Operating manual
mic+ Ultrasonic Sensors with one switched output
mic+25/F/TC
mic+35/F/TC
mic+130/F/TC
mic+340/F/TC
mic+600/F/TC

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

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 operation 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 sensors perform the ultrasonic measurement sequentially from low to high address.

The mic+ sensors are IO-Link capable according to specification V1.1 and support the Smart Sensor Profile like Digital Measuring Sensor.

Product description
The mic+ sensor with one switched output measures the distance to an object within the detection zone contactless. Depending on the adjusted detect distance the switched output is 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 NCC to NOC.
The sensors are adjustable manually using Teach-in processes.

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.
The mic+ sensors are IO-Link capable according to specification V1.1 and support Smart Sensor Profile like Digital Measuring Sensor.

Synchronisation
If the assembly distances shown in Fig.1 for two or more sensors are exceeded the integrated synchronisation should be used. Connect SyncCom-channels (pin 5 at the units receptacle) of all sensors (10 maximum).

Multiplex mode
The Add-on-menu allows to assign an individual address +01« to +10» to each sensor connected via the SyncCom-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».

Start-up
mic+ sensors are delivered factory made with the following settings:
Switched output on NOC.
Detecting distance at operating range and half operating range.
Measurement range set to maximum range.

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 mode operation, a yellow LED D2 signals that the switched output has connected.

During normal mode operation, the measured distance value is displayed on the LED-indicator 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 loops are set back to factory settings.
If no objects are placed within the detection zone the LED-indicator shows »- - -».
If no push-buttons are pressed for 20 seconds during parameter setting mode the made changes are stored and the sensor returns to normal mode operation.
The latest IODD file and information about start-up and configuration of mic+ sensors with IO-Link, you will find online at: www.microsonic.de/mic+.

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

Start-up
Press T1 and T2 simultaneously for about 3 s until welcome message has passed.

For single detect point press T2 until » - - - « is displayed.

For window mode operation set far detect point in mm or cm.

Choose » « for NOC or » « for NCC.

Set switched output

Ready

Note

Fig. 1: Assembly distances, indicating synchronisation/multiplex
Multiplex mode The Add-on-menu allows to assign an individual address »01« to »10« to each sensor connected via the SyncCom-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«.

Fig. 2: Pin assignment with view onto sensor connector.

Push-buttons T1 and T2

Push-buttons T1 and T2

Fig. 3: TouchControl

Operation
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

Show parameters
Tapping push-button T1 shortly during normal mode operation shows »Par« on the LED-display. Each time you tap push-button T1 the actual settings of the switched output are shown.

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

Start-up
Press T1 and T2 simultaneously for about 3 s until welcome message has passed.

For single detect point press T2 until » - - - « is displayed.

For window mode operation set far detect point in mm or cm.

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Push-buttons T1 and T2

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Operation
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

Show parameters
Tapping push-button T1 shortly during normal mode operation shows »Par« on the LED-display. Each time you tap push-button T1 the actual settings of the switched output are shown.
...or with the Teach-in procedure

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

Start here

Key lock and factory settings

- Activate/deactivate TouchControl
- Reset to factory setting
- Turn supply voltage ON
- Turn supply voltage OFF

While pressing T1 turn supply voltage ON until »off« is displayed and keep it pressed for ca. 15 s until »reset« has passed through the display

To activate or deactivate press T1.

Normal mode operation

**Note:** Changes in the Add-on menu may impact the sensor function. AE, A3, A8, A10, A11, A12 have influence on the response time of the sensor.
### Technical Data

#### Push-Pull output in pnp circuit

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage drift</td>
<td>±1% (Temperature drift internal compensated, ±0.15%</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-25°C to +70°C</td>
</tr>
<tr>
<td>Operating range</td>
<td>250 mm</td>
</tr>
<tr>
<td>Blind zone</td>
<td>0 to 30 mm</td>
</tr>
</tbody>
</table>

#### Push-Pull output in npn circuit

<table>
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<tbody>
<tr>
<td>Voltage drift</td>
<td>±1% (Temperature drift internal compensated, ±0.15%</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-25°C to +70°C</td>
</tr>
<tr>
<td>Operating range</td>
<td>350 mm</td>
</tr>
<tr>
<td>Blind zone</td>
<td>0 to 65 mm</td>
</tr>
</tbody>
</table>

### Detection Zones for Different Objects

- **Dark Grey Areas:** These are determined by the optimum angle between the plate and sensor, always employed. It is not possible to evaluate ultrasonic reflections outside this area.
- **Light Grey Areas:** These are determined by the optimum angle between the plate and sensor, always employed. It is not possible to evaluate ultrasonic reflections outside this area.

### Operating Parameters

- **Operating Voltage (UB):** 9 V to 30 V DC, reverse polarity protection, Class 2
- **No-load Supply Current:** ≤ 80 mA
- **Switching Frequency:** 12 Hz
- **Storage Temperature:** -40°C to +85°C
- **Response Time:** ≤ 30 ms
- **Turn-On Time:** ≤ 30 ms
- **Class of Protection:** IP 67
- **Operating Range:** Push-Pull, UB-3 V, -UB+3 V, Imax = 100 mA
- **Indicators:** Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
- **Type of Connection:** 5-pin initiator plug, PBT
- **Housing:** Brass sleeve, nickel-plated, plastic parts: PBT, TPU

### Additional Information

- **Supplementary Information:**
  - **Weight:** 150 g
  - **Depth of Field:** 30 cm
  - **Sensitivity Adjustment:** ±10% (Temperature drift internal compensated, ±0.15%)
  - **Compatibility:** Yes, with TouchControl and LinkControl

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1) Can be programmed with TouchControl, LinkControl, and IO-Link.