



SLOVENSKI STANDARD

SIST EN 50008:1998

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Low-voltage switchgear and controlgear for industrial use - Inductive proximity switches - Form A, for direct current, 3 or 4 terminals

Low-voltage switchgear and controlgear for industrial use - Inductive proximity switches - Form A, for direct current, 3 or 4 terminals

Industrielle Niederspannungs-Schaltgeräte - Induktive Näherungsschalter - Form A für Gleichspannung 3 oder 4 Anschlüsse

Appareillage industriel à basse tension - Détecteurs de proximité inductifs - Forme A, pour courant continu, 3 ou 4 bornes

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English version

Low voltage switchgear and controlgear for industrial use. Inductive proximity switches. Form A, for direct current, 3 or 4 terminals

Appareillage industriel à basse tension. Détecteurs de proximité inductifs. Forme A, pour courant continu, 3 ou 4 bornes

Industrielle Niederspannung-Schaltgeräte. Induktive Näherungsschalter. Form A, für Gleichspannung, 3 oder 4 Anschlüsse

This European Standard was ratified by CENELEC on 3 December 1985. CENELEC members are bound to comply with the requirements of the CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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This European Standard has been prepared by the CENELEC Technical Committee 17B. Dimensions in mm.

1 Scope

This standard specifies only inductive proximity switches for direct current, in cylindrical form, with 3 or 4 terminals for rated voltage not exceeding 48 V.

Two types are included:

Embeddable in metal (see figure 2): A1.

Not embeddable in metal (see figure 3): A2.

2 Definitions

Definitions are given in European Standard EN 50 032.

3 Dimensions

The dimensions to be observed are shown in figure 1 and the actual range of possible dimensions is given in table 1. Apart from these dimensions, the design of the proximity switch is not restricted.

Within the dimensions d_2 and l_2 are included all the rigid parts of cable entries.

The diameter of unthreaded portion d_2 shall not exceed the minor diameter of the thread.

For type A1., the thread can be omitted and the diameter reduced to d_2 on a length not exceeding $l_3 = 1$ mm.

For type A2., the thread can be omitted and the diameter reduced to d_2 on a length not exceeding $l_3 = 2s_n$.

The length of connecting lead shall be 2 m.

4 Installation (see figures 2 and 3)

The dimensions are given for proximity switches installed in mild steel, Fe 360, according to Euronorm 27¹⁾.

5 Designation

Example of designation of a proximity switch Form A.. Embeddable .1. Size ..3.

Proximity switch EN 50 008 – A13.

Additionally, the following are to be given:

- the rated voltage;
- the polarity of the output signal when current flows;
- the output current;
- the function (make or break).

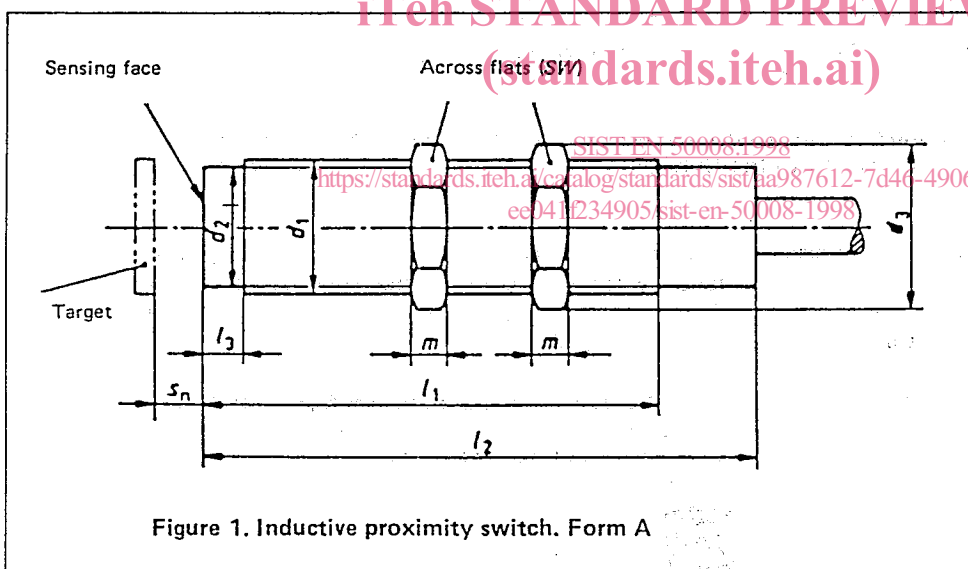


Figure 1. Inductive proximity switch. Form A

Table 1. Dimensions							
Type		Dimensions					
A1. embeddable	A2. not embeddable	Body			Nuts		
		d_1	l_1 min.	l_2 max.	SW H12	m $\pm 0,15$	d_3 max. 1)
Size	Size						
..1	—	M8 x 1	40	60	13	4	15
..2	..2	M12 x 1	40	80	17	4	20
..3	..3	M18 x 1	50	100	24	4	28
..4	..4	M30 x 1,5	50	100	36	5	42

1) d_3 min = 1,13 SW

1) Each national committee may indicate its own symbol.

