

Compact manual



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BAPPU 
evo



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1. BAPPU^{evo}

The product is a multi-meter for orienting measurement of environmental characteristics at workplaces. The following measurands can be measured: Air temperature, relative humidity, noise level class 2 with C-peak up to 137 dB, illuminance class C, flicker frequency, luminance, luminance ratio, and optionally CO₂ value, TVOC, CO value, IRevo surface temperature, Globe temperature, air velocity, and fine dust PM₁, PM_{2.5}, PM₁₀.

Developed and manufactured by:



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The contents of this manual are subject to unannounced changes that reflect technical progress.

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The instructions for use contain the most important information for operating the product safely. The instructions for use must always be kept close at hand and always accessible near the product.

This instruction manual meets the requirements of the Product Safety law. (ProdSG)

When operating the product, follow the instructions for use and the product specifications.

The contents of the important instructions for use must be read, understood and followed in all respects by anyone responsible for the assembly and operation of the product. This is especially for the safety instructions in Chapter 2. Following the safety instructions and instructions will help to prevent accidents, malfunctions, faults and property damage.

For technical questions, please contact: support@bappu.de

1.1. Symbols

The following symbols are used in this operating manual:



This note indicates the risk of injury and / or death as well as health hazard, if certain rules of conduct are disregarded.

Tipp:

Important notes and information for installation, operation and maintenance.



Please note and read the instructions for use.

1.2. Security alert

During assembly and operation, the following safety instructions must be observed:

Use personal protective equipment (PPE)

	When using the product, it may be necessary to wear safety shoes.
	When using the product, wearing protective clothing may be required.
	When using the product, it may be necessary to wear protective gloves.
	When using the product, wearing an industrial helmet may be required.
	When operating the product for noise measurement, it may be necessary to wear ear protection.
	While charging, do not leave the device unattended.

1.3. General information



Risk of burns: The product is subjected to an operating temperature of up to 50 ° C. There is a risk of burns on housing parts.



Avoid installation errors: The product may only be installed by qualified personnel of the operator. Assembly errors can lead to malfunctions!

1.4. Qualification of the operating personnel

Work with and on the product may only be carried out by instructed persons of the operator with the requisite knowledge and experience.

1.5. Observe accident prevention regulations

The relevant accident prevention regulations as well as the other generally accepted safety rules must be observed.

1.6. Intended use

The product may only be used to measure the above-mentioned measurands at workplaces in accordance with ArbStättV (see place of use) within the scope of the ambient conditions and permissible measuring ranges listed below.

The various sensors may only be used for intended measurements or for measurements within the calibrated or permissible measuring range. For measurements outside the calibrated range, readings may be outside the allowable tolerance; measuring unintended readings or taking readings outside the acceptable range may damage the sensors or even the entire product.

The product can be used at workplaces. Workplaces are workspaces or other places in buildings on the premises of an establishment, places in the open air on the premises of an establishment, places on construction sites, if they are intended for use for workplaces.

A workplace includes, in particular, places on the premises of an establishment or construction site to which workers have access in the course of their work, traffic routes, escape routes, emergency exits, warehouses, machines and ancillary rooms, sanitary facilities, canteens, breaks and preparedness rooms, first aid rooms, accommodation as well Facilities for the operation of the workplace, fire-extinguishing equipment, utilities, lighting, ventilation and air conditioning, signaling, power distribution systems, doors and gates, moving walks, escalators, loading ramps and ladders.

Any use beyond its intended use is deemed to be contrary to the intended purpose. The manufacturer is not liable for resulting damages.

Proper use also includes observing and following all instructions in this documentation.

1.7. Technical changes

The manufacturer assumes no liability for technical changes by the operator or by another manufacturer.

If technical modifications are made to the multimeter by the operator or by another manufacturer, this must be considered anew from a safety point of view.

1.8. Initial assembly

The initial assembly and all related work will be carried out by the manufacturer.

1.9. Delivery contents

BAPPUevo with internal data logger for long-term recording, carrying case, rechargeable batteries (4 x Mignon (HR6, NiMh)), power supply, USB cable, hand strap, mini tripod, "Stupka" stand and operating instructions.

1.10. Optional Sensor

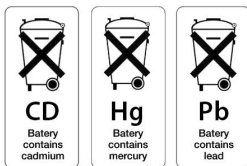
ANEMOMETERevo, GLOBETHERMOMETERevo, VOCOOsx, IRevo

1.1. Optional accessories

A **calibration unit** for checking the accuracy of and for adjusting the noise level measurements on site.

- An additional **battery** pack
- A high-quality **charger** for charging external batteries. This unit helps you get the maximum capacity from the battery. It can even be used for charging an additional battery pack.

1.2. Disposal



Please dispose of all packaging and obsolete devices in the correct manner. In the interest of the environment, the device must not be thrown away as normal household waste. You should arrange for the proper disposal of the device.

Your local government will be able to provide you with the respective collection points and their opening hours.

1.3. Support

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1.4. Calibrating BAPPU-evo

Detectors and sensors are prone to drifting and change. In order to guarantee high-quality results with BAPPU-evo, we recommend that a factory calibration of the unit should be carried out every twelve months.

BAPPU-evo displays a corresponding message in the main menu one month before the end of the calibration interval. This can be deactivated under "Settings / Display". However, it is then possible that the results of the measurements are outside the tolerance range.

1.5. Technical data and measuring range

Permissible operating conditions

Temperature: range from 0 °C to +50 °C | Relative humidity: range from 0 to 95% (non-condensing) | The optional sensors might have deviating operating conditions: With the optional CO sensor (only in BAPPU-VOCOO to serial number xxx/04): temperature: range from 0 °C to +50 °C (this also applies for storage).



Caution: Storage below 0 °C can permanently **damage** the CO sensor.

With option particular matter (in BAPPU-VOCOO-sx): temperature: from 0 °C to +40 °C, humidity: from 10 %...70 % rF (this also applies to storage).

Measuring range and tolerances

Measurement Range		Tolerance	Sensor	Resolution
Air temperature	-20...50 °C	+/- 0,5 °C	PT 1000 Sensor	0,1 °C
Globe temperature*	0...70 °C -20...70 °C	+/- 0,7 °C +/- 2 °C	Integ. temperature semiconductor sensor	0,1 °C
Surface temperature*	0...50 °C -20...75 °C	+/- 1 °C +/- 1,5 °C	IR-sensor	0,1 °C
Rel. humidity	10...90%	+/- 4% r.H.	Capacitive humidity sensor	0,10 %
Air speed*	0,01...5,00 m/s	+/- 10 % f. MV.** +/- 3 Digit	Thermo-anemometer	0,01 m/s
Noise level (Class 2) in accordance with DIN EN 61672-1: 2014	30...135 dB(A) A-evaluation Slow/Fast c-peak= 137 dB	+/-1 dB(A) at 1 kHz inherent noise <25 dB(A)	Precision electret condenser microphone	0,1 dB
Illuminance (Class C) in accordance with DIN 5032-7: 2017	50...30.000 Lux 1...50 Lux	V-lambda adjustment 7,5 % Cosine-correction 4 % Linearity 3 % plus +/- 1 Lux	Silicon photo-element with adapted spectral sensitivity	1 Lux
Flicker frequency	0...1000 Hz	+/- 0,2 Hz	Silicon photodiode	0,1 Hz
Luminance Maximum display brightness Luminance contrast	10 ... 2000 cd/qm 1/60...60/1 (under typical workplace lighting conditions)	+/- 10% f. MV.** +/- 10 cd/qm as for the luminance	Silicon photo-element with adapted spectral sensitivity	0,1 cd/qm 1 Digit
CO ₂ (carbon dioxide)*	0...10.000 ppm	+/- 75 ppm +/- 5 % f. M.V.**	Non-dispersive infrared	1 ppm
TVOC (total volatile organic compounds)*	100...2000 ppb (isobutylenäq.)	+/- 100 ppb +/- 15 % v.M.**	metal	1 ppb
CO (carbon-monoxide)*	0...500 ppm	+/- 5 ppm +/- 5 % v.M.**	electrochemical (Lifespan up to 10 years)	1 ppb
Particular Matter (pm)*	PM ₁ : 0...1000 µg/m³ PM _{2.5} : 0...1000 µg/m³ PM ₁₀ : 0...1000 µg/m³	PM ₁ , PM _{2.5} : 0...100 µg/m³ +/-15 µg/m³ 101...1000 µg/m³ +/-15 % v.M.** PM ₁₀ : 0...100 µg/m³ +/-30 µg/m³ 101...1000 µg/m³ +/-30 % v.M.** at 0...40°C; 10...70 % rF	optical	1 µg/m³

*optional sensor, **from measured value

BAPPUevo: L=260mm, W=94mm, H=40mm, G=450gr.

WLAN module: 2.4 GHz Wi-Fi (802.11 b/g/n), Bit rate: 802.11n up to 150 Mbps, Operating frequency: 2412 ~ 2484 MHz

Subject to technical changes at the factory.

Independent from the classification of individual measurements, the BAPPUevo has been designed as a measuring device for performing indicative measurements. Therefore, BAPPUevo should be used according to these prerequisites.

Specifications of the measurement with VOCOOsx



Caution: The VOC sensor needs after switching on about 3 minutes, to stabilize. During the heating phase, the “VOC” LED flashes during the heating phase.

Available sensors in VOCOOsx

When switched on, the LEDs of the VOCOOsx signal the available sensors.

