

## Product description

- The crm+ sensor offers a non-contact measurement of the distance to an object which must be positioned within the sensor's detection zone.
- The ultrasonic transducer surface of the crm+ sensors is laminated with a PEEK film. The transducer itself is sealed against the housing by a PTFE joint ring. This composition ensures a high resistance against many aggressive substances.
- All settings are done with two push-buttons and a three-digit LED-display (TouchControl).
- Two LEDs indicate operation and the state of the switching output.
- 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.
- The crm+ sensors are IO-Link capable according to specification V1.1 and support

Smart Sensor Profile like Digital Measuring Sensor.

## Safety Notes

- Read the operating manual prior to start-up.
- Connection, installation and adjustment works may only be carried out by qualified staff.
- No safety component in accordance with the EU Machine Directive.

## Use for intended purpose only

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

The crm+ 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 at the units receptacle) of all sensors (10 maximum).

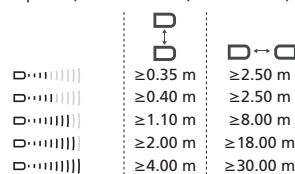


Fig. 1: Assembly distances, indicating synchronisation/multiplex

## 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«.)

## Assembly instructions

- Mount the sensor at the installation location.
- Connect a connection cable to the M12 device plug, see fig. 2.

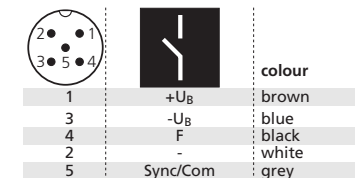


Fig. 2: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

## Factory setting

- Switching output on NOC
- Switching point 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 detect points.

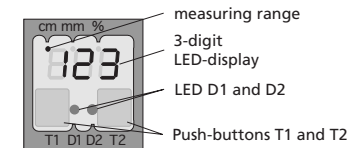


Fig. 3: TouchControl

## Maintenance

crm+ sensors are maintenance-free. In case of excess caked-on dirt we recommend cleaning the sensor surface.

## Note

- As a result of the design the assembly of PEEK film and PTFE joint ring is not gas-proof.
- The chemical resistance has to be tested experimentally if necessary.
- crm+ 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 is set.
- 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 value 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 reset the factory settings at any time, see »Key lock and factory setting«.
- The latest IODD file and informations about start-up and configuration of mic+ sensors with IO-Link, you will find online at: [www.microsonic.de/crm+](http://www.microsonic.de/crm+).

