INTERNATIONAL STANDARD

ISO 5599-2

First edition
1990-01-15

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 : 1990 (E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 5599-2 was prepared by Technical Committee ISO/TC 131, *Fluid power systems.*

This first edition of ISO 5599-2 cancels and replaces the first edition of ISO 5599-1 : 1978, of which it constitutes a technical revision in part.

ISO 5599-1 : 1978 specified requirements both for mounting interface surfaces without electrical connector and for mounting interface surfaces with optional electrical connector. This part of ISO 5599 specifies requirements for mounting interface surfaces with optional electrical connector only. Part 1 specifies requirements for mounting interface surfaces without electrical connector.

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

— *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*

Annex A of this part of ISO 5599 is for information only.

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Introduction

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

The various devices for gas distribution and control can be either mounted directly onto the pipeline, or mounted on interface surfaces, allowing quicker dismantling and promoting equipment interchangeability.

Pneumatic directional control valves of the five-port, four-way type, mounted on 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 sub-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 operator actuation and a system of dimensional tolerances are provided to enhance mounting interchangeability of pneumatic control valves used on the mounting interface surfaces complying with the requirements of this part of ISO 5599.

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Pneumatic fluid power — Five-port directional control valves —

Part 2:
Mounting interface surfaces with optional electrical connector

1 Scope

This part of ISO 5599 is applicable to mounting interface surfaces and electrical connectors for five-port pneumatic directional control valves for a maximum working pressure of 1,6 MPa [16 bar[1)]]. It specifies

— dimensions and tolerances of the interface features;

— port identification;

— identification of the result of operator actuation;

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

It does not apply to the functional characteristics of interfaces.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 5599. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 5599 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 468 : 1982, *Surface roughness — Parameters, their values and general rules for specifying requirements.*

ISO 1101 : 1983, *Technical drawings — Geometrical tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings.*

ISO 1302 : 1978, *Technical drawings — Method of indicating surface texture on drawings.*

ISO 5598 : 1985, *Fluid power systems and components — Vocabulary.*

1) 1 bar = 0,1 MPa = 10^5 N/m^2

3 Definitions

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

3.1 electrical connector: A device consisting of two parts (contact and housing) which, when they are joined, provide electrical and mechanical continuity.

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

3.3 socket: A contact with an opening or hollow designed to be the mechanical holder of a pin-type contact.

3.4 pin: A pointed contact designed to mate with a socket contact.

3.5 housing: A 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.

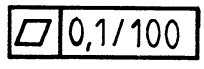
4.2 Dimensional requirements for sizes 4E, 5E and 6E are shown in figure 2 and given in table 2.

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 line, shall be as follows:

— Surface roughness: 1,6 µm (class N7) (see ISO 468 and ISO 1302)

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



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 connected to open ports in the sub-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 control by actuator 12, as shown in figure 7.

5.3 When a positive pressure signal is applied to port 12, flow port 1 shall be connected with flow port 2 (and 4 with 5). When a positive signal is applied to port 14, flow port 1 shall be connected with flow port 4 (and 2 with 3). See figure 8.

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

6 Electrical connectors

6.1 General

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

6.2 Connectors

The connector shall be readily removable, if not required, and shall comply with the requirements of 6.2.1 to 6.2.3.

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

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

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

6.3 Contacts

6.3.1 Connectors 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 diameter that allows friction fits on the pin contacts.

6.4 Insulation

6.4.1 Wire of sectional area 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 Figure 10 shows the dimensions of the electrical connector.

