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Subject to technical change.

We assume no liability for typing errors.

## Safety notes / Technical support

### Notes

- Installation, maintenance and commissioning must be carried out only by qualified technical personnel.
- The product must be used only in the manner outlined in this instruction manual.

Special attention must be paid to warnings and notes as follows:



#### WARNING

Relates to a caution symbol on the product and means, that a failure to observe the necessary precautions can result in death, serious injury and/or considerable material damage.



#### WARNING




Relates to a caution symbol on the product and means, that a failure to observe the necessary precautions can result in death, serious injury and/or considerable material damage.

This symbol is used, when there is no corresponding caution symbol on the product.

#### CAUTION

A failure to observe the necessary precautions can result in considerable material damage.

### Safety symbols

In manual and on product	Description
	CAUTION: refer to related documents (manual) for details.
	Earth (ground) Terminal
	Protective Conductor Terminal

### Technical support

Please contact your local supplier (see [www.uwt.de](http://www.uwt.de) for address). Otherwise you can contact:

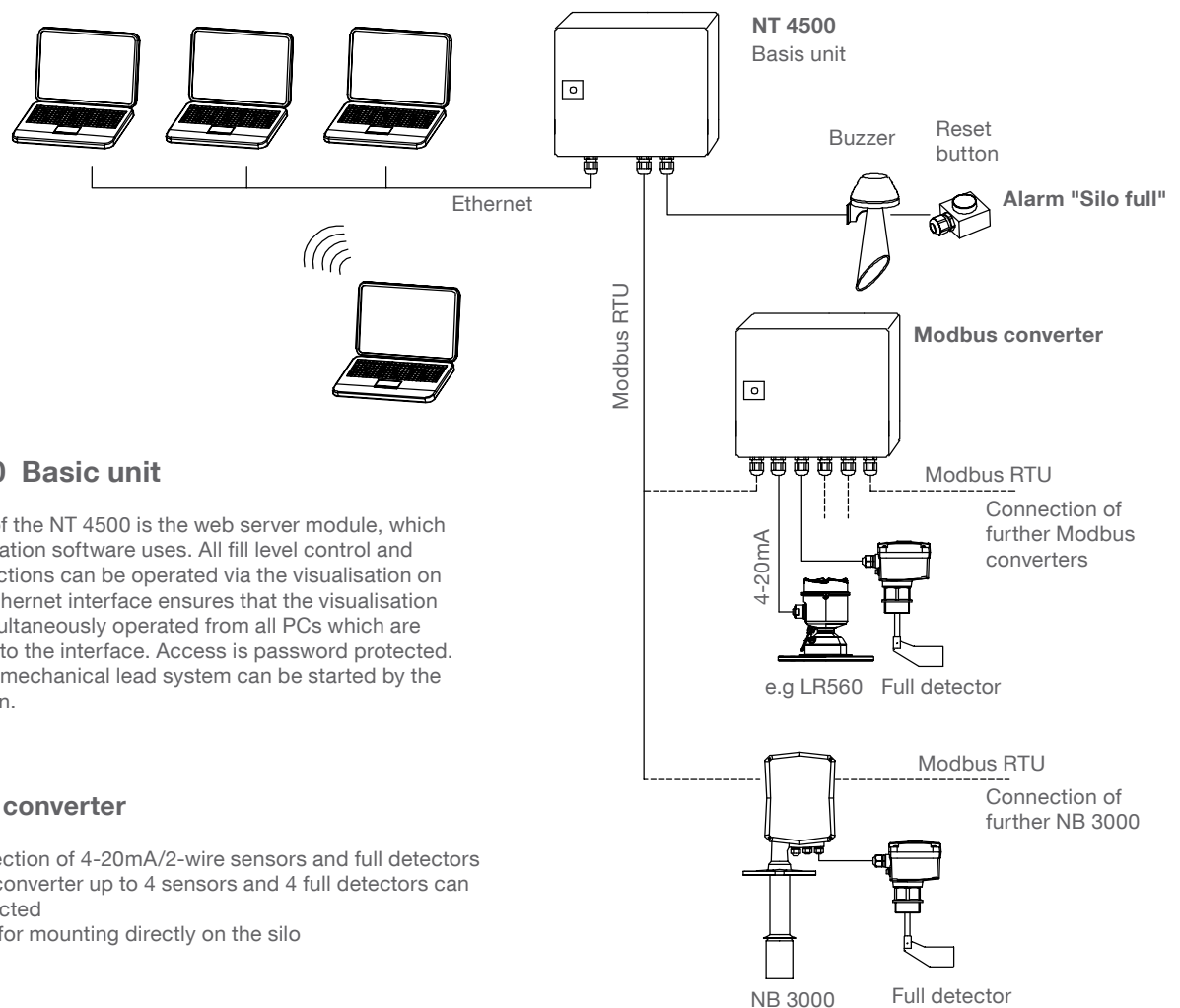
UWT GmbH  
Westendstr. 5  
87488 Betzigau  
Germany

Tel. 0049 (0)831 57123-0  
Fax. 0049 (0)831 76879  
[info@uwt.de](mailto:info@uwt.de)  
[www.uwt.de](http://www.uwt.de)

## Overview

### Level monitoring and visualisation via web server

- Standardized system up to 30 silos
- Visualisation and operation via standard internet browser software
- Software language german or english
- Password protected
- Worldwide remote enquiry of the level
- Data in percentage, height, volume or weight
- Trend display, data storage, export via .csv
- Evaluation of the analogue 4-20 mA signals of any sensors, as well as Modbus RTU of the UWT-systems
- Implementation of full detectors
- Fill control via full alarm signal (buzzer)



### NT 4500 Basic unit

The heart of the NT 4500 is the web server module, which the visualisation software uses. All fill level control and display functions can be operated via the visualisation on a PC. An Ethernet interface ensures that the visualisation can be simultaneously operated from all PCs which are connected to the interface. Access is password protected. The electromechanical lead system can be started by the visualisation.

