EM5010A
Environment Monitor

User's Guide

Notices

Copyright Notice

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Safety Information

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

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Safety Symbols

The following symbols on the instrument and in the documentation indicate precautions which must be taken to maintain safe operation of the instrument.

	Direct current (DC)		Alternating current (AC)
	WARNING, RISK OF ELECTRIC SHOCK.		Instruction manual symbol affixed to product. Indicates that the user must refer to the manual for specific WARNING or CAUTION information to avoid personal injury or damage to the product.
	Indicates the field wiring terminal that must be connected to earth ground before operating the equipment — protects against electrical shock in case of fault.		Frame or chassis ground terminal—typically connects to the equipment's metal frame.

Safety Considerations

WARNING

Read the information below before using this instrument.

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards for design, manufacture, and intended use of the instrument. wekomm assumes no liability for the customer's failure to comply with these requirements.

- **Ground the equipment:** For Safety Class 1 equipment (equipment having a protective earth terminal), an uninterruptible safety earth ground must be provided from the mains power source to the product input wiring terminals or supplied power cable.

- **DO NOT** operate the product in an explosive atmosphere or in the presence of flammable gases or fumes.

- For continued protection against fire, replace the line fuse(s) only with fuse(s) of the same voltage and current rating and type. DO NOT use repaired fuses or short-circuited fuse holders.

- **Keep away from live circuits:** Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers or shields are for use by service-trained personnel only. Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, DO NOT perform procedures involving cover or shield removal unless you are qualified to do so.

- **DO NOT** operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by service-trained personnel. If necessary, return the product to wekomm for service and repair to ensure that safety features are maintained.
-

WARNING

- **DO NOT** service or adjust alone: Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.
- **DO NOT substitute parts or modify equipment:** Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to wekomm for service and repair to ensure that safety features are maintained.
- **High voltages are always hazardous:** When placing the sensors or working on and installing sensors of this instrument always keep the appropriate distance to high voltage sources.
- **Permanent wiring of hazardous voltage** or sources capable of delivering grater than 150 VA should be labeled, fused, or in some other way protected against accidental bridging or equipment failure.
- **DO NOT** try to connect other devices than wekomm sensors to the according inputs of the instrument. Doing so might lead to a permanent damage of the instrument and or electrical shock.
- **DO NOT** try to connect the sensors to other devices than the wekomm environment monitor. Doing so might lead to a permanent damage of the sensor and or electrical shock.
- **DO NOT** connect any voltages or currents exceeding the given limits to the optional rear contacts. Doing so might lead to a permanent damage of the instrument and or electrical shock.
- To prevent electrical shock, disconnect the instrument from AC mains power and disconnect all test leads before cleaning. Clean outside of the instrument using a soft, lint-free, cloth slightly dampened with water. D0 NOT use detergent or solvents. DO NOT attempt to clean internally. If needed, contact wekomm to arrange for a proper cleaning to ensure that safety features and performance are maintained.

CAUTION

This is a sensitive measurement apparatus by design and may have some performance loss when exposed to ambient continuous electromagnetic phenomenon.

Environmental Conditions

The EM5010A is designed for indoor use and in an area with low condensation. The table below shows the general environmental requirements for this instrument.

Environmental condition	Requirement
Temperature	Storing condition: -10°C to +70°C Operating condition: 5°C to 40°C
Humidity	Operation condition: up to 95% RH (non condensing)
Altitude	Up to 2500m
Installation category	II
Over voltage protection	II

WARNING

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE OR WET ENVIRONMENTS

Do not operate the instrument around flammable gases or fumes or vapor. Risk of fire or explosion. If you have the need of operating the instrument in such conditions please contact wekomm for a special version of the instrument

Do not operate the instrument in wet environments. Risk of short circuit or fire.

WEEE

Waste Electrical and Electronic Equipment (WEEE) Directive

This instrument complies with the WEEE Directive marking requirement. This affixed product label indicates that you must not discard this electrical or electronic product in domestic household waste.

Product category:

With reference to the equipment types in the WEEE directive Annex 1, this instrument is classified as a "Monitoring and Control Instrument" product.

The affixed product label is as shown below.

Do not dispose in domestic household waste.

To return this instrument for recycling, contact wekomm for instructions how to return this instrument or visit www.wekomm.de

Sales and Support

To contact wekomm for sales and technical support, refer to the support links on the wekomm website or contact us via phone or email.

We will be happy to assist you in answering your questions or help choosing the appropriate accessories and or instruments for your application.

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Installation and Maintenance

Introduction

This chapter contains information on initial inspection, installation, and maintenance. It also contains lists of the instrument's available options and accessories.

It's a good idea to read this chapter before making any electrical connections to the instrument.

Initial Inspection

WARNING

If any of the following symptoms exist, or are expected, remove the instrument from service:

- Visible damage.
- Severe transport stress.
- Prolonged storage under adverse conditions.
- Failure to perform intended measurements or functions.

Do not use instrument until safe operation can be verified by service trained personnel.

The instrument was carefully inspected before it left the factory. It should be undamaged and in proper working order upon receipt. If the shipping container or cushioning material is damaged, keep it, until the contents of the shipment have been checked and the multimeter has been inspected. When you unpack the instrument, verify that the following items are included:

- Line Power Cord (Qty. 1)
- Replacement line power fuses: 500 mA T (Qty 1 for 220/240 operation), 1.0 A NTD (Qty 1 for 100/120 operation)

If the instrument is damaged or the contents are incomplete, promptly notify wekomm. We will then discuss the next steps with you.

Options and Accessories

Table 1-1 lists the available options, and Table 1-2 lists the available sensors and accessories for the Environment Monitor

Table 1-1 Available Options

Description	Option Number	Part Number for retrofit
Four contacts for external alarms or controlling of devices	002	EM5010A-002
Additional Power Supply Input 12 - 24 V DC	010	EM5010A-010
Internal Battery with internal charger	020	EM5010A-020

Table 1-2 Available Sensors and Accessories

Description	Model- or Part Number
Printed User Manual	EM5010A-0001
Precision Sensor for Humidity and Temperature	S5001A
Sensor for Air Pressure and Temperature	S5002A
Sensor for a list of environment informations: Temperature, Humidity, Particulate Matter, VOC	S5010A
Sensor for a list of environment informations: Temperature, Humidity, Particulate Matter, VOC, NOx	S5011A
Sensor for Positioning Data (GPS, Gallieo, GLONASS)	S5090A
Sensor for eight digital Inputs	S5100A

Installing the Instrument

This section discusses the instrument's grounding and power requirements and contains instructions for installing the instrument. Figure 1-1 shows the Instrument's rear panel. Many of the rear panel connectors are referenced in this section.

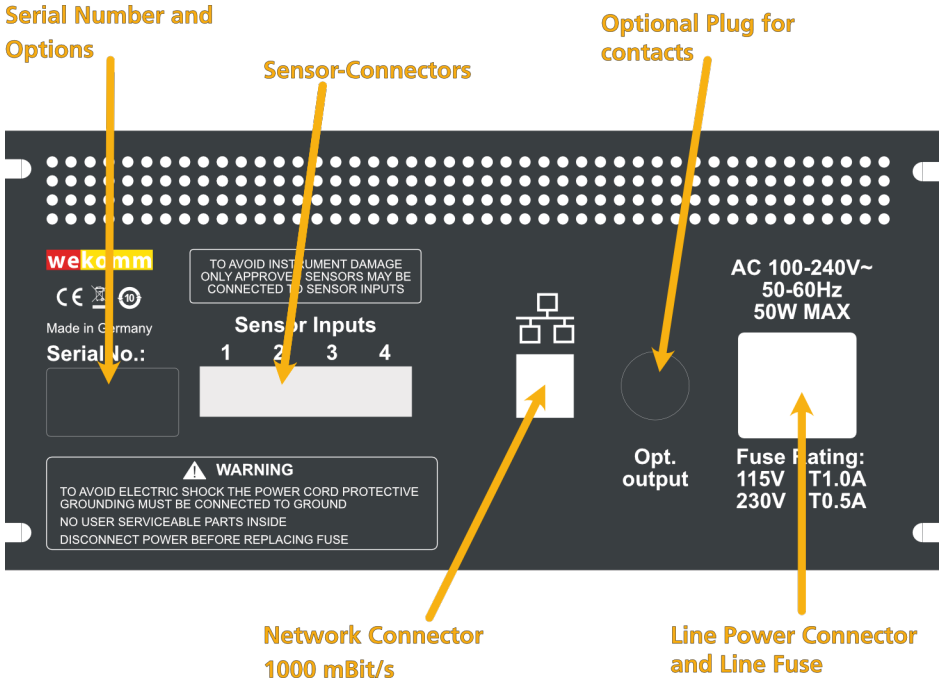

Figure 1 Panel Rear

Grounding requirements

The Environment Monitor comes with a three-conductor AC power cable.

The power cable must be connected to an approved three-contact electrical outlet that has its ground conductor connected to an electrical ground (safety ground). The instrument's power jack and the supplied power cable meet International Electrotechnical Commission (IEC) and VDE safety standards.

WARNING

For protection from electrical shock, the power cord ground must not be defeated.

Installing the line power fuse

The line power fuse must match the line voltage selection.

For **220 VAC or 240 VAC** operation install a **500 mAT** fuse.

For **100 VAC or 120 VAC** operation install a **1.0 AT** fuse.

The line power fuse holder is located on the right side of the multimeter's rear panel (see Figure 1-1) near the line connector. To install a fuse, make sure the multimeter's power cord is removed.
To remove the fuse holder take a small flat-blade screwdriver and pry the holder out of the socket. Do not remove the holder from the power line socket. Now you can replace the fuse.
After successful replacing push back the fuse holder into it's position.

