उत्पाद मैनुअल
लघु -वोल्टेज स्विचगियर और कंट्रोल गियर भाग 5 नियंत्रण सर्किट उपकरण और स्विचिंग तत्व
अनुभाग 2 प्राक्सिमटी स्वीट्चेस
IS/IEC 60947-5-2: 2019 के अनुसर

PRODUCT MANUAL
Low-Voltage Switchgear and Control Gear Part 5 Control Circuit Devices and Switching Elements
Section 2 Proximity Switches
according to IS/IEC 60947-5-2: 2019

यह उत्पाद नियमावली सभी क्षेत्रीय/शाखा कार्यालयों और लाइसेंसधारियों द्वारा विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना-X के अंतर्गत प्रमाणन के संचालन में एकरूपता और पारदर्शिता सुनिश्चित करने के लिए संदर्भ सामग्री के रूप में उपयोग की जाएगी। बीआईएस प्रमाणन प्राप्त करने के इच्छुक भावी आवेदक भी इस दस्तावेज़ का उपयोग कर सकते हैं।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity of practice and transparency in operation of certification under Scheme-X of Bureau of Indian Standards (Conformity Assessment) Regulations,2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification.

1.	**मानक संख्या / IS No.**	:	IS/IEC 60947-5-2: 2019
	शीर्षक / Title	:	Low-Voltage Switchgear and Control Gear Part 5 Control circuit devices and switching elements Section 2 Proximity Switches
	संशोधनों की संख्या No. of amendments	:	Nil
2.	**नमूनाकरण दिशानिर्देश / Sampling Guidelines**		
a)	**लाइसेंस देने / लाइसेंस के दायरे में बदलाव के लिए अतिरिक्त दिशानिर्देश Additional Guidelines for GoL / CSoL**	:	Please refer **ANNEX – A**
3.	**समूहीकरण दिशानिर्देश Grouping Guidelines**	:	Please refer **ANNEX – B**
4.	**तकनीकी फाइल Technical File**	:	Please refer **ANNEX – C**
5.	**लेबलिंग और चिह्नांकन की आवश्यकताएँ Labelling and Marking Requirements**	:	Please refer **ANNEX – D**

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6.	**लाइसेंस का दायरा / Scope of the Licence:**	
Licence is granted to use Standard Mark as per **IS/IEC 60947-5-2: 2019** with the following scope:		
Name of the product:	Proximity Switches	
Type Designation (s) or Identification (cl.6.1(b))		
Classification (cl.4.2)		
Rated voltages (Cl. 5.3.1)	- Rated operational voltage (U_e) (5.3.1.1) - Rated insulation voltage (U_i) (5.3.1.2) - Rated impulse withstand voltage (U_{imp}) (5.3.1.3) - Voltage drop (U_d) (5.3.1.4) - Operating voltage range (U_B) (5.3.1.5)	
Rated Current (Cl. 5.3.2)	- Rated operational currents (I_e) (5.3.2.1) - Minimum Operational Current (I_m) ((5.3.2.2) - Off state current (I_r) (5.3.2.3) - No load supply current (I_o) (5.3.2.4)	
Rated Frequency	- 50 Hz - 50/60 Hz	
Ingress Protection (cl.8.1.10)		
Utilization Categories (Table 1)	- AC 12 - AC 140	- DC 12 - DC 13
Class of Protection against Electric Shock	(to be declared by the manufacturer)	
Pollution Degree (cl.7.1.4.2)		
Ingress Protection (cl.8.1.10)	- To be declared	
Operating distances (Cl. 8.2.1.3)	(to be declared by the manufacturer)	

ANNEX - A
Additional Guidelines for GoL / CSoL

1. To ensure uniform operation of certification process, the following guidelines in addition to CMD Guidelines on GoL / CSoL as per the conformity assessment Scheme – X of Schedule – II of the BIS (Conformity Assessment) Regulations, 2018 placed below shall be followed:

For GoL:

i. The scope of the licence shall be restricted to the applicable test (with / without Special Environment Condition tests as per Cl. 8.4.4, etc) that were carried out on the representative samples of the Proximity Switches as per the grouping guidelines given at **Annex - B**. However, it shall be ensured that all the requirements of the standard and all applicable tests as declared by the manufacturer have been reported in the test report.

for eg(s):

a) *In case if special tests are carried out based on the declaration of the manufacturer, the same has to be incorporated in the applicable models.*

ii. The licence document shall contain the following technical data for each of the model as enclosed at Annex – C.1.