### Modbus converter

- For connection of 4-20mA/2-wire sensors and full detectors
- On each converter up to 4 sensors and 4 full detectors can be connected
- Provided for mounting directly on the silo

### Integration of full detector incl. alarm "silo full"

- Flashlight-buzzer with reset button (supplied loose, for outdoor mounting)
- One unit for all connected silos
- Alarm happens, if one of the silos gets full
- Reset of the alarm
- Provided for mounting directly on the silo

## Technical Data / Accessories

### Technical data

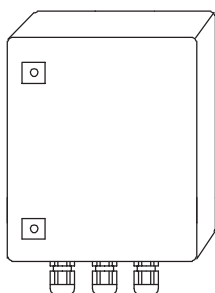
Dimensions	NT 4500, Modbus converter:	300 x 300 x 155mm (W x H x D)
Mounting	NT 4500, Modbus converter:	wall mounting
Material	NT 4500, Modbus converter:	steel plate
Ingress protection	NT 4500, Modbus converter:	IP65
Ambient temperature	NT 4500:	0...+55°C
	Modbusumsetzer:	-25...+70°C
Power supply	NT 4500, Modbus converter:	115V or 230V 50/60Hz (integrated power converter 24V DC)
	LR560:	supplied by Modbus converter
	NB 3000:	115V or 230V AC, connection is made on site
	Full detector:	Connection either on NB 3000 resp. Modbus converter. In this case the supply voltage must be equal to NB 3000 resp. Modbus converter. Alternative it is possible to connect on site.
Power consumption	NT 4500, Modbus converter:	20VA
	Connected level sensors:	see documentation of the respective sensors
Signal output full detector	Floating contact is required	

### Technical data of the used Wago Controllers:

see [www.wago.com](http://www.wago.com), search for 750-881

### Terminal box

Intermediate terminals for the wires leading to the silo (mounting e.g. on the silo frame).  
Applicable for cables of level (Modbus or 4-20mA), limit switch, buzzer, reset button



### Technical data

Dimensions	200 x 300 x 120mm (W x H x D), for wall mounting
Material	steel plate
Ingress protection	IP65
Ambient temperature	-25...+60°C
Terminal blocks	15 pieces grey, 5 pieces blue, 5 pieces green/yellow; each terminal implements 3 cable inlets 2,5mm², mounted on top hat rail
Cable glands	6 pieces M20x1,5    2 pieces M25x1,5

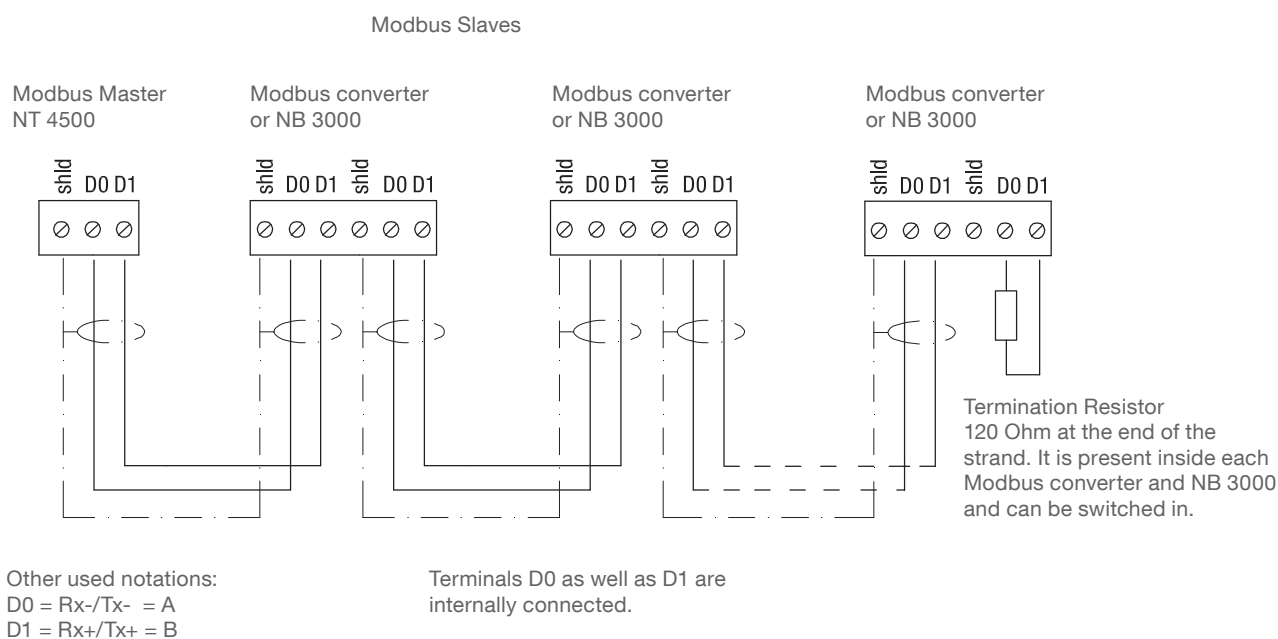
## Electrical installation

### Safety Instructions

<b>Handling</b>	In case of improper handling or handling malpractice, the electric safety of the device cannot be guaranteed.
<b>Installation regulations</b>	The local regulations or VDE 0100 (Regulations of German Electrotechnical Engineers) must be observed.
<b>Fuse</b>	Use a fuse as stated in the connection diagrams.
<b>RCCB protection</b>	In case of a fault, the supply voltage must be automatically switched off by a RCCB protection switch to protect against indirect contact with dangerous voltages.
<b>Power supply switch</b>	A voltage disconnection switch must be provided near the device.
<b>Wiring diagram</b>	The electrical connections are made in accordance with the wiring diagram.
<b>Supply voltage</b>	Compare the supply voltage applied with the specifications given on the name plate before switching the device on.
<b>Cable gland</b>	Make sure that the screwed cable gland safely seals the cable and that it is tight (danger of water intrusion). Cable glands that are not used have to be sealed with a blanking element.
<b>Field wiring cables</b>	All field wirings must have insulation suitable for at least 250V AC. The temperature rating must be at least 80°C (176°F).
<b>Installation in Hazardous Locations</b>	The NT 4500 and the Modbus converter are not permitted for installation in Hazardous Areas. Observe the valid regulations for wiring in Hazardous Areas, if the NB 3000 is installed in Hazardous Areas.

