DATA SHEET

QuadPod

The QuadPod is Redflow's scalable energy storage solution for large residential, small commercial & industrial or remote/agricultural applications. Capable of delivering up to 40 kWh of energy from the 4 ZBM3 hybrid flow batteries housed and pre-wired in the custom designed enclosure.

The solution provides battery management, electrical protection and optional power conditioning, enabling safe and reliable energy delivery for on- or off-grid applications.

Key applications

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

INTEGRATED HYBRID INVERTER

Available as a nominal 40 kWh/12 kW @ 48 Vdc base unit. Designed for customisable use or with the option of a selected hybrid inverter built-in, simplifying integration with other generating sources such as solar PV, wind or backup generator.

TECHNOLOGY

+ **Battery type:** Zinc-bromine hybrid flow battery (ZBM3).
+ **Architecture:** 4 parallel connected ZBM3, 10 kWh batteries.
+ **Battery management:** Incorporated Battery Management System (BMS).

ELECTRICAL RATINGS

+ **Base unit:** 40 kWh/12 kW @ 48 Vdc (nominal, floating)
+ **Integrated unit:** 40 kWh/12 kW (50 Hz, 3-phase, 230/400 Vac) or 40 kWh/12 kW (60 Hz, split-phase, 120/240/208 Vac) (US only).

PERFORMANCE

+ **Rated discharge power:** Up to 12 kW (cont.) or 20 kW (peak) @ 48 Vdc or Up to 12 kW (cont.) @ selected AC voltages. [1] (Nominally 2.5 kW per ZBM3)
+ **Rated discharge energy:** 40 kWh
+ **Duration:** 4 - 12 hours [2]
+ **Depth of discharge:** 100%
+ **Maximum charge rate:** 10 kW (2.5 kW per ZBM3)

BUILDING BLOCKS

+ Compatible with selected battery/hybrid inverters for on- and off-grid applications.
+ Hybrid inverter integrated units can be coupled to existing PV systems (AC-coupled) or support directly connected solar PV strings via MPPT inputs (DC-coupled).

ON-GRID CONNECTION

+ Suitable AC connection required from site main switchboard.
+ Grid-export capable. [3]
+ Blackstart capable. [4]

OFF-GRID CONNECTION

+ Grid-forming. [5]
+ Blackstart capable. [4]

ENVIRONMENTAL

+ **Ambient temperature:** Standard enclosure [6]: 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:** (TBA) California building code seismic zone 4. [7]

MODULAR | SCALABLE | COMPETITIVE CAPEX

PHYSICAL

+ **Dimensions (L x W x H):** 2,270 x 1,110 x 1,241 mm (89½" x 43¾" x 49")
+ **Clearances & access:** (8)

Front (Battery Bay): 1,300 mm (51¼") (9)
Left side (Control Bay): 1,300 mm (51¼") (9)
Right side: 50 mm (2") (10)
Rear (For adequate ventilation): 500 mm (20")

+ **Mass:** 1,445 - 1510 kg ± 1.5% (3,185 - 3,330 lbs ± 1.5%) (Subject to configuration.)
+ **Handling:** Suitable capacity forklift or crane.
+ **Transport:** Open truck/flatbed transport.
+ **Mounting:** M16 bolts through feet. (11)

SITE PREPARATION

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

AUXILIARY POWER (12)

+ **Type:** Single phase plus ground, 50/60 Hz.
+ **Voltage range:** 110 Vac to 240 Vac.
+ **Power consumption:** 500 W (max.)

COMMUNICATION

+ **BMS hierarchy:** Redflow multi-layer BMS integrates ZBM3s at the enclosure-level, and with inverters and site-level EMS.
+ **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.

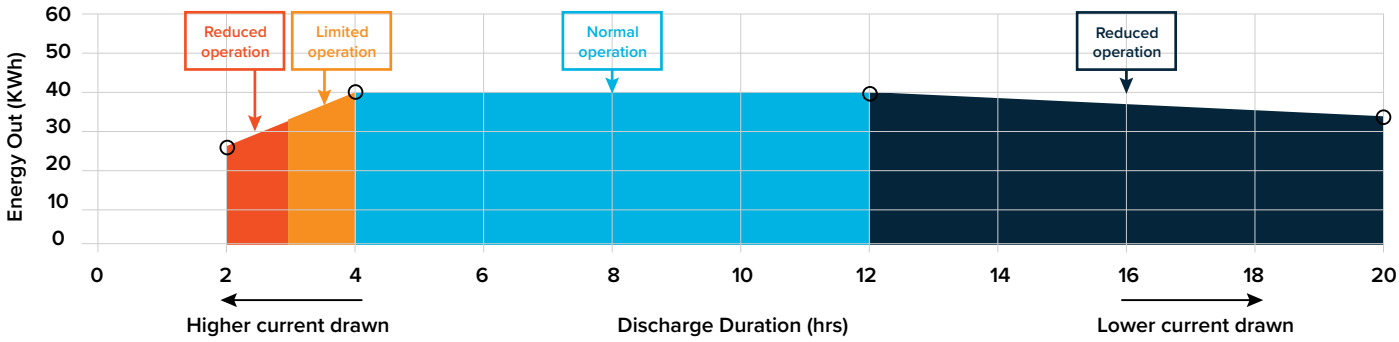
HARDWARE PROTECTION

+ Optional enclosure mounted STOP button suspends Power Conversion Equipment operation.
+ Isolation circuit breakers on individual ZBM batteries.
+ Integrated inverter is 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.

QUADPOD ENERGY OUTPUT vs DISCHARGE DURATION



FOOTNOTES
(1) Dependent on Power Conversion Equipment (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.

E&OE

(7) Mounting brackets included and pre-assembled. (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) QuadPod units can be placed end-to-end 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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