

VITROVEX® through wall solutions



Interfaces and procedures



Pressure housings often require through-wall solutions for their unique combinations of connectors and sensors which moreover vary in diameter and length. For its VITROVEX® glass enclosures, Nautilus Marine Service has developed appropriate interfaces and specific manufacturing operations to this effect and supports its implementation.



Through holes with chamfers, precise ground flat and fixing material

VITROVEX® Glass housings can be customized with through holes to accommodate a large variety of penetrators for connection to electronics and batteries inside, or releases, sensors or other packages on the outside. Each hole has a surrounding flat sealing area that is precisely ground and has a bevel machined around the entry and exit of each hole. Through holes can be positioned anywhere across the hemisphere with a minimum setback from the edge of the equator. A certain distance between drill holes is recommended to not compromise the integrity of the enclosure.



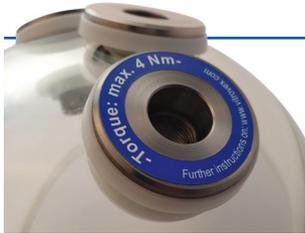
Through hole installations should be supported by VITROVEX® adaptor plates. Adapter plates avoid bearing stress for penetrators and compensate for potential manufacturing tolerances along the socket and/or a missing undercut there. As interface between penetrator and glass surface, VITROVEX® adaptor plates provide perfect flatness and surface quality to match with the penetrator and to prevent corrosion. On the interior, profiled and flat washers, disk springs and nuts complement the fastener hardware.

Enclosures with larger wall sizes and the use of adaptor plates may require penetrators with non-standard shaft lengths and potentially longer lead times. **VITROVEX® bulkhead adaptors** therefore provide a good **alternative** for through wall connections, while at the same time offering even more **advantages**.

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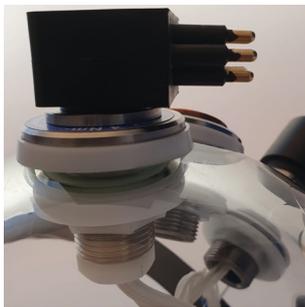


Bulkhead adaptors

VITROVEX® bulkhead adaptors are a straightforward interface to realize through-wall connections on glass enclosures. They are available for circular and low-profile connectors with default thread sizes such as 7/16", 5/8" and 3/4". Adaptors with 5/8" thread size can even be adjusted by a thread reducer to fit penetrators with 1/2" and 7/16" thread size. The azimuth of low-profile connectors can be aligned precisely with an inner sleeve.



In this way, additional interfaces could be attached proactively as back-up or spare and sealed with filler plugs providing greater flexibility and extended opportunities in using glass enclosures.



Through their convenient and easy handling, the attachment of penetrators does not require any glass specific knowledge nor familiarization. Lifetime and reliability of the glass enclosure will improve due to the absence of direct contact between penetrator and glass surface.



Heat sinks

The VITROVEX® heat sink solution is a 5/8" bulkhead adaptor with a Copper insert to effectively dissipate heat generated inside the glass enclosure. The maximal heat flow can be based on the table beside.

Length	Diameter	
	15.5 mm	19.0 mm
45 mm	1.6 W	2.5 W
50 mm	1.5 W	2.2 W
55 mm	1.3 W	2.0 W
60 mm	1.2 W	1.8 W

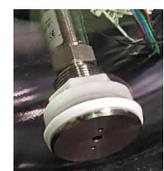
Heat flow per $\Delta T = 1.0\text{ }^{\circ}\text{C}$

The Copper insert has a face seal towards the bulkhead adaptor and side flats to support easy replacement in the field. On the inside, a heat pipe can be attached to two threaded holes. The heat sink is pressure tested to 700 bar.



Pressure feedthrough and switches

Pressure sensors with G1/4" pressure connection (e.g. Keller AG) can be attached to a modified bulkhead adaptor with corresponding interface from inside the enclosure. This assembly has successfully been pressure tested to 700 bar. Other pressure feedthroughs with 1/8" and 1/4" NPT



interface can also be glass mounted. Pressure activated switches which triggers at approx. 3 bar (on/off) can easily be integrated into 7/16" bulkhead adaptors or separately be mounted into VITROVEX® glass enclosures.

Further information set forth in the handling procedures for VITROVEX® glass housings.