microsonic

Operating manual

crm+ Ultrasonic Sensors with two switched outputs

crm+25/DD/TC/E
crm+35/DD/TC/E
crm+130/DD/TC/E
crm+340/DD/TC/E
crm+600/DD/TC/E

Product description

- The crm+ sensor with with two switched outputs measures the distance to an object within the detection zone contactless. Depending on the adjusted detect distance the switched outputs are set.
- 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 resitance against many aggressive substances.
- 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 using Teach-in processes.
- 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.

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.

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 receptable) 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

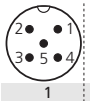
Fig. 1: Assembly distances, indicating synchronisation/multiplex

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

- Assemble the sensor at the installation location.
- Plug in the connector cable to the M 12 connector.



		colour
1	$+U_B$	brown
3	$-U_B$	blue
4	D2	black
2	D1	white
5	Sync/Com.	grey

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

Start-up

crm+ sensors are delivered factory made with the following settings:

- Switched output on NOC
- Detecting distance at operating range and half 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.

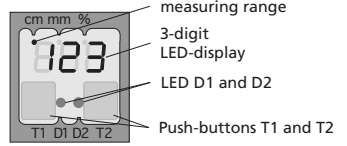


Fig. 3: TouchControl

Operation

crm+ 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.

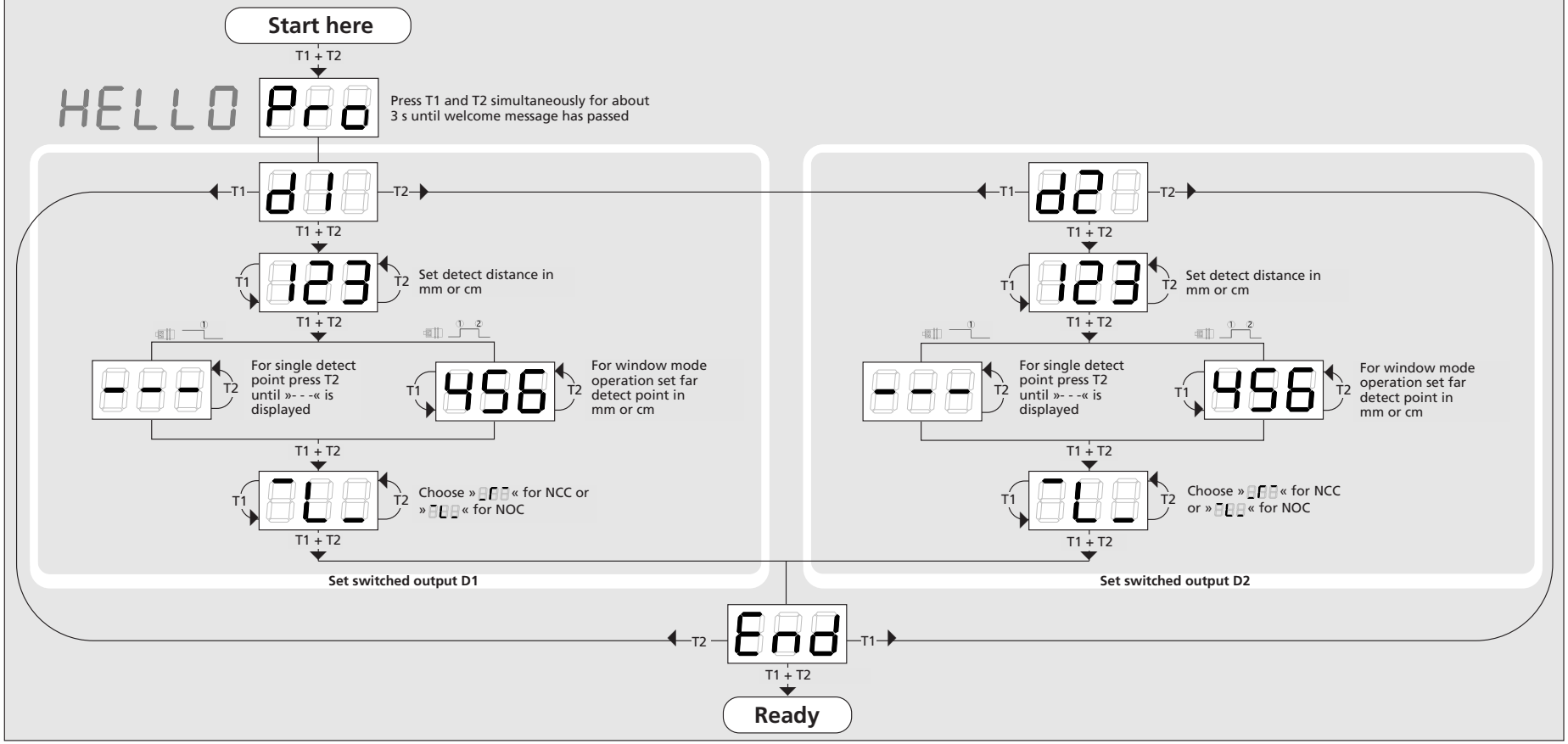
Note

- 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 mode operation, a yellow LED D2 signals that the switched output has connected.
- During normal mode operation, 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 mode operation.
- 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 mode operation shows »PAr« on the LED-display. Each time you tap push-button T1 the actual settings of the switched output are shown.

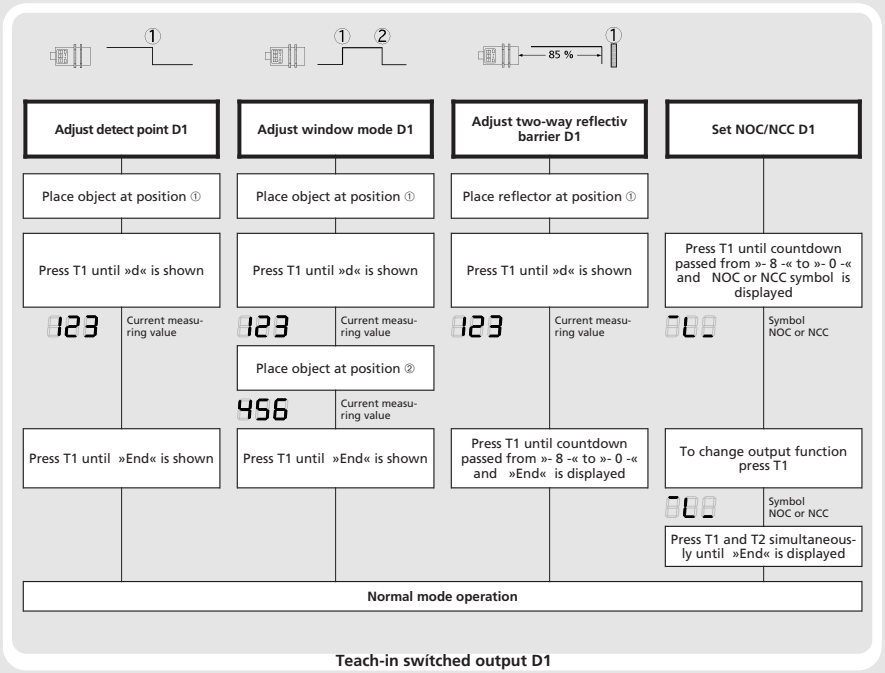
Set sensor parameters alternatively numerically using LED-display...



