



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 limits 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 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.

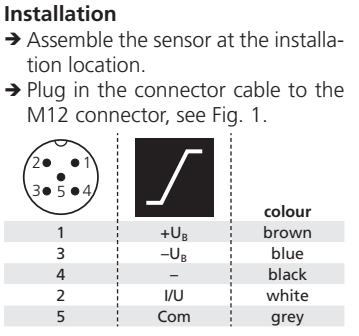


Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

- #### Start-up
- Connect the power supply.
 - Set sensor parameters via the Teach-in procedure (see Diagram 1)

- #### Factory setting
- mic-sensors are delivered factory made with the following settings:
- Rising analogue characteristic
 - Window limits for the analogue output set to blind zone and 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).

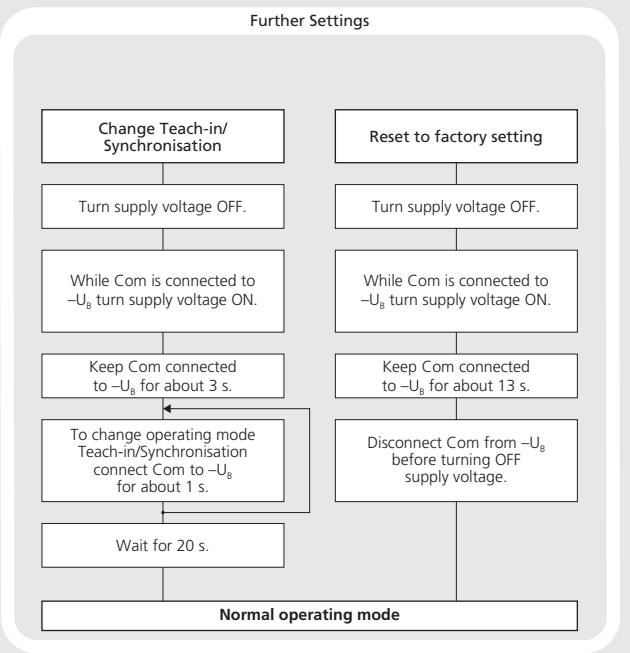
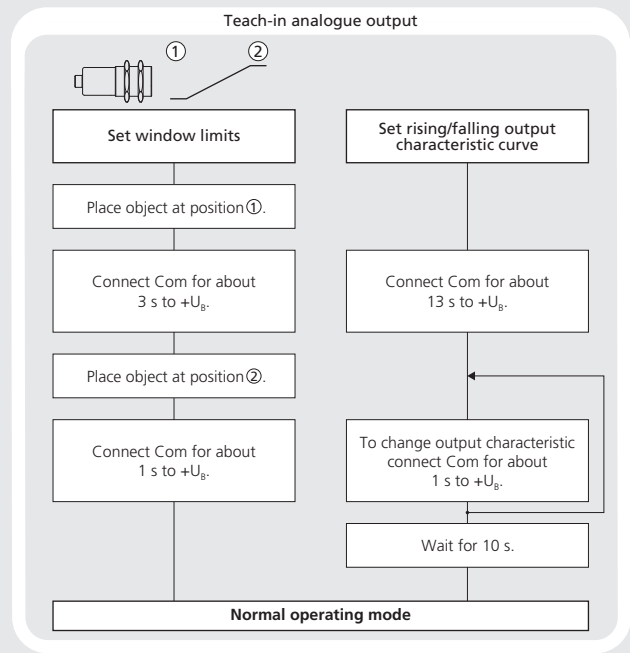
mic-25...	≥0.35 m	≥2.50 m
mic-35...	≥0.40 m	≥2.50 m
mic-130...	≥1.10 m	≥8.00 m
mic-340...	≥2.00 m	≥18.00 m
mic-600...	≥4.00 m	≥30.00 m

Fig. 2: Assembly distances, indicating synchronisation

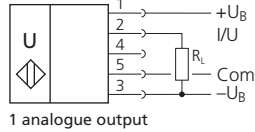
- #### Maintenance
- mic-sensors work maintenance free. Small amounts of dirt on the surface do not influence function. Thick layers of dirt and caked-on dirt affect sensor function and therefore must be removed.

- #### 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.
 - 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 Diagram 1.

