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# International Standard



# 6431

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## **Pneumatic fluid power — Single rod cylinders with detachable mountings — 10 bar (1 000 kPa) series — Bores from 32 to 320 mm — Mounting dimensions**

*Transmissions pneumatiques — Vérins à simple tige à fixations détachables — Série 10 bar (1 000 kPa) — Alésages de 32 à 320 mm — Dimensions de montage*

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Descriptors : fluid power, pneumatic fluid power, pneumatic cylinders, dimensions.

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

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.

International Standard ISO 6431 was developed by Technical Committee ISO/TC 131, *Fluid power systems*, and was circulated to the member bodies in January 1982.

It has been approved by the member bodies of the following countries :

Austria	Germany, F. R.	Norway
Belgium	Hungary	Poland
Brazil	India	Romania
China	Italy	Spain
Egypt, Arab Rep. of	Japan	Sweden
Finland	Mexico	United Kingdom
France	Netherlands	USA

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Australia  
USSR

# Pneumatic fluid power — Single rod cylinders with detachable mountings — 10 bar (1 000 kPa<sup>1)</sup>) series — Bores from 32 to 320 mm — Mounting dimensions

## 0 Introduction

In pneumatic fluid power systems, power is transmitted and controlled through a gas under pressure within an enclosed circuit. One component of such systems is the pneumatic cylinder. This is a device which converts the power brought by the gas into mechanical energy or force applied in a direction defined by the motion of an element, the piston, following the axis of a bore.

This piston is fastened to another element, the rod, which is the main point where the cylinder force is applied. To enable them to be fastened to user mechanisms, pneumatic cylinders have devices called "mountings". This International Standard deals with pneumatic cylinders for which these mountings can be detached from the main body of the device. The detachable mountings can be replaced without dismantling the basic cylinder.

Another International Standard of a similar conception, ISO 6430, deals with cylinders for which these mountings are integrated to the main body of the device.

## 1 Scope and field of application

This International Standard establishes a metric series of mounting dimensions required for interchangeability of commonly used pneumatic cylinders for a maximum working pressure of 10 bar (1 000 kPa).

NOTE — This International Standard allows manufacturers of pneumatic equipment freedom of design in metric cylinders and does not restrict technical development but provides basic guidelines.

## 2 References

ISO 228/1, *Pipe threads where pressure tight joints are not made on the threads — Part 1: Designation, dimensions and tolerances.*

1) 1 bar = 100 kPa = 10<sup>5</sup> Pa; 1 Pa = 1 N/m<sup>2</sup>

2) At present at the stage of draft.

ISO 4393, *Fluid power systems and components — Cylinders — Basic series of piston strokes.*

ISO 4395, *Fluid power systems and components — Cylinders — Piston rod thread dimensions and types.*

ISO 5598, *Fluid power systems and components — Vocabulary.*<sup>2)</sup>

ISO 6099, *Fluid power systems and components — Cylinders — Identification code for mounting dimensions and mounting types.*

ISO 6430, *Pneumatic fluid power — Single rod cylinders with integral mountings — 10 bar (1 000 kPa) series — Bores from 32 to 250 mm — Mounting dimensions.*

## 3 Definitions

For definitions of terms used, see ISO 5598.

## 4 Dimensions

Select mounting dimensions for cylinders manufactured in accordance with this International Standard from tables 2 to 9 inclusive.

NOTE — The tolerances of dimensions dependent on stroke included in the tables apply for strokes up to and including 1 250 mm. If strokes are longer than 1 250 mm, select tolerances from national standards or by agreement between manufacturer and user.

## 5 Nominal stroke

5.1 Select the nominal strokes from the recommended values shown in ISO 4393.

5.2 See table 1 for the nominal stroke tolerances.

**Table 1 — Nominal stroke tolerances**

Dimensions in millimetres

Bore	Nominal stroke, $S$	Nominal stroke tolerance <sup>1)</sup>
32 40 50	$S < 500$	+ 2 0
	$500 < S < 1\ 250$	+ 3,2 0
63 80 100	$S < 500$	+ 2,5 0
	$500 < S < 1\ 250$	+ 4 0
125 160 200 250 320	$S < 500$	+ 4 0
	$500 < S < 1\ 250$	+ 5 0

1) See note in clause 4.

## 6 Bore sizes

Included in this series are the following bore sizes :

32 — 40 — 50 — 63 — 80 — 100 — 125 — 160 — 200 —  
250 — 320 mm

## 7 Mounting styles

This International Standard includes the following mounting styles as described in ISO 6099 :

MF 1 — Head rectangular flange mounting (see figure 2 and table 3)

MF 2 — Cap rectangular flange mounting (see figure 3 and table 4)

MP 2 — Cap detachable clevis mounting (see figure 4 and table 5)

MP 4 — Cap detachable eye mounting (see figure 5 and table 6)

MS 1 — End angles mounting (see figure 6 and table 7)

MT 4 — Intermediate fixed or movable trunnion (male) mounting (see figure 7 and table 8)

MX 1 — Both ends studs or tie rods extended mounting (see figure 8 and table 9)

## 8 Piston rod characteristics

This International Standard includes the following piston rod characteristics :

Shouldered male threads (see figure 1, table 2)

The dimensions of the piston rod threads are chosen in accordance with ISO 4395.

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

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

"Mounting dimensions for interchangeable cylinders are selected in accordance with ISO 6431, *Pneumatic fluid power — Single rod cylinders with detachable mountings — 10 bar (1 000 kPa) series — Bores from 32 to 320 mm — Mounting dimensions.*"

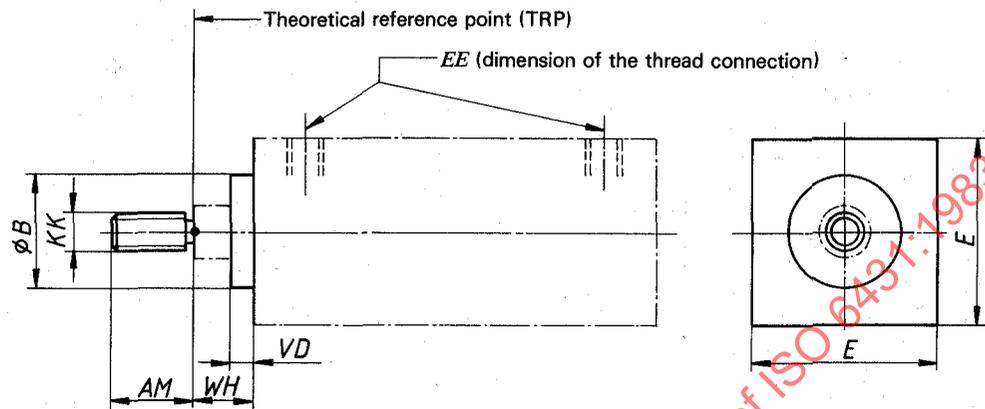


Figure 1 – Basic dimensions

Table 2 – Basic dimensions

Dimensions in millimetres

Bore	B max.	KK <sup>1)</sup>	AM <sup>1)</sup>		VD	WH min.	EE <sup>3)4)</sup>		E max.
			nom.	tol.			metric	inch	
32	30	M10 × 1,25	22		See footnote 2)	16	M10 × 1	G1/8	50
40	36	M12 × 1,25	24			20	M14 × 1,5	G1/4	60
50	48	M16 × 1,5	32			25	M14 × 1,5	G1/4	70
63	48	M16 × 1,5	32			25	M18 × 1,5	G3/8	85
80	60	M20 × 1,5	40	0 - 2		30	M18 × 1,5	G3/8	105
100	60	M20 × 1,5	40			35	M22 × 1,5	G1/2	130
125	72	M27 × 2	54			45	M22 × 1,5	G1/2	160
160	108	M36 × 2	72			60	M27 × 2	G3/4	195
200	108	M36 × 2	72			70	M27 × 2	G3/4	240
250	126	M42 × 2	84			80	M33 × 2	G1	290
320	144	M48 × 2	96		90	M33 × 2	G1	380	

- 1) Dimensions KK and AM given for the piston rod end threads correspond to the "long" type as in ISO 4395.
- 2) Dimension VD is given either in the national standards, where they exist, or by manufacturers of cylinders.
- 3) A definitive choice of port threads EE will be made in accordance with future decisions of ISO/TC 131/SC 4.
- 4) The inch series of port threads EE is chosen in accordance with ISO 228/1.

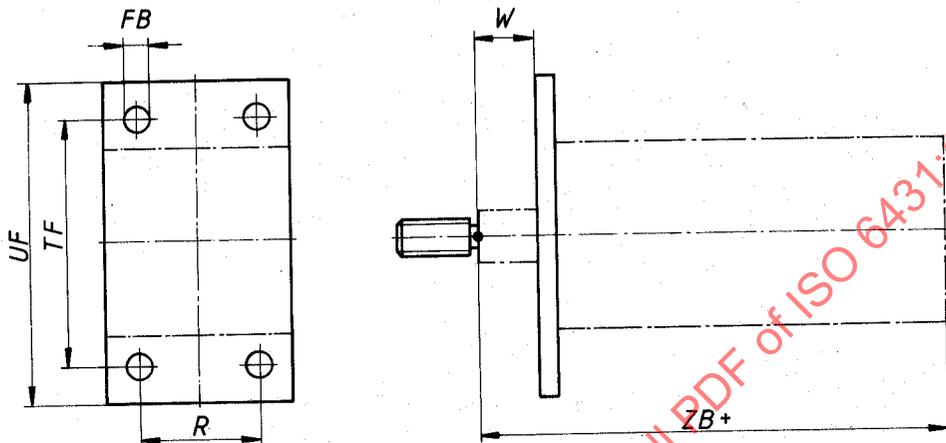


Figure 2 — Head rectangular flange mounting (MF 1)

Table 3 — Dimensions of mounting by head rectangular flange (MF 1)

Dimensions in millimetres

Bore	UF max.	TF Js14	FB H13	R Js14	W		ZB max.
					nom.	tol.	
32	86	64	7	32	16		124
40	96	72	9	36	20	± 1,6	142
50	115	90	9	45	25		149
63	130	100	9	50	25	± 2	165
80	165	126	12	63	30		182
100	187	150	14	75	35		198
125	224	180	16	90	45	± 2,5	235
160	280	230	18	115	60		264
200	320	270	22	135	70		280
250	395	330	26	165	80		305
320	475	400	33	200	90		340

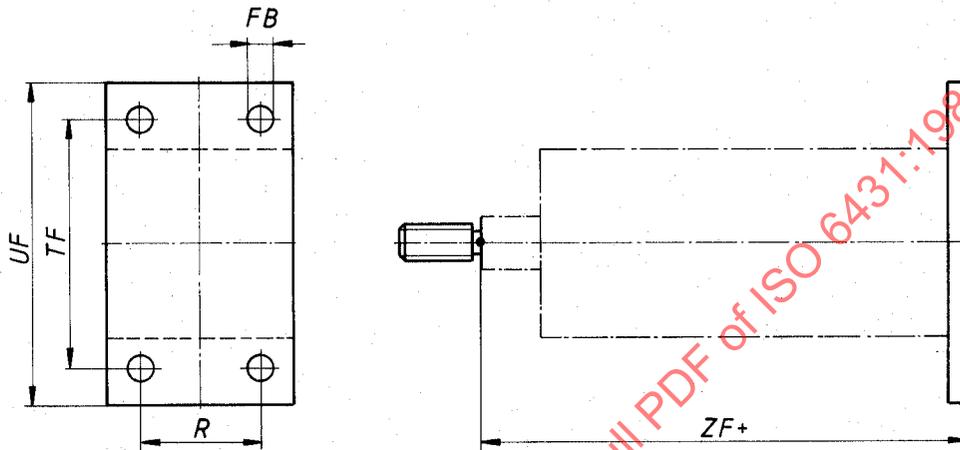


Figure 3 – Cap rectangular flange mounting (MF 2)

Table 4 – Dimensions of mounting by cap rectangular flange (MF 2)

Dimensions in millimetres

Bore	UF max.	TF Js14	FB H13	R Js14	ZF <sup>1)</sup>	
					nom.	tol.
32	86	64	7	32	130	± 1,25
40	96	72	9	36	145	
50	115	90	9	45	155	
63	130	100	9	50	170	± 1,6
80	165	126	12	63	190	
100	187	150	14	75	205	
125	224	180	16	90	245	± 2
160	280	230	18	115	280	
200	320	270	22	135	300	
250	395	330	26	165	330	± 2,5
320	475	400	33	200	370	

1) See note in clause 4.

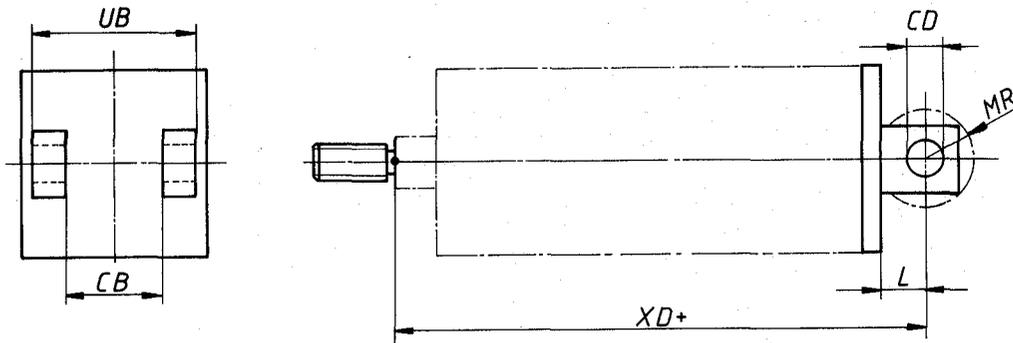


Figure 4 – Cap detachable clevis mounting (MP 2)

Table 5 – Dimensions of mounting by cap detachable clevis (MP 2)

Dimensions in millimetres

Bore	UB h14	CB H14	CD H9	MR max.	L min.	XD <sup>1)</sup>	
						nom.	tol.
32	45	26	10	11	12	142	± 1,25
40	52	28	12	13	15	160	
50	60	32	12	13	15	170	
63	70	40	16	17	20	190	± 1,6
80	90	50	16	17	20	210	
100	110	60	20	21	25	230	± 2
125	130	70	25	26	30	275	
160	170	90	30	31	35	315	
200	170	90	30	31	35	335	± 2
250	200	110	40	41	45	375	
320	220	120	45	46	50	420	± 2,5

1) See note in clause 4.

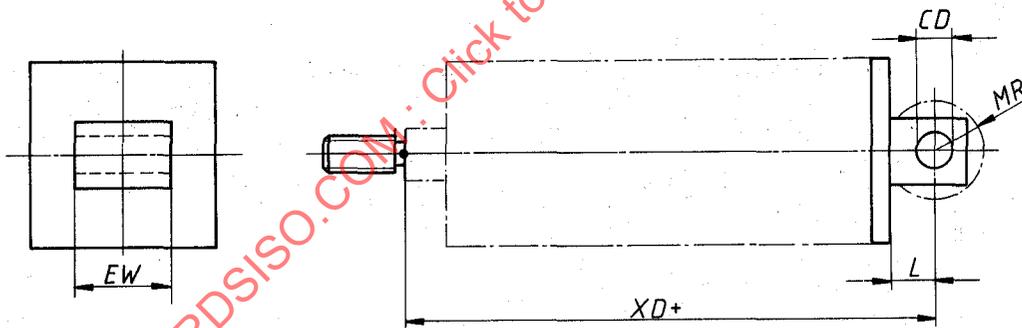


Figure 5 – Cap detachable eye mounting (MP 4)

Table 6 – Dimensions of mounting by cap detachable eye (MP 4)

Dimensions in millimetres

Bore	EW		CD H9	MR max.	L min.	XD <sup>1)</sup>	
	nom.	tol.				nom.	tol.
32	26		10	11	12	142	± 1,25
40	28		12	13	15	160	
50	32	-0,2	12	13	15	170	
63	40	-0,6	16	17	20	190	± 1,6
80	50		16	17	20	210	
100	60		20	21	25	230	± 2
125	70		25	26	30	275	
160	90		30	31	35	315	
200	90	-0,5	30	31	35	335	± 2
250	110	-1,2	40	41	45	375	
320	120		45	46	50	420	± 2,5

1) See note in clause 4.

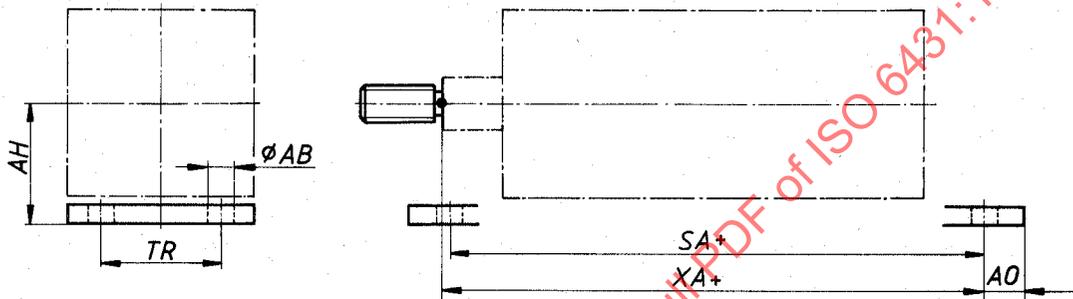


Figure 6 – End angles mounting (MS 1)

Table 7 – Dimensions of mounting by end angles (MS 1)

Dimensions in millimetres

Bore	AH Js15	TR Js14	AB H13	SA <sup>1)</sup>		XA <sup>1)</sup>		AO max.
				nom.	tol.	nom.	tol.	
32	32	32	7	142		144		11
40	36	36	9	161	± 1,25	163	± 1,25	15
50	45	45	9	170		175		15
63	50	50	9	185		190		15
80	63	63	12	210	± 1,6	215	± 1,6	20
100	71	75	14	220		230		25
125	90	90	16	250		270		25
160	115	115	18	300		320		25
200	135	135	22	320	± 2	345	± 2	35
250	165	165	26	350		380		40
320	200	200	33	390	± 2,5	425	± 2,5	45

1) See note in clause 4.