



AQUABOT TECHNICIANS

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Non-ROV Device Documentation

MECHANICAL DESIGN

Our vertical profiling float, Redemption, uses a buoyancy engine constructed from a clear-cut acrylic tube with a 151.9 ± 1.5 mm inner diameter and height of 298mm. Redemption is composed of internal components sealed between two end capsules from all from blue robotics with penetrating screws and O-ring seals. Redemption's buoyancy engine consists of a 10 10mL syringe, which is mounted to a 12 volt 50mm linear actuator (See Figure 2)and is controlled by an Timer Relay (See Figure 3)

The 10 syringe system intakes and ejects water to descend, ascend, and maintain a given depth. In the ascending position, the linear actuator will extend to expel water from the syringe chamber, making the float positively buoyant. The float will surface and relay pressure, time, and depth to the on-deck receiver. To descend, the linear actuator retracts to increase the volume of water in the syringe chamber. The float becomes negatively buoyant as the device's weight increases by 10 ml each



Figure 1: Redemption

ELECTRICAL DESIGN

To begin the vertical profile, the linear actuator will fully extend so the float remains positively buoyant. The float runs on a 2-70---1-70 second interval The Timer Relay will make its first communication and process to extend the linear actuator, the float will be extending for 2 seconds waiting 70 to then, the linear actuator will retract for the float to become negatively buoyant for 1 second then wait another 70 seconds and repeat the actions 3 times.

The float's water-proofing process includes designs being constructed with a water tight enclosure by alcohol grease screws and O rings. Rubber O-rings were used to seal Penetrating screws, and Wetlink penetrators are used for endcap penetrations.

Per safety regulations, a 2-amp fuse is attached to the float's power supply and is within 5 cm of the battery pack. Eight 1.5V Alkaline AA-batteries are connected in series to supply a total 12-volt independent power source (See Figure 4). Safety components of the float include batteries being tightly secured to Linear Actuator and Timer Relay, a pressure relief opening at the top of the float which is sealed by a penetrator screw plug with a 2.5 cm diameter complying with MATE regulations, and the covering of sharp edges.



Figure 2: Linear Actuator



Figure 3: Timer Relay



Figure 4: 12-volt Independent Power Source

Figure 5: Profiling Float SID

