

### Product description

The nano sensor offers a non-contact measurement of the distance to an object which must be positioned within the sensor's detection zone. The switched output is set conditional upon the adjusted detect distance.

Via the Teach-in procedure, the detect distance and operating mode can be adjusted. One 2-colour LED indicates operation and the state of the switched output.

### Safety notes

- 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.

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### Use for intended purpose only

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

### Installation

- 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.

### Start-up

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

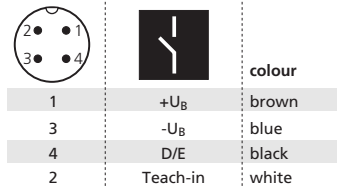


Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cables

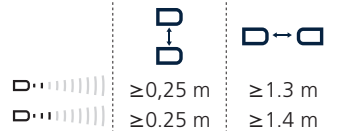


Fig.2: Assembly distances

### Factory setting

- Detect point operation.
- Switched output on NOC.
- Detect distance at operating range.

### Operating modes

Three operating modes are available for the switched output:

- Operation with one detect point: The switched output is set when the object falls below the set detect point.
- Window mode: The switched output is set when the object is within the set window.
- Two-way reflective barrier: The switched output is set when the object is between sensor and fixed reflector.

### Maintenance

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

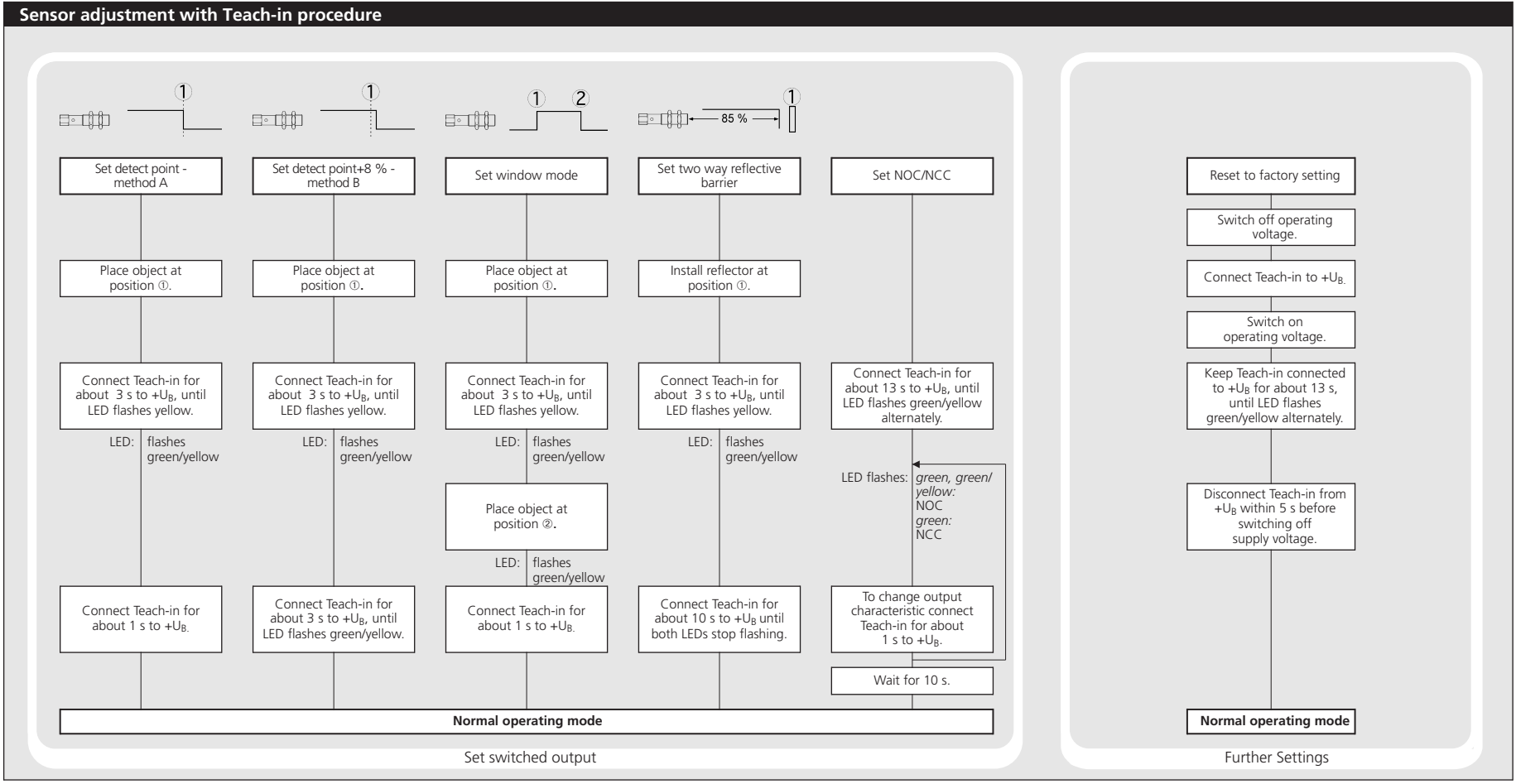
### Notes

- Every time the power supply is switched on, the sensor detects its actual operating temperature and transmits it to the internal temperature compensation. The adjusted value is taken over after 45 seconds.
