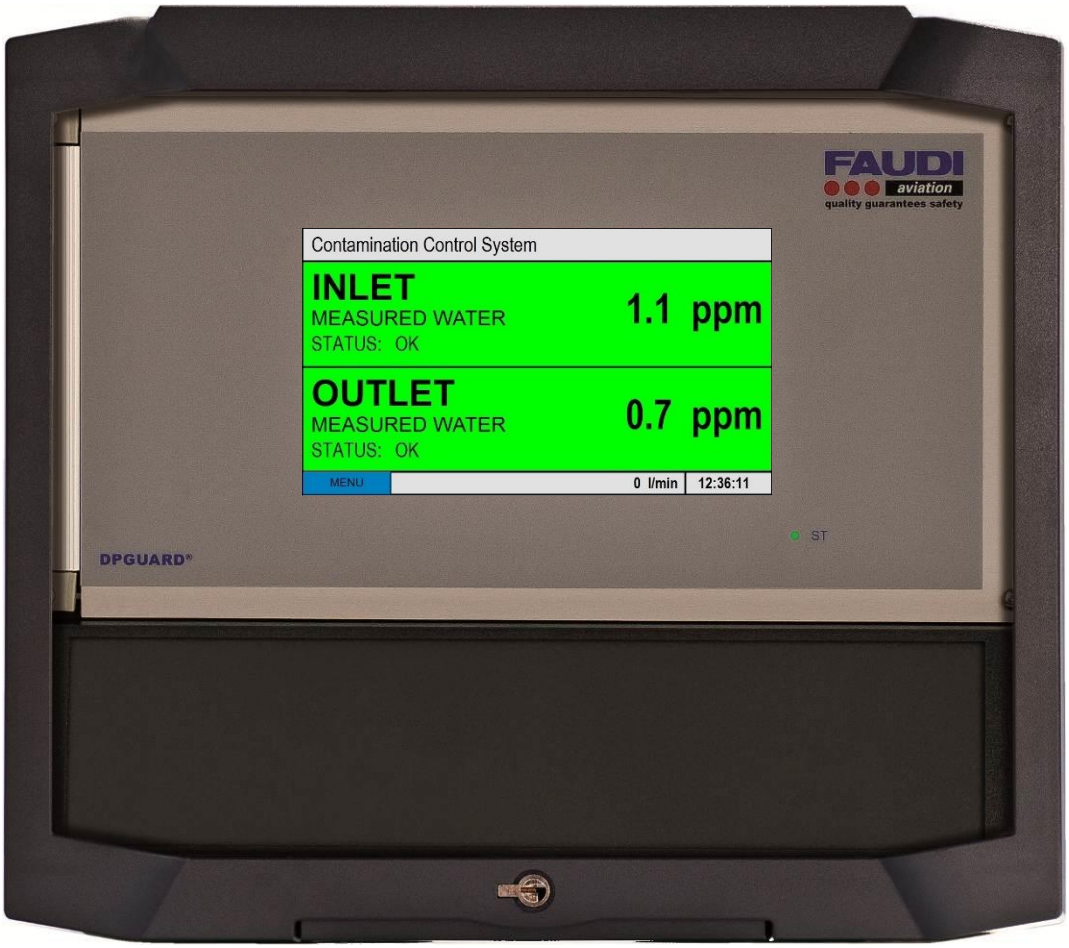
Contamination Control System gold (CCS gold)



Control system for the handling and evaluation of one or two AFGUARD® free water sensors in refuelling applications according JIG bulletin 110.

1 Amendment Record

Revision Number	Revision Details and Date	Received and Entered by	Date
0	Standard manual	**Matthias Aden**	30/04/2019
1	Revision 1	**Matthias Aden**	06/05/2019
2	Revision 2 – Software version CCS_201906225	**Matthias Aden**	01/07/2019
3	Update newest screenshots and JIG requirements	**Matthias Aden**	09/07/2019

Notes on safety icons and symbols

Warning!
This symbol alerts you to hazards. They can cause serious damage to the instrument or to persons if ignored.

Caution!
This symbol alerts you to possible faults which could arise from incorrect operation. They could cause damage to the instrument if ignored.

Note!
This symbol indicates important items of information.

1.1 Purpose

The Contamination Control System has been designed for a continuous evaluating of water contamination in fuel measured by an AFGUARD® - free water sensor. If water contamination is too high for a while it interrupts the refuelling process via a safety relay. Additionally, it can evaluate other sensors like a SLUGGUARD®. The contamination control system is especially made for guarding a filter water separator or a dirt-defence filter system. The CCS will also log information on a USB drive for every refuelling cycle.

1.2 Safety instructions

This manual provides operation and routine maintenance instructions for the FAUDI Aviation Contamination Control System.
Read this manual and ensure that you fully understand its content before you attempt to install, use or maintain the Contamination Control System.
Work on electrical equipment is to be conducted by trained specialists only, according to valid regulations.
Attention must be paid to the requirements of VDE 0100 when setting up high-power electrical units with nominal voltages of up to 1000V, including associated standards and stipulations.
Check the details on the type plate to ensure that the equipment is connected to the correct mains voltage.
Protect against touching dangerously high electrical voltages. Before opening the equipment, it must be switched off and hold no voltages. This also applies to any external control circuits that are connected.
The equipment is only to be used within the permitted temperature and operation ranges.

Check that the location is weather-protected. It is recommended that the Contamination Control System should not be exposed to either direct rain or moisture.
Installation, maintenance, monitoring and any repairs may only be conducted by authorized personnel with respect to the relevant stipulations.
All CHANGEs of the standard Contamination Control System with parts which are not specified or approved by FAUDI Aviation GmbH, as well as repair and service with unspecified parts will result in loss of the CE conformity and guarantee.
In case of doubt, please turn directly to FAUDI Aviation GmbH, respectively to your FAUDI Aviation Distributor or Service organization.

1.3 Designated use

The CCS is suitable for indication and measuring operation of the AFGUARD® during the flow of a medium to be monitored (kerosene, diesel, AVGAS, etc..). Its intention is to catch up electrical signals coming from electrical sensors to detect water content values during flow. Additionally, hereto it provides the functionality to detect and give out alarm status if high free water values are detected.
The manufacturer is not liable for damages caused by improper or non-designated use

1.4 Installation, commissioning and operation

Please refer to installation manual for cabling and mechanical setup of CCS.
Installation, electrical connection, commissioning, operation and maintenance of the measuring system must only be carried out by trained technical personnel. The technical personnel must be authorized by the system operator to conduct the specified activities. Technical personnel must have read and understood these Operating Instructions and must adhere to them.

Before commissioning the entire measuring point, check all the connections for correctness. Ensure that electrical cables are not damaged. Do not operate damaged products and secure them against unintentional commissioning. Mark the damaged product as being defective.
Measuring point faults may only be rectified by authorised and specially trained personnel. If faults cannot be rectified, the products must be taken out of service and secured against unintentional commissioning.

Repairs not described in these Operating Instructions may only be carried out by manufacturer or by a designated service organisation.

1.5 Operational safety

The CCS has been designed and tested according to the state of the art and left the factory in perfect functioning order. Relevant regulations and European standards have been met.

As the user, you are responsible for complying with the following safety conditions:
- Installation instructions
- Local prevailing standards and regulations.

1.6 Return

If the device requires repair, please send it in cleaned condition to the appropriate sales centre. Please use the original packaging, if possible.

When sending for repair, please enclose a note with a description of the error and the application.

1.7 Contact

Contact address of manufacturer: FAUDI Aviation GmbH Scharnhorststrasse 7 B D- 35260 Stadtallendorf Germany	Telephone: +49 6428 4465 - 275 Fax: +49 6428 4465 - 221 Mail: Sensor@faudi-aviation.com Web: www.faudi-aviation.com

1.8 Identification

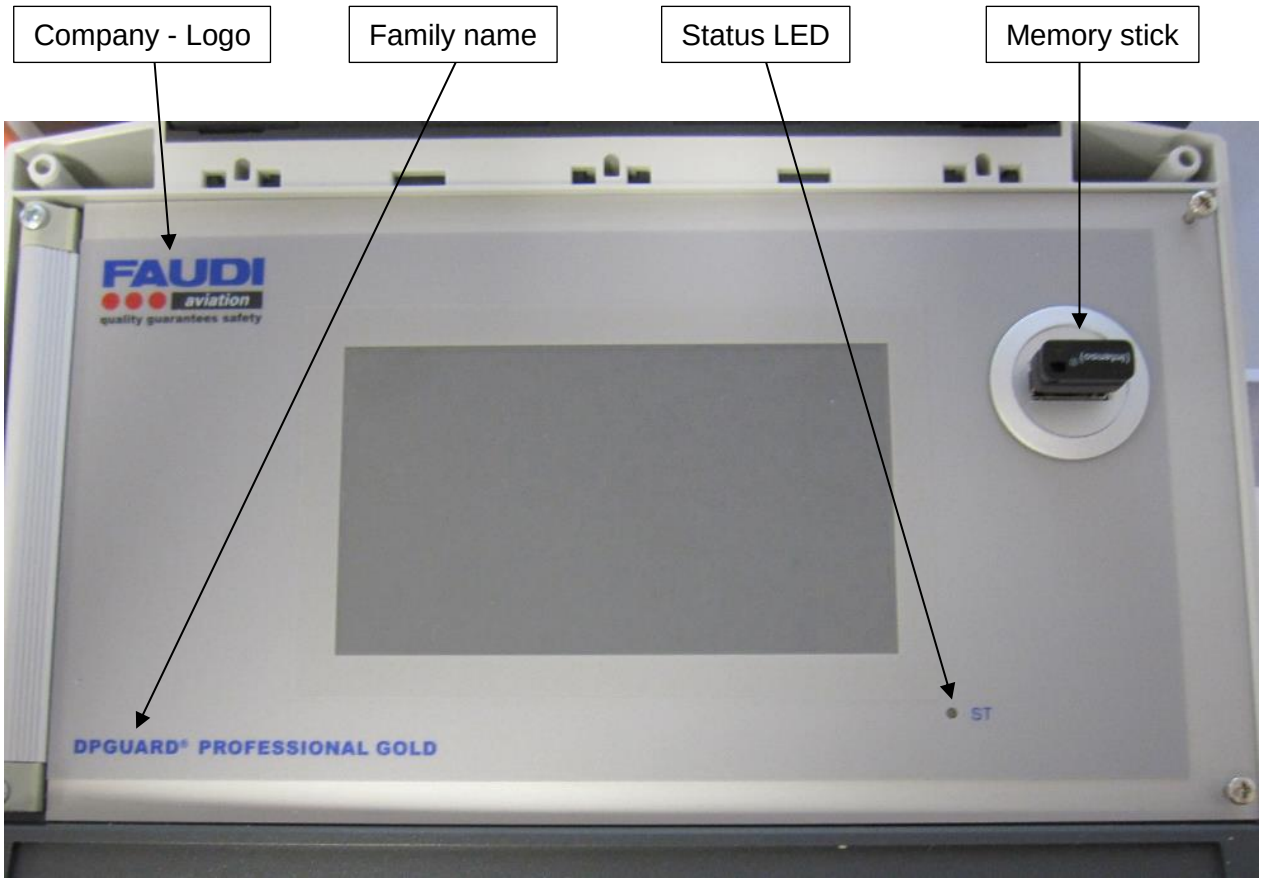
1.8.1 Incoming acceptance, transport, storage

You should have received a device like above.

Make sure the packaging is undamaged!
Inform the supplier about damage to the packaging.
Keep the damaged packaging until the matter has been settled.
Make sure the contents are undamaged!
Inform the supplier about damage to the delivery contents. Keep the damaged products until the matter has been settled.
Check that the scope of delivery is complete and agrees with your order and the shipping.
The packaging material used to store or to transport the product must provide shock protection and humidity protection. The original packaging offers the best protection. Also, keep to the approved ambient conditions (see "Technical data").
If you have any questions, please contact your supplier or your sales centre responsible.

1.9 Product structure

The CCS is marked with the following, permanently identification marking.

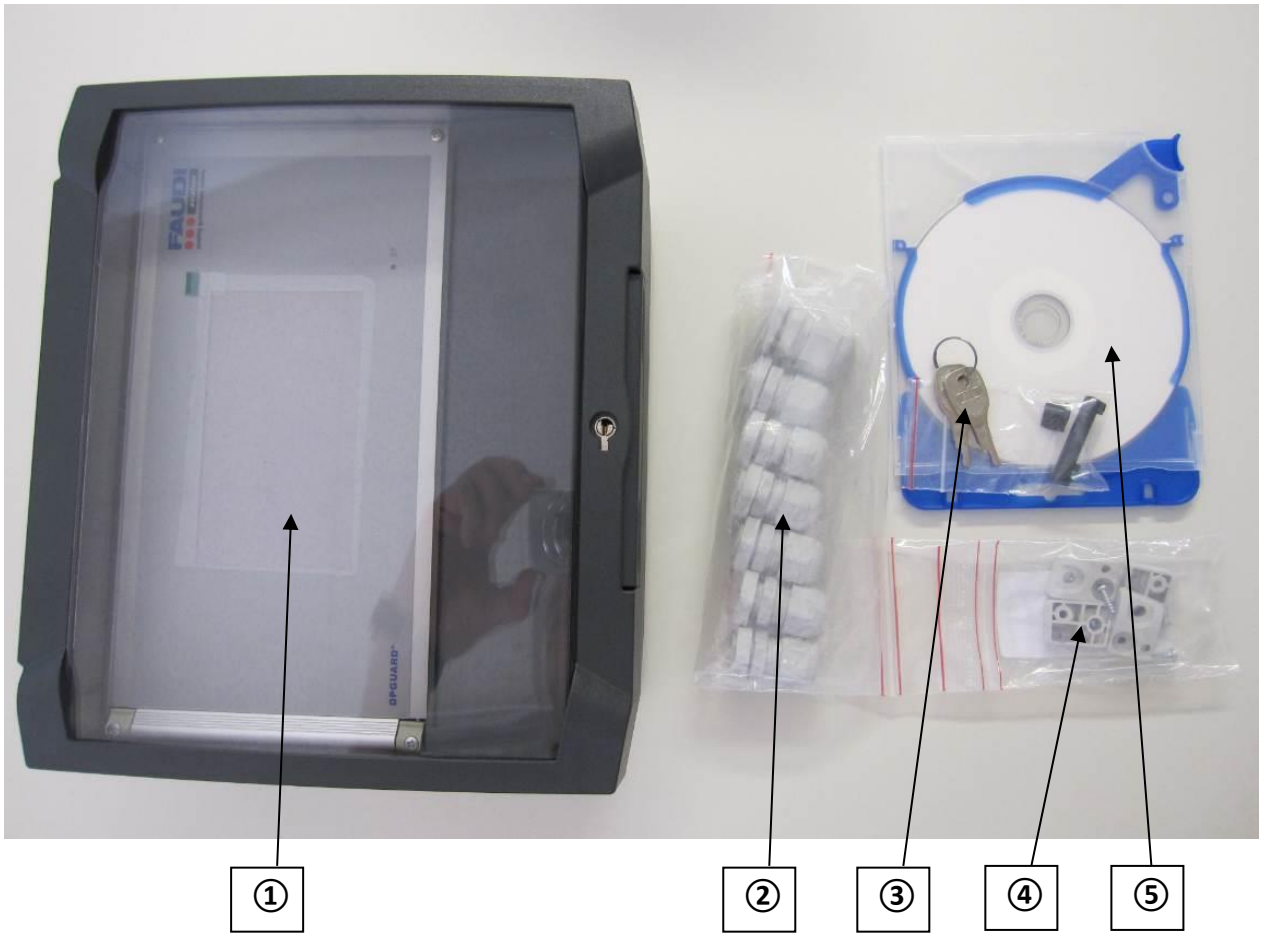


You may wonder about the naming “DPGUARD PROFESSIONAL GOLD”

The difference between DPGUARD gold and CCS gold is based on different software to run the devices. Reason to always use the master device out of the family which is the DPGUARD PROFESSIONAL GOLD type.

1.10 Scope of delivery

The following items are included in the delivery:



A set comprises of:

① - DPGUARD® – mounted in cabinet with ingress protection of IP 65 for wall mounting
USB-Memory Stick with 4 GB included

② - Mounting kit for wall mounting

③ - Key locker with two keys

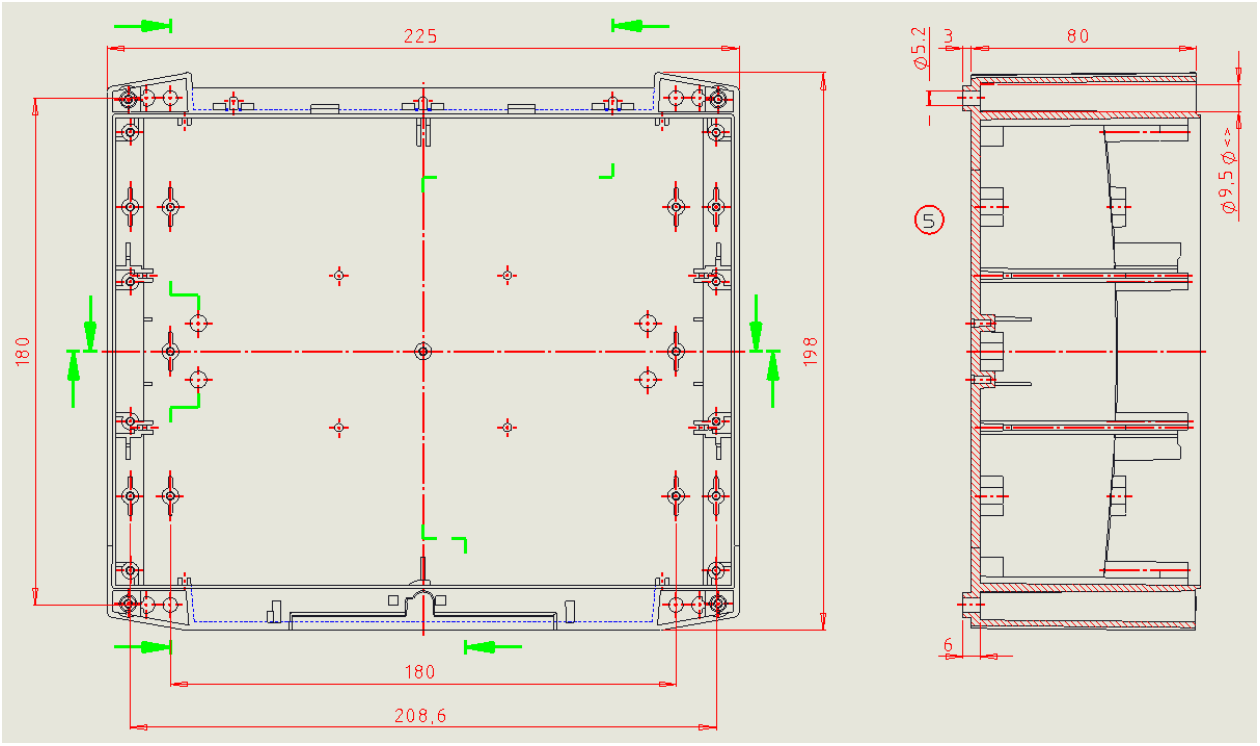
④ - PG-fittings

⑤ - CD with manuals in different languages – or download on FAUDI WEB server

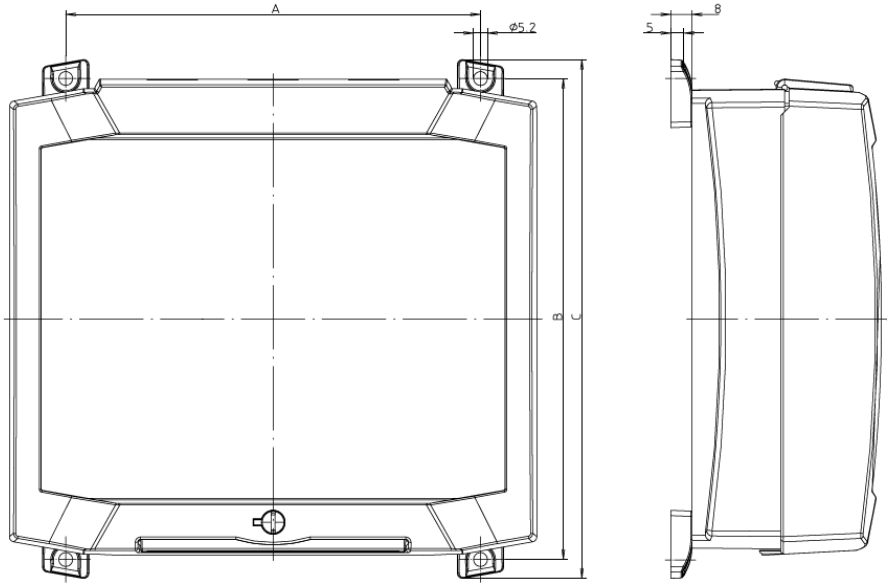
1.11 Installation and dismantling

1.12 Dimensions

Version 1) Secure mounting using inside fixation holes 180 * 180 mm square



Version 2) Fixation using hangers – fixation holes: 186,5 * 206 mm square



with:
A = 186,5 mm
B = 206 mm

C = 220,3 mm

1.13 Mounting Position

The CCS should be mounted on walls in safe area location, vibrant free. Do not mount the CCS in harsh environment / direct solar radiation or without weather/rain protection

1.14 Place of Installation

Select the installation location so that there is easy access. In case of adjustment, CHANGE of values or readout of memory – you need to easily access the device.
Make sure that the CCS and related assemblies are secured safely and vibration-free.

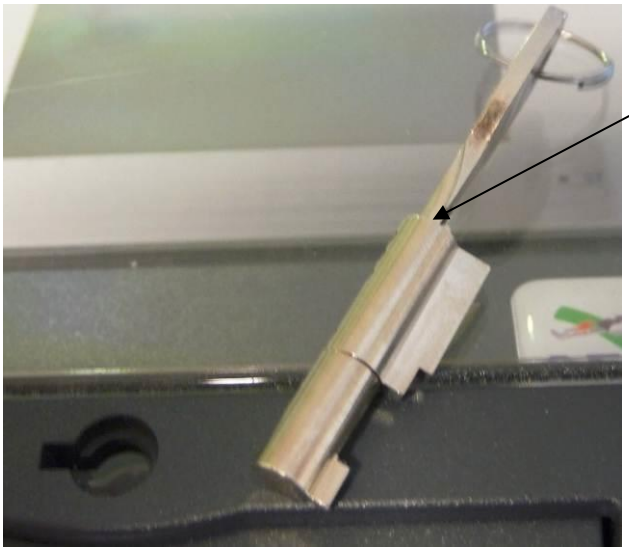
1.15 Housing

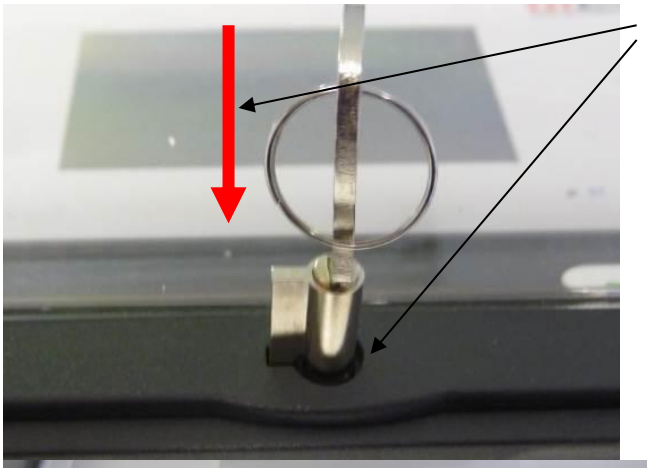
1.15.1 Installation of Key locker

CCS will be delivered without mounted key locker (first units have been send out with mounted key lockers to be delivered via airfreight. This sometimes resulted in vacuum inside the housing). Key lockers intention is to prevent misuse. CCS could even been used with or without key locker.

1.15.2 Step by step installation procedure for key locker

open key locker and put key locker into opening at front door. Adjust it till end position is reached.



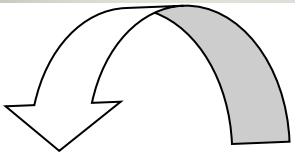


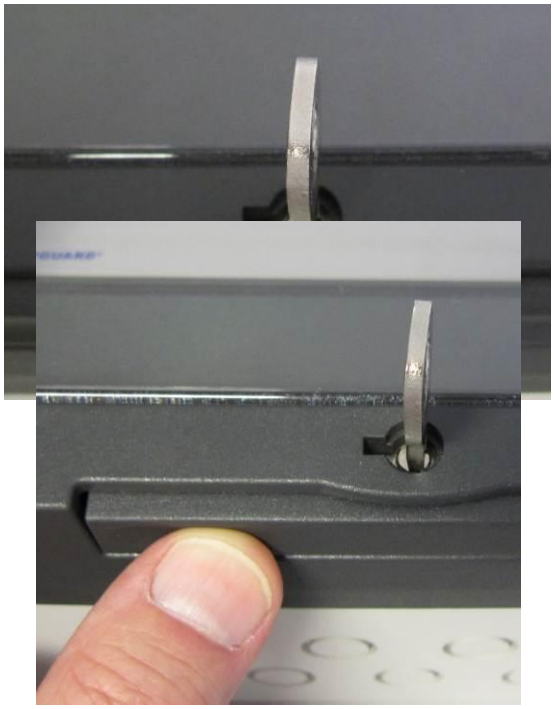
Press key locker into hole till you reach the end position

Close front door till it clicks and shut key locker to remove the key.

1.16 Key locker to open the front door of the CCS

The CCS is installed in an IP65 housing with plexiglas door.
To prevent misuse the door could be locked. It is locked when it left the factory.
To unlock – please proceed as follows:



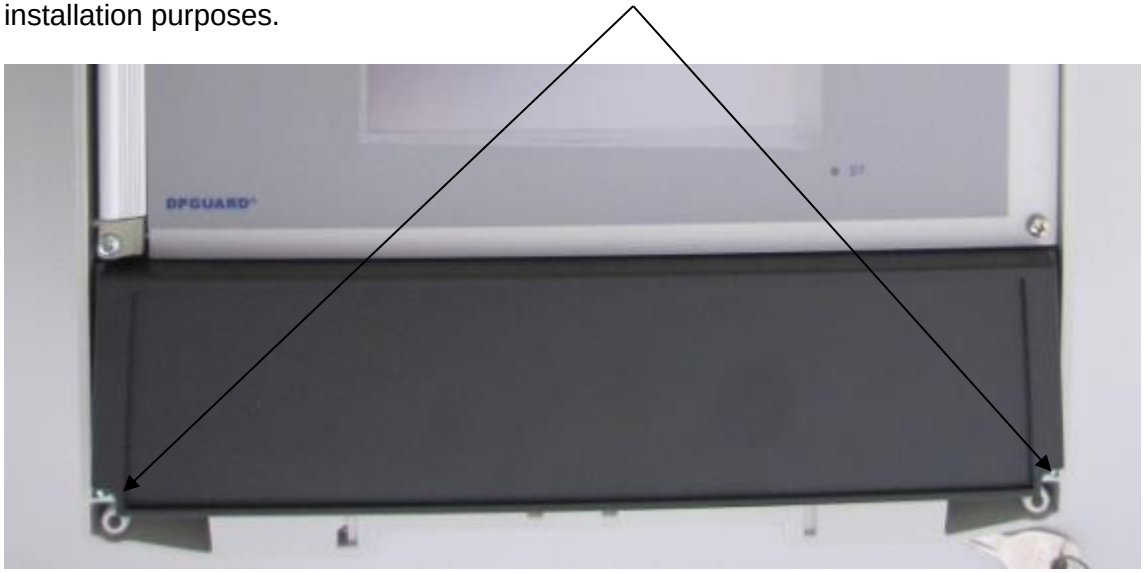


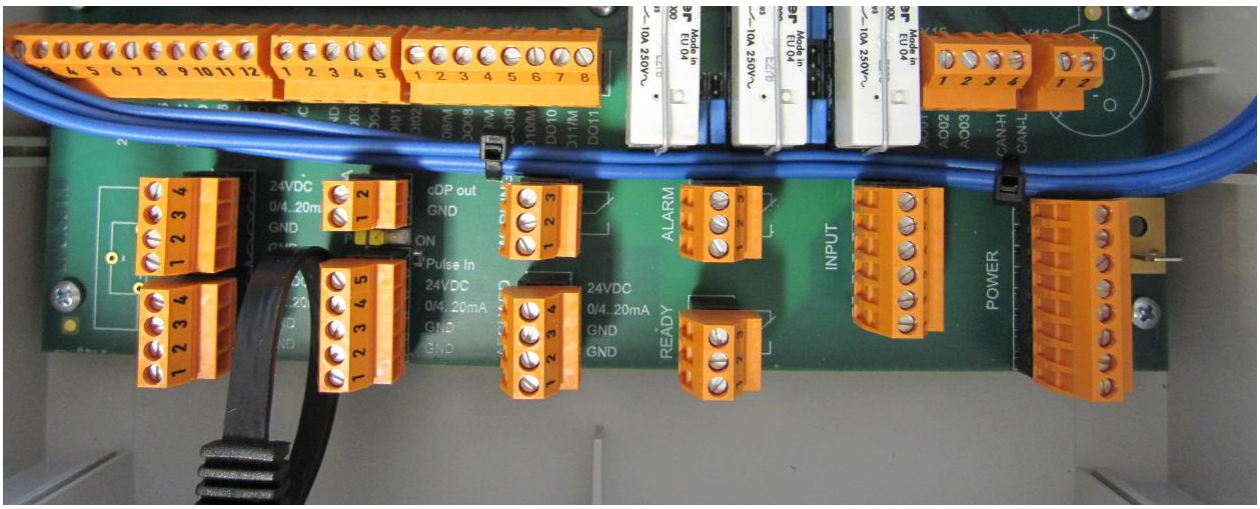
Insert the key into the keyhole and turn it 90 degree counterclockwise.
Than open the housing by pressing the locking device

Open the door carefully. You will feel a slight resistance during opening (100 degree of opening angle) to overcome. The resistance is very useful to hold the door open during service operation.

1.17 Access to mainboard

Disconnect the service cover by the use of a screw driver to get access to the mainboard for installation purposes.



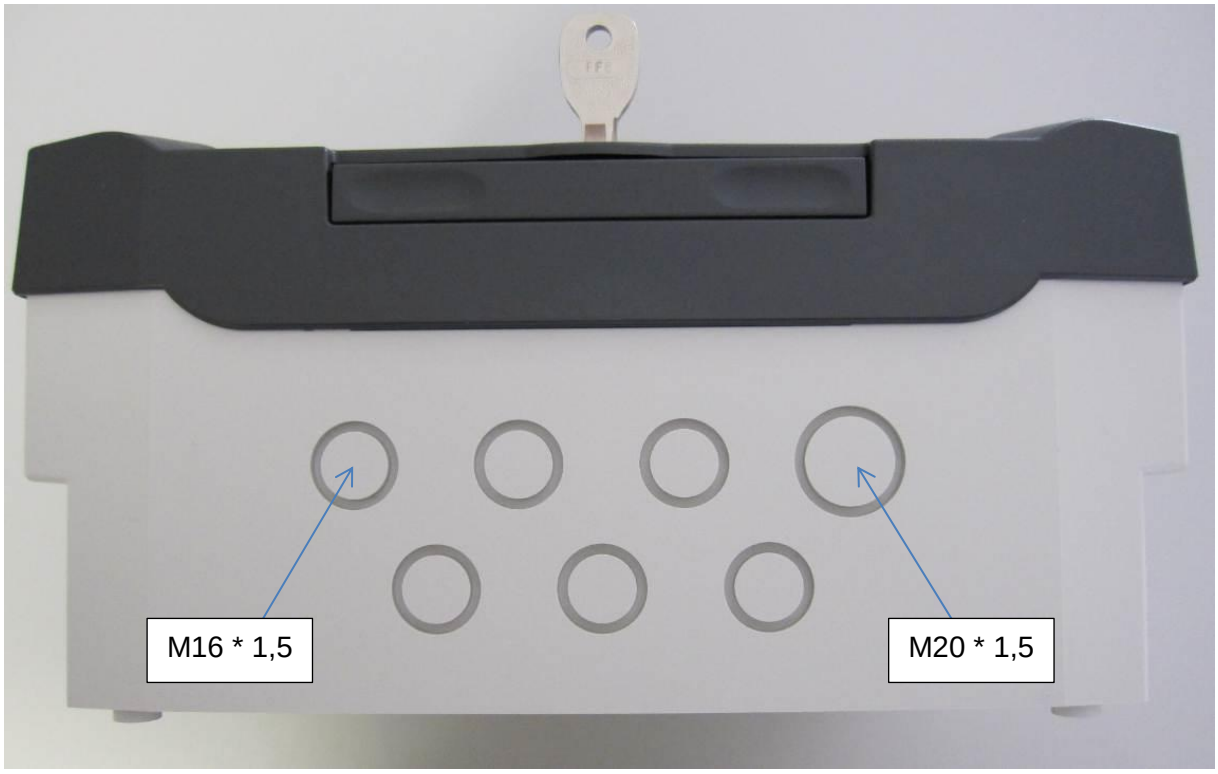


Now you can see the plug connector for power input, analog sensor input and Relays output etc.
In front of any cable connection please install the required numbers of PG-fittings to bring the cables in – see next chapter.

1.18 Installing the PG-fittings for cabling purposes

1.18.1 Preparation for assembling

The CCS has 7 prepared holes on his bottom side to bring the cables into the housing.
These holes could either be used for single cables or multiwire cables.
Please make sure to assemble the required number of PG - fittings ② in front of wall mounting.



View from bottom side

Identification	Wire cross section / clamping range
M16 * 1,5 mm	4 to 10 mm
M 20 * 1,5 mm	6 to 12 mm

1.18.2 Preparation of housing

Procedure:

1) Remove residual plastic in prepared hole for PG-fittings e.g. by the use of a cutting edge.

2) Remove plastic and screw in the PG-fitting into the prepared hole

3) Connect the counter nut and pull it tight.

Proceed with all other required PG-fittings.

1.19 Following cables are effective:

AFGUARD sensor:
M16*1,5 for blue 2 wire cable with IP 67 connector (part of AFGUARD delivery)

Pressure sensor:

differential pressure	**M16*1,5 mm**	cable: Ölflex classic recommended
or		
2 independent Pressure sensors	**M16*1,5 mm**	cable: Ölflex classic recommended

Flow sensor:

Pulse or current	**M 16*1,5 mm**	shielded cable recommended
Trigger:	**M16*1,5 mm**	cable: Ölflex classic recommended
Reset switch:	**M16*1,5 mm**	cable: Ölflex classic recommended
Blue lamp:	**M16*1,5 mm**	cable: Ölflex classic recommended
Power supply:	**M16*1,5 mm**	cable: Ölflex classic recommended

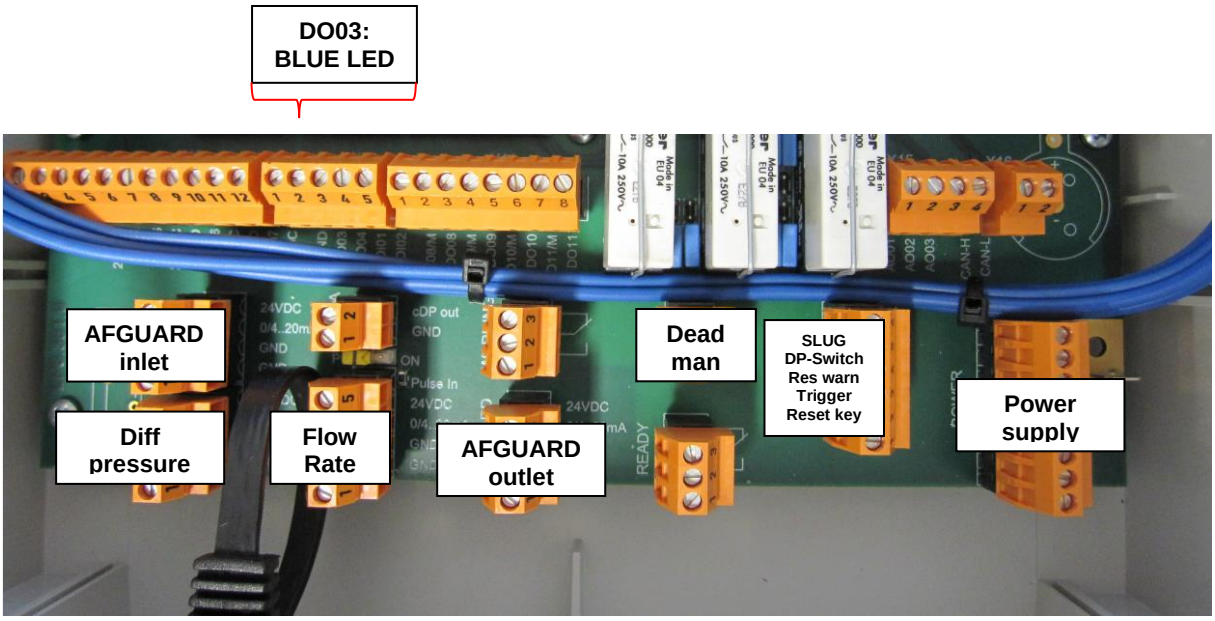
Relays output:

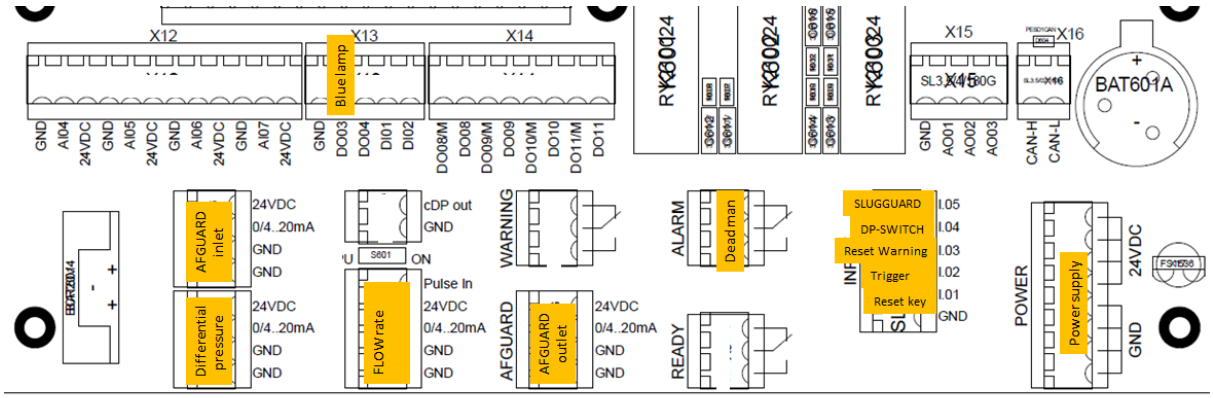
Max 3 Relays	**M20*1,5 mm**	multi wire cable

2 Wiring and Assembly

The Circuit board inside the CCS has inscriptions for the mounting of the signal cables.
To prevent damage, please make sure, not to connect power supply during wiring. Connect power supply when all other connections are made.
Please use proper tools for making the connections. Use flexible copper wire to connect signals to the CCS. We recommend flexible wire with a cross-section of 1 mm². It is not allowed to mount wires without ferrules. An appropriate crimping tool must be used to apply the ferrules to the wires (see chapter 1.19)

The wiring diagram is shown in the photography:





AFGUARD Inlet – P Outlet
AFGUARD outlet – AFGUARD
DP – DP
Flow - FLOW

Reset	- I 01
Trigger	- I 02
Reset Warning	- I 03
DP-SWITCH	- I 04
SLUGGUARD	- I 05
Blue Lamp	- DO 03

Terminal panel	Inscription	Connected Signal
Power	24V	Power Supply 24V DC
Power	GND	Power Supply GND
DIGITAL_INPUT	I 01	Reset Key for WARNING and ALARM
DIGITAL_INPUT	I 02	Trigger
DIGITAL_INPUT	I 03	Reset for WARNING only – no PW
DIGITAL_INPUT	I 04	DP-SWITCH (high dp)
DIGITAL INPUT	I 05	SLUGGUARD /Bulk sensor
P outlet	mA	AFGUARD Inlet
AFGUARD	mA	AFGUARD Outlet
DP / P inlet	mA	DP Transmitter
Flowmeter	mA or pulse	Flow (analogue) optional
DIGITAL OUTPUT	DO03	Blue LED
ALARM	REL_1	Deadman

Please connect all signals according to the table. All sensor signals are optional.

