



Operating manual

mic Ultrasonic Sensors with one analogue output

mic-25/IU/M
mic-35/IU/M
mic-130/IU/M
mic-340/IU/M
mic-600/IU/M

Product description

- The mic-sensor with one analogue output measures the distance to an object within the detection zone contactless. A signal proportional to distance is created according to the adjusted window margins of the analogue characteristic curve.
- The sensor automatically detects the load put to the analogue output and switches to current output or voltage output respectively.
- Choosing between rising and falling output characteristic is possible.
- The sensors are adjustable using Teach-in processes via the Com-channel (Pin 5).
- Using the LinkControl adapter (optional accessory) all Teach-in 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 sound (e.g. pebble stones) can also reduce the defined operating range.

Assembly instructions

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

		colour
1	+UB	brown
3	-UB	blue
4	-	black
2	I/U	white
5	Com.	grey

Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

Synchronisation

If the assembly distances shown in Fig. 2 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).

≥0.35 m	≥2.50 m
≥0.40 m	≥2.50 m
≥1.10 m	≥2.50 m
≥2.00 m	≥18.00 m
≥4.00 m	≥30.00 m

Fig. 2: Assembly distances

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
- Maximum detection range set to maximum range

Set the parameters of the sensor using the Teach-in procedure to adjust the analogue characteristic curve.

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.

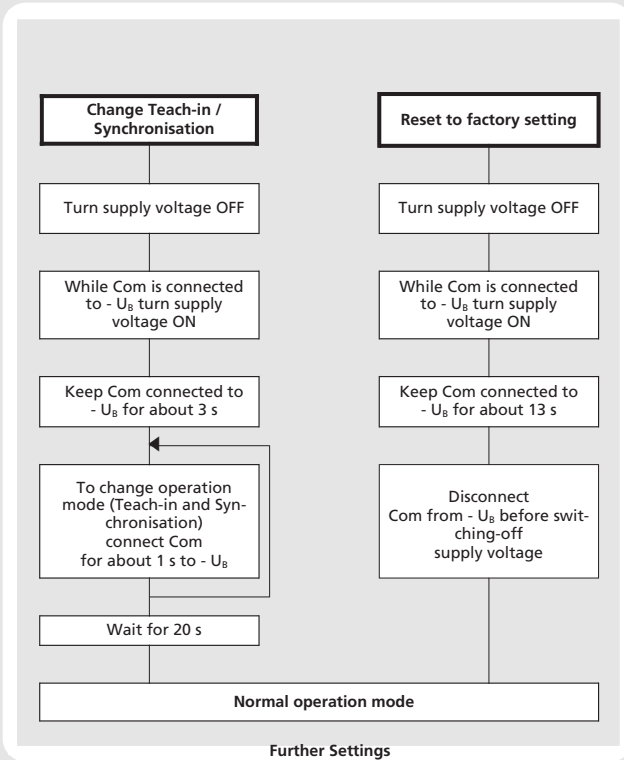
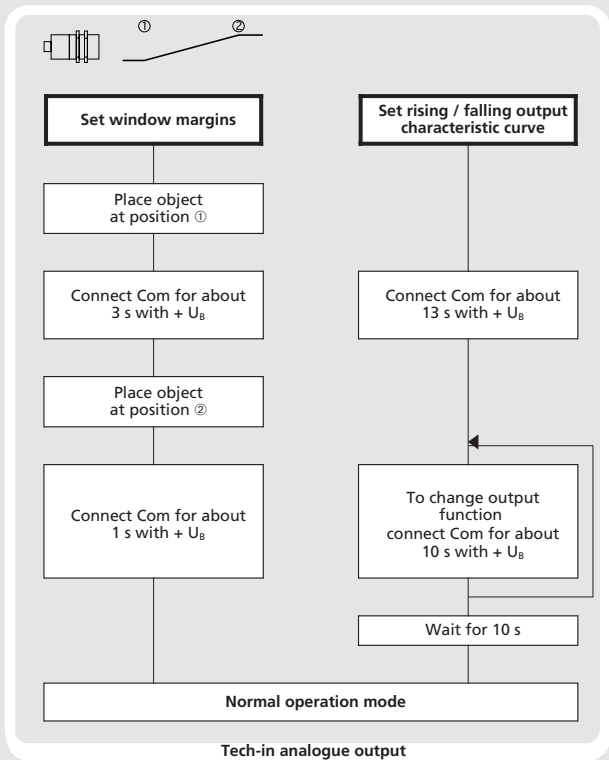
Note

- 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.
- The load put to the analogue output is detected automatically when turning supply voltage on.
- If no signal is detected for 20 seconds during teach-in procedure the made changes are stored and the sensor returns to normal mode operation.
- You can reset the factory settings at any time, see »Reset to factory setting«.



