

Non-ROV Device Vertical profiling Float – BUMBLE JR

(Magnificent Vortex Bee)

BumbleJR (shown figure 1) is a Profiling Float designed to complete several Vertical profiles flawlessly. The float Compromises of 2 Separate enclosures, The Electric enclosure that holds up the brain of the float & a small water tank that holds 600 CCs. The two enclosures are connected via a HDPE connector.

The Float operates On a Buoyancy engine that utilizes two R385 Water pumps with a 3/2 DCV that is connected to the pumps in series. When the float is powered, the pumps start filling & emptying the water tank, the DCV keeps the flow of water in the right direction. As water begins filling the tank, the float begins sinking then the pumps empties the tank making the float rise again.

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

BumbleJR's Design **Figure (2)** was achieved after reviewing numerous ideas & tests. The Water tank is designed and positioned so that the float is stable while operating, Executing successful vertical profiles with a low center of mass. The electric components are also housed in a separate container from the water to avoid any harm to the float.

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

The float consists of H-bridge, pump, solenoid actuated valve and Arduino nano to give the float the required signal. Once the float has been deployed, it would attempt to complete vertical profiles by touching the bottom and returning to the surface, and so on.

Table 1: Float Power Calculation

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

