



Operating Instructions

Ultrasonic proximity switch with one switched output and IO-Link

lpc+15/CFF	lpc+15/WK/CFF
lpc+25/CFF	lpc+25/WK/CFF
lpc+35/CFF	lpc+35/WK/CFF
lpc+100/CFF	lpc+100/WK/CFF

Product description

The lpc+ 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. Two LEDs indicate operation and the state of the switched output. The lpc+ 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 ad-

justments may only be carried out by qualified staff.

- No safety component in accordance with the EU Machine Directive

Use for intended purpose only

lpc+ 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, see fig. 1.

Start-up

- Connect the power supply.
- Carry out sensor adjustment in accordance with the diagram »Sensor adjustment with the Teach-in procedure«.

		colour
1	+U <sub>B</sub>	brown
3	-U <sub>B</sub>	blue
4	F1	black
2	F2	white
5	Com	grey

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

Factory setting

- Detect point operation
- Switched output on NOC
- Detect distance at operating range
- Multi-function input »Com« set to »Teach-in«
- Filter at F01
- Filter strength at P00

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.

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 set the switched out-

puts of all sensors in accordance with the diagram »Sensor adjustment with the Teach-in procedure«. Then switch-on the multi-function output »Com« to »Teach-in« and »synchronisation« (see »Further settings«). Finally interconnect each pin 5 of the sensors to be synchronised.