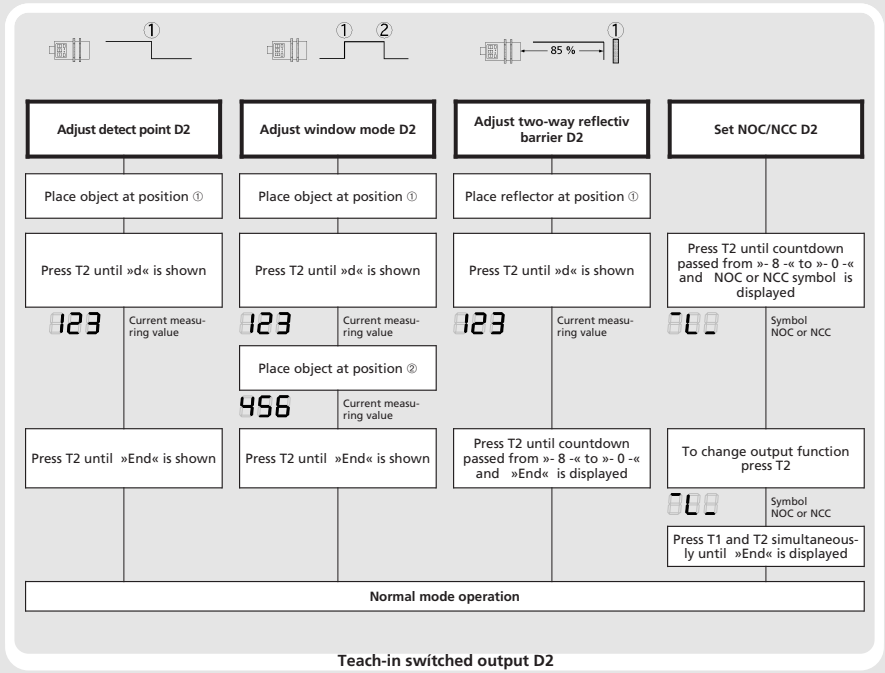
HM 1909

2014/30/EU

...or with the Teach-in procedure

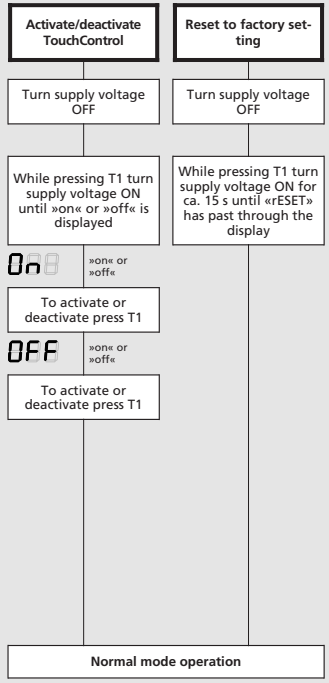


Teach-in switched output D1

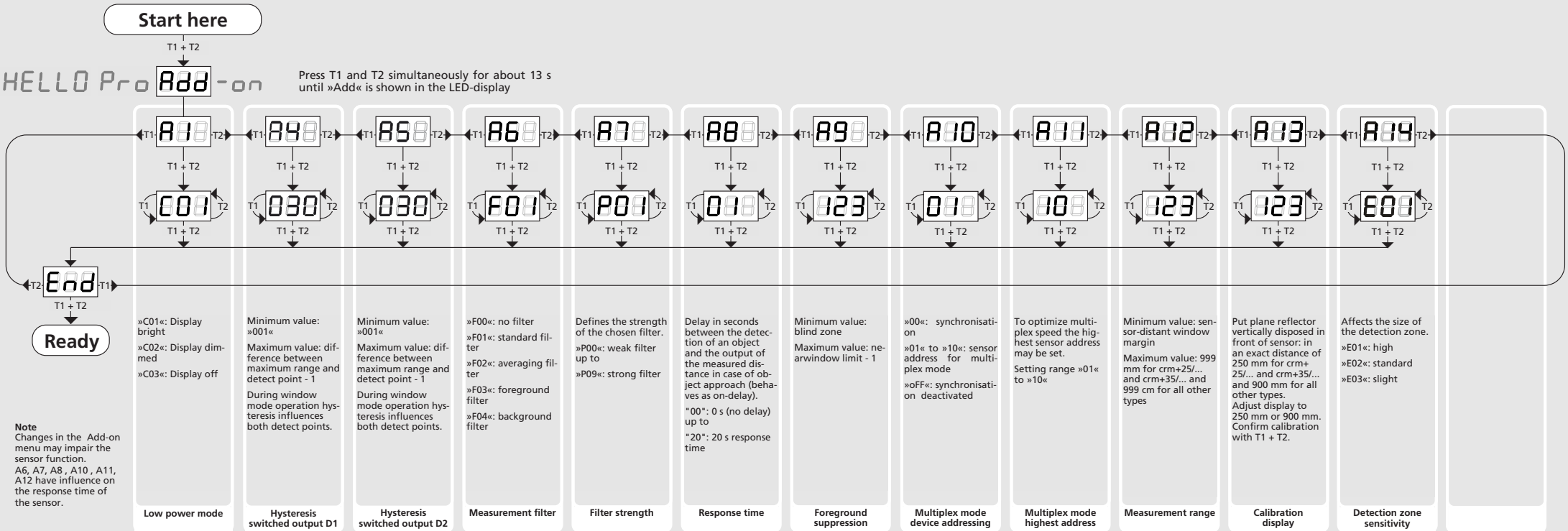


Teach-in switched output D2

Key lock and factory setting

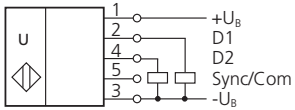


Usefull additional functions in Add-on menu (for experienced users only, settings not required for standard applications)

