



Operating Manual

mic+ Ultrasonic Sensors
with one switching output

- mic+25/D/TC

mic+35/D/TC

mic+130/D/TC

mic+340/D/TC

mic+600/D/TC
- mic+25/E/TC

mic+35/E/TC

mic+130/E/TC

mic+340/E/TC

mic+600/E/TC

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.
- All settings are done with two push-buttons and a three-digit LED-display (TouchControl).
- Three-colour LEDs indicate the switching status.
- The output functions are changeable from NOC to NCC.
- The sensors are adjustable manually via TouchControl or 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 can be adjusted by a Windows® Software.

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.

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

Proper Use

mic+ ultrasonic sensors are used for non-contact detection of objects.

Synchronisation

If the assembly distance of multiple sensors falls below the values shown in Fig. 1 the integrated synchronisation should be used. Connect Sync/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. 1: Assembly distances, indicating synchronisation/multiplex

Multiplex mode

The Add-on-menu allows to assign an individual address »01« to »10« to each sensor connected via the Sync/Com-channel (Pin5). 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«.

Installation

- Assemble the sensor at the installation location.
- Plug in the connector cable to the M12 connector, see Fig. 2.

1	+U _B	colour brown
3	-U _B	blue
4	D	black
2	-	white
5	Sync/Com	grey

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

Start-up

- Connect the power supply.
- Set the parameters of the sensor manually via TouchControl (see Fig. 3 and Diagram 1)
- or use the Teach-in procedure to adjust the detect points (see Diagram 2).

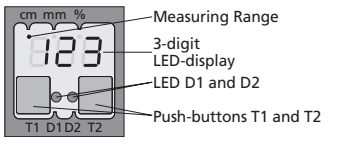


Fig. 3: TouchControl/LED display

Factory setting

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

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 normal operating mode, a yellow LED D2 signals that the switching output has connected.
- During normal operating mode, 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.
- During Teach-in mode, the hysteresis loops are set back to factory settings.
- If no objects are placed within the detection zone the LED-indicator shows »- - -«.
- If no push-buttons are pressed for 20 seconds during parameter setting mode the made changes are stored and the sensor returns to normal operating mode.

- The sensor can be reset to its factory setting, see »Key lock and factory setting«, Diagram 3.

Show parameters

- In normal operating mode shortly push T1. The LED display shows »PAr.«

Each time you tap push-button T1 the actual settings of the switching output are shown.

