

Description

High capacity load testing of generators, UPS, and other AC power sources; periodic reliability exercise of standby generators; automatic load leveling and minimum load regulation; regenerative/reverse power protection and other load bank applications is possible with the Simplex Saturn Version 2.0 Load Bank Series.

The Simplex Saturn Version 2.0 is a highly standardized, advanced design, digitally controlled Load Bank Series spanning the 1400-3200kw range at common 60 Hertz and 50 Hertz low voltages. Saturn V2.0 is a standard inventory item with versatile control and application possibilities.

Saturn V2.0 is intended for outdoor or indoor installation. As with all Simplex Planet Series Load Banks, the Saturn is UL/CUL Listed.

Saturn V2.0 is digitally controlled via an on-board PLC, which accepts standard programs for manual, automatic and multi-station control, as well as data monitoring and data acquisition. V2.0 is designed for local or remote control, including multi-station control, using a standard digital, color touchscreen HMI. Remote control connection is simplified through use of RS-485 over shielded/twisted pair network cable (1000m). Local/remote HMI is housed in a weather/tamper resistant, lockable enclosure.

Basic V2.0 is setup for manual control via direct numeric keypad entry.

A comprehensive automation option is available which allows automatic load regulation via KW sensing such that the load bank automatically maintains a constant load on the generator. Load level, bandwidth, and timing are user programmable from the touchscreen. This function can be used for minimum loading to prevent wet-stacking and other low load issues, engine optimum loading for emissions control and for regenerative power protection. This function can also be used to stabilize voltage and frequency transients. With the automation option, full display of load bank electrical values (V-A-Hz-KW) is also provided on the touchscreen, with MODBUS registers provided for remote indication and data acquisition.



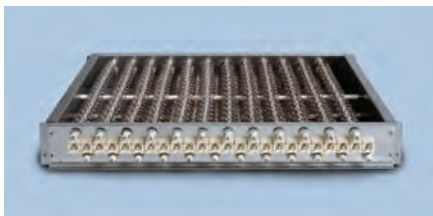
Options are available for Load Bank integration with Building Automation Systems via Modbus RTU RS-485 or Modbus TCP.

Features

- Utilizes the proven Simplex "Powr-Web" load element (see page 2)
- Branch circuit fuse protection of load elements
- Digital control (see page 4)
- Comprehensive malfunction detection system
- UL/CUL Listed
- Modular enclosure design with separate and isolated control and power sections

- Type 3R, oversize control section with generous cable connection space
- Vertical airflow, exhausts hot air above level of personnel and away from buildings, pavement etc.
- Slide-out, tray mounted load elements
- Comprehensive overload, short circuit and malfunction protection
- Highly standardized for quick turn-around inventory item
- Supported by nationwide service centers





Powr-Web Resistive Load Element

Description

Simplex Load Banks utilize “Powr-Web” load elements. The “Powr-Web” is an advanced design, air-cooled power resistor specifically designed for application to Load Bank systems. The “Powr-Web” is conservatively operated at half the maximum temperature rating of the alloy and features a short-circuit-safe design based on continuous mechanical support of the element by high temperature, ceramic clad stainless steel rods. The “Power Webs” are assembled into discrete trays which are assembled in a vertical “stack.” Each tray in the “stack” is independently serviceable without disturbing adjacent trays.

Specifications

- Alloy: FeCrAl
- Maximum continuous temperature rating: 1920°F
- Maximum operating temperature as applied in Load Bank: 1080° F
- Cool down time from operating to ambient temperature: 10 seconds

Construction

- Ceramic clad, stainless steel through-rods
- UL Recognized

Version 2.0 Specifications

Capacity:	1400-3000KW, Resistive, 1.0 power factor
Voltage:	All common 3-phase 60, 50 Hz voltages: 60 Hertz: 208V, 220V, 240V, 416V, 440V, 450V, 460V, 480V, 575V, 600V 50 Hertz: 190V, 200V, 208V, 380V, 400V, 416V
Frequency:	50, 60 Hz
Load Steps:	25 KW resolution standard. (25-25-50-100-100-250... KW)
Duty Cycle:	Continuous
Temperature:	120°F maximum ambient temperature. Exhaust rise: 150°F–200°F. Hot spots 575°F.
Airflow:	60,000 CFM, 30 HP
Fan/Control:	External or internal from load bus. Control circuits at 120V via transformer. The cooling fan operates at 3-phase line voltage. Load control circuits and fan motor control operate at 120V. Control circuits are fused. Control circuit fuses are 100,000 A.I.C., 600V rated. External, 120V, supply for humidity controller, when ordered.

