microsonic nero-15-CI Ultrasonic Proximity Switch with One Analogue Output Instruction Manual

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microsonic nero-15-CI Ultrasonic Proximity Switch with One Analogue Output

Product Information

Analogue Output

The Nero sensor is a non-contact measurement device used to detect the distance of an object within its detection zone. The device comes in various models, including nero-15/CI, nero-25/CI, nero-35/CI, nero-100/CI, nero-15/WK/CI, nero-25/WK/CI, nero-35/WK/CI, and nero-100/WK/CI. It also includes models with a CU suffix, which indicates a different housing material. The device has one analogue output that produces a distance-proportional signal that can be adjusted using the Teach-in procedure. The device includes two LEDs that indicate operation and the state of the analogue output.

Safety Instructions

Before starting up the device, read the operating manual carefully. Only qualified personnel should carry out connection, installation, and adjustments. The device is not a safety component and should not be used for personal and machine protection. Use the device only for its intended purpose.

Product Usage Instructions

To use the Nero sensor:

1. Connect the M12 device plug according to the pin assignment shown in Fig. 1.
2. Ensure that the minimum assembly distances shown in Fig. 2 are not fallen below when using two or more sensors to avoid mutual interference.
3. Use the Teach-in procedure to adjust the window limits and characteristic curve of the analogue output. Refer to Diagram 1 for instructions on setting sensor parameters via Teach-in.
4. In normal operating mode, an illuminated yellow LED signals that an object is within the adjusted window limits.
5. Note that the device has a blind zone within which distance measurement is not possible.
6. If excess caked-on dirt accumulates on the white sensor surface, clean it as recommended.

Ultrasonic proximity switch with one analogue output

- nero-15/CI nero-15/CU
- nero-25/CI nero-25/CU
- nero-35/CI nero-35/CU

- nero-100/CI nero-100/CU
- nero-15/WK/CI nero-15/WK/CU
- nero-25/WK/CI nero-25/WK/CU
- nero-35/WK/CI nero-35/WK/CU
- nero-100/WK/CI 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 settings window limits, a dis-tance-proportional analogue signal is an output.

The window limits of the analogue output and its characteristic can be adjusted with the Teach-in procedure. Two LEDs indicate the operation and the state of the analogue output.

Safety instructions

- Read the operating manual prior to start-up.
- Connection, installation, and ad- adjustments may only be carried out by qualified staff.
- No safety component in accordance with the EU Machine Directive, use in the area of per-sonal 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 the 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.

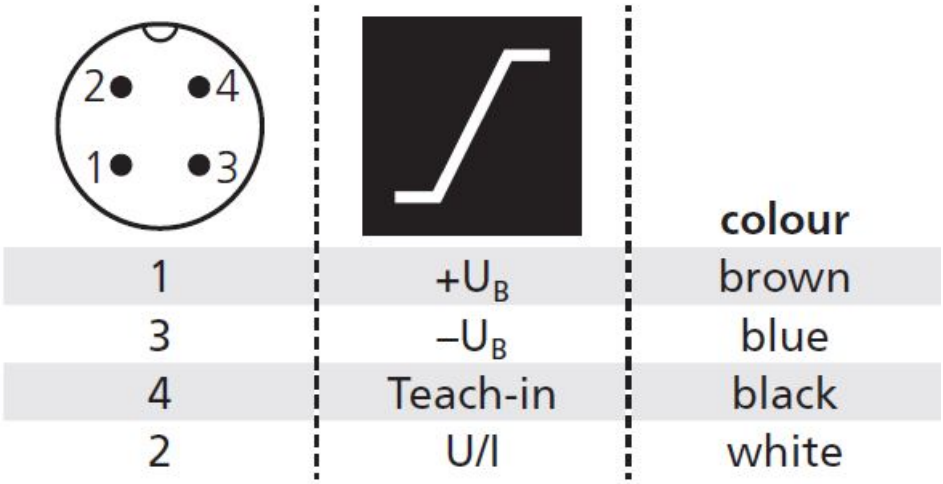


Fig. 1: Pin assignment with view onto sensor plug and color coding of the microscopic connection cable

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:

