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Manual

Blue**METER SIGMA**

INDEX

Datum / Date	Geändert durch Modified by	Beschreibung der Änderung Description of modifications
1.10.2013	MG	Function Print added
15. 7.2014	MG	Units completed
8.1.2015	HEH	New: Conformity Declarations and Approvals

In the link list below, you will find more information on different important topics:

- Important Product Information (e.g. Important Conformity Declarations and Approvals)
  http://www.wylerag.com/en/support/certificates/

- Imagefilms, Instructional videos and Tutorials
  https://www.youtube.com/user/wylerag

- Manuals und Compendium
  http://www.wylerag.com/en/support/documentation/manuals/

- Representatives WYLER AG / Product Training
  http://www.wylerag.com/en/contact/representatives/

The following additional manuals may be downloaded from http://www.wylerag.com:

- **BlueSYSTEM,** the new series of measuring instruments with and without wireless data transmission.
  The new series of measuring instruments is particularly suitable for suitable precision measurement of smallest angles. Applications are therefore in particular the measurement of flatness of surface plates or the measurement of the geometry of machine tools. The sensor itself, equipped with high-tech electronics on ceramic substrate, allows precise measurements even under critical environmental conditions, e.g. high air humidity or rough workshop environments.

- **DYNAM**, the software for measuring and monitoring data delivered by the ZEROTRONIC-sensors

- **LEVELSOFT PRO**, the software for measuring flatness and inclination with WYLER inclination measuring instruments

- **MT-SOFT,** that gives the possibility to measure individual elements of machine tools with standard inclination measuring instruments. The measured results can be saved and at a later stage used for comparison and put together to receive a thorough result of the **over all accuracy of the machine tool**.

- **COMPENDIUM**, the guide to our products, technology and to a variety of applications.

- **Description of the interface RS485**

If for any reason it is not possible to download the respective data we will gladly supply against a nominal charge a CD **"ALL-IN-ONE"** with all the manuals in different languages included.

1. BASICS / INTRODUCTION

The new **BlueMETER SIGMA** has been developed as a successor respectively replacement of the two display units LEVELMETER 2000 and BlueMETER. With the BlueMETER SIGMA the measuring data can be transmitted via cable or wireless to a PC/Laptop.

The BlueMETER SIGMA is compatible with WyBus. Therefore a wide range of measuring instruments and sensors can be read, such as

- the measuring instruments of the BlueSYSTEM family
- ZEROTRONIC sensors
- ZEROMATIC 2/1 and 2/2
- MINILEVEL NT
- LEVELTRONIC NT

1.1 DESCRIPTION OF THE BLUEMETER SIGMA

The BlueMETER SIGMA serves as

- a display unit
- an interface between instruments and PC/Laptop

On the BlueMETER SIGMA various parameters, such as

- measuring unit
- measuring mode
- relative base length   etc.

can be changed or adjusted.

1.2 PREPARATION AND START-UP OF THE BLUEMETER SIGMA

BEFORE YOU START

Read this manual carefully before working for the first time with the BlueMETER SIGMA. You will get an overview on the versatile functions and possibilities offered by this display unit. At the same time you get familiar with the various operating elements. Thus you can avoid faulty manipulations.
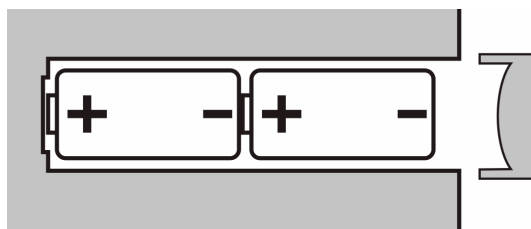
1.2.1 BATTERIES

The batteries are not installed in the new instruments they are delivered separately. It is recommended to remove the batteries when transporting the instruments.

The status of the battery power is normally displayed e.g. 2_7 **(2.7 Volt)**

The lowest voltage is **1.7 Volt**. After this limit has been reached a battery symbol blinking ☐ is displayed. The batteries should then be exchanged in due time.

2 units   1.5V, Size "C" ALKALINE

As an end user you are forced by law (battery regulations) to return all used batteries and accumulators, disposal with the household waste is prohibited.

Contamination-laden batteries/accumulators are marked with the symbol shown above which renders you aware of the prohibition to dispose of them with the household waste.

Your used batteries/accumulators can be dispensed free of charge at the collecting points of your community, with our distribution partners or at any point of sale where batteries/accumulators are sold. Thus you fulfil your legal obligations and contribute to the protection of the environment.

Remarks concerning the battery power:

BlueMETER SIGMA
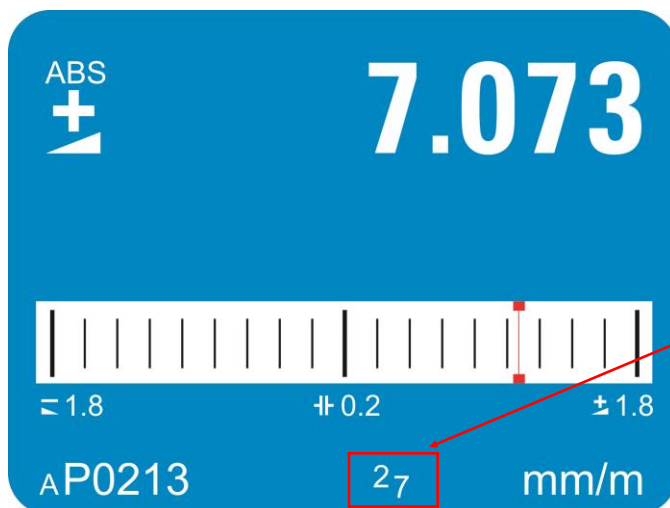
Display of the actual battery power (example: 2.7 V)

The lowest voltage is **1.5 Volt**. After this limit has been reached a battery symbol blinking is displayed. The batteries should now be replaced <u>immediately</u>.
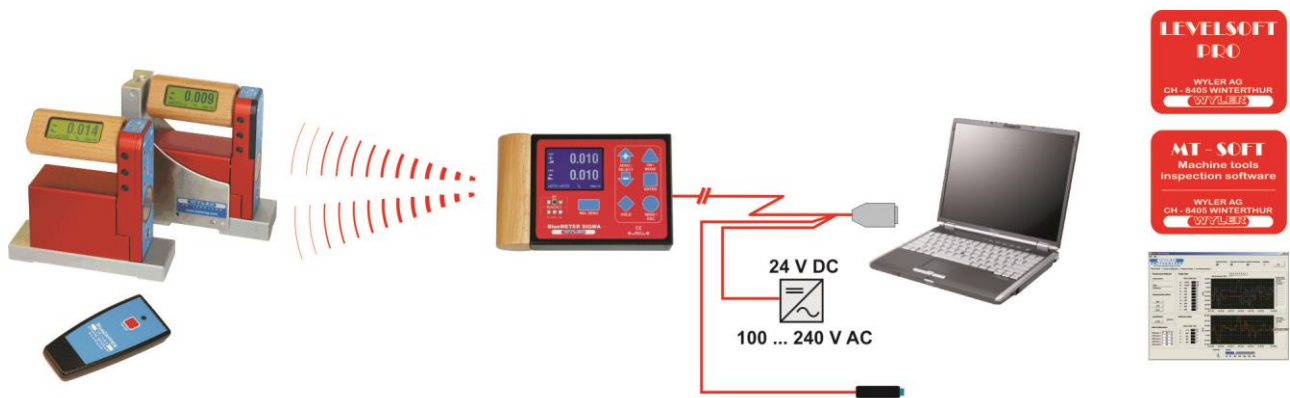
1.2.2 POSSIBLE CONFIGURATIONS

BLUESYSTEM VIA WIERELESS TRANSMISSION TO **BLUEMETER SIGMA**,
WITH CONNECTION TO A **PC / RS232**
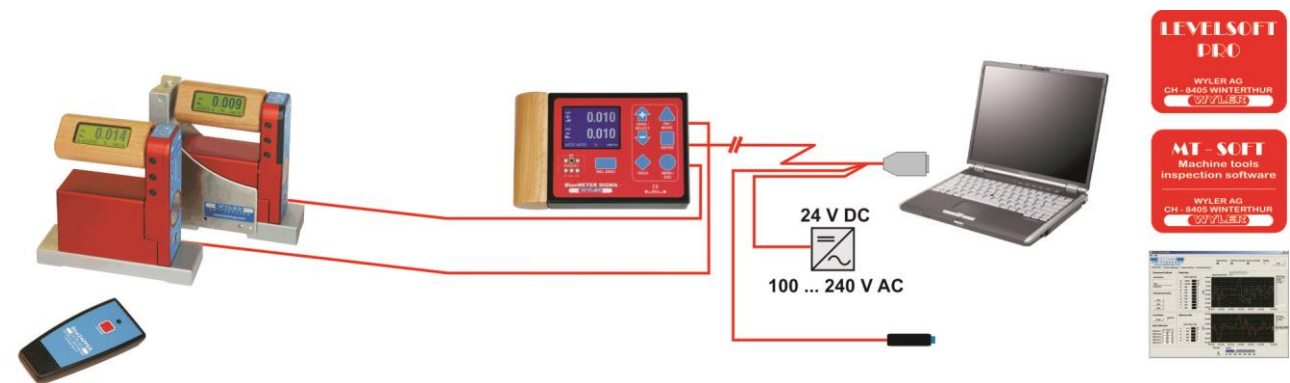
BLUESYSTEM VIA CABLES TO **BLUEMETER SIGMA**, WITH CONNECTION TO A **PC / RS232**

BLUECLINO OR **BLUECLINO HIGH PRECISION** VIA WIRELESS TRANSMISSION TO **BLUEMETER SIGMA**
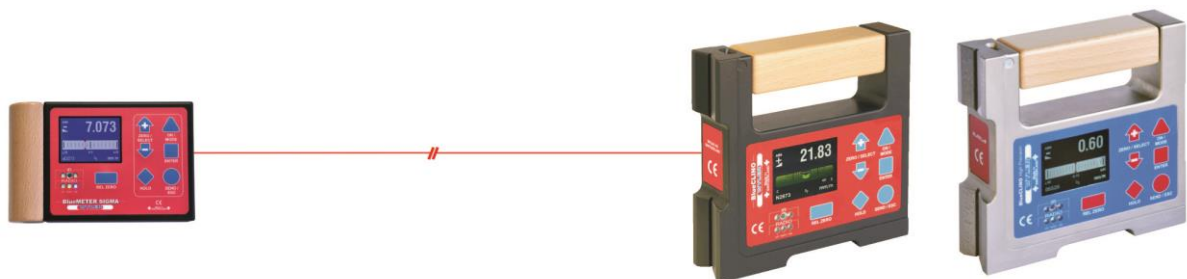
BLUECLINO OR **BLUECLINO HIGH PRECISION** VIA CABLES TO **BLUEMETER SIGMA**
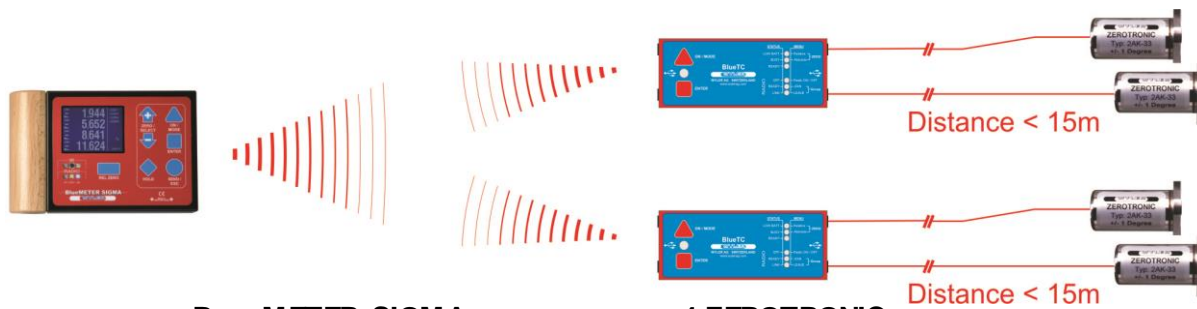
BLUEMETER SIGMA CONNECTED TO 4 ZEROTRONIC SENSORS VIA TWO BLUETC WITH WIRELESS TRANSMISSION

THE CONFIGURATIONS SHOWN ABOVE ARE POSSIBLE. REGARDING THE SPECIFICATIONS OF THE SENSORS AND MEASURING INSTRUMENTS PLEASE REFER TO THE RESPECTIVE DATA SHEETS

2 INITIAL STARTUP OF THE BLUEMETER SIGMA AND THE MEASURING INSTRUMENTS/SENSORS
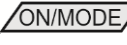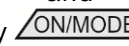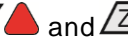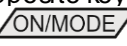
General remarks:

- *The "Grouping of measuring instruments/sensors and the BlueMETER SIGMA is already done at WYLER's when the measuring system / measuring group is delivered.*
- *When a group of instruments are shut off e.g. after a measurement is completed, the group set-up remains saved. When started again, the communication is immediately ready, no additional set-up is required.*
- *When a group of instruments is extended e.g. by joining or replacing an instrument, this newly added instrument must be joined according Pt.2.4 „Combine a group...."*

First time **start-up of a measuring group** (BlueLEVEL and BlueMETER SIGMA) **with radio transmission** (wireless transmission of the data):

1. G Remove the instruments with care from the transport and storage case and insert the batteries.
2. For **measuring groups with wireless transmission** (BlueMETER SIGMA and BlueLEVEL) the instruments are delivered in a set-up to recognise each other after the start.
3. Place the instruments on a clean horizontally aligned surface. Switch the instruments (BlueLEVEL and BlueMETER SIGMA) on. On the BlueLEVEL press the two opposite keys /ON/MODE/ ▲ and /ZERO/SELECT/ ⬆⬇ simultaneously and on the BlueMETER SIGMA press the key /ON/MODE/ ▲ until all 5 LEDs are lit, release the keys and the display will show "SYSTEM TEST"
   If the keys /ON/MODE/ ▲ and /ZERO/SELECT/ ⬆⬇ (BlueLEVEL), respectively the key /ON/MODE/ ▲ (BlueMETER SIGMA) **are pressed longer than 10 seconds when STARTING the instrument** all the LED's start blinking and **the automatic shut-off system is deactivated**. In the standard mode the instrument is automatically shut off after 60 minutes.
4. The instruments are now communicating and after a few seconds the measured values are displayed. The battery power should be checked (see below).
5. The measuring task may now be started.

First time start-up of a measuring group (BlueLEVEL and BlueMETER SIGMA) **without radio transmission** (transmission of the data by cables):

1. Remove the instruments with care from the transport and storage case and insert the batteries.
2. Place the instruments on a clean horizontally aligned surface and connect the instruments (BlueLEVEL and BlueMETER SIGMA) with the cables supplied.
3. Switch the instruments on. Press the two opposite keys /ON/MODE/ ▲ and /ZERO/SELECT/ ⬆⬇ simultaneously (BlueLEVEL), respectively /ON/MODE/ ▲ (BlueMETER SIGMA) until all 5 LED's are on. When the keys are released on the display is seen „SYSTEM TEST".
   If the keys /ON/MODE/ ▲ and /ZERO/SELECT/ ⬆⬇ (BlueLEVEL), respectively /ON/MODE/ ▲ (BlueMETER SIGMA) **are pressed longer than 10 seconds when STARTING the instrument** all the LED's start blinking and **the automatic shut-off system is deactivated**. In the standard mode the instrument is automatically shut off after 60 minutes.
4. The instruments are ready for use and the measured values are displayed. The battery power should be checked (see below).
5. The measuring task may now be started.

