LinkControl Version 7.3.1

Programming of ultrasonic sensors using the PC
Parametrisierung von Ultraschallsensoren mit dem PC

Subject to change without notice - EW-DO-021316 Rev. 6-168037
Änderungen vorbehalten - EW-DO-021316 Rev. 6-168037

Note

You can find the latest LinkControl software under:

www.microsonic.de

Table of Contents

Preparation

Delivery scope

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

- LCA-2
- Adapter for sensors with cable connection (lcs) incl. cable clamps
- Adapter for power supply incl. cable clamps
- Power supply 90-240VAC/24VDC, 625 mA, with 2,5 m cable
- four exchangeable AC-plugs for use in Europe, USA, Great Britain and Australia
- USB - cable A-plug to B-plug
- Installation CD with LinkControl software
- Manual (German / English)

System requirements

- Pentium I 166 MHz or higher, 256 MB main memory, 10 MB free space on hard disk drive
- Windows Vista, Windows XP, Windows 2000 or Windows ME/98SE
- Graphic minimum resolution 800*600, minimum 256 colours

Installing the Software

➔ Start your computer and wait until Windows has booted.

➔ Put the installation CD into the drive

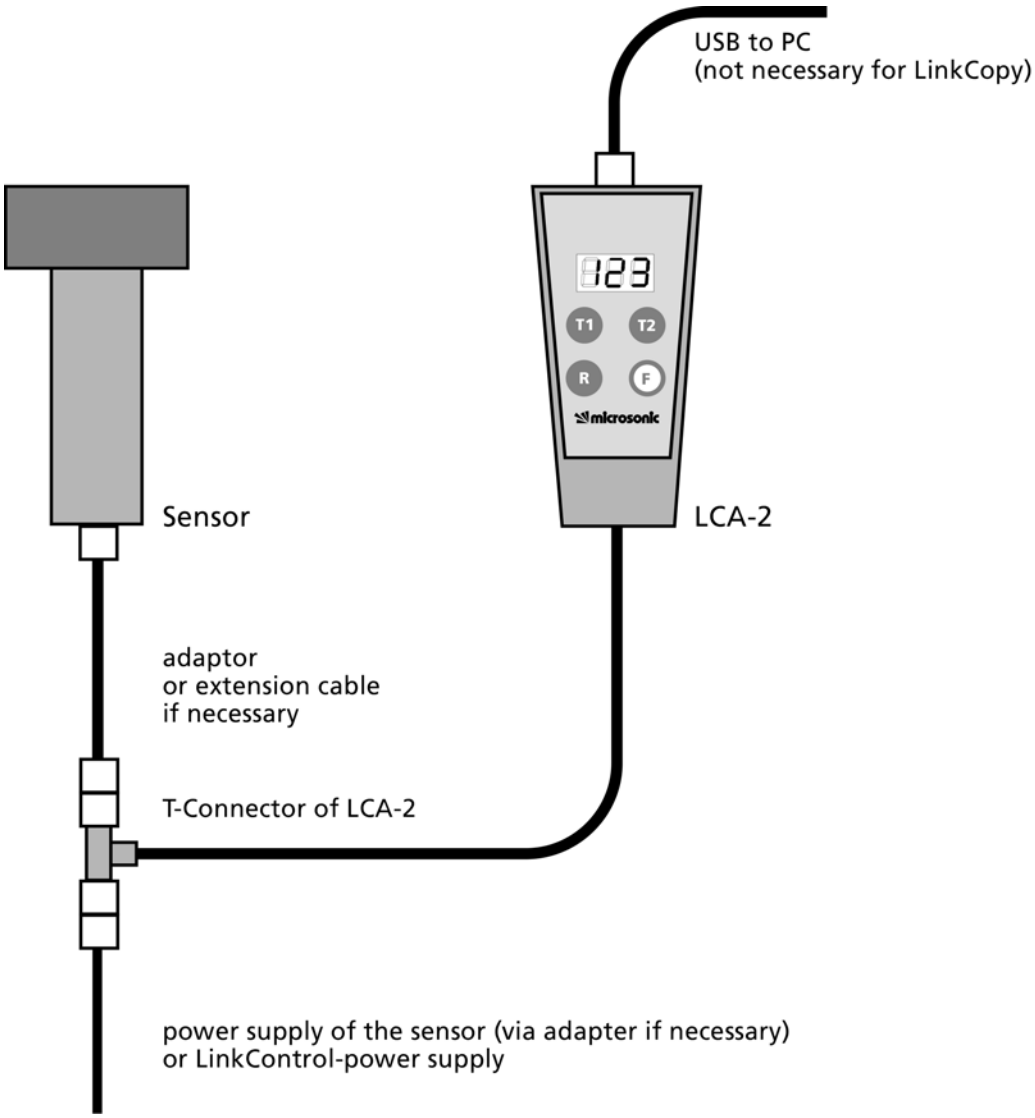
➔ If autostart function for CD is active, installation starts immediately, otherwise open Start.EXE from the CD.

➔ Follow the instructions on the screen.

The following files are copied into this directory:

- ***LINKCONTROL.EXE*** executable program file
- ***LINKC_E.CHM*** English help file
- ***LINKC.INI*** configuration file for LinkControl
- ***LINKC.LST*** list of microsonic brand ultrasonic sensors
- ****.MIC*** default parameter files for the actual microsonic brand ultrasonic sensors
- ***Driver*** folder with the driver, used for the LCA-2

Connection of the LCA-2

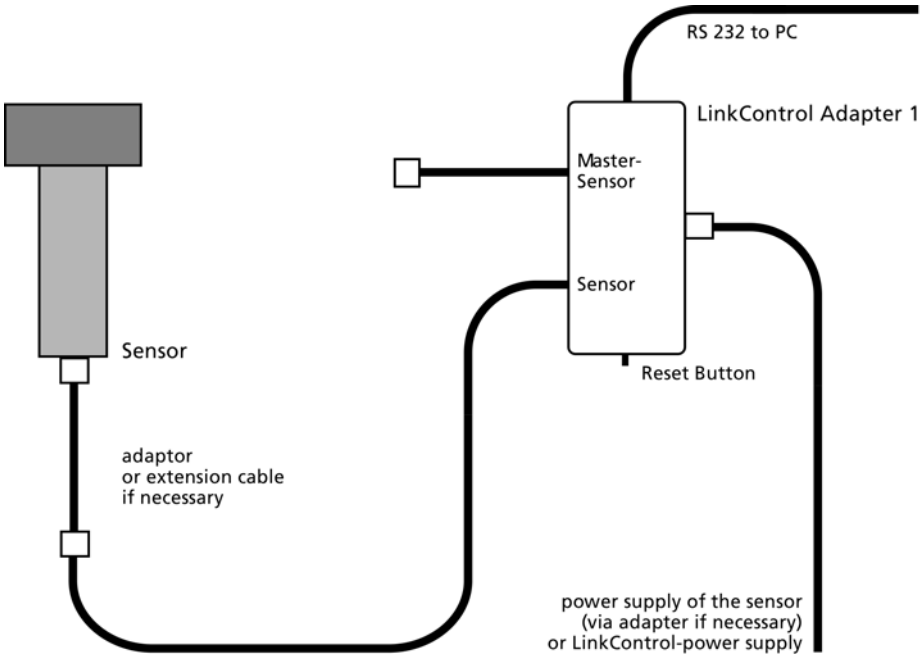


For further Information see: quick reference guide on the LCA-2

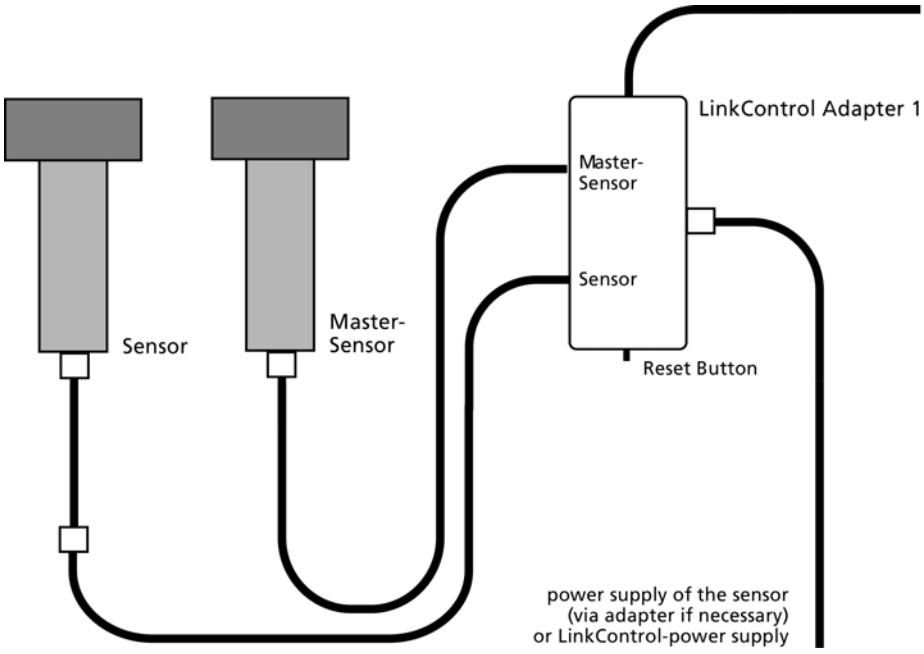
Connection of the LinkControl Adapter 1

For the use of the advanced functions with current sensor models we recommend the use of the LCA-2.

