RESISTANCE TO MECHANICAL SHOCKS AND VIBRATIONS

Shock by EN 60068-2-27

- Max acceleration: 50 gn
- Impulse time: 11 ms

Vibrations by EN 60068-2-6

- Frequency range: 10 ÷ 55 Hz
- Width: ± 2 mm.

DEGREE OF PROTECTION by EN60529

IP 65: spouting water from all directions.
IP 67: immersion for 30 min. in 1 m. depth of water
IP 68: extended immersion in water at conditions agreed between user and manufacturer.
Please contact our technical office for further details.

DESCRIPTION OF THE TECHNICAL TERMS IN THE CATALOGUE

RATED OPERATING DISTANCE (S_n)

The rated operating distance is a conventional quantity used to designate the operating distance. Manufacturing tolerances and external factors are not taken in account. In fig. 1 we can see the relation between the operating distance (S_n,S_r,S_a) and the hysteresis (H).

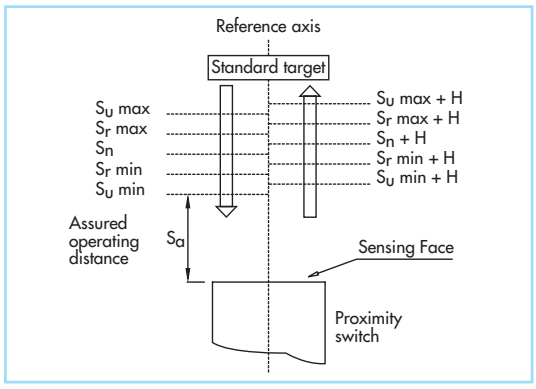


Fig. 1

STANDARD TARGET

The target used for the distance survey is built with an FE360 square steel sheet 1mm thick and on the side it is like the diameter of the circle on the active surface of the sensing face, or either three times the rated operating distance Sn if this is more than the diameter. If the object to survey is of a different material, you can have the rated operating distance by multiplying the effective operating distance (Sr) by one of these reduction factors:

Inductive Sensors

- stainless steel	0,3 ÷ 0,4
- brass	0,35 ÷ 0,50
- aluminum	0,35 ÷ 0,50
- copper	0,25 ÷ 0,45

Capacitive Sensors

- metal	1
- water	1
- PVC	0,5
- wood	0,25
- clothes	0,15
- paper	0,1

These reductions are not valid for the slot types, on which the switching point is almost indipendent by the metal used.

REAL OPERATING DISTANCE (S_r)

The real operating distance is measured with rated voltage and with a temperature of 23 ± 5°C. It must be between the 90% and 110% of the rated operating distance (S_n):

$$0,9\ S_n \leq S_r \leq 1,1\ S_n$$

ASSURED OPERATING DISTANCE (S_a)

It represents the safe sensibility distance considering the constructive tolerances and the voltage and temperature changes. For the inductive proximity switches the assured operating distance is between 0 and 81% of the rated operating distance (S_n):

$$0 \leq S_a \leq 0,81\ S_n$$

For the capacitive proximity switches the assured operating distance is between 0 and 72% of the rated operating distance (S_n):

$$0 \leq S_a \leq 0,72\ S_n$$

DIFFERENTIAL TRAVEL OR HYSTERESIS (H)

The differential travel is the difference between the switch-on point and the switch-off point with an axial motion of the target. It's given as a percentage of the effective operating distance (S_r) with a temperature of 23 ± 5°C and is shown in the tables. That value is never over the 15% of the effective operating distance (S_r).

REPEAT ACCURACY (R)

The repeat accuracy (R) is the maximum variation, in percentage, of the effective operating distance (S_r) performing several switching cycles in 8 hours with a temperature of 23 ± 5°C and power supply changes of ± 5%.
The differences between any measures is never higher than the 10% of the real operating distance:

$$R \leq 0,1 \cdot S_r$$

MAX SWITCHING FREQUENCY (f)

The max switching frequency specified in the tables of the products, is measured according to fig. 2.