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

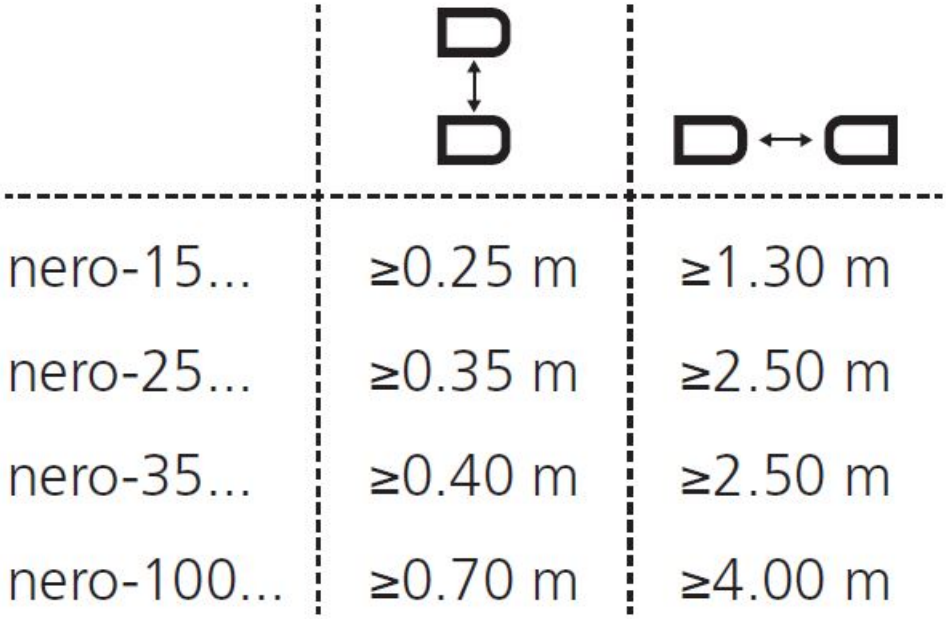


Fig. 2: Minimal assembly distances

Maintenance

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

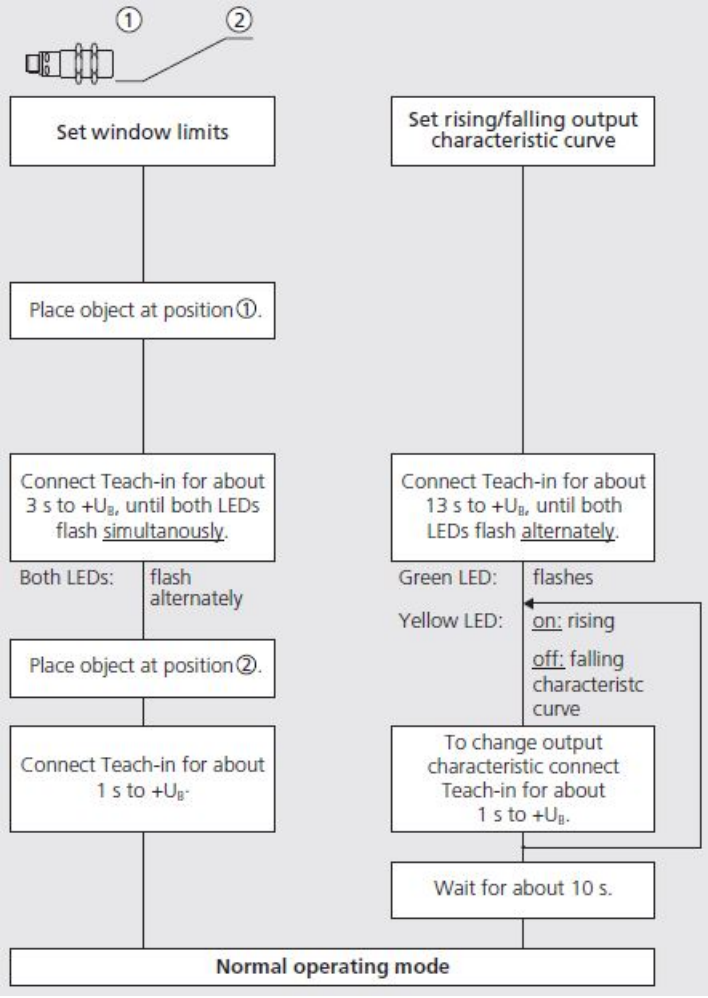
Notes

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

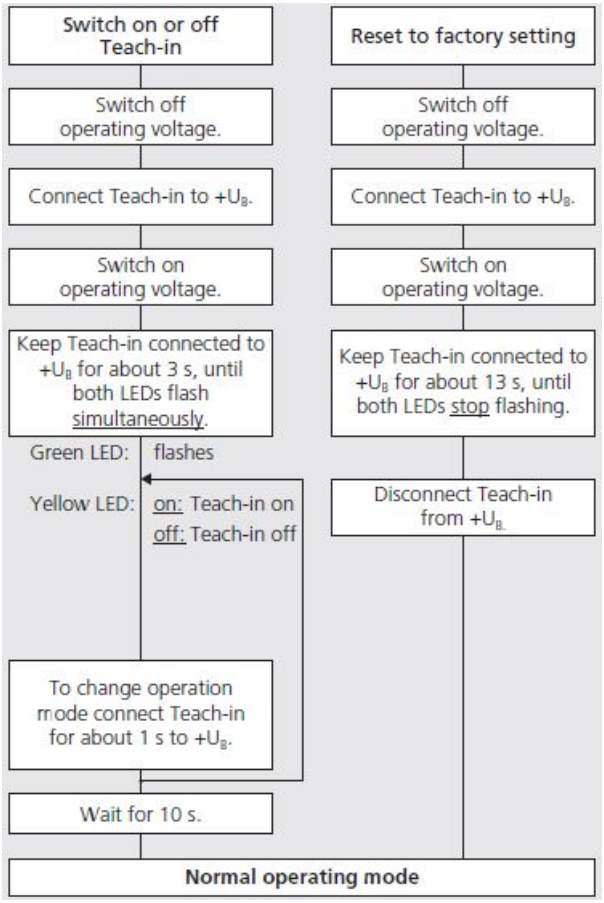
Set sensor parameters via the Teach-in procedure

Diagram 1: Set sensor parameters via the Teach-in procedure

