Vertiv™ PowerDirect 5000

800 kW, ±400 VDC / 800 VDC Power Rack

AI compute rack densities are outpacing the traditional power infrastructure designed to serve them. Every kilowatt of conversion and energy storage placed inside the GPU rack is valuable revenue generating compute space. The Vertiv™ PowerDirect 5000 Power Rack moves that equipment into a dedicated power rack adjacent to the IT racks, taking facility AC in and delivering ±400 VDC or 800 VDC to the row while the white space stays as it is.

Benefits

- **Free rack space for compute:** power conversion and energy storage move out of the IT rack into a dedicated power rack
- **Scale to megawatt-class compute:** Up to 800 kW modular redundant power capacity, scale up to four racks in parallel
- **High frequency power smoothing:** capacitor bank units smooth dynamic compute loads; battery backup units hold the load at least 50 seconds
- **Service under load:** hot-pluggable power supply, battery, and capacitor bank units, with fuse blow detection
- **Deploy safely:** ground fault, current, and liquid leakage detection/ mitigation, emergency, power off, and triple layer arc flash prevention

Description

Each Power Rack contains up to thirty hot-pluggable 30 kW power supply units (PSU) across five shelves, configurable battery backup (BBU) and capacitor bank units (CBU), and integrated AC and DC distribution options. System input voltage 400 to 480 VAC converts output to ±400 VDC or 800 VDC at capacity of up to 800 kW with 100kW redundancy. Capacitor bank units (CBU) smooth the pulse loads of AI compute and battery backup units (BBU) carry the load for at least 50 seconds. A centralized control module (CCM) provides system level controls and monitoring, reporting through Modbus and Redfish.



Vertiv™ PowerDirect 5000, ±400 VDC / 800 VDC

Application

- Hyperscale, Colocation, Enterprise ±400 VDC / 800 VDC rack architectures
- AI workloads
- White space (Row-level) deployments where facility distribution remains AC power

Where it fits in the 800 VDC power train



Technical specifications

Input

Voltage, AC input	Nominal 400 / 415 / 480 VAC (3W+PE), ±10% range. 400 - 528 VAC without derating PSU capacity
AC input connection	Up to 8 x 200A
AC input protection	Each PSU is fuse protected

Output

Voltage	±400 VDC with return rail, or 800 VDC / 0 V, ± 5% regulation
Power Rack capacity	800 kW output distribution capacity, 900 kW PSU capacity (30 PSUs)
Power supply unit (PSU) capacity	30 kW
Power supply shelf configurations	Six PSU modules per shelf and up to five shelves per Power Rack
Power supply unit efficiency	Up to 98% peak, up to 97.25% at full load
Pulse power tolerance	175% for 2 ms, 140% for 50 ms
Hold up time	>20 ms at 100% load
DC output distribution	Up to 16 x 50 kW rack configuration

Energy storage

Battery backup unit (BBU)	≥50 seconds backup at 25 kW load EoL; Up to 36 BBUs; Lithium Ion
Capacitor bank unit (CBU)	Up to 36 CBUs for power dynamic pulse load smoothing
CBU pulse load power smoothing	140% for 50 ms, 160% for 400 µs, 100% for 1 s
Shelf configurations	Up to six CBU/BBU modules per shelf and up to six shelves per power rack

Protection and safety

Ground fault	Ground fault & leakage current detection/mitigation
Arc flash prevention	Three levels to prevent arc flash for load disconnection
DC Output protection	Overcurrent and short-circuit protection fuses
Emergency power off	Front door EPO switch and remote signal-activated
Leak Detection	Overhead liquid leak detection

Preliminary Specifications (subject to change without notice.)

Control and monitoring

Centralized control module	10.1" LCD HMI touch-screen controller integrated on the front door for local and remote monitoring, controls and alarms
Northbound communication	Modbus and Redfish via gigabit connection
Firmware	Online firmware upgrade capable
Parallel operation	Up to four racks

Physical characteristics - Rack Dimensions, Component Weights

Product: Power Rack	600 mm (23.6") W x 2286 mm (90") H x 1219 mm (48") D; ~1960 kg fully populated
Power supply unit	12 kg
Power supply shelf	26 kg
Battery (BBU) / Capacitor (CBU)	BBU 27 kg / CBU 17 kg
Battery (BBU) / Capacitor (CBU) shelf	26 kg
AC PDU	5.5 kg
DC PDU	12 kg
Centralized control module	1.5 kg

Environmental and compliance

Operating temperature	5°C to 40°C at full load
Humidity	10% to 90% relative humidity, non-condensing
Altitude	Up to 6,000 ft with no de-rating
Cooling	Forced air-cooled
Safety compliance	UL/IEC 62368-1, UL 9540A 6th Edition, UL 1973
EMC	FCC Part 15 and EN55032 Class A Emissions, EN55035 Immunity

Preliminary Specifications (subject to change without notice.)

© 2026 Vertiv Group Corp. All rights reserved. Vertiv™ and the Vertiv logo are trademarks or registered trademarks of Vertiv Group Corp. All other names and logos referred to are trade names, trademarks, or registered trademarks of their respective owners. While every precaution has been taken to aim for accuracy and completeness here, Vertiv Group Corp. assumes no responsibility and disclaims all liability for damages resulting from use of this information or for any errors or omissions. Specifications, rebates, and other promotional offers are subject to change at Vertiv's sole discretion upon notice.