



**VERTIV™**

**NetSure™**

211 Series

DC Power System





## KEY FEATURES

- **Supports Ethernet, SNMP V2 & SNMP V3, ModBus and RS485 communication interfaces** – enables remote control and monitoring
- **NetSure™ rectifiers are designed to operate from -40 °C to +75 °C, providing 600 W output at 65 °C** – suitable for harsh environmental conditions
- **Extremely wide AC voltage range window** – 85 VAC to 300 VAC
- **Several distribution configuration options** – battery disconnect breakers, load breakers, and GMT fuses up to 15 A to meet application needs
- **NEBS Level 3 compliant and UL Listed** – to meet industry standards
- **Monitoring and battery test and charge functions** – advanced battery management features and AC service monitoring
- **Configuration file capability** – minimizes installation time and allows planned network conformity

## Description

The NetSure 211 DC Power Solution is a flexible system capable of providing DC power through the use of 500 W or 1000 W rectifiers and a variety of output distribution options. The system is available in an integrated distribution configuration. The NetSure 211 is available in both 19" and 23" 1 RU & 2 RU rack-mount configurations, suited for up to 6 kW power requirements in the most harsh environments. The system is supported by a single SCU+, ACU+ or NCU controller (ACU+ for 2 RU systems only) that provides all control and operational conditions, as well as historical site data and external signal conditioning and monitoring. Each rectifier shelf includes a slot for the controller and space for the rectifiers. Distribution is provided by breakers or fuses located in the power shelf.

Distribution options include load low-voltage disconnect (LLVD), battery low-voltage disconnect (BLVD), or no low-voltage disconnect. Plug-in rectifiers, AC connectivity and DC load outputs enhance the overall flexibility of the system by minimizing installation and start-up time. This dynamic system also offers alternative AC input configurations, relay rack configurations, battery tray options, battery box options and pre-configured output load kits.

The NetSure 211 is designed for up to 4 kW loads (19") or 6 kW loads (23"). This cost-effective solution is NEBS Level 3 compliant and UL Listed. Rated for continuous operation from -40 °C to +75 °C (see rectifier data for derating), this system is designed for the harsh outside plant environment, as well as customer premise FTTx, wireless back-haul, microwave, and DLC applications.

The NetSure™ 211 is especially designed for all types of access applications in both fixed and wireless access networks, offering unmatched site installation flexibility.

## Environmental Endurance

### Great output power at high temperatures

NetSure 211 rectifiers deliver high output power in relation to ambient temperature conditions (see diagram 1), making them especially suitable for high-temperature environments. In a system with rectifiers operating at 65 °C, the output is still 60% of full power.

### Extremely wide AC voltage range window

The AC voltage input range vs. rectifier output is another extraordinary feature of this small system. The 1000 W rectifier will deliver full power from 176 VAC to 300 VAC. From 85 VAC to 176 VAC the power level is derated (see diagram 2). The 500 W rectifier will deliver full power from 104 VAC to 300 VAC.

## Configurability for Space and Energy Efficiency

### NetSure 211 comes in many different shapes

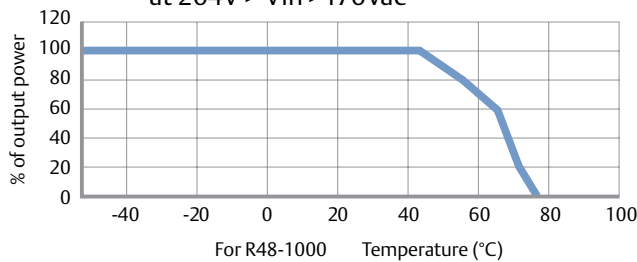
This highly flexible DC power system, featuring efficiency levels greater than 92%, is available in 1 RU or 2 RU integrated distribution shelves. These alternatives are optimal for rack-mounting in any building, shelter or cabinet installation.

NetSure 211 is easily integrated into any Vertiv™ outdoor enclosure when a pre-manufactured space-efficient outdoor solution is needed. The system can also be shipped loose or mounted in a relay rack with battery trays.

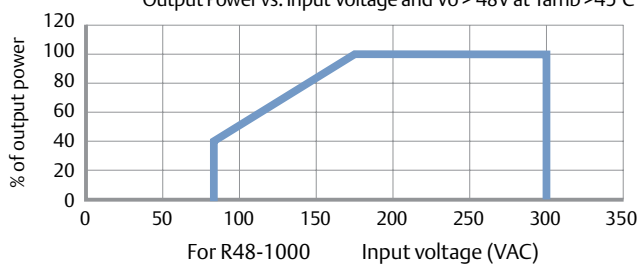
## Application

The NetSure 211 System is designed for deployment in central office, POP sites, co-location sites, customer premises, outdoor cabinets, CEVs, vaults or portable shelters. Specific applications include: DLC, xDSL, DSLAM, FTTx electronics, broadband communications, multiplexers, LTE, WiMAX, microwave and PBX.

