

Technical Specification

Medium Voltage UPS Solution

5MW to 50MW+

5kV to 36kV



MV UPS Solution Series connected power conditioning device

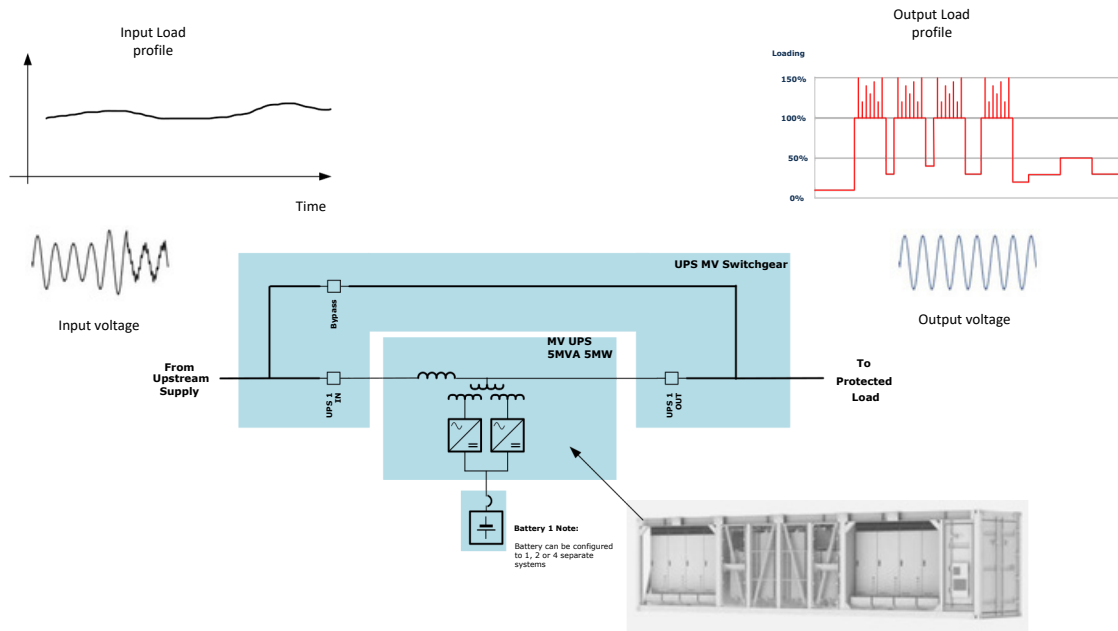
Objectives:

- Deliver conditioned, stable voltage to downstream solid-state transformers (SST) and/or conventional transformers
- Buffer AI and industrial load power transients, presenting a smooth, predictable power profile to the upstream grid or distributed generation source
- Provide seamless bridge power during transitions between grid and distributed generation, eliminating transfer interruptions
- Deliver ancillary grid services on demand, including full compliance with ERCOT large-load voltage ride-through requirements
- Supply high-magnitude fault-clearing current to clear downstream faults 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
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

Architecture



The MV UPS Solution 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.

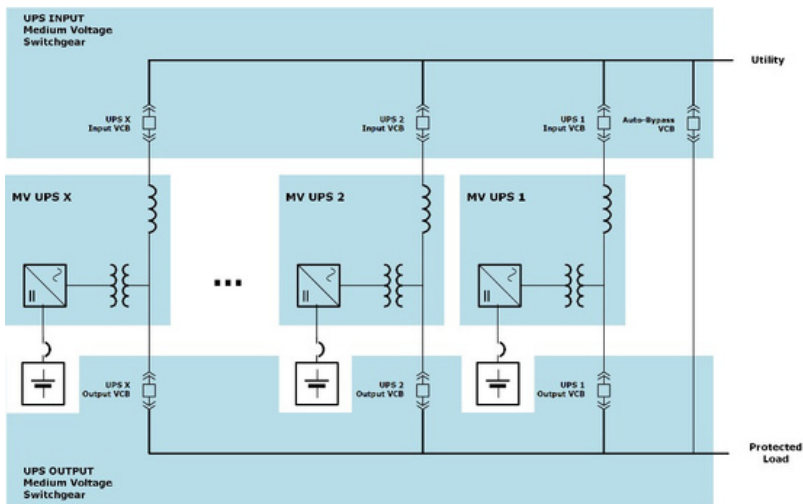
Output voltage quality matches that of leading low-voltage double-conversion UPS systems, exceeding ITIC ride-through requirements and ensuring stable, reliable delivery to the most sensitive loads.

The MV UPS Solution 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.