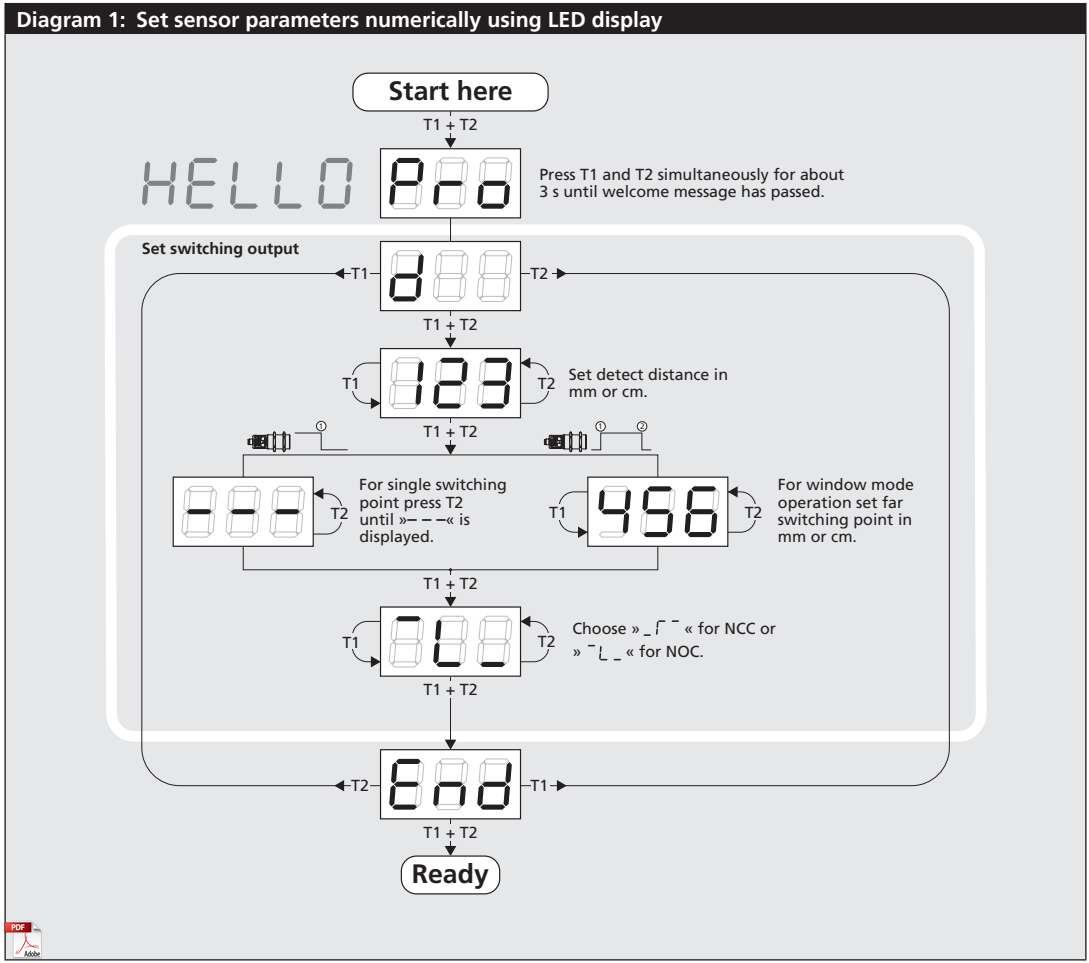


Diagram 2: Set sensor parameters via Teach-in procedure

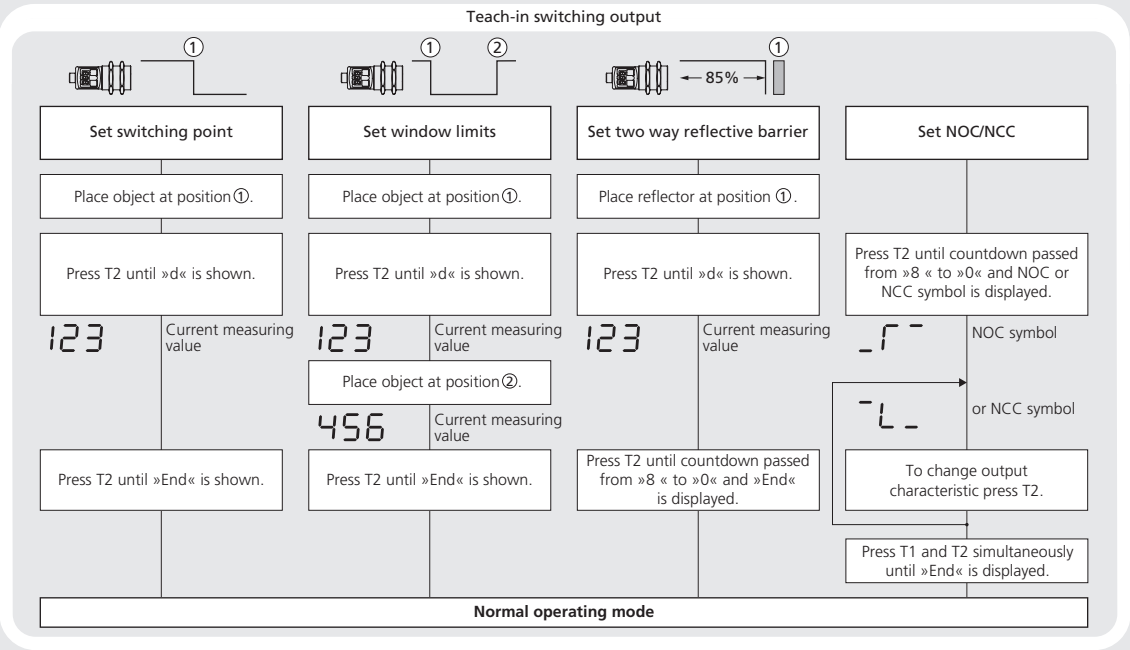


Diagram 3: Key lock and factory setting

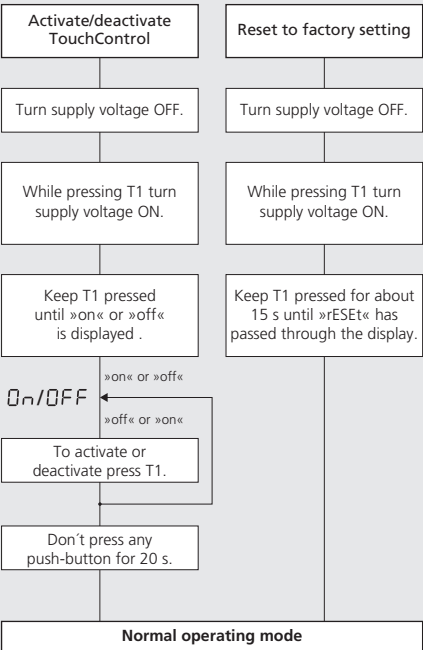
