



Operating manual mic+ Ultrasonic Sensors with one switching output

mic+25/D/TC	mic+25/E/TC
mic+35/D/TC	mic+35/E/TC
mic+130/D/TC	mic+130/E/TC
mic+340/D/TC	mic+340E/TC
mic+600/D/TC	mic+600/E/TC

Product description

- The mic+ sensor with one switching output offers a non-contact measurement of the distance to an object. Depending on the adjusted detect distance the switching output is set.
- All settings are done with two push-buttons and a three-digit LED display (TouchControl).
- Light emitting diodes (three-colour LEDs) indicate the switching status.
- The output functions are changeable from NOC to NCC.
- The sensors are adjustable manually using the numerical LED display or may be trained via Teach-in procedure.
- Useful additional functions are set in the Add-on-menu.
- Using the LinkControl adapter (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 operating 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.

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) of all sensors (10 maximum).

	≥0.35 m		≥2.50 m
	≥0.40 m		≥2.50 m
	≥1.10 m		≥8.00 m
	≥2.00 m		≥18.00 m
	≥4.00 m		≥30.00 m

Fig. 1: Minimal assembly distances without synchronisation or multiplex mode.

Multiplex mode

The Add-on-menu allows to assign an individual address »01« to »10« to each sensor connected via the Sync/Com-channel (pin 5). 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«.)

Assembly instructions

- Assemble the sensor at the installation location.
- Plug in the connector cable to the M12 connector.

	+U _B	brown
	-U _B	blue
	D	black
	-	white
	Sync/Com	grey

Fig. 2: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable.

Start-up

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

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

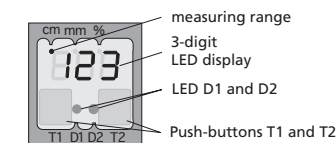


Fig. 3: TouchControl

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.

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 operating mode, the measured distance value is displayed on the LED display 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 values is set back to factory settings.
- If no objects are placed within the detection zone the LED display shows »- -«.
- If no push-buttons are pressed for 20 seconds during parameter setting mode, the parameter changes are saved and the sensor returns to normal operating mode.
- You can lock the key pad to provide inputs, see »Key lock and factory setting«.
- You can reset the factory settings at any time, see »Key lock and factory setting«.

Show parameters

Tapping push-button T1 shortly during normal operating mode shows »PAR« on the LED display. Each time you tap push-button T1 the actual settings of the switching output are displayed.



2014/30/EU



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

The proximity switches shall be used with a Listed (CYJV77) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.