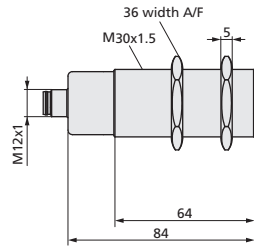
Diagram 1: Set sensor parameters via Teach-in procedure



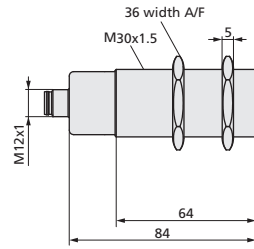
Technical data



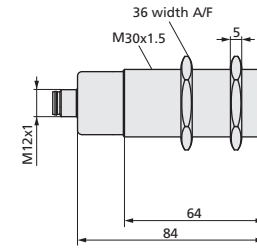
mic-25...



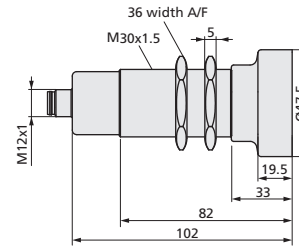
mic-35...



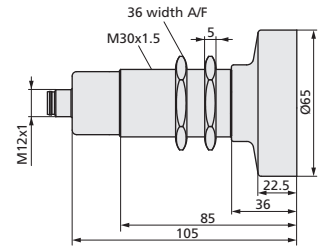
mic-130...



mic-340...



mic-600...



blind zone
operating range
maximum range
angle of beam spread
transducer frequency
resolution

0 to 30 mm
 250 mm
 350 mm
 see detection zone
 320 kHz
 0.025 mm to 0.10 mm, depending on the analogue window

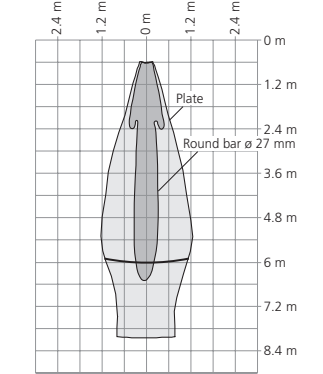
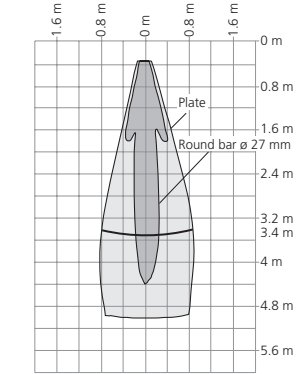
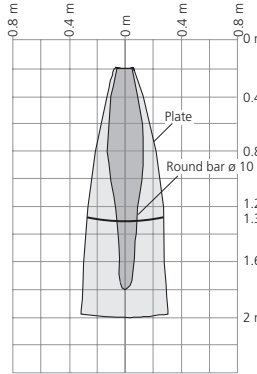
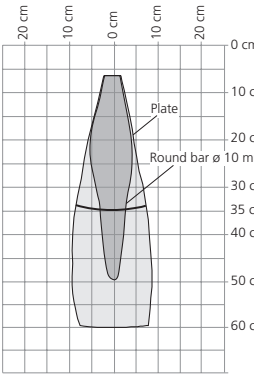
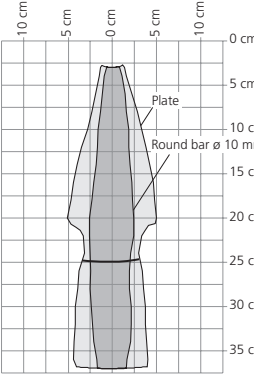
0 to 65 mm
 350 mm
 600 mm
 see detection zone
 400 kHz
 0.025 mm to 0.17 mm, depending on the analogue window

0 to 200 mm
 1,300 mm
 2,000 mm
 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
 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
 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 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.



reproducibility
accuracy
operating voltage UB
voltage ripple
no-load supply current
housing
class of protection to EN 60529
norm conformity
type of connection
controls
programmable
operating temperature
storage temperature
weight
response time 1)
time delay before availability 1)