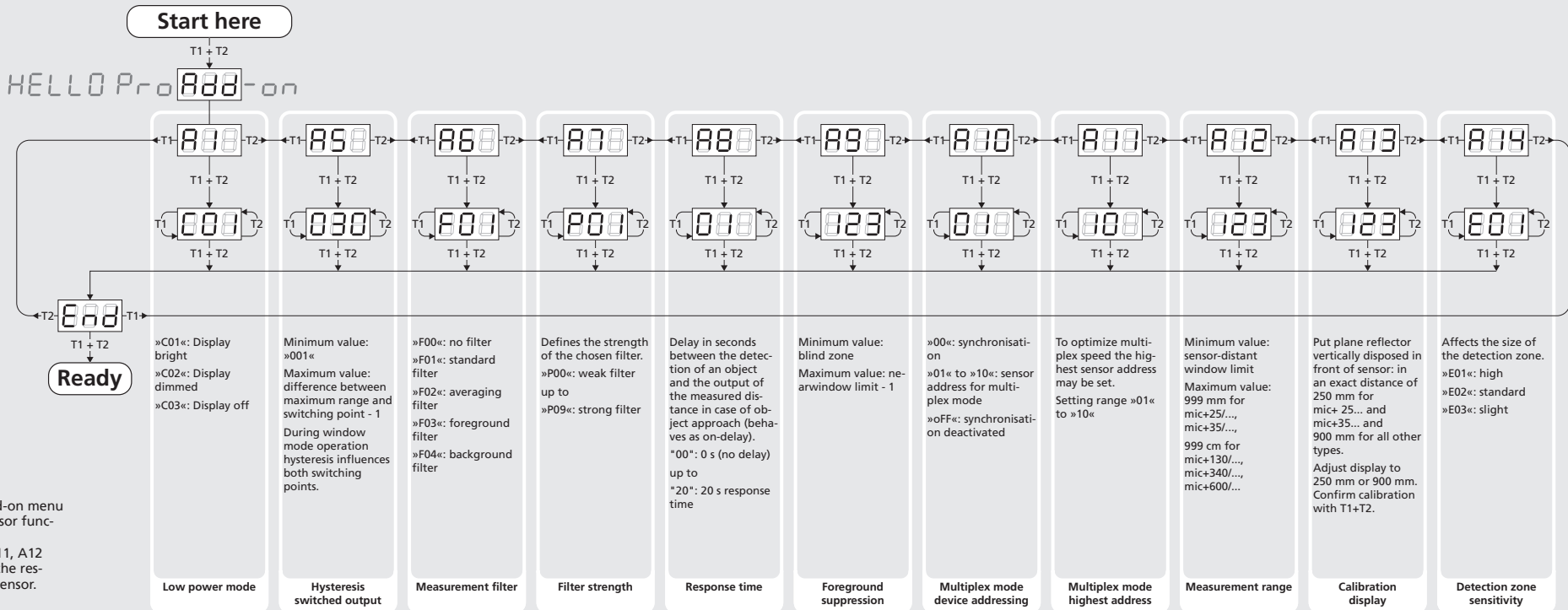
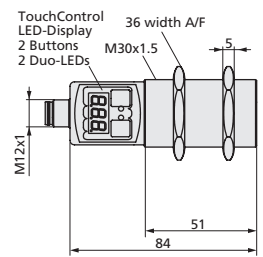
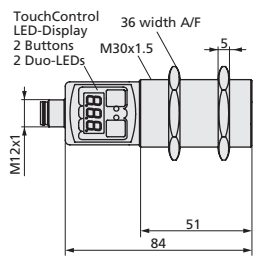
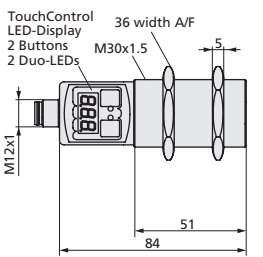
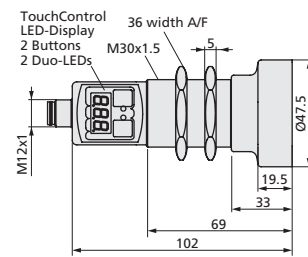
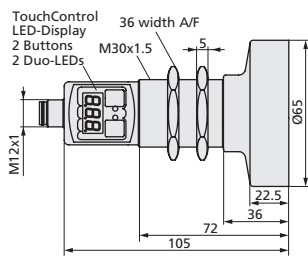
