INTER PLANT STANDARD - STEEL INDUSTRY		
IPSS	**SPECIFICATION FOR POSITION SWITCHES & PROXIMITY SWITCHES (*SECOND REVISION*)**	**IPSS:2-07-024-97**
	NO CORRESPONDING IS	Formerly: IPSS:2-07-024-95 (First revision)

0. FOREWORD

0.1 This Inter plant Standard (*second revision*) was prepared by the Standards Committee on Computerization and Automation, IPSS 2:7 and was adopted in 1997.

0.2 Interplant standards for steel industry primarily aim at achieving rationalization and unification of parts and sub-assemblies used in steel plant equipment and accessories, and provide guidance in indenting stores for existing or new installations by individual steel plants. For exercising effective control on inventory, it is advisable to select a fewer number of types from among those mentioned in this standard, for the purpose of company standards of individual steel plants. It is not desirable to make deviations in technical requirements.

0.3 This standard was first published in 1988. The first revision has been carried out to update the standard after reviewing from implementation point of view.

0.4 In the 1995 version of the standard, some vital printing errors were detected. These errors have been corrected in this revision.

1. SCOPE

1.1 In view of large scale use of only Inductive and Optical position and proximity switches, the IPSS standard may cover these two items only.

2. COUPLING

2.1 The body of the housing of the switch should be directly coupled to the operational member by fixing screws, or the probe will be mounted on a rigid frame in case of contactless switching.

3. SWITCHING DELAY

3.1 Switching delay should not be more than 50 ms.

3.2 The unit should have horizontal or vertical mounting facility.

4. TYPE OF SENSOR

4.1 Type of sensor may be one of the following:

a) Inductive proximity switch

b) Optical proximity switch.

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4.2 These switches are normally of two terminal devices. However, for certain applications three terminal switches are required. In such devices one terminal is common between the power supply input and the output contacts.

5. 1 NO AND 1 NC - Output contact shall be provided with all these switches.

6. INDUCTIVE (PICK UP) PROXIMITY SWITCHES

6.1 **Operation Characteristic** - Inductive proximity switch is a precision electromagnetic device that responds to the presence of ferromagnetic object in the proximity.

i) Input should be 24 V dc

ii) Output shall be relay based with potential free contacts.
No. of contacts 3 NO + 3 NC,

Contact rating - 1 Amp at 230 V ac or equivalent

iii) Switching status - LED shall be provided

iv) Switching frequency - 1 K Hz

v) Sensor range - Better than 25 mm

vi) Repeatability - 0.05 mm

vii) Short Circuit Protection - Shall be provided before relay.

viii) Termination - 3 wire type.

6.2 **Packaging** - Packaging will ensure total magnetic shielding. The sensor proper shall be housed in an outer protective shell, to which it shall be fixed by threading, along with appropriate sealing against dust, moisture etc. Type of protection shall be as specified in class E of IPSS:2-07-001-87

6.3 **Primary and Secondary Windings** - The windings shall be impregnated with insulating resin preventing any possibility of short circuiting. Primary and secondary windings shall be sealed side by side. Secondary winding shall be placed at the end of the sensor facing the object. Resistances of primary and secondary windings are adjusted to achieve highest sensitivity of the system. However, resistances of secondary winding shall not be higher than 1 K ohm.

6.4 **Core of the Windings** - Core of the winding shall be made of ferrite or any other material with magnetic characteristics close to ferrite. Core shall be cylindrical and its dimension shall be uniform throughout the length.

6.5 **Sensitive Surface** - Sensitive surface of the sensor facing the object shall be coated with anti-corrosive, high-temperature resistive, magnetic point.

6.6 **Temperature** - The sensor shall withstand temperature of application for environment class E of IPSS:2-07-001-87.

6.7 **Body of Probe** - Body of probe shall be of stainless steel.

7. OPTICAL PROXIMITY SWITCHES

7.1 **Operational Characteristics** - The photoswitch system obtains its ON/OFF input signal from the action of making or breaking a beam of light between the Emitter and Detector. The output is given through a relay which can be used for alarm/switching functions.

7.2 Important features of the device shall be as follows:

a) Maximum distance of installation of the device from the object should be 2 m in opposed mode and 0.25 m in reflective mode.

b) The system shall be able to operate in the atmosphere with smoke, oil and dust.

c) The system shall operate with modulated beam of light, thus giving total immunity to ambient light.

d) Opto isolator shall be built into Detector unit for protection from relay switching noise.

e) Shall have provision of self-test function internally in each unit.

f) The device shall have indicating lamps to show:

i) Power on,
ii) Object detected (or disappeared), and
iii) Device failure.

g) Response time : 20 ms including relay response.

h) Output : CMOS logic (Response time - ms) or relay with NC and NO contacts of 3 sets.

j) Emitting element : IR light emitting diode.

k) Sensing element : Silicon photo transistor.

m) Temperature range : $-25^{o}C$ to $+85^{o}C$.

n) Leakage current : Less than 10 microampere.

7.3 The system shall be reliable in industrial application. Meantime between failures should be minimum 2 years.

7.4 The system shall be built around solid state devices including the modulation of light beam.

7.5 The design shall be compact with photo transistor receiver, amplifying circuitry and an infrared or visible light source.

7.6 There shall be provision of adjustable time delays in the range of 10 ms to 100 ms.

7.7 A visible LED beam with alignment and output indicator shall be provided for easy installation and inspection.

7.8 There shall be provision for externally adjustable sensitivity.

7.9 The unit shall be packaged to suit the environment class E of IPSS:2-07-001-87.

7.10 Polarised beam compact optics shall be used.

7.11 i) Input shall be 24 V dc

ii) Output shall be relay based with potential free contacts,

No. of contacts - 3 NO + 3 NC
Contact rating - 1 Amp at 230 V ac or equivalent.

iii) Reverse polarity protection shall be provided.