EN- English

Instruction manual

Leak detector with camera

testo Sensor LD pro / pro +/ pro ultra

1 Table of Content

2 Safety instructions

About this document

- Read this documentation carefully and familiarize yourself with the product before using it. Pay particular attention to the safety and warning instructions to prevent injury and product damage.
- Keep this documentation handy for future reference.
- Share this documentation with future users of the product.

2.1 General safety instruction

- The product is to be used only in accordance with the intended purpose and within the parameters specified in the technical data. Do not use force for operation.
- Never measure with the device at or near live/energized parts!
- During leak detection on electrical systems, please maintain a sufficient safety distance to avoid dangerous electric shocks!
- Avoid any direct contact with hot and/or rotating parts.
- Always switch on the device before putting on the headphones! At high signal levels (bar graph headphones in the red area), the volume can be correspondingly large. The sensitivity setting can be used to reduce the volume.
- Observe the prescribed storage and operating temperatures.
- In case of improper handling or violence, the warranty claims are lost.
- Interventions on the device of any kind, unless they correspond to the intended and described procedures, lead to the expiration of warranty and to the disclaimer.
- The device is intended solely for the described purpose.

2.2 Using of class 2 laser

- Never point the laser directly towards persons!
- Absolutely avoid a direct irradiation of the eyes of humans and animals!
- If a person‘s eyes are exposed to class 2 laser radiation, they should shut their eyes and immediately move away from the beam
- Do not stare into the beam
- Laser module: corresponds to DIN EN 60825-1: 2014 Class 2 (<1mW / 635nm)

- Laser output point trumpet and parabolic mirror:

3 Service and maintenance

Service and maintenance work must only be carried out by authorized personnel.

4 Environmental protection

- Disposal of defective batteries / dead batteries according to the valid legal regulations.
- After the end of the useful life, take the product to the separate collection for electrical and electronic equipment (observe local regulations) or return the product to Testo Sensor GmbH for disposal.

Testo Sensor GmbH makes no warranty as to its suitability for any particular purpose and assumes no liability for any errors contained in this manual. Nor for consequential damages in connection with the delivery, performance or use of this device.

The following accumulator is contained in this electrical appliance

Battery type	Chemical system
Akkumulator	LiIon 2S1P

Information on the safe removal of the batteries or accumulators

- Warning: Make sure that the battery is completely empty.
- Removing the battery

Removing the battery cover

Disconnecting the connector

Carefully pull out the battery

- Carefully remove the accumulator
- The accumulator and the appliance can now be disposed of separately

5 Intended use

The testo Sensor LD pro, - pro +, - pro ultra is a leak detector for quick and reliable leak detection in/on compressed air systems.
The leak detector evaluates the ultrasonic waves generated by the leakage based on distance and pressure.
It is solely designed and constructed for the intended use described here and may only be used for this purpose.
The user must verify that the device is suitable for the intended use. The technical data listed in this datasheet are binding.
Improper handling or operation outside the technical specifications is not permitted. Claims of any kind for damages arising from improper use are excluded.

6 Technical data

Dimensions hand-held housing	263 x 96 x 280 mm (with preamp module and acoustic trumpet)
Weight	0.55 kg with preamp module and acoustic trumpet, complete set in case approx. 3.0 kg
Operating frequency	40 kHz (+/-2 kHz)
Power supply	Internal 7.2 V lithium-ion battery
Operating time	> 9 h (continuous operation)
Charging	ext. battery charger (included in scope of delivery)
Charging time	max.4 h
Laser	Wavelength 630–660nm, output power < 1mW (laser class 2)
Connections	3.5 mm stereo jack for headset, Power supply socket for connecting an external charger USB connection
Colour screen	3.5" touch panel TFT transmissive
Interface	USB for data export/import, SW update, etc.
Data logger	16GB memory card storage (micro SD class 4)
Application Area	Indoor use
Operating temperaturer	-5 °C bis +50 °C
Storage temperature	-20 °C to +60 °C
Altitude	Up to 4000m above sea level
Max. Humidity	<95% rH, without condensation
Pollution degree	2
Protection class	IP20

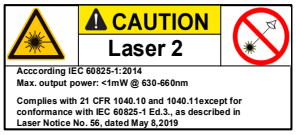
7 Identification

7.1 Laser warning label

7.2 Label positions

7.2.1 testo Sensor LD pro (for Standard & Laser distance module)

7.2.2 Parabolic mirror



8 Device components and controls

8.1 testo Sensor LD pro (basic device)

3.5mm jack for the headphone

9 Overview and application description of the different sensor types

Acoustic trumpet (standard tool)

The acoustic trumpet bundles incident ultrasonic waves, thereby extending the range of the device. This behaviour makes it ideal for medium distances.
The leakage can be heard from large distances, for precise detection, the user must approach the leakage and consistently follow the "loudest" point. Individual compressed air components are then checked for precise detection.
Quantification distance (distance) → 1 – 6 m

Use of acoustic trumpet:

- Average distance to pipe/component 0.2 - 6 m
- Low interfering noise
- Leakage freely accessible
- Use at distances of up to 6 metres if no parabolic mirror available

Straightening tube

The straightening tube permits only very few ultrasonic waves to pass in the direction of the ultrasonic transducer, allowing leakages to be located very precisely.

For this reason, the use of the straightening tube is recommended for small distances, for the precise detection of the corresponding leakage.

Quantification distance: 0…0,2 m

Use of focus tube:

- Short distance to pipe/component 0.05 m
- Pipe/component freely accessible
- Pipes and components to be inspected are very close together
- Medium to high noise
- Use when no gooseneck available

Gooseneck

The gooseneck should be used if the pipes and components to be inspected are physically very close. In addition, the shape of the gooseneck can be flexibly adapted to easily inspect hard-to-reach pipes and components.

The sensitivity of the gooseneck has been reduced to dampen noise. This makes it ideal for target-ed, local testing of compressed air components at high noise levels, for example in systems using pneumatic cylinders and in compressed air distribution cabinets

Quantification distance → 0 …0.05m

Use of gooseneck:

- Short distance to pipe/component 0.05 m
- Leakage not freely accessible
- Medium to high ultrasonic noise
- Pipes and components to be inspected are very close together

Parabolic mirror

The parabolic mirror bundles horizontally incident ultrasound at its focal point where the ultrasonic transducer is located. On the one hand, this leads to a considerable amplification of the measured ultrasound (high range) and, on the other hand, to a very precise directional behaviour, since ultra-sound that does not incident horizontally is reflected by the reflector.

The combination of these two characteristics enables the parabolic mirror to precisely locate leaks at large distances.

Quantification distance → 3 – 12 m

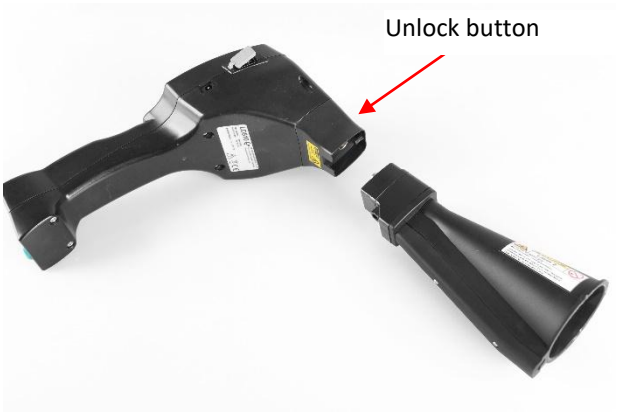
Use of parabolic mirror:

- Large distance to pipe/components 3 – 15 m
- Interfering noise
- Leakage not freely accessible (behind a fence)
- Near leaks (superimposition))

9.1 Assembly with acoustic trumpet

The acoustic trumpet allows acoustic amplification by bundling the sound waves and specifies the location of the leak. Due to the special construction of the integrated laser pointer is still usable. The camera is integrated on the bottom of the acoustic trumpet and is electrically connected to the preamplifier module via the jack plug.
Assembling is done by plugging the individual components until easy locking audible (plug in to the stop).
The components are removed in the reverse order; for unlocking the preamplifier module, the release button must also be pressed.

Standard



with laser distance module

9.2 Assembly with focus tube with focus tip

The focus tube with focus tip is used to detect very small leaks, to accurately locate them.
Just like the acoustic trumpet, the tube can be plugged into the preamplifier with ultrasonic receiver.
The use of the camera is **no longer** possible.

The components are removed in the reverse order; for unlocking the preamplifier module, the release button must also be pressed.

9.3 Assembly with Gosseneck

Due to its flexibility, the gooseneck tool is used for punctual measurements in hard-to-reach areas.
Connection to the Sensor LD pro is via the supplied spiral cable, see Figure 10.

It is **no longe**r possible to use the camera.

To remove the component, remove the connection cable by pressing the release button on both sides and pulling off the cable.

9.4 Assembly with Parabolic mirror

The parabolic mirror is used for measurements at greater distances as well as for high requirements regarding selectivity and location of leakage positions.
Connection to the Sensor LD pro is via the supplied spiral cable, see Figure 11.

To remove the component, remove the connection cable by pressing the release button on both sides and pulling off the cable.

Note: To use the parabolic mirror and gooseneck, these components must be activated in the device during initial commissioning in order to save the component-specific adjustment parameters. If this has not already been done ex-works, the data for this is supplied via USB stick. For the activation (parameter import), see chapter 11 Operation here in Sub chapter "Export / Import".“ The parabolic reflector 2.0 and the gooseneck 2.0 are automatically recognized, so you do not need to import it.

10 Start-up / Application

Please first observe the safety instructions in Chapter 2

10.1 Switch on

Hold down the power button for about 1 second, the power will turn on, and a start-up sequence will appear on the display. Pressing the button again switches the device off again.

On-Off button, see device components and controls

10.2 Headphone Volume Up / Volume Down

The volume up and volume down buttons in the headset can be increased or decreased in 16 steps. Continuously pressing the button automatically increases / decreases the value.

Volume up / down buttons for headphone volume, see device components and controls

Please make sure the headphone level is <50% before putting on the headphones.

10.3 Sensitivity level

Ultrasound levels can be understood as a "loudness" of the leakage.

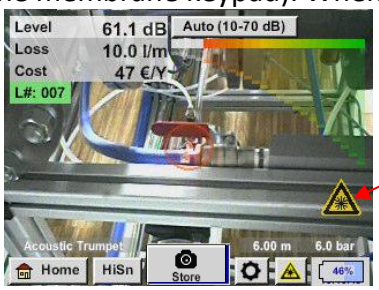
With the “Sensitivity" button, the sensitivity of the device can be adjusted to the environment, which strongly influences the acoustic behavior of the device and increases or decreases the valid value range. A reduction in sensitivity reduces the range of leakage reading but the "responding area", indicated by the circle in the display, also gets smaller, which considerably simplifies detection.

Sensitivity levels
0 – 60 dB = Highest sensitivity level of the device (use with small leaks and no noise), selection with the "***HiSn***" button or the "***Sensitivity***" button
10 – 70 dB = Leakages and noises get "less noisy", the range is reduced.
20 – 80 dB = Leakages and noises get "less noisy", the range is reduced.
30 – 90 dB = Leakages and noises get "less noisy", the range is reduced.
40 – 100 dB = Most insensitive stage (large leaks, many noises → for heavy-duty application)
50 – 110 dB = leakage and noise become "quieter", the range is reduced.
60 – 120 dB = least sensitive level (large leakages, a lot of noise for a heavy-duty application).
Whether the levels 50 - 110 / 60 - 120 dB are available depends on whether the testo Sensor LD pro and the sensor are intelligent.