In the picture below the red arrow indicates the place where to put the screwdriver.

Figure 2 Line Power connector and fuse holder

Power cords

Figure 1-3 shows the various multimeter power cords and their wekomm part numbers. If you received the wrong power cord, notify wekomm for replacement.

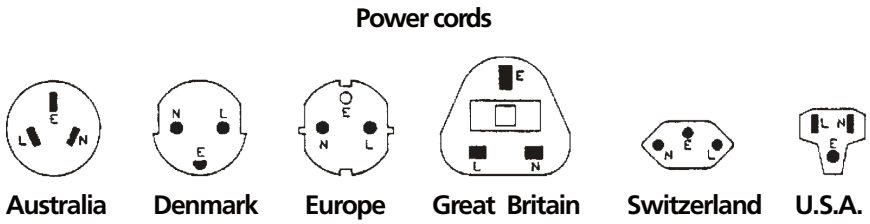

Figure 3 Socket Types

Country	Part Number	Option	Ratings
Australia	EM5010A-905	905	250V 6A
Denmark	EM5010A-904	904	250V 6A
Europe	EM5010A-901	901	250V 6A
United Kingdom	EM5010A-903	903	250V 6A
Switzerland	EM5010A-902	902	250V 6A
USA	EM5010A-906	906	120V 10A

If no Power Cord Option is given, when ordering the Environment Monitor, the device will be equipped with the Option 901 by default.

Power cords supplied have polarities matched to the power input socket on the instrument.

NOTE: Plugs are viewed from connector and shape of molded plug may vary within country.

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Getting started

Introduction

This chapter is intended for the novice user of the EM5010A user.

It shows you how to use the instrument's front panel, setting parameters and configurations. We will also discuss how to retrieve data from the instrument.

Since front panel operation is discussed first, it covers important topics such as the power-on state, Touch display operations and how to change specific settings.

For this reason, you should read the entire chapter even if you intend to use the instrument primarily from remote.

Before Applying Power

- Make sure the line voltage matches to the instrument's rear panel given limits
- Make sure the proper line fuse is installed.
- Any sensors you wish to use with the instrument should be plugged in before applying power. Unplugging the sensor or connecting the sensor while the instrument is powered on is not supported and might damage the instrument or the sensor
- If you have any questions concerning installation or power requirements, refer to Chapter 1.

Connecting the Sensors

Of course you need to connect the sensors you want to use with the instrument before connecting power. At the back of the instrument you will find four sockets where you are able to plug the sensor cable in.
Which socket is chosen does not matter, all sockets have the same functionality. A good idea though can be to start with socket #1 to later remember more easily, which sensor was placed where. The numbers above the sockets identify the channel number, which will be referred to, later in this manual.

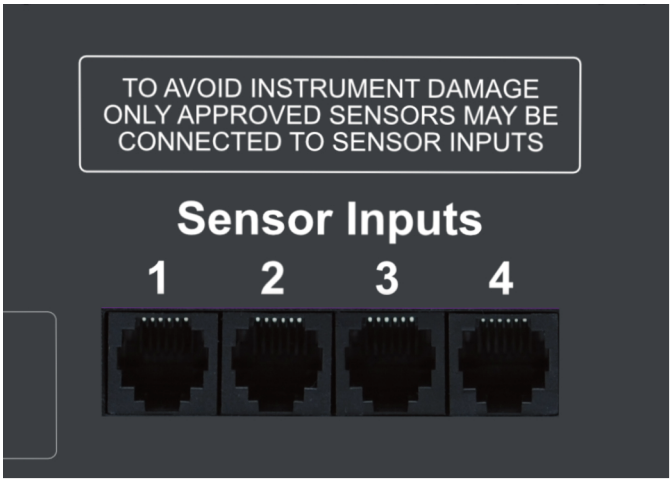

Figure 4 Sensor Connections

Applying Power

To apply power, just connect the instrument with the power supply (line or external DC, Option). You might see a short flash on the screen, after about 5 seconds the green Power-LED should come on.
Following this, the Environment Monitor shows a boot screen until the instrument has fully started up.

If anything other than this happens, disconnect the instrument from power and re-power it after 30 seconds. If it won't start up then, disconnect the instrument and contact wekomm for service.

When the instrument ist being started for the first time, it should come up with the following screen, no matter which sensors are connected:

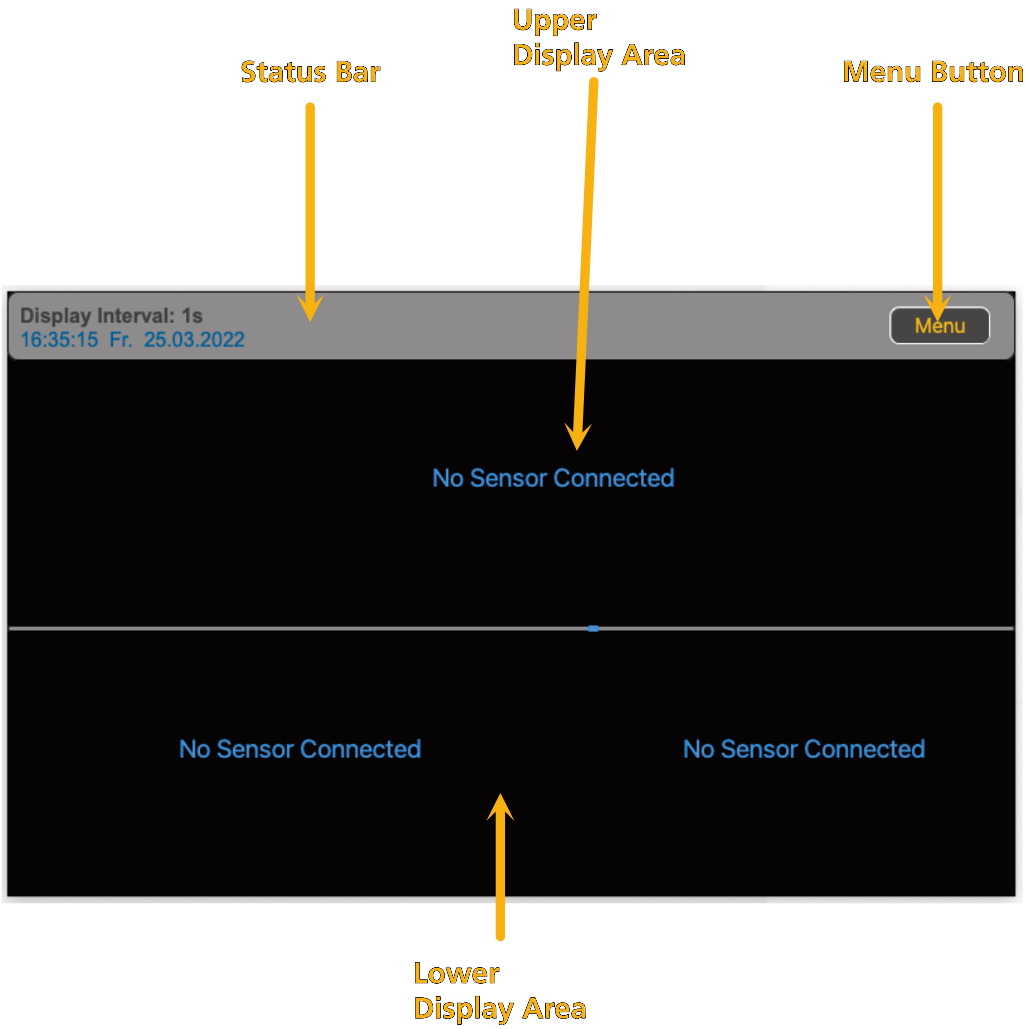

Figure 5 Instrument Screen

Using the instrument - getting started

The instrument is to be controlled just by the touch screen. To display any measurements, you need to assign a sensor to a specific display area. This section will guide you through all steps to setup the instrument for the first time.

In the upper area just one blue line saying "No Sensor Connected". This tells you, that no sensor input is assigned to this specific area. To assign a sensor, just double tap this line, which will bring up the following display

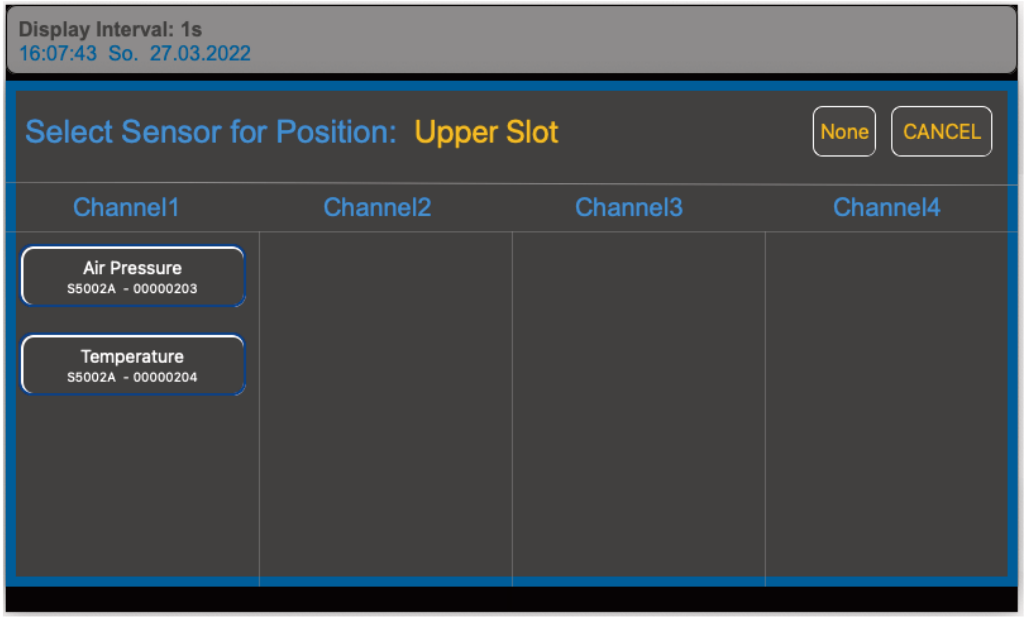

Figure 6 Sensor selection menu

This display tells you already, that in our example here, the sensor S5002A is connected to Sensor input #1 and that this sensor offers two measurement - the air pressure and the temperature.
Now we want to select the air pressure to be displayed in the upper portion of the screen so you tap the accordingly labeled button. The Sensor select screen closes and the main screen of the instrument changes, similar to the display pictured below.
What exactly is been show depends on which sensor you have connected and which actual values the sensor is providing

