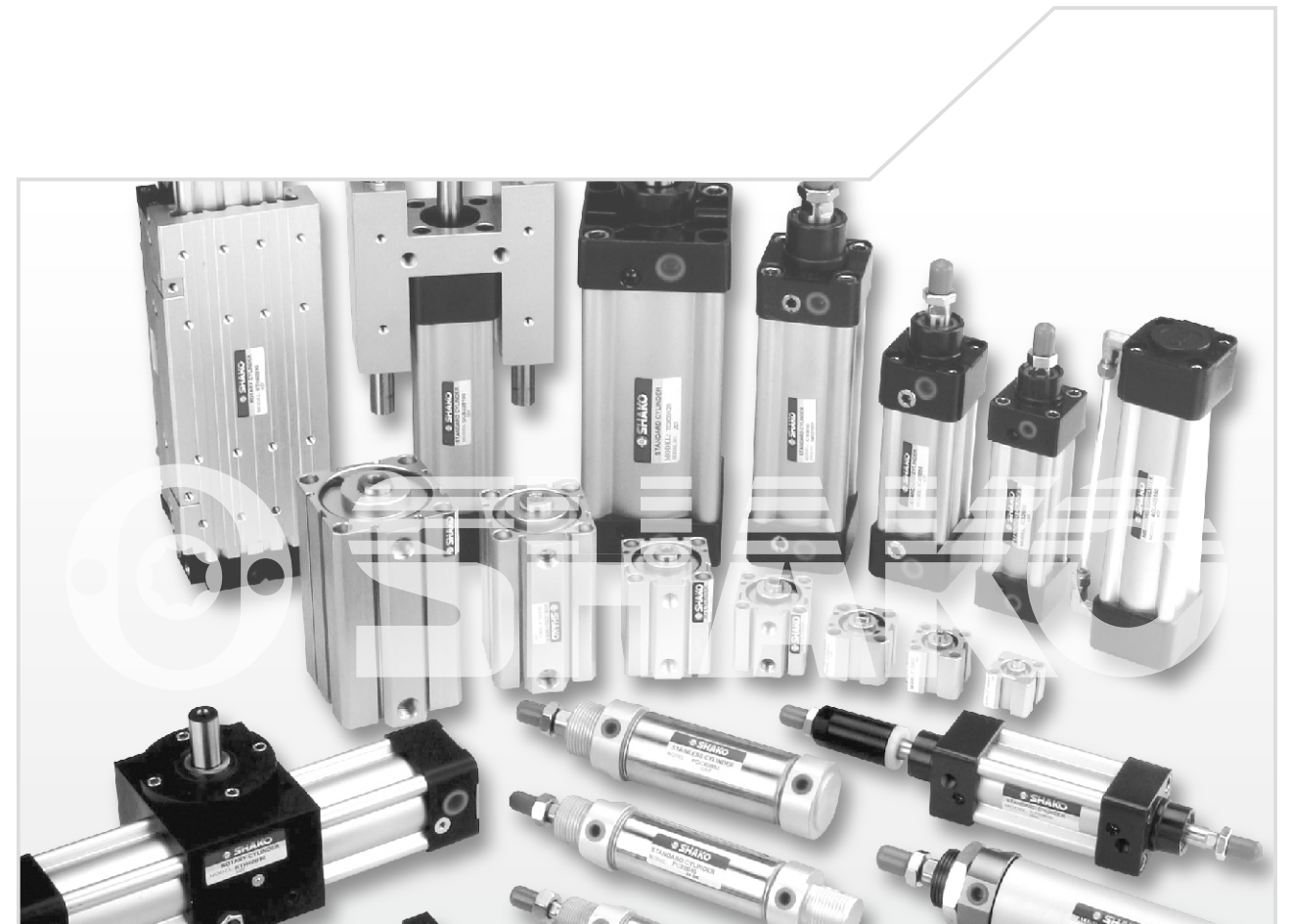
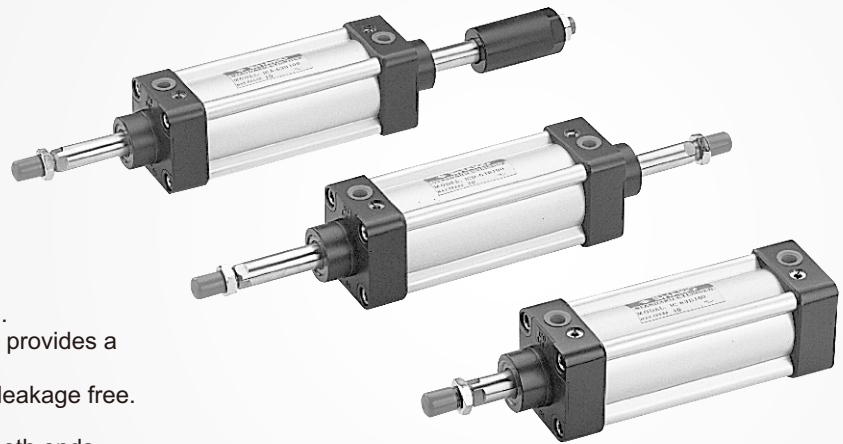
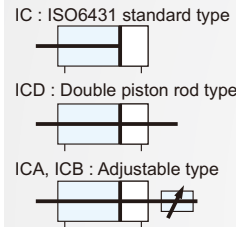


# AIR CYLINDERS

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### Symbol



### Features

- \* Identical to ISO6431 standard.
- \* High quality of aluminum tube provides a long service life.
- \* High quality of seals ensures leakage free.
- \* Various sensors for option.
- \* With adjustable cushions on both ends.

### How to order

※For  $\phi$  IC32~ $\phi$  IC100 non-rotated type, please contact our sales.

<b>IC</b>	<b>32</b>	<b>B</b>	<b>50</b>	<b>SF</b>	<b>1</b>	<b>FA</b>	<b>Y</b>
Type	Bore size	Magnet	Stroke	Sensor type	Number of sensor	Mounting parts	Rod end joint
IC ISO6431 standard type	32 $\phi$ 32	B W/I magnet		Blank W/O sensor	1 pc	Blank W/O mounting parts	Blank W/O rod end joint
ICD Double piston rod type	40 $\phi$ 40	C W/O magnet		SF LED in front	2 pcs	FA Front flange	Y Double knuckle joint
ICA Stroke adjustable 25mm	50 $\phi$ 50			ST LED on top		FB Rear flange	I Single knuckle joint
ICB Stroke adjustable 50mm	63 $\phi$ 63					TC Central trunnion	P Eyebolt floating joint
	80 $\phi$ 80					CA Male clevis	T Basic floating joint
	100 $\phi$ 100					CB Female clevis	
						LB Foot mounting	

### How to order Mounting parts / Rod end joints

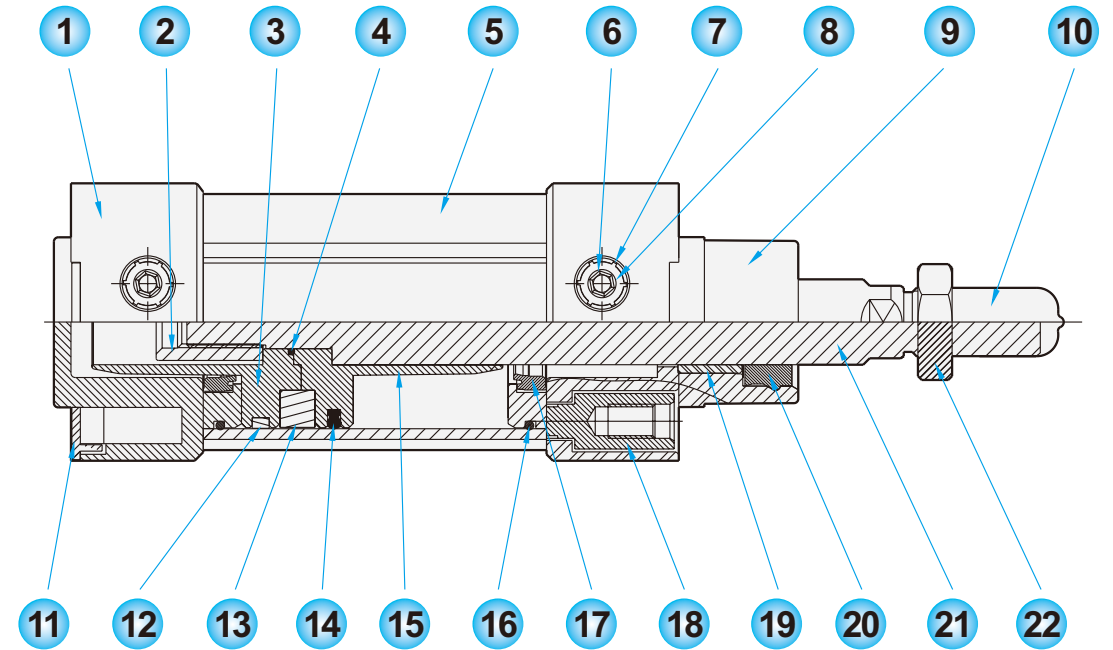
<b>ZI</b>	<b>FA</b>	<b>FY</b>	<b>32</b>
IC series	Mounting parts	Rod end joint	Bore size
	Blank W/O mounting parts	Blank W/O rod end joint	32 $\phi$ 32 63 $\phi$ 63
	FA Front flange	FY Double knuckle joint	40 $\phi$ 40 80 $\phi$ 80
	FB Rear flange	FI Single knuckle joint	50 $\phi$ 50 100 $\phi$ 100
	TC Central trunnion	P Eyebolt floating joint	
	CA Male clevis	T Basic floating joint	
	CB Female clevis		
	LB Foot mounting		

\* Please refer to P5-10~11  
 \* Please refer to P5-40~41

### Specifications

Bore size	$\phi$ 32	$\phi$ 40	$\phi$ 50	$\phi$ 63	$\phi$ 80	$\phi$ 100
Port size	1/8"	1/4"	3/8"	3/8"	1/2"	1/2"
Fluid	Compressed air					
Acting	Double acting					
Operating pressure range	1.5 ~ 9.5 kgf/cm <sup>2</sup> (150~950Mpa)					
Barrel material	Aluminum alloy					
Cushion	Built in					
Magnet	Option					
Ambient temperature	-5°C ~ 60°C					
Piston speed	50~700mm/Sec.					

### Material of parts



No.	Description	Material	Qty.	No.	Description	Material	Qty.
1	Rear cover	Aluminum alloy	1	12	Wear ring	Teflon	1
2	Piston mounting nut	Brass+Ni	1	13	Magnet	Rubber	1
3	Rear piston	Aluminum alloy	1	14	U-Piston seal	NBR	1
4	O-ring	NBR	1	15	Front piston	Aluminum alloy	1
5	Barrel	Aluminum alloy	1	16	O-ring	NBR	2
6	Cushion needle	Brass	1	17	Cushion	PU	2
7	Fixing nut	Brass+Ni	2	18	Fixing bolt	Fe+Ni	8
8	O-ring	NBR	2	19	Bushing	Brass	1
9	Front cover	Aluminum alloy	1	20	Rod seal	PU	1
10	Rubber cap	NBR	1	21	Piston rod	S45C+Cr	1
11	Rear plate	Plastic	1	22	Nut	Fe+Ni	1

### Stroke table

Bore size		Acting	Standard stroke(mm)
$\phi$ 32	$\phi$ 63	Double acting	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350,
$\phi$ 40	$\phi$ 80		400, 450, 500, 550, 600, 650, 700, 750, 800, 850,
$\phi$ 50	$\phi$ 100		900, 950, 1000

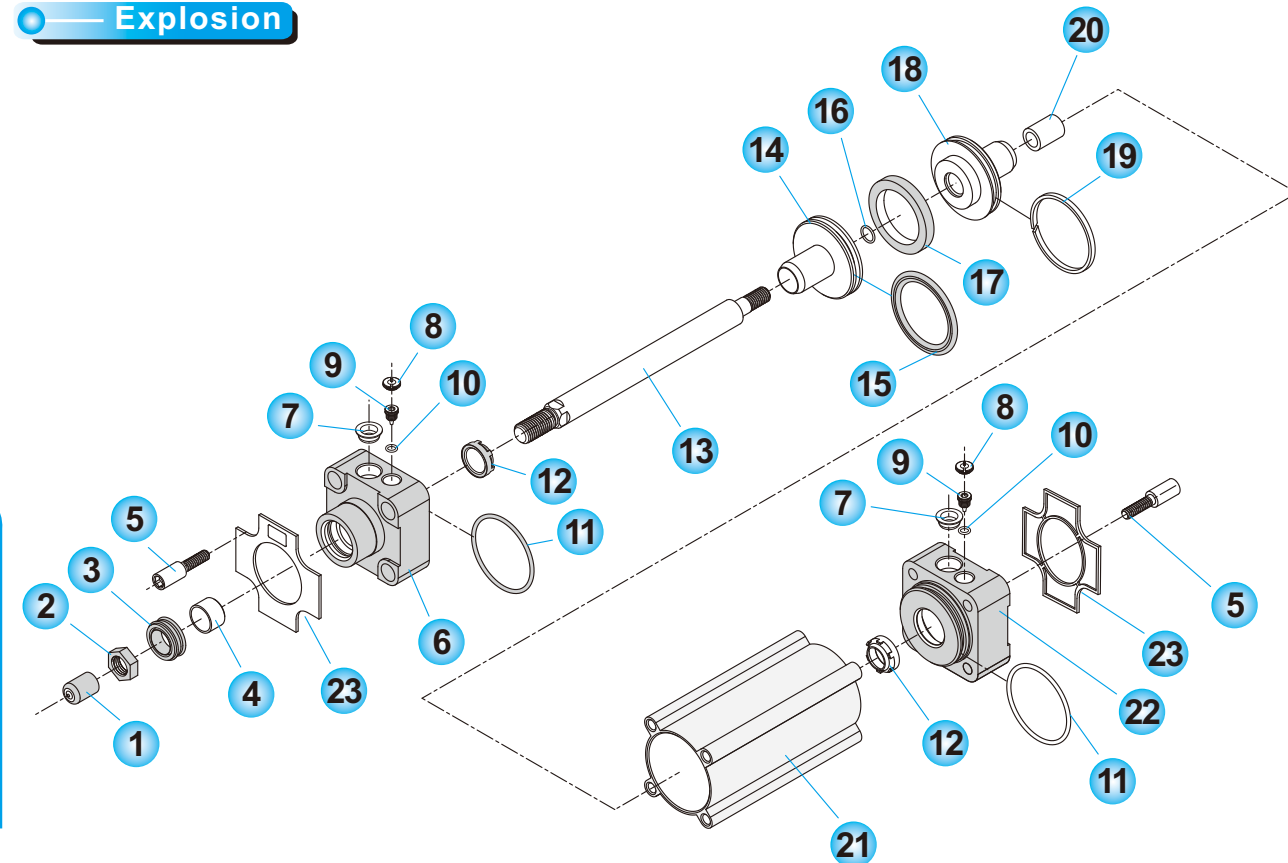
Note: Please contact our sales for non-standard stroke.

### How to order Cylinder kit/Repair kit

Bore size	Cylinder kit	Repair kit
φ 32	ZGCI-32	ZGCIN-32
φ 40	ZGCI-40	ZGCIN-40
φ 50	ZGCI-50	ZGCIN-50
φ 63	ZGCI-63	ZGCIN-63
φ 80	ZGCI-80	ZGCIN-80

Bore size	Cylinder kit	Repair kit
φ 100	ZGCI-100	ZGCIN-100
φ 125	ZGCI-125	ZGCIN-125
φ 160	ZGCI-160	ZGCIN-160
φ 200	ZGCI-200	ZGCIN-200

### Explosion



No.	Description	Qty.
1	Rubber cap	1
2	Rod nut	1
3	Front seal	1
4	Bushing	1
5	Fixing bolt	8
6	Front cover	1
7	Port plug	2
8	Fixing nut	2
9	Cushion needle	2
10	O-ring	2
11	Front cover o-ring	2
12	Cushion o-ring	2

No.	Description	Qty.
13	Piston rod	1
14	Front piston	1
15	U-Piston seal	1
16	O-ring	1
17	Rubber magnet	1
18	Rear piston	1
19	Wear ring	1
20	Piston mounting nut	1
21	Aluminum barrel	1
22	Rear cover	1
23	Rear plate	1

### Theoretical force

Bore size	φ 32		φ 40		φ 50		φ 63		φ 80		φ 100		
	Rod diameter φ 12		φ 16		φ 20		φ 20		φ 25		φ 25		
Acting	Double acting		Double acting		Double acting		Double acting		Double acting		Double acting		
	Push	Pull	Push	Pull	Push	Pull	Push	Pull	Push	Pull	Push	Pull	
Operating pressure (kgf/cm <sup>2</sup> )	1	8.04	6.91	12.5	10.5	19.6	16.5	31.1	28	50.2	45.3	78.5	73.6
	2	16	9.8	25.1	21	39.2	33	62.3	56	100	90.7	157	147
	3	24.1	13.8	37.6	31.5	58.9	49.5	93.5	84	150	136	235	220
	4	32.1	20.7	50.2	42	78.5	66	124	112	201	181	314	294
	5	40.2	27.6	62.8	52.5	98.1	82.5	155	140	251	226	392	368
	6	48.2	34.6	75.3	63	117	99	187	168	301	272	417	441
	7	56.2	41.5	87.9	73.5	137	116	218	196	351	317	549	515
	8	64.3	48.4	100	84	157	132	249	224	402	362	628	589
	9	72.3	55.3	113	94.5	176	149	280	252	452	408	706	662
	10	80.4	62.2	125	105	196	165	311	280	502	453	785	736

Push :  $F1 = A1 \times P \times B$  (kgf)

Pull :  $F2 = A2 \times P \times B$  (kgf)

Single acting force :  $F3 = (A1 \times P - S) \times B$  (kgf)  
(Spring return)

Single acting force :  $F4 = (A2 \times P - S) \times B$  (kgf)  
(Spring extend)

A1 : Piston area for push

$$A1 = \frac{\pi}{4} D^2$$

A2 : Piston area for pull

$$A2 = \frac{\pi}{4} (D^2 - d^2)$$

D : Bore size (mm)

d : Rod diameter (mm)

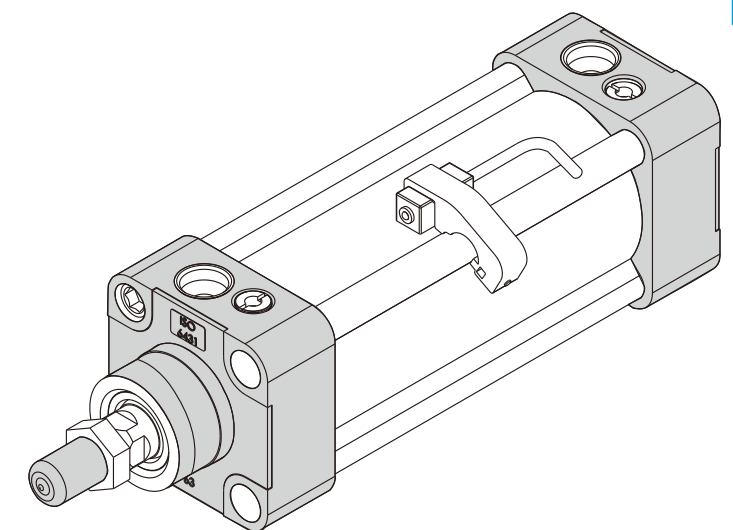
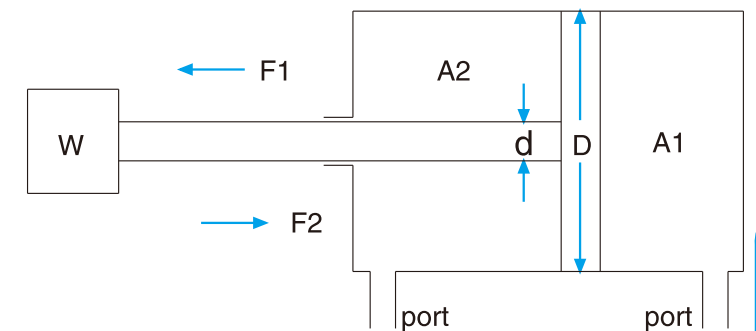
P : Operating pressure (kgf/cm<sup>2</sup>)

S : Spring force (kgf)

