

9 Frequently Asked Questions (FAQs)

9.1 Why is a separate through hull necessary and how does the fail safe solenoid and moisture detector function?

A separate dedicated through hull fitting is required for operation of the SeaKeepers ocean monitoring module for several reasons:

First: To make accurate measurements, the seawater being analyzed must neither be contaminated with any of the organisms which can build up and reside in sea chests nor can it be exposed to any metals, paints or anti fouling materials.

Second: In order to make an accurate determination of Sea Surface Temperature the seawater must be monitored outside the ship away from any heat being stored or generated through the hull.

Third: To prevent the lift pump that circulates water through the monitoring system from stripping dissolved gasses out of solution we need to present the water to this pump under a slight positive pressure.

We have devised a through hull penetration system that comprises several components in order to achieve these objectives and to eliminate any risk of catastrophic leakage from this system.

A 1.5 inch internal diameter through hull penetration and gate valve has been designed. Externally a faired pod, protruding approximately 4 inches from the hull, with a self cleaning screen, constructed from Teflon acts as a scoop generating a dynamic pressure as the vessel moves through the water and providing a platform separated from the hull for mounting the sea surface temperature thermometer.

This scoop, or pod, is attached by glass filled Delryn threaded rods that will shear off if the pod is impacted by flotsam rather than translate enough force to damage the hull.

A probe head constructed from Teflon and attached to a thin wall Teflon tube is inserted from inside the hull, while the vessel is in the water. This probe passes through the open gate valve and seats into the external pod where it forms an 'O'

ring seal so that the water being drawn through the system is exposed only to Teflon, which is chemically inert.

The probe head contains a Platinum resistance thermometer and a pair of Platinum electrodes, which under the control of the SeaKeepers computer system can generate controlled volumes of Chlorine to sterilize the system and provide a signal that may be utilized to calibrate some optical sensors.

The gate valve has been sharpened so that it will easily cut through the Teflon hose and wiring to positively isolate the through hull penetration. On the inside of the gate valve an electrically actuated rotary valve is coupled to a leak detector in the sampling module enclosure so that if moisture or leakage is detected in the enclosure the water intake will be isolated.

The inside of the gate valve and the rotary valve are enclosed in a containment vessel that provides both physical protection and a water tight enclosure. The plumbing between the containment vessel and the sampling module enclosure is accomplished using Stainless Steel braided Teflon hose that is strain relieved at each enclosure.