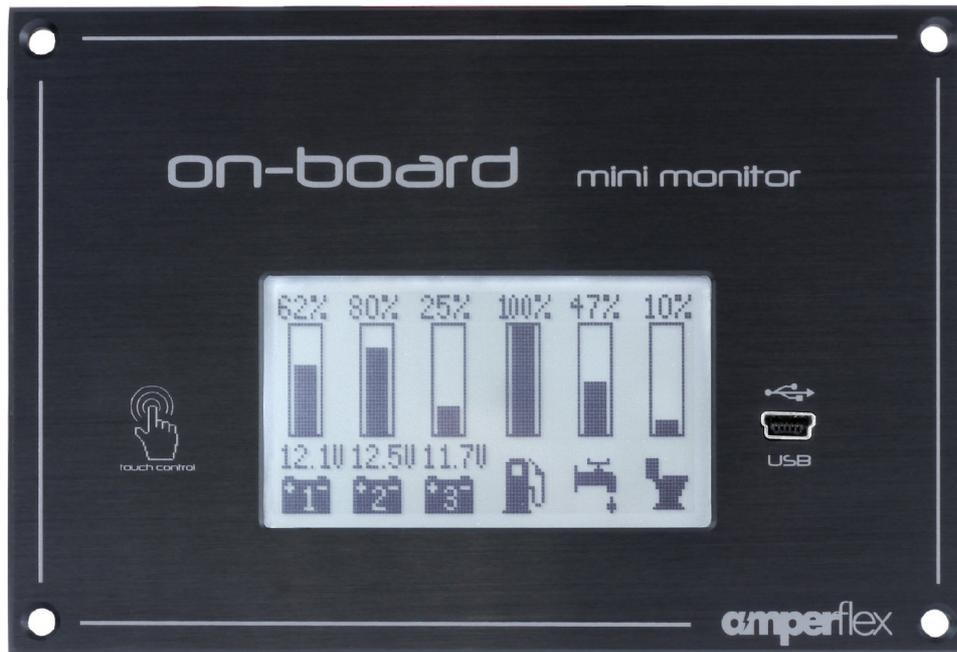


# On-board mini monitor



## Installation & Settings

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## 1. Device description

This is a modern and functional measurement panel, designed to monitor selected parameters on a sailing yacht, motor boat or camping vehicle. The monitor measures and displays working parameters of 6 batteries and 6 tanks (maximum 6 units at all).

Readout values are displayed conveniently on a clear LCD display, and the touch screen enables intuitive operation of the device. The menu is set up with icons for easy handling by an international crew.

The device measures voltage and current for the individual batteries and uses those measurements to calculate energy consumption in time interval, battery capacity, average current in the last hour and 12 hours. It forecasts the remaining battery time for the current and average load.

The specialised 16-bit A/D converters ensure very accurate readouts, for example: the smallest measurement value for a 100A shunt is 3.33 mA.

Average voltage, current and battery capacity values are stored in the device memory every 5 or 15 minutes. These stored values can be viewed on the screen in form of a time-line chart. The device uses a non-volatile memory with enough capacity to store the data for over 2 years.

On-board Mini Monitor fully supports the ACH series battery chargers. The operating mode and parameters of the battery charger – the voltage and charging current – can be seen on the screen. The following features are also available: change of the operating mode, charging ON/OFF, silent night mode (fan OFF). Advanced charging parameters can be programmed in the service mode. Additionally, the device is equipped with control outputs for external devices and alarm signals, as well as 2 inputs allowing, for example, for the monitoring of bilge pump operation.

The front control panel is provided with an USB port that can be used for software updates or readout of history data stored in the flash memory.

### 1.1 Major functions

- very low current consumption 4mA at 12VDC (8mA with 70% backlight),
- Display LCD 2,8" mono. 128x64 pixels with resistive touch screen and backlight,
- measures voltage, current and battery capacity,
- calculates the average current and forecast consumption
- measures the amount of fluid in tanks and forecast empty or full
- storage of parameters in non-volatile memory
- supports chargers aap.tron ACH Series
- outputs for external devices and alarm signals
- digital communication with battery shunts and tanks
- monitor two bilge pumps

## 1.2 Technical data

Supply voltage	5-36V DC
Current consumption	4mA @ 12V DC (8mA with 70% backlight)
Save memory and RTC	lithium battery backup
Display	mono LCD 128x64 pix.
Control	resistive touch panel
Shunts	100A, 200A, 300A, 500A - Class0.5
Number of batteries / shunts	max. 6 shunts
Number of tanks	max. 6 tanks
Current measurement resolution	3.33 mA for 100A Shunt
Measuring accuracy	0.5% ±1bit
Memory	2MB Flash
Alarms	6 programmable alarms and pre-alarms
Outputs	4x open collector 500mA - programmable
Inputs	2x digital
Working temperature, humidity	-20 to 80 °C, 90% without condensation
Safety standards	EN 60335-1
Emission / Immunity	EN 61000-6-3 / EN 61000-6-1
Front panel	3mm brushed and black anodized aluminum
Tightness	IP40
Dimensions	140x96x35 mm