2.1 CONNECTING THE INSTRUMENTS / CONNECTING OPTIONS ON THE BLUEMETER SIGMA

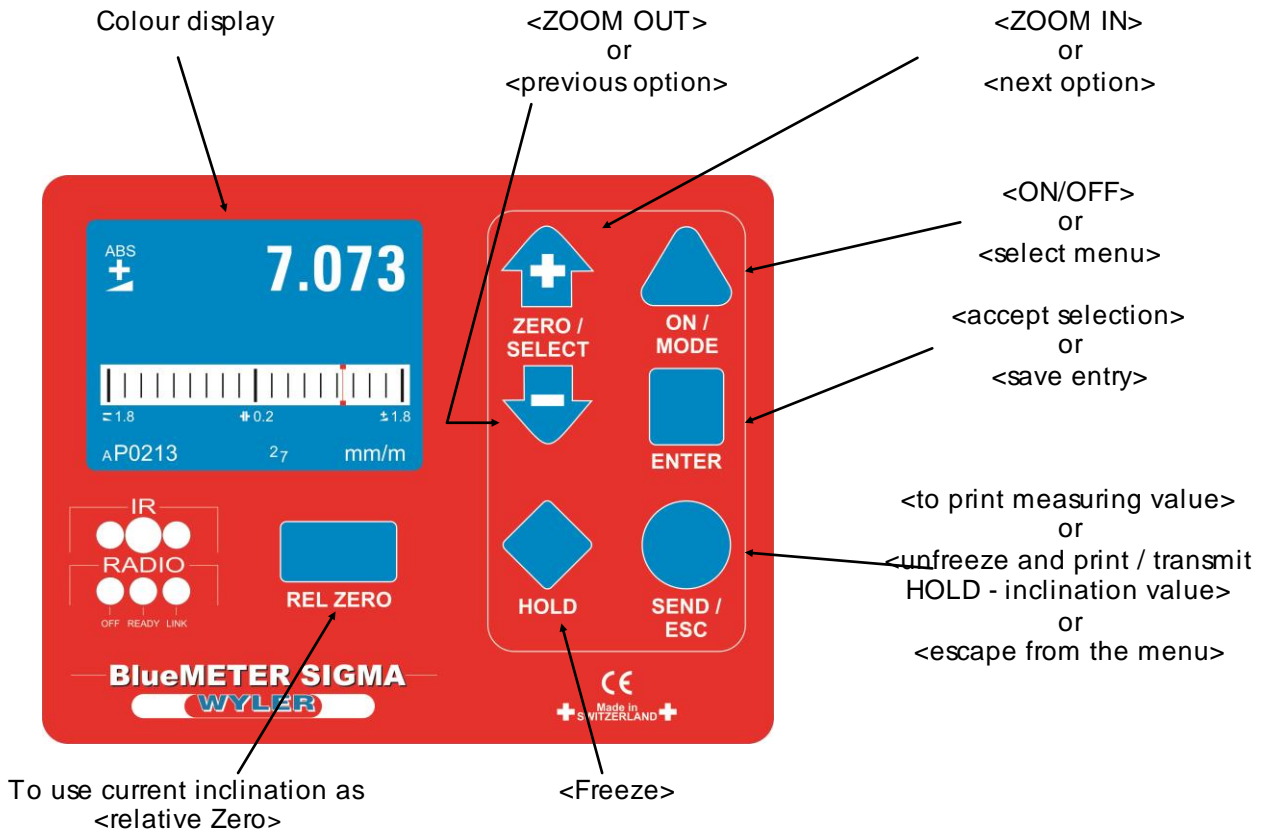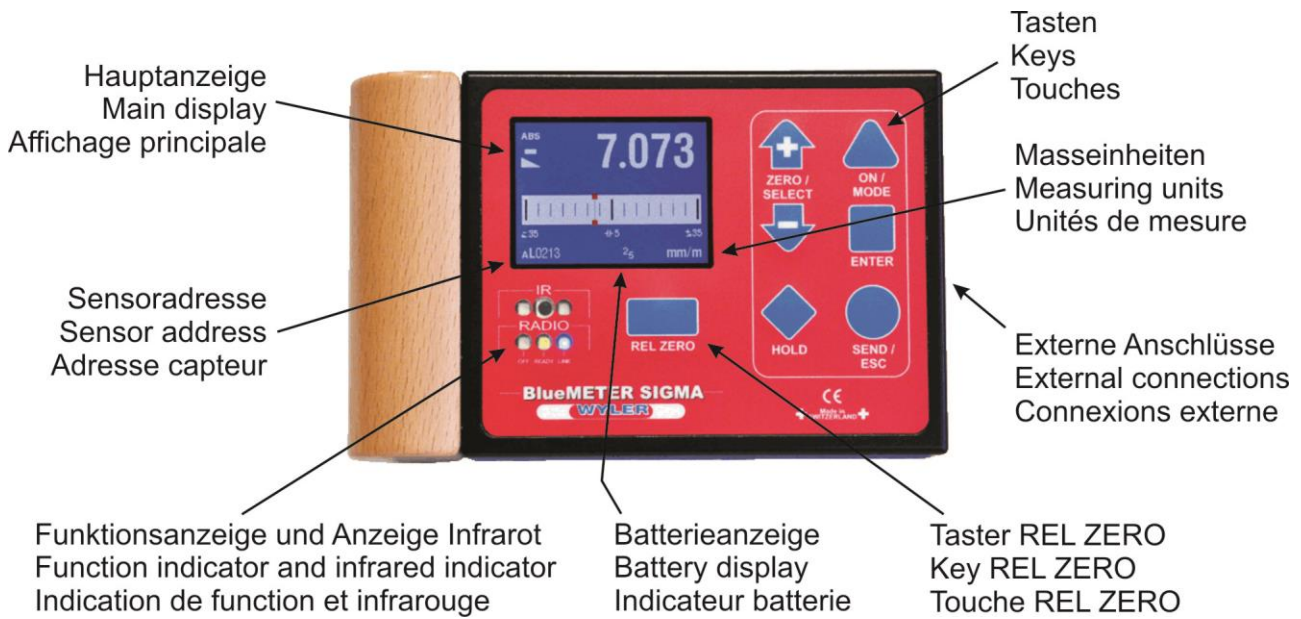|	
CONNECTOR "A"	• CABLE CONNECTION FOR MEASURING INSTRUMENT BLUEMETER OR OTHER WYBUS COMPATIBLE INSTRUMENT • CABLE CONNECTION FOR EXTERNAL POWER
↕↑ (USB symbol)	• CONNECTION TO A PC OR LAPTOP • CABLE CONNECTION FOR EXTERNAL POWER
CONNECTOR "B"	• CABLE CONNECTION FOR MEASURING INSTRUMENT BLUEMETER OR OTHER WYBUS COMPATIBLE INSTRUMENT • CABLE CONNECTION FOR EXTERNAL POWER

REMARK:
AN EXTERNAL POWER SUPPLY UNIT MAY BE CONNECTED TO ANY FREE CONNECTOR

2.2   START UP

2.2.1   OPERATING ELEMENTS/SHORT OVERVIEW
2.2.1.1   OVERVIEW KEYS AND DISPLAY

Hauptanzeige
Main display
Affichage principale

Tasten
Keys
Touches

Masseinheiten
Measuring units
Unités de mesure

Sensoradresse
Sensor address
Adresse capteur

Externe Anschlüsse
External connections
Connexions externe

Funktionsanzeige und Anzeige Infrarot
Function indicator and infrared indicator
Indication de function et infrarouge

Batterieanzeige
Battery display
Indicateur batterie

Taster REL ZERO
Key REL ZERO
Touche REL ZERO

Colour display

<ZOOM OUT>
or
<previous option>

<ZOOM IN>
or
<next option>

<ON/OFF>
or
<select menu>

<accept selection>
or
<save entry>

<to print measuring value>
or
<unfreeze and print / transmit
HOLD - inclination value>
or
<escape from the menu>

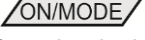To use current inclination as
<relative Zero>

<Freeze>

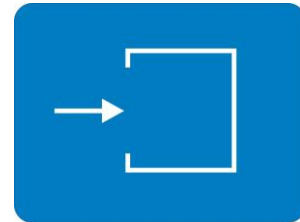### 2.2.1.2 SWITCHING THE INSTRUMENT ON AND OFF

The BlueMETER SIGMA features an automatic shut off. In normal mode the instrument is automatically switched off 60 minutes after the last key operation. This automatic shut OFF function can be deactivated with a special ON sequence or when using an external power supply

To switch the instrument ON

Keep the key ⟋ON/MODE⟋ 🔺 pressed until the display and all LEDs are lit and release the key. The instrument will automatically shut off 60 minutes after the last key operation.
If you keep the key ⟋ON/MODE⟋ 🔺 pressed for **more than 10 seconds** the automatic OFF function is deactivated. This is indicated by blinking LEDs.

The instrument carries out a short function test and establishes connections to other instruments, if any had been available before switching off the instrument.

The instrument changes into measuring mode. The settings, which were used prior to switching the instrument off, are reloaded.
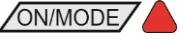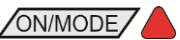
To switch the instrument OFF

Keep the key ⟋ON/MODE⟋ 🔺 pressed until the display disappears (about 3 seconds). All settings are kept and will be reloaded again next time the instrument is switched on.

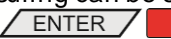| /ON/MODE/ ▲	**ON/MODE - key**

Function - 1 - Serves to switch the BlueMETER SIGMA ON. When for starting the key /ON/MODE/ ▲ is pressed, a grey picture will appear on the screen and all LEDs will be illuminated. After releasing the key the BlueMETER SIGMA is switching to the measuring mode. The current inclination of the measuring instrument is displayed in the mode and unit which was used before switching the instrument OFF. In case of an error the respective error message is shown in the display. The instrument will automatically shut of 60 minutes after the last key operation.

If the key /ON/MODE/ ▲ is pressed **for more than 10 seconds** the LEDs start blinking and the **automatic OFF function is deactivated**.

Exception: If the BlueMETER SIGMA is powered from an external power supply, the automatic OFF function is deactivated and the instrument will remain ON.

Function - 2 - To switch the instrument OFF, press the key /ON/MODE/ ▲ **more than 3 seconds**, until the display disappears.

Function - 3 - With the key /ON/MODE/ ▲ you open the menu. Pressing the key repeatedly will move you through the menu which is indicated by the cursor moving down to the required function.

Function - 4 - While manually setting a value with the key /ON/MODE/ ▲ the default value can be recalled.

/ENTER/ ■	**ENTER – key**

Function - 1 - The key /ENTER/ ■ is used to confirm a chosen function or to save a value entered.

Function - 2 - While in the function **"REL ZERO"** or **"ABS ZERO"** the measuring can be started or an ongoing measuring can be finished by pressing the key /ENTER/ ■.

/SEND/ESC/ ●	**SEND/ESC- key**

Function - 1 -   The key /SEND/ESC/ ● is used to send / transmit a measuring value to a PC or to a printer or similar output device through the ⇕ (RS485) port

Function - 2 -   Unfreeze of the **"HOLD"-**function to return to the measuring mode.
At the same time the "frozen" value is sent to the ⇕ port to any connected device

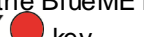**Function - 3 -**   **Escape** from an entry function or from the menu

/ZERO/SELECT/ 🔼🔽	**ZERO/SELECT "+/-" - keys**

Function - 1 -   The keys /ZERO/SELECT/ 🔼🔽 are used to
- changing the scale in the display
- increase / decrease the display range

This function can, however, be disabled in the instrument settings.

Function - 2 -   The keys /ZERO/SELECT/ 🔼🔽 are used to select possible adjustments, such as
- menu selection
- modification of a figure in the menu

/HOLD/ ◆	**HOLD - key**

Function - 1 -   The key /HOLD/ ◆ serves for "freezing" a measuring value. The value is displayed until the BlueMETER SIGMA returns to the measuring mode by pressing the /SEND/ESC/ ● key.

Function - 2 -   In the functions **"REL.ZERO"** and **"ABS.ZERO"** the key /HOLD/ ◆ is used for reading in the actual measuring value again during the manual entering.

/REL ZERO/ ▮	**REL ZERO - key**

Function - 1 -   The key /REL ZERO/ ▮ serves for setting the actual inclination as the relative Zero.

2.3 DISPLAY

The BlueMETER SIGMA features various graphic displays which can be scaled according to the requirements of the measuring task. Also the background colour and the brightness of the display can be adjusted.

2.3.1 SCALING OF THE DISPLAY

For an optimal use of the graphic display, you have various options for scaling.

With the linear scaling the display precision remains constant over the full range. With the keys /ZERO/SELECT/ ⬆⬇ the resolution can be changed. Thus also the range being displayed will be changed. The following ranges can be selected, whereas certain restrictions may be possible depending on the display type and the measuring unit selected: 60°, 45°, 20°, 10°, 5°, 2°, 1°, 30', 12', 5', 2', 1', 30", 15".

With the logarithmic scaling the display precision around Zero is the highest and it is reduced continuously with higher inclination values. Around Zero the resolution corresponds to the unit selected.

In the adjustments of the instrument you can switch between linear and logarithmic scaling.

Using the key /ON/MODE/ 🔺 select the menu point [Options] and confirm with /ENTER/ 🟥. Select now [Logscale] and confirm with /ENTER/ 🟥

Switch the logarithmic scaling ON or OFF using the keys /ZERO/SELECT/ ⬆⬇. The display will show the requested state of the instrument. Confirm with the key /ENTER/ 🟥.
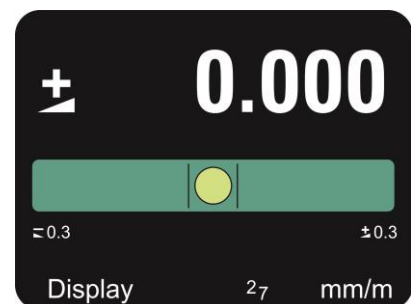
The instrument will return to the measuring mode. If the logarithmic scaling is enabled, the symbol "LOG" will appear below the graph.

2.3.2 DISPLAY TYPES

The display type can be selected in the menu "display".

Using the key /ON/MODE/ 🔺 select the menu point [Display] and confirm this selection with /ENTER/ 🟥.

Select the required display type using the keys /ZERO/SELECT/ ⬆⬇ and confirm your selection with the key /ENTER/ 🟥.
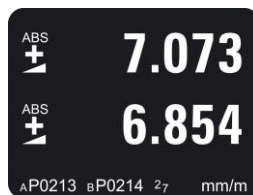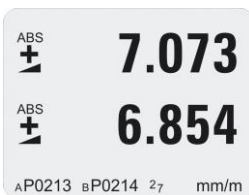
The instrument will return to the measuring mode.

Depending on the number of sensors selected the choice of display types in the BlueMETER SIGMA is varying.

For one only selected sensor or two sensors in differential mode the following displays are available:
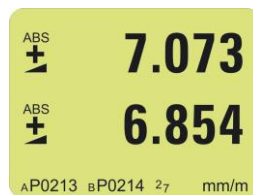
Numeric display		
Numeric display plus bar graph		
Numeric display plus 3 bars, each with a 10 times higher resolution		
Numeric display plus vial (spirit level)		
Numeric display plus simple vial (spirit level)		
Numeric display plus LED-display		
Numeric display plus pin		
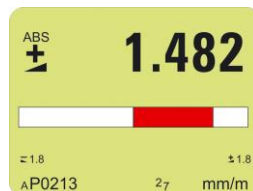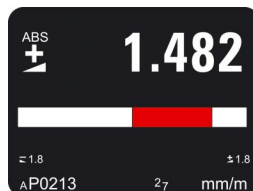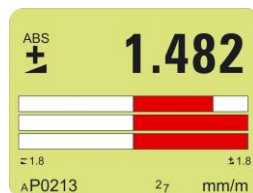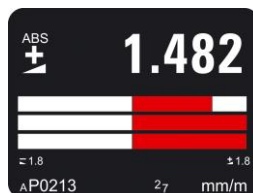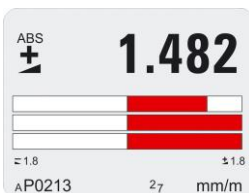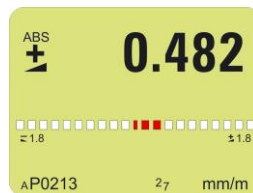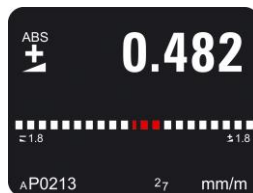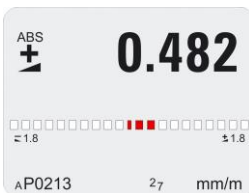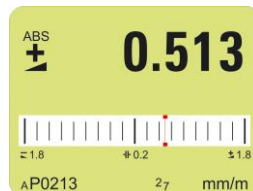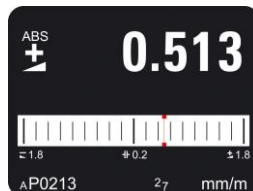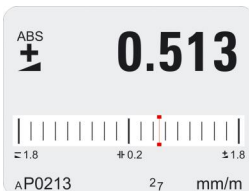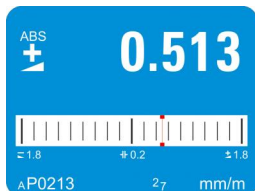
For two selected sensors or four sensors in differential mode the following displays are available:

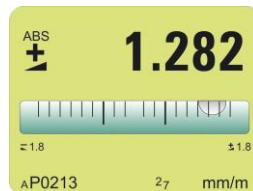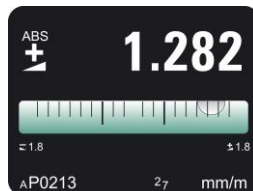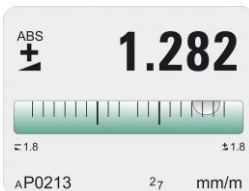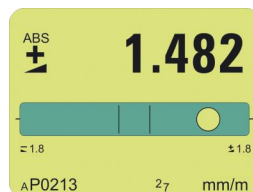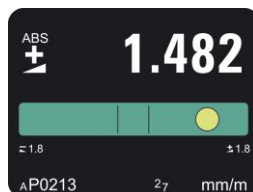Numeric display

ABS ± 7.073	ABS ± 7.073	ABS ± 7.073	ABS ± 7.073
ABS ± 6.854	ABS ± 6.854	ABS ± 6.854	ABS ± 6.854
AP0213 BP0214 2_7 mm/m	AP0213 BP0214 2_7 mm/m	AP0213 BP0214 2_7 mm/m	AP0213 BP0214 2_7 mm/m

Display cross vial

± 4.311 ±9 B AP0213 BP0214 / ≈9 ±9 / ± 0.996 A 2_7 / ≈9 mm/m (repeated four times in blue, white, black, yellow)

Display target

θ ± 4.421 R 9 AP0213 BP0214 / φ ± 76.9° ⊕1 2_7 mm/m (repeated four times)

Display LED cross

± 4.311 ±8.727 B AP0213 BP0214 / ≈8.727 ±8.727 / ± 0.996 A 2_7 / ≈8.727 mm/m (repeated four times)

For three and four selected sensors the numeric display is available:

Numeric display

ABS ± 7.073	ABS ± 7.073	ABS ± 7.073	ABS ± 7.073
ABS ± 7.073	ABS ± 7.073	ABS ± 7.073	ABS ± 7.073
ABS ± 7.073	ABS ± 7.073	ABS ± 7.073	ABS ± 7.073
ABS ± 7.073	ABS ± 7.073	ABS ± 7.073	ABS ± 7.073

AP0213 BP0214 CP0215 DP0216 2_7 mm/m
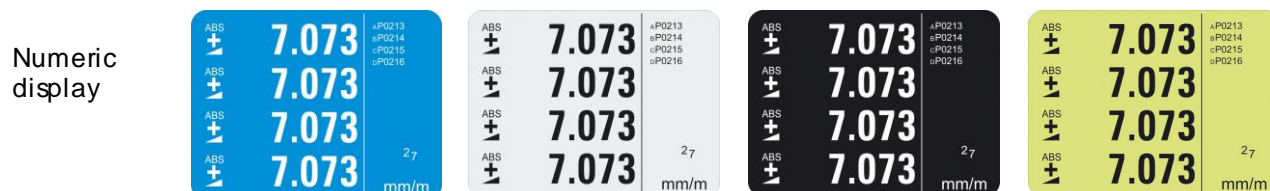
2.3.3 BACKGROUND COLOUR

In the adjustments of the instrument the background colour can be selected. Depending on the brightness of the colour selected the colour of the fonts and the symbols will change between black and white.

Using the key /ON/MODE/ ▲ select the menu point [Options] and confirm with /ENTER/ ■. Select now [Display Settings] and confirm with /ENTER/ ■

With the keys /ZERO/SELECT/ ⬆⬇ select the display colour and confirm the selection with the key /ENTER/ ■.

The instrument will return to the measuring mode.

