

# MATE//GO-BGC Float

One Degree North 2022



Skeleton View of Float

Dimensions	108mm $\varnothing$ x 400mmH
Power	9V Battery * 1 3A Mini Blade Fuse
Controller	ESP8266 NodeMCU
Connectivity	Wi-Fi - 802.11b/g/n Bluetooth Low Energy 5.0
Mechanism	Buoyancy Engine
Pump	EK SPC-60 Water Cooling Pump
Sensors	Pressure Sensor Monitoring Sensors

## Design

The float utilizes a homemade buoyancy engine, constructed using pre-used computer cooling parts. To adjust buoyancy, the pump is turned on, generating 2.6m of head pressure. This is enough to inflate the balloon slightly, increasing the volume of the system, making it more buoyant. The waterproof enclosure is positioned at the top, keeping the float level, allowing it to sink and float back up without drifting. The internal reservoir is additionally filled only to 3/4 its volume with water, allowing the water to flow into the balloon without needing to expand the fluid.

## Operation

When the battery is inserted into the 9V battery box, the float will automatically power on as a Wi-Fi access point. The operator connects to the network, and uses a web browser to connect to <http://192.168.1.1>. On this page, there is a control panel, allowing the operator to sink the float for a defined amount of time. Operators can also view the voltage and pressure within the tube, while they are connected. Once the float sinks, the operator will lose connection until it resurfaces.

## Safety

Before operating the float, it is advisable to check the integrity of all connections and O-rings, as well as the pressure in the reservoir and balloon.. The electronics enclosure must be tightened carefully in a diagonal pattern, to ensure tension is distributed appropriately to the O-ring. In the case of a blown fuse, operators can replace the fuse with any other standard Mini Blade Fuse between 3A-5A.

