



SLOVENSKI STANDARD
SIST EN 50038:1998
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Low-voltage switchgear and controlgear for industrial use. Inductive proximity switches - Form D, for alternating current, 2 terminals

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

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

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

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EUROPEAN STANDARD
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EN 50 038

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English version

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

Appareillage industriel à basse tension. Détecteurs
de proximité inductifs. Forme D, pour courant
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Industrielle Niederspannung-Schaltgeräte.
Induktive Näherungsschalter. Form D,
für Wechselspannung, 2 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 alternating current, in rectangular cross-section, with 2 terminals, the supply voltage being included between 24 V and 240 V (r.m.s.).

These proximity switches are not embeddable in metal.

There is only one type:

With an upper sensing face: D4●

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 overall dimensions are included the fixing means but not the cable entry.

4 Installation (see figure 2)

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 D●●
Not embeddable ●4● Size ●●2

Proximity switch EN 50 038 – D42.

Additionally, the following are to be given:

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

Table 1. Dimensions

Size	l_1 max. ³⁾	$l_2 = b_2$	b_1
●●1	120	$45 \pm 0,5$	$60 \pm 0,5$
●●2	135	$65 \pm 0,5$	$80 \pm 0,5$

3) $l_1 \geq b_1$

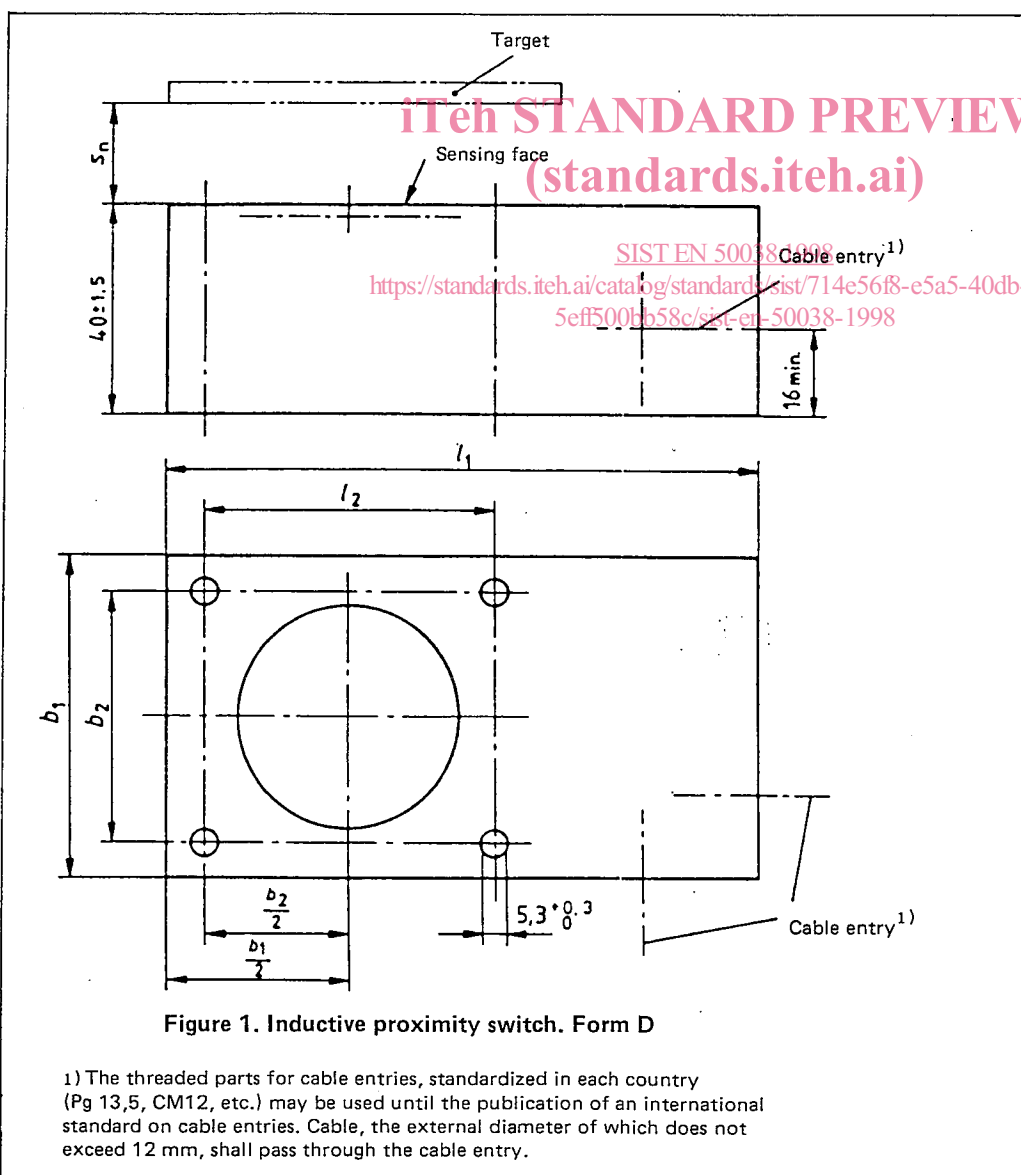
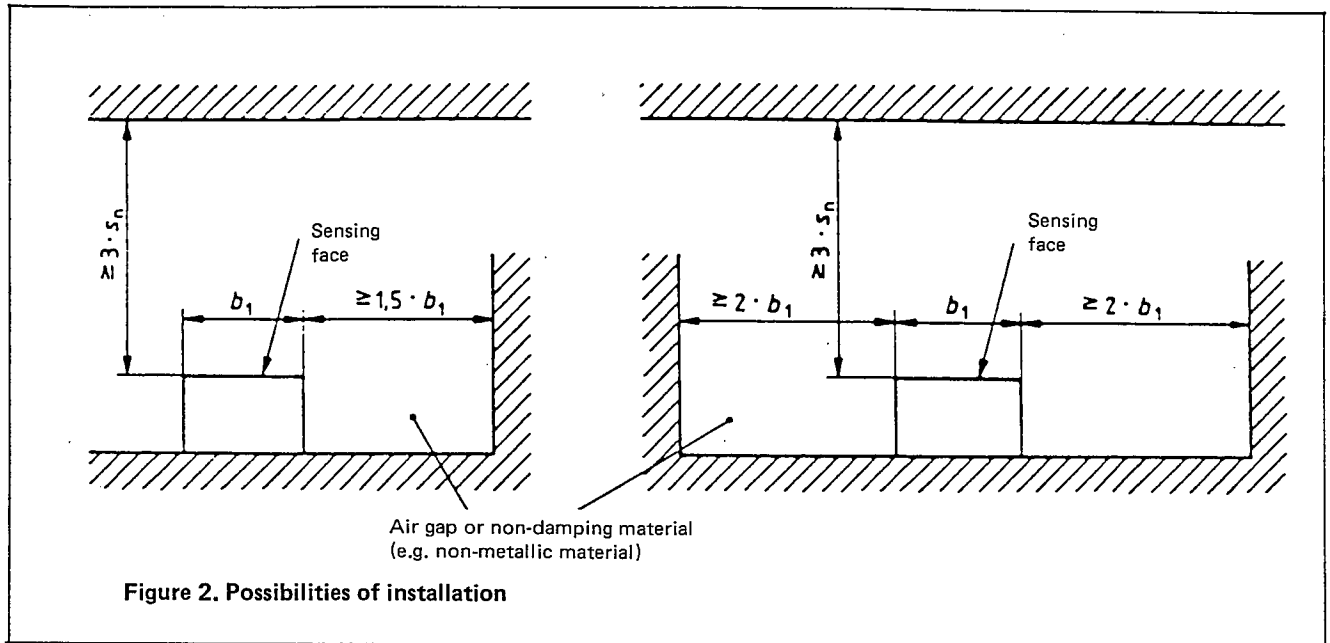


Figure 1. Inductive proximity switch. Form D

1) The threaded parts for cable entries, standardized in each country (Pg 13,5, CM12, etc.) may be used until the publication of an international standard on cable entries. Cable, the external diameter of which does not exceed 12 mm, shall pass through the cable entry.

1) Each national committee may indicate its own symbol.



6 Characteristics

The characteristics of the proximity switch shall be achieved whether it is mounted in a non-damping or in a damping material, provided the mounting conditions shown in figure 2 of clause 4 are complied with.

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	Rated operating distance s_n
D41	25
D42	40

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 65.

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.