The following background colours are available in the BlueMETER SIGMA:

Background colour blue	
Background colour black	
Background colour beige	
Background colour green	
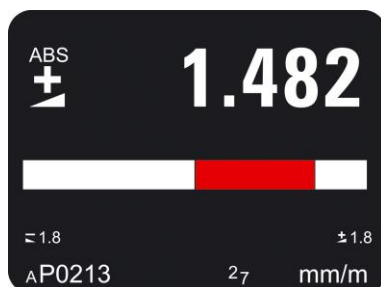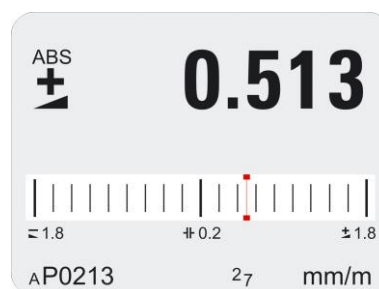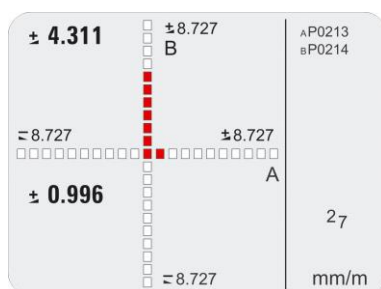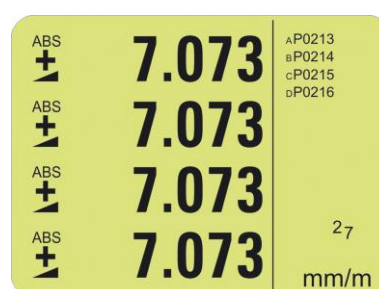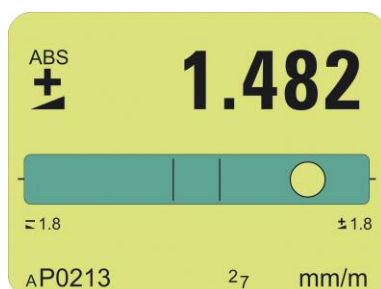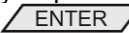
2.3.4 BRIGHTNESS OF THE DISPLAY

Adjustment of the brightness of the display. Difference between battery operation and the use of an external power supply.

In the adjustments of the instrument the brightness of the display can be adjusted in order to adapt it to the environmental conditions and to optimise the battery life time. Thus two different values can be set for the battery operation and the operation with an external power supply

Using the key ⟋ON/MODE⟍ 🔺 select the menu point [Options] and confirm with ⟋ENTER⟍ 🟥. Select now [Display Settings] and confirm with ⟋ENTER⟍ 🟥.
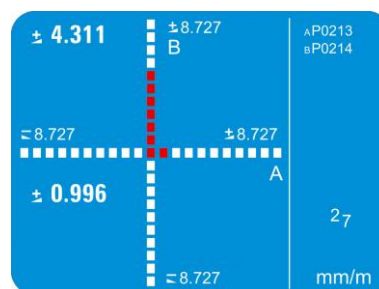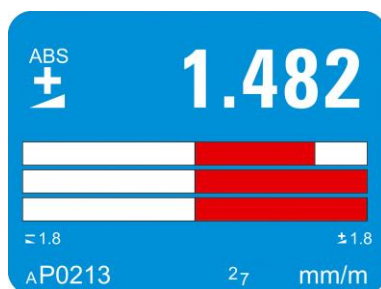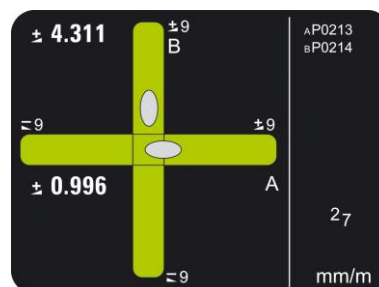Using the keys ⟋ZERO/SELECT⟍ 🔼🔽 select [Brightness] for the adjustment when using an external power supply and [Brightness Powersave] for the adjustment in battery operation. Confirm this selection with ⟋ENTER⟍ 🟥.

With the keys ⟋ZERO/SELECT⟍ 🔼🔽 you can adjust the brightness required. The display will show the power consumption in a range from 10% to 100% of the maximum brightness. Only steps of 10% are possible. Confirm the adjustment with the key ⟋ENTER⟍ 🟥.
With the key ⟋ON/MODE⟍ 🔺 the default value of 50% will be recalled.

80

Brightness Battery   O/O
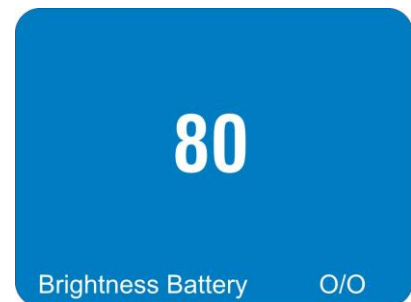
The instrument will return to the measuring mode.

2.3.5 SHORT DESCRIPTION OF THE INDIVIDUAL DISPLAY AREAS

Main display

In the main display the actual measuring value will be displayed.

Display of the direction of the inclination	A symbol indicates the direction of the inclination of the value displayed.

inclined to the right (positive inclination)

declined to the right (negative inclination)

on hold	The HOLD function is activated, i.e. the measuring value is "freezed".
ABS	Absolute measurement is activated.
REL	Relative measurement is activated, i.e. the measuring value is the difference between the current and the reference plane, i.e. the relative base.
displaying range 60°	Shows the selected displaying range. The displaying range can be adjusted using the keys ZERO/SELECT ⬆⬇ provided that this function is enabled in the options.
scale division 5°	Angle between two tick marks
Scale division LOG	Indicates that the logarithmic scale is in use. If this sign is missing, the linear scale is in use.
Serial number	Shows the serial number of the instrument.
Gravity G	Correction of a different gravity force is on.
Battery voltage 2₆ Power supply 5	Display of the current battery voltage (example 2.6 V). The lowest possible voltage is 1.7 Volt. After a further voltage drop a blinking battery symbol will appear. The batteries must then be exchanged immediately. A plug symbol will appear when the instrument is powered with 24V by an external source. The symbol a white five on black background indicates a 5V external source.
Measuring unit	Display of the measuring unit in use. There are 10 basic units available, whereas for each setting various options can be selected.

3   OPERATING INSTRUCTIONS BLUEMETER SIGMA

The BlueMETER SIGMA offers a wide range of functions and adjustment possibilities. The list of functions appears when the key /ON/MODE/ ▲ is pressed. With the keys /ZERO/SELECT/ ⬆⬇ the desired function can be selected and with /ENTER/ ■ it will be started. If during 10 seconds no further key is operated, the function list will be left. With the key /SEND/ESC/ ● a function selected can be abandoned. Already entered changes of parameters will be rejected and the BlueMETER SIGMA will return to the previously used display mode.

Here after the single functions will be described.

3.1   FUNCTIONS ON THE BLUEMETER SIGMA / OVERVIEW KEYS AND DISPLAY

Function circle according to G. Lasczyk ... using the key /ON/MODE/ ▲

OPTIONS:
- Set Pin-Code   - Radio ON/OFF
- Display-Settings   - Gravity
- Logscale   - Version SW
- Programmable Keys   - Factory Reset
- Functions ON/OFF   - Self Test
- Hide disabled
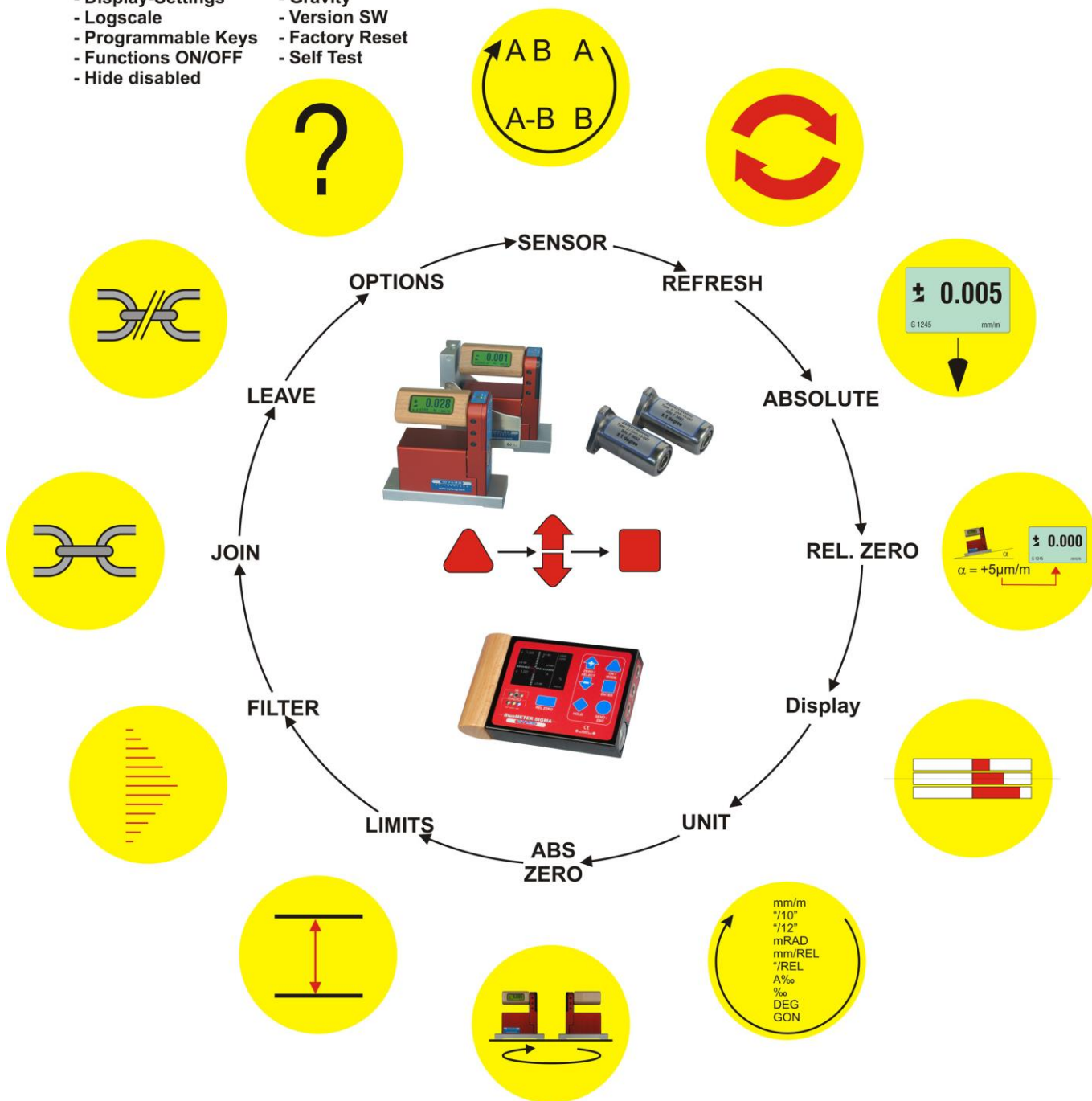
The following functions are available:

- Refresh
  Starts the search for instruments connected and registers them in the internal list of instruments. Instruments not connected any more are marked in the list of instruments as "not present". To make a later search easier these remain, however, in the list.

- **Sensor**
  Adjustment of the measuring mode and assigning the measuring instruments resp. sensors.

- **Absolute**
  Absolute measurement is activated and relative measurement is disabled.

- **Rel. Zero**
  Relative measurement is activated and the relative inclinations are read respectively pre-set.

- **Display**
  Selection of the display graph

- **Unit**
  Selection of the measuring unit displayed

- **Abs. Zero**
  Absolute measurement is activated and the Zero-offset is determined respectively set.

- **Limits**
  Enabling and setting of Limits for the supervision of the inclinations

- **Filter**
  Setting the filter type fort he measuring values

- **Join**
  Grouping of instruments

- **Leave**
  Deleting of a grouping

- **Options**
  Setting and adjustment of additional settings

3.2 STARTING THE BLUEMETER SIGMA

3.2.1 START WITH UNCHANGED CONFIGURATION

Using the key ON/MODE start the BlueMETER SIGMA and the measuring instruments connected.

Keep the key ON/MODE pressed until the display and all LEDs are lit and release the key. The display shows shortly a grey screen and changes to the initialisation. After the start you can see the actual measuring values with the last used configuration and measuring unit. In battery operation instrument will automatically shut off after 60 minutes.

If the key ON/MODE is pressed **for more than 10 seconds** all LEDs start blinking and the **automatic OFF function is deactivated**.

After a self check the BlueMETER SIGMA is initialising itself.

The BlueMETER SIGMA tries to build up a connection with the measuring instruments resp. sensors connected prior to switching it off. For each instruments selected in the function "sensor" a pair of arrows will be shown in the display.

The measuring mode memorised before switching the instrument off will be started and the measuring instruments resp. sensors will be called. If the configuration is still identical to the one during the last performed measurement, the measurement is started.
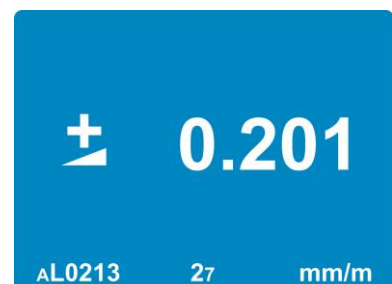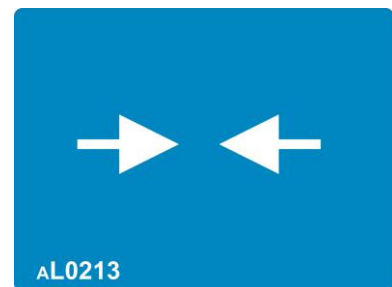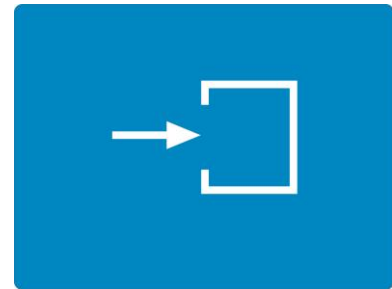
3.2.2 START WITH A CHANGED CONFIGURATION

Using the key ⟦ON/MODE⟧ 🔺 start the BlueMETER SIGMA and the measuring instruments connected.

Keep the key ⟦ON/MODE⟧ 🔺 pressed until the display and all LEDs are lit and release the key. The display shows shortly a grey screen and changes to the initialisation. After the start you can see the actual measuring values with the last used configuration and measuring unit. In battery operation instrument will automatically shut off after 60 minutes.

If the key ⟦ON/MODE⟧ 🔺 is pressed **for more than 10 seconds** all LEDs start blinking and the **automatic OFF function is deactivated**.

After a self check the BlueMETER SIGMA is initialising itself.

The BlueMETER SIGMA tries to build up a connection with the measuring instruments resp. sensors connected prior to switching it off. For each instruments selected in the function "sensor" a pair of arrows will be shown in the display.

If the configuration has changed or if one of the measuring instruments is out of reach the following sequence will start.

- The picture to the right indicates that the measuring instrument resp. the sensor has not been found.

- The searching procedure starts again

Check the configuration!

If this has changed, the measuring instruments resp. sensors must newly be connected.
Using the key ⟦ON/MODE⟧ 🔺 you get to the function [Sensor] and with a further keystroke to the selection of functions.
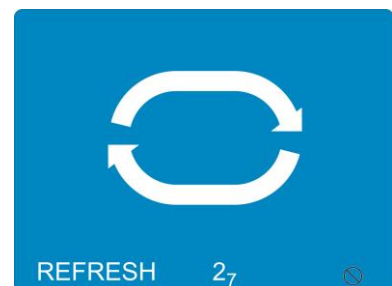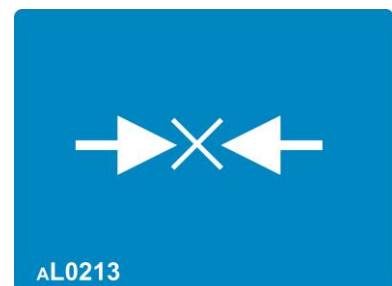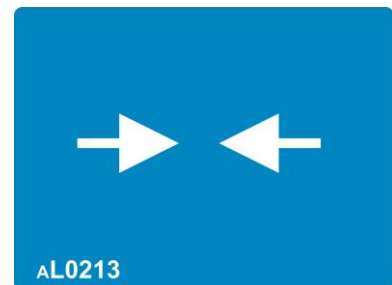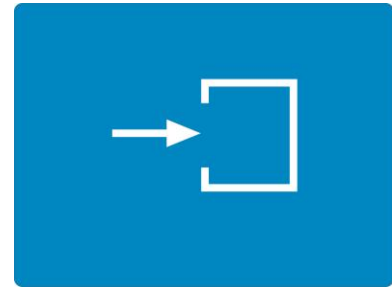
3.3 REFRESH

Starts the search for instruments connected and registers them in the internal list of instruments. Instruments not connected any more are marked in the list of instruments as "not present". To make a later search easier these remain, however, in the list.
The function "REFRESH" must be performed each time new instruments have been connected.
If BlueLEVEL or BlueTC instruments are used which have never before been connected to this BlueMETER SIGMA, these must be integrated one by one. After each new instrument connected to a cable the function "REFRESH" must be performed.

After the "Refresh" the instrument will automatically start the function "sensor" and waits for the selection of the measuring mode and the sensors.
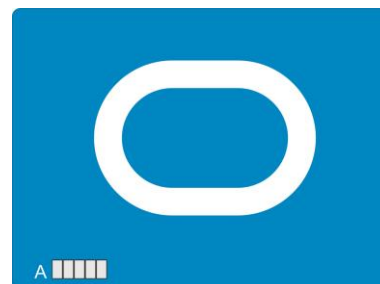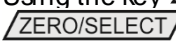
3.4 SENSOR
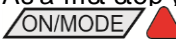
Here you can select the measuring mode, i.e. single or differential display as well as make adjustments to the active sensors/ports. The following measuring modes are possible:
- Measuring instrument/sensor Port "A"
- Measuring instrument/sensor Port "B"
- Measuring instrument/sensor Port "A" – instrument Port "B"
- Measuring instruments/sensors on Port "A" und "B" simultaneously
- Measuring instruments/sensors on Port "A", "B" and "C" simultaneously
- Measuring instrument/sensor Port "A" – instrument Port "B" and Measuring instrument/sensor Port "C" – instrument Port "D" simultaneously
- Measuring instrument/sensor Port "A", "B", "C" and "D" simultaneously
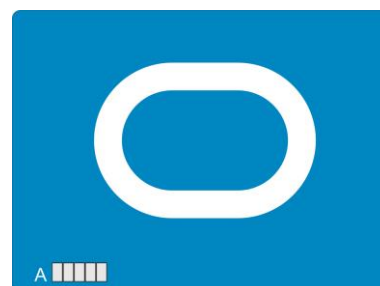
Using the key ⌧ON/MODE 🔺 you get into the menu With the keys ⌧ZERO/SELECT ⬆⬇ select the menu item [sensor]. The following picture will appear.

