



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.
- 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.

		colour
1	+U <sub>B</sub>	brown
3	-U <sub>B</sub>	blue
4	D2	black
2	D1	white
5	D3/Com.	grey

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

**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.

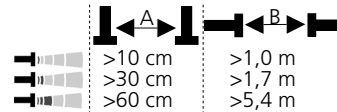


Fig. 2: Assembly distances

**Start-up**

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 LinkControl Adapter LCA-2 and the LinkControl software.

**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**

- ICS-sensors have internal temperature compensation. Because the sensors heat up on their own, the temperature com-

pensation 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.
- 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 ② «Optional setting of parameters using the LinkControl Adapter LCA-2», ① «Download of sensor parameters in the LCA-1» and ③ «Upload of sensor parameters back to the sensor».



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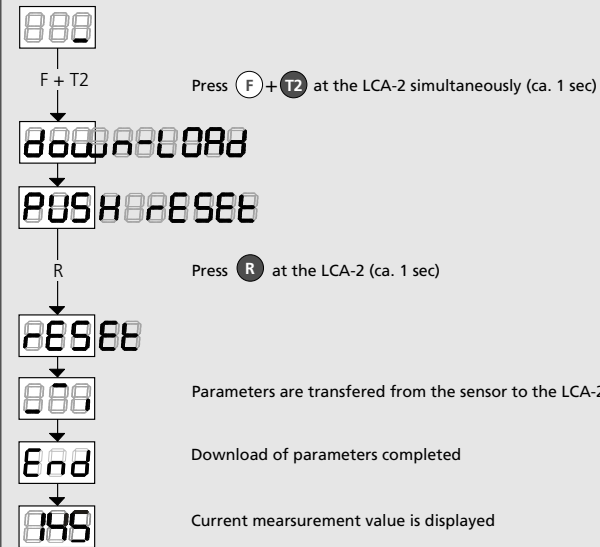
**Instruction manual**  
ICS-Ultrasonic Sensors with three switched outputs

ICS-25/DDD/QP  
ICS-35/DDD/QP  
ICS-130/DDD/QP

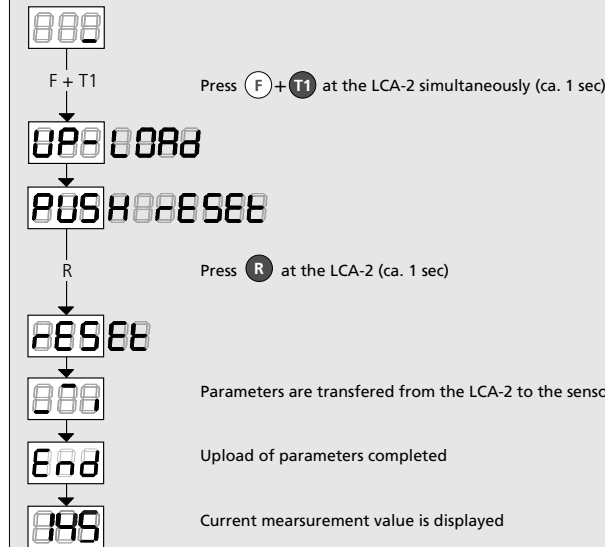
**Product description**

- The ICS-sensor with three switched outputs measures the distance to an object within the detection zone contactless.

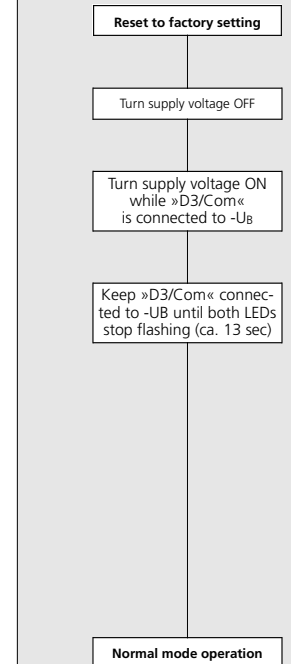
**① Download of sensor parameters in the LCA-1**



