

BMS Offline Simulation Report – GREATPOWER

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Params: data/params_rack_greatpower.yaml

Scenarios: data/scenarios_greatpower.yaml

Contents:

- 1) Rack & BMS configuration summary
- 2) Scenario test plan (IDs + descriptions)
- 3) Results: metrics + plots per scenario

| Field | Value |
|---|---|
| Active profile | GREATPOWER |
| Params YAMI | data/params_rack_greatpower.yaml |
| Scenarios YAMI | data/scenarios_greatpower.yaml |
| Rack & BMS Configuration Summary | Extracted directly from the active params YAMI used in simulations. |
| Structure: packs_in_series_per_rack | 4 |
| Structure: cells_in_series_per_pack | 104 |
| Derived: n_series_cells | 416 |
| Electrical: q_nom_ah | 280.0 |
| Electrical: r0_ohm | 0.09 |
| Electrical: r1_ohm / c1_f | 0.03 / 8000.0 |
| Electrical: r2_ohm / c2_f | 0.015 / 25000.0 |
| Limits: i_discharge_max_a | 320.0 |
| Limits: i_charge_max_a | 320.0 |
| Limits: v_cell_min_v / v_cell_max_v | 2.6 / 3.6 |
| Limits: t_min_c / t_max_c | -30.0 / 60.0 |
| BMS: soc_low_cutoff / start | 0.05 / 0.1 |
| BMS: soc_high_cutoff / start | 0.95 / 0.9 |
| BMS: t_low_cutoff_c / start (legacy) | -30.0 / 0.0 |
| BMS: t_low_cutoff_discharge_c / start | -30.0 / 0.0 |
| BMS: t_low_cutoff_charge_c / start | 0.0 / 10.0 |
| BMS: t_high_cutoff_c / start | 60.0 / 50.0 |
| BMS: v_margin_v (or split) | 0.05 (low=0.05, high=0.05) |
| Thermal: c_th_j_per_k | 3000000.0 |
| Thermal: r_th_k_per_w | 0.015 |
| Thermal: t_init_c | 25.0 |
| Faults: ov_cell_v / uv_cell_v | 3.65 / 2.5 |
| Faults: ot_rack_c / ut_rack_c | 60.0 / -30.0 |
| Faults: oc_discharge_a / oc_charge_a | 360.0 / 360.0 |

Scenario Test Plan

Scenarios executed in this report.

| Field | Value |
|-----------------------------------|--|
| GP_S1_nominal_25C_1C | Nominal 1C (280A) discharge at 25°C with BMS current limitation. |
| GP_S3_nominal_-10C_0p5C | Cold discharge at -10°C, 0.5C (140A). Used to validate temperature derating / |
| GP_S5_uv_fault_injection | Under-voltage fault (deterministic injection) during discharge at 25°C. |
| GP_S6_ov_fault_injection | Over-voltage fault (deterministic injection) during charge at 25°C. |
| GP_S7_ot_fault_injection | Over-temperature fault (deterministic injection) at 25°C. |
| GP_S8_oc_fault_injection | Over-current fault (deterministic injection) at 25°C. |
| GP_S9_fire_gas_alarm_injection | Fire/Gas alarm pathway test (injected gas_alarm at t=1200s) |
| GP_S10_ekf_convergence_mismatch | EKF convergence demo: true SoC differs from EKF initial SoC. |
| GP_S11_voltage_window_derate_demo | Voltage-window derating demonstration (starts near upper region). |
| GP_S13_charge_0C_cutoff | Charge at 0°C to verify CHARGE low-temp cutoff (expected i_act ~ 0 A due to t) |
| GP_S14_charge_5C_derate_demo | Charge at 5°C to verify linear derate for charge (expected ~50% temp scale be |