Setting the sensor parameter with LinkControl by PC



Setting the sensor parameter with LinkCopy (also see LinkCopy with LinkControl Adapter 1)



Pinning and colour coding

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

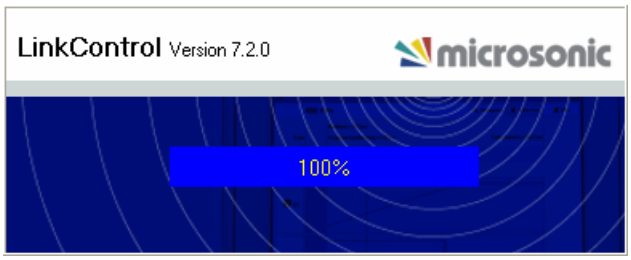
Pin	Standard colour coding	Colour coding lcs sensors	Sensors with 1 switching output	Sensors with 2 switching outputs	Sensors with analogue out-put	Sensors with switching output + analogue out-put
1	brown	brown	$+U_B$	$+U_B$	$+U_B$	$+U_B$
2	white	white	-	output D1	analogue output	analogue output
3	blue	green	$-U_B$	$-U_B$	$-U_B$	$-U_B$
4	black	grey	output D	output D2	-	output D
5	grey	yellow	communication *	communication *	communication *	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.*

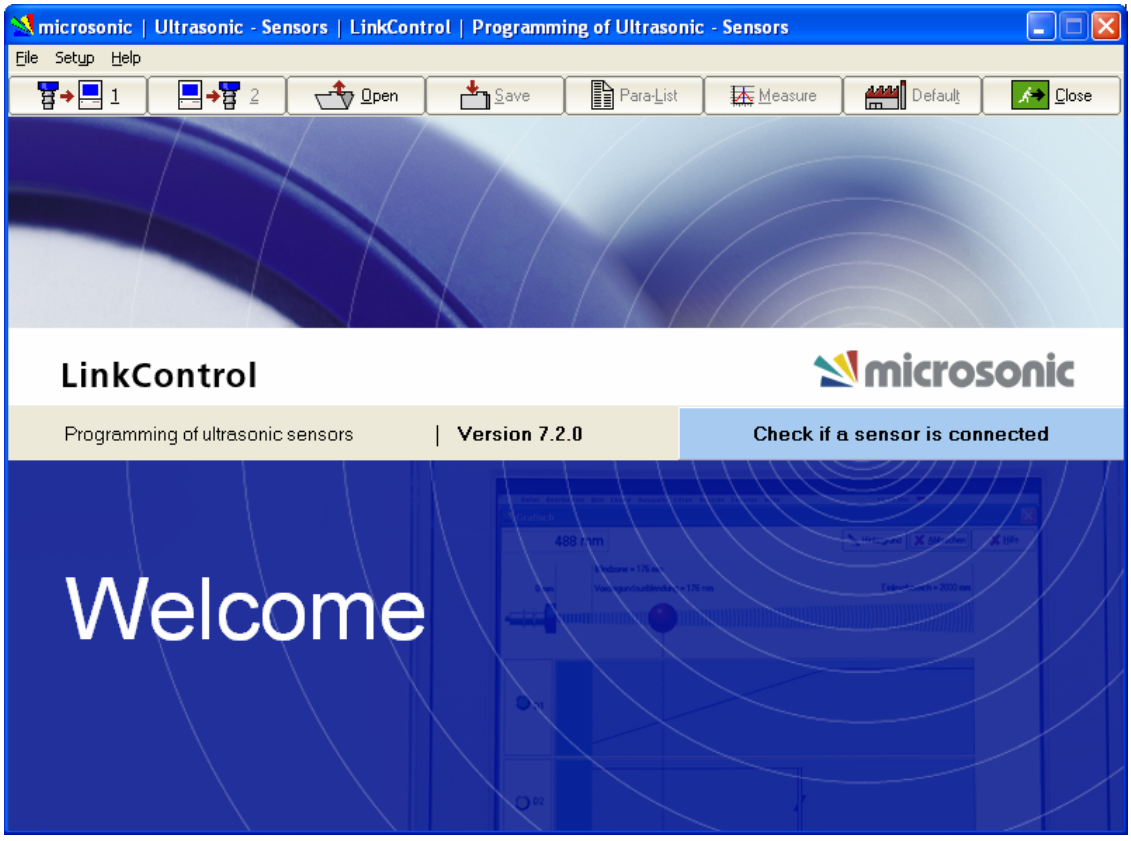
Launching the LinkControl software

➔ In the task bar choose Start/Programme/LinkControl/*LinkControl.EXE*

After starting the software

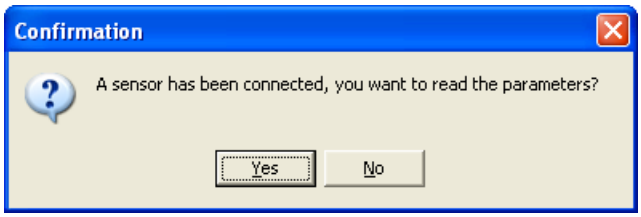


The start-up screen appears.



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.

Reading / writing parameters

Reading parameters from a connected sensor

only for mic-.../M30, lcs and lpc:

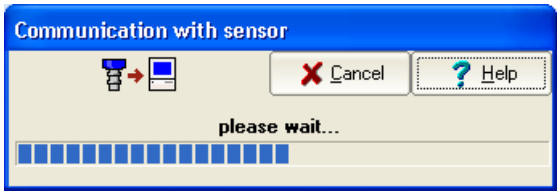
Please notice that the sensor does not perform ultrasonic measurements during programming with LinkControl; thus none of the outputs are served during this period. You are allowed to alter sensor parameters on an installation or machine under operation using LinkControl only, if you have made sure that no harmful situation for man and machine may occur when doing so. When in doubt you must 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...COM8).

➔ Click with the mouse on the button for Reading parameters from the sensor

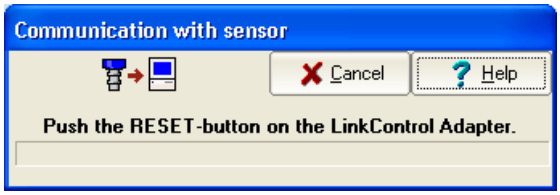
or

➔ switch on the sensor and confirm the security query.



All parameters are read from the sensor and transferred to the input mask of the LinkControl software afterwards.

If the following message occurs,



➔ push the RESET button on the LinkControl adapter.

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 adapter (LED's on sensor must be illuminated)

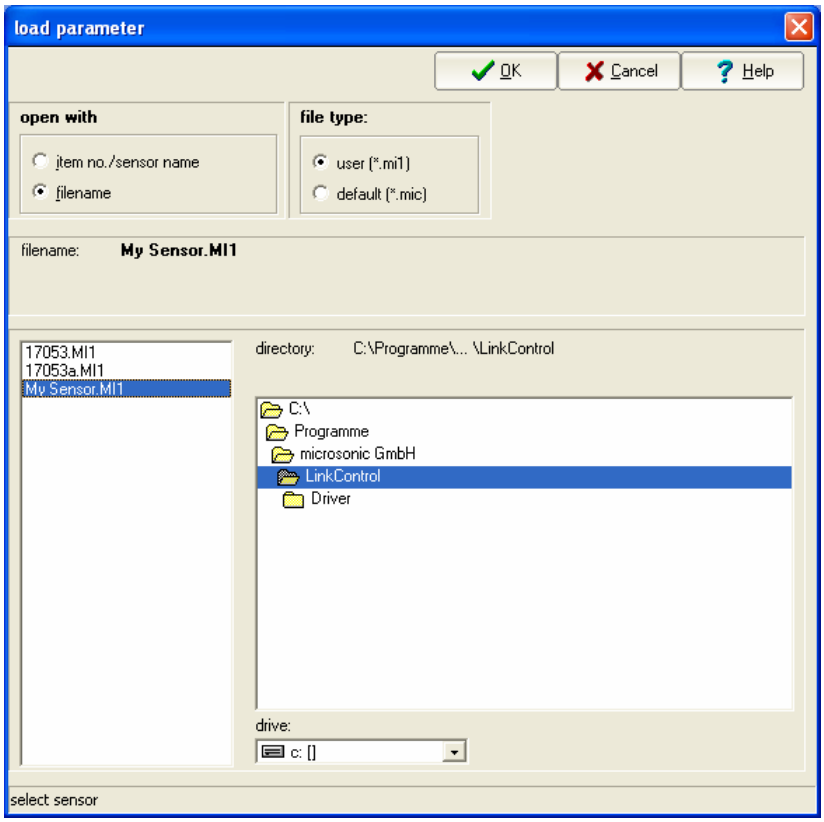
➔ the USB - connection to the PC is properly made