## 2. Safety information



### **Caution!**

**Before installing or using On-board Mini Monitor, you need to read following safety information carefully.**

### **2.1 General safety precautions**

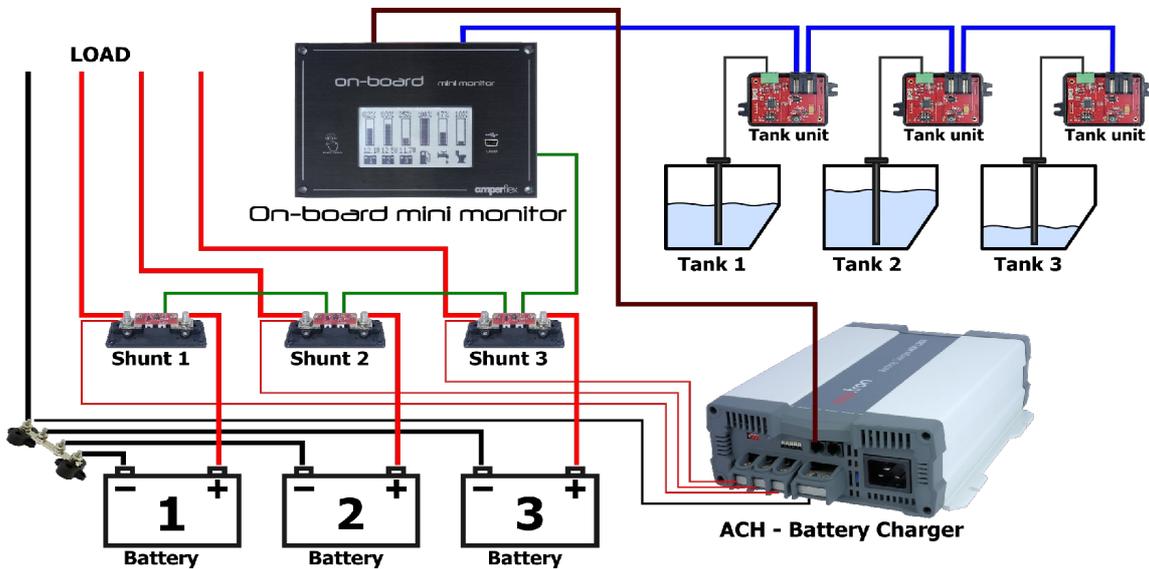
- 2.1.1 For indoor use, do not expose On-board Mini Monitor to water, mist, snow, or dust. .
- 2.1.2 To avoid the risk of fire and electric shocks, make sure that existing wiring is in good electrical condition and not undersized.
- 2.1.3 Installation should be made by qualified person with basic electric and electronic knowledge.
- 2.1.4 All connections and wires, especially high amperage, should be done with special care and properly protected against short circuits and corrosion.
- 2.1.5 To operate the touch screen, do not use sharp metal objects.

### **2.2 Battery precautions**

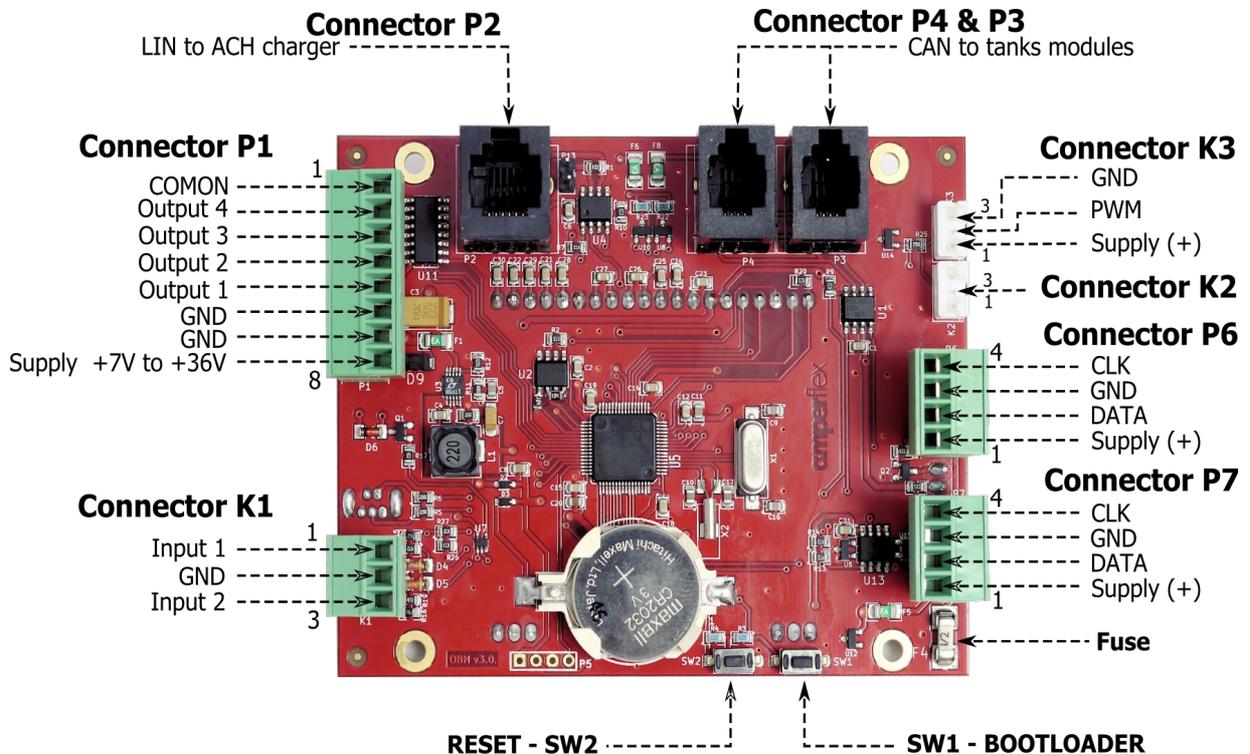
- 2.2.1 If battery acid contacts your skin or clothing, wash it out with soap and water immediately.
- 2.2.2 If battery acid contacts your eyes, wash it out with cold running water for at least 20 minutes and get medical attention immediately.
- 2.2.3 Never smoke or make a spark or flame in the vicinity of the battery or the engine.
- 2.2.4 Do not drop metals on the battery.  
The resulting sparks or short-circuits on the battery or other electrical parts may cause an explosion.
- 2.2.5 Remove personal metal items such as rings, bracelets, necklaces, and watches when operating with lead-acid batteries. It may cause short circuit and very high temperature, which can melt metal items.

