Vertiv™ PowerDirect 3000

90 kW, 19” 800 VDC to 54 VDC Power Shelf

AI rack densities are outpacing the power infrastructure designed to serve them. As GPU clusters scale, the last conversion stage inside the rack becomes the deciding factor in both efficiency and serviceable density. The Vertiv™ PowerDirect 3000 90 kW power shelf addresses that stage directly, converting an 800 VDC bus to the 54 VDC required by rack-mounted compute trays through a shared bus structure.

Benefits

- **Maximize rack power density:** 90 kW in a 1U form factor with four 22.5 kW power supply units
- **Scale with the rack:** up to eight shelves in parallel, to 630 kW per rack with N+1 redundancy
- **Simplify deployment:** hot-pluggable power supply units and controller for online maintenance, reduced MTTR
- **Monitor remotely:** Redfish over Ethernet, with CAN and PMBus telemetry
- **Fit existing infrastructure:** standard 19-inch width, with rail options for OCP ORV3 21” racks

Description

Each 1U shelf contains four hot-pluggable 22.5 kW power supply units (PSU) and a Power Management Controller (PMC), delivering up to 1731 A at 52 VDC and up to 98.5% peak efficiency. Up to eight shelves operate in parallel for up to 630 kW compute rack with redundant configurations such as 540 kW in 6+2. Reinforced input-to-output isolation and pulse power handling to 180% of rating keep the shelf stable under the dynamic load profiles of AI compute.

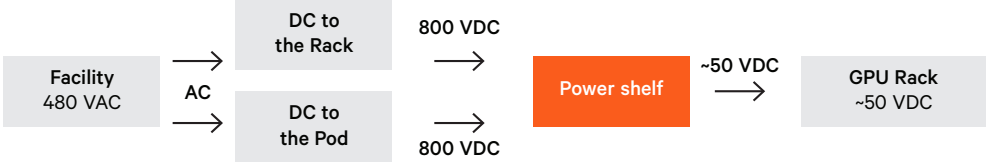


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Application

- Hyperscale and colocation data centers
- AI/ML training and inferencing workloads
- NVIDIA MGX rack ecosystems powered from an 800 VDC bus
- High-density racks above 300 kW

Where it fits in the 800 VDC power train



Technical specifications

Input

Voltage, shelf, and power supply unit	760 to 840 VDC (800 VDC nominal)
Current, shelf	121 A at 760 VDC nominal
Input connection	125 A hot-plug connector; left- or right-side shelf variants
Isolation	Reinforced, input to output

Output power

Voltage	54 VDC at no load (settable 52.0 to 54.0 VDC), 52 VDC at 100% load (2 V downslope from no load to full load)
Current, shelf	1731 A (432.7 A per power supply unit)
Power, power supply unit	22.5 kW
Efficiency	Up to 98.5% peak, up to 98.0% @ 50-75% load, up to 97.5% @ 100% load
Hold up time	6 ms @100% load
Pulse power	≤180%, ≤0.5 ms; ≤150%, ≤50 ms

Protection

Over-voltage	Latches off if output voltage exceeds 55 V for 200 ms
Over-current	Latch off at 120% after 100 ms and at 115% after 10 s; Auto restart attempt five times
Over-temperature	Shuts down above a predetermined internal module temperature; operation resumes automatically once the condition clears
Internal fault on output	Output blocking (ORing) circuit prevents an internal fault in a unit from affecting the bus voltage

Controller

Communication ports	1 x Ethernet (PMC); 2 x rear RJ45 (ISHARE, SYNC_START)
Protocol	Redfish

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

Power supply unit	40 x 101.5 x 639.9 mm, <4.8kg
Product: Power shelf	1RU x 19" x 809.6 mm, 13.3kg (excluding power supply units)

Environmental

Storage temperature	-40°C to +60°C
Operating temperature	5°C to +40°C at full power
Humidity	8% to 85% relative humidity, non-condensing
Altitude	0 to 3050m; derating applies above 3050m
Acoustic noise	≤85 dB(A) at 35°C ambient at 1 meter distance
Safety compliance	UL 62368-1, C22.2 No. 62368-1, IEC 62368-1, EN 62368-1, CNS 14336-1; EU and China RoHS, REACH
EMC	EN55032/CISPR 32 and FCC Part 15 Subpart B Class A emissions; EN55035/CISPR 35 immunity

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