microsonic

Operating Manual

Ultrasonic sensor with two switching outputs

lcs+340/DD
lcs+600/DD

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 conditional upon the adjusted detect distances.
The sensors can be adjusted via Teach-in procedure using two buttons. Two LEDs indicate operation and the states of the switching outputs.
Optionally all Teach-in and additional sensor parameter settings can be made using the LinkControl adapter (optional accessory) and the LinkControl software for Windows®.

Note

The housing was updated with Batch number
- FA2304912 for lcs+340
- FA2304201 for lcs+600.

The assembly diagram and installation height are identical to the old housing.

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.

Installation

➔ Mount the sensor at the place of fitting. Maximum torque of attachment screw: 1.5 Nm.
➔ Connect a connection cable to the M12 device plug, see Fig. 1.

		colour
1	$+U_B$	brown
3	$-U_B$	blue
4	D2	black
2	D1	white
5	Sync/Com	grey

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

Start-Up

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

Factory Setting

- Switching outputs on NOC
- Detect distance D1 at operating range and D2 at half operating range

Synchronisation

If the assembly distance of multiple sensors falls below the values shown in Fig. 2, the internal synchronisation should be used to avoid mutual interference between them. To do this interconnect each pin 5 of the sensors to be synchronised (max. 10 sensors).

lcs+340...	≥2.00 m	≥18.00 m
lcs+600...	≥4.00 m	≥30.00 m

Fig. 2: Minimal assembly distances without synchronisation

Maintenance

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

Notes

- Pin 5 (Sync/Com) of the sensor may only be connected for synchronisation.
- 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 corresponding switching output is set.
- In the »Two-way reflective barrier« operating mode, the object has to be within the range of 0 to 85 % of the set distance.
- If no push-buttons are pressed for 5 minutes during parameter setting mode the made changes are discarded and the sensor returns to normal operating mode.
- In the »Set switching 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 (see Fig. 3).

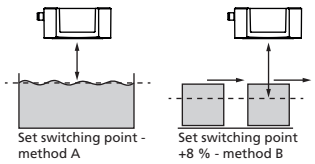
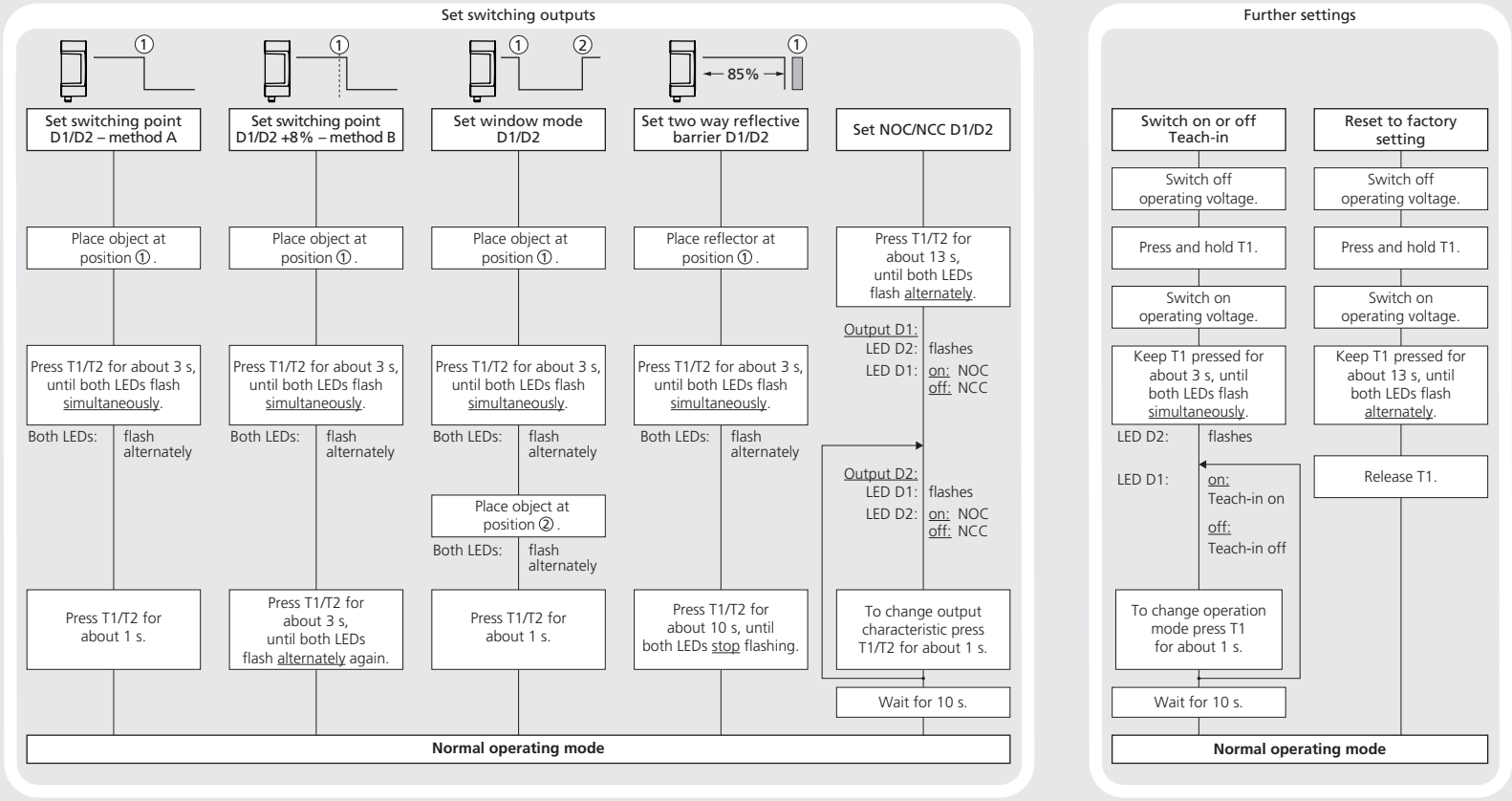
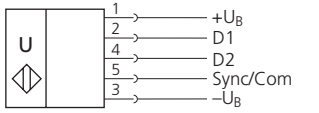