By default, the device is set to the auto function and will automatically switch between levels (10 – 70 dB to 40 – 100 dB).

10.4 Laser On/Off

The laser pointer can only be switched on or off via the laser on / off button  in the display (not via the membrane keypad). When switched on, the display shows a laser warning symbol.



Laser „On“ Icon

Please note the warnings for laser operation!
Avoid direct / indirect (via reflexion) irradiation of the eyes in humans and animals!

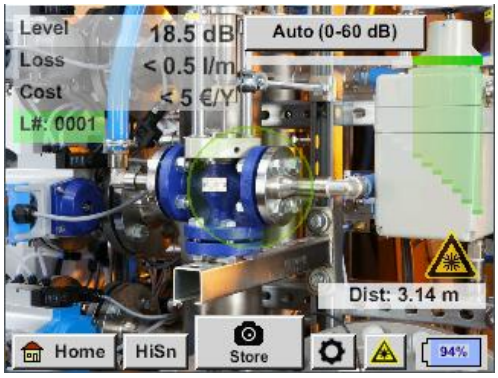
10.4.1 Automatic distance measurement

The integrated distance measurement module is optional for the **testo Sensor LD pro** and included in the **testo Sensor LD pro +** and **pro ultra**. This is then integrated in the sound funnel.

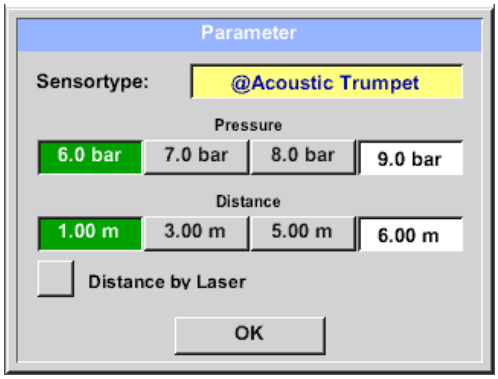
The distance measurement option is automatically recognised by SW and can be used.

Description of functionality:

- The laser needs to be started to activate the distance measurement as it is done with all other tools.
- The device will then show the measured distance on the display. In this case, it is 3,14 meters or 124".



- To use the measured distance for the cost quantification, "Distance by Laser" must be activated under "Parameters.
  Note: Before "Distance by Laser" can be activated, the laser must be turned on. Otherwise, the icon will blink in yellow and red.



Note: For the trumpet, the valid distance range is 1 – 6 meters or 40" – 236".

- The device will actualize the distance automatically now. The actual measured distance is shown in the grey bar “Dist:”. The used distance for the cost quantification is shown in the small bar below next to the pressure's left side.

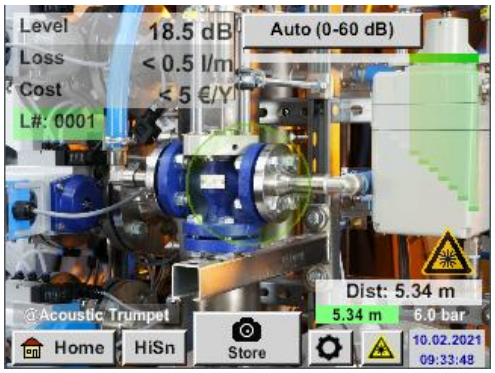
State	Actual distance measurement	Used distance parameter internally:	The certainty that distance is measured correctly
Best case	White	Green	High
Check plausibility of measurement	Yellow	Yellow	Medium
Move into the valid distance range	White	Yellow & showing 1 m or 6 meters	High, but: Out of range: Distance < 1 m Distance > 6 m
Target on another close surface to the leak until "best case" is reached and the measurement is robust	Red	Empty	Low: measuring on a black surface?

Attention: On black surfaces or in very bright environments measuring the distance can be problematic. Thus, it is still possible to enter manual distances. “Distance by Laser” must be disabled, and then manual distances can be entered.

States:

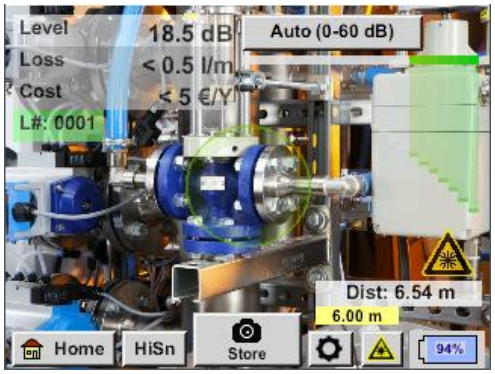
Best-case: Used distance parameter internally:

“Dist:” is green, the distance module's measurement is robust, and the used distance is within the valid range.



Out of range:

Distance measurement = robust, but out of range! Move within the valid distance range.



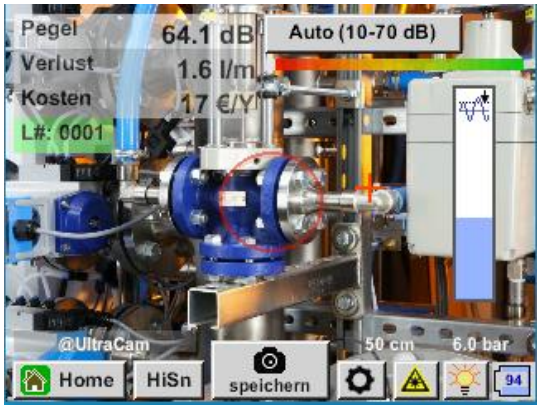
10.4.2 testo Sensor LD pro ultra

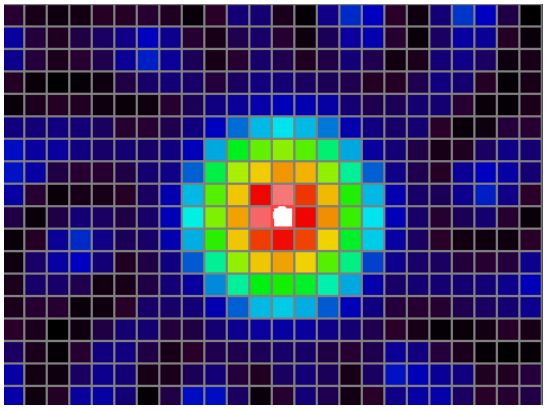
Note on use:

- The openings of the digital microphones must not be cleaned with a compressed air gun.
- The openings of the digital microphones must not be cleaned with liquids.
- The LD pro ultra must generally be protected from dust and liquids.
- The LD pro ultra should be transported and stored in its clean case if possible.

Optical leak detection

The device uses 30 digital mems, a camera, an FPGA and a processor to calculate the ultrasound map. The algorithm used is called beamforming and is based on the delay and sum function. Each pixel of the ultrasound map is quickly calculated and transmitted to the device.



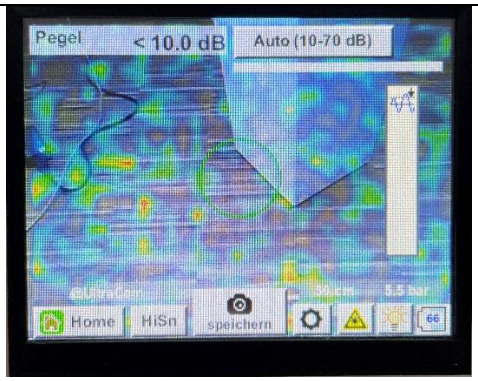
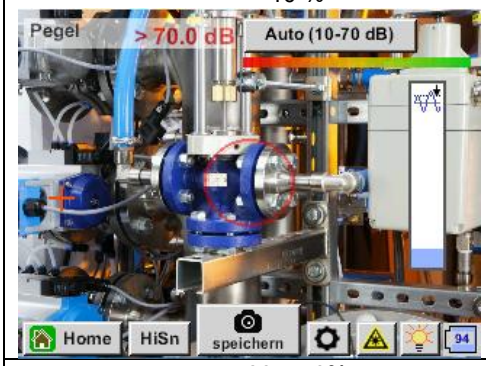
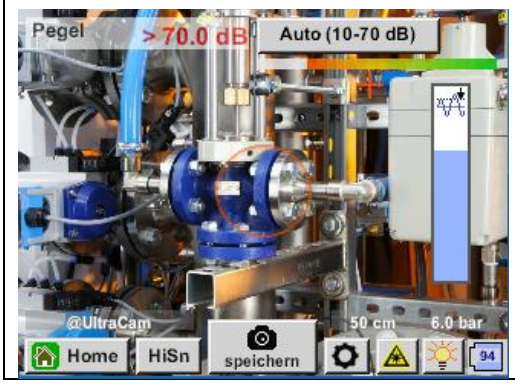


The threshold (slider on the right edge) defines the limit from which the pixels in the image shown on the screen are colored, based on the measured level in the ultrasound map.

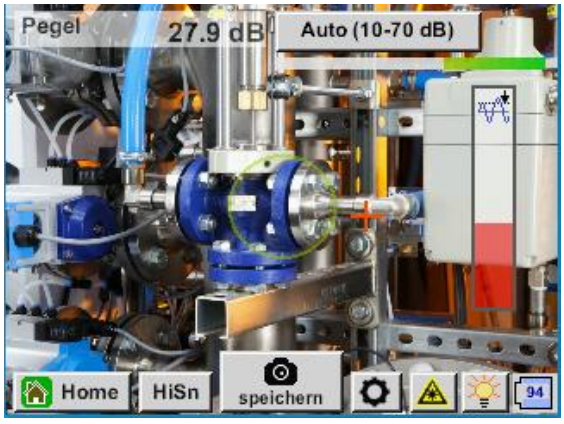
The selected color tone of the coloring depends directly on the intensity of the ultrasound for the corresponding pixel and is controlled by the device accordingly.

- No coloring = maximum level <= Threshold
- Blue = little ultrasound
- Green → Yellow → Orange → Red
- White = maximum ultrasound

Threshold	Environment	Meaning
0 %	Find smallest leaks in environments without strong ultrasonic sources	If there is no dominant source, a nebula will be shown on the screen.

Threshold	Environment	Meaning
		
10 % 	**Recommended value!**	If there is no ultrasound source, the screen will not be colored
30 – 70% 	If strong ultrasonic sources are present –	so the sensitivity can be reduced that the colored area becomes none.

If the threshold has been set very high and is significantly above the existing level in the ultrasound card, so that the image is not colored on the screen, the slider for setting the threshold flashes red and a reduction is recommended.



How to find leaks?

1. Start from a distance and point the device in a direction where pressurized air lines are located.
2. Find a hotspot (headphones & screen).
3. Come closer when you hear something! This is because the sensitivity of hearing is higher than imaging.
4. Once the measured ultrasound of the 30 digital mems is sufficiently high, the device will display the source on the screen
5. Save the leakage and document how to fix the leakage and where it is located.