B : Loading rate : Medium speed.....65%

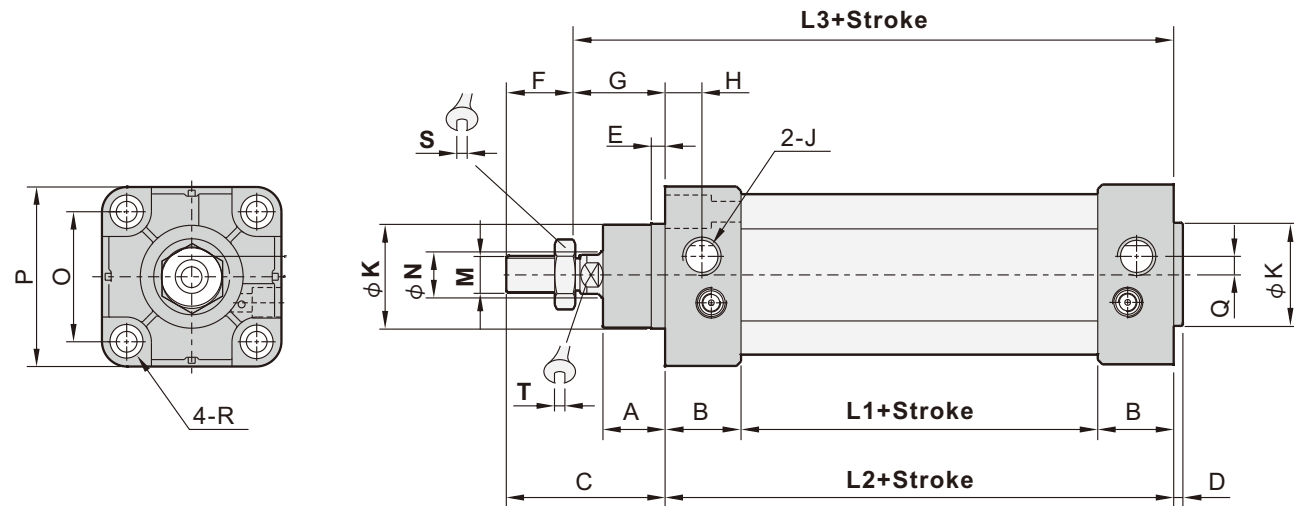
Low speed.....80%

High speed.....Below 50%



### Dimensions

#### ISO6431 standard type



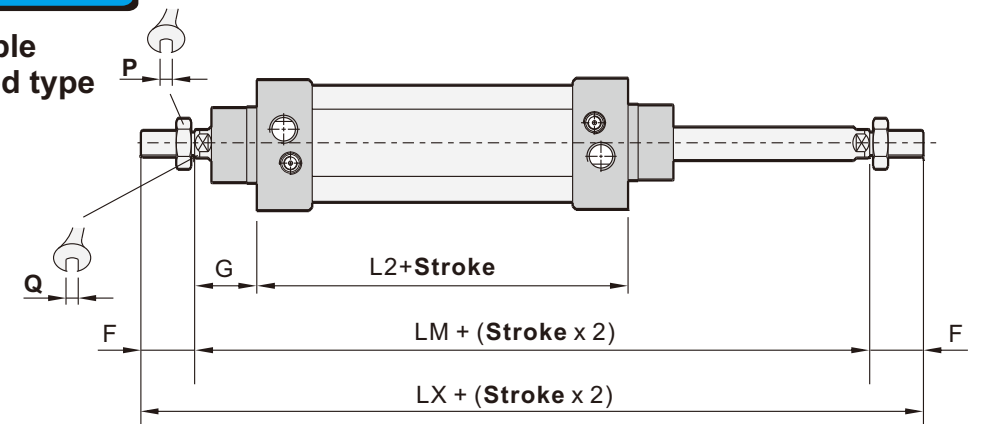
(Unit : mm)

Bore size	A	B	C	D	E	F	G	H	J	K
φ 32	18	26	48	3	4.5	22	26	11.5	G 1/8	φ 30
φ 40	20.2	34	53.5	4	4.5	24	29.5	13.5	G 1/4	φ 34.5
φ 50	28	31	71	4	6	32	39	16	G 1/4	φ 39.7
φ 63	25.2	32.6	70.5	4	6	32	38.5	16	G 3/8	φ 44.7
φ 80	32.5	35.5	86	4	6	40	46	20.5	G 3/8	φ 44.7
φ 100	37	37	91	4.8	5.5	40	51	18	G 1/2	φ 55.3

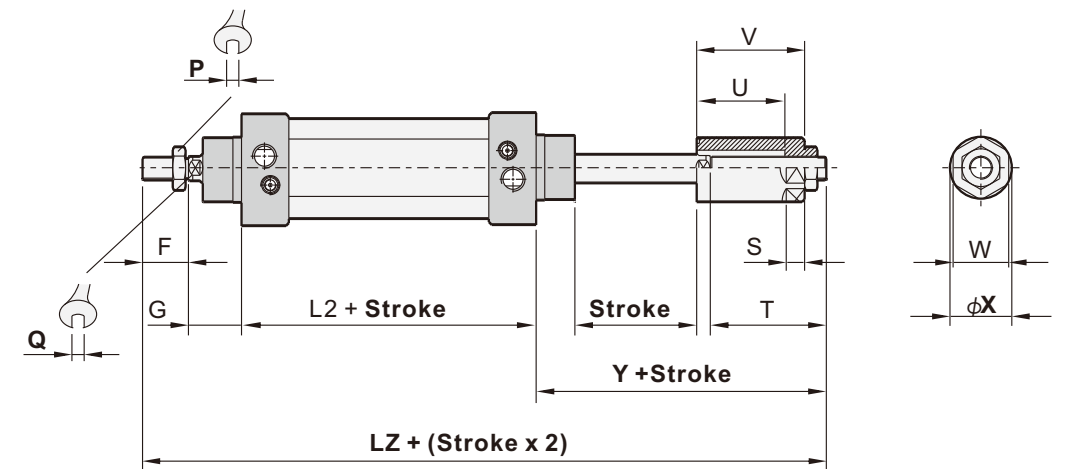
Bore size	L1	L2	L3	M	N	O	P	Q	R	S	T
φ 32	42	94	120	M10xP1.25	φ 12	32.5	47	4.3	M6	17	10
φ 40	37	105.2	134.8	M12xP1.25	φ 16	38	55	5.3	M6	19	13
φ 50	44	106	147	M16xP1.5	φ 20	46.5	65	7	M8	24	17
φ 63	55	120	159	M16xP1.5	φ 20	56.5	78	8	M8	24	17
φ 80	57	128	175	M20xP1.5	φ 25	72	95	9	M10	26	22
φ 100	64	138	189	M20xP1.5	φ 25	89	115	13.5	M10	26	22

### Dimensions

#### ICD Double piston rod type



#### ICA Stroke adjustable 25mm, ICB Stroke adjustable 50mm



(Unit : mm)

Bore size	F	G	L2	LM	LX	LZ		P	Q	S
						ICA	ICB			
φ 32	22	26	94	146	190	215	240	17	10	10
φ 40	24	29.5	105	164	212	236	261	19	13	10
φ 50	32	39	106	182	248	266	291	24	17	12
φ 63	32	38.5	120.2	196.5	262	280.5	305.5	24	17	12
φ 80	40	46	128	220	300	318	343	26	22	15
φ 100	40	51	138	240	320	338	363	26	22	15

Bore size	T		U		V		W	X	Y	
	ICA	ICB	ICA	ICB	ICA	ICB			ICA	ICB
φ 32	47	72	35	62	47	72	22	φ 25	73	98
φ 40	48	73	37	62	47	72	27	φ 30	77.5	102.5
φ 50	52	77	38	63	53	78	36	φ 40	91	116
φ 63	52	77	38	63	53	78	36	φ 40	90.5	115.5
φ 80	58	83	40	65	60	85	46	φ 50	104	129
φ 100	58	83	40	65	60	85	46	φ 50	109	134



### Symbol

IC : ISO6431 standard type



ICD : Double piston rod type



### Features

- \* Identical to ISO6431 standard.
- \* High quality of aluminum tube provides a long service life.
- \* High quality of seals ensures leakage free.
- \* Various sensors for option.
- \* With adjustable cushions on both ends.



### How to order

<b>IC</b>	<b>125</b>	<b>B</b>	<b>50</b>	<b>SF</b>	<b>1</b>	<b>FA</b>	<b>Y</b>
Type	Bore size	Magnet	Stroke	Sensor type	Number of sensor	Mounting parts	Rod end joint
IC ISO6431 standard type	125 $\phi$ 125	B W/I magnet	50	Blank W/O sensor	1 pc	Blank W/O mounting parts	Blank W/O rod end joint
ICD Double piston rod type	160 $\phi$ 160 200 $\phi$ 200	C W/O magnet		SF LED in front	2 pcs	FA Front flange FB Rear flange CA Male clevis CB Female clevis LB Foot mounting	Y Double knuckle joint I Single knuckle joint P Eyebolt floating joint T Basic floating joint
				ST LED on top			

### How to order Mounting parts / Rod end joints

<b>ZI</b>	<b>FA</b>	<b>FY</b>	<b>125</b>
IC series	Mounting parts	Rod end joint	Bore size
Blank	W/O mounting parts	Blank	W/O rod end joint
FA	Front flange	FY	Double knuckle joint
FB	Rear flange	FI	Single knuckle joint
	CA Male clevis	P	Eyebolt floating joint
	CB Female clevis	T	Basic floating joint
	LB Foot mounting		

\* Please refer to P5-10~11

\* Please refer to P5-38~39

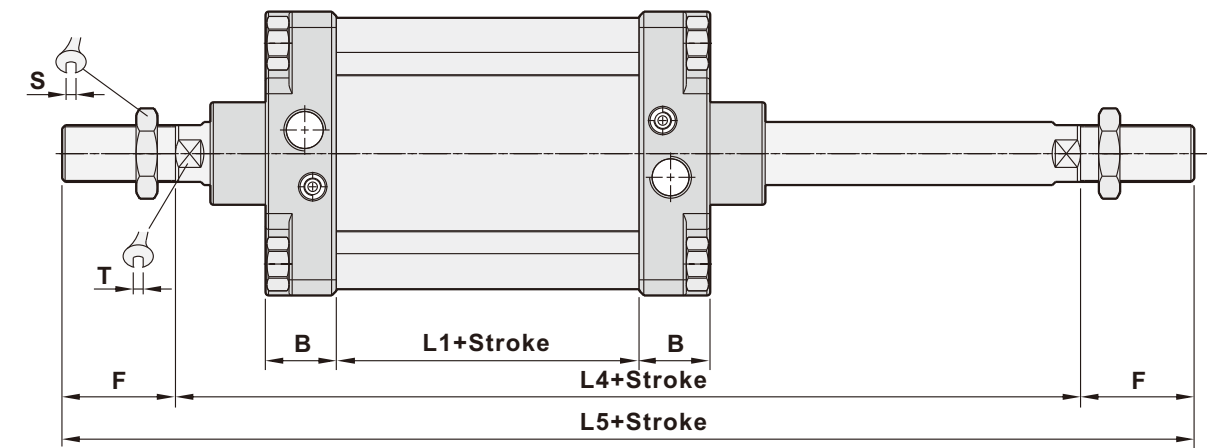
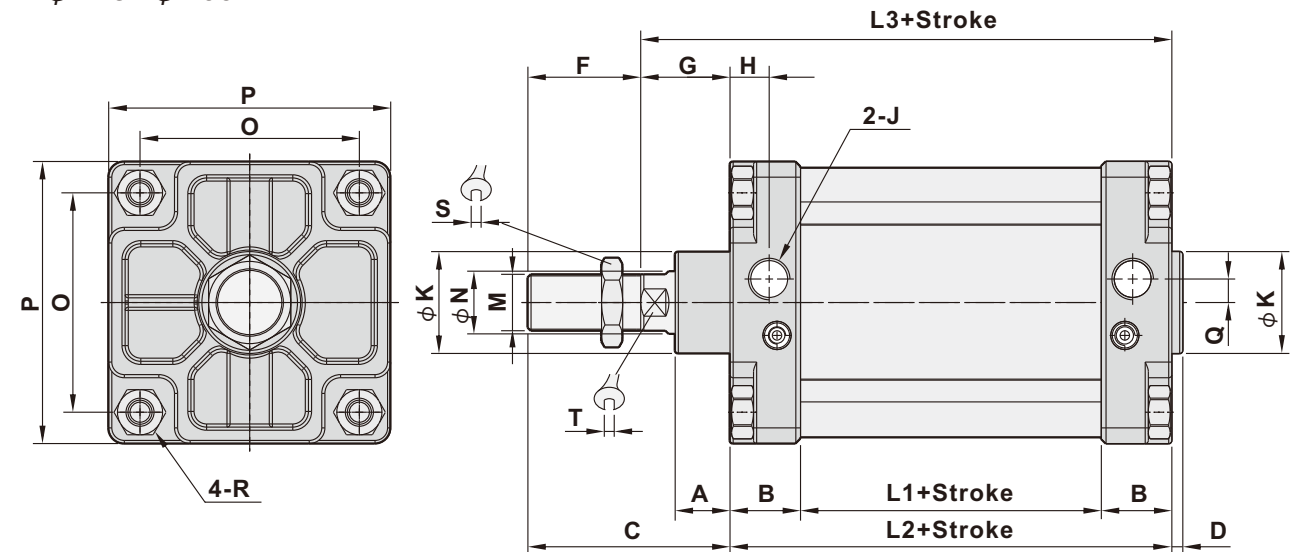
### Specifications

Bore size	$\phi$ 125	$\phi$ 160	$\phi$ 200
Port size	1/2"	3/4"	
Fluid	Compressed air		
Acting	Double acting		
Operating pressure range	1.5 ~ 9.5 kgf/cm <sup>2</sup> (150~950Mpa)		
Barrel material	Aluminum alloy		
Cushion	Built in		
Magnet	Option		
Ambient temperature	-5°C ~ 60°C		
Piston speed	50~700mm/Sec.		

### Dimensions

#### ISO6431 standard type

$\phi$  125~ $\phi$  200



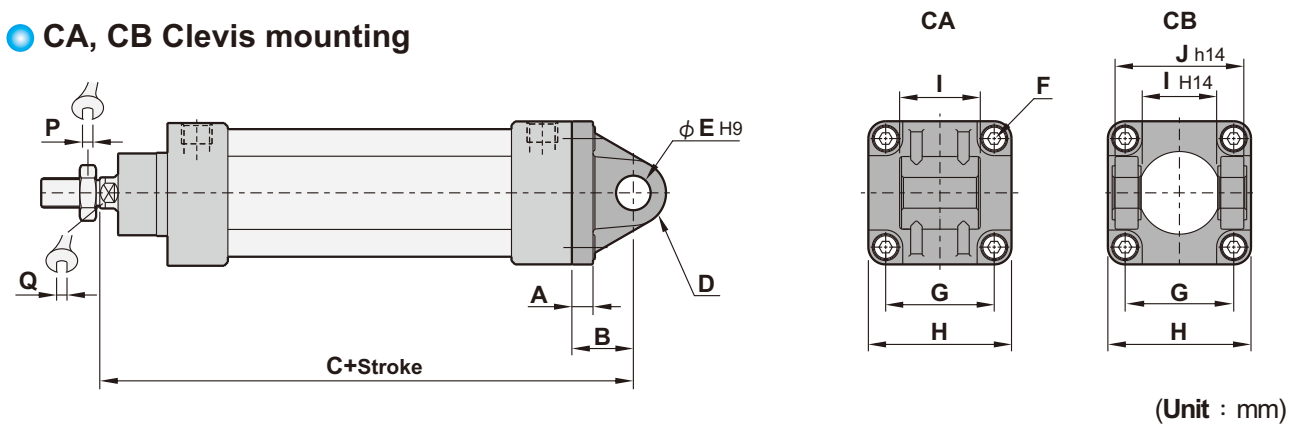
(Unit : mm)

Bore size	A	B	C	D	F	G	H	J	K
$\phi$ 125	32	40	119	8	54	65	23	G 1/2	$\phi$ 60
$\phi$ 160	35	45	152	7	72	80	25	G 3/4	$\phi$ 65
$\phi$ 200	58	45	167	8	72	95	25	G 3/4	$\phi$ 75

Bore size	L1	L2	L3	L4	L5	M	N	O	P	Q	R	S	T
$\phi$ 125	80	160	225	290	398	M27xP2	$\phi$ 32	110	140	14	M12	40	27
$\phi$ 160	90	180	260	340	484	M36xP2	$\phi$ 40	140	180	15	M16	50	36
$\phi$ 200	90	180	275	370	514	M36xP2	$\phi$ 40	175	220	15	M16	50	36

## Dimension of mounting parts

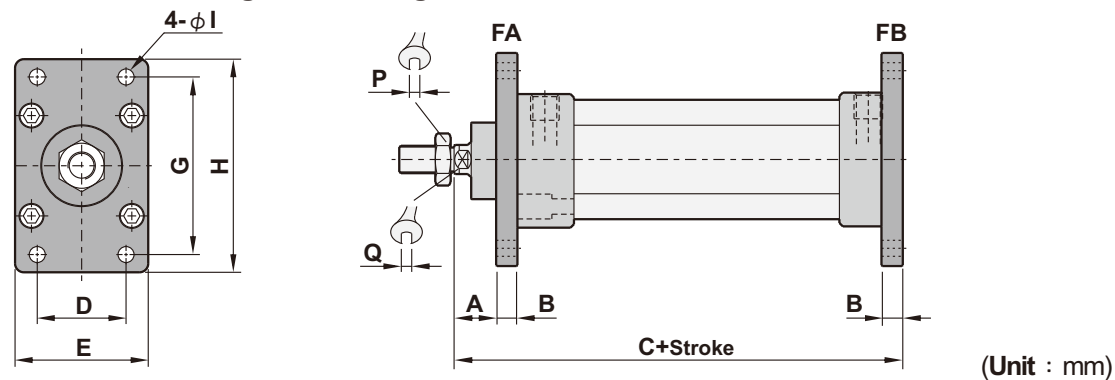
### CA, CB Clevis mounting



Bore size	A		B	C	D	E	F	G	H	I	J	P	Q
	CA	CB											
φ 32	10	10	22	142	R11	φ 10	M6	32.5	46	26 <sup>-0.2</sup> <sub>-0.6</sub>	45	17	10
φ 40	10	10	25	160.8	R13	φ 12	M6	38	54	28 <sup>-0.2</sup> <sub>-0.6</sub>	52	19	13
φ 50	13	13	28	170	R13	φ 12	M8	46.5	64	32 <sup>-0.2</sup> <sub>-0.6</sub>	60	24	17
φ 63	13	13	33	190	R17	φ 16	M8	56.5	77	40 <sup>-0.2</sup> <sub>-0.6</sub>	70	24	17
φ 100	15	15	35	210.8	R17	φ 16	M10	72	94	50 <sup>-0.2</sup> <sub>-0.6</sub>	90	26	22
φ 125	15	15	40	230	R21	φ 20	M10	89	114	60 <sup>-0.2</sup> <sub>-0.6</sub>	110	26	22
φ 160	17	19	50	275	R25	φ 25	M12	110	140	70 <sup>-0.5</sup> <sub>-1.2</sub>	130	40	27
φ 200	19.5	19.5	55	315	R30	φ 30	M16	140	180	90 <sup>-0.5</sup> <sub>-1.2</sub>	170	50	36
	23	22	60	335	R30	φ 30	M16	175	220	90 <sup>-0.5</sup> <sub>-1.2</sub>	170	50	36

(Unit : mm)

### FA, FB Front & Rear flange mounting

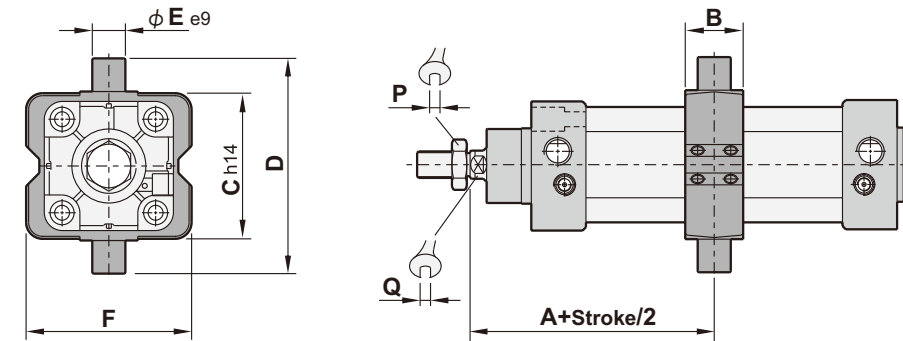


Bore size	A	B	C	D	E	G	H	I	P	Q
φ 32	16	10	130	32	50	64	79	7	17	10
φ 40	20	10	145	36	55	72	90	9	19	13
φ 50	25	12	155	45	65	90	110	9	24	17
φ 63	25	12	170	50	75	100	120	9	24	17
φ 100	30	16	190	63	95	126	153	12	26	22
φ 125	35	16	205	75	115	150	178	14	26	22
φ 160	32	20	245	90	140	180	224	16.5	40	27
φ 200	37	20	280	115	180	230	280	18.5	50	36
	61	25	300	135	220	270	320	24	50	36

(Unit : mm)

