Power load is applied via a screen keypad. Using the RS-232 cables, any number of load banks can be connected in a series. To create a load bank chain, connect the RS-232 cables from the “out” connector to the “in” connector of the next unit. Continue this process until the desired number of units are connected. All control and metering is provided from a single hand-held controller. All instrumentation values for the total network are summed and displayed on the master controller.

The load bank is highly portable and easily transported to the job site. The load bank includes casters, lifting, and moving handles. Power connections plug in to Cam-Lok connectors. Control and cooling fan power is obtained from a common 115v, 15A outlet via the included connection cord. The load bank is a fully self-contained and portable testing system. It includes integral cooling fans and control circuits, which can operate from a supplied 120V control power cord.

3.4 Safety

In the interest of safety, the load bank is equipped with an automatic system to de-energize all the load if conditions are met that may be dangerous to the operator or could damage the hardware. If the load elements aren't cooled properly due to a fan failure or high exhaust temperature, the load bank will de-energize any applied load.

After operation, the load bank has an auto cool down feature to prevent burns and injury during transportation after use.

3.5 Specifications

The table below shows the operation KW at the various voltages across the Powerstar and the different model of Northstar Load Banks.

Model	KW	Rating	600VAC, 3Ph	480VAC, 3Ph	240VAC, 3Ph	240VAC, 1Ph	230VAC, 1Ph	208VAC, 2Ph	208VAC, 1Ph
PowerStar 110	110	480VAC, 3Ph		110KW/132A	110KW/264A	70.4KW/293A	64.7KW/281A	82.5KW/229A	52.9KW/254A
NorthStar 125	125	208VAC, 3Ph						125KW/345A	80KW/385A
NorthStar 150	150	600VAC, 3Ph	150KW/145A	96KW/115A	24KW/58A				

Table 1 Specifications of Load Banks

4.0 UNPACKING

4.1 Introduction

This section will detail the procedure to unpack the load bank. This guide will include preparation for setting up the equipment for proper use.

In this section, you will find:

— A list of included components and parts.

— An inspection list.

4.2 Included Components and Parts

— Powerstar or Northstar Portable Load Bank

— HMI

— Power cord

— Serial cable

— Manual

4.3 Primary Inspection

Preventative visual inspections of the shipping crate and the load bank are advised. Physical or electrical problems due to handling and vibration may occur. Never apply power to a load bank before performing this procedure. The following five-point inspection is recommended before installation and as part of the 50-hour / 6-month maintenance schedule or as a load bank is relocated:

1. If the crate shows any signs of damage, examine the load bank in the corresponding areas for signs of initial problems.
2. Check the entire outside of the cabinet for any visual damage, which could cause internal electrical or mechanical problems due to reduced clearance.
3. Inspect all relays and control modules. Make sure all components are secure in their bases and safety bails are in place. Spot check electrical connections for tightness. If any loose connections are found, inspect and tighten all remaining connections.
4. Examine all accessible internal electrical components such as fuses, contactors, and relays. Check lugged wires at these components.
5. Visually inspect element chamber for foreign objects, broken ceramic insulators, and mechanical damage.

If any problems are observed during Primary Inspection, call the Simplex Service Manager at 1-800-637-8603.

5.0 INSTALLATION

5.1 Introduction

With a portable load bank, placement is not a permanent thing; however, because of its mobile nature, extra attention is required whenever the load bank is moved. Whenever the load bank is moved, even within the same room, the following warnings must be observed.

In this section, you will find:

— How to choose the load bank's location.

5.2 Load Bank Location

The load elements in the load bank are cooled by a horizontal forced air system, which discharges through the front of the cabinet. The location of the load bank is of prime importance and is one of the most critical factors involved in safe operation. The load bank must be positioned and installed to allow for a 4-foot intake clearance as well as a 20-foot exhaust clearance. Never point the exhaust at nearby surfaces or objects, which may be adversely affected by high temperatures. Never operate the load bank in a confined space without regard for adequate intake of air and provision for exit of high temperature exhaust. Consider that the load bank and a nearby generator set may have to compete for cooling air. Never bounce hot exhaust air off nearby objects and allow it to re-circulate through the cooling system. Never operate the load bank in proximity to a sprinkler system.

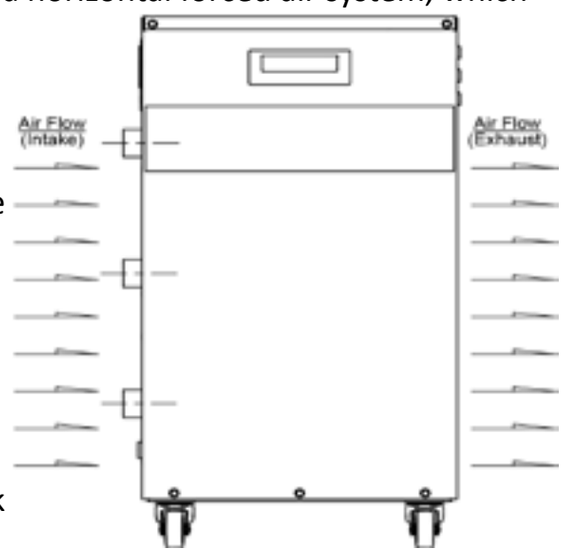


Figure 1 Airflow Diagram

See Figure 1 load bank placement image for more specific details when choosing a place for your load bank.