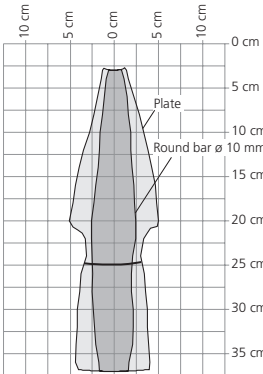
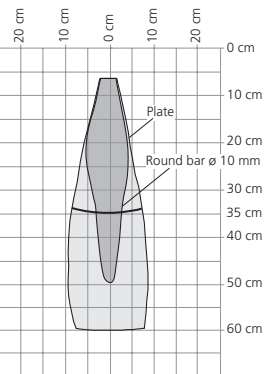
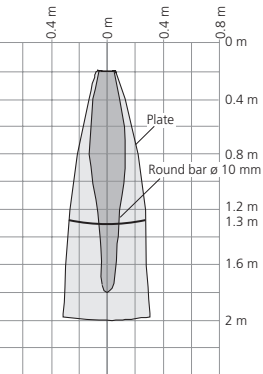
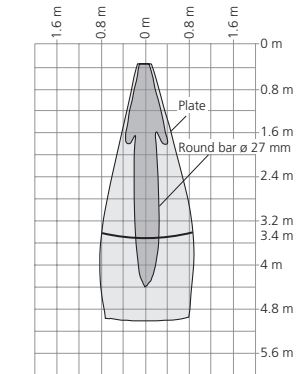
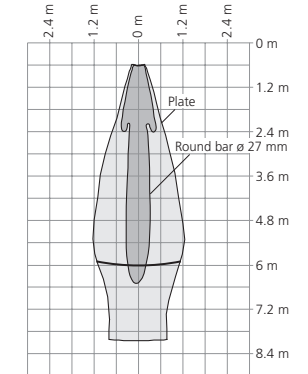


