

PEN CYLINDERS

Consistently our best-selling products, pen cylinders are essential basic components for all types of small actuators. We have further developed pen cylinders, taking the lead in air cylinder miniaturization with superior individual design.

Lighter Body Weight

Using a thin-walled stainless steel tube we have reduced pen cylinder body weight

Decrease in Rod Bearing Clearance Gap

We have improved cylinder durability by decreasing the rod bearing clearance gap.

Smooth Restart

To ensure low operating pressure, low speed and long service life, we have adopted two lip packings.

High-Speed Actuation

Our bumper of highly durable urethane rubber can withstand operation at the maximum speed of 750 mm/s.

Option Data : Allowable Kinetic Energy for Pen Cylinder

A cushion mechanism is incorporated into all pen cylinders (excluding heat resistant type). This mechanism minimizes the impact of a piston with high kinetic energy stopping at its stroke end. The following two kinds of cushions are available:

● Rubber cushion (provided with standard models)

Rubber bumpers mounted on both ends of a piston lessen the impact at the piston's stroke end. The bumper also absorbs impact noise during high-frequency and high-speed operation. This cushion is provided with all standard cylinders except heat resistant type.

Please note that slight bound will occur at the stroke end of cylinders equipped with a rubber cushion.

● Variable cushion

The variable cushion should be used for large loads which cannot be absorbed by the rubber cushion, and for high-speed operation. Using air compression, the variable cushion acts as a shock absorber when the piston stops at its stroke end. As cushion stroke is within the cylinder stroke, avoid excessive cushioning on strokes of less than 25. Excessive cushioning results in added time for each stroke and poor efficiency. If kinetic energy of the load is less than the absorbable kinetic energy values shown in the chart below, service life of the cushion packing reaches one million strokes or more.

The kinetic energy of a load can be found with the following formula:

$$Ex = \frac{W}{2g} \nu^2$$

Ex: Kinetic energy (N·cm)

W: Weight of load (kg)

g: Gravitational acceleration 980 (cm/s²)

ν: Piston Speed (cm/s)

Impact Absorption

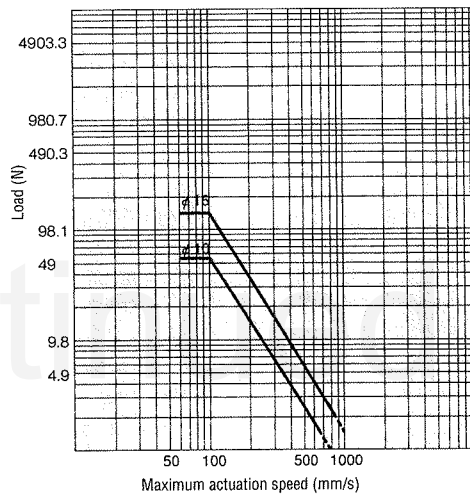
● Rubber cushion 30~800mm/s

● Variable cushion 30~1000mm/s

N·cm

Cylinder bore size mm	Allowable kinetic energy	
	With rubber cushion	With variable cushion
10	2.9	6.9
16	6.9	17.7

● Rubber cushion



● Adjustable Cushion

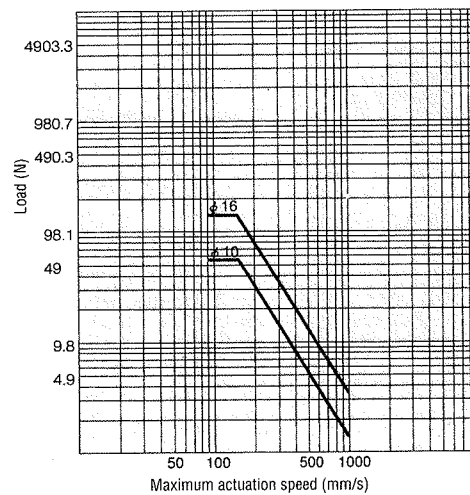


Chart Figures

For a load of 39.2N and the maximum driving speed of 200 mm/s, select a φ 16 cylinder with rubber cushion.

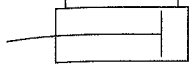
For a load of 19.6N and maximum driving speed of 400 mm/s, select a φ 16 cylinder with adjustable cushion.

PEN CYLINDERS

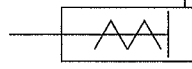
DOUBLE ACTING TYPE, SINGLE ACTING PUSH TYPE, SINGLE ACTING PULL TYPE

Symbols

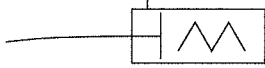
Double acting type



Single acting push type



Single acting pull type



Specifications

Items	Cylinder bore size mm	6	10	16
Operation		Double acting type, Single acting push type, and Single acting pull type		
Fluid		Air		
Mounting type		Basic type, foot type, flange type clevis type (available on ϕ 10 and ϕ 16 only)		
Fluid		Air		
Pressure range ^{note}	MPa{kgf/cm ² }	0.12~0.7{1.2~7.1}	0.08~0.7{0.8~7.1}	0.06~0.7{0.6~7.1}
Proof pressure	MPa{kgf/cm ² }	1.03{10.5}		
Temperature range	℃	0~70		
Speed range	mm/s	50~500	50~750	
Cushion		Not available	Rubber Bumper	
Lubrication		Not required		
Port size		M5 x 0.8(M3 x 0.5 is also available only for the cylinder bore size ϕ 6)		

Note: See Minimum Working Pressure chart for details on each cylinder operation.

Bore Size and Stroke

Double acting type

Bore size	Stroke	Available stroke	Stroke tolerance
6	5 10 15 30 45 60	100	± 1.2 -0.2
10	5 10 15 30 45 60 75 100 125 150	150	± 1.5 -0.2
16	5 10 15 30 45 60 75 100 125 150 175 200	200	± 1.5 -0.2

Single acting type

Operation	Cylinder bore size	Stroke	Available stroke	Stroke tolerance
Single acting push type	6	5 10 15 30 45 60	75	± 1.2 -0.2
	10		105	± 1.5 -0.2
	16		120	± 1.2 -0.2
Single acting pull type	6	5 10 15 30	30	± 1.2 -0.2
	10			± 1.5 -0.2
	16			± 1.2 -0.2

Remark: Consult us on non-standard strokes.

Order Example

P 10X30 — — — — — — —

Cylinder bore size
 X
 stroke

Cylinder specifications
 Blank — Standard cylinder
 S — Sensor cylinder

Type of action
 DA — Double acting type
 SA — Single acting push type
 TA — Single acting pull type

Rod clevis
 Blank — Without rod end bracket
 I — With I-shaped Rod clevis
 Y — With Y-shaped Rod clevis (with pin)
 For bore size $\phi 10$ and $\phi 16$ only
 Please order the cylinder joint separately

Number of sensor switches
 1 — With one switch
 2 — With two switches
 3 — With three switches
 : — :

Lead wire length
 A — 1000mm
 B — 3000mm

Type of Sensor switch
 Blank — Without sensor switch
 ZC153 — Three-wire, solid state type
 ZC130 — Two-wire, solid state type
 CS5T — Two-wire, reed switch type
 CS11T — Two-wire, reed switch type
 See page 616 for further details

Pen cylinder series

Head cover piping specifications
 Blank — Axial piping
 A — Lateral piping
 M — Lateral piping, with mounting screw
 (Only $\phi 10$ and $\phi 16$ double acting type and single acting push type are available.
 Not available for clevis mounting type.)

Mounting type (included in delivery, except for clevis mounting type)
 Blank — Basic type
 1 — Double foot type
 (Available for double acting with head cover
 M specification type and $\phi 10$, $\phi 16$ single acting push type only.)
 1A — Single foot type
 3 — Flange type
 7 — Clevis type
 (With pin, for bore size $\phi 10$ and $\phi 16$ only)
 7-7C — Clevis type with supporting bracket (with pin)(for $\phi 10$ and $\phi 16$ only)

Port size
 Blank — M5 x 0.8 ($\phi 6$, $\phi 10$, $\phi 16$)
 M3 — M3 x 0.5 (for $\phi 6$ only)

Minimum Operating Pressure

Operation	Cylinder bore size mm	Minimum operating pressure MPa(kgf/cm ²)
Double acting type	6	0.12 {1.2}
	10	0.08 {0.8}
	16	0.06 {0.6}
Single acting push type	6	0.3 {3.1}
	10	0.15 {1.5}
	16	
Single acting pull type	6	0.4 {4.1}
	10	0.3 {3.1}
	16	0.25 {2.5}

Mounting Type

Mounting type	Item	Remarks
1	Double foot type	Included delivery ^{note}
1A	Single foot type	Included in delivery
3	Flange type	Included in delivery
7	Clevis type (with pin)	Delivered assembled
7-7C	Clevis type with supporting bracket	Supporting bracket included in delivery

Note : Please use double foot type for foot brackets with strokes longer than 60mm.

Weight

Operation	Mounting type	Cylinder bore size mm		Stroke mm						Added weight								Added weight of lateral piping.								
										Added weight for each mounting type			Sensor cylinder	Added weight of one sensor switch												
				5	10	15	30	45	60	Single foot type	Flange	Clevis type (with supporting bracket and pin)		ZC153□	ZC130□	CS5T□	CS11T□									
Double acting type	Basic type	6	M3 port	19	19	20	22	24	26	7	5	—	2	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	2								
			M5 port	30	30	31	33	35	37	7	5	—	2					4								
		10	43	44	45	48	52	55	7	5	—	5	4													
			16	82	84	86	91	97	102	18	12	—	12					6								
	Clevis type (with pin)	10	54	55	56	59	63	66	—	—	32	5	—													
		16	110	112	114	119	125	130	—	—	45	12	—													
Single acting push type	Basic type	6	M3 port	13	13	14	18	23	27	7	5	—	3					A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	2				
			M5 port	14	14	15	19	24	28	7	5	—	3									4				
		10	29	30	31	40	50	59	7	5	—	5	4													
			16	66	68	70	90	110	130	18	12	—	12									6				
	Clevis type (with pin)	10	39	40	41	50	69	69	—	—	32	5	—													
		16	90	92	94	114	134	154	—	—	45	12	—													
Single acting pull type	Basic type	6	M3 port	22	22	23	27	—	—	7	5	—	4									A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	—
			M5 port	32	32	33	37	—	—	7	5	—	4													—
		10	44	45	46	55	—	—	7	5	—	5	—													
			16	86	88	90	110	—	—	18	12	—	12													—
	Clevis type (with pin)	10	60	61	62	71	—	—	—	—	32	5	—													
		16	116	118	120	116	—	—	—	—	45	12	—													

Remark : Mounting nut and rod end nut are included.

Calculation Example : The weight of a double acting cylinder with magnets with a foot bracket of 10mm bore, 45mm stroke and two CS5TA installed is calculated as follows:

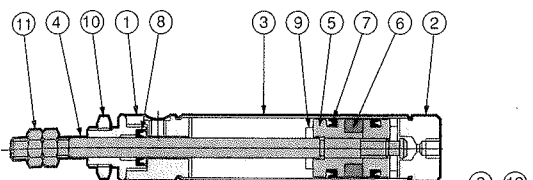
$$57+7+40=104g$$

Spring Return Force Single Acting Type

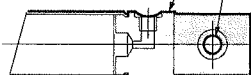
Cylinder bore size mm	Spring return force						Stroke end
	5St	10St	15St	30St	45St	60St	
2.5	0.6	0.6	—	—	—	—	1.2
4	1.5	1.5	0.15	20St 1.5	—	—	2.8
6	3.9	2.9	2.0	2.0	2.0	2.0	5.9
10	5.9	4.9	2.9	2.9	2.9	2.9	6.9
16	9.8	6.9	4.9	2.9	4.9	4.9	11.8

Construction DiagramConstruction Diagram

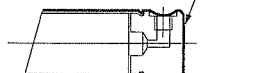
● Double acting type



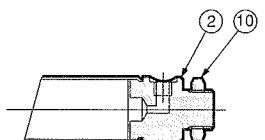
● Clevis type (-7)



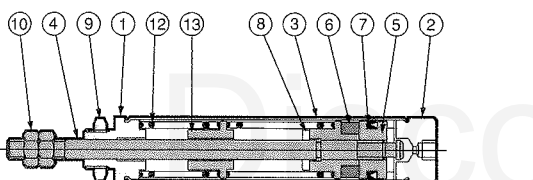
● Lateral piping (-A)



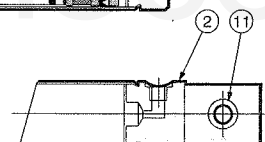
● Lateral piping with mounting screw (-M)



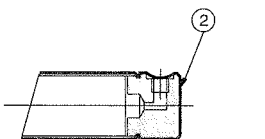
● Single acting push type



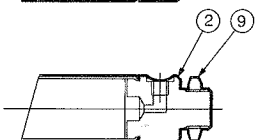
● Clevis type (-7)



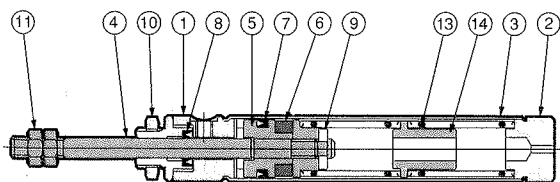
● Lateral piping (-A)



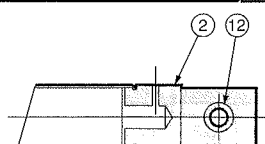
● Lateral piping with mounting screw (-M)



● Single acting pull type



● Clevis type (-7)



Materials of Major Parts

No.	Item	Material
①	Rod cover	Brass (nickel plated)
②	Head cover	
③	Cylinder barrel	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Magnet	Resin
⑦	Piston seal	Synthetic rubber(NBR)
⑧	Rod seal	
⑨	Bumper	Urethane rubber
⑩	Mounting nut	Brass (nickel plated)
⑪	Rod end nut	Mild steel (nickel plated)
⑫	Clevis-shaped bushing	Oil permeated bronze

No.	Items	Material
①	Rod cover	Brass (nickel plated)
②	Head cover	
③	Cylinder barrel	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Magnet	Resin
⑦	Piston seal	Synthetic rubber(NBR)
⑧	Bumper	Urethane rubber
⑨	Mounting nut	Brass (nickel plated)
⑩	Rod end nut	Mild steel (nickel plated)
⑪	Clevis-shaped bushing	Oil permeated bronze
⑫	Spring	Hard steel
⑬	Collar	Brass

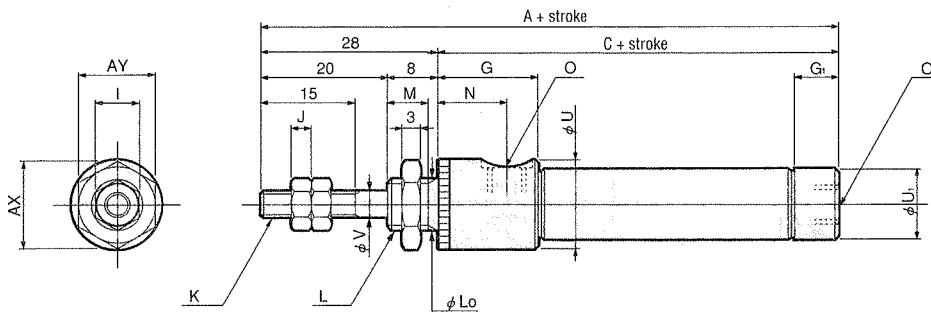
No.	Items	Material
①	Rod cover	Brass (nickel plated)
②	Head cover	
③	Cylinder barrel	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Magnet	Resin
⑦	Piston seal	Synthetic rubber(NBR)
⑧	Rod seal	
⑨	Bumper	Urethane rubber
⑩	Mounting nut	Brass (nickel plated)
⑪	Rod end nut	Mild steel (nickel plated)
⑫	Clevis-shaped bushing	Oil permeated bronze
⑬	Spring	Hard steel
⑭	Collar	Brass

The figure shown here is a cylinder with magnets. Sensor switch magnet is not built into standard cylinders.

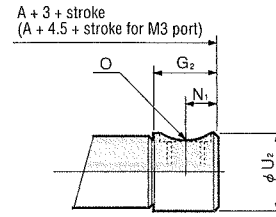
Dimensions of Double Acting Type

(unit : mm)

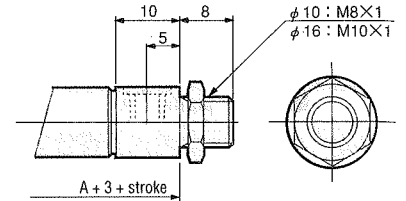
Basic type



Lateral piping (-A)



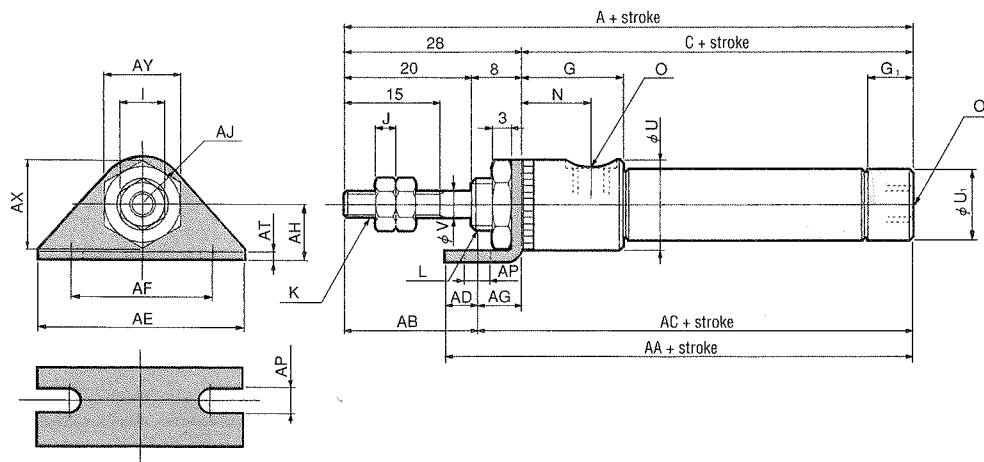
Lateral piping, with mounting screw (-M)



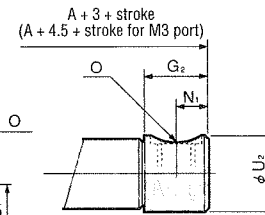
Type		Standard cylinder		Sensor cylinder								
Bore size	Symbol	A	C	A	C	G	G ₁	G ₂	I	J	K	L
6	M3 port	62.5	34.5	72.5	44.5	13.5	3.5	8	5.5	2.4	M3×0.5	M6×1
	M5 port	69	41	79	51	16.5	7	10				
10		73	45	83	55	16	7	10	7	3.2	M4×0.7	M8×1
16		74.5	46.5	84.5	56.5	15.5	7	10	8	4	M5×0.8	M10×1

Bore size	Symbol	Lo	M	N	N ₁	O	U	U ₁	U ₂	V	AX	AY
6	M3 port	6 ^{-0.05 -0.10}	6.5	10	4	M3×0.5	11	7	8	3	11.5	10
	M5 port			11.5	5	M5×0.8	14	8	10			
10		8 ^{-0.05 -0.10}	6.5	11	5	M5×0.8	14	11	12	4	13.9	12
16		10 ^{-0.05 -0.10}	6	10.5	5	M5×0.8	17	17	17	5	16.2	14

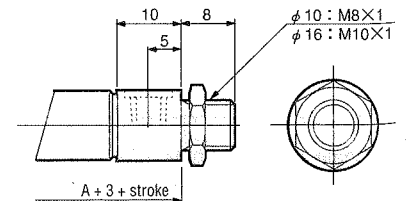
Single foot type



Lateral piping (-A)



Lateral piping, with mounting screw(-M)



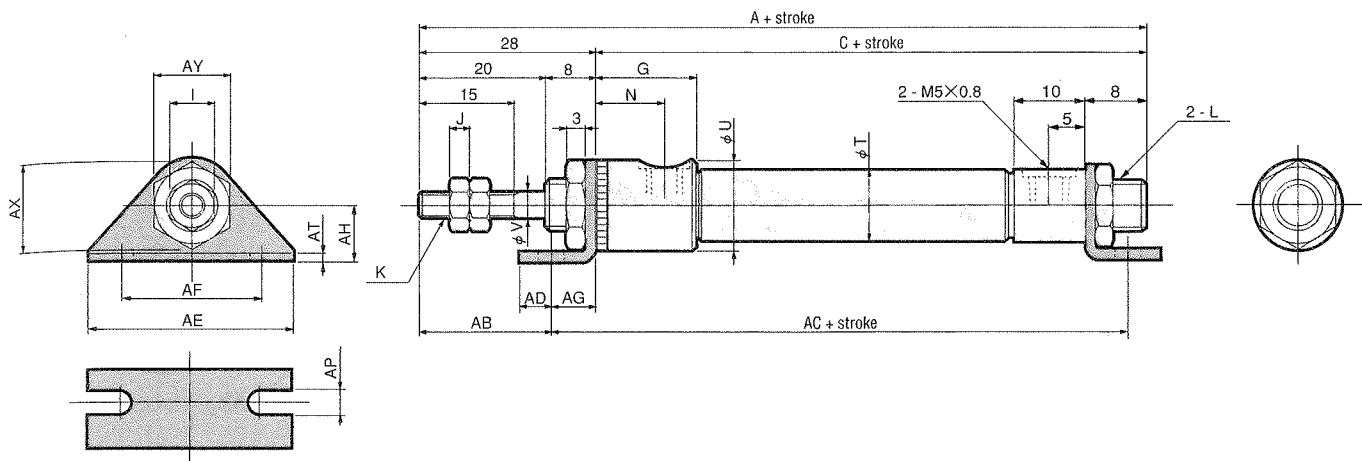
Type		Standard cylinder		Sensor cylinder											
Bore size	Symbol	A	C	A	C	G	G ₁	G ₂	I	J	K	L	N	N ₁	O
6	M3 port	62.5	34.5	72.5	44.5	13.5	3.5	8	5.5	2.4	M3×0.5	M6×1	10	4	M3×0.5
	M5 port	69	41	79	51	16.5	7	10					11.5	5	M5×0.8
	10	73	45	83	55	16	7	10	7	3.2	M4×0.7	M8×1	11	5	M5×0.8
	16	74.5	46.5	84.5	56.5	15.5	7	10	8	4	M5×0.8	M10×1	10.5	5	M5×0.8

Type						Standard cylinder			Sensor cylinder																
Bore size	Symbol	U	U ₁	U ₂	V	AA	AB	AC	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AP	AT	AX	AY				
6	M3 port	11	7	8	3	46.5	21	41.5	56.5	21	51.5	5	32	22.2	7	9	7	4.2	1.6	11.5	10				
	M5 port	14	8	10		53		48	63		58														
	10	14	11	12	4	57	21	52	67	21	62	5	32	22.2	7	9	7	4.2	1.6	13.9	12				
	16	17	17	17	5	61.5	19	55.5	71.5	19	65.5	6	42	29.2	9	14	10	5.2	2.3	16.2	14				

Dimensions of Double Acting Type

(unit : mm)

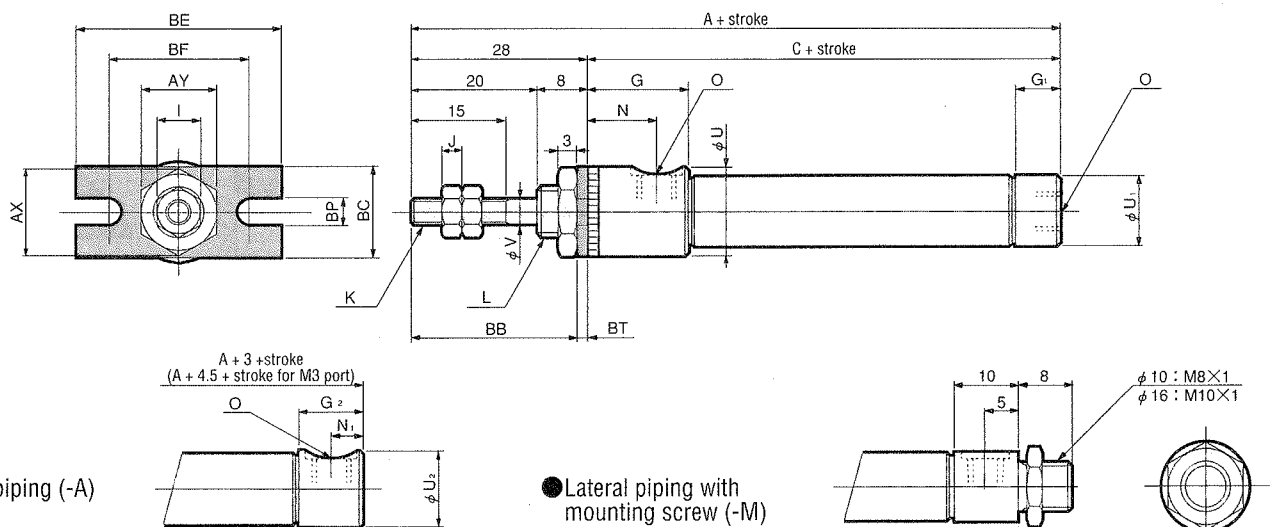
●Double foot type



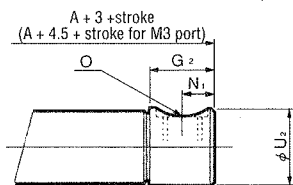
Type	Standard cylinder	Sensor cylinder										
Bore size	Symbol	A	C	A	C	G	I	J	K	L	U	V
10		84	56	94	66	16	7	3.2	M4×0.7	M8×1	14	4
16		85.5	57.5	95.5	67.5	16	8	4	M5×0.8	M10×1	17	5

Type	Standard cylinder		Sensor cylinder												
Bore size	Symbol	AC	AB	AC	AB	AD	AE	AF	AG	AH	AJ	AP	AT	AX	AY
10		62	21	72	21	5	32	22.2	7	9	7	4.2	1.6	14	12
16		67.5	19	87.5	19	6	42	29.2	9	14	10	5.2	2.3	16	14

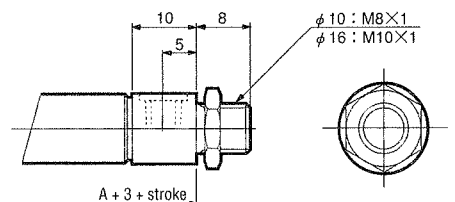
●Flange type



●Lateral piping (-A)



●Lateral piping with mounting screw (-M)



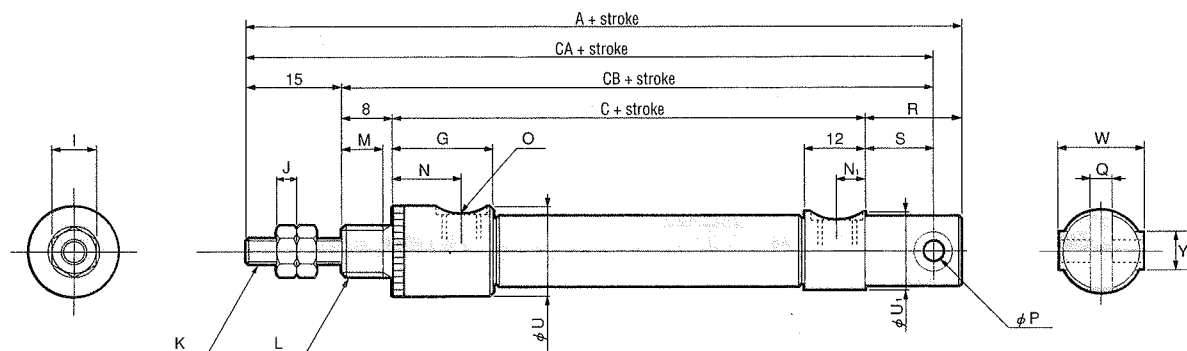
Type	Standard cylinder	Sensor cylinder												
Bore size	Symbol	A	C	A	C	G	G1	G2	I	J	K	L	N	Nt
6	M3 port	62.5	34.5	72.5	44.5	13.5	3.5	8	5.5	2.4	M3×0.5	M6×1	10	4
	M5 port	69	41	79	51	16.5	7	10					11.5	5
10		73	45	83	55	16	7	10	7	3.2	M4×0.7	M8×1	11	5
16		74.5	46.5	84.5	56.5	15.5	7	10	8	4	M5×0.8	M10×1	10.5	5

Bore size		Symbol	O	U	U ₁	U ₂	V	AX	AY	BB	BC	BE	BF	BP	BT
6	M3 port		M3×0.5	11	7	8	3	11.5	10	26.4	14	32	22.2	4.2	1.6
	M5 port		M5×0.8	14	8	10									
10			M5×0.8	14	11	12	4	13.9	12	26.4	14	32	22.2	4.2	1.6
16			M5×0.8	17	17	17	5	16.2	14	25.7	20	42	29.2	5.2	2.3

Dimensions of Double Acting Type

(unit : mm)

●Clevis type



Type	Standard cylinder		Sensor cylinder		G	I	J	K	L	M	N	N ₁
	A	C	A	C								
10	86	50	96	60	16	7	3.2	M4×0.7	M8×1	6.5	11	7
16	94.5	51.5	104.5	61.5	15.5	8	4	M5×0.8	M10×1	6	10.5	7

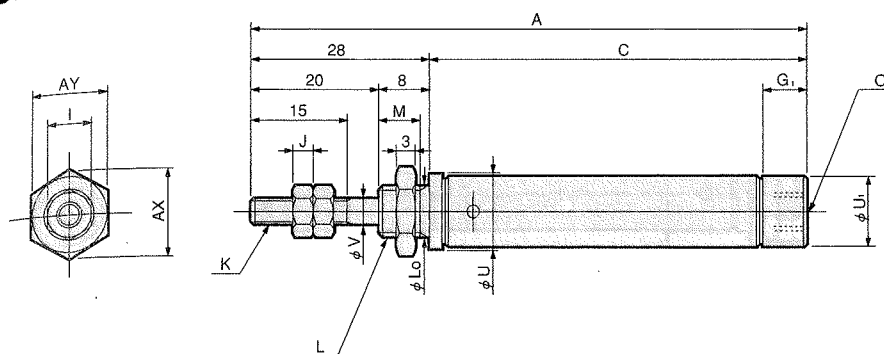
Type	O	P	Q	R	S	U	U ₁	W	Y	Standard cylinder		Sensor cylinder	
										CA	CB	CA	CB
10	M5×0.8	3.3±0.05	3.2 ^{+0.2} _{+0.1}	13	8	14	12	12	φ 6	81	66	91	76
16	M5×0.8	5.1±0.05	6.5 ^{+0.2} _{+0.1}	20	10	17	17	17	φ 8	84.5	69.5	94.5	79.5

Discontinued

Dimensions of Single Acting Push Type

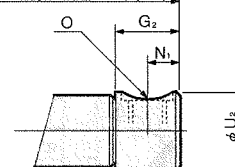
(unit : mm)