WARNING

Reverse air-flow will damage load bank. Please observe the above image for how air travels into and out of the load bank.

Note: Load bank warranty is void if incorrectly cooled.

High Voltage: Because this unit uses dangerous voltage, turn off the equipment and disconnect power source before opening the load bank.

High Temperature: Due to the amount of heat generated during operation, allow the equipment to cool before servicing or opening the load bank.

Rotating Equipment: Before opening the load bank, ensure that the power is removed, and the fan has stopped completely.

For Operator Safety: Make sure this equipment is properly grounded when in use.

All compression type connections on fuse blocks, load blocks, and contactors should be checked for tightness frequently. This check should be established as part of routine maintenance.

⚠ CAUTION ⚠

This load bank is high-powered, technical, industrial equipment operating at dangerous voltages, and temperatures. It is capable of damage to itself or property or personnel, if improperly used. It is not a consumer product. It must be installed, connected, and operated by personnel properly trained and experienced in its use. An operator's manual is supplied with each load bank. It is imperative that the operator be familiar with its contents and has access to it during operation.

The following cautions should be observed before and during operation:

1. Check all aspects of the load bank (intake/exhaust screen, louvers, fans, and load elements) for foreign objects.
2. Position and install load bank with great consideration given to large cubic airflow requirements, exhaust temperature and velocity. The exhaust temperature of a large load bank rapidly diminishes downstream but can easily exceed 300°F within 20 feet of exhaust outlet. Therefore, do not point exhaust at any nearby surface or object, which may be adversely affected by high temperature. This includes but is not limited to painted surfaces, tar paper and asphalt roofs, water sprinkler heads, fire alarms, and volatile material.

   Do not use in confined spaces with less than a 4-foot clearance for intake air and less than a 20-foot clearance for exit of high temperature exhaust. Do not permit vertical airflow unit with wheels to sink into soft surfaces thereby cutting off bottom air intake. Be concerned with possibility that the load bank may have to compete with cooling air requirements of a nearby running engine generator set where cooling air intake to a confined space may not be adequate for both engine and load bank. Be especially careful not to bounce hot exhaust air off nearby obstructions for re-circulation through the load bank.
3. Verify that all control switch positions are correct for intended usage before making connection.
4. The load cables carry high amperage. Be constantly aware of possibility of inductively heating adjacent ferrous objects to temperatures sufficient to damage cable insulation.
5. If load bank does not have a fan reversal switch, give extra attention to proper phasing of power cable and external control power connection to assure proper fan rotation.
6. Always connect safety ground cable to a proper ground. Do not rely on a possible grounded neutral somewhere else in the system.
7. Do not let equipment operate unattended for long periods of time.
8. Do not store or operate in rain or spray unless unit is designed for this service or adequate protection is provided.
9. Routinely inspect all components and electrical connections for tightness and integrity.
10. Repair any damaged or degraded components and wiring without delay.

If technical assistance, service, or parts are needed, please call 800-837-8603 (24 Hours).

6.0 OPERATING INSTRUCTIONS

6.1 Introduction

The load bank was designed with simplicity in mind. The hardware is simple to use and easy to maintain.

Using a hand-held interface, the load bank can apply a desired load to a target device.

In this section, you will find:

— An overview of the load bank's HMI.

— How to properly handle the load bank.

— How to start the load bank, apply a load, and shut down the load bank.

6.2 Overview of Load Bank HMI Software

In order to apply a load using the load bank, you must use the hand-held HMI touchscreen. The HMI is loaded with a number of important features to complete your desired tasks. It is advised to fully understand the screens of the HMI software fully before starting using the equipment. See Figure 2 Screen Explanation and the related Table 2 for a breakdown of the main screen.