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

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

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

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

6.5.6 Contact No. 5 shall be used for earth.

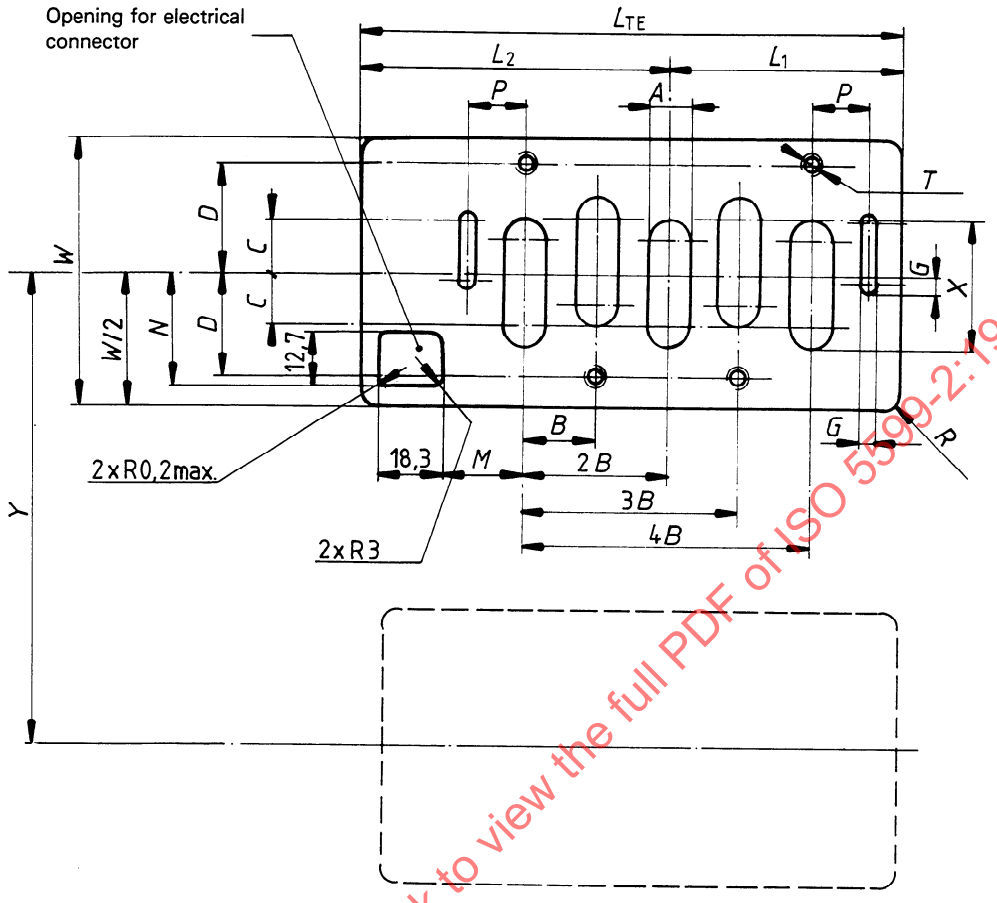
6.5.7 Each connector half shall be kept in place when the valve body and base are disconnected.

