microsonic

Operating Manual

Ultrasonic proximity switch with one analogue output

nero-15/CI
nero-25/CI
nero-35/CI
nero-100/CI
nero-15/WK/CI
nero-25/WK/CI
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nero-100/WK/CI

nero-15/CU
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nero-35/WK/CU
nero-100/WK/CU

Product description

The nero sensor offers a non-contact measurement of the distance to an object that has to be positioned within the sensor's detection zone. Depending on the set window limits, a distance-proportional analogue signal is output.
The window limits of the analogue output and its characteristic can be adjusted with the Teach-in procedure. Two LEDs indicate operation and the state of the analogue output.

Safety instructions

- **Read the operating manual 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 in the area of personal and machine protection not permitted.**

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, see Fig. 1.

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

		colour
1	$+U_B$	brown
3	$-U_B$	blue
4	Teach-in	black
2	U/I	white

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

Start-up

➔ Connect the power supply.
➔ Carry out sensor adjustment in accordance with Diagram 1.

Factory setting

nero-sensors are delivered factory made with the following settings:

- Rising analogue characteristic curve between the blind zone and the operating range
- »Teach-in« active

	D↕D	D↔D
nero-15...	≥0.25 m	≥1.30 m
nero-25...	≥0.35 m	≥2.50 m
nero-35...	≥0.40 m	≥2.50 m
nero-100...	≥0.70 m	≥4.00 m