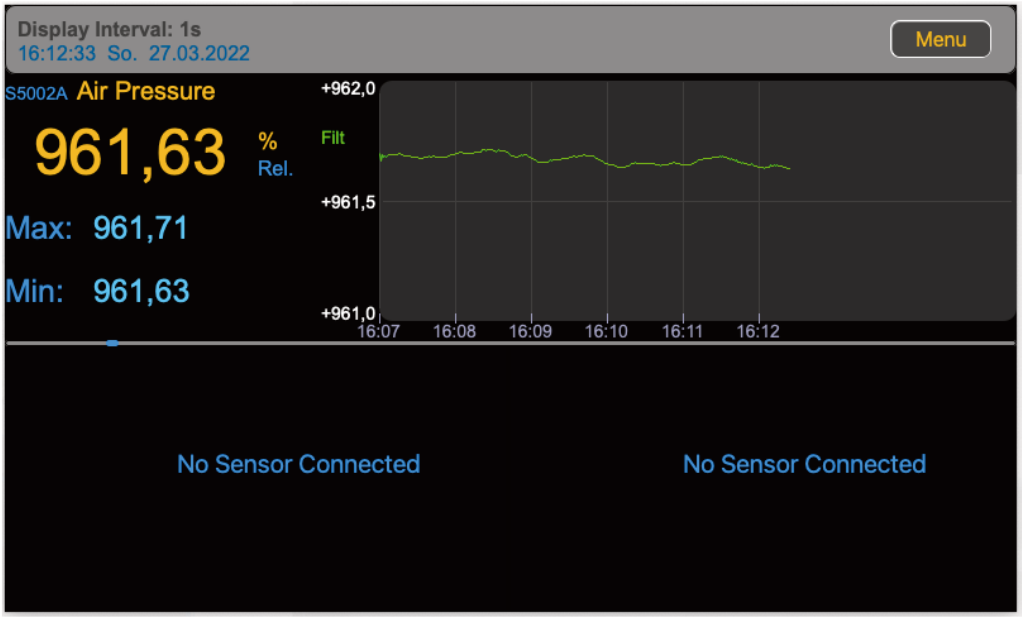

Figure 7 Main screen with one measurement

If you look at the lower area of the display, you can see the aforementioned line twice. That tells us, that the lower display area is configured to display two values. As we have only one measurement value left in our example we want to configure the lower display area to display just one value.

To do so, you should tap the menu-button, which opens the menu

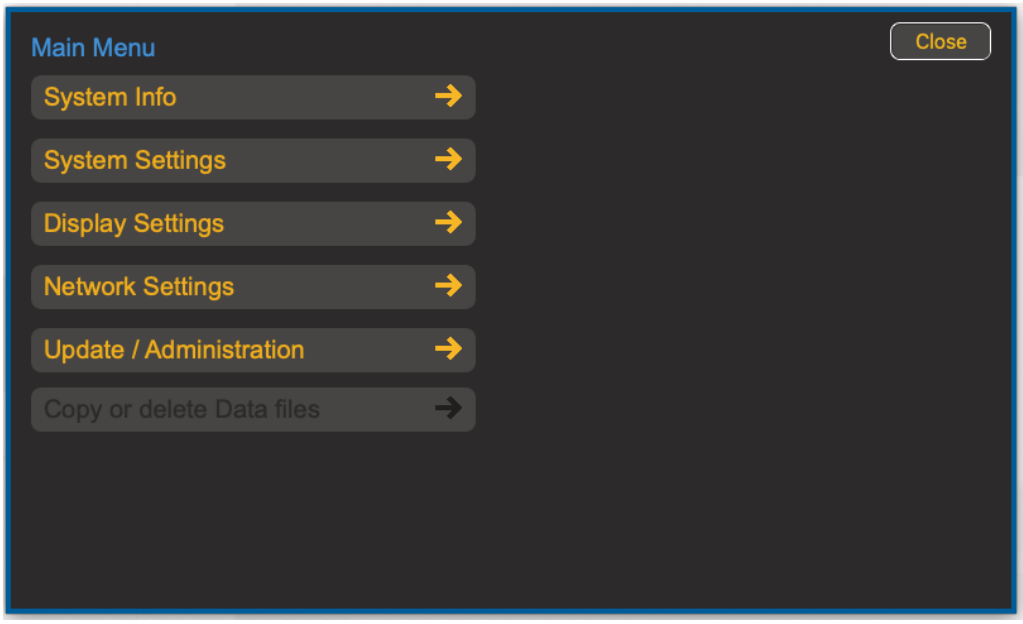

Figure 8 Main Menu Screen

To continue, tap the button labeled “Display Settings”, which opens the next sub menu

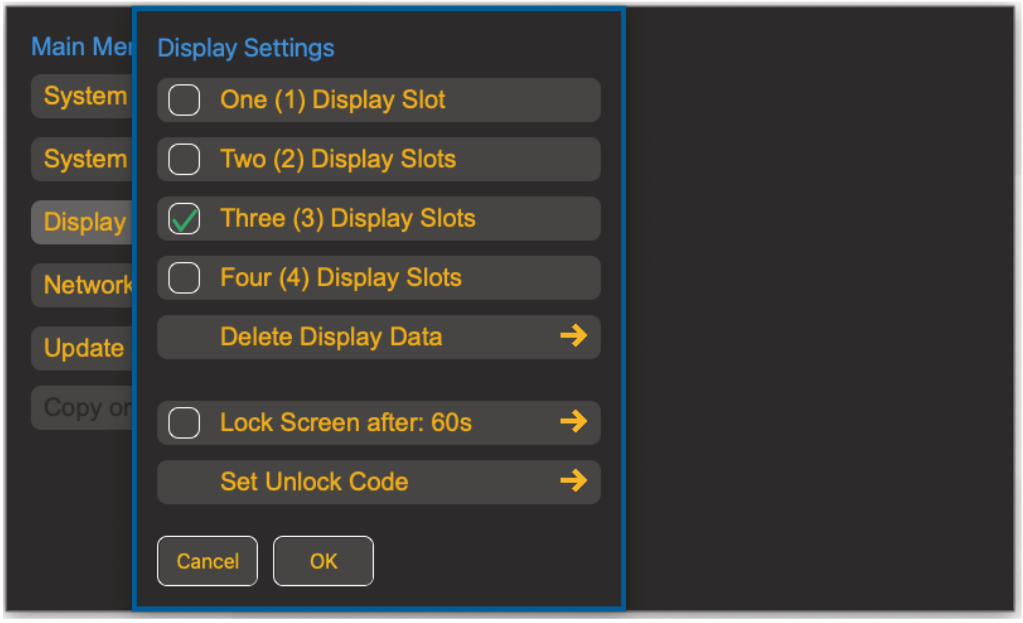

Figure 9 Display Settings

In this sub-menu, you are able to select the number of display slots aka displayed measurement values. To configure our instrument, tap on the check-box labeled “Two (2) Display Slots. The check box should be marked now. It is only possible to mark one of the four upper menu items. The menu should look like this now

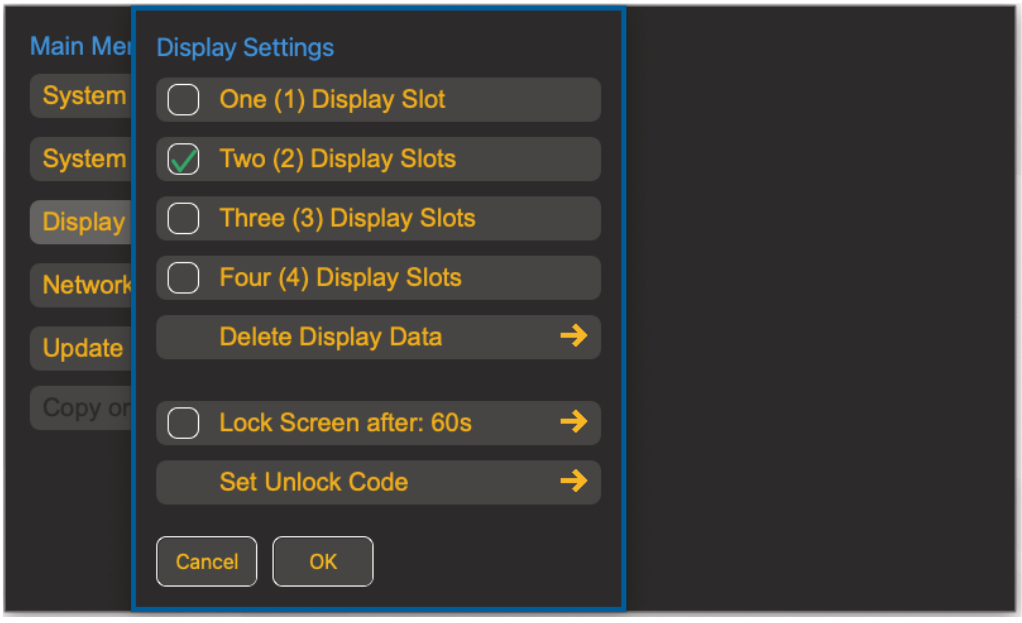

Figure 10 Two selected display slots

Now tap the OK Button to close the sub menu and the Close-Button to close the menu. The main screen of the instrument now should only show one display slot in the lower portion of the instrument