## Modbus network

### General wiring of a Modbus network



## Electrical installation

### Cable recommendations for Modbus network

#### Shielded cable

Functionality up to 50m

Manufacturer: Lapp, Type UNITRONIC LiYCY 2x0.34, Art.no: 0034502

#### Twisted pair cable

Functionality up to 1000m

Manufacturer: Lapp, Type UNITRONIC BUS CAN 1x2x0.34, Art.no: 2170263

#### UV-protection hose with threaded hose coupling M20x1,5

UV protection for Modbus cable

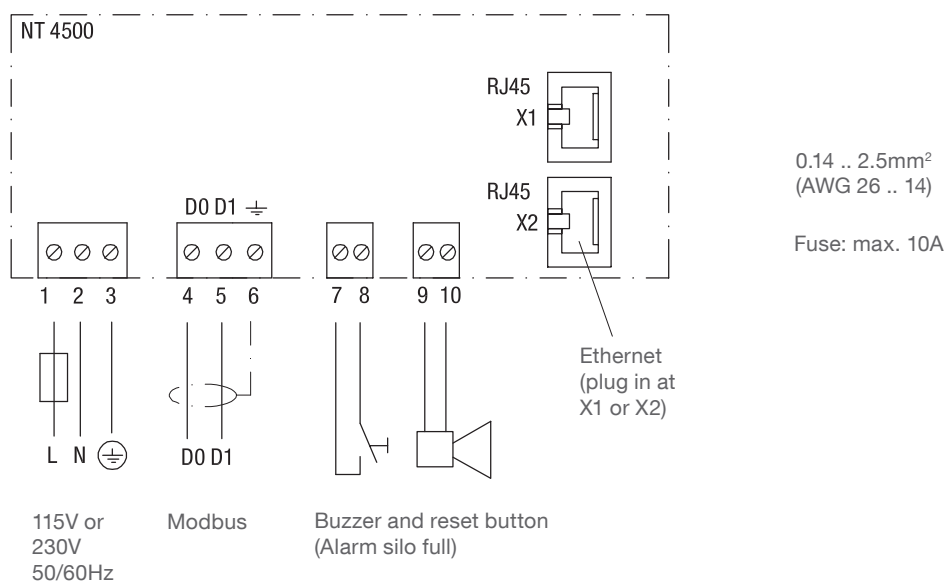
Manufacturer: Flexa, Type Rohrflex PA6, Art.no: 0233.202.012 and Type RQG1-M, Art.no: 5020.055.018

#### ATEX-protection hose with threaded hose coupling M20x1,5

For installation of Modbus cable in ATEX Zone 21

Manufacturer: PMA, Type ESX, Art.no: ESXT-12B.50 and Type END, Art.no: BEND-M202GT

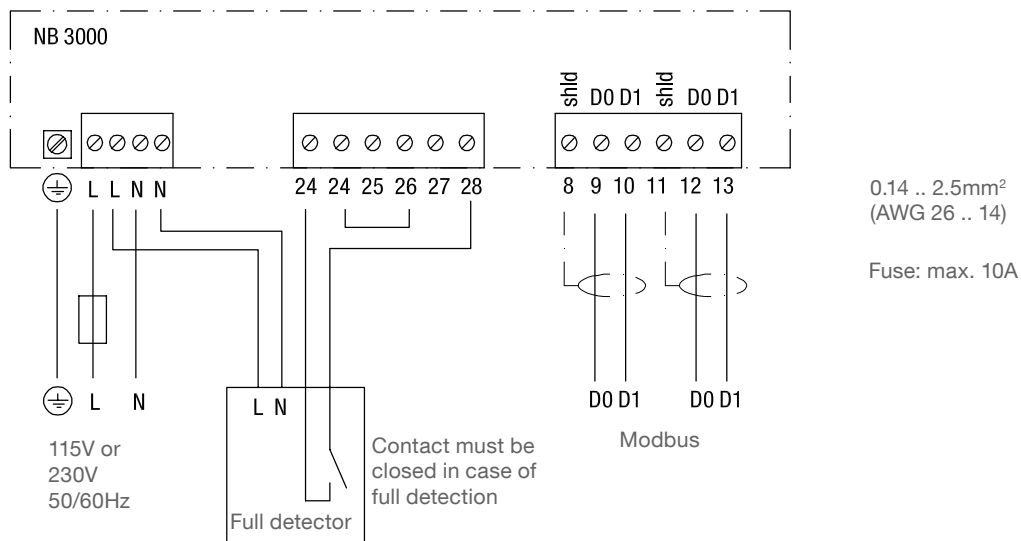
## NT 4500



Note: All DIP switches on the controller are set to OFF and must not be changed.

