

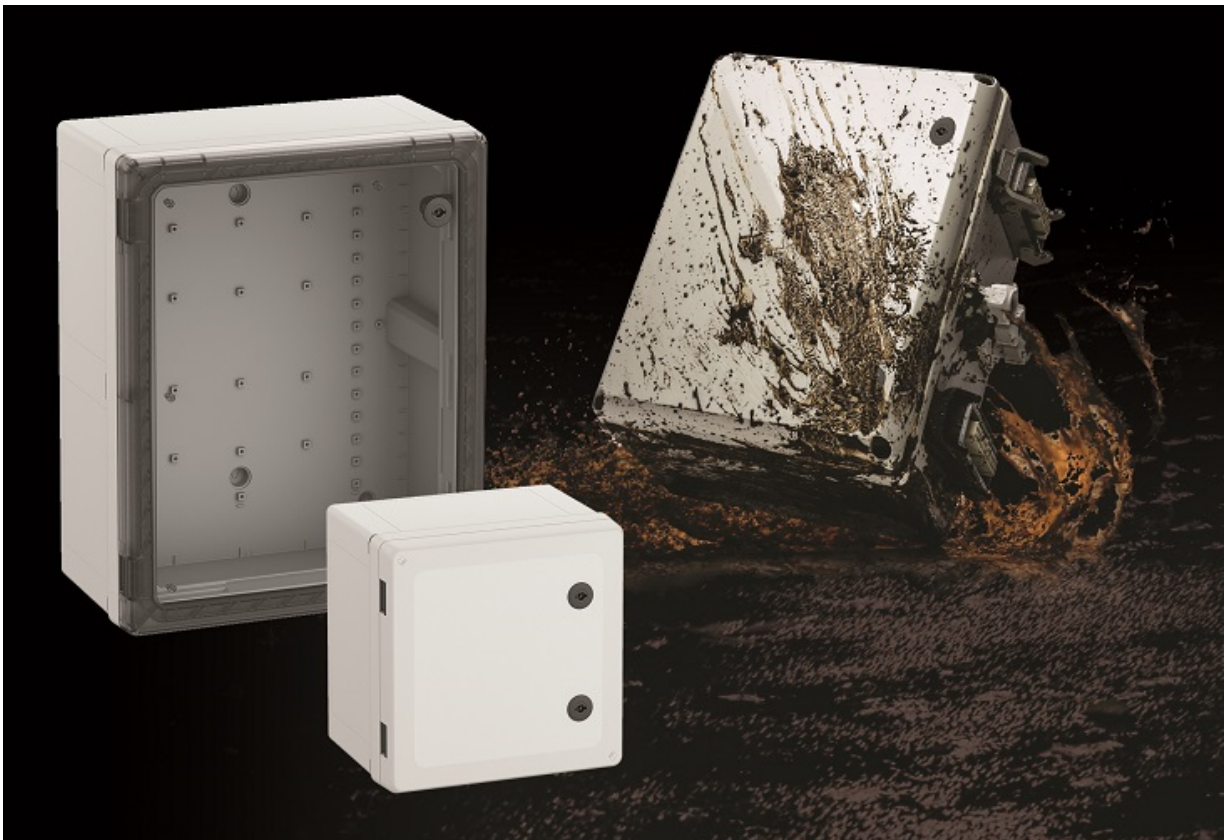
## Cabinet-style electric enclosures for simplified harsh environmental protection

*These enclosures improve accessibility and still protect against moisture, contaminants and temperature in harsh environments.*

Peter Brown

Enclosures in electrical system design are often mission-critical components — even if it might not seem so. Considering these systems house electrical wiring, fiber optic devices, microcontrollers, routers, switches, power supplies and other components, these enclosures protect vital electronics that keep equipment and electronics operating reliably.

