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# OPERATOR'S MANUAL BlueCLINO and BlueCLINO High Precision





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## Modifications / Änderungen:

Datum /	Geändert durch /	Beschreibung der Änderung /
Date	Modified by	Description of the modification
15.11.2011	MG	Modifications for BlueCLINO High Precision
7.1.2015	HEH	New: CONFORMITY DECLARATIONS AND APPROVALS

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- Important Product Information
  - http://www.wylerag.com/en/support/certificates/
- Imagefilms, Instructional videos and Tutorials
- https://www.youtube.com/user/wylerag
- Manuals und Compendium

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

### 1 INTRODUCTION

## 1.1 DESCRIPTION OF BLUECLINO

BlueCLINO is a high precision measuring instrument developed by WYLER AG in Switzerland.

BlueCLINO can be used - as measuring instrument

Various parameters can be set and changed in the BlueCLINO like

- Measuring units
- Measuring mode
- Relative base length etc.

An RS 232 interface allows sending measuring values to a printer or a PC / Laptop.

BlueCLINO contains a ZEROTRONIC Sensor Type C. The measuring principle of the ZEROTRONIC Type C Sensor is based on measuring a differential capacity with a pendulum which is moving between 2 electrodes. Inclining the sensor respectively the measuring instrument moves the pendulum which changes the 2 capacities. This change of capacities is used as the primary signal for the calculation of the inclination angle. In the BlueCLINO this primary signal is transformed into an inclination value basing on a curve of reference points and displayed.

The system is unsusceptible to external electromagnetic influences

#### 1.2 PREPARATION AND START-UP

#### PRIOR TO STARTING

Please read this manual prior to working with the BlueCLINO. You will get an overview on all the functions and possibilities of this instrument. At the same time you get familiar with the handling of the instrument and wrong handling and specifically the unintentional erasing of the calibration data can be avoided.

#### 1.2.1 BATTERIES

The batteries are not inserted in the instrument during shipment. It is strongly recommended to remove the batteries during transport.

The battery voltage is shown in the display e.g. 27 (2.7 Volt)

Lowest possible battery voltage is 1.7 Volt. If the voltage drops below this value a blinking battery symbol is

shown:

The batteries should then be exchanged rather soon.

2 pieces 1.5V, Size "C" ALKALINE





As an end user you are forced by law to return all used batteries and accumulators, a disposal through household waste is prohibited.

Batteries/accumulators containing contaminants are marked with the symbol shown, which clearly indicates the prohibition of disposal through household waste.

You can dispose of your used batteries/accumulators free of charge at the collecting points of your community, our distribution partners or at each location selling batteries/accumulators. You thus fulfil your legal obligation and contribute to the protection of the environment.



#### Stand-alone instrument



#### BlueCLINO connected to the RS232 port of a PC



BlueCLINO connected to a BlueMETER or BlueTC via Bluetooth and then connected to a the RS232 port of a PC





BlueCLINO connected to a BlueMETER via Bluetooth

Please check the respective manuals and data sheets for details on the other products shown above.

## 2 STARTING

## 2.1 OPERATION/ SHORT DESCRIPTION

## 2.1.1 OVERVIEW KEYBOARD AND DISPLAY



#### 2.1.2 How to switch the instrument ON and OFF

The BlueCLINO 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 ON

Keep the key <u>ON/MODE</u> 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 <u>ON/MODE</u> 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 OFF

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

## 2.1.3 KEYS / FUNCTIONS / SHORT DESCRIPTIONS OF EACH SINGLE KEY

	ON/MODE - Key
Function - 1 -	To switch the BlueCLINO 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 BlueCLINO is switching to the measuring mode. The current inclination 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 BlueCLINO is powered from an external power supply, the automatic OFF function is deactivated and the instrument will remain ON.
Function - 2 -	To switch OFF, press the key <u>ON/MODE</u> more than 3 seconds, until the display disappears.
Function - 3 -	With the key <u>ON/MODE</u> by 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 setting a value with the key <u>VON/MODE</u> the default value can be recalled.

