LINKCONTROL VERSION 7.7

Programming of ultrasonic sensors

Here you can find the latest LinkControl software:

www.microsonic.de

NOTES

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CONTENT

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PREPARATION

DELIVERY SCOPE

The LinkControl Adapter is delivered separately or in a plastic case with the following contents:

- LCA-2
- Adaptor for sensors with cable connection (lcs) incl. cable clamps
- Adaptor for power supply incl. cable clamps
- Power supply 90-240VAC/24VDC, 625 mA, with 1,8 m cable
- four exchangeable AC-plugs for use in Europe, USA, Great Britain and Australia
- USB cable A-plug to B-plug
- USB-Stick with LinkControl software and documentation

SYSTEM REQUIREMENTS

- 1 Gigahertz (GHz) or higher, 1 GB main memory, 16 MB free space on hard disk drive
- Windows 10, Windows 8, Windows 7, Windows Vista, Windows XP
- Graphic minimum resolution 800*600, minimum 256 colours

INSTALLING THE SOFTWARE

➔ Start your computer and wait until Windows has booted.

➔ Insert the installation USB stick into the computer

➔ If autostart function is active, installation starts immediately, otherwise open Start.EXE from the USB stick.

➔ ... or get the current LinkControl software from our website and start "Setup.EXE"

➔ Follow the instructions on the screen.

The following files are copied into this directory:

- LinkControl.exe   executable program file
- Updater.exe   used for updating LinkControl
- LinkC_E.chm   english help file
- LinkC.ini   configuration file for LinkControl
- LinkC.lst   list of microsonic sensors
- Parameter   directory with the default - parameter files of microsonic - Ultrasonic Sensors
- Driver   folder with the driver, used for the LCA-2

USB to PC
(not necessary for LinkCopy)

Sensor

LCA-2

Adaptor
or extention cable
if necessary

T-connector of LCA-2

Power supply of the sensor (via adaptor if necessary)
or LinkControl power supply
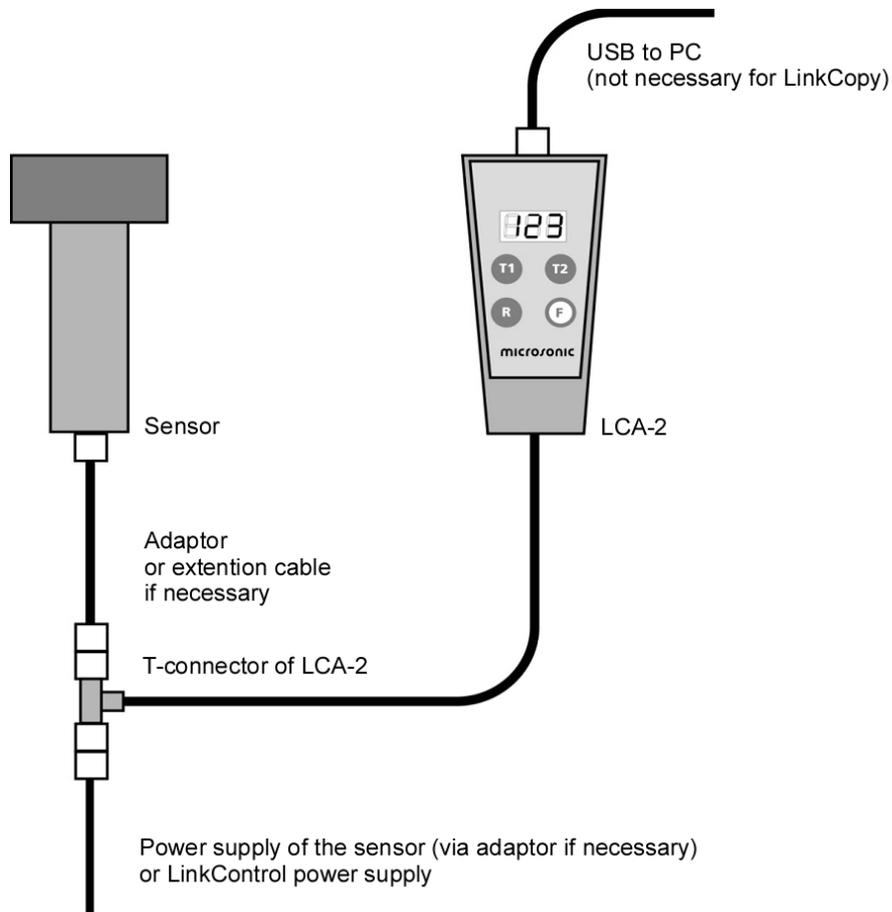
For further Information see: quick reference guide on the LCA-2

PINNING / COLOUR CODING

For connecting lcs-sensors or mic-sensors with cable to the LinkControl Adapter please use following adapter.

Pin	Standard colour coding	Alternative colour coding	sensors with 1 switched output	sensors with 2 switched outputs	sensors with analogue output	sensors with analogue output + switched output
1	brown	brown	+UB	+UB	+UB	+UB
2	white	white	-	output D1	analogue output	analogue output
3	blue	green	-UB	-UB	-UB	-UB
4	black	grey	output D	output D2	-	output D
5	grey	yellow	communi-cation *	communi-cation*	communi-cation*	communication*

* With the LinkControl adapter Pin 5 is used for communication between sensor and LinkControl adapter. In normal operation pin 5 is used for synchronisation and multiplex operation.*

LAUNCHING THE LINKCONTROL SOFTWARE

After starting the software…

the start-up screen appears.
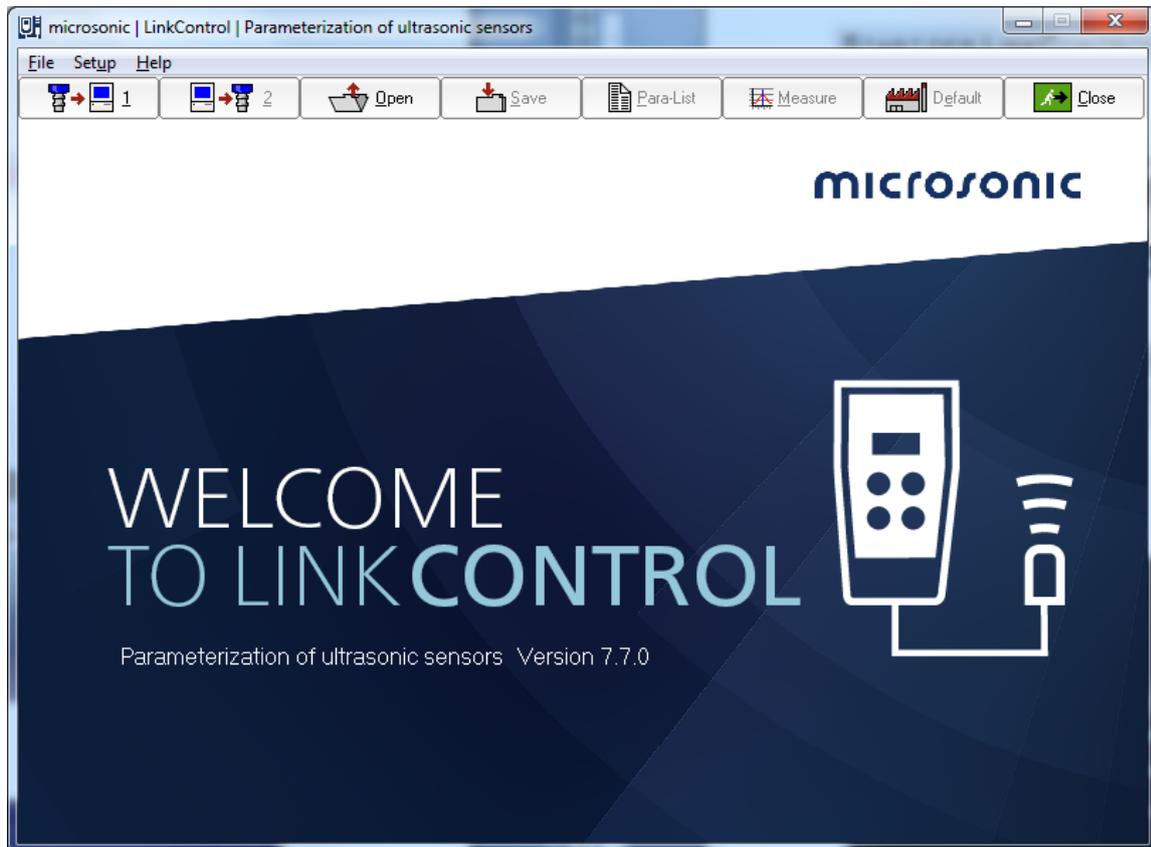
LinkControl checks, if a connected sensor is ready for communication.

If a sensor is recognized, this message appears
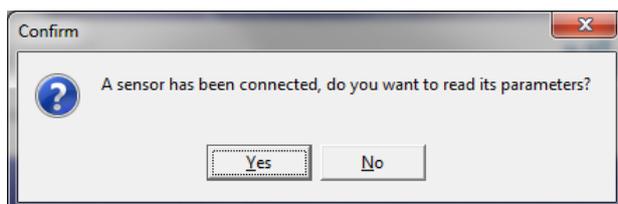
You can either read the actual parameters from the connected sensor or open a file with a parameter set.

SELECTING THE COM-PORT

For the communication of LinkControl with the computer, you have to select the COM-Port.

