

OPERATOR'S MANUAL

LEVELTRONIC NT and MINILEVEL NT with Radio transmission and LEVELMETER 2000



Content

Subject	Page
1. BASICS	3
1.1. Instrument's overview	3
1.2. Measuring instruments / External display instruments	4
1.3. Measuring procedure / general use	6
1.4. Zero setting by reversal measurement (Absolute ZERO)	11
1.5. Applications	11
1.6. WYLER software LEVEL SOFT	16
2. DETAILED INFORMATION to the various instruments	18
2.1. MINILEVEL / LEVELTRONIC „classic“	18
2.2. MINILEVEL / LEVELTRONIC „NT“	32
3. TECHNICAL DATA	45
3.1. LEVELTRONIC NT	45
3.2. MINILEVEL NT	45
3.3. RADIO MODULE	46
4. UPGRADE OF MINILEVEL NT AND LEVELTRONIC NT TO RADIO TRANSMISSION UNITS	47
5. MAINTENANCE / easy to cure malfunctions	49
6. ACCESSORIES / SPARE PARTS	51
7. STORING	51
8. DECLARATION OF CONFORMITY	52

Änderungen / Modifications:

Datum / Date	Geändert durch Modified by	Beschreibung der Änderung Description of modifications
--------------	-------------------------------	---

The **following manuals** are ready for download on the internet homepage <http://www.wylerag.com>:

- DYNAM, the software for measuring and monitoring for use with ZEROTRONIC-sensors
- LEVELSOFT WIN99, the software for inclination and flatness measurement with WYLER inclination measuring instruments
- LEVELMETER 2000
- LEVELMETER „light“
- +CLINO PLUS+, the handy inclination measuring instrument
- CLINO 2000, the instrument with a number of features
- MINILEVEL / LEVELTRONIC „classic“ and „NT“
- Remote Display, the simple display unit
- COMPENDIUM, the informative brochure for our agents with an overview on our products, technologies and applications
- Interface description RS485

These manuals can also be received against a nominal fee on a CD **„ALL-IN-ONE“** if ordered at WYLER AG. On this CD the manuals are available in different languages

1. BASICS

The family of electronic inclination measuring instruments is very well suited for all kind of precision measurement.

Two configurations are possible

- I. **Communication from the measuring instrument to the external display unit via cable**
Using this conventional configuration the data transmission between the measuring instruments (MINILEVEL NT und LEVELTRONIC NT) are connected to the external display unit (LEVELMETER 2000 or Levelmeter C25 (analogue model)) with cables
- II. **Communication from the measuring instrument to the external display unit via radio module**
Using the configuration „wireless transmission“ the data will be transmitted via radio transmission to the external display unit (possible with LEVELMETER 2000 only)

IMPORTANT: The MINILEVEL NT still can be used as stand alone instruments as well

Depending on the country in which the units are used the respective available free to use frequencies are 433MHz or 902 MHz.

(Technical data see **Point 3**)

1.1 INSTRUMENT'S OVERVIEW



MINILEVEL NT with integrated display and radio transmission unit installed



2 LEVELTRONIC NT with LEVELMETER 2000 and cable connection



2 MINILEVEL NT with LEVELMETER 2000 and radio transmission module as an engineer set

1.2 MEASURING INSTRUMENTS / EXTERNAL DISPLAY UNITS

Differences between MINILEVEL / LEVELTRONIC concerning display.

The **MINILEVEL** is equipped with an **integrated display** and can be used as a stand-alone instrument. It is however possible to connect it to a Levelmeter (E.g. LEVELMETER 2000) to receive remote display or to use it together with another instrument for differential measurement.

Picture right:
MINILEVEL NT with integrated radio transmission module



MINILEVEL NT with integrated radio transmission module

The **LEVELTRONIC** instruments are not equipped with an internal display and require therefore the connection to an **external display unit**.

Picture rights:
LEVELTRONIC with integrated radio transmission module



LEVELTRONIC NT with integrated radio transmission module



2 LEVELTRONIC NT with
LEVELMETER 2000
(Cable connection)



2 LEVELTRONIC NT with
LEVELMETER 2000 and radio transmission box

Differences between LEVELMETER 25, C25 and LEVELMETER 2000



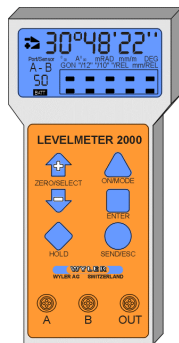
LEVELMETER C25/DC

Measured values in analogue form possible via cables only

The **LEVELMETER C25** is very simple in using

Possible connections are:

- LEVELTRONIC NT
- MINILEVEL NT
- MINILEVEL „classic“



LEVELMETER 2000

Digital data transmission possible via cables or via wireless transmission

The **LEVELMETER 2000** has a number of built-in sophisticated options, which can be used by the skilled user.

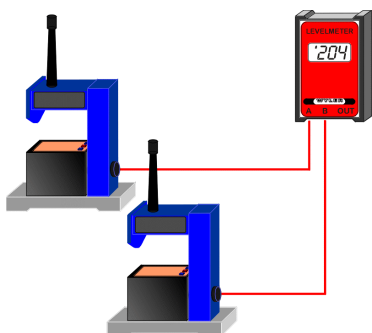
The **Version „RADIO TRANSMISSION“** is only possible with the LEVELMETER 2000

The LEVELMETER C25 and LEVELMETER 2000 are especially well suited for use with the above-mentioned instruments, especially when differential measurement is applied in precision measurements. (Engineer set)

All the mentioned instruments are optimally used together with the **flatness measurement software of WYLER AG (LEVELSOFT WIN99)**

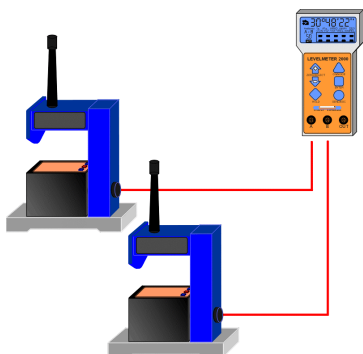
1.3 MEASURING PROCEDURE / GENERAL USE

1.3.1. TYPICAL CONFIGURATION WITH AND WITHOUT RADIO TRANSMISSION



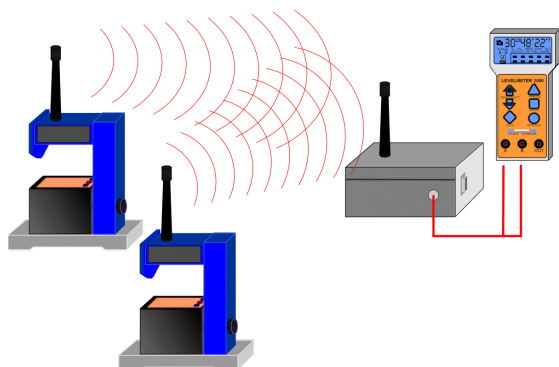
Analogue data transmission

Two LEVELTRONIC NT or MINILEVEL NT are connected to a LEVELMETER C25



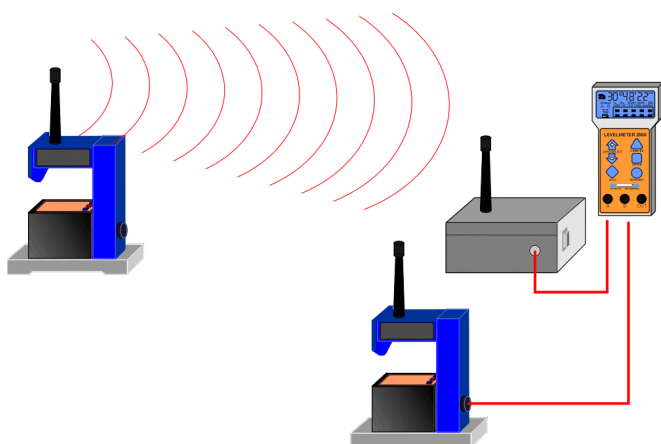
Digital data transmission via cables

Two LEVELTRONIC NT or MINILEVEL NT connected with a LEVELMETER 2000



Digital data transfer via radio transmission

Two LEVELTRONIC NT or MINILEVEL NT wireless connected via a transmission box to a LEVELMETER 2000



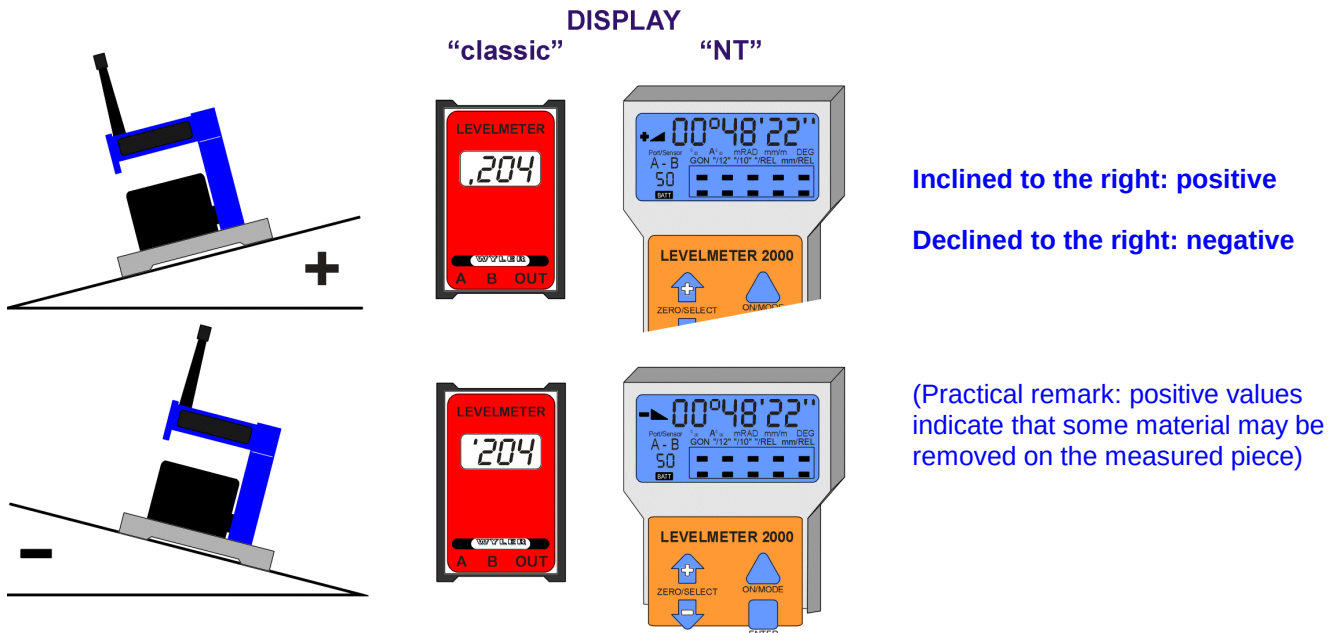
Digital data transfer via radio transmission as well as with cable

Generally it is also possible to connect one of the instruments via cable to the LEVELMETER 2000 and receive the data of the second, further away instrument, via radio transmission to the LEVELMETER 2000.

Additional information to the configuration can be seen under Point 2 „Detailed information to the various instruments“

1.3.2. BASIC SET-UP OF THE INCLINATION MEASURING INSTRUMENTS / PLUS - MINUS RULE

The instrument should always be placed in a way that the cable output is on the **right hand side**.

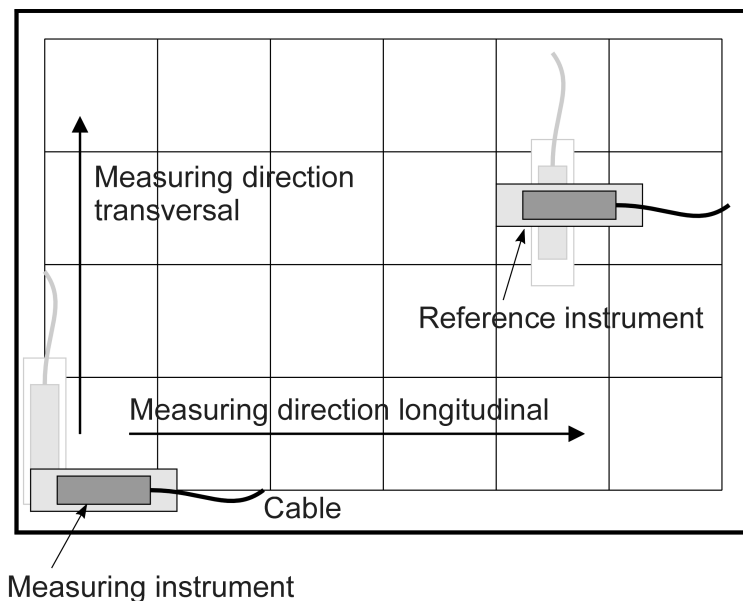


Before starting the measurement enough acclimatization time must be allowed for the instruments.

Place the instrument (LEVELTRONIC or MINILEVEL) carefully to the required measuring spot. (Surface) and read the value on the LEVELMETER or on the integrated display.

It is important to measure always in the direction of the cable connector, respectively the cable.

Example: Flatness measurement of a measuring and setting plate of granite



IMPORTANT:

- Touch the instruments only at the handle (Temperature!!!)
- Measuring from left to right and from close to far.
- Cable respectively cable connector in measuring direction

1.3.3 ABSOLUTE MEASUREMENT / RELATIVE MEASUREMENT / DIFFERENTIAL MEASUREMENT

Absolute measurement

(Absolute ZERO)

Condition for the absolute measurement is the performing of a reversal measurement for determining the absolute zero (to the center of the earth)

After this procedure the instrument will display the effective deviation from the center of gravity. This means the value is an absolute angle of the measured surface.

Example: if the object to be measured is absolutely level, the display is "0"

Relative measurement

(Relative ZERO)

A number of measurements do not require the absolute ZERO as described above.

Example: Angular deviation between two objects. (Lines, surfaces, guide ways)
The measurement instrument is placed on an object and the displayed value is changed to "0". Then the instrument is relocated to a second object and the displayed value of the angle is the angular difference between the two surfaces. If the display is also "0", then both surfaces are parallel.

