

Vertiv™ PowerDirect 3000

50 VDC power system, scalable from 33 kW to 198 kW



Key benefits

- **High power density:** Each shelf delivers up to 33 kW (673.5A at 49 VDC) in a single 1.87" open rack unit.
- **Life maintenance:** Add power supply units (PSUs) and shelves to a running system without scheduled downtime.
- **Scalable capacity:** The system supports high-capacity servers with up to 8 shelves paralleled per rack.
- **High efficiency:** With up to 97.5% peak efficiency, PSUs can help reduce energy consumption.
- **Quick deployment:** OCP-compliant design streamlines platform integration.

Compact, high-density power delivery for Open Compute ORV3 high-power rack deployments.



Vertiv™ PowerDirect 3000

Description

The Vertiv™ PowerDirect 3000 50 VDC power system scales from 33 kW to 198 kW per rack through parallel shelf operation. Each 1U shelf houses six hot-pluggable 5.5 kW power supply units (PSUs). Both PSUs and shelves can be added to a live system with minimal service interruption.

Two controller options are available for monitoring and managing up to 48 PSUs across various redundancy configurations: the power management module (PMM) and the power management controller (PMC). Both communicate with the rack management system. The PMC is engineered for compatibility with current and next-generation Vertiv power shelf platforms.

Application

The Vertiv™ PowerDirect 3000 50 VDC power system is designed for the Open Compute ORV3 rack and fully compliant with the ORV3 High Power Rack (HPR) specification.



Vertiv™ PowerDirect 3000
50V power supply unit (PSU)



Vertiv™ PowerDirect
3000 power management
module (PMM)



Vertiv™ PowerDirect 3000
33 kW power management
controller (PMC)

Ordering information

Part number	Model number	Description
1PSS503321N2	PSS5033-21N2	Shelf, 50VDC, 33kW, OCP ORV3, Dual Input (PMM version)
1PMM1S0	PMM1S0	Power Management Module, OCP ORV3
1R505500E4	R50-5500E4	Power Supply Unit, 50VDC, 5500W, OCP ORV3
1PSS503321C1	PSS5033-21C1	Shelf, 50 VDC, 33 kW, OCP ORV3, dual input (PMC version)
1PMC1S0	PMC1S0	Power management controller, OCP ORV3



Specifications

Input

Voltage, shelf	220/380 VAC to 277/480 VAC nominal three-phase (4-wire + PE) with range of 180/312 VAC and 305/528 VAC 200 VAC to 240 VAC nominal three-phase (3-wire + PE) with range of 180 VAC to 264 VAC (needs customized AC input connector)
Voltage, PSU	200 VAC / 208 VAC / 220 VAC / 240 VAC / 277 VAC nominal single-phase with range of 180 VAC to 305 VAC
Current, shelf	Maximum 30 amps x2 at 198 VAC
Circuit protection	Fuses located in each line input of power supply units
Efficiency	97.5% peak

Output capacity

Voltage	50.0 VDC at 0 load, 49.0 VDC at 100% load
Current, shelf	673.5 amps at 49.0 VDC
Current, PSU	112.2 amps at 49.0 VDC (5500 watts maximum)
Regulation	Steady state output voltage remains within $\pm 0.25\%$ 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 0.5V
Filtering	Wide band noise does not exceed 500 mV peak to peak

Protection capacity

Over-voltage	Auto shutdown/lockout at >52.5 VDC; auto restart attempted once. Backup circuit latches off at >54.5 VDC
Over-current, PSU	Continuous operation up to 105% of rated current without shutdown; shutdown dependent on duration above threshold
Power limit	5,500W max per PSU (non-adjustable)
Over-temperature	Auto shutdown at predetermined internal temperature; auto resumes when condition clears
Internal fault on output	Output blocking (ORing) circuit prevents internal fault from affecting bus voltage

Communication

PMM	Modbus protocol via RS-485
PMC	Redfish protocol via Ethernet

Physical characteristics - Dimensions (H x W x D), Weight

Shelf	14.5 kg (32 lbs) 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)
PSU	1.82 kg (4.0 lbs), 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	-60 m (-200 ft) to 3050 m (10000 ft) with no derating
EMC	FCC Part 15 and EN55032 Class A for radiated and conducted noise
Safety compliance	UL 62368-1, IEC 62368-1, EN 62368-1, RoHS

Vertiv.com | Vertiv Headquarters, 505 N Cleveland Ave, Westerville, OH 43082, USA

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