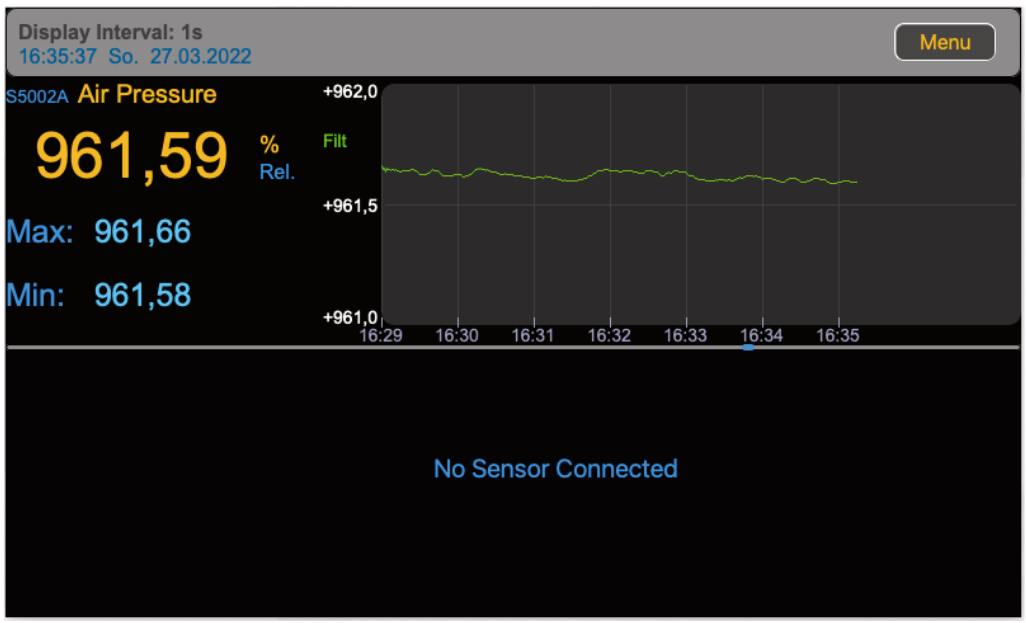

Figure 11 Newly configured main screen

In the similar way as described above you are now able to select the remaining sensor value to be displayed in the lower portion of the display.
So at the end, your main display of the Instrument should look like this

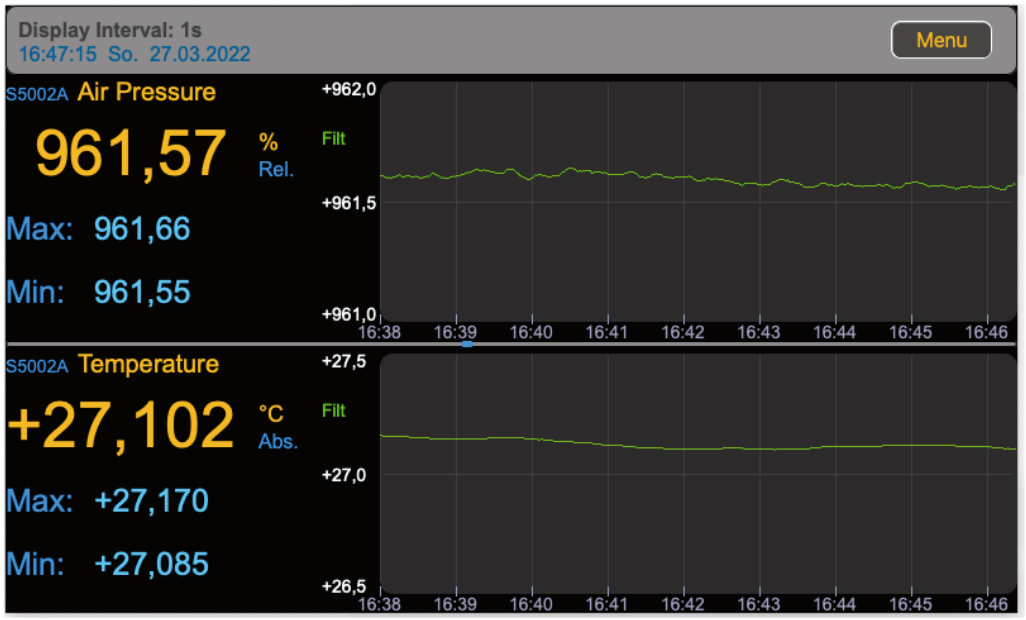

Figure 12 Both display slots are configured

Congratulations! You have successfully configured the instrument and you are making your first measurements.

The main screen

Active Areas of the main screen

In the following picture all active areas of the main screen are depicted. Active Area means that it is possible to perform a Tap or Double Tap on this area to bring up a menu or execute some functions.

Keep in mind that the areas can be slightly different, when the graph is displayed in a different way, for example multiple graphs in one row. The placement might change accordingly but the function of the areas is still valid and keeps the same.
In the above picture only the lower half of the screen is described. The upper half has the very same touch sensitive areas and will function in the same way as the lower half.

The upper gray area of the main screen is called the status bar and contains two active areas. The right menu button will activate the menu screen and is described later in this manual.

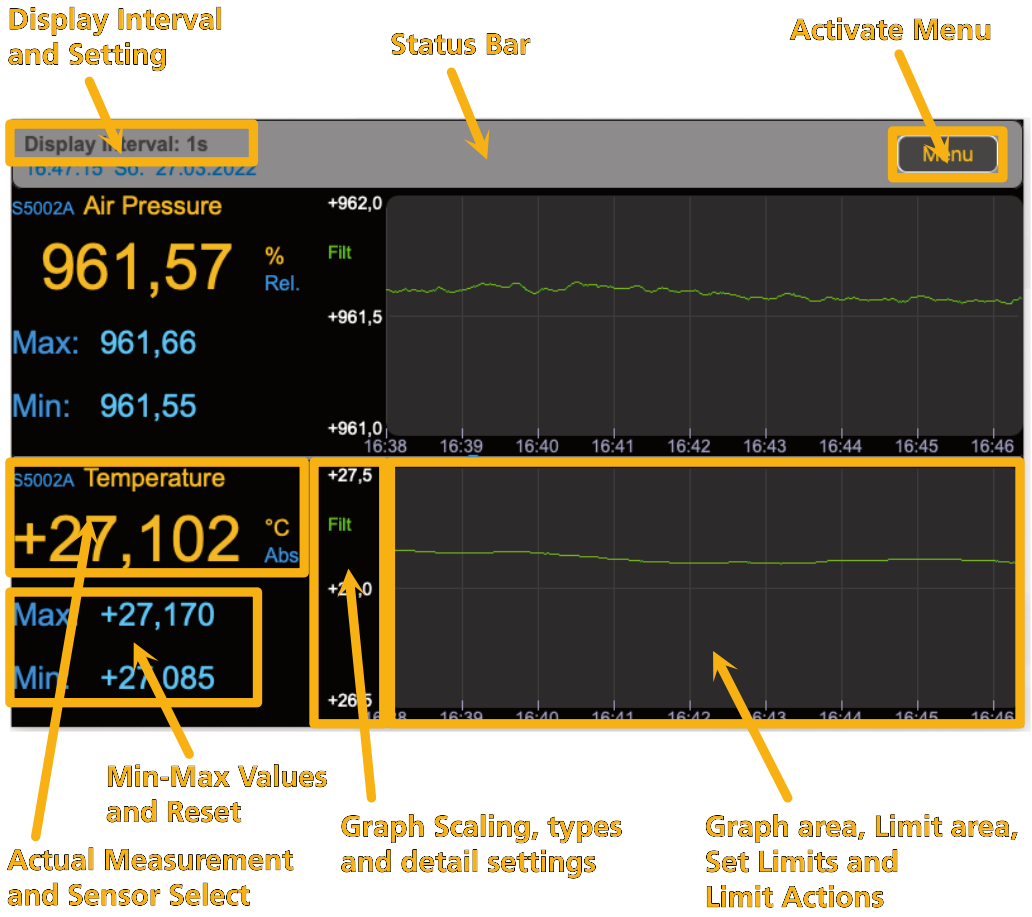

Figure 13 Touch sensitive areas

Before we can go into detail how to operate the main screen, it is necessary to present and explain a UserInterface element, which we will call a MenuLine. Below, several examples of such menu lines are shown:

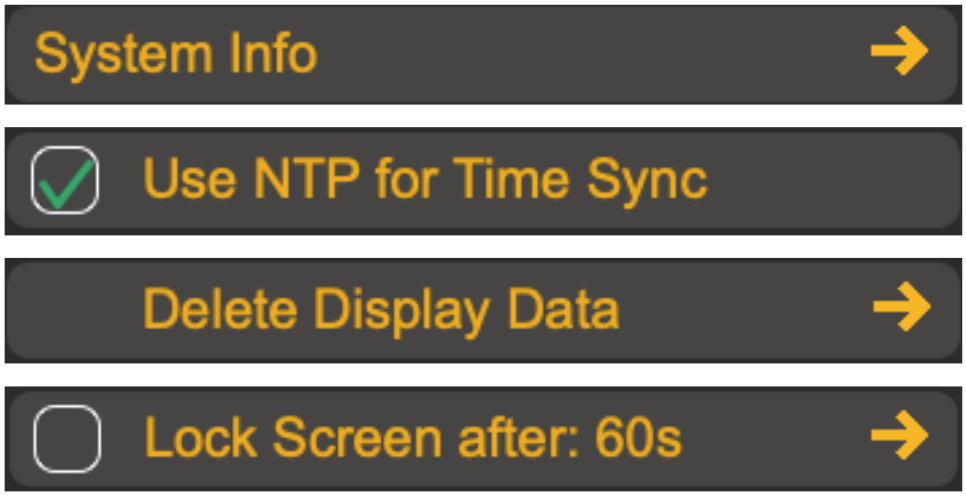

Figure 14 Several MenuLines

Menu Lines

The above UserInterface will be present throughout the whole instrument. Therefore it is very helpful to understand the differences between the various MenuLines.
A general rule of thumb is to look if there is a right pointing arrow present in the menu line. This arrow indicates, that there is a submenu which can be activated using this MenuLine. To call this Submenu, tap on the arrow or the menu text. Above, lines 1,3 and 4 are MenuLines with a following submenu.
In line 2 and 4 you will notice a checkbox on the left side. It is possible, that a MenuLine has both a checkbox and a submenu like in line 4. In any case, to change the value of the checkbox, you need to tap on the checkbox. Tapping on the menu text will have either no effect or call the submenu if the arrow is present.
The very same logic is valid for most of the menu entries, described later in this manual.

Display Interval and Settings

In the status bar on the left the upper line tells you about the actual used display interval. In this context the term ‘display interval’ describes the time between two data refresh events. At such an event, the Environment Monitor queries all connected sensors for new measurement data and displays this set of data.

A double Tap on this display line brings up the dialog for entering the interval in seconds. This dialog offers you all necessary possibilities to enter the desired display interval in seconds.
The lowest number you can enter, depends on the type of sensor connected, in any case, 1 second will be the absolute lowest value. Some sensors will only allow a display interval longer than 1 second. The reason for this is the fact that some sensors require a rather complicated data processing when querying. This data processing might take longer than one second so the Environment Monitor automatically calculates the minimum of time needed to allow for all necessary data processing.
If you enter a number lower than the necessary value, the value will be automatically corrected.

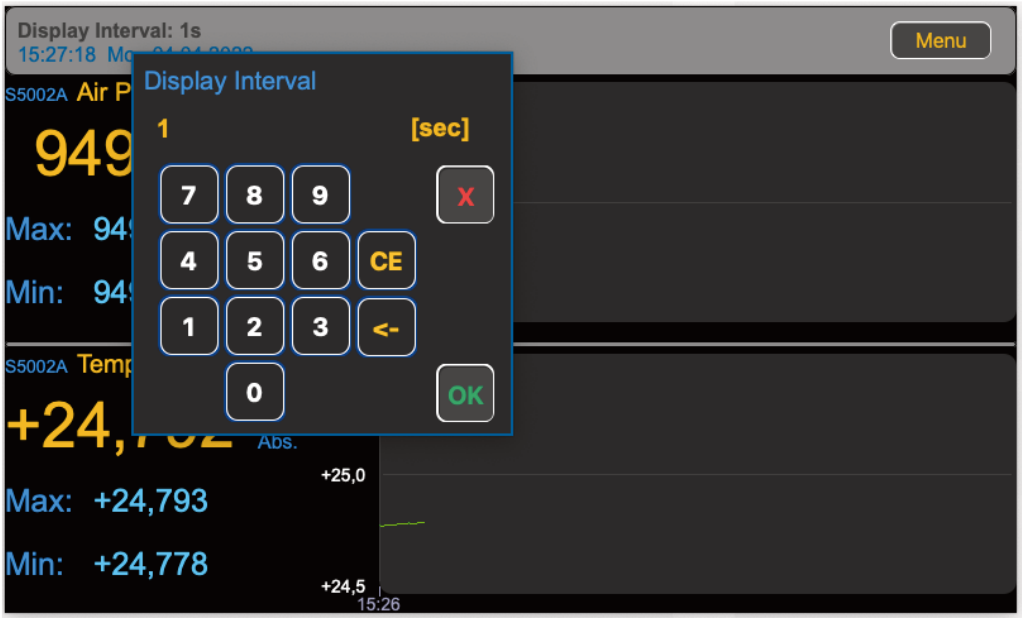

Figure 15 Changing the display interval

If the entered number is correct you may activate the new interval by pressing the green ‘OK’ button or close the dialog without changing anything by pressing the red ‘X’ button.

CAUTION

Even though it is possible to enter one second as minimum interval for most sensors, this is not recommended in most cases. Especially temperature sensors are prone to self heating when being queried too often. Result of this could be false temperature readings and consecutively false other readings, like air pressure or humidity.

For each sensor there is a minimum recommended interval given, which you will find in the sensors manual. If the interval time is shorter than this recommended sensor interval, wekomm will be in no way liable or responsible for any false readings produced by the sensors and the resulting consequences thereof.

Actual Measurement and Sensor Select

Primarily this area shows the actual measurement value, the measurement unit and details like type of value and sensor name.
In the example in Picture 13 the actual measurement value is 27.102°C. In addition we learn that this an absolute Value (abs.) and we are indeed measuring temperature. In front of the measurement type description the product name of the sensor is given. This allows the user to quickly determine, which sensor delivers the values and how accurate those values can be.

A double Tap on this area will bring up the dialog for sensor selection which will be discussed in detail lather in this manual.

Min Max Values and Reset

One important part of working with these measurement can be the knowledge about the absolute minimum and maximum values recorded. The values displayed in this field are retrieved from all measurements taken, not only those displayed on the actual graph.

This is true, until the recording of those values is started again. To do so, just double tap on this area, which brings up a small dialog box:

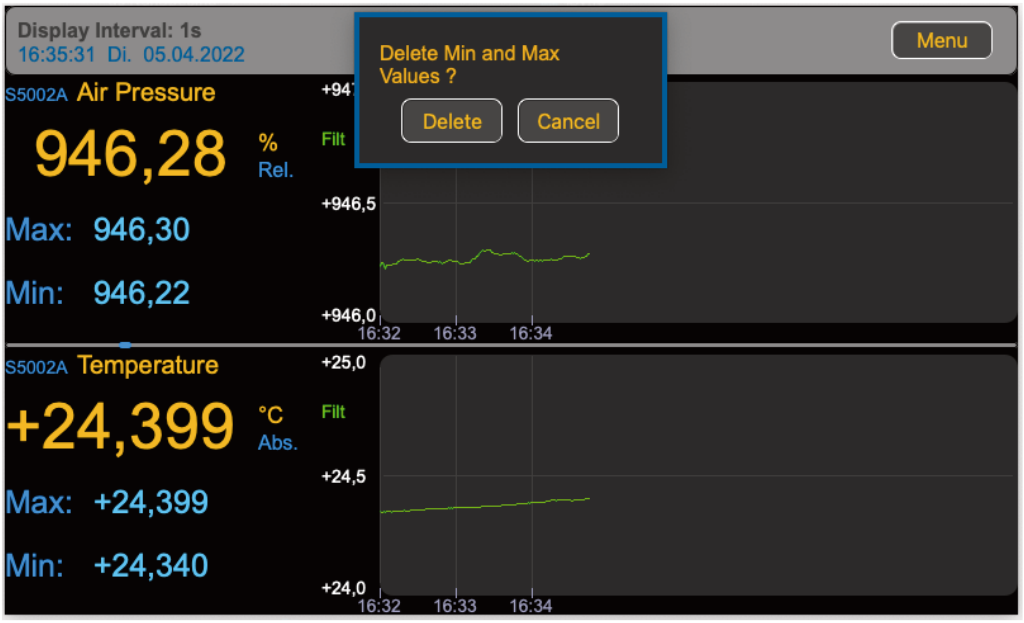

Figure 16 Reset Min and Max values

Now you are able to reset the min and max values for this specific sensor. MinMax evaluation will be started again, based on the actual measurements.

Note

The MinMax values displayed are not recorded or present in the data stream. As the measurement data produced by the instrument is being processed by separate instances, this instance (e.g. a computer system) will be able to identify MinMax values itself

Graph scaling and details settings

As it is important to have a proper scale for any graph, the scale is given in this area. The default setting for any graph will be ‘autoscaling’. Autoscaling in this context means the fact that only the necessary value range is shown to picture the complete graph. This gives you the best possible resolution and the most detail available.

To change any setting related to graph type or scaling, just single tap on the scale area which brings up the according dialog box:

Figure 17 Graph Type Settings

In this dialog box it is possible to select between three different types of information to be displayed and to set the Y-Scaling manually.

The first menu line ‘Show Raw Data’ allows you to display the direct measured value. In most cases this value is of minor interest, why this setting is unselected by default. The directly measured values or raw data are the values, the sensor delivers back to the environment monitor when the sensor is being queried.
As with most measurements, this value is likely somewhat noisy. On the other hand is the environment monitor made to survey - well - environment values. Typically those values change rather slowly. Therefore there is usually enough time (and enough single measurements) to eliminate the noise. So unless you really need to see the unmodified Sensor data, this graph type is usually not being used.
The graph line for raw data is shown in a light grey color.