2.1 AFGUARD® Inlet, Outlet

The main application of the CCS is to evaluate water levels measured by the AFGUARD® - free water sensor. You can connect one or two AFGUARD®s to the CCS.
The **P Outlet** terminal is for the AFGUARD® in the **Inlet** of the vessel.
The **AFGUARD** terminal is for the AFGUARD® in the **Outlet**.
The “mA”-Terminal is the path where the given current-signal flows in. For Ex-i Safety, a barrier is needed. The barrier connects between AFGUARD® and CCS ANALOG_1 or ANALOG_2 input. To power and ground the barrier and the sensor, you can use the “24V”, “GND”, and “PE” connector of the terminal.

2.2 Differential Pressure

The CCS can work with a DP signal. The CCS can use the DP as a trigger for the monitoring. It also logs the DP.
The CCS can work with analogue DP transmitters with a current range between 0..20mA and 4..20mA.
The ANALOG_3 terminal is for connecting a DP signal. The “mA”-Terminal is the path where the given current flows in. For Ex-i Safety, a barrier is needed. The barrier connects between DP sensor and CCS ANALOG_3 input. To power and ground the barrier or the sensor, you can use the “24V”, “GND”, an “PE” connector of the terminal.

2.3 Flow Rate

For basic function of the CCS, a flow signal is not necessary but highly recommended. With a flow signal, the CCS can calculate exact water average values. The flow can also be used as a trigger for the water monitoring, and the flow gets logged by the datalogger, if connected.
When you connect a flow meter, you need to know the signal type. The CCS can work with pulse-based flow meters and with analogue flow meters with a current range between 0..20mA and 4..20mA. Please check signal type of your flow meter. Use the upper table to connect the flow signal properly.

2.3.1 Analogue Flow Meter

When using an analogue flow meter, use the 0/4…20 mA terminal. The “mA”-Terminal is the path where the given current flows in. For Ex-i safety, a barrier is needed. The barrier connects between flow sensor and CCS input. To power and ground the barrier or sensor, you can use the “24V”, “GND” connector of the terminal.

2.3.2 Pulsed Flow Meter

When using a pulse-based flow meter, use the PULSE in terminal to connect the sensor. Connect the pulse output of the sensor to the PULSE connector. To power and ground the sensor, you can use the “24V”, “GND” connector of the terminal.

2.4 SLUGGUARD®

A SLUGGUARD® is a binary sensor which indicates water slug in pipes or vessels or which detects collected water on low points (vessel drain port). The SLUGGUARD® can trigger water alarms in the CCS. It is an optional sensor. It must be connected to the **Input I05** connector in the DIGITAL_INPUT terminal panel. For Ex-i safety, a barrier between SLUGGUARD® and CCS will be needed.

2.5 Interlock

An interlock signal is an optional signal which can be connected to the CCS to detect when a refuelling process starts. **This has no effect on the clearance of the water relays.**
It effects on the evaluation of the refuelling process. When the truck gets parked under the aircraft and the operator takes the refuelling equipment out of its storage place, a binary signal gets created. You can connect a 24V interlock signal to the CCS which tells the system when the refuelling truck refuelling one aircraft. 24V means, refuelling process is active (truck parked under the aircraft). 0V means, that there is no refuelling process and no evaluation.
If you do not connect an Interlock signal, the detection of a refuelling process works in another way.
The 24V interlock signal gets connected to the I 02 connector in the Digital Input terminal panel.

2.6 Trigger

When there is no possibility to install a flow meter or a DP transmitter, the system needs a binary trigger, otherwise, there is no need to connect it. The trigger tells the system if there is a refuelling now. This condition activates the water monitoring with the AFGUARD®. **Do not mix up the trigger with the interlock signal!**

The trigger is usually the output of a Deadman. It must be a 24V signal. Connect the signal to the **TRIGGER** connector in the CONTROL terminal panel.

2.7 Reset

When an alarm occurs, it must be reset to continue refuelling. You can reset it by software over the visualisation by Entering a PIN or you can use the hardware reset. This is usually a key switch. In the CONTROL terminal panel “digital Input”, there is a connector called **I 01**, connect the reset switch to 24V and I 01, that the current path gets closed when applying reset.

2.8 Water Indicator

To indicate water warnings and water alarms to the operator, a blue flashlight should be connected to the CCS. The 24V Light must be connected between the **DO03** of the Terminal panel X13 and GND.

2.9 Relay Outputs

The CCS has 4 relay outputs. 2 of them are in use.

REL_1	Alarm levels for all critical modes of sensors and measures
REL_2	Water warning(s) (AFGUARD®s)

All relay outputs use inverted logic. This means, the relays are triggered if everything is okay. The relay releases if a warning/alarm/error occurs.

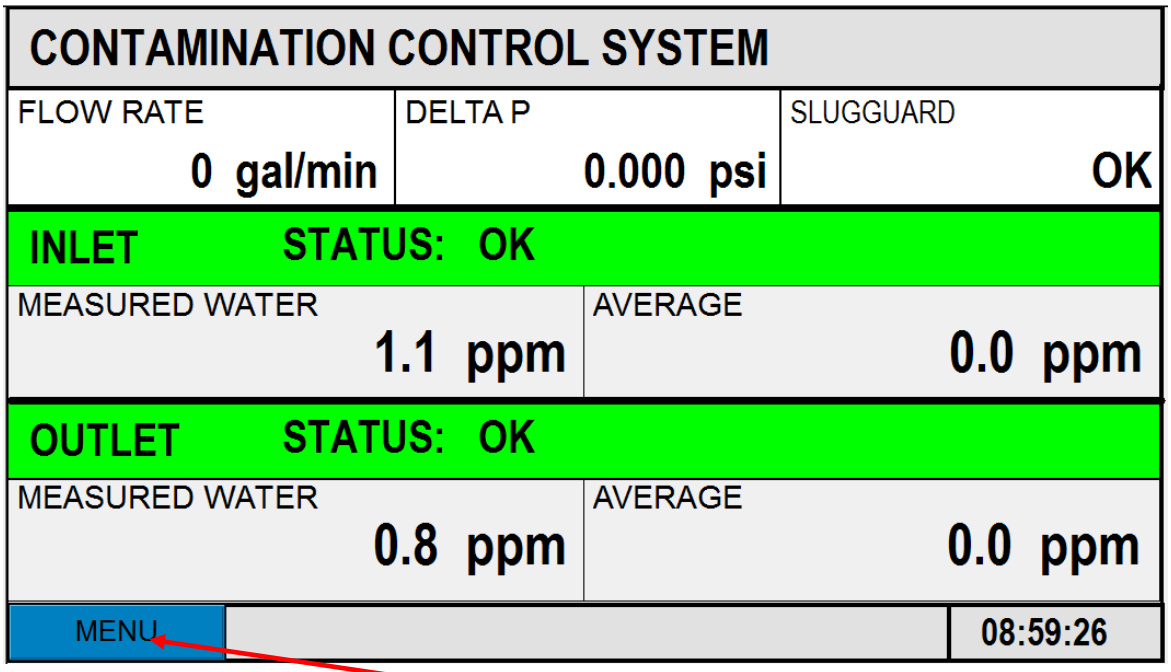
2.10 Power Supply

The CCS works with a power of 24V DC ±10 %, Residual ripple 5 %.

In the SYSTEM terminal panel, the supply voltage must be connected. Use the 24V and the GND terminal to connect the power supply. Optionally use **PE** to ground the CCS.
It is highly recommended to use a DCDC converter close to the CCS to supply a stabilized power to the system.

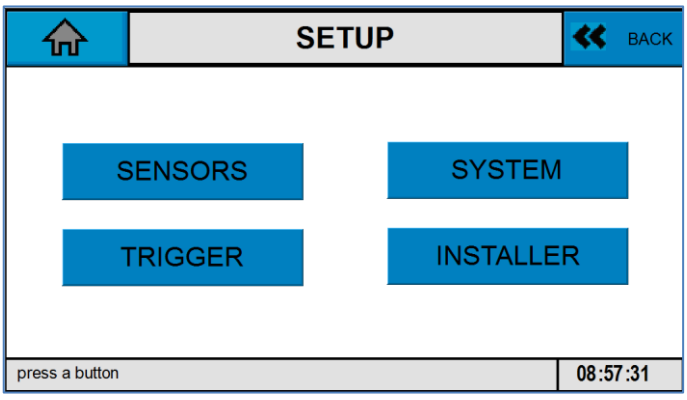
3 Operation

CCS can handle different analogue and digital sensor signals which will be displayed on the screen if sensors are available and enabled.
For first initial setup of CCS a so-called INSTALLER will automatically appear to guide you through the settings.



If needed you can access it by clicking onto the menu button.

The next menu appears with four different buttons:
SENSORS, TRIGGER, SYSTEM and INSTALLER

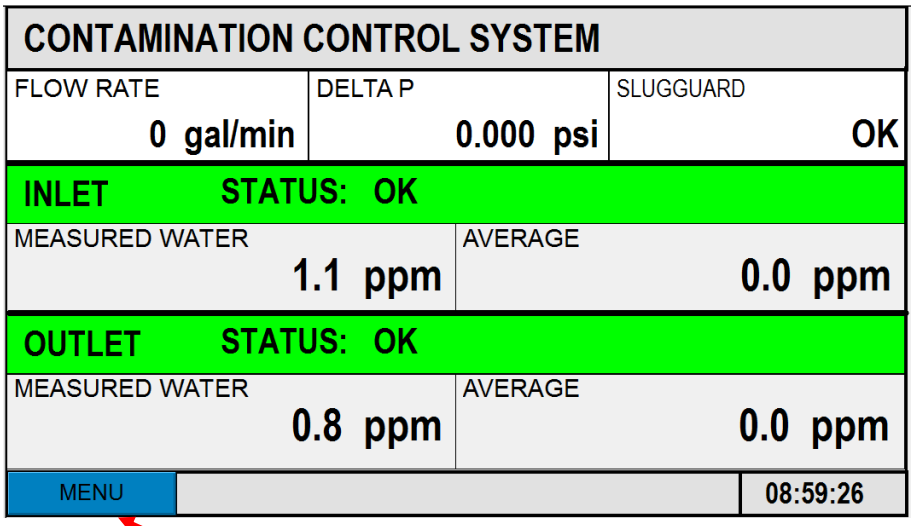


Click on
INSTALLER
To access the INSTALLER menu

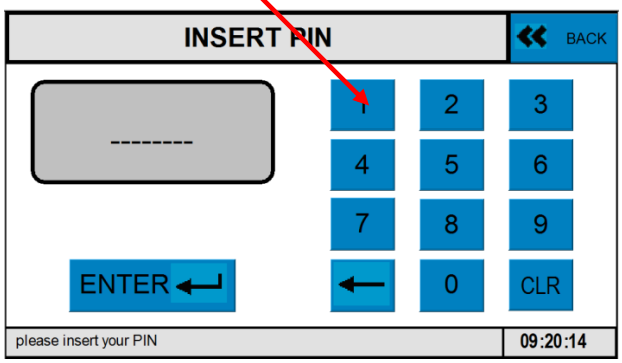
3.1 General procedure to operate the touch screen

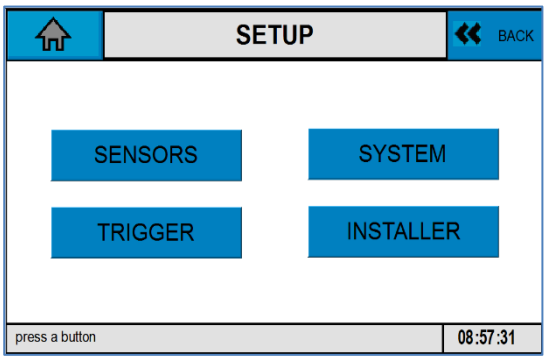
CCS Gold uses a touch screen displays to show results and to set up sensors and to change general settings.

3.1.1 Use of touch screen

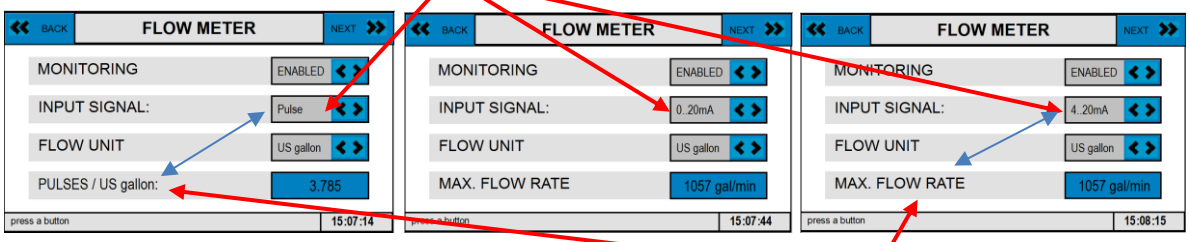


All blue coloured fields can be touched to activate the sub menus or to enter the setup screens for further settings of sensors, warning levels, alarms etc.





In some cases – there are multiple settings behind the buttons which need to be selected



Changing one setting might interfere with some others – please check for logical configuration.

3.2 INSTALLER

3.2.1 INSTALLER for first setup

Set the CCS under power (24 VDC). Ensure to have all required sensors connected. After successful booting the main screen should appear.
For first Installation of CCS – an INSTALLER appears that guides you through the configuration menu.
This subroutine could be called whenever you go into the setup menu to ENTER the INSTALLER

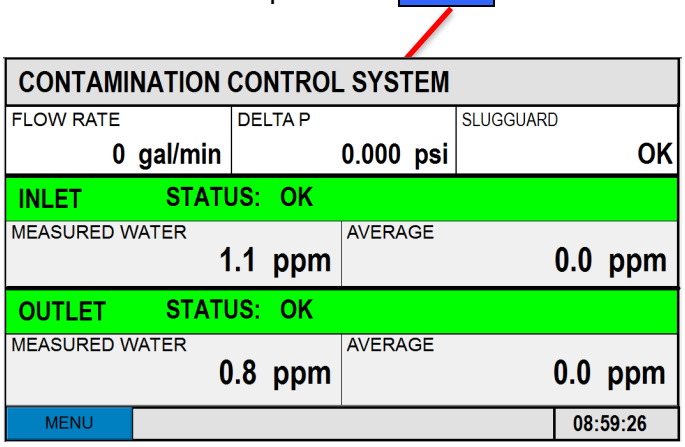
The INSTALLER is a setup wizard which guides you through all necessary settings of the CCS.
On the first launch of the CCS the INSTALLER starts automatically with the language page. It is highly recommended to use the INSTALLER to setup the CCS on installation instead of setting up every menu point individually. **Please go through the INSTALLER meticulously and know what values you set up on every page.** There is a List of Settings at the end of the document which helps you going through the INSTALLER.
The INSTALLER routine consists of the following structure:

INSTALLER

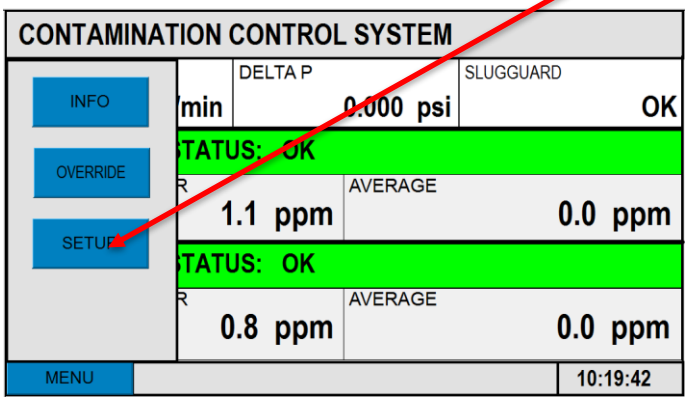
- LANGUAGE
- DATE SETTING
- TIME SETTING
- CHANGE PIN
- DATA LOGGING
- FLOW METER
- DELTA PRESSURE
- DP SWITCH
- SLUGGUARD
- TRIGGER MONITORING
- AFGUARD SETTING

3.2.2 Manually start of the INSTALLER

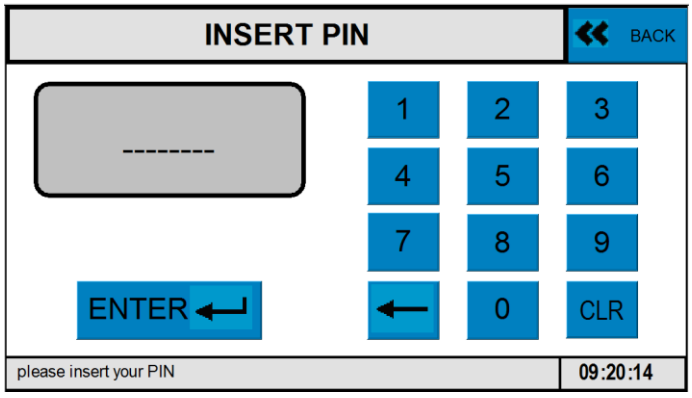
In cases where you want to manually start the INSTALLER for a reconfiguration – please go on main screen and press the MENU button:



The menu appears where you need to press the SETUP button



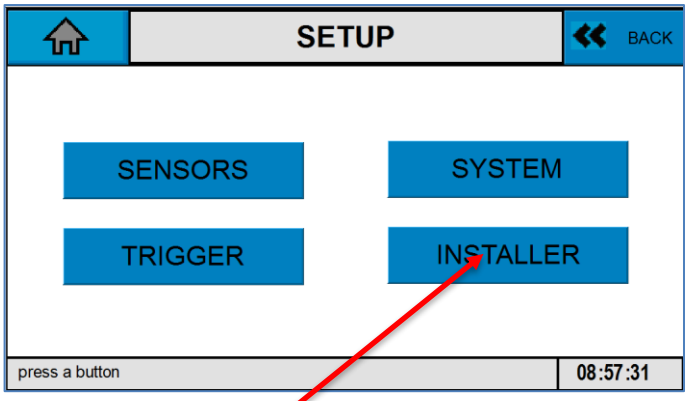
You will be asked to ENTER your PIN number (1 2 3 4 5 6 7 8):



Following PIN numbers are preconfigured:

Administrator – PIN level: 12345678
User – PIN level: 00000000

Please type in **Administrator PIN** number and press ENTER.
Now you are in Setup mode.



Press the INSTALLER button to ENTER the INSTALLER menu

The INSTALLER launches with the Language page.

3.2.3 Handling of the INSTALLER

In the headline of the screen, there are two navigation buttons. Press the NEXT >> button to ENTER next menu step or go back to previous menu with the << BACK button. In the INSTALLER some configuration dialogs get opened where you must ENTER some values. You can use the blue keypad on the screen or the buttons of the NUM Block off your keyboard as well.
Every CHANGE you make in the INSTALLER will be applied **immediately.** At the end of the INSTALLER, a reset will be applied to delete cable break errors which could come from configuration routine.

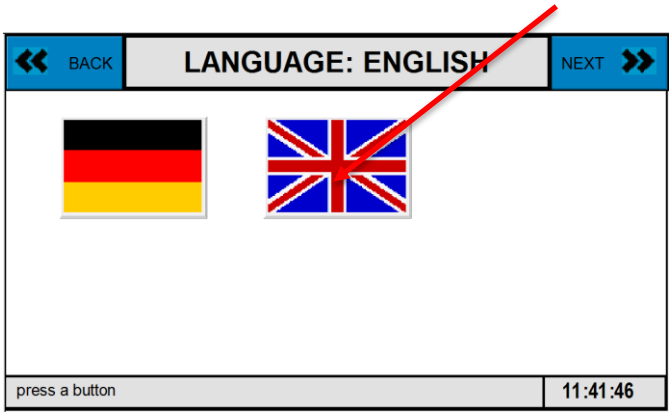
3.2.4 Menu structure of the INSTALLER

INSTALLER – menu structure

- LANGUAGE
- DATE SETTING
- TIME SETTING
- CHANGE PIN
- DATA LOGGING
- FLOW METER
- DELTA PRESSURE
- DP SWITCH
- SLUGGUARD
- TRIGGER MONITORING
- AFGUARD SETTING

3.2.4.1 LANGUAGE – selection of language to be used

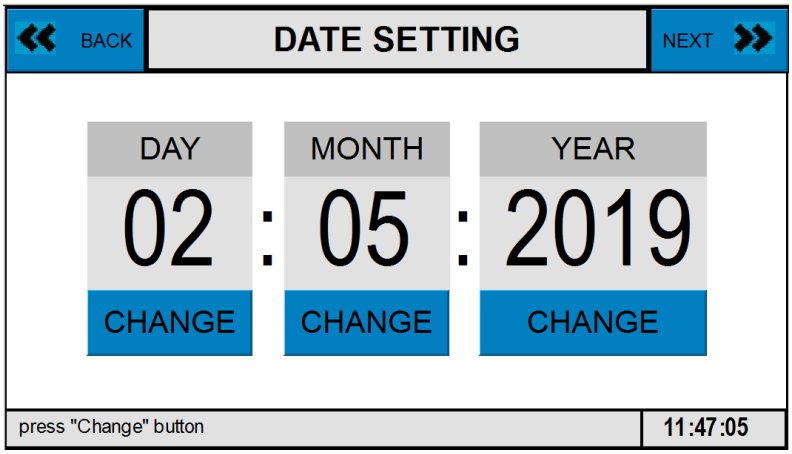
First screen in INSTALLER Setup Menu is the menu to select the LANGUAGE. Selected language is shown in header (here it is English):



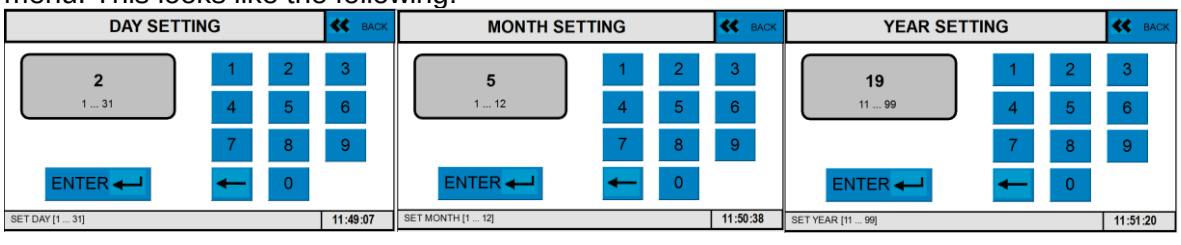
To CHANGE language – click on the appropriate flag - you will see CHANGEs in the header between “LANGUAGE ENGLISH” and “Sprachauswahl Deutsch” for the selection of German. Than press NEXT >>

3.2.4.2 DATE SETTING

Next menu is DATE SETTING. Click on CHANGE button of Day, Month, Year and select the right numbers to set it appropriately.

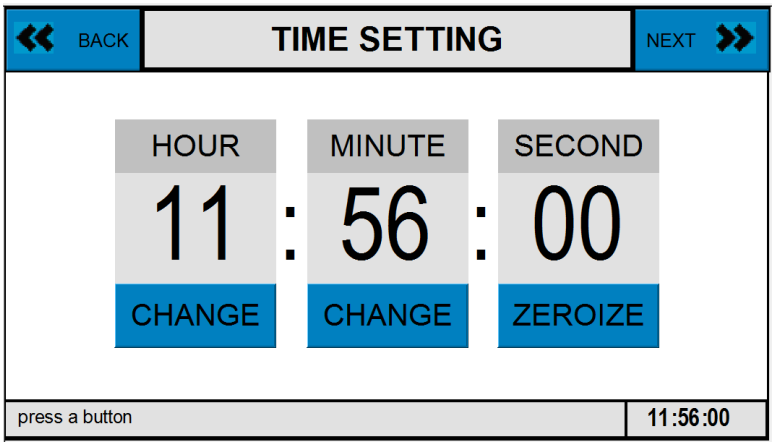


Example:
Press the CHANGE button for Day, Month or Year - you will ENTER the appropriate menu. This looks like the following:

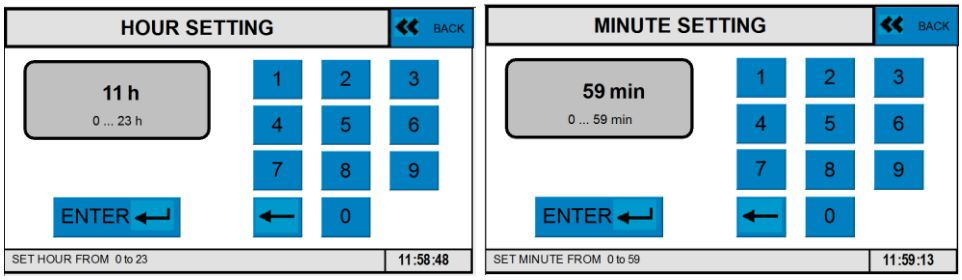


To set up the right year, please only type in the last two digits e.g. **19** for 20**19**. The latest date supported by the system will be in year 2099. For Setting Day or Month type in the last one or two digits and press ENTER. You will go back to the Date and Time Screen. If the chosen value is 0 or if the value is out of the specified range, a press of ENTER won't be accepted.

3.2.4.3 TIME SETTING



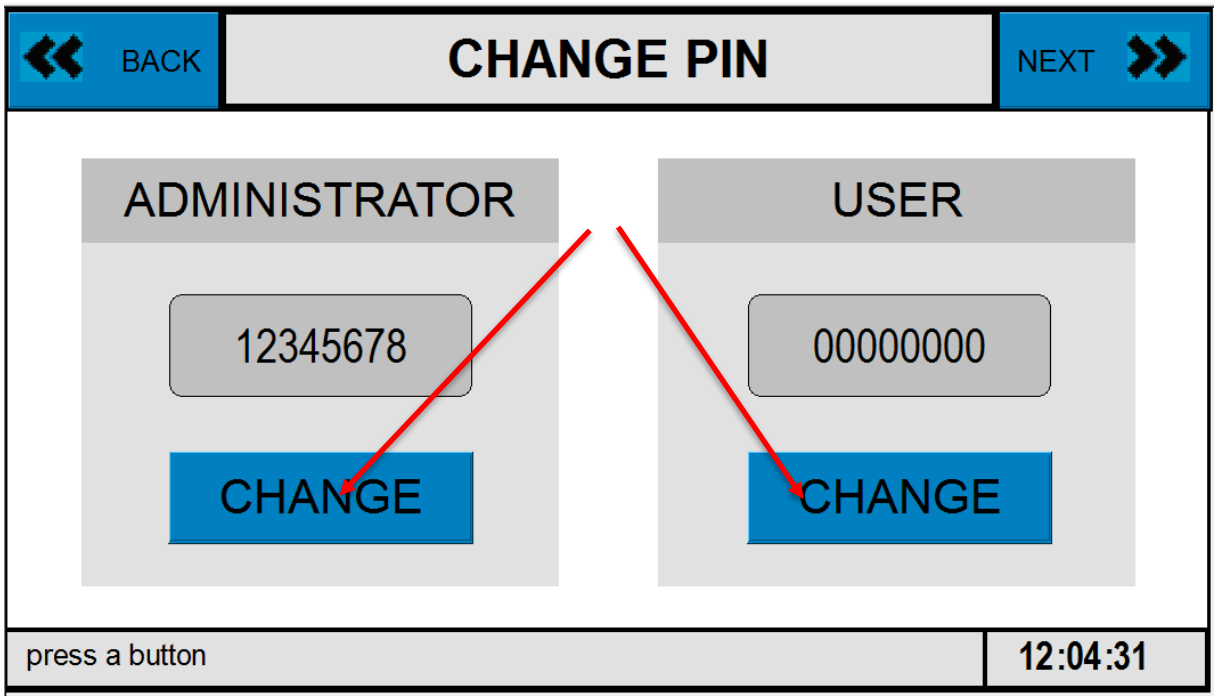
Same systematic for the TIME SETTING. To CHANGE HOUR, MINUTE or SECOND press the associated blue CHANGE or ZEROISE button. The menu for Hour or Minutes will open. Please ENTER a one- or two-digit value and press ENTER. If the value is out of range, the ENTER won't be accepted. To CHANGE SECOND please only press ZEROISE when seconds switch to zero.



Click the NEXT >> button when finished.

3.2.4.4 CHANGE PIN

Next menu is to CHANGE PIN. Click on CHANGE button of ADMINISTRATOR or USER to set new PIN numbers:

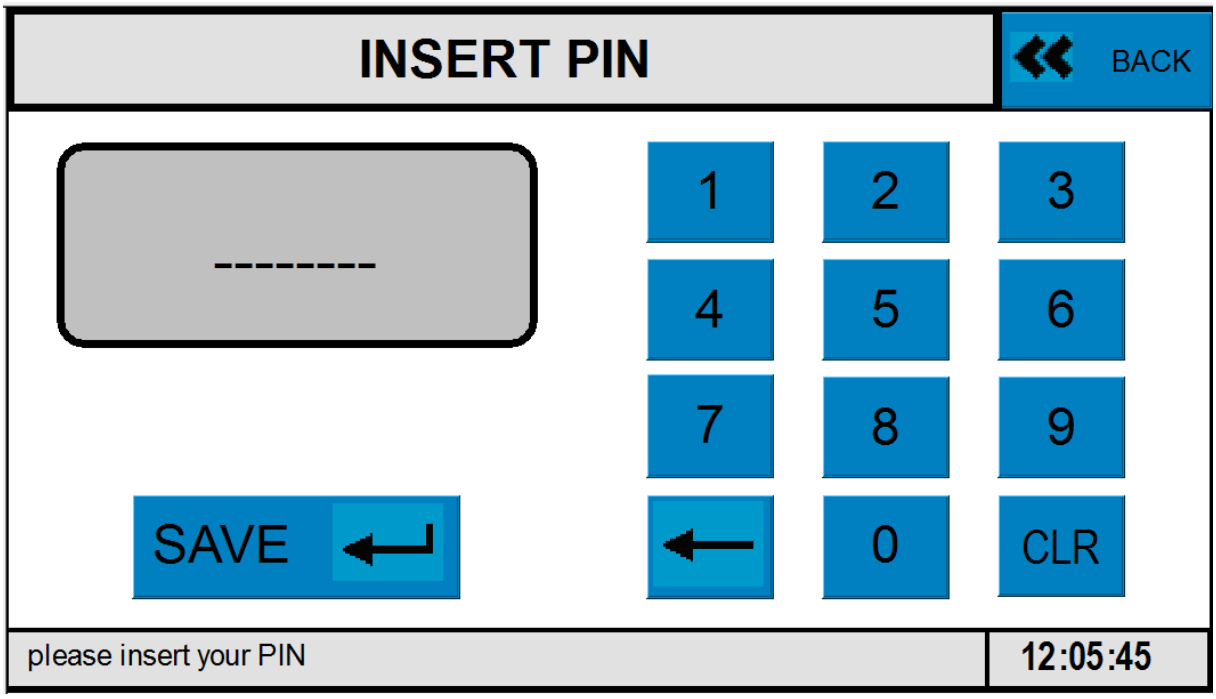


Following PIN numbers are preconfigured:

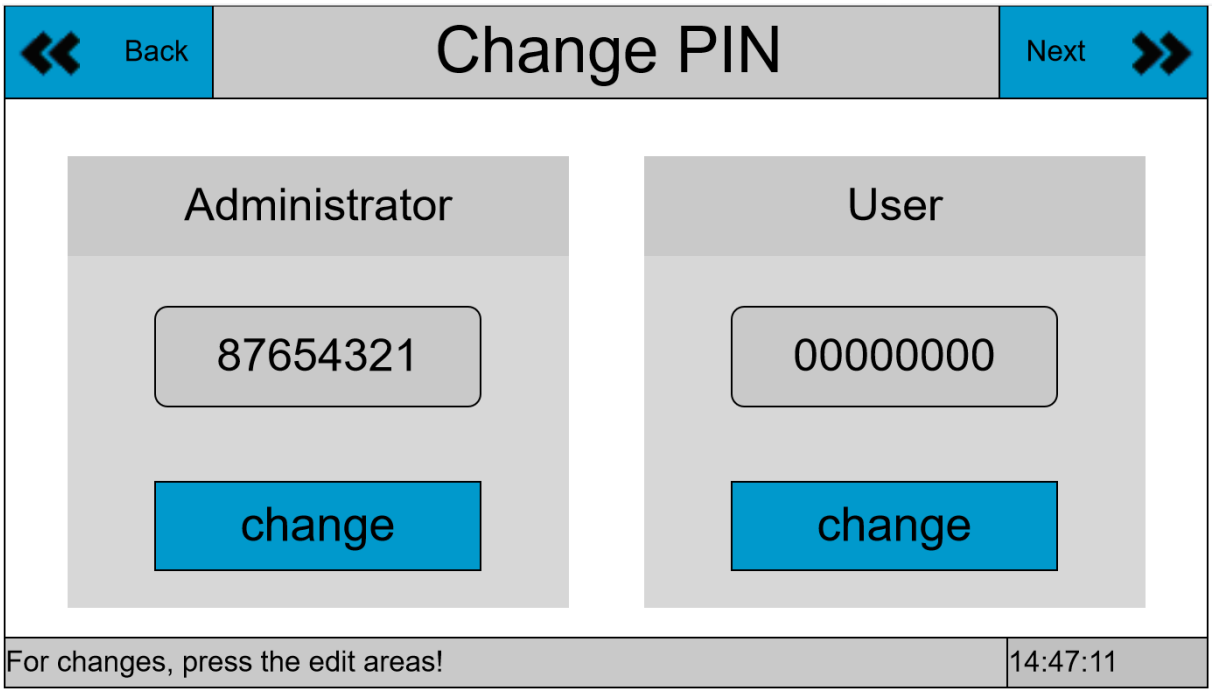
Administrator – PIN level: 12345678
User – PIN level: 00000000

Make sure to remember CHANGE PIN numbers. In cases of loss of CHANGE PIN numbers only FAUDI Aviation GmbH can reconfigure.

PIN – Insert new PIN
CHANGE PIN number with INSERT PIN menu:



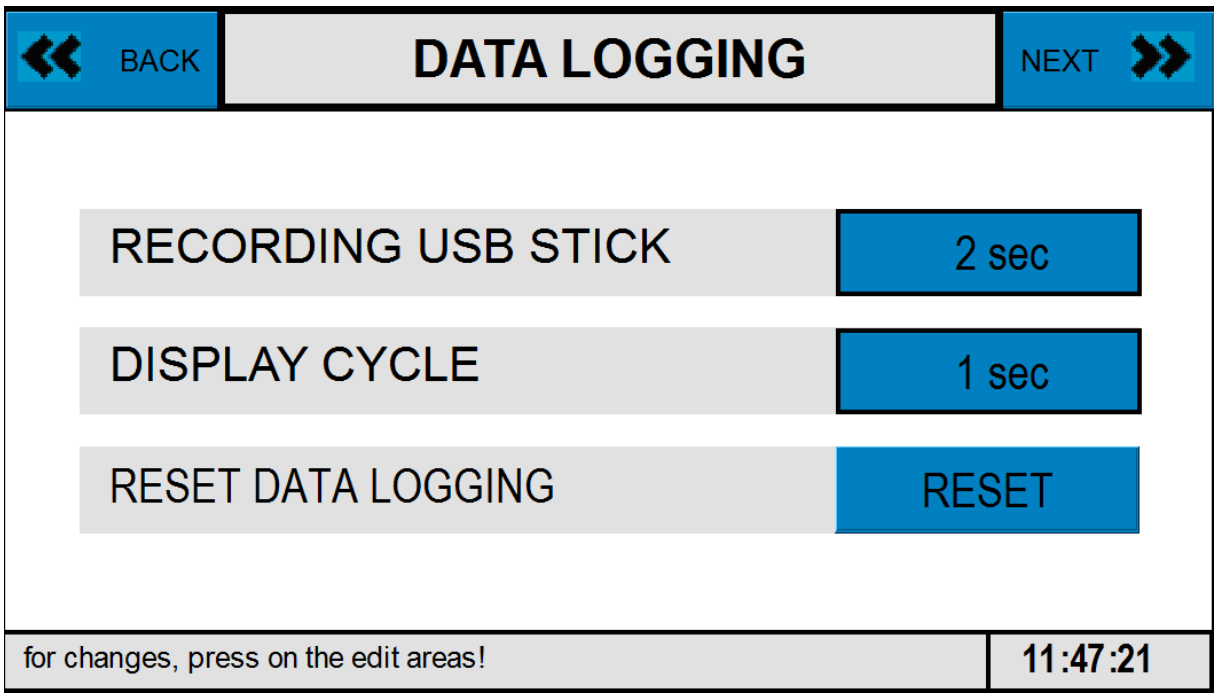
The PIN must have **4 to 8** digits. If you have Entered a valid PIN, you will go back to the following screen. Changes affect immediately. Please check the new PIN on the following screen (example with new PIN 87654321:



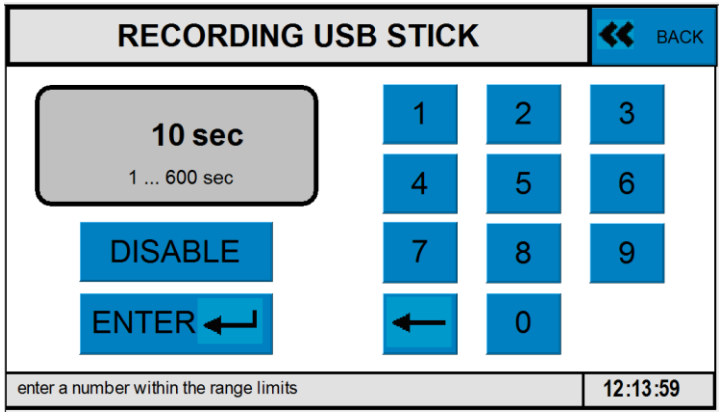
Please repeat the same procedure to CHANGE the USER PIN level.

3.2.4.5 DATA LOGGING

Choose NEXT >> button to ENTER next menu step DATA LOGGING where you are asked to define timing for the log files and the display cycle for the graphs of AFGUARD on main screen.



RECORDING USB STICK: Defines the cycle time to log data from sensors and status messages on the memory stick. Remember: The more data you log – the better you can find unexpected effects on logged data after having measuring effects.
The longer the recording cycles – the smaller the log files will be:
It is recommended to start with a 2 second logging cycle and a 1 second display cycle.

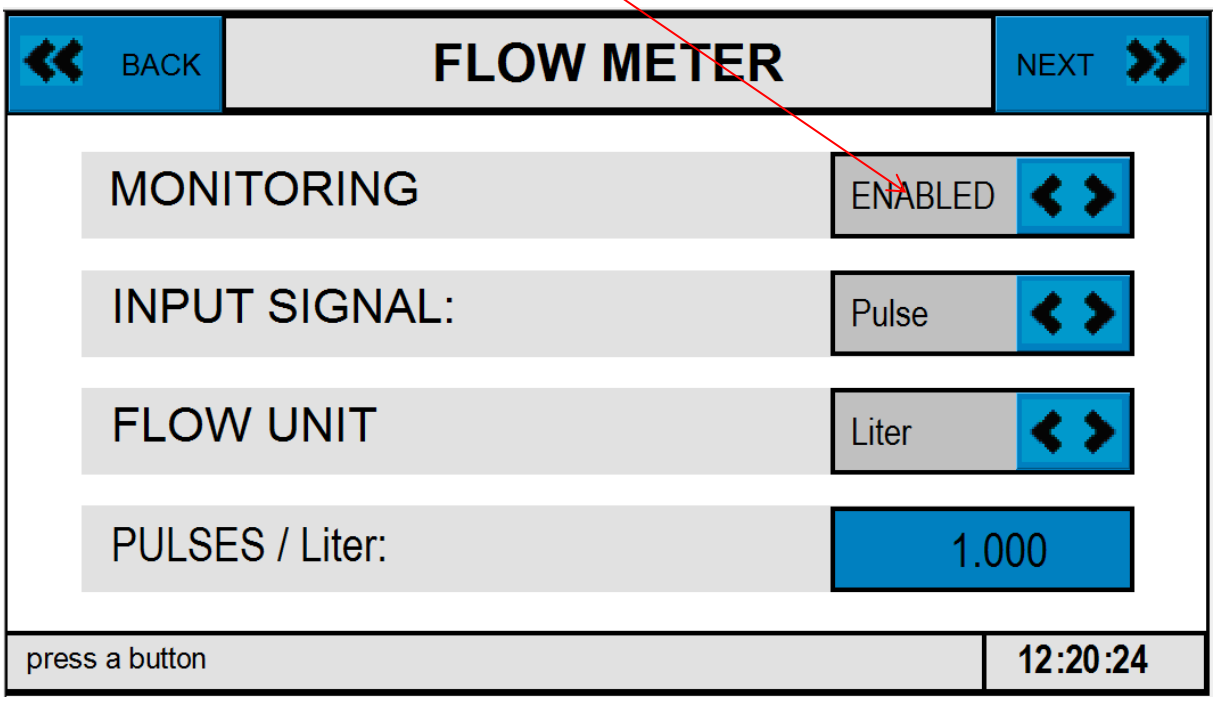


You can even disable the logging of data by pressing the DISABLE button
After setting the right numbers – press Enter to fix the settings.