Figure 2 Screen Explanation

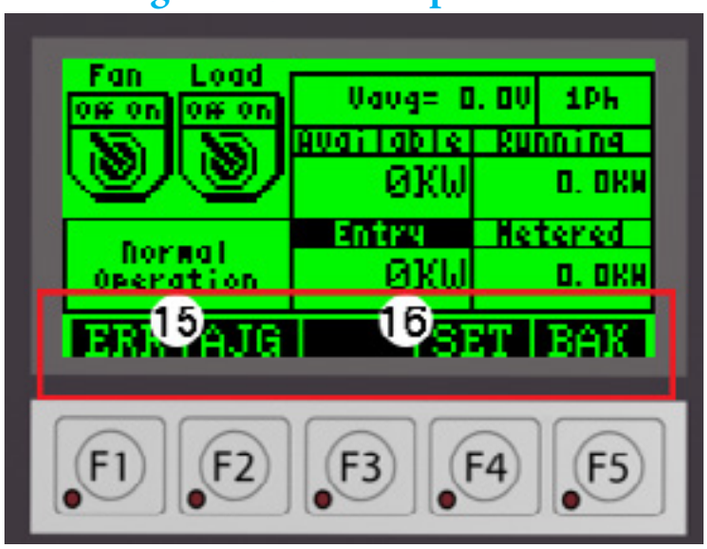


Figure 3 Screen Explanation 2

Reference Number	Explanation
1	The “Fan” switch will turn the fan and unit on.
2	The “Load” switch will apply the set load to the testing source.
3	The “Vavg” is the average voltage of the load.
4	This section will designate the phase in which the load bank is running. It can be in 1Ph (single phase) or 3Ph (3-phase).
5	The “Available” section is how much KW is available for use.
6	The “Running” is the amount of KW load bank has attempted to apply.
7	The “Normal Operation” section will remain normal unless an error appears. Touching here, “ERR” (Reference Number 10), or F1 will access the errors and allow you to address the issues.
8	The “Entry” value is the value entered that you desire for the load. When touched, a number pad will appear for entering values.
9	The “Metered” section is the amount of KW the load bank has applied as read from the on-board digital meter.
10	The “ERR” selection will load the error tab for the HMI. If any errors are active, then this tab will show what is causing the errors.
11 & 12	The JG+ and JG- values are abbreviations for “Jog Up” and “Jog Down,” respectively. These will increase or decrease the KW entry by a value set in the setup (See Reference 14).
13	The “MTR” (Meter) button will display the metering screen.
14	The “SHF” (Shift) button will reveal newer functions of “AJG” and “SET” on the bottom of the screen where the function buttons are.
15	The “AJG” (Auto-Jog) button will allow you to set the Auto-Jog functions. By using a minimum and maximum value as well as setting the steps and duration to go from the minimum to the maximum, the auto-jog will run in a loop until stopped.
16	The “SET” button will load the setup menu. Please see “6.6.1 Setup Information” on page 20 for more information on the setup menu.

Table 2 Screen Definitions

6.3 Handling

6.3.1 General Handling Information

When moving the Load Bank, please keep the device upright and do not transport on its side. Use the attached rollers for short distances. If the unit needs to be lifted, only lift the unit using the handles on the sides or lifting the from the bottom of the unit. Avoid lifting from the Cam-Lok connections as it will apply extra pressure to the BUS connectors. Do not insert any lifting tools in the fan grating. Avoid impact while transporting as well as avoid dropping the unit in general. While the metal casing is quite strong, avoid dropping anything heavy on the unit.

6.3.2 After-Operation Handling Information

Because of the nature of the Load Bank's operation, the unit will be extremely hot. To prevent burn injury, allow the fans to run for a few minutes without an applied load at the end of operation. When the unit has cooled, turn the fans off and move it as necessary.

6.4 Basic Operations

6.4.1 Powering the Load Bank

2. Before starting the Load Bank, ensure that the load bank is connected to an independent ground line.
3. Connect the Control Power Cable to the control power outlet, connect the HMI(Port 3) to the "In" port (Port 1), and connect the cables from the load source to the Cam-Lok connectors.
4. Plug in the Control Power Cable into a 120V, 15A maximum external receptacle.
5. Visually observe for any possible fan obstruction.
6. The HMI hand-held controller will energize. On the HMI hand-held controller, press the "On" switch for the "Fan." (See Figure 4). The fans will start.

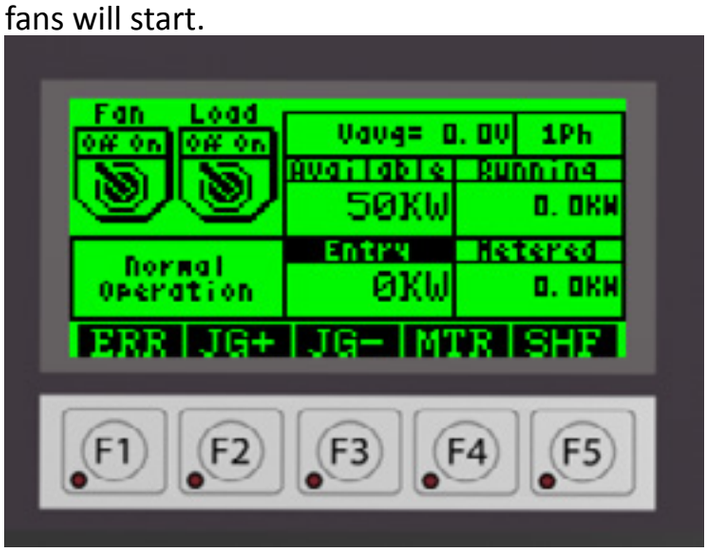


Figure 4 Home Screen; No Power

6.4.2 Operation Maintenance

1. Visually observe correct fan operation and investigate any unusual fan-related noises.
2. Check air intake for obstructions and confirm positive air flow.
3. Verify the “Normal” indicator is shown before proceeding.

6.4.3 Applying a Load

1. The HMI will display “XXXKW Available” in the “Available” section. This number represents the amount of load available. For a single unit at 240V or 480V, this value will be 100KW. The amount of KW available will decrease as lower voltages.
2. With the “Fan” switch set to “On.” Turn the Load switch “On.” This action will enable the load (See Figure 5).

NOTE: If the load is selected before the Master is on, the load will activate at once. If there is no selected load when the Master is turned on, the load will be added when it is selected.

3. To set the load amount, select the “Entry” section. A number pad to enter your load value will display (See Figure 6 Entry Pad). You cannot enter a value larger than the “Available” KW.
4. After entering the amount of load to be applied, press Enter to apply the load (See Figure 7). Pressing F4 or “MTR” on the HMI controller will bring up the metering screen (See Figure 8 for a 3-phase example).

