### Operating manual

**Ics-Ultrasonic Sensors with two switched outputs**

**Ics-25/DD/QP**

**Ics-35/DD/QP**

**Ics-130/DD/QP**

#### Important instructions for assembly and application

All employees and plant safety-relevant measures must be taken prior to assembly, start-up, or maintenance work (see operation 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 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.

#### Assembly instructions

- **Both LEDs:** Connect Com to +U (ca. 3 s)
- **Adjust two-way reflective barrier D1**
- **Place object at position:**
- **Connect Com to +U**
- **Set NDC/NCC D1**
- **Wait for 10 s**
- **Set switched output D1**

**Notes**

- Ics 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 signals that the corresponding switched output has connected.
- During Teach-in mode, the hysteresis loops are set back to factory settings.
- If no signal is transmitted to the Com input for 20 s during parameter setting mode the made changes are stored and the sensor returns to normal mode operation.
- You can reset the factory settings at any time, see »Lock Teach-in & factory settings«.
- Ics-sensors optional can be programmed using the LinkControl adapter LCA-2, see »Optional setting of parameters using the LinkControl Adapter LCA-2«.

### Normal mode operation

**Set switched output D1**

#### Assembly distances

The assembly distances shown in fig. 2 for two or more sensors should not be fallen below in order to avoid mutual interference.

**Notes**

- To activate or deactivate Teach-in connect Com to -U for about 1 s
- Set Teach-in to factory setting
- Turn supply voltage OFF
- While Com is connected to -U turn off power supply
- Keep Com connected to -U until both LEDs stop flashing (ca. 13 s)
- To activate or deactivate Teach-in disconnect Com to +U for about 1 s
- Wait for 10 s
- Normal mode operation

**Set switched output D2**

#### Assembly distances

<table>
<thead>
<tr>
<th>Distance</th>
<th>Switched Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;3.0 m</td>
<td>On</td>
</tr>
<tr>
<td>&gt;1.0 m</td>
<td>On</td>
</tr>
<tr>
<td>&gt;0.5 m</td>
<td>On</td>
</tr>
<tr>
<td>&gt;0.25 m</td>
<td>Off</td>
</tr>
</tbody>
</table>

**Notes**

- Both sensors are delivered factory made with the following settings:
  - Switched outputs on NOC
  - Detecting distances at operating range and half operating range
  - Measurement range set to maximum range

Set the parameters of the sensor using the Teach-in procedure.

**Fig. 1:** Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

**Fig. 2:** Assembly distances

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**Legend:**

- **D1**:
  - Blue: Brown
  - White: Grey
  - Black: Blue
  - Yellow: Orange
  - Brown: Brown

**Changes in Measurement Range:**

- Set switched output D1
- Set switched output D2
### Technical data

#### Blind zone
- 0 to 30 mm

#### Operating range
- 0 to 65 mm

#### Maximum range
- 250 mm
- 350 mm
- 400 mm

#### Angle of beam spread
- 0 to 30 mm
- 0 to 65 mm

#### Resolution, sampling rate
- 0.18 mm
- 0.18 mm
- ± 0.15 %

#### Detection zones for different objects:
- The dark grey areas are determined with a thin round bar (10 mm dia.) and indicate the typical operating range of a sensor. In order to obtain the light grey areas, a plate (100 x 100 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.

#### Transducer frequency
- 320 kHz
- 400 kHz

#### Reproducibility
- ± 0.15 %
- ± 0.15 %

#### Temperature drift
- Internal compensated, ≤ 2%, may be deactivated

#### Operating voltage U_B
- 9 V to 30 V DC, reverse polarity protection

#### No-load current consumption
- < 60 mA
- < 60 mA

#### Housing
- PBT
- PBT

#### Ultrasonic transducer
- Polyurethane foam, epoxy resin with glass content
- Polyurethane foam, epoxy resin with glass content
- Polyurethane foam, epoxy resin with glass content