Specifications for noise level measurement

Properties	Value
Measurement tolerance	+/- 1dB Reference conditions: 87,5 dB at 1 kHz
Resolution	0,1 dB
Level range	30 – 95 dB and 80 – 135 dB
Frequency range	31,5 – 8 kHz
Frequency weighting	A
Reference frequency/range	1000 Hz / 87,5 dB
Direction of reference	Perpendicular to the middle of the microphone
Acoustic centre	Centre of microphone diaphragm
Screen refresh	0,33 s

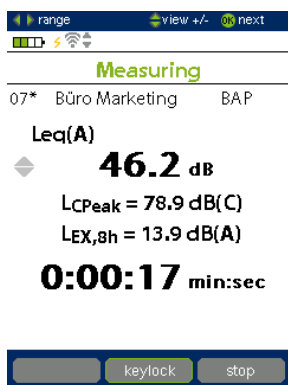
The noise level measurement values are made using frequency weighting A. For carrying out frequency weightings, “slow” (1 second) and “fast” (125 milliseconds) are available (please refer to page 28, chapter 8.4, “Measurement settings (measurement)”).

The standard configuration of the level range is “auto”. We recommend using this setting. Changing the level range to “Low” or “High” can be selected in the main menu under properties/settings (please refer to chapter 8.4, “Measurement settings (measurement)”). When the range is exceeded, it will be indicated - depending on how long this takes - at least every second. All specifications for noise level measurements refer to a BAPPU-evo that is **not** fitted with extra accessories and optional sensor devices.

Frequency weighting and permissible errors

Nominal frequency in Hz	A-evaluation in dB	Permissible error class 2 in dB
31,5	-39,4	+/- 3
1000	0	+/- 1,5
4000	1	+/- 3
8000	-1,1	+/- 5

Equivalent continuous sound level (L_{eq} , $L_{ex,9h}$)



In addition to the sound level measurement, the equivalent continuous sound level of the past minute is continuously determined (noise equivalent = L_{eq}).

With BAPPUevo it is also possible to record the equivalent continuous sound level, C-peak value and $L_{ex,8h}$ (see 8.4 "C-peak/ $L_{ex,8h}$ " setting) over any period of time. To access the corresponding mode, proceed as follows:

You are within a measurement in the "Noise" measurement area (see also chapter 6.1 "Perform measurement").

Press  to access the user-defined sound level measurement (Noise User). Press the "Measure" function key or  to start the measurement.

The elapsed time and the corresponding equivalent sound level are now displayed. The measurement can be interrupted by pressing the "Stop/Continue" function key. If you want to restart the measurement, the current measurement must first be interrupted by pressing the "Stop" function key.

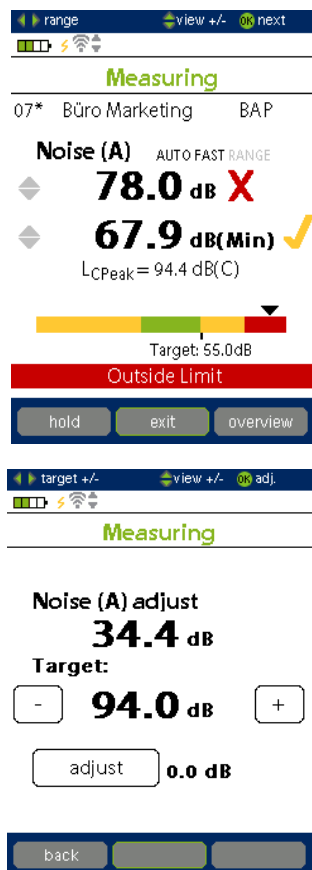


By pressing the "Restart" function key, the current measurement is discarded and a new measurement starts.



The noise exposure level $L_{EX,8h}$ calculated in the BAPPU uses the displayed noise equivalent level $L_{eq}(A)$ and the displayed measurement time for the calculation. A noise equivalent level of 0dB is assumed for the remaining time until the 8 hours are reached.

Using the optional sound level calibrator



The sound level calibrator can be used to check the "Noise" measurand of the BAPPUevo at a level of 94 dB and a frequency of 1 kHz.

To calibrate the "Noise" measurand, proceed as follows: You are inside a measurement of the measurand "Noise".

Carefully insert the sound level calibrator as far as it will go into the microphone on the front of the housing.

Compare the displayed sound level taking into account the correction factor. For the supplied Cirrus CR:514 sound level calibrator, the correction factor for BAPPUevo is **-0.3 dB**. The displayed value should be **93.7 dB**.

If the deviation is larger, it is recommended to readjust BAPPUevo. Proceed as follows: You are within a measurement of the measurand "Noise". Press  to access the sound level adjustment.

When using the calibrator, note the correction factor to be taken into account.

For the supplied sound level calibrator Cirrus CR:514, the correction factor for BAPPUevo is **-0.3 dB**.

Therefore, set the setpoint to **93.7 dB** using the plus and minus keys on the display.

To adjust, plug the calibrator onto the microphone on the front of the housing. Then press  or "Adjust" on the display and the adjustment is performed.



Note: The correction factor will be re-determined individually for your device during the calibration of your device in our laboratory. For this purpose, send your sound level calibrator together with BAPPUevo for calibration.

Special features for the measurement of illuminance

BAPPUevo is used to measure lighting conditions at a typical work place, including, for example, those specified in DIN 5035-6:2006-11. With other conditions, larger measuring tolerances may occur.

Description	BAPPU-evo	Permissible error class C DIN 5032-7
<i>V(λ)-Adjustment</i>	7,5 %	9,0 %
<i>Cosine correction</i>	4,0 %	6,0 %
<i>Linearity</i>	3,0 %	5,0 %
<i>Calibration error</i>	1,0 %	2,0 %
<i>Display device errors</i>	1,0 %	7,5 %
<i>Total errors*</i>	18,0 %	20,0 %

*The total of all errors allowed is larger than the total errors allowed (DIN 5032-7).

To obtain the best possible results, we recommend aligning the illumination sensor horizontally over the workplace to be measured. To set up the device, use the table stand.

Self-trigger of the illumination measurement

The "Hold" function in the "Illumination" measurement area is provided as a self-trigger of the measurement function. In this way, the measurement can be performed without the measurement being influenced by the person taking the measurement.

Press "Hold" to trigger the measurement. After about three seconds, the measured value is recorded, enough time to briefly move away from the measuring device and thus not to shade the sensor.

Special features for temperature measurement

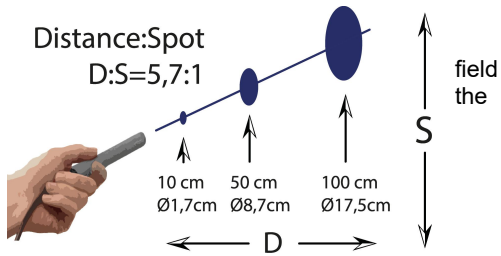
With the key  a dew point calculation is available. This is calculated on the basis of the measured values of air temperature and relative humidity. At the dew point temperature, the maximum saturation of the air with water vapor is reached. If it is undershot, liquid water precipitates as condensation and condenses on surfaces that fall below this temperature.

Special features of IR temperature measurement

The IR temperature reading is displayed along with the dew point. To get to the IR temperature measurement, press the button in the temperature measurement area.

Distance:Spot

The diameter of the measurement increases with the distance from sensor to the measurement object. The D:S ratio is 5.7:1



- Make sure that there are no disturbances such as dust, steam, etc. between the sensor and the measurement object.
- The sensor and the measuring surfaces must be free of dirt.
- The emissivity must be adjusted to the measurement surface (see table).
- The IRevo thermometer should have enough time to adjust to the ambient temperature.

The emissivity values in the table serve as points of reference. Further tables and information can be found on the Internet. The emissivity of the BAPPUevo IRevo thermometer can be adjusted via the keys  in the range from 0.05 to 1 in 0.05 steps. For many measurements the default setting of 0.95 is sufficient. If you are unsure, you can stick a non-reflective, black insulating tape on the surface to be measured and measure with an emissivity of 0.95.

Material	Emissionsgrad
Concrete	0,93
Ice, smooth	0,97
Plaster	0,90
Glass	0,94
Rubber	0,94
Wood	0,94
Heat sink, black, anodized	0,98
Plastics: PE, PVC, PP	0,94
Lack, schwarz, matt	0,97
Lacquer, white	0,95
Masonry	0,93
Oil paints (all colors)	0,95
Paper	0,97

Porcelain	0,92
Clay, fired	0,91
Brick, mortar, plaster	0,93

Commissioning

BAPPUevo is delivered with inserted and charged batteries. Several charging cycles are necessary until the maximum battery capacity is reached. After switching on, BAPPUevo is immediately ready for operation.

Supply voltage

The power supply can be provided by the power supply unit, the rechargeable battery or, in exceptional cases, by the battery. If the voltage is too low, the unit switches off. GP ReCyko+ NiMh HR6 210AAHCB type 2050mAh 1.2V batteries are recommended for trouble-free operation. The external voltage supply via the power supply unit or the USB port of the PC is marked by ⚡ in the BAPPUevo.



Caution: We recommend the use of rechargeable batteries.
Caution: If the symbol for external power supply does not flash or flashes, the power supply of the USB port is insufficient. **Caution:** Do not leave the device unattended while charging.

Charging function

The integrated charging function fully charges the inserted batteries within eight hours if they are completely discharged. For this purpose, BAPPU-evo must be switched on and connected to the power supply unit via the USB port.



Make sure that only rechargeable batteries are inserted in the battery compartment when starting the charging function.

When charging via the USB port of a PC or laptop, the charging time increases to 16 hours. To ensure a consistent service life of BAPPU-evo, it is recommended to charge the batteries at longer intervals (30 - 50 charging cycles) with a high-quality external charger (please refer to page 7, chapter 1.1 „Optional accessories“). The capacity can be better preserved in this way and the service life of the batteries can be favored.

The charging process is indicated in the display of BAPPUevo by the gradual "filling" of the battery  symbol.

Tip: The charging will commence approximately one minute after the device has been connected to the USB power supply. In cases where the rechargeable batteries in the battery compartment are not recognised, you have the possibility to start the charge programme manually by pressing the battery icon.

2. Glossary

2.1. BAPPU-measurement

In BAPPUevo, "BAPPU measurement series" refers to the acquisition of instantaneous values of a measured variable and their internal storage under a defined name (workplace).

