

SEJ

SYSTEM ELECTRONIC JAPAN CO., LTD.

SEJ



**proxicator®
fotocaptor
fluocaptor**

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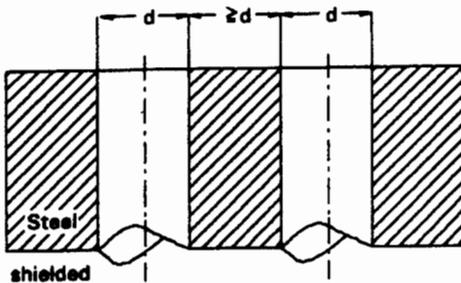
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Installation

A "shielded" or "flush" proximity switch will not be affected by surrounding metal.

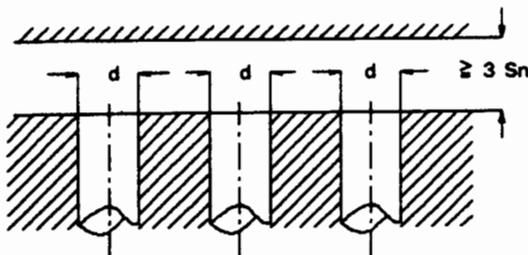
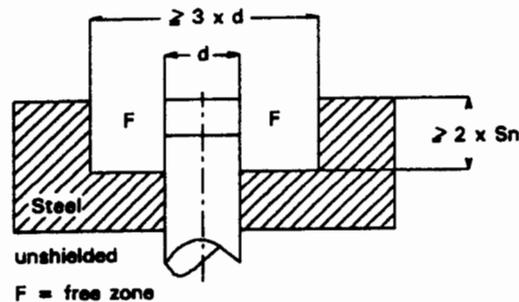
An "unshielded" or "not flush" proximity switch must have an open space around the active face. If proximity switches are installed opposing one another, the oppos-



ing switches must be installed with a spacing of 3 x the switch diameter between them.

Installation side by side

To avoid interference in side by side installations a minimum clearance distance between the switches must be observed.



For shielded side by side installations the interspace is

$$a > d \text{ (interspace } > \text{ diameter)}$$

If unshielded proximity switches are to be installed side by side the following spacing must be observed:

$$a > 2d \text{ (interspace } > 2 \times \text{ diameter)}$$

Cable installation

To avoid pick up of induced voltage and current peaks, connecting wires for proximity switches should be installed separately from motor-magnet or valve-wires.

Cable length

Extremely long cables will add a capacitive load to the output and increase interference. Cables for AC-and DC-switches should not exceed 100 m (300 ft) substantially. Cables for NAMUR-switches should not exceed 250 m. (750 ft)

Magnetic fields

Strong magnetic fields may increase the sensing range or even trigger off a proximity switch. Radio frequencies may also influence a proximity switch. At installations with strong sources of radio interference the proximity switch and cable should be shielded.

Actuating area

The actuating area is a limited zone in front of the active face of a proximity switch. Within this area a target will be detected and turned into a switching signal.

Sensing range

a.) Nominal sensing range S_n

The nominal sensing range is the value obtained when the ambient temperature is held at 20 °C and voltage between 12-24 V. Under these conditions the switching point must be within a tolerance of + 10 %.

b.) Real sensing range S_r

This is the actual switching distance for an individual proximity switch. It is measured at nominal voltage and ambient temperature of + 20 °C and will be between 90 % and 110 % of S_n .

$$0,9 S_n < S_r < 1,1 S_n$$

c.) Useful sensing range s_a

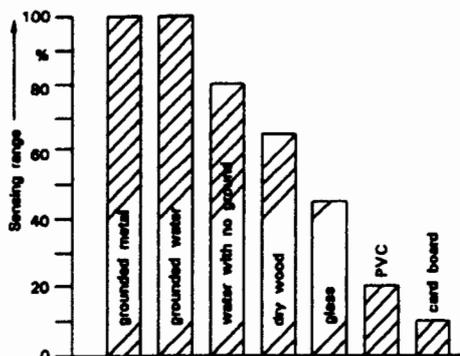
Useful sensing range is the distance at which the operation of the proximity switch, under stated temperature and voltage conditions is guaranteed. This distance is between zero and up to 81 % of S_n

$$0 < s_a < 0,9 \times 0,9 S_n$$

Changes in switching point also occur if dimensions of target are larger or smaller than measuring plate.