## Dimension of mounting parts

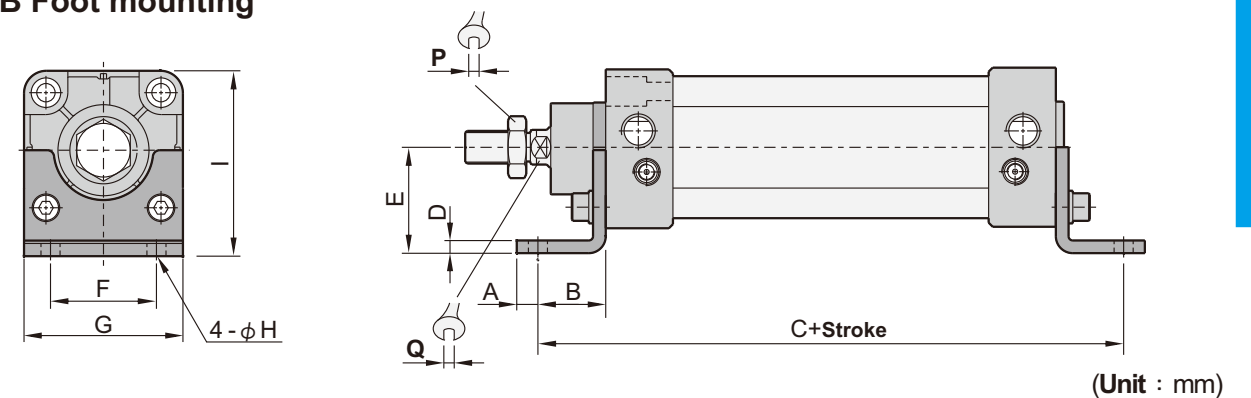
### TC Central trunnion mounting



Bore size	A	B	C	D	E	F	P	Q
φ 32	73	22	50	74	φ 12	58	17	10
φ 40	82.5	28	63	95	φ 16	70	19	13
φ 50	90	32	75	107	φ 16	85	24	17
φ 63	97.5	35	90	130	φ 20	100	24	17
φ 100	110	40	110	150	φ 20	120	26	22
	120	45	132	182	φ 25	145	26	22

(Unit : mm)

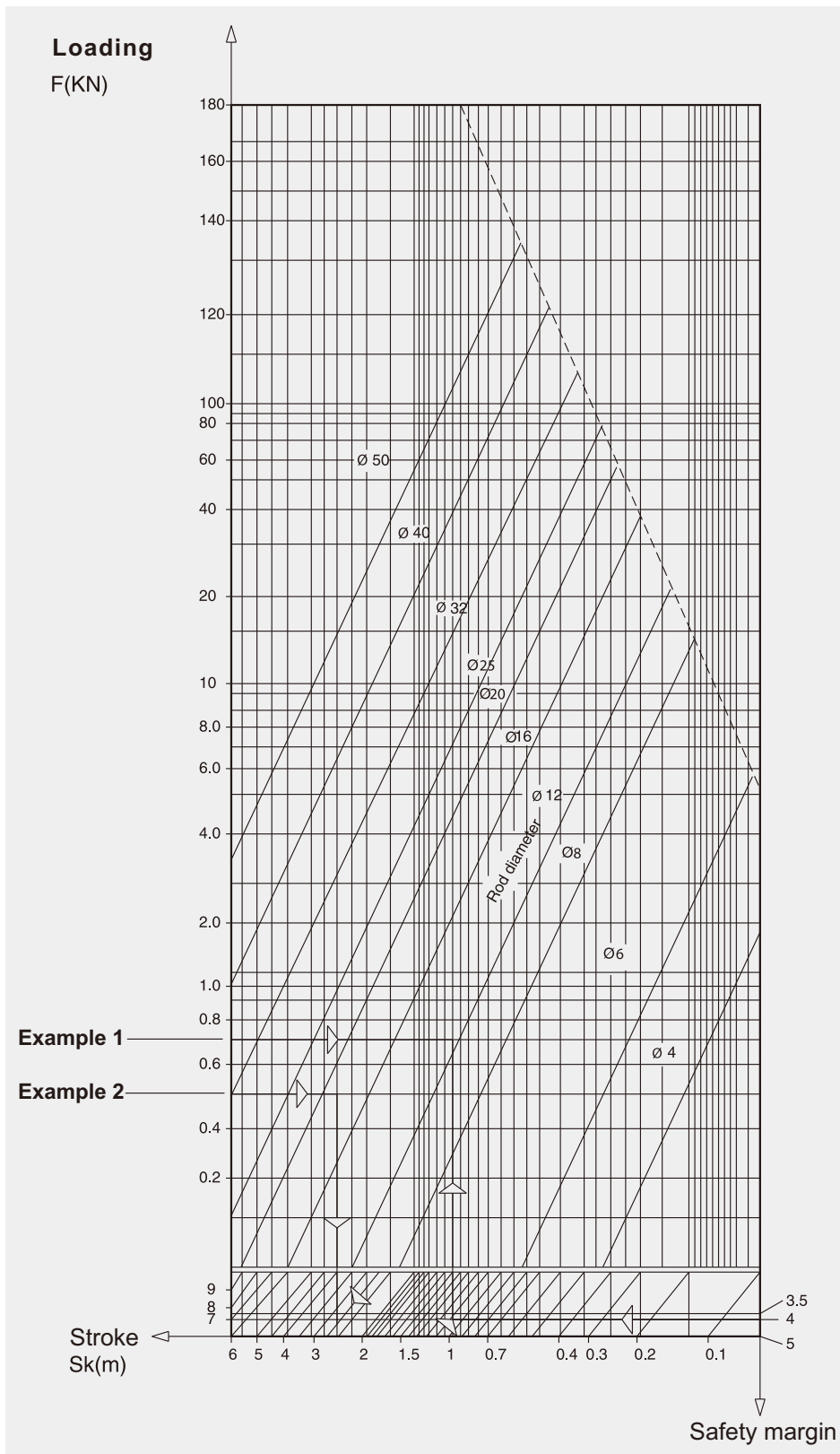
### LB Foot mounting



Bore size	A	B	C	D	E	F	G	H	I	P	Q
φ 32	8	24	142	4	32	32	47	φ 7	56.5	17	10
φ 40	10	28	161	4	36	36	53	φ 9	63.5	19	13
φ 50	10	32	170	4	45	45	65	φ 9	77.5	24	17
φ 63	10	32	185	4	50	50	75	φ 9	87.5	24	17
φ 100	13	41	210	5	63	63	95	φ 12	110	26	22
φ 125	13	41	220	6	71	75	115	φ 14	127.5	26	22
φ 160	20	45	250	8	90	90	140	φ 16.5	160	40	27
φ 200	20	60	300	8	115	115	180	φ 18.5	205	50	36
	30	70	320	9	135	135	220	φ 24	245	50	36

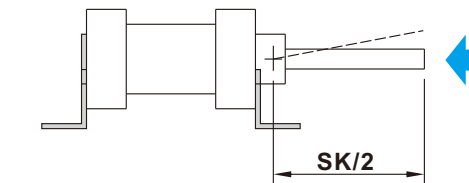
(Unit : mm)

### Rod loading chart

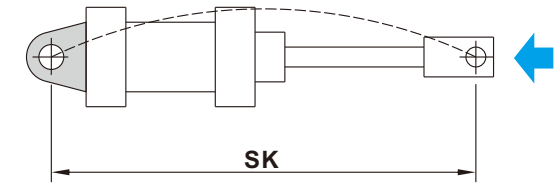


### Rod swing length

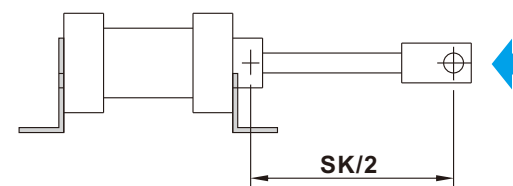
● A, C, D



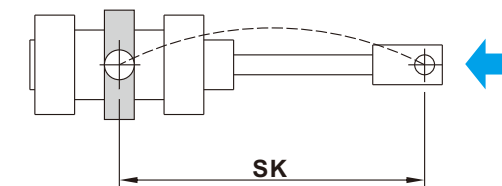
● B



● A, C, D



● E



### ● Example 1

Piston push force: 0.7Kn  
Stroke: 1000mm  
Pressure: Approx. 6 bar  
Mounting: C

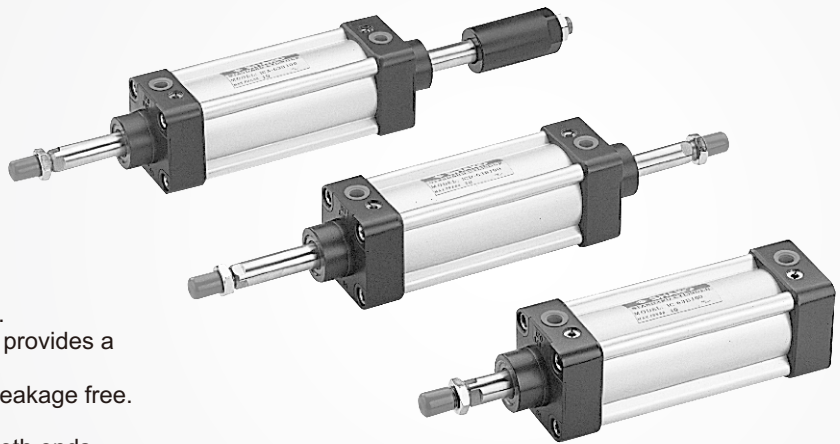
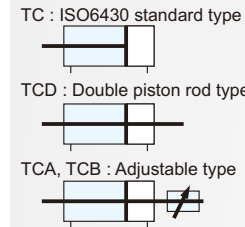
Ans: Referring to the rod loading chart, the rod diameter location between  $\phi 12 \sim \phi 16$ . Consider the rod loading, the actual diameter is  $\phi 16$ mm, also, we can know the cylinder body diameter is  $\phi 40$ mm.

### ● Example 2

Cylinder diameter:  $\phi 50$ mm  
Rod diameter:  $\phi 20$ mm  
Stroke: 1000mm  
Piston push force: 0.5Kn  
Mounting: B

Ans: Referring to the rod loading chart,  
Sk=2900mm  
Max stroke=1450mm

### Symbol



### Features

- \* Identical to ISO6430 standard.
- \* High quality of aluminum tube provides a long service life.
- \* High quality of seals ensures leakage free.
- \* Various sensors for option.
- \* With adjustable cushions on both ends.

### How to order

For  $\phi$ TC32~ $\phi$ TC100 non-rotated type, please contact our sales.

TC	32	B	50	SF	1	FA	Y
Type	Bore size	Magnet	Stroke	Sensor type	Number of sensor	Mounting parts	Rod end joint
TC ISO6430 standard type	32 $\phi$ 32	B W/I magnet		Blank W/O sensor	1 pcs	Blank W/O mounting parts	Blank W/O rod end joint
TCD Double piston rod type	40 $\phi$ 40	C W/O magnet		SF LED in front	2 pcs	FA Front flange	Y Double knuckle joint
TCA Stroke adjustable 25mm	50 $\phi$ 50			ST LED on top		FB Rear flange	I Single knuckle joint
TCB Stroke adjustable 50mm	63 $\phi$ 63					TC Central trunnion	P Eyebolt floating joint
	80 $\phi$ 80					CA Male clevis	T Basic floating joint
	100 $\phi$ 100					CB Female clevis	
						LB Foot mounting	

### How to order Mounting parts / Rod end joints

ZT	FA	FY	32
TC series	Mounting parts	Rod end joint	Bore size
	Blank W/O mounting parts	Blank W/O rod end joint	32 $\phi$ 32
	FA Front flange	FY Double knuckle joint	40 $\phi$ 40
	FB Rear flange	FI Single knuckle joint	63 $\phi$ 63
	TC Central trunnion	P Eyebolt floating joint	80 $\phi$ 80
		T Basic floating joint	100 $\phi$ 100

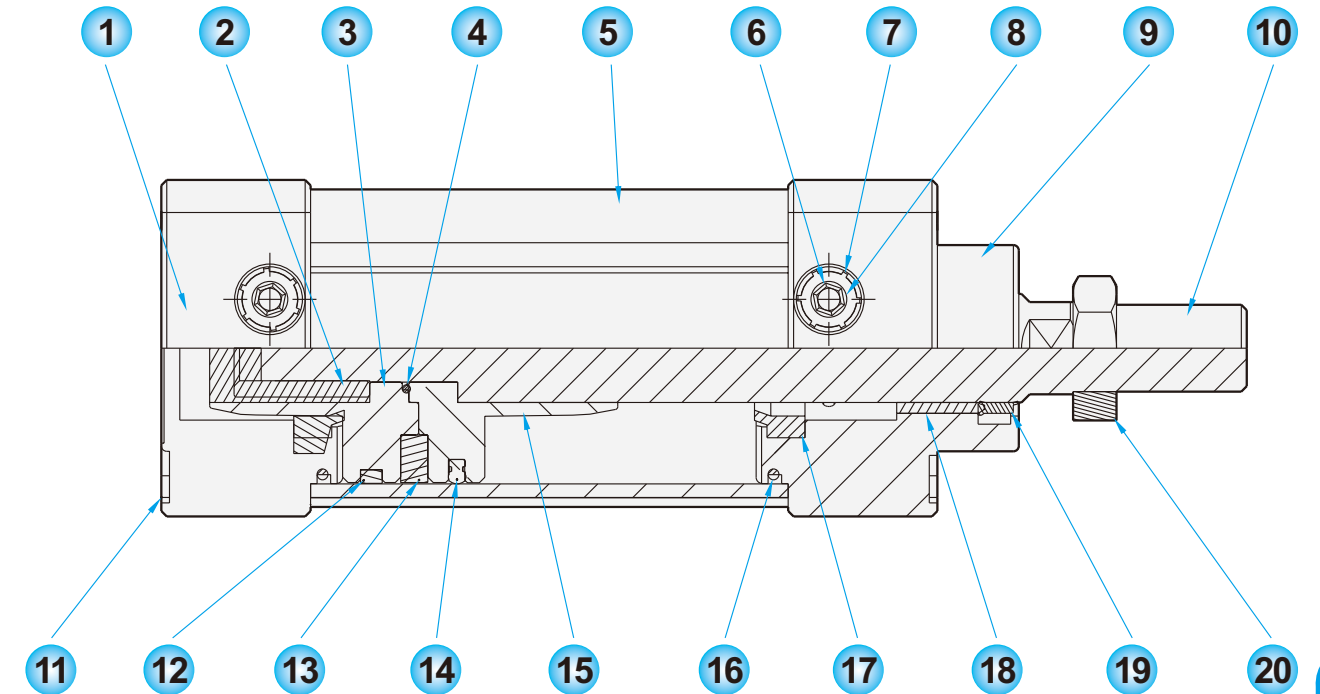
\* Please refer to P5-19~20

\* Please refer to P5-40~41

### Specifications

Bore size	$\phi$ 32	$\phi$ 40	$\phi$ 50	$\phi$ 63	$\phi$ 80	$\phi$ 100
Port size	1/8"	1/4"	3/8"		1/2"	
Fluid	Compressed air					
Acting	Double acting					
Operating pressure range	1.5 ~ 9.5 kgf/cm <sup>2</sup> (150~950Mpa)					
Barrel material	Aluminum alloy					
Cushion	Built in					
Magnet	Option					
Ambient temperature	-5°C ~ 60°C					
Piston speed	50~700mm/Sec.					

### Material of parts



No.	Description	Material	Qty.	No.	Description	Material	Qty.
1	Rear cover	Aluminum alloy	1	11	Fixing bolt	Fe+Ni	8
2	Piston mounting nut	Brass+Ni	1	12	Wear ring	Teflon+Graphite	1
3	Rear piston	Aluminum alloy	1	13	Magnet	Rubber	1
4	O-ring	NBR	1	14	U-Piston seal	NBR	1
5	Barrel	Aluminum alloy	1	15	Front piston	Aluminum alloy	1
6	Cushion needle	Brass	1	16	O-ring	NBR	2
7	Fixing nut	Brass+Ni	2	17	Cushion	PU	2
8	O-ring	NBR	2	18	Bushing	Brass	1
9	Front cover	Aluminum alloy	1	19	Rod seal	PU	1
10	Piston rod	S45C+Cr	1	20	Nut	Fe+Ni	1

### Stroke table

Bore size		Acting	Standard stroke(mm)
$\phi$ 32	$\phi$ 63	Double acting	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350,
$\phi$ 40	$\phi$ 80		400, 450, 500, 550, 600, 650, 700, 750, 800, 850,
$\phi$ 50	$\phi$ 100		900, 950, 1000

Note: Please contact our sales for non-standard stroke.



### Theoretical force

Bore size	φ 32		φ 40		φ 50		φ 63		φ 80		φ 100		
Rod diameter	φ 12		φ 16		φ 20		φ 20		φ 25		φ 25		
Acting	Double acting		Double acting		Double acting		Double acting		Double acting		Double acting		
	Push	Pull	Push	Pull	Push	Pull	Push	Pull	Push	Pull	Push	Pull	
Operating pressure (kgf/cm <sup>2</sup> )	1	8.04	6.91	12.5	10.5	19.6	16.5	31.1	28	50.2	45.3	78.5	73.6
	2	16	9.8	25.1	21	39.2	33	62.3	56	100	90.7	157	147
	3	24.1	13.8	37.6	31.5	58.9	49.5	93.5	84	150	136	235	220
	4	32.1	20.7	50.2	42	78.5	66	124	112	201	181	314	294
	5	40.2	27.6	62.8	52.5	98.1	82.5	155	140	251	226	392	368
	6	48.2	34.6	75.3	63	117	99	187	168	301	272	417	441
	7	56.2	41.5	87.9	73.5	137	116	218	196	351	317	549	515
	8	64.3	48.4	100	84	157	132	249	224	402	362	628	589
	9	72.3	55.3	113	94.5	176	149	280	252	452	408	706	662
	10	80.4	62.2	125	105	196	165	311	280	502	453	785	736

Push :  $F_1 = A_1 \times P \times B$  (kgf)

Pull :  $F_2 = A_2 \times P \times B$  (kgf)

Single acting force :  $F_3 = (A_1 \times P - S) \times B$  (kgf)

(Spring return)

Single acting force :  $F_4 = (A_2 \times P - S) \times B$  (kgf)

(Spring extend)

A1 : Piston area for push

$$A_1 = \frac{\pi}{4} D^2$$

A2: Piston area for pull

$$A_2 = \frac{\pi}{4} (D^2 - d^2)$$

D : Bore size (mm)

d : Rod diameter (mm)

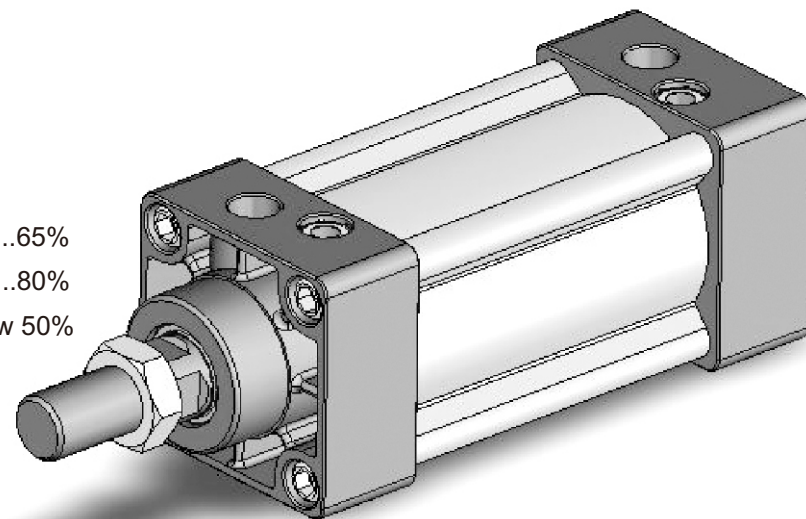
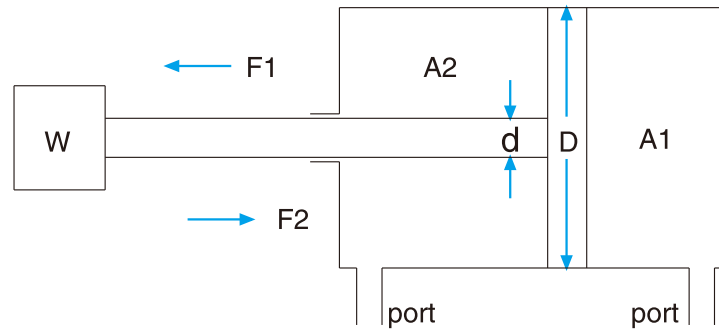
P : Operating pressure (kgf/cm<sup>2</sup>)

S : Spring force (kgf)

