## Technical Specification

# Medium Voltage UPS

5MW to 50MW+, 4.16kV to 34.5kV

## **MV UPS Series** connected power conditioning device

### Objectives:

- Deliver conditioned and tightly regulated voltage to sensitive and mission-critical loads
- Buffer rapid AI and industrial load transients, presenting a smooth and predictable power profile to the upstream grid or distributed generation sources
- Support grid stability during utility disturbances by maintaining load connection and surpassing modern grid ride-through requirements, including ERCOT guidelines
- Provide seamless bridge power during transitions between utility and distributed generation sources with zero transfer interruption
- Utilize integrated BESS functionality for backup energy, load support, and extended ride-through operation when required
- Supply high fault-clearing current capability to support downstream fault clearing and maintain system continuity

### Technical highlights:

| | |
|---|---|
| Efficiency | >98% |
| Fault clearing capability | > 450% of rated current |
| Dynamic response | Equivalent to LV double-conversion UPS — surpasses the ITIC curve & Semi47 requirements |
| Input power smoothing | Fully compliant with utility and slow-ramp distributed generation (e.g., gas turbines) dynamic load requirements |
| Load profile compatibility | Optimized for both industrial and AI data center load profiles |
| Energy storage autonomy | Scalable from seconds to multiple hours |

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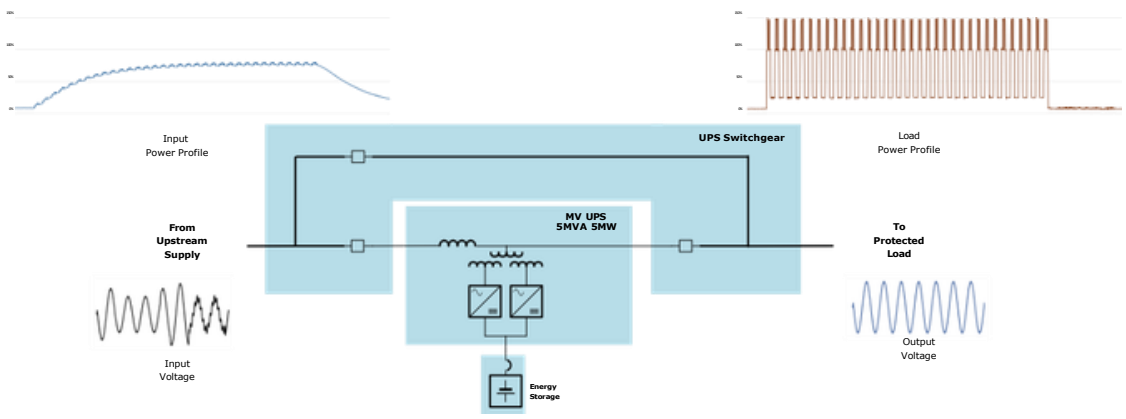
## Architecture




The MV UPS is a high-performance, high-efficiency power-conditioning and uninterruptible power supply built on an advanced line-interactive architecture. It protects critical loads from a broad spectrum of utility voltage events while delivering continuous, clean power.

At the core of this architecture is an isolating line reactor paired with high-performance power converters. This elegant design — enhanced by advanced controls — achieves exceptional availability and class-leading efficiency. The isolating line reactor decouples the system from the utility grid, allowing the converters to continuously condition and filter upstream disturbances such as sags, surges, harmonics, voltage imbalance, and transient deviations without engaging the energy storage. Downstream events, including load-side faults and dynamic reactive-current swings, are absorbed by the architecture's robust overload capability.

The isolating line reactor and coupling transformer operate at medium voltage, while the power converters and energy storage remain on the low-voltage side — keeping maintenance simple and serviceability straightforward.

Output voltage quality matches that of leading low-voltage double-conversion UPS systems, exceeding ITIC ride-through requirements and ensuring stable, reliable delivery to the most sensitive loads.

The MV UPS also acts as a dynamic buffer between rapidly cycling load profiles and the upstream grid, presenting a clean, stable, grid-friendly load that accommodates any grid-integration requirement or distributed-generation constraint.

Compatible with a broad range of modern energy storage technologies — including ultracapacitors and LFP batteries — the system scales from seconds to multiple hours of autonomy to meet virtually any application requirement.

