



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 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.

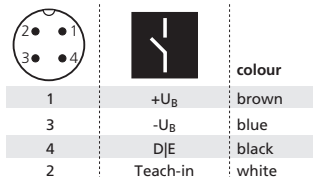


Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cables

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.

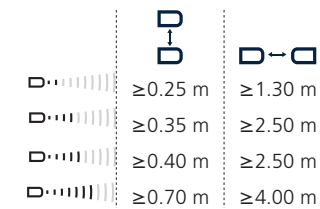


Fig. 2: Assembly distances

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.

Contact

Sensor Partners BV

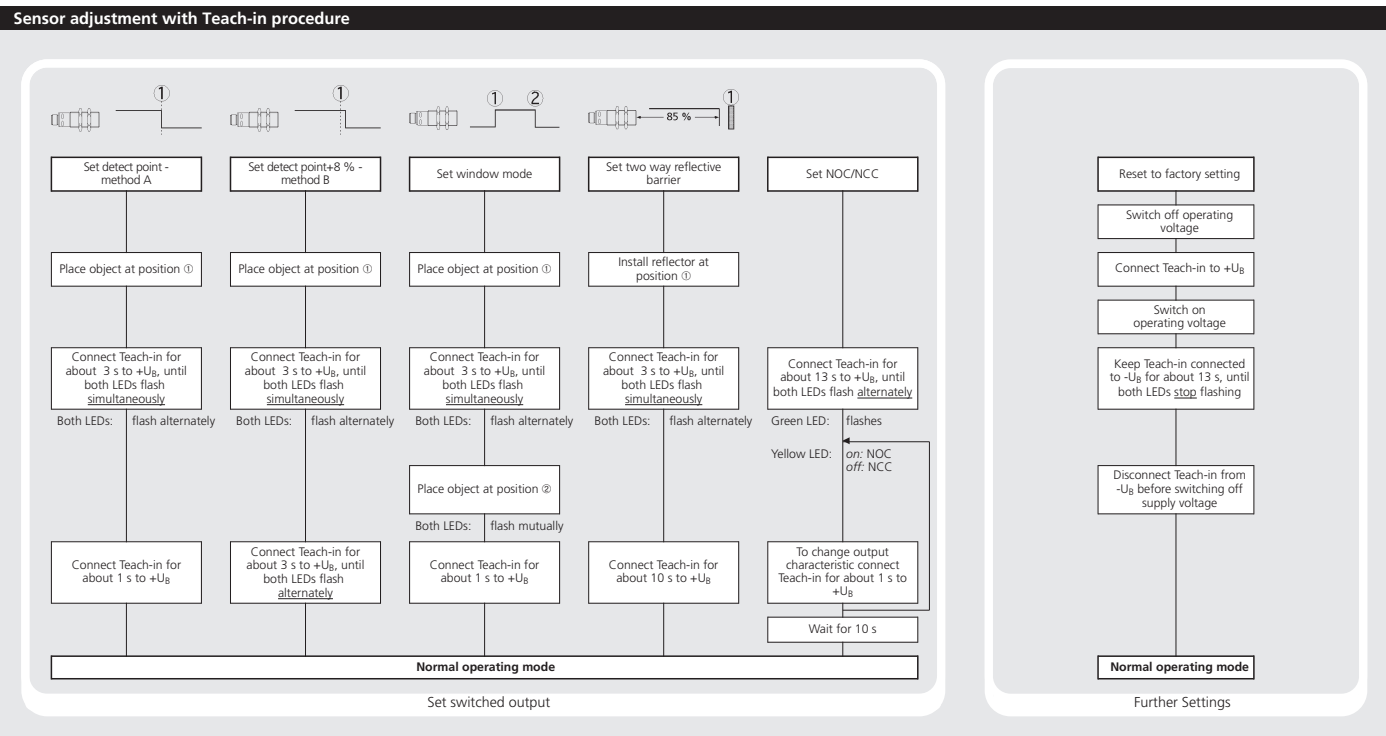
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Technical data