Recommended distance for ultrasound imaging

- 0.3 - 5 meters (low ultrasound level environments)
- 0.3 - 2 meters (challenging environments)
- 0,1 meter for small leaks

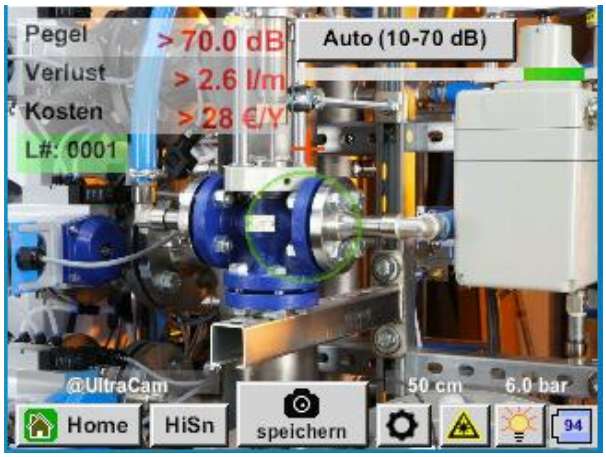
Loss and cost - first indicated

- Leak is in the center of the circle of leak detection
- Click on the left side of the screen

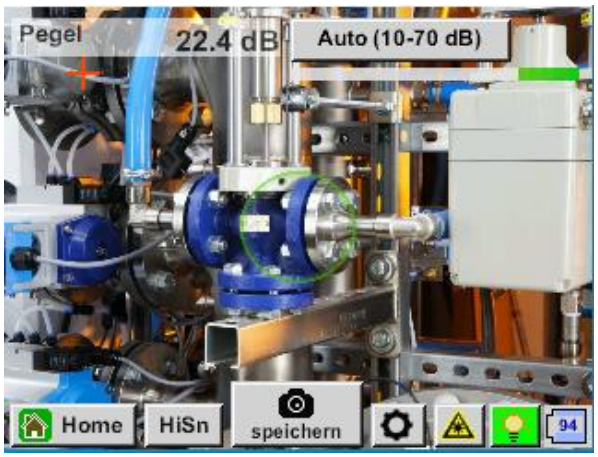
11 LED's and an ambient light sensor

To improve the quality of the captured image, an ambient light sensor measures the amount of light. If there is too little light, the LEDs provide better illumination.

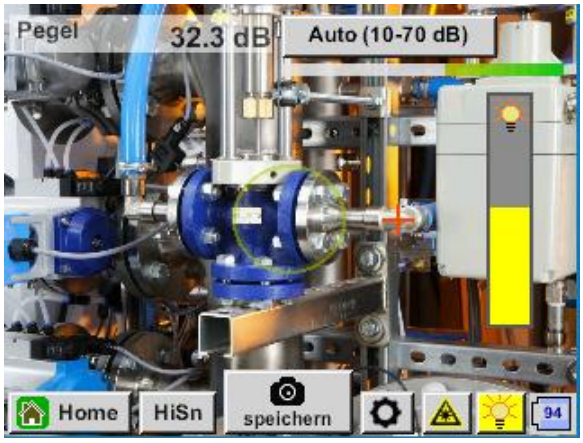
Intelligent illumination off:



Intelligent illumination: automatic



Intelligent illumination: manual



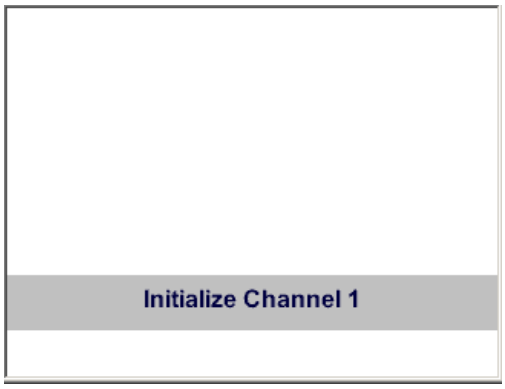
12 Operation

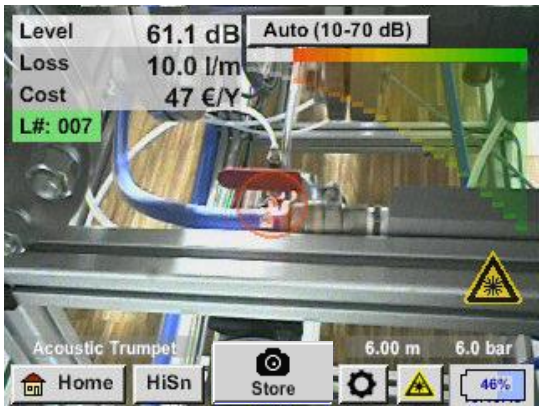
The operation is largely self-explanatory and menu-driven via the touch panel.
The selection of the respective menu items occurs via short "tapping" with the finger or a soft round pen.

<u>Attention</u>: Please use no pens or other objects with sharp edges!
The foil can be damaged!

Inputs or changes can be made with all white deposit fields

12.1 Initialization

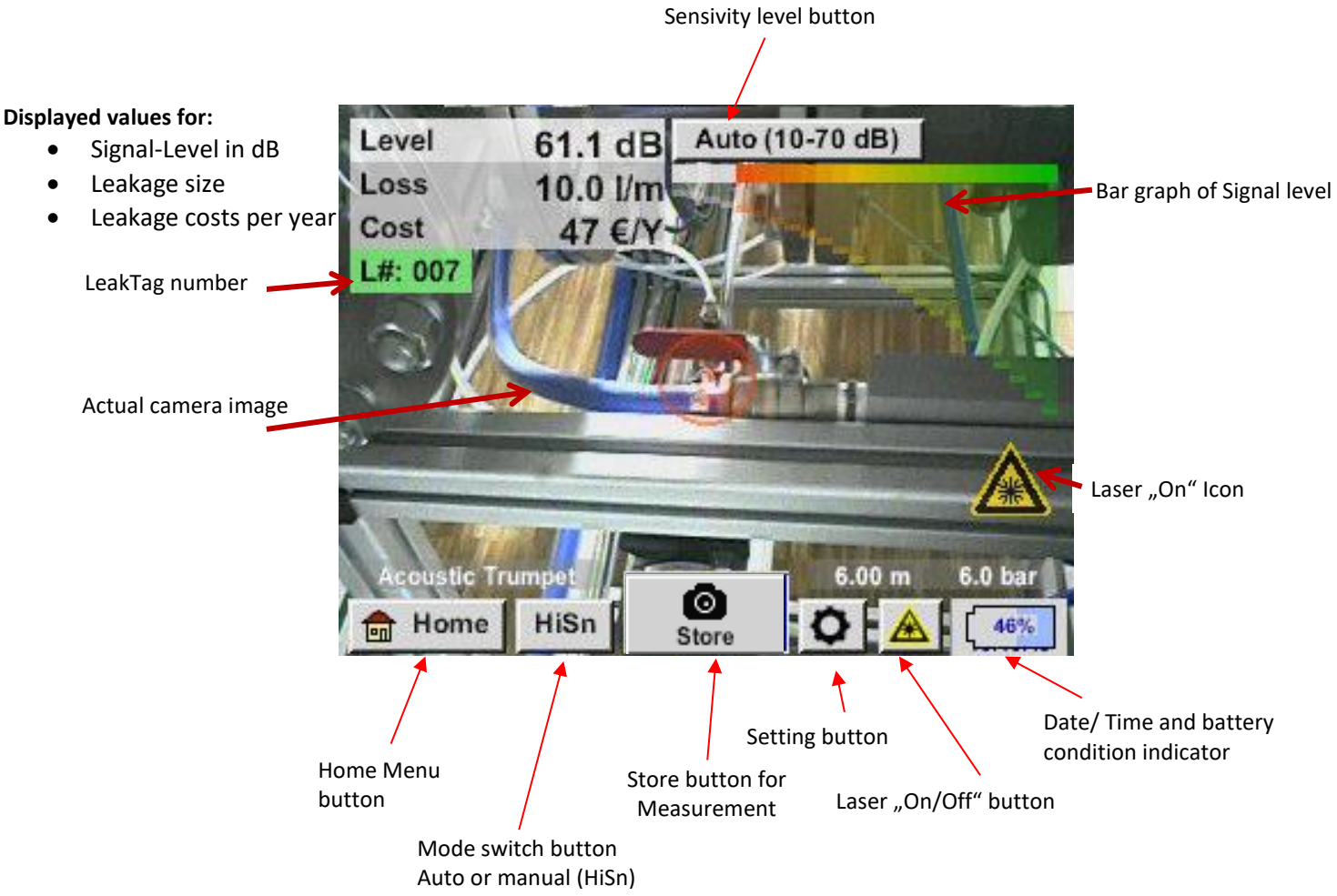




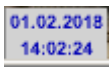
After switching on the device, the initialization takes place and then switch to leakage display.

12.2 Screen Leckage

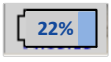
The following picture shows and describes the display elements.



Date / Time:



Battery condition indicator

Battery condition: 

Power supply connected and battery is charging: 

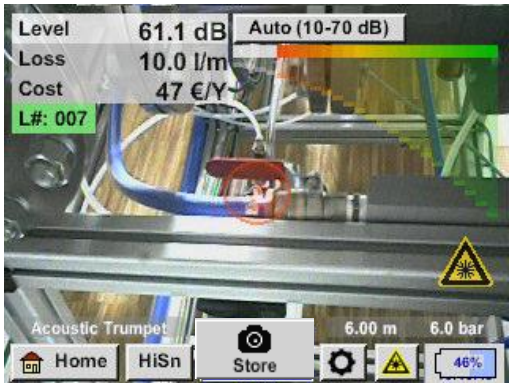
12.3 Home menu

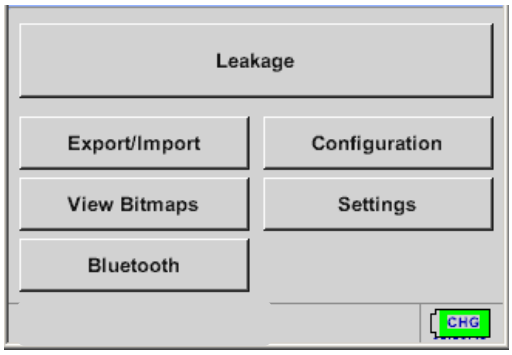
The operation is largely self-explanatory and menu-driven via the touch panel.
The selection of the respective menu items occurs via short "tapping" with the finger or a soft round pen.

<u>Attention</u>: Please use no pens or other objects with sharp edges!
The foil can be damaged!

Before the leakage search is started, the device must be configured. The user can access the menu by clicking the "Home" button. The following figure shows the Home "Menu".

Home 



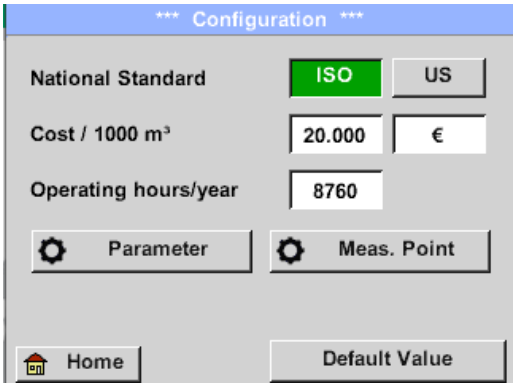


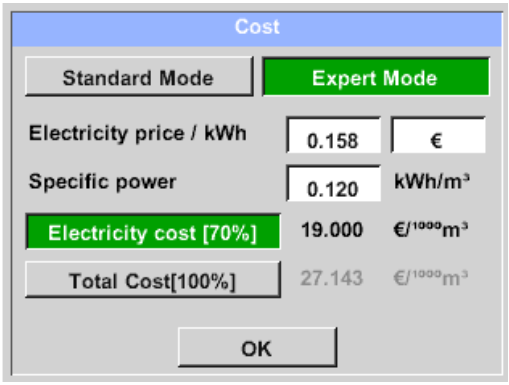
With the button ***„Home“*** you access the basic menu of the device.

