



Operating Manual PPC-PAD-plus



Operating Manual
STAUFF PPC-PAD-plus



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About this Operating Manual



This operating manual is a component part of STAUFF PPC-PAD-plus and contains important information on the intended use, safety, operation and maintenance of the device described.

Subject to change without prior notice.


- ☐ Before each step, read the corresponding information carefully and adhere to the sequence of steps described.
- ☐ Pay particular attention to Chapter  "Safety Information" on Page 11 and follow the instructions.

Notation and Symbols



INFORMATION

This information symbol indicates useful tips which is provided.

-  This symbol indicates a reference to other sections, documents or sources.
- This symbol indicates lists of information.
- This symbol indicates working instructions.
- 1 This symbol indicates working instructions to be completed in a specific sequence.
- ☑ This symbol indicates the results of working instructions completed.

1. Product Description

STAUFF PPC-PAD-plus is intended for recording the measured values of the sensors connected. The sensors are connected via two CAN bus network and analog inputs. In the case of sensors with automatic sensor detection, the parameterization of units and measuring ranges is automatic. In addition, sensors without sensor detection can be used with analog signals as well as a digital input/output and two frequency channels. STAUFF PPC-PAD-plus can be extended by two input modules providing additional connections and functions.

STAUFF PPC-PAD-plus is operated basically by using the touch-sensitive touchscreen. Alternatively, the main functions can be selected via the six hardware keys. The USB and LAN connections or wifi (WLAN) interface can be used to connect STAUFF PPC-PAD-plus with a PC or local network to analyze the measured values.

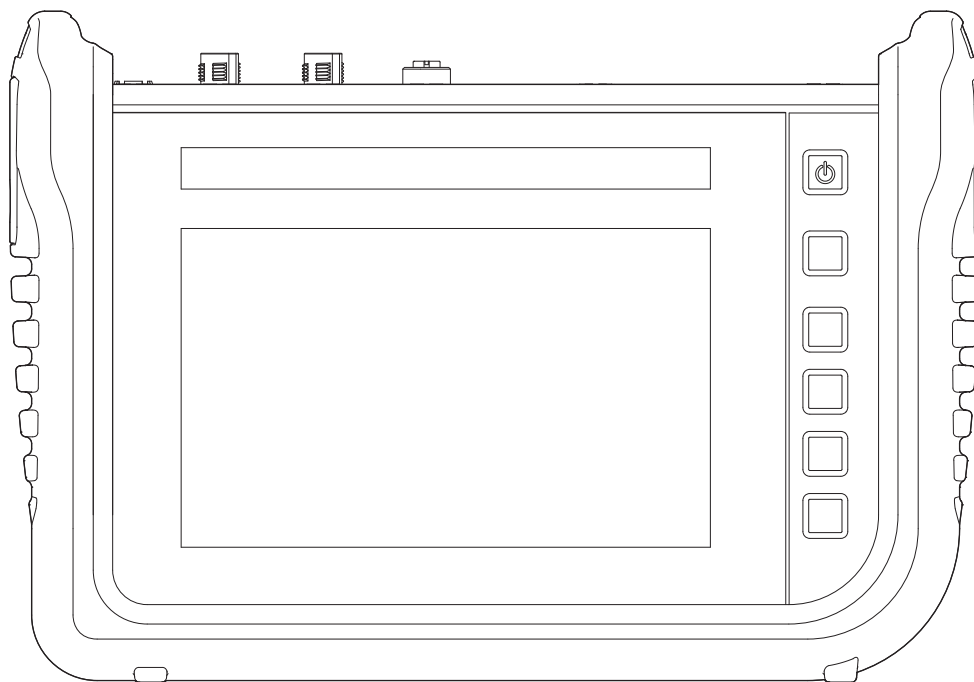


Fig. 1 STAUFF PPC-PAD-plus

1.1 Intended Use

STAUFF PPC-PAD-plus, subsequently referred to as "device", enables access to sensors used in hydraulic applications in machines and vehicles. The various connections

can be used to compile, store, monitor and evaluate CAN bus data, digital or analog sensor signals for pressure, temperature, volume flows, frequencies, speeds, particles, water in oil, volumes and output, for example.

The device is exclusively designed for commercial use in mobile and stationary systems.

1.2 Improper Use

All usage and conditions of use which are contrary to those described in Section "Intended Use" are deemed to be unintended use and lead to loss of all rights to claims under the terms of guarantee, warranty and liability in respect of the manufacturer.

- ☒ The device does not comply with Directive 94/9/EC and, therefore, must not be used in potentially explosive atmospheres.

1.3 Conformity

The device fulfills the requirements of the following standards and legal regulations:



CE conformity

The device complies with the directives, standards and standard-related documents specified in Chapter "Certificates" on Page 132.

Further information is available in Chapter "Certificates" on Page 132.

1.4 Equipment Supplied

Check the parts included in the supply package prior to starting up the device. If anything is missing, please contact your sales outlet.

- PPC-PAD-plus
- Power adapter (110/240 V_{AC} – 24 V_{DC} / 3.750 mA)
- Country adapters (EN, US, UK, AUS)
- USB cable (2.0)
- Shoulder strap
- Quick reference manual

2. Safety Information

This chapter contains important information on preventing the risk of life-threatening situations, injuries and property damage.

Before starting to work with the pressure switch, read this operating manual and ob-

serve the instructions. Failure to observe the instructions provided, particularly those related to safety, can lead to risks to human beings, the environment, equipment and systems.

The device has been produced according to state-of-the-art technology with regard to accuracy, principles of operation and safe operation of the equipment.

2.1 Notation

This section explains how the various types of safety information are presented within the scope of this operating manual.

2.1.1 Safety Levels

The following safety levels are used in this operating manual:

DANGER

Risk of fatal or severe personal injury.
Probability of occurrence: **very high**.

WARNING

Risk of fatal or severe personal injury.
Probability of occurrence: **possible**.

CAUTION

Risk of minor to moderate personal injury.
Probability of occurrence: **possible**.

IMPORTANT

Risk of property damage.
Probability of occurrence: **possible**.

2.1.2 Warnings

The warnings are structured as follows in this operating manual:



DANGER

Type and source of the risk
Consequences of failure to observe the warning
☐ Measures to avoid the risk



WARNING

Type and source of the risk
 Consequences of failure to observe the warning
 ☐ Measures to avoid the risk



CAUTION

Type and source of the risk
 Consequences of failure to observe the warning
 ☐ Measures to avoid the risk



IMPORTANT

Type and source of the risk
 Consequences of failure to observe the warning
 ☐ Measures to avoid the risk

2.2 Basic Warnings



DANGER

Risk of explosion through operating electronic devices in potentially explosive atmospheres.
 Risk of fatal or severe personal injury.
 ☐ Observe the provisions and precautionary measures applicable for potentially explosive atmospheres.



DANGER

Risk of breakdown of communication equipment in planes through radio frequency energy.

Risk of fatal or severe personal injury.

- ☐ Switch the device off before boarding a plane.
- ☐ Ensure that the device cannot be switched on while on board the plane.



WARNING

Risk of interference to medical devices through radio frequency energy.

Risk of fatal or severe personal injury.

Medical devices are sensitive to radio frequency energy.

The functionality of pacemakers, other medical implants and hearing aids can be impaired if the device is operated too close to medical equipment.

- ☐ If you have a pacemaker or another medical implant, do not move into the vicinity of the device when switched on.
- ☐ Observe local regulations regarding the use of devices with radio frequency energy in hospitals or other medical institutions. Cut off the power supply to the device if local regulations require you to do so in sensitive areas.
- ☐ If you are in doubt as to any possible risks, contact a doctor or the manufacturer of the medical device to check if the screening provided is adequate.



WARNING

Risk of interference to electronic devices through radio frequency energy.

Risk of fatal or severe personal injury.

Electronic devices are sensitive to radio frequency energy.

- ☐ Do not use the device in connection with defective cables and plugs. Cables and plugs must always be shielded.
- ☐ Follow all special rules and switch the device off when its use is forbidden or you are in doubt as to whether interference or risks could result from its use.



IMPORTANT

Risk of property damage.

- ❑ The device must be connected and put into operation by properly trained technical personnel.
- ❑ Avoid using any forms of force on the device.
- ❑ Never expose the device to direct sunlight over an extended period of time.
- ❑ Never immerse the device in water or other liquids.
- ❑ Never attempt to repair the device yourself. The device may only be repaired by STAUFF.
- ❑ Never clean the device with substances containing solvents. The device may only be cleaned in the way described in Section "**Cleaning**".

2.3 Safety-Related Warnings

Throughout this operating manual, warnings which relate to specific, individual functional processes or activities are provided directly preceding the corresponding instructions.

2.4 Technical Personnel

This operating manual is intended for properly trained technical personnel who are familiar with the applicable regulations and standards regarding the area of use.

Technical personnel entrusted with starting up and operating the device must produce evidence of the necessary qualification. Qualification can be obtained through participation in a relevant training course or receiving applicable instruction.

Technical personnel must have read and understood the operating manual. Technical personnel must have access to the content of the operating manual at all times.

3. Design and Function

This chapter contains information on the design of the device and the functions provided.

The connection ports, pin assignments and interfaces available on the device are described.



INFORMATION

Information on the input modules is provided in Chapter ""Input Modules" on Page 26.

3.1 Overview

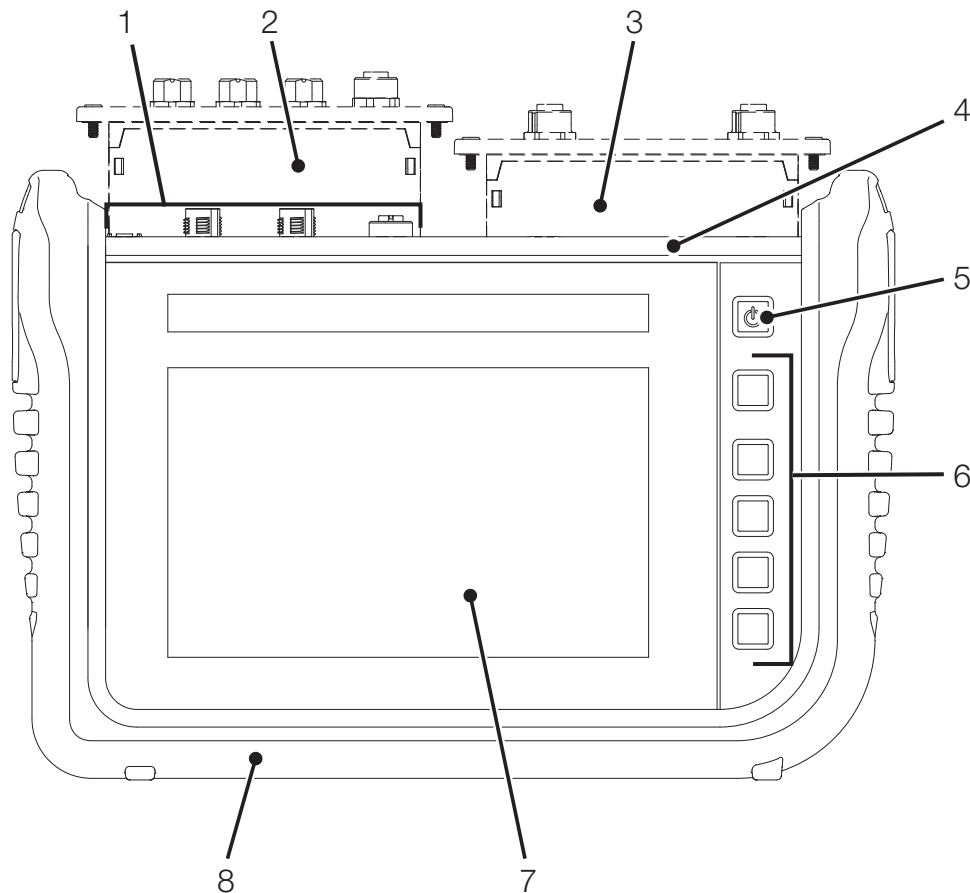


Fig. 2 Overview

Pos.	Designation
1	Inputs and outputs (power connection, CAN X, CAN Y, D-IN/D-OUT F1/F2)
2	Input module A (option)
3	Input module B (option)
4	Communication ports (2 × USB Host, 1 × USB Device, LAN) and SIM card slot
5	On/Off key
6	Context-sensitive function keys
7	Screen (touchscreen)
8	Shock protection

3.2 Functions and Features

The device is equipped with the following functions:

- ☐ Inputs and outputs to connect sensors
- ☐ Measurements, e.g. of pressure, temperature, volume flows, frequencies, speeds, particles, water in oil, volumes and output
- ☐ For recording, saving and analyzing measured data
- ☐ Various types of measurement and their representation
- ☐ Module slots to extend system with input modules
- ☐ LAN connection port
- ☐ GPS
- ☐ Wireless interfaces (option): Bluetooth LE, WLAN, LTE
- ☐ Fold-out stand
- ☐ VESA standard for wall installation

3.3 Connections

The figure indicates the connection ports on the device:

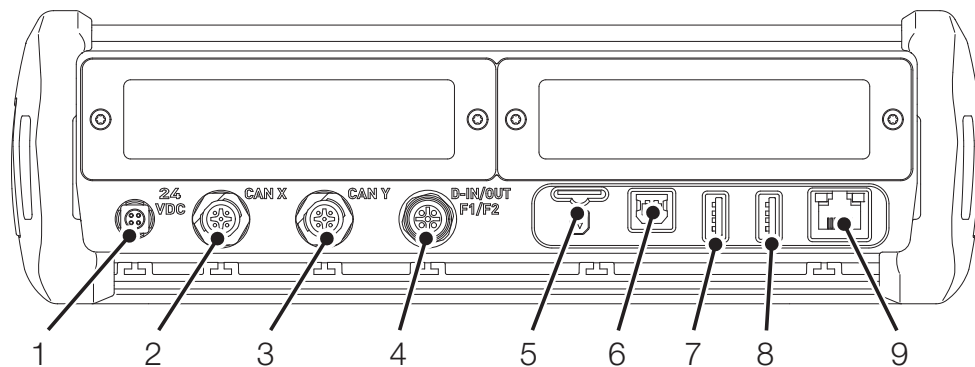


Fig. 3 Connections

Pos.	Designation	Description
1	Power connection (24V _{DC})	For connection of the power adapter
2	CAN bus (CAN X)	To connect the CAN bus sensors
3	CAN bus (CAN Y)	To connect the CAN bus sensors
4	D-IN/D-OUT F1/F2	To connect sensors
5	SIM card slot	Slot for a SIM card
6	USB port (device)	To connect a PC
7	USB port (Host 1)	To connect a mass storage device
8	USB port (Host 2)	To connect a mass storage device
9	LAN connection port	To connect a network cable

More information on the sensor connection ports is available in the following chapters.



INFORMATION

Do not connect the device via the LAN and USB ports simultaneously when transmitting data to PPC-Analyze. This will prevent any disturbance.

3.3.1 STAUFF CAN / External CAN

You can use the CAN X and CAN Y ports to connect the device via CAN BUS lines and additional Y-junctions to up to 24 STAUFF sensors (max. 24 channels) with automatic sensor detection (STAUFF CAN).

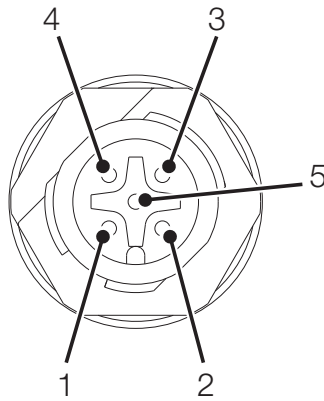


Fig. 4 Connection port, CAN X / CAN Y


PIN	Designation
1	Shielding
2	+Ub (+24 V _{DC})
3	GND
4	CAN High
5	CAN Low



INFORMATION

The CAN X and CAN Y ports are not galvanically separated. A galvanic separation is only provided in SAEJ1939-IM.

Alternatively, you can use the CAN-Y port to connect up to 5 CAN bus external sensors without automatic sensor detection (external CAN).

In order to be able to complete measurements using CAN bus sensors without automatic sensor detection (External CAN), you must parameterize the CAN bus sensors in the device accordingly, beforehand, using CANopen or CAN Generic . Further information on parameterization of the connection ports is available in Chapter  "Sensors" on Page 89.



INFORMATION

It is not possible to mix operation on one CAN bus using sensors with automatic sensor detection (STAUFF CAN) and external sensors without automatic sensor detection (External CAN).




IMPORTANT

The internal terminating resistor of the CAN-Y is fixed. Do not switch the device to the bus via a stub.



IMPORTANT

The device must be correspondingly configured before using external sensors. Further information on adjustment and parameterization of external sensors is available in Chapter  "Sensors" on Page 89.

3.3.2 D-IN/D-OUT F1/F2

The D-IN/D-OUT F1/F2 connection port is a galvanically separated, doubly assigned connection and has one of the following functions according to the setting in the device:

- ☐ DIGITAL-IN and DIGITAL-OUT
- ☐ 2× frequency input



INFORMATION

The frequency inputs are also suitable for the connection of volume flow sensors.

Information on switching the connection is available in Chapter "Sensors" on Page 89.

Refer to the following overview for the PIN assignment:

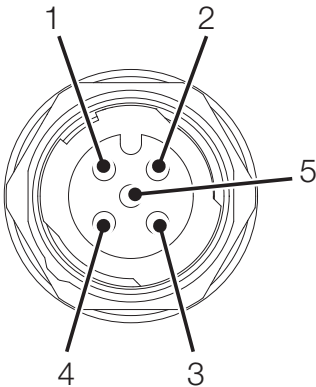


Fig. 5 Connection port, D-IN/D-OUT F1/F2

PIN	D-IN/D-OUT	F1/F2
1	Digital-In+	Frequency signal 1
2	Digital-In GND	Frequency signal 1 GND
3	Digital-Out+	Frequency signal 2
4	Digital-Out GND	Frequency signal 2 GND
5	+Ub (+24 V _{DC})	+Ub (+24 V _{DC})

3.4 Connection Ports - Input Modules

In addition to the basic connections, the device can be extended with up to two further input modules.

The figure illustrates the slots for the input modules:

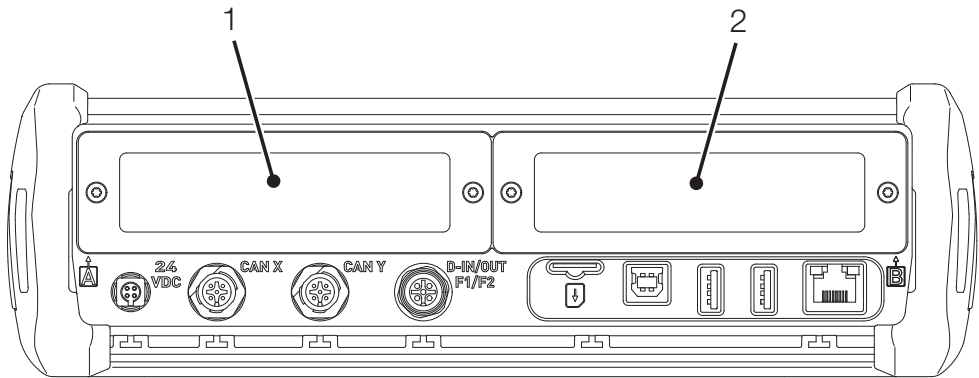


Fig. 6 Connection port, input module

Pos.	Designation	Description
1	Input module, SLOT A	First slot for an input module
2	Input module, SLOT B	Second slot for an input module

Further information on the input modules available, the corresponding connections and PIN assignment is available in Chapter "Input Modules" on Page 26.

4. Input Modules

This chapter provides information on the input modules available.



INFORMATION

The input modules can be obtained separately. To do this, contact your sales outlet.

4.4.1 Inserting the Input Module

In order to be able to use the connection ports provided on the input module, you must insert the input module in one of the slots in the device.

Input modules can be inserted or exchanged while the device is in operation (hot plug or hot swap).

- 1** Loosen the two screws (1) in the dummy cover of the slot (e.g. input module A) on the top of the device.
 - 2** Remove the dummy cover from the slot and keep it in a safe place.
 - 3** Insert the input module (2) in the slot.
 - 4** Tighten the two screws (1) hand-tight.
- The input module is installed and ready to operate.

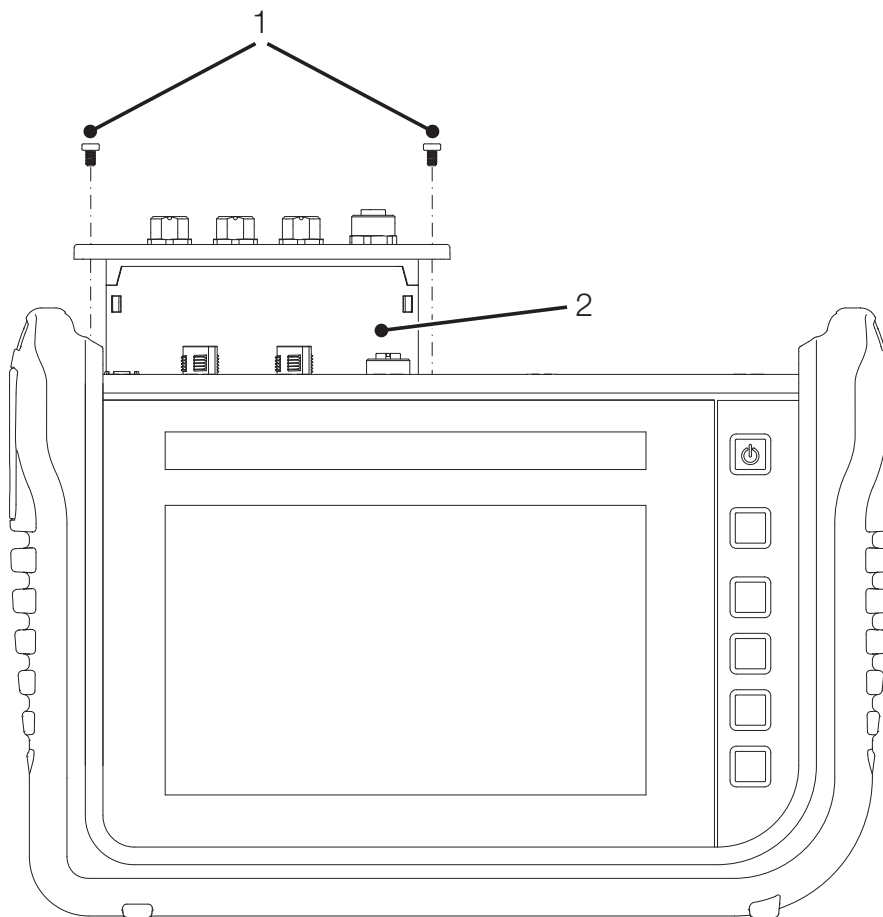


Fig. 7 Insert the input module

4.4.2 Analog Input Module

The analog input module is equipped with three analog connection ports, IN1-3, for sensors with automatic sensor detection (STAUFF analog) and an analog connection, IN4/5, for up to two external sensors without automatic sensor detection (e.g. standard industrial sensors).

The IN4/5 analog connection can be used to complete fast measurements.

