

Operating instructions

Graphic display for SINEAX CAM



CAM Display Be

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Overview

The optional graphic display is intended for on-site visualization of measurement data, lists and alarms of the SINEAX CAM. The operation of the display is performed by means of the keys. Using the keys the user may acknowledge alarms or extreme values as well. Which data can be displayed depends on the version of the device, especially which I/O modules are present and which options are activated. Also the configuration of the measurement unit influences the data display. The most influencing factor in this context is the connected system.

The parametrization of the graphic display and the assembly of user specific measurement displays are done using the **CB-Manager** Software. But settings like contrast or display language may also be performed by means of the operating keys.

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1. Display structure and operation

Generally

When first switching on the device the main menu is displayed. On every further start-up the last displayed image before the power-down is shown. There may be exceptions after a reconfiguration of the device via interface, if the displayed information is no longer available.

When changing the display window there may be a waiting time, which is symbolized by displaying a sand glass. This way it can be prevented that out-of-date data is displayed.



Selection menus



◀:⬆ = Back to previous menu
 ■:↵ = Execute the selected line

▲: Shift the selection up

Scroll position: If displayed, the list contains more entries than can be displayed at the same time

▼: Shift the selection down

Menu description
 as a navigation help

Operating menu
 (possible functions)



The operation of the display is performed using the keys. The symbols displayed in the operating menu correspond to the symbols on the keys. The assigned function is stated behind the colon.

Overview of the used operating functions

- | | | | | | |
|--|--|--|---|--|---|
| | Back to the previous displayed menu | | Positioning using the cursor keys | | Positioning upwards or downwards |
| | Perform selection | | Adopt selected item | | Display page ± |
| | Perform selection, press ■ longer (>1s) | | Alarm acknowledge, press ■ longer (>1s) | | Reset selected item, press ■ longer (>1s) |
| | Go to next parameter | | Harmonic ± | | Adjust value ± |
| | Enlarge / downsize: Number of measurements, scaling | | | | |

2. Settings



select a parameter group

Invoke the line *settings* in the main menu. This line will be visible only if the selection is shifted downwards. In the menu settings go to the line with the desired parameter group using the keys ▲ and ▼. Then invoke the corresponding parameter page by pressing the key ■.

2.1 Settings of the display



parameter selection

Position to the parameter which should be modified using the keys ▲ and ▼. Press ■ to see the value start flashing. Subsequent the possible functions of the operating menu change.



modifying parameters

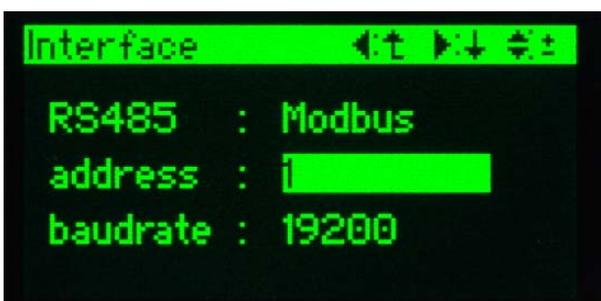
The parameter can now be adjusted to the desired value using the keys ▲ and ▼. After pressing the key ■ again the value will be adopted and stops flashing. The operating menu changes back. Repeat the procedure for other parameters.



display 2

Preference display and rotation are features of the customer specific measurement displays (see page 8). Auto scaling adjusts the representation to the measurement value. This way and if input signals are low more digits are shown, but maybe are not significant.

2.2 Settings of the interface



adjust Modbus parameters

Following the procedure used in 2.1 modify the parameters device address and the baud rate to your needs.

Attention: All devices connected to the Modbus must have the same baud rate.

2.3 Settings of the clock

The SINEAX CAM has an internal clock, which is used as a time reference for alarms, events, progression of measurements and so on. Due to the daylight saving time used in many regions the time must to be set forward once a year and backward once a year as well. Especially when setting back the time information gets lost, because data for this time is acquired twice but can be stored only once.