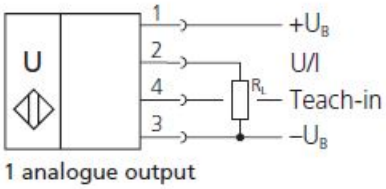
Set analogue output



Further settings

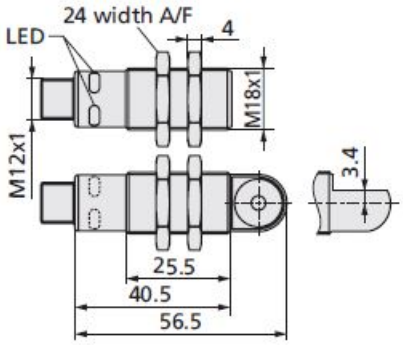


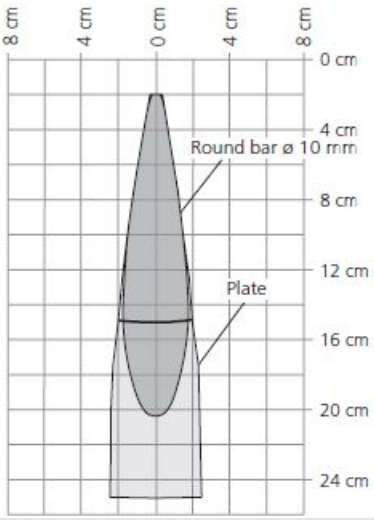
Technical data

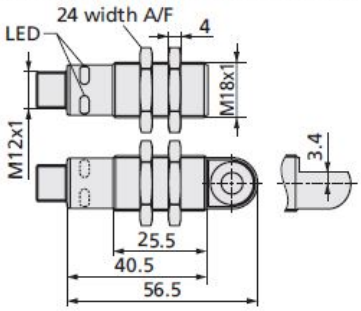
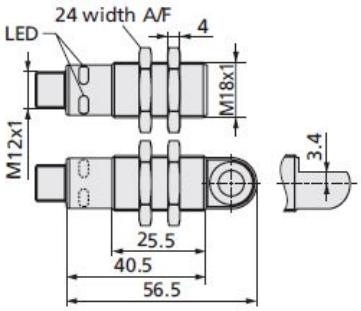
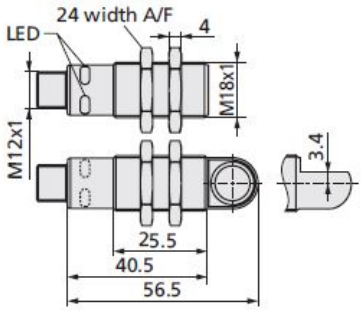
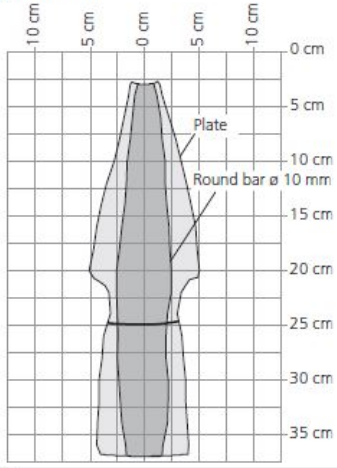
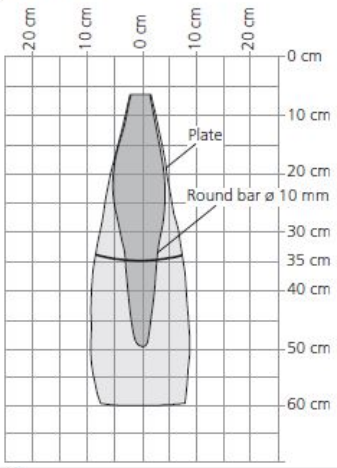
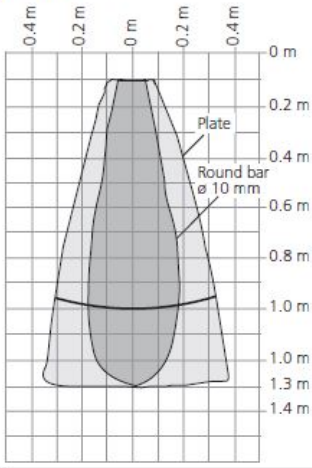