The figure indicates the connection ports on the analog input module:

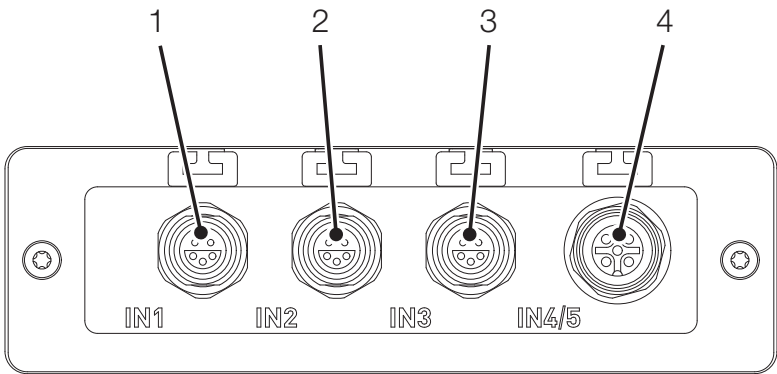


Fig. 8 Analog input module

Pos.	Designation	Description
1	Analog port (IN1)	To connect sensors with automatic sensor detection
2	Analog port (IN2)	To connect sensors with automatic sensor detection
3	Analog port (IN3)	To connect sensors with automatic sensor detection
4	Analog port (IN4/5)	To connect sensors without automatic sensor detection

Refer to the following overview for the PIN assignment of the analog connection port (IN4/5) to connect external sensors:

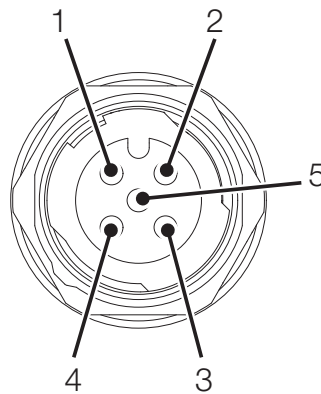


Fig. 9 PIN assignment, analog input module

PIN	Designation
1	+Ub (+24 VDC)
2	Measuring signal 1 (IN4)
3	GND
4	Measuring signal 2 (IN5)
5	GND

Other external sensors without automatic sensor detection can also be connected to one of the analog connections (IN1-IN3) via an adapter (current/voltage converter).



INFORMATION

Further information on connecting sensors without sensor detection via an adapter is available in the manual supplied with the respective adapter.

After connecting the sensors without sensor detection, complete the necessary settings for the electrical connection and expected signal according to the properties of the sensors connected. Refer to Chapter "Input Modules A and B" on Page 96.

4.4.3 Can Input Module

The Can Input Module is equipped with two passive CAN bus connections for external sensors without automatic sensor detection (external CAN).



INFORMATION

The passive CAN bus connections are galvanically separated from each other and from the device. Both connections are provided with connectable terminating resistors.

The passive CAN bus connections are optimally suited to reading out diesel motor data via the SAE J1939 protocol. Messages from other CAN protocols can also be read out. In this case, the CAN input module is passive and cannot be detected by other CAN masters.

The figure indicates the connection ports on the analog input module:

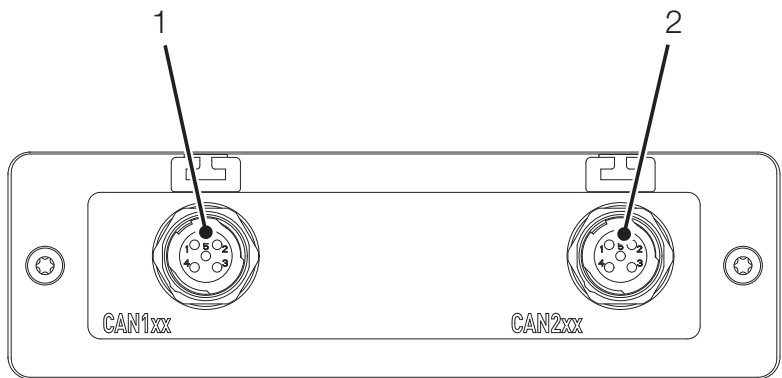


Fig. 10 Can Input Module

Pos.	Designation	Description
1	CAN bus (CAN1xx)	To connect sensors without automatic sensor detection
2	CAN bus (CAN2xx)	To connect sensors without automatic sensor detection

Refer to the following overview for the PIN assignment:

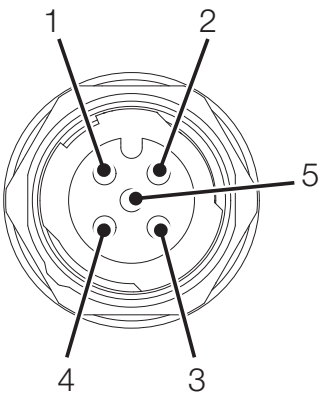



Fig. 11 PIN assignment, Can Input Module

PIN	Designation
1	Shielding
2	Not connected
3	GND
4	CAN High
5	CAN Low

After connecting the sensors without sensor detection, complete the necessary settings for the electrical connection and expected signal according to the properties of the sensors connected. Refer to Chapter  "Input Modules A and B" on Page 96.

5. Starting Up

This chapter contains information on the steps necessary to put the device into operation.


5.1 Charging the Battery

Before you can put the device into operation, you must charge the battery fully using the power adapter supplied.



IMPORTANT

Risk of property damage.

- ❑ Do not store the device with a low battery charge status in order to prevent a total discharge.
- ❑ Only use the power adapter supplied to charge the battery.
- ❑ Avoid fully charging or total discharge of the battery to increase the service life of the battery. The optimum battery charge is between 10 and 90%.
- ❑ Only use the device within the temperature range permitted. Refer to Chapter  "Mechanical Data" on Page 125.



INFORMATION

Observe the following information regarding use of the integrated battery:

- ❑ If the charge status of the integrated battery drops below a specific value, the measurement in progress is stopped. The measured values and user parameters are automatically saved. The device switches off automatically.

5.2 Switching the Device On and Off

Switching the Device On

- 1 When off, press the On/Off key.

↳ The device starts up.

After switching on, the firmware version and serial number are displayed.

Switching the Device Off

- 1 When switched on, press and hold the On/Off key for at least 5 seconds.

↳ The device is switched off.

Alternatively:

- 1 When switched on, press the On/Off key.

↳ The SHUT DOWN button appears in the display.

- 2 Press the SHUT DOWN button.

↳ The device is switched off.

5.3 Connecting the Sensors

Before the device can be used to take measurements, the sensors required for the measurement must be connected.

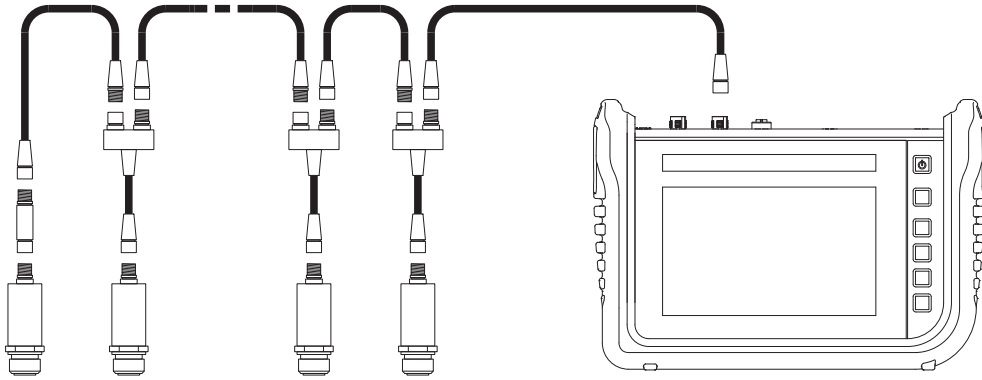


Fig. 12 Connect the sensors

Connect the sensors in the following sequence:

- 1 Connect the sensors on the application side (e.g. hydraulic connection).
- 2 Connect the sensors to a bus cable or a Y-junction (refer to figure).
- 3 Connect a bus cable to the corresponding port on the device which is switched on.



IMPORTANT

The device does not record data from sensors which are connected while a measurement is in progress.

Restart the measurements in order to record data from sensors just connected.

Measuring data from sensors which are disconnected while a measurement is in progress is recorded by the device to the moment of disconnection.

5.4 Using the Stand

You can setup the device on a flat surface and use the fold-out stand to improve visibility. The stand can be folded out to a maximum angle of 40°.

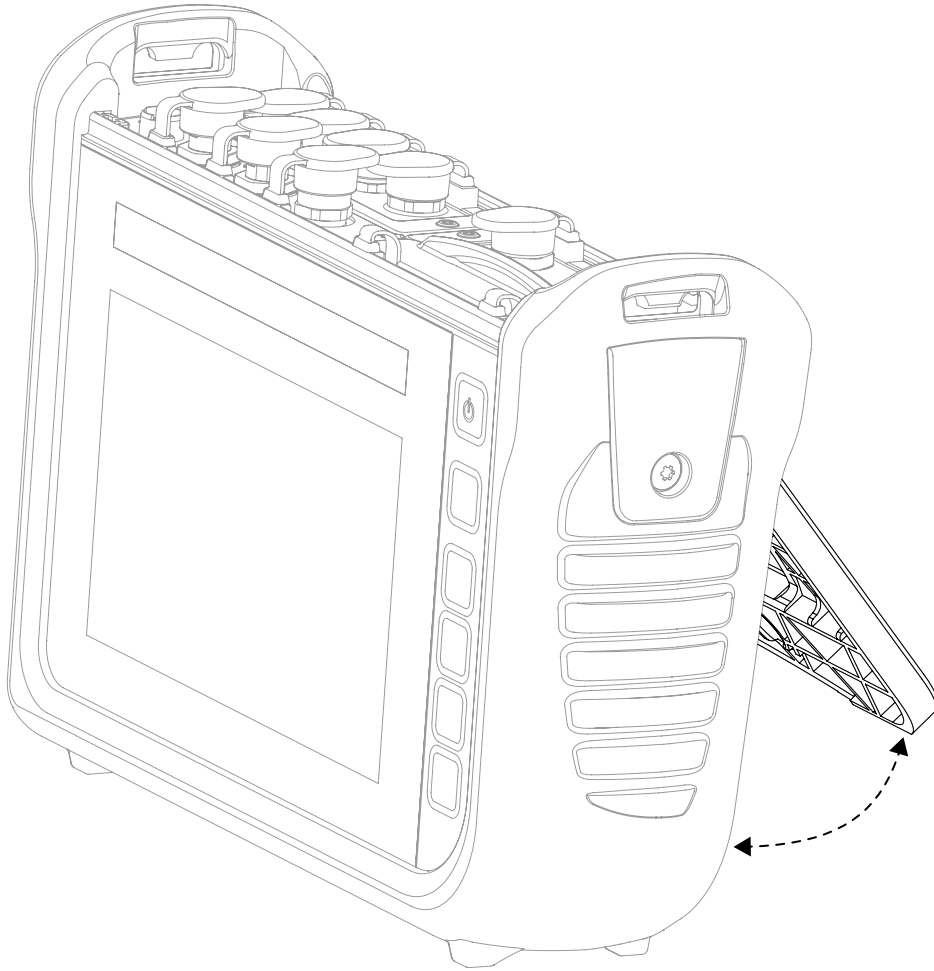


Fig. 13 Using the fold-out stand

- 1 Pull the fold-out stand on the rear side of the device to the required position.
- 2 Set the device down on a level surface.

5.5 Mounting the Device

If necessary, you can mount the device on a wall after assembling the VESA holder (100 mm × 100 mm) on the rear panel of the device.

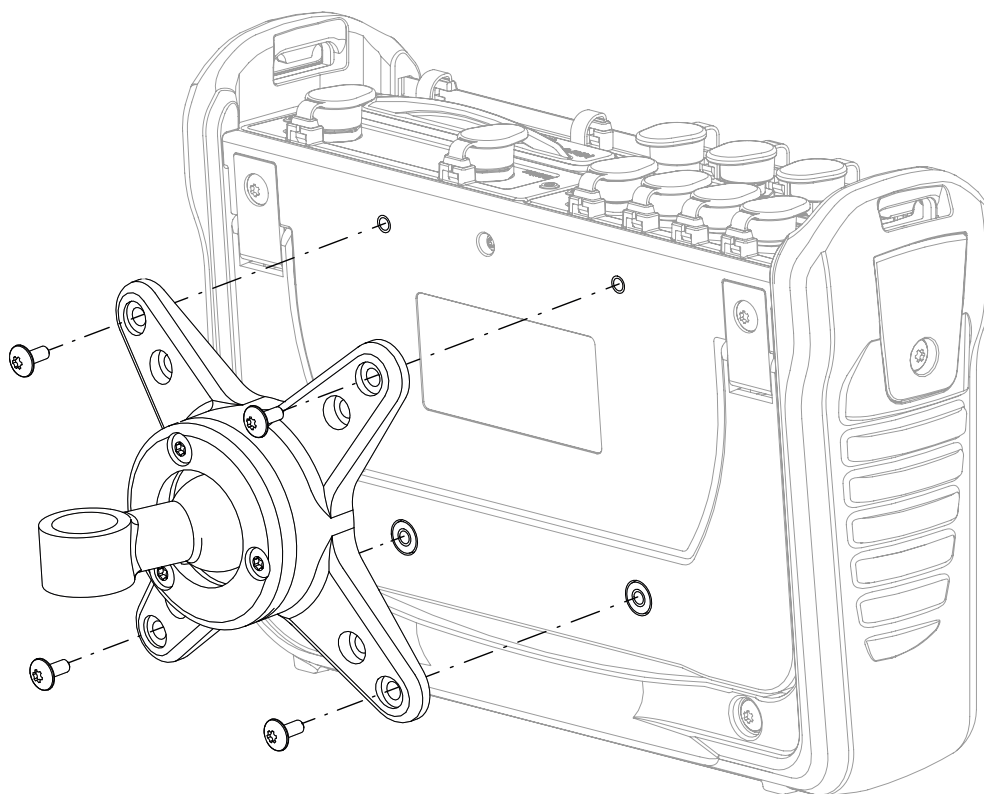


Fig. 14 Assembling the holder

Mount the device in the following sequence:

- 1 Assemble the VESA holder at the installation location. Observe the information in the manual supplied with the VESA holder.

- 2 Mount the device on the VESA holder.
 - 3 Screw the device using four retaining screws and an appropriate tool.
- 🔧 The device is mounted.



INFORMATION

The maximum screw-in depth for the retaining screws is 6 mm. The VESA holder and screws necessary for assembly (M4 metric) are included in the supply package.

6. Operation

This chapter contains information on the basic operation of the device.

6.1 Basic Factors

The device is immediately ready for use after being started up. The sensors connected are normally displayed in the list view.

Select one of the four display options for the measurement view and define the type of measurement for your application accordingly.

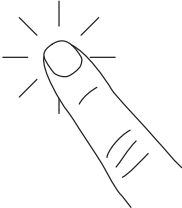
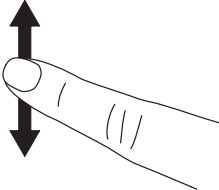
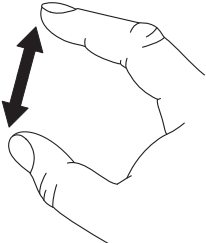
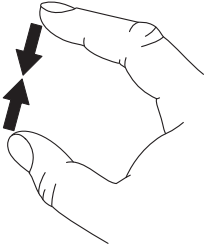
6.1.1 Operating the Device

The device is mainly operated by using the buttons provided on the touchscreen. You can use your fingers or an appropriate input tool.

Alternatively, the main functions can be selected using the context-sensitive function keys.

The following overview illustrates the possible finger movements and their functions:

Finger movements	Function
------------------	----------

	Tap your finger on the respective button or element to initiate a function.
	Swipe your finger through lists and views to scroll.
	Draw two fingers apart on an element or view to zoom in. This function is not available for all views.
	Draw two fingers towards each other on an element or view to zoom out. This function is not available for all views.



INFORMATION

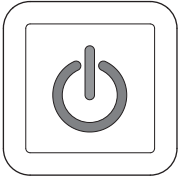
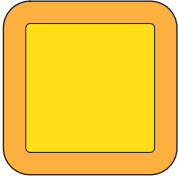
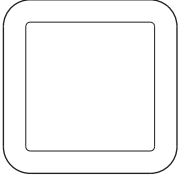
It is also possible to use the touchscreen when wearing gloves appropriate for the purpose.

Function Keys

The device is equipped with six function keys positioned beside the touchscreen. One function key is used to switch the device on and off, one function key is used to start and stop measurements and four function keys are assigned context-sensitive functions.

The four context-sensitive function keys are used to initiate the functions according to the corresponding button in the menu area of the touchscreen.


Key	Function
-----	----------

	On/Off key
	Function key (yellow) to start and stop measurements
	Four context-sensitive function keys

Buttons

The device displays the buttons appropriate for the current view. Tap your fingers directly on the buttons displayed on the screen to navigate through the device's menus and select the respective functions.

A screen keyboard appears with which to enter digits and characters.

Further information on the buttons available is provided in Chapter  "Screen Design" on Page 41.

6.2 Screen Design

This chapter contains information on the basic layout of the screen and the positions of the screen elements.

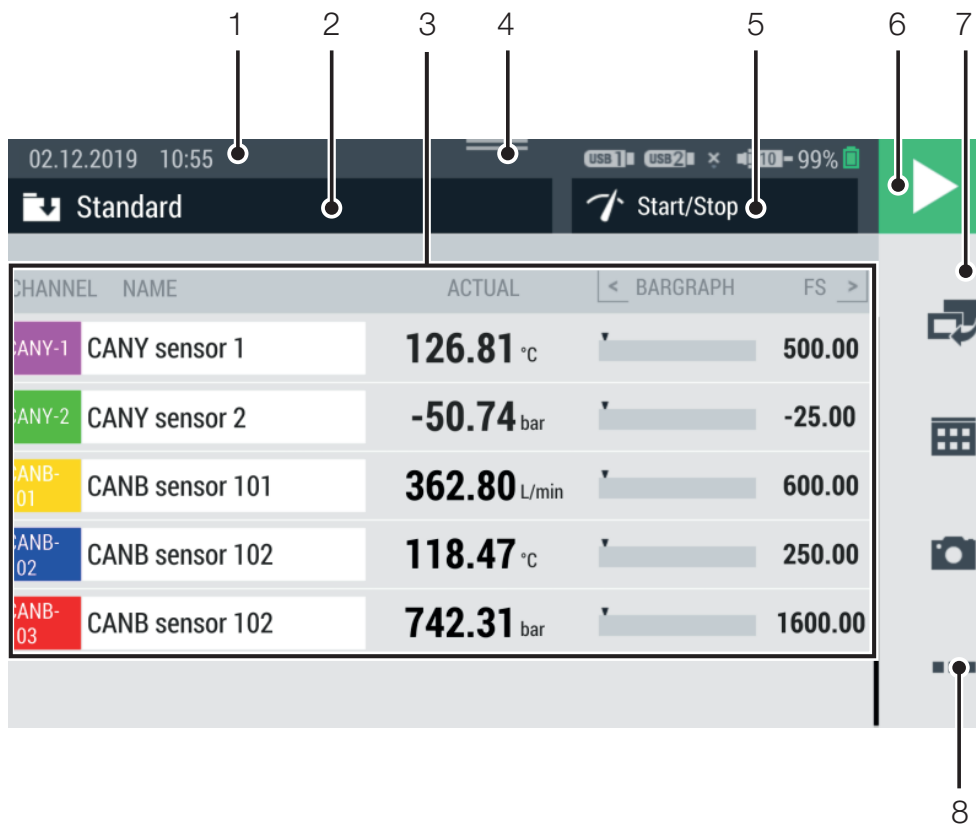











Fig. 15 Screen layout

Pos.	Element	Description
1	Status bar	Display for system status
2	Button, Projects & Templates	To select projects or templates
3	Main view	Display of the current function
4	Button, Quick Start Menu	To open the Quick Start menu
5	Menu area, measurement options	To select measurement options
6	Button, Start/Stop	To start/stop measurements
7	Menu area	To initiate the main functions
8	Button, Options	To unhide/hide the options

6.2.1 Status Bar

The status bar displays various symbols to indicate certain system states and general information such as date and time.

The table below indicates the possible symbols:

Symbol	Function
	Number of channels which transmit data to the cloud
	Connection of a device at the USB1 connection port
	Connection of a device at the USB2 connection port
	Status of the Bluetooth connection
	Status of the wifi connection
	Number of active channels
	Battery charge status in percent
	Battery charge status as an icon
	Active connection to PPC-Analyze or online measurement in progress

6.2.2 Quick Start Menu

You can open the Quick Start menu via the status bar. The Quick Start menu displays information and provides the option of defining settings.

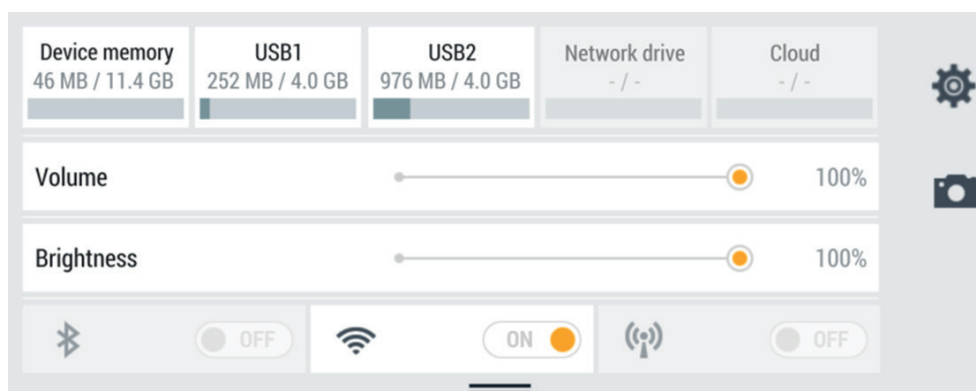


Fig. 16 Quick Start menu

The following information is displayed:

- ☐ Memory utilization, internal device memory
- ☐ Memory utilization, USB 1
- ☐ Memory utilization, USB 2

Memory locations which are not configured are grayed out. Tapping on one of the buttons opens the corresponding memory location.

The following settings can be configured:

- ☐ Adjust the volume
 - ☐ Adjust the brightness
 - ☐ Activate/Deactivate the wifi connection
- 1** Swipe from the top screen edge downwards.
 ☞ The Quick Start menu opens.
 - 2** Swipe upwards over the QuickStart menu.
 ☞ The Quick Start menu closes.

Further information on setting WLAN connections is available in Chapter  "Connections" on Page 100.

**INFORMATION**

Open the Settings menu by tapping on the gearwheel symbol.

6.2.3 Screen Keyboards

A screen keyboard appears in the display to enter texts and digits.

The screen keyboard automatically appears when you select the corresponding input field.