#### Class of protection to EN 60 529
- IP 65
- IP 65

#### Type of connection
- 5-pin M12 initiator plug
- 5-pin M12 initiator plug

#### Indicators
- 2 three-colour LEDs
- 2 three-colour LEDs
- 2 three-colour LEDs

#### Programmable
- Yes, with LCA-2 & LinkControl
- Yes, with LCA-2 & LinkControl
- Yes, with LCA-2 & LinkControl

#### Operating temperature
- -25°C to +70°C
- -25°C to +70°C
- -25°C to +70°C

#### Storage temperature
- -40°C to +85°C
- -40°C to +85°C
- -40°C to +85°C

#### Weight
- 120 g
- 120 g
- 120 g

#### Time delay before availability
- ≤ 300 ms
- ≤ 300 ms
- ≤ 300 ms

#### Order no.
- LCS-25/DD/QP
- LCS-35/DD/QP
- LCS-130/DD/QP

#### Switched output
- PNP, U_B = -2 V, I_max = 200 mA
- PNP, U_B = -2 V, I_max = 200 mA
- PNP, U_B = -2 V, I_max = 200 mA

#### Reproducibility
- ± 0.15 %
- ± 0.15 %
- ± 0.15 %

#### Environmental conditions
- Temperature drift internal compensated, ≤ 2%, may be deactivated

#### Additional notes
1) Can be programmed with LinkControl

#### Specifications
- Resolution, sampling rate:
  - 320 kHz: 0.18 mm
  - 400 kHz: 0.18 mm
- Temperature drift internal compensated, ≤ 2%, may be deactivated

#### Notes
- The dark grey areas are determined with a thin round bar (10 mm dia.) and indicate the typical operating range of a sensor. In order to obtain the light grey areas, a plate (100 x 100 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.
Optional setting of parameters using the LinkControl Adapter LCA-2 (Offline programming)

**Offline programming**
- Load sensor parameters in the LinkControl Adapter LCA-2
- Change parameters and additional functions as described here
- Write changed parameters back into the lcs sensor

Please refer to the quick reference guide on the LCA-2.

**Setting of additional functions in the LCA-2**

Start here

Adjust parameters using the LCA-2 (Offline programming)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low power mode</td>
<td>No function</td>
</tr>
<tr>
<td>Hysteresis switched output D1</td>
<td>Minimum value: no filter, Maximum value: difference between maximum range and detect point - 1</td>
</tr>
<tr>
<td>Measurement filter</td>
<td>For single detect point press T2 until «- - -» is displayed</td>
</tr>
<tr>
<td>Filter strength</td>
<td>For single detect point press T2 until «- - -» is displayed</td>
</tr>
<tr>
<td>Response time</td>
<td>Delay in seconds between the detection of an object and the output of the measured distance in case of object detection. Behavior as on-delay: 0°-0° (no delay), 10°-8° (3 s delay), 20°-20° (5 s delay)</td>
</tr>
<tr>
<td>Foreground suppression</td>
<td>Minimum value: sensor-origin window margin. Maximum value: 999 mm for lcs-25/... and lcs-35/..., 999 cm for lcs-130/...</td>
</tr>
<tr>
<td>Multiplex mode device addressing</td>
<td>No function</td>
</tr>
<tr>
<td>Multiplex highest device address</td>
<td>No function</td>
</tr>
<tr>
<td>Measurement range</td>
<td>Minimum value: sensor-origin window margin. Maximum value: 999 mm for lcs-25/... and lcs-35/..., 999 cm for lcs-130/...</td>
</tr>
<tr>
<td>Detection zone sensitivity</td>
<td>Affects the size of the detection zone. No function!</td>
</tr>
</tbody>
</table>

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.

Press T1 + T2 on the LCA-2 simultaneously for about 13 s until «Add» is shown in the LED-display.

Ready

Note: Please refer to the quick reference guide on the LCA-2 for more information.