



### Operating manual

### Ultrasonic proximity switch with one switched output and IO-Link interface

lcs+340/F/A  
lcs+600/F/A

### 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 switched output is set conditional upon the adjusted detect distance.

Via the Teach-in procedure, the detect distance and operating mode can be adjusted. One LED indicates operation and the state of the switched output.

The lcs+ sensors are IO-Link-capable in accordance with IO-Link specification V1.1 and support Smart Sensor Profile like Digital Measuring Sensor.

### Safety instructions

- Read the operating instructions prior to start-up.

- Connection, installation and adjustments may only be carried out by qualified staff.
- No safety component in accordance with the EU Machine Directive.

### Use for intended purpose only

lcs+ ultrasonic sensors are used for non-contact detection of objects.

### Installation

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

### Start-up

- Connect the power supply.
- Carry out sensor adjustment in accordance with the diagram.

Pin	Signal	Colour
1	+U <sub>B</sub>	brown
3	-U <sub>B</sub>	blue
4	F	black
2	-	white
5	Sync	grey

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

### Factory setting

- Switched output on NOC.
- Detect distance at operating range.

### Operating modes

Three operating modes are available for the switched output:

- Operation with one detect point  
The switched output is set when the object falls below the set detect point.
- Window mode  
The switched output is set when the object is within the set window.
- Two-way reflective barrier  
The switched output is set when the object is between sensor and fixed reflector.

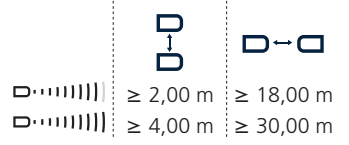


Fig. 2: Assembly distances

### Synchronisation

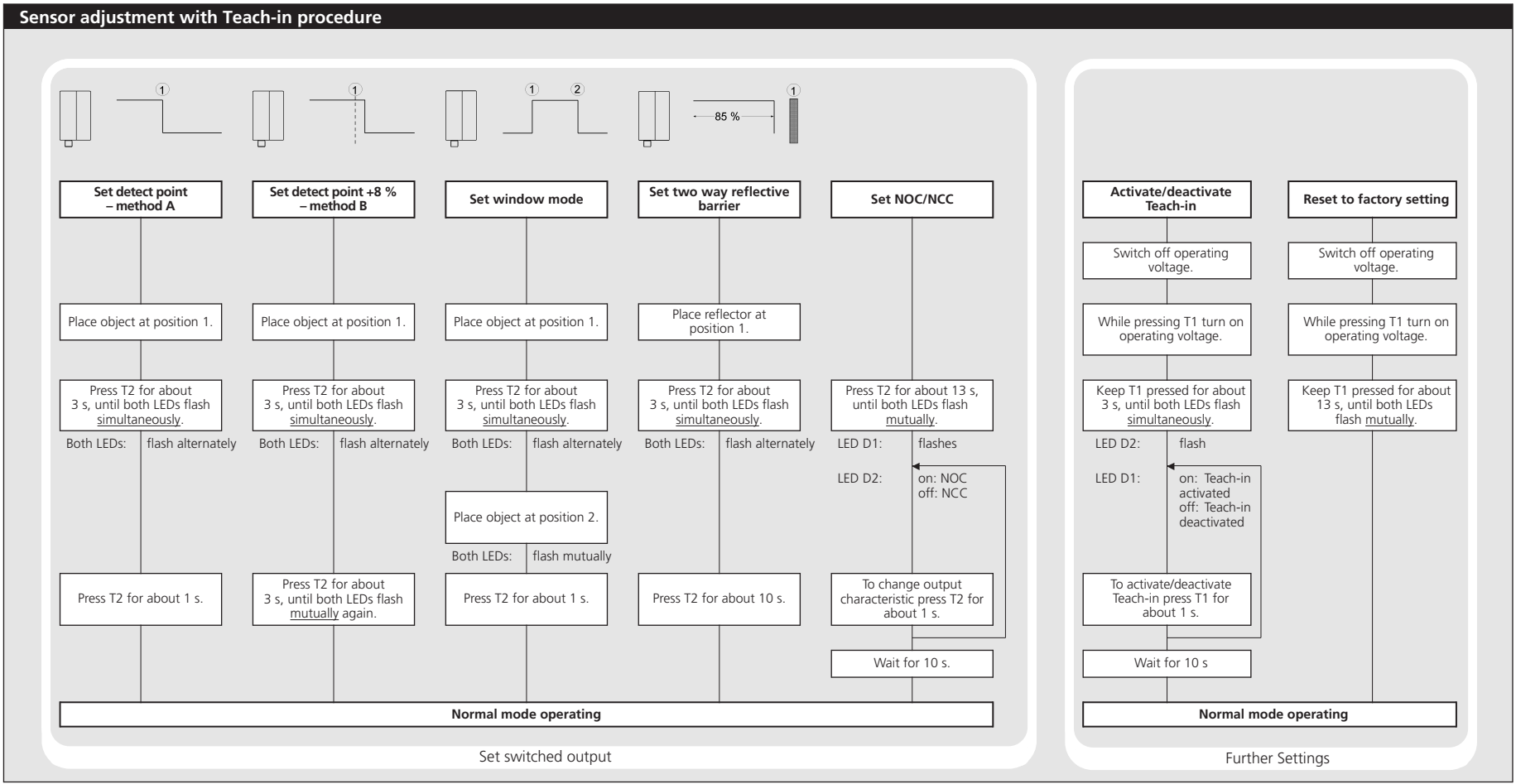
If under multiple sensor operation the assembly distance falls below the values shown in Fig. 2, the internal synchronisation should be used. For this purpose interconnect each pin 5 of max. 10 sensors.

