



## Operating Manual

### mic Ultrasonic Sensors with one switching output

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

### Product description

- The mic-sensor with one switching output measures the distance to an object within the detection zone contactless. Depending on the adjusted detect distance the switching output is set.
- The output functions are changeable from NOC to NCC.
- The sensors are adjustable using Teach-in processes via the Com-channel (Pin 5).
- Using the LinkControl adapter (optional accessory) all sensor parameter settings can be adjusted by a Windows® Software.

### Safety Notes

- Read the operating instructions prior to start-up.
- Connection, installation and adjustment works may only be carried out by expert personnel.
- No safety component in accordance with the EU Machine Directive, use in the area of personal and machine protection not permitted

The mic-sensors have a blind zone in which distance measurement is not possible. 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.

### Installation

- Assemble the sensor at the installation location.
- Plug in the connector cable to the M12 connector, see Fig. 1.

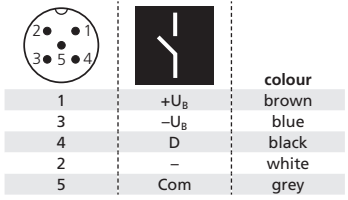


Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

### Start-up

- Connect the power supply.
- Set detect points via the Teach-in procedure (see Diagram 1)

### Factory setting

- mic-sensors are delivered factory made with the following settings:
  - Switching output on NOC
  - Detecting distance at operating range and half operating range
  - Maximum detection range set to maximum range

### Synchronisation

If the assembly distances shown in Fig. 2 for two or more sensors are exceeded the integrated synchronisation should be used. Connect Com-channels (pin 5 at the units receptable) of all sensors (10 maximum).