Most important is that always the instrument is placed on both positions in the same direction.

Differential measurement

A differential measurement is a measurement with two instruments **Measuring instrument** (A) and **Reference instrument** (B), measuring the angular difference between the two. This means e.g. if the angular change in both instruments is the same the displayed value (Difference A - B) does not change. In principle this is a special relative measurement.

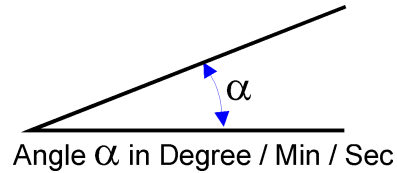
In the following measuring tasks the differential measurement is especially used

- Measurement on object with vibrations imposed.
- Measurements on unstable systems or objects

Example: Measuring the flatness of a machine bed. The reference instrument is placed on a stable part of the machine where the measurement is not interfered. With the measuring instrument the measurement is taking place without removing the reference instrument.

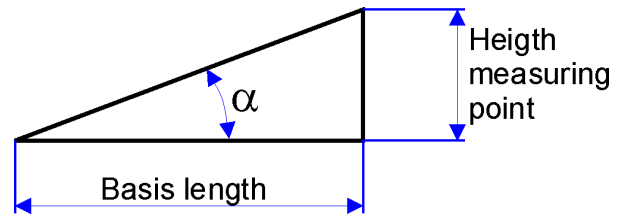
1.3.4 GENERAL REMARKS ABOUT "ANGLES"

Every angle may be defined in different ways. The most popular way is a definition in Degrees / Minutes / Seconds. This is shown in the graph.



Such a definition is especially useful for larger angles.

With an angular measuring instrument not only an angle may be measured but also the height of a certain point over a defined base length can be calculated. (for a profile of a line or a surface) Due to this simple and reliable method a number of tasks are possible, especially for measuring guide ways and surface plates definition.

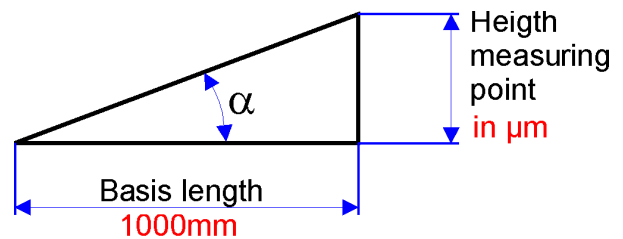


Angle α = Height of the measuring point related to a defined base.

Height of the measuring point = $\tan \alpha \times \text{length of base}$

Example:

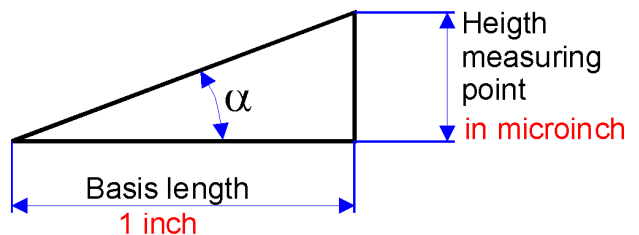
Angle = Height related to a defined base.
e.g.. **22 $\mu\text{m}/\text{m}$**



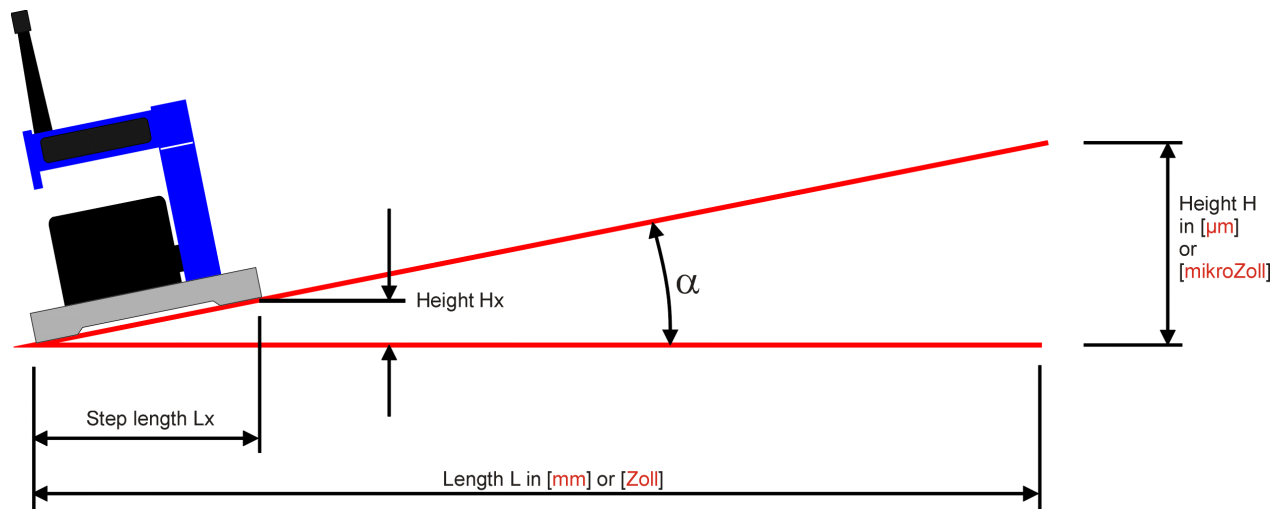
Example:

Because the relation $\mu\text{m}/\text{m}$ is 1/1'000'000 the same relation can also be applied to micro inch/inch

Angle = Height related to a defined base.
e.g. **22 $\mu\text{m}/\text{m}$ are equal to 22 micro inch/inch or 0,00022 Inch / Inch**



1.3.5 HEIGHT RELATED TO THE STEP LENGTH



Height Hx in **[μm]** related to step length

$$\text{Height Hx } [\mu\text{m}] = \frac{\text{Height H}[\mu\text{m}] \times \text{Steplength Lx}[\text{mm}]}{\text{Length L}[\text{mm}]}$$

Height Hx in **[micro Inch]** related to step length

1 micro Inch = 0,000001 Inch

$$\text{Height Hx } [\text{micro Inch}] = \frac{\text{Height H}[\text{mikroINCH}] \times \text{Steplength Lx}[\text{Inch}]}{\text{Length L}[\text{Inch}]}$$

Height Hx in **[μm]** related to step length

$$\text{Height Hx } [\mu\text{m}] = \tan \frac{\alpha[\text{arc sec}]}{3600} \times \text{Length Lx}[\text{mm}]$$

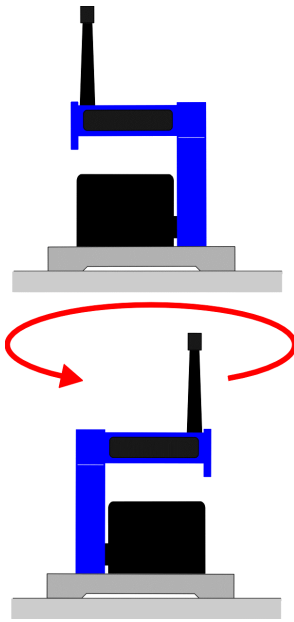
Height Hx in **[micro Inch]** related to step length

1 micro Inch = 0,000001 Inch

$$\text{Height Hx } [\text{micro Inch}] = \tan \frac{\alpha[\text{arc sec}]}{3600} \times \text{Length Lx}[\text{Inch}] \times 1000'000$$

1.4 ZERO SETTING BY REVERSAL MEASUREMENT (ABSOLUTE ZERO)

Using the reversal measurement is a simple way to determine the exact zero offset of the instrument as well as the exact inclination of the surface the instrument is placed.



Reversal measurement for determination of:

- I. Zero point deviation of the instrument
- II. Inclination of the measured surface

Zero point deviation of the instrument N_m :

$$N_m = \frac{A + B}{2}$$

Inclination of the measured surface N_p :

$$N_p = \frac{A - B}{2}$$

Procedure:

Prior to adjusting the zero point, the instrument should be allowed time to acquire the ambient, respectively the work-piece temperature. Also the measuring system should have been switched on for about 1 min. (for sensitivity of 1 mm/m about 3 minutes).

- Slide the instrument onto a flat, horizontally levelled surface (e.g. engineer's surface plate).
- The position of the MINILEVEL NT is to be marked on the surface.
- Set the display on the instrument or on the LEVELMETER to zero.
- The instrument must be turned 180 degrees and slid exactly onto the previously marked position.
- Read the value and divide by two
- Set the display on the instrument or on the LEVELMETER to the so calculated value
- Now reverse the instrument once more. The display should now show the same value as before but with reversed indication.

1.5 APPLICATIONS

The following examples are displayed by using LEVELTRONIC NT and LEVELMETER. Naturally the same measurements are possible by using MINILEVEL

1.5.1 MEASURING ABSOLUTE

Zero point is to be set by reversal measurement. Now the LEVELTRONIC/LEVELMETER will read deviations from absolute horizontal position.

Using MINILEVEL NT and LEVELTRONIC NT with a LEVELMETER 2000 the value of the display is shown in Arcsec or in $\mu\text{m}/\text{m}$.

Using one of the analogue instruments MINILEVEL „classic“ / „NT“ and LEVELTRONIC „classic“ / „NT“ with connected LEVELMETER (25 or C25/DC) then the values displayed are "digits".

The digits must be multiplied by the value stated on the handle of the LEVELTRONIC and below the LCD on the LEVELMETER to calculate the correct inclination.

The MINILEVEL „classic“ has two measuring ranges.

Range II is the fine range. The displayed digits must be calculated by multiplying with the correct sensitivity.

Range I is the coarse range. The displayed digits must be calculated by multiplying with the correct sensitivity and the factor 10.

1.5.2 MEASURING RELATIVE

It is not always required to set the instrument to zero by reversal measurement (absolute ZERO). If e.g. the straightness of a line is measured only the relative most of the time the relative straightness is only required.

The same applies when lines, parallels, flatness is measured with the WYLER LEVEL SOFT. These are relative measurements.

1.5.3 DIFFERENTIAL RESPECTIVELY REFERENCE MEASUREMENT USING AN ENGINEER SET

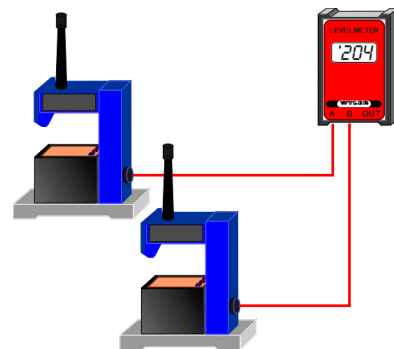
Such a measurement is useful or necessary if some of the following cases:

- Measurement on object with vibrations imposed.
- The inclination of the object to be measured will change by the weight of the instrument
- The floor is unstable (heavy loads in the close surroundings)
- The relative pitch and roll on a machine must be measured.

The **Engineer set** usually consists of:

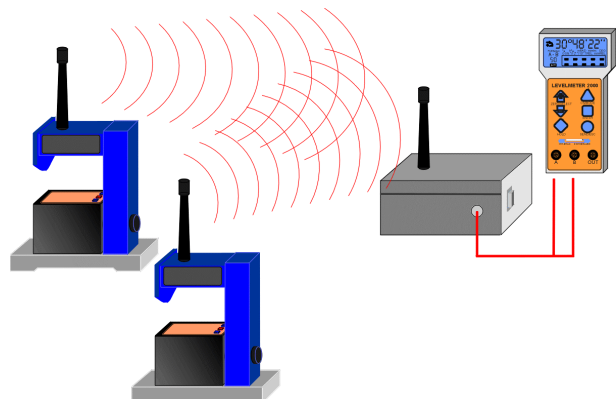
Two LEVELTRONIC NT or MINILEVEL NT with a LEVELMETER C25

Picture:
Two LEVELTRONIC NT with a
LEVELMETER C25 (red cover)



Two LEVELTRONIC NT or MINILEVEL NT with a LEVELMETER 2000

Picture:
Two LEVELTRONIC NT with a
LEVELMETER 2000 and a radio module



Remarks concerning NT instruments:

It makes sense to combine a LEVELTRONIC NT and a MINILEVEL NT to an engineer set. With such a combination a great variety of other measuring tasks requiring a stand-alone instrument may be fulfilled.

Connecting the instruments performing a differential measurement

- One of the instruments is used as a measuring instrument and the other as reference instrument.
- The measuring instrument is connected to port "A" the reference instrument to port "B".
- When analogue values are transmitted (LEVELMETER 25 or C25/DC) the sensitivity of the two instruments must be identical.
- Both instruments must be placed looking the same direction.

Examples for differential / reference measurement:

R = Reference instrument, connected to port „-B“

M = Measuring instrument, connected to port „A“

Fig.7

Rectangularity resp. parallelism of machine spindle in resp. to work table.

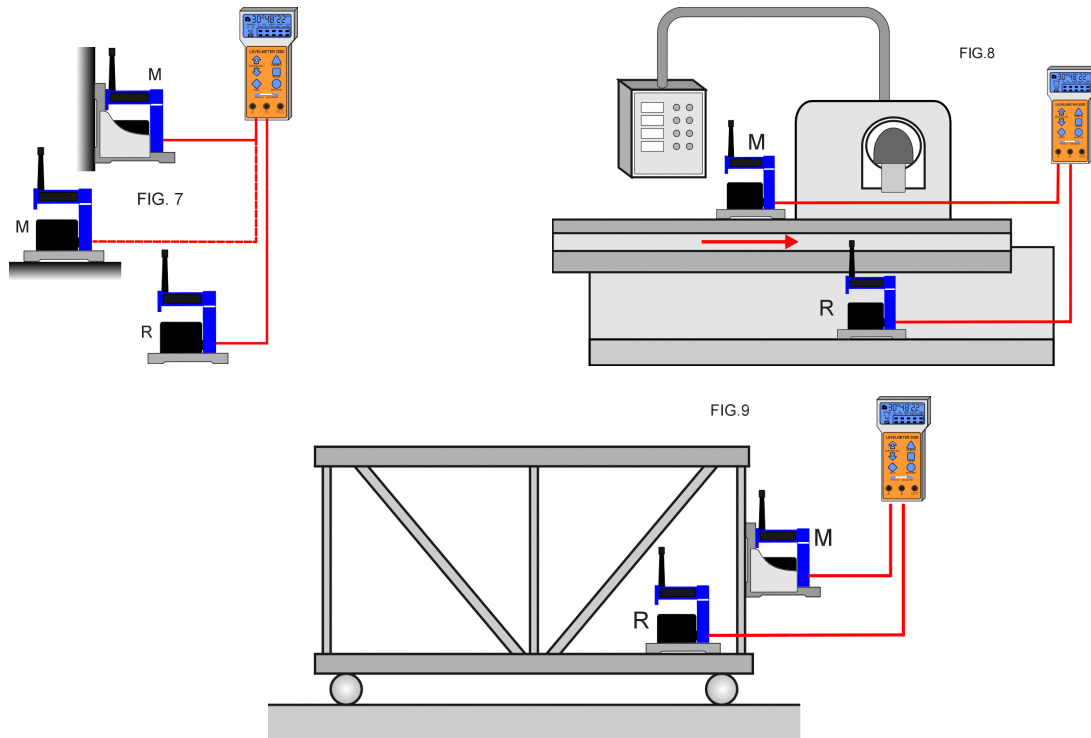
For precise square measurements an angular model fitted with magnets in the vertical face should be used.
(Elimination of deformation due to manual pressure).

