



Product Description
 The nano sensor offers a non-contact measurement of the distance to an object that has to be present 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. A duo-LED indicates operation and the state of the analogue output.

Proper Use
 nano ultrasonic sensors are used for non-contact detection of objects.

Operating Manual

Ultrasonic sensor with one analogue output

- nano-15/CI nano-15/CU
- nano-24/CI nano-24/CU

- Safety Notes**
- Read the operating manual prior to start-up.
 - Connection, installation and adjustment works should be carried out by expert personnel only.
 - No safety component in accordance with the EU Machine Directive, use in the area of personal and machine protection not permitted

- Installation**
- Mount the sensor at the installation site.
 - 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.

	+U _B	brown
	-U _B	blue
	I/U	black
	Teach-in	white

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

- Inbetriebnahme**
- Connect the power supply.
 - Adjust the sensor according to Diagram 1.

- Factory Setting**
- Rising analogue characteristic curve between the blind zone and the operating range

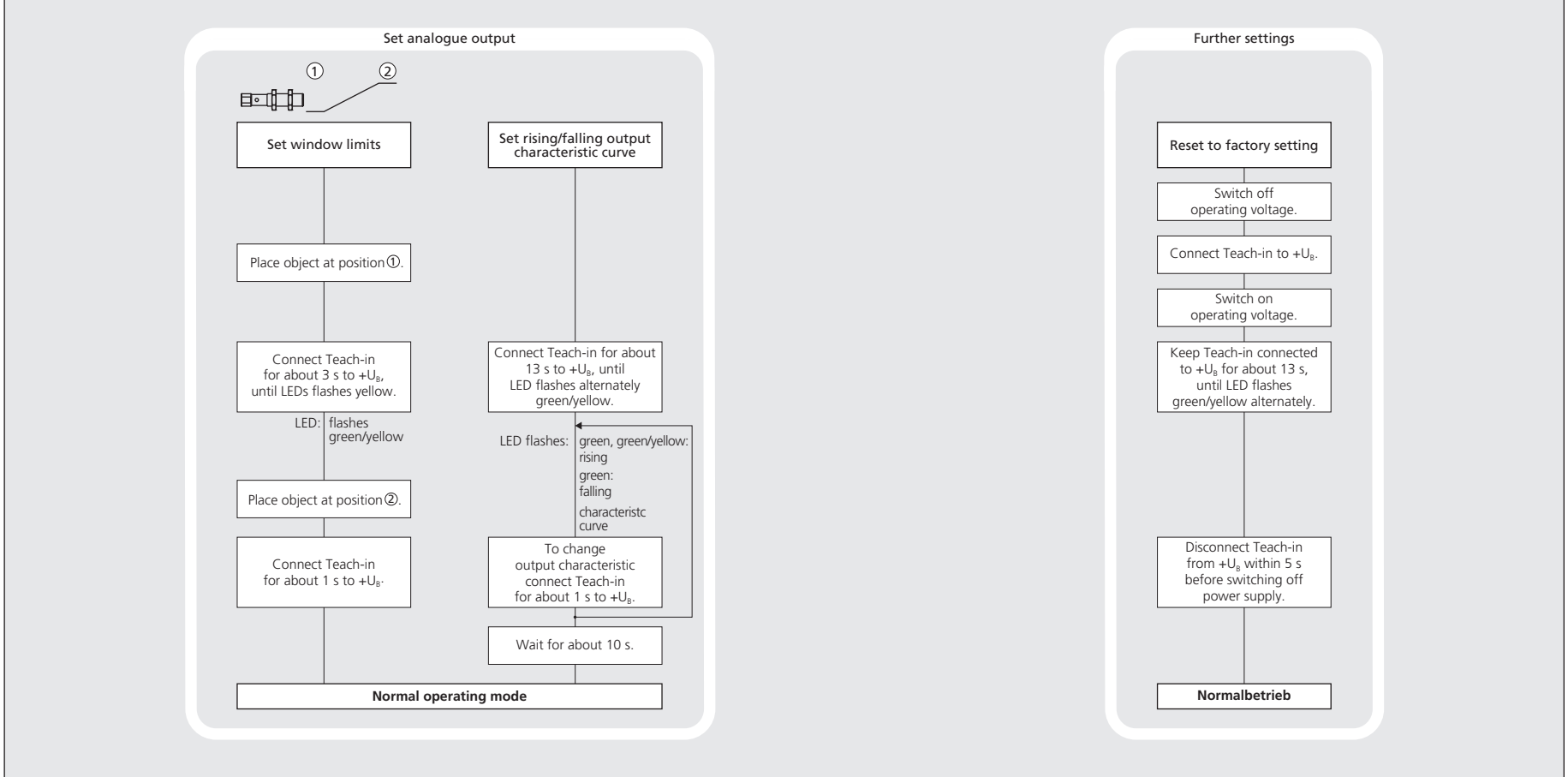
nano-15...	≥0.25 m	≥1.30 m
nano-24	≥0.25 m	≥1.40 m

Fig. 2: Minimum mounting distances

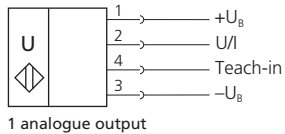
Maintenance
 microsonic sensors are maintenance-free. In case of excess caked-on dirt we recommend cleaning the white sensor surface.