Basic type

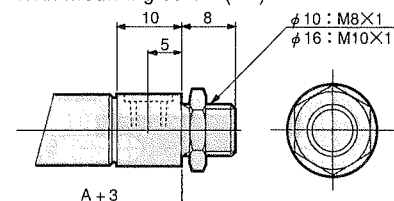


Lateral piping (-A)

A + 3 (A + 4.5 for M3 port)



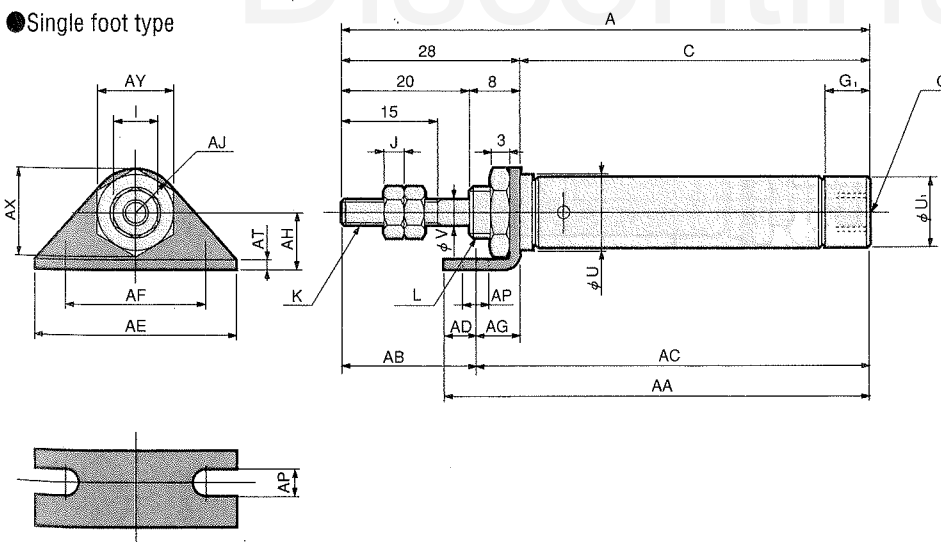
Lateral piping With mounting screw (-M)



Type	Symbol	Standard cylinder												Sensor cylinder											
		A						C						A						C					
Bore size	Stroke	5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60
6	M3 port	61.5	66.5	71.5	98.5	125.5	152.5	33.5	38.5	43.5	70.5	97.5	124.5	71.5	76.5	81.5	108.5	135.5	162.5	43.5	48.5	53.5	80.5	107.5	134.5
	M5 port	65	70	75	102	129	156	37	42	47	74	101	128	75	80	85	112	139	166	47	52	57	84	111	138
	10	69	74	79	106	133	160	41	46	51	78	105	132	79	84	89	116	143	170	51	56	61	88	115	142
	16	70	75	80	107	134	161	42	47	52	79	106	133	80	85	90	117	144	171	52	57	62	89	116	143

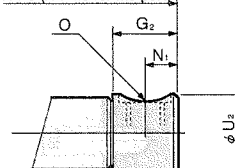
Bore size	Symbol	G1	G2	I	J	K	L	Lo	M	N1	O	U	U1	U2	V	AX	AY
6	M3 port	3.5	8	5.5	2.4	M3×0.5	M6×1	6 ^{+0.05} _{-0.10}	6.5	4	M3×0.5	8	7	8	3	11.5	10
	M5 port	7	10							5	M5×0.8		8	10			
	10	7	10	7	3.2	M4×0.7	M8×1	8 ^{+0.05} _{-0.10}	6.5	5	M5×0.8	11	11	12	4	13.9	12
	16	7	10	8	4	M5×0.8	M10×1	10 ^{+0.05} _{-0.10}	6	5	M5×0.8	17	17	17	5	16.2	14

Single foot type

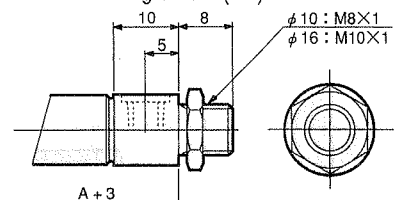


Lateral piping (-A)

A + 3 (A + 4.5 for M3 port)



Lateral piping With mounting screw (-M)



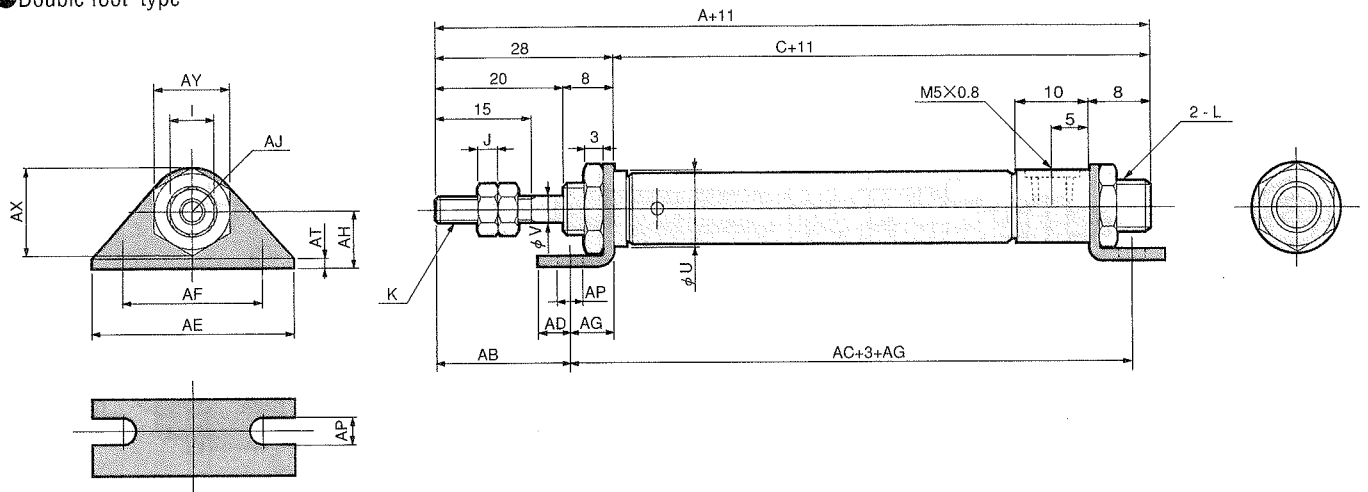
Type	Symbol	Standard cylinder												Sensor cylinder											
		A						C						A						C					
Bore size	Stroke	5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60
6	M3 port	61.5	66.5	71.5	98.5	125.5	152.5	33.5	38.5	43.5	70.5	97.5	124.5	71.5	76.5	81.5	108.5	135.5	162.5	43.5	48.5	53.5	80.5	107.5	134.5
	M5 port	65	70	75	102	129	156	37	42	47	74	101	128	75	80	85	112	139	166	47	52	57	84	111	138
	10	69	74	79	106	133	160	41	46	51	78	105	132	79	84	89	116	143	170	51	56	61	88	115	142
	16	70	75	80	107	134	161	42	47	52	79	106	133	80	85	90	117	144	171	52	57	62	89	116	143

Type	Symbol	Standard cylinder												Sensor cylinder											
		AA						AB						AA						AC					
Bore size	Stroke	5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60
6	M3 port	45.5	50.5	55.5	82.5	109.5	136.5	21	40.5	45.5	50.5	77.5	104.5	131.5	55.5	60.5	65.5	92.5	119.5	146.5	21	50.5	55.5	60.5	87.5
	M5 port	49	54	59	86	113	140	21	44	49	54	81	108	135	59	64	69	96	123	150	21	54	59	64	91
	10	53	58	63	90	117	144	21	48	53	58	85	112	139	63	68	73	100	127	154	21	58	63	68	95
	16	57	62	67	94	121	148	19	51	56	61	88	115	142	67	72	77	104	131	158	19	61	66	71	98

Dimensions of Single Acting Push Type

(unit : mm)

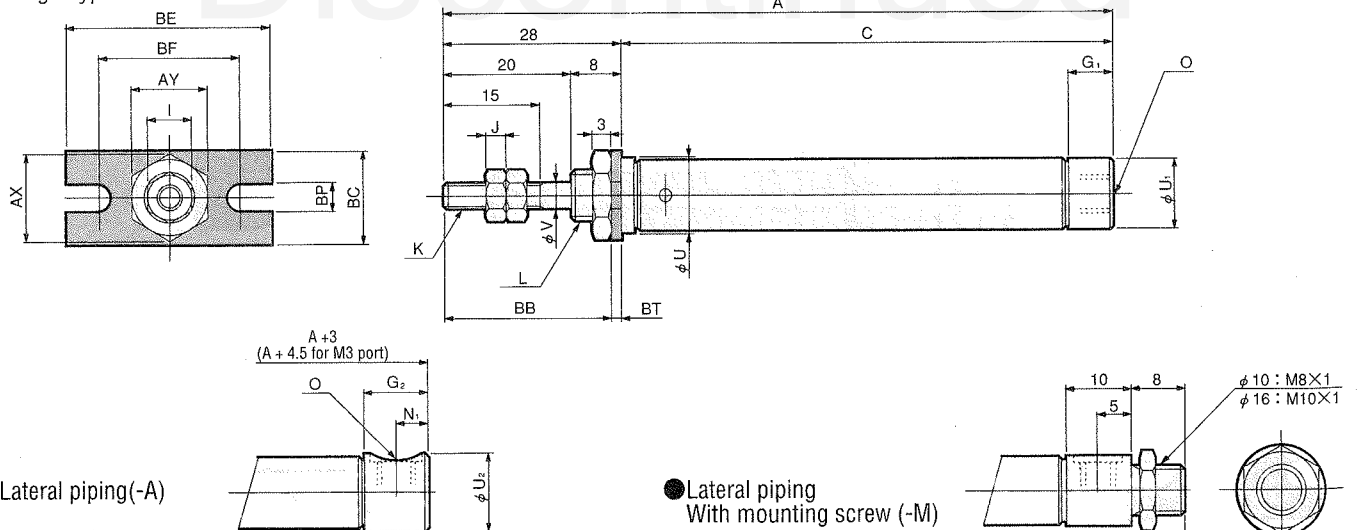
●Double foot type



Type	Standard cylinder												Sensor cylinder												I	J	K	L	U	V
Symbol	A						C						A						C											
Bore size	5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60						
10	69	74	79	106	133	160	41	46	51	78	105	132	79	84	89	116	143	170	51	56	61	88	115	142	7	3.2	M4X0.7	M8X1	11	4
16	70	75	80	107	134	161	42	47	52	79	106	133	80	85	90	117	144	171	52	57	62	89	116	143	8	4	M5X0.8	M10X1	17	5

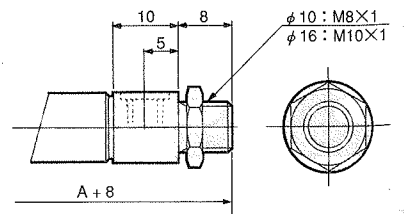
Type	Standard cylinder							Sensor cylinder																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Symbol	AB	AC						AB	AC						AD	AE	AF	AG	AH	AJ	AP	AT	AX	AY																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Stroke		5	10	15	30	45	60		5	10	15	30	45	60																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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●Flange type



●Lateral piping(-A)

●Lateral piping With mounting screw (-M)



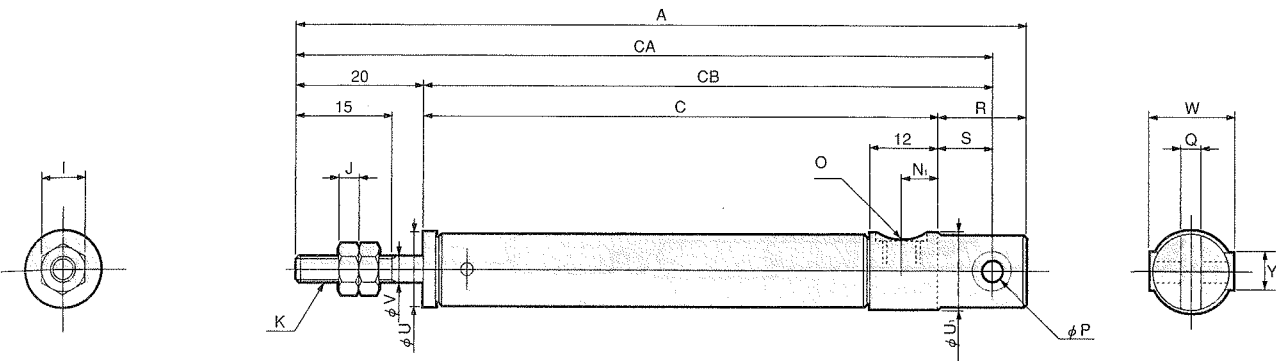
Type		Standard cylinder												Sensor cylinder											
Symbol		A						C						A						C					
Bore size	Stroke	5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60
6	M3 port	61.5	66.5	71.5	98.5	125.5	152.5	33.5	38.5	43.5	70.5	97.5	124.5	71.5	76.5	81.5	108.5	135.5	162.5	43.5	48.5	53.5	80.5	107.5	134.5
	M5 port	65	70	75	102	129	156	37	42	47	74	101	128	75	80	85	112	139	166	47	52	57	84	111	138
	10	69	74	79	106	133	160	41	46	51	78	105	132	79	84	89	116	143	170	51	56	61	88	115	142
	16	70	75	80	107	134	161	42	47	52	79	106	133	80	85	90	117	144	171	52	57	62	89	116	143

Bore size	Symbol	G1	G2	I	J	K	L	N1	O	U	U1	U2	V	AX	AY	BB	BC	BE	BF	BP	BT
6	M3 port	3.5	8	5.5	2.4	M3X0.5	M6X1	4	M3X0.5	8	7	8	3	11.5	10	26.4	14	32	22.2	4.2	1.6
	M5 port	7	10					5	M5X0.8		8	10									
	10	7	10	7	3.2	M4X0.7	M8X1	5	M5X0.8	11	11	12	4	13.9	12	26.4	14	32	22.2	4.2	1.6
	16	7	10	8	4	M5X0.8	M10X1	5	M5X0.8	17	17	17	5	16.2	14	25.7	20	42	29.2	5.2	2.3

Dimensions of Single Acting Push Type

(unit : mm)

●Clevis type



Type	Standard cylinder												Sensor cylinder												I	J	K	N ₁	O	P
Symbol	A						C						A						C											
Stroke	5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60						
Bore size																														
10	79	84	89	116	143	170	46	51	56	83	110	137	89	94	99	126	153	180	56	61	66	93	120	147	7	3.4	M4×0.7	7	M5×0.8	3.3±0.05
16	87	92	97	124	151	178	47	52	57	84	111	138	97	102	107	134	161	188	57	62	67	94	121	148	8	4	M5×0.8	7	M5×0.8	5.1±0.05

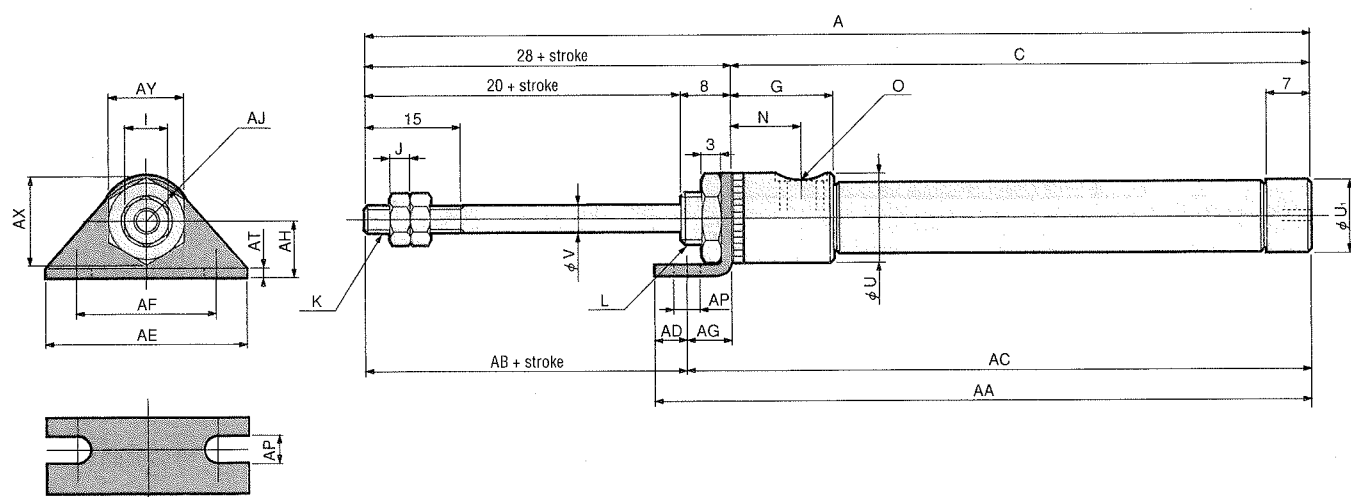
Type	Symbol	Standard cylinder								Sensor cylinder												Q	R	S	U	U ₁	V	W	Y								
Stroke		CA				CB				CA				CB				CA																			
		5	10	15	30	45	60	5	10	15	30	45	60	5	10	15	30	45	60	5	10									15	30	45	60	5	10	15	30
Bore size																																					
10	3.2 ^{+0.2} _{-0.1}	13	8	11	12	4	12	φ 6	74	79	84	111	138	165	54	59	64	91	118	145	84	89	94	121	148	175	64	69	74	101	128	155					
16	6.5 ^{+0.2} _{-0.1}	20	10	17	17	5	17	φ 8	77	82	87	114	141	168	57	62	67	94	121	148	87	92	97	124	151	178	67	72	77	104	131	158					

Discontinued

(unit : mm)

Technical drawing of a hydraulic cylinder. The drawing includes a front view (left) and a side view (right). The front view shows a circular cross-section with dimensions: AX (total height), AY (flange outer diameter), I (flange inner diameter), and J (flange thickness). The side view shows the cylinder's profile with dimensions: $28 + \text{stroke}$ (total length), $20 + \text{stroke}$ (length to the first seal), 15 (flange thickness), 8 (seal diameter), 3 (rod diameter), M (rod diameter), N (rod diameter), G (rod diameter), O (rod diameter), 7 (rod diameter), K (flange), L (rod), ϕV (rod diameter), ϕLo (rod diameter), ϕU (rod diameter), and C (total length).

●Single foot type

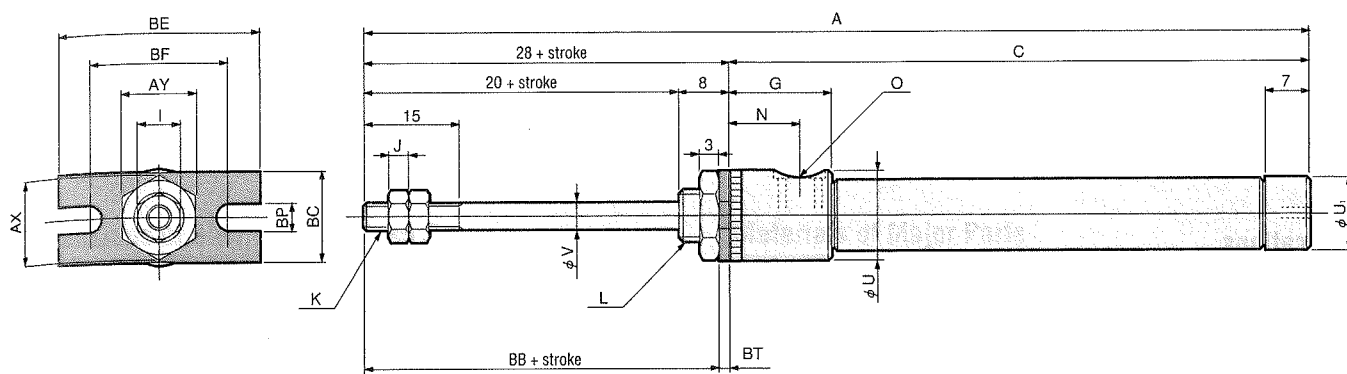


Type		Standard cylinder										Sensor cylinder										AD	AE	AF	AG	AH	AJ	AP	AT	AX	AY
Symbol		AA				AB	AC				AA				AB	AC															
Stroke		5	10	15	30		5	10	15	30	5	10	15	30		5	10	15	30												
Bore size		5	10	15	30	AB	5	10	15	30	5	10	15	30	AB	5	10	15	30												
6	M3 port	60.5	65.5	70.5	97.5	21	55.5	60.5	65.5	92.5	70.5	75.5	80.5	107.5	21	65.5	70.5	75.5	102.5	5	32	22.2	7	9	7	4.2	1.6	11.5	10		
	M5 port	63.5	68.5	73.5	100.5		58.5	63.5	68.5	95.5	73.5	78.5	83.5	110.5		68.5	73.5	78.5	105.5												
	10	67	72	77	104	21	62	67	72	99	77	82	87	114	21	72	77	82	109	5	32	22.2	7	9	7	4.2	1.6	13.9	12		
	16	70	75	80	107	19	64	69	74	101	80	85	90	117	19	74	79	84	111	6	42	29.2	9	14	10	5.2	2.3	16.2	14		

Dimensions of Single Acting Pull Type

(unit : mm)

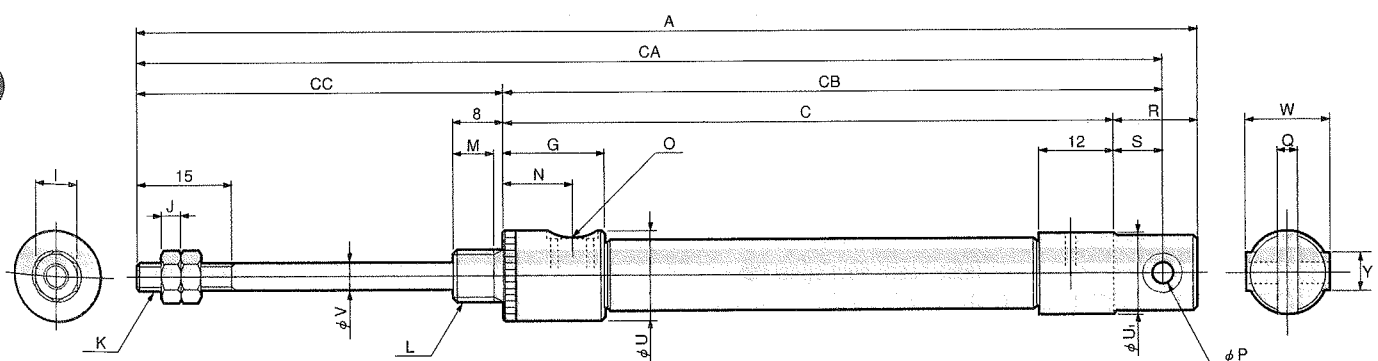
● Flange type



Type	Symbol	Standard cylinder								Sensor cylinder							
		A				C				A				C			
Stroke		5	10	15	30	5	10	15	30	5	10	15	30	5	10	15	30
6	M3 port	81.5	91.5	101.5	143.5	48.5	53.5	58.5	85.5	91.5	101.5	111.5	153.5	58.5	63.5	68.5	95.5
	M5 port	84.5	94.5	104.5	146.5	51.5	56.5	61.5	88.5	94.5	104.5	114.5	156.5	61.5	66.5	71.5	98.5
10		88	98	108	150	55	60	65	92	98	108	118	160	65	70	75	102
16		88	98	108	150	55	60	65	92	98	108	118	160	65	70	75	102

Bole size	Symbol	G	I	J	K	L	N	O	U	U1	V	AX	AY	BB	BC	BE	BF	BP	BT
6	M3 port	13.5	5.5	2.4	M3×0.5	M6×1	10	M3×0.5	11	8	3	11.5	10	26.4	14	32	22.2	4.2	1.6
	M5 port	16.5					11.5	M5×0.8	14										
	10	16	7	3.2	M4×0.7	M8×1	11	M5×0.8	14	11	4	13.9	12	26.4	14	32	22.2	4.2	1.6
	16	15.5	8	4	M5×0.8	M10×1	10.5	M5×0.8	17	17	5	16.2	14	25.7	20	42	29.2	5.2	2.3

● Clevis type



Type	Symbol	Standard cylinder								Sensor cylinder								G	I	J	K	L	M	N	O	P	Q
		A				C				A				C													
		5	10	15	30	5	10	15	30	5	10	15	30	5	10	15	30										
Stroke	Bore size	101	111	121	163	60	65	70	97	111	121	131	173	70	75	80	107	16	7	3.2	M4×0.7	M8×1	6.5	11	M5×0.8	3.3±0.05	3.2±0.1
16		113	123	133	175	60	65	70	97	123	133	143	185	70	75	80	107	15.5	8	4	M5×0.8	M10×1	6	10.5	M5×0.8	5.1±0.05	6.5±0.1

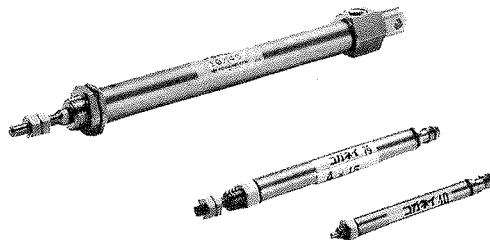
Type	Symbol	R	S	U	U1	V	W	Y	Standard cylinder												Sensor cylinder												
									CA				CB				CC				CA				CB				CC				
									5	10	15	30	5	10	15	30	5	10	15	30	5	10	15	30	5	10	15	30	5	10	15	30	
Stroke	Bore size	10	13	8	14	12	4	12	φ6	96	106	116	158	68	73	78	105	28	33	38	53	106	116	126	168	78	83	88	115	28	33	38	53
		16	20	10	17	17	5	17	φ8	103	113	123	165	70	75	80	107	33	38	43	58	113	123	133	175	80	85	90	117	33	38	43	58

PEN CYLINDERS

Single Acting Push Cylinders $\phi 2.5, \phi 4$
Non-Rotating Single Acting Push Cylinders

Symbols

- Single acting push type ● Non-Rotating Single Acting Push Cylinders



Specifications

Item	Bore size mm	2.5 · 4	10 · 16
Operation		Single acting push type	Non-Rotating Single Acting Push Cylinders
Fluid		Air	
Mounting type		Basic type	Basic type, Foot type, Flange type, Pivot type
Pressure range ^{note} MPa(kgf/cm ²)		0.34~0.7{3.5~7.1}	0.15~0.7{1.5~7.1}
Proof pressure MPa(kgf/cm ²)		1.03{10.5}	
Temperature range °C		0~60	
Piston speed range mm/s		50~300 (External stopper is required for operation over the specified speed or workload.)	
Cushion		None	Fixed type (rubber bumper)
Lubrication		Not required	
Maximum rod rotation		—	±2°
Port connection		$\phi 2.5$ and $\phi 4$ are equipped with barb fittings for nylon tube.	M5×0.8

Note: See minimum operating pressure chart for further details on each operation.

Bore Size and Stroke

Operation	Bore size	Stroke	available stroke	Stroke tolerance
Single acting push type	2.5	5 10	10	±1.2 -0.2
	4	5 10 15 20	20	
Non-rotating Single acting push type	10	15 30 45 60	60	±1.5 -0.5
	16			±1.2 -0.2

Minimum Operating Pressure

Operation	Bore size mm	Minimum operating pressure MPa(kgf/cm ²)
Single acting push type	2.5, 4	0.34{3.5}
Non-rotating Single acting push type	10, 16	0.15{1.5}

Spring Returning Force

See page 119.

Weight

Operation	Mounting type	Cylinder bore size mm	Stroke mm							Additional weight of bracket	
			5	10	15	20	30	45	60	Foot type	Flange type
Single acting push type	Basic type	2.5	1.5	1.9	—	—	—	—	—	—	—
		4	3.4	4.4	5.2	6.1	—	—	—	—	—
Non-rotating Single acting push type	Basic type (same for pivot type)	10	—	—	59	—	70	81	92	36	12
		16	—	—	108	—	128	148	168	34	11

Remark: Includes mounting nut and rod end nut.

Order Example

P SA [] [] — [] — []

Pen cylinder series

Operation
Blank — Single acting push type
L — Non-rotating Single acting push type

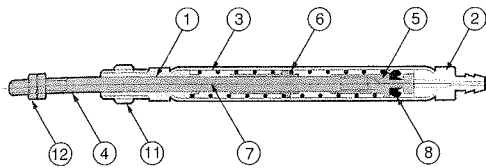
Bore size x stroke

Mounting type
Blank — Basic type (clevis mounting type for non-rotating cylinder)
1 — Double foot type (for non-rotating cylinder only)
3 — Flange type (same for both rod side and head side; for non-rotating cylinder only)
8E — pivot type (with pin and pivot supporting bracket for non-rotating cylinder only)
Note: Basic type cylinder and supporting brackets are delivered together

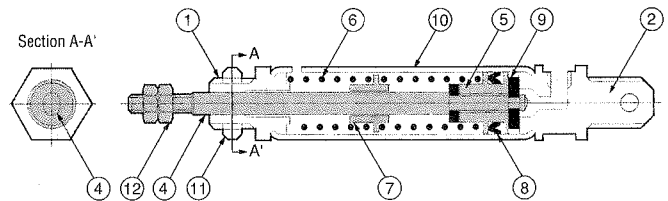
Rod knuckle
Blank — Without rod knuckle
I — With I-shaped rod knuckle
Y — With Y-shaped rod knuckle (with pin)
For bore size $\phi 10$ and $\phi 16$ only
Please order cylinder joint separately.

Construction Diagrams

- Single acting push type
- $\phi 2.5 \cdot \phi 4$



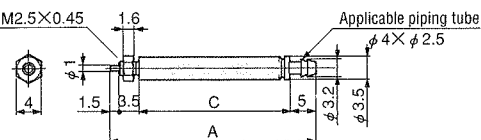
- Non-rotating (single acting-push type)
- $\phi 10 \cdot \phi 16$



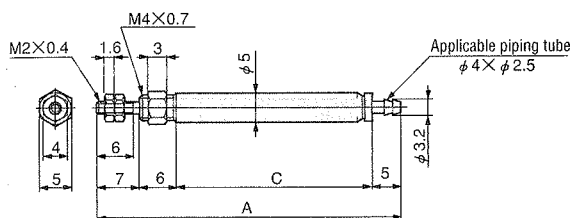
Dimensions of Single Acting Push Type

(unit : mm)

- Basic type
- $\phi 2.5$



- $\phi 4$



Symbol	A ^{note}				C ^{note}			
Bore size	5	10	15	20	5	10	15	20
2.5	26.5	35.5	—	—	16.5	25.5	—	—
4	37	46	55	64	19	28	37	46

Note: See longer figures for non-standard strokes because distance collars are used.

