



## EM5010A Environment Monitor

### EM5010A

The EM5010A is a unique, versatile and capable Instrument which long-term displays, monitors, surveys and records all sorts of data, delivered by sensors. The sensors might measure virtually all thinkable parameters, as the data and the type of data processed by the EM5010A is defined just by the sensor.

With these features, the EM5010A is the perfect instrument for monitoring all kinds of environmental data, like temperature, ambient air pressure, humidity, particulate matters, VOC (volatile organic components), NO<sub>x</sub>, CO, CO<sub>2</sub>, strain, height, etc. So it is ideal for monitoring all slow changing values which are in many cases mission critical when producing, storing, running labs etc.

But the EM5010A does not stop there. Many sensors come with a built in movement detector. That allows you to identify the cause for your value

changes most likely. So finding out, if that temperature peak was caused by the DuT or somebody touching the sensor is just a matter of seconds. Even later on, because the movements are always recorded. Furthermore the EM5010A supports sensors with digital inputs to monitor all sorts of external influences. So you can easily see, if someone switched on the light, opened a door or even see when the AC was working. These digital inputs are equally recorded as the analog values to give you the best possible view of what exactly happened at every time.

In mobile use the EM5010A can be fitted with an external GPS sensor, so all measurements are recorded with position data. That allows areal surveillance or fail-proof documentation of the measurement location.

As for the instrument EM5010A itself, no calibration is needed, as all calibration data is stored and processed in the sensor itself.

One feature, rarely seen in this kind of instruments is the very capable limit surveillance function, the EM5010A offers.

Basically you can choose between two modes of checking. One mode is just recording, if the value monitored exceeds its allowed limits. This event then will trigger some configurable actions like sending an email or activating a contact (option). In addition, a warning sign is displayed even if the value has already returned within limits. By this way you will never miss any violation of limits. This kind of warning needs to be reset manually while all limit violations are listed.

The second way of surveillance is offered by adding some hysteresis values. Once the measured value exceeds the limit value, an alarm is triggered as in the first mode. When the value returns to the allowed range, (which is now narrowed by the hysteresis), the alarm is automatically reset. In combination with external contacts this feature allows for some control functions, like activating a heater, when the temperature falls below some limit. The hysteresis prevents oscillation and allows more sophisticated functions.

Of course all limit violations are recorded, no matter if they are reset manually or automatically.

Both ways of limit checking are combinable, even on the very same measurement. So you might apply a hysteresis for the lower limit of any value and apply a recording limit for the high value.