Contact

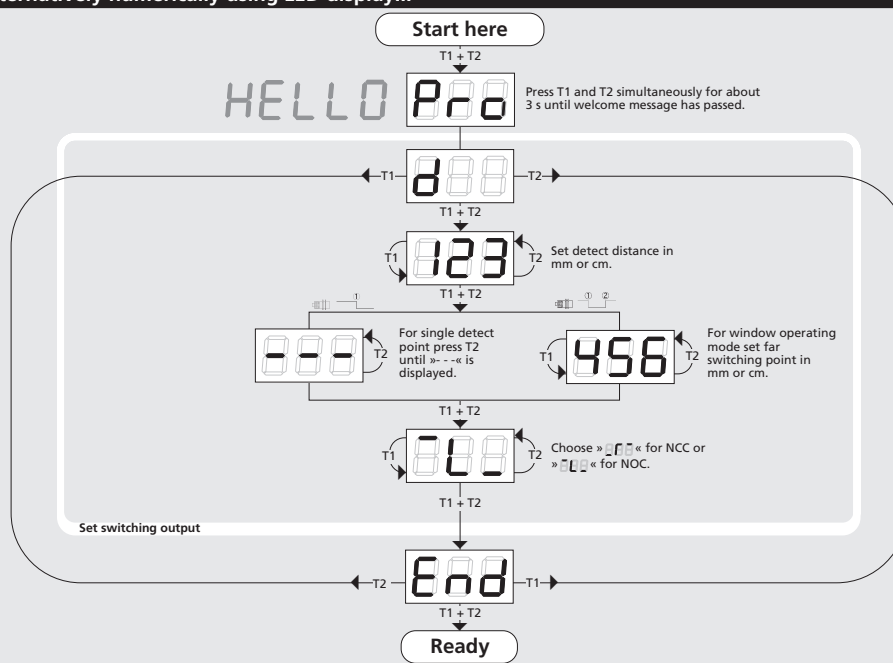
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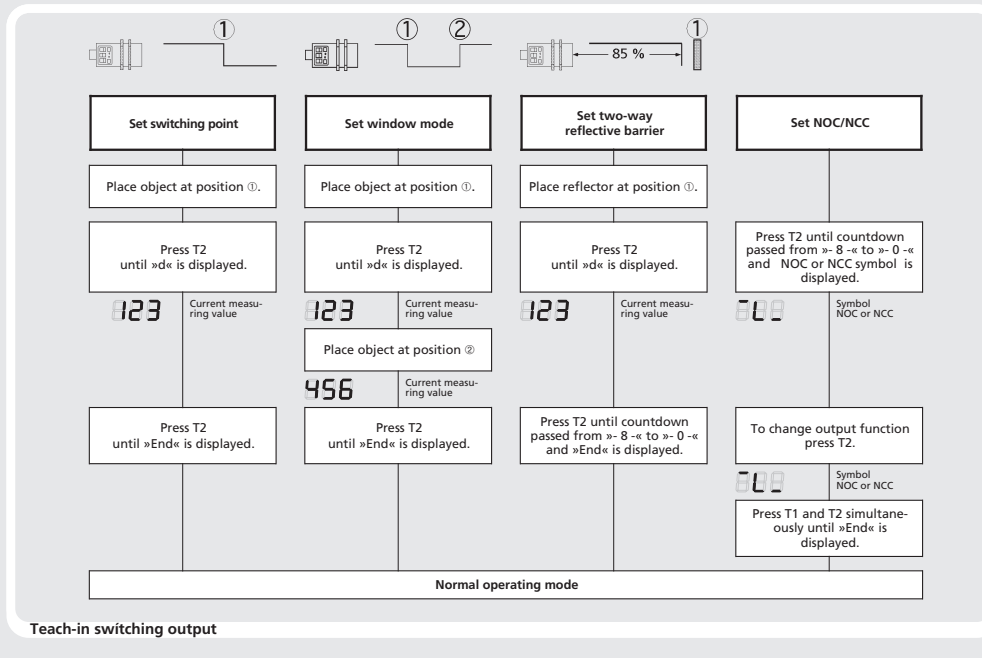
Sensor Partners BVBA

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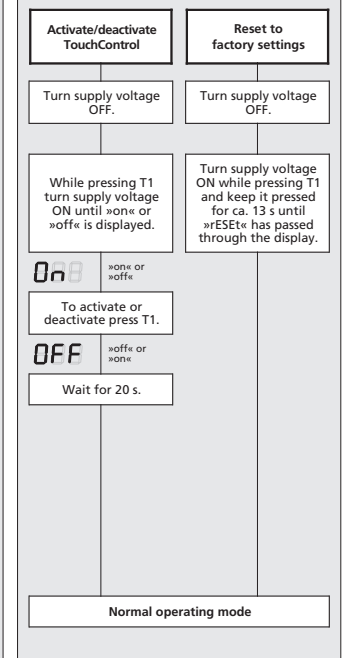
Set sensor parameters alternatively numerically using LED display...