### 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.

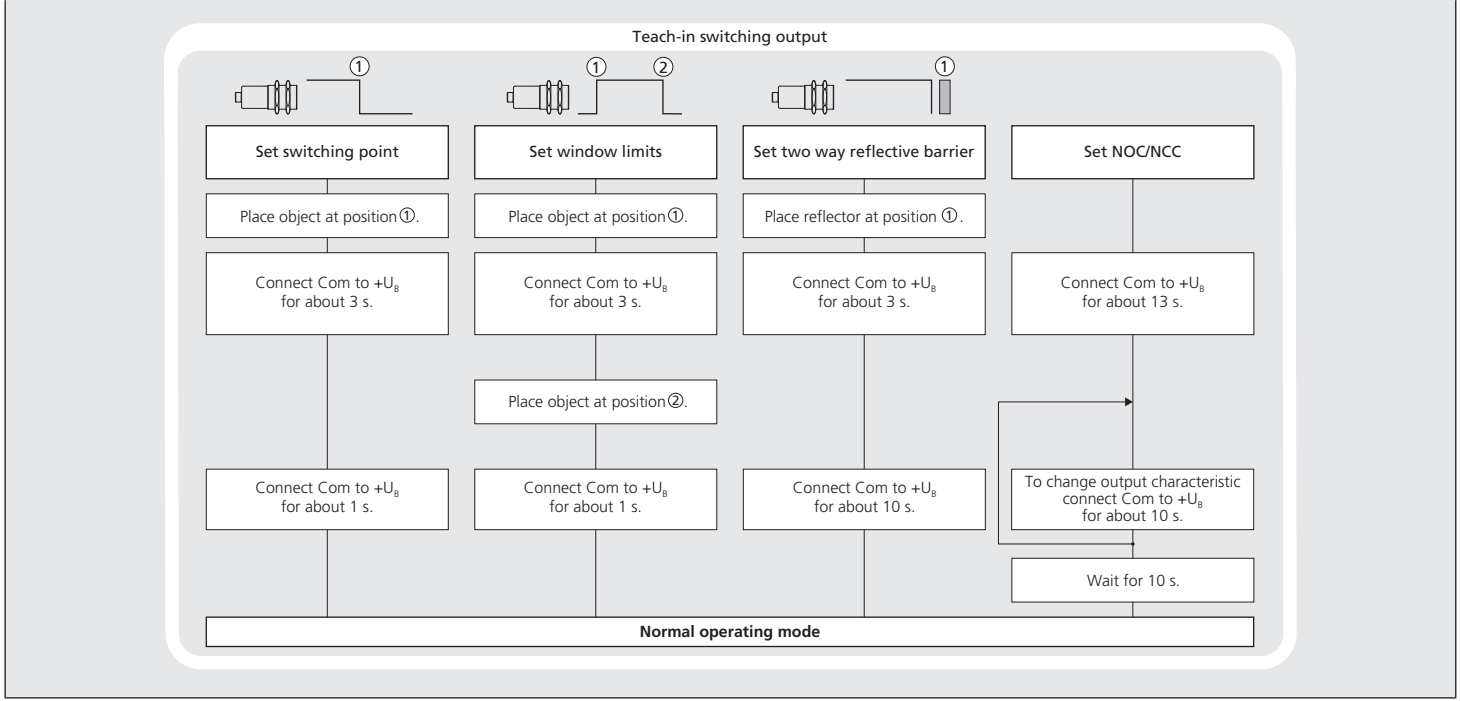
### Notes

- 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.
- During Teach-in mode, the hysteresis loops are set back to factory settings.
- 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 Diagram 2.

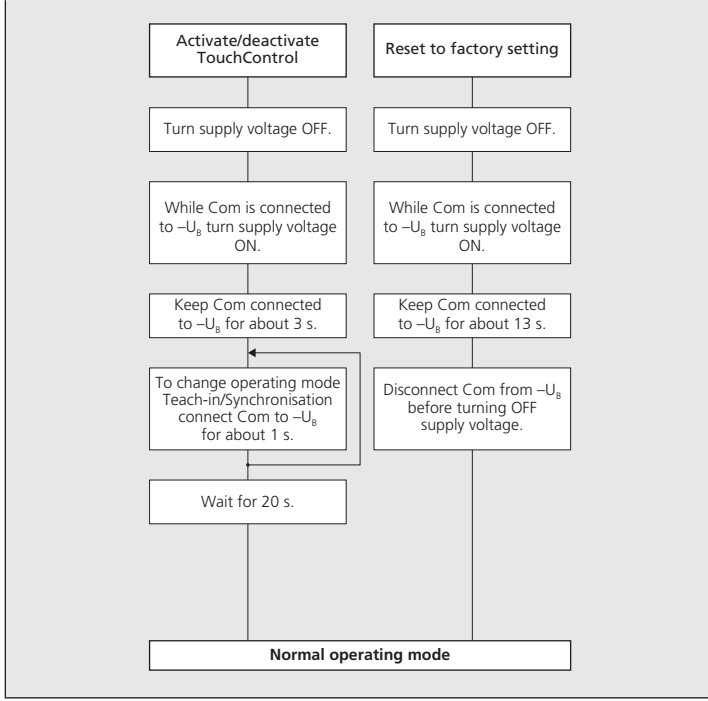
Model	Minimum Distance (m)	Maximum Distance (m)
mic-25...	≥0.35 m	≥2.50 m
mic-35...	≥0.40 m	≥2.50 m
mic-130...	≥1.10 m	≥8.00 m
mic-340...	≥2.00 m	≥18.00 m
mic-600...	≥4.00 m	≥30.00 m

Fig. 2: Assembly distances, indicating synchronisation

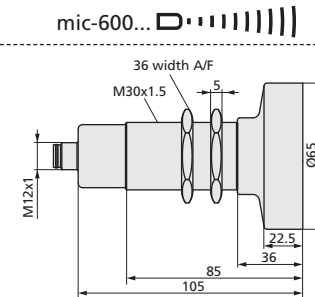
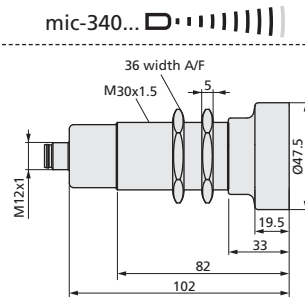
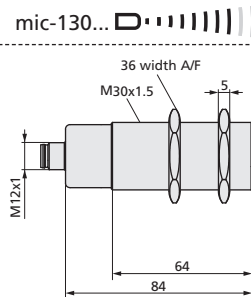
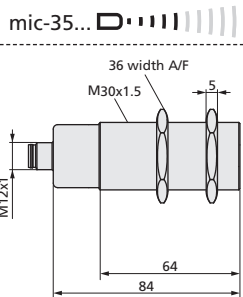
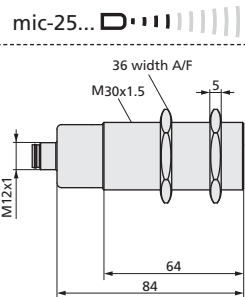
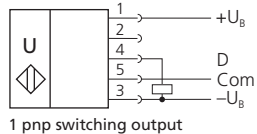
## Diagram 1: Set sensor parameters via Teach-in procedure