Press back button to go back into DATA LOGGING menu to change the display cycle settings, to reset the data logging or to enter the next menu step.

3.2.4.6 FLOW METER

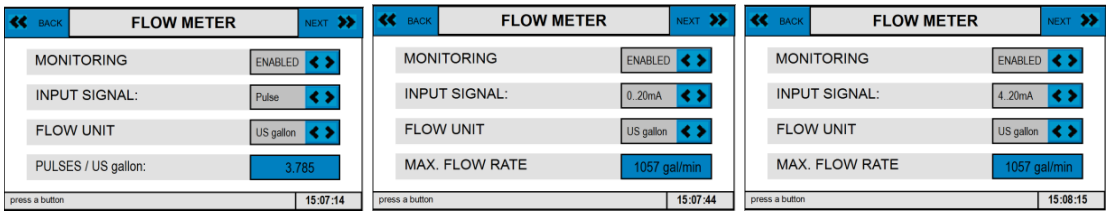
Select FLOW METER menu to set up the flow sensor:
When in use – switch MONITORING to ENABLED, when not in use – DISABLE it.



You are asked to select:
INPUT SIGNAL:

- Pulse
- 0..20 mA
- 4..20 mA

For a CHANGE click on the < > Button.

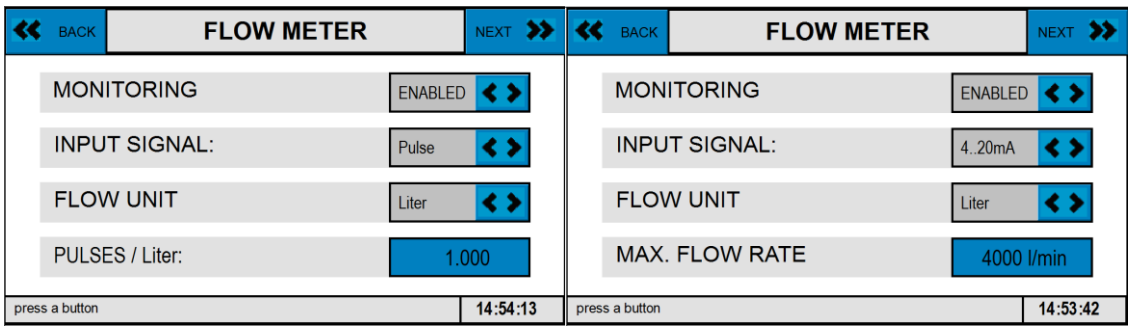


FLOW UNIT:

- Liter
- US gallon
- m^3/h

For a CHANGE click on the < > Button.

When selecting pulses for the input signal – you will be asked to type in PULSES per volume
When selecting the current input signal (0 to 20 mA or 4 to 20 mA) you will be asked to type in MAX FLOW RATE:



If you use an analogue sensor, it is very important not to mix up the ranges 0..20mA and 4..20mA. Otherwise the system will work with invalid flow values or system will detect a sensor error or a wire break! **Please refer to original documentation of sensors to check for correct settings.**

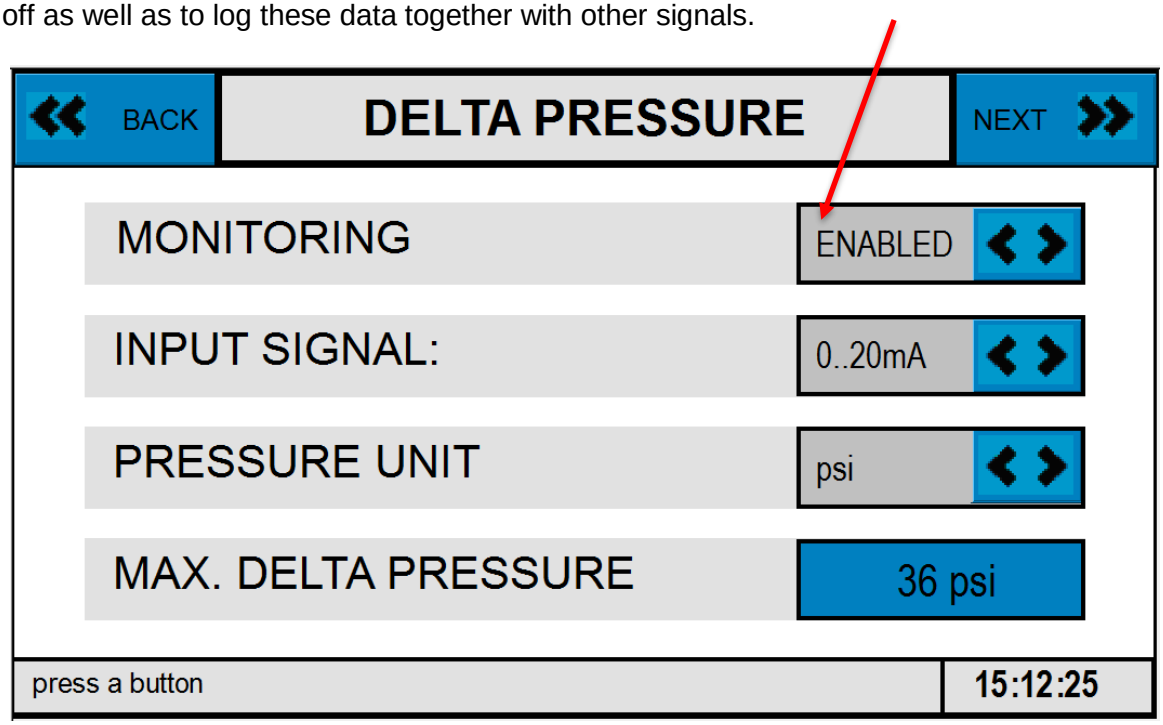
It is required to know the max flow of the sensor when selecting the 0 to 20 mA or 4 to 20 mA range – this information is coming from manufacturer of flow sensor.

When operating with pulse signals – it is required to know the volume per pulse – this information should come out of the calibration protocol of flow meter.

Click NEXT >>

3.2.4.7 DELTA PRESSURE

The following page is to set up the differential pressure sensor. This sensor can be enabled or disabled. When disabled – the sensor will not be present. When enabled the sensor signals will be displayed and measurement levels can be used to generate alarms and shut off as well as to log these data together with other signals.



You are asked to select:

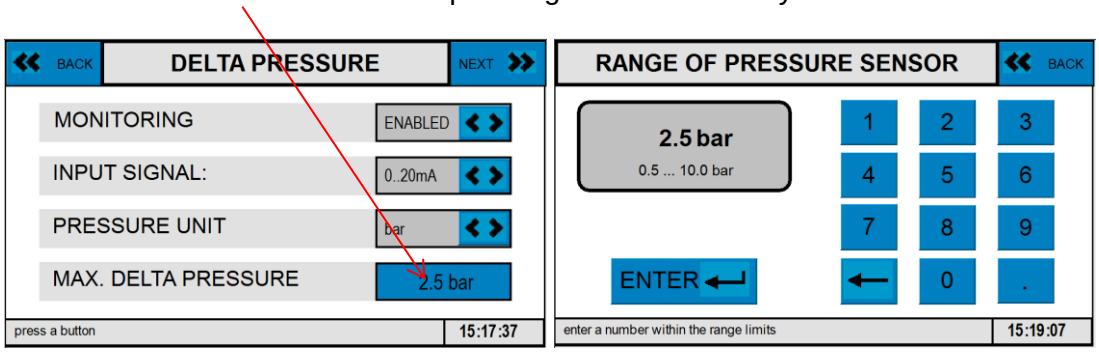
INPUT SIGNAL:
- 0..20 mA
- 4..20 mA

For a CHANGE click on the < > Button.

PRESSURE UNIT:
- psi
- kPa
- bar

For a CHANGE click on the < > Button.

MAX. DELTA PRESSURE: When pressing the blue buttom you will enter the next level



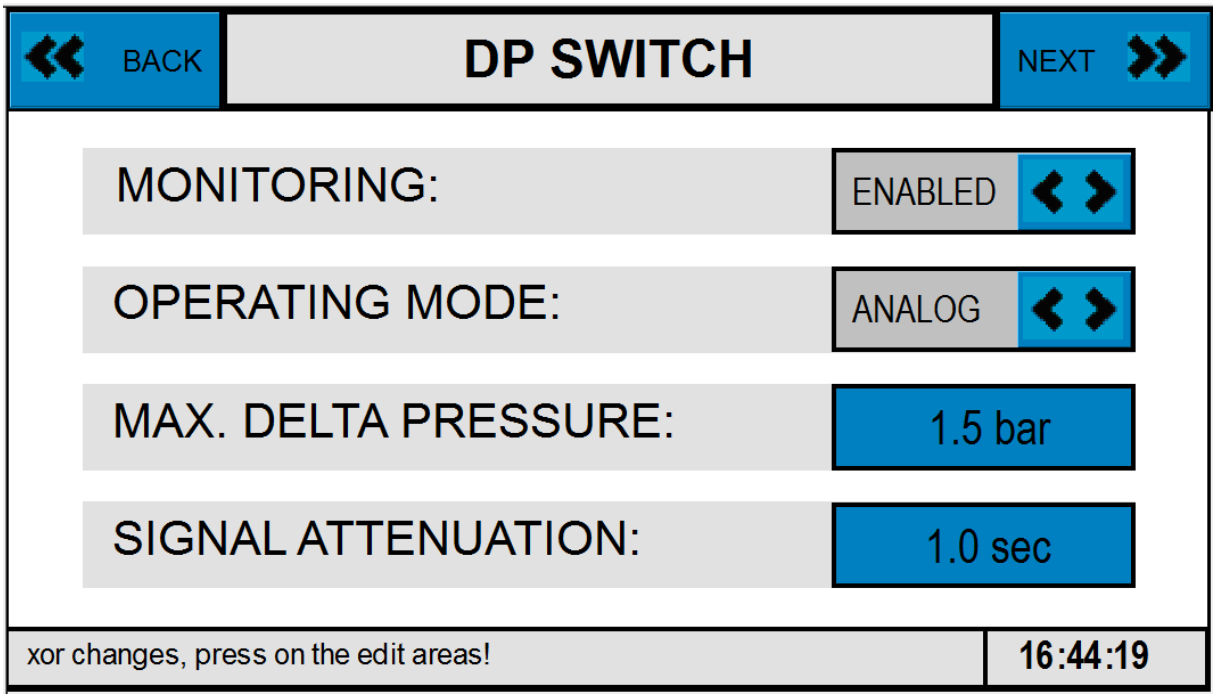
where you will be asked to type in the RANGE OF PRESSURE SENSOR – which could be found in the calibration protocol of the pressure sensor (sometimes there is a label with the pressure range sitting on the unit)

You can use the CCS without a pressure sensor. If no pressure sensor is available, please disable the sensor. The CCS supports an analogue current driven differential pressure sensor with ranges of 0..20 mA and 4..20 mA. It is highly recommended to use 4 to 20 mA sensors as they supply a fail safe signal to ensure their availability.

MAX. DELTA PRESSURE (20mA): Click on the blue box to CHANGE the value of the pressure range. An input dialog will open and ask for a value. Please insert the value given by the documentation of your differential pressure sensor.

Click NEXT >>

3.2.4.8 DP SWITCH



Subroutine to enable / disable dp-SWITCH function by the use of analogue or digital sensor signals.
Therefore following modes are available:
Monitoring:

- Enabled
- Disabled

For a CHANGE click on the < > Button.

Operating Mode:

- Analog
- Digital

For a CHANGE click on the < > Button.

Max. Delta Pressure for analog sensors:

- Type in max allowable differential pressure to switch off in case of dp increase

Input Alarm State for digital sensors:

- High or
- Low for digital signals (to invert signals coming from e.g. proximity sensors)

For a CHANGE click on the < > Button.

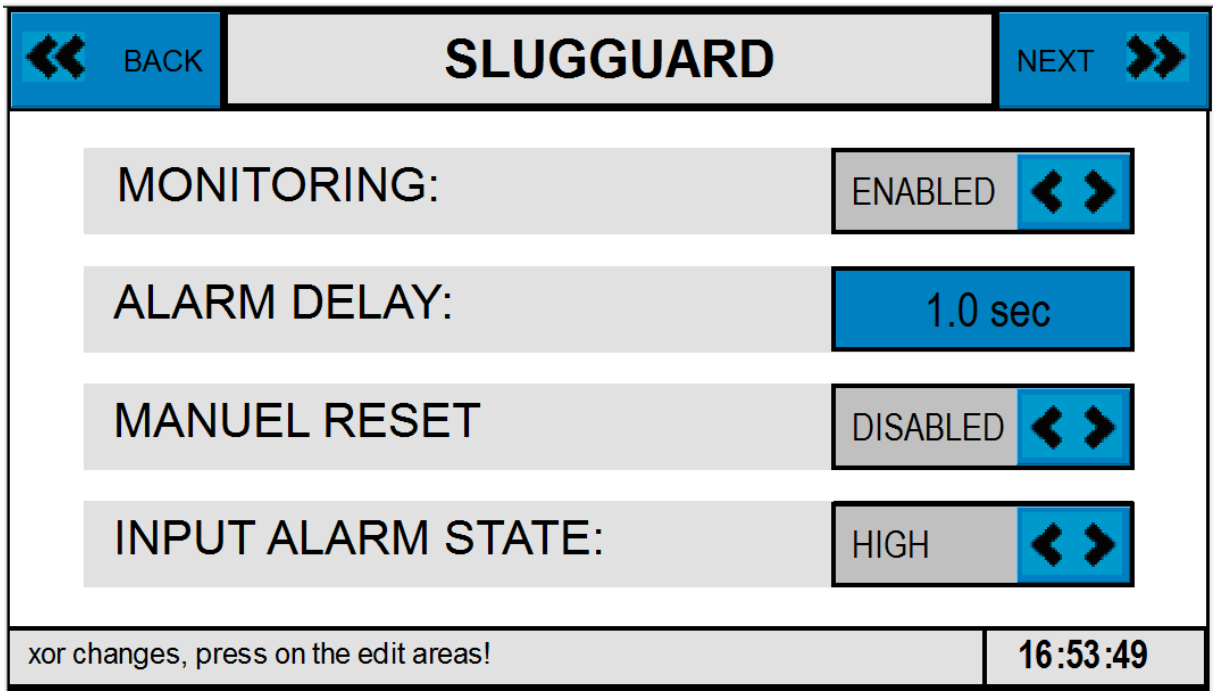
Signal attenuation for analog sensors:

- Timespan for positive signal to get rid of spikes and peaks. Type in attenuation time.

Alarm delay for digital sensors:

- To get rid of peak sand spikes

3.2.4.9 SLUGGUARD



Sensor to detect bulk water e.g. in water sumps.
Following modes are available:
Monitoring:

- Enabled
- Disabled

For a CHANGE click on the < > Button.

Alarm delay:

- Type in time span to generate an alarm in case activated sensor

Manual reset:

- Enabled
- Disabled

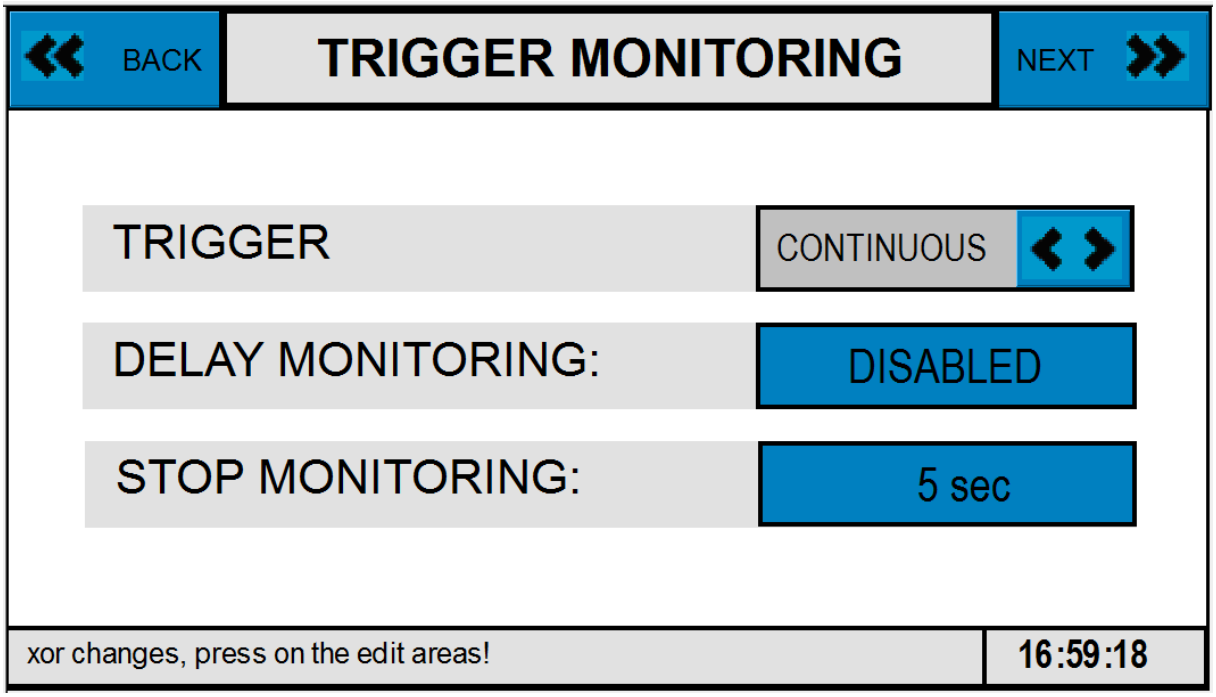
For a CHANGE click on the < > Button.

Input Alarm State:

- High or
- Low for digital signals (to invert the signal)

For a CHANGE click on the < > Button.

3.2.4.10 TRIGGER MONITORING



CCS offers different methods to generate a trigger for flow indication.
Flow indication is required to only use AFGUARD signals in case of flow. Otherwise AFGUARD without flow can create false signals coming from condensation effects of condensed water in front of the detector.
Following modes are available:
TRIGGER:

- Continuous
- Flow meter
- Delta P
- Input signal

For a CHANGE click on the < > Button.

DELAY MOINITORING for continuous trigger:

- Disabled
- Type in time span to start monitoring after trigger went on.

STOP MONITORING for continuous trigger:

- Type in time span to stop monitoring after trigger went off.

START MONITORING for FLOW METER option

- Type in flow rate to start monitoring (here – a flow signal can be used to indicate flow).

START MONITORING for DELTA P option

- Type in delta p rate to start monitoring (here – a signal from dp transmitter can be used to indicate flow – no flow –> no dp).

DELAY MONITORING for INPUT SIGNAL option:

- Disabled
- Type in time span to start monitoring after trigger went on.

Click NEXT >> to continue

3.2.5 AFGUARD® setting (free water sensor)

AFGUARD free water sensor is intended to measure the amount of free water in Jet fuel. Therefor the AFGUARD should be located in main stream of distribution path for Jet fuel to detect the amount of free water just in time of delivery. AFGUARD signals could be used to:

- show actual measured amount of free water to address Alarm and/or Warning using every peak in free water crossing the optical path of AFGUARD.
- give out average amount of free water as mathematical result coming from flow and free water measurement to give out averaged free water signal
- give out ALARM in case of high levels of water (water slug)

EACH AFGUARD has a calibration protocol. You will need the high value for setting up the measuring range of the AFGUARD.

High range could be found here:

	Wasserdosage	Messwert Trübung
Stützpunkte der Ausgabekennlinie	0 ppm	145
	5 ppm	212
	10 ppm	270
	15 ppm	340
	20 ppm	405
	25 ppm	468
	30 ppm	530
	35 ppm	592
	40 ppm	651
	45 ppm	705
	50 ppm	753

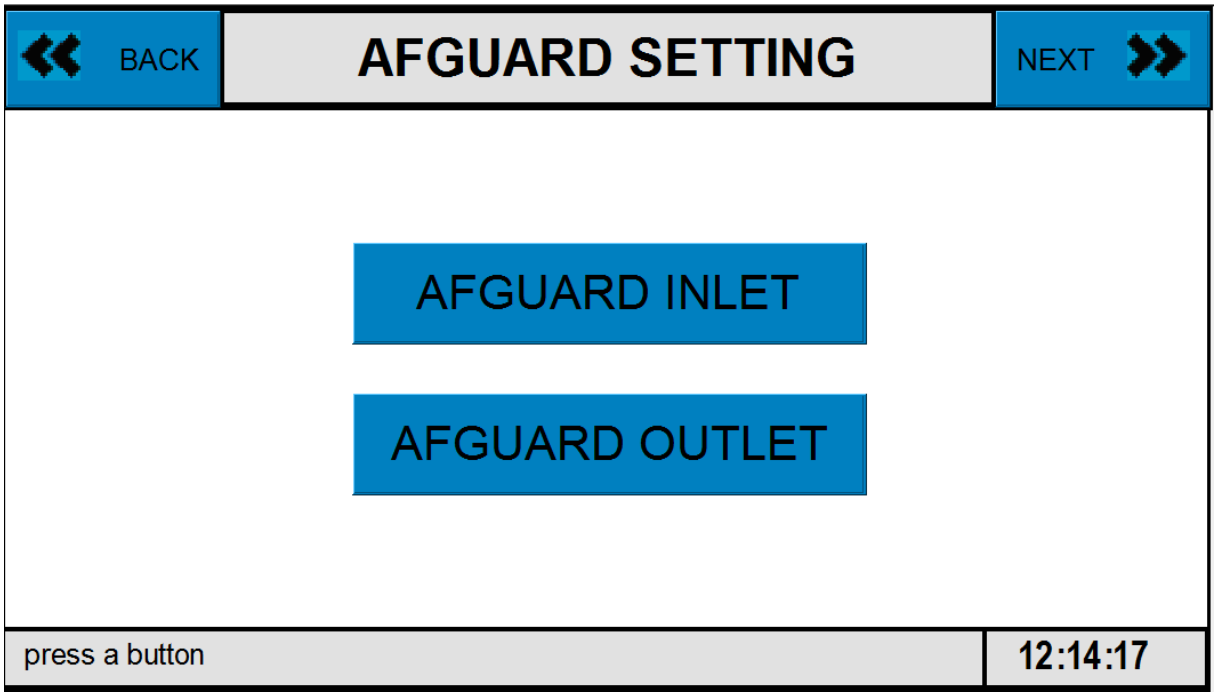
Picture: part of calibration protocol of AFGUARD® free water sensor.

If you do not know about calibration range of AFGUARD® free water sensor - please contact your FAUDI Aviation sales contact. You need to have the serial no of AFGUARD® in use.

AFGUARD Kalibrierung

Sensornummer:	AFG0/00020/c	Datum: 11.11.2011	T. Preis
Messwiderstand	470 kOhm	50 ppm - fine droplets	
Verstärkung	Trübung 2,22	Wasser 5,54	Diodenüberwachung 3,45
DA-Wandlerwerte	Dunkelstrom 116	Offset Trübung 0	Offset Wasser 0
DA-Output	4 mA - Wert 643	20 mA - Wert 3240	

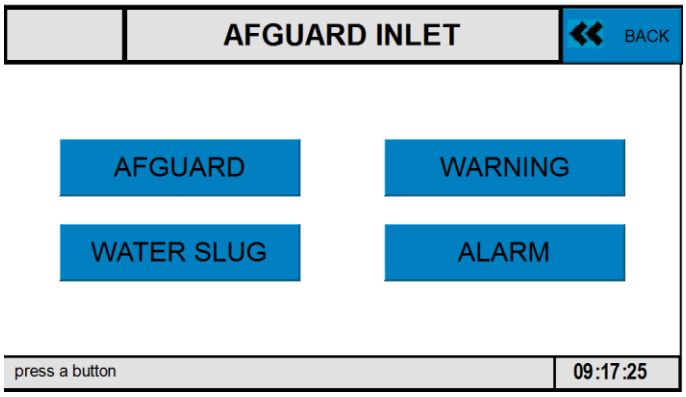
3.2.5.1 SENSOR SETTING for AFGUARD inlet and outlet



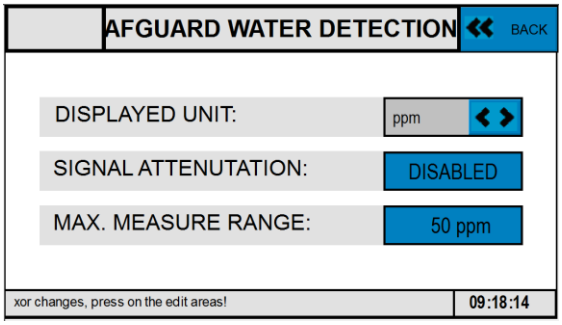
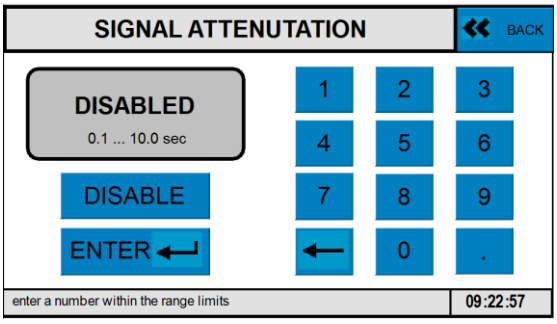
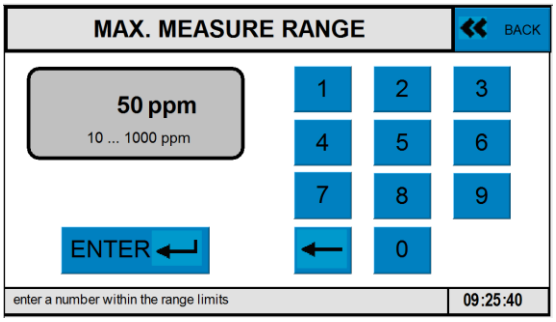
CCS is prepared to run one or two AFGUARD sensors. To change between only one or two sensors – please contact FAUDI Aviation GmbH. There is a special password level to enable additional sensors like the inlet AFGUARD

3.2.5.1.1 AFGUARD Inlet

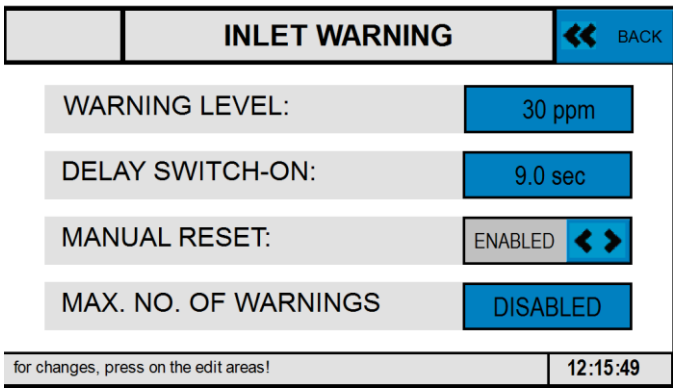
Press AFGUARD INLET to enter the AFGUARD INLET menu:
To set up the AFGUARD Inlet, there are four submenus.



The steps are explained in the following table:

Submenu 1 of 4    	**DISPLAYED UNIT**: It is possible to switch between ppm and % General setting is ppm. **SIGNAL ATTENUATION:** Possibility to average the measured signals for a defined period to get rid of spikes and peaks. General setting is disabled. To enter a specific time frame press blue button and enter the required time. Press Enter to activate. **MAX. MEASURE RANGE**: please adjust AFGUARD® calibration range (most of them should be calibrated for 0 to 50 ppm. Type in high range of calibration (here: 50 ppm) - please refer to calibration protocol of free water sensor AFGUARD® for high level. It is the ppm value when the AFGUARD® delivers a current of 20mA.

Submenu 2 of 4 WARNING



WARNING LEVEL: A ppm value at which a water warning gets triggered. It should be 15 ppm according JIG bulletin 110.

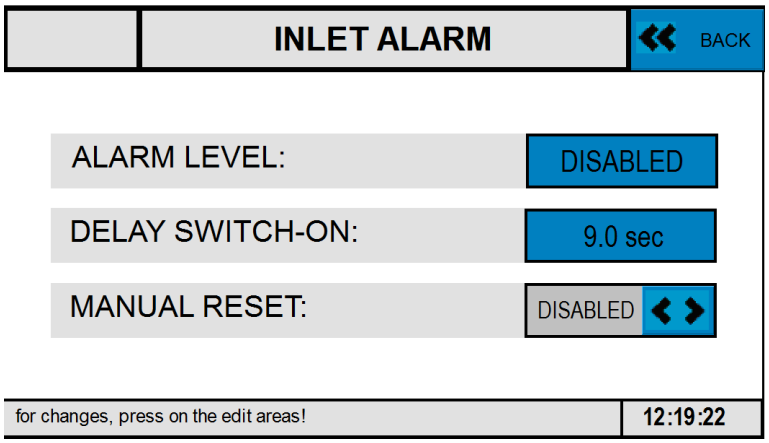
Press blue button and set the level.

DELAY SWITCH ON: Time for which the warning level should be present to switch the relay.

MANUAL RESET:
To enable or disable manual reset options.

MAX. NO. OF WARNINGS:
To activate the Alarm relay after predefined no of warnings

Submenu 3 of 4 ALARM LEVEL

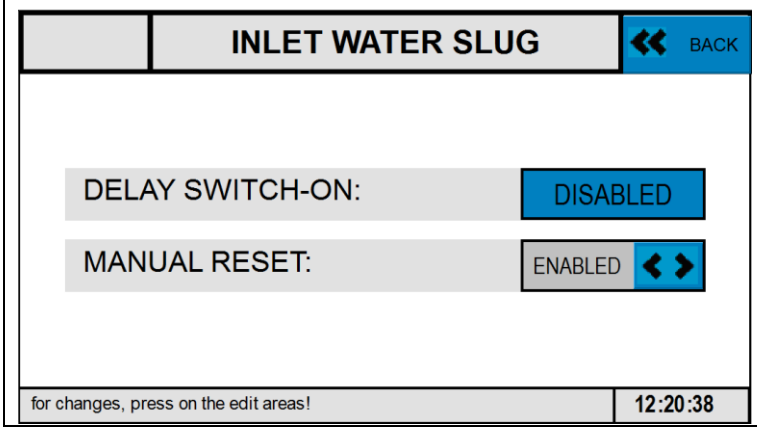


ALARM LEVEL: The limit at which an alarm gets triggered and the alarm relay gets released.

DELAY SWITCH-ON: The time the water contamination must be above the specified value until the alarm relay gets triggered and the blue lamp blinks fast.

MANUAL RESET:
To enable or disable manual reset options.

Submenu 4 of 4 WATER SLUG



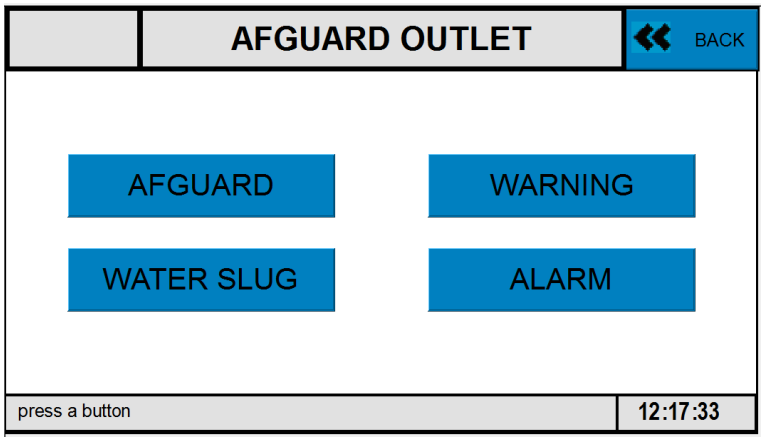
DELAY SWITCH-ON: The time the water contamination must be above the specified value until the alarm relay gets triggered and the blue lamp blinks fast. It should be 5 sec according JIG bulletin 110.

MANUAL RESET:
To enable or disable manual reset options.

One Warning will release the warn relay (slow blinking LED) – several warnings will activate the alarm relay – dependent on “no of warnings”
Multiple warnings or one alarm or one water slug will release the alarm relay (fast blinking LED). This only will happen when the Water Monitoring is activated.
Go << BACK and access the AFGUARD OUTLET sensor

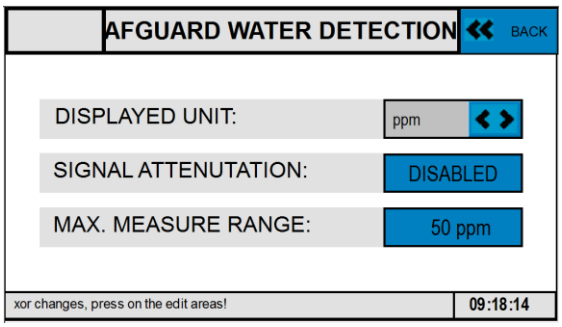
3.2.5.1.2 AFGUARD Outlet

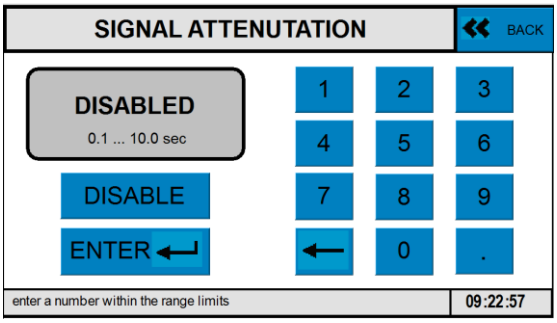
To set up the AFGUARD OUTLET, there are four submenus.

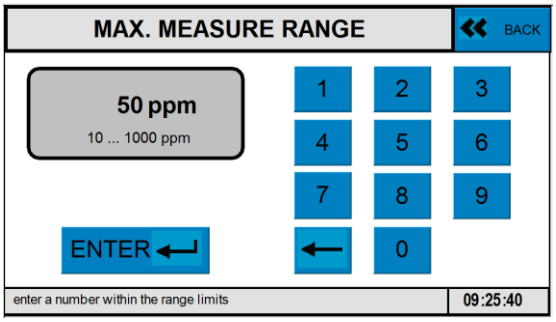


The steps are explained in the following table:

Submenu 1 of 4







DISPLAYED UNIT:

It is possible to switch between ppm and %
General setting is ppm.

SIGNAL ATTENUATION:

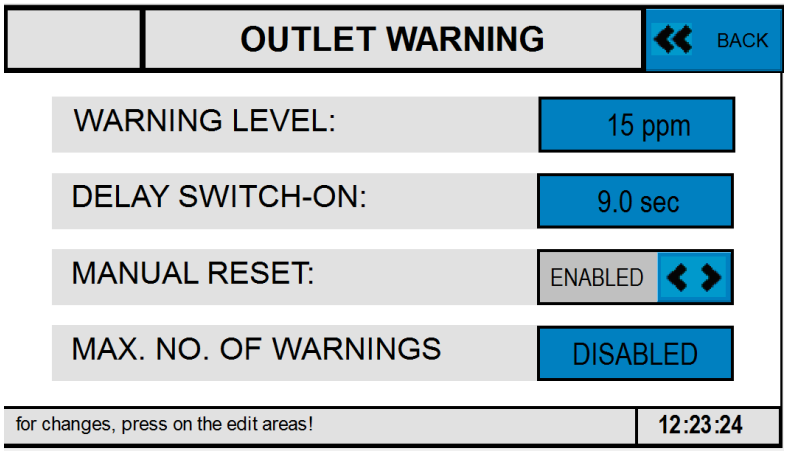
Possibility to average the measured signals for a defined period to get rid of spikes and peaks. General setting is disabled.

To enter a specific time frame press blue button and enter the required time. Press Enter to activate.

MAX. MEASURE RANGE:

please adjust AFGUARD® calibration range (most of them should be calibrated for 0 to 50 ppm. Type in high range of calibration (here: 50 ppm) - please refer to calibration protocol of free water sensor AFGUARD® for high level.
It is the ppm value when the AFGUARD® delivers a current of 20mA.

Submenu 2 of 4 WARNING



WARNING LEVEL: A ppm value at which a water warning gets triggered. It should be 15 ppm according JIG bulletin 110.

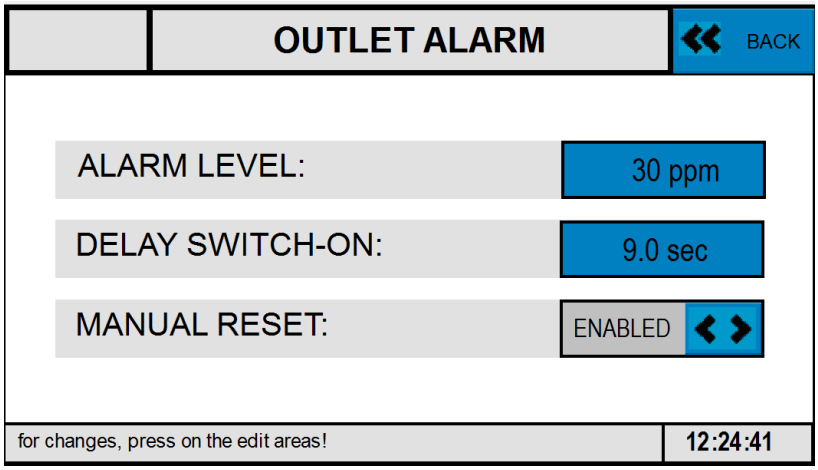
Press blue button and set the level.

DELAY SWITCH ON: Time for which the warning level should be present to switch the relay.

MANUAL RESET: To enable or disable manual reset options.

MAX. NO. OF WARNINGS: To activate the ALARM relay after predefined no of warnings

Submenu 3 of 4 ALARM LEVEL

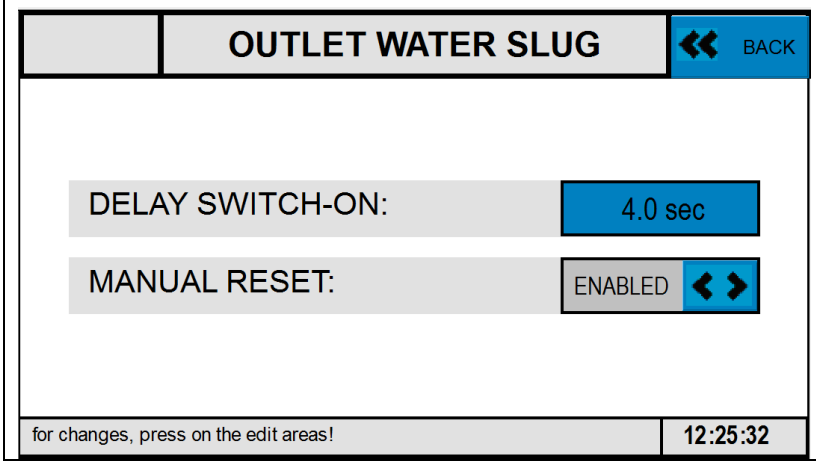


ALARM LEVEL: The limit at which an alarm gets triggered and the alarm relay gets released. According JIG bulletin 110 – ALARM level should be 30 ppm for 10 seconds

DELAY SWITCH-ON: The time the water contamination must be above the specified value until the alarm relay gets triggered and the blue lamp blinks fast.