Standard value

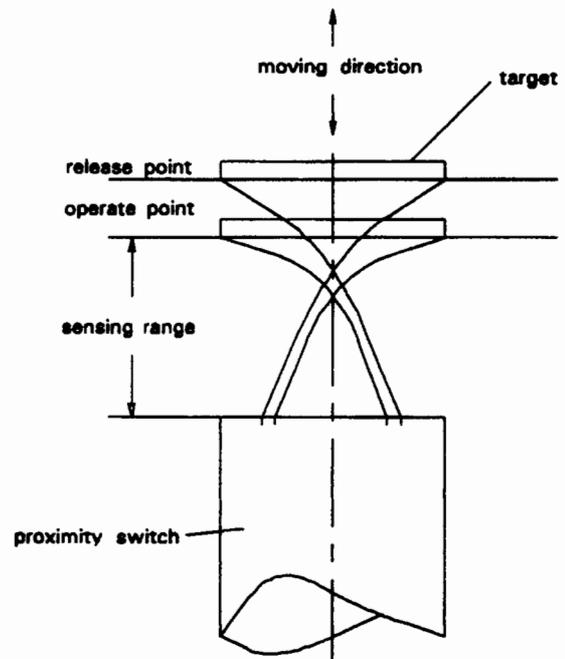
Target size %	150	125	100	75	50	25	12,5
Deviation from S_n in %	+10	+7	0	-7	-14	-27	-45



Capacitive proximity switches feature a potentiometer to adjust the useful sensing range s_a . See diagram. The diagram shows the reduction created by different materials. The sensing range may be raised up to 20 % in ambient temperatures less than + 50 °C.

Hysteresis

This is the difference between the operating point and the release point of a proximity switch.



Measuring plate

Standard target is a square test plate of 1 mm steel St. 37 - Side length normal equals the diameter of the applied proximity switch. Particular dimensions are given in the data sheets.

Sensing range reductions

The sensing range is based upon the standard DIN measuring plate.

With different materials, the sensing range decreases.

Influence of different materials:

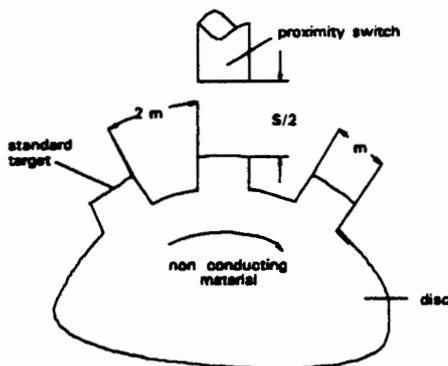
Steel St. 37	$S_n \times 1,0$
Brass	$S_n \times 0,5$
Aluminium	$S_n \times 0,4$
Copper	$S_n \times 0,46$
Chrome Nickel	$S_n \times 0,9$
Stainless-Steel	$S_n \times 0,7$

These factors are only approximation formula. Deviations are possible if using various alloys.

Switching frequency

maximum

This frequency indicates the maximum number of pulses per second, this is for an on/off ratio of 2:1 and one half the nominal switching distance S_n (according to the standard EN 50010).

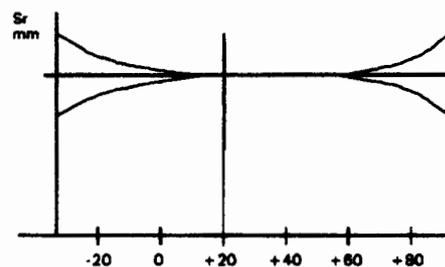


Repeatability

The repeatability of switch points shows the repeated effective switching distance of two consecutive switching processes within 8 hours at an ambient temperature between + 15 °C and + 30 °C and a voltage of + 5 % deviation from nominal voltage.