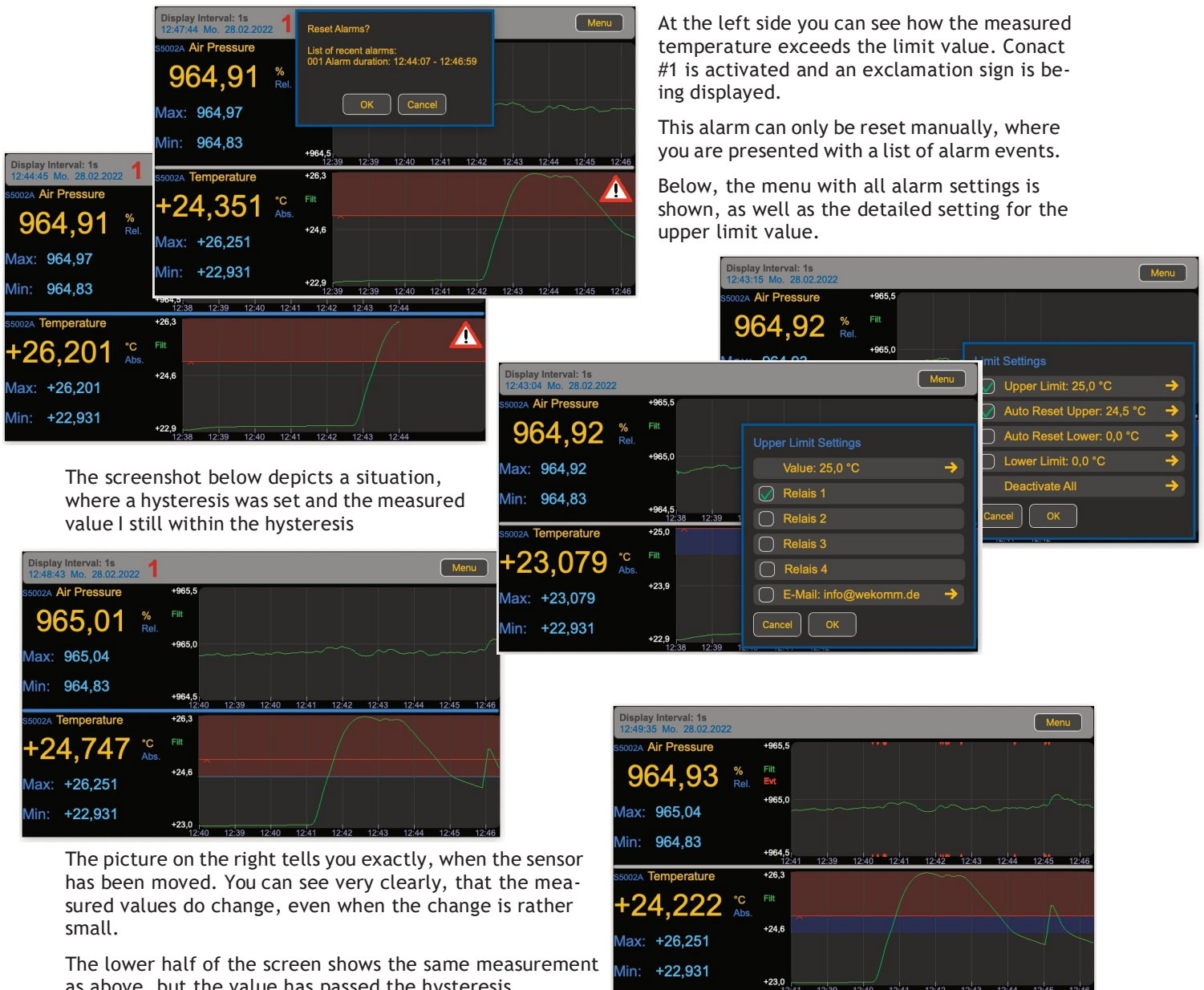
Another unique functionality of the EM5010A is the ability to detect sensor movements and to record them. Those events will tell you exactly if someone or something tampered with the specific sensor. That helps to identify the root cause for the change in measurement value. All events are recorded so you have always a clear indication, when the specific sensor was moved. For mobile applications or cases where sensor movement is unavoidable, the display of the movement can be unselected. Although the movement events are always recorded, no matter how the display setting was chosen.

At the left side you can see how the measured temperature exceeds the limit value. Contact #1 is activated and an exclamation sign is being displayed.

This alarm can only be reset manually, where you are presented with a list of alarm events.

Below, the menu with all alarm settings is shown, as well as the detailed setting for the upper limit value.

The screenshot below depicts a situation, where a hysteresis was set and the measured value is still within the hysteresis



The screenshot below depicts a situation, where a hysteresis was set and the measured value is still within the hysteresis

The picture on the right tells you exactly, when the sensor has been moved. You can see very clearly, that the measured values do change, even when the change is rather small.

The lower half of the screen shows the same measurement as above, but the value has passed the hysteresis

# Data management



All data, measured by the connected sensors are permanently recorded locally. All sensors are queried in a defined interval (5 sec shortest) and will deliver their respective measurement data.

The EM5010A provides up to four display areas (slots), where measurement data can be shown. That display I intended to give a good overview about the most critical data being measured.

A specific sensor can deliver multiple values, which might not be of a immediate interest. The recording of the data value makes sure, that even this information is stored. So no matter which information you chose to display on the large touch sensitive display, all measured information will be equally recorded.