MANUAL RESET: To enable or disable manual reset options.

Submenu 4 of 4 WATER SLUG

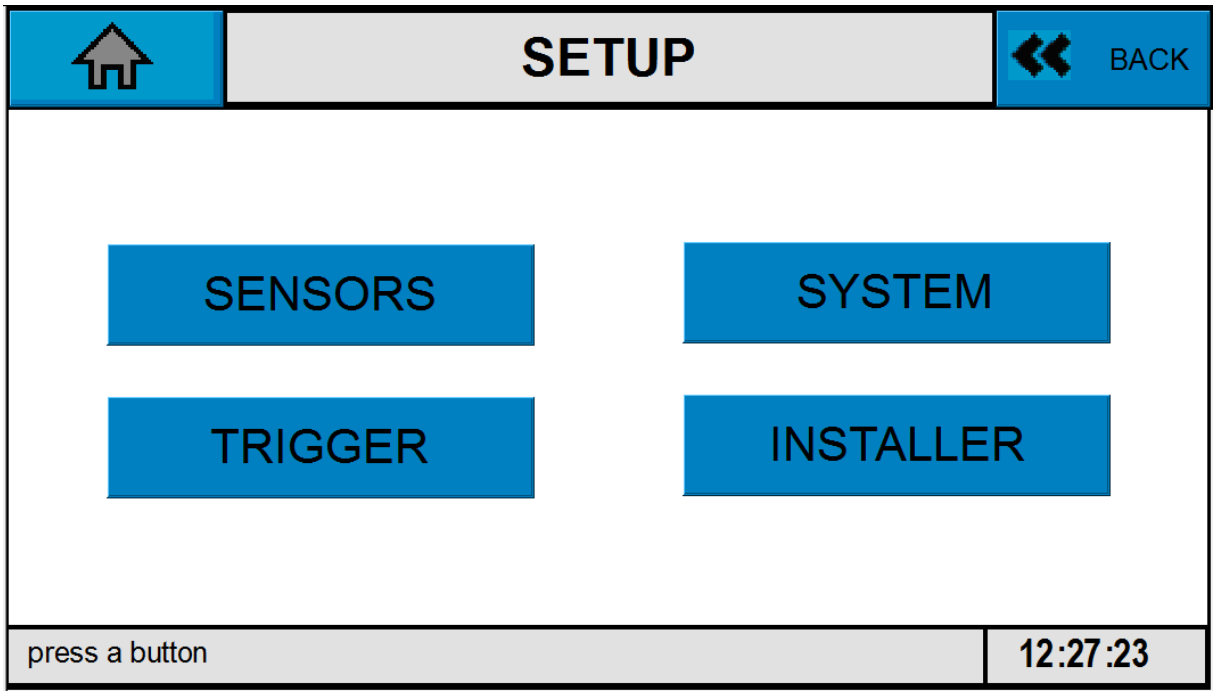


DELAY SWITCH-ON:
The time the water contamination must be above the specified value until the alarm relay gets triggered and the blue lamp blinks fast. It should be 5 sec according JIG bulletin 110.

MANUAL RESET:
To enable or disable manual reset options.

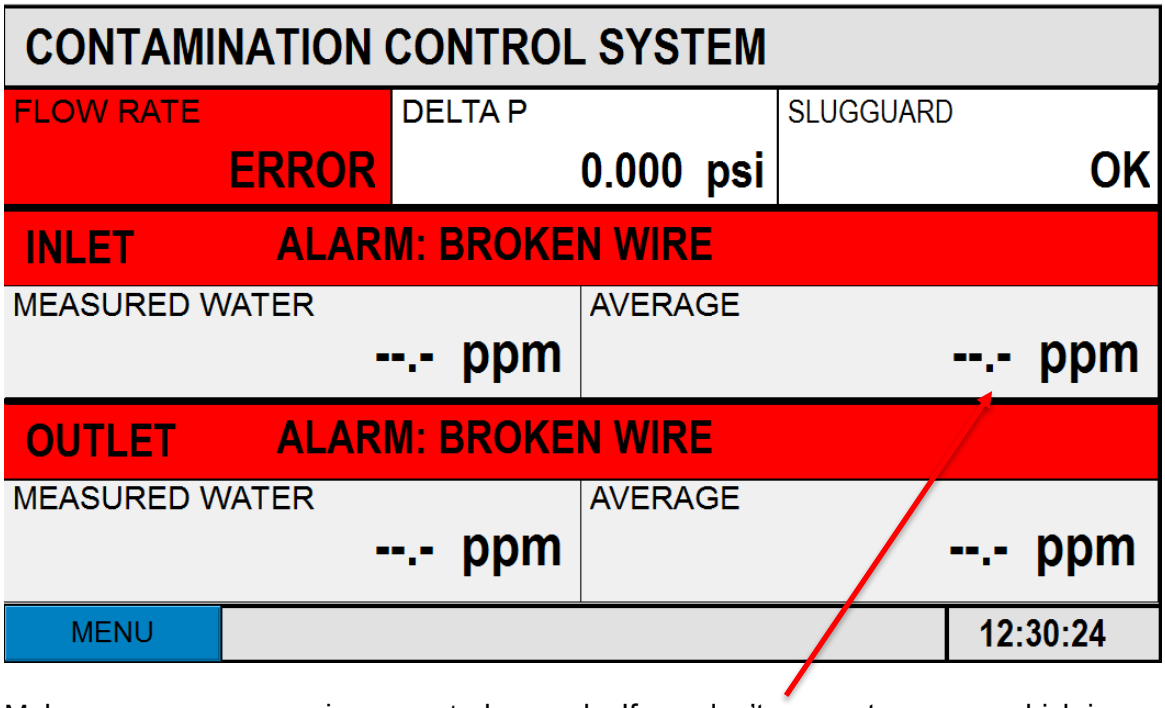
One Warning will release the warn relay (slow blinking LED)
Multiple warnings or one alarm or one water slug will release the alarm relay (fast blinking LED). This only will happen when the Water Monitoring is activated.

You will return to the setup screen where you can manually enter the sensor menu, the trigger menu or the system settings. Go back and you will enter the dashboard menu



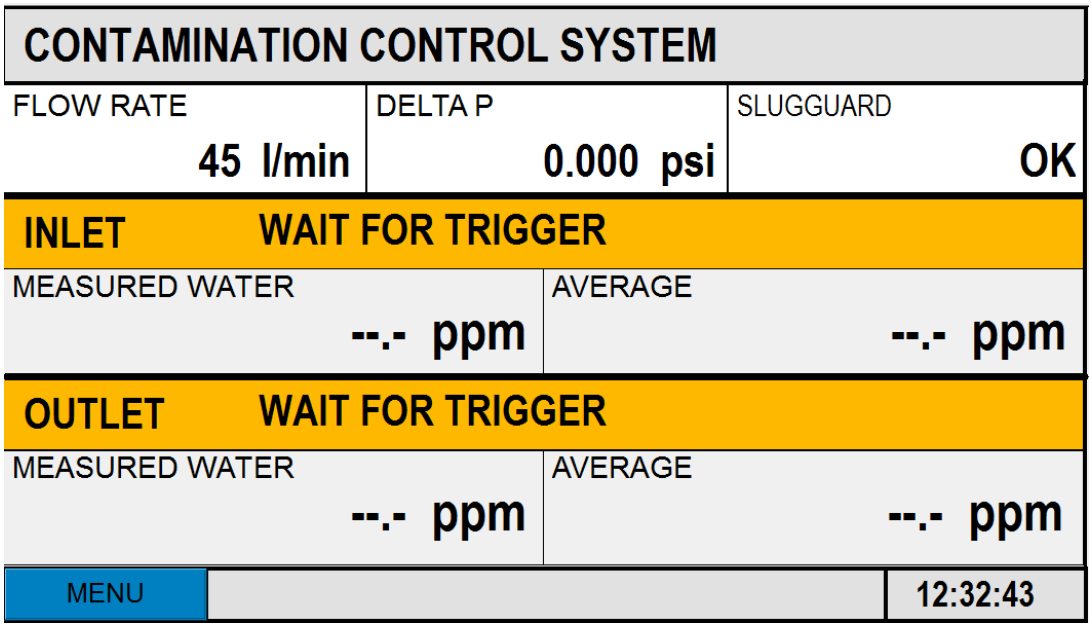
3.2.5.2 Check for the right settings

If your sensors are connected wrong, then the dashboard may show you some errors. E.g. if no sensors are connected yet, the screen could look like the following:



Make sure every sensor is connected properly. If you don't connect a sensor which is expected by the system, you will see Broken Wire Errors on the main screen. In this case, check the connections first.

If sensors are connected properly but system is waiting for a trigger signal to start measurement – it could look like below:



3.3 Setup

At the first launch of the CCS you should use the INSTALLER to set up the system. If you want to CHANGE any settings later, you can go to the setup.
You should never open the setup and make CHANGEs during a refuelling process!

There are two levels for the setup:
- User
- Administrator

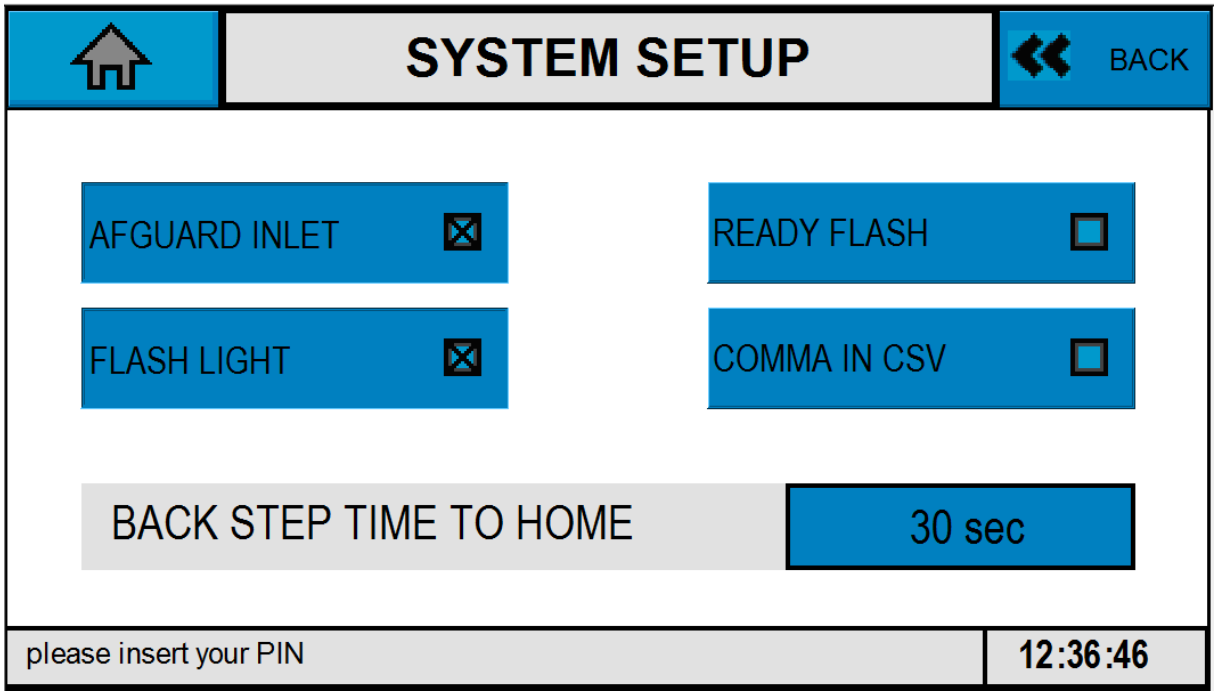
The User level has the following rights:
- CHANGE language
- CHANGE date and time

The Administrator has the following rights:
- CHANGE language
- CHANGE system settings
  - Date and time
  - Units
  - User PIN and Administrator PIN
  - Timing settings
  - Network settings
  - Reset configuration to defaults
  - Reset history
  - Filter Parameter
- CHANGE sensor inputs
  - Flow Rate
  - Pressure
  - Interlock
  - SLUGGUARD
  - AFGUARD Inlet
  - AFGUARD Outlet
  - Water Monitoring
- Launch INSTALLER

Setup screen – to be addressed from main screen
To ENTER the setup procedure – please click on Setup button.

There are two additional password levels available which are intended for service providers only.
In case of service needs – please ask your local service provider or contact FAUDI Aviation GmbH in Germany

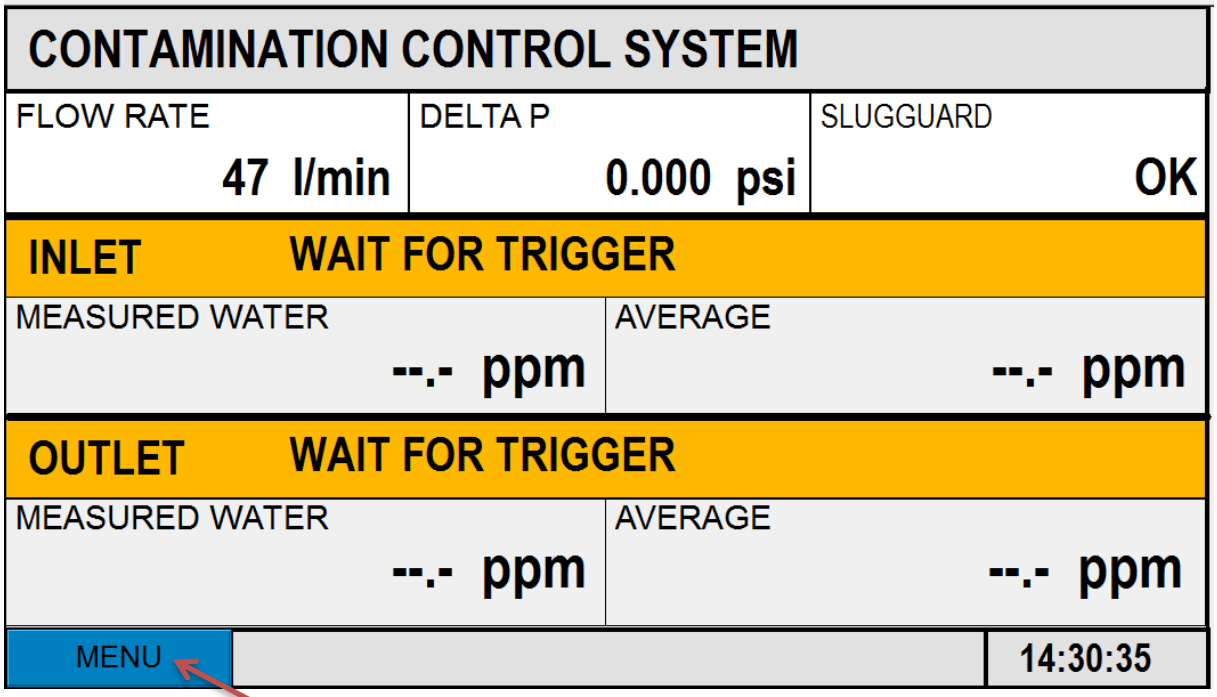
3.3.1 Password level for setup of sensors:



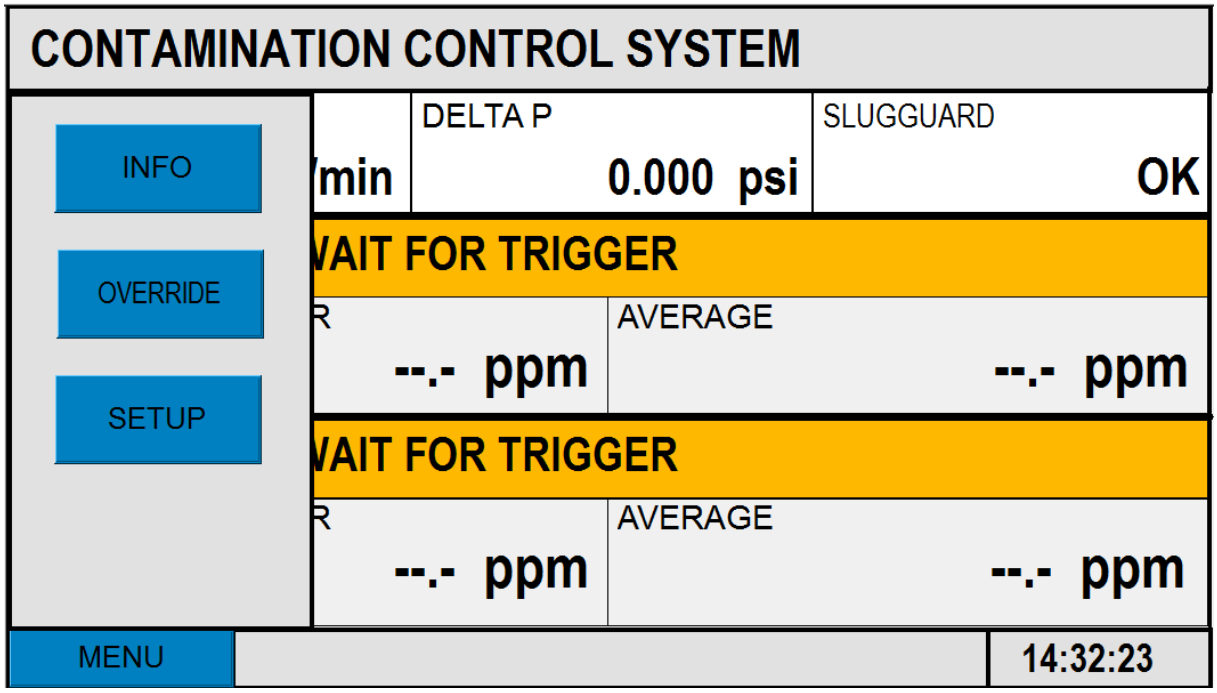
3.3.2 Super Master password level

To reset password levels and to assist in general settings. Ask FAUDI Aviation GmbH in case.

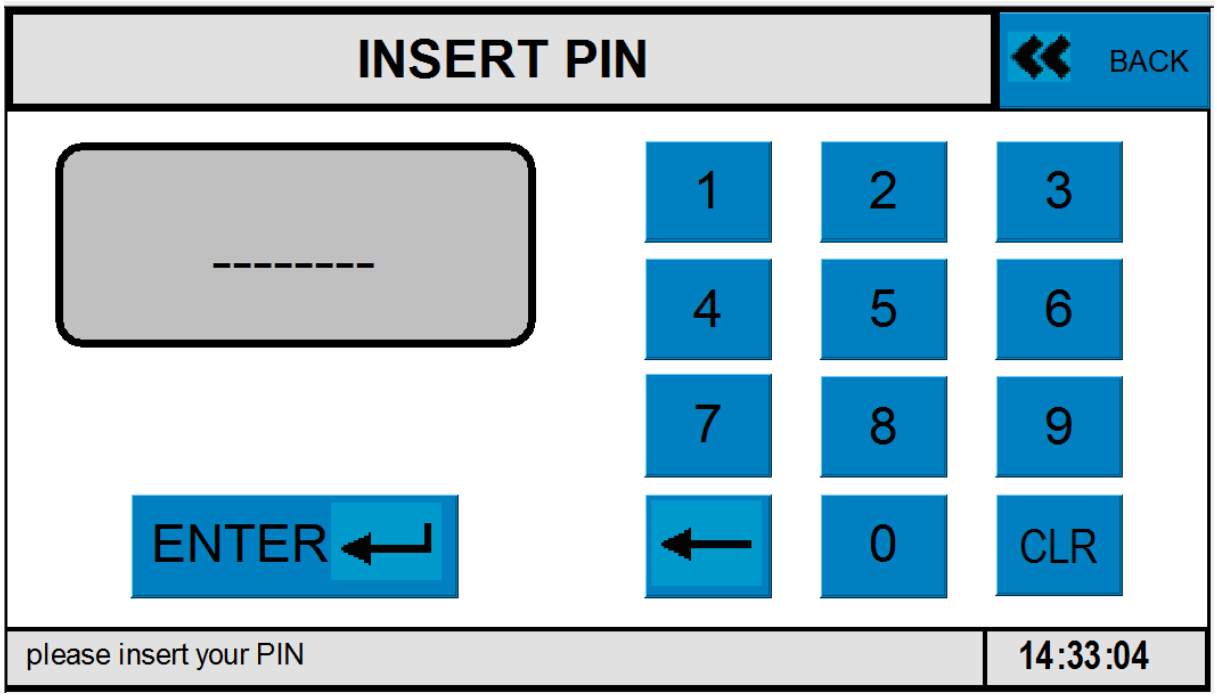
3.4 Setup menu



After pressing the MENU button and afterwards the SETUP button



– you are immediately asked to ENTER your PIN number:

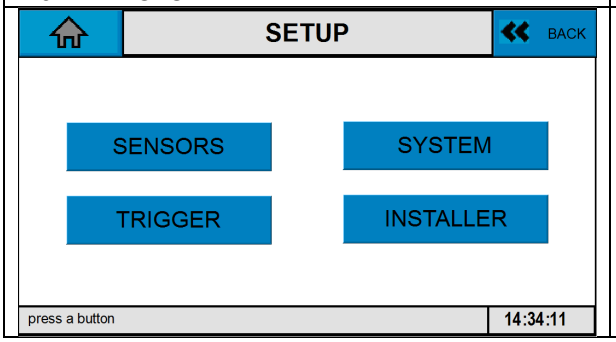


Press ENTER when you are finished.
Following PIN numbers are preconfigured:

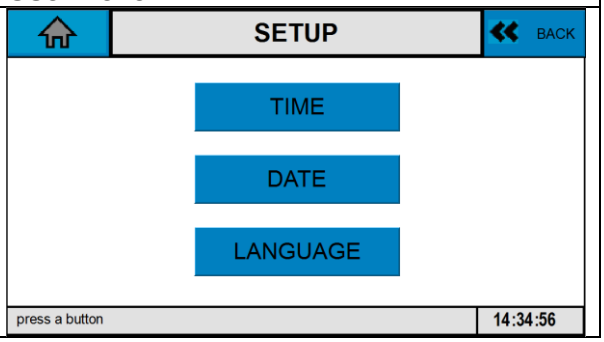
Administrator – PIN level: 12345678
User – PIN level: 00000000

After ENTERing your PIN number, you should ENTER one of the following menu levels:

Admin Level



User Level

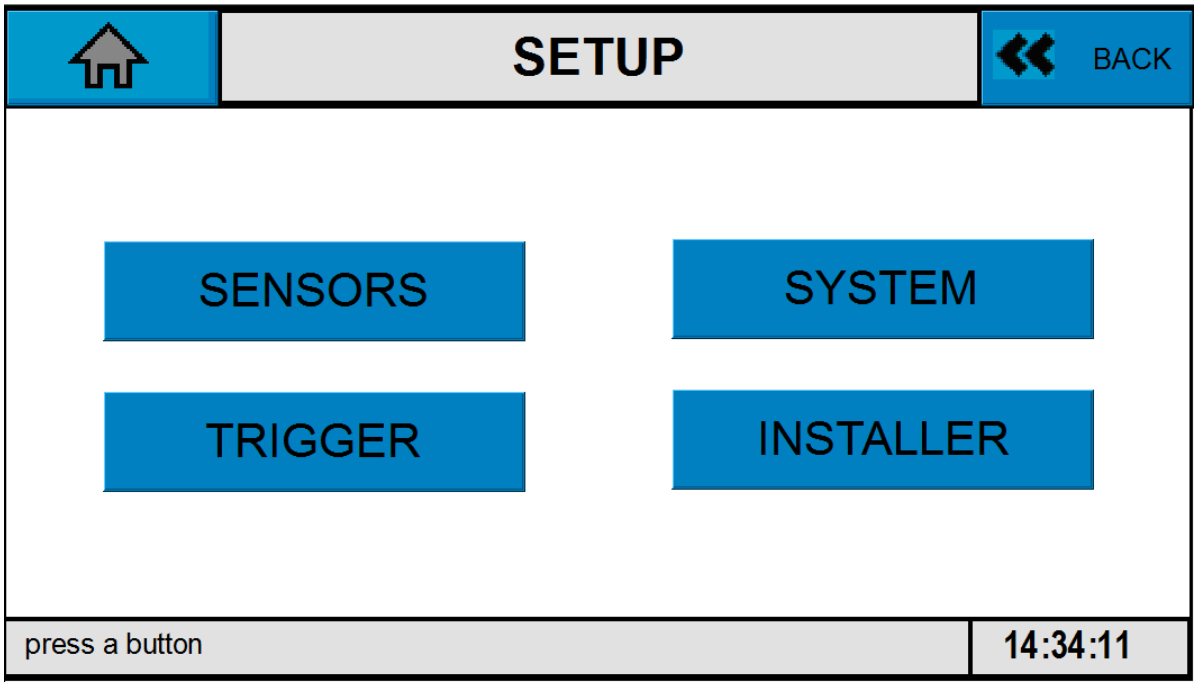


In User Setup you are only allowed to CHANGE **language** and **date and time**.
In Admin Menu you can do much more. The menu structure for the Admin setup is:

- Setup
  - System
  - Display Units
  - Date and Time
  - Network
  - CHANGE PIN

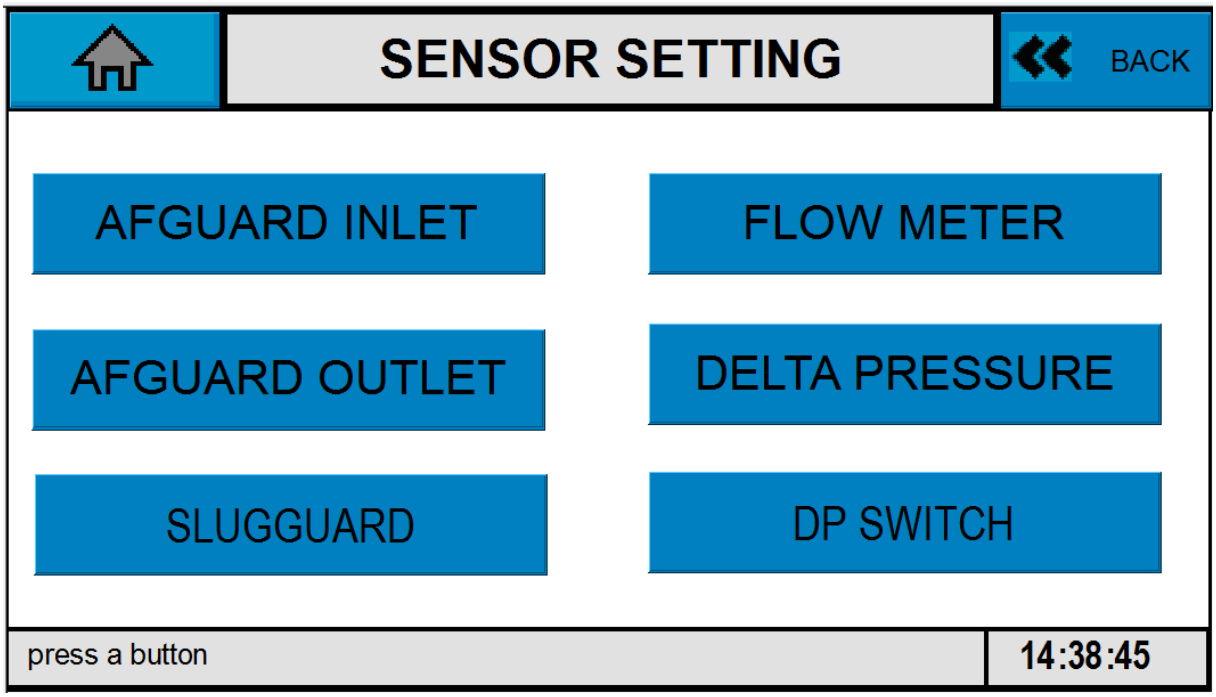
  - Timing
  - Reset
    - Reset Config
    - Reset History
  - Filter Parameter (optional)
- Sensor Input
  - Pressure
  - Flow Rate
  - AFGUARD Inlet
  - AFGUARD Outlet
  - SLUGGUARD
  - Interlock Settings
  - Water Monitoring
- Language
- INSTALLER

Warning: settings in setup have effect to alarm behaviour, data logging and more. Never CHANGE settings of the system during operation!
In the following the Admin Setup is explained.

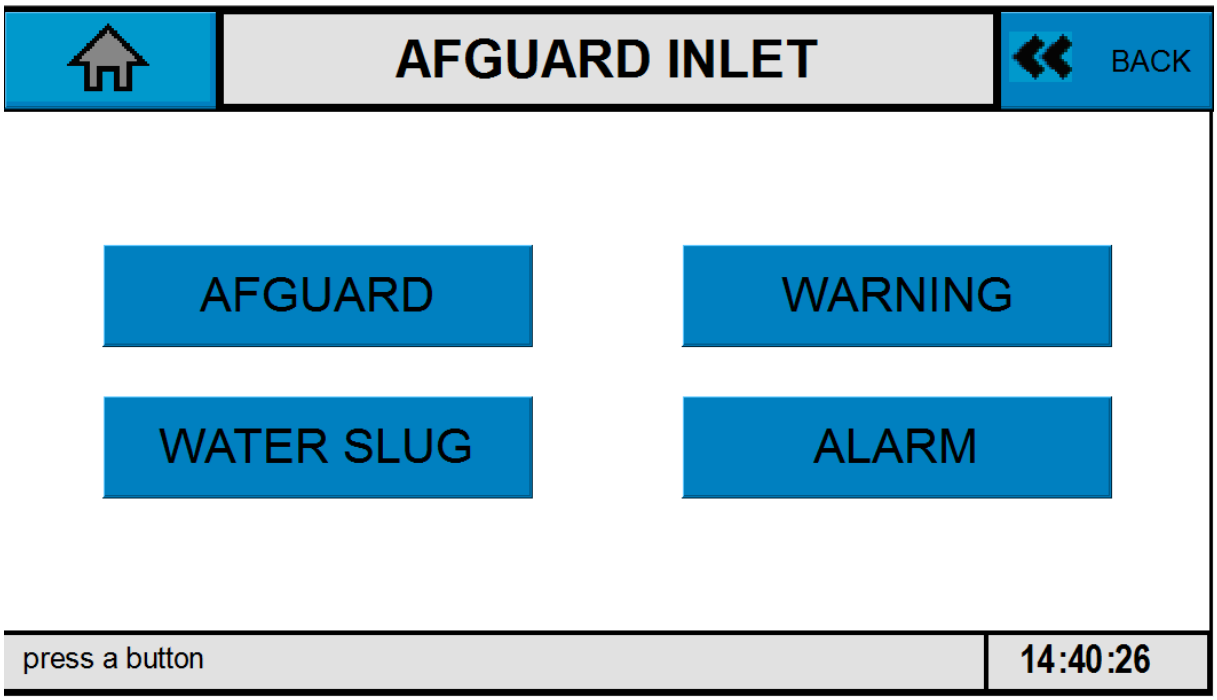


3.4.1 Sensors

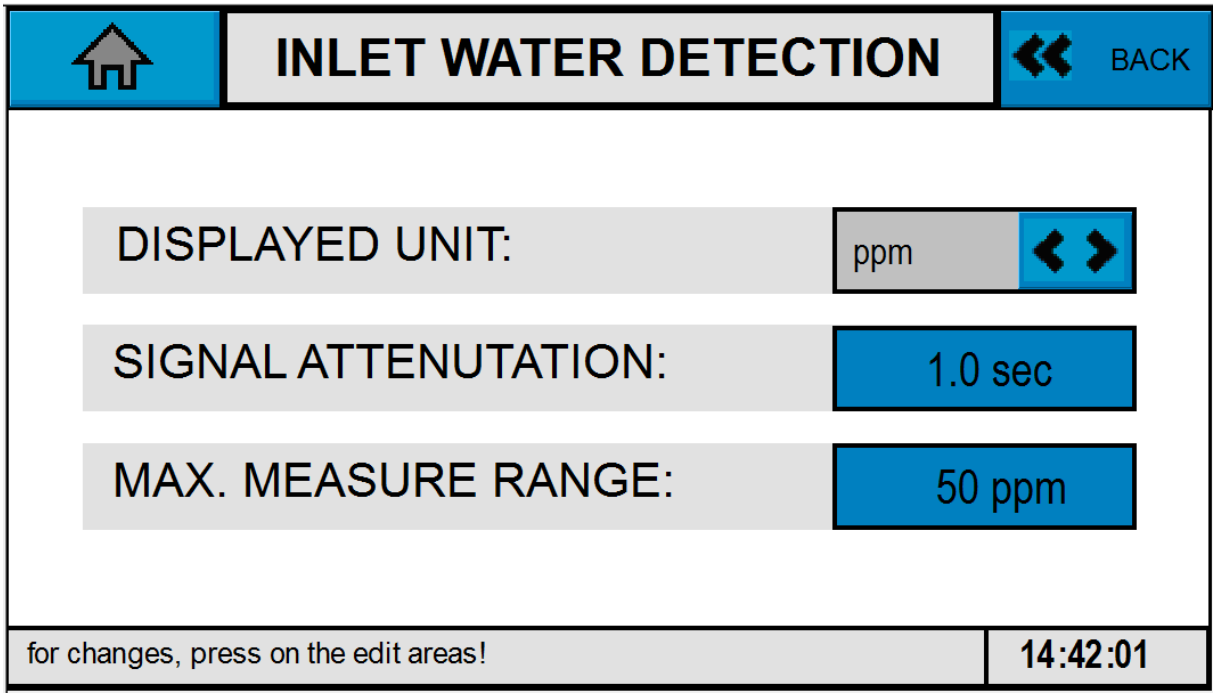
This menu is to set up the right values for the sensors in use:
Press the SENSORS button – you will enter the following screen where you can select
AFGUARD INLET
AFGUARD OUTLET
SLUGGUARD
FLOW METER
DELTA PRESSURE
DP SWITCH



3.4.1.1 AFGUARD INLET



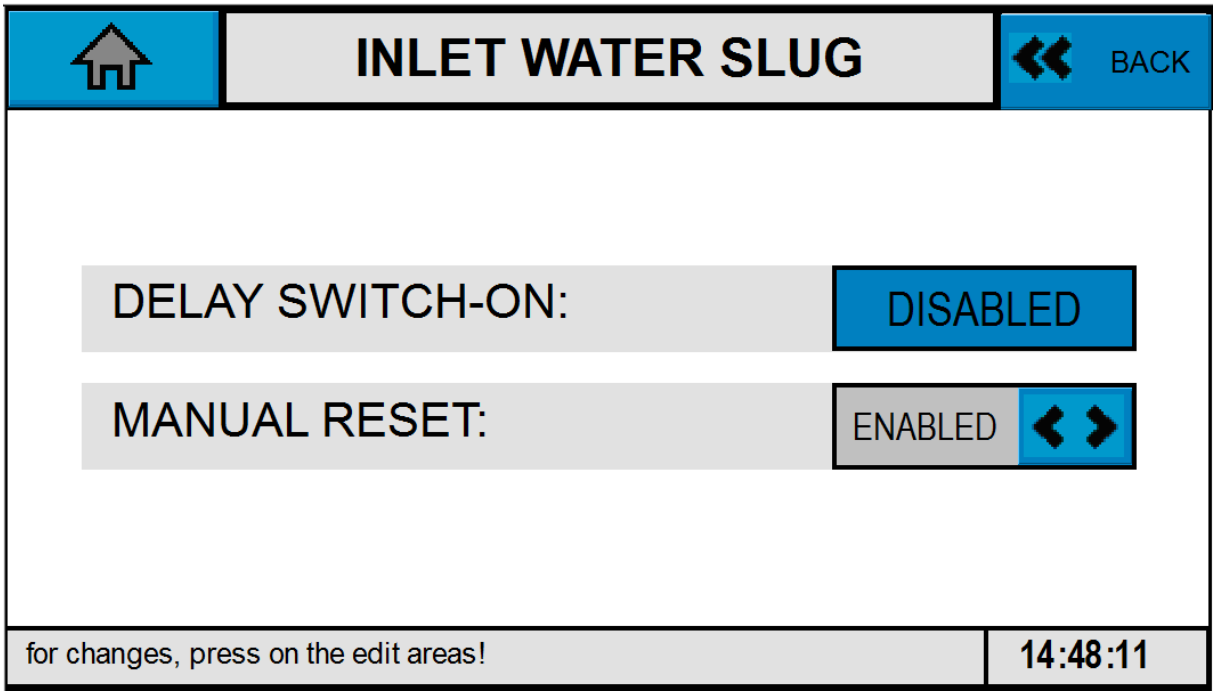
You can choose four setup masks:
AFGUARD – where you are asked to set up the measurement values:



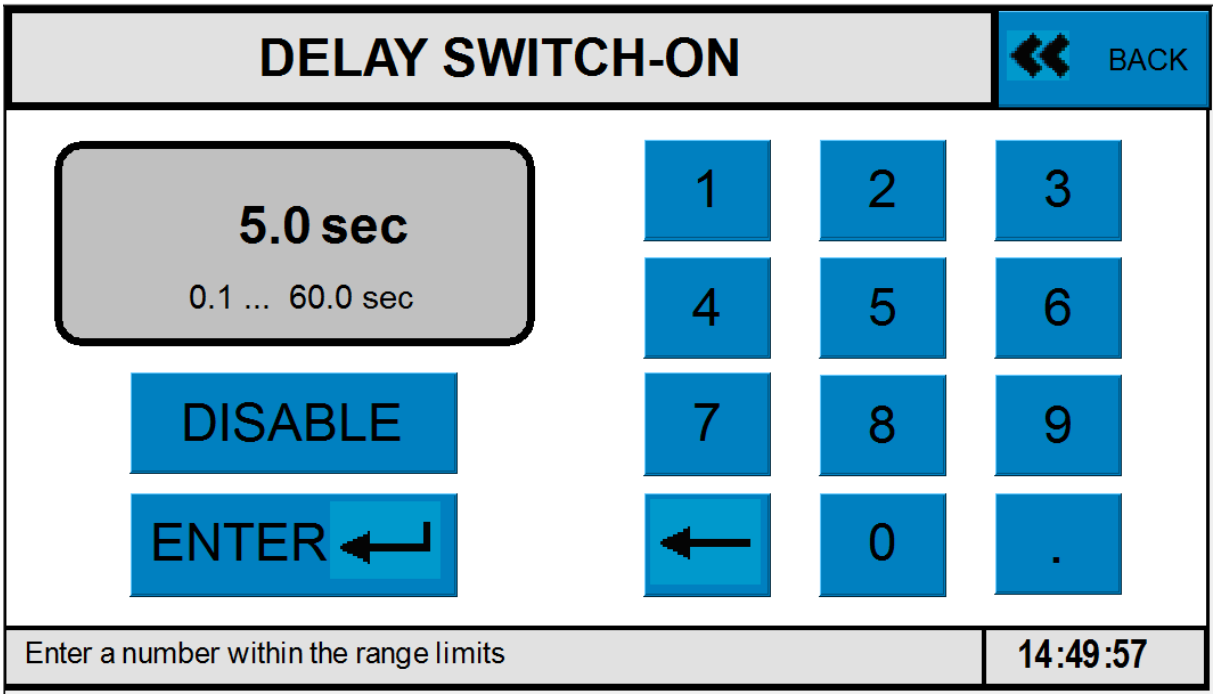
Displayed Unit: select ppm or %

Signal attenuation: to slow down the speed of response for the AFGUARD signals
Max. measurement range. Related to the calibration range: In most cases 50 ppm dur to the calibration of 0 to 50 ppm for the 4 to 20 mA signal.