Meticulously engineered enclosure boxes can protect these critical systems against high temperatures, moisture, humidity and other harsh environmental conditions that may otherwise compromise these electrical systems. Problems such as overheating and moisture will shorten the operational lifespan of electrical equipment, creating expensive service or manufacturing disruptions, and potentially electrical hazards to personnel.



*Figure 1: Electrical enclosures are critical in protecting vital electronics. Source: Altech*

The [GEOS line of enclosures from Altech](#) employs materials that ensure the long-term reliability of all components contained inside the enclosure. These electrical enclosures are not only impact resistant,

scratch resistant and shatterproof, but also are designed to work in rugged outdoor environments, providing protection against temperature, corrosion, ultraviolet light and weather resistance.

Ingress protection and temperature control are common features for such enclosures. However, a key challenge has long been the accessibility of components within the enclosure, be it for machinery controls or interfaces, or component maintenance and inspection. A high-durability frame, hinge and door panel provides operators ample accessibility to the enclosed components.

While the GEOS line is targeted for outdoor enclosures, it is also suitable for indoor applications, such as those that might present IP challenges due to dust, debris or moisture. These enclosures are suitable for many industries and applications, ranging from solar and renewable energy, transportation and infrastructure and agriculture, to food and beverage, general manufacturing and industry.



Figure 2: The cabinet design allows workers to open and close the enclosure without having to remove doors. Source: Altech

## Ratings, specifications and features

Altech's GEOS enclosures are in full compliance with UL50, IEC 62208 and IEC 61439 as well as other relevant international standards.

The enclosures are rated IP67. The rating is comprised of two numbers. The first number ranges from 0 to 6 measuring the degree of protection of the device against solid objects such as debris and sand. A 0 rating means the device has little to no protection against these objects and 6 indicates the objects are highly secured against solid objects. The second rating ranges from 0 to 9 measuring how well the enclosures withstand liquids. A rating of 0 means it is not protected from liquids while a 9 indicates it can withstand high pressure jets at high temperature. An overall rating of IP67 means the electrical enclosures are dust tight and short term immersible in water.



Figure 3. Altech's GEOS enclosures. Source: Altech

In terms of resistance to weather, the GEOS polycarbonate enclosures use a drain protection sealing system to prevent contaminants from getting inside. This could be anything from moisture, dust, dirt, rain, snow, cold and heat. The drain system helps keep the housing tight and dry in accordance with UL Type 4X and 12K standards (meaning it has been approved for use in U.S., Canada and Europe) by discharging water before it can reach the enclosure's elastomer seal. The electrical enclosure diverts moisture to the back side of the enclosure by using an overlapping cover with a built-in drainage channel on the top edge of the enclosure. Drainage holes are also possible on all sides of the box base, which can be opened if necessary, before or after installation.

Five basic housing sizes are available for GEOS enclosures, ranging up to 15.75 x 19.69 x 8.9 in. This allows for different internal dimensions and volumes, and accessories are available for customization for additional variety and versatility.

Altech's GEOS enclosures can be operated in electric networks with rated voltage of up to 1,000 V AC/1,500 V DC, where the short circuit current (ICP) does not exceed 10 kA. The reinforced double insulation inside the enclosures allow for IEC Class 2 electric protection.

Air inside the enclosure can heat up to 55° C due to power dissipated by the electrical devices, and temperatures can reach even higher when electric devices and wiring are exposed to high temperatures. This can be an issue for sealed enclosures in environments with high temperature and humidity because the warm air inside the enclosure gradually absorbs the water vapor in the ambient air. When temperatures outside cool, the water vapor inside the enclosure can condense, collecting in the box and potentially causing damage.