DIRECTLY SELECTION OF THE COM PORT

If you know the used COM-Port,

➔ Use the pull down menu „Setup | Port" to select the COM-Port 1…23.
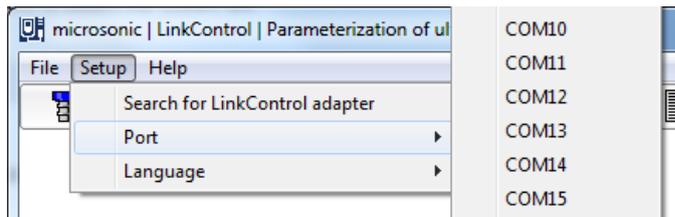
AUTOMATICALLY SEARCH THE COM-PORT

If the COM-Port is unknown, LinkControl is able to identify the COM-Port, used by the LinkControl Adaptor.

➔ Select „Setup | Find LinkControl Adaptor" and follow the instructions of the software.
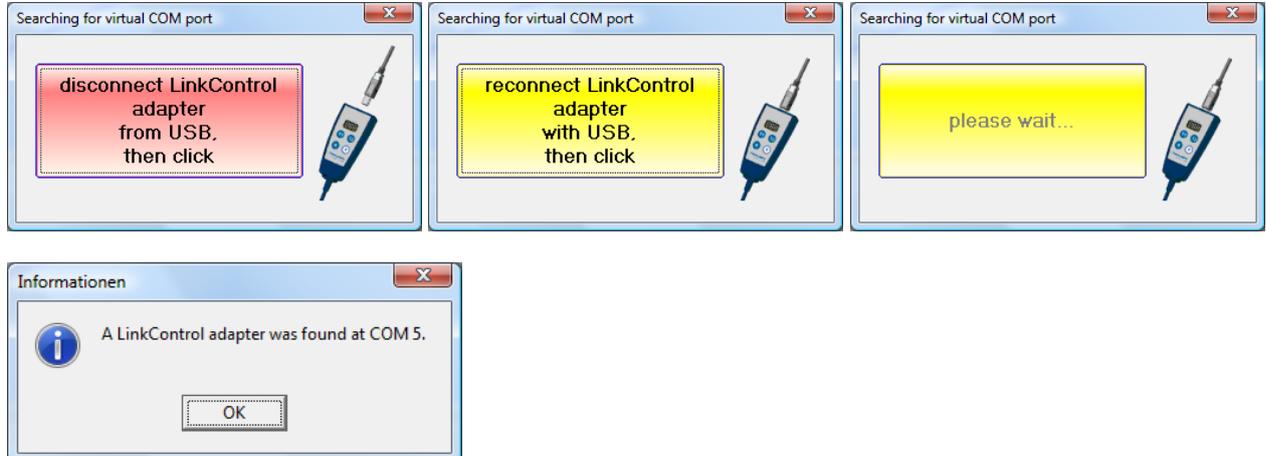
READING / WRITING PARAMETERS

READING PARAMETERS FROM A CONNECTED SENSOR

🖥➔📟 1	📟➔🖥 2	⬆ Open	⬇ Save	📄 Para list	📈 Measure	🌡 Temp	🏭 Default	🏃 Close

❓ *only for mic-.../M30, lcs and lpc:*
Please notice that the sensor does not perform ultrasonic measurements during programming with LinkCon-trol; 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 LinkControl 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 before altering parameters with LinkControl.

➔ Check for a proper connection of your LinkControl Adapters to your sensor and to your PC and make sure that the correct port has been selected (COM1...COM23).

➔ Press [🖥➔📟 1], for Reading parameters from the sensor and confirm the prompt.

or

➔ switch on the sensor and confirm the prompt.
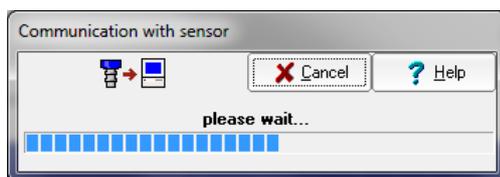
All parameters are read from the sensor and transferred to the input mask of the LinkControl software after-wards.

If the following message occurs,
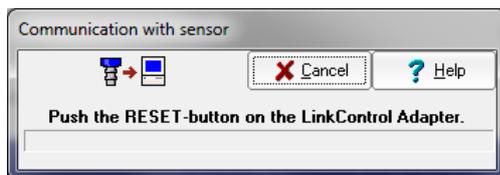
➔ press the RESET button on the LinkControl Adaptor.

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

➔ a sensor capable for LinkControl is connected

➔ the sensor gets its power supply via the LinkControl adaptor (LED's on sensor have to be illuminated)

➔ the USB - connection to the PC is made properly

➔ the correct port has been selected within the LinkControl software

🖥️→🖥️ 1	🖥️→🖥️ 2	📂 Open	💾 Save	📋 Para list	📊 Measure	🌡️ Temp	📊 Default	➡️ Close

➔ Press 📂 Open

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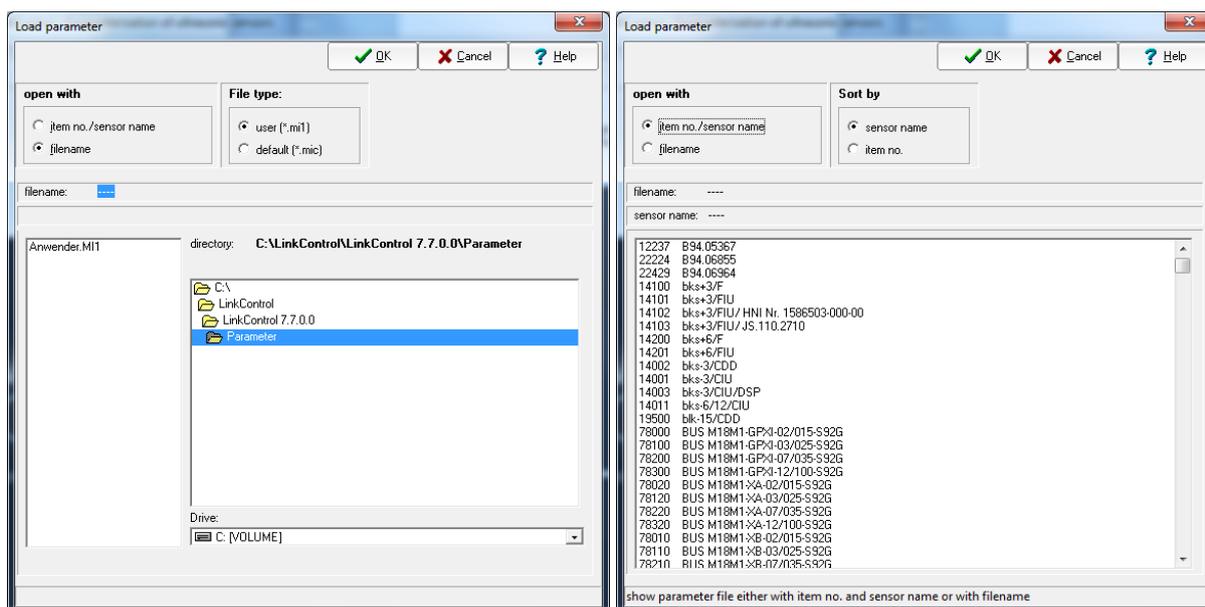
➔ select the sensor respectively the parameter file and confirm by OK.

Parameter files with the extension *.MIC contain data for default settings of the specific sensor. These files have been established by microsonic. You may alter these basic settings and store them afterwards with the extension *.MI1 under the same or a different name. Thus the files with the default settings will not be corrupted.

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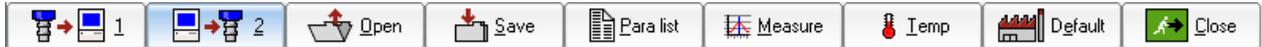
All changes that you have made in the input masks, are only temporarily stored within the LinkControl program. You have to transfer the data to the sensor and / or save it as a file on the hard disc of your PC or on a floppy disc.

➔ 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 in-put mask. Subsequently the altered parameters are transferred to the sensor.

If the following message occurs,

➔ press the RESET button on the LinkControl adaptor.

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

➔ a sensor capable for LinkControl is connected

➔ the sensor gets its power supply via the LinkControl adapter (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 LinkControl software

Also see page Reading parameters from a connected sensor

If the LinkControl software realises, that the selected sensor type does not match the connected sensor type, the transfer of parameters is inhibited.

SAVING PARAMETERS TO A FILE

| 🔧→🖥 1 | 🖥→🔧 2 | ↗ Open | ↓ Save | 📄 Para-List | 📈 Measure | 🌡 Temp | 🏭 Default | 🏃→ Close |

➔   Press [↓ Save]
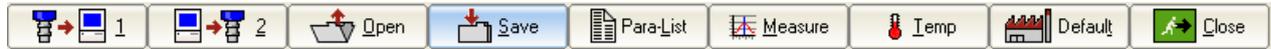
➔   Select a file name of your own and confirm by pressing OK.

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).

CHANGING PARAMETERS ON DISTANCE MEASURING SENSORS

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 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.

Additional 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 ↔).
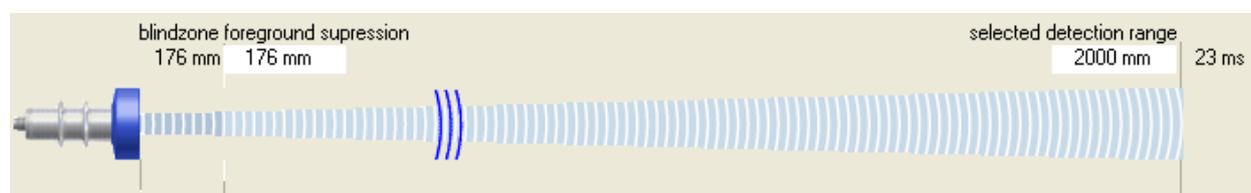
BLINDZONE

Since the ultrasonic sensor uses the same transducer element for both sending and receiving, the sensor can-not 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 set-tings the selected detection range is set to the maximum detection range 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 nominal detection range, which is indicated in the technical data sheets of microsonic, 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 %/°C. 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..