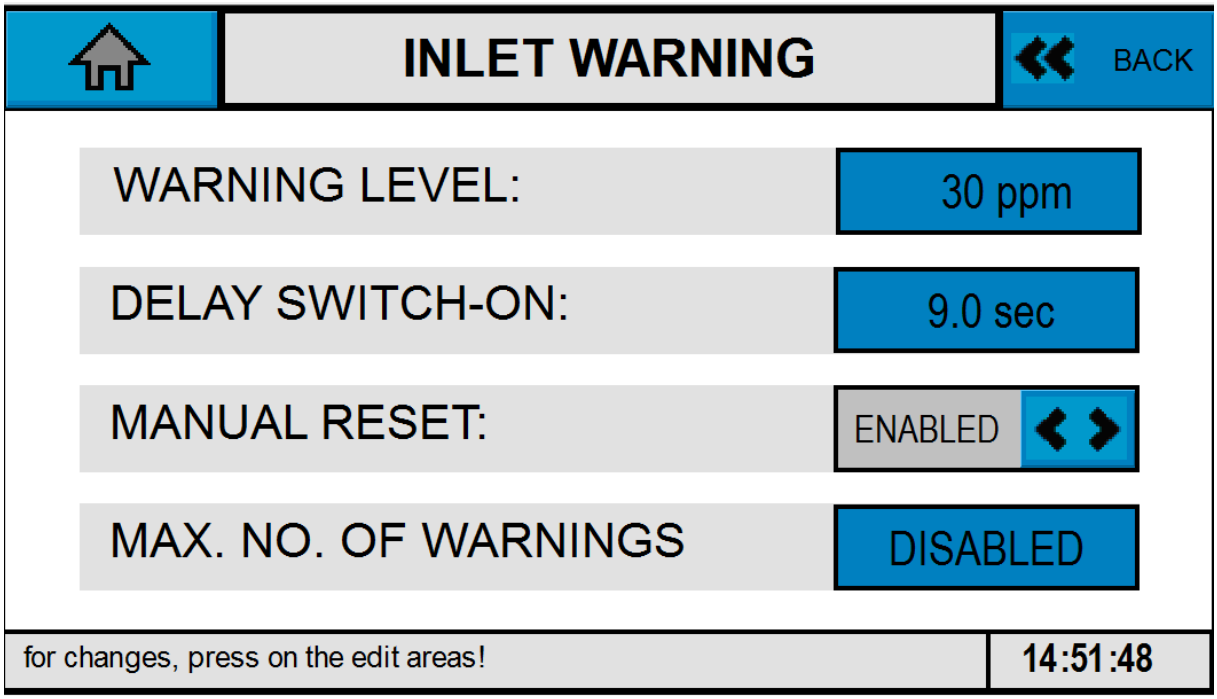
Water Slug – where you are asked to set up the behaviour of the AFGUARD in case of water slug indication:



Delay Switch on: to only generate an alarm if the slug is active for the time setting: between 0.1 and 600 sec. – JIG bulletin 110 is asking for 5 seconds for the outlet AFGUARD only.



Warning: where you are asked to set up the behaviour in case of water levels above the warning range (JIG bulletin 110 is asking for more than 15 ppm):



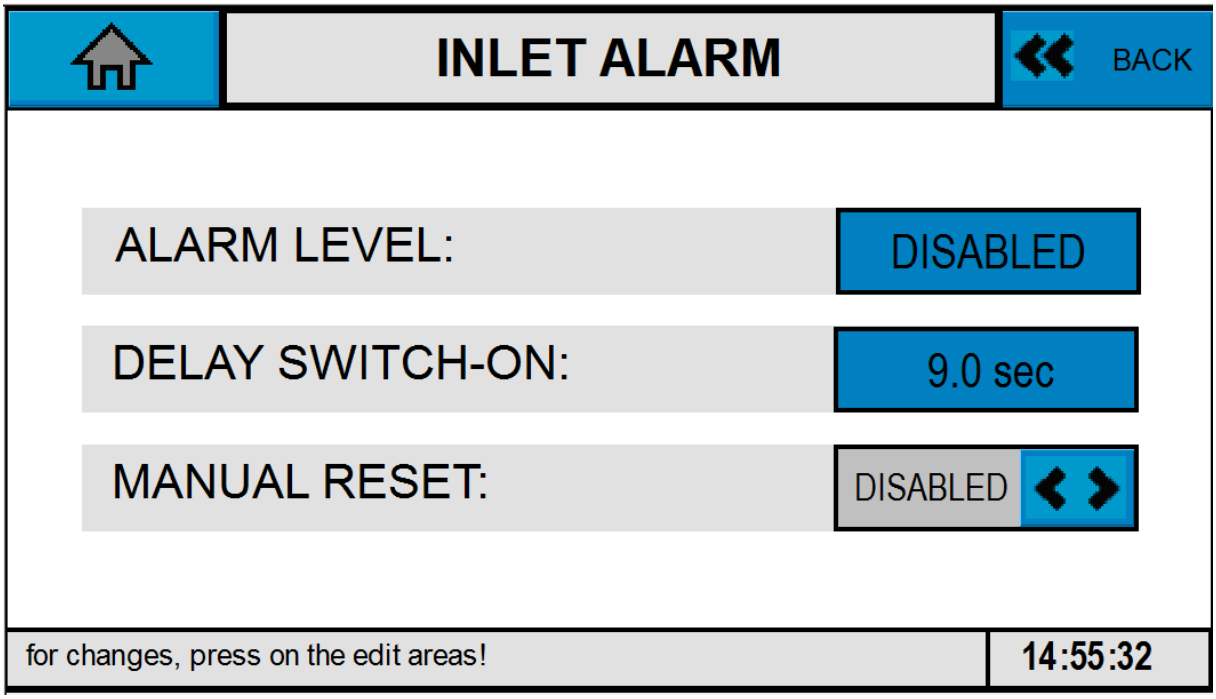
Warning level should be 15 ppm

Delay switch on should be 10 seconds oin total

Manual reset should be enabled to enter a password level in case of alarm

Max. no of warnings can be used to go for an alarm if there are several warnings in between one refuelling operation and the operator likes to be informed about the multiple warnings. More than 2 warnings in between one refuelling operation should generate an alarm.

Alarm: Where you are asked to set up the behaviour in case of water levels above the alarm range (JIG bulletin 110 is asking for more than 30 ppm):



Alarm level should be 30 ppm

Delay switch on should be 10 sec in total

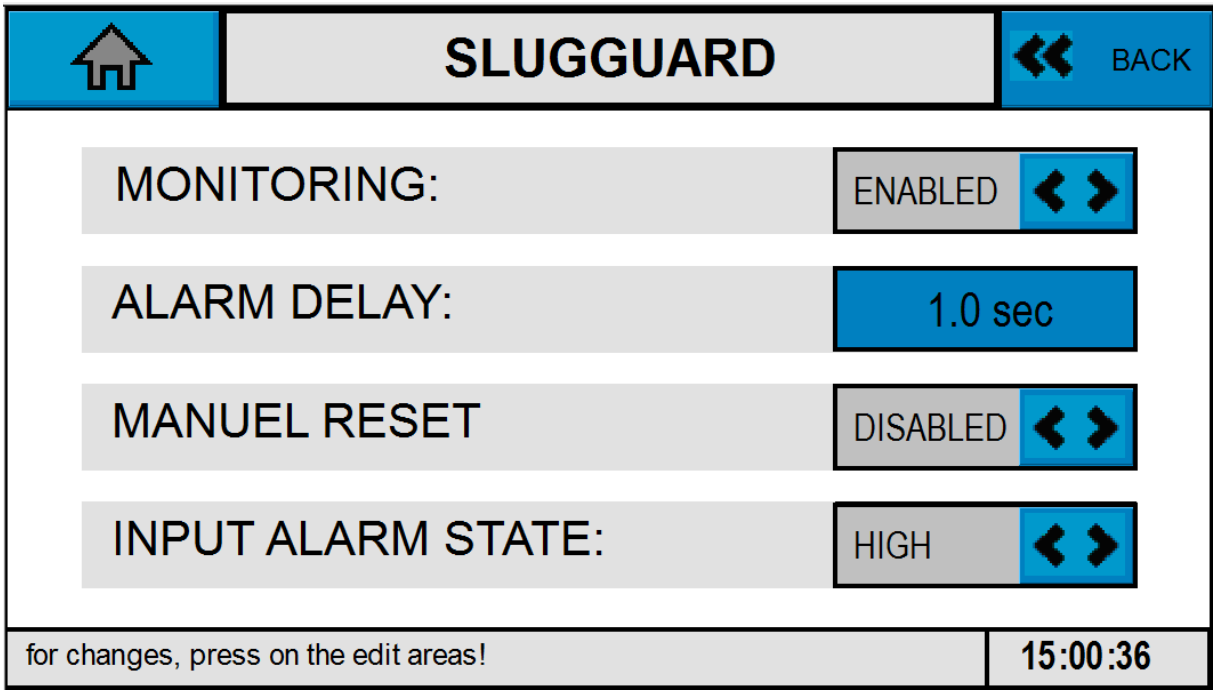
Manual reset should be disabled to only reset using a password level.

3.4.1.2 AFGUARD OUTLET

Same procedure for the AFGUARD outlet:
Ppm level = 30 ppm, delay time = 10 sec, password required to set back the alarm

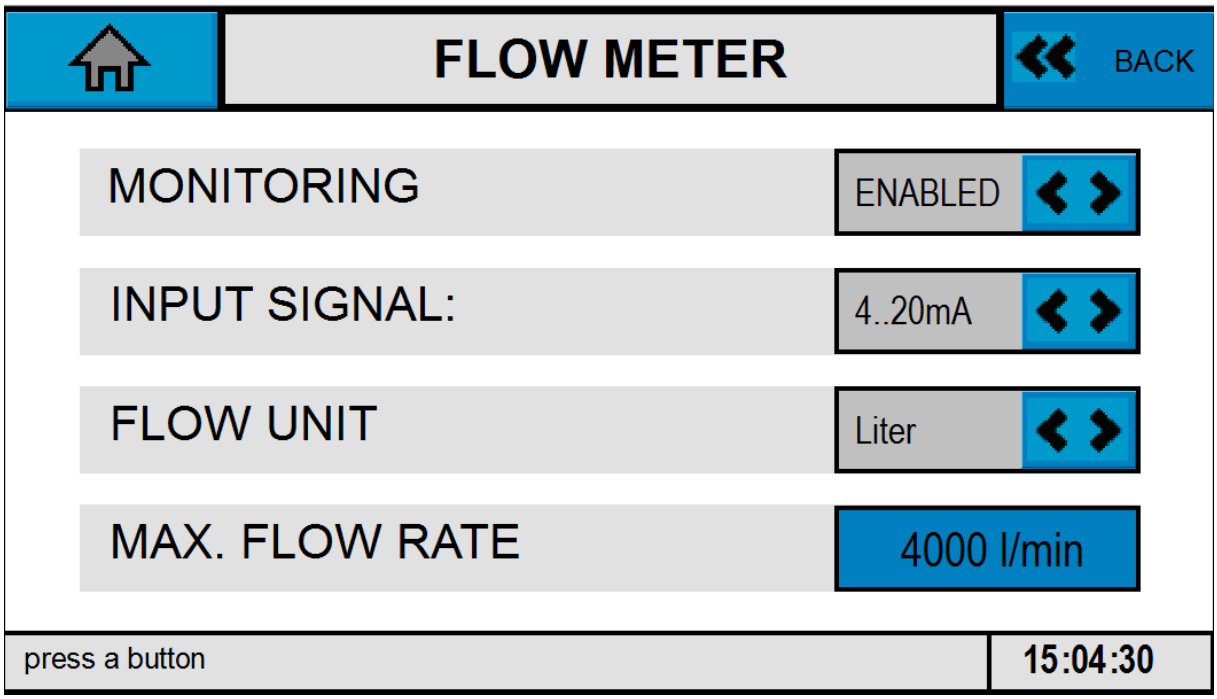
3.4.1.3 SLUGGUARD

SLUGGUARD is a sensor according EI 1592, intended to inform about high levels of water in fuel / to shut down flow in case of water. Can be mounted in the pipe section to prevent water slugs or can be mounted on low points to inform about the build-up of water in sumps or drain ports.

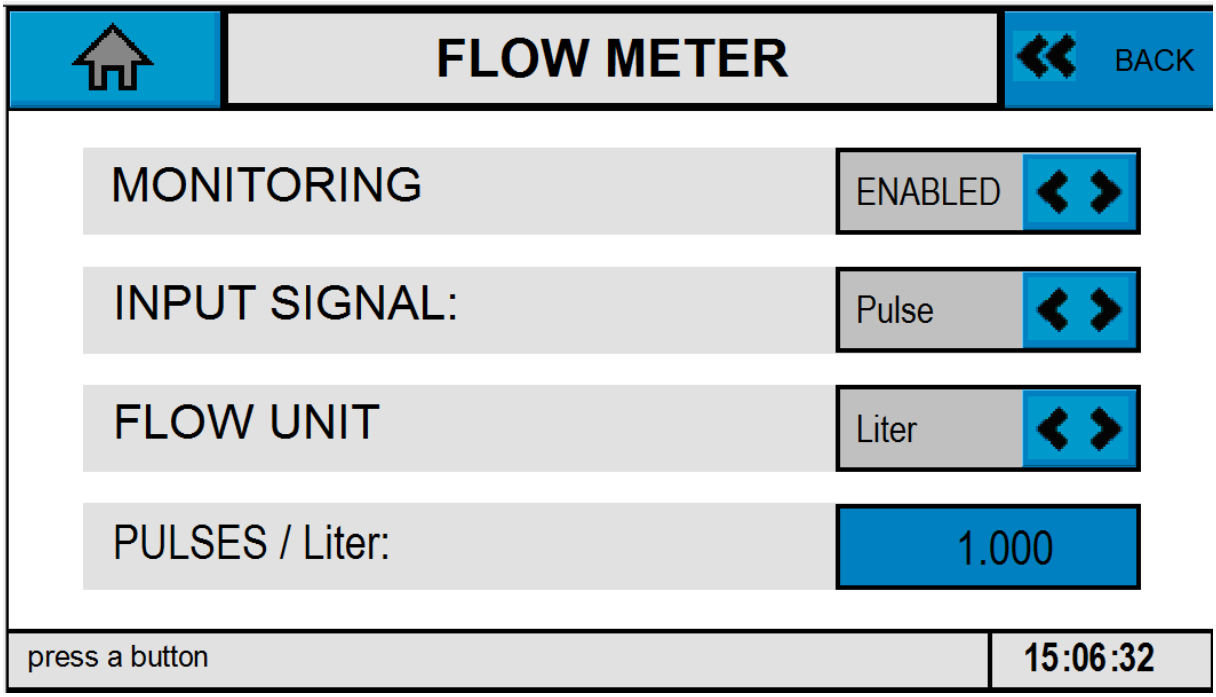


Monitoring: Should be enabled when using a SLUGGUARD sensor
Alarm delay should be 1 sec max to be fast enough
Manual reset should be disabled – It will only show an alarm in case of water. After drainage – alarm automatically disappears. In case of required password to reset the alarm – please enable manual reset.
Input alarm state dependant on the configuration of the SLUGGUARD sensor

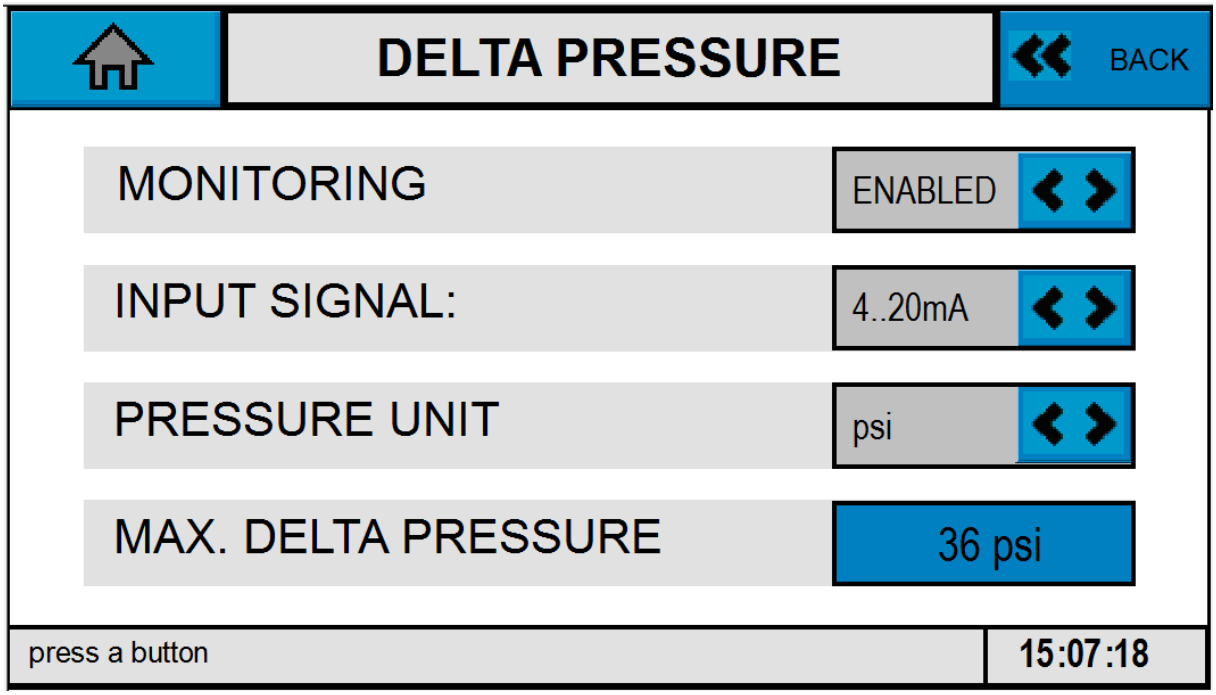
3.4.1.4 Flow meter



Monitoring should be enabled if connected to the flow meter
Input signal can be changed from pulse, 0 to 20 mA and 4 to 20 mA – choose the right setting
Flow unit must be selected when using current signals
Max. flow rate shall be set in case of current signals. Otherwise pule per volume in case of pulse signals:

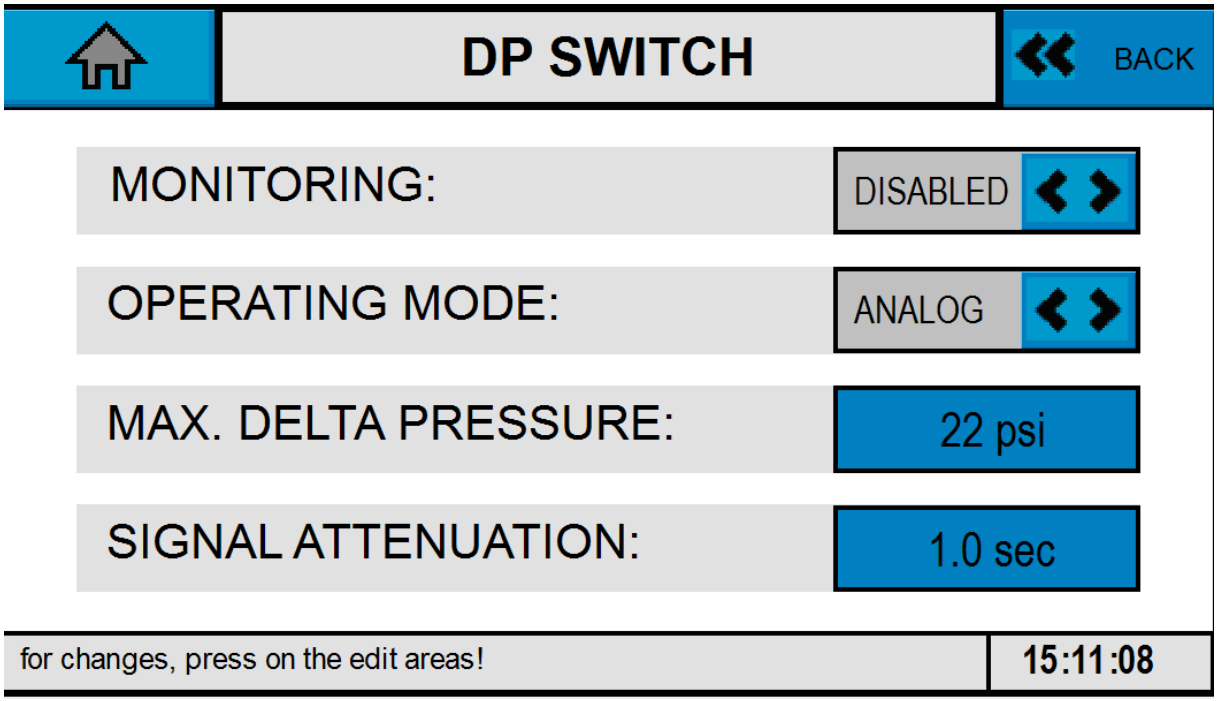


3.4.1.5 Delta Pressure



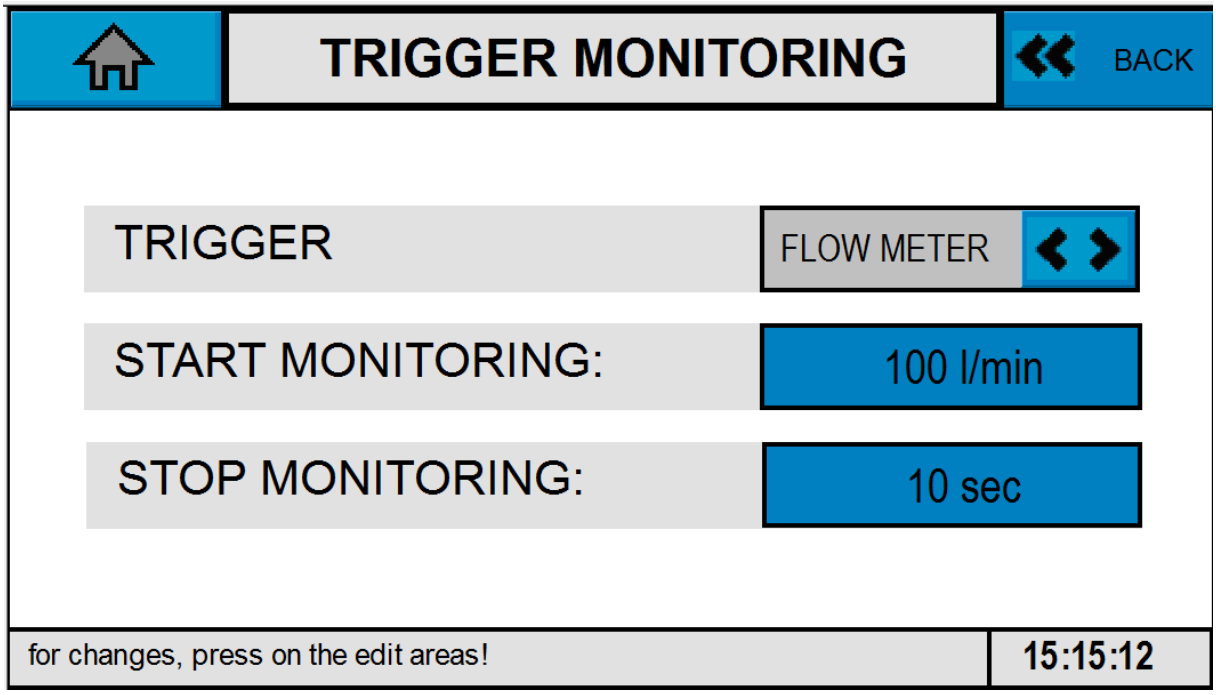
Monitoring must be enabled in case of existing dp transmitter, connected to the CCS gold
Input signal must be selected – to be chosen between 0 to 20 mA and 4 to 20 mA
Pressure units to be selected: choose between psi, kPa, bar
Max. delta pressure for the delta p transmitter must be selected (calibration range)

3.4.1.6 DP SWITCH



Should be enabled to stop fuelling when increasing max. allowed differential pressure over the filter elements
Operating mode can be selected between analogue signals (dp transmitter in use) or digital signal (proximity switch in use).
Max. delta pressure to set alarm level for the filter elements (in most cases it is 15 psi)
Signal attenuation to have a slight delay for the measured signal to avoid peaks.

3.4.2 Trigger

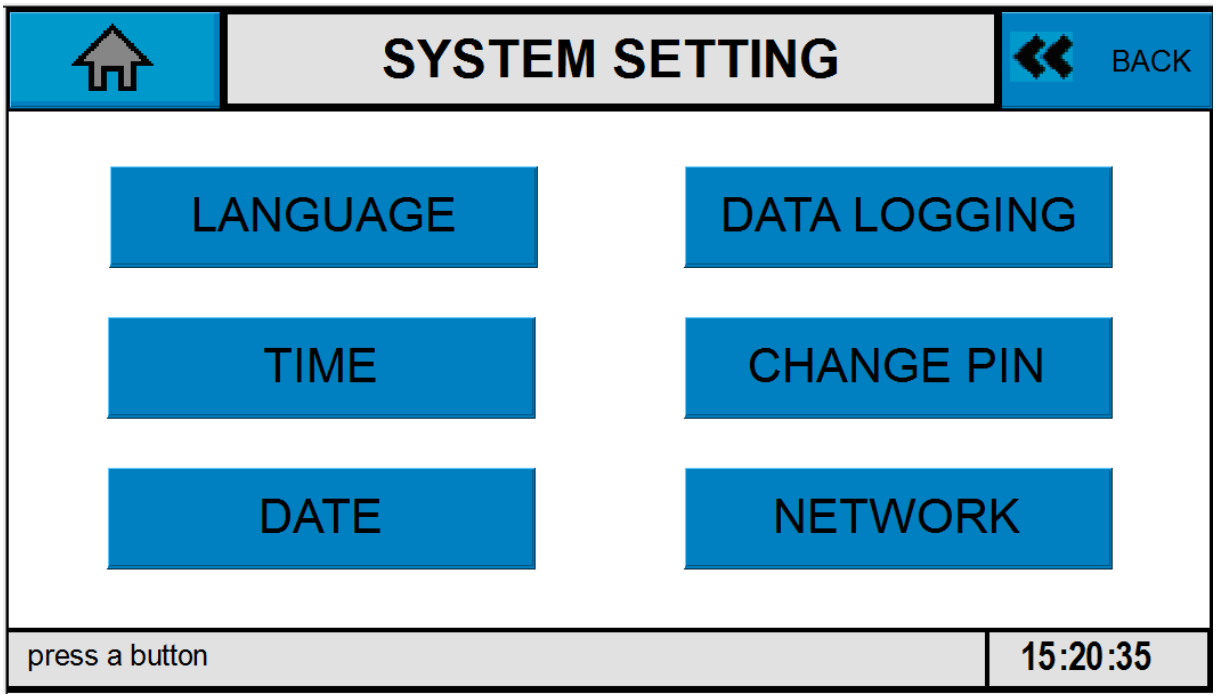


To avoid false measurements and false warnings and alarms – CCS is asking for a status signal to clearly indicate a flow situation. Without flow – the likelihood for false signals is on the high level as condensation effects on the optics of the water sensors can happen. Under flow situation – condensed water will be washed away.

Trigger signals can be generated by the use of several devices like: flow meter, delta p transmitter, input signal coming from separate device, pulses coming from pulse meter, continuous signal coming from master device.
Dependant on the trigger setting – start monitoring signal must be chosen. E.g. 100 l/min for flow signal in case of a flow meter.

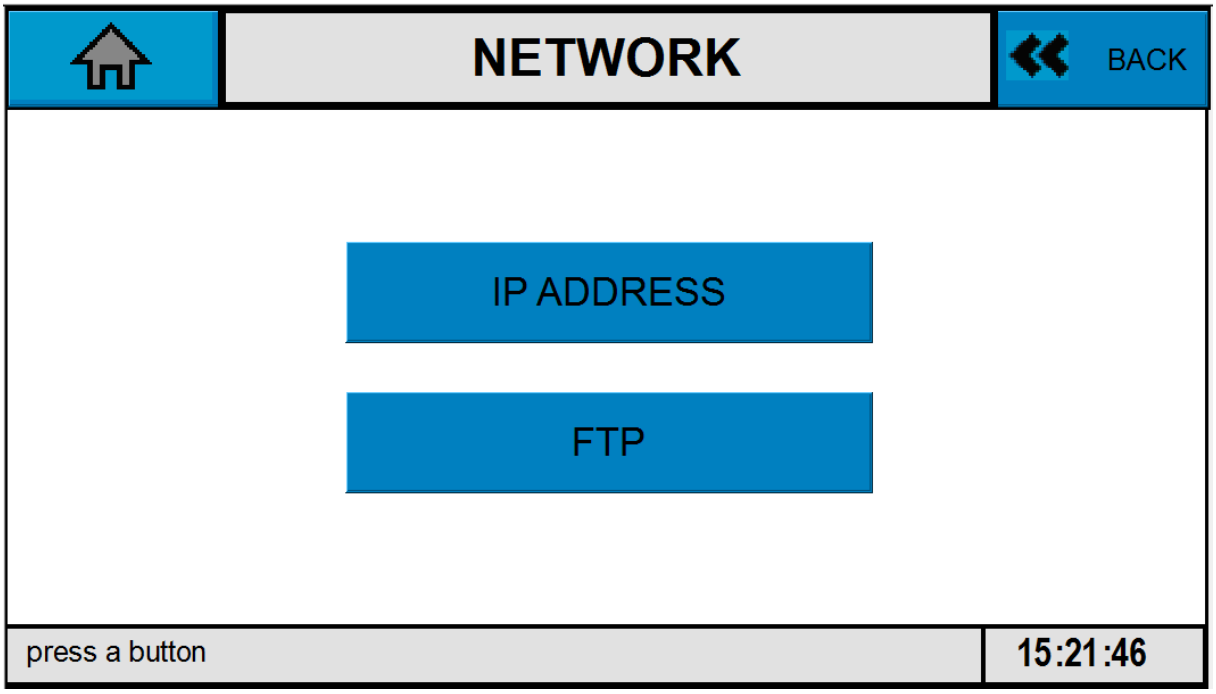
Trigger signal can be delayed to fold the signal in case of short stop in flow, dp or whatever trigger signal is chosen.

3.4.3 System



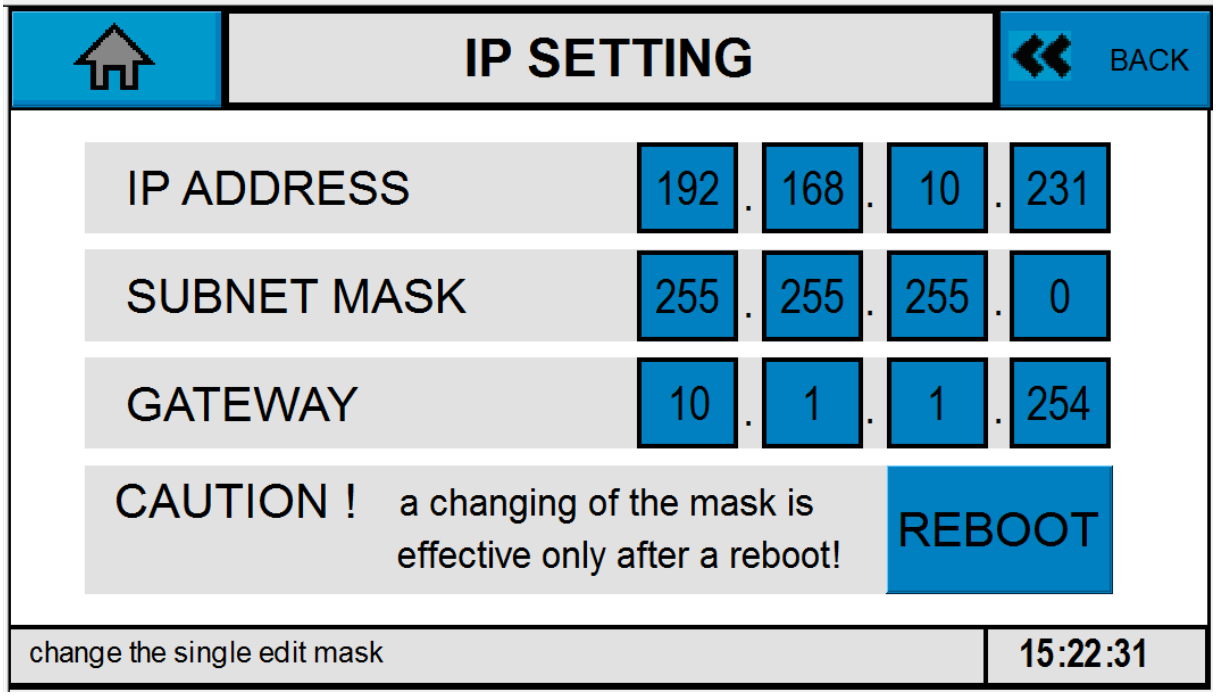
To set up language, time, date, data logging, change pin and set up network

3.4.3.1 Network

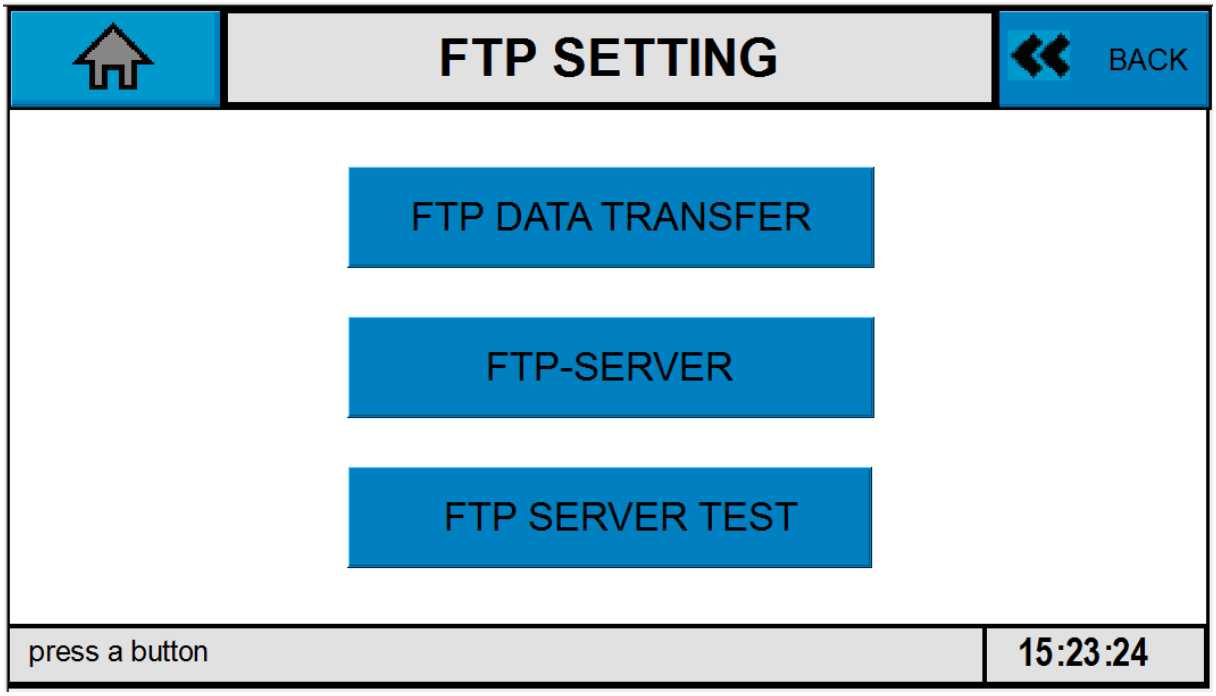


To communicate with master device – IP address and possible FTP server address can be generated.

