

Connect+



Parameterization of Ultrasonic Sensors

EN



**Connect+****Note**

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The current version of the Connect+ Software, see

[http://www.mysick.com/en/Connect\\_Software\\_CPA](http://www.mysick.com/en/Connect_Software_CPA)

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## Notes

# 1 Preparation

## 1.1 System requirements

- 1 Gigahertz (GHz) or faster, 1GB MB RAM, 16 MB free hard disk space
- Windows 10, Windows 8, Windows 7, Windows Vista, Windows XP
- Graphic: minimum resolution 800 \* 600, 256 colours

## 1.2 Installing the Software

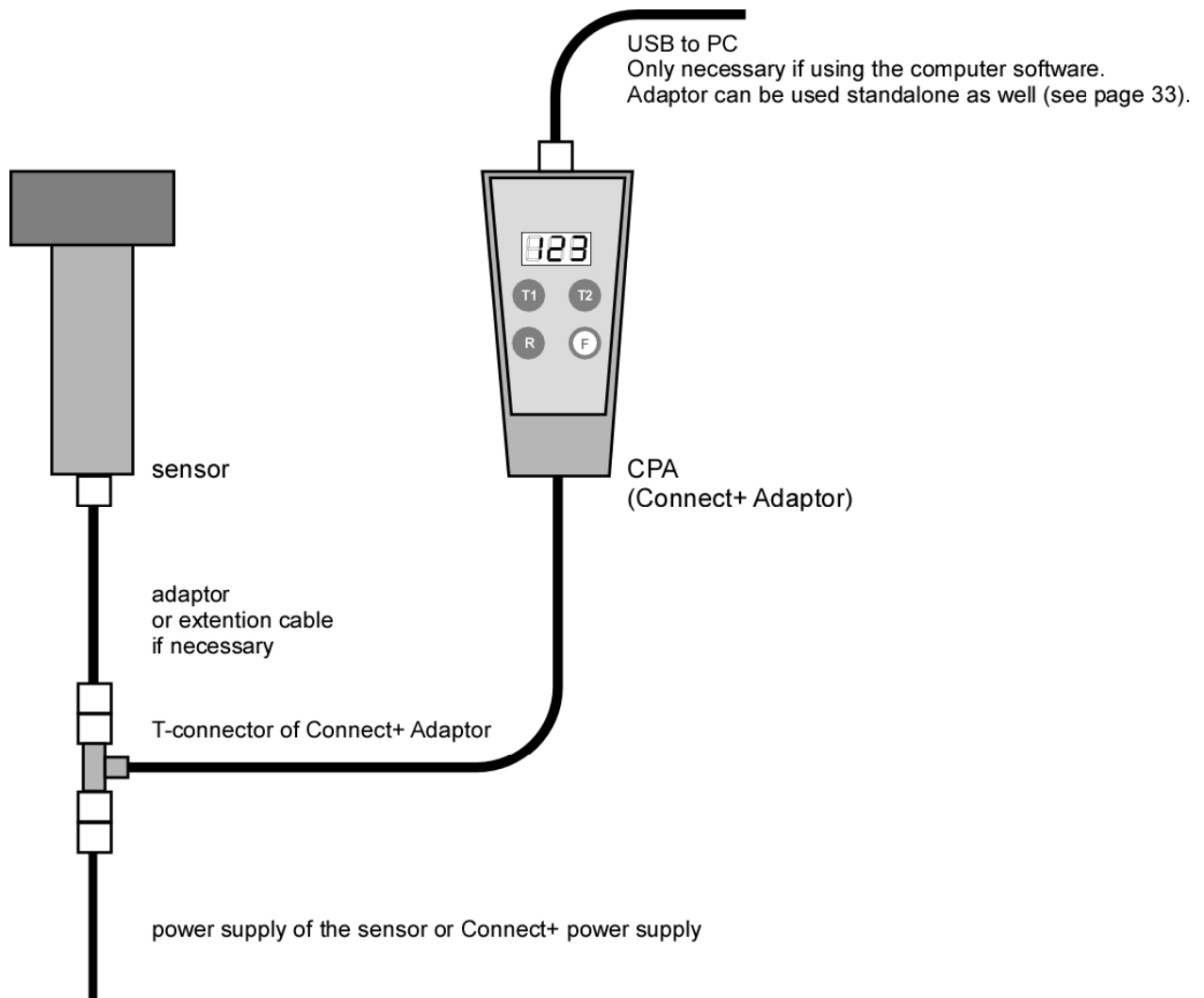
- ➔ Start your computer and wait until Windows has booted.
- ➔ Insert the installation CD into the drive
- ➔ If autostart function for CD is active, installation starts immediately,
- ➔ otherwise open Start.EXE from the CD.
- ➔ or download the newest Connect+ Software
- ➔ Follow from our homepage and start "Setup.exe".
- ➔ Follow the instructions on the screen.

### The following files are copied into this directory:

- Connect+.exe            executable program file
- Connect+\_D.chm        German help file
- Connect+\_E.chm        English help file
- LinkC.ini                configuration file for Connect+
- LinkC.lst                list with the SICK – ultrasonic sensors
- Parameter                folder with default – parameter files of the SICK – ultrasonic sensors
- Driver                    folder with the driver, used for the Connect+ Adaptor

## Connect+

### 1.3 Connection of the Connect+ Adaptor



## 1.4 Pinning and colour coding

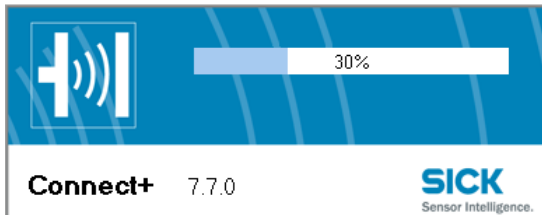
| Pin | Standard colour coding | Sensors with 1 switching output | Sensors with 2 switching outputs | Sensors with analogue output | Sensors with switching output + analogue output |
|-----|------------------------|---------------------------------|----------------------------------|------------------------------|---|
| 1   | brown                  | +U <sub>B</sub>                 | +U <sub>B</sub>                  | +U <sub>B</sub>              | +U <sub>B</sub>                                 |
| 2   | white                  | -                               | Output D1                        | Output                       | Analogue output                                 |
| 3   | blue                   | -U <sub>B</sub>                 | -U <sub>B</sub>                  | -U <sub>B</sub>              | -U <sub>B</sub>                                 |
| 4   | black                  | Output D                        | Output D2                        | -                            | Output D  |
| 5   | grey                   | Communication *                 | Communication *                  | Communication *              | Communication *                                 |

\* With the Connect+ Adaptor Pin 5 is used for communication between sensor and Connect+ Adaptor. In normal operation pin 5 is used for synchronisation and multiplex operation.

## Connect+

## 1.5 Launching the Connect+ Software

After starting the software

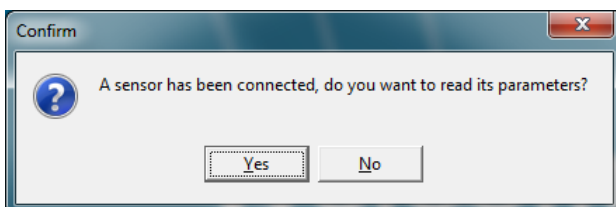


The start-up screen appears.



Connect+ checks, if a connected sensor is ready for communication.

If a sensor is recognized, this message appears



You can either read the actual parameters from the connected sensor or open a file with a parameter set.

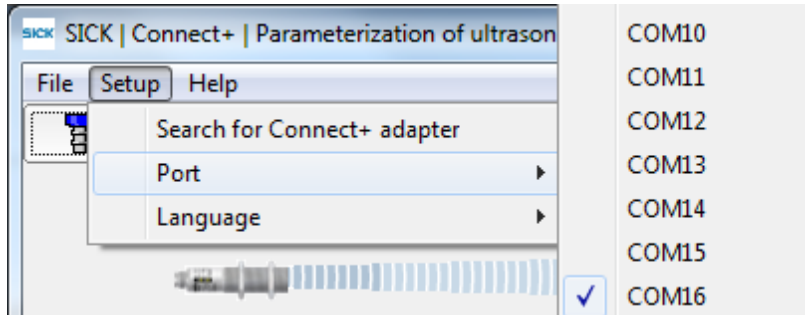
## 1.6 Select / Set the COM port

To establish communication between the Connect+ Adaptor and the PC, you have to choose the serial port.

### 1.6.1 Direct selection of the COM port

If the serial port is known,

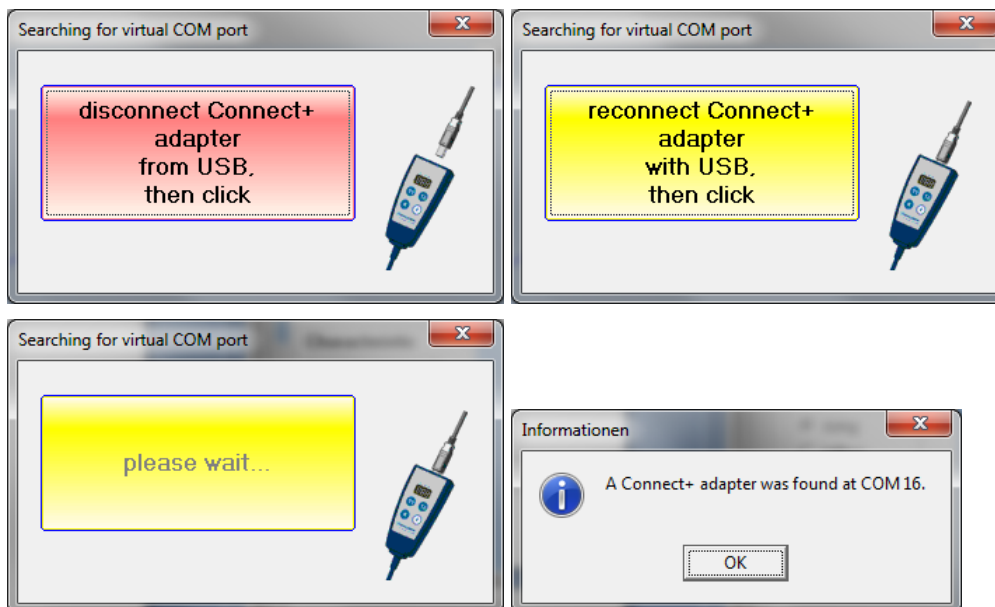
→ select the COM-Port via „Setup | Port“.



### 1.6.2 Automatic search of the COM port

If the serial port is unknown, Connect+ is able to identify the used port.

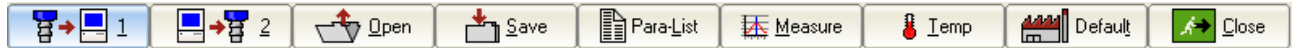
→ Click "Find Setup | Connect+ Adaptor" and follow the next instructions.