Return to measurement by pressing ***„Leakage“*** button.

12.3.1 Configuration

Home ➔ Configuration





In the configuration settings the unit system can be selected, and the required parameters entered, this to calculate the leakage costs per year.

➔ Selection of ISO or US unit system

➔ Call up the text field "Costs/ 1000 m³" to define the costs. There are 2 variants to choose from:

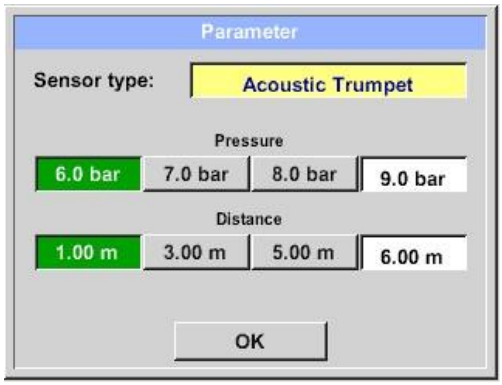
- **Standard:** Cost per 1000 volume units
  Enter cost and the currency
  Default value: 19 € / 1000 m³ or 0.538€/1000cf
- **Expert:** Here you can see in detail the electricity
  - costs / KWh and define the specific power of the system. For the specific power 3 pre-defined asset values are created and a user defined input field for the individual input is made available.

➔ Enter working hours per year

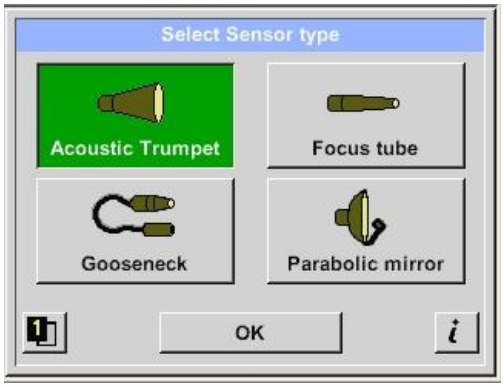
Home ➔ Configuration ➔ Parameter

Depending on the selected sensor type, there are up to 4 pre-defined pressure and distance values that can be selected directly as well as two fields (white) in which values for the pressure and the distance are freely selected.

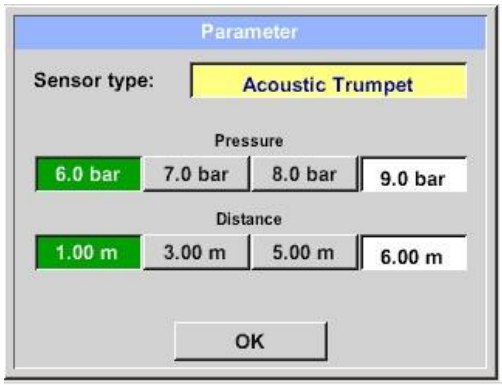
For the **different sensor types** different **minimum and maximum distances** from the testo Sensor LD pro to the leakage are defined to calculate valid leakage loss and costs per year.
These distances must be strictly adhered too.



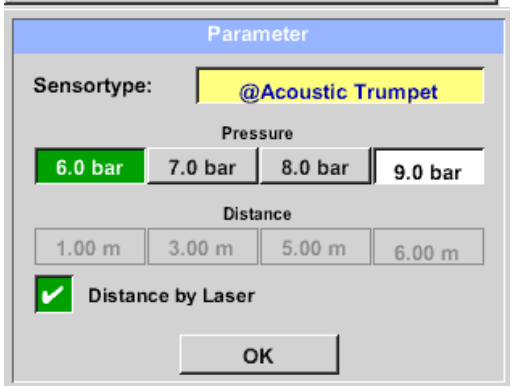
➔ Sensor type
Selection of the sensor type according to the application and ambient conditions, see therefor chapter 9.



Select sensor type and confirm choice by pressing “OK”



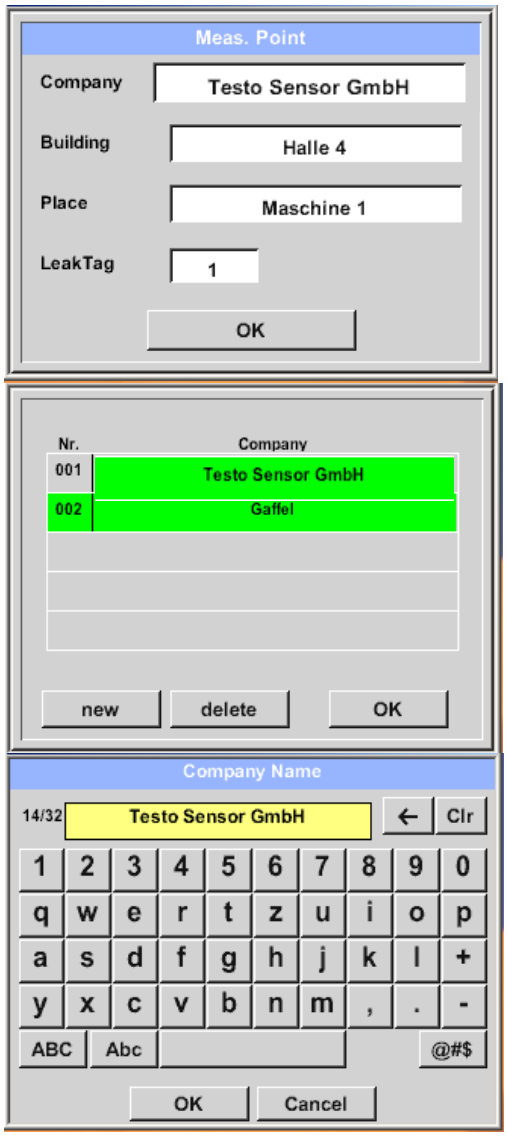
➔ Pressure (line pressure in bar)
The **pressure** can be set variably between 1 - 10 bar.
➔ Distance (distance to leakage in m)
The min. or max. distance depends on the sensor type used.



When using the acoustic trumpet with laser distance measurement, the measured distance can be taken over directly, please activate "Distance by laser".

Note: For the use of the "Laser distance measurement", the laser must also be activated, see chapter 10.4.
In case of a deactivated laser the icon **"Laser?"** flashes alternately yellow and red.

Home ➔ Configuration ➔ Meas.Point



The measuring point is stored for each leakage in its journal data. These can be seen later in the leakage report in the software.

➔ LeakTag: will be automatically increased by one after storing a measurement.

All information about the measuring point can be changed by selecting the corresponding text field or the stored measuring points can be loaded from the internal database.

Then a menu opens with the available / saved entries. When selecting a saved value, select it (highlighted in green) and then take over with ***„OK“***.

If a new entry is necessary, the input menu opens after pressing the ***„new“*** button.

Input is accepted via ***„OK“***.

This procedure is analogous to enter the information for company, building and location.

Using the ***„delete“*** button, individual entries can be deleted too.

12.3.1.1 Sensortype selection (Measuring tool)

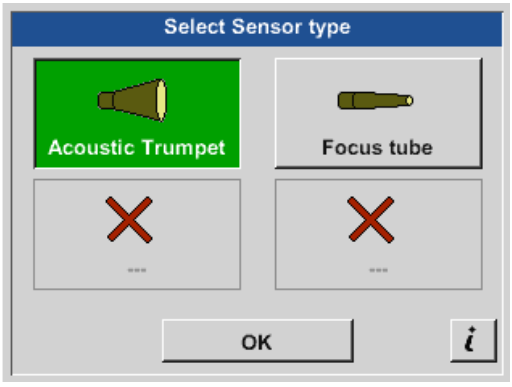
To simplify the leak detection for the user, various tools for different measuring conditions have been developed .
The distances mentioned for quantifying the leakage always refer to the front of the respective tool.

12.3.1.1.1 Intelligentes Tool

From FW 3.02, the connected measuring tools are recognised automatically. The prerequisite is that the tools support this.
When using older sensor types (measurement tools) without detection, the corresponding tool must be selected at startup, see chapter 11.3.1.1.2 Selecting the sensor type manually.

12.3.1.1.2 Sensortyp selection manual

After starting the device with a tool without automatic detection, the corresponding sensor type must be selected and confirmed with **"OK**".



If the parabolic mirror / gooseneck has been ordered separately, the application data for the devices must be loaded into the testo Sensor LD pro first. Data is supplied via USB stick.

Import:
Home →Export/Import → Import new Tool → Parabolic Mirror / Gooseneck Serial Number

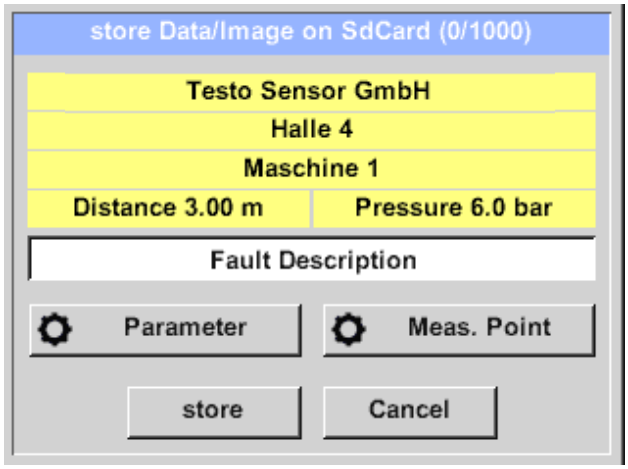
12.3.1.2 Storing of the measurement

To store the measurements please press either the button **„Store“** on the foil keypad, see chapter Device components and controls , or by button **„Store“** 

in the display.

All data are stored on to the internal SD card.
The measurement data, the measurement point and the image of the measurement point are saved as a journal, which can be exported later and a report can be created with the testo Leak Reporter Software V2 (order no.: 8900 0610).

After pressing one of the two **„Store“** keys, the corresponding information for the measuring point must be completed. The measuring point information of the last stored storage (company, building and location) is displayed, the numbering of the leaking tag is increased by 1.
e.g .:



If necessary, fill out the Leak Tag-form and attach it to the measuring location.

Please use correct Leak Tag-number.

