

GRID EDGE SOLUTIONS

## e-mesh PowerStore Integrated Energy storage with a compact footprint



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

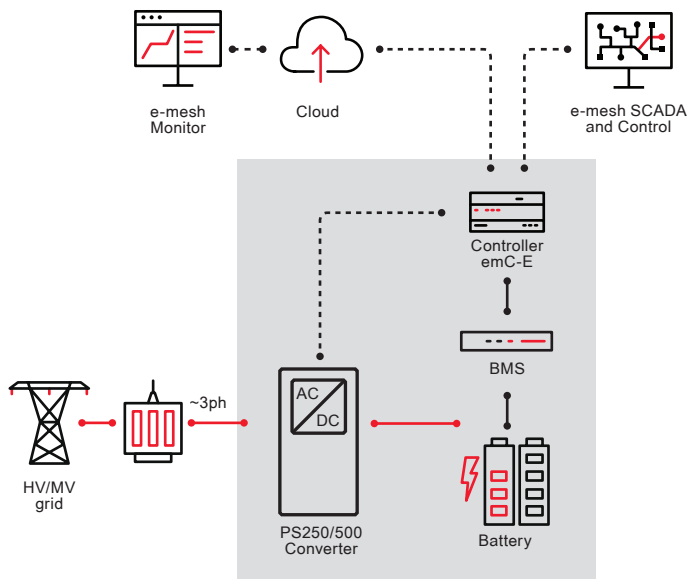
01 PowerStore Integrated

Hitachi ABB Power Grids' 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



**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

02 PowerStore Integrated



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 0.5Cp<sup>1</sup> 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 BoL<sup>2</sup> 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 <sup>3</sup>   |
| Web server                    | HMI Panel (Optional)  |
| SCADA                         | e-mesh SCADA (Optional)   |
| Remote access                 | e-mesh Monitor (Optional)   |
| Remote communication          | Wired: TCP-IP via ethernet<br>Wireless: GSM/3G or 4G (Optional)   |
| <b>Basic control modes</b>    |   |
| 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  |
| <b>Extended control modes</b> |   |
| Grid following (on grid)      | External f & V references for our GSM <sup>2</sup> primary control functionalities:<br>Fast Voltage & Frequency support based on droops & dead band<br>Virtual Inertia  |
| Grid transition (on/off)      | Seamless transition from VGM <sup>3</sup> to GSM <sup>2</sup> in grid connected and island  |
| Grid forming (off grid)       | External f & V references for our VGM <sup>3</sup> primary control functionalities:<br>- Droop control with dead band<br>- Synthetic Inertia & Synthetic impedance<br>- 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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