To handle this problem the SINEAX CAM uses internally UTC time only (see below). The user can set a time offset, which performs a static time shift to the local time. This way time references shown on the display are correct. In countries where a change to daylight saving time is performed, the offset of normally one hour has to be adjusted at the beginning and at the end of the daylight saving time.

ATTENTION !

A modification of the **UTC time** has a serious impact on logger and lists. If e.g. the time is shifted into the past, no entry can be made into the logger or lists until the UTC time is at least equal to the one used for the last entry. Only this way the consistency of the already recorded data can be guaranteed. The only alternative is the complete reset of all logger and list data. Therefore the following warning is displayed before the clock data:



use carefully
loggers and lists may be
affected
(read operating instructions)

However, a modification of the **local time offset** is harmless.



Clock ◀↑ ▶+ ↻±
UTC time (YYYY-MM-DD):
2007-09-06 13:16:59
local time offset [hrs]: +2.0
local time (UTC +2.0 hours):
2007-09-06 15:16:59

changing of parameters

There is no need for a special modification mode. The flashing value can be modified directly using the keys ▲ and ▼. To go on to the next parameter use ▶. The take over of the data is not performed before the return to the menu settings.

UTC (Universal Time Coordinated)

Sometimes UTC is called world time as well. The reference corresponds to the Greenwich Mean Time (GMT). The time zones of the world nowadays are all referenced with an offset to UTC. UTC time doesn't use time shifts, which may occur due to a change to daylight saving time.

Example: In Switzerland the CET (Central European Time) is valid, which has an offset of +1[h] to UTC. But during have of the year the CEST (Central European Summer Time) is used, which has an offset of +2[h] to the UTC time used in the SINEAX CAM.

3. Security system

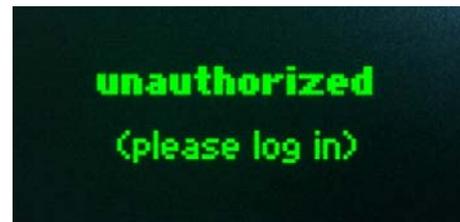
The device supports a security system which allows to selectively assign rights to different users. Thereby rights for the changing of measurement or configuration data or the simulation of I/O data may be granted.

The granting of the rights is performed using the CB-Manager software during the configuration of the device. Along with the administrator up to three users are supported. To each user the administrator assigns a user name and a password and the individual rights. Then the system is activated. The protection then is secured for access via CB-Manager software as well as via display.

For the display the following functions may be protected using the security system:

- *Reset of meters and extreme values*
- *Settings of display, interface and clock*

To perform one of this functions a user must be logged in and he has to own the necessary rights. If no user is logged in or the necessary rights are not granted the following error message appears:



entrance via main menu

The login is not requested when trying to perform a protected function. A user has to log in prior via main menu. Subsequent he is able to perform all functions enabled for him until he logs out or the device is switched off.