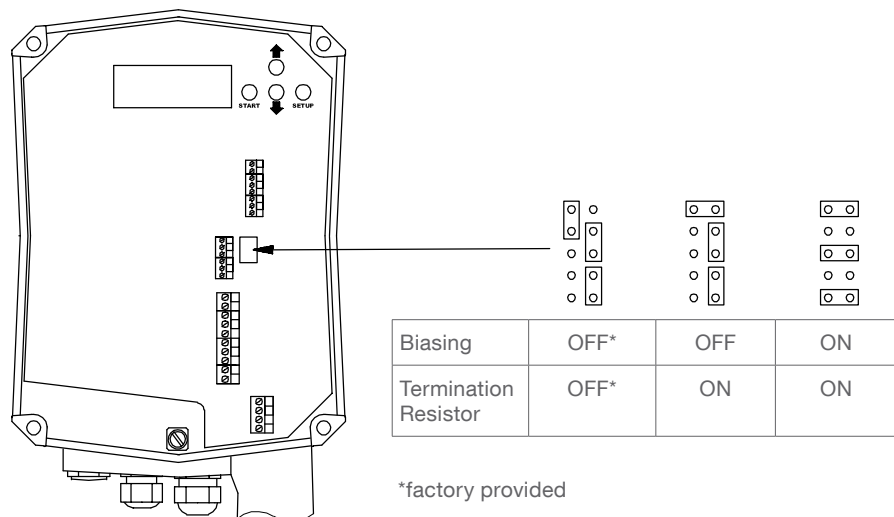
## Electrical installation

NB 3000



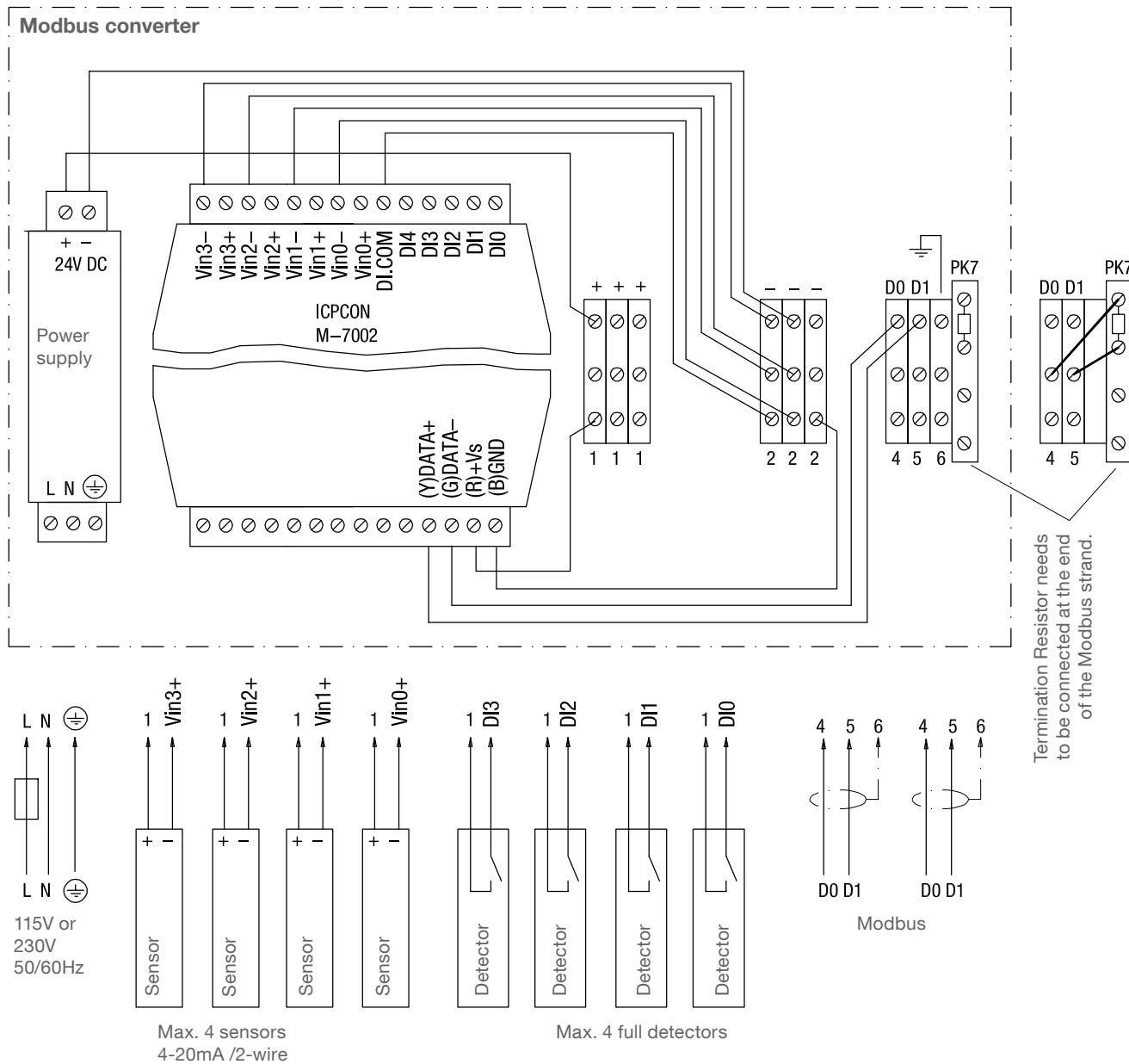
## Setting Modbus: Biasing and Termination Resistor

Termination Resistor and Biasing needs to be switched ON at the end of the Modbus strand.



## Electrical installation

### Modbus converter



Fuse: max. 10A

Terminals M-7002: 0.14 .. 1.5mm<sup>2</sup> (AWG 26 .. 16)

Other terminals: 0.14 .. 2.5mm<sup>2</sup> (AWG 26 .. 14)

The stated wiring inside the Modbus converter is factory provided.



## Commissioning

### 1. Generation of a synoptical table

Commissioning is facilitated if an overview of the connected sensors is made in advance.

The table shows an example of a project with 10 silos and mixed configuration of Nivobob NB 3000 and LR560 radar as well as implementation of full detectors:

Silo	Sensor	Modbus ID	Modbus converter Channel*	Modbus converter Terminal of sensor	Modbus converter Terminal of full detector
1	NB 3000	3	n/a	n/a	n/a
2	NB 3000	4	n/a	n/a	n/a
3	NB 3000	5	n/a	n/a	n/a
4	NB 3000	6	n/a	n/a	n/a
5	LR 560	1	0	Vin0+	DI0
6	LR 560	1	1	Vin1+	DI1
7	LR 560	1	2	Vin2+	DI2
8	LR 560	1	3	Vin3+	DI3
9	LR 560	2	0	Vin0+	DI0
10	LR 560	2	1	Vin1+	DI1

\* see page 14 under "Input Signal"

### 2. Check the wiring

Make sure that the Modbus network is wired, set the Modbus Termination Resistor (and for NB 3000 the Biasing), check that the Ethernet connection is available (see "Electrical installation" from page 5 onwards).

Note: All units are preset to 19200 Baud. Thus no setting is required.

### 3. Web server configuration

CAUTION: The configuration should be done by the network administrator only.

The web server is preset to the IP address 192.168.10.70. It must be changed to a company's own IP address as follows:

- Use a PC, which is connected via Ethernet to the Web server. Set in the system control the TCP / IP to address 192.168.10.xx, whereas xx can be any two digit number (the access to the Web server requires the number 192.168.10., the last two digits are not relevant).
- An up to date version of Internet browser and Java must be installed.
- Open the Internet browser and type the IP address 192.168.10.70 of the web server in the command bar. The overview page "Home" of the visualisation opens (see page 10).
- Click the "User" button and set the User Level to 5. The "Config" button will appear in the menu bar.
- Click on this button. The configuration page of the web server will open (see page 12).
- Enter your IP address, sub net mask and gateway, the current date and time
- Then reset to your TCP / IP address in the system control of your PC.