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## 2 Reading / writing parameters

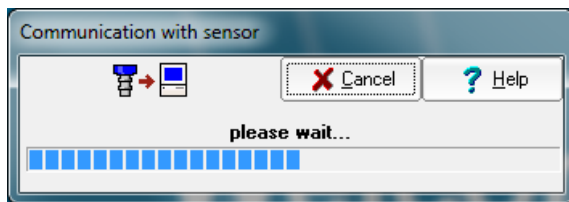
### 2.1 Reading parameters from a connected sensor



Only for UM18-1:

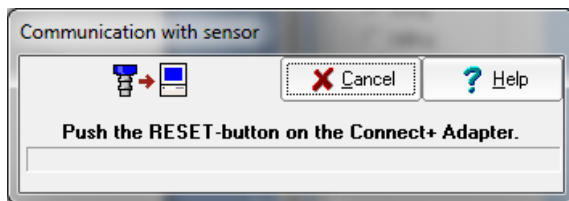
Please notice that the sensor does not perform ultrasonic measurements during programming with Connect+; thus none of the outputs are served during this period. You are allowed to alter sensor parameters on an installation or machine under operation using Connect+ only, if you have made sure that no harmful situation for man and machine may occur when doing so. When in doubt you must power down the installation or machine before altering parameters with Connect+.

- ➔ Check for a proper connection of your Connect+ Adaptors to your sensor and to your PC and make sure that the correct port has been selected.
- ➔ Press  for Reading parameters from the sensor
- ➔ or
- ➔ switch on the sensor and confirm the prompt.



All parameters are read from the sensor and transferred to the input mask of the Connect+ Software.

If the following message occurs,

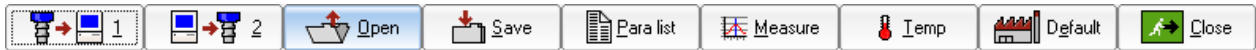



- ➔ press the RESET button on the Connect+ Adaptor.

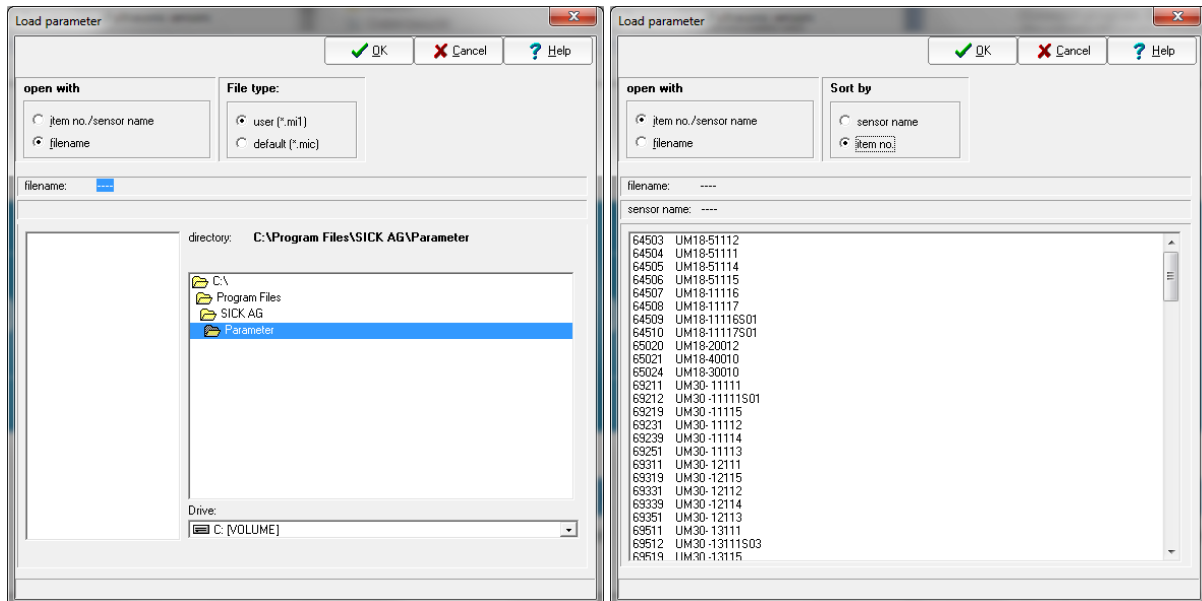
If still the parameters cannot be read from the sensor, please check, whether

- ➔ a sensor capable for Connect+ is connected
- ➔ the sensor gets its power supply via the Connect+ Adaptor (LED's on sensor must be illuminated)
- ➔ the USB - connection to the PC is properly made
- ➔ the correct port has been selected within the Connect+ Software


## 2.2 Reading parameters from a file



- ➔ Press 
- ➔ select, whether you want to load parameters out of a file...
- ➔ or load the default parameter files of a specified sensor by sensor name by his sensor name and his item number.

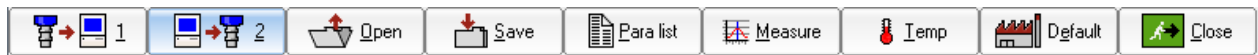


- ➔ select the sensor respectively the parameter file and confirm by OK.


 Parameter files with the extension \*.MIC contain data for default settings of the specific sensor. These files have been established by SICK. You may alter these basic settings and store them afterwards with the extension \*.M11 under the same or a different name. Thus the files with the default settings will not be corrupted.

## Connect+

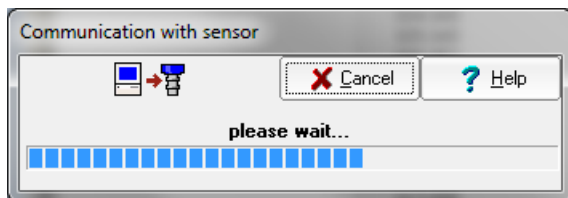
## 2.3 Transmit parameters to the sensor



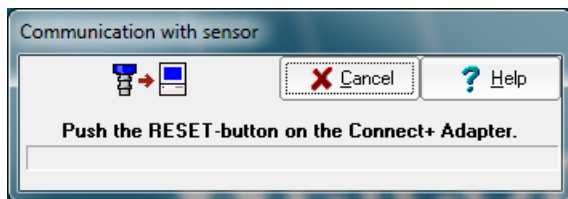
All changes that you have made in the input masks, are only temporarily stored within the Connect+ program. You have to transfer the data to the sensor and / or save it as a file on the hard disc of your PC or on a floppy disc.

- ➔ Press  for sending the parameters to the sensor
- ➔ confirm the prompt

It is checked in advance whether the connected sensor matches the sensor type, which is indicated in the input mask. Subsequently the altered parameters are transferred to the sensor.



If the following message occurs,



- ➔ press the RESET button on the Connect+ Adaptor.

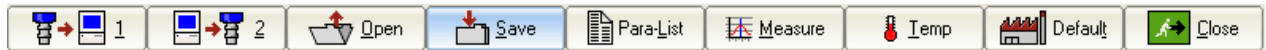
If still the parameters cannot be written to the sensor, please check, whether


- ➔ a sensor capable for Connect+ is connected
- ➔ the sensor gets its power supply via the Connect+ Adaptor (LED's on sensor have to be illuminated)
- ➔ the USB connection to the PC is properly made
- ➔ the correct port has been selected within the Connect+ Software


Also see page 9: Reading parameters from a connected sensor

If the Connect+ Software realises, that the selected sensor type does not match the connected sensor type, the transfer of parameters is inhibited.

## 2.4 Saving parameters to a file



- Press 
- Select a file name of your own and confirm by pressing OK.

 When saving parameter data only the file name extension \*.MI1 is accepted (to mark the file as user file), to preserve the default parameter files (\*.MIC).

## 2.5 Copy / Clone parameters

With the help of saving parameters to a file, reading the parameter file and then writing to a second sensor of the same type and series, parameters can be copied or cloned in a simple and fast way.

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
### 3 Changing parameters

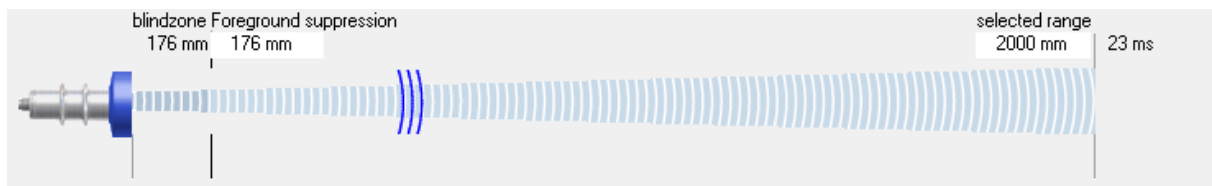


Depending on the connected sensor (or according to the loaded sensor file) the input mask may vary in its appearance. All changes which you make in the input mask are only temporarily stored in the PC. Subsequently these new settings have to be transferred to the sensor and / or be stored permanently on the hard disc of your PC.

All general parameters can be set on switching sensors as well on analogue ultrasonic sensors.

The numeric values have to be input in mm and can be edited by keyboard.

Additionally the values of foreground suppression, switching distances, hysteresis points and window margins can be changed by clicking and dragging the edge point (mouse pointer changes to ).



#### Blindzone

Since the ultrasonic sensor uses the same transducer element for both sending and receiving, the sensor cannot start to read in echo signals before the oscillations of the strong sending pulse have calmed down. This results in a blind zone which is typical for an ultrasonic sensor. The usable measurement range begins right after the blind zone. The target distance should not be less than the blind zone, as this may result in mismeasurements. The size of the blind zone varies with the different maximum detection ranges of different models; the blind zone is sensor-immanent and cannot be influenced by the user.

#### Foreground suppression

The foreground suppression represents an artificial enlargement of the blind zone, i.e. the measurement range begins after the value of the foreground suppression instead of the blind zone. All echo signals, which arrive between sensor and foreground suppression, are ignored. You can use this feature to suppress small unwanted targets, which are located in the vicinity of the sensor.

#### Selected detection range

The selected detection range determines the maximum distance that can be measured. Using the default settings the selected detection range is set to the limiting of a sensor type. The maximum detection range is the recommended - physically reasonable - detection range, up to which the sensor can be used (assuming good reflection properties of the target object). The working range, which is indicated in the technical data sheets of SICK, represents on the other hand the typical detection range where the sensor still functions according to its technical specifications - even on reflectors with critical reflection properties (functional reserve).

The selected detection range takes effect on the repetition rate of sensor measurements. The time for a single ultrasonic measurement, resulting from the selected detection range, is displayed above the correspondent input field. If you decrease the selected detection range you will increase the measurement repetition rate of the sensor. Please notice however that values below the nominal detection range of the specific sensor type might affect the sensor function due to double reflections. Normally there is no need to select a value for the selected detection range other than given by the default settings.

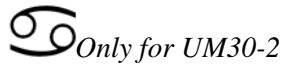
#### Temperature compensation

The velocity of sound in air is temperature dependent. The dependency can roughly be specified as 0.17 %/°K. To compensate this temperature influence, the temperature is internally measured and a correction factor is calculated for the time-of-flight of echoes. The internal temperature compensation can be enabled / disabled by the check box Temp. Comp.

## Touch Control

The ultrasonic sensors of the product family UM30-2 are equipped with a control panel to manually adjust basic sensor parameters via two push buttons (TouchControl). If the UM30-2 sensors should only be adjustable using the Connect+ Adaptor, the control panel may be locked by unmarking the check box Touch Control. This is helpful, if you want to prevent unauthorised, manual adjustment of sensors.

## Sensitivity



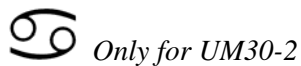
The amplifier sensitivity can be varied in three levels (high, standard, low). Compared to the default level, the sensitivity increases with the setting "high" - the sound field becomes larger. When set to "low", it has the opposite effect.