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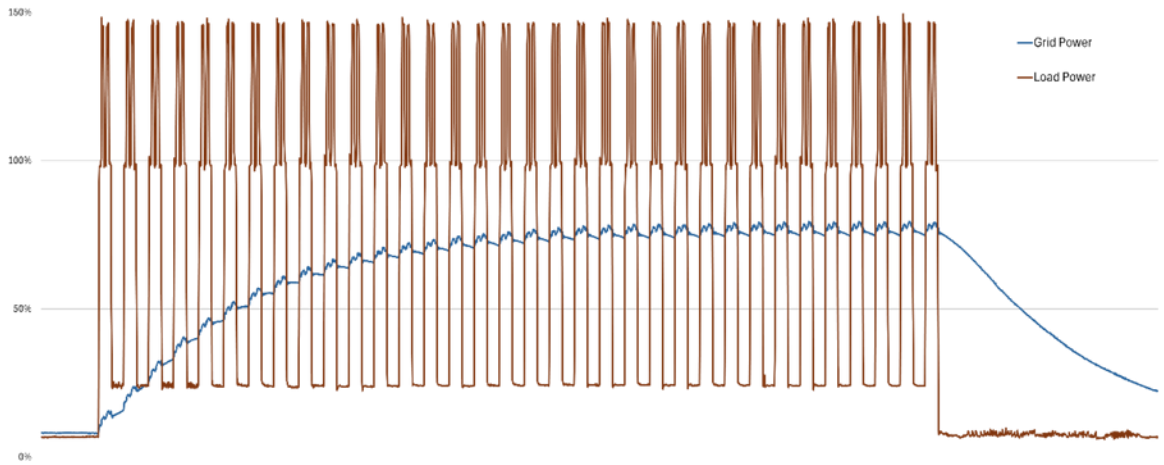
# Grid Stability Redefined

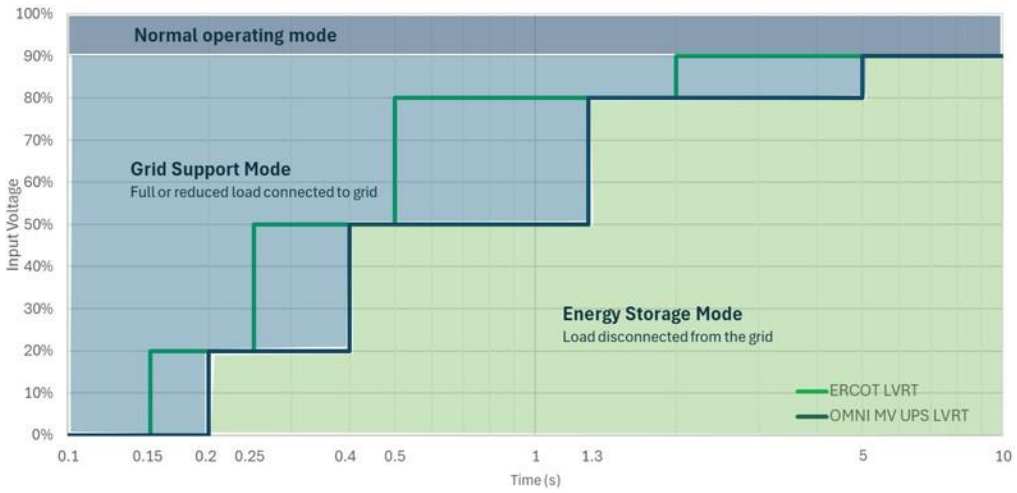
## Dynamic Load Buffering

Dynamic Load Buffering is an advanced MV UPS functionality that decouples fast-changing AI and HPC loads from the upstream electrical infrastructure. By absorbing rapid load fluctuations and smoothing power demand seen by the utility grid and on-site generators, the system reduces voltage instability, frequency deviations, and mechanical stress on generation assets. This enables stable operation of large fluctuating loads while improving overall grid compatibility and power system reliability.




## Fault Ride Through

The MV UPS features advanced Fault Ride Through (FRT) capability designed to support modern large-load grid interconnection requirements. During grid disturbances, the UPS operates in grid support mode, maintaining full or partial load connection to the utility grid instead of immediately disconnecting the facility. The system ride-through performance exceeds current ERCOT Large Load (LL) voltage ride-through curve requirements, providing significant operational margin for future and evolving grid compliance standards.