➔ the correct port has been selected within the LinkControl software

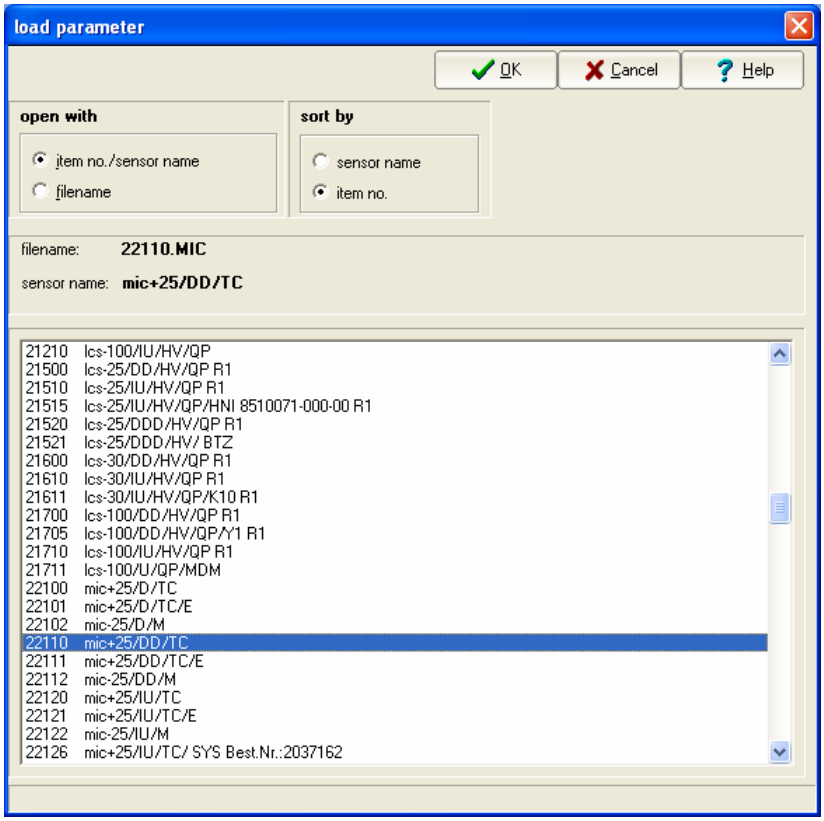
Reading parameters from a file

➔ click with the mouse on the button **Open**

➔ choose, 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.



➔ choose 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.*

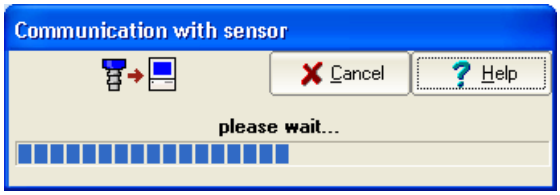
Transmit parameters to the sensor

All changes that you have made in the input masks, are only temporarily stored within the LinkControl program. You must 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.

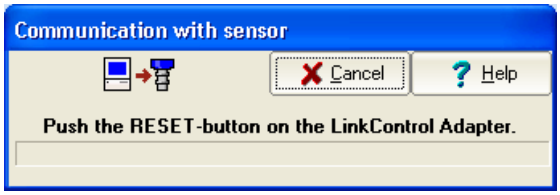
➔ Click with the mouse on the button for sending the parameters to the sensor

➔ Confirm the security query

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,



➔ push the RESET button on the LinkControl adapter.

➔ 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 must be illuminated)

➔ the USB connection to the PC is properly made

➔ the correct port has been selected within the LinkControl software

Also see page10: Reading parameters from a connected sensor

Unequal sensor types

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

Conversion of parameters for the R1 sensors

The mic-XX/YY/HV/M30 and Ics-XX/YY/HV/QP ultrasonic sensors have been revised in terms of hardware and software. The revised sensors are additionally marked with “R1” in the product designation:

mic-101/IU/HV/M30 becomes mic-101/IU/HV/M30 R1

These R1 sensors are mechanically, electrically and acoustically downward-compatible with the old Ics sensors.

Programming via the LinkControl software has changed for the new R1 sensors.

The parameter files of the R1 sensors are not compatible with those of the old sensors.

The R1 sensors no longer support the LinkCopy function via the master sensor.

The filter settings have changed.

To transfer the sensor settings of an old Ics sensor to a new R1 sensor, you can read out the sensor settings from the old Ics sensor via the LinkControl software (or load your parameter file from the hard disk) and then write the settings into the connected R1 sensor. Version 7.3.0 or higher of the LinkControl software converts the parameters of the old sensor and indicates whether the conversion was successful.

This procedure is described below.

➔ Connect the LinkControl adapter to your PC and start the LinkControl software.

➔ Connect the old Ics sensor with the sensor settings to be converted to the LinkControl adapter and read out the parameters (or open the parameter file from the hard disk).

The two following screenshots show the sensor settings of an Ics-25/DD/HV/QP as an example:

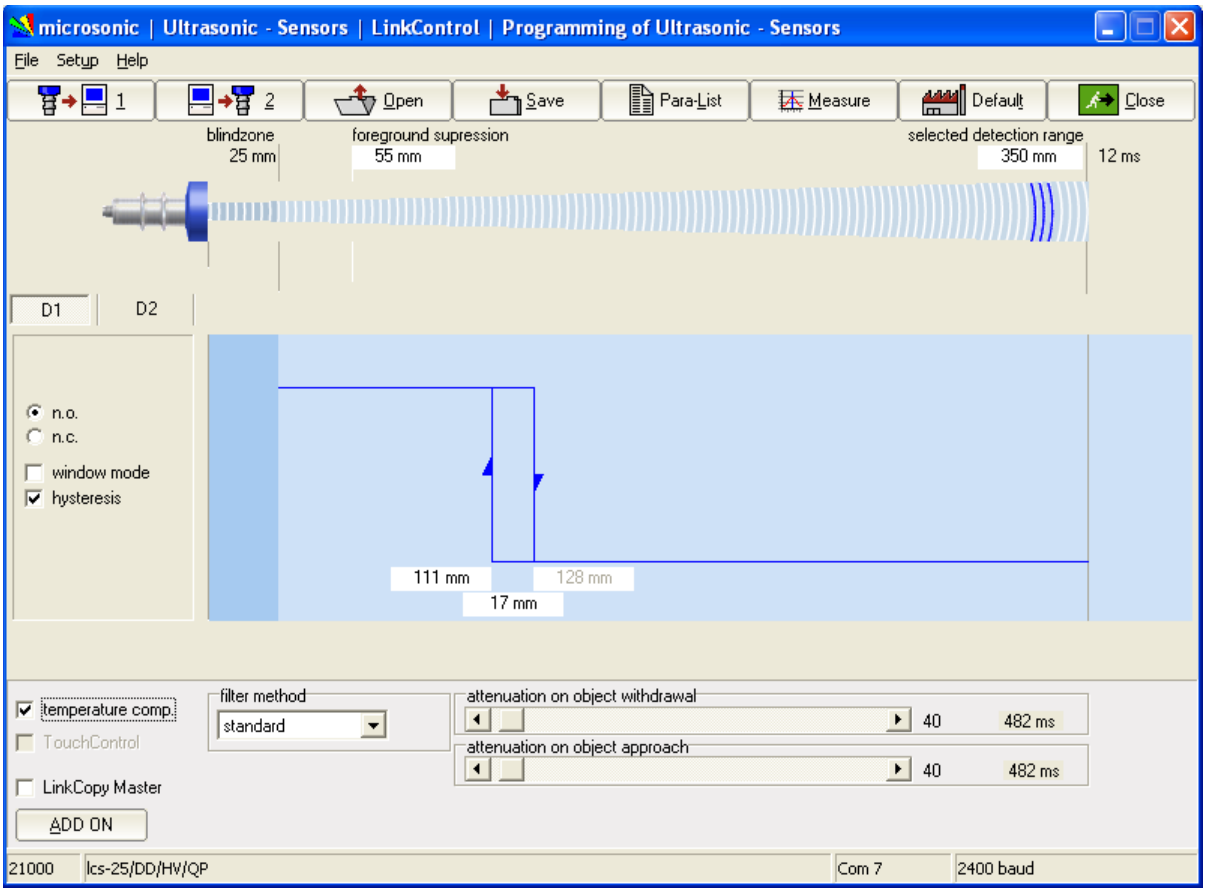


Fig. 1: Old Ics sensor with settings for switched output D1 and filter settings

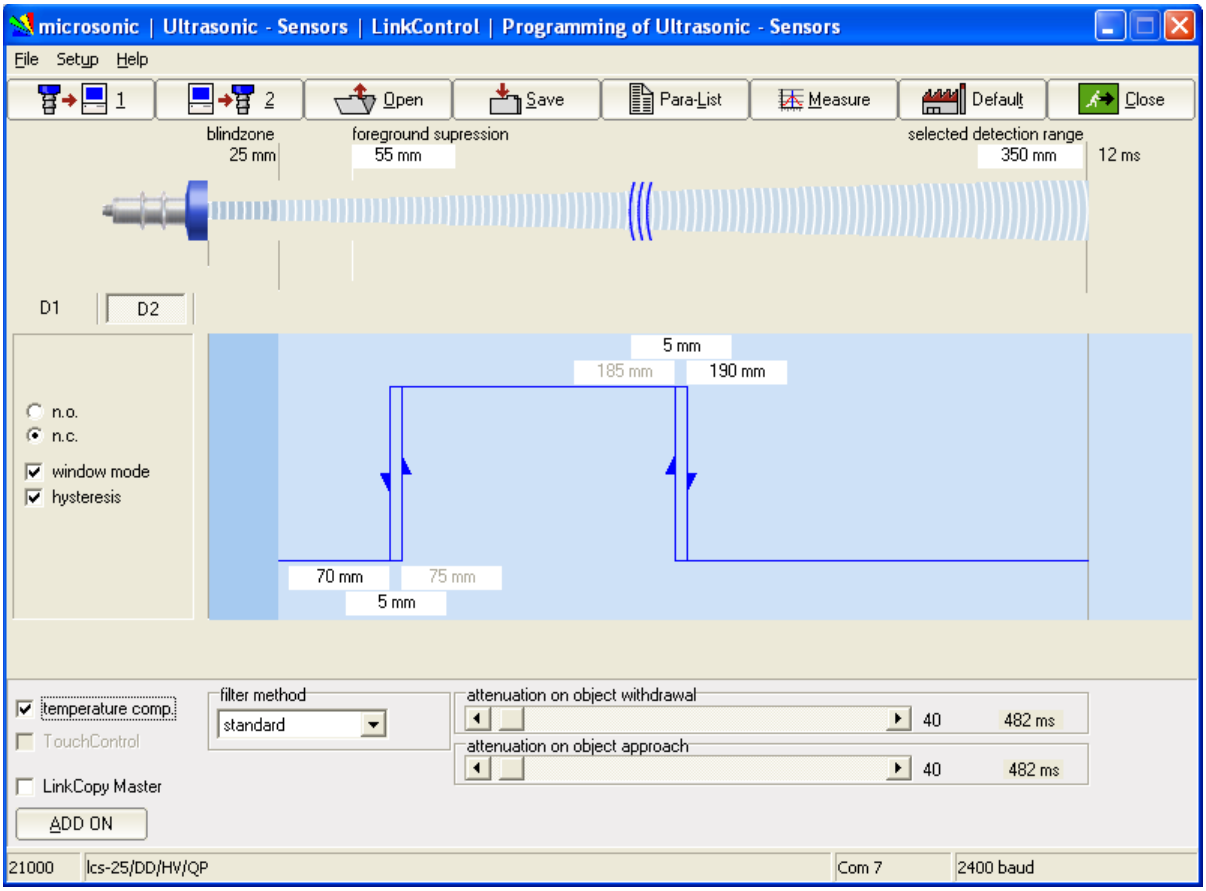
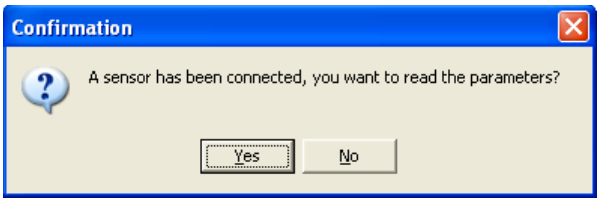


Fig. 2: Old Ics sensor with settings for switched output D2 and filter settings

➔ Connect an R1 sensor of the same type to the LinkControl adapter (Ics-25/DD/HV/QP R1 shown in the example).
LinkControl automatically recognizes the connection of a different sensor and now asks you whether the parameters of this sensor are to be read out.



➔ Click “No” to cancel the process..

➔ Click the button 

LinkControl now converts the parameters of the old sensor into new parameters for the R1 sensor. If LinkControl was able to convert all parameters, you are offered the option of either directly writing the converted parameters into the new sensor or checking the converted parameters on the screen mask:

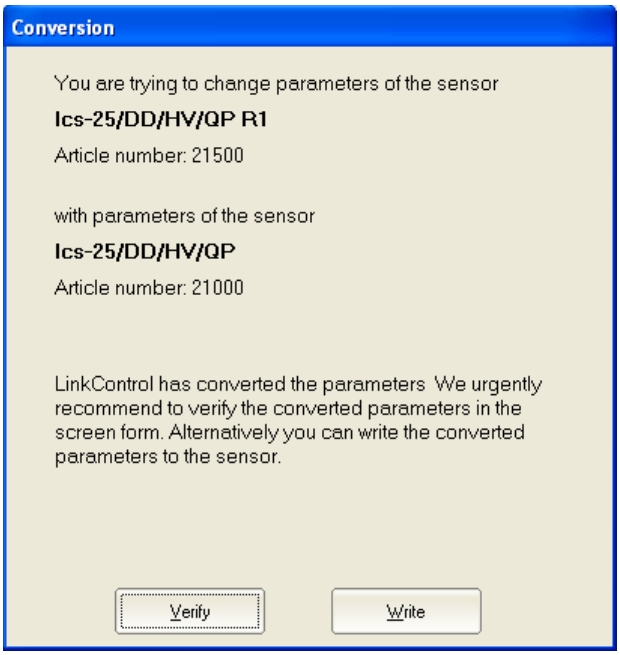


Fig. 3: LinkControl completely converted the parameters.

➔ Click the button "Verify" to verify the converted parameter first, or click "Write" to write the converted parameter directly into the new sensor.

If LinkControl was not able to convert all parameters, the software asks you to check the converted parameters on the screen mask:

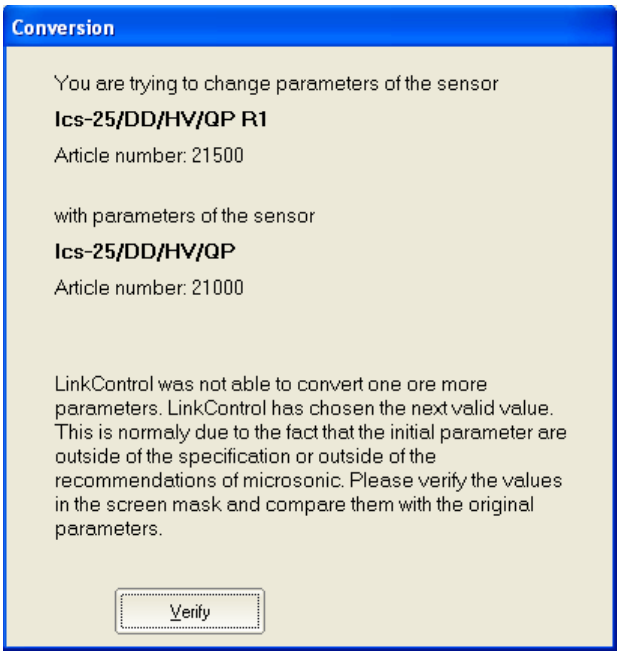


Fig. 4: LinkControl could not completely convert the parameters

➔ Click the button "Verify".

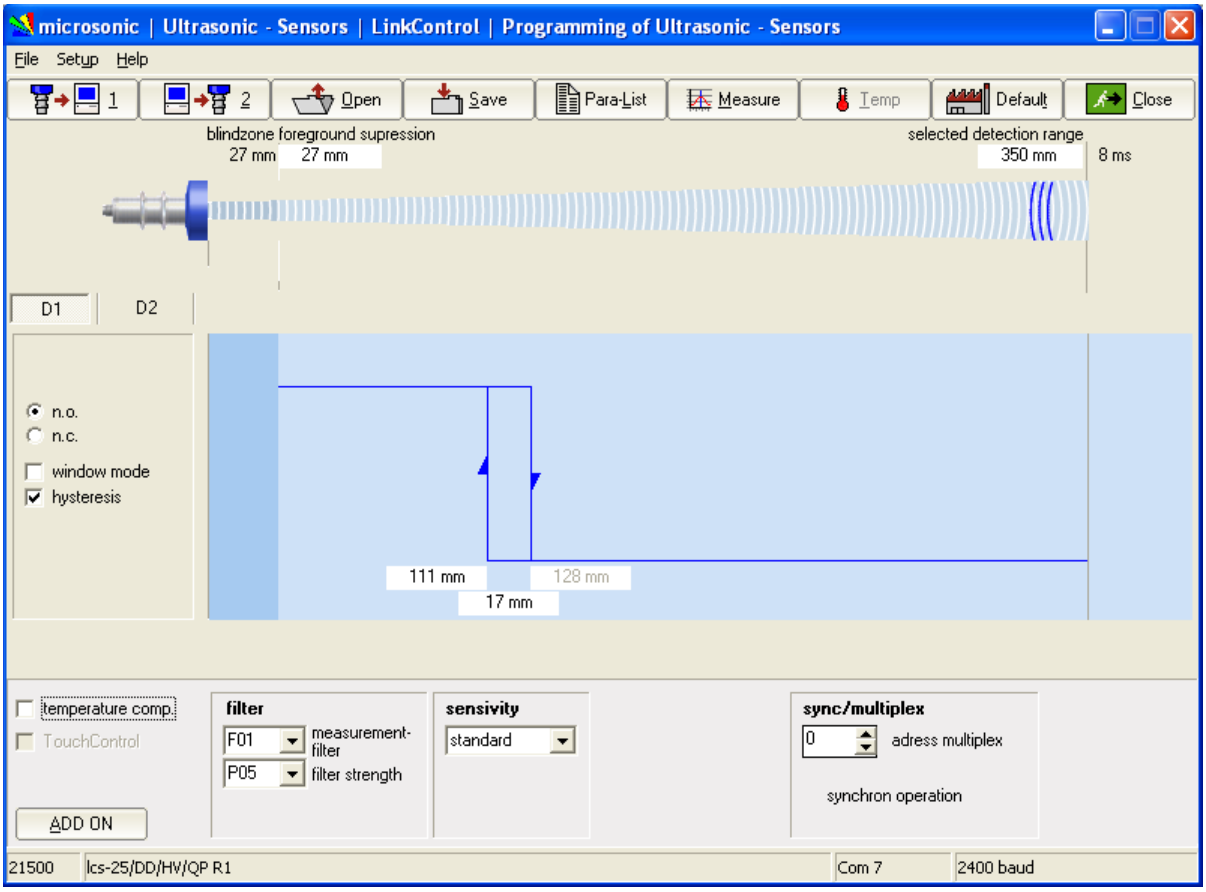


Fig. 5: R1 sensor with converted settings for switched output D1 and filter settings

