



**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.

1	+U <sub>B</sub>	3	-U <sub>B</sub>
4	Teach-in	2	U/I
	colour		
	brown		
	blue		
	black		
	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

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

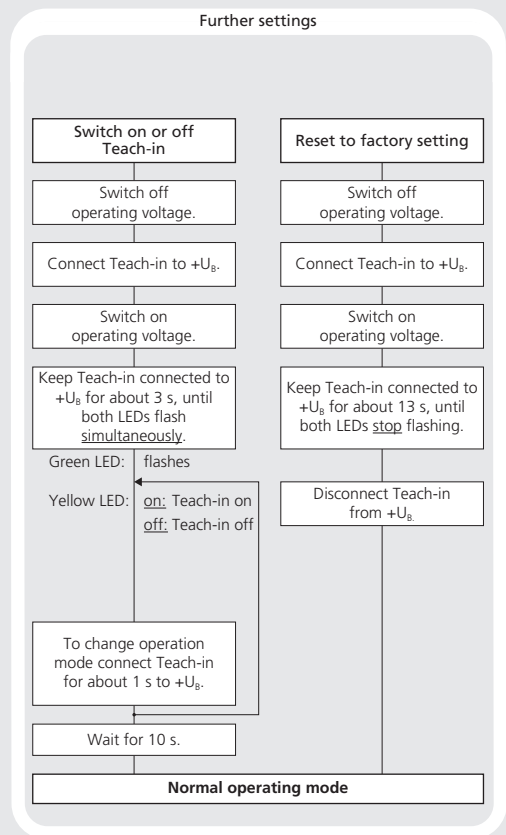
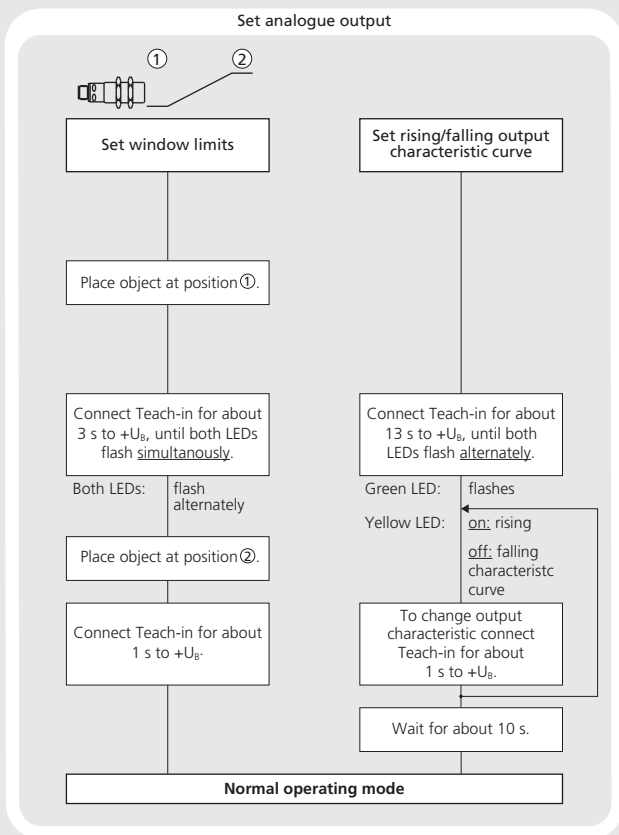
Fig. 2: Minimal assembly distances

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

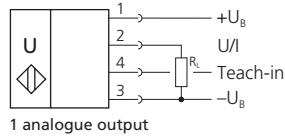
**Notes**

- 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).

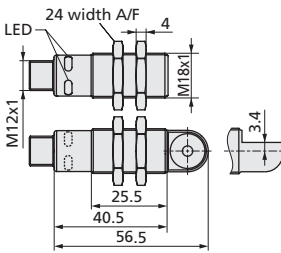
## Diagram 1: Set sensor parameters via Teach-in procedure