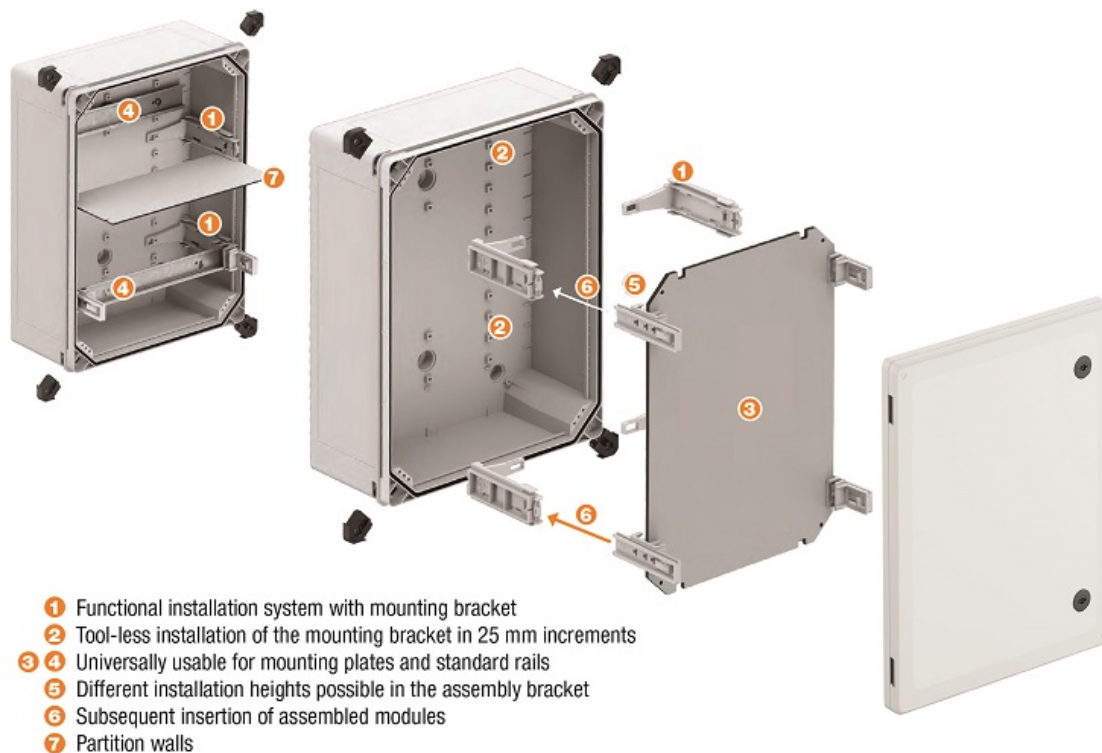


Figure 4: The cabinet enclosures feature a drain protection system along with two different depths, multiple mounting options, modular component mounting system, optional drain knockout and more. Source: Altech

To solve this issue, Altech offers an optional air ventilation element for its electrical enclosures to prevent condensate, while still maintaining a high level of protection. The system mixes air from inside the enclosure constantly with the surrounding air and transports the moisture outside the enclosure. This is especially helpful in humid environments. The ventilation elements are maintenance free and provided with a replaceable filter that traps particles larger than 10 microns.

## **Cabinet-style advantages**

Altech offers a recently innovated cabinet-style access door for its electrical enclosures. With a heavy-duty design, the enclosure doors provide excellent protection, but not at the expense of accessibility. Optional transparent doors provide viewing windows, allowing operators to check measurements or visually inspect components without opening the box.

Traditional enclosures sometimes need to be partially disassembled to access internal components, and the worker may be challenged by the tight confines of the enclosure. These are all challenges the GEOS line of electrical enclosures addresses.

- Quickly open and access or close and seal the enclosure
- Fewer restrictions for internal fittings and components
- Tool-less internal mounting options allow for easy removal of components
- Doors provide wide opening angles, often greater than 180° depending on installation
- Doors can be locked for access restriction
- Doors are easily removed or reversed
- Transparent materials permit easy monitoring and inspection

## **Conclusion**

For those looking to find more adaptable and accessible electrical enclosures, the [Altech GEOS cabinet enclosures](#) provide the same protection against liquids and solids as traditional electrical enclosures, but greatly simplify monitoring and maintenance of the critical components contained within.