ENTER	ENTER – key		
Function - 1 - Function - 2 -	The key <b>ENTER</b> is used to confirm a chosen function or to save a value entered While in the function <b>"REL ZERO"</b> or <b>"ABS ZERO"</b> the measuring can be started or an ongoing measuring can be finished by pressing the key <b>ENTER</b>		
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		
	Data format OUT port: [sss xxxxxx sn.nnnnn <cr>]</cr>		[sss xxxxxx sn.nnnnn <cr>]</cr>
		SSS =	0 255 – Continuous number
	x (example:	xxxxxx = N2673L	Sensor Serial Number and Type BlueCLINO )
	sn.nn	sn.nnnnnn =	inclination in rad, e.g. +0.226349 +9.999999 -> Positive Overrange -9.999999 -> Negative Overrange
	Format of transmission: asynchron, 7Bit, 2 Stopbits, no parity, 9600 Baud		
Function - 2 -	Unfreeze of the <b>"HOLD"-</b> function to return to the measuring mode. At the same time the "frozen" value is sent to the RS 485 port to any connected device		
Function - 3 -	Escape function from the menu		

	ZERO/SELECT "+/-" - key		
Function - 1 -	<ul> <li>The key ZERO/SELECT</li></ul>		
Function - 2 -	<ul> <li>The key <u>ZERO/SELECT</u> • is used to select possible adjustments, such as</li> <li>menu selection</li> <li>modification of a figure in the menu</li> </ul>		
HOLD	HOLD - key		
Function - 1 -	The key HOLD serves for "freezing" a measuring value. The value is displayed until the BlueCLINO returns to the measuring mode by pressing the SEND/ESC key.		
Function - 2 -	In the functions " <b>REL.ZERO</b> " and " <b>ABS.ZERO</b> " the key HOLD is used for reading in the actual measuring value again during the manual entering.		
	REL ZERO - kov		
Function - 1 -	The key <b>RELZERO</b> serves for setting the actual inclination as the relative Zero.		
Mirroring the display	With the two middle keys <b>ENTER</b> and <b>ZERO/SELECT</b> the display can be turned by 180 deg. First press <b>ENTER</b> then <b>ZERO/SELECT</b> . This function can be disabled in "options"		
	With this function the values displayed can be perfectly seen from all possible angles. This function can be executed at all times, even when the instrument is remotely controlled by a BlueMETER.		
	Left: Display "standard" Left: Display "standard" Set Set Set Set Set Set Set S		

## 2.2 DISPLAY

The BlueCLINO 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.

#### 2.2.1 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: 60°, 45°, 20°, 10°, 5°, 2°, 1°, 30', 12'. The range of 12' in the bar graph is the highest possible resolution of the instrument, i.e. 5" for each pixel.

In the BlueCLINO High Precision the following ranges can be selected: 1°, 30', 12', 6', 3', 1'.

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 <u>ON/MODE</u> select the menu point [Options] and confirm with <u>ENTER</u>. Select now [Logscale] and confirm with <u>ENTER</u>

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 <u>ENTER</u>.



The instrument will return to the measuring mode. If the logarithmic scaling is enabled, the symbol "LOG" will appear below the graph.

#### 2.2.2 DISPLAY TYPES

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

Using the key <u>ON/MODE</u> select the menu point [Display] and confirm this selection with <u>ENTER</u>.

Select the required display type using the keys ZERO/SELECT



The instrument will return to the measuring mode.

ABS

t

Numeric display plus bar graph

Numeric display

Display ranges: 60°, 45°, 20°, 10°, 5°, 2°, 1°, 30', 12' for *BlueCLINO High Precision* 1°, 30', 12', 6', 3', 1'.

Numeric display plus 3 bars, each with a 10 times higher resolution

Display ranges: 60°, 45°, 20°, 10°, 5°, 2°, 1°, 30', 12' for *BlueCLINO High Precision* 1°, 30', 12', 6', 3', 1'.

Numeric display plus vial (spirit level)

Display ranges: 60°, 45°, 20°, 10°, 5°, 2°, 1°, 30', 12' for *BlueCLINO High Precision* 1°, 30', 12', 6', 3', 1'.

Numeric display plus simple vial (spirit level)

Display ranges: 60°, 45°, 20°, 10°, 5°, 2°, 1°, 30', 12' for *BlueCLINO High Precision* 1°, 30', 12', 6', 3', 1'.

Numeric display plus LED-display

Display ranges: 60°, 45°, 20°, 10°, 5°, 2°, 1°, 30', 12' for *BlueCLINO High Precision* 1°, 30', 12', 6', 3', 1'.



4°12'35"





















Numeric display plus pin

Display ranges: 60°, 45°, 20°, 10°, 5°, 2°, 1°, 30', 12' for *BlueCLINO High Precision* 1°, 30', 12', 6', 3', 1'.





## 2.2.3 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 <b>ENTER</b>	

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 BlueCLINO:



## 2.2.4 BRIGHTNESS

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 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.