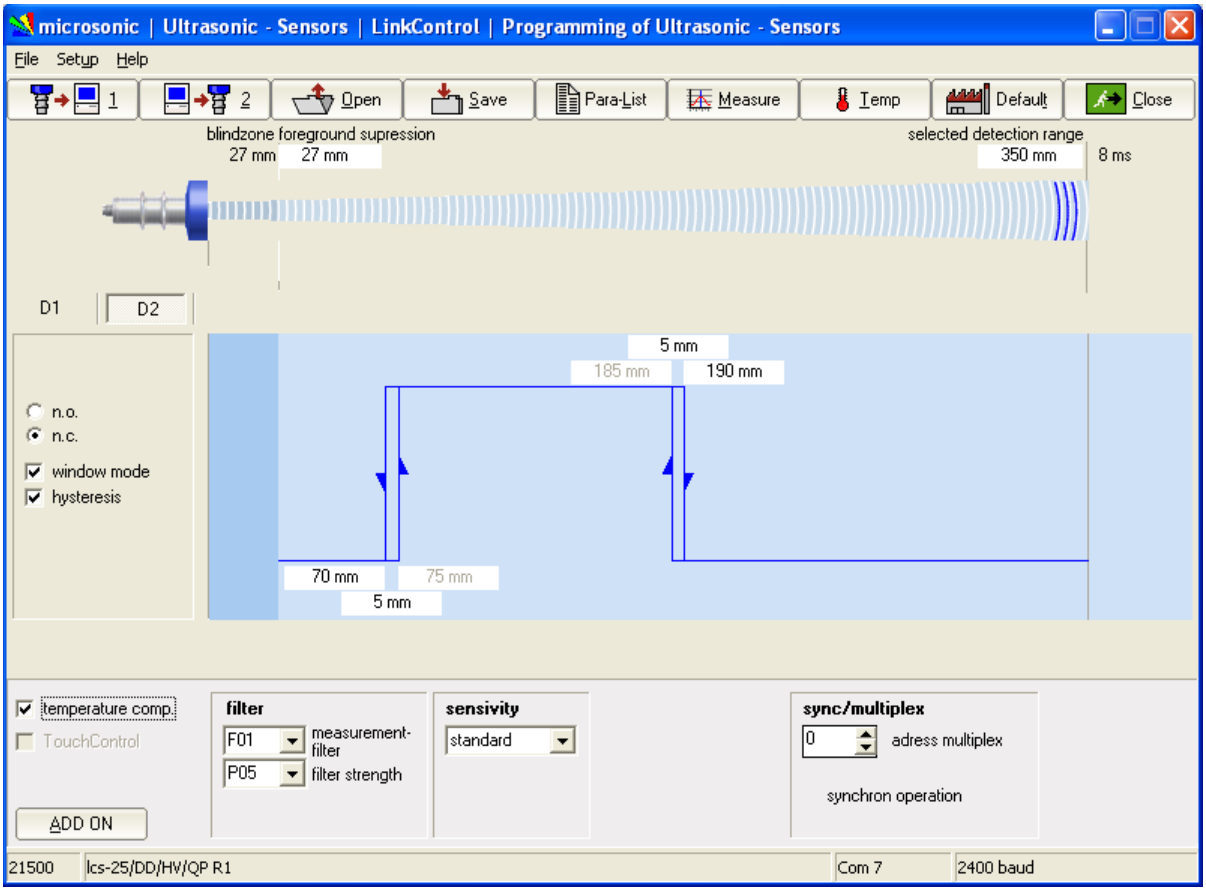


Fig. 6: R1 sensor with converted settings for switched output D2 and filter settings

➔ Check the converted parameters.

➔ Click the button  to transfer the checked parameter directly into the new sensor.

➔ Check the sensor settings during ongoing measuring operation.

➔ If required, save the converted sensor settings as a new converted parameter file to your hard disk.

Saving parameters to a file

➔ Click with the mouse on the button **Save**

➔ Choose 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

Changing general parameters

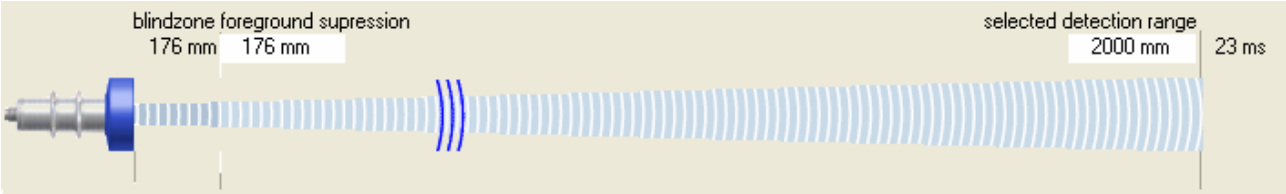
Depending on the connected sensor (or according to the loaded sensor file) the input mask may vary in its appearance.
All changes which you make in the input mask are only temporarily stored in the PC. Subsequently these new settings must be transferred to the sensor (see Transmit) and / or be stored 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 must 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 must not be closer than the blind zone, because this would lead to false measurements. 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 re-flection properties (functional reserve).
The selected detection range takes effect on the repetition rate of sensor measurements. The time for a sin-gle ultrasonic measurement, resulting from the selected detection range, is displayed above the correspon-dent 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 sen-sor type might affect the sensor function due to double reflections. Normally there is no need to choose 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 unchecking 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 or mic-...M from 2004!

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 must have the device address >0<.

Display mode

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

Near 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

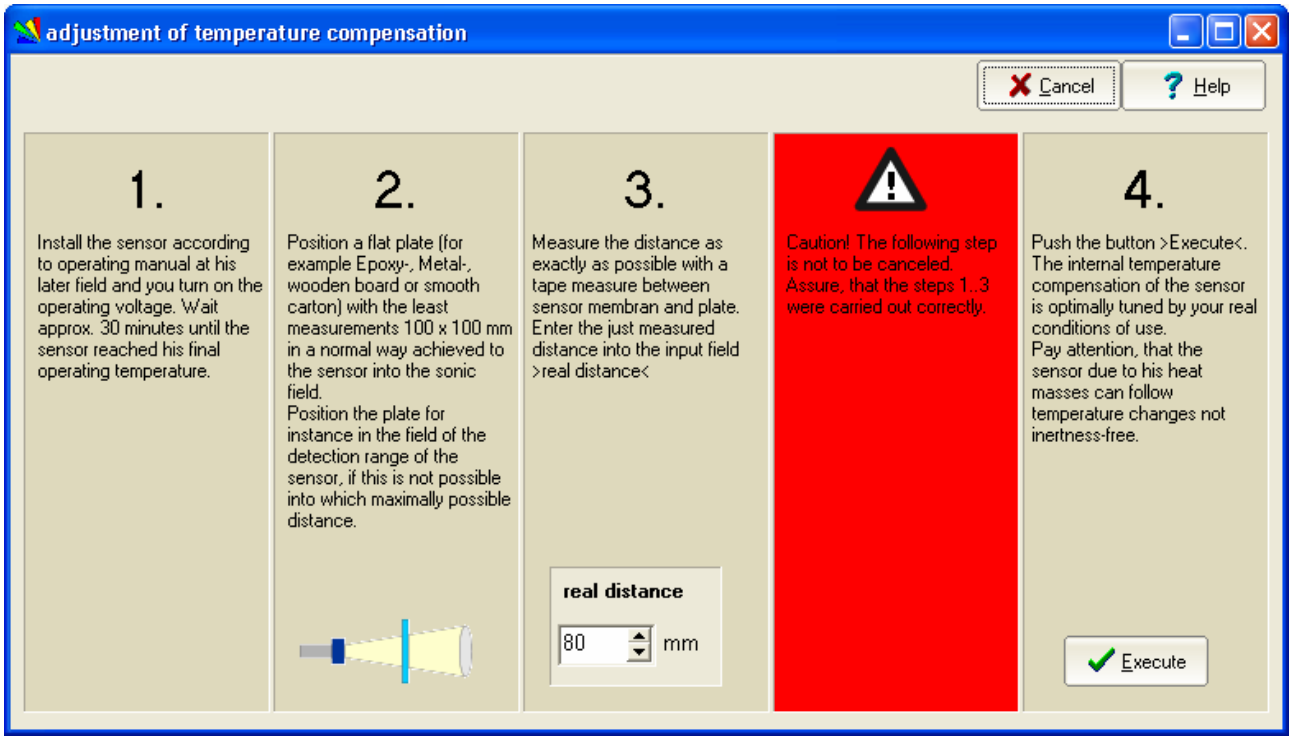
0...100%: the measured distance value is indicated as percentage value of the analogous characteristic, begun from the sensor-near vertex up to the sensor-far vertex

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

Adjustment of temperature compensation

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

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.