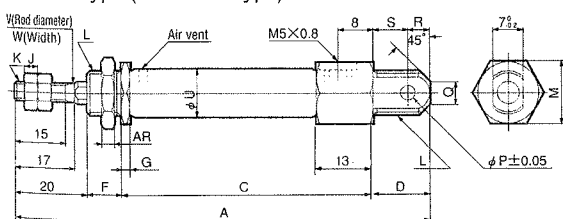
Materials of Major Parts

No.	Item	Material
①	Rod cover	Brass (nickel electroplated)
②	Head cover	
③	Cylinder tube	
④	Piston rod	Stainless steel
⑤	Piston	Brass
⑥	Spring	Hard steel
⑦	Collar	Brass
⑧	Piston packing	Synthetic rubber(NBR)
⑨	Bumper	
⑩	Cylinder tube	Stainless steel
⑪	Mounting nut	Brass (nickel electroplated)
⑫	Rod end nut	$\phi 4$ —Brass (nickel electroplated) Non-rotating type —Hard steel (nickel electroplated)

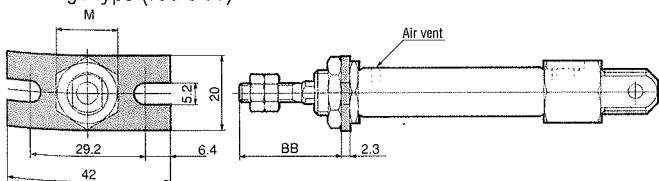
Dimensions of Non-Rotating Single Acting Push Type

(unit : mm)

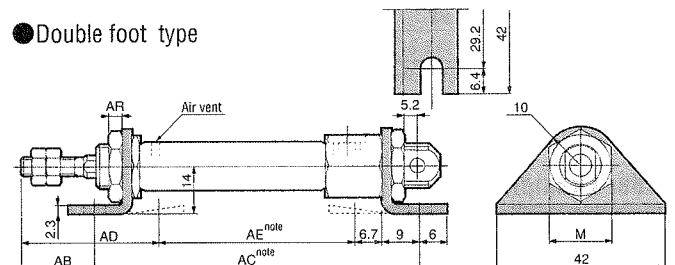
- Basic type (also Pivot type)



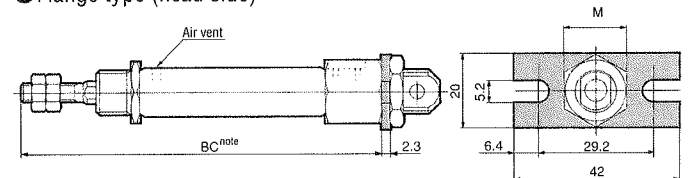
- Flange type (rod side)



- Double foot type



- Flange type (head side)



Symbol	A				C				D	F	G	J	K	L	M	P	Q
Stroke	15	30	45	60	15	30	45	60									
Bore size																	
10	98	125	152	179	57	84	111	138	13	8	2	3.2	M4×0.7	M10×1	14	3.3	5
16	106.5	133.5	160.5	187.5	59.5	86.5	113.5	140.5	17	10	4	4	M5×0.8	M12×1	17	5.1	6

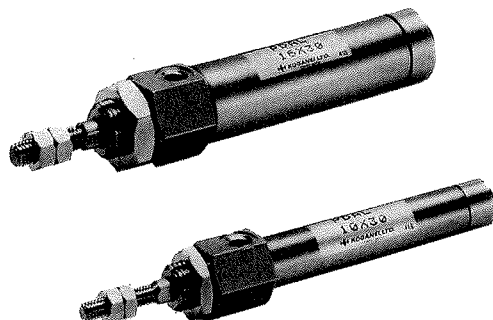
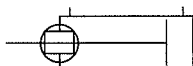
Symbol	R	S	U	V	W	AB	AC				AD	AE				AR	BB	BC			
Stroke							15	30	45	60		15	30	45	60			15	30	45	60
Bore size																					
10	5	8	11	5	4.2	19	75	102	129	156	34.7	43.6	70.6	97.6	124.6	3	25.7	85	112	139	166
16	7	10	17	6	5.2	21	77.5	104.5	131.5	158.5	36.7	46.1	73.1	100.1	127.1	5	27.7	89.5	116.5	143.5	170.5

Note: See longer figures for non-standard strokes because distance collars are used.

PEN CYLINDERS

Non-Rotating Double Acting Cylinders

Symbol	Unit	Value
α	deg	10
β	deg	10
γ	deg	10
δ	deg	10
ϵ	deg	10
ζ	deg	10
η	deg	10
θ	deg	10
ϕ	deg	10
ψ	deg	10
ω	deg	10
χ	deg	10
λ	deg	10
μ	deg	10
ν	deg	10
ξ	deg	10
π	deg	10
ρ	deg	10
σ	deg	10
τ	deg	10
κ	deg	10
ι	deg	10
υ	deg	10
ϕ	deg	10
χ	deg	10
ψ	deg	10
ω	deg	10
λ	deg	10
μ	deg	10
ν	deg	10
ξ	deg	10
π	deg	10
ρ	deg	10
σ	deg	10
τ	deg	10
κ	deg	10
ι	deg	10
υ	deg	10
ϕ	deg	10
χ	deg	10
ψ	deg	10
ω	deg	10
λ	deg	10
μ	deg	10
ν	deg	10
ξ	deg	10
π	deg	10
ρ	deg	10
σ	deg	10
τ	deg	10
κ	deg	10
ι	deg	10
υ	deg	10
ϕ	deg	10
χ	deg	10
ψ	deg	10
ω	deg	10
λ	deg	10
μ	deg	10
ν	deg	10
ξ	deg	10
π	deg	10
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κ	deg	10
ι	deg	10
υ	deg	10
ϕ	deg	10
χ	deg	10
ψ	deg	10
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ν	deg	10
ξ	deg	10
π	deg	10
ρ	deg	10
σ	deg	10
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ι	deg	10
υ	deg	10
ϕ	deg	10
χ	deg	10
ψ	deg	10
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ξ	deg	10
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μ	deg	10
ν	deg	10
ξ	deg	10
π	deg	10
ρ	deg	10
σ	deg	10
τ	deg	10
κ	deg	10
ι	deg	10
υ	deg	10
ϕ	deg	10
χ	deg	10
ψ	deg	10
ω	deg	10
λ	deg	10
μ	deg	10
ν	deg	10
ξ	deg	10
π	deg	10
ρ </		



Specifications

Item	Cylinder bore size (mm)	10	16
Operation		Double acting type	
Mounting type		Basic type, Foot type, Flange type, Clevis type	
Fluid		Air	
Pressure range MPa(kgf/cm ²)		0.1~0.7{1.0~7.1}	
Proof pressure MPa(kgf/cm ²)		1.03{10.5}	
Temperature range °C		0~70	
Speed range mm/s		50~500	
Cushion		Fixed type (rubber bumper)	
Lubrication		Not required	
Port size		M5×0.8	
Maximum rod rotation		±2°	

Bore Size and Stroke

		mm
Bore size	Standard stroke	available stroke
10	5 10 15 30 45 60	60
16	5 10 15 30 45 60	60

Mounting type

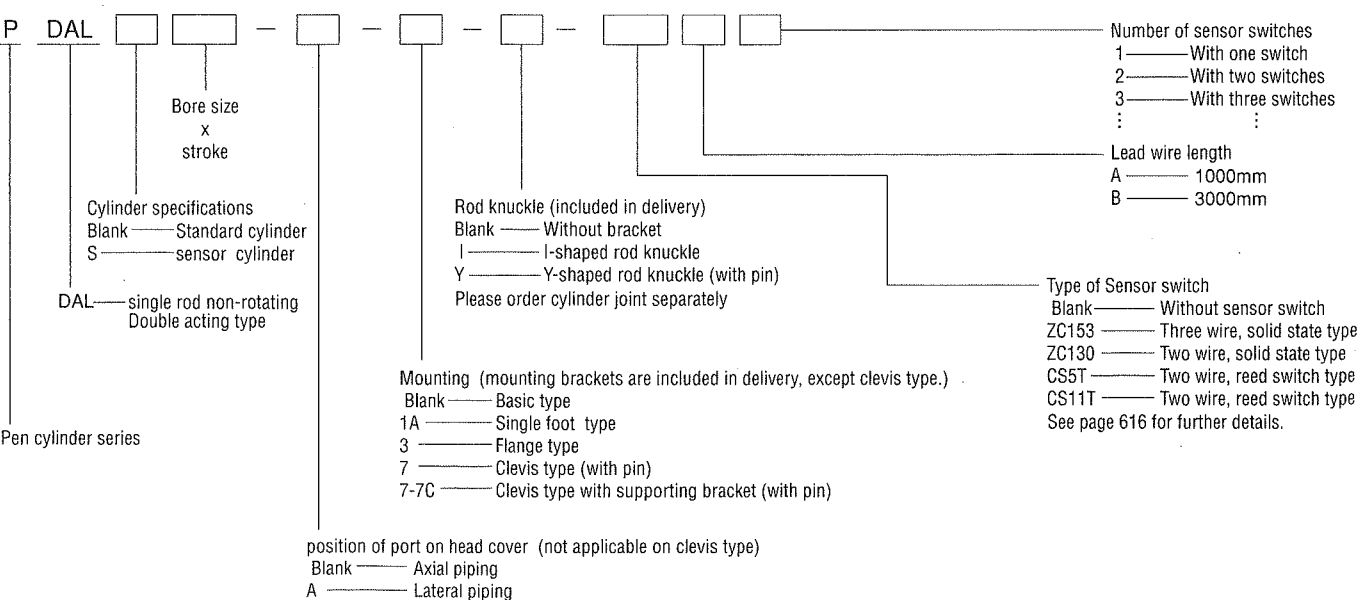
Mounting type	Item	Notes
1A	Single foot type	included in delivery
3	Flange type	included in delivery
7	Clevis type (with pin)	Clevis type (with pin)
7-7C	Clevis type with supporting bracket (with pin)	supporting bracket included in delivery.

Weight

Cylinder bore size mm	Mounting type	Stroke mm						Additional weight of bracket			Sensor cylinder	Additional weight of sensor switch			
		5	10	15	30	45	60	-1A	-3	-7C		ZC153□	ZC130□	CS5T□	CS11T□
10	Basic type	51.1	52.2	53.3	56.6	59.9	63.2	18	12	32	5	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
16		86.8	88.6	90.5	96	101.5	107	18	12	45	12				
10	Clevis type	62.1	63.2	64.3	67.6	70.9	74.2	—	—	32	5	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
16		113.8	115.6	117.4	122.9	128.4	133.9	—	—	45	12				

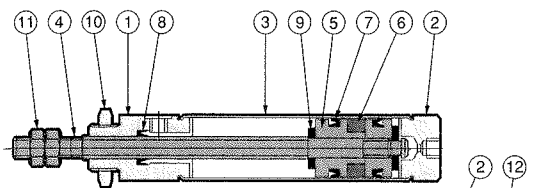
Remark: Includes mounting nut and rod-end nut

Order Example

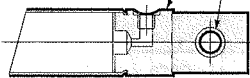


Construction Diagrams

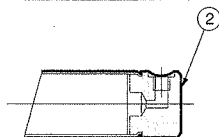
● Double acting type



● Clevis type (-7)



● Lateral piping (-A)



Materials of Major Parts

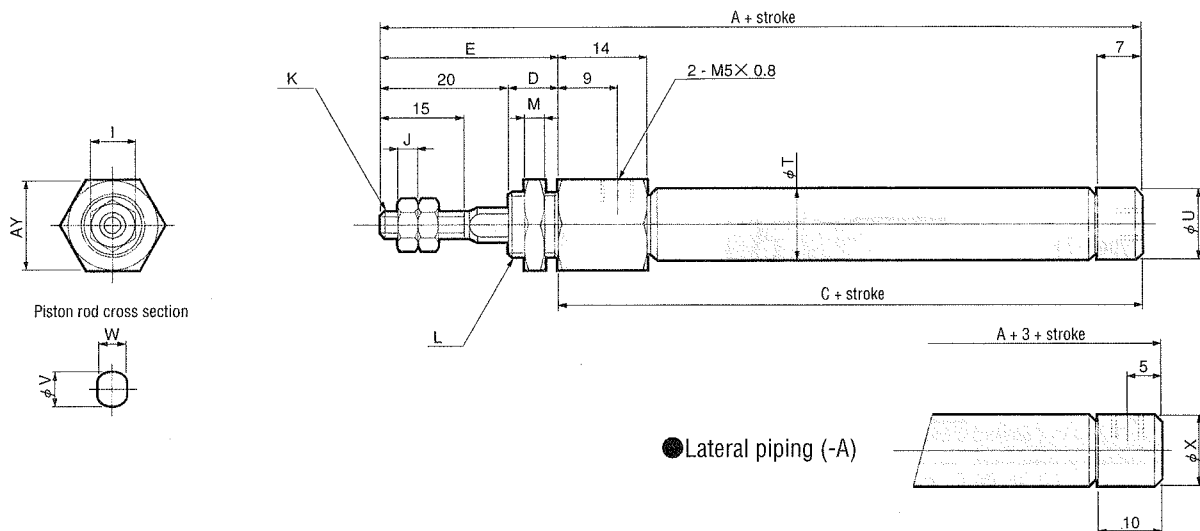
No.	Item	Material
①	Rod cover	Brass (nickel plated)
②	Head cover	
③	Cylinder tube	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Magnet	—
⑦	Piston packing	Synthetic rubber(NBR)
⑧	Rod packing	
⑨	Bumper	Urethane rubber
⑩	Mounting nut	Brass (nickel plated)
⑪	Rod end nut	Mild steel (nickel plated)
⑫	Clevis shaped bushing	Oil permeated bronze

Discontinued

Dimensions of Non-Rotating Double Acting Type

(unit : mm)

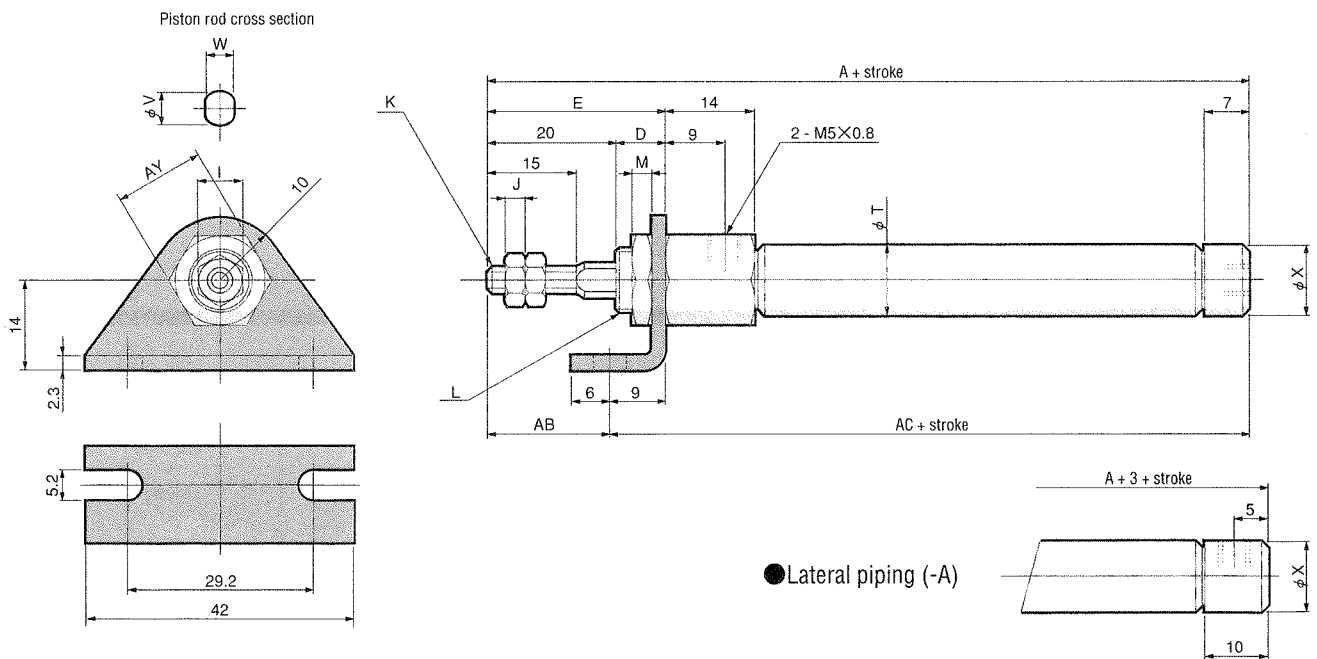
● Basic type



Type	Standard cylinder	Cylinder with magnets								
Bore size	Symbol	A	C	A	C	D	E	I	J	K
10		71	43	81	53	8	28	7	3.2	M4×0.7
16		75	45	85	55	10	30	8	4.0	M5×0.8

Bore size	Symbol	AY	M	φ T	φ U	φ V	W	φ X
10		14	3	11	11	5	4.2	12
16		17	5	17	17	6	5.2	17

● Single foot type



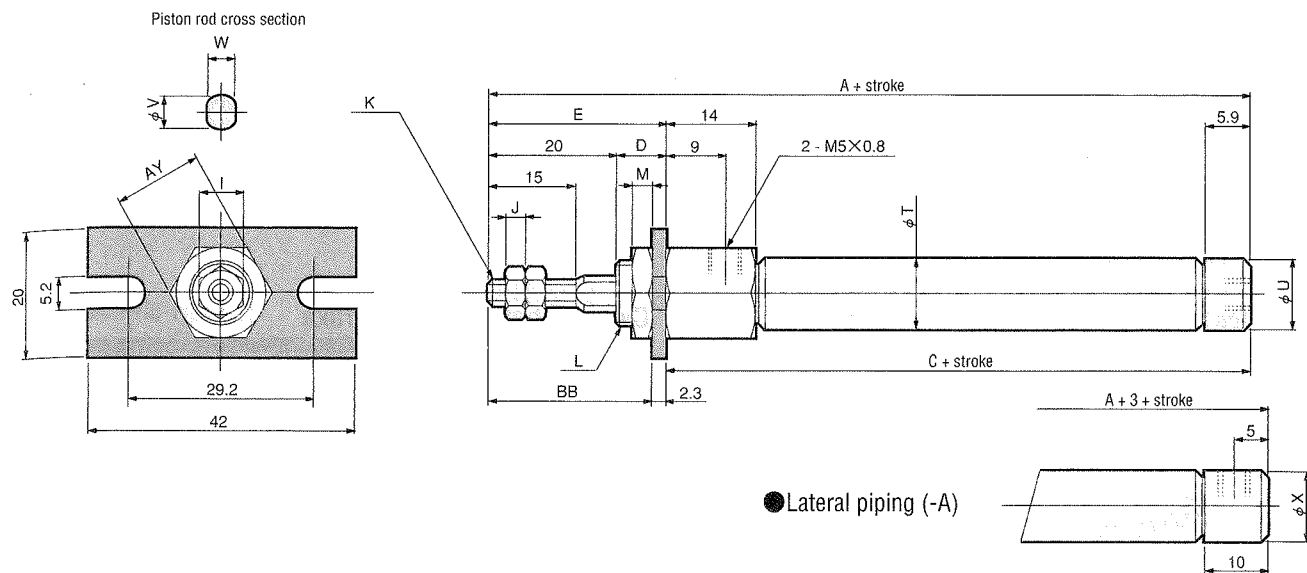
Type	Standard cylinder	Cylinder with magnets								
Bore size	Symbol	A	AB	AC	A	AB	AC	D	E	I
10		71	19	52	81	19	62	8	28	7
16		75	21	54	85	21	64	10	30	8

Bore size	Symbol	AY	L	M	φ T	φ U	φ V	W	φ X
10		14	M10×1	3	11	11	5	4.2	12
16		17	M12×1	5	17	17	6	5.2	17

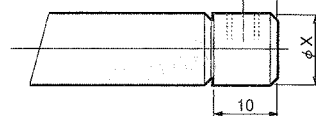
Dimensions of Non-Rotating Double Acting Type

(unit : mm)

● Flange type



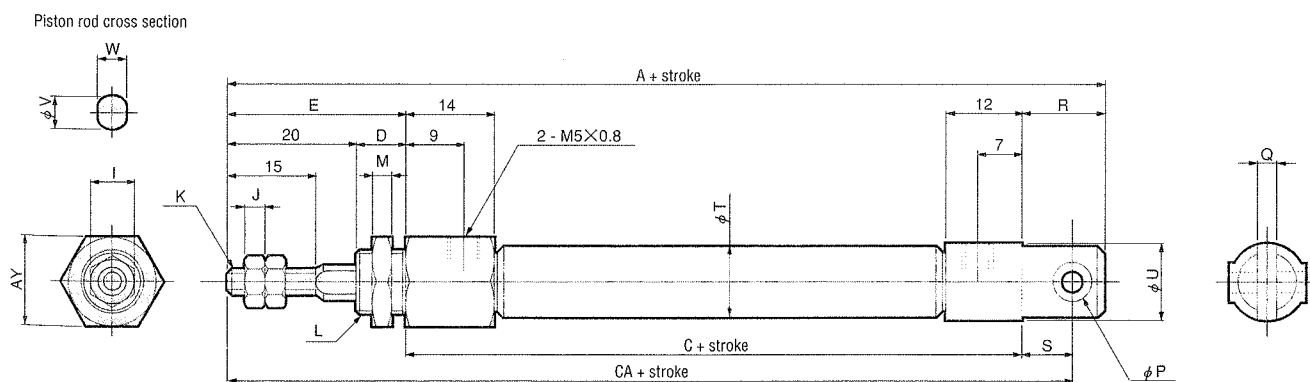
● Lateral piping (-A)



Type	Standard cylinder		Sensor cylinder		D	E	I	J	K
Bore size	Symbol	A	C	A	C				
10		71	43	81	53	8	28	7	3.2
16		75	45	85	55	10	30	8	4.0

Bore size	Symbol	L	M	AY	φT	φU	φV	W	BB	φX
10		M10×1	3	14	11	11	5	4.2	25.7	12
16		M12×1	5	17	17	17	6	5.2	27.7	17

● Clevis type



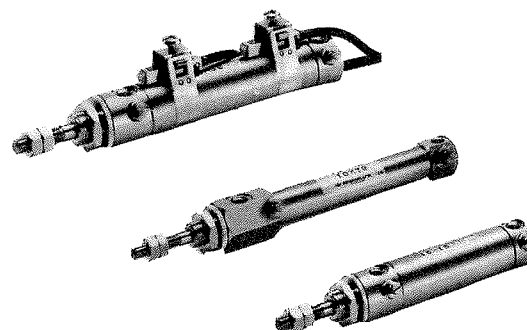
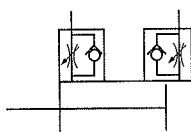
Type	Standard cylinder			Sensor cylinder			D	E	I	J	K	L	M
Bore size	Symbol	A	C	CA	A	C	CA						
10		89	48	84	99	58	94	8	28	7	3.2	M4×0.7	3
16		100	50	90	110	60	100	10	30	8	4.0	M5×0.8	5

Bore size	Symbol	AY	φP	Q	R	S	φT	φU	φV	W
10		14	3.3±0.05	3.2±0.1	13	8	11	12	5	4.2
16		17	5.1±0.05	6.5±0.1	20	10	17	17	6	5.2

PEN CYLINDERS

Pen Cylinders with Speed Controller

Symbol



Specifications

Item	Bore Size mm	10	16
Operation		Double acting type	
Mounting type		Basic type, Foot type, Flange type, Clevis type	
Fluid		Air	
Pressure range	MPa(kgf/cm ²)	0.1~0.7{1.0~7.1}	
Proof pressure	MPa(kgf/cm ²)	1.03{10.5}	
Temperature range	°C	0~70	
Piston speed range	mm/s	50~300	
Cushion		Fixed type (rubber bumper)	
Lubrication		Not required	
Port size		M5×0.8	

Cylinder bore size and stroke

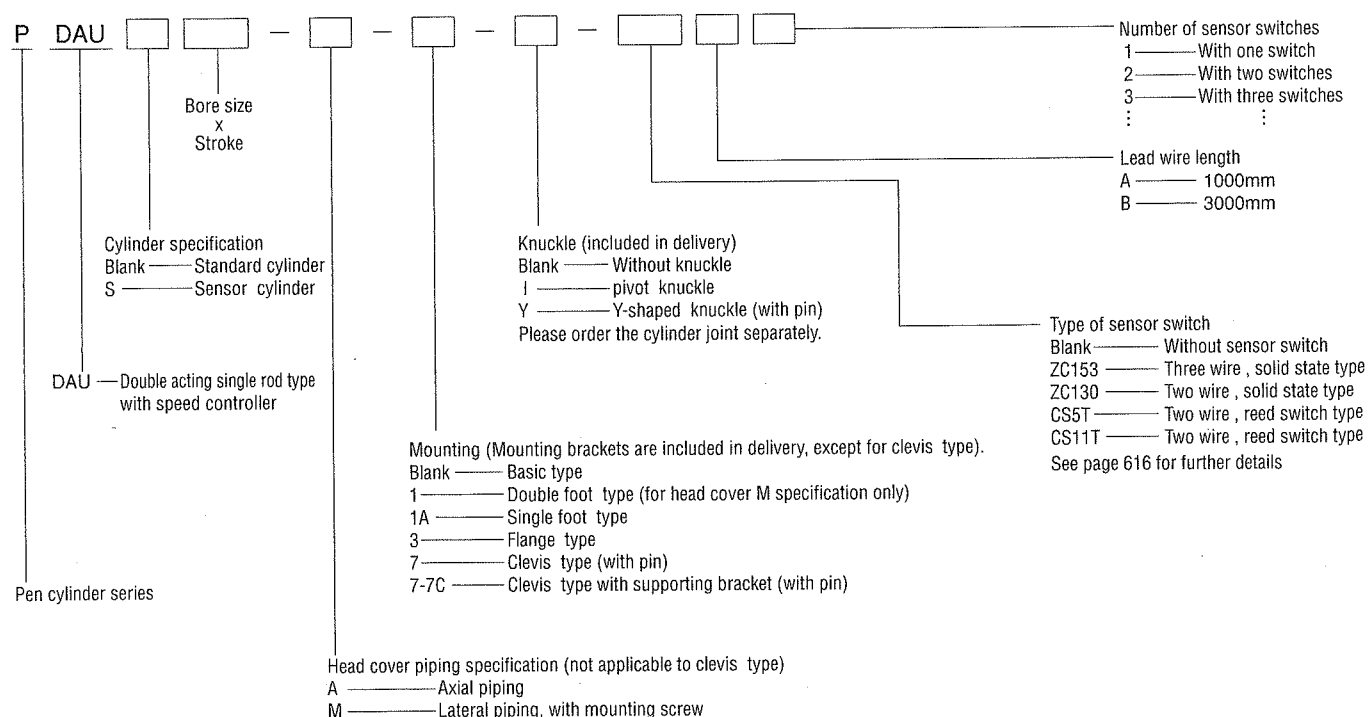
Bore size	Standard stroke	available stroke
10	5 10 15 30 45 60 75 100 125 150	150
16	5 10 15 30 45 60 75 100 125 150 175 200	200

Mounting type

Mounting type	Name	Remarks
1	Double foot type	included in delivery
1A	Single foot type	included in delivery ^{note}
3	Flange type	included in delivery
7	Clevis type (with pin)	delivered assembled
7-7C	Clevis type with supporting bracket (with pin)	supporting bracket is included in delivery.

Note: Use double foot type for foot brackets with strokes longer than 60mm.

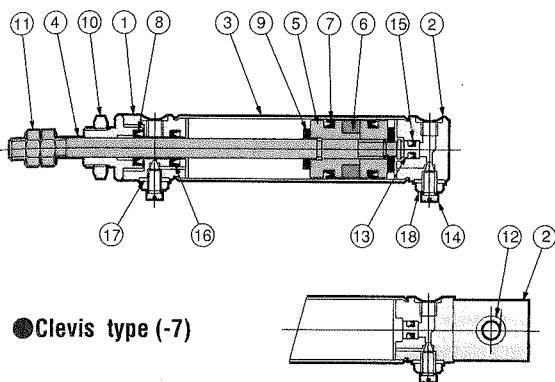
Order Example



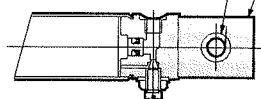
Note: Please use double foot type for foot brackets with strokes longer than 60mm.

