Operating instructions

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

**Ics-25/DDD/QP**

**Ics-35/DDD/QP**

**Ics-130/DDD/QP**

### Product description
- The Ics-sensor 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 output functions are changeable from NOC to NCC.
- Light emitting diodes (three-colour LEDs) indicate the switching status.
- The sensors can be trained using Teach-in processes.
- Using the LinkControl adapter (optional accessory) all sensor parameter settings may be made by a Windows-Software.

### Important instructions for assembly and application

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

### 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.

![Fig. 2: Assembly distances](image)

### Start-up

Ics-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.

### Operation

Ics-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
- 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 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 setting«.
- Ics-sensors optional can be programmed using the LinkControl adapter LCA-2, see »Optional setting of parameters using the LinkControl Adapter LCA-2«.

**Factory setting**

**Reset to factory setting**

**Normal mode operation**

**Download of sensor parameters in the LCA-1**

![Diagram of LCA-1](image)

1. Press F + T2 at the LCA-2 simultaneously (ca. 1 sec)
2. Press R at the LCA-2 (ca. 1 sec)
3. Parameters are transferred from the sensor to the LCA-2
4. Download of parameters completed
5. Current measurement value is displayed

**Upload of sensor parameters back to the sensor**

![Diagram of LCA-2](image)

1. Press F + T1 at the LCA-2 simultaneously (ca. 1 sec)
2. Press R at the LCA-2 (ca. 1 sec)
3. Parameters are transferred from the LCA-2 to the sensor
4. Upload of parameters completed
5. Current measurement value is displayed
Optional setting of parameters using the LinkControl Adapter LCA-2 (Offline programming)

Start here

Press T1 + T2 on the LCA-2 simultaneously for about 3 s until welcome message has passed.

For single detect point press T2 until « - - - » is displayed.

For window mode operation set far detect point in mm or cm.

Choose » « for NOC or » « for NCC or » « for NCC or » « for NCC.

Select switched output D1.

Choose » « for NOC or » « for NCC or » « for NCC or » « for NCC.

Set switched output D2.

Set switched output D3.

Start here

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

No function!

Low power mode

Hysteresis switched output D1

Hysteresis switched output D2

Measurement filter

Filter strength

Response time

Foreground suppression

Multiplex mode device addressing

Multiplex highest device address

Measurement range

Detection zone sensitivity

Note: Changes in the Add-on menu may impair the sensor function.
A3, A7, A8, A10, A11, A12 have influence on the response time of the sensor.

Minimum value: 0
Maximum value: 999
Minimum value: 0
Maximum value: 999
Minimum value: 0
Maximum value: 999
Minimum value: 0
Maximum value: 999
No function!
No function!
Minimum value: 999
Maximum value: 999
Minimum value: 999
Maximum value: 999
Affects the size of the detection zone.
»E01«: high
»E02«: standard
»E03«: slight
»E04«: background filter
»E03«: slight
»E02«: standard
»E01«: high
Minimum value: near window limit - 1
Maximum value: near window limit + 1
Delay in seconds between the detection of an object and the output of the measured distance in case of object approach behavior «on-delay»: 0 s (no delay), "20": 0 s (no delay), "20": 20 s response time
Defines the strength of the chosen filter
Hysteresis switched output D1
Hysteresis switched output D2
Measurement filter
Filter strength
Response time
Foreground suppression
Multiplex mode device addressing
Multiplex highest device address
Measurement range
Detection zone sensitivity

Optional setting of additional functions in the LCA-2

Start here

Press T1 + T2 on the LCA-2 simultaneously for about 3 s until welcome message has passed.

For single detect point press T2 until « - - - » is displayed.

For window mode operation set far detect point in mm or cm.

Choose » « for NOC or » « for NCC or » « for NCC or » « for NCC.

Select switched output D1.

Choose » « for NOC or » « for NCC or » « for NCC or » « for NCC.

Set switched output D2.

Set switched output D3.

Start here

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

No function!

Low power mode

Hysteresis switched output D1

Hysteresis switched output D2

Measurement filter

Filter strength

Response time

Foreground suppression

Multiplex mode device addressing

Multiplex highest device address

Measurement range

Detection zone sensitivity

Note: Changes in the Add-on menu may impair the sensor function.
A3, A7, A8, A10, A11, A12 have influence on the response time of the sensor.

Minimum value: 0
Maximum value: 999
Minimum value: 0
Maximum value: 999
Minimum value: 0
Maximum value: 999
Minimum value: 0
Maximum value: 999
No function!
No function!
Minimum value: 999
Maximum value: 999
Minimum value: 999
Maximum value: 999
Affects the size of the detection zone.
»E01«: high
»E02«: standard
»E03«: slight
»E04«: background filter
»E03«: slight
»E02«: standard
»E01«: high
Minimum value: near window limit - 1
Maximum value: near window limit + 1
Delay in seconds between the detection of an object and the output of the measured distance in case of object approach behavior «on-delay»: 0 s (no delay), "20": 0 s (no delay), "20": 20 s response time
Defines the strength of the chosen filter
Hysteresis switched output D1
Hysteresis switched output D2
Measurement filter
Filter strength
Response time
Foreground suppression
Multiplex mode device addressing
Multiplex highest device address
Measurement range
Detection zone sensitivity

Optional setting of additional functions in the LCA-2

Start here

Press T1 + T2 on the LCA-2 simultaneously for about 3 s until welcome message has passed.

