

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. One 2-colour LED indicates operation and the state of the analogue output.

- Read the operating instructions 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

- Mount the sensor at the installation site.
- Connect a connection cable to the M12 device plug. The assembly distances shown in fig. 2 for two or more sensors should not be fallen below in order to avoid mutual interference.

- Connect the power supply.
- Carry out the sensor adjustment in accordance with the diagram.

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



Operating manual

Ultrasonic sensor with one analogue output

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

Use for intended purpose only

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

| | | | |
|--|---|-----------------|-------|
| | 1 | +U _B | brown |
| | 3 | -U _B | blue |
| | 4 | I/U | black |
| | 2 | Teach-in | white |

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

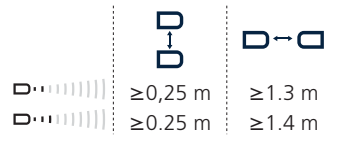
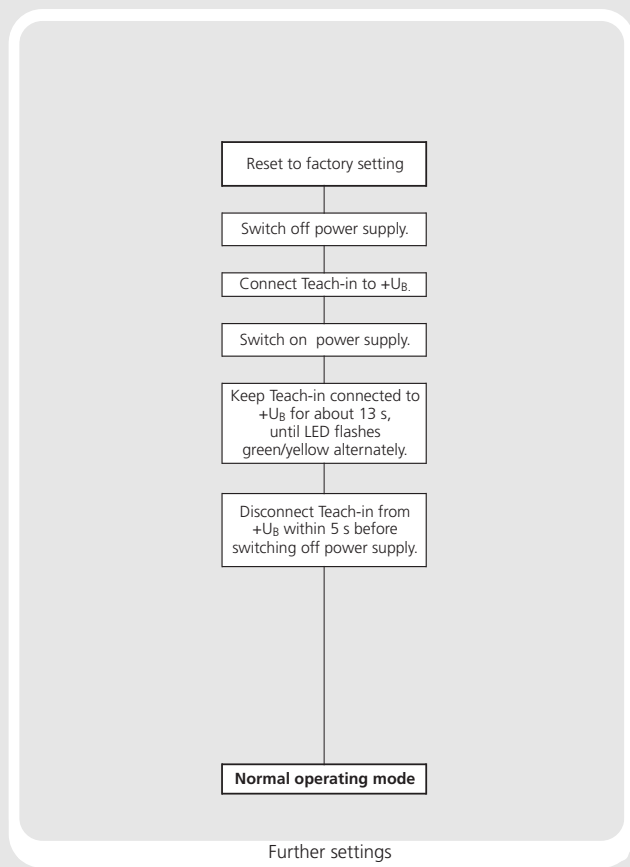
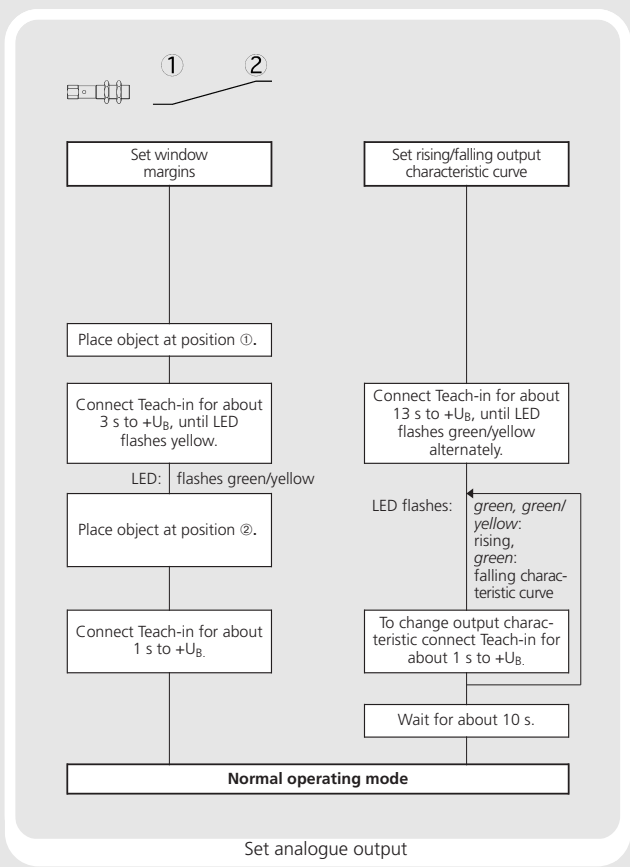