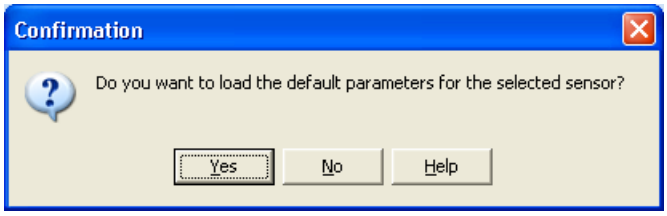
➔ Measure the distance as exactly as possible with a tape measure between sensor membrane and plate. Enter the determined value into the input field >real distance<.

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

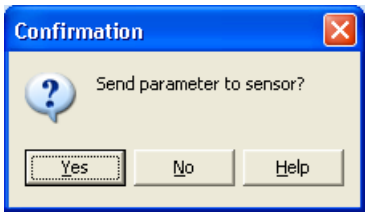
➔ Push the button >Execute<. The internal temperature compensation of the sensor is optimally tuned by your real conditions of use. Pay attention, that the sensor due to his heat masses can follow temperature changes not inertness-free.

Setting the sensor to its defaults

➔ Click on the button **Default**.



➔ Confirm the security query.

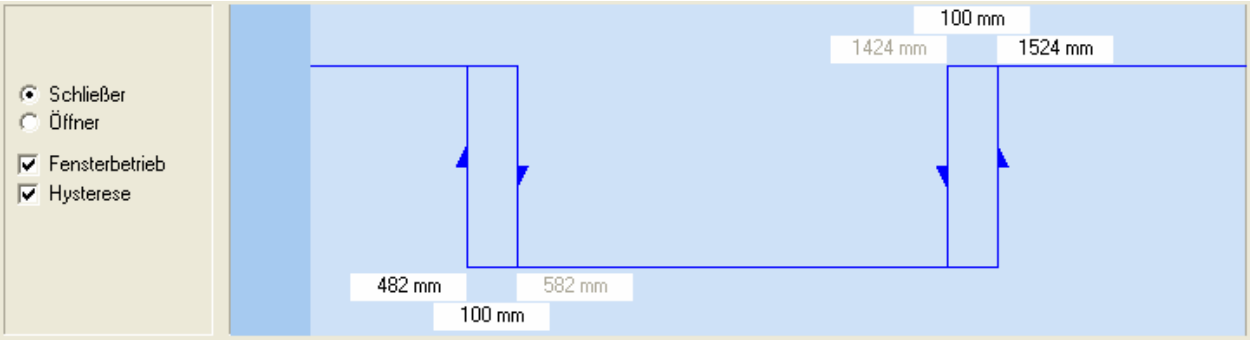


All parameters that you changed, will be set to its default values located in the default parameter files (*.MIC).

All changes that are made in the input mask are temporarily stored in the PC program only. Subsequently these new settings must be transferred to the sensor (see page: 14, Transmit parameters to the sensor) and / or be stored permanently on the hard / floppy disc of your PC.

Changing parameters for switching sensors

microsonic ultrasonic sensors with pnp-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 hysteresis values remain the same as programmed before in this case.

Window mode

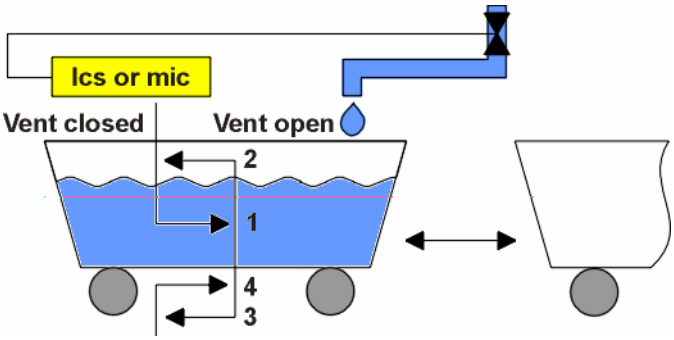
If the check box Window Mode has been checked, another trip point plus correspondent hysteresis becomes available for each switching output. Both trip points form a window, where the output is set only if an object is detected between these two margins.

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

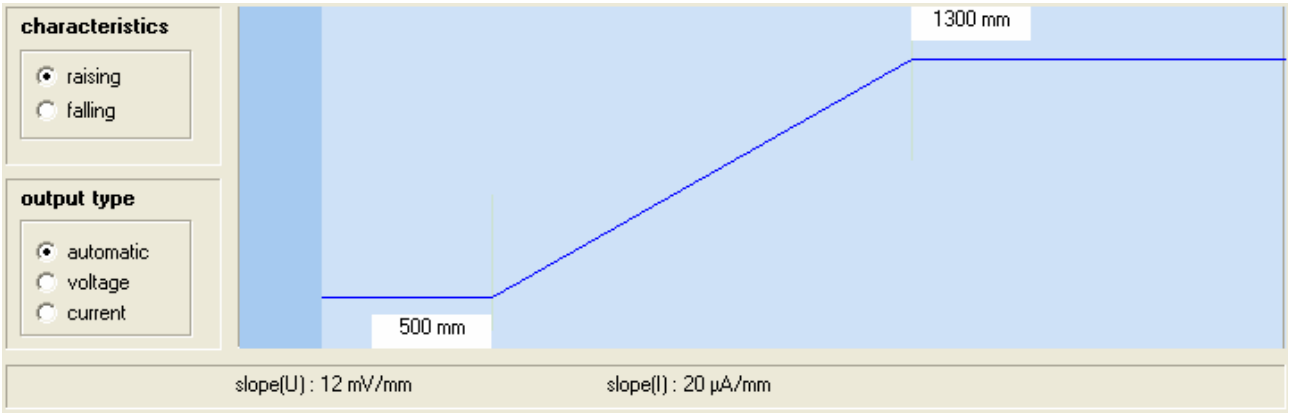


The output is set at trip distance 1 and the valve opens for filling. Beyond the hysteresis the valve closes again at trip distance 2. To prevent the valve from opening when there is no vehicle at all, the valve is kept shut by trip distance 3. As soon as there is a vehicle once again below the valve, 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 to 0.36mm 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 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).

Filter settings

General filter settings

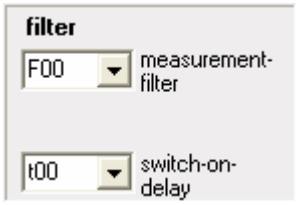
microsonic brand ultrasonic sensors normally combine several ultrasonic measurements for a reliable result. Plausibility is checked and measured values are attenuated. All filter settings may be applied to switching sensors as well as to analogue sensors. Different filter methods are at hand to achieve 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.

Sensor families mic+.../TC and mic-.../M

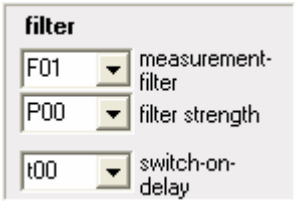
Within these sensor families you are able to choose four different types of filter. On every of these filter types, you can set the filter strength in steps from 0 to 9.

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.

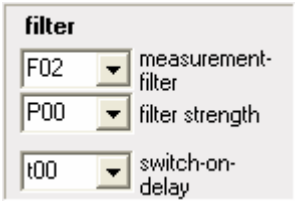
F01



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.

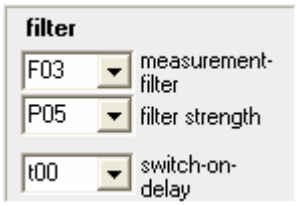
F02



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

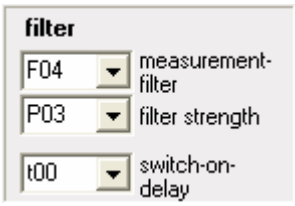
The applied method is not exactly a true mean value calculation from the mathematical point of view; due to the limited RAM storage capacity of a microcontroller a similar method is employed.
The maximum allowable attenuation must experimentally be derived.

F03



In the case of arrival of different distance values the sensor-near measured values are preferred.

F04

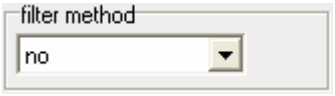


In the case of arrival of different distance values the sensor-far measured values are preferred.

Sensor families mic-.../M30 and lcs

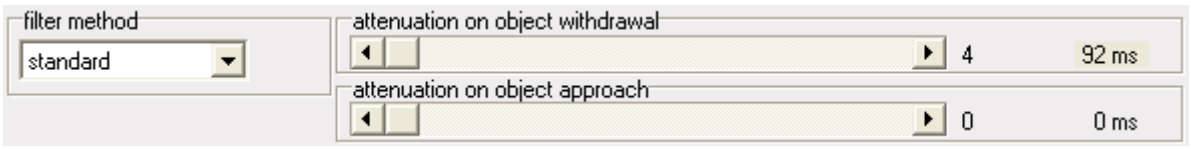
Within these sensor families you are able to choose two different types of filter. You can change the filter strength by a slider.

No filter



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



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.

Example 1

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.