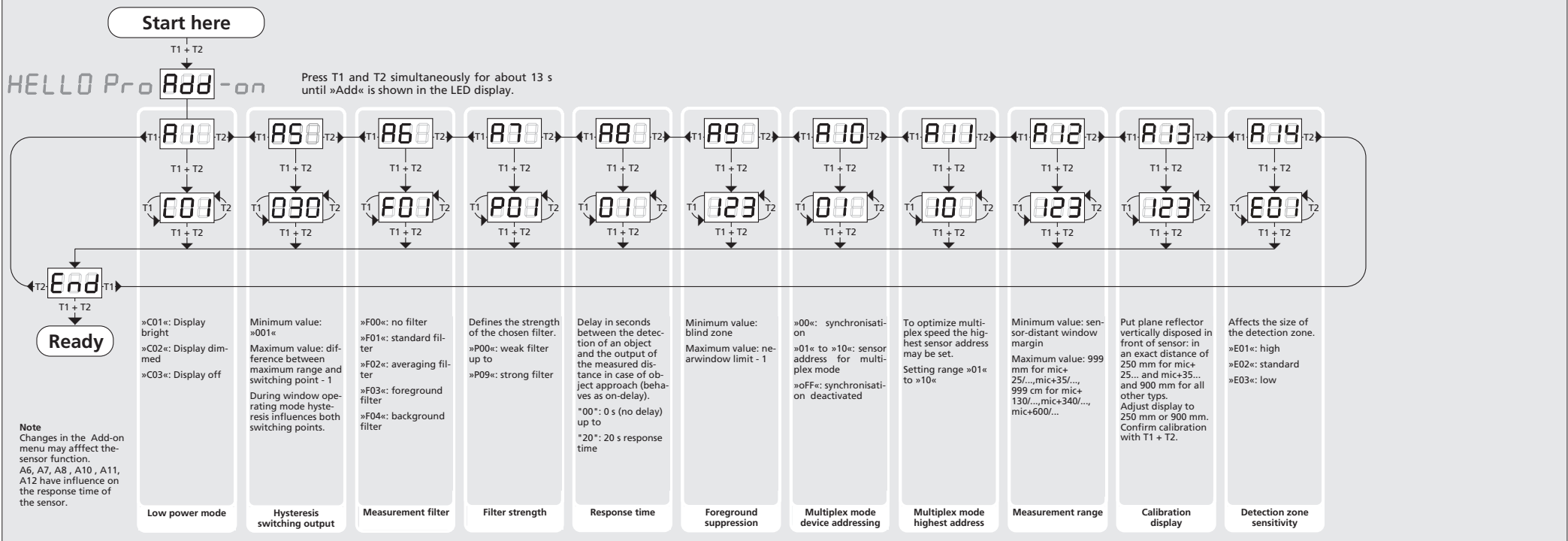
...or with the Teach-in procedure



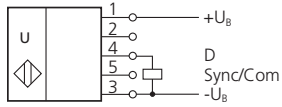
Key lock and factory setting



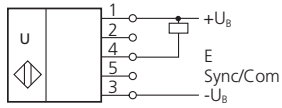
Useful additional functions in Add-on menu (for experienced users only, settings not required for standard applications)



Technical data



1 pnp switching output

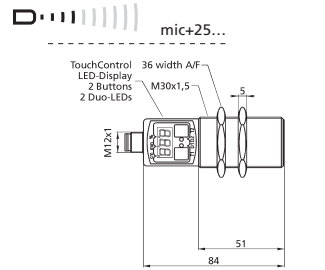


1 npn switching output

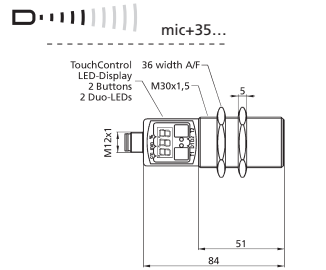
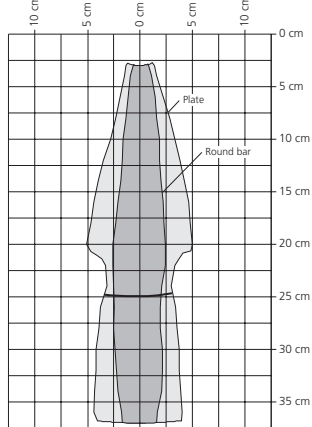
blind zone
operating range
maximum range
angle of beam spread
transducer frequency
resolution
reproducibility
accuracy

detection zones for different objects:

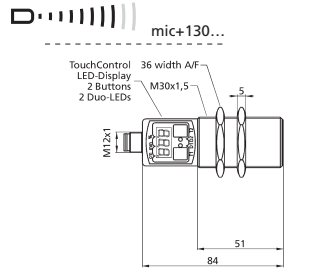
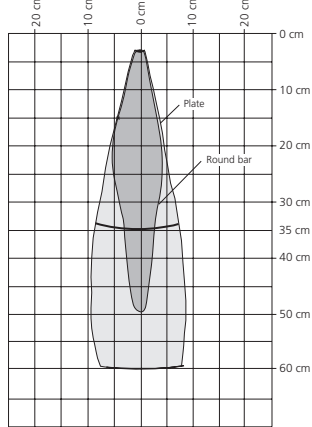
The dark grey areas are determined with a thin round bar (10 or 27 mm dia.) and indicate the typical operating range of a sensor. In order to obtain the light grey areas, a plate (500 x 500 mm) is introduced into the beam spread from the side. In doing so, the optimum angle between plate and sensor is always employed. This therefore indicates the maximum detection zone of the sensor. It is not possible to evaluate ultrasonic reflections outside this area.