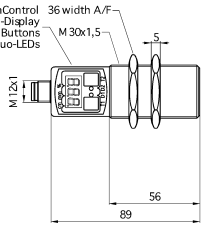
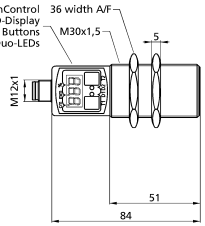
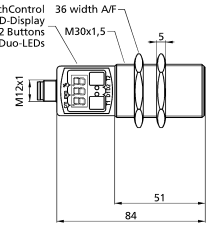
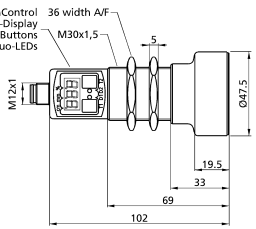
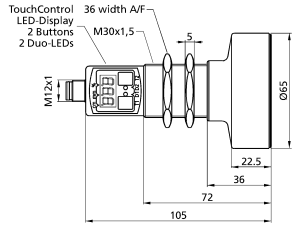
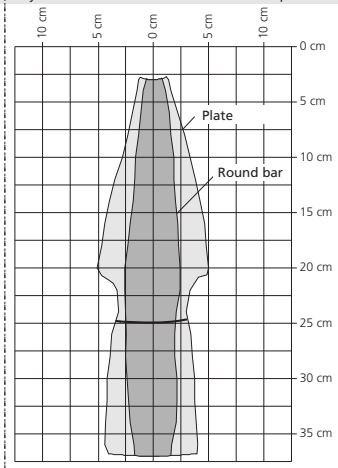
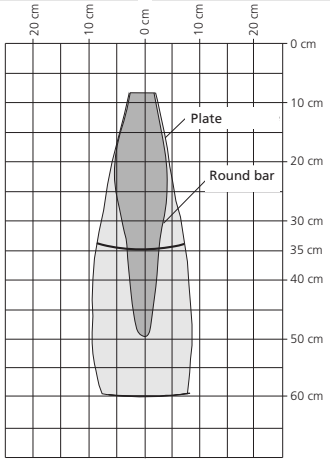
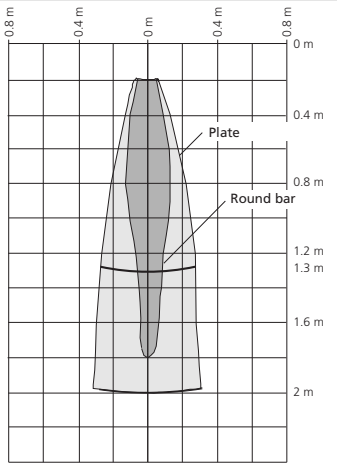
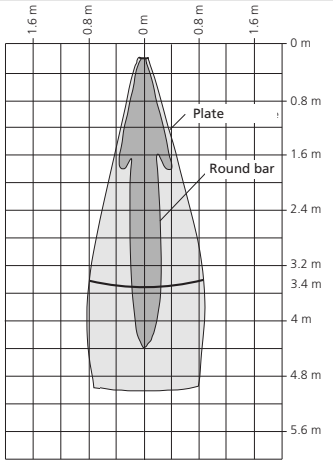
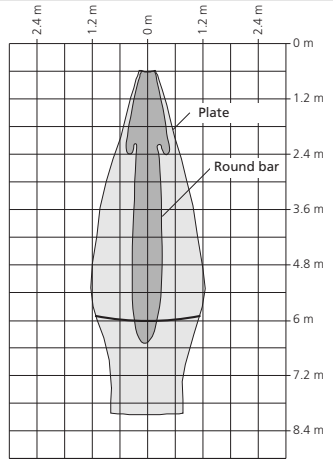


Note
Changes in the Add-on menu may impair the sensor function.
A6, A7, A8 , A10 , A11, A12 have influence on the response time of the sensor.