Diagram 4: Useful additional functions in Add-on menu (for experienced users only, settings not required for standard applications)



Note
Changes in the Add-on menu may impair the sensor function.
A6, A7, A8, A10, A11, A12 have influence on the response time of the sensor.

	mic+25... 	mic+35... 	mic+130... 	mic+340... 	mic+600... 
  1 pnp switching output 1 npn switching output					
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	0 to 65 mm 350 mm 600 mm see detection zone 400 kHz 0.025 mm	0 to 200 mm 1,300 mm 2,000 mm see detection zone 200 kHz 0.18 mm	0 to 350 mm 3,400 mm 5,000 mm see detection zone 120 kHz 0.18 mm	0 to 600 mm 6,000 mm 8,000 mm see detection zone 80 kHz 0.18 mm
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 U_B voltage ripple no-load supply current housing class of protection to EN 60529 norm conformity type of connection controls indicators programmable operating temperature storage temperature weight switching hysteresis ¹⁾ switching frequency ²⁾ response time ²⁾ time delay before availability	±0.15 % ±1 % (Temperature drift internal compensated, may be deactivated ³⁾ , 0.17%/K without compensation) 9 to 30 V DC, short-circuit-proof, Class 2 ±10 % ≤ 80 mA Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content IP 67 EN 60947-5-2 5-pin initiator plug, PBT 2 push-buttons (TouchControl) 3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl -25 to +70 °C -40 to +85 °C 150 g 3 mm 25 Hz 32 ms <300 ms	±0.15 % ±1 % (Temperature drift internal compensated, may be deactivated ³⁾ , 0.17%/K without compensation) 9 to 30 V DC, short-circuit-proof, Class 2 ±10 % ≤ 80 mA Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content IP 67 EN 60947-5-2 5-pin initiator plug, PBT 2 push-buttons (TouchControl) 3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl -25 to +70 °C -40 to +85 °C 150 g 5 mm 12 Hz 64 ms <300 ms	±0.15 % ±1 % (Temperature drift internal compensated, may be deactivated ³⁾ , 0.17%/K without compensation) 9 to 30 V DC, short-circuit-proof, Class 2 ±10 % ≤ 80 mA Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content IP 67 EN 60947-5-2 5-pin initiator plug, PBT 2 push-buttons (TouchControl) 3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl -25 to +70 °C -40 to +85 °C 150 g 20 mm 8 Hz 92 ms <300 ms	±0.15 % ±1 % (Temperature drift internal compensated, may be deactivated ³⁾ , 0.17%/K without compensation) 9 to 30 V DC, short-circuit-proof, Class 2 ±10 % ≤ 80 mA Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content IP 67 EN 60947-5-2 5-pin initiator plug, PBT 2 push-buttons (TouchControl) 3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl -25 to +70 °C -40 to +85 °C 210 g 50 mm 4 Hz 172 ms <380 ms	±0.15 % ±1 % (Temperature drift internal compensated, may be deactivated ³⁾ , 0.17%/K without compensation) 9 to 30 V DC, short-circuit-proof, Class 2 ±10 % ≤ 80 mA Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content IP 67 EN 60947-5-2 5-pin initiator plug, PBT 2 push-buttons (TouchControl) 3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl -25 to +70 °C -40 to +85 °C 270 g 100 mm 3 Hz 240 ms <450 ms
order No. switching output order No. switching output	mic+25/D/TC pnp, $U_B = 2\text{ V}$, $I_{max} = 200\text{ mA}$ switchable NOC/NCC, short-circuit-proof mic+25/E/TC npn, $-U_B + 2\text{ V}$, $I_{max} = 200\text{ mA}$ switchable NOC/NCC, short-circuit-proof	mic+35/D/TC pnp, $U_B = 2\text{ V}$, $I_{max} = 200\text{ mA}$ switchable NOC/NCC, short-circuit-proof mic+35/E/TC npn, $-U_B + 2\text{ V}$, $I_{max} = 200\text{ mA}$ switchable NOC/NCC, short-circuit-proof	mic+130/D/TC pnp, $U_B = 2\text{ V}$, $I_{max} = 200\text{ mA}$ switchable NOC/NCC, short-circuit-proof mic+130/E/TC npn, $-U_B + 2\text{ V}$, $I_{max} = 200\text{ mA}$ switchable NOC/NCC, short-circuit-proof	mic+340/D/TC pnp, $U_B = 2\text{ V}$, $I_{max} = 200\text{ mA}$ switchable NOC/NCC, short-circuit-proof mic+340/E/TC npn, $-U_B + 2\text{ V}$, $I_{max} = 200\text{ mA}$ switchable NOC/NCC, short-circuit-proof	mic+600/D/TC pnp, $U_B = 2\text{ V}$, $I_{max} = 200\text{ mA}$ switchable NOC/NCC, short-circuit-proof mic+600/E/TC npn, $-U_B + 2\text{ V}$, $I_{max} = 200\text{ mA}$ switchable NOC/NCC, short-circuit-proof

¹⁾ Can be programmed via TouchControl and LinkControl.

²⁾ With TouchControl and LinkControl, the selected filter setting and the maximum range influence the switching frequency and the response time.

³⁾ Can be deactivated via LinkControl.