



Product Description

- The lcs-sensor offers a non-contact measurement of the distance to an object which must be positioned within the sensor's detection zone. The switching outputs are set conditionally upon the adjusted detect distances.
- The output functions are adjustable from NOC to NCC.
- Three-colour LEDs indicate the switching status.
- The sensor can be set via Teach-in procedure.
- Optionally all Teach-in and additional sensor parameter settings can be made using the LinkControl adapter (optional accessory) and the LinkControl software for Windows®.

Safety Notes

- Read the operating manual prior to start-up.
- Connection, installation and adjustment works should be carried out by expert personnel only.
- No safety component in accordance with the EU Machine Directive, use in the area of personal and machine protection not permitted

Proper Use

lcs ultrasonic sensors are used for non-contact detection of objects. The lcs-sensors have a **blind zone** in which distance measurement is not possible. 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.

Installation

- Mount the sensor at the place of fitting.
- Connect a connection cable to the M12 device plug, see Fig. 1.

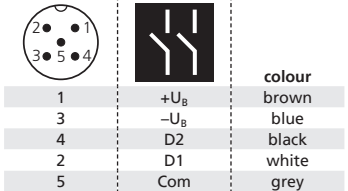


Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cables

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.

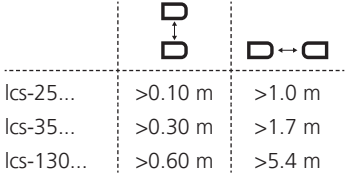


Fig. 2: Assembly distances

Start-Up

- Connect the power supply.
- Set the sensor parameters using the Teach-in procedure, see Diagram 1.

Factory Setting

lcs-sensors are delivered factory made with the following settings:

- Switching outputs on NOC
- Detect distance at operating range and at half operating range
- Measurement range set to maximum range

Maintenance

microsonic sensors are maintenance free. In case of excess caked-on dirt we recommend to clean the white sensor surface.

Notes

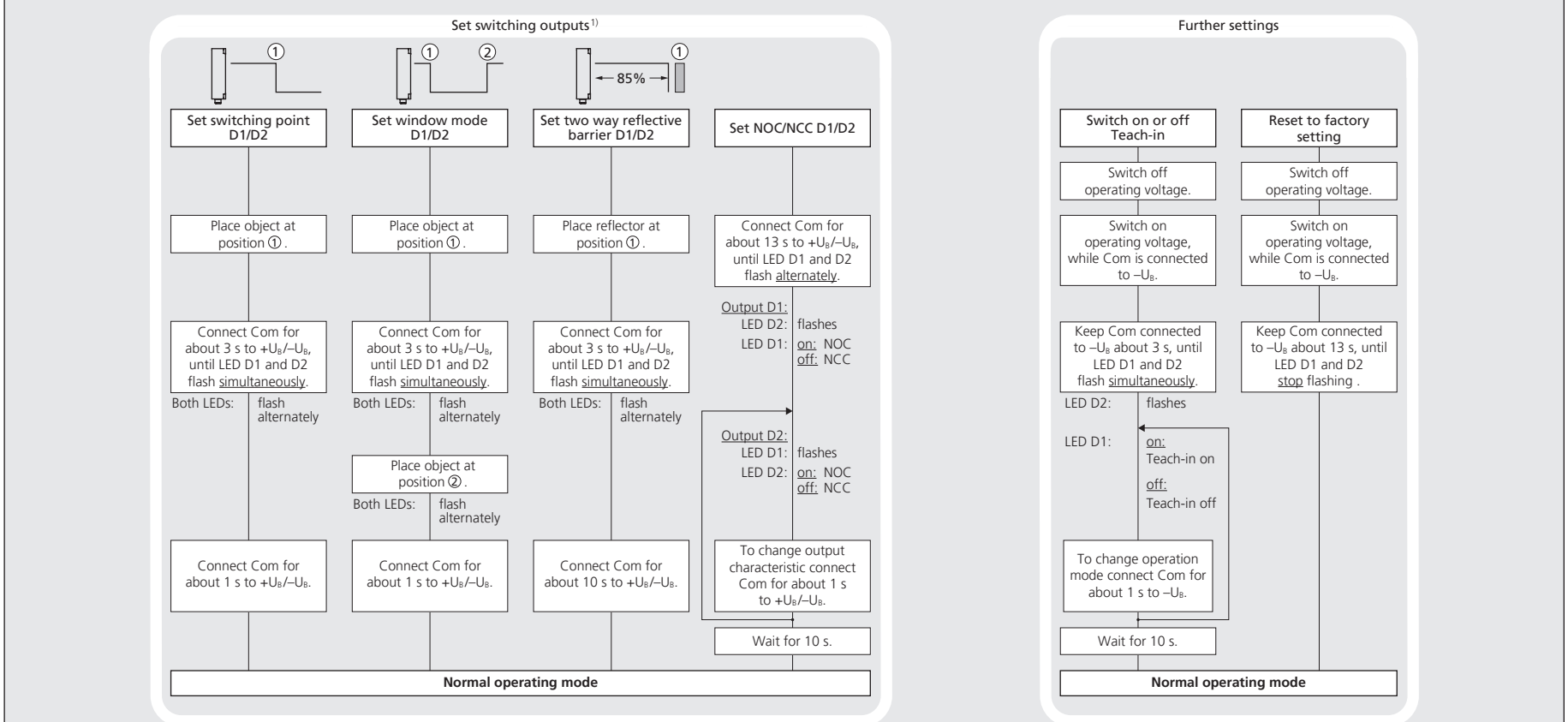
- lcs-sensors have internal temperature compensation. Because the sensors heat up on their own, the temperature compensation reaches its optimum working point after approx. 30 minutes of operation.
- In the normal operating mode, an illuminated yellow LED signals that the corresponding switching output is set.
- During Teach-in procedure, the hysteresis loops are set back to factory settings.
- If no signal is generated at the Com input for 20 seconds during the Teach-in procedure, the settings made up to that point are stored and the sensor returns to normal operating mode.
- The sensor can be reset to its factory setting (see Diagram 1).