### 4. Perform the basic settings of the connected sensors

With the following settings, the connected sensors are addressed via the visualisation and give a real measurement result. For this settings the above mentioned synoptical table is helpful:

- Enter in page "Settings" (see page 14), the data under "Hardware", "Signal Input" and, if full detectors are connected, "Full Level Indicator".
- Enter in page "Volume Calculation" (see page 16) the data under "Silo Profile" and "Silo Data".

### 5. Perform further user settings

Enter the required user specific settings according to the "Visualisation - Operation" from page 10 onwards.

## Visualisation - Operation

### Start of the Visualisation

By entering the IP address in the browser (according to the web server configuration) the visualisation starts.  
On the first call Java is started. If the progress bar does not move further, please restart your browser and the visualisation.



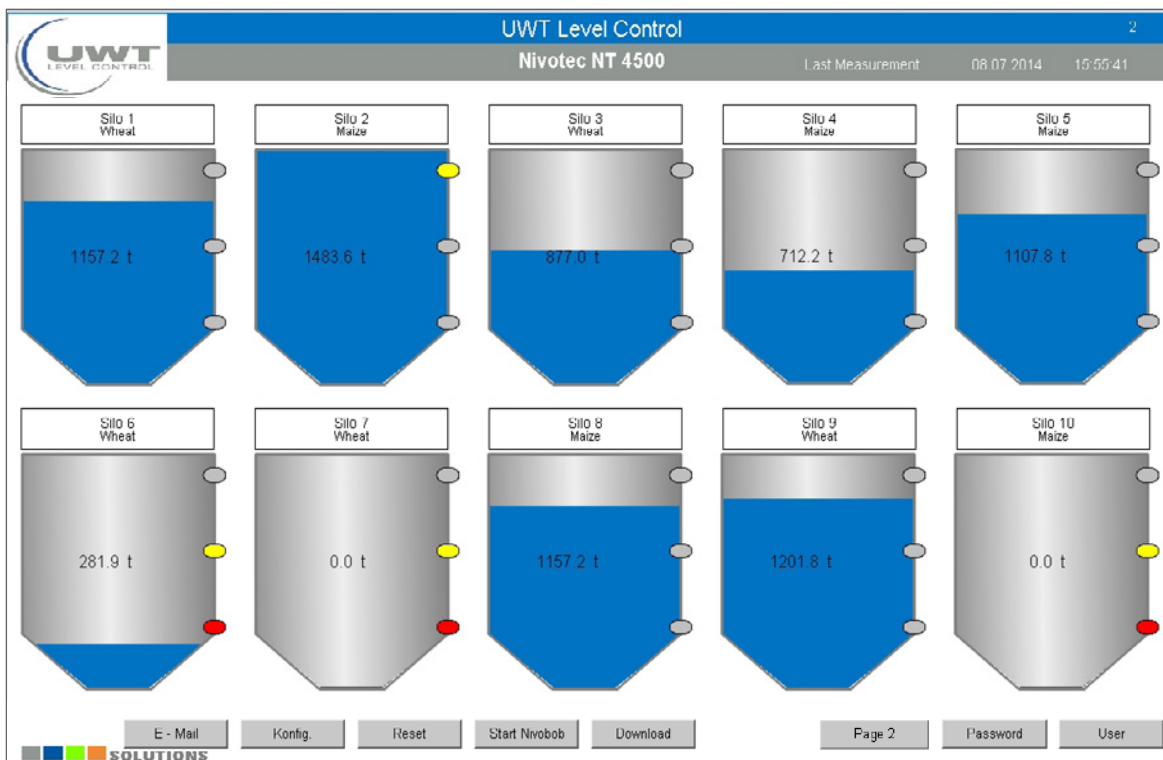
After successful start the overview page "Home" appears.

### Overview page (Home)

#### Display of level, level switches, information regarding silo and error messages

User Level 0 or higher

The selected number of silos (see page "Config") is presented. If more than 10 silos are defined, a button appears for progression to the next page.



Note: If a distorted image on the PC is present, it should not be viewed in full screen mode, thus the window can be drawn in an undistorted view.

## Visualisation - Operation

The following selections appear depending on the setted User Level:

### Silo Single View (click on a silo)

The single view for the respective silo will open (see page 13).

### E-Mail

Sends an E-mail if a level switch is activated (see page 15) or if an error message of the NB 3000 is present.

### Config

See page 12.

### Reset

Reset of the full signal (buzzer) and of error messages.

### Start Nivobob

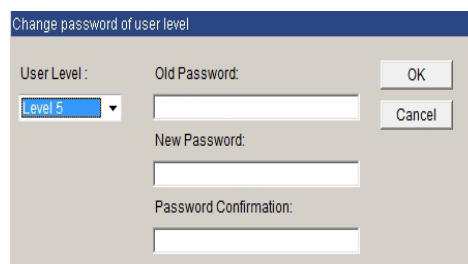
Starts the measurement of all connected Nivobobs. If more than 10 silos are defined, the measurements of the silos not displayed on the screen are started as well. As long as the measurement is running, a green arrow appears in each silo.

### Download

Issue of trend data for all silos in .csv format. The level values are stated in the unit as defined under "Volume Calculation" (see page 15).

### Password

Used for password assignment. Each User Level can change its own password. The higher level can change the password of the lower levels. No password is presetted apart from Level 7.



