

Bilgewater and temperature alarm system

The **purpose** is to be warned by a buzzer and with a LED indication if:

- There's water at the bottom of the engine compartment.
- The temperature in the engine compartment reaches 50° C.
- There's water in one of the other bilges in the boat.
- The temperature above the outlet of the heater reaches 50° C.

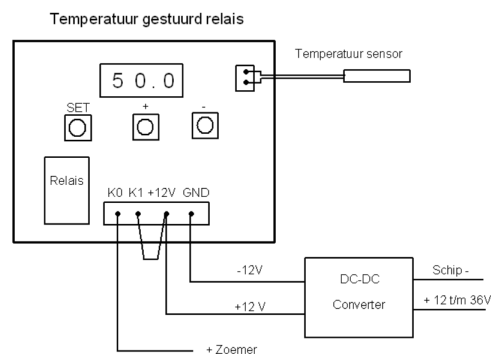
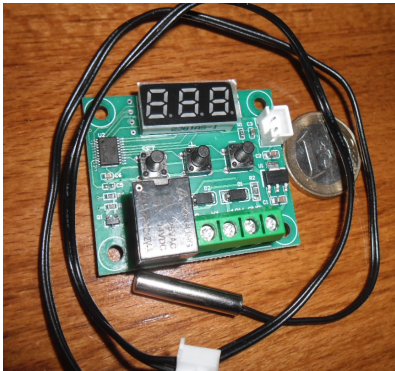
The system consists of the following components:

- The sensors that are placed at the relevant locations.
- A relay unit (controlled switch), which puts voltage on the buzzer and LED.
- The alarm panel on which the buzzer and the LED's are located that indicate which alarm is triggered
- The regulation of the supply voltage that is not allowed to exceed 12 V

The water detection buzzer of the engine room is also triggered by the float switch of the automatic bilgepump. This system (automatic bilgepump) is always on.

Sensors and relays

The temperature-controlled relay puts voltage on the buzzer and an LED, when the temperature of the sensor reaches a set value. (see photo). The temperature can be set with the 3 black push buttons. (From left to right: SET, + and -) The temperature sensor is connected to the top right of the printed circuit board (PCB) with a small plug. Via the green terminal block at the bottom of the PCB, the relay is connected to the supply voltage, buzzer and LED.



For the engine compartment I had to extend the cable of the temperature sensor to be able to mount the PCB (with the readout) outside the engine compartment. To leave the small plug intact, I soldered the two meter extension, in the middle of the cable between them (but first removed it from the PCB).

By extending the cable, the resistance changes slightly and the temperature value must be calibrated. This is easy via the SET menu and for my situation this was only 0.7°.

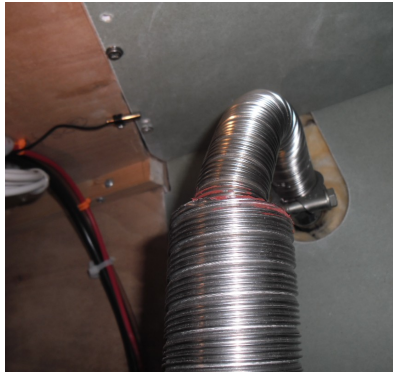
The circuit board is mounted in the kitchen cabinet near the engine compartment, so that the temperature can be read there, without having to lift the engine hatch.

For the measuring point at the outlet of the Eberspächer heater, the extension of the temperature sensor cable was not necessary. The circuit board is mounted in the cupboard next to it and can be read and set there.

The glow of the red displays might help you to find your way in the dark without spoiling your night vision.

The power cables to the circuit boards and the return line from the +12 volts to the buzzer are, per circuit board, combined in a 3 wire cable, which runs to the buzzer / LED panel. (grey in photo

below) On the second picture, the temperature sensor can be seen near the heater outlet.

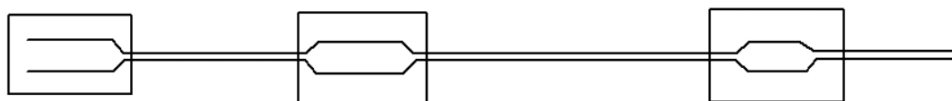


The **sensors for water detection** consist of two bare contact points per measuring point with a distance of 6-10 mm between them. They are isolated from each other on a sheet of nylon.



A sensor cable with one sensor goes to the engine compartment (under the propeller shaft). A second cable with multiple sensors runs from back to front through the rest of the ship