The second menu line selects the filtered data to be shown. At the time of this manual being written, only one filter can be applied to the data. This filter is called Arithmetic Mean Filter and processes the data in a rather simple way.
Your are able to define, how many measurements are considered to build the arithmetic mean. The algorithm to calculate the arithmetic mean is defined as:

$$Value_{mean} = \frac{\sum_1^n Value_n}{n}$$

Depending to the measurement, you might want to define own values for n. This value ist set to 10 by default. To change it, tap on the MenuLine ‘Show Filtered Data’ to open a dialog, which depicts the arithmetic mean as actual method and the value of n.
At the moment wekomm is evaluating several methods to filter data and will implement them in following software versions.

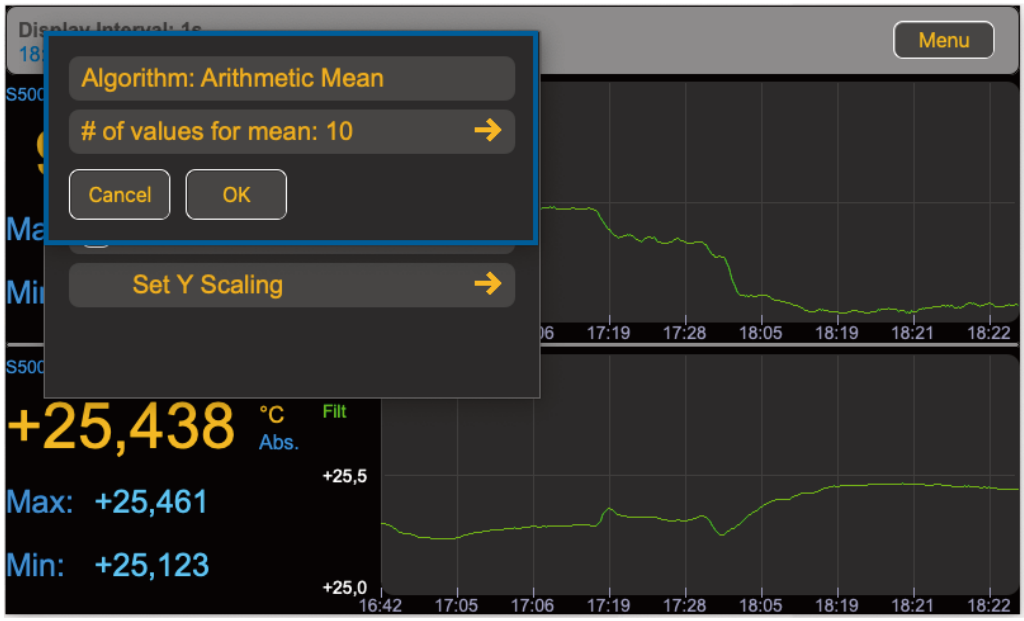

Figure 18 Arithmetic Mean Settings

Now the first MenuLine is not functional but reminds you, that the arithmetic mean is being used. To change the value of the parameter n, tap on the second MenuLine to open the appropriate dialog to enter this value.

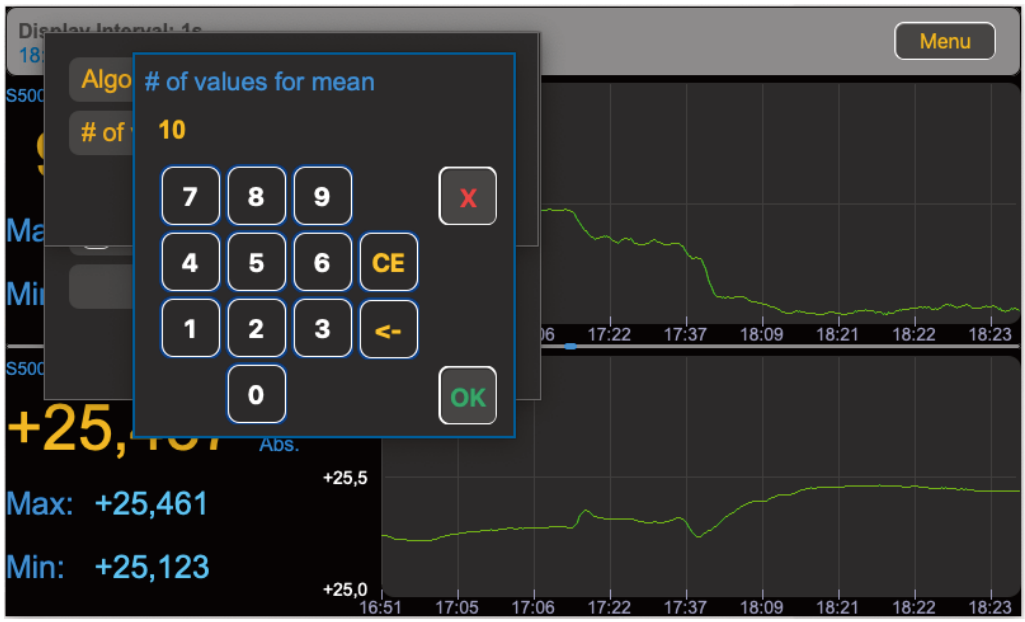

Figure 19 Changing the value for n

You are able to close this dialog without changing anything by tapping the red X Button. If you like to use the newly entered value you confirm that value by pressing the green OK Button. The Number Dialog will close again.

To close the dialog for setting values for arithmetic mean you need to confirm this dialog by pressing the Ok Button. Tapping on the Cancel Button will close the dialog without any change.

Note

You can show both raw and filtered data simultaneously in one graph. However it is not possible to unselect both types at the same time. At least one type of graph is required to be displayed.

The third MenuLine is used to activate the display of activity markers. These markers ares displayed on top and bottom of the graph, when a capable sensor was moved or touched.

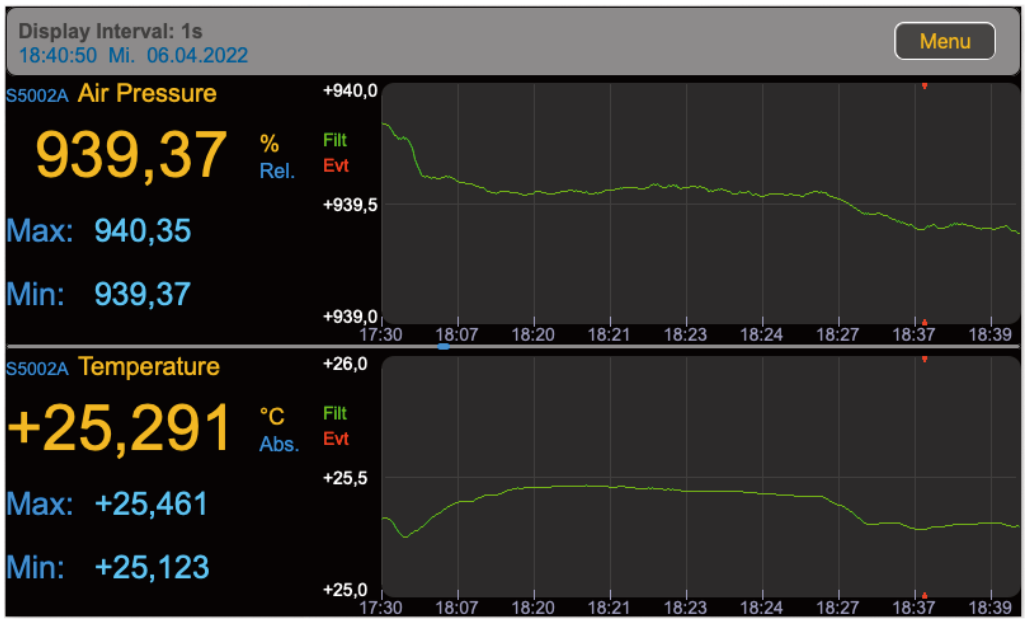

Figure 20 Activity markers shown

These activity markers tell you, that the sensor was moved or experienced some sort of external impact.
This functionality is one of the unique features of the EM5010A. By evaluating those markers you get a much better idea why your measurement values could have changed. If there is a sudden change in the curve, it might either be the value itself, measured. Or it might be the fact, that someone handled the sensor and therefore cause the rapid change.
For that reason, the activity marker is being recorded in the measurement data and is also present in the actual data stream, when retrieved via LXI/SCPI. This is always the case, no matter if the activity markers are displayed or not. There might be situations, where a measurement is made while the whole instrument and sensor are moving. In those cases a indication of movement does not provide additional information. Therefore displaying activity markers can be unselected.

In the upper picture you can see, that the red letters ‘Evt’ are present in the scale of the graph. The abbreviation ‘Evt’ stands for Event and is only displayed, when actual activity markers are visible in the graph.

The last MenuLine in this dialog sets the Y.Scaling of the displayed graph. When this MenuLine ist tapped, the following dialog box will open:

Figure 21 Y-Scaling Settings

The first MenuLine in this dialog box allows you to chose between autoscaling and manual scaling. Autoscaling is selected by default. When autoscaling is selected, the minimum scale available will match to a whole number of the measured data. For example, if the measurement values are given in °C, the minimum scale will be 1°C.

