



SLOVENSKI STANDARD
SIST EN 50036:1998

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Low-voltage switchgear and controlgear for industrial use - Inductive proximity switches - Form A, for alternating current, 2 terminals

Low-voltage switchgear and controlgear for industrial use - Inductive proximity switches - Form A, for alternating current, 2 terminals

Industrielle Niederspannung-Schaltgeräte - Induktive Näherungsschalter - Form A, für Wechselspannung, 2 Anschlüsse

Appareillage industriel à basse tension - Détecteurs de proximité inductifs - Forme A, pour courant alternatif, 2 bornes

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EUROPEAN STANDARD
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English version

Low voltage switchgear and controlgear for industrial use.
Inductive proximity switches.
Form A, for alternating current, 2 terminals

Appareillage industriel à basse tension. Détecteurs
de proximité inductifs. Forme A, pour courant
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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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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CENELEC General Secretariat has the same status as the official versions.

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CENELEC

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

General Secretariat: rue Bréderode 2, B-1000 Brussels

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 alternating current, in cylindrical form, with 2 terminals for rated voltages between 24 V and 240 V (r.m.s.).

Two types are included:

Embeddable in metal (see figure 2): A3●

Not embeddable in metal (see figure 3): A4●

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 A3., the thread can be omitted and the diameter reduced to d_2 on a length not exceeding $l_3 = 1$ mm.

For type A4., 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 ●3● Size ●●3.

Proximity switch EN 50 036 – A33.

Additionally, the following are to be given:

- the rated voltage;
- the output current;
- the function (make or break).

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.

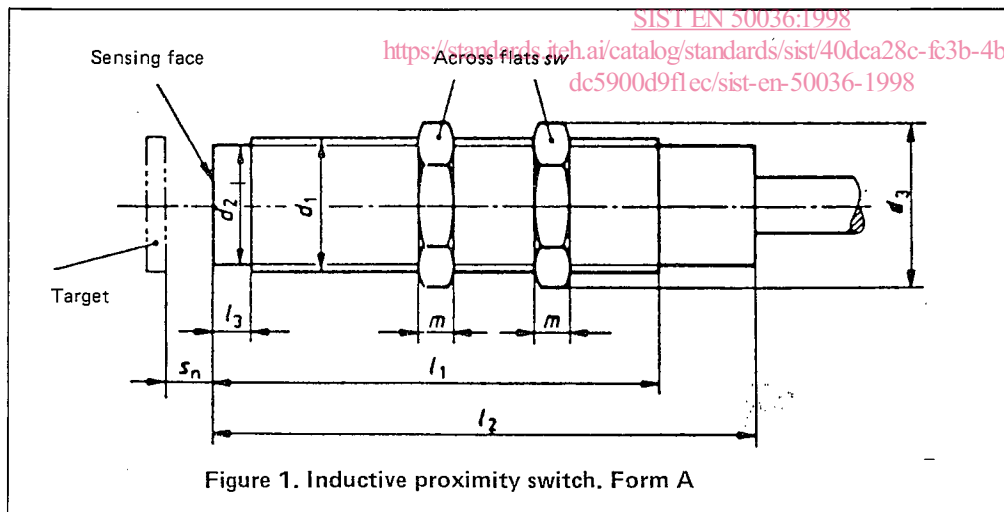


Figure 1. Inductive proximity switch, Form A

Table 1. Dimensions							
Type		Dimensions					
A3● embeddable	A4● not embeddable	Body			Nuts		
		d_1	l_1 min.	l_2 max.	sw h 12	m $\pm 0,15$	d_3 max. ¹⁾
Size	Size						
●●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.