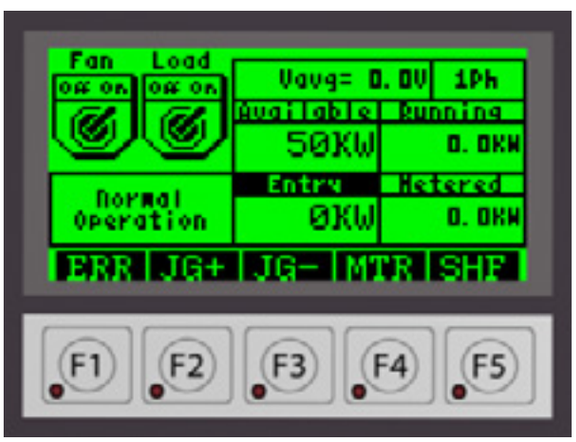


Figure 5 Power On

Figure 6 Entry Pad

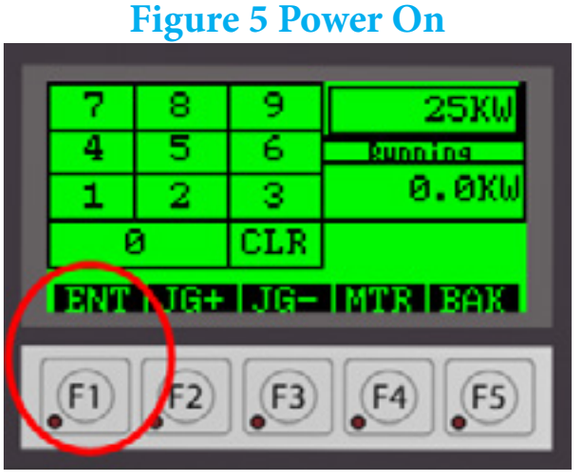


Figure 7 Press Enter for Entry

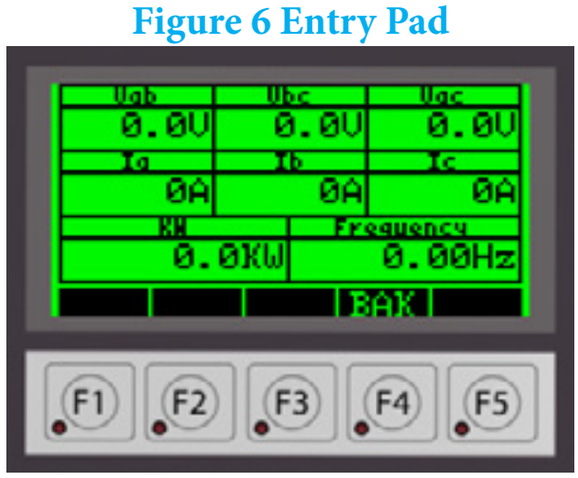


Figure 8 Metering Screen

6.5 Shutdown

1. To shut down the Load Bank, de-energize the load by switching the “Load” switch to “Off.”
2. Select the “Fan” switch to “Off.” The unit will begin a cooldown phase for a set duration. If desired, the cooldown timer can be set to zero.
3. Disconnect all the connections to the load bank and store the load bank as desired.

6.6 Additional Screens and Programming Information

6.6.1 Setup Information

There are a few features that need to be setup behind the scenes for the load bank. These settings are located in the Setup menu. From this menu, you will be able to set the “Jog” steps , the “Cooldown” timer, and include manual load steps. From this Setup screen, you can also view the KWHR, which serves as an odometer.

For an explanation of the parts of the Setup menu, please see Figure 9 and Table 3 Setup Screen Definitions below.