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

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

Dimensions in millimetres



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

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

Dimensions in millimetres

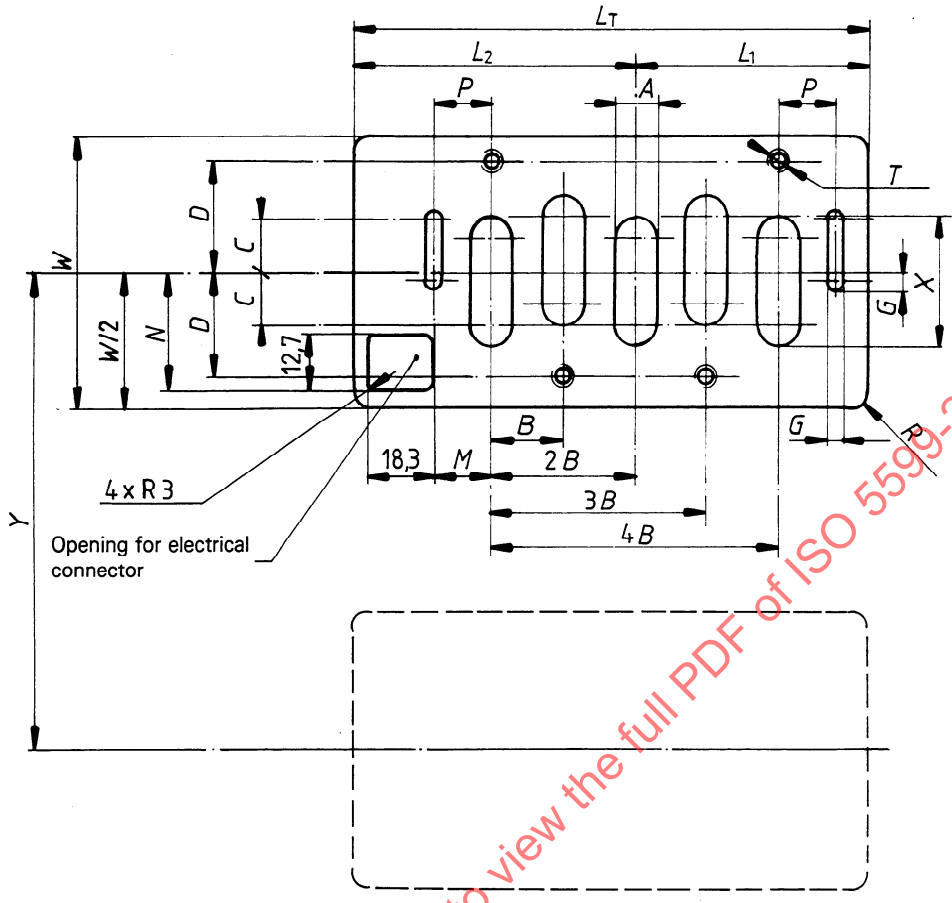
Size	A	B	C	D	G[1]	L_1 min.	L_2 min.	L_{TE} min.	M	N	P	R max.	T[2]	W min.	X	Y[3]	Orifice area mm²
1E	4,5	9	9	14	3	32,5	54,5	87	14,5	14	8,5	2,5	M5 × 0,8	38	16,5	43	79
2E	7	12	10	19	3	40,5	62,5	103	16,5	19	10	3	M6 × 1,0	50	22	56	143
3E	10	16	11,5	24	4	53	75	128	21	26	13	4	M8 × 1,25	64	29	71	209

1) The minimum depth of orifices of width G shall be equal to G.

2) The minimum thread depth provided in the base shall be twice the bolt diameter, T (see figure 4, cross-section XX).

3) Y represents the minimum distance between the axes of successive mounting surfaces of interfaces of the same size on a multiple block.

Dimensions in millimetres



NOTE — 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 with opening for electrical connector — Sizes 4E, 5E and 6E

Table 2 — Dimensions — Sizes 4E, 5E and 6E

Dimensions in millimetres

Size	A	B	C	D	G[1]	L_1 min.	L_2 min.	L_T min.	M	N	P	R max.	T[2]	W min.	X	Y[3]	Orifice area mm²
4E	13	20	14,5	29	4	64,5	77,5	142	15,5	31	15,5	4	M 8 × 1,25	74	36,5	82	438
5E	17	25	18	34	5	79,5	91,5	171	19	38	19	5	M10 × 1,5	88	42	97	652
6E	20	30	22	44	5	95	105	200	22,5	48	22,5	5	M10 × 1,5	108	50,5	119	924

1) The minimum depth of orifices of width G shall be equal to G.

2) The minimum thread depth provided in the base shall be twice the bolt diameter, T (see figure 4, cross-section XX).

3) Y represents the minimum distance between the axes of successive mounting surfaces of interfaces of the same size on a multiple block.