One good example is the GPS-Sensor S5090A, which

will not even be selectable for display. Whereas all GPS data is being recorded together with the measured data. This provides a location information for each set of measurements.

Even alarms will be executed, when the specific value is not displayed. So it is recommended, that measurement which requires a manual alarm reset should be in permanent display on the EM5010A.

Recorded data is stored in a CSV-format and accessible via a shared folder through network. Database connectivity as well as local copy to an USB-Stick will be added in near future.

# Front and Rear view



# Specifications

Display:	7" colour display, capacitive touch
Resolution:	800 x 480 pixel
External connections:	(Front) USB-Port, (Rear) Power, Ethernet, 4 x Sensor input, external contacts
Data access:	CSV-format
Update possible:	Over internet connection
RTC:	Yes
External contacts:	Optional, Option 002, max 24V, 1A
Power Supply:	110-240V AC, 12-24V DC optional, Option 010
Internal Battery:	Optional, Option 011
Weight:	3 kg
Dimensions	L 24.5cm x W 26cm x H 14cm (all dimensions w/o handle)
Available Options:	002, 010, 011

## Available Sensors



The range of sensors for the EM5010A is under continuous development and will be expanded in the future. At the date of editing this document the following sensors are available:

S5001A	Humidity, Temperature
S5002A	Air Pressure, Temperature
S5010A	Particulate Matter (1.0, 2.5, 4.5, 10), VOC, Humidity, Temperature
S5090A	GPS location data
S5100A	Eight digital inputs

## S5001A Specifications

### Humidity

Typ. accuracy rel. humidity	1.8% rH
Measurement range	0 - 100%
Response time	8s

### Temperature

Typ. accuracy temperature	0.1 °C
Measurement range	-40 to +125 °C
Response time	5s

**Dimensions** length: 13cm, Diameter 12mm

**Weight** 0.03 kg

**Cable Length** approx. 1.5m

## S5002A Specifications

### Pressure

abs. accuracy pressure	± 1hPa
Measurement range	300 - 1100 hPa
Response time	1s

### Temperature

Typ. accuracy temperature	± 0.5 °C @ 25 °C ± 1 °C 0 - +65 °C
Measurement range	-40 to +85 °C
Response time	1s

**Dimensions** length: 13cm,  
Diameter 12mm

**Weight** 0.03 kg

**Cable Length** approx. 1.5m

For precision temperature Measurement  
please consider using S5001A sensor



## S5010A Specifications



### Particulate Matter

accuracy	± 10%
Measurement range	0 - 1000 µg/m <sup>3</sup>
Particle Sizes	PM1.0, PM2.5, PM4.0, PM10.0
Each Particle Size measurement is represented as a separate sensor and is therefore Measured simultaneously	

### Temperature

Typ. accuracy temperature	0.45 °C
Measurement range	-10 to +50 °C
Response time	60s

### Humidity

Typ. accuracy humidity	4.5 %rH
Measurement range	0 to 90 %rH
Response time	20s

### VOC

Output Signal	0 - 500 VOC index
Measurement range	0 - 1000 ppm
Response Time	10s
Sensor to Sensor deviation	± %m.v. (TVOC)
Detection Limit	< 0.05 ppm of ethanol equivalents or < 10% of concentration setpoint, whichever is larger
Settle Time	1h
Internal Humidity comp.	yes

**Dimensions** Subject to change

**Weight** 0.5 kg

**Cable Length** approx. 1.5m

## S5090A Specifications

<b>Supported Systems</b>	GPS, GLONASS, GALILEO, QZSS
<b>Supported Channels</b>	210 PRN-Channels with 99 search channels and 33 tracking channels
<b>Dimensions</b>	n/a
<b>Weight</b>	0.03 kg
<b>Cable Length</b>	approx. 1.5m

## S5100A Specifications

<b>Input voltages</b>	24V max
<b>Dimensions</b>	n/a
<b>Weight</b>	0.03 kg
<b>Cable Length</b>	approx. 1.5m



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