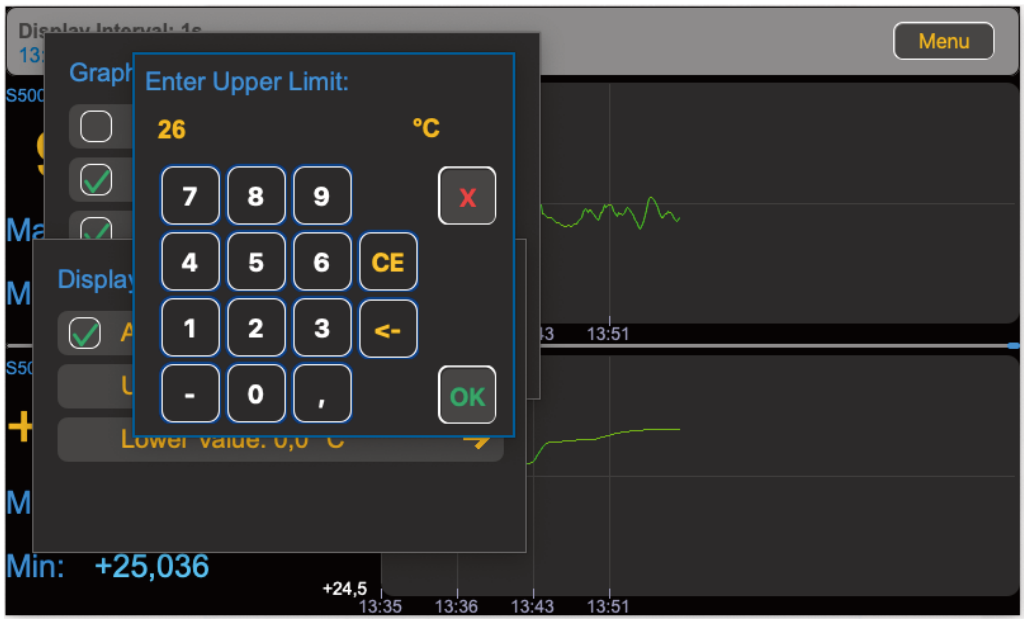

Figure 22 Y-Scaling Settings

The second and third MenuLines in this dialog allow to define the upper and lower values for scaling the graph. Tapping on those MenuLines will call the dialogs to enter the upper or lower value accordingly.
Please be aware, that measurement values exceeding the entered scaling limits are not displayed. So in the worst case it might well be that the graph looks empty but instead all values are outside the defined range.

Graph Area, Limit Area, Set Limits and Limit Actions

One very powerful feature of the environment monitor EM5010A is it's ability to work with local limits. Those limits are a very powerful tool to check if some limits are exceeded, for example the maximum allowed temperature or maybe particulate matters. If configured correctly, the EnvironmentMonitor is able to take actions according to the specific limit settings. When connected to the internet, the instrument can be configured to send a mail when the specific limit is exceeded.
When the Instrument is equipped with Option 002 (external contacts), there are four double throw contacts to control any external device. This might be useful to operate an external alarm device like a horn or alarm light.

If only a limit is defined, the instrument will display a warning sign in the graph area, when the limit was exceeded.

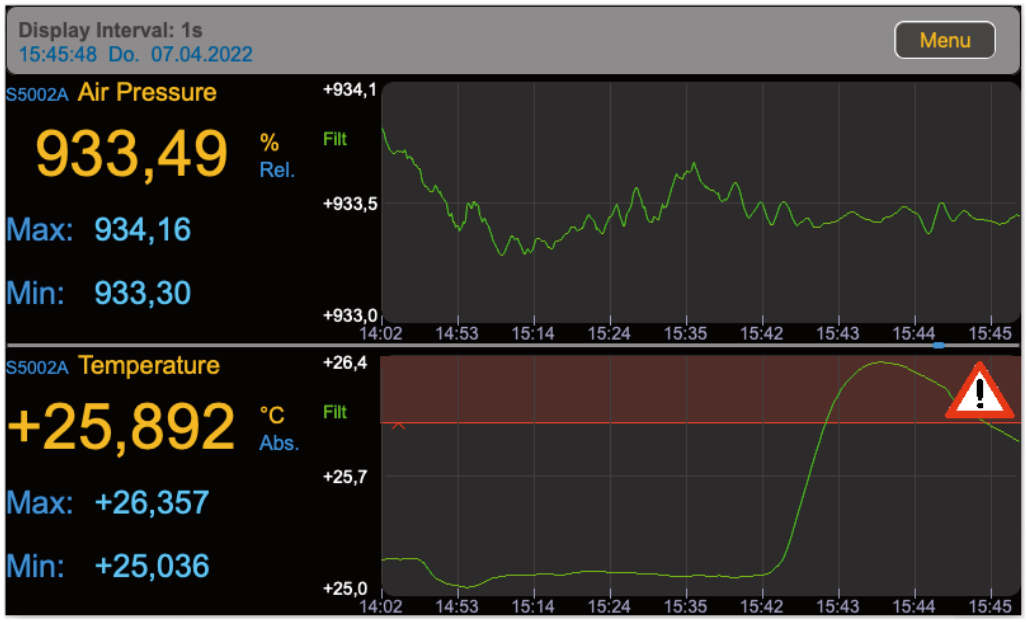

Figure 23 Limit Alarm triggered

Even when the actual values are within the limit values again, the warning sign will remain on the screen until the warning is manually acknowledged. To do so, the warning sign must be tapped on which will bring up a list. In this list all timestamps are shown, when the measurement values exceeded the given limits.

For upper and lower limits there exist two different warning signs and therefore two different lists. The alarms for upper and lower limits can therefore be reset independently.

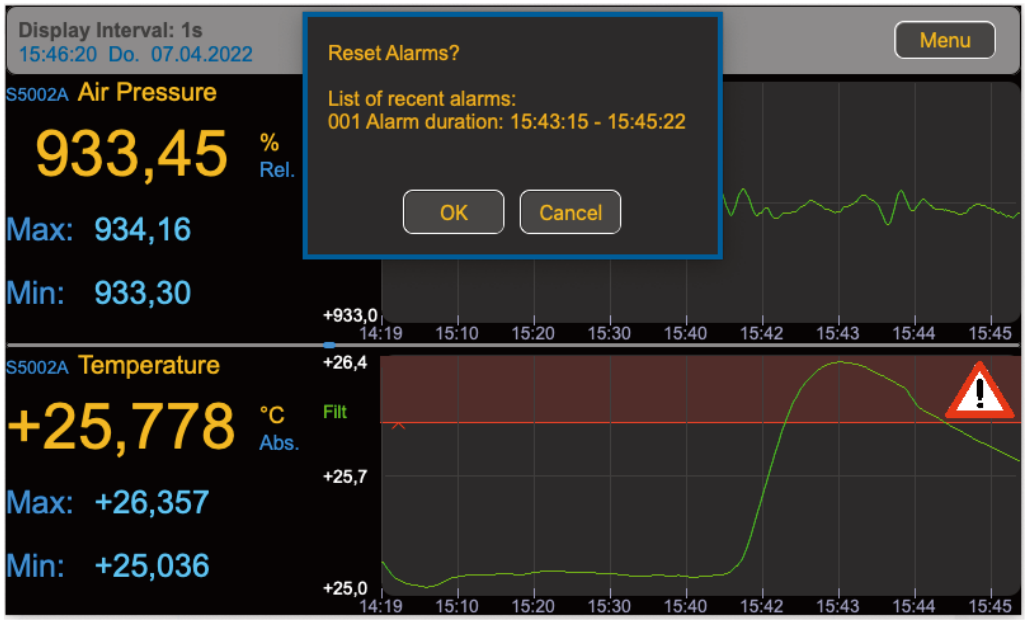

Figure 24 Resetting Limit Alarms

A complete different range of applications is possible, when the 'Auto Reset Limits' are activated. Technically that can be compared with a hysteresis applied to the limit. So when the measured value exceeds the limit an alarm is triggered (email and external contacts if available). Only when the measured values is below the hysteresis or reset value, the appropriate alarm ist being reset and the external contacts are released.
Let us assume that we have a temperature measurement and the lower limit is set to 10°C. The auto reset value (hysteresis) is set to 11°C. Now, if the temperature falls below 10°C, the alarm is triggered and an external heater is switched on by the activated contact. This will likely increase the measured temperature until the value reaches 11°C. At that moment the heater is being switched off (because the alarm is being reset automatically).
This functionality is available for the upper and lower limit with separate settings for each limit. Using this functionality it is possible to us the EnvironmentMonitor as a controller to keep the desired value within range. As the EnvironmentMonitor provides four contacts with Option 002, the EnvironmentController can act as a controller for two independent measurements.
Changing the display interval (and therefore the query interval for the sensors) is another parameter which can be modified to obtain the desired controller properties.

An example of how this might look like is shown in the pictures below:

Figure 25 shows a measurement value which triggered the maximum alarm. In this example contact #1 was configured so the large Number 1 is shown in the status bar. In contrast to limit surveillance there is no warning sign shown, as the auto reset function is being configured.

Figure 26 shows a measurement value which triggered the alarm but is already below the upper limit value. Still the alarm is active which you are able to see because the area for the auto reset value is painted in red and the selected contact #1 is still activated.