B : Loading rate : Medium speed.....65%

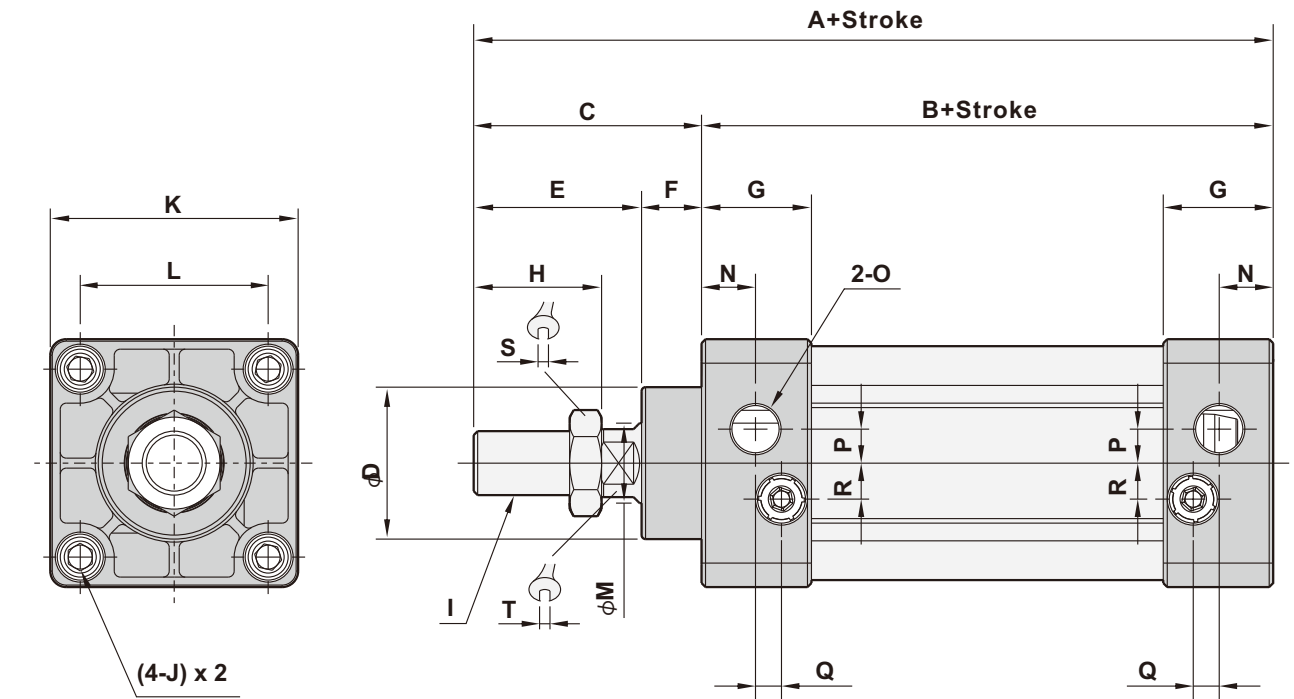
Low speed.....80%

High speed.....Below 50%



### Dimensions

#### ISO6430 standard type



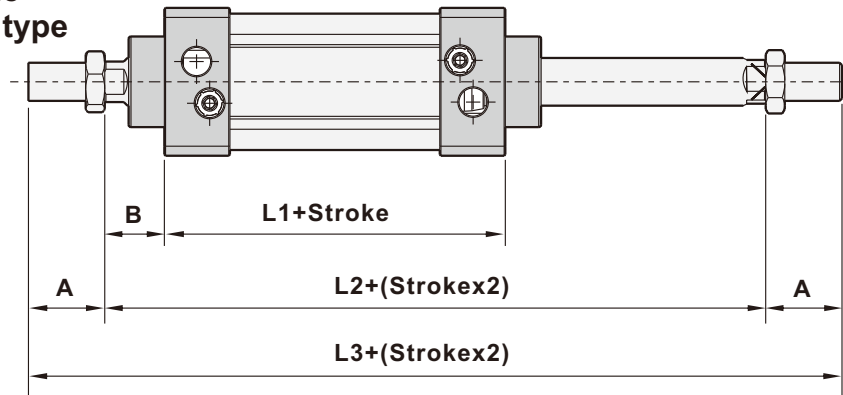
(Unit : mm)

Bore size	A	B	C	D	E	F	G	H	I	J
φ 32	140	93	47	φ 28	32	15	27.5	22	M10xP1.25	M6xP1.0
φ 40	142	93	49	φ 32	34	15	27.5	24	M12xP1.25	M6xP1.0
φ 50	150	93	57	φ 34	42	15	27.5	32	M16xP1.5	M6xP1.0
φ 63	153	96	57	φ 34	42	15	29	32	M16xP1.5	M8xP1.25
φ 80	183	108	75	φ 47	54	21	33	40	M20xP1.5	M10xP1.5
φ 100	189	114	75	φ 47	54	21	33	40	M20xP1.5	M10xP1.5

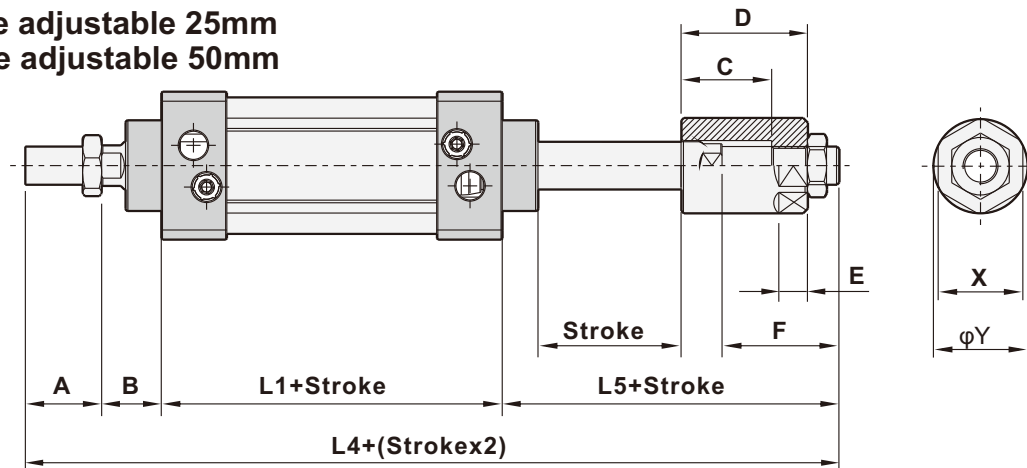
Bore size	K	L	M	N	O	P	Q	R	S	T
φ 32	45	33	φ 12	13.75	G 1/8	3.5	6.5	7	17	10
φ 40	50	37	φ 16	13.5	G 1/4	6	6	7	19	13
φ 50	62	47	φ 20	13.5	G 1/4	8.5	5.5	9	24	17
φ 63	75	56	φ 20	14.5	G 3/8	8.5	5.5	9	24	17
φ 80	94	70	φ 25	16.5	G 3/8	10	7.5	14	26	22
φ 100	112	84	φ 25	16.5	G 1/2	11	7.5	14	26	22

### Dimensions

#### TCD Double piston rod type



#### TCA Stroke adjustable 25mm TCB Stroke adjustable 50mm



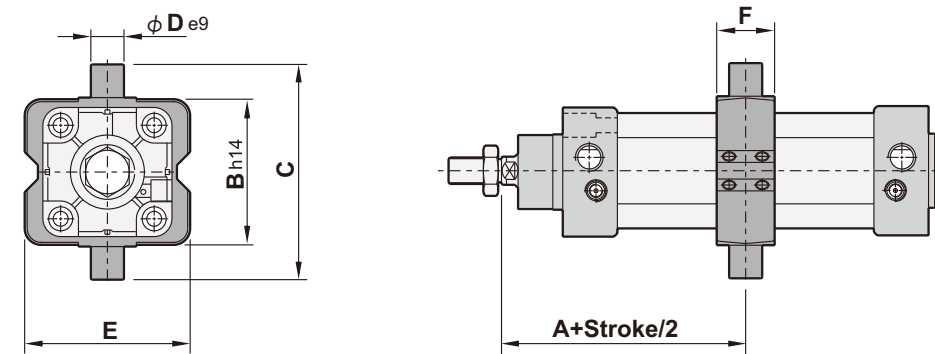
(Unit : mm)

Bore size	A	B	C		D		E	F	
			TCA	TCB	TCA	TCB		TCA	TCB
φ 32	22	25	35	62	47	72	10	47	72
φ 40	24	25	37	62	47	72	10	48	73
φ 50	32	25	38	63	53	78	12	57	82
φ 63	32	25	38	63	53	78	12	57	82
φ 80	40	35	40	65	60	85	12	57	82
φ 100	40	35	40	65	60	85	12	58	83

Bore size	L1	L2	L3	L4		L5		X	Y
				TCA	TCB	TCA	TCB		
φ 32	93	143	187	212	237	72	97	22	φ 25
φ 40	93	143	191	215	240	73	98	27	φ 30
φ 50	93	143	207	232	257	82	107	36	φ 40
φ 63	96	146	210	235	260	82	107	36	φ 40
φ 80	108	178	258	275	300	92	117	36	φ 40
φ 100	114	184	264	282	307	93	118	36	φ 40

### Dimension of mounting parts

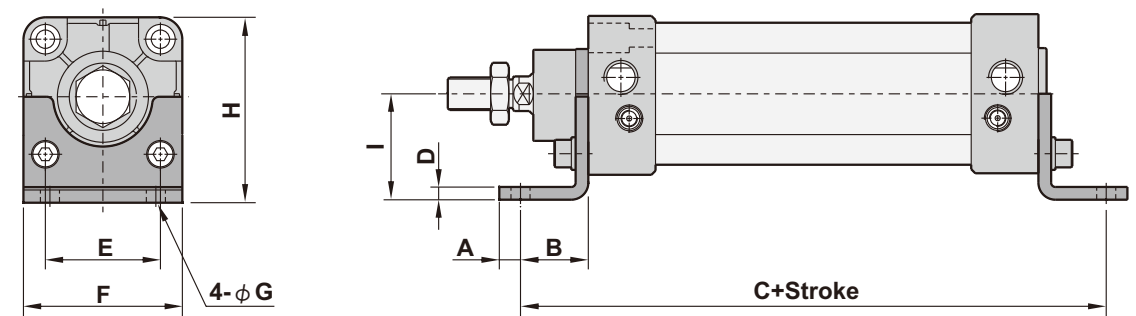
#### TC Central trunnion



(Unit : mm)

Bore size	A	B	C	D	E	F
φ 32	73	55	87	φ16	55	22
φ 40	82.5	63	113	φ25	63	28
φ 50	90	76	126	φ25	76	32
φ 63	97.5	88	138	φ25	88	35
φ 80	110	114	164	φ25	114	40
φ 100	120	132	182	φ25	132	45

#### LB Foot mounting



(Unit : mm)

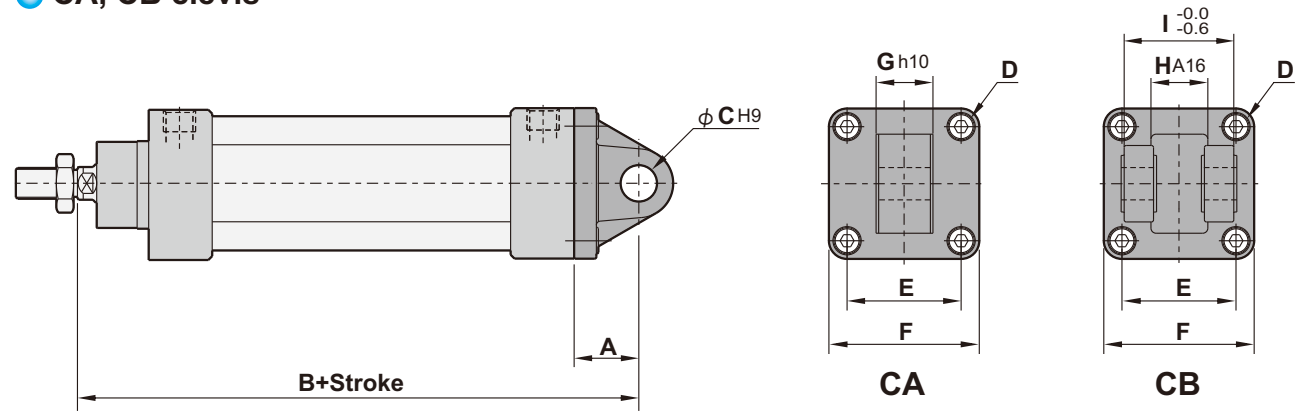
Bore size	A	B	C	D	E	F	G	H	I
φ 32	9.5	20.5	134	3	33	50	φ9	50.5	28
φ 40	14.5	23.5	140	3	36	57	φ12	55	30
φ 50	12	28	149	3	47	68	φ12	67.5	36.5
φ 63	13	31	158	3	56	80	φ12	78.5	41
φ 80	16	30	167	4	70	97	φ14	96	49
φ 100	18	30	173	4	84	112	φ14	113	57

PNEUMATIC CYLINDER

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**Dimensions**

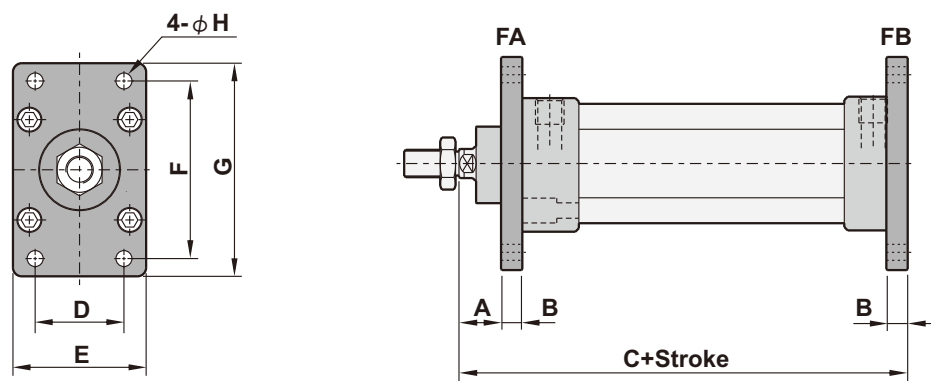
**CA, CB clevis**



(Unit : mm)

Bore size	A		B		C	D	E	F	G	H	I
	CA	CB	CA	CB							
φ 32	34	19	150.5	137	φ 12	M6XP1.0	33	48	16	16.3	32
φ 40	34	19	150.5	137	φ 14	M6XP1.0	37	50	19	20.3	44
φ 50	34	19	152	139	φ 14	M6XP1.0	47	62	20	20.3	52
φ 63	34	19	156	143	φ 14	M8XP1.25	56	75	20	20.3	52
φ 80	48	32	188	175	φ 20	M10XP1.5	70	94	32	32.3	64
φ 100	48	32	194	181	φ 20	M10XP1.5	84	112	32	32.3	64

**FA, FB Front & Rear flange**



(Unit : mm)

Bore size	A	B	C	D	E	F	G	H
φ 32	15	10	125	33	47	58	72	φ7
φ 40	15	10	125	36	52	70	84	φ7
φ 50	15	10	125	47	65	86	104	φ9
φ 63	15	12	130	56	76	98	116	φ9
φ 80	19	16	153	70	95	119	143	φ12
φ 100	19	16	153	84	115	138	162	φ12



PNEUMATIC CYLINDER

PNEUMATIC CYLINDER

### Features

- \* Identical to ISO6432  $\phi 8 \sim \phi 25$ .
- \* Adjustable cushion at both ends is able to absorb vibration from high speed impact and provide stable movement.
- \* Built in magnet for sensor use.
- \* Caps are rolled and polished, which provides stable quality.
- \* Stainless steel SUS304 barrel provides stable movement and features high quality and durable life.
- \* Stainless steel SUS304 barrel features corrosion resistance and strongly mechanical strength.



### How to order

PC	32	B	50	C	SF	1	FA	Y
Type	Bore size	Magnet	Stroke	Cushion	Sensor type	Number of sensor	Mounting parts	Rod end joint
PC	Standard integrated clevis	8 $\phi 8$		Blank W/O cushion	Blank W/O sensor		Blank W/O mounting parts	Blank W/O rod end joint
PCC	Boss-cut	10 $\phi 10$		C W/I cushion $\phi 20 \sim \phi 40$	SF LED in front	1 pc	FA Front flange	Y Double knuckle joint
PCD	Double rod	12 $\phi 12$				2 pcs	FB Rear flange	I Single knuckle joint
PCA	Stroke adjustable 25mm	16 $\phi 16$					CB Female clevis	P Eyebolt floating joint
PCB	Stroke adjustable 50mm	20 $\phi 20$					LB Foot mounting	T Basic floating joint
PCH	Hollow double rod	25 $\phi 25$						L Axial foot type floating joint
PCG	Dual stroke/Single rod/Boss-cut	32 $\phi 32$						F Flange type floating joint.
PCM	Dual stroke/Double rod	40 $\phi 40$						
PCF	Dual stroke/Single rod/Standard							
APCC	Single acting/Spring return/Boss-cut							
APDC	Single acting/Spring extended/Boss-cut							
APC	Single acting/Spring return/Standard							
APD	Single acting/Spring extended/Standard							

### How to order Mounting parts / Rod end joints

ZIP	FA	FY	32
PC series	Mounting parts	Rod end joint	Bore size
	Blank W/O mounting parts	Blank W/O rod end joint	8 $\phi 8$
	FA Front flange	FY Double knuckle joint	10 $\phi 10$
	FB Rear flange	FI Single knuckle joint	12 $\phi 12$
	CB Female clevis	P Eyebolt floating joint	16 $\phi 16$
	LB Foot mounting	T Basic floating joint	20 $\phi 20$
		L Axial foot type floating joint	25 $\phi 25$
		F Flange type floating joint.	32 $\phi 32$
			40 $\phi 40$

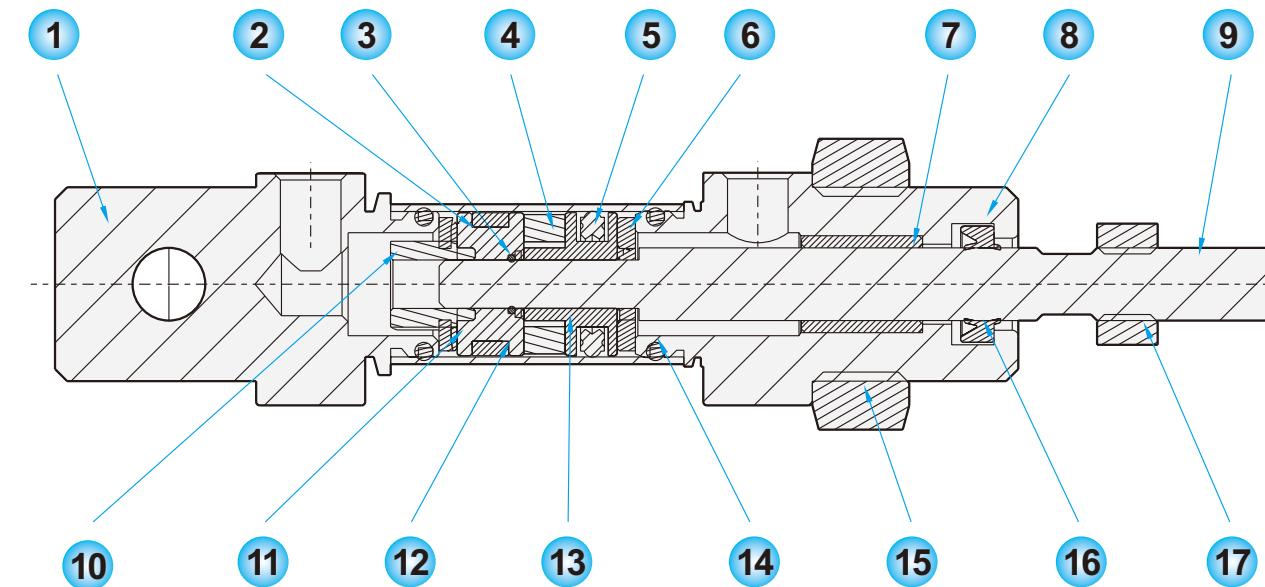
\* Please refer to P5-39

\* Please refer to P5-40~41

### Specifications

Bore size	$\phi 8$	$\phi 10$	$\phi 12$	$\phi 16$	$\phi 20$	$\phi 25$	$\phi 32$	$\phi 40$
Port size	M5xP0.8				1/8"			
Fluid	Compressed air							
Acting	Double acting or single acting							
Cushion	Adjustable type							
Operating pressure range	1.5 ~ 8.5 kgf/cm <sup>2</sup>							
Max. operating pressure	9.5 kgf/cm <sup>2</sup>							
Barrel material	Stainless steel SUS304							
Magnet	Built-in							
Ambient temperature	-5°C ~ 60°C							
Piston speed	50~700mm/Sec							

### Material of parts



No.	Description	Material	Qty.	No.	Description	Material	Qty.
1	Rear cover	Aluminum alloy	1	10	Nut	Fe+Ni	1
2	Wear ring	Teflon +Graphite	1	11	Rear piston	Aluminum alloy	1
3	O-ring	NBR	1	12	Barrel	SUS304	1
4	Magnet	Rubber	1	13	Front piston	Aluminum alloy	1
5	U piston seal	NBR	1	14	O-ring	NBR	2
6	Bumper	NBR	2	15	Fixing nut	SS41+Ni	1
7	Bushing	Brass	1	16	Rod seal	NBR	1
8	Front cover	Aluminum alloy	1	17	Nut	Fe+Ni	1
9	Piston rod	S45C+Cr	1				

### Stroke table

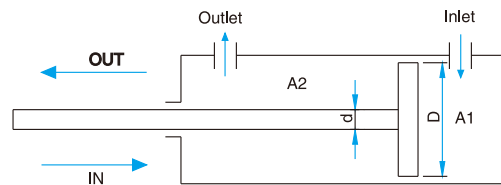
Bore size	Acting	Standard stroke (mm)
$\phi 8$	Double acting	15, 25, 50, 75, 100, 125, 150
$\phi 10$	Double acting	15, 25, 50, 75, 100, 125, 150
$\phi 12$	Double acting	15, 25, 50, 75, 100, 125, 150
$\phi 16$	Double acting	15, 25, 50, 75, 100, 125, 150
$\phi 20$	Single acting	25, 50
$\phi 20$	Double acting	25, 50, 75, 100, 125, 150, 200
$\phi 25$	Single acting	25, 50
$\phi 25$	Double acting	25, 50, 75, 100, 125, 150, 200, 250, 300
$\phi 32$	Single acting	25, 50
$\phi 32$	Double acting	25, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500
$\phi 40$	Single acting	25, 50
$\phi 40$	Double acting	25, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500

Note: Please contact our sales for non-standard stroke.