Operating Manual

Ultrasonic sensor with two switching outputs

lcs-25/DD/QP
lcs-35/DD/QP
lcs-130/DD/QP

Diagram 1: Set sensor parameters via Teach-in procedure



¹⁾ Teach-in Switching output D1 (Pin 2): connect Com with +U_B.
Teach-in Switching output D2 (Pin 4): connect Com with -U_B.

Diagram 2: 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.
- Refer to the quick reference guide on the LCA-2.

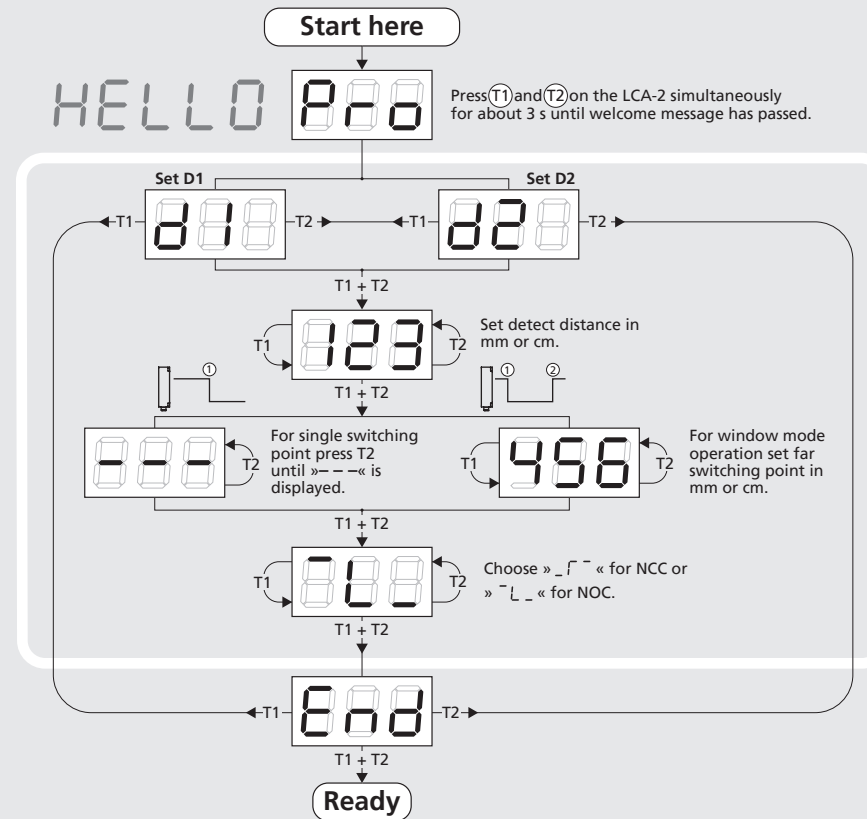
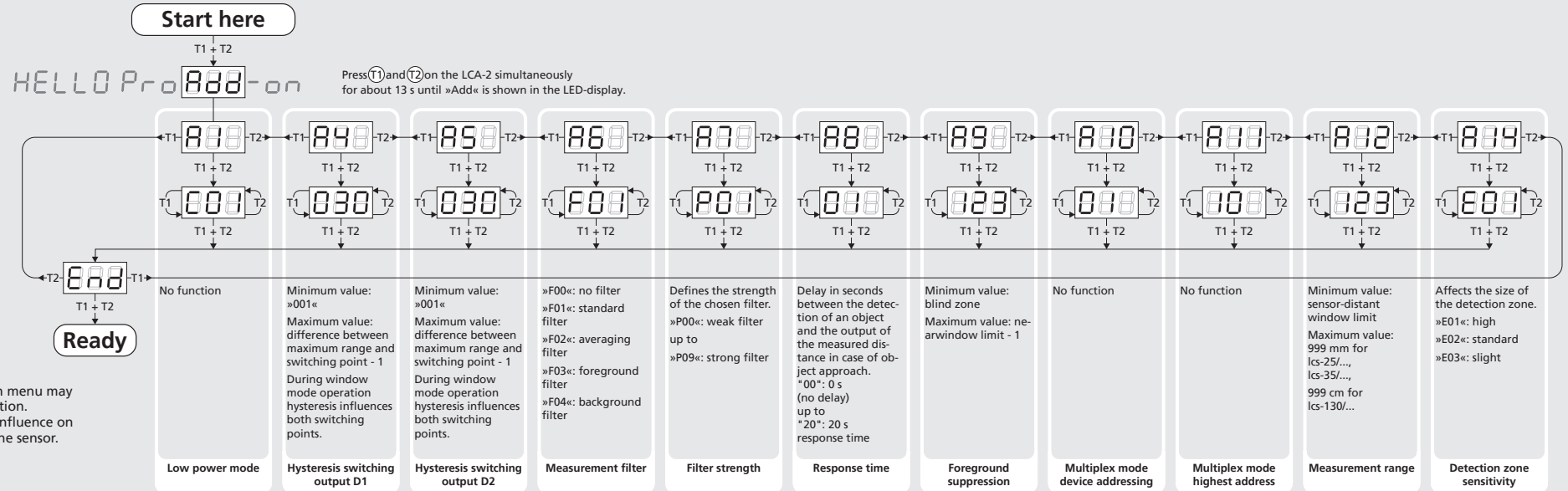
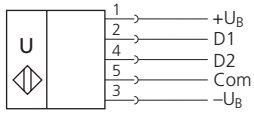


Diagram 3: Useful additional functions in Add-on menu (for experienced users only, settings not required for standard applications)

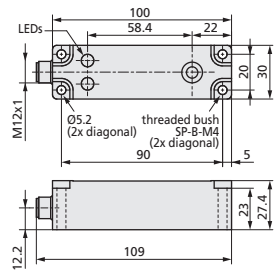


Note
Changes in the Add-on menu may impair the sensor function. A6, A7, A8, A12 have influence on the response time of the sensor.

