Non-Rov device: Buoyancy engine

A-Mechanical Design

Figure 1: CAD Design of the float engine.

The Float engine is designed to flawlessly complete several Vertical profiles. The float consists of two separate enclosures: an electric enclosure that houses the float's brain and a small water tank that holds 600 CCs. An HDPE connector connects the two enclosures.

The float is powered by a buoyancy engine that employs two R385 water pumps with a 3/2 DCV connected in series. When the float is activated, the pumps begin filling and emptying the water tank, while the DCV directs the flow of water in the proper direction. As the tank fills with water, the float sinks, and when the tank is empty, the float rises again.

The PMMA electrical enclosure is sealed from both ends with HDPE caps and O-rings, and the HDPE water tank is sealed from the top with a PMMA face. Pneumatic cables are used to help the water flow inside the float.

After reviewing numerous ideas and tests, the final design was created. The water tank is designed and positioned in such a way that the float remains stable while operating, allowing for successful vertical profiles with a low center of mass.

B-Electrical Design

To protect the float, the electric components are also housed in a separate container from the water.

To achieve 12V from the series connection and increase the mAmpH usage from the parallel connection, we use a set of 8-in series 1.5V alkaline batteries in parallel with the same set. A 4 Amp fuse is installed within 5 cm of the positive terminal of the battery.

The float is made up of an H-bridge, a pump, a solenoid-actuated valve, and an Arduino nano to provide the necessary signal. After being deployed, the float would try to complete vertical profiles by touching the bottom and returning to the surface.

Component	Max current	Max voltage	max power	Quantity	Max power
Pump	0.3A	12V	3.6w	2	7.2W
solenoid actuated valve	0.4A	12V	4.8w	1	4.8W
Arduino nano	0.019A	5V	0.095w	1	0.095W
L298N	-	-	20w	1	32w
Total power					8.496W

Table 1: Float Power Calculation