### 3.Installation

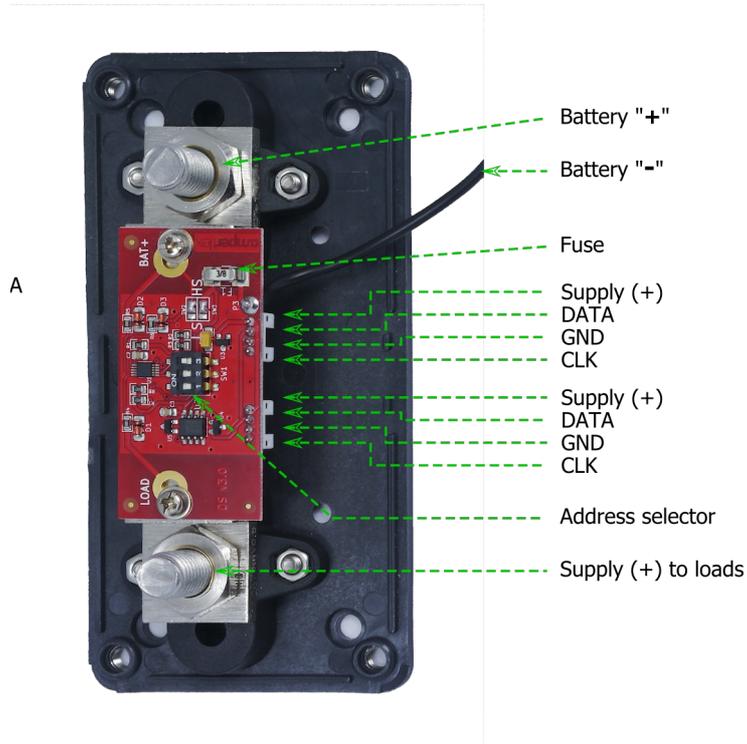
#### 3.1.1 Draft of the system



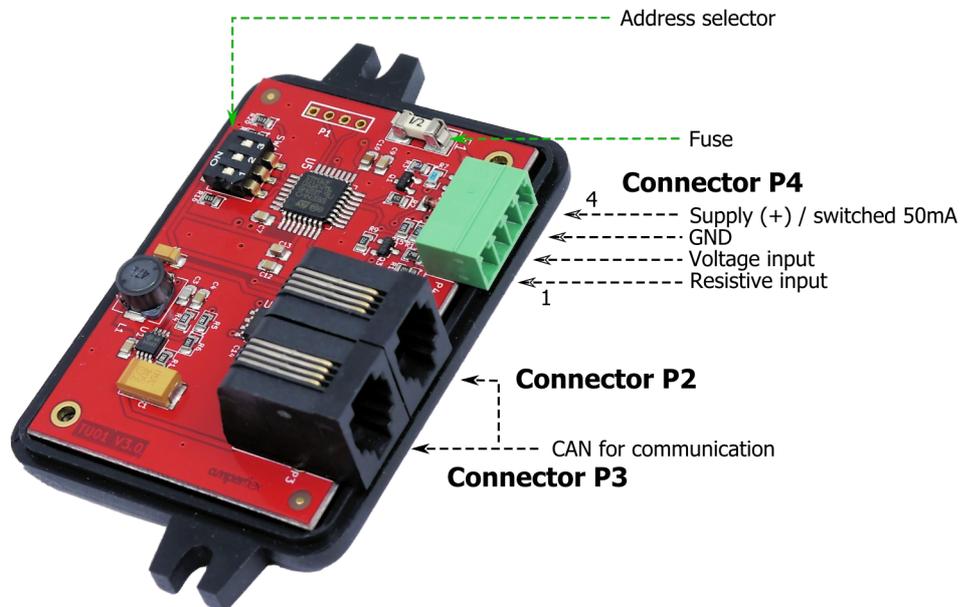
#### 3.1.2 On-board Mini Monitor connectors



