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

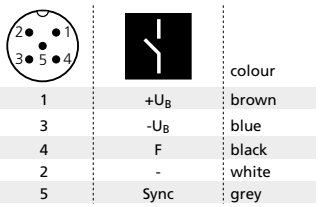
lcs+ ultrasonic sensors are used for non-contact detection of objects.

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.



		colour
1	$+U_B$	brown
3	$-U_B$	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.

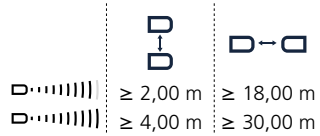


Fig. 2: Assembly distances

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.

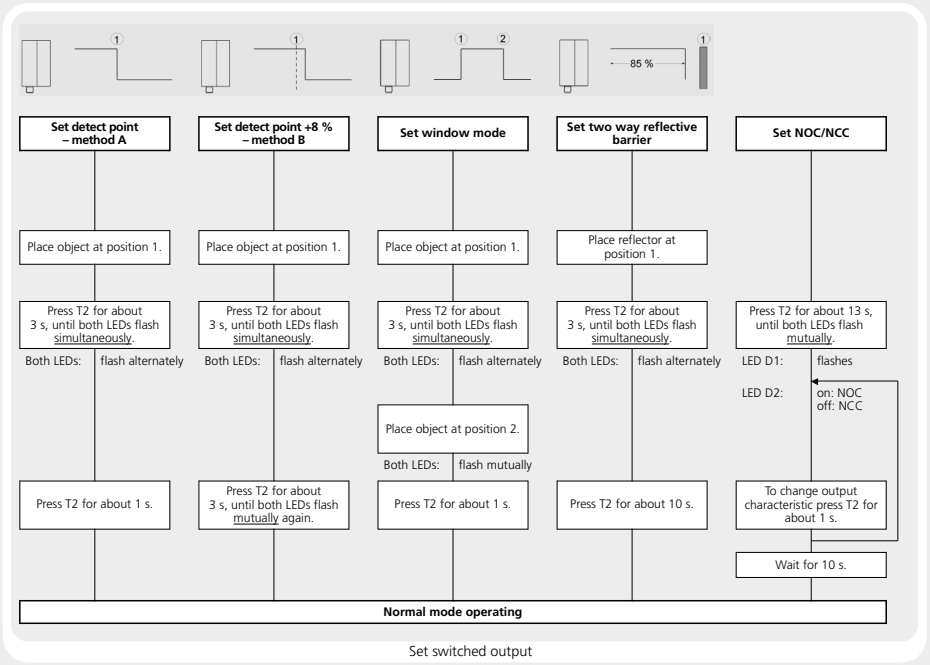
Maintenance

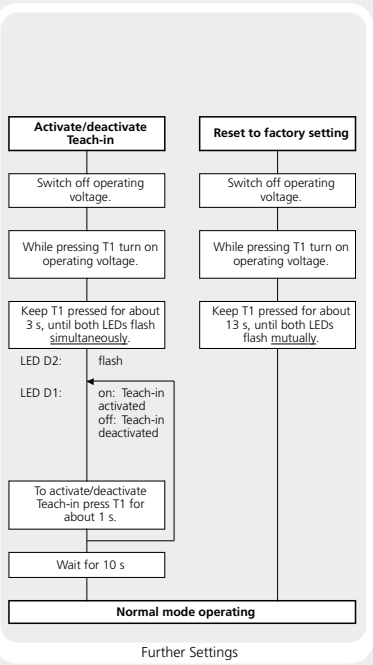
microsonic sensors are maintenance-free. In case of excess caked-on dirt we recommend cleaning the white sensor surface.

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.