TouchControl

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

only for mic-.../M30: If on switching sensors the option window mode is activated, or on analogue sensors the option end value delimiter, TouchControl is automatically reset, to prevent a subsequent change of these complex settings via the control panel.

Sensitivity

Only for sensors mic+.../TC or mic-...M from 2004!

Current saving-mode

Only for sensors mic+.../TC or mic-...M from 2004!

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

Only for sensors mic+.../TC, mic-...M from 2004 and pico+

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<.

Display mode

Only for sensors mic+.../TC or mic-...M from 2004

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 pico+ or lcs+ sensors

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

ADJUSTMENT OF TEMPERATURE COMPENSATION

Only for sensors mic+.../TC, ,mic-...M from 2004 and pico+

| 📷→🖥 1 | 🖥→📷 2 | ⬆ Open | ⬇ Save | 📋 Para-List | 📈 Measure | 🌡 Temp | 🏭 Default | 🏃 Close |

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.
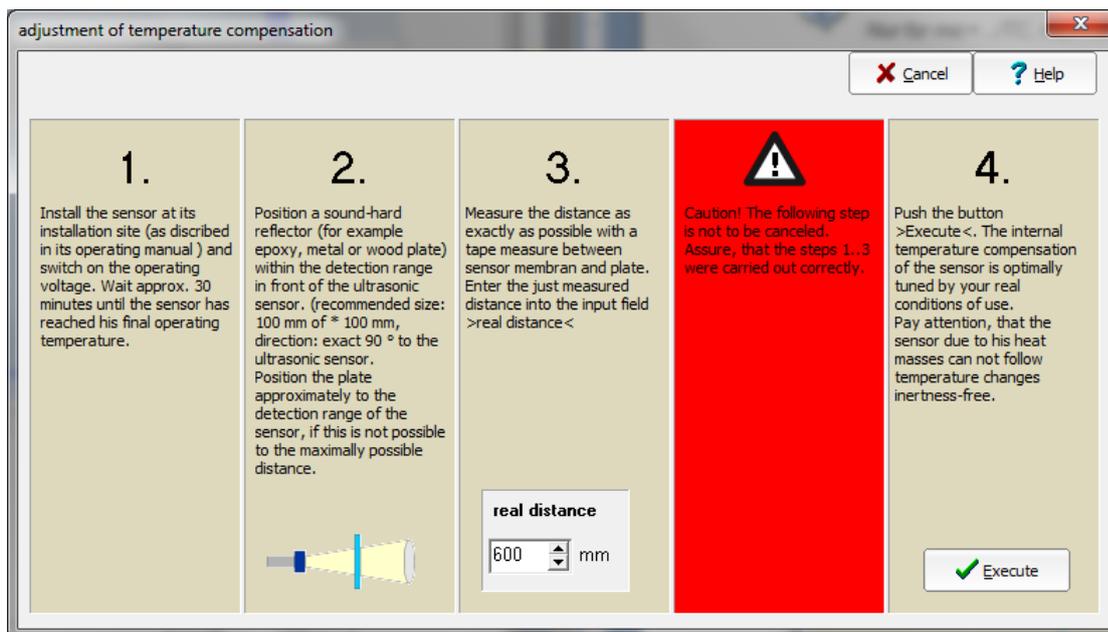
➔ Install the sensor according to operating manual at his later field and you turn on the operating voltage. Wait approx. 30 minutes until the sensor reached his final operating temperature.

➔ 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 [✔ Execute]. 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.

SETTING THE SENSOR TO ITS DEFAULTS

🔧→🖥 1	🖥→🔧 2	📂 Open	💾 Save	📄 Para-List	📊 Measure	🌡 Temp	🏭 Default	🏃 Close

➔ Press [🏭 Default]

Confirm ✖

❓ Do you want to load the default parameters for the selected sensor?

[Yes] [No] [Help]

➔ Confirm the prompt.

Confirm ✖

❓ Send parameter to sensor?

[Yes] [No] [Help]
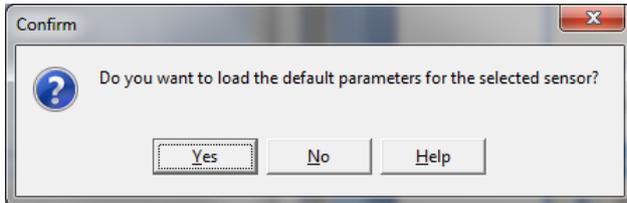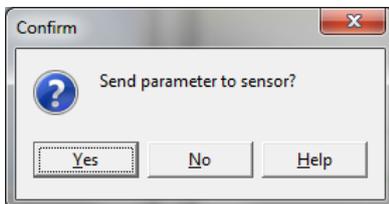
All parameters that you changed, will be set to its default values located in the default parameter files (*.MIC).

⚠ *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: Transmit parameters to the sensor).*

CHANGING PARAMETERS FOR SWITCHING SENSORS

microsonic 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 trip points can be set independent from each other.
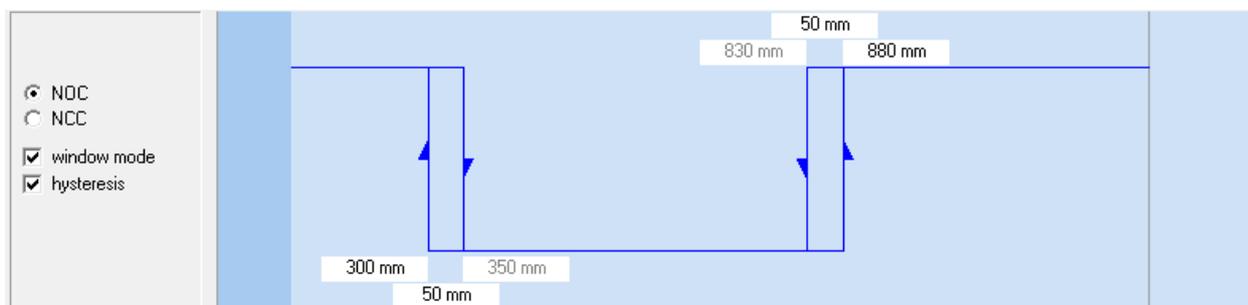
N.O. / N.C (MAKE / BREAK BEHAVIOUR)

For each switching output a Make or Break behaviour can be selected individually (make = n.o. = normally open, break = n.c. = normally closed).

SETTING TRIP POINTS AND HYSTERESIS

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

only for mic-.../M30

These trip points may as well be adjusted on mic series sensors using the TouchControl panel; all hysteresis values have a fixed pre-selection. If you however have used LinkControl first to make adjustments on trip points inclusive their hysteresis, you can still alter the trip points afterwards using TouchControl; the hystere-sis values remain the same as programmed before in this case.

WINDOW MODE

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

only for mic-.../M30

If you activate the window mode, TouchControl is automatically locked, since an adjustment of several trip points via the control panel does not appear feasible any longer in this case.

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

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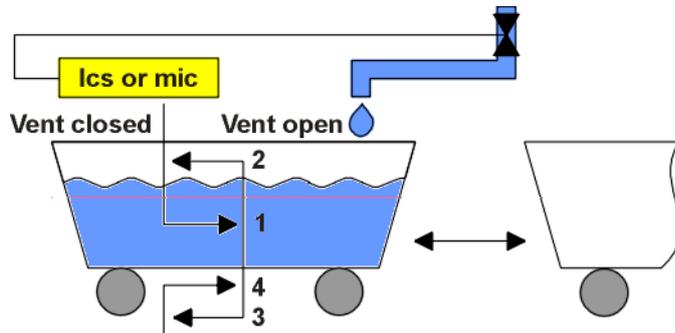
the output is set at trip distance 1 and the valve opens for filling. Beyond the hysteresis the valve closes again at trip distance 2. To prevent the valve from opening when there is no vehicle at all, the valve is kept shut by trip distance 3. As soon as there is a vehicle once again below the valve,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

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

CHANGING PARAMETERS FOR ANALOGUE SENSORS

The sensors resolve distances downto 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.
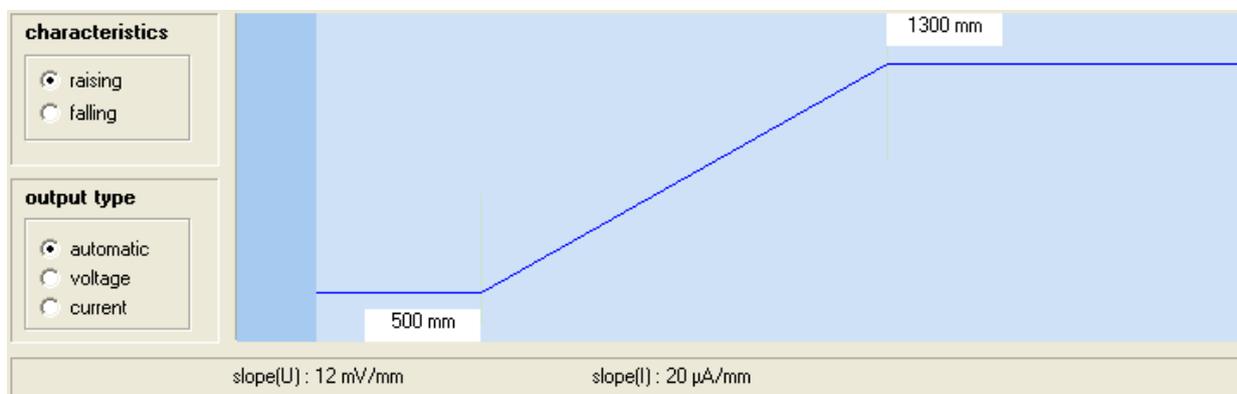
INNER WINDOW MARGIN / OUTER WINDOW MARGIN

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 ac-cording 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 take place every time when the device is powered up. If the load resistance is low (< 500 Ohm) the analogue sensor go for the current output; if the load is high (> 10 kOhm) for voltage out-put.