## Current saving-mode



For the reduction of the current consumption, one can dim or switch off the display. For a further reduction of the current consumption you can deactivate the synchronisation.

## Sync/Multiplex



If the assembly distances for two or more sensors are exceeded, the integrated synchronisation should be used. Within the multiplex operation every sensor can be assigned sensor an individual device address between 1 and 10. The sensors perform the ultrasonic measurement sequentially from low to high address. Therefore any influence between the sensors is rejected.

The device address >0< is for the synchronous working reserved and deactivates the multiplex mode. For the synchronous working all sensors, the device address has to be >0<.

---

**Connect+****Display mode**

*Only for UM30-2*

On sensors with analogue output the display mode of the sensor-display can be changed.

**mm:** the measured distance value is indicated in mm and/or cm

**0...100%:** the measured distance value is indicated as percentage value of the analogous characteristic, starting from the sensor-near up to the sensor-far folding point

**100...0%:** the measured distance value is indicated as percentage value of the analogous characteristic, starting from the sensor-far up to the sensor-near folding point

**Noise interference filter**

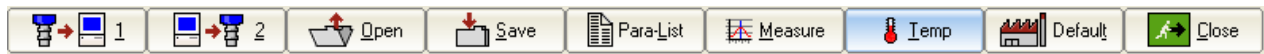
*Only for UM18-2*

Interfering ultrasonic signals, which are not produced by the sensor itself can be suppressed by the activation of the noise interference filter.

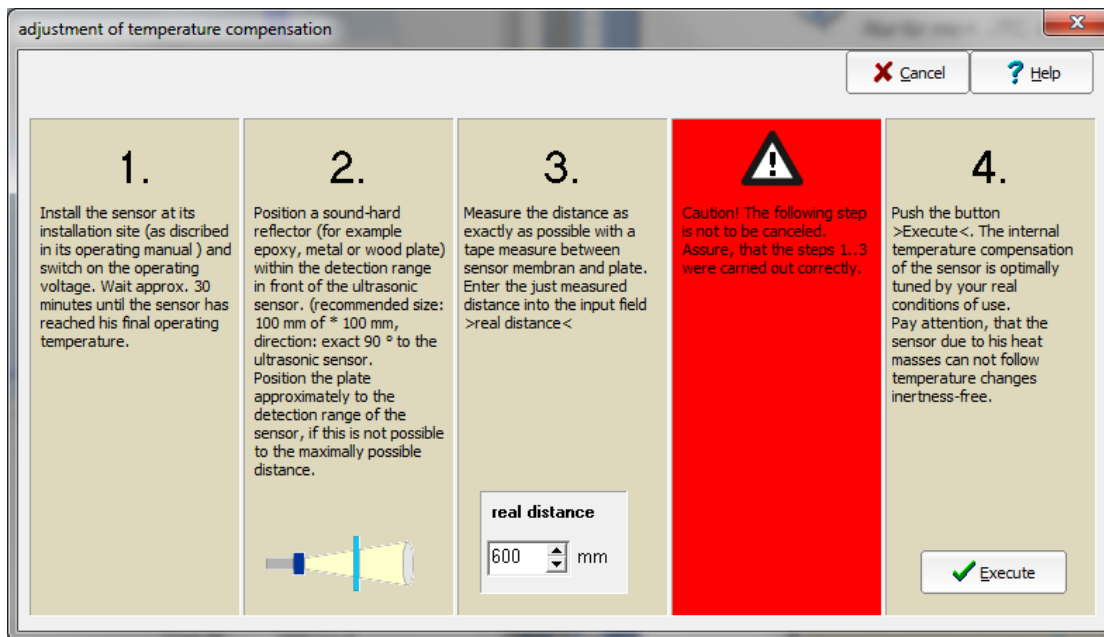
## 4 Adjustment of temperature compensation



Only for UM18-2 and UM30-2



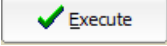
For very precise measurements the temperature compensation can be adjusted. For that a sound-hard reflector is positioned in the exactly measured distance to the sensor and sends this distance information to the sensor.



- ➔ Install the sensor according to operating manual at his later field and you turn on the operating voltage. Wait approx. 30 minutes until the sensor reached his final operating temperature.
- ➔ Position a flat plate (for example Epoxy-, Metal-, wooden board or smooth carton) with the least measurements 100 x 100 mm in a normal way achieved to the sensor into the sonic field. Position the plate for instance in the field of the detection range of the sensor, if this is not possible into the maximally possible distance.
- ➔ Measure the distance as exactly as possible with a tape measure between sensor membrane and plate. Enter the determined value into the input field >real distance<.

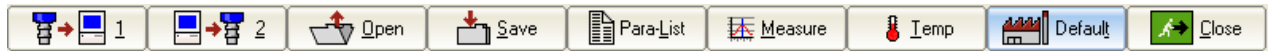


The following step is not to be cancelled. Assure that the steps 1...3 were carried out correctly.

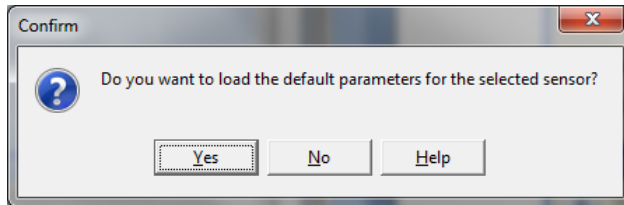
- ➔ Press . The internal temperature compensation of the sensor is optimally tuned by your real conditions of use. Pay attention, that the sensor due to his heat masses can follow temperature changes not inertness-free.

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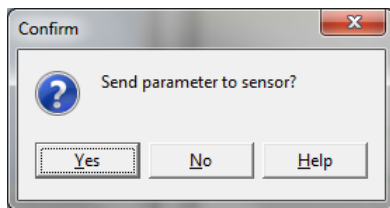
## 5 Setting the sensor to its defaults



→ Press .



→ Confirm the prompt.



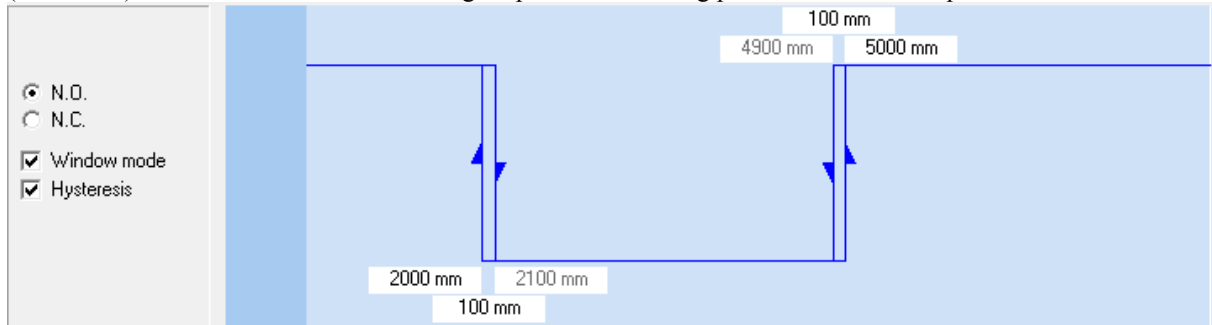
All parameters that you changed, will be set to its default values located in the default parameter files (\*.MIC).



*All changes that are made in the input mask are temporarily stored in the PC program only. Subsequently these new settings have to be transferred to the sensor (see: page 11)*

## 6 Changing parameters for switching sensors

SICK - ultrasonic sensors with pnp- or npn switching output are available as versions with one or two outputs (S1 and S2). On sensors with two switching outputs the switching points can be set independently from each other.



### Normally open (N.O. / Normally closed (N.C.)

For each switching output a normally open / normally closed behaviour can be selected individually (N.O. = normally open, N.C. = normally closed).

### Setting switching points and hysteresis

The switching points (=switching distances) are furnished with an adjustable hysteresis. If the check box Hysteresis is checked, you specify a fixed hysteresis in the correspondent input field. The switching point may then be adjusted between the foreground suppression and the selected detection range (minus hysteresis).

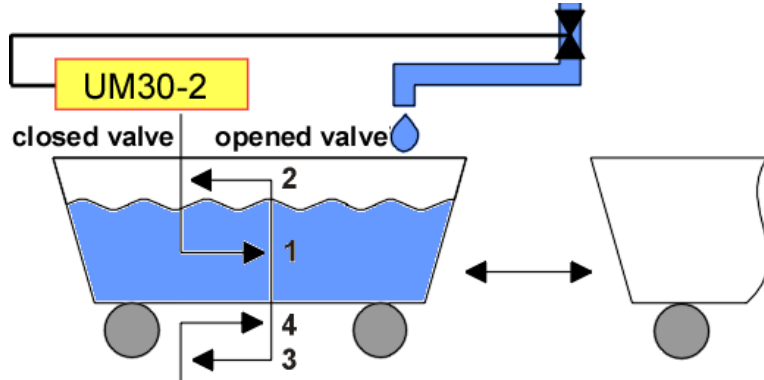
If the check box Hysteresis is unchecked, you specify the switching point to the OFF-state and the switching point to the ON-state separately. The hysteresis is then calculated by switching point OFF minus switching point ON. (This is interesting for level detection applications: a Min/Max control feature can be realised by using just one switching output).

### Window mode

If the check box Window Mode has been checked, another switching point plus correspondent hysteresis becomes available for each switching output. Both switching points form a window, where the output is set only if an object is detected between these two margins.

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Some very interesting applications can be derived from the possibility to load both switching points with different hysteresis values:

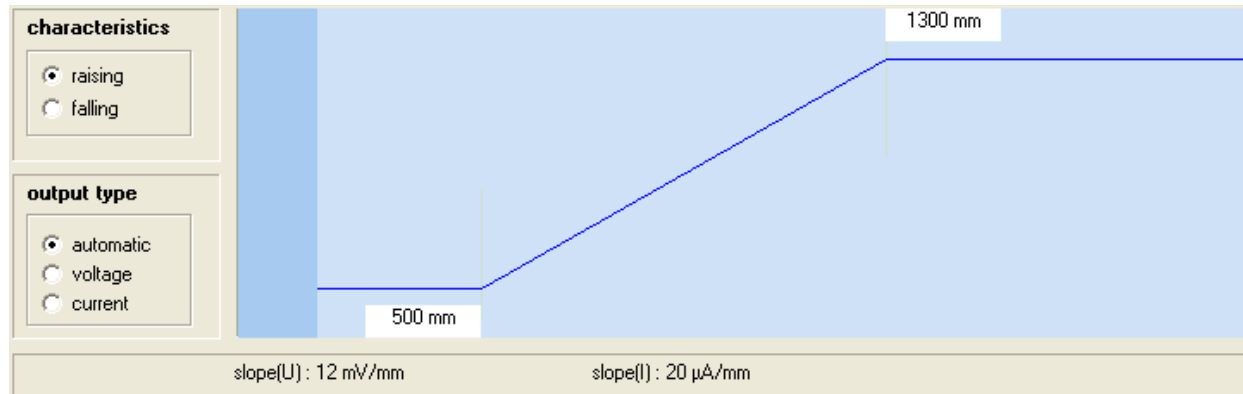
**In the example**

the output is set at switching distance 1 and the valve opens for filling. Beyond the hysteresis the valve closes again at switching distance 2. To prevent the valve from opening when there is no vehicle at all, the valve is kept shut by switching distance 3. As soon as there is a vehicle once again below the valve, the sensor reopens the valve by switching distance 4.