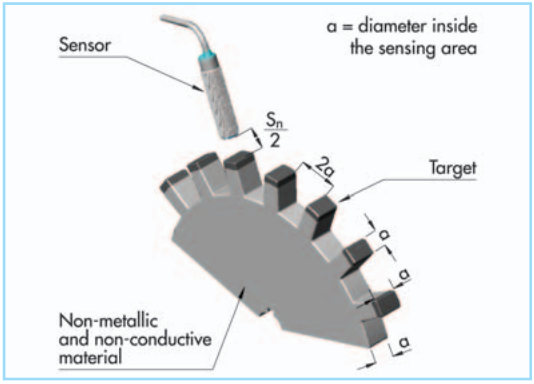


Fig. 2

OPERATIONAL VOLTAGE (U_B)

It's the voltage range where is ensured the proper working of the device. It includes ripples and oscillations.

VOLTAGE DROP (U_d)

It's the voltage measured at the end of the active output of the sensor when it is in on condition at the rated operational current (I_e).

BDC Electronic - Viale Lidice, 37/39 - 10095 Grugliasco (To) - Italy -Tel. (+39)011.31.49.021/022 Fax (+39) 011.31.49.023 - www.bdcelectronic.com - E-mail:bdc@bdcelectronic.com

RATED OPERATIONAL CURRENT (I_e)

It's the load current which the sensor can withstand in all temperature and operational voltage range.

OFF-STATE CURRENT (I_r)

It's the current which flows through the 2 wire amplified sensors in off condition. It is recommended to check that this current doesn't exceed the minimum activation current of the load.

MINIMUM OPERATIONAL CURRENT (I_m)

It's the minimum current needed for a proper working of the 2 wire amplified sensors in on condition.

IMPULSE WITHSTAND VOLTAGE

All sensors are protected against the overvoltages coming from the supply line or from the load. The minimum value is 1KV and is tested according to EN60947-5-2 standards.

CHARACTERISTIC OF THE OUTPUT STAGES

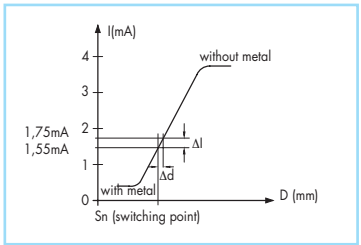
NON AMPLIFIED IN d.c. NAMUR SERIES

The sensors of this series contain only the oscillator stage and an output filter. This allows the reduction of space and costs. Thanks to a small number of components and being used with low currents, these sensors ensure a very high reliability. The driving of a load is possible using them with a proper amplifier (AM... series. See section G) or connected to equipment with specific input stage for NAMUR devices.
ATEX sensors category 1G - 1D must be used with associated apparatus with ATEX certification.

Working:
With references to fig. 3, apply Un between 5 and 30 Volts: the I current flows through the sensor crossing the **Rx** resistance giving the **Vo** voltage. The current value will decrease in proportion to how a metal approaches its sensible surface, following the characteristic curve shown.
With Vo voltage we can control a trigger stage having then an exact switching point and giving an ON/OFF output. For the scaling of Rx look the table below:

Un (V)	Rx (Ω)
5	390
8,2	1000
12	1800
24	3900

It's important to consider that the NAMUR rules recommend the applications of these sensors in a supply range between 7,7 and 9 Vdc with an Rx of 1000 Ω.



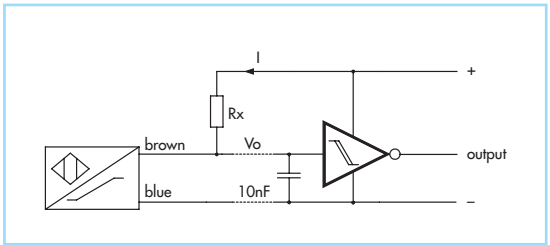


Fig. 3

NAMUR WITH LED SERIES

This series has a LED for the output condition and thanks to the integrated trigger, it has an exact switching point which permits to control PLC inputs and direct loads up to 10 mA without any interface module.