For single detect point press T2 until « - - - » is displayed.

For window mode operation set far detect point in mm or cm.

Choose » « for NOC or » « for NCC or » « for NCC or » « for NCC.

Select switched output D1.

Choose » « for NOC or » « for NCC or » « for NCC or » « for NCC.

Set switched output D2.

Set switched output D3.

Start here

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

No function!

Low power mode

Hysteresis switched output D1

Hysteresis switched output D2

Measurement filter

Filter strength

Response time

Foreground suppression

Multiplex mode device addressing

Multiplex highest device address

Measurement range

Detection zone sensitivity

Note: Changes in the Add-on menu may impair the sensor function.
A3, A7, A8, A10, A11, A12 have influence on the response time of the sensor.

Minimum value: 0
Maximum value: 999
Minimum value: 0
Maximum value: 999
Minimum value: 0
Maximum value: 999
Minimum value: 0
Maximum value: 999
No function!
No function!
Minimum value: 999
Maximum value: 999
Minimum value: 999
Maximum value: 999
Affects the size of the detection zone.
»E01«: high
»E02«: standard
»E03«: slight
»E04«: background filter
»E03«: slight
»E02«: standard
»E01«: high
Minimum value: near window limit - 1
Maximum value: near window limit + 1
Delay in seconds between the detection of an object and the output of the measured distance in case of object approach behavior «on-delay»: 0 s (no delay), "20": 0 s (no delay), "20": 20 s response time
Defines the strength of the chosen filter
Hysteresis switched output D1
Hysteresis switched output D2
Measurement filter
Filter strength
Response time
Foreground suppression
Multiplex mode device addressing
Multiplex highest device address
Measurement range
Detection zone sensitivity

Optional setting of additional functions in the LCA-2

Start here

Press T1 + T2 on the LCA-2 simultaneously for about 3 s until welcome message has passed.

For single detect point press T2 until « - - - » is displayed.

For window mode operation set far detect point in mm or cm.

Choose » « for NOC or » « for NCC or » « for NCC or » « for NCC.

Select switched output D1.

Choose » « for NOC or » « for NCC or » « for NCC or » « for NCC.

Set switched output D2.

Set switched output D3.

Start here

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

Blind zone
- 0 to 30 mm
- 0 to 65 mm
- 0 to 200 mm
- 0 to 600 mm
- See detection zone
- See detection zone

Operating range
- 250 mm
- 250 mm
- 1,300 mm

Maximum range
- 350 mm
- 350 mm
- 2,000 mm

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

Resolution, sampling rate
- 0,18 mm
- 0,18 mm
- ± 0,15 %

Reproducibility
- ± 0,15 %
- ± 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

Resolution, sampling rate
- 0,18 mm
- 0,18 mm

Reproducibility
- ± 0,15 %
- ± 0,15 %

Temperature drift internal compensated, ± 2%, may be deactivated (±0,17%/K without compensation)
- 9 V to 30 V DC, reverse polarity protection ±10 %

Accuracy
- Temperature drift internal compensated, ± 2%, may be deactivated (±0,17%/K without compensation)
- 9 V to 30 V DC, reverse polarity protection ±10 %

Operating voltage UB
- 9 V to 30 V DC, reverse polarity protection ±10 %

No-load current consumption
- ≤ 70 mA
- ≤ 70 mA
- ≤ 70 mA

Housing
- PBT
- PBT

Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
- Ultrasonic transducer: polyurethane foam, epoxy resin with glass content

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

Norm conformity
- EN 60947-5-2
- EN 60947-5-2
- EN 60947-5-2

Type of connection
- No
- No
- No

Indicators
- 3 three-colour LEDs
- 3 three-colour LEDs
- 3 three-colour LEDs

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

Temperature drift internal compensated, ± 2%, may be deactivated (±0,17%/K without compensation)
- 9 V to 30 V DC, reverse polarity protection ±10 %

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

Switching hysteresis
- 3 mm
- 3 mm
- 3 mm

Switching frequency
- 11 Hz
- 11 Hz
- 11 Hz

Response time
- 50 ms
- 50 ms
- 50 ms

Time delay before availability
- < 300 ms
- < 300 ms
- < 300 ms

Order no.
- lcs-25/DDD/QP
- lcs-35/DDD/QP
- lcs-130/DDD/QP

Switched output
- 3 pnp, Uₘₐₓ = 200 mA
- 3 pnp, Uₘₐₓ = 200 mA
- 3 pnp, Uₘₐₓ = 200 mA

- Switchable NOC/NCC, short-circuit-proof
- Switchable NOC/NCC, short-circuit-proof
- Switchable NOC/NCC, short-circuit-proof

1) Can be programmed with LinkControl.