

## A.Vertical Profiling Float Design

The Mosasaurus Vertical Profiling Float contains an integrated buoyancy engine. This innovative system consists of various components, including an ESP32 microcontroller, a DRV8833 motor driver, a Bar 30 depth sensor, a 5-volt regulator, a piston, a 12-volt battery pack, and six 10-millilitre syringes. The float utilises rechargeable NiMH AA batteries to provide 12 volts. Due to the float's full-load amp being less than 3.5A (1.1A), a 3A fuse is used. The lid pops off to prevent overpressure when pressure is higher on the inside.

The ESP32 microcontroller serves as the control centre of our vertical profiling float. It connects with a computer and executes precise commands to control the piston's movement. By pushing or pulling the syringe, the piston enables us to draw water into the float or drain it out. This mechanism can provide a 0.6 Newton difference to the vertical profiling float to influence its buoyancy, allowing it to ascend or descend in the pool as needed. Additionally, we have installed steel bars on both sides of the float, on which we can place different small steel weights to regulate the balance of the float.



Fig.1 the float



Fig.2 Ampere range.

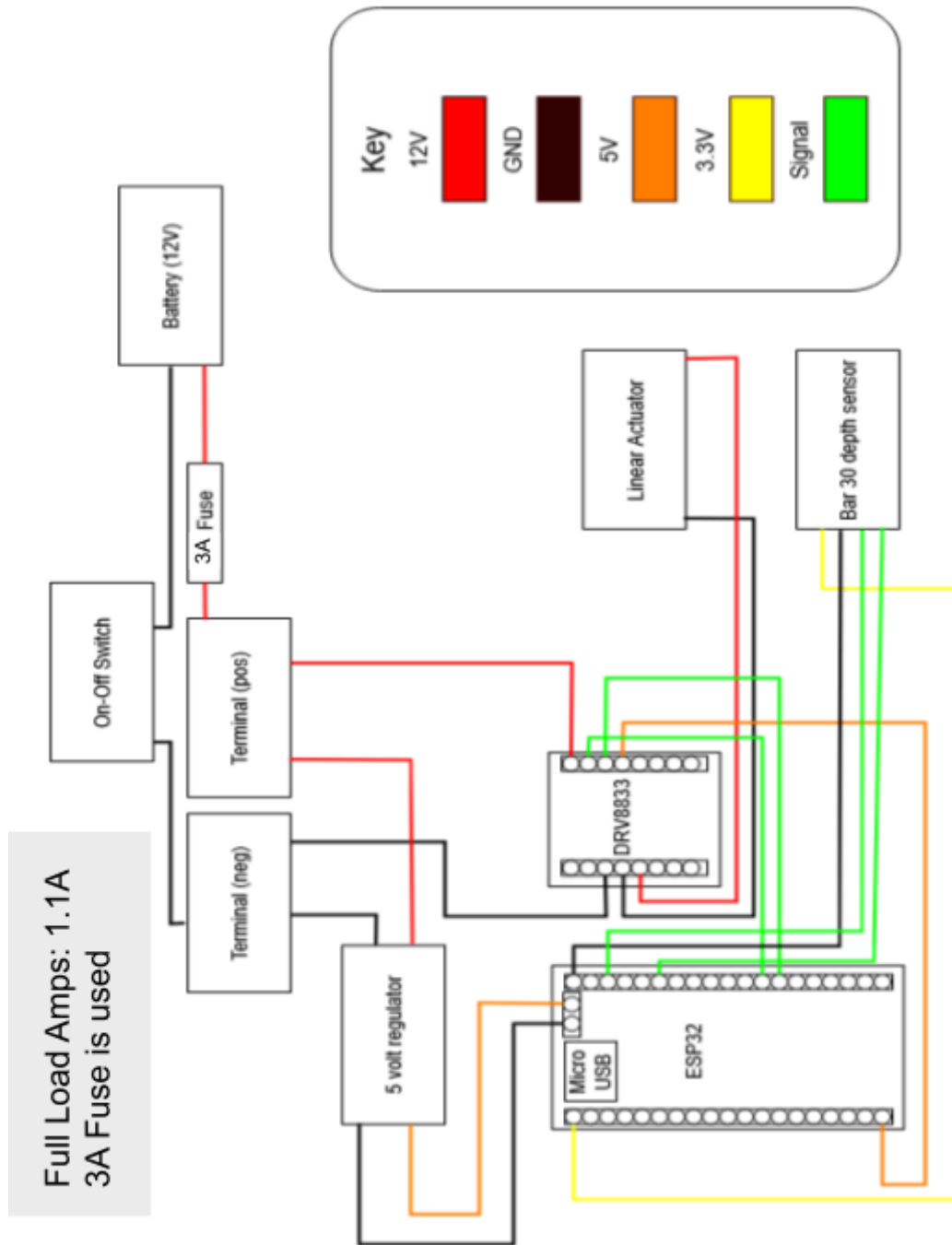


Fig.3 Float SID

## B.Independent Sensor - 360 camera

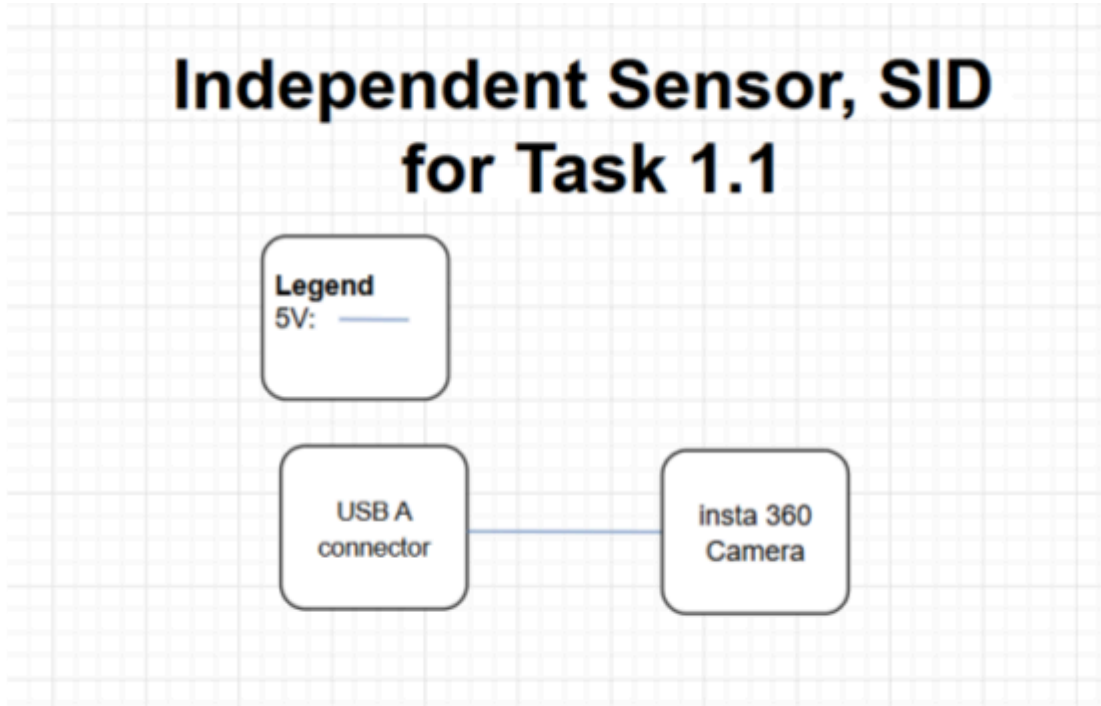


Figure.4: 360 camera, SID

***According to ELEC-IS-004, an additional fuse is not needed for USB Power Sensors.***

For Task 1.1, to create a 360 Photosphere. We choose to customize 360 cameras to do the job. Battery is removed, and a 3D Printing Part and epoxy is applied to the battery cap. The Sensor (360 Camera) will be powered by USB 5 Volt.

The operational sequence is as following:

1. Activate the camera's recording mode before deployment.
2. Submerge the device using the ROV as a deployment platform.
3. After video recording, retrieve the system by hauling in the tether cable.



Fig.5 360 camera, front view



Fig.6 360 camera, side view