INTERNATIONAL STANDARD

ISO 5599-2

Second edition
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Pneumatic fluid power — Five-port directional control valves —

Part 2: Mounting interface surfaces with optional electrical connector

Transmissions pneumatiques — Distributeurs à cinq orifices principaux —

Partie 2: Plans de pose avec connecteur électrique facultatif

Reference number
ISO 5599-2:2001(E)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 5599 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 5599-2 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 5, *Control products and components*.

This second edition cancels and replaces the first edition (ISO 5599-2:1990), which has been technically revised.

ISO 5599 consists of the following parts, under the general title *Pneumatic fluid power — Five-port directional control valves*:

— *Part 1: Mounting interface surfaces without electrical connector*

— *Part 2: Mounting interface surfaces with optional electrical connector*

— *Part 3: Code system for communication of valve functions*

Introduction

In pneumatic fluid power systems, power is transmitted and controlled through a gas under pressure circulating within a circuit.

The various devices for gas distribution and control can be either mounted directly onto the piping, or mounted on interface surfaces to allow quicker dismantling and to promote equipment interchangeability.

Pneumatic directional control valves of the five-port, four-way type, as used on mounting interface surfaces complying with the requirements of this part of ISO 5599, control the flow of compressed gas.

When the valve is electrically operated, it may be desirable to use an electrical connector at the interface of the valve body and base. Users of pneumatic valves benefit when this electrical connector is standardized, allowing easy electrical connection interchangeability between valves produced by different manufacturers.

Standardization of port and orifice identification, the result of control-mechanism actuation and a system of dimensional tolerances are provided to enhance mounting interchangeability of pneumatic control valves used on the mounting surfaces complying with the requirements of this part of ISO 5599.

Pneumatic fluid power — Five-port directional control valves —

Part 2:
Mounting interface surfaces with optional electrical connector

1 Scope

This part of ISO 5599 specifies the requirements for a mounting interface surface with optional electrical connector for five-port pneumatic directional control valves, for use at a maximum rated pressure of 1,6 MPa [16 bar[1)]]. It gives

— dimensions and tolerances of the interface features,

— port identification,

— identification of the result of control-mechanism actuation, and

— dimensions, tolerances and specifications for optional interface electrical connector mating.

It is not applicable to the functional characteristics of interfaces.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 5599. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 5599 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1101:—[2)], *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*.

ISO 1302:—[3)], *Geometrical Product Specifications (GPS) — Indication of surface texture in technical product documentation*.

ISO 4287, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*.

ISO 4288, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture*.

ISO 5598, *Fluid power systems and components — Vocabulary*.

ISO 11727, *Pneumatic fluid power — Identification of ports and control mechanisms of control valves and other components*.

1) 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2

2) To be published. (Revision of ISO 1101:1983)

3) To be published. (Revision of ISO 1302:1992)

3 Terms and definitions

For the purposes of this part of ISO 5599, the terms and definitions given in ISO 5598 and the following apply.

3.1
electrical connector
device consisting of two parts (contact and housing) that when joined provide electrical and mechanical continuity

3.2
contact
current-carrying component used at a removable junction of an electric circuit

3.3
socket
female contact with an opening or hollow designed to be the mechanical holder of a pin type contact

3.4
pin
male pointed contact designed to mate with a socket contact

3.5
housing
device designed to orient, secure and insulate contacts

4 Dimensional requirements and tolerances

4.1 Dimensional requirements for sizes 1E, 2E and 3E are shown in Figure 1 and given in Table 1.

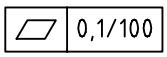
4.2 Dimensional requirements for sizes 4E, 5E and 6E are shown in Figure 2 and given in Table 2.

4.3 The main dimensions and tolerances of form and location of the interface features are shown in Figures 3, 4, 5 and 6, and given in Table 3.

4.4 Tolerances on surface condition, within the continuous lines, shall be as follows:

— surface roughness: $Ra = 1{,}6$ m (see ISO 1302, ISO 4287 and ISO 4288);

— surface flatness: 0,1 mm over a distance of 100 mm (see ISO 1101).