Change password of user level

User Level: Level 5 Old Password:  OK Cancel

New Password:

Password Confirmation:

### User

Selecting the User Level with different permissions:

#### Level 0

- Overview page (Home)

#### Level 1

Similar to Level 0, additional:

- Silo Single View
- Start Nivobob
- View of Event List
- Reset of the full signal (buzzer) and of error messages
- Download of trend data

#### Level 2

Similar to Level 1, additional:

- Page "Settings"
- Page "Volume calculation"

#### Level 3+4

BLocked

#### Level 5

Similar to Level 2, additional:

- Page "Setup Nivobob"
- Page "Config"
- Page "E-Mail"

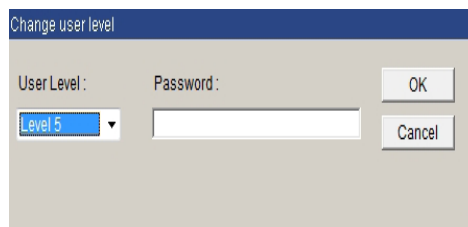
-

#### Level 6

BLocked

#### Level 7

UWT Service-Level



Change user level


User Level: Level 5 Password:  OK Cancel

## Visualisation - Operation

### Page "Config"

**Setting of date, time, software language, country-specific units, number of displayed silos as well as network settings**

User Level 5 or higher



**Konfiguration Controller**  
**Nivotec NT 4500**

Date - Time	
Time	13:28:21
Date	03.07.2014
New Time	00:00:00
New Date	01.01.1970
Set	


  

Einstellungen	
Meter	Feet
Tonnen	US Tonnen
Deutsch	Englisch

Network				
IP Address	192.168.10.70			
Sub Net Mask	255.255.255.0			
Gateway	192.168.10.250			
New IP Address	0	0	0	0
New Sub Net Mask	0	0	0	0
New Gateway	0	0	0	0
Set				

Silo Anzahl Number of Silos
10



Home

## Visualisation - Operation

### Page "Silo Single View"

#### View of details and settings of the sensors for a silo

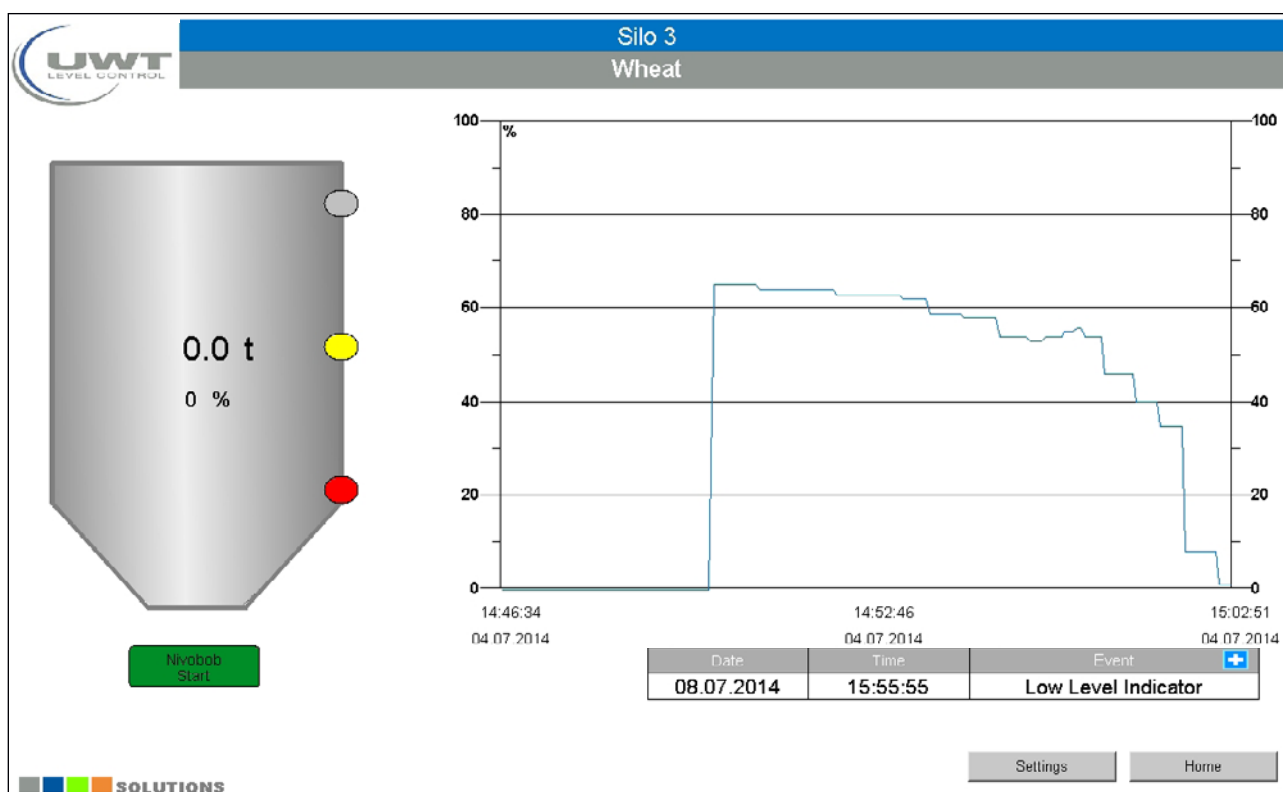
User Level 1 or higher

Clicking on a silo in the Overview page (Home) opens the Silo Single View.

The level is displayed in the unit as defined under "Volume Calculation" (see page 15), in addition as a percentage.  
The colored points display the full, demand and empty detection.

The trend stores a total of 200 data points per silo. The oldest point is deleted when a new value is stored.

Events are displayed in a table. The selection "+" opens the list of the last 17 events.



#### Nivobob Start

Starts the measurement of the Nivobob for this silo. During the measurement, the button appears gray. When the measurement is completed, the color changes back to green.

The button appears only if on page "Settings" under "Hardware" the selection "Nivobob" has taken place.

#### Settings

Leads to the page "Settings" of this silo (see page 14).

## Visualisation - Operation

### Page "Settings"

#### Detail settings for the respective measurement point

User Level 2 or higher

The page opens with click on "Settings" in the page "Silo Single View".