Fig. 2: Minimal assembly distances

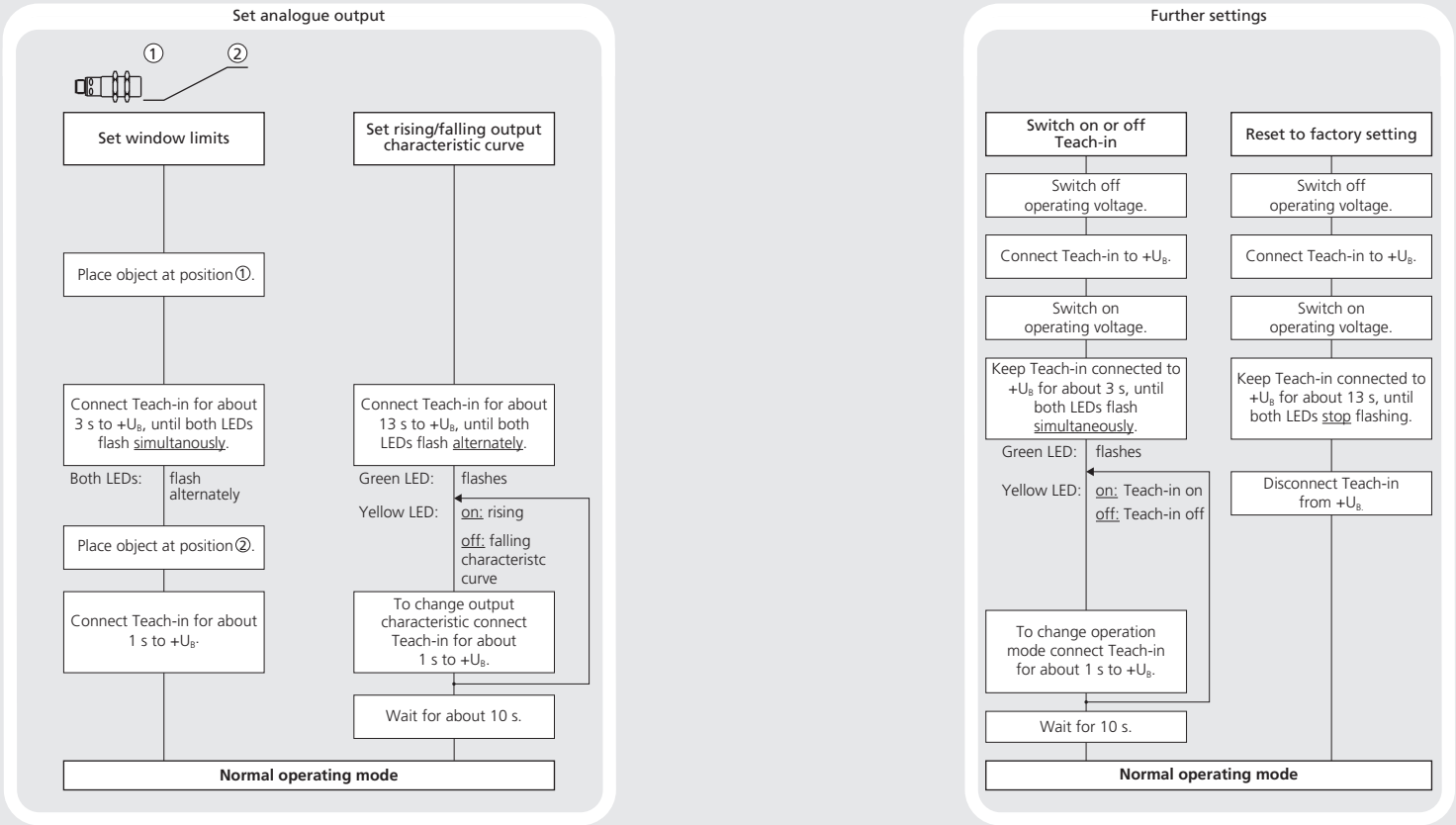
Maintenance

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

Notes

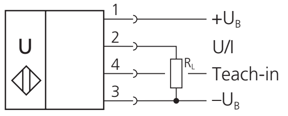
- The sensors of the nero family have a blind zone, within which a distance measurement is not possible.
- In the normal operating mode, an illuminated yellow LED signals the object is within the adjusted window limits.
- The sensor can be reset to its factory setting (see »Further settings«, Diagram 1).

Diagram 1: Set sensor parameters via Teach-in procedure

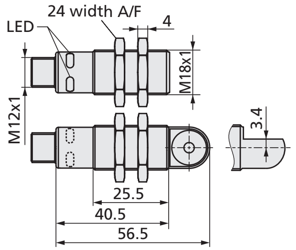


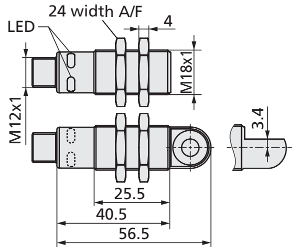
Technichal data

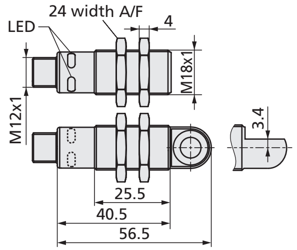
	nero-15...	nero-25...	nero-35...	nero-100...