Construction

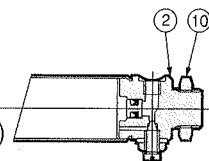
● Double acting type



● Clevis type (-7)



● Lateral piping With mounting screw(-M)



Materials of Major Parts

No.	Item	Material
①	Rod cover	Brass (nickel plated)
②	Head cover	
③	Cylinder tube	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Magnet	—
⑦	Piston packing	Synthetic rubber(NBR)
⑧	Rod packing	
⑨	Bumper	Urethane rubber
⑩	Mounting nut	Brass (nickel plated)
⑪	Rod end nut	Mild steel (nickel plated)
⑫	Clevis shaped bushing	Oil permeated bronze
⑬	Housing	Brass
⑭	Needle	Stainless steel
⑮	Check packing	Synthetic rubber(NBR)
⑯	Check packing	
⑰	Gasket	Brass (nickel plated)
⑱	Locking nut	

Weight

Cylinder bore size mm	Mounting type	Stroke mm												g
		5	10	15	30	45	60	75	100	125	150	175	200	
10	Basic type	59.1	60.2	61.3	64.6	67.9	71.2	74.5	80	85.5	91	—	—	
16		87.8	89.6	91.4	96.9	102.4	107.9	113.4	122.4	131.4	140.5	149.4	158.4	
10	Clevis type	70.1	71.2	72.3	75.6	78.9	82.2	85.5	91	96.5	102	—	—	
16		114.8	116.6	118.5	124	129.5	135	140.5	149.5	158.5	167.5	176.5	185.5	

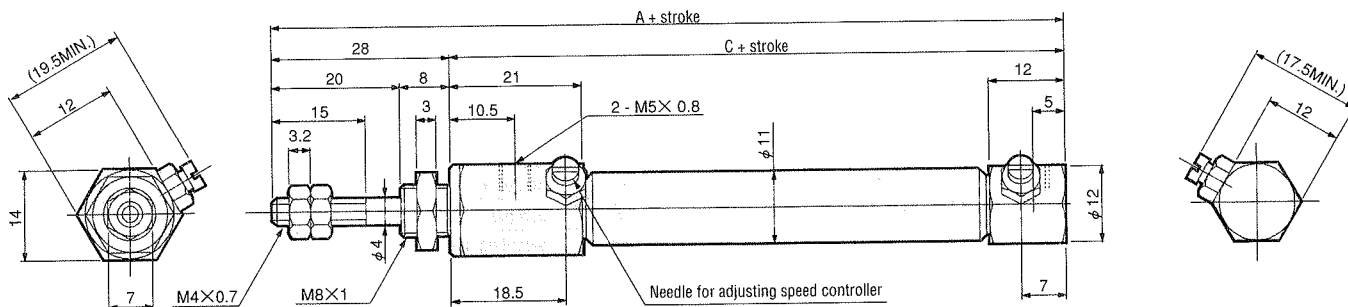
Cylinder bore size mm	Mounting type	Added weight of mounting bracket				Sensor cylinder	Added weight of sensor switch			
		-1	-1A	-3	-7C		ZC153□	ZC130□	CS5T□	CS11T□
10	Basic type	14	7	5	32	5	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
16		36	18	12	45	12	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
10	Clevis type	14	7	5	32	5	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
16		36	18	12	45	12	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50

Dimensions of Cylinder with Speed Controller

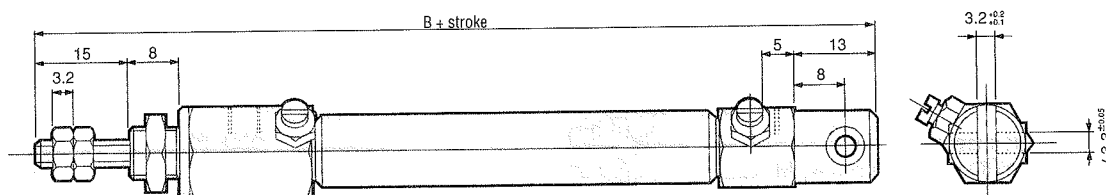
(unit : mm)

● $\phi 10$

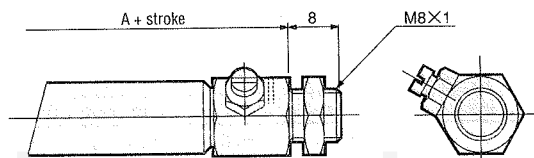
● Lateral piping (-A)



● Clevis type (-7)



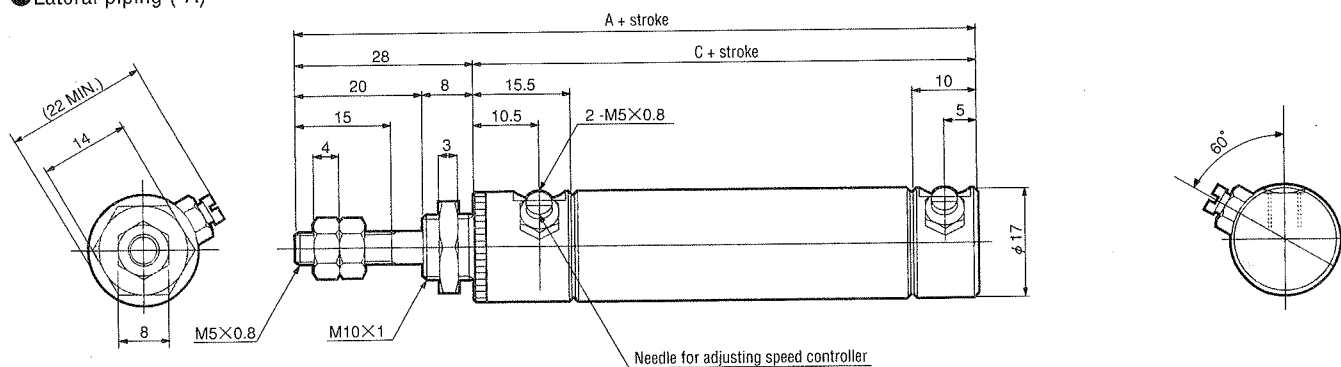
● Lateral piping, with mounting screw (-M)



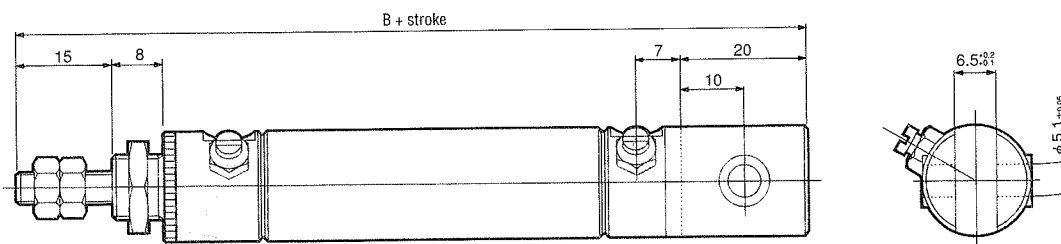
Type	Symbol	A	B	C
Standard cylinder		83	91	55
Sensor cylinder		93	101	65

● $\phi 16$

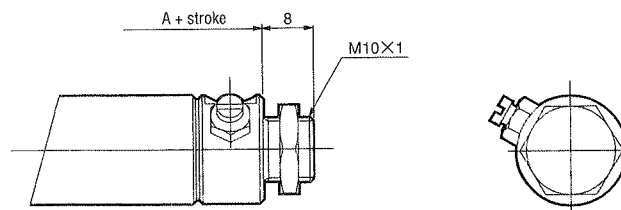
● Lateral piping (-A)



● Clevis type (-7)



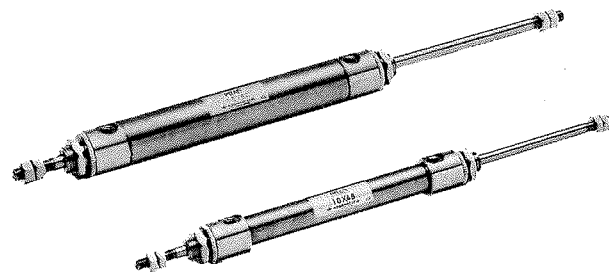
● Lateral piping with mounting screw (-M)



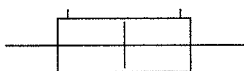
Type	Symbol	A	B	C
Standard cylinder		77.5	94.5	49.5
Sensor cylinder		87.5	104.5	59.5

PEN CYLINDERS

Double-End Rod Cylinders



Symbol



Specifications

Item	Cylinder bore size mm	10	16
Operation		Double acting type	
Mounting type		Basic type, Foot type, Flange type	
Fluid		Air	
Pressure range MPa(kgf/cm ²)		0.12~0.7{1.2~7.0}	0.1~0.7{0.1~7.1}
Proof pressure range MPa(kgf/cm ²)		1.03{10.5}	
Temperature range °C		0~70	
Operating speed range mm/s		50~750	
Cushion		Fixed type (rubber bumper)	
Lubrication		Not required	
Port size		M5×0.8	

Cylinder bore size and Stroke

Bore size	Standard stroke	available stroke
10	15 30 45 60	60
16	15 30 45 60	100

Mounting type

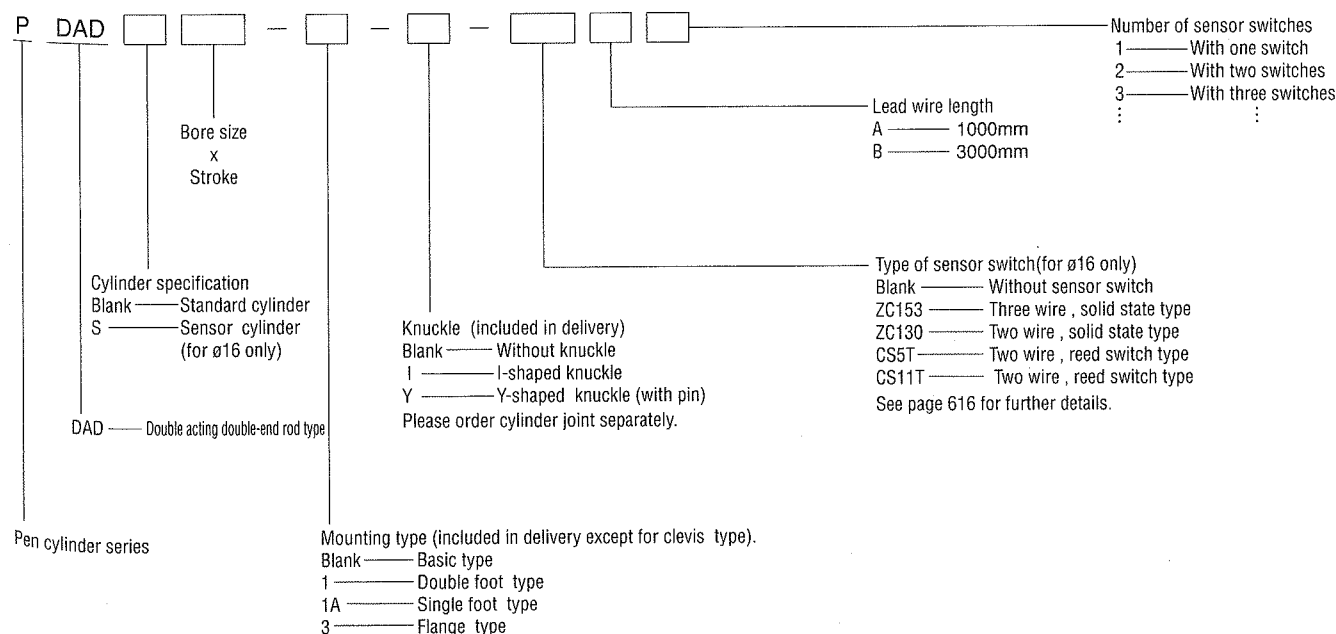
Mounting type	Name	Remarks
1	Double foot type	included in delivery
1A	Single foot type	included in delivery ^{note}
3	Flange type	included in delivery

Note : Please use double foot type for foot brackets with strokes longer than 60mm.

Weight

Cylinder bore size mm	Stroke mm				Added weight of bracket			Sensor cylinder	Added weight of sensor switch			
	15	30	45	60	-1	-1A	-3		ZC153□	ZC130□	CS5T□	CS11T□
10	76.8	81.6	86.4	91.2	14	7	5	—	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
16	138.8	146.6	154.4	162.2	36	18	12	12				

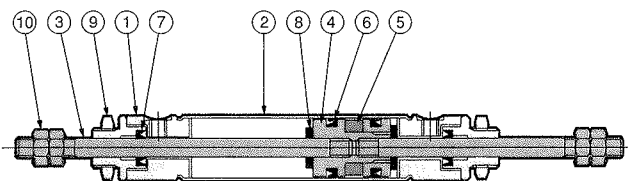
Order Example



Note : Please use double foot type for foot brackets with strokes longer than 60mm.

Construction

● Double acting type



Materials of Major Parts

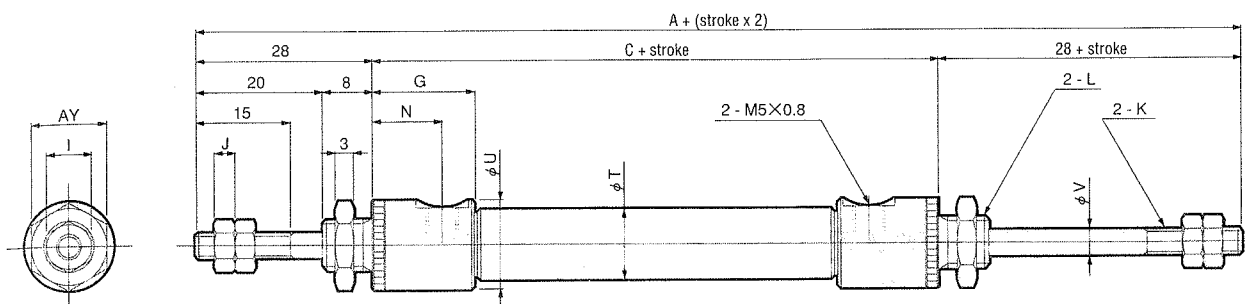
No.	Item	Material
①	Rod cover	Brass (nickel plated)
②	Cylinder tube	Stainless steel
③	Piston rod	
④	Piston	Brass
⑤	Magnet	—
⑥	Piston packing	Synthetic rubber(NBR)
⑦	Rod packing	
⑧	Bumper	Urethane rubber
⑨	Mounting nut	Brass (nickel plated)
⑩	Rod end nut	Mild steel (nickel plated)

Discontinued

Dimensions of Double-End Rod Cylinder

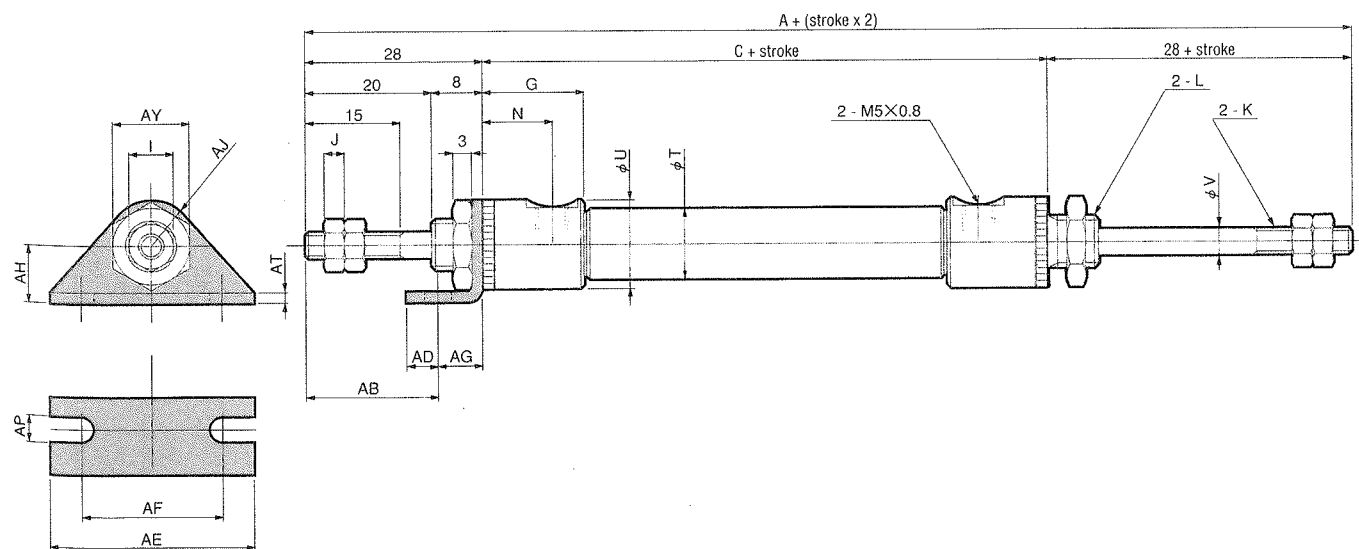
(unit : mm)

Basic type



Type Bore size	Standard cylinder		Sensor cylinder		G	I	J	K	L	N	φ T	φ U	φ V	AY
	A	C	A	C										
10	120	64	—	—	16.0	7	3.2	M4×0.7	M8×1	11.0	11	14	4	12
16	121	65	121	65	15.5	8	4.0	M5×0.8	M10×1	10.5	17	17	5	14

Single foot type



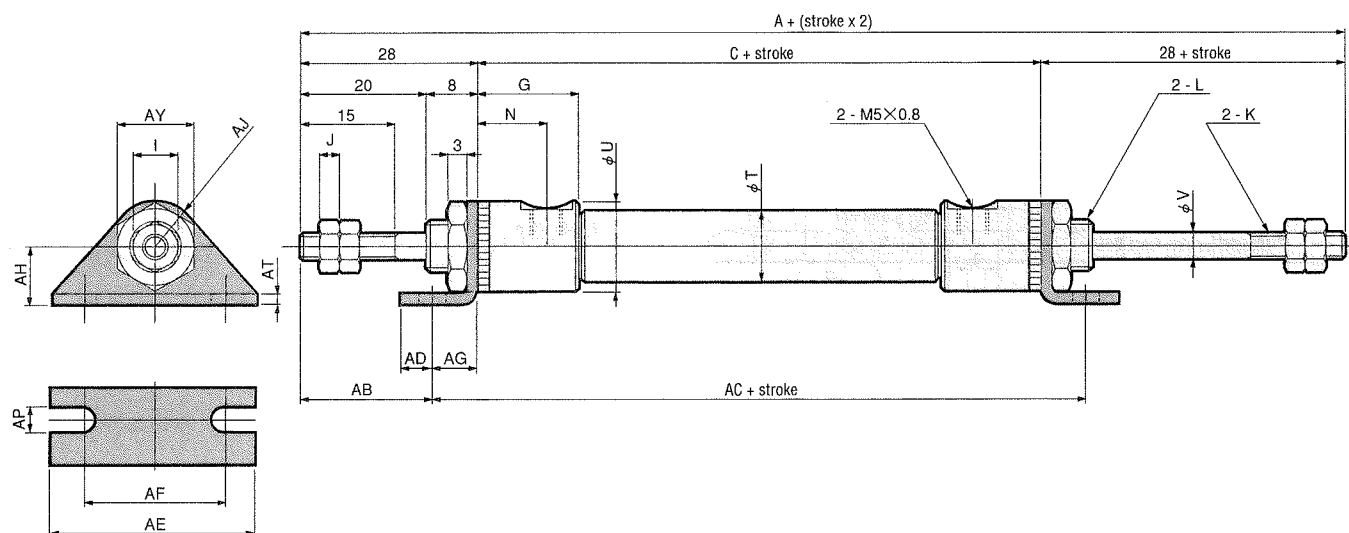
Type Bore size	Standard cylinder		Sensor cylinder		G	I	J	K	L	N	φ T	φ U	φ V	AY
	A	C	A	C										
10	120	64	—	—	16.0	7	3.2	M4×0.7	M8 × 1	11.0	11	14	4	12
16	121	65	121	65	15.5	8	4.0	M5×0.8	M10×1	10.5	17	17	5	14

Type Bore size	Symbol	AB	AD	AE	AF	AG	AH	AJ	AP	AT
10		21	5	32	22.2	7	9	7	4.2	1.6
16		19	6	42	29.2	9	14	10	5.2	2.3

Dimensions of Double-End Rod Cylinder

(unit : mm)

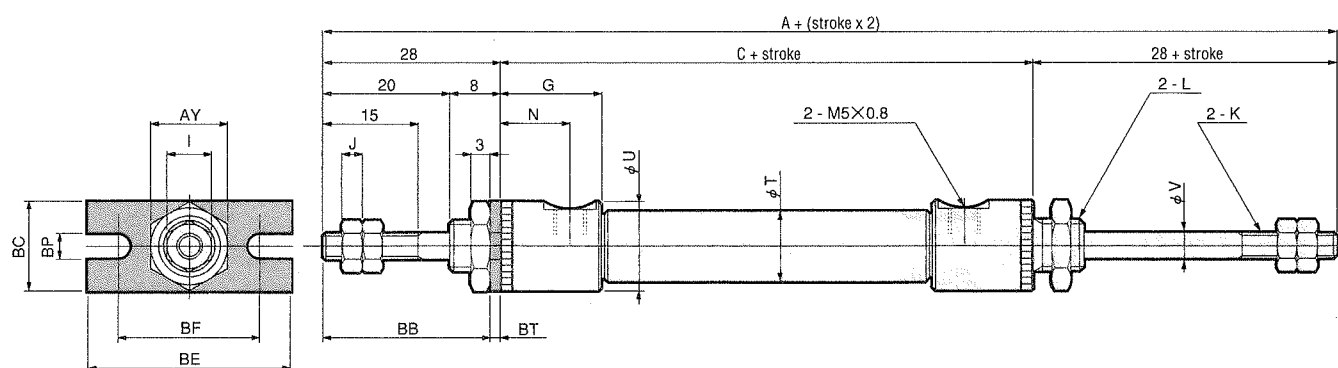
●Double foot type



Type Bore size Symbol	Standard cylinder			Sensor cylinder			G	I	J	K	L	N	φ T	φ U	φ V	AY
	A	C	AC	A	C	AC										
10	120	64	78	—	—	—	16.0	7	3.2	M4×0.7	M8×1	11.0	11	14	4	12
16	121	65	83	121	65	83	15.5	8	4.0	M5×0.8	M10×1	10.5	17	17	5	14

Bore size	Symbol	AB	AD	AE	AF	AG	AH	AJ	AP	AT
10		21	5	32	22.2	7	9	7	4.2	1.6
16		19	6	42	29.2	9	14	10	5.2	2.3

● Flange type



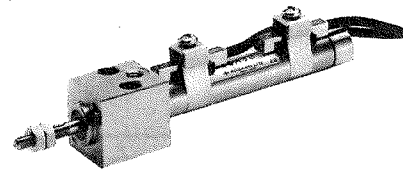
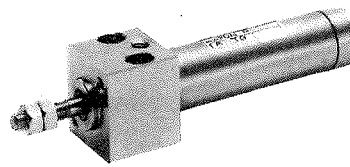
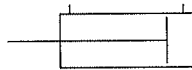
Type	Standard cylinder		Sensor cylinder		G	I	J	K	L	N	φ T	φ U	φ V	AY	
Bore size	Symbol	A	C	A											C
10		120	64	—	—	16.0	7	3.2	M4×0.7	M8×1	11.0	11	14	4	12
16		121	65	121	65	15.5	8	4.0	M5×0.8	M10×1	10.5	17	17	5	14

Bore size \ Symbol	BB	BC	BE	BF	BP	BT
10	26.4	14	32	22.2	4.2	1.6
16	25.7	20	42	29.2	5.2	2.3

PEN CYLINDER

Block Cylinder

Symbol



Specification

Item	Cylinder bore size mm	mm	
		10	16
Operation		Double acting type	
Mounting type		Side mounting type and front mounting type	
Fluid		Air	
Pressure range	MPa(kgf/cm ²)	0.08~0.7{0.8~7.1}	0.06~0.7{0.6~7.1}
Proof pressure	MPa(kgf/cm ²)	1.03{10.5}	
Temperature range	°C	0~70	
Operation speed range	mm/s	50~750	
Cushion		Rubber bumper	
Lubrication		Not required	
Post size		M5×0.8	

Bore Size and Stroke

bore size	Stroke	available stroke ^{note}
10	5 10 15 30 45 60 75 100	100
16	5 10 15 30 45 60 75 100	100

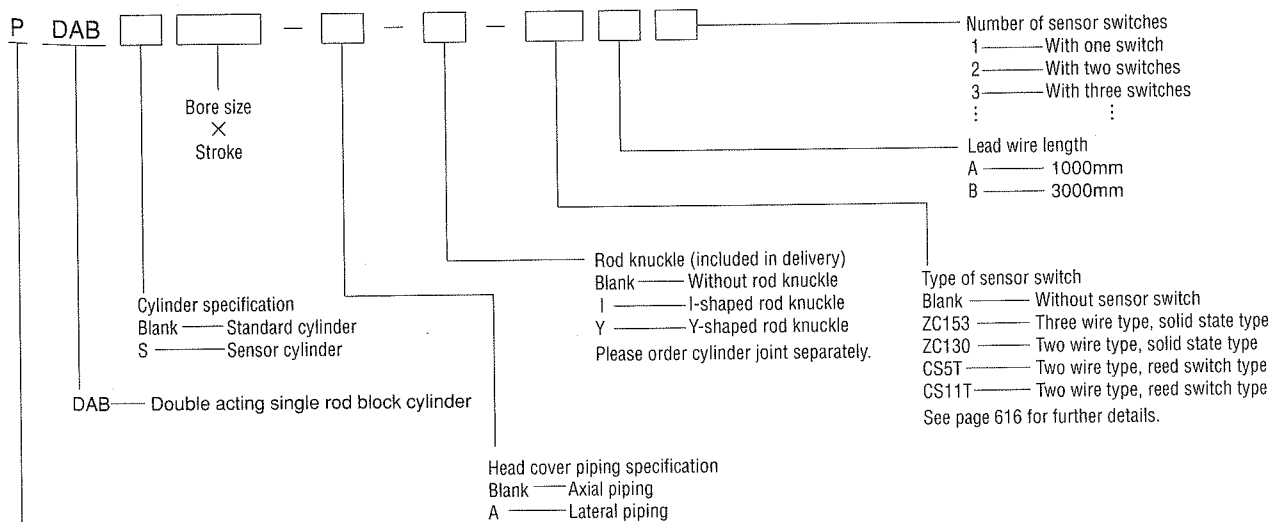
Remark: Not applicable for more than 100mm stroke due to side mounting.

Weight

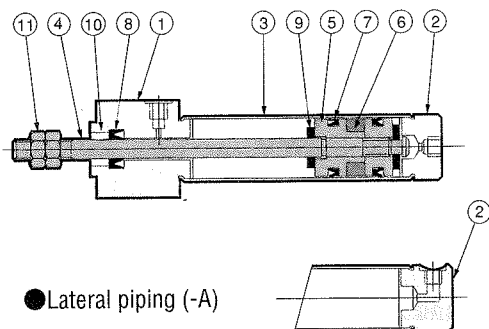
Cylinder bore size mm	Stroke mm								Sensor cylinder	Added weight of sensor switch			
	5	10	15	30	45	60	75	100		ZC153□	ZC130□	CS5T□	CS11T□
10	89.1	90.2	91.3	94.6	97.9	101.2	104.5	110	5	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
16	152.8	154.6	156.4	161.9	167.4	172.9	178.4	187.4	12				

Remark: Including rod end nut.

Order Example



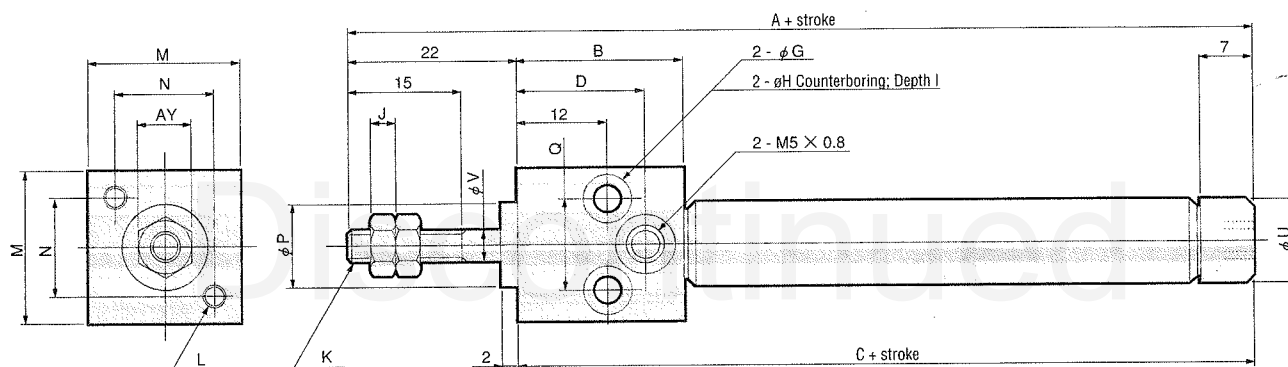
Pen cylinder series



[REDACTED]

No.	Item	Material
①	Rod cover	Brass (nickel plated)
②	Head cover	
③	Cylinder tube	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Magnet	—
⑦	Piston packing	Synthetic rubber (NBR)
⑧	Rod packing	
⑨	Bumper	Urethane rubber
⑩	Rod bushing	Oil permeated bronze
⑪	Rod end nut	Mild steel (nickel plated)

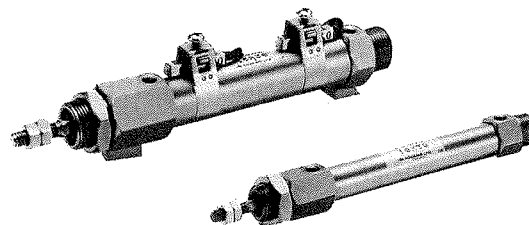
(unit : mm)



Type	Standard cylinder		Sensor cylinder		B	D	φ G	φ H	I	J	Bore size
Symbol	A	C	A	C							
10	73.0	51.0	83.0	61.0	22.0	17.0	3.5	6.5	3.5	3.2	M4×0.7
16	74.5	52.5	84.5	62.5	21.5	16.5	4.5	8.0	4.5	4.0	M5×0.8

Bore size	Symbol	L	M	N	ϕ P	Q	ϕ U	ϕ V	AY
10	M3X0.5 Depth 6	20	13	12	12	11	4	7	
16	M4X0.7 Depth 7	25	16	14	16	17	5	8	

Linear bearing cylinder



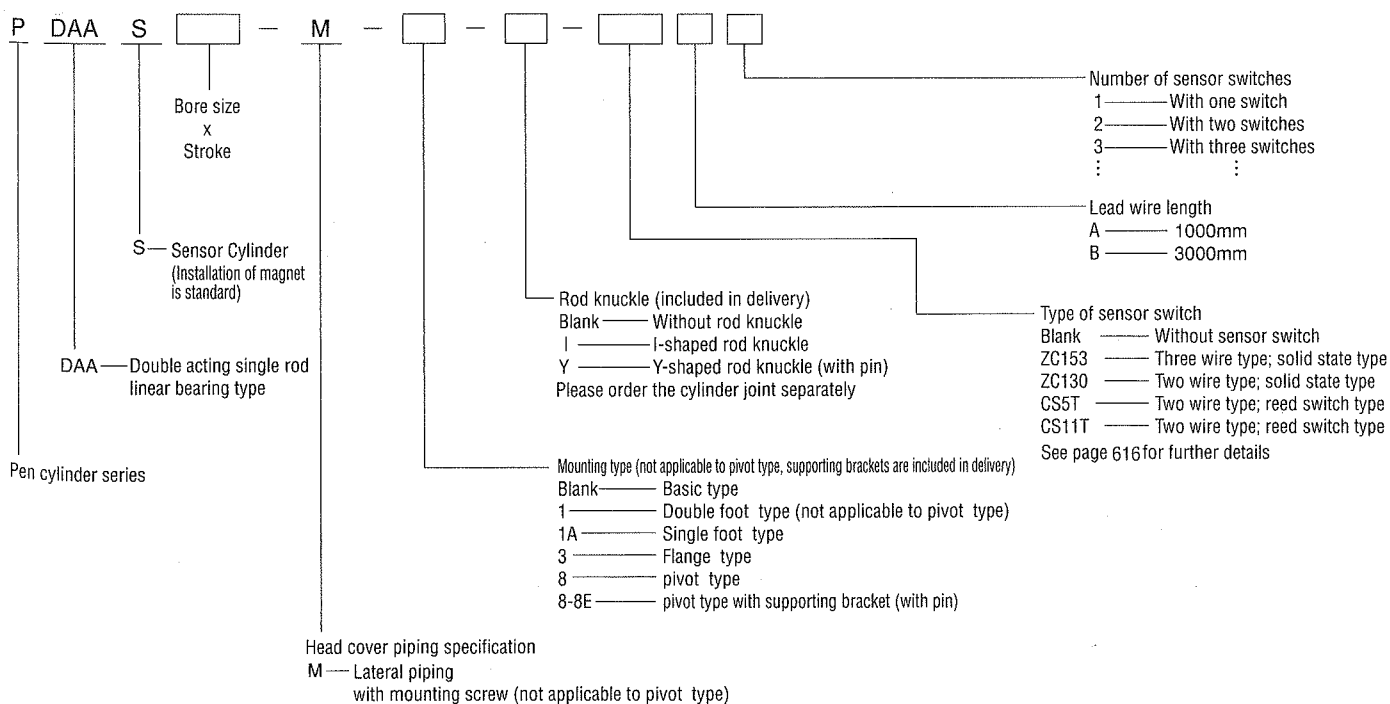
Item	Cylinder bore size mm	10	16
Operation		Double acting type	
Mounting type		See the following chart.	
Fluid		Air	
Pressure range	MPa(kgf/cm ²)	0.12~0.7{1.2~7.1}	0.1~0.7{1.0~7.1}
Proof pressure	MPa(kgf/cm ²)	1.03(10.5)	
Temperature range	°C	0~70	
Speed range	mm/s	50~750	
Cushion		Rubber bumper	
Lubrication		Not required	
Port size		M5×0.8	

					mm
Bore size	Standard cylinder				available stroke
10	25	50	75	100	300
16	25	50	75	100	500

Mounting type

Mounting type	Name	Remarks
1	Double foot type	included in delivery
1A	Single foot type	included in delivery ^{note1}
3	Flange type	included in delivery
8	pivot type (with pin)	delivered assembled ^{note2}
8-8E	pivot type with supporting bracket	with pin, supporting bracket is included in delivery.