- If the sensor was switched off for at least 30 minutes and after power on the switched output is not set for 30 minutes 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 that the switched output is switched through.
- In the »Two-way reflective barrier« operating mode, the object has to be within the range of 0-85 % of the set distance.
- In the »Set detect point - method A« Teach-in procedure the actual distance to the object is taught to the sensor (e.g. with level control) then the taught distance is the level at which the sensor has to switch the output.
- If the object to be scanned moves into the detection area from the side, the »Set detect point+8 % - method B« Teach-in procedure should be used. In this way the switching distance is set 8 % further than the actual measured distance to the object. This ensures a reliable switching distance even if the height of the objects varies slightly.

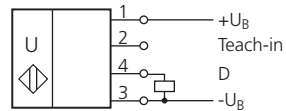
## Operating Manual

### Ultrasonic proximity switch with one switched output

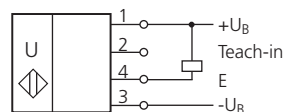
- nano-15/CD      nano-15/CE
- nano-24/CD      nano-24/CE



## Technical data



1 pnp switched output

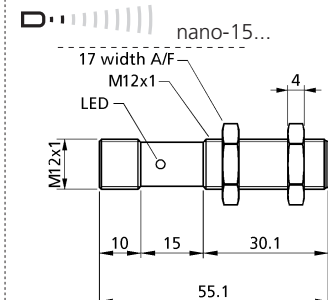


1 npn switched output

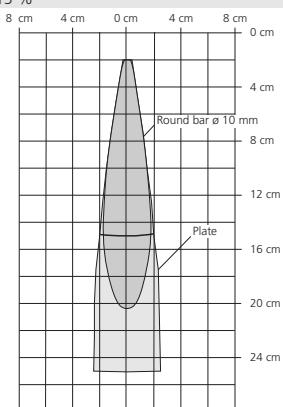
<b>blind zone</b>	20 mm
<b>operating range</b>	150 mm
<b>maximum range</b>	250 mm
<b>angle of beam spread</b>	See detection zone
<b>transducer frequency</b>	380 kHz
<b>resolution, sampling rate</b>	69 µm
<b>reproducibility</b>	± 0.15 %

### 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 recognized. The requirement here is for an optimum alignment to the sensor. It is not possible to evaluate ultrasonic reflections outside this area.