Fig. 8

Straightness of table motion in relation to the machine's base. The table must be moved step by step and the measured value at each step should be noted/recorded after stabilization only.

Fig. 9

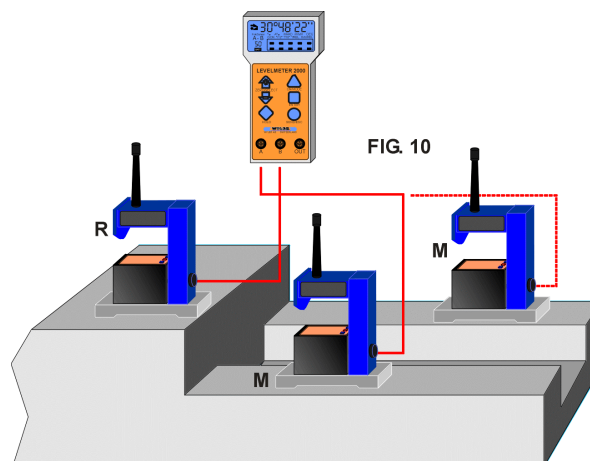
Inspection of perpendicularity and parallelism on large structures. Suitable instrument for outdoor applications.



Parallelism, Fig. 10

To conduct high precision measurements of parallelism (e.g. guide way rails two or more)

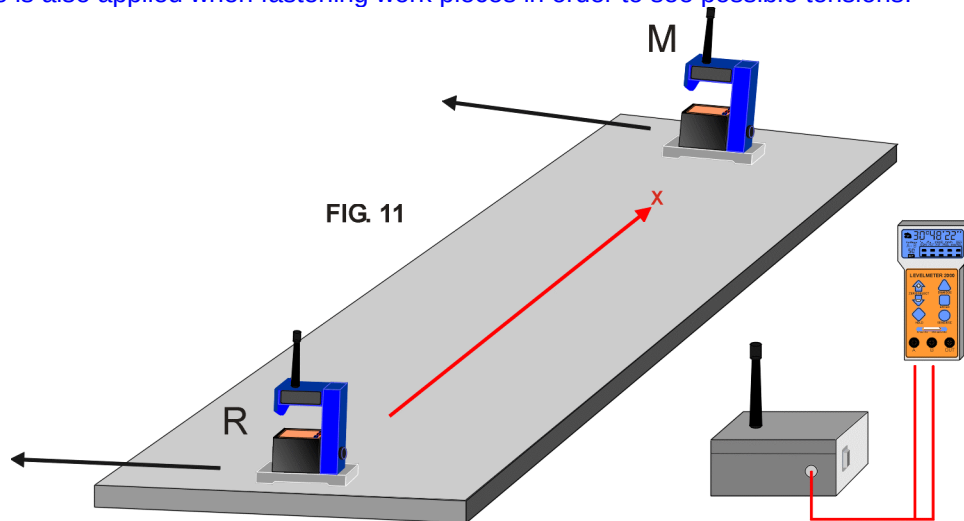
The reference LEVELTRONIC (R) will compensate for all changes in the objects orientation while measurements are made. Using this method the instrument (sensitivities up to 1 $\mu\text{m/m}$) allows determination of the exact shape of the guide ways.



Torsion, Fig. 11

Torsion in guide ways and work piece surfaces. The instrument (M) is moved step by step in direction of X, noting the reading at each step after allowing sufficient time for the instrument to settle. (Attention: Measuring axis have to be parallel!!)

This procedure is also applied when fastening work pieces in order to see possible tensions.



1.5.4 ANGULAR MEASUREMENTS

a) Small angles

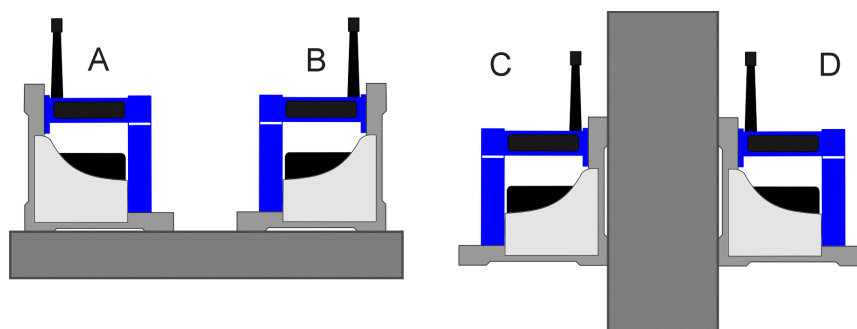
The measuring instruments MINILEVEL and LEVELTRONIC are especially well suited for measuring small angles. It is however to be considered that the larger the angle is getting the larger the linearity error of the instrument is. It is therefore important to level the object to be measured (e.g. surface plate) as good as possible in both axis.

b) 90°-angle (squareness)

For measuring 90° angles (square angles) instruments with an angular base can best be used. Before starting a precision measurement the angular error of the instrument must be determined by reversal measurement on a suitable object.

After the reversal measurement precision measurement with **measuring uncertainty of 3 to 5 µm/m** is possible.

The determination of the instrument's angular error is done as follows:



CALCULATION OF THE INDEX OF CORRECTION, RESPECTIVELY
THE ANGULAR ERROR OF THE INSTRUMENT

$$\text{Index of correction} = \frac{C + D}{2} - \frac{A + B}{2}$$

In the **WYLER LEVELSOFT 99** a new set-up allows the easy measurement of squareness of rectangular objects.

Principal procedure of a 90° measurement with WYLER LEVEL SOFT

The angular error of the instrument must be determined (optional)

The measurement follows the required set-up (Step length, number of measurements etc.)

After the measurement the respective lines may be adjusted according to different methods. For the following three methods the angular errors are computed and displayed:

- Method Endpoints
- Method ISO1101
- Method Linear regression (least square)

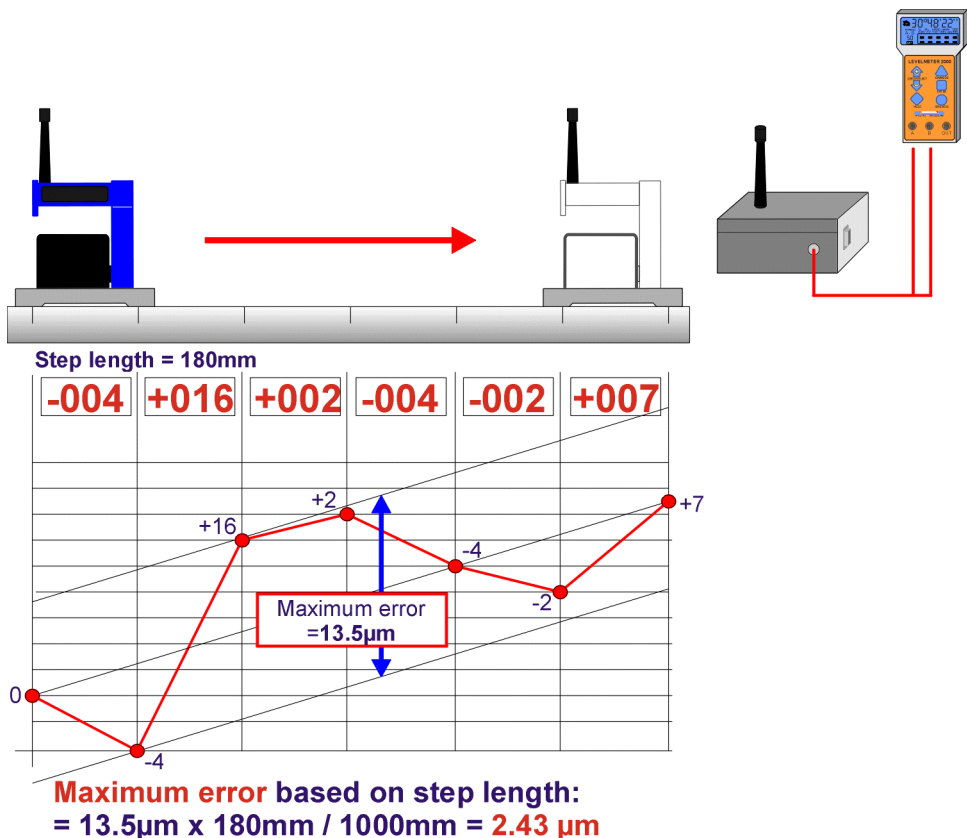
Ask your local WYLER representative for further information of the software LEVEL SOFT

1.5.5 LINES AND FLATNESS MEASUREMENT (MANUAL PROCEDURE)

A principal procedure of a measurement of a line with WYLER instruments is described below:

Example:

- Sensitivity of the instrument 1 µm/m
- Length of measuring base 200 mm/ step length 180 mm
- The line to be measured must be divided in equal sizes according to the base available (calculated step length) Overlapping of the steps is important, otherwise measuring errors are inevitable.
- Place the instrument at the begin of the line measurement
- Slide the instrument step by step along the line to be measured. Note all the measuring results after allowing enough settling time. Then the line can be drawn as shown below considering the base length and the sensitivity of the instrument.



This shows the measurement of a line using LEVELTRONIC „NT“ and a LEVELMETER 2000

The data transfer is done via radio module

Measurements on granite surface plates are done with instruments equipped with hardened steel bases with dust grooves. The sharp edges prohibit dust particles to get between the plate and the base when sliding the instrument.

The manual measuring and the computing effort is quite big if possible at all and the source of errors large. Such a task is best done with the **WYLER LEVEL SOFT 99**.

1.6 WYLER SOFTWARE LEVELSOFT

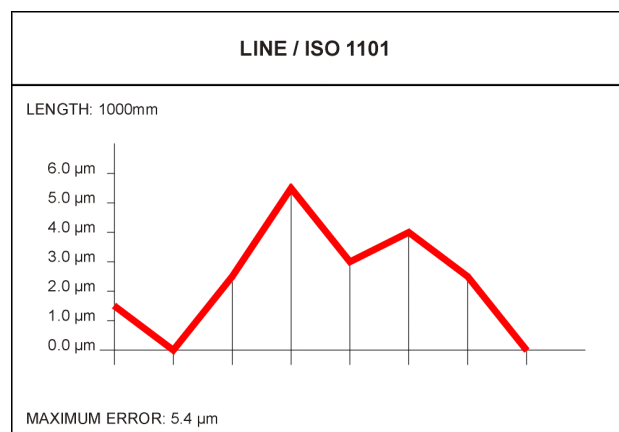
The WYLER software LEVELSOFT well proven package based on the ISO 1101 for measuring lines and surface flatness constantly upgraded to the demands of the user.

The following measurements can be done with the WYLER LEVELSOFT in combination with the correct measuring instruments:

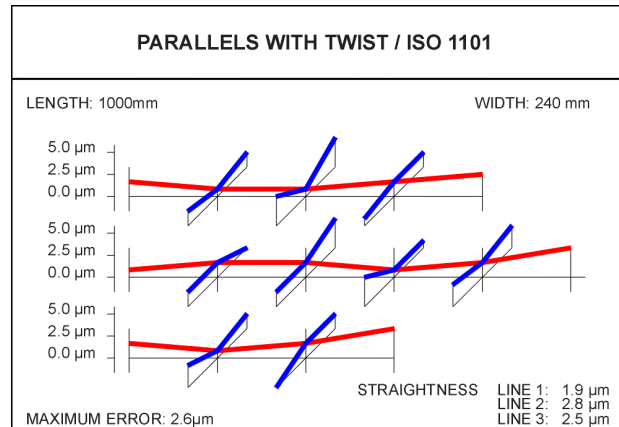
- Lines (Straightness)
- Lines with twist (torsion)
- Parallelism
- Rectangularity
- Surface flatness
- Measurement on machine tools
-



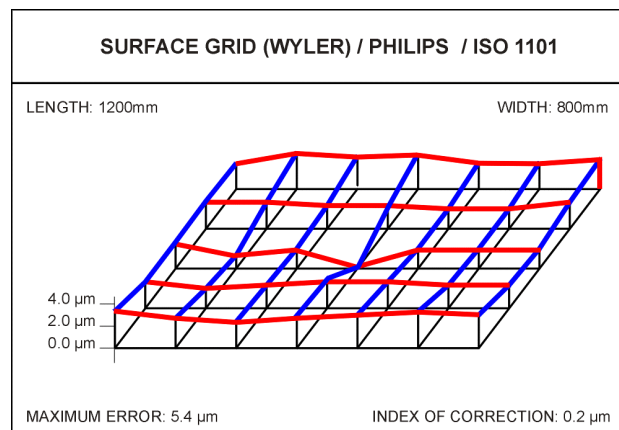
**Measurement of line according to ISO1101
with and without twist (torsion)**