Login, logout

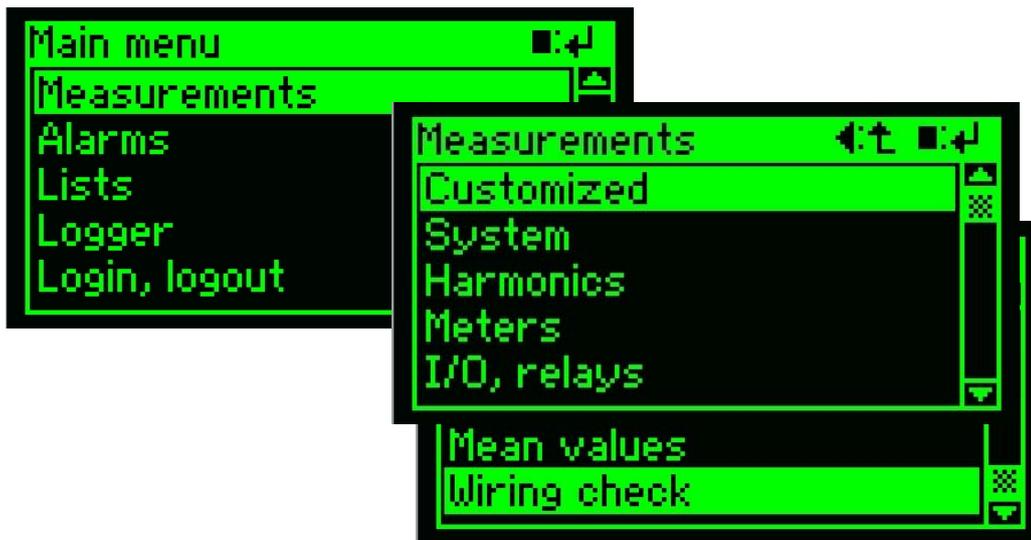
When a user or administrator logs in the present user is automatically logged out. Only when log in the input of a password is required. To perform the desired operation position to the appropriate line using ▲ and ▼ and press the key ■. The displayed process, here the logout of the administrator, will take effect.



enter the password

For the input of the password position to the characters and press shortly ■. Special characters can be masked using * and will not be tested then. To finish the entry of the password press the key ■ for a longer time (>1s).

4. Display measurements



The Measurements menu has more entries as directly can be displayed.

Via main menu the menu measurements may be invoked. There the following data are available:

Customized: Free assembled measurement data, arranged by the user using the CB-Manager software.

System: Instantaneous values of the system and their extreme values with reset facility.

Harmonics: Individual harmonics, THD and TDD of voltage and current as well as their maximum values with reset facility.

Meters: All acquired meter contents of the measured system and the I/O's.

I/O, relays: Measurements resp. states of the I/O's and relays.

Mean values: Trend and last value of the mean-values with interval time t_1 / t_2 , with extreme values and reset facility.

Wiring check: Measurements for checking the correct wiring of the device.

4.1 Customer specific measurement displays

Because the user doesn't need all of the provided measurement data, it's possible to make an almost free assembling of up to 20 display screens using the CB-Manager software. Existing pages of other measurement displays may be used or free combinations of single measurements can be made.

This way it should be possible, that the user works only with the customized measurement display. Other pages are then required for special functions only. The representation of these data is not shown here in detail, because it's identical to other existing measurement displays.

Preference display: If activated, one of the customer specific pages will be displayed automatically after a configurable time without user interaction. This way the appearance of the device is always similar.

Rotation: If activated, all customer specific pages will be displayed one after the other. The rotation interval is configurable.

Preference display and rotation may be switched on and off via the display settings. But these functions can not be used at the same time.

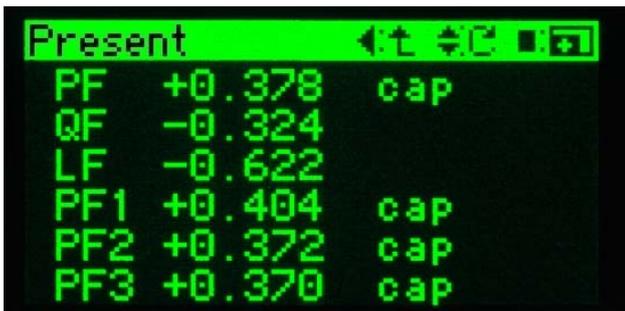
4.2 Measurement display of system quantities



Present: Contains the instantaneous values of the system

Minimum, maximum: Shows all acquired minimum and maximum values with timestamp

Reset minimum, maximum: Allows to selectively reset the acquired extreme values



Present

This predefined assembling of measurements consists of multiple pages. The representation can be switched from big (3 values) to small (6 values), or vice versa, using the key ■. To select the next or the previous page use the keys ▲ and ▼.



