



## 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.

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.

	colour
1 +U <sub>B</sub>	brown
3 -U <sub>B</sub>	blue
4 D2	black
2 D1	white
5 Com.	grey

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

## 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«.

## Operating instructions

### 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 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

## 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.

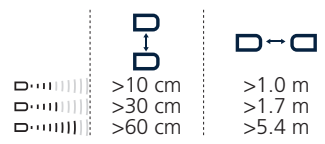


Fig. 2: Assembly distances

## Sensor adjustment with Teach-in procedure

**Adjust detect point D1**

Place object at position ①

Connect Com to +U<sub>B</sub> until both LEDs flash simultaneously (ca. 3 s)

Both LEDs: flash mutually

Connect Com to +U<sub>B</sub> for about 1 s

**Adjust window mode D1**

Place object at position ①

Connect Com to +U<sub>B</sub> until both LEDs flash simultaneously (ca. 3 s)

Both LEDs: flash mutually

Place object at position ②

Beide LEDs: blinken wechselseitig

Connect Com to +U<sub>B</sub> for about 1 s

**Adjust two-way reflectiv barrier D1**

Place reflector at position ①

Connect Com to +U<sub>B</sub> until both LEDs flash simultaneously (ca. 3 s)

Both LEDs: flash mutually

Connect Com to +U<sub>B</sub> for about 10 s

**Set NOC/NCC D1**

Connect Com to +U<sub>B</sub> until both LEDs flash mutually (ca. 13 s)

LED D1: on: NOC off: NCC

LED D2: flashes

To change output characteristic connect Com to +U<sub>B</sub> for about 1 s

Wait for 10 s

Normal mode operation

Set switched output D1

**Adjust detect point D2**

Place object at position ①

Connect Com to -U<sub>B</sub> until both LEDs flash simultaneously (ca. 3 s)

Both LEDs: flash mutually

Connect Com to -U<sub>B</sub> for about 1 s

**Adjust window mode D2**

Place object at position ①

Connect Com to -U<sub>B</sub> until both LEDs flash simultaneously (ca. 3 s)

Both LEDs: flash mutually

Place object at position ②

Beide LEDs: blinken wechselseitig

Connect Com to -U<sub>B</sub> for about 1 s

**Adjust two-way reflectiv barrier D2**

Place reflector at position ①

Connect Com to -U<sub>B</sub> until both LEDs flash simultaneously (ca. 3 s)

Both LEDs: flash mutually

Connect Com to -U<sub>B</sub> for about 10 s

**Set NOC/NCC D2**

Connect Com to -U<sub>B</sub> until both LEDs flash mutually (ca. 13 s)

LED D2: on: NOC off: NCC

LED D1: flashes

To change output characteristic connect Com to -U<sub>B</sub> for about 1 s

Wait for 10 s

Normal mode operation

Set switched output D2

## Lock Teach-in & factory setting

**Activate/deactivate Teach-in**

Turn supply voltage OFF

While Com is connected to -U<sub>B</sub> turn on power supply

Keep Com connected to -U<sub>B</sub> until both LEDs flash simultaneously (ca. 3 s)

LED D1: on: Teach-in activated off: Teach-in deactivated

LED D2: flashes

To activate or deactivate Teach-in connect Com to -U<sub>B</sub> for about 1 s

Wait for 10 s

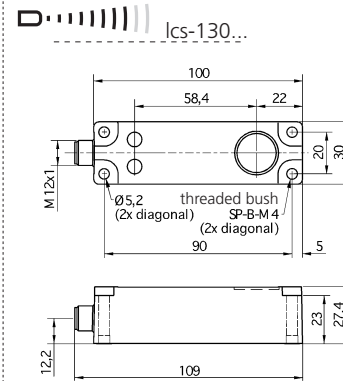
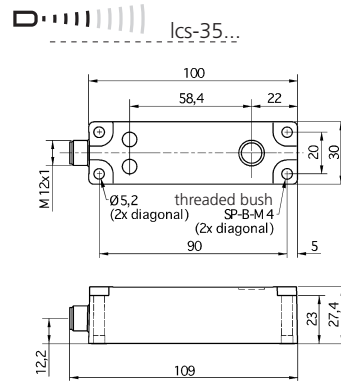
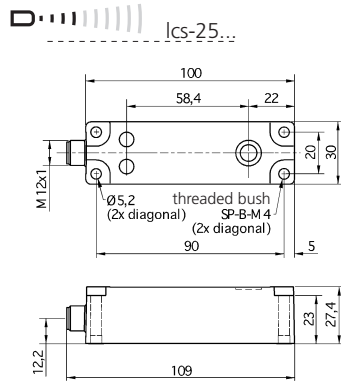
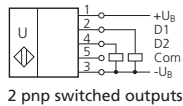
**Reset to factory setting**

