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JAPANESE INDUSTRIAL STANDARD

Fluid power cylinders —
general rules for
requirement of component and
identification code of mounting
dimensions and mounting types

JIS B 8366—1990

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In the event of any doubt arising,
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Fluid power cylinders - general rules for
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code of mounting dimensions and mounting types

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1. Scope

This Japanese Industrial Standard specifies the requirements relating to the constituting elements and the indicating methods and identification symbols of mounting types as given in the following for the fluid power cylinders:

- (1) Nominal pressures of cylinders
- (2) Bores of cylinders and diameters of piston rods (hereafter referred to as the "rods")
- (3) Rod end screw threads (hereafter referred to as the "rod threads")
- (4) Piston strokes (hereafter referred to as the "strokes")
- (5) Identification symbols of cylinders

Remarks 1. The applicable Standards to this Standard are as given in the following:

JIS B 0142 Glossary of Terms for Oil Hydraulics and Pneumatics

JIS B 0207 Metric Fine Screw Threads

JIS Z 8601 Preferred Numbers

ISO 497 Guide to the choice of series of preferred numbers and of series containing more rounded values of preferred numbers

2. The equivalent International Standards to this Standard are given in Attached Table 1.

3. The units and numerical values given in { } in this Standard are in accordance with the traditional units, and are appended for informative reference.

Reference Standards:

JIS B 8367-Hydraulic Cylinder - Mounting Dimensions

JIS B 8368-Pneumatic Cylinders - Mounting Dimensions

2. Definitions

For the purposes of this Standard, JIS B 0142 applies, and others are in accordance with the following.

Informative reference: The prescriptions of the terms are given in ISO 5598.

- (1) rod side ⁽¹⁾ That side from which the rod is exposed to outside.
- (2) head side ⁽¹⁾ That side from which the rod is not exposed to outside.
- (3) mounting part When a cylinder is mounted to a machine, that place which receives the reaction against the thrust of the cylinder.

Note ⁽¹⁾ In JIS B 0142, the rod side is defined as the head side, and the head side, as the cap side.

3. Nominal Pressures of Cylinders

The nominal pressures of the cylinders shall be in accordance with Table 1.

Table 1. Nominal Pressures of Cylinders

Unit: MPa {kgf/cm²}

0.1 {1.02},	0.16 {1.63},	0.25 {2.55},	0.4 {4.08},	0.63 {6.42},
1 {10.2},	1.6 {16.3},	2.5 {25.5},	4 {40.8},	6.3 {64.2},
10 {102},	16 {163},	25 {255},	40 {408}	

Remarks: The unit of pressure shall be expressed by MPa, and it shall be the gauge pressure. However, for a place where the pressure is low, kPa may also be employed.

$$1 \text{ MPa} = 10.197 \text{ kgf/cm}^2$$

$$1 \text{ kPa} = 0.010197 \text{ kgf/cm}^2$$

Informative reference: In ISO 2944, other pressures than this pressure steps are also specified.

4. Cylinder Bores and Rod Diameters

The cylinder bores and rod diameters shall be in accordance with Table 2 and Table 3.

Furthermore, the indicating methods of the cylinder bores and rod diameters shall be in accordance with Fig. 1.

Table 2. Cylinder Bores

Unit: mm

8,	10,	16,	20,	25,	32,	40,	50,	63,	80,	100,	125,
140,	160,	180,	200,	250,	320,	400,	500				

Remarks: When other cylinder bores than the values of Table 2 are to be selected, R10 of JIS Z 8601 applies.

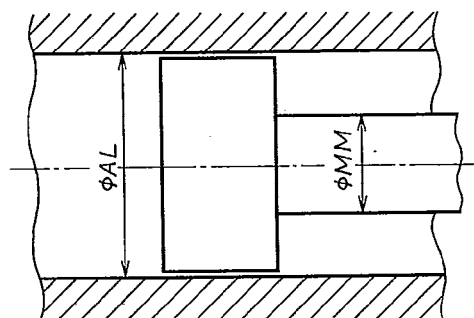
Table 3. Rod Diameters

Unit: mm

4,	5,	6,	8,	10,	12,	14,	16,	18,	20,	22,	25,	28,
32,	36,	40,	45,	50,	56,	63,	70,	80,	90,	100,	110,	
125,	140,	160,	180,	200,	220,	250,	280,	320,	360			

Remarks: When other rod diameters than the values of Table 3 are to be selected, R20 of JIS Z 8601 applies.

Fig. 1. Indicating Method of Cylinder Bores and Rod Diameters



AL : cylinder bore
MM : rod diameter

5. Dimensions of Rod Threads and Types Thereof

The dimensions of the rod threads shall be in accordance with Table 4, and the types thereof shall be in accordance with Figs 2 to 4.

Table 4. Rod Threads

Unit: mm

Designation of screw thread	Lengths of threaded parts of A, AM and AF ⁽²⁾	
	A and AF (short type)	AM (long type)
M3×0.35	6	9
M4×0.5 ⁽³⁾	8	12
M5×0.5	10	15
M6×0.75 ⁽³⁾	12	16
M8×1 ⁽³⁾	12	20
M10×1.25	14	22
M12×1.25	16	24
M14×1.5	18	28
M16×1.5	22	32
M18×1.5	25	36
M20×1.5	28	40
M22×1.5	30	44
M24×2	32	48
M27×2	36	54
M30×2	40	60
M33×2	45	66
M36×2	50	72
M42×2	56	84
M48×2	63	96
M56×2	75	112
M64×3	85	128
M72×3	85	128
M80×3	95	140
M90×3	106	140
M100×3	112	—
M110×3	112	—
M125×4	125	—
M140×4	140	—
M160×4	160	—
M180×4	180	—
M200×4	200	—
M220×4	220	—
M250×6	250	—
M280×6	280	—

Notes ⁽²⁾ The internal thread AF indicates the minimum dimension, and the external thread A, the maximum dimension.

⁽³⁾ For the pneumatic pressure use, the following screw threads may also be used.

M4×0.7 M6×1 M8×1.25

Remarks 1. The rod threads shall be in accordance with JIS B 0207.

2. When a rock nut is required to adjust the fastening length, the screw thread of long type shall be used.

Fig. 2. Internal Thread

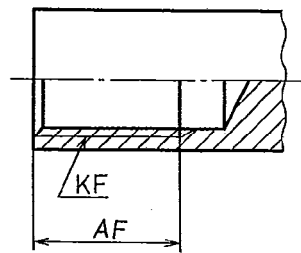


Fig. 3. Shoulder Fitting Type 1 - External Thread

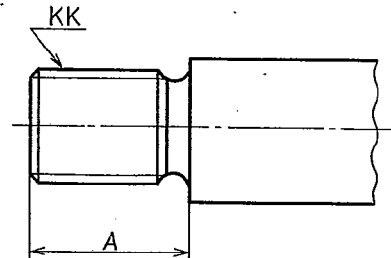
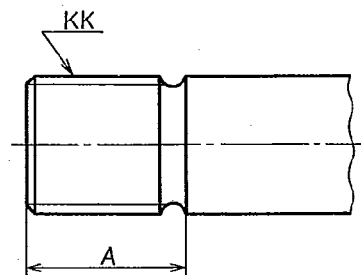


Fig. 4. Shoulderless Type 2 - External Thread



6. Strokes and Indicating Method of Stroke

The strokes and the indicating method of the stroke shall be in accordance with Table 5 and Fig. 5.

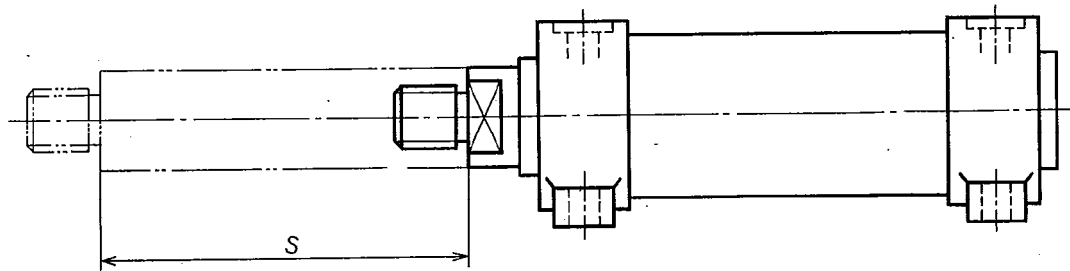
Table 5. Strokes

Unit: mm

25,	32,	40,	50,	63,	80,	100,	125,	160,	200,	250,
320,	400,	500,	630,	800,	1000,	1250,	1600,	2000		

Remarks: In the case where other dimensions than given in the Table are required, R10 of ISO 497 applies.

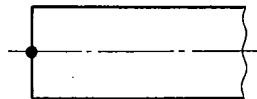
Fig. 5. Indicating Method of Stroke



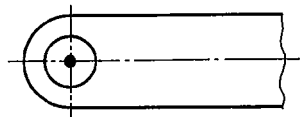
7. Mounting Method of Identification Symbols to be Used in Mounting Types

7.1 The reference point shall be expressed by the point which transmit the force from the rod to the fastening part, and it shall be as follows:

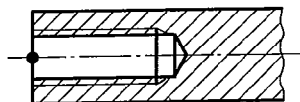
- (1) In the case of a flat end rod, the reference point shall be the position on the rod center line of the rod end.



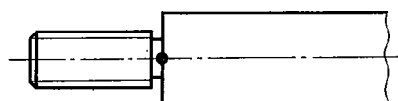
- (2) In the case where the tip end is a pin joint, the reference point shall be the position of the point of intersection of the pin center line and the rod center line.



- (3) In the case where the rod end is an internal thread, the reference point shall be the position on the rod center line of the rod end.



- (4) In the case where the tip end is an external thread, the reference point shall be the position of the shoulder on the rod center line.



- (5) In other cases than (1) to (4), it shall be positioned in accordance with these, as appropriate.

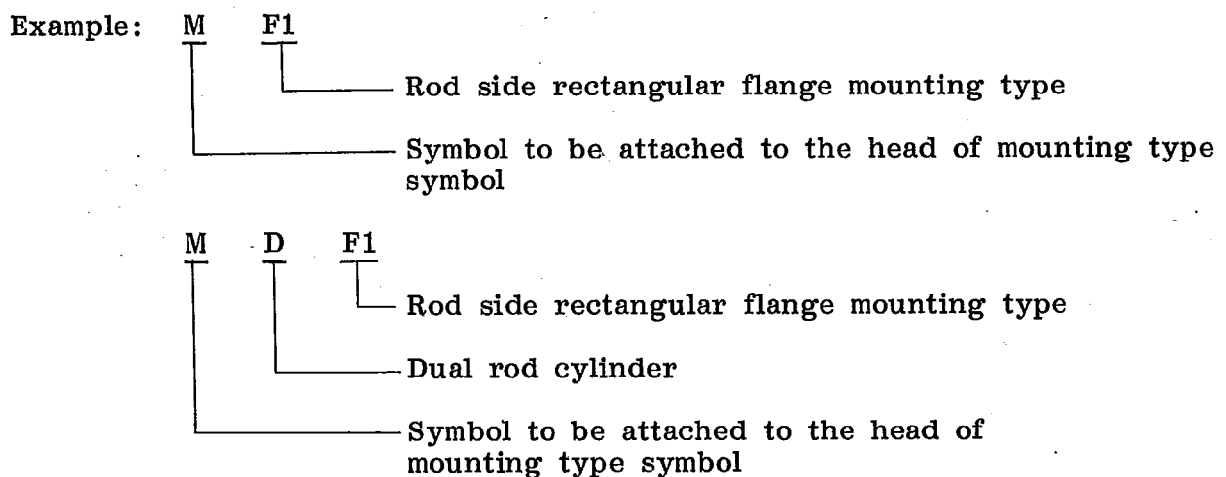
7.2 Meanings of Letter and Symbol The meanings of the letter and symbol shall be expressed by a letter or the combination of two letters, and further the indicating place of dimension related to the stroke shall be indicated by the combination of symbols of +, ++ or +/.

Furthermore, the meanings of the letters and symbols shall be as given in the following:

- (1) The symbol of two letters beginning with a letter Z indicates the maximum dimension from the reference point of the horizontal shaft.
- (2) The symbol of two letters beginning with a letter U indicates the maximum dimension of the end face figure.
- (3) The symbols of two letters beginning with letters W, X, Y and Z indicate the dimensions from the reference point.
- (4) The symbol of two letters beginning with a letter H indicates the center height dimension.
- (5) The symbol + means adding a stroke, and is suffixed after a letter.
- (6) The symbol ++ means adding two times the stroke, and is suffixed after a letter.
- (7) The symbol +/ means adding half the stroke, and is suffixed after a letter.

7.3 Identification Symbol of Mounting Type ⁽⁴⁾ The identification symbol of the mounting type shall be assembled by two or three letters and a number indicated in the drawing.

Note ⁽⁴⁾ As regards the terms of "mounting type", if it does not cause misunderstanding, it may be used simply as the "type", being abbreviated of "mounting".



Furthermore, the following letters are capable of considered to be the identification symbols of respective mounting types, substituting in lieu of the flange mounting types in examples.

E : rod cover or head cover mounting type

F : flange separating form mounting type

P : clevis or eye mounting type

R : thread mounting type

S : foot mounting type

T : trunnion mounting type

X : stud or tie rod mounting type

7.4 Identification Symbols and Names of Mounting Types The identification symbols and names of the mounting types shall be in accordance with Table 6.

Table 6. Identification Symbols and Names of Mounting Types

Identification symbol	Name	Figure No.
ME5	Rectangular rod cover mounting type	Fig. 9
MDE5	Rectangular rod cover mounting type - double rods	Fig. 10
ME6	Rectangular head cover mounting type	Fig. 11
ME7	Round rod cover mounting type	Fig. 12
MDE7	Round rod cover mounting type - double rods	Fig. 13
ME8	Round head cover mounting type	Fig. 14
ME9	Square rod cover mounting type	Fig. 15
MDE9	Square rod cover mounting type - double rods	Fig. 16
ME10	Square head cover mounting type	Fig. 17
MF1	Rod side rectangular flange mounting type	Fig. 18
MDF1	Rod side rectangular flange mounting type - double rods	Fig. 19
MF2	Head side rectangular flange mounting type	Fig. 20
MF3	Rod side round flange mounting type	Fig. 21
MDF3	Rod side round flange mounting type - double rods	Fig. 22
MF4	Head side round flange mounting type	Fig. 23
MF5	Rod side square flange mounting type	Fig. 24
MDF5	Rod side square flange mounting type - double rods	Fig. 25
MF6	Head side square flange mounting type	Fig. 26
MF7	Rod side round flange mounting with spigot joint	Fig. 27
MDF7	Rod side round flange mounting with spigot joint - double rods	Fig. 28
MF8	Rod side rectangular flange mounting type - 2 mounting bolt holes	Fig. 29

Table 6 (Continued)

Identification symbol	Name	Figure No.
MP1	Head clevis mounting type	Fig. 30
MP2	Head separated clevis mounting type	Fig. 31
MP3	Head eye mounting type	Fig. 32
MP4	Head separated eye mounting type	Fig. 33
MP5	Head spherical bearing mounting type	Fig. 34
MP6	Head separated spherical bearing mounting type	Fig. 35
MP7	Rod separated clevis mounting type	Fig. 36
MR3	Rod side threaded cover mounting type	Fig. 37
MDR3	Rod side threaded cover mounting type - double rods	Fig. 38
MR4	Head side threaded cover mounting type	Fig. 39
MS1	Axial direction foot mounting type	Fig. 40
MDS1	Axial direction foot mounting type - double rods	Fig. 41
MS2	Vertical to axial direction foot mounting type	Fig. 42
MDS2	Vertical to axial direction foot mounting type - double rods	Fig. 43
MS3	Rod side foot mounting type	Fig. 44
MS4	Cover side face tap mounting type	Fig. 45
MDS4	Cover side face tap mounting type - double rods	Fig. 46
MT1	Rod cover trunnion mounting type	Fig. 47
MDT1	Rod cover trunnion mounting type - double rods	Fig. 48
MT2	Head cover trunnion mounting type	Fig. 49
MT4	Intermediate trunnion mounting type	Fig. 50

Table 6 (Continued)

Identification symbol	Name	Figure No.
MDT4	Intermediate fixed or movable trunnion mounting type - double rods	Fig. 51
MT5	Rod side separated trunnion mounting type	Fig. 52
MT6	Head side separated trunnion mounting type	Fig. 53
MX1	Both side studs or tie rods mounting type	Fig. 54
MDX1	Both side studs or tie rods mounting type - double rods	Fig. 55
MX2	Head side stud or tie rod mounting type	Fig. 56
MDX2	Head side stud or tie rod mounting type - double rods	Fig. 57
MX3	Rod side stud or tie rod mounting type	Fig. 58
MX4	Both side 2 studs or 2 tie rods mounting type	Fig. 59
MDX4	Both side 2 studs or 2 tie rods mounting type - double rods	Fig. 60
MX5	Rod side front face tap mounting type	Fig. 61
MDX5	Rod side front face tap mounting type - double rods	Fig. 62
MX6	Head side front face tap mounting type	Fig. 63

7.5 Indicating Methods and Indicating Symbols of Basic Dimensions and Rod Ends The indicating methods and indicating symbols of basic dimensions and rod ends shall be in accordance with Figs. 6 and 7.