SIMPLEX® NEPTUNE V2.0

TECHNICAL SPECIFICATION

Project:
Quotation #:
Customer:
Customer PO#:
Date:

Simplex NEPTUNE Version 2.0 Stationary Generator Load Bank
Designed for permanent installation outdoors
UL/CUL Listed
Item A, Qty. 1

Operational Ratings and Limitations as follows:

Capacity:	KW, 1.0 PF, standard ratings (select one): 175-200-250-300-350-400-450-500-550-600-650
Voltage:	Standard voltage, V AC, 3-phase, 3-wire (select one): 208-240-380-416-480-600vAC
Frequency:	60 or 50 hertz
Load steps:	5 KW step resolution (5-10-10-25-50-100….KW)
Duty cycle:	Continuous
Ambient temp:	125°F
Exhaust rise:	220°F (Note: as airflow is not laminar, exhaust air temperatures are not equal at all points at the plane of air exhaust. Some parcels of air may reach approximately 600°F before mixing)
Airflow req'd:	12,500 cfm.
Fan/Control power:	Internal, 460V, 3-phase. Control circuits at 120V via transformer and 24vDC via power supply. Cooling fan motor at line voltage. Control circuits fused, 100,000 A.I.C. current limiting type, 600V fuses. Cooling fan: 5.0 HP, 230/460v, 13.0/6.5a, 60 hertz. Control load: Approx 500VA, 230/460v, 2.2/1.1a Heater load (when ordered): 1000w, 8.3a, External, 120v, 15A service

Principal Systems and Components as follows:

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, digital controller with malfunction detection system. Outdoor type enclosure.

Load elements:

Simplex Powr Web: UL/CUL Recognized component. Open wire, helically wound, chromium alloy, thermally derated to 60%. 5% tolerance, 2% balance. 0.995 power factor. Element wire mechanically supported over entire length such that if a wire should break, the broken wire segments will not short to adjacent conductors or to ground.

Load elements individually serviceable and replaceable in the field without major disassembly of load bank. Load elements installed in slide-out, removable trays such that any element is easily accessed without disturbing any other elements.

All materials used in the mounting and installation of the load elements are suitable for the temperatures encountered, in both normal operation and under fault conditions.

Materials in direct contact with the element wire are ceramic. Other materials which structurally support the load elements and/or which form the hot air duct within which the elements are mounted are steel, stainless steel or aluminum.

Load control: Branch circuit contactors, each step or each 50kw circuit maximum, 3-pole, 600v, with enclosed silver surfaced contacts, 120V coils; electrically operated and electrically held.

Element circuit protection: Branch circuit fuses, each 50kw branch circuit maximum, 200kAIC, 600v, current limiting type.

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Power wiring:	150°C insulated; color-coded and numbered
Control wiring:	105°C insulated, color-coded and numbered
Power connection:	Plated bus bar within Type 3R terminal junction box to accept terminated contractor/field cables
Control connection:	To terminal blocks. Remote HMI requires Belden 9481 shielded pair or equal.
Cooling:	Forced air, vertical airflow, top exhaust. 5HP, 3-phase, TEFC motor driving cast aluminum fan blade. Circuit breaker combination fan motor starter with adjustable overload relay.
System protection:	Fan failure, high exhaust temp, hi intake temp, fan motor overload; lockout and alarm message display on HMI.
	Airflow pressure differential switch; dual exhaust temperature thermocouples; intake air temperature thermocouple; fan motor overload relay. Display of temperatures on HMI
Enclosure:	Type 3R control section; Type 3R power section.
	Dimensions: 38.5”W x 111”H (69” basic cabinet, 42” exhaust hood) x 54”D. Approx. 1,600 lbs.
	Hinged access doors with lockable latches.
	Power section double-wall construction for thermal isolation
	Vertical airflow, top exhaust. Screened inlets/exhaust. Rain shedding vanes within exhaust hood.
	Forklift channels, lifting eyes.
	Powder coated dark gray cabinet, high temperature black exhaust hood. UL/CUL Listed process.