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).

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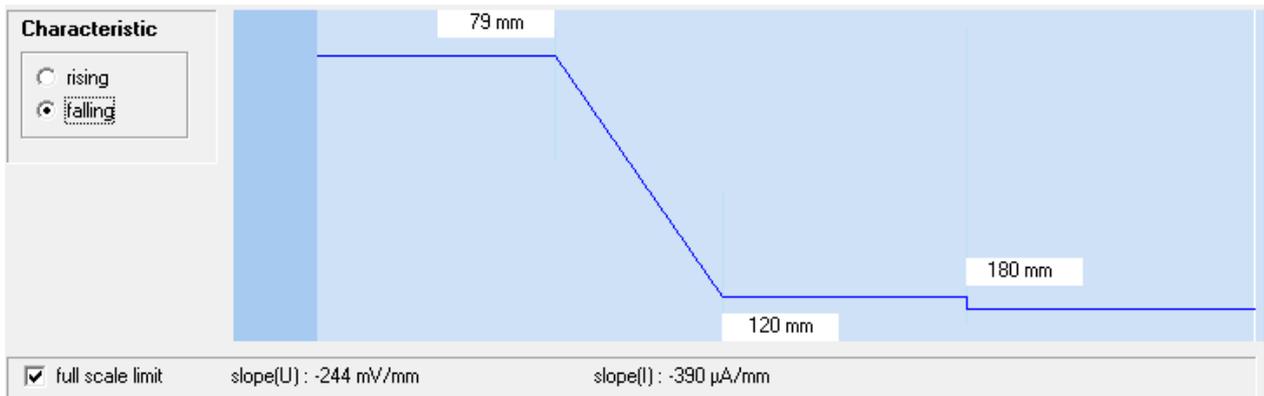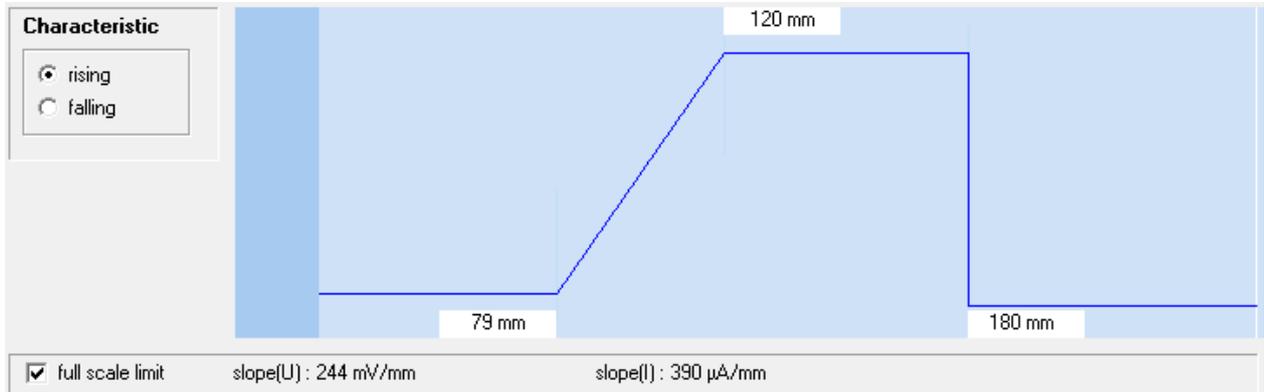
You can insert an additional break point behind the far sensor break point of the characteristic curve. Behind this break point the output voltage/output current falls to 0 V/4 mA.

FILTER SETTINGS FOR DISTANCE MEASURING SENSORS

microsonic 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. How-ever you have to take into account that the sensor looses any kind of noise suppression.

ALL SENSOR FAMILIES EXCEPTING MIC-…/M30, LCS, LPC AND UCS

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 affect 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.

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.

Sensor families mic-…/M30 und lcs

Within these sensor families you are able to select two different types of filter. You can change the filter strength by a slider.

No filter

filter method
no ▼

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.

Standard – Filter
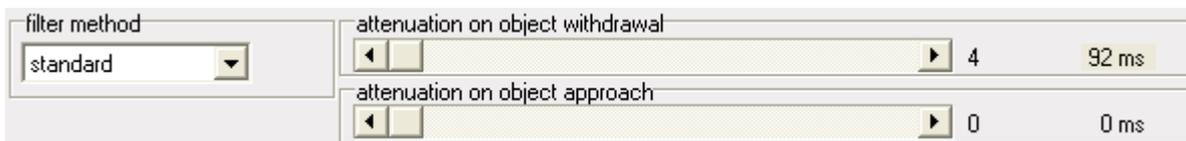
filter method	attenuation on object withdrawal		
standard ▼	◀	▶ 4	92 ms
	attenuation on object approach		
	◀	▶ 0	0 ms

The standard filter method is component of the basic setting of switching ultrasonic sensors. The default filter intensity at object withdrawal is set to 4 and the default intensity for object approach is set to 0.

Thus with the default setting, the standard filter is acting unsymmetrical: At an approximation of the object onto the sensor, the shorter measured value is accepted immediately. If the object removes itself from the sensor, the old measured value is output for the holding time, before the new value is accepted. With this filter method for example short-term dropouts of the measurement can be bridged. The hold time can be several seconds.

This filter method has the advantage, that the sensor in a working-direction (here at object approximation) reacts immediately and without delay.

Example1
With level detection applications on diffuse reflectors, like on sand or gravel, there can be a blanking in the target detection. To prevent the container from overflowing when filling up (= object approach) there shall be a fast response on decreasing distances. The value for an object approach is 0% and a high attenuation for object withdrawals is selected.

Example2
The attenuation for an object approach can be used to suppress unwanted obstacles which appear sporadically and which are located in between sensor and the real target.

The maximum allowable filtering should be determined experimentally.

The filter method average simulates an arithmetic mean value calculation over several measurements. The scroll bar for Attenuation determines how many elapsed measurements shall be taken into account to form the mean. The resulting settling time for the measurement value to follow a sudden distance jump is calculated from the time for a single ultrasonic measurement multiplied by the number of measurements, which are taken into account.

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.

Example

The filter method average is suited especially for analogue sensors in applications, where an attenuation of the measured distance for both moving directions is needed. Typical applications are coil winding, loop con-troll and level detection...

On slow processes often the highest filter setting may be chosen. Short term error target, for instance a fast moving hand through the ultrasonic beam, does hardly affect the output signal.

SENSOR FAMILIES LPC UND UCS

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 + F01

see:F00 + F01 All Sensor families excepting

F05
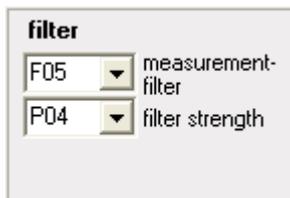
The filter F05 corresponds to the filter F01 with the filter strength P01.

The setting "filter strength" defines a delay P00 = 1 s to P09 = 10 s.

F06
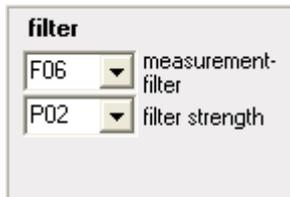
This filter works according to the principle of the tolerance belt-filter (see: Tolerance belt - filter).

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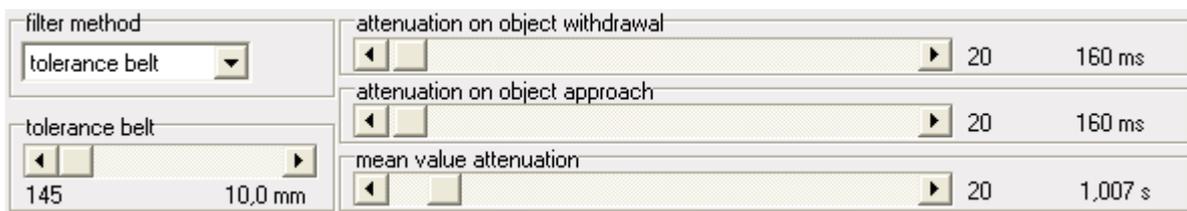
With this filter a tolerance belt is put symmetrically around the measured value. The current distance values remain within this belt, they are passed through an average filter.

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) be-fore the new value is taken over.

PARAMETER CHANGE IN THE DOUBLE SHEET CONTROL

The function of the double sheet detection is to detect two or more sheets lying one on top of the other or to detect other laminary materials. The sensor system consists of a transmitter and a receiver complete with integrated evaluation electronics.