**Diagram1:** R48-1000 Output Power vs. Temperature at 264V > Vin > 176Vac



**Diagram2:** Output Power vs. Input Voltage at Tamb <45°C  
Output Power vs. Input Voltage and Vo > 48V at Tamb >45°C



The NetSure™ 211's extensive battery management capabilities, easy configuration and maintenance are all backed by the resources and quality reputation of a worldwide service organization.



## Basic Configurations

Two core configurations define the combination of rectifier and distribution shelves and determine the ultimate capacity of the system.



### Internal Distribution up to 3 kW

Our most compact system measures 1 RU high with distribution capability and rectifiers in the same shelf. Available in 19" and 23" widths, the system provides distribution space for (10) GMT fuses up to 15 A. Configuration options include battery low voltage disconnect (BLVD) or no low voltage disconnect.



### Internal Distribution up to 6 kW

The 2 RU high configuration is also available in 19" and 23" widths with distribution capability and rectifiers in the same shelf. The system provides distribution space for GMT fuses up to 15 A or a combination of circuit breakers up to 100 A and GMT fuses. Configuration options include battery low voltage disconnect (BLVD), load low voltage disconnect (LLVD), or no low voltage disconnect.

## Rectifier Shelves

The rectifier shelves integrated into the NetSure™ 211 system are either 1.75" (1RU) or 3.5" (2 RU) high and available in 19" and 23" widths. These shelves provide front to back ventilation, maximizing revenue-generating space. Each unit will operate from 120/208/240 VAC and is equipped to accommodate plug-in AC connections or

open wire line cords. DC output connection options for each shelf include terminal blocks, plug-in DC jumpers for GMT load, and two-hole compression lugs for breakers. The shelf with rectifiers is UL Listed and meets FCC Class B EMI/RFI requirements.



As load demand grows, the system can be easily expanded with additional modular components.

## Rectifiers

The R48-500 and R48-1000 NetSure rectifiers are rated for 500 W or 1000 W constant output power when operated at 208/240 VAC nominal input. The 1000 W model rectifier provides approximately half its rated output when operated at 120 VAC. This auto-sensing circuit enables each rectifier to automatically adjust its output to the available line voltage. The rectifier will provide up to 100% of rated power at 45 °C.

As the temperature increases from 45 °C to 75 °C, the thermal power limit circuit linearly decreases power. In the typical operating range, these rectifiers have a total harmonic distortion less than 5%, and efficiencies greater than 92% (1000 W). Each hot-swappable rectifier has an integral multi-speed cooling fan and tri-LED status indication.



R48-1000, NetSure 211 Rectifier

## Controller

The SCU+, ACU+ (for 2 RU systems only) and now the NCU are powerful control units that enable remote monitoring of the main AC supply, DC power plant, battery backup and site environment.

The controller enables advanced battery management such as sophisticated boost charge control, remaining capacity testing, constant current discharge testing and scheduled discharge testing. With basic

energy saving functions, the SCU+ is a cost-efficient system component. For more sophisticated site monitoring the ACU+ is available as an option for 2 RU systems only. The NCU supports multiple web browsers including IE, Firefox, chrome and Safari. Standard supported protocols include ModBus, SNMP V2 & V3. Encrypted security is provided by IPv6 and SNMP V3.



NCU Controller

## Distribution

Output distribution for the NetSure™ 211 is available in four different forms. Internal distribution is attained through GMT fuses or circuit breakers. Internal distribution options include: (10) GMT fuses (1 RU); or 13 GMT fuses composed of a combination of 15 A positions and 10 Amp positions; or (4) load circuit breakers (0 A to 100 A) and (5) 10 A GMT fuses; or (2) load circuit breakers (0 A to 100 A) and (2) battery disconnect circuit breakers (0 A to 125 A) and (5) 10 A GMT positions. All distribution panel options are available with low-voltage disconnect capability.

## Battery Cabinet

An enclosed battery cabinet is available that can be mounted on the wall or in a relay rack. A 40 A battery disconnect is included with the battery cabinet. It can be connected in parallel with other cabinets to provide additional backup time.



