

Standard Operating Procedure: PowerStation G-3500 HVAC Chiller Diagnostics & Refrigerant Recovery

Purpose

This standard operating procedure provides step-by-step diagnostic and field repair instructions for resolving chiller compressor overload alerts ([ERR_HVAC_502](#)) and low refrigeration efficiency within the **Gigavolt PowerStation G-3500**.

Safety & Environmental Regulations

- Technicians servicing the closed-loop chiller must hold EPA Section 608 Universal Certification.
- System refrigerant charge: 14.5 kg of hydrofluorocarbon R410A. Deliberate atmospheric venting is a violation of federal law; full recovery into certified DOT recovery cylinders is mandatory.

Diagnostic Procedure for Error Code [ERR_HVAC_502](#)

1. **Initial Condition Scan:** Review 48-hour trailing telemetry from [bms_telemetry.json](#) for compressor current draw ([I_comp](#)) and chiller discharge temperature ([T_chiller_out](#)).
2. **Condenser Airflow Inspection:** Inspect exterior condenser grilles for debris, dirt encrustation, or vegetation blockages. Wash coils using low-pressure warm water and alkaline coil cleaner.
3. **Gauge Manifold Hookup:** Connect digital manifold gauges to low-side (suction) and high-side (liquid) service ports.
 - **Nominal Suction Pressure:** 8.5 bar to 10.2 bar (123 to 148 psig) at 25 °C ambient.
 - **Nominal Discharge Pressure:** 24.0 bar to 28.5 bar (348 to 413 psig).
4. **Leak Detection & Filter Drier Replacement:** If suction pressure is below 6.0 bar, system has lost refrigerant. Run ultrasonic leak detector along brazed joints. Prior to

evacuating and recharging, always replace inline filter drier (Part Number: **FLT-DHR-410**).

5. **Deep Vacuum Evacuation:** Pull system down with dual-stage rotary vane vacuum pump until micron gauge reads ≤ 350 microns. Perform a 15-minute standing vacuum decay test; pressure rise must not exceed 50 microns.