### 3.2 Shunt DS100-DS500 connectors



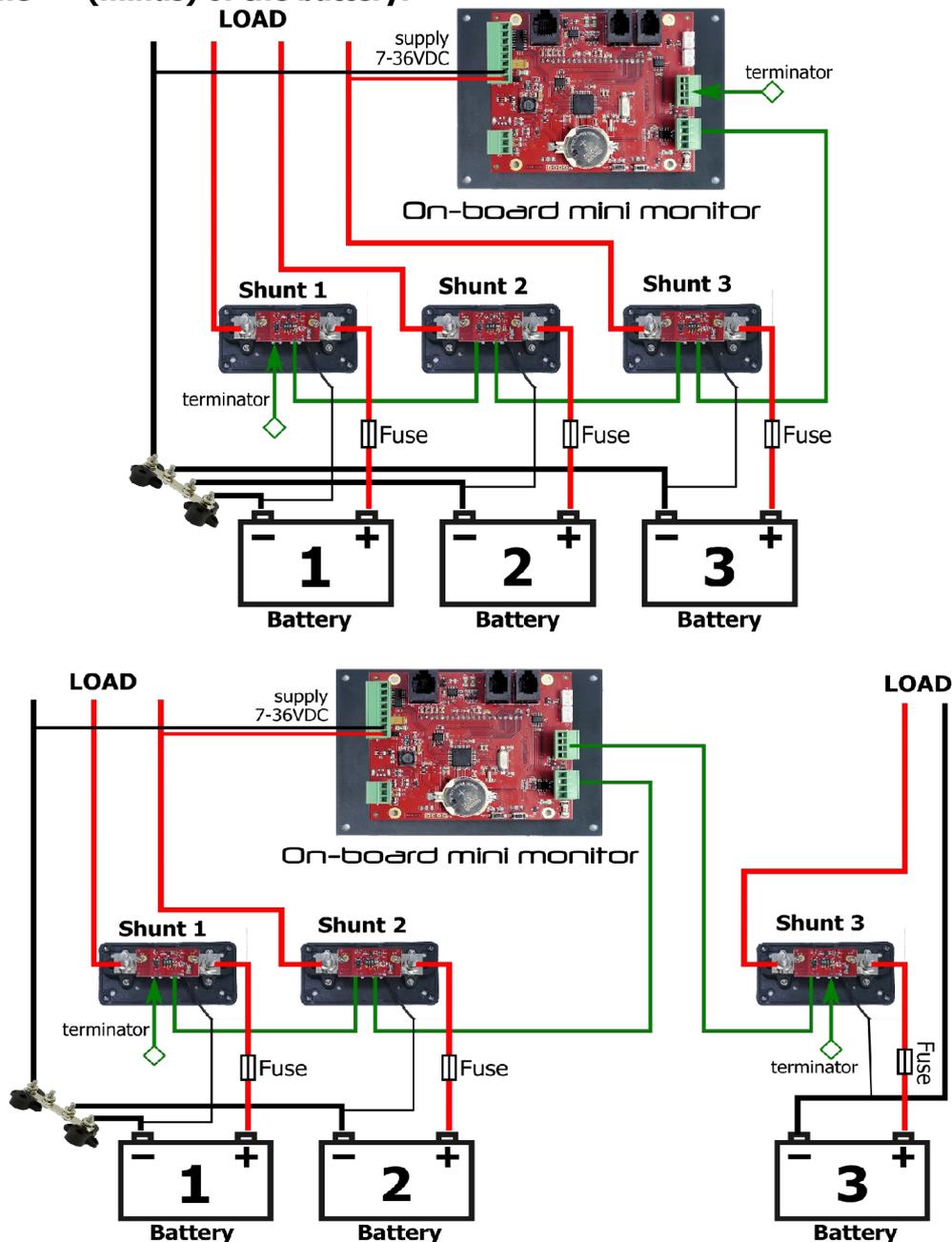
### 3.3 Tank unit TU01 connectors



### 3.4 Connecting shunts

Shunts are connected to On-board Mini Monitor by digital bus. To allow identification and correct communication, each shunt has its own individual address set using DIP switch. Such a solution can significantly save on the cables, because only one cable communication is used to the room with the batteries and then shunts connect with each other. The order connection shunts is arbitrary, you only need to remember that communication line both sides have to be "closed" by special terminator . The figures below are examples of installations and method of affixing terminators.

**Caution: To properly measure voltage of the battery, connect the black wire from the shunt to the "-" (minus) of the battery.**