Sensoren waterdetectie

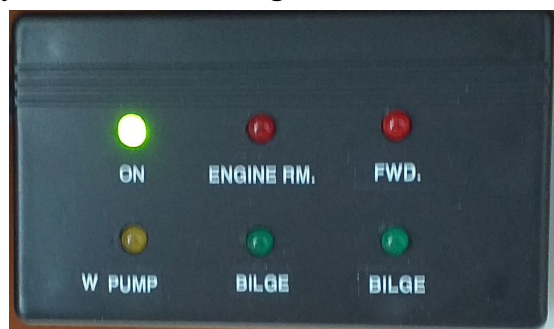


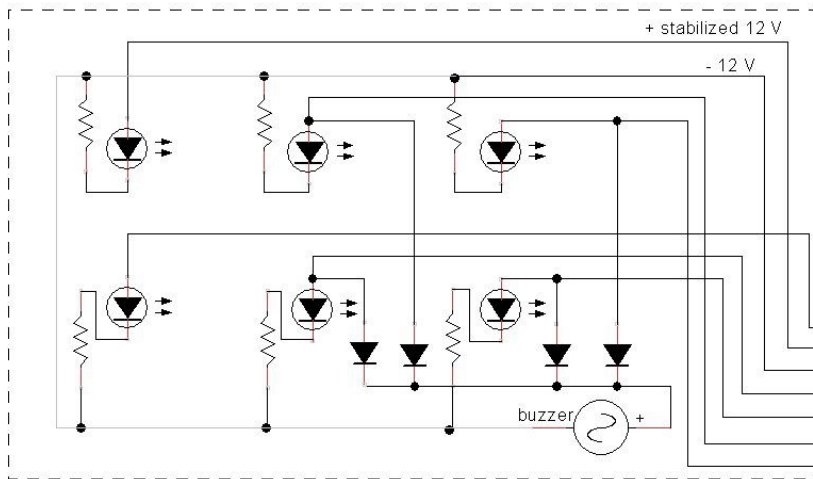
afstand contacten 6-10 mm

The panel

The panel is mounted against the window wiper motor above the steering position, so it is well noticeable while underway. When the system is “on” the green LED shows. The red LED's indicate high temperature and the blue LED's indicate water in the bilges. When the pump of the drink water system runs, a yellow LED is on.

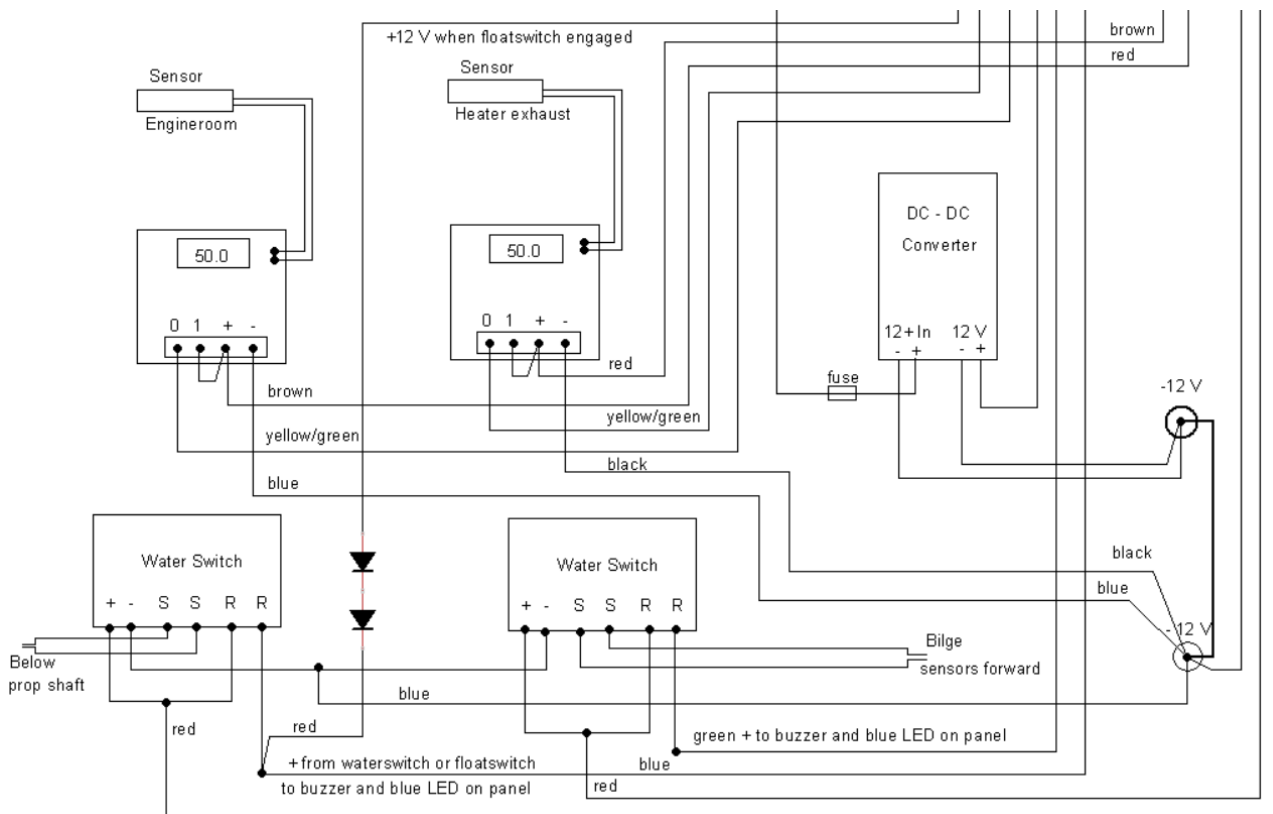
I chose to use one buzzer and feed it via a diode from the relay in question. With an LED, in series with a 1 kOhm resistor, I can see which alarm is on.





7 core cable to display/ buzzer box

- yellow waterpump on
- red + 12 V
- black - 12 V
- blue bilgealarm engine compartment
- green bilgealarm forward part ship
- brown temperature alarm engine compartment
- white temperature alarm heater exhaust



The power supply

It is important, both for the temperature sensors and the water detector, that the power supply voltage does not exceed 12 V. Because this happens during the charging of the batteries, I use a DC-DC converter that keeps the voltage at 12 V. One could also use a 7812 stabilizer.

There are many variations possible with the use of the sensors and the chips in question. For example, a water detection chip with a series of measuring points can also be used as a level meter in a water tank.

(We had this in our previous ship where part of the keel acted as a water tank)