

## General Construction:

The SEAL Robotics Vertical Profiling Float contains an integrated buoyancy engine. The housing of the float is constructed from 4" PVC pipe with a syringe potted in epoxy on one end, and a rubber cap on the other end. Inside is a 500ml syringe, a linear servo and an Arduino Mega microprocessor. The separate battery housing is constructed from 3" PVC pipe. The battery housing has an integrated 7.5A fuse, as well as a pressure relief valve in the form of a 30cm rubber stopper. The vertical profiling float's **dimensions** are 97 cm in length and 12.7 cm in diameter, which falls within the MATE specifications.

## Buoyancy Engine Powered Vertical Profiling Float:

We created a Vertical Profiling Float following the MATE non-ROV Device (NRD) specifications, specifically engineered to utilize a buoyancy engine to execute two vertical profiles during the competition demonstration period. After several design and test iterations, we settled on a simplistic solution. An Arduino Mega controller governs the linear servo action to change buoyancy of the float once every 4 minutes. This causes the float to iteratively dive and surface.



Figure 1. SEAL Robotics Vertical Profiling Float with battery compartment on top.

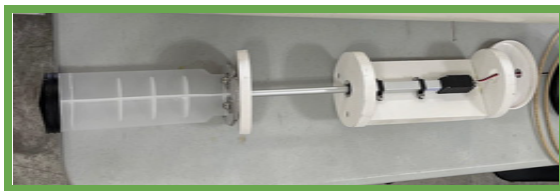


Figure 2. SEAL Robotics Vertical Profiling Float internals - linear servo and syringe.

Float (NRD) Fuse Calculations	
Device	Current Draw (Amps)
Arduino	0.2
Linear Servo	4.7
<b>Total Calculated Current (Amps)</b>	<b>4.9</b>
<b>Overcurrent Protection Factor</b>	<b>150%</b>
<b>Fuse Calculation (Amps)</b>	<b>7.35</b>
<b>Round to Fuse Size (Amps)</b>	<b>7.5</b>

Table 1. Fuse calculations for the Vertical Profiling Float.