3.4.3.2 IP address

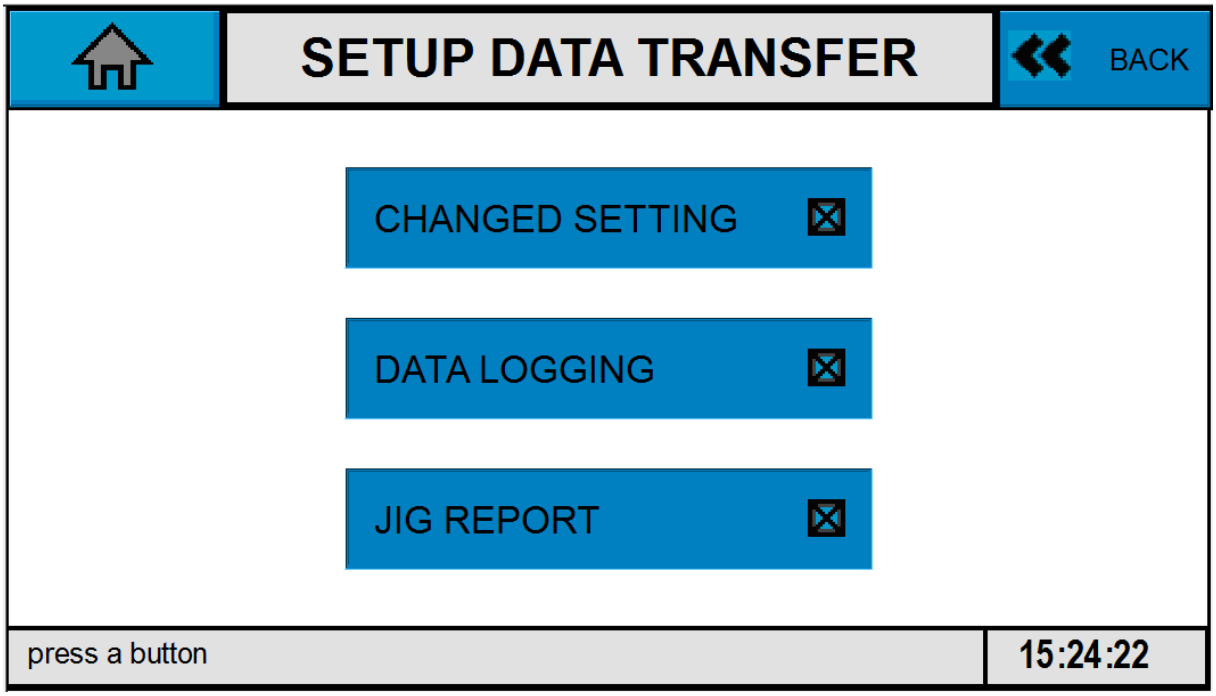


3.4.3.3 FTP server settings

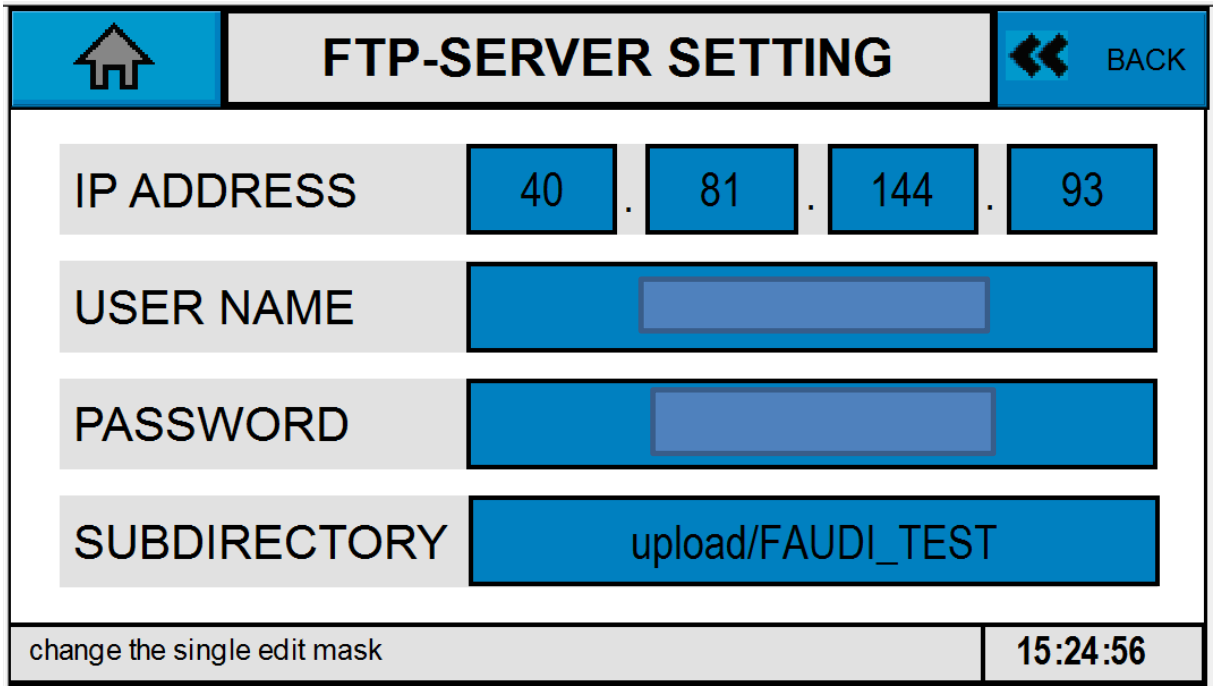


3.4.3.4 FTP data transfer

Selection of datafiles to be transferred:

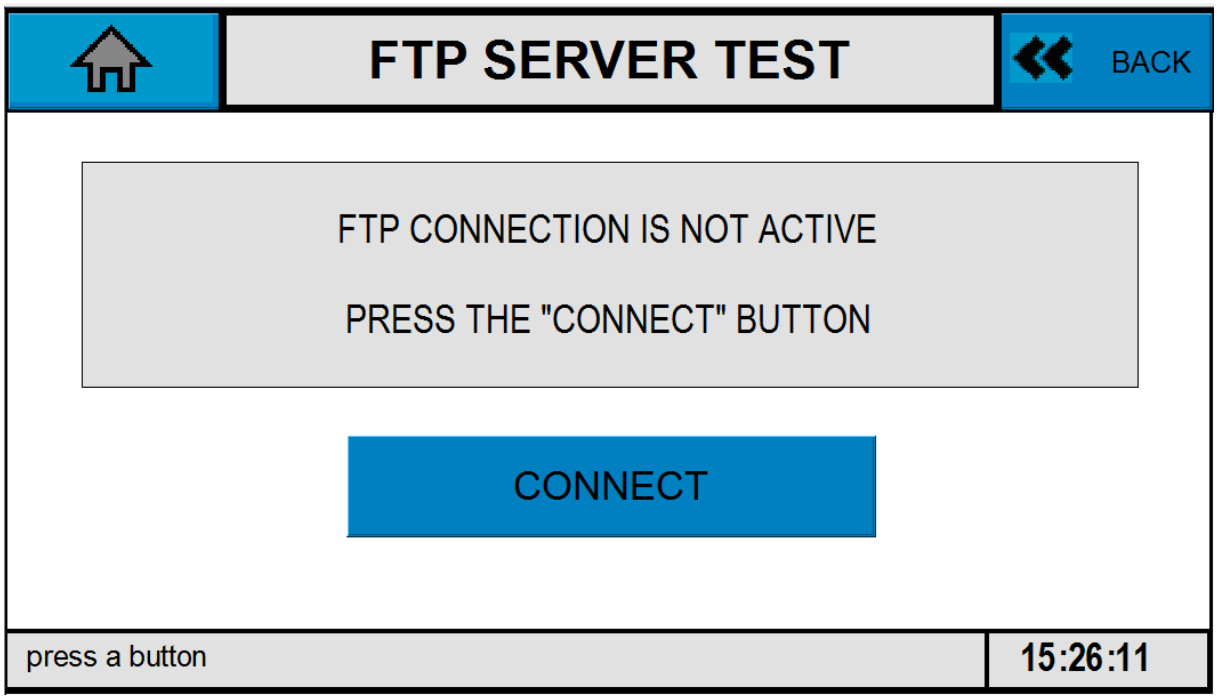


3.4.3.5 FTP file server



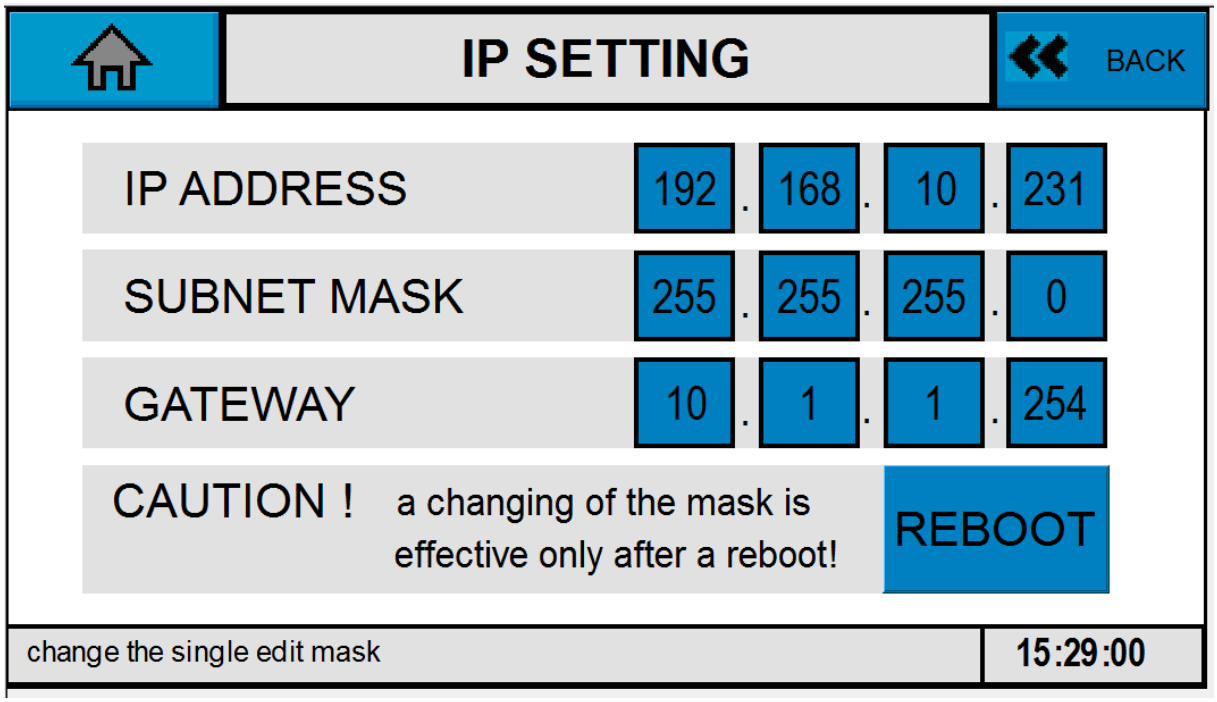
3.4.3.6 FTP file server test

To test FTP connection

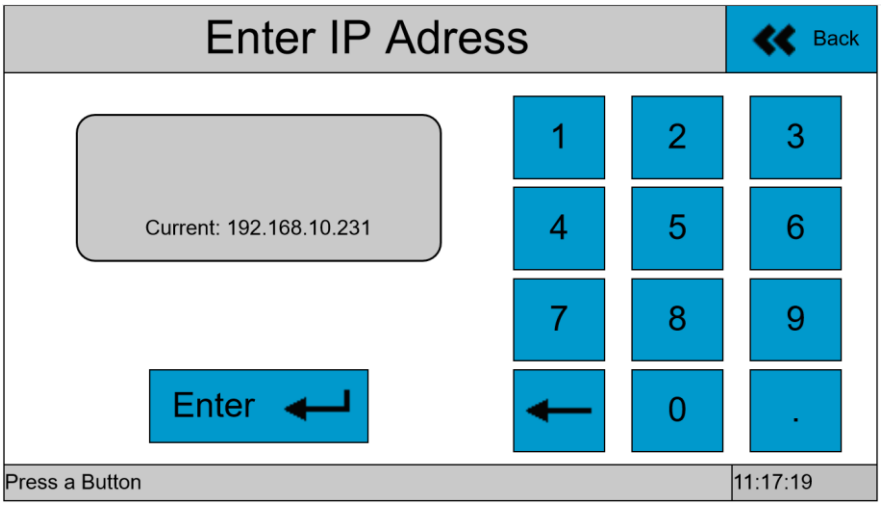


3.4.3.7 IP Settings

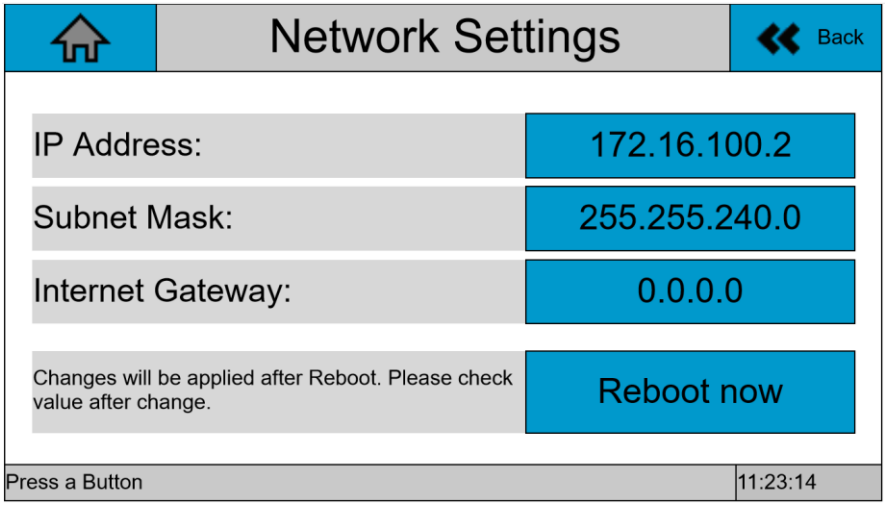
By a click on Network, the following dialog will open:



The system has one ethernet interface. For this interface you can CHANGE the network settings in this menu.
The Default IP Address is **192.168.10.231** with subnet mask **255.255.255.0** (Prefix length **24**).
The internet gateway is **0.0.0.0** by default. This means it is undefined. It could be necessary for future functions of the CCS.
If you want to set the internet gateway, it must be in the same subnet than the system. In this case it should be in range **192.168.10/24**. The internet gateway is the address of the router which connect the subnet with the internet.
To CHANGE the IP Address, Subnet mask or Internet gateway, click on the corresponding blue box. A dialog will open.

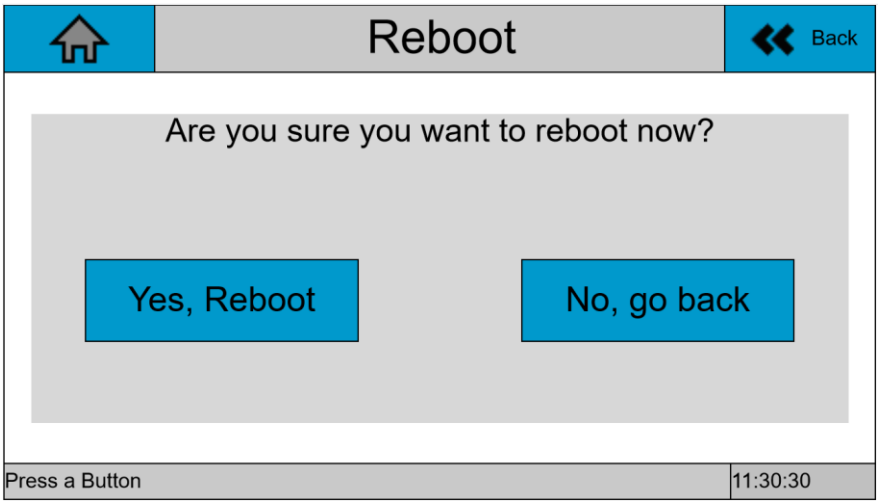


Use the keypad on the right to type in the decimal IPv4 address in four octets separated by a dot and press ENTER.
You will go back to the last screen.



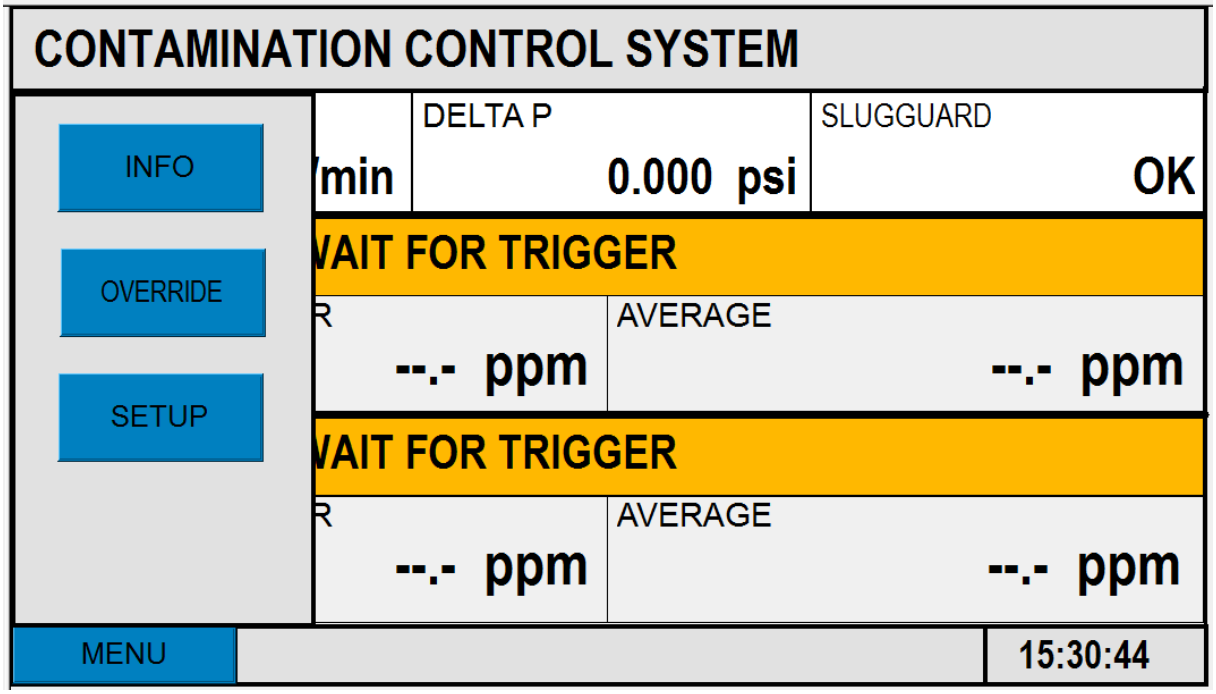
It is very important to check the values in the blue boxes again after a click on ENTER. If you ENTER an invalid IP address, it can happen that the blue boxes are blank, or they show a wrong value. **The shown addresses will be set when the system reboots.** You can do this by disconnecting the power supply or by a click on Reboot now.

When you click on Reboot now, a confirm dialog opens:

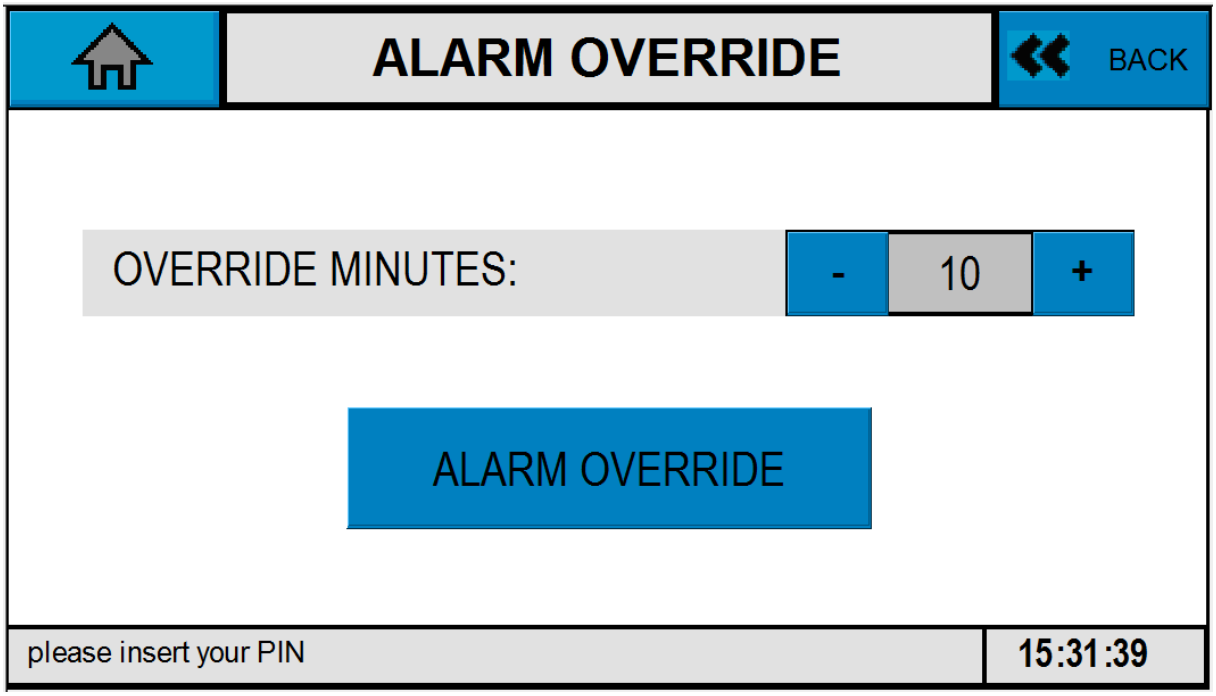


3.4.3.8 Override

In some cases, it can be helpful to deactivate the alarm functionality of the System. The CCS supports an Override feature. To open the override mode, navigate to Setup and then click on **Override**



You have to enter your pin no,
The Override dialog will open.



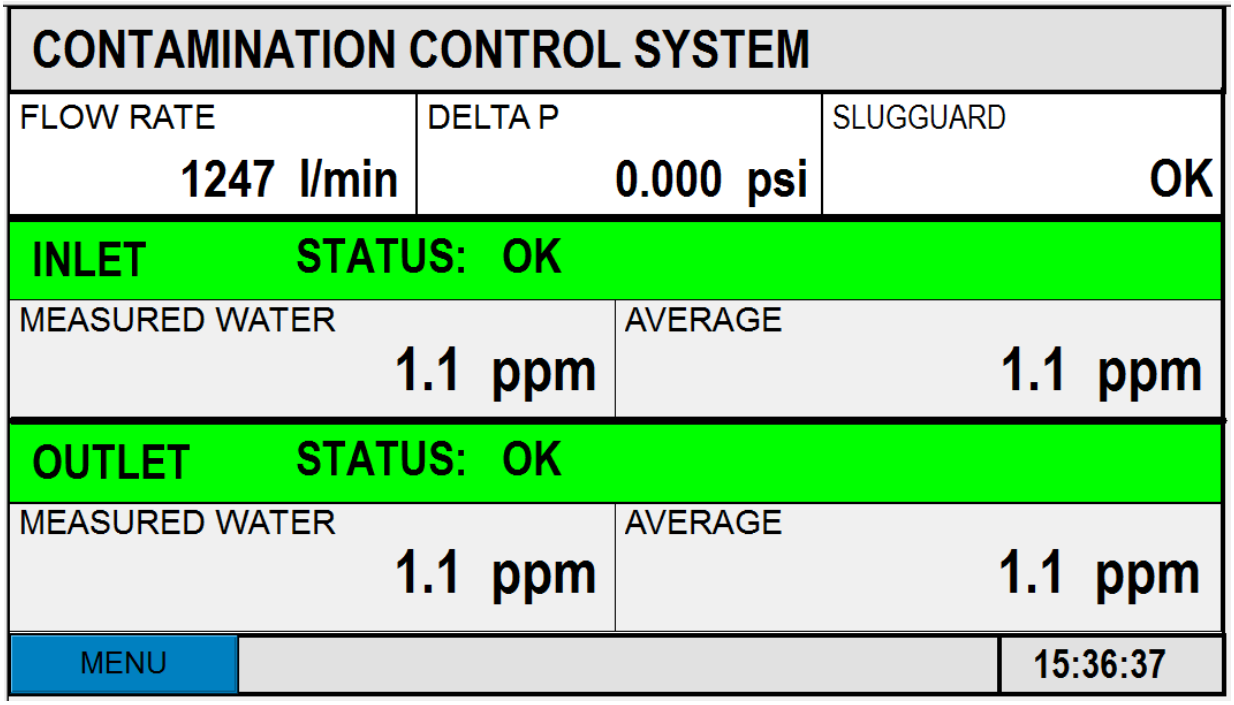
With the button in the Override Time section, you can set up a time up to 60 min.
For this time, the both relays will stay in ready position, they won't get released when an alarm / water slug / warning / error appears. To indicate the unreadiness of the system, the blue lamp stays off.
The time begins with a click on ALARM OVERRIDE.

To cancel the override function: press override again or reboot.

During override – the blue light is off and any alarm will not interfear with the relay outputs.

3.5 Dashboard (main screen)

The Dashboard is the main screen of the visualisation. It shows several information about status and sensor signals.

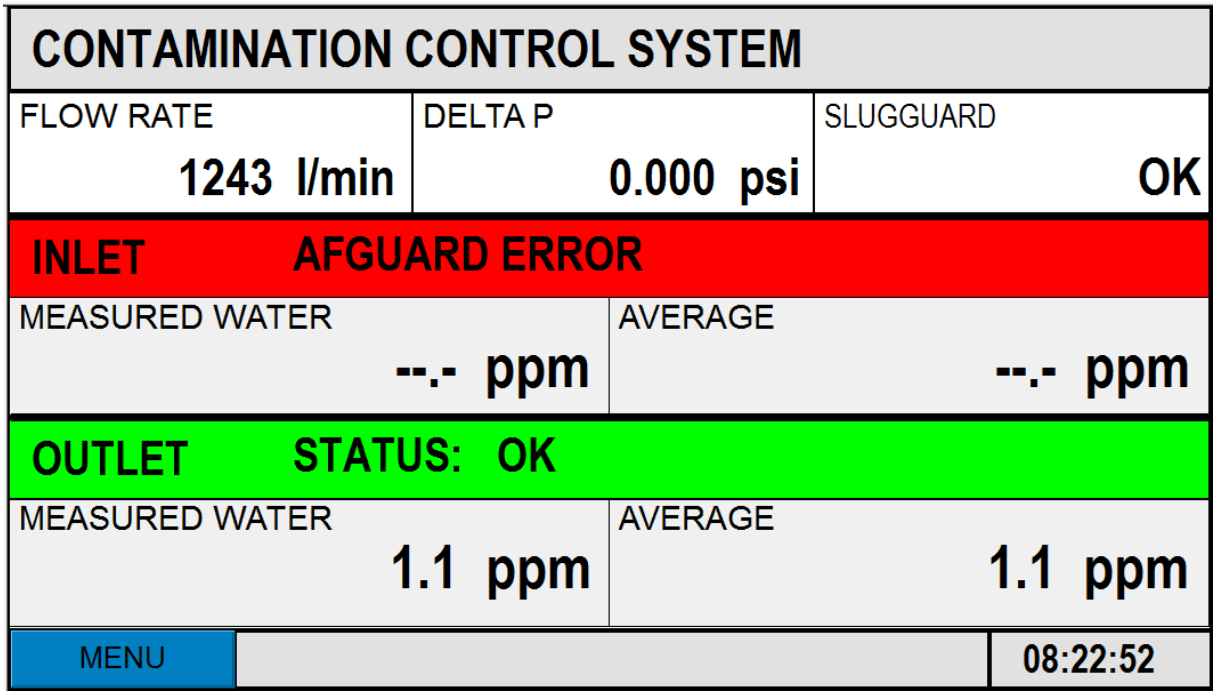


Information displayed:
All activated sensors like

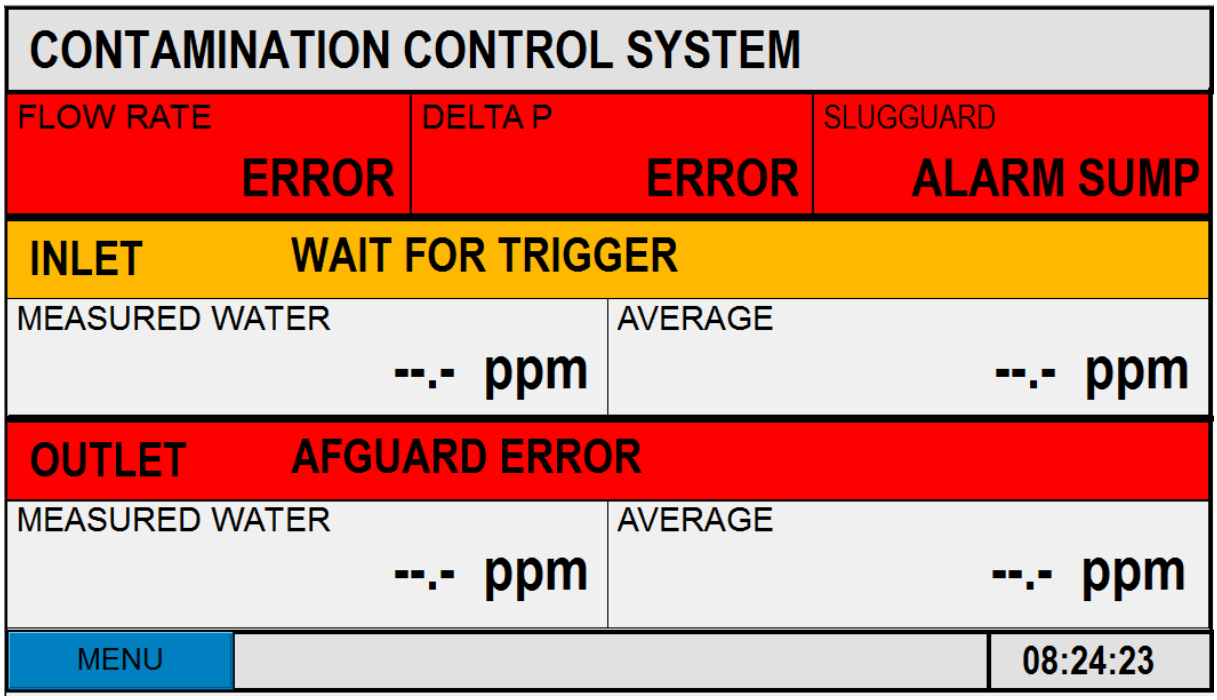
- FLOW RATE
- DELTA P
- SLUGGUARD
- INLET AFGUARD (Upstream)
- OUTLET AFGUARD (Downstream)

Status information
Time

3.5.1.1 Status information

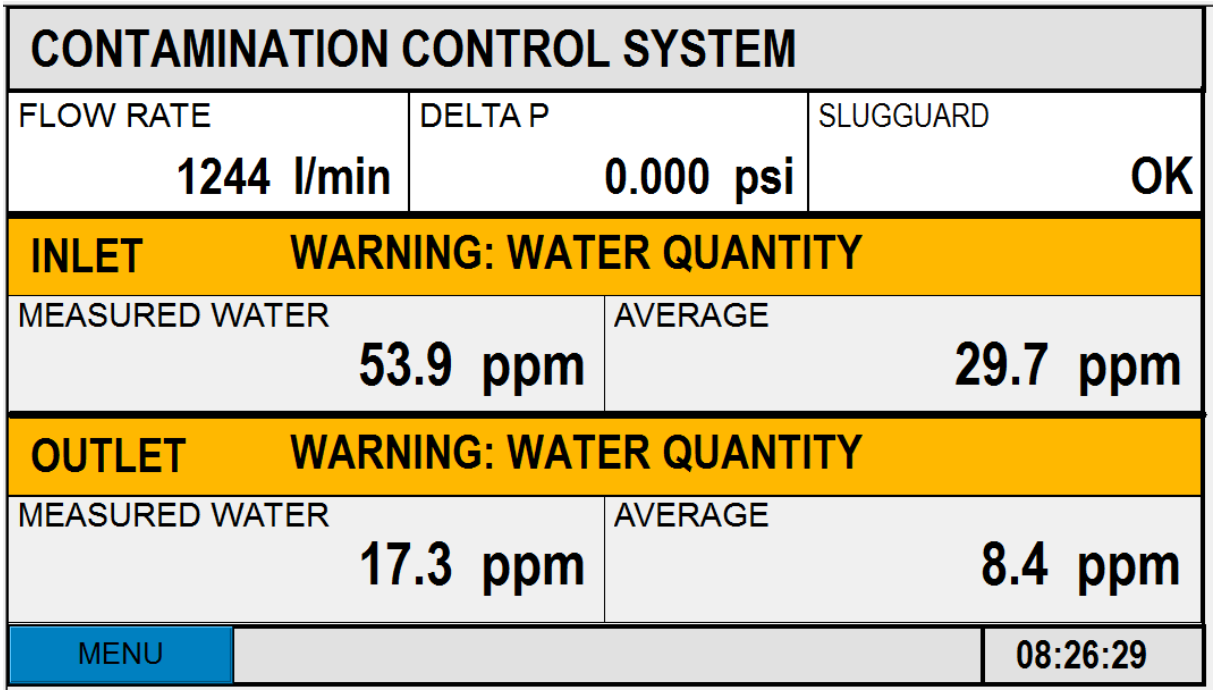


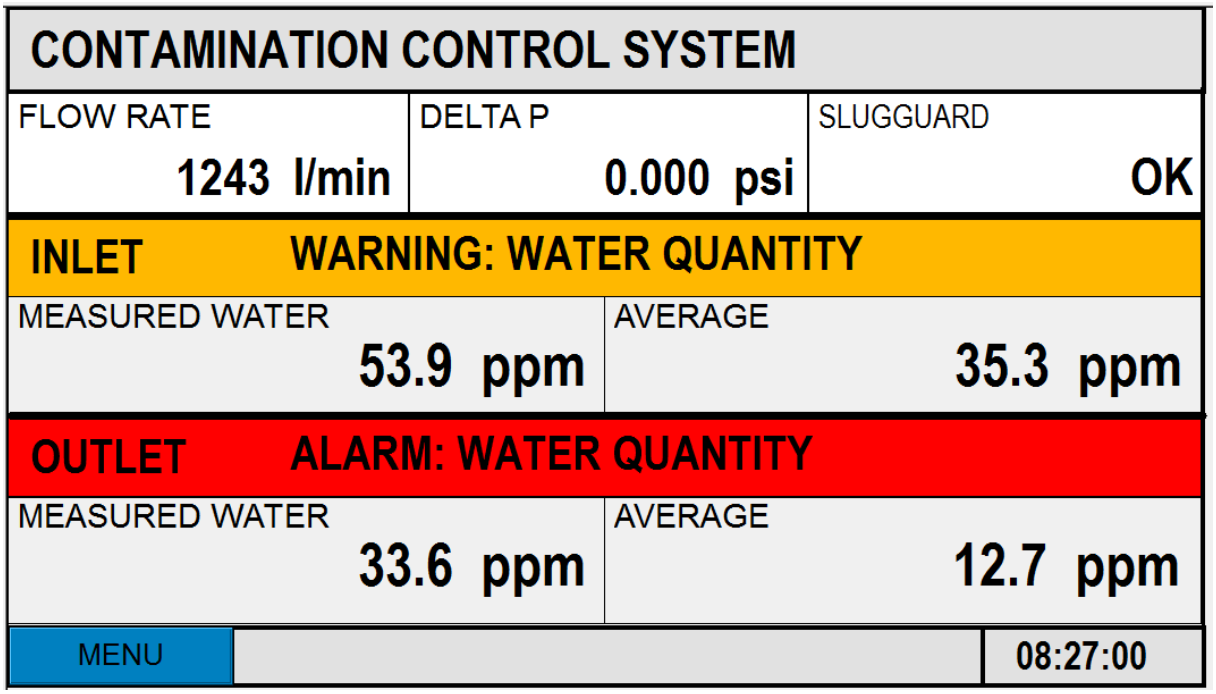
In case of sensor fault – status line becomes red (Alarm) or amber (warning)



This enables service provider to search for the sensor which is generating the Warning / Alarm

Same procedure in case of water warnings or alarms:

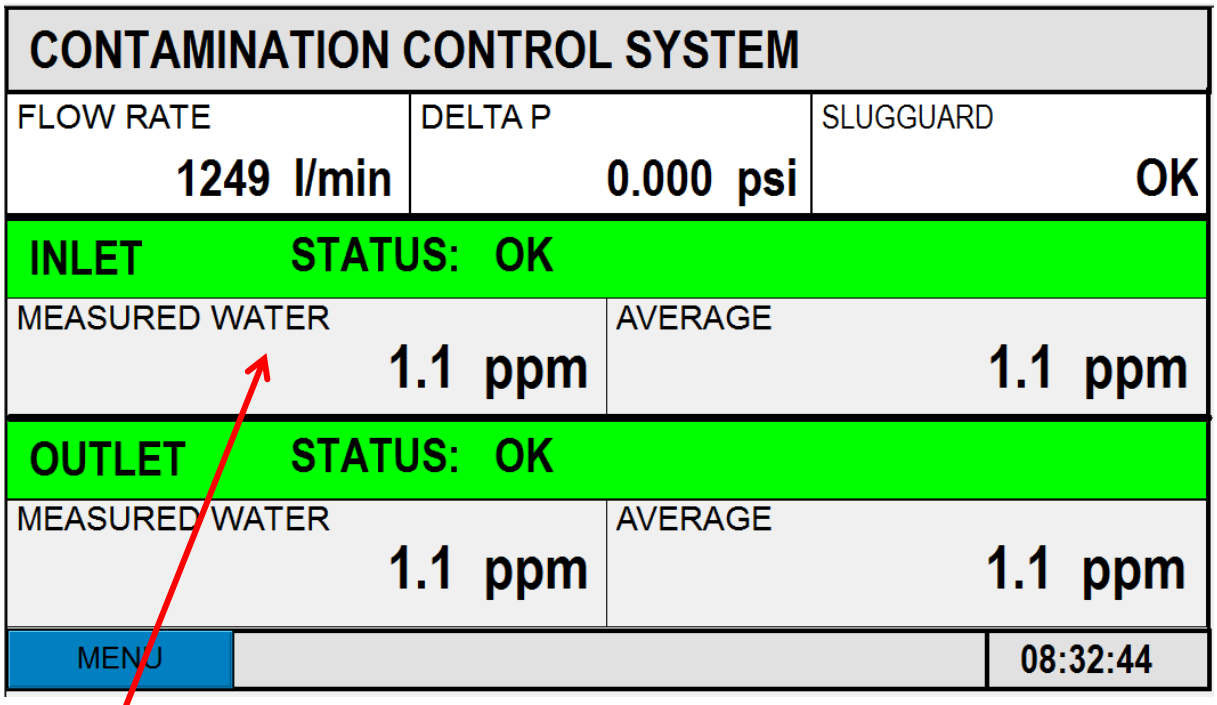




3.5.1.2 History

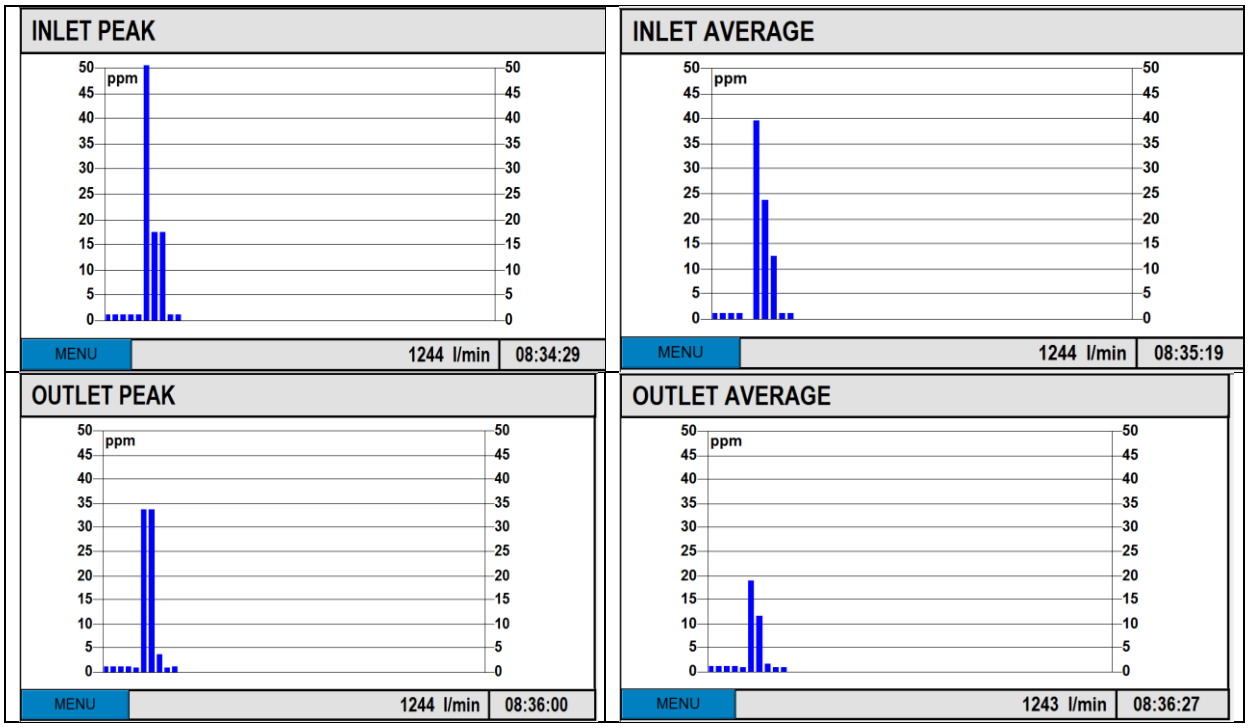
JIG bulletin 110 is asking for a history of water levels for water peak and water average for the last 50 refuelling operations.

The history will be provided as a graph which can be activated by pressing on the dedicated sensor fields like
INLET AFGUARD MEASURED WATER
INLET AFGUARD AVERAGE
OUTLET AFGUARD MEASURED WATER
OUTLET AFGUARD AVERAGE



Press field area to activate graph of history for the sensors

Example of history for inlet and outlet AFGUARD



To leave the history screens – tip on it again.

3.5.2 Sensor faults

3.5.2.1 Broken wire alarm

Broken wire and sensor error can only get detected for current sensors with signal range “4..20 mA”. It is not possible to detect a wire break on a pulse flowmeter, a 0..20mA sensor or a binary 24V High/Low voltage input like trigger, reset or interlock.
The table explains the states of a 4..20mA sensor:

0 – 3.8 mA	No sensor connected or wire break	Check connection, power supply of sensor / barrier
3.8 – 4mA	Sensor or barrier connected, error	Please refer to the manual of the sensor or barrier
4 – 20 mA	Sensor works properly	

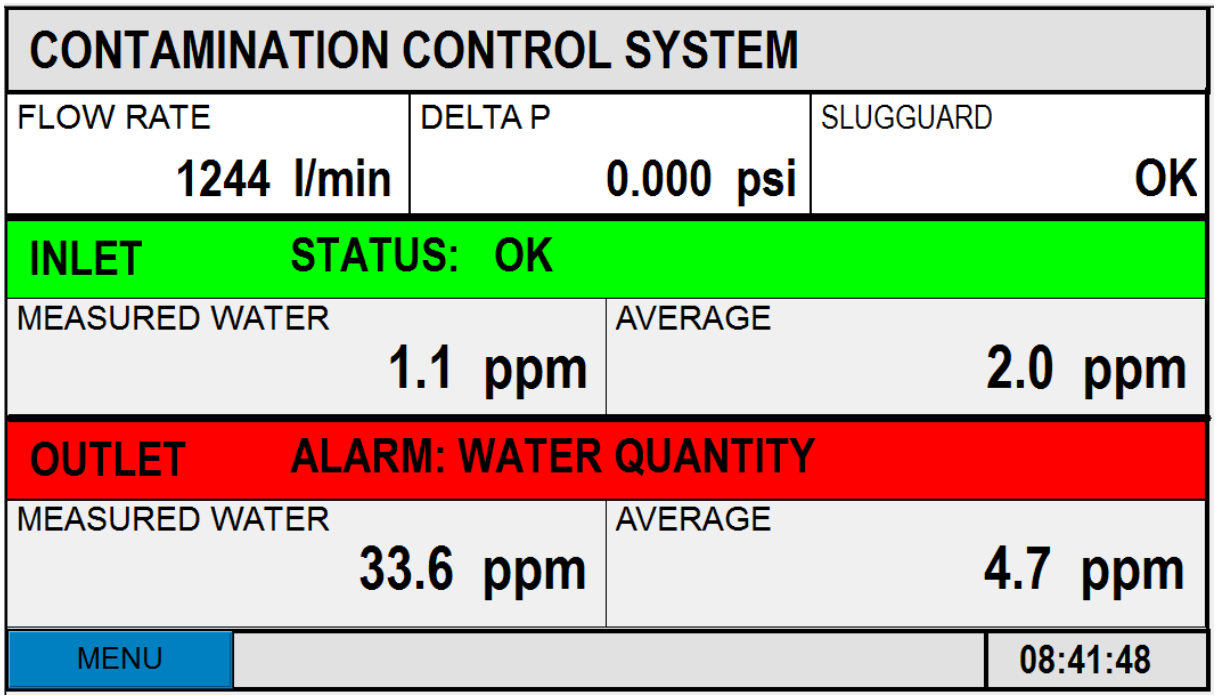
Please consider that in Ex safe areas a safety barrier is mounted between sensor and CCS. The problems don’t need to come from the sensor, it can also come from the barrier or connection between.