Technical data



2 pnp switched outputs

	crm+25…	crm+35…	crm+130…	crm+340…	crm+600…
					
Blind zone	0 to 30 mm	0 to 85 mm	0 to 200 mm	0 to 350 mm	0 to 600 mm
Operating range	250 mm	350 mm	1.300 mm	3.400 mm	6.000 mm
Maximum range	350 mm	600 mm	2.000 mm	5.000 mm	8.000 mm
Angle of beam spread	Please see detection zone	Please see detection zone	Please see detection zone	Please see detection zone	Please see detection zone
Transducer frequency	ca. 320 kHz	360 kHz	200 kHz	120 kHz	80 kHz
Resolution. sampling rate	0.025 mm	0.025 mm	0.18 mm	0.18 mm	0.18 mm
Reproducibility	± 0.15 %	± 0.15 %	± 0.15 %	± 0.15 %	± 0.15 %
Accuracy	± 1 % (Temperature drift internal compensated. may be deactivated[1]: 0.17%/K without compensation)	± 1 % (Temperature drift internal compensated. may be deactivated[1]: 0.17%/K without compensation)	± 1 % (Temperature drift internal compensated. may be deactivated[1]: 0.17%/K without compensation)	± 1 % (Temperature drift internal compensated. may be deactivated[1]: 0.17%/K without compensation)	± 1 % (Temperature drift internal compensated. may be deactivated[1]: 0.17%/K without compensation)
Detection zones for different objects: The dark grey areas are determind 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.					
Opperating voltage U_B	9 V to 30 V DC. reverse polarity protection	9 V to 30 V DC. reverse polarity protection	9 V to 30 V DC. reverse polarity protection	9 V to 30 V DC. reverse polarity protection	9 V to 30 V DC. reverse polarity protection
Voltage ripple	±10 %	±10 %	±10 %	±10 %	±10 %
No-load supply current	≤ 80 mA	≤ 80 mA	≤ 80 mA	≤ 80 mA	≤ 80 mA
Housing	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PEEK film, PTFE	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PEEK film, PTFE	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PEEK film, PTFE	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PEEK film, PTFE	Stainless steel 1.4571, plastic parts: PBT, TPU; Ultrasonic transducer: PEEK film, PTFE
Class of protection to EN 60529	IP 67	IP 67	IP 67	IP 67	IP 67
Norm conformity	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Type of connection	5-pin initiator plug, PBT	5-pin initiator plug, PBT	5-pin initiator plug, PBT	5-pin initiator plug, PBT	5-pin initiator plug, PBT
Controls	2 push-buttons (TouchControl)	2 push-buttons (TouchControl)	2 push-buttons (TouchControl)	2 push-buttons (TouchControl)	2 push-buttons (TouchControl)
Indicators	3-digit LED-display, 2 three-colour LEDs	3-digit LED-display, 2 three-colour LEDs	3-digit LED-display, 2 three-colour LEDs	3-digit LED-display, 2 three-colour LEDs	3-digit LED-display, 2 three-colour LEDs
Programmable	Yes, with TouchControl and LinkControl	Yes, with TouchControl and LinkControl	Yes, with TouchControl and LinkControl	Yes, with TouchControl and LinkControl	Yes, with TouchControl and LinkControl
Operating temperature	-25°C to +70°C	-25°C bis +70°C	-25°C bis +70°C	-25°C bis +70°C	-25°C bis +70°C
Storage temperature	-40°C to +85°C	-40°C bis +85°C	-40°C bis +85°C	-40°C bis +85°C	-40°C bis +85°C
Weight	150 g	150 g	150 g	210 g	270 g
Switching hysteresis[1]	3 mm	5 mm	20 mm	50 mm	100 mm
switching frequency[1]	25 Hz	12 Hz	8 Hz	4 Hz	3 Hz
Response time[1]	32 ms	64 ms	92 ms	172 ms	240 ms
Time delay before availibility	< 300 ms	< 300 ms	< 300 ms	< 380 ms	< 450 ms
Order No.	**crm+25/DD/TC**	**crm+35/DD/TC**	**crm+130/DD/TC**	**crm+340/DD/TC**	**crm+600/DD/TC**
Switched output	2 x pnp, U_B - 2 V, I_{max} = 2 x 200 mA switchable NOC/NCC, short-circuit-proof	2 x pnp, U_B - 2 V, I_{max} = 2 x 200 mA switchable NOC/NCC, short-circuit-proof	2 x pnp, U_B - 2 V, I_{max} = 2 x 200 mA switchable NOC/NCC, short-circuit-proof	2 x pnp, U_B - 2 V, I_{max} = 2 x 200 mA switchable NOC/NCC, short-circuit-proof	2 x pnp, U_B - 2 V, I_{max} = 2 x 200 mA switchable NOC/NCC, short-circuit-proof

1) Can be programmed with TouchControl and LinkControl