Example 2

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 must found experimentally

Average - filter

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 must 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 controll 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.

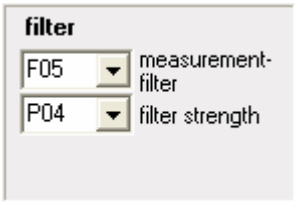
Sensor families lpc und ucs

Within these sensor families you are able to choose 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

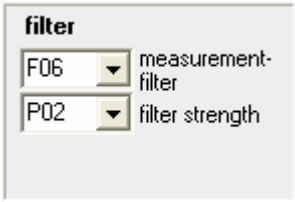
see: Sensor families mic+.../TC and mic-.../M on page 29

F05



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

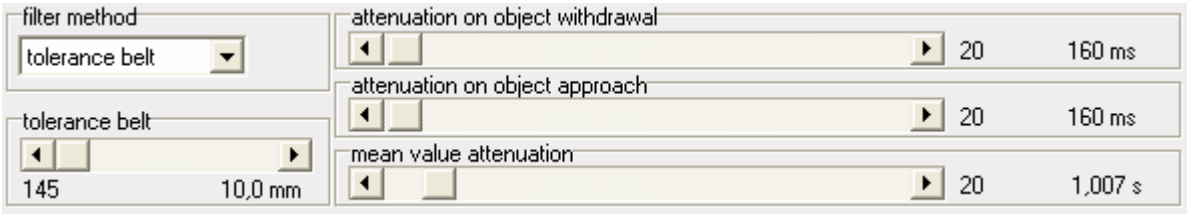
F06



This filter works according to the principle of the tolerance belt-filter (see Tolerance belt - filter on page 33.

Tolerance belt - filter

only for lpc



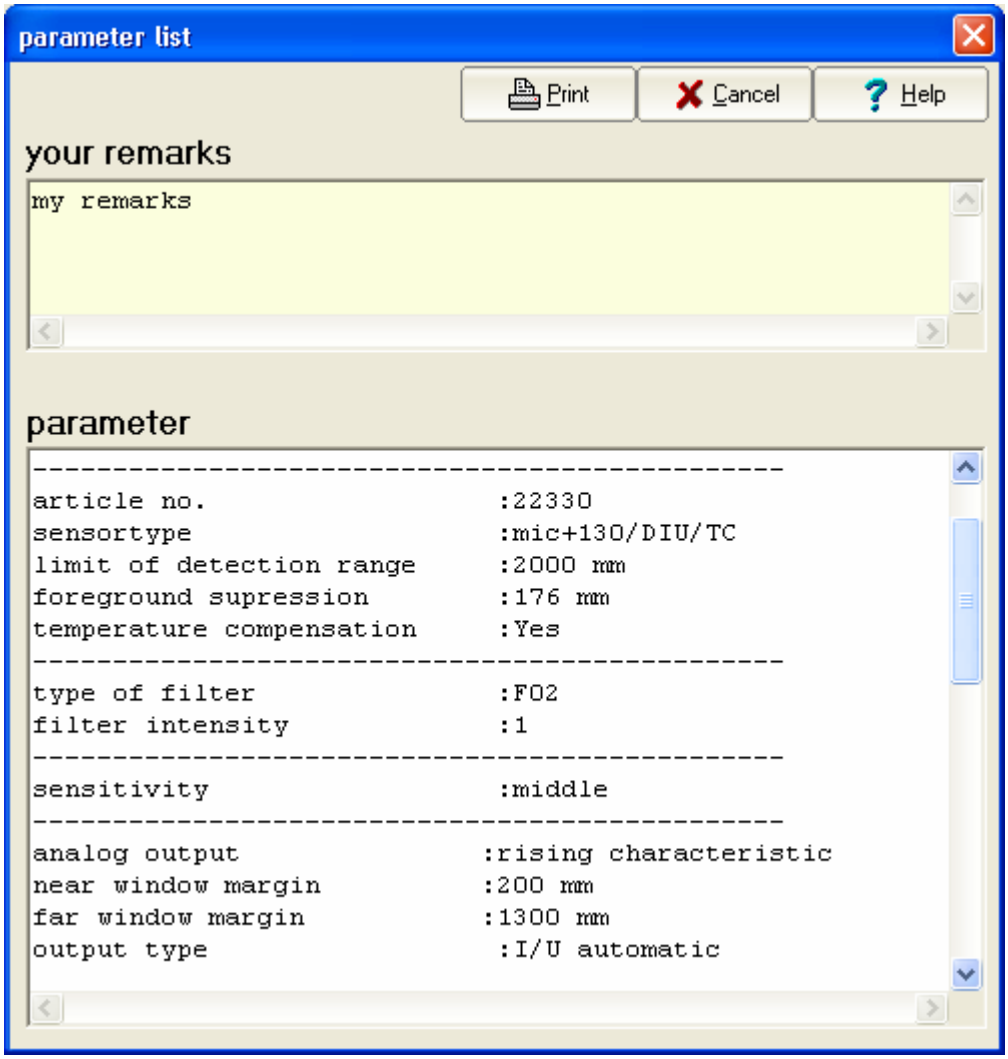
With this filter a tolerance belt is put symmetrically around the measured value. The current distance values remain within this belt, they are passed through an average filter.

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) before the new value is taken over.

Documentation of parameters

The parameter list

➔ Click with the mouse on the button **Para-List**.



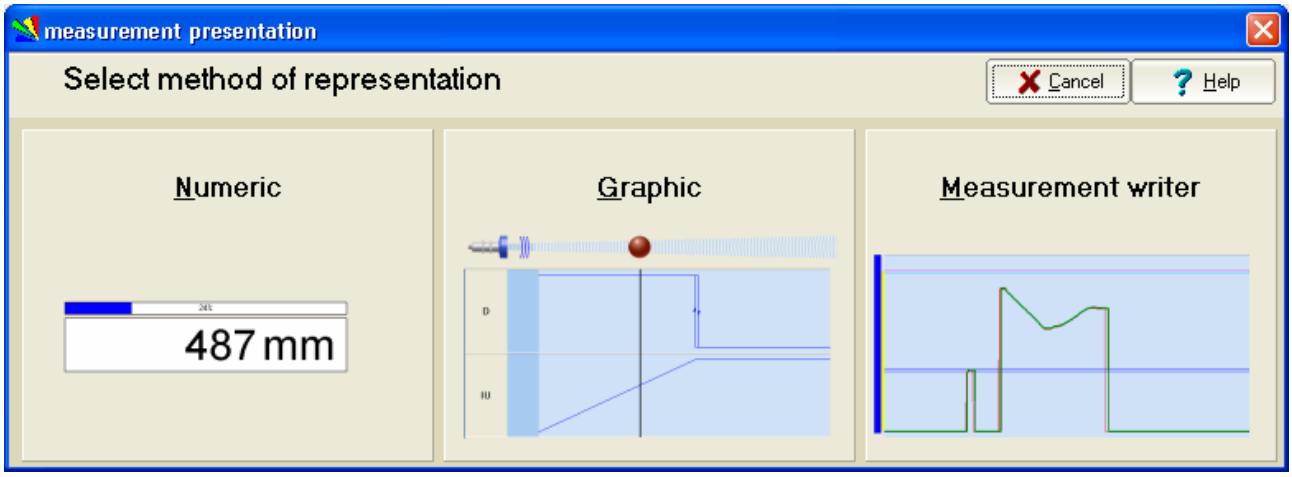
This list documents the parameter settings of the sensor. In the upper text field you can make your own remarks. In the lower text field all parameters of the sensor are listed. You can print this list inclusive the remarks for your documentation.

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

Visualisation of measurements

Selecting the mode

➔ Click the button **Measure**



only for mic-.../M30, lcs and lpc:

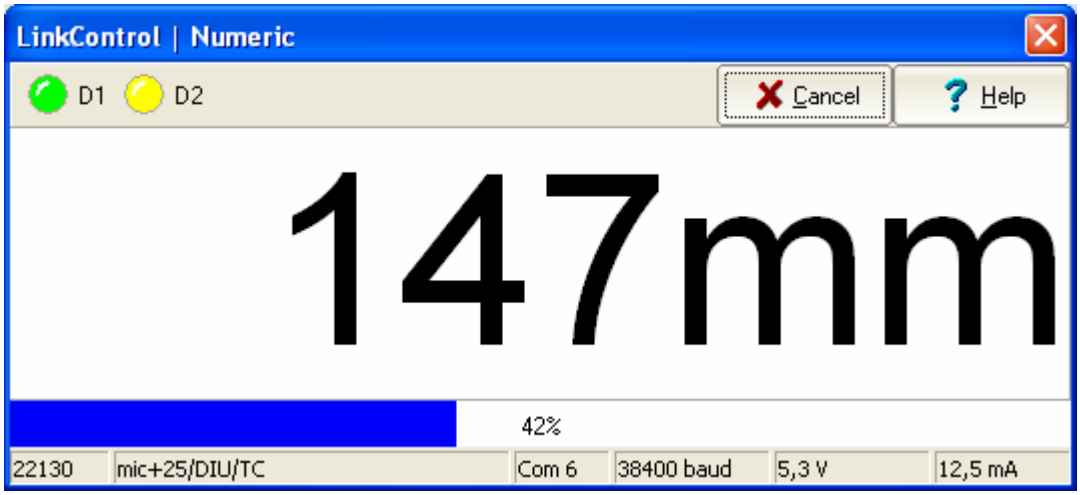
Please notice that the sensor in conjunction with LinkControl performs ultrasonic measurements only under the Measurement menu. When the visualisation is invoked no ultrasonic measurements take place for some seconds. Also the repetition rate is greatly reduced during visualisation mode. You are allowed 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 must power down the installation or machine during visualisation with LinkControl

Before visualising the measured distances the parameters in the input masks must 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
- graphic
- measurement writer

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 must 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 must 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 must be identical to the values stored in the sensor!