Technical data

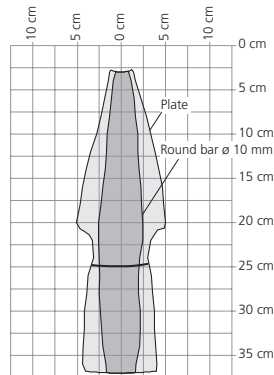


lcs-25...

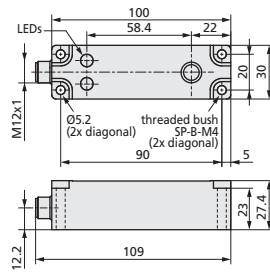


blind zone: 0 to 30 mm
operating range: 250 mm
maximum range: 350 mm
angle of beam spread: see detection zone
transducer frequency: 320 kHz
resolution: 0.18 mm
reproducibility: ±0.15 %

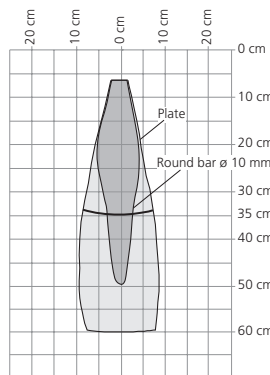
detection zones
 for different objects:
 The dark grey areas represent the zone where it is easy to recognise the normal reflector (round bar). This indicates the typical operating range of the sensors. The light grey areas represent the zone where a very large reflector – for instance a plate – can still be recognised. The requirement here is for an optimum alignment to the sensor. It is not possible to evaluate ultrasonic reflections outside this area.