The following keyboard is available to enter texts and digits:

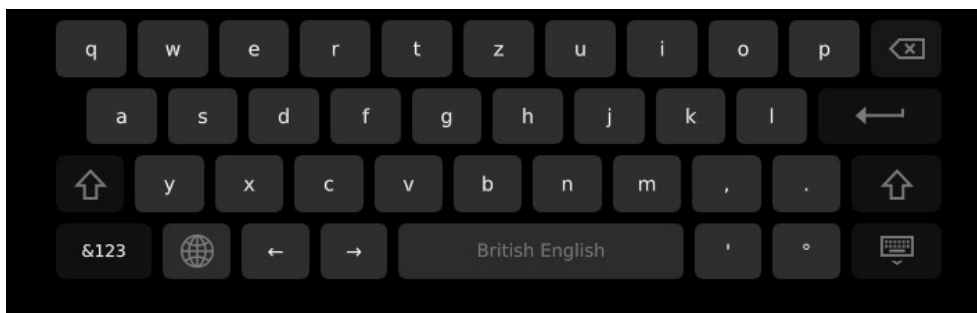


Fig. 17 Screen keyboard, characters and digits



INFORMATION

The keyboard layout varies according to various languages and can be changed. The following keyboard layouts are available:

QWERTZ, QWERTY, AZERTY. Refer to Chapter "Device" on Page 105.

The following keyboard is available to complete basic arithmetical operations:

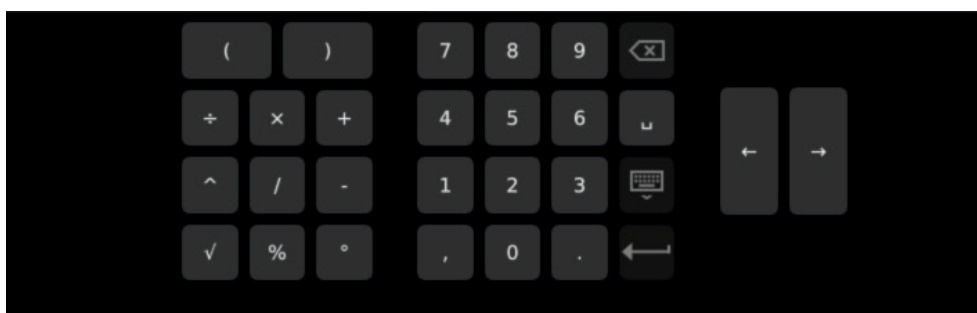


Fig. 18 Screen keyboard, simple arithmetic operations

The following keyboard is available to complete more advanced mathematical calculations:












Fig. 19 Screen keyboard, advanced mathematical calculations






6.2.4 Menu Area

The menu area displays up to four buttons with main functions, depending on the current view. These functions can also be operated using the context-sensitive function keys on the device. Not all the functions are always available.


The table below indicates the possible buttons:

Symbol	Function
--------	----------

	Switch to the main view
	Switch between measurement views
	Switch to the last menu option
	Create a screenshot of the current view
	Switch to the main menu
	Unhide/Hide the options
	Display information on the current measurement
Symbol	Function
	Add an entry
	Edit a setting

	Record a measuring point ("Keystroke" presetting)
	Confirm current selection or adapted settings
	Discard current selection or adapted settings
	Zoom in on current view
	Zoom out from current view

6.2.5 Options

If the options are available as buttons, they can be unhidden and hidden by means of the  button. The functions available relate to the current view.

The table below indicates the possible buttons in the measurement views:

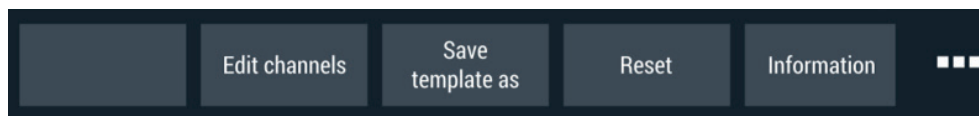


Fig. 20 Options menu in measurement views

Designation	Description
Edit channels	Define settings for the channels
Save Template as	Save the current measurement view as a template
Reset	Reset values
Information	Unhide/Hide information on the sensors

The table below indicates the buttons possible in the File Manager:

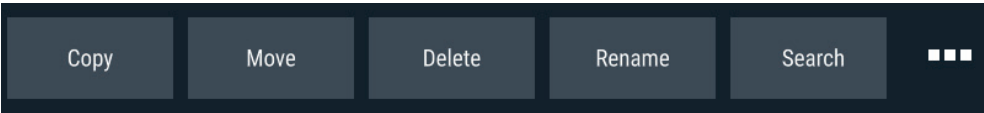


Fig. 21 Options menu in the File Manager

Designation	Description
Copy	Copy file(s)
Move	Move file(s) to a different folder/memory location
Delete	Delete file(s)
Rename	Rename the file(s)
Search	Search for file(s)

6.2.6 Resetting Values

With regard to resetting certain values, there are further optional functions available via the **Reset** button:

- 1 Tap on the button.
 ↳ The options are displayed.
- 2 Tap on the **Reset** button.
 ↳ The functions available are displayed:

Designation	Description
Delta to zero	Reset delta to zero

Channel to zero	Reset the channel offset to zero (to max. 2% FS)
D-IN to zero	Reset the D-IN counter to zero
D-OUT to zero	Reset the D-OUT output to zero
MIN/MAX	Reset the Min/Max setting

- 3 Tap on the respective function to reset the corresponding value.

↳ The value selected is reset.

The selected function resets the values of all the channels.



INFORMATION

It is not possible to reset values when a measurement is in progress.

6.3 Measurement Views

The device can provide four different views to represent measurements.

Before completing a measurement, you can edit the channels and adjust them as necessary. Further information on adjusting channels is available in Chapter "Edit Channels" on Page 61.

Changing the Measurement View

You can switch between the individual measurement views:

- 1 Tap on the button.
↳ The next measurement view appears.

It is possible to switch between the individual measurement views while a measurement is in progress.

6.3.1 List 6 View

The **List 6** view provides a detailed view of the channels.

If more than six channels are active, you can scroll through the list.

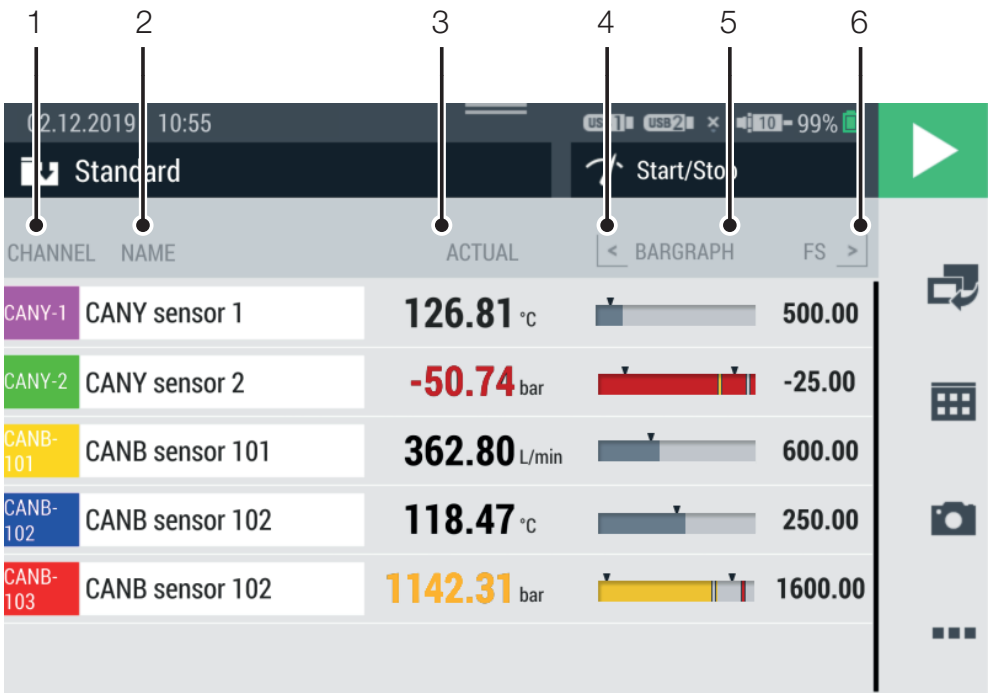


Fig. 22 List 6 view

Pos.	Description
1	Designations of the active channels. The channels are automatically designated by the device according to the connections used (e.g. CANY-1...24, CANX-1...24).
2	Names of the active channels.
3	Current measured values of the channels
4	Switch to the previous screen display combination
5	This section displays the maximum and minimum measured values, bar graphs or the measuring range full scale value in various display combinations. Possible combinations: BARGRAPH, BARGRAPH + MAX, MIN + MAX, MIN + BARGRAPH, BARGRAPH + FS)
6	Switch to the next screen display combination

6.3.2 List 12 View

The List 12 view displays an overview of the active channels and their current measured values. This view enables you to follow twelve channels in one view. If more than twelve channels are active, you can scroll through the list.

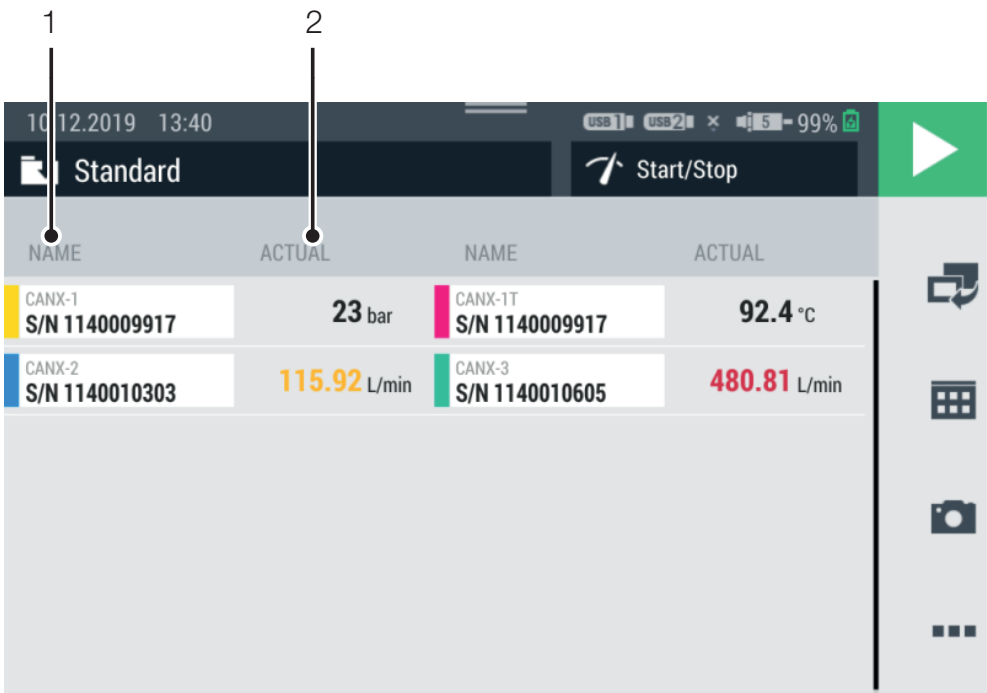


Fig. 23 List 12 view

Pos.	Description
1	Names of the active channels.
2	Current measured values of the channels

6.3.3 Manometer View

The manometer view displays the current, minimum and maximum measured value as well as the measuring range full scale value for each channel.

If more than four channels are active, you can scroll through the list.

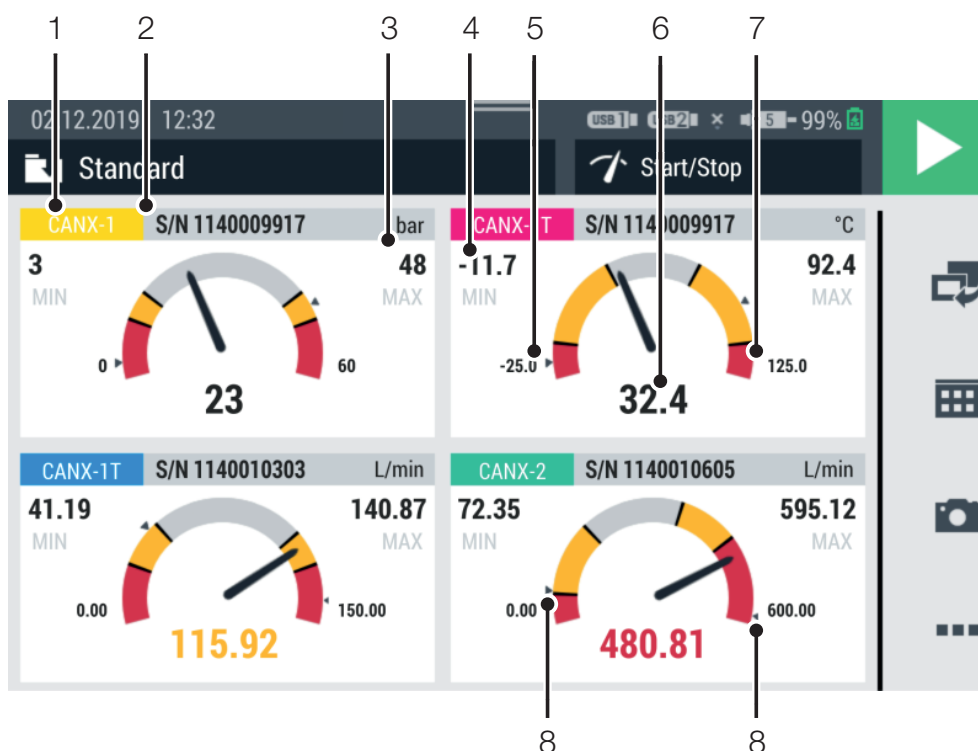


Fig. 24 Manometer view

Pos.	Description
1	Designation of the active channel
2	Name of the active channel
3	Maximum measured value
4	Minimum measured value
5	Starting value for measuring range
6	Current measured value
7	Full scale (FS) value of measuring range
8	Drag indicator for minimum and maximum measured value



INFORMATION

The yellow range in the manometer indicates the defined warning value, the red range the defined alarm value.

6.3.4 Trend Graph View

The trend graph view can display up to eight channels in the form of trend curves on a graph. The trend graph view displays the current measured values.



02.12.2019 12:33

Standard

Start/Stop

CANX-1 CANX-1T CANX-2 CANX-3

S/N 1140... S/N 1140... S/N 1140... S/N 1140

23bar 32.4°C 115.92L/min 480.81L/min

150.0

120.0

90.0

60.0

0.0

00:00:00 00:00:12 00:00:24 00:00:36 00:00:48 00:01:00

Pos.	Description
1	Name of the channel
2	Current measured value of the channel
3	Selected channel (increased line thickness)
4	Trend graph line of the selected channel

- 1 Tap on any channel.
- 2 Swipe to the right or left.

↪ The list of channels displayed is scrolled through.

Scaling the Axes

When using the trend graph view, you can use the **Curve tools** button to adjust the scale of the axes (X/Y):



Fig. 26 Curve tools

- 1 Tap on the **...** button.
↪ The options are displayed.
- 2 Tap on the **Curve tools** button.
- 3 Tap on the **X/Y axis** button and adapt the scaling.

Scaling the Trend Graph

You can use your fingers on the trend graph view to adjust the size of the graph:

- 1 Tap with two fingers on the screen and drag the fingers apart.
↪ The graph is enlarged.
- 2 Tap with two fingers on the screen and drag the fingers towards each other.

↶ The graph is reduced in size again.

3 Tap twice with a finger on the screen.

↶ The graph is scaled to 100%.

6.3.5 Analyzing the Measurements

You can analyze measurements which have been saved by using the curve tools.

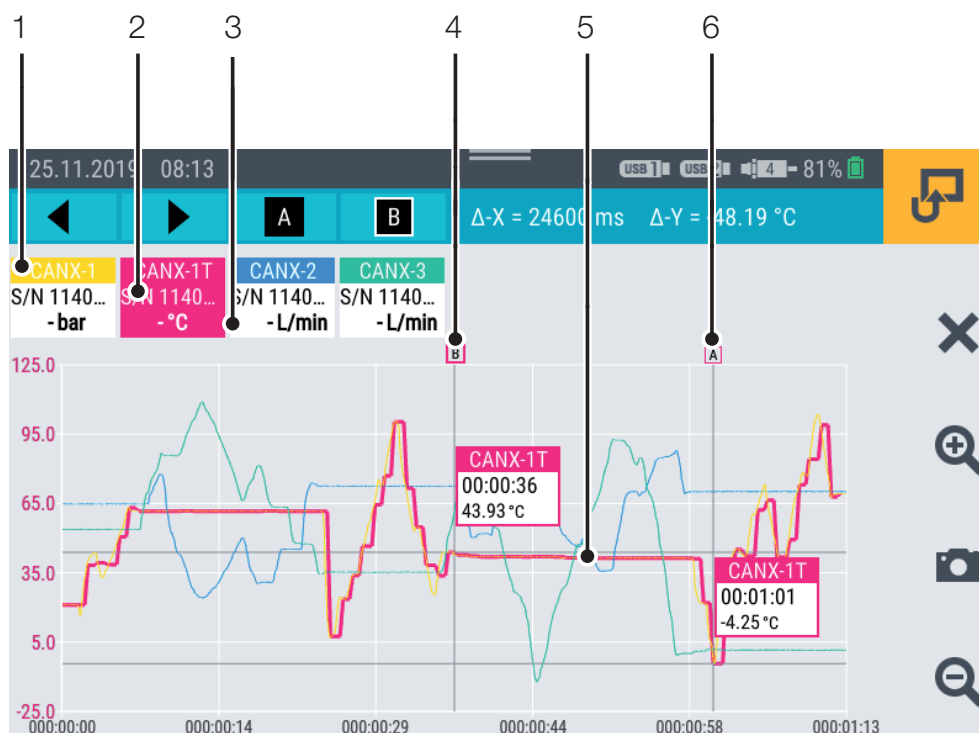


Fig. 27 Trend graph view, analyzing measurements

Pos.	Description
1	Name of the channel
2	Selected channel (increased line thickness)
3	Current measured value of the channel
4	Cursor B of the selected channel
5	Trend graph line of the selected channel
6	Cursor A of the selected channel



INFORMATION

The figure displays the trend graph view of a stored measurement with active curve tools. When a measurement is in progress, the trend graph view deviates because the curve tools are not available.

In order to analyze measurements which have been saved, various functions are available using the options provided after pressing the **Curve tools** button:

- 1 Open one of the measurements previously saved. Further information is available in Chapter "File Manager" on Page 87.

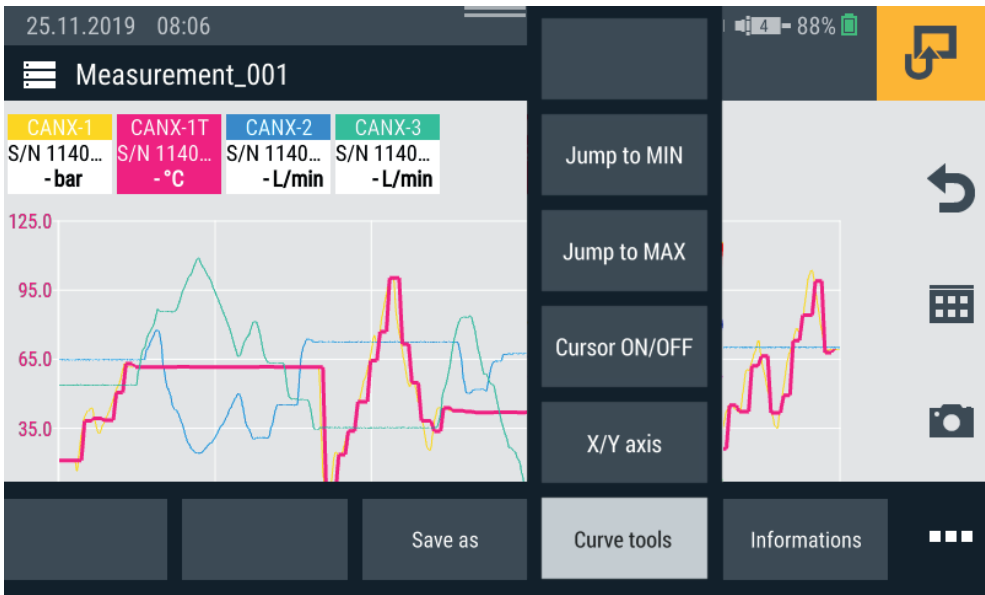


Fig. 28 Curve tools

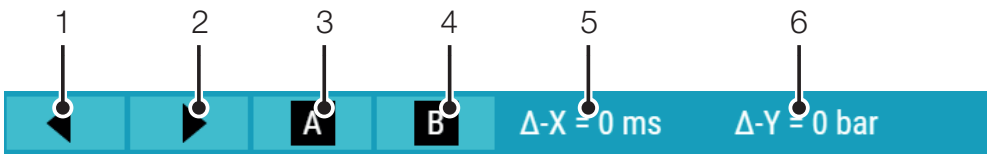
- 2 Tap on the **...** button.
↳ The options are displayed.
- 3 Tap on the **Curve tools** button.
↳ The functions available are displayed:

Designation	Description
Jump to MIN	The cursor springs to the minimum value of the selected channel
Jump to MAX	The cursor springs to the maximum value of the selected channel
Cursor ON/OFF	Unhide or hide the cursor
X/Y axis	Adjust the scaling of the axes

- 4 Tap on the appropriate button.
↳ The function selected is performed.

Analyzing the Measured Value Graphs

After selecting the **Jump to MIN**, **Jump to MAX** or **Cursor ON/OFF** function, a blue menu bar appears containing additional buttons.



Pos.	Description
1	Move the cursor on the X-axis to the left
2	Move the cursor on the X-axis to the right
3	Unhide/Hide cursor A
4	Unhide/Hide cursor B
5	Delta indicator for the X-axis
6	Delta indicator for the Y-axis; displayed per channel

The following statuses can be configured:

Status	Description
A	Cursor is hidden
	Cursor is unhidden and active

You can move the active cursor along the trend curve using the arrow buttons or with your finger. Select the corresponding cursor (A or B) via the blue menu bar.

The following information appears on the cursor:

- Name of the channel
- Time of measurement
- Measured value

You can select various channels and use the cursor to complete evaluations of the graph curves.

6.3.6 Edit Channels

You can use the **Edit channels** button to edit the channels in the measurement views. The functions can be used to hide or activate/deactivate individual channels.

- 1 Tap on the button.

2 Tap on the **Edit channels** button.

↳ The window in which to edit the channels opens.

