



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 adjustments may only be carried out by qualified staff.

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- 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«.

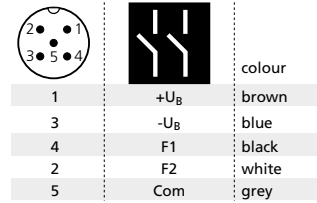


Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cables

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.

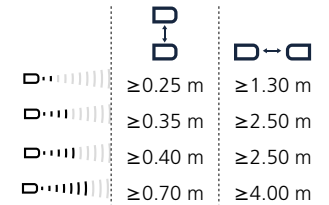


Fig. 2: Assembly distances

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.

Contact

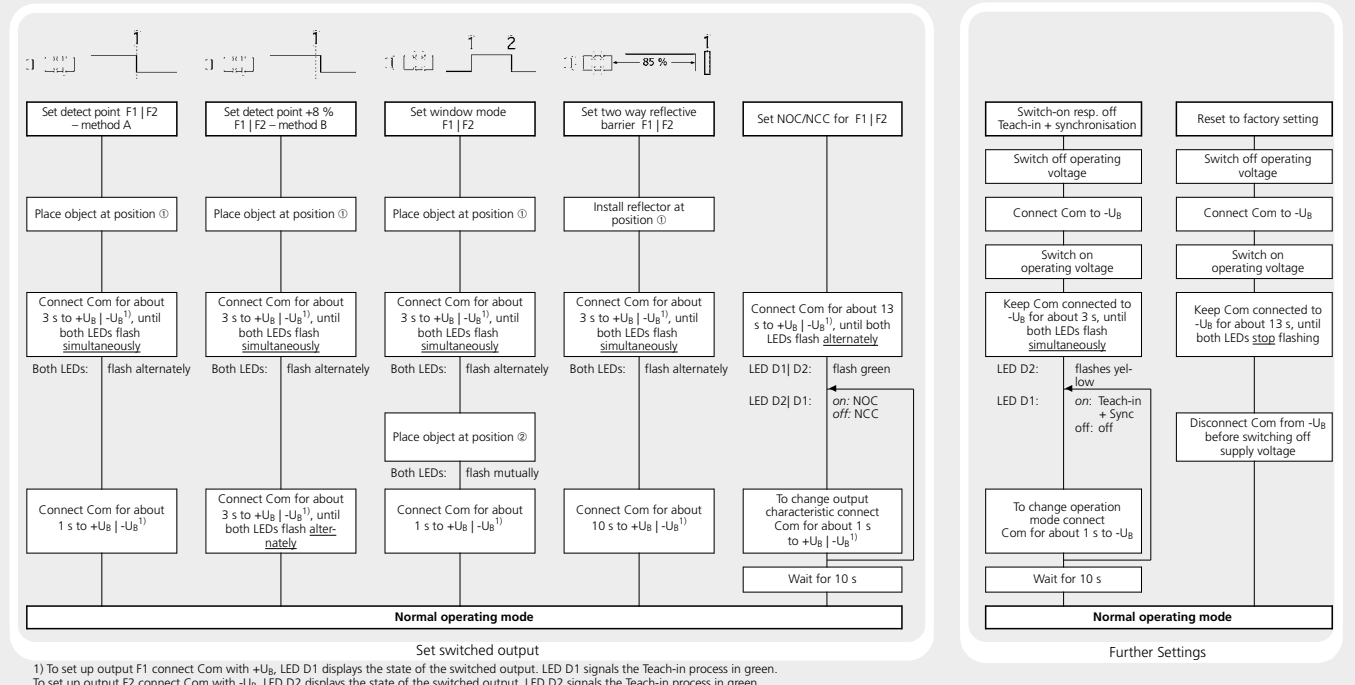
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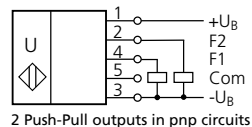
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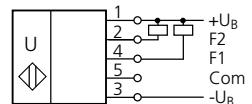
Sensor adjustment with Teach-in procedure