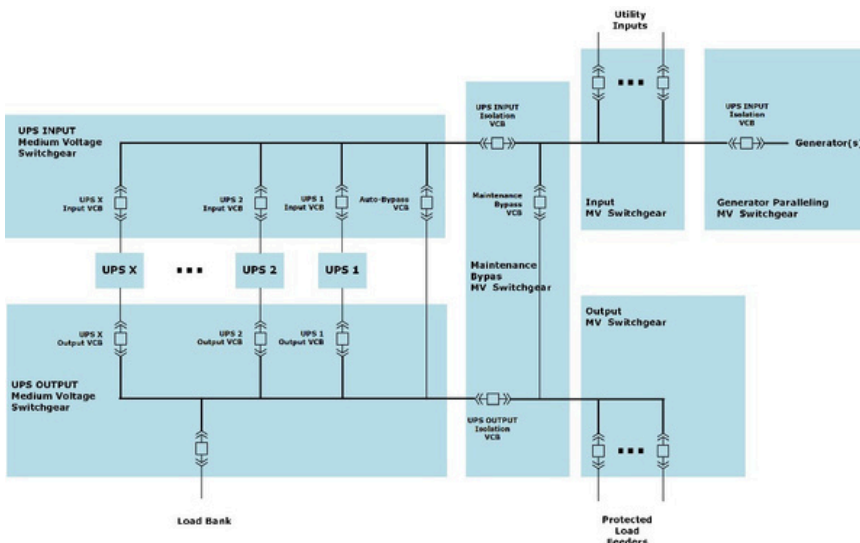
System configuration overview

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



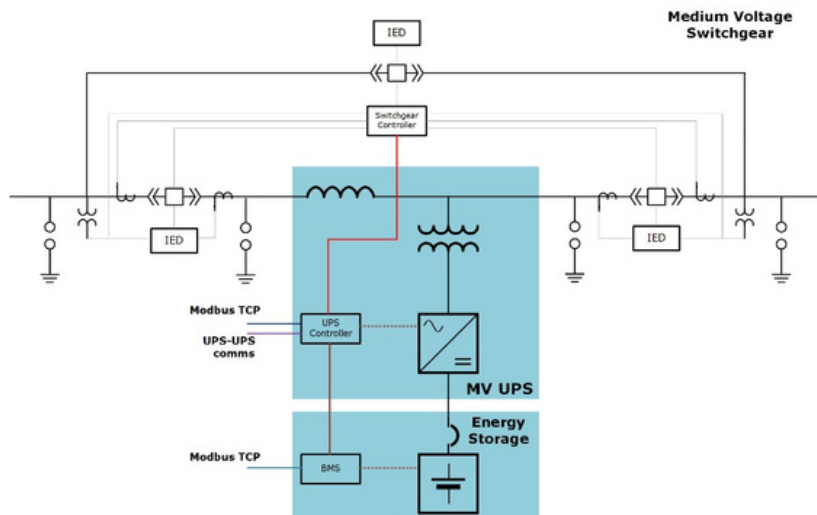
A standard MV UPS project is built around a core system rated up to 50 MW or beyond, seamlessly integrated with the site's Balance of Plant electrical infrastructure. Depending on project requirements, this can range from a streamlined three-breaker MV maintenance bypass to a fully engineered switchgear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

MV UPS System Design Overview

Single 5000kVA system design example



Seamless integration between the UPS and MV switchgear is achieved through a dedicated switchgear controller embedded directly within the switchgear lineup. This controller continuously acquires real-time data from current transformers (CTs) and potential transformers (PTs), feeding live electrical measurements directly to the UPS main controller to enable precise, informed decision-making.

Simultaneously, the UPS controller issues coordinated commands to the MV vacuum circuit breakers (VCBs) through the switchgear controller — ensuring that protection and operating sequences are executed with tight synchronization across the entire system.

Every MV switchgear component is engineered and configured specifically around the operational demands of the UPS, ensuring the integrated assembly performs as a unified system rather than a collection of independently specified equipment.

The result is a tightly coupled, fully coordinated MV power system with deterministic behavior across all operating modes — from normal steady-state operation through fault response and source transfer.