EXAMPLE 

4.5 The mounting surface shall not include any orifices other than those shown in the figures. All passages shown in the interface shall be included, and shall be connected to open ports in the base.

5 Identification of ports and orifices

5.1 The flow path orifices in the mounting surface interface, and the ports serving these orifices, shall be designated as follows (see Figures 4 and 6):

— ports 1, 2, 3, 4 and 5 are the principal flow paths;

— ports 12 and 14 are the actuation orifices.

NOTE Port 14 is preferred for single-source external solenoid pilot supply.

5.2 For monostable valves, the mandatory stable position of the valve shall always be identical to the result of actuation by control mechanism 12, as shown in Figure 7.

5.3 When a positive signal is applied to control mechanism 12, flow port 1 shall be connected with flow port 2 (and 4 with 5). When a positive signal is applied to control mechanism 14, flow port 1 shall be connected with flow port 4 (and 2 with 3) (see Figure 8 and ISO 11727).

5.4 The orientation of control mechanisms 12 and 14 on the valve relative to flow ports 2, 3, 4 and 5 in the base shall be as shown in Figures 7 and 8.

5.5 Additional options for port identification shall be in accordance with ISO 11727.

6 Electrical connector

6.1 General

Figure 9 is an illustration of an electrical connector, showing pin, socket and housing, for use with mounting surfaces with openings for an electrical connector. Figure 10 shows dimensions for electrical connectors.

6.2 Connector

6.2.1 The connector shall be readily removable, if not required, and shall comply with the requirements of 6.2.2 to 6.2.4.

6.2.2 Connectors shall be rated at 300 V a.c. or d.c.

6.2.3 Connectors shall be rated at 2 A maximum holding and at 10 A maximum inrush.

6.2.4 Insulated leads shall be rated at 300 V and shall be suitable for use at 105 °C.

6.3 Contacts

6.3.1 Each connector shall comprise four live contacts and one earth contact. The earth contact shall make first and break last. It shall be 1,5 mm longer than the other contacts.

