



**Product description**

- The mic+ sensor with two switching outputs offer a non-contact measurement of the distance to an object. Depending on the adjusted detect distance the switching outputs are set.
- All settings are done with two push-buttons and a three-digit LED display (TouchControl).
- Light emitting diodes (three-colour LEDs) indicate the switching status.
- The output functions are changeable from NOC to NCC.
- The sensors are adjustable manually using the numerical LED display or via Teach-in procedure.
- Useful additional functions are set in the Add-on-menu.
- Using the LinkControl adapter (optional accessory) all TouchControl and additional sensor parameter settings may be made by a Windows software.

## Operating manual mic+ Ultrasonic Sensors with two switching outputs

- mic+25/DD/TC
- mic+35/DD/TC
- mic+130/DD/TC
- mic+340/DD/TC
- mic+600/DD/TC
- mic+25/EE/TC
- mic+35/EE/TC
- mic+130/EE/TC
- mic+340/EE/TC
- mic+600/EE/TC

**Important instructions for assembly and application**

All employee and plant safety-relevant measures must be taken prior to assembly, start-up, or maintenance work (see operating manual for the entire plant and the operator instruction of the plant).

**The sensors are not considered as safety equipment and may not be used to ensure human or machine safety!**

The mic+ sensors indicate a **blind zone**, in which the distance cannot be measured. The **operating range** indicates the distance of the sensor that can be applied with normal reflectors with sufficient function reserve. When using good reflectors, such as a calm water surface, the sensor can also be used up to its **maximum range**. Objects that strongly absorb (e.g. plastic foam) or diffusely reflect sound (e.g. pebble stones) can also reduce the defined operating range.

**Synchronisation**

If the assembly distances shown in fig.1 for two or more sensors are exceeded the integrated synchronisation should be used. Connect Sync/Com-channels (pin 5) of all sensors (10 maximum).

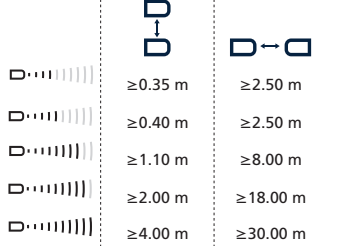


Fig. 1: Minimal assembly distances without synchronisation or multiplex mode.

**Multiplex mode**

The Add-on-menu allows to assign an individual address »01« to »10« to each sensor connected via the Sync/Com-channel (Pin5). The sensors perform the ultrasonic measurement sequentially from low to high address. Therefore any influence between the sensors is rejected. The address »00« is reserved to synchronisation mode and deactivates the multiplex mode. (To use synchronised mode all sensors must be set to address »00«.)

**Assembly instructions**

- Assemble the sensor at the installation location.
- Plug in the connector cable to the M12 connector.

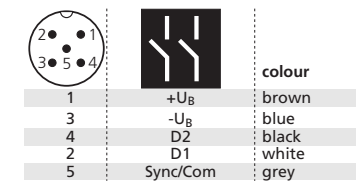


Fig. 2: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable.

**Start-up**

mic+ sensors are delivered factory made with the following settings:

- Switching outputs on NOC
- Detecting distances at operating range and half operating range
- Measurement range set to maximum range

Set the parameters of the sensor manually or use the Teach-in procedure to adjust the switching points.

