भारतीय मानक

Indian Standard

IS 7722 : 2024
IEC 60382 : 1991

प्रक्रिया नियंत्रण प्रणालियों के लिए एनालॉग वायवीय संकेत

(पहला पुनरीक्षण)

Analogue Pneumatic Signals for Process Control Systems

(First Revision)

ICS 25.040.40

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

March 2024 **Price Group 3**

Industrial Process Measurement and Control Sectional Committee, ETD 18

NATIONAL FOREWORD

This Indian Standard (First Revision) which is identical to IEC 60382 : 1991 ‘Analogue pneumatic signal for process control systems’ issued by the International Electrotechnical Commission (IEC) was adopted by the Bureau of Indian Standards on the recommendation of the Industrial Process Measurement and Control Sectional Committee and approval of the Electrotechnical Division Council.

This standard was originally published in 1975. This revision has been undertaken to harmonize it with the latest developments that have taken place at international level.

The text of IEC standard has been approved as suitable for publication as an Indian Standard without deviations. Certain terminologies and conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words ‘International Standard’ appear referring to this standard, they should be read as ‘Indian Standard’; and
b) Comma (,) has been used as a decimal marker, while in Indian Standards the current practice is to use a point (.) as the decimal marker.

The Committee has reviewed the provisions of the following international standards referred in this adopted standard and decided that they are acceptable for use in conjunction with this standard.

International Standard	*Title*
IEC 654-2 : 1979	Operating conditions for industrial-process measurement and control equipment — Part 2: Power
ISO 1000 : 1981	SI units and recommendations for the use of their multiples and of certain other units

Only the English language text has been retained while adopting it in this Indian Standard, and as such, the page numbers given here are not the same as in the IEC Publication.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding of numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ANALOGUE PNEUMATIC SIGNALS FOR PROCESS CONTROL SYSTEMS

(First Revision)

1 General

1.1 *Scope and object*

This International Standard specifies the analogue pneumatic signal used in industrial-process measurement and control systems to transmit information between the elements of such systems.

It is applicable to:

a) pneumatic controllers;

b) pneumatic transmitters and information transmission systems.

This standard does not apply to analogue pneumatic signals used entirely within an element.

The object of this standard is to establish:

a) a standard operating pressure range for pneumatic information transmission systems;

b) a standard air supply pressure (with limit values) for the operation of pneumatic controllers and transmitters, pneumatic information transmission systems, current-to-pressure transducers, and similar devices.

1.2 *Normative references*

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 654-2: 1979, *Operating conditions for industrial-process measurement and control equipment. Part 2: Power.*

ISO 1000: 1981, *SI units and recommendations for the use of their multiples and of certain other units.*

2 Definitions

For the purpose of this International Standard the following definitions apply:

2.1 elements of industrial-process measurement and control systems: Functional units which transduce, process or transmit measured values of controlling, controlled and reference variables.

NOTE - A valve actuator in combination with a current-to-pressure transducer, valve positioner, or a booster relay is considered to be an element which receives the standard pneumatic transmission signal or standard electric current transmission signal.

2.2 pneumatic information transmission system: A system for conveying information comprising a transmitting mechanism converting input information into a corresponding air pressure, interconnecting tubing and a receiving element responsive to air pressure which develops an output directly corresponding to the input information.

2.3 current-to-pressure transducer: A device which receives an analogue electrical signal and converts it to a corresponding air pressure.

2.4 analogue pneumatic signal: A pneumatic signal, which varies in a continuous manner within its range, used in industrial-process measurement and control systems to transmit information.

2.5 range of the analogue pneumatic signal: The range is all the values of the signal which lie between defined limits.

2.6 lower limit: The specified lowest value of the range.

2.7 upper limit: The specified highest value of the range.

2.8 supply pressure: The pneumatic pressure supply which enables the system element to generate the pneumatic signal specified in this standard and, if applicable, to provide the actuator of the final control element with operational force.

3 Specified values

NOTE - All values of pressure are given in gauge pressure. The unit for pressure in the International System of Units (SI) is the pascal (Pa), defined as one newton per square metre. Customary units for pressure are the kPa and the bar. The bar is not an SI unit but ISO 1000 states that it may be used for fluid pressure.

$$1\ Pa = 1\ N/m^2 = 10^{-5}\ bar$$
$$100\ kPa = 1\ bar$$

3.1 *Range of the analogue pneumatic signal*

The range of the analogue pneumatic signal shall be as given in table 1.

Table 1 - Range of analogue pneumatic signal

Lower limit kPa	Upper limit kPa
20	100

NOTE - The output of a controller or a current-to-pressure transducer may be connected directly (without using a positioner) to a pneumatic actuator for positioning a final control element with a nominal range of 20 kPa - 100 kPa. Under operational conditions, if forces are exerted from the controlled medium to the final control element, a larger range is required for proper functioning. In this case, devices should be used with an output designed to vary from near zero to near supply pressure (preferably 5 kPa - 120 kPa).

3.2 *Supply pressure*

The supply pressure limits shall be as given in table 2. These limits are in accordance with the limit values specified in 5.2.1.1 of IEC 654-2.

Table 2 - Supply pressure limits

Minimum kPa	Maximum kPa
130	150

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

This Indian Standard has been developed from Doc No.: ETD 18 (22818).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	2323 7617
Eastern	: 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	2367 0012 2320 9474
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	265 9930
Southern	: C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	2254 1442 2254 1216
Western	: Manakalya, 4th Floor, NTH Complex (W Sector), F-10, MIDC, Andheri (East), Mumbai 400093	283 25838

Branches : AHMEDABAD, BENGALURU, BHOPAL, BHUBANESHWAR, CHANDIGARH, CHENNAI, COIMBATORE, DEHRADUN, DELHI, FARIDABAD, GHAZIABAD, GUWAHATI, HARYNA, HUBLI, HYDERABAD, JAIPUR, JAMMU & KASHMIR, JAMSHEDPUR, KOCHI, KOLKATA, LUCKNOW, MADURAI, MUMBAI, NAGPUR, NOIDA, PARWANOO, PATNA, PUNE, RAIPUR, RAJKOT, SURAT, VIJAYAWADA.

Published by BIS, New Delhi