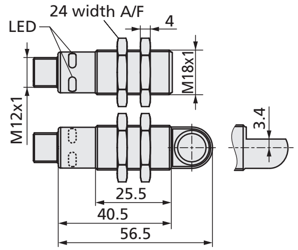


1 analogue output



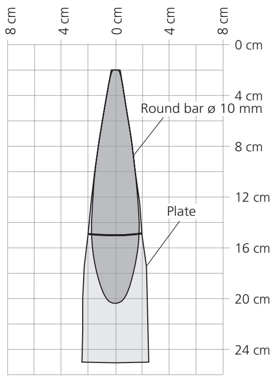


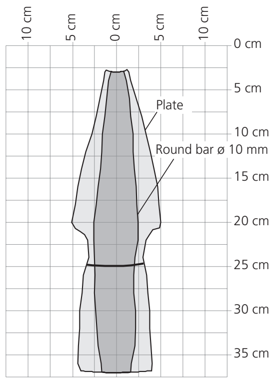


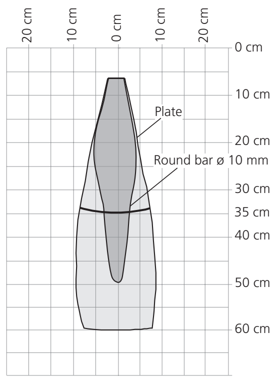


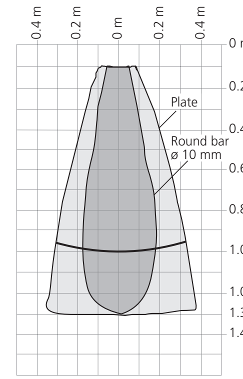
	nero-15...	nero-25...	nero-35...	nero-100...
blind zone	20 mm	30 mm	65 mm	120 mm
operating range	150 mm	250 mm	350 mm	1,000 mm
maximum range	250 mm	350 mm	600 mm	1,300 mm
angle of beam spread	see detection zone	see detection zone	see detection zone	see detection zone
transducer frequency	380 kHz	320 kHz	400 kHz	200 kHz
resolution	0.056 to 0.297 mm, depending on the analogue window	0.056 bis 0.413 mm, depending on the analogue window	0.056 bis 0.691 mm, depending on the analogue window	0.056 to 1.525 mm, depending on the analogue window

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.









	nero-15...	nero-25...	nero-35...	nero-100...
reproducibility	±0.15 %	±0.15 %	±0.15 %	±0.15 %
accuracy	temperature drift 0.17 %/°C	temperature drift 0.17 %/°C	temperature drift 0.17 %/°C	temperature drift 0.17 %/°C
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 60529	IP 67	IP 67	IP 67	IP 67
norm conformity	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
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 4	Teach-in via pin 4	Teach-in via pin 4	Teach-in via pin 4
indicators	LED green, LED yellow	LED green, LED yellow	LED green, LED yellow	LED green, LED yellow
programmable	Teach-in	Teach-in	Teach-in	Teach-in
operating temperature	–25 to +70 °C	–25 to +70 °C	–25 to +70 °C	–25 to +70 °C
storage temperature	–40 to +85 °C	–40 to +85 °C	–40 to +85 °C	–40 to +85 °C
response time	32 ms	32 ms	64 ms	80 ms
time delay before availability	<300 ms	<300 ms	<300 ms	<300 ms
analogue output 4 to 20 mA	R_L ≤ 500 Ω, rising/falling characteristic	R_L ≤ 500 Ω, rising/falling characteristic	R_L ≤ 500 Ω, rising/falling characteristic	R_L ≤ 500 Ω, rising/falling characteristic
operating voltage U_B	10 to 30 V DC for R_L ≤ 100 Ω, 20 to 30 V DC for R_L > 100 Ω, terminal reverse polarity protected, Class 2	10 to 30 V DC for R_L ≤ 100 Ω, 20 to 30 V DC for R_L > 100 Ω, terminal reverse polarity protected, Class 2	10 to 30 V DC for R_L ≤ 100 Ω, 20 to 30 V DC for R_L > 100 Ω, terminal reverse polarity protected, Class 2	10 to 30 V DC for R_L ≤ 100 Ω, 20 to 30 V DC for R_L > 100 Ω, terminal reverse polarity protected, Class 2
order no. directly radiating	**nero-15/CI**	**nero-25/CI**	**nero-35/CI**	**nero-100/CI**
weight	15 g	15 g	15 g	15 g
order no. angular head	**nero-15/WK/CI**	**nero-25/WK/CI**	**nero-35/WK/CI**	**nero-100/WK/CI**
weight	20 g	20 g	20 g	20 g
analogue output 0 to 10 V	R_L ≥ 100 kΩ, short-circuit-proof, rising/falling characteristic	R_L ≥ 100 kΩ, short-circuit-proof, rising/falling characteristic	R_L ≥ 100 kΩ, short-circuit-proof, rising/falling characteristic	R_L ≥ 100 kΩ, short-circuit-proof, rising/falling characteristic
	15 to 30 V DC, terminal reverse polarity protected, Class 2	15 to 30 V DC, terminal reverse polarity protected, Class 2	15 to 30 V DC, terminal reverse polarity protected, Class 2	15 to 30 V DC, terminal reverse polarity protected, Class 2
order no. directly radiating	**nero-15/CU**	**nero-25/CU**	**nero-35/U**	**nero-100/CU**
weight	15 g	15 g	15 g	15 g
order no. angular head	**nero-15/WK/CU**	**nero-25/WK/CU**	**nero-35/WK/CU**	**nero-100/WK/CU**
weight	20 g	20 g	20 g	20 g

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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.

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