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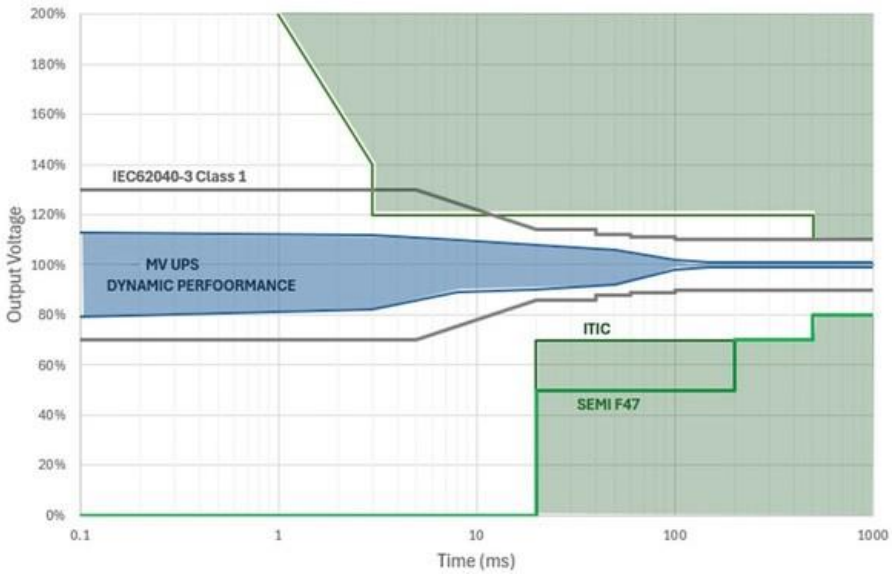
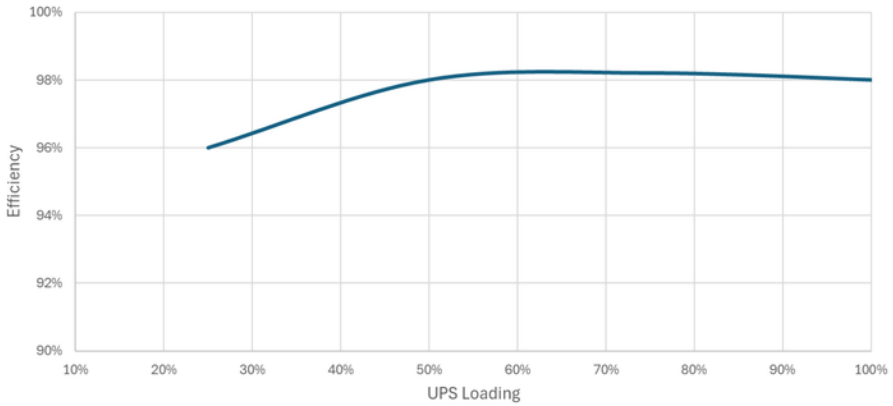
# Worry Free Operations

## Dynamic Performance

The MV UPS delivers ultra-fast dynamic performance with continuous full online operation and zero transfer time during upstream grid disturbances or rapid load changes. The system maintains tightly regulated output voltage under severe utility events and large transient load steps, providing load immunity performance exceeding industry standards such as ITIC and SEMI F47. Its dynamic response performance is in line with, or superior to, traditional double-conversion LV UPS systems compliant with IEC 62040-3 Class 1, while operating at medium voltage and multi-megawatt scale.




## Efficiency




The MV UPS delivers industry- leading efficiency of up to 98% across a wide operating range, substantially reducing operational losses compared to traditional LV double-conversion UPS systems. Compared to alternative medium- voltage backup technologies, the system provides dramatically lower energy losses, resulting in significant reductions in operating costs.

Designed as a fully outdoor-rated solution, the MV UPS eliminates dedicated UPS HVAC infrastructure, reducing parasitic cooling losses and further improving overall facility efficiency and PUE for large-scale AI, HPC, and mission- critical applications.