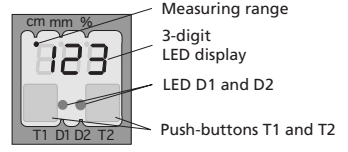


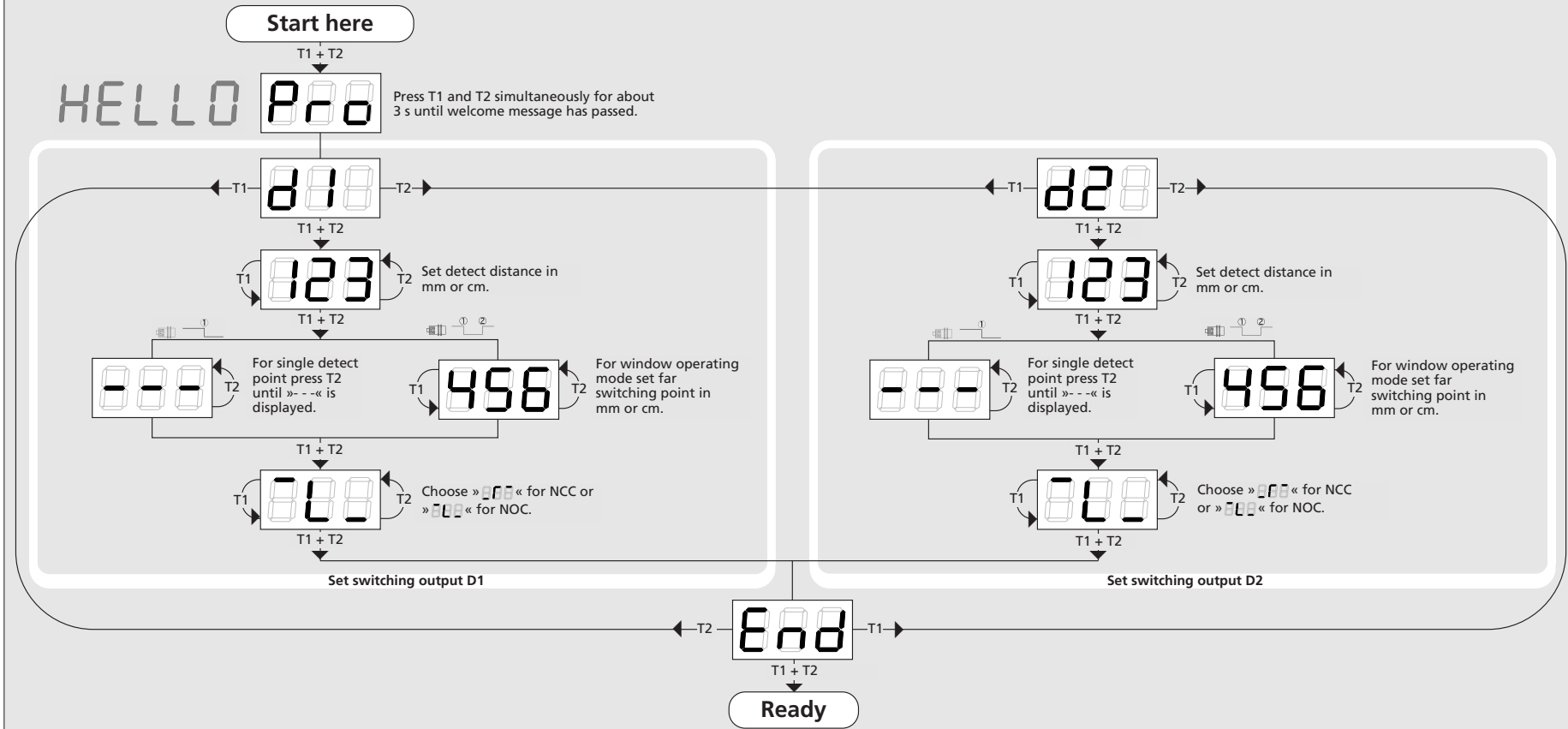
Fig. 3: TouchControl

**Maintenance**

mic+ sensors work maintenance free. Small amounts of dirt on the surface do not influence function. Thick layers of dirt and caked-on dirt affect sensor function and therefore must be removed.

- Note**
- mic+ sensors have internal temperature compensation. Because the sensors heat up on their own, the temperature compensation reaches its optimum working point after approx. 30 minutes of operation.
  - During normal operating mode, a yellow LED signals that the corresponding switching output is set.
  - During normal operating mode, the measured distance value is displayed on the LED display in mm (up to 999 mm) or cm (from 100 cm). Scale switches automatically and is indicated by a point on top of the digits.
  - During Teach-in mode, the hysteresis value is set back to factory settings.
  - If no objects are placed within the detection zone the LED display shows »- -«.
  - If no push-buttons are pressed for 20 seconds during parameter setting mode, the parameter changes are saved and the sensor returns to normal operating mode.