Options

Option No.	Description
A	Automation option. Allows AUTOMATIC LOAD REGULATION, REGENERATIVE POWER PROTECTION, via KW sensing. Requires installation of remote current transformer (supplied). User programmable: set point, step up/step down bandwidth, initiate delay, step-up delay, step-down delay, shutdown delay. Includes voltage and frequency sensing with adjustable set point and delay. Includes display of volts-amps-hertz-kw and MODBUS registers for same.
010	Anti-condensation heaters with thermostatic control
020	BMS control. Allows load bank to be controlled/monitored by BMS
030	MODBUS TCP. Replaces MODBUS RTU-485 with TCP capability
040	Multiple remote control stations

Model Number Generation

Example: SN-2.0-3000-4803-60-R-M-010

3000KW, 480V, 3-phase, 60Hz, Remote Manual Control with Interior Heaters

SN	2.0	3000	4803	60	R	M	010
Saturn	Version	KW	Voltage	Frequency	Control	Function	Options
Saturn	1.0 Legacy	1400kw, 1500kw,	2083	60Hz	L – Local	M – Manual	010: Interior heaters
	2.0 2013	1600kw, 1700kw,	2403	50Hz	R – Remote	A – Automation	020: BMS Control
		1800kw, 2000kw,	4803				030: MODBUS TCP
		2250kw, 2500kw,	6003				040: Multiple control stations
		3000kw, 3200kw	(Volts x Ph)				

Principle Systems and Components

The load bank is a completely self-contained, freestanding unit which includes all resistive load elements, load control devices, load element branch circuit fuse protection, main load bus and terminals, cooling system, control power supply, unit controller and malfunction detection system and NEMA type enclosure.

Load Elements

Simplex "Powr-Web" open wire, helically wound, chromium alloy, thermally derated to 60%. 5% tolerance, 2% balance, .995 p.f.

UL Recognized.

Load Control

Branch circuit contactors each step, overall 50KW circuit maximum. Contactors have enclosed silver surfaced contacts, 120V coils; electrically operated and electrically held.

Element Circuit Protection

Branch circuit fuses, each 50KW branch circuit, 200kAIC, current limiting type.

Power Wiring

150°C insulated, color coded, numbered.

Control Wiring

105°C, color coded, numbered.

Power connection

Plated bus bar within an oversize terminal junction box.

Cooling

Forced air, vertical airflow, top exhaust. 30 HP, 230/460V, 3-phase, TEFC motor driving cast aluminum fan blade. Circuit breaker combination motor starter.

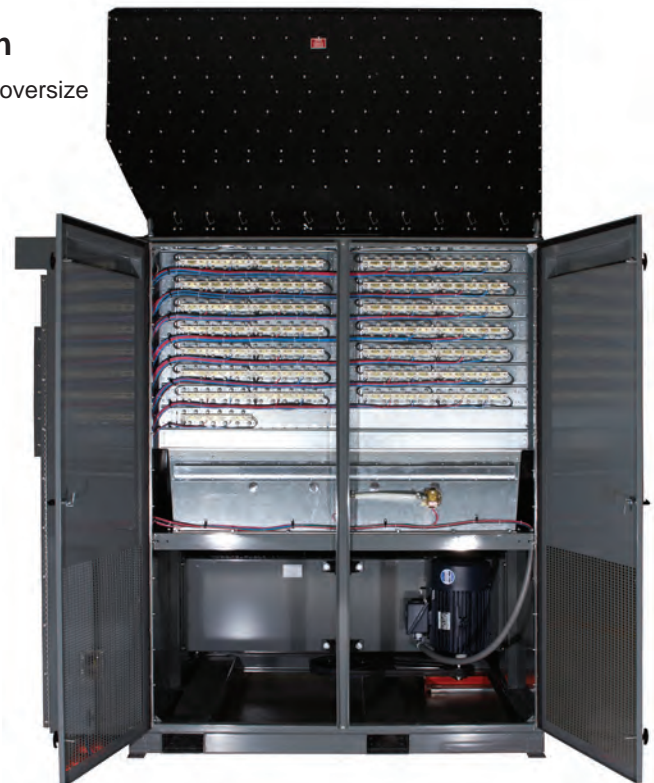
System Protection

Fan failure, high exhaust temperature, high intake temperature; lockout and alarm. Exhaust temperature indicated on screen.

