NON-ROV DEVICE

Vertical Profiling Float

Dimension

- Height: 19.88 in (50,5 cm)
- Circumference: 4.33 in (11cm)
- Weight: 10.3 lbs (4,67 kg)

Safety

12 V on-board voltage through 8 x 1.5V alkaline batteries (not rechargeable)

- Batteries are firmly placed in the housing
- 7.5 AMP within 5 cm of battery positive terminal
- End cap for pressure release

Communication and Electronic

Raspberry Pi Pico W

We are using a Raspberry Pi Pico W as MCU, with its RP2040 chip it is reliable and affordable. The Pico W also comes with an on-chip Infineon Wi-Fi controller, which allows us to use the in IoT applications common MQTT protocol for wireless communication.

LoRa Module

The LoRa (Long Range) Module is our second option for wireless communication. The long-range communication protocol uses modulated transmission technology for transmitting data and is therefore not depending on a Wi-Fi connection and also capable to overcome a higher distance up to 5km.

Pressure Sensor and measurement

As a sensor for pressure measurement, we got a sponsored BSP B002-DV004-A06A1A-S4 by Balluff. It delivers a 4-20 mA analog signal which then gets detected by an MAX11210 24-bit ADC via a 120 Ω resistor. The ADC provides the pressure data to the MCU using the SPI bus.

Motor control

For motor control we just went with a classic H-Bridge using some standard MOSFETs.

Power supply

Eight 1.5 V alkaline batteries, which generate an on-board voltage of 12V, serve as the power supply.

Mechanical Design

The housing consists of a PVC pipe and 2 end caps. There is a valve on the upper end cap which is used for pressure equalization. The pressure sensor and a hose are located on the lower end cap. The complete internal construction is also based on the lower end cap. The centerpiece is a linear motor that moves a syringe in and out. A hose is attached to the end of the syringe, which is guided outwards at the bottom. This allows water to be sucked in and pumped out. Due to the change in volume inside, the buoy sinks or rises.