



Vertical Profiling Float Design



Macau Pui Ching Middle School

General Construction:



Fig. 1 Interior of the vertical profiling float

The Achelous Vertical Profiling Float contains an integrated buoyancy engine. The float housing comprises a 4" acrylic tube and two o-ring flanges. One end is connected to a power switch, and the other has six 10-milliliter syringes connected with adhesive. Inside the float are esp32, L298N, a 5v voltage regulator, a linear actuator, and a 12v battery box. The vertical profiling float is 33.9cm in size and 11.5cm in diameter, which is within MATE's specifications. To safeguard the float's internal

circuitry and keep the float's total weight from rising and make it simpler to debug to a suspended position, we add o-rings to cover off any openings where water may enter the float easily. Since it is not possible to utilize rechargeable lithium batteries, we included a 7.5A fuse to the power supply circuit to guard against over-current and an imbalanced power supply. We used an AA battery pack to power the ESP32 board and linear actuator. This battery pack can hold eight AA batteries at 12 volts.

Buoyancy Engine Powered Vertical Profiling Float:

We have created a vertical profiling float according to MATE's specifications. After several test and design iterations, we have chosen a simple solution. The Bluetooth connection to the esp32 controls the pushing of the piston to control the amount of water in the syringe and achieve the purpose of floating or sinking. In addition, the ESP32 can receive local time to complete the task accurately.

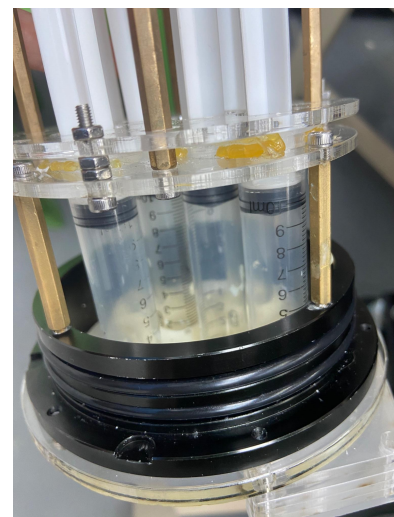


Fig. 2 Buoyancy engine inside the acrylic tube



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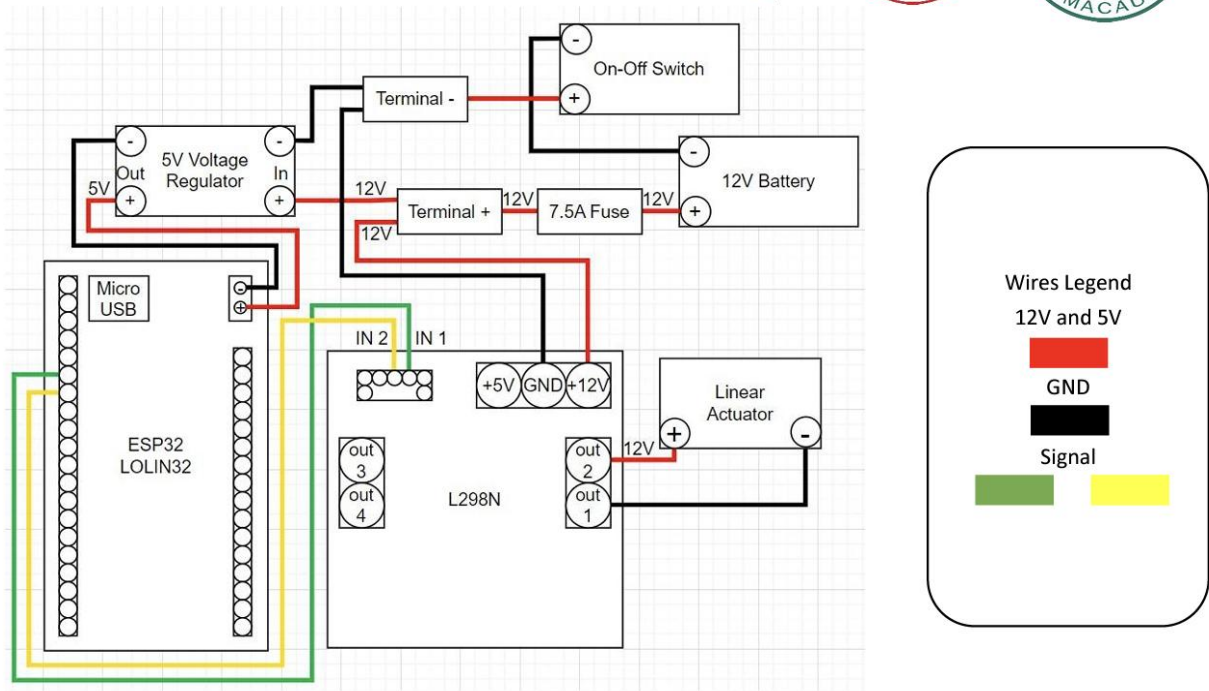


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Non-ROV device SID

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Company Name: Achelus



ESP32 LOLIN32: 0.6A
 Linear Actuator: 0.22A

Fuse Calculation:
 $0.6A + 0.22A = 0.86A \leq 7.5A$
 Therefore 7.5A fuse is used

Fig.3 Non-ROV device SID