

Translation of the original operating instructions

EN

DP 500 / DP 510

| DEW POINT |



The completeness and accuracy of this documentation have been carefully checked. We reserve the right to make technical changes at any time. These changes may result in deviations from the information provided in this documentation.

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1 General information

For the sake of simplicity, this documentation refers to the product "DP 500 / DP 510" simply as the **product**.

1.1 Documentation

This documentation provides important warnings, safety precautions, and instructions for the safe and proper operation of the product.

- ▷ Before operating the product, read this documentation carefully and ensure that you fully understand its contents.
- ▷ Always keep this documentation readily available for reference purposes.

1.2 Symbols and labels used

The following markings and symbols are used in this documentation:

Labeling/symbol	Usage
Text	Important text passages are highlighted
text	Control elements DP 500 / DP 510
Text	User interface software
Text > Text > Text	User interface click path
 2 Security	Cross-reference to text passage, figure or chapter
•	Enumeration, list element
▷	Call to action as part of an instruction. Can also be numbered.
✓	Final or intermediate result of an action instruction
✗	Final or intermediate result of an instruction that has not been achieved
!	Note on an intermediate result

Table 1: Symbols and labels used

1.3 Safety instructions and notes

	DANGER Indicates an imminent danger. Death or very serious injuries may result.
	WARNING Indicates a potentially dangerous situation. Death or serious injury may result.
	CAUTION Indicates a potentially dangerous situation. Slight or minor injuries may result.
	NOTICE Indicates a potentially dangerous situation. Material or environmental damage may result.
	NOTE Indicates important information, application tips, and useful information for proper working.

2 Security

The product has been designed, manufactured, and functionally tested in accordance with applicable safety regulations.

To ensure operational safety, please observe the following:

- Chapter "Intended use"
- Chapter "Organizational measures to be taken by the operator"
- Chapter "Residual hazards"

Regardless of the instructions provided in this manual, all applicable country-specific occupational health and safety regulations must be observed.

2.1 Intended use

The operational safety of the product supplied is only guaranteed if it is used as intended.

This product enables mobile dew point measurement in compressed air and gas systems.

This product is not intended for direct flow measurement. However, when used in conjunction with a flow sensor, it can be used to measure and log flow and consumption values of gaseous media—particularly compressed air—in closed pipes.

The product is considered to be used as intended, in particular, when

- the installation is performed exclusively downstream of a fully functional dryer,
- the product is positioned correctly,
- the product is operated within the specified pressure range,
- only gaseous, non-corrosive, non-aggressive carrier gases that are clean, dry, and oil-free are used,
- the permissible operating temperature is maintained,
- the installation is performed in such a way that condensation on the sensor element is prevented (e.g., by briefly venting the compressed air before installation),
- the relevant measurement parameters and the flow medium are specified, and
- calibration and maintenance are performed regularly by qualified personnel.

Any use outside these conditions is considered improper and may lead to malfunctions or irreversible damage. This applies in particular if pressure or temperature limits are exceeded or if liquids or hazardous substances enter the system.

Any use beyond or contrary to these instructions is considered improper. The manufacturer assumes no liability for any resulting damage.

Intended use also includes:

- Adherence to the supplied documentation
- Compliance with all inspection and maintenance requirements specified by the manufacturer

Reasonably foreseeable misuse includes, in particular:

- Overheating the product
- Measurements on or near live parts
- Use as a climbing aid
- Operation outside the technical specifications
- Any modifications to the product that do not correspond to the intended and described procedures
- Continuous, unprotected outdoor operation in wet conditions or when directly exposed to the elements
- Use in areas at risk of explosion



2.2 Organizational measures of the operator

The product may only be used if it is in perfect technical condition. It may no longer be used if it has been technically modified or damaged.

Instructions

The information on commissioning, operation, and maintenance provided in these instructions must be followed. These instructions should always be kept accessible with the product.

Personnel

People working on the product must read these instructions, particularly the chapter entitled " 2 Security", before starting work. This also applies to people who only work occasionally.

2.3 Residual risks



DANGER

Risk of injury due to insufficiently qualified personnel

Improper handling of the product can lead to serious personal injury and damage to property. All work described in these instructions may only be carried out by qualified specialists.

Qualified personnel are persons with appropriate training and in-depth knowledge of measurement, control, regulation and compressed air technology. They must also be familiar with the applicable national regulations, standards and directives and be able to assess risks independently.



WARNING

Danger during operation outside the specified limit values

Exceeding or falling below the permissible operating, storage or transportation limits can endanger people and property. There is a risk of malfunctions and operating faults as well as falsified measurement results.

- ▷ Only operate the product within the limit values specified on the rating plate and in the technical data.
- ▷ Observe the permissible storage and transportation conditions.



WARNING

Risk of injury due to unauthorized modifications

Unauthorized modifications to the product may cause injury and result in the loss of the approval. The product may only be operated using original components.

- ▷ Unauthorized modifications are not permitted and lead to the exclusion of any warranty and liability by the manufacturer (CS INSTRUMENTS).



CAUTION

Danger due to malfunction of the product

Incorrect installation or inadequate maintenance can lead to malfunctions that impair the function of the product and can lead to dangerous misinterpretations.

- ▷ Observe all applicable national regulations and safety regulations during installation and operation.

**CAUTION****Lithium-ion battery**

Lithium-ion batteries may only be used, charged, and stored in accordance with the manufacturer's instructions. Improper handling can lead to overheating, fire, or explosion.

- ▷ Follow the battery manufacturer's safety instructions.
- ▷ Do not expose the battery to heat, direct sunlight, or open flames.
- ▷ Avoid physical damage, such as dropping, crushing, or piercing the device.
- ▷ Replace batteries immediately if they have been dropped from a height of more than one meter or exposed to significant impacts - even if the housing appears undamaged. Internal cell damage may have occurred and could pose a safety risk.
- ▷ Do not short-circuit the battery terminals or take the battery apart.
- ▷ Use only the charger supplied with the product or chargers explicitly approved by the manufacturer. Always follow the manufacturer's recommended charging parameters to prevent product damage and ensure safe operation.
- ▷ Do not use the supplied charger to charge other devices.
- ▷ Dispose of damaged, leaking, or inflated batteries immediately.
- ▷ If chemicals get on the skin, wash the area with water and get medical help.
- ▷ Follow local regulations and dispose of lithium-ion batteries at approved collection sites.

**CAUTION****Risk of burns from heated components**

Hot process gases in the pipe can cause the components of the product (e.g., sensor shaft or measuring section) to heat up significantly.

- ▷ Only touch the components when they have cooled down.
- ▷ Wear suitable protective gloves if necessary.

**NOTICE****Measurement errors caused by contaminants in the measurement medium**

Contaminants can lead to malfunctions or disruptions.

- ▷ The plant operator must ensure that the measuring medium meets the required purity standards and that appropriate cleaning and maintenance intervals are observed.
- ▷ The manufacturer (CS INSTRUMENTS) accepts no warranty or liability for incorrect use.

3 DP 500 / DP 510

3.1 Product overview

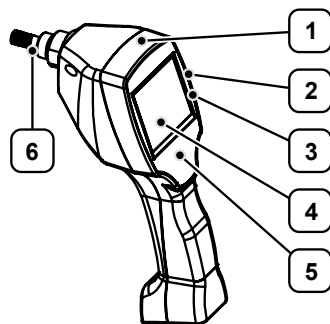


Figure 1: DP 500 / DP 510 (example)

- | | | | |
|---|-----------------------------|---|-------------------|
| 1 | Housing | 4 | Display |
| 2 | USB interface | 5 | Membrane keyboard |
| 3 | Power-supply unit connector | 6 | Measuring unit |

3.2 Product description

This product is a portable measuring device for monitoring the pressure dew point in compressed air and gas systems. It enables continuous measurement and graphical display of dew point trends over an extended period of time. This allows the operating conditions of compressed air dryers to be analyzed, documented, and optimized.

For product versions with an external sensor, an additional sensor can be connected via the sensor input. The sensor is processed, displayed, and configured as an additional sensor channel. This allows additional process variables to be recorded, displayed, and evaluated in parallel.

3.3 Type plate

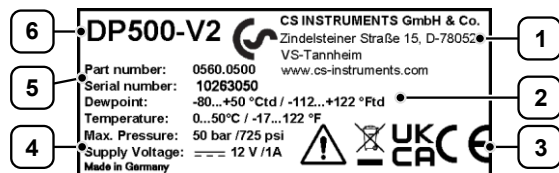


Figure 2: Type plate (example)

- | | | | |
|---|-----------------------------------|---|----------------------------|
| 1 | Manufacturer information | 4 | Electrical connection data |
| 2 | Technical specifications | 5 | Material/Serial number |
| 3 | Conformity/Certification markings | 6 | Product name |

3.4 Scope of delivery

Depending on the version ordered, the package includes the following components:

- DP 500 / DP 510
- Plug-in power supply
- Measuring chamber (up to 16 bar)
- PTFE tubing (diffusion-tight) with quick coupling
- Control and calibration set (11.3% rF)
- Quick-release coupling
- Dry container for dew point sensors
- Transport case
- Calibration certificate
- Translation of the original operating instructions

4 Transportation and storage



NOTE

Improper transport, improper storage, or improper commissioning may cause damage to or malfunctions in the product, for which the manufacturer, (CS INSTRUMENTS), assumes no liability and provides no warranty.

4.1 Delivery

Transport damage

- ▷ Check the delivered components for any visible transportation damage.
- ▷ Report any transportation damage to the following parties immediately:
 - the carrier
 - the manufacturer's customer service (CS INSTRUMENTS)
- ▷ Ensure that the product is handled properly during transportation.

Packaging

- ▷ Keep the original packaging for any future transportation or storage.

4.2 Storage



CAUTION

Damage to battery cells due to incorrect storage

Incorrect storage can damage the battery cells in rechargeable batteries.

- ▷ Observe the safety instructions provided by the battery manufacturer.
- ▷ Store batteries only in a charged state (at least 40% charged).
- ▷ Keep batteries in a cool and dry place.
- ▷ Protect batteries from humidity and direct sunlight.
- ▷ Prevent batteries from freezing.
- ▷ Dispose of batteries that have been stored below 0°C for more than 60 minutes.

To prevent damage caused by environmental factors, the product must be stored properly when not in use.

- ▷ If possible, store the product in its original packaging.
- ▷ Store the product in dry, dust-free rooms.
- ▷ Keep the product away from direct sunlight, heat sources, and corrosive or aggressive chemicals.



5 Installation and commissioning



CAUTION

Danger from commissioning a damaged product

If a damaged product is installed or put into operation, it may result in functional failures, electrical hazards, or mechanical risks.

- ▷ Before each commissioning, inspect the product, accessories, and all supply lines for visible damage, loose parts, or missing components.
- ▷ Immediately take any defective product out of operation immediately.

5.1 General installation instructions



NOTICE

Note the process connection

To ensure safe and reliable operation, the use of a suitable measuring chamber is recommended. A measuring chamber ensures stable measurement conditions and improves the reproducibility of measurement results.

- ▷ Install the measuring chamber on the product so that it is pressure-tight.

5.2 Set up measuring point

Setting up a point of measurement

To ensure accurate measurement results, the point of measurement must be set up properly.

Connection via quick-release coupling

- ▷ Before taking a measurement, vent compressed air at the sampling point to remove condensate and dirt deposits.
 - ⓘ This reduces the risk of contamination of the product.
- ▷ Avoid stagnant air, as this leads to longer response times.
 - ⓘ If condensate is escaping at the point of measurement, check the compressed air treatment system before starting the measurement.

Connection via male thread (G 1/2")

Prerequisite

- The system is depressurized.
- ▷ Check the sampling point before taking a measurement.
 - ⓘ If condensate is leaking from the point of measurement, check the compressed air treatment system before starting the measurement.
- ▷ Screw the product (without the measuring chamber attached) into the point of measurement with a G 1/2" female thread.
 - ⓘ Use the wrench flat (SW 27) for installation.



NOTICE

Dew point measurement on plastic pellet dryers

Plastic granulate dryers typically operate with slight overpressure in the millibar range and at high air temperatures. Therefore, use the measuring chamber designed for granulate dryers and route the air to the measuring chamber via a Teflon hose.