Despite the instantaneous character of some measured quantities, averages over several minutes are available (noise level, air velocity).

2.2. workplace

The workplace contains storage space for the necessary info, or the possibility to store/add all the necessary info. This information includes:

- workplace number (memory number)
- workplace name (max. 20 characters)
- assigned workplace type
- assigned measurement series profile (profile)

2.3. workplace list

The workplace list is the overview of all existing workplace, numbered from 1 - 99. Names and profiles can be assigned to these. The list is displayed after selecting "BAPPU measurement series" in the main menu.

2.4. Workplace type

Limit values and target values for the individual measured variables are stored in the workplace types. The evaluation is reflected, among other things, in the traffic light-colored evaluation bars of the individual measurements.

2.5. Measurement series profile (Profile)

Here, the measured variables to be recorded can be selected and assigned to individual workplace (see p.21, chapter 5.1 "Edit measurement series profile (profile)"). The measurement series profile allows individual measurement variables to be switched on or off. Up to nine different measurement series profiles can be defined. A measurement series profile is assigned to each workplace. This makes it possible to perform only the measurements relevant for the workplace.

2.6. Measurement result overview (overview)

In the overview, all important measured values and measurement data of the current workplace are displayed.

2.7. Measurement value details

The detailed view shows the value stored in the memory for a measured variable and its evaluation. A catch-up measurement can be started from here. It is also possible to scroll through the measured variables with an . The measured variables that were switched off in the measurement series profile are also displayed. The "Hold" function within a measurement also takes you to the detailed view.

2.8. Repeat measurement

In the case of a repeat measurement, individual measurement types within a measurement series can be repeated and omitted or hidden measurement types can be added. The remaining measurement types of the measurement series remain unaffected.

2.9. Recording

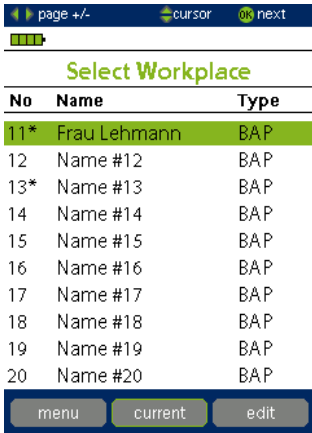
In long-term recording, all measurement data of the selected measured variables are recorded in the internal memory. A preview of the recording in thumbnail view shows the course of the measured values.



Important information: For the utilization of the data recording you need a (chargeable) license of the "BAPPU-time" software.

3. Operating instructions

3.1. Display and touch screen



The display of the device is equipped with a touchscreen. This means that in many cases it is possible to make entries directly via the display.

Sensitive areas

Analogous to the keyboard, the functions of the control pad are also available in many places on the display (see figure ).

Function buttons

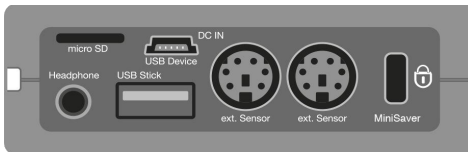
The function keys F1, F2 and F3 are located at the bottom of the display and trigger different functions according to their labels.

3.2. Keyboard

Below the display are the function keys F1, F2, F3, which perform different functions depending on the screen display.

The directional pad and the OK key are used to navigate the cursor and confirm a selection. The help line at the top of the screen shows more detailed assignments of the control pad.

3.3. Connections BAPPUevo (from version 4000/11)

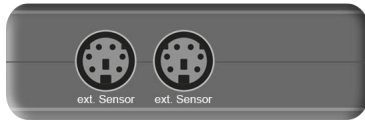


The connection sockets of the device are located at the lower edge of the housing.

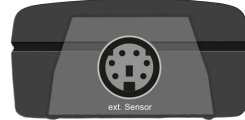
- **Headphone** – Headphone/Analogue Line Out
- **micro SD slot** – Card reader for microSD card for memory expansion
- **USB Device/DC IN** – Connection to PC or power supply (for data transfer)
- **USB Stick** – flash drive – receptacle for USB flash drive

- **External sensor (2x)** - Globe temperature / CO₂ / Anemometer-evo / from version: 4000/10
- **MiniSaver** – Kensington compatible

Connectors VOCOOsx as well as ANEMOMETERevo



VOCOOsx



ANEMOMETERevo

3.4. Help bar



At the top of the screen there is the

help line describing the valid keyboard functions. The assignment of the right/left arrow keys, the up/down arrow keys and the function of the OK key are shown.

Please note that additional functions may be enabled via the three function keys at the bottom of the screen.

3.5. Background Colour

The background colour indicates the operating mode of the device. A dark grey background indicates either menu items or data from the memory. During the measuring process a light background is used.

The changing background colours make it easy to see if the device is currently measuring (light background) or if values that have already been measured are displayed (dark background).

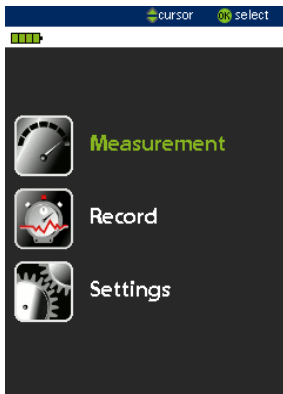
4. Main menu

After switching on the device – after a start message and a self-test – the main menu will appear.

Tip: You can access the main menu any time by holding the  button.

From the main menu you can access the functions described below.

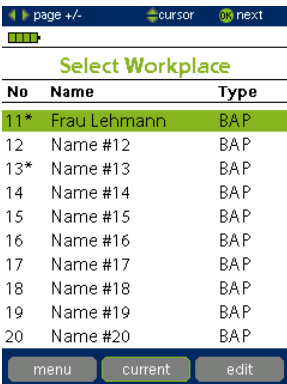
4.1. BAPPU-measurement



By selecting the menu item "BAPPU measurement series" you will see an overview of the workplace, the workplace list. Edit the workplace (name, workplace type, measurement series profile) and/or start the measurement.

Measurement series marked with a "*" already contain measurement data.

The "Current" function key displays an overview of all currently recorded measurement values at a glance. With "Edit" you reach the menu to change the workplace name, the workplace type as well as the measurement series profile.



Tip: The view "current" does not represent all existing measurement types. All existing measurement types are only visible when a measurement series has been run through completely.

4.2. Recording

Here you make the settings for the data logger and start the internal long-term recording. After a short time, depending on the selected interval, you will see the course of the selected measuring range in the preview.



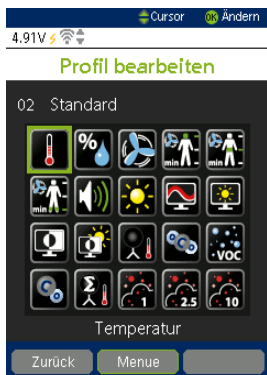
To read out the recorded data, you need a license for the "BAPPU-time" long-term recording software. This is available as an option and is not included in the standard scope of delivery.

4.3. Settings

All settings, such as language, display and energy functions, profile settings, etc. must be made here (see page 28, chapter 8 "Settings").

5. Measurement preparation

5.1. Edit measurement series profile (Profile)



By means of measurement series profiles you define which measurement types are to be recorded in the measurement series. The "All" (all measured variables) and "Standard" profiles are available. In addition, you can set eight user-defined profiles. By default, all measurement types are activated for all profiles. Adapt the profiles to your needs.

Tip: Measured variables of external sensors, which are not connected, **do not** appear in the measurement series, even if they are activated.

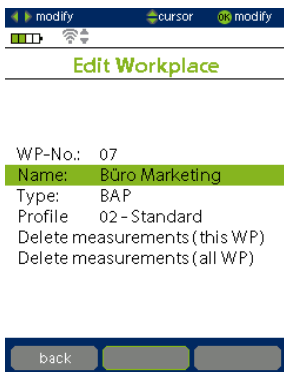
To edit the other profiles, select "Settings" in the main menu and then "Profiles". Confirm the selection with **OK**. Profile

"01 ALL" is permanently assigned and contains all measured variables.

All other profiles can be adapted to your own needs. Highlight the profile to be edit and press **OK**. Use the cursor keys   and  to navigate through the measured variables. Press **OK** to select measured variable on or off. Alternatively, you can also make a selection directly via the touchscreen.

Measurement series profiles can also be managed with the BAPPU standard software (please refer to page 37, chapter 10.11, „Measurement profile (Profile)“).

5.2. Editing the workplace



Each workplace is marked with a (memory) number, additionally a name can be assigned and a workplace type can be assigned. By default, the workplace type "BAP" (screen workplace) is assigned as well as the profile "Standard".

How to create and edit new workplace types can be found on page 34, chapter 10.7, „Defining the type (defining the type of work place)“

Select the specific workplace in the list ( ) and press "edit" (F3).

Tip: All editing functions can be easily carried out using the software and can be transferred to the device. (please refer to page 35, chapter, 10.8 "Workplace names and type definition (data retrieval)"). Editing the workplace type can be carried out only using "BAPPU-Standard" software.

Enter workplace name

To assign a name, select "Name" and press . Using the screen keyboard, the user can enter a name with up to a maximum of 20 characters.

Assign workplace type

Select an existing type using . This had already been created and transferred to the BAPPU-evo (please refer to page 34, chapter 10.7, „Defining the type (defining the type of work place)“).

Tip: When you do not wish to select specific results, please select workplace type "NONE".

Assign workplace profile

Select an existing profile using . In doing so, the user defines which measuring ranges are to included in the measurement sequence (please refer to page 21 chapter 5.1 "Edit measurement series profile (Profile)").

Deleting measurement data

It is possible to delete data from either the current work place or alternatively of all work places.

Tip: Measurement data of the currently displayed workplace can also be deleted via the measurement result overview.

If you have edited the workplace as desired, select "Back" (F1) to go to the list view to configure further workplace or to start a BAPPU measurement series.