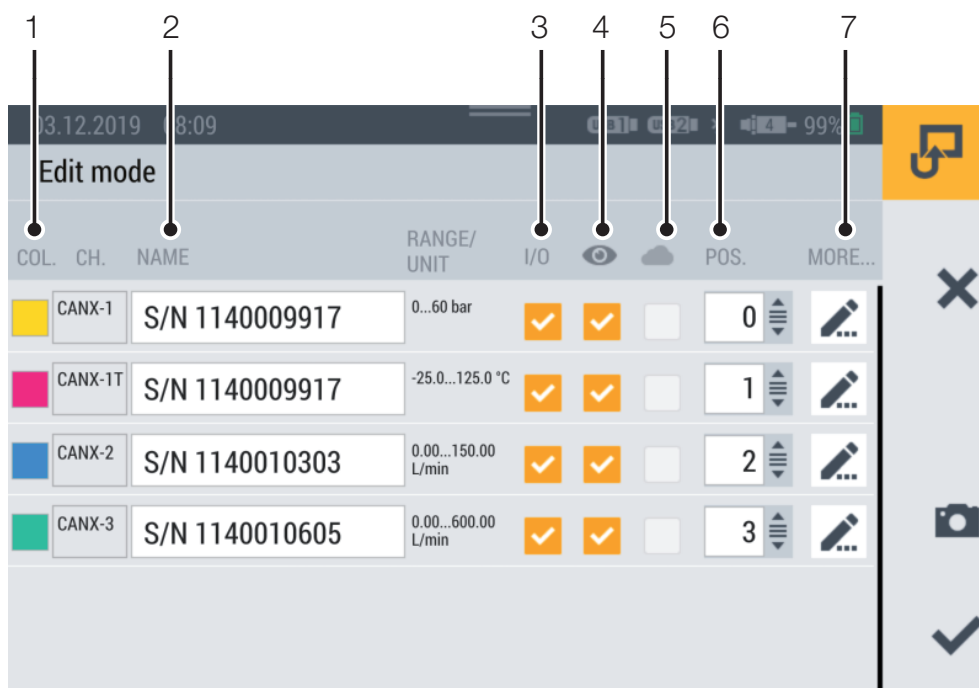




Fig. 29 Edit channels

Pos.	Description
1	Edit the colors of the channels
2	Enter/Edit the names of the channels
3	Activate/Deactivate channels (measured value are not saved)



4	Unhide/Hide channels (measured value are saved)
5	Activate/Deactivate uploading measured values in the cloud *
6	Edit the list positions of the channels (by entering numbers or manual movement)
7	Edit further channel settings

- 3** Tap on the  button for the channel to be edited.
 The window in which to edit the channel selected opens.



INFORMATION

Alternatively, tap on the channel name in the measurement view for direct access to the window to edit the channel selected. This function can be used in all the measurement views apart from the trend graph view.

- 4** Define the parameters as required.
- 5** Tap on the  button to activate the setting.
 You have now edited the channel successfully.

*This option was not available at the time of the manual going to print.

Edit mode	
Decimal places	0
Unit	bar
Cloud interval	-
ALARMS	
Minimum alarm value	10
Minimum warning value	15

Fig. 30 Edit channels, adjust parameters




You can define the number of decimal places, the unit and the minimum and maximum alarm and warning values for each channel. If a channel reaches a defined alarm or warning value, the current measured value is displayed in color in the bar graphs.

6.4 Measurement Status

A measurement is started and stopped using the **Start/Stop** button or the yellow function key on the device.

The **Start/Stop** button indicates the current status of a measurement.

The following statuses can be configured:

Status	Description
	Measurement has not yet been started, adjustments can be made.
	Measurement is activated, the device is waiting for the defined trigger to be triggered in order to record the measured data.
	Measurement is started and measured data is recorded.

- 1 Tap on the **Start/Stop** button.

↪ The measurement starts up.



INFORMATION

Alternatively, press the yellow function key on the device.

Recording of the measured data begins according to the measuring method selected, either immediately or after triggering one or several triggers.

The current runtime of the measurement is displayed underneath the **Start/Stop** button.

- 2 Tap on the **Start/Stop** button.

↪ The measurement is stopped.


6.5 Measuring Methods

The device is provided with the following measuring methods:

- ❑ Start/Stop
- ❑ Data logger
- ❑ Point measurement
- ❑ Trigger
- ❑ Trigger logic
- ❑ Fast measurement (is only available when IN4 and IN5 are active)

Measured values are buffered in the device's working memory and stored in a defined device memory. The ACT values or ACT, MIN and MAX values are stored depending on the measuring method and settings selected.

You can switch between the measuring methods.

- 1 Tap on the **measuring method** menu option.
- 2 Tap on the measuring method required.
 The measuring method selected is displayed.



INFORMATION

The button displays the name of the measuring method selected (e.g. Start/Stop).

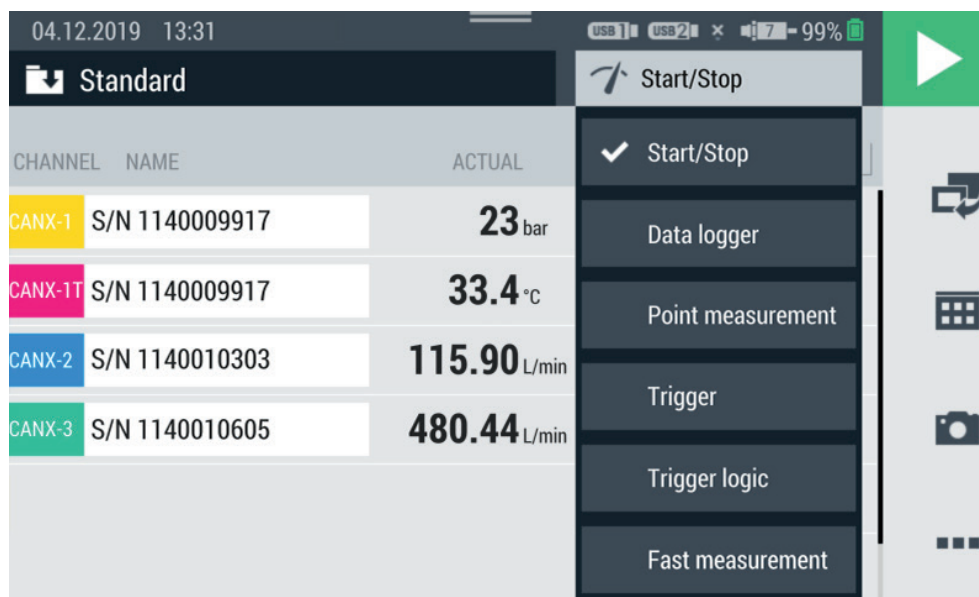


Fig. 31 Measuring methods

6.5.1 Start/Stop

The **Start/Stop** measuring method starts the recording of the measured values after tapping on the **Start/Stop** button.

Recording is stopped by tapping on the **Start/Stop** button again.

The **Start/Stop** measuring method implements an automatic data compression feature and requires no further adjustment.

In addition to the current measured value, the Min and Max values are also saved.

The measurement is completed independent of the current storage rate at a scanning rate of 1 ms.

If the predefined memory area is full, the data compression is activated. The storage rate is doubled and every second measured value is deleted. In this case, the Min and Max values are also compared and the highest and lowest measured value are transferred to the Min and Max value respectively.



INFORMATION

The Min and Max values are not lost but are saved, even in the case of long-term measurements.

6.5.2 Data Logger

The **Data logger** measuring method starts recording of the measured values by tapping on the **Start/Stop** button.

Recording is stopped after a defined storage time has elapsed or by tapping on the **Start/Stop** button.

After selecting the **Data logger** measuring method, the device displays predefined pa-

rameters to complete the measurement.

1 Tap on the  button.

↳ The configuration window opens in which to define the parameters.

2 Define the values according to your application.

The following settings are available to be defined:

Designation	Description
Storage interval	Set the storage interval of the measurement in the format h : m : s : ms
Storage time	Set the storage time for the measurement in the format d : h : m : s When the storage time has expired, the measurement stops automatically
Ring buffer	If this option is activated, the defined memory area is continuously overwritten by current measured data
Recording MIN/MAX	If this option is activated, the Min and Max measured values are also recorded in addition to the current measured value

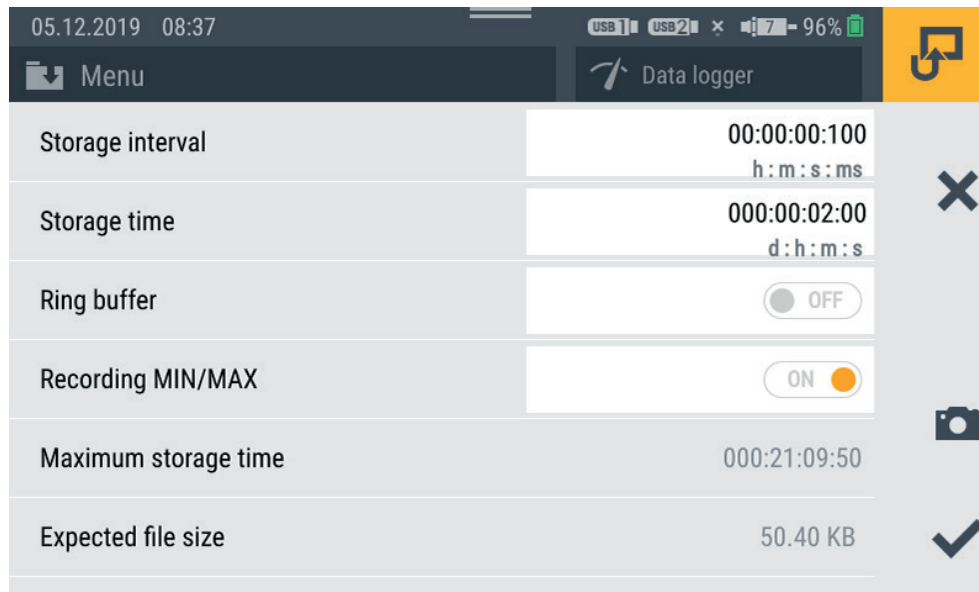


Fig. 32 Data logger, settings

The file size expected and maximum storage time for the measurement are calculated and displayed according to the applicable, defined parameters.


6.5.3 Point Measurement

The **Point measurement** measuring method starts recording of the measured values through the triggering of a defined trigger. The recording includes the respective, current measured value of all the active channels at the time of triggering.

The table below contains information on the triggers available:

Designation	Description
Keystroke	Recording of a measuring point by tapping on the corresponding button
D-IN falling slope	Recording of a measuring point on transition of a digital signal from High to Low
D-IN rising slope	Recording of a measuring point on transition of a digital signal from Low to High
Channel alarm	Recording of a measuring point if defined alarm values occur
Channel warning	Recording of a measuring point if defined warning values occur

After selecting the **Point measurement** measuring method, the device displays a pre-defined trigger to start the measurement.

- 1 Tap on the  button.
↳ The configuration window to select the trigger opens.
- 2 Select a trigger source according to your application.

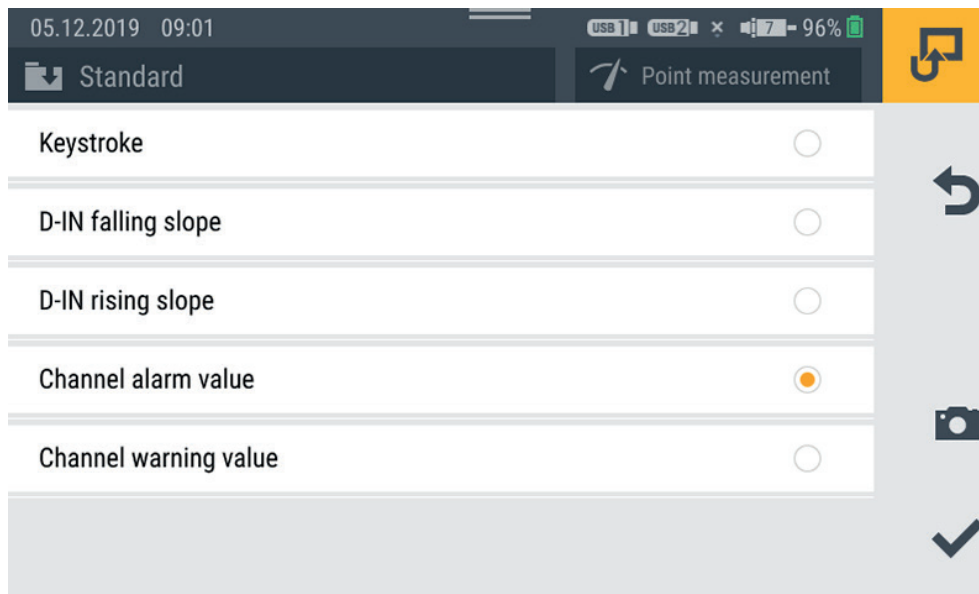


Fig. 33 Point measurement), settings

Measurement is started by tapping on the **Start/Stop** button. The device waits for the defined trigger to be triggered. Recording of a measured point starts when the defined trigger is triggered.

Measurement is stopped by tapping on the **Start/Stop** button.

6.5.4 Trigger

The **Trigger** measuring method starts recording of the measured values through the triggering of a defined trigger.

Recording is stopped automatically after the defined storage time has expired.

After selecting the **Trigger** measuring method, the device displays a predefined trigger and corresponding parameters to complete the measurement.

1 Tap on the  button.

↳ The configuration window opens in which to define the parameters.

2 Define the parameters and select a trigger according to your application.

The following parameters are available:

Designation	Description
Storage interval	Set the storage interval of the measurement in the format h : m : s : ms
Storage time	Set the storage time for the measurement in the format d : h : m : s When the storage time has expired, the measurement stops automatically
Recording MIN/MAX	If this option is activated, the Min and Max measured values are also recorded in addition to the current measured value
Pre-Trigger time	Define the period of time in which the measured values have already been recorded prior to the trigger being triggered
Trigger type	Select the trigger type for the measurement
Auto repeat	When the option is activated, the measurement is started again the next time the trigger is triggered after automatic storage of the previous measurement
Ring buffer	If this option is activated, the defined memory area is continuously overwritten by current measured data

The file size expected and maximum storage time for the measurement are calculated and displayed according to the applicable parameters selected.

The table below contains information on the triggers available:

Designation	Description
-------------	-------------

Keystroke	Recording of a measuring point by tapping on the corresponding button
Level	Measurement is started on exceeding or dropping below a limit value
Window	Measurement is started on exceeding or dropping below one of two limit values for a defined measuring range
Time	Measurement is started at a defined moment of time
External	Measurement is started on transition of the digital signal from High to Low Measurement is started on transition of the digital signal from Low to High
Channel warning value	Recording of a measuring point if defined warning values occur
Channel alarm value	Recording of a measuring point if defined alarm values occur

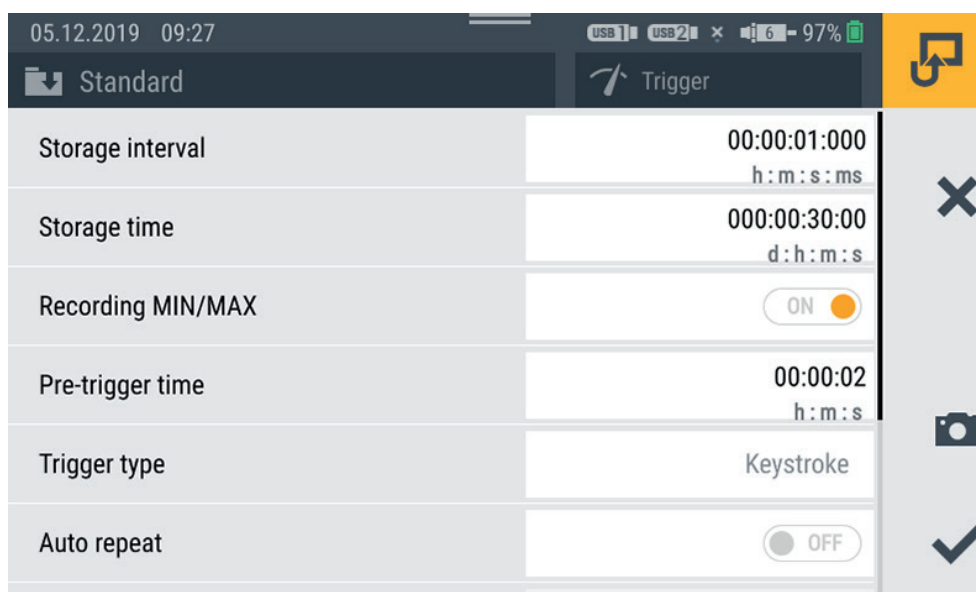


Fig. 34 Trigger, settings

**INFORMATION**

Please note that the D-IN connection must be activated for the external trigger. Refer to Chapter "D-IN/D-OUT F1/F2" on Page 93.

Measurement is started by tapping on the **Start/Stop** button. The device waits for the defined trigger to be triggered. Recording of a measured value starts when the defined trigger is triggered.

Measurement is stopped when the defined storage time has expired or the **Start/Stop** button is tapped.

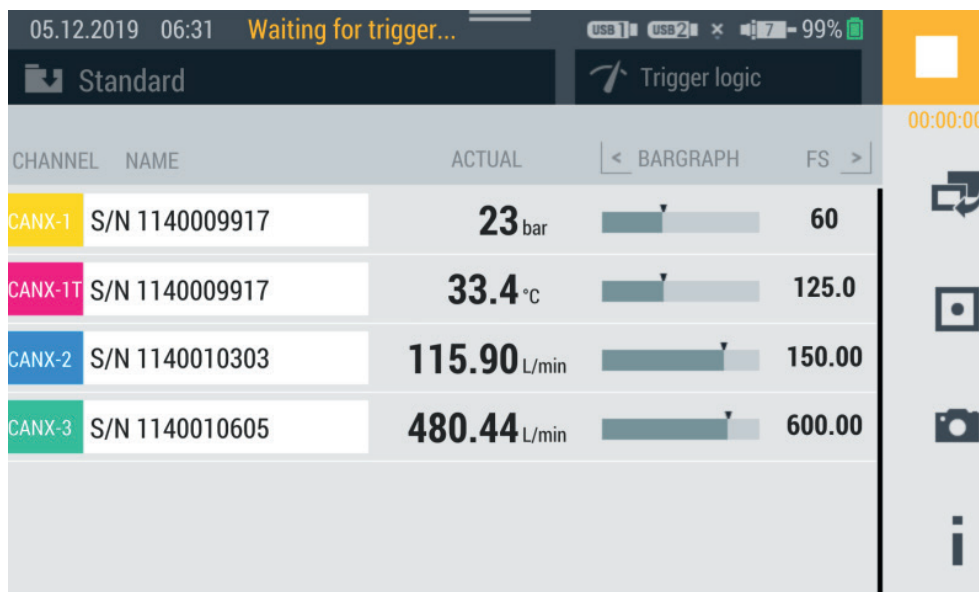


Fig. 35 Trigger, settings

6.5.5 Trigger Logic

The **Trigger logic** measuring method starts recording of the measured values after one or two defined triggers are triggered.

Recording is stopped after one or two defined triggers are triggered.



INFORMATION

Please note that you must define the start/stop conditions in order to be able to use this measuring method.

Select between the following combinations as the start conditions for the measurement:

- ☐ Condition A
- ☐ Conditions A and B
- ☐ Conditions A or B


Select between the following combinations as the stop conditions for the measurement:

- ☐ Condition C
- ☐ Conditions C and D
- ☐ Condition C or D

The following triggers are available for the start conditions:

Trigger A	Trigger B	Trigger C	Trigger D
Level	Level	Level	Level
Window	Window	Window	Window
Time		Time	
External	External	External	External
Keystroke		Duration	
Channel warning value		Channel warning value	
Channel alarm value		Channel alarm value	

After selecting the **Trigger logic** measuring method, the device displays predefined parameters to complete the measurement.

- 1 Tap on the  button.
 ↳ The configuration window opens in which to define the parameters.
- 2 Select a trigger and define the parameters trigger according to your application.

The table below contains information on the triggers available:

Designation	Description
-------------	-------------

Keystroke	Measurement is started by tapping on the corresponding button
Level	Measurement is started/stopped on exceeding or dropping below a limit value
Window	Measurement is started/stopped on exceeding or dropping below one of two limit values for a defined measuring range
Time	Measurement is started/stopped at a defined moment of time
External	Measurement is started/stopped on transition of a digital signal from High to Low Measurement is started/stopped on transition of a digital signal from Low to High
Channel warning value	Measurement is started/stopped when defined warning values occurs
Channel alarm value	Measurement is started/stopped when defined alarm values occur
Duration	Measurement stops after a defined time period has expired



INFORMATION

Please note that the D-IN connection must be activated for the external trigger. Refer to Chapter "D-IN/D-OUT F1/F2" on Page 93.

The measurement is started after one or two defined triggers are triggered.

The measurement is stopped after one or two defined triggers are triggered or tapping on the **Start/Stop** button.

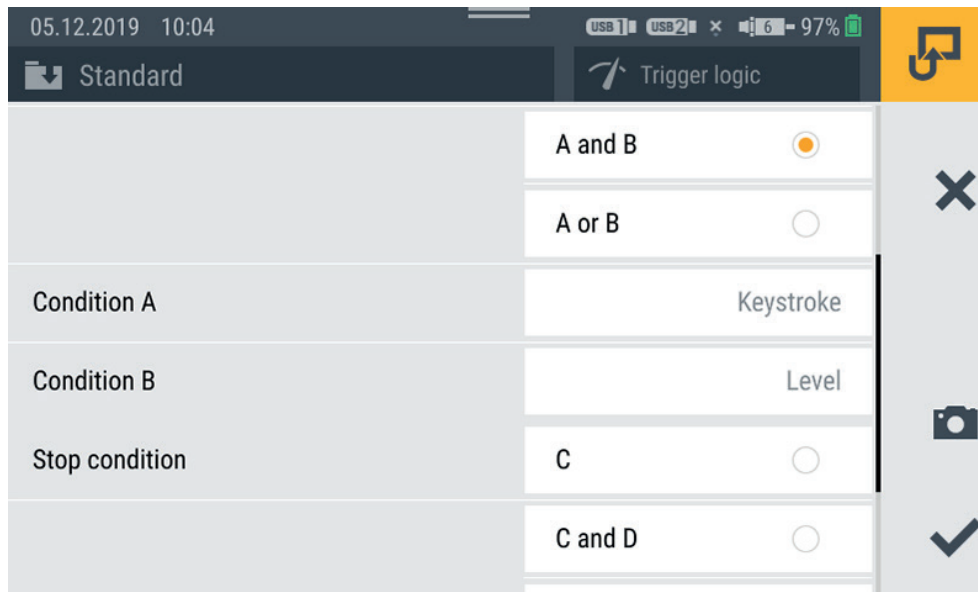


Fig. 36 Trigger logic, settings

6.5.6 Fast Measurement

The **Fast measurement** measuring method (FAST MODE) enables the recording of measured values from upto four fast channels. In the case of these fast channels, the measurement is performed at a storage interval of 100 μ s.



INFORMATION

The use of the **Fast measurement** measuring method is only possible with analog external sensors. They must be configured accordingly prior to their use. Refer to Chapter "Input Modules A and B" on Page 96.

After selecting the fast measurement measuring method, the device displays a pre-defined trigger and corresponding parameters to complete the measurement.

- 1 Tap on the button.
 The configuration window opens in which to define the parameters.
- 2 Select a trigger and define the parameters trigger according to your application.

The following settings are available to be defined:

Designation	Description
Storage time	Set the storage time for the measurement. When the storage time has expired, the measurement stops automatically
Pre-Trigger time	Define the period of time in which the measured values have already been recorded prior to the trigger being triggered
Trigger type	Select the trigger type for the measurement
Auto repeat	When the option is activated, the measurement is started again the next time the trigger is triggered after automatic storage of the previous measurement
Ring buffer	If this option is activated, the defined memory area is continuously overwritten by current measured data

The file size expected and maximum storage time for the measurement are calculated and displayed according to the applicable parameters selected.

The table below contains information on the triggers available:

Designation	Description
Keystroke	Measurement is started by tapping on the corresponding button
Level	Measurement is started on exceeding or dropping below a limit value

Window	Measurement is started on exceeding or dropping below one of two limit values for a defined measuring range
Time	Measurement is started at a defined moment of time
External	Measurement is started on transition of a digital signal from High to Low Measurement is started on transition of a digital signal from Low to High
Channel warning value	Measurement is started when defined warning values occurs
Channel alarm value	Measurement is started when defined alarm values occur



INFORMATION

Please note that the D-IN connection must be activated for the external trigger. Refer to Chapter "D-IN/D-OUT F1/F2" on Page 93.