	≥ 0.25 m	≥ 1.30 m
	≥ 0.35 m	≥ 2.50 m
	≥ 0.40 m	≥ 2.50 m
	≥ 0.70 m	≥ 4.00 m

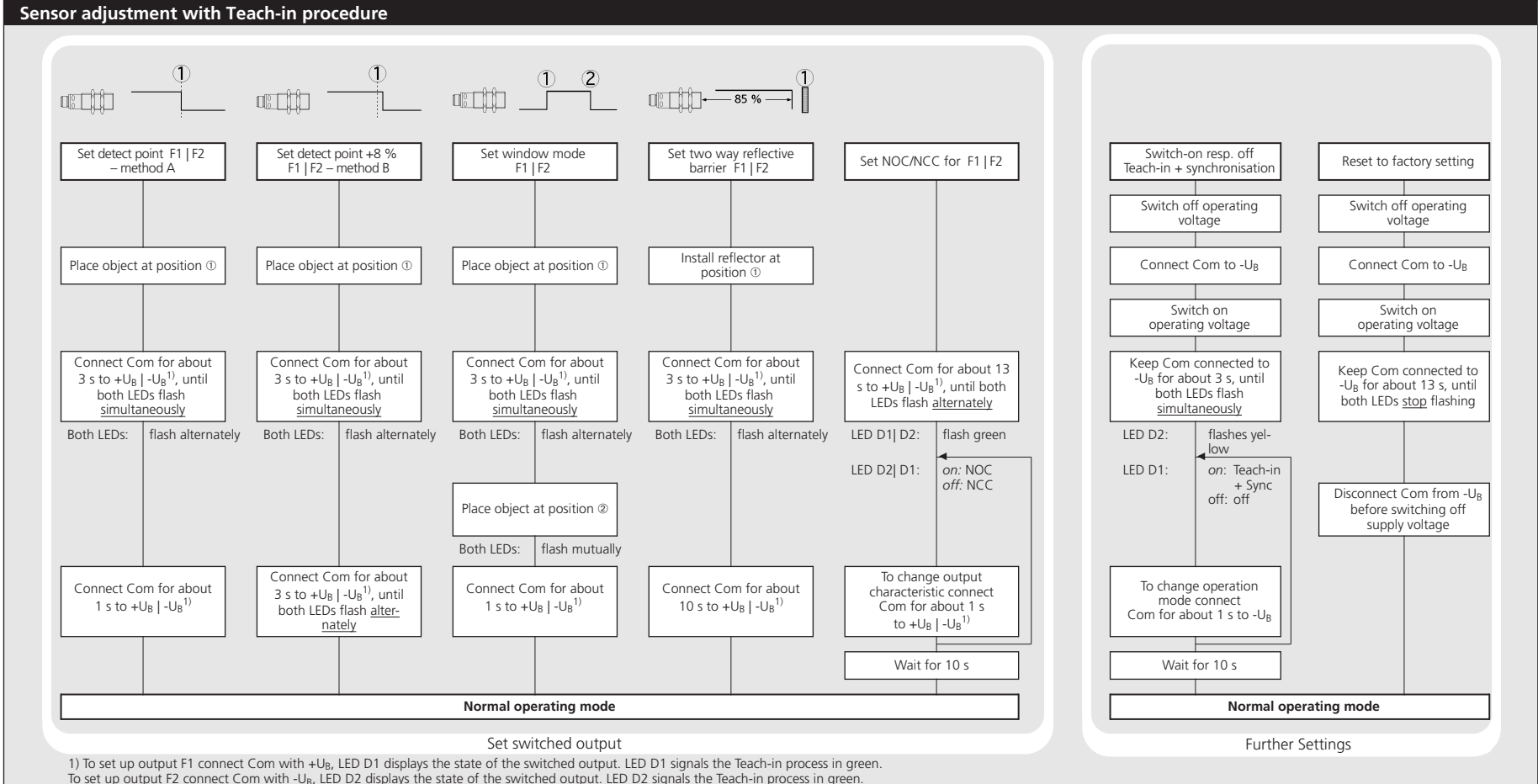
Fig. 2: Assembly distances

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 lpc+ family have a blind zone, within which a distance measurement is not possible.
- The lpc+ sensors are equipped with an internal temperature compensation. Due to the sensors self heating, the temperature compensation reaches its optimum working-point after approx. 120 seconds of operation.
- The lpc+ sensors have two push-pull switched outputs.
- In the normal operating mode, an illuminated yellow LED signals that the switched output is switched through.
- 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, see fig. 3.



**Further Settings**

Switch-on resp. off Teach-in + synchronisation

Switch off operating voltage

Connect Com to -U<sub>B</sub>

Switch on operating voltage

Keep Com connected to -U<sub>B</sub> for about 3 s, until both LEDs flash simultaneously

LED D2: flashes yellow

LED D1: on: Teach-in + Sync off: off

To change operation mode connect Com for about 1 s to -U<sub>B</sub>

Wait for 10 s

Reset to factory setting

Switch off operating voltage

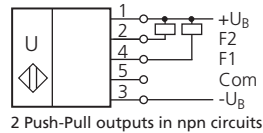
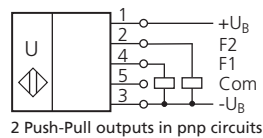
Connect Com to -U<sub>B</sub>

Switch on operating voltage

Keep Com connected to -U<sub>B</sub> for about 13 s, until both LEDs stop flashing

Disconnect Com from -U<sub>B</sub> before switching off supply voltage

## Technical data



**blind zone**

**operating range**

**maximum range**

**angle of beam spread**

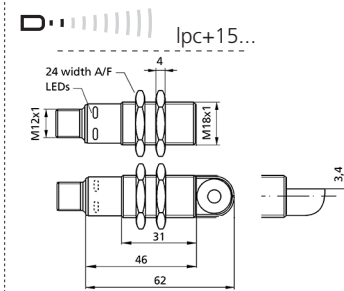
**transducer frequency**

**resolution**

**reproducibility**

**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 recognized. The requirement here is for an optimum alignment to the sensor. It is not possible to evaluate ultrasonic reflections outside this area.



20 mm

150 mm

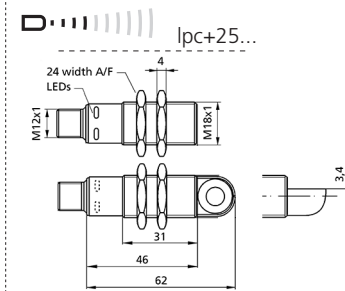
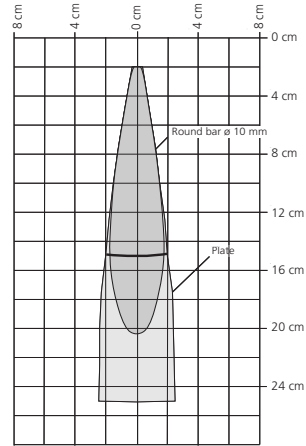
250 mm

see detection zone

380 kHz

0,1 mm

± 0.15 %



30 mm

250 mm

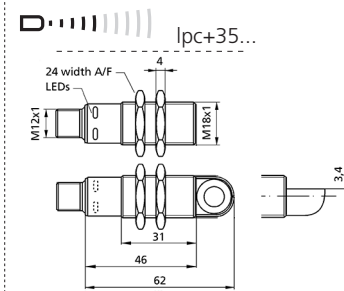
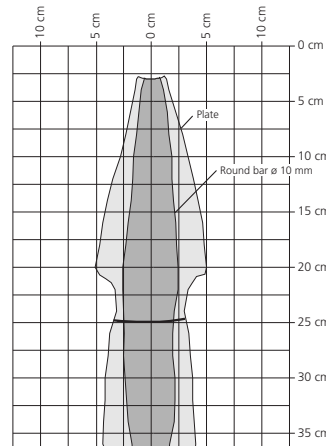
350 mm

see detection zone

320 kHz

0,1 mm

± 0.15 %



65 mm

350 mm

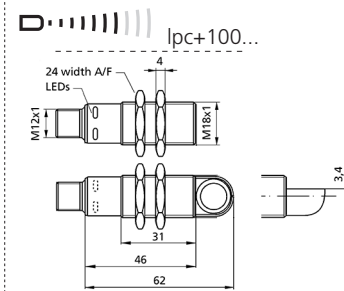
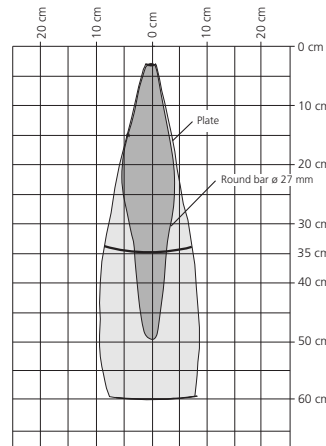
600 mm