Dimensions and tolerances of form in millimetres

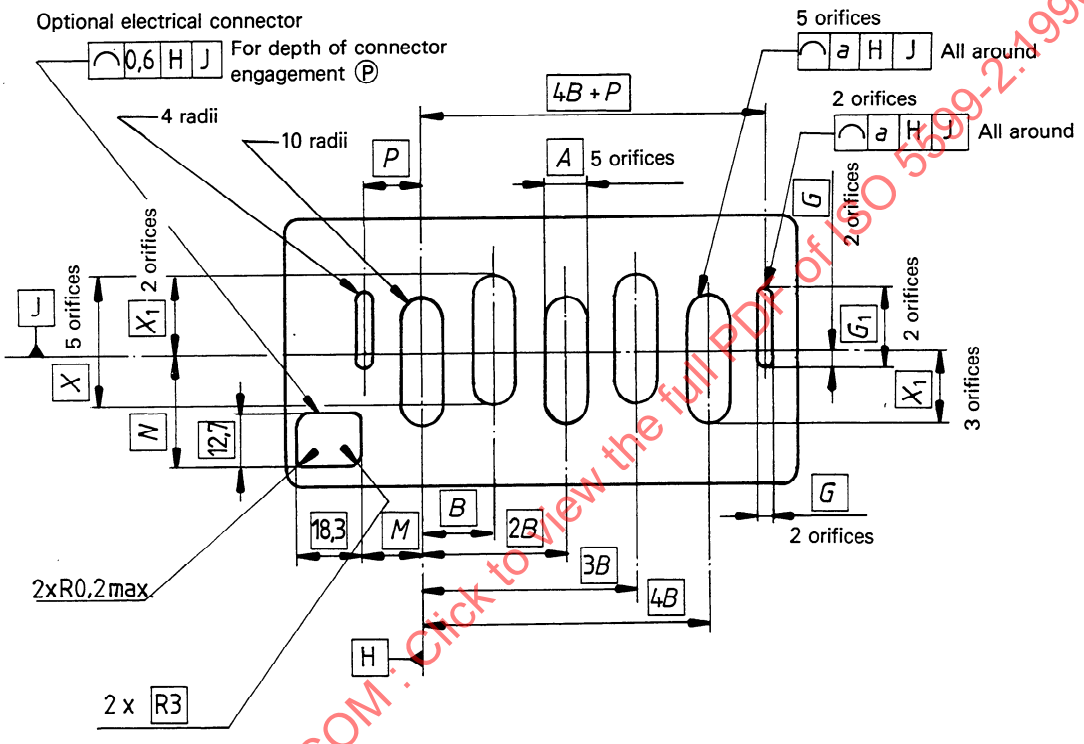


Figure 3 — Dimensions and tolerances of form of interface features — Sizes 1E, 2E and 3E