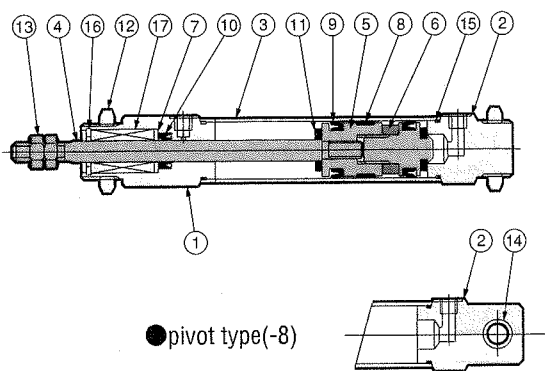
Order Example



Note : Please use double foot type for foot brackets with strokes longer than 60mm.

Construction Diagram

●Double acting type



Materials of Major Parts

No.	Item	Material
①	Rod cover	Brass (nickel plated)
②	Head cover	
③	Cylinder barrel	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Magnet	Resin
⑦	Washer	Mild steel
⑧	Wearing	Fluorocarbon resin
⑨	Piston packing	Synthetic rubber (NBR)
⑩	Rod seal	Synthetic rubber (NBR)
⑪	Bumper	Urethane rubber
⑫	Mounting nut	Brass (nickel plated)
⑬	Rod end nut	Mild steel (nickel plated)
⑭	I-shaped bushing	Oil permeated bronze
⑮	Tube gasket	Synthetic rubber (NBR)
⑯	Snap ring	Mild steel
⑰	Linear bearing	—

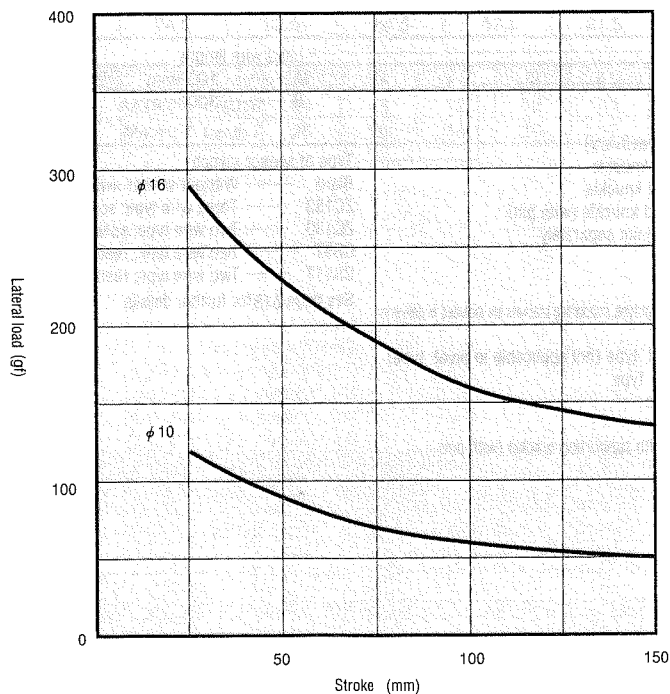
Weight

Cylinder bore size mm	Mounting type	Stroke mm				Added weight of mounting bracket				Sensor Cylinder	Added weight of sensor switch			
		25	50	75	100	-1A	-1	-3	-8E		ZC153□	ZC130□	CS5T□	CS11T□
10	Basic type	102.4	110.8	119.2	127.6	19	38	10	8	5	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
16		221.7	238.4	255.1	271.8	38	76	25	23	12	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
10	pivot type	98.4	106.8	115.2	123.6	19	38	10	8	5	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
16		223.7	240.4	257.1	273.8	38	76	25	23	12	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50

Note: Including mounting nut and rod end nut

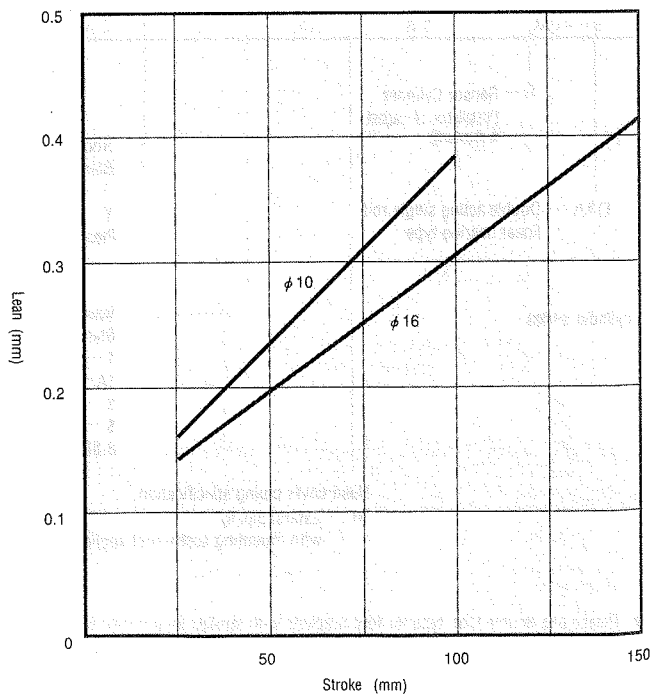
Allowable lateral load

Lateral load on the piston rod end should be less than that shown in the accompanying chart.



Piston rod end lean

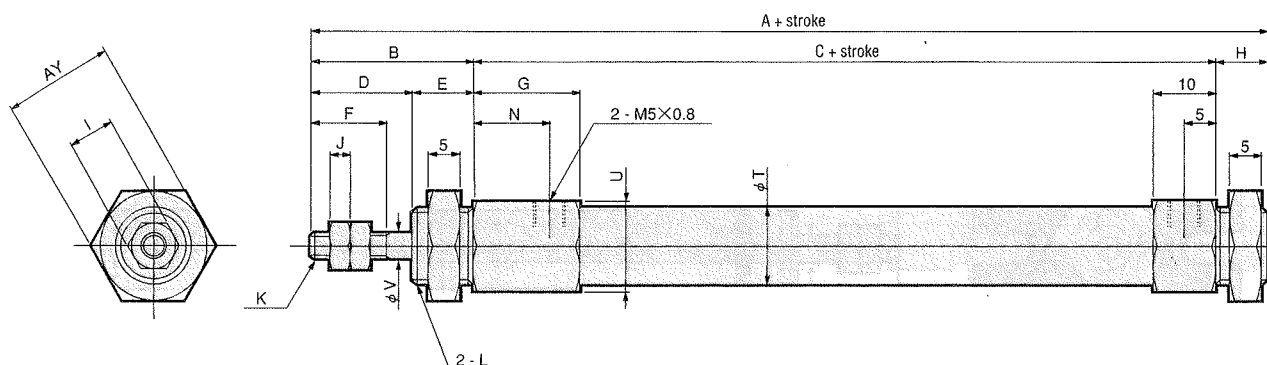
Piston rod end lean without load is within the range shown on the graph below.



Dimensions of linear bearing type

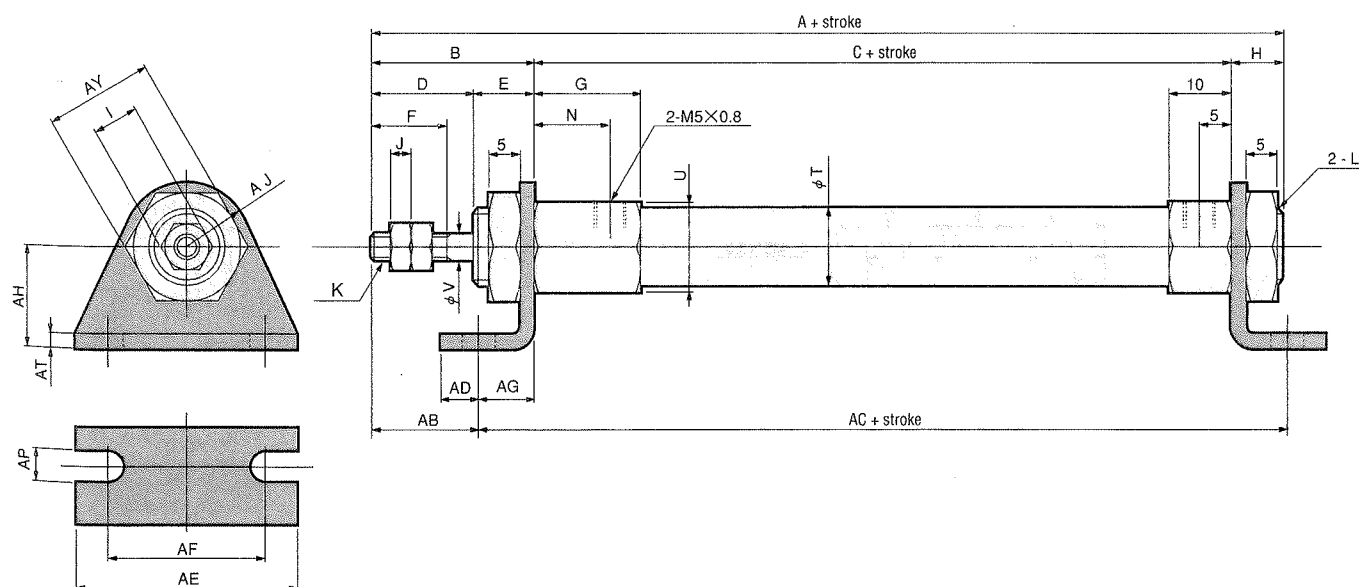
(unit : mm)

● Basic type



Symbol	A	B	C	D	E	F	G	H	I	J	K	L	N	ϕT	U	ϕV	AY
10	101	26	67	16	10	12	17	8	7	3.2	M4x0.7	M12x1	12	12	14	4	17
16	115	32	73	20	12	15	23	10	8	4.0	M5x0.8	M16x1	18	18	20	6	20

● Double foot type



Symbol	A	B	C	D	E	F	G	H	I	J	K	L	N	ϕT	U	ϕV	AY
10	101	26	67	16	10	12	17	8	7	3.2	M4x0.7	M12x1	12	12	14	4	17
16	115	32	73	20	12	15	23	10	8	4.0	M5x0.8	M16x1	18	18	20	6	20

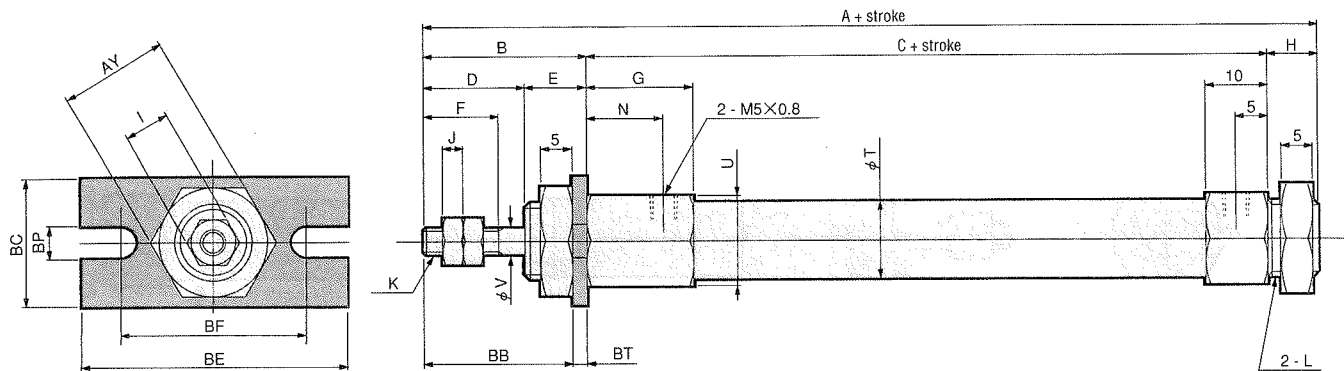
Symbol	AB	AC	AD	AE	AF	AG	AH	AJ	AP	AT
10	13	93	5	35	25	13	16	10	4.5	2.3
16	19	99	6	44	32	13	20	13	5.5	3.2

PEN CYLINDERS

Dimensions of linear bearing type

(unit : mm)

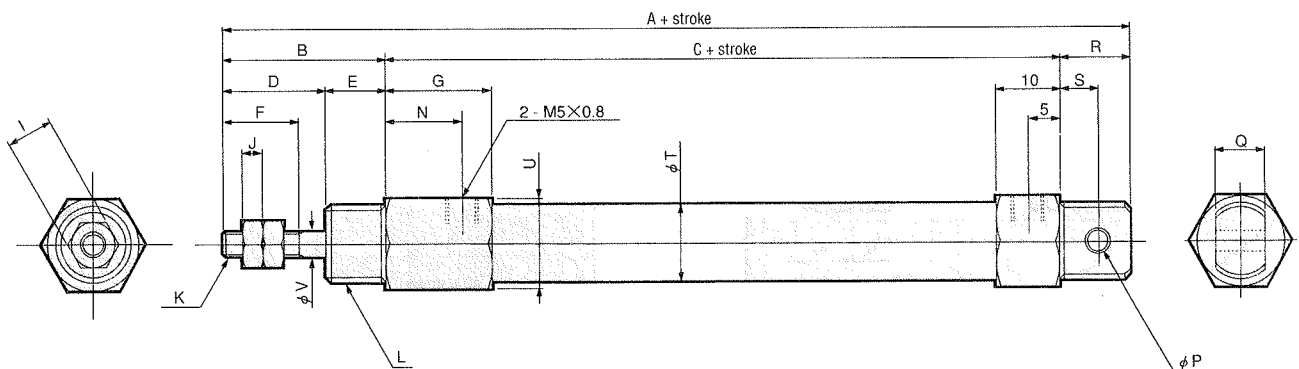
● Flange type



Bore size	Symbol	A	B	C	D	E	F	G	H	I	J	K	L	N	φT	U	φV	AY
10		101	26	67	16	10	12	17	8	7	3.2	M4×0.7	M12×1	12	12	14	4	17
16		115	32	73	20	12	15	23	10	8	4.0	M5×0.8	M16×1	18	18	20	6	20

Bore size	Symbol	BB	BC	BE	BF	BP	BT
10		23.7	20	40	30	4.5	2.3
16		28.8	26	52	40	5.5	3.2

● pivot type



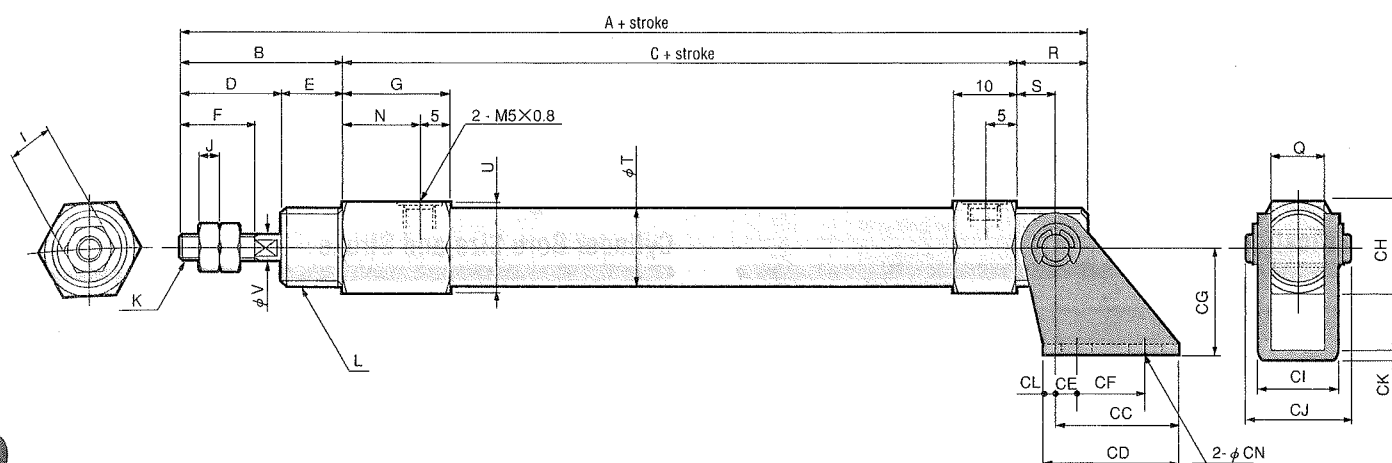
Bore size	Symbol	A	B	C	D	E	F	G	I	J	K	L	N
10		104	26	67	16	10	12	17	7	3.2	M4×0.7	M12×1	12
16		121	32	73	20	12	15	23	8	4.0	M5×0.8	M16×1	18

Bore size	Symbol	φP	Q	R	S	φT	U	φV
10		4 ^{+0.08} ₀	8 ^{+0.04} _{-0.26}	11	6	12	14	4
16		6 ^{+0.08} ₀	12 ^{+0.05} _{-0.23}	16	9	18	20	6

Dimensions of linear bearing type

(unit : mm)

●Pivot type with supporting bracket



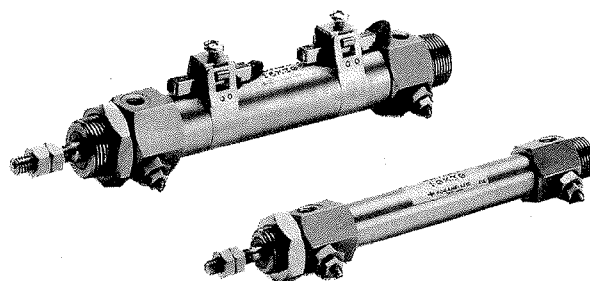
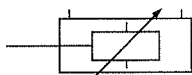
PEN CYLINDERS

Size	Symbol	A	B	C	D	E	F	G	I	J	K	L	N	ϕP	Q
10		104	26	67	16	10	12	17	7	3.2	M4×0.7	M12×1	12	$4^{+0.08}_0$	$8^{+0.04}_{-0.26}$
16		121	32	73	20	12	15	23	8	4.0	M5×0.8	M16×1	18	$6^{+0.08}_0$	$12^{+0.05}_{-0.23}$

Size	Symbol	R	S	ϕT	U	ϕV	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CN
10		11	6	12	14	4	18	20	3	10	16	14	11.3	15	1.6	2	4.5
16		16	9	18	20	6	20	23	3	12	20	20	16.7	20.8	2.3	3	5.5

PEN CYLINDERS

Variable Cushioned Cylinders

Symbol

Specifications

Item	Cylinder bore size mm	10	16
Operation		Double acting type	
Mounting type		Basic type, Foot type, Flange type, Pivot type	
Fluid		Air	
Pressure range	MPa(kgf/cm ²)	0.2~0.7{2.0~7.1}	0.1~0.7{1.0~7.1}
Proof pressure	MPa(kgf/cm ²)	1.03{10.5}	
Temperature range	°C	0~70	
Speed range	mm/s mm/s	100~1000	
Cushion		Variable cushioned type	
Cushion stroke	mm	8	10
Allowable kinetic energy	Kgf•cm	0.7	1.8
Lubrication		Unnecessary	
Port size		M5×0.8	

Cylinder Bore Size and Stroke

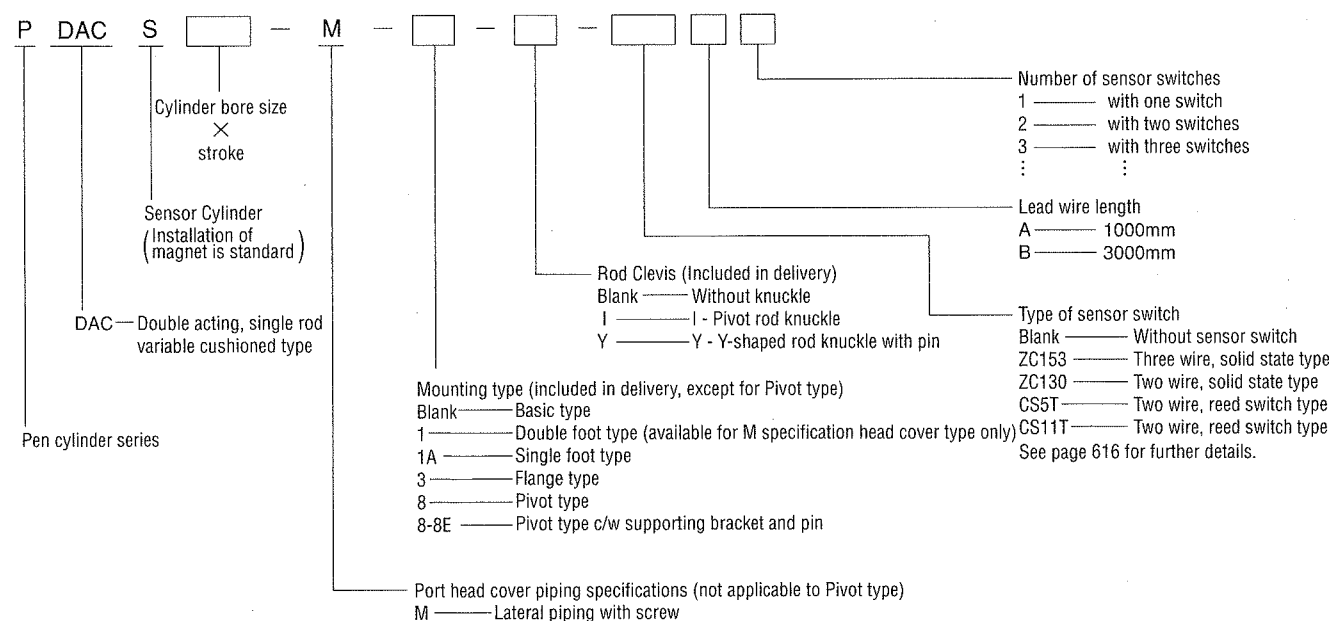
Bore size	Standard stroke	Available stroke
10	25 50 75 100	150
16	25 50 75 100	300

Mounting Type

Mounting type	Item	Remarks
1	Double foot type	included in delivery
1A	Single foot type	included in delivery ^{note}
3	Flange type	included in delivery
8	Pivot type with pin	delivered assembled
8-8E	Pivot type c/w supporting bracket	and pin, included in delivery

Note : Please use double foot type for foot brackets with strokes longer than 60mm.

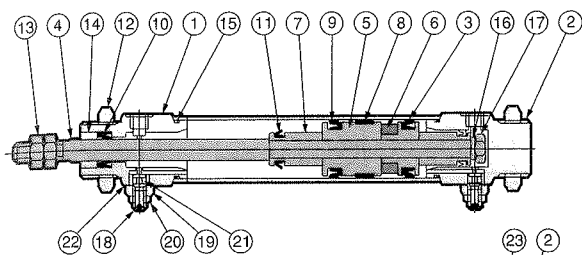
Order Example



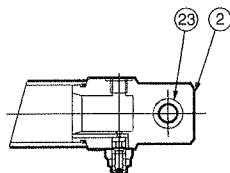
Note : Please use double foot type for foot brackets with strokes longer than 60mm.

Construction (Diagram)

● Double acting type



● Pivot mounting type (-8)



Materials of Major Parts

No.	Name	Material
①	Rod cover	Brass (Nickel plated)
②	Head cover	
③	Cylinder barrel	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Magnet	Resin
⑦	Cushion collar	Mild steel
⑧	Wearing	Fluorocarbon resin
⑨	Piston packing	Synthetic rubber (NBR)
⑩	Rod seal	
⑪	Cushion packing	
⑫	Mounting nut	Brass (Nickel plated)
⑬	Rod-end nut	Mild steel (Nickel plated)
⑭	Rod bushing	Oil permeated bronze
⑮	Tube gasket	Synthetic rubber (NBR)
⑯	Washer	Mild steel
⑰	Hexagon nut	
⑱	Needle	Stainless steel
⑲	Needle guide	Brass (Nickel plated)
⑳	Lock nut	
㉑	Gasket	Synthetic rubber (NBR)
㉒	Gasket	
㉓	Pivot bushing	Oil permeated bronze

Weight

Cylinder bore size mm	Mounting type	Stroke mm										
		5	10	15	25	50	75	100	125	150	175	200
10	Basic type	106.7	108.4	110.1	113.4	121.8	130.2	138.6	147.3	155.7	—	—
16		213.3	216.6	219.9	226.7	243.4	260.1	276.8	292.9	309.6	326.3	343
10	Pivot type	102.7	104.4	106.1	109.4	117.8	126.2	134.6	143.3	151.7	—	—
16		215.3	218.6	221.9	228.7	245.4	262.1	278.8	294.9	311.6	328.3	345

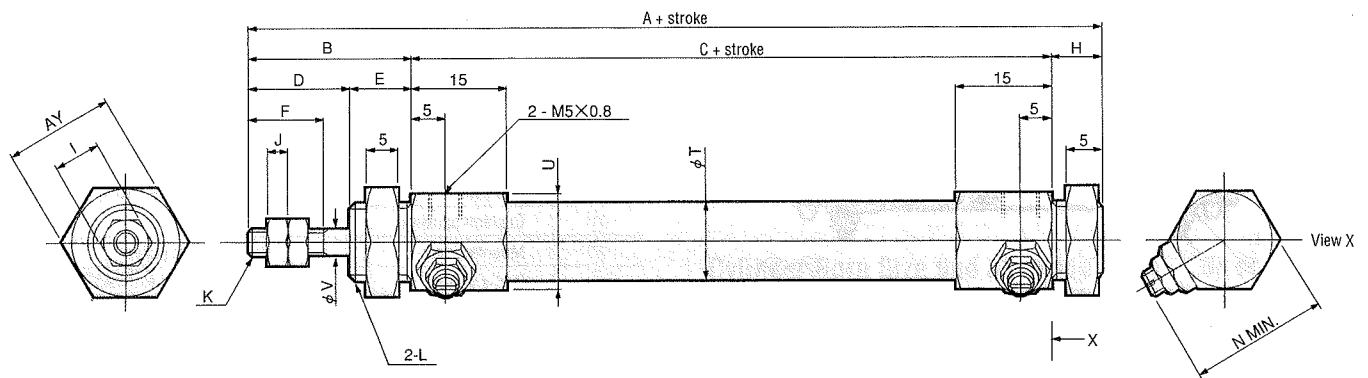
Cylinder bore size mm	Mounting type	Added weight of mounting brackets				Sensor cylinder	Added weight of sensor switch			
		-1	-1A	-3	-8C		ZC153□	ZC130□	CS5T□	CS11T□
10	Basic type	38	19	10	8	5	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
16		76	38	25	23	12	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
10	Pivot type	—	—	—	8	5	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50
16		—	—	—	23	12	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50	A : 20 B : 50

Remark: includes mounting nut and rod-end nut

Dimensions of Variable Cushioned Cylinder

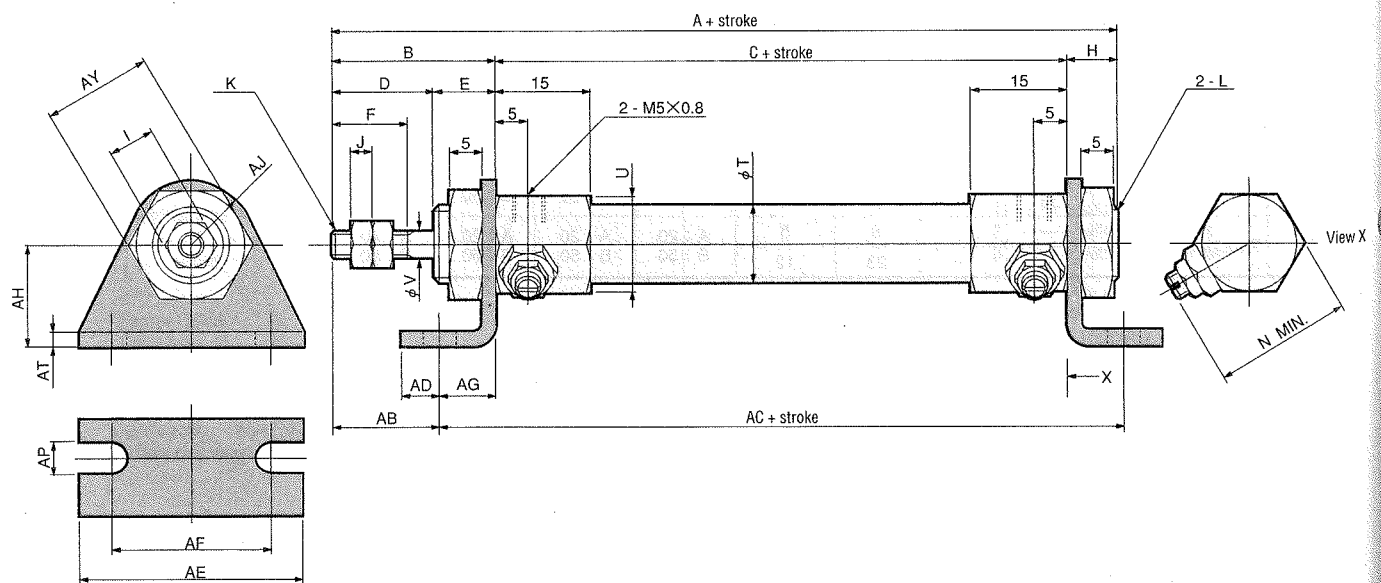
(unit : mm)

Basic type



Bore size	Symbol	A	B	C	D	E	F	H	I	J	K	L	N	φT	U	φV	AY
10		94	26	60	16	10	12	8	7	3.2	M4×0.7	M12×1	22	12	15	4	17
16		112	32	70	20	12	15	10	8	4.0	M5×0.8	M16×1	27	18	20	6	20