The instrument will return to the measuring mode.

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 $2 \times 2 $		
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		
Battery voltage 2 <sub>6</sub>	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 by an external source.		
	Display of the measuring unit in use. There are 10 basic units		
Measuring unit	Measuring unit available, whereas for each setting various options can be selected. Depending on the unit set, the last digit of the display will be rounded to 5" or to the next lower integer value. (e.g. 20 μm/m)		

## **3** OPERATING INSTRUCTIONS BLUECLINO

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

Here after the single functions will be described.

## 3.1 "ZERO-SETTING" / ABSOLUTE ZERO

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

#### 3.1.1 SET ABSOLUTE ZERO (WITH A REVERSAL MEASUREMENT)

The absolute zero is used as the base for <u>absolute inclination</u> measurements. In order to achieve the best possible precision please observe that the measuring object (support) and the BlueCLINO 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 BlueCLINO in order to be able to turn the instrument by 180 degrees and to put it in opposite direction at the very same spot.



Measurement "A"

The absolute zero will be determined from a <u>reversal</u> <u>measurement</u> (two measurements in opposite direction but at the same spot). Use for this procedure an adequate surface (rigid and stable support, as flat as possible and as horizontal as possible), where you put the BlueCLINO. Mark the position and the direction of the BlueCLINO precisely and turn it on the same spot by 180 degrees.



Turning the instrument at the same spot by 180°

ZERO OFFSET = Mesurement "A" + Mesurement "B" 2

Measurement "B"

The "ZERO-OFFSET" will be stored in the BlueCLINO

#### EXAMPLE:

With the key <u>ON/MODE</u> select the menu item [Abs ZERO] and confirm this selection with <u>ENTER</u>.

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

Put the BlueCLINO to the first position and press the key <u>ENTER</u> for reading the first measuring value. Alternatively the first measuring value can also be entered 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 BlueCLINO now to the second position (turn the instrument by 180 degrees in the horizontal) and press the key <u>ENTER</u> again for reading the second measuring value. Alternatively the second measuring value can also be entered 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 BlueCLINO compared to the absolute Zero (gravity). The displayed measuring value corresponds to

#### VALUE displayed =

Value of the BlueCLINO minus "ZERO OFFSET"

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

## 3.2 SELECTION OF THE MEASURING UNIT / UNIT

#### 3.2.1 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 now 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	"/10"	inch per 10 inches / 4 decimals
XX.XXXX	"/12"	inch per 12 inches / 4 decimals
XXXX.XX	mRad	Milliradian / 2 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	"/REL	inches in relation to the relative base / 4 decimals
XXXX.XX	Α‰	artillerie-permille
XXXX.XX	‰	permille
xxx.xxx°	DEG	degrees / 3 decimals
xxx° xx'	DEG	degrees / minutes
<b>XX° XX' XX</b> "	DEG	degrees / minutes / seconds
XXXX' XX"	DEG	minutes / seconds
XXXXXX"	DEG	seconds
XXXXX.X"	DEG	seconds *
XXX.XXX	GON	gon / 3 decimals

\* only for BlueCLINO High Precision instruments with a measuring range of 1°

Depending on the unit selected the last digit will be rounded to 5" or to the nearest lower integer (e.g.20  $\mu$ mm/m). For the BlueCLINO *High Precision* 1° the rounding will be to 0.2".

#### 3.2.2 UNITS WITH RELATIVE BASE LENGTH

The units mm/REL and "/REL are related to a relative, this means selectable, base length. 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 ENTER key.

With the key <u>ON/MODE</u> 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**).



## 3.3 FUNCTION HOLD

The key function  $\checkmark$  HOLD  $\checkmark$  can be applied in all measuring modes.

Put the BlueCLINO on a stable support. Press now the key

HOLD . While the BlueCLINO 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.



ABS 0°23'40" = 45° ± on hold 27 DEG

12...48V DC

AC 90 ...

015-018-468-USB or/oder 065-025-978-04A

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 **"RS485**" 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.



#### 3.4 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 <u>ON/MODE</u> select the menu item [FILTER] and confirm this selection with <u>ENTER</u>.





The measuring instrument will return to the measuring mode.

#### 3.5 ABSOLUTE MEASUREMENT / RELATIVE MEASUREMENT

#### 3.5.1 ABSOLUTE MEASUREMENT

As a factory setting the BlueCLINO 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 <u>ENTER</u> the instrument is ready for measurements in the mode "ABSOLUTE".