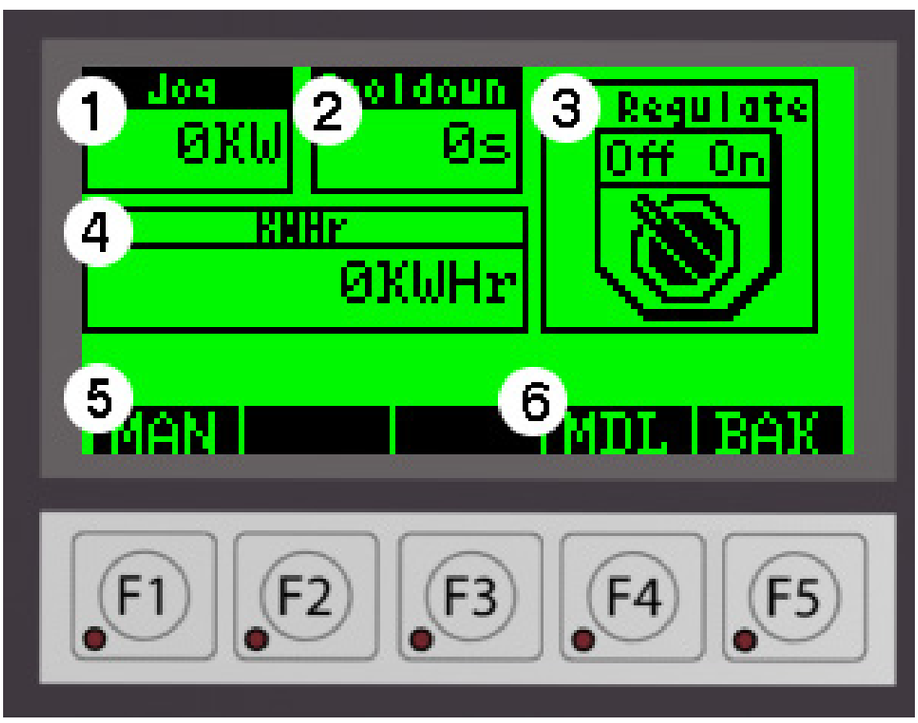


Figure 9 Setup Explanations

Ref. Num.	Description
1	The “Jog” section of the setup screen is where you set the amount that the JG+/JG- will change the value. For example, if the “Jog” is set to 5KW, then pressing JG+ on the number entry screen will increase the entry value by 5. This feature allows for quick value changes. Touching this area will load an entry screen.
2	The Cooldown selection is the amount of time the system will keep the fans running after the “Fan” switch turns to “Off” in order to allow the elements to cool after use. Touching this area will load an entry screen.
3	When “KW Regulate” is enabled, the load bank will regularly sample voltage, recalculate the rated load step KW values, then add or remove load steps to maintain the desired KW. When “KW Regulate” is disabled, the load bank will only sample voltage when load is applied or changed.
4	The KWHR setting serves a running total of service hours.
5	Selecting “MAN” will load the manual selection screen. This menu allows for selection of individual steps for testing purposes.
6	Selecting “MDL” will load the model screen. This screen is for Simplex usage only.

Table 3 Setup Screen Definitions

After setting these various options, the HMI controller is ready for your customize use.

6.6.2 Error Reporting Menu

The Error menu (as seen in Figure 10) will show what’s wrong with the load bank. If there is a loss of amperage from the cooling fans, then the Cooling Fan Failure indicator will illuminate. If the Exhaust Temperature is greater than 235° F (~112° C), the “High Exhaust Temp” indicator will illuminate. If the metering communication is disrupted, then “Metering System Fault” will be indicated for your attention. The “Load OK” option will be displayed if the load is within a set range. If it is over or under that desired range, an “Over KW Fault” or “Under KW Warning” will be displayed. To remove the respective indicator, you must address the problem. To remove the respective indicator, please see “Table 5 Trouble Shooting Table” on page 26 for some resolutions

Figure 10 Error Menu

6.6.3 Auto Jog Settings

The load bank includes an Auto Jog feature to cycle through various load steps for a set period of time. The way Auto Jog works is by starting at the Minimum KW for a set interval. When that interval lapses, the KW is increased to the next step repeating this process until the Maximum KW is reached. After KW is decreased, the process repeats until stopped (Figure 13).

To access the Auto Jog function, you must press “SHF” (F5) and then select “AJG” (F2) from this alternate menu (See Figure 11). See Figure 12 for an example of how to set up an auto jog operation.

Figure 11 Auto Jog Selection

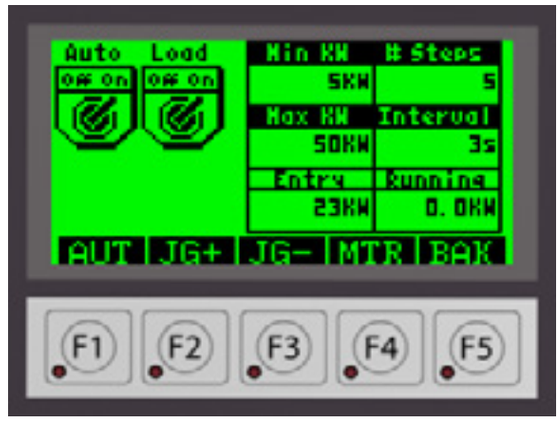


Figure 12 Setting Auto Jog

To set up an Auto Jog operation:

1. Select the “Min. KW” area. A number pad will open. Enter a value below the available from the main screen. Press ENT to accept the entry.
2. Select the “Max. KW” area. A number pad will open. Enter a value below or equal to the available from the main screen. Press ENT to accept the entry.
3. Select the “# Steps” area. A number pad will open. Enter the desired number of steps for the load bank to go from the minimum to the maximum. Press ENT to accept the entry.
4. Select the “Interval” area. A number pad will open. Enter the desired amount of seconds for the load bank to hold on each interval step.
5. The “Entry” value will be what the current step’s value will be.
6. The “Running” value will be the current metered value.