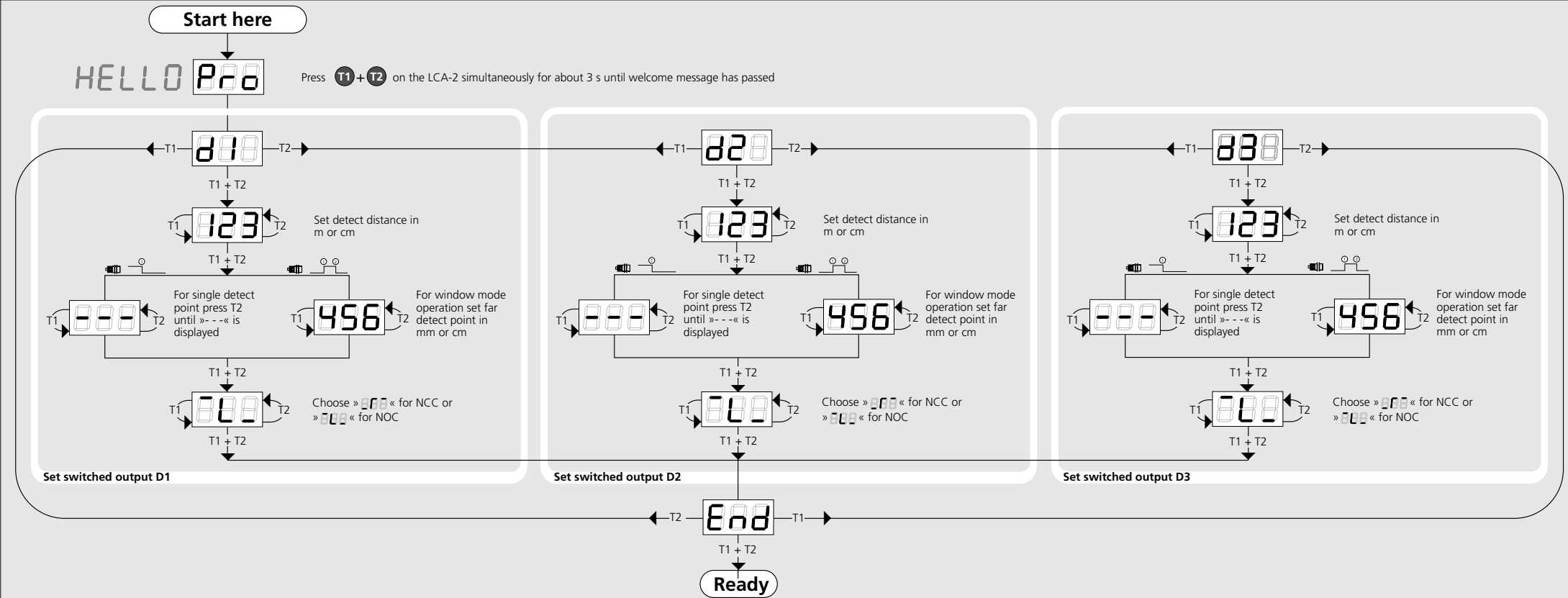
**③ Upload of sensor parameters back to the sensor**