Turn supply voltage OFF

While Com is connected to -U<sub>B</sub> turn on power supply

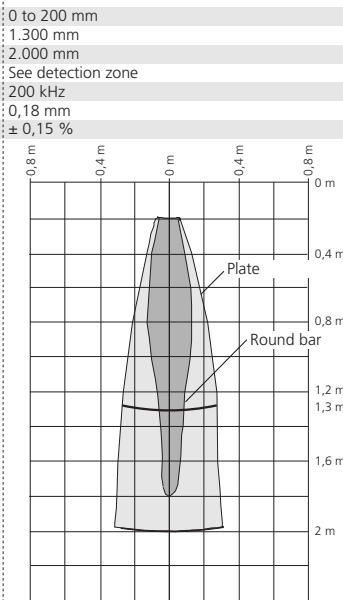
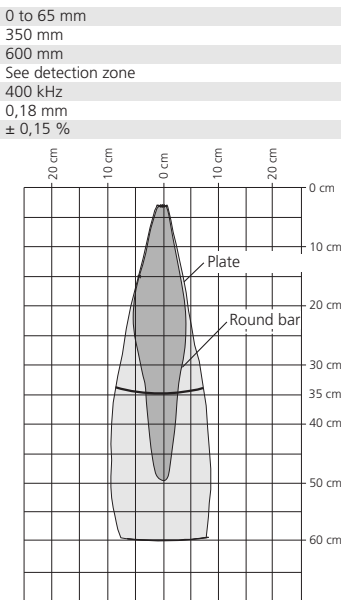
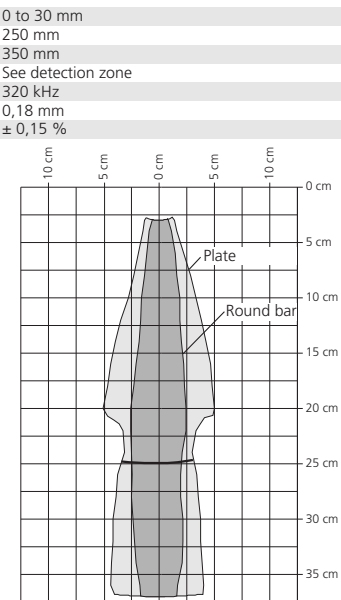
Keep Com connected to -U<sub>B</sub> until both LEDs stop flashing (ca. 13 s)

Normal mode operation

**Technical data**


**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** 0,18 mm  
**Reproducibility** ± 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.



**Accuracy** Temperature drift internal compensated, ≤ 2%, may be deactivated <sup>1)</sup> (0,17%/K without compensation 9 V to 30 V DC, reverse polarity protection)  
**Operating voltage  $U_B$**  9 V to 30 V DC, reverse polarity protection  
**Voltage ripple** ± 10 %  
**No-load current consumption** < 60 mA  
**Housing** PBT  
 ultrasonic transducer: polyurethane foam, epoxy resin  $\bar{\omega}$ with glass content  
**Class of protection to EN 60 529** IP 65  
**Norm conformity** EN 60947-5-2  
**Type of connection** 5-pin M12 initiator plug  
**Indicators** 2 three-colour LEDs  
**Programmable** Yes, with LCA-2 & LinkControl  
**Operating temperature** -25°C to +70°C  
**Storage temperature** -40°C to +85°C  
**Weight** 120 g  
**Switching hysteresis <sup>1)</sup>** 3 mm  
**Switching frequency <sup>1)</sup>** 11 Hz  
**Response time <sup>1)</sup>** 50 ms  
**Time delay before availability** < 300 ms

**Accuracy** Temperature drift internal compensated, ≤ 2%, may be deactivated <sup>1)</sup> (0,17%/K without compensation 9 V to 30 V DC, reverse polarity protection)  
**Operating voltage  $U_B$**  9 V to 30 V DC, reverse polarity protection  
**Voltage ripple** ± 10 %  
**No-load current consumption** < 60 mA  
**Housing** PBT  
 ultrasonic transducer: polyurethane foam, epoxy resin  $\bar{\omega}$ with glass content  
**Class of protection to EN 60 529** IP 65  
**Norm conformity** EN 60947-5-2  
**Type of connection** 5-pin M12 initiator plug  
**Indicators** 2 three-colour LEDs  
**Programmable** Yes, with LCA-2 & LinkControl  
**Operating temperature** -25°C to +70°C  
**Storage temperature** -40°C to +85°C  
**Weight** 120 g  
**Switching hysteresis <sup>1)</sup>** 5 mm  
**Switching frequency <sup>1)</sup>** 8 Hz  
**Response time <sup>1)</sup>** 70 ms  
**Time delay before availability** < 300 ms