A window has been defined between switching distance 1 and 4. The correspondent hysteresis points 2 and 3 were selected individually. The operating mode is N.C. (normally closed function).

## 7 Changing parameters for analogue sensors

The sensors UM30-2 resolves distances with 0.18 mm increments and output the measured distance with the same resolution. The resolution is independent from the selected detection range and also independent from the selected window margins.



### Inner window margin / outer window margin

The turning points of the analogue output curve are selected by the inner window margin and the outer window margin. In between these two distances the analogue output signal runs linearly - rising or falling according to the selected output slope.

### Characteristics

By the selection buttons rising / falling the output characteristic can be toggled between rising (0 - 10 V or 4 - 20 mA) or falling (10 - 0 V or 20 - 4 mA) slope of the analogue output curve.

### Output type

Ultrasonic sensors with automatic changing of voltage- current output check the output load resistor and switch autonomously to current or voltage output mode depending on the result. Checking the output load takes place every time when the device is powered up. If the load resistance is low (< 500 Ohm) the analogue sensor goes for the current output; if the load is high (> 10 kOhm) for voltage output.

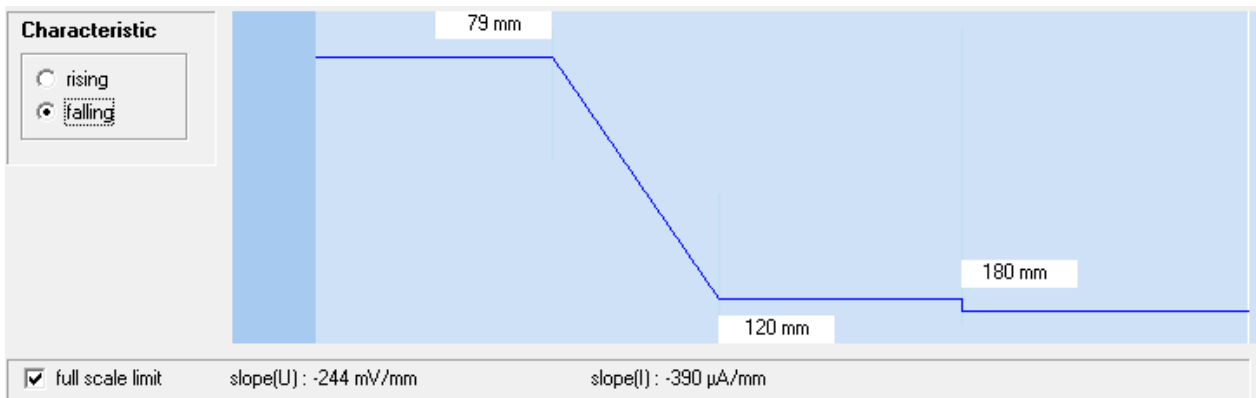
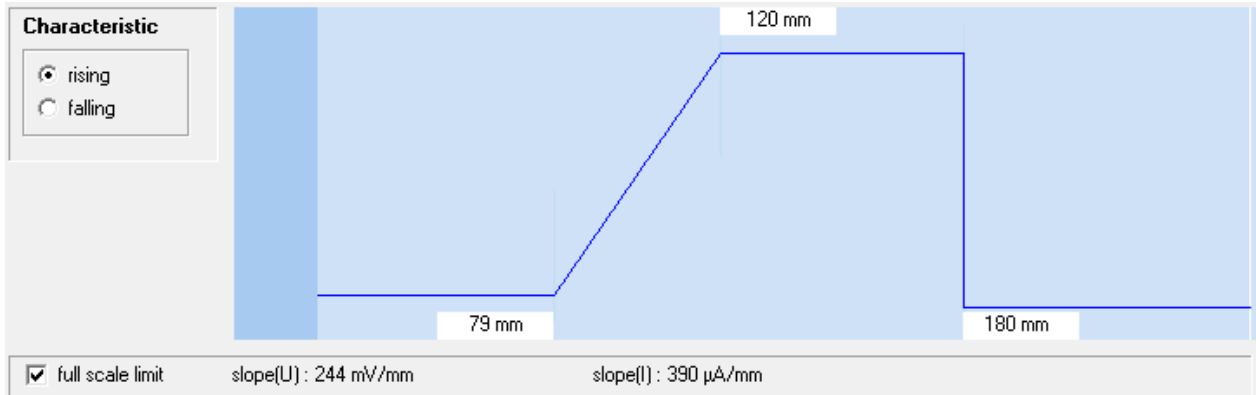
The automatic changing of voltage- current output can be switched off and the type of the output can be programmed as a fixed output type (voltage or current).

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## Full scale limit



Only for UM18-2

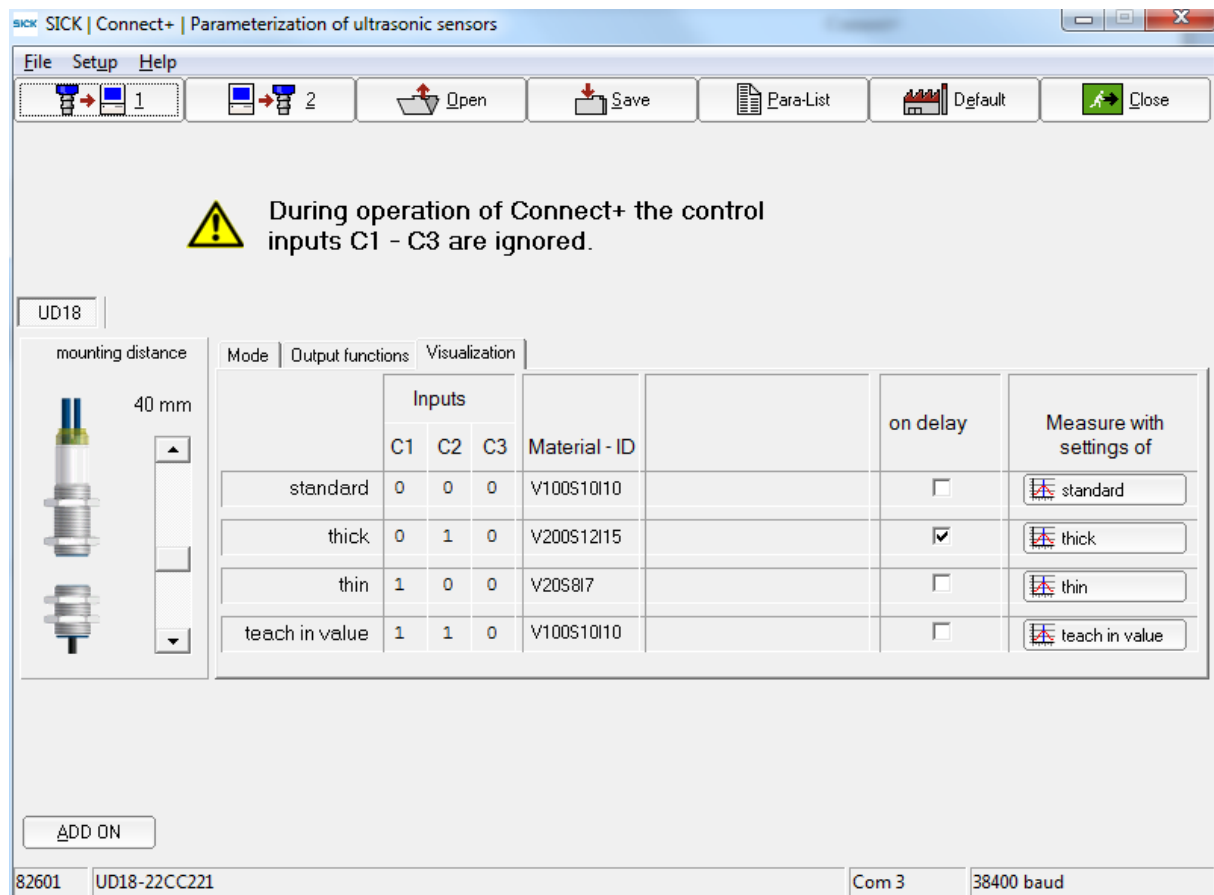


You can insert an additional break point behind the far sensor break point of the characteristic curve. Behind this break point the output voltage/output current falls to 0 V/4 mA.

## 8 Change parameter for double layer sensor

The ultrasonic double sheet detection consists of a transmitter and a receiver. It is used for contactless detecting missing, single and double (more than one) layers of material and other laminar materials.

A high-frequency ultrasonic transmitter emits from one side to the sheet material. The emitted ultrasonic pulse stimulates the material to vibrate. These cause the spread of a very small sound wave on the opposite side of the material layer, which is received from the ultrasonic receiver. In superimposed layers (= double layer), the receiver detects the signal difference and sets the corresponding output.



### Voltage level of the logic states at the control inputs

| Logical status | voltage level    |                  |
|----------------|------------------|------------------|
|                | pnp              | nnp              |
| 0              | -U <sub>V</sub>  | + U <sub>V</sub> |
| 1              | + U <sub>V</sub> | - U <sub>V</sub> |

### Mounting distance

Numeric input of the mounting distance between transmitter and receiver. The actual mounting distance between transmitter and receiver must always correspond to this value in order to ensure reliable operation..

**Connect+****Sensitivity classes**

During operation of Connect+ the control inputs C3 to C1 will be ignored. They are used in sensor mode to select and teach the sensitivity classes.

Nevertheless, the corresponding logic states are shown for better understanding.

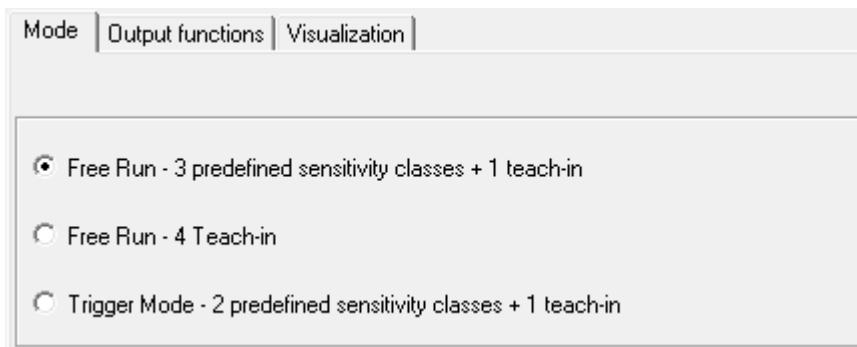
| Mode           | Output functions | Visualization |    |    | Material - ID |
|----------------|------------------|---------------|----|----|---------------|
|                |                  | Inputs        |    |    |               |
|                |                  | C1            | C2 | C3 |               |
| standard       |                  | 0             | 0  | 0  | V100S10I10    |
| thick          |                  | 0             | 1  | 0  | V200S12I15    |
| thin           |                  | 1             | 0  | 0  | V20S8I7       |
| teach in value |                  | 1             | 1  | 0  | V100S10I10    |

## 8.1 Operating modes

You can choose among the following modes:

- Free-run mode with 3 predefined sensitivity classes and additional teach-in mode, for example, for sampling of bonded wafers with a water film.
- Free-run mode with 4 independent teach-in classes
- Trigger mode with 2 predefined sensitivity classes and additional teach-in mode, edge or level-controlled trigger mode, for example, for applications in the scale flow.