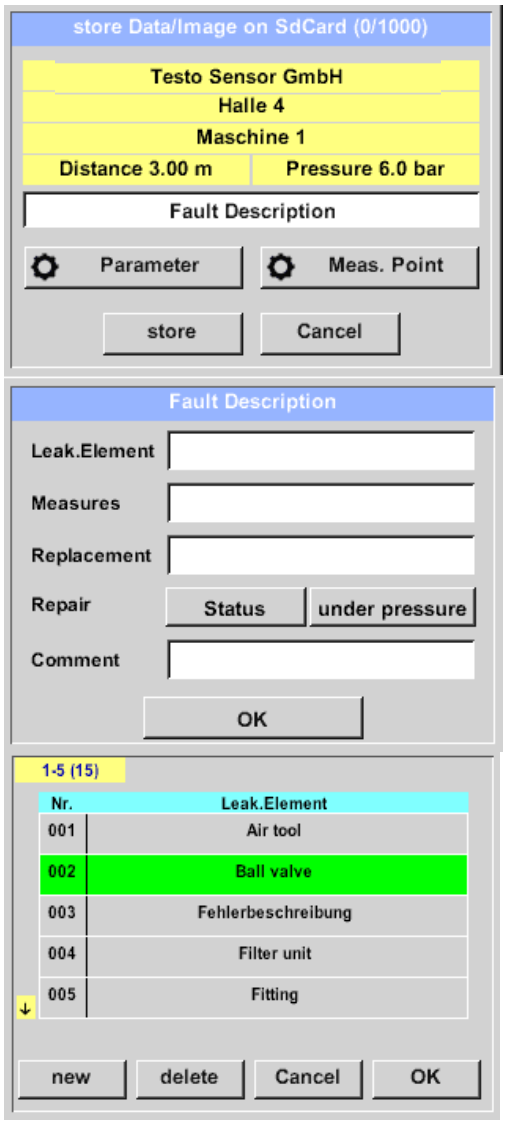
12.3.1.3 Parameter / Meas. Point (Re-Check)

Store ➔ Parameter
Store ➔ Meas. Point
At this point, it is again possible to check and correct the parameters „Pressure" and „Distance" and the measuring point.

Changing the parameters gives new values for leakage and cost.
Execution of the corrections see description chapter 9.3.1

12.3.1.4 Fault description

Store ➔ Textfield Fault Description



In addition to the details of the measuring point with company, building and location, it is possible to enter a fault description

To do this, select the text field ***„Fault description“***.

The following error descriptions are available, which significantly facilitate subsequent leakage elimination.

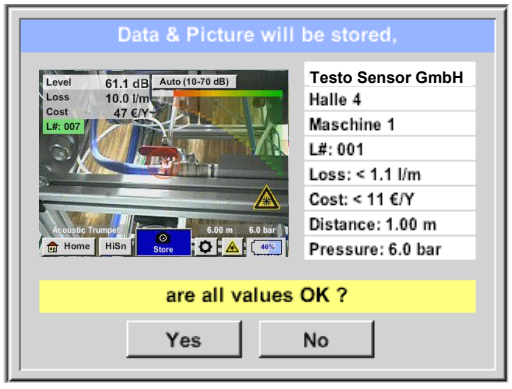
- Leakage element
- Measure
- Spare part
- Repair possible under pressure?
- Leakage repaired on site (status)

The entries are also stored in an internal database so that they can be used again and again.
Some suggestions are already saved on delivery.

See left, for example the selection for the field "Leak. Element".

12.3.1.5 Storing measurement data to internal SD-card

Store ➔ store



Before final storage of the measurement on the internal SD card, a summary is created and the correctness is queried once more for safety.

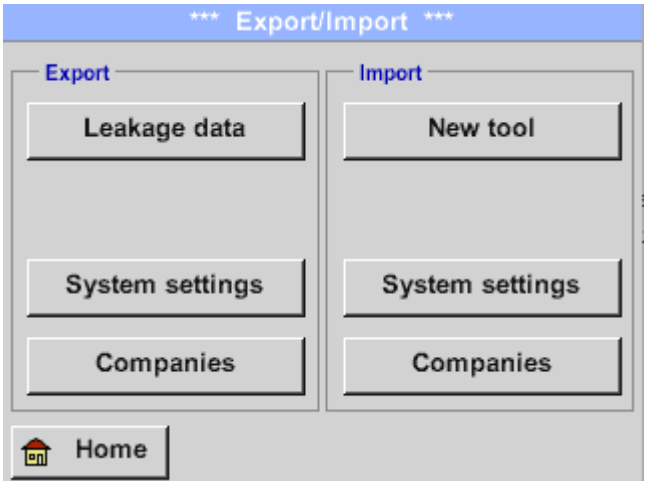
Storage is done with the ***„Yes“*** key.

The ***„No“*** key returns to the previous menu.

12.3.2 Export/Import

With *Home → Export / Import*,

- Recorded "Leakage data" can be transferred to a USB stick
- System settings can be exported as well as imported
- Measuring points (company, building and location data) can be exported as well as imported.
- Non-activated optional measurement tools can be activated/loaded.

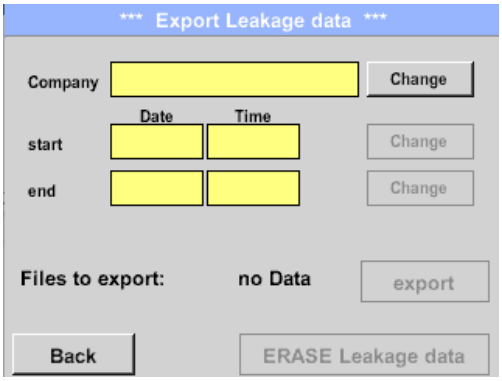


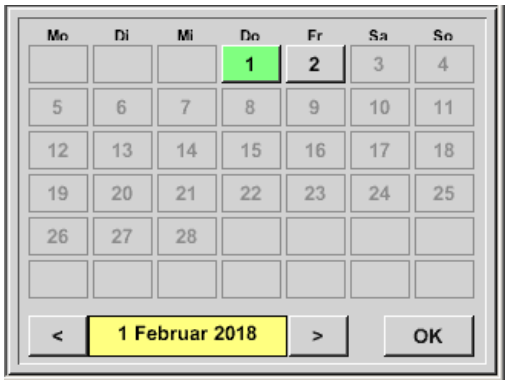
12.3.2.1 Export

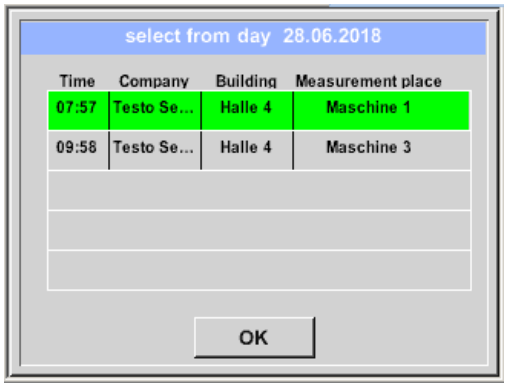
12.3.2.1.1 Export „Leakage Data“

Once all leakages have been documented, the next step is to export the data to a USB stick.
The user has the possibility to select one or more companies and to determine the start and end time of the leakage export.

Home → Export / Import → Export → Leakage Data





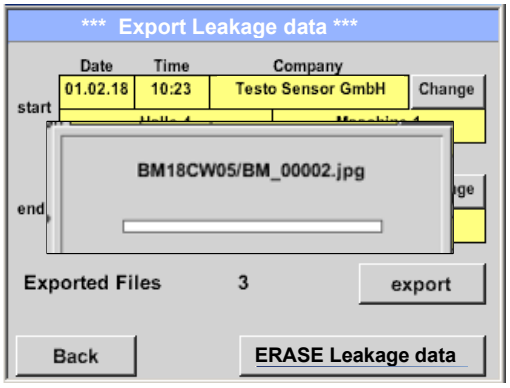


The „***Change“***. button can be used to select one, several or all companies to be exported. Use ***„Start“*** and ***„End“***. to define the period for which stored measurement data are to be exported.

The selected date is always highlighted in green and the dates of the Sundays are, as in the calendar, red. Highlighted.

For days on which measurement data was recorded, the date numbers are visually exalted

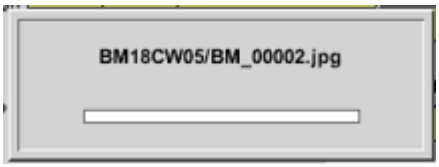
If several measurements have been recorded on a date, they will appear after the date selection.
Now you can easily select the desired recording.
With ***„OK“***. the start or end time is taken over.



Press the „***Export***"- button to transfer the selected data to the USB stick
In the example given, 3 measurements are exported.

With ***„ERASE Leakage Data"*** the Journal Database is deleted.
For verification is still a security question.

With ***„Back"*** you return to the main menu.



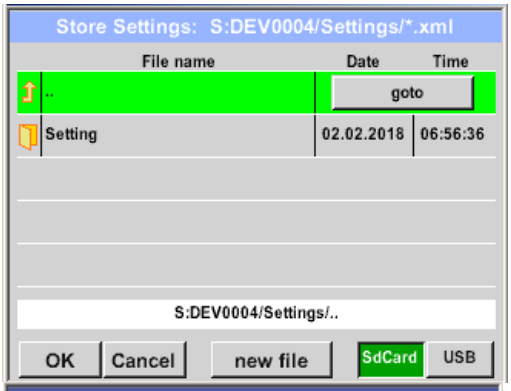
Attention:

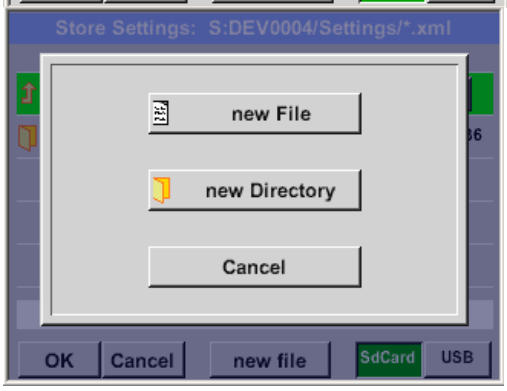
When the function **«ERASE Leakage data»** is activated, **ALL** leakages in the memory are irretrievably deleted.

12.3.2.1.2 Export of System settings

This feature is especially relevant for storing the external sensor settings as well as e.g. display option for charts, sensor value etc.

Home → Export / Import → Export → System settings





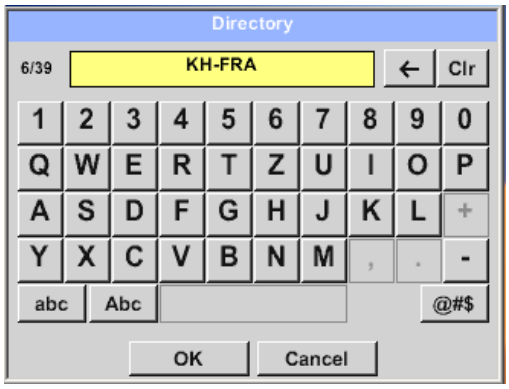
Here the definition of the storage location takes place
Selection for internal SD card with activation of key ***„SdCard"*** or on USB stick with key ***„USB"***.
The selection of the desired folder is made by selecting and activating with ***„goto"*** button.

If a new directory is required, this is done by pressing ***„new File"***, this can be created by selecting ***„ new Directory"***

Saving a system file with a new name takes place analogously, then the key ***„new File"*** must be pressed

Entries are to be confirmed with ***„OK".***

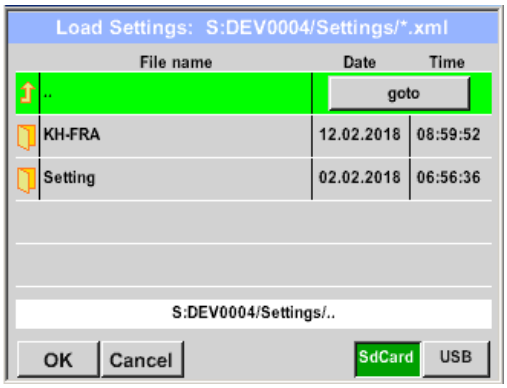
With ***„Cancel"*** you return to the previous menu.