As a first step you can define the measuring mode using the key ⌧ON/MODE 🔺, whereas only those measuring modes are shown which are possible based on the number of measuring instruments resp. sensors.
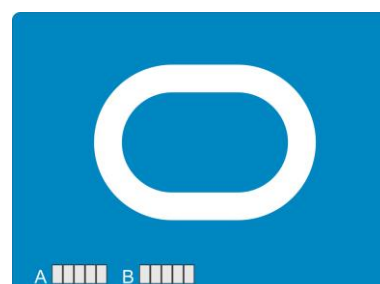
Confirm the configuration selected with ⟋ ENTER ⟋ ▮.
The address of the sensor "A" can now be selected with the
⟋ ZERO/SELECT ⟋ ⬆ ⬇ keys. Confirm the selection with the key
⟋ ENTER ⟋ ▮.

The remaining measuring instruments resp. sensors can be connected
with the same procedure.

When you start the instruments again with the same measuring
configuration a selection as described above is not necessary again.
The last used configuration will automatically be re-started.

Now the measurement starts.
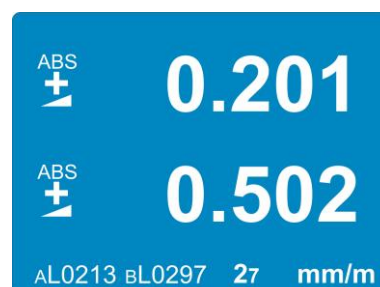
3.5 ZERO-SETTING / ABSOLUTE ZERO

Absolute ZERO means that the instrument shows the measuring value "0" if the measuring surface of the instrument/sensor is aligned exactly according to gravity (true horizontal or true vertical).

3.5.1 SET ABSOLUTE ZERO (WITH A REVERSAL MEASUREMENT)

The absolute zero is used as the base for absolute inclination measurements. In order to achieve the best possible precision please observe that the measuring object (support) and the measuring instruments and/or sensors connected have the same temperature and that the instrument is in operation for several minutes before starting a measurement. Mark the precise position and particularly the direction of the measuring instruments and/or sensors connected in order to be able to turn the instrument by 180 degrees and to put it in opposite direction at the very same spot.

Example with a BlueLEVEL:
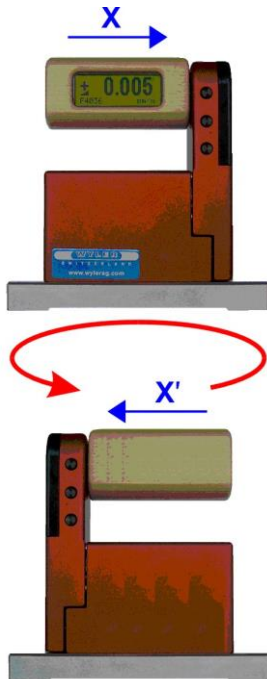
Reversal measurement to determine
  I. the Zero offset of the measuring instrument N_m
  II. the inclination of the supporting surface N_p

Zero offset of the measuring instrument N_m:

$$N_m = \frac{X + X'}{2}$$

Inclination of the supporting surface N_p:

$$N_p = \frac{X - X'}{2}$$

EXAMPLE (BlueLEVEL):

Using the key [ON/MODE] ▲ select the menu item [Abs ZERO] and confirm this selection with [ENTER] ▮.

Note:
Several of the connected measuring instruments can be set to absolute Zero at the same time.

In the display the position of the instrument for the first measurement will be shown.

Put the BlueLEVEL to the first position.

Start the first measurement by pressing the key [ENTER] ▮ or with the zapper.

During the measurement the display will graphically show the current measurement.

Confirm the first measurement with the key [ENTER] ▮ or with the zapper. After 15 seconds the value will automatically be read.
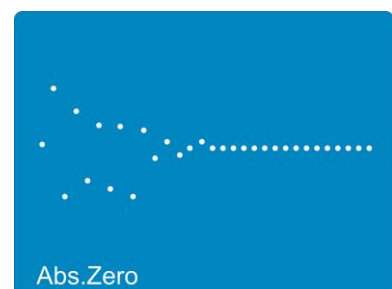
After a successful reading of the first measuring value the position of the instrument for the second measurement will appear in the display.

Put the BlueLEVEL now to the second position (turn the instrument by 180 degrees in the horizontal).

Start the second measurement by pressing the key ⟋ ENTER ⟋ 🟥 or with the zapper.

During the measurement the display will graphically show the current measurement.

Confirm the second measurement with the key ⟋ ENTER ⟋ 🟥 or with the zapper. After 15 seconds the value will automatically be read.

After termination of the reversal measurement the display for the actual measurement under consideration of the ZERO OFFSET will appear on the screen.
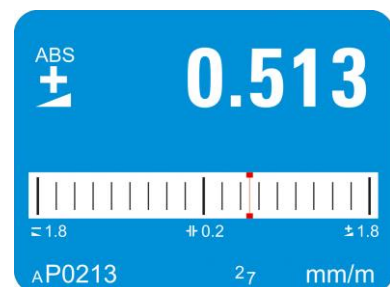
Notice:
The value of the "ZERO OFFSET" determined by a reversal measurement corresponds to the deviation of the zero point of the measuring instrument/sensor compared to the absolute Zero (gravity). The displayed measuring value corresponds to

<div style="text-align:center">

VALUE displayed =

Value of the measuring instrument minus "Zero offset"

</div>

The reversal measurement described above should be repeated periodically in order to achieve a high measuring precision, particularly when the instruments have not been in use for a longer period.

3.6 SELECTION OF THE MEASURING UNIT / UNIT
3.6.1 STANDARD-UNITS

You can change the measuring unit of the inclination values displayed. If you start the function [UNIT] the list of the available measuring units will appear. With the keys ⟨ZERO/SELECT⟩ 🔼 🔽 you can now select the measuring unit preferred. For memorizing the measuring unit selected you press the key ⟨ENTER⟩ 🟥. The measuring unit will remain active until you change it again according to the above procedure.

The following **measuring units** can be chosen:

XXXX.XX	mm/m	mm per m / 2 decimals
XXX.XXX	mm/m	mm per m / 3 decimals
XX.XXXX	mm/m	mm per m / 4 decimals
XX.XXXX	"/10"	inch per 10 inches / 4 decimals
XX.XXXX	"/12"	inch per 12 inches / 4 decimals
XXXX.XX	mRad	Milliradian / 2 decimals
XXX.XXX	mRad	Milliradian / 3 decimals
XXXX.XX	mm/REL	mm in relation to the relative base / 2 decimals
XXX.XXX	mm/REL	mm in relation to the relative base / 3 decimals
XX.XXXX	mm/REL	mm in relation to the relative base / 4 decimals
XX.XXXX	"/REL	inches in relation to the relative base / 4 decimals
XXXX.XX	A ‰	artillerie-permille
XXXX.XX	‰	permille
XXX.XXX°	DEG	degrees / 3 decimals
XX.XXXX°	DEG	degrees / 4 decimals
XXX° XX'	DEG	degrees / minutes
XX° XX' XX"	DEG	degrees / minutes / seconds
XXXX' XX"	DEG	minutes / seconds
XXXXXX"	DEG	seconds
XXXXX.X"	DEG	seconds / 1 decimal
XXX.XXX	GON	gon / 3 decimals
XX.XXXX	GON	gon / 4 decimals

3.6.2 UNITS WITH RELATIVE BASE LENGTH

The units mm/REL and "/REL are related to a relative, this means selectable, base length of the measuring instrument connected. After selecting one of these units, the relative base length must be entered.

Example: **mm/REL /** mm in relation to a relative base / 2 decimals.

After the selection of the measuring unit in our example the stored base length of 1000 mm will appear.

With the keys ⟨ZERO/SELECT⟩ 🔼 🔽 the proposed base length can be modified. The newly entered value can finally be confirmed with the key ⟨ENTER⟩ 🟥.
With the key ⟨ON/MODE⟩ 🔺 the default value 1000 mm will be recalled.

The following measurements are now related to a base length of 1250 mm.
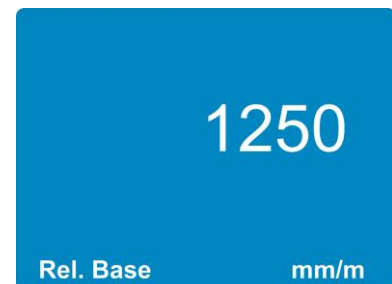
When measuring in the "relative mode" the height **"X"** will be displayed as linear measure in the selected unit and in relation to the set base length (in **mm** or **inches**).
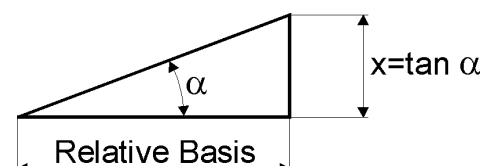
3.7   FUNCTION HOLD

The key function ⟋ HOLD ⟋ ◆ can be applied in all measuring modes.

Put the measuring instrument on a stable support. Press now the key
⟋ HOLD ⟋ ◆. While the BlueMETER SIGMA is waiting for a valid
measuring value the display will show graphically the measuring values
read in the form of a shoal of points. As it is practically impossible to
obtain a valid measuring value during manipulation, the instrument can
be set to the final position even after activating the key.

From the connected PC/Laptop the function HOLD can be started by
sending the letter "H" through a serial port RS232 to the ⇕ port of the
BlueMETER SIGMA.
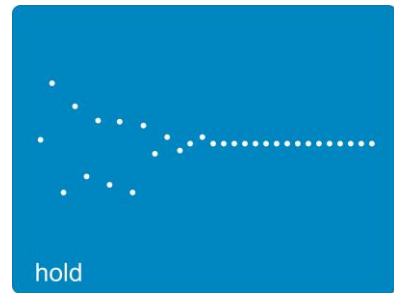
Complete the measurement with the ⟋ ENTER ⟋ ■ key or with the
zapper. After 15 seconds the measuring value will automatically be
read.

By pressing the key ⟋ HOLD ⟋ ◆ again a new valid measuring value
will be read.
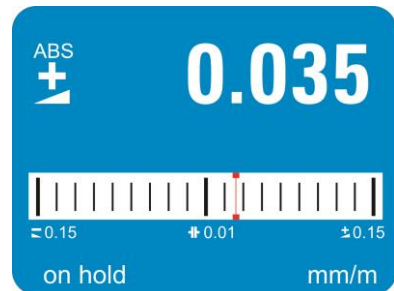
With the key ⟋ SEND/ESC ⟋ ● the "frozen" measuring value will be
transmitted via the ⇕ port to a connected PC/Laptop with an RS232
interface. At the same time the instrument will return to the measuring
mode.

The function SEND can also be initiated from the PC/Laptop connected
by sending "P" (as a letter) via the RS 232 port.

3.8   FUNCTION SEND (PRINT FUNCTION)

Using the key ⟋SEND/ESC⟋ 🔴 or sending the letter "P" through a serial port RS232 will send the displayed value through the port ⬍ (OUT port) to a connected PC/Laptop. This function can also be used in combination with th "HOLD" function, i.e. using the key ⟋ HOLD ⟋ 🔶 or sendig the letter "H", in order to transmit the "frozen" value.

By default the returned value will be sent in the BlueSystem format. Optional the Format of the measuring device LEVELMETER 2000 can be chosen. The selection can be done within the options.

BlueSystem data format OUT-Port:

MeasMode_A	[sss xxxxxx sn.nnnnnn<cr>]
MeasMode_B	[sss yyyyyy sn.nnnnnn<cr>]
MeasMode_A_minusB	[sss xxxxxx-yyyyyy sn.nnnnnn <cr>]
MeasMode_A_B	[sss xxxxxx sn.nnnnnn yyyyyy sn.nnnnnn <cr>]
MeasMode_A_B_C	[sss xxxxxx sn.nnnnnn yyyyyy sn.nnnnnn zzzzzz sn.nnnnnn <cr>]
MeasMode_A_minusB_C_minusD	
	[sss xxxxxx-yyyyyy sn.nnnnnn zzzzzz-vvvvvv sn.nnnnnn <cr>]
MeasMode_A_B_C_D	[sss xxxxxx sn.nnnnnn yyyyyy sn.nnnnnn zzzzzz sn.nnnnnn vvvvvv sn.nnnnnn <cr>]

	sss =	0 .. 255 – Continuous no.)*
x	xxxxxx =	Sensor Serial Number and Type
y	yyyyyy =	Sensor Serial Number and Type
z	zzzzzz =	Sensor Serial Number and Type
v	vvvvvv =	Sensor Serial Number and Type
	N2673L	BlueMETER CLINO

sn.nn	sn.nnnnnn =	+9.999999 - Positive Overrange
		-9.999999 - Negative Overrange
		other value - Angle in rad e.g. +0.226349

LEVELMETER 2000 data format OUT-Port:

MeasMode_A	[sss Aaaa sn.nnnnnn<cr>]
MeasMode_B	[sss Baaa sn.nnnnnn<cr>]
MeasMode_A_minusB	[sss Aaaa-Baaa sn.nnnnnn<cr>]
MeasMode_A_B	[sss Aaaa sn.nnnnnn Baaa sn.nnnnnn<cr>]

sss =	0 .. 255 – Continuous no.)*
aaa =	Sensor address 1..255 (e.g. 004) / ML/LT NT 1-32

sn.nnnnnn =	+9.999999 - Positive Overrange
	-9.999999 - Negative Overrange
	other value - Angle in rad e.g. +0.226349

Format der Übertragung:
> asynchron, 7Bit, 2 Stopbits, no parity, 9600 Baud

)*   when the continuous number does not change no new data are measured. The most probable reason is a communication error between the BlueMETER SIGMA and the Sensor caused by e.g. a disconnected cable.

3.9   SELECTION OF THE FILTER UNDER DIFFERENT MEASURING CONDITIONS / FILTER

A number of different predefined filters can be selected.

Description of the different filter types:
- FILTER 1:   No filtering, no integration of the measuring values   (T const. = 0.33 sec.)
- FILTER 2:   Floating average of 3 measuring values   (T const. = 1 sec.)
- FILTER 3:   Floating average of 15 measuring values   (T variable = 0.33 … 5 sec.)
- FILTER 4:   Floating average of 6 measuring values   (T const. = 2 sec.)
- FILTER 5:   Floating average of 15 measuring values   (T const. = 5 sec.)

T: Response time when changing the position. For filter 3 the actual change of the measuring value will define the number of values to be used for calculating the floating average. With a considerable change the number of values will be reduced with minute fluctuations the number will be increased.

Filter type 3 is the factory setting when leaving WYLER AG.

With the key ON/MODE ▲ select the menu item [FILTER] and confirm this selection with ENTER ■.

Using the keys ZERO/SELECT ➕ ▼ you can now select the filter type desired and then confirm it with ENTER ■.

Filter
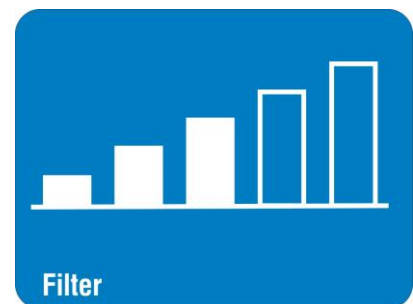
The measuring instrument will return to the measuring mode.

3.10   ABSOLUTE MEASUREMENT / RELATIVE MEASUREMENT
3.10.1 ABSOLUTE MEASUREMENT
As a factory setting the BlueMETER SIGMA will be programmed for absolute measurement (default setting).

If this is not the case select the function [Absolute]. After confirming this function with the key ENTER ■ the instrument is ready for measurements in the mode "ABSOLUTE".

The measuring value corresponds to the

value of the measuring instrument minus "ZERO - OFFSET"
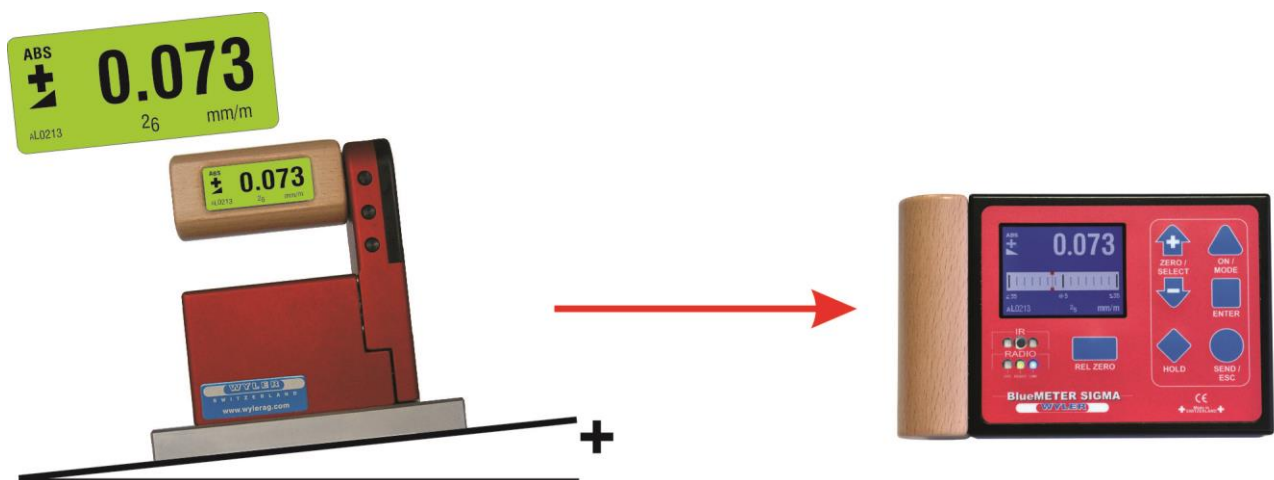
3.10.2 RELATIVE MEASUREMENT / REL ZERO

Important preliminary remark:

The "REL ZERO OFFSET" determined for a relative measurement will be superposed to the "ZERO OFFSET", e.g. determined by a reversal measurement.