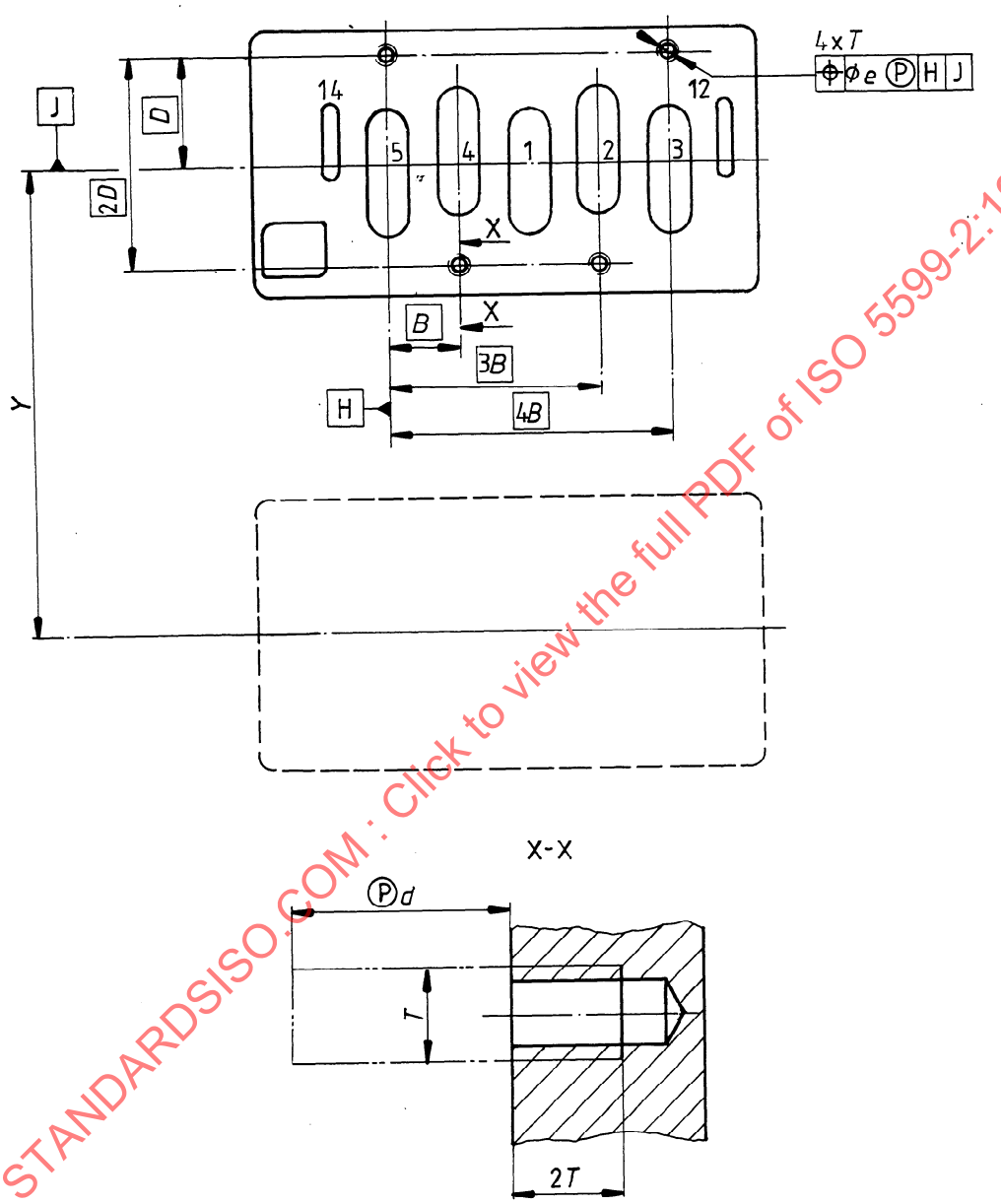


Figure 4 — Identification of main and actuation orifices and tolerances of position of the mounting surface — Sizes 1E, 2E and 3E