6.3 Differential travel H

The differential travel is given as a percentage of the effective operating distance (s_r). It shall be between 1 % and 15 % of the effective operating distance (s_r). The measurement is made in accordance with European Standard EN 50 010 at rated ambient temperature (T_n) and rated voltage (U_n):

$$0,01 s_r \leq H \leq 0,15 s_r$$

6.4 Voltages U

6.4.1 Rated voltage U_n

The rated voltage shall not exceed 48 V:

$$U_n \leq 48 \text{ V}$$

6.4.2 Supply voltage U_b

The instantaneous value of the supply voltage shall be between 80 % and 115 % of the rated voltage (U_n):

$$0,8 U_n \leq U_b \leq 1,15 U_n \text{ (instantaneous value)}$$

6.4.3 Ripple voltage σ

The maximum value of the ripple voltage (peak to peak) shall not exceed 0,1 U_n :

$$\sigma \leq 0,1 U_n$$

6.5 Output

6.5.1 Voltage drop U_d

The voltage drop, measured across the proximity switch when closed and carrying the maximum permanent current (I_a) at the minimum ambient temperature (T_a) and supplied with the maximum supply voltage (U_b) shall not exceed 3,5 V:

$$U_d \leq 3,5 \text{ V}$$

6.5.2 Output operation

The output operation shall be snap action (for break and make function).

6.5.3 Currents I

6.5.3.1 Permanent current I_a

A proximity switch shall perform correctly for a permanent current between 1 mA and 50 mA:

$$1 \text{ mA} \leq I_a \leq 50 \text{ mA}$$

6.5.3.2 Residual current I_r

The residual current shall not exceed 0,5 mA:

$$I_r \leq 0,5 \text{ mA}$$

6.6 Time characteristics

6.6.1 Operating frequency f

The operating frequency is measured in accordance with the European Standard EN 50 010. The values obtained shall be not less than those given in table 3:

Type	Operating frequency f min.
A11	1 000 Hz
A12	800 Hz
A13	500 Hz
A14	300 Hz
A22	400 Hz
A23	200 Hz
A24	100 Hz

6.6.2 Time delay before availability t_v

The time delay before availability shall not exceed 50 ms:

$$t_v \leq 50 \text{ ms}$$

During this time, the output shall not give any false signal longer than 2 ms when the distance between the target and the sensing face is greater than 3 s_n for make output function or less than 2/3 s_n for break output function proximity switches.

6.7 Temperatures T

6.7.1 Rated ambient temperature T_n

The rated ambient temperature is 20 °C:

$$T_n = 20 \text{ °C}$$

6.7.2 Ambient temperature T_a

The permissible range of ambient temperature is - 25 °C to + 70 °C:

$$- 25 \text{ °C} \leq T_a \leq + 70 \text{ °C}$$

6.8 Degree of protection

The degree of protection is indicated and measured in accordance with CENELEC Harmonization Document HD 365-S2 (IEC Publication 529*).

This shall be IP 67.

6.9 Shock and vibration tests

The measurements are made in accordance with IEC Publications 68-2-27 and 68-2-6 or harmonized national standards. The operating characteristics of the proximity switch shall be maintained during the measurements.

6.9.1 Shock tests

The conditions of the shock tests shall be as follows:

Pulse shape: half-sine;

Peak acceleration: $\leq 30 g_n$;

Duration of the pulse: 11 ms.

6.9.2 Vibration tests

The conditions of vibration tests shall be as follows:

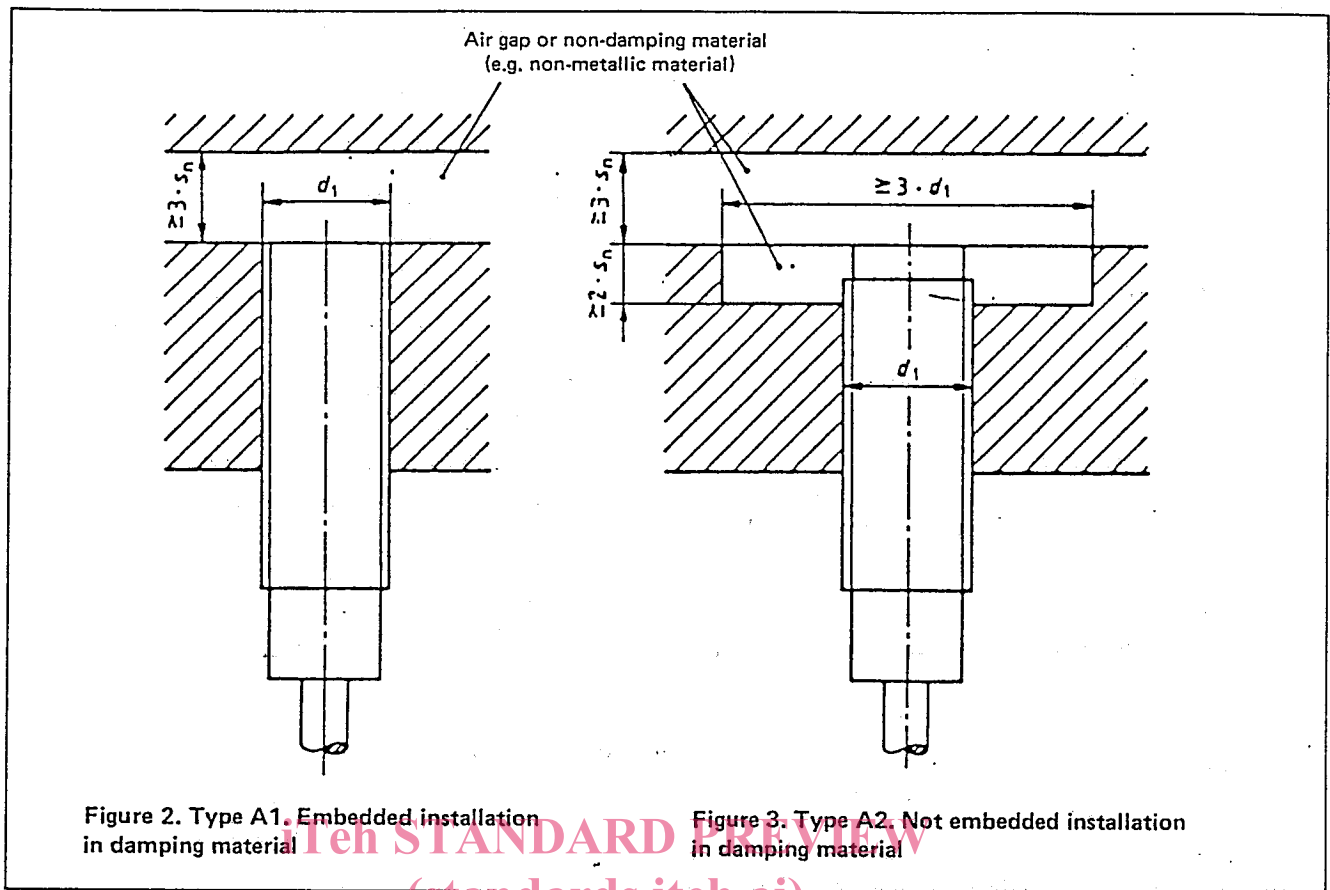
Frequency: 10 Hz to 55 Hz;

Amplitude: $\leq 1 \text{ mm}$;

Sweep cycle duration: 5 minutes;

Duration at resonant frequency or at 55 Hz: 30 minutes in each of the 3 axes (90 minutes in all).

*or IEC Publication 144, when this is revised.



6 Characteristics

The characteristics of the proximity switch shall be achieved even when mounted as shown in figures 2 and 3 of clause 4.

These characteristics are valid over the whole ambient temperature (T_a) and the supply voltage (U_b) ranges except when otherwise specified.

Requirements concerning the nature of the load and the corresponding tests are under consideration.

6.1 Operating distance s

The operating distances are measured according to EN 50 010.

6.1.1 Rated operating distance s_n

Rated operating distances are given in table 2.

Type A1. Embeddable		Type A2. Not embeddable	
Size	Rated operating distance s_n	Size	Rated operating distance s_n
..1	1	—	—
..2	2	..2	4
..3	5	..3	8
..4	10	..4	15

6.1.2 Effective operating distance s_r

The effective operating distance is measured at rated voltage (U_n) and rated ambient temperature (T_n). It shall be between 90 % and 110 % of the rated operating distance (s_n):

$$0,9 s_n \leq s_r \leq 1,1 s_n$$

6.1.3 Usable operating distance s_u

The usable operating distance is measured with the ambient temperature (T_a) and the supply voltage (U_b) being within the limits prescribed. It shall be between 90 % and 110 % of the effective operating distance s_r :

$$0,9 s_r \leq s_u \leq 1,1 s_r$$

6.1.4 Actuation distance s_a

The actuation distance is between 0 and 81 % of the rated operating distance (s_n):

$$0 \leq s_a \leq 0,9 \cdot 0,9 s_n$$

6.2 Repeat accuracy R

The repeat accuracy of the usable operating distance (s_u) is measured over an 8-hour period with an enclosure temperature between 15 °C and 30 °C and with a supply voltage between $U_n + 5\%$ and $U_n - 5\%$. The difference between any two measurements shall not exceed 10 % of the rated operating distance (s_n):

$$R \leq 0,1 s_n$$