



Operating Manual

Ultrasonic proximity switch with one switched output

- nero-15/CD nero-15/CE
- nero-25/CD nero-25/CE
- nero-35/CD nero-35/CE
- nero-100/CD nero-100/CE

- nero-15/WK/CD nero-15/WK/CE
- nero-25/WK/CD nero-25/WK/CE
- nero-35/WK/CD nero-35/WK/CE
- nero-100/WK/CD nero-100/WK/CE

Product description

The nero-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.

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

nero-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. The assembly distances shown in fig. 2 for two or more sensors should not be fallen below in order to avoid mutual interference.

Start-up

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

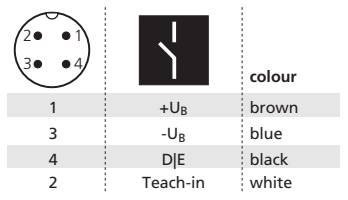


Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cables

Factory setting

- Detect point operation
- Switched output on NOC
- Detect distance at operating range

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.

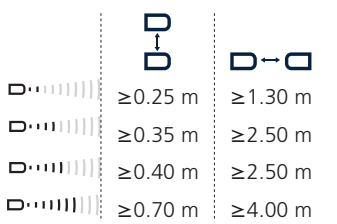


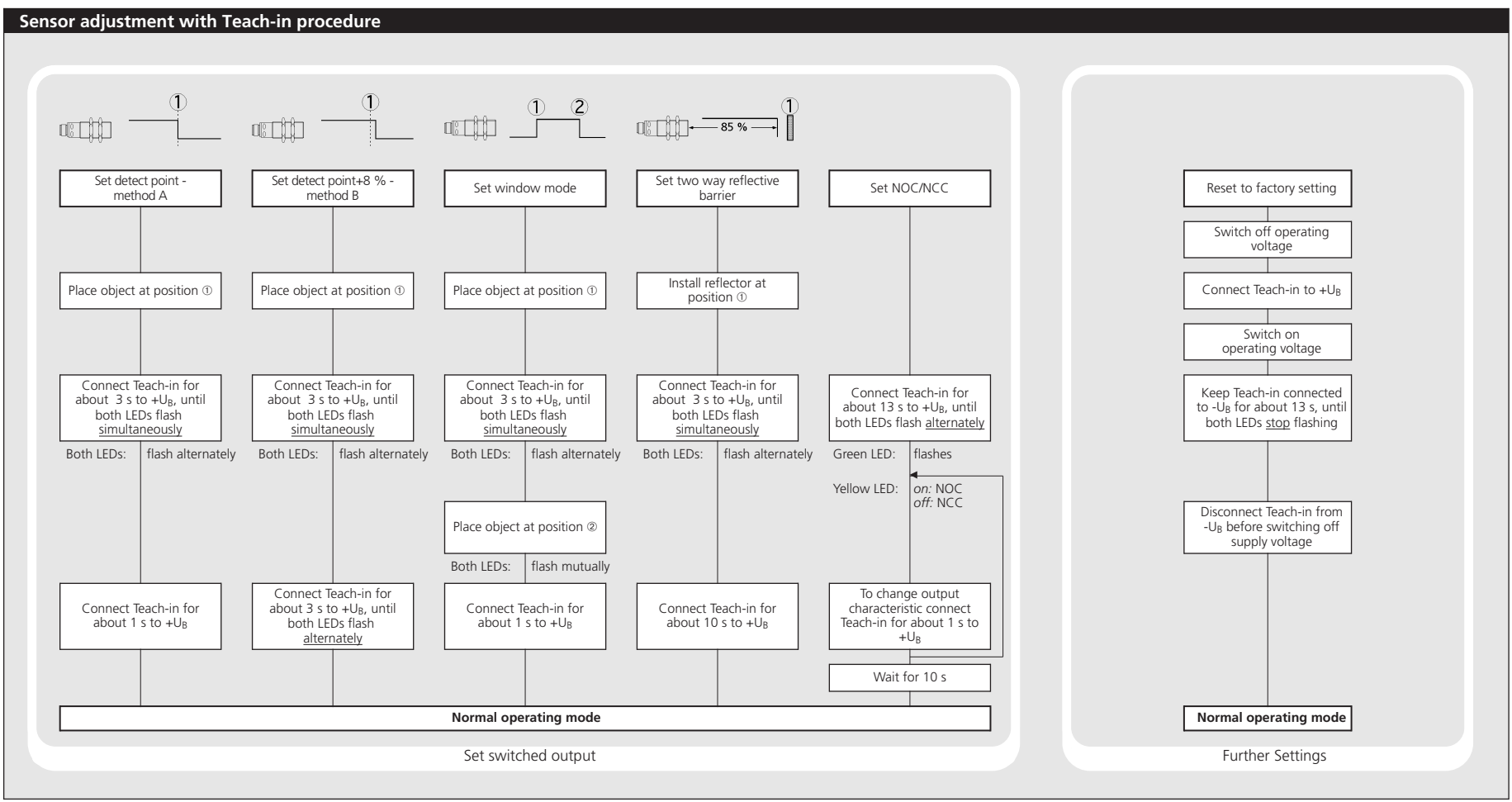
Fig.2: Assembly distances

Maintenance

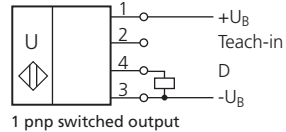
microsonic sensors are maintenance-free. In case of excess caked-on dirt we recommend cleaning the white sensor surface.