Measurement is started when the trigger is triggered and stopped when the defined storage time has expired or the **Start/Stop** button is tapped.

13.02.2020 13:37 USB 1 USB 2 6 99%







Standard Fast measurement


Storage time	000:00:02:00 d:h:m:s
Pre-trigger time	00:00:00 h:m:s
Trigger type	Keystroke
Auto repeat	<input type="checkbox"/> OFF
Measurement name	Trigger_001
Ring buffer	<input type="checkbox"/> OFF
Maximum storage time	000:00:13:20
Expected file size	4.80 MB


Fig. 37 Fast measurement, settings

6.6 Completing a Measurement

The description below explains how to complete a measurement according to an example:

- 1 Switch the device on. Further information is available in Chapter  "Switching the Device On and Off" on Page 32.
- 2 Connect the sensors to the device according to your application. Further information is available in Chapter  "Connecting the Sensors" on Page 33.
- 3 Setup the channels displayed according to your application. Further information is available in Chapter  "Edit Channels" on Page 61.
- 4 Select a measuring method. Further information is available in Chapter  "Measuring Methods" on Page 65.
- 5 Tap on the **Start/Stop** button to start a measurement. Alternatively, wait until the defined trigger is triggered.
 Recording of the measured data is started.
- 6 To stop the measurement, based on the measuring method selected:
 Tap on the **Start/Stop button**, wait for the defined storage time to expire, wait for the defined trigger to trigger.
 Recording of the measured data is stopped.




After recording is stopped, the measured data is saved in the Service Project Container (SPC) at the defined storage location. Further information is available in Chapter  "Project Management" on Page 81.

You can access the measured data via the File Manager in order to complete evaluations. Further information is available in Chapter  "File Manager" on Page 87.

6.7 Project Management

Individual settings related to measuring tasks can be stored in an SPC (Service Project Container).

An SPC serves for:

-  project-related compilation of measured data, templates and media data
-  exchanging with colleagues or other organizations
-  compressing the measured data which reduces the memory space required on a USB stick. It has no effect on the internal device memory.

6.7.1 SPC (Service Project Container)

An SPC consists of the three following folders:

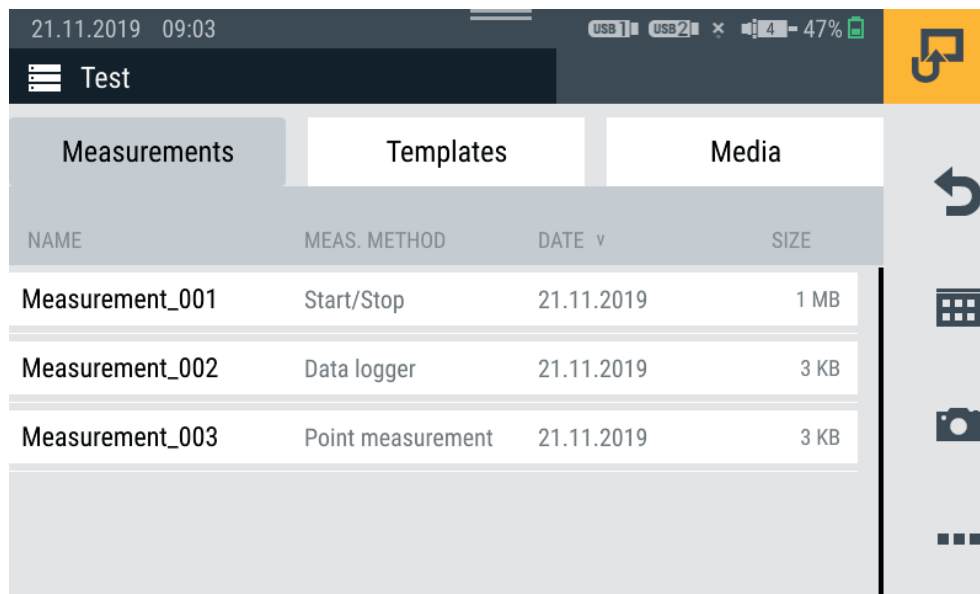
- ☐ Measurement data
- ☐ Templates
- ☐ Media data

An SPC stores data from the following categories:

- ☐ Measurements: Relate to measured data from measurements already completed
- ☐ Templates: Relate to templates for measurements comprised of the screen view and settings for individual channels, measuring methods with corresponding settings, sensor types and parameters, list positions of the channels
- ☐ Media: PDF files, screenshots, photos, videos* etc.

These settings can be used as templates for new measuring tasks.

An SPC can contain and manage several different measuring tasks.



NAME	MEAS. METHOD	DATE	SIZE
Measurement_001	Start/Stop	21.11.2019	1 MB
Measurement_002	Data logger	21.11.2019	3 KB
Measurement_003	Point measurement	21.11.2019	3 KB


*This option was not available at the time of the manual going to print.

Fig. 38 SPC (Service Project Container)

When the default settings are set for the device, a standard SPC is predefined. If no other settings are defined in other individual SPCs, data is stored in the predefined standard SPC.


**INFORMATION**

Please note that the standard SPC is essential for correct functioning of the device and cannot be deleted.

SPCs and the related files can be edited or fully deleted via the File Manager. Further information on editing and deleting files is available Chapter  "File Manager" on Page 87.

6.7.2 Creating an SPC (Service Project Container)

An SPC must be created prior to starting or after stopping a measurement.

- 1 Connect the sensors to the device according to your application. Further information is available in Chapter  "Connecting the Sensors" on Page 33.
- 2 Set the measurement view required. Further information is available in Chapter "Edit Channels" on Page 61.
- 3 Open the options and tap on the **Save Template as** button.

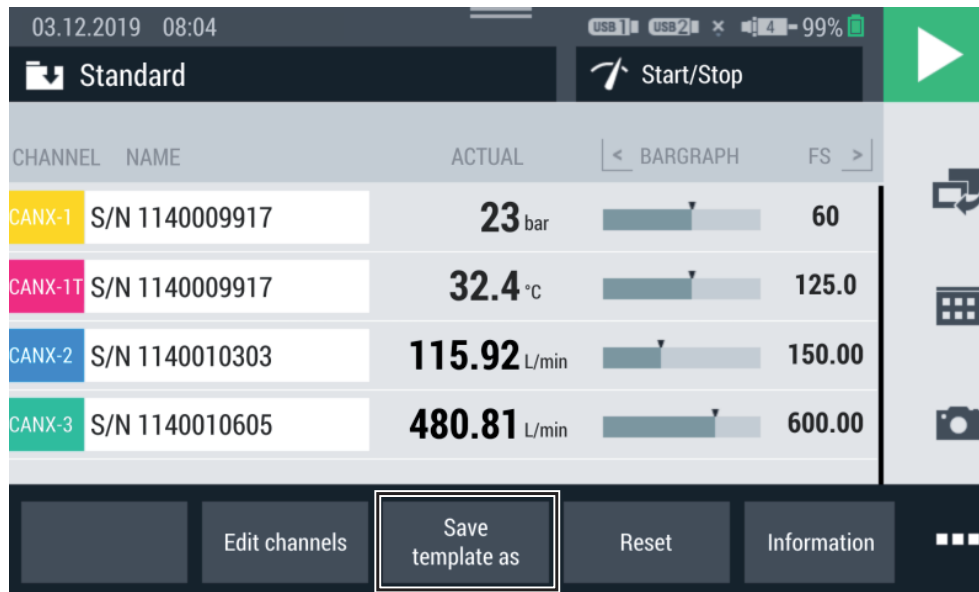


Fig. 39 Create an SPC (Service Project Container) (1)

➡ The **Save template** window opens.

- 4 Enter a name for the template in the **Name** field.
- 5 If necessary, enter an appropriate comment regarding the measurement or the project in the **Comment** field.
- 6 Select a storage location in the **Storage location** field.
- 7 Tap on the **SPC - Service Project Contai...** field.

03.12.2019 08:35

Save template

Name Template_001

Comment < Please enter a comment >

Storage location Device memory

SPC - Service Project Contai... Standard

Fig. 40 Create an SPC (Service Project Container) (2)

↩ The **Select storage location** window opens.



INFORMATION

If the storage location selected already contains SPCs, an overview of the SPCs opens.

If necessary, select an existing SPC or tap on the **+** button to add a new SPC.

- 8 Enter a name for the new SPC (Service Project Container) in the **Name** field.
- 9 Select a storage location for the Service Project Container (SPC) in the **Storage** field.

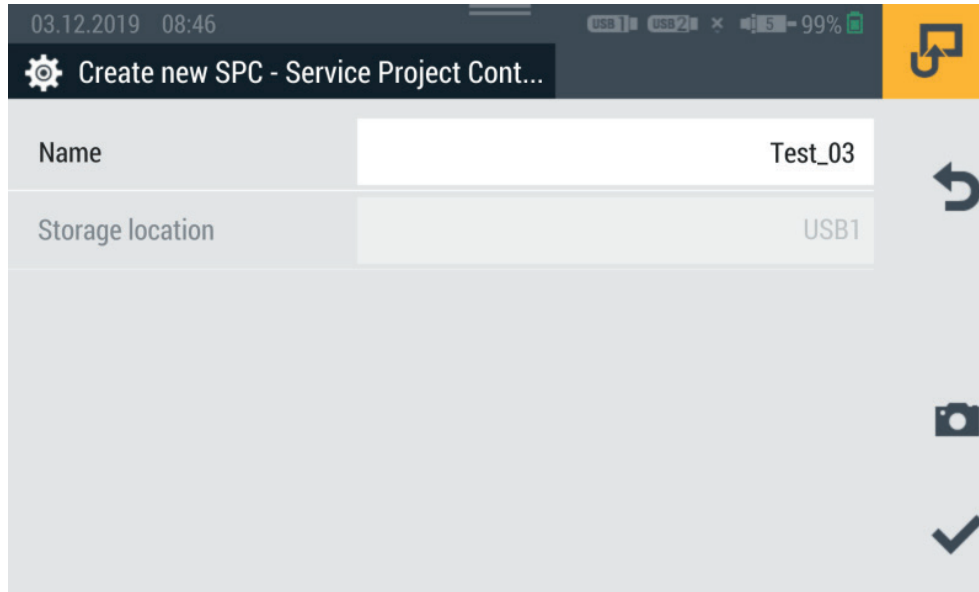


Fig. 41 Create an SPC (Service Project Container) (3)

- 10 Tap on the ✓ button to save the Service Project Container (SPC).
 - ↳ The **Save template** window opens again.
- 11 Tap on the ✓ button to save the template.
 - ↳ The new template and new Service Project Container (SPC) have now been created.

6.8 Menu

The **Menu** can be opened by tapping the  button.

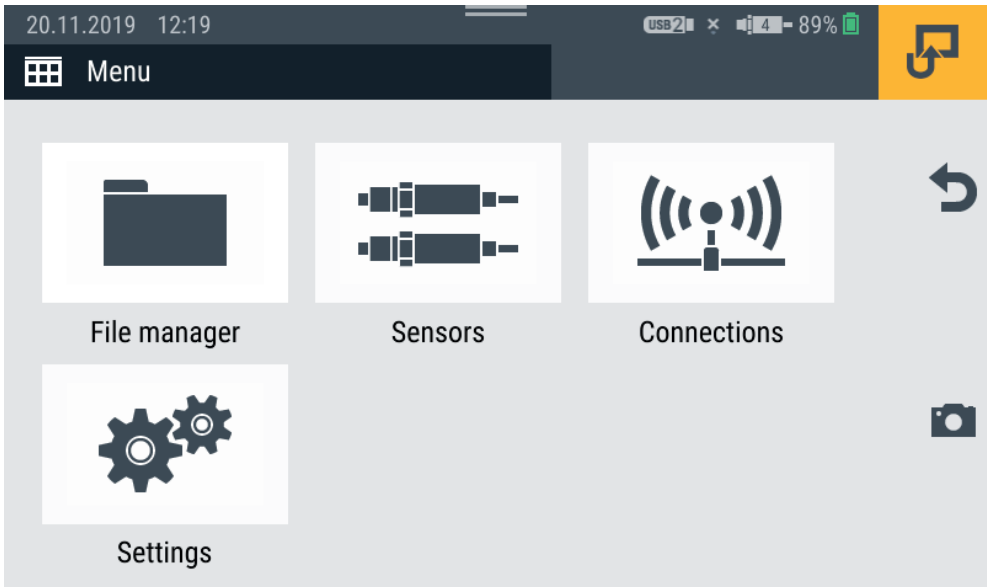


Fig. 42 Menu

The **Menu** enables access to the following submenus:

Designation	Description
File manager	To manage all the files (e.g. measured data, PDF files, photos, videos) in the various storage locations of the device. Refer to Chapter "File Manager" on Page 87
Sensors	To setup and configure the sensors connected. Refer to Chapter "Sensors" on Page 89
Connections	To manage all the connections (e.g. network, cloud) Refer to Chapter "Connections" on Page 100
Settings	To setup the device (e.g. screen brightness, volume, battery). Refer to Chapter "Settings" on Page 104

Use the button to return to the measurement view.

6.9 File Manager

The **File manager** menu is used to administrate the Service Project Container (SPC), templates, measurements and related files stored on the various storage media.

The Menu is comprised of a series of tiles which provide a preview of the settings or corresponding information contained in them. Each tile can also be used as a button to open the corresponding submenu. If a storage location is not available, the tile is grayed out.

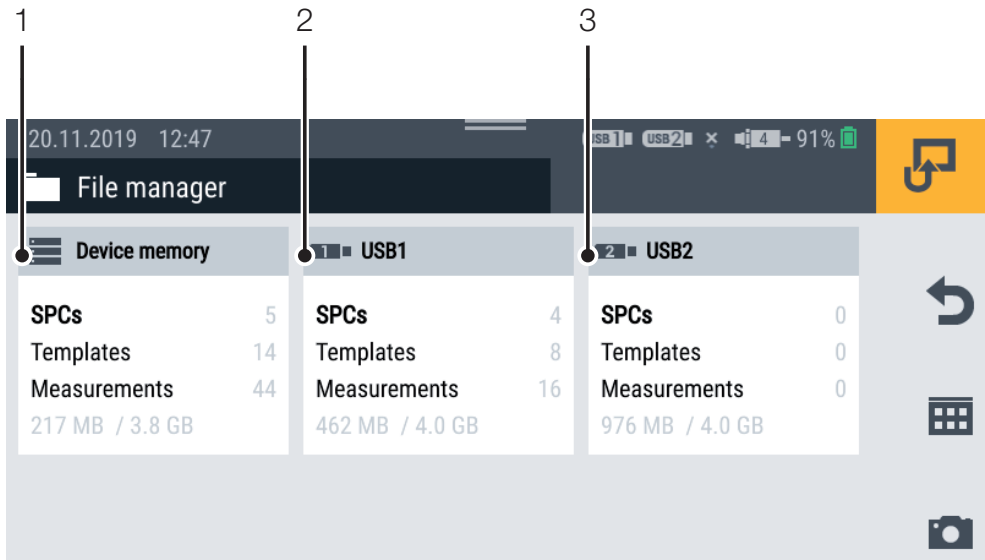


Fig. 43 File manager

Pos.	Designation	Description
1	Device memory	Represents the internal memory of the device
2	USB1	The removable media connected to the USB1 port
3	USB2	The removable media connected to the USB2 port

The tiles of the storage media provide the following information:

- ☐ The total number of Service Project Containers (SPC) stored
- ☐ The total number of templates stored
- ☐ The total number of measurements stored
- ☐ An overview of the occupied and total number of storage locations

6.9.1 Managing Files

The management of files is independent of the storage medium selected. After selecting a storage medium (e.g. Device Memory), the following functions are available via the options:

Designation	Description
-------------	-------------

Copy	Copy file(s)
Move	Move file(s) to a different folder/memory location
Delete	Delete file(s)
Rename	Rename the file(s)
Search	Search for file(s)

After selecting a storage medium, an overview of all the Service Project Containers (SPC) and other data stored on the storage medium appears.

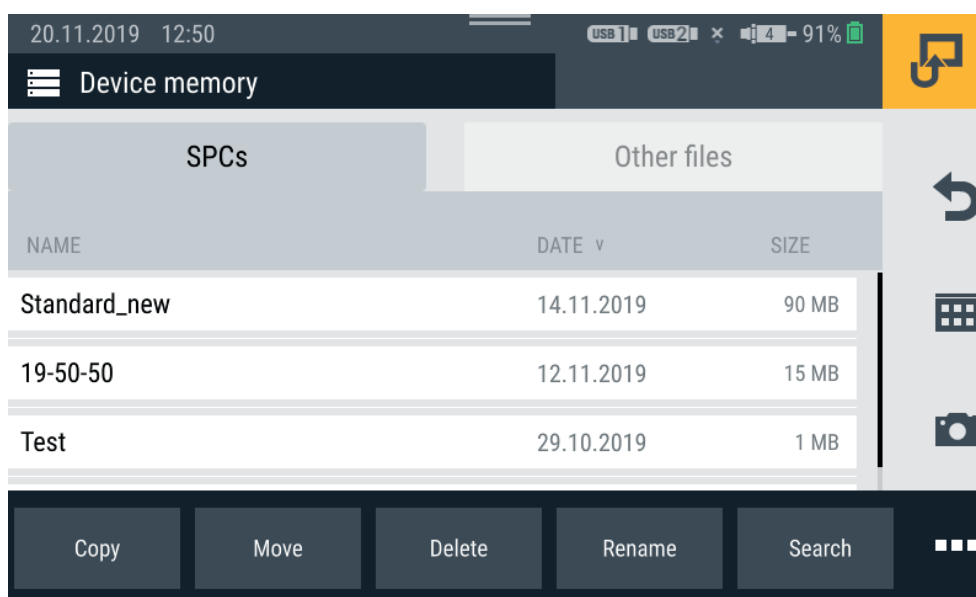


Fig. 44 Manage files



INFORMATION

Please note that only files from the **SPCs** area can be edited. Files from the **Other files** area cannot be edited.

6.10 Sensors

The **Sensors** menu contains the settings to setup and configure the sensors for all the connections on the device and input modules implemented.

The Menu is comprised of a series of tiles which provide a preview of the settings contained in them. Each tile can also be used as a button to open the corresponding submenu. If no input modules are implemented, the tiles (A, B) are grayed out.

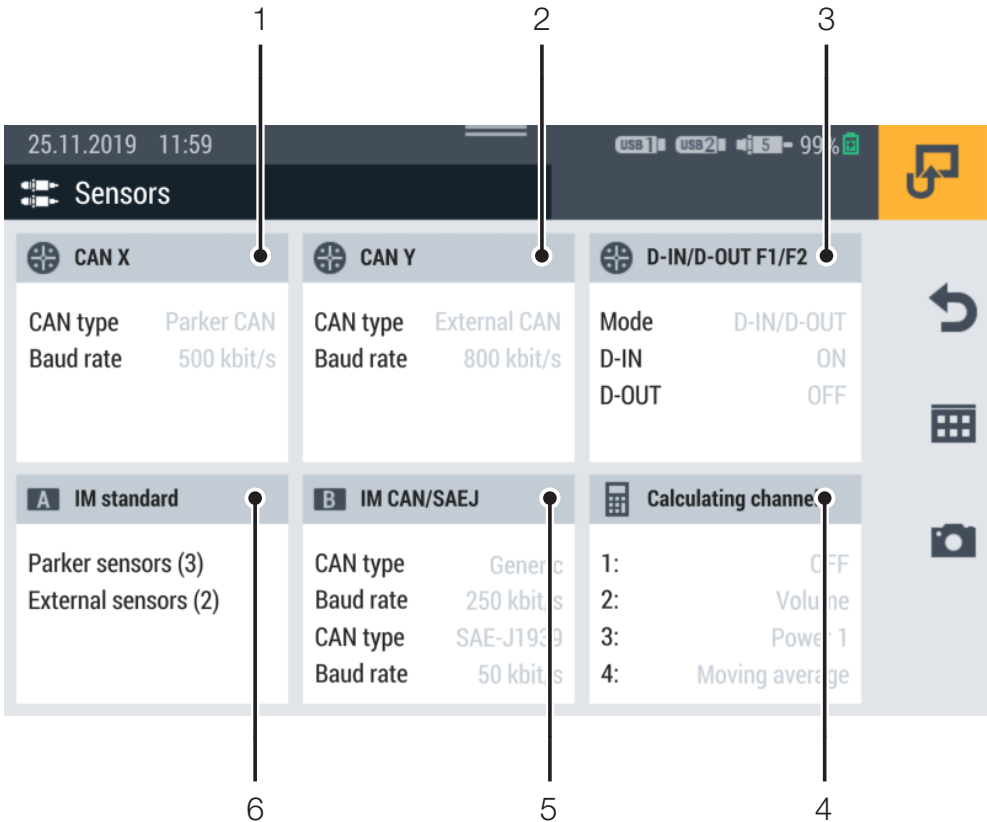


Fig. 45 Sensors

Position	Position	Description
1	CAN X	Information on the CAN X connection port
2	CAN Y	Information on the CAN Y connection port, setting and parameterization
3	D-IN/D-OUT F1/F2	Information on the connection port, setting and parameterization

4	Calculating channels	Setting of the four calculation channels
5	IM CAN/SAEJ	Setup and parameterization of the connection ports on input module B
6	IM standard	Setup and parameterization of the connection ports on input module A

6.10.1 CAN X

The **CAN X** tile displays the following information:

Designation	Description
CAN type	Current operating mode
Baud rate	Current Baud rate

Up to 24 STAUFF sensors (max. 24 channels) can be connected to the CAN X port.
Other setting adjustments are also possible.

6.10.2 CAN Y

The **CAN Y** tile displays the following information:

Designation	Description
CAN type	Current operating mode
Baud rate	Current Baud rate

The menu is used to select the operating mode and perform further settings.

The following operating modes are available for selection:

Designation	Description
STAUFF CAN	STAUFF CAN (standard connection)
External CAN	External CAN (CANopen)

When **STAUFF CAN** operating mode is active, up to 24 STAUFF sensors (max. 24 channels) can be connected. Sensors with automatic sensor detection (STAUFF CAN) are detected by the device and are operational. Other setting adjustments are not possible.

When **External CAN** operating mode is active, you can set the Baud rate for the CAN bus and connect up to 5 external sensors (max. 5 channels). Select a message type for each channel. The following signal types are available:

☐ CANopen PDO

☐ CAN Generic

Define the parameters for the selected channel according to your application.

Fig. 46 CAN-Y connection port, settings

For further information, refer to the  Technical Data related to the sensors connected.



INFORMATION

When **External CAN** operating mode is active, the settings may only be defined by properly trained technicians.

6.10.3 D-IN/D-OUT F1/F2

The **D-IN/D-OUT F1/F2** tile displays the following information:

Designation	Description
Mode	Current operating mode
D-IN	Current operating status of the D-IN connection port
D-OUT	Current operating status of the D-OUT connection port

The menu is used to select the operating mode and perform further settings. The following operating modes are available for selection:

Designation	Description
D-IN/D-OUT	DIGITAL-IN and DIGITAL-OUT
Frequency 1/ Frequency 2	Two-channel frequency for volume flow
Two-channel frequency	Frequency connection with rotation direction detection
D-IN State (0/1)	Operating mode D-IN
D-OUT State (0/1)	Operating mode D-OUT

Setup the selected operating mode according to your application.