Minimum, maximum

For selected measurements acquired maximum and, if applicable, minimum values can be displayed with timestamp (time of occurrence).

The selection of the page to display may be done using ▲ and ▼.



Reset min., max.

For all acquired extreme values or selectable kinds of measurand, minimum and maximum values may be reset by pressing ■ for a longer time (>1s).

Note: For measurands like the slave pointer IB it may take several minutes until a new value is stored.

The displayable measurements depend on the configured system (type of connection). The displayed measurement combinations therefore may be different according to the

application. Details for the timestamp (time of occurrence) used here may be found in the chapter settings of the clock.

4.3 Measurement display of harmonics



Present: Contains the present harmonic contents as well as THD and TDD

Maximum: Contains the acquired maximum values with timestamp

Reset maximum: Allows to selectively reset the maximum values



Present

Each page shows a graphical overview of the present harmonic contents (U or I) and the value for one individual harmonic. The displayed harmonic may be changed using ▲ and ▼. Scaling may be adjusted using ■. To select the next measurand use the key ►.



Maximum

Each page shows a maximum THD (resp. TDD) with timestamp, the corresponding harmonic contents as well as the value for one individual harmonic. The displayed harmonic may be changed using ▲ and ▼. Scaling may be adjusted using ■. To select the next measurand use the key ►.



Reset maximum

Maximum values of THD (voltage) resp. TDD (current) along with their corresponding harmonics may be reset by pressing ■ for a longer time (>1s). This can be done for all values or selectively for the harmonics of voltage or current only.

Note: When monitoring the maximum values of the harmonics, in fact the maximum value of the THD resp. TDD is supervised. If a new maximum value is detected, it is stored along

with the corresponding harmonic contents. This way it's assured that the stored data belong together and represent an image of the real world.

4.4 Display meter contents



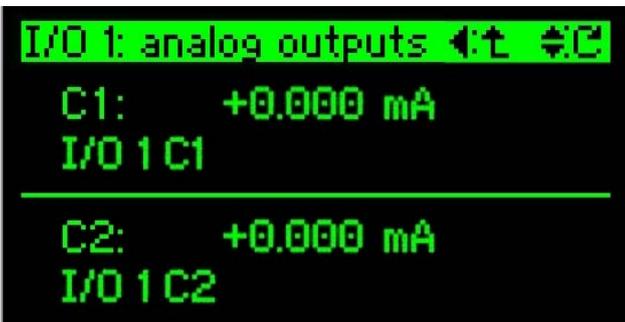
Meter contents are acquired for both the measured system as well as for analog inputs. For digital inputs it takes place only if the inputs are configured as meter inputs.



Meters

For each meter the contents for high tariff (HT) and for low tariff (LT) are displayed. If the tariff switching is not active for the meters, no value will be shown for LT. The selection of the meter is performed via ▲ and ▼. A long pressing of the key ■ (>1s) resets the displayed meter contents.

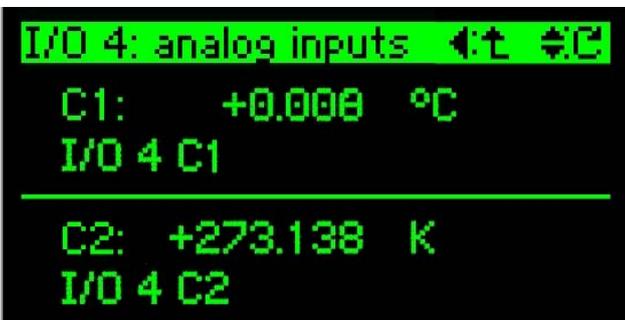
4.5 Measurements of I/O's and relays



For each channel of analog output modules the output value and the channel text is displayed.



For each channel of digital input or output modules the output value and the channel text is displayed.



For each channel of analog input modules the scaled measurement and the channel text is displayed.



For each relay output the present position of the switching contact is shown.