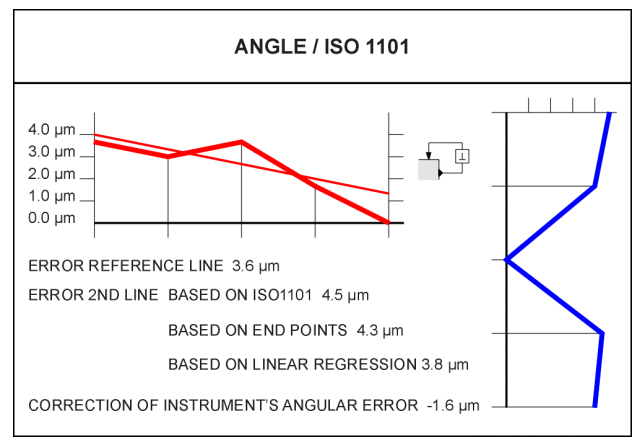
**Measurement of parallel lines according
to ISO1101 with and without twist (torsion)**



**Surface flatness according to ISO 1101
as well as "U-Jack" method**



Rectangularity according to ISO1101



In order to connect the measuring instruments with a PC or Laptop an adapter is required

- LEVELADAPTER SET 2000 (for all type of instruments) or
- the special connecting set (LEVELSOFT no. 24A) to be used with instruments of the NT family together with a LEVELMETER 2000

2. DETAILED INFORMATION TO THE VARIOUS INSTRUMENTS

2.1 MINILEVEL NT WITH RADIO MODULE

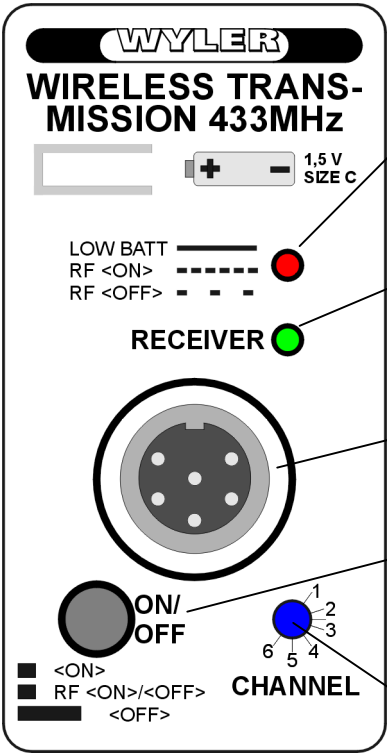
MINILEVEL NT has an integrated display and can be used as a stand alone instrument Two measuring ranges can be set.

Two of the instruments can also be used for differential measurements in combination with

- LEVELMETER C25/DC (red cover) / Art. no. WYLER: 025-005 or
- LEVELMETER 2000 /Art. no. 065-004-001 (using cables or wireless transmission)



MINILEVEL NT



Display for 902MHz (USA)
see page 48

	Blinking rapidly	Blinking slowly	Continuously ON
LED red	Sender/Receiver ON Power for sensor ON	Power for sensor only ON	Not enough battery power
LED green	Data transmission (sending/receiving)		
Connector	Cable connection to LEVELMETER for conventional transmission of data		
ON / OFF	Measuring instrument and data transmission ON/OFF		
Channel switch	6 Channels are available: The same channel is required for the instruments connected together In case of transmission problems another channel may be chosen. The originally used channel may be occupied by another user.		

Switch ON the instrument

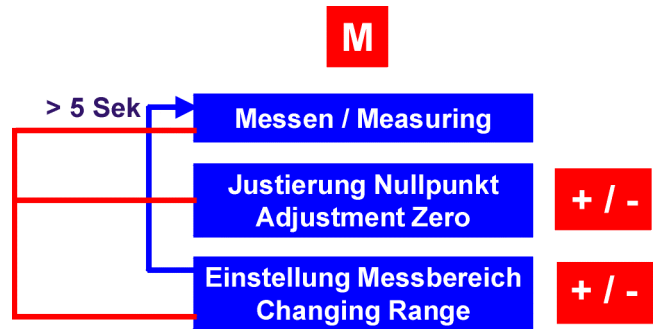
- press once only the button <ON/OFF> the instrument and the sender/receiver starts to work. The red LED is blinking rapidly
- with another short push to the button the sender/receiver may be stopped. Local measurement with the instrument only. The red LED is blinking slowly.
- with another short push to the button the sender/receiver is activated again

Switch OFF the instrument

- Press the button <ON>/<OFF> a few seconds until the red LED has stopped blinking.



MINILEVEL NT



Functions

The MINILEVEL NT has three pushbuttons.

M = Mode

With this button the different functions may be chosen one after the other (see picture). For starting the instrument this button "M" must be pressed.

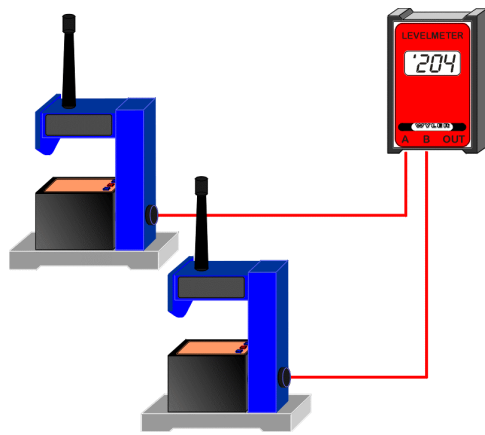
- Press „M“ 1 x: Zero setting / „ZERO“ is flashing
- Press „M“ 2 x: Change measuring range I or II (The actual range is visible and flashing)
 - Range I: Coarse range (Sensitivity x Factor 10)
 - Range II: Fine range

Changes must be made with the buttons + / -.

Remarks:

Pressing the buttons + or - when ZERO mode is chosen will change the display by one unit. For larger changes the button must remain pressed and the changes will gradually increase in speed.

2.1.1 MINILEVEL NT COMBINED WITH THE LEVELMETER C25 (ANALOGUE DATA TRANSMISSION)



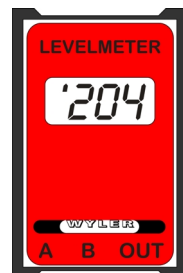
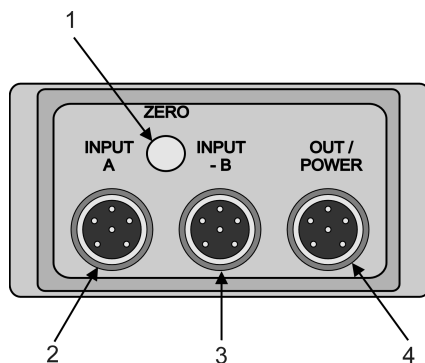
Analogue data transmission

One or two MINILEVEL NT connected with a LEVELMETER C25

This configuration does not allow the use of wireless transmission because the LEVELMETER C25 is an analogue display instrument

IMPORTANT: The measuring instruments must be switched ON via <ON/OFF> button the red LED must be blinking rapidly. With another short push to the button the sender/receiver may be stopped. Local measurement with the instrument only. The red LED is blinking slowly.

THE LEVELMETER C25



IMPORTANT: The display on the MINILEVEL NT is in $\mu\text{m}/\text{m}$ or Arcsec. The display on the LEVELMETER C25 is in digits only (sensitivity unit) in order to receive the correct measured value the value must be multiplied by the sensitivity set on the MINILEVEL (Range I or II)

Switch (Backside)
"On" / "Off"

Switch for LEVELMETER. The low battery indication (XX:XX colon) is appearing automatically during operation if battery power is insufficient.

Top view
LEVELMETER C25 / DC

Potentiometer:
"ZERO" (1)

Enables adjustment of the zero point. The regulating range is min. +/- 400 digits.

Socket A (2)

Input for measuring with **one** MINILEVEL „classic“

Socket -B (3)

Input for the reference level in differential mode. In order to prevent interference voltage to channel A, input B is switched off when no instrument is connected.

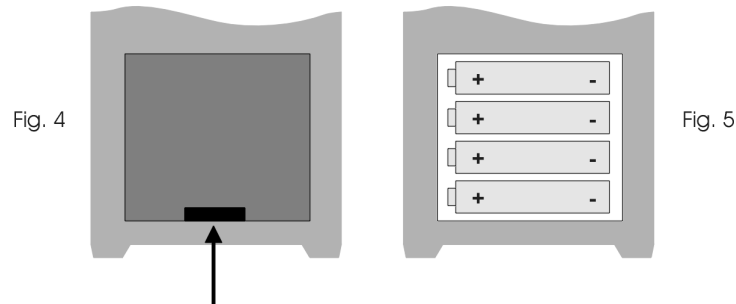
Socket:
"POWER/OUT (4)

Analogue output 1 mV per digit.
External power supply input.

Battery change / Battery check LEVELMETER C25

In case low battery indication (XX:XX colon) is appearing the batteries have to be exchanged.

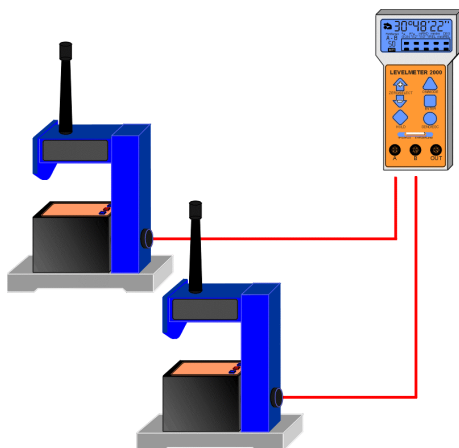
For exchanging batteries press the cam in arrow's direction as shown in Fig. 4 (use screwdriver) and remove the cover. Take out batteries by shaking the LEVELMETER C25 and check all contacts for corrosion. Install new leak proof batteries with a voltage of 1,5V in the battery case as shown on the diagram (see Fig. 5)



Function check of the system MINILEVEL NT" combined with LEVELMETER C25

- a) Shut off the MINILEVEL NT
- b) LEVELMETER 25 power ON without cables connected
Low battery indication (XX:XX colon) must not appear
- c) Connect MINILEVEL NT with LEVELMETER C25, Socket "A" MINILEVEL NT will start automatically
- D) MINILEVEL cable to the right
 - Cable side of the instrument UP Display: ,1
 - Cable side of the instrument DOWN Display: '1

2.1.2 MINILEVEL NT COMBINED WITH THE LEVELMETER 2000 (DIGITAL DATA TRANSMISSION WITH CABLES)

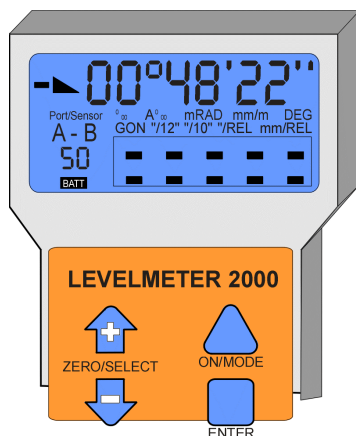


Digital data transmission

One or two MINILEVEL NT connected with a LEVELMETER 2000

LEVELMETER 2000

Important: The MINILEVEL NT must be switched ON via <ON/OFF> button the red LED must be blinking.



The values are on the MINILEVEL NT displayed in $\mu\text{m}/\text{m}$ or in Arcsec

The values can be displayed on the LEVELMETER 2000 in the choice selected by the user.

Recommended display units are:

- X.XXX mm/m
- X°XX'XX"

2.1.2.1 Start the LEVELMETER 2000



press, ON/MODE key. The measuring mode last used is now being restarted, then a display appears.

2.1.2.2 Measurement absolute (1 Instrument only)



press repeatedly, until the cursor is positioned under SENSOR



confirm selection. Display is flashing.



press repeatedly until the required channel, e.g. "A" is displayed



confirm. The address is being searched



press to confirm displayed address

Displayed mode changes to ABSOLUTE respectively the last used mode

2.1.2.3 Differential Measurement (2 Instruments) as 2.1.2.2, but



press until "A-B" appears

2.1.2.4 ZERO Setting (absolute) using reversal measurement

After this procedure the instrument indicates the absolute inclination in relation to the centre of the earth

Condition:

Only one channel "A" or "B" active to be set to ZERO at a time. Select Channel „A or B“

Chose correct channel „A“ or „B“



press repeatedly, until the cursor is flashing under SENSOR



confirm selection.



press repeatedly until the required channel, "A" or "B" is displayed, flashing



confirm selection. The Levelmeter 2000 now searches the address of the instrument connected.



confirm displayed address

Displayed mode changes to ABSOLUTE, respectively to the last set-up mode

Start reversal measurement



press repeatedly until the cursor is flashing under ZERO



confirm (Direction indicator flashing) and the previously stored ZERO offset is displayed.

place the instrument on the designated position



press HOLD key to register the first measuring value.
The display shows -000000- for a few seconds. Then the measured value is displayed and the cursor under ZERO is flashing again.

Turn the instrument by 180°



press again to register the second measuring value. The display shows -000000- for a few seconds. Then the measured value is displayed and the direction indicator on the display is flashing.



press ENTER, to accept the correction factor for this reversal measurement

Displayed mode changes to ABSOLUTE

2.1.2.5 Measuring with relative Zero (1 instrument only)

Select channel „A or B“ see 2.1.2.2

Set instrument to relative ZERO



press repeatedly until the cursor flashes under REL ZERO



confirm. Direction indicator is flashing. The last stored Offset is displayed.

Put the instrument in the designated position.



press HOLD key to register the measured value. The display shows -000000- for about 30 seconds, then the amount of correction is displayed and the direction indicator flashes again.



confirm

The display is set to Zero and remains in the mode REL ZERO. All measured values are now displayed in comparison to the relative Zero point set.

2.1.2.6 Differential Measurement with Relative Zero (2 instruments)

Select channel „A or B“ see 2.1.2.2

set relative Zero to the difference of the instruments



press MODE key repeatedly until the cursor flashes under REL ZERO



confirm. Direction indicator is flashing.

Put both instruments in the required position. Both instruments looking in the same direction



press to register the measured values

The display shows -000000- for about 30 seconds, then the correction value is displayed, the direction indicator is flashing



confirm and save

The display is set to Zero and remains in the REL ZERO mode.

All measuring values displayed are changes in the inclination between the two instruments.

