
**Pneumatic fluid power — Five-port
directional control valves —**

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

Transmissions pneumatiques — Distributeurs à cinq orifices principaux —

Partie 1: Plans de pose sans connecteur électrique



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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 5599-1 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 5, *Control products and components*.

This third edition cancels and replaces the second edition (ISO 5599-1:1989), 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.

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.

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Pneumatic fluid power — Five-port directional control valves —

Part 1:

Mounting interface surfaces without electrical connector

1 Scope

This part of ISO 5599 specifies the requirements for a mounting interface surface without electrical connector for five-port pneumatic directional control valves, for use at a maximum rated pressure of 1,6 MPa [16 bar¹⁾]. It gives

- dimensions and tolerances of the interface features,
- port identification, and
- identification of the result of control-mechanism actuation.

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 = 10⁵ Pa; 1 MPa = 1 N/mm²

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 apply.

4 Dimensional requirements and tolerances

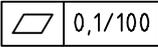
4.1 Dimensional requirements for sizes 1, 2 and 3 are shown in Figure 1 and given in Table 1.

4.2 Dimensional requirements for sizes 4, 5 and 6 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 and 4, and given in Table 3.

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

- surface roughness: $Ra = 1,6 \mu\text{m}$ (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 on 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 Figure 4):

- 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 5.

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 6 and ISO 11727).

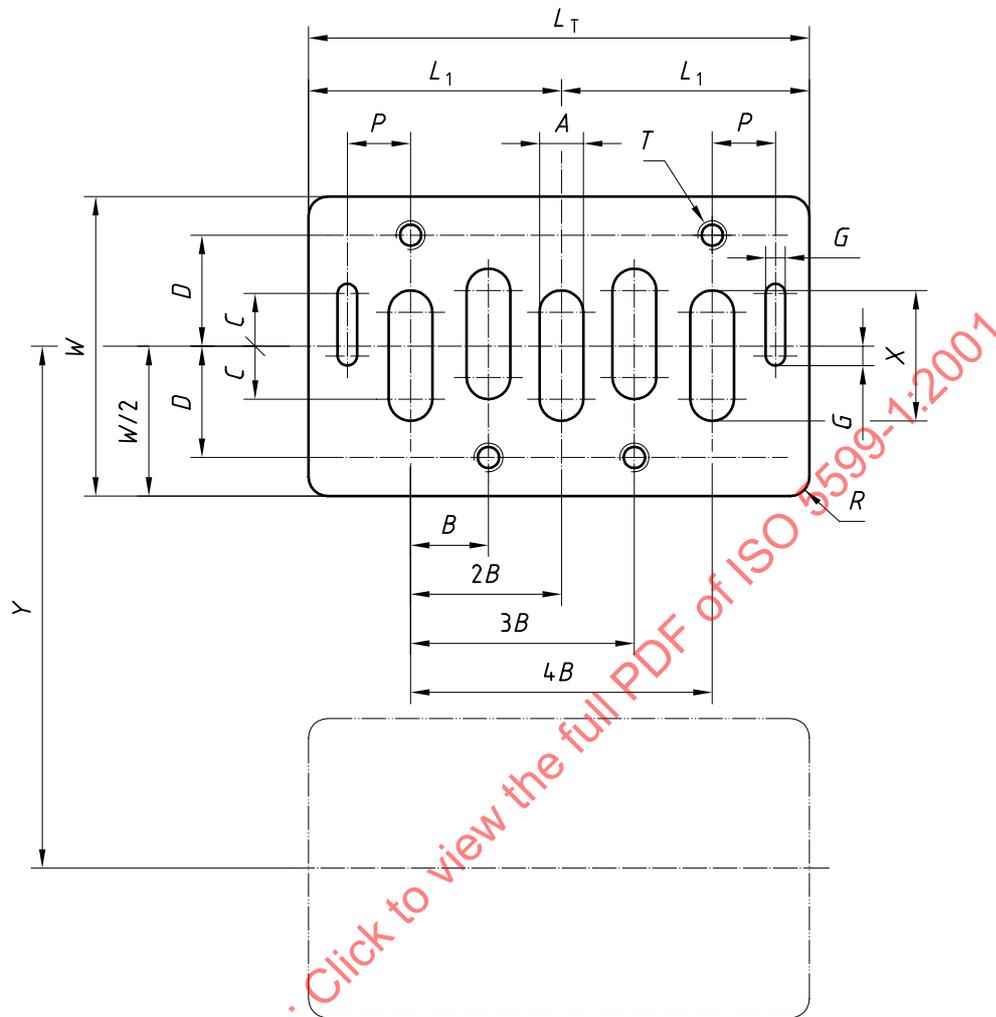
5.4 The orientation of control mechanisms 12 and 14 on the valve relative to flow ports 2, 3, 4 and 5 in the base shall be as shown in Figures 5 and 6.