For each existing I/O module one page is shown, followed by the view of the relay states.

The selection of the display page is done using the keys ▲ and ▼.

4.6 Measurement display of mean values

Mean values may be acquired with two different interval times t_1 and t_2 . The corresponding measured quantities are freely configurable. Therefore also the appropriate

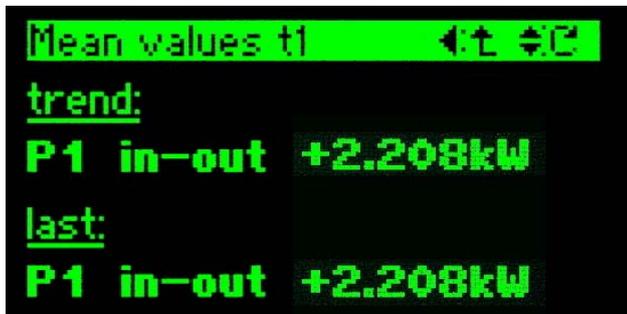
measurement displays are variable. Up to 12 different pages may be displayed. The selection is performed using the keys ▲ and ▼.



Trend, last value t_1 / t_2 : Last calculated mean value and the trend of this measurement

Maximum, minimum t_1 / t_2 : The extreme values of the acquired mean values with timestamp

Reset maximum, minimum: Allows to selectively reset the extreme values



Mean values t_1 / t_2

For each selected measurand the last acquired mean value as well as the trend value is shown.

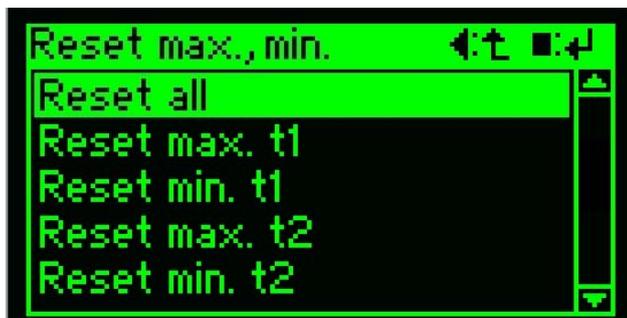
Monitoring of trend values by means of limit values makes sense especially for power quantities.



Maximum, minimum t_1 / t_2

For each configured mean value quantity the maximum and the minimum value with timestamp (time of occurrence) is shown.

Details about the timestamp may be found in the chapter settings of the clock.



Reset max., min.

For all acquired values or selectively only for parts extreme values can be reset by pressing ■ for al longer time(>1s).

Note: Depending on the interval time t_1 resp. t_2 it may take hours until a new extreme value is stored.

4.7 Measurements for wiring control

| Wiring check | | | |
|--------------|-------|---|-------|
| U1N | 234.0 | V | |
| U2N | 234.0 | V | |
| U3N | 234.0 | V | |
| I1 | 22.32 | A | G → M |
| I2 | 23.24 | A | G → M |
| I3 | 23.09 | A | G → M |

The wiring check shows measurements for voltage and current of all phases and the direction of energy flow of the currents.

If all voltages have almost similar values and the energy flow direction of the currents is equal it may be assumed that the wiring has been performed correctly.

5. Alarms

Via the logic module of the SINEAX CAM complex contexts may be monitored. Out of them alarms can be generated, which are shown on the graphic display and can be acknowledged via the keys.



The option **Lists** offers the possibility to record the occurrence, the acknowledgement and the setting of alarms with time reference in chronological and correct order.