The measuring value corresponds to the



## 3.5.2 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 BlueCLINO 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 either be confirmed, newly entered or set to zero.



 $\alpha$  = +0.400 mm/m

Put the measuring instrument on the reference surface. The display shows the value +0.400 mm/m. This corresponds to the absolute inclination of the reference surface.



 $\alpha$  = +0.400 mm/m



On the display the position of the instrument for the measurement will be shown.

With the key <u>ON/MODE</u> you can at this stage open the manual entry in order to enter a reference value defined by yourselves.

Set the BlueCLINO to the correct position and press the key <u>ENTER</u>. Alternatively the measuring can also be started using the zapper.

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

Complete the measurement with the <u>ENTER</u> key or with the zapper. After 15 seconds the measuring value will automatically be read.

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

The **value** displayed **is "0**" and represents the position of the reference defined.









The values stored in the registers "ZERO" and/or "REL ZERO" can be changed or deleted as follows:

Select with the key <u>ON/MODE</u> the function [REL ZERO] or [ABS ZERO] and confirm this selection with <u>ENTER</u>. Press now again the key <u>ON/MODE</u>. The offset value stored will be displayed. Press now the keys ZERO/SELECT  $4 - \frac{1}{2}$  until the display shows the desired value. Using the key <u>ON/MODE</u> the value can directly be set to "0". With the key **ENTER** the value displayed will be stored and the procedure terminated. With the key SEND/ESC/ - the procedure will be abandoned without change. After that the BlueCLINO will return to the measuring mode.

Use this procedure if you have to set one of these registers to an exact value, e.g. 5°.

Using the key <u>ON/MODE</u> select the menu item [LIMITS] and confirm

#### 3.6 **MEASURING WITH LIMITS / LIMITS**

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**. 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.



The measuring instrument will return to the measuring mode.

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 Lower Limit	[sss xxxxxt [sss xxxxxt	[sss xxxxxt UL sn.nnnnn sm.mmmmmm <cr>] [sss xxxxxt LL sn.nnnnn sm.mmmmmm<cr>]</cr></cr>	
	SSS =	0 255 - continuous number	
	xxxxxt = N2673L	Sensor Serial Number and Type BlueCLINO	
	sn.nnnnnn	<ul> <li>+9.999999 - Positive Overrange</li> <li>-9.999999 - Negative Overrange</li> <li>other value - angular value in rad e.g. +0.226349</li> </ul>	
	sm.mmmm	mm = limit defined	

#### 3.7 GROUPING OF INSTRUMENTS TO A MEASURING GROUP IN THE WIRELESS MODE

#### 3.7.1 GROUPING VIA CABLE CONNECTION / JOIN

 Connect all instruments to be grouped (BlueCLINO and e.g. a BlueMETER or BlueTC) using the cables provided and switch all instruments on.



- Select on the BlueMETER 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 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).
- 5. 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 "freezed" for a short while and replaced by empty zeroes until, after successful connection, the measuring values will be displayed again.
- 6. After successful connection the blue LED "LINK" will be lighting on all the instruments connected.

#### 3.7.2 GROUPING IN THE WIRELESS MODE / JOIN

With the function "JOIN" an instrument can be added to an existing group. During this procedure no instrument must be connected by cables as otherwise the "JOIN" procedure for cables will be performed. To make sure that the instrument does not belong to another group, it is advisable to perform the function "LEAVE" first.

- On the BlueCLINO select the menu "JOIN" using the ON/MODE key. Confirm with ENTER
   Set the second instrument also to the JOIN mode.

#### 2. Searching

The two instruments are "searching" each other. During

the searching procedure the green LED on both instruments is 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.

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 LEDs on both instruments. The joining can now

- be activated by using the **ENTER** key on one of the instruments or

- the whole process may be cancelled by pressing the  $\sqrt{ON/MODE}$  key.

If the LED "OFF" is blinking in red, a grouping is not possible (see chapter 3.7.3 / special case)

4. The green LED "READY" will blink shortly as many times as instruments are joined in the measuring group (including the own address).

#### 3.7.3 SPECIAL CASE "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 <u>SEND/ESC</u>.

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.

#### 3.7.4 UNHINGE AN INSTRUMENT FROM A GROUP USING THE FUNTION "LEAVE" / LEAVE

Each instrument may be unhinged individually from an existing measuring group.