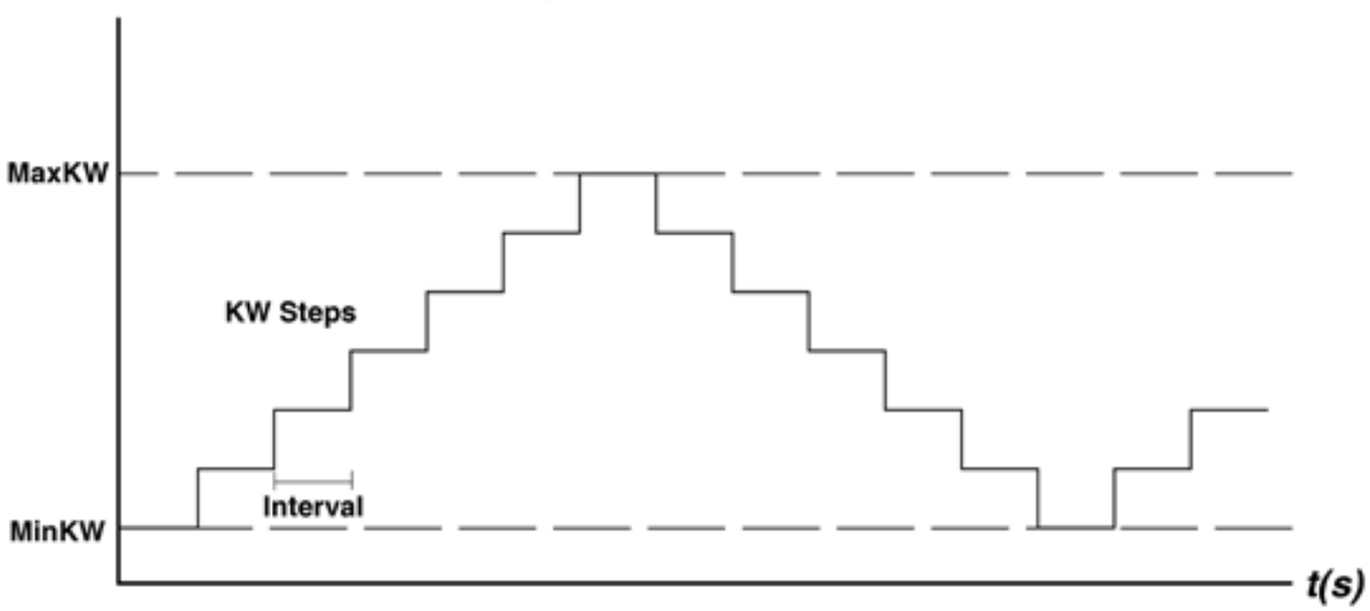


Figure 13 Auto Jog Chart

7.0 ALARMS AND WARNINGS

7.1 Introduction

With Simplex Portable Load Banks, there are few things that will cause a serious issue. One of the primary alarms that will occur is an over-temperature alarm.

In this section, you will learn:

— What triggers an alarm.

— How to reset the unit.

7.2 Over-temperature Alarm

When the exhaust temperature exceeds 235° F (~112° C). The load bank will open all contactors, this removes the load and allows the load bank to cool to an operable temperature. Once cooled, fully cycle the unit's power and try to complete testing. When powering the unit off, leave it off for a couple of seconds before powering the unit. If the problem persists, please call 1-800-637-8603.

8.0 SUPPLEMENTAL EQUIPMENT

8.1 Introduction

In this section, you will learn:

— About Cam-Lok cables

8.2 Cam-Lok Cables

In order apply load to the load bank from a power source, you will need to connect via Cam-Lok cables. The required type is 15 series, single-pole detachable plug. The communications cable and 120V power cable are included.

Description	Simplex Numbers	Vendor Reference
Black Female Plug	25608823	16D29-E
Red Female Plug	25608822	16D29-R
Blue Female Plug	25608820	16D29-B
Small Green Female Plug	25608811	15D22-G

Table 4 Female Cam-Lok Plugs for Input

Figure 14 Load Bank Female Cam-Lok Plugs for Input

9.0 DIAGNOSTICS AND TROUBLESHOOTING

9.1 Introduction

Through good practice, cumulative issues can be prevented through basic maintenance. In the unlikely event that something goes wrong with the load bank, we will cover how to solve some of the more common problems. Finally, if the need arises, we will cover how to replace various parts for the load bank.

In this section, you will learn:

— How to perform preventative maintenance on the placeholder hardware.

— Some common issues that you may run into and how to troubleshoot these items independently.

— The part names and numbers, and each of the primary functions is in the load bank.

9.2 General Maintenance

The load bank has been designed to require minimum maintenance. All components have been chosen for a long, reliable life. Two basic intervals of maintenance are required: each operation and either every 50 hours or 6 months (whichever comes first).

WARNING

Always remove all power from the load bus and all fan/control power before servicing the Load Bank. Never operate or service a Load Bank that is not properly connected to an earth-ground.

9.2.1 Each Operation

The air intake screens and louvers, fan and cooling chamber, and exhaust openings must be checked for any obstructions or foreign objects. Due to the high volume of air circulated, paper and other items can be drawn into the air intake. During load bank operation, ensure that air is exiting from the exhaust vent. The load branches should be checked for blown fuses or opened load resistors. To check the fuses or load resistors, operate the load bank from a balanced 3-phase source and check the three-line currents. The three-current readings should be essentially the same. If a sizable difference is noted, one or more load fuses or load resistors may have malfunctioned.

9.2.2 Every 50 Hours or 6 Months

Check the tightness of the electrical connections. The expansion and contraction caused by load bank operation may result in loose connections. The vibrations caused by the cooling fan may also loosen electrical connections. If the load bank is transported long distances, the electrical connections should be checked for tightness at a shorter-than-normal time interval. For a detailed inspection guide, see “4.3 Primary Inspection” on page 13.

9.3 Failure Subsystem

Excessive intake/exhaust temperatures, any reduction in cooling air flow, or a Loss of Communication from either the hand-held controller or the controlling load bank is indicated by the illumination of the "Error" indicator on the hand-held remote control. Any of the above conditions will result in the load bank entering a failure state. The "Failure" indicator on the hand-held controller will illuminate and the load de-energizes. All load steps are locked out until the problem is corrected. Until the failure is investigated/corrected and the control system is reset the load cannot be reapplied.

WARNING

If a failure occurs during Load Bank operation, the Load Bank will de-energize all load steps The operator must reset the Load Bank by turning it "Off" then "On." The load failure must be investigated and corrected before load application can resume.