### Free Run - 3 predefined material classes + 1 Teach-in



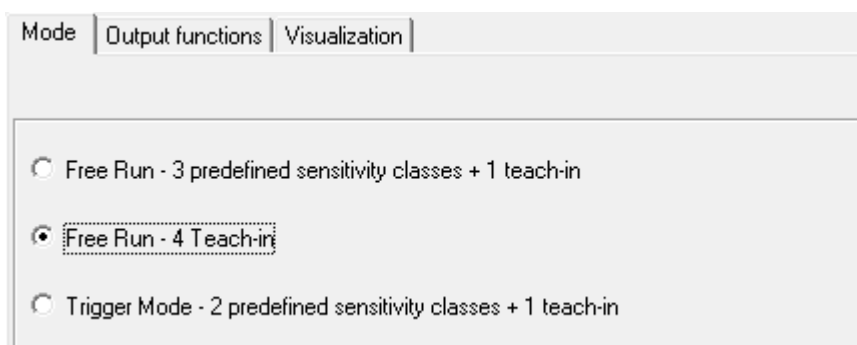
With factory setting, the UD18-2 operates in free-run mode. In free-run mode the UD18-2 results cyclically by measurements.



*Should be measured in an overlapping stream, an external signal can trigger each measurement separately.*

### Free Run – 4 Teach-in

If the free-run mode is parameterized, up to 4 different materials can be taught.



The predefined sensitivity classes "standard", "thick", "thin" and "teach-in value" can all be customized.

**Connect+**

With appropriate buttons under "Visualization", the learned sensitivity classes are brought back to the factory setting for Factory setting for "Default", "thick" and "thin".

| Mode       | Output functions | Visualization |    |            | Material - ID | Factory setting |
|------------|------------------|---------------|----|------------|---------------|-----------------|
|            |                  | C1            | C2 | C3         |               |                 |
| teach in 1 | 0                | 0             | 0  | V100S10I10 | Standard      |                 |
| teach in 2 | 0                | 1             | 0  | V200S12I15 | thick         |                 |
| teach in 3 | 1                | 0             | 0  | V20S8I7    | thin          |                 |
| teach in 4 | 1                | 1             | 0  | V100S10I10 |               |                 |

**Operation in trigger mode**

In trigger mode, each measurement can be triggered individually by means of an external trigger signal. This is useful if you want to hide double layers, for example, for measurements in the overlapping stream.

The response time is also significantly reduced in the trigger mode.

If trigger mode is parameterized by Connect +, the external trigger signal must be connected to the control input C2. Under "Trigger Mode" can be selected, on which event at the control input C2 a measurement is to be performed.

In the edge-controlled trigger modes, the double-layer control executes one measurement with each status change from 1 to 0 or from 0 to 1 and stores the result until the next trigger edge.

In the level-controlled trigger modes the UD18 performs measurements as long the selected trigger signal at the control input C2 is applied. Once the opposite signal is applied, the result of the last measurement to the switching outputs is maintained.

| Mode  | Output functions | Visualization |
|---|------------------|---------------|
| <input type="radio"/> Free Run - 3 predefined sensitivity classes + 1 teach-in<br><input type="radio"/> Free Run - 4 Teach-in<br><input checked="" type="radio"/> <b>Trigger Mode - 2 predefined sensitivity classes + 1 teach-in</b> |                  |               |
| <b>Trigger Mode</b><br><input checked="" type="radio"/> state change from 0 to 1<br><input type="radio"/> state change from 1 to 0<br><input type="radio"/> Logical status = 1<br><input type="radio"/> Logical status = 0            |                  |               |

In trigger mode the sensitivity levels "standard", "thin" and "teach in value" are available as shown in the following table.

| Mode           | Output functions | Visualization | Inputs |    |    | Material - ID |
|----------------|------------------|---------------|--------|----|----|---------------|
|                |                  |               | C1     | C2 | C3 |               |
| standard       |                  |               | 0      |    | 0  | V100S10I10    |
|                |                  |               |        |    |    |               |
| thin           |                  |               | 0      |    | 1  | V20S8I7       |
| teach in value |                  |               | 1      |    | 0  | V100S10I10    |

## 8.2 Output functions

You can make the following settings for the switching outputs D1 and D2:

| Mode  | Output functions | Visualization |
|---|------------------|---------------|
| Output D1   |                  |               |
| <input checked="" type="radio"/> N.C. (Single sheet = closed, Missing sheet = open) |                  |               |
| <input type="radio"/> N.O. (Single sheet = open, Missing sheet = closed)            |                  |               |
| <input type="radio"/> Override (N.C.)   |                  |               |
| <input type="radio"/> Override (N.O.)   |                  |               |
| Output D2   |                  |               |
| <input checked="" type="radio"/> N.C. (Double-sheet = open)                         |                  |               |
| <input type="radio"/> N.O. (Double-sheet = closed)                                  |                  |               |

Connect+

### 8.3 Visualization

The measurement data of the ultrasonic double layer detection can be visualized in a measurement writer. For this you have to select the setting for "standard", "thick", "thin" or "teach-in value", with the corresponding sensitivity level of the sensor, which operates only for the time of visualization.

UD18

mounting distance 40 mm

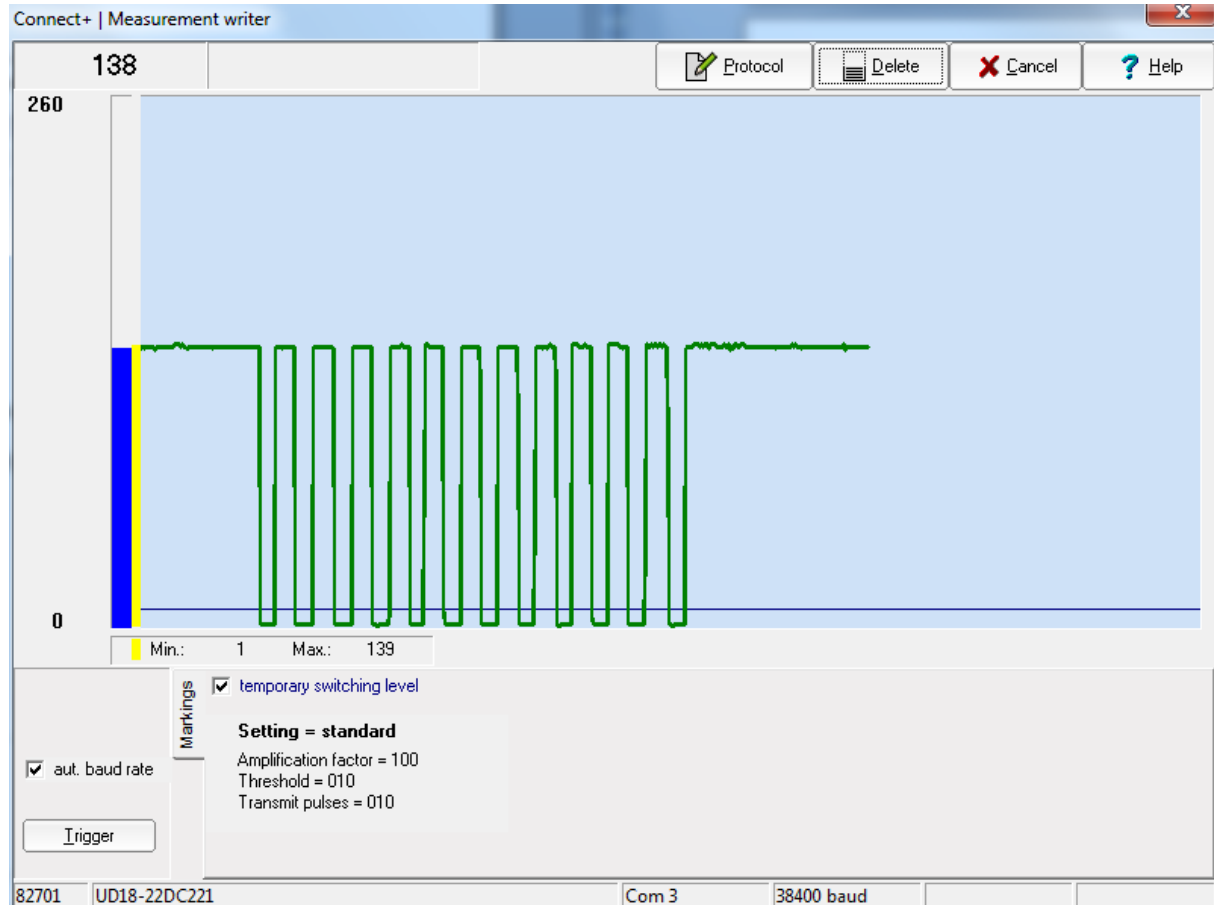
Mode Output functions Visualization

|                | Inputs |    |    | Material - ID | on delay                            | Measure with settings of                    |
|----------------|--------|----|----|---------------|-------------------------------------|---|
|                | C1     | C2 | C3 |               |                                     |   |
| standard       | 0      | 0  | 0  | V100S10I10    | <input type="checkbox"/>            | <input type="text" value="standard"/>       |
| thick          | 0      | 1  | 0  | V200S12I15    | <input checked="" type="checkbox"/> | <input type="text" value="thick"/>          |
| thin           | 1      | 0  | 0  | V20S8I7       | <input type="checkbox"/>            | <input type="text" value="thin"/>           |
| teach in value | 1      | 1  | 0  | V100S10I10    | <input type="checkbox"/>            | <input type="text" value="teach in value"/> |

ADD ON

82601 UD18-22CC221 Com 3 38400 baud

When visualizing with the measurement writer, the digitized received echo as 8-bit value (0 ... 255) is shown. Only the relative measurement is of interest. It is used for determining whether the distance from the switching threshold is sufficiently high. The measured values are highly dependent on the homogeneity of the material.



## 8.4 Filter and switching threshold

The measured value filters act on the recognition of a double layer and not to the detection of missing material.

The off delay after detecting the presence of a double layer is always active independently of the selected sensitivity level and is adjustable in a range of 0 to 20 measuring cycles.

The on delay at detection of a double layer acts only on the selected sensitivity level, you have selected in Connect+ under “Visualization” and can be set in a range from 0 to 5 measuring cycles.

Connect+

## 9 Filter settings

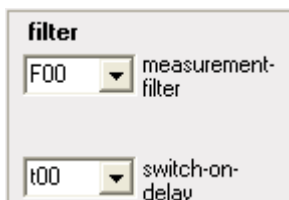
SICK - ultrasonic sensors normally combine several ultrasonic measurements for a reliable result. Plausibility is checked and measured values are attenuated. All filter settings may be applied to switching sensors as well as to analogue sensors. Different filter methods are at hand to achieve this, where the intensity of the influence can be varied.



*All internal filters always lead to a reduction of the switching frequencies or an increase of the settling time of analogue signals. If a very quick response of the sensor is necessary, all filters can be deployed. However you have to take into account that the sensor loses any kind of noise suppression.*

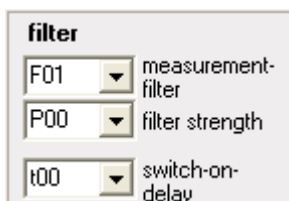
Within these sensor families you are able to select four different types of filter. On every of these filter types, you can set the filter strength in steps from 0 to 9.