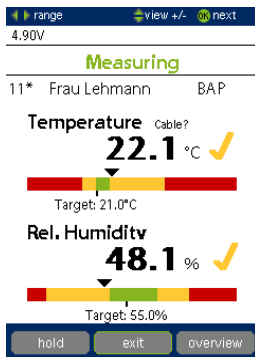
6. Measurement sequence

6.1. Perform measurement

In order to carry out the measurement sequence, select the work place from the work place list. To start measuring, press **OK**. According to the profile selected, you will now start your first measurement. By default, this will be the measurement of the air temperature.

Tip: Work places that are marked with “*” already have measurement data. In this case, you will firstly get to the overview of the respective work place (please refer to 6.2, „Measurement result overview“).

Evaluation



The coloured evaluation bars positioned under the measurement result provide information as to whether the measured values are within the defined limits. The set values show the optimum value. Moreover, the evaluation is represented by **✓**, **✓** or **✗**. The settings for the set values and the evaluation limits can be set using “BAPPU-Standard” software (10.7 „Defining the type (defining the type of work place)“)

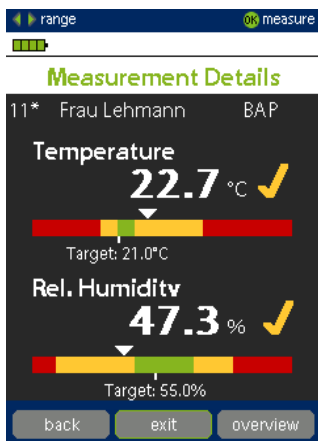
Saving measured values

To save the measured value, you must press **OK**. Following this, the next measuring range is shown. Information pertaining to the individual measurement areas and the correct measuring procedure can be taken from the quick start guides.

Hold / freeze readings

While carrying out a measurement, the current measured value can be recorded with “hold” (F1) for view. Pressing the “hold” key (F1) again will repeat the measurement, by pressing the keys **◀** or **▶** you can switch to the previous or the next measured range. The held value is saved.

Tip: The background colour of the display always shows you the current mode (light background = measuring mode, dark background = save mode).



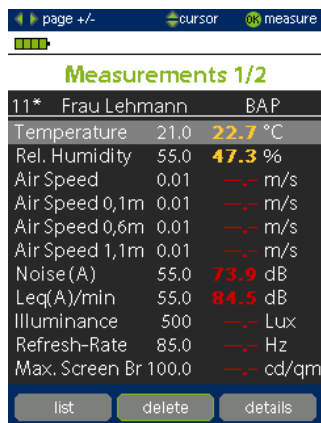
During the illuminance measurement, the self-timer function can be activated by pressing “hold”. The “hold” button activates a countdown that shows the time until the measurement value is recorded. When the measurement is complete, the user can change to the next measuring range using . Alternatively, the measurement can be repeated by pressing “measure”.

At any time during a measurement sequence or detailed view, you can change to the next or previous measuring range by simply pressing or .

Finishing or cancelling a measuring range

You can cancel a measuring range by pressing the “exit” (F2) button. Following this, you will be prompted to either discard or save the measured values. Pressing “overview” (F3) will show the measurement result overview. All measured values will be saved, overwriting the previous measurements.

6.2. Measurement result overview



After carrying out the BAPPU series of measurements, you will be taken to the overview of the stored measurement results. The inverse display (white on black) indicates that data from the memory is being displayed.

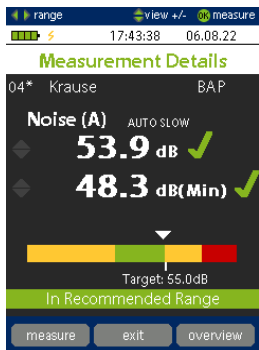
If data are already available in a workstation at the start of the measurement (this is marked with an “*” in the workstation list), you can access the measurement results overview before the measurement.

From here, a series of measurements can also be carried out, or only the measurement of a single measuring range (catch-up measurement).

The measurement result overview shows, e.g. for noise, stored measurement values of the selected workplace. The evaluation of the individual results is done by the color coding.

Using or , you can browse the overview, which always comprises two screens. Pressing the keys calls up the first screen of the following work place. Keying in “delete” will delete all of the measured values from the current work place.

6.3. Detailed view



Detailed view shows all of the values and results stored in the memory (as long as they are activated). When working in detailed view, you can use  and  to toggle between the previous or following measuring range. Moreover, you can start a new recording of the measuring range (repeat measurement).

6.4. Repeat measurement

When carrying out a repeat measurement with an already existing measurement sequence, you can rerecord a specific measurement range.

Select a measurement range in the measurement result overview and press . The next detailed view will appear. In order to start the recording, press .

7. (Long-term) recording

With the integrated data counter, you can record all of the measuring ranges simultaneously with BAPPU-evo. A preview of the recorded data can be viewed immediately.

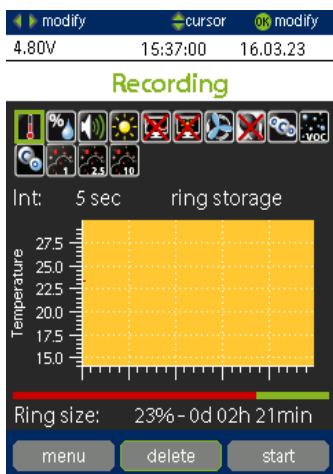


For later evaluation (see page 37, chapter 11, „BAPPU-time software “), the “BAPPU-time” longterm recording software, which is available for a fee, is required.

Tip: Generally it is recommended to operate BAPPU-evo with the power supply during a long-term recording.

To begin with, select “recording” in the main menu. The measurement sequence symbol indicates which measuring ranges have been selected or deselected for the long-term recording.

On the line below the symbols, you can view the settings for the logging intervals and the memory type. In the middle there is a preview of the recorded data. The measuring range that is outlined with green in the measuring range symbols is always displayed. In the bottom line you can see an overview of the remaining storage space and the available recording time for the currently selected configuration.



Selecting the measuring range

Using the  buttons, select the measuring range you require and confirm the selection by pressing . When selecting a measuring range that requires an external sensor, please note that a recording can only be made when the sensor is connected. Use the  symbol to call up the settings for the intervals.

7.1. Set interval

Using the  buttons, you can adjust the interval settings. In order to guarantee satisfactory data measurements, 60-second intervals are generally sufficient. Please note that all maximum and

minimum values are recorded within an interval. Exceptional values that are outside of the selected parameters (longer than 60 seconds) are also indicated. Use  to call up the settings for the memory type.

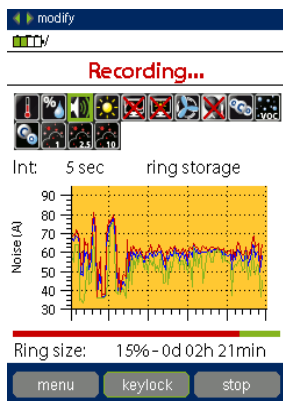
Tip: BAPPU-time software can also be used to specify other intermediate values of the interval, e.g. 2.5 min.

7.2. Memory type

The internal data logger provides three memory types. "Fill" means that recording is stopped once the memory capacity has been reached. "Ring" means that the oldest data is overwritten once the memory capacity has been reached. BAPPUnew means that the data is sent directly to the BAPPUnew. The storage capacity is virtually unlimited. However, a stable Internet connection is required.

7.3. Starting and stopping the recording

To start the recording press "start" (F3). When the recording is running the background colour will change to white. In addition, the words "Recording" appear in red in the upper screen and the "REC" symbol, which is to be seen in the status bar next to the battery symbol, will blink. The display will remain visible even when the user leaves the menu.



The recording can be stopped by pressing “Stop” (F3) or when the memory capacity is reached.

The data can be read using the optional “BAPPU-time” software (please refer to page 39., chapter 11.6, „Operating and reading the internal data counter“).

7.4. Keyboard lock

If you want to protect the recording from unwanted interference with the device, you can lock the keyboard of BAPPU-evo. Press “Lock” and enter a 4-digit key combination of your choice. To unlock the keyboard, reenter the combination. After restarting the device, the keyboard lock is unlocked.

Tip: If you have forgotten the combination, you can unlock it with the BAPPU standard software (see page [32 f. chapter 9.6 Extra](#)).

7.5. table-mounting pin



When carrying out a long-term recording, we recommend using the table mounting pin to position the BAPPU-evo and securing the temperature sensor in the appropriate recess (please refer to the picture below).

In addition, the table-mounting pin is used to achieve the optimum position for the illuminance sensor.

8. Settings

In order to make adjustments to the following settings, select “Settings” in the main menu.



8.1. WLAN

The WLAN function can be switched on and off here by pressing the **OK** button.

8.2. Language

Call up the available languages (DE/EN) with **OK**. Then select the desired language.

8.3. Display/Energy

Here you will find the display and energy functions where you can select the option required with  . Using the  button, you can select the modes that are available

8.4. Measurement settings (measurement)

The following sections will explain how the settings to the individual measuring ranges can be made.

Humidity compensation (rf-compensation)

Since the relative humidity is to be seen in dependence on the temperature, the housing temperature influences the measured value until the housing has the same temperature as the ambient air.

For BAPPU this means that a cold measuring device (e.g. if it was in the car before) shows too high values in heated rooms until the housing temperature equals the ambient temperature.

By implementing the "temperature shock compensation of the humidity sensor", a very good acclimatization ability of the measuring sensor is achieved, i.e. a high speed in adapting to changed temperature conditions. By default, the humidity compensation is activated.

Tip: Switching off may be necessary, or is usually only necessary if the temperature sensor is defective.

Time-weighting (time weighting noise)

Time weighting for the measurement values is distinguished by "slow" (1 second) and "fast" (125 milliseconds). You can change between the time weighting during a measurement by pressing "slow" or "fast" on the touch screen. The default setting is "fast".