Problem	Cause		Resolution
High Exhaust	The unit has overheated due to:	[1]The fan has stopped running.	The unit needs to be serviced. Please contact a technician for your problem.
		[2]The unit lacks sufficient exhaust space.	Move the unit to an area that allows for proper air circulation.
Metering Sys Fault	Communications failure between PLC and meter.		Turn the unit off, disconnect all power cables, and wait a couple of seconds. Reapply power and turn the unit on. If the problem persists, contact a technician for your problem.
Over KW/Under KW	Metered load does not match expected load.		The connection may be loose or the wire may have become disconnected. Please contact a technician for your problem.
Slave # Failure	When multiple units are chained together, the primary unit will display "Slave [Unit Number] Failure." You must inspect that unit to resolve the failure.		

Table 5 Trouble Shooting Table

9.4 Parts Breakdown

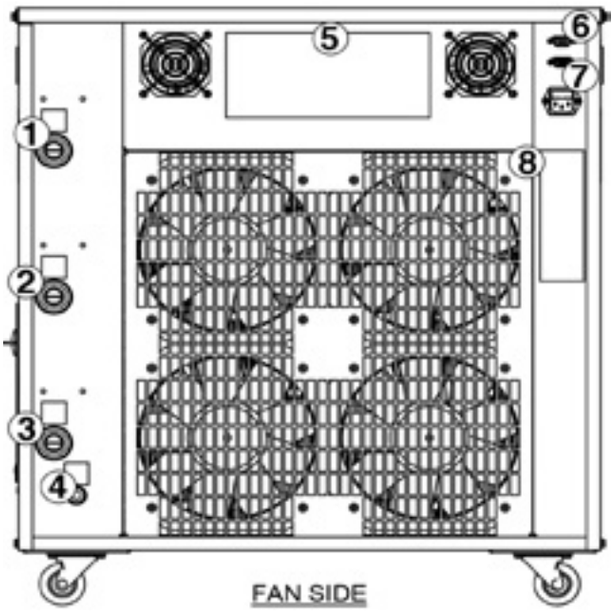


Figure 15 Fan View

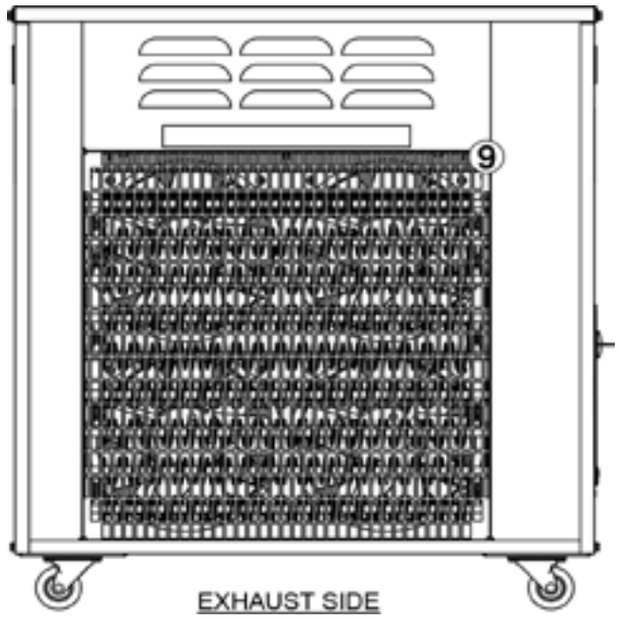


Figure 16 Exhaust View

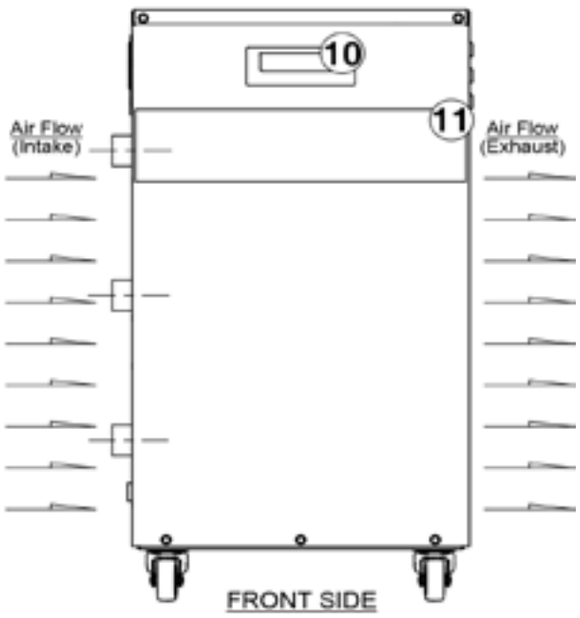


Figure 17 Side View

Reference	Description
1	Load Connection AØ
2	Load Connection BØ
3	Load Connection CØ
4	Ground Connection
5	Product Info
6	Communication Ports
7	Control Power 120VAC
8	Intake
9	Exhaust
10	Lift Handle
11	Product Label

Table 6 Parts of a Load Bank

Did You Know?

Simplex was founded in 1938 in Burlington, Iowa by Michael Debrey, a Hungarian immigrant. A self-taught inventor, Debrey introduced multiple innovations to the electrical engineering field, including the Automatic Voltage Regulator. Simplex was moved to East Moline, Illinois, where it remained until 1951, when the company relocated to Springfield.