see detection zone

400 kHz

0,1 mm

± 0.15 %



120 mm

1,000 mm

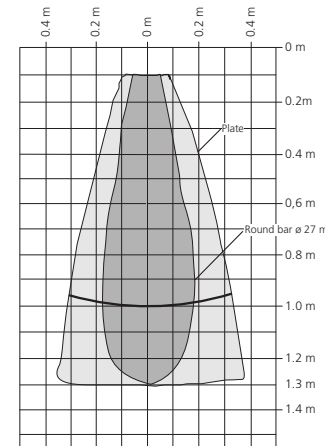
1,300 mm

see detection zone

200 kHz

0,1 mm

± 0.15 %



■ 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, see fig. 3.

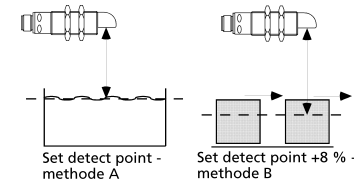


Fig. 3: Setting the detect point for different directions of movement of the object

- 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 lpc+ sensors with IO-Link, you will find online at: [www.microsonic.de/lpc+](http://www.microsonic.de/lpc+)

**accuracy** ±1 % (temperature drift internally compensated)

**operating voltage  $U_B$**  10 - 30 V DC, reverse polarity protection (Class 2)

**voltage ripple** ±10 %

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

**housing** brass sleeve, nickel-plated, plastic parts: PBT;

ultrasonic transducer: polyurethane foam, epoxy resin with glass content

15 Nm

IP 67

5-pin M12 circular plug

Teach-in via pin 5 (Com)

LED green (operation)

LED yellow (state of output)

Teach-in, LinkControl

internal synchronisation up to 10 sensors

-25°C to +70°C

-40°C to +85°C

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

switchable NOC/NCC, short-circuit-proof

2 mm

25 Hz

32 ms

< 300 ms

EN 60947-5-2

**order no. directly radiating**

**weight** lpc+15/CFF

35 g

**order no. angular head**

**weight** lpc+15/WK/CFF

40 g

±1 % (temperature drift internally compensated)

10 - 30 V DC, reverse polarity protection (Class 2)

±10 %

< 60 mA

brass sleeve, nickel-plated, plastic parts: PBT;

ultrasonic transducer: polyurethane foam, epoxy resin with glass content

15 Nm

IP 67

5-pin M12 circular plug

Teach-in via pin 5 (Com)

LED green (operation)

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Teach-in, LinkControl

internal synchronisation up to 10 sensors

-25°C to +70°C

-40°C to +85°C

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

switchable NOC/NCC, short-circuit-proof

3 mm

25 Hz

32 ms

< 300 ms

EN 60947-5-2

**order no. directly radiating**

**weight** lpc+25/CFF

35 g

**order no. angular head**

**weight** lpc+25/WK/CFF

40 g

±1 % (temperature drift internally compensated)

10 - 30 V DC, reverse polarity protection (Class 2)

±10 %

< 60 mA

brass sleeve, nickel-plated, plastic parts: PBT;

ultrasonic transducer: polyurethane foam, epoxy resin with glass content

15 Nm

IP 67

5-pin M12 circular plug

Teach-in via pin 5 (Com)

LED green (operation)

LED yellow (state of output)

Teach-in, LinkControl

internal synchronisation up to 10 sensors

-25°C to +70°C

-40°C to +85°C

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

switchable NOC/NCC, short-circuit-proof

5 mm

12 Hz

64 ms

< 300 ms

EN 60947-5-2

**order no. directly radiating**

**weight** lpc+35/CFF

35 g

**order no. angular head**

**weight** lpc+35/WK/CFF

40 g

±1 % (temperature drift internally compensated)

10 - 30 V DC, reverse polarity protection (Class 2)

±10 %

< 60 mA

brass sleeve, nickel-plated, plastic parts: PBT;

ultrasonic transducer: polyurethane foam, epoxy resin with glass content

15 Nm

IP 67

5-pin M12 circular plug

Teach-in via pin 5 (Com)

LED green (operation)

LED yellow (state of output)

Teach-in, LinkControl

internal synchronisation up to 10 sensors

-25°C to +70°C

-40°C to +85°C

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

switchable NOC/NCC, short-circuit-proof

20 mm

10 Hz

80 ms

< 300 ms

EN 60947-5-2

**order no. directly radiating**

**weight** lpc+100/CFF

35 g

**order no. angular head**

**weight** lpc+100/WK/CFF

40 g