Operating manual

mic+ Ultrasonic Sensors with two switched outputs

mic+600/DD/TC  mic+600/EE/TC
mic+340/DD/TC  mic+340/EE/TC
mic+130/DD/TC  mic+130/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 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 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 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 at the units receptable) 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 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«.)

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

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

Assembly instructions

- Assemble the sensor at the installation location.
- Plug in the connector cable to the M 12 connector.

Start-up

The proximity switches shall be used with a Listed (CYJV/7) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.

Enclosure Type 1
For use only in industrial machinery NFPA 79 applications.

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 signals that the corresponding 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 menu is indicated by a point on top of the digits.
- During Teach-in mode, the hysterisis loops are set back to factory settings.
- You can lock the key pad to provide inputs, see »Key lock and factory settings«.

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

Show parameters

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

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

- Start here
- Press T1 and T2 simultaneously for about 3 s until welcome message has passed
- The proximity switches shall be used with a Listed (CYJV/7) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.
...or with the Teach-in procedure

- Adjust point D2
- Adjust window mode D2
- Adjust two-way reflector barrier D2
- Set NOC/NCC D2

Place object at position.
Press T2 until »d2« is shown
Press T2 until »End« is shown
Press T2 until countdown passed from »- 8 « to »- 0 « and a NOC or NCC symbol is displayed
Press T1 and T2 simultaneously until »End« is shown

Normal mode operation
Teach-in switched output D2

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

- Start here
- Press T1 and T2 simultaneously for about 13 s until »End« is shown in the LED-display
- Press T2 until »d1« is shown
- Place object at position

Normal mode operation
Teach-in switched output D2

Key lock and factory setting

- Activate/deactivate TouchControl
- Reset to factory setting
- Turn supply voltage OFF
- While pressing T1: turn supply voltage ON until a NOC or NCC symbol is displayed
- To activate or deactivate press T1
- Turn supply voltage OFF
- To activate or deactivate press T1

Activate/reinitialize

- ON
- OFF

Low power mode
Hysteresis switched output D1
Measurement filter
Filter strength
Response time
Foreground suppression
Multiplex mode device adding
Multiplex mode highest address
Measurement range
Calibration display
Detection zone sensitivity

Hysteresis switched output D2
Measurement filter
Filter strength
Response time
Foreground suppression
Multiplex mode device adding
Multiplex mode highest address
Measurement range
Calibration display
Detection zone sensitivity

Note
Changes in the Add-on menu may impair the sensor function. A6, A7, A8, A9, A10, A11, A12 have influence on the response time of the sensor.
### Technical data

#### Blinds

<table>
<thead>
<tr>
<th>Model</th>
<th>Operating range</th>
<th>Angle of beam spread</th>
<th>Resolution, sampling rate</th>
<th>Reproducibility</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>mic+25/DD/TC</td>
<td>8 to 30 mm</td>
<td>3.2°</td>
<td>0.15 mm</td>
<td>±1% (Temperature drift internal compensated, may be deactivated© 0.17% (without compensation)</td>
<td>±0.15%</td>
</tr>
<tr>
<td>mic+35/DD/TC</td>
<td>0 to 65 mm</td>
<td>3.2°</td>
<td>0.15 mm</td>
<td>±1% (Temperature drift internal compensated, may be deactivated© 0.17% (without compensation)</td>
<td>±0.15%</td>
</tr>
<tr>
<td>mic+130/DD/TC</td>
<td>0 to 200 mm</td>
<td>3.2°</td>
<td>0.15 mm</td>
<td>±1% (Temperature drift internal compensated, may be deactivated© 0.17% (without compensation)</td>
<td>±0.15%</td>
</tr>
<tr>
<td>mic+340/DD/TC</td>
<td>0 to 350 mm</td>
<td>3.2°</td>
<td>0.15 mm</td>
<td>±1% (Temperature drift internal compensated, may be deactivated© 0.17% (without compensation)</td>
<td>±0.15%</td>
</tr>
<tr>
<td>mic+600/DD/TC</td>
<td>0 to 600 mm</td>
<td>3.2°</td>
<td>0.15 mm</td>
<td>±1% (Temperature drift internal compensated, may be deactivated© 0.17% (without compensation)</td>
<td>±0.15%</td>
</tr>
</tbody>
</table>