## 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

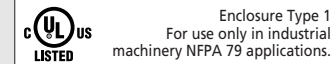
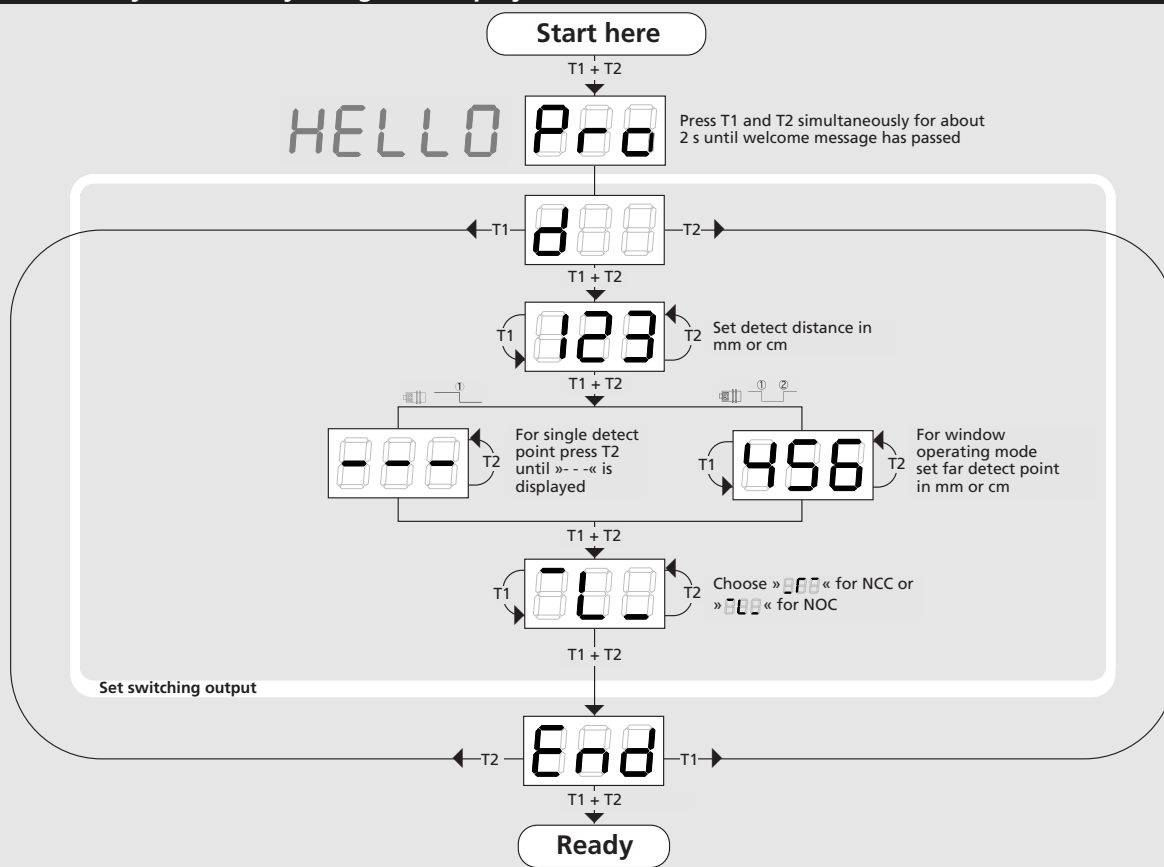
## Operating manual

### crm+ Ultrasonic Sensors with one switching output and IO-Link

- crm+25/F/TC/E
- crm+35/F/TC/E
- crm+130/F/TC/E
- crm+340/F/TC/E
- crm+600/F/TC/E