For CSoL:

The manufacturer shall submit the technical file for the model(s) for which the manufacturer intends to get the CSoL as specified in **Annex C**, covering all aspects, including compliance report of product having complete test report issued by third party laboratory(ies). The manufacturer shall also submit a declaration whether the product category applied for inclusion falls under the same group for which the manufacturer is already having licence or the product category is a new group as per the grouping guidelines (Annex – B). The technical file and documents submitted by the manufacturer shall be reviewed by the BOs and the following process has to be followed:

a) If the model / variety applied for CSoL falls under the existing group and does not require any additional manufacturing and testing infrastructure, CSoL may be done based on desk audit for which the manufacturer has applied for CSoL.

b) If the model / variety applied for CSoL falls under different group, firm shall submit the technical file incorporating test reports issued from BIS approved Lab. If required, a visit may be carried out to verify the manufacturing process and necessary processes required for manufacturing such products and after satisfactory verification of manufacturing process and necessary processes required for manufacturing, CSoL may be processed.

ANNEX – B
Grouping Guidelines

1. For considering Grant of licence / Change in scope of licence the manufacturer shall submit the technical file including the test reports(s) / certificates(s) etc. for each of the variety of particular type designation(s) or model(s) as specified in the Scope of Licence (as given in Sl. 6 above) based on product grouping given below:

2. **Product Grouping**

2.1 Product Series - A group of Proximity switches, as defined in cl.4.2 of IS/IEC 60947-5-2: 2019; referring to a particular type designation with a unique combination of feature(s) under classification mentioned in Table A at Annexure -I.

3. **Sampling and Testing**

3.1 Sampling and testing - The type test for each product series shall be as below:

3.1.1 For each product series, the type test report for proximity switches with maximum features and configurations satisfying all the operational performance criteria shall be tested. The tests and sample(s) must be in accordance with the clause 9.3.1 of IS/IEC 60947-5-2: 2019.

3.1.2 Type tests shall be done as per sequence and applicability defined in clause 9.1.2 and 9.3.1 of IS/IEC 60947-5-2: 2019.

Note- Spares, accessories and sub-assemblies are integral part of product series. They shall be tested as far as possible with the equipment. (Spares and sub-assemblies being the integral part of the device, separate testing is not envisaged; Accessories may please be used while testing.
In case, the accessories are complying to the requirement of any other standard (IS/IEC 60947 series) then accessories shall meet the requirements of the respective Indian Standards.

3.1.3 Each product rating(s) /varieties may not be subjected to testing. Product sample as mentioned in para 3.1.4 will cover all the Product rating (s) / varieties having ratings equal or below under the Scope of Licence by virtue of this grouping guidelines.

3.1.4 In order to reduce multiple testing for the same type of Proximity Switches, following simplified test procedure shall be used:

a) **Type Testing** (as per cl.**9.3.1** of **IS/IEC 60947-5-2: 2019**): Proximity Switches of each type of sensing means having similar construction, shall be tested.

b) In case of Proximity switches marked with more than one utilization category, then higher utilization category with the most severe conditions shall be tested**. Proximity Switches marked with both AC & DC utilization categories shall be tested**

separately for AC as well as DC supply.

c) Tests performed at 50 Hz are deemed to cover 60 Hz applications and vice versa.

d) In case of multiple rated operational voltages (U_e) & rated operational currents (I_e) for a single utilization category; Making & breaking capacities tests will be conducted on the rating with highest VA (U_e x I_e).

e) Tests performed with different terminal designs. Where proximity switches is designed to be provided with different designs of terminal, additional test(s) shall be done as per Test sequence I (IS/IEC 60947-5-2: 2019) along with Measurement of clearances and creepage distances (cl.8.1.3 of IS/IEC 60947-5-2: 2019), if applicable

3.1.5 However, for the below cases, all type tests may not be conducted; if applicable only selected type tests will be conducted for inclusion of the same under scope of licence.
Following Proximity Switches can be added under the scope of Licence without additional complete type testing:

Case	**Control Circuit Devices**	**Condition**
A	Same type of Proximity switches with same type of sensing means	**If proximity switch is tested for higher sensing distance, other proximity switches with lower sensing distance may be covered subject to declaration of same fundamental design & same sensing means by manufacturer;** *Example: If proximity switch with inductive means of higher sensing distance is tested, proximity switches with same sensing means (i.e. inductive) of lower sensing distance may be covered.*