Notes

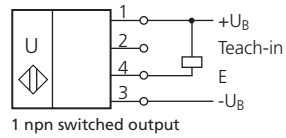
- The sensors of the nero-family have a blind zone, within which a distance measurement is not possible.
- In the normal operating mode, an illuminated yellow LED signals that the switched output is switched through.
- In the »Two-way reflective barrier« operating mode, the object has to be within the 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.
- 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



1 pnp switched output



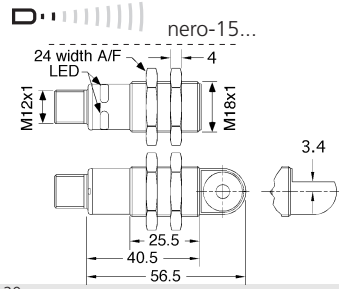
1 npn switched output

blind zone 20 mm
operating range 150 mm
maximum range 250 mm
angle of beam spread See detection zone
transducer frequency 380 kHz
resolution, sampling rate 0.20 mm
reproducibility ± 0.15 %

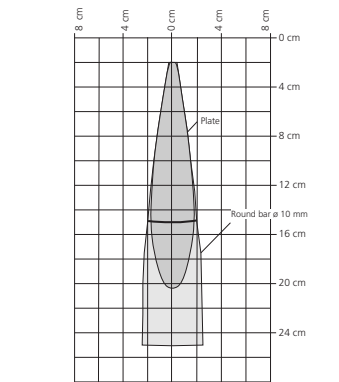
detection zones for different objects:
 The dark grey areas represent the zone where it is easy to recognise the normal reflector (round bar). This indicates the typical operating range of the sensors. The light grey areas represent the zone where a very large reflector - for instance a plate - can still be recognized. The requirement here is for an optimum alignment to the sensor. It is not possible to evaluate ultrasonic reflections outside this area.

accuracy temperature drift 0,17 %/°C
operating voltage UB 10 - 30 V DC, reverse polarity protection
voltage ripple ±10 %
no-load current consumption < 40 mA
housing PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content
max. tightening torque of nuts 1 Nm
class of protection per EN 60 529 IP 67
type of connection 4-pin M12 circular plug
controls Teach-in via pin 2 (Teach-in)
indicators LED green (operation)
 LED yellow (state of output)
programmable Teach-in
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
switching hysteresis 2 mm
switching frequency 25 Hz
response time 32 ms
time delay before availability < 300 ms
norm conformity EN 60947-5-2

order no. directly radiating pnp switched output **nero-15/CD**
 pnp, UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
order no. directly radiating npn switched output **nero-15/CE**
 npn, -UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
weight 15 g
order no. angular head pnp switched output **nero-15/WK/CD**
 pnp, UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
order no. angular head npn switched output **nero-15/WK/CE**
 npn, -UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
weight 20g

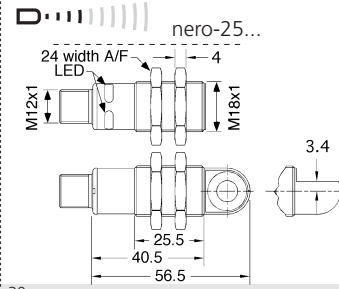


blind zone 30 mm
operating range 250 mm
maximum range 350 mm
angle of beam spread See detection zone
transducer frequency 320 kHz
resolution, sampling rate 0.20 mm
reproducibility ± 0.15 %

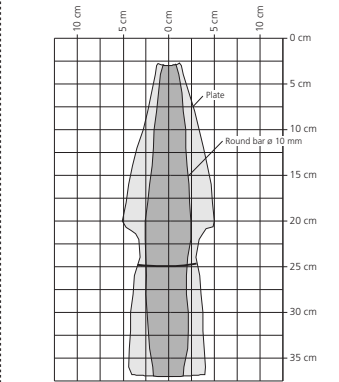


accuracy temperature drift 0,17 %/°C
operating voltage UB 10 - 30 V DC, reverse polarity protection
voltage ripple ±10 %
no-load current consumption < 40 mA
housing PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content
max. tightening torque of nuts 1 Nm
class of protection per EN 60 529 IP 67
type of connection 4-pin M12 circular plug
controls Teach-in via pin 2 (Teach-in)
indicators LED green (operation)
 LED yellow (state of output)
programmable Teach-in
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
switching hysteresis 3 mm
switching frequency 25 Hz
response time 32 ms
time delay before availability < 300 ms
norm conformity EN 60947-5-2

order no. directly radiating pnp switched output **nero-25/CD**
 pnp, UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
order no. directly radiating npn switched output **nero-25/CE**
 npn, -UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
weight 15 g
order no. angular head pnp switched output **nero-25/WK/CD**
 pnp, UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
order no. angular head npn switched output **nero-25/WK/CE**
 npn, -UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
weight 20g