2.1.2.7 Change of Measuring Unit



press repeatedly until the cursor is flashing under UNIT



confirm. (Measuring unit is flashing)



press repeatedly, until the required measuring unit with the correct number of digits appears



confirm

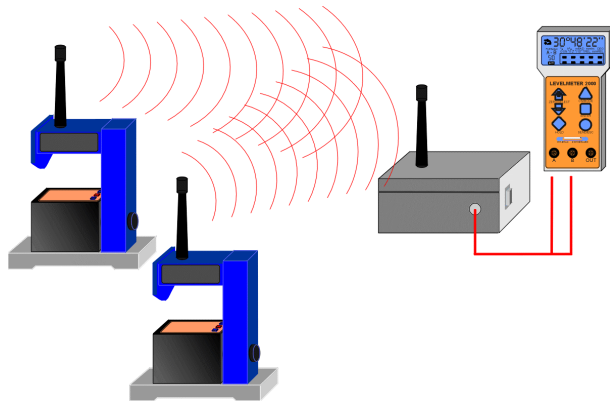
The display returns to the measuring mode last used (ABSOLUTE or REL ZERO), now indicating the measuring unit selected.

2.1.2.8 Switch the Levelmeter 2000 off



press continuously until the display dies out.

2.1.3 MINILEVEL NT COMBINED WITH THE LEVELMETER 2000 (DIGITAL DATA TRANSMISSION VIA RADIO MODULE)



Digital data transfer via radio transmission

Two MINILEVEL NT wireless connected via a transmission box to a LEVELMETER 2000

Connection to the radio box via special Y-cable

Installation of the configuration

- Connecting the radio box to the LEVELMETER 2000 via the special Y-cable
- Insert all the respective batteries in the box, the instruments and the LEVELMETER 2000
- If possible connect the LEVELMETER 2000 with a mains adapter to an outlet (battery saving)

Start up the configuration „radio module“

- press once only the button <ON/OFF> on the MINILEVEL handle, the instrument and the sender/receiver starts to work. The red LED is blinking rapidly
- Start the radio box the same way. The red LED is blinking rapidly
- Make sure that on all the used modules the correct high frequency channel (CHANNEL) is chosen. If the channel is occupied the next possible channel can be selected.
- Start the LEVELMETER 2000 and the correct measuring mode (A / B / A-B). Check the correct instruments address connected to the correct port chosen (A, B)



MINILEVEL NT with radio module

Antenna

Radio module handle

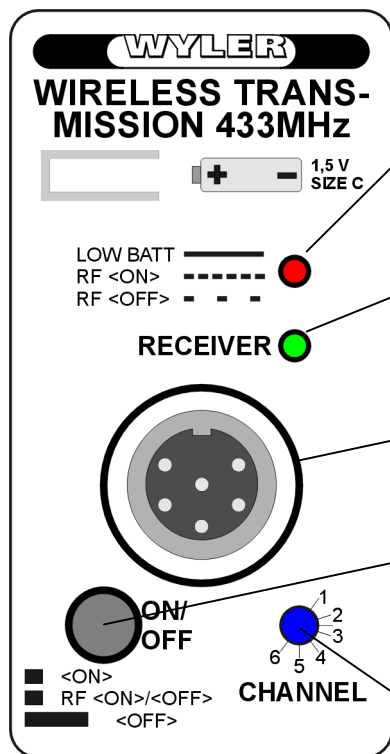


Radio box

Antenna

Connector RS 232 (Not relevant for MINILEVEL NT or LEVELTRONIC NT)

Connector /Interface RS485 for connection of the special Y-cable



**Display for 902MHz (USA)
see page 28**

	Blinking rapidly	Blinking slowly	Continuously ON
LED red	Sender/Receiver ON Power for sensor ON	Power for sensor only ON	Not enough battery power
LED green	Data transmission (sending/receiving)		
Connector	Cable connection to LEVELMETER for conventional transmission of data		
ON / OFF	Measuring instrument and data transmission ON/OFF		
Channel switch	6 Channels are available: The same channel is required for the instruments connected together In case of transmission problems another channel may be chosen. The originally used channel may be occupied by another user.		

Switch ON the instrument

- press once only the button <ON/OFF> the instrument and the sender/receiver starts to work. The red LED is blinking rapidly
- with another short push to the button the sender/receiver may be stopped. Local measurement with the instrument only. The red LED is blinking slowly.
- with another short push to the button the sender/receiver is activated again

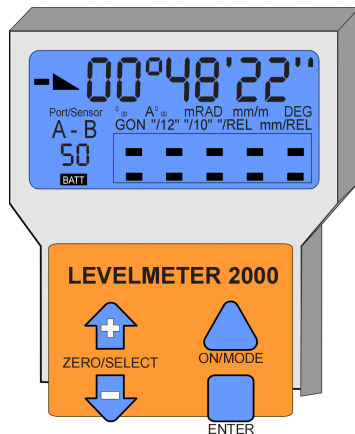
Switch OFF the instrument

- Press the button <ON>/<OFF> a few seconds until the red LED has stopped blinking.

IMPORTANT: When an instruments address is to be changed only the one respective instrument can be active

LEVELMETER 2000

Important: The MINILEVEL NT must be switched ON via <ON/OFF> button the red LED must be blinking.



The values are on the MINILEVEL NT displayed in $\mu\text{m}/\text{m}$ or in Arcsec

The values can be displayed on the LEVELMETER 2000 in the choice selected by the user.

Recommended display units are:

- X.XXX mm/m
- X°XX'XX"

2.1.3.1 Start the LEVELMETER 2000



press, ON/MODE key. The measuring mode last used is now being restarted, then a display appears.

2.1.3.2 Measurement absolute (1 Instrument only)



press repeatedly, until the cursor is positioned under SENSOR



confirm selection. Display is flashing.



press repeatedly until the required channel, e.g. "A" is displayed



confirm. The address is being searched



press to confirm displayed address

Displayed mode changes to ABSOLUTE respectively the last used mode

2.1.3.3 Differential Measurement absolute (2 Instruments) as 2.1.3.2, but



press until "A-B" appears

2.1.3.4 ZERO Setting (absolute) using reversal measurement

After this procedure the instrument indicates the absolute inclination in relation to the centre of the earth

Condition:

Only one channel "A" or "B" active to be set to ZERO at a time. Select Channel „A or B“

Chose correct channel „A“ or „B“



press repeatedly, until the cursor is flashing under SENSOR



confirm selection.



press repeatedly until the required channel, "A" or "B" is displayed, flashing



confirm selection. The Levelmeter 2000 now searches the address of the instrument connected.



confirm displayed address

Displayed mode changes to ABSOLUTE, respectively to the last set-up mode

Start reversal measurement



press repeatedly until the cursor is flashing under ZERO



confirm (Direction indicator flashing) and the previously stored ZERO offset is displayed.

place the instrument on the designated position



press HOLD key to register the first measuring value. The display shows -000000- for a few seconds. Then the measured value is displayed and the cursor under ZERO is flashing again.

Turn the instrument by 180°



press again to register the second measuring value. The display shows -000000- for a few seconds. Then the measured value is displayed and the direction indicator on the display is flashing.



press ENTER, to accept the correction factor for this reversal measurement

Displayed mode changes to ABSOLUTE

2.1.3.5 Measuring with relative Zero (1 instrument only)

Select channel „A or B“ see 2.1.3.2

Set instrument to relative ZERO



press repeatedly until the cursor flashes under REL ZERO



confirm. Direction indicator is flashing. The last stored Offset is displayed.

Put the instrument in the designated position.



press HOLD key to register the measured value. The display shows -000000- for about 30 seconds, then the amount of correction is displayed and the direction indicator flashes again.



confirm

The display is set to Zero and remains in the mode REL ZERO. All measured values are now displayed in comparison to the relative Zero point set.

2.1.3.6 Differential Measurement with Relative Zero (2 instruments)

Select channel „A or B“ see 2.1.3.2

set relative Zero to the difference of the instruments



press MODE key repeatedly until the cursor flashes under REL ZERO



confirm. Direction indicator is flashing.

Put both instruments in the required position. Both instruments looking in the same direction



press to register the measured values

The display shows -000000- for about 30 seconds, then the correction value is displayed, the direction indicator is flashing



confirm and save

The display is set to Zero and remains in the REL ZERO mode.

All measuring values displayed are changes in the inclination between the two instruments.

2.1.3.7 Change of Measuring Unit



press repeatedly until the cursor is flashing under UNIT



confirm. (Measuring unit is flashing)



press repeatedly, until the required measuring unit with the correct number of digits appears



confirm

The display returns to the measuring mode last used (ABSOLUTE or REL ZERO), now indicating the measuring unit selected.

2.1.3.8 Switch the Levelmeter 2000 off



press continuously until the display dies out.

Zero setting of the measuring system MINILEVEL „NT“ 11 with LEVELMETER C25/DC

Prior to adjusting the zero point, the instrument should be allowed time to acquire the ambient, respectively the work-piece temperature. Also the measuring system should have been switched on for about 1 min. (for sensitivity of 1 $\mu\text{m/m}$ about 3 minutes)

The absolute zero setting can be done in two ways.

a) with the **MINILEVEL NT**

- Slide the MINILEVEL NT onto a flat, horizontally levelled surface (e.g. engineer's surface plate)
- The position of the MINILEVEL NT is to be marked on the surface.
- Press the pushbutton "M" once until the ZERO is flashing, use the + or - keys to bring the display to "0"
- Now the MINILEVEL NT is to be turned 180 degrees and slid exactly onto the previously marked position.
- By means of the + / - keys set the display to half the value now showing.
- Now reverse the MINILEVEL NT once more. The display should now show the same value as before but with reversed indication.
- The display on the LEVELMETER C25/DC must be adjusted with the potentiometer ZERO to indicate the same value as on the MINILEVEL NT

b) using the **LEVELMETER C25/DC**

- Slide the MINILEVEL „NT“ onto a flat, horizontally levelled surface (e.g. engineer's surface plate)
- The position of the MINILEVEL „NT“ is to be marked on the surface.
- The display is to be set to zero by means of the potentiometer "ZERO" on the LEVELMETER C25
- Now the MINILEVEL „NT“ is to be turned 180 degrees and slid exactly onto the previously
- By means of the potentiometer set the display on the LEVELMETER C25 to half the value now showing.
- Now reverse the MINILEVEL „NT“ once more. The display should now show the same value as before but with reversed indication.

Zero setting of the measuring system MINILEVEL „NT“ 11 with **LEVELMETER 2000**

Prior to adjusting the zero point, the instrument should be allowed time to acquire the ambient, respectively the work-piece temperature. Also the measuring system should have been switched on for about 1 min. (for sensitivity of 1 $\mu\text{m/m}$ about 3 minutes)

Condition:

Only one channel "A" or "B" active to be set to ZERO at a time. Select Channel „A or B“

Select channel "A" or "B"



press repeatedly, until the cursor is flashing under SENSOR



confirm selection.



press repeatedly until the required channel, "A" or "B" is displayed, flashing



confirm selection. The Levelmeter 2000 now searches the address of the instrument connected.



confirm displayed address

Displayed mode changes to ABSOLUTE, respectively to the last set-up mode

Start reversal measurement



press repeatedly until the cursor is flashing under ZERO



confirm (Direction indicator flashing) and the previously stored ZERO offset is displayed.

place the instrument on the designated position



press HOLD key to register the first measuring value.
The display shows -000000- for a few seconds. Then the measured value is displayed and the cursor under ZERO is flashing again.

Turn the instrument by 180°



press again to register the second measuring value. The display shows -000000- for a few seconds. Then the measured value is displayed and the direction indicator on the display is flashing.



press ENTER, to accept the correction factor for this reversal measurement

Displayed mode changes to ABSOLUTE

2.2 LEVELTRONIC NT WITH RADIO MODULE

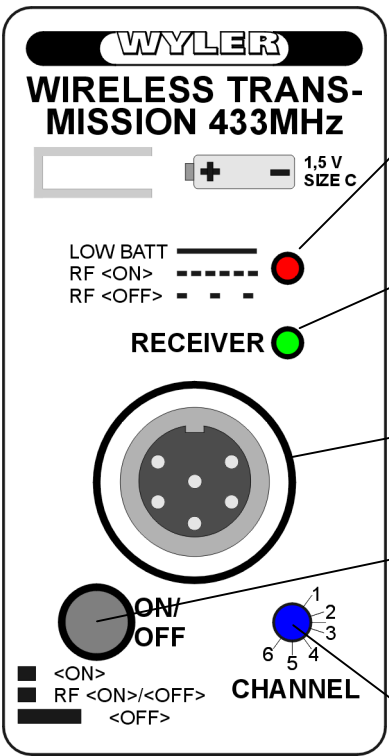
In contrary to the MINILEVEL NT the LEVELTRONIC NT has no integrated display and requires an external display unit. Also the LEVELTRONIC NT has one measuring range only

The instruments can be used for differential measurements as well in combination with

- LEVELMETER C25/DC (red cover) / Art. no. WYLER: 025-005 or
- LEVELMETER 2000 /Art. no. 065-004-001 (using cables or wireless transmission)



LEVELTRONIC NT



Display for 902MHz (USA)
see page 48

	Blinking rapidly	Blinking slowly	Continuously ON
LED red	Sender/Receiver ON Power for sensor ON	Power for sensor only ON	Not enough battery power
LED green	Data transmission (sending/receiving)		
Connector	Cable connection to LEVELMETER for conventional transmission of data		
ON / OFF	Measuring instrument and data transmission ON/OFF		
Channel switch	6 Channels are available: The same channel is required for the instruments connected together In case of transmission problems another channel may be chosen. The originally used channel may be occupied by another user.		

Switch ON the instrument

- press once only the button <ON/OFF> the instrument and the sender/receiver starts to work. The red LED is blinking rapidly
- with another short push to the button the sender/receiver may be stopped. Local measurement with the instrument only. The red LED is blinking slowly.
- with another short push to the button the sender/receiver is activated again

Switch OFF the instrument

- Press the button <ON>/<OFF> a few seconds until the red LED has stopped blinking.



LEVELTRONIC NT without integrated display of the measured values

Functions

The LEVELTRONIC NT has three pushbuttons.