Measurement writer

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

The expected output voltage and the expected output current is 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 must 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 must be identical to the values stored in the sensor!

only mic+.../TC, mic-...M sensors from 2004 and 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.

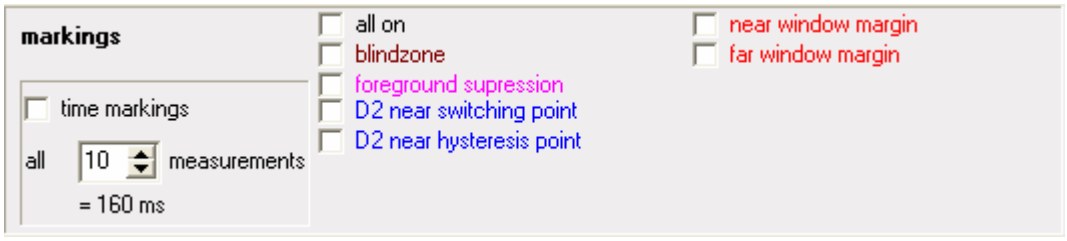
Minimum/maximum display

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

Markings

After click on trigger you will see more settings. The following parameters can be displayed:

- blindzone
- foreground suppression
- switching- and hysteresis points (on sensors with switching output)
- 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

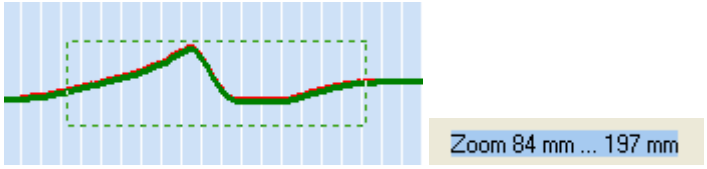
In the mode Triggered writing starts, when the distance value exceed a trigger level. The presentation ends with reaching the right window margin and starts only then, when the above mentioned condition comes true.

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 click the button Reset.

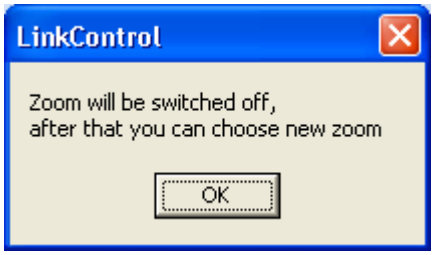
Zoom

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:



Log measurements

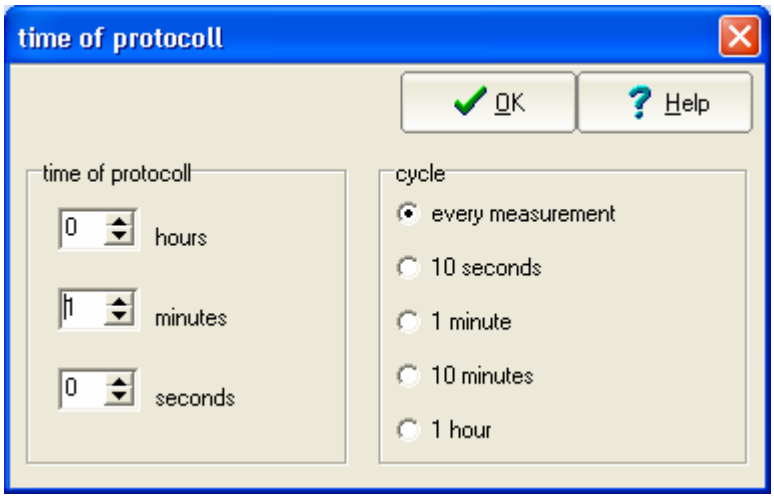
For logging, the measurements can be saved into a file

➔ Push 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.

only mic+.../TC, mic-...M sensors from 2004 and lpc
In the first column the filtered measurements are shown, in the second column the unfiltered.

only mic+.../TC and mic-...M sensors from 2004

In the third column you see the outer temperature, measured by the sensor.

Individual input mask

Locking input fields

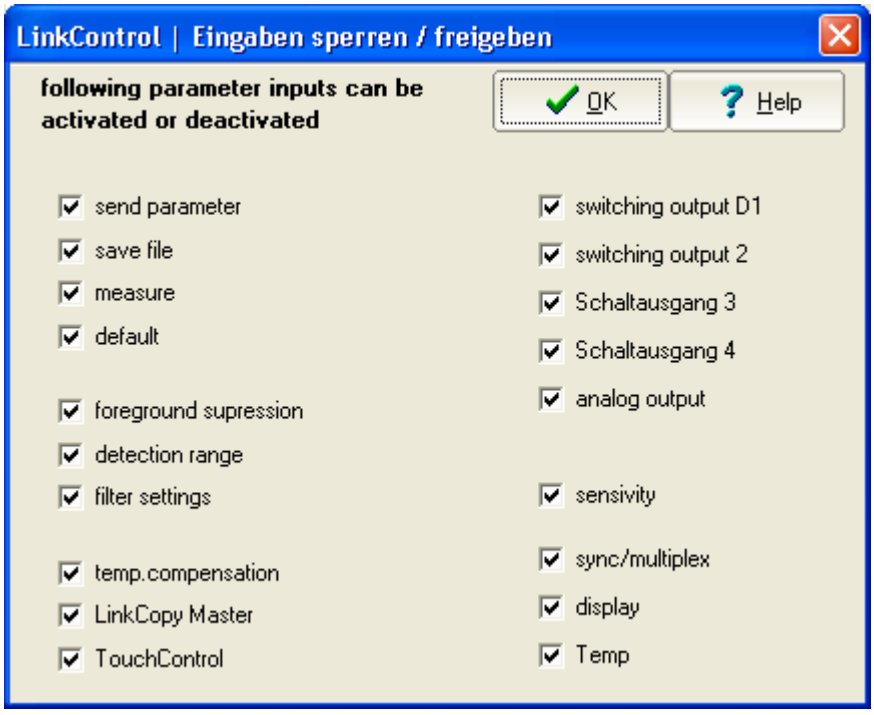
You can create your own input mask by enabling or disabling certain input fields. This is helpful when you want to send a floppy disc with a special parameter set and the LinkControl software to a third party, but only letting them adjust for instance the trip points of switching sensors.

To design an individual input mask the LinkControl software offers the feature to lock / unlock each parameter input field

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

➔ Enter the password **snoopy**

➔ Select which input field shall be locked or not.



The LinkCopy function

LinkCopy with LCA-2

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

LinkCopy with LinkControl Adapter 1


The following description is valid only for the LinkControl Adapter 1 and sensors which support the master sensor. You can identify these sensors, that in the main mask the check box „LinkCopy Master" is to be seen. You only can copy parameters from sensors of same type and same type series.

The LinkCopy function allows a quick copy of all sensors parameters from a master sensor to another sensor.

At first a sensor with the final parameters must be declared to be a master sensor. With this master sensor you can adjust as many sensors as wanted to the same settings without using a PC.

How to declare a sensor to be a LinkCopy master

➔ Connect the sensor to be programmed to the master connector A of the LinkControl adapter

➔ Make your selections as explained in the chapters before

➔ Mark the check box LinkCopy Master

➔ Transfer the settings to the sensor

The sensor has now been declared to be a master sensor.


After the parameter transfer the check box LinkCopy Master is automatically reset to prevent other sensors from being erroneously declared to be a master as well.

If you now want to adjust other sensors using the LinkCopy function, quit the LinkControl software and interrapt the cable connection to the PC.

Adjust further sensors using LinkCopy

➔ Connect the master sensor to the plug (female) B of the LinkControl adapter (the connector is denoted as master sensor). If the sensor does not have a M12 plug, use the provided adapter.

➔ Connect the sensor to be adjusted to the plug (female) A of the LinkControl adapter. If the sensor does not have a M12 plug, use the provided adapter.

➔ Connect the DC power supply for the sensor and the plug (male) D an. If your power supply is not equipped with a M12 plug (female), use the provided adapter.

➔ Press the RESET button on the LinkControl adapter


When adjusting sensors by the LinkCopy function the LinkControl adapter should not be connected to the PC.

Communication starts and the master sensor transfers its parameters to the sensor to be adjusted. The LED's begin to flicker and display the adjustment state as follows:

for Ics sensors:

After a successful data transfer the green LED of the master sensor flashes.

When data transmission is disturbed the master tries up to 25 times to resent the parameters. If data are still void the unsuccessful transmission is signalised by flashing the yellow LED's.

for mic Sensors:

After a successful data transfer both LED's of the master sensor flash in green.

When data transmission is disturbed the master tries up to 25 times to resent the parameters. If data are still void the unsuccessful transmission is signalised by a red flashing of both LED's.