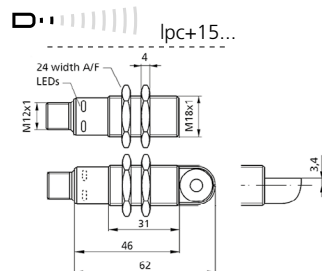
Technical data



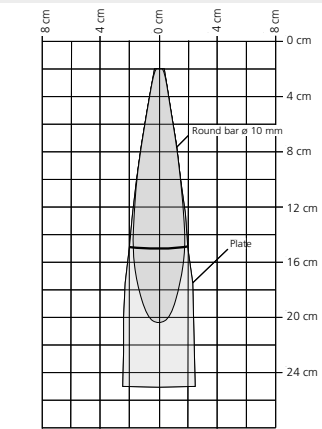
2 Push-Pull outputs in pnp circuits



2 Push-Pull outputs in npn circuits

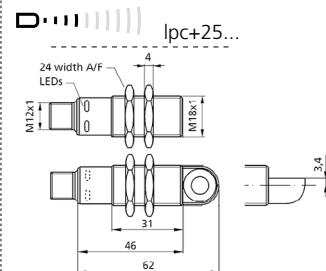


blind zone 20 mm
operating range 150 mm
maximum range 250 mm
angle of beam spread see detection zone
transducer frequency 380 kHz
resolution 0,1 mm
reproducibility ± 0.15 %

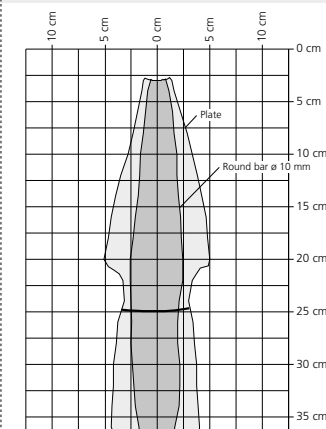


accuracy ±1 % (temperature drift internally compensated)
operating voltage U_B 10 - 30 V DC, reverse polarity protection (Class 2)
voltage ripple ±10 %
no-load current consumption < 60 mA
housing brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content
max. tightening torque of nuts 15 Nm
class of protection per EN 60 529 IP 67
type of connection 5-pin M12 circular plug
controls Teach-in via pin 5 (Com)
indicators LED green (operation)
 LED yellow (state of output)
programmable Teach-in, LinkControl
synchronisation internal synchronisation up to 10 sensors
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
switched output Push-Pull, U_B -3 V, $-U_B$ +3 V, I_{max} = 100 mA switchable NOC/NCC, short-circuit-proof
switching hysteresis ¹⁾ 2 mm
switching frequency ¹⁾ 25 Hz
response time ¹⁾ 32 ms
time delay before availability ¹⁾ < 300 ms
norm conformity EN 60947-5-2

order no. directly radiating lpc+15/CFF
weight 35 g
order no. angular head lpc+15/WK/CFF
weight 40 g

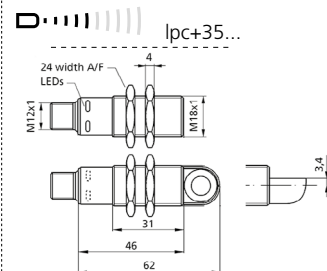


blind zone 30 mm
operating range 250 mm
maximum range 350 mm
angle of beam spread see detection zone
transducer frequency 320 kHz
resolution 0,1 mm
reproducibility ± 0.15 %

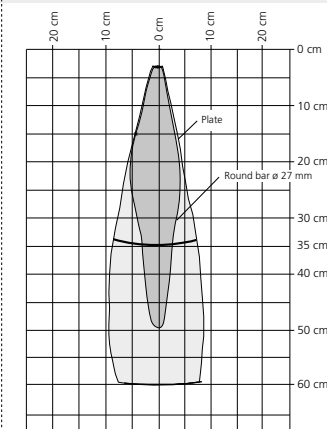


accuracy ±1 % (temperature drift internally compensated)
operating voltage U_B 10 - 30 V DC, reverse polarity protection (Class 2)
voltage ripple ±10 %
no-load current consumption < 60 mA
housing brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content
max. tightening torque of nuts 15 Nm
class of protection per EN 60 529 IP 67
type of connection 5-pin M12 circular plug
controls Teach-in via pin 5 (Com)
indicators LED green (operation)
 LED yellow (state of output)
programmable Teach-in, LinkControl
synchronisation internal synchronisation up to 10 sensors
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
switched output Push-Pull, U_B -3 V, $-U_B$ +3 V, I_{max} = 100 mA switchable NOC/NCC, short-circuit-proof
switching hysteresis ¹⁾ 3 mm
switching frequency ¹⁾ 25 Hz
response time ¹⁾ 32 ms
time delay before availability ¹⁾ < 300 ms
norm conformity EN 60947-5-2