### Theoretical force

Bore size	φ 8		φ 10		φ 12		φ 16		φ 20		φ 25		φ 32		φ 40		
	Rod diameter φ 4		φ 4		φ 6		φ 6		φ 8		φ 10		φ 12		φ 16		
Acting	Double acting		Double acting		Double acting		Double acting		Double acting		Double acting		Double acting		Double acting		
	Push	Pull	Push	Pull	Push	Pull	Push	Pull	Push	Pull	Push	Pull	Push	Pull	Push	Pull	
Operating pressure (kgf/cm <sup>2</sup> )	1	0.5	0.38	0.79	10.5	1.13	0.9	2.01	1.81	3	2	4	3	8	8	12	10
	2	1	0.75	1.57	21	2.26	1.81	4.02	3.62	6	5	9	8	16	13	25	21
	3	1.51	1.13	2.36	31.5	3.39	2.27	6.03	5.44	9	7	14	12	24	20	37	31
	4	2.01	1.51	3.14	42	4.62	3.63	8.04	7.25	12	10	19	16	32	27	50	42
	5	2.51	1.89	3.93	52.5	5.65	4.54	10.05	9.07	15	13	24	20	40	34	62	52
	6	3.01	2.27	4.71	63	6.78	5.45	12.06	10.88	18	15	29	24	48	47	75	63
	7	3.51	2.64	5.49	73.5	7.91	6.36	14.07	12.69	21	18	34	28	56	48	87	73
	8	4.02	3.02	6.28	84	9.04	7.27	16.07	14.47	25	21	39	32	64	55	100	84
	9	4.52	3.40	7.07	94.5	10.17	8.18	18.08	16.28	28	23	44	37	72	62	113	94
	10	5.03	3.78	7.85	105	11.3	9.09	20.08	18.09	31	26	49	41	80	69	126	105



- A : Cylinder sectional area (cm<sup>2</sup>)
- D : Diameter of bore (cm)
- d : Diameter of piston (cm)
- F : Theoretical force (kg)
- P : Operating pressure (kgf/cm<sup>2</sup>)
- N : Newton
- Q : Air consumption l/min
- A1 : Head end effective piston area (cm<sup>2</sup>)
- A2 : Rod end effective piston area (cm<sup>2</sup>)
- L : Stroke (cm)
- P : Pressure (kgf/cm<sup>2</sup>)
- N : Number of strokes per minute
- K : Safety factor=2

### Actual in force

$$A = \frac{\pi L}{4} (D^2 - d^2) \times P - R$$

### Actual out force

$$F = \frac{\pi D^2}{4} \times P - R$$

### Theoretical force

$$A = \frac{\pi D^2}{4}$$

$$F = A \times P$$

$$N = F \times 9.81 \text{ N/kg}$$

### Output efficiency:

The output efficiency of air cylinder is depended upon the size of piping tubes, size of control valves, cylinder internal friction, and operating speed. It is difficult in solving these factors precisely so we must put more tolerance in design.

Low speed takes 80 percent.

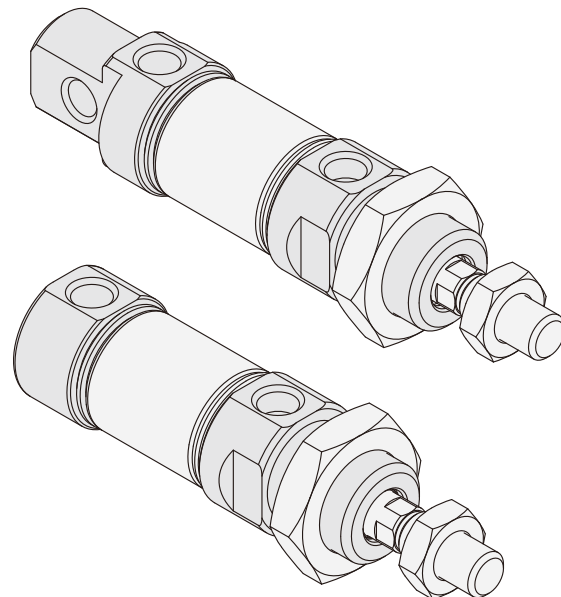
High speed takes less than 50 percent.

Normal operating speed takes 65 percent.

### Calculate of air consumption:

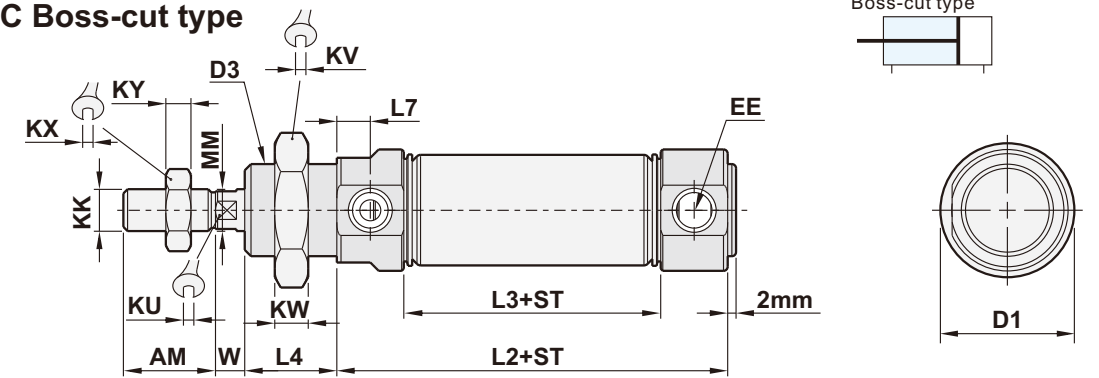
The air consumption is an amount of air to be consumed in cylinder or in the inside of tubing between the cylinder and the selector valve when the selector valve operates in an equipment used with cylinder and it is required to select a compressor.

$$Q = \frac{(A1+A2)L(P+1)N}{1000} \text{ (l/min)} \times K$$



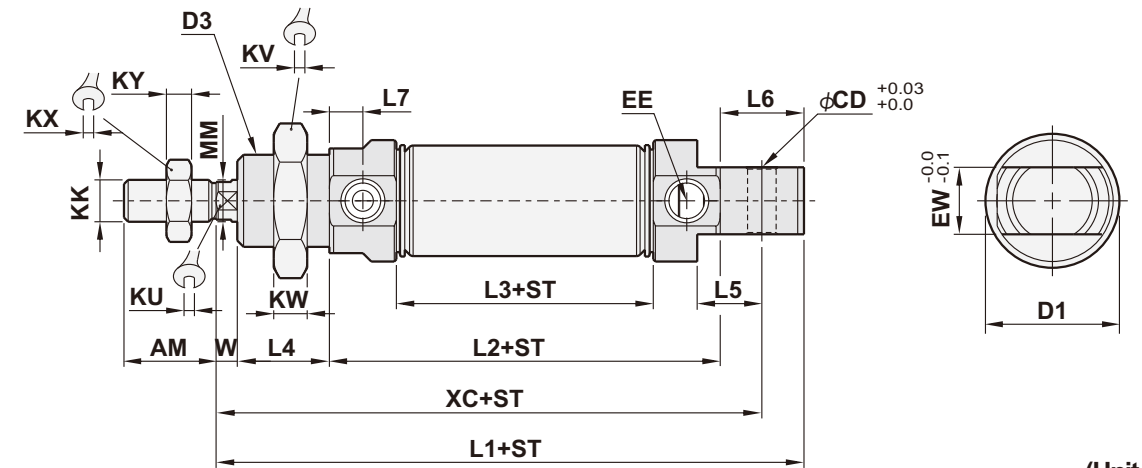
### Dimensions

#### PCC Boss-cut type



PC, PCC  
ISO6432 Standard,  
Boss-cut type

#### PC Standard integrated clevis type



(Unit : mm)

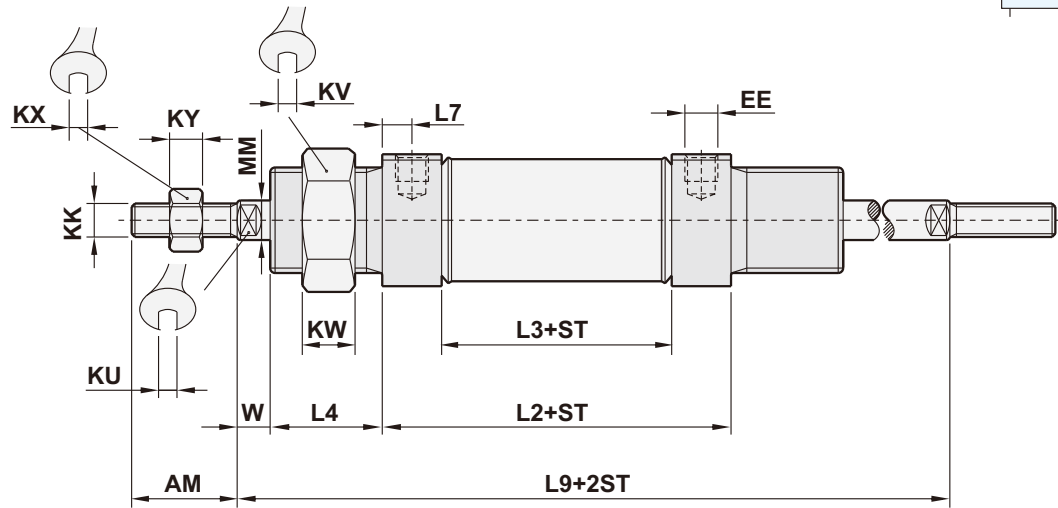
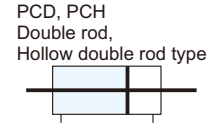
Bore size	AM	D1	φ CD	D3	L1	L2	L3	L4	L5	L6	L7
φ 8	12	17	φ 4	M12xP1.25	71.4	43.4	25.4	12	6	13.4	4.5
φ 10	12	17	φ 4	M12xP1.25	71.4	43.4	25.4	12	6	13.4	4.5
φ 12	16	20	φ 6	M16xP1.5	84.4	45.4	27.4	17	9	18.4	4.5
φ 16	16	20	φ 6	M16xP1.5	90	51	31	17	9	17	5
φ 25	20	29	φ 8	M22xP1.5	109	69	36	18	12	18	7.75
φ 32	22	29	φ 8	M22xP1.5	117.5	69.5	37.5	20	12	20	8
φ 40	22	37	φ 10	M27xP2.0	133	83	47	20	13.5	22	9
	24	45	φ 10	M33xP2.0	138	85	49	20	13.5	22	9

Bore size	KK	KU	KV	KW	KX	KY	MM	W	EW	XC	EE
φ 8	M4xP0.7	3.4	17	4	7	3.2	φ 4	4	8	64	M5xP0.8
φ 10	M4xP0.7	3.4	17	4	7	3.2	φ 4	4	8	64	M5xP0.8
φ 12	M6xP1.0	5	22	6	10	5	φ 6	5	12	75	M5xP0.8
φ 16	M6xP1.0	5	22	6	10	5	φ 8	5	12	82	M5xP0.8
φ 25	M8xP1.25	7	30	6	13	6	φ 8	6	16	95	G 1/8
φ 32	M10xP1.25	9	30	6	17	6	φ 10	8	16	104	G 1/8
φ 40	M10xP1.25	10	32	8	17	6	φ 12	8	22	120	G 1/8
	M12xP1.25	14	41	8	19	7	φ 16	11	26	125	G 1/8

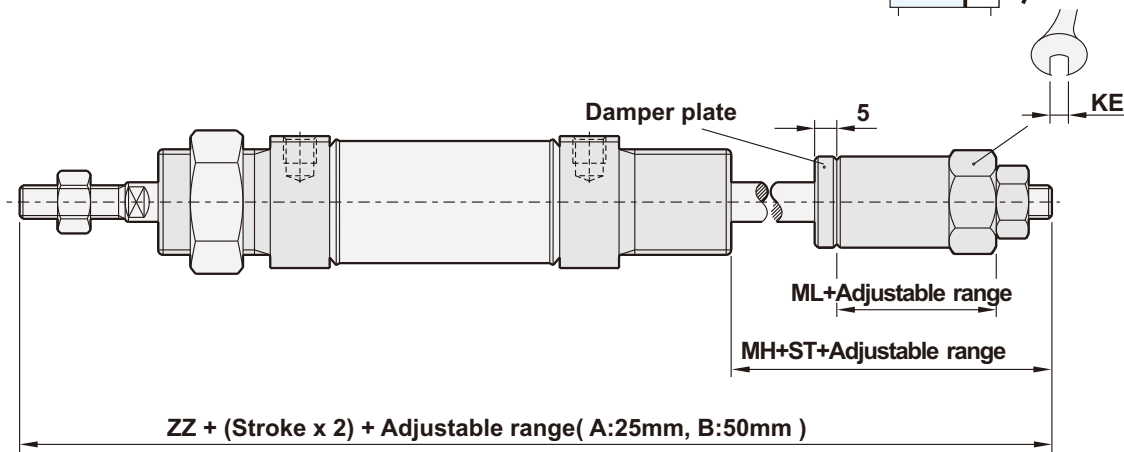
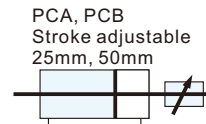
PNEUMATIC CYLINDER

### Dimensions

#### PCD Double rod type



#### PCA Stroke adjustable 25mm PCB Stroke adjustable 50mm



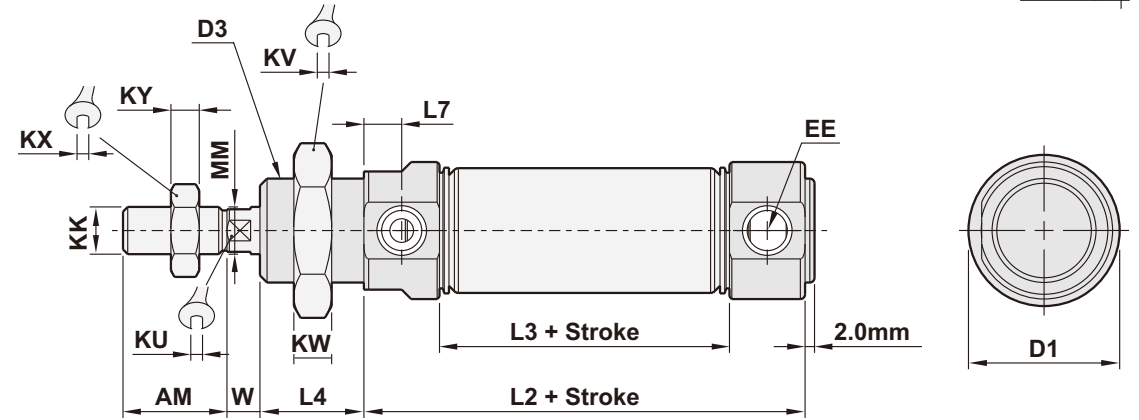
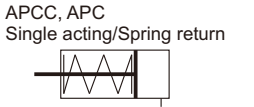
(Unit : mm)

Bore size	AM	L2	L3	L4	L7	L9	EE	KU	KV	KW	KX
φ20	20	67	36	18	7.6	115	G 1/8	7	30	6	13
φ25	22	69.5	37.5	20	8	125.5	G 1/8	9	30	6	17
φ32	22	83	47	20	9	139	G 1/8	10	32	8	17
φ40	24	85	49	20	9	147	G 1/8	14	41	8	19

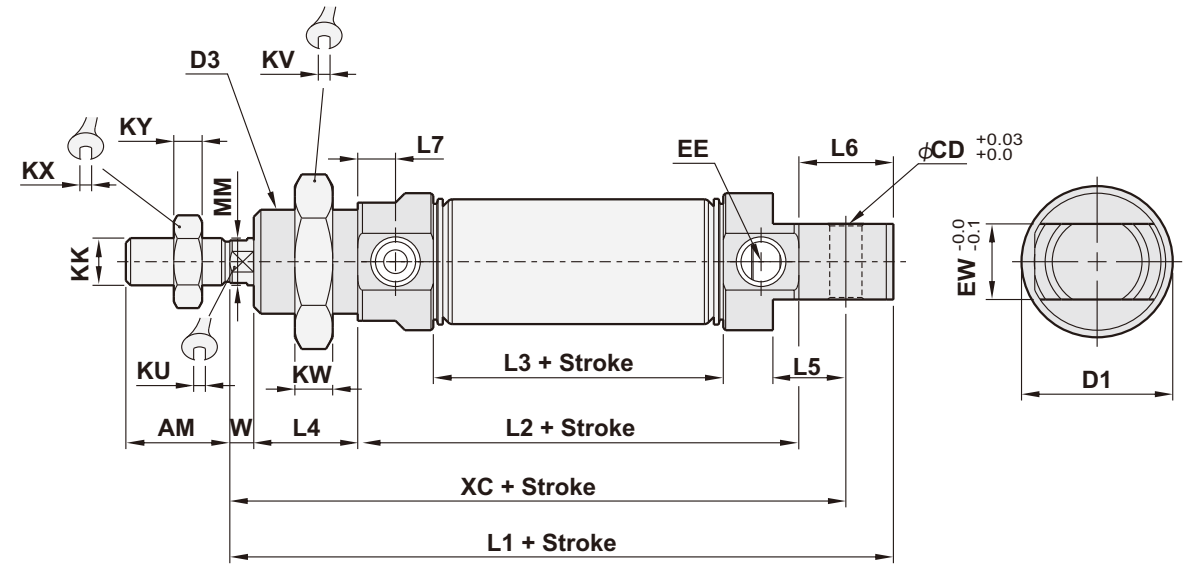
Bore size	KY	MM	W	KK	ZZ	MH	ML	KE
φ20	4	φ8	6	M8xP1.25	165	31	20	19
φ25	6	φ10	8	M10xP1.25	172	33	20	19
φ32	6	φ12	8	M10xP1.25	188	35	22	21
φ40	7	φ16	11	M12xP1.25	195	35	22	26

### Dimensions

#### APCC Single acting/Spring return/Boss-cut



#### APC Single acting/Spring return/Standard integrated clevis



(Unit : mm)

Bore size	AM	D1	φ CD	D3	L1	L2	L3	L4	L5	L6
φ20	20	29	φ8	M22xP1.5	134	92	61	18	12	18
φ25	22	29	φ8	M22xP1.5	142.5	94.5	62.5	20	12	20
φ32	22	37	φ10	M27xP2.0	158	108	72	20	13.5	22
φ40	24	45	φ10	M33xP2.0	163	110	74	20	13.5	22

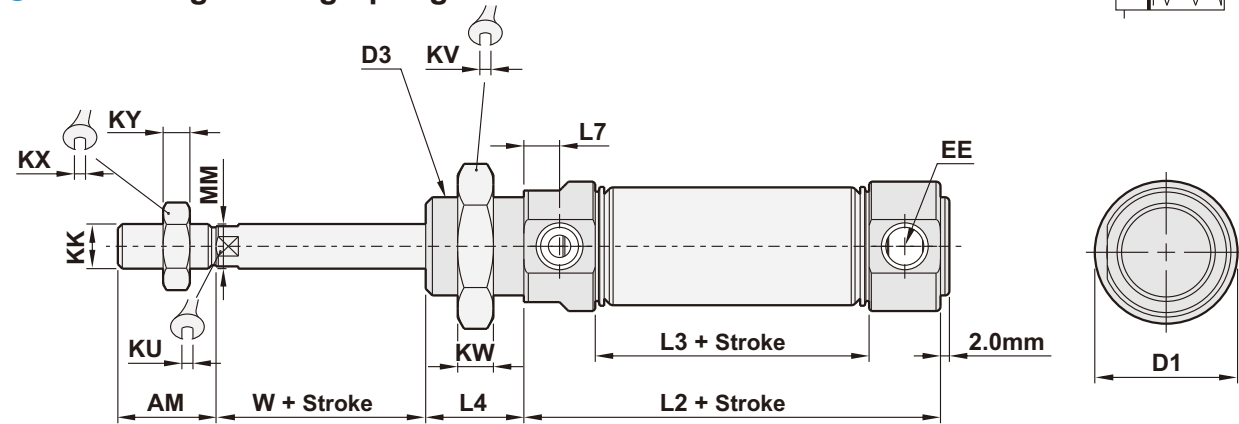
Bore size	L7	KK	KU	KV	KW	KX	KY	MM	W	EW	XC	EE
φ20	7.75	M8xP1.25	7	30	6	13	6	φ8	6	16	120	G 1/8
φ25	8	M10xP1.25	9	30	6	17	6	φ10	8	16	129	G 1/8
φ32	9	M10xP1.25	10	32	8	17	6	φ12	8	22	145	G 1/8
φ40	9	M12xP1.25	14	41	8	19	7	φ16	11	26	150	G 1/8