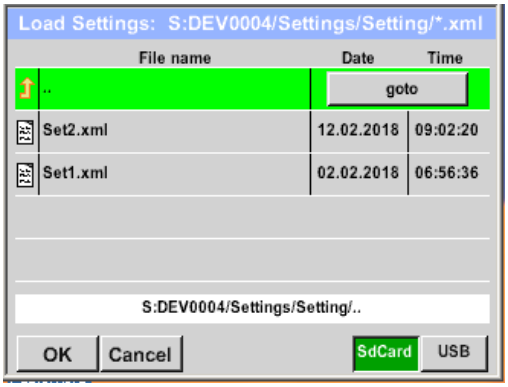


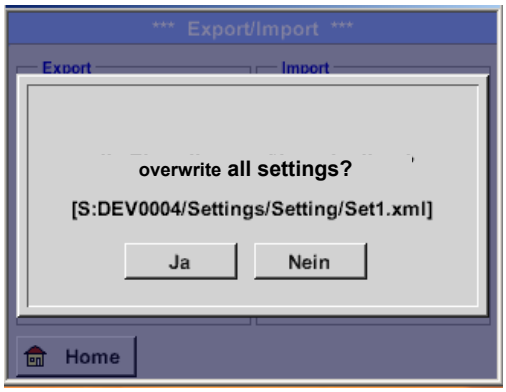
12.3.2.2 Import

12.3.2.2.1 Import of system settings

Home → Export / Import → Import → System settings







Sequence of directory and file selection is analogous to file export.
Selection of internal SD card with activation of key ***„SdCard“*** or on USB stick with key ***„USB“***.

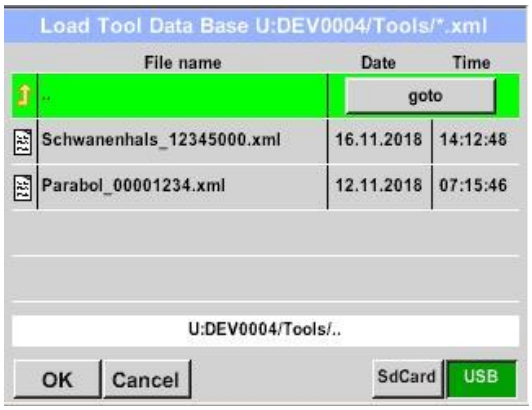
The selection of the desired folder is made by selecting and activating with the ***„goto“*** button, then select corresponding system file.

Selection to be confirmed with ***„OK“.***

Since system-relevant changes are made here, a confirmation prompt is issued, which must be confirmed with ***„OK“***.

12.3.2.2.2 Import new measurement tool

Home → Export / Import → Import → Import new Tool



The directory and file selection process is the same as for export e.g. system settings Selection of internal SD card with activation of button ***"SdCard"*** or of USB stick withbutton ***"USB".***

Select the desired folder by pressing the ***"goto"*** key and then the corresponding system file.

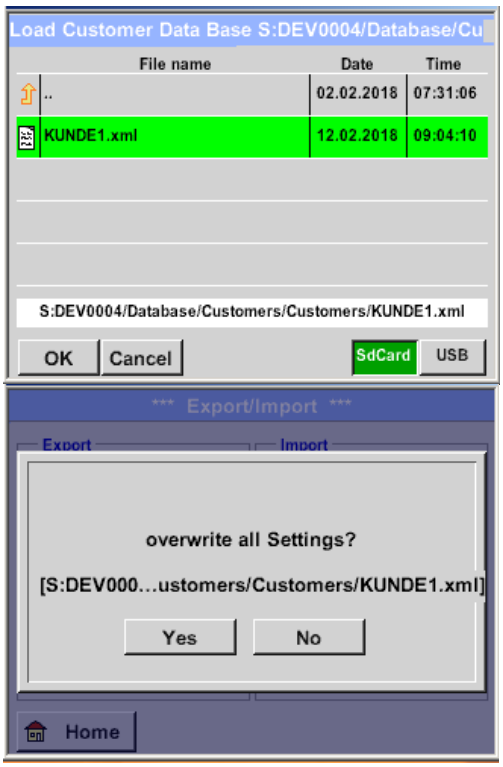
Confirm your entries witht ***„OK“***.

Since system relevant changes are made here, a security query is made which must be confirmed with ***"Yes".***

12.3.2.3 Export / Import Customer database

These functions allow the stored measuring point descriptions (companies, buildings and location) to be exported as an XML file or to be imported from another device exported database.
That means it is also possible to create and import the database externally, but the prerequisite is the correct format of the XML file.

Home → Export / Import → Export → Customers *Export / Import → Import → Customers*

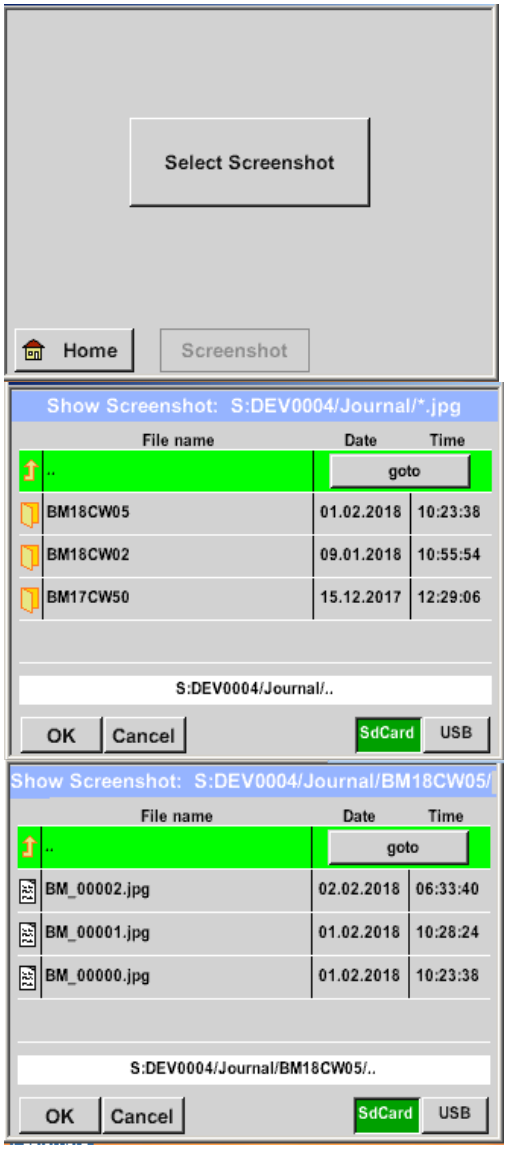


As data changes are made during importing, a confirmation question needs to be confirmed with "***„Yes“***.

Remark: Customer data will be exported to folder \\DEV0004/Database .
Data to be imported (XML files) must be stored in the directory \\DEV0004/Database as well.

12.3.3 View bitmaps

Home → View Bitmaps → Select Screenshoot



This allows the stored pictures (measurement pictures) on the SD-Card or USB Stick to load and shown in the display again.

Please press button „Select Screenshot“ and select the required picture (bitmap).

The pictures are stored and organized in different directories

The directory structure is year / calendar week

Designation: BMyyCWxx
yy = Year xx = calendar week

The selection of the desired folder is made by selecting and activating with the ***„goto“*** button.

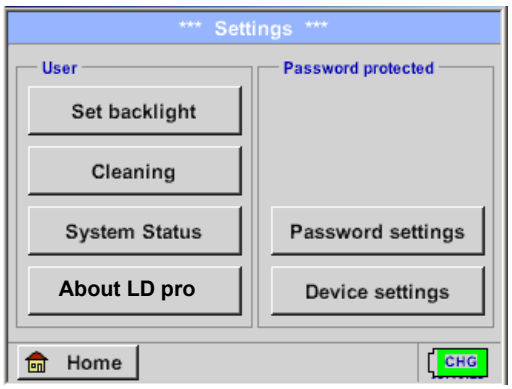
Select the desired image and then display with ***„OK“***.

12.3.4 Device Settings

The settings are all protected by a password!
Settings or changes are generally confirmed with OK!

Remark:
If you go back to main menu and then again one of the setting menus is called, you must enter the password again.

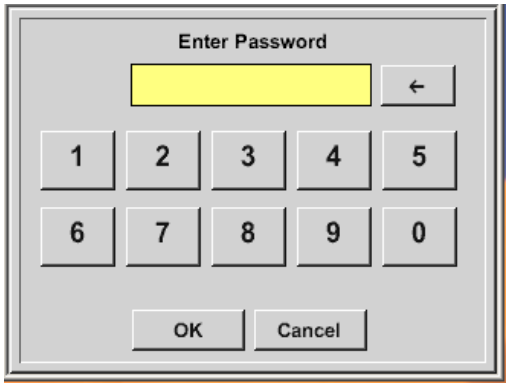
Home ➔ Settings



Overview of the *Settings*

12.3.4.1 Passwort-Einstellung

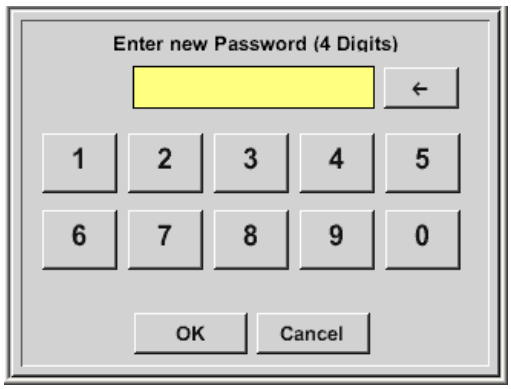
Home ➔Settings ➔ Passwort Settings



Factory settings for password at the time of delivery: 0000 (4 times zero).

If required, the password can be changed in the *Password settings*.

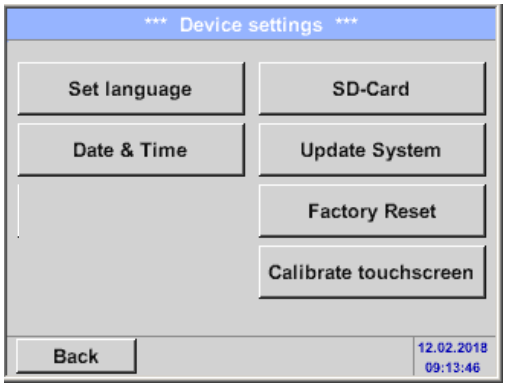
The new password must be entered two times in a row and in each case confirmed with *OK*



If an incorrect password is entered there appears *Enter password* or *New password repeat* in red font.
If you can't remember the password, please use Master password in order to enter a new password.
Remark:
The master password is supplied together with the instrument's documentation.