Area (area noise)

The default setting for the measuring area changeover for the noise level measurement is "Auto". Therefore, when the value range overflows or underflows, the change is automatic. You also have the possibility to change the measuring area changeover manually. The settings available for measuring area changeover are "Hi" and "Low".



Attention: If the level range is set manually, the occurrence of an overshoot or undershoot of the range is more likely.

C-peak measurement (C-peak measurement) / L_{ex8h}

If "On" is selected, the C-weighted peak sound level (C-peak) of the past minute is measured. For the user-defined sound level measurement, the C-peak and the calculation of the daily noise exposure level based on 8 hours (L_{ex8h}) of the measured time are also displayed.

Clothing insulation value (PMV CLO)

In each measurement sequence, the climate indices (PMV/PPD) for the three clothing values, which are present in the work place definition, are indicated. These are clothing values for light clothing (Summer), middleweight clothing and heavy clothing (Winter). Please select the appropriate values that should be used with BAPPUevo.

Tip: In the standard "BAPPU-software", PMV and PPD are displayed for **all 3** garment insulation values.

PMV–Calculation (PMV air velocity)

Due to the fact that different values for the air velocity may be present, please select the value for the PMV/PPD calculation which should be used.

Selecting the default setting "Auto" will result in all of the existing air velocity measured values being used in the calculation. Additional settings available include the single value measurement "Single" or "LG I", "LG II", "LG III", which represent the three minute average value.

8.5. Time

When your BAPPUevo hasn't been in operation for a certain length of time, the time and date will have to be adjusted. When the power supply or batteries are removed from the unit, the internal clock will run for approximately 14 days.

Tip: In the BAPPU-time software you can transfer the PC time to the BAPPUevo comfortably at the push of a button.

8.6. Firmware update/Init

Another menu appears.

Update All/Dis/FW

Download the corresponding zip file from our website at the [.downloads#software](#)

To update the BAPPUevo firmware (FW), proceed as follows:

Carry out the update with the power supply connected. Unzip the zip file and copy both files to a USB stick. Insert the USB stick into the USB input of your BAPPUevo. Go to the "Settings", "Update" menu. BAPPUevo starts to search for the files by pressing the "OK" button. After a few seconds, the selection "Update ALL", "Update Dis" and "Update FW" appears. Select "Update ALL". The successful check of this file is indicated by a ". Press "Start" (F3) to start the firmware update. The update takes approx. 3-4 minutes, after which BAPPUevo restarts automatically.



Caution: Please backup all existing data and settings before performing a FW update - if possible. All settings made should be checked afterwards.

Following a FW update, it is also strongly recommended to perform a user init.

User Init

By selecting User-Init, the factory settings can be restored thus returning the device to the original delivery status.



All stored data and settings in the device are lost. Logger data remains.

8.7. Measurement profile (Profile)

This allows you to select the measuring range that is to be shown in the measurement sequence. A comprehensive explanation of how the profile can be edited can be found on page 21, chapter 5.1 "Edit measurement series profile (Profile).

8.8. Info-page

Press the F3 "Info" function buttons to display information about the device, such as serial numbers and firmware versions. Use the buttons   to access information about the WLAN module. When the connection is active, this includes the current IP address, the MAC address and the firmware version of the WLAN module.

9. BAPPUnow online-software

Used to manage and document customers, measurement data and devices.

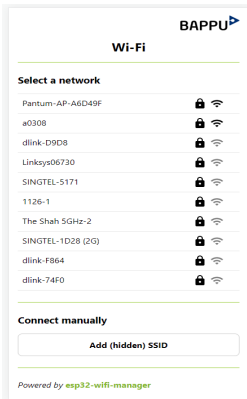
9.1. Connection to measured value analysis software BAPPUnow

Integration into the local network

If BAPPUevo is started and no connection to a local WLAN can be established, BAPPUevo opens an open WLAN that can be accessed via a WLAN-capable end device using a browser.



The access point is deactivated again after 15 minutes without a connection being established. You must then unplug the device and restart it.

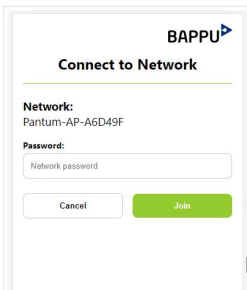


Select the WLAN network "BAPPUevo-SN" (SN: serial number of the device) from your mobile device. You will be prompted to enter the password (factory setting: "bappu-evo").

If your mobile device does not prompt you to log in to the network, this address will take you to the WiFi Manager start page <http://10.10.0.1>. Enter the data in the address bar of your browser.

You will be taken to the overview page of the available networks. Select the desired network to which BAPPUevo should be registered.

Important: The network must have access to the Internet so that BAPPUevo can send measurement data to BAPPUnow.¹



After entering the access data for the WiFi, click on "Join" to add the device to this network. As soon as the connection has been successfully established, the device's WiFi Manager can no longer be accessed at <http://10.10.0.1>.

The successful connection to the network is symbolized on the display of the device by .

¹ Only possible in conjunction with a license for BAPPUnow.



It is possible to access the WiFi Manager again if the configured network is not (or no longer) available or no connection has been established.

If the license is valid, the connection is established and BAPPUevo logs in automatically. The successful connection to the online measurement management is symbolized by .

10. BAPPU pc-software

This PC software is used to prepare measurements and document workplace analyses with BAPPUevo. This program allows you to conveniently evaluate the data recorded with BAPPUevo and to edit the device's management functions.

10.1. License general terms and conditions

When starting the "BAPPU-Software-CD", the following license terms and conditions shall be acknowledged:

- All rights, especially the right to reproduce (the exception being for the purpose of installing the program on the user's harddrive) and distribution as well as the processing of the program in any way whatsoever, remain at ELK GmbH.
- This version is intended as a multi-user application and can be installed on multiple devices (PCs). Each license is intended for use with a BAPPU multimeter. To operate an installation with several multimeters BAPPU you need several licenses. Licenses are only available from ELK GmbH.
- ELK GmbH shall not assume any liability for any editorial or technical mistakes as well as the accuracy of the information.
- This version is specifically a standalone application. Licenses are only available from ELK GmbH.
- The information included in this document does not represent any kind of obligation of ELK GmbH and can be changed without prior notice.
- Moreover, ELK GmbH reserves the right to change the software that is described in this document without prior notice.

10.2. Installation

To be able to install BAPPU Standard, it is necessary that your computer is equipped with the Windows 10 operating system. The start window of the software will open automatically after inserting the CD into the corresponding drive.

If this is not the case, open the start window by double-clicking on "BappuStart.exe" in the root directory of the CD. Start the installation from the start window by clicking on: "Install BAPPU software". Follow the instructions of the installation program.

10.3. Starting the programme and connecting BAPPU

You start the programme by clicking "Start", "Program", "BAPPU-time". Subsequently, the start image will appear followed by the main window (refer to chapter 10.4 - 10.8).



When BAPPUevo is correctly connected to a PC via the USB port, the message "Reading type of work place" will appear in the dialog window after a few seconds. This indicates that data pertaining to the type of work place is being read from the measurement device. If BAPPU is not recognised, you can choose the right device and port in the settings list.

10.4. Settings

In order to communicate with BAPPU-evo, please make sure that the appropriate device has been selected from the device list (see figure to the left). BAPPU-evo is the default setting.

When the programme starts, the software will suggest a possible path for the working directory (storage location) of your data. You can change the location of where you would like to store your data in the box "Working directory". You can change the language by clicking on the "Language" box.

10.5. Online

If you would like to call up the current measurement data on your PC, press the "Online" button. When all of the previously mentioned settings have been correctly carried out, the measurement data will be listed in the dialog field.



10.6. Extra

Here you can clear the keyboard lock (see page 25 chapter 7.5 Keyboard lock) which you have activated during the long-term recording with the internal datalogger. You can also set the BAPPU internal clock under "Extra".

10.7. Defining the type (defining the type of work place)

Of course, it goes without saying that every work place has its own unique set of conditions in terms of health and safety. Therefore, in order to be able to check and assess if the work places are in line with the existing regulations, the currently valid set values can be entered and transferred to BAPPU-evo for integrated conformity control.

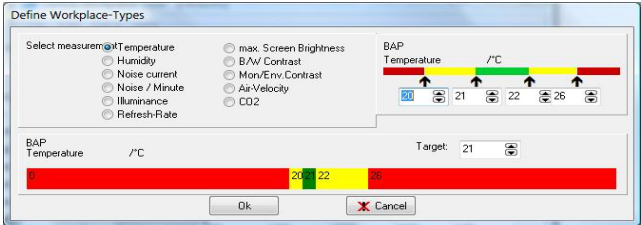
	Range	Range	Range	Range	Target
Temperature /°C	20	21	22	25	21
Humidity /%	30	50	65	75	55
Noise current /dB(A)	0	35	55	70	55
Noise / Min /dB(A)	0	35	55	70	55
Illuminance /Lux	300	400	3000	31000	500
RefreshRate /Hz	73	84	456	460	85
max ScreenBrightness /cd/m²	80	100	3000	3100	100
B/A/ Contrast	3	5	11	15	0
Mon/Env Contrast	0	0	3	20	3
Air-Velocity /m/s	0.00	0.00	0.10	0.20	0.01
CO2 /ppm	0	0	1000	1500	390

The set values can be entered in the "Defining the type of work place" dialog field. This window can be opened by clicking the "Type definition" button in the main window.

Select the function "Data/new" from the menu item "File", and enter a set of appropriate initials (a maximum of 4 characters) in the window to identify the type of work place. Finally, the set values for the existing regulations can be assigned to the appropriate measurement ranges.

With a double click, you can select the measurement value you would like to define or you can select the function "Editing the work place definition" from the menu item "Edit".