M = Mode

With this button the different functions may be chosen one after the other (see picture). For starting the instrument this button "M" must be pressed.

- Press „M“ 1 x: Zero setting / „ZERO“ is flashing

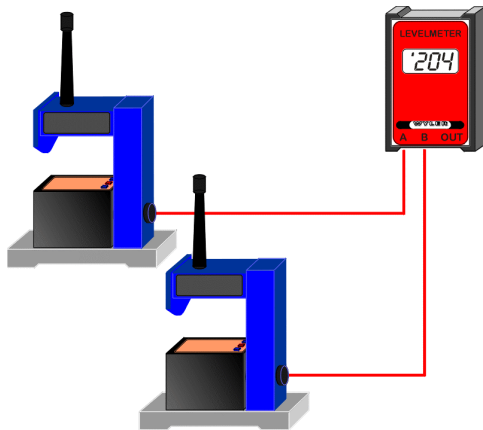
Changes of the zero setting are best made via the LEVELMETER 2000

Respective changes in the “M” mode must be made with the buttons + / -.

Remarks:

Every push of the button changes the unit by one for larger changes the button must remain pressed and the changes will gradually increase in speed.

2.2.1 LEVELTRONIC NT IN COMBINATION WITH THE LEVELMETER C25 (ANALOGUE DATA TRANSMISSION)



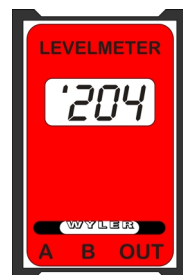
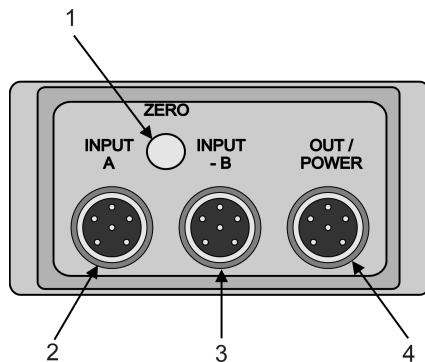
Analogue data transmission

One or two LEVELTRONIC NT are connected to a LEVELMETER C25

This configuration does not allow the use of wireless transmission because the LEVELMETER C25 is an analogue display instrument

IMPORTANT: The measuring instruments must be switched ON via <ON/OFF> button the red LED must be blinking.

THE LEVELMETER C25



IMPORTANT: The display on the MINILEVEL NT is in $\mu\text{m}/\text{m}$ or Arcsec. The display on the LEVELMETER C25 is in digits only (sensitivity unit) in order to receive the correct measured value the value must be multiplied by the sensitivity set on the MINILEVEL (Range I or II)

Switch (Backside)
"On" / "Off"

Switch for LEVELMETER. The low battery indication (XX:XX colon) is appearing automatically during operation if battery power is insufficient.

Top view
LEVELMETER C25 / DC

Potentiometer:
"ZERO" (1)

Enables adjustment of the zero point. The regulating range is min. +/- 400 digits.

Socket A (2)

Input for measuring with one MINILEVEL „classic“

Socket -B (3)

Input for the reference level in differential mode. In order to prevent interference voltage to channel A, input B is switched off when no instrument is connected.

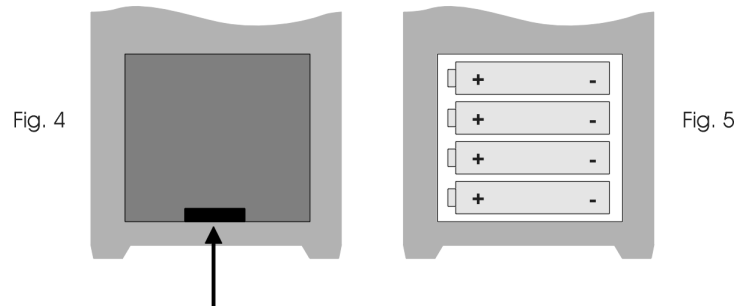
Socket:
"POWER/OUT (4)

Analogue output 1 mV per digit.
External power supply input.

Battery change / Battery check LEVELMETER C25

In case low battery indication (XX:XX colon) is appearing the batteries have to be exchanged.

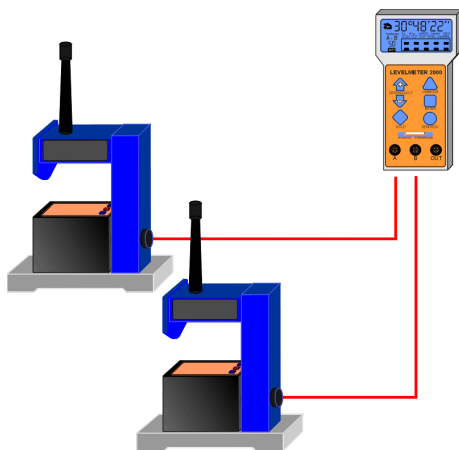
For exchanging batteries press the cam in arrow's direction as shown in Fig. 4 (use screwdriver) and remove the cover. Take out batteries by shaking the LEVELMETER C25 and check all contacts for corrosion. Install new leak proof batteries with a voltage of 1,5V in the battery case as shown on the diagram (see Fig. 5)



Function check of the system LEVELTRONIC NT" combined with LEVELMETER C25

- a) Shut off the LEVELTRONIC NT
- b) LEVELMETER 25 power ON without cables connected
Low battery indication (XX:XX colon) must not appear
- c) Connect LEVELTRONIC NT with LEVELMETER C25, Socket "A" LEVELTRONIC NT will start automatically
- D) LEVELTRONIC NT cable to the right
 - Cable side of the instrument UP Display: ,1
 - Cable side of the instrument DOWN Display: '1

2.2.2 LEVELTRONIC NT IN COMBINATION WITH THE LEVELMETER 2000 (DIGITAL DATA TRANSITION WITH CABLES)

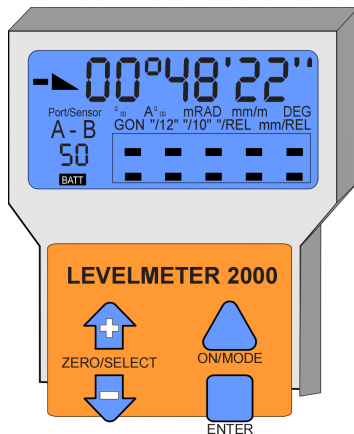


Digital data transmission with cables

One or two LEVELTRONIC NT connected with a LEVELMETER 2000

LEVELMETER 2000

Important: The MINILEVEL NT must be switched ON via <ON/OFF> button the red LED must be blinking.



The values are on the MINILEVEL NT displayed in $\mu\text{m}/\text{m}$ or in Arcsec

The values can be displayed on the LEVELMETER 2000 in the choice selected by the user.

Recommended display units are:

- X.XXX mm/m
- X°XX'XX"

2.2.2.1 Start the LEVELMETER 2000



press, ON/MODE key. The measuring mode last used is now being restarted, then a display appears.

2.2.2.2 Measurement absolute (1 Instrument only)



press repeatedly, until the cursor is positioned under SENSOR



confirm selection. Display is flashing.



press repeatedly until the required channel, e.g. "A" is displayed



confirm. The address is being searched



press to confirm displayed address

Displayed mode changes to ABSOLUTE respectively the last used mode

2.2.2.3 Differential Measurement absolute (2 Instruments) as 2.2.2.2, but



press until "A-B" appears

2.2.2.4 ZERO Setting (absolute) using reversal measurement

After this procedure the instrument indicates the absolute inclination in relation to the center of the earth

Condition:

Only one channel "A" or "B" active to be set to ZERO at a time. Select Channel „A or B“

Chose correct channel „A“ or „B“



press repeatedly, until the cursor is flashing under SENSOR



confirm selection.



press repeatedly until the required channel, "A" or "B" is displayed, flashing



confirm selection. The Levelmeter 2000 now searches the address of the instrument connected.



confirm displayed address

Displayed mode changes to ABSOLUTE, respectively to the last set-up mode

Start reversal measurement



press repeatedly until the cursor is flashing under ZERO



confirm (Direction indicator flashing) and the previously stored ZERO offset is displayed.

place the instrument on the designated position



press HOLD key to register the first measuring value.
The display shows -000000- for a few seconds. Then the measured value is displayed and the cursor under ZERO is flashing again.

Turn the instrument by 180°



press again to register the second measuring value. The display shows -000000- for a few seconds. Then the measured value is displayed and the direction indicator on the display is flashing.



press ENTER, to accept the correction factor for this reversal measurement

Displayed mode changes to ABSOLUTE

2.2.2.5 Measuring with relative Zero (1 instrument only)

Select channel „A or B“ see 2.2.2.2

Set instrument to relative ZERO



press repeatedly until the cursor flashes under REL ZERO



confirm. Direction indicator is flashing. The last stored Offset is displayed.

Put the instrument in the designated position.



press HOLD key to register the measured value. The display shows -000000- for about 30 seconds, then the amount of correction is displayed and the direction indicator flashes again.



confirm

The display is set to Zero and remains in the mode REL ZERO. All measured values are now displayed in comparison to the relative Zero point set.

2.2.2.6 Differential Measurement with Relative Zero (2 instruments)

Select channel „A or B“ see 2.2.2.2

set relative Zero to the difference of the instruments



press MODE key repeatedly until the cursor flashes under REL ZERO



confirm. Direction indicator is flashing.

Put both instruments in the required position. Both instruments looking in the same direction



press to register the measured values

The display shows -000000- for about 30 seconds, then the correction value is displayed, the direction indicator is flashing



confirm and save

The display is set to Zero and remains in the REL ZERO mode.

All measuring values displayed are changes in the inclination between the two instruments.

2.2.2.7 Change of Measuring Unit



press repeatedly until the cursor is flashing under UNIT



confirm. (Measuring unit is flashing)



press repeatedly, until the required measuring unit with the correct number of digits appears



confirm

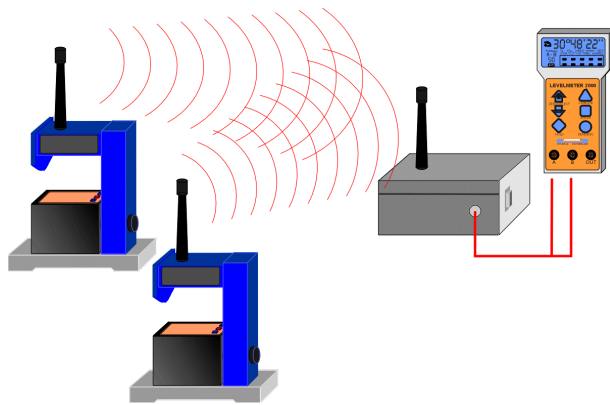
The display returns to the measuring mode last used (ABSOLUTE or REL ZERO), now indicating the measuring unit selected.

2.2.2.8 Switch the Levelmeter 2000 off



press continuously until the display dies out.

2.2.3 LEVELTRONIC NT COMBINED WITH THE LEVELMETER 2000 (DIGITAL DATA TRANSMISSION VIA RADIO MODULE)



Digital data transfer via radio transmission

One or two LEVELTRONIC NT wireless connected via a transmission box to a LEVELMETER 2000

Connection to the radio box via special Y-cable

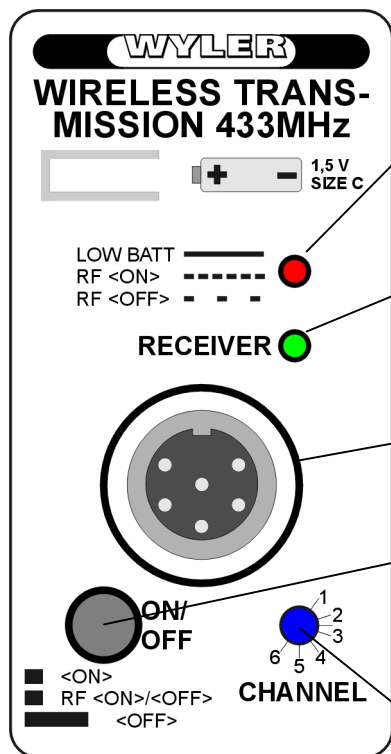
Installation of the configuration

- Connecting the radio box to the LEVELMETER 2000 via the special Y-cable
- Insert all the respective batteries in the box, the instruments and the LEVELMETER 2000
- If possible connect the LEVELMETER 2000 with a mains adapter to an outlet (battery saving)

Start up the configuration „radio module“

- press once only the button <ON/OFF> on the LEVELTRONIC handle, the instrument and the sender/receiver starts to work. The red LED is blinking rapidly
- Start the radio box the same way. The red LED is blinking rapidly
- Make sure that on all the used modules the correct high frequency channel (CHANNEL) is chosen. If the channel is occupied the next possible channel can be selected.
- Start the LEVELMETER 2000 and the correct measuring mode (A / B / A-B). Check the correct instruments address connected to the correct port chosen (A, B)





Display for 902MHz (USA)
see page 48

	Blinking rapidly	Blinking slowly	Continuously ON
LED red	Sender/Receiver ON Power for sensor ON	Power for sensor only ON	Not enough battery power
LED green	Data transmission (sending/receiving)		
Connector	Cable connection to LEVELMETER for conventional transmission of data		
ON / OFF	Measuring instrument and data transmission ON/OFF		
Channel switch	6 Channels are available: The same channel is required for the instruments connected together In case of transmission problems another channel may be chosen. The originally used channel may be occupied by another user.		

Switch ON the instrument

- press once only the button <ON/OFF> the instrument and the sender/receiver starts to work. The red LED is blinking rapidly
- with another short push to the button the sender/receiver may be stopped. Local measurement with the instrument only. The red LED is blinking slowly.
- with another short push to the button the sender/receiver is activated again

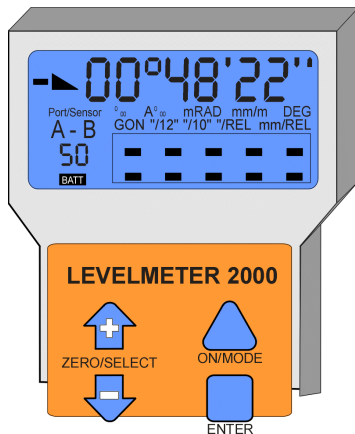
Switch OFF the instrument

- Press the button <ON>/<OFF> a few seconds until the red LED has stopped blinking.