Temperature drift

The temperature drift indicates the change of the switching point caused by ambient temperature variations within the range of - 25 °C to + 70 °C. The temperature of the measuring plate does not influence the switching point. The switching point at - 25 °C and + 70 °C may vary up to 15 % compared to the point measured at + 20 °C.



Primary DC-sources

Please note: If problems with proximity switches occur, a very common cause is a poor DC-source (excessive ripple) Simple sources as a transformer and rectifier are not recommended. A smoothing capacitor is required to avoid more than 10 % ripple. Transformers with 24 V output, rectifier and smoothing capacitor amount to a floating voltage of substantially more than 30 V. Proximity switches with 10-30 V rating may be damaged.

Reverse polarity protection

All NAMCO Controls proximity switches are protected against reverse polarity. The switch will not be damaged if connections are accidentally reversed.

Interference protection

All NAMCO Controls proximity switches feature an interference protection circuitry. This feature assures that voltage peaks or release interference caused by relays does not destroy the proximity switch.

Ready for operation delay

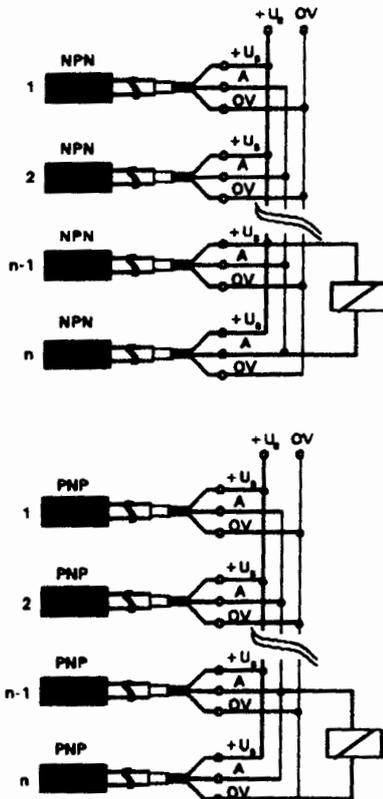
When power is supplied to the proximity switch, it normally triggers off for a very short period of time. NAMCO Controls proximity switches feature a ready for operation delay to suppress the power on impulse.

Parallel connections

DC-Proximity switches may be connected in parallel. Please note:

- current consumption increases
- leakage currents add up.

It is not advised to hook-up AC-proximity switches in parallel. Parallel operation may cause "false trips" to occur.

**No load current**

This is the current consumption of a proximity switch when the output transistor is

in the off state. It is indicated at the maximum voltage rate.

Max current load

This is the maximum load at which a proximity switch may be operated continuously. The minimum current is the smallest current which must flow in the closed state to guarantee the operation of the switch.

Short circuit protection

Internal circuitry which protects the switch against accidental overloads. If the load is shorted, the DC-switch will revert to the open state until short circuit conditions are corrected, AC-proximity switches have no short circuit protection.

Rate of rise and fall of output voltage edge

Time for rise and fall is approximately the same. For proximity switches up to 20 mm sensing range it is $> 5 \text{ Volt}/\mu\text{s}$. For proximity switches with more than 20 mm sensing range it is $> 1 \text{ Volt}/\mu\text{s}$.

Voltage drop

The difference in voltage at minimum load measured with and without the switch in a circuit.

Leakage current

The current which flows through the load when the sensor is non-energized. Also called burden or residual current.

Ripple

This is the alternating voltage super-imposed on the DC-voltage in percent. For the operation of DC-switches a maximum ripple of 10 % should not be exceeded.

LED

NAMCO Controls proximity switches feature a light emitting diode to indicate the "on stage" with a red LED.

Oil-resistance

Normal lubrications do not cause problems. If special lubrications are being used which may adversely affect the proximity switch or cable, please contact manufacturer.

Protection class IP 65

Complete protection against contact with live parts. Protection against ingress of dust and hose water.

Protection class IP 67

Complete protection against contact with live parts. Protection against ingress of dust and protection against ingress of water when submerged into water for one meter (three feet) for a period of 30 minutes.