The coloured blocks making up the value bar represent the areas where the "Traffic-light" function for conformity control is indicated. You can use the mouse to move the



coloured blocks to the values where you would like to set the threshold values for the respective measurement range. The values are then shown as numbers in the fields.

The edited threshold values are also displayed in colour in the top right-hand field. The threshold values can also be entered here.

The set values, which will be indicated by BAPPU as the desired values of the selected measurement range of the work place, can be entered in the "Set value of the display (Target)" input field.

To display the PMV type definitions as well as the necessary clothing values and the

Physical Activity Levels for the PMV calculation, click the “Adjusted (PMV)” button that can be found at the bottom of the window. The existing records represent the intermediate values for VDU work places and, as a rule, must not be changed.

Tip: In cases where no recording is to be made in a measurement range, the user should enter “0” in the set value of the display input field. BAPPU-evo will not show a set value for this measurement range (“NONE”) and will not carry out a conformity control check with this measurement range.

Air-velocity	m/s	0,00	0,00	0,10	0,20	0,30
CO2	/ppm	0	0	1000	1500	380
PMV (Predicted Mean Vote)	/1	-0,70	-0,50	0,50	0,70	0,01

Clothing light (Summer)	Clothing middle	Clothing heavy (Winter)	Metabolic Equivalent (Energieumsatz / Hautoberfläche)
0,60 clo	0,90 clo	1,20 clo	1,30 met
[1 clo <-> 0,155 m ² °C / W <-> Isolation of normal work-clothing]			[1 met <-> 58 W/m ²]

Reduced (No PMV)

You can refresh all work place types in BAPPU-evo by pressing the “Refresh” function in the

menu list. The work place definitions in BAPPU-evo will be updated according to the current status of the PC. All measured values that have been saved will remain unchanged. A newly created type will only be transferred when it is selected in the “Type/name” selection field.

10.8. Workplace names and type definition (data retrieval)

File Edit BAPPU Table-View Extra Help

Read Value Write def. Copy

Project-Title: BAPPU-Data

	Name	Type	Temp	Humidity	Noise/dB/A	Noise(Min)
1	Stamm	BAP	1			
2	Wahl	BAP	1			
3	Lehmann	BAP	1			
4	Krause	BAP	1			
5		BAP	1			
6		BAP	1			
7		BAP	1			
8		BAP	1			
9		BAP	1			
10		BAP	1			
11		BAP	1			
12		BAP	1			
13		BAP	1			
14		BAP	1			
15		BAP	1			

Workplace Name...

Workplace-Number: 5

Workplace-Name:

Workplace-Type: BAP

WP-Profile: 1 (Standard)

Ok Cancel

Select “Data retrieval” in the main window of the program.

The data retrieval window is used to prepare workstation analyses and to display the measurement results. Named identifiers of the storage locations, workstation type definitions and measurement series profile assignments can be sent from this window to your BAPPU or measurement series can be transferred from your BAPPU to the PC.

To begin a new project, select “File/New”, or if you want to make any changes to an existing project use “Open file”.

When you want to make changes select the “Edit” function in the main menu or double click the line in the table where you want to make the changes. The dialog box for

entering the work place name and type of work place will open.

You can now enter the name of the employee who works at the work place or the location of the work place in up to 20 characters.

In the Workplace type field, the appropriate setpoint profile for the workstation can be selected from the previously created workstation type definitions, for example BAP or None.

The “Write definition” button opens the window for transferring the work place definition to the measurement device.

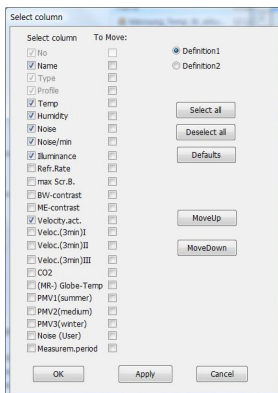


Caution: Please note that the data in the corresponding BAPPUevo memory locations are deleted during transfer to the measuring device. It is therefore advisable to transfer data stored in the BAPPU to the computer beforehand and save it there.

10.9. Reading and evaluating measurement values

In order to start the data transfer from BAPPU-evo, click on the “Read measurement values” button. In the “Select” dialog box you can select the data pertaining to the particular workplace you would like to transfer.

10.10. User-defined display



In order to prevent the data retrieval window from becoming too big, the system does not, by default, show all of the individual values. Select “Table view/Settings” (user defined), if you would like to set up the window to show additional information.

You can set up two definition tables, which, by default, will appear when you select specific measuring ranges.

For editing the tables, please click either “Definition 1” or “Definition 2”. In the “Column selection” section, mark the value for the measurement you would like to view.

Apart from the user-defined settings and standard settings, you also have the possibility to show the so-called “PMV view”, which can be found under “Table view”.

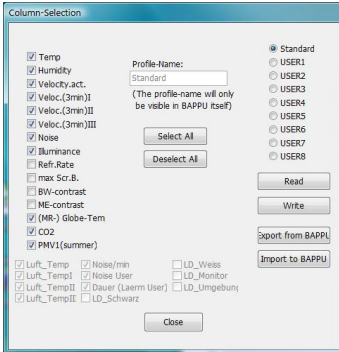
This view includes solely the climate data and the calculation of the climate index (ISO 7730) PMV und PPD* (*predicted mean vote und predicted percentage of dissatisfied).



Caution: Regardless of the selected view, all data is retained. This also applies to saving. I.e. the saved file always contains all data.

10.11. Measurement profile (Profile)

By means of measurement series profiles you define which measurement variables are to be recorded in the BAPPU measurement series. Here you have the possibility to edit and manage different profiles. To edit the profiles, BAPPUevo must be connected to the PC.



In the left column, you can select or deselect the specific measuring ranges. In the upper middle part of the screen, you will see the name that BAPPU-evo has designated to the profile

You can designate the profiles “User 1” to “User 8” with new names. You can select the profile you would like to edit in the right-hand column.

The “Read” button will call up the profile that has already been saved in BAPPU-evo and display it in the software. When changes to the profile have already been made using the software, a message box will appear explaining that this data will be lost.

“Write” means that the profile is being transferred from the software to your BAPPU-evo. The profiles in your BAPPU-evo will be overwritten.

If you want to save the profiles from your BAPPU-evo, click the “Export from BAPPU” button. A dialog box will prompt you to enter a name for the data. You can confirm this by clicking “Save”.

If you want to transfer saved profiles to your BAPPU-evo, click the “Import to BAPPU” button.

11. BAPPU-time software

BAPPU-time software is a program for the evaluation and recording of long-term examinations with measuring instruments of the BAPPU product family.

All measured variables are recorded simultaneously and can be displayed, examined and further processed by BAPPU-time as graphics or tables in parallel.

11.1. License general terms and conditions

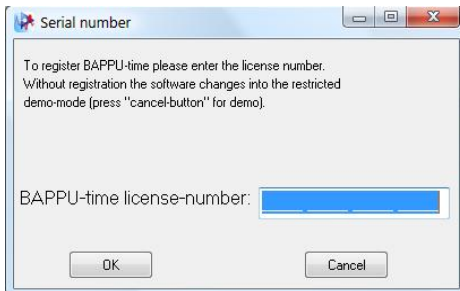
Same as paragraph [9.1. License general terms and conditions](#)

The license for the Bappu-time software is assigned to a specific multimeter BAPPU in each case. For the operation of an installation with several multimeters BAPPU you need accordingly several licenses. Licenses are available exclusively from ELK GmbH.

11.2. Installation

To be able to install BAPPU-time, it is necessary that your computer is equipped with the Windows 10 operating system. The start window of the CD "BAPPU-time" will be opened automatically after inserting the CD into the corresponding drive. If this is not the case, open the start window by double-clicking on "BappuTimeStart.exe" in the root directory of the CD. Start the installation from the start window by clicking on: "Install BAPPU-time software". Follow the instructions of the installation program.

11.3. Starting the programme



You start the programme by clicking "Start", "Program", "BAPPU-time". Subsequently, the start image will appear followed by the main window.

In the dialog box "License" that automatically opens, please enter your BAPPU-time license number that has been assigned to every BAPPU.

To register additional devices, select "Settings/register additional BAPPU devices" in the main menu.

Tip: When the license number has been entered and the BAPPU-evo has been connected for the first time, demo mode in BAPPUevo is deactivated. The respective dialog window will not appear again.

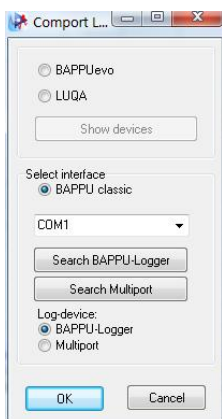
11.4. Computer test

When the programme is started for the first time, a computer test is automatically carried out. This function checks if your PC has sufficient memory and if there is enough space on the hard drive. The computer test detects the optimum settings for the visualisation of a long-term recording. It is advisable to carry out the test.

11.5. Working with BAPPU-time

Tip: Generally, working with BAPPU-time can be divided into either carrying out a long term recording directly on your PC or reading recorded data from the internal data counter in your BAPPUevo. These two different processes are explained in chapters 11.6 and 11.10.

11.6. Operating and reading the internal data counter



Data Logger port

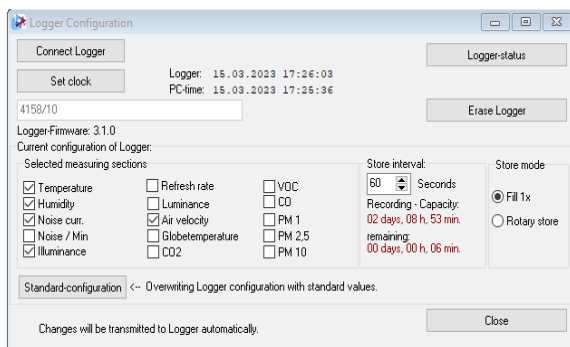
To configure or read the BAPPU-evo internal data counter (which will be referred to as “counter”), the correct port has to be selected and the BAPPU-evo should be selected as the device of choice.