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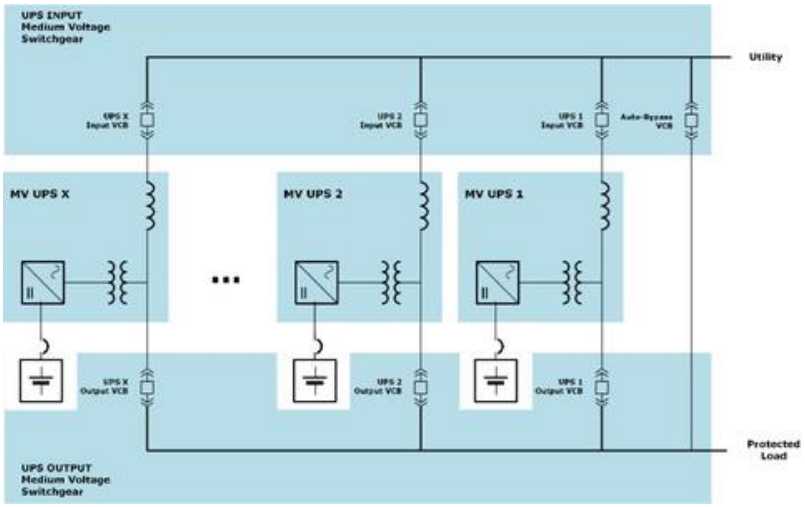
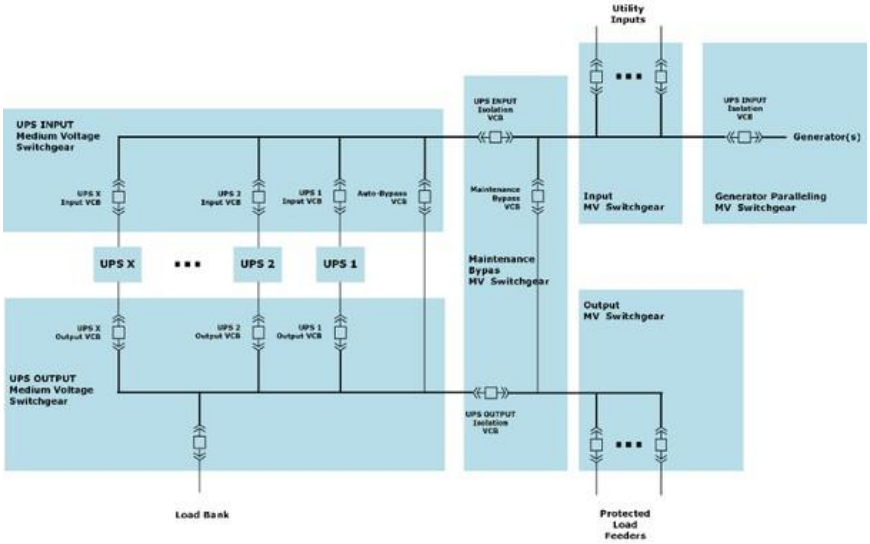
# System configuration overview

## Parallel and/or Redundant configuration




Multiple units can be connected in parallel to scale total system capacity beyond 50 MW, with each unit contributing equally to both load sharing and redundancy. This architecture natively supports any redundancy tier — from N+1 to full 2N — without requiring additional switchgear or bypass infrastructure, making it equally suited to cost-optimized deployments and mission-critical applications demanding the highest levels of availability.

## Dedicated Electrification System




A standard MV UPS project is built around a core system rated up to 50 MW or beyond, seamlessly integrated with the site's Balance of Plant electrical infrastructure. Depending on project requirements, this can range from a streamlined three-breaker MV maintenance bypass to a fully engineered switchgear arrangement managing all incoming and outgoing feeders. For more complex sites, the scope can extend further to encompass comprehensive MV generator-paralleling switchgear — enabling fully integrated islanding, generation dispatch, and source transfer within a single, cohesive electrical system.

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No two MV UPS deployments are alike. Each project carries its own technical nuances, performance criteria, and integration constraints that cannot be addressed with a one-size-fits-all approach. This is precisely where Omniverter's engineering depth becomes a decisive advantage — translating site-specific requirements into a precisely configured, fully optimized solution through a rigorous, consultative design process that spans from initial concept through final commissioning.