Double foot type



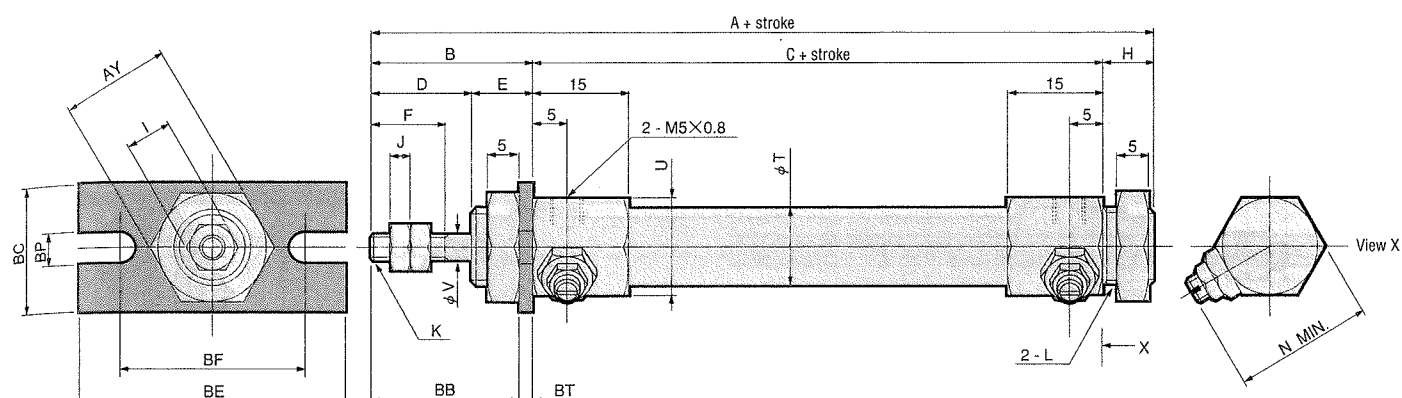
Bore size	Symbol	A	B	C	D	E	F	H	I	J	K	L	N	φT	U	φV	AY
10		94	26	60	16	10	12	8	7	3.2	M4×0.7	M12×1	22	12	15	4	17
16		112	32	70	20	12	15	10	8	4.0	M5×0.8	M16×1	27	18	20	6	20

Bore size	Symbol	AB	AC	AD	AE	AF	AG	AH	AJ	AP	AT
10		13	86	5	35	25	13	16	10	4.5	2.3
16		19	96	6	44	32	13	20	13	5.5	3.2

Dimensions of Variable Cushioned Cylinder

(unit : mm)

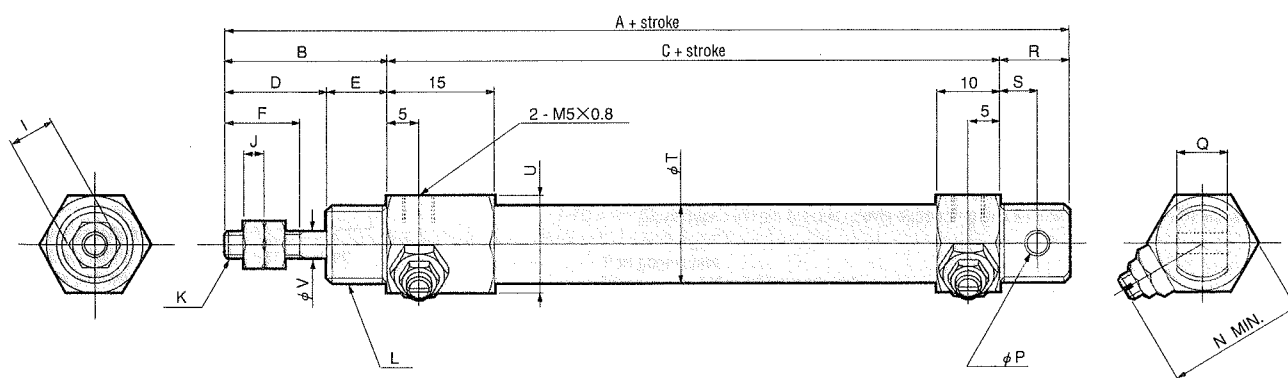
● Flange type



Bore size	Symbol	A	B	C	D	E	F	H	I	J	K	L	N	ϕT	U	ϕV	AY
10		94	26	60	16	10	12	8	7	3.2	M4X0.7	M12X1	22	12	15	4	17
16		112	32	70	20	12	15	10	8	4.0	M5X0.8	M16X1	27	18	20	6	20

Bore size	Symbol	BB	BC	BE	BF	BP	BT
10		23.7	20	40	30	4.5	2.3
16		28.8	26	52	40	5.5	3.2

● Pivot type



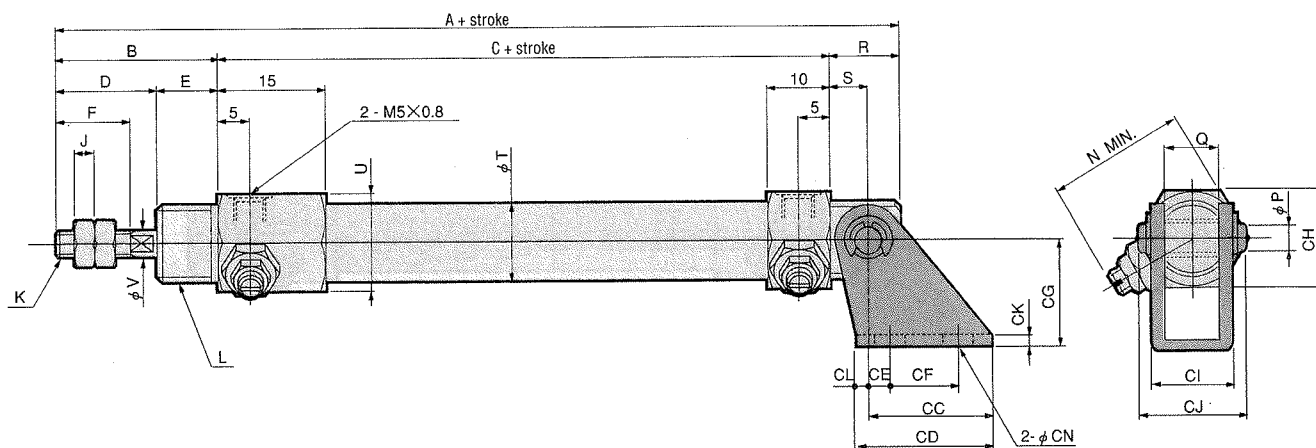
Bore size	Symbol	A	B	C	D	E	F	I	J	K	L	N
10		97	26	60	16	10	12	7	3.2	M4X0.7	M12X1	22
16		118	32	70	20	12	15	8	4.0	M5X0.8	M16X1	27

Bore size	Symbol	ϕP	Q	R	S	ϕT	U	ϕV
10		4 ^{+0.08} ₀	8 ^{-0.04} _{-0.26}	11	6	12	15	4
16		6 ^{+0.08} ₀	12 ^{-0.05} _{-0.23}	16	9	18	20	6

Dimensions of Variable Cushioned Cylinder

(unit : mm)

- Pivot type with supporting brackets



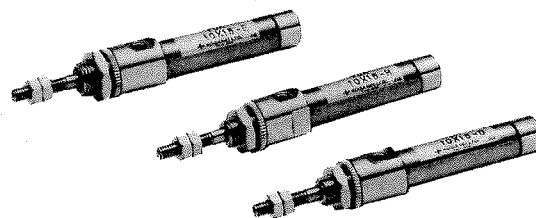
Bore size \ Symbol	A	B	C	D	E	F	I	J	K	L	N	ϕ P	Q
10	97	26	60	16	10	12	7	3.2	M4×0.7	M12×1	22	$4^{+0.08}_0$	$8^{+0.04}_{-0.26}$
16	118	32	70	20	12	15	8	4.0	M5×0.8	M16×1	27	$6^{+0.08}_0$	$12^{+0.05}_{-0.23}$

Bore size \ Symbol	R	S	ϕ T	U	ϕ V	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CN
10	11	6	12	14	4	18	20	3	10	16	15	11.3	15	1.6	2	4.5
16	16	9	18	20	6	20	23	3	12	20	20	16.7	20.8	2.3	3	5.5

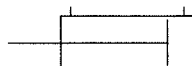
CUSTOM-MADE PEN CYLINDER SPECIFICATION

Oil Permeated Metal Rod Bushing Specification
With Spanner Hanger Specification
Spot Facing of Port Specification

Contact our nearest business office for delivery time.



Symbol



Specifications

Same as standard double acting type. See page 118.

Cylinder Bore Size & Stroke

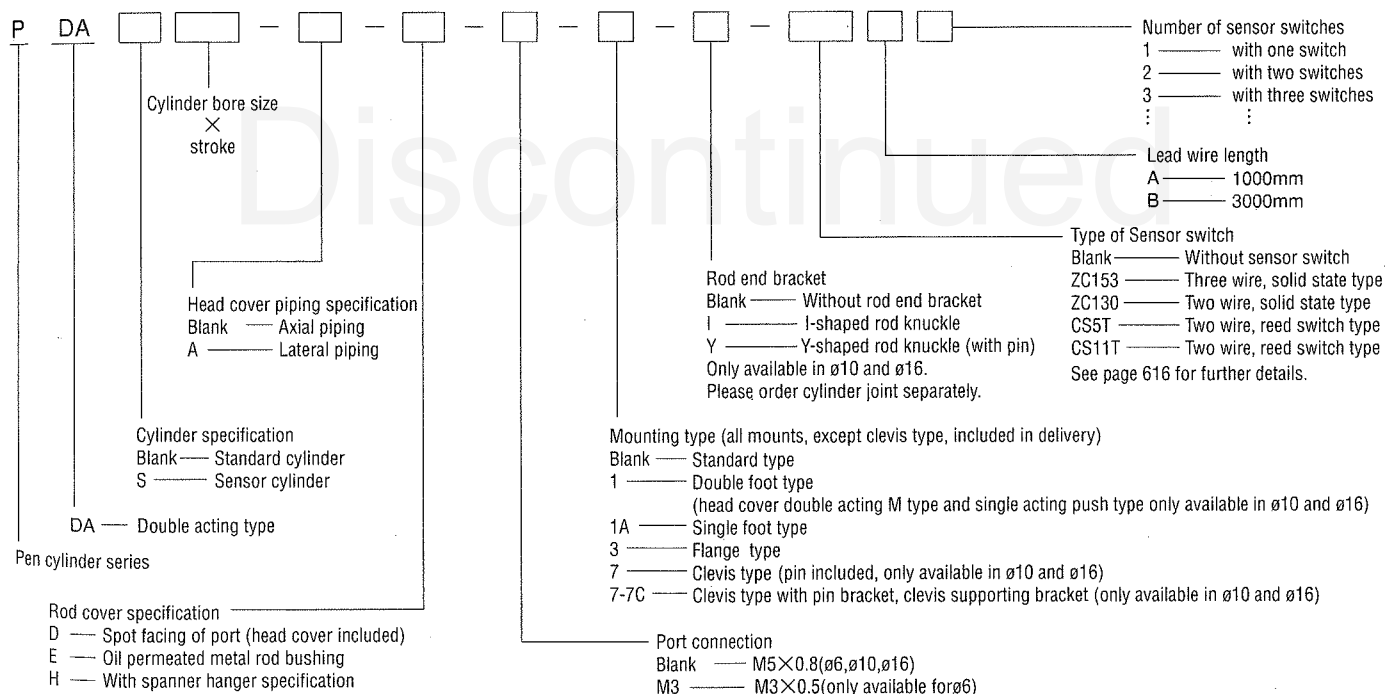
Same as standard double acting type. See page 118.

Mounting Type

Symbol	Name	Remarks
1	Double foot type	included in delivery
1A	Single foot type	ncluded in delivery ^{note}
3	Flange type	included in delivery
7	Clevis type (with pin)	delivered assembled
7-7C	Clevis type with supporting bracket (with pin)	supporting bracket included in delivery.

Note: Please use double foot type for foot bracket with strokes longer than 60mm.

Order Example

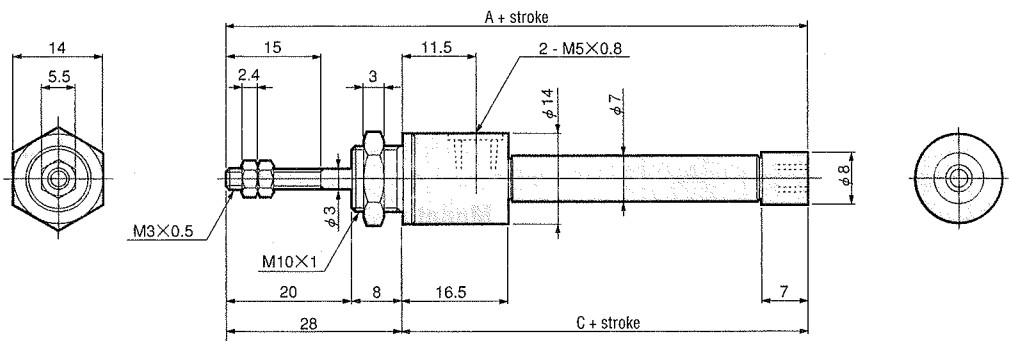


Note : Please use double foot type for foot bracket with strokes longer than 60mm.

Dimensions of Oil Permeated Rod Bushing Specification

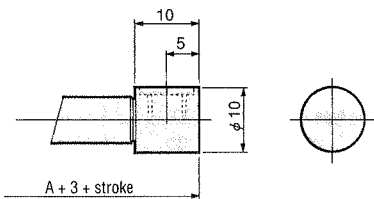
(unit : mm)

● $\phi 6$

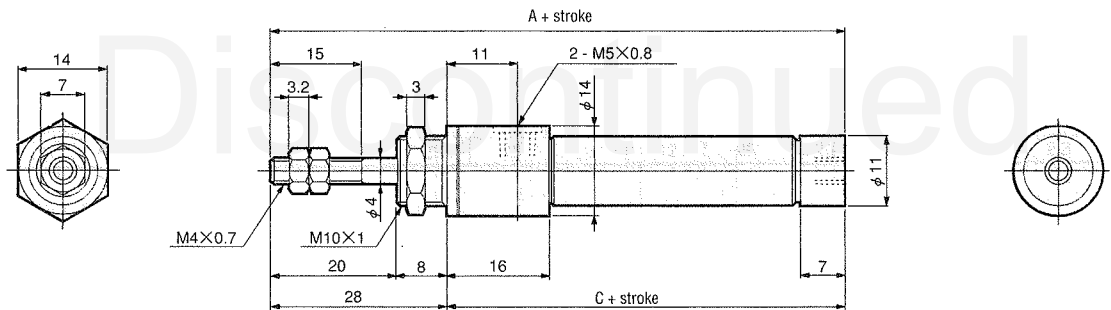


Bore size	Symbol	A	C
Standard cylinder		69	41
Sensor cylinder		79	51

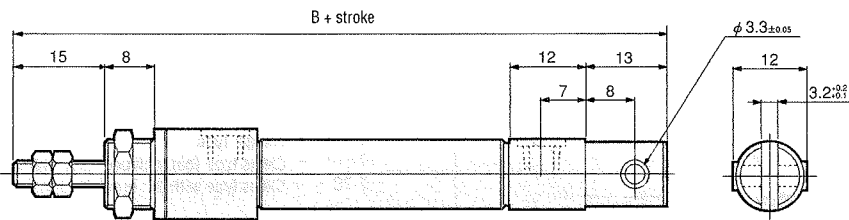
● Lateral piping (-A)



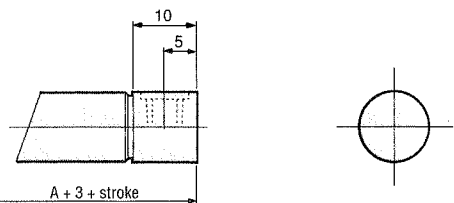
● $\phi 10$



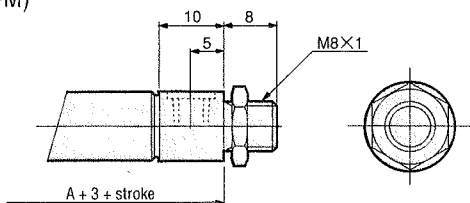
● Clevis type (-7)



● Lateral piping (-A)



● Lateral piping, with mounting nut (-M)

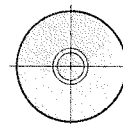
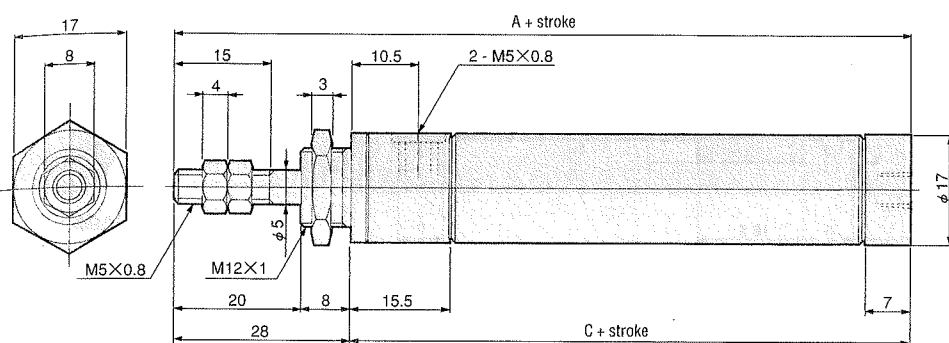


Bore size	Symbol	A	B	C
Standard cylinder		73	86	45
Sensor cylinder		83	96	55

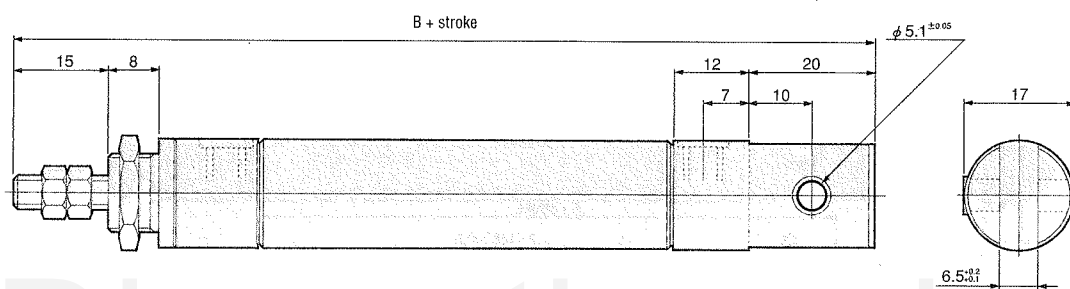
Dimensions of Oil Permeated Metal Rod Bushing Specification

(unit : mm)

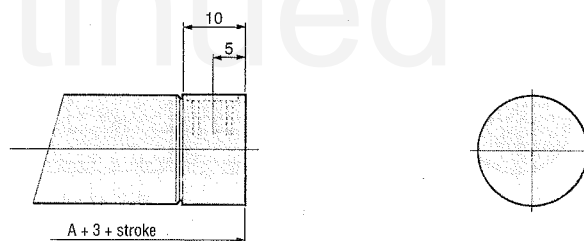
● $\phi 16$



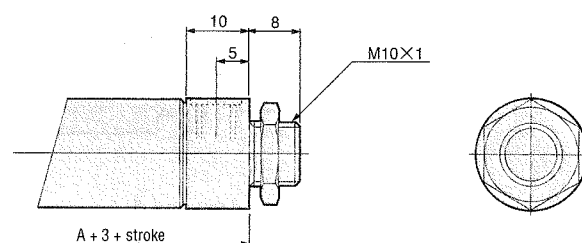
● Clevis type (-7)



● Lateral piping (-A)



● Lateral piping, with mounting screw (-M)



Bore size	Symbol	A	B	C
Standard cylinder		74.5	94.5	46.5
Sensor cylinder		84.5	104.5	56.5

PEN CYLINDERS

(unit : mm)

Technical drawing of a mechanical part. The front view shows a cylindrical part with a total diameter of $\phi 10$ and a total height of 10. A section line is drawn through the part, labeled "A + 3 stroke". The section line is a dashed line with a break, indicating a break in the part. The dimensions 10 and 5 are shown for the top view, indicating a diameter of 10 and a radius of 5. The side view shows a circular cross-section with a diameter of $\phi 10$.

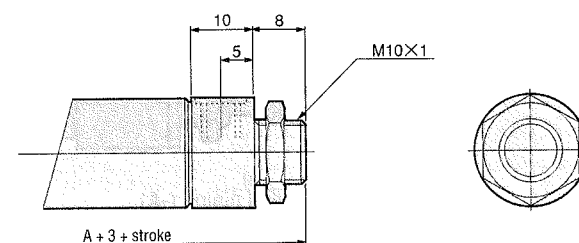
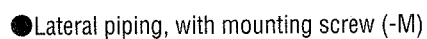
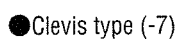
Bore size \ Symbol	A	C
Standard cylinder	69	41
Sensor cylinder	79	51

Technical drawing of a hydraulic cylinder. The main view shows a side profile with dimensions: 15, 8, B+stroke, 12, 13, 7, 8, and a hole diameter of $\phi 3.3 \pm 0.05$. An end view shows a diameter of 12 and a hole diameter of $3.2^{+0.2}_{-0.1}$.

Technical drawing of a bolt and nut assembly. The bolt has a threaded section of length 10, a smooth section of length 5, and a total length of 8. The nut is M8x1. The drawing is labeled "A + 3 + stroke".

Bore size \ Symbol	A	B	C
Standard cylinder	73	86	45
Sensor cylinder	83	96	55

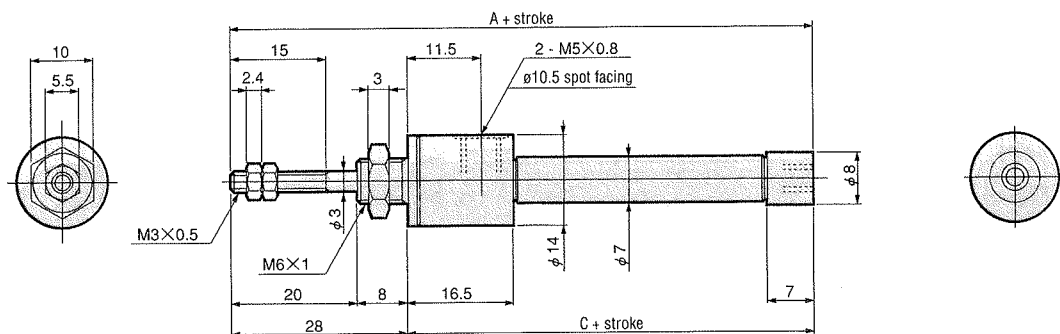
PEN CYLINDERS

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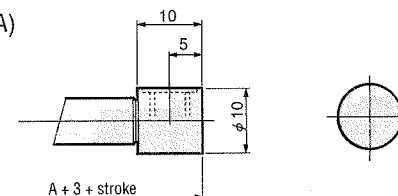
Dimensions of Spot Facing of Port Specification

(unit:mm)

● $\phi 6$

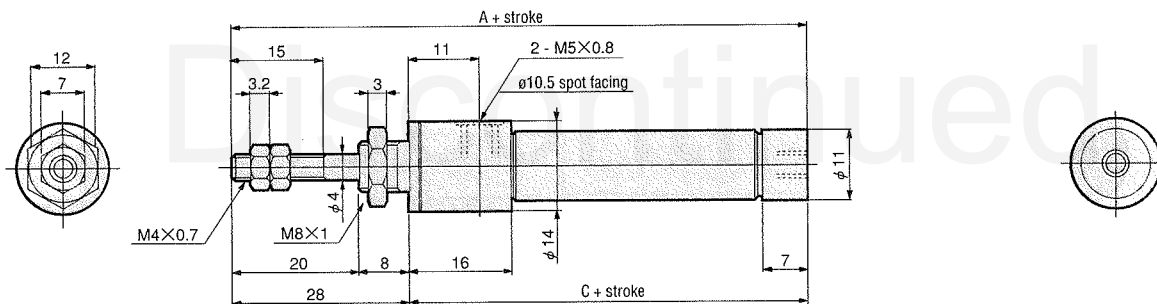


● Lateral piping (-A)

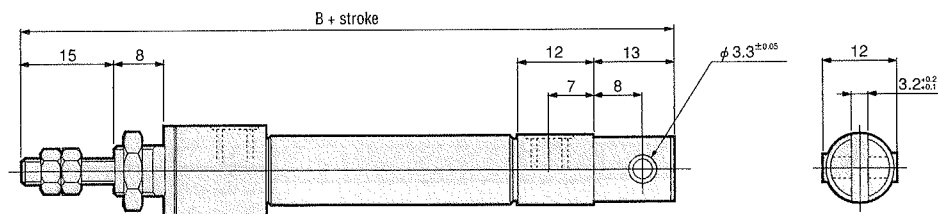


Bore size	Symbol	A	C
Standard cylinder		69	41
Sensor cylinder		79	51

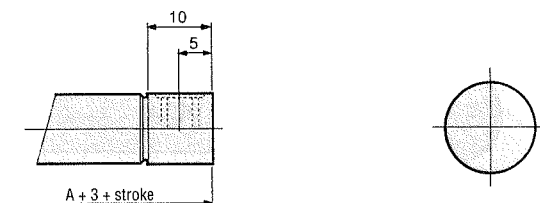
● $\phi 10$



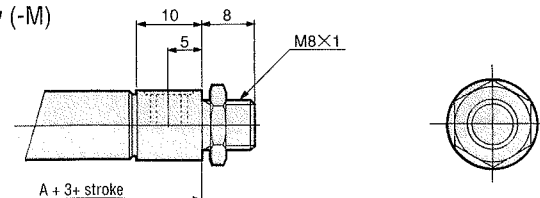
● Clevis type (-7)



● Lateral piping (-A)



● Lateral piping, with mounting screw (-M)

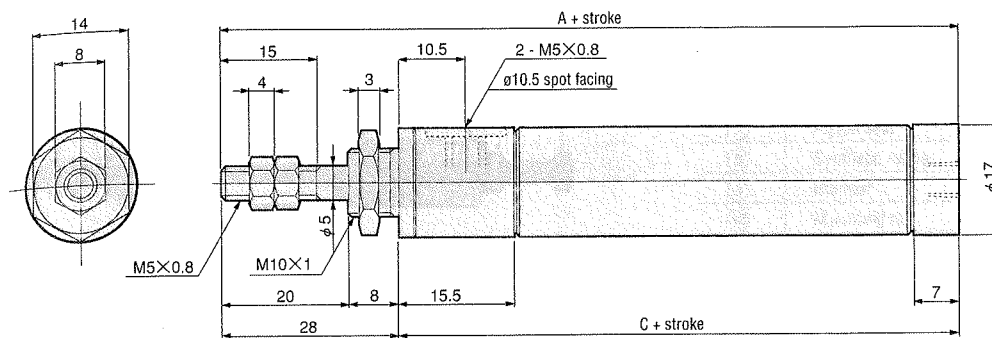


Bore size	Symbol	A	B	C
Standard cylinder		73	86	45
Sensor cylinder		83	96	55

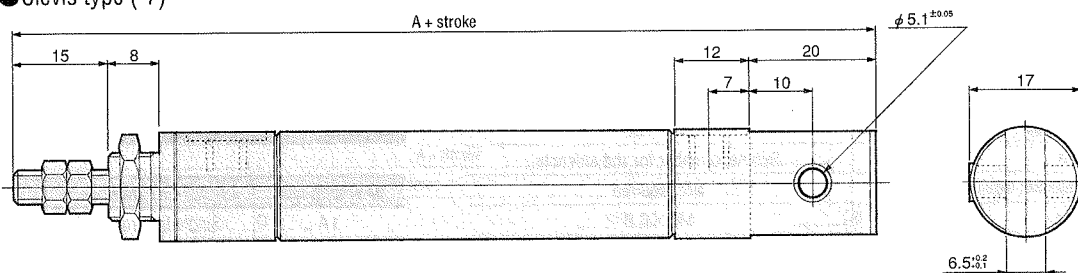
Dimensions of Spot Facing of Port Specification

(unit:mm)

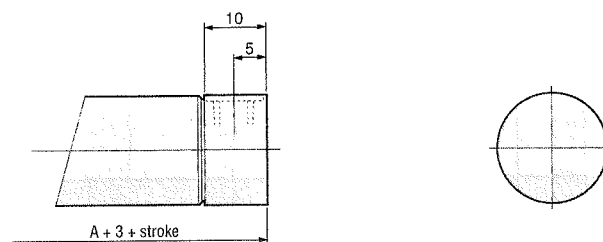
● $\phi 16$



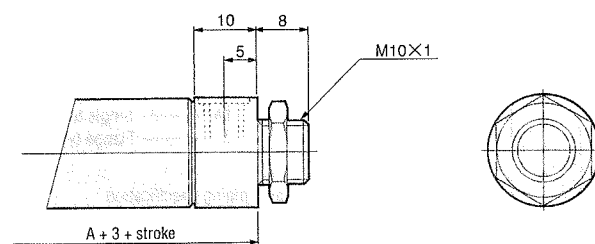
● Clevis type (-7)



● Lateral piping (-A)



● Lateral piping, with mounting screw (-M)



Bore size	Symbol	A	B	C
Standard cylinder		74.5	94.5	46.5
Sensor cylinder		84.5	104.5	56.5

PEN CYLINDERS

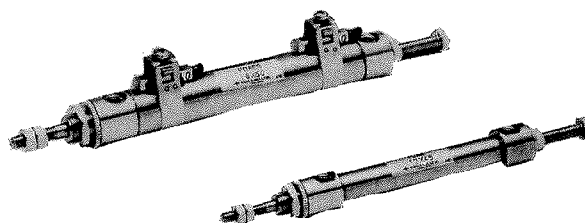
CUSTOM-MADE PEN CYLINDER SPECIFICATION

Pull Side Adjustable Stroke Cylinder

Symbol



● Contact us for detailed dimensions and delivery time.



Specifications

Item		Cylinder Bore Size (mm)	10	16
Operation			Double acting type	
Mounting type			Basic type, Foot type, Flange type	
Fluid			Air	
Pressure range	MPa(kgf/cm ²)		0.08~0.7{0.8~7.1}	
Proof pressure	MPa(kgf/cm ²)		1.03{10.5}	
Temperature range	°C		0~70	
Speed range	mm/s		50~750	
Cushion			Synthetic rubber for rod side note	
Lubrication			Not required	
Port size			M5×0.8	
Stroke adjustment range	mm		0~15	

Note: Cushion is not provided for head side.