12.3.4.2 Device Settings

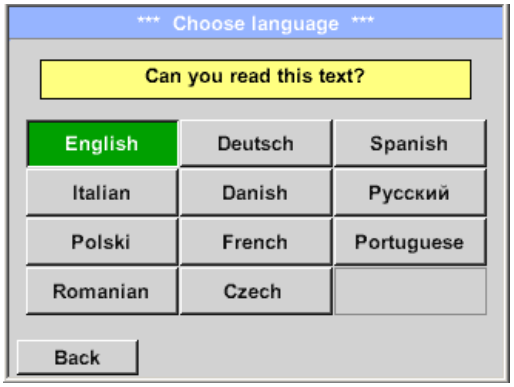
Home ➔Settings ➔ Device settings



Overview of *Device settings*

12.3.4.2.1 Language

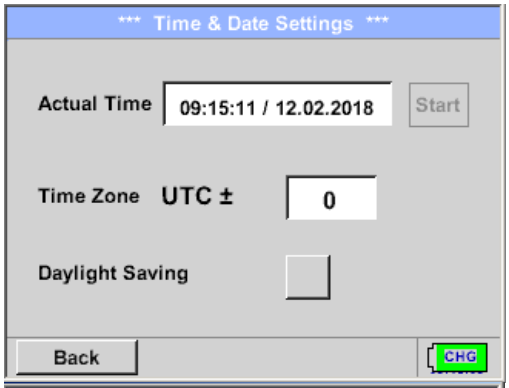
Home ➔Settings ➔ Device settings ➔ Set language



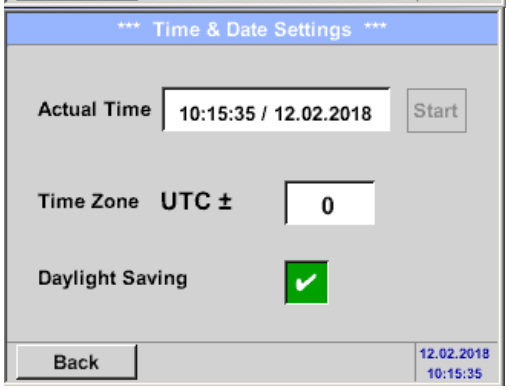
Here you can select one of 11 languages for the device.

12.3.4.2.2 Date & Time

Home ➔Settings ➔ Device settings ➔ Date & Time



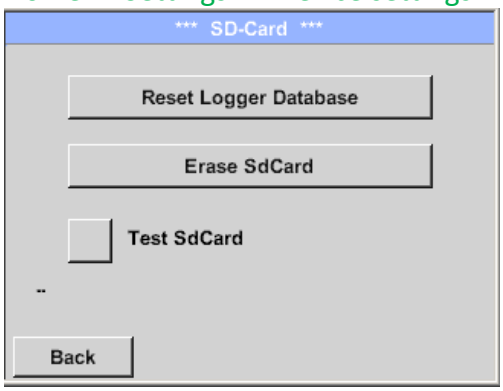
By pushing the *Time Zone* description field and enter the correct *UTC*, you can set the correct time all over the world.



The summer and wintertime switchover is realized by pushing the *Daylight Saving* button.

12.3.4.2.3 SD-Card

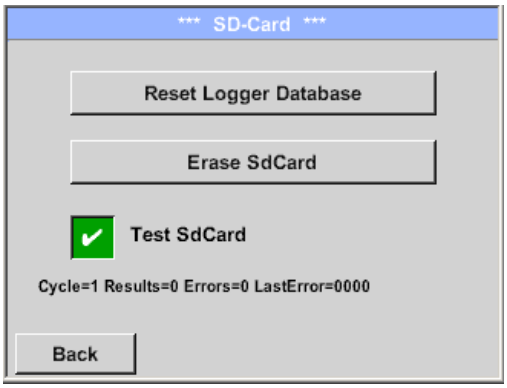
Home ➔Settings ➔ Device settings ➔ SD-Card ➔ Reset Logger Database
Home ➔Settings ➔ Device settings ➔ SD-Card ➔ Erase SdCard



By pressing *Reset Logger Database* all actual stored data on SD-Card will be blocked for use in the device. Nevertheless, all data are still stored and available for external use only.

By pressing *Erase SdCard* all Data on the SD-Card will be deleted.

Home ➔Settings ➔ Device settings ➔ SD-Card ➔ Test SdCard



With activation of *Test SdCard* data are written and read to and from the SD-card.

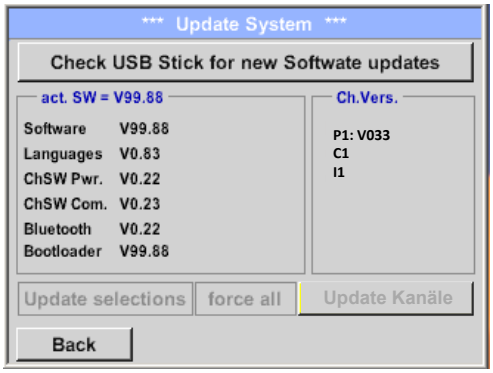
The number of test cycles, as well as possible errors and error codes are display in the status line.

Press the *Back* button to returns to the device settings menu.

12.3.4.2.4 System update

If required, there is the possibility for the device to download a firmware update to the device via the USB stick. The latest software is available on the Testo Sensor GmbH homepage.
The received file must then be stored on the USB stick and transferred to your device as described below.

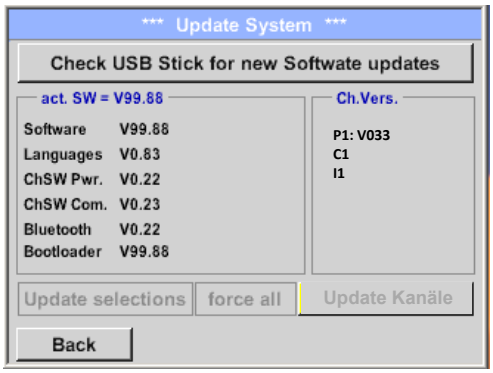
Home ➔Settings ➔ Device settings ➔ System-Update



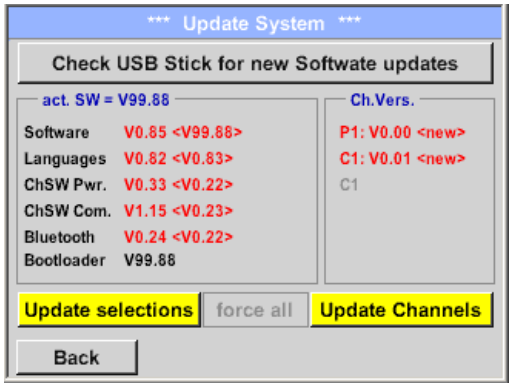
Overview of *System-Update*-Functions.

12.3.4.2.5 Check for Updates

Home ➔Settings ➔ Device settings ➔ System-Update➔ check USB-Stick for new Updates



f after pressing the button *"Check USB Stick for new Software updates"* the following messages appear in the window, is the device is not properly connected to the USB flash drive or there are no files available.



If the device is correctly connected to the USB stick and there are new versions of the individual SW Parts, the new versions are marked in red.

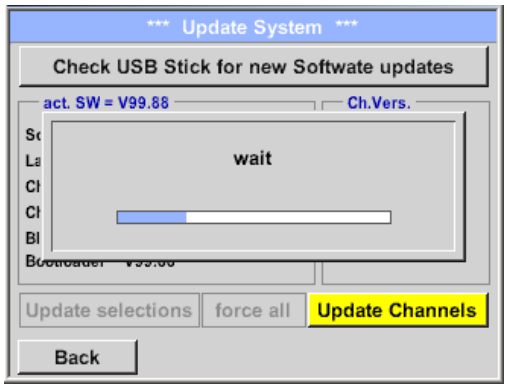
The update is started by pressing the ***„Update selections"*** button.

If it is required to install an older software version, you have press the button ***„Force all"***

12.3.4.2.6 Update Channels

Home ➔Settings ➔ Device settings ➔ System-Update ➔ Update-Channels

If there is an update either, it must be started separately



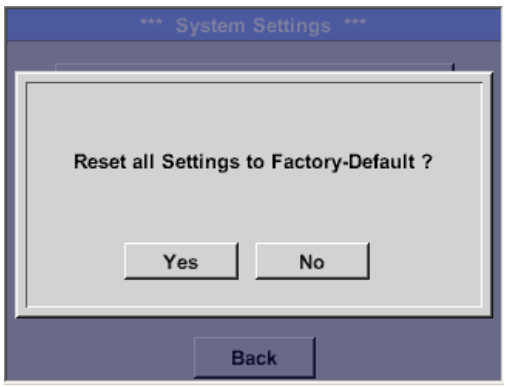
Update of the Channels.

Important:
If the *Reboot system* button appears after the update, it must be pushed to restart the device!

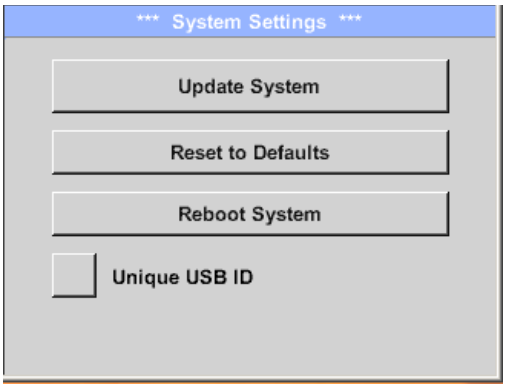
12.3.4.2.7 Factory Reset

12.3.4.2.7.1 Reset to default settings

Home ➔Settings ➔ Device settings ➔ System ➔ Reset to Defaults



Bevor the settings are changed to the production default settings a safety prompt is displayed and must be confirmed by pressing the button ***„Yes“***.



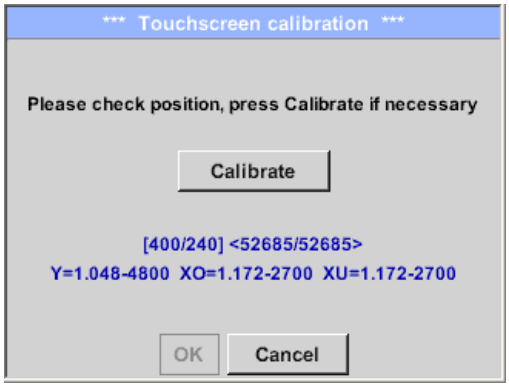
If needed with ***„Reboot System“*** the device can be started (reboot) here.

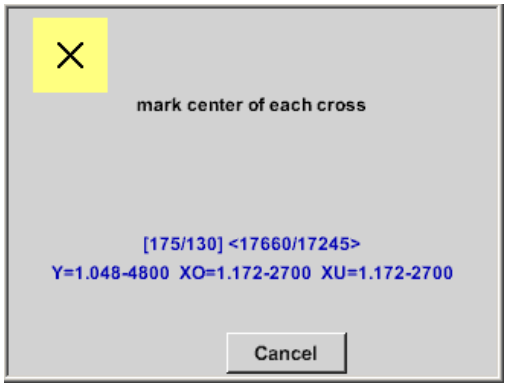
12.3.4.2.8 Unique USB ID

For connections with the PC, a status and therefore a unique USB ID can be defined here. Relevant for simultaneous connection of several USB devices to the PC.

12.3.4.2.9 Calibration of touchpanel

Home ➔Settings ➔ Device settings ➔ calibrate touchscreen





If necessary, the touch-screen calibration can be changed here.

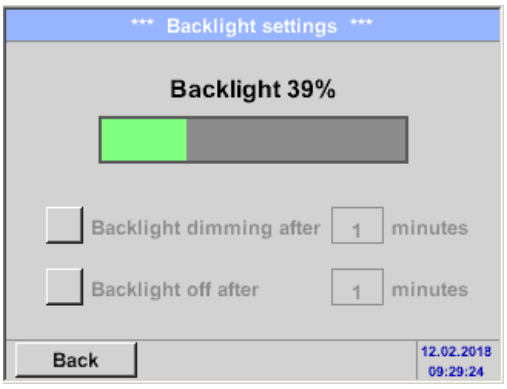
Push *Calibrate* and it appears, 1. left above,2. bottom right, 3. bottom left, 4.right above and 5. in the middle, a calibration cross that must be pushed consecutively.