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## Operating principle

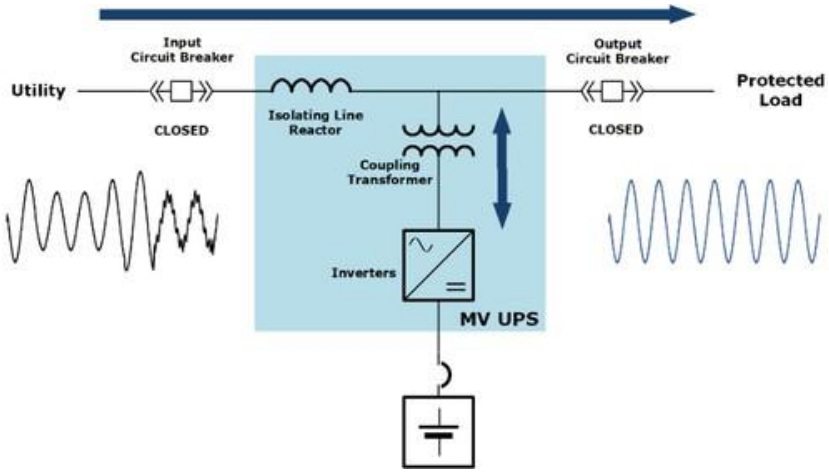
The MVUPS delivers continuously regulated output voltage to the load, independent of upstream utility conditions. Its high-performance power-electronic inverters maintain tight output regulation across the full range of load power factors and input voltage disturbances — achieving output quality fully consistent with LV double-conversion UPS standards. The system exceeds ITIC ride-through requirements and provides continuous clean power, all while sustaining system efficiency in the 98% range.

The advanced line-interactive architecture inherently functions as a dynamic buffer between variable or rapidly cycling loads and the upstream grid. By presenting a clean, stable, and predictable load profile to the utility or distributed generation, the system supports grid-integration requirements and mitigates constraints common in distributed or weak-grid environments.

The architecture also intelligently manages energy storage utilization based on disturbance severity. For shallow voltage sags and swells, the isolating line reactor and converter stage absorb and correct the disturbance entirely — without drawing on the energy storage system. This eliminates unnecessary micro-cycling, preserves battery health, and extends service life. For deep voltage sags or complete supply interruptions, the input breaker opens and the MV UPS transitions seamlessly to stored energy, maintaining uninterrupted, regulated voltage to the protected load with no detectable discontinuity.

### Power conditioning mode

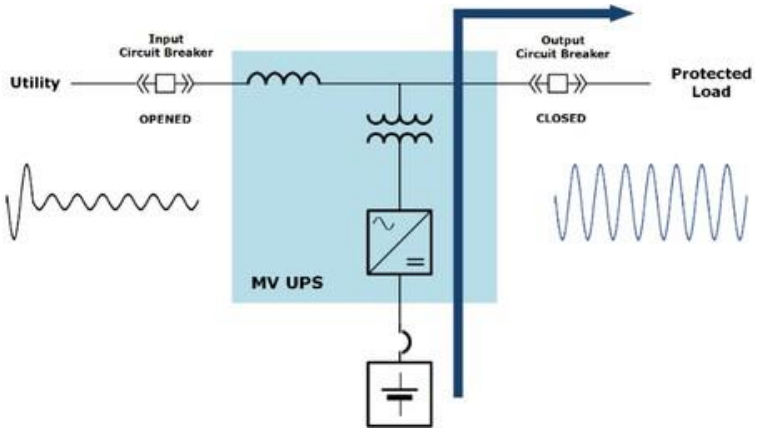
During Power Conditioning mode, the power converters actively regulate power flow between the utility and the load without engaging the energy storage system, eliminating unnecessary battery cycling and preserving stored energy for critical events. At the same time, the MV UPS continuously conditions the incoming supply, mitigating upstream disturbances such as voltage sag, surges, harmonics, voltage imbalance, flicker, and transient voltage deviations before they reach the protected load.




The system provides real-time dynamic reactive power support and high-speed voltage regulation, ensuring stable, high-quality power delivery during steady-state operation, rapid AI load fluctuations, and downstream fault conditions. As a specialized extension of Power Conditioning mode, the MV UPS also delivers advanced Fault Ride Through capability, supporting the upstream grid during voltage disturbances while maintaining full or partial load connection to the utility system. This enables compliance with modern large-load grid interconnection requirements while preventing unnecessary facility disconnection during grid events.

### Energy storage mode

If utility power becomes unavailable, the MV UPS immediately opens its input breaker and transitions the load to the energy storage system without interruption, entering energy-storage mode. The transfer is seamless and imperceptible to the protected load — output voltage regulation is maintained continuously throughout. Stored energy then sustains the critical load for the required ride-through duration, bridging the gap until utility voltage is restored or an alternative source — such as a diesel generator — is brought online, synchronized, and ready to assume the load.