### Maintenance

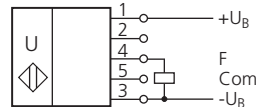
microsonic sensors are maintenance-free. In case of excess caked-on dirt we recommend cleaning the white sensor surface.

### Notes

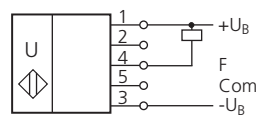
- The sensors of the lcs+ family have a blind zone, within which a distance measurement is not possible.
- The lcs+ sensors are equipped with an internal temperature compensation. Due to the sensors self heating, the temperature compensation reaches its optimum working-point after approx. 30 minutes of operation.
- In the normal operating mode, an illuminated yellow LED signals that the switched output is switched through.
- The lcs+ sensors have a push-pull switched output.
- In the »Two-way reflective barrier« operating mode, the object has to be within the range of 0-85 % of the set distance.
- In the »Set detect point – method A« Teach-in procedure the actual distance to the object is taught to the sensor as the detect point. If the object moves towards the sensor (e.g. with level control) then the taught distance is the level at which the sensor has to switch the output.
- If the object to be scanned moves into the detection area from the side, the »Set detect point +8 % – method B« Teach-in procedure should be used. In this way the switching distance is set 8 % further than the actual measured distance to the object. This ensures a reliable switching distance even if the height of the objects varies slightly.



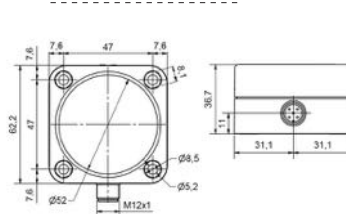
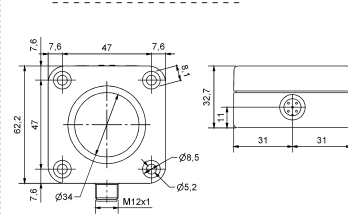
## Technical data



