

# VoltPak 1000

## Technical Reference Manual

Revision 1.2 | April 2026 | [voltpak.com/support/manuals](http://voltpak.com/support/manuals)



# Electrical Architecture

VoltPak 1000 | Block diagram and specs

## System block diagram

AC Input -> [PFC Stage] -> [DC Bus 400 V] -> [Bidirectional DC-DC] -> [LFP Pack 25.6 V / 40 Ah]

|  
[H-Bridge Inverter] -> AC Output

|  
USB-C PD Controller + USB-A QC + DC 12 V Rail

## Power conversion stages

Stage 1 - PFC / AC-DC: Active power factor correction. THD < 5%. Input range 90-264 V AC.

Stage 2 - Bidirectional DC-DC: Boost/buck topology. Controls charge from 0 to 1,800 W. Interfaces to LFP pack via BMS UART bus.

Stage 3 - H-Bridge Inverter: Pure sine wave output. Dead-time controlled MOSFET bridge. THD+N < 3% at rated load. UPS transfer time < 20 ms.

## Battery pack specification

<b>Chemistry</b>	LFP (LiFePO <sub>4</sub> )
<b>Nominal voltage</b>	25.6 V (8S configuration)
<b>Capacity</b>	40 Ah / 1,024 Wh
<b>Max charge rate</b>	1C (40 A)
<b>Max discharge rate</b>	2C (80 A continuous)
<b>Cycle life</b>	>= 3,500 cycles to 80% capacity
<b>BMS interface</b>	UART 115200 baud, 3.3 V logic
<b>Cell temp sensors</b>	8x NTC thermistors (one per cell group)
<b>Protection</b>	OVP, UVP, OCP, OTP, SCP, cell balancing

# Thermal Management & Open Hardware

## Airflow architecture

Intake: 2x 60 mm fans on the left side panel (negative pressure zone).

Exhaust: Rear vent array - 15 mm slot geometry, 6 slots, angled 12 deg.

Airflow path: Left intake -> inverter board -> DC-DC stage -> LFP pack -> rear exhaust.

Thermal target: Delta-T < 25 C across inverter board at 2,200 W / 25 C ambient.

## Fan specification

<b>Model</b>	Delta BFB0612H or equivalent 60 mm, 12 V, PWM
<b>Connector</b>	4-pin JST PH2.0
<b>Control</b>	PWM from MCU, 25 kHz carrier
<b>Idle speed</b>	~1,200 RPM   <= 30 dB(A)
<b>Full speed</b>	~4,500 RPM   <= 48 dB(A)
<b>Replacement</b>	M3 x 8 mm socket head   standard 60 mm bolt pattern

## Open hardware release

VoltPak releases all hardware design files under CERN-OHL-S v2. Included:

- KiCad schematic and PCB layout files for the main inverter board
- KiCad files for the BMS interface board
- STEP and IGES mechanical models for the chassis
- STL files for user-replaceable panels and fan guard
- Bill of materials (BOM) with Mouser/DigiKey part numbers

The MCU firmware is proprietary and is not released. It is our engineering moat. We do not publish it. The community is welcome to reverse-engineer it - and builders who go deep and share findings in our Discord will receive hardware, pre-release units, and direct engineering support.

## Fastener reference

All external fasteners are M3 Phillips or M3 hex socket. No proprietary tooling required. Panel retention: M3 x 8 mm pan-head. Board standoffs: M3 x 6 mm hex. BMS cover: M3 x 5 mm countersunk.