

# Energy Pod200

The Redflow Energy Pod200 is the modular building block for large commercial and industrial applications through to 'Community Battery'-scale requirements, with the capability to store up to 200 kWh each. 20 ZBM3 hybrid flow batteries are housed in a custom enclosure which provides electrical protection and various power conditioning configurations, enabling it to deliver energy safely and reliably in a range of applications.

## Key applications

- + Peak shaving
- + Renewables integration
- + Backup power
- + Bulk energy shifting
- + Smart grid support
- + On- & off-grid microgrid



## INTEGRATED POWER CONVERSION EQUIPMENT (PCE)

Equipped with optional and scaleable DC-DC converters to achieve higher range output voltages

or

Selected hybrid inverters for direct AC output.

## TECHNOLOGY

- + **Battery type:** Zinc-bromine hybrid flow battery (ZBM3).
- + **Architecture:** 20 parallel connected ZBM3, 10 kWh batteries.
- + **Battery management:** Incorporated Battery Management System (BMS).

## ELECTRICAL RATINGS

- + **Base unit:** 200 kWh/60 kW @ 48 Vdc (nominal, floating)
- + **HiDC unit:** 850 Vdc  $\pm$  10% (balanced to earth)
- + **Integrated unit:** 200 kWh/48 kW (50 Hz, 3-phase, 230/400 Vac) or 200 kWh/36 kW (60 Hz, split-phase 120/240 Vac or 60 Hz, 3-phase 208 Vac) (US only).

## PERFORMANCE

- + **Rated discharge power:**  
Up to 60 kW (cont.) or 100 kW (peak) @ 48 Vdc  
or 30 - 60 kW (cont.) or 100 kW (peak) @ 850 Vdc or AC. <sup>(1)</sup>  
(Nominally 2.5 kW per ZBM3)
- + **Rated discharge energy:** 200 kWh
- + **Duration:** 4 - 12 hours <sup>(2)</sup>
- + **Depth of discharge:** 100%
- + **Maximum charge rate:** 50 kW (2.5 kW per ZBM3).

## BUILDING BLOCKS

- + Compatible with external industrial sized storage inverters or larger central storage inverters at high DC voltages (if DC-DC converters are integrated).
- + Hybrid inverter integrated units can be coupled to existing PV systems (AC-coupled) or support multiple directly connected solar PV strings via MPPT inputs (DC-coupled).

## ON-GRID CONNECTION

- + Suitable AC connection required from site main switchboard.
- + Grid-export capable. <sup>(3)</sup>
- + Blackstart capable. <sup>(4)</sup>

## OFF-GRID CONNECTION

- + Grid-forming <sup>(5)</sup>
- + Blackstart capable. <sup>(4)</sup>

## ENVIRONMENTAL

- + **Ambient temperature:**  
Standard enclosure<sup>(6)</sup>: 10 °C to 45 °C (50 °F to 113 °F).  
With optional Heating Pads: 0 °C to 45 °C (32 °F to 113 °F)
- + **Humidity:** 5 %RH to 95 %RH (non-condensing)
- + **Altitude:** Up to 2,000 m (6,500 ft)
- + **Enclosure:** IP55 / NEMA 3R with C5 rated coating
- + **Seismic:** California building code seismic zone 4. <sup>(7)</sup>



## PHYSICAL

- + **Dimensions ( L x W x H ): 2,927 x 2,261 x 2,200 mm**  
(115¼" x 89" x 86½")
- + **Clearances & access<sup>(8)</sup>:**
  - Front (Control Bay): 1,300 mm (51¼") <sup>(9)</sup>
  - Left/Right side (Battery Bays): 1,300 mm (51¼") <sup>(9)</sup>
  - Rear: 50 mm (2") <sup>(10)</sup>
- + **Mass:** 7,150 - 7,350 kg ± 1.5% (15,765 - 16,205 lbs ± 1.5%)  
(Subject to configuration).
- + **Handling:** Suitable capacity forklift or crane.
- + **Transport:** 2 per 20' or 3 per 40' standard ISO shipping container.
- + **Mounting:** M16 bolts through feet. <sup>(11)</sup>

## SITE PREPARATION

- + **Surface/Foundation:** Compacted soil/crushed stone/tarmac/ concrete pad/plinths/ screw- or driven pile. <sup>(11)</sup>
- + **Seismic fixing:** Fixed to suitable foundation for site geotechnical requirements.