Digital Controller

PLC based with 6-inch color TFT touchscreen with programmable softkeys (HMI)

Local or remote control (specify one)

When local, installed behind weatherproof cover. When remote, installed in type-3R wall mountable enclosure. Capable of multi-remote station control.

Capable of limited user programming for time/load sequencing

Includes:

1. Power supply for PLC / screen, 24vDC
2. Malfunction detection/auto disconnect system. Monitors airflow pressure differential switch, temperature sensing thermocouples and fan motor overload relay. Display air temperatures on screens. Allows operator programming of temperature setpoints. Allows for failure sensing time delays. Displays alarm messages. Provides remote MODBUS registers and remote alarm contacts.
4. Remote load dump circuit to allow use of remote dry contacts (close to run) to trip load bank off line.
5. Remote communications modules, MODBUS RTU/RS-485 (std), MODBUS RTU/TCIP (Ethernet) (Optional)
6. Auxiliary dry contacts to indicate "normal operation"/"system failure"
7. HMI functions, including:
   a. Control Power On – Off buttons (starts/stops cooling fan)
   b. Bypass switch to override remote load dump
   c. Direct entry load application: keypad to enter direct values, apply and remove pushbuttons. Displays load programmed and load applied. Allows direct transition from preset to preset.

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8. HMI messages including (repeated as MODBUS registers):
   a. Control Power On/Off
   b. Manual mode
   c. Auto mode (if equipped)
   d. Load dump: normal/bypass
   e. Normal operation
   f. High exhaust temp with numeric display
   g. High intake temp with numeric display
   h. Airflow failure
   i. Fan motor overload
   j. Master load on
   k. Load step on (one for each load step)

AUTOMATION OPTION

Adds digital transducer and current transformers to capture electrical values.

Provides the following capability:

-Display of electrical values on touchscreen: 3-phase voltage, 3-phase amperes, frequency, KW

-MODBUS registers for these values

-Programmable automatic operation:
- KW sensing automatic load regulation and minimum loading
- KW sensing regenerative power protection
- Automatic sequential step loading
- Automatic exercise (requires external control power)
- Other programmable automatic functions
- Operator programmable levels, delays, time sequencing.

-Adds the following protective features, user activated, user programmable:
- Over/under voltage
- Over/under current
- Over/under frequency
- Over/under power (KW)

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WARNING:

Refer to Drawing ASM-00005804 for installation site clearances

Temp rise: the formula for air temp rise is:
RISE = KW X 3000 / CFM

Applying this formula blindly can be misleading in that airflow is not laminar and temperature can vary greatly from point to point. Since this is a close-coupled propeller type fan, there is considerable air disturbance due to centrifugal force with lobes of dense and lobes of rarified air. Consequently, there is a wide temperature gradient from approximately 200F to approx 600F. From an application standpoint, the system must be designed for the hottest air

WARNING: The installation site must provide for the free flow of cooling air to the load bank and the free exhaust of hot air (12,500CFM) to the atmosphere without impinging upon buildings, walls, etc and without re-circulating to the load bank air intakes. Load banks installed indoors must be equipped with an exhaust air duct (supplied by others) which will route all load bank hot exhaust air to the outdoors. This load bank will produce 12,500CFM of exhaust air with a calculated temperature rise overall of 160°F, but with possible superheated parcels of air at or near the plane of exhaust of the load bank of approximately 600°F. This air must not be exhausted within an indoor space and must not be allowed to re-circulate to the load bank air intakes. Failure to properly install this load bank with proper clearances and, for an indoor installation, with a correctly sized and vented exhaust air duct, will result in substantial damage to or destruction of the load bank, adjacent equipment and the building in which the load bank is installed. Damage to the load bank due to improper installation is not covered by Simplex warranty. Incidental and consequential damage is not covered by Simplex warranty.