This can be achieved by selecting “Logger-Comport” in the menu list. Select BAPPU-evo, as shown in the diagram on the left.

Configuring the data logger

The configuration window, which is to be found in the main window, is used for entering the settings for the measurement specifications and the configuration data. To open the window, select “Logger/Configure Logger” in the menu list.

The “Connect Logger” button is for checking the ports (an automatic system connection process is carried out by the system every ten seconds). When a counter (BAPPU-evo) has been found, its serial number is shown in the dialog box below the time setting button.



Tip: Before a new recording, the data in the counter should be deleted in order to be able to get the maximum recording time. You can see if there is any data in the counter by clicking “Counter status”.

The “Logger status” button is used for calling up details pertaining to the status of the memory content (existing long term recordings, data memory OK). “Erase Logger” is used for deleting all of the data saved in the counter. The counter’s internal clock is also reset.

The data logger's "Selected measurement range" dialog box is used to select the measurement range, whose measurement values are to be recorded during the measurement.

The "Standard configuration" button automatically deselects the measurement range noise level/min, display refresh rate and luminance density, because the recording of these measurement areas is only of limited use as shown below.

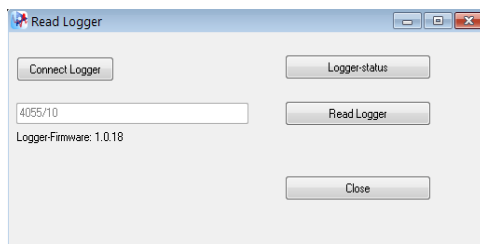
Through specifying the memory data capture intervals, the user defines the chronological gaps between two successive saved measurement values and thus the averaging time period. This also affects the maximum amount of time available for the recording. When the recording time increases, memory data capture intervals should be increased in respect to memory resources and clarity.

Due to the fact that the minimum, maximum, and mean values of all selected measurement ranges to be saved are recorded, it is possible to document the data of individual measurement ranges with larger intervals.

"Store mode" is used to define whether a long-term recording is to be automatically stopped once the counter memory is full or if the long-term recording should continue (ring memory).

Data at the beginning of the recording is continuously overwritten in the "Ring buffer" mode. This is useful, for example, if the end of the recording cannot be scheduled exactly, but the most current values possible are desired.

Reading the BAPPU-evo data counter



To read the data, select "Logger/Read Logger" in the menu list.

By clicking the "Connect Logger" button, you can establish a connection manually (an automatic system connection process is carried out by the system every ten seconds).

The "Logger status" button is used for calling up details pertaining to the

status of the memory content. The "Read counter" function is for transferring data stored on the counter to your PC.

A progress bar shows the status of the transfer. When the transfer is complete, the recordings already stored in the memory will be listed in the "Readout window" indicating the respective recording period.

When several data records have been stored, an additional window will appear.

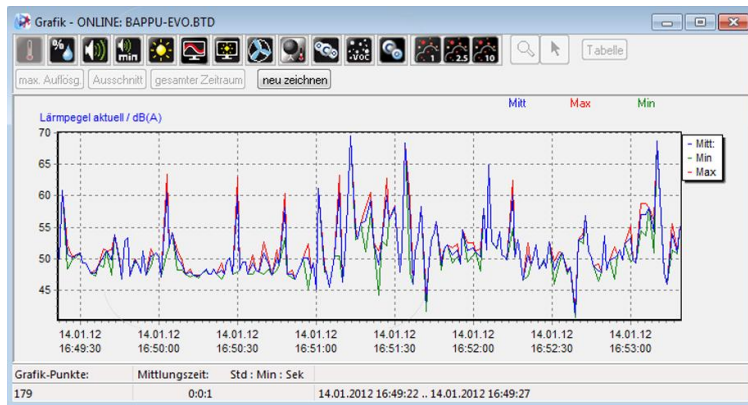
Individual data records can be selected by marking them with the left mouse button. Several data records can be selected by simultaneously pressing the left mouse button and the control key on your keyboard, or by selecting "Select all".

Pressing "selected separately", marked recordings can be saved separately. Pressing "Combine selected", several marked recordings can be compiled into one piece of data, as long as the data records required were recorded close together.

When "Connect selection" is selected, the recordings will be compiled under one file name.

11.7. Opening and displaying recorded data

To view a completed long-term recording, click "File / Open" in the menu bar or the "Open" icon below. Select the desired directory and the desired file. Open the highlighted "btd" file by double-clicking or pressing the "Open" button. In the main window, the progress of loading the file is displayed graphically.



If the file is 100% loaded, the file name appears in the header bar of the graphics window. The settings for the default settings (averaging time, etc.) are displayed in the footer of the window. First, the measuring range temperature of the selected file is displayed.

	Air temperature /dew point
	Rel. humidity
	Noise level (Class 2 in accordance with DIN EN 61672-1)
	Noise Leq/min
	Illuminance (Class C in accordance with DIN 5032-7)
	Flicker frequency
	Display brightness
	Air velocity
	Globe temperature
	CO ₂
	VOC-indicator
	CO
	Particular matter

The measured value icons at the top left of the window (see illustration on the left) allow you to switch between the displays of the various measured variables.

By clicking on the respective measuring range icons, the measured ranges can be displayed in the window one after the other. It is possible to display several measured variables simultaneously.

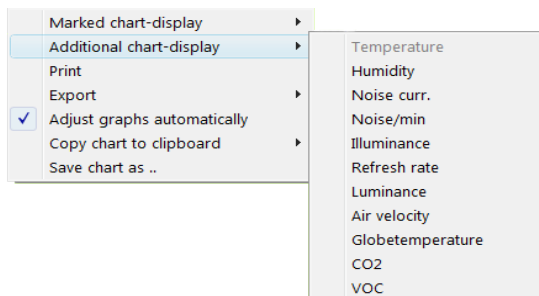
The graphics window offers the option of displaying several graphics at the same time. These can be selected via the selection menu with the right mouse button or in the main menu via "View/additional graph display".

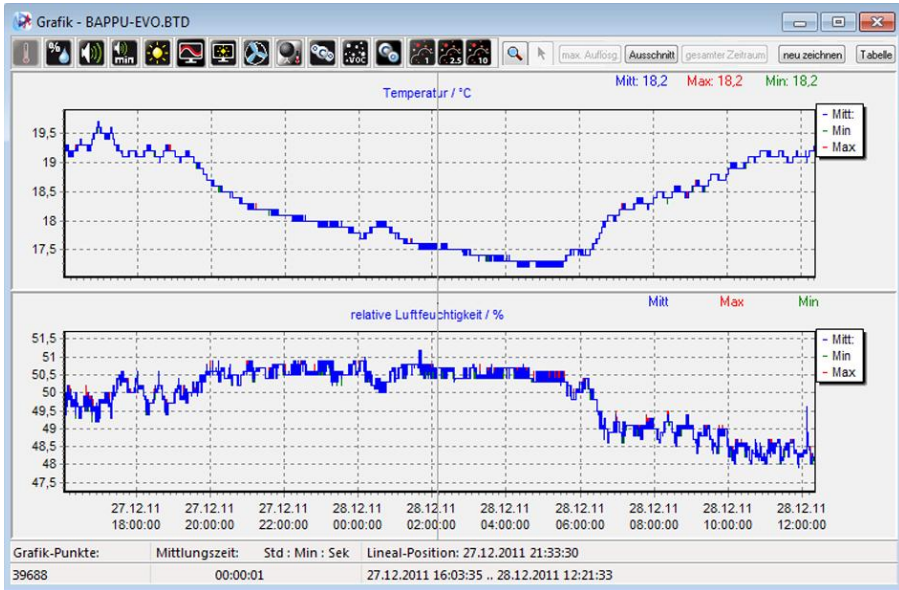
A graphic display can be marked with a mouse click and replaced by a new graphic.



Tipp: : PMV tendency (climate sum measure) can be switched on via the context menu (right mouse button).

The new measuring range can be selected via the right mouse button menu, measured value symbol or in the main menu via "View/marked graphic". It is also possible here to hide a selected graphic.





Display options for the graphs

The white box at the top right hand side of the window shows the colour legend used for presenting curves. They can be displayed separately by clicking on the abbreviation in the white box or on the header.

- **Mean:** Display the average value with a blue curve
- **Min** Display the minimum value with a green curve
- **Max** Display the maximum value with a red curve

Tip: If you encounter problems displaying the data, select "View/new graph" in the menu list or press the "New graph" button.

Specific selection

If you want to analyse a specific part of the graph, all you need to do is enter the time of the beginning and end of the specific area in the "Detail" dialog box. The selection criteria will shrink the timeline of the graph to the time you require.

Zoom in/zoom out

When the zoom function has been selected, a “+” will appear next to the magnifying glass cursor. You can then click on a point that you want to enlarge or, with the left mouse button pressed down, move the mouse from left to right to draw a frame around the selection you would like to view.

If you would like to zoom out when the zoom function is activated, simply press the CTRL key on your keyboard. A “-” sign will appear next to the magnifying glass cursor. If you would like to zoom out of a specific selection, simply click the left mouse button and press “CTRL” on your keyboard.

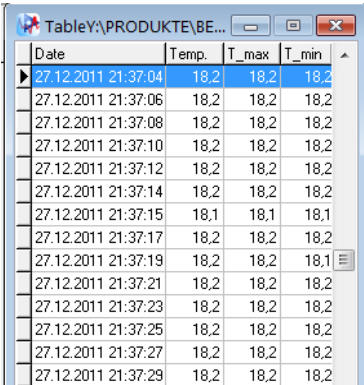
The “Total time period” button returns the selection to the original size. A drop down menu showing various display possibilities can be called up by clicking the right mouse button. The zoom factor always refers to the graphs open in the current window. Clicking on the arrow symbol will return you to “mark and move” mode.

