

ZBM3 flow battery

Redflow's ZBM3 battery is the world's smallest commercially available zinc-bromine flow battery.

Its modular, scalable design means that it is suitable for a wide range of applications from small commercial installations to large GWh storage solutions.

The ZBM3 is smaller, simpler and more compatible than previous versions. The compact and flexible design includes a smaller stack design and a bi-directional DC-DC converter built into the Battery Control Module, allowing flexibility of internal energy flow of 0-60 volts. This makes it compatible with existing and hybrid battery solutions in a wide range of applications.

Benefits

Competitive capex

- + Battery capacity reduces minimally over its lifetime, resulting in low levelized cost of storage and no oversizing required.

Excellent longevity

- + Estimated electrode stack lifetime 10 years / 36,500 kWh energy delivery (based on daily full-depth cycling).

Hibernation mode

- + Can be left at 100% state of charge for extended periods and started up rapidly.

Recyclable

- + All battery components and electrolyte are either recycled or repurposed at end of life.

Constant power

- + Charge 100% of the capacity with constant power, due to a flat voltage curve and simple one stage charge profile.

High energy density

- + 34 kWh per m² / 3.2 kWh ft²* with expected electrode stack throughput of 36,500 kWh. (* Based on Energy Pod200 design).

Unparalleled safety

- + Water based electrolyte proven to have no thermal runaway in accordance with UL9540a.

No HVAC required

- + Systems can be specified to operate in ambient temperatures of 10 °C to 45 °C (50 °F to 113 °F).

Intuitive battery management system

- + 24/7 remote self-monitoring with real-time data capture accessed via the cloud-based system or direct network connection.

Supply chain security

- + Designed and developed in Australia, manufactured in our Thailand facility.



HIGH ENERGY DENSITY AT 10KWH

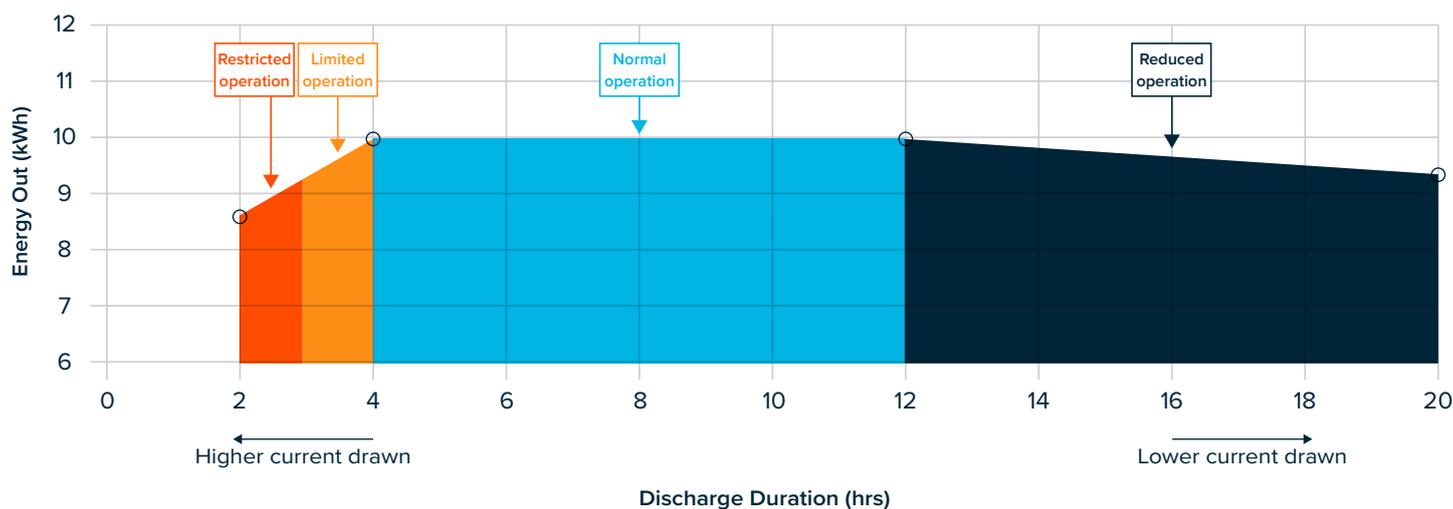


48 VOLT DC NOMINAL BATTERIES



POWER RATING 3KW (5KW PEAK)

ZBM stack energy output vs discharge duration



Technical Specifications

- + **Voltage:** 48 Vdc nominal batteries (typical operating range 40 V to 60 V).
- + **Capacity:** Maximum 10 kWh energy output per cycle. No reserved battery capacity requirement – full 10 kWh cycle depth available.
- + **Degradation:** Minimal (avg. 0.5% p.a.) capacity reduction over 10 year lifetime.
- + **Dimensions:** (W x D x H): 400 x 861 x 747 mm; 16 x 34 x 29 in.
- + **Weight:** 240 kg (530 lb) with electrolyte; 90 kg (198 lb) without electrolyte.
- + **Electrolyte volume:** 100 L (26 Gal).
- + **Stack energy efficiency:** 80% DC-DC Max.
- + **Internal electrolyte operating temperature:** 15 °C to 50 °C (59 °F to 122 °F). ZBM3 can operate at ambient temperatures outside this range depending on enclosure design. Additional cold weather kit available per individual battery.
- + **Communication:** MODBUS RS485 MODBUS-TCP, CANBUS.
- + **Safety data sheet:** DG Class 8 for electrolyte.
- + **Power rating:** 3 kW continuous (5 kW peak).
 - + **3 kW continuous:** current up to 75 A (40 V disconnection point).
 - + **5 kW peak depending on the State of Charge (SOC):** current up to 125 A (40 V disconnection point).
- + **Regulatory compliance:** CE (EU) and RCM (AU) pending.
- + **Performance:** No cycle depth limitations – battery performance and lifetime not sensitive to cycle depth.
- + **Warranty:** 1 year / 3,650 kWh standard warranty (whichever comes first) and up to 10 year / 36,500 kWh extended warranty via an optional long term service agreement.
- + **Standards:** Certification to UL9540a completed.

About Redflow

Redflow Limited, a publicly listed Australian company (ASX: RFX), produces zinc-bromine flow batteries for stationary energy storage applications. Redflow batteries are designed for high cycle-rate, long time-base energy storage, and are scalable from small commercial systems through to grid-scale deployments. Redflow's smart, self-protecting batteries offer unique advantages including secure remote management, 100 per cent daily depth of discharge, tolerance of high ambient temperatures, a simple recycling path, no propensity for thermal runaway and sustained energy delivery throughout their operating life.



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