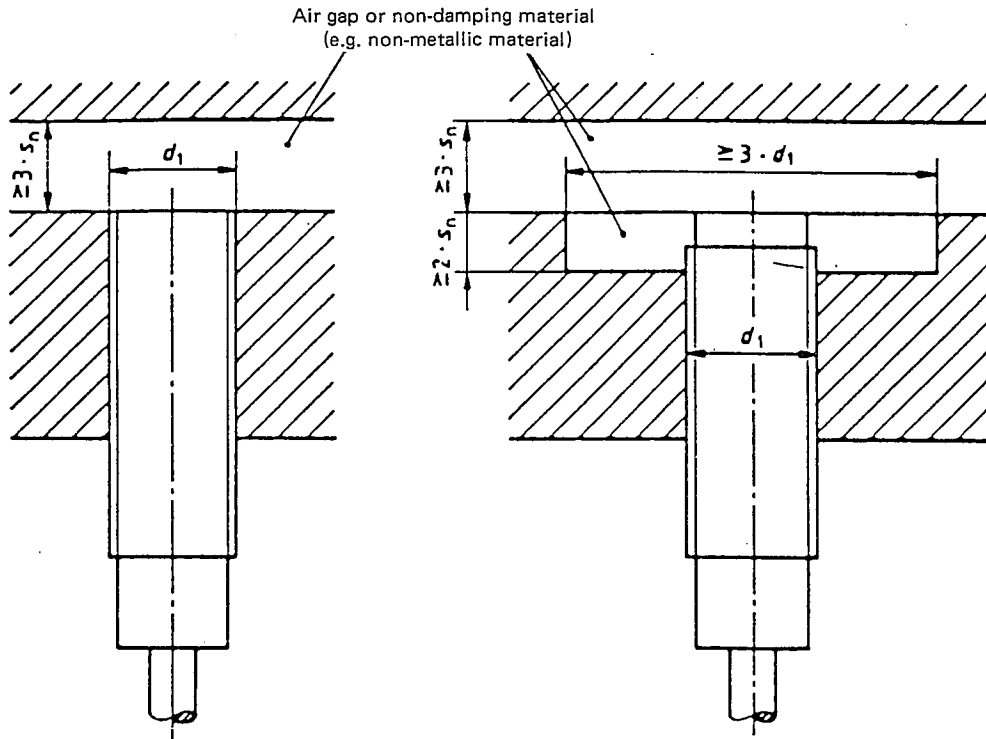


Figure 2. Type A3● Embedded installation in damping material

Figure 3. Type A4● Not embedded installation in damping material

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 A3● embeddable		Type A4● not embeddable	
Size	Rated operating distance, s_n	Size	Rated operating distance, s_n
●●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):

$$R \leq 0,1 s_n$$

6.3 Differential travel H

The differential travel is given as a percentage of the effective operating distance (s_r). It shall be between 3 % and 20 % 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):

$$0,03 s_r \leq H \leq 0,20 s_r$$

6.4 Voltages U

6.4.1 Rated voltage U_n

The r.m.s. value of the voltage shall be between 24 V and 240 V:

$$24 \text{ V} \leq U_n \leq 240 \text{ V (r.m.s.)}$$

6.4.2 Supply voltage U_b

The r.m.s. value of the supply voltage shall be between 85 % and 110 % of the rated voltage (U_n):

$$0,85 U_n \leq U_b \leq 1,10 U_n \text{ (r.m.s.)}$$

6.4.3 Supply frequency f_b

The supply frequency shall be between 45 and 65 Hz:

$$45 \text{ Hz} \leq f_b \leq 65 \text{ Hz}$$

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 10 V (r.m.s.).

This measurement shall be performed by connecting in series with the proximity switch a resistive load corresponding to the maximum current (I_a):

$$U_d \leq 10 \text{ V (r.m.s.)}$$

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 5 mA and 200 mA (r.m.s.):

$$5 \text{ mA} \leq I_a \leq 200 \text{ mA (r.m.s.)}$$

6.5.3.2 Residual current I_r

The residual current shall not exceed 3 mA (r.m.s.):

$$I_r \leq 3 \text{ mA (r.m.s.)}$$

6.5.3.3 Short time withstand current I_k

The proximity switch shall carry a current equal to 1,2 A (r.m.s.), during 20 ms with an operating frequency of 1 Hz:

$$I_k = 1,2 \text{ A (r.m.s.) during 20 ms with } f = 1 \text{ Hz}$$

6.6 Time characteristics**6.6.1 Operating frequency f**

The operating frequency shall be at least 5 Hz. It is measured in accordance with EN 50 010 with a resistive load corresponding to a current of 200 mA:

$$f \geq 5 \text{ Hz}$$

6.6.2 Time delay before availability t_v

The time delay before availability shall not exceed 300 ms:

$$t_v \leq 300 \text{ ms}$$

During this time, the output shall not give any false signal other than 0 when the distance between the target and the sensing face is greater than $3s_n$ for make output function or less than $2/3s_n$ 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-S3 (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: $\leq 30g_n$;
- 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.