



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.

Operating Manual

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

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.

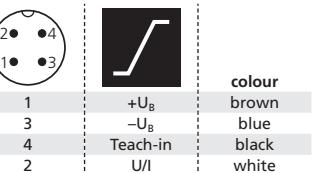


Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

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

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

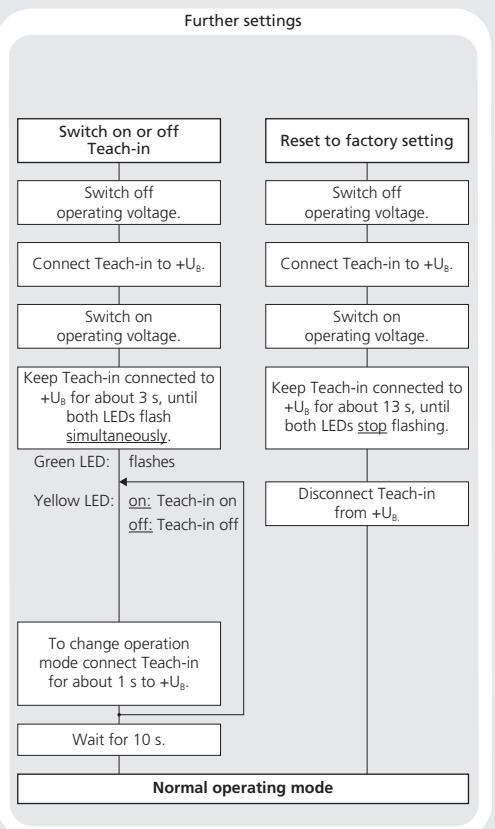
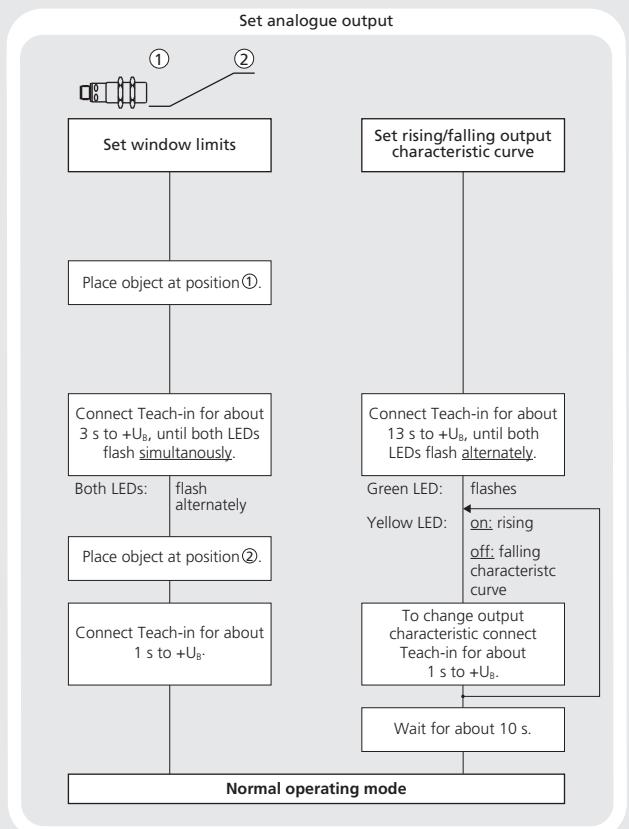
Fig. 2: Minimal assembly distances

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



Technical data

	nero-15...	nero-25...	nero-35...	nero-100...	
1 analogue output					
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.				
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	$R_L \leq 500 \Omega$, rising/falling characteristic	$R_L \leq 500 \Omega$, rising/falling characteristic	$R_L \leq 500 \Omega$, rising/falling characteristic	$R_L \leq 500 \Omega$, 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	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	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	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	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	$R_L \geq 100 \text{ k}\Omega$, short-circuit-proof, rising/falling characteristic 15 to 30 V DC, terminal reverse polarity protected, Class 2	$R_L \geq 100 \text{ k}\Omega$, short-circuit-proof, rising/falling characteristic 15 to 30 V DC, terminal reverse polarity protected, Class 2	$R_L \geq 100 \text{ k}\Omega$, short-circuit-proof, rising/falling characteristic 15 to 30 V DC, terminal reverse polarity protected, Class 2	$R_L \geq 100 \text{ k}\Omega$, short-circuit-proof, rising/falling characteristic 15 to 30 V DC, terminal reverse polarity protected, Class 2	
order no. directly radiating	nero-15/CU	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	



Enclosure Type 1
For use only in industrial
machinery NFPA 79 applications.



The proximity switches shall be used with a Listed (CYW77) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.