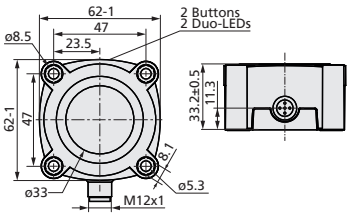
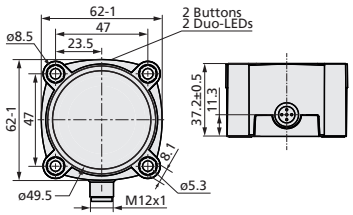
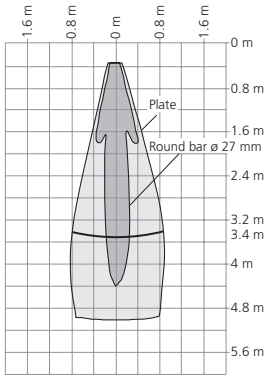
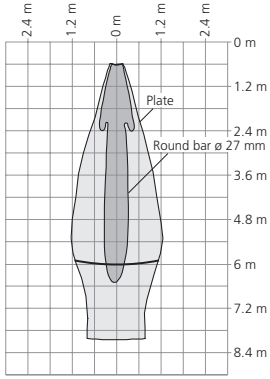
Fig. 3: Teach-in for different directions of movement of the obcject

Diagram 1: Set sensor parameters via Teach-in procedure



Technical data



	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 zone	see detection zone
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 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.		
accuracy	±1 % (temperature drift internally compensated; can be deactivated [1], 0.17 %/K without compensation)	±1 % (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	9 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 60529	IP 67	IP 67
torque of attachment screw	1.5 Nm ± 0.2 Nm	1.5 Nm ± 0.2 Nm
type of connection	5-pin M12 circular plug, PBT	5-pin M12 circular plug, PBT
torque of circular plug	hand-tight (0.4 Nm)	hand-tight (0.4 Nm)
controls	2 push-buttons	2 push-buttons
scope of settings	Teach-in via push-buttons, LCA-2 with LinkControl	Teach-in via push-buttons, LCA-2 with LinkControl
indicators	2 LEDs yellow/green (switching output set/not set)	2 LEDs yellow/green (switching output set/not set)
synchronisation	internal synchronisation up to 10 sensors	internal synchronisation up to 10 sensors
operating temperature	–25 to +70 °C	–25 to +70 °C
storage temperature	–40 to +85 °C	–40 to +85 °C
weight	180 g	240 g
switching hysteresis [1]	50 mm	100 mm
switching frequency [2]	4 Hz	3 Hz
response time [2]	172 ms	240 ms
time delay before availability	<380 ms	<450 ms
norm conformity	EN 60947-5-2	EN 60947-5-2
order no.	**lcs+340/DD**	**lcs+600/DD**
switching outputs	2x pnp, U_B–2 V, I_{max} = 2x 200 mA NOC/NCC adjustable, short-circuit-proof	2x pnp, U_B–2 V, I_{max} = 2x 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.

- If the object to be scanned moves into the detection area from the side, the »Set switching 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 (see Fig. 3).
- The sensor can be reset to its factory setting (see Diagram 1).

2014/30/EU

Enclosure Type 1
For use only in industrial machinery NFPA 79 applications.

The proximity switches shall be used with a Listed (CYJV/7) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.

microsonic GmbH / Phoenixseestraße 7 / 44263 Dortmund / Germany / T +49 231 975151-0 / **F** +49 231 975151-51 / **E** info@microsonic.de / **W** microsonic.de

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