If the calibration finished positive a message *"Calibration successful"* appears and have to be confirmed with *OK*.

Is this not the case, so you can repeat the calibration with the help of the Cancel and *Calibrate* button.

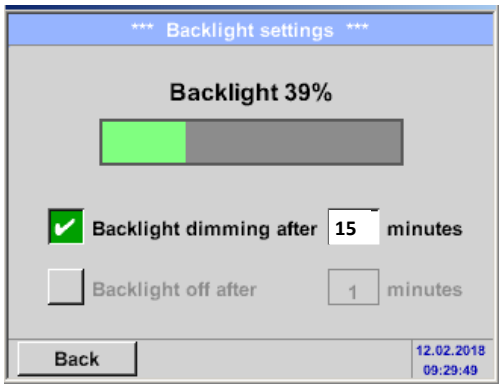
12.3.4.2.10 Set backlight brightness

Home ➔Settings ➔ Set backlight



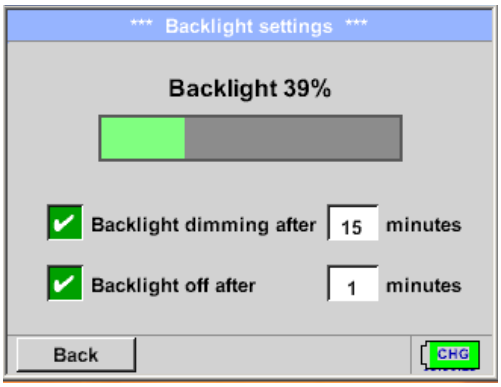
Here you adjust the desired *Backlight* (15-100%) of the display directly.

E.g. *Backlight* to 39 %



With the help of the *Backlight dimming after* button, after a definable time interval (here after 15 minutes), the *Backlight* can be reduced to the minimum.

As soon as the dimmed screen is operated again, the *Backlight* is committed automatically on the last set value before dimming.



To reduce the energy consumption (device runtime), you can switch off the display backlight by setting ***"Backlight off after".***

Remark:
At the first touch, the *Backlight* in our example is reset to 39%, after that a "normal" function operation is possible.

<u>Important</u>:
If the *Backlight dimming after* button is not activated, then the *Backlight* stays permanently on, in the currently set brightness.

12.3.4.2.11 Cleaning

Home ➔ Settings ➔ Cleaning

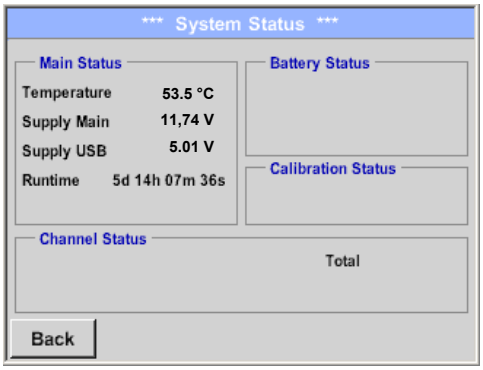
This function can be used for cleaning the touch panel during running measurements.

If one minute is not enough time to clean, the process can be repeated at any time.

Is the cleaning faster finished, then you can push the *to abort press long* button (for one or two seconds) to cancel.

12.3.4.2.12 System-Status

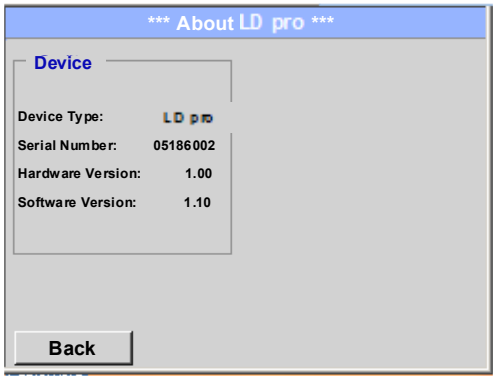
Home ➔ Settings ➔ System-Status



The menu item ***"System status"*** provides information about the power supply voltages and an operating hour counter.

12.3.4.2.13 About

Home ➔ Settings ➔ about LD pro

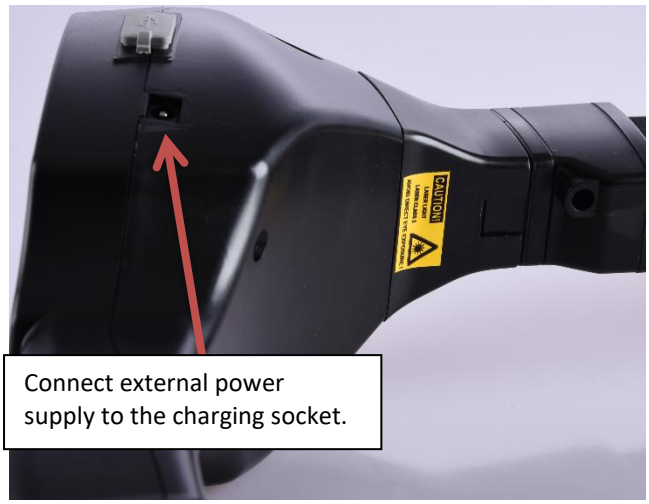


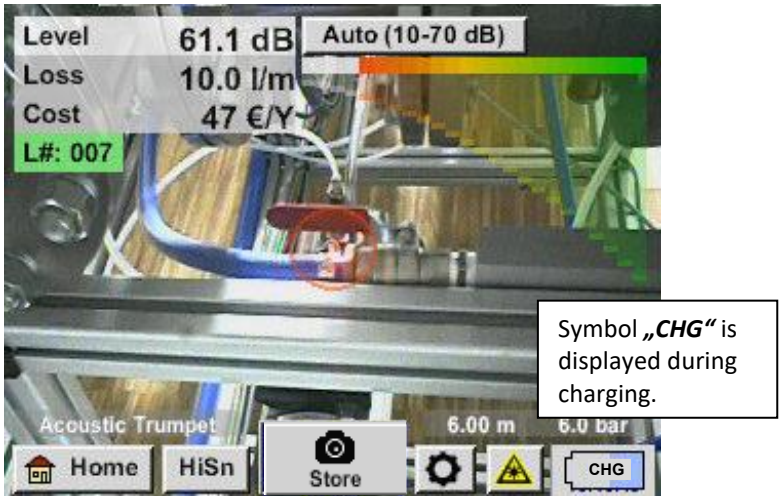
Brief description of the Hardware and Software Version, as well as the Serial Number of the device.

Under options, you can buy four additional, different functions, if you have not done this by ordering.

13 Charging the batteries

The battery is charged within the device. For this, the supplied plug-in power supply is connected to the built-in charging socket of the device and the 230V socket.





The device checks the charging status of the battery and starts the charging process automatically if necessary.

To protect the Li-ION accumulator of exhaustive discharge the device is switching off automatically if a cell voltage of 6,4V will be reached.

14 Scope of delivery

testo Sensor LD pro + / pro ultra is available either as a single unit or in a set. The set contains all the components and accessories that are protected in a rugged and shock-resistant transport case.

The following table lists the components with their order numbers.

Description	Order No.
Set of:	**8900 0601**
testo Sensor LD pro leak detector with acoustic trumpet, and integrated camera	8900 0602
Sound-proof headset	8800 0304
Focus tube with focus tip	8800 0305
Battery charger(AC adapter plug)	8800 0306
Transportation case	8800 0307
Helix cable for connecting the ultrasonic sound sensor	8900 0504
Gooseneck for leak detection in hard-to-reach areas (optional)	8900 0506
Parabolic mirror for leak detection at long distances (optional)	8900 0507

15 Appendix

15.1 Report UN 38.1

Jauch
THE PULSE OF PROGRESS

Lithium cells or batteries test summary according to UN38.3

Battery Manufacturer:	UN38.3 Test Lab:
Jauch Quartz GmbH In der Lache24 D-78056 Villingen-Schwenningen Germany +49 7720 945-0 www.jauch.com · info@jauch.com	Waltek Testing Group (Shenzhen) Co., Ltd. Liuxian 2nd Road, Block 70, Bao'an District, Shenzhen, China Tel- +86-0755-33663308 www.waltek.com.cn sem@waltek.com.cn
Description of cell or battery: Cell/battery type: ☐ Lithium metal ☒ Lithium-ion Cell or battery: ☐ cell ☐ single-cell-battery ☒ battery Model name: LI18650JE 2s1p Physical Description: round cell battery stacked with wires and connector Part-no.: 249611 Voltage: 7.2V Capacity: 2550mAh Energy: 18.36Wh Lithium content: / Weight of cell/battery: Approx. 100g	**Test report-no.:** WTX21X06061626B **Date of test report:** Aug. 06, 2021
List of tests (result: pass/fail):	**For air transportation only:** State of charge ☒ max. 30% ☐ not applicable

Test number	Test Item	Result	Remarks
T-1	Altitude	pass	
T-2	Thermal cycling	pass	
T-3	Vibration	pass	
T-4	Shock	pass	
T-5	External short circuit	pass	
T-6	Impact /Crush	pass	for cell only
T-7	Overcharge	pass	
T-8	Forced Discharge	pass	for cell only

Test results in accordance with the UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Test and Criteria ST/SG/AC.10/11 Rev.6, Amend. 1, 38.3. Cell manufacturing as well as battery assembly is done under the quality assurance program of ISO9001.

This document remains valid as long as no changes, modifications or additions are made to the model(s) described in this document. The model(s) has (have) been classified according to the applicable transport regulation and the UN Manual of Test and Criteria as of the date of the certification. The model(s) must be packed, labelled and documented according to country and other international regulations for transportation.

Name / Title of Signatory / Date Sönke Zacher / Head of Project Management Aug. 31, 2021

Headquarters: Jauch Quartz GmbH · In der Lache 24 · 78056 Villingen-Schwenningen · Germany
Registry court: Freiburg HRB 602574, Managing Director: Thomas Jauch

15.2 Report IEC62133-2

	Ref. Certif. No.
IEC IECEE CB SCHEME	SG ITS-26038

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

CB TEST CERTIFICATE

Product	Rechargeable Li-Ion Battery
Name and address of the applicant	Jauch Quartz GmbH In der Lache 24, 78056 Villingen-Schwenningen, Germany
Name and address of the manufacturer	Jauch Quartz GmbH In der Lache 24, 78056 Villingen-Schwenningen, Germany
Name and address of the factory Note: *When more than one factory, please report on page 2*	Jauch Quartz GmbH In der Lache 24, 78056 Villingen-Schwenningen, Germany ☒ Additional Information on page 2
Ratings and principal characteristics	7.2V, 2550mAh, 18.36Wh
Trademark (if any)	Jauch www.jauch.com
Customer's Testing Facility (CTF) Stage used	-
Model / Type Ref.	Li18650JE 2S1P
Additional information (if necessary may also be reported on page 2)	-
A sample of the product was tested and found to be in conformity with	IEC 62133-2:2017
As shown in the Test Report Ref. No. which forms part of this Certificate	210721010GZU-001

This CB Test Certificate is issued by the National Certification Body

Intertek Testing Services (Singapore) Pte Ltd
5, Pereira Road, #06-01
Asiawide Industrial Building
Singapore 368025

intertek

Date: 30 August 2021

Signature: Ong Keng Chuan

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D-79853 Lenzkirch

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