International Standard 6020/1

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

Hydraulic fluid power — Single rod cylinders — Mounting dimensions — 160 bar (16 000 kPa) series — Part 1 : Medium series

Transmissions hydrauliques — Vérins 160 bar (16 000 kPa) à simple tige — Dimensions d'interchangeabilité — Partie 1 : Série moyenne

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Descriptors : hydraulic fluid power, hydraulic equipment, hydraulic cylinders, mounting flanges, fasteners, dimensions, interchangeability, cylindrical bores.

Price based on 8 pages

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 6020/1 was developed by Technical Committee ISO/TC 131, *Fluid power systems and components*, and was circulated to the member bodies in December 1978.

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

Austria	India	South Africa, Rep. of
Belgium	Ireland	Spain
Canada	Italy	Sweden
Chile	Japan	Turkey
Czechoslovakia	Korea, Rep. of	United Kingdom
Finland	Netherlands	USA
France	Poland	USSR
Germany, F. R.	Romania	Yugoslavia

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

Australia
Hungary
Norway

Printed in Switzerland

Hydraulic fluid power — Single rod cylinders — Mounting dimensions — 160 bar (16 000 kPa[1]) series — Part 1 : Medium series

0 Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit.

One component of such systems is the fluid power cylinder. This is a device which converts power into linear mechanical force and motion. It consists of a movable element, i.e. a piston and piston rod, operating within a cylindrical bore.

Two mounting standards have been provided to meet the needs required in the application of interchangeable cylinders. This International Standard is one of two parts relating to mounting dimensions for 160 bar hydraulic cylinders. The other part, relating to 160 compact series, is ISO 6020/2, *Hydraulic fluid power — Single rod cylinders — Mounting dimensions — 160 bar (16 000 kPa) series — Part 2 : Compact series.*

1 Scope and field of application

This International Standard establishes metric mounting dimensions for medium series cylinders as required for interchangeability of commonly used hydraulic cylinders.

The medium series dimensions are applicable to both round or square head cylinders thus allowing a wider range of applications. They permit larger ports with longer cushions that are particularly suitable for applications requiring higher velocity and rapid decelerations.

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

2 References

ISO 273, *Fasteners — Clearance holes for bolts and screws.*

ISO 3320, *Fluid power systems and components — Cylinder bores and piston rod diameters — Metric series.*

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

ISO 5598, *Fluid power systems and components — Vocabulary.*[2]

3 Definitions

Definitions of other terms used in this International Standard are given in ISO 5598.

3.1 cylinder : A device which converts fluid power into linear mechanical force and motion.

3.2 cylinder bore : The internal diameter of the cylinder.

3.3 piston rod : The element transmitting mechanical force and motion from the piston.

3.4 mounting : A device by which a cylinder is fastened to its mating element.

4 Dimensions

Select mounting dimensions for cylinders manufactured in accordance with this International Standard from tables 1 to 5 inclusive.

5 Bore sizes

Included in this medium series are the following bore sizes :

25 — 32 — 40 — 50 — 63 — 80 — 100 — 125 — 160 — 200 — 250 — 320 — 400 — 500 mm

1) 1 Pa = 1 N/m^2

2) At present at the stage of draft.

6 Mounting styles

This International Standard includes the following mounting styles :

MF1 — Head rectangular flange mounting (see figure 2 and table 2)

MF2 — Cap rectangular flange mounting (see figure 2 and table 2)

MF3 — Head circular flange mounting (see figure 3 and table 3)

MF4 — Cap circular flange mounting (see figure 3 and table 3)

MP3 — Cap fixed eye mounting (see figure 4 and table 4)

MP4 — Cap detachable eye mounting (see figure 4 and table 4)

MP5 — Cap fixed eye with spherical plain bearing mounting (see figure 4 and table 4)

MP6 — Cap detachable eye with spherical plain bearing mounting (see figure 4 and table 4)

MT1 — Head integral trunnion (male) mounting (see figure 5 and table 5)

MT2 — Cap integral trunnion (male) mounting (see figure 5 and table 5)

MT4 — Intermediate fixed or movable trunnion (male) mounting (see figure 5 and table 5).

7 Piston rod characteristics

7.1 This International Standard covers piston rods having a shouldered male thread end (see figure 1 and table 1 for basic dimensions).

7.2 For internally threaded rod ends, see ISO 4395.

7.3 For rod end eyes, International Standards are being prepared.

8 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 :

"Interchangeable cylinder mounting dimensions selected in accordance with ISO 6020/1, *Hydraulic fluid power — Single rod cylinders — Mounting dimensions — 160 bar (16 000 kPa) series — Part 1 : Medium series.*"

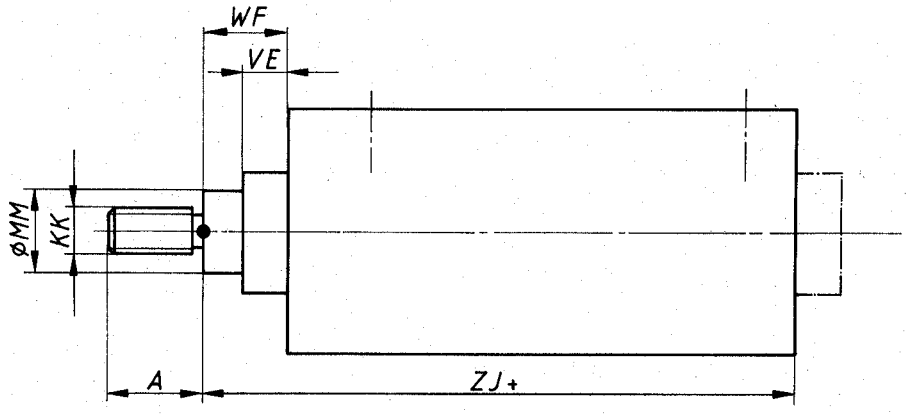


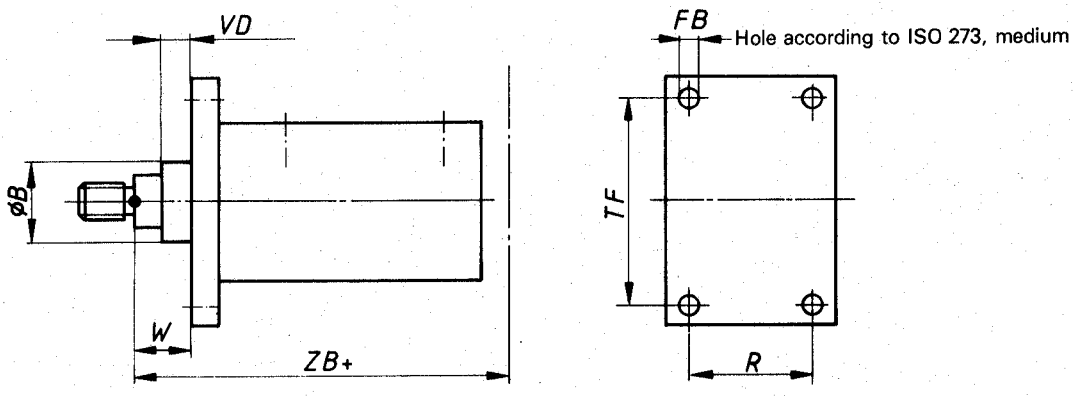
Figure 1 — General dimensions

Table 1 — General dimensions

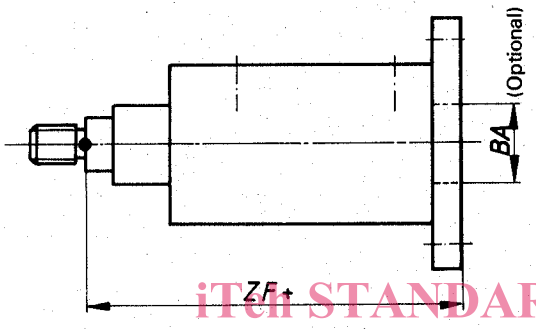
Dimensions in millimetres

Cylinder				Threaded piston rod end			
Bore	*VE*	*WF*	*ZJ*	*KK*	*MM*	*A*	
25	15	28	150	M12 × 1,25	14	16	
				M14 × 1,5	18	18	
32	19	32	170	M14 × 1,5	18	18	
				M16 × 1,5	22	22	
40	19	32	190	M16 × 1,5	22	22	
				M20 × 1,5	28	28	
50	24	38	205	M20 × 1,5	28	28	
				M27 × 2	36	36	
63	29	45	224	M27 × 2	36	36	
				M33 × 2	45	45	
80	36	54	250	M33 × 2	45	45	
				M42 × 2	56	56	
100	37	57	300	M42 × 2	56	56	
				M48 × 2	70	63	
125	37	60	325	M48 × 2	70	63	
				M64 × 3	90	85	
160	41	66	370	M64 × 3	90	85	
				M80 × 3	110	95	
200	45	75	450	M80 × 3	110	95	X
				M100 × 3	140	112	
250	64	96	550	M100 × 3	140	112	X
				M125 × 4	180	125	
320	71	108	660	M125 × 4	180	125	X
				M160 × 4	220	160	
400	90	130	740	M160 × 4	220	160	X
				M200 × 4	280	200	
500	110	163	890	M200 × 4	280	200	
				M250 × 6	360	250	

NOTE — If other piston rod diameters or other threads are required, use those identified in ISO 3320 and ISO 4395.



a) Head mounting



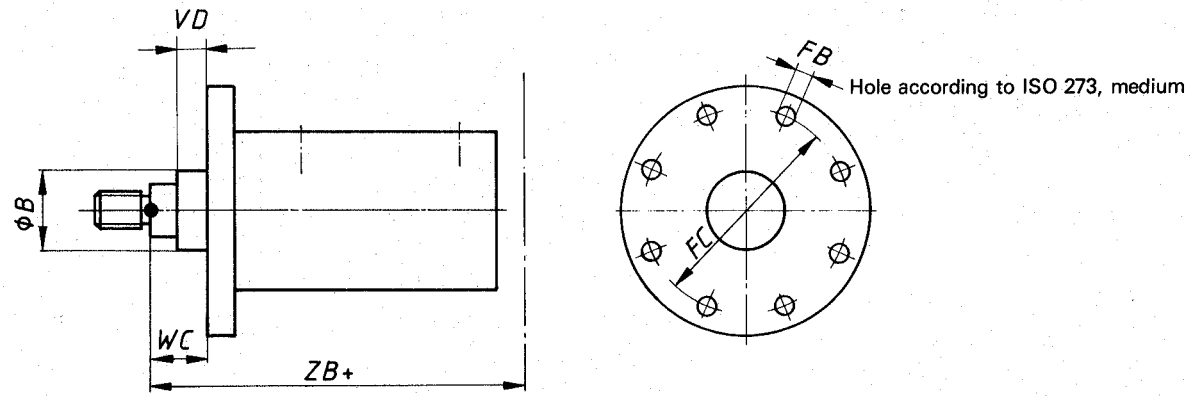
b) Cap mounting

Figure 2 — MF1 — Head rectangular flange mounting
MF2 — Cap rectangular flange mounting

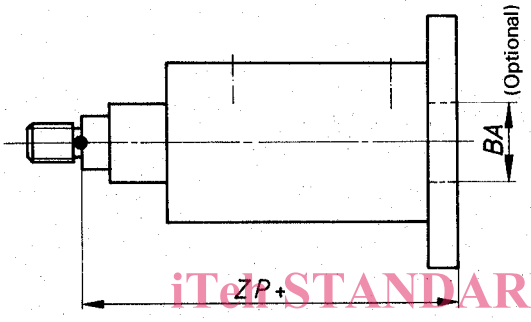
Table 2 — Dimensions of mounting by rectangular flange

Dimensions in millimetres

Bore	*W*	*TF* Js13	*FB*	*R* Js13	*ZF*	*ZB* max.	*VD*	*B, BA*
25	16	69,2	6,6	28,7	162	158	3	32
32	16	85	9	35,2	186	178	3	40
40	16	98	9	40,6	206	198	3	50
50	18	116,4	11	48,2	225	213	4	60
63	20	134	13,5	55,5	249	234	4	70
80	22	152,5	17,5	63,1	282	260	4	85
100	25	184,8	22	76,5	332	310	5	106
125	28	217,1	22	90,2	357	355	5	132



a) Head mounting



b) Cap mounting

Figure 3 — MF3 — Head circular flange mounting
MF4 — Cap circular flange mounting

Table 3 — Dimensions of mounting by circular flange

Dimensions in millimetres

Bore	*VD* min.	*WC*	*FB*	*FC* Js13	*ZP*	*ZB* max.	*B, BA*
25	3	16	8 × φ 6,6	75	162	158	32
32	3	16	8 × φ 9	92	186	178	40
40	3	16	8 × φ 9	106	206	198	50
50	4	18	8 × φ 11	126	225	213	60
63	4	20	8 × φ 13,5	145	249	234	70
80	4	22	8 × φ 17,5	165	282	260	85
100	5	25	8 × φ 22	200	332	310	106
125	5	28	8 × φ 22	235	357	335	132
160	5	30	8 × φ 22	280	406	380	160
200	5	35	8 × φ 26	340	490	480	200
250	8	40	8 × φ 33	420	606	580	250
320	8	45	8 × φ 39	520	723	710	320
400	10	50	8 × φ 45	640	820	790	400
500	10	63	12 × φ 45	720	990	940	500

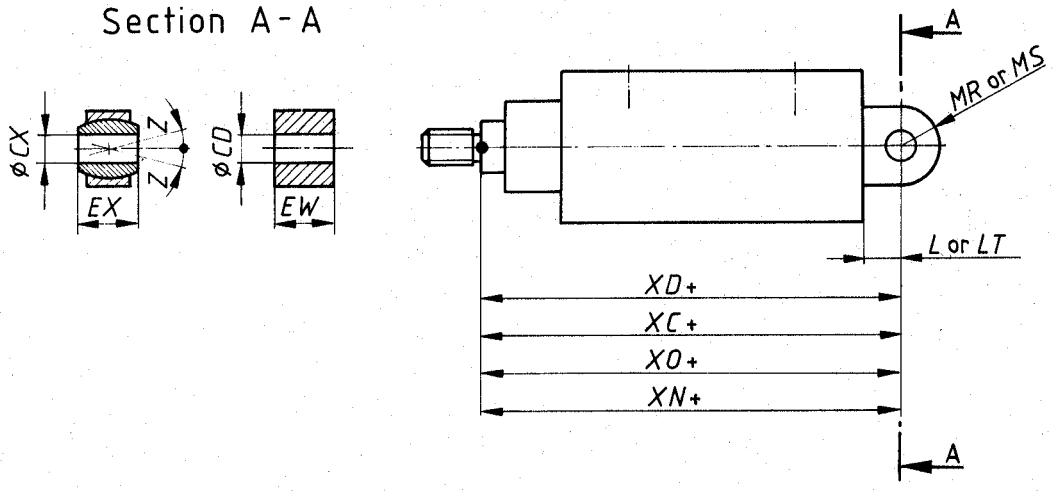


Figure 4 — MP3 — Cap fixed eye mounting
MP4 — Cap detachable eye mounting
MP5 — Cap fixed eye with spherical plain bearing mounting
MP6 — Cap detachable eye with spherical plain bearing mounting

Table 4 — Dimensions of mounting by cap eye

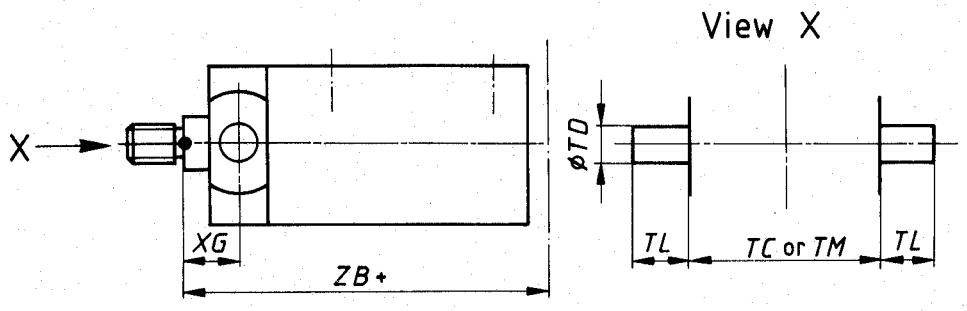
Dimensions in millimetres

Bore	CD[1] or CX[2] H9 H7	EW[1] or EX[2] h12	L[1] or LT[2] min.	MR[1] or MS[2] max.	XC, XD, XO or XN[3]	Tilting angle Z
25	12	12	16	16	178	
32	16	16	20	20	206	
40	20	20	25	25	231	
50	25	25	32	32	257	
63	32	32	40	40	289	
80	40	40	50	50	332	
100	50	50	63	63	395	
125	63	63	71	71	428	4°
160	80	80	90	90	505	
200	100	100	112	112	615	
250	125	125	160	160	773	
320	160	160	200	200	930	
400	200	200	250	250	990	
500	250	250	320	320	1 210	

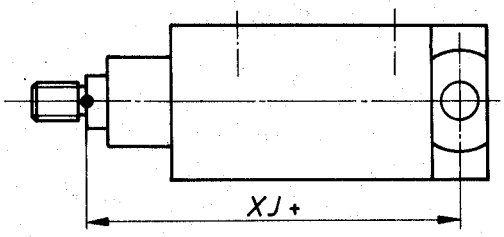
1) The dimensions CD, EW, L and MR are valid for mounting types MP3 and MP4.

2) The dimensions CX, EX, LT and MS are valid for mounting types MP5 and MP6.

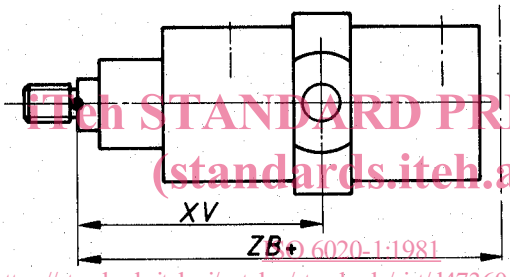
3) The dimension XC is valid for mounting type MP3, the dimension XD is valid for mounting type MP4, the dimension XO is valid for mounting type MP5 and the dimension XN is valid for mounting type MP6.



a) Head mounting



b) Cap mounting*



c) Intermediate mounting

* Corresponding values for $ZB+$ are not possible here.

Figure 5 — MT1 — Head integral trunnion (male) mounting
MT2 — Cap integral trunnion (male) mounting
MT4 — Intermediate fixed or movable trunnion

Table 5 — Dimensions of mounting by male trunnion

Dimensions in millimetres

Bore	*TD* f8	*TL* J16	*TC* or *TM*[1] h12	*XG*, *XV*, *XJ*	*ZB* max.
25	12	10	63	(Variable)	158
32	16	12	75		178
40	20	16	90		198
50	25	20	105		213
63	32	25	120		234
80	40	32	135		260
100	50	40	160		310
125	63	50	195		335
160	80	63	240		380
200	100	80	295		480
250	125	100	370		580
320	160	125	470		710
400	200	160	570		790
500	250	250	700		940

1) The dimension *TC* is valid for mounting type MT1 and MT2, the dimension *TM* is valid for mounting type MT4.