Please check cabling to make sure that all connections are OK.
Faulty alarm could either be caused by wrong pre-setting of sensor signals. In this case we recommend launching the INSTALLER again.

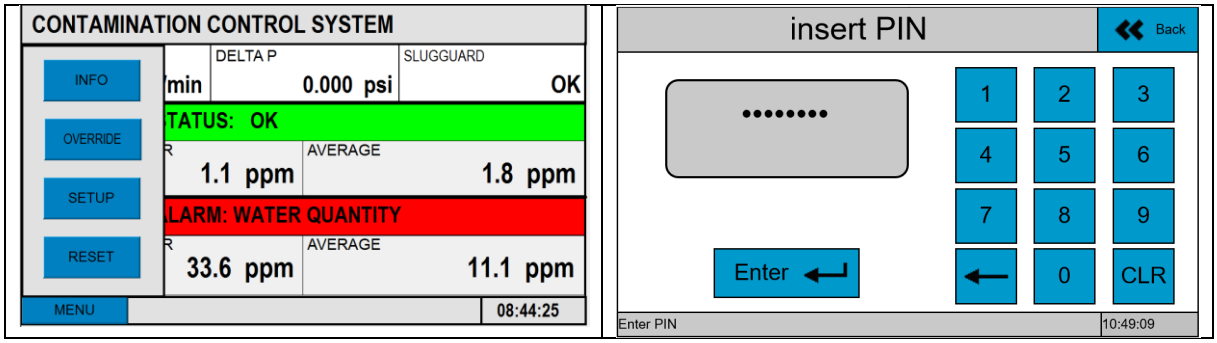
For the SLUGGUARD there is also a fail-safe option which allows to show a wire break. The SLUGGUARD should output 24V if everything is ok (no water). It should output 0V when it detects water. In this case the CCS shows a SLUGGUARD alarm, when it comes to a cable break. Make sure the SLUGGUARD® is programmed with this logic and the wiring matches the fail-safe requirements.

3.5.3 Reset Alarm

3.5.3.1 Reset Alarm by Software



In any case of activated alarm – tha alarm need to be reset by the use of a rest key (external key to trigger digital input which set back the alarm) or by the use of password level. Go into menu and press the reset key. Type in password to reset the alarm and press Enter



If there is no ALARM condition present which means:

- When Water Monitoring is active and:
  - No Water warnings Inlet/Outlet
  - No Water alarm Inlet/Outlet
  - No Water slug Inlet/Outlet
- No SLUGGUARD alarm
- No wire breaks ($I < 38mA$) or sensor errors ($I < 4mA$) on all activated sensors
- No Overflow
- No Over DP

If the listed conditions don't match, the reset won't be accepted, affecting to the state of the relays and depending on the reason of the alarm to the blue flashlight.

3.5.3.2 Reset Alarm using external switch

Alarm could either be reset using an external reset switch.
CCS consists of different digital inputs. Digital input RESET has been setup to reset Alarm or Warning via external switch, e.g. a key switch. Please refer to CCS installation instructions for hardware setup.

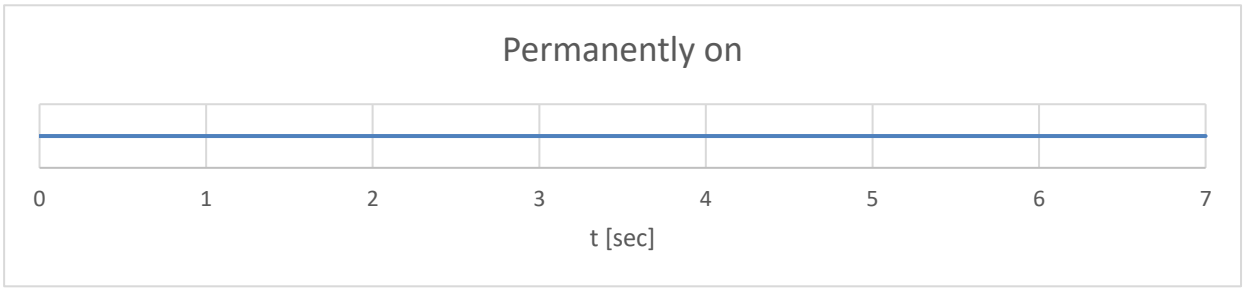
3.5.4 Operational States

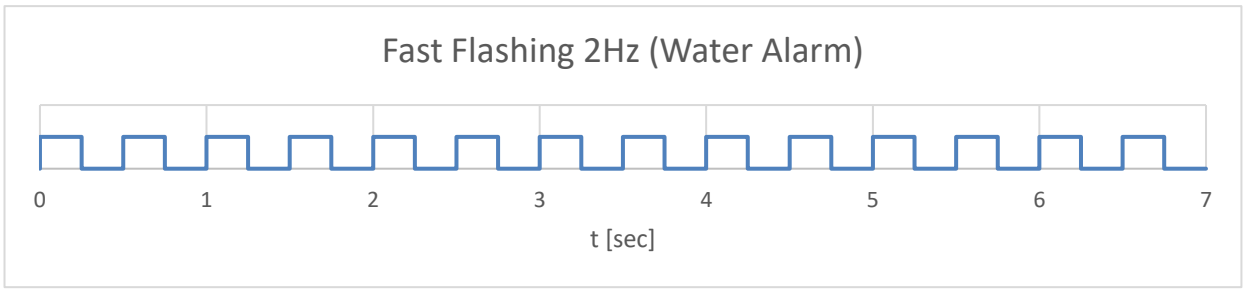
This page describes the different states of the blue LED flashlight (water indicator) There are 5 different light patterns of the water indicator:

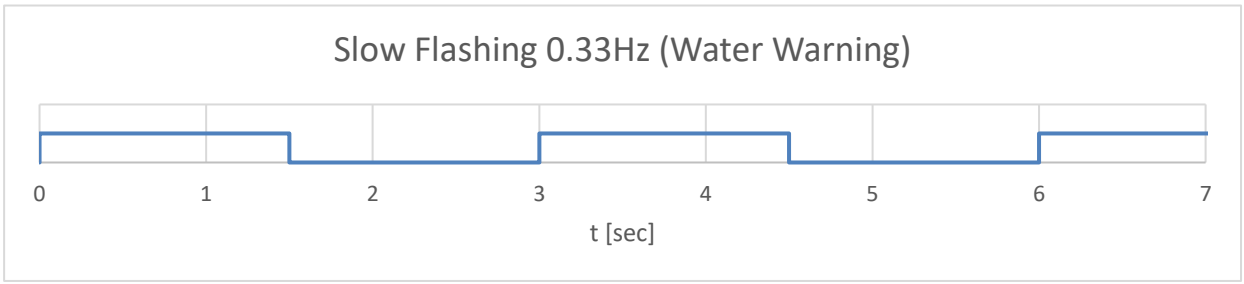
Type	Meaning
Ready blinking	- System ready, waiting for trigger condition (AFGUARDs unarmed)
Permanently on	- Actually refuelling, monitoring active (AFGUARDs armed)
Slow flashing (0.33Hz)	- Water warning
Fast flashing (2Hz)	- Water Alarm (multiple Warnings, Alarm, Slug) - Caused by an AFGUARD or SLUGGUARD
Permanently off	- Overflow Alarm, - Over DP Alarm, - Sensor Error, - Sensor cable break, - CCS unpowered - Override active

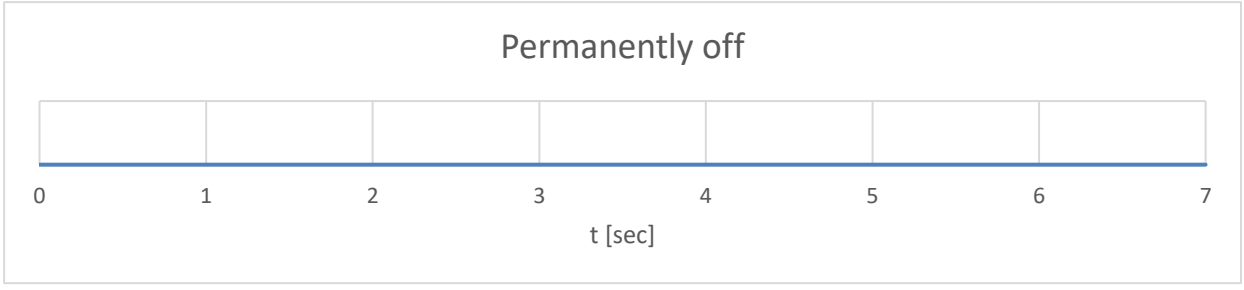
Caution: When you begin refuelling, by pressing the deadman, please check, that the blue indicator lamp turns on permanently within a few seconds. This is very important. When the lamp is not lighting permanently, this means, that the water monitoring is inactive. The measured water values by the AFGUARD®(s) will be ignored!

The different flashing patterns are shown in the following diagrams:



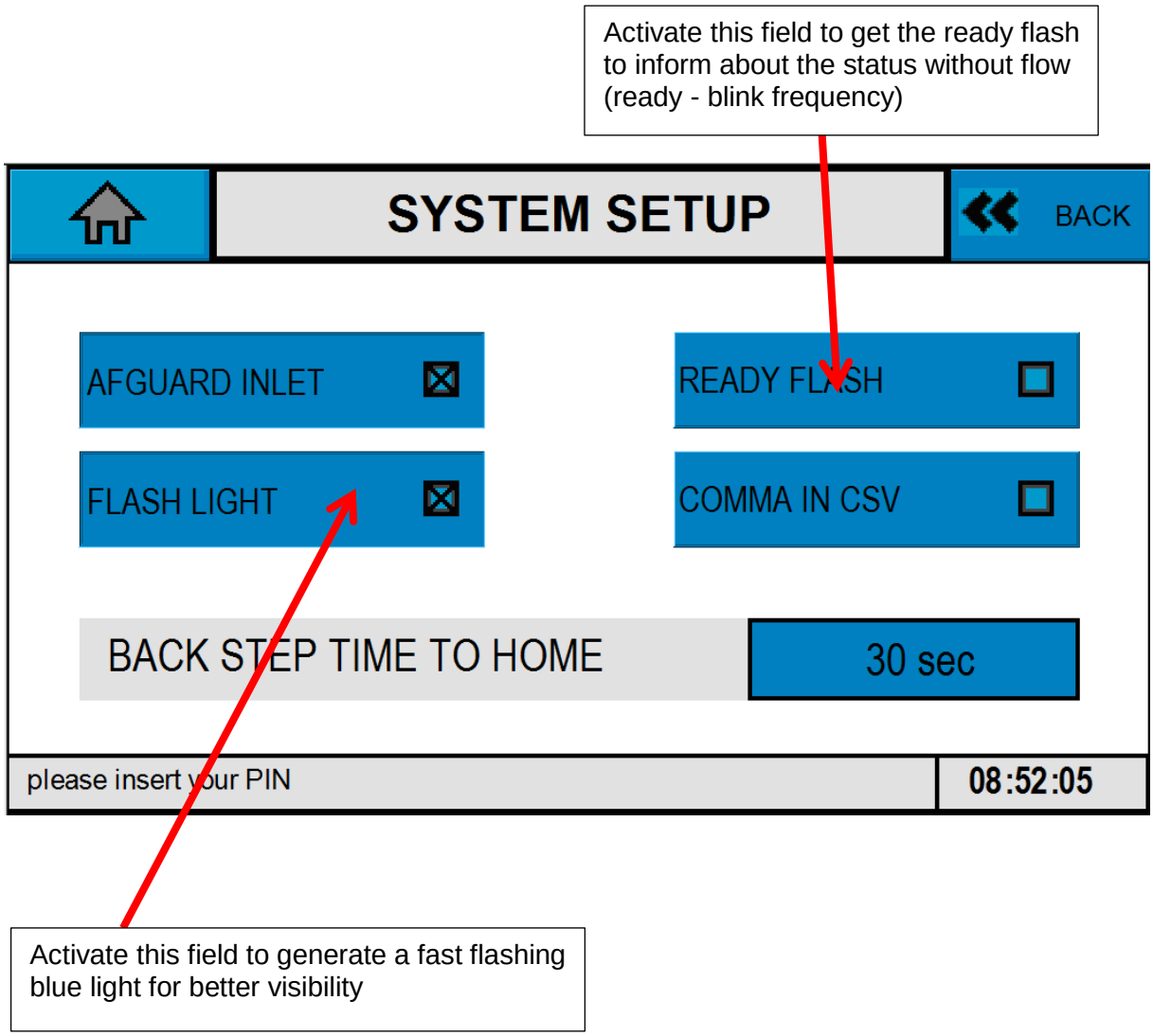






3.5.4.1 Blue flash light options – using service password level

There is a special password available to set up the blue flashlight.



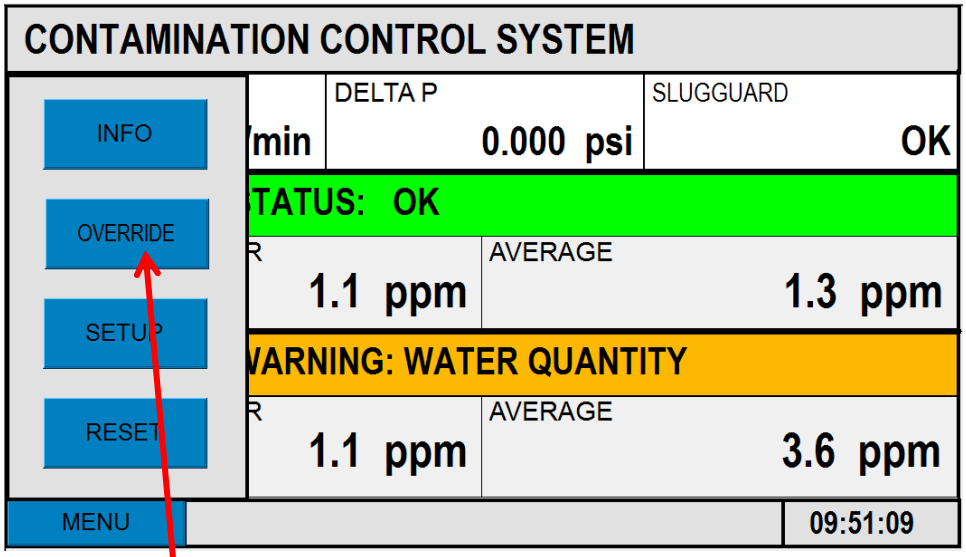
3.5.5 Info screen

When pressing the INFO button on the menu
screen – all relevant contact info's are displayed on this screen

When contacting FAUDI Aviation GmbH for service purposes – please make sure to have data on info screen prepared. These data are relevant to make online service available.

Clicking on the screen again – will bring you back to main screen.

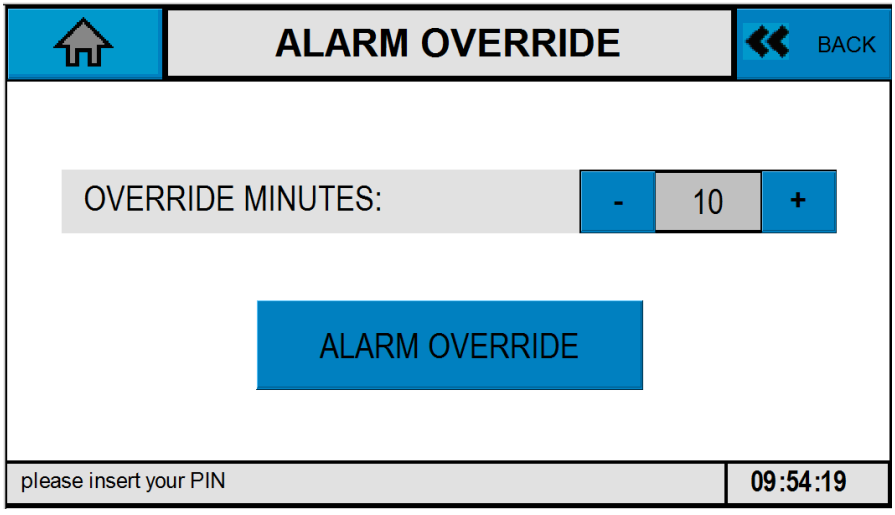
3.5.6 Override function



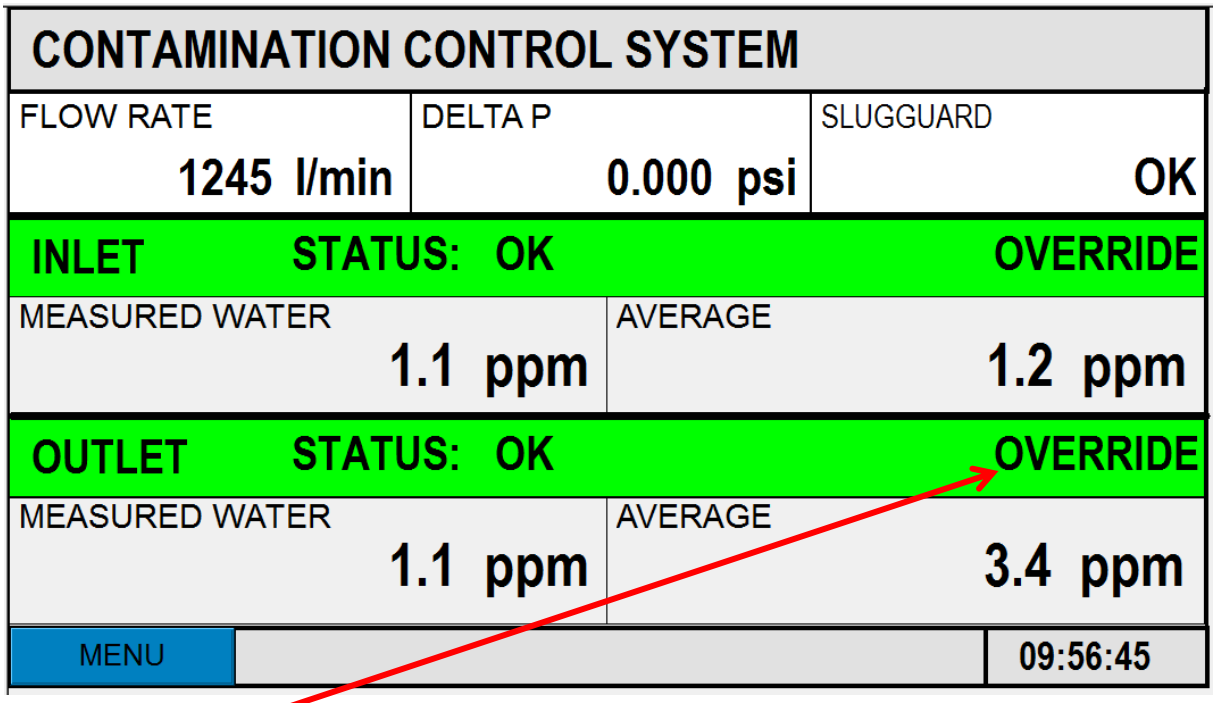
Press this button to override the alarm and warning function of the CCS. During Override – the blue flash light will be constantly off to indicate the special override situation.

To Override – you will be asked to type in your password

You will then be asked to type in the time frame for the override in minutes using the + and – buttons. Than press ALARM OVERRIDE.



Override function can be disabled by pressing the override function in Menu again or by a reset of the CCS.



Activated Override function will be displayed on the screen – blue flash light is off.

3.6 Datalogger

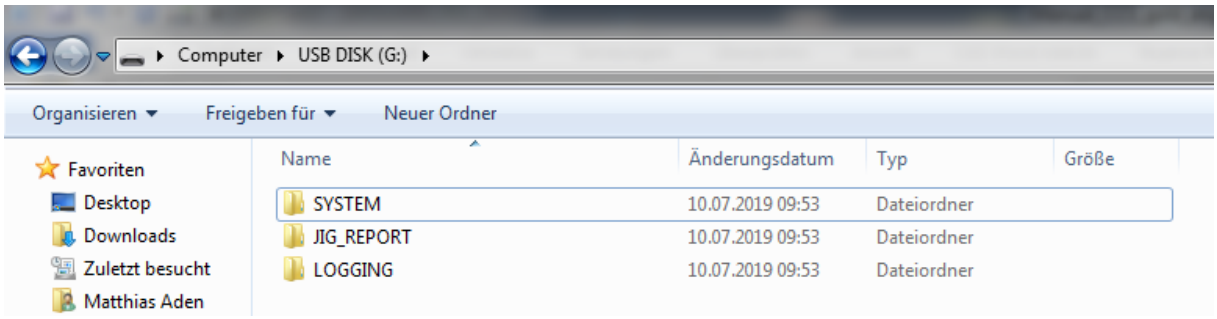
The CCS consists about a built-in data logger. All relevant data are stored there.

This data is stored during the process on a USB memory stick located on the PCB of the CCS in the front door.

To get access to these data, remove the USB memory stick and plug it into a computer. Caution: **Do not remove the USB drive during a refuelling process of the system! This can cause in data loss of the currently opened logfile.**

Logged data could be analysed with every computer-based software with the ability to read CSV data or Excel files. A simple text editor like Microsoft Notepad will do it as well. For a more comfortable evaluation we recommend Excel or an equivalent tool.

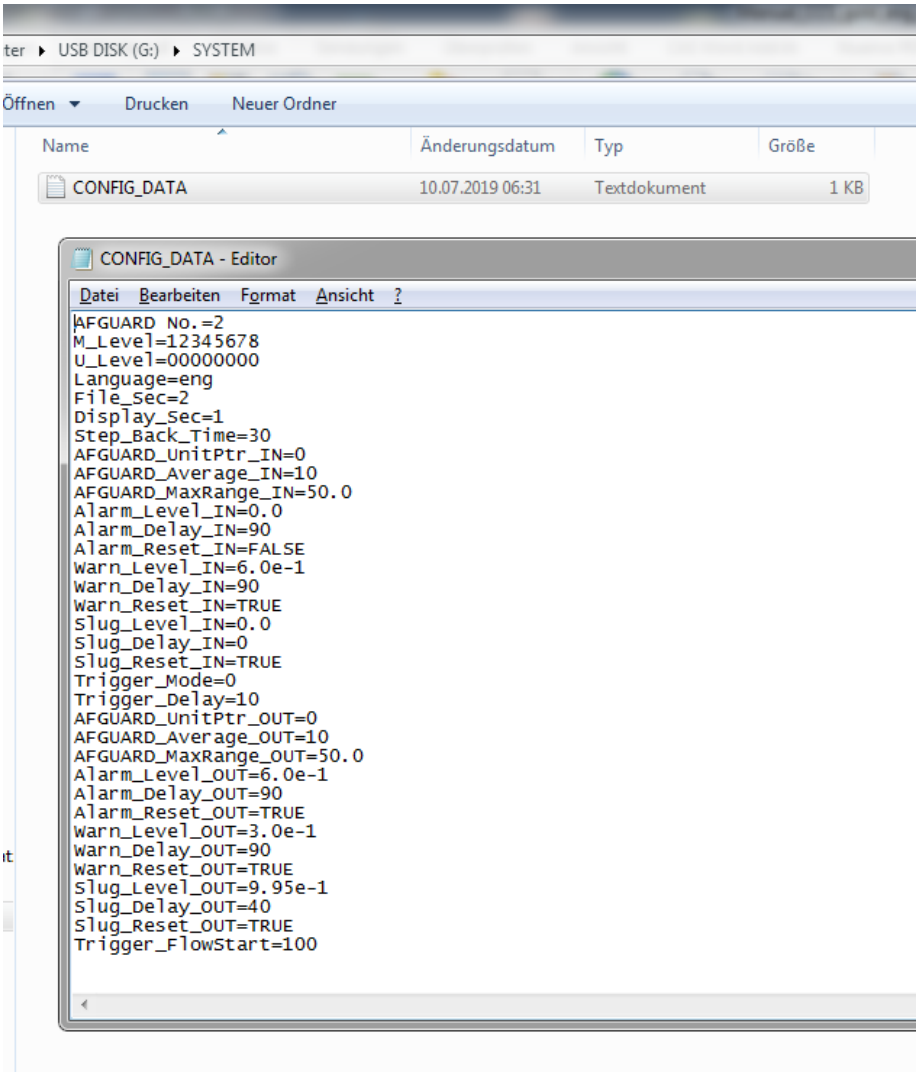
Please insert the memory stick into a computer. You can see following data structure:



There are three directories:

1. SYSTEM
2. JIG_REPORT
3. LOGGING

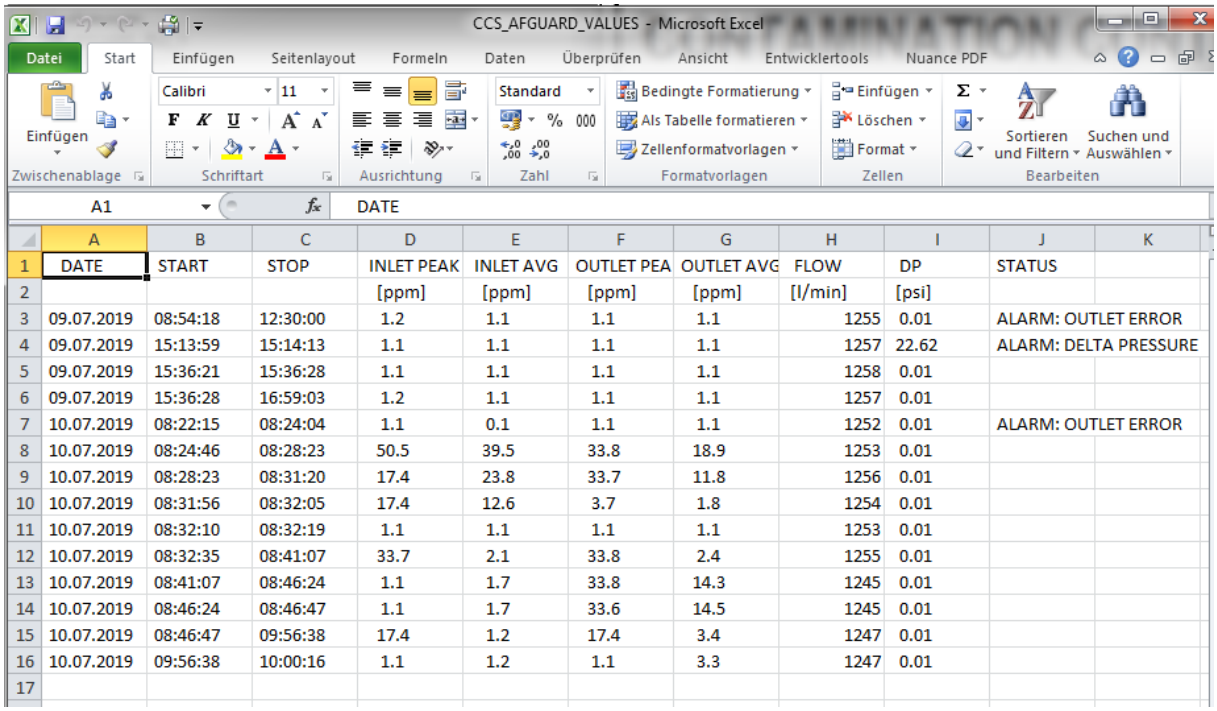
3.6.1 System



This folder stores the actual list with settings which can be downloaded and which should be used for possible service evaluation of CCS gold

3.6.2 JIG_REPORT

This folder does have an excel file which represents all refuelling operations since start of the device. For every refuelling CCS stores one row

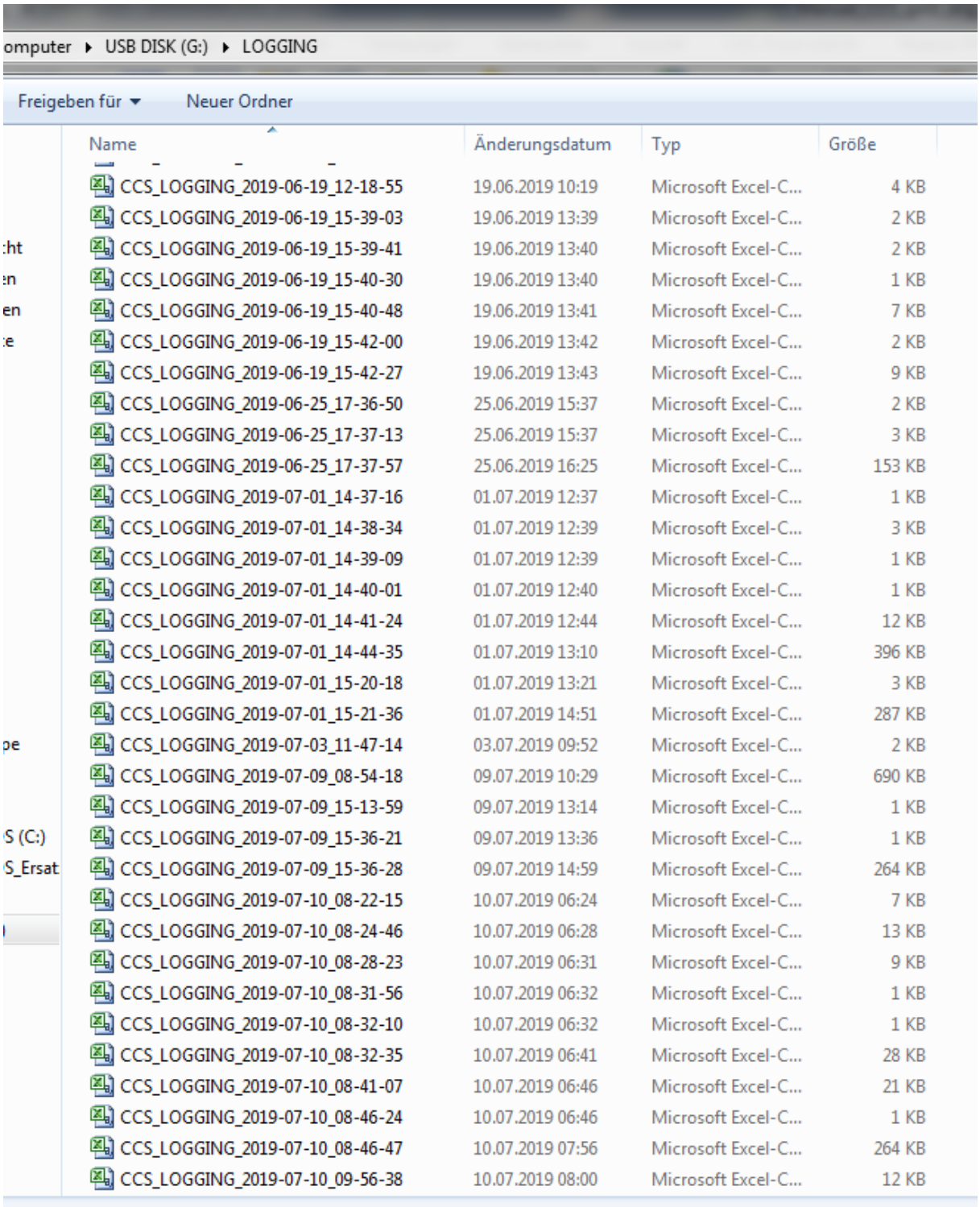


	A	B	C	D	E	F	G	H	I	J	K
1	DATE	START	STOP	INLET PEAK	INLET AVG	OUTLET PEA	OUTLET AVG	FLOW	DP	STATUS	
2				[ppm]	[ppm]	[ppm]	[ppm]	[l/min]	[psi]		
3	09.07.2019	08:54:18	12:30:00	1.2	1.1	1.1	1.1	1255	0.01	ALARM: OUTLET ERROR	
4	09.07.2019	15:13:59	15:14:13	1.1	1.1	1.1	1.1	1257	22.62	ALARM: DELTA PRESSURE	
5	09.07.2019	15:36:21	15:36:28	1.1	1.1	1.1	1.1	1258	0.01		
6	09.07.2019	15:36:28	16:59:03	1.2	1.1	1.1	1.1	1257	0.01		
7	10.07.2019	08:22:15	08:24:04	1.1	0.1	1.1	1.1	1252	0.01	ALARM: OUTLET ERROR	
8	10.07.2019	08:24:46	08:28:23	50.5	39.5	33.8	18.9	1253	0.01		
9	10.07.2019	08:28:23	08:31:20	17.4	23.8	33.7	11.8	1256	0.01		
10	10.07.2019	08:31:56	08:32:05	17.4	12.6	3.7	1.8	1254	0.01		
11	10.07.2019	08:32:10	08:32:19	1.1	1.1	1.1	1.1	1253	0.01		
12	10.07.2019	08:32:35	08:41:07	33.7	2.1	33.8	2.4	1255	0.01		
13	10.07.2019	08:41:07	08:46:24	1.1	1.7	33.8	14.3	1245	0.01		
14	10.07.2019	08:46:24	08:46:47	1.1	1.7	33.6	14.5	1245	0.01		
15	10.07.2019	08:46:47	09:56:38	17.4	1.2	17.4	3.4	1247	0.01		
16	10.07.2019	09:56:38	10:00:16	1.1	1.2	1.1	3.3	1247	0.01		
17											

Including peak and average values for the AFGUARD, sensors as well as status information which gives a good overview about critical refuelling operations where warning or alarms showed up.

3.6.3 Logging

In the directory “logging” there is are files for every refuelling process, which contains logged information of the refuelling.



Every time when the refuelling starts (by interlock or monitoring), then a new file will be created. The filename contains the date and time of the **begin** of the refuelling process**. If the timestamp is wrong, this can be a sign that the system time of the CCS is set wrong or the battery for the real time clock is discharged.**

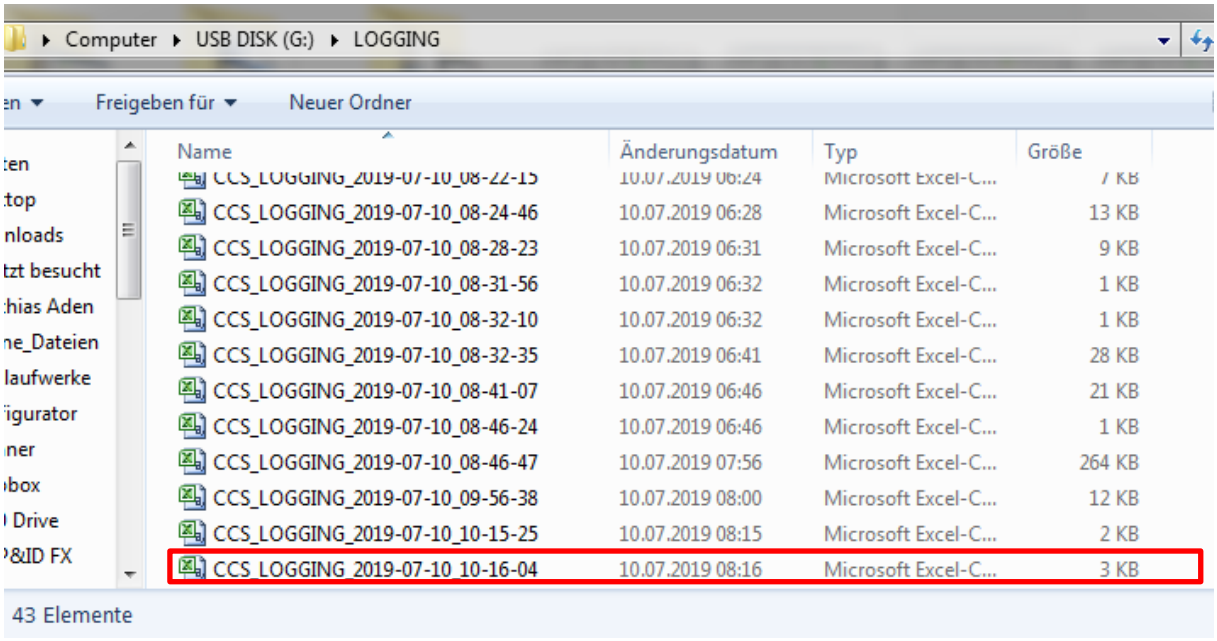
3.6.3.1 How to use data

Find the match between critical JIG-REPORT and LOGGING file
For example:

DATE	START	STOP	INLET PEAK [ppm]	INLET AVG [ppm]	OUTLET PEA [ppm]	OUTLET AVG [ppm]	FLOW [l/min]	DP [psi]	STATUS
09.07.2019	08:54:18	12:30:00	1.2	1.1	1.1	1.1	1255	0.01	ALARM: OUTLET ERROR
09.07.2019	15:13:59	15:14:13	1.1	1.1	1.1	1.1	1257	22.62	ALARM: DELTA PRESSURE
09.07.2019	15:36:21	15:36:28	1.1	1.1	1.1	1.1	1258	0.01	
09.07.2019	15:36:28	16:59:03	1.2	1.1	1.1	1.1	1257	0.01	
10.07.2019	08:22:15	08:24:04	1.1	0.1	1.1	1.1	1252	0.01	ALARM: OUTLET ERROR
10.07.2019	08:24:46	08:28:23	50.5	39.5	33.8	18.9	1253	0.01	
10.07.2019	08:28:23	08:31:20	17.4	23.8	33.7	11.8	1256	0.01	
10.07.2019	08:31:56	08:32:05	17.4	12.6	3.7	1.8	1254	0.01	
10.07.2019	08:32:10	08:32:19	1.1	1.1	1.1	1.1	1253	0.01	
10.07.2019	08:32:35	08:41:07	33.7	2.1	33.8	2.4	1255	0.01	
10.07.2019	08:41:07	08:46:24	1.1	1.7	33.8	14.3	1245	0.01	
10.07.2019	08:46:24	08:46:47	1.1	1.7	33.6	14.5	1245	0.01	
10.07.2019	08:46:47	09:56:38	17.4	1.2	17.4	3.4	1247	0.01	
10.07.2019	09:56:38	10:00:16	1.1	1.2	1.1	3.3	1247	0.01	
10.07.2019	10:15:25	10:15:47	33.7	15.1	17.5	14.3	1255	0.01	WARNING: OUTLET WATER
10.07.2019	10:16:04	10:16:36	33.7	13.1	17.5	9.1	1255	0.01	WARNING: OUTLET WATER

JIG-LOGGING tells that there have been a refuelling event with a water warning for the outlet sensor on 10th of July 2019 - starting the log file at 10:16:04

➔ Try to select the file on the LOGGING folder with the corresponding naming:



Open this file and evaluate the data:

A1 fx DATE

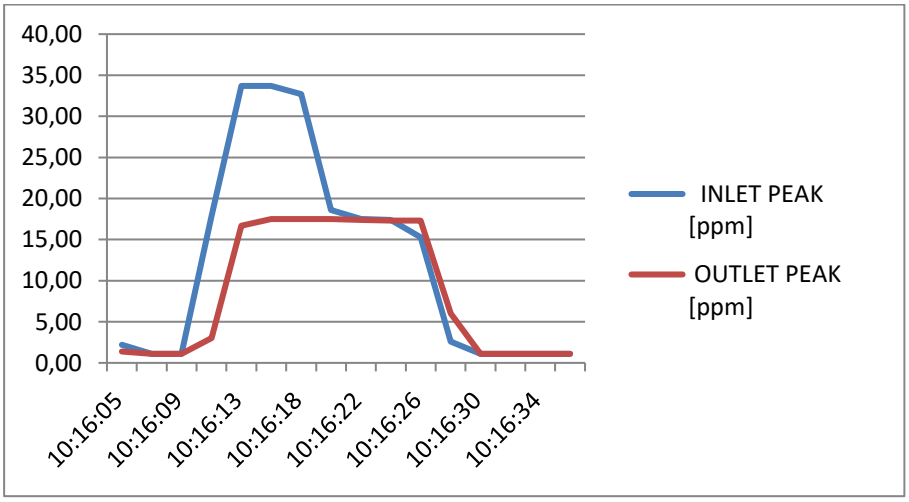
DATE	TIME	INLET PEAK [ppm]	INLET AVG [ppm]	OUTLET PEA [ppm]	OUTLET AVG [ppm]	FLOW [l/min]	DP [psi]	SUMP	SYSTEM STATUS
10.07.2019	10:16:05	2.2	1.1	1.4	1.1	1135	0.01		
10.07.2019	10:16:07	1.1	1.1	1.1	1.1	1255	0.01		
10.07.2019	10:16:09	1.1	1.1	1.1	1.1	1254	0.01		
10.07.2019	10:16:11	17.9	5.7	3.0	1.1	1255	0.01		
10.07.2019	10:16:13	33.7	12.3	16.7	5.0	1253	0.01		
10.07.2019	10:16:15	33.7	16.4	17.5	7.4	1246	0.01		
10.07.2019	10:16:18	32.7	19.2	17.5	9.0	1246	0.01		
10.07.2019	10:16:20	18.6	19.1	17.5	10.6	1246	0.01		
10.07.2019	10:16:22	17.5	19.0	17.4	11.4	1246	0.01		
10.07.2019	10:16:24	17.4	18.8	17.3	12.0	1246	0.01		
10.07.2019	10:16:26	15.3	18.1	17.3	12.5	1247	0.01		
10.07.2019	10:16:28	2.6	16.6	6.0	11.5	1246	0.01		WARNING: OUTLET WATER
10.07.2019	10:16:30	1.1	15.4	1.1	10.7	1245	0.01		WARNING: OUTLET WATER
10.07.2019	10:16:32	1.1	14.4	1.1	10.0	1246	0.01		WARNING: OUTLET WATER
10.07.2019	10:16:34	1.1	13.5	1.1	9.4	1247	0.01		WARNING: OUTLET WATER
10.07.2019	10:16:36	1.1	12.7	1.1	8.9	1247	0.01		WARNING: OUTLET WATER

Here the logging interval is 2 second. To save memory, we recommend a value of 5 seconds. The needed memory on the USB drive increases linear to the number of logs.
All sensors are optional. If no sensor is connected to the system, there will be no entry in the log. In this case, there is Inlet AFGUARD, Outlet aFGUARD, dp transmitter flow signal and SLUGGUARD sensor in the drain port of the filter activated.