Cylinder Bore Size and Stroke

Bore size (mm)	Standard stroke												Available Stroke
	15	30	45	60	75	100	125	150	175	200			
10													150
16													200

Mounting type

Mounting type	Item	Remark
1A	Single foot mounting type	included in delivery
	Flange mounting type	included in delivery

Order Example

P **DAE** — **A** — — —

Number of sensor switches
 1 — With one switch
 2 — With two switches
 3 — With three switches
 : — :

Lead wire length
 A — 1,000 mm
 B — 3,000 mm

Type of Sensor switch.
 Blank — Without sensor switch
 ZC153 — Three-wire solid state type
 ZC130 — Two-wire solid state type
 CS5T — Two-wire reed switch type
 CS11T — Two-wire reed switch type
 See page 616 for further details.

knuckle
 Blank — Without rod end bracket
 I — With I-shaped rod clevis
 Y — With Y-shaped rod clevis (with pin)
 Please order cylinder joint separately

Mounting type (included in delivery)
 Blank — Basic type
 1A — Single foot type
 3 — Flange type

Head cover piping specification
 A — Lateral piping

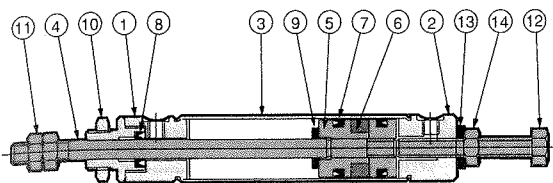
Cylinder bore size
 ×
 Stroke

Cylinder specification
 Blank — Standard cylinder
 S — Sensor cylinder

DAE — Double acting single rod type, pull side stroke adjustable cylinder

Construction Diagram

● Double acting type

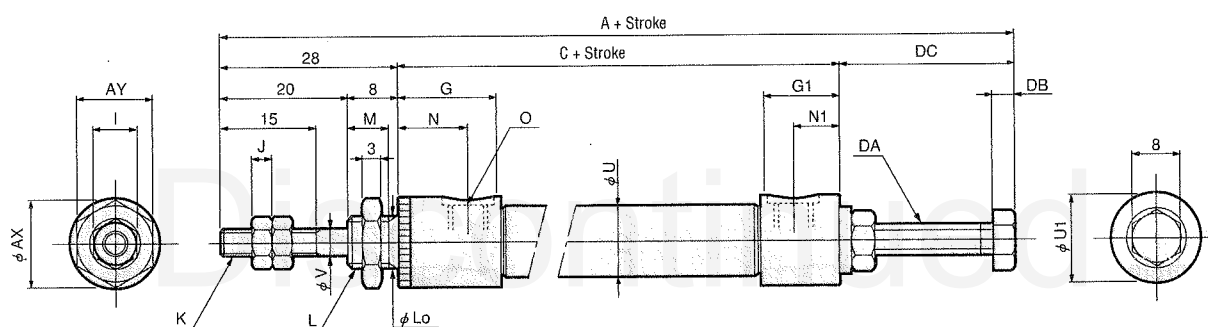


Materials of Major Parts

No.	Item	Material
①	Rod cover	Brass (nickel plated)
②	Head cover	
③	Cylinder barrel	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Magnet	Resin
⑦	Piston seal	Rod seal(NBR)
⑧	Synthetic rubber	
⑨	Bumper	Urethane rubber
⑩	Mounting nut	Brass (nickel plated)
⑪	Rod end nut	Mild steel (nickel plated)
⑫	Stroke adjusting bolt	Mild steel
⑬	Die thread	Mild steel and synthetic rubber(NBR)
⑭	Locking nut	Mild steel (nickel plated)

Dimensions of Pull Side Adjustable Stroke Cylinder

(Unit : mm)



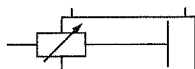
Type	Standard cylinder		Sensor cylinder		G	G ₁	G ₂	I	J	K	L	Lo
Bore size Symbol	A	C	A	C								
10	76	48	86	58	16	12	—	7	3.2	M4×0.7	M8×1	8 ^{+0.05} _{-0.10}
16	77.5	49.5	87.5	59.5	15.5	12	—	8	4	M5×0.8	M10×1	10 ^{+0.05} _{-0.10}

Type	Symbol	M	N	N ₁	O	U	U ₁	U ₂	V	AX	AY	DA	DB	DC
Bore size														
10		6.5	11	7.5	2-M5×0.8	11	17	—	4	14	12	M5×0.8	3.5	(28max)
16		6	10.5	7.5	—	17	17	—	5	17	14	M5×0.8	3.5	(28max)

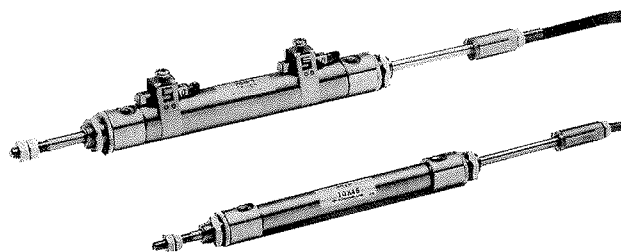
CUSTOM-MADE PEN CYLINDER SPECIFICATION

Push Side Adjustable Stroke Cylinder

Symbol



● Contact us for detailed dimensions and delivery time.



Specifications

Item	Cylinder bore size mm	10	16
Operation		Double acting type	
Mounting		typeSee separate chart	
Fluid		Air	
Pressure range MPa{kgf/cm ² }		0.12~0.7{1.2~7.1}	0.1~0.7{1.0~7.1}
Proof pressure MPa{kgf/cm ² }		1.03{10.5}	
Temperature range °C		0~70	
Speed range mm/s		50~750	
Cushion		Synthetic rubber	
Lubrication		Not required	
Port size		M5×0.8	
Stroke adjustment range mm		0~15	

Cylinder Bore Size and Stroke

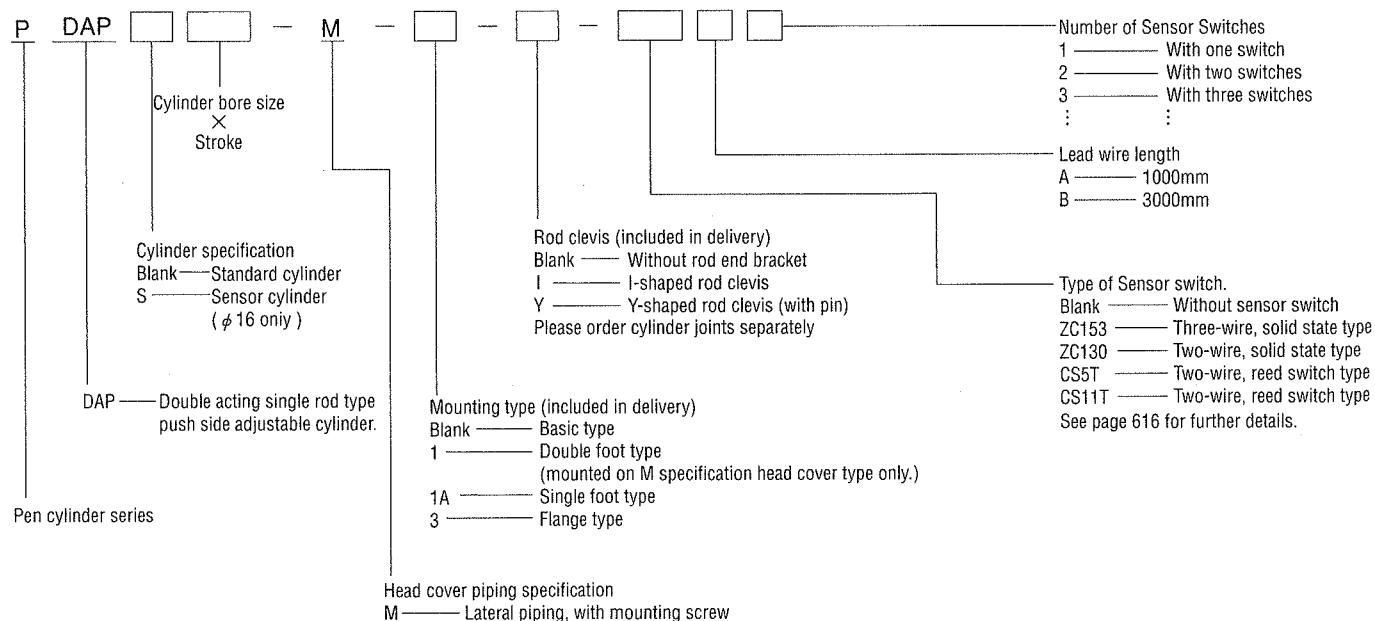
Bore size	Standard stroke	Available Stroke
10	15 30 45 60	60
16	15 30 45 60	100

Mounting type

Mounting type	Item	Remark
1	Double foot type	included in delivery
1A	Single foot type	included in delivery ^{Note}
3	Flange type	included in delivery

Note : Please use double foot type for foot brackets with strokes longer than 60 mm.

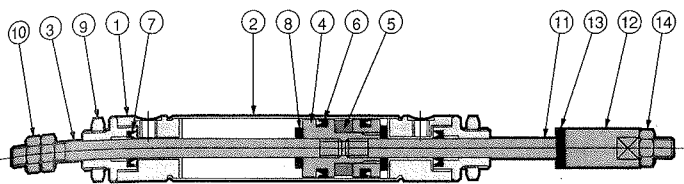
Order Example



Note: Please use double foot type for foot brackets with strokes longer than 60mm.

Construction Diagram

● Double acting type

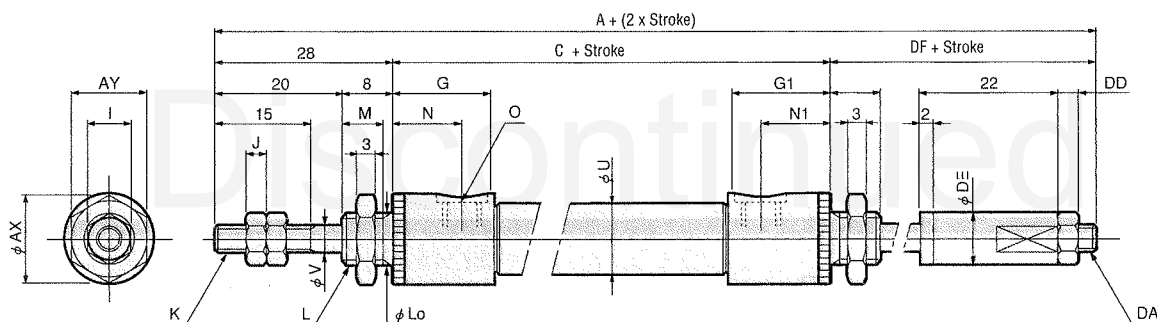


Materials of Major Parts

No.	Item	Material
①	Rod cover	Brass (Nickel electroplated)
②	Cylinder barrel	Stainless steel
③	Piston rod	
④	Piston	Brass
⑤	Magnet	—
⑥	Piston seal	Synthetic rubber(NBR)
⑦	Rod seal	
⑧	Bumper	Urethane rubber
⑨	Mounting nut	Brass (nickel plated)
⑩	Rod end nut	Mild steel (nickel plated)
⑪	Stroke adjusting rod	Stainless steel
⑫	Stroke adjusting knob	Brass (nickel plated)
⑬	Bumper	Urethane rubber
⑭	Locking nut	Mild steel (nickel plated)

Dimensions of Push Side Adjustable Stroke Cylinder

(Unit : mm)



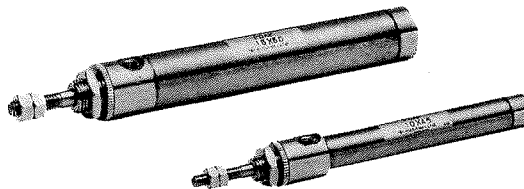
Type	Standard cylinder		Sensor cylinder		G	G ₁	G ₂	I	J	K	L	Lo
Bore size Symbol	A	C	A	C								
10	127	64	—	—	16	16	—	7	3.2	M4×0.7	2-M8×1	8 ^{+0.05} _{-0.10}
16	128	65	128	65	15.5	15.5	—	8	4	M5×0.8	M10×1	10 ^{+0.05} _{-0.10}

Symbol	M	N	N ₁	O	U	V	AX	AY	DA	DD	DE	DF
10	6.5	11	11	2-M5×0.8	11	4	14	12	M4×0.7	3.2	8	35
16	6	10.5	10.5	M5×0.8	17	5	17	14	M5×0.8	4	10	35

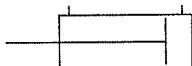
CUSTOM-MADE PEN CYLINDER SPECIFICATION

Heat Resistant Cylinder

● Contact us for detailed dimensions and delivery time.



Symbol



Specifications

Item	Cylinder bore size mm	6	10	16
Operation		Double acting type		
Mounting type		Basic type, Foot type, Flange type, Clevis type		
Fluid		Air		
Pressure range MPa(kgf/cm ²)		0.5~0.7{5.0~7.1}	0.25~0.7{2.5~7.1}	0.2~0.7{2.0~7.1}
Proof pressure MPa(kgf/cm ²)		1.03{10.5}		
Temperature range °C		0~150		
Speed range mm/s		—		
Cushion		Not available		
Lubrication		Not required		
Port size		M5×0.8		

Note: Fluororubber is used for packing. Contact us for further details.

Cylinder Bore Size and Stroke

													mm
Bore size	Standard stroke												Available Stroke
6	5	10	15	30	45	60							100
10	5	10	15	30	45	60	75	100	125	150			150
16	5	10	15	30	45	60	75	100	125	150	175	200	200

Mounting Type

Mounting type	Item	Remark
1	Double foot type	Included in delivery
1A	Single foot type	Included in delivery
3	Flange type	Included in delivery
7	Clevis type	Assembled at factory prior to delivery
7-7C	Clevis type with supporting bracket (with pin)	Supporting brackets included in shipment.

Note : Please use double foot type for foot brackets with strokes longer than 60 mm.

Order Example

P DAF — — —

Cylinder bore size
×
Stroke

Rod clevis (included in delivery)
Blank — Without rod end bracket
I — With I-shaped rod clevis
Y — With Y-Shaped rod clevis (with pin)

Mounting type (All mounting types except clevis mounting type included in delivery)
Blank — Basic type
1 — Double foot type (available for M specification head cover type only.)
1A — Single foot type
3 — Flange type
7 — Clevis type (with pin) (φ 10 and φ 16 only).
7-7C — Clevis type with supporting bracket (with pin) (φ 10 and φ 16 only).

Head cover piping specification (Not applicable to clevis mounting type)

Blank — Axial piping
A — Lateral piping
M — Lateral piping, with mounting screw (Available on ø10 and ø16 only).

DAF — Double acting single rod heat-resistant type

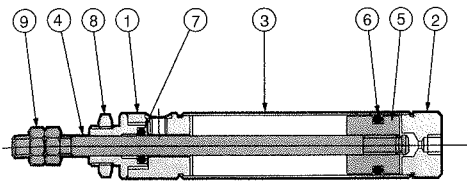
Pen cylinder series

Cantion : Not available heat resistant cylinder with sensor switch.

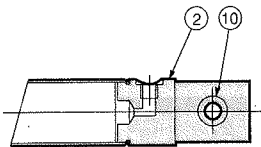
Note : Please use double foot type for foot brackets with strokes longer than 60 mm.

Construction Diagram

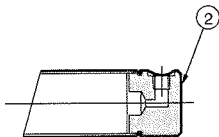
● Double acting type



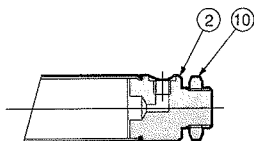
● Clevis type (-7)



● Lateral piping (-A)



● Lateral piping with mounting screw (-M)



Materials of Major Parts

No.	Item	Material
①	Rod cover	Brass (nickel plated)
②	Head cover	
③	Cylinder barrel	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Piston seal	Fluororubber
⑦	Rod seal	
⑧	Mounting nut	Brass (nickel plated)
⑨	Rod end nut	Mild steel (nickel plated)
⑩	Clevis-shaped bushing	Oil permeated bronze

Dimensions

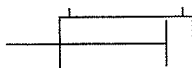
(Unit : mm)

- Same as standard double acting type. See pages 121 to 123.

CUSTOM-MADE PEN CYLINDER SPECIFICATION

Low Hydraulic Cylinder

Symbol



Specifications

Item	Cylinder bore size mm	6	10	16
Operation		Double acting type		
Mounting type		See separate chart		
Fluid		Turbine oil containing a defoaming agent (ISO VG 22~100 equivalent)		
Pressure range MPa(kgf/cm ²)		0.5~0.7(5.0~7.1)	0.25~0.7(2.0~7.1)	0.2~0.7(2.0~7.1)
Proof pressure MPa(kgf/cm ²)		1.03(10.5)		
Temperature range °C		0~70		
Speed range mm/s		5~500(30~100 for sensor specification)		
Cushion		Fixed type (synthetic rubber)		
Port size		M5×0.8		

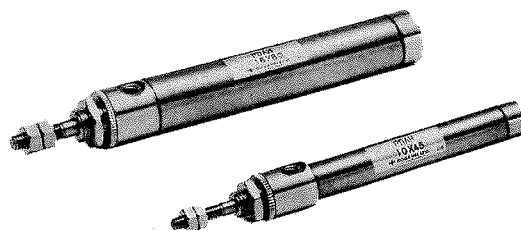
Note 1: Application of oil to both ends of low hydraulic cylinder is advised. If oil is applied to one end, and air to the other end, precise speed control may not be achieved or hydraulic oil may force its way into the air pressurized end. Please control speed via a meter to output control.

2: When using a cylinder with a reed switch, maintain a minimum speed of 30mm/s.

3: Nonflammable hydraulic fluid, machine oil, and spindle oil cannot be used for this type.

4: Operating speed varies with oil temperature

● Contact us for detailed dimensions and delivery time.



Bore Size and Stroke

Bore size	Standard stroke	Available Stroke
6	5 10 15 30 45 60	100
10	5 10 15 30 45 60 75 100 125 150	150
16	5 10 15 30 45 60 75 100 125 150 175 200	200

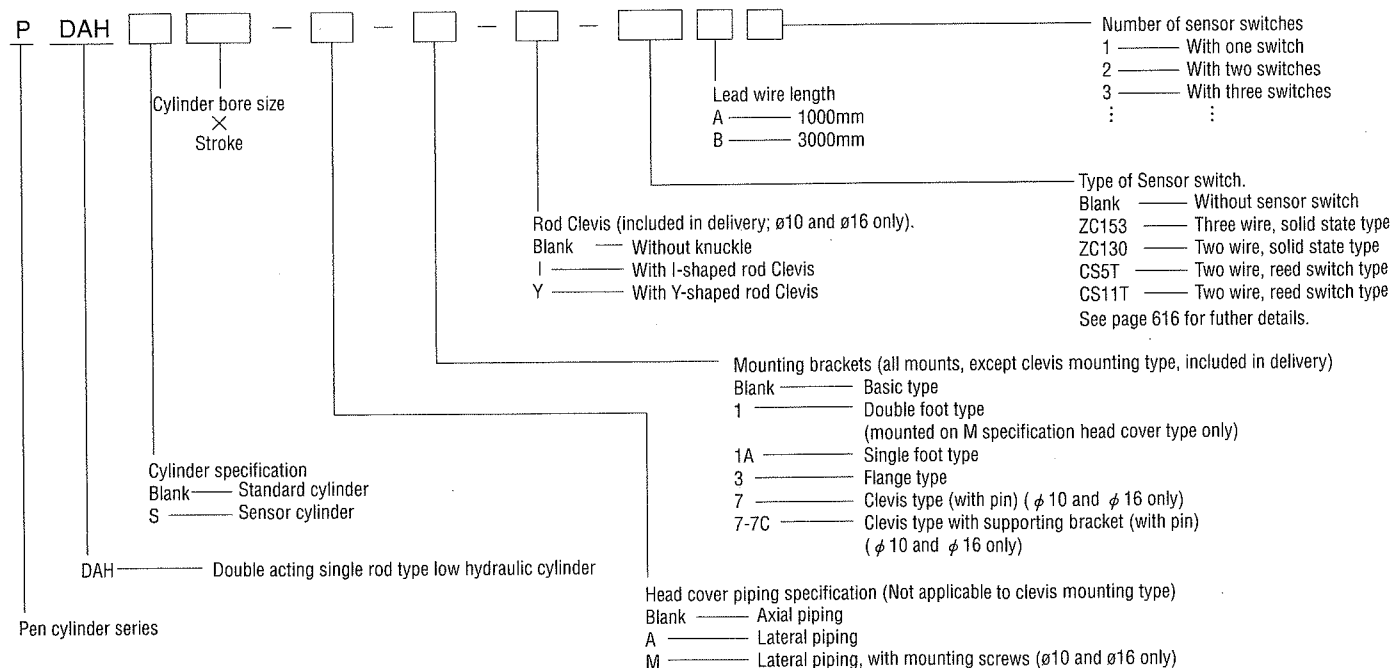
Mounting Type

Mounting type	Item	Remark
1	Double foot type	Included in delivery.
1A	Single foot type	Included in delivery. ^{Note 1}
3	Flange type	Included in delivery.
7	Clevis type	Delivered assembled ^{Note 2}
7-7C	Clevis type with supporting bracket (with pin)	Supporting bracket included in delivery.

Note 1: Please use double foot type for foot brackets with strokes longer than 60mm.

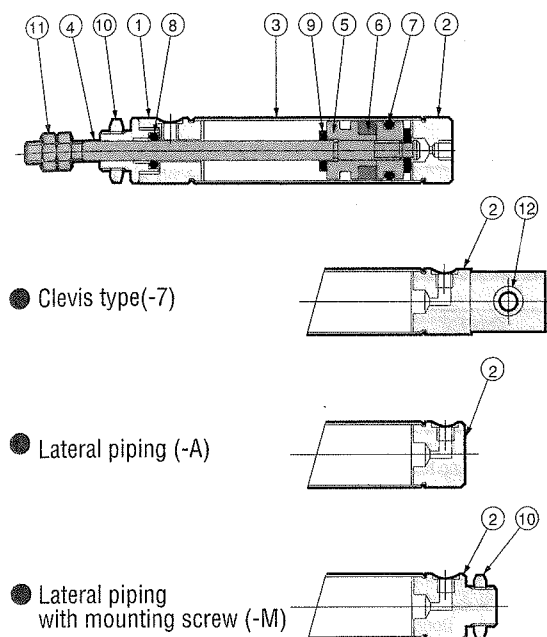
Note 2: Oil permeated bushing is the standard part used for the clevis shaped pin hole.

Order Example



Note: Please use double foot mounting type for foot bracket with strokes longer than 60mm.

Construction Diagram



Materials of Major Parts

No.	Item	Material
①	Rod cover	Brass (nickel plated)
②	Head cover	
③	Cylinder barrel	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Magnet	—
⑦	Piston seal	Fluororubber(NBR)
⑧	Rod seal	
⑨	Bumper	Urethane rubber
⑩	Mounting nut	Brass (nickel plated)
⑪	Rod end nut	Mild steel (nickel plated)
⑫	Pivot shaped bushing	Oil permeated bronze

PEN CYLINDERS

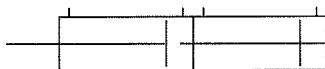
Dimensions

- Same as standard double acting type. See pages 121 to 123.

CUSTOM-MADE PEN CYLINDER SPECIFICATION

Tandem Cylinders

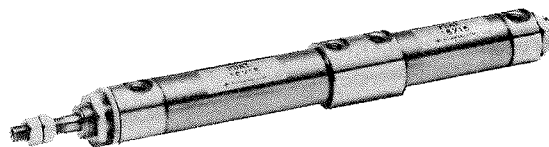
Symbol



Specifications

Item	Cylinder bore size mm	10	16
Operation		Double acting type	
Mounting type		Basic type	
Fluid		Air	
Pressure range MPa(kgf/cm ²)		0.2~0.7{2.0~7.1}	
Proof Pressure MPa(kgf/cm ²)		1.03{10.5}	
Temperature range °C		0~70	
Speed range mm/s		50~300	
Cushion		Fixed type (synthetic rubber)	
Lubrication		Not required	
Port size		M5×0.8	

● Contact us for detailed dimensions and delivery time.



Cylinder Bore Size and Stroke

Bore size	Stroke 1 (standard)	5	10	15	30	45	60	Available stroke (St1 x 2) + St2
10		0	5	10	15	30		150
16		0	5	10	15	30		150

Note : The figures in the above chart are combinations of stroke 2 (standard), corresponding to stroke 1 (standard)

Mounting Type

Mounting type	Item	Remark
1	Double foot type	Included in delivery.
1A	Single foot type	Included in delivery ^{Note}
3	Flange type	Included in delivery.
7	Clevis type (with pin)	Delivered assembled
7-7C	Clevis type with supporting bracket (with pin)	Supporting bracket included in delivery.

Note : Please use double foot type for foot brackets with total stroke (St1 x 2 + St2) longer than 60 mm.

Order Example

P **DAT** - - - - - - - -

Bore size
 ×
 Stroke 1
 ×
 Stroke 2

Lead wire length
 A 1000mm
 B 3000mm

Number of sensor switches
 1 With one switch
 2 With two switches
 3 With three switches
 : :

Type of Sensor switch.
 Blank Without sensor switch
 ZC153 Three-wire, solid state type
 ZC130 Two-wire, solid state type
 CS5T Two-wire, reed switch type
 CS11T Two-wire, reed switch type
 See page 616 for further details

Rod Clevis (included in delivery).
 Blank Without rod end bracket
 I With I-shaped rod Clevis
 Y With Y-shaped rod Clevis (with pin)
 Please order cylinder joint separately.

Mounting type
 (All mounts, except clevis mounting type, included in delivery)
 Blank Basic type
 1 Double foot type
 (mounted on M specification head cover type only)
 1A Single foot type
 3 Flange type
 7 Clevis type (with pin)
 7-7C Clevis type with supporting bracket (with pin)

Head cover piping specification (Not applicable to clevis mounting type)
 Blank Axial piping
 A Lateral piping
 M Lateral piping, with mounting screw

Cylinder specification
 Blank Standard cylinder
 S Sensor cylinder

DAT Double acting single rod type tandem cylinder

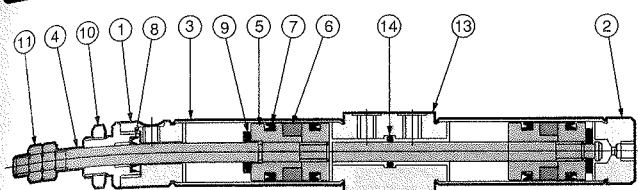
Pen cylinder series

● for stroke 1 and stroke 2

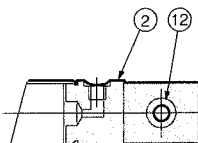
Stroke 1 of Cylinder 1.
 Stroke 2 equals Stroke 1 subtracted from the stroke of cylinder 2.

Note : Please use double foot mounting type for foot bracket with total stroke (St1 x 2 + St2) longer than 60mm

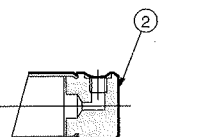
Construction Diagram



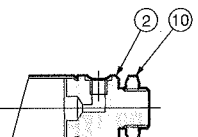
● Clevis type(-7)



● Lateral piping(-A)



● Lateral piping with mounting screw (-M)

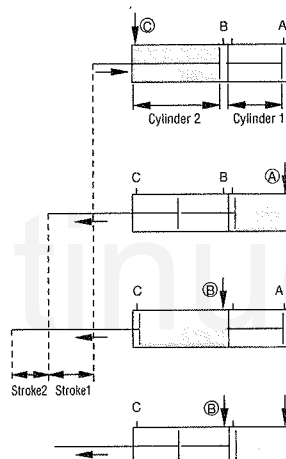


Materials of Major Parts

No.	Item	Material
①	Rod cover	Brass (nickel plated)
②	Head cover	
③	Cylinder barrel	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Magnet	—
⑦	Piston seal	Synthetic rubber(NBR)
⑧	Rod seal	
⑨	Bumper	Urethane rubber
⑩	Mounting nut	Brass (nickel plated)
⑪	Rod end nut	Mild steel (nickel plated)
⑫	Clevis shaped bushing	Oil permeated bronze
⑬	Intermediate cover	Brass (nickel plated)
⑭	Rod packing	Synthetic rubber(NBR)

Tandem Cylinder Operation

Tandem cylinders are constructed of two cylinders connected end to end. A tandem cylinder can be used as a two stage stroke cylinder by supplying the A or B port with air, and also doubles the cylinder thrust of other cylinders within one stroke range.



Apply air to port ③, both strokes 1 and 2 are pulled.

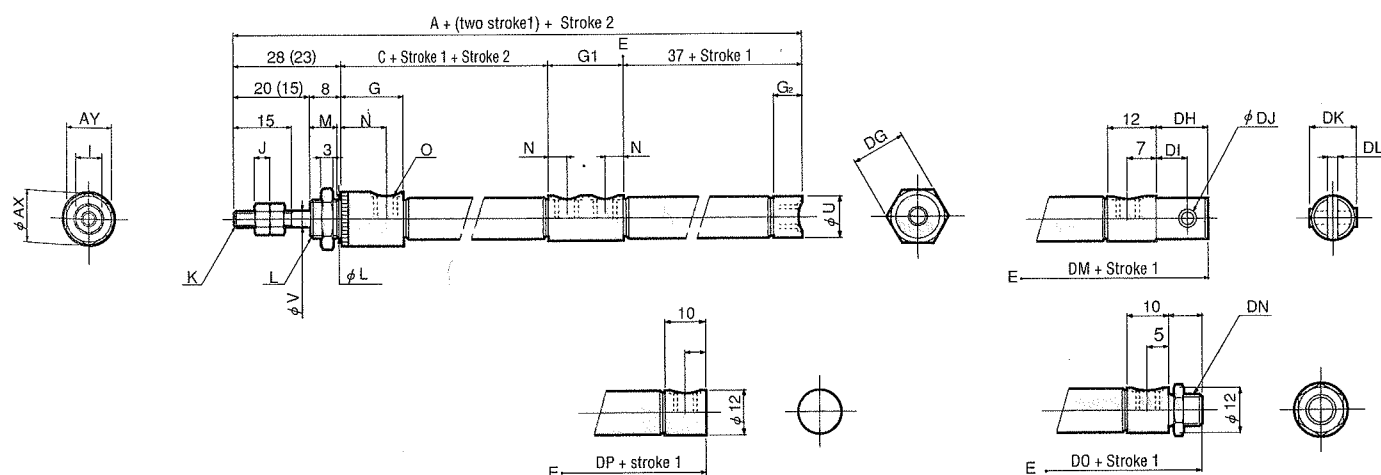
Apply air to port ①, rod operates stroke 1.

Apply air to port ②, rod operates stroke 2.

Apply air to ports ① and ②, output will be doubled with less than one stroke.