## Set sensor parameters alternatively numerically using LED display...



**Show parameters**

Tapping push-button T1 shortly during normal operating mode shows »PAR« on the LED display. Each time you tap push-button T1 the actual settings of the switching outputs are displayed.

# ...or via the Teach-in procedure

**Teach-in switching output D1**

**Teach-in switching output D2**

### Key lock and factory setting

**Activate/deactivate TouchControl**  
Turn supply voltage OFF.  
While pressing T1 turn supply voltage ON until »on« or »off« is displayed.  
To activate or deactivate press T1.  
Wait for 20.  
Normal operating mode

**Reset to factory settings**  
Turn supply voltage OFF.  
Turn supply voltage ON while pressing T1 and keep it pressed for ca. 13 s until »ESEt« has passed through the display.  
Normal operating mode

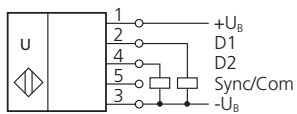
## Useful additional functions in Add-on menu (for experienced users only, settings not required for standard applications)

**Start here**  
HELLO Pro **Add-on**  
Press T1 and T2 simultaneously for about 13 s until »Add« is shown in the LED display.

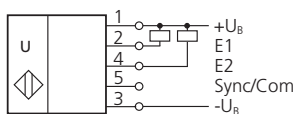
<p>»C01«: Display bright »C02«: Display dimmed »C03«: Display off</p> <p><b>Ready</b></p>	<p>»001«: Display bright »002«: Display dimmed »003«: Display off</p> <p><b>Low power mode</b></p>	<p>Minimum value: »001« Maximum value: difference between maximum range and switching point - 1 During window operating mode hysteresis influences both switching points.</p> <p><b>Hysteresis switching output D1</b></p>	<p>Minimum value: »001« Maximum value: difference between maximum range and switching point - 1 During window operating mode hysteresis influences both switching points.</p> <p><b>Hysteresis switching output D2</b></p>	<p>»F00«: no filter »F01«: standard filter »F02«: averaging filter »F03«: foreground filter »F04«: background filter</p> <p><b>Measurement filter</b></p>	<p>Defines the strength of the chosen filter. »P00«: weak filter up to »P09«: strong filter</p> <p><b>Filter strength</b></p>	<p>Delay in seconds between the detection of an object and the output of the measured distance in case of object approach (behaves as on-delay). *00*: 0 s (no delay) up to *20*: 20 s response time</p> <p><b>Response time</b></p>	<p>Minimum value: blind zone Maximum value: nearwindow limit - 1</p> <p><b>Foreground suppression</b></p>	<p>»00«: synchronisation »01« to »10«: sensor address for multiplex mode »FF«: synchronisation deactivated</p> <p><b>Multiplex mode device addressing</b></p>	<p>To optimize multiplex speed the highest sensor address may be set. Setting range »01« to »10«</p> <p><b>Multiplex mode highest address</b></p>	<p>Minimum value: sensor-distant window margin Maximum value: 999 mm for mic+25/..., mic+35/..., 999 cm for mic+130/..., mic+340/..., mic+600/...</p> <p><b>Measurement range</b></p>	<p>Put plane reflector vertically disposed in front of sensor: in an exact distance of 250 mm for mic+25... and mic+35... and 900 mm for all other types. Adjust display to 250 mm or 900 mm. Confirm calibration with T1 + T2.</p> <p><b>Calibration display</b></p>	<p>Affects the size of the detection zone. »E01«: high »E02«: standard »E03«: low</p> <p><b>Detection zone sensitivity</b></p>
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**Note**  
Changes in the Add-on menu may affect the sensor function.  
A6, A7, A8, A10, A11, A12 have influence on the response time of the sensor.