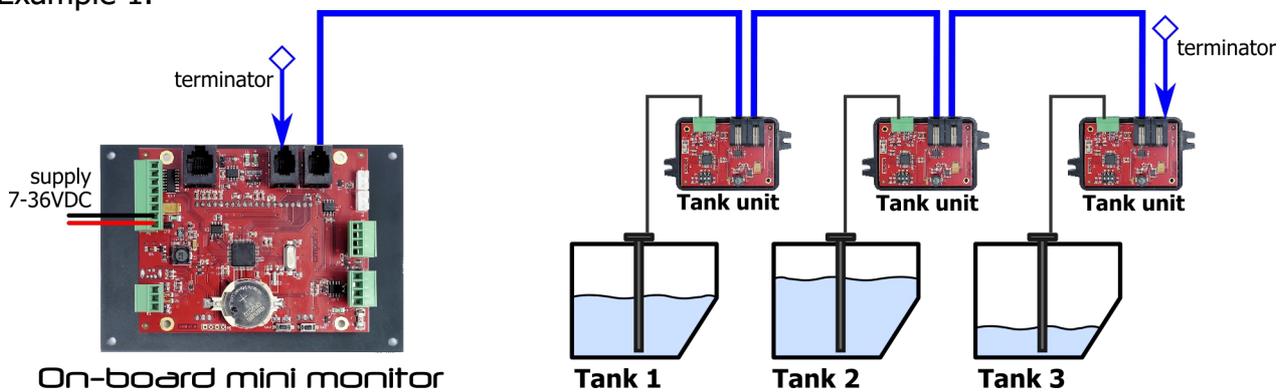
### 3.5 Shunts address settings

address of the shunt: 1 2 3 4 5 6

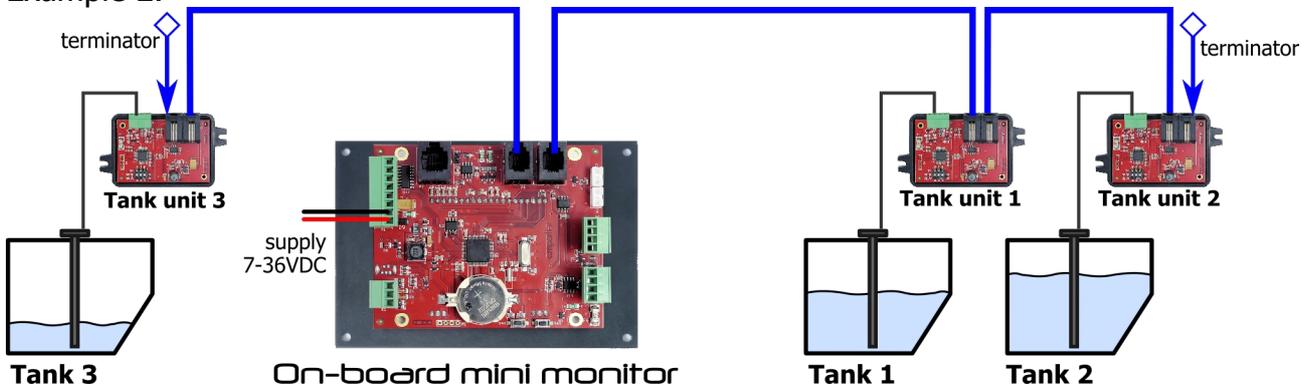
### 3.6 Connecting the tank module

Similarly to shunts, also tanks modules communicates with On-board Mini Monitor via digital CAN bus. This method of transmission enables multi-modules per line and affects the system efficiency while increasing reliability. The figures below show examples of how to connect the tanks. To ensure proper operation, communication line at both ends should be "closed" by special terminator. The order of the modules is arbitrary, each module has its own individual address set via DIP switches.

Example 1.



Example 2.

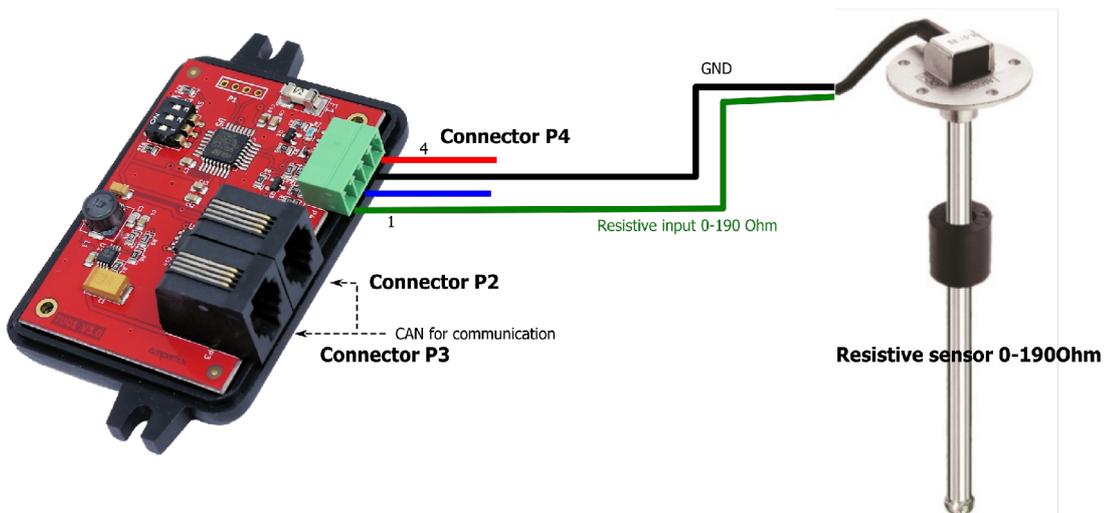
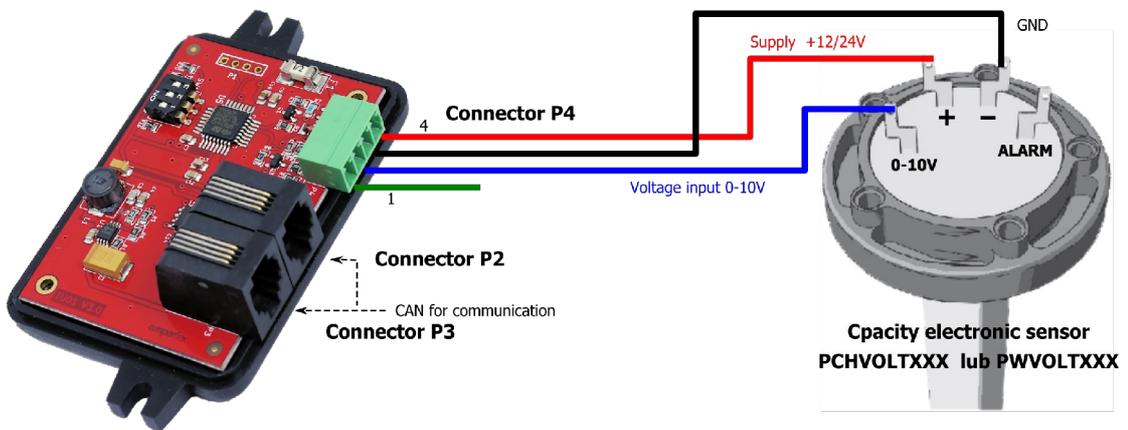