**Accuracy** Temperature drift internal compensated, ≤ 2%, may be deactivated <sup>1)</sup> (0,17%/K without compensation 9 V to 30 V DC, reverse polarity protection)  
**Operating voltage  $U_B$**  9 V to 30 V DC, reverse polarity protection  
**Voltage ripple** ± 10 %  
**No-load current consumption** < 60 mA  
**Housing** PBT  
 ultrasonic transducer: polyurethane foam, epoxy resin  $\bar{\omega}$ with glass content  
**Class of protection to EN 60 529** IP 65  
**Norm conformity** EN 60947-5-2  
**Type of connection** 5-pin M12 initiator plug  
**Indicators** 2 three-colour LEDs  
**Programmable** Yes, with LCA-2 & LinkControl  
**Operating temperature** -25°C to +70°C  
**Storage temperature** -40°C to +85°C  
**Weight** 120 g  
**Switching hysteresis <sup>1)</sup>** 20 mm  
**Switching frequency <sup>1)</sup>** 6 Hz  
**Response time <sup>1)</sup>** 110 ms  
**Time delay before availability** < 300 ms

**Order no.** lcs-25/DD/QP  
**Switched output** pnp,  $U_B=2 V$ ,  $I_{max} = 200 mA$   
 switchable NOC/NCC, short-circuit-proof

**Order no.** lcs-35/DD/QP  
**Switched output** pnp,  $U_B=2 V$ ,  $I_{max} = 200 mA$   
 switchable NOC/NCC, short-circuit-proof

**Order no.** lcs-130/DD/QP  
**Switched output** pnp,  $U_B=2 V$ ,  $I_{max} = 200 mA$   
 switchable NOC/NCC, short-circuit-proof

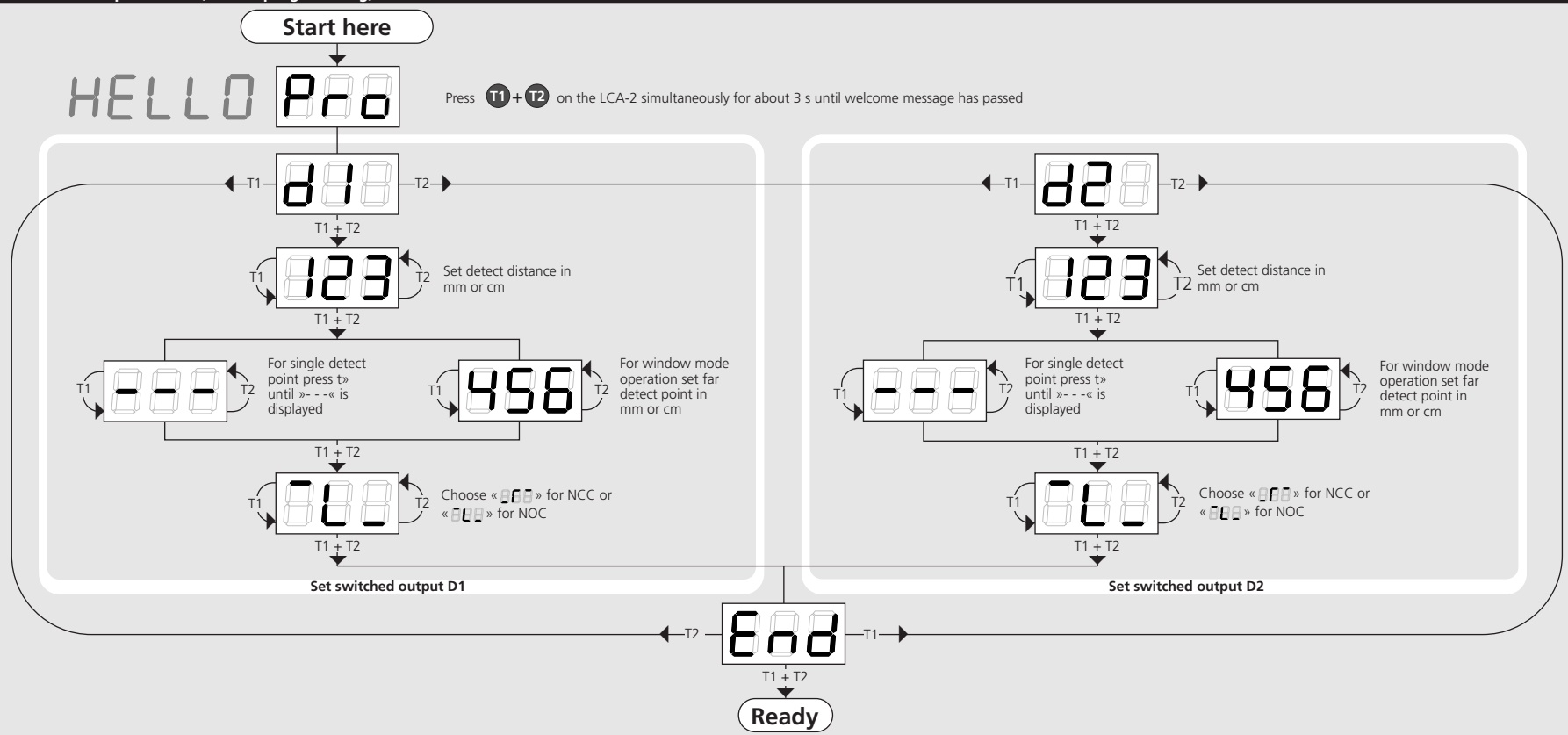
1) Can be programmed with LinkControl

## 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