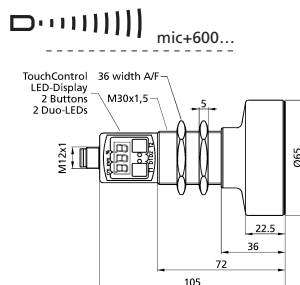
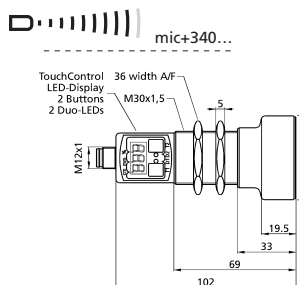
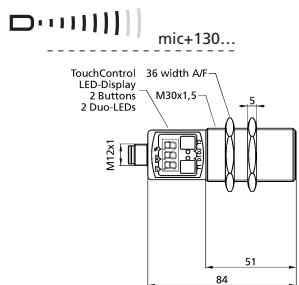
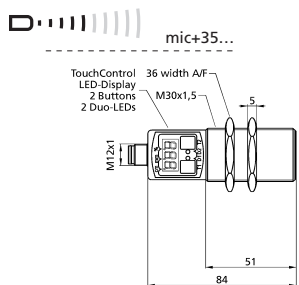
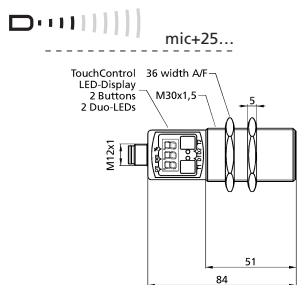
# Technical data



2 npn switching outputs

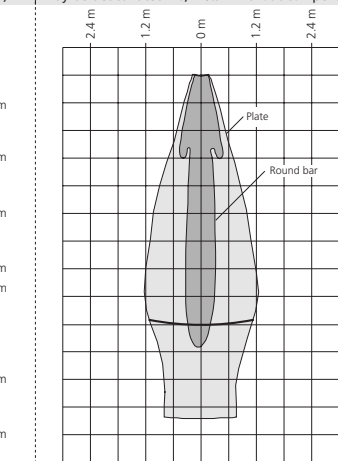
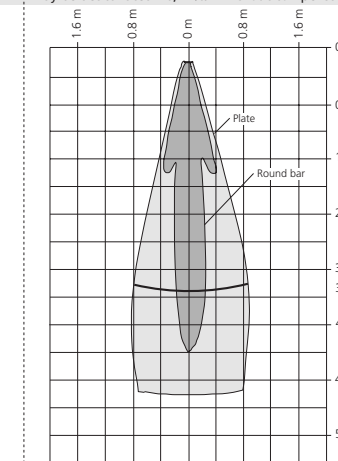
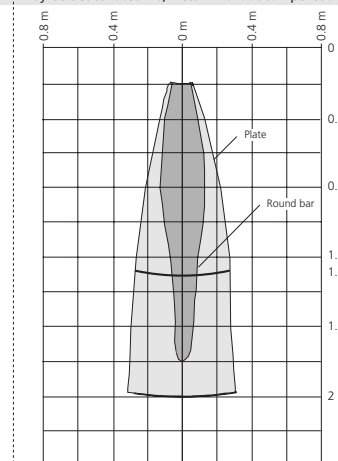
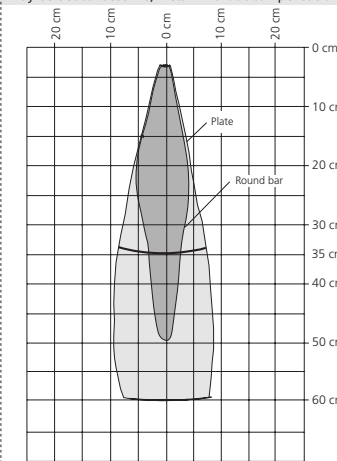
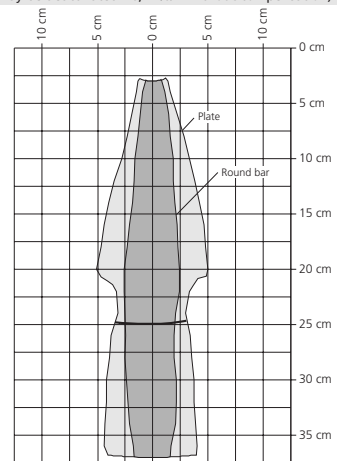