±0.15 %
 ±1 % (Temperature drift internal compensated, may be deactivated 1), 0.17%/K without compensation)
 9 to 30 V DC, short-circuit-proof, Class 2
 ±10 %
 ≤55 mA
 Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
 IP 67
 EN 60947-5-2
 5-pin initiator plug, Brass, nickel-plated
 via Com-channel
 via Teach-in and LinkControl
 -25 to +70 °C
 -40 to +85 °C
 200 g
 32 ms
 <390 ms

±0.15 %
 ±1 % (Temperature drift internal compensated, may be deactivated 1), 0.17%/K without compensation)
 9 to 30 V DC, short-circuit-proof, Class 2
 ±10 %
 ≤55 mA
 Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
 IP 67
 EN 60947-5-2
 5-pin initiator plug, Brass, nickel-plated
 via Com-channel
 via Teach-in and LinkControl
 -25 to +70 °C
 -40 to +85 °C
 200 g
 64 ms
 <420 ms

±0.15 %
 ±1 % (Temperature drift internal compensated, may be deactivated 1), 0.17%/K without compensation)
 9 to 30 V DC, short-circuit-proof, Class 2
 ±10 %
 ≤55 mA
 Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
 IP 67
 EN 60947-5-2
 5-pin initiator plug, Brass, nickel-plated
 via Com-channel
 via Teach-in and LinkControl
 -25 to +70 °C
 -40 to +85 °C
 200 g
 92 ms
 <440 ms

±0.15 %
 ±1 % (Temperature drift internal compensated, may be deactivated 1), 0.17%/K without compensation)
 9 to 30 V DC, short-circuit-proof, Class 2
 ±10 %
 ≤55 mA
 Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
 IP 67
 EN 60947-5-2
 5-pin initiator plug, Brass, nickel-plated
 via Com-channel
 via Teach-in and LinkControl
 -25 to +70 °C
 -40 to +85 °C
 260 g
 172 ms
 <530 ms

±0.15 %
 ±1 % (Temperature drift internal compensated, may be deactivated 1), 0.17%/K without compensation)
 9 to 30 V DC, short-circuit-proof, Class 2
 ±10 %
 ≤55 mA
 Brass sleeve, nickel-plated, plastic parts: PBT; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
 IP 67
 EN 60947-5-2
 5-pin initiator plug, Brass, nickel-plated
 via Com-channel
 via Teach-in and LinkControl
 -25 to +70 °C
 -40 to +85 °C
 320 g
 240 ms
 <600 ms

order No.
Current output 4 to 20 mA
Voltage output 0 to 10 V

mic-25/IU/M
 $R_L \leq 100 \Omega$ at $9 V \leq U_B \leq 20 V$;
 $R_L \leq 500 \Omega$ at $U_B \geq 20 V$
 Rising/falling output characteristic
 $R_L \geq 100 k\Omega$ at $U_B \geq 15 V$, short-circuit-proof
 Rising/falling output characteristic

mic-35/IU/M
 $R_L \leq 100 \Omega$ at $9 V \leq U_B \leq 20 V$;
 $R_L \leq 500 \Omega$ at $U_B \geq 20 V$
 Rising/falling output characteristic
 $R_L \geq 100 k\Omega$ at $U_B \geq 15 V$, short-circuit-proof
 Rising/falling output characteristic

mic-130/IU/M
 $R_L \leq 100 \Omega$ at $9 V \leq U_B \leq 20 V$;
 $R_L \leq 500 \Omega$ at $U_B \geq 20 V$
 Rising/falling output characteristic
 $R_L \geq 100 k\Omega$ at $U_B \geq 15 V$, short-circuit-proof
 Rising/falling output characteristic

mic-340/IU/M
 $R_L \leq 100 \Omega$ at $9 V \leq U_B \leq 20 V$;
 $R_L \leq 500 \Omega$ at $U_B \geq 20 V$
 Rising/falling output characteristic
 $R_L \geq 100 k\Omega$ at $U_B \geq 15 V$, short-circuit-proof
 Rising/falling output characteristic

mic-600/IU/M
 $R_L \leq 100 \Omega$ at $9 V \leq U_B \leq 20 V$;
 $R_L \leq 500 \Omega$ at $U_B \geq 20 V$
 Rising/falling output characteristic
 $R_L \geq 100 k\Omega$ at $U_B \geq 15 V$, short-circuit-proof
 Rising/falling output characteristic

1) 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 (CYJV/7) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.