1 analogue output

nero-15...



blind zone	20 mm
operating range	150 mm
maximum range	250 mm
angle of beam spread	see detection zone
transducer frequency	380 kHz
resolution	0.056 to 0.297 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.	
reproducibility	±0.15 %
accuracy	temperature drift 0.17 %/°C
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 60529	IP 67
norm conformity	EN 60947-5-2
type of connection	4-pin M12 circular plug
controls	Teach-in via pin 4
indicators	LED green, LED yellow
programmable	Teach-in
operating temperature	–25 to +70 °C
storage temperature	–40 to +85 °C
response time	32 ms
time delay before availability	<300 ms
analogue output 4 to 20 mA	$R_L \leq 500\ \Omega$, rising/falling characteristic
operating voltage U_B	10 to 30 V DC for $R_L \leq 100\ \Omega$, 20 to 30 V DC for $R_L > 100\ \Omega$, terminal reverse polarity protected, Class 2
order no. directly radiating	**nero-15/CI**
weight	15 g
order no. angular head	**nero-15/WK/CI**
weight	20 g
analogue output 0 to 10 V	$R_L \geq 100\ k\Omega$, short-circuit-proof, rising/falling characteristic 15 to 30 V DC, terminal reverse polarity protected, Class 2
order no. directly radiating	**nero-15/CU**
weight	15 g
order no. angular head	**nero-15/WK/CU**
weight	20 g

nero-25...	nero-35...	nero-100...
		
30 mm	65 mm	120 mm
250 mm	350 mm	1,000 mm
350 mm	600 mm	1,300 mm
see detection zone	see detection zone	see detection zone
320 kHz	400 kHz	200 kHz
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
		
±0.15 %	±0.15 %	±0.15 %
temperature drift 0.17 %/°C	temperature drift 0.17 %/°C	temperature drift 0.17 %/°C
±10 %	±10 %	±10 %
<40 mA	<40 mA	<40 mA
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
1 Nm	1 Nm	1 Nm
IP 67	IP 67	IP 67
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
4-pin M12 circular plug	4-pin M12 circular plug	4-pin M12 circular plug
Teach-in via pin 4	Teach-in via pin 4	Teach-in via pin 4
LED green, LED yellow	LED green, LED yellow	LED green, LED yellow
Teach-in	Teach-in	Teach-in
–25 to +70 °C	–25 to +70 °C	–25 to +70 °C
–40 to +85 °C	–40 to +85 °C	–40 to +85 °C
32 ms	64 ms	80 ms
<300 ms	<300 ms	<300 ms
R_L ≤ 500 Ω, rising/falling characteristic	R_L ≤ 500 Ω, rising/falling characteristic	R_L ≤ 500 Ω, rising/falling characteristic
10 to 30 V DC for R_L ≤ 100 Ω,	10 to 30 V DC for R_L ≤ 100 Ω,	10 to 30 V DC for R_L ≤ 100 Ω,
20 to 30 V DC for R_L > 100 Ω,	20 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	terminal reverse polarity protected, Class 2	terminal reverse polarity protected, Class 2
nero-25/CI	**nero-35/CI**	**nero-100/CI**
15 g	15 g	15 g
nero-25/WK/CI	**nero-35/WK/CI**	**nero-100/WK/CI**
20 g	20 g	20 g
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
nero-25/CU	**nero-35/U**	**nero-100/CU**
15 g	15 g	15 g
nero-25/WK/CU	**nero-35/WK/CU**	**nero-100/WK/CU**
20 g	20 g	20 g

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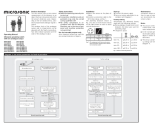
The content of this document is subject to technical changes. Specifications in this document are presented in a descriptive way only. They do not warrant any product features.

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.

Documents / Resources

	microsonic nero-15-CI Ultrasonic Proximity Switch with One Analogue Output [pdf] Instruction Manual nero-15-CI Ultrasonic Proximity Switch with One Analogue Output, nero-15-CI, Ultrasonic Proximity Switch with One Analogue Output, Switch with One Analogue Output, Analogue Output

Manuals+,