2 npn switching outputs



<b>blind zone</b>	0 to 30 mm	0 to 65 mm	0 to 200 mm	0 to 350 mm	0 to 600 mm
<b>operating range</b>	250 mm	350 mm	1,300 mm	3,400 mm	6,000 mm
<b>maximum range</b>	350 mm	600 mm	2,000 mm	5,000 mm	8,000 mm
<b>angle of beam spread</b>	Please see detection zone				
<b>transducer frequency</b>	320 kHz	400 kHz	200 kHz	120 kHz	80 kHz
<b>resolution, sampling rate</b>	0.025 mm				
<b>reproducibility</b>	± 0.15 %				
<b>accuracy</b>	± 1 % (Temperature drift internal compensated, may be deactivated <sup>1)</sup> , 0,17%/K without compensation)				

**detection zones for different objects:**  
The dark grey areas are determined with a thin round bar (10 or 27 mm dia.) and indicate the typical operating range of a sensor. In order to obtain the light grey areas, a plate (500 x 500 mm) is introduced into the beam spread from the side. In doing so, the optimum angle between plate and sensor is always employed. This therefore indicates the maximum detection zone of the sensor. It is not possible to evaluate ultrasonic reflections outside this area.



<b>operating voltage U<sub>B</sub></b>	9 V to 30 V DC, reverse polarity protection, Class 2	9 V to 30 V DC, reverse polarity protection, Class 2	9 V to 30 V DC, reverse polarity protection, Class 2	9 V to 30 V DC, reverse polarity protection, Class 2	9 V to 30 V DC, reverse polarity protection, Class 2
<b>voltage ripple</b>	± 10 %				
<b>no-load supply current</b>	≤ 80 mA				
<b>housing</b>	Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content				
<b>class of protection to EN 60529</b>	IP 67				
<b>norm conformity</b>	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
<b>type of connection</b>	5-pin initiator plug, PBT				
<b>controls</b>	2 push-buttons (TouchControl)				
<b>indicators</b>	3-digit LED display, 2 three-colour LEDs				
<b>programmable</b>	TouchControl and LinkControl				
<b>operating temperature</b>	-25°C to +70°C				
<b>storage temperature</b>	-40°C to +85°C				
<b>weight</b>	150 g	150 g	150 g	210 g	270 g
<b>switching hysteresis<sup>1)</sup></b>	3 mm				
<b>switching frequency<sup>2)</sup></b>	25 Hz	12 Hz	8 Hz	4 Hz	3 Hz
<b>response time<sup>2)</sup></b>	32 ms	64 ms	92 ms	172 ms	240 ms
<b>time delay before availability</b>	< 300 ms				
<b>order no.</b>	<b>mic+25/DD/TC</b>	<b>mic+35/DD/TC</b>	<b>mic+130/DD/TC</b>	<b>mic+340/DD/TC</b>	<b>mic+600/DD/TC</b>
<b>switching output</b>	2 x npn, U <sub>B</sub> -2 V, I <sub>max</sub> = 2 x 200 mA switchable NOC/NCC, short-circuit-proof				
<b>order no.</b>	<b>mic+25/EE/TC</b>	<b>mic+35/EE/TC</b>	<b>mic+130/EE/TC</b>	<b>mic+340/EE/TC</b>	<b>mic+600/EE/TC</b>
<b>switching output</b>	2 x npn, -U <sub>B</sub> +2 V, I <sub>max</sub> = 2 x 200 mA switchable NOC/NCC, short-circuit-proof				

1) Can be programmed with TouchControl and LinkControl  
2) With TouchControl and LinkControl, the selected filter setting and the maximum range influence the switching frequency and response time.