## AUXILIARY POWER <sup>(12)</sup>

- + **Type:** Single phase plus ground, 50/60 Hz
- + **Voltage range:** 110 Vac to 240 Vac
- + **Power consumption:** 1,000 W (max.)

## COMMUNICATION

- + **BMS hierarchy:** Redflow multi-layer BMSs integrate ZBM3s at the enclosure-level, and with inverters and site-level Energy Management System (EMS) or Power Plant Controllers (PPC).
- + **BMS to EMS/PPC protocols:** Modbus-TCP (Ethernet), CAN bus, REST/JSON
- + **BMS to PCE communication:**
  - DC-DC converters: CAN bus, Modbus-RS485
  - Hybrid storage inverters: Modbus-TCP (Ethernet), CAN bus
  - External storage inverters: Modbus-TCP (Ethernet), CAN bus
- + **Remote monitoring:** Cloud-based (BMS) or local monitoring (EMS/ PPC) possible.

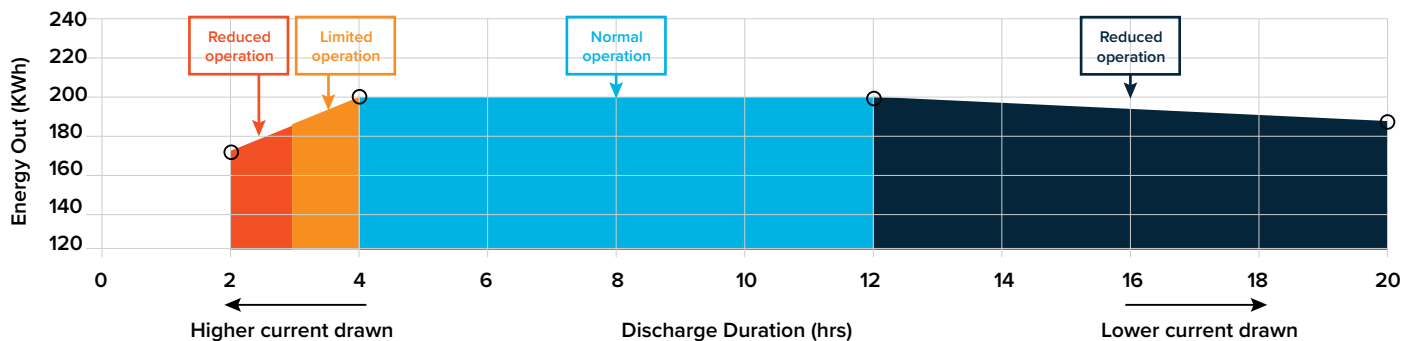
## HARDWARE PROTECTION

- + Optional enclosure mounted STOP button suspends Power Conversion Equipment operation.
- + Isolation circuit breakers on individual ZBM batteries.
- + Integrated inverters are also individually isolated.
- + Protection inherent in the ZBM3 batteries included (refer to the ZBM3 datasheet).
- + Fire suppression not required. Non-flammable electrolyte is not subject to thermal runaway (tested to UL 9540a). Fire test reports available upon request.

## STANDARDS

- + Certification to UL 1973 and UL 9540 in progress. UL 9540a completed.
- + Selected hybrid inverters comply to regulatory approvals in AU/ NZ, US and ZA markets. Others to be determined if required.

## POD200 ENERGY OUTPUT vs DISCHARGE DURATION



### FOOTNOTES

- (1) Dependent on PCE selection.
- (2) Longer deferred or scheduled discharge via hibernation capability
- (3) Selected hybrid inverters comply to regulatory approval in AU/NZ, US and ZA.
- (4) Additional equipment needed depending on inverter requirements.
- (5) Can operate independent of grid network connection.
- (6) Custom enclosures can be designed for extended low or high temperature ranges.

- (7) Mounting brackets supplied for site fitting. (Testing to required rating still to be conducted.)
- (8) Local codes & standards may have differing requirements.
- (9) 1,500 mm (60") recommended if layout space not constrained.
- (10) Pod units can be placed back-to-back on this side.
- (11) Seismic mounting brackets to be fixed according to engineered site geotechnical requirements.
- (12) Optional, but recommended per enclosure for higher efficiency, flexibility and site resilience.

## 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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