Vertiv™ PowerNexus MV UPS

Outdoor medium-voltage UPS system featuring fault ride-through and AI power smoothing capabilities

At a glance

3.0 MVA - Rated power

34.5 kV - Operating voltage

1 – 4 hrs - Backup time

98.5% - Peak system efficiency



Vertiv™ PowerNexus MV UPS

Power solutions for mission-critical AI data centers

High-density AI data centers require uninterruptible power architectures that support rapid load variation, high power density, and reliable energy delivery at medium voltage levels. Conventional architectures with low voltage (LV) uninterruptible power supply (UPS) and diesel generators introduce multiple conversion stages, increasing losses and system complexity.

The Vertiv™ PowerNexus MV UPS is an outdoor-rated medium-voltage UPS designed for high-density AI data centers. It operates at 34.5 kV and delivers continuous power protection with on-grid reactive power compensation, AI load smoothing, enhanced fault ride-through, and full battery backup during grid failure, all within a compact, containerized modular outdoor deployment.

Key benefits

- **Uninterruptible power:** Battery backup supports continuous operation of critical workloads during grid failures.
- **AI load management:** Advanced AI power smoothing to manage rapid load fluctuations preventing grid disturbances and supporting stable AI workload performance.
- **High energy efficiency:** Up to 98.5% system efficiency in AC-AC mode and 97% from battery, reducing energy losses and operating costs.
- **Diesel generator elimination:** Support customers to remove diesel generator from site architecture as back up time can be achieved through long-duration batteries supporting energy goals and reducing site operating expenditure (OpEx) costs.
- **Free up valuable white and grey space:** The outdoor-rated 40-ft skid relocates critical power outside, freeing up white and grey space to increase IT density and maximize revenue-generating compute capacity.
- **Dual redundant PCS architecture:** 2 ×2.5 MVA power conversion systems in a redundant architecture deliver high reliability and continuous operation during single-unit maintenance to help minimize downtime.
- **Carbon footprint reduction:** Reduced diesel runtime, improved power train efficiency, and lower copper losses support a more efficient power architecture.
- **Single vendor, single system.** Transformer, reactor, converter, controls, pre-assembled and pre-tested in one container. One purchase order. One system. One accountability. Long-duration batteries will be disposed of in separate containers. Switchgear is optional.

3.0 MVA System configuration

The Vertiv™ PowerNexus MV UPS system is a fully integrated, containerized system. Its topology routes grid power at 34.5 kV through a line reactor and coupling transformer to dual Power Conversion Systems (PCS), which manage both battery charging and load supply. During grid outages, the PCS units switch to battery to help maintain continuous power delivery to connected loads.

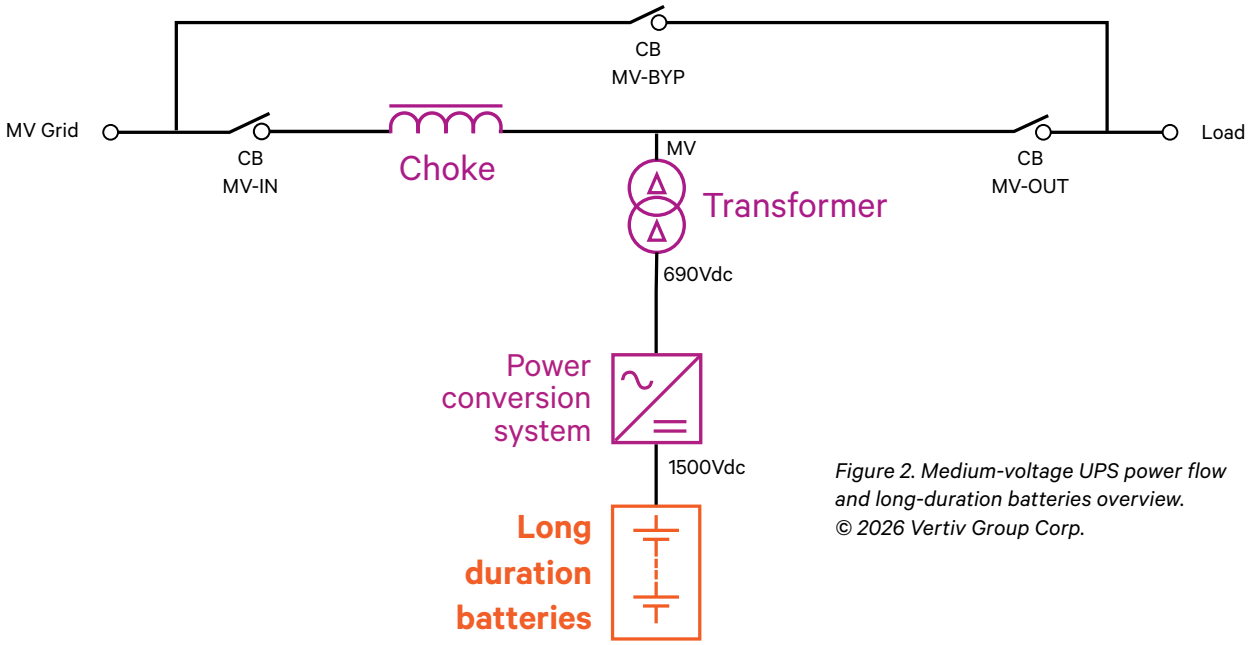


Figure 2. Medium-voltage UPS power flow and long-duration batteries overview.
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System components

1. Line reactor

- Used to decouple the grid from load.
- Limits inrush current and reduces input harmonic distortion.
- Designed and tested per IEEE 57.16/57.21 standards for medium voltage inductive filtering.

2. Coupling transformer

- Steps down 34.5 kV to 690 Vac for the PCS interface.
- Provides galvanic isolation between the medium voltage grid and low-voltage power conversion systems.
- Rated per IEEE C57.12.00/C57.12.90.

3. Power conversion system (PCS)

- Dual 2.5 MVA PCS units (5.0 MVA total AC rated).
- On-grid: Bidirectional AC/DC conversion, reactive power, harmonic compensation, and battery charging.
- On-battery: Full-load supply from battery banks at >98% inverter efficiency. Rated IP66, operating at -20°C to +45°C.

4. Long duration batteries

- Available options to cover backup time from 1 to 4 hours.

Applications

- AI colocation data centers
- Neoclouds
- Hyperscalers

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