Sensor adjustment with Teach-in procedure





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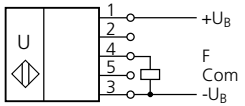
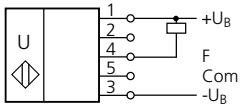
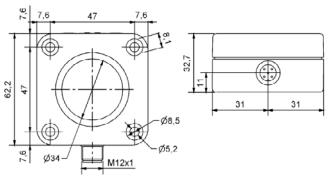
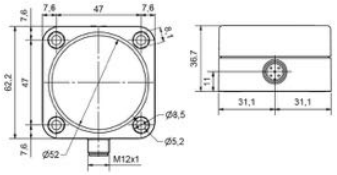
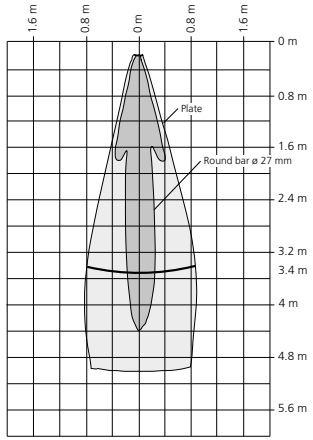
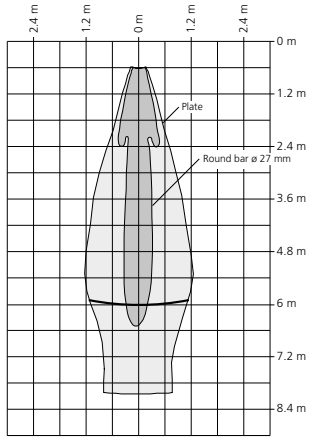
Technical data



Push-Pull output in pnp circuit



Push-Pull output in npn circuit

	lcs+340...	lcs+600...
		
blind zone	0 to 350 mm	0 to 600 mm
operating range	3,400 mm	6,000 mm
maximum range	5,000 mm	8,000 mm
angle of beam spread	see »detection zones«	see »detection zones«
transducer frequency	120 kHz	80 kHz
resolution	0.18 mm	0.18 mm
reproducibility	± 0.15 %	± 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 regognised.. 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)	±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	9 V to 30 V DC, reverse polarity protection
voltage ripple	±10 %	±10 %
no-load current consumption	≤ 60 mA	≤ 60 mA
housing	PBT, Polyester; ultrasonic transducer: polyurethane foam, epoxy resin with glass content	PBT, Polyester; ultrasonic transducer: polyurethane foam, epoxy resin with glass content
class of protection per EN 60 529	IP 67	IP 67
type of connection	5-pin M12 circular plug, PBT	5-pin M12 circular plug,. PBT
controls	2 push-buttons	2 push-buttons
programmable	• Teach-in via push-buttons • LCA-2 with LinkControl	• Teach-in via push-buttons • LCA-2 with LinkControl
indicators	LED yellow/green (switched output set/not set)	LED yellow/green (switched output set/not set)
synchronisation	internal synchronisation up to 10 sensors	internal synchronisation up to 10 sensors
operating temperature	-25°C to +70°C	-25°C to +70°C
storage temperature	-40°C to +85°C	-40°C to +85°C
weight	180 g	240 g
switching hysteresis [1]	50 mm	100 mm
switching frequency [1]	4 Hz	3 Hz
response time [1]	172 ms	240 ms
time delay before availability [1]	< 380 ms	< 450 ms
norm conformity	EN 60947-5-2	EN 60947-5-2
order no.	lcs+340/F/A	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	Push-Pull, U_B-3 V, -U_B+3 V, I_{max} = 100 mA NOC/NCC adjustable, short-circuit-proof

1) Can be programmed with LinkControl and IO-Link

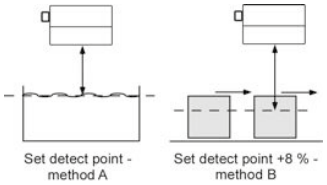


Fig. 4: Setting the detect point for different directions of movement of the object

- 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 informations about start-up and confituration of lcs+ sensors with IO-Link, you will find online at: www.microsonic.de/lcs+.
- For further informations on IO-Link see www.io-link.com.

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