6.3.2 The pins shall have diameters of 2,03 mm to 2,18 mm.

6.3.3 Socket contacts shall have an opening that allows friction fits on the pin contacts.

6.4 Insulation

6.4.1 Wire of a sectional area of from 0,75 mm^2 to 2,5 mm^2 shall be used.

6.4.2 Same-colour insulation on diagonally opposite leads shall be used.

6.4.3 Green insulation shall identify the earth connection.

6.5 Orientation

6.5.1 The dimensions of the electrical connector shall conform to those given in Figure 10.

6.5.2 The contacts shall be located at the corners of a rectangle, with the earth at the centre.

6.5.3 Contacts 1 and 4 shall be oriented parallel to the valve port slots and towards the valve interior.

6.5.4 Contacts 1 and 3 shall be used with single solenoid valves.

6.5.5 Contacts 2 and 4 shall be used with the second solenoid of a double solenoid valve.

6.5.6 Contact 5 shall be the earth ground.

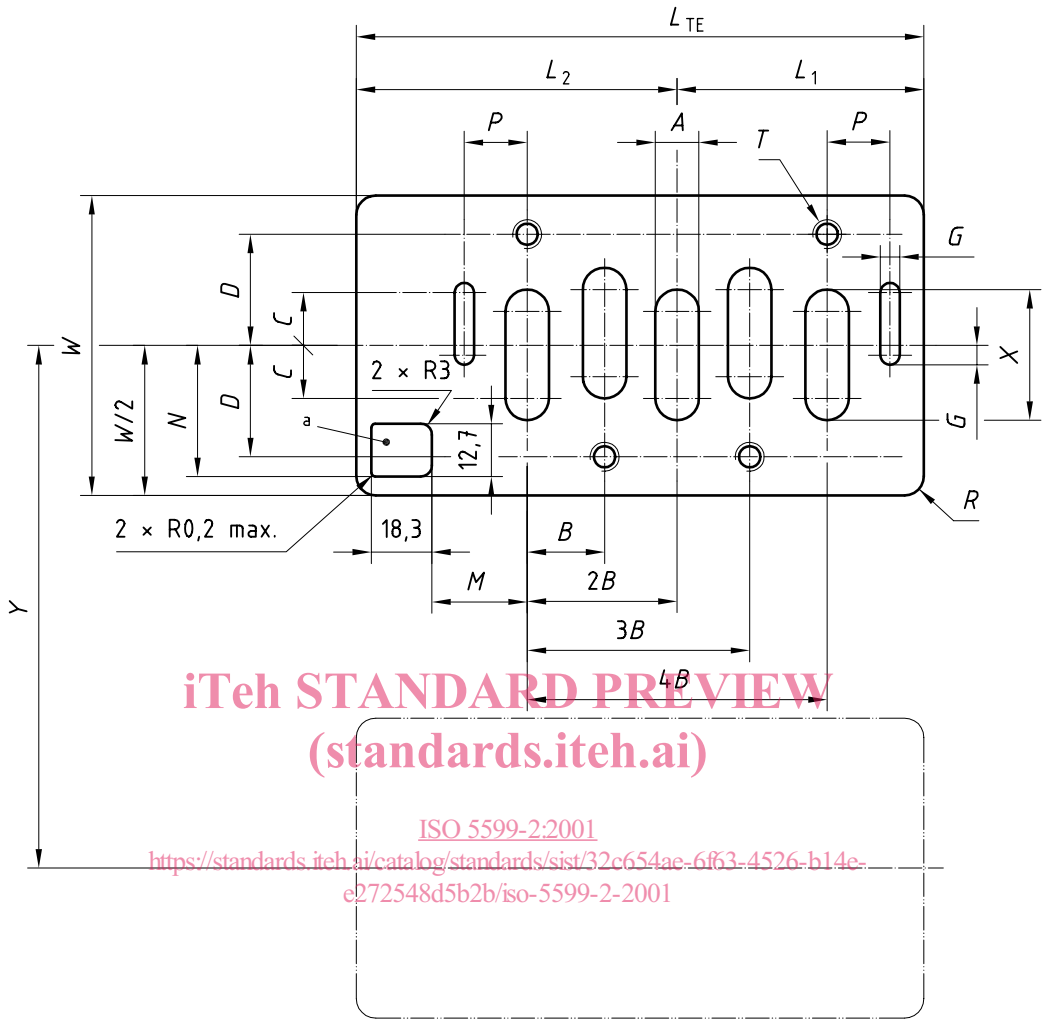
6.5.7 Each connector half shall be kept in place when the valve body and base are disconnected.

7 Identification statement (Reference to this part of ISO 5599)

It is strongly recommended that manufacturers use the following statement in test reports, catalogues and sales literature when electing to comply with this part of ISO 5599.

"Mounting interface dimensions conform to ISO 5599-2:2001, *Pneumatic fluid power — Five-port directional control valves — Part 2: Mounting interface surfaces with optional electrical connector*."

Dimensions in millimetres



A plane Y wide by 4 L_2 min. long, centred on and including the mounting surface, shall be free from any encroachment, except for mounting bolts.

[a] Opening for electrical connector.

Figure 1 — Mounting surface with opening for electrical connector — Sizes 1E, 2E and 3E

Table 1 — Dimensions — Sizes 1E, 2E and 3E

Dimensions in millimetres

Size	A	B	C	D	G[a]	L_1 min.	L_2 min.	L_{TE} min.	M	N	P	R max.	T[b]	W min.	X	Y[c]	Orifice area mm^2
1E	4,5	9	9	14	3	32,5	54,5	87	14,5	14	8,5	2,5	M5 × 0,8	38	16,5	43	79
2E	7	12	10	19	3	40,5	62,5	103	16,5	19	10	3	M6 × 1	50	22	56	143
3E	10	16	11,5	24	4	53	75	128	21	26	13	4	M8 × 1,25	64	29	71	269

[a] The minimum depth of orifices of width G shall be equal to G.

[b] The minimum thread depth provided in the base shall be twice the bolt diameter, T (see Figure 4, cross section X-X).

[c] Y represents the minimum distance between the axes of successive mounting surfaces of interfaces of the same size on a multiple block.