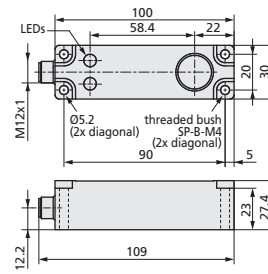
lcs-35...



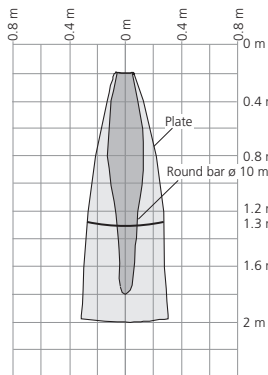
blind zone: 0 to 65 mm
operating range: 350 mm
maximum range: 600 mm
angle of beam spread: see detection zone
transducer frequency: 400 kHz
resolution: 0.18 mm
reproducibility: ±0.15 %



lcs-130...



blind zone: 0 to 200 mm
operating range: 1,300 mm
maximum range: 2,000 mm
angle of beam spread: see detection zone
transducer frequency: 200 kHz
resolution: 0.18 mm
reproducibility: ±0.15 %



accuracy: ≤2 % (temperature drift internally compensated; can be deactivated ¹⁾, 0.17 %/K without compensation
operating voltage U_B: 9 to 30 V DC, reverse polarity protection
voltage ripple: ±10 %
no-load current consumption: <60 mA
housing: PBT

accuracy: ≤2 % (temperature drift internally compensated; can be deactivated ¹⁾, 0.17 %/K without compensation
operating voltage U_B: 9 to 30 V DC, reverse polarity protection
voltage ripple: ±10 %
no-load current consumption: <60 mA
housing: PBT

accuracy: ≤2 % (temperature drift internally compensated; can be deactivated ¹⁾, 0.17 %/K without compensation
operating voltage U_B: 9 to 30 V DC, reverse polarity protection
voltage ripple: ±10 %
no-load current consumption: <60 mA
housing: PBT

class of protection per EN 60529: IP 65

norm conformity: EN 60947-5-2

type of connection: 5-pin M12 circular plug

controls: Com input (pin 5)

indicators: 2 three-colour LEDs

scope of settings: Teach-in via Com (pin 5), LCA-2 and LinkControl

operating temperature: -25 to +70 °C

storage temperature: -40 to +85 °C

weight: 120 g

switching hysteresis ¹⁾: 3 mm

switching frequency ²⁾: 25 Hz

response time ²⁾: 32 ms

time delay before availability: <300 ms

class of protection per EN 60529: IP 65

norm conformity: EN 60947-5-2

type of connection: 5-pin M12 circular plug

controls: Com input (pin 5)

indicators: 2 three-colour LEDs

scope of settings: Teach-in via Com (pin 5), LCA-2 and LinkControl

operating temperature: -25 to +70 °C

storage temperature: -40 to +85 °C

weight: 120 g

switching hysteresis ¹⁾: 5 mm

switching frequency ²⁾: 12 Hz

response time ²⁾: 64 ms

time delay before availability: <300 ms

class of protection per EN 60529: IP 65

norm conformity: EN 60947-5-2

type of connection: 5-pin M12 circular plug

controls: Com input (pin 5)

indicators: 2 three-colour LEDs

scope of settings: Teach-in via Com (pin 5), LCA-2 and LinkControl

operating temperature: -25 to +70 °C

storage temperature: -40 to +85 °C

weight: 120 g

switching hysteresis ¹⁾: 20 mm

switching frequency ²⁾: 8 Hz

response time ²⁾: 92 ms

time delay before availability: <300 ms

order no.: lcs-25/DD/QP

switching outputs: 2x pnp, U_B – 2 V, I_{max} = 200 mA

NOC/NCC adjustable, short-circuit-proof

order no.: lcs-35/DD/QP

switching outputs: 2x pnp, U_B – 2 V, I_{max} = 200 mA

NOC/NCC adjustable, short-circuit-proof

order no.: lcs-130/DD/QP

switching outputs: 2x pnp, U_B – 2 V, I_{max} = 200 mA

NOC/NCC adjustable, short-circuit-proof

¹⁾ Can be programmed via LinkControl.

²⁾ With LinkControl the selected filter setting influences the switching frequency and response time.