

# Vertiv™ PowerDirect Rack

50V DC Power System, Scalable from 33kW to 132kW



## Benefits

- Save space by leveraging high power density shelves – up to 33 kW (660 A at 50 V DC) per shelf in one open rack unit (1.87")
- Expand rack capacity of a live system by adding more PSUs and shelves without disruption
- Support high-capacity servers with high power shelves and PSUs providing up to 132 kW per rack
- Provide flexibility to your data center by using power shelves and PSUs that can support both AC and HVDC input
- Save energy by using high efficiency (97.5% Peak) power supply units

*This high-density 50V DC power system features a compact, modular design that is well-suited for a wide variety of data rack applications.*



## Description

The modular Vertiv™ PowerDirect Rack, 50V DC power system provides up to 132 kW (2640 amps at 50 volts DC) per rack via high efficiency power supply units rated at 5500 watts (110 amps) each. Each power shelf takes up one open rack unit of height. It's rated at 33 kW and can house six 5.5 kW high efficiency power supply units. The PSUs are hot pluggable and can be added in an operating system without any interruption. Also, new power shelves can be added live when more power is required.

The power system accommodates a power management unit that controls and monitors the power supply units while communicating to the rack management system. The power management unit can support up to 48 power supply units to meet various redundancy schemes.

## Application

The Vertiv™ PowerDirect Rack 50V DC power system is specifically designed for compatibility with the Open Compute ORV3 rack. It is fully compliant with the ORV3 high power specification.



50V power supply unit

Power management module

## Ordering Information

| Part Number  | Model Number | Description                               |
|--------------|--------------|-------------------------------------------|
| 1PSS503321N2 | PSS5033-21N2 | Shelf, 50VDC, 33kW, OCP ORV3, Dual Input  |
| 1PMM1S0      | PMM1S0       | Power Management Module, OCP ORV3         |
| 1R505500E4   | R50-5500E4   | Power Supply Unit, 50VDC, 5500W, OCP ORV3 |

## Technical Specifications

### Input

|                            |                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage, Shelf             | 200 V AC to 240 V AC nominal three-phase (3-wire + PE) with range of 180 V AC to 264 V AC<br>230/400 V AC to 277/480 V AC nominal three-phase (4-wire + PE) with range of 195/338 V AC and 305/528 V AC<br>200 V AC to 277 V AC nominal single phase (2-wire + PE) with range of 180 V AC to 305 V AC<br>240 V DC to 336 V DC nominal with range of 180 V DC to 410 V DC |
| Voltage, Power Supply Unit | 200 V AC / 208 V AC / 220 V AC / 240 V AC / 277 V AC nominal single-phase with range of 180 V AC to 305 V AC,<br>240 V DC to 336 V DC nominal with range of 180 V DC to 410 V DC                                                                                                                                                                                         |
| Current, Power Supply Unit | 31.8 amps maximum at full power and 180 V AC, 31.6 amps maximum at 180 V DC                                                                                                                                                                                                                                                                                              |
| Circuit Protection         | Fuses located in each line input of power supply units                                                                                                                                                                                                                                                                                                                   |
| Efficiency                 | 97.5% peak                                                                                                                                                                                                                                                                                                                                                               |

### Output Capacity

|                            |                                                                                                                                                                        |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage                    | 50.0 V DC nominal                                                                                                                                                      |
| Current, Shelf             | 660 amps at 50.0 V DC                                                                                                                                                  |
| Current, Power Supply Unit | 110 amps at 50.0 V DC (5500 watts maximum)                                                                                                                             |
| Regulation                 | Steady state output voltage remains within $\pm 1\%$ for any load current from no load to full load and over the specified input voltage range                         |
| Dynamic Response           | For a 50% step load change within the range of 10% to 100% of full rated current, the maximum voltage transient will not exceed 1% of the initial steady state voltage |
| Filtering                  | Wide band noise does not exceed 500 mV peak to peak                                                                                                                    |

### Protection Capacity

|                          |                                                                                                                                                                                                                                                                                                |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Over-Voltage             | Each power supply unit will automatically shut down and lock out should its output voltage exceed 52.5 V DC. Unit will automatically attempt to restart once. A second (backup) over-voltage protection circuit will shut down and latch off the unit if the voltage exceeds 54.5 V DC maximum |
| Over-Current             | The power supply can operate continuously at up to 115 amps above which it will shut down dependent on the duration of the overcurrent condition. Consult the user manual for details.                                                                                                         |
| Power Limit              | Non-adjustable limit of 5500 watts maximum per power supply unit                                                                                                                                                                                                                               |
| Over-Temperature         | Each power supply unit will automatically shut down if the internal temperature of the module exceeds a predetermined value. Operation will automatically resume after the over-temperature condition is removed                                                                               |
| Internal Fault On Output | Each power supply unit contains an output blocking (ORing) circuit which prevents an internal fault in the unit from affecting the bus voltage                                                                                                                                                 |

### Physical Characteristics

#### Dimensions (H x W x D), Weight

|                   |                                                                                                  |
|-------------------|--------------------------------------------------------------------------------------------------|
| Shelf             | 14.5 kg (32 lb) without AC cords, 46 mm H x 537 mm W x 788.7 mm D (1.81" H x 21.1" W x 31.05" D) |
| Power Supply unit | 1.82 kg (4.0 lb), 40 mm H x 73.5 mm W x 640 mm D (1.57" H x 2.89" W x 25.2" D)                   |

### Environmental

|                       |                                                                              |
|-----------------------|------------------------------------------------------------------------------|
| Operating Temperature | -20°C to +75°C (-4°F to +167°F) with power derating above 45°C               |
| Storage Temperature   | -40°C to +85°C (-40°F to +185°F)                                             |
| Humidity              | 10% to 90% relative humidity, non-condensing                                 |
| Altitude              | -60m (-200 ft) to 3050m (10000 ft) with no derating                          |
| EMC                   | FCC Part 15, Subpart B, Class A and EN55022 for radiated and conducted noise |
| Safety Compliance     | UL 62368-1, IEC 62368-1, EN 62368-1, RoHS                                    |