Internal Distribution Configuration

## System Specifications, NetSure 211

INPUT		
<b>System Voltage, Nominal</b>	120 VAC, 208 VAC, 240 VAC	
<b>Output Capacity</b>	19" 1 RU up to 40 A 23" 1 RU up to 60 A	19" 2 RU up to 80 A 23" 2 RU up to 120 A
<b>Dimensions</b>	Relay rack (can be mounted in enclosures) Mounting width: 19" or 23" width	Mounting Depth: Integrated distribution system 12" 1 RU Height 1.75" 2 RU Height 3.5"
<b>Access</b>	Integrated system – Front for installation, operation and maintenance	
<b>Control</b>	SCU+ controller, ACU+ controller (2 RU systems only), NCU controller	
ENVIRONMENTAL		
<b>Temperature Range, Operating</b>	-40 °C to +75 °C (-40 °F to +167 °F) see rectifier specification for any derating*	
<b>Storage</b>	-40 °C to +75 °C (-40 °F to +167 °F)	
<b>Humidity</b>	0 to 95%, non-condensing	
<b>Ventilation</b>	Fan-cooled front to rear	
<b>EMI/RFI</b>	Conforms to FCC rules Part 15, Subpart B, Class B and EN55022 Class B, radiated and conducted	
<b>Safety Compliance</b>	UL 60950 Recognized (US & Canada) NEBS Level 3 Compliance	

\*Operating and storage temperatures for batteries installed in the battery cabinet are provided by the battery manufacturer.

## Rectifier Specifications, R48-500 and R48-1000

AC INPUT	
<b>Input Voltage, Nominal</b>	120 VAC, 208 VAC, 240 VAC
<b>Input Voltage, Operating Range</b>	85 VAC to 300 VAC
<b>Frequency</b>	45 Hz to 65 Hz
<b>Power Factor (PF)</b>	>0.90 for 25% to 50% load, >0.98 for 50% to 100% load and >0.99 for 100% load at 208 VAC, 220 VAC, 230 VAC, 240 VAC and 25 °C
<b>Total Harmonic Distortion</b>	<5% from 50 to 100% of rated load at 208 Voc to 240 Voc
<b>Input Current, Maximum</b>	6.5 A both 500 W and 1000 W
<b>Inrush Current</b>	Inrush current does not exceed 150% of the rated input steady state peak value
<b>Operating Efficiency</b>	91% (500 W) 92% (1000 W)
DC OUTPUT	
<b>Output Voltage, Adjustment Range</b>	-42 VDC to -58 VDC
<b>Output Power</b>	Constant power limiting operation 500 W and 1000 W @ -48 VDC (for 1000 W, see derating chart for voltages less than 176 VDC or temperatures higher than 45 °C)
<b>Output Current</b>	10.42 A @ -48 VDC (500 W) 20.83 A @ -48 VDC (1000 W)
<b>Regulation</b>	Steady state output voltage remains within +/-1% for any combination of input voltage and temperature from 5% to 100% load
<b>Voice Band Noise</b>	The voice-frequency noise generated by a rectifier does not exceed 32 dBnC output noise from 0% to 100% load
<b>Wide Band Noise</b>	Does not exceed 250 mv peak-to-peak, or 100 mv rms per Telcordia GR-947-CORE
<b>Psophometric Noise</b>	<1 mV at 0% to 100% of rated load; <32 dBnc at 0% to 100% of rated load (output voltage > -42 V)
<b>Protection</b>	High voltage shutdown fixed and selective capability. Fixed – requires manual restart. Selective – If rectifier detects over voltage it will turn off. After 5 seconds it will restart; if it encounters an over voltage within 5 minutes it will turn off and remain off until reset.
ENVIRONMENTAL	
<b>Temperature</b>	-40 °C to +75 °C (-40 °F to 167 °F)
<b>Altitude</b>	2000 m (6560 ft) at full power
<b>Ventilation</b>	Front to back with speed-controlled fan (field replaceable)
<b>Audible Noise</b>	The rectifier does not produce sound levels above 53 dB(A), measured 0.6 m in front of the rectifier, at the same horizontal line as the middle of the rectifier at 25 °C
STATUS /ALARM INDICATORS AND MONITORING	
<b>Visual Indicators</b>	Green LED: Normal Operation Red LED: Failure Yellow LED: Alarm Flashing Red LED: Fan Failure
<b>Status Settings</b>	The SCU+, ACU+ or NCU controller establishes all rectifier settings
RECTIFIER PHYSICAL SPECIFICATIONS	
<b>Mounting</b>	Plug-in installation
<b>Dimensions (H x W x D)</b>	40.8 x 86.5 x 241 mm (1.6" x 3.4" x 9.5")
<b>Weight</b>	1.25 kg (2.76 lbs)
<b>Safety Compliance</b>	UL 60950 Recognized (US & Canada)

### Additional Information

For additional specification, engineering and installation information, request specification number 582136600 (system), 1R48500 or 1R481000 (rectifiers), or 541434 (battery cabinet).  
For ordering information on the complete system, request SAG582136600.



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