

Overflow Robotics Co.

Alexandria, Egypt

Non-ROV device Document

Operated by a buoyancy engine, floating and sinking is achieved by adjusting the volume of water inside the float. So for a negative buoyancy effect, water taken inside makes the float sink and to float, the same water is pushed outside becoming positively buoyant letting it rise. This is done using a motor driver and a power screw mechanism that rotates to extend two 50-millilitre syringes and take in water. This process is controlled by a limit switch mounted such that its action prevents overextension of the syringes, which would otherwise cause separation and leaking of water to the inside of the float. To return to the surface, the motor driver rotates in the opposite direction, closing the syringes to expel water until stopped by another limit switch. This setup allows for cautious and safe movement.

Frame

The internal frame consists of six iron rings, machined precisely with suitable holes to accommodate mission-specific components within the float. The structure is packaged in a cylindrical acrylic shell, allowing maximum visibility into the float interior. The entire assembly is 90 cm tall and has a diameter of 17 cm, compact but functional.

Sealing and pressure relief

The float is sealed with two pop-off designed to release if excessive internal pressure is built up that can cause structural damage or small explosions in worst cases. Each cap is lined with two rubber O-rings ensuring a watertight seal even under high pressure at depths of six meters. The top cap featuring two cable glands securely housing two open pneumatic cables, which are sealed and connected directly to the syringes to allow water movement.

Electrical components

The float system is operated using a esp32 that works as a microcontroller while providing a wide range of communication, a motor driver is utilized to operate the linear actuator in both direction.

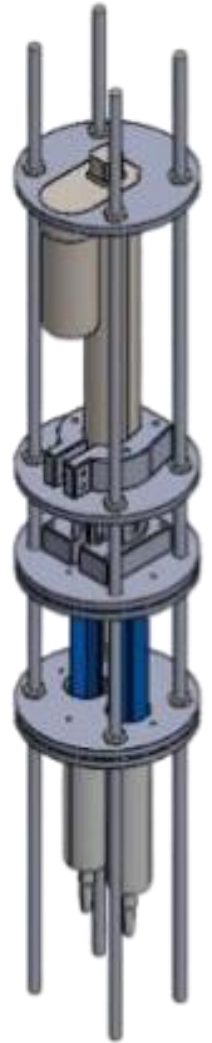


Figure1 Float internal structure