#### PROCEDURE "LEAVE"

- 1. On the BlueCLINO select the menu "LEVAE" using the ON/MODE key. Confirm with ENTER.
- 2. The BlueCLINO is now unhinged from the group and is no longer accessible via wireless data transmission.

#### 3.8 QUICK CALIBRATION (ONLY POSSIBLE WITH QUICK CALIBRATION OPTION) /Q.CALIB

The BlueCLINO is equipped with an integrated calibration set-up for a quick calibration procedure which enables the calibration without complex means. On the backside of the instrument precisely manufactured and placed holes are available for installing the dowel pins as calibration aids. These pins are part of the delivery and can be inserted into the holes. With the quick calibration method the values at + and - 45° as well as the exact zero value can be adjusted. By this procedure the instrument can be set to a sufficiently high precision for most of the applications.

Attention: Before a quick calibration can be performed, the local gravity must be set. To do this, use the function [Gravity], which is described in section 4.8. Relative offset must be turned off. During quick calibration the absolute offset will be reset. Therefore at the end the correction of the zero point (absolute Zero) must be determined by a reversal measurement.

The calibration procedure is as follows:

- Start the instrument in the measuring mode
- 1 "Absolute" and set the local gravity.
- 2 Select the function [QUICK CALIB] using the key ON/MODE and confirm with ENTER

Correction of the value at +45°.

The dowel pins delivered are to be inserted in such a way that the instrument would display +45° when two pins are on a horizontal plane. Align the instrument with the pins inserted on the edge of a measuring and setting plate

<sup>3</sup> To start the calibration press the key <u>ENTER</u>, hold the instrument still. Alternatively the calibration can also be released with the zapper.

With the key <u>ON/MODE</u> you can at this point open the manual entry in order to enter a predefined correction value.

The correction value at +45° is determined



chapters 4.8 and 3.5.1



Correction of the value at 0°.

The dowel pins delivered are to be inserted now in such a way that the calibration at  $0^{\circ}$  can be defined. To start the calibration press the key  $\angle$  ENTER  $\angle$ 

4 hold the instrument still. Alternatively the calibration can also be released with the zapper.

With the key <u>ON/MODE</u> you can at this point open the manual entry in order to enter a predefined correction value.



The correction value at  $+0^{\circ}$  is determined.



Correction of the value at +45°.

The dowel pins delivered are to be inserted now in such a way that the calibration at -45° can be defined.

5 To start the calibration press the key **ENTER**, hold the instrument still. Alternatively the calibration can also be released with the zapper.

With the key <u>ON/MODE</u> you can at this point open the manual entry in order to enter a predefined correction value.

The correction value at -45° is determined



**Q.Calib** 

6 After a successful calibration the instrument will be re-started.

Finally the correction of the zero point (absolute

- Zero) must be determined by a reversal
- 7 measurement.
- 8 The BlueCLINO has now been re-calibrated and can be used for further measurements.

The calibration aids (dowel pins) delivered must be stored cleaned and grease applied. Also the holes in the instrument must remain free from dust and dirt.

## 3.9 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
- 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"** 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 <ON/OFF> on or off.
- Option "Functions ON/OFF" With this option specific functions can be switched on or off. Functions switched off will no longer appear in the main menu.
- Option "Hide disabled Functions ON/OFF" If this option is enabled, disabled functions will not be shown.
- **Option "Radio ON/OFF"** With this option the wireless data transmission can be activated or deactivated.
- **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 "Version"
   With this option the version of the firmware will be displayed.
- Option "Reset Quick Calibration" The values of the quick calibration will be deleted and replaced by the factory set values (only with the option Quick Calibration).
- 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 BlueCLINO against unauthorised changes you have the possibility to block the entering of options with a PIN code.



The measuring instrument will change back to the measuring mode.

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



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 BlueCLINO 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.



The measuring instrument will return to the measuring mode.

#### 4.4 **PROGRAMMABLE KEYS**

The function of the keys  $\overline{\text{ZERO/SELECT}}$   $2 \overline{\bullet}$  as well as the key  $\overline{\text{RELZERO}}$  can be switched on or off.

Using the key <u>ON/MODE</u> select the menu point [Options] and confirm with <u>ENTER</u> . Select now [Programmable keys] and confirm with <u>ENTER</u>	
Select the key you want to activate or deactivate using the keys ZERO/SELECT  and confirm your choice with the key ENTER	Programmable Keys -> Ok □ - Rel.Zero {ON} ☆☆ Scale {ON}
With the keys ZERO/SELECT $2$ 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.	O N ₽®- Scale
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	Programmable Keys -> Ok □ - Rel.Zero {ON} ☆☆ Scale {ON}

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.