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

6 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 5599-1:2001, *Pneumatic fluid power — Five-port directional control valves — Part 1: Mounting interface surfaces without electrical connector.*”



A plane Y wide by $4 L_1$ min. long, centred on, and including, the mounting surface, shall be free from any encroachment, except for mounting bolts.

Figure 1 — Mounting surface — Sizes 1, 2 and 3

Table 1 — Dimensions of mounting surfaces — Sizes 1, 2 and 3

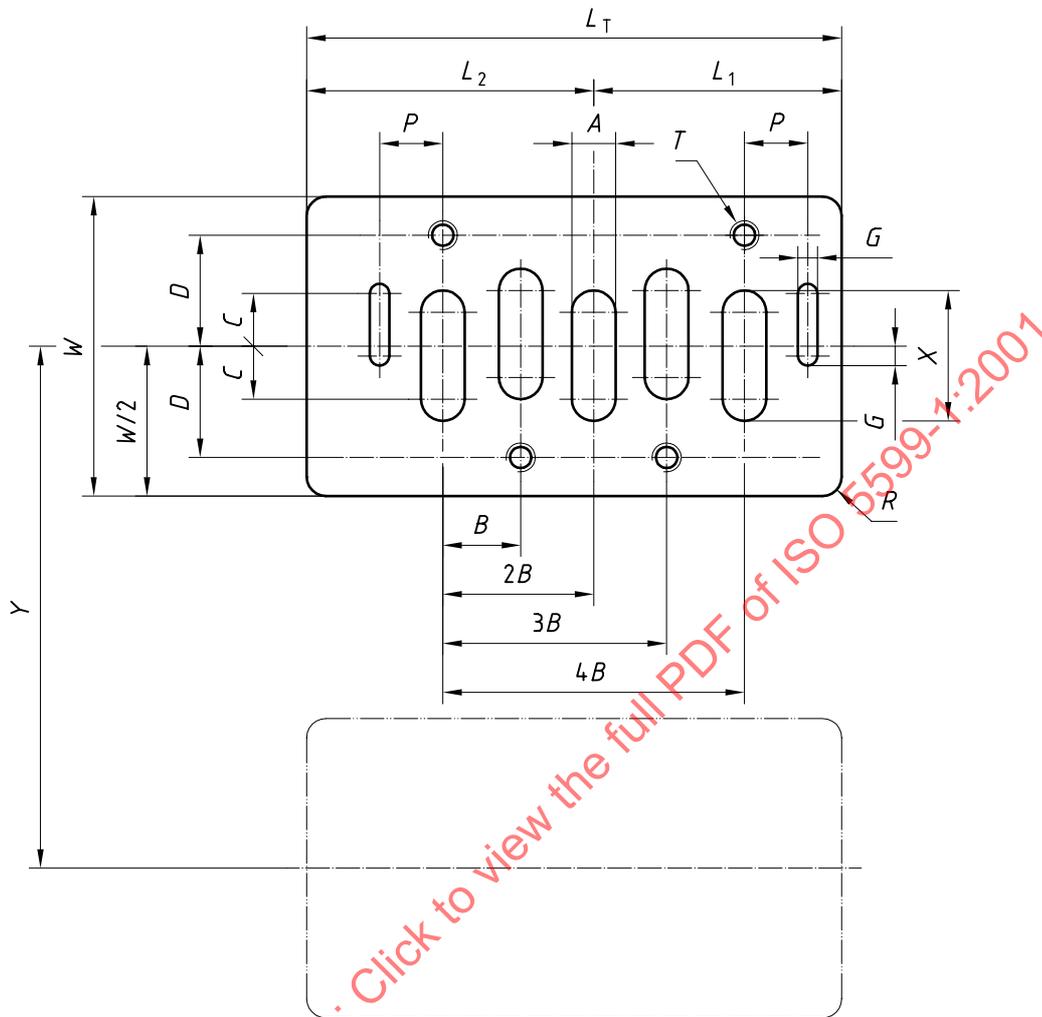
Dimensions in millimetres

Size	A	B	C	D	G^a	L_1 min.	L_T min.	P	R max.	T^b	W min.	X	Y^c	Orifice area mm^2
1	4,5	9	9	14	3	32,5	65	8,5	2,5	M5 × 0,8	38	16,5	43	79
2	7	12	10	19	3	40,5	81	10	3	M6 × 1	50	22	56	143
3	10	16	11,5	24	4	53	106	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 interfaces of the same size on a multiple block.