The acknowledgement resets a possibly defined further action, e.g. the switching of a relay output. The alarm handling is possible even if the option lists (alarm, event, operator list) is not implemented.

alarm reporting

The occurrence of an alarm is reported by a blinking bell symbol in the upper left corner of the display, no matter which display page is active at the moment. The information which alarm is really active can be found via the alarm display.

alarm display

Via the menu item alarms of the main menu one may proceed to the alarm list. There the states of all monitored alarms are displayed, no matter if they are active or not.

alarm states

The alarm display gives the information if a specific monitored alarm is active or not. The alarm number refers to the appropriate logic function. The status shows if the alarm is active, active acknowledged or inactive.

acknowledgement of alarms

By pressing the key ■ for a longer time (>1s) the displayed alarm will be acknowledged. It changes its status to active acknowledged. If the alarm symbol in the upper left corner changes accordingly, then there is no further alarm in the alarm state.

If the security system has been activated, also the user who has acknowledged an alarm will be recorded.

6. Lists

The option **Lists** allows to perform a chronological recording of events, alarms or system messages. At a later time it's possible to understand and analyse each state change of the power system and each intervention to the device in a correct time sequence.



Alarm list / event list

The list contains all alarms / events, which has been intended for recording in the alarm resp. event list using the logic module. For the entries the texts will be used which have been defined in the logic module for the appropriate state change.



All recordings can be displayed on request, with time stamp and dedicated text. If the security system has been activated for specific displays also the involved user is available. This way it's e.g. possible to see later on which user has acknowledged an alarm.

access to list information

Via the menu item lists in the main menu the sub-menu lists can be entered. If no lists are active or the option is not implemented, then after the selection of the menu item lists no further action is performed.

available information

For each list entries with time stamp and explanatory text may be requested. There is no list display if still no entries exist or if the list hasn't been configured for use, e.g. if the number of events to record is 0.

The following will be recorded with time stamp:

- * *The occurrence of the event*
- * *The determination of the event*

A possible acknowledgement of alarms will be recorded in the operator list. Events are not subject for acknowledgement.

list entry

The time stamp shows the time of the occurrence of the event. The user defined text gives further information about the event. Also given is the number of the associated logic function. By means of the keys ▲ and ▼ it's possible to browse the existing entries.

Operator list

This list contains all the events which are caused by a user interaction or a specific system event.

```
Operator list  ◀▶ ⏪ ⏩
2007-09-21 13:11:07.88 (UTC+2.0)
power: on
operator:
device
```

The monitored events are listed below. All texts are predefined and can't be modified by the user.

list entry

The time stamp shows the time of the occurrence of the event. The predefined text describes the event. If applicable a *detail code* is also given (see below). If possible the user is shown who has provoked the event. By means of the keys ▲ and ▼ it's possible to browse the existing entries.

Monitored events

• Auxiliary power supply

- ON or return
- OFF or fail

• Configuration

- Modification of clock parameters
- Modification of interface parameters
- Configuration change with *detail code* (binary)

| | | | | | | | | |
|------------------|---------|-------------|--------|----------------|-------------|-------------|--------------|--------------|
| (Dist. recorder) | Display | Mean values | Meters | Logger + lists | I/O-Modules | Measurement | Logic module | Limit module |
| 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 |

```
Operator list  ◀▶ ⏪ ⏩
2007-09-21 14:10:59.30 (UTC+2.0)
configuration: changed
0 0000 0010
operator:
unknown
```

e.g. logic module data changed

• Security system

- Activation
- Deactivation
- Right of user 1, 2 or 3 changed
- Log-in of a new user

• Logger

- mean values t1 or t2: start
- mean values t1 or t2: stop
- mean values t1 or t2: reset
- min./max.: start
- min./max.: stop
- min./max.: reset

• Simulation

- Logic module: on / off
- Analog outputs: on / off
- Digital outputs: on / off

Alarm handling

- Acknowledgement of all active alarms
- Selective alarm acknowledgement LS1..16, with *detail code (binary)*

| | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| LS16 | LS15 | LS14 | LS13 | LS12 | LS11 | LS10 | LS9 | LS8 | LS7 | LS6 | LS5 | LS4 | LS3 | LS2 | LS1 |
| 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 |