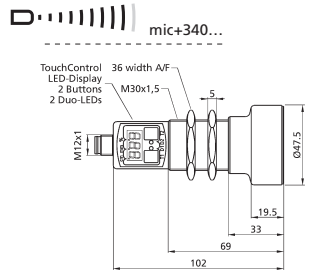
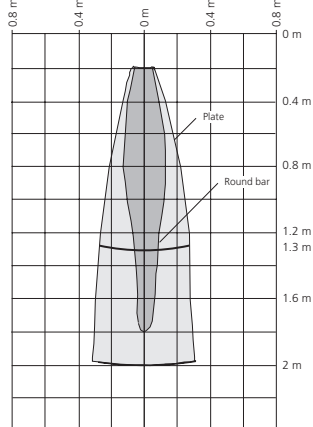
0 to 30 mm
250 mm
350 mm
Please see detection zone
320 kHz
0.025 mm
± 0.15 %
± 1 % (Temperature drift internal compensated, may be deactivated¹⁾, 0.17%/K without compensation)



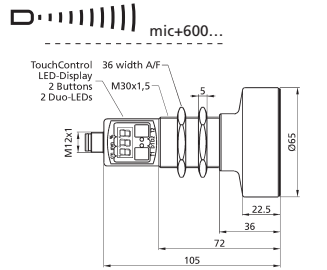
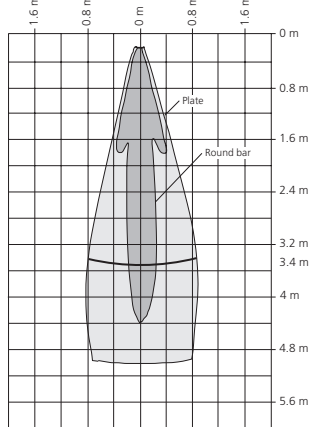
0 to 65 mm
350 mm
600 mm
Please see detection zone
400 kHz
0.025 mm
± 0.15 %
± 1 % (Temperature drift internal compensated, may be deactivated¹⁾, 0.17%/K without compensation)



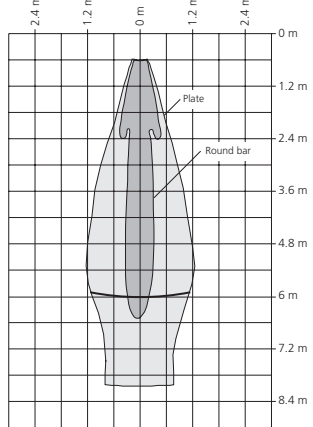
0 to 200 mm
1,300 mm
2,000 mm
Please see detection zone
200 kHz
0.18 mm
± 0.15 %
± 1 % (Temperature drift internal compensated, may be deactivated¹⁾, 0.17%/K without compensation)



0 to 350 mm
3,400 mm
5,000 mm
Please see detection zone
120 kHz
0.18 mm
± 0.15 %
± 1 % (Temperature drift internal compensated, may be deactivated¹⁾, 0.17%/K without compensation)



0 to 600 mm
6,000 mm
8,000 mm
Please see detection zone
80 kHz
0.18 mm
± 0.15 %
± 1 % (Temperature drift internal compensated, may be deactivated¹⁾, 0.17%/K without compensation)



operating voltage U_B 9 V to 30 V DC, reverse polarity protection, Class 2
voltage ripple ±10 %
no-load supply current ≤ 80 mA
housing Brass sleeve, nickel-plated, plastic parts: PBT, TPU; 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, PBT
controls 2 push-buttons (TouchControl)
indicators 3-digit LED display, 2 three-colour LEDs
programmable TouchControl and LinkControl
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
weight 150 g
switching hysteresis³⁾ 3 mm
switching frequency²⁾ 25 Hz
response time²⁾ 32 ms
time delay before availability < 300 ms