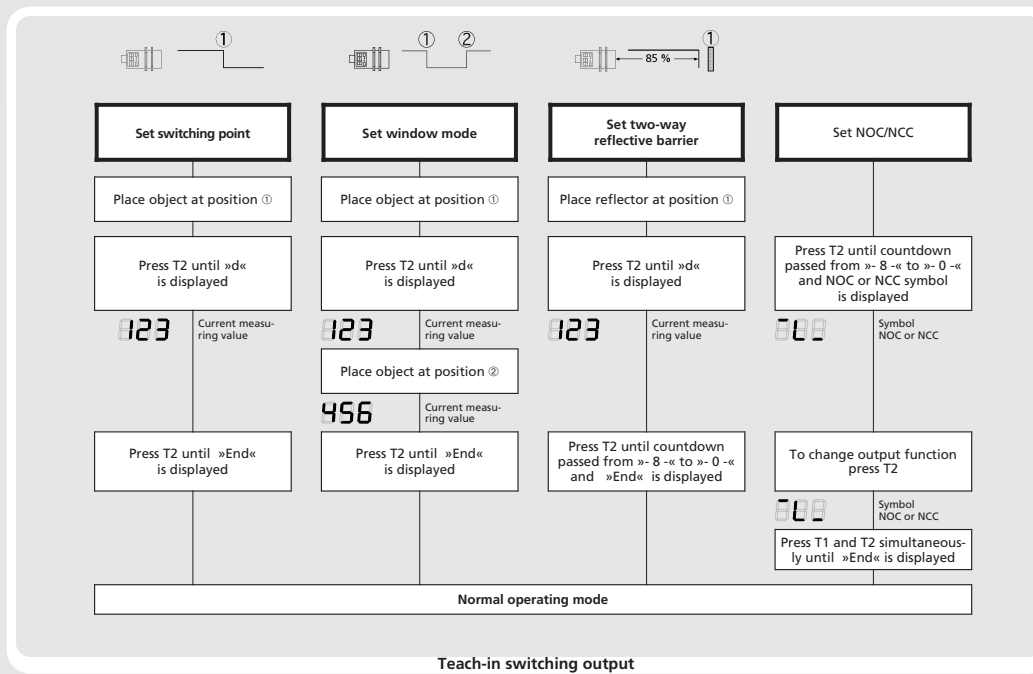


## Set sensor parameters alternatively numerically using LED-display...

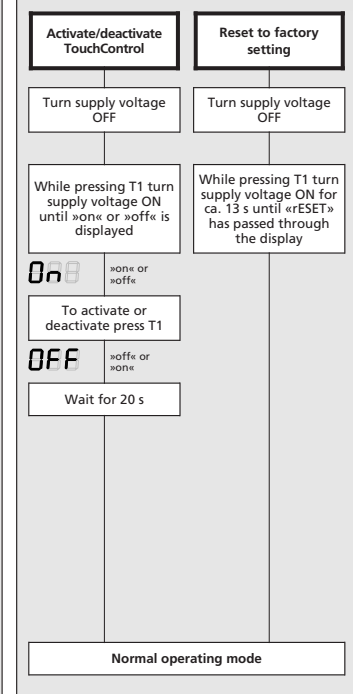


The proximity switches shall be used with a Listed (CYJV/7) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.

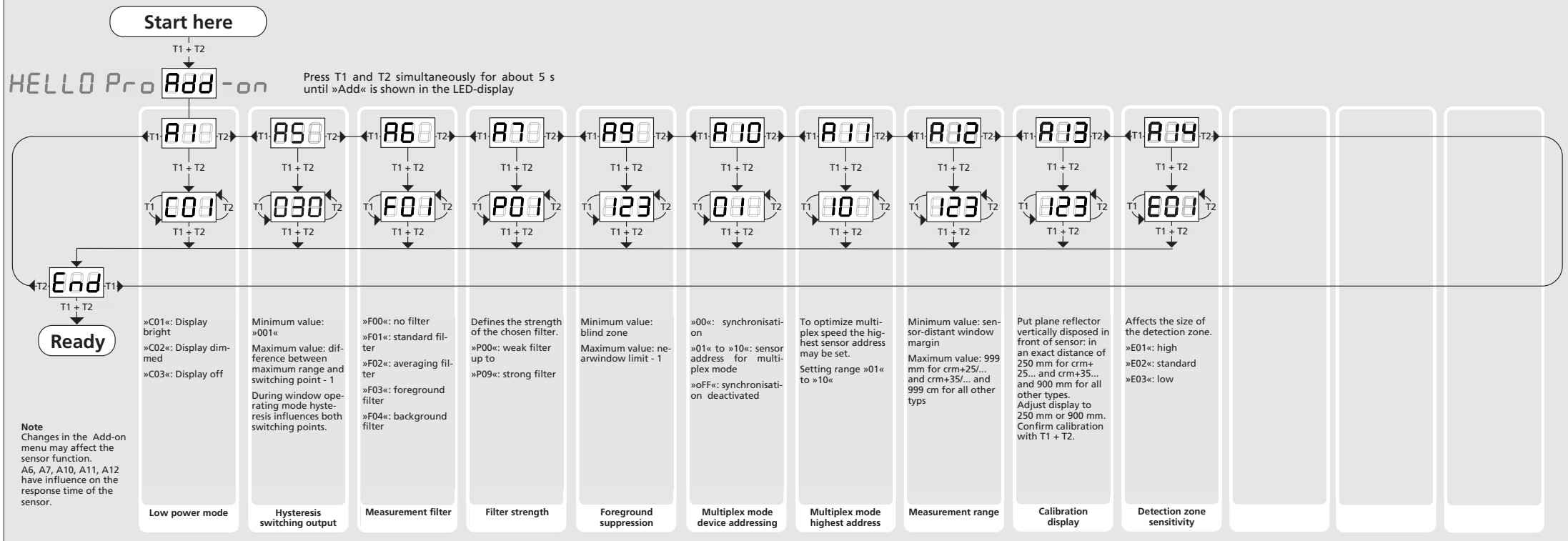
## ...or via the Teach-in procedure



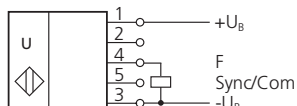
## Key lock and factory setting



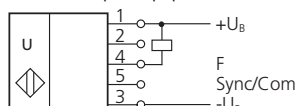
## Useful additional functions in Add-on menu (for experienced users only, settings not required for standard applications)