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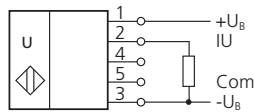
Set the mic-sensor using the Teach-in procedure



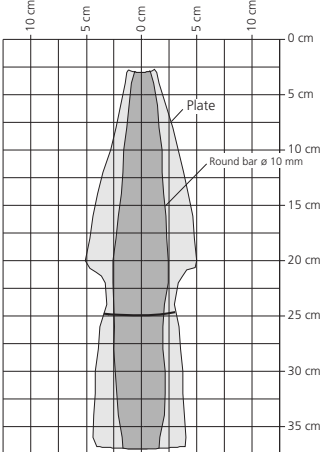
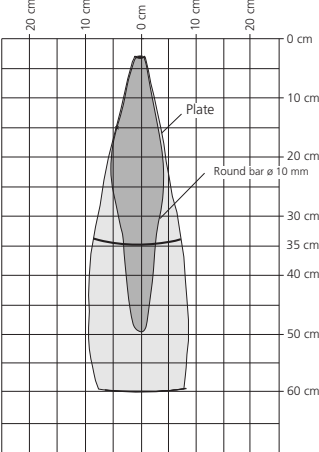
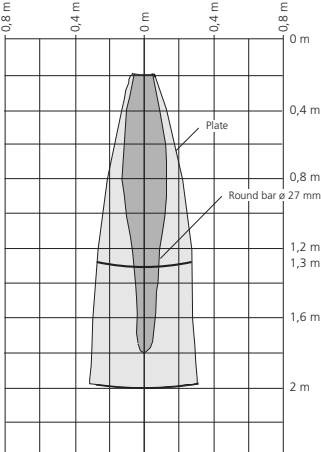
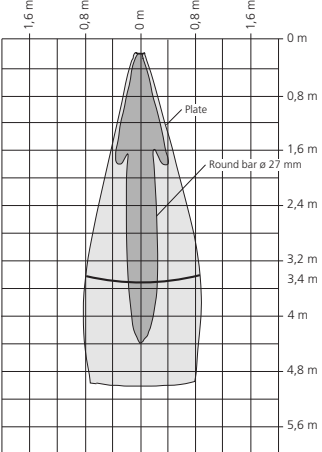
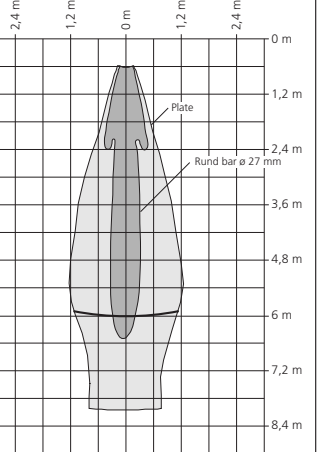
Enclosure Type 1
For use only in industrial
machinery NFPA 79 applications.

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.

