

Choosing an Enclosure

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The enclosure protects your electronics from weather, UV, and physical damage. Choose based on IP rating requirements, available mounting options, and your willingness to do custom drilling and fitting.

IP Rating Guide

Rating	Protection	Suitable For
IP54	Dust partial, splash-resistant	Under eaves, protected outdoor locations
IP65	Dust-tight, water jets	Standard outdoor exposed deployment
IP67	Dust-tight, immersion 1m/30min	Ground-level, flood-risk, or harsh weather sites
IP68	Dust-tight, continuous immersion	Underwater or buried applications

Common Enclosure Options

Zulkit IP65 Junction Box - \$12

150 × 100 × 70mm. Hinged lid with a foam gasket. Comes with two cable glands pre-installed. Good balance of cost, size, and weatherproofing for a single-node solar repeater. The size accommodates a Heltec V3/V4, a charge controller module, and an 18650 battery holder.

Generic IP65 - IP68 Junction Boxes - \$10 - \$15

Available in many sizes from AliExpress and Amazon. Quality varies; check reviews for gasket quality. At this price point, IP65 is reliable; IP68 ratings on cheap boxes should be treated skeptically.

Pelican 1300 - \$15 - \$20

Durable, crushproof, watertight. Overkill for most deployments but excellent for portability or high-risk mounting locations. Foam insert must be cut to fit your components.

Ammo Can

Military surplus ammo cans are cheap, widely available, and extremely durable. The steel construction provides RF shielding (keep the antenna outside), and the gasket provides good weather sealing. Replace the original gasket with EPDM for cold-climate use. Conductive enclosures can affect radios - mount the node with stand-offs to keep it away from the metal walls.

PVC Pipe Cap Enclosure - \$3 - \$5

A 3 - 4 inch PVC end cap can house a minimal node (Heltec V3 + small LiPo + charge controller) and is surprisingly weatherproof when the seams are sealed with PVC cement and silicone. Best for compact builds where size matters more than serviceability.

Muzi Works Injection-Molded Cases

Custom-designed for the Heltec V3. Available from Muzi Works directly. More form-fitting than generic boxes and easier to assemble, but more expensive. Good option if you want a professional-looking install without custom fabrication.

3D Printed Enclosures

Community-designed enclosures are available on Printables, Thingiverse, Thangs, and Cults3D. Search for your specific device model. Print in PETG or ASA for outdoor use - PLA degrades in UV and heat. Seal seams and lid interfaces with food-grade silicone. Add UV-resistant coating or paint to PETG prints for long-term outdoor durability.

Size Selection

Measure your components before ordering an enclosure. A typical single-node solar repeater (Heltec V3 or V4 + 18650 + CN3791) fits comfortably in a 150 × 100 × 70mm box. For a RAK WisBlock with larger battery packs, consider 200 × 120 × 75mm or larger.

What to Avoid

- Generic "waterproof" boxes without an IP rating - these often fail in sustained rain
- Enclosures with screw-on lids that require tools to open - maintenance becomes annoying quickly
- Clear/translucent enclosures - UV degrades clear plastics quickly and solar heating inside a clear box can overheat electronics

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