### 3.7 Tanks address settings

address of the tank: 1 2 3 4 5 6

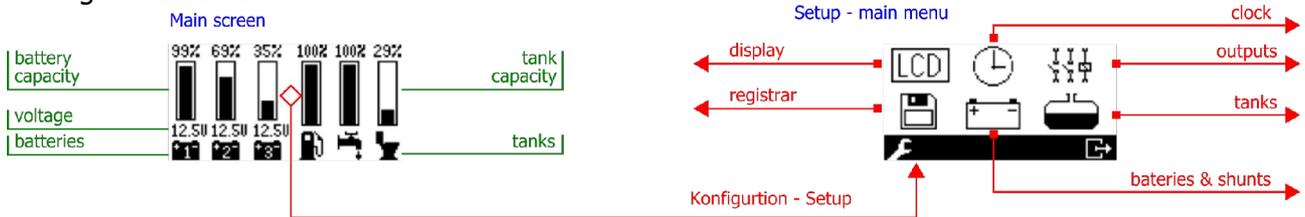
### 3.8 Sensor connection to the Tank Module

Tank communication module TU-01 has two measurement inputs, one voltage and the other resistance. This allows connection to a wide range of sensors, both analog and electronic. The module also has a power supply output, which supplies power to the electronic sensor. This output is switched through software - sequentially, which significantly affects the energy savings on a yacht. The sensor is then powered only on reading time. But keep in mind that depending on the length of the control cables, the output may appear considerable voltage drops. Additionally not every electronic sensor can work in this way, some require a longer time to be ready for measuring.



## 4. Settings

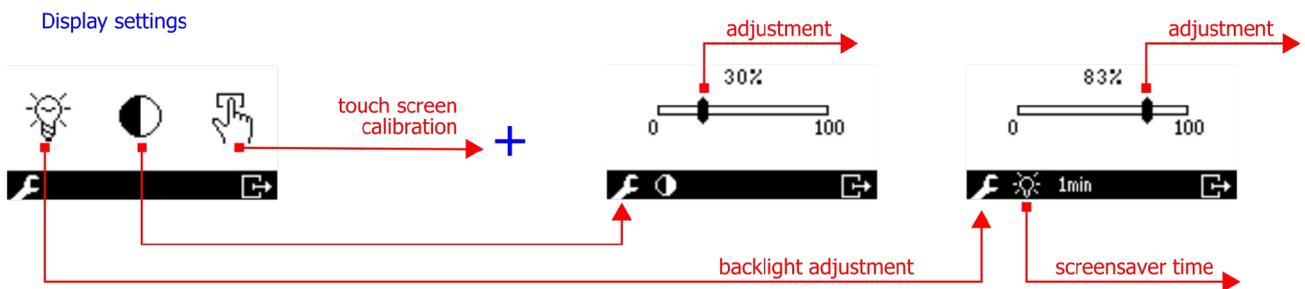
To change the configuration of the device, press and hold the screen in the middle area. After about 2-3 seconds the main menu appears and you may change the configuration and settings to On-board Mini Monitor.



### Legend:

- function description
- button - short press
- ◊ button - long press

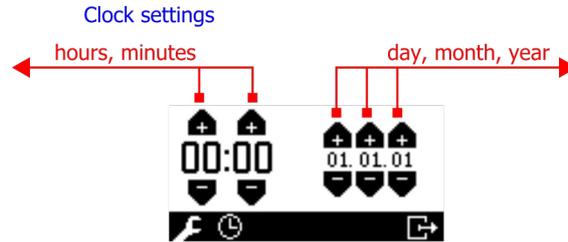
### 4.1 Display settings



**Caution:** Calibration of the touch screen should be performed only in justified cases, when not working properly and there is a problem with the interpretation of the touch point . After starting the calibration function, the "+" sign is displayed in the upper left corner, you need to carefully press the center of "+". Then you will see the same sign in the lower left corner and next on the right side of the screen. Also be sure both of these characters press exactly, preferably using a special stylus made of plastic. Calibration should not be performed by the finger because has too large surface area and calibration can not be adequately precise. The third sign "+" ends calibration process and device goes to normal operation.