Fig. 2: Assembly distances, indicating synchronization

Sensor adjustment with Teach-in procedure



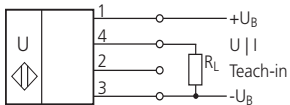
Maintenance

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

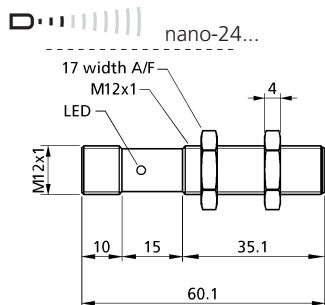
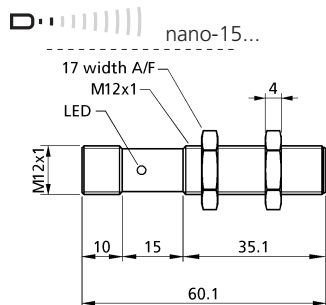
Notes

- 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«).

Technical data

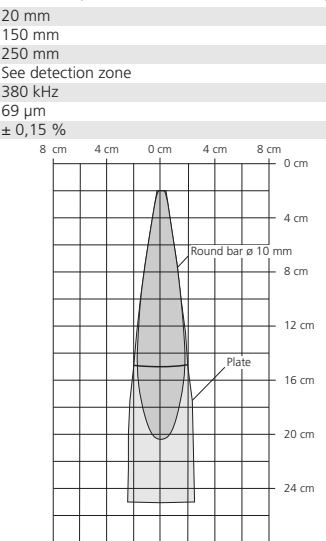


1 analogue output

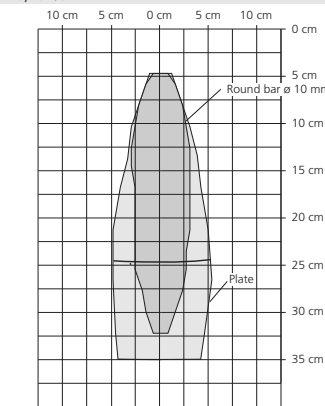


blind zone 20 mm
operating range 150 mm
maximum range 250 mm
angle of beam spread See detection zone
transducer frequency 380 kHz
resolution 69 µm
reproducibility ± 0,15 %

detection zones for different objects:
 The dark grey areas are determined with a round bar and indicate the typical operating range of a sensor. In order to obtain the light grey areas, a plate (100 x 100 mm) is introduced into the beam spread from the side. In doing so, the optimum angle between plate and sensor is always employed. This therefore indicates the maximum detection zone of the sensor. It is not possible to evaluate ultrasonic reflections outside this area.



blind zone 40 mm
operating range 250 mm
maximum range 350 mm
angle of beam spread See detection zone
transducer frequency 500 kHz
resolution 69 µm
reproducibility ± 0,15 %



accuracy ± 1 % (temperature drift internally compensated)
operating voltage ripple ± 10 %
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 to EN 60 529 IP 67
norm conformity EN 60947-5-2
type of connection 4-pin M12 initiator plug
controls Teach-in via pin 2
indicators LED green/yellow
programmable Teach-in
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
weight 15 g
response time 24 ms
time delay before availability < 300 ms

accuracy ± 1 % (temperature drift internally compensated)
operating voltage ripple ± 10 %
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 to EN 60 529 IP 67
norm conformity EN 60947-5-2
type of connection 4-pin M12 initiator plug
controls Teach-in via pin 2
indicators LED green/yellow
programmable Teach-in
operating temperature -25°C to +70°C
storage temperature -40°C to +85°C
weight 15 g
response time 30 ms
time delay before availability < 300 ms

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

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

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

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