### F00



Every measured distance value takes effect on the output unfiltered. This filter setting is used for real measurement purposes, for example when the measured values are post-processed in a laboratory using a PC

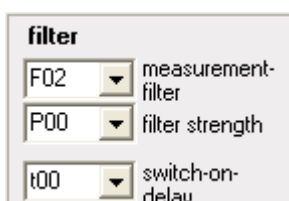
### F01



When a target approaches the sensor the shortened distance is accepted at once. If the target withdraws again the old distance is output using a hold time before the new value is valid. Employing this filter method short time blanking of echoes is suppressed.

The advantage of this filtering can be seen in the fact that the sensor immediately reacts in one direction - here on an object approach - whereas the withdrawal is attenuated.

### F02



This filter method simulates an arithmetic mean value calculation over several measurements. The setting for filter strength takes effect on the attenuation.



The applied method is not exactly a true mean value calculation from the mathematical point of view; due to the limited RAM storage capacity of a microcontroller a similar method is employed. The maximum allowable attenuation should experimentally be derived.

### F03

| filter |                    |
|--------|--------------------|
| F03    | measurement-filter |
| P05    | filter strength    |
| t00    | switch-on-delay    |

In the case of arrival of different distance values, the sensor-near measured values are preferred. On these measurements works a hold time, as with F01 filter and a following arithmetic averaging, as in F02 filter.



Only for UM30-2

### F04

| filter |                    |
|--------|--------------------|
| F04    | measurement-filter |
| P03    | filter strength    |
| t00    | switch-on-delay    |

In the case of arrival of different distance values the sensor-far measured values are preferred. On these measurements works a hold time, as with F01 filter and a following arithmetic averaging, as in F02 filter.



Only for UM30-2

**Connect+****F05**

= F01 with filter strength P01 + switch-on delay from 1 to 10 s.



*Only for UM18-1*

**F06**

With this filter a tolerance belt is put symmetrically around the measured value. If the current distance values remain within this belt, they are passed through an average filter.

If the current measured value crosses the tolerance belt (above or below), still the old range-to-target reading is spent so over the hold time (Attenuation on object withdrawal and/or attenuation on object approach) before the new value is taken over.



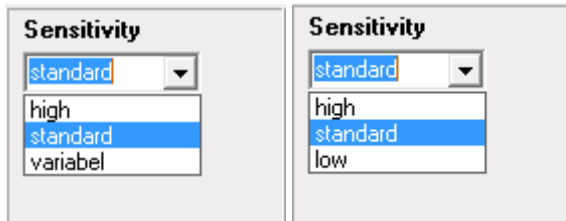
*Only for UM18-1*

## 10 Sound cone adjustment / Sensitivity adjustment



Only for UC30-2 and UM30-2

For the product families UC30-2 and UM30-2 there is the possibility to adjust the ultrasonic cone size by adjusting the sensitivity of the sensor. Be aware that these changes in sensitivity not only refer to the limiting range, but also to the width of the ultrasonic cone.



The default setting is "standard".

When operating in the setting "high", the length and width of the ultrasonic cone will increase by about +20%.

In the setting "low" it will decrease the sensitivity and thus the size of the ultrasonic cone by about -20%.

For UC30-2 and UM30-2 from production week CW15 in 2014 (Date code on the device "1415") there is also the possibility to adjust the sound cone size variably. After reading a sensor described above, "low" is replaced by the setting "variable". By selecting the setting "variable", the behavior of the sensitivity gain/amplification will be visualized in Connect+.

**Connect+**

This variable sound cone adjustment is realized by a change of the amplification of the received echo. By default, the gain/amplification increases with the time-of-flight of the ultrasonic impulse and therefore with the measured distance to compensate the damping effect in air. Thanks to this software feature you can set the starting value and the ending value of the gain/amplification increase and thus directly influence the sensitivity and sound cone size.

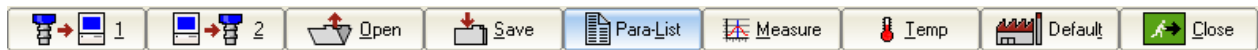
Below you find a step-by-step explanation of the variable sound cone adjustment:

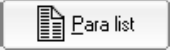
- Start the software Connect+.
- After reading the parameters from the sensor, open the ADD ON menu on the starting page.
- Set the sensitivity adjustment to "variable". You will only see this setting when using a UC30-2 or a UM30-2 from production week CW15 in 2014 (Date code on the device "1415").
- In the graphic above you will see the visualization of a sound cone. When selecting "variable", two input fields appear with the name "Start" and "End" in the ADD ON - menu.
- "Start" determines the distance value, from that the echo gain starts.
- At "start" you need to put in a specific value that defines the distance from which on the echo amplification increases.
- "End" indicates the distance value to which the echo gain is increased linear to its maximum. Therefore, the value may be greater than the maximum range, it is a theoretical value. The higher the value, the narrower is the sound field. To find the perfect solution in the particular application, the sensor behavior has to be observed after each adjustment.

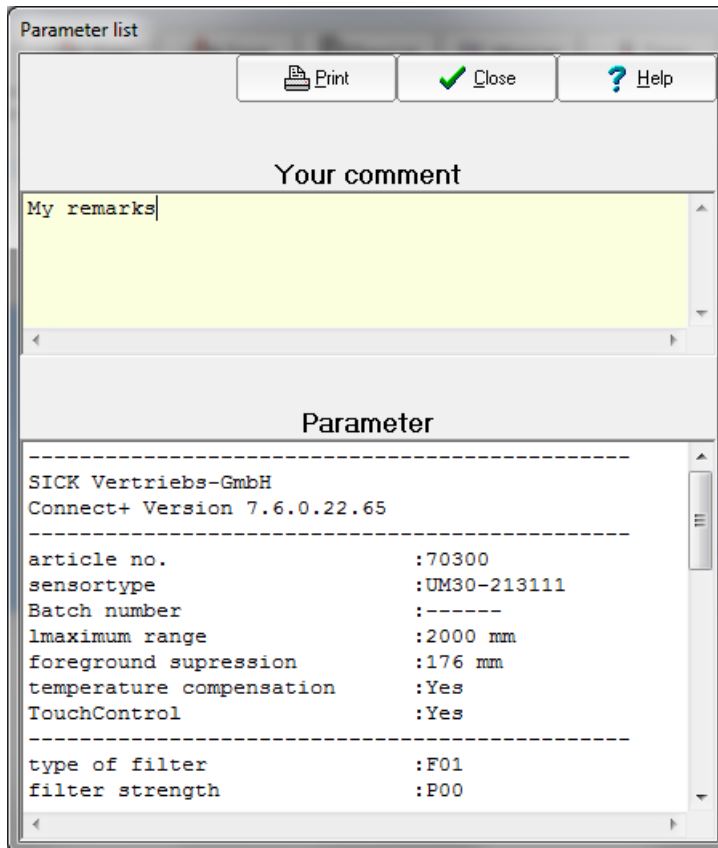
*Restore default settings in Connect+ for UM30-2*

Please note that if you set the sensor to the "default" using Connect+ (for devices from production week CW15 in 2014, date code on the device "1415"), Connect+ shows "low" instead of "variable". This is due to the fact that for all versions UM30-2 a default parameter file is used. When you read after the default the sensor again, you will see "variable" back in the drop-down menu.

# 11 Documentation of parameters



→ Press , to get a list of the adjusted parameters.



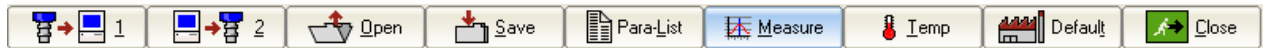
This list documents the parameter settings of the sensor. In the upper text field you can make your own remarks. In the lower text field all parameters of the sensor are listed. You can print this list inclusive the remarks for your documentation.

Your remarks will be saved by saving the parameter into a file.

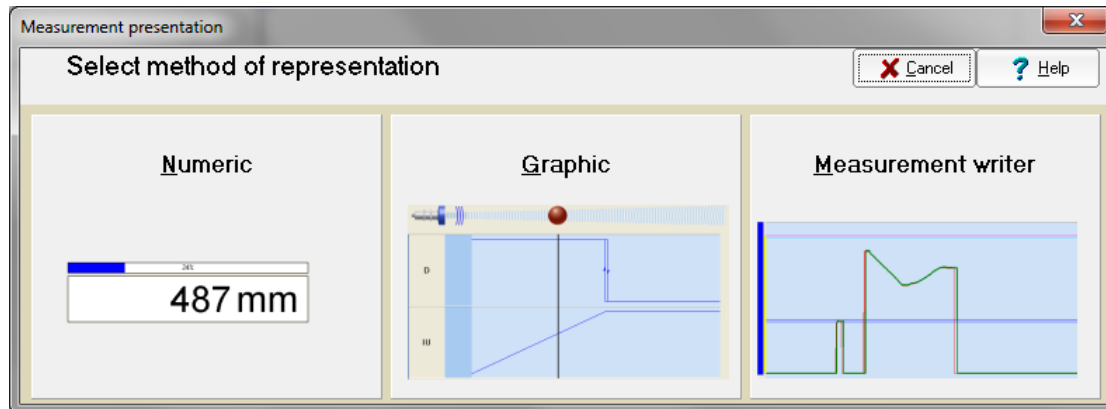
Connect+

## 12 Visualisation of measurements

### 12.1 Selecting the mode



→ Press  Measure



Only for UM18-1:

Please notice that the sensor in conjunction with Connect+ performs ultrasonic measurements only under the Measurement menu. When the visualization is invoked no ultrasonic measurements take place for some seconds. Also the repetition rate is greatly reduced during visualization mode. You are allowed to visualize measured distances on an installation or machine under operation using Connect+ only, if you have made sure that no harmful situation for man and machine may occur when doing so. When in doubt you have to power down the installation or machine during visualization with Connect+.

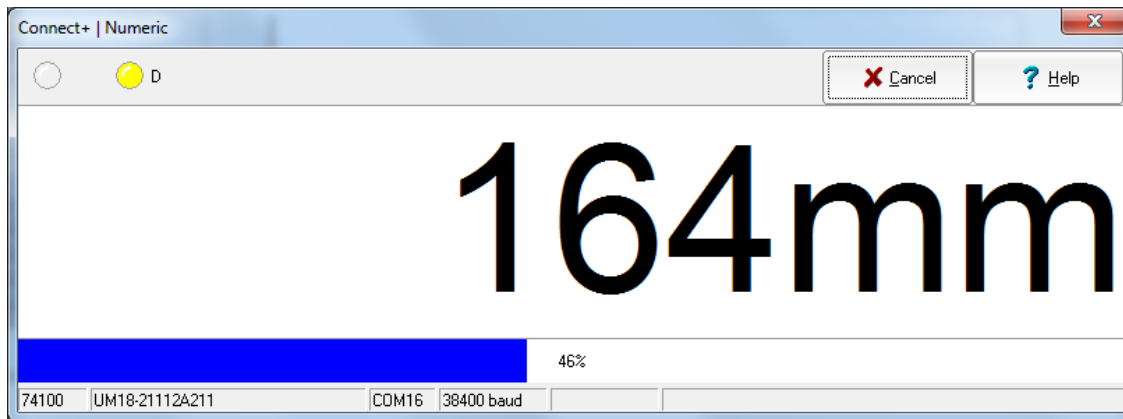


Before visualizing the measured distances the parameters in the input masks has to be identical to the ones of the connected sensor. Read out the parameters from the connected sensor first.