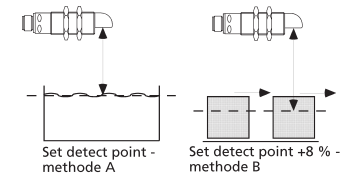
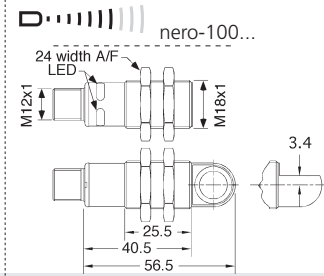
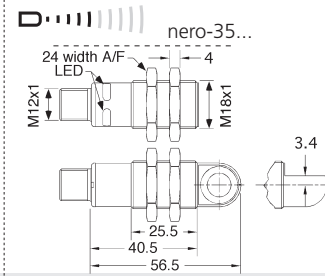
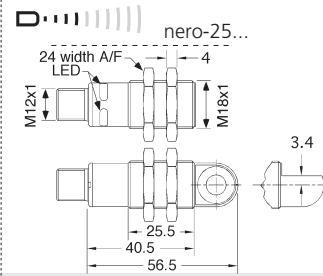
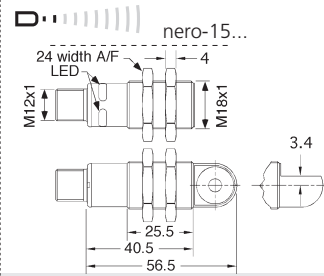
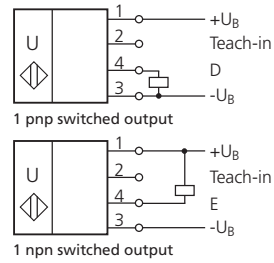


Fig. 4: Setting the detect point for different directions of movement of the object

	blind zone 20 mm	blind zone 30 mm	blind zone 65 mm	blind zone 120 mm
operating range	150 mm	250 mm	350 mm	1,000 mm
maximum range	250 mm	350 mm	600 mm	1,300 mm
angle of beam spread	See detection zone	See detection zone	See detection zone	See detection zone
transducer frequency	380 kHz	320 kHz	400 kHz	200 kHz
resolution, sampling rate	0.20 mm	0.20 mm	0.20 mm	0.20 mm
reproducibility	± 0.15 %	± 0.15 %	± 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 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	temperature drift 0,17 %/°C	temperature drift 0,17 %/°C	temperature drift 0,17 %/°C
operating voltage UB	10 - 30 V DC, reverse polarity protection	10 - 30 V DC, reverse polarity protection	10 - 30 V DC, reverse polarity protection	10 - 30 V DC, reverse polarity protection
voltage ripple	±10 %	±10 %	±10 %	±10 %
no-load current consumption	< 40 mA	< 40 mA	< 40 mA	< 40 mA
housing	PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content	PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content	PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content	PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content
max. tightening torque of nuts	1 Nm	1 Nm	1 Nm	1 Nm
class of protection per EN 60 529	IP 67	IP 67	IP 67	IP 67
type of connection	4-pin M12 circular plug	4-pin M12 circular plug	4-pin M12 circular plug	4-pin M12 circular plug
controls	Teach-in via pin 2 (Teach-in)	Teach-in via pin 2 (Teach-in)	Teach-in via pin 2 (Teach-in)	Teach-in via pin 2 (Teach-in)
indicators	LED green (operation) LED yellow (state of output)	LED green (operation) LED yellow (state of output)	LED green (operation) LED yellow (state of output)	LED green (operation) LED yellow (state of output)
programmable	Teach-in	Teach-in	Teach-in	Teach-in
operating temperature	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C
storage temperature	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
switching hysteresis	2 mm	3 mm	5 mm	20 mm
switching frequency	25 Hz	25 Hz	12 Hz	10 Hz
response time	32 ms	32 ms	70 ms	100 ms
time delay before availability	< 300 ms	< 300 ms	< 300 ms	< 300 ms
norm conformity	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
order no. directly radiating pnp switched output	nero-15/CD pnp, UB=2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof	nero-25/CD pnp, UB=2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof	nero-35/CD pnp, UB=2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof	nero-100/CD pnp, UB=2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof
order no. directly radiating npn switched output	nero-15/CE nnp, -UB+2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof	nero-25/CE nnp, -UB+2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof	nero-35/CE nnp, -UB+2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof	nero-100/CE nnp, -UB+2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof
weight	15 g	15 g	15 g	15 g
order no. angular head pnp switched output	nero-15/WK/CD pnp, UB=2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof	nero-25/WK/CD pnp, UB=2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof	nero-35/WK/CD pnp, UB=2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof	nero-100/WK/CD pnp, UB=2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof
order no. angular head npn switched output	nero-15/WK/CE nnp, -UB+2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof	nero-25/WK/CE nnp, -UB+2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof	nero-35/WK/CE nnp, -UB+2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof	nero-100/WK/CE nnp, -UB+2V, Imax = 200 mA switchable NOC/NCC, short-circuit-proof
weight	20g	20g	20g	20g

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

