Vertical Profiling Float Design

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The Achelous Vertical Profiling Float contains an integrated buoyancy engine. This innovative system consists of various components, including an ESP32 microcontroller, an L298N motor driver, two limit switches, a Bar 30 depth sensor, a 5-volt regulator, a piston, a 12-volt battery pack and six 10-milliliter syringes. Since it is not possible to utilize rechargeable lithium batteries, we included a 5A fuse to the power supply circuit to guard against over-current and an imbalanced power supply.

The ESP32 microcontroller serves as the control center of our vertical profiling float. It is responsible for establishing a connection with a computer and executing precise commands to control the piston's movement. By pushing or pulling the syringe, the piston enables us to draw water

Fig. 1 Interior of the vertical profiling float

into the float or drain it out. This mechanism can provide a 0.6 Newton difference to the vertical profiling float in order to influence the float's buoyancy, allowing it to ascend or descend in the pool as needed.In addition, we also installed two limit switches, which can be used to know whether the syringe is full or empty during the process of pumping and draining water from the syringe. Besides, We have installed iron bars on both sides of the float, on which we can place different weights of small iron blocks to regulate the balance of the float.
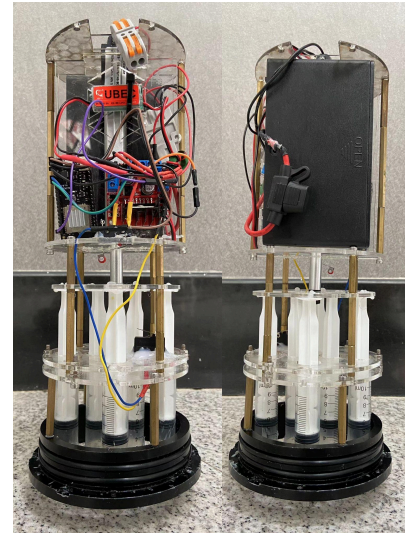

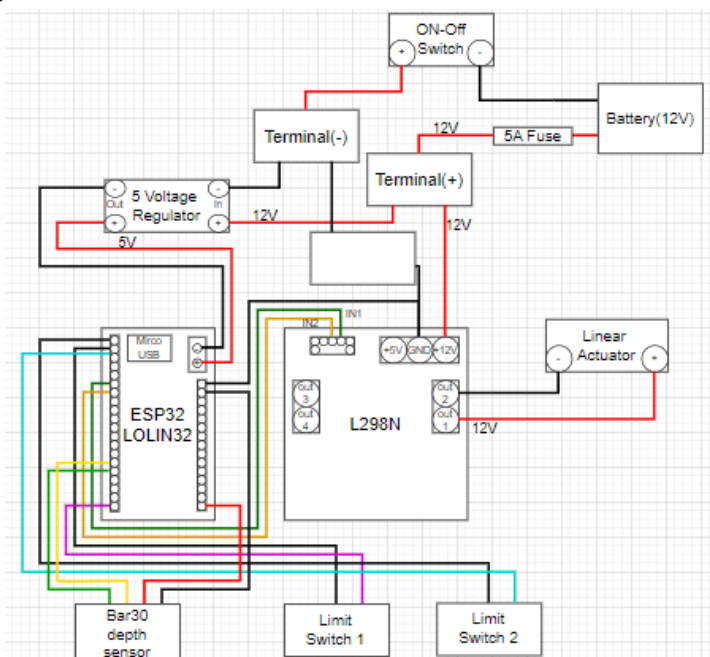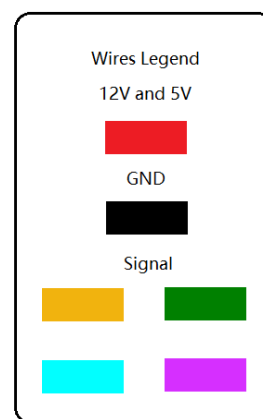
Fig. 2 Non-ROV device SID

Wires Legend

12V and 5V

GND

Signal

ESP32 LOLIN32: 0.6A

Linear Actuator: 0.22A

Fuse Calculation:
0.6A + 0.22A = 0.86A ≤ 5A
Therefore 5A fuse is used