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 <u>ON/MODE</u> select the menu point [Options] and confirm your selection with <u>ENTER</u>. Select now [Hide disabled Functions ON/OFF] and confirm with <u>ENTER</u>

Switch the adjustment "Hide disabled functions" ON or OFF with the keys  $\angle$  ZERO/SELECT  $\bigcirc$  and confirm with the key  $\angle$  ENTER  $\bigcirc$ 

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 <u>ON/MODE</u> select the menu point [Options] and confirm your selection with <u>ENTER</u>. Select now [Radio ON/OFF] and confirm with <u>ENTER</u>

Switch the wireless transmission ON or OFF using the keys ZERO/SELECT

The measuring instrument will return to the measuring mode.



#### 4.8 **GRAVITATION**

The inclination displayed by the BlueCLINO is 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  $\frac{1}{2}$ 

- 9,78033 m/s<sup>2</sup> at the equator ,
- 9,80620 m/s<sup>2</sup> at 45 degree of latitude,
- $9,83219 \text{ m/s}^2$  at the poles.

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

The BlueCLINO has 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

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

measured will be corrected accordingly before the value is displayed.

The correction is calculated according the following formula:

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

whereas

- g<sub>c</sub> gravity at the place of calibration
- α<sub>m</sub> displayed angle at place of measurement
- g<sub>m</sub> gravity at the location of measurement
- $\alpha_{eff}$  effective angle

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

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

Switch the correction of the gravitation ON or OFF using the keys  $\boxed{\text{ZERO/SELECT}} \bigoplus \bigoplus$  and confirm with the key  $\boxed{\text{ENTER}}$ .

Now you can enter the value of the local gravity. The value is adjusted with the keys  $\angle$  ZERO/SELECT  $\bigcirc$   $\bigcirc$ . With the key  $\angle$  ON/MODE  $\bigcirc$  the standard value 9.80700 m/s<sup>2</sup> will be recalled. Confirm your entry with the key  $\angle$  ENTER  $\bigcirc$ .

The measuring instrument will return to the measuring mode.

#### 4.9 VERSION FIRMWARE

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

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

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
- Serial number of the integrated sensor
- Measuring range
- Quick Calibration (ON/OFF)

After 10 seconds or with the key **ENTER** this display will be left.

The measuring instrument will return to the measuring mode.

Device SN Firmware Date	005526 258 22/08/2011
Type Bluetooth	Wireless 3.7.0
Sensor SN Range	L6905 60°
Q.Calib	ON



**4.10 RESET QUICK CALIBRATION (ONLY POSSIBLE WITH QUICK CALIBRATION OPTION)** The data of the quick calibration will be deleted and replaced by the factory default values.

Using the key <u>ON/MODE</u> select the menu point [Options] and confirm your selection with <u>ENTER</u>. Select now [Reset Quick Calibration] and confirm with <u>ENTER</u>.

In order to prevent a resetting by error, the question "Are you sure?" will appear. If you really want to delete the data of the quick calibration, press now the key <u>ENTER</u>. After 10 seconds or with the key <u>SEND/ESC</u> the instrument will return to the measuring mode.



The instrument will return to the measuring mode.

#### 4.11 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 BlueCLINO will be set to the following standard configuration:

Standard-Values:	
measuring mode:	absolute
measuring unit:	DEC xx°xx'xx"
relative base:	1000 mm
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/s2

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

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 <u>ENTER</u>.

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.



## 4.12 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 <u>ON/MODE</u> select the menu point [Options] and confirm your selection with <u>ENTER</u>. Select now [Self Test] and confirm with <u>ENTER</u>.

In the display a simplified design of the front foil of the BlueCLINO will be shown. If any key or the IR zapper is pressed, the real LEDs as well as those on the display will lit. In addition the key pressed will be marked. Each key will create an individual pattern. Thereby the real LEDs and those on the display must be identical. If this is not the case, either a key or an LED is defective.

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

The measuring instrument will return to the measuring mode.