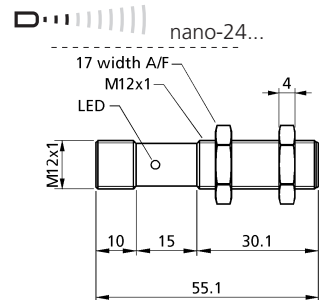
<b>blind zone</b>	20 mm
<b>operating range</b>	150 mm
<b>maximum range</b>	250 mm
<b>angle of beam spread</b>	See detection zone
<b>transducer frequency</b>	380 kHz
<b>resolution, sampling rate</b>	69 µm
<b>reproducibility</b>	± 0.15 %



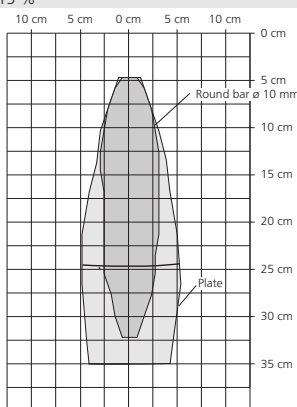
<b>accuracy</b>	± 1 % (temperature drift internally compensated)
<b>operating voltage <math>U_B</math></b>	10 - 30 V DC, reverse polarity protection
<b>voltage ripple</b>	± 10 %
<b>no-load current consumption</b>	< 25 mA
<b>housing</b>	brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content

<b>max. tightening torque of nuts</b>	1 Nm
<b>class of protection per EN 60 529</b>	IP 67
<b>norm conformity</b>	EN 60947-5-2
<b>type of connection</b>	4-pin M12 circular plug
<b>controls</b>	Teach-in via pin 2
<b>indicators</b>	LED yellow/green
<b>programmable</b>	Teach-in
<b>operating temperature</b>	-25°C to +70°C
<b>storage temperature</b>	-40°C to +85°C
<b>weight</b>	15 g
<b>switching hysteresis</b>	2 mm
<b>switching frequency</b>	25 Hz
<b>response time</b>	24 ms
<b>time delay before availability</b>	< 300 ms

<b>order no.</b>	<b>nano-15/CD</b>
<b>switched output</b>	pnp, $U_B=2V$ , $I_{max} = 200$ mA switchable NOC/NCC, short-circuit-proof
<b>order no.</b>	<b>nano-15/CE</b>
<b>switched output</b>	npn, $-U_B+2V$ , $I_{max} = 200$ mA switchable NOC/NCC, short-circuit-proof



<b>blind zone</b>	40 mm
<b>operating range</b>	240 mm
<b>maximum range</b>	350 mm
<b>angle of beam spread</b>	See detection zone
<b>transducer frequency</b>	500 kHz
<b>resolution, sampling rate</b>	69 µm
<b>reproducibility</b>	± 0.15 %



<b>accuracy</b>	± 1 % (temperature drift internally compensated)
<b>operating voltage <math>U_B</math></b>	10 - 30 V DC, reverse polarity protection
<b>voltage ripple</b>	± 10 %
<b>no-load current consumption</b>	< 35 mA
<b>housing</b>	brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content

<b>max. tightening torque of nuts</b>	1 Nm
<b>class of protection per EN 60 529</b>	IP 67
<b>norm conformity</b>	EN 60947-5-2
<b>type of connection</b>	4-pin M12 circular plug
<b>controls</b>	Teach-in via pin 2
<b>indicators</b>	LED yellow/green
<b>programmable</b>	Teach-in
<b>operating temperature</b>	-25°C to +70°C
<b>storage temperature</b>	-40°C to +85°C
<b>weight</b>	15 g
<b>switching hysteresis</b>	3 mm
<b>switching frequency</b>	20 Hz
<b>response time</b>	30 ms
<b>time delay before availability</b>	< 300 ms

<b>order no.</b>	<b>nano-24/CD</b>
<b>switched output</b>	pnp, $U_B=2V$ , $I_{max} = 200$ mA switchable NOC/NCC, short-circuit-proof
<b>order no.</b>	<b>nano-24/CE</b>
<b>switched output</b>	npn, $-U_B+2V$ , $I_{max} = 200$ mA switchable NOC/NCC, short-circuit-proof

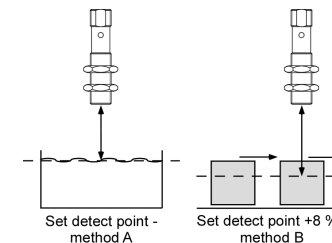


Fig. 4: Setting the detect point for different directions of movement of the object

- The sensor can be reset to its factory setting (see »Further settings«).



2004/108/EC