The "REL ZERO OFFSET" will be stored in the BlueMETER SIGMA and can be re-called again and again. When starting the next relative measurement the "REL ZERO OFFSET" entered or determined the last time will be displayed. The value can be confirmed, newly entered or set to zero.

> **Value displayed =**
>
> **Value of the measuring instrument - "ZERO-OFFSET" - "REL ZERO OFFSET"**

Procedure with the key ⟋REL ZERO⟋ 🟥 **with one measuring instrument/sensor connected:**

Put the measuring instrument on the reference surface. The display shows the value +0.073 mm/m. This corresponds to the absolute inclination of the reference surface.
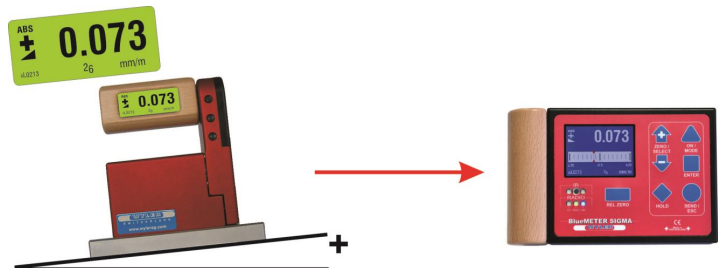
Press now the key ⟋REL ZERO⟋ 🟥 on the BlueMETER SIGMA

In the display you will see the picture to the right

The display will show graphically the measuring values read in the form of a shoal of points.

Complete the measurement with the key ⟋ENTER⟋ 🟥 or with the zapper. After 15 seconds the measuring value will automatically be read.

REL.ZERO
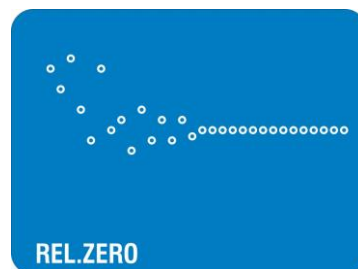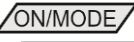
On the screen of the BlueMETER SIGMA now the display for the actual measurement will appear under consideration of the ZERO OFFSET.

REL ± 0.000

The **value displayed** on the BlueMETER SIGMA is now **"0"** and corresponds to the inclination of the reference surface. On the measuring instrument the value remains +0.073 mm/m. This corresponds to the absolute value of the instrument.
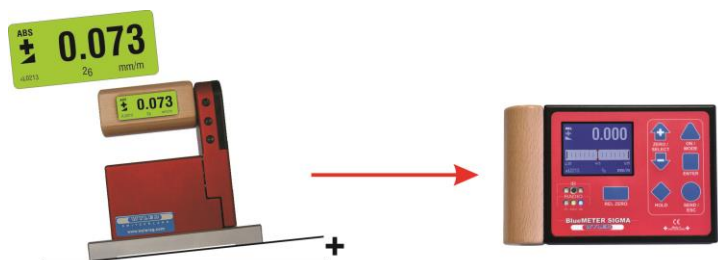
The values for **"ZERO"** and/or **"Relative ZERO"** stored in the BlueMETER SIGMA can manually be amended or deleted as follows:

Using the key /ON/MODE/ 🔺 select the function [REL ZERO] or [ABS ZERO] and confirm this selection with /ENTER/ 🟥. Press again the key /ON/MODE/ 🔺

The offset value stored will now be displayed.
With the key /ON/MODE/ 🔺 the values can be set to "0".
With the key /HOLD/ ◆ the new offset values will be determined from the present inclinations of the measuring instruments and then displayed.
With the key /ENTER/ 🟥 the values displayed will be stored and the procedure will be completed.
With /SEND/ESC/ ⬤ the procedure can be abandoned without any change.
After that the BlueMETER SIGMA will return to the measuring mode.
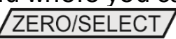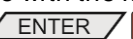
With one of the keys /ZERO/SELECT/ 🔼🔽 you get to a menu where you can select an offset and modify it manually. Select the sensor required with the keys /ZERO/SELECT/ 🔼🔽 and press the key /ENTER/ 🟥.
Adjust now the value with the keys /ZERO/SELECT/ 🔼🔽 to the value required. Confirm this value with the key /ENTER/ 🟥. With the key /HOLD/ ◆ you can newly determine the corresponding offset.
(not realised yet)
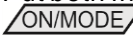
Use this procedure when you have to set one of these registers to a specific value, e.g. exactly 5°.

Procedure with the key /REL ZERO/ 🟥 with two measuring instruments/sensors connected:

The procedure is similar to the procedure described above with the difference that the inclination values of both instruments/sensors will be considered.
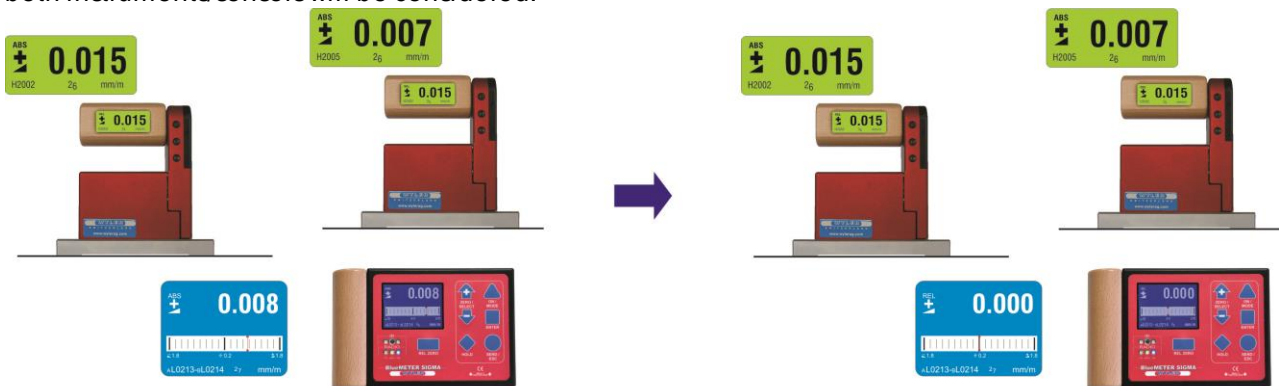
Put both instruments in position. With the key /ON/MODE/ 🔺 select the menu [**REL.ZERO**]. and confirm with /ENTER/ 🟥 or use the key /REL ZERO/ 🟥.
As a first step the picture to the right will appear on the display

Rel.Zero

With the key /ENTER/ 🟥 or with the IR zapper you can confirm the selection. The actual measuring values are continuously read and displayed in the form or a shoal of points.
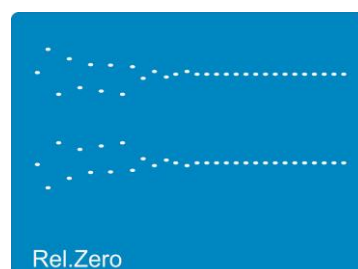
Rel.Zero

As soon as the value is stable the value for the relative Zero (REL ZERO) can be read in with the key ⟋ENTER ⟋ 🔲 or with the IR zapper.
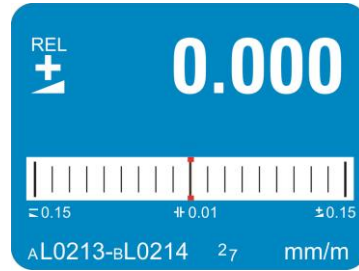
In the display of the BlueMETER SIGMA the value "0.000" is now displayed, i.e. the absolute value under consideration of the relative offset. This value serves as the reference for the subsequent measurements.

IMPORTANT:
The display on the measuring instruments (BlueLEVELs) continue to show the actual **absolute measuring values** in the absolute mode.

3.11 MEASURING WITH LIMITS / LIMITS
(not realised yet)
If you intend to set off an "Alarm" when a defined limit is exceeded this can be realised using the function "LIMITS".
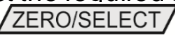
The function "LIMITS" allows defining an upper and a lower **limit** on the BlueMETER SIGMA. If this set limit is exceeded respectively under-run, a horizontal bar in the display will start blinking. A blinking bar above the displayed value means that the upper limit has been exceeded. If the blinking bar is below the lower limit has been under-passed. Through the RS485 port a message will be sent.

Using the key ⟋ON/MODE⟋ 🔺 select the menu item [LIMITS] and confirm this selection with ⟋ENTER ⟋ 🔲.

Switch the function [LIMITS] on or off using the ⟋ZERO/SELECT⟋ 🔺🔻 keys and confirm with the key ⟋ENTER ⟋ 🔲.
Select the required sensor respectively the measuring channel using the keys ⟋ZERO/SELECT⟋ 🔺🔻 and confirm the selection with the key ⟋ENTER ⟋ 🔲.
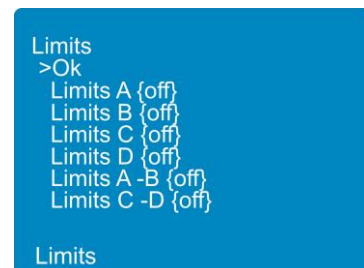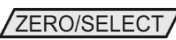
Switch the respective limit ON or OFF using the keys ⟋ZERO/SELECT⟋ 🔺🔻.
With the key ⟋ENTER ⟋ 🔲 you get to the entering mask of the lower limit.
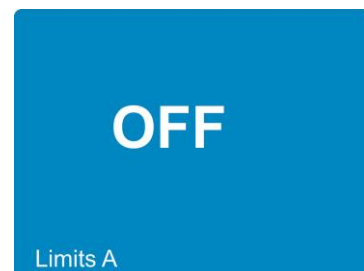
The value is adjusted using the ⟋ZERO/SELECT⟋ 🔺🔻 keys. Confirm the value with the key ⟋ENTER ⟋ 🔲. With the key ⟋ON/MODE⟋ 🔺 the default value will be recalled.
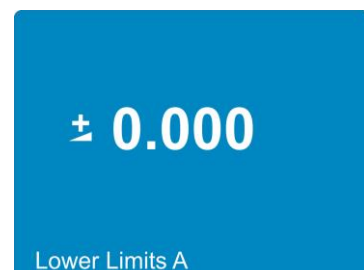
Now you can enter the upper limit. The value is adjusted using the /ZERO/SELECT/ ⬆ ⬇ keys. Confirm the value with the key /ENTER/ ■. With the key /ON/MODE/ ▲ the default value will be recalled.

± 0.000

Upper Limits A

The measuring instrument will return to the measuring mode.

ABS ± 0.035

≡ 0.15   ⊩ 0.01   ± 0.15
on hold   mm/m
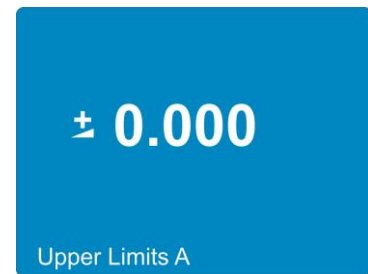
If during the measurement the lower respectively the upper limit is exceeded a blinking horizontal bar will appear above respectively below the inclination value. Via the RS485 port a respective message will be sent.
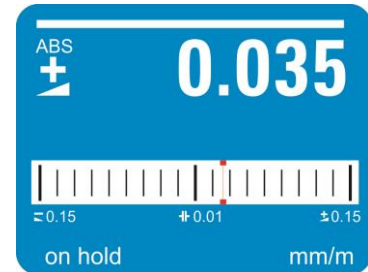
It is possible to set the lower limit above the upper limit. In this case a respective message will be sent via the RS485 port continuously.

Data format at the RS 485 interface

Upper Limit	[sss xxxxxt UL sn.nnnnnn sm.mmmmmm<cr>]
Lower Limit	[sss xxxxxt LL sn.nnnnnn sm.mmmmmm<cr>]

sss =   0 .. 255 - continuous number

xxxxxt =   Sensor Serial Number and Type

N2673L   BlueCLINO

sn.nnnnnn =   +9.999999   - Positive Overrange

                     -9.999999   - Negative Overrange

                     other value - angular value in rad, e.g. +0.226349

sm.mmmmmm =   limit defined

3.12 **G**ROUPING AND UNHINGING OF A **MEASURING GROUP (JOIN/LEAVE)**
3.12.1 **P**ROCEDURE **"JOIN"** VIA <u>CABLE CONNECTION</u>
(EXAMPLE WITH BlueLEVEL AND BlueMETER SIGMA)

1. Connect all instruments to be grouped (BlueLEVEL and BlueMETER SIGMA) using the cables provided and switch all instruments on.

2. Select on the BlueMETER SIGMA the menu **"JOIN"** using the ⟋ON/MODE⟋ 🔺 key. Confirm with the key ⟋ENTER ⟋ 🟥. All instruments connected are now searched and joined to a group.

3. After establishing the group a **"REFRESH"** will be performed.

4. After a successful grouping the command "SENSOR will be performed. As the measuring mode has not been set yet, the message **"not defined"** will be displayed.

5. The measuring mode ("A", "B", "A B" or "A-B") must now be defined. Select the desired mode with the keys ⟋ZERO/SELECT⟋ ➕ ➖ (corresponds to the menu [**SENSOR**]) and confirm with ⟋ENTER ⟋ 🟥.
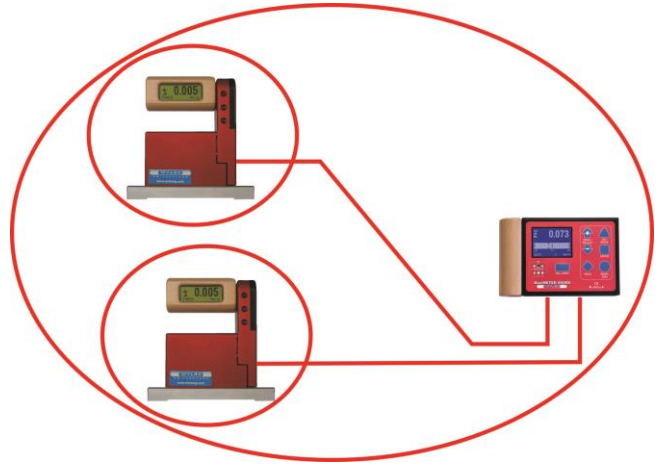
   It is also possible to execute any other function of the menu. For instance it is possible to integrate with further "JOIN" commands additional instruments with wireless connection into the group

6. The sensors must be selected. Select the sensors for A and - depending on the measuring mode - also for B using the key ⟋ZERO/SELECT⟋ ➕ ➖ and confirm with ⟋ENTER ⟋ 🟥. The measuring values are now shown in the display according to the selected configuration.

7. After a successful grouping on both instruments the green LED "READY" will blink shortly as many times as instruments are joined in the measuring group (including the own address).

8. For using the wireless mode (the wireless mode must be switched-on on each instrument) the cables can now be removed. After removing the cables the measuring values will be "freeze" for a short while and replaced by empty zeroes until, after successful connection, the measuring values will be displayed again

9. After successful connection the blue LED "LINK" will be lighting on all the instruments connected.

3.12.2 PROCEDURE "JOIN" WITH WIRELESS DATA TRANSMISSION

With the function "JOIN" an instrument can be added by wireless data transmission to an existing group. During this procedure no instrument must be connected by cables as otherwise the "JOIN" procedure for cables will be performed.

IMPORTANT:

Only two instruments can be grouped in one procedure. If more instruments are members of a measuring group, e.g. a BlueLEVEL "1", a BlueLEVEL "2" and a BlueMETER SIGMA it is recommended to group first the BlueLEVEL "1" with the BlueMETER SIGMA and then the BlueLEVEL "2" also with the BlueMETER SIGMA. The affiliation to the measuring group will be communicated between the members.

. The <**ON/MODE**> key must be pressed repeatedly until the mode [**JOIN**] appears in the display. Confirm with <**ENTER**>

1. The **two instruments to be grouped** must be set to the **JOIN-mode** The ⟨ON/MODE⟩ ▲ key must be pressed repeatedly until the mode [**JOIN**] appears in the display. Confirm with ⟨ENTER⟩ ■.

2. **Searching**
   Both instruments are "searching" each other. During the searching procedure the green LED on both instruments are lit continuously. The instruments remain in the "search" mode until they have detected each other.

   During the search process the following picture will be displayed
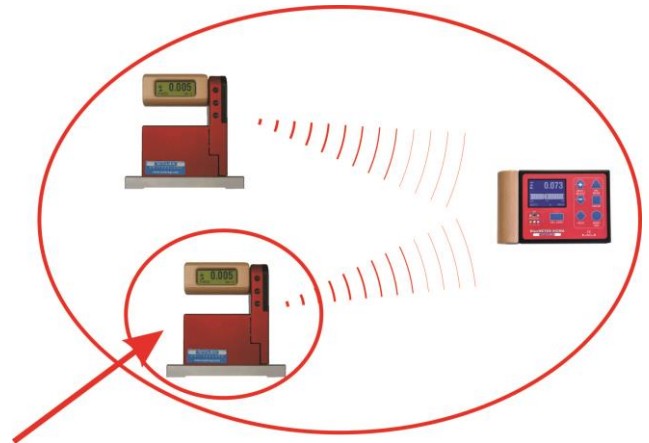
   Remark: The searching process may go on for several minutes in bad communication conditions. The join process may be cancelled by pressing one of the ⟨ON/MODE⟩ ▲ or ⟨SEND/ESC⟩ ● keys.

3. **Group connection**
   As soon as the two instruments have successfully detected each other the search process is stopped and this is visualised by a rapid blinking (4 to 5 times per second) of the green LED's on both instruments.. The joining can no be activated by
   - using the ⟨ENTER⟩ ■ key on one of the instruments
        or
   - the whole process may be cancelled after some seconds by pressing one of the ⟨ON/MODE⟩ ▲ or the ⟨SEND/ESC⟩ ● keys.

4. After establishing the group a **"REFRESH"** will be performed.

5. After the grouping the command **"SENSOR"** will be performed. As the measuring mode has been cancelled during the JOIN procedure this mode must be selected again. The message **"not-defined"** will be displayed.

6. The measuring mode ("A", "B" or "A-B" must now be selected. Select the mode preferred using the ⟨ZERO/SELECT⟩ ⬆⬇ d keys (corresponding to the menu [**SENSOR**]) and confirm with ⟨ENTER⟩ ■.

   It is also possible to execute any other function of the menu. For instance it is possible to integrate with further "JOIN" commands additional instruments with wireless connection into the group

7. The sensors must be selected. Select the sensors for A and - depending on the measuring mode - also for B using the ⟨ZERO/SELECT⟩ ⬆⬇ keys and confirm with ⟨ENTER⟩ ■. The measuring values are now

shown in the display according to the selected configuration.