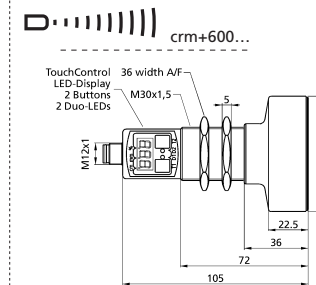
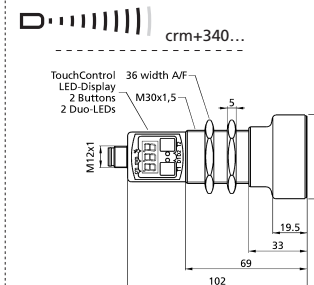
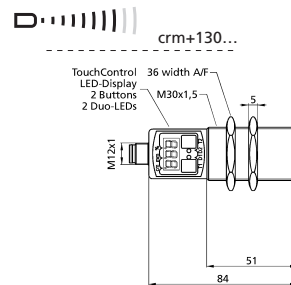
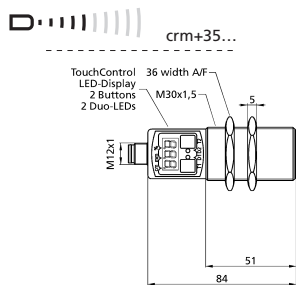
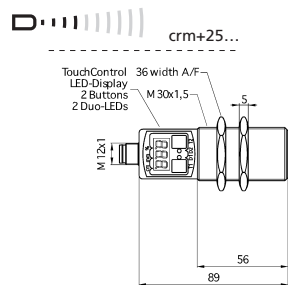
# Technical data



Push-Pull output in pnp circuit



Push-Pull output in npn circuit



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, sampling rate	0.025 mm
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internal compensated, may be deactivated <sup>1)</sup> , 0.17%/K without compensation)

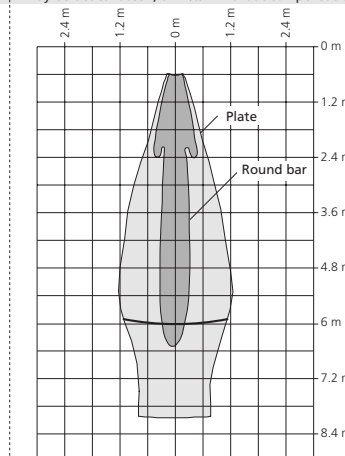
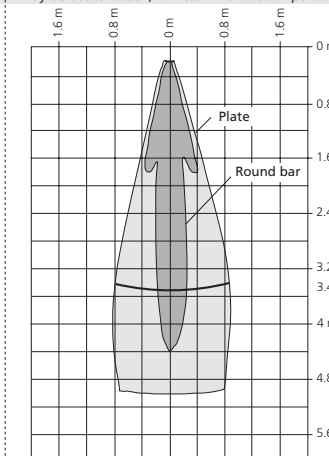
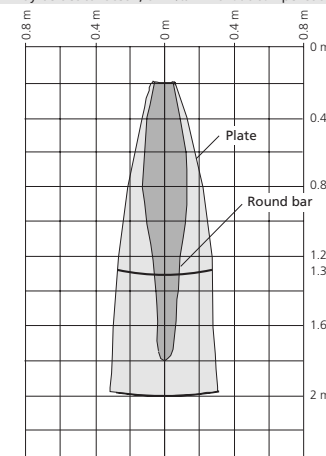
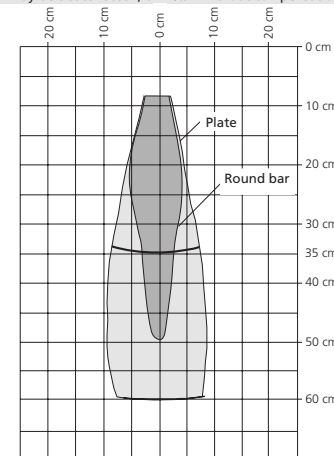
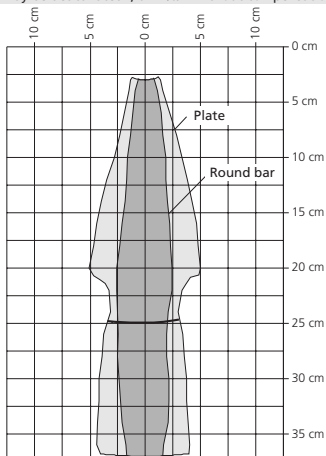
blind zone	0 to 85 mm
operating range	350 mm
maximum range	600 mm
angle of beam spread	see detection zone
transducer frequency	360 kHz
resolution, sampling rate	0.025 mm
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internal compensated, may be deactivated <sup>1)</sup> , 0.17%/K without 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, sampling rate	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, sampling rate	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, sampling rate	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 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.