A high-frequency ultrasonic transmitter beams from the underside against the sheet material. The emitted ultrasonic pulse excites the sheet material into vibrations. The effect of these vibrations is for a very small sonic wave on the other side of the sheet to spread. This wave is received by the ultrasonic receiver located there. In the case of sheet one on top of the other (double sheet), the receiver detects the difference in signal and sets its outputs accordingly.
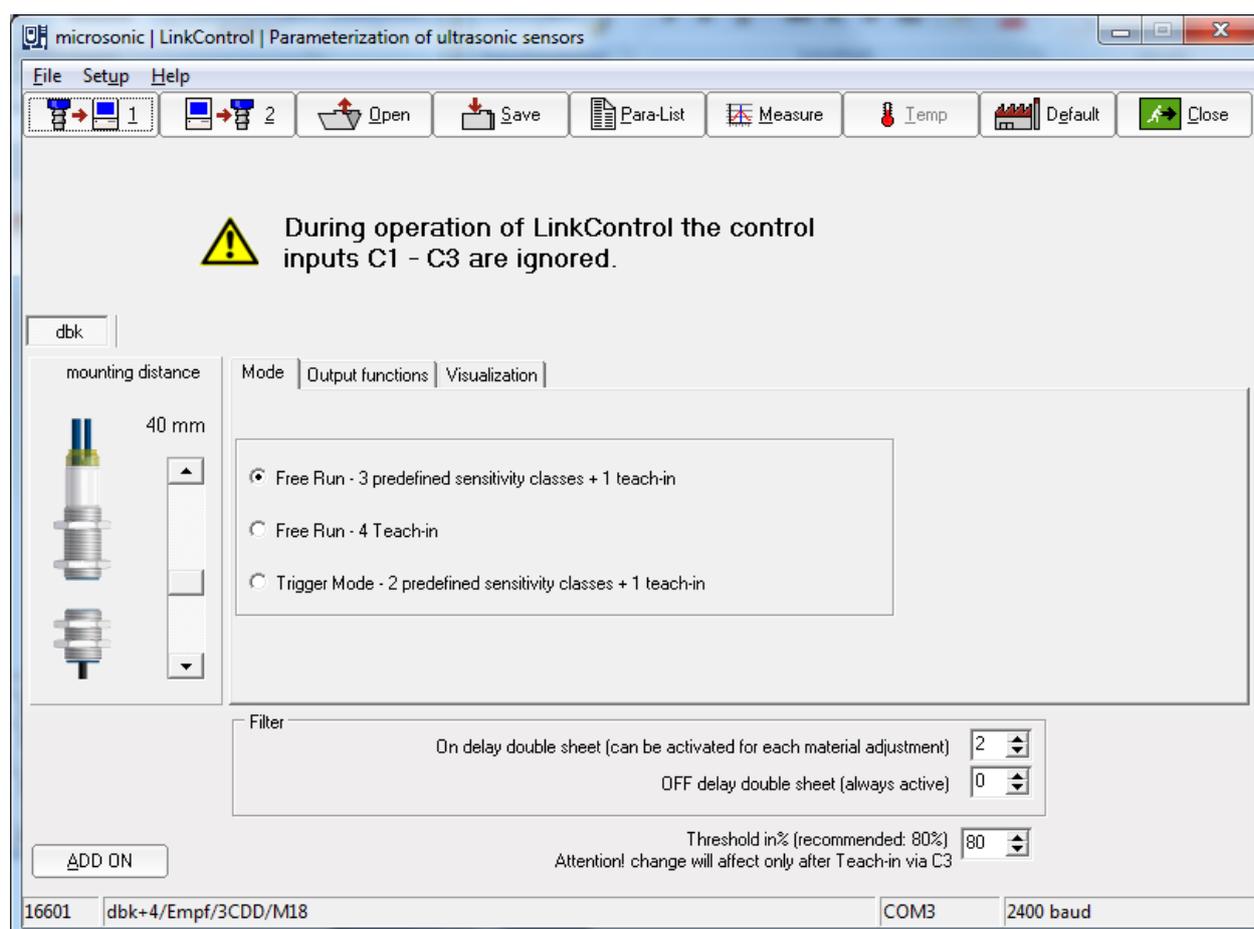
OPERATING MODES

You can select from the following operating modes:

- Free-Run-Mode with 3 predifined sensitivity classes and additional teach-in mode, e.g. for scanning wafers glued 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
  Level or edge triggered mode, e.g. for applications in the imbricated stream.

FREE RUN – 3 PREDIFINED SENSITIVITY CLASSES + 1 TEACH-IN

The dbk+4 operates in the free-run mode ex-works. In the free-run mode, the dbk+4 performs measurements cyclically.

Should measurements be taken in the imbricated stream, then an external trigger signal can individually trigger each measurement. To this end, the trigger mode can be parameterized with the aid of the LCA-2 LinkControl adapter available as an accessory and the LinkControl software.

FREE RUN – 4 TEACH-IN

If the dbk+4 is parameterized in Free-Run mode, you can teach up to 4 different materials.

The sensitivity classes "Standard", "Thick", "Thin" und "Teach-in" can be customized..

With the appropriate buttons the teached classes of materials can be brought back to the default.

	Inputs			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	

Mode | Output functions | Visualization

TRIGGER MODE – 2 VORDEFINIERTE MATERIALKLASSEN + 1 TEACH-IN

If the dbk+4 is parameterized in Trigger mode, you have to contact the external trigger signal to input C2.

Mode | Output functions | Visualization

○ Free Run - 3 predefined sensitivity classes + 1 teach-in

○ Free Run - 4 Teach-in

◉ Trigger Mode - 2 predefined sensitivity classes + 1 teach-in

Trigger Mode
◉ state change from 0 to 1
○ state change from 1 to 0
○ Logical status = 1
○ Logical status = 0

In trigger mode the following sensitivity classes are available : »Standard«, »Thin« and »teach-in-value«.

Mode | Output functions | Visualization

	Inputs			Material - ID
	C1	C2	C3	
standard	0		0	V100S10I10
thin	0		1	V20S8I7
teach in value	1		0	V100S10I10

OUTPUT FUNCTIONS

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

Mode	Output functions	Visualization

Output D1
- ● N.C. (Single sheet = closed, Missing sheet = open)
- ○ N.O. (Single sheet = open, Missing sheet = closed)
- ○ Override (N.C.)
- ○ Override (N.O.)

Output D2
- ● N.C. (Double-sheet = open)
- ○ N.O. (Double-sheet = closed)

:

MEASURING VALUE WRITER

The button "standard", "thick," "thin" and "teach in value" starts the measuring value writer. The dbk+ then temporarily works with these settings.

	Inputs					on delay	Measure with settings of
	C1	C2	C3	Material - ID			
standard	0	0	0	V100S10I10		☐	📈 standard
thick	0	1	0	V200S12I15		☑	📈 thick
thin	1	0	0	V20S8I7		☐	📈 thin
teach in value	1	1	0	V100S10I10		☐	📈 teach in value

Logical state	Voltage level	
	pnp	npn
0	-UB	+ UB
1	+ UB	- UB

MOUNTING DISTANCE

Numeric input of the spacing between transmitter and receiver.

SENSITIVITY CLASSES

The fact that the dbk+4 control inputs are unconnected or on logic 0 points to pre-selection of the "Standard" sensitivity class where the range of sheet material weights from a typical 50 g/m^2 up to 800 g/m^2 can be scanned.

- The 3 control inputs allow the sensitivity classes to be pre-selected in keeping with the Fig 4 table.

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

- The "thin" setting is to be selected for extremely thin materials, such as bible printing paper, with weight per unit areas of under 50 g/m^2.

- The "thick" setting is available for sheet metals, thick plastic films, paperboard and finest corrugated card..

- Changes between sensitivity classes can be undertaken under on-going operations.

- Pre-selecting an over-low sensitivity class can result - even with a single sheet - in a double sheet signal appearing. In such an instance, the next-higher sensitivity class is to be pre-selected.

- Pre-selecting an over-high sensitivity class results - given a single sheet - in the double-sheet detection indicating override at the LEDs: one LED lights up green and the other green/red (orange blend). In such an instance, the next-lower sensitivity class is to be pre-selected.

Usual D1 shows a missing sheet. If previously the switching output D1 was parameterized to the output function "override", override is issued via D1.

PARAMETER CHANGE IN THE LABEL-/SPLICE SENSORS ESP-4 AND ESF-1

Labels are guided through the fork. An ultrasonic transmitter in the lower tine of the fork beams a fast sequence of pulses through the backing material. The sound pulses cause the backing material to vibration, so that a greatly attenuated sound save is beamed from the opposite side. The receiver in the upper tine of the fork receives this sound wave.

The backing material transmits a different signal level from the label. This signal difference is evaluated by the esf-1. The signal difference between the backing material and the label can be very slight. To ensure a reliable distinction, the esf-1 must be trained to the label.
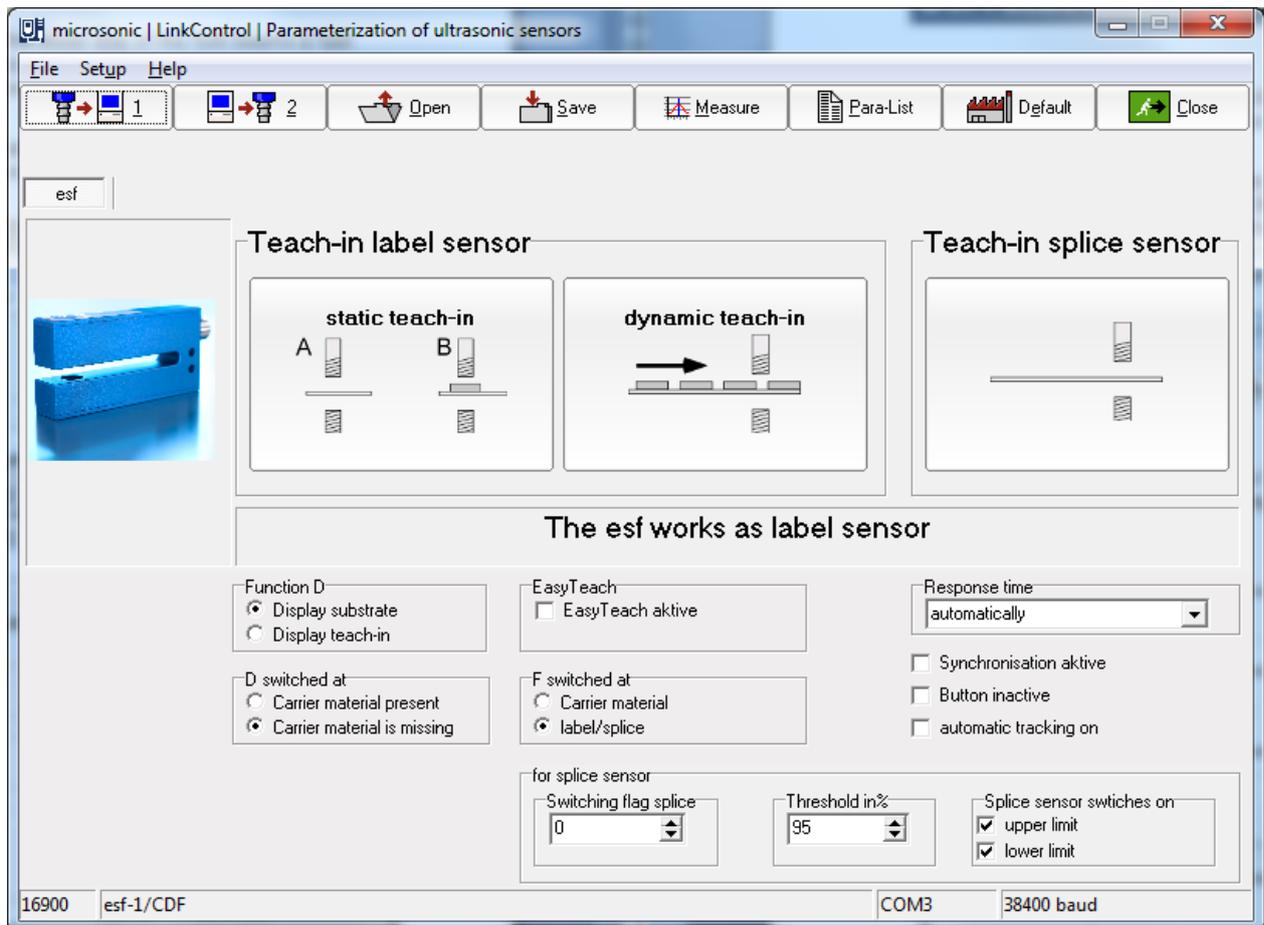
Teach-in-Methods

