

System Overview: Gigavolt CompactGrid C-1200 Modular Storage Unit

General Description

The **Gigavolt CompactGrid C-1200** (Model: **C-1200**) is a compact, skid-mounted energy storage system built for telecom shelters, microgrid distribution nodes, and electric vehicle DC fast-charging buffer stations. It operates at an energy capacity of 1,200 kWh with an output rating of 300 kW. The unit features standardized slide-in rack cassettes, enabling hot-swapping during scheduled low-demand maintenance windows.

Technical Specifications

- **Model Identifier:** **C-1200**
- **Equipment Series:** CompactGrid Modular Distribution Series
- **Nominal Output Power:** 300 kW
- **DC Voltage System:** 480 V nominal (Operating: 400 V - 550 V DC)
- **Cell Chemistry:** Lithium Iron Phosphate (LiFePO₄)
- **Cooling Architecture:** High-static-pressure dual axial fan air cooling with integrated cabin thermal shutter doors
- **Sub-Module Weight:** 48 kg per cassette (24 cassettes per cabinet)
- **Ingress Protection:** NEMA 3R / IP54

Safety Protocols and Standard Operating Procedures (SOP)

SOP 12: Cassette Insertion and Extraction

1. Verify rack string breaker **CB-RACK-[1-4]** is switched to the **OFF** position.
2. Confirm the cassette status LED indicates extinguished/safe state.
3. Connect anti-static ESD wrist strap to grounding point **GND-STUD-01**.
4. Loosen dual retention knurled thumbscrews on both mounting ears of the cassette.
5. Using cassette extraction tool (Part: **TOOL-EXT-C1**), slowly withdraw the module halfway (250 mm), pause for 5 seconds to ensure guide rails hold mechanical equilibrium, then lift using two-person ergonomic lift procedures.

6. Never insert hands or tools into blind-mate rear high-current connector receptacles
REC-HV-REAR.

[CAUTION]: BLIND MATE CONNECTORS CARRY RESIDUAL CAPACITIVE CHARGE.

ALLOW 180 SECONDS POST-DISCONNECT BEFORE TOUCHING INTERNAL
RECEPTACLES.

Diagnostic Procedures & Troubleshooting Trees

Diagnostic Code Table

Fault Code	Telemetry Name	Severity	Primary Root Cause	Corrective Action
ERR_THM_204	Air Intake Delta Mismatch	Warning	Intake filter clogged with debris, louvers jammed	Inspect intake air filters FLT-AIR-12. Wash or replace filter media. Check louver servo SRV-LUV-02.
ERR_VOLT_102	Under-Voltage Cutoff	High	Deep discharge past allowable DoD limit, cell balance defect	Isolate rack. Apply low-current recovery charging profile (0.05 C max) using auxiliary charger CHG-AUX-480.

Fault Code	Telemetry Name	Severity	Primary Root Cause	Corrective Action
ERR_FUSE_001	DC String Fuse Blown	Critical	External dead short, power component avalanche breakdown	Replace semiconductor fuse Part FUS-FAST-600 A. Inspect DC bus polarity before restoring breaker.
ERR_SENS_005	Humidity Excursion (>90% RH)	Moderate	Enclosure door gasket degraded, condensation heater failure	Inspect condensation heater HTR-CAB-100 . Inspect silicone door seal GSK-DR-1200 ; replace if worn or cracked.

Decision Tree: Rapid Degradation or Premature Capacity Loss

1. Has capacity dropped > 5% within a 90-day window?

- **YES:** Extract raw BMS CSV cycle logs from SD card logger port or telemetry broker.

2. Review continuous charge/discharge C-rate metrics:

- Did operational telemetry log continuous discharge at > 1.2 C in ambient environments > 40 °C?
- If yes: Inform customer of operational warranty breach under Section 4.3 (Operating Thermal Boundaries).

3. Inspect individual module drift:

- Measure open-circuit voltage (OCV) across all 24 cassettes after an 8-hour rest.
- If one cassette deviates > 50 mV from string average, remove cassette and replace with fresh unit matching current cycle state. Recalibrate State of Charge (SoC) using manual balance routine.

Parts Inventory Correlation List

When ordering components for C-1200 repairs, ensure cross-referencing with official Parts Database keys:

- FUS-FAST-600A: Ultra-rapid semiconductor fuse, 600A, 700V DC rated.
- FLT-AIR-12: Washable electrostatically charged MERV-11 filter cartridge.
- HTR-CAB-100: Positive Temperature Coefficient (PTC) anti-condensation heating element (100W, 120/240V).
- GSK-DR-1200: Molded EPDM cellular rubber sealing gasket strip with self-adhesive backing.
- BMS-CAS-LFP: Cassette slave BMS balancing board with integrated CAN controller.