

Grid Edge Solutions

e-mesh PowerStore Integrated

Hitachi Energy's latest innovation in grid stabilizing technology incorporates advanced grid-forming converter and virtual generator capabilities for resilient and cost-effective access to power.

Energy storage with a compact footprint

Hitachi Energy's e-mesh™ PowerStore™ grid-forming battery energy storage systems are designed for both grid-connected and off-grid applications, ensuring reliable power, seamless renewable integration and grid stability while reducing operating costs and complying with main grid codes and standards.

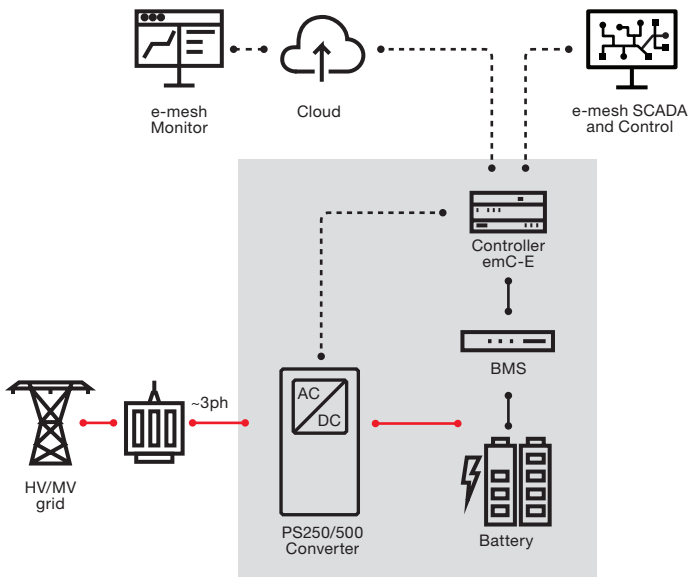
Intended for small and medium power applications across remote communities, oil & gas and mining, defense and commercial and industrial establishments, e-mesh PowerStore Integrated* is a fully packaged, easy-to-deploy solution.



Key automation features of the e-mesh PowerStore systems include:

- **Peak shaving:** Reduce peak demand from your facility or power system
- **Renewable shifting:** Store excess renewable production to be used during peak demand hours
- **Frequency and voltage support:** Proprietary Virtual Generator Mode algorithms manage frequency and voltage excursions
- **Renewable smoothing:** Smooth out the rapid fluctuations in power output from renewable generators and dynamic loads
- **Microgrid/Islanding:** Grid-forming, seamless transition and black start capabilities to provide power in the event of utility disruption
- **Cyber Security:** assuring high level of cyber security according NERC-CIP and IEEE 1686

* available on a limited basis

**Key components:**

- e-mesh Control
- Outdoor grid-forming power conversion system with AC and DC protection included
- Battery racks, BMS and battery protection
- Fire detection and suppression



e-mesh™ PowerStore™ Integrated is a fully packaged, easy-to-deploy solution that comes with lithium-ion batteries, power conversion system and sophisticated automation. Built for safe operation in a variety of environments, the solution has AC and DC protection systems and can be installed indoor or outdoor in a fully outdoor-rated enclosure.

Readily available in various ratings with a standardized specification for installation as per customer requirements.

Extensions with additional battery pods upon request.

Battery System Power & Energy ratings

The DC system integrates 0.5Cp¹ to 2Cp battery modules in different configurations allowing great flexibility in terms of power – energy ratio (Cp).

Different configurations are available achieving DC energy storage capacity at the BoL² up to:

- 2Cp: 280 kWh
- 1Cp: 356 & 712kWh
- 0.5Cp: 406 & 812kWh

[1] Cp Ratio Power / Energy in DC
 [2] BoL Beginning of Life

Technical specifications

GENERAL DATA

Product name	PowerStore Integrated
AC power (40°C)	125 to 500 kVA
AC voltage on the LV side	480V
MV/LV transformer	Required (external)
Nominal frequency	50 or 60 Hz
Charge/Discharge duration	0.5 to 2 hours
DC voltage range	750 – 1150V

DC SUBSYSTEM FEATURES

Material	Metal Enclosure with Fire resistance internal panels
Protection degree	IP54
Painting	C5M
Fire resistance	60 minutes
Cooling	HVAC / Chiller
Operating temperature	-20°C to 50°C
Maximum operating altitude	2000 m without derating
Relative humidity	0 to 95% non-condensing
Installation	Base fixing on concrete footing or raised platform
Handling	Crane lifting

SAFETY & QUALITY

DC protection	Fuses & disconnecter
Ground fault detection	Alarm & Trip with impedance monitoring
Lightning protection	Surge Protection Device DC (Type 2)
Fire detection & suppression	Included
Certification	UL & CE mark
Quality	ISO 9001

CONTROL SYSTEM

Local controller	e-mesh Control RTU
Control interface	Modbus-RTU, Modbus-TCP/IP, IEC60870-5-104. Others available upon request ³
Web server	HMI Panel (Optional)
SCADA	e-mesh SCADA (Optional)
Remote access	e-mesh Monitor (Optional)
Remote communication	Wired: TCP-IP via ethernet Wireless: GSM/3G or 4G (Optional)

Basic control modes

Grid following (on grid)	External PQ (power) DQ (Current) Cos Phi (pf) references
Grid transition (on/off)	Seamless transition in both directions available for PQ control
Grid forming (off grid)	External PQ references
Black start capable	Yes, includes DC pre-charge. Requires external auxiliary control power

Extended control modes

Grid following (on grid)	External f & V references for our GSM ² primary control functionalities: Fast Voltage & Frequency support based on droops & dead band Virtual Inertia
Grid transition (on/off)	Seamless transition from VGM ³ to GSM ² in grid connected and island
Grid forming (off grid)	External f & V references for our VGM ³ primary control functionalities: - Droop control with dead band - Synthetic Inertia & Synthetic impedance - Current limiting during faults and inrush

[1] DNP3, IEC 61850 optional

[2] GSM: Grid Support Mode

[3] VGM: Virtual Generator Mode

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