#### Detection zones

- **U**
  - **E2**
  - **D1**
  - **B**

- **E1**
- **D2**
- **B**

#### Operating temperature

- **mic+25/DD/TC**: -40°C to +85°C
- **mic+35/DD/TC**: -25°C to +70°C
- **mic+130/DD/TC**: -12°C to +80°C
- **mic+340/DD/TC**: -25°C to +70°C
- **mic+600/DD/TC**: -10°C to +80°C

#### Voltage ripple

- **mic+25/DD/TC**: ±10% (Temperature drift internal compensated, may be deactivated© ±0.15%)
- **mic+35/DD/TC**: ±10% (Temperature drift internal compensated, may be deactivated© ±0.15%)
- **mic+130/DD/TC**: ±10% (Temperature drift internal compensated, may be deactivated© ±0.15%)
- **mic+340/DD/TC**: ±10% (Temperature drift internal compensated, may be deactivated© ±0.15%)
- **mic+600/DD/TC**: ±10% (Temperature drift internal compensated, may be deactivated© ±0.15%)

#### Time delay before availability

- **mic+25/DD/TC**: 64 ms
- **mic+35/DD/TC**: 64 ms
- **mic+130/DD/TC**: 64 ms
- **mic+340/DD/TC**: 64 ms
- **mic+600/DD/TC**: 64 ms

#### Controls

- **2 push-buttons (TouchControl)**
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#### Voltage

- **mic+25/DD/TC**: 9 V to 30 V DC, reverse polarity protection, Class 2
- **mic+35/DD/TC**: 9 V to 30 V DC, reverse polarity protection, Class 2
- **mic+130/DD/TC**: 9 V to 30 V DC, reverse polarity protection, Class 2
- **mic+340/DD/TC**: 9 V to 30 V DC, reverse polarity protection, Class 2
- **mic+600/DD/TC**: 9 V to 30 V DC, reverse polarity protection, Class 2

#### Weight

- **mic+25/DD/TC**: 64 g
- **mic+35/DD/TC**: 64 g
- **mic+130/DD/TC**: 64 g
- **mic+340/DD/TC**: 64 g
- **mic+600/DD/TC**: 64 g

#### Resolution, sampling rate

- **mic+25/DD/TC**: 12 Hz
- **mic+35/DD/TC**: 12 Hz
- **mic+130/DD/TC**: 12 Hz
- **mic+340/DD/TC**: 12 Hz
- **mic+600/DD/TC**: 12 Hz

#### Response time

- **mic+25/DD/TC**: 32 ms
- **mic+35/DD/TC**: 32 ms
- **mic+130/DD/TC**: 32 ms
- **mic+340/DD/TC**: 32 ms
- **mic+600/DD/TC**: 32 ms

#### Voltage ripple

- **mic+25/DD/TC**: ±10% (Temperature drift internal compensated, may be deactivated© ±0.15%)
- **mic+35/DD/TC**: ±10% (Temperature drift internal compensated, may be deactivated© ±0.15%)
- **mic+130/DD/TC**: ±10% (Temperature drift internal compensated, may be deactivated© ±0.15%)
- **mic+340/DD/TC**: ±10% (Temperature drift internal compensated, may be deactivated© ±0.15%)
- **mic+600/DD/TC**: ±10% (Temperature drift internal compensated, may be deactivated© ±0.15%)

#### Detection zone

- **mic+25/DD/TC**: 0 to 30 mm
- **mic+35/DD/TC**: 0 to 65 mm
- **mic+130/DD/TC**: 0 to 200 mm
- **mic+340/DD/TC**: 0 to 350 mm
- **mic+600/DD/TC**: 0 to 600 mm

#### ultrasonic transducer

- **mic+25/DD/TC**: Polyurethane foam, epoxy resin with glass content
- **mic+35/DD/TC**: Polyurethane foam, epoxy resin with glass content
- **mic+130/DD/TC**: Polyurethane foam, epoxy resin with glass content
- **mic+340/DD/TC**: Polyurethane foam, epoxy resin with glass content
- **mic+600/DD/TC**: Polyurethane foam, epoxy resin with glass content