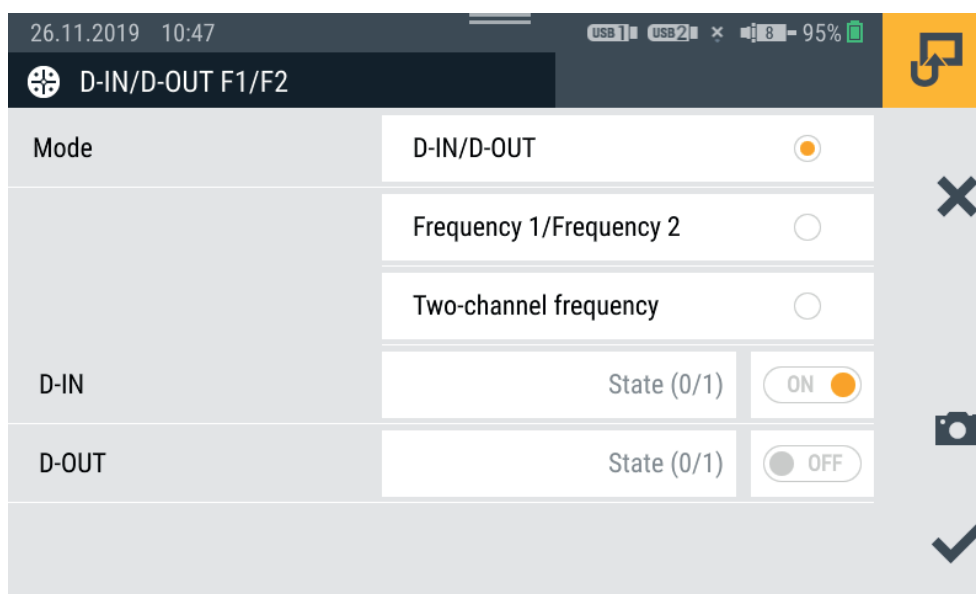



Fig. 47 Connection D-IN/D-OUT F1/F2, settings

Further information is provided on the following pages and in the  Technical Data related to the sensor connected.

D-IN Settings

The following operating modes are available for the DIGITAL-IN connection port:

Designation	Description
Counter (rising slope)	Recording of a measuring point on transition of a digital signal from Low to High
Counter (falling slope)	Recording of a measuring point on transition of a digital signal from High to Low
State (0/1)	Switch operating status on/off

D-OUT Settings

The following operating modes are available for the DIGITAL-OUT connection port:

Designation	Description
Counter	Counter
State (0/1)	Switch operating status on/off

Select between the following combinations as the start condition:

- ☐ Condition A
- ☐ Conditions A and B
- ☐ Conditions A or B

The following triggers are available for the conditions:

Condition A	Condition B
Level	Level
Window	Window
Time	
External	External
Channel warning value	
Channel alarm value	

The table below contains information on the triggers available:

Designation	Description
Level	Measurement is started/stopped on exceeding or dropping below a limit value
Window	Measurement is started/stopped on exceeding or dropping below one of two limit values for a defined measuring range
Time	Measurement is started/stopped at a defined moment of time
External	Measurement is started/stopped on transition of a digital signal from High to Low Measurement is started/stopped on transition of a digital signal from Low to High
Channel warning value	Measurement is started/stopped when defined warning values occur
Channel alarm value	Measurement is started/stopped when defined alarm values occur

The following methods are available in the **Switch function** area:

Designation	Description
NCLS (Opener)	0 = Active-Low: Output is < 0.2 V (closed) 1 = Active-High: Output is dead (open)
NOPN (Closer)	1 = Active-High: Output is dead (open) 0 = Active-Low: Output is < 0.2 V (closed)

Frequency 1 Settings

The following measuring methods are available for the Frequency 1 connection :

Designation	Description
Frequency	Measurement of the frequency
Rotational speed	Measurement of the rotational speed
Flow rate	Measurement of the flow rate

Define the settings according to your application.

Frequency 2 Settings

The following measuring methods are available for the Frequency 2 connection :

Designation	Description
Frequency	Measurement of the frequency
Rotational speed	Measurement of the rotational speed
Flow rate	Measurement of the flow rate

Define the settings according to your application.

Two-channel Frequency Settings

The following measuring methods are available for the combined two-channel connection:

Designation	Description
Frequency	Measurement of the frequency
Rotational speed	Measurement of the rotational speed
Flow rate	Measurement of the flow rate

Define the settings according to your application.

6.10.4 Input Modules A and B

The **Input module A** and **Input module B** tiles display information on the connections and sensors connected according to the input module implemented.

Further options are available for setup and configuration according to the input module and connections available.

For further information, refer to the  **Technical Data** related to the sensors.

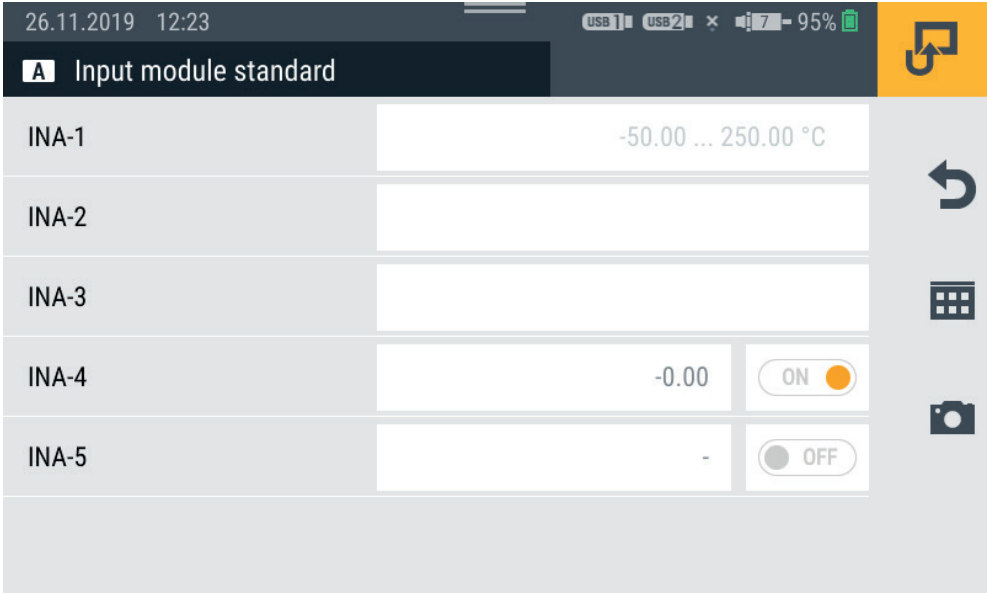


Fig. 48 Input module, settings

Sensors Without Sensor Detection

There are two methods with which to connect sensors without sensor detection to the device.

Method 1: Direct connection to the analog IN4/5 connection on the analog input module in accordance with the figure:

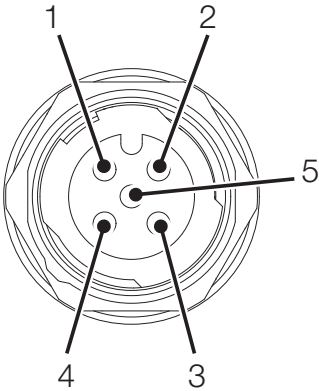


Fig. 49 PIN assignment of sensors without sensor detection

PIN	Designation
-----	-------------

1	+Ub (+24 VDC)
2	Measuring signal 1 (IN4)
3	GND
4	Measuring signal 2 (IN5)
5	GND

Method 2: Use of an adapter (current/voltage converter). The adapter is connected between the sensors without sensor detection and the connection for analog sensors with automatic sensor detection (IN1-IN3). If a sensors without sensor detection is connected to the device using this method, further configurations must be completed in the corresponding menu.



INFORMATION

Further information on connecting sensors without sensor detection via an adapter and the relevant parameters for configuration is available in the manual supplied with the respective sensor.

6.10.5 Calculating Channels

The **Calculating channels** tile displays the following information:

Designation	Description
1:	The calculation type for channel 1
2:	The calculation type for channel 2

3:	The calculation type for channel 3
4:	The calculation type for channel 4

The menu is used to select the corresponding type of calculation for each channel. The following calculation types are available:

Designation	Description
Subtraction	To calculate difference measurements A condition is the channels have a similar physical unit
Addition	To calculate additions A condition is the channels have a similar physical unit
Volume	To calculate the flow rate, in liters, within a certain time A condition is an active channel with volume flow in l/min
Power 1	To calculate power A condition is at least one pressure channel and one flow channel
Power 2	To calculate power through differential pressure A condition is two pressure channels and one flow channel
Moving average	To calculate a floating average for a channel

In addition to the calculation types available, freely editable equations can be created with up to three variable channels.

The **formula library** contains standard formulas and new formulas can be saved in the **user formula library**.

Define the calculation types according to your application.

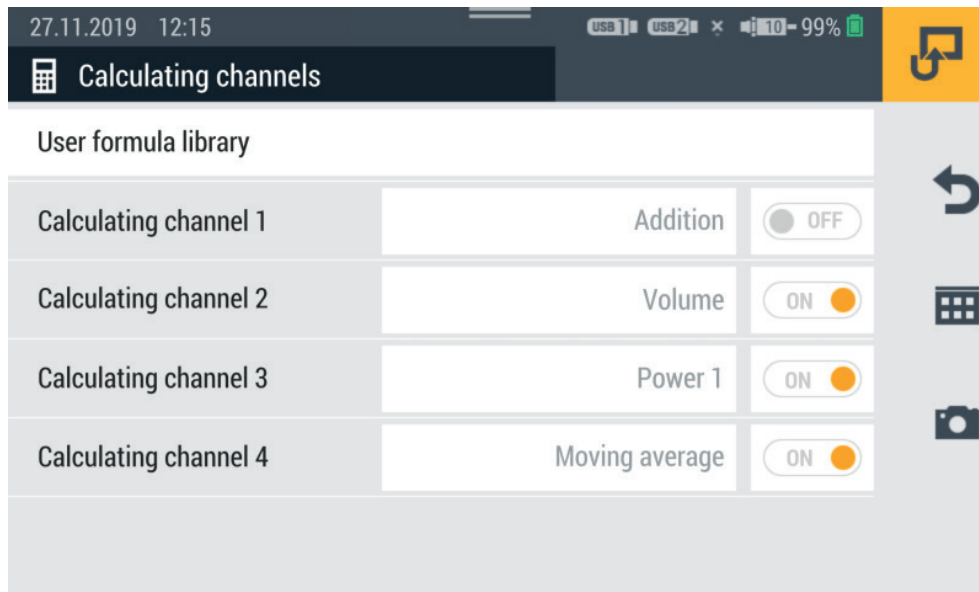


Fig. 50 Calculating channels

6.11 Connections

The **Connections** menu contains settings related to the individual connection methods of the device.

The menu is comprised of a series of tiles which provide a preview of the settings contained in them. Each tile can also be used as a button to open the corresponding submenu.

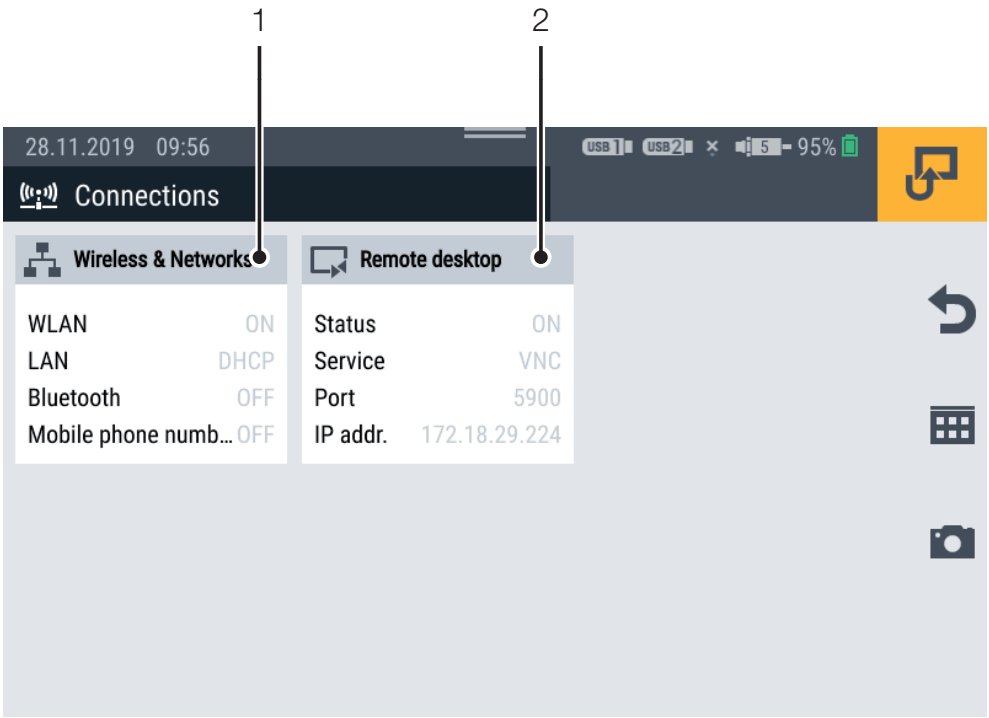


Fig. 51 Connections

Pos.	Designation	Description
1	Wireless & Networks	Settings for wifi, LAN, Bluetooth, mobile communication, proxy server

2	Remote desktop	Activate/Deactivate and settings for remote access
---	----------------	--

6.11.1 Wireless & Networks

The **Wireless & Networks** tile displays the following information:

Designation	Description
WLAN	Status of the wifi connection
LAN	Status of the LAN connection
Bluetooth	Status of the Bluetooth connection
Mobile phone number	Status of the mobile communication

The submenu enables you to define settings for wifi and LAN connections and to connect or disconnect the respective connection:

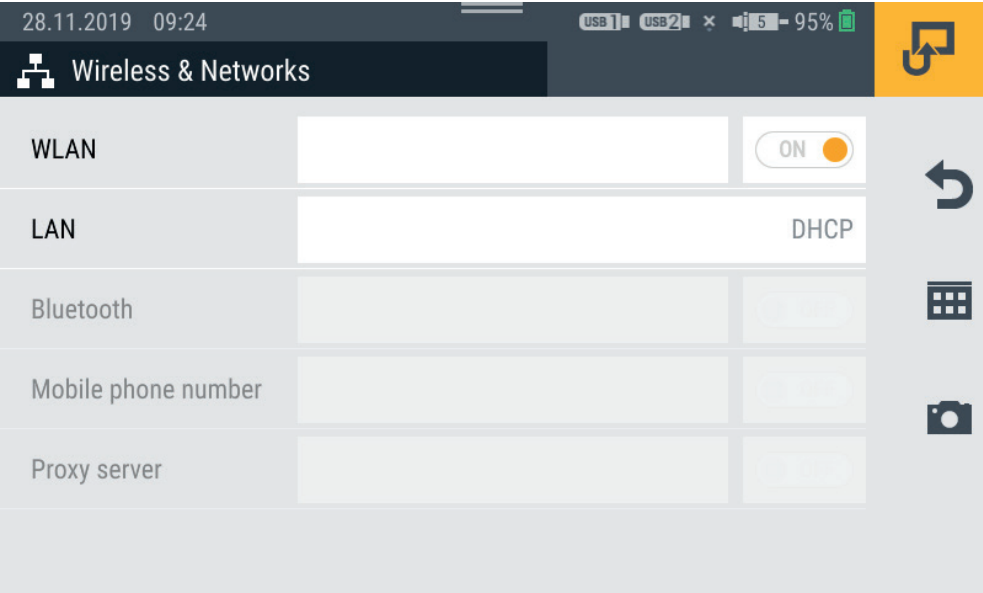


Fig. 52 Wireless & Networks

6.11.2 Remote Desktop

The **Remote desktop** tile displays the following information:

Designation	Description
-------------	-------------

Remote desktop	Status of the remote desktop connection
Service	The service set
Port	Port on the device
IP addr.	IP address of the device

The menu can be used to activate /deactivate the connection and enable the remote desktop connection and define a password.

The maximum length of the password is 8 characters.

The **VNC** service is available to use the remote desktop connection.

To use the remote desktop connection, you must authenticate yourself with the user name and password.

28.11.2019 09:54

USB 1 USB 2 95%

Remote desktop

Remote desktop ☐ ON

Service VNC

IP address 172.18.29.224

Port 5900

Password

Fig. 53 Remote desktop



INFORMATION

The IP address is automatically displayed when the LAN or wifi connection is active. If both connections are active, only the IP address of the LAN connection is displayed.

6.12 Settings

The **Settings** menu is used to define basic settings for the device, manage user information and update the firmware.

The Menu is comprised of a series of tiles which provide a preview of the settings or corresponding information contained in them. Each tile can also be used as a button to open the corresponding submenu.

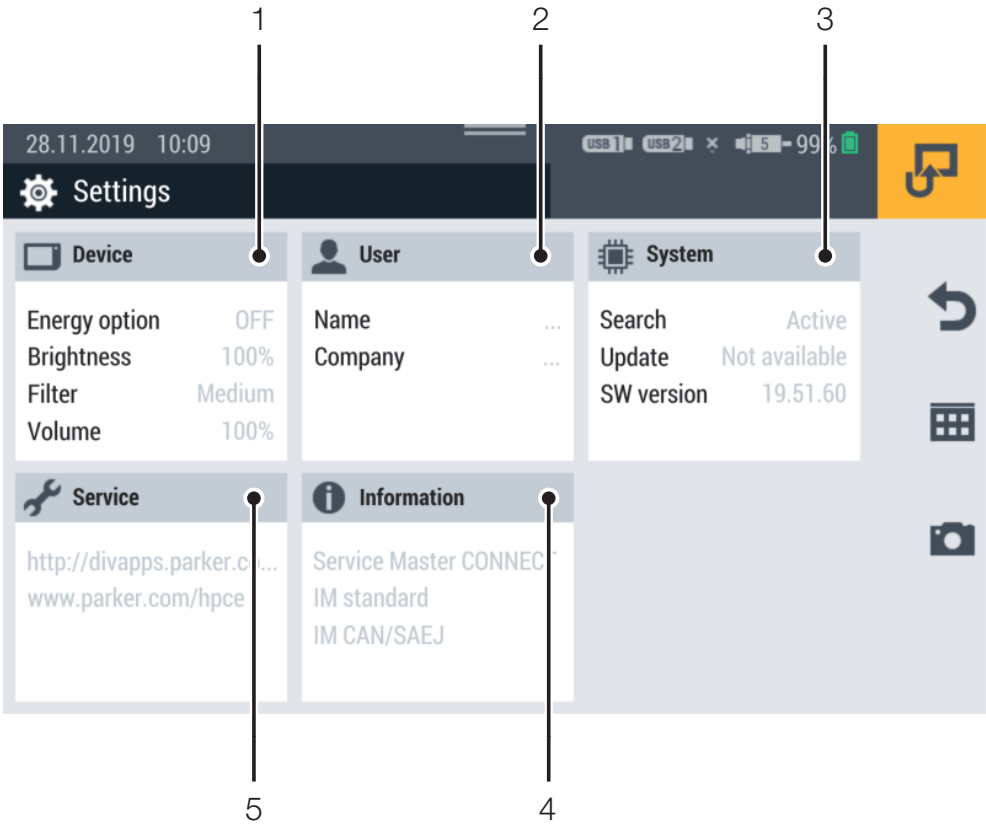


Fig. 54 Settings

Pos.	Designation	Description
1	Device	Settings on the device

2	User	User information
3	System	Update the device firmware, create a backup
4	Information	Information on the device
5	Service	Link to the service and manufacturer websites

6.12.1 Device

The **Device** tile displays the following information:

Designation	Description
Energy option	The energy-save option set
Brightness	The brightness set
Filter	The screen filter set
Volume	The volume set

You can use the menu to define the following settings:

Designation	Description
Display	Screen brightness and filter for the measured value display
Menu	Pressure, temperature, flow rate, particles, water in oil, volumes, power
Display dimming	Time until the display is dimmed
Tones	Volume of the device for various notifications
Position determination	Switch the GPS on and off, select the system for GPS
Language	Languages
Time/Date	Time and date
Keyboard	QWERTZ / QWERTY / AZERTY

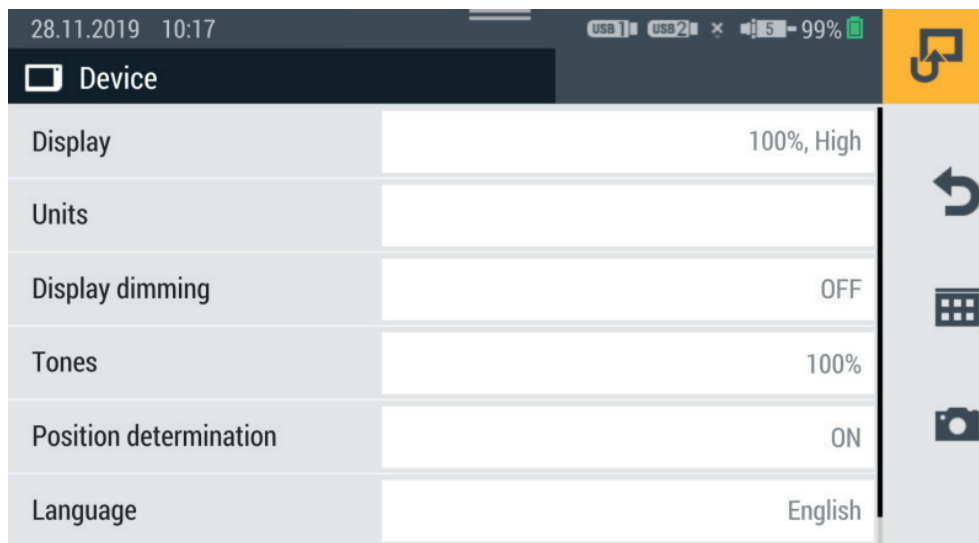


Fig. 55 Device

6.12.2 User

The **User** tile displays the following information:

Designation	Description
Name	Name of the user
Company	Name of the company
Department	Name of the department
Phone number	Landline phone number
Mobile phone number	Mobile phone number

The menu contains further information and options to edit the information.



INFORMATION

Information is voluntary. All the functions on the device can be used even without this information.

To improve assignment, the name entered is added when a measurement is saved.

28.11.2019 11:27 USB 1 USB 2 99%

User

Name

USER INFORMATION

Company

Department

Phone number

Mobile phone number

Fig. 56 User

6.12.3 System

The **System** tile displays the following information:

Designation	Description
Search	Status of the automatic search for the firmware
Update	Availability of a new firmware version
SW version	Current firmware version

The menu contains the following information:

Designation	Description
Save & Reset	Data backup, restore a data backup or reset the device to its default settings
Software update	Read out and update the firmware version

Information on completing a data backup is available in Chapter "Creating a Backup" on Page 111.

Information on resetting the device is available in Chapter "Resetting the Device to its Default Settings" on Page 117.