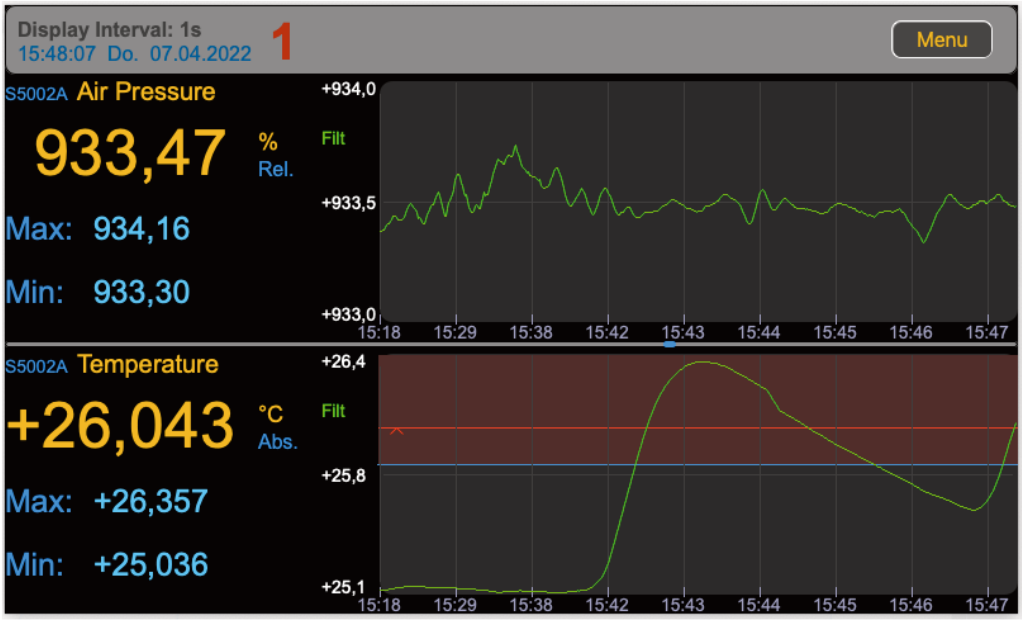

Figure 25 Alarm with auto reset - triggered

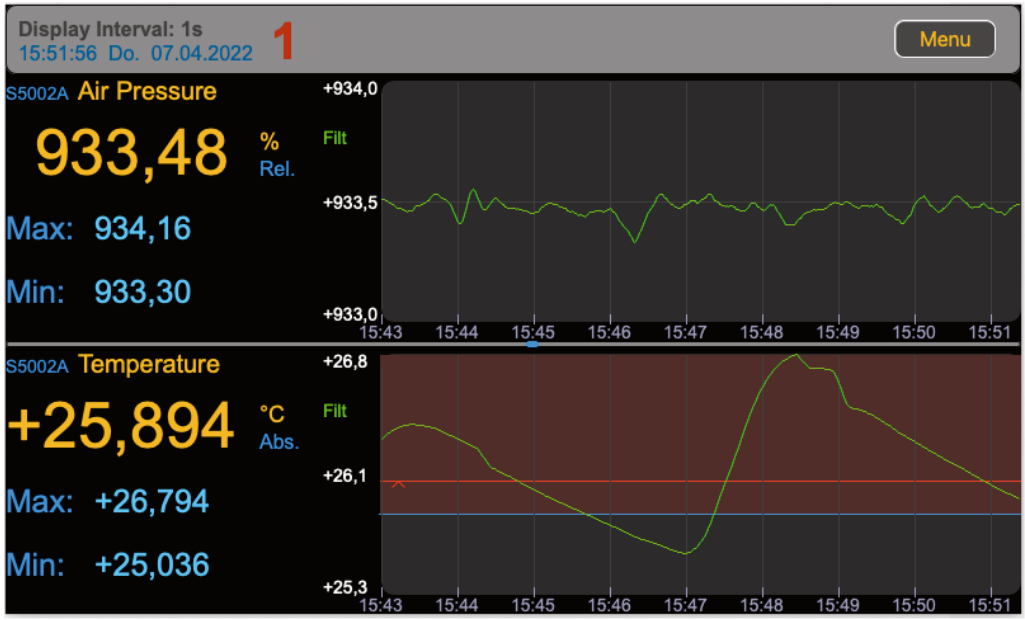

Figure 28 Alarm with auto reset - in Hysteresis

To configure all these functions just perform a double tap on the graph area which will bring up the dialog box shown in Figure 26.

The available MenuLines are rather self explaining. The upper two lines define the upper limit settings. The two lines below define the lower limit settings.
The last MenuLine deactivates all limits, aka clears all checkboxes. The limit values or the defined actions are not modified in any way.

In this context we are explaining how to work with limits regarding only the upper limit settings. The lower limit settings work just accordingly. The only difference is of course, that the auto reset value for the upper limit needs to be lower than the upper limit. The auto reset value for the lower limit needs to be higher that the lower limit. It is not

Figure 26 Configuring Limits

possible to enter values for auto reset, that are higher respectively lower than the limit values.

To work with limits, first of all it is necessary to define the limit itself. In this example to set the upper limit and define the appropriate actions. To do so, tap on the first MenuLine to open the dialog for settings the alarm properties.

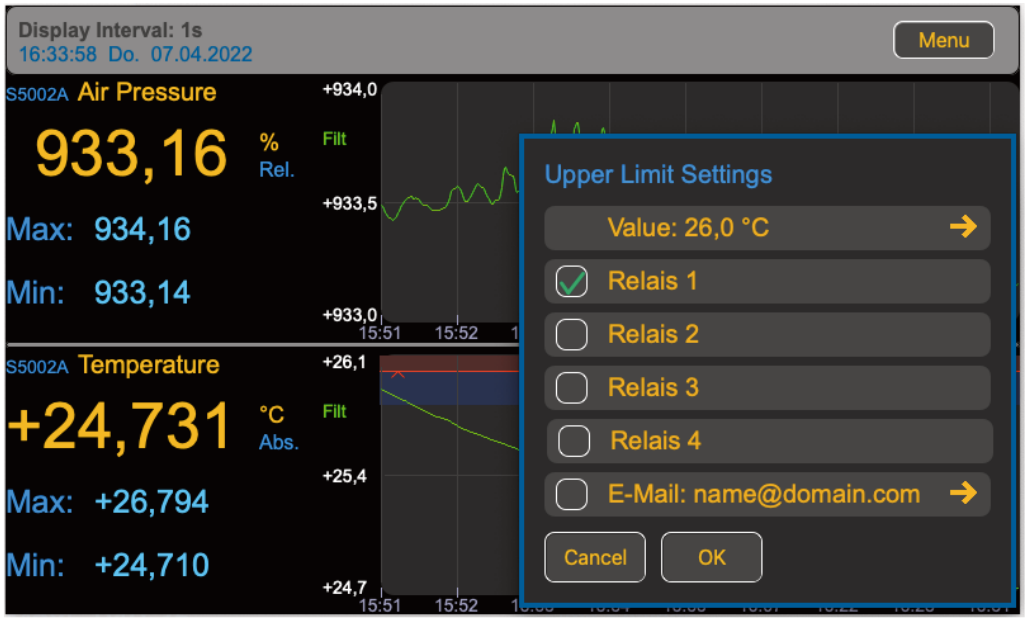

Figure 27 Defining the upper Limit

To understand what settings can be made in this dialog box we are discussing each MenuLine separately.
The first MenuLine allows the user to define the limit value itself. When tapping this line the dialog for entering a number is called (See Figure 22) and provides the possibility to enter this value. It is possible to enter fractional values, like 26.1234 although only the

first digit of the fraction will be user. So this value would be used as 26.1 and being display accordingly in the first MenuLine.
The next four MenuLines allow the user to define which contact will be activated in case of an alarm. All limit settings share the same contacts so be careful how to select those contacts.

CAUTION

The contacts are operated only when a transition occurs. So when a limit value is exceeded, the according contact will be triggered to activate. If the contact is being reset by another limit, it will not be triggered again, even when the first limit is still exceeded.

This is explained best with an example. Let us assume we have to measurements made by the instrument, Humidity and Temperature. Both measurements have limits set and the auto reset active. Now let us assume, the temperature value exceeds it's limit. The configured contact is #1 for this limit. Consequently, contact #1 will be activated. When the value representing the humidity exceeds it's limit, it triggers contact #1 as well. As this contact is already active, nothing will happen.
Now the humidity could fall below the auto reset value while the temperature still exceeds the limit. The humidity will release contact #1 as the falling below the release value initiates the trigger. Contact #1 will not be activated anymore, until a limit exceeding happens again.

While this functionality might be used to implement some complex controlling functions, generally it is very much recommended to use different contacts for different limits.

The last MenuLine lets you define an email address, which receives a notification, once an alarm is set (limit exceeded) or reset (below auto reset value). By default the mail address configured in the general mail settings is used but it is very much possible to use a different mail address for each limit.
To enter or modify the mail address just tap on the Menuline, A dialog wil be opened which allows to edit the address.

Figure 29 Entering the email address

This MenuLine has the double functionality as it carries a checkbox and is able to activate a sub menu. So if you like to send an email when the limit is exceeded, do not forget to check the corresponding field in this MenuLine.

Once all settings are done, you can close that dialog box with the OK button or cancel all changes by tapping the Cancel button.

Now you have defined all limit settings, but the limit itself is not active yet. In figure 26 you can see that the second MenuLine gives you the ability to enter the auto reset value. This procedure is straight forward, just tap the MenuLine, enter the desired value using the number entry dialog box and confirm by tapping the green button.

Which type of limit handling you will use, depends only on the activated checkboxes regarding the limit settings.
To use Limit Checking ONLY activate the limit (first MenuLine in this example).
To use automatic limit reset, activate BOTH limit settings (limit and auto reset value).

You cannot enable the auto reset value by it's own, the auto reset value will be disabled as well when the according limit ist being disabled.

So this dialog box gives you the ability to define limits for your measurement values as well as activating them in two different modes.

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The menu

The main menu screen

Right after tapping the Menu button in the main screen, the main menu will appear on the screen.
The main menu is the program area, where you are able to change the most settings and configure the instrument.