The esf-1 can reliably detect high-transparency, reflective materials as well as metallised labels and labels of any colour. The measurement cycle time automatically self-adjusts to the sound power required. For thin labels and backing materials, the esf-1 can work at its maximum speed, with a response time of < 300 µs.

To be able to detect special labels, for example labels with punches or perforations, there are three different teach-in methods available.

A) Learn both backing material and label dynamically

During the teach-in process, the backing material and its labels are guided through the fork at a constant speed.

The esf-1 sensor automatically learns the signal level for the labels and for the gaps between the labels.

This is the standard teach-in for labels.

B) Separate teach-in for backing material and labels

The signal level difference for the backing material and labels might be very slight. In order to still scan labels with very little difference in signals, teach-in for the signal levels is done separately: teach-in is firstly done for the backing material and then for the label on it. The switching threshold then lies between these two signal levels.

C) Learn web material only

Web material is generally processed from a roll. The splice to be detected is hidden somewhere in the roll. There is a separate teach-in method available for this purpose, in which only the web material is learned. The esf-1 detects the level difference at the splice and sets its output.

EasyTeach

With EasyTeach, you have a simplified Teach-in process that you have to activate once before initial commissioning.

To use EasyTeach, you have to decide whether the sensor will act as a label or a splice detector.

Once EasyTeach is activated, you can't switch between NCC/NOC any more.

The EasyTeach functionality is available for sensors with lot numbers > 12xxxxx.

Insert the web material into the fork and carry out one of the three standard Teach-in methods or EasyTeach.

CHANGE PARAMETER OF THE WEB EDGE SENSOR BKS+

The bks+ ultrasonic web edge sensor is a fork sensor for scanning the edges of sound-impermeable materials such as foil or paper.

This is why the bks+ is ideally suited for the web control of highly transparent foils, light-sensitive materials, materials with greatly varying transparency and paper subject to high paper dust loads.

The fork's lower leg is equipped with an ultrasonic sensor which cyclically emits short sound impulses, which are detected by the ultrasonic receiver arranged in the upper fork leg. Material immersing into the fork covers this sound path and thus attenuates the receive signal in dependence of the coverage, which is evaluated by the internal electronics. An analogue signal is output in dependence of the coverage degree.

microsonic
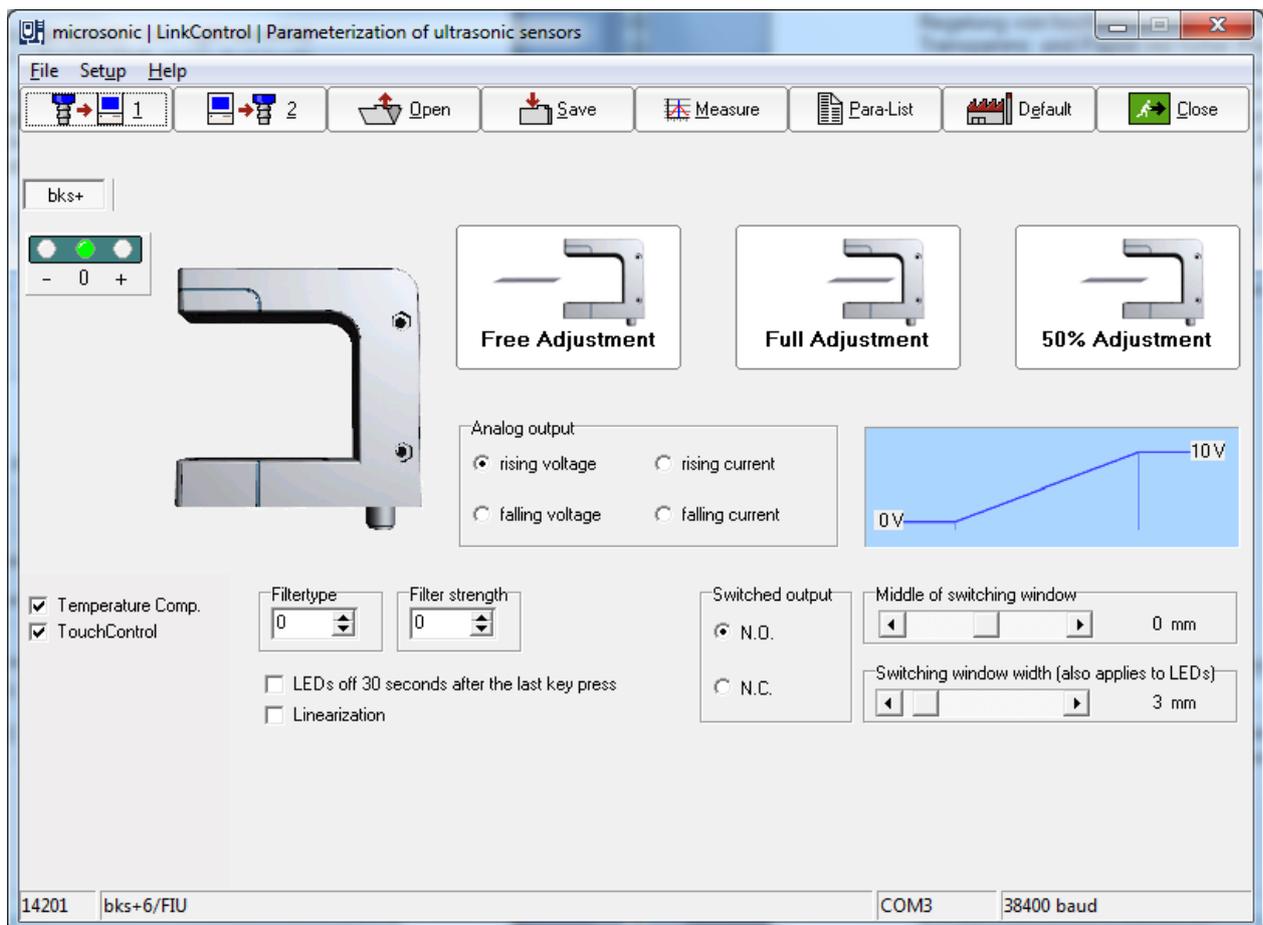
TEACH-IN-METHODS

To adjust the zero position of the edge to be controlled, the sensor can be calibrated with two options.

Completely freeing the fork from the web material

press [Free-adjustment], then completely fill sensor fork and

press [Full-adjustment].
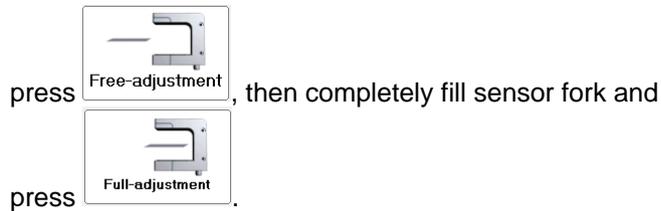
Or align the web edge inside the fork with the two marks to ensure a 50 % coverage of the sound path,

then press [50%-adjustment].
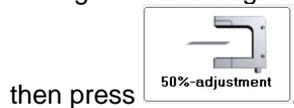
Ready.

SETTING THE ANALOG OUTPUT

Analog Output	
○ Rising voltage	○ Rising current
○ Falling voltage	⊙ falling current
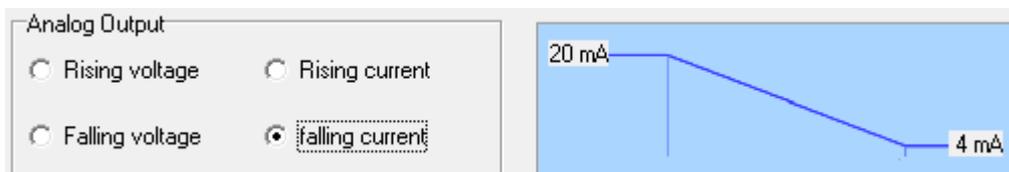
The analog output can be adjusted so that it supplies current or voltage. The characteristic can be selected as rising or falling.