- ▷ Use a Teflon hose approximately 1 to 2 m long between the granulate dryer and the air inlet of the measuring chamber.
- ▷ Ensure that the measured air temperature in the product remains below 40 °C as much as possible.
- ▷ Extend the Teflon hose if necessary.
- ▷ Connect a Teflon hose at least 80 cm long to the air outlet of the measuring chamber to prevent humidity from flowing back in.



5.3 Connect product



DANGER

Danger to life due to electrical voltage

During installation, maintenance, or in the event of a malfunction, conductive parts that can be touched may carry dangerous voltages. Contact with live parts can result in serious injury or death.

- ▷ Perform work on electrical connections only when the power supply is turned off.
- ▷ Secure the product against accidental restarting.
- ▷ Work on electrical systems or equipment may only be performed by qualified electricians or by trained personnel under the direction and supervision of a qualified electrician.
- ▷ Check all electrical connections before commissioning and regularly during operation.

Connect the product to a power source (only for product versions with an external sensor)

An 8-pin push-pull circular connector is used as the sensor interface connector.

Prerequisite

- The product is de-energized.
 - The product is protected against accidental restart.
 - A product version with an external sensor is available.
- ▷ Connect the external sensor according to the sensor type and the corresponding wiring diagram.
- ❗ The permissible input signals and the corresponding wiring diagrams can be found in chapter "12.3 Interface for external sensors".
- ▷ Check the electrical connection to ensure it is secure and correctly wired.

Version	Cable length [m]
8-pin circular connector with open ends	5
8-pin circular connector with open ends	10
8-pin circular connector to M12 plug	5
Extension cable (circular connector/circular connector)	10

Table 2: Available connection cables

Designation	Pin assignment	Wire Color	Plug
Power supply	Pin 1 (Modbus (A))	white	
	Pin 2 (Modbus (B))	brown	
	Pin 3 (SDI (internal data transmission))	green	
	Pin 4 (Analog IN + (current/voltage signal))	yellow	
	Pin 5 (Analog IN - (current/voltage signal))	gray	
	Pin 6 (500 µA current source (sensor power supply))	pink	
	Pin 7 (VB+ (positive power supply))	blue	
	Pin 8 (VB- (negative power supply GND))	red	

Table 3: Pin assignment



5.4 Initial commissioning

Turn on the product

- ▷ Press the on/off key.
 - ✓ After turning on the product, it will perform an initialization process that takes about 3 seconds.

Connection via quick-connect coupling:

- ▷ Connect the measuring chamber mounted on the product to the quick coupling at the point of measurement.

Connection via male thread:

- ▷ Slowly apply pressure to the point of measurement.

Putting the product into operation

- ▷ After turning on the power, wait until the measured value stabilizes.
 - ⓘ Depending on the positioning of the point of measurement and storage conditions, this may take up to 15 minutes.
 - ⓘ If the product was previously operated for an extended period in a system with a higher dew point or stored in ambient air, a longer response time is required when taking measurements in the low dew point range.



NOTICE

Local atmospheric pressure at the measurement location

The ambient pressure used in the product is detected by the integrated pressure sensor as the local atmospheric pressure at the measurement location and should be checked in a pressure-free state before each measurement and updated if necessary.

- ▷ Further information can be found in chapter "→ 7.2 Adjust configuration settings".



NOTICE

Initial commissioning of product models with an external sensor

When commissioning a product with an external sensor for the first time, an external sensor channel may not yet be configured.

- ▷ Further information can be found in chapter "→ 7.2 Adjust configuration settings".

5.5 Switching on and off

Turn on

- ▷ Press the on/off key.
 - ✓ After turning on the product, it performs an initialization process that takes about 3 seconds.
 - ⓘ The main screen appears automatically once initialization is complete and serves as the starting point for all further operations.

Turning off

- ▷ Press the on/off key.
 - ✓ The product will turn off.

6 Operation

6.1 Control elements

**CAUTION****Damage to the display**

- ▷ Avoid letting the display come into contact with pointed or sharp objects.

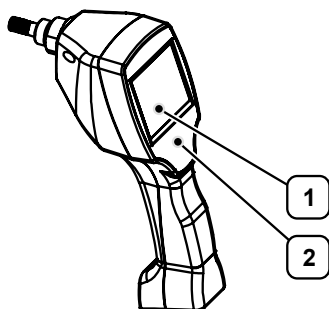


Figure 3: Operating elements (example)

1 Touchscreen

2 Membrane keyboard

Touchscreen

The user interface is operated via the touchscreen.

- ▷ Select menu items by tapping them with your finger or a soft, round stylus.

On-screen keyboard

You can use the membrane keyboard to adjust the display brightness and save screenshots of the current display.

- ▷ Adjust the display brightness using the ◀ and ▶ keys.
- ▷ Tap the **Camera** button to save the current screen content.
 - ❗ The image is saved to a USB storage device or the internal SD card.
 - ❗ Images are saved by day in a separate directory and numbered sequentially.
 - ❗ Directory name: DDJJMY (D + Year + Month + Day)
 - ❗ Storage path: DEV0006/<Device Name>/Bitmap

**NOTICE****Data loss caused by overwriting screenshots**

Screenshots may be overwritten when saved directly to a USB storage device if several identical devices are used.

- ▷ First, save the screenshots to the product's SD card.
- ▷ Exportieren Sie die Screenshots anschließend auf das USB-Speichermedium.
Further information on data export can be found in chapter " 9.1 Export data".
- ▷ Where possible, use separate USB storage devices for different devices.

6.2 User interface

The following user interface is displayed each time the product is started.

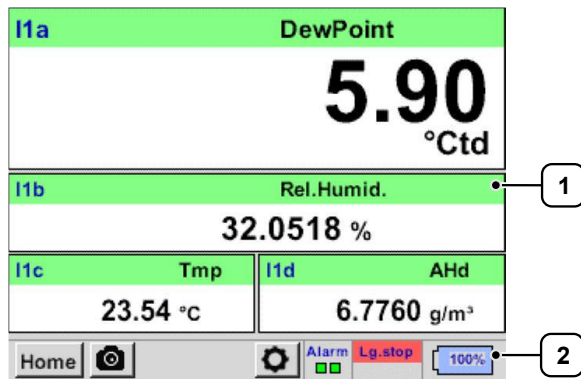


Figure 4: User Interface | Main view (example)

1 Measured values

2 Status bar



NOTE

The Main view can be configured. A total of 6 layouts are available, in which 1 to 5 freely selectable measured values can be displayed. If the set alarm limits are exceeded or not met, the corresponding measured value flashes yellow (Alarm 1) or red (Alarm 2).

Further information can be found in chapter "[8.2 Display measured values](#)".

Status bar

Various pieces of information are displayed in the Status bar:

- Hardware version
- Software version
- Alarm status
- Chart recorder status
- Date and time
- Battery status

7 Configuration

Open the main menu

The Main menu serves as the starting point for all of the product's key functions.

- ▷ Tap the Home button.

7.1 Set up basic settings

Open Settings

- ▷ Tap the Settings button.
 - ✓ The Settings will open.
 - ! The menu items in the left pane are freely accessible and do not affect the measured values.
 - ! The menu items in the right-hand pane (Sensor Settings, Logger Settings, Password Settings, and Device Settings) can be protected with a password.

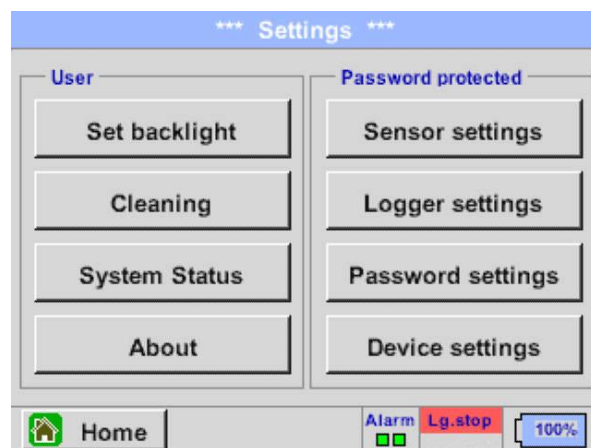


Figure 5: Open Settings (example)

Adjusting display brightness and standby mode

A lower display brightness setting and a shorter display timeout help minimize energy consumption.



NOTICE

Display burn-in

High, sustained display brightness can, among other things, cause the display to burn in. Dimming the display helps reduce this risk.

- ▷ Select the Brightness button.
- ▷ Select the desired settings.

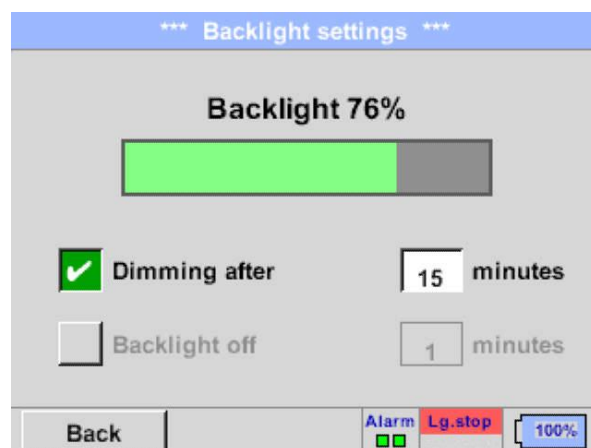


Figure 6: Adjusting display brightness and standby mode (example)

Viewing system information

The System Overview menu item provides information about the voltages and currents on individual and all channels, as well as the power-supply units' power supply. It also displays the product's operating hours.

- ▷ Tap the System Overview button.
 - ✓ The system information is displayed.

Open Device Settings

- ▷ Tap the Device Settings button.



Set language

There are several languages to choose from.

- ▷ Tap the Language button.
- ▷ Select the desired setting.

Set the date and time

- ▷ Tap the Date & Time button.
- ▷ Select the desired settings.

Enable access protection for menu items

The menu items Sensor Settings, Logger Settings, Password Settings and Device Settings can be protected from unauthorized access with a password.

- ▷ Select the Password Settings button.
- ▷ Enter the desired password.
 - ❗ The password must be a four-digit numeric code.
 - ❗ Default password: **0000**
- ▷ Re-enter the password to confirm.
- ▷ Write down the password and keep it in a safe place.
 - ❗ **If lost:** Contact customer service to reset the password.

7.2 Adjust configuration settings

Open Sensor Settings

- ▷ Select Settings > Sensor Settings.
 - ✓ The overview of available channels opens.
 - ❗ Depending on the product model, channels with or without an external sensor are displayed.

I1	
DewPoint	2.43 °Ctd
Rel.Humid.	26.1015 %
Temperatur	22.91 °C
Abs.Humid.	5.3259 g/m³

C1	
☒ Flow	0.00 m³/h
☒ Consum	615701 m³
Temp.	28.04 °C
Velocity	0.00 m/s

Figure 7: Overview of available channels (example)

Configure sensor settings

- ▷ Tap the corresponding sensor area on the display to open the sensor settings for that sensor channel.
 - ❗ Sensor settings can only be changed when the chart recorder is disabled. Otherwise, a message will appear that must be confirmed.

*** Channel I1 ***	
Type	FA5xx
Name	

Record	Sensor	Value	Alarm
☐	DewPoint	4.85 °Ctd	☐
☐	Rel.Humid.	27.6055 %	☐
☐	Tempera...	24.82 °C	☐
☐	Abs.Hum...	6.2749 g/m³	☐

Figure 8: Configuring sensor settings (example)

Set reference parameters and calibration

The product measures the pressure dew point based on the current line pressure.

No pressure input is required for direct pressure dew point measurement.

To perform the calculation of the atmospheric dew point or the pressure dew point at reduced pressure, you must enter the reference pressure and system pressure.

- ▷ Tap the **>** button.
 - ✓ The configuration menu opens.
- ▷ Select the desired units for temperature and absolute humidity.
- ▷ Tap the **Pressure Settings** button.
 - ✓ The configuration menu for the pressure parameters opens.