**You can select out of three different modes:**

- Numeric presentation
- Graphic presentation
- Measurement writer

## 12.2 Numeric presentation

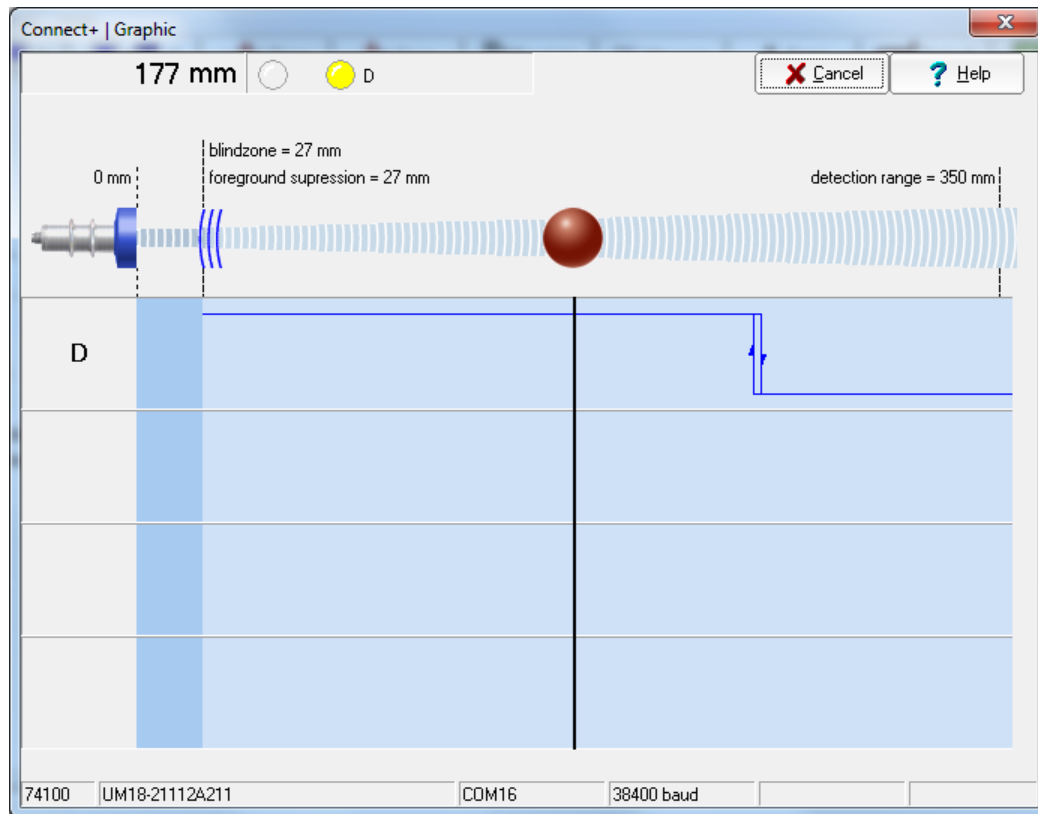


The measuring value is displayed in "mm" and as a bar graph in percent. The selected detection range is equivalent to 100%.

The LED's are showing the required state of the switching outputs D1 and D2 respectively the analogue output. To have correct results the values in the input masks has to be identical to the values stored in the sensor.

Connect+

## 12.3 Graphic presentation



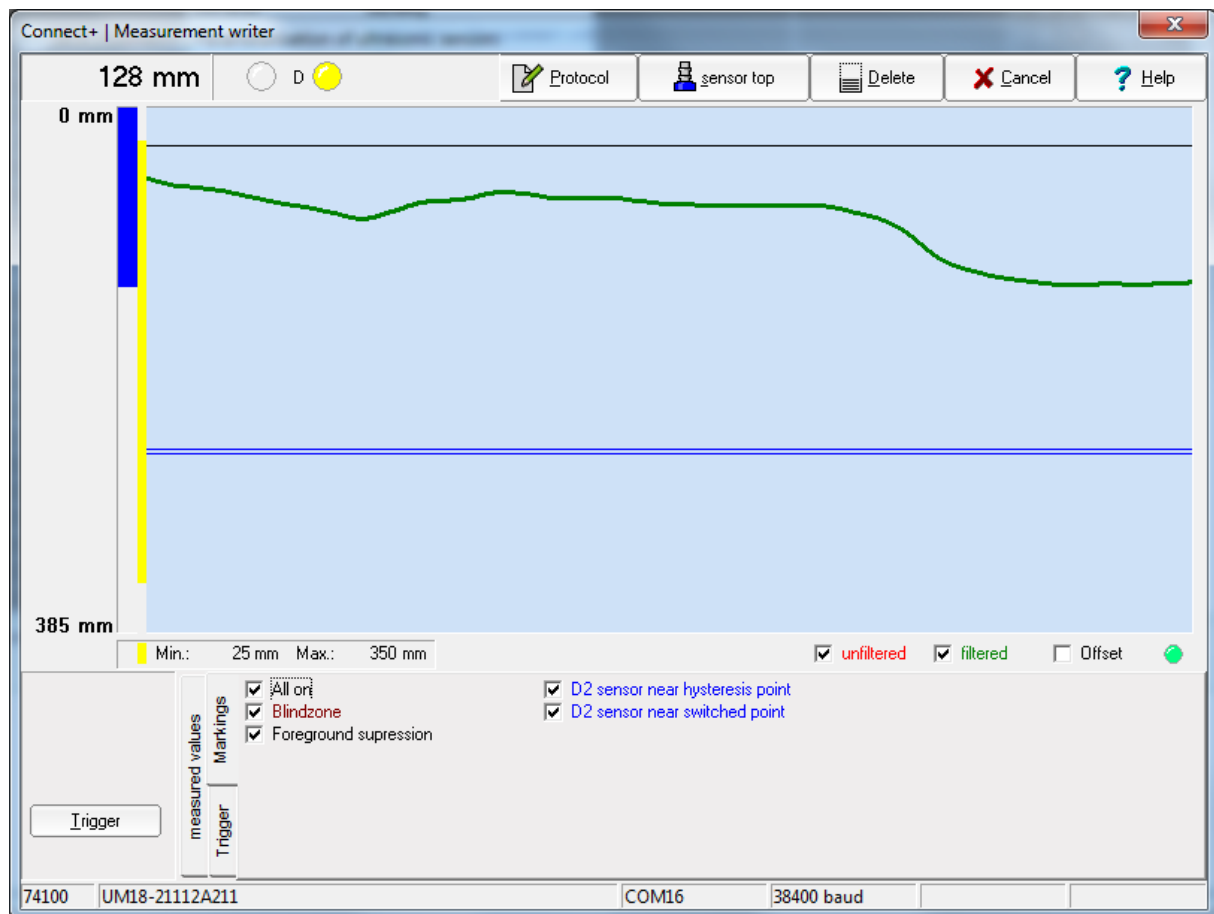
The displayed output characteristics correspond to the settings in the input mask.

The position of the vertical line below the target (red wall) changes proportional to the measured distance.

The expected output voltage and the expected output current is calculated on the values as given in the input mask and showed in the lower part of the window; thus they should match with the actual analogue signal on the sensor output (within the specified accuracy). To have correct results the values in the input masks have to be identical to the values stored in the sensor!

The LED's D1 and D2 are showing the required state of the switching output S1 and S2, respectively the analogue output. To have correct results the values in the input masks have to be identical to the values stored in the sensor.

## 12.4 Measurement writer



Every measuring value is displayed time continuous like an x-t writer.

The expected output voltage and the expected output current are calculated on the values as given in the input mask; thus they should match with the actual analogue signal on the sensor output (within the specified accuracy). To have correct results the values in the input masks have to be identical to the values stored in the sensor!

The LED's D1 and D2 are showing the required state of the switching output S1 and S2, respectively the analogue output.

Unfiltered (red curve) and filtered measured values (green curve) can be represented simultaneously. Both measured values are to be fading out. If unfiltered and filtered measured values lie above each other, one can move the red curve of the unfiltered measured values around some pixels.

### Minimum/maximum display

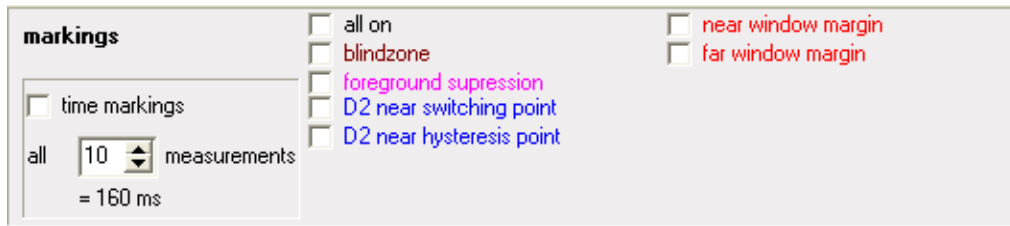
Minimum and maximum distance is shown as a yellow bar. With the button Delete you can reset these values.

### Trigger

→ Press  to see additional settings. The following parameters can be displayed.

## Connect+

## Markings



Blindzone, foreground suppression, switching- and hysteresis points (on sensors with switching output) and window margins (on sensors with analogue output)

If time markings is active, all X measurements a vertical white line is displayed in the diagram. It represents the time between the measurements

## Trigger



In the mode Free Run the measuring values are displayed in an continuous way

In the mode Triggered writing starts, when the distance value exceed a trigger level. The presentation ends with reaching the right window margin and starts again, when the above mentioned condition comes true.

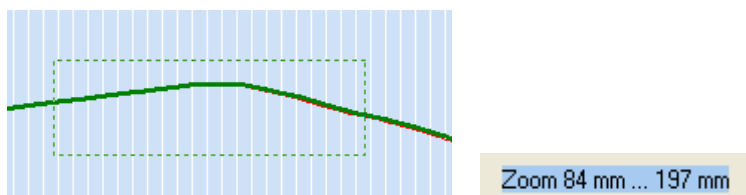
In the mode Single Shot displaying starts, when the values exceed a trigger level. The presentation ends with reaching the right window margin and starts again,

when the button Reset is pressed.

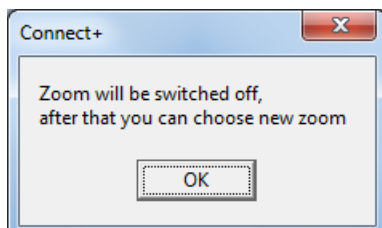
## Zoom

The displayed measuring range (0 mm to the selected detection range) can be reduced for better visualisation.

- ➔ Select a sector with the mouse cursor (hold the left mouse button and drag). The range will be shown and after you release the mouse button, the window will be zoomed.