APPENDICES

# A FLOAT CHARTS GENERAL

## A1 START THE INSTRUMENT / ON/OFF

POWER UP / Gerät einschalten



## A2 KEY REL.ZERO





# A3 KEY HOLD, FREEZING OF A MEASURING VALUE / HOLD





## A5 ADJUSTMENT OF THE DISPLAY / DISPLAY



#### A6 MEASUREMENT ABSOLUTE / MODE ABSOLUTE









## A10 SETTING OF LIMITS / LIMITS



#### A11 ADJUSTMENT OF FILTER TYPES / FILTER





#### A13 LEAVING A GROUP OF INSTRUMETNS / LEAVE



## A14 QUICK CALIBRATION / QUICK CALIBRATION WITH PINS (IF AVAILABLE)



## **B** FLOAT CHARTS OPTIONS

# B1 PIN-CODE-QUERY FOR ACCESS TO THE OPTIONS







**OPTIONS / Logarithmic Scale ON/OFF** 



#### B5 PROGRAMMING OF THE KEYS "REL ZERO" AND "ZERO/SELECT" / PROGRAMMABLE KEYS





B7 SWITCHING THE HIDING OF DISABLED FUNCTIONS ON OR OFF / HIDE DISABLED FUNCTIONS ON/OFF











## B11 LOAD THE FACTORY SET VALUES OF THE QUICK CALIBRATION / RESET QUICK CALIBRATION





## **OPTIONS / Factory Reset**



- C EXAMPLE USING THE HYPER TERMINAL OF WINDOWS OR WINDOWS TERMINAL PROGRAM (EXAMPLE IS WIN XP)
- 1. Open the Terminal-Program in Windows / Accessories. and insert a name

Confirm with <OK>

 Neue Verbindung

 Geben Sie den Namen für die neue Verbindung ein, und weisen

 Sie ihr ein Symbol zu:

 Name:

 BlueClind

 Symbol:

 Image:

 Image:

 OK

Beschreibung der Verbindung

? ×

2. Enter the serial port definition connected to the BlueCLINO.

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-Windows appear.

Repeatedly pressing the key <u>SEND/ESC</u> the actual value will be transmitted in [Rad]

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

Anschlusseinstellungen		
Bjts pro Sekunde:	9600	~
<u>D</u> atenbits:	7	*
<u>P</u> arität:	Keine	~
Stoppbits:	2	~
<u>F</u> lusssteuerung:	Kein	~
		iederherstellen
	K Abbrech	an Obernehme

# Example: BlueCLINO with address 50 is connected:

Г

Meaning of the display: 52	Continuous number (3 measurements per second will be performed continuously)	BlueClino - HyperTerminal         Datei       Bearbeiten       Ansicht       Anrufen       Übertragung       2         D       D       D       D       D       D       D         D       D       D       D       D       D       D         52       N2673L       -0.006826       006826       006826	
N2673	Serial Number of the instrument	Verbunden 00:50:15         Auto-Erkenn.         9600 8-N-2	RF GROSS N
L	Type of instrument: BlueCLINO		
-0.006826	- 0.006826 Rad bzw 6826 µRad		

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# D Error Messages

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

Display is blinking gre	y mottled.	Programme memory is defective
Display blinks two time	es grey mottled	Display error
ERROR 1 ERROR 2 ERROR 3 ERROR 4 ERROR 5 ERROR 6	General instrument de No calibration data av Sensor not found Bluetooth not found Defective Flash memo Defective EEPROM	ifect ailable pry

## E MAINTENANCE

#### E.1 GENERAL

The BlueCLINO needs no special service other than the regular cleaning.

#### E.2 STORAGE/ CARE AND HANDLING OF THE BATTERIES





For storage periods the measuring instrument should be placed in a position in which the instrument is also used when measuring (upright position).

Read the instructions in your manual before installing batteries. Make sure to insert the batteries properly, following the symbols showing you the correct way to position the positive (+) and negative (-) ends of the batteries. Keep battery contact surfaces clean by gently rubbing with a clean pencil eraser or cloth. Replace batteries with the size and type specified by the device's manufacturer. Remove all used batteries from the device at the same time, then replace them with new batteries of the same size and type. Store batteries in a cool, dry place at normal room temperature. Remove batteries from devices that will be stored for extended periods. Don't dispose of batteries in a fire - they may rupture or leak. Don't recharge a battery unless it is specifically marked "rechargeable." Attempting to recharge a normal battery could result in rupture or leakage

Operating temperature (min/max):0°C ... +40°Crelative humidity:max. 85%

#### E.3 SPARE PARTS / ACCESSORIES

- The following spare parts are available:
  - Batteries, NC-accumulators
  - various cables
  - Infra-red Zapper

