### Product Description

- The **crm+** sensor with one switched output measures the distance to an object within the detection zone contactless. Depending on the adjusted detect distance the switched output is 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 resistance 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 using Teach-in processes.
- 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 Synchronisation

If the assembly distances shown in Fig. 1 for two or more sensors are exceeded the integrated synchronisation should be used. Connect Syncom-Channels (pin 5 at the units receptacle) of all sensors (10 maximum).

### Multiplex Mode

The Add-on-menu allows to assign an individual address «01» to «10» to each sensor connected via the SyncCom-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 non-operating range.

### Set Operating and Parameter Settings

#### Set the Parameters of the Sensor Manually or via Teach-In Procedure

1. **Start-up**
   - crm+ sensors are delivered factory made with the following settings:
     - Switched output on NOC
     - Detecting distance at operating range

#### Synchronisation

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

#### Operation

- The **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.
- 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.

#### Notes

- 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...

1. **Start-up**
   - Press T1 and T2 simultaneously for about 3 sec until welcome message has passed

2. **T1 + T2**
   - Set detect distance in mm or cm
   - For single detect point press T2 until « - - » is displayed
   - For window mode operation set far detect point in mm or cm

3. **T1 + T2**
   - Choose «+U» for NCC or «-U» for NOC

4. **T1 + T2**
   - Set switched output

5. **Stop**
   - You can reset the factory settings at any time, see «Key lock and factory setting».

### Measurement Range Set to Maximum Range

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

### Pin Assignment with View on Sensor Plug and Colour Coding of the Microsonic Connection Cable

- Pin assignment of the sensor plug at the microsonic connection cable:
  - 1: +U
  - 2: D
  - 3: -U
  - 4: B
  - 5: SyncCom.

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

<table>
<thead>
<tr>
<th>Function</th>
<th>Symbol</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjust detect point</td>
<td></td>
<td>Place object at position</td>
</tr>
<tr>
<td>Adjust window mode</td>
<td></td>
<td>Place object at position</td>
</tr>
<tr>
<td>Adjust two-way reflectivity barrier</td>
<td></td>
<td>Place reflector at position</td>
</tr>
<tr>
<td>Set NOC/NCC</td>
<td></td>
<td>Press T2 until countdown passed from B to D and NOC or NCC symbol is displayed</td>
</tr>
</tbody>
</table>

#### Key lock and factory setting

<table>
<thead>
<tr>
<th>Action</th>
<th>Symbol</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activate/deactivate TouchControl</td>
<td></td>
<td>While pressing T1 turn supply voltage ON for ca. 15 s until WSET+ has passed through the display</td>
</tr>
<tr>
<td>Reset to factory setting</td>
<td></td>
<td>While pressing T1 turn supply voltage OFF</td>
</tr>
</tbody>
</table>

#### Normal mode operation

- **Low power mode**
- **Hysteresis switched output**
- **Measurement filter**
- **Filter strength**
- **Response time**
- **Foreground suppression**
- **Multiplex mode device addressing**
- **Multiplex mode highest address**
- **Measurement range**
- **Calibration display**
- **Detection zone sensitivity**

### Teach-in procedure

1. Place object at position
2. Press T2 until `+d+` is shown
3. Place object at position
4. Press T2 until `+d+` is shown
5. Press T2 until countdown passed from `B` to `D` and `+d+` is displayed
6. Press T2 until `+d+` is displayed
7. Symbol NOC or NCC
8. Symbol NOC or NCC

**Normal mode operation**

- **Start here**
- **Hello**
- **Add**
- **OK**
- **OK**
- **End**
- **Ready**

**Note**

Changes in the Add-on menu may impair the sensor function. A6, A1, A3, A8, A10, A11, A12 have influence on the response time of the sensor.
### Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>CRM+25/D/TC</th>
<th>CRM+35/D/TC</th>
<th>CRM+130/D/TC</th>
<th>CRM+600/D/TC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage $U_{\text{IN}}$</td>
<td>9 V to 30 V DC, reverse polarity protection</td>
<td>9 V to 30 V DC, reverse polarity protection</td>
<td>9 V to 30 V DC, reverse polarity protection</td>
<td>9 V to 30 V DC, reverse polarity protection</td>
</tr>
<tr>
<td>Voltage ripple</td>
<td>±10 %</td>
<td>±10 %</td>
<td>±10 %</td>
<td>±10 %</td>
</tr>
<tr>
<td>No-load supply current</td>
<td>80 mA</td>
<td>80 mA</td>
<td>80 mA</td>
<td>80 mA</td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultrasonic transducer</td>
<td>PEEK film, PTFE</td>
<td>PEEK film, PTFE</td>
<td>PEEK film, PTFE</td>
<td>PEEK film, PTFE</td>
</tr>
<tr>
<td>Housing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless steel 1.4571, plastic parts:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plastic parts: PBT, TPU;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Indicators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-pin initiator plug, PBT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 push-buttons (TouchControl)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-digit LED-display, 2 three-colour LEDs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-digit LED-display, 2 three-colour LEDs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating range</strong></td>
<td>0 to 30 mm</td>
<td>0 to 85 mm</td>
<td>0 to 200 mm</td>
<td>0 to 600 mm</td>
</tr>
<tr>
<td><strong>Resolution, sampling rate</strong></td>
<td>0.025 mm</td>
<td>0.025 mm</td>
<td>0.025 mm</td>
<td>0.025 mm</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>±0.15 %</td>
<td>±0.15 %</td>
<td>±0.15 %</td>
<td>±0.15 %</td>
</tr>
<tr>
<td><strong>Angle of beam spread</strong></td>
<td>10° 15°</td>
<td>10° 15°</td>
<td>10° 15°</td>
<td>10° 15°</td>
</tr>
<tr>
<td><strong>Temperature drift internal compensated</strong></td>
<td>±0.17%/K (without compensation)</td>
<td>±0.17%/K (without compensation)</td>
<td>±0.17%/K (without compensation)</td>
<td>±0.17%/K (without compensation)</td>
</tr>
<tr>
<td><strong>Switching hysteresis</strong></td>
<td>5 mm</td>
<td>5 mm</td>
<td>5 mm</td>
<td>5 mm</td>
</tr>
<tr>
<td><strong>Response time</strong></td>
<td>32 ms</td>
<td>32 ms</td>
<td>32 ms</td>
<td>32 ms</td>
</tr>
<tr>
<td><strong>Storage temperature</strong></td>
<td>-25°C to +70°C</td>
<td>-25°C to +70°C</td>
<td>-25°C to +70°C</td>
<td>-25°C to +70°C</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>150 g</td>
<td>150 g</td>
<td>150 g</td>
<td>150 g</td>
</tr>
<tr>
<td><strong>Switched output</strong></td>
<td>2 pin</td>
<td>2 pin</td>
<td>2 pin</td>
<td>2 pin</td>
</tr>
<tr>
<td><strong>Switched output current</strong></td>
<td>200 mA</td>
<td>200 mA</td>
<td>200 mA</td>
<td>200 mA</td>
</tr>
</tbody>
</table>

1) Can be programmed with TouchControl and LinkControl.