Log file starts at 10:16:04, First log is delayed for1 second as it represents a 2 second log (mid of the time frame for logging).

You can see a rise in inlet AFGUARD and OUTLET AFGUARD, peak levels are on the high value, average values went up (related to the flow values. After ten seconds OUTLET AFGUARD generates a warning which is logged in the file as well – reason why JIG-LOGGING does have the warning highlighted.

Using Excel – you can easily create charts out of the data:



3.7 Update via USB

A very comfortable way to do update whenever program CHANGEs or program updates are due could be done using built-in USB-connector.

Please replace the memory stick against the one with updated software and close the housing.
You should only proceed in the way described when there is no process running. Do not remove memory stick under process conditions (when DPGUARD is working or logs should be done)
Whenever update is needed, please make sure that no fuelling is ongoing.

4 Connection of CCS Gold to other devices

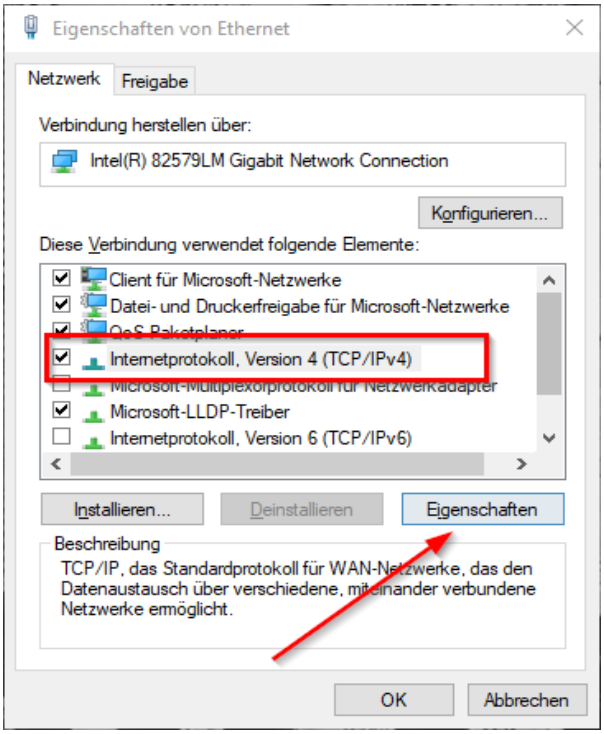
4.1 Connection Settings for local area network

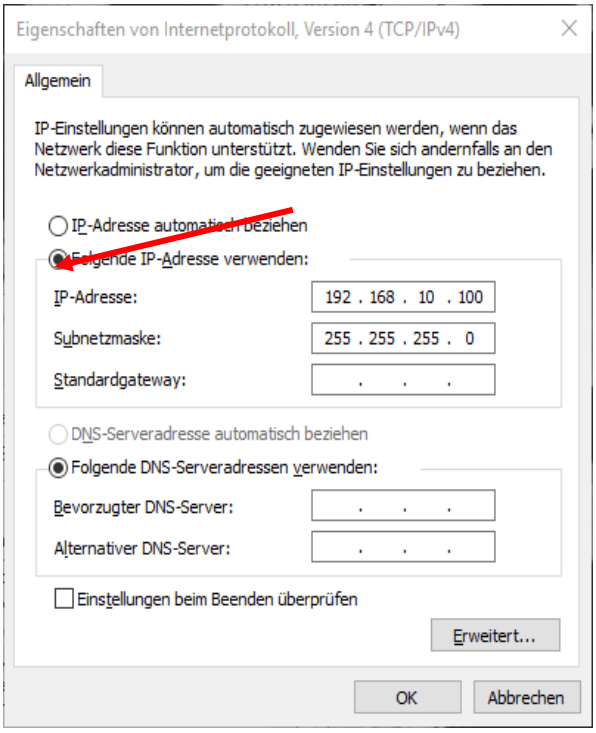
You're able to connect a Computer or a Smartphone or Tablet PC to the CCS via Local Area Network. This is necessary for setting up the system. Also, the refuelling process can be guarded via the so-called web visualisation .
The computer or smartphone and the CCS must be in the same IPv4 Network.
For connecting a Smartphone or Tablet PC, a Wi-Fi access point is required.
For an easy connection with a computer, you only need an Ethernet crosslink cable (Cat.5 or better).

4.1.1 Direct connection via Ethernet Cable

If you want to connect the computer directly **without** using a router with DHCP Server, follow these instructions:

1. Take your computer / laptop
2. Open the settings of your Ethernet connection (Network Adapter).
3. Choose Internet Protocol Version 4 (TCP/IPv4)
4. Open properties
   - Activate static network settings (no DHCP)
   - Change IP address to **192.168.10.100**
   - Change Subnet mask to **255.255.255.0**
   - Delete gateway settings
   - Delete DNS settings
   - Settings should be in accordance to the right picture





- Press “OK”

Note the original settings e.g. by screenshot and carefully safe the original information to set back your computer when finished with the settings on the CCS.

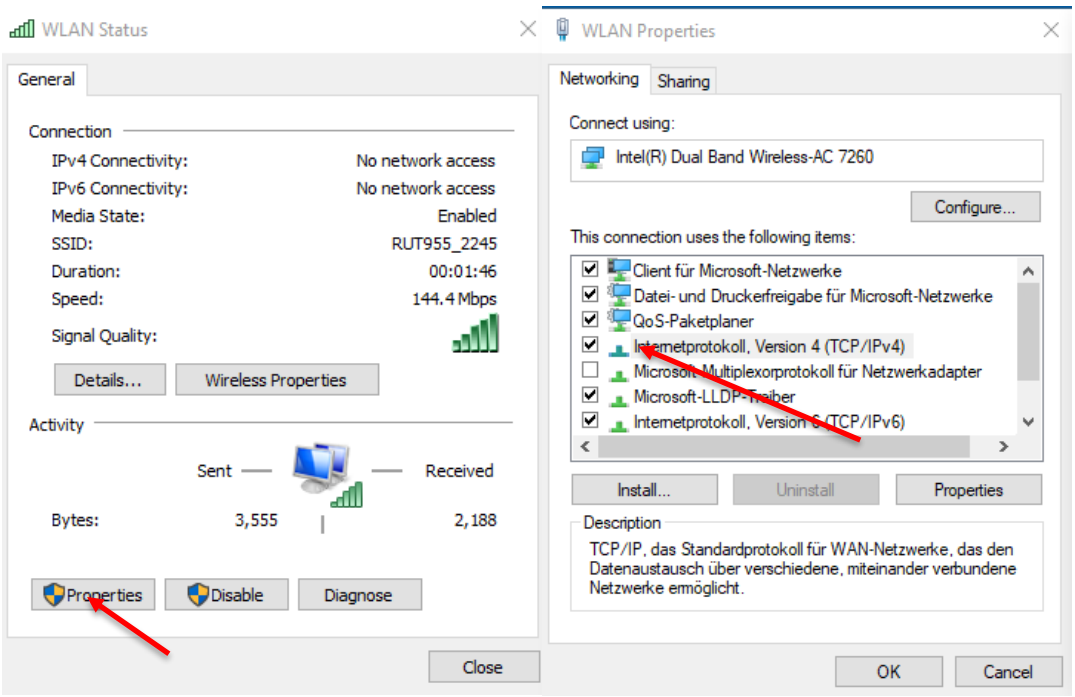
Connect your computer to the CCS using an Ethernet cable.

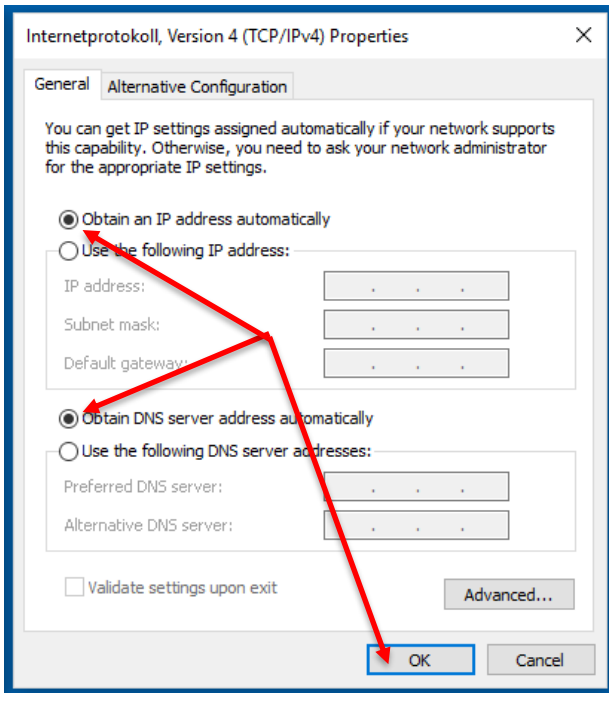
4.1.2 Connection via Wi-Fi

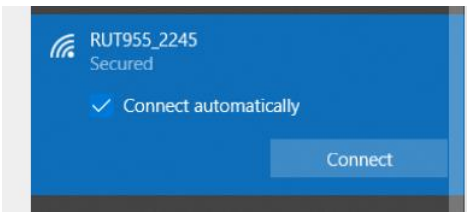
When you want to access to the CCS with a mobile device like a smartphone or a tablet PC or a Laptop using Wi-Fi, you need an **access point or wireless router**.
The most routers support the Dynamic Host Configuration Protocol (DHCP). When you use a router with this feature, you don’t need to configure the IP Address of your smartphone / tablet / laptop manually, referring to the last chapter.
In the following steps, we show you how to configure a router. The screenshots show you the setup of the Teltonika® RUT955 router.

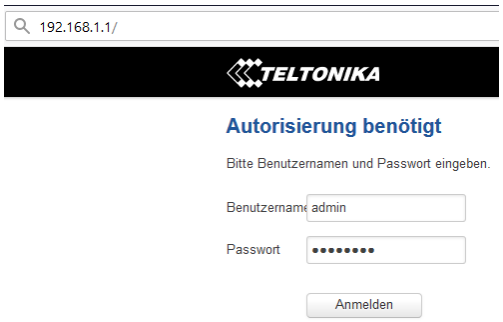
1. Connect the CCS to the router via an Ethernet cable
2. Connect your computer to the router (Ethernet or Wi-fi) the following pages show a configuration via Wi-fi using Windows
3. Open the adapter settings of your computer
4. Set the IP settings to automatic (DHCP) referring to the pictures
5. Open the configuration of your router by entering its IP address to your web browser. It is printed to the device
6. Change access password to router configuration and note
7. Set the IPv4 Address of the router to from default to **192.168.10.1**
8. Set the Subnet mask to 255.255.255.0 or set the Prefix length to **24** (depending on the setup of your router)
9. Your router might disconnect because you changed its IP address. Reconnect by typing **192.168.10.1** to your web browser
10. Open the DHCP Settings of your router
11. Set the IP Address range to e.g. 192.168.10**.100** to 192.168.10**.199** (The CCS uses a static IP Address which is by default **192.168.10.231**) The range must not contain the IP address of the CCS
12. Set a Wi-Fi passcode. It’s recommended to use **WPA2** or a better encryption
13. Rename the name (SSID) of the Wi-Fi. It is highly recommended to enter a number/code of the vehicle where the CCS is installed. Otherwise it will be difficult to differentiate between the devices if multiple CCS are installed at an airfield.
14. Now take your smartphone / tablet /laptop and access to the Wi-Fi of the router, enter the wi-fi passcode and make sure you are connected to the network.

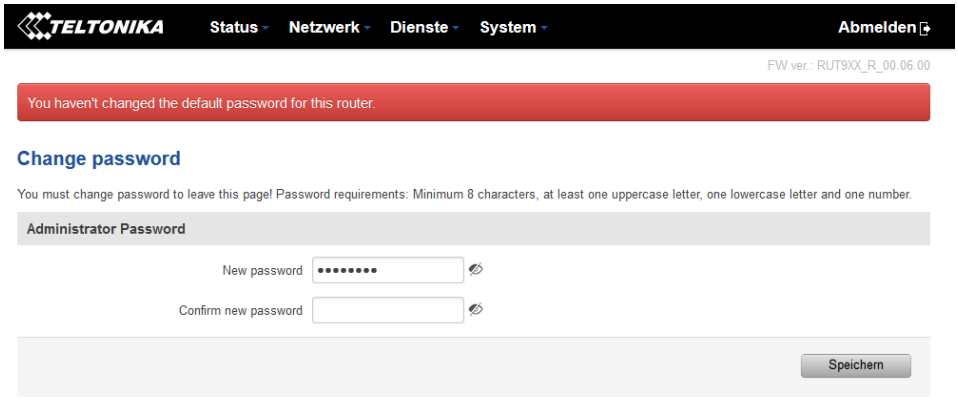
Note that everybody who knows this passcode gets access to the CCS. For additional security we recommend setting another Wi-Fi code than the User and Administrator PIN of the CCS.

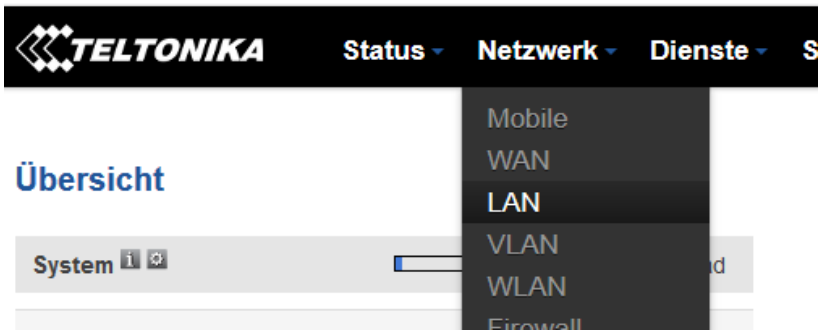

WLAN Status
General
Connection
IPv4 Connectivity: No network access
IPv6 Connectivity: No network access
Media State: Enabled
SSID: RUT955_2245
Duration: 00:01:46
Speed: 144.4 Mbps
Signal Quality:
Details...
Wireless Properties
Activity
Sent
Received
Bytes: 3,555 2,188
Properties
Disable
Diagnose
Close
WLAN Properties
Networking
Sharing
Connect using:
Intel(R) Dual Band Wireless-AC 7260
Configure...
This connection uses the following items:
Client für Microsoft-Netzwerke
Datei- und Druckerfreigabe für Microsoft-Netzwerke
QoS-Paketplaner
Internetprotokoll, Version 4 (TCP/IPv4)
Microsoft-Multiplexorprotokoll für Netzwerkadapter
Microsoft-LLDP-Treiber
Internetprotokoll, Version 6 (TCP/IPv6)
Install...
Uninstall
Properties
Description
TCP/IP, das Standardprotokoll für WAN-Netzwerke, das den Datenaustausch über verschiedene, miteinander verbundene Netzwerke ermöglicht.
OK
Cancel

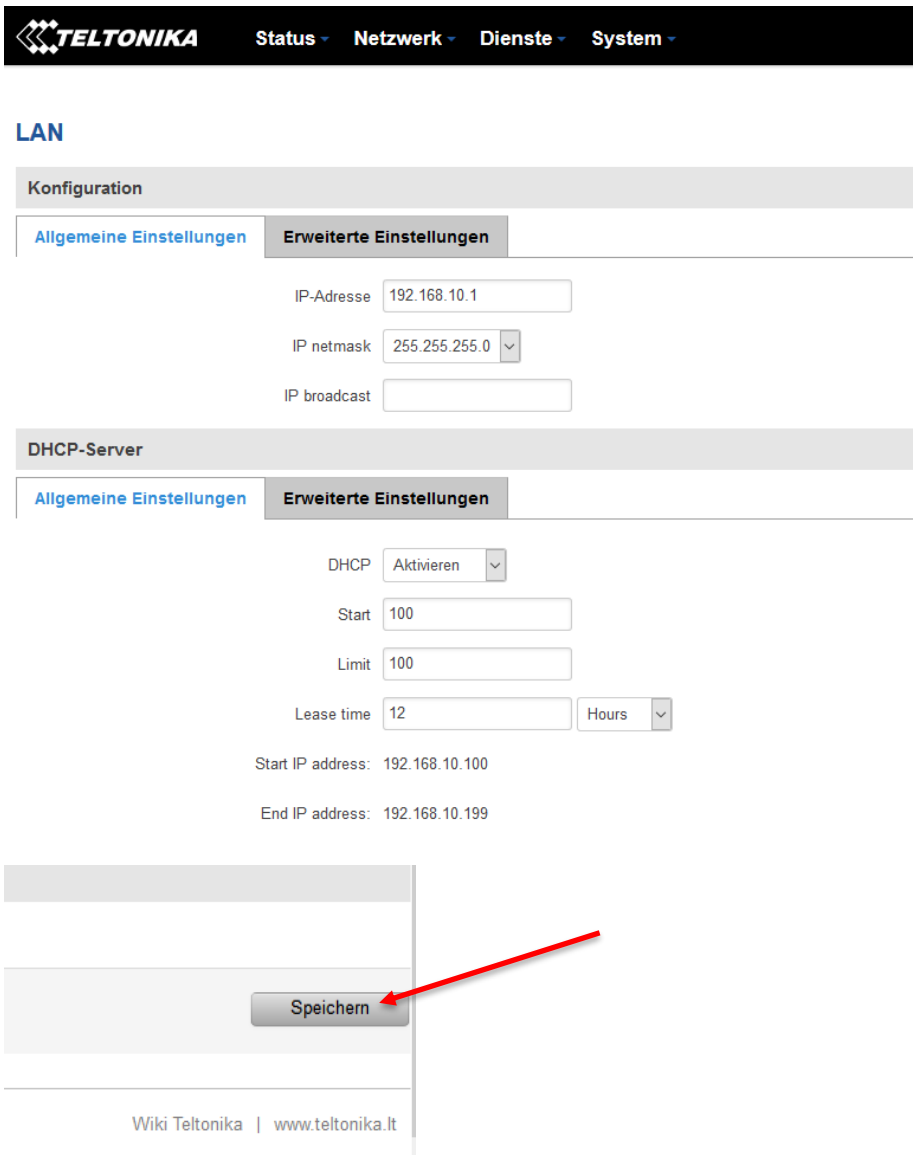

Internetprotokoll, Version 4 (TCP/IPv4) Properties
General
Alternative Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternative DNS server:
Validate settings upon exit
Advanced...
OK
Cancel


RUT955_2245
Secured
Connect automatically
Connect

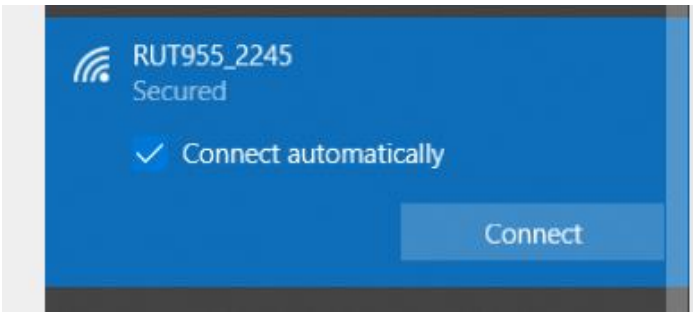

192.168.1.1/
TELTONIKA
Autorisierung benötigt
Bitte Benutzernamen und Passwort eingeben.
Benutzername admin
Passwort
Anmelden


TELTONIKA
Status
Netzwerk
Dienste
System
Abmelden
FW ver.: RUT9XX_R_00.06.00
You haven't changed the default password for this router.
Change password
You must change password to leave this page! Password requirements: Minimum 8 characters, at least one uppercase letter, one lowercase letter and one number.
Administrator Password
New password
Confirm new password
Speichern

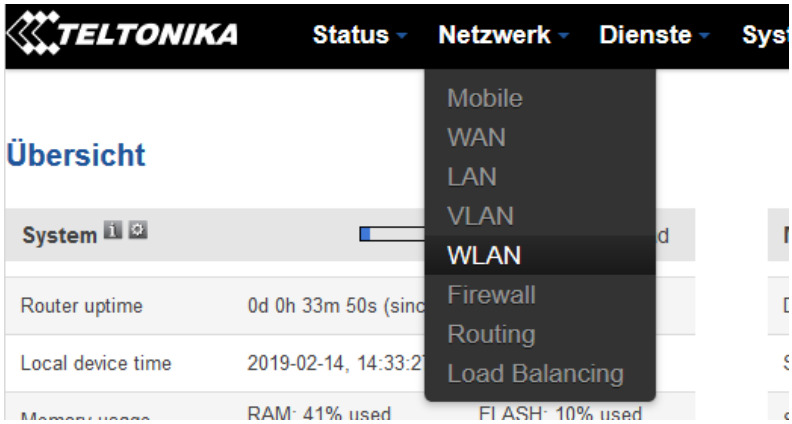

TELTONIKA
Status
Netzwerk
Dienste
Mobile
WAN
LAN
VLAN
WLAN
Übersicht
System

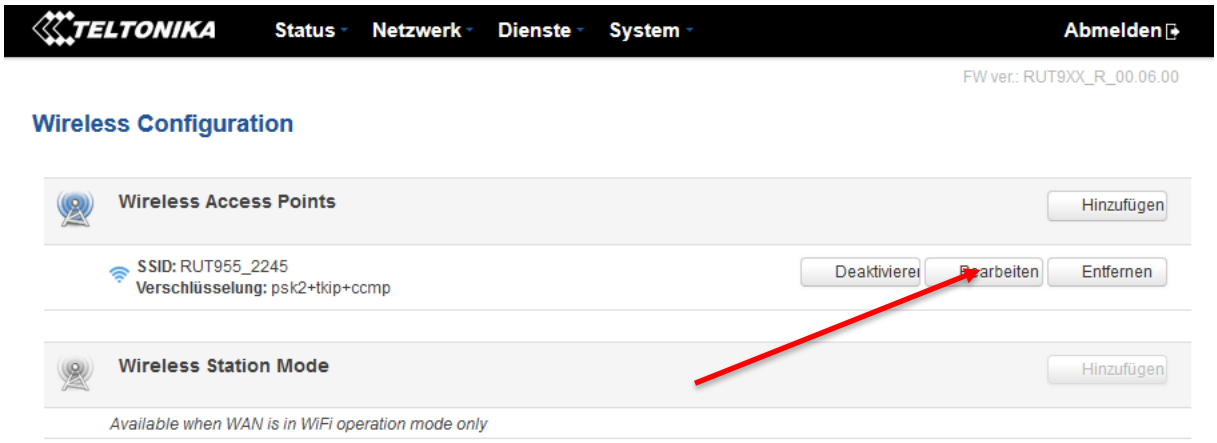


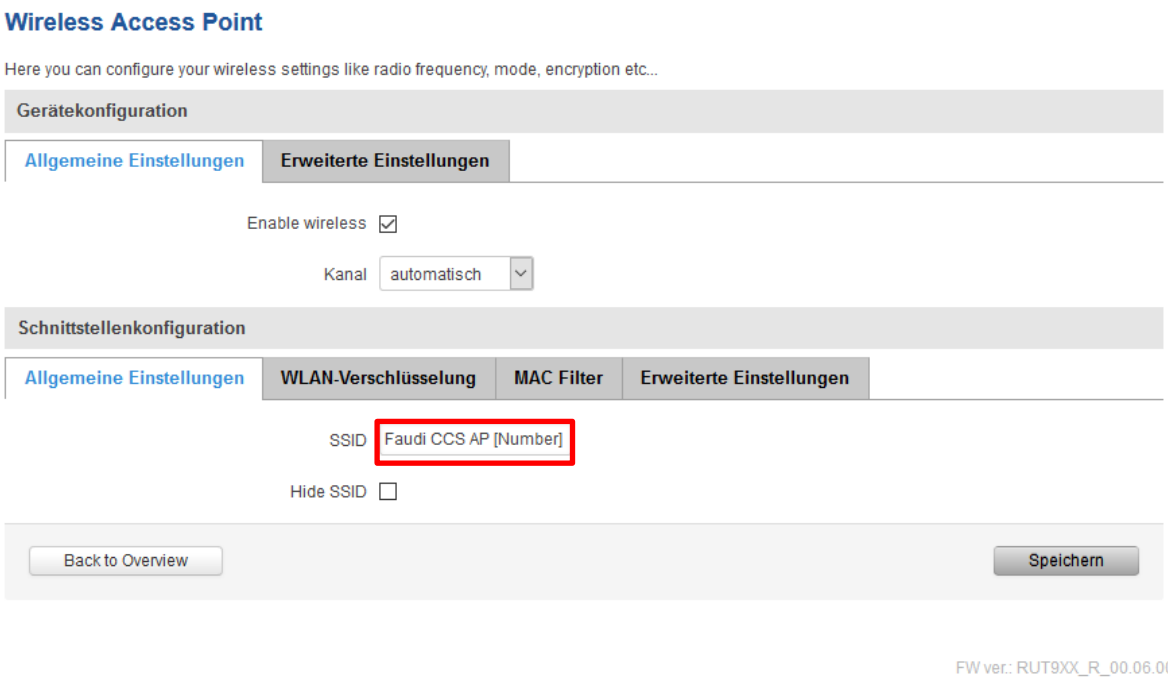
Now the address of the router changed from 192.168.1.1 to 192.168.10.1
You need to reconnect

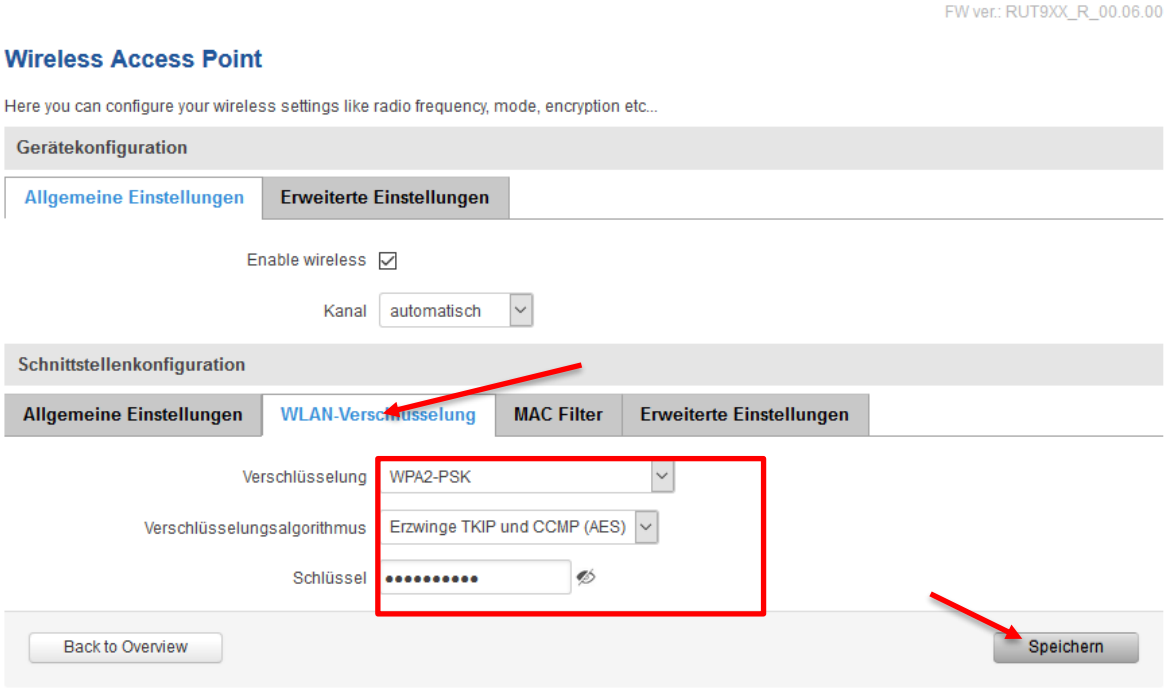


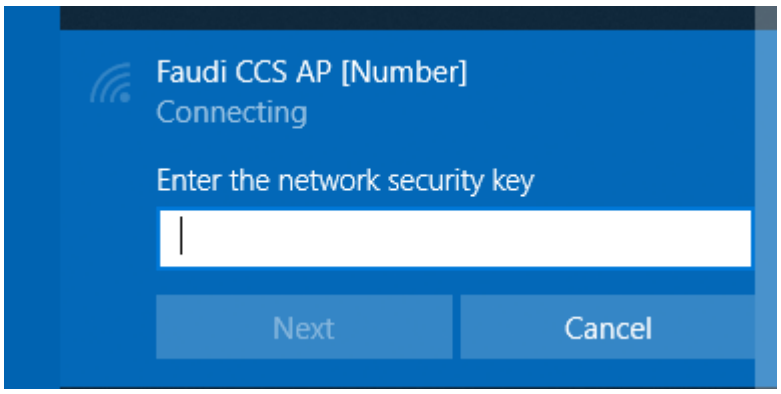

192.168.10.1
TELTONIKA
Autorisierung benötigt
Bitte Benutzernamen und Passwort eingeben.
Benutzername admin
Passwort
Anmelden


TELTONIKA
Status
Netzwerk
Dienste
Mobile
WAN
LAN
VLAN
WLAN
Firewall
Routing
Load Balancing
Übersicht
System
Router uptime
Local device time


TELTONIKA
Status
Netzwerk
Dienste
System
Abmelden
FW ver.: RUT9XX_R_00.06.00
Wireless Configuration
Wireless Access Points
Hinzufügen
SSID: RUT955_2245
Verschlüsselung: psk2+tkip+ccmp
Deaktivieren
Bearbeiten
Entfernen
Wireless Station Mode
Hinzufügen
Available when WAN is in WiFi operation mode only


Wireless Access Point
Here you can configure your wireless settings like radio frequency, mode, encryption etc...
Gerätekonfiguration
Allgemeine Einstellungen
Erweiterte Einstellungen
Enable wireless
Kanal
automatisch
Schnittstellenkonfiguration
Allgemeine Einstellungen
WLAN-Verschlüsselung
MAC Filter
Erweiterte Einstellungen
SSID
Faudi CCS AP [Number]
Hide SSID
Back to Overview
Speichern


FW ver.: RUT9XX_R_00.06.00
Wireless Access Point
Here you can configure your wireless settings like radio frequency, mode, encryption etc...
Gerätekonfiguration
Allgemeine Einstellungen
Erweiterte Einstellungen
Enable wireless
Kanal
automatisch
Schnittstellenkonfiguration
Allgemeine Einstellungen
WLAN-Verschlüsselung
MAC Filter
Erweiterte Einstellungen
Verschlüsselung
WPA2-PSK
Verschlüsselungsalgorithmus
Erzwinge TKIP und CCMP (AES)
Schlüssel
Back to Overview
Speichern

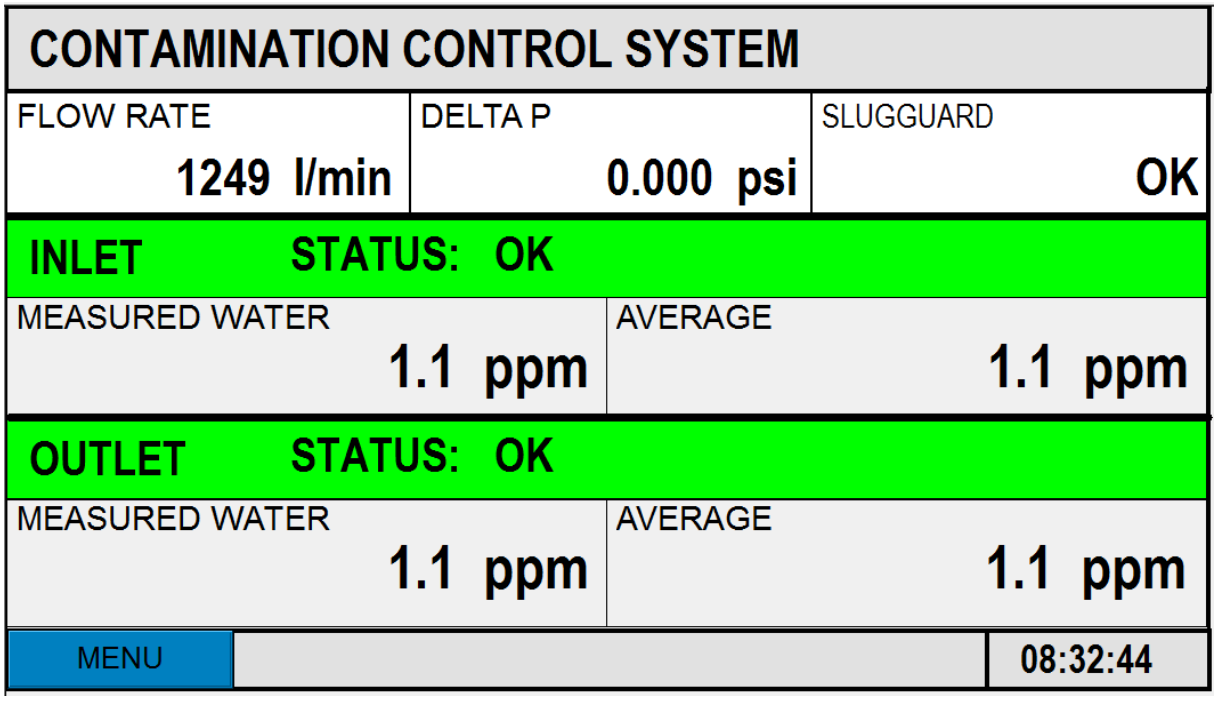


4.1.3 Open the web visualisation

When you connected your device to the CCS via Local Area Network, follow these steps:

- Make sure the CCS is powered on and wait about a minute until it has been booted. The status LED on the CCS on the left side of the battery must stop blinking and **stationary light green**.
- Start web browser. **The browser must support HTML5**
- Type in **http://192.168.10.231:8080/webvisu.htm**

Following screen should appear (On first run, the installer appears instead of the dashboard):



If there is a loading logo, try to actualize the site.

5 List of settings

Attached you will find a list of settings to be used for setup procedures.

Section	Menu Point	Default Value	Recommended Value
Language	Language	English	
Date and Time	Year		Current Date
	Month		
	Day		
	Hours		Current Time
	Minutes		
	Seconds		
PIN	PIN User	00000000	CHANGE and note
	PIN Admin	12345678	
Units	Pressure Unit	bar	
	Volume Unit	Liters (l)	
Flow Rate Sensor	Signal (Sensor type)	Pulse	Check flow meter documentation
	Measure range (20mA)	4000 l/min	Check flow meter documentation
	Volume per Pulse	1 l	Check flow meter documentation
	Attenuation time	2 sec	2 sec
Pressure Sensor	Signal (Sensor type)	N/A	Check DP sensor documentation
	Measure range (20mA)	2.5 bar	Check DP sensor documentation
	Attenuation time	2 sec	2 sec
Monitoring	Min. flow for Monitoring	50 l/min	150 l/min
	Min DP for Monitoring	0.05 bar	0.1 bar
	Off delay Monitoring	10 sec	10 sec
AFGUARD Inlet	Available	no	Check assembly
	Measure range (20mA)	50 ppm	50 ppm
	Signal Attenuation time	0 sec	0 sec
	Limit Warning	15 ppm	15 ppm
	No. Of Warnings	2	2
	Level Alarm	30 ppm	30 ppm

	Level Water Slug	>50 ppm	>50 ppm
	On Delay Warning	10 sec	10 sec
	On Delay Alarm	10 sec	10 sec
	On Delay Water Slug	5 sec	5 sec
AFGUARD Outlet	Available	yes	Check assembly
	Measure range (20mA)	50 ppm	50 ppm
	Signal Attenuation time	0 sec	0 sec
	Limit Warning	15 ppm	15 ppm
	No. Of Warnings	2	2
	Level Alarm	30 ppm	30 ppm
	Level Water Slug	50 ppm	50 ppm
	On Delay Warning	10 sec	10 sec
	On Delay Alarm	10 sec	10 sec
	On Delay Water Slug	5 sec	5 sec
SLUGGUARD	Available	yes	Check assembly
	Invert Signal	yes	Check wiring. Check logic levels of SLUGGUARD®
	On Delay	0 sec	0 sec
	Off Delay	1 sec	1 sec
Interlock	Available	no	Check assembly
	On Delay	5 sec	5 sec
	Off Delay	5 sec	5 sec
No Interlock	End Refuelling Process after	10 sec	10 sec
Filter Parameter	Rated Flow	4000 l/min	Check Filter documentation
	DP CHANGEout	1.5 bar	Check Filter documentation
Timing	Logger Interval	2 sec	2 sec
Network	IP Address	192.168.10.231	CHANGE only if necessary
	Subnet Mask	255.255.255.0	
	Internet Gateway	0.0.0.0	

6 Troubleshooting

Issue	Reason	Solution
I cannot reach the web visualisation with my computer or smartphone	The system has not been booted yet	Wait until the CCS has been booted. The Status LED must light green permanently. This can take up to 2 minutes
	The PC or Smartphone is not in the same network with the CCS	Make sure the devices are connected, directly with an Ethernet cable or via a Wi-Fi router in between. Make sure the PC, or smartphone has a valid IP address. If you connect directly to the CCS with an Ethernet cable, make sure the network adapter of the PC has a static IP Address, no use of DHCP. Maybe a restart of the PC is necessary after CHANGE. Apply a ping command to the IP address of the CCS to check the connectivity.
	The browser is too old and does not support HTML5	Get the latest version of your web browser.
	The URL of the web visualisation is miswritten	The URL is: http://192.168.10.231:8080/webvisu.htm Only if the IP Address of the CCS didn't get CHANGEd since delivery in factory condition. Otherwise, replace the IP address in the shown URL
The status LED of the CCS is blinking. The CCS does not boot.	There is a failure of the device. Usually this should not happen.	Note the blinking pattern and contact the manufacturer.
The CCS shows wrong values for analogue sensors.	Wrong signal type is set	Do not mix up ranges 0..20mA and 4..20mA. go To Setup -> Sensor Input and fix it.
	Wrong signal limits are set (Value for 20mA)	To Setup -> Sensor Input and fix it. Refer to the datasheet of your sensor
The alarm relay is still released.	The system has not booted yet	Wait until the CCS has been booted.
	There is an alarm in memory.	Open the web visualisation (Dashboard) to find the reason for the alarm.
The blue indicator lamp is permanently off.	The system has not booted yet	Wait until the CCS has been booted.
	Interlock signal is installed but it is 0V	Check wiring. check source of interlock signal. If there is no interlock signal, go to Setup -> Interlock and check settings.
	Lamp or wiring is broken	Check functionality of lamp

7 Index