8. After a successful grouping on both instruments the blue LED "LINK" will be lit continuously. The green LED "READY" will blink shortly as many times as instruments are joined in the measuring group (including the own address)

Attention: If the LED "OFF" is blinking in red, a connection is not possible (see chapter 2.4.2 / special case)

3.12.3 SPECIAL CASES "JOIN"

In case both instruments are already joined in different groups of instruments they do find each other but they can not communicate together. The **red LED "OFF"** is blinking. The search process may be cancelled by using the key SEND/ESC ●
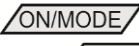
If it is required to use one of the instruments in the new measurement group it is necessary to use the mode "LEAVE" to cancel the existing connection.

3.12.4 UNHINGE AN INSTRUMENT IN THE RADIO MODE FROM A GROUP BY USING THE FUNCTION „LEAVE"

Each instrument may be unhinged from an existing group of connected instruments.

PROCEDURE "LEAVE"
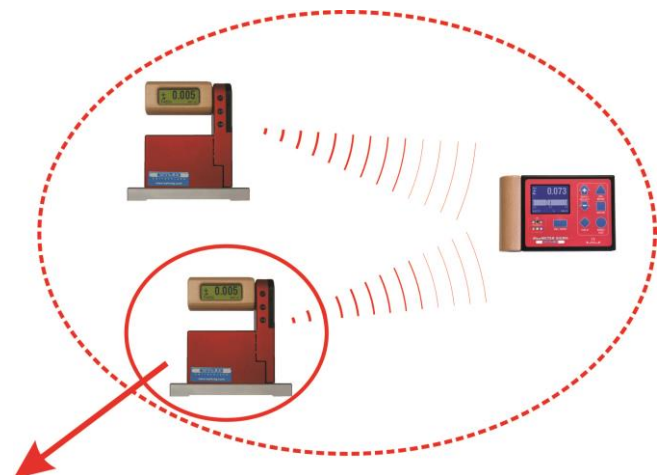
1. If BlueLEVEL instruments are transmitting measuring values to a BlueMETER SIGMA or a BlueTC, the keys on the BlueLEVELs are locked. To unlock a BlueLEVEL, the settings at the BlueMETER SIGMA have to be changed in such a way that it no longer communicates with this BlueLEVEL.

2. On the instruments to be disconnected the ON/MODE key must repeatedly be pressed until in the display shows the mode **[LEAVE]**. Confirm with ENTER .

3. During the leaving mode the blue LED is blinking under "LINK", the green LED "READY" is blinking respectively off

4. After the successful procedure the green LED is blinking once for approx. 1 second. With this the unhinge process is finished.

3.12.5 RENEWED CONNECTION OF A MEASURING GROUP

After a measuring group has been stopped e.g. after the termination of a measurement, the group of instruments remains intact. After the restart the communication is automatically activated and the communication is started. The process JOIN must not be repeated.

3.13 TEACH-IN of the IR-trigger (Zapper)

In order to eliminate interference of the zapper signals when several measuring groups are active in the triggering range the IR trigger can be assigned to a specific measuring group by applying the function TEACH-IN

Procedure **TEACH-IN**:

- The measuring or display instrument must be started
- Keep one of the keys ■ ◆ ⬇ ⬆ ● on the measuring or display instrument pressed
- Point the trigger (IR Zapper) in the direction of the measuring or display instrument
- Press the **actuator key** on the IR Zapper until both red IR LED's are lighting up

This procedure must be done on all the measuring and display instruments using the same IR triggering. When the instruments are dispatched this procedure is already factory set standard.

4   OPTIONS

The options serve for entering the basic adjustments of the measuring instrument. The access to the options can be protected with a PIN code in order to avoid unauthorised modifications.

The following options are available:

- **Option "Set PIN-Code"**
  With this option it is possible to block the entering of options with a PIN code.

- **Option "Display Settings"**
  With this option basic settings of the display, such as the brightness and colour pattern, are possible.

- **Option "Logscale ON/OFF"**
  With this option the logarithmic scaling can be switched on or off.

- **Option "Programmable Keys"**
  With this option it is possible to switch the scale-functions of the keys <ZERO/SELECT> and the functions of the key <REL ZERO> on or off.

- **Option "Functions ON/OFF"**
  With this option specific functions can be switched on or off. Functions switched off will appear in the main menu in grey fonts only.

- **Option "Hide disabled Functions ON/OFF"**
  If this option is enabled, disabled functions will not be shown.

- **Option "Radio "**
  With this option the wireless data transmission can be activated or deactivated.

- **Option "Auto Address ON/OFF"**
  With this option the automatic assignment of the RS485 device address can be switched on or off.

- **Option "Set Address"**
  With this option the RS485 address of a single sensor can be read and set.

- **Option "Gravitation"**
  With this function the correction of the gravitation can be switched on or off and the local gravity force can be entered.

- **Option "LM2000 Output-Mode ON/OFF "**
  With this option the format of the function SEND can be chosen.

- **Option "Version"**
  With this option the version of the firmware will be displayed.

- **Option "Factory Reset"**
  A complete factory reset will set the instrument to the factory (default) settings as it has been configured at the factory. All personal settings are lost.

- **Option "Function Check"**
  A function check of the instrument will be performed.

4.1   SET PIN-CODE

In order to protect the settings of the BlueMETER SIGMA against unauthorised changes you have the possibility to block the entering of options with a PIN code.

Using the key /ON/MODE/ ▲ select the menu point [Options] and confirm with /ENTER/ ■. Select now [Set Pin Code] and confirm with /ENTER/ ■
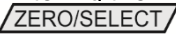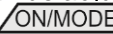
Switch the blocking of options with the keys /ZERO/SELECT/ ⬆ ⬇ to ON and confirm with the key /ENTER/ ■

You can now enter your PIN code. The value can be adjusted using the keys /ZERO/SELECT/ ⬆ ⬇. With the key /ON/MODE/ ▲ the standard value 00000 will be recalled.
Confirm your entry with the key /ENTER/ ■.
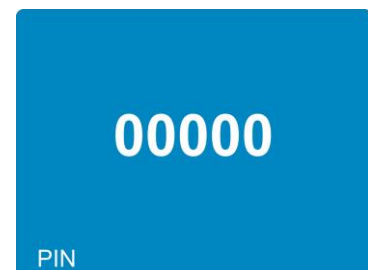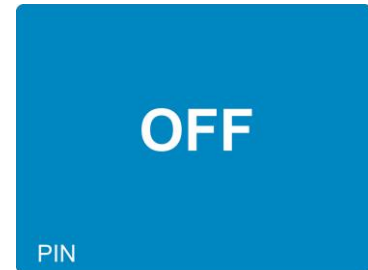
The measuring instrument will return to the measuring mode.

If the option PIN code is activated, the code must be entered before the list of options will be shown.

Entering the PIN code: The value can be adjusted using the keys /ZERO/SELECT/ ⬆ ⬇. With the key /ON/MODE/ ▲ the standard value 00000 will be recalled.

As a factory setting the PIN code is deactivated. The default value is 00000.

4.2   DISPLAY SETTINGS
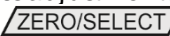
The brightness of the display, the brightness in the energy safe mode and the colour pattern can be adjusted individually. The BlueMETER SIGMA will work in the energy safe mode as long as no external power supply is connected and it is powered by batteries. The brightness is indicated as a percentage of the maximum brightness. As the power consumption is considerably reduced with a reduced brightness, it is recommended to use in the energy safe mode a brightness of 50 % (default).
With the colour pattern the background colour can be adjusted. The colour of the fonts changes according to the brightness of the background between white and black. Standard background is blue.
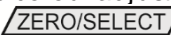
Using the key /ON/MODE/ ▲ select the menu point [Options] and confirm with /ENTER/ ■. Select now [Display Settings] and confirm with /ENTER/ ■

Display Settings
> Brightness
  Brightness Battery
  Color

With the keys /ZERO/SELECT/ ⬆⬇ select the display option you would like to change and confirm the selection with the key /ENTER/ ■.

In the brightness adjustments you can increase or reduce the brightness using the keys /ZERO/SELECT/ ⬆⬇. The range is from 10% to 100%. With the key /ON/MODE/ ▲ the default value of 50% will be recalled. Confirm the new value with the key /ENTER/ ■.

50

Brightness   %
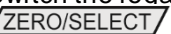
In the colour adjustments you can select the colour preferred using the keys /ZERO/SELECT/ ⬆⬇. Confirm your choice with the key /ENTER/ ■.

REL
±   **0.000**

|||||||||||||||||||||
≂0.15   ⊩0.01   ±0.15
Color   mm/m

The measuring instrument will return to the measuring mode.

4.3   LOGSCALE

With this option the logarithmic scaling can be switched on or off.

Using the key /ON/MODE/ ▲ select the menu point [Options] and confirm with /ENTER/ ■. Select now [Logscale] and confirm with /ENTER/ ■

Switch the logarithmic scaling ON or OFF using the keys /ZERO/SELECT/ ⬆⬇ and confirm with the key /ENTER/ ■.

OFF

Logscale

The measuring instrument will return to the measuring mode.

4.4 PROGRAMMABLE KEYS

With the keys /ZERO/SELECT/ ⬆⬇ the scaling of the display can be adjusted and with the key /REL ZERO/ ▮ a relative Zero can be set. The functions of these keys can be switched on or off.

Using the key /ON/MODE/ ▲ select the menu point [Options] and confirm with /ENTER/ ▮. Select now [Programmable keys] and confirm with /ENTER/ ▮

Select the key you want to activate or deactivate using the keys /ZERO/SELECT/ ⬆⬇ and confirm your choice with the key /ENTER/ ▮.

With the keys /ZERO/SELECT/ ⬆⬇ you can switch the selected key ON or OFF. In the display the selected status will be shown. ON means activated, OFF means deactivated.
Confirm with the key /ENTER/ ▮.

The list of the programmable keys will be shown again. For switching another key on or off, repeat the procedure as described above.
In order to store the settings select "Ok" and confirm with the key /ENTER/ ▮.

The measuring instrument will return to the measuring mode.
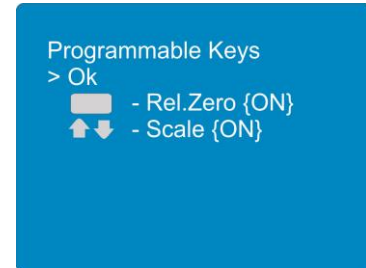
4.5   FUNCTIONS ON/OFF

The menu functions provided can be switched on respectively off. Thus the menu displayed can be adjusted to the needs of the user.

Using the key ⟨ON/MODE⟩ 🔺 select the menu point [Options] and confirm your selection with ⟨ENTER⟩ 🟥. Select now [Functions ON/OFF] and confirm with ⟨ENTER⟩ 🟥

```
Functions ON/OFF
> Ok
  Absolute {ON}
  Rel.Zero {ON}
  Display {ON}
  Unit {ON}
  Abs.Zero {ON}
  Limits {ON}
  Filter {ON}
  Join {ON}
  Leave {ON}
```

Select the function you want to switch on respectively off with the keys ⟨ZERO/SELECT⟩ 🔼 🔽 and confirm your selection with the key ⟨ENTER⟩ 🟥.

With the keys ⟨ZERO/SELECT⟩ 🔼 🔽 you can switch the selected function ON or OFF. In the display the selected status will be shown. ON means enabled, OFF means disabled.
Confirm with the key ⟨ENTER⟩ 🟥.

```
ON

Limits
```

The list of the switchable functions will be shown again. For switching another function on or off, repeat the procedure as described above. In order to store the settings select "Ok" and confirm with the key ⟨ENTER⟩ 🟥.

```
Functions ON/OFF
> Ok
  Absolute {ON}
  Rel.Zero {ON}
  Display {ON}
  Unit {ON}
  Abs.Zero {ON}
  Limits {ON}
  Filter {ON}
  Join {ON}
  Leave {ON}
```

The measuring instrument will return to the measuring mode.

4.6   HIDE DISABLED FUNCTIONS ON/OFF

This adjustment allows you to hide the functions disabled. The list of functions will only show those functions which are enabled. If this adjustment is not activated, disabled functions will be shown in the list of functions in grey fonts.

Using the key ⟨ON/MODE⟩ 🔺 select the menu point [Options] and confirm your selection with ⟨ENTER⟩ 🟥. Select now [Hide disabled Functions ON/OFF] and confirm with ⟨ENTER⟩ 🟥

Switch the adjustment "Hide disabled functions" ON or OFF with the keys ⟨ZERO/SELECT⟩ 🔼 🔽 and confirm with the key ⟨ENTER⟩ 🟥.

```
OFF

Hide Disabled
```

The measuring instrument will return to the measuring mode.

4.7 Radio ON/OFF

This adjustment allows you to switch the wireless data transmission on or off.

Using the key [ON/MODE] ▲ select the menu point [Options] and confirm your selection with [ENTER] ■. Select now [Radio ON/OFF] and confirm with [ENTER] ■

Switch the wireless transmission ON or OFF using the keys [ZERO/SELECT] ⬆⬇ and confirm with the key [ENTER] ■.

The measuring instrument will return to the measuring mode.

ON
Radio

4.8 Auto Deviceaddress ON/OFF

This adjustment allows you to switch the automatic assignment of RS485 addresses on or off.

Using the key [ON/MODE] ▲ select the menu point [Options] and confirm your selection with [ENTER] ■. Select now [Auto Deviceaddress ON/OFF] and confirm with [ENTER] ■

Switch the automatic assignment of RS485 addresses ON or OFF using the keys [ZERO/SELECT] ⬆⬇ and confirm with the key [ENTER] ■.

The measuring instrument will return to the measuring mode.

ON
Auto Address
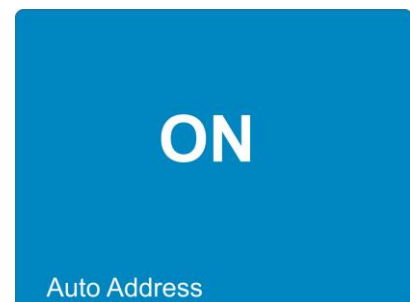
4.9 Changing sensor addresses

When the automatic assignment is switched off, the RS485 addresses can be assigned manuall y.

Using the key [ON/MODE] ▲ select the menu point [Options] and confirm your selection with [ENTER] ■. Select now [Set Device Address] and confirm with [ENTER] ■

The BlueMETER SIGMA searches now all the instruments/sensors connected.

Set Address

As soon as this search is completed, the list of instruments connected will be displayed. The list is sorted according to the RS485 device address. In case a sensor is connected via a transmission unit, e.g. a BlueTC, this will be shown in the list with the tag "via" plus the serial number of the transmission unit.

With the keys [ZERO/SELECT] ⬆⬇ you can select the instrument, the address of which shall be changed.
Confirm the selection with [ENTER] ■.

Set Address
    OK
    1 N4711Z
    2 N4559Z
-> 5 N4723Z via O8048t
    7 N4689Z via O8048t

With the keys ⟋ZERO/SELECT⟋ ⬆⬇ the RS485 device address can be selected whereas only those numbers will be displaced which have not assigned yet.
Confirm the new address with ⟋ ENTER ⟋ ⬛

9

N4723:   New Address
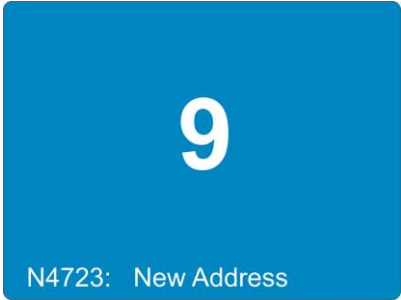
The list of instruments connected will be displayed again. In order to change another RS485 address, please proceed again as described above. If you want to quit the menu, select "OK" and confirm this selection with the key ⟋ ENTER ⟋ ⬛.

Set Address
-> OK
   1 N4711Z
   2 N4559Z
   9 N4723Z via O8048t
   7 N4689Z via O8048t

The measuring instrument will return to the measuring mode.

In case there is a conflict of addresses this will be shown in the list under the respective RS485 address. If the conflict occurs with a transmission unit, e.g. a BlueTC, this will be shown in the list with the tag "via" plus the serial number of the transmission unit.
A conflict occurs also when the same RS485 address is used for two different transmission units.

Select "Resolve" in order to solve this conflict of addresses or "OK" to return to the measuring mode without memorising the changes.

Set Address
   OK
-> Resolve
   1 Conflict
   9 N4723Z via O8048t
   7 N4689Z via O8048t

4.10   GRAVITATION

The inclination values transmitted by the measuring instruments and sensors to the BlueMETER SIGMA are based on the gravitation. Around the globe the gravitation is, however, not constant but it varies with the latitude and with the height above sea level. Furthermore variations of the density in the lithosphere cause additional local deviations.

As an example the gravity at sea level is

- 9,78033 m/s^2 at the equator ,
- 9,80620 m/s^2 at 45 degree of latitude,
- 9,83219 m/s^2 at the poles.

In the table to the right the values of gravity for some cities are listed.

The measuring instruments have been calibrated at the head office of WYLER AG. The inclinations displayed are exact only in this location. In different places the displayed value must be corrected. If the correction of the local gravity is switched on, the inclination measured will be corrected accordingly before the value is displayed.

Amsterdam	9.813	Istanbul	9.808	Paris	9.809
Athens	9.807	Havana	9.788	Rio de Janeiro	9.788
Auckland, NZ	9.799	Helsinki	9.819	Rome	9.803
Bangkok	9.783	Kuwait	9.793	San Francisco	9.800
Brussels	9.811	Lisbon	9.801	Singapore	9.781
Buenos Aires	9.797	London	9.812	Stockholm	9.818
Calcutta	9.788	Los Angeles	9.796	Sydney	9.797
Cape Town	9.796	Madrid	9.800	Taipei	9.790
Chicago	9.803	Manila	9.784	Tokyo	9.798
Copenhagen	9.815	Mexico City	9.779	Vancouver, BC	9.809
Nicosia	9.797	New York	9.802	Washington, DC	9.801
Jakarta	9.781	Oslo	9.819	Wellington, NZ	9.803
Frankfurt	9.810	Ottawa	9.806	Zurich	9.807

The correction is calculated according the following formula:

$$\alpha_{eff} = \arcsin\left(\frac{g_c}{g_m} \sin(\alpha_m) \right)$$

whereas

g_c gravity at the place of calibration
α_m displayed angle at place of measurement
g_m gravity at the location of measurement
α_{eff} effective angle

If measuring instruments like e.g. the BlueCLINO are connected, who are designed to apply this correction themselves, the value for local gravitation will be transmitted to the measuring instrument. For all other measuring instruments and sensors the BlueMETER SIGMA will calculate the correction. This will lead to the effect that different inclination values may be shown on the measuring instrument and on the BlueMETER SIGMA.