Voltage / Current Increasing: voltage / current increases with higher coverage
Voltage / Current falling: voltage / current drops with higher coverage

SETTING THE SWITCHED OUTPUT

Switched output	Center of switching window
○ NO	◄ ▬ ► 0 mm
⊙ NC	Switching window width (also applies to LEDs) ◄ ▬ ► 22 mm
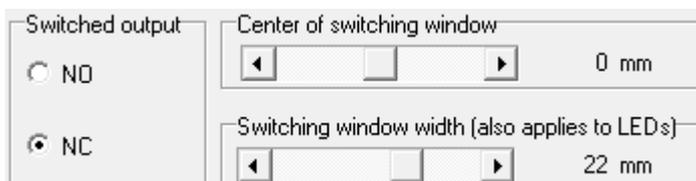
The switched output of the bks+../FIU or bks+../F can be used e.g. for monitoring purposes. He switches around the (adjustable) center in a (adjustable) window.

FILTER SETTING

The filter type F can be chosen from 0 to 3. Where is:

0: No Filter

1: Moving average

2: Median filter

The filter strength can be varied for each filter types between 0-9.

OTHER SETTING

LEDS OFF 30 SECONDS FROM LAST KEY PRESS:
If this feature is activated, the LEDs are off 30 seconds after the last key press. This is needed eg for light-sensitive materials.

CHARACTERISTICS LINEARIZATION:
The characteristic is linearized so that it has a straight course within its limits.

TEMPERATURE COMPENSATION:
see Temperature compensation on page 16

TOUCHCONTROL:
see TouchControl on page 16

DOCUMENTATION OF PARAMETERS

THE PARAMETER LIST
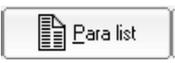
➔ Press [Para list] , to get a list of the adjusted parameters.

Parameter list

Your comment

My remarks

Parameter

```
article no.                  :22230
sensortype                   :mic+35/DIU/TC
Batch number                 :------
lmaximum range               :600 mm
foreground supression        :59 mm
temperature compensation     :Yes
TouchControl                 :Yes
-----------------------------------------------
type of filter               :F02
filter strength              :P01
switch-on delay              :t00
-----------------------------------------------
sensitivity                  :standard
-----------------------------------------------
```
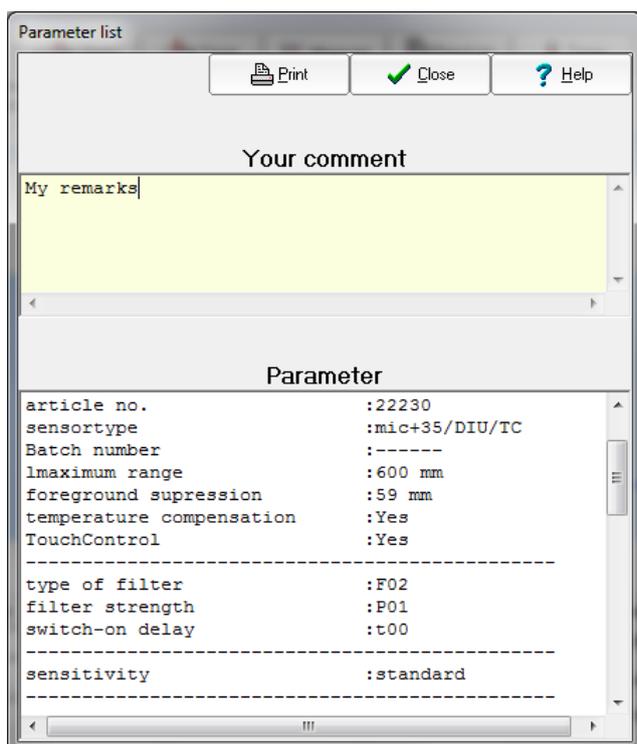
This list documents the parameter settings of the sensor. In the upper text field you can make your own re-marks. In the lower text field all parameters of the sensor are listed. You can print this list inclusive the re-marks for your documentation.

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

VISUALISATION OF MEASUREMENTS

SELECTING THE MODE

🔧→🖥 1	🖥→🔧 2	📤 Open	📥 Save	📄 Para-List	📈 Measure	🌡 Temp	🏭 Default	🏃 Close

➔   Press [📈 Measure]
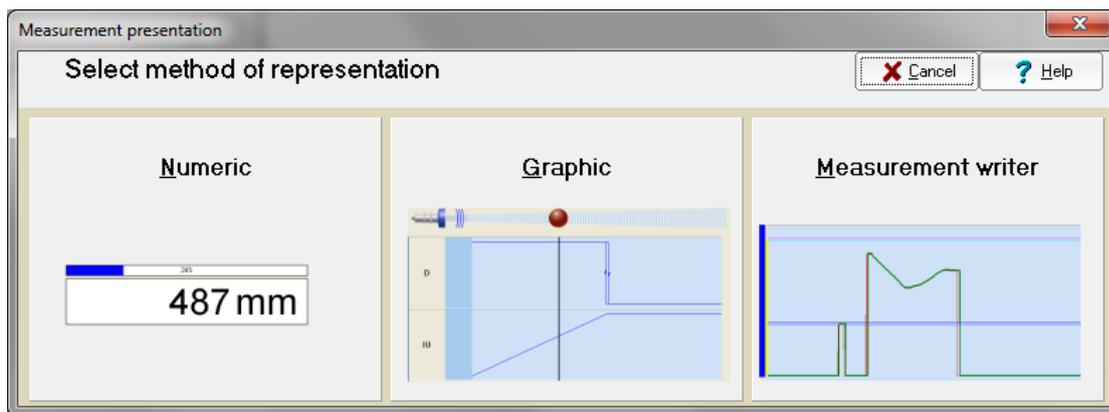
❓   *only for mic-.../M30, lcs and lpc:*
Please notice that the sensor in conjunction with LinkControl performs ultrasonic measurements only under the Measurement menu. When the visualisation is invoked no ultrasonic measurements take place for some seconds. Also the repetition rate is greatly reduced during visualisation mode. You are allowed to visualise measured distances on an installation or machine under operation using LinkControl 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 visualisation with LinkControl.

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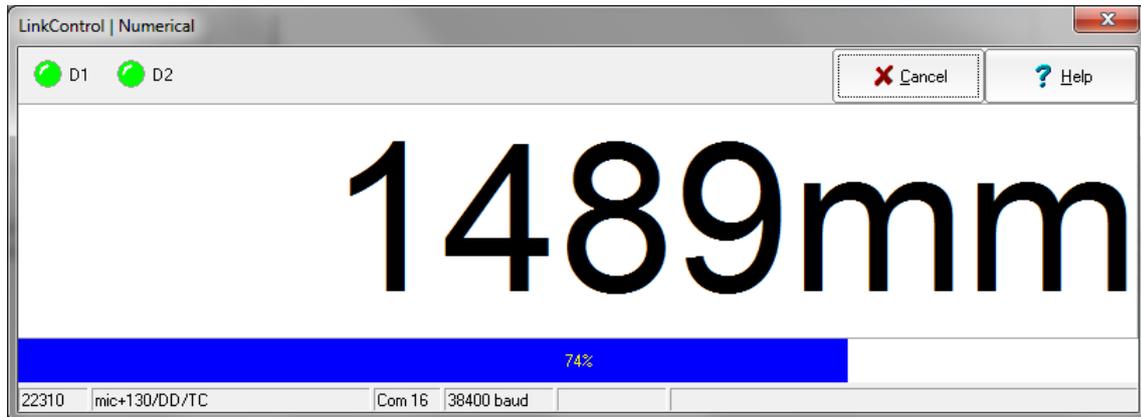
The measuring value is displayed in "mm" and as a bar graph in percent. The selected detection range is equivalent to 100%.

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.

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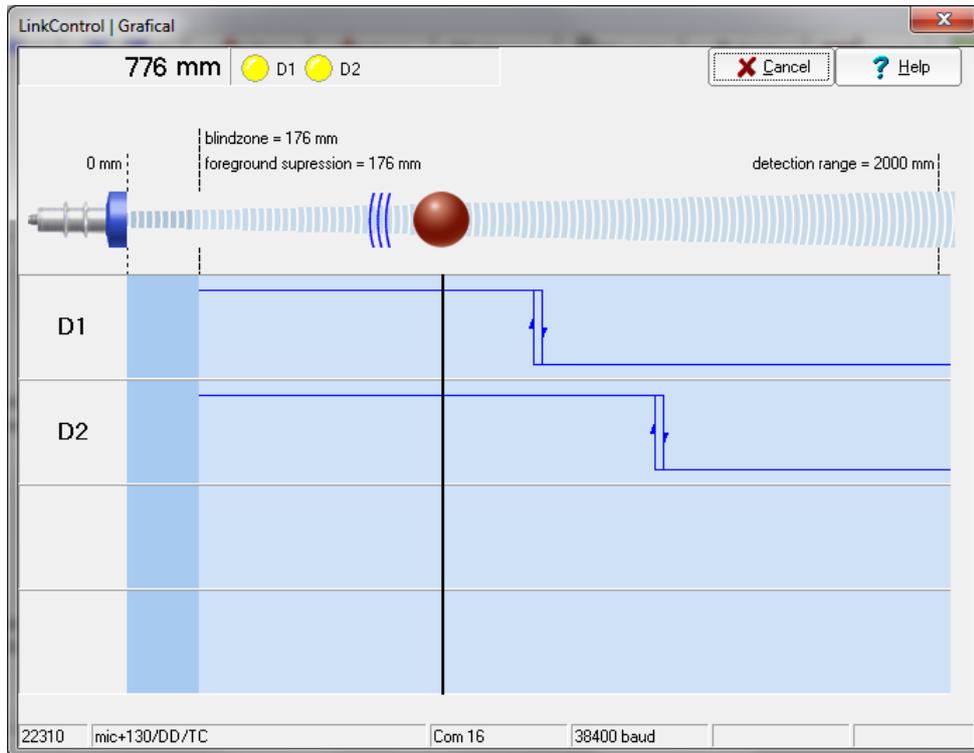
The displayed output characteristics correspond to the settings in the input mask.