operating voltage $U_B$	9 V to 30 V DC, reverse polarity protection
operating voltage ripple	±10 %
no-load current consumption	≤ 80 mA
housing	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PEEK film, PTFE
class of protection to EN 60929	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, LinkControl and IO-Link
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	150 g
switching hysteresis <sup>1)</sup>	3 mm
switching frequency <sup>2)</sup>	25 Hz
response time <sup>2)</sup>	32 ms
time delay before availability	< 300 ms

operating voltage $U_B$	9 V to 30 V DC, reverse polarity protection
operating voltage ripple	±10 %
no-load current consumption	≤ 80 mA
housing	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PEEK film, PTFE
class of protection to EN 60929	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, LinkControl and IO-Link
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	150 g
switching hysteresis <sup>1)</sup>	5 mm
switching frequency <sup>2)</sup>	12 Hz
response time <sup>2)</sup>	64 ms
time delay before availability	< 300 ms

operating voltage $U_B$	9 V to 30 V DC, reverse polarity protection
operating voltage ripple	±10 %
no-load current consumption	≤ 80 mA
housing	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PEEK film, PTFE
class of protection to EN 60929	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, LinkControl and IO-Link
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	150 g
switching hysteresis <sup>1)</sup>	20 mm
switching frequency <sup>2)</sup>	8 Hz
response time <sup>2)</sup>	92 ms
time delay before availability	< 300 ms

operating voltage $U_B$	9 V to 30 V DC, reverse polarity protection
operating voltage ripple	±10 %
no-load current consumption	≤ 80 mA
housing	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PEEK film, PTFE
class of protection to EN 60929	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, LinkControl and IO-Link
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	210 g
switching hysteresis <sup>1)</sup>	50 mm
switching frequency <sup>2)</sup>	4 Hz
response time <sup>2)</sup>	172 ms
time delay before availability	< 380 ms

operating voltage $U_B$	9 V to 30 V DC, reverse polarity protection
operating voltage ripple	±10 %
no-load current consumption	≤ 80 mA
housing	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PEEK film, PTFE
class of protection to EN 60929	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, LinkControl and IO-Link
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	270 g
switching hysteresis <sup>1)</sup>	100 mm
switching frequency <sup>2)</sup>	3 Hz
response time <sup>2)</sup>	240 ms
time delay before availability	< 450 ms

order No.	crm+25/F/TC/E
switching output	Push-Pull, $U_B=3V, -U_B=3V, I_{max}=100mA$ switchable NOC/NCC, short-circuit-proof

order No.	crm+35/F/TC/E
switching output	Push-Pull, $U_B=3V, -U_B=3V, I_{max}=100mA$ switchable NOC/NCC, short-circuit-proof

order No.	crm+130/F/TC/E
switching output	Push-Pull, $U_B=3V, -U_B=3V, I_{max}=100mA$ switchable NOC/NCC, short-circuit-proof

order No.	crm+340/F/TC/E
switching output	Push-Pull, $U_B=3V, -U_B=3V, I_{max}=100mA$ switchable NOC/NCC, short-circuit-proof

order No.	crm+600/F/TC/E
switching output	Push-Pull, $U_B=3V, -U_B=3V, I_{max}=100mA$ switchable NOC/NCC, short-circuit-proof

1) Can be programmed with TouchControl, LinkControl and IO-Link.

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