order no. directly radiating lpc+25/CFF
weight 35 g
order no. angular head lpc+25/WK/CFF
weight 40 g

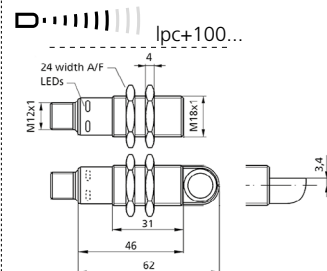


blind zone 65 mm
operating range 350 mm
maximum range 600 mm
angle of beam spread see detection zone
transducer frequency 400 kHz
resolution 0,1 mm
reproducibility ± 0.15 %

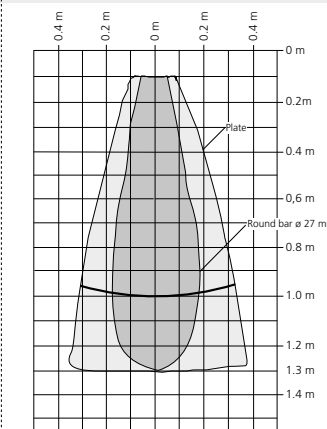


accuracy ±1 % (temperature drift internally compensated)
operating voltage U_B 10 - 30 V DC, reverse polarity protection (Class 2)
voltage ripple ±10 %
no-load current consumption < 60 mA
housing brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content
max. tightening torque of nuts 15 Nm
class of protection per EN 60 529 IP 67
type of connection 5-pin M12 circular plug
controls Teach-in via pin 5 (Com)
indicators LED green (operation)
 LED yellow (state of output)
programmable Teach-in, LinkControl
synchronisation internal synchronisation up to 10 sensors
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
switched output Push-Pull, U_B -3 V, $-U_B$ +3 V, I_{max} = 100 mA switchable NOC/NCC, short-circuit-proof
switching hysteresis ¹⁾ 5 mm
switching frequency ¹⁾ 12 Hz
response time ¹⁾ 64 ms
time delay before availability ¹⁾ < 300 ms
norm conformity EN 60947-5-2

order no. directly radiating lpc+35/CFF
weight 35 g
order no. angular head lpc+35/WK/CFF
weight 40 g



blind zone 120 mm
operating range 1,000 mm
maximum range 1,300 mm
angle of beam spread see detection zone
transducer frequency 200 kHz
resolution 0,1 mm
reproducibility ± 0.15 %



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
max. tightening torque of nuts 15 Nm
class of protection per EN 60 529 IP 67
type of connection 5-pin M12 circular plug
controls Teach-in via pin 5 (Com)
indicators LED green (operation)
 LED yellow (state of output)
programmable Teach-in, LinkControl
synchronisation internal synchronisation up to 10 sensors
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
switched output Push-Pull, U_B -3 V, $-U_B$ +3 V, I_{max} = 100 mA switchable NOC/NCC, short-circuit-proof
switching hysteresis ¹⁾ 20 mm
switching frequency ¹⁾ 10 Hz
response time ¹⁾ 80 ms
time delay before availability ¹⁾ < 300 ms
norm conformity EN 60947-5-2

order no. directly radiating lpc+100/CFF
weight 35 g
order no. angular head lpc+100/WK/CFF
weight 40 g

■ 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.

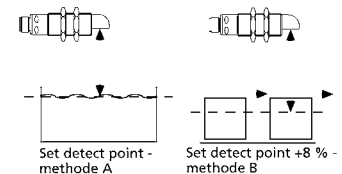


Fig. 3: Setting the detect point for different directions of movement of the object

- 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 informations about start-up and configuration of lpc+ sensors with IO-Link, you will find online at: www.microsonic.de/lpc+