PNEUMATIC CYLINDER

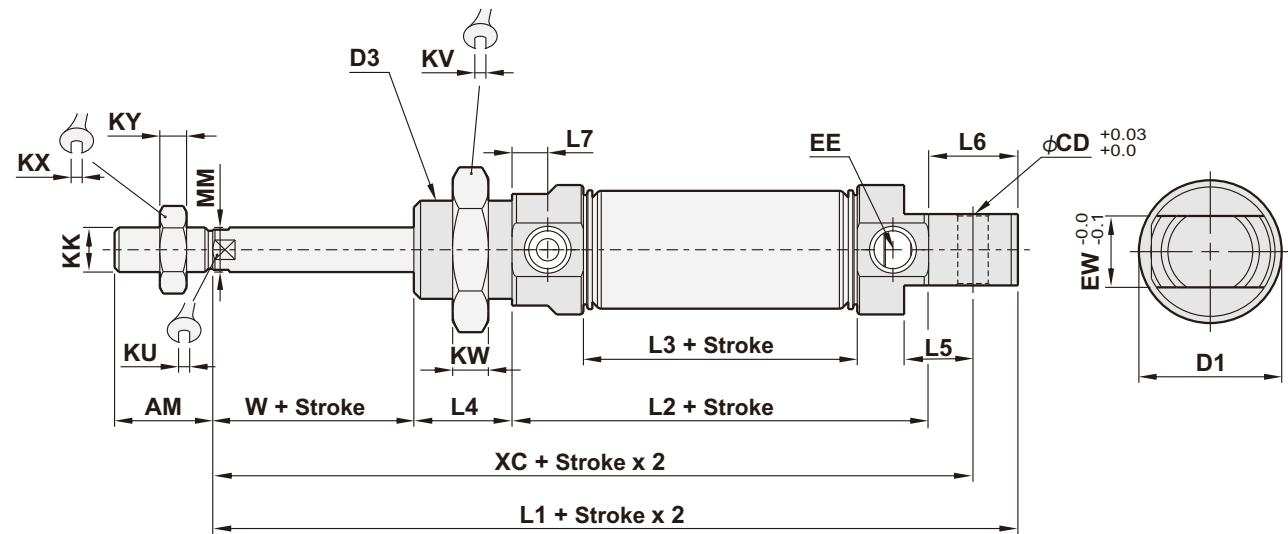
PNEUMATIC CYLINDER

### Dimensions

#### APDC Single acting/Spring extended/Boss-cut



#### APD Single acting/Spring extended/Standard integrated clevis



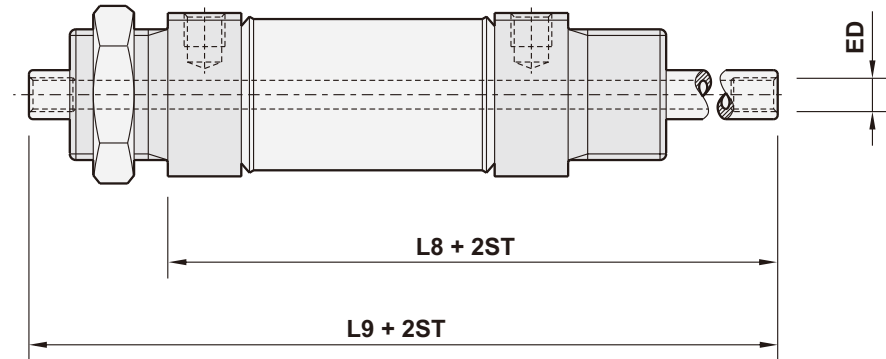
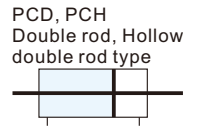
(Unit : mm)

Bore size	AM	D1	φ CD	D3	L1	L2	L3	L4	L5	L6
φ 20	20	29	φ 8	M22xP1.5	134	92	61	18	12	18
φ 25	22	29	φ 8	M22xP1.5	142.5	94.5	62.5	20	12	20
φ 32	22	37	φ 10	M27xP2.0	158	108	72	20	13.5	22
φ 40	24	45	φ 10	M33xP2.0	163	110	74	20	13.5	22

Bore size	L7	KK	KU	KV	KW	KX	KY	MM	W	EW	XC	EE
φ 20	7.75	M8xP1.25	7	30	6	13	6	φ 8	6	16	120	G 1/8
φ 25	8	M10xP1.25	9	30	6	17	6	φ 10	8	16	129	G 1/8
φ 32	9	M10xP1.25	10	32	8	17	6	φ 12	8	22	145	G 1/8
φ 40	9	M12xP1.25	14	41	8	19	7	φ 16	11	26	150	G 1/8

### Dimensions

#### PCH Hollow double rod type



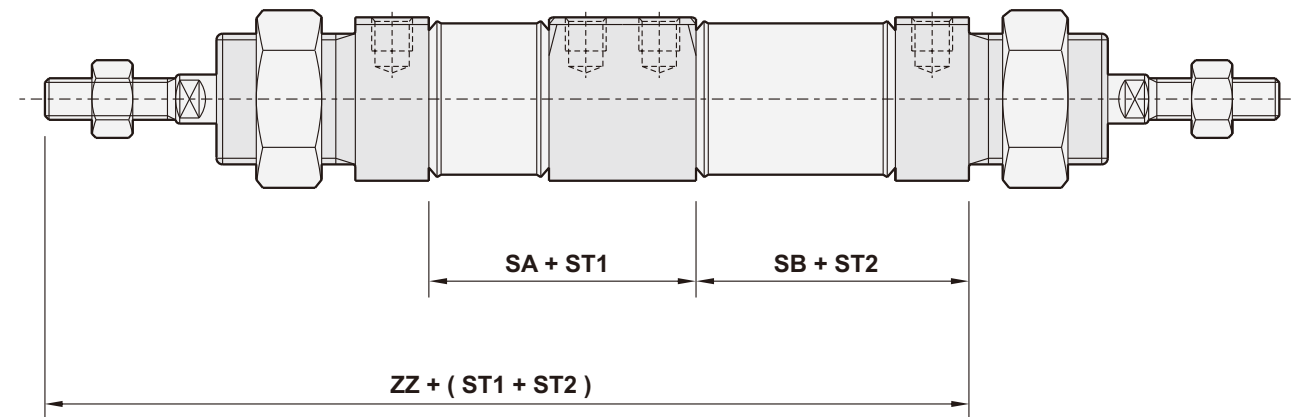
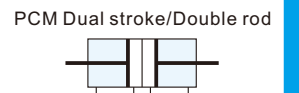
(Unit : mm)

Bore size	L8	L9	ED
φ 25	98	126	M5xP0.8x20
φ 32	112	140	PT1/8
φ 40	116	147	PT1/8

- Suitable for vacuum pad.
- Vacuum pad and other devices could be directly screwed on to rod end.
- Permanent magnetic is built-in.

Please refer to page 5-23 PC standard integrated clevis type for other dimensions.

#### PCM Dual stroke/Double rod



(Unit : mm)

Bore size	SA	SB	ZZ
φ 25	85.5	53.5	239
φ 32	101.5	65.5	267
φ 40	103	67	280

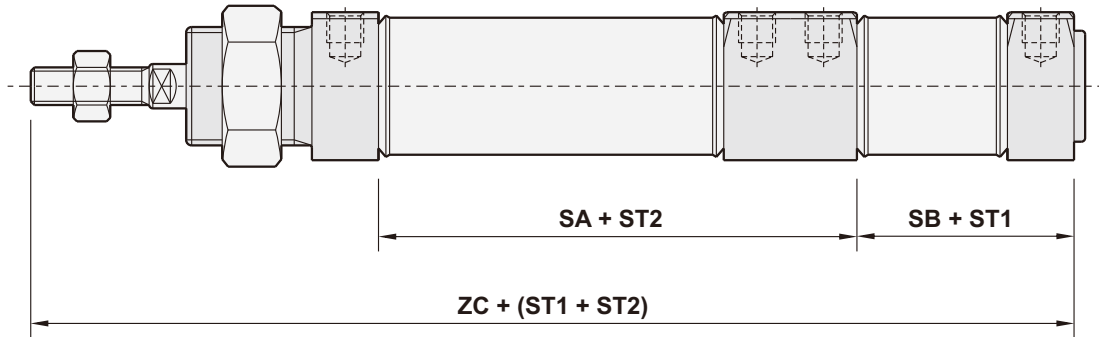
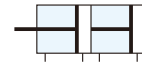
- Two cylinders are constructed as one cylinder in a shrinking back configuration.
- Cylinder stroke could be controlled in three or four steps.
- One end of piston rod is fixed, the cylinder barrel executes the movement, the cylinder must connected with flexible line connections.
- Applicable to positioning transportation, quantitative filling, right and left displacement, capable flow control...etc, which is for accuracy and speedy purpose.

Please refer to page 5-23 PC standard integrated clevis type for other dimensions.

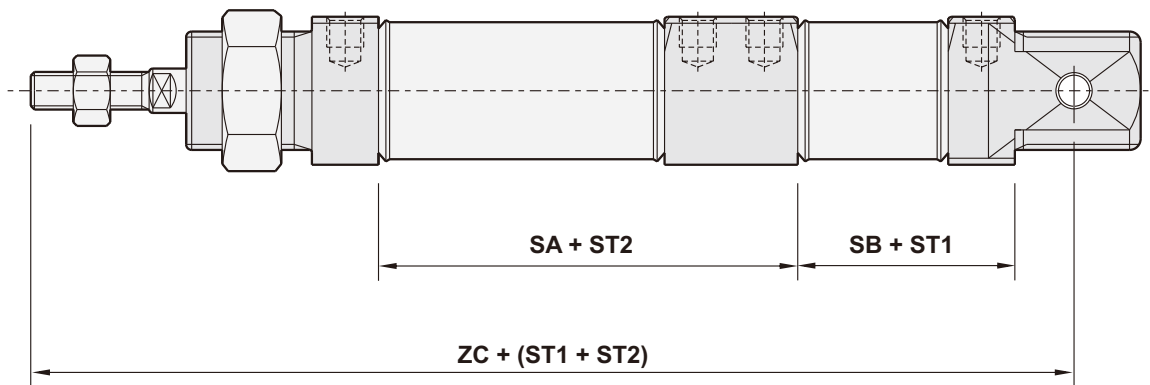
**Dimensions**

**PCG Dual stroke/Single rod/Boss-cut**

PCG, PCF  
Dual stroke/Single rod/Boss-cut  
Dual stroke/Single rod/Standard  
integrated clevis



**PCF Dual stroke/Single rod/Standard integrated clevis**



(Unit : mm)

Bore size	SA	SB	ZC	ZT
φ 32	101.5	65.5	225.5	217
φ 40	103	67	234	225

Please refer to page 5-23 PC standard integrated clevis type for other dimensions.

- The cylinder constructed as one cylinder in line allows double the output force.
- Cylinder stroke could be controlled in three steps.
- Applicable to position transportation, quantitative filling and flow control, right and left displacement.
- Adjustable cushions on both ends.
- Permanent magnet is built-in.





#### Features

- \* Identical to ISO6432  $\phi 20 \sim \phi 25$ .
- \* Miniature size and space saving.



#### How to order

<b>PCL</b>		<b>32</b>	<b>B</b>	<b>50</b>	<b>M</b>	<b>SF</b>	<b>1</b>	<b>FA</b>	<b>Y</b>
Type	Bore size	Magnet	Stroke	Sensor type	Sensor type	Number of sensor	Mounting parts	Rod end joint	
PCL Standard integrated clevis(Aluminum)	20 $\phi 20$			Blank W/O magnet	Blank W/O sensor	1 pc	Blank W/O mounting parts	Blank W/O rod end joint	
PCCL Boss-cut	25 $\phi 25$			M W/I magnet	SF LED in front	2 pcs	FA Front flange	Y Double knuckle joint	
PCLD Double rod	32 $\phi 32$						FB Rear flange	I Single knuckle joint	
PCLA Stroke adjustable 25mm	40 $\phi 40$						CB Female clevis	P Eyebolt floating joint	
PCLB Stroke adjustable 50mm							LB Foot mounting	L Basic floating joint	
APCL Single acting/Spring return/Standard					AL-20R			T Axial foot type floating joint	
APDL Single acting/Spring extended/Standard					ST LED on top			F Flange type floating joint.	
APCCL Single acting/Spring return/Boss-cut									
APDCL Single acting/Spring extended/Boss-cut									

#### How to order Mounting parts / Rod end joints

<b>ZIP</b>	<b>FA</b>	<b>Y</b>	<b>32</b>
PC, PCL Series	Mounting parts	Rod end joint	Bore size
	Blank W/O mounting parts	Blank W/O rod end joint	20 $\phi 20$
	FA Front flange	FY Double knuckle joint	25 $\phi 25$
	FB Rear flange	FI Single knuckle joint	32 $\phi 32$
	CB Female clevis	P Eyebolt floating joint	40 $\phi 40$
	LB Foot mounting	T Basic floating joint	
		L Axial foot type floating joint	
		F Flange type floating joint.	

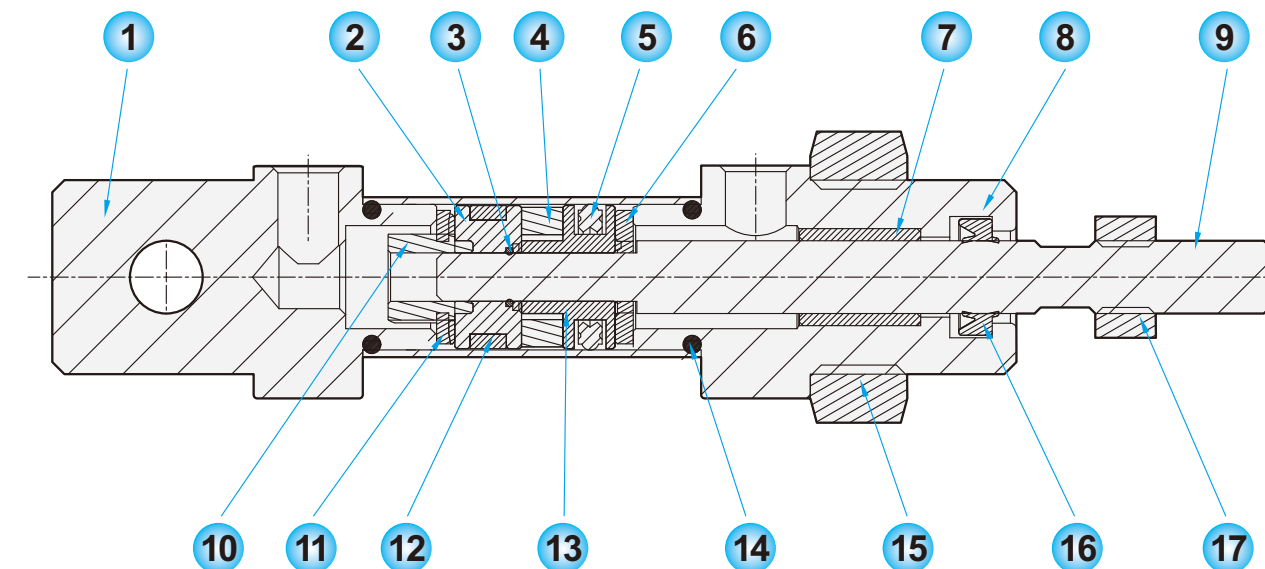
\* Please refer to P5-39

\* Please refer to P5-40~41

#### Specifications

Bore size	$\phi 20$	$\phi 25$	$\phi 32$	$\phi 40$
Port size	1/8"			
Fluid	Compressed air			
Acting	Double acting or single acting			
Operating pressure range	1.5 ~ 8.5 kgf/cm <sup>2</sup>			
Max operating pressure	9.5 kgf/cm <sup>2</sup>			
Barrel material	Aluminum alloy			
Ambient temperature	-5°C ~ 60°C			
Piston speed	50~700mm/Sec			

#### Material of parts



No.	Description	Material	Qty.	No.	Description	Material	Qty.
1	Rear cover	Aluminum alloy	1	10	Nut	Fe+Ni	1
2	Wear ring	Teflon+Graphite	1	11	Rear piston	Aluminum alloy	1
3	O-ring	NBR	1	12	Barrel	Aluminum alloy	1
4	Magnet	Rubber	1	13	Front piston	Aluminum alloy	1
5	U piston seal	NBR	1	14	O-ring	NBR	2
6	Bumper	NBR	2	15	Fixing nut	SS41+Ni	1
7	Bushing	Brass	1	16	Rod seal	NBR	1
8	Front cover	Aluminum alloy	1	17	Nut	Fe+Ni	1
9	Piston rod	S45C+Cr	1				

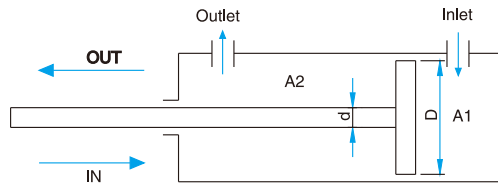
#### Stroke table

Bore size	Acting	Standard stroke (mm)
$\phi 20$	Single acting	25, 50
$\phi 20$	Double acting	25, 50, 75, 100, 125, 150, 200
$\phi 25$	Single acting	25, 50
$\phi 25$	Double acting	25, 50, 75, 100, 125, 150, 200, 250, 300
$\phi 32$	Single acting	25, 50
$\phi 32$	Double acting	25, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500
$\phi 40$	Single acting	25, 50
$\phi 40$	Double acting	25, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500

Note: Please contact our sales for non-standard stroke.

#### Theoretical force

Bore size	φ 20		φ 25		φ 32		φ 40		
Rod diameter	φ 8		φ 10		φ 12		φ 16		
Acting	Double acting		Double acting		Double acting		Double acting		
	Push	Pull	Push	Pull	Push	Pull	Push	Pull	
Operating pressure (kgf/cm <sup>2</sup> )	1	3	2	4	3	8	8	12	10
	2	6	5	9	8	16	13	25	21
	3	9	7	14	12	24	20	37	31
	4	12	10	19	16	32	27	50	42
	5	15	13	24	20	40	34	62	52
	6	18	15	29	24	48	47	75	63
	7	21	18	34	28	56	48	87	73
	8	25	21	39	32	64	55	100	84
	9	28	23	44	37	72	62	113	94
	10	31	26	49	41	80	69	126	105



#### Actual in force

$$A = \frac{\pi L}{4} (D^2 - d^2) \times P - R$$

#### Actual out force

$$F = \frac{\pi D^2}{4} \times P - R$$

#### Theoretical force

$$A = \frac{\pi D^2}{4}$$

$$F = A \times P$$

$$N = F \times 9.81 \text{ N/kg}$$

#### Output efficiency:

The output efficiency of air cylinder is depended upon the size of piping tubes, size of control valves, cylinder internal friction, and operating speed. It is difficult in solving these factors precisely so we must put more tolerance in design.

Low speed takes 80 percent.

High speed takes less than 50 percent.

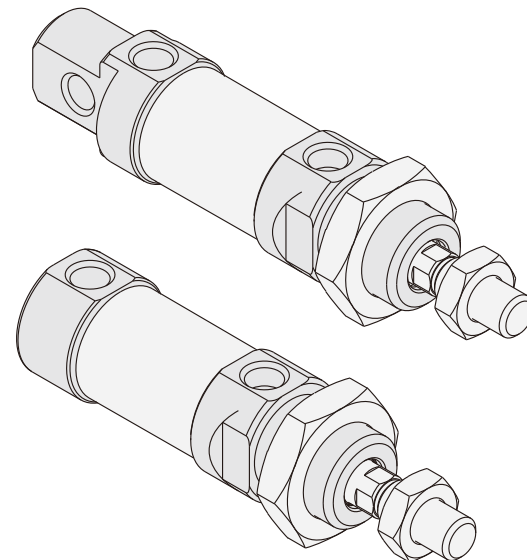
Normal operating speed takes 65 percent.

#### Calculate of air consumption:

The air consumption is an amount of air to be consumed in cylinder or in the inside of tubing between the cylinder and the selector valve when the selector valve operates in an equipment used with cylinder and it is required to select a compressor.

