

Engineering Change Order: Inverter Thyristor Snubber Assembly Upgrade

ECO Tracking Identifier: ECO-2024-019

Target Platform: Gigavolt Megapack X-7000 (Model: X-7000)

Effective Manufacturing Date: October 1, 2024

Impacted Subsystem: Inverter Bridge Assembly (Part Number: INV-SCR-9901)

Originating Engineer: Marcus Vance, Lead Power Electronics Architect

Reason for Change

Field telemetry logs from three operational utility installations (Unit Serial Numbers: SN-X7-0041, SN-X7-0089, and SN-X7-0112) indicated recurring instances of ERR_INV_404 (DC Overcurrent Trip) under high ambient operating temperatures ($> 40^{\circ}\text{C}$) combined with rapid grid-tie active power ramping. Investigation revealed that the factory-installed RC snubber network was susceptible to thermal fatigue, leading to transient voltage spikes exceeding the breakdown threshold of the primary SCR thyristor bridge.

Engineering Modification Details

- Old Component:** RC Snubber Board SNB-STD-01 (rated for 1,200 V transient absorption).
- Replacement Component:** Metal Oxide Varistor (MOV) and High-Speed Transient Absorption Module SNB-ADV-02 (Gigavolt P/N: SNB-ADV-02, rated for 1,600 V surge with clamping time $< 25\text{ ns}$).
- Firmware Requirement:** Inverter DSP firmware must be updated to version v2.4.11-b or later to adjust commutation dead-time from $2.2\text{ }\mu\text{s}$ to $2.8\text{ }\mu\text{s}$.

Field Service & Retrofit Instructions

- Field dispatches servicing Megapack units built prior to October 2024 showing persistent ERR_INV_404 fault logs must execute Retrofit Kit RET-X7-019.
- Estimated technician labor time: 2.5 hours.

- **Mandatory LOTO:** Ensure all high-voltage DC links are locked out and capacitors discharge below 5.0 V prior to opening Inverter Bay INV-01.