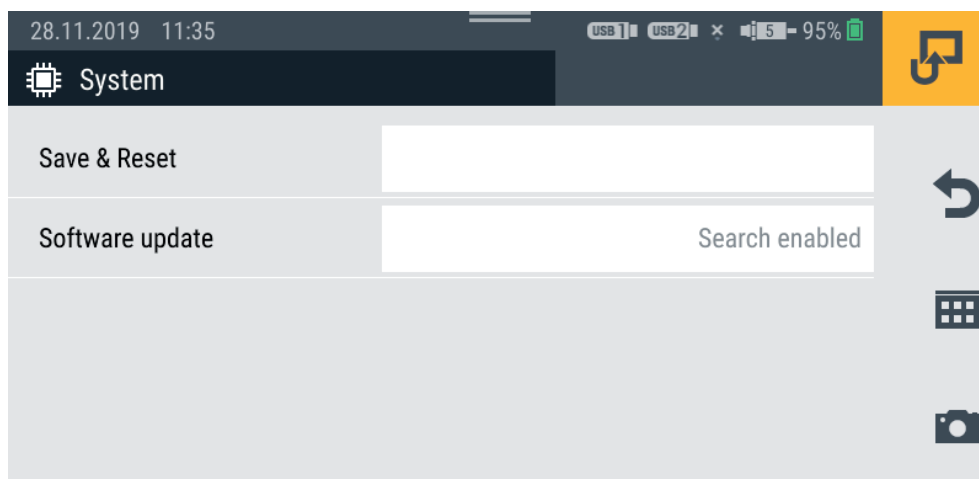


Fig. 57 System

6.12.4 Service

The **Service** tile displays links to the manufacturer's website.

6.12.5 Information

The **Information** tile displays the following information:

- ? Name of the device

🔍 Name of the input module inserted

The menu contains the following information:

Designation	Description
Device	Hardware formation: Manufacturer, serial number, order code, hardware version, operating system, operating system version, kernel version, FCC, CE, Approvals, GNSS, LTE, Bluetooth, Wifi, PTS number
Input modules	Name, serial number, order code, hardware version, firmware version, next calibration
Memory	Internal memory, USB1, USB2, network drive, cloud
Battery	Capacity, voltage, current, battery temperature, remaining charge time, remaining operating time, number of charge cycles
User manual	Operating manual

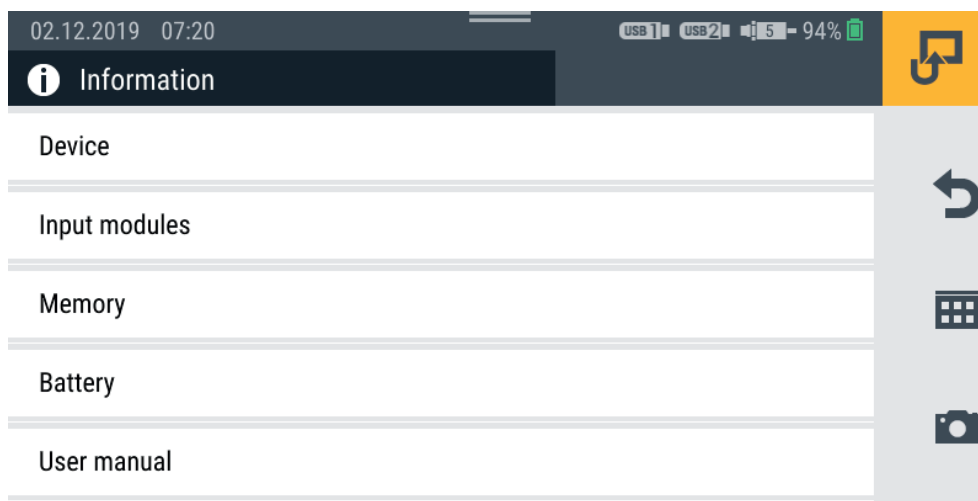


Fig. 58 Information


6.13 Creating a Backup

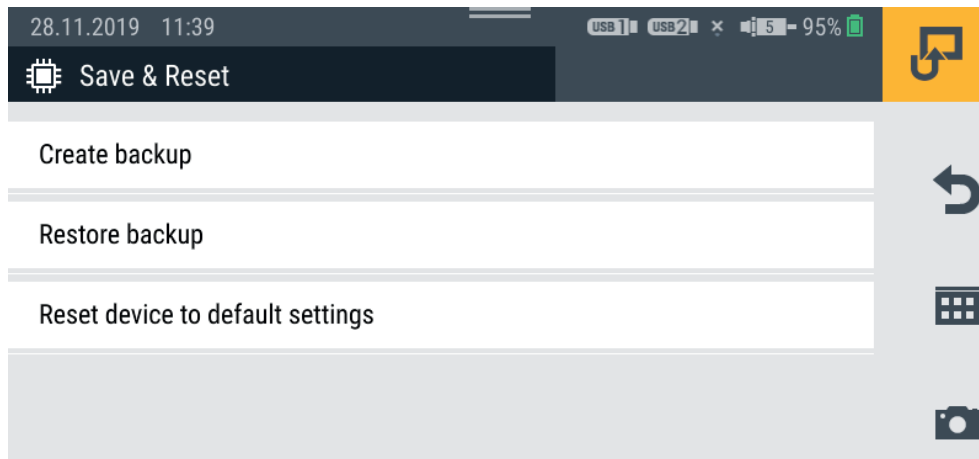
Save the data stored on the device before you reset the device or update the firmware.



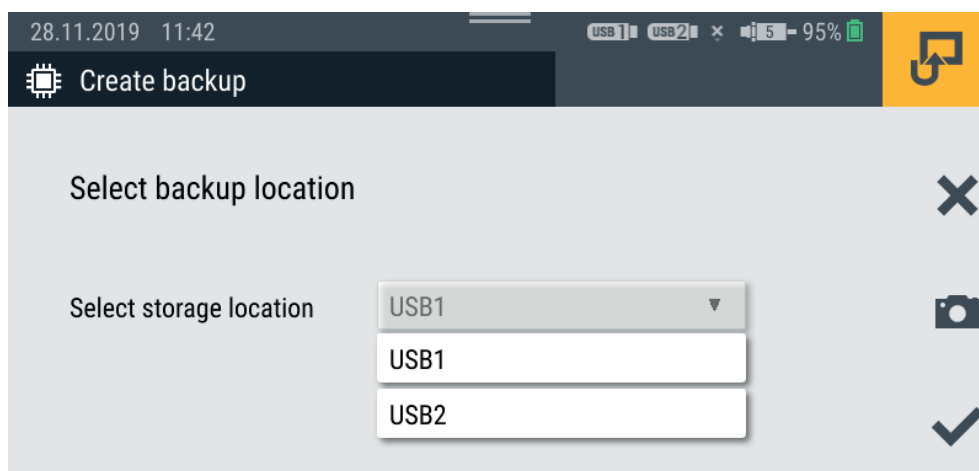
INFORMATION

In the case of a data backup, all the SPCs, including the measurements, templates and media data and current firmware on the device, are saved.

- 1 Connect a storage medium (e.g. USB stick) to save the data.
- 2 Tap on the  button.
- 3 Navigate to the **Settings** > **System** > **Save & Reset** menu option.
- 4 Tap on the **Create backup** button.



- 5 Select the storage medium (e.g. USB1) in the **Storage location** area.



**IMPORTANT**

Data loss will occur if the process is stopped.

The data backup could be incomplete if the process is stopped.

- ❗ Before starting the process, ensure that the battery is charged to at least 50% or the device is connected to the main power via the power adapter.

6 Tap on the  button.


➡ The backup is performed. The process may take a few minutes.

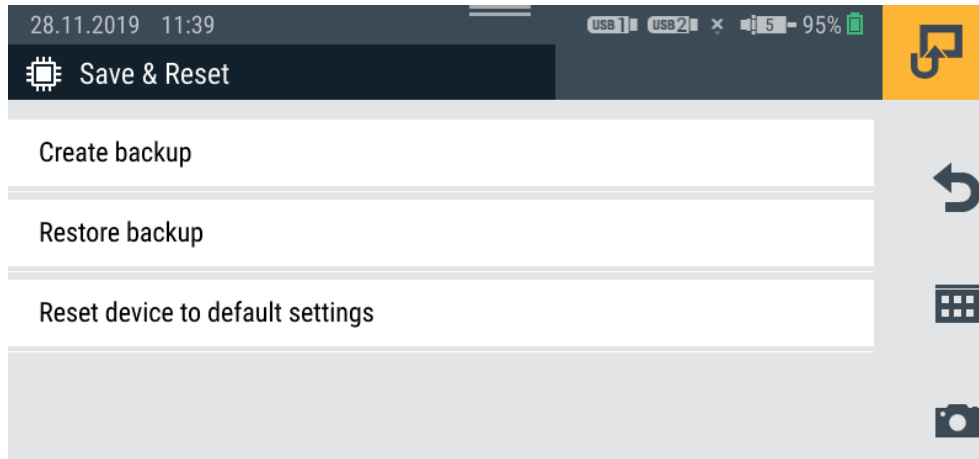
6.14 Restoring a Backup

You can restore the data from a backup on your device.

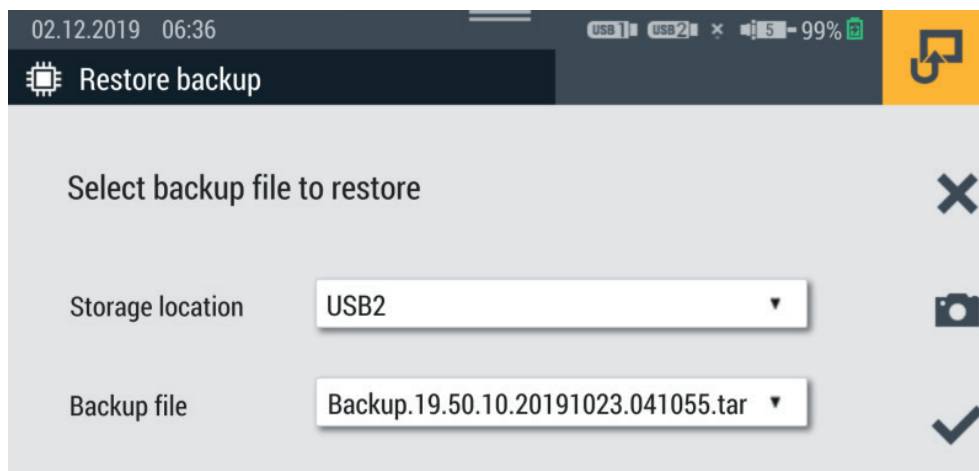
**INFORMATION**

Please note that when restoring data from a backup, the firmware saved on the backup is also restored.

- 1 Connect the storage medium (e.g. USB stick) which contains the data backup.
- 2 Tap on the  button.
- 3 Navigate to the **Settings > System > Save & Reset** menu option.
- 4 Tap on the **Restore backup** button.



- 5 Select the storage medium (e.g. USB1) in the **Storage location** area.
- 6 Select the data backup required from the **Backup file** area.





IMPORTANT

Data loss will occur if the process is stopped.

The data restored could be incomplete if the process is stopped.

- ⓘ Before starting the process, ensure that the battery is charged to at least 50% or the device is connected to the main power via the power adapter.

7 Tap on the button.

➞ The data restoring process is performed. The process may take a few minutes.

7. Troubleshooting

This chapter contains information on dealing with faults and errors.

Problem	Possible solution
Device cannot be switched on	Charge the battery in the device
Device does not respond	Restart the device
Device has no reception	Change your location Restart the device
Sensors are not displayed	Check the cabling is correct Check the connections for soiling

Always ensure that the latest version of the firmware is installed on the device. Further information on updating the firmware is available in Chapter "Updating the Firmware" on Page 118.

If you find no solution to your problem in this user manual, contact the relevant sales

outlet.



IMPORTANT

Risk of material damage through improperly performed repair work.

- ⚠ Never open the device!
- ⚠ Never attempt to perform repair work yourself.
- ⚠ In the event of defects, return the device to the manufacturer!

7.1 Restarting the Device

If the device no longer responds, it must be restarted.



IMPORTANT

Loss of data.

Data which has not been saved could be lost if the device is restarted.

- ⚠ Only initiate a restart of the device when it is absolutely necessary.

- 1 Press the On/Off switch and yellow function key simultaneously for approx. 3 seconds.

➡ The device is switched off.

- 2 Press the On/Off key.

➡ The device starts up again.

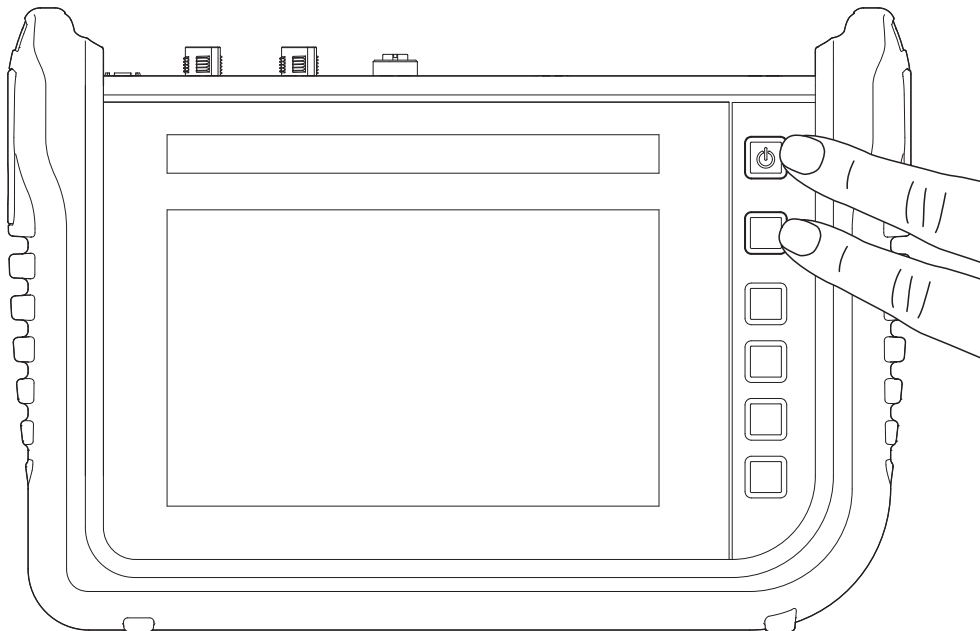


Fig. 59 Restarting the device

7.2 Resetting the Device to its Default Settings

You can reset your device to its status on delivery.



INFORMATION

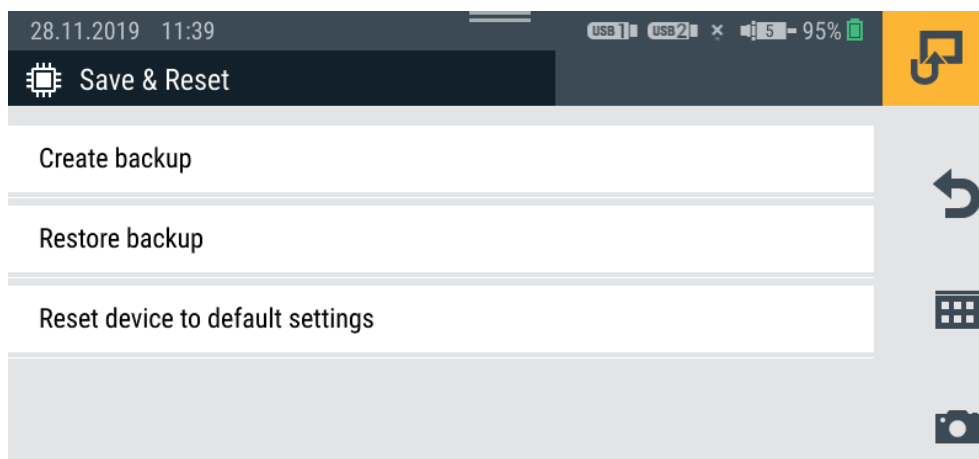
Before resetting the device, make a backup of the data on the device. Refer to Chapter "Creating a Backup" on Page 111.



IMPORTANT

All the settings and parameters are returned to their default settings following a reset.

- 1 Tap on the button.
- 2 Navigate to the **Settings > System > Save & Reset** menu option.
- 3 Tap on the **Reset device to default settings** button.





IMPORTANT

Risk of property damage if the process is stopped.

If the process is stopped, the file system of the device could be damaged.

- ⓘ Before starting the process, ensure that the battery is charged to at least 50% or the device is connected to the main power via the power adapter.

- 4 Tap on the  button to confirm the process.

⚠ The device is reset to the default settings. The process may take a few minutes.


7.3 Updating the Firmware

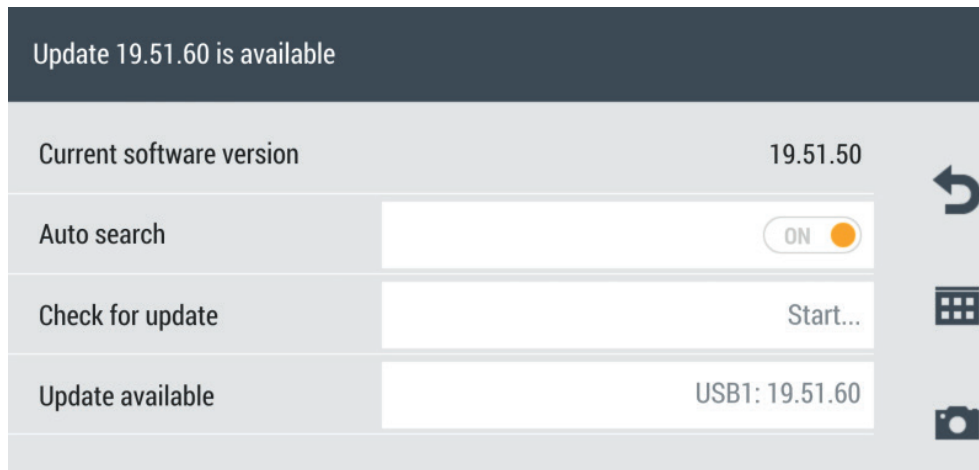
You can update the firmware on the device using a USB stick.



INFORMATION

Please note that the files for the firmware version on the USB stick must be in the main folder.

- 1 Tap on the  button.
- 2 Navigate to the **Settings > System > Software update** menu option.
- 3 Tap on the **Check for update** button.



↪ The device searches for a firmware version update.

↳ If there is no firmware update available, a system message appears. The current version number appears in the **Update available** field.

4 Tap on the **Update available** field.




IMPORTANT

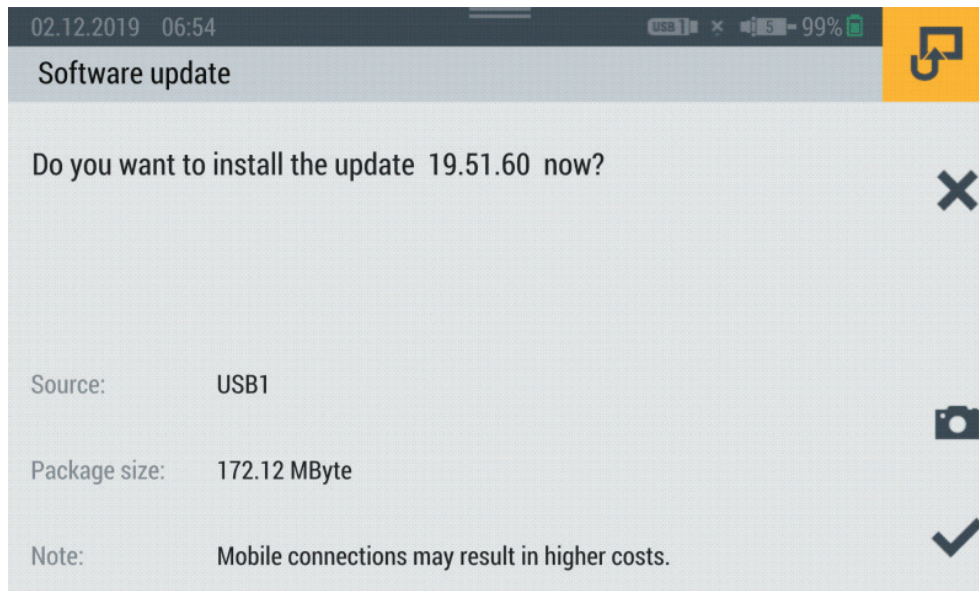
Risk of property damage if the update process is stopped.

If the update process is stopped, the file system of the device could be damaged.

- ☐ Before starting the update process, ensure that the battery is charged to at least 50% or the device is connected to the main power via the power adapter.

5 Tap on the  button to start updating the firmware.

↳ The firmware on the device is updated. A progress bar indicates the status of the updating process.



6 Wait until the process has finished.

↳ The device restarts several times during the process.

↳ When the process has been completed, the corresponding message appears in the display.

↳ The latest version of the firmware is now installed on the device.

8. Packaging and Transporting

This chapter contains information on packaging and transporting.



IMPORTANT

Risk of property damage through improper storage and transportation.

- ❑ Do not store the device with a low battery charge status in order to prevent a total discharge.
- ❑ Avoid fully charging or total discharge of the battery to increase the service life of the battery. The optimum battery charge is between 10 and 90%.
- ❑ Only use the device within the temperature range permitted. Refer to Chapter "Mechanical Data" on Page 125.



IMPORTANT

Risk of property damage.

- ❑ Fit all the screw-in connections on the device with sensors or protective caps provided in order to ensure type of protection IP65.
- ❑ Never expose the device to direct sunlight over an extended period of time.



IMPORTANT

Risk of environmental pollution through lithium-ion battery.

According to the currently applicable transport regulations regarding lithium-ion batteries, the respective devices or their packaging must be specially identified for transport.

- ❑ Contact your sales outlet prior to dispatch.
- ❑ Only dispatch the device in packaging which has been appropriately identified on the outside.

9. Cleaning and Maintenance

This chapter contains information on cleaning, servicing and repairing the device.

9.1 Cleaning

Clean the touchscreen and surfaces of the device with a dry or slightly dampened, lint-free cloth.



IMPORTANT

Risk of material damage through aggressive and corrosive substances.

- ❑ Never use abrasives or volatile cleaners!
- ❑ Never use any aggressive or corrosive cleaning agents!

9.2 Maintenance

The device is maintenance-free for the user and must not be repaired by the user.

Maintenance work is not necessary on the device within the scope of the intended use.

The device must be recalibrated after a longer time in use. Contact your sales outlet in this case.

9.3 Repairing

If a defect becomes apparent on the device, please contact your sales outlet providing the following information:

- Company name
- Department
- Contact partner
- Telephone and fax number
- Email address
- Article number of the corresponding device part, firmware version and serial number if available
- Detailed description of the fault

**IMPORTANT**

Risk of material damage through improperly performed repair work.

- ❑ Never open the device!
- ❑ Never attempt to perform repair work yourself.
- ❑ In the event of defects, return the device to STAUFF!

10. Disposal

The device is composed of various materials and must not be disposed of with normal household waste. The device contains a lithium-ion battery, which can contain toxic, environmentally harmful heavy metals.

The packaging material must be disposed of according to local regulations.

What can we do for you?

We can provide you with the option of returning your old device to us for disposal at no extra cost. We then initiate recycling and disposal according to the applicable legal framework.