Annexure-I

Table A. Classification of Proximity Switches

Sl. No.	Classification based on	Type of physical and operational parameter
Classification as per Clause 4 & Table 1 of IS/IEC 60947-5-2: 2019		
1.a)	Sensing means (Cl. 4.2)	Inductive (I) Capacitive (C) Ultrasonic (U) Diffuse reflective photoelectric (D) Non-mechanical magnetic (M) Retroreflective photoelectric (R) Through beam photoelectric (T)
1.b)	Mechanical Installation (Cl. 4.3)	Embeddable (1) Non-embeddable (2) Neither (3)
1.c)	Construction from and Size (Cl. 4.4)	Cylindrical threaded barrel (A) Cylindrical smooth barrel (B) Rectangular with square cross-section (C) Rectangular with rectangular cross-section (D)
1.d)	Switching Element Function (Output) (Cl. 4.5)	NO (make) (A) NC (break) (B) changeover (make-break) (C) Programmable by user (P) Other (S)
1.e)	Type of Output (Cl. 4.6)	PNP-output 3 or 4 terminal DC (P) NPN-output 3 or 4 terminal DC (N) 2 terminal DC (D) 2 terminal AC (F) 2 terminal (U) AC or DC Other (S)
1.f)	Method of Connection (Cl. 4.7)	Integral leads (1) Plug-in (2) Screw (3) Other (4)
2	Degree of protection	According to Cl. 8.1.10 of IS/IEC 60947-5-2
Operational Characteristic:		
3.	Kind of current	- ac, - dc - ac & dc
4.	Utilization category	AC-12, AC-140, DC-12, DC-13

For Example-

Product Series 1*- Proximity Switch, Classification: I1B30AD2, IP65, Utilization Categories: AC-12.*

Product Series 2*- Proximity Switch, Classification: R3C30PN2, IP65, Utilization Categories: DC-12.*

ANNEX – C
Technical File

1. **TECHNICAL FILE** - Manufacturer shall maintain a Technical File for each model(s) manufactured by them as per the latest BIS circular Ref: CMD-I/2:17:1 with subject 'Guidelines for Grant of Licence (GoL) as per the conformity assessment Scheme – X of Schedule – II of BIS (Conformity Assessment) Regulations, 2018'.

2. In addition to the documents indicated in above circular, following documents are also to be submitted in the Technical File:
    a) Declaration for variety(ies) applied for BIS licence. The declaration shall be in line with scope of licence specified in this Product Manual;
    b) Technical data for model(s) to be tested as per format specified in Annex C.1 (for guidance only);
    c) Test Report / Certificate of Compliance for Constructional and Performance requirements (Cl. 8 of IS/IEC 60947-5-2: 2019, wherever applicable);
    d) Declaration with respect to special test and its compliance as per Cl. 8.4.4 of the IS/IEC 60947-5-2: 2019.

3. The technical File shall be maintained by the manufacturer till the End of Life of the variety(ies).

Annex C.1

Format for Technical Data

Name of the product: Proximity Switches

Technical Description of the product:

Test item particulars:	
Sensing means (Cl. 4.2)	
Mechanical Installation (Cl. 4.3)	
Construction from and Size (Cl. 4.4)	
Switching Element Function (Output) (Cl. 4.5)	
Type of Output (Cl. 4.6)	
Method of Connection (Cl. 4.7)	
Rated Voltages	
- Rated operational voltage (Ue) (5.3.1.1)	
- Rated insulation voltage (Ui) (5.3.1.2)	
- Rated impulse withstand voltage (Uimp) (5.3.1.3)	
- Voltage drop (Ud) (5.3.1.4)	
- Operating voltage range (UB) (5.3.1.5)	
- Rated operational voltage (Ue) (5.3.1.1)	
Rated Currents	
- Rated operational currents (Ie) (5.3.2.1)	
- Minimum Operational Current (Im) ((5.3.2.2)	
- Off state current (Ir) (5.3.2.3)	
- No load supply current (Io) (5.3.2.4)	
Type of Supply (ac/dc)	
Rated Frequency (Hz):	
Utilization Category	
Ingress Protection (Cl. 8.1.10)	
Pollution Degree (Cl.7.1.4.2)	
Mounting dimensions and conditions (Cl.7.3)	
Physical dimensions (Cl.8.3)	
Operating distances (Cl. 8.2.1.3)	
Frequency of operating cycles (Cl 8.2.1.6)	
Excess gain or, in case of Type D photoelectric proximity switches with background suppression, sensing range displacement (see 8.2.1.8);	
Turn-on time and the measuring method (Cl. 8.2.1.6.2.2)	
Turn-off time and the measuring method (Cl. 8.2.1.6.2.3).	

ANNEX – D
Labelling and Marking Requirements

1. **Labelling and Marking Requirements**- Labelling and Marking of Proximity Switches shall be as per Cl. 6.2 of IS/IEC 60947-5-2: 2019.

   a) Each Proximity Switch and/or its packaging shall be marked with the Standard Mark, as specified in Scheme –X in Schedule –II of the BIS (Conformity Assessment) Regulations, 2018. The Standard Mark shall carry the licence number in a visible manner and shall be as specified in the licence document.

   b) In addition, details of BIS website shall be marked on the package as follows: 'For details of BIS certification please visit www.bis.gov.in.'

2. Proximity Switch shall be clearly marked with the rated current up to which the product has been tested.

