
# Merus® PCS

## Power Conversion System

**Merus Power, a Finnish technology leader, delivers innovative turnkey battery energy storage system (BESS) solutions, fully designed, manufactured, and tested in-house. With proprietary technology like the Power Conversion System (PCS) and the Control & Protection System developed internally, we ensure seamless integration with top-tier LFP batteries and maintain the flexibility to adapt swiftly to evolving market demands.**

### SCALABLE DESIGN WITH EXPERTISE

Redundant and independent units in 1 MW increments – offering the flexibility to design tailored solutions that maximize profitability for each customer, supported by our expert engineers who are always available to assist.

### GRID FORMING CAPABILITIES

With decades of power electronics expertise, Merus Power originated as a grid support company and is now pioneering advancements like grid-forming capabilities. As Finland leads in adopting these requirements, we help clients stay competitive as similar standards emerge across Nordic markets.

### SUPERIOR WEATHER RESISTANCE

Engineered for arctic conditions down to -40°C, snow, and ice, our system ensures safe, reliable operations and high availability in any weather.

### SAFETY PRIORITIZED

As a European manufacturer, we prioritize safety, durability, and cybersecurity in every design. We ensure long-lasting performance and incorporate advanced protective measures to keep our solutions secure and resilient in an increasingly digitalized energy landscape.

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**Power Conversion System**

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| **GENERAL INFORMATION** | |
| Origin of goods | Finland |
| Standard compliance | IEC 62933, Electrical energy storage (EES) systems |
| **ENVIRONMENTAL CONDITIONS** | |
| Ambient temperature | -40°C to 40°C without derating.<br>Up to 60°C with derating |
| Type of installation | Outdoor |
| **UNIT RATINGS AT PCC** | |
| Active Power (800V Un) | 1000kW / PCM module – up to 5 PCM modules |
| Apparent Power (800V Un) | 1053kVA / PCM module – up to 5 PCM modules |
| Power factor range | +/- 0,95 at rated active power |
| **AC CONNECTION** | |
| AC system type | 600-800 V +/- 10<br>IT system, 3-wire |
| Available voltage levels | Any voltage above 800 V with a step-up transformer(s) |
| Frequency | 50/60 Hz (47.5-51.5 Hz / 57.5-61.5. Hz) |
| Specified power quality | IEEE-519-2014, EN 50160 (requirement in PQ control, specification in Voltage control) |
| PCM inverters | 3-level aNPC inverters with inverter level protection |
| **BATTERIES** | |
| Battery type | LFP / NMC or other equal |
| Battery voltage range | Up to 1500VDC |
| **OPERATION & PERFORMANCE** | |
| Control system type | Merus Control Platform: High-performance DSP+MCU+FPGA<br>with peripheral cards for communication with subsystems |
| Control system response time | <1 ms |
| Maximum power ramp rate | 0 … nominal power in a network cycle (16.67 ms / 20 ms) [1] |
| Output current quality | < 3 % THD(i) |
| Control modes | Grid-connected (PQ control), Islanded operation (voltage control), Grid Forming (GFM) |
| Operation algorithms | Dispatch (active and reactive power setpoint), Frequency regulation, Voltage regulation<br>Reserve markets, Power limiting, State of charge (SoC) control, Black start (optional) |
| Maximum charge /discharge efficiency | >98% typical<br>98,8 peak % [2] |
| **HOUSING** | |
| Ingress protection | IP55 and IP3X |
| Ventilation | Forced air cooling |
| Module dimensions (AC / PCM / DC) | 1550mm x 1200mm x 2400mm (W x D x H) [3] |
| Module weights including plinths (AC / PCM / DC) | 720kg / 1400kg / 670kg |
| **MONITORING AND CONNECTIVITY** | |
| HMI | Local touchscreen at system level (optional) |
| Remote operations and digital services | MERUSCOPE™ platform |
| Available interfaces for external systems | IEC-104 as default<br>Modbus TCP, gRPC & others upon request |

[1] Subject to network fault level. The ramp rate is usually intentionally slowed down to avoid rapid transients in the network.
[2] Efficiency for PCS only. System efficiency is configuration- and operation point dependent. For details, please contact Merus Sales.
[3] For detailed dimensions refer to Merus PCS site planning data document.

MERUS POWER

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