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.

Figure 2 — Mounting surface — Sizes 4, 5 and 6

Table 2 — Dimensions of mounting surfaces — Sizes 4, 5 and 6

Dimensions in millimetres

Size	A	B	C	D	G ^a	L ₁ min.	L ₂ ^b min.	L _T min.	P	R max.	T ^c	W min.	X	Y ^d	Orifice area mm ²
4	13	20	14,5	29	4	64,5	77,5	142	15,5	4	M8 × 1,25	74	36,5	82	438
5	17	25	18	34	5	79,5	91,5	171	19	5	M10 × 1,5	88	42	97	652
6	20	30	22	44	5	95	105	200	22,5	5	M10 × 1,5	108	50,5	119	924

^a The minimum depth of orifices of width G shall be equal to G .
^b L_2 is not equal to L_1 for sizes 4, 5 and 6 in order to accommodate optional electrical connector requirements.
^c The minimum thread depth provided in the base shall be twice the bolt diameter, T (see Figure 4, cross section X-X).
^d Y represents the minimum distance between the axes of successive mounting interfaces of the same size on a multiple block.

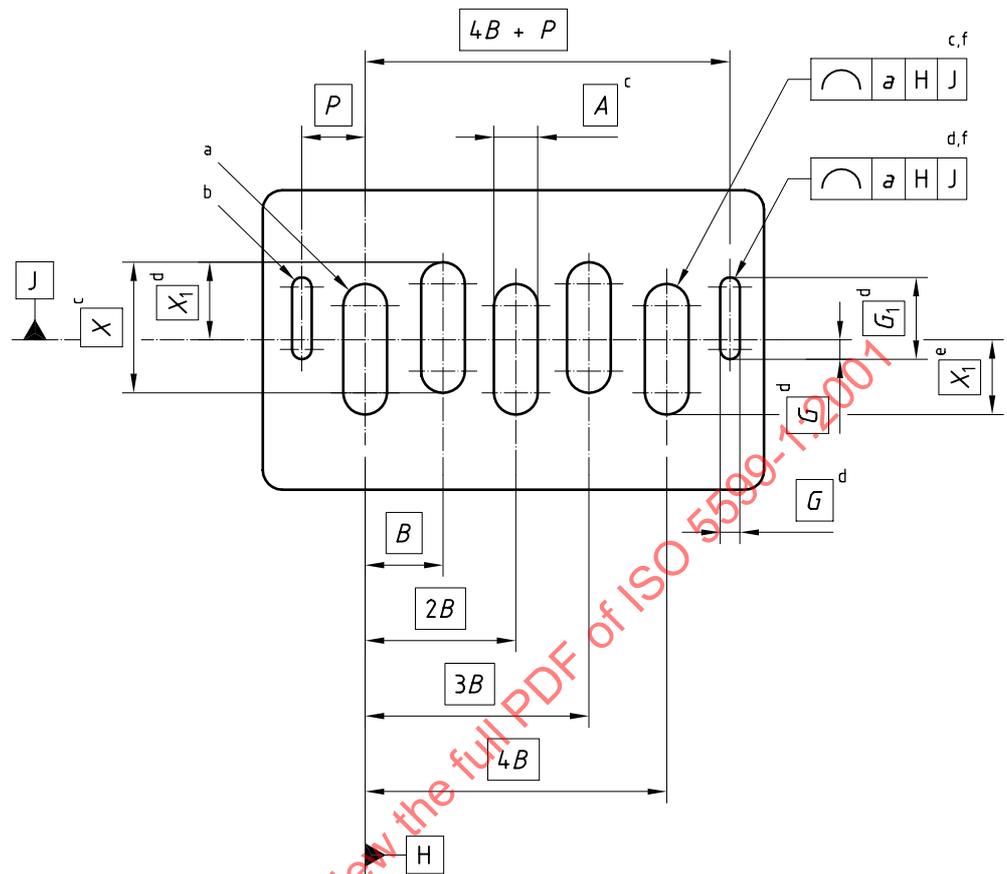


Figure 3 — Dimensions and tolerances of form of interface features

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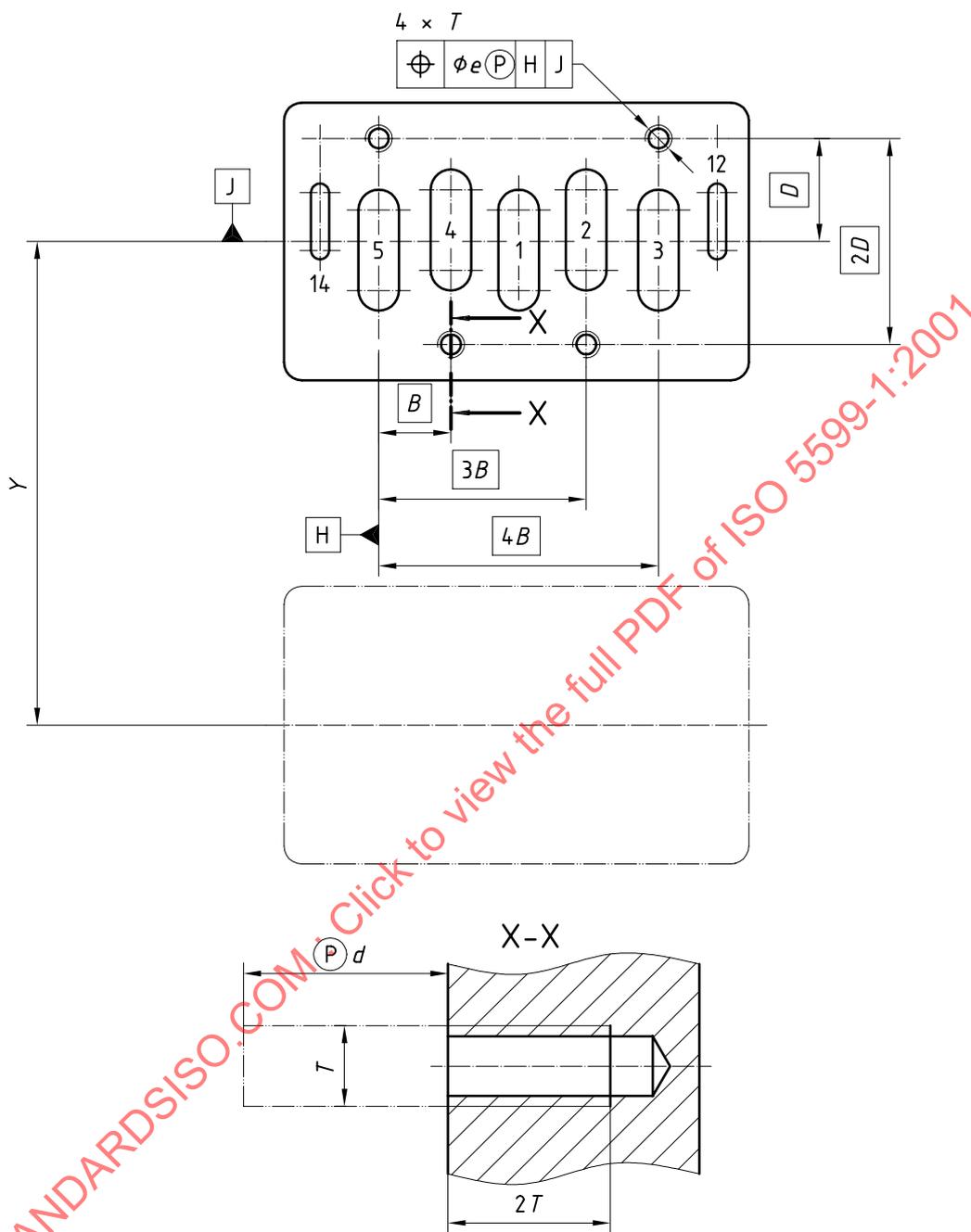


Figure 4 Identification of main actuating orifices and tolerances of position of mounting surface