Enclosure

Modular enclosure consists of three parts:

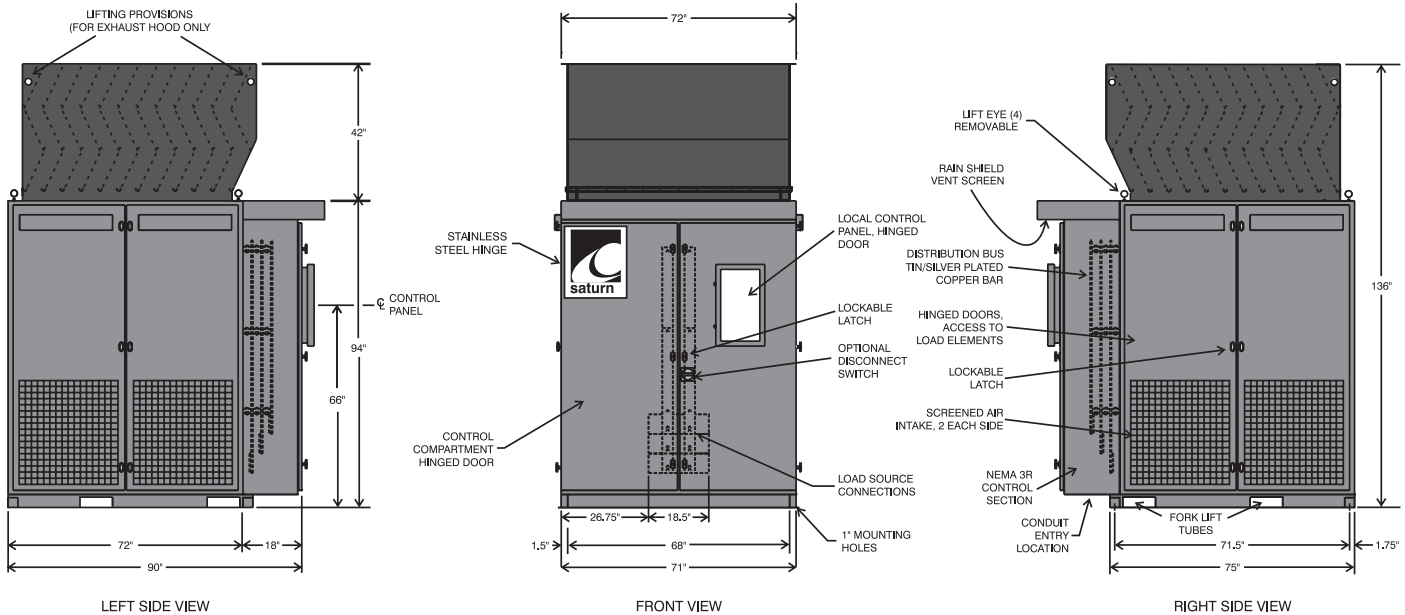
- 1.Type 3R rainproof power section including load elements and cooling fan
- 2.Type 3R control section, thermally and electrically isolated from power section
- 3.Exhaust hood. Mounts atop power section. Vertical flow with rain separators. Hood may be deleted and a duct flange provided for indoor applications where air is exhausted through a duct to the outdoors.



All access via hinged doors with stainless steel hinges and lockable latches. All exterior fasteners are stainless steel.

The load bank enclosure is of double wall construction for cool exterior and thermal isolation of the load elements. Cooling airflow through the enclosure is vertical with cold air intake at the bottom and hot air exhaust out the top. Intake and exhaust openings are screened. Enclosure is powder-coated dark gray. Hood powder-coated high temperature black.

Dimensions and Key Features



Controller

PLC based control with local or remote 4-inch TFT color HMI.

1. 4" Color Touch HMI – Provides all functionality previously accomplished by physical lights/ switches
 - a. Control Power On/Off Switch
 - b. Numeric Load Application Mode: direct entry to keypad, apply and remove function. Allows successive block loading
 - c. Master Load Switch function
 - d. Load Step Switches function
 - e. Fan Failure Indication
 - f. High Exhaust Temperature Indication
 - g. Load Dump Active Indication
 - h. Load Dump Bypassed Indication
 - i. Setup Functions
 - j. Various other functions depending on chosen options



2. Cooling Failure Load Lockout – Disables all load in the event of an exhaust over-temperature or fan failure
3. Remote Load Dump input – Allows user to connect normally closed contacts to permit remote load dump (close to run, open to dump)

4. Load Dump Bypass– Provides means to defeat load dump function above
5. Discrete Power Available Lamp – Indicates control power available to load bank. LED indicator on load bank.
6. Summary Alarm Lamp – Indicates that there has been a cooling failure, load dump activation or other failure. LED indicator on load bank.
7. BMS Monitoring (Dry Contacts) – Relay dry contacts for BMS monitoring of "normal operation", "summary alarm".
8. BMS Monitoring (Modbus RTU RS-485) – Allows all load bank conditions to be monitored via Modbus RTU RS-485