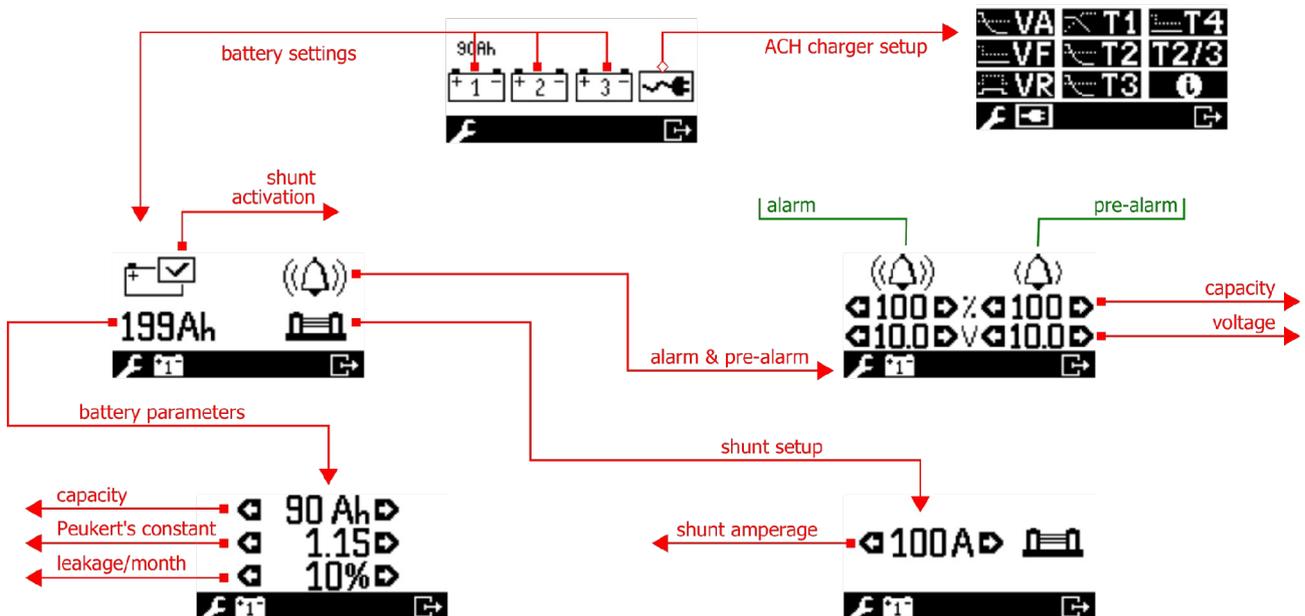
In the case of improper calibration, operation of the panel will be impossible. Run the emergency calibration mode by: power off, press and hold the screen in the middle area and at the same time power on. The calibration function will start automatically and the process must be performed properly.

## 4.2 Time and Date settings



## 4.3 Batteries and Shunts settings

Battery & shunt settings



### Charger settings:

VA - "absorption" voltage 14-14,99V (default 14,4V)

VF - "float" voltage 13-13,99V (default 13,8V)

VR - recharge voltage 12-12,99V (default 12,8V)

T1 - max. charging time "bulk" 6-10 hours (default 8 hours)

T2 - max. charging time "absorption" 1-10 hours (default 6 hours)

T3 - max. switching time "absorption" to "float" 1-18 hours (default 1h)

T4 - charging time "float" 168-504 hours (default 336 hours = 2 weeks)