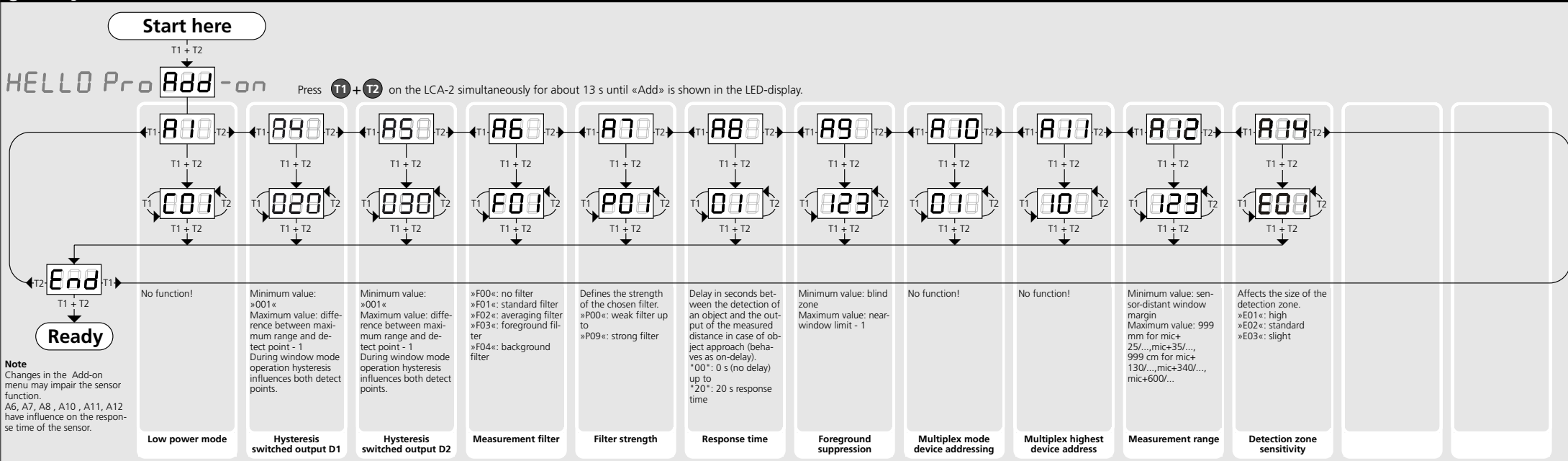
**Factory setting**



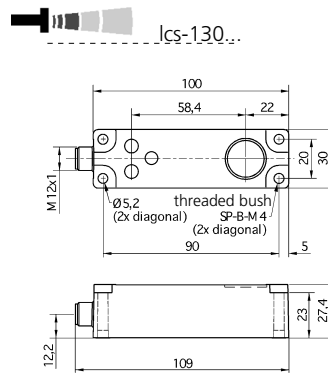
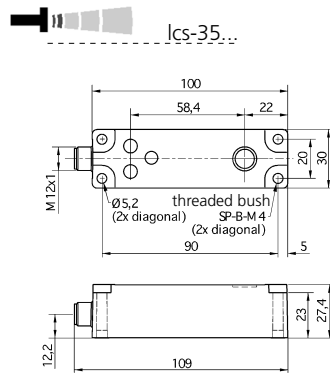
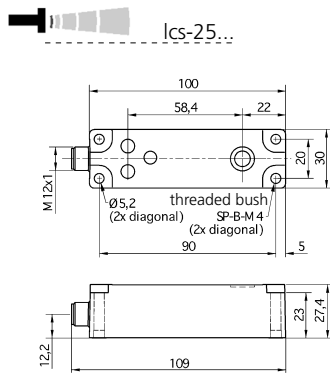
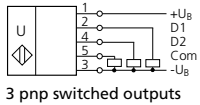
② Optional setting of parameters using the LinkControl Adapter LCA-2 (Offline programming)



②a Setting of additional functions in the LCA-2

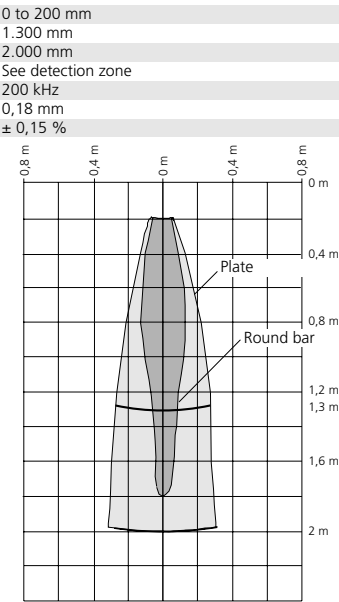
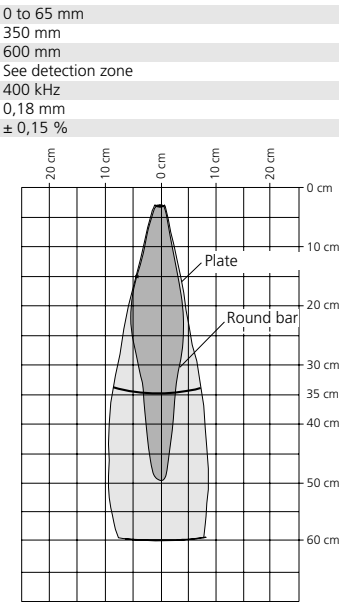
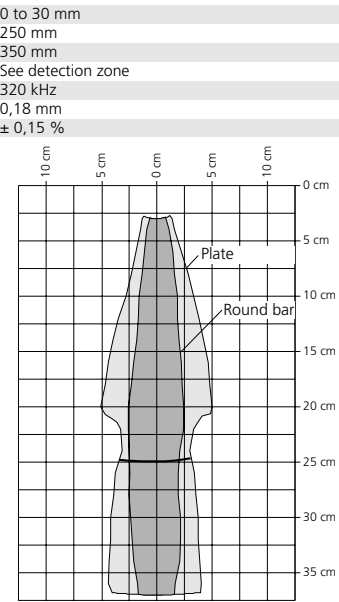


Technical data



**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<sub>B</sub>** 9 V to 30 V DC, reverse polarity protection  
**Voltage ripple** ±10 %  
**No-load current consumption** < 70 mA  
**Housing** PBT  
 ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
**Class of protection to EN 60 529** IP 65  
**Norm conformity** EN 60947-5-2  
**Type of connection** No  
**Indicators** 3 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<sub>B</sub>** 9 V to 30 V DC, reverse polarity protection  
**Voltage ripple** ±10 %  
**No-load current consumption** < 70 mA  
**Housing** PBT  
 ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
**Class of protection to EN 60 529** IP 65  
**Norm conformity** EN 60947-5-2  
**Type of connection** No  
**Indicators** 3 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<sub>B</sub>** 9 V to 30 V DC, reverse polarity protection  
**Voltage ripple** ±10 %  
**No-load current consumption** < 70 mA  
**Housing** PBT  
 ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
**Class of protection to EN 60 529** IP 65  
**Norm conformity** EN 60947-5-2  
**Type of connection** No  
**Indicators** 3 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/DDD/QP  
**Switched output** 3 \* pnp, U<sub>B</sub>-2 V, I<sub>max</sub> = 200 mA  
 switchable NOC/NCC, short-circuit-proof

**Order no.** lcs-35/DDD/QP  
**Switched output** 3 \* pnp, U<sub>B</sub>-2 V, I<sub>max</sub> = 200 mA  
 switchable NOC/NCC, short-circuit-proof

**Order no.** lcs-130/DDD/QP  
**Switched output** 3 \* pnp, U<sub>B</sub>-2 V, I<sub>max</sub> = 200 mA  
 switchable NOC/NCC, short-circuit-proof

1) Can be programmed with LinkControl