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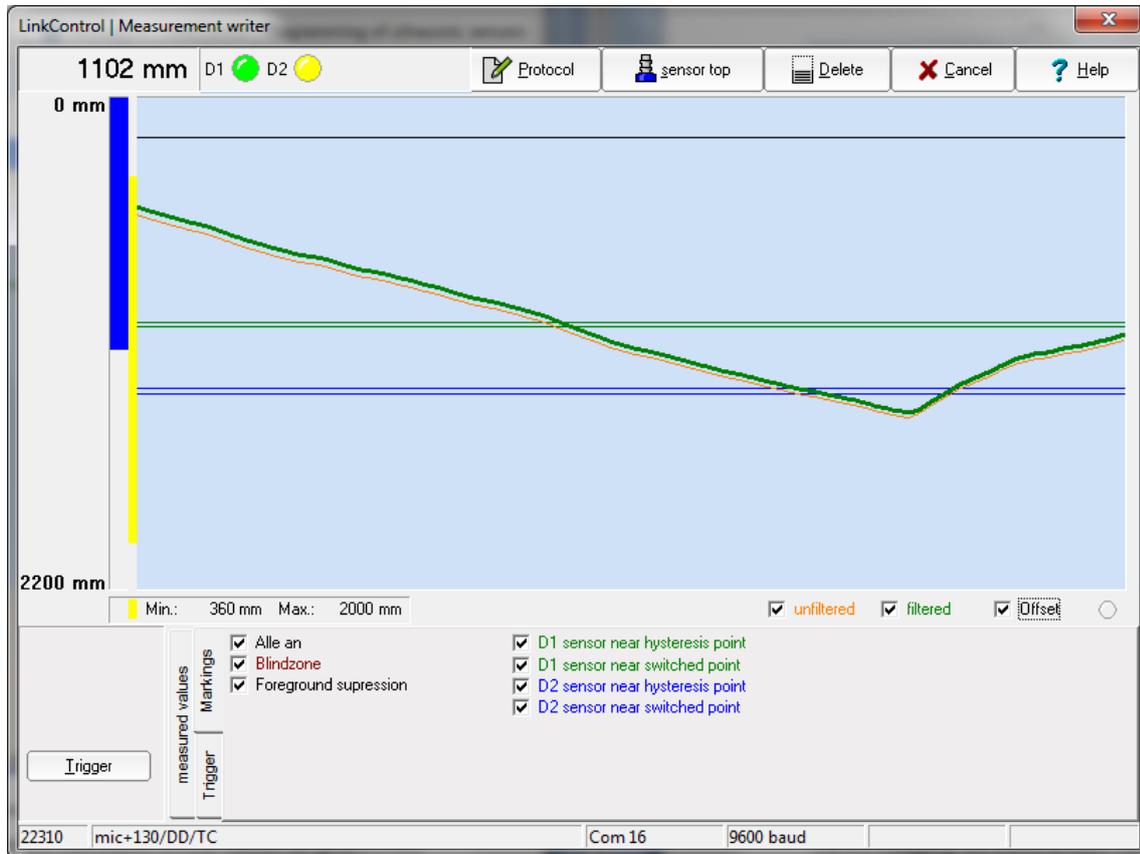
Every measuring value is displayed time continuous like an x-t writer.

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 ac-curacy). 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.

onlymic+.../TC bzw. mic-...M Sensoren ab 2004 und lpc
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

After pressing [Trigger] you will see aditional settings. The following parameters can be displayed.

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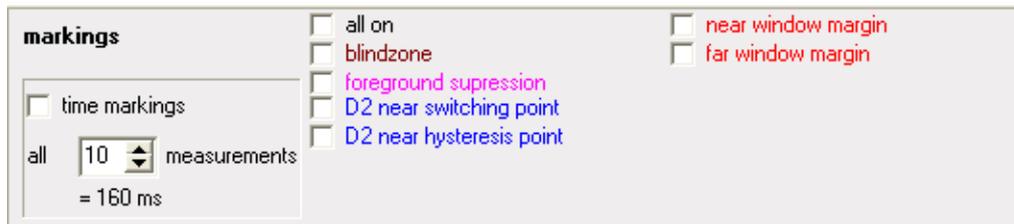
Blindzone, foreground suppression, switching- and hysteresis points (on sensors with switching output) and window margins (on sensors with analogue output)

If time markings is active, all X measurements a vertical white line 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 only then, 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 only then, when you Press the button Reset.

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.
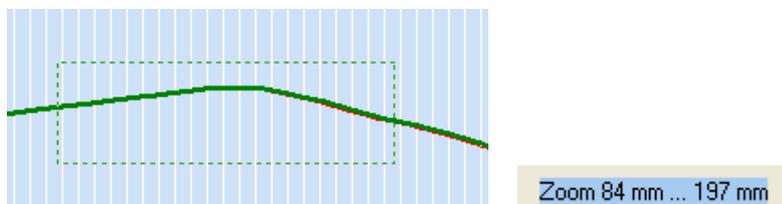
To switch off the zoom, click on the graphic and following message will be displayed.
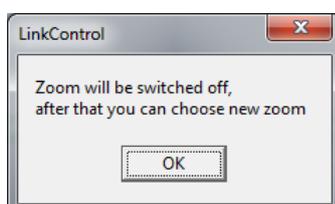
For logging, the measurements can be saved into a file.

➔   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..
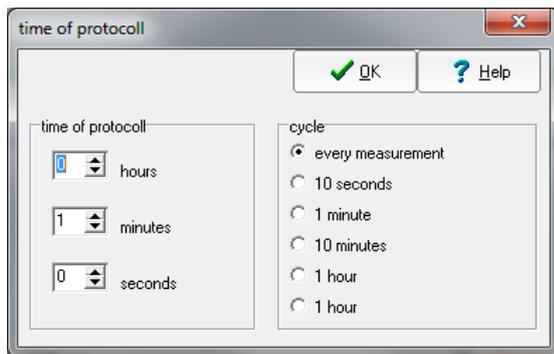
All sensor parameters will be saved into the file, followed by the measurement values.

INDIVIDUAL INPUT MASK

LOCKING INPUT FIELDS

.

➔   Select from the menu File the submenu Lock Inputs

➔   Enter the password "snoopy"
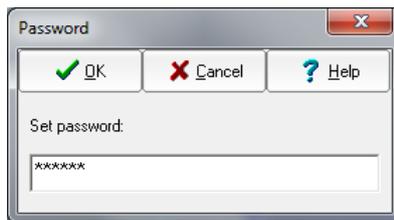
➔   Select which input field shall be locked or not.
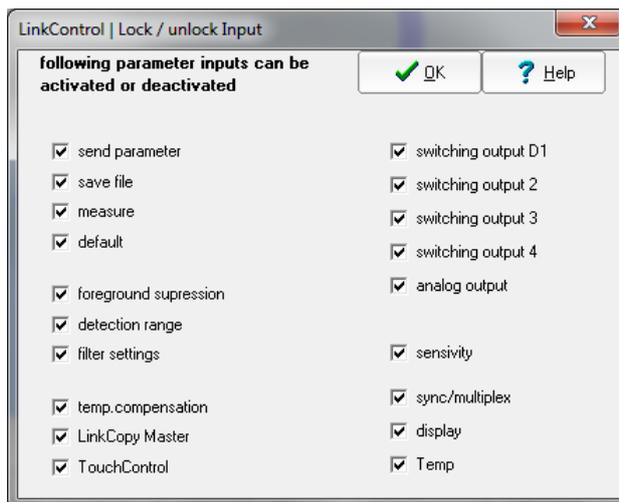
With the LCA-2 you can copy parameters of a sensor onto a second sensor of same type and same product line. For that the software LinkControl is not necessary.

For further information see: quick reference guide on the LCA-2.

UPDATING LINKCONTROL

Link Control is continuously updated. Please take a look at our website and download the latest LinkControl software.
You can find the current LinkControl at the following link:

http://www.microsonic.de/en/service/downloads/linkcontrol.htm

Link Control even offers the possibility to update the default parameter files. This for example is necessary if microsonic releases new sensors.

➔ Choose "Help | Update"
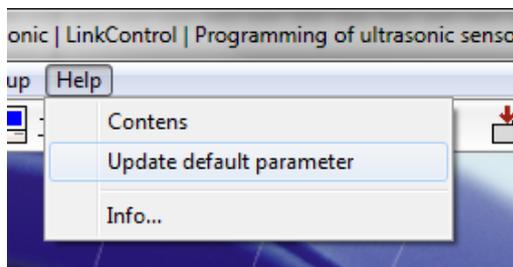
A dialog shows your version and the version available on the Internet.
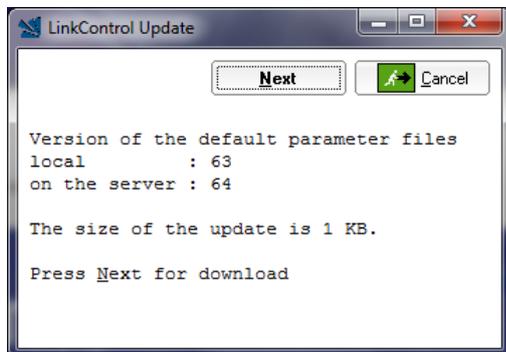
➔ Press Next

LinkControl downloads the update to your computer, there it will be unziped and loaded to LinkControl.