

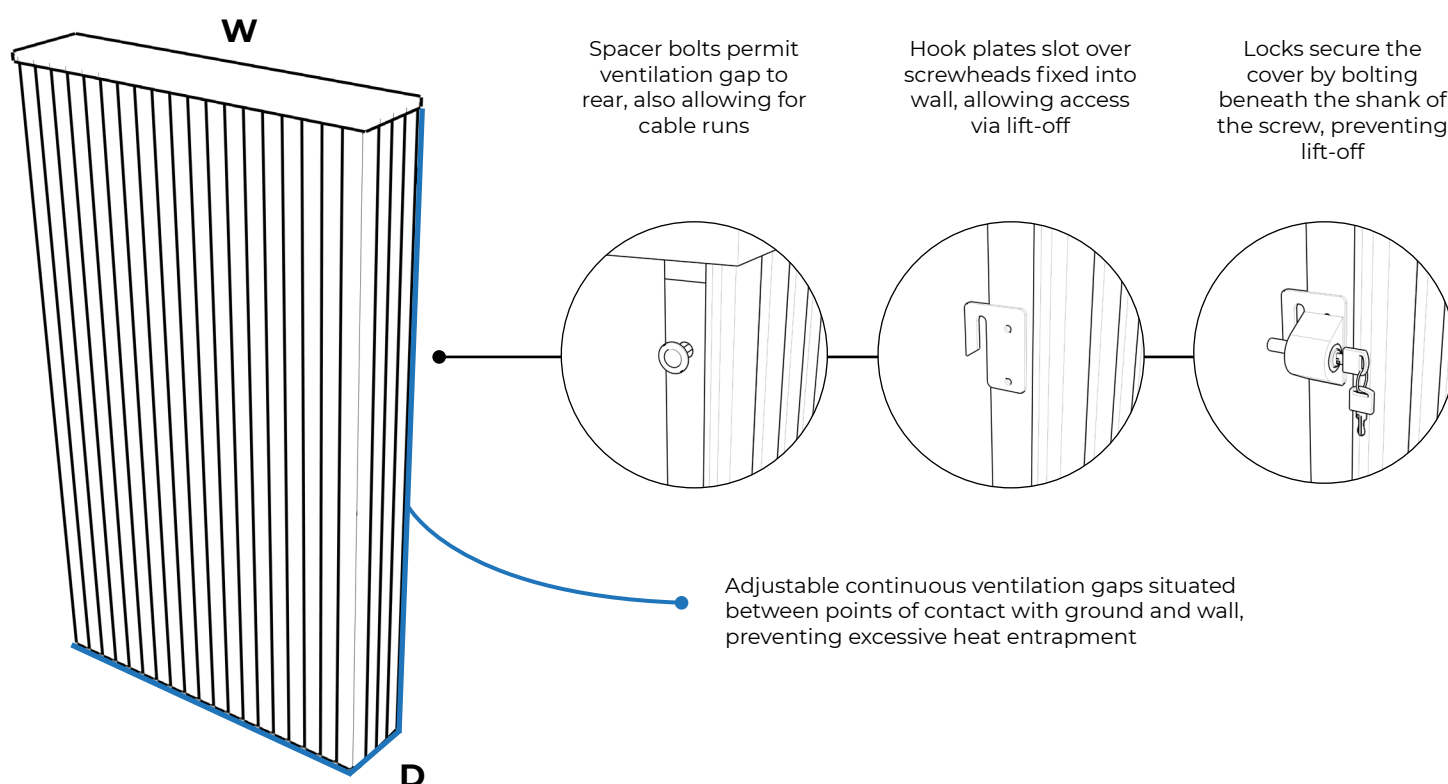
Battery and Inverter Cover Specifications

Material composition	Aluminium frame and lid, UPVC cladding - 30-year guarantee
Weight	5-54.5kg (size dependent)
Mounting type	Floor & Wall Fixed or Wall Hung
Assembly method	Flat-packed, see instruction manual
Ventilation method	Passive intake through 25mm ventilation allowance, see diagram
Maintenance	N/A
Access type	Lift-off removable (entire unit)

The range comprises over 1,500 made-to-order standard size combinations based on the dimensional increments outlined below:

Dimensions (mm):	Range of Internal Measurements (mm)	Increments (mm)
Height	500 - 2400	+/- 100
Width	425 - 2675	+/- 125
Depth	240 - 605	+/- 125

*Excluding 40mm external wall thickness



Technical Overview: Thermal Performance of Inverter and Battery Covers

Objective

This document analyses the thermal dynamics of protective covers for inverters and batteries, demonstrating that overheating is physically impossible. By leveraging passive ventilation and conductive heat transfer, the design ensures thermal stability across all types, sizes, and operating conditions.

Heat Dissipation Mechanisms

The covers maintain internal temperatures near ambient levels through two primary mechanisms:

1. Natural Convection: Ventilation gaps enable buoyancy-driven airflow, governed by GrashofPrandtl relations, with mass flow rate scaling as:

$$\dot{m} \propto \sqrt{(\beta g \Delta T H)}$$

Warm air exits through upper and side vents, replaced by cooler ambient air entering below, ensuring continuous exchange. Ventilation area scales with cover size, delivering cooling capacity that exceeds typical heat outputs (e.g., 5–10% inefficiency losses).

2. Conduction: The cover's cladding is 2mm thick, which further supports efficient heat dissipation to the external environment.

Thermal Performance Analysis

Steady-state heat balance ($Q_{\text{generated}} = \alpha Q_{\text{conv}} + Q_{\text{cond}}$) yields minimal temperature rise, as convection's heat transfer coefficient ($h \propto (\Delta T)^{1/4}$) creates a negative feedback loop, amplifying cooling with increasing heat load. Vented enclosures typically limit ΔT to $< 5^\circ\text{C}$ above ambient for electronics, ensuring reliability even in high-ambient conditions.

Conclusion

The physics of convection and conduction in the cover design preclude overheating through adaptive, scalable heat dissipation. This universal design ensures safe operation, protection against weather, impact, and theft, and supports exemptions from standard spacing guidelines.