# F 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/

## G TECHNICAL DATA

#### G.1 BLUECLINO

Measuring range/ Messbereich		± 60 Arcdeg
Settling time / Messzeit	Value available after / Anzeige nach	< 5 sec.
Resolution Auflösung	Depending on units set Abhängig von ausgewählter	5 Arcsec (≈ 0.025 mm/m)
C C	Masseinheit	
Limits of error within 6 months (TA = 20°C)* / Fehlergrenze innerhalb von 6 Monaten (TA = 20°C)*		< 12 Arcsec + 0.027%R.O.
Limits of error at -45°, 0°, +45° right after quick calibration, using the calibration aids/ Fehlergrenze bei -45°, 0°, +45° unmittelbar nach Kurzkalibrierung mit den Kalibrierhilfen		Error limits as above, < 30 Arcsec in the Range of ± 45°
Data connection / Anschluss		RS 232 / RS 485, asynchr., 7 DataBits, 2 Stopbits, no parity, 9600 bps
Power supply with batteries (Lifetime) Stromversorgung mit Batterien (Betriebsdauer)		2 x size C, max. overall batteries- voltage = 3.2V Types Primary, NiMH, NiCd, NiZn (ca. 25 hrs)
External power supply / Externe Speisung		+12 +48 V DC / 200 - 500 mW
Dimension Housing + Net weight / Abmessungen Gehäuse + Netto-Gewicht	Cast iron, rust protected / Grauguss, rostgeschützt Aluminium, black anodized / Aluminium, schwarz harteloxiert	150 x 150 x 40 mm / 3.450 kg 150 x 150 x 40 mm / 1.5 kg
Temp. range / TempBereich	Operating / Betriebstemperatur	0° to 40 °C.
	Storage / Lagertemperatur	-20° to 70 °C.
CE conformity / CE Konformität	Emission / Emmissionen Immunity / Störfestigkeit	Fulfils, details see under section "F" Erfüllt, Details s. unter Abschnitt "F"

\* Remarks / Bemerkungen

F.S. = Full Scale (errors related to F.S. are mainly due to drift of zero).

R.O. = Read Out (error related to R.O. are mainly due to change of gain).

**Remark:** As a standard the instrument is delivered with batteries of Type C. When using external power supply, batteries can be left in the instrument. Rechargeable batteries have to be recharged outside of the instrument

#### G.2 **BLUECLINO HIGH PRECISION**

Measuring range/		± 1 Arcdeg
Messbereich		
Settling time / Messzeit	Value available after / Anzeige nach	< 5 sec.
Resolution	Depending on units set	1 Arcsec (≈ 0.005 mm/m)
Auflösung	Abhängig von ausgewählter Masseinheit	
Limits of error according to DIN 2276 Fehlergrenze gemäss DIN 2276		Up to / bis 0.5°: 1%R.O. >0.5°: 0.1 x (2 x R.O. – 0.5°) at least / mind. 1 Arcsec, resp. 0.005 mm/m
Data connection / Anschluss		RS 232 / RS 485, asynchr., 7 DataBits, 2 Stopbits, no parity, 9600 bps
Power supply with batteries (Lifetime) Stromversorgung mit Batterien (Betriebsdauer)		2 x size C, max. overall batteries- voltage = 3.2V Types Primary, NiMH, NiCd, NiZn (ca. 25 hrs)
External power supply / Externe Speisung		+12 +48 V DC / 200 - 500 mW
Dimension Housing + Net weight / Abmessungen Gehäuse + Netto-Gewicht	Cast iron, rust protected / Grauguss, rostgeschützt	150 x 150 x 40 mm / 3.450 kg
Temp. range / TempBereich	Operating / Betriebstemperatur Storage /	0° to 40 °C. -20° to 70 °C.
CE conformity / CE Konformität	Emission / Emmissionen Immunity / Störfestigkeit	Fulfils, details see under section "F" Erfüllt, Details s. unter Abschnitt "F"

\* Remarks / Bemerkungen

F.S. = Full Scale (errors related to F.S. are mainly due to drift of zero). R.O. = Read Out (error related to R.O. are mainly due to change of gain).

Standardmässig werden die Geräte mit Batterien des Typ C ausgeliefert. Bei Fremdspeisung können die Batterien im Gerät belassen werden. Anmerkung: Rechargeable Batterien (Akkus) müssen ausserhalb des Gerätes geladen werden.
# H PIN-DEFINITION FOR BLUECLINO



# RS485

PIN	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

PIN	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

# I SERVICE AND REPAIR

## I.1 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.
  - o reduced total repair time
  - o 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.

## I.2 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 recalibration 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.





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