

Version control

V2, 11/11/2023 – Updated low temperature set-point, updated best efficiency range.

V3, 05/08/2024 – Added cell voltage criteria for external EMS control.

Overview

If an external Energy Management System (EMS) is used then the EMS must also ensure that the charge/discharge rate is controlled within our specifications. The GivEnergy EMS built into our system will provide the external EMS with high and low cell temperatures and voltages. Deviation out of these tolerances will void system warranty.

Max power

Maximum power is determined by the battery size kWh times the 'C' rating of the system, most GivEnergy systems are designed at 0.5c, the maximum allowable 'C' rating is 0.8c. The maximum power is used to determine the maximum allowable charge rate based on the criteria defined below.

System size	69kWh	138kWh	207kWh	276kWh	600kWh	1.2MWh	2.4MWh
0.5c Max power	34kW	69kW	103kW	138kW	300kW	0.6MW	1.2MW
0.8c Max power	55kW	110kW	165kW	220kW	480kW	0.96MW	1.92MW

Temperature criteria

Our systems are designed to operate most efficiently at between 15 – 35°C, if installing in an environment that is not temperature controlled efficiency and maximum charge/discharge rates may be affected. Based on internal cell temperatures values the maximum power must be limited at high and low temperatures.

Min cell temperature	0°C or less	1 to 12°C	12 to 45°C	> 45°C	> 55°C
Max power	0%	50%	100%	50%	0%

Max cell temperature	0°C or less	1 to 45°C	> 45°C	> 55°C
Max power	0%	100%	50%	0%

State of charge (SOC) criteria

At high and low levels of SOC the maximum power must be limited to avoid over or undercharging the system.

SOC	0 to 7%	8 to 89%	90 to 94%	95 to 97%	98 to 100%
Max power	10%	100%	75%	50%	10%

Cell voltage criteria

As an additional level of protection, the minimum and maximum cell voltages must be monitored and power levels reduced based on the criteria below;

Max cell voltage	>3.500	>3.550	>3.600
Max power	10%	5%	0%

Min cell voltage	<3.000	<2.900	<2.800
Max power	10%	5%	0%

Note: It can be difficult to limit discharge power for off-grid systems, with this in mind if a temperature or cell voltage is approaching a limitation threshold it is recommended to begin providing power from alternative sources.