## Diagram 2: Operating mode and factory setting



**Technical data**



**blind zone** 0 to 30 mm  
**operating range** 250 mm  
**maximum range** 350 mm  
**angle of beam spread** see detection zone  
**transducer frequency** 320 kHz  
**resolution** 0.018 mm  
**reproducibility** ±0.15 %  
**accuracy** ±1 % (Temperature drift internal compensated, may be deactivated <sup>1)</sup>, 0.17%/K without compensation)

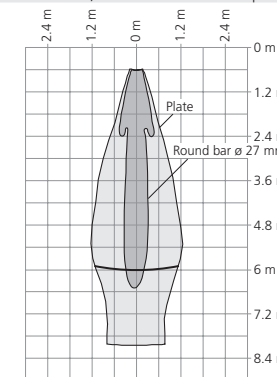
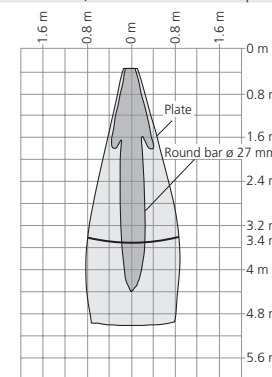
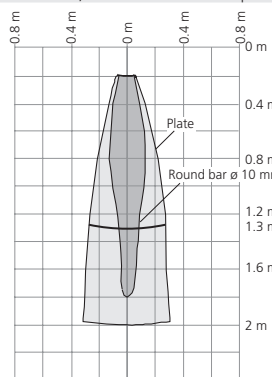
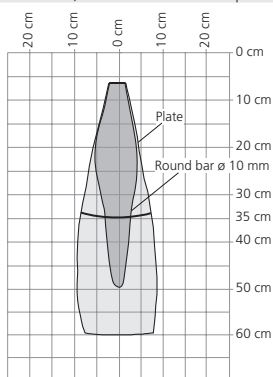
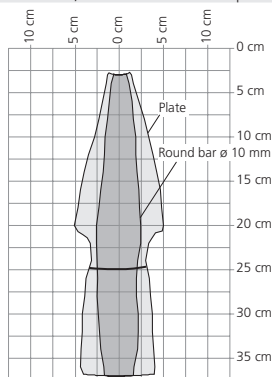
**blind zone** 0 to 65 mm  
**operating range** 350 mm  
**maximum range** 600 mm  
**angle of beam spread** see detection zone  
**transducer frequency** 400 kHz  
**resolution** 0.018 mm  
**reproducibility** ±0.15 %  
**accuracy** ±1 % (Temperature drift internal compensated, may be deactivated <sup>1)</sup>, 0.17%/K without compensation)

**blind zone** 0 to 200 mm  
**operating range** 1,300 mm  
**maximum range** 2,000 mm  
**angle of beam spread** see detection zone  
**transducer frequency** 200 kHz  
**resolution** 0.18 mm  
**reproducibility** ±0.15 %  
**accuracy** ±1 % (Temperature drift internal compensated, may be deactivated <sup>1)</sup>, 0.17%/K without compensation)

**blind zone** 0 to 350 mm  
**operating range** 3,400 mm  
**maximum range** 5,000 mm  
**angle of beam spread** see detection zone  
**transducer frequency** 120 kHz  
**resolution** 0.18 mm  
**reproducibility** ±0.15 %  
**accuracy** ±1 % (Temperature drift internal compensated, may be deactivated <sup>1)</sup>, 0.17%/K without compensation)

**blind zone** 0 to 600 mm  
**operating range** 6,000 mm  
**maximum range** 8,000 mm  
**angle of beam spread** see detection zone  
**transducer frequency** 80 kHz  
**resolution** 0.18 mm  
**reproducibility** ±0.15 %  
**accuracy** ±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 represent the zone where it is easy to recognise the normal reflector (round bar). This indicates the typical operating range of the sensors. The light grey areas represent the zone where a very large reflector – for instance a plate – can still be recognised. The requirement here is for an optimum alignment to the sensor. It is not possible to evaluate ultrasonic reflections outside this area.