Push-Pull output in pnp circuit



Push-Pull output in npn circuit



**blind zone** 0 to 350 mm

**operating range** 3,400 mm

**maximum range** 5,000 mm

**angle of beam spread** see »detection zones«

**transducer frequency** 120 kHz

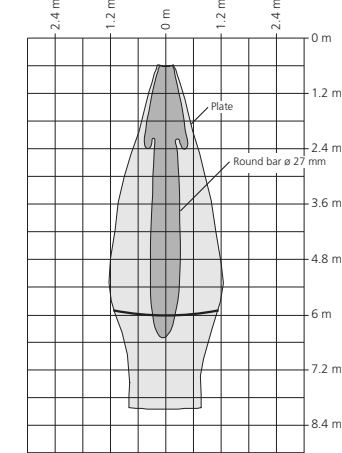
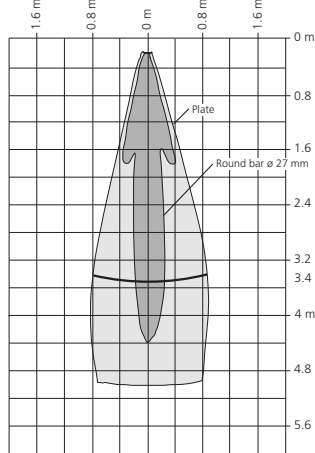
**resolution** 0.18 mm

**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 good 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.



**accuracy** ±1 % (temperature drift internally compensated; may be deactivated, 0.17 %/K without compensation)

**operating voltage  $U_B$**  9 V to 30 V DC, reverse polarity protection

**voltage ripple** ±10 %

**no-load current consumption** ≤ 60 mA

**housing**

PBT, Polyester; ultrasonic transducer: polyurethane foam, epoxy resin with glass content

**class of protection per EN 60 529** IP 67

**type of connection** 5-pin M12 circular plug, PBT

**controls** 2 push-buttons

**programmable** • Teach-in via push-buttons

• LCA-2 with LinkControl

**indicators** LED yellow/green (switched output set/not set)

**synchronisation** internal synchronisation up to 10 sensors

**operating temperature** -25°C to +70°C

**storage temperature** -40°C to +85°C

**weight** 180 g

**switching hysteresis** <sup>1)</sup> 50 mm

**switching frequency** <sup>1)</sup> 4 Hz

**response time** <sup>1)</sup> 172 ms

**time delay before availability** <sup>1)</sup> < 380 ms

**norm conformity** EN 60947-5-2

**order no.** lcs+340/F/A

**switched output** Push-Pull,  $U_B$ -3 V,  $-U_B$ +3 V,  $I_{max}$  = 100 mA

NOC/NCC adjustable, short-circuit-proof

**accuracy** ±1 % (temperature drift internally compensated; may be deactivated, 0.17 %/K without compensation)

**operating voltage  $U_B$**  9 V to 30 V DC, reverse polarity protection

**voltage ripple** ±10 %

**no-load current consumption** ≤ 60 mA

**housing**

PBT, Polyester; ultrasonic transducer: polyurethane foam, epoxy resin with glass content

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**type of connection** 5-pin M12 circular plug, PBT

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• LCA-2 with LinkControl

**indicators** LED yellow/green (switched output set/not set)

**synchronisation** internal synchronisation up to 10 sensors

**operating temperature** -25°C to +70°C

**storage temperature** -40°C to +85°C

**weight** 240 g

**switching hysteresis** <sup>1)</sup> 100 mm

**switching frequency** <sup>1)</sup> 3 Hz

**response time** <sup>1)</sup> 240 ms

**time delay before availability** <sup>1)</sup> < 450 ms

**norm conformity** EN 60947-5-2

**order no.** lcs+600/F/A

**switched output** Push-Pull,  $U_B$ -3 V,  $-U_B$ +3 V,  $I_{max}$  = 100 mA

NOC/NCC adjustable, short-circuit-proof

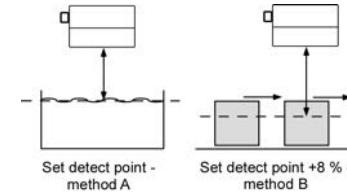


Fig. 4: Setting the detect point for different directions of movement of the object

- The sensor can be reset to its factory setting (see »Further settings«).
- Using the LinkControl adapter (optional accessory) and the LinkControl software for Windows, all Teach-in and additional sensor parameter settings can be optionally undertaken.
- The latest IODD file and information about start-up and configuration of lcs+ sensors with IO-Link, you will find online at: [www.microsonic.de/lcs+](http://www.microsonic.de/lcs+).
- For further information on IO-Link see [www.io-link.com](http://www.io-link.com).

1) Can be programmed with LinkControl and IO-Link