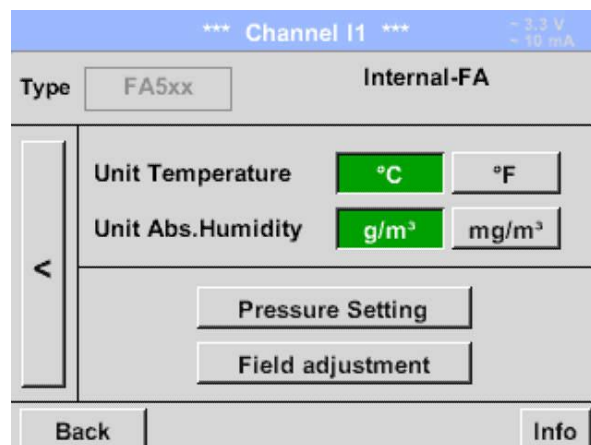


Figure 9: Setting reference parameters and calibration (example)

Switch pressure display

The displayed pressure value depends on the selected display mode:

- Absolute pressure: actual physical pressure relative to absolute vacuum [bar(a)]
 - Relative pressure: difference between measured pressure and ambient pressure [bar(g)]
- ▷ Tap the **Absolute** or **Relative** button to select the desired pressure display.
 - ✓ The pressure reading is updated according to the selected display mode.

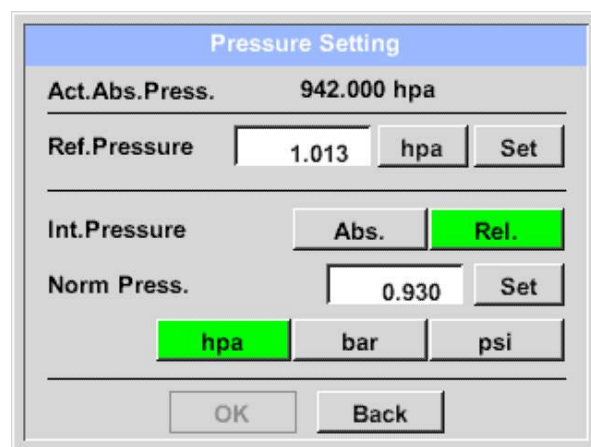


Figure 10: Configuring pressure settings (example)

Set reference pressure

The reference pressure defines the base pressure to which the measured pressure dew point is converted. This allows measured values to be compared with one another regardless of the current system pressure.

- ▷ Enter the desired value in the **Reference Pressure** text field.
 - ⓘ Factory setting: 1013 mbar
- ▷ Confirm twice by clicking **OK**.
 - ✓ The entered pressure value is applied.

Set local atmospheric pressure

Local atmospheric pressure is measured by the built-in pressure sensor at the measurement location and can be adjusted as needed. It serves as the basis for the calculation of relative pressure.

- ▷ Enter the desired value in the **Standard Pressure** text field.
- ▷ Or: Tap the **Set** button to apply the ambient pressure determined by the product.
- ▷ Confirm twice by tapping **OK**.
 - ✓ The entered pressure value is applied.

Example: Pressure dew point at different system pressures

Different system pressures affect the pressure dew point. By converting to a reference pressure, the product provides comparable measured values.

Reference pressures:

- Measuring station 1: 1.013 bar(a)
- Measuring station 2: 12.69 bar(g)

	Test station 1: Refrigeration dryer	Test station 2: Point of use	Unit
Pressure dew point	1.52	-2.68	°Ctd
System pressure	12.69	8.51	bar(g) ¹
Pressure dew point (reference)	-27.19	1.53	°Ctd

Table 4: Pressure dew point values at different system pressures

Perform single-point calibration

During single-point calibration, the product is adjusted against a known reference value to correct deviations between the displayed measured value and the actual value.

- Tap the **Field Adjustment** button.
- Enter the desired value in the **Reference Value** text field.
- Tap the **Calibration** button to apply the entered reference value.
 - ⓘ Each time a calibration is performed, the meter reading is incremented by 1.
- Tap the **Reset** button to reset the calibration to the factory settings.

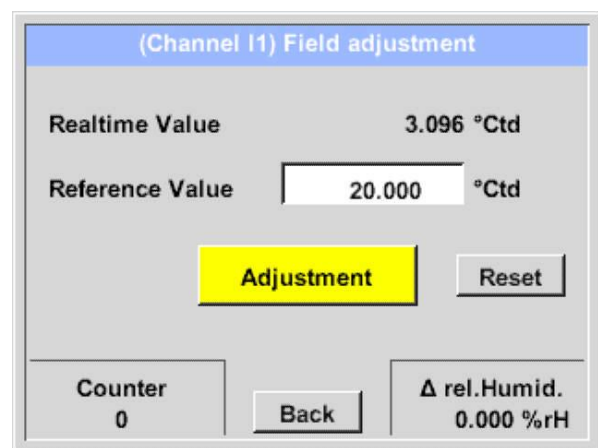


Figure 11: Performing a single-point calibration (example)

Set the label and decimal places for measured values

You can set the value name, short name, and resolution (number of decimal places) of the measured value.

- Tap the **Tool** button for the desired measured value.
 - ⓘ You can assign a name of up to 10 characters to the measured value to be recorded. This makes it easier to identify the measured value later in the **Graph** and **Graph/Current Values** menus.
 - ⓘ Without a custom name, for example, C1a is displayed. C1 stands for the channel name, a for the first measured value of the channel, b for the second measured value, and c for the third.
- Tap the **<** or **>** button to set the number of decimal places.
 - ⓘ The resolution can be set between 0 and 5 decimal places.
- Select the desired settings.

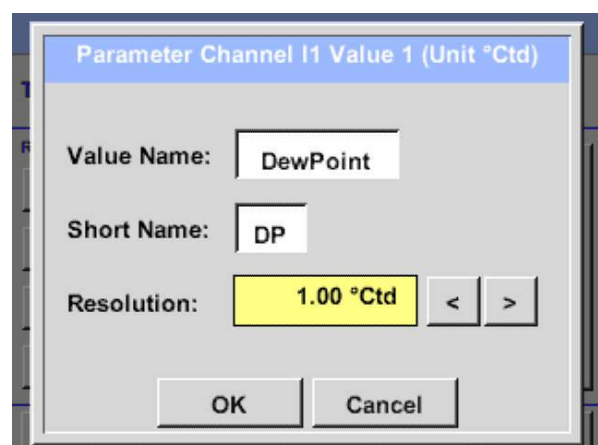


Figure 12: Setting the name and resolution of measured values (example)

¹ bar(g) = Relative pressure relative to ambient pressure

Set alarm

For each channel, you can enter the threshold values for Alarm 1 and Alarm 2, including hysteresis.

- ▷ Select Home > Alarm Overview.
 - ✓ The Alarm Overview screen opens.
 - ⓘ The alarm overview shows whether Alarm 1 or Alarm 2 has been triggered. It also shows which alarm messages are configured as Alarm 1 and/or Alarm 2 for the respective channel.
- ▷ Tap the button for the desired channel to adjust the alarm parameters.
 - ✓ The Sensor settings open.
- ▷ Tap the Alarm checkbox for the desired measured value.
 - ✓ The configuration menu opens.
 - ⓘ If the measured value exceeds or falls below the set alarm limits, the corresponding channel label flashes yellow (Alarm 1) or red (Alarm 2).
- ▷ Select the desired settings.
- ▷ Tap the OK button to activate the alarm.

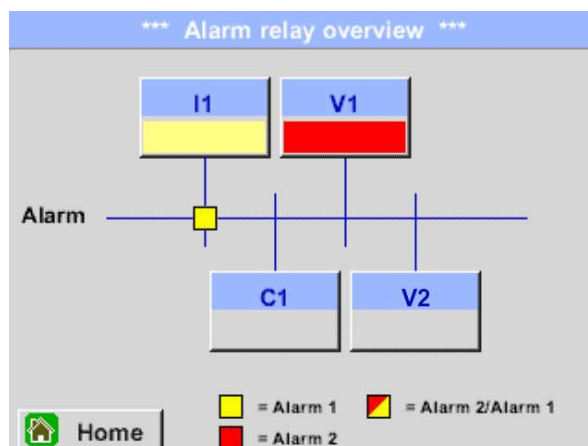


Figure 13: Open the Alarm Overview screen (example)

Alarm settings for channel I1 (DewPoint)				
Upper limit				
Alarm	Value °Ctd	Hysteresis +/-	Alarm Popup	
Alarm 1 ☒	100.000	3.000	☒	use
Alarm 2 ☐	110.000	2.000	☐	
Lower limit				
Alarm 1 ☐	85.000	2.000	☐	
Alarm 2 ☒	75.000	3.000	☒	use

OK Cancel

Figure 14: Set an alarm (example; Alarm 1 = yellow, Alarm 2 = red)

7.3 Configure an additional sensor channel

Prepare sensor channel

Sensor settings can only be changed when the chart recorder is deactivated. If the chart recorder is active, a message will appear that must be confirmed.

Prerequisite

- A product version with an external sensor is available.
- The external sensor is electrically connected.
- The chart recorder is deactivated.

- ▷ Select **Settings > Sensor Settings**.
 - ✓ The overview of available channels opens.
- ▷ Tap the desired sensor channel.
 - ✓ The sensor settings for that channel will open.
- ▷ Tap the **Type** text field.
- ▷ Select the desired sensor type.
 - ❗ The **No Sensor** type marks the external sensor channel as unconfigured.
- ▷ Tap the **Name** text field and enter the name of the sensor channel.
 - ❗ You can enter up to 24 characters for the name.
 - ❗ After creating the new sensor channel, you can configure the alarm, recording, and decimal resolution settings, just as you would for the internal dew point sensor. Further information can be found in chapter "[7.2 Adjust configuration settings](#)".

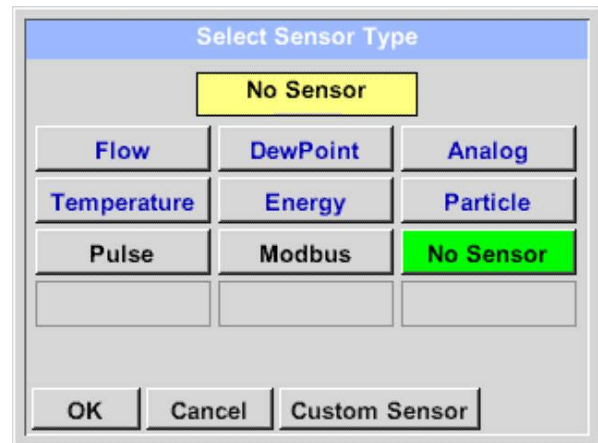


Figure 15: Select sensor type (example)

7.3.1 Configure the dew point sensor

7.3.1.1 Dew point sensor with SDI data transmission

No further configuration is required for dew point sensors with SDI data transmission. You simply need to select the appropriate sensor type.

7.3.1.2 Dew point sensor with RS-485 interface (Modbus)

Set reference parameters and calibration

The product measures the pressure dew point based on the current line pressure.

No pressure input is required for direct pressure dew point measurement.

To perform the calculation of the atmospheric dew point or the pressure dew point at reduced pressure, you must enter the reference pressure and system pressure.

- ▷ Tap the **>** button.
 - ✓ The configuration menu opens.
- ▷ Select the desired units for temperature and absolute humidity.
- ▷ Tap the **Pressure Settings** button.
 - ✓ The configuration menu for the pressure parameters opens.

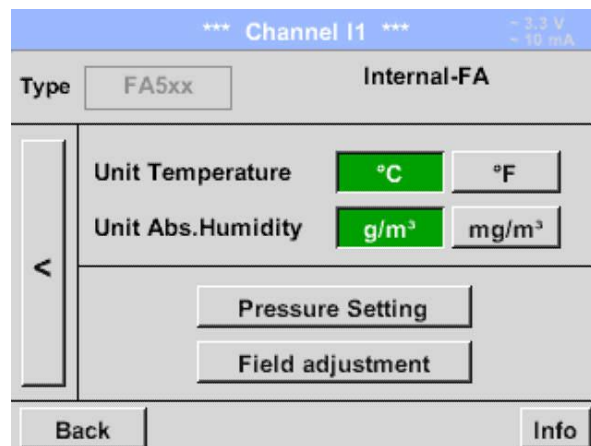


Figure 16: Setting reference parameters and calibration (example)

Switch pressure display

The displayed pressure value depends on the selected display mode:

- Absolute pressure: actual physical pressure relative to absolute vacuum [bar(a)]
 - Relative pressure: difference between measured pressure and ambient pressure [bar(g)]
- ▷ Tap the **Absolute** or **Relative** button to select the desired pressure display.
 - ✓ The pressure reading is updated according to the selected display mode.