- Notes**
- Every time the power supply is switched on, the sensor detects its actual operating temperature and transmits it to the internal temperature compensation. This results in a slight correction of the analogue output value after 45 seconds.
 - If the sensor was switched off for at least 30 minutes and after power on an object is placed in the middle of the adjusted analogue window for 30 minutes (the analogue output value is in the range of 11 to 13 mA or 4.4 to 5.6 V) a new adjustment of the internal temperature compensation to the actual mounting conditions takes place.
 - The sensors of the nano family have a blind zone. Within this zone 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«).

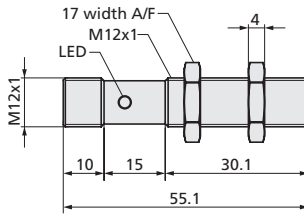
Diagram 1: Set Sensor via Teach-in procedure



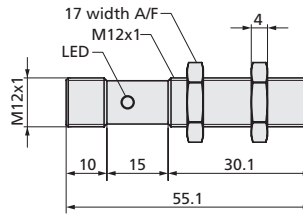
Technical data



nano-15...

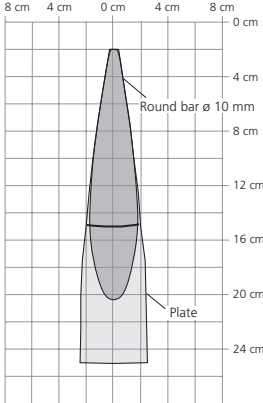


nano-24...

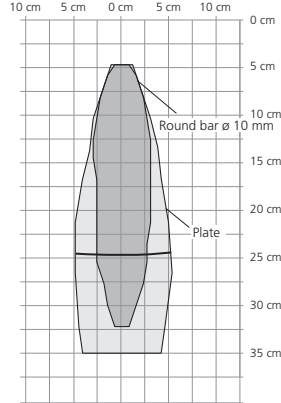


blind zone: 20 mm
operating range: 150 mm
maximum range: 250 mm
angle of beam spread: see detection zone
transducer frequency: 380 kHz
resolution: 69 µm
reproducibility: ±0.15 %
detection zone

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 is an optimal alignment to the sensor. It is not possible to evaluate ultrasonic reflections outside this area.



blind zone: 40 mm
operating range: 240 mm
maximum range: 350 mm
angle of beam spread: see detection zone
transducer frequency: 500 kHz
resolution: 69 µm
reproducibility: ±0.15 %
detection zone



accuracy: ±1 % (temperature drift internally compensated)
no-load current consumption: <30 mA
housing: brass sleeve, nickel-plated, plastic parts: 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 2
indicators: LED green/yellow
scope of settings: Teach-in
operating temperature: -25 to +70 °C
storage temperature: -40 to +85 °C
weight: 15 g
response time: 24 ms
time delay before availability: <300 ms

accuracy: ±1 % (temperature drift internally compensated)
no-load current consumption: <40 mA
housing: brass sleeve, nickel-plated, plastic parts: 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 2
indicators: LED green/yellow
scope of settings: Teach-in
operating temperature: -25 to +70 °C
storage temperature: -40 to +85 °C
weight: 15 g
response time: 30 ms
time delay before availability: <300 ms

order no.: nano-15/CI
analogue output 4 to 20 mA: $R_L \leq 500 \Omega$, rising/falling characteristic
operating voltage U_B : 10 to 30 V DC for $R_L \leq 100 \Omega$ (Class 2)
 15 to 30 V DC for $R_L > 100 \Omega$ (Class 2)

order no.: nano-24/CI
analogue output 4 to 20 mA: $R_L \leq 500 \Omega$, rising/falling characteristic
operating voltage U_B : 10 to 30 V DC for $R_L \leq 100 \Omega$ (Class 2)
 15 to 30 V DC for $R_L > 100 \Omega$ (Class 2)

order no.: nano-15/CU
analogue output 0 to 10 V: $R_L \geq 100 \text{ k}\Omega$, short circuit proof, (Class 2) rising/falling characteristic
operating voltage U_B : 15 to 30 V DC, reverse polarity protection (Class 2)

order no.: nano-24/CU
analogue output 0 to 10 V: $R_L \geq 100 \text{ k}\Omega$, short circuit proof, (Class 2) rising/falling characteristic
operating voltage U_B : 15 to 30 V DC, reverse polarity protection (Class 2)

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.