In order to switch the correction of the local gravity on respectively off, proceed as follows:

Using the key ON/MODE ▲ select the menu point [Options] and confirm your selection with ENTER ■. Select now [Gravity] and confirm with ENTER ■.

Switch the correction of the gravitation ON or OFF using the keys ZERO/SELECT ⬆⬇ and confirm with the key ENTER ■.

ON

Gravity

Now you can enter the value of the local gravity. The value is adjusted with the keys ZERO/SELECT ⬆⬇. With the key ON/MODE ▲ the standard value 9.80700 m/s^2 will be recalled.
Confirm your entry with the key ENTER ■.

9.80700

Local Gravity   m/s^2
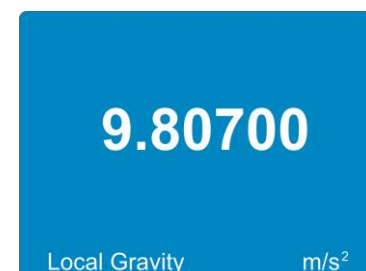
The measuring instrument will return to the measuring mode.

4.11 OPTION "LM2000 OUTPUT-MODE ON/OFF"

With this option the format of the function SEND can be chosen.

Using the key [ON/MODE] ▲ select the menu point [Options] and confirm your selection with [ENTER] ■. Select now [Option "LM2000 Output-Mode ON/OFF"] and confirm with [ENTER] ■

Switch the LM2000 Output-Mode On or OFF using the key [ZERO/SELECT] ⬆ ⬇ and confirm with the key [ENTER] ■. By default (OFF) the data format BlueSystem is chosen.

The description of the data formats can be found in the chapter "3.8 Function SEND (Print function)".

The measuring instrument will return to the measuring mode.
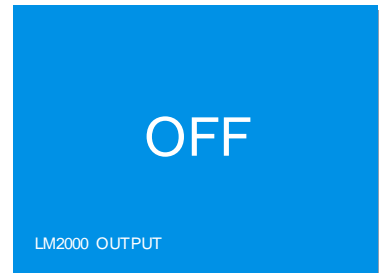
4.11 VERSION FIRMWARE

With this option information about the firmware installed and the configuration can be displayed.

Using the key [ON/MODE] ▲ select the menu point [Options] and confirm your selection with [ENTER] ■.
Select now [Version] and confirm with [ENTER] ■.

The following information will be displayed:

- Serial number of the instrument
- Number of the Firmware
- Release date of the Firmware

- Type of the instrument (Wireless / Cable)
- Version of the Bluetooth module

After 10 seconds or with the key [ENTER] ■ you leave this display mask.

The measuring instrument will return to the measuring mode.
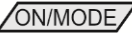
4.12 FACTORY RESET

A complete factory reset will reset the instrument to the state as it has been configured at the factory. All personal settings are lost.
The BlueMETER SIGMA will be set to the following standard configuration:

Standard-Values:	
measuring mode:	absolute
measuring unit:	DEC xx°xx'xx"
relative base:	1000 mm, 10"
absolute Zero point (ZERO-OFFSET):	0
relative Zero point (REL ZERO-OFFSET):	0
Filter	No. 3
Display	vial
Limits	OFF
Upper Limit	0
Lower Limit	0
Scale	maximum range
Join	not joined
Pin Code	OFF; Code = 00000
Display Settings	Colour Blue;
	Saturation 100%;
	Saturation Power Save 50%;
Logscale	OFF
Programmable Keys	all keys enabled
Functions	all functions enabled
Hide disabled Functions	OFF
Radio	ON, if available
Gravitation	OFF; value = 9.807 kg·m/s^2
LM2000 Output-Mode	OFF

Using the key ON/MODE △ select the menu point [Options] and confirm your selection with ENTER ■. Select now [Factory Reset] and confirm with ENTER ■.

In order to prevent a resetting by error the question "Are you sure?" will appear. If you really want to delete all personal settings, press now the key ENTER ■.
After 10 seconds or with the key SEND/ESC ● the instrument will return to the measuring mode.

The measuring instrument returns to the measuring mode.

Are you sure?

Factory Reset

4.13 FUNCTION CHECK

At the start of the instrument a system test will be performed, checking the most important functions.
In addition to this test the functions of the keys and of the LEDs can be checked.

Using the key ⟋ON/MODE⟋ 🔺 select the menu point [Options] and
confirm your selection with ⟋ENTER⟋ 🟥. Select now [Self Test] and
confirm with ⟋ENTER⟋ 🟥.

In the display a simplified design of the front foil of the BlueMETER
SIGMA with all the keys and LEDs will be shown.

In an interval of approx. 0.5 seconds the LEDs will light up one after the
other whereas the LED lit on the instrument must be identical to the one
marked in the display.
If this is not the case, the instrument is defective.

If any key or the IR zapper is pressed, the key pressed will be marked.
Each key will create an individual pattern. If the key is not marked the
instrument is defective.

After 10 seconds without activating any key the instrument will leave the
function check mode.

The measuring instrument returns to the measuring mode.
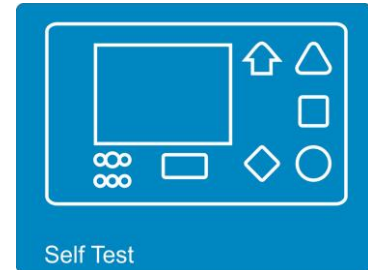
APPENDICES
A   FLOAT CHARTS GENERAL

A1   START THE INSTRUMENT / ON/OFF

POWER UP / Gerät einschalten

```
                    Start
                      │
                 /ON/MODE/ ▲
                      │
                 ┌─────────┐
                 │         │
                 └─────────┘
                      │
               ┌──────────┐   No
               │ Program  │──────▶ Display flashes
               │ memory   │
               │  OK?     │
               └──────────┘
                    │ Yes
               ┌──────────┐   No
               │ Display  │──────▶ Display flashes twice
               │   OK?    │
               └──────────┘
                    │ Yes
                 ┌─────────┐
                 │         │
                 └─────────┘
                      │
               ┌──────────┐   No
               │ EEPROM   │──────▶ ERROR 6
               │   OK?    │
               └──────────┘
                    │ Yes
               ┌──────────┐   No
               │  Flash   │──────▶ ERROR 5
               │ EPROM    │
               │   OK?    │
               └──────────┘
                    │ Yes
               ┌──────────┐   No
               │  Sensor  │──────▶ ERROR 3
               │   OK?    │
               └──────────┘
                    │ Yes
               ┌──────────┐   No
               │Bluetooth-│──────▶ ERROR 4
               │ module   │
               │   OK?    │
               └──────────┘
                    │ Yes
                 ┌─────────┐
                 │  →□     │
                 └─────────┘
                      │
                 ┌─────────┐
                 │± 0.400  │
                 │         │
                 │M1234  mm/m│
                 └─────────┘
```

.

Relative ZERO Key

```
±  0.400

M1234    2₇    mm/m
```

REL.ZERO ▮

```
Rel.Zero
```

ENTER ▮

IR-Zapper

15"

```
→⌐
```

```
±  0.000

M1234    2₇    mm/m
```

HOLD


```
        ± 0.400
      [display M1234  2₇  mm/m]

         HOLD  ◆

        [Hold icon]
         Hold

         1"

        [Hold graph]
         Hold

         ENTER  ■
         IR-Zapper
         15"

        ± 0.400
      [display on hold  2₇  mm/m]

         HOLD  ◆

         SEND/ESC  ●

      Serial Interface
      Serielle Schnittstelle

        [Exit icon]

        ± 0.400
      [display M1234  2₇  mm/m]
```

A4   Menu selection/ MODE

Menu selection
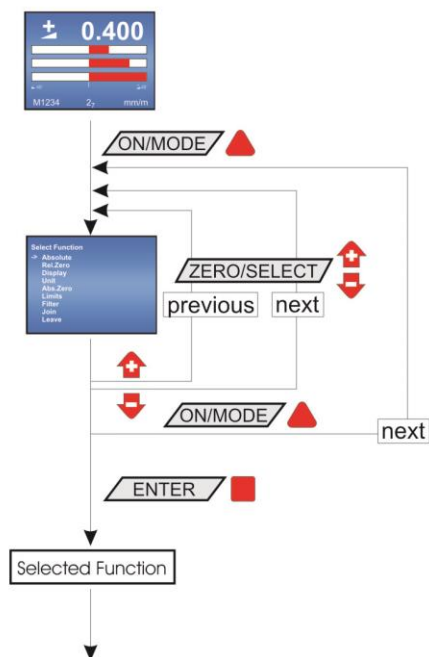
A5   Adjustment of the display / DISPLAY

DISPLAY

Absolute

Absolute ZERO

± 0.400
M1234

ON/MODE ▲

Abs ZERO

ENTER ■

ON/MODE ▲

ENTER ■
IR-Zapper

ZERO-OFFSET
± 0.360
± 0.027
± 0.719
± 0.002
Abs.Zero   mm/m

ON/MODE ▲   = 0.000

ZERO/SELECT ▲▼

ENTER ■

HOLD ◆

Abs.Zero

ENTER ■
IR-Zapper

Abs.Zero

ENTER ■
IR-Zapper
15"

Abs.Zero

ENTER ■
IR-Zapper

Abs.Zero

ENTER ■
IR-Zapper
15"

Abs.Zero

ENTER ■
IR-Zapper
15"

→⊐

± 0.830
M1234

Select Channel
→ Ok
A: 06901z
B: 06902z
C: 06903z
D: 06904z

ZERO/SELECT ▲▼
Select

ON/MODE ▲   next

ENTER ■   **OK**

A, B, C or D

ZERO-OFFSET
± 0.360
Abs.Zero   mm/m

ZERO/SELECT ▲▼
+1   -1

ON/MODE ▲   = 0.000

ENTER ■

HOLD ◆

Abs.Zero

ENTER ■
IR-Zapper

Abs.Zero

ENTER ■
IR-Zapper
15"

Abs.Zero

ENTER ■
IR-Zapper

Abs.Zero

ENTER ■
IR-Zapper
15"

ENTER ■
IR-Zapper

Abs.Zero

ENTER ■
IR-Zapper

ENTER ■
IR-Zapper

± 0.760
M1234

Relative ZERO

UNIT

mm/m

```
ABS
±  66.23
≥45°        ±45°
M2673   2₇   mm/m
```

ON/MODE ▲

UNIT

ENTER ■

xxxx.xx	mm/m
xxx.xxx	mm/m
xx.xxxx	"/10"
xx.xxxx	"/12"
xxxx.xx	mRad
xxx.xxx	mRad
xxxx.xx	mm/REL
xxx.xxx	mm/REL
xx.xxxx	"/REL
xxxx.xx	A ‰
xxxx.xx	‰
xxx.xxx°	DEG
xxx° xx'	DEG
xx° xx' xx"	DEG
xxxx' xx"	DEG
xxxxxx"	DEG
xxx.xxx	GON

xx.xxxx	"/REL
xxx.xx	mm/REL

ZERO/SELECT ✚ ✚

ENTER ■

ZERO/SELECT ✚ ✚

ENTER ■

```
→ ⌐
```

DEG

```
ABS
±  4°12'35"
≥45°        ±45°
N2673   2₇   DEG
```

mm/REL

```
1000
Unit      mm/REL
```

+1 -1   ZERO/SELECT ✚ ✚

✚

✚   ON/MODE ▲   DEFAULT VALUE

```
1250
Unit      mm/REL
```

ENTER ■

```
→ ⌐
```

```
ABS
±  82.78
≥45°        ±45°
M2673   2₇   mm/REL
```

LIMITS

0.400

M1234   2₇   mm/m

ON/MODE

LIMITS

Select Channel
→ Ok
A: O6901z
B: O6902z
C: O6903z
D: O6904z

ZERO/SELECT
Select

ON/MODE   next

ENTER

A, B, C or D

OK

0.400

M1234   2₇   mm/m

OFF
Limits

ZERO/SELECT
ON / OFF

ENTER   **OFF**

ON

$\pm$ 000.00
Lower Limit   mm/m

ZERO/SELECT
+1   -1

ON/MODE   = 0.000

ENTER

$\pm$ 000.00
Upper Limit   mm/m

ZERO/SELECT
+1   -1

ON/MODE   = 0.000

ENTER

FILTER

ON/MODE ▲

FILTER

ENTER ■

Filter

ZERO/SELECT
Type 1 - 5

ENTER ■

JOIN

BlueMETER

BlueClino

ON/MODE

JOIN

ENTER

Join

Devices connected by cable?

Yes

No

JOIN possible?

No

Yes

ON/MODE

JOIN

ENTER

Join

JOIN possible?

Yes

No

Red LED "READY" flashes quickly on both devices

SEND/ESC

Green LED "READY" flashes quickly on both devices

ENTER

ON/MODE

Joining

Joining

Joining

Refresh

Refresh

A 26

A 26

M1234

SENSOR

LEAVE

B FLOAT CHARTS OPTIONS

B1 PIN-CODE-QUERY FOR ACCESS TO THE OPTIONS

OPTIONS / PIN-Code query

OPTIONS / Set Pin-Code

OPTIONS / Display Settings

± 0.400

M1234   2₂   mm/m

ON/MODE ▲

OPTIONS

ENTER ■

Query Pin-Code

Option
→ Set Pin Code
  Display Settings
  Logscale
  Programmable Keys
  Functions ON/OFF
  Hide Disabled
  Radio ON/OFF
  Gravitation
  Version

ON/MODE ▲

Display Settings

ENTER ■

Display Settings
→ Brightness
  Brightness Battery
  Color

ZERO/SELECT ✚/➖

Select

ON/MODE ▲   next

ENTER ■

Color   **Brightness, Brightness Powersave**

± 0.400

Color

ZERO/SELECT ✚/➖

next previous

ENTER ■

± 0.400

M1234   2₂   mm/m

100

BRIGHTNESS   %

ZERO/SELECT ✚/➖

+1 -1

ON/MODE ▲   DEFAULT VALUE

ENTER ■

± 0.400

M1234   2₂   mm/m

OPTIONS / Logarithmic Scale ON/OFF

| ± 0.400 |
| M1234   2̱   mm/m |

⬇ ON/MODE ▲

OPTIONS

⬇ ENTER ■

Query Pin-Code

Option
→ Set Pin Code
 Display Settings
 Logscale
 Programmable Keys
 Functions ON/OFF
 Hide Disabled
 Radio ON/OFF
 Gravitation
 Version

⬇ ON/MODE ▲

LOGSCALE ON/OFF

⬇ ENTER ■

OFF
Logscale

ZERO/SELECT ⬆⬇
ON / OFF

⬆
⬇

⬇ ENTER ■

→⬗

± 0.400
M1234   2̱   mm/m

OPTIONS / Programmable Keys

```
        ┌─────────────┐
        │  ± 0.400    │
        │             │
        │ M1234  2₇ mm/m│
        └─────────────┘
              │
         /ON/MODE/ ▲
              │
        ┌─────────────┐
        │   OPTIONS   │
        └─────────────┘
              │
         /ENTER/ ■
              │
        ( Query Pin-Code )
              │
        ┌─────────────┐
        │ Option      │
        │ Set Pin Code│
        │ Display Settings│
        │ Logiscale   │
        │ Programmable Keys│
        │ Functions ON/OFF│
        │ Hide Disabled│
        │ Radio ON/OFF│
        │ Gravitation │
        │ Version     │
        └─────────────┘
              │
         /ON/MODE/ ▲
              │
        ┌─────────────────┐
        │ Programmable Keys│
        └─────────────────┘
              │
         /ENTER/ ■
```

Programmable Keys screen:
- Ok
- Rel.Zero (ON)
- Scale (ON)

/ZERO/SELECT/ ⬍ Select

/ON/MODE/ ▲ next

/ENTER/ ■ **Programmable Key selected**

OK

ON screen: Scale

/ZERO/SELECT/ ⬍ ON / OFF

/ENTER/ ■

```
        ┌─────────────┐
        │  ± 0.400    │
        │             │
        │ M1234  2₇ mm/m│
        └─────────────┘
```

OPTIONS / Functions ON/OFF

```
        ┌──────────────┐
        │ ±   0.400    │
        │ ▬▬▬▬▬▬        │
        │ ▬▬▬  ▬▬▬      │
        │ M1234  2₇  mm/m │
        └──────────────┘
              │
         /ON/MODE/ ▲
              │
        ┌──────────────┐
        │   OPTIONS    │
        └──────────────┘
              │
         / ENTER / ■
              │
        ╭──────────────────╮
        │  Query Pin-Code  │
        ╰──────────────────╯
              │
        ┌──────────────────┐
        │ Option           │
        │ ⇒ Set Pin Code   │
        │   Display Settings│
        │   Logscale       │
        │   Programmable Keys│
        │   Functions ON/OFF│
        │   Hide Disabled  │
        │   Radio ON/OFF   │
        │   Gravitation    │
        │   Version        │
        └──────────────────┘
              │
         /ON/MODE/ ▲
              │
        ┌────────────────────┐
        │ FUNCTIONS ON/OFF   │
        └────────────────────┘
              │
         / ENTER / ■
              │
        ┌──────────────────┐
        │ Functions ON/OFF │          /ZERO/SELECT/  ✚
        │ ⇒ Ok             │                          ✚
        │   Absolute (ON)  │          Select
        │   Rel.Zero(ON)   │
        │   Display (ON)   │
        │   Unit(ON)       │
        │   Abs.Zero (ON)  │
        │   Limits (ON)    │          ✚
        │   Filter (ON)    │          ✚     /ON/MODE/ ▲   next
        │   Join (ON)      │
        └──────────────────┘
              │
         / ENTER / ■
              │
          OK        Function selected
              │
        ┌──────────────┐          ┌──────────────┐
        │      ⇥       │          │   O N        │   /ZERO/SELECT/ ✚
        │              │          │              │   ON / OFF     ✚
        │              │          │ Limits       │
        └──────────────┘          └──────────────┘
              │                         ✚
        ┌──────────────┐                ✚
        │ ±   0.400    │            / ENTER / ■
        │ ▬▬▬▬▬▬        │
        │ ▬▬▬  ▬▬▬      │
        │ M1234  2₇  mm/m │
        └──────────────┘
```