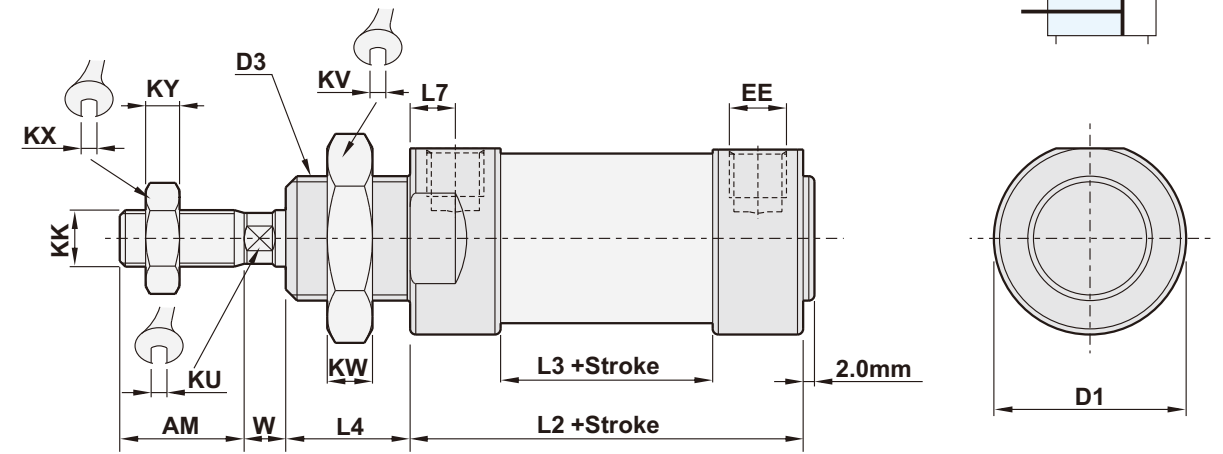
$$Q = \frac{(A1+A2)L(P+1)N}{1000} \text{ (l/min)} \times K$$

- A : Cylinder sectional area (cm<sup>2</sup>)
- D : Diameter of bore (cm)
- d : Diameter of piston (cm)
- F : Theoretical force (kg)
- P : Operating pressure (kgf/cm<sup>2</sup>)
- N : Newton
- Q : Air consumption l/min
- A1 : Head end effective piston area (cm<sup>2</sup>)
- A2 : Rod end effective piston area (cm<sup>2</sup>)
- L : Stroke (cm)
- P : Pressure (kgf/cm<sup>2</sup>)
- N : Number of strokes per minute
- K : Safety factor=2



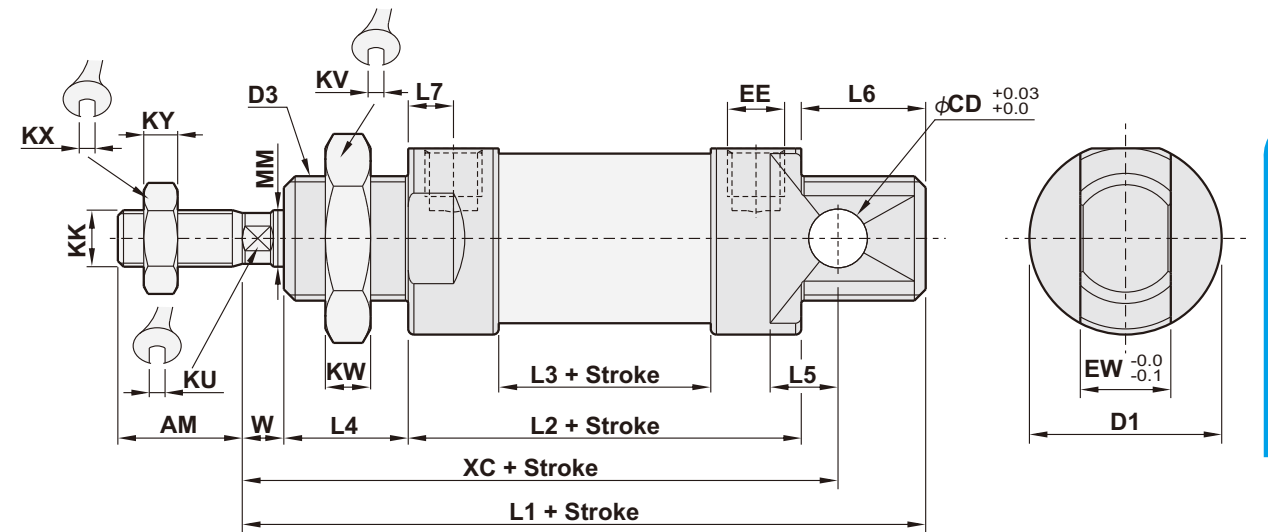
#### Dimensions

##### PCCL Boss-cut type



PCL, PCCL  
ISO6432 Standard,  
Boss-cut type

##### PCL Standard integrated clevis type



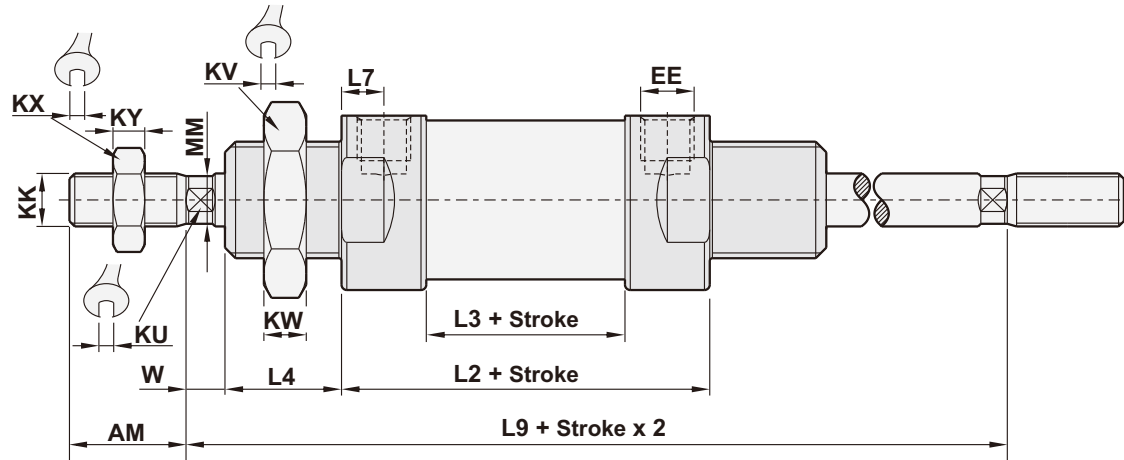
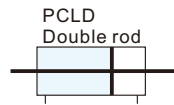
(Unit : mm)

Bore size	AM	D1	φ CD	D3	L1	L2	L3	L4	L5	L6	L7
φ 20	20	29	φ 8	M22xP1.5	109	67	36	18	12	20	7.75
φ 25	22	34	φ 8	M22xP1.5	117.5	69.5	37.5	20	12	20	8
φ 32	22	39.5	φ 10	M27xP2.0	133	83	47	20	13.5	22	9
φ 40	24	49	φ 10	M33xP2.0	138	85	49	20	13.5	22	9

Bore size	KK	KU	KV	KW	KX	KY	MM	W	EW	XC	EE
φ 20	M8xP1.25	7	32	8	14	4	φ 8	6	16	95	G 1/8
φ 25	M10xP1.25	9	32	8	17	6	φ 10	8	16	104	G 1/8
φ 32	M10xP1.25	10	36	9.5	17	6	φ 12	8	22	120	G 1/8
φ 40	M12xP1.25	14	40.5	9.5	19	8	φ 16	11	26	125	G 1/8

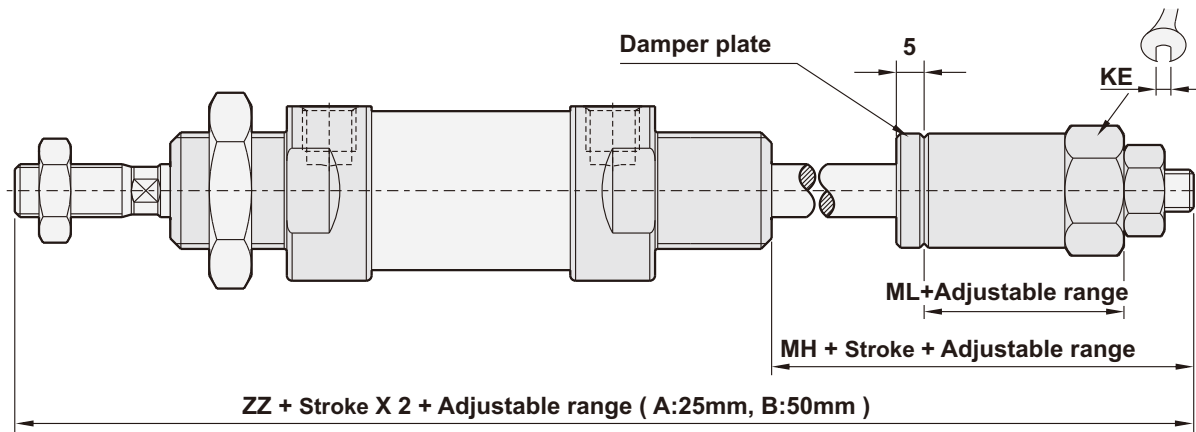
#### Dimensions

##### PCLD Double rod type



##### PCLA Stroke adjustable 25mm PCLB Stroke adjustable 50mm

PCLA, PCLB  
Stroke adjustable 25mm, 50mm



(Unit : mm)

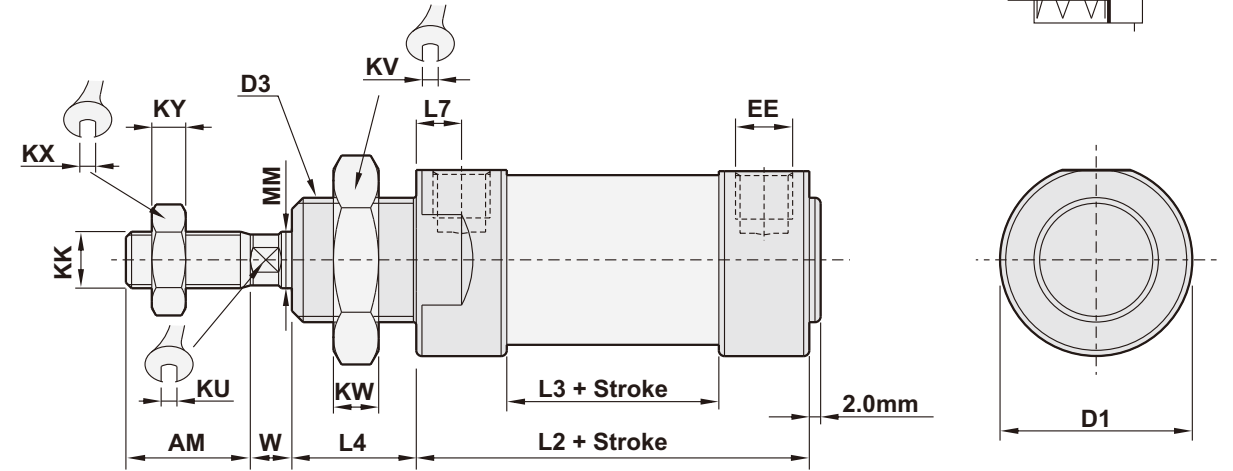
Bore size	AM	L2	L3	L4	L7	EE	KU	KV	KW	KX	KY
φ 20	20	67	36	18	7.75	PS 1/8	4	32	8	14	4
φ 25	22	69.5	37.5	20	8	PS 1/8	6	32	8	17	6
φ 32	22	83	47	20	9	PS 1/8	6	36	9.5	17	6
φ 40	24	85	49	20	9	PS 1/8	8	40.5	9.5	19	8

Bore size	MM	W	KK	L9	ZZ	MH	ML	KE
φ 20	φ 8	6	M8xP1.25	115	160	31	20	19
φ 25	φ 10	8	M10xP1.25	125.5	172.5	33	20	19
φ 32	φ 12	8	M10xP1.25	139	188	35	22	21
φ 40	φ 16	11	M12xP1.25	147	195	35	22	26

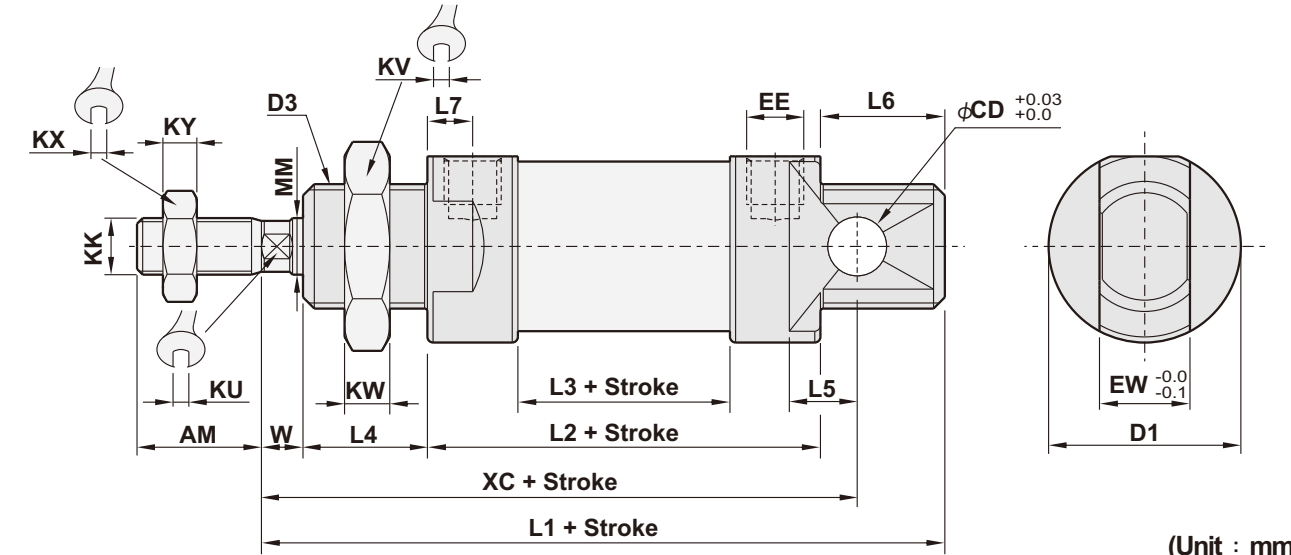
#### Dimensions

##### APCCL Single acting/Spring return/Boss-cut

APCL, APCCL  
Single acting/Spring return



##### APCL Single acting/Spring return/Standard integrated clevis



(Unit : mm)

Bore size	AM	D1	φ CD	D3	L1	L2	L3	L4	L5	L6
φ 20	20	29	φ 8	M22xP1.5	134	92	61	18	12	20
φ 25	22	34	φ 8	M22xP1.5	142.5	94.5	62.5	20	12	20
φ 32	22	39.5	φ 10	M27xP2.0	158	108	72	20	13.5	22
φ 40	24	49	φ 10	M33xP2.0	163	110	74	20	13.5	22

Bore size	L7	KK	KU	KV	KW	KX	KY	MM	W	EW	XC	EE
φ 20	7.75	M8xP1.25	7	32	8	14	4	φ 8	6	16	120	G 1/8
φ 25	8	M10xP1.25	9	32	8	17	6	φ 10	8	16	129	G 1/8
φ 32	9	M10xP1.25	10	36	9.5	17	6	φ 12	8	22	145	G 1/8
φ 40	9	M12xP1.25	14	40.5	9.5	19	8	φ 16	11	26	150	G 1/8

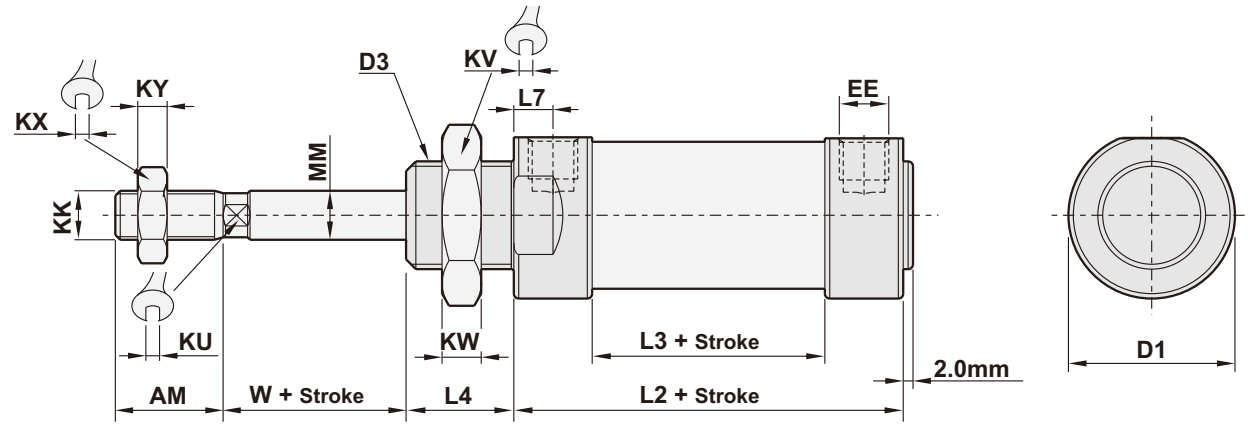
PNEUMATIC CYLINDER

PNEUM AIR CYLINDERS

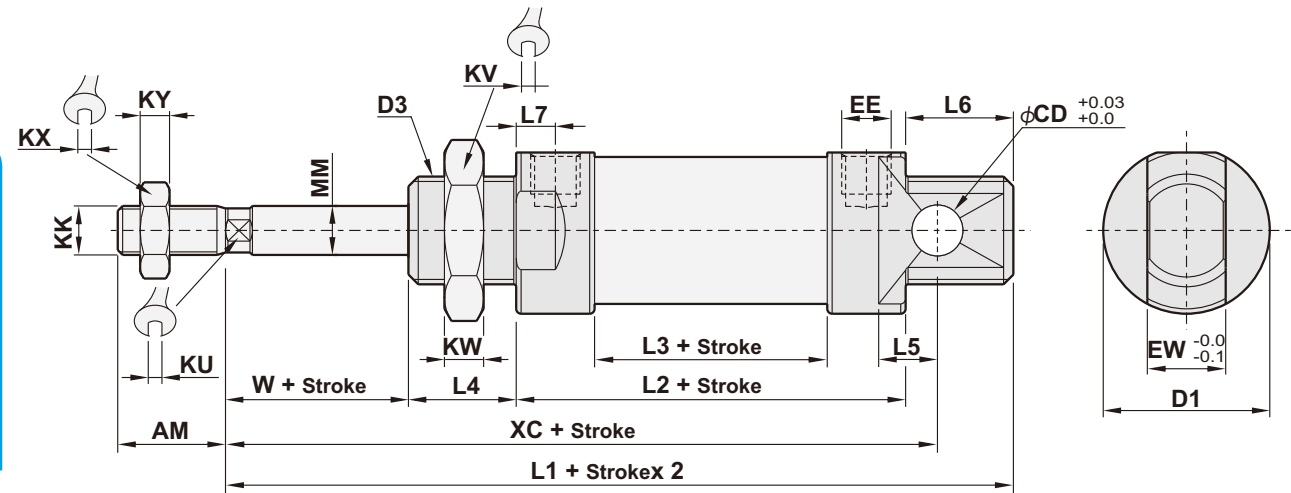
## Dimensions

### APDCL Single acting/Spring extended/Boss-cut

APDL, APDCL  
Single acting/Spring  
extended



### APDL Single acting/Spring extended/Standard integrated clevis



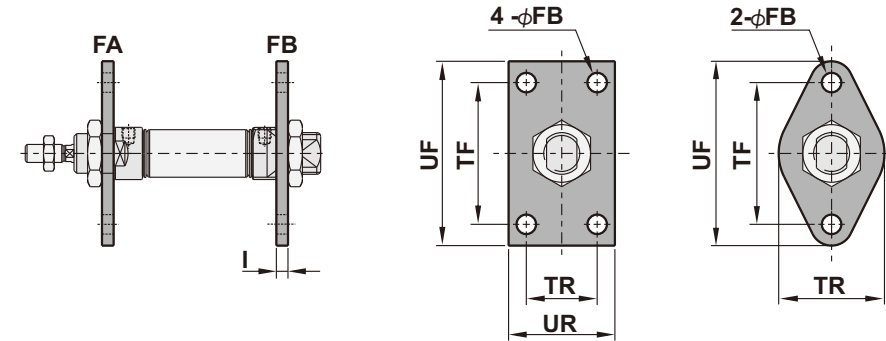
(Unit : mm)

Bore size	AM	D1	φ CD	D3	L1	L2	L3	L4	L5	L6
φ 20	20	29	φ 8	M22xP1.5	134	93	61	18	12	20
φ 25	22	34	φ 8	M22xP1.5	140.5	94	62.5	20	12	20
φ 32	22	39.5	φ 10	M27xP2.0	158	108	72	20	13.5	22
φ 40	24	49	φ 10	M32xP2.0	163	110	74	20	13.5	22

Bore size	L7	KK	KU	KV	KW	KX	KY	MM	W	EW	XC	EE
φ 20	7.75	M8xP1.25	7	32	8	14	4	φ 8	6	16	120	G 1/8
φ 25	8	M10xP1.25	9	32	8	17	6	φ 10	8	16	129	G 1/8
φ 32	9	M10xP1.25	10	36	9.5	17	6	φ 12	8	22	145	G 1/8
φ 40	9	M12xP1.25	14	40.5	9.5	19	8	φ 16	11	26	150	G 1/8

