

INTERNATIONAL  
STANDARD

**ISO**  
**4401**

Second edition  
1994-12-15

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**Hydraulic fluid power — Four-port  
directional control valves — Mounting  
surfaces**

**iTeh STANDARD PREVIEW**

*(Transmissions hydrauliques — Distributeurs à quatre orifices — Plan de  
pose*  
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ISO 4401:1994

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Reference number  
ISO 4401:1994(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 voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 4401 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 4401:1980), which has been technically revised.

Annex A of this International Standard is for information only.

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## Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. Typical components found in such systems include hydraulic valves. These devices control flow direction, pressure or flowrate of liquids in the enclosed circuit.

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# Hydraulic fluid power — Four-port directional control valves — Mounting surfaces

## iTeh STANDARD PREVIEW

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### 1 Scope

This International Standard specifies the dimensions and other data relating to surfaces on which four-port hydraulic directional control valves are mounted in order to ensure their interchangeability.

It applies to mounting surfaces for four-port hydraulic directional control valves which represent current practice. They are generally applicable to industrial equipment.

### 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.

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 1302:1992, *Technical drawings — Method of indicating surface texture*.

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

ISO 5783:1981, *Hydraulic fluid power — Code for identification of valve mounting surfaces*.

### 3 Definitions

For the purposes of this International Standard, the definitions given in ISO 5598 apply.

### 4 Symbols

For the purpose of this International Standard, the following symbols apply:

- A, B, P, T, L, X and Y identify ports;
- F<sub>1</sub>, F<sub>2</sub>, F<sub>3</sub>, F<sub>4</sub>, F<sub>5</sub> and F<sub>6</sub> identify threaded holes for fixing bolts (see footnote 1 in the figures);
- G, G<sub>1</sub> and G<sub>2</sub> identify locating pin holes.

## 5 Tolerances

**5.1** The following values shall be applied to the mounting surface, i.e. that area within the dotted bold lines:

- surface roughness:  $R_a \leq 0,8 \mu\text{m}$  as specified in ISO 468 and ISO 1302
- surface flatness: 0,01 mm over a distance of 100 mm, as specified in ISO 1101
- tolerance for diameter of locating pin hole: H12

**5.2** The following tolerances shall be complied with along the  $x$  and  $y$  axes with respect to the origin:

- pin holes and bolt holes:  $\pm 0,1$  mm
- port holes:  $\pm 0,2$  mm

As for the other dimensions, see the figures.

## 6 Dimensions

The mounting surface dimensions for hydraulic directional control valves with four service ports shall be selected from the figures and tables specified in 6.1 to 6.6.

**6.1** Mounting surface dimensions for control valves with four service ports with 4,5 mm maximum port diameter (4401 - 02 - 01 - 0 - 94)<sup>1)</sup>, are given in figure 1 and table 1.

**6.2** Mounting surface dimensions for control valves with four service ports with 7,5 mm maximum port diameter

- a) without pilot port (4401 - 03 - 02 - 0 - 94)<sup>1)</sup>, are given in figure 2 and table 2;
- b) with pilot ports (4401 - 03 - 03 - 0 - 94)<sup>1)</sup>, are given in figure 3 and table 3.

**6.3** Mounting surface dimensions for control valves with four service ports with 11,2 mm maximum port diameter

- a) without pilot port (4401 - 05 - 04 - 0 - 94)<sup>1)</sup>, are given in figure 4 and table 4;
- b) with pilot ports (4401 - 05 - 05 - 0 - 94)<sup>1)</sup>, are given in figure 5 and table 5.

**6.4** Mounting surface dimensions for control valves with four service ports with pilot ports and with 17,5 mm maximum port diameter, with or without drain port (4401 - 07 - 06 - 0 - 94)<sup>1)</sup>, are given in figure 6 and table 6.

**6.5** Mounting surface dimensions for control valves with four service ports with pilot ports and with 25 mm maximum port diameter, with or without drain port (4401 - 08 - 07 - 0 - 94)<sup>1)</sup>, are given in figure 7 and table 7.

**6.6** Mounting surface dimensions for control valves with four service ports with pilot ports and with 32 mm maximum port diameter, with or without drain port (4401 - 10 - 08 - 0 - 94)<sup>1)</sup>, are given in figure 8 and table 8.

## 7 Pressure limitations

Operating pressure limitations for subplates and manifold blocks with these mounting surfaces will be established by the manufacturer.

## 8 Identification statement (Reference to this International Standard)

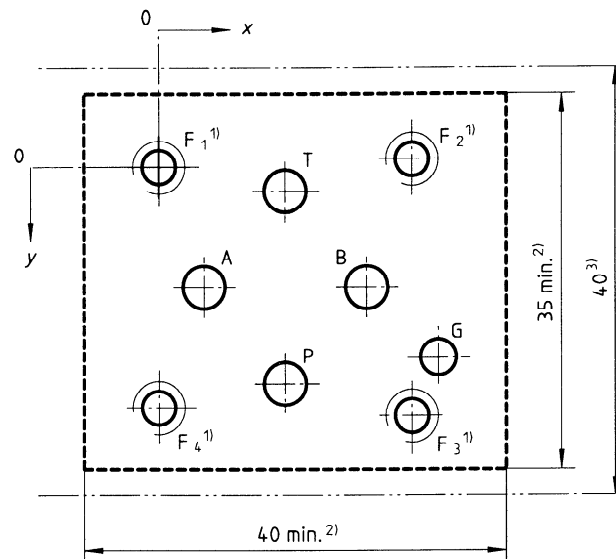
Use the following statement in tests reports, catalogues and sales literature when electing to comply with this International Standard:

"Mounting surface dimensions conform to ISO 4401:1994, *Hydraulic fluid power — Four-port directional control valves — Mounting surfaces.*"

1) For the explanation of codes, see ISO 5783.

## Codification: 4401 - 02 - 01 - 0 - 94

Dimensions in millimetres



- 1) The minimum thread depth is 1,5 bolt diameters,  $D$ . The recommended full-thread depth shall be  $2D + 6$  mm to aid interchangeability of valves and to reduce the number of fixing bolt lengths. The recommended engagement of fixing bolt thread for ferrous mountings is  $1,25D$ .
- 2) The dimensions specifying the area within the dotted bold lines are the minimum dimensions for the mounting surface. The corners of the rectangle may be radiused to a maximum radius,  $r_{max}$ , equal to the thread diameter of the fixing bolts.  
Along each axis the fixing holes are at equal distances to the mounting surface edges.
- 3) This dimension gives the minimum space required for a valve with this mounting surface. The dimension is also the minimum distance from centreline to centreline of two identical mounting surfaces placed on a manifold block.
- The attention of valve manufacturers is drawn to the fact that no part of the width of the complete valve assembly is to exceed this dimension.

**Figure 1 — Mounting surface for four-port hydraulic directional control valves with 4,5 mm maximum port diameter**

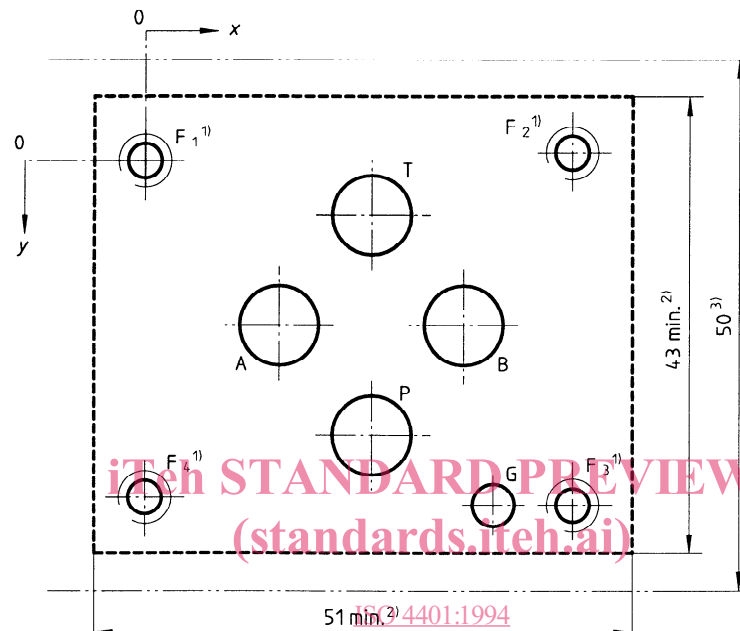
**Table 1 — Mounting surface for four-port hydraulic directional control valves with 4,5 mm maximum port diameter**

Dimensions in millimetres

Axis	P	A	T	B	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	G <sup>1)</sup>
	∅ 4,5 max.	∅ 4,5 max.	∅ 4,5 max.	∅ 4,5 max.	M5	M5	M5	M5	∅ 3,4
x	12	4,3	12	19,7	0	24	24	0	26,5
y	20,25	11,25	2,25	11,25	0	- 0,75	23,25	22,5	17,75
NOTE — Operating pressure limitations for subplates and manifold blocks with these mounting surfaces will be specified by the manufacturer.									
1) Blind holes made in the mounting surfaces to accommodate the locating pins on the valves; their minimum depth is 4 mm.									

Codification: 4401 - 03 - 02 - 0 - 94

Dimensions in millimetres



- <https://standards.iteh.ai/catalog/standards/sist/77ea46dd-937d-4292-8d08-15624401:1994>
- 1) The minimum thread depth is 1,5 bolt diameters,  $0,4 D$ . The recommended full-thread depth shall be  $2D + 6$  mm to aid interchangeability of valves and to reduce the number of fixing bolt lengths. The recommended engagement of fixing bolt thread for ferrous mountings is  $1,25 D$ .
  - 2) The dimensions specifying the area within the dotted bold lines are the minimum dimensions for the mounting surface. The corners of the rectangle may be radiused to a maximum radius,  $r_{max}$ , equal to the thread diameter of the fixing bolts.  
Along each axis the fixing holes are at equal distances to the mounting surface edges.
  - 3) This dimension gives the minimum space required for a valve with this mounting surface. The dimension is also the minimum distance from centreline to centreline of two identical mounting surfaces placed on a manifold block.  
The attention of valve manufacturers is drawn to the fact that no part of the width of the complete valve assembly is to exceed this dimension.

**Figure 2 — Mounting surface for four-port hydraulic directional control valves with 7,5 mm maximum port diameter and without pilot port**



**Table 2 — Mounting surface for four-port hydraulic directional control valves with 7,5 mm maximum port diameter and without pilot port**

Dimensions in millimetres

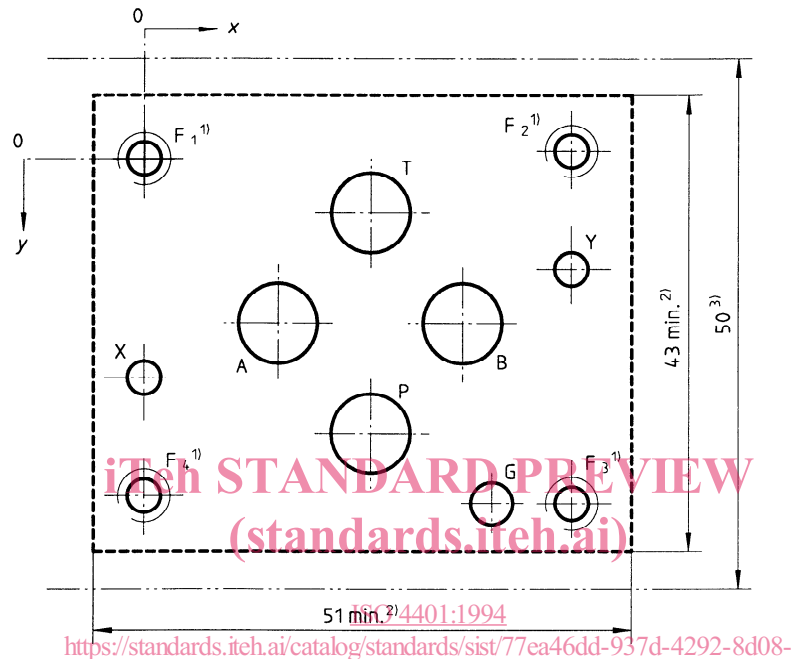
Axis	P	A	T	B	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	G <sup>1)</sup>
	∅ 7,5 max.	∅ 7,5 max.	∅ 7,5 max.	∅ 7,5 max.	M5	M5	M5	M5	∅ 4
x	21,5	12,7	21,5	30,2	0	40,5	40,5	0	33
y	25,9	15,5	5,1	15,5	0	- 0,75	31,75	31	31,75

NOTES

- 1 The use of this new mounting surface with valves designed in conformance with mounting surfaces of ISO 4401:1980 (maximum port diameter 6,3 mm) will require caution relative to the port seals.
  - 2 Operating pressure limitations for subplates and manifold blocks with these mounting surfaces will be specified by the manufacturer.
- 1) Blind holes made in the mounting surfaces to accommodate the locating pins on the valves; their minimum depth is 4 mm.

Codification: 4401 - 03 - 03 - 0 - 94

Dimensions in millimetres



- <https://standards.iteh.ai/catalog/standards/sist/77ea46dd-937d-4292-8d08-1155b01d0000/iso-4401-1994>
- 1) The minimum thread depth is 1,5 bolt diameters,  $D$ . The recommended full-thread depth shall be  $2D + 6$  mm to aid interchangeability of valves and to reduce the number of fixing bolt lengths. The recommended engagement of fixing bolt thread for ferrous mountings is  $1,25D$ .
  - 2) The dimensions specifying the area within the dotted bold lines are the minimum dimensions for the mounting surface. The corners of the rectangle may be radiused to a maximum radius,  $r_{max}$ , equal to the thread diameter of the fixing bolts.  
Along each axis the fixing holes are at equal distances to the mounting surface edges.
  - 3) This dimension gives the minimum space required for a valve with this mounting surface. The dimension is also the minimum distance from centreline to centreline of two identical mounting surfaces placed on a manifold block.  
The attention of valve manufacturers is drawn to the fact that no part of the width of the complete valve assembly is to exceed this dimension.

**Figure 3 — Mounting surface for four-port hydraulic directional control valves with 7,5 mm maximum port diameter and with pilot port**

**Table 3 — Mounting surface for four-port hydraulic directional control valves with 7,5 mm maximum port diameter and with pilot ports**

Dimensions in millimetres

Axis	P	A	T	B	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	X	Y	G <sup>1)</sup>
	∅ 7,5 max.	∅ 7,5 max.	∅ 7,5 max.	∅ 7,5 max.	M5	M5	M5	M5	∅ 3,3 max.	∅ 3,3 max.	∅ 4
x	21,5	12,7	21,5	30,2	0	40,5	40,5	0	0	40,5	33
y	25,9	15,5	5,1	15,5	0	- 0,75	31,75	31	22	9	31,75

NOTE — Operating pressure limitations for subplates and manifold blocks with these mounting surfaces will be specified by the manufacturer.

1) Blind holes made in the mounting surfaces to accommodate the locating pins on the valves; their minimum depth is 4 mm.