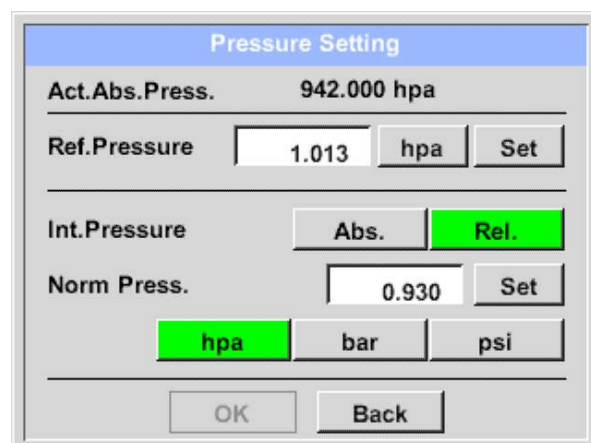


Figure 17: Configuring pressure settings (example)

Set reference pressure

The reference pressure defines the base pressure to which the measured pressure dew point is converted. This allows measured values to be compared with one another regardless of the current system pressure.

- ▷ Enter the desired value in the **Reference Pressure** text field.
 - ⓘ Factory setting: 1013 mbar
- ▷ Confirm twice by clicking **OK**.
 - ✓ The entered pressure value is applied.

Set local atmospheric pressure

Local atmospheric pressure is measured by the built-in pressure sensor at the measurement location and can be adjusted as needed. It serves as the basis for the calculation of relative pressure.

- ▷ Enter the desired value in the **Standard Pressure** text field.
- ▷ Or: Tap the **Set** button to apply the ambient pressure determined by the product.
- ▷ Confirm twice by tapping **OK**.
 - ✓ The entered pressure value is applied.

Example: Pressure dew point at different system pressures

Different system pressures affect the pressure dew point. By converting to a reference pressure, the product provides comparable measured values.

Reference pressures:

- Measuring station 1: 1.013 bar(a)
- Measuring station 2: 12.69 bar(g)

	Test station 1: Refrigeration dryer	Test station 2: Point of use	Unit
Pressure dew point	1.52	-2.68	°Ctd
System pressure	12.69	8.51	bar(g) ¹
Pressure dew point (reference)	-27.19	1.53	°Ctd

Table 5: Pressure dew point values at different system pressures

Perform single-point calibration

During single-point calibration, the product is adjusted against a known reference value to correct deviations between the displayed measured value and the actual value.

- Tap the **Field Adjustment** button.
- Enter the desired value in the **Reference Value** text field.
- Tap the **Calibration** button to apply the entered reference value.
 - ⓘ Each time a calibration is performed, the meter reading is incremented by 1.
- Tap the **Reset** button to reset the calibration to the factory settings.

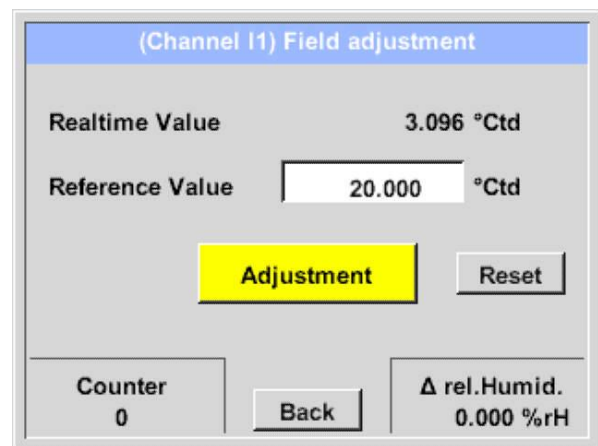


Figure 18: Performing a single-point calibration (example)

Configure analogue output

The measuring range of the analog output (4...20 mA) is freely configurable.

- Tap the **>** button.
- Select **Advanced Settings > 4...20 mA** to configure the measured value and scaling.
- Tap the desired button to select the measured value for the analogue output.
- Under **Error Val.**, select the value to be output at the analogue output in the event of an error.
- Select the desired settings.

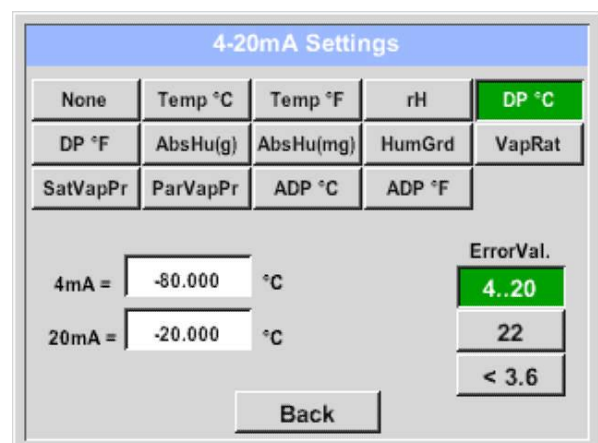


Figure 19: Configuring the analogue output (Example)

Parameter	Description
4 mA	Defines the scaling value for the analogue output

¹ bar(g) = Relative pressure relative to ambient pressure



Parameter	Description
20 mA	Defines the scaling value for the analogue output

Table 6: Configuration parameters

Setting	Meaning
< 3.6 mA	Sensor error / System error
22 mA	Sensor error / System error
4...20	Output according to NAMUR (3.8 mA – 20.5 mA) < 4 mA – 3.8 mA = Below measurement range > 20 mA – 20.5 mA = Measurement range exceeded

Table 7: Output values for error current

7.3.2 Configure the consumption sensor

Configure the consumption sensor

Depending on the version, consumption sensors can be connected via SDI data transmission or an RS-485 interface. Depending on the connected sensor, parameters such as unit, pipe inner diameter, gas type, reference pressure, or reference temperature must be set.

- ▷ Tap the button.
 - ✓ The configuration menu opens.
- ▷ Select the desired settings.

Figure 20: Configuring the consumption sensor (example)



NOTICE

Inaccurate measurement results due to an incorrect pipe inner diameter

An incorrectly entered pipe inner diameter distorts the measurement results.

- ▷ Enter the pipe inner diameter with as much accuracy as possible.
- ▷ Determine the pipe inner diameter from the manufacturer's specifications or through a measurement.

Parameter	Description
Unit	Defines the unit.
Consumption / Velocity	Defines the display unit for the current value, e.g., consumption or velocity.
Gas constant	Defines the gas type and its corresponding gas constant. The suffix "real" indicates a stored real-gas calibration curve.
Reference Temperature / Reference Pressure	Defines the reference conditions for the calculation of volume and consumption values. Factory setting: 20 °C and 1000 hPa according to ISO 1217. Alternatively, 0 °C and 1013 hPa can be set for standard cubic meters. Operating pressure or operating temperature must not be entered as reference conditions.
Diameter	Defines the pipe's inner diameter. For sensors with an integrated measuring section, this menu item is disabled.

Parameter	Description
Meter reading	Defines the meter reading. The meter reading can be set to a desired value if necessary.

Table 8: Parameters for consumption sensors

Parameter	Factory setting
Reference temperature	20 °C
Reference pressure	1000 hPa

Table 9: Factory settings reference conditions

Adjust the consumption sensor reading

The consumption sensor reading can be adjusted and, if necessary, manually reset to zero.

- ▷ Tap the **Meter Reading** text field.
- ▷ Enter the desired value.
- ▷ Select the **CLR** button to manually reset the consumption sensor to zero.
 - ❗ The meter reading can be displayed in various units.
- ▷ Tap the **Unit** text field.
- ▷ Select the desired unit.
 - ✓ If the unit of the meter reading is changed, the meter reading is automatically converted to the corresponding unit.



NOTE

When the maximum value of 100,000,000 [units] is reached, the meter reading is automatically reset to zero.

Configure analogue output

The measuring range of the analogue output is freely configurable. Depending on the sensor type, a measured value such as temperature, velocity, or flow can be assigned to the analogue output.

- ▷ Select **Advanced Settings** > **4...20 mA**.
 - ✓ The configuration menu opens.
- ▷ Select the measured value for the analogue output.
- ▷ Select the desired scaling.
 - ❗ Scaling can be carried out automatically or manually. With automatic scaling, the value is calculated on the basis of the sensor calibration data. In this case, 4 mA corresponds to the lower measured value and 20 mA to the upper measured value.
- ▷ Under **Error Val.**, select the value to be output at the analogue output in the event of an error.
- ▷ Select the desired settings.

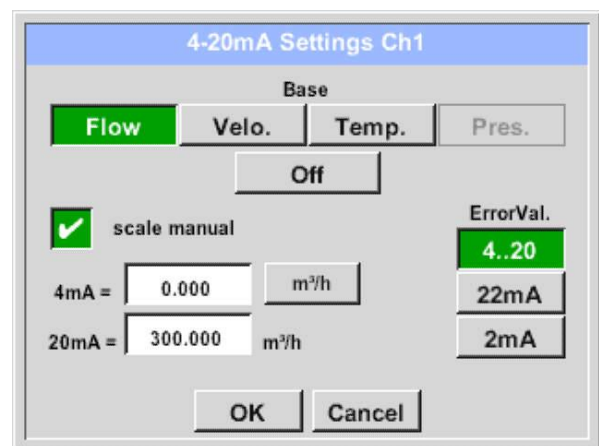


Figure 21: Configuring the analogue output (example)

Parameter	Description
4 mA	Defines the lower scaling value.
20 mA	Defines the upper scaling value.

Table 10: Configuration parameters

Setting	Meaning
2 mA	Sensor error / System error
22 mA	Sensor error / System error

Setting	Meaning
4...20	Output according to NAMUR (3.8 mA – 20.5 mA) < 4 mA – 3.8 mA = Below measurement range > 20 mA – 20.5 mA = Measurement range exceeded

Table 11: Output values for error current

Configure the galvanically isolated output

The galvanically isolated output can be defined as a pulse or alarm output.

- ▷ Select **Advanced Settings > Pulse/Alarm**.
 - ✓ The configuration menu opens.
- ▷ Select the desired output type.
 - ⓘ You can disable the output using the **Off** button.

Configuring the pulse output

To use the pulse output, you must specify the unit, sign, and polarity.

- ▷ Tap the **Pulse** button.
- ▷ Select the desired settings.

Figure 22: Configuring the pulse output (example)

Parameter	Description
Unit	Defines the unit.
Value	Defines the pulse value.
Threshold	Defines the switching state: positive = 0 → 1, negative = 1 → 0.

Table 12: Parameters for output configuration

Configure alarm output

To use it as an alarm output, you must specify the unit, alarm value, and hysteresis.

- ▷ Tap the **Alarm** button.
- ▷ Select the desired settings.

Figure 23: Configuring the alarm output (example)



Parameter	Description
Unit	Defines the unit.
Value	Defines the alarm value.
Limit	Defines the hysteresis: High = alarm when the value is exceeded; Low = alarm when the value is not reached.

Table 13: Parameters for output configuration

Adjust the zero point and leak flow volume suppression

Zero-point adjustment provides reliable measurement results only under stable conditions. It must be performed with system pressure applied and with no flow.

Prerequisite

- The product is under system pressure.
 - There is no flow in the pipe.
 - The process conditions are stable.
- ▷ Make sure there is no flow in the pipe.
- ❗ If the sensor displays a flow rate greater than 0 m³/h when there is no flow, the zero point of the calibration curve can be set at this point.
- ▷ Select **Advanced Settings > Zero Point**.
- ▷ Tap the **Adjust Value** button.
- ✓ The zero point is adjusted.
 - ❗ You can use the **Reset** button to reset the settings to zero.

