
**Hydraulic fluid power — Single rod
cylinders, 16 MPa (160 bar) compact
series — Mounting dimensions for
accessories**

*Transmissions hydrauliques — Vérins 16 MPa (160 bar) à simple tige,
série compacte — Dimensions d'interchangeabilité des accessoires*

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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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8133 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 3, *Cylinders*.

This second edition cancels and replaces the first edition (ISO 8133:1991), ISO 6982:1992, and ISO 8138:1998, which have been technically revised.

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Introduction

In hydraulic fluid 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 that 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.

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Hydraulic fluid power — Single rod cylinders, 16 MPa (160 bar) compact series — Mounting dimensions for accessories

1 Scope

This International Standard specifies the mounting dimensions required for interchangeability of accessories for 16 MPa [160 bar¹⁾] compact cylinders conforming to ISO 6020-2. The accessories have been designed specifically for use with cylinders manufactured in accordance with ISO 6020-2, but this does not limit their application.

This International Standard covers the following accessories, identified in accordance with ISO 6099:

- AP6: rod eye spherical, female thread (see Figure 1 and Table 1)
- AB5: clevis bracket, spherical eye, in angle (see Figure 2 and Table 2)
- AA7: pivot pin, spherical bearing, locking plate (see Figure 3 and Table 3)
- AL7: locking plate for pivot pin (see Figure 4 and Table 4)
- AP2: rod clevis, female thread (see Figure 5 and Table 5)
- AP4: rod eye plain, female thread (see Figure 6 and Table 6)
- AB2: eye bracket (see Figure 7 and Table 7)
- AB4: clevis bracket, straight (see Figure 8 and Table 8)
- AA4: pivot pin, plain (cotter pin or snap ring type) (see Figure 9 and Table 9)
- AT4: trunnion bracket (see Figure 10 and Table 10)

These accessories are used on hydraulic cylinders for mechanically transmitting the cylinder force. The design of these accessories is based on the maximum forces resulting from the specified internal diameters of the cylinders and pressures according to ISO 3320 and ISO 3322.

This International Standard only applies to the dimensional criteria of products manufactured in conformity with this International Standard; it does not apply to their functional characteristics.

1) 1 bar = 0,1 MPa = 10⁵ Pa; 1 MPa = 1 N/mm²

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 286-2, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*

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

ISO 3322, *Fluid power systems and components — Cylinders — Nominal pressures*

ISO 5598²⁾, *Fluid power systems and components — Vocabulary*

ISO 6020-2, *Hydraulic fluid power — Mounting dimensions for single rod cylinders, 16 MPa (160 bar) series — Part 2: Compact series*

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

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 5598 apply.

4 Mounting dimensions

The mounting dimensions for accessories are shown in Figures 1 to 10 and given in Tables 1 to 10.

5 Material — Load capacity

All cross-sections shall be selected so that, under the maximum tensile load produced by the cylinder, the yield strength of the material used for accessories is at least 2,5 times the maximum tensile load.

6 Application instructions

6.1 Installation

6.1.1 A tolerance of f8 is recommended for plain bearing shafts (see ISO 286-2). Usually a tolerance of f6 shall be used for the shaft fitting the spherical plain bearing bore. However, in exceptional cases (for example where there are difficulties in cylinder installation), a tolerance of f7 may be admitted. In this instance, a case-hardened shaft is recommended since movement will occur between the shaft and the bearing bore, and lubrication should be carried out through the shaft.

6.1.2 The specified tilting angle of $\pm 3^\circ$ for the spherical bearing can still be obtained even after the clevis is in place next to the side faces of the spherical plain bearing's inner ring.

6.1.3 The rod clevis and the rod eye shall be screwed firmly against the piston rod shoulder before locking.

2) To be published. (Revision of ISO 5598:1985)

6.2 Life of spherical bearing

6.2.1 The life of the spherical plain bearing is influenced by many factors, such as the specific load, angle of oscillation, type of lubricant and frequency of lubrication.

6.2.2 The spherical plain bearings are designed to give an acceptable bearing life under normal operating conditions.

6.2.3 Where a constant unidirectional load is applied or other unusual operating conditions exist, consultation with the supplier is recommended.

6.3 Lubrication

6.3.1 Sufficient lubrication for the satisfactory performance of these accessories shall be provided.

6.3.2 The method and frequency of such lubrication depends on the particular operating conditions.

6.3.3 For maintenance-free mating parts, no additional lubrication is required.

7 Designation

Accessories in accordance with this International Standard shall be designated by the mounting type identification in accordance with ISO 6099, followed by ISO 8133, followed by a dash, followed by the size type from the relevant table.

EXAMPLE 1 A rod eye spherical, female thread of type 20 ($CV = 20$) is designated as follows in accordance with this International Standard:

AP6 ISO 8133 - 20 [ISO 8133:2006](https://standards.iteh.ai/catalog/standards/sist/901a25bb-3f82-4756-a9d2-d2c4540a57d1/iso-8133-2006)
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EXAMPLE 2 A clevis bracket, spherical eye, in angle of type 20 ($CF = 20$) is designated as follows in accordance with this International Standard:

AB5 ISO 8133 - 20

EXAMPLE 3 A pivot pin, spherical bearing, locking plate of type 20 ($DK = 20$) is designated as follows in accordance with this International Standard:

AA7 ISO 8133 - 20

EXAMPLE 4 A locking plate for pivot pin of type 20 ($DK = 20$) is designated as follows in accordance with this International Standard:

AL7 ISO 8133 - 20

EXAMPLE 5 A rod clevis, female thread of type 20 ($CK = 20$) is designated as follows in accordance with this International Standard:

AP2 ISO 8133 - 20

EXAMPLE 6 A rod eye plain, female thread of type 20 ($CK = 20$), in accordance with this International Standard is designated as follows in accordance with this International Standard:

AP4 ISO 8133 - 20

ISO 8133:2006(E)

EXAMPLE 7 An eye bracket of type 20 ($CK = 20$) is designated as follows in accordance with this International Standard:

AB2 ISO 8133 - 20

EXAMPLE 8 A clevis bracket, straight of type 20 ($CK = 20$) is designated as follows in accordance with this International Standard:

AB4 ISO 8133 - 20

EXAMPLE 9 A pivot pin plain (plain cotter pin or snap ring type) of type 20 ($EK = 20$) is designated as follows in accordance with this International Standard:

AA4 ISO 8133 - 20

EXAMPLE 10 A trunnion bracket of type 20 ($CR = 20$) is designated as follows in accordance with this International Standard:

AT4 ISO 8133 - 20

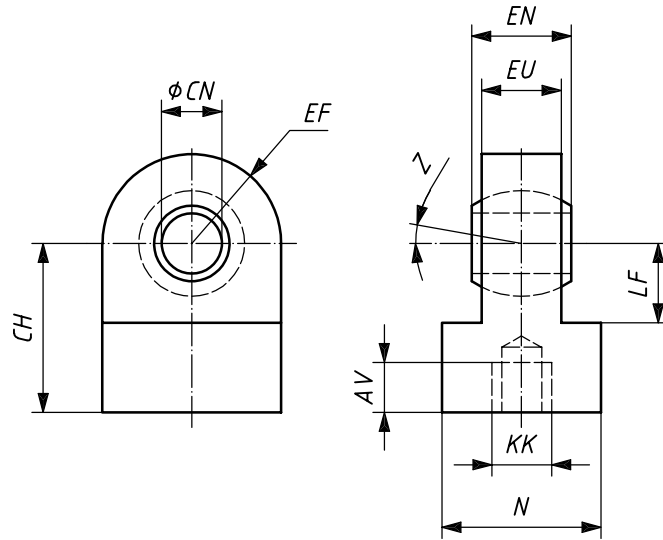
8 Identification statement (reference to this International Standard)

It is strongly recommended to fabricators who elect to conform to this International Standard to use the following statement in test reports, catalogues and sales literature when electing to comply with this International Standard:

“Cylinder accessory mounting dimensions selected in accordance with ISO 8133:2006, *Hydraulic fluid power — Single rod cylinders, 16 MPa (160 bar) compact series — Mounting dimensions for accessories.*”

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A suitable locking device shall be used.

Figure 1 — AP6 — Rod eye spherical, female thread

Table 1 — Dimensions of AP6 — Rod eye spherical, female thread

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Dimensions in millimetres

Type	Nominal force N	N max.	KK 6H	CM ISO 8133:2006 EN		EF max.	CH js13	AV min.	LF min.	EU max.	Tilting angle Z min.	
				nom.	tol. µm							nom.
12	8 000	19	M10 × 1,25	12	0	10	0 -50	18	42	15	16	8,5
16	12 500	22	M12 × 1,25	16	-8	14		23	48	17	20	11,5
20	20 000	28	M14 × 1,5	20	0 -10	16		28	58	19	25	13,5
25	32 000	31	M16 × 1,5	25		20		33	68	23	30	18
30	50 000	37	M20 × 1,5	30		22		41	85	29	35	20
40	80 000	47	M27 × 2	40	0	28		51	105	37	45	24
50	125 000	57	M33 × 2	50	-12	35		61	130	46	58	31
60	200 000	69	M42 × 2	60	0	44	0 -150	80	150	57	68	39
80	320 000	91	M48 × 2	80	-15	55		102,5	185	64	92	48
100	500 000	110	M64 × 3	100	0 -20	70	0 -200	120	240	86	116	57