Dimensions of Tandem Cylinder

(Unit : mm)



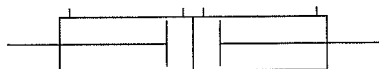
Type	Standard cylinder		Sensor cylinder		G	G ₁	G ₂	I	J	K	L	Lo	M	N	N ₁	O	
Bore size	Symbol	A	C	A													C
10		113	36	133	46	16	22	7	7	4	M4×0.7	M8×1	8 ^{+0.05} _{-0.10}	6.5	11	5	4-M5×0.8
16		120.5	38.5	140.5	48.5	15.5	24	7	8	4	M5×0.8	M10×1	10 ^{+0.05} _{-0.10}	6	10.5	5	4-M5×0.8

Bore size	Symbol	U	V	AX	AY	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP
10		11	4	14	12	14	13	8	3.3 ^{+0.05} _{-0.10}	12	3.2 ^{+0.05} _{-0.10}	55	M8×1	48	40
16		17	5	20	14	20	20	10	5.1 ^{+0.05} _{-0.10}	17	6.5 ^{+0.05} _{-0.10}	65	M8×1	51	43

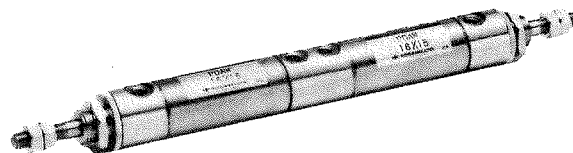
CUSTOM-MADE PEN CYLINDER SPECIFICATION

Dual Stroke Cylinders

Symbol



● Contact us for detailed dimensions and delivery time.



Specifications

Item	Cylinder bore size mm	10	16
Operation		Double acting type	
Mounting type		See separate chart	
Fluid		Air	
Pressure range MPa(kgf/cm ²)		0.08~0.7{0.8~7.1}	0.06~0.7{0.6~7.1}
Proof pressure MPa(kgf/cm ²)		1.03{10.5}	
Temperature range °C		0~70	
Speed range mm/s		50~750	
Cushion		Fixed type (synthetic rubber)	
Lubrication		Not required	
Port size		M5×0.8	

Bore Size and Stroke

Bore size	Standard stroke		Available stroke St1+St2
	Stroke 1	Stroke 2	
10	5 10 15 30 45 60	5 10 15 30 45 60	120
16	5 10 15 30 45 60	5 10 15 30 45 60	120

Mounting Type

Mounting type	Item	Remark
1	Double foot type	Included in delivery.
1A	Single foot type	Included in delivery (Note).
3	Flange type	Included in delivery.

Note : Please use double foot type for foot bracket with a total stroke (St1 + St2) longer than 60 mm.

Discontinued

Order Example

P DAW [] [] - [] - [] - [] [] []

Cylinder bore size x Stroke 1 x Stroke 2

Rod Clevis
Blank — Without rod end bracket
I — With I-shaped rod Clevis
Y — With Y-shaped rod Clevis (with pin)
φ 10 and φ 16 only.
Please order cylinder joints separately.

Mounting type (included in delivery)
Blank — Basic type
1 — Double foot type
1A — Single foot type
3 — Flange type

Cylinder specification
Blank — Standard cylinder
S — Sensor cylinder

DAW — Double acting single rod type, dual stroke cylinder.

Pen cylinder series

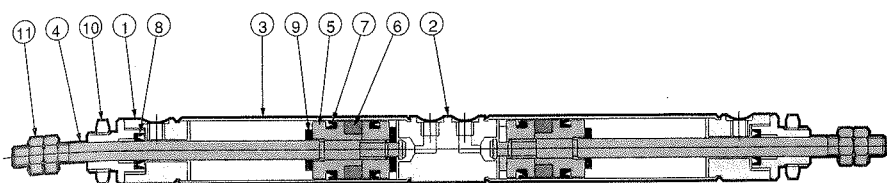
Length of lead wire
A — 1000mm
B — 3000mm

Number of Sensor Switches
1 — With one switch
2 — With two switches
3 — With three switches
: :
:

Type of Sensor switch.
Blank — Without sensor switch
ZC153 — Three-wire, solid state type
ZC130 — Two-wire, solid state type
CS5T — Two-wire, reed switch type
CS11T — Two-wire, reed switch type
Please see page 616 for further details

Note : Please use double foot mounting type for foot bracket with total stroke (St1 x 2 + St2) longer than 60mm

Construction Diagram

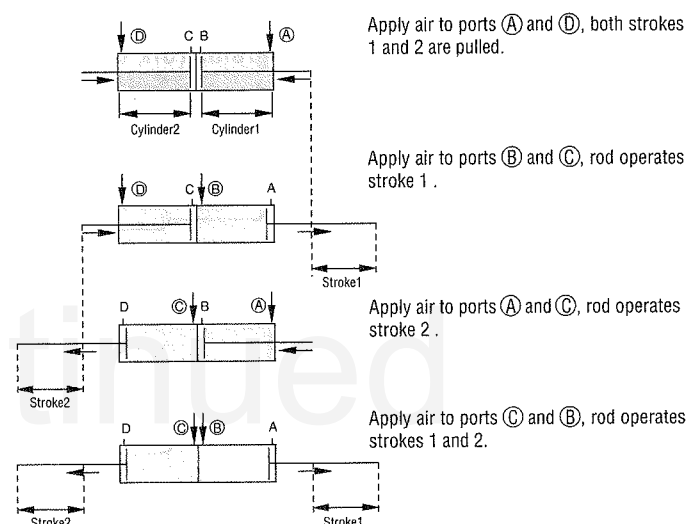


Materials of Major Parts

No.	Item	Material
①	Rod cover	Brass (Nickel plated)
②	Intermediate cover	
③	Cylinder barrel	Stainless steel
④	Piston rod	
⑤	Piston	Brass
⑥	Magnet	—
⑦	Piston seal	Synthetic rubber(NBR)
⑧	Rod seal	
⑨	Bumper	Urethane rubber
⑩	Mounting nut	Brass (Nickel plated)
⑪	Rod end nut	Mild steel (Nickel plated)

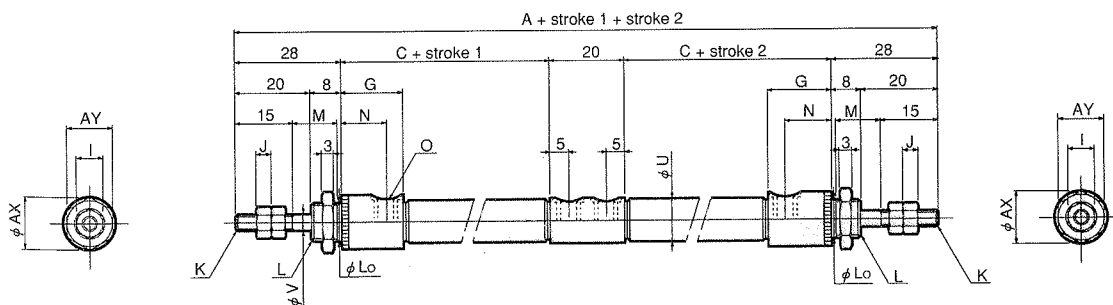
Tandem Cylinder Operation

Dual stroke cylinders are constructed of two cylinders connected back to back. When mounted onto the cylinder body, both strokes can be controlled separately. When mounted onto one rod end, a two-step or a three-step stroke can be achieved.



Dimensions of Dual Stroke

(Unit : mm)



Type	Standard cylinder		Sensor cylinder		G	G ₁	G ₂	I	J	K
Bore size Symbol	A	C	A	C						
10	152	38	172	48	16	—	—	7	3.2	M4×0.7
16	155	39.5	175	49.5	15.5	—	—	8	4	M5×0.8

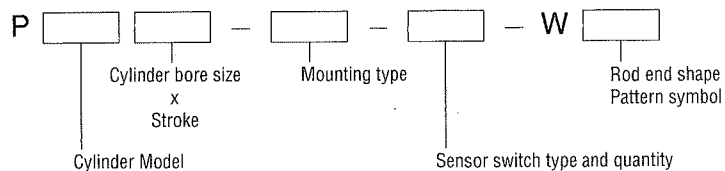
Type	Standard cylinder		Sensor cylinder		G	G ₁	G ₂	I	J	K
Bore size Symbol	L	Lo	M	N	N ₁	O	U	V	AX	AY
10	M8×1	8 ^{-0.05 -0.10}	6.5	11	—	4- M5×0.8	12	4	14	12
16	M10×1	10 ^{-0.05 -0.10}	6	10.5	—	4- M5×0.8	17	5	17	14

PATTERN DIAGRAM OF ROD END SHAPES

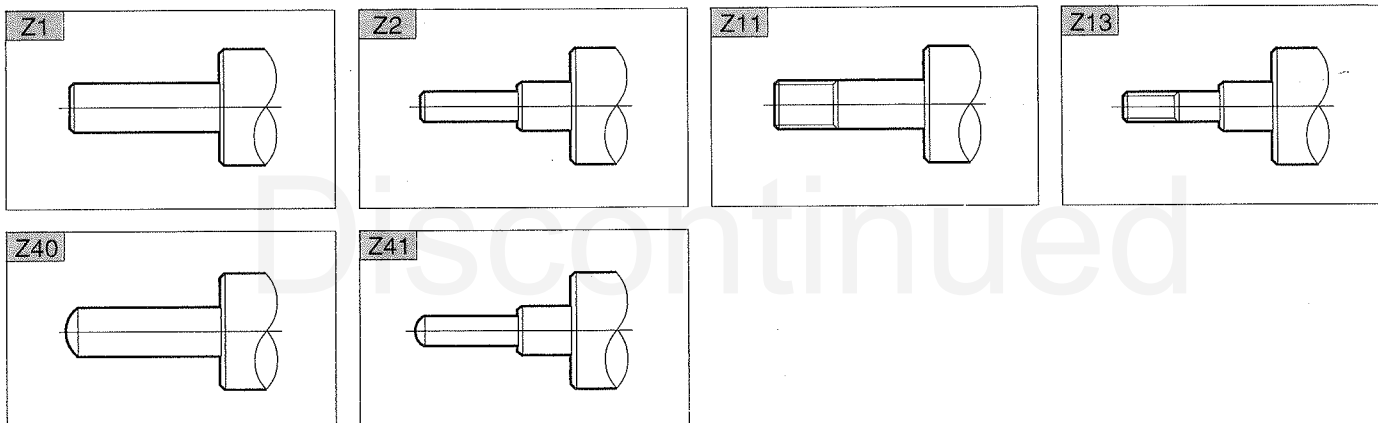
Simply choose the pattern you desire from the six shapes and fill in the required spaces on the order form where the pattern appears. You can also order a custom made cylinder with a rod end shape other than the standard models offered. Any rod end shape can be used with the entire Pen Cylinder series excluding PDAAS, PDAL, PDALS, PSAL, PSA/2.5, and PSA/4.

Please contact any of our business offices for the order forms with rod end patterns.

Order Example



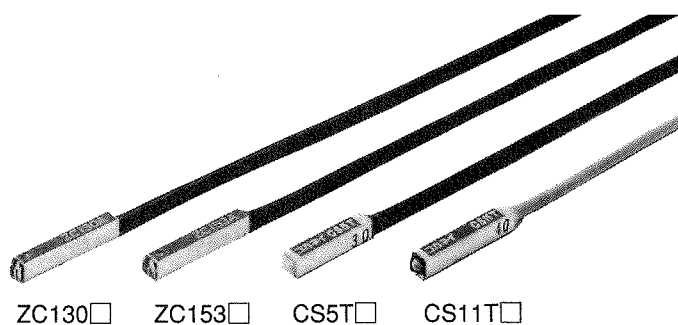
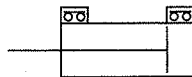
Piston Rod End Shape Pattern Diagrams (Six Types)



SENSOR SWITCH

Solid State Type; Reed Switch Type

Symbol



ZC130□

ZC153□

CS5T□

CS11T□

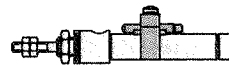
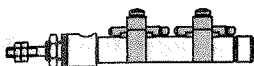
Minimum Strokes for Sensor Switch Installation

● With two switches installed

● With two switches mounted linearly on the cylinder

● With two switches mounted non-linearly on the cylinder

● With one switch installed



Sensor switch model	With two switches installed		With one switch installed
	Linear installation	Non-linear installation	
ZC130□ · ZC135□	30	5	5
CS5T□ · CS11T□		10	

Operating Range, Response Differential, Ideal Sensing Location

● Operating range: l

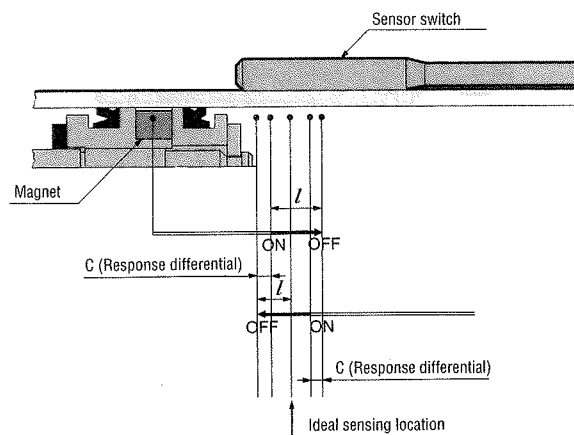
The range between the point where the reed switch turns ON and the point where it turns OFF after the piston moves further along in the same direction.

● Response differential: C

The distance between the point where the piston turns the reed switch ON and the point where it turns OFF after the piston moves further along in the same direction.

Cylinder bore size	ZC130□ · ZC135□		CS5T□ · CS11T□	
	Operating range	Response differential	Operating range	Response differential
6	1.3~2.2	less than 0.1	3.1~6.2	less than 1.6
10	1.4~2.6	less than 0.1	4.0~6.9	less than 1.6
16	1.7~3.3	less than 0.1	4.7~8.2	less than 1.6

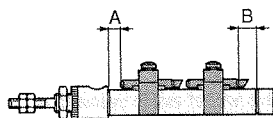
Note: The operating ranges and response differential shown in the chart are reference values.



Sensor Switch Mounting Location

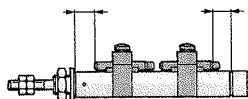
By mounting sensor switches as shown below (figures in chart are reference values), the piston magnet will achieve maximum sensing at the cylinder stroke end.

● Double acting type



Cylinder bore size		6	10	16
Sensor switch type	Symbol			
ZC130□	A	3	9.5	9.5
ZC153□	B	-0.5	-0.5	-0.5
CS5T□				
CS11T□	A	1	7.5	7.5
	B	0.5	-1.5	0.5

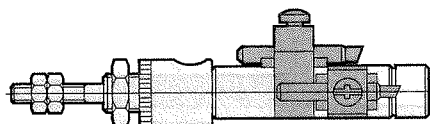
● Double acting type



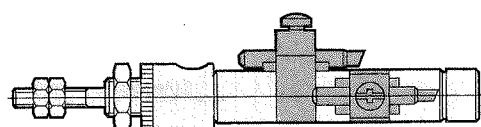
Cylinder bore size		6	10	16
Sensor switch type	Symbol	Stroke		
ZC130□	A	5 · 10 · 15	8.5	14.5
ZC153□		30	20.5	26.5
CS5T□		45	32.5	38.5
		60	44.5	50.5
	B	—	1	-1
CS11T□	A	5 · 10 · 15	6.5	12.5
		30	18.5	24.5
		45	30.5	36.5
		60	42.5	48.5
	B	—	0.5	-1.5

Installation of Sensor Switch by Stroke

● For five strokes



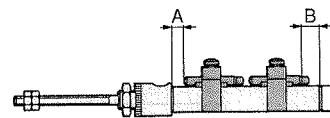
● For ten strokes or more



Sensor holder position and movement

- If two sensor switches are mounted on a cylinder with five strokes, sensor holder cannot be mounted in the center of each switch.
- If two sensor switches are mounted on a cylinder with five strokes, loosen the set screw, reposition the sensor switches so that the sensor holder can be mounted as shown in the figure, and mount.
- For a cylinder with ten strokes or more, the sensor holder can be mounted near the center of the sensor switch.

● Single acting pull type

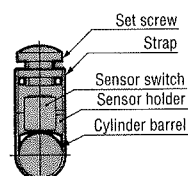


Cylinder bore size		6	10	16
Sensor switch type	Symbol	Stroke		
ZC130□	A	—	3	8.5
ZC153□	B	5 · 10 · 15	5	3.5
CS5T□		30	17	15.5
CS11T□	A	—	1	6.5
	B	5 · 10 · 15	6	4.5
		30	18	16.5

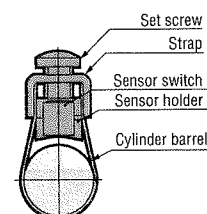
Sensor Switch Movement

- Loosen the set screw, allowing the sensor switch to move along its axis or circumference.
- For fine adjusting in the axial direction, loosen the set screw slightly (about 180°) to permit movement of the sensor switch only.
- The tightening torque of the set screw should not exceed 0.3N/cm (3kgf/cm).

● φ 6

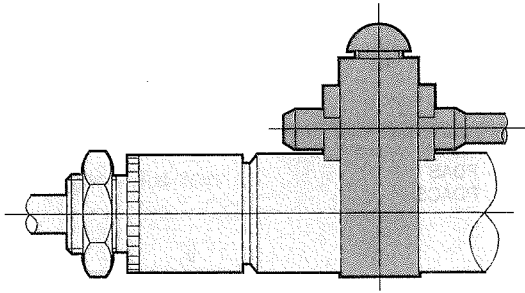
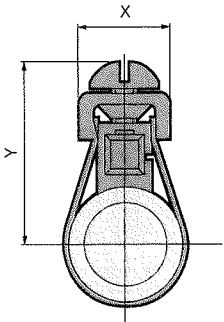


● φ 10 · φ 16



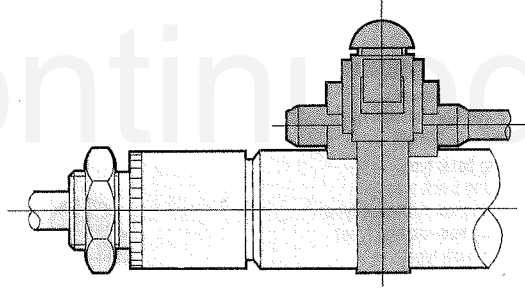
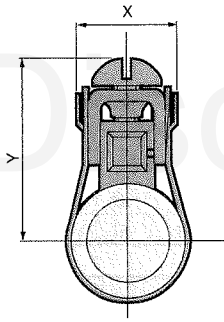
Mounting Dimensions for Sensor Switch

● PDAS type



mm		
Bore size	Symbol	Y
6	X	15.5
10		17.5
16		20.5

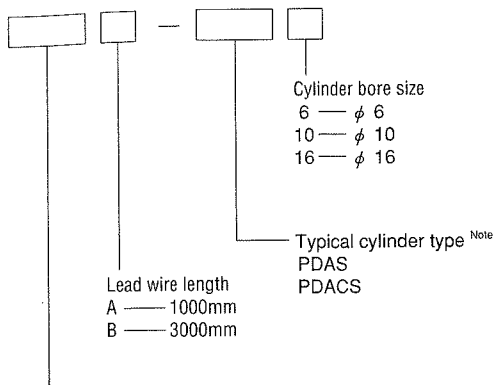
● PDACS type



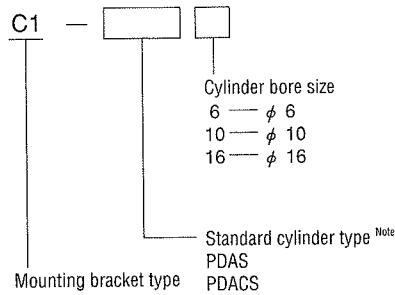
mm		
Bore size	Symbol	X
10	Y	(14)
16		(21)

Sensor Switch Order Example

● For sensor switch (with mounting bracket)



● For mounting bracket only



Sensor switch type

ZC130	Solid state type with indicator lamp	DC10~28V
ZC153	Solid state type with indicator lamp	DC4.5~28V
CS5T	Reed switch type without indicator lamp	DC5~28V
CS11T	Reed switch type with indicator lamp	AC85~115V
		DC10~28V

Note: Mounting brackets are categorized into two types in accordance with cylinder types.

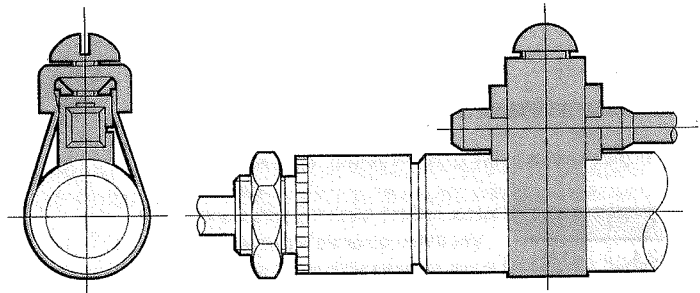
PDAS is applicable to PDAS (double acting basic type), PDABS (double acting block type), PDAHS (double acting low-hydraulic type), PDALS (double acting non-rotating type), PSAS (single acting push type) and PTAS (single acting pull type).

PDACS is applicable to PDAAS (double acting linear bearing type), PDACS (double acting with bumper type), PDADS (double acting double rods type), PDAES (double acting pull-side stroke adjustable type), PDAPS (double acting push-side stroke adjustable type), PDATS (double acting tandem type), PDAWS (double acting dual type) and PDAUS (double acting with speed controller type).

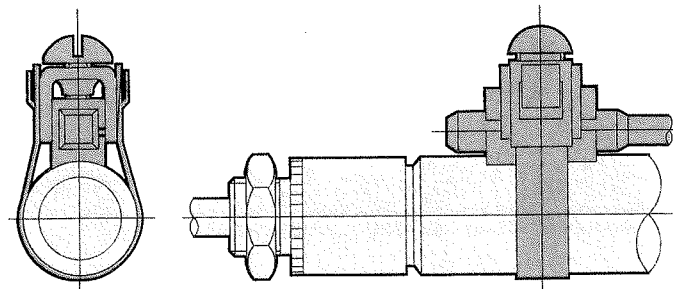
SENSOR BAND

Note: Two types of sensor bands are available depending on cylinder type. Refer to the following when placing your order.

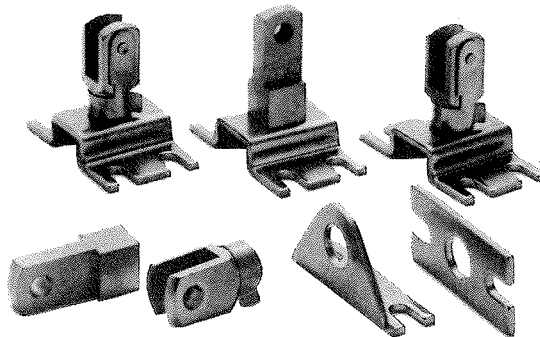
- PDAS — PDAS (double acting basic type)
— PDABS (double acting block type)
— PDAHS (double acting low hydraulic type)
— PDALS (single acting non-rotating type)
— PSAS (single acting push type)
— PTAS (single acting pull type)



- PDACS — PDAAS (double acting linear bearing type)
— PDACS (double acting with bumper type)
— PDADS (double acting double rods type)
— PDAES (double acting pull-side stroke adjustable type)
— PDAPS (double acting push-side stroke adjustable type)
— PDATS (double acting tandem type)
— PDAWS (double acting dual type)
— PDAUS (double acting with speed controller)



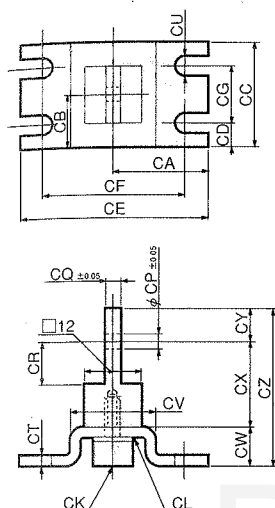
MOUNTING BRACKET AND ROD CLEVIS



Dimensions of Mounting Brackets

(Unit : mm)

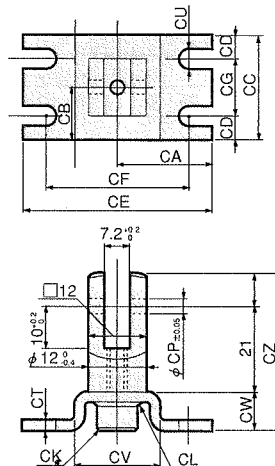
● Clevis mounting bracket



Symbol Bore size	CA	CB	CC	CD	CE	CF	CG	CK (Hexagon socket head cap screw)
10	20	11	22	5	40	30.2	12	M4×0.7×10
16	24	14	28	6	48	35.2	16	M5×0.8×10

Symbol Bore size	CL (Spring washer)	CP	CQ	CR	CT	CU	CV	CW	CX	CY	CZ
10	Cylinder diameter4	3.3	3.1	9	2	4.2	18	8	21	7	36
16	Cylinder diameter5	5.1	6.4	14	2.3	5.2	20	10	25	7	42

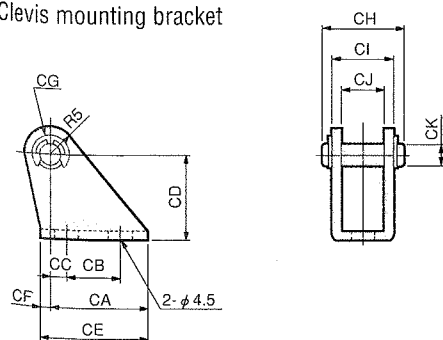
● I-shaped Rod clevis



Symbol Bore size	CA	CB	CC	CD	CE	CF	CG	CK (Hexagon socket head cap screw)
10	20	11	22	5	40	30.2	12	M4×0.7×10
16	24	14	28	6	48	35.2	16	M5×0.8×10

Symbol Bore size	CL (Spring washer)	CP	CT	CU	CV	CW	CZ
10	Cylinder diameter4	3.3	2	4.2	18	8	36
16	Cylinder diameter5	5.1	2.3	5.2	20	10	38

● Clevis mounting bracket

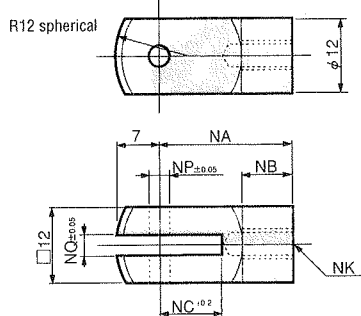


Symbol Bore size	CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK
10	18	10	3	16	20	2	Cylinder diameter3	15	11.3	8.1	φ 4
16	20	12	3	20	23	3	Cylinder diameter5	20.8	16.7	12.1	φ 6

Dimensions of Rod clevis

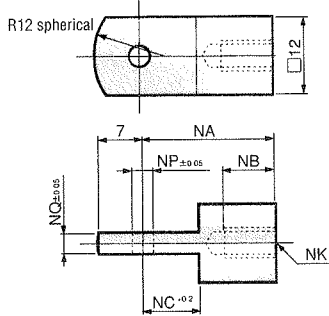
(Unit : mm)

Y-shaped Rod clevis



Symbol	NA	NB	NC	NK	NP	NQ	Weight (with pin) (Unit: g)
Bore size							
10	21	8	10	M4×0.7	3.3	3.2	21
16	21	11	10	M5×0.8	5.1	6.5	15

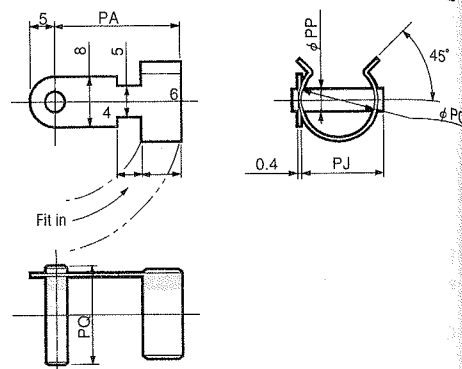
I-shaped Rod clevis



Symbol	NA	NB	NC	NK	NP	NQ	Weight (Unit: g)
Bore size							
10	21	8	9	M4×0.7	3.3	3.1	16
16	25	8	14	M5×0.8	5.1	6.4	22

Dimensions of Pins

(Unit : mm)



Symbol	PA	PC	PJ	PP	PQ	Weight (Unit: g)
Bore size						
10	20	12	13.5	3.2	15	2
16	20	12	13.5			
16 *	22	17	19	5	15	3

Note : The bore size marked with * applies to clevis head.

Order Example for Brackets and Rod clevis

(1) Single foot bracket

P — Type (See the following chart)
Single foot bracket

Type	Applicable cylinder types
PDA6	PDA6 PSA6 PTA6 PDAF6 PDAH6
PDA10	PDA10 PDAU10 PDAP10 PDAT10 PSA10 PDAD10 PDAF10 PDAW10 PTA10
PDA10	PDA16 PDAU16 PDAH16 PSAT16 PDAD16 PDAT16 PTA16 PDAE16 PDAW16 PDAF16 PDAP16
PDA10	PDAL10 (Same part as PDA16)
PDA10	PDAL16
PDA10	PDAA10 PDAC10
PDA10	PDAA16 PDAC16

(2) Double foot bracket

1 — Type (See the following chart)
Double foot bracket

Type	Applicable cylinder types
PDA10	PDA10 PDAU10 PDAP10 PDAT10 PSA10 PDAD10 PDAF10 PDAW10 PDAH10
PDA16	PDA16 PDAD16 PDAH16 PSA16 PDAP16 PDAT16 PDAU16 PDAF16 PDAW16
PSAL10	PSAL10
PSAL16	PSAL16
PDAC10	PDAA10 PDAC10
PDAC16	PDAA16 PDAC16

Note : One set consists of two foot mounting brackets.

(3) Flange bracket

3 — Type (See the following chart)
Flange bracket

Type	Applicable cylinder types
PDA6	PDA6 PSA6 PTA6 PDAF6 PDAH6
PDA10	PDA10 PDAU10 PDAP10 PDAT10 PSA10 PDAD10 PDAF10 PDAF10 PDAW10 PTA10 PDAE10 PDAH10
PDA16	PDA16 PDAU16 PDAH16 PSA16 PDAD16 PDAT16 PTA16 PDAE16 PDAW16 PDAF16 PDAP16
PDAL10	PDAL10 PSAL10
PDAL16	PDAL16 PSAL16
PDAC10	PDAA10 PDAC10
PDAC16	PDAA16 PDAC16

(4) Clevis bracket

7C — Type (See the following chart)
Clevis bracket

Type	Applicable cylinder types
PDA10	PDA10 PDAU10 PDAT10 PSA10 PDAF10 PDAL10 PTA10 PDAH10
PDA16	PDA16 PDAU16 PDAT16 PSA16 PDAF16 PDAL16 PTA16 PDAH16

(5) I-shaped bracket

8E — Type (See the following chart)
I-shaped bracket
Cylinder bore size
10 — ϕ 10
16 — ϕ 16
Type
PDAC (also includes PDAA)
PSAL

(6) Y-shaped rod clevis

Y — Type (See the following chart)
Y-shaped rod clevis
Cylinder bore size
10 — ϕ 10
16 — ϕ 16
Pen cylinder

(7) I-shaped rod clevis

I — Type (See the following chart)
I-shaped rod clevis
Cylinder bore size
10 — ϕ 10
16 — ϕ 16
Pen cylinder

(8) Pins

PK — Type (See the following chart)
Pin
Types of Pins
3 — Y-shaped rod clevis for ϕ 10; use with clevis bracket
5 — Y-shaped rod clevis for ϕ 16
6 — Clevis for ϕ 16