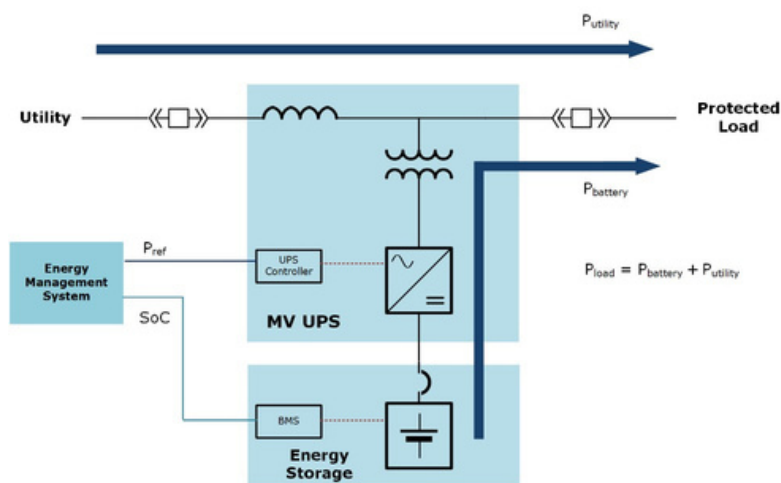
For further technical details or project-specific integration requirements, please contact Fuji Bridex.

Ancillary Grid Services

The MV UPS Solution 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 MV UPS Solution from a purely protective asset into an active, revenue-generating grid resource — improving both operational economics and overall system resilience.



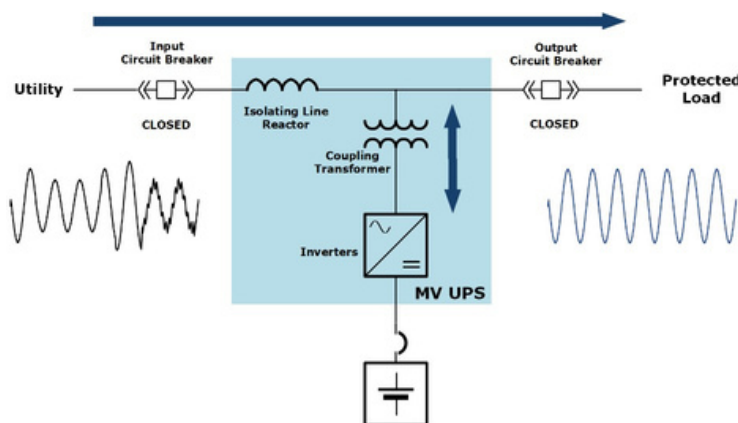
Operating principle

The MV UPS Solution 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 Solution transitions seamlessly to stored energy, maintaining uninterrupted, regulated voltage to the protected load with no detectable discontinuity.

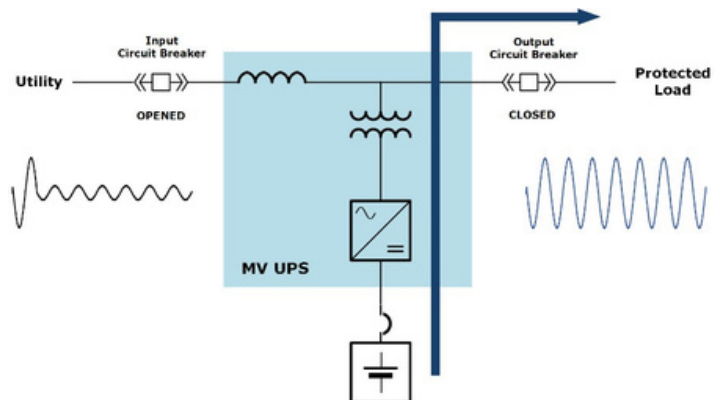
Power conditioning mode



During power-conditioning mode, the power converters actively regulate both real and reactive power flow from the utility to the load — without engaging the energy storage system, eliminating unnecessary cycling and preserving storage capacity for when it matters most. Simultaneously, the MV UPS Solution continuously conditions the incoming supply, filtering upstream disturbances including harmonics, voltage imbalance, and transient deviations before they can propagate to the protected load. Dynamic reactive-current support is provided in real time, ensuring stable, high-quality voltage delivery under all load conditions — from steady-state operation through rapid load swings and downstream fault events.

Energy storage mode

If utility power becomes unavailable, the MV UPS Solution 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.





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 Surpassing the ITIC 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
Distributed generation support	Controlled load hand over	Keeping the upstream grid stable
BESS functionality	Yes	External EMS required
Special grid requirements	LVRT and HVRT compatible	ERCOT and other grid requirements
Interface		
System Display	Touch screen display	
Communication	Ethernet Modbus TCP	
Hardwired Interface	Digital Inputs Relay Outputs	



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	25T (55000lbs)	

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 Indoor, Outdoor NEMA3R, Outdoor PDC	



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