order no. **mic+25/D/TC**
switching output pnp, $U_B=2 V$, $I_{max} = 200 mA$
switchable NOC/NCC, short-circuit-proof

order no. **mic+25/E/TC**
switching output npn, $-U_B=2 V$, $I_{max} = 200 mA$
switchable NOC/NCC, short-circuit-proof

operating voltage U_B 9 V to 30 V DC, reverse polarity protection, Class 2
voltage ripple ±10 %
no-load supply current ≤ 80 mA
housing Brass sleeve, nickel-plated, plastic parts: PBT, TPU; 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, PBT
controls 2 push-buttons (TouchControl)
indicators 3-digit LED display, 2 three-colour LEDs
programmable TouchControl and LinkControl
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
weight 150 g
switching hysteresis³⁾ 5 mm
switching frequency²⁾ 12 Hz
response time²⁾ 64 ms
time delay before availability < 300 ms

order no. **mic+35/D/TC**
switching output pnp, $U_B=2 V$, $I_{max} = 200 mA$
switchable NOC/NCC, short-circuit-proof

order no. **mic+35/E/TC**
switching output npn, $-U_B=2 V$, $I_{max} = 200 mA$
switchable NOC/NCC, short-circuit-proof

operating voltage U_B 9 V to 30 V DC, reverse polarity protection, Class 2
voltage ripple ±10 %
no-load supply current ≤ 80 mA
housing Brass sleeve, nickel-plated, plastic parts: PBT, TPU; 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, PBT
controls 2 push-buttons (TouchControl)
indicators 3-digit LED display, 2 three-colour LEDs
programmable TouchControl and LinkControl
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
weight 150 g
switching hysteresis³⁾ 20 mm
switching frequency²⁾ 8 Hz
response time²⁾ 92 ms
time delay before availability < 300 ms

order no. **mic+130/D/TC**
switching output pnp, $U_B=2 V$, $I_{max} = 200 mA$
switchable NOC/NCC, short-circuit-proof

order no. **mic+130/E/TC**
switching output npn, $-U_B=2 V$, $I_{max} = 200 mA$
switchable NOC/NCC, short-circuit-proof

operating voltage U_B 9 V to 30 V DC, reverse polarity protection, Class 2
voltage ripple ±10 %
no-load supply current ≤ 80 mA
housing Brass sleeve, nickel-plated, plastic parts: PBT, TPU; 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, PBT
controls 2 push-buttons (TouchControl)
indicators 3-digit LED display, 2 three-colour LEDs
programmable TouchControl and LinkControl
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
weight 210 g
switching hysteresis³⁾ 50 mm
switching frequency²⁾ 4 Hz
response time²⁾ 172 ms
time delay before availability < 380 ms

order no. **mic+340/D/TC**
switching output pnp, $U_B=2 V$, $I_{max} = 200 mA$
switchable NOC/NCC, short-circuit-proof

order no. **mic+340/E/TC**
switching output npn, $-U_B=2 V$, $I_{max} = 200 mA$
switchable NOC/NCC, short-circuit-proof

operating voltage U_B 9 V to 30 V DC, reverse polarity protection, Class 2
voltage ripple ±10 %
no-load supply current ≤ 80 mA
housing Brass sleeve, nickel-plated, plastic parts: PBT, TPU; 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, PBT
controls 2 push-buttons (TouchControl)
indicators 3-digit LED display, 2 three-colour LEDs
programmable TouchControl and LinkControl
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
weight 270 g
switching hysteresis³⁾ 100 mm
switching frequency²⁾ 3 Hz
response time²⁾ 240 ms
time delay before availability < 450 ms

order no. **mic+600/D/TC**
switching output pnp, $U_B=2 V$, $I_{max} = 200 mA$
switchable NOC/NCC, short-circuit-proof

order no. **mic+600/E/TC**
switching output npn, $-U_B=2 V$, $I_{max} = 200 mA$
switchable NOC/NCC, short-circuit-proof

1) Can be programmed with TouchControl and LinkControl 2) With TouchControl and LinkControl, the selected filter setting and the maximum range influence the switching frequency.