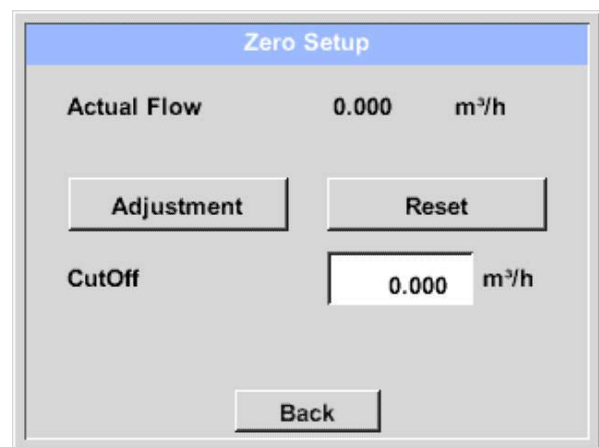


Figure 24: Adjusting the zero point and leak flow volume suppression (example)

Parameter	Description
CutOff	Defines the leak flow volume suppression. Flow rates below the defined low-flow cutoff value are displayed as 0 m³/h and are not recorded by the consumption sensor.

Table 14: Configuration parameters

7.3.3 Configure analog sensor

Configure analog sensor

The additional sensor channel is configured by adjusting the sensor type, scaling, and other parameters to match the connected analog sensor.

- ▷ Select the desired sensor type.
- ▷ Tap the **>** button.
 - ✓ The configuration menu opens.
 - ❗ Refer to the data sheet for the connected sensor for the sensor scaling.
- ▷ Enter the scaling values for the lower and upper signal values.
- ▷ Tap the (Offset) Set Value to ... button to adjust the sensor's measured values to a defined value.
 - ❗ Use the **Reset** button to reset the offset to zero.
- ▷ Check the **Power** checkbox if the selected sensor type requires an external sensor power supply.
- ▷ Select the desired settings.

Figure 25: Configuring an analog sensor (example)

Parameter	Description
Unit	Defines the unit. Use the Edit button to define user-specific units.
Scale 0 V or 0/4 mA	Defines the lower scaling value.
Scaling 1/10/30 V or 20 mA	Defines the upper scaling value.

Table 15: Configuration parameters

Configure totalizer function (optional)

Prerequisite

- The "Analog Total" software option is enabled.

The "Analog Total" software option enables consumption calculation based on an analog input signal. It calculates a cumulative total value - such as consumption [m³] - from an instantaneous value, such as flow rate [m³/h].

- ▷ Enable the "Analog Total" software option.
 - ❗ Further information can be found in chapter "10.4 Activate software option".
- ▷ Tap the text fields for **Unit** for measured value and consumption quantity.
- ▷ Select the desired units.
 - ❗ The text field Unit for the consumption quantity can only be edited for meter readings that specify a volume or quantity per unit of time.
- ▷ Enter the scaling values for 4...20 mA.
- ▷ If necessary, enter a start value in the **Set Total to** text field.

Figure 26: Configuring the totalizer function (example)

- 1 Measured value
- 2 Consumption quantity

7.3.4 Configure the temperature sensor

Configure the temperature sensor

To configure the additional sensor channel, select the sensor type and set the parameters for adjusting the temperature measurement.

- ▷ Select the desired sensor type.
- ▷ Tap the  button.
 - ✓ The configuration menu opens.
- ▷ Tap the (Offset) set values button to calibrate the sensor's readings to a defined value.
 - ❗ Use the Reset button to reset the offset to zero.
- ▷ Select the desired settings.

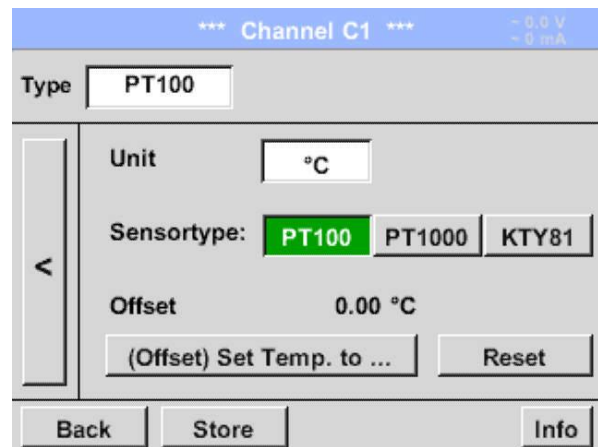


Figure 27: Configuring the temperature sensor (Example)

Parameter	Description
Unit	Defines the unit.
Sensor type	Defines the sensor type.

Table 16: Configuration parameters

7.3.5 Configure the pulse sensor

Configure pulse sensor

The additional sensor channel is configured by specifying the pulse mode, as well as the corresponding units and parameters for recording consumption or meter readings.

- ▷ Select the desired sensor type.
- ▷ Tap the  button.
 - ✓ The configuration menu opens.
 - ❗ Refer to the data sheet for the connected sensor to determine the pulse value.
- ▷ Check the Power checkbox if the selected sensor type requires an external power supply.
- ▷ Select the desired settings.

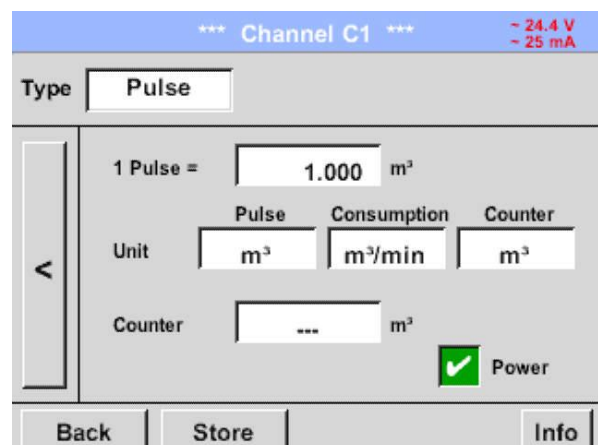


Figure 28: Configuring a pulse sensor (example)

Parameter	Description
1 pulse	Defines the pulse value.
Unit: Pulse / Consumption / Meter Reading	Defines the units. For the pulse unit, you can select either flow volume or energy consumption.
Meter reading	Defines the meter reading. The meter reading can be set to any desired value at any time.

Table 17: Configuration parameters

7.3.6 Configure the sensor with an RS-485 interface

Configuring a sensor with an RS-485 interface

Up to 8 register values can be read via Modbus from the input or holding registers of the connected sensor.

- ▷ Tap the **>** button.
 - ✓ The configuration menu opens.
- ▷ Select the required register setting.
- ▷ Tick the **use** checkbox to enable the function.
- ▷ Tick the **Power** checkbox if the selected sensor type requires an external power supply.
- ▷ Select the desired settings.

Figure 29: Configuring a sensor with an RS-485 interface (example)

Parameter	Description
ID	Defines the mapping or identification of the register or signal.
Address register	Defines the register address. The register address must be entered as a decimal value in the range 0 to 65535.
Register format	Defines the register type, data type and byte order.
Unit	Defines the unit. User-specific units can be defined using the Edit button.
Scaling	Defines the scaling. The output value is multiplied by the set scaling factor.

Table 18: Configuration parameters

Configuring data type and byte order

A Modbus register comprises 2 bytes. Two registers are read for 32-bit values, and one register for 16-bit values. As the byte order is not explicitly defined in the Modbus specification, it must be set to match the connected sensor. The necessary details can be found in the sensor's data sheet.

- ▷ Type in the text field Register format.
 - ✓ The configuration menu opens.
- ▷ Select the register type.
- ▷ Select the data type.
- ▷ Select the byte order to match the connected sensor.

Figure 30: Configuring data type and byte order (example)

Data type	Description	Range of values
UI1 (8 Bit)	Unsigned Integer	0 to 255
I1 (8 Bit)	Signed Integer	-128 to 127
UI2 (16 Bit)	Unsigned Integer	0 to 65535



Data type	Description	Range of values
I2 (16 Bit)	Signed Integer	-32768 to 32767
UI4 (32 Bit)	Unsigned Integer	0 to 4294967295
I4 (32 Bit)	Signed Integer	-2147483648 to 2147483647
R4 (32 Bit)	Floating-point number	IEEE 754

Table 19: Supported data types and value ranges

Example	Byte order	Byte sequence
16-bit value	A	00 12
16-bit value	B	12 00
32-bit value	A-B-C-D	AE 41 56 52
32-bit value	D-C-B-A	52 56 41 AE
32-bit value	B-A-D-C	41 AE 52 56
32-bit value	C-D-A-B	56 52 AE 41

Table 20: Examples of byte arrangements

Configuring Modbus communication parameters

- ▷ Tap the **Modbus Settings** button.
 - ✓ The configuration menu opens.
 - ⓘ This section is used to configure the sensor's Modbus communication parameters. These include the Modbus ID, baud rate, stop bit, parity and timeout.
- ▷ Set the communication parameters in accordance with the data sheet for the connected sensor.
- ▷ If the product is connected at the end of the bus: Tick the **Term** checkbox to enable scheduling.
- ▷ If required, tick the **Bias** tick box to enable a bias.
 - ⓘ The **Set to Default** button can be used to reset the sensor to its factory settings.
- ▷ Select the desired settings.

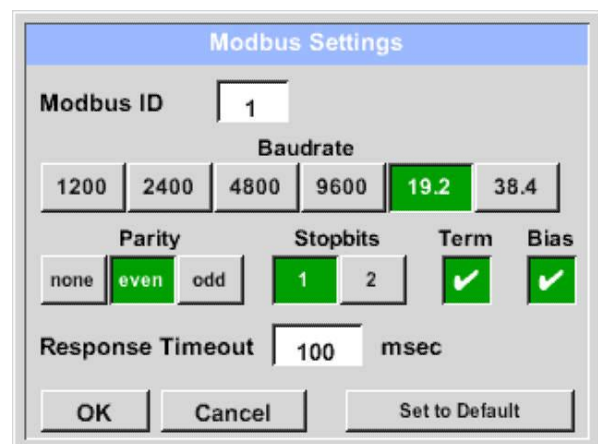


Figure 31: Configuring Modbus communication parameters (example)

7.3.7 Configure virtual channels

Configuring virtual channels

Prerequisite

- The "Virtual Channels" software option is enabled.

The "Virtual Channels" software option allows you to perform calculation and display of additional virtual measured values based on existing measurement channels and freely definable constants.

For each virtual channel, up to 8 value calculations can be performed, each with 3 operands and 2 operations. Addition, subtraction, multiplication, and division are supported.

Typical applications include, for example:

- Calculation of the specific power of a system
- Determination of the total consumption of a system
- Calculation of energy costs

- ▷ Enable the "Virtual Channels" software option.
 - ⓘ Further information can be found in chapter "10.4 Activate software option".
- ▷ Tap the **Virtual Channel** button.
 - ✓ The overview of available virtual channels opens.
 - ⓘ By default, no virtual channels are preconfigured.

- ▷ Tap the desired virtual channel.
- ▷ Tap the **Type** text field.
- ▷ Select the desired sensor type.
- ▷ Tap the **Name** text field and enter the name of the virtual channel.

Selecting sensor type

There are various predefined sensors to choose from. Alternatively, you can create and configure your own sensor.

- ▷ Tap the desired sensor channel on the display to open the sensor settings for that channel.
 - ✓ The configuration menu opens.
 - ❗ The **No Sensor** type indicates that the external sensor is not configured.
 - ❗ You can enter up to 24 characters for the name.

Configuring a virtual value

Up to 8 virtual values can be calculated per virtual channel. Each virtual value must be enabled separately.

- ▷ Tap the **>** button.
 - ✓ The configuration menu opens.
- ▷ Select the desired virtual value.
- ▷ Activate the virtual value.
- ▷ Select the desired settings.

Figure 32: Configuring a virtual value (example)

Parameter	Description
Operand	Defines the operands. Existing measured values or constant values can be used for the calculation. Tapping a button for a hardware or virtual channel (e.g., I1) opens a drop-down list showing the available measured values for each channel as well as predefined virtual channels. If the Const. Value button is selected, the value must be entered manually via an input field.
Operation	Defines the mathematical operations. Addition, subtraction, multiplication, and division are supported.
Unit	Defines the unit User-specific units can be defined using the Edit button.

Table 21: Configuration parameters



NOTE

When all operands and operators are used, calculations with three values and two operations are possible.

- Format: V1a = (1st operand, 1st operation, 2nd operand) 2nd operation, 3rd operand
- Example: V1a = (A1c – A2a) * 4.6



NOTE

The labels and resolution of the measured values for virtual channels are defined in the same way as the settings for a sensor channel.

Further information can be found in chapter " 7.2 Adjust configuration settings".

8 Dew point measurement

8.1 Perform the measurement

Select measured values for recording

- ▷ Select **Settings > Sensor Settings**.
 - ✓ The overview of available channels opens.
- ▷ Check the checkbox next to the desired measured values in the **Record** column to enable them for data logging.
 - ❗ The selected measured values will not be recorded until the chart recorder is activated after the settings are complete.

Figure 33: Selecting measured values for recording (example)

Configuring data logging

To analyze measurements, you can record measured values and add a comment, such as the name of the measurement location. The time interval for recording can be set as desired.

- ▷ Select **Settings > Logger Settings**.
- ▷ Select the desired time interval.
 - ❗ Depending on the number of recorded measured values, the minimum chart recorder interval is limited: more than 12 measured values = 2 seconds; more than 25 measured values = 5 seconds.
 - ❗ For logging, you can select predefined time intervals or enter a custom time interval of up to 300 seconds in the text field in the upper right corner. The currently set time interval is displayed there.
- ▷ Check the **Force new logger file** checkbox to create a new log file.
 - ❗ Otherwise, the last used log file will be continued.
- ▷ If necessary, check the **Start Time** checkbox.
 - ✓ If "Start Time" is selected, the current time plus one minute is automatically set.
- ▷ Tap the **Start Time** text field to set the start date and time.
- ▷ If necessary, select the **Stop Time** checkbox.
 - ✓ If the "Stop Time" checkbox is selected, the current time plus one hour is automatically set.
- ▷ Tap the **Stop Time** text field to set the end date and end time.
 - ❗ The Cal button opens the calendar for selecting a date.

Figure 34: Configuring data logging (example)



Enable data logging

- ▷ Tap the **Home** button.
 - ✓ The chart recorder begins recording at the set time. The number of measured values recorded and the remaining recording time are displayed.
 - ❗ The chart recorder can also be controlled using the **START** and **STOP** buttons even if the start and stop times are not set.
 - ❗ Sensor settings can only be changed when the chart recorder is deactivated. Otherwise, a message will appear that must be confirmed.

8.2 Display measured values

Configure the main view

The main view can be customized. A total of six layouts are available, in which one to five freely selectable measured values can be displayed.

- ▷ Tap the **Settings** button.
- ▷ Tap the **Next Layout** button to switch between the available layouts and select the desired layout.
- ▷ Tap the white-background fields (Val. 1 through Val. 5) to select the desired measured values.
- ▷ Select the desired settings.

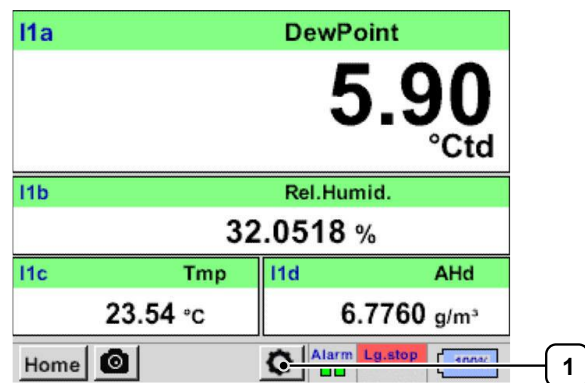


Figure 35: User interface | main view (example)

1 Settings

Open the main menu

The **Main menu** serves as the starting point for all of the product's key functions.

- ▷ Tap the **Home** button.

Display measured values graphically (ongoing measurement)

During the measurement, the current values are displayed in the **Current Values** view.

Prerequisite

- The measurement is in progress.

▷ Tap the **Graph / Current Values** button.

❗ Here, you can select one or more channels to record and display measured values.

❗ Swipe horizontally to switch between earlier and later time points. Swipe vertically to zoom in or out on the displayed time period.

▷ Tap the desired channel on the right side to display it in the graph.

▷ Tap the **Time Interval** button to switch between the predefined time intervals.

✓ The graph is updated accordingly.

❗ Tap the button repeatedly to cycle through the predefined time intervals. The currently selected time is displayed on the button.

▷ Tap the **→** button to display the currently recorded measured values within the set time range.

▷ Tap the **Settings** button to enable up to 6 measured values simultaneously.

✓ The configuration menu opens.

❗ For each channel, you can select a measured value to display in the graph. Additionally, you can specify the color and y-axis scaling (minimum, maximum, grid).

❗ If multiple channels are active, all graphs are displayed. However, only the y-axis of the selected channel is shown. If no y-axis scaling is defined, the default values are used (minimum 0, maximum 100, grid 10).

▷ Select the desired settings.

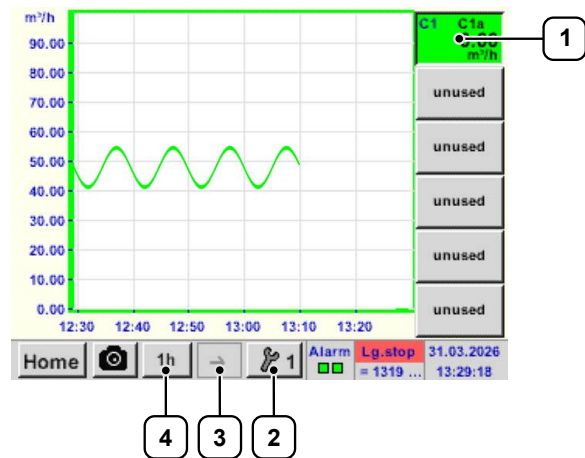


Figure 36: Displaying measured values (example)

- | | |
|------------|--------------------------------------|
| 1 Channel | 3 Currently recorded measured values |
| 2 Settings | 4 Time interval |

Display measured values numerically (ongoing measurement)

The **Channels** view displays the current measured values of all connected sensors.

- ▷ Tap the **Channels** button.
 - ✓ The individual channels and their settings are displayed.
 - ❗ If the measured value exceeds or falls below the set alarm limits, the corresponding value flashes yellow (Alarm 1) or red (Alarm 2).
 - ❗ Changes cannot be made in this view and must be made in the **Settings**.
 - ❗ Further information can be found in chapter "→ 7 Configuration".
- ▷ Tap the corresponding sensor area on the display to open the sensor settings for that sensor channel.
- ▷ Tap the **Min/Max** button to view the minimum and maximum measured values for the current measurement.
 - ❗ Recording begins once the sensor is configured and connected.
- ▷ Tap the **Reset** button for the desired measured value to reset the minimum and maximum measured values.
 - ✓ The configuration menu opens.
 - ❗ You can reset either a single measured value or all minimum and maximum measured values for the sensor.
- ▷ Select the desired setting.

Min/Max 11-				
DewPoint	↑ ↓	138662 138290	°Ctd	Reset
Rel.Humid.	↑ ↓	31.4029 31.0082	%	Reset
Temperatur	↑ ↓	29.40 0.00	°C	Reset
Abs.Humid.	↑ ↓	7.2905 0.0000	g/m³	Reset
Back				1 1..4

Figure 37: Overview of minimum and maximum measured values (example)

Display measured values graphically (completed measurement)

The Graph view is used to display recordings that have already been completed. No values are displayed during an ongoing measurement.

Prerequisite

- The measurement is complete.

- Tap the **Graph** button.
 - ✓ The Graph view opens.
 - ⓘ Swipe horizontally to switch between earlier and later time points. Swipe vertically to zoom in or out on the displayed time period.
- Tap the **Date** button to open the calendar and select the desired date.
 - ⓘ Saved measured values can be filtered by time, start and stop times, comments, file name, and file format.
- Tap the **Time Interval** button to switch between the predefined time intervals.
 - ⓘ A maximum time period of 24 hours can be displayed. The smallest possible display range is automatically selected based on the recording's time interval.
- Tap the **Settings** button to configure the Y-axes.
 - ✓ The configuration menu opens.
 - ⓘ For each Y-axis, you can select the unit, scale, grid, associated channels, and color.

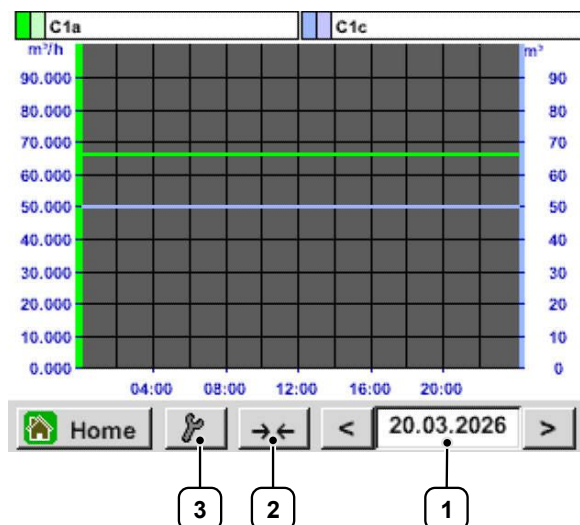


Figure 38: Displaying measured values graphically (example)

- 1 Date
- 2 Time interval
- 3 Settings

Parameter	Description
Unit	Defines the unit.
Color	Defines the color of the measurement curve.
Graphs	Defines the channel to be displayed.
A.Scale	Enables automatic scaling of the Y-axis.
Min.	Defines the minimum value of the Y-axis.
Max.	Defines the maximum value of the Y-axis.
Grid	Defines the step size of the axis scaling.

Table 22: Configuration parameters

8.3 End measurement

End dew point measurement

Connection via quick-release coupling:

- After completing the measurement, detach the measuring chamber from the quick coupling at the point of measurement.

Connection via male thread:

- After completing the measurement, slowly release the pressure at the point of measurement.
- Detach the product from the point of measurement.
 - ⓘ Use the wrench flat (SW 27) for disassembly.



9 Data management

Manage data

Data can be imported into and exported from the product.

Tools

- USB storage device
- ▷ Tap the **Export/Import** button.
 - ✓ The configuration menu opens.

9.1 Export data

Export measurement data

The recorded measurement data can be exported to a USB storage device.

Prerequisite

- A USB storage device is connected.
- ▷ Tap the **Logger Data** button.
- ▷ Tap the **Selection** buttons to choose the desired export period.
 - ❗ The configuration menu opens.
 - ❗ The selected date is highlighted in green; Sundays are shown in red, just like on a calendar. Days with recorded data are visually highlighted.
 - ❗ If multiple measurements were recorded on a single date, they will be displayed after the date is selected.
- ▷ Tap the **Export** button.
 - ✓ All saved data within the selected time period will be exported.

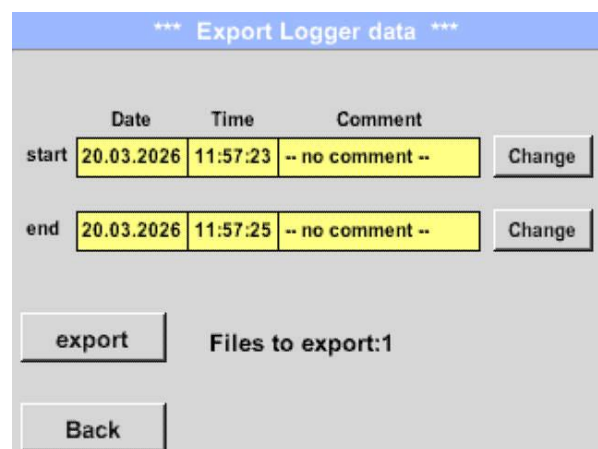


Figure 39: Exporting measurement data (example)

Export screenshots

The screenshots stored on the SD card can be exported to a USB storage device.

Prerequisite

- A USB storage device is connected.
- ▷ Tap the **Screenshots** button.
- ▷ Tap the **Selection** buttons to choose the desired export period.
 - ❗ The configuration menu opens.
 - ❗ The selected date is highlighted in green; Sundays are shown in red, just like in the calendar. Days with recorded data are visually highlighted.
- ▷ Tap the **Export** button.
 - ✓ All saved data within the selected time period will be exported.

Export system settings

System settings can be exported to the internal SD card or a USB storage device. This is particularly useful before a software update.

Prerequisite

- USB storage device is connected (optional).

- ▷ Tap the **System Settings (Export)** button.
- ▷ Select the desired export directory (SD card or USB).
 - ✓ All system settings already saved to the selected location are displayed.
 - ! Storage path: DEV0006/Settings
 - ! You can select an existing file (data will be overwritten) or create a new file.
- ▷ **Overwrite existing file:** Select the desired file and tap the **OK** button.
- ▷ **Create new file:** Tap the **New File** button.
 - ! You can enter up to 8 characters for the name.
- ▷ Select the desired settings.
 - ✓ The system settings are saved as an XML file in the selected export directory. This saves all sensor settings, including recording, alarm, and measurement resolution settings, as well as graphics, "Current Values," and name definitions.

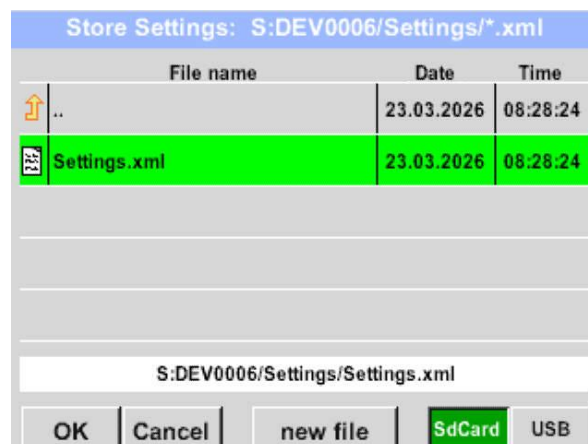


Figure 40: Export system settings (example)

9.2 Import data

Import system settings

Saved system settings can be loaded from the internal SD card or a USB storage device.

Prerequisite

- USB storage device is connected (optional).

- ▷ Tap the **System Settings (Import)** button.
- ▷ Select the desired import directory (SD card or USB).
 - ✓ All system settings already saved in the selected location will be displayed.
- ▷ Select the desired import file.
- ▷ Tap the **OK** button.
 - ✓ When importing system settings, all sensor settings - including recording, alarm, measurement resolution, graphics, "current values", and name definitions - are applied.
 - ✓ Once the import is complete, the product will automatically restart.
 - ! To fully apply the new sensor settings, they must be enabled separately for each channel.
- ▷ Select **Settings > Sensor Settings**.
- ▷ Select the desired settings.

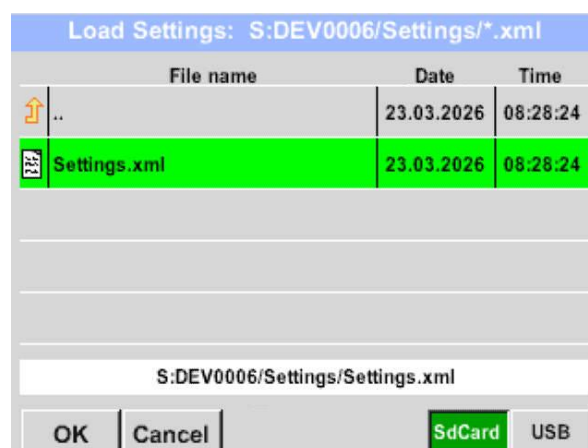


Figure 41: Importing system settings (example)

9.3 Manage SD card

Manage SD card

- ▷ Select **Settings** > **Device Settings** > **SD Card**.
- ▷ Tap the **Reset Logger Database** button to reset the data.
 - ❗ However, the data remains on the SD card and can be reused externally.
- ▷ Tap the **Erase SD Card** button to delete the data from the SD card.
- ▷ Check the **Test SD Card** checkbox to run a test on the SD card.

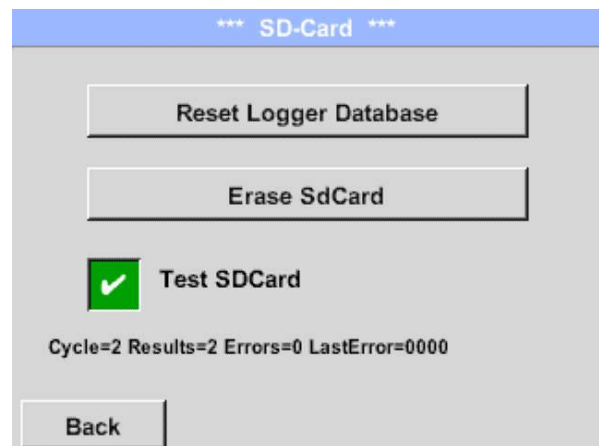


Figure 42: Manage SD card (example)

10 Maintenance and servicing



CAUTION

Safety instructions

- ▷ The product may only be serviced by a qualified electrician.
- ▷ Work on the electrical equipment of the product may only be carried out by qualified electricians or by instructed persons under the direction and supervision of a qualified electrician in accordance with the electrotechnical regulations.
- ▷ Spare parts must comply with the technical requirements specified by the manufacturer (CS INSTRUMENTS). This is always guaranteed with original spare parts.



NOTICE

Measurement errors caused by contaminants in the measurement medium

Contaminants can lead to malfunctions or disruptions.

- ▷ The plant operator must ensure that the measuring medium meets the required purity standards and that appropriate cleaning and maintenance intervals are observed.
- ▷ The manufacturer (CS INSTRUMENTS) accepts no warranty or liability for incorrect use.



NOTE

Unless expressly described otherwise, only begin maintenance and servicing work after

- the product has been disconnected from the power supply,
- the product has been switched off and secured against being switched on again.

10.1 Clean product

Cleaning the housing

If the housing becomes dirty, perform cleaning with solvent-free cleaning agents.

- ▷ Use a slightly damp, lint-free cloth to perform regular cleaning of the housing.
- ▷ Check the product for damage and corrosion.

Cleaning the display

If the display is dirty, perform cleaning with solvent-free cleaning agents.

- ▷ Select Settings > Cleaning.
 - ✓ The display will be temporarily disabled.
- ▷ Use a slightly damp, lint-free cloth to perform regular cleaning of the display.

Cleaning the sensor

Contaminants on the sensor can lead to measurement errors. Depending on environmental conditions, deposits may form at varying rates.

Determining appropriate maintenance intervals is always the responsibility of the operator.



NOTICE

Measurement errors or permanent damage to the sensor

Improper cleaning when the sensor is heavily soiled can damage the sensor.

- ▷ Do not attempt to perform cleaning on the sensor if it is heavily soiled.
- ▷ Send the product to the manufacturer for inspection and maintenance.



Prerequisite

- The product is de-energized.
- ▷ If the sensor is slightly dirty, clean it by swishing it in water, a non-corrosive cleaning agent, or isopropyl alcohol, or in an ultrasonic bath.
 - ⓘ Do not touch the surface of the sensor plate.
 - ⓘ Do not perform mechanical cleaning of the sensor (e.g., with a sponge or brush).
- ▷ Allow the sensor to dry completely afterward.

10.2 Check cables



DANGER

Danger to life due to electrical voltage

During installation, maintenance, or in the event of a malfunction, conductive parts that can be touched may carry dangerous voltages. Contact with live parts can result in serious injury or death.

- ▷ Perform work on electrical connections only when the power supply is turned off.
- ▷ Secure the product against accidental restarting.
- ▷ Work on electrical systems or equipment may only be performed by qualified electricians or by trained personnel under the direction and supervision of a qualified electrician.
- ▷ Check all electrical connections before commissioning and regularly during operation.



CAUTION

Danger from commissioning a damaged product

If a damaged product is installed or put into operation, it may result in functional failures, electrical hazards, or mechanical risks.

- ▷ Before each commissioning, inspect the product, accessories, and all supply lines for visible damage, loose parts, or missing components.
- ▷ Immediately take any defective product out of operation immediately.

Check the wiring

The product's electrical wiring must be inspected regularly by a qualified person. It is the operator's responsibility to determine appropriate maintenance intervals.

Prerequisite

- The product must be de-energized and freely accessible.
- ▷ Check the electrical wiring for damage.

10.3 Perform calibration

Calibrate the display

If necessary, you can calibrate the display.

- ▷ Select **Settings** > **Device Settings** > **Calibrate Touchscreen**.
- ▷ Tap the **Calibrate** button.
 - ✓ A calibration cross will appear one after another in different positions.
- ▷ Press each calibration cross that appears.
 - ✓ A message will appear once calibration is complete.
 - ✗ If this does not happen, you can cancel the calibration by tapping **Cancel** and then repeat the process by tapping **Calibrate** again.

Observe calibration intervals

It is the operator's responsibility to determine appropriate calibration intervals.

**NOTICE****Manufacturer's recommendation**

To detect measurement deviations early on, calibration is recommended every 12 months.

- ▷ Perform an initial recalibration of the product no later than 12 months after delivery - regardless of operating conditions.

A shorter calibration interval may be necessary, particularly under the following conditions:

- extreme ambient temperatures, particularly low temperatures
 - exposure to moisture or condensate use other than as intended
 - mechanical stress, e.g., from impact or overload
 - interventions for maintenance or repair purposes
 - high requirements for measurement precision
- ▷ Follow your company's guidelines for determining calibration intervals, as well as the specifications in your quality management manual.
 - ▷ When determining calibration intervals, take into account the operating conditions, the required measurement precision, and economic considerations.
 - ❗ Rare recalibrations increase the risk of inaccurate measurement results. Frequent recalibrations can increase operating costs.
 - ▷ Always have the product calibrated after exposure to special operating conditions.
 - ▷ For more information, refer to the enclosed factory calibration certificate.

Have the factory calibration performed

- ▷ Send the product to the manufacturer.
 - ❗ For use in mission-critical systems, a replacement product of the same design should be kept on hand.

10.4 Activate software option

Activate software option

Software options can be purchased at a later date and activated on the product using an activation code. This allows you to expand the product's functionality as needed.

Prerequisite

- You have the activation code for the desired software option.
- ▷ Contact customer service to purchase the desired software option.
- ▷ Select **Settings > About**.
 - ✓ The product information screen, which includes details on the product type, serial number, and software and hardware versions, will open.
- ▷ Tap the **Buy** button for the respective software option.
- ▷ Enter the activation code.
 - ✓ The software option will be activated and will then be available for use.



10.5 Update software

10.5.1 Download software package

Download software package

Tools

- USB storage device
- ▷ Go to the manufacturer's website.
- ▷ Download the appropriate software package.
 - ❗ The current hardware and software versions, as well as the serial number, are displayed under **Settings > About**.
- ▷ Save the software package to the desired USB storage device and extract it there.
 - ❗ The **DEV0006** folder must be located in the root directory of the USB storage device.

10.5.2 Performing a software update



NOTICE

Data loss or malfunction due to an interrupted software update

The software update can only be performed with the AC adapter plugged in to ensure an uninterrupted power supply.

- ▷ Do not disconnect the AC adapter during the software update.
- ▷ Do not turn off the product during the software update.

Preparing for the software update

Before performing a software update, you should back up the system settings so you can restore them if necessary.

- ▷ Before the software update, back up the system settings to a USB storage device or the internal SD card.
- ▷ Further information can be found in chapter " 9.1 Export data".
- ▷ Plug the USB storage device into the product via the USB-A port.
 - ✓ The software update can now be performed.

Installing the software update

- ▷ Select **Settings > Device Settings > System Update**.
- ▷ Tap the **Check USB Drive for Updates** button.
 - ✓ The system compares the version numbers of the available software package and the currently installed one.
 - ✓ If a newer software package is available, it will be displayed and the installation button will be enabled.
- ▷ Tap the **Update Selection** button to install parts of the software package.
- ▷ Tap the **Force All** button to install the entire software package.
 - ✓ The installation of the software package will begin.
 - ⓘ The installation may take up to five minutes.
- ▷ If the **Restart** button appears after the update, tap it to restart the product.
- ▷ Tap the **Update Channels** button to update the channels.
- ▷ If the **Restart** button appears after the update, tap it to restart the product.
 - ⓘ The channel update may require a double system run followed by a restart. In this case, a corresponding message will appear during the restart.

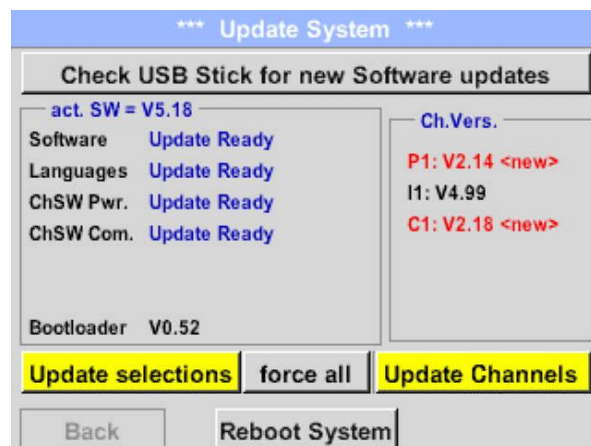


Figure 43: Installing a software update (example)

10.6 Restore factory settings

Restore factory settings

If necessary, you can reset the product to its factory settings to restore it to its original state.

- ▷ Select **Settings > Device Settings > Factory Setting > Reset to Default Settings**.
- ▷ Check the **Unique USB ID** checkbox to reset and regenerate the unique USB ID.
- ▷ Tap the **Restart** button to restart the product.

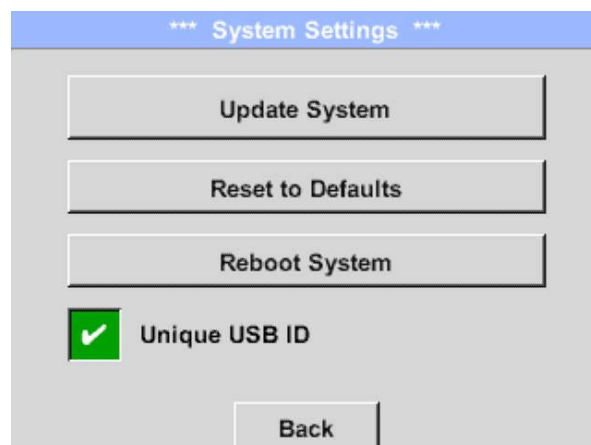


Figure 44: Restoring factory settings (example)

10.7 Customer service

To ensure prompt processing by customer service, please have the following information ready:

- Part number from the type plate
 - Serial number from the type plate
- ▷ Describe the problem as precisely as possible.
 - ▷ Make a note of any error messages displayed.



- ▷ Inform customer service about:
- When does the problem occur?
 - How often does it occur?
 - What changes have been made recently to the product, its configuration, or its environment?

11 Decommissioning and disposal



CAUTION

Improper disposal of the lithium-ion battery

This product contains a lithium-ion battery that must not be disposed of with regular household waste.

- ▷ Dispose of defective batteries in an environmentally responsible manner, in accordance with local regulations, or through a certified disposal company.

Remove the lithium-ion battery



CAUTION

Damage to the battery due to improper handling

Fire hazard or leakage of hazardous substances

- ▷ Do not damage the battery. Do not crush or short-circuit it.
- ▷ Remove the battery only when it is completely discharged.

Prerequisite

- The battery is fully discharged.

Tools

- Phillips screwdriver

- ▷ Remove the battery cover.
- ▷ Disconnect the connector between the battery and the product.
- ▷ Carefully pull out the battery.
- ✓ The battery and the product can now be disposed of separately.

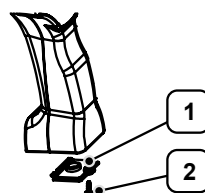


Figure 45: Removing the Lithium-Ion Battery (Example)

1 Cover

2 Screw

Decommissioning

Decommissioning refers to a prolonged period during which the product is not in use. During decommissioning, the product must be stored correctly and protected from damage and harmful environmental influences.

- ▷ If necessary, disconnect the product from the power supply.
- ▷ If the product is not going to be used for a prolonged period, please pack it away properly.
- ▷ Store the product in a dry place, protected from significant temperature fluctuations. Any resulting condensation may cause corrosion.

Waste disposal

At the end of its useful life, the product must be disposed of properly in accordance with the applicable national regulations. The product and its packaging contain recyclable materials which must not be disposed of as general waste.

- ▷ Before passing on or disposing of the device, delete any stored data, if present.
 - ! You can find information on this in the section 'Safely deleting user data'.
- ▷ Sort the components by material.
 - ! Observe the local disposal regulations and waste codes applicable to this product.
- ▷ Dispose of the components in an environmentally responsible manner, in accordance with local regulations or through a specialist waste disposal company.
 - ! You can obtain information on environmentally sound disposal from local authorities or specialist waste management companies.
- ▷ Alternatively, you can return the product to the manufacturer for proper disposal.

12 Appendix

12.1 Technical data

Parameters	Specification	Unit
Weight	~ 0.6	kg
Power supply	Power-supply unit: - Input: 100...240 V AC, 50...60 Hz - Output: 12 V DC, 1 A - Protection Class II (Suitable only for use in dry rooms.)	
Power supply for sensors	Only for product versions with an external sensor: - Output voltage: 24 V DC $\pm$ 10% - Output current: 120 mA (continuous operation)	
Internal power supply	Internally rechargeable Li-ion battery (charging time: ~4 h) Operating time (continuous operation): - Model without external sensor: ~ 12 h - Device version with external sensor: > 4 h (depending on the power consumption of the connected sensor)	
Pressure dew point measuring range	-80...+50	°Ctd
Temperature measuring range	-20...+70	°C
Relative humidity measuring range	0...100	% RH
Measurement precision	$\pm$ 0.5 (-10...+50); typically $\pm$ 2 (remaining range)	°Ctd
Response time T95	-50 °Ctd $\rightarrow$ -10 °Ctd: < 10 s -10 °Ctd $\rightarrow$ -50 °Ctd: < 5 min	
Sensor connections / Output signals	- AWG: 16...28 - Wire cross-section: 0.14...1.5 mm²	
Connection thread	Depending on the version: - G ½" - NPT ½"	
Pressure range	- Installation without measuring chamber (standard): -1...50 - Installation with measuring chamber: 2...16 - Special version: up to 350	bar
Measured variables	- Humidity measurement parameters: g/m³, mg/m³, ppm V/V, g/kg - Dew point / relative humidity: °Ctd atm, % rF	
Display	- TFT color display - Size: 3.5" - Resolution: 320 x 240 pixels	
USB interface	A	
Housing material	PC/ABS	
Optional	- Chart recorder - Storage: 8 GB SD card (standard)	
Application	Indoor use	
Dirt level	2	
Ambient temperature	0...+50	°C
Measured gas temperature	-20...+70	°C
Storage temperature	-20...+70	°C
Humidity	Max. 95% relative humidity, non-condensing	
Altitude rating	Up to 4,000 m above sea level	

Parameters	Specification	Unit
Protection Class	IP20	

Table 23: Technical specifications | DP 500 / DP 510

12.2 Dimensions

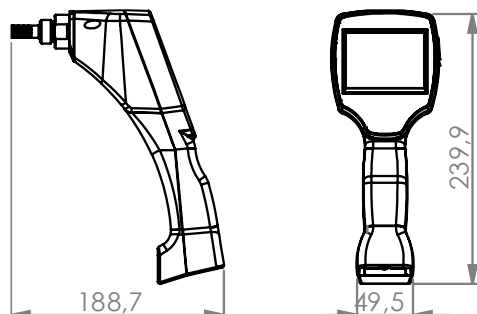


Figure 46: Dimensions

12.3 Interface for external sensors

12.3.1 Input signals

Input Signal	Measuring range	Resolution	Accuracy	Input resistance / Notes
Current signal	0...20 mA / 4...20 mA	0.0001 mA	$\pm 0.03 \text{ mA} \pm 0.05\%$	50 Ω ; Internal or external power supply
Voltage signal	0...1 V	0.05 mV	$\pm 0.2 \text{ mV} \pm 0.05\%$	100 k Ω
Voltage signal	0...10 V / 0...30 V	0.5 mV	$\pm 2 \text{ mV} \pm 0.05\%$	1 M Ω
RTD Pt100 / Pt1000	-200...+850 °C	0.1 °C	$\pm 0.2 \text{ °C}$ (-100...+400 °C) $\pm 0.3 \text{ °C}$ in the remaining range	
Pulse				- Pulse length $\geq 100 \mu\text{s}$ - Frequency range 0...1 kHz - Max. voltage 30 V DC

Table 24: Input signals

12.3.2 Wiring diagrams

Sensor type	Note	Wiring diagram
Consumption/Dew point sensor with SDI Data Transmission ¹	Digital communication between the product and the sensors takes place via an SDI bus line.	

¹ FA 300, FA 4xx, and VA 4xx series

Sensor type	Note	Wiring diagram
Consumption/Dew point sensor with RS-485 Interface (Modbus) ¹	Digital communication between the product and the sensor takes place via an RS-485 interface (Modbus).	
Pulse sensor	- Signal level 0 (Low): 0...0.7 V DC - Signal level 1 (High): 2.5...30 V DC - Pulse duration t: 400 μs - Max. frequency (duty cycle 1:1): 1000 Hz - Input resistance: ≥ 100 kΩ	
	External pull-up resistor required: $R = 4.7$ kΩ Note: One consumption unit is recorded when the device is powered on.	
	External pull-up resistor required: $R = 4.7$ kΩ	

¹ FA/VA 5xx series

Sensor type	Note	Wiring diagram
Not permitted		
Analog sensor	Sensor with 4...20 mA output (2-wire technology)	
	Sensor with 4...20 mA output (3-wire technology)	
	Sensor with 4...20 mA output (4-wire technology)	



Sensor type	Note	Wiring diagram
	Sensor with 0...1 / 10 / 30 V DC voltage output (3-wire technology)	
	Sensor with voltage output 0...1 / 10 / 30 V DC (4-wire technology)	
Temperature sensor	PT100 / PT1000 / KTY81 (2-wire technology)	
	PT100 / PT1000 / KTY81 (3-wire technology)	

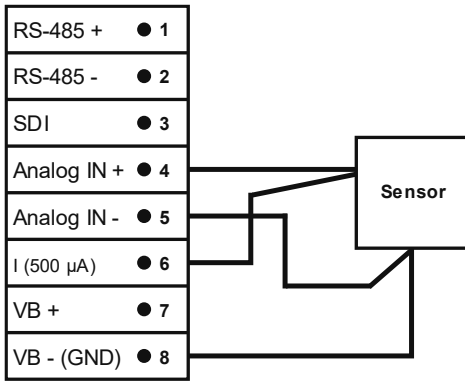
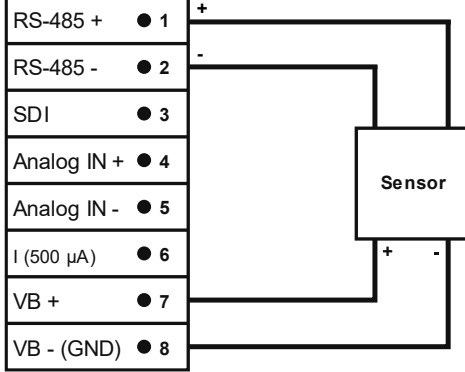
Sensor type	Note	Wiring diagram
	PT100 / PT1000 / KTY81 (4-wire configuration)	
Sensor with RS-485 interface		

Table 25: Wiring diagrams for external sensors

12.4 Declaration of conformity



KONFORMITÄTSERKLÄRUNG

DECLARATION OF CONFORMITY

Wir
We

CS INSTRUMENTS GmbH & Co.KG
Zindelsteiner Straße 15, 78052 VS-Tannheim

Erklären in alleiniger Verantwortung, dass das Produkt
Declare under our sole responsibility that the product

Mobile Taupunkt –Messgeräte DP 500 / DP 510
Portable dew point meters DP 500 / DP 510

den Anforderungen folgender Richtlinien entsprechen:

We hereby declare that above mentioned components comply with requirements of the following EU directives:

Elektromagnetische Verträglichkeit Electromagnetic compatibility	2014/30/EU 2014/30/EU
RoHS (Restriction of certain Hazardous Substances)	2011/65/EU – EU 2015/863

Angewandte harmonisierte Normen:

Harmonised standards applied:

EMV-Anforderungen EMC requirements	EN IEC 55011: 2022-05 EN IEC 61326-1: 2022-11
---------------------------------------	--

Das Produkt ist mit dem abgebildeten Zeichen gekennzeichnet.
The product is labelled with the indicated mark.



Tannheim, den 07.04.2026


Wolfgang Blessing Geschäftsführer



CS INSTRUMENTS GmbH & Co. KG

Zindelsteiner Str. 15 | 78052 VS-Tannheim | GERMANY

Tel. +49 7705 978 99 0 | info@cs-instruments.com

www.cs-instruments.com