Dimensions and tolerances of form in millimetres

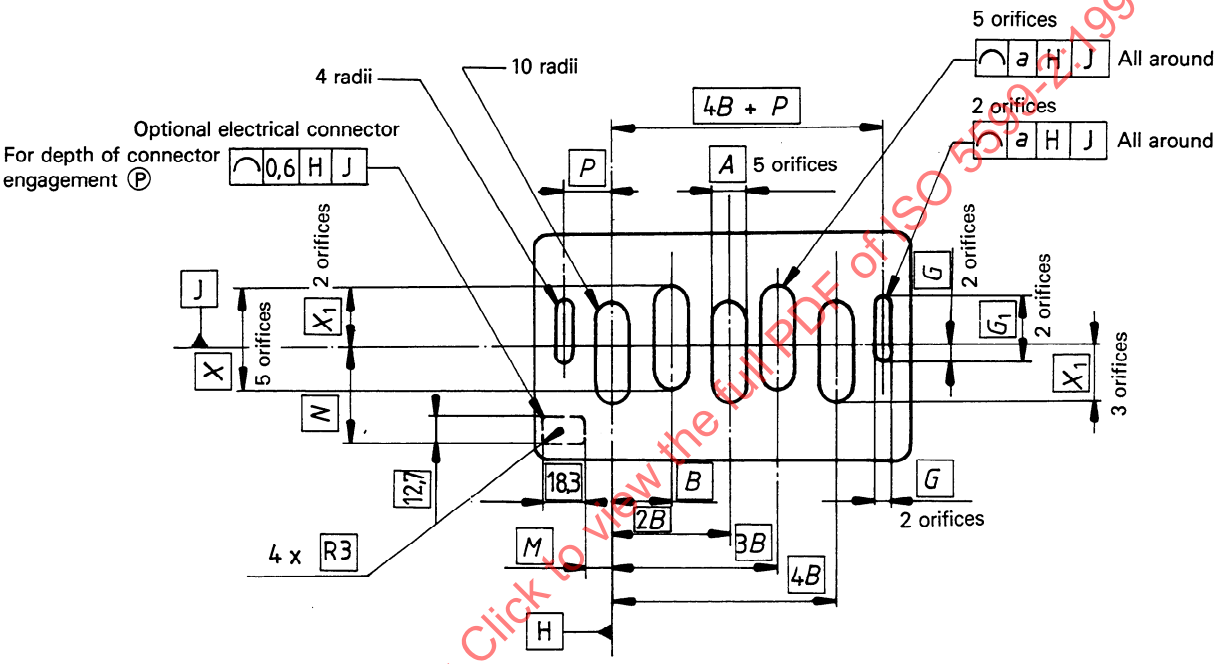


Figure 5 — Dimensions and tolerances of form of interface features — Sizes 4E, 5E and 6E

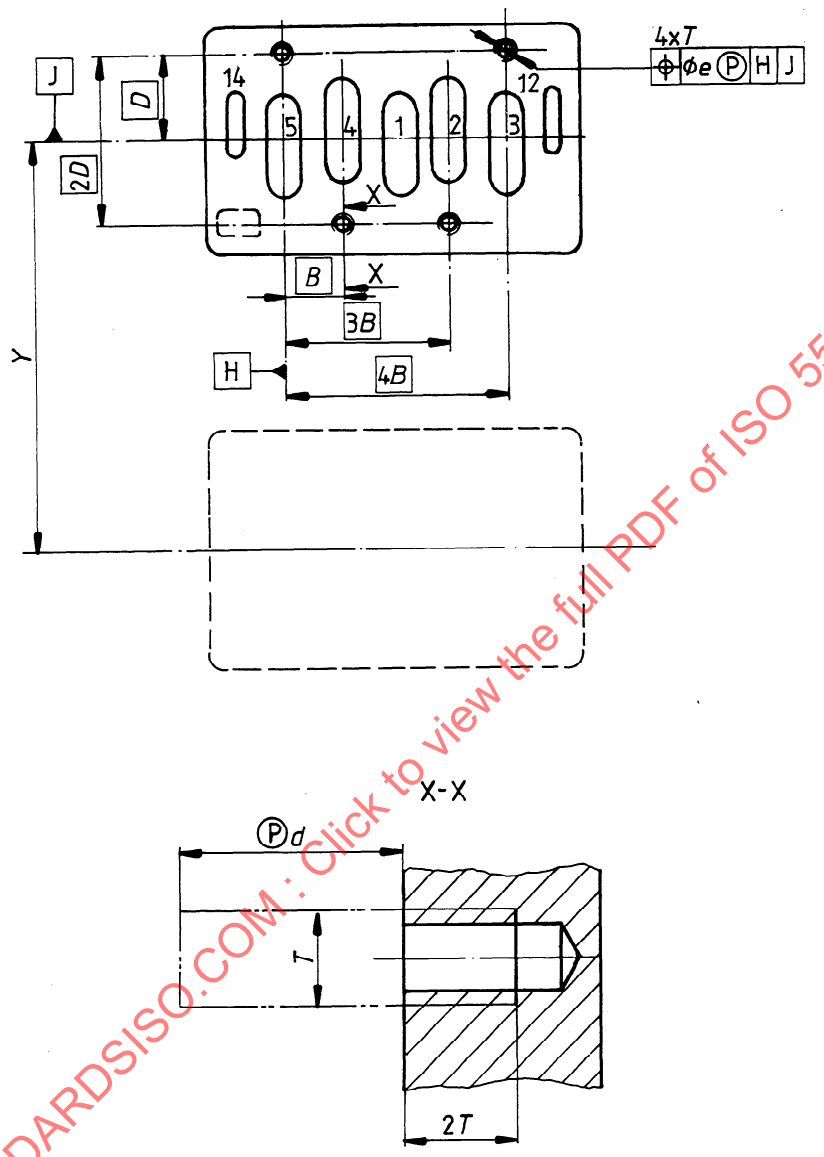


Figure 6 — Identification of main and actuation orifices and tolerances of position of the mounting surface — Sizes 4E, 5E and 6E