Ruler

In mark and move mode, you can use the moveable horizontal ruler in the graphic window to mark striking events and read all of the values of the measurement ranges on the graph up until that particular point in time.

The “average/maximum/minimum values” as well as the coordinates of the selected position are immediately displayed in the window and can be identified. All of the measurement values at this position can be displayed in the measurement value table.

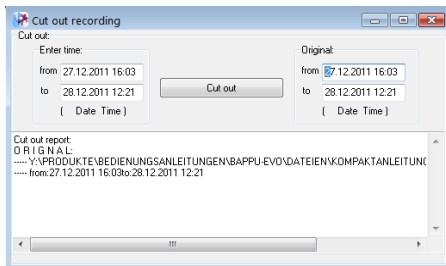
Measurement value table



Date	Temp.	T_max	T_min
27.12.2011 21:37:04	18,2	18,2	18,2
27.12.2011 21:37:06	18,2	18,2	18,2
27.12.2011 21:37:08	18,2	18,2	18,2
27.12.2011 21:37:10	18,2	18,2	18,2
27.12.2011 21:37:12	18,2	18,2	18,2
27.12.2011 21:37:14	18,2	18,2	18,2
27.12.2011 21:37:15	18,1	18,1	18,1
27.12.2011 21:37:17	18,2	18,2	18,2
27.12.2011 21:37:19	18,2	18,2	18,1
27.12.2011 21:37:21	18,2	18,2	18,2
27.12.2011 21:37:23	18,2	18,2	18,2
27.12.2011 21:37:25	18,2	18,2	18,2
27.12.2011 21:37:27	18,2	18,2	18,2
27.12.2011 21:37:29	18,2	18,2	18,2

Click the “table” button on the menu list of the graphic window. All of the values of the measurement range are now displayed in a separate window according to the resolution you have selected. Moreover, every measuring point is presented in graphical form on the X and Y-axis according to the time it was acquired. Any value that has been selected with the ruler tool in the graphic window is marked by colouring the respective box. Vice versa, it is also possible to mark the exact position of a value in the graphic window by double clicking it with the cursor.

11.8. Selecting a recording



When part of a recording needs to be edited, you can select this in the “Cut” window.

Select “Recording/Cut out recording” in the main menu. Then enter the time frame of the selection you would like to work on in the dialog box.

As soon as you select “Cut”, the programme will prompt a file name for the selected time coordinates. In order to be

able to open the newly created file, confirm the name by pressing “Save”.

11.9. Mean value calculator

The mean value for all of the recorded values of a freely definable section of a long-term recording can be generated for all measurement ranges. To generate the mean value, select “Recording/mean value calculator” in the main menu, and enter the time frame in the dialog box. By default, the setting encompasses the calculation of the entire time frame of the recording.

If you want to display the average, maximum and minimum values in the window, select “averages calculator”. You can save the file as a text file (*.txt) by selecting “Save”. The “Print” button opens the print preview screen for the file currently being displayed. Pressing “to clipboard” copies the file to the clipboard for other applications. The “clean evaluation window” deletes the data in the window.

11.10. Recording with the PC

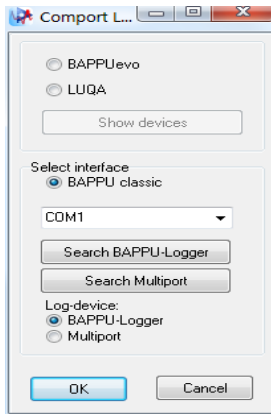
Using the USB port, connect the BAPPU-evo to your PC. The relevant connection cable is supplied with the device. To begin the transfer of the data, the measuring device has to be switched on using the ON/OFF button.

Next, select BAPPU-evo as the relevant device in the “Settings/Interface” dialog box.

The appearance of the serial number of your device in the status bar of the main window indicates that a connection to the measuring device has been established.



Caution: Disable the standby and hibernation functions under Windows during long-term recording, otherwise the recording will be interrupted!



When contact between BAPPU-evo and BAPPU-time software has been established, the next step is to select "Recording" and then "Start recording" in order to begin a long term recording. Alternatively, you can press . Following this, the "Recording settings" dialog box will appear.

Subsequently, enter the date and time in the "Terminating recording manually" dialog box to set the end of the recording. If you would like to stop the recording manually, select "Manually stop recording". (This is also possible when you have set the end of the recording).

The next step is to enter the "Average time". Finally, confirm this by pressing "OK".

Tip: Generally, intervals of 30 seconds for the average time will give significant values and trends, due to the fact that **all** of the measurement values are factored in during this time. (s.a. [Kapitel 7.1 „Set interval“](#))

11.11. Starting a recording

After pressing the "OK" button, the program will prompt you to enter a name and storage location for the recording. Intermediate storage on the local hard drive of your PC offers you the possibility to view data already stored during the recording and greatly improves data security.

Tip: The data format for long term recordings is "*.btd" (BAPPU-time file). When the data is exported, it can be saved as a "*.csv" file, which is compatible with Windows-based spreadsheet and word processing software.

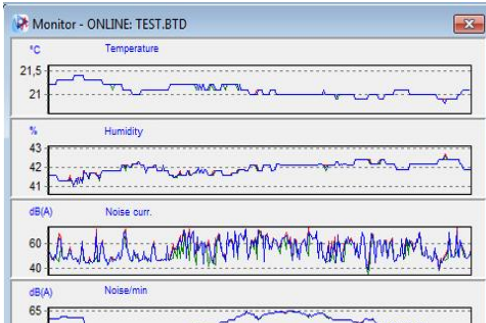
After confirming the file name, the recording starts. When recording starts, the progress of the recording in time is indicated in days, hours and minutes.

In the status bar of the program interface the recording mode is indicated by the lettering "Recording in progress" and the quantity of the collected data records. At the same time, the "Measured values" window is opened, in which the current values are displayed.

The recording mode will be indicated on the status bar of the program interface with the words "Recording running" and the amount of recorded data will be shown. At the same time, the "Measured values" window will pop up and show the current values.

Online-Monitor

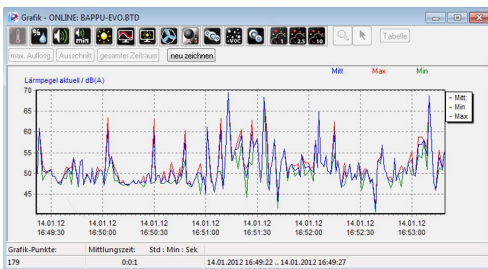
During the recording it is possible to view the measurement trend in the data monitor as well as call up the data which has already been stored in the graphic window. In order to call up the monitor function press  in the menu list.



The monitor window lets you view all of the measurement ranges on your measuring device in accordance with the order you have set, and shows the progress as a graphical curve.

Graphic display

In order to view the data with a higher resolution in the monitor window, you can simply double click the specific measurement range in the monitor window. Alternatively, you can open this by clicking "View/Show window for recording chart" which can be found in the menu, or by clicking .



By clicking the measured values symbol in the top left hand side of the screen, you can switch between the different measurement range views.

The end of the recording

A recording will end when the specified time frame expires. BAPPU-time

confirms this with a pop up window that states: "The recording was terminated automatically". If you want to stop the recording manually, click the "Stop recording" symbol, and confirm the pop up question "Are you sure you want to terminate the recording?" with "OK".

11.12. General

Exporting files

BAPPU-time data can be exported as "*.csv" data for common Windows word processing or spreadsheet programs. Select "File", then "Export" in the main menu or open the menu window by clicking the right mouse button. Specify whether you want to export all the data in the file or only a certain amount of data. The program opens the export window where you can enter the file name for the file.

Printing

If you would like to print your BAPPU-time graphs, select either "Print file" in the main menu or right click your mouse and select "Print" from the list.

Additional options such as print layout and the print quality can be selected in print preview.

Right mouse button

In many cases, clicking the right mouse button opens a context related menu that offers the user a number of functions such as exchange images or show additional images. Moreover, it is possible to call up the file export function, print a file and show the zoom functions.

12. Warranty and Guarantee

BAPPU has been produced with utmost care and checked to guarantee a trouble free operation. However, should production-related problems occur, please notify us immediately upon occurrence within the guarantee period.

Wear parts, fragile parts as well as damage that occurs due to misuse or disregarding the manual are not subject of the guarantee. Opening the measuring device or removing or modifying the serial number inside the device shall lead to the guarantee claim being nullified.

The guarantee period is 24 months.

Claiming upon a guarantee shall not extend the guarantee period. Repairs and settings that are not covered by the guarantee as well as transport and packaging expenses shall be charged. Any guarantee outside the statutory liability, especially those for damage that are not related to the device, shall be excluded.

13. Operator Responsibility

The operator must find out about the applicable occupational health and safety regulations and, in a risk assessment, determine additional hazards that result from the special working conditions at the machine's place of use. He must implement these in the form of operating instructions for the operation of the product.

During the entire service life of the product, the operator must check whether the operating instructions he has created correspond to the current status of the regulations and, if necessary, adapt them.

The operator must clearly regulate and define the responsibilities for operation, troubleshooting, maintenance and cleaning.

The operator must ensure that all employees who handle the product have read and understood the instructions. In addition, he must instruct the staff at regular intervals and inform them about the dangers.

The operator must provide the personnel with the necessary protective equipment and must instruct them to wear the necessary protective equipment.

The operator must have all safety devices checked regularly for functionality and completeness.



The operator must have all safety devices checked regularly for functionality and completeness.

Instruction by the operator

The operator must instruct his employees in the following areas before using the product:

- Risk assessment
- Operating instructions
- Personal protective equipment
- Area of application of the product
- Environmental conditions of the product
- Setting up, operating and cleaning the product
- Checking the product before starting work and after finishing work
- Ergonomics at the workplace
- Hazards in the operating environment



**The new standard
in instrumentation**



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Brand of ELK GmbH: BAPPUevo