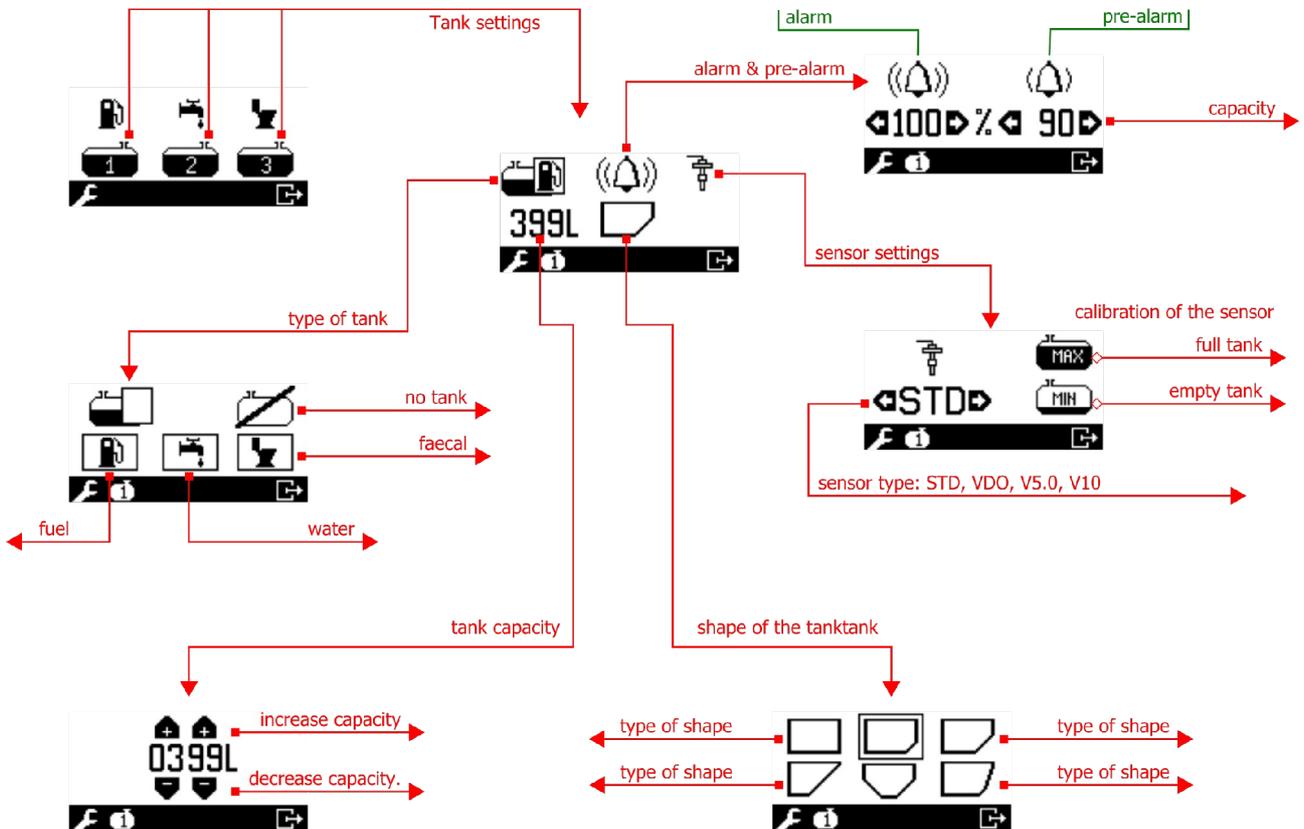
T2/T3 - switching level "absorption" to "float"

6,25%; 12,5% or 25% full output amperage

example: for ACH1225 = 25A x 6,25% = 1,56A

## 4.4 Tanks settings

Tanks settings



### Type of sensors:

STD - Standard resistive sensor: tank empty 240ohm / full 33ohm

VDO - VDO resistive sensor: tank empty 10ohm / full 180ohm

V5.0 - electronic sensor with voltage output 0-5V

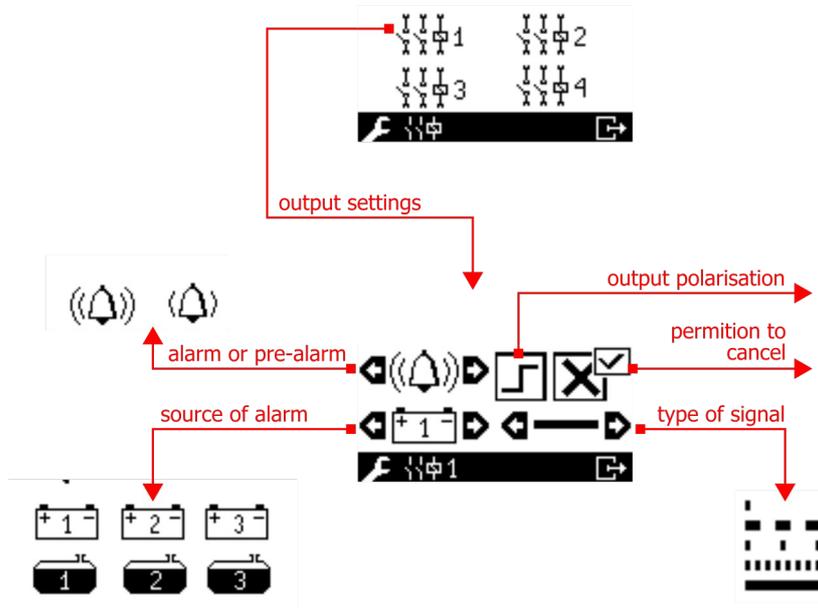
V10 - electronic sensor with voltage output 0-10V

You can connect the sensor with other parameters of resistance or voltage. Simply select the most similar characteristics of the sensor type and calibrate settings: the minimum and maximum input signal.

Be aware not to exceed the maximum input voltage to 10V.

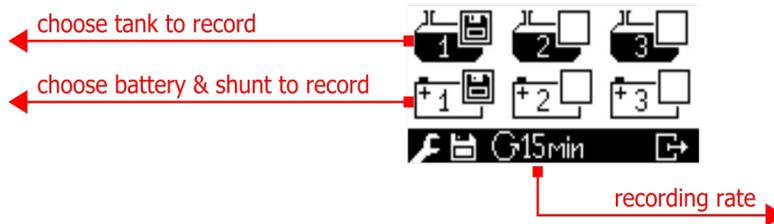
## 4.5 Outputs settings

Outputs settings



## 4.6 Registrar settings

Registrar settings



**WARNING: Changing the configuration parameters to be recorded, results in erasing the recorders memory.**

## 5. Installer notes: