# Portable Pressure- and Dew-Point Monitoring Device
# TPK 21 portable / TPK 61 portable

## Functional description and operating instructions

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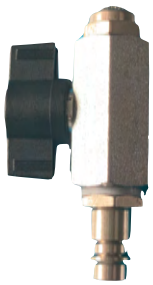
# 1 Scope of Delivery

The pressure dew-point monitor is supplied ready to use. The scope of delivery includes the AC adaptor, stylus, stylus holder (which may be attached to the dew-point meter) and relevant operating instructions.

- 6/4 mm PTFE compressed - air - hose
- Bypass valve, to test humidity condition in the piping system



Bypass valve:

Please use bypass valve before using the measurement device to test, if there is any liquid water inside the piping system, which could damage the sensor.

This is especially recommended after a dryer breakdown.

PTFE hose with coupling plug:

The PTFE hose with coupling plug is necessary to connect the device with the compressed air system.

Please read the operating instructions before using this device. In addition to the operating instructions, important information is provided regarding installation, initial start-up and troubleshooting in each of the relevant chapters.

# 2 General dangers and precautions

Please read the following warnings prior to initial start-up! The symbols used in the operating instructions are intended to call your attention to the safety risks. It is not enough to simply observe the symbol. It is important to read the full text provided in the safety instructions!

This symbol indicates a potential risk to humans, equipment or the environment. The information provided must be strictly observed in order to prevent risks.

This symbol indicates important instructions for use and tips that are important in order to successfully complete tasks, and which must be strictly observed to ensure good results.

## 2.1 Safety instructions for electrical connection

The device must only be supplied with extra-low voltage. The device's other electrical connections must also only be connected with electronic components that are operated via an extra-low voltage supply.

Contact with live parts may result in death. Installation of the controller and maintenance work must therefore only be carried out by trained personnel. The power supply must be turned off for installation and servicing.

Also avoid touching the plug or any other electronic components when the power is switched off. Electrostatic phenomena may damage electronic components.

The product is not intended to control systems with safety-related functions. Even during normal operation there is a risk of unexpected malfunction, for example due to a surge or the failure of a component. The user must make sure that no damage can occur as a result of a malfunction or undefined device status. This can be achieved, for instance, through the use of redundant components or safety circuits.

Incorrect screw tightening torques at the connecting terminals or the use of unsuitable tools can damage the terminal, resulting in damage to insulation or the contacts. Poorly connected cables can come loose during operation, posing a considerable risk to safety. Contact resistance at clamp connections results in increased heat production that can cause a fire to start. Incorrectly wired connections can destroy electrical components and result in other damage.

## 2.2 Safety instructions for compressed air systems

In the case of unforeseen events, the energy stored in compressed air can cause material damage or result in injury. The risk increases with the operating pressure of the system. All work must therefore be performed by appropriately trained personnel. Appropriate care is necessary when performing any work on the compressed-air system in order to avoid damage!

The loud venting noise produced upon uncontrolled opening of pressurised lines can damage hearing or startle other people in the vicinity.

At high flow rates, foreign bodies in the air stream can behave like projectiles and cause injury to the skin or eyes.

The built-in measuring chamber with sensor is designed to handle pressures of up to 17 bar. This maximum permissible operating pressure must not be exceeded. Upstream components must be dimensioned according to the system's operating pressure and temperature.

The warranty will become null and void if the sensor housing is opened, or in the event of improper handling or the use of force.

# 3 Important application notes

## 3.1 Avoiding damage to the measuring probe

Measuring devices are sensitive and must be handled with care:
Avoid shocks, impacts and vibrations.

Prior to installation, check that there is no condensation, oil or dirt at the measuring point! Should this be the case, repair and dry out the system!

The measuring system is not suitable for use with compressed air with a high oil content, as directly covering the sensor with a film of oil impairs its response, blocks the pores of the filter and damages the filter choke.

As a rule of thumb: If you have any questions, contact the manufacturer.
Do not attempt to experiment with the device as you may cause faults and damage to occur!

## 3.2 Calibration and measuring accuracy

Prior to delivery, the pressure dew-point sensor is adjusted and tested by means of a complex calibration procedure involving several temperatures and humidity points. It is not possible for the end user to calibrate the device.

Please observe the permissible temperature range for use. Excessive temperatures reduce the measuring accuracy. The probe will be damaged if the temperature limit is exceeded.

The specified data, in particular the desired measuring accuracy, are valid at a temperature of 20°C. In principle, the lower the temperature at the sensor, the more accurate the measurement result. If possible, measurements should be taken in a cool area, or the gas should be cooled to ambient temperature.

With proper use, the probe will have a lifespan of many years. Nevertheless, to prevent errors, it is important that the sensor be calibrated once a year, according to the manufacturer's specifications. This particularly applies when the probe is used in critical applications within the lower dew-point measuring range.

## 3.3 Intended application

The new TPK portable series is intended to be used to measure the pressure dew points, pressure and temperature of clean, oil-free compressed air, which is free of any abrasive, corrosive, caustic, toxic, flammable and combustible components. For the scope of application and the calibrated measuring range, please refer to the technical data.

# 4 Humidity measurement in compressed air systems

In the industrial sector, quality requirements for compressed air are becoming ever stricter. Humidity and condensation are not permitted in compressed air and often cause damage to machines and lead to reduced production quality. Compressed-air dryers are commonly used. When used correctly, these reduce the moisture content of the air and ensure the production of high-quality compressed air.

However, problems with dryers are often detected very late on, usually when damage has already occurred. A large quantity of humidity will have already entered the compressed-air network, and considerable efforts will be required to dry the system out again. The high quality standards of the industrial sector call for continuous, reliable and stable long-term monitoring of the humidity content. This is the only way to detect problems early, before any damage has occurred.

With its large measuring range, the new TPK series is the ideal measuring system for monitoring refrigeration, adsorption and membrane dryers. The device is primarily intended for stationary applications but is also suitable for use as a portable measuring device thanks to its simple connection system.

# 5 Function

If compressed air is not dried before being fed into the compressed-air network, significant quantities of condensate can form in the pipe network, resulting in the malfunctioning of valves and pneumatic components, ultimately leading to loss of production. The pressure dew point in compressed-air systems is therefore a key factor in determining air quality and should be measured in all systems.

The new TPK portable series offers the ideal device for monitoring compressed-air quality (humidity, pressure and temperature) and giving timely warning, before any damage has occurred.

The series has a built-in measuring chamber with a protection filter and filter choke, as well as a plug connection for a 7.2 mm NW compressed-air socket. Power is supplied via battery or mains adapter. Initial set-up of the measuring system therefore requires no interference with the compressed-air network, nor any electrical installation work.

# 6 Mounting of the device

## 6.1 Safety instructions

The device must only be used for its intended purpose.

Installation of the controller and maintenance work must only be carried out by trained personnel. The power supply must be turned off for installation and servicing. The applicable safety regulations must be observed! All work on the compressed-air system must be carried out under pressure-free conditions.

The device must only be operated with extra-low voltage. This also applies to all external connections, such as the relay outputs.

## 6.2 Application notes

The air quality at the site of installation must be checked prior to assembly. Repairs must be made to the system in the case of any water or oil leakages. Contact with large quantities or water or oil may damage the sensor.

The compressed air must be drawn from the upper side of the pipe. The device must be mounted above the compressed-air line so that any condensation produced in the event of failure cannot flood the measuring chamber.

Use only suitable materials. The materials used must be impermeable to water vapour. Therefore please do not use regular polyurethane hoses! The only recommended material for flexible hose connections is PTFE ("TEFLON"). All metals are suitable down to -30°Ctpd.  Below this, stainless steel is the preferred choice. Avoid using excessively long sample-gas lines or unnecessary connectors.

The sensors on upstream components must not diffuse water vapour into the surrounding environment! Please use only high-quality components, e.g. ball valves with PTFE seals.

Carefully seal all points of connection with the sensor or measuring chamber. However, never use anaerobic liquid sealants, as these maydamage the sensor element!

Heavy particle loads will clog the filter or filter choke over time, resulting in a delayed response. In critical cases, an additional fine filter must be installed upstream of the measuring device.

If using compressed air of unknown quality, use a condensate separator or particle filter. Additional components must be suitable for the intended use!

In EMC-critical environments the measuring chamber should be electrically isolated from the metal pipes of the compressed-air network. The use of a PTFE or Polypropylene double nipple is an example of a suitable solution.

## 6.3 Procedure for installation

Installation involves the following steps:

- Testing of impurities and liquid water via filter choke (included in scope of delivery).
- Connection to the compressed-air network via PTFE hose
- Connection to the power supply (if requested)
- Setting of the switching points
- Testing and function control

## 6.4 Mounting

Please put the box on a sufficient big and flat surface.

Please take care, that the device couldn't fall down because of vibrations.

# 7 Connection at the compressed air network

## 7.1 Direct stationary assembly at the compressed air line

The device will be connected to the compressed air piping coupling with a „plug“ (included). Via the included PTFE-hose the air will be guided into the integrated measuring chamber.

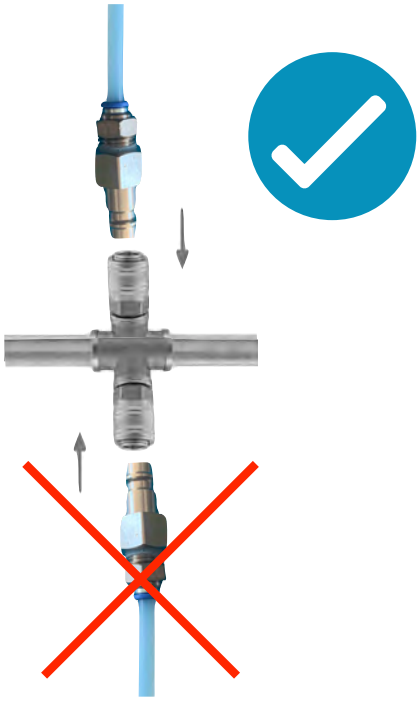
There has to be a definded flow to grant correct functionality and highest accuracy.

The basic setting for the flow is 60 l / h, ex works.
A closed throttle would cause higher values or cause an alarm.

For monitoring the whole compressed air station, the measuring device should be installed after dryer and filtration.
You can as well choose a random position within the plant to monitor partial segments, or the operating air for a special machine or area.

In order to avoid accumulation of condensation water
in case of an error, it is neccessary to mount the coupling on top oft he piping system.

Extreme high flow or abrupt change of pressure have to be avoided, because this could damage the sensor!



## 7.2 Application of a pre-filter / water separator

Depending on the state of the compressed-air system and distribution network, it is possible for dirt, condensate or oil to leak out from the measuring point. In order to avoid damage to the probe in such critical areas of application, a water separator with a fine filter can be connected upstream of the device. The upstream components must not alter the moisture content of the air or unduly impair the response. We can provide you with a list of suitable components upon request.

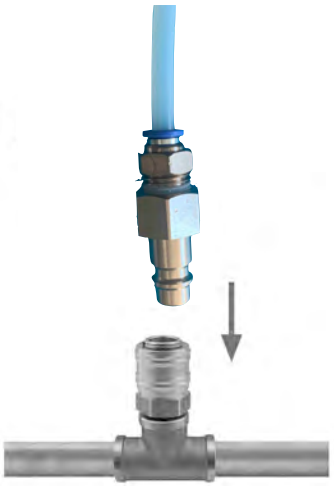
## 7.3 Mounting examples

The device is suitable for a variety of applications. The flexible design of the measuring chamber allows it to be easily adapted to the intended use:

Connection to a 7.27,2 mm NW quick coupler:

This connection can be quickly and easily performed within minutes, without any complex installation.

- The device is connected directly to the coupling, and no further mounting is required.



Connection of PTFE - hose with the measuring device:

Please insert the the hose-end without plug into the „INLET" port of the device.

Please notice urgently the pressure specification (16 bar/ 230 psi) to avoid damage inside the device.

## 7.6 Connection of power supply

The device is operated with extra-low voltage. It is possible to use the device via integrated battery with our permanent power supply connection. A suitable mains adapter is provided to use the device for long term measurements.

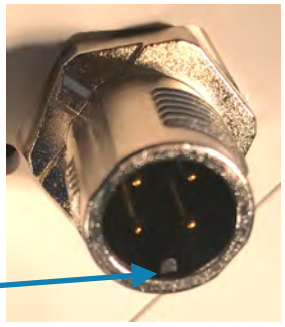
The power supply unit is plugged into one of the lower two M12 sockets („Analog Output“ or „Modbus") on the right-hand side of the device and screwed into place.

No complex electrical installation is necessary, and the device is immediately ready for operation

The AC adaptor with Europlug is of a high-quality design with a wide-range input. It is suitable for a 90 - 240 V power supply and is therefore suitable for Europe-wide use.

Do not try to force the connector when plugging it in.

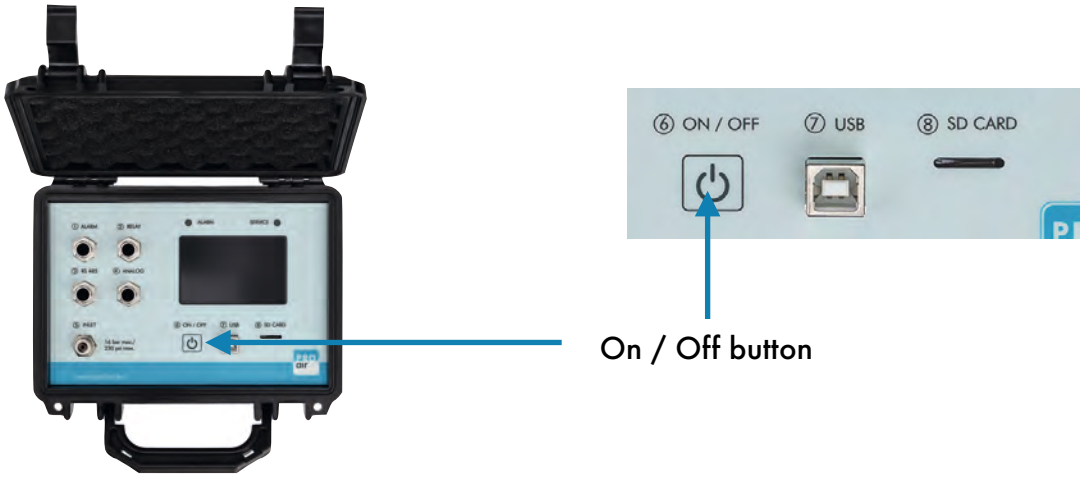
Follow the guidelines for plugs and sockets!!



## 7.5 Start-Up

The device immediately starts up when you push the „On/Off „button. The first measured values are displayed immediately after turning on the device. The measured values are likely to fall immediately following connection to the compressed-air network. The values will stabilise after a short time. Depending on the system, the following values should be set:

- For refrigeration dryers: approx. 0 to 7°Ctdp
- For an additional membrane dryer: approx. -20 to -10°C
- For an adsorption dryer: approx. -60 to -30°C




## 7.6 For the rarest of the cases...

If the device does not start up, please check the following points:

- Is the battery complete charged ?
- Is the mains plug correctly plugged in ?
- Is the M12 socket of the power supply correctly connected to the device ?

If you have examined all the possible causes and still have not managed to rectify the malfunction, please immediately contact our customer service department. Do not open the device, as this will invalidate the warranty claim !

# 8 Operation

General information on the description of the operating procedures

All images of the displays, numerical values and configurations are used by way of example to explain and clarify the information provided. The actual display on your device may differ according to the selected settings or ambient conditions.

## 8.1 View of unit

**Top view**
(transport box open)

### 8.1.1 View from the top (with open transport box)

## 8.2 Display

The built-in touch display is a monochrome FSTN dot-matrix display with white backlight and a resolution of 160 x 110.

All values may be set or changed accordingly via the screen using the stylus provided or with careful finger movements.

Caution: The use of pointed objects, such as ballpoint pens or pencils, can destroy the display and invalidate the warranty!

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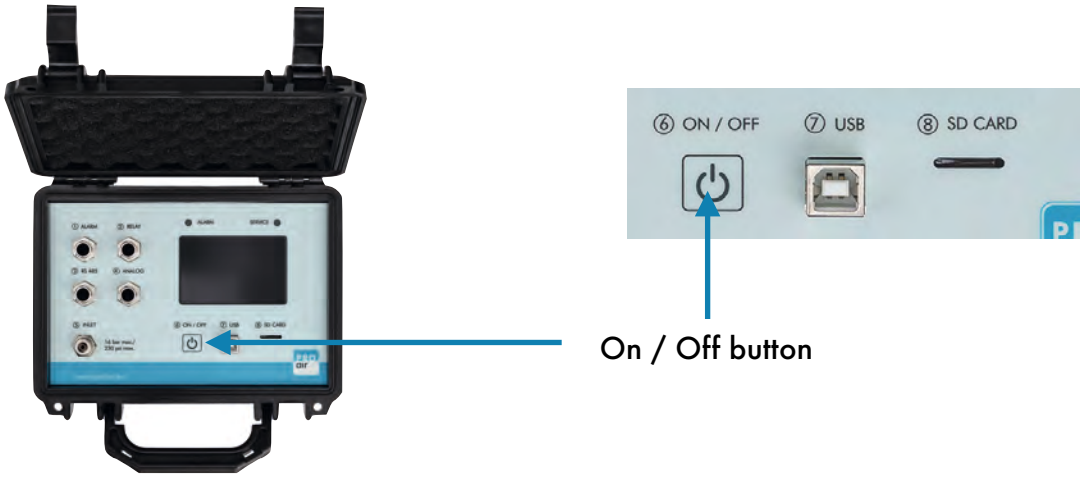


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- Is the mains plug correctly plugged in ?
- Is the M12 socket of the power supply correctly connected to the device ?

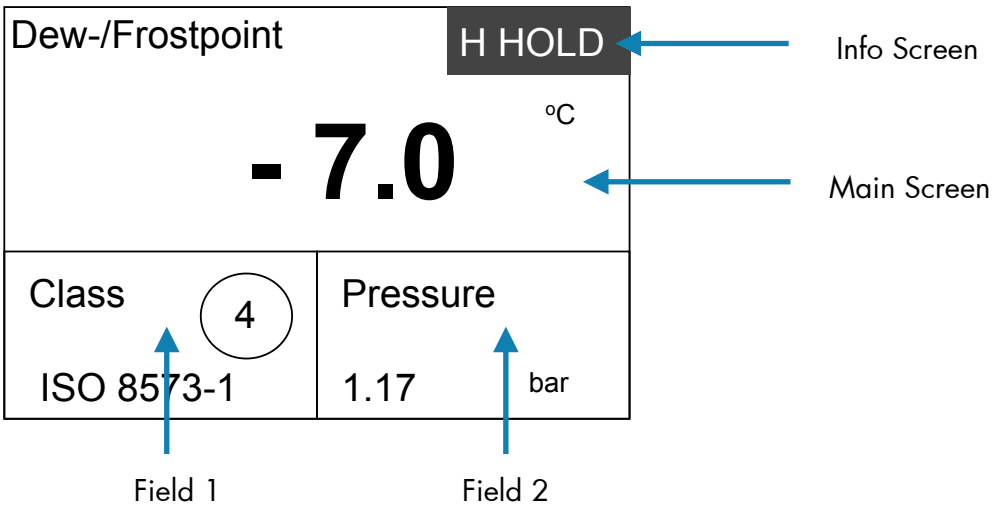
If you have examined all the possible causes and still have not managed to rectify the malfunction, please immediately contact our customer service department. Do not open the device, as this will invalidate the warranty claim !

### 8.2.1 Description of the Displays

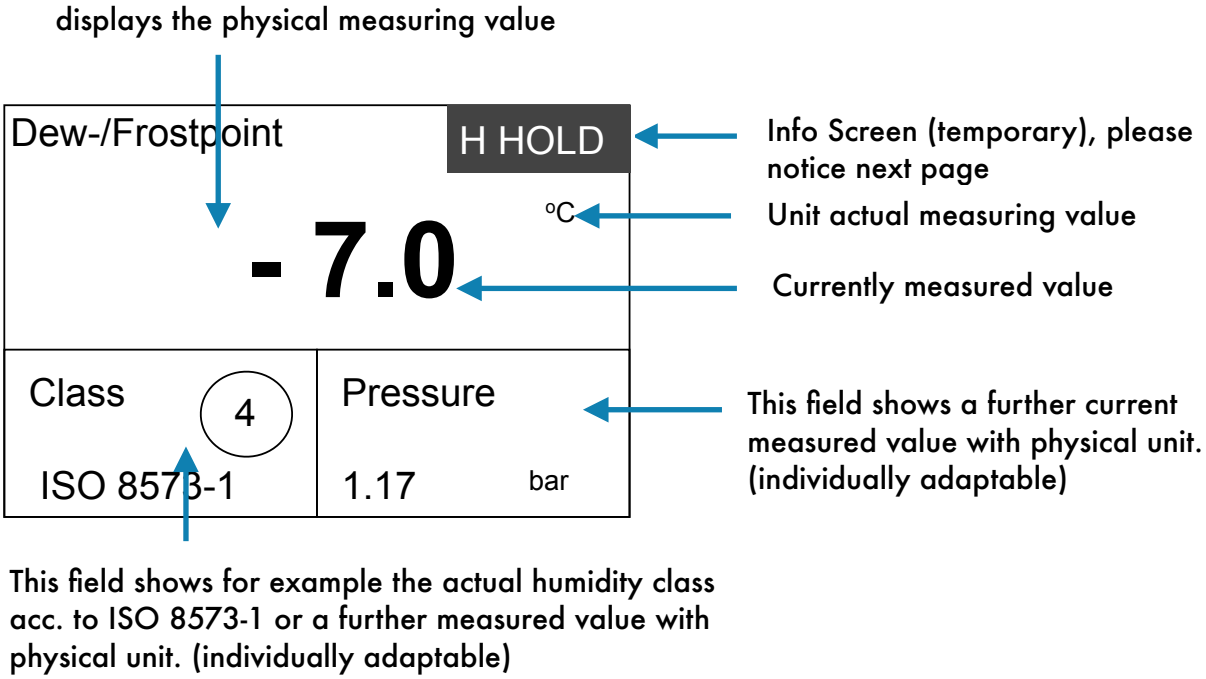
Once the device is connected to the power supply, a welcome screen with the logo and company name briefly appears and then the main screen is displayed.

The screen is divided into 3 fields (a main field and 2 smaller fields).

All fields can be individually adjusted.




#### 8.2.1.1 Description of the Main Screen



#### 8.2.1.2 Description Info Screen

After restarting the device or during bake-out of the sensor an "Information Screen" is displayed in the upper right-hand corner of the display with the following background.

Dew points in the range of -60 to -20°C at room temperature correspond to relative humidity values of 0.08 to 5.37% RH. To ensure accurate measurement at the lowest humidity values, the slightest drift effect of the humidity sensor element must be compensated for.

Moreover, in order to guarantee the long-term stability of the dew-point sensor the sensor element is periodically baked out. The sensor is heated every 13 h for approximately 5 minutes and then allowed to cool down to ambient temperature.

During heating "HHOLD" appears on the display, and "CHOLD" is indicated during cooling. The operation is indicated on the display:

The „Info Screen“ displays the current auto-calibration status:

**H** HOLD: **H**eat (The sensor element is being heated)
HOLD (The measured value is being saved)

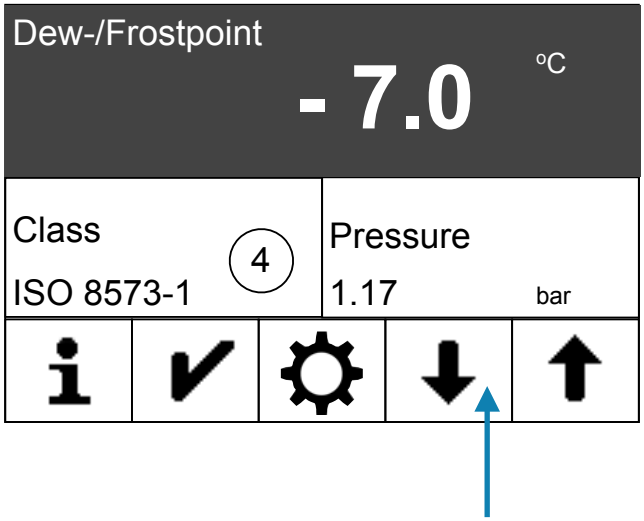
**C** HOLD: **C**old (The sensor is cooling down)
HOLD (The measured value is being saved)

Bake-out is performed every time the device is connected to the mains supply, then every 13 h. During the entire cycle, the last measured values are retained and are qualitatively available at the outputs. No further measurements are made during the heating phase. Therefore no alarm signal will be emitted during this period of time in the event that a maximum permissible value is exceeded. Only after the heating/ cooling cycle has finished will the device resume measurement and alarm evaluation.

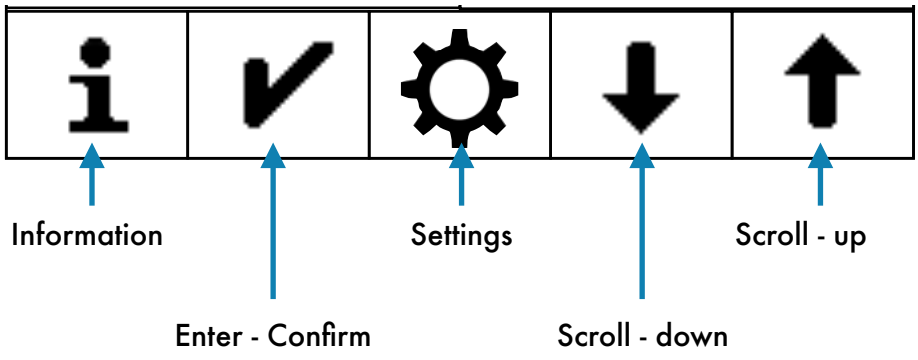
### 8.2.2 Adjustment of display fields

To adjust one of the fields according your specific needs, select the desired field by tapping it with the stylus provided or your finger.

The display now appears as follows (the main field has been selected as an example).




In the lower third of the display an additional menu bar appears that allows further settings to be defined.



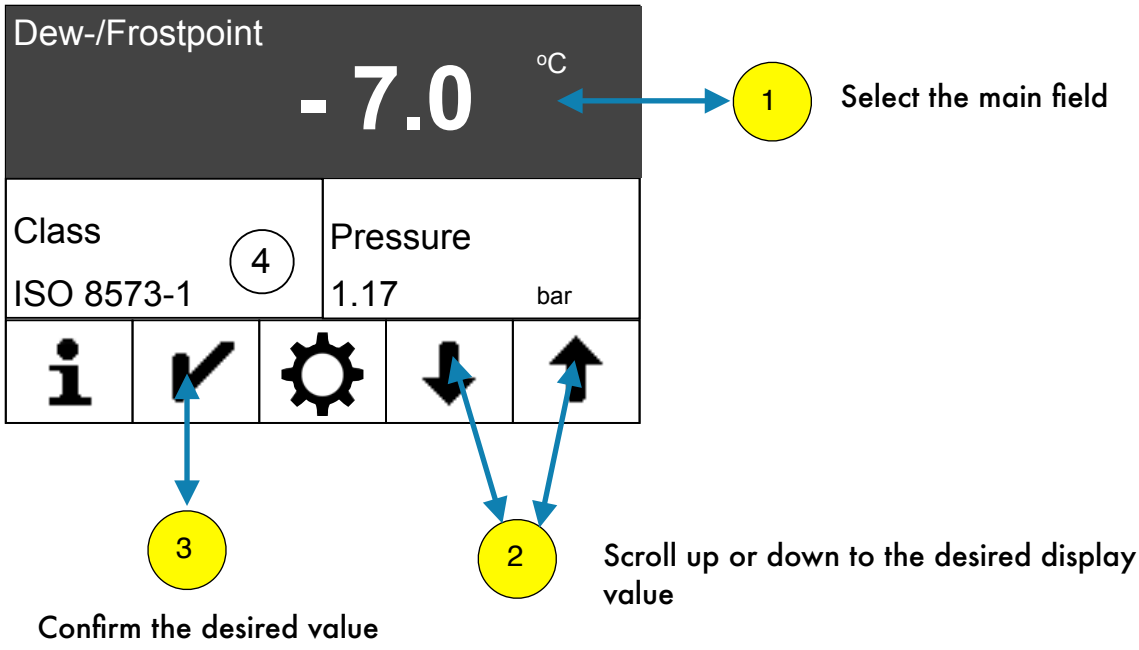
### 8.2.2.1 Possible display variation concerning the different fields

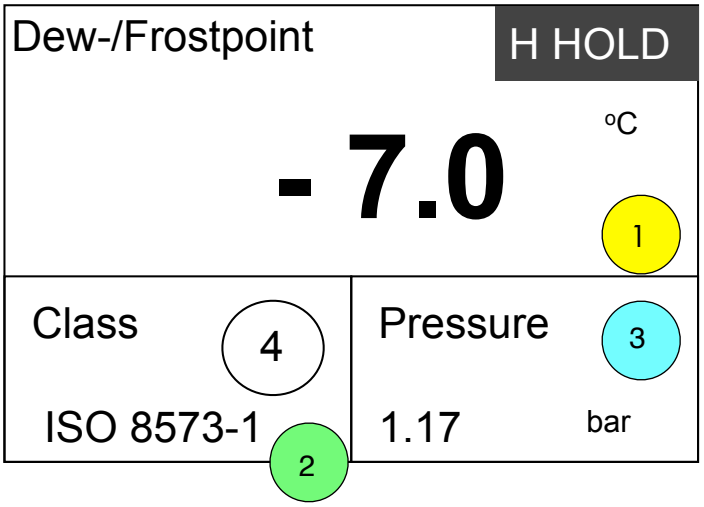
Each field can be adjusted on site to meet your specific needs.

The procedure is as follows:

1. Select the desired field on the display (the background turns dark and control keys appear at the bottom of the display).
2. Scroll up or down to the desired setting using the two arrow keys.
3. Confirm the setting using the "Confirm" ✔ key. The display jumps back to the home screen, where the modified field contents can be seen.

example: Changing the display value in the main field






| Physical variable | Possible units | Field 1 | Field 2 | Field 3 |
|---|---|---|---|---|
| Pressure dew point / Frostpoint | °C, °F | X | | |
| System pressure | bar, psi | X | | X |
| Ambient pressure | bar, psi | X | X | X |
| ppm volume concentration | ppm V | X | X | X |
| Absolute humidity | g/m³ | X | | X |
| Alarm values (settings) | Pre-alarm / Main alarm / Service | | X | X |
| Date / Time | Various settings are possible in the main menue | | | X |
| Relay - settings | On/Off | | X | X |
| Statistics | Minimum- / Maximum- / mean value | | X | X |
| Temperature | °C, °F | X | X | X |
| Relative Humidity | % | X | X | X |
| Compressed air class according to ISO 8573-1 | | | X | |

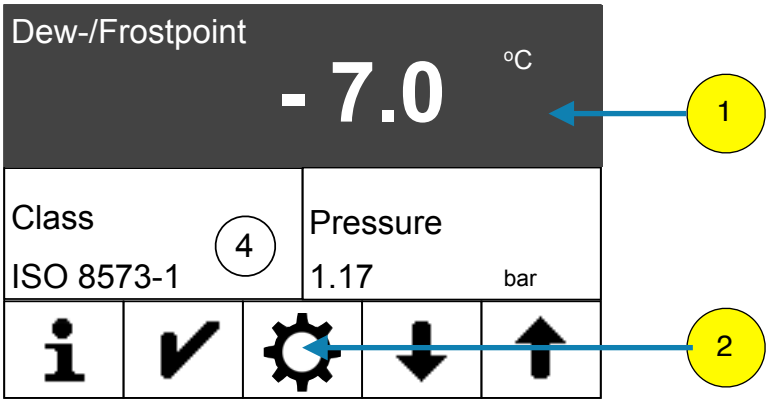
## 8.3 Personalising Password

The password can be personalised. The factory default is **111111**.

*CAUTION: Please make a note of the new password. If the password is forgotten, the device must be reset to the factory settings. This will result in the loss of all settings!*

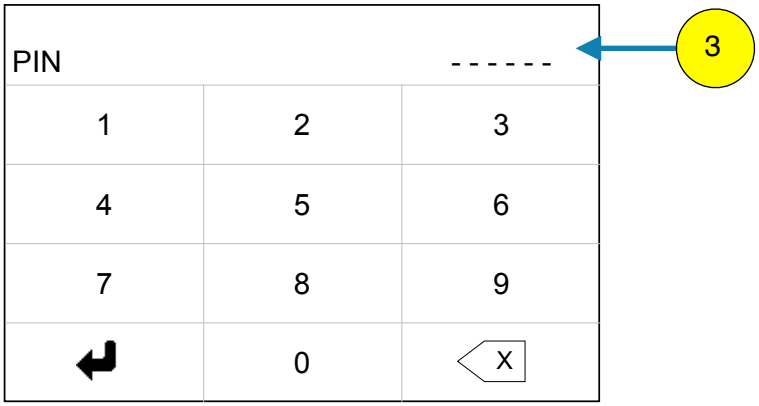
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



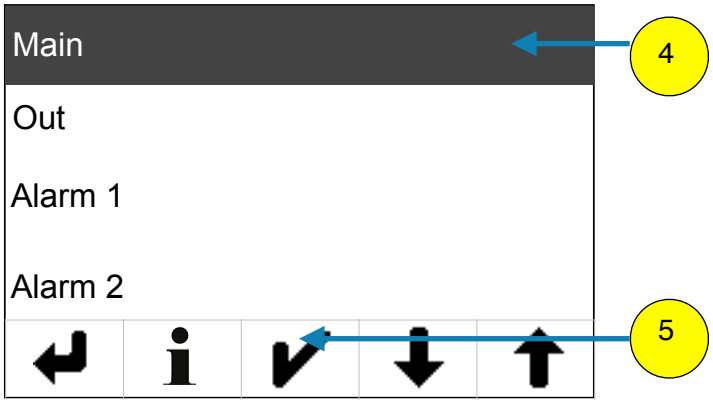

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

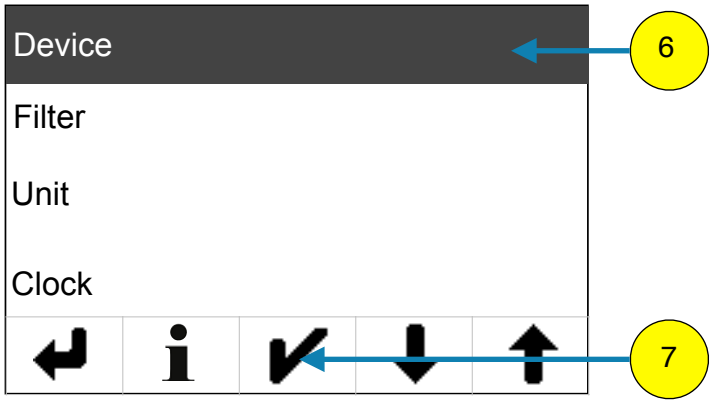
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔ .

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

The following display of the settings menu appears (Level 2):

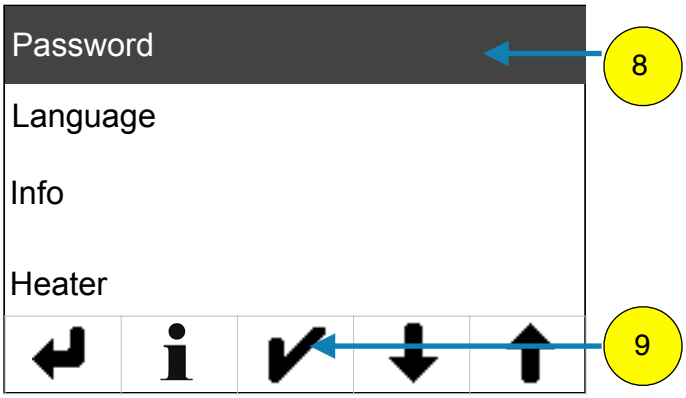



6. If the „Device“ setting field is not already highlighted, select the field and confirm with ✔ .

Under the menu item „Device“ " you will find all of the basic settings for the device.

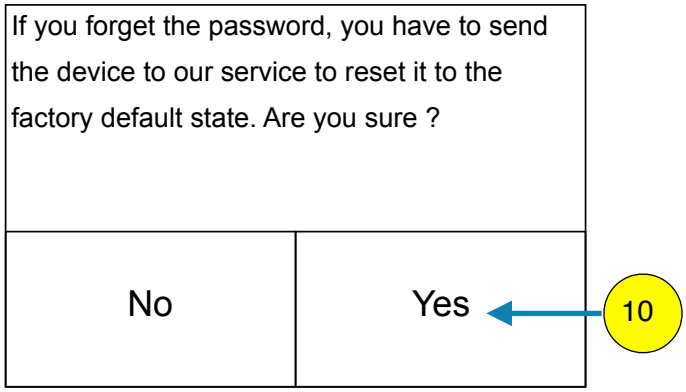
NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display of the settings menu appears (Level 3):

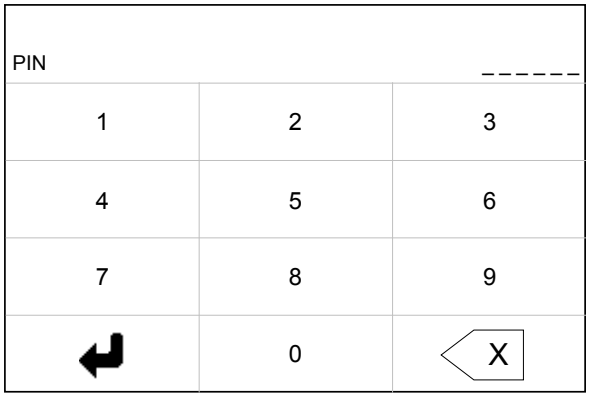



8. If the „Password" field is not already highlighted, select the field and confirm with ✔.

A display will appear with the following warning:




Select "Yes" to confirm and continue.



| Current PIN | | _ _ _ _ _ _ |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |
| ↵ | 0 | X |

If the password has already been changed, enter it now.

If the device is still in its factory settings, enter 111111.

A screen appears that allows you to enter a password of your choice.

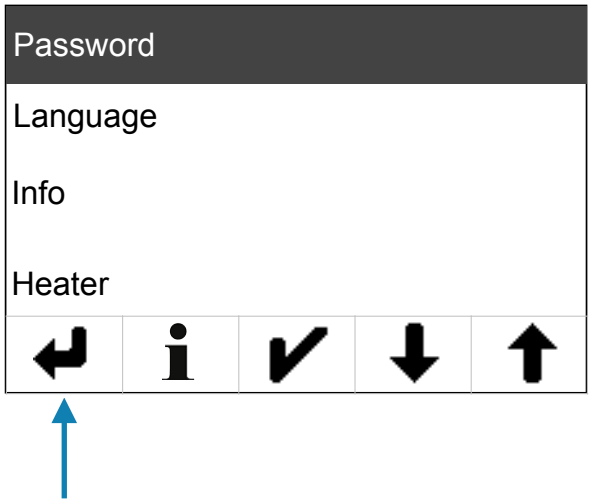
| New PIN | | _ _ _ _ _ _ |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |
| ↵ | 0 | X |

Please confirm the new password

| Confirm PIN | | _ _ _ _ _ _ |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |
| ↵ | 0 | X |

The required input is indicated in the Password menu in the upper left corner of the display.

After correctly entering the new password, the display automatically jumps back to the following display.



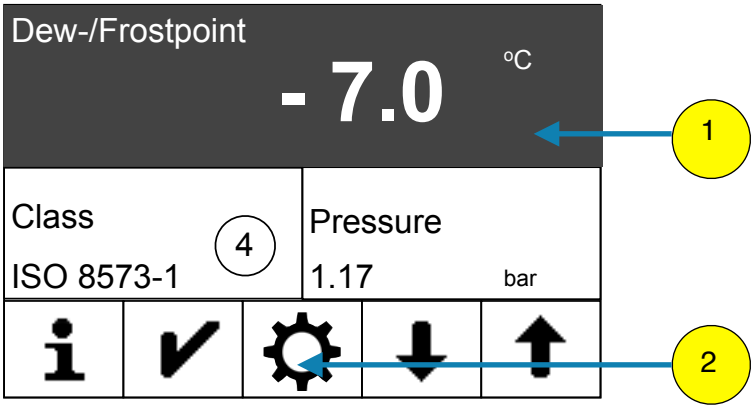

The„Back“ key ↵ takes you back to the previous level until you are back at the home screen.

## 8.4 Adjustment of national language

The currently available languages are English, German and French. These can be easily selected via the menu.

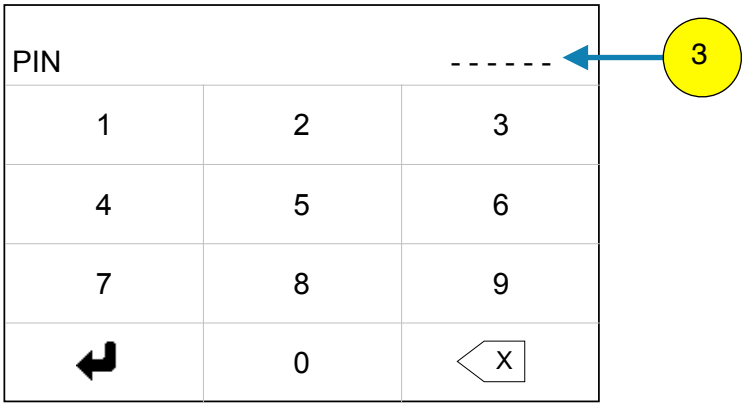
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



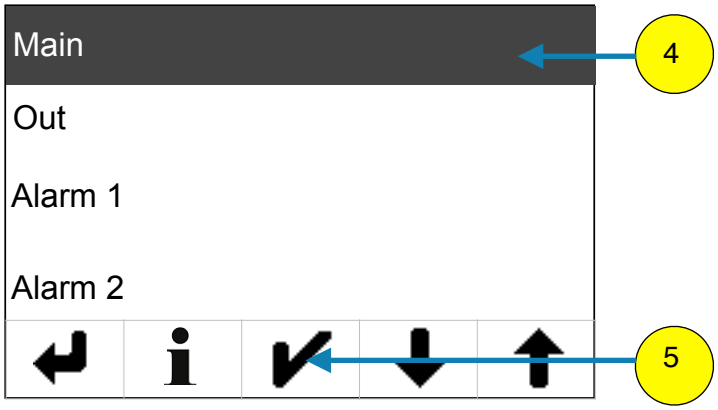

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

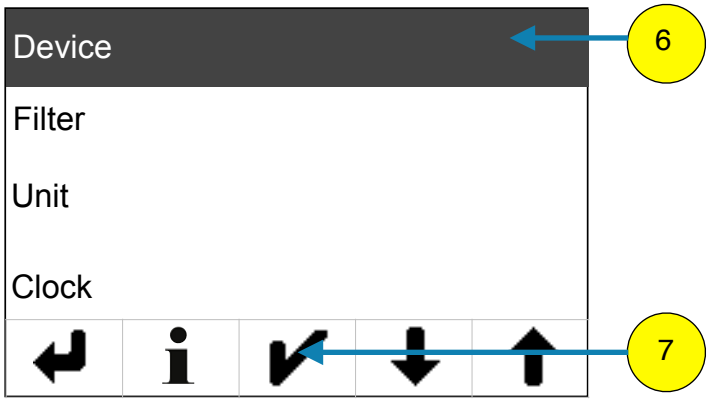
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔.

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values

The following display of the settings menu appears (Level 2):

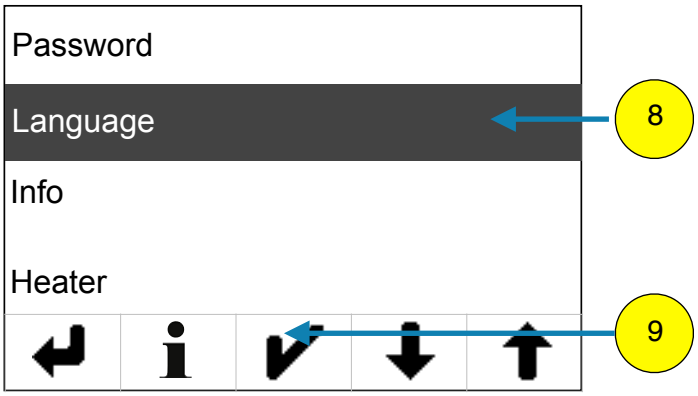



6. If the „Device“ setting field is not already highlighted, select the field and confirm with ✔ .

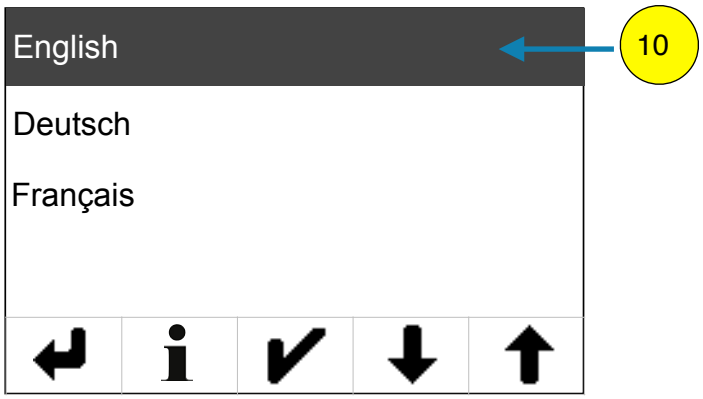
Under the menu item „Device“ " you will find all of the basic settings for the device.

NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display of the settings menu appears (Level 3):




8. If the „Language“ field is not already highlighted, select the field and confirm with ✔.




10. Select the desired language (the field will be highlighted) and confirm your choice with ✔.

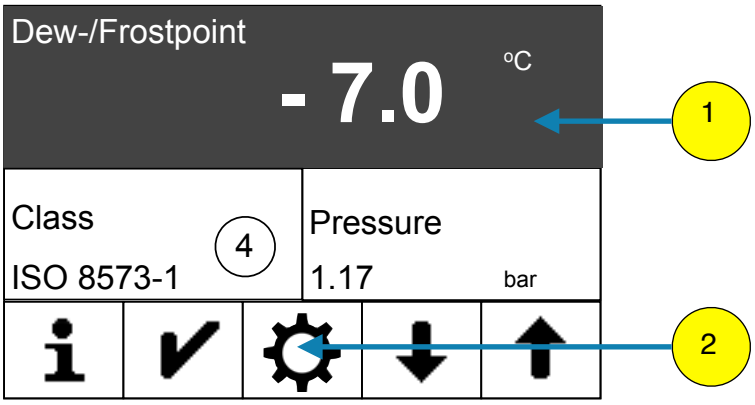
The „Back“ key ↵ takes you back to the previous level **until you are back at the home screen.**

## 8.5 Informationen

The menu item „Information“ shows all the important device informations at a glance.

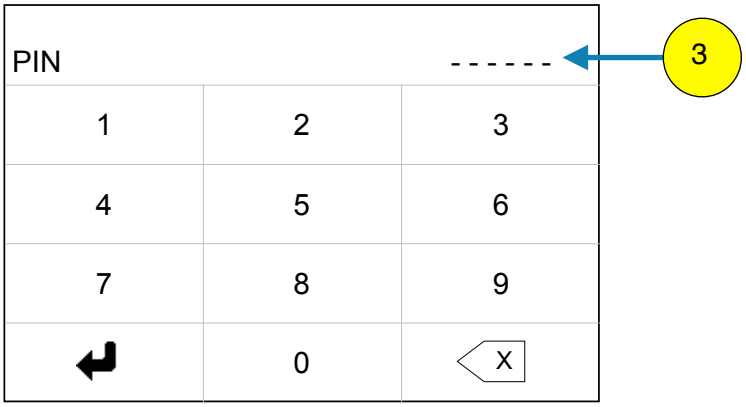
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



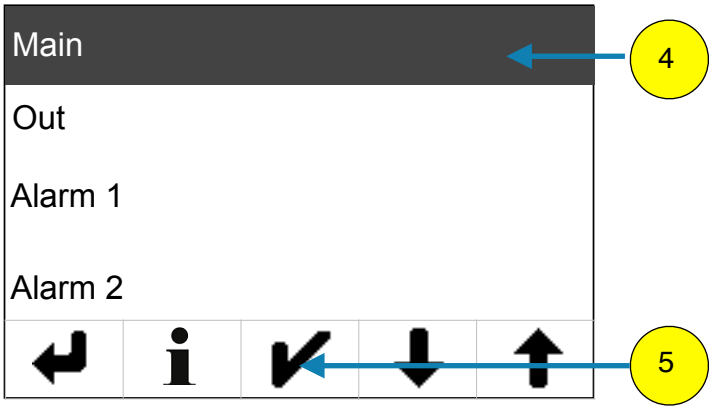

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**

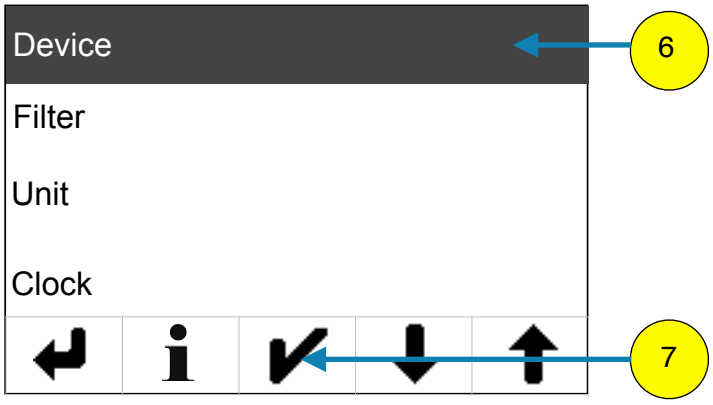
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔.

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

The following display of the settings menu appears (Level 2):

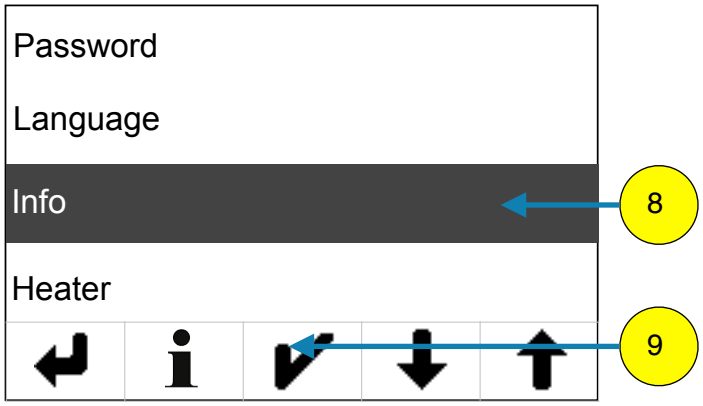



6. If the „Device“ setting field is not already highlighted, select the field and confirm with ✔.

Under the menu item „Device“ " you will find all of the basic settings for the device.

NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display of the settings menu appears (Level 3):




8. If the „Info" field is not already highlighted, select the field and confirm with. ✔.

A screen is displayed which provides you with an overview of the most important information.

A list of this information is given below:

| | | |
|---|---|---|
| FW ID-Nr. | means: | Current software number |
| Geräte-Seriennummer | | Serial number of the device |
| Zeit | | Current time |
| OP | | Hours of operation |
| SRV | | Time until next service |
| Freier Speicherplatz auf SD Karte | | Free memory on the SD card |
| rH OFS | | Relative Humidity: set offset value |
| T OFS | | Temperature: set offset value |
| sysP OFS | | System pressure: set offset value |
| ambP OFS | | Ambient pressure: set offset value |

The „Back" key ↵ takes you back to the previous level until you are back at the home screen.

## 8.6 Switching the heating (Heater) system On and Off

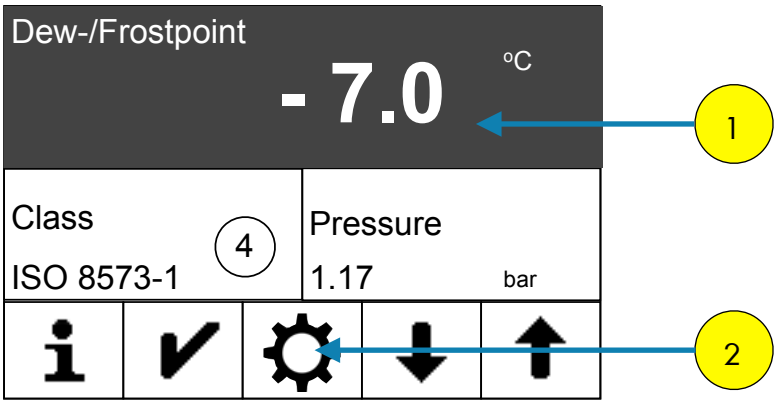
The menu „Heater" allows you to turn the sensor heating system on or off.

With some primary control systems the heating process can lead to system malfunctions. This menu enables you to turn off the factory-set heating process.

With typical use in the upper dew-point range of over -10°C the trace heater should be switched on. In the case of measurements at below -10°C, the trace heater may be switched off if necessary.

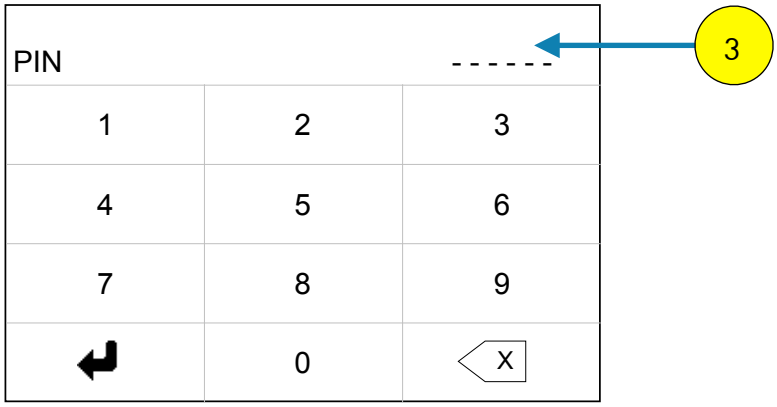
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



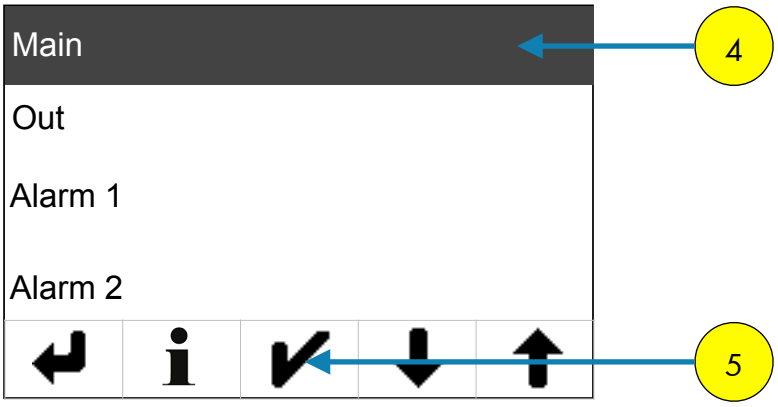

2. Select „Settings"

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

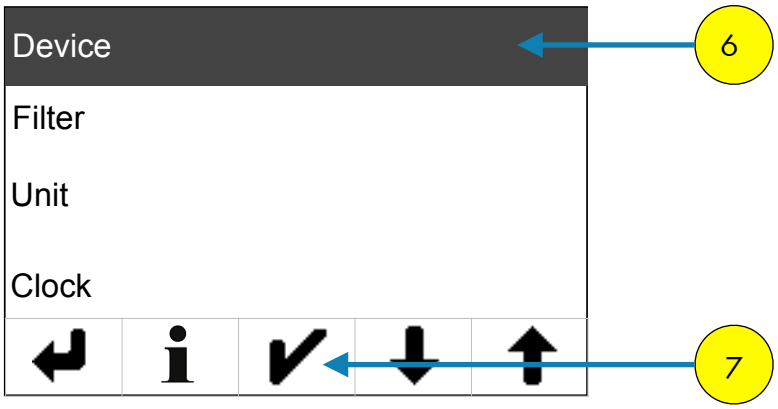
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔ .

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

The following display of the settings menu appears (Level 2):

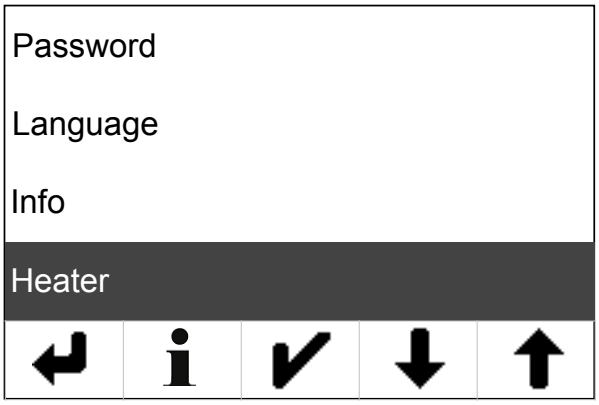



6. If the „Device“ setting field is not already highlighted, select the field and confirm with ✔ .

Under the menu item „Device“ " you will find all of the basic settings for the device.

NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display of the settings menu appears (Level 3):




8. If the „Heater“ field is not already highlighted, select the field and confirm with ✔.

The following display appears, which allows you to determine the status of the heating system by selecting "On" or "Off".

Confirm your entry with ✔.

The „Back“ key ↵ takes you back to the previous level until you are back at the home screen.

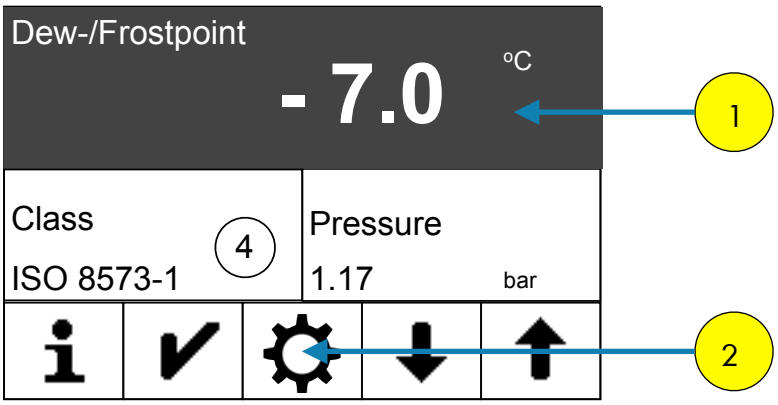
## 8.7 Factory Settings

The menu item "Factory settings" can be used to reset the device to its factory default settings.

CAUTION! This will result in the loss of all settings!

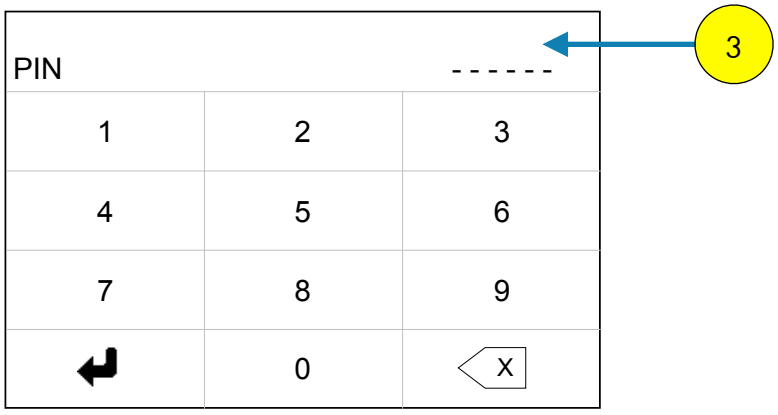
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



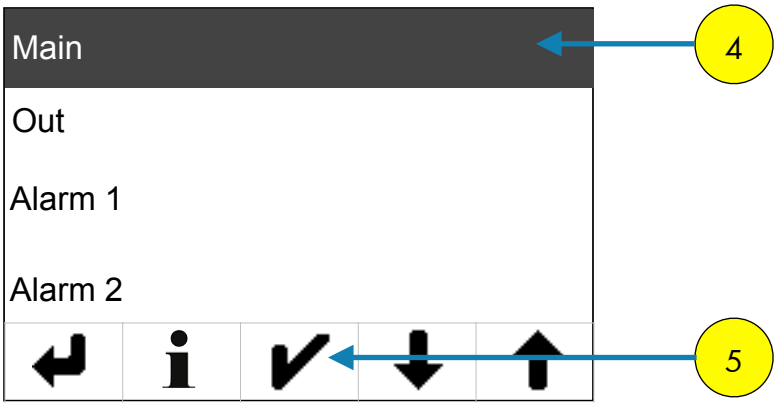

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

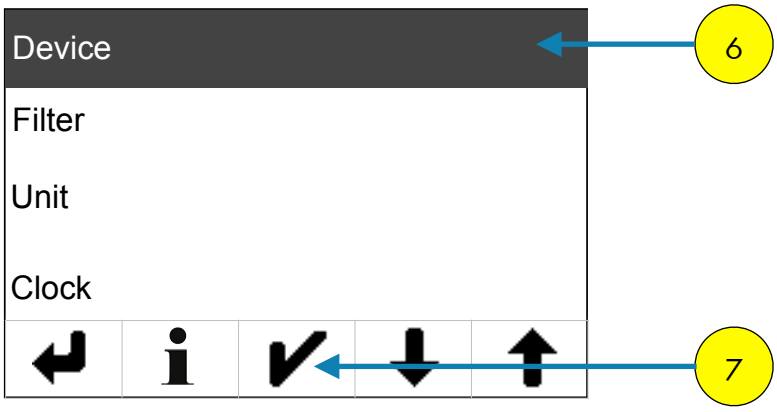
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔.

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

The following display of the settings menu appears (Level 2):

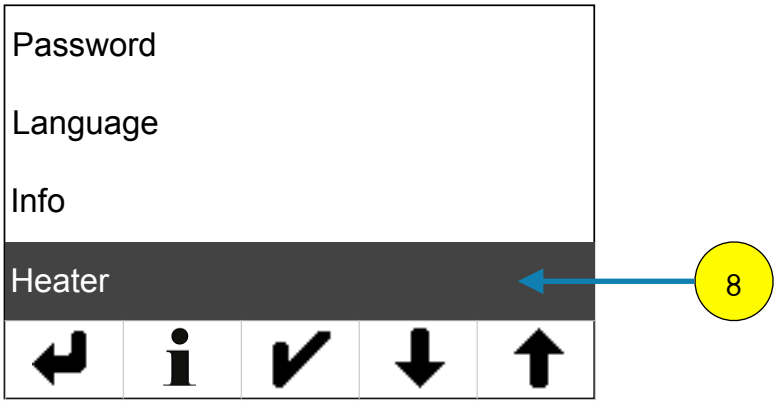



6. If the „Device“ setting field is not already highlighted, select the field and confirm with ✔.

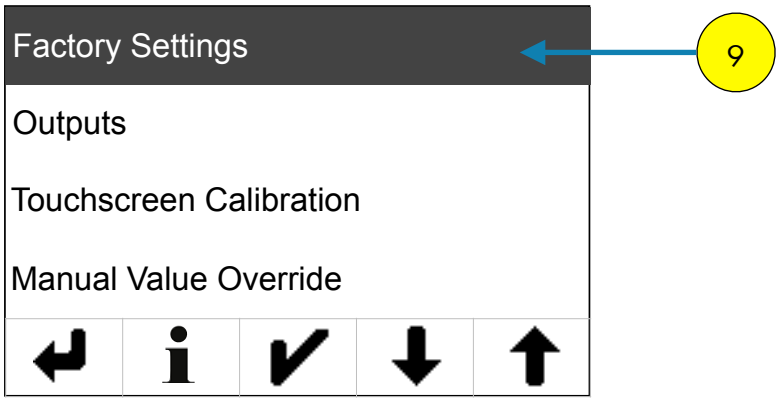
Under the menu item „Device“ " you will find all of the basic settings for the device.

NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display of the settings menu appears (Level 3):




8. Please scroll down with „Scroll-down“ key ↓ until you see the following screen.




9. If the „Factory Setting“ field is not already highlighted, select the field and confirm with ✔ .

Select „Yes“ if you want to return the device to its factory settings (NOTE: all saved data will be lost) and confirm by pressing „Enter“ ✔ .

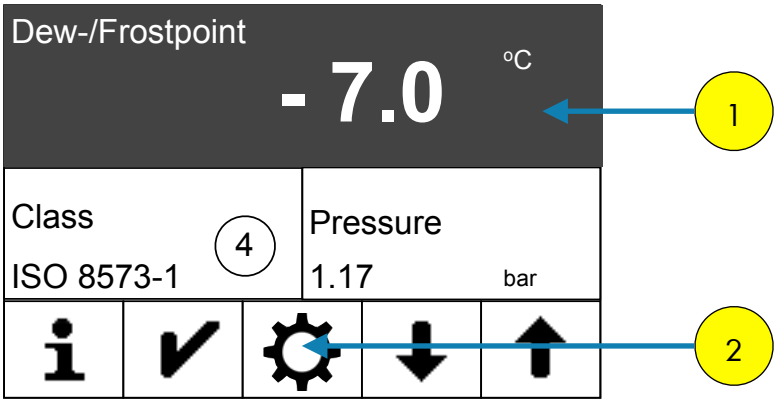
The „Back“ key ↵ takes you back to the previous level until you are back at the home screen.

## 8.8 Outputs

This menu item is used to test the relay and alarm functions. Each output can be switched manually.

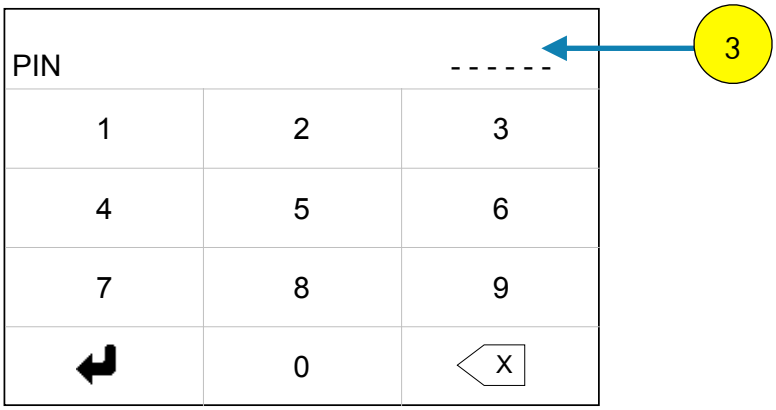
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



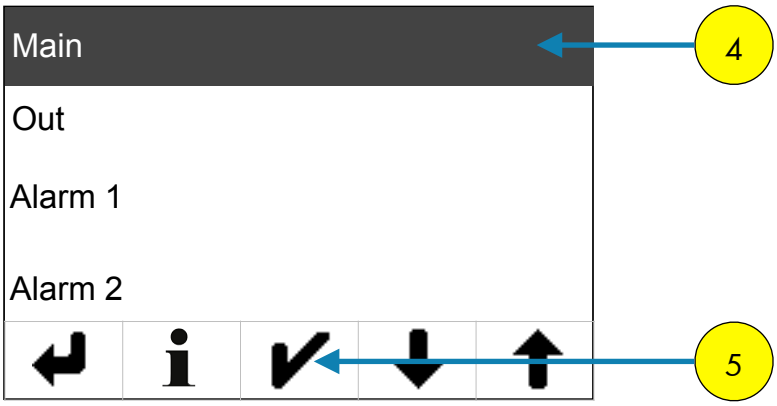

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

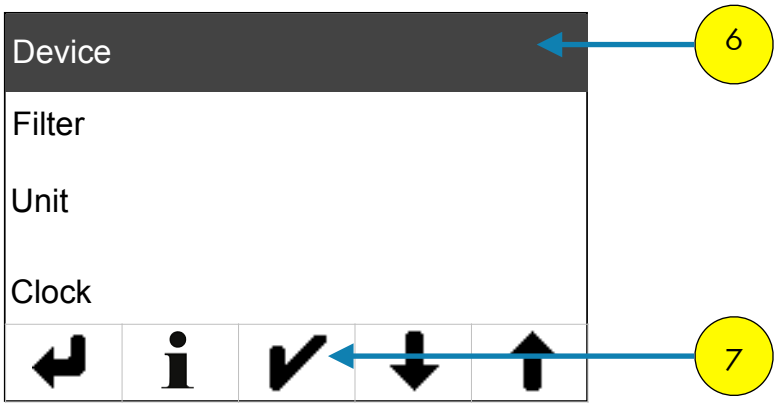
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔.

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

The following display of the settings menu appears (Level 2):

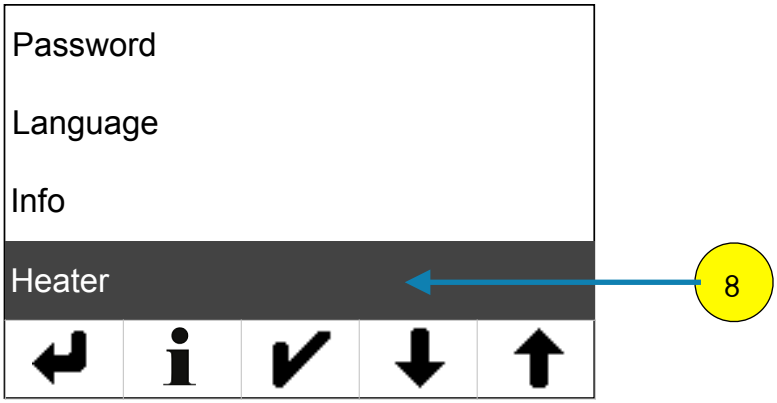



6. If the „Device“ setting field is not already highlighted, select the field and confirm with ✔.

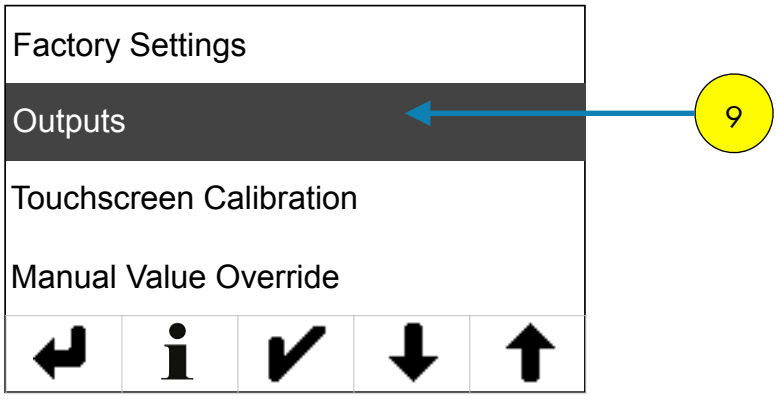
Under the menu item „Device“ " you will find all of the basic settings for the device.

NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display of the settings menu appears (Level 3):

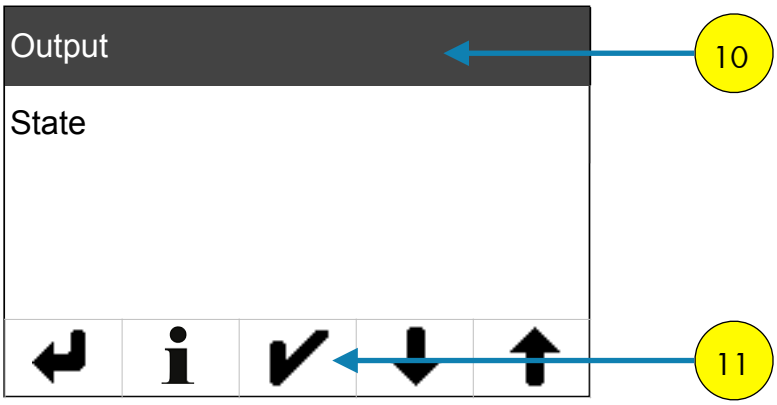



8. Please scroll down with „Scroll-down“ key until you see the following screen.



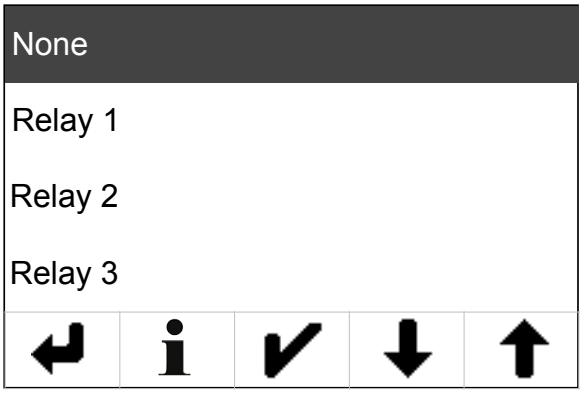

9. If the „Outputs“ field is not already highlighted, select the field and confirm with ✔ .

Two choices appear („Output“ and „State“)




10. If the „Output“ field is not already highlighted, select the field and confirm with ✔.

11. A list will appear of all the test possibilities.

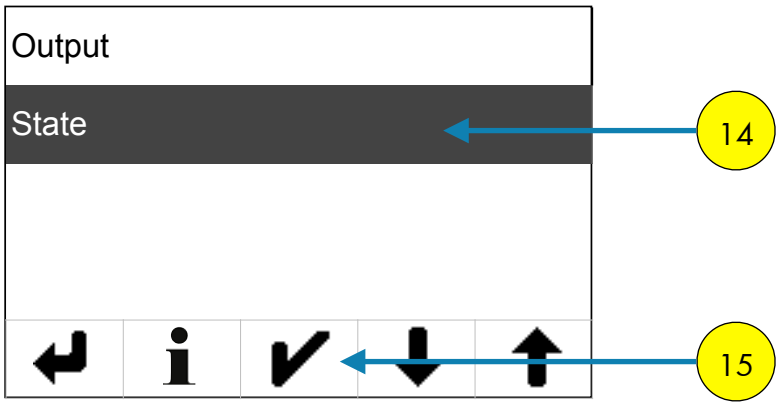



| None |
| --- |
| Relay 1 |
| Relay 2 |
| Relay 3 |
| Relay 4 |
| Pre Alarm |
| Main Alarm |
| Analog Out |

12. Scroll up or down using the "Scroll-down" ↓ and "Scroll-up" ↑ keys until you find the output value that you wish to test.

13. Select the desired output (the field will be highlighted), and the display will automatically jump to the next level.

14. If the „State“ field is not already highlighted, select the field and confirm with ✔ .




You can now select the status of the previously selected output.

NOTE: For each relevant menu item you can press **i** to call up the help text in your selected language.

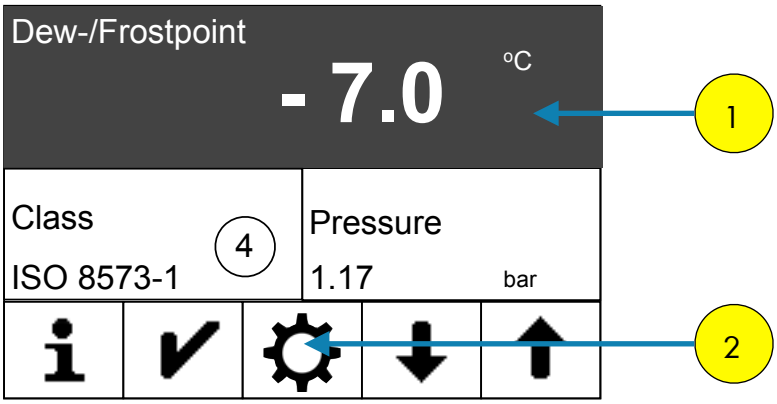
The „Back“ key ↵ takes you back to the previous level until you are back at the home screen.

## 8.9 Touchscreen Calibration

This menu item is used to calibrate the touchscreens. Calibration should be performed if the screen responds inaccurately when touched.

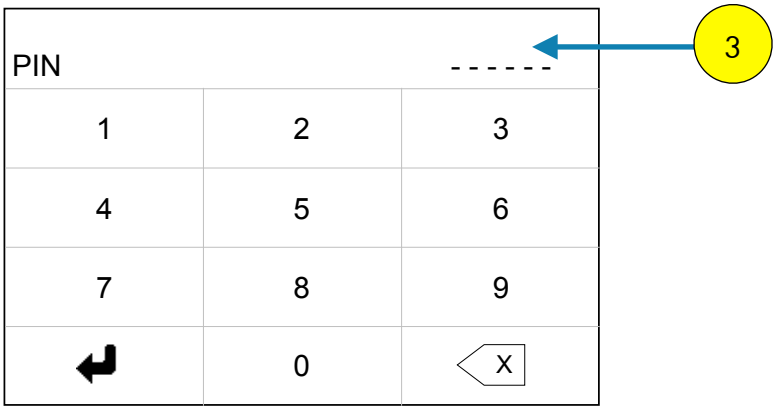
To calibrate the touchscreen, proceed as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



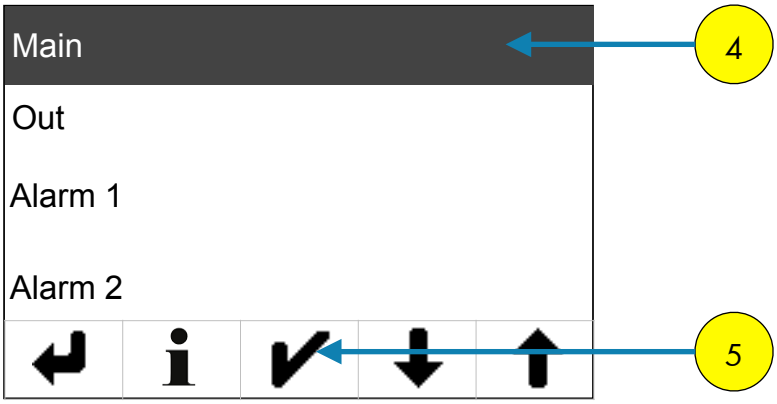

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

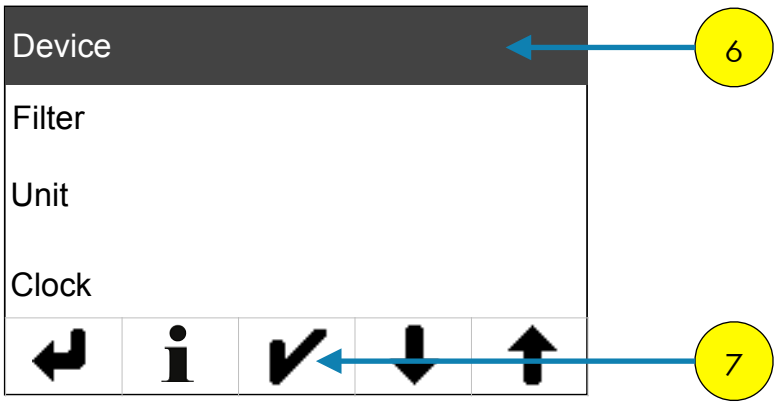
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔.

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

The following display of the settings menu appears (Level 2):

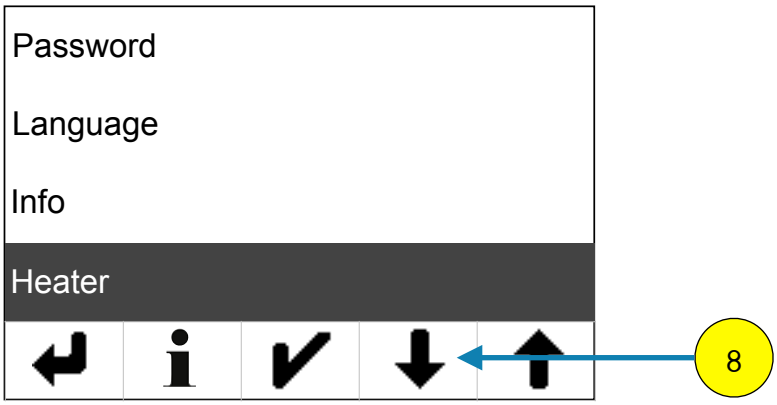



6. If the „Device“ setting field is not already highlighted, select the field and confirm with ✔.

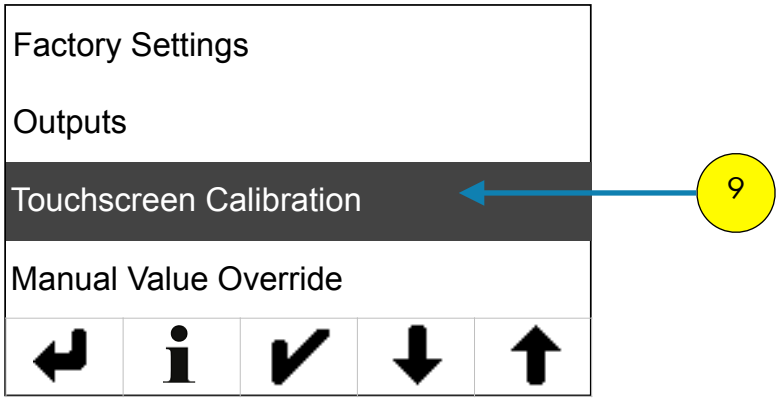
Under the menu item „Device“ " you will find all of the basic settings for the device.

NOTE: For each relevant menu item you can press **i** to call up the help text in your selected language.

The following display of the settings menu appears (Level 3):




8. Please scroll down with „Scroll-down" key ↓ until you see the following screen.




9. If the „Touchscreen Calibration" field is not already highlighted, select the field and confirm with ✔.

To calibrate the touchscreen, proceed as follows

| Step | Display | To Do |
|---|---|---|
| 1 | Please touch the mark | Tap the screen until the view changes |
| 2 | Upper left corner | Touch the target cross on the screen for around 2 seconds |
| 3 | Upper right corner | Touch the target cross on the screen for around 2 seconds |
| 4 | Bottom left corner | Touch the target cross on the screen for around 2 seconds |
| 5 | Bottom right corner | Touch the target cross on the screen for around 2 seconds |

The display will then automatically jump back to the home screen.

## 8.10 Measurement Value Simulation

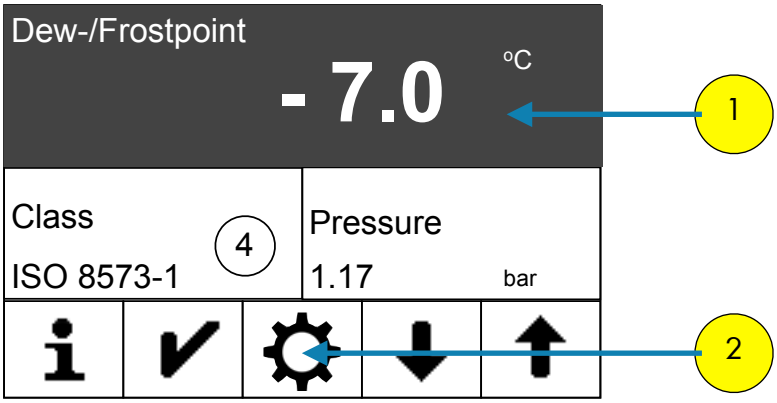
This menu item is used to test the relay and alarm functions. Measured values can be simulated in order to test the switching characteristics of the outputs.

This menu item enormously facilitates initial start-up, since it is not necessary to set real conditions in the compressed air system in order to check the correct settings.

There is therefore no interference with operation

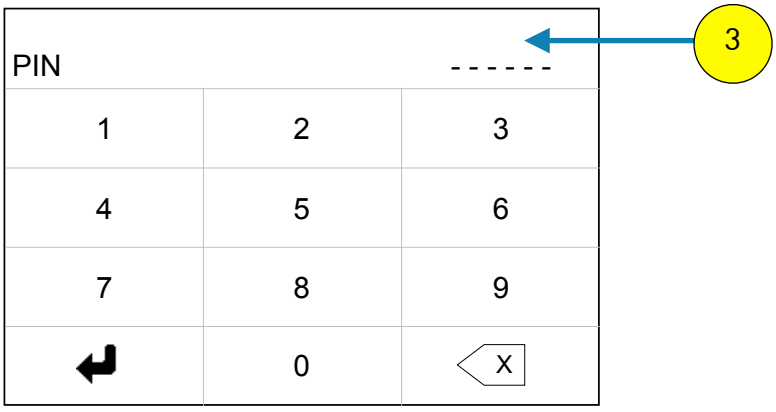
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



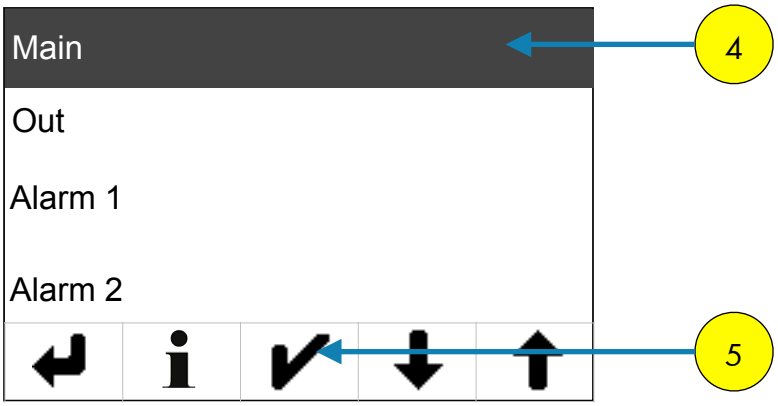

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

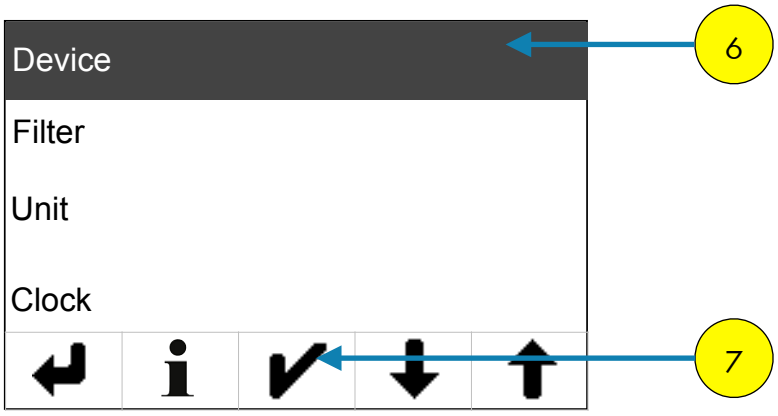
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔ .

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

The following display of the settings menu appears (Level 2):

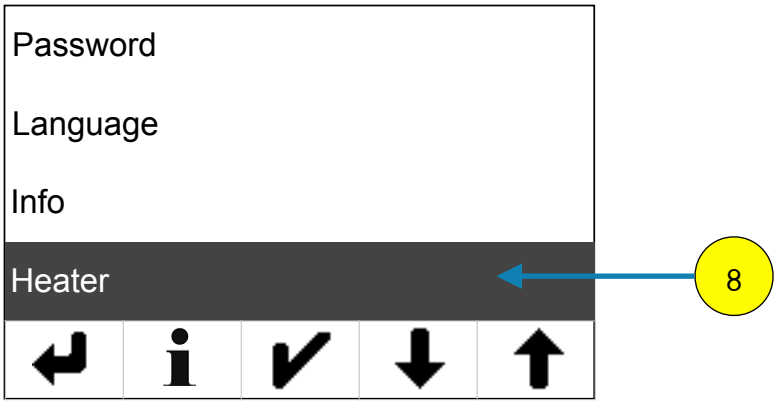



6. If the „Device“ setting field is not already highlighted, select the field and confirm with ✔ .

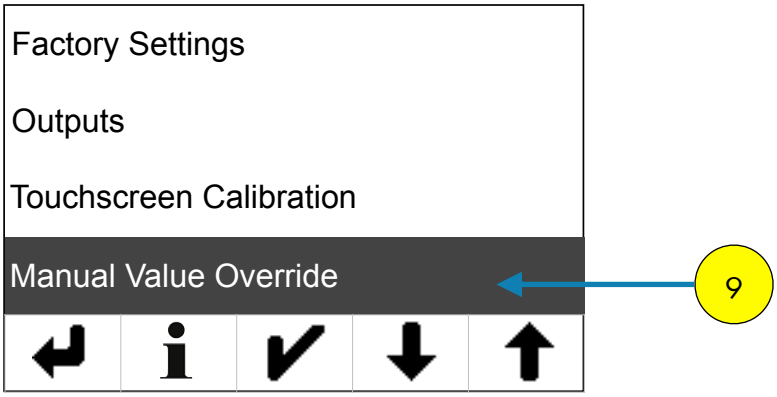
Under the menu item „Device“ " you will find all of the basic settings for the device.

NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display of the settings menu appears (Level 3):

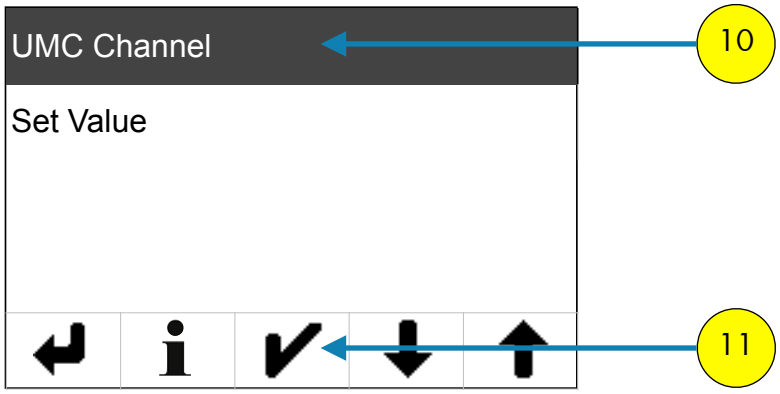



8. Please scroll down with „Scroll-down“ key ↓ until you see the following screen.



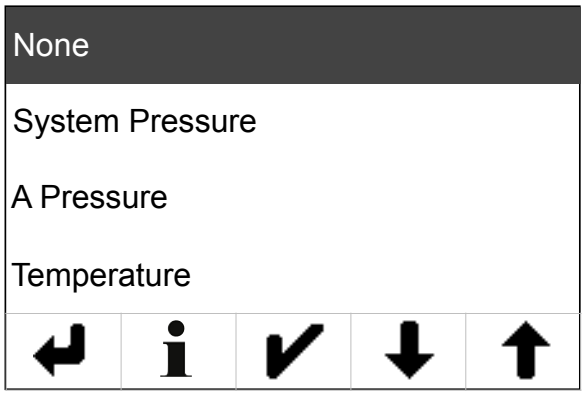

9. If the „Manual Value Override“ field is not already highlighted, select the field and confirm with ✔ .

Two choices appear („UMC Channel“ und „Set Value“)




10. If the „UMC Channel“ field is not already highlighted, select the field and confirm with ✔ .

12. A list appears of all of the measurement parameters for which a measured value can be simulated.

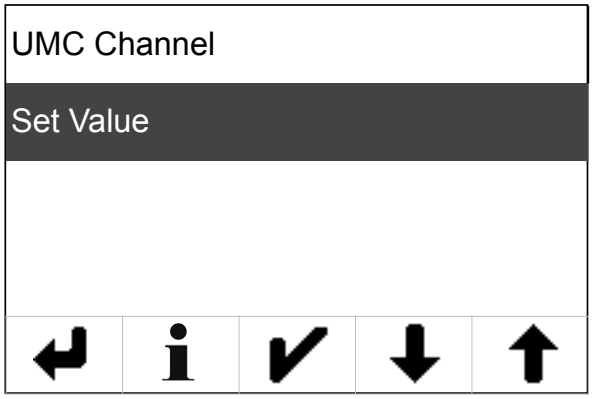



| None |
|---|
| System Pressure |
| A. Pressure |
| Temperature |
| Rel.Humidity |
| Dew-/ Frostpoint |
| ppm Volume |
| A. Humidity |

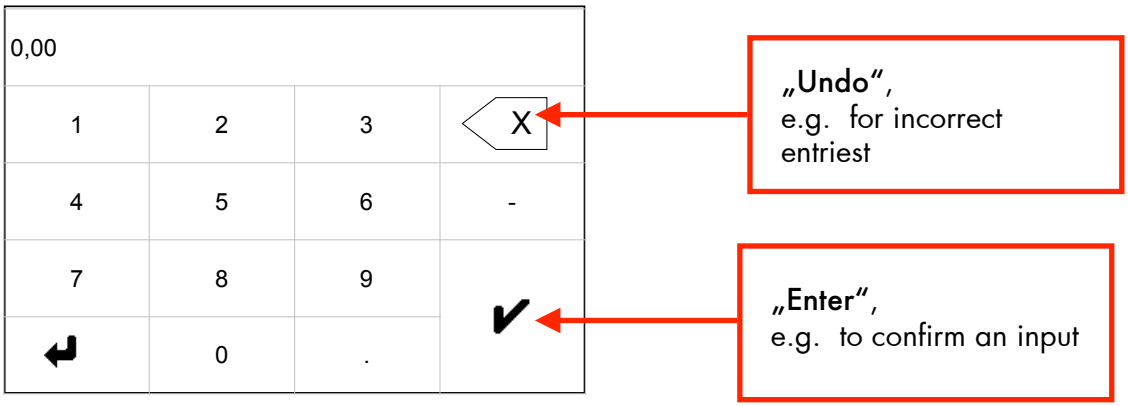
Scroll up or down using the "Scroll-down" ↓ and "Scroll-up" ↑ keys until you find the Relay and Alarm output value that you wish to test.

13. Select the desired output (the field will be highlighted), and the display will automatically jump to the next level.

14. If the „Set Value“ field is not already highlighted, select the field and confirm with ✔ .




You can now enter a measured value for which the simulation should be performed.




NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The „Back“ key ↵ takes you back to the previous level until you are back at the home screen.

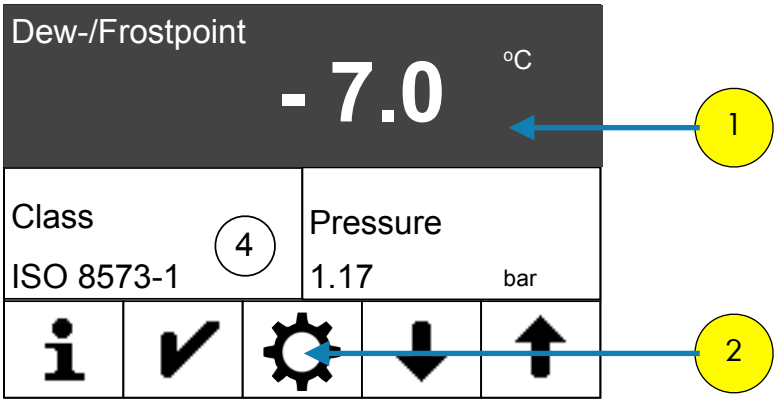
## 8.11 Statistics Reset

On the main screen you can display the MIN/MAX/MEAN statistical data.

This menu item resets these values in the measured-value view so that new statistics can be recorded.

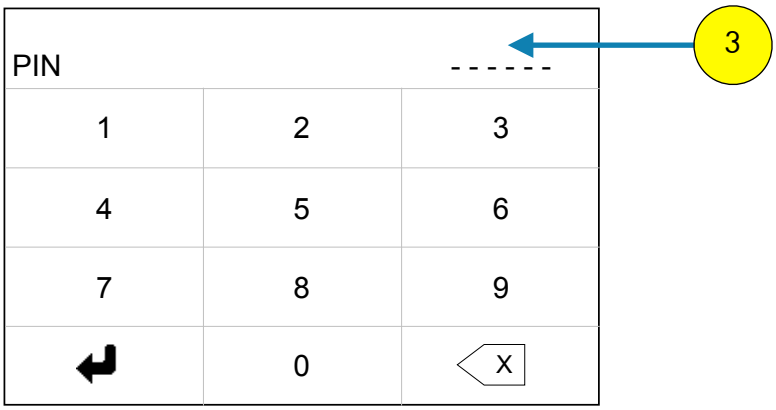
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



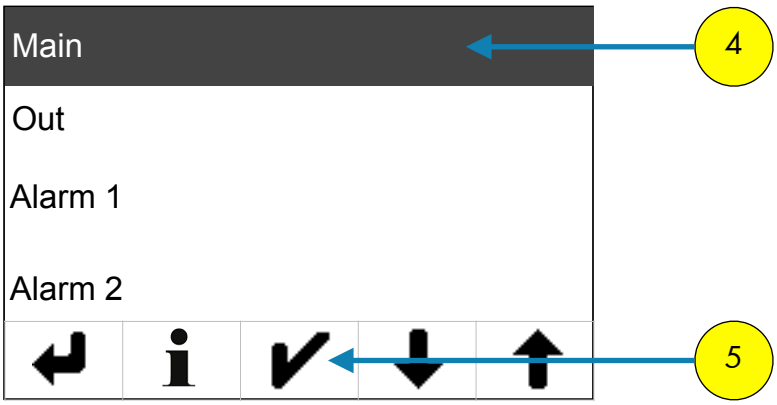

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

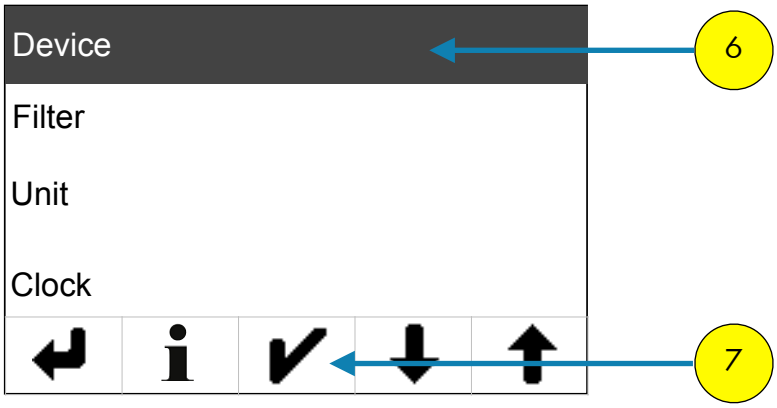
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔ .

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

The following display of the settings menu appears (Level 2):

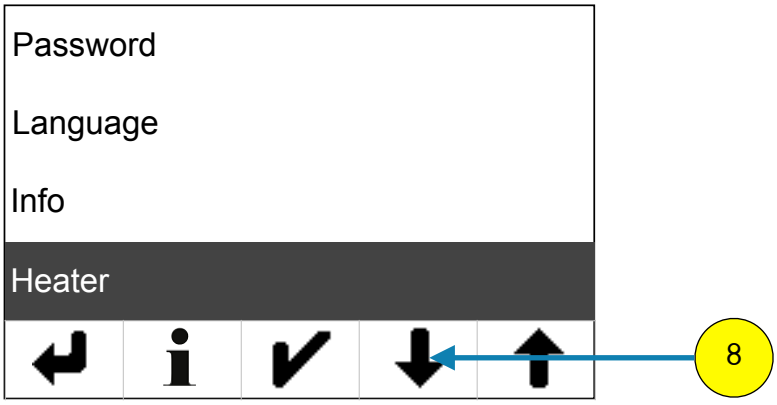



6. If the „Device“ setting field is not already highlighted, select the field and confirm with ✔ .

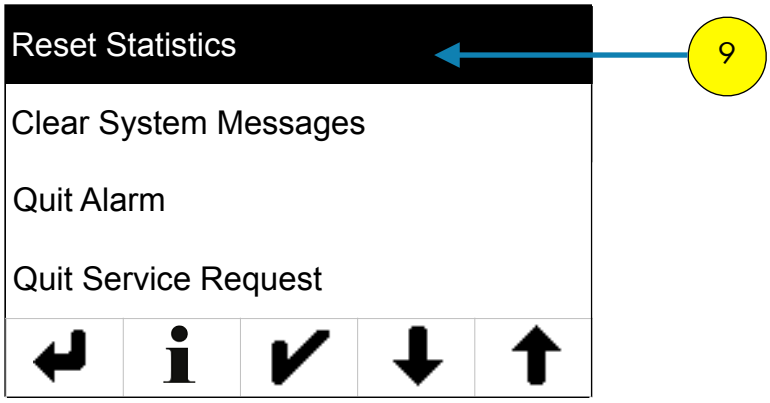
Under the menu item „Device“ " you will find all of the basic settings for the device.

NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display of the settings menu appears (Level 3):




8. Please scroll down with „Scroll-down" key ↓ until you see the following screen.




9. If the „Reset statistics" field is not already highlighted, select the field and confirm with ✔.

10. Press „Yes" or „No" to select your desired choice.
Confirm your selection by pressing ✔ .

## 8.12 Reset of Fault Memory

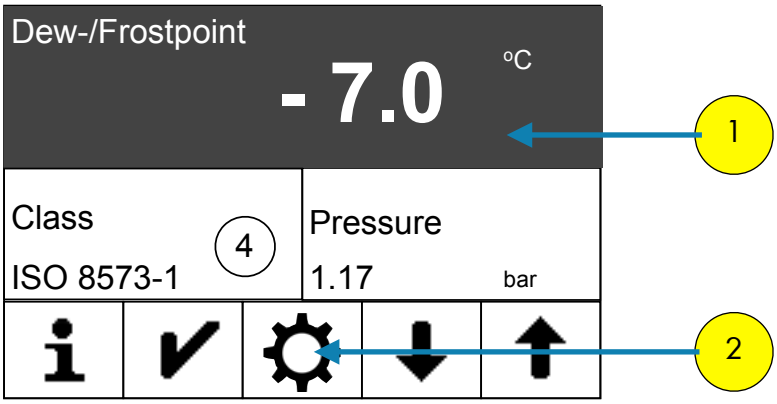
The device has an internal fault memory that makes it easier for you and for us as manufacturers to comprehend any malfunctioning of the device after the event has occurred.

This fault memory runs in the background and is stored on the SD card.

This menu item allows the fault memory of the device to be reset. This frees memory on the SD card.

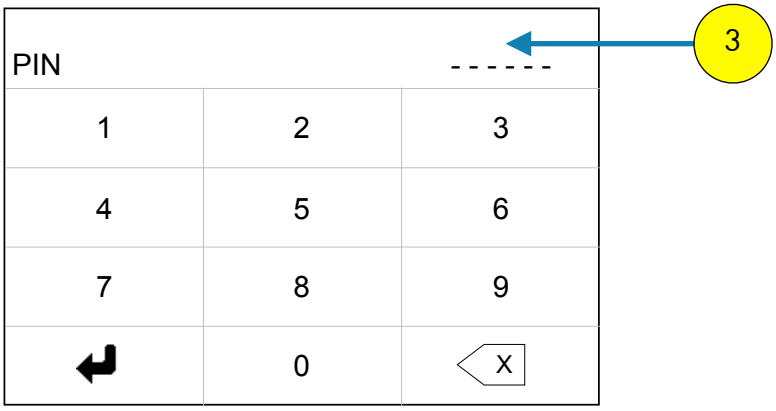
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



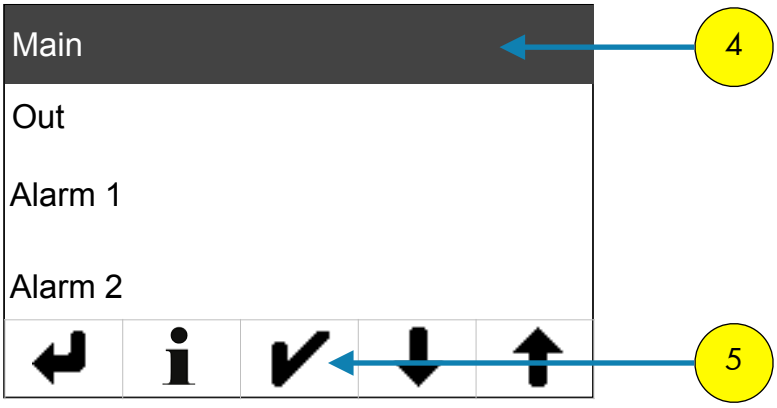

2. Select „Settings“ ⚙

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

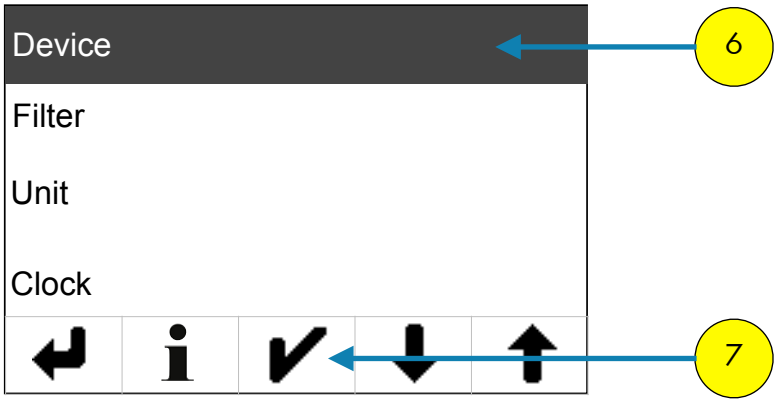
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔ .

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

The following display of the settings menu appears (Level 2):

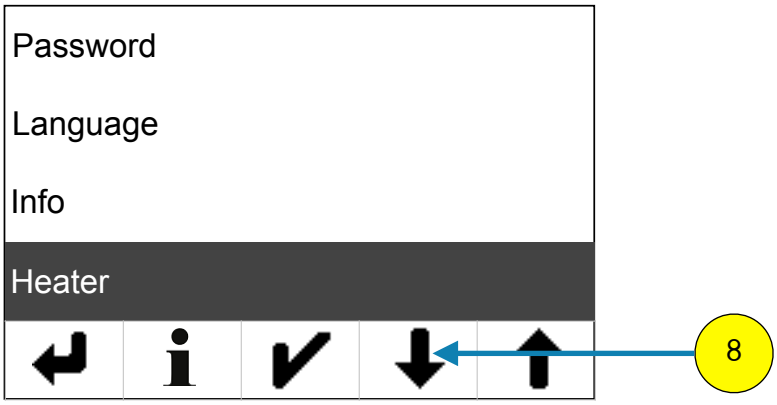



6. If the „Device“ setting field is not already highlighted, select the field and confirm with ✔ .

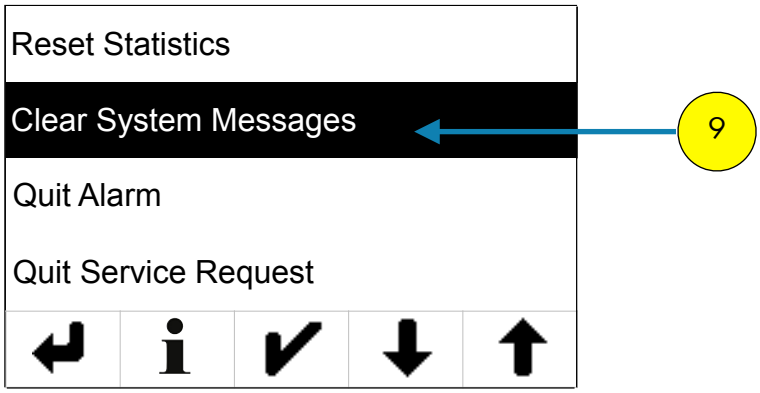
Under the menu item „Device“ " you will find all of the basic settings for the device.

NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display of the settings menu appears (Level 3):




8. Please scroll down with „Scroll-down“ key ↓ until you see the following screen.




9. If the „Clear System Messages“ field is not already highlighted, select the field and confirm with ✔.

10. Press „Yes“ or „No“ to select your desired choice.
Confirm your selection by pressing ✔ .

## 8.12 Quit Alarm

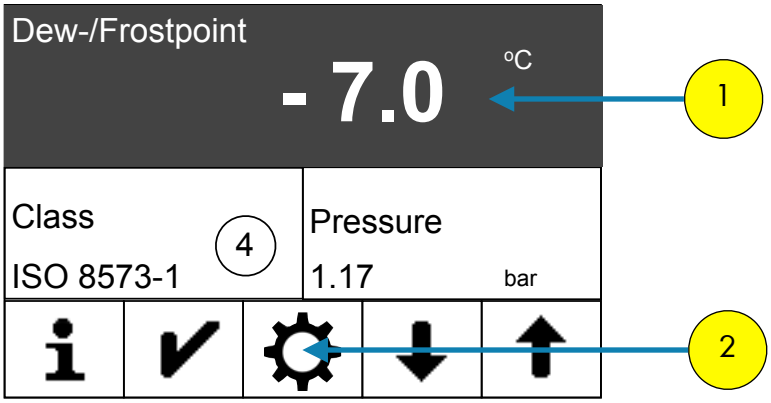
The device has an alarm management. The alarm is displayed until it is acknowledged accordingly.

This menu item shows you how to end the displayed alarm.

ATTENTION: If the error continues to occur (e.g. increased dew point values), the alarm will be displayed again.

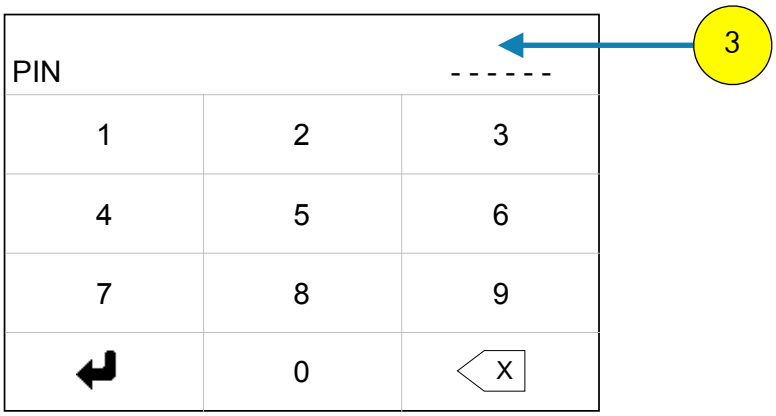
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



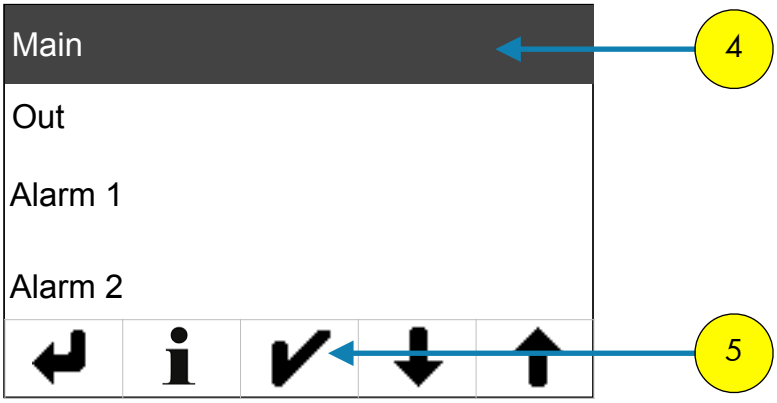

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

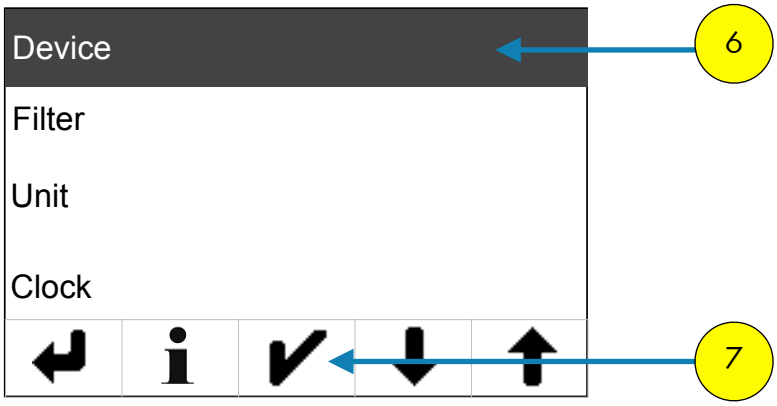
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔ .

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

The following display of the settings menu appears (Level 2):

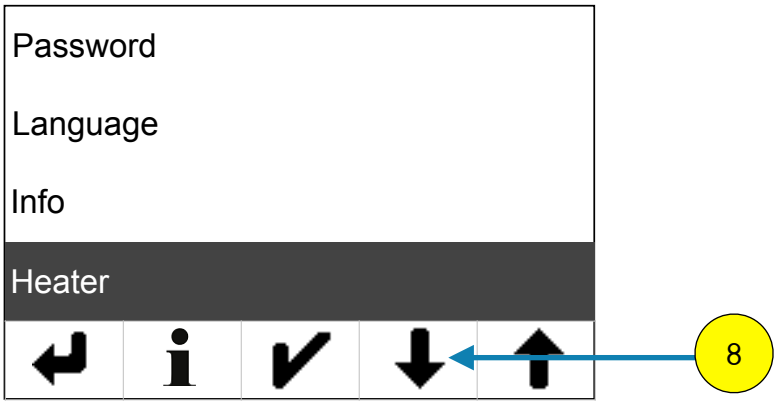



6. If the „Device“ setting field is not already highlighted, select the field and confirm with ✔ .

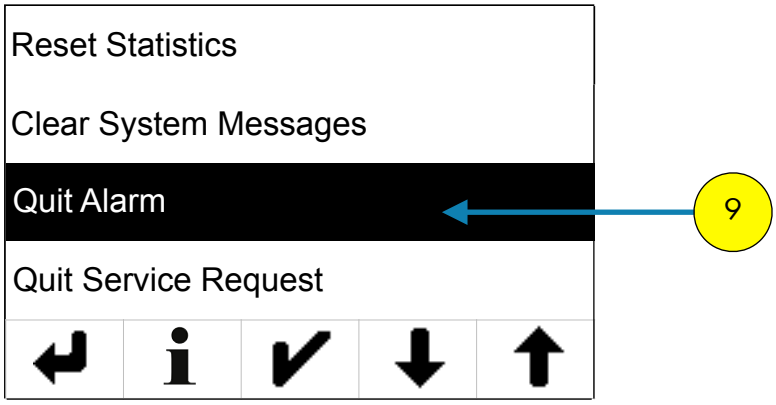
Under the menu item „Device“ " you will find all of the basic settings for the device.

NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display of the settings menu appears (Level 3):




8. Please scroll down with „Scroll-down“ key ↓ until you see the following screen.




9. If the „Clear System Messages“ field is not already highlighted, select the field and confirm with ✔.

10. Press „Yes“ or „No“ to select your desired choice.
Confirm your selection by pressing ✔.

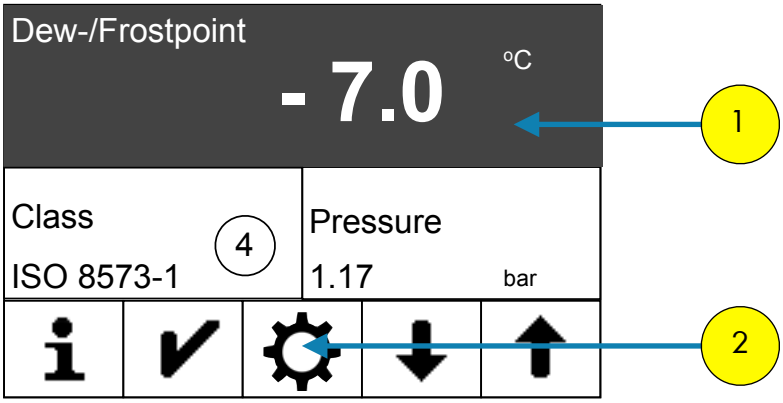
## 8.14 Quit Service Request

The device has an service management. The service light is displayed until it is acknowledged accordingly.

This menu item shows you how to end the displayed alarm.

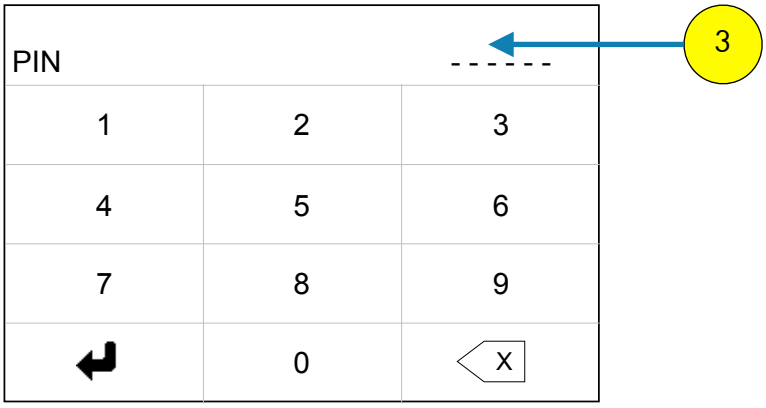
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



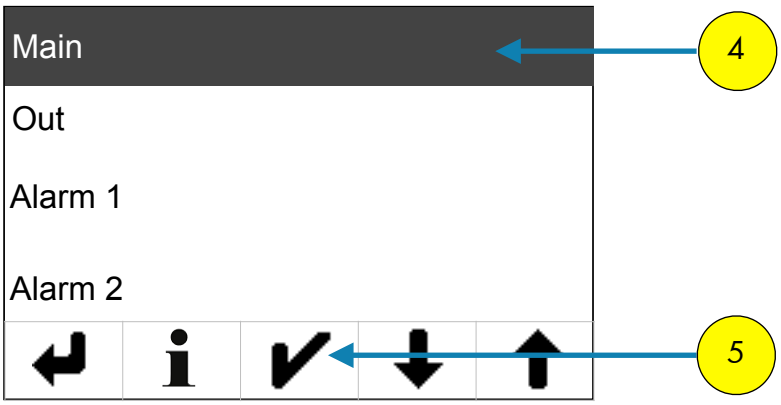

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

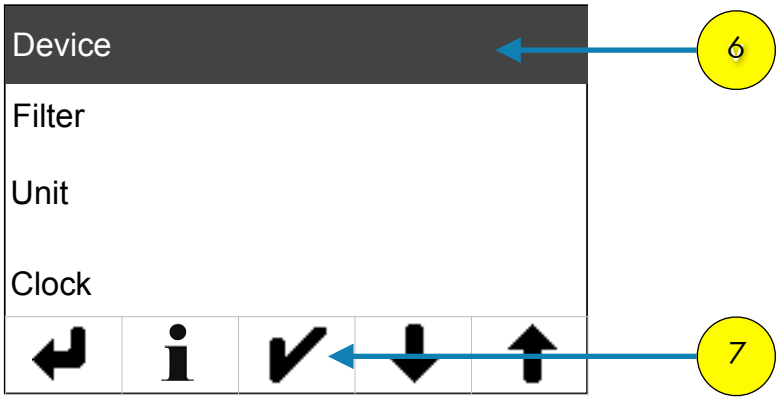
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔.

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

The following display of the settings menu appears (Level 2):

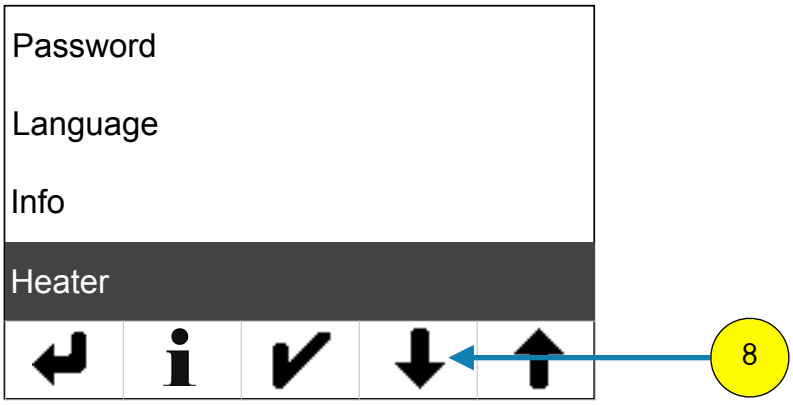



6. If the „Device“ setting field is not already highlighted, select the field and confirm with ✔.

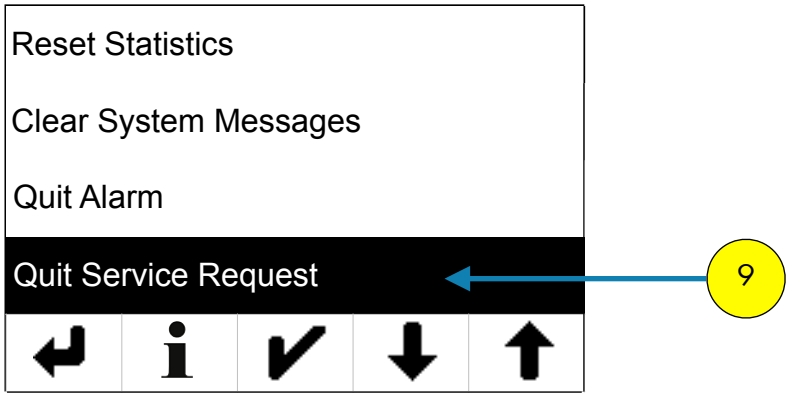
Under the menu item „Device“ " you will find all of the basic settings for the device.

NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display of the settings menu appears (Level 3):




8. Please scroll down with „Scroll-down“ key ↓ until you see the following screen.




9. If the „Clear System Messages“ field is not already highlighted, select the field and confirm with ✔ .

10. Press „Yes“ or „No“ to select your desired choice.
Confirm your selection by pressing ✔ .

## 8.15 Filter

The filter setting is used to smooth out abrupt changes in the measured values, which can slow down the display.

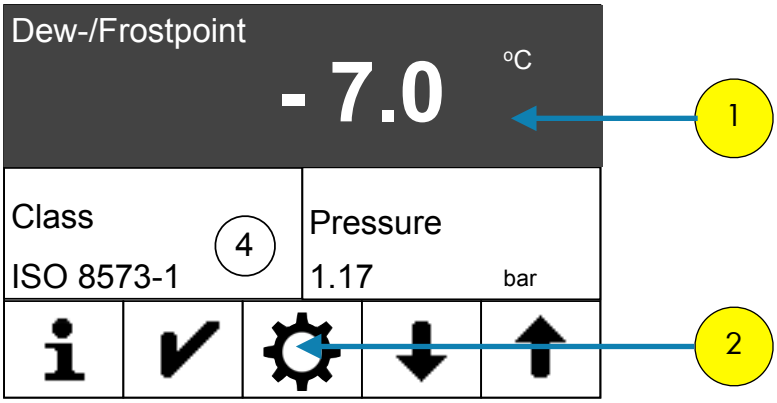
This menu item should be reserved for experienced users, since an incorrect choice of filter may distort the measured value.

BACKGROUND:
In exceptional cases in some dryers—adsorption dryers in particular—excessively high values can be briefly output (especially when switching to the other container). This can trigger alarm signals.

In order to prevent false alarms, an appropriate filter can be used to smooth out the measured values.

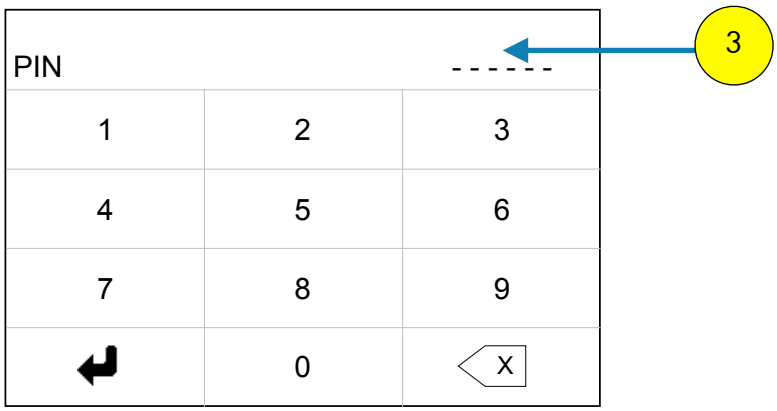
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



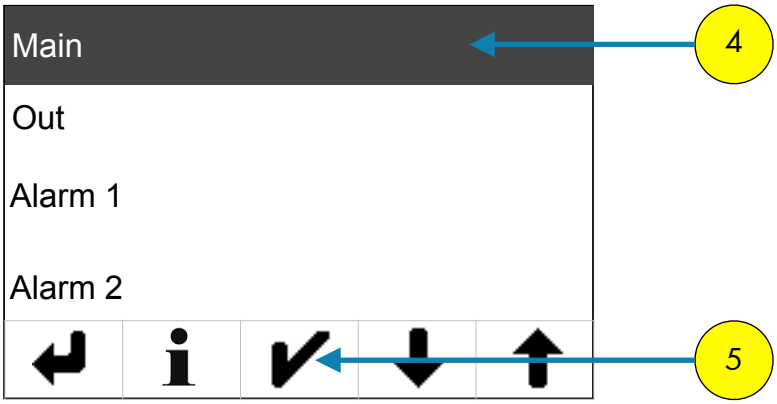

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

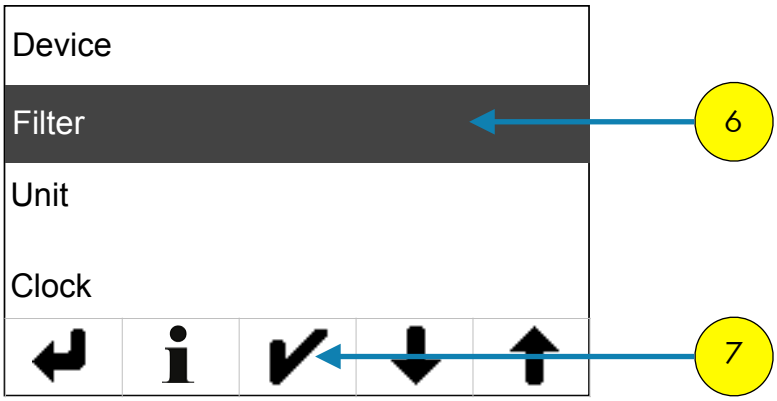
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔ .

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

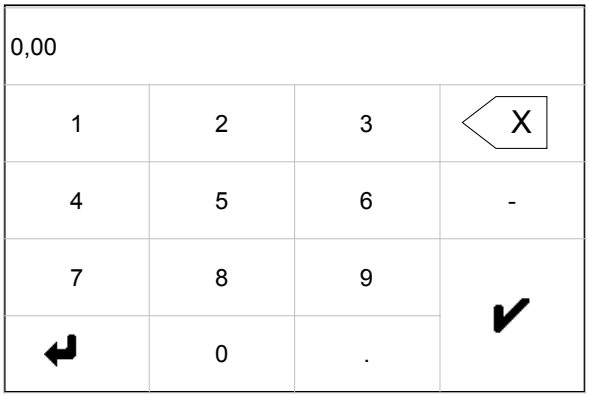
The following display of the settings menu appears (Level 2):




6. If the „Filter“ field is not already highlighted, select the field and confirm with ✔ .

NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

You are now on the screen which allows you to specify the desired filter.




A permanently-stored algorithm determines how the measured values are averaged.

The value "0" corresponds to unfiltered measured values.

The higher the selected value, the "slower" the display.

It makes sense to set the filter on a scale of 0 to 20. It makes no sense to use values greater than 20.

The factory default setting is „5“.

8. Select the desired value and confirm with ✔ .

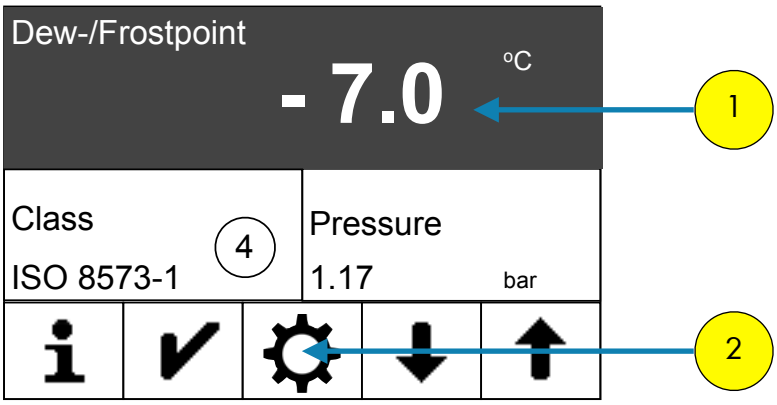
9. Leave the input field by pressing the „Back“ - key ↵

## 8.16 Units Setting

This menu item allows the physical units to be set for all of the measurement parameters.

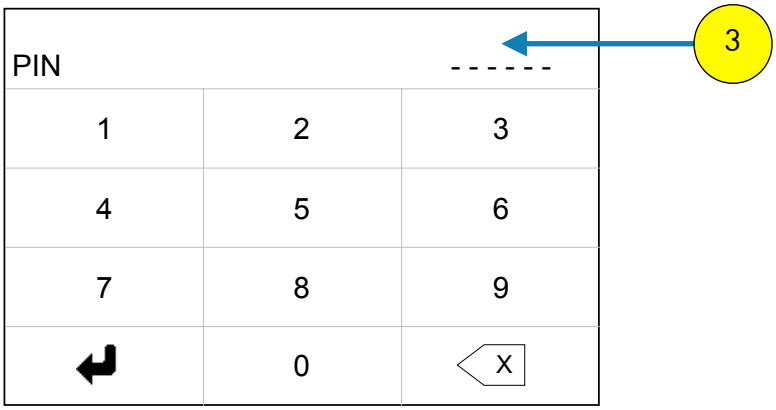
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



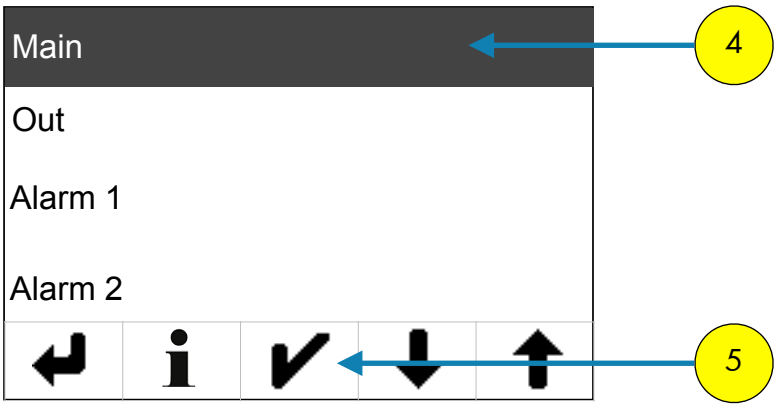

2. Select „Settings“ ⚙

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

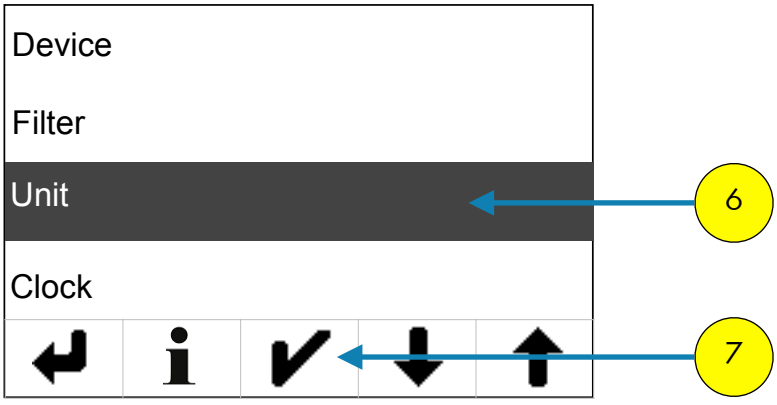
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔ .

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

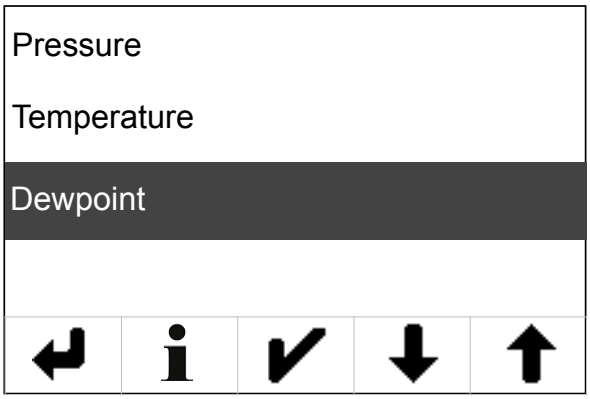
The following display of the settings menu appears (Level 2):




6. If the „Unit“ field is not already highlighted, select the field and confirm with ✔ .

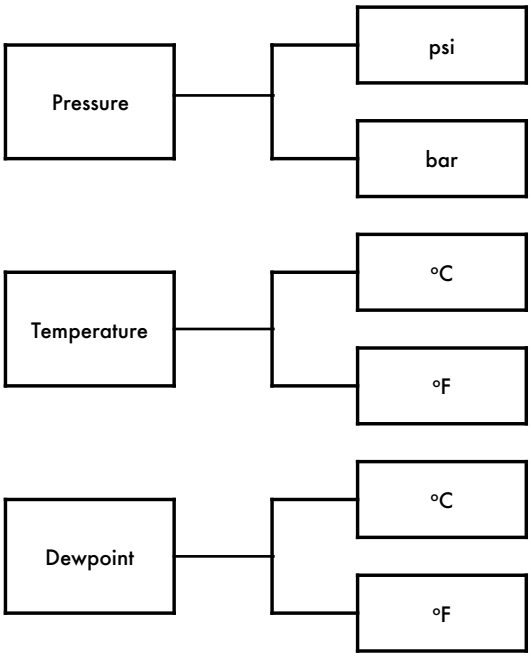
NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display appears:




Here you can chose the desired units by selecting the relevant measurement parameter. Confirm your choice with ✔ .

At the moment there are the following choices .




Select the desired unit and confirm with ✔ .

The „Back" key ↵ takes you back to the previous level until you are back at the home screen.

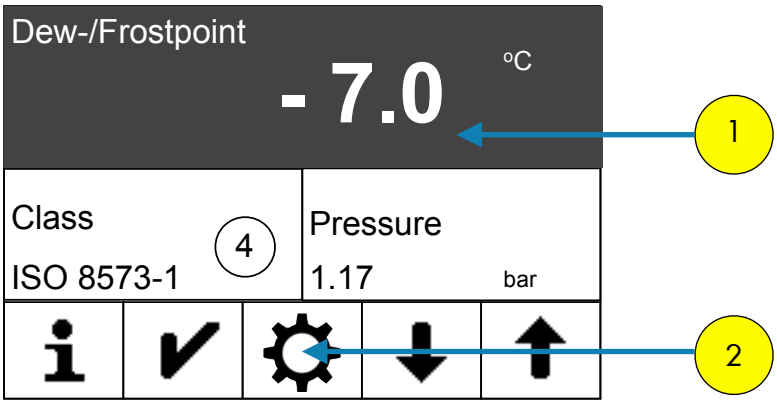
## 8.17. Setting the Date / Time

### 8.17.1 Setting the Date

This menu item allows the time and date to be set in various formats.

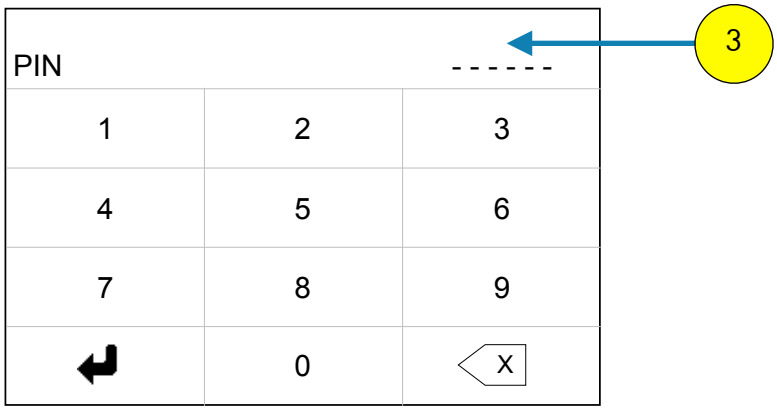
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



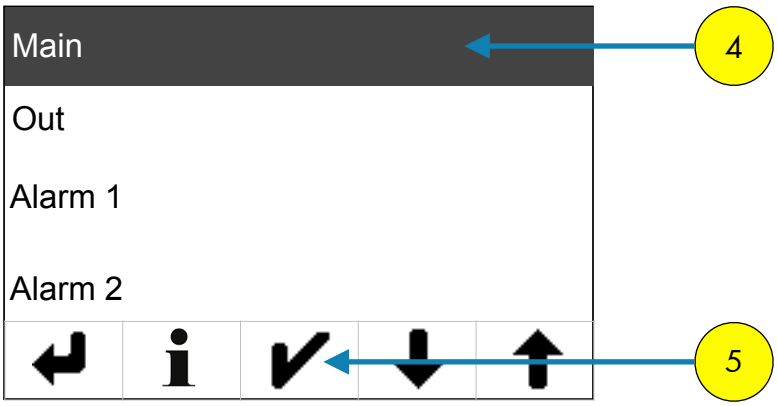

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

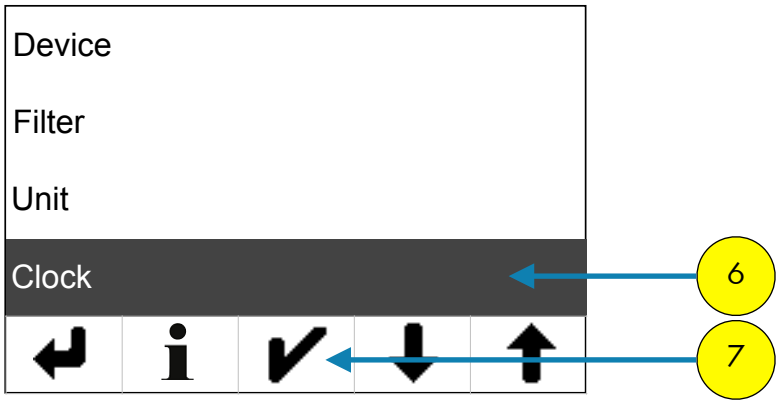
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔.

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

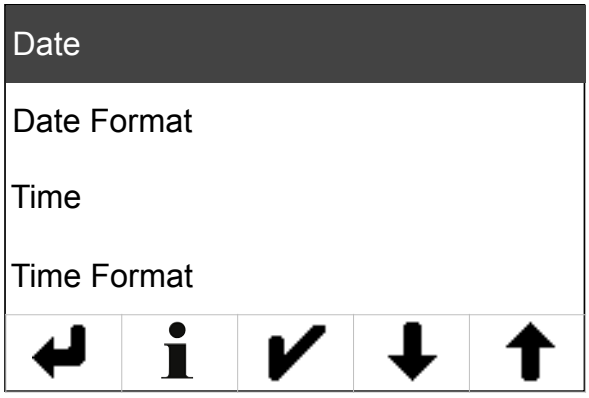
The following display of the settings menu appears (Level 2):




6. If the „Clock“ field is not already highlighted, select the field and confirm with ✔ .

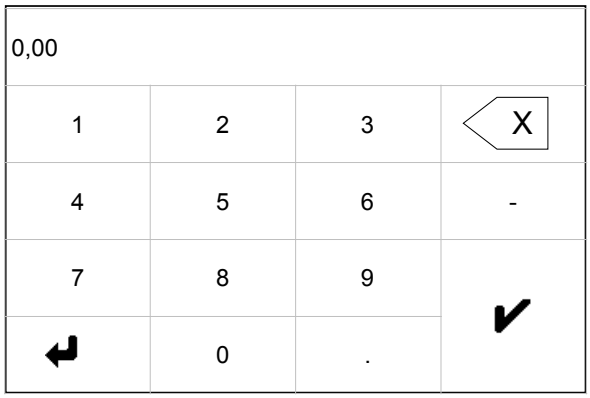
NOTE: For each relevant menu item you can press i to call up the help text in your selected language.

The following display appears:




8. If the „Date“ field is not already highlighted, select the field and confirm with ✔.

The following display appears:




10. Enter the current date as follows:

**EXAMPLE:** You wish to enter the date „21st March 2017“. Enter the following number combination into the screen shown above: „20170321“.

**NOTE: The date is always entered in the following format: „YYYYMMDD“**
Year (4-digits) Month (2-digits) Day (2-digits)

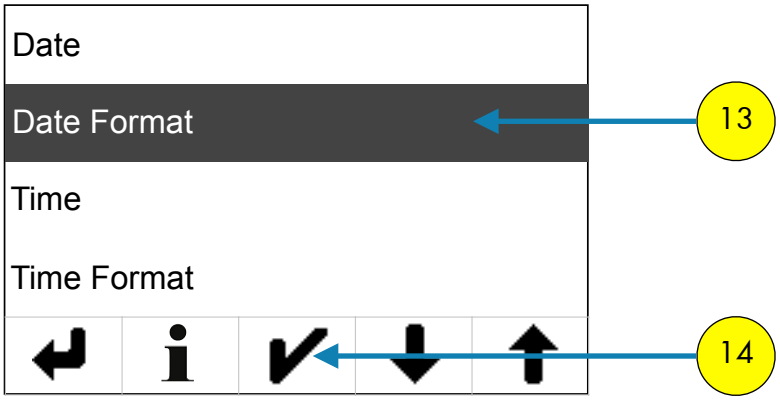
11. Confirm by pressing the „Enter“ - key ✔ .

12. Leave the input field by pressing the „Back“ - key ↵.

There is only one way to enter the date.

However, there are various options for displaying the date.

Use the „Date Format“ submenu to select the desired choices.




13. If the „Date Format“ field is not already highlighted, select the field and confirm with ✔ .

The following display appears:

15. Select the desired Date-Format and confirm with ✔.

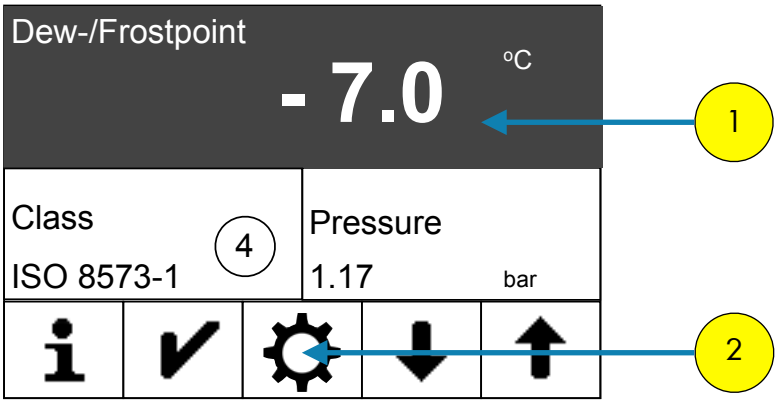
16. Leave the input field by pressing the „Back“ - key ↵.

## 8.17.2 Setting the Time

This menu item allows the time to be set in various formats.

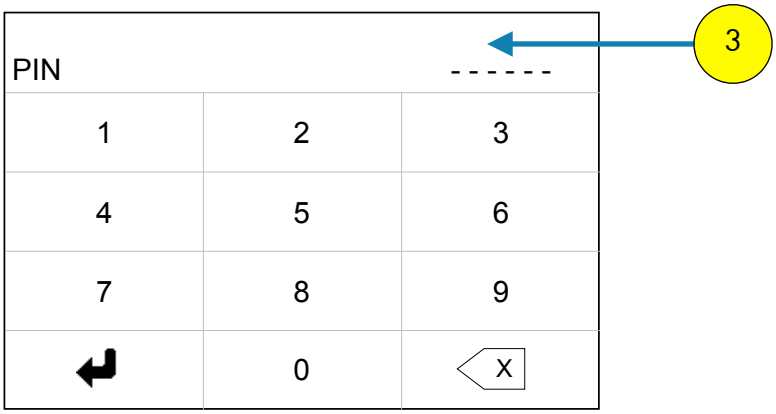
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



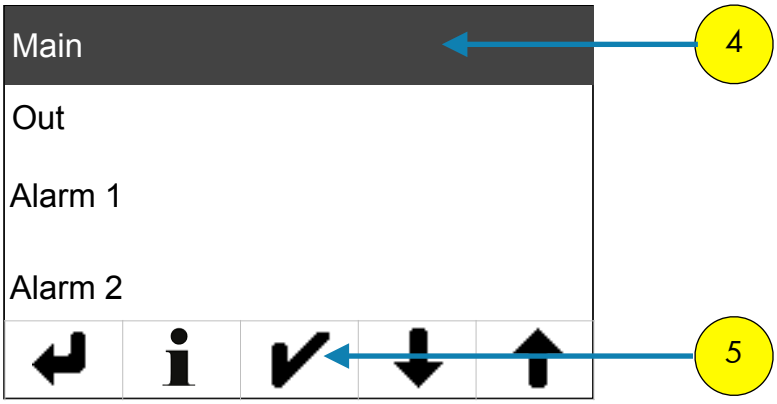

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

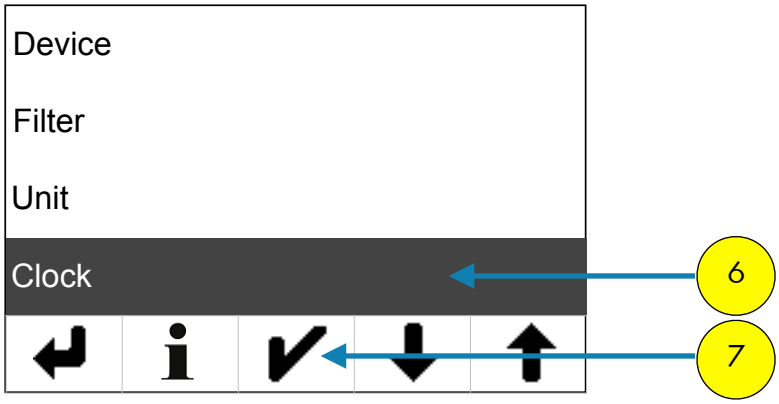
You are now in the settings menu (Level 1).




4. If the „Main“ field is not already highlighted, select the field and confirm with ✔.

Under the menu item „Main“ you will find all of the device settings, as well as the settings for displaying the measured values.

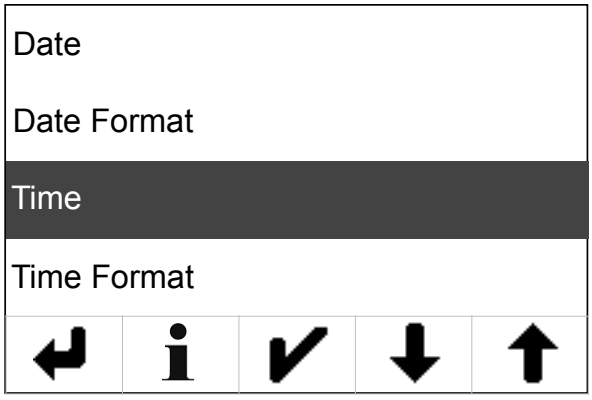
The following display of the settings menu appears (Level 2):




6. If the „Clock“ field is not already highlighted, select the field and confirm with ✔ .

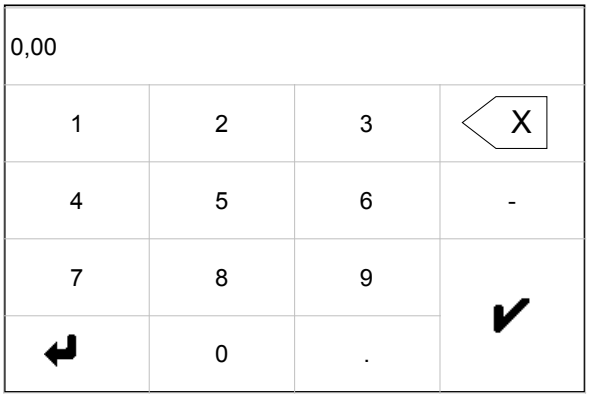
NOTE: For each relevant menu item you can press **i** to call up the help text in your selected language.

The following display appears:




8. If the „Time“ field is not already highlighted, select the field and confirm with ✔ .

The following display appears:




10. Enter the current time as follows:

**EXAMPLE:** You wish to enter the time „17.31“ . Enter the following number combination into the screen shown above:„173100“.

**NOTE: The time is always entered in the following format: „HHMMSS“**

hours (2-digits) minute (2-digits) Seconds (2-digits)

The seconds must be entered

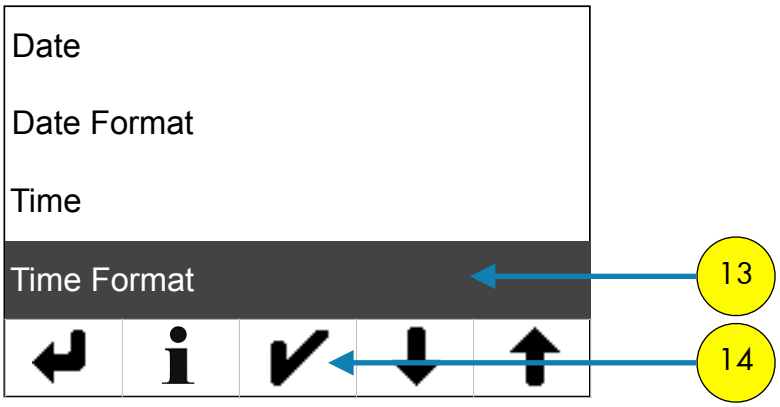
11. Confirm by pressing the „Enter“ - key ✔ .

12. Leave the input field by pressing the „Back“ - key ↵.

There is only one way to enter the time.

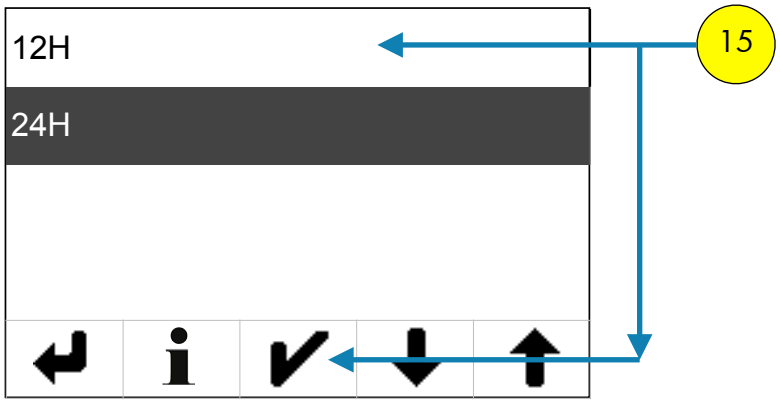
However, there are two options for displaying the time.

Use the "Date Format" submenu to select the desired choice.




8. If the „Time Format“ field is not already highlighted, select the field and confirm with ✔.

The following screen appears:




15. Please chose the desired Time-Format and confirm with ✔.

16. Leave the input field by pressing the „Back“ - key ↵

You can check your input at any time on the main screen.

Select one of the lower two fields on the home screen and scroll down until you can see the Date/Time field.

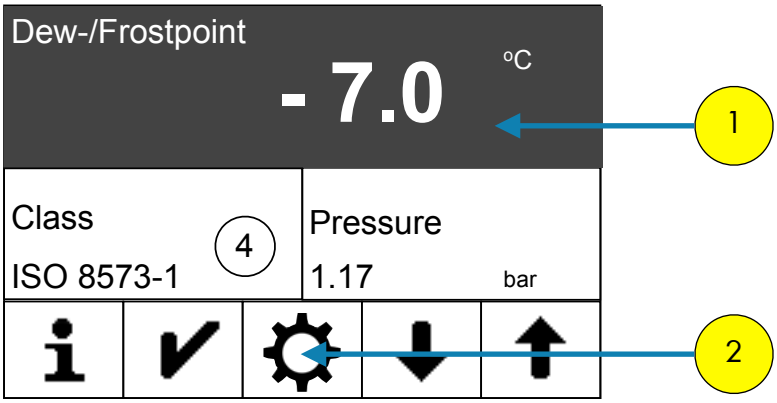
(see also page 20 et seq.)

# 9. Configuration of Relay Adjustments

The device has 4 independent relays. Each relay can be configured individually.

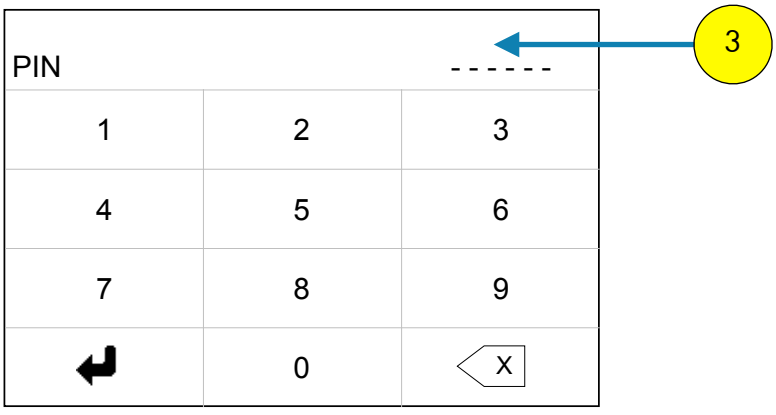
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



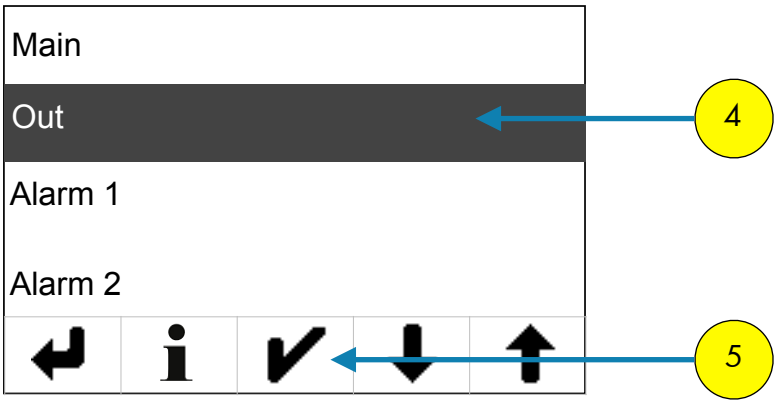

2. Select „Settings“

The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

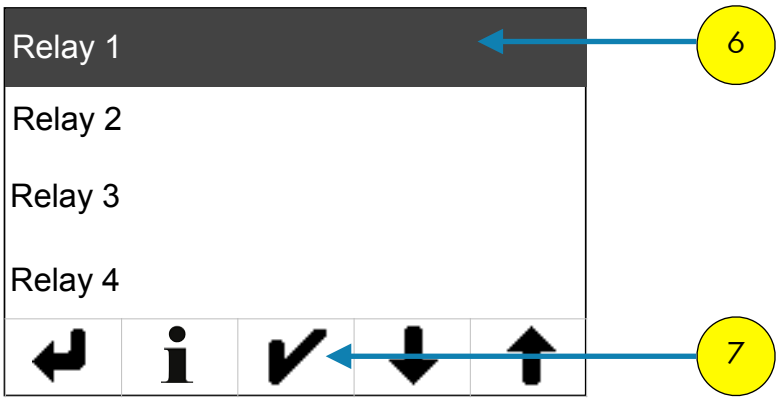
You are now in the settings menu (Level 1).




4. If the „Out“ field is not already highlighted, select the field and confirm with ✔ .

Under the menu item „Out“ you will find all settings options for the relays and the analog output.

The following display of the settings menu appears (Level 2):



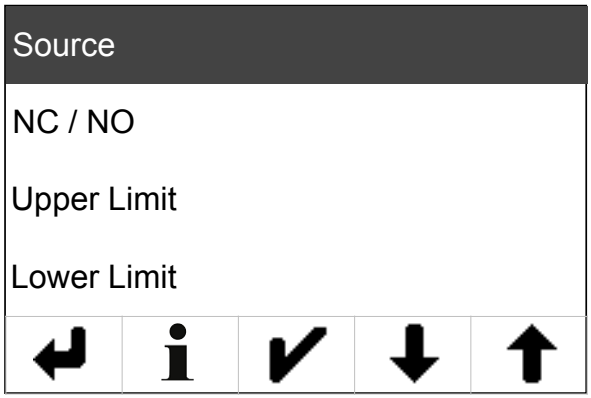

6. If the „Relay 1“ field is not already highlighted, select the field and confirm with ✔ .

The menu item "Relay 1" allows all of the settings for Relay 1 to be defined.

NOTE: For each relevant menu item you can press **i** to call up the help text in your selected language.

## 9.1 Setting Source (Output Parameters)

You are now at the level that allows you to determine the necessary configurations.




„Source“ allows you to set the parameter that you wish to monitor using Relay 1

You may chose between the following sources:

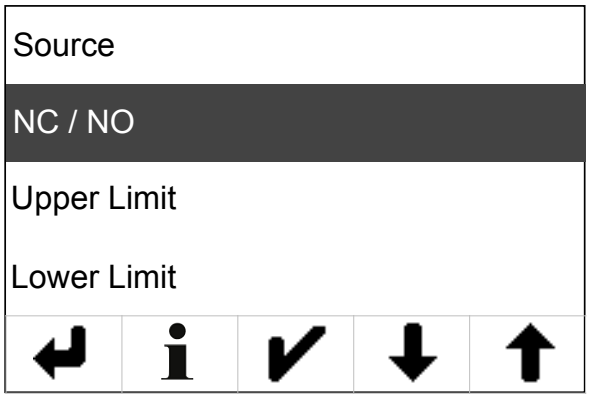
| |
|---|
| None |
| System Pressure |
| Ambient Pressure |
| Temperature |
| Rel. Humidity |
| Dew-/Frostpoint |
| ppm Volume |
| Absolute Humidity |
| Pre-alarm 1 |
| Alarm 1 |
| Pre-alarm 2 |
| Alarm 2 |

Select the „Source“ field (the field will be highlighted) and go to the desired value in the list that appears (using the scroll function ↑ or ↓ if necessary).

Confirm your choice with ✔.

## 9.2 Setting the Relay Switching Characteristics

After selecting the desired output value, you can define the switching characteristics of the relay.




NC/NO" sets the desired switching characteristics for Relay 1.

This parameter determines whether relay can be open or closed in its initial state.

You may chose between the following switching characteristics:

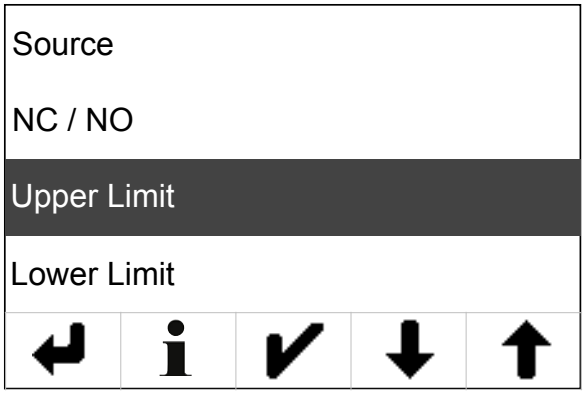
| |
|---|
| Normaly closed |
| Normaly open |
| Always closed |
| Always open |

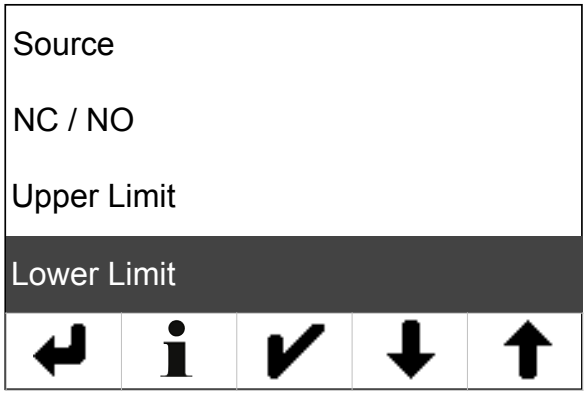
Select the "NC/NO" field (the field will be highlighted) and go to the desired value in the list that appears.

Confirm your choice with ✔ .

## 9.3 Setting of Limit Values

After selecting the desired output value and the switching characteristics, you can set the upper and lower limit values for the relay.




The desired limit values for Relay 1 are set using "Upper limit value" and "Lower limit value".

| Upper or lower limit value | |
|---|---|
| Used | The settings determines whether the upper limiter this channel should be used. If it is not used, the following settings (limit value and hysteresis) are not possible. |
| Limit value | The upper limit value is the switching point, beyond which the relay switches. |
| Hysteresis | Hysteresis is the difference between the switch-on and switch-off points at the limit value. The switch-on point is the limit value plus half of the hysteresis, and the switch-off point is the limit value minus half of the hysteresis. |

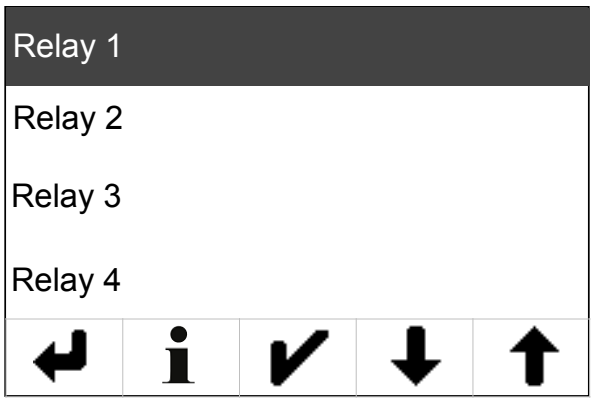
Select the "Upper limit" field (the field will be highlighted) and go to the desired value in the list that appears.

Confirm your choice with ✔ .

Now select the "Lower limit" field (the field will be highlighted) and go to the desired value in the list that appears.

Confirm your choice with ✔ .

To define the settings for Relay 2/ Relay 3 /Relay 4 return to the initial screen shown below.




Select the field for the relay that you wish to configure ("Relay 2", "Relay 3" or "Relay 4").

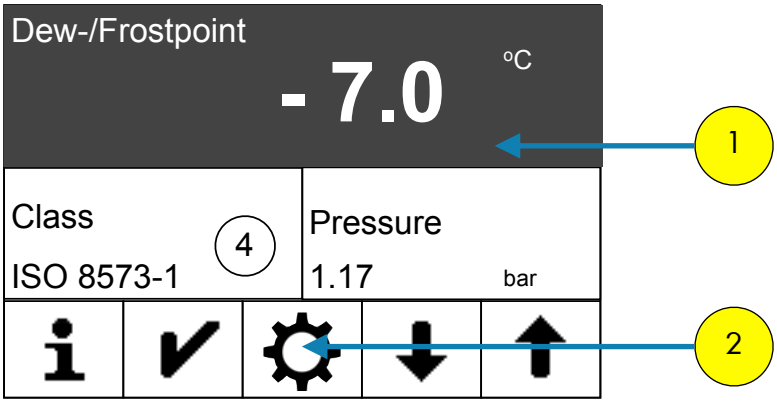
*Proceed in the same way as for the setting of "Relay 1" (see pages 74-77).*

# 10. Configuration of Analog Output

The device has an analogue output. This can be individually configured.

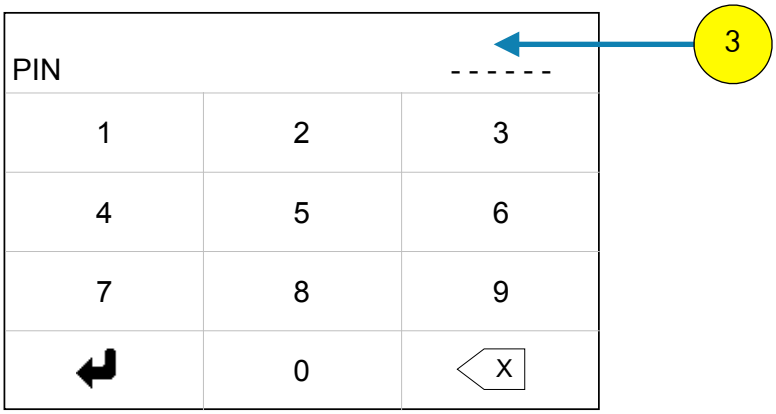
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).



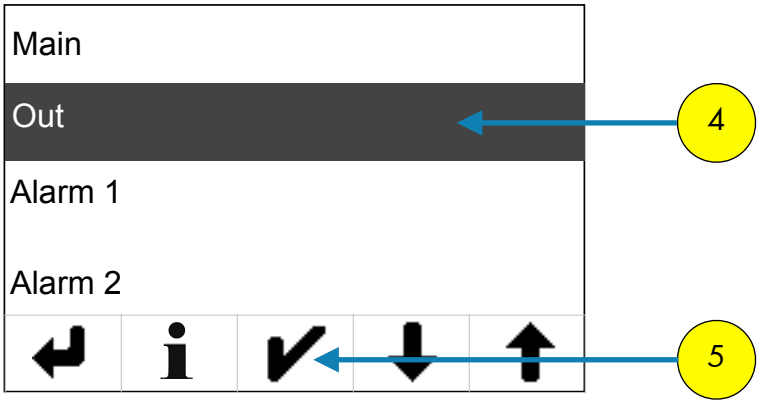

2. Select „Settings“

The following display appears:



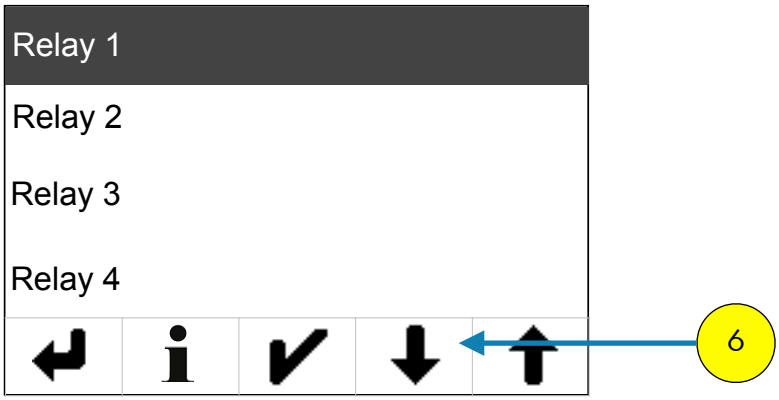

3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

You are now in the settings menu (Level 1).

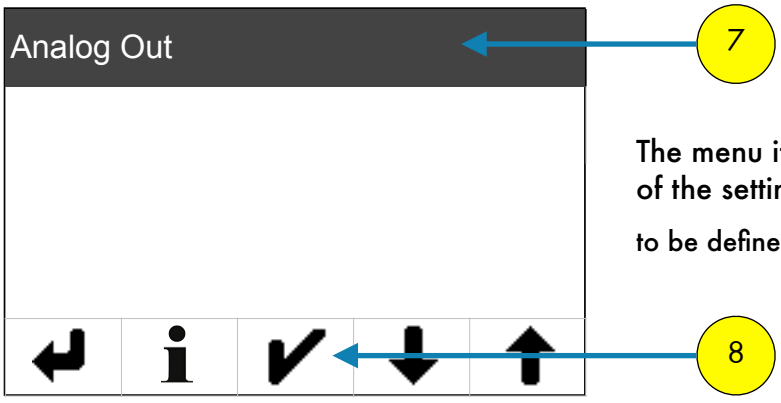



4. If the „Out" field is not already highlighted, select the field and confirm with ✔ .

The following screen of the settings menu will appear:




6. Please scroll down with „Scroll-down" key ⬇ until you see the following screen.

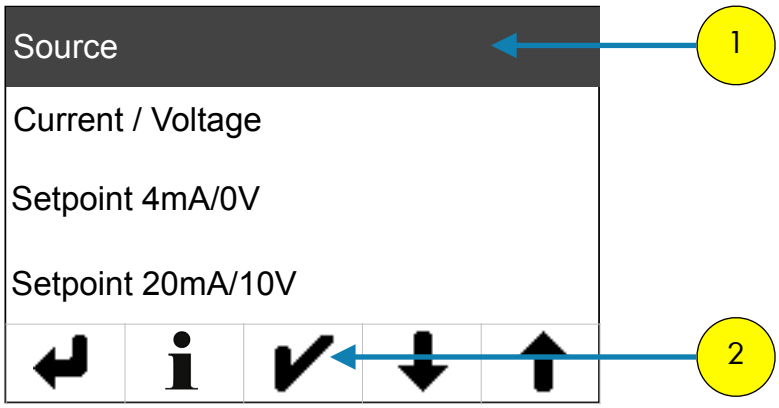



The menu item „Analog Out", allows all of the settings for the analogue output to be defined.

7. If the „Analog Out" field is not already highlighted, select the field and confirm with ✔ .

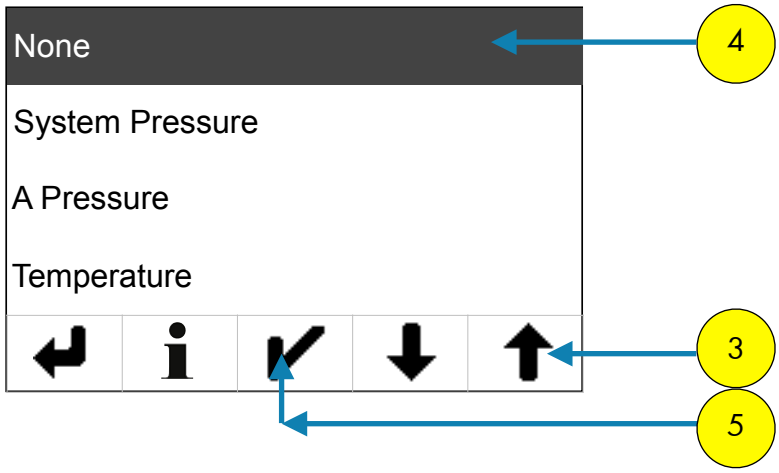
## 10.1. Selection of the desired Source (Output Parameter)

Wenn Sie den Menüpunkt „Analog Out“ mit „Enter“✔ bestätigt haben, kommen Sie in folgendes Untermenü.




1. To see the list of available measurement parameters for which an analogue output value can be generated, select "Source" (if the field is not already highlighted, this will be the case once you have made the selection) and confirm your choice by pressing „Enter“ ✔ .

A list appears of all of the measurement parameters for which an analogue output can be generated.




*Complete list of parameters for which an analogue output can be generated.*

| |
|---|
| None |
| System Pressure |
| A. Pressure |
| Temperature |
| Rel.Humidity |
| Dew- / Frostpoint |
| ppm Volume |
| A.Humidity |

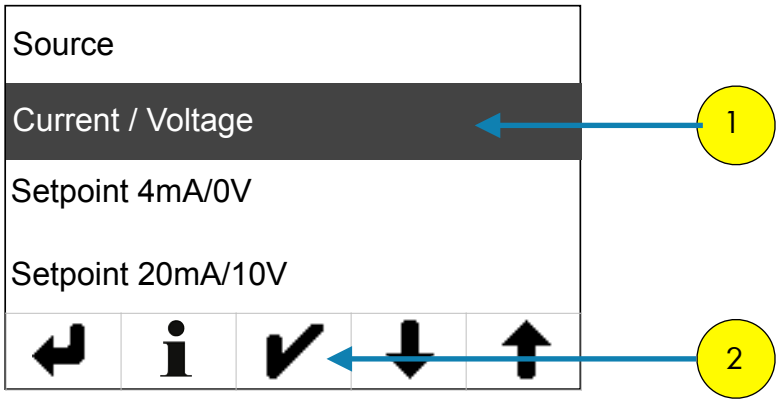
3. Scroll up or down using the „scroll-down“ and „scroll-up“ keys until you reach the parameter for which the analog output is to be generated.

4. Select the desired parameter (the field will be highlighted).

5. Confirm with „Enter“✔ .

## 10.2. Selection of the desired analog output value

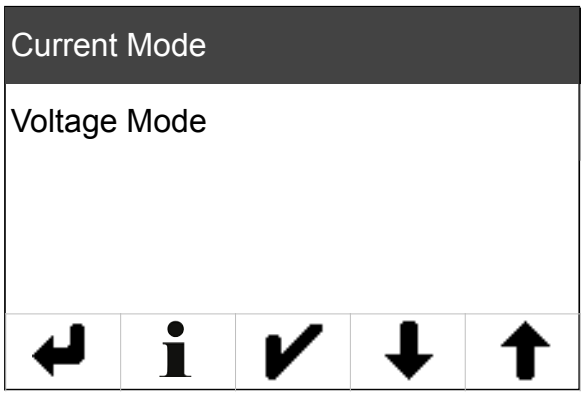
Menu item „4...20 mA/0...10 V“ allows you to chose whether you wish the analog output signal to be a current- (4...20 mA) or a voltage (0...10 V) signal.




1. To see the list of available output signals **select "4...20 mA/0...10 V" (if the field is not already highlighted this will be the case once you have made the selection) and confirm your**

   choice by pressing **„Enter“** ✔ .

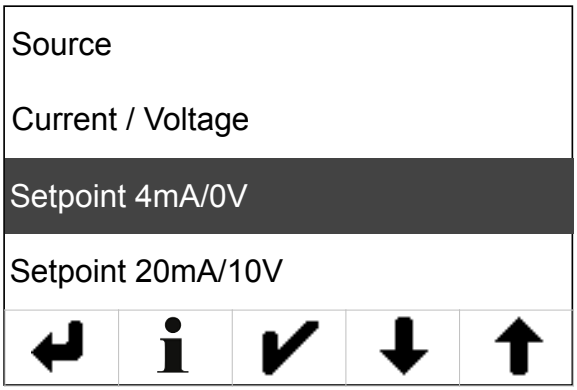
**The following screen appears, which allows you to set the desired output and confirm with „Enter“** ✔ .



## 10.3. Configuration of lower analog output value

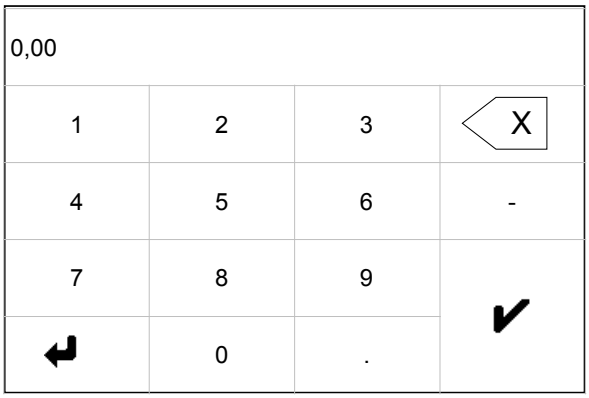
The analogue output signal is freely configurable. Both the lower and the upper output value can be freely determined.

The menu item „Setpoint 4 mA/0V" allows you to enter the lower value for the analog output signal. The desired value must lie within the setting range selected in section 10.2.




If the „Setpoint 4mA/0V“ field is not already highlighted, select the field and confirm with ✔ .

The following screen will appear:

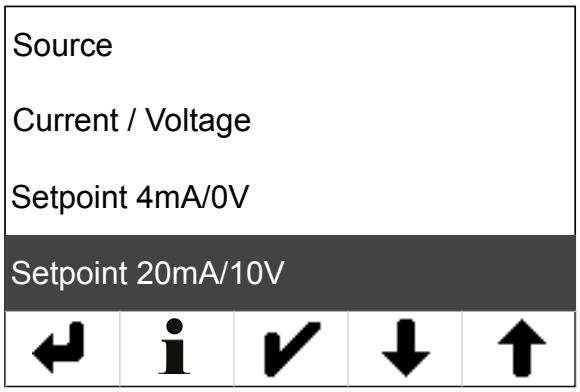



Select the desired value and confirm with „Enter“ ✔

## 10.4. Configuration of upper analog output value

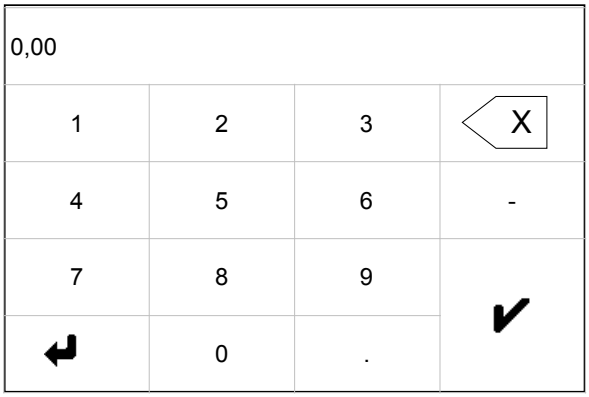
The analogue output signal is freely configurable. Both the lower and the upper output value can be freely determined.

The menu item „Setpoint 20 mA/10V" allows you to enter the upper value for the analog output signal. The desired value must lie within the setting range selected in section 10.2.




If the „Setpoint 20mA/10V" field is not already highlighted, select the field and confirm with ✔ .

The following screen will appear:




Select the desired value and confirm with „Enter" ✔

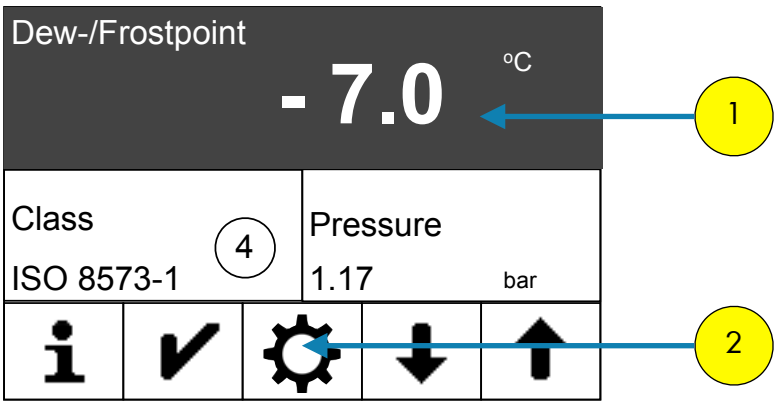
# 11. Configuration of Alarm Output

The device has two alarm outputs. Each alarm output provides a pre- and a main alarm and can be allocated to a measured value.

The input options are described step by step in detail below.

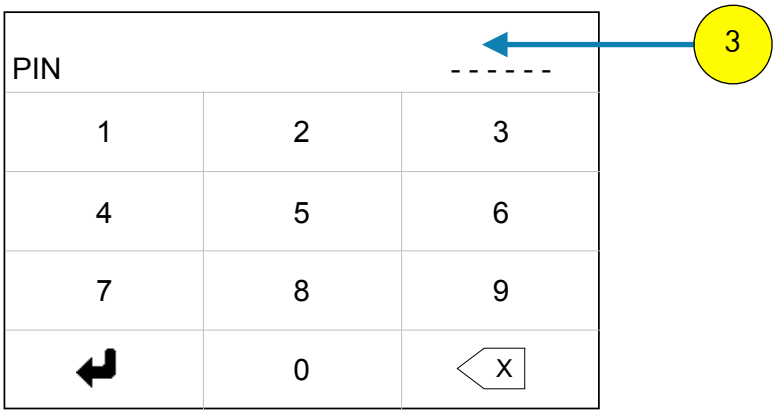
The procedure is as follows:

1. Select one of the three segment fields (the background turns dark and control keys appear at the bottom of the display).




2. Select „Settings“

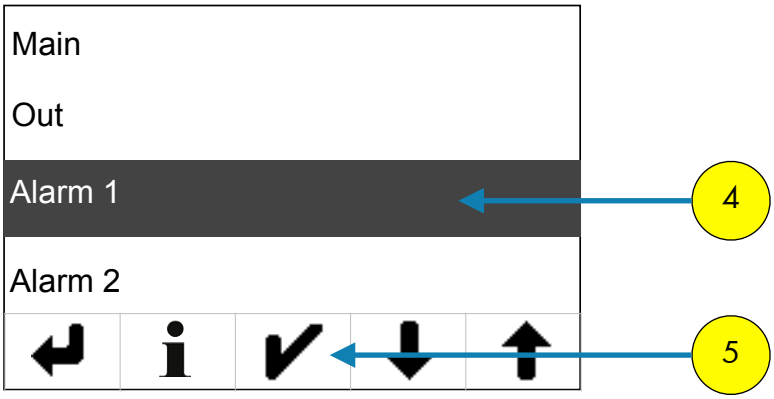
The following display appears:




3. Enter your personal PIN code (if it has already been changed). If the device is still in its factory settings, key in **111111**.

## 11.1. Setting of desired Alarm Value 1

Below you see the screen of the setting menu:

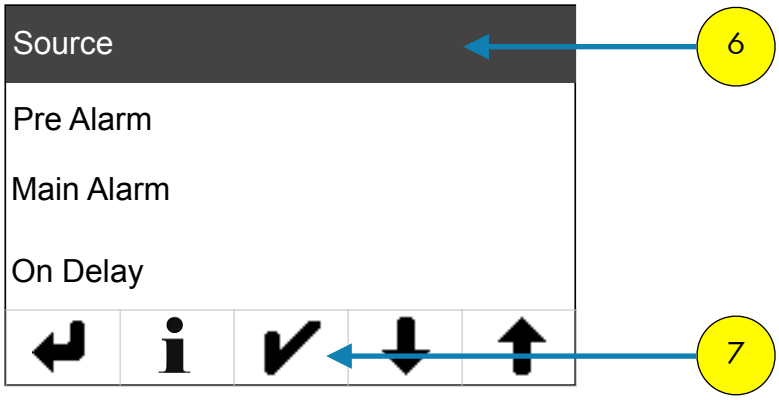



4. If the „Alarm 1“ field is not already highlighted, select the field and confirm with ✔ .

Under the Menü item „Alarm 1“ you will find all the settings for the alarm system.

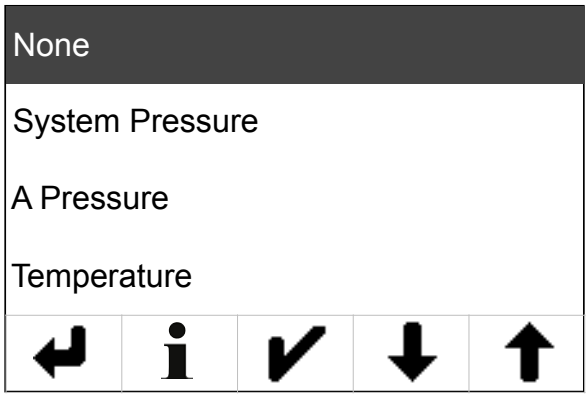
### 11.1.1 Setting of desired measurement - channel (source)

The following screen of the settings menu will appear:




6. If the „Source“ field is not already highlighted, select the field and confirm with ✔ .

„Source“ allows you to set the parameter that you wish to monitor using Alarm 1.




You may choose between following channels:

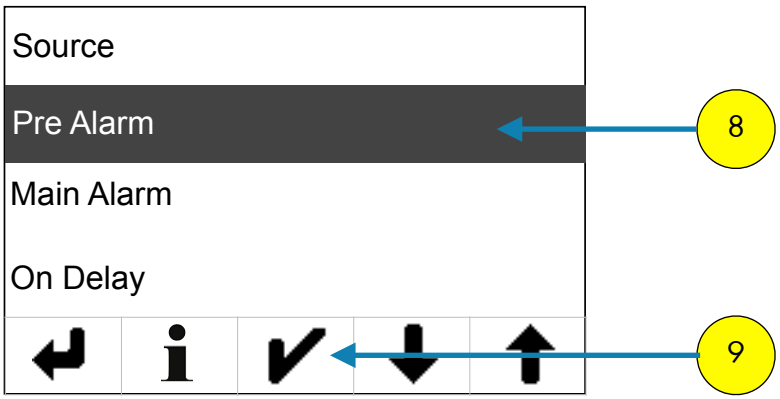
| |
|---|
| None |
| System Pressure |
| Ambient Pressure |
| Temperature |
| Rel. Humidity |
| Dew-/Frostpoint |
| ppm Volume |
| Absolute Humidity |
| Pre-alarm 1 |
| Alarm 1 |
| Pre-alarm 2 |
| Alarm 2 |

Select the „Source“ field (the field will be highlighted) and go to the desired value in the list that appears (using the scroll function ↓ or ↑ if necessary).

Confirm your choice with ✔.

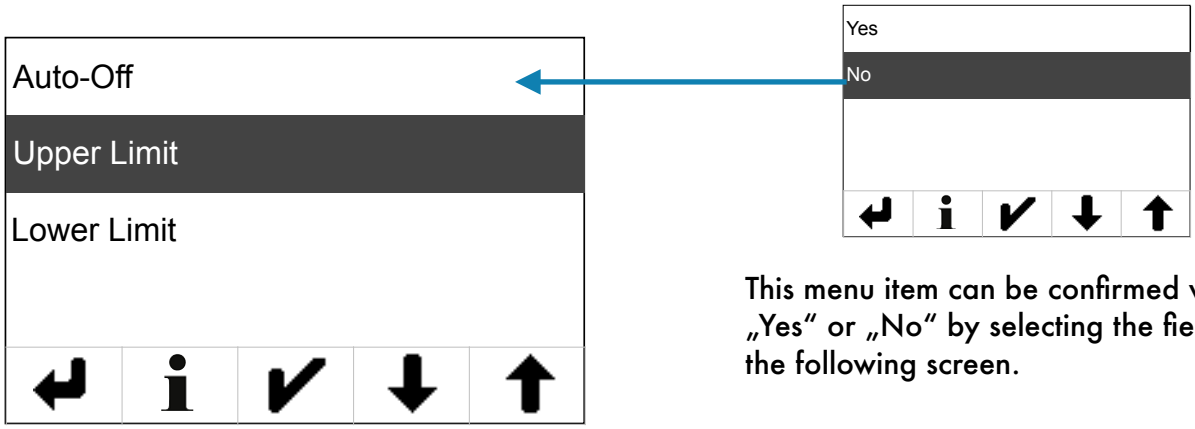
### 11.1.2 Setting Pre-Alarm

Once the desired measuring channel has been set, the desired value for the „Pre Alarm" can be set.




8. If the „Pre Alarm" field is not already highlighted, select the field and confirm with ✔ .

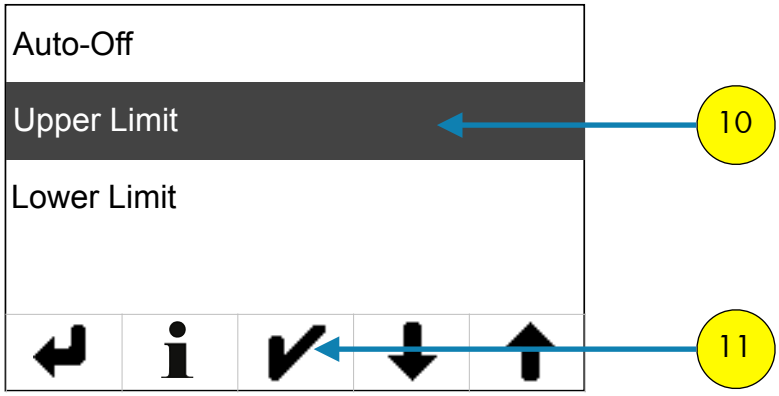
This brings you to the following menu:




This menu item can be confirmed with „Yes" or „No" by selecting the field in the following screen.

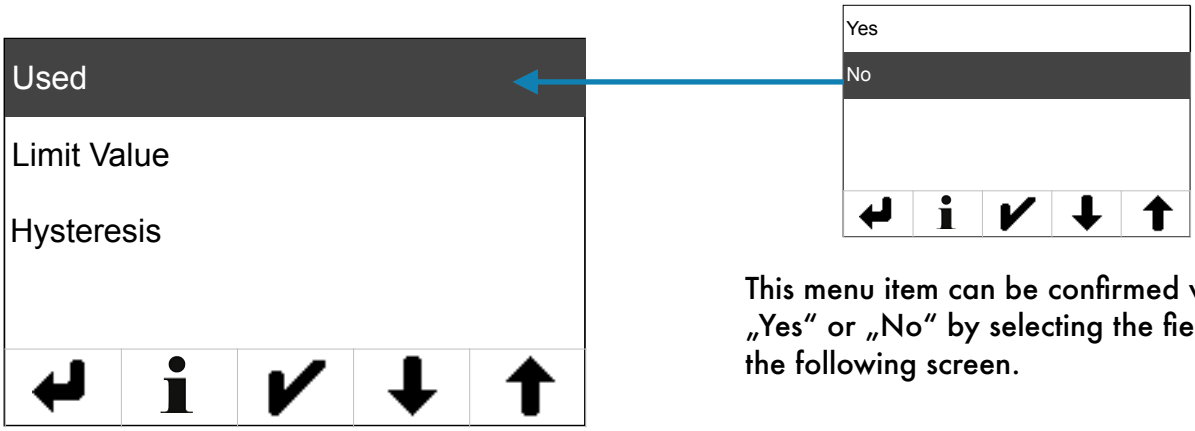
| Description: | Meaning: |
|---|---|
| Auto-Off | Defines whether Pre-alarm 1 must be acknowledged or automatically turns itself off in the event of a limit violation. |
| Upper Limit | This menu item allows you to configure the upper limit value for Pre-alarm 1. |
| Lower Limit | This menu item allows you to configure the lower limit value for Pre-alarm 1. |

Once you have selected whether or not the alarm must be acknowledged in the event of lower limit violation, the "Upper Limit" for the pre-alarm can be set.




10. To do this, select the „Upper Limit“ field (highlighted) and confirm with ✔ .

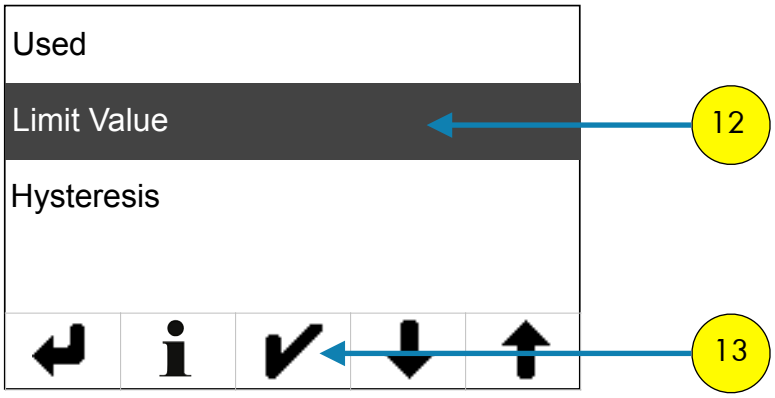
This brings you to the following menu:



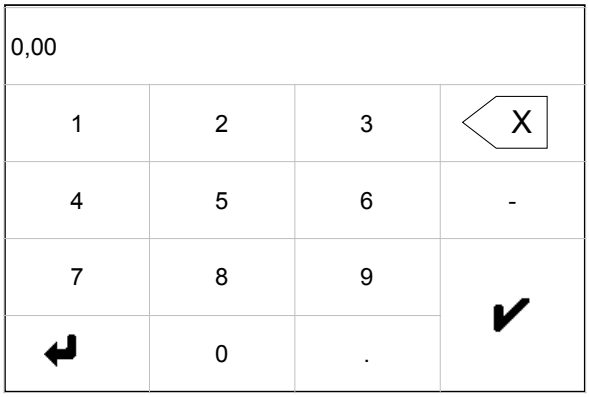

This menu item can be confirmed with „Yes“ or „No“ by selecting the field in the following screen.

| Description: | Meaning: |
|---|---|
| Used | The setting determines whether the upper limit for the pre-alarm should be used. If it is not used, the following settings (limit value and hysteresis) are not possible. |
| Limit Value | The (upper) limit value is the switching point, beyond which the pre-alarms is triggered. |
| Hysteresis | Hysteresis is the difference between the switch-on and switch-off points at the limit value. The switch-on point is the limit value plus half of the hysteresis, and the switch-off point is the limit value minus half of the hysteresis. |

To determine the desired alarm value for the „Upper Limit“ for the pre-alarm press „Limit Value“ and confirm with „Enter“ ✔.

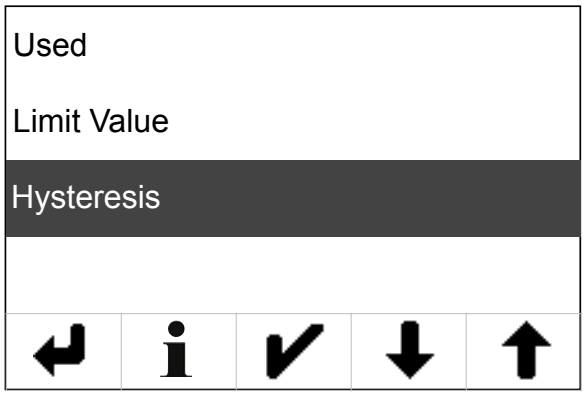


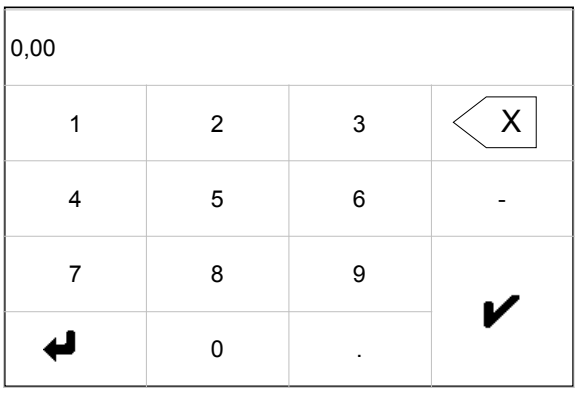

This brings you to the following setting menu:




Select the desired value and confirm with „Enter“ ✔.

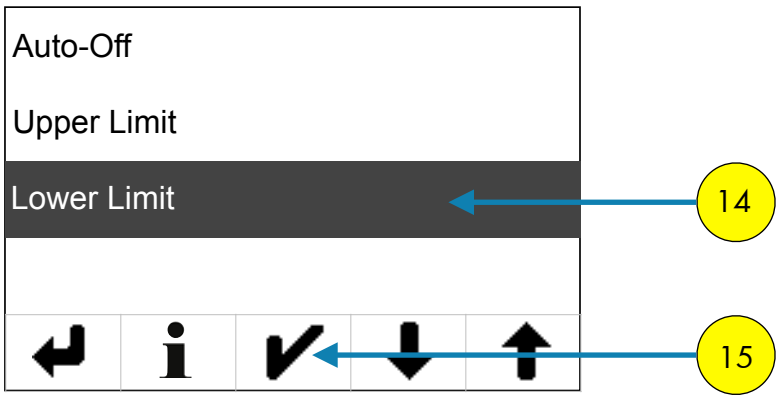
If you so wish, you may now enter a "Hysteresis" value for the upper limit value. To do this, select "Hysteresis" and confirm with „Enter" ✔



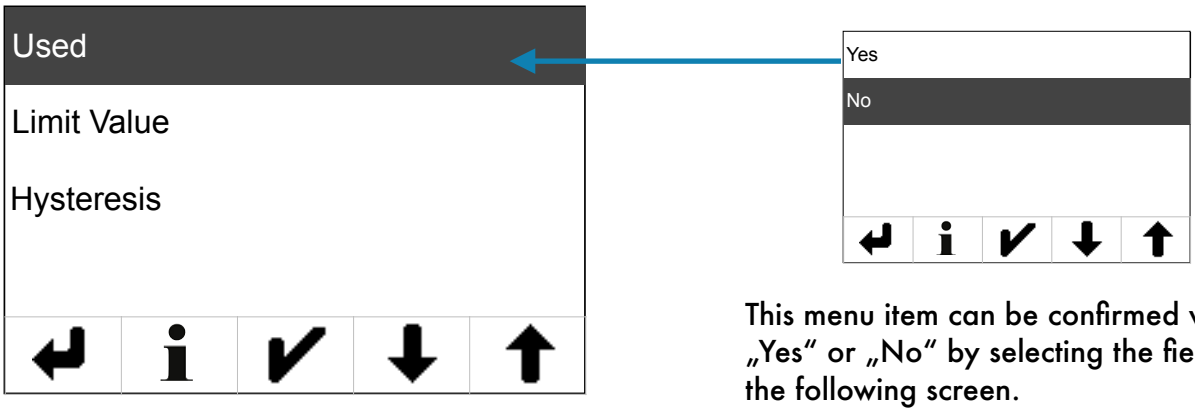

In the screen that follows, enter the desired value and confirm your input with "Enter" ✔.

Once you have selected whether or not the alarm must be acknowledged in the event of lower limit violation, the "Lower Limit" for the pre-alarm can be set.




14. To do this, select the „Lower Limit“ field (highlighted) and confirm with ✔ .

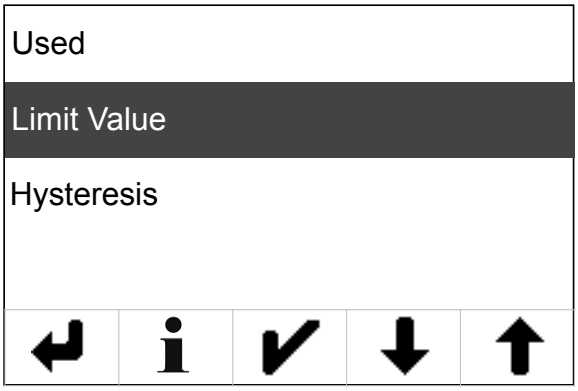
This brings you to the following menu:



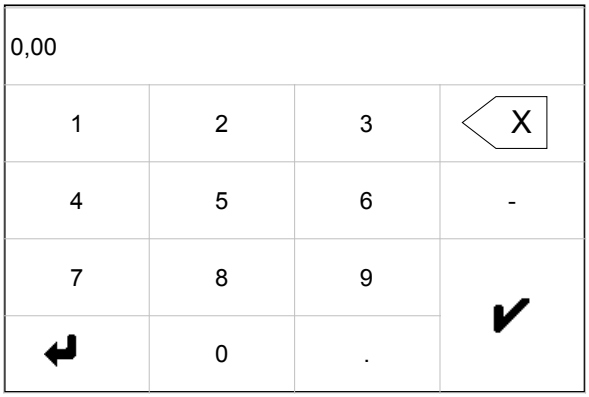

This menu item can be confirmed with „Yes“ or „No“ by selecting the field in the following screen.

| Description: | Meaning: |
|---|---|
| Used | The setting determines whether the upper limit for the pre-alarm should be used. If it is not used, the following settings (limit value and hysteresis) are not possible. |
| Limit Value | The (upper) limit value is the switching point, beyond which the pre-alarms is triggered. |
| Hysteresis | Hysteresis is the difference between the switch-on and switch-off points at the limit value. The switch-on point is the limit value plus half of the hysteresis, and the switch-off point is the limit value minus half of the hysteresis. |

To determine the desired alarm value for the "Lower Limit" for the pre-alarm, press "Limit value" and confirm with „Enter" ✔.

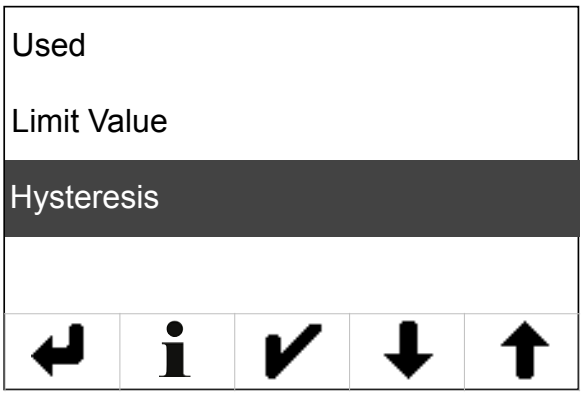


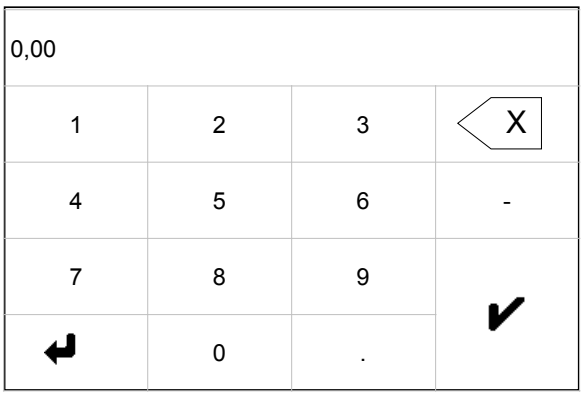

This brings you to the following setting menu:




Select the desired value and confirm with „Enter" ✔ .

If you so wish, you may now enter a "Hysteresis" value for the upper limit value. To do this, select "Hysteresis" and confirm with „Enter" ✔.

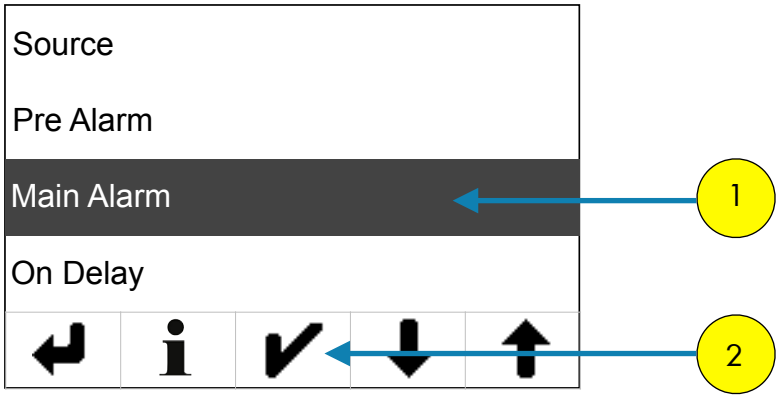



In the screen that follows, enter the desired value and confirm your input with "Enter" ✔ .

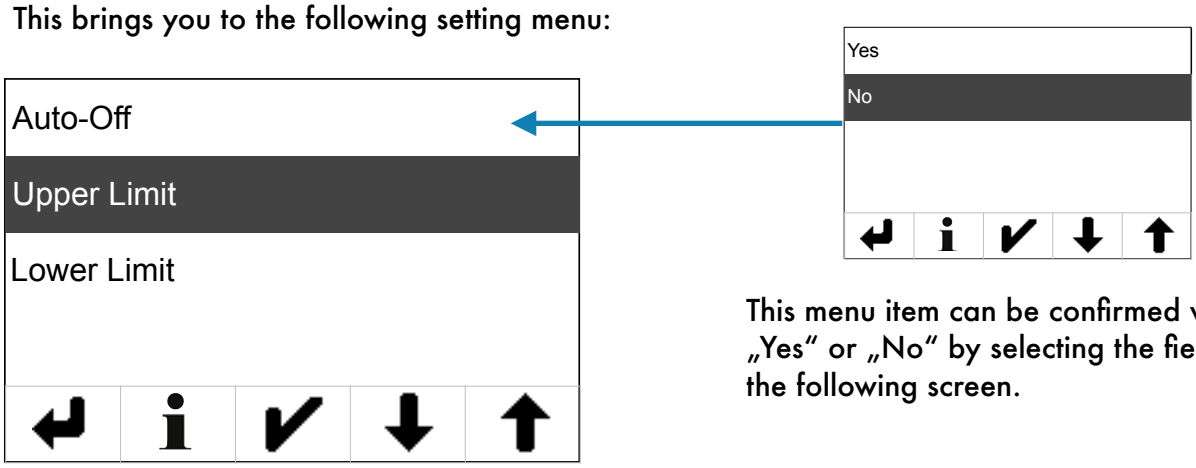
### 11.1.3 Setting Main Alarm

Once the desired measuring channel and pre-alarm have been set, the desired value for the "Main Alarm" can be set.




1. To do this, select „Main Alarm“ field (highlighted) and confirm with „Enter“ ✔ .

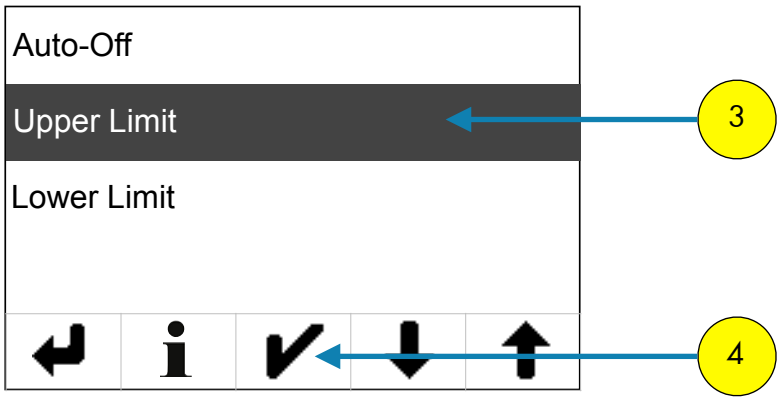
This brings you to the following setting menu:




This menu item can be confirmed with „Yes“ or „No“ by selecting the field in the following screen.

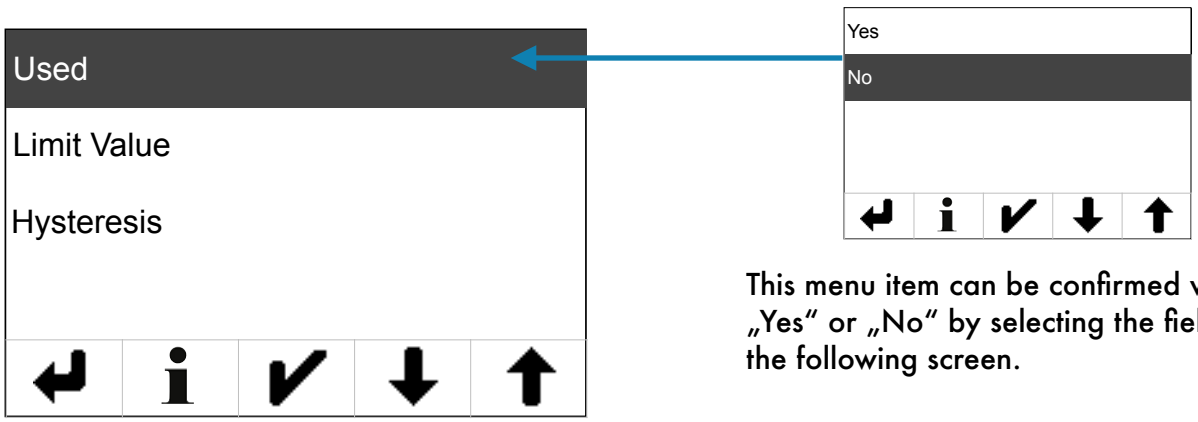
| Description: | Meaning: |
|---|---|
| Auto-Off | Defines whether Main Alarm 1 must be acknowledged or automatically turns itself off in the event of a limit violation. |
| Upper Limit | This menu item allows you to configure the upper limit value for Main Alarm 1. |
| Lower Limit | This menu item allows you to configure the lower limit value for Main Alarm 1. |

Once you have selected whether or not the alarm must be acknowledged in the event of lower limit violation, the "Upper Limit" for the main alarm can be set.




3. To do this, select the **"Upper Limit"** field (highlighted) and **confirm with "Enter ✔ .**

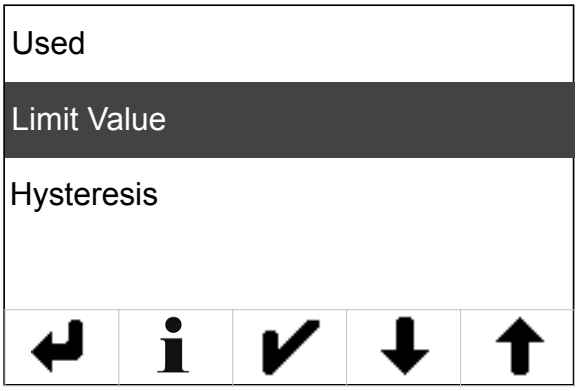
This brings you to the following setting menu:



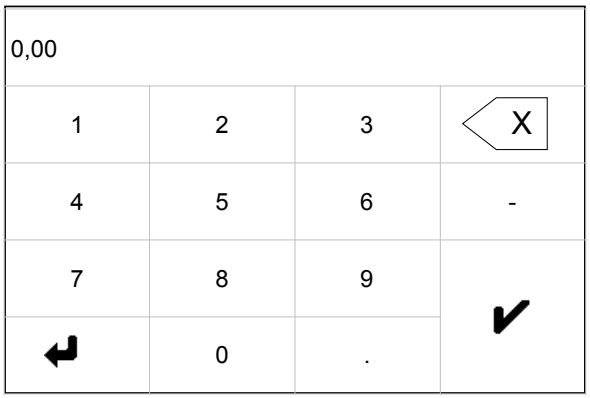

This menu item can be confirmed with „Yes“ or „No“ by selecting the field in the following screen.

| Description: | Meaning: |
|---|---|
| Used | The setting determines whether the upper limit for the Main Alarm should be used. If it is not used, the following settings (limit value and hysteresis) are not possible. |
| Limit Value | The (upper) limit value is the switching point, beyond which the main-alarm is triggered. |
| Hysteresis | Hysteresis is the difference between the switch-on and switch-off points at the limit value. The switch-on point is the limit value plus half of the hysteresis, and the switch-off point is the limit value minus half of the hysteresis. |

To determine the desired alarm value for the "Upper Limit" for the main alarm, press "Limit Value" and confirm with "Enter" ✔.

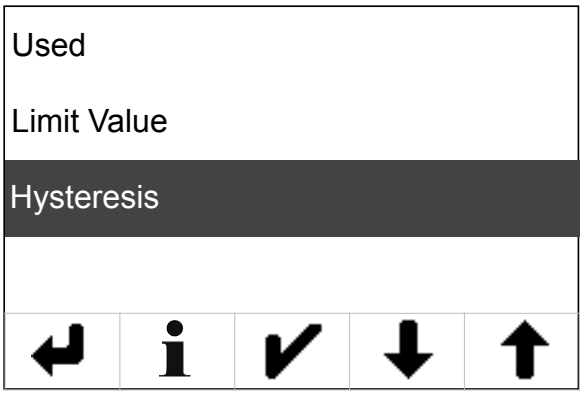


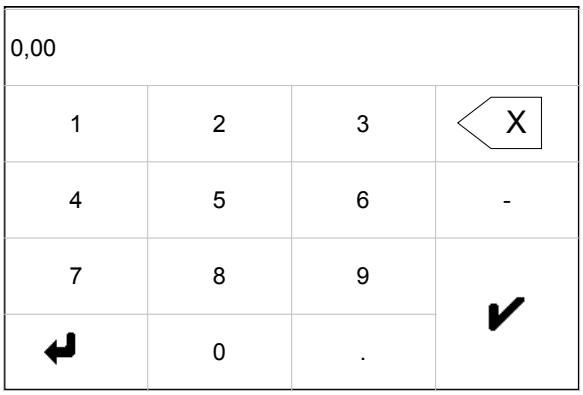

This brings you to the following setting menu:




Select the desired value and confirm with „Enter" ✔ .

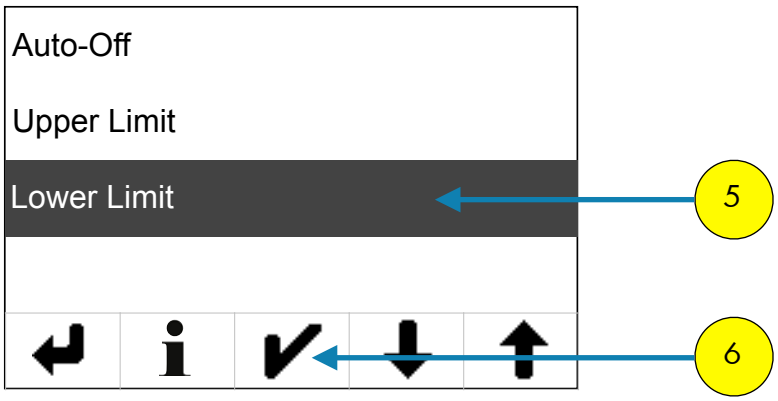
If you so wish, you may now enter a "Hysteresis" value for the upper limit value. To do this, select "Hysteresis" and confirm with „Enter" ✔ .



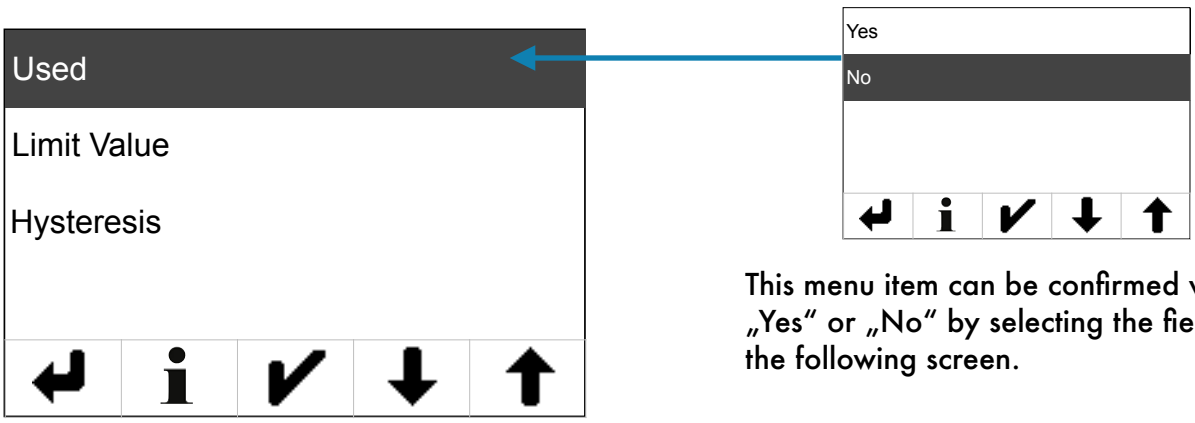

In the screen that follows, enter the desired value and confirm your input with "Enter" ✔ .

Once the desired „Upper Limit“ have been set, the desired value for the „Lower Limit" for the Main Alarm can be set.




5. To do this, select the **"Lower Limit"** field (highlighted) and **confirm with "Enter ✔.**

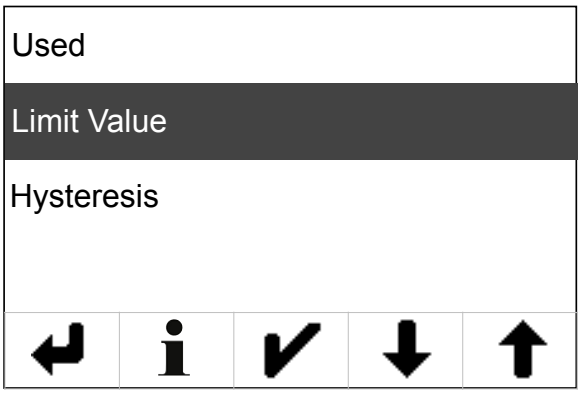
This brings you to the following setting menu:



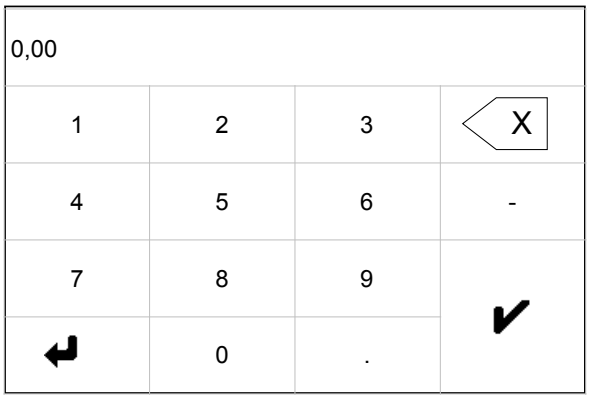

This menu item can be confirmed with „Yes“ or „No“ by selecting the field in the following screen.

| Description: | Meaning: |
|---|---|
| Used | The setting determines whether the upper limit for the main-alarm should be used. If it is not used, the following settings (limit value and hysteresis) are not possible. |
| Limit Value | The (upper) limit value is the switching point, beyond which the main-alarm is triggered. |
| Hysteresis | Hysteresis is the difference between the switch-on and switch-off points at the limit value. The switch-on point is the limit value plus half of the hysteresis, and the switch-off point is the limit value minus half of the hysteresis. |

To determine the desired alarm value for the "Lower Limit" for the main alarm, press "Limit Value" and confirm with „Enter“ ✔.

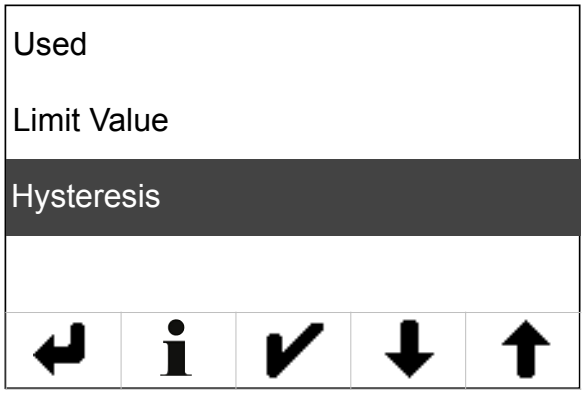


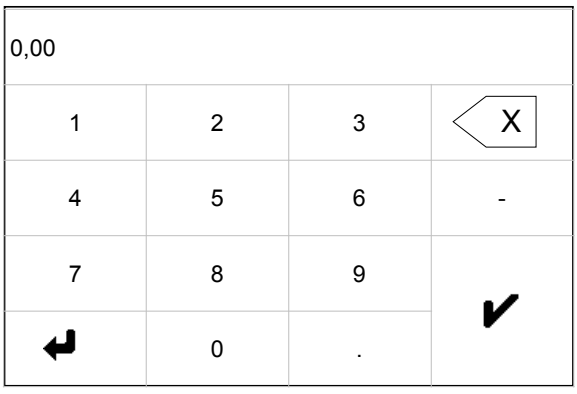

This brings you to the following setting menu:




Select the desired value and confirm with „Enter“ ✔.

If you so wish, you may now enter a "Hysteresis" value for the upper limit value. To do this, select "Hysteresis" and confirm with „Enter" ✔.



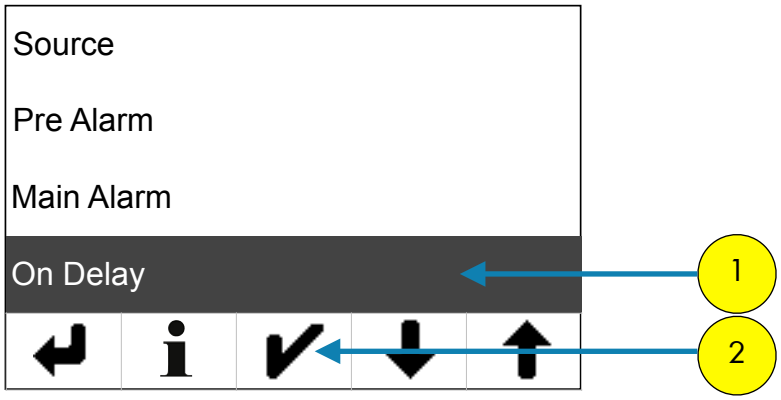

In the screen that follows, enter the desired value and confirm your input with "Enter" ✔.

### 11.1.4 Setting Delay

Once all of the values for the "Pre-alarm" and "Main alarm" and the corresponding "Channel" have been set, the device also allows you to enter a corresponding "Delay", so that the alarm is not immediately triggered every time the alarm values are briefly exceeded.

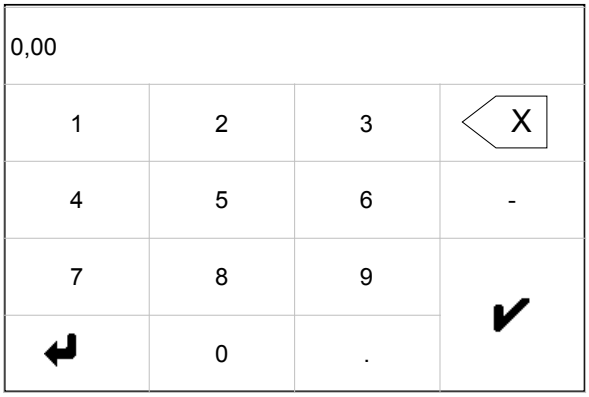
There are 2 setting options:

| Description: | Meaning |
|---|---|
| On Delay | This parameter determines the length of time between alarm condition 1 being met and actual triggering of the alarm transmitter. |
| Off Delay | This parameter determines the length of time for which alarm condition 1 is no longer met, until the alarm transmitter switches off again. |




1. To define this setting, select the „**On Delay**" field (highlighted) and confirm with **"Enter"** ✔.

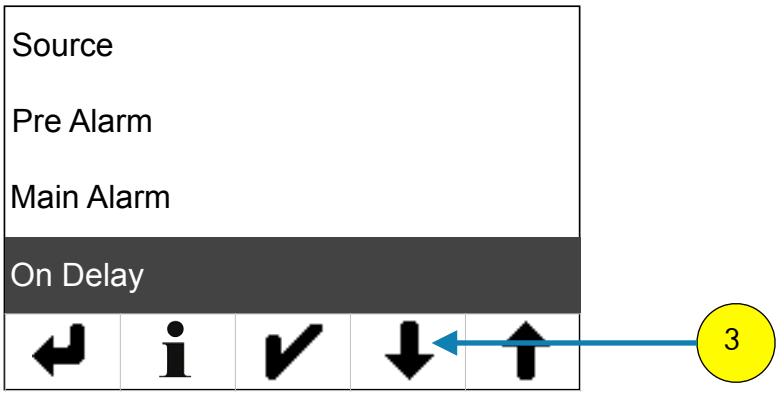
This brings you to the following setting menu:



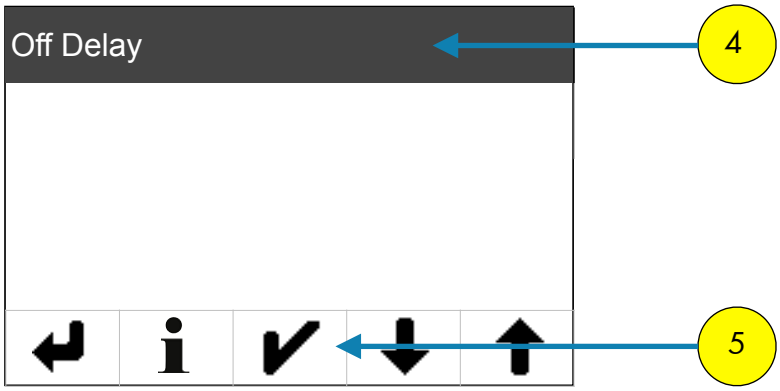

Enter the desired value and confirm with „Enter'✔ .

*The entered value is in seconds!!*

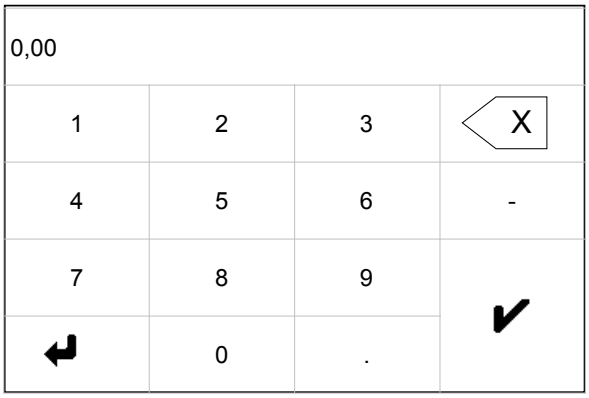
To set „Off Delay“ please proceed as follows:




3. Please scroll down with „Scroll-down“ key ↓ until you see the following screen.




4. Please confirm „Off Delay“ (highlighted) with „Enter“ ✔ .

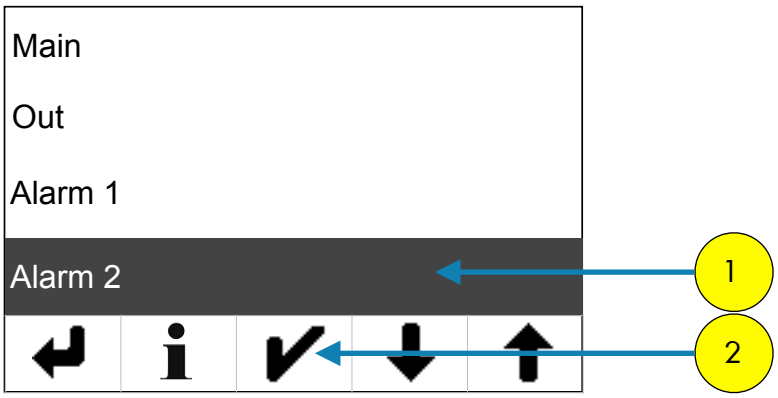



Enter the desired value and confirm with „Enter“ ✔

All of the values Source/Pre-Alarm/Main Alarm and Delay) have now been set for Alarm 1.

NOTE: For each relevant menu item you can press **i** to call up the help text in your selected language.

## 11.2. Setting of desired Alarm 2




1. If the „Alarm 2“ setting field is not already highlighted, select the field and confirm with ✔.

To set all of the parameters for alarm value 2, proceed in the same way as described in „Setting of desired Alarm Value 1“.

Description, how to set all values, you will find on page 86 onwards.

# 12. Technical Datas

| | |
|---|---|
| calibrated measuring range: | -20...+20 °$C_{tp}$ (TPK 21 portable)<br>-60...+20 °$C_{tp}$ (TPK 61 portable) |
| pressure range: | 0 ... 16 bar |
| sample medium: | clean, oil-free compressed air that is free of any abrasive, corrosive, caustic, toxic, flammable and combustible components |

output/display values:

| | |
|---|---|
| pressure dew point | °C, °F |
| relative system pressure | bar, psi |
| absolute system pressure | bar, psi |
| ambient pressure | bar, psi |
| gas temperature | °C, °F |
| ppm by volumen | ppm V |
| relative humidity | % r.F., % r.H. |
| absolute humidity | g, Kg |
| ppm by weight | ppm W |
| molecular mix | ppm |

humidity sensor element: capacitive polymer sensor

analogue output (active) - freely configurable output

4...20 mA (resolution 15 bit ) or 0...10 V (resolution 16 bit )

analoge output - specifications:
under MBE at „underflow" to 3,8 mA
above MBE at „overflow" 20,5 mA
cable fault monitoring at 0 mA (immanent)
system-failure at 24 mA
current output is designed in 4-wire

2 alarm thresholds: adjustable pre-alarm and main alarm

4 relay outputs:
isolated normally-open contacts (DC/AC 40V/100mA)
switching polarity may be set via the menu
upper and lower limits may be set for each relay channel

| | |
|---|---|
| RS485 interface: | with MODBUS protocol (customisable) |
| operating temperature: | -20°C ... 50°C ( sensor ) |
| sample gas temperature: | -20°C ... 50°C |
| protection system: | IP 54 housing and connector |
| mechanical connection: | 3/8“ female thread. SW 27 quick-release coupling included |
| electrical connection: | M12 - connector |
| sample measuring chamber | stainless steel 1.4404 (medium-contacted parts) |
| display: | FSTN dot matrix, monochrome, back-lit LCD touchscreen |
| dimensions: | 160 x 120 x 59 mm (h x b x t) - with coupling |
| weight: | ca. 600 g (without power supply) |
| housing material: | ABS plastic |
| languages: | German, English, French<br>set via the display |
| Industry 4.0: | ready |
| data logging: | SD card, 8 GB (ring storage) |
| power supply: | 230V AC / max 20VA (power supply included)<br>(device: 24 V DC/5W ± 5%) |
| accuracy : | ± 1K dtp (at 0....- 20°C $t_{pd}$)<br>± 2K dtp (at -20....-40°C $t_{pd}$)<br>± 3K dtp (at -40....-55°C $t_{pd}$) |

# 13. Modbus

The TPK series pressure dew-point monitor is equipped with a Modbus RTU interface. The following points describe the MODBUS slave functionality.

## 13.1. Supported MODBUS features

| Parameter | Value(s) |
|---|---|
| Device type | Slave |
| Baud rates | 9600, 19200, 38400*, 57600, 115200,230400, 460800, 921600 bps |
| MODBUS protocol | RTU over serial interface*, ASCII over serial interface |
| Data size | RTU-mode - 8*<br>ASCII mode - 7 bits |
| Stop bits | 1 |
| Parity | None*, even, odd |
| Slave adress range | 1….247 |

* The colored items are factory settings

The MODBUS communication over serial line settings and slave address can be configured over SENCON in our factory.

| Physical Parameter | MODBUS-Address |
|---|---|
| **Pressure Dewpoint / Frostpoint in °C** | 1600 |
| **System pressure in bar** | 576 |
| **ppm Volume concentration in ppm** | 1664 |
| **Absolute humidity in g/m³** | 1920 |
| **Temperature in °C** | 1280 (Temperature is in Kelvin) |
| **Relative humidity in %** | 1408 |

# 14. Data logging

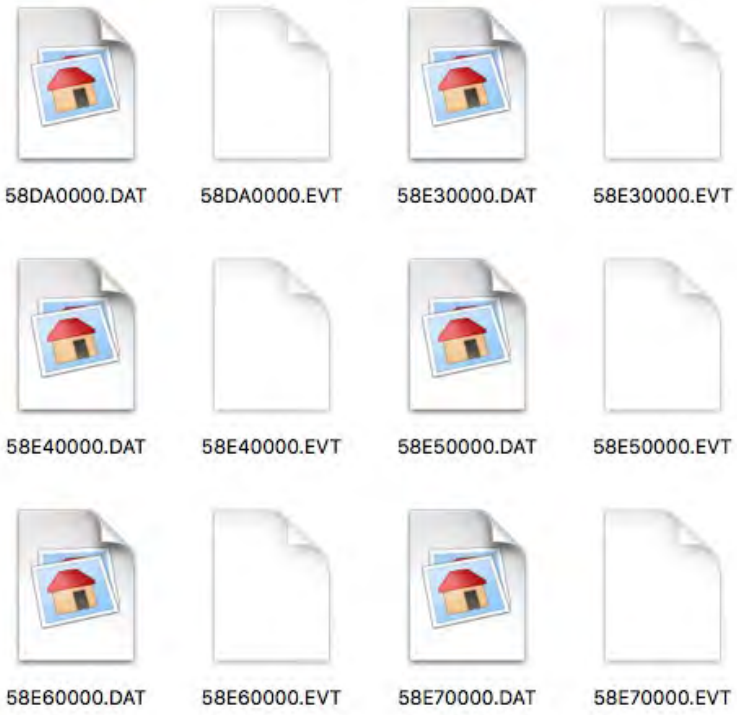
The dew point monitoring device series - TPK portable is designed with an internal data logging - and event logging - function.

The datas will be stored as *csv - files on a included SD-card

To transfer the datas from the SD-card onto your computer, please proceed as follows:

1. Please unplug the power supply, otherwise you will get an failure message at the display.
2. Press gently at the Button side of the device against the MICRO-SD-CARD
3. Remove carefully the storage card.
4. Now, you are able to read out the stored datas from the SD-card via a suitable card reader.

The display on your PC should look as follows:




The two different data formats stand for:

| Data format | Function |
|---|---|
| *.dat | Data memory |
| *.evt | Event memory |

Should your version of Excel not recognise the data format, please rename the file as a *csv file.

Excel will now be able to recognise the individual tables when importing the data and doing some conversion works.

**NOTE:**

For simple reading of the data files, we recommend our EXCEL-MACRO, which can be purchased optional.
This tool includes all conversion works and you will get all datas in clear table format.

Once you have imported the data into your PC, put the card back into the measuring device.

The procedure is as follows

1. Re-insert the memory card into the card slot with the gold contacts facing upwards.

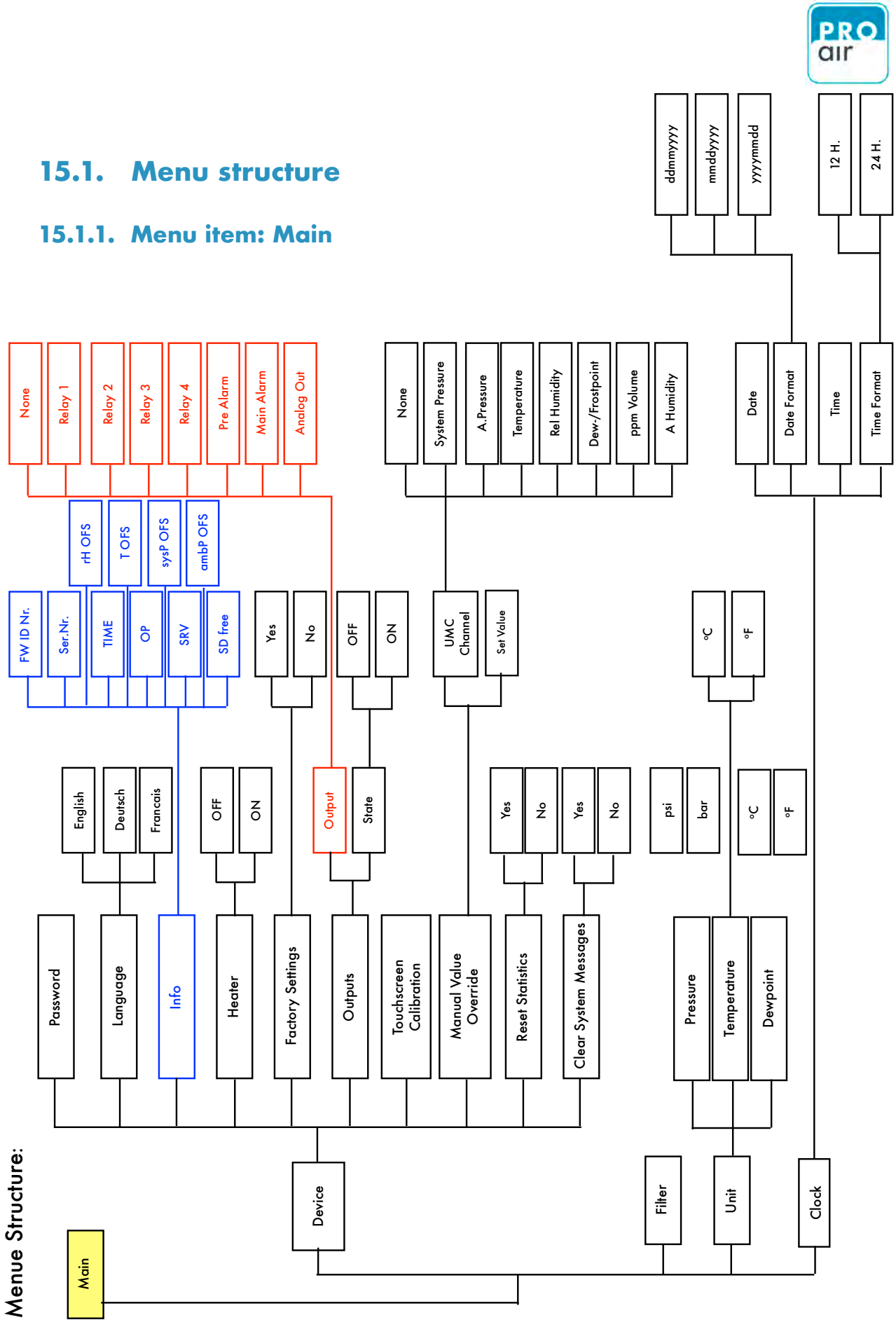
2. Gently press the micro SD card into the slot. You will clearly notice the card click into place.

3. Reconnect the TPK to power supply.

# 15. APPENDIX

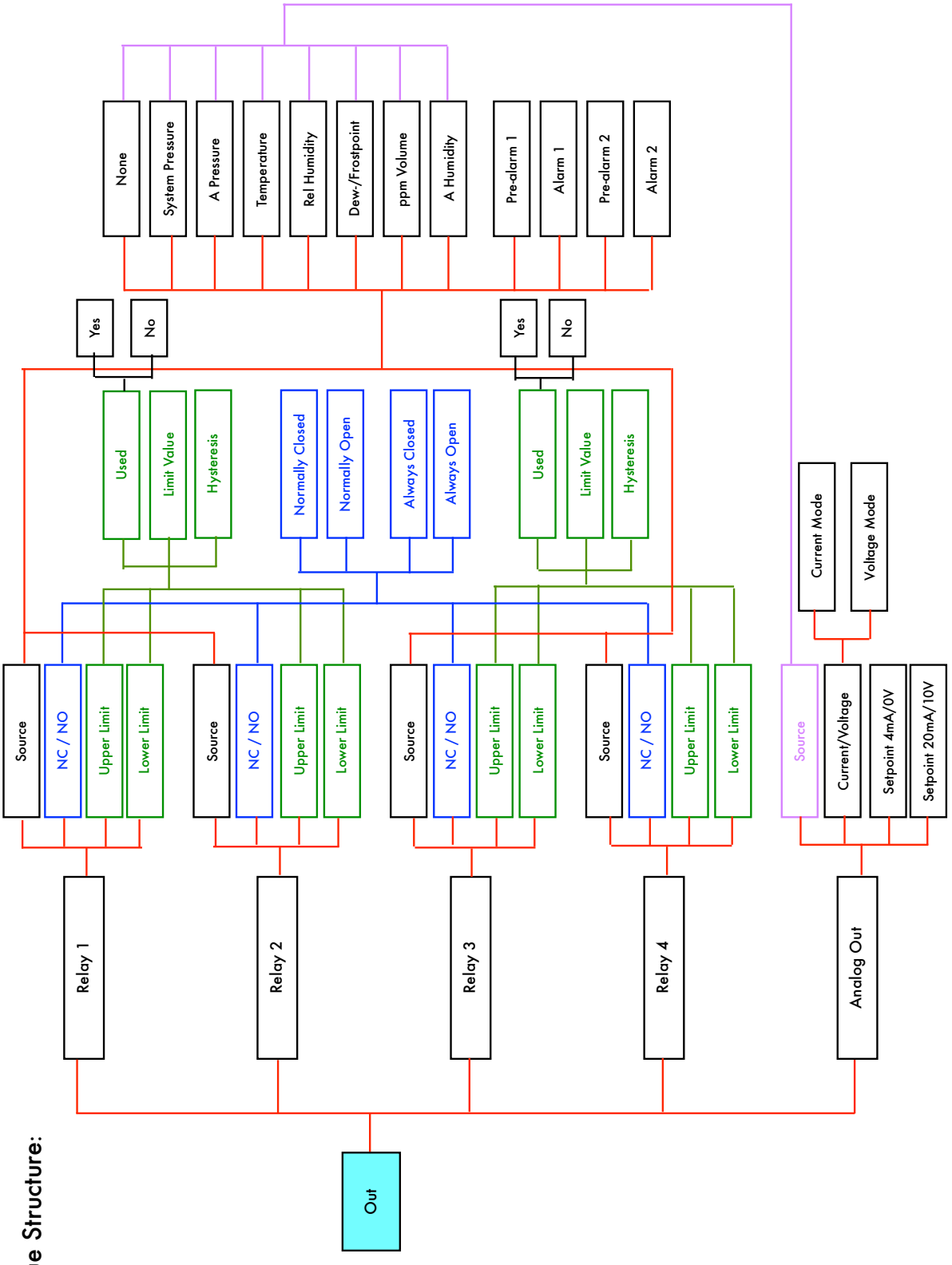
## 15.1. Menu structure

### 15.1.1. Menu item: Main



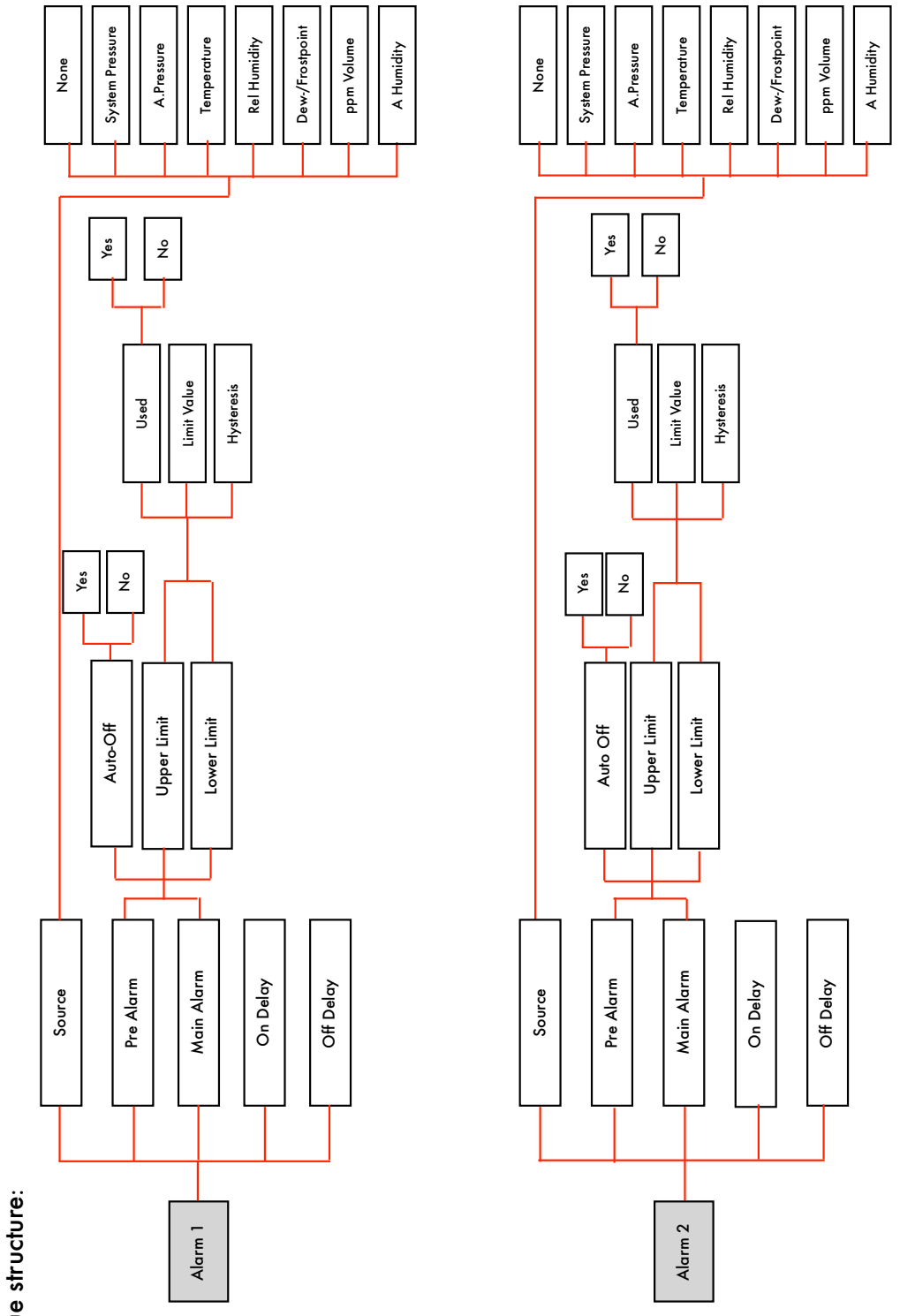
## 15.1.2. Menu item: Out

Menue Structure:



## 15.1.3. Menu item: Alarm

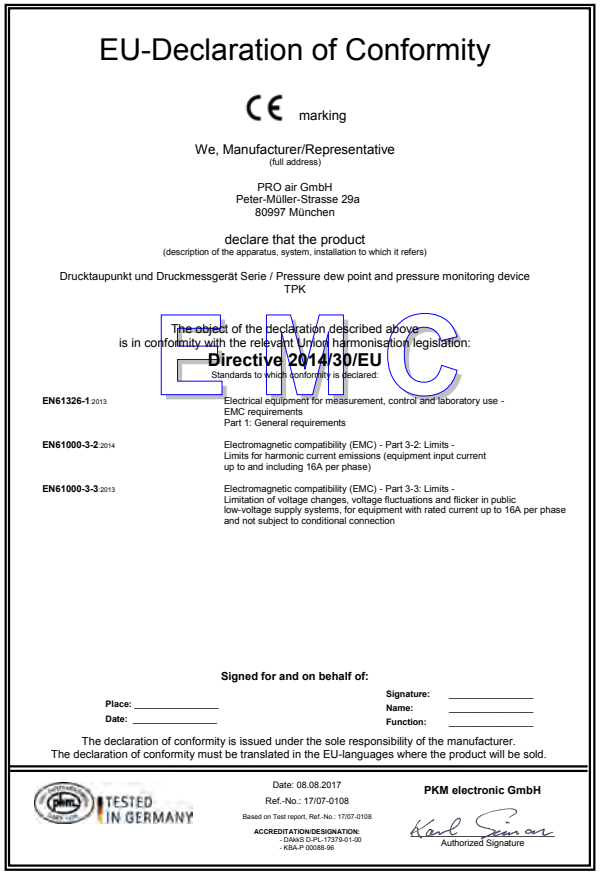
Menue structure:



## 15.2. System References and Messages

| Indication on display | Necessary action ? |
|---|---|
| EMERG | Contact the manufacturer |
| ALERT | Contact the manufacturer |
| CRITICAL | Contact the manufacturer |
| ERROR | Contact the manufacturer |
| WARNING | Contact the manufacturer |
| PREAlarm 1 | Pre-alarm 1 active - check compressed air system |
| PREAlarm 2 | Pre-alarm 2 active - check compressed air system |
| MAINAlarm 1 | Main-alarm 1 active - check compressed air system |
| MAINAlarm 2 | Main-alarm 2 active - check compressed air system |
| Sevice/maintenance fällig in ## Tagen | Reminder message for calibration. Appears 30 days before the due date. |
| Sevice/maintenance überfällig seit ## Tagen | Reminder message for calibration. Appears as of the calibration date. |
| SD card missing | Insert SD card into the SD card slot |
| SD card free space low | SD card memory almost full - clear memory |

## 15.3. EG-Conformance Details



EU-Declaration of Conformity

CE marking

We, Manufacturer/Representative
(full address)

PRO air GmbH
Peter-Müller-Strasse 29a
80997 München

declare that the product
(description of the apparatus, system, installation to which it refers)

Drucktaupunkt und Druckmessgerät Serie / Pressure dew point and pressure monitoring device
TPK

The object of the declaration described above
is in conformity with the relevant Union harmonisation legislation:
**Directive 2014/30/EU**
Standards to which conformity is declared:

EMC

| | |
|---|---|
| **EN61326-1**:2013 | Electrical equipment for measurement, control and laboratory use - EMC requirements Part 1: General requirements |
| **EN61000-3-2**:2014 | Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16A per phase) |
| **EN61000-3-3**:2013 | Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current up to 16A per phase and not subject to conditional connection |

**Signed for and on behalf of:**

Place: _____
Date: _____

Signature: _____
Name: _____
Function: _____

The declaration of conformity is issued under the sole responsibility of the manufacturer.
The declaration of conformity must be translated in the EU-languages where the product will be sold.

TESTED IN GERMANY

Date: 08.08.2017
Ref.-No.: 17/07-0108
Based on Test report, Ref.-No.: 17/07-0108
ACCREDITATION/DESIGNATION:
- DAkkS D-PL-17379-01-00
- KBA-P 00088-96

**PKM electronic GmbH**
Authorized Signature

The above-mentioned manufacturer shall keep the necessary conformity-assessment documentation ready for inspection.

Munich, 15/04/2017

Ralf Kotzock

## 15.4. Guarantee

The quality of our products is constantly monitored as part of our QM system, according to ISO 9001. The devices are thoroughly tested and configured prior to shipping. If you still have cause for complaint, we will rectify the defect free of charge within the warranty period of 24 months, provided that it may be proven that the defect is due to an error on our part.

Warranty services are provided on the condition that you inform us of the defect without delay and within the warranty period.

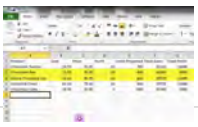
The warranty will be deemed void if the device is not used for its intended purpose, not installed according to these instructions or has been damaged due to improper treatment or interference with the device. Furthermore, travel costs, defective sensors and probes and calibration services are excluded from the warranty.

The warranty will also become void if the device has been opened or disassembled. The serial number on the product label must not be changed, damaged or removed.

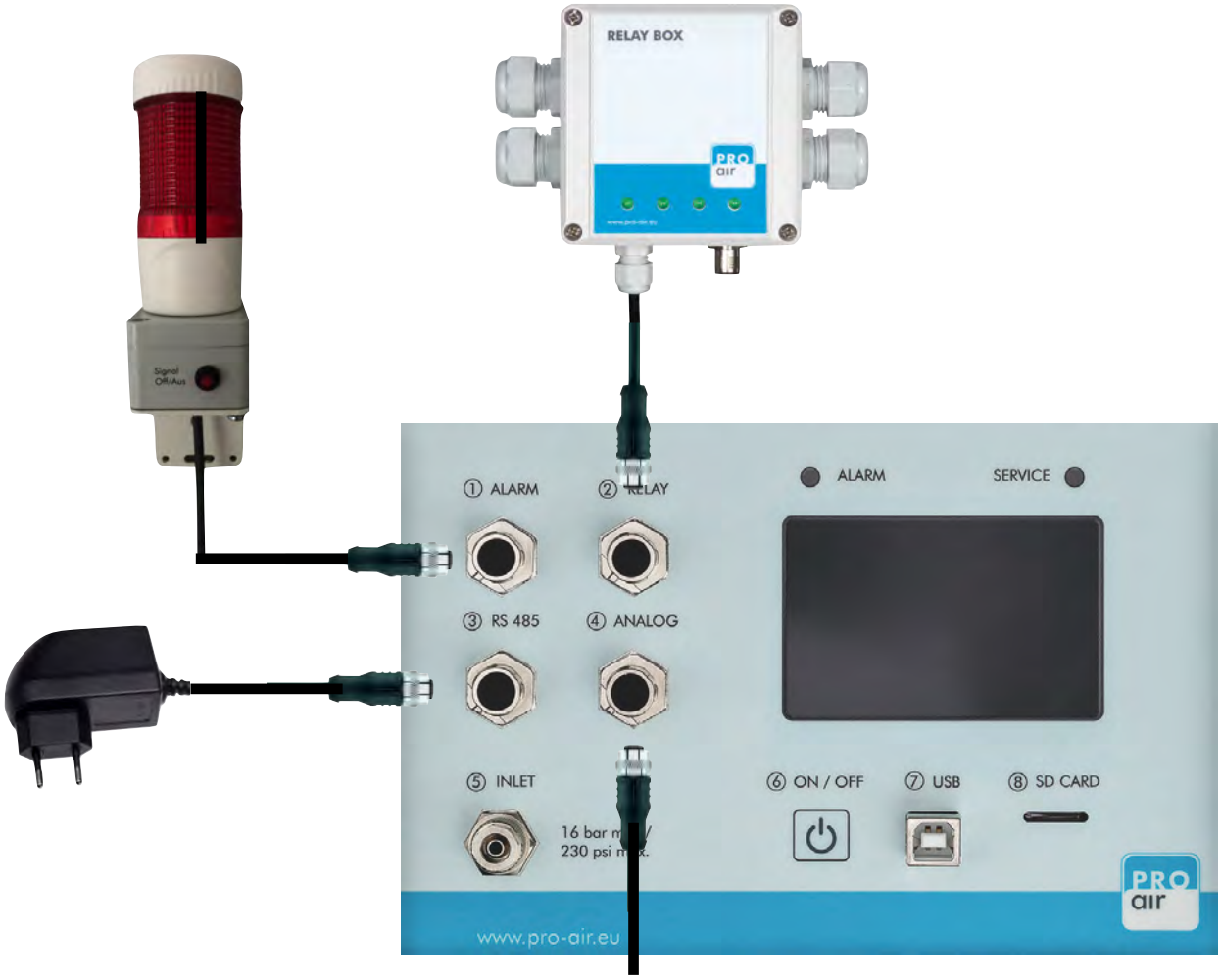
If necessary repairs are carried out in addition to the warranty services, these will be free of charge. However further services will be billed, including postage and packaging costs.

No further-reaching claims for liability or damages will be accepted, unless required by law.

## 15.5. Accessories

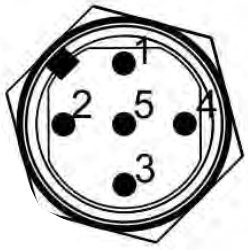
| Item | Description | |
|---|---|---|
| TPZSIG | **TPK-SIG II**<br>external signal with light and horn, incl. acknowledgement button and wall holder<br>10m connection cable with 5-pole M-12 plug, A-coded | |
| TPZREL | **External relay box model TPK-REL**<br>relay box including 4 relays, connection cable 3m with M12 plug and external voltage supply.<br>the unit model TPK has a potential free output 30 V. If it is necessary to activate external aggregates with a voltage supply of 220 V (for external lamp, electric motor activated ball valve) with the dew point meter, you must use the external relay box, which transfers the potential free output into the right voltage. | |
| TPZKA- | **Sensor/actuator cable M 12x1, 5 pin**<br>PUR halogen free black grey RAL 7021, straight M12, A-coded, | |
| - 3O | cable length: 3,0 m - straight, cable socket - open end | |
| - 3S | cable length: 3,0 m - straight, cable socket - plug | |
| - 10O | cable length: 10 m - straight, cable socket - open end | |
| - 10S | cable length: 10 m - straight, cable socket - plug | |
| TPZSTY | **Stylos pencil**<br>replacement pencil for touch displays | |
| TPZNT | **plug in power supply**<br>suitable for TPK - series<br>replacement power plug Inch. cable and M12 plug | |
| TPZMAK | **Excel Macro**<br>for simple reading for stored datas at the SD card of the datalogger |  |

### 15.5.1. Connecting optional accessories



### 15.5.2. PIN-Assignment for Connector

The PIN assignment for the connector is as follows:



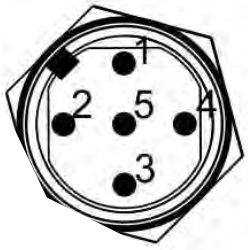

## Alarm Signal Output

| Pin | Colour | Alarm | Remarks |
|---|---|---|---|
| 1 | BN - brown | 15 V | Operating voltage 15 V max. 50 mA |
| 2 | WH - white | Light | NPN switching output, switches to earth |
| 3 | BU - blue | Earth | Earth |
| 4 | BK - black | Signal generator | NPN switching output, switches to earth |
| 5 | GN/YE green/yellow | Button | Input, button switches in respect to earth |

## Relay Output

| Pin | Colour | Alarm | Remarks |
|---|---|---|---|
| 1 | BN - brown | Relay 1 | Relay 1, normally open, switches to Rel-common |
| 2 | WH - white | Relay 2 | Relay 2, normally open, switches to Rel-common |
| 3 | BU - blue | Relay 3 | Relay 3, normally open, switches to Rel-common |
| 4 | BK - black | Relay 4 | Relay 4, normally open, switches to Rel-common |
| 5 | GN/YE green/yellow | Relay Common | Common connection for all 4 relays |

The relay contacts are designed for extra-low voltage. Circuit insulation voltage max. 40 V, Switching current max. 100 mA. The external relay box is necessary to control external loads.




## RS 485 Interface

| Pin | Colour | Alarm | Remarks |
|---|---|---|---|
| 1 | BN - brown | 24 V | Operating voltage connection +24 V DC |
| 2 | WH - white | RS_A | Signal line A |
| 3 | BU - blue | GND | Power supply earth |
| 4 | BK - black | RS_B | Signal line B |
| 5 | GN/YE green/yellow | GNB | Signal earth |

The RS 485 interface is not electrically isolated from the supply earth!

To supply power to the device, a mains adapter can be connected to Pin 1 (+) and Pin 2 (-)

## Analog Interface 4....20 MA / 0...10 V

| Pin | Colour | Alarm | Remarks |
|---|---|---|---|
| 1 | BN - brown | 24 V | Operating voltage connection +24 V DC |
| 2 | WH - white | RS_A | Voltage output 0...10 V |
| 3 | BU - blue | GND | Power supply earth |
| 4 | BK - black | RS_B | Current output 4...20 mA |
| 5 | GN/YE green/yellow | GNB | Signal earth |

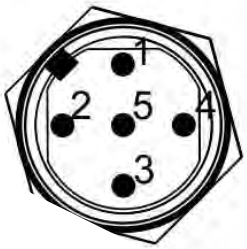
The analogue interface is not electrically isolated from the supply earth!

The current output is active, i.e. it delivers the signal current to earth and requires no external supply

The voltage output is also active, i.e. it delivers the signal voltage to earth.

To supply power to the device, a mains adapter can be connected to Pin 1 (+) and Pin 3 (-)

### 15.5.3. Voltage supply from an external source of supply




It is possible to supply the device with an external voltage source. This is usually the case in applications where it is possible to obtain the supply voltage from a separate supply unit (e.g. enclosure).

The nominal value of the supply voltage is 24 V DC. The TPK should be supplied with a stabilised, short-circuit protected and surge-protected voltage source.

The power source of the pressure transducer must be from an energy-limited source (10 A max./30 V max.) and be safely separated from the mains. See EN 61010-1, paragraph 9.4.

| Pin | Colour | Alarm | Remarks |
|---|---|---|---|
| 1 | BN - brown | + | Operating voltage connection +24 V DC |
| 3 | BU - blue | GND | Earth |

NOTE:

If the device is connected to an external voltage supply, the above-mentioned points must be observed and checked.

Incorrect connection may damage the device.

# 16.0. Setting Examples

## 16.1. Setting example: Dew Point Control

| | | | |
|---|---|---|---|
| Relay 1: | Source: | Dew Point | |
| | Upper Limit: | Used | Yes |
| | Limit Value: | 15,0 | |
| | Hysteresis: | 0,00 | |
| | Lower Limit: | Used | No |
| | Limit Value: | — | |
| | Hysteresis: | — | |
| Alarm 1: | Source: | Dew Point | |
| | Pre Alarm: | Auto Alarm | Out |
| | Upper Limit: | Used | Yes |
| | Limit Value: | 12,0 | |
| | Hysteresis: | 0,00 | |
| | Lower Limit:: | Used | No |
| | Limit Value | - - - | |
| | Hysteresis: | - - - | |
| | Main Alarm: | Auto Alarm | Out |
| | Upper Limit: | Used | Yes |
| | Limit Value: | 15,0 | |
| | Hysteresis: | 0,00 | |
| | Grenzwert unten: | Used | No |
| | Limit Value: | —— | |
| | Hysteresis: | - - | |

## 16.2. Setting example: Minimum pressure control

| | | | |
|---|---|---|---|
| Relay 1: | Source | System Pressure | |
| | Upper Limit: | Used | No |
| | Limit Value: | - - - | |
| | Hysteresis: | - - - | |
| | Lower Limit: | Used | Yes |
| | Limit Value: | 7,50 | |
| | Hysteresis: | 0,00 | |
| Alarm 1: | Source | System Pressure | |
| | Pre Alarm: | Auto Alarm | Out |
| | Upper Limit: | Used | No |
| | Limit Value: | - - - | |
| | Hysteresis: | - - - | |
| | Lower Limit: | Used | No |
| | Limit Value: | - - - | |
| | Hysteresis: | - - - | |
| | Main Alarm: | Auto Alarm | Out |
| | Upper Limit: | Used | No |
| | Limit Value: | - - - | |
| | Hysteresis: | - - - | |
| | Lower Limit: | Used | Yes |
| | Limit Value: | 7,50 | |
| | Hysteresis: | 0,00 | |