- Selective alarm acknowledgement LS17..32, with *detail code (binary)*

| | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| LS32 | LS31 | LS30 | LS29 | LS28 | LS27 | LS26 | LS25 | LS24 | LS23 | LS22 | LS21 | LS20 | LS19 | LS18 | LS17 |
| 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 |

Reset

- Standard meters
- Meters of the module inputs
- min./max. of instantaneous values with *detail code (binary)*

| | | | | | | | | | |
|--------|-------|-------|-------|------------|------------|--------|-------|-------|-------|
| PF min | S max | Q max | P max | Freq. min. | Freq. max. | IB max | I max | U min | U max |
| 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 |

- min./max. harmonic analysis with *detail code (binary)*

| | | | | | | | | | | | |
|-------|-------|---------|---------|---------|--------|--------|--------|--------|--------|--------|----------|
| TDD.I | THD.U | THD.U31 | THD.U23 | THD.U12 | TDD.I3 | TDD.I2 | TDD.I1 | THD.U3 | THD.U2 | THD.U1 | Unbal. U |
| 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 |

- min./max. mean values t1 with *detail code (binary)*, up to 12 mean values

| | | | | | | | | | | | |
|-------|-------|-------|------|------|------|------|------|------|------|------|------|
| t1.12 | t1.11 | t1.10 | t1.9 | t1.8 | t1.7 | t1.6 | t1.5 | t1.4 | t1.3 | t1.2 | t1.1 |
| 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 |

- min./max. mean values t2 with *detail code (binary)*, up to 12 mean values

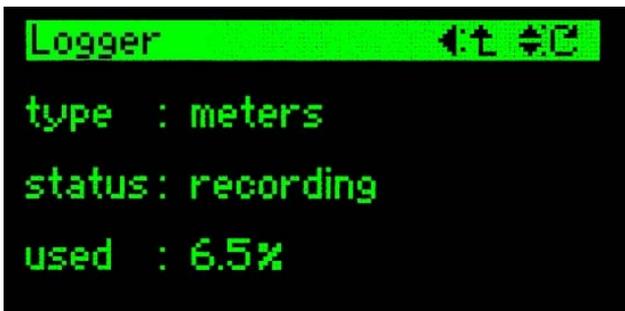
| | | | | | | | | | | | |
|-------|-------|-------|------|------|------|------|------|------|------|------|------|
| t2.12 | t2.11 | t2.10 | t2.9 | t2.8 | t2.7 | t2.6 | t2.5 | t2.4 | t2.3 | t2.2 | t2.1 |
| 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 |

For the evaluation by means of the software CB-Analyzer no *detail code* is required, because they are converted into plaintext messages. Thereby single events, e.g. the modification of all parts of the configuration of the device, are converted

into multiple events with the same time. Because the display contrary to the PC software hasn't the possibility to show more than one entry at a time this conversion would have been confusing.

7. Logger

The optional **Logger** serves for long-term recordings of measurement progressions. The user can record variations of instantaneous values (min/max values) or mean values. It's also possible to make automatic meter readings.



Via display the status of the logger can be requested. This way it's possible to make an assumption how long the corresponding data recording can continue. If the endless recording mode is used no specific state information is available.

logger status

Via the menu item logger in the main menu the state display of the active data loggers can be entered. If no logger is active or the option is not implemented, then after the selection of the menu item logger no further action is performed.

mean values logger (endless mode)

In this example the recording of mean values with interval time t1 is active. The logger records using the endless mode. Therefore no information about the usage of the dedicated memory is available. To change to the state information of other logger types use ▲ and ▼.

mean values logger (one-time)

The recording of mean values with interval time t2 is active. The logger is currently recording. Because the memory usage is given with 0.4% you know that the logger uses the one-time recording mode. As soon as the usage reaches 100% recording will stop.

meters logger

In this example the automatically reading of meter contents is active. The recording is performed one time and stops as soon as the dedicated memory part is used.

8. Menu overview