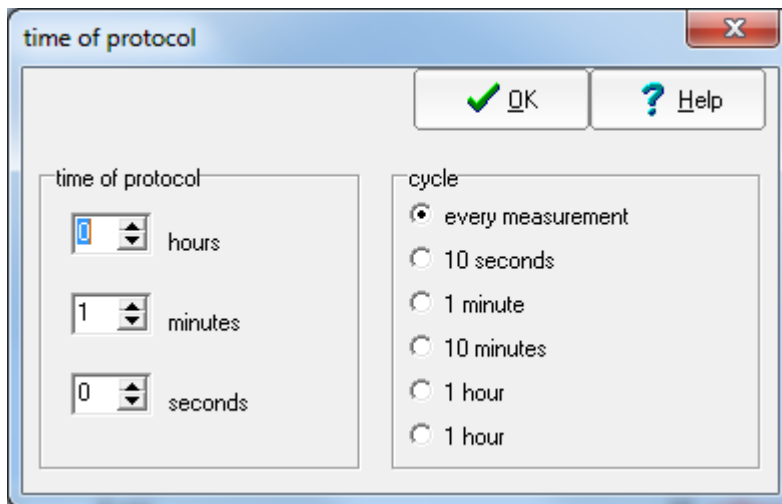
To switch off the zoom, click on the graphic and following message will be displayed.



## 12.5 Log measurements

For logging, the measurements can be saved into a file.

- ➔ Press the button Protocol.
- ➔ Select a file name (ending is \*.TXT)
- ➔ Select the maximum period of time for the logging
- ➔ Select the cycle for logging..

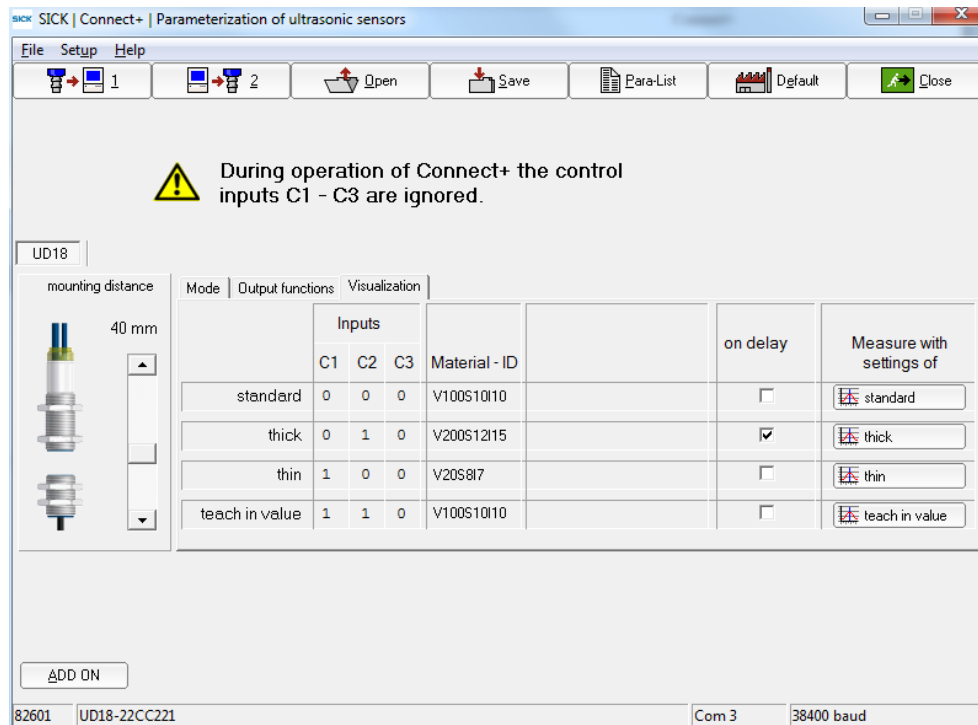


All sensor parameters will be saved into the file, followed by the measuring/measured/ values.

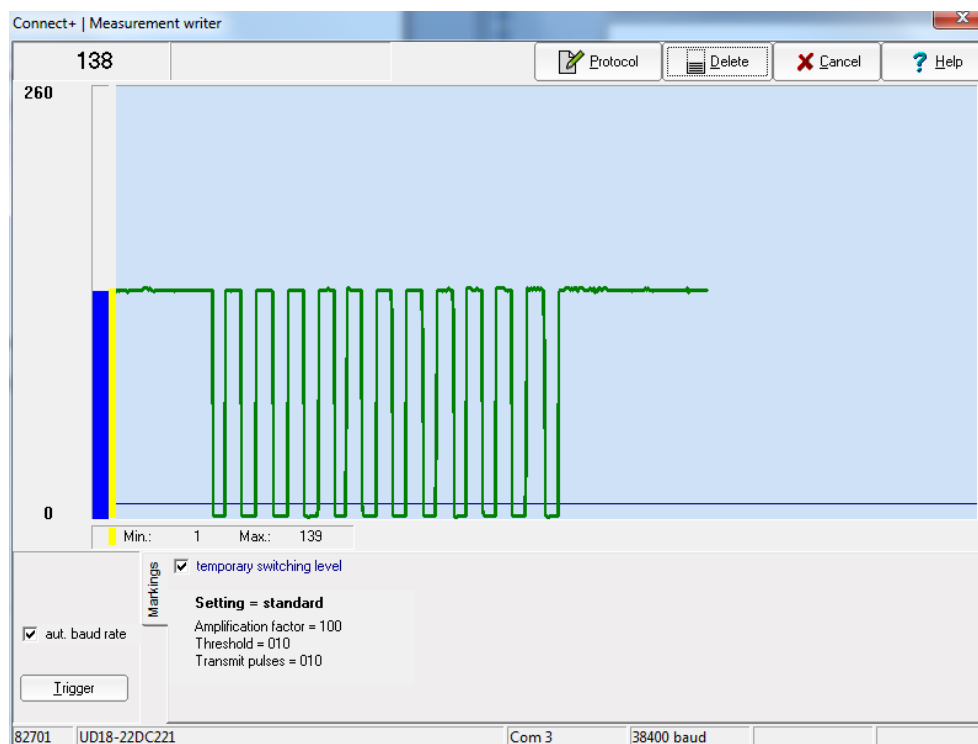
## Connect+

## 12.6 Visualization of UD18

The measurement data of the ultrasonic double layer detection can be visualized in a measurement writer. For this you have to select the setting for "standard", "thick", "thin" or "teach-in value", with the corresponding sensitivity level of the sensor, which operates only for the time of visualization.



When visualizing with the measurement writer, the digitized received echo as 8-bit value (0 ... 255) is shown. Only the relative measurement is of interest. It is used for determining whether the distance from the switching threshold is sufficiently high. The measured values are highly dependent on the homogeneity of the material.



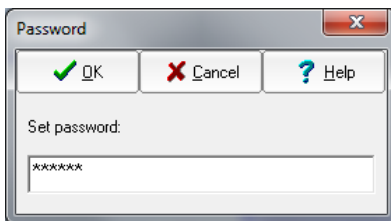
## 13 Individual input mask

You can create your own input mask by enabling or disabling certain input fields. This is helpful when you want to send a floppy disc with a special parameter set and the Connect+ Software to a third party, but only letting them adjust for instance the switching points of switching sensors.

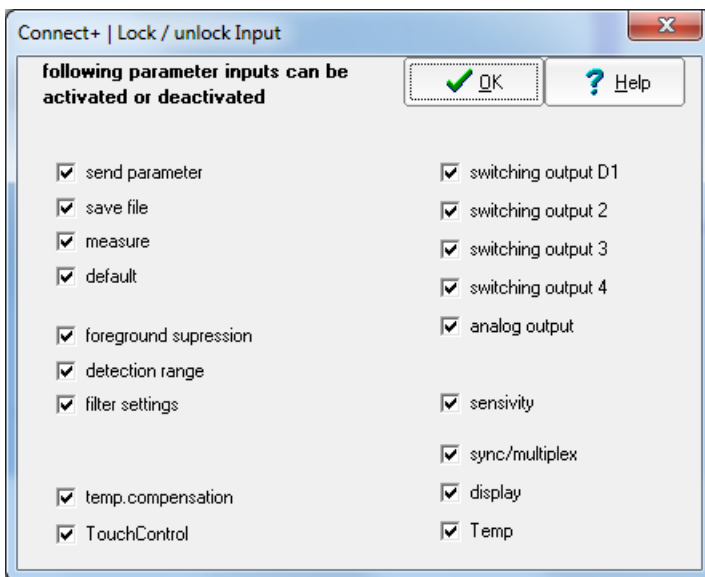
To design an individual input mask the Connect+ Software offers the feature to lock / unlock each parameter input field.

➔ Select from the menu File the submenu **Lock Inputs**

➔ Enter the password **snoopy**



➔ Select which input fields should be locked or unlocked.



## Connect+

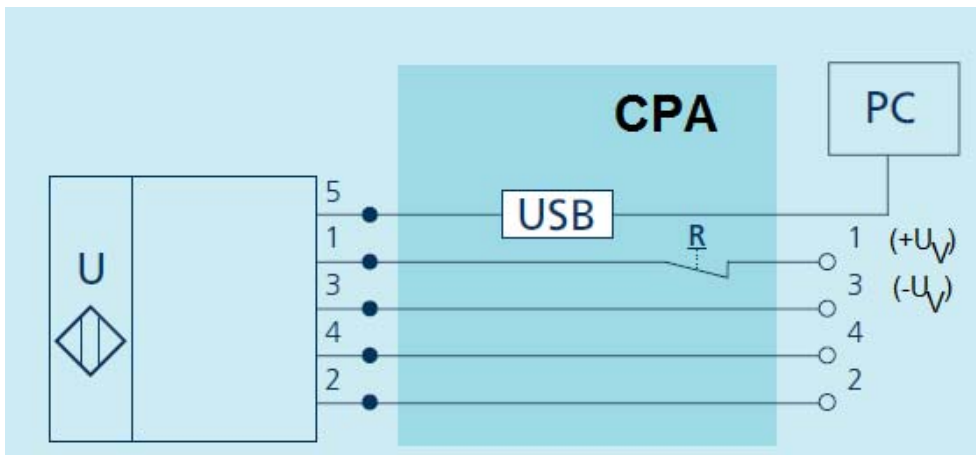
## 14 The Connect+ Adaptor (CPA)

### 14.1 General

The CPA is an adaptor suitable for all SICK UM30 and UM18-2 Pro sensors which is used to establish a communication between the sensors and the Connect+ Software on a PC. For standalone use, parameters can be copied to a second sensor of the same type and series.

### 14.2 CPA functions when connected to PC

- T1 Press T1 to apply  $+U_v$  to pin 5 of the sensor. (The length of the signal will be displayed in seconds).
- T2 Press T2 to apply  $\square U_v$  to pin 5 of the sensor. (The length of the signal will be displayed in seconds).
- R Press R to interrupt the power supply of the sensor (reset).
- F Press F to display the measured values in mm / cm. T1 and T2 are disabled in this mode. Press R to exit.



### 14.3 CPA functions when used as standalone device

- F + T2 Loads all parameters from the sensor to the CPA (Download). The parameters remain stored in the CPA after the power supply is disconnected.
- T1+T2 Offline sensor settings for UM30□2 sensors. This function recalls the parameters stored in the CPA and allows altering them. Changes are only stored in the CPA. To make them applicable to the sensor they must be uploaded.
- F + T1 Loads all parameters from the CPA to the sensor (upload).
- R Press R to interrupt the power supply of the sensor (reset).
- F Press F to display the measured values in mm / cm. T1 and T2 are disabled in this mode. Press R to exit.

