Operating manual mic+ Ultrasonic Sensors with one analogue output and two switched outputs

mic+25/DDIU/TC
mic+35/DDIU/TC
mic+130/DDIU/TC
mic+340/DDIU/TC
mic+600/DDIU/TC

Product description
- The mic+sensors with one analogue output and two switched outputs measure the distance to an object within the detection zone contactless. A signal proportional to distance is created and the switched outputs are set according to the adjusted detect distance.
- The sensor automatically detects the load put to the analogue output and switches to current output or voltage output respectively.
- All settings are done with two push-buttons and a three-digit LED-display (TouchControl).
- The mic+sensors are delivered factory made with a numerical LED-display or may be trained using Teach-in-processes.
- Useful additional functions are set in the Add-on-menu.
- Using the LinkControl adapter LCA-2 (optional accessory) all TouchControl and additional sensor parameter settings may be made by a Windows-Software.

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 water surface, the sensor can also be used up to its maximum range. Objects that strongly absorb (e.g. plastic foam) or diffusely reflect (e.g. pebble stones) can also reduce the defined operating range.

Assembly distances
- The table below lists the minimum mounting distances between two sensors. Smaller distances should not be used because otherwise the sensors can influence each other, see fig. 1.

Assembly instructions
- Assemble the sensor at the installation location.
- Plug in the connector cable to the M 12 plug and colour coding of the microsonic connection cable.
- Start-up mic+sensors are delivered factory made with the following settings:
  - Rising analogue characteristic
  - Window margins for the analogue output set to blind zone and operating range.
  - Switched outputs on NOC.
  - Detecting distances at operating range and half operating range.
  - Measurement range set to maximum range.

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

The proximity switches shall be used with a Listed (CYSV7) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.

Notes
- 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.
- If the LCA-2 is connected to the mic+ when turning supply voltage on, the sensors start in communication mode and the switched output on pin 5 of the connector is not available.
- The load put to the analogue output is detected automatically when turning supply voltage on.
- 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. Alternatively a percentage scale may be set in the add-on menu.
- In this connection 0% and 100% correspond to the set window margins of the analogue output.
- During Teach-in mode, the hysteresis loops are set back to factory settings.
- In the Two-way reflective barrier operating mode, the object has to be within the range of 0.85 % of the set distance.
- If no objects are placed within the detection zone, the LED-indicator shows "- - -".

Set parameters of the sensor manually or use the Teach-in procedure to adjust the detect points, see fig. 3.

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

Start here

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

HELLO

Set detected distance in mm or cm

For single detect point press T2 until < → is displayed.

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 analogue output and the switched output are shown.

End

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

...or with the Teach-in procedure

Start here

Press T1 and T2 simultaneously until »Add« is shown in the LED-display

Press T1 until »d« is shown
Place object at position »C03«
Display bright red value
Press T1 until »I«: current output
Performing window mode operation
T1 + T2

Press T2 until »d2« is shown
Place object at position »C01«
Display in %, 100%
Press T2 until countdown passed from »- 8 -« to »- 0 -« and NOC or NCC symbol is displayed
To activate or deactivate press T1
OFF
Normal mode operation

Screen example

Normal mode operation

Key lock and factory setting

1. Activate/deactivate TouchControl
2. Reset to factory setting
3. Turn supply voltage OFF
4. Turn supply voltage ON while pressing T1 and keep it pressed for ca. 1 sec until »RSET« has passed through the display

TouchControl

OFF
Normal mode operation
The technical data 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.

- **Blind zone**: Operating range
- **Resolution, sampling rate**: 
- **Max range**: 
- **Angle of beam spread**: 
- **Transducer frequency**: 
- **Switching hysteresis**: 
- **Switching frequency**: 
- **Current output**: 4 – 20 mA
- **Voltage output**: 0 – 10 V
- **Operating voltage**: 9 V to 30 V DC, short-circuit-proof, Class 2
- **Voltage ripple**: ± 1 % (Temperature drift internal compensated, may be deactivated), 0.17%/K without compensation
- **No-load supply current**: 
- **Housing**: Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, spray resin with glass content
- **Switching**: Switchable NOC/NCC, short-circuit-proof
- **Weight**: 
- **Response time**: < 380 ms
- **Time delay before availability**: 
- **Type of connection**: 5-pin initiator plug, PBT
- **Type of indicator**: 3-digit LED-display, 2 three-colour LEDs
- **Programmable**: Yes, with TouchControl and LinkControl
- **Operating temperature**: -25°C to +70°C
- **Storage temperature**: -40°C to +85°C
- **Class of protection according to EN 60529**: IP 67
- **Nominal conformity**: EN 60947-5-2

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