**operating voltage U<sub>B</sub>** 9 to 30 V DC, short-circuit-proof, Class 2  
**voltage ripple** ±10 %  
**no-load supply current** ≤80 mA  
**housing** Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
**class of protection to EN 60529** IP 67  
**norm conformity** EN 60947-5-2  
**type of connection** 5-pin initiator plug, Brass, nickel-plated  
**controls** via Com-channel  
**programmable** via Teach-in and LinkControl  
**operating temperature** -25 to +70 °C  
**storage temperature** -40 to +85 °C  
**weight** 200 g  
**switching hysteresis** <sup>1)</sup> 3 mm  
**switching frequency** <sup>1)</sup> 11 Hz  
**response time** <sup>1)</sup> 32 ms  
**time delay before availability** <sup>1)</sup> <300 ms

**operating voltage U<sub>B</sub>** 9 to 30 V DC, short-circuit-proof, Class 2  
**voltage ripple** ±10 %  
**no-load supply current** ≤80 mA  
**housing** Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
**class of protection to EN 60529** IP 67  
**norm conformity** EN 60947-5-2  
**type of connection** 5-pin initiator plug, Brass, nickel-plated  
**controls** via Com-channel  
**programmable** via Teach-in and LinkControl  
**operating temperature** -25 to +70 °C  
**storage temperature** -40 to +85 °C  
**weight** 200 g  
**switching hysteresis** <sup>1)</sup> 5 mm  
**switching frequency** <sup>1)</sup> 8 Hz  
**response time** <sup>1)</sup> 64 ms  
**time delay before availability** <sup>1)</sup> <300 ms

**operating voltage U<sub>B</sub>** 9 to 30 V DC, short-circuit-proof, Class 2  
**voltage ripple** ±10 %  
**no-load supply current** ≤80 mA  
**housing** Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
**class of protection to EN 60529** IP 67  
**norm conformity** EN 60947-5-2  
**type of connection** 5-pin initiator plug, Brass, nickel-plated  
**controls** via Com-channel  
**programmable** via Teach-in and LinkControl  
**operating temperature** -25 to +70 °C  
**storage temperature** -40 to +85 °C  
**weight** 200 g  
**switching hysteresis** <sup>1)</sup> 20 mm  
**switching frequency** <sup>1)</sup> 6 Hz  
**response time** <sup>1)</sup> 92 ms  
**time delay before availability** <sup>1)</sup> <300 ms

**operating voltage U<sub>B</sub>** 9 to 30 V DC, short-circuit-proof, Class 2  
**voltage ripple** ±10 %  
**no-load supply current** ≤80 mA  
**housing** Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
**class of protection to EN 60529** IP 67  
**norm conformity** EN 60947-5-2  
**type of connection** 5-pin initiator plug, Brass, nickel-plated  
**controls** via Com-channel  
**programmable** via Teach-in and LinkControl  
**operating temperature** -25 to +70 °C  
**storage temperature** -40 to +85 °C  
**weight** 260 g  
**switching hysteresis** <sup>1)</sup> 50 mm  
**switching frequency** <sup>1)</sup> 3 Hz  
**response time** <sup>1)</sup> 172 ms  
**time delay before availability** <sup>1)</sup> <300 ms

**operating voltage U<sub>B</sub>** 9 to 30 V DC, short-circuit-proof, Class 2  
**voltage ripple** ±10 %  
**no-load supply current** ≤80 mA  
**housing** Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
**class of protection to EN 60529** IP 67  
**norm conformity** EN 60947-5-2  
**type of connection** 5-pin initiator plug, Brass, nickel-plated  
**controls** via Com-channel  
**programmable** via Teach-in and LinkControl  
**operating temperature** -25 to +70 °C  
**storage temperature** -40 to +85 °C  
**weight** 320 g  
**switching hysteresis** <sup>1)</sup> 100 mm  
**switching frequency** <sup>1)</sup> 2 Hz  
**response time** <sup>1)</sup> 240 ms  
**time delay before availability** <sup>1)</sup> <300 ms

**order No.** mic-25/D/M  
**switching output** pnp, U<sub>B</sub> = 2 V, I<sub>max</sub> = 200 mA  
 switchable NOC/NCC, short-circuit-proof

**order No.** mic-35/D/M  
**switching output** pnp, U<sub>B</sub> = 2 V, I<sub>max</sub> = 200 mA  
 switchable NOC/NCC, short-circuit-proof

**order No.** mic-130/D/M  
**switching output** pnp, U<sub>B</sub> = 2 V, I<sub>max</sub> = 200 mA  
 switchable NOC/NCC, short-circuit-proof

**order No.** mic-340/D/M  
**switching output** pnp, U<sub>B</sub> = 2 V, I<sub>max</sub> = 200 mA  
 switchable NOC/NCC, short-circuit-proof

**order No.** mic-600/D/M  
**switching output** pnp, U<sub>B</sub> = 2 V, I<sub>max</sub> = 200 mA  
 switchable NOC/NCC, short-circuit-proof

<sup>1)</sup> Can be programmed via LinkControl.



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

The proximity switches shall be used with a Listed (CYJV7) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.