#### View with selection "Hardware - Nivobob":

Settings Silo 2		Software ID: 4500																								
Maize		V6.2.3 M. Nigst																								
<table border="1"> <tr><th colspan="2">Silo Data</th></tr> <tr><td>Name</td><td>Silo 2</td></tr> <tr><td>Content</td><td>Maize</td></tr> <tr><td>Art. Nr.</td><td></td></tr> </table>	Silo Data		Name	Silo 2	Content	Maize	Art. Nr.		<table border="1"> <tr><th colspan="2">Signal Input</th></tr> <tr><td>Modbus</td><td>ID 2</td></tr> </table>	Signal Input		Modbus	ID 2	<table border="1"> <tr><th colspan="2">Trend</th></tr> <tr><td>Trend Intervall</td><td>00:01:00</td></tr> </table>	Trend		Trend Intervall	00:01:00								
Silo Data																										
Name	Silo 2																									
Content	Maize																									
Art. Nr.																										
Signal Input																										
Modbus	ID 2																									
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Trend Intervall	00:01:00																									
<table border="1"> <tr><th colspan="2">Hardware</th></tr> <tr><td>LR 560</td></tr> <tr><td>Nivobob</td></tr> </table>	Hardware		LR 560	Nivobob	<table border="1"> <tr><th colspan="2">Level Indicator</th></tr> <tr><th colspan="2">Full Level Indicator</th></tr> <tr><td>Modbus</td><td>Value</td></tr> <tr><td></td><td>90</td></tr> <tr><th colspan="2">Demand Level Indicator</th></tr> <tr><td>Value</td><td>30</td></tr> <tr><th colspan="2">Low Level Indicator</th></tr> <tr><td>Value</td><td>10</td></tr> </table>	Level Indicator		Full Level Indicator		Modbus	Value		90	Demand Level Indicator		Value	30	Low Level Indicator		Value	10	<table border="1"> <tr><th colspan="2">Enable Nivobob</th></tr> <tr><td>Yes</td><td>No</td></tr> </table>	Enable Nivobob		Yes	No
Hardware																										
LR 560																										
Nivobob																										
Level Indicator																										
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Modbus	Value																									
	90																									
Demand Level Indicator																										
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Low Level Indicator																										
Value	10																									
Enable Nivobob																										
Yes	No																									
<table border="1"> <tr><td>Volume Calculation</td></tr> <tr><td>Setup Nivobob</td></tr> </table>	Volume Calculation	Setup Nivobob		<table border="1"> <tr><th colspan="2">Automatic Power Measurement Start</th></tr> <tr><td>Yes</td><td>No</td></tr> </table>	Automatic Power Measurement Start		Yes	No																		
Volume Calculation																										
Setup Nivobob																										
Automatic Power Measurement Start																										
Yes	No																									
		<table border="1"> <tr><th colspan="2">Measure Interval</th></tr> <tr><td>Yes</td><td>No</td></tr> <tr><td>Intervall Time</td><td>00:00:30</td></tr> <tr><td>Start Time</td><td>14:53:00</td></tr> </table>	Measure Interval		Yes	No	Intervall Time	00:00:30	Start Time	14:53:00																
Measure Interval																										
Yes	No																									
Intervall Time	00:00:30																									
Start Time	14:53:00																									
		<a href="#">Back</a> <a href="#">Home</a>																								

#### View with selection "Hardware - LR560":

Settings Silo 2		Software ID: 4500																						
Maize		V6.2.3 M. Nigst																						
<table border="1"> <tr><th colspan="2">Silo Data</th></tr> <tr><td>Name</td><td>Silo 2</td></tr> <tr><td>Content</td><td>Maize</td></tr> <tr><td>Art. Nr.</td><td></td></tr> </table>	Silo Data		Name	Silo 2	Content	Maize	Art. Nr.		<table border="1"> <tr><th colspan="2">Signal Input</th></tr> <tr><td>Modbus</td><td>ID 2</td></tr> <tr><td></td><td>0</td></tr> <tr><td rowspan="3">Channel</td><td>1</td></tr> <tr><td>2</td></tr> <tr><td>3</td></tr> </table>	Signal Input		Modbus	ID 2		0	Channel	1	2	3	<table border="1"> <tr><th colspan="2">Trend</th></tr> <tr><td>Trend Intervall</td><td>00:01:00</td></tr> </table>	Trend		Trend Intervall	00:01:00
Silo Data																								
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Content	Maize																							
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Modbus	ID 2																							
	0																							
Channel	1																							
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	3																							
Trend																								
Trend Intervall	00:01:00																							
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<table border="1"> <tr><td>Volume Calculation</td></tr> </table>	Volume Calculation																							
Volume Calculation																								
		<a href="#">Back</a> <a href="#">Home</a>																						

## Visualisation - Operation

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### Silo Data

The silo shown can be labeled with any text for silo name, content and article number.

### Hardware

Indication of the sensor used. For 4-20mA sensors LR560 must be selected.

### Signal Input

- If a Nivobob is connected (with selections "Hardware - Nivobob") :  
 Set here the Modbus address which is present on the Nivobob. The Modbus address of the Nivobob is set in the Nivobob communication menu (see manual Nivobob). It is reasonable to use the address 1 for the first device, then ascending to 2, 3, etc. With mixed use of Modbus converters the first addresses of the Modbus converters are already preset (see below), the Nivobob addresses must then be allocated above these. Optional (with selection code 33) the Nivobob devices are delivered with already preset address.
- If a Modbus converter is connected (with selection "Hardware - LR560"):  
 Setting of the Modbus ID number (Modbus address) of the Modbus converter.  
 The Modbus converters are factory preset to address 1 for the first Modbus converter, then ascending to 2, 3, etc. The settings can not be changed. A label with the Modbus address is present inside the Modbus converters on the implemented module M-7002.  
  
 Setting of the Channel for 4-20mA sensors and full detectors:  
 Channel 0 is allocated to the terminal Vin0+ and DI0 (see Electrical installation on page 8)  
 Channel 1 is allocated to the terminal Vin1+ and DI1  
 Channel 2 is allocated to the terminal Vin2+ and DI2  
 Channel 3 is allocated to the terminal Vin3+ and DI3

### Level Indicator

If a full detector is connected, it is read with setting to "Modbus".

If "value" is selected, the message for full and demand is activated, when the entered value (in percent) is exceeded by the material level.

The message for empty is activated, when the material level is below the entered value (in percent).

The demand and empty message can only be activated via the input "value".

### Trend

The trend stores the level values according to the set interval (hours : minutes : seconds).