OPTIONS / Hide disabled Functions

± 0.400

M1234   2₇   mm/m

↓

/ON/MODE/ ▲

↓

OPTIONS

↓

/ENTER/ ■

↓

Query Pin-Code

↓

Option
-> Set Pin Code
Display Settings
Logscale
Programmable Keys
Functions ON/OFF
Hide Disabled
Radio ON/OFF
Gravitation
Version

↓

/ON/MODE/ ▲

↓

HIDE DISABLED

↓

/ENTER/ ■

↓

OFF
Hide Disabled

/ZERO/SELECT/ ✚ ✚
ON / OFF

↓

/ENTER/ ■

↓

→⌐

↓

± 0.400

M1234   2₇   mm/m
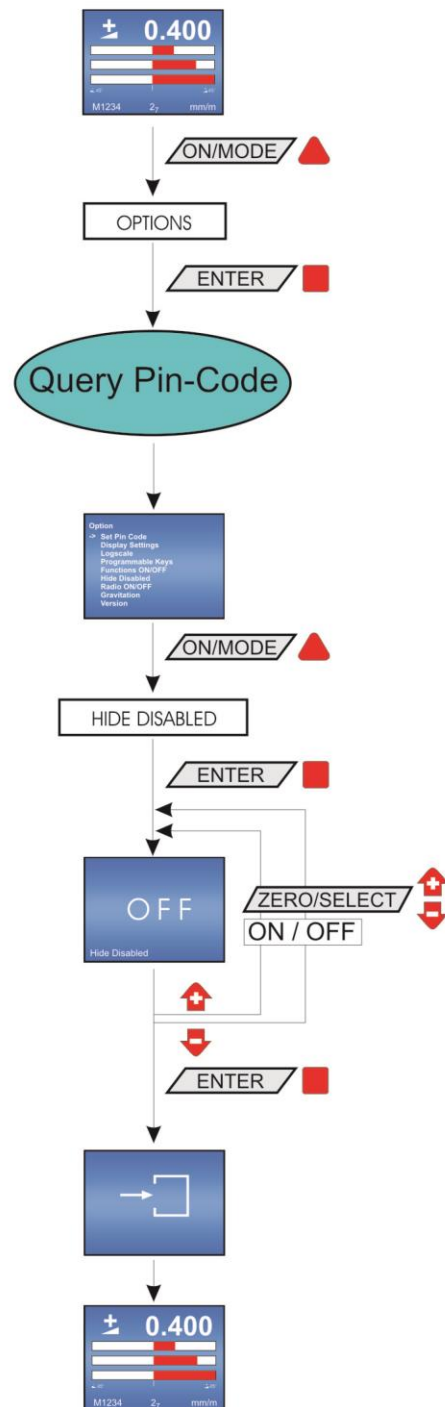
OPTIONS / Radio ON/OFF
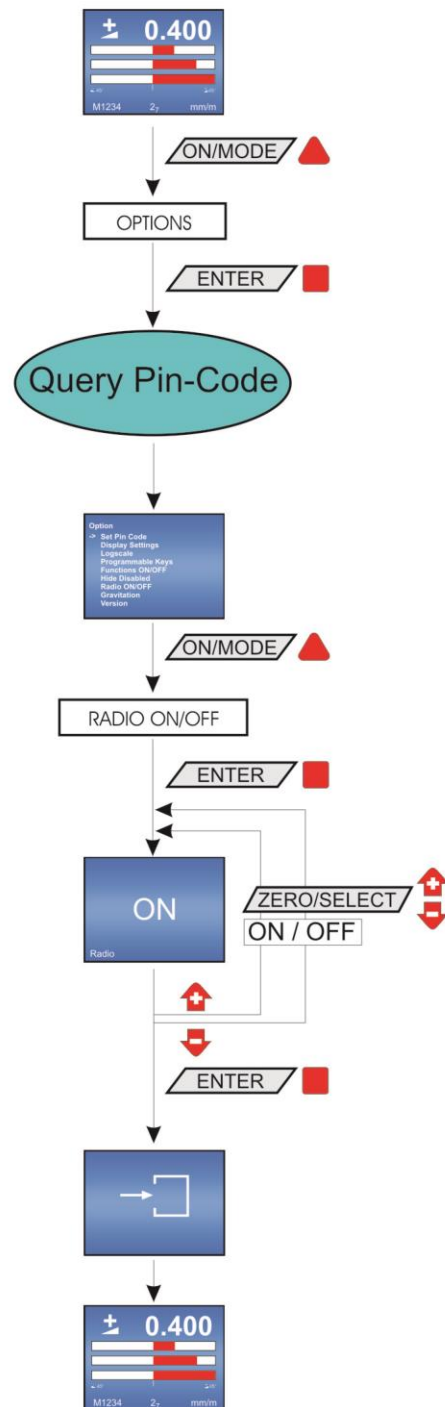
OPTIONS / Auto Address ON/OFF

± **0.400**

M1234 2_γ mm/m

ON/MODE ▲

OPTIONS

ENTER ■

Query Pin-Code

Option
Set Pin Code
Display Settings
Logscale
Programmable Keys
Functions ON/OFF
Hide Disabled
Radio ON/OFF
➔ Auto Device Address ON/OFF
Set Device Address
Gravitation

ON/MODE ▲

Auto Address ON/OFF

ENTER ■

ON
Auto Device Address

ZERO/SELECT ⬆⬇
ON / OFF

⬆
⬇

ENTER ■

→ ⃞

± **0.400**

M1234 2_γ mm/m

OPTIONS / Set Address

± 0.400
M1234   2₂   mm/m

ON/MODE

OPTIONS

ENTER

Query Pin-Code

Option
Set Pin Code
Display Settings
Logscale
Programmable Keys
Functions ON/OFF
Hide Disabled
Radio ON/OFF
Auto Device Address ON/OFF
Set Device Address
Gravitation

ON/MODE

Set Address

ENTER

Set Address

Address Conflict

Address OK

Set Address
OK
1 N4711Z
2 N4593Z
5 N4723Z via O8048t
7 N4689Z via O8048t

ZERO/SELECT
Select

ON/MODE   next

ENTER

OK

Set Address
OK
Resolve
1 Conflict
5 N4723Z via O8048t
7 N4689Z via O8048t

ZERO/SELECT
Select

ON/MODE   next

ENTER

Resolve

OK

9
N4723: New Address

ZERO/SELECT
+1 -1

ON/MODE   = 1

± 0.400
M1234   2₂   mm/m

± 0.400
M1234   2₂   mm/m

OPTIONS / Local Gravity

± 0.400

M1234   2₇   mm/m

ON/MODE ▲

OPTIONS

ENTER ■

Query Pin-Code

Option
→ Set Pin Code
   Display Settings
   Logoscale
   Programmable Keys
   Functions ON/OFF
   Hide Disabled
   Radio ON/OFF
   Gravitation
   Version

ON/MODE ▲

GRAVITATION

ENTER ■

ON
Gravity

ZERO/SELECT ⬍
ON / OFF

ENTER ■

ON

OFF

→⃞

± 0.400

M1234   2₇   mm/m

9.80700
Local Gravity m/s^2

ZERO/SELECT ⬍
+1 -1

ON/MODE ▲

= 9.807

ENTER ■

→⃞

± 0.400

M1234   2₇   mm/m

OPTIONS / Version FIRMWARE

OPTIONS / Version FIRMWARE

OPTIONEN / Factory Reset

OPTIONS / Self Test

± **0.400**

M1234   2ᵧ   mm/m

/ON/MODE

OPTIONS

/ENTER

Query Pin-Code

Option
⇒ Set Pin Code
Display Settings
Logscale
Programmable Keys
Functions ON/OFF
Hide Disabled
Radio ON/OFF
Gravitation
Version

/ON/MODE

Self Test

Self Test

± **0.400**

M1234   2ᵧ   mm/m

C   READING OR MEASURING DATA WITH A HYPER TERMINAL-PROGRAMME

1. Open the Terminal-Program in Windows/ Accessories. and insert a name

   Confirm with **<OK>**

2. Enter the serial port definition connected to the BlueMETER SIGMA.

   Confirm with **<OK>**

3. Enter the parameters

 | | |
   |---|---|
   | Bits per Second: | 9600 |
   | Data bits: | 7 |
   | Parity: | no |
   | Stop bits: | 2 |
   | Protocol: | no |

   Confirm with **<OK>**

   The HyperTerminal-Window appears.

   Repeatedly pressing the key ⟨SEND/ESC⟩ 🔴 the actual value in [Rad] will be transmitted.

   Alternatively the value can be called by pressing the key "P" on the PC keyboard.

   With the key "H" the hold function is started. By pressing the key "P" the evaluated value will be returned.
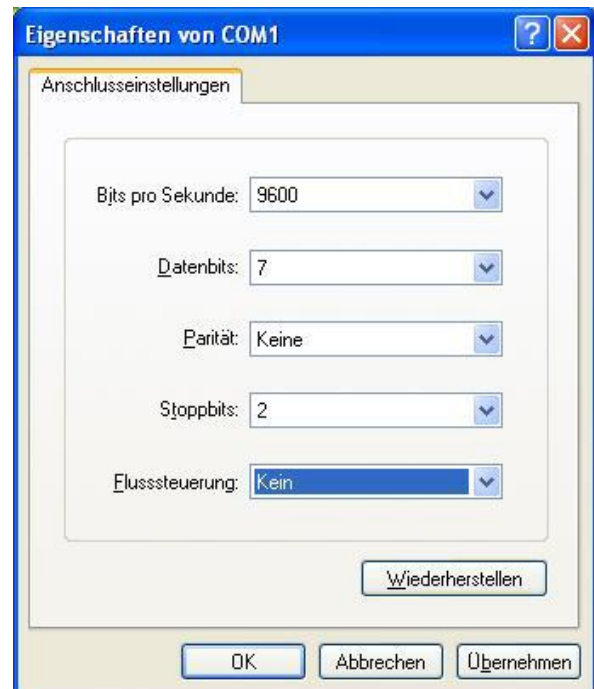
By default the returned value will be sent in the BlueSystem format. Optional the Format of the measuring device LEVELMETER 2000 can be chosen. The selection can be done within the options.

BlueSystem data format

Meaning of the display:	
52	Continuous number (3 measurements per second will be performed continuously)
N2673	Serial Number of the instrument
L	Type of instrument: BlueCLINO
-0.006826	- 0.006826 Rad resp.- 6826 µRad

LEVELMETER 2000 data format

Meaning of the display:	
180	Continuous number 0..255 (3 measurements per second will be performed continuously)
A003	Measuring mode plus device address of the device
-0.000043	- 0.000048 Rad resp. - 48 µRad
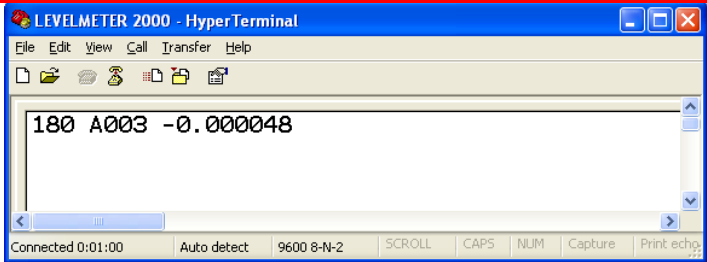
D   Error Messages

During the start-up of the instrument the BlueMETER SIGMA performs a function check. If any defects are detected **<u>the instrument must be returned to the WYLER distribution partner</u>**. A proper functioning can not be guaranteed. The following error messages may appear:

- Display is blinking grey mottled.   Programme memory is defective
  Display blinks two times grey mottled   Display error

 | | |
  |---|---|
  | **ERROR 1** | General instrument defect |
  | **ERROR 2** | No calibration data available |
  | **ERROR 3** | Sensor not found |
  | **ERROR 4** | Bluetooth not found |
  | **ERROR 5** | Defective Flash memory |
  | **ERROR 6** | Defective EEPROM |

During the execution of functions errors may be caused by the connected instruments:

- **ERROR 101**   Measuring value is Overrange
- **ERROR 102**   Measuring instrument or sensor cannot be reached

On the BlueMETER SIGMA errors are displayed as follows:

Confirm the error message with the key ⟋ ENTER ⟋ ■.

If possible the measuring instrument will return to the measuring mode.

ERROR
101: Overrange
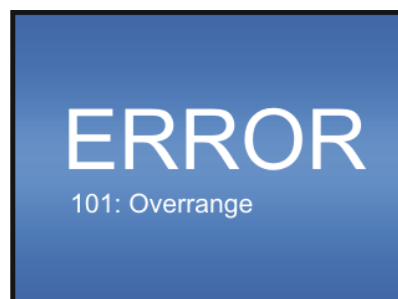
E   CONFORMITY DECLARATIONS AND APPROVALS

All documents relating to
- Declaration of Conformity "DoC"
- FCC Compliance, Statement for cB-0946
- IC Compliance
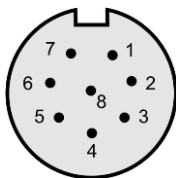- Japan Radio Equipment Compliance (TELEC)
- Batteries / WEEE

can be found on our website WYLER AG, **http://www.wylerag.com/en/support/certificates/**

F PIN-ASSIGNMENT BLUEMETER SIGMA
F1 PORT A AND PORT B

RS232 / RS485

Binder Serie 712
8 pol.
(female)

RS485

Connection	Signal	Pin Type	Pin Function
1	VPP	Power in	Unregulated Power
2	VSS	GND	Ground
3	VDD	Power out	Power +5V
4	RTA	Input/Output	RS485-Line A
5	RTB	Input/Output	RS485-Line B
6	-	-	-
7	-	-	-
8	KEY*	Input	Trigger Key

F2 OUT-PORT

RS232 / RS485

Binder Serie 712
8 pol.
(female)
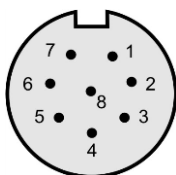
RS485

Connection	Signal	Pin Type	Pin Function
1	VPP	Power in	Unregulated Power
2	VSS	GND	Ground
3	VDD	Power out	Power +5V
4	RTA	Input/Output	RS485-Line A
5	RTB	Input/Output	RS485-Line B
6	-	-	-
7	-	-	-
8	KEY*	Input	Trigger Key

RS232

Connection	Signal	Pin Type	Pin Function
1	VPP	Power in	Unregulated Power
2	VSS	GND	Ground
3	VDD	Power out	Power +5V
4	TD	Output	RS232-TD
5	-	-	-
6	RD	Input	RS232-RD
7	-	-	-
8	KEY*	Input	Trigger Key

G   TECHNICAL DATA OF THE BLUEMETER SIGMA

Digital output / Digitalausgang	RS232 / RS485, asynchron, 7 DataBits, 2 StopBits, no parity, 9600 bps
External power supply Externe Stromversorgung	BlueMETER SIGMA: + 5V DC, max. 1 W or/oder 10…28 V DC
Operating temperature range / Betriebstemperatur Storage temperature range / Lagertemperatur	0 … +40°C -10 … +60°C
Net weight, including batteries Netto-Gewicht, inklusive Batterien	850g

H   SERVICE AND REPAIR
H1   REPAIR OF MEASURING INSTRUMENTS AND DISPLAY UNITS

Normally any instruments requiring repair can be sent to the local WYLER partner (local distributor) who will take the necessary steps and make the arrangements for repair on behalf of the customer.

Express Repair Service, ERS

A large number of customers can not miss the instruments for a longer period as these are in daily operation. For these cases WYLER SWITZERLAND has created a new service called "Express Repair Service, ERS". Employing this service the transport time from the user to WYLER SWITZERLAND and back and thus the complete repair time can be reduced considerably.

A simplified description of this service:

- The customer announces the repair request to the local WYLER partner in his country.
- The WYLER partner will inform the customer about the possibility of the ERS service outlining the advantages and consequences of this service, such as e.g.
  - reduced total repair time
  - required acceptance to repair without quote up to 65 % of the price for a new instrument
  - suitable packing for air transport
  - expenses of the ERS
- In case the customer decides to use the ERS, the customer informs the local WYLER partner or directly WYLER SWITZERLAND providing the necessary data.
- The customer will receive all information and instructions necessary for a smooth handling, the customer has just to pack the product suitably and to fill in a form for the **TNT courier service** as well as to announce the readiness to the local TNT office for pick-up. Everything else will run automatically.
- Products reaching WYLER SWITZERLAND under this service will be handled with **first priority, and** the instrument will be returned using the same carrier.
- The invoicing will be through the WYLER partner in your country.

Please do not hesitate to make use of this service in order to have your WYLER instrument back at your disposal as soon as possible. In case of any questions please contact WYLER SWITZERLAND or your local distributor, we will gladly help you to use the ERS successfully.

H2   SERVICE - AND MAINTENANCE CONTRACTS

Measuring systems are becoming more and more complex and are therefore subject to continuous supervision in respect of quality and reliability. For this purpose WYLER AG offers the option of a MAINTENANCE CONTRACT with the purchase of new instruments.

Such a MAINTENANCE CONTRACT offers the following services to the customer:
- Complete inspection and re-adjustment of the instrument / system in a bi-yearly interval.
- The scope of delivery includes an internationally recognised Calibration Certificate SCS for the entire system confirming the performance after the service intervention. Traceable certificates SCS are issued according to our accreditation as a calibration laboratory by the Swiss authorities
- Highest priority for any repair works (actual repair work is not included and will be quoted separately)
- Technical enhancements and modifications published by WYLER, if considered suitable
- Costs for packing and transport of the instrument(s) from the customer to WYLER and back, either directly or through the WYLER distribution partner
- Extension of warranty period to 24 months: If a maintenance contract is signed within 6 months of the purchasing of a new instrument the warranty period is extended to 24 month.

Options:
Depending on the customers requirement the re-calibration interval can be shortened (every year) or be extended (every 3rd year)

The following services are **excluded** from all maintenance contracts:
- The contract does not include any repair work. If it is determined during the inspection or the re-calibration process that the instrument requires repair, such work will be quoted separately to the customer.

**We help you to keep your valuable and important instruments always accurate and ready for use!
We would be glad to offer you a maintenance contract adapted to your specific requirements.**

I INDEX

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