10.0 ORDERING INFORMATION

This section will serve as a guide to assist in ordering the Powerstar and Northstar Portable Load Bank. The options below are for the standard models. For any custom orders or for any clarification or questions on the items, please contact your Simplex Inc. representative. When ordering, please attach your purchase order to this form and fax it to Simplex, Inc. at 1-800-637-8603.

10.1 Powerstar or NorthStar

(Circle Selection)

	Powerstar	OR	Northstar
KW Capacity	110KW	125KW	150KW
Voltage	240VAC/480VAC, 3-phase	208VAC, 3-phase	600VAC, 3-phase
Duty Cycle	Continuous		
Weight	125 lbs		
Dimensions	15”W x 28.5”H x 26”D		

10.2 Covering

Vinyl Covering (Select One): YES OR NO

Customer Name: _____

P.O. #: _____

Fax to 217-483-1616

Did You Know?

Load banks simulate the “real world” loads that the power source will experience. Electrical load can be broadly classified as resistive, magnetic, and capacitive. In the real world, these components are mixed, as they are with a load bank, except with the load bank, full control of the components is possible.

Resistive loads comprise incandescent lighting, electric heating and other loads in which electrical energy is largely converted to heat. Magnetic loads comprise motors, transformers, and other devices which convert electrical energy to mechanical force. Capacitive loads comprise electronic loads. Although both AC and DC systems power similar loads, most of this discussion will involve AC systems.

APPENDIX A — ABBREVIATIONS IN THIS MANUAL

Listed below are abbreviations of terms found for the Portable Load Bank. When following a drawing, utilize this guide to define abbreviated system and component names. As this is a master list, drawings and text pertaining to your equipment may not contain all these terms.

A - Amps
AC - Alternating Current
GND - Ground
HZ - Hertz
HMI - Human-Machine Interface
kW - Kilowatt
Ø - Phase
V - Volts

APPENDIX B — IMPORTANT FORMULA

OHMS LAW:

OHMS = VOLTS / AMPS (R = E / I)

AMPS = VOLTS / OHMS (I = E / R)

VOLTS = AMPS / OHMS (E = IR)

3 Phase

Resistance = (V^2 X 2) / W

Amperage = W / (V X 1.732)

208V	KW	1	5	10	20	25	40	50	100	200	250	400	500
	RES	86.5	17.3	8.6	4.3	3.46	2.16	1.73	0.865	0.432	0.346	0.276	0.173
	AMP	2.77	13.9	27.8	55.5	69.4	111	139	278	555	694	1110	1388

240V	KW	1	5	10	20	25	40	50	100	200	250	400	500
	RES	115	23.0	11.5	5.76	4.61	2.88	2.30	1.15	0.576	0.461	0.288	0.230
	AMP	2.41	12.0	24.0	48.0	60.0	96.2	120	240	480	600	962	1200

380V	KW	1	5	10	20	25	40	50	100	200	250	400	500
	RES	289	57.7	28.8	14.4	11.5	7.22	5.77	2.88	1.44	1.15	0.722	0.577
	AMP	1.51	7.59	15.2	30.4	37.9	60.7	75.9	152	304	380	608	760

480V	KW	1	5	10	20	25	40	50	100	200	250	400	500
	RES	460.8	92.2	46.1	23.0	18.4	11.5	9.22	4.61	2.30	1.84	1.15	0.922
	AMP	1.20	6.01	12.0	24.0	30.0	48.1	60.0	120	240	300	481	600

1 Phase

Resistance = V^2 / W

Amperage = W/ V

120V	KW	1	5	10	20	25	50	100	200	250	500
	RES	57.6	28.8	14.4	7.20	4.80	3.60	2.88	1.44	0.720	0.360
	AMP	2.08	4.16	8.33	16.7	25.0	33.3	41.7	83.3	167	333

208V	KW	1	5	10	20	25	50	100	200	250	500
	RES	43.3	8.65	4.33	2.16	1.73	0.865	0.432	0.216	0.173	0.086
	AMP	4.80	24.0	48.1	96.1	120	240	481	962	1202	2404

240V	KW	1	5	10	20	25	50	100	200	250	500
	RES	57.6	11.5	5.8	2.88	2.30	1.15	0.576	0.288	0.230	0.115
	AMP	4.16	20.8	41.6	83.3	104	208	417	833	1042	2083

KVA: 1 phase VOLTS X AMPS

3 phase 1.732 X VOLTS X AMPS

Derating KW:

KW(^{V2} / $_{V1}$)^2 = derated KW;

EX. 50KW (^{200}/$_{240}$)^2 = 34.722KW

Derating KW and Hz:

KW (^{V2}/$_{V1}$)^2 X (^{F1}/$_{F2}$) = Derated KW at different Hz

3 Phase Henrys: V^2/(Kvar X 3.14 X freq)

1 Phase Henrys: V^2/(2 X 3.14 X freq X vars)

1 Phase Farads: Kvar / (2 X 3.14 X freq X V^2)

MA Output

Amps: amps / (833 X 16 + 4) volt: (V2 / V1) X 16 + 4

Heater Current (Wye)

$I_H = W_H * (V_{L-H}/(X_H*V_H^2))$

I_H = Heater Current

W_H = Wattage of 1 Heater

X_H = # of Heaters from Line to Neutral

V_H = Rated Voltage of 1 Heater

Fuses for Transformer

Total Amperage = V*A / Source Voltage

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Duluth, GA 30096-4691

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Springfield, IL 62711-6228

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