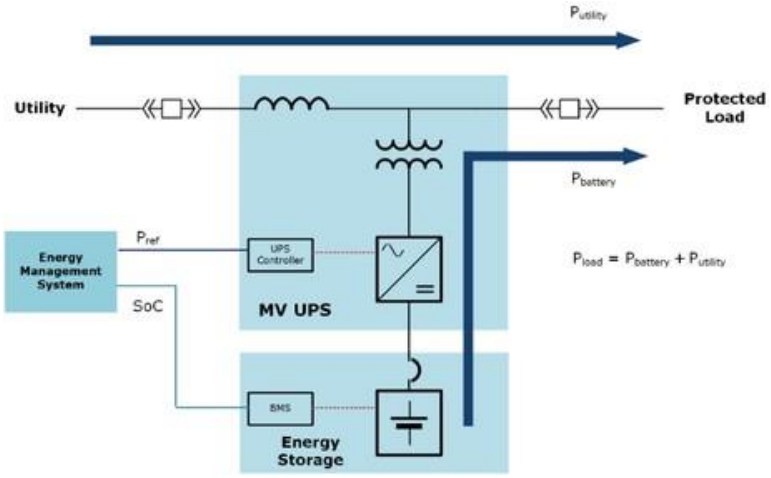

## Grid Support

### Ancillary Grid Services

The MV UPS integrates seamlessly with external Energy Management Systems (EMS), unlocking a broad range of intelligent grid-support functions beyond core power protection.

The onboard energy storage system can be actively dispatched for peak shaving — reducing demand charges and flattening load profiles — as well as for renewable energy integration support, smoothing the inherent variability of solar and wind generation to deliver a stable, predictable output to the grid.

Together, these capabilities transform the UPS from a purely protective asset into an active, revenue-generating grid resource — improving both operational economics and overall system resilience.

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## Technical data

| | | |
|---|---|---|
| Rated Voltage | 4.16kV to 34.5kV | Application specific voltage |
| Rated Power | 5MVA, 5MW | Single unit |
| System Max Rated Power | 50MW+ | Parallel operation |
| **Performance** | | |
| Efficiency | >98% | |
| Dynamic Output Performance | In line with LV double conversion UPS<br>(IEC62040-3 Class 1)<br>Surpassing the ITIC requirements<br>Surpassing the SEMI F47 requirements | Full online, not transfer time |
| Architecture | Advanced Line interactive | |
| **Output** | | |
| Steady State Voltage Variation | ±1% | |
| Rated Frequency | 50Hz or 60Hz | |
| Frequency Accuracy | ±0.1% | ES mode only |
| Maximum Fault Clearing Current | >450% | |
| | | |

| | | |
|---|---|---|
| **Advanced Functionality** | | |
| Dynamic Load Buffering | Adjustable load rate or fully adaptive | Input smoothing of rapidly cycling load profiles on the output |
| Fault Ride Through | LVRT and HVRT compatible | ERCOT and other grid requirements |
| Distributed generation support | Controlled load hand over | Keeping the upstream grid stable |
| BESS functionality | Yes | External EMS required |

| | | |
|---|---|---|
| **Interface** | | |
| System Display | 12” Touchscreen display | |
| Communication | Ethernet<br>Modus TCP | |
| Hardwired Interface | Digital Inputs<br>Relay Outputs | |

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| MV Switchgear | | |
|---|---|---|
| Type | Air Insulated or Gas Insulated | Manufacturer agnostic |
| IEDs | As required by UPS and system protection | IED Manufacturer agnostic |
| Specification | VCBs, PT, CTs, SAs, for the MV UPS portion as per the UPS engineering requirements | Contact Fuji Bridex for more details |

| Energy Storage | | |
|---|---|---|
| Type | LFP, ultracapacitors | Manufacturer agnostic |
| Autonomy | seconds to hours | Project specific |
| Rated voltage | < 1500VDC | |
| Specification | As per the UPS engineering requirements | Contact Fuji Bridex for more details |

| System Dimensions | | |
|---|---|---|
| **Single UPS unit, 5MVA, outdoor NEMA3R** | | |
| Dimensions (LxWxH) | 40’ x 8’x 8’ | |
| Weight | 39T (86000lbs) | |
| **Single battery system, 5MW, outdoor** | | |
| Dimensions (LxWxH) | One or multiple 20’Lx 8’W containers | Autonomy and application dependent |
| **MV Switchgear** | | |
| Dimensions (LxWxH) | Project dependent<br>Indoor, Outdoor NEMA3R, Outdoor PDC | |

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