Technical data



Analogue output

Blind zone Operating range Maximum range Angle of beam spread Transducer frequency Resolution, sampling rate	0 to 30 mm 250 mm 350 mm Please see detection zone 320 kHz 0.025 mm to 0.10 mm, depending on the analogue window	0 to 65 mm 350 mm 600 mm Please see detection zone 400 kHz 0.025 mm to 0.17 mm, depending on the analogue window	0 to 200 mm 1,300 mm 2,000 mm Please see detection zone 200 kHz 0.18 mm to 0.57 mm, depending on the analogue window	0 to 350 mm 3,400 mm 5,000 mm Please see detection zone 120 kHz 0.18 mm to 1.5 mm, depending on the analogue window	0 to 600 mm 6,000 mm 8,000 mm Please see detection zone 80 kHz 0.18 mm to 2.4 mm, depending on the analogue window
	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. 				
Reproducibility Accuracy	± 0,15 % ± 1 % (Temperature drift internal compensated, may be deactivated ¹⁾ , 0,17%/K without compensation)	± 0,15 % ± 1 % (Temperature drift internal compensated, may be deactivated ¹⁾ , 0,17%/K without compensation)	± 0,15 % ± 1 % (Temperature drift internal compensated, may be deactivated ¹⁾ , 0,17%/K without compensation)	± 0,15 % ± 1 % (Temperature drift internal compensated, may be deactivated ¹⁾ , 0,17%/K without compensation)	± 0,15 % ± 1 % (Temperature drift internal compensated, may be deactivated ¹⁾ , 0,17%/K without compensation)
Operating voltage U _B Voltage ripple No-load supply current Housing	9 V to 30 V DC, reverse polarity protection (Class 2) ±10 % ≤ 55 mA Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content	9 V to 30 V DC, reverse polarity protection (Class 2) ±10 % ≤ 55 mA Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content	9 V to 30 V DC, reverse polarity protection (Class 2) ±10 % ≤ 55 mA Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content	9 V to 30 V DC, reverse polarity protection (Class 2) ±10 % ≤ 55 mA Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content	9 V to 30 V DC, reverse polarity protection (Class 2) ±10 % ≤ 55 mA Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
Class of protection to EN 60529 Norm conformity Type of connection	IP 67 EN 60947-5-2 5-pin initiator plug, Brass, nickel-plated	IP 67 EN 60947-5-2 5-pin initiator plug, Brass, nickel-plated	IP 67 EN 60947-5-2 5-pin initiator plug, Brass, nickel-plated	IP 67 EN 60947-5-2 5-pin initiator plug, Brass, nickel-plated	IP 67 EN 60947-5-2 5-pin initiator plug, Brass, nickel-plated
Controls Indicators Programmable	Yes, via Com-channel No Yes, with Teach-in and LinkControl	Yes, via Com-channel No Yes, with Teach-in and LinkControl	Yes, via Com-channel No Yes, with Teach-in and LinkControl	Yes, via Com-channel No Yes, with Teach-in and LinkControl	Yes, via Com-channel No Yes, with Teach-in and LinkControl
Operating temperature Storage temperature Weight Response time ¹⁾ Time delay before availability	-25°C bis +70°C -40°C bis +85°C 200 g 32 ms < 390 ms	-25°C bis +70°C -40°C bis +85°C 200 g 64 ms < 420 ms	-25°C bis +70°C -40°C bis +85°C 200 g 92 ms < 440 ms	-25°C bis +70°C -40°C bis +85°C 260 g 172 ms < 530 ms	-25°C bis +70°C -40°C bis +85°C 320 g 240 ms < 600 ms
Order No. Current output 4 – 20 mA Voltage output 0 – 10 V	mic-25/IU/M R _L ≤ 100 Ω at 9 V ≤ U _B ≤ 20 V; R _L ≤ 500 Ω at U _B ≥ 20 V Rising/falling output characteristic R _L ≥ 100 kΩ at U _B ≥ 15 V, short-circuit-proof Rising/falling output characteristic	mic-35/IU/M R _L ≤ 100 Ω at 9 V ≤ U _B ≤ 20 V; R _L ≤ 500 Ω at U _B ≥ 20 V Rising/falling output characteristic R _L ≥ 100 kΩ at U _B ≥ 15 V, short-circuit-proof Rising/falling output characteristic	mic-130/IU/M R _L ≤ 100 Ω at 9 V ≤ U _B ≤ 20 V; R _L ≤ 500 Ω at U _B ≥ 20 V Rising/falling output characteristic R _L ≥ 100 kΩ at U _B ≥ 15 V, short-circuit-proof Rising/falling output characteristic	mic-340/IU/M R _L ≤ 100 Ω at 9 V ≤ U _B ≤ 20 V; R _L ≤ 500 Ω at U _B ≥ 20 V Rising/falling output characteristic R _L ≥ 100 kΩ at U _B ≥ 15 V, short-circuit-proof Rising/falling output characteristic	mic-600/IU/M R _L ≤ 100 Ω at 9 V ≤ U _B ≤ 20 V; R _L ≤ 500 Ω at U _B ≥ 20 V Rising/falling output characteristic R _L ≥ 100 kΩ at U _B ≥ 15 V, short-circuit-proof Rising/falling output characteristic

1) Can be programmed with LinkControl