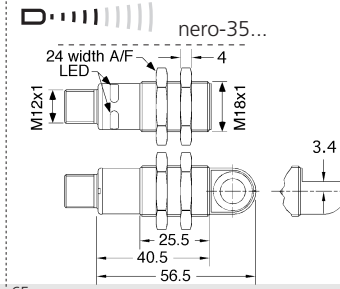


blind zone 65 mm
operating range 350 mm
maximum range 600 mm
angle of beam spread See detection zone
transducer frequency 400 kHz
resolution, sampling rate 0.20 mm
reproducibility ± 0.15 %

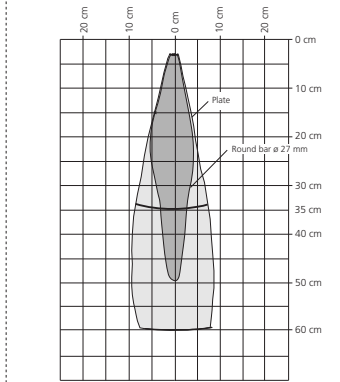


accuracy temperature drift 0,17 %/°C
operating voltage UB 10 - 30 V DC, reverse polarity protection
voltage ripple ±10 %
no-load current consumption < 40 mA
housing PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content
max. tightening torque of nuts 1 Nm
class of protection per EN 60 529 IP 67
type of connection 4-pin M12 circular plug
controls Teach-in via pin 2 (Teach-in)
indicators LED green (operation)
 LED yellow (state of output)
programmable Teach-in
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
switching hysteresis 5 mm
switching frequency 12 Hz
response time 70 ms
time delay before availability < 300 ms
norm conformity EN 60947-5-2

order no. directly radiating pnp switched output **nero-35/CD**
 pnp, UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
order no. directly radiating npn switched output **nero-35/CE**
 npn, -UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
weight 15 g
order no. angular head pnp switched output **nero-35/WK/CD**
 pnp, UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
order no. angular head npn switched output **nero-35/WK/CE**
 npn, -UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
weight 20g

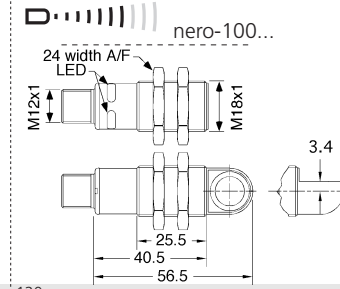


blind zone 120 mm
operating range 1,000 mm
maximum range 1,300 mm
angle of beam spread See detection zone
transducer frequency 200 kHz
resolution, sampling rate 0.20 mm
reproducibility ± 0.15 %

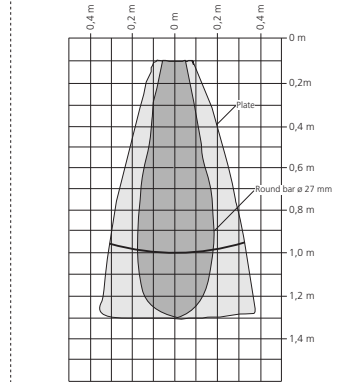


accuracy temperature drift 0,17 %/°C
operating voltage UB 10 - 30 V DC, reverse polarity protection
voltage ripple ±10 %
no-load current consumption < 40 mA
housing PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content
max. tightening torque of nuts 1 Nm
class of protection per EN 60 529 IP 67
type of connection 4-pin M12 circular plug
controls Teach-in via pin 2 (Teach-in)
indicators LED green (operation)
 LED yellow (state of output)
programmable Teach-in
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
switching hysteresis 20 mm
switching frequency 10 Hz
response time 100 ms
time delay before availability < 300 ms
norm conformity EN 60947-5-2

order no. directly radiating pnp switched output **nero-100/CD**
 pnp, UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
order no. directly radiating npn switched output **nero-100/CE**
 npn, -UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
weight 15 g
order no. angular head pnp switched output **nero-100/WK/CD**
 pnp, UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
order no. angular head npn switched output **nero-100/WK/CE**
 npn, -UB+2V, I_{max} = 200 mA
 switchable NOC/NCC, short-circuit-proof
weight 20g



blind zone 20 mm
operating range 150 mm
maximum range 250 mm
angle of beam spread See detection zone
transducer frequency 380 kHz
resolution, sampling rate 0.20 mm
reproducibility ± 0.15 %



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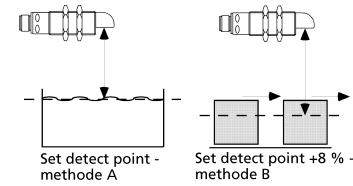


Fig. 4: Setting the detect point for different directions of movement of the object

- The sensor can be reset to its factory setting (see »Further settings«).



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