IMPORTANT: When an instruments address is to be changed only the one respective instrument can be active

LEVELMETER 2000

Important: The MINILEVEL NT must be switched ON via <ON/OFF> button the red LED must be blinking.



The values are on the MINILEVEL NT displayed in $\mu\text{m}/\text{m}$ or in Arcsec

The values can be displayed on the LEVELMETER 2000 in the choice selected by the user.

Recommended display units are:

- X.XXX mm/m
- X°XX'XX"

2.2.3.1 Start the LEVELMETER 2000



press, ON/MODE key. The measuring mode last used is now being restarted, then a display appears.

2.2.3.2 Measurement absolute (1 Instrument only)



press repeatedly, until the cursor is positioned under SENSOR



confirm selection. Display is flashing.



press repeatedly until the required channel, e.g. "A" is displayed



confirm. The address is being searched



press to confirm displayed address

Displayed mode changes to ABSOLUTE respectively the last used mode

2.2.3.3 Differential Measurement absolute (2 Instruments) as 2.1.2.2, but



press until "A-B" appears

2.2.3.4 ZERO Setting (absolute) using reversal measurement

After this procedure the instrument indicates the absolute inclination in relation to the centre of the earth

Condition:

Only one channel "A" or "B" active to be set to ZERO at a time. Select Channel „A or B“

Select channel „A“ or „B“



press repeatedly, until the cursor is flashing under SENSOR



confirm selection.



press repeatedly until the required channel, "A" or "B" is displayed, flashing



confirm selection. The Levelmeter 2000 now searches the address of the instrument connected.



confirm displayed address

Displayed mode changes to ABSOLUTE, respectively to the last set-up mode

Start reversal measurement



press repeatedly until the cursor is flashing under ZERO



confirm (Direction indicator flashing) and the previously stored ZERO offset is displayed.

place the instrument on the designated position



press HOLD key to register the first measuring value.
The display shows -000000- for a few seconds. Then the measured value is displayed and the cursor under ZERO is flashing again.

Turn the instrument by 180°



press again to register the second measuring value. The display shows -000000- for a few seconds. Then the measured value is displayed and the direction indicator on the display is flashing.



press ENTER, to accept the correction factor for this reversal measurement

Displayed mode changes to ABSOLUTE

2.2.3.5 Measuring with relative Zero (1 instrument only)

Select channel „A or B“ see 2.2.3.2

Set instrument to relative ZERO



press repeatedly until the cursor flashes under REL ZERO



confirm. Direction indicator is flashing. The last stored Offset is displayed.

Put the instrument in the designated position.



press HOLD key to register the measured value. The display shows -000000- for about 30 seconds, then the amount of correction is displayed and the direction indicator flashes again.



confirm

The display is set to Zero and remains in the mode REL ZERO. All measured values are now displayed in comparison to the relative Zero point set.

2.2.3.6 Differential Measurement with Relative Zero (2 instruments)

Select channel „A or B“ see 2.2.3.2

set relative Zero to the difference of the instruments



press MODE key repeatedly until the cursor flashes under REL ZERO



confirm. Direction indicator is flashing.

Put both instruments in the required position. Both instruments looking in the same direction



press to register the measured values
The display shows -000000- for about 30 seconds, then the correction value is displayed, the direction indicator is flashing



confirm and save

**The display is set to Zero and remains in the REL ZERO mode.
All measuring values displayed are changes in the inclination between the two instruments.**

2.2.3.7

Change of Measuring Unit



press repeatedly until the cursor is flashing under UNIT



confirm. (Measuring unit is flashing)



press repeatedly, until the required measuring unit with the correct number of digits appears



confirm

The display returns to the measuring mode last used (ABSOLUTE or REL ZERO), now indicating the measuring unit selected.

2.2.3.8

Switch the Levelmeter 2000 off



2.1.2.8

Switch the Levelmeter 2000 off

Zero setting of the measuring system LEVELTRONIC NT 11 with **LEVELMETER C25/DC** (absolute zero)

Prior to adjusting the zero point, the instrument should be allowed time to acquire the ambient, respectively the work-piece temperature. Also the measuring system should have been switched on for about 1 min. (for sensitivity of 1 µm/m about 3 minutes)

- Slide the LEVELTRONIC NT onto a flat, horizontally levelled surface (e.g. engineer's surface plate)
- The position of the LEVELTRONIC NT is to be marked on the surface.
- The display is to be set to zero by means of the potentiometer "ZERO" on the LEVELMETER C25
- Now the LEVELTRONIC NT is to be turned 180 degrees and slid exactly onto the previously
- By means of the potentiometer set the display on the LEVELMETER C25 to half the value now showing.
- Now reverse the LEVELTRONIC NT once more. The display should now show the same value as before but with reversed indication.

Zero setting of the measuring system LEVELTRONIC NT with **LEVELMETER 2000** (absolute zero)

Prior to adjusting the zero point, the instrument should be allowed time to acquire the ambient, respectively the work-piece temperature. Also the measuring system should have been switched on for about 1 min. (for sensitivity of 1 µm/m about 3 minutes)

Condition:

Only one channel "A" or "B" active to be set to ZERO at a time. Select Channel „A or B“

Select channel "A" or "B"



press repeatedly, until the cursor is flashing under SENSOR



confirm selection.



press repeatedly until the required channel, "A" or "B" is displayed, flashing



confirm selection. The Levelmeter 2000 now searches the address of the instrument connected.



confirm displayed address

Displayed mode changes to ABSOLUTE, respectively to the last set-up mode

Start reversal measurement



press repeatedly until the cursor is flashing under ZERO



confirm (Direction indicator flashing) and the previously stored ZERO offset is displayed.

place the instrument on the designated position



press HOLD key to register the first measuring value.
The display shows -000000- for a few seconds. Then the measured value is displayed and the cursor under ZERO is flashing again.

Turn the instrument by 180°



press again to register the second measuring value. The display shows -000000- for a few seconds. Then the measured value is displayed and the direction indicator on the display is flashing.



press ENTER, to accept the correction factor for this reversal measurement

Displayed mode changes to ABSOLUTE

3. TECHNICAL DATA

3.1 LEVELTRONIC NT / 41

Sensitivity	1 µm/m 0.2 Arcsec	5 µm/m 1 Arcsec	10 µm/m 2 Arcsec
Measuring range	2 mm/m 400 Arcsec	10 mm/m 2000 Arcsec	20 mm/m 4000 Arcsec
Limits of error <0.5 Full scale value (DIN 2276)	max. 1% of the measured value, min. 0,05% of the F.S. value		
Limits of error >0.5 Full scale value (DIN 2276)	max. 1% of (2 x measured value - 0.5 x F.S. value)		
External display	within 3 Seconds		
Analogue output	1 mV / 1µm/m 1 mV / 0.2 Arcsec	1 mV / 5µm/m 1 mV / 1 Arcsec	1 mV / 10µm/m 1 mV / 2 Arcsec
Digital output	RS485 asynchron / 9600 Baud, 7Bit, 2Stopbits, no parity		
Temperature influence /°C	max. 0.1% of F.S. value		
External power supply	+ 5V DC, 20 mW		
Operating temperature	0....+40°C		
Storage temperature	-20....+70°C		

3.2 MINILEVEL NT / 11

Sensitivity	+/- 1 µm/m +/- 0.2 Arcsec.	+/- 5 µm/m +/- 1 Arcsec.
Range II	2 mm/m 400 Arcsec	10 mm/m 2000 Arcsec
Measuring and display range I	20 mm/m 4000 Arcsec	100 mm/m 20000 Arcsec
Measuring range II Limits of error <0.5 Full scale value (DIN 2276)	max. 1% of the measured value, min. 0,05% of the F.S. value	
Limits of error >0.5 Full scale value (DIN 2276)	max. 1% of (2 x measured value - 0.5 x F.S. value)	
Measuring range I +/-500 Digit Limits of error <0.25 Full scale value (DIN 2276) Display range +/- 2000 sensitivity units	max. 1% of the measured value, min. 0,05% of the F.S. value	
Limits of error >0.25 Full scale value (DIN 2276)	Display range only	
Display	within 3 Seconds	
Analogue output Range II	1 mV / 1µm/m 1 mV / 0.2 Arcsec	1 mV / 5µm/m 1 mV / 1 Arcsec
Analogue output Range I	1 mV / 10µm/m 1 mV / 2 Arcsec	1 mV / 50µm/m 1 mV / 10 Arcsec
Digital output	RS485 asynchron / 9600 Baud, 7Bit, 2Stopbits, no parity	
Temperature influence /°C	max. 0.1% Full scale value	
Lifetime Battery	100 - 200 Std.	
Battery TYPE in (LEVELMETER)	1 x Size AA, 1.5V Alkaline, alternatively 1 x Size AA 3V MnO ₂ -Lithium	
External power supply	+5V DC, 20 mW	
Operating temperature	0....+40°C	
Storage temperature	-20....+70°C	

3.3 RADIO MODULE

	EUROPE	USA
Serial Interface		
of WYLER		
Data-Bits	7	
Stop-Bits	2	
Parity-Bits	none	
Baud rate	9600Bps	
Sender/Receiver data		
Channels	6	10
Channel width	200kHz	400kHz
Frequency	433MHz	902MHz
Output power	7mW / +9dBm	2mW / +3dBm
Sensitivity receiver	< -90dBm (50 Ohm)	- 95dBm (50 Ohm)
Modulation	FSK (Frequency Shift Keying)	
Power consumption		
Sending / receiving	360mW	
No sending / receiving	60mW	
consumption of NT instrument alone		
Transmitting distance		
open filed no obstacles	150 – 500m	up to 200 m
within house / factory	50 – 150m	25 - 50m
Min. distance between 2 antennas	10cm	10cm
Batteries	2 standard 1,5V Alkaline Batteries Size "C" (120h in active mode)	

Radio Module EUROPE with 433MHz



Radio Module USA with 902MHz



4. CHANGING OF MINILEVEL NT AND LEVELTRONIC NT TO RADIO MODULE

Existing MINILEVEL NT and LEVELTRONIC NT can be upgraded to a Radio module set

One set consists of the following components:

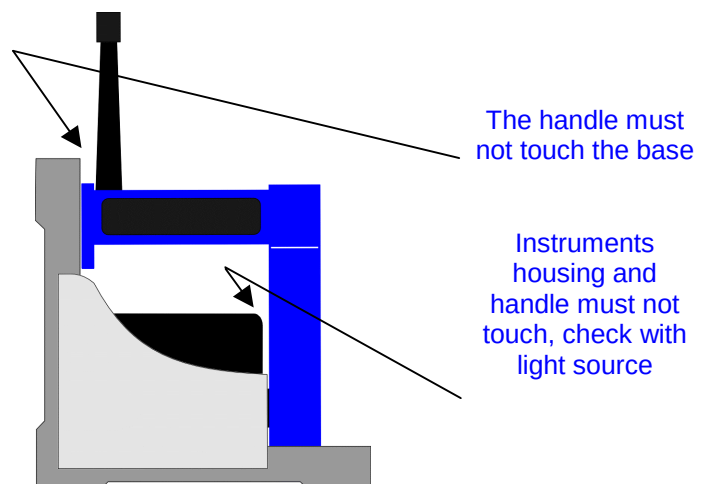
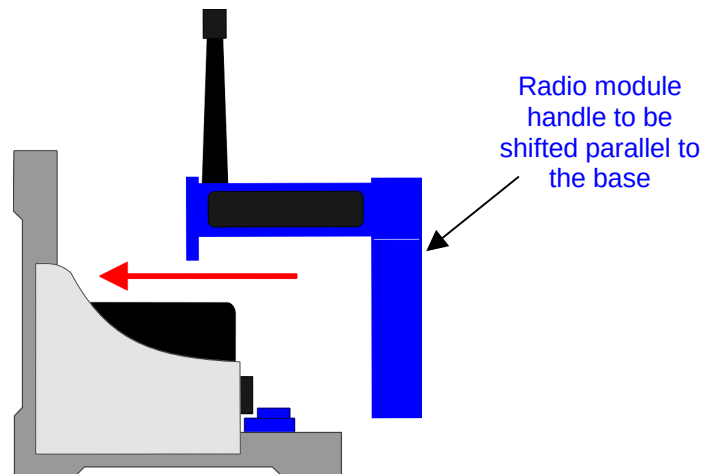
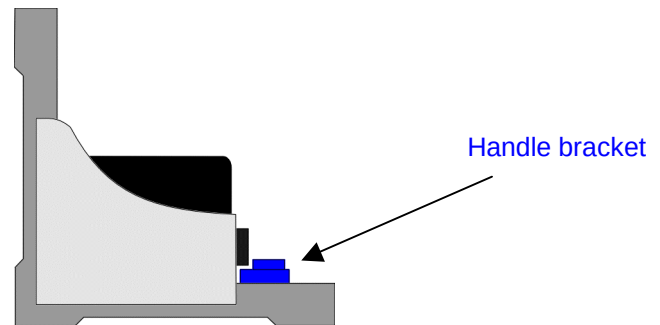
- Handle for the instrument with integrated radio module
- Radio module box
- Cable set inclusive Y-cable connecting radio module box with LEVELMETER 2000

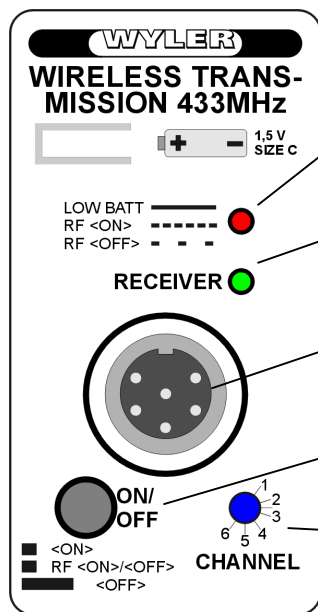
Article numbers of a complete set (for 2 MINILEVEL NT or LEVELTRONIC NT)

- for EUROPE 065-005-0350
- for USA 065-005-0351

How to install:

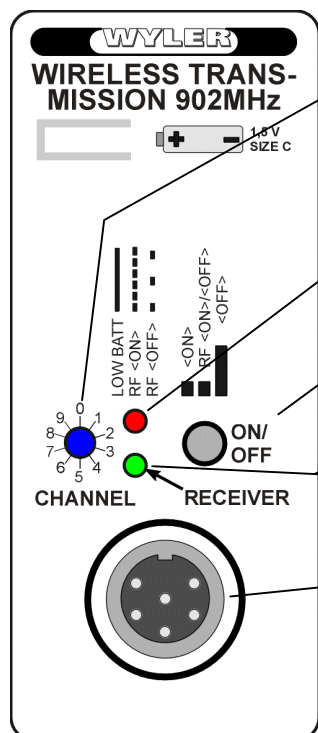
1. Remove existing handle
2. Remove existing installed batteries, they will not be used anymore
3. Mount the new handle bracket to the base, use the existing holes
4. Install the new handle by shifting it horizontally onto the bracket. Please make sure that the connecting pins make good contact with the existing socket.
IMPORTANT:
Remove batteries from the radio module handle during installation!
5. Fasten the handle to the bracket with 4 bolts.
IMPORTANT:
By the angular model please make sure that the handle is not touching the base. (Distance is about 0.3 mm)
6. Insert batteries in handle of measuring instruments (2 x 1,5V Size „C“ Alkaline)
7. Insert batteries in the radio module box (2 x 1,5V Size „C“ Alkaline)
8. Make functional check according to the procedure described below





Display EUROPE 433MHz

	Blinking rapidly	Blinking slowly	Continuously ON
LED red	Sender/Receiver ON Power for sensor ON	Power for sensor only ON	Not enough battery power
LED green	Data transmission (sending/receiving)		
Connector	Cable connection to LEVELMETER for conventional transmission of data		
ON / OFF	Measuring instrument and data transmission ON/OFF		
Channel switch 6 Channels are available	The same channel is required for the instruments connected together In case of transmission problems another channel may be chosen. The originally used channel may be occupied by another user		



Display USA 902MHz

Channel switch 10 Channels are available:	The same channel is required for the instruments connected together In case of transmission problems another channel may be chosen. The originally used channel may be occupied by another user.		
LED red	Sender/Receiver ON Power for sensor ON	Power for sensor only ON	Not enough battery power
ON / OFF	Measuring instrument and data transmission ON/OFF		
LED green	Data transmission (sending/receiving)		
Connector	Cable connection to LEVELMETER for conventional transmission of data		

Switch ON the instrument

- press once only the button <ON/OFF> the instrument and the sender/receiver starts to work. The red LED is blinking rapidly
- with another short push to the button the sender/receiver may be stopped. Local measurement with the instrument only. The red LED is blinking slowly.
- with another short push to the button the sender/receiver is activated again

Switch OFF the instrument

- Press the button <ON>/<OFF> a few seconds until the red LED has stopped blinking.

5. MAINTENANCE

Below you will find a "trouble-shooting" list. If this does not help you to remove your difficulty the instrument must be sent to your nearest WYLER service engineer.

When repairing the electronic unit, special care must be taken as the integrated circuits are sensitive to electro static charges.

EASILY CURED DIFFICULTIES

Difficulty:

Zero point unattainable - but instrument operates normally (Sensitivity)

Possible cause:

The instrument may have been subjected to a severe shock the zero point is dislocated in the sensor head.

Remedy: ...**LEVELTRONIC „NT“ 41 with LEVELMETER C25/DC**

1. Adjust the display to zero by using a screwdriver size 00. (Fig. 13) If the above adjustment is impossible, the unit is most likely malfunctioning.
2. Connect the cable only to the connector „A“ of the LEVELMETER C25/DC. Power on the LEVELMETER and adjust the display to zero. Place the LEVELTRONIC NT on a horizontally set plate (within +/- 50 mm/m in both directions) and connect to the cable.
3. Use the mode button "M" to enter the adjustment mode. Use the +/- keys on the LEVELTRONIC NT to set the display of the LEVELMETER C25 to zero (see Fig. 13a). If the above adjustment is impossible, the electronic unit is most likely malfunctioning.

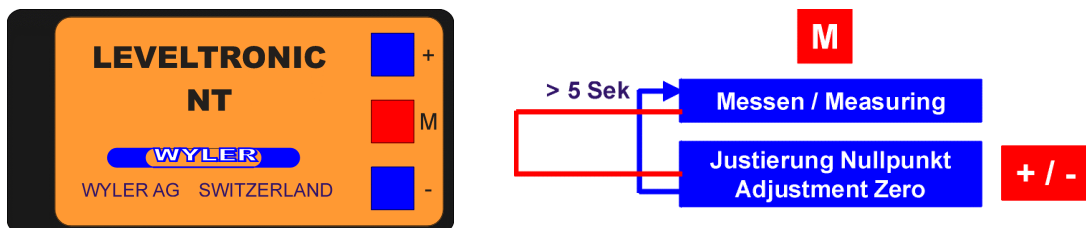


FIG: 13a

4. A reset function is possible in case some unjust manipulation has been done.

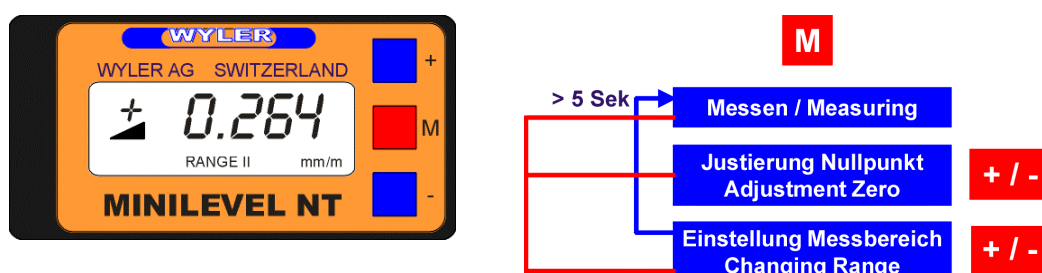
Important: For this function a LEVELMETER 2000 has to be connected to the instrument.

The "M" button is to be pressed a short time only. After that both keys + and - must be pressed both **at the same time for 25 seconds**. When the reset has been successful the display on the LEVELMETER 2000 changes from the actual value to the originally adjusted ZERO value. After this the instrument returns to the measuring mode in the basic configuration.

Remedy: ...**MINILEVEL „NT“ 11**

1. Adjust the display to zero by using a screwdriver size 00. (Fig. 13) If the above adjustment is impossible, the unit is most likely malfunctioning.
2. Use the mode button "M" to enter the adjustment mode. Use the +/- keys on the MINILEVEL NT to set the display to zero (see Fig. 13a). If the above adjustment is impossible, the electronic unit is most likely malfunctioning.
3. A reset function is possible in case some unjust manipulation has been done. The "M" button is to be pressed a short time only. After that both keys + and - must be pressed both **at the same time for 25 seconds**. During the reset function the display shows "zero". After successful resetting the "zero" display disappears and the display on the LEVELMETER 2000 and on the instrument changes from the actual value to the originally adjusted ZERO value.

The instrument returns to the measuring mode in the basic configuration.



Difficulty:

Radio transmission problems

Checks:

1. Check if the red LED is blinking on all the used modules
2. Check if the green LED is blinking on all the modules (indicates data receiving)

Possible cause:

Battery power not sufficient

Remedy:

Exchange batteries

Possible cause:

The system is interfered by another radio system

Remedy:

Change frequency channel on all the modules involved

Difficulty:

Radio transmission doesn't work at all

Checks:

1. Check if the red LED is blinking on all the used modules
2. Check if the green LED is blinking on all the modules (indicates data receiving)

Possible cause:

- Battery power not sufficient
- LEVELMETER 2000 has not the correct SW Version. For Radio transmission the SW Version 96 or higher is necessary.

Remedy:

- Exchange batteries
- Update the SW Version on the LEVELMETER 2000 (Download from WYLER Homepage <http://www.wylerag.com>)

Possible cause:

The system is interfered by another radio system

Remedy:

Change frequency channel on all the modules involved

6. ACCESSORIES / SPARE PARTS

For connecting the measuring instruments to a PC or Laptop. The ideal combination for precision flatness measurements

:

- LEVELADAPTER 2000 with set of cables
- LEVELADAPTER set 24 A (only for MINILEVEL/LEVELTRONIC NT with LEVELMETER 2000)

All the MEASURING INSTRUMENTS are available with a great variety of measuring bases.

To the LEVELMETER the following parts are available:

- Mains adapter WYLER No. 29 for connection to 220V/50HZ also possible to be used for charging rechargeable batteries. Other voltage adapters on request.

7. STORAGE

For storage periods the measuring instrument should be placed in a position in which the instruments are also used when measuring (upright position). Unsuitable storage may result in a longer period of zero creeping due to overload of the pendulum system.

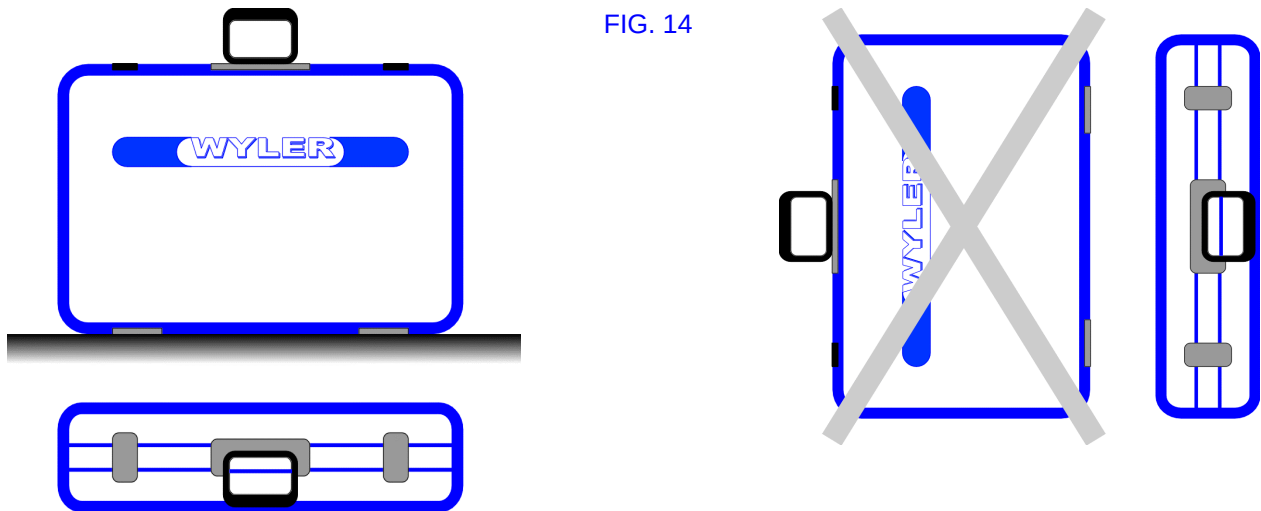


FIG. 14

KONFORMITÄTSERKLÄRUNG

Wir
(Name des Anbieters)

WYLER AG
CH-8405 Winterthur

(Anschrift)

erklären in alleiniger Verantwortung, dass das Produkt

MONTEURSET 433 MHz
mit 1 Funkbox + 1 oder 2 Handgriffen

(Bezeichnung, Typ oder Modell, Los-, Chargen- oder Seriennummer, möglichst Herkunft und Stückzahl)

auf das sich diese Erklärung bezieht, mit der/den folgenden
Norm(en) oder normativen Dokument(en) übereinstimmt.

ETS 300 683 / EN 300 220

(Titel und/oder Nummer sowie Ausgabedatum der Norm(en) oder der anderen normativen Dokumente)

(falls zutreffend)

Gemäss den Bestimmungen der Richtlinie

89/336/EG (EMV)
99/5/EG (R&TTE) (Radiocom)

Winterthur 18.05.2000

(Ort und Datum der Ausstellung)

H. Hinnen

(Name und Unterschrift oder gleichwertige Kennzeichnung des Befugten)

DECLARATION OF CONFORMITY

We
(supplier's name)

WYLER AG
CH-8405 Winterthur

(address)

declare under our sole responsibility that the product

ENGINEERSET 433 MHz
including 1 Box + 1 or 2 Handles

(name, type or model, lot, batch or serial number, possibly sources and numbers of items)

to which this declaration relates is in conformity with the
following standard(s) or other normative document(s)

ETS 300 683 / EN 300 220

(title and/or number and date of issue of the standard(s) or other normative document(s))

(if applicable)

following the provisions of Directive

89/336/EG (EMV)
99/5/EG (R&TTE) (Radiocom)

Winterthur 18.05. 2000

(Place and date of issue)

H. Hinnen

(name and signature or equivalent marking of authorized person)

DÉCLARATION DE CONFORMITÉ

Nous
(nom du fournisseur)

WYLER AG
CH-8405 Winterthur

(adresse)

déclarons sous notre seule responsabilité que le produit

JEU DE MONTEUR 433 MHz
y inclus 1 boîte + 1 ou 2 poignée

(nom, type ou modèle, no. de lot, d'échantillon ou de série, éventuellement sources et nombre d'exemplaires)

auquel se réfère cette déclaration est conforme à la (aux)
norme(s) ou autre(s) document(s) normatif(s)

ETS 300 683 / EN 300 220

(titre et/ou no. et date de publication de la (des) norme(s) ou autre(s) document(s) normatif(s))

(le cas échéant)

conformément aux dispositions de Directive

89/336/EG (EMV)
99/5/EG (R&TTE) (Radiocom)

Winterthur 18.05. 2000

(Lieu et date)

H. Hinnen

(nom et signature du signataire autorisé)

8. DECLARATION OF CONFORMITY USA

**WYLER AG
CH-8405 WINTERTHUR**

**Radio Transmission
ENGINEERSET (Monteur Set) – WIRELESS 902 MHz
Mod. No. 027FXXX-XXX-XXX**

FCC ID: O3T - 065-005-0351

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference,**

and
- 2) This device must accept any interference received. Including interference that may cause undesired operation**