What do you have to do?

After your device has reached the end of its service life, simply send it (packed in a box) via a parcel service to the sales outlet which provides your support. We then carry out any recycling and disposal measures required. This is easy and free of charge for you.



IMPORTANT

Risk of environmental pollution through lithium-ion battery.
According to the currently applicable transport regulations regarding lithium-ion batteries, the respective devices or their packaging must be specially identified for transport.

- ☐ Only dispatch the device in packaging which has been appropriately identified on the outside.
- ☐ Contact your sales outlet prior to dispatch.

Any further questions?


If you have any further questions, please contact your sales outlet.

11. Technical Data


This chapter contains information on the technical data of the device and input modules available.

11.1 Device Model

Device	Connections	Sensors	Channels	Scanning rate
PPC-PAD-plus	2 CAN bus	24 CAN X	24	≥1 ms
		24 CAN Y	24	≥1 ms

	1 D-IN	1 D-IN	1	1 ms
	1 D-OUT	1 D-OUT	1	1 ms
	2 frequencies	2	2	1 ms

11.2 Mechanical Data

Designation	Property
 Dimensions	282 × 195 × 85 mm
Weight	1.880 g
Type of protection	IP65 (EN/IEC 60529:2014), all screw-in connections must be fitted with sensors or protective caps
Ambient temperature	-10 – +50 °C
Storage temperature	-20 – +60 °C
Relative humidity	0 – 80 %
Housing	ABS/PC, thermoplastic
Protective casing	TPE, thermoplastic elastomer
VESA holder	100 mm × 100 mm / M4 metric
Fold-out stand	40° angle of inclination
Slot	2× for input module

11.3 Touchscreen Data

Designation	Property
Type	P Cap multi-touchscreen, antireflective
Resolution	800 × 480 pixels
Size	7"
Surface	3 mm glass (scratchproof)
Back-lit display	0 – 100% adjustable
Brightness	450 cd
Reading angle	90° from all angles

Electrical Data

11.3.1 Power Supply (External)

Designation	Property
Plug	3-pin, female, from Binder, 719 series
Model label	GT-41133-9028-4.0-T2
Input voltage	100-240 V
Input AC frequency	50-60 Hz
Output voltage	24 V
Output current	3.75 A
Output power	90 W

11.3.2 Power Supply (Internal)

Designation	Property	Description
Battery type	Lithium-ion battery	
Voltage	+14.4 V _{DC}	
Capacity	3350 mAh	
Battery power duration	>6 h	With 24 sensors, 20 mA per sensor

11.3.3 Memory

Designation	Property
Main processor	I.MX6
Internal memory	12 GB internal SD card (approx. 250 measurements)
Measured value storage	16,000,000 data points / measurement

11.4 Inputs

11.4.1 CAN Bus

Designation	Properties	Description
Number	2	CAN X and CAN Y
Plug	5-pin, M12×1, panel connector	SPEEDCON® connector
Voltage	+18...+24 V _{DC}	Per network
Power supply	Max. 250 mA	Per connection
Fuse	Short circuit	Per network, CAN V+ to GND
CAN X	120 Ω terminating resistor between PIN 4 and PIN 5	No galvanic separation
CAN Y	120 Ω terminating resistor between PIN 4 and PIN 5	No galvanic separation
Baud rate (STAUFF CAN)	500 kBit/s	
Baud rate (external CAN)	10, 20, 50, 125, 250, 500, 800, 1000 kBit/s	Only at CAN-Y
Sensors, CAN X	Max. 24 (STAUFF CAN)	CANX1 – CANX24
Sensors, CAN Y	Max. 24 (STAUFF CAN) Max. 5 (external CAN)	CANY1 – CANY24
Scanning rate, P-channel, 1	1 ms = 1,000 meas. values/s	Up to 4 sensors per network
Scanning rate, P-channel, 2	2 ms (per network)	From 5 sensors per network

11.4.2 D-IN/D-OUT/F1/F2

Designation	Properties	Description
Number	2	1 × D-IN, 1 × D-OUT or 1 × F1, 1 × F2
Plug	5-pin, M12×1, panel connector	SPEEDCON® connector
Voltage	+24 V _{DC}	
Power supply	80 mA	
Input	D-IN/D-OUT or F1/F2	Galvanically separated
Active High	> 3 V _{DC}	
Active Low	< 1.4 V _{DC}	
Accuracy	≤± 0.1%	
D-IN input impedance	1 kΩ	
Frequency range	0 ... 20 kHz	
Load current, D-OUT	max. 20 mA	

11.4.3 Calculation Channels

Designation	Properties	Description
Number	4	CALC-1, CALC-2, CALC-3, CALC-4
Connection	Virtual	
Functions	/, *, +, -, f'(t), Integral, sin, cos, tan, x^2, SQRT, x^y	

11.5 Interfaces

11.5.1 USB Device

Designation	Property	Description
Plug	USB, female	Shielded, type B
Standard	2.0, full speed	
Transmission rate	12 MBit/s	
Power supply	No	No power supply

11.5.2 USB Host

Designation	Property	Description
Plug	2× USB, female	Shielded, type A
Standard	2.0, full speed	Host 1 and Host 2
Transmission rate	12 MBit/s	
Memory capacity	64 GB	
Voltage	+5 V _{DC}	
Power supply	Max. 450 mA	Low power
Fuse	Short circuit	VCC to GND

11.5.3 LAN

Designation	Property	Description
Plug	RJ45, female	Shielded
Transmission rate	10, 100 MBit/s	
Standard	IEEE 802.3 (10/100BaseT)	

11.5.4 Wifi (WLAN)

Designation	Property
Wifi frequency range	2.400 – 2.4835 GHz (IEEE 802.11 b/g/n) in 13 channels
Wifi transmission rate	IEEE 802.11b: to 11 MBit/s IEEE 802.11g: to 54 MBit/s
Wifi transmission power	20 mW at 2.400 – 2.4835 GHz
Wifi encryption	WPA, WPA2, WEP64/128, PEAP

11.6 Analog Input Modules

Designation	Properties	Description
Number	4	
Plug	3× 5-pin, ODU 1× 5-pin, M12×1	
Inputs	INx-1, INx-2, INx-3, INx-4, INx-5	
Voltage	+24 V _{DC}	Per network
Power supply	max. 250 mA	Thermal fuse

Interface	Measuring bus based on RS-422	
Housing material	ABS/PC	
Housing sealing	TPE	
Type of protection	IP65	When installed
Ambient temperature	-10 – +50 °C	
Storage temperature	-20 – +60 °C	

11.6.1 Connections, STAUFF Sensors

Designation	Properties	Description
Number	3	
Plug	5-pin, ODU	For STAUFF sensors
Inputs	INx-1, INx-2, INx-3	Analog
Voltage	+12 V _{DC}	
Power supply	max. 70 mA	Thermal fuse
Fuse	Protection against overvoltage, short-circuit protected	Active current monitoring for each channel
Accuracy	0.1 % FS (full scale)	= end value of measuring range
Input signal range	-3.4 V – +3.4 V	
Scanning rate	1 ms = 1,000 measured values/s	

11.6.2 Connection, External Sensor

Designation	Properties	Description
Number	1	
Plug	5-pin, M12×1	For sensors with current/voltage output
Inputs	INx-4, INx-5	Analog
Voltage	+24 V _{DC}	Per network
Power supply	Max. 100 mA	Thermal fuse
Accuracy	0.1 % FS (full scale)	= end value of measuring range
Input signal range	-3.4 V – +3.4 V	
Scanning rate	1 ms = 1,000 measured value/s (FAST MODE at 100 µs)	

11.7 Can Input Module

Designation	Properties	Description
Number	2	CANx-1xx and CANx-2xx
Plug	5-pin, M12×1, socket connector	SPEEDCON® connector
CANx-1xx	120 Ω terminating resistor between PIN 4 and PIN 5, can be switched off via software	Galvanic separation (CAN High, CAN Low and GND) to device and CANx-2xx
CANx-2xx	120 Ω terminating resistor between PIN 4 and PIN 5, can be switched off via software	Galvanic separation (CAN High, CAN Low and GND) to device and CANx-1xx
Interface	Measuring bus based on RS-422	
Protocols	CANopen PDO, SAE-J1939, CAN Generic	
Max. CAN Baud rate	1000 kBit	
Sensors, CAN1xx	Max. 24	
Sensors, CAN2xx	Max. 24	
Scanning rate, P-channel, 1	1 ms = 1,000 measured values/s	
Housing material	ABS/PC	
Housing sealing	TPE	
Type of protection	IP65	When installed
Ambient temperature	-10 – +50 °C	
Storage temperature	-20 – +60 °C	

12. Appendix

This chapter contains information on the device models available, the appropriate accessories, technical data and certificates.

12.1 Accessories

Order code	Description
PLUG-PPC-PAD-PLUS-AUX-M12A/5	AUX-Adaptor
Power-Supply-PPC-PAD-PLUS-MULTI	Power Supply
Carry-strap-PPC-PAD-PLUS	Carry strap

12.2 Technical Standards

	Standard
EMC	EN61326-1:2013 EN 55011:2009 EN 61000-3-2:2014 / -3:2013 EN 61000-4-2:2009 / -3:2006 / -4:2012 / -5:2014 / -6:2014 / -11:2004
RED	ETSI EN 301 489-1 V2.1.1 ETSI EN 301 489-19 V2.1.0 ETSI EN 300 328 V2.1.1 ETSI EN 301 511 V9.0.2 ETSI EN 301 908-1 V11.1.1 ETSI EN 300 440 V2.1.1 ETSI EN 303 413 V1.1.1 ETSI TS 151 010-1 V4.9.0 EN 50566:2013 / EN 62209-2:2011
Safety	EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013
Type of protection	EN 60529:1989 + A1:1999 + A2:2013
RoHS	EN 50581:2012
Environment	EN 60068-2-6:2008

12.3 Dimensional Drawings

12.4 Rating Plate

The rating plate is located on the rear of the device.



INFORMATION

The information on the rating plate is required in the case of queries addressed to your sales outlet.

12.5 Certificates

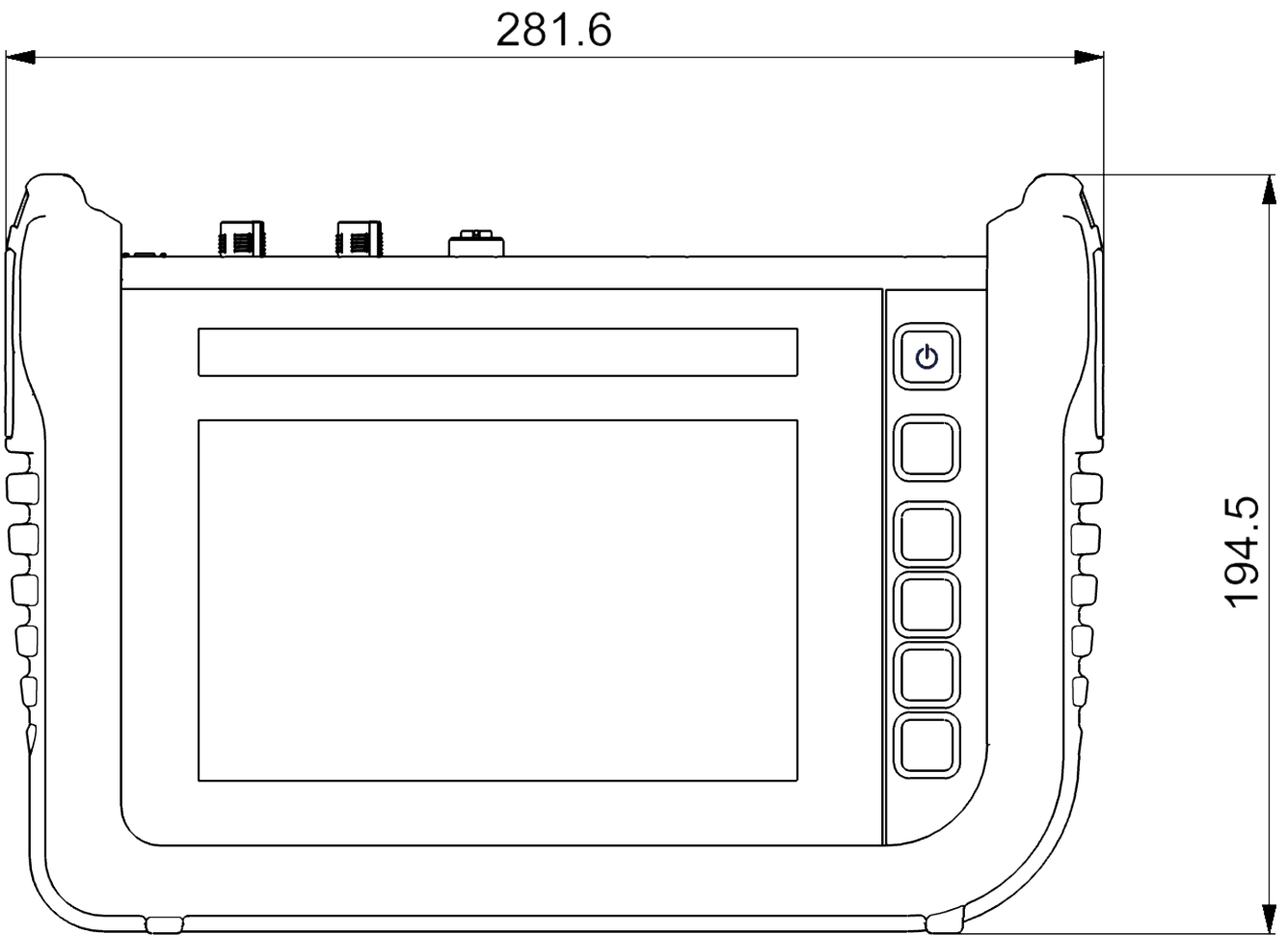
The basic certificates and Declaration of Conformity are provided for the device in the **Settings > Information > Device** menu option.

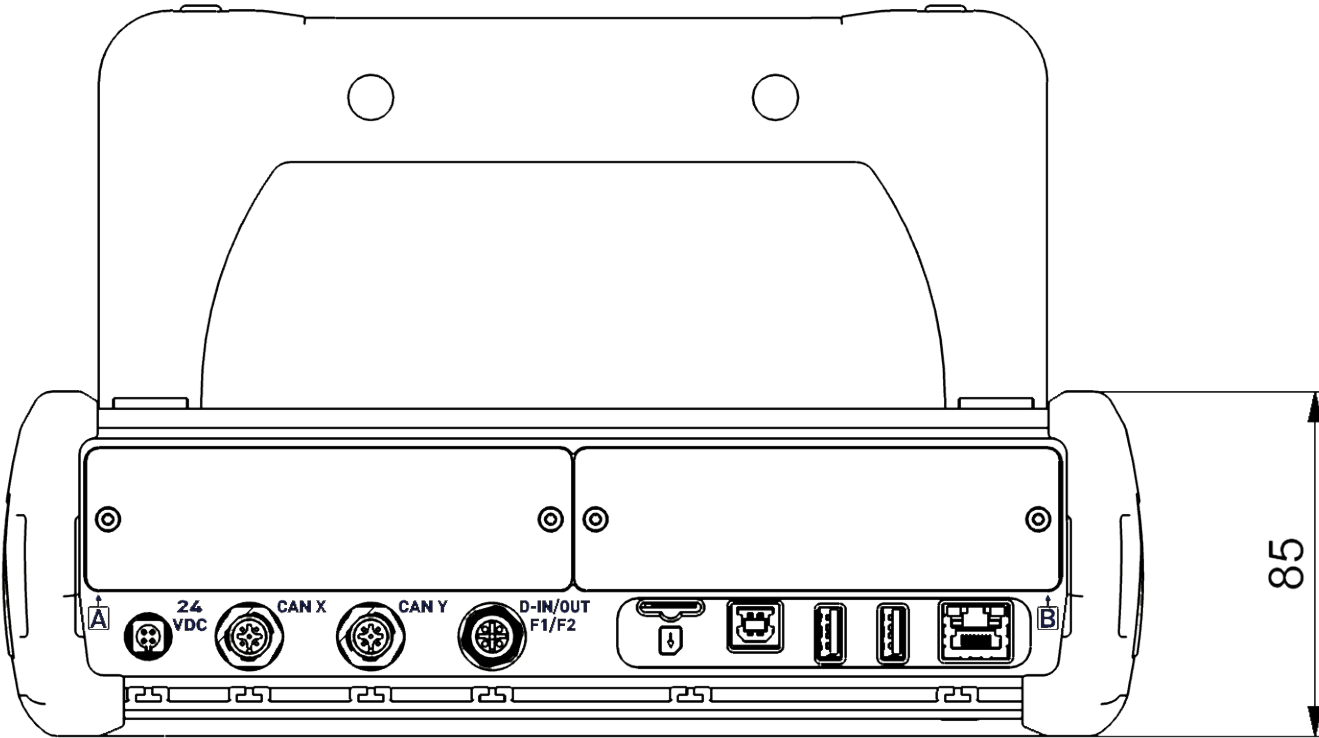


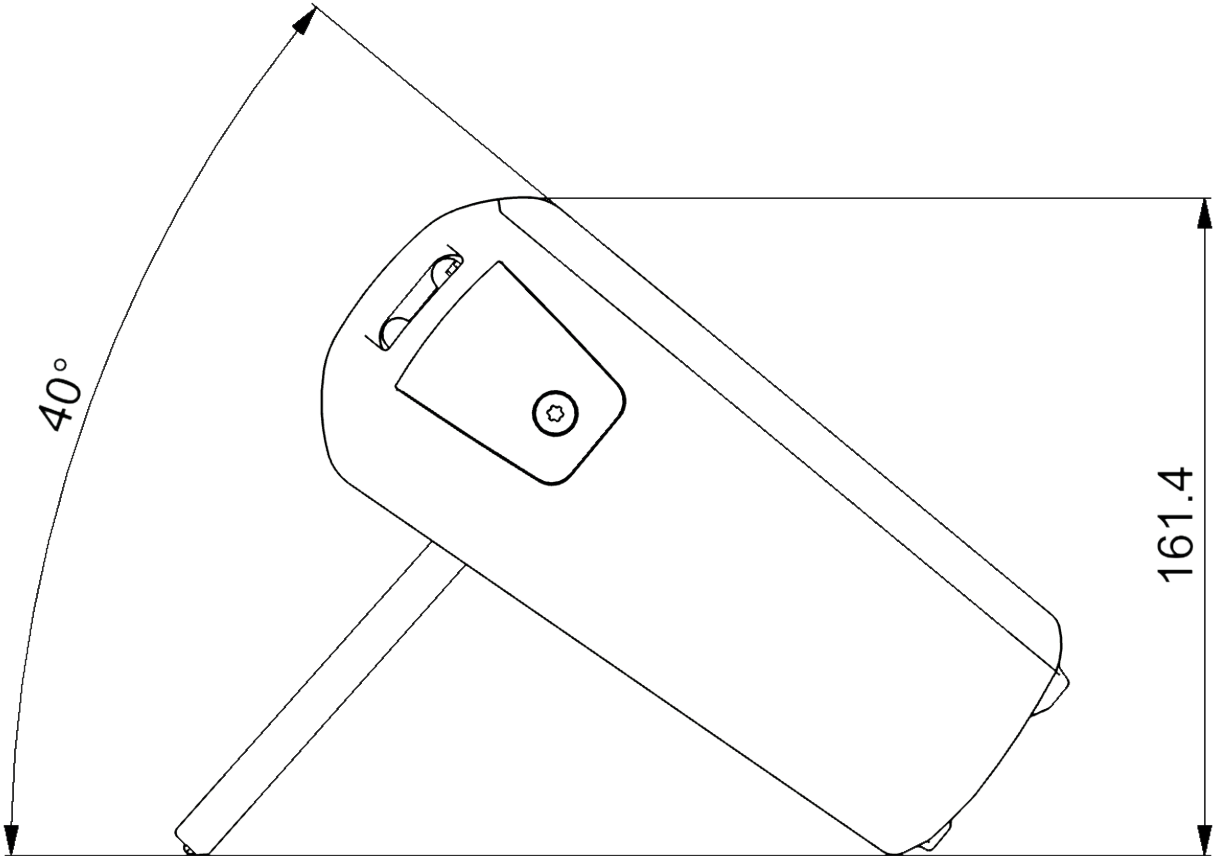
INFORMATION

Information on the approval tests can be obtained from your sales outlet.

12.6 List of Figures







EU - Konformitätserklärung EC - Declaration of Conformity

Hiermit erklären wir, dass folgende Erzeugnisse,
Herewith we declare, that following products,

Handmessgerät PPC-PAD-plus
Handheld Device PPC-PAD-plus

Typbezeichnung der Einzelprodukte:
Types of single products:

PPC-PAD-plus-W
PPC-PAD-plus-W-Cal

den grundlegenden Anforderungen der folgenden Richtlinien entsprechen:
corresponds to the basic requirements of the above directives.

2014/30/EU	Elektromagnetische Verträglichkeit <i>Electromagnetic compatibility and repealing directive</i>
2011/65/EU + (EU) 2015/863	Richtlinie zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (RoHS-Richtlinie) <i>Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS directive)</i>
2014/53/EU	Richtlinie über die Bereitstellung von Funkanlagen auf dem Markt (RED-Richtlinie) <i>Council Directive relating to the making available on the market of radio equipment (RED directive)</i>

Folgende harmonisierte Normen wurden angewandt:
The following harmonized standards have been used:

ETSI EN 301 489-1 V2.1.1	DIN EN 61326-1:2013-07
ETSI EN 301 489-3 V2.1.1	DIN EN 62368-1:2016-05
ETSI EN 301 489-7 V1.3.1	DIN EN 50566:2019-04
ETSI EN 301 489-17 V3.1.1	DIN EN 62209-2:2020-07
ETSI EN 300 328 V2.1.1	DIN EN 60068-2-6:2008
	DIN EN IEC 63000

FCC Compliance Statement

This device complies with Part 15 B of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Werdohl, 09.09.2021

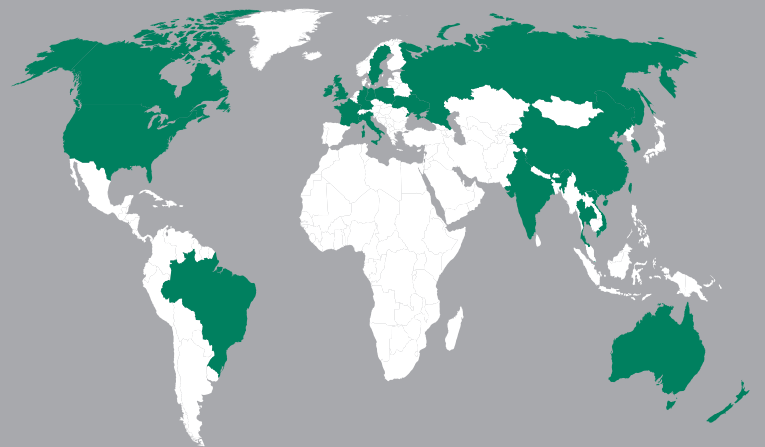


Ort, Datum / place, date

Unterschrift / signature (Carsten Krenz (Geschäftsführer / General Manager)

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Contact STAUFF:

www.stauff.com/contact