A total of 200 data points per silo are stored. The oldest point is deleted when a new value is stored.

### Enable Nivobob

Measurement start can be blocked by setting to "No", e.g. while a silo is being filled.

### Automatic Power Measurement Start

After power up or after power failure of the web server, the Nivobobs will start automatically if "Yes" is selected. The level measurement is then immediately updated (the Nivobob gives no actual signal output until a new measurement is started).

### Measure Interval

Activation of automatic measurement start of Nivobob, if set to "Yes". The start takes place automatically, the first time at the set start time (time of day), then regularly repeated with the set interval (hours : minutes : seconds).

### Volume Calculation

see page 16

### Setup Nivobob

see page 17

## Visualisation - Operation

### Page "Volume Calculation"

#### Settings for volume related measurement display and setting of the silo dimensions

User Level 2 or higher

The page opens with click on "Volume Calculation" in the page "Settings".

Silo Profile	
Cylindrical	Rectangular

Unit	
Meter (m)	
Cubicmeter (m³)	
Ton (t)	
Kilogram (kg)	
Liter (l)	
Percent (%)	

Silo Data	
H (m)	15.0
K (m)	1.8
L (m)	1.2
D1 (m)	3.5
D2 (m)	0.0

Volume	
Max Volume	121.16
Density g/l	1000

Calculated	
Max. Value	Current Value
121.16 t	1.33 t

Back Home

#### Silo Profile and Silo Data

With the setted data the software calculates the max. volume:

##### Programming of the sensors

For the correct measurement display the connected sensors must be set as follows:

##### • Nivobob NB 3000:

Value "Cone Height" must be set to 0 (see page 17):

Value "Silo Height" must correspond to the value H given above

Value "Air Dist" must correspond to the value L given above

(H and L are related to the lower edge of the sensor-weight)

##### • 4-20mA sensors (connected via Modbus converter):

4mA must correspond to the value 0% given above

20mA must correspond to the value 100% given above

(H and L are related to the fixing flange if using LR 560)

Note: All sensors needs to have a linear level signal (relation between the signal output and level in the silo).

The volume-based calculation is performed in the visualisation only.

#### Unit

The selected unit is used in the visualisation.

#### Volume

Display of the max. volume (in cubic meters) and input of bulk density to calculate the weight.

#### Calculated values

Display of the calculated maximum content (according to the entered Silo Profile and Data) and the actual content.

Both values are shown in the above selected unit.



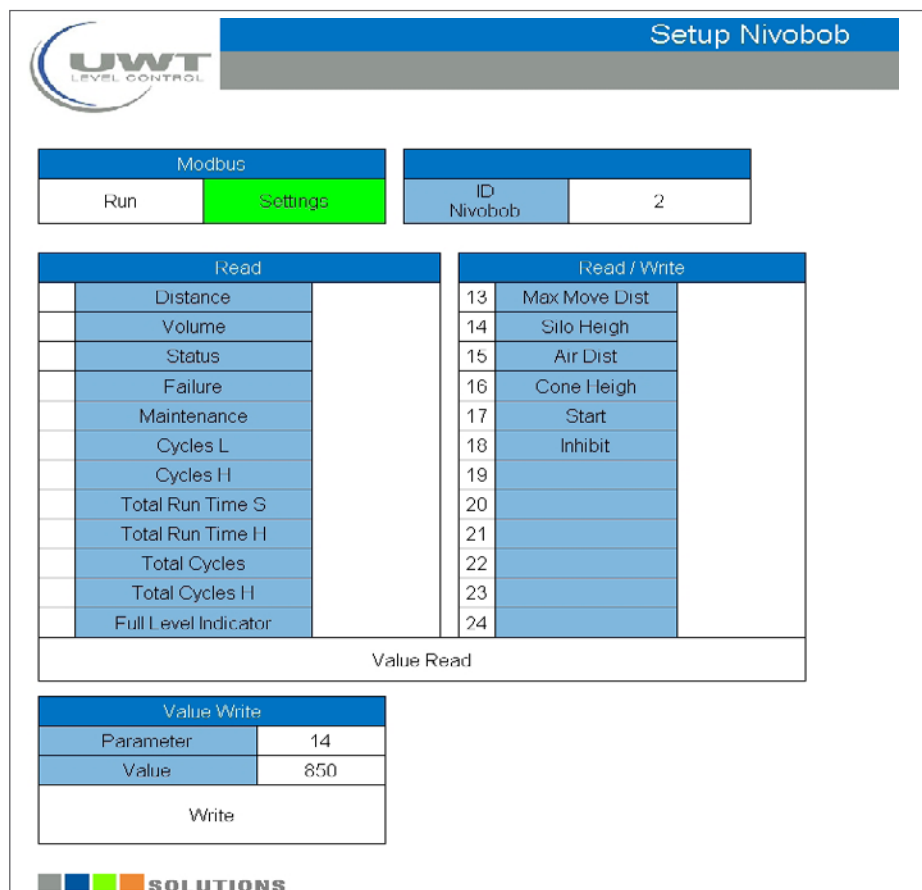
## Visualisation - Operation

### Page "Setup Nivobob"

#### Parameterization and reading diagnostic data from the Nivobob

User Level 5 or higher

The page opens with click on "Setup Nivobob" in the page "Settings".



#### Modbus

Activation of parameter setting and value reading with click on "Settings". A list with parameters of Nivobob NB 3000 appears. For details of the displayed parameters, see manual of the NB 3000.

Selecting "Run" will close again.

#### ID Nivobob

Enter the ID number (Modbus address) of the Nivobob which is related to this silo.

#### Read and Read/Write

The parameters which are read only, or which are read and write, are displayed. Update the values by clicking the "Value Read" button. After a few seconds, the values are shown. The values 13-16 are always displayed and written in millimeters.

#### Value write

Enter the number (13-18) of the value, which shall be written, in the "Parameter" box. This value is transferred to the Nivobob by clicking the "Write" button

With parameter 17 "Start" set to 1 the Nivobob can be started. Set back to 0 afterwards.

With parameter 18 "Inhibit" set to 1 a running measurement of the Nivobob is stopped. Set back to 0 afterwards.