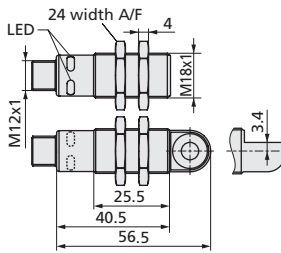
**Technical data**



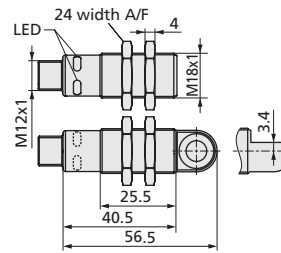
**nero-15... D**



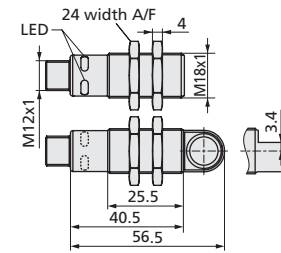
**nero-25... D**



**nero-35... D**



**nero-100... D**



**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

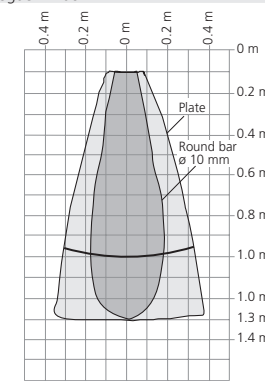
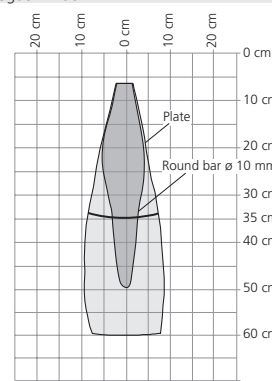
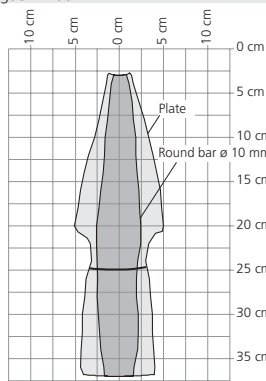
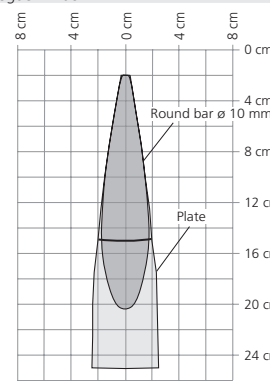
**blind zone**: 30 mm  
**operating range**: 250 mm  
**maximum range**: 350 mm  
**angle of beam spread**: see detection zone  
**transducer frequency**: 320 kHz  
**resolution**: 0.056 bis 0.413 mm, depending on the analogue window

**blind zone**: 65 mm  
**operating range**: 350 mm  
**maximum range**: 600 mm  
**angle of beam spread**: see detection zone  
**transducer frequency**: 400 kHz  
**resolution**: 0.056 bis 0.691 mm, depending on the analogue window

**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**: 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 %  
**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

**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

**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**: 64 ms  
**time delay before availability**: <300 ms

**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**: 80 ms  
**time delay before availability**: <300 ms

**analogue output 4 to 20 mA**:  $R_t \leq 500 \Omega$ , rising/falling characteristic  
**operating voltage  $U_B$** : 10 to 30 V DC for  $R_t \leq 100 \Omega$ , 20 to 30 V DC for  $R_t > 100 \Omega$ , terminal reverse polarity protected, Class 2

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**order no. directly radiating weight**: **nero-15/CI**: 15 g  
**order no. angular head weight**: **nero-15/WK/CI**: 20 g

**order no. directly radiating weight**: **nero-25/CI**: 15 g  
**order no. angular head weight**: **nero-25/WK/CI**: 20 g

**order no. directly radiating weight**: **nero-35/CI**: 15 g  
**order no. angular head weight**: **nero-35/WK/CI**: 20 g

**order no. directly radiating weight**: **nero-100/CI**: 15 g  
**order no. angular head weight**: **nero-100/WK/CI**: 20 g

**analogue output 0 to 10 V**:  $R_t \geq 100 \text{ k}\Omega$ , short-circuit-proof, rising/falling characteristic  
**operating voltage  $U_B$** : 15 to 30 V DC, terminal reverse polarity protected, Class 2

**analogue output 0 to 10 V**:  $R_t \geq 100 \text{ k}\Omega$ , short-circuit-proof, rising/falling characteristic  
**operating voltage  $U_B$** : 15 to 30 V DC, terminal reverse polarity protected, Class 2

**analogue output 0 to 10 V**:  $R_t \geq 100 \text{ k}\Omega$ , short-circuit-proof, rising/falling characteristic  
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**analogue output 0 to 10 V**:  $R_t \geq 100 \text{ k}\Omega$ , short-circuit-proof, rising/falling characteristic  
**operating voltage  $U_B$** : 15 to 30 V DC, terminal reverse polarity protected, Class 2

**order no. directly radiating weight**: **nero-15/CU**: 15 g  
**order no. angular head weight**: **nero-15/WK/CU**: 20 g

**order no. directly radiating weight**: **nero-25/CU**: 15 g  
**order no. angular head weight**: **nero-25/WK/CU**: 20 g

**order no. directly radiating weight**: **nero-35/CU**: 15 g  
**order no. angular head weight**: **nero-35/WK/CU**: 20 g

**order no. directly radiating weight**: **nero-100/CU**: 15 g  
**order no. angular head weight**: **nero-100/WK/CU**: 20 g



**UL I LISTED** Enclosure Type 1  
 For use only in industrial machinery NFPA 79 applications.  
 The proximity switches shall be used with a Listed (CYJV7) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.