## Dimension of mounting parts

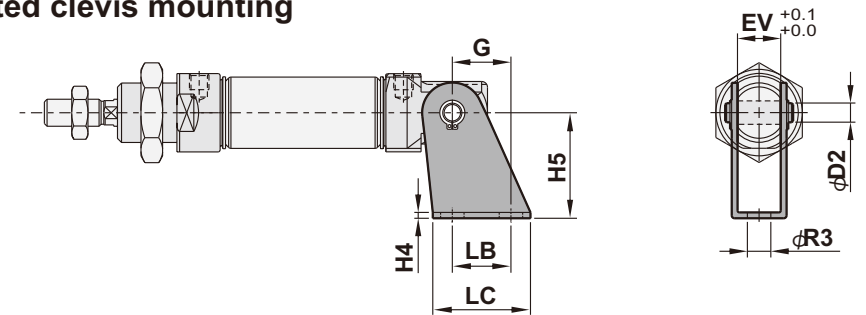
### Flange mounting(FA, FB)



(Unit : mm)

Bore size	TF	TR	UF	UR	I	φ FB	Bore size	TF	TR	UF	UR	I	φ FB
φ 12	40	--	52	30	3	φ 5.5	φ 25	50	--	66	40	3	φ 6.5
φ 16	40	--	52	30	3	φ 5.5	φ 32	50	26	64	40	3	φ 7
φ 20	50	--	66	40	3	φ 6.5	φ 40	54	30	74	50	4	φ 7

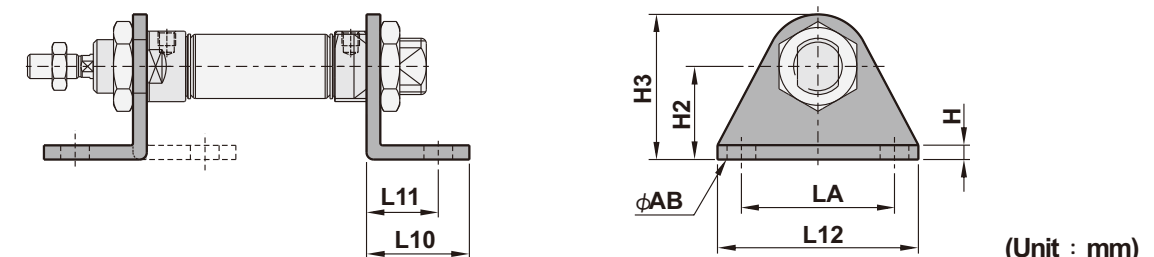
### CB Integrated clevis mounting



(Unit : mm)

Bore size	LB	LC	EV	H4	H5	G	φ D2	φ R3	Bore size	LB	LC	EV	H4	H5	G	φ D2	φ R3
φ 12	15	25	12	3	27	15	6 <sup>+0.03/+0.0</sup>	φ 6	φ 25	20	32	16	3	30	18.5	8 <sup>+0.04/+0.0</sup>	φ 7
φ 16	15	25	12	3	27	15	6 <sup>+0.03/+0.0</sup>	φ 6	φ 32	25	40	22	3	40	22.5	10 <sup>+0.03/+0.0</sup>	φ 9
φ 20	20	32	16	3	30	18.5	8 <sup>+0.04/+0.0</sup>	φ 7	φ 40	25	40	26	3	40	22.5	10 <sup>+0.03/+0.0</sup>	φ 9

### LB Axial foot mounting



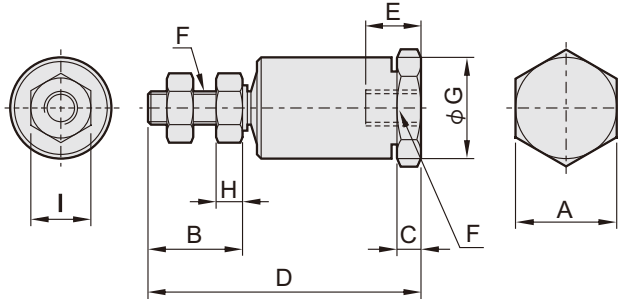
(Unit : mm)

Bore size	L10	L11	L12	LA	H	H2	H3	φ AB	Bore size	L10	L11	L12	LA	H	H2	H3	φ AB
φ 12	20.5	14	42	32	3	20	33	φ 6	φ 25	26	17	54	40	3	25	45	φ 7
φ 16	20.5	14	42	32	3	20	33	φ 6	φ 32	25	18	64	50	3.5	28	48	φ 7
φ 20	26	17	54	40	3	25	45	φ 7	φ 40	30	20	74	54	4	31.5	60	φ 7



**Dimensions**

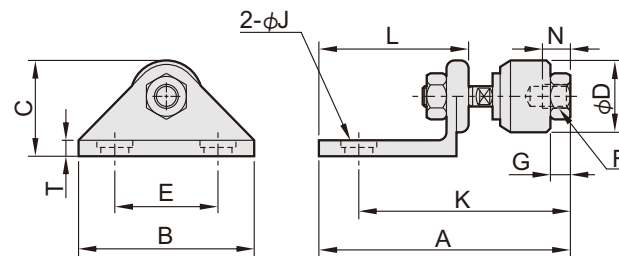
**Basic type floating joint (T)**



(Unit : mm)

Bore size	A	B	C	D	E	F	G	H	I
φ 10	5	10	4	26	5	M4xP0.7	12	-	-
φ 12	10	12.5	5	37	7	M6xP1.0	18	-	-
φ 16	10	12.5	5	37	7	M6xP1.0	18	-	-
φ 20	13	18	7	50	8	M8xP1.25	24	-	-
φ 25	17	20	8	58	9	M10xP1.25	26	6	17
φ 32	17	20	8	58	9	M10xP1.25	26	6	17
φ 40	17	21.5	8	58	9	M12xP1.25	28	7	19
φ 50	27	27	12	90	14	M16xP1.5	45	8	24
φ 63	27	27	12	90	14	M16xP1.5	45	8	24
φ 80	27	27	12	90	14	M16xP1.5	45	8	24
φ 100	33	29	14	102	18	M20xP1.5	53	8	27
φ 125	33	29	14	102	18	M20xP1.5	53	8	27
φ 160	-	54	16	147	39	M27xP2.0	62	14	-
φ 200	-	72	42	251	80	M36xP2.0	80	18	-
	-	72	42	251	80	M36xP2.0	80	18	-

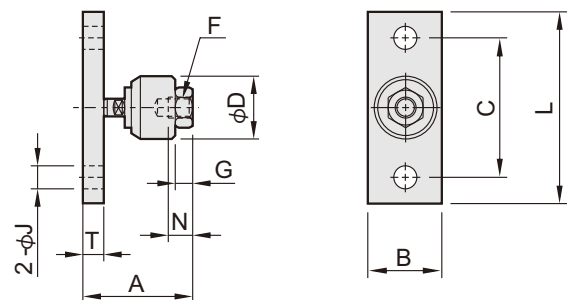
**Axial foot type floating joint (L)**



(Unit : mm)

Bore size	A	B	C	D	E	G	J	K	L	N	T	F
φ 20	63	44	15	24	26	7	9	53	29	8	4	M8xP1.25
φ 25	74	44	19	26	26	8	9	63	35	9	5	M10xP1.25
φ 32	71	45	19	28	26	8	9	60	35	9	5	M12xP1.25
φ 40	71	45	19	28	26	8	9	60	35	9	5	M12xP1.25
φ 50	151	60	28	45	32	13	11	105	90	15	15	M18xP1.5
φ 63	151	60	28	45	32	13	11	105	90	15	15	M18xP1.5
φ 80	178	68	35	53	36	15	14	124	106	18	20	M20xP1.5
φ 100	178	68	35	53	36	15	14	124	106	18	20	M20xP1.5

**Flange type floating joint (F)**

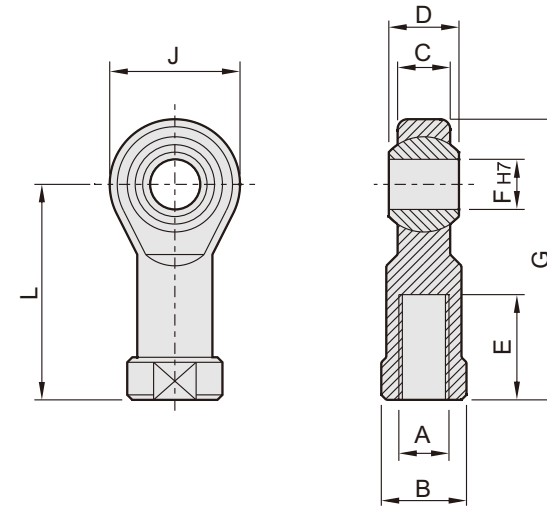


(Unit : mm)

Bore size	A	B	C	D	F	G	J	L	N	T
φ 20	39	25	40	24	M8xP1.25	7	φ6.6	52	8	6
φ 25	48	32	44	26	M10xP1.25	8	φ6.6	56	9	9
φ 32	45	32	44	28	M12xP1.25	8	φ6.6	80	9	9
φ 40	45	32	44	28	M12xP1.25	8	φ6.6	80	9	9
φ 50	76	74	45	45	M18xP1.5	13	φ11	-	15	15
φ 63	76	74	45	45	M18xP1.5	13	φ11	-	15	15
φ 80	87	87	100	62	M20xP1.5	15	φ11	-	18	18
φ 100	87	87	100	62	M20xP1.5	15	φ11	-	18	18

**Dimensions**

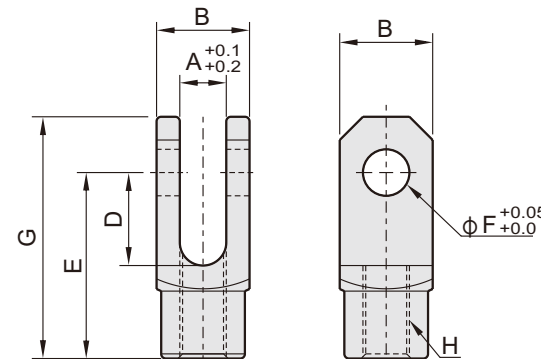
**Eyebolt floating joint (P)**



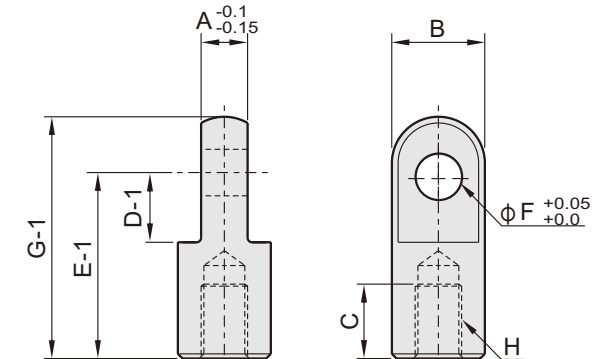
(Unit : mm)

Bore size	A	B	C	D	E	F	G	J	L
φ 12	M6xP1.0	11	6.7	9	14	φ6	39	18	30
φ 16	M6xP1.0	11	6.7	9	14	φ6	39	18	30
φ 20	M8xP1.25	14	9	12	17	φ8	47	22	36
φ 25	M10xP1.25	17	10.5	14	21	φ10	56	26	43
φ 32	M10xP1.25	17	10.5	14	21	φ10	56	26	43
φ 40	M12xP1.25	19	12	16	24	φ12	65	30	50
φ 50	M12xP1.25	19	12	16	24	φ12	65	30	50
φ 63	M16xP1.5	22	15	21	33	φ16	83	38	64
φ 80	M16xP1.5	22	15	21	33	φ16	83	38	64
φ 100	M16xP1.5	22	15	21	33	φ16	83	38	64
φ 125	M20xP1.5	30	18	25	40	φ20	100	46	77
φ 160	M20xP1.5	40	26	37	56	φ30	143.5	67	110
φ 200	M27xP2.0	-	37	-	51	φ30	145	70	110
	M36xP2.0	-	43	-	56	φ35	165	80	125
	M36xP2.0	-	43	-	56	φ35	165	80	125

**Double knuckle joint (Y)**



**Single knuckle joint (I)**



(Unit : mm)

Bore size	A	B	C	D	D-1	E	E-1	F	G	G-1	H
φ 20	8	19	---	10	10	35	35	φ8	45	45	M8XP1.25
φ 25	8	19	---	10	10	35	35	φ8	45	45	M10XP1.25
φ 32	10	20	16	20	14	40	40	φ10	52	52	M10XP1.25
φ 40	12	25	18	24	16	48	48	φ12	62	62	M12XP1.25
φ 50	16	32	26	32	20	65	56	φ16	83	70	M16XP1.5
φ 63	16	32	26	32	20	65	56	φ16	83	70	M16XP1.5
φ 80	20	40	30	40	30	80	68	φ20	105	88	M20XP1.5
φ 100	20	40	30	40	30	80	68	φ20	105	88	M20XP1.5
φ 125	30	54	45	55	40	110	110	φ30	151.8	155	M27xP2.0
φ 160	35	70	55	73	65	144	144	φ35	195.8	195	M36xP2.0
φ 200	35	70	55	73	65	144	144	φ35	195.8	195	M36xP2.0

### Features


- \* Hard anodized aluminum barrel provides corrosion and wear resistance as well as long life.
- \* Compact size and space saving.
- \* Strict quality control ensures the product in stability and excellent performance.
- \* Simple maintenance and installation.
- \* Different bore sizes and strokes for selection.
- \* Various sensor switches are available.



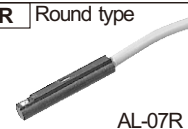
### How to order

※ For  $\phi$  JC32~ $\phi$  100 non-rotated type, please contact our sales for request.

JC		32	B	50	H	M	SS	1	
Type	Bore size	Stroke	Rod thread		Magnet		Sensor type		Number of sensor
JC	Standard double acting	12 $\phi$ 12	Blank	Female thread	Blank	W/O magnet	Blank	W/O sensor	1 pc
JCO	Single acting/Spring extended ( $\phi$ 12~ $\phi$ 50)	16 $\phi$ 16 20 $\phi$ 20	H	Male thread	M	W/I magnet	SS	Square type	2 pcs
JCI	Single acting/Spring return ( $\phi$ 12~ $\phi$ 50)	25 $\phi$ 25 32 $\phi$ 32							
JCA	Stroke adjustable 25mm ( $\phi$ 20~ $\phi$ 100)	40 $\phi$ 40 50 $\phi$ 50							
JCB	Stroke adjustable 50mm ( $\phi$ 20~ $\phi$ 100)	63 $\phi$ 63 80 $\phi$ 80							
JCDD	Double rod/Double acting ( $\phi$ 20~ $\phi$ 100)	100 $\phi$ 100							



AL-11R



AL-07R

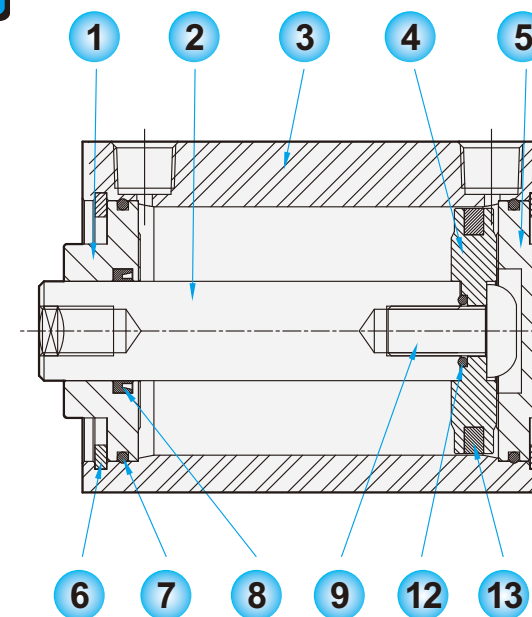
※ Please use stainless setting bolts for magnet type cylinder to mount.

### Specifications

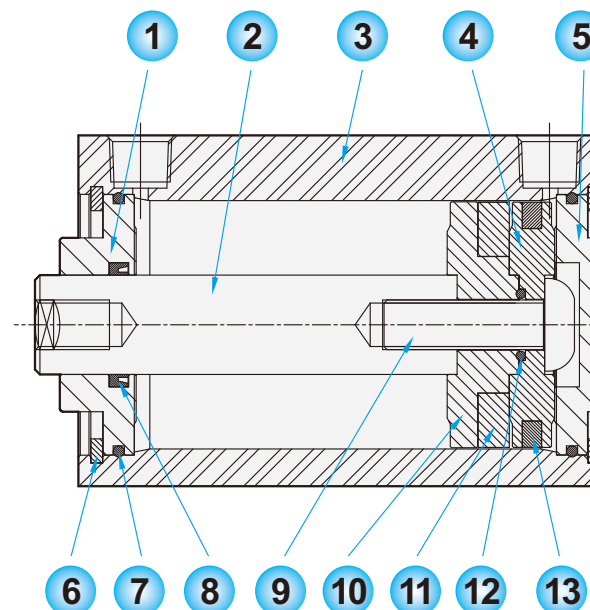
Bore size	$\phi$ 12	$\phi$ 16	$\phi$ 20	$\phi$ 25	$\phi$ 32	$\phi$ 40	$\phi$ 50	$\phi$ 63	$\phi$ 80	$\phi$ 100
Port size	M5x0.8			1/8"		1/4"		3/8"		
Fluid	Compressed air									
Acting	Double acting or single acting									
Operating pressure range	1.0 ~ 9 kgf/cm <sup>2</sup>									
Max operating pressure	9.5 kgf/cm <sup>2</sup>									
Barrel material	Aluminum alloy									
Magnet	Option									
Ambient temperature	-5°C ~ 60°C									
Piston speed	50~700mm/Sec									
Double acting mm/Sec.	50~500					50~300		50~250		
Single acting mm/Sec.	100~500					—				

### Material of parts

#### Without magnet



#### With magnet



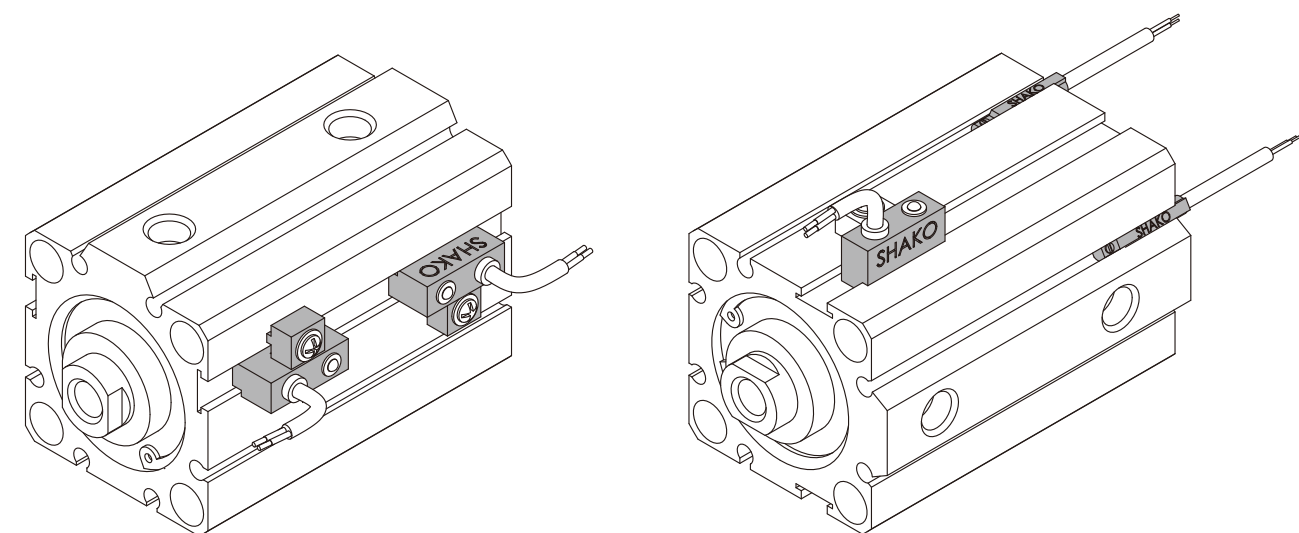
No.	Description	Material	Qty.	No.	Description	Material	Qty.
1	Front cover	Aluminum alloy	1	8	Rod packing	NBR	1
2	Piston rod	S45C+Cr	1	9	Hex socket head cap screw	Fe	1
3	Barrel	Aluminum alloy	1	10	Magnet holder	Aluminum	1
4	Piston	Aluminum alloy	1	11	Magnet	Ferrite magnet	1
5	Rear cover	Aluminum alloy	1	12	O-ring	NBR	1
6	Snap ring	Spring steel	2	13	U-Piston seal	NBR	1
7	O-ring	NBR	2				

**Stroke table**

Model	Bore size	Standard stroke (mm)										Standard stroke (with magnet)											
		5	10	15	20	25	30	35	40	45	50	75	5	10	15	20	25	30	35	40	45	50	75
Double acting	φ 12	●	●	●	●	●	●						●	●	●	●	●	●					
	φ 16	●	●	●	●	●	●						●	●	●	●	●	●					
	φ 20	●	●	●	●	●	●	◎	●	◎	●		●	●	●	●	●	◎	●	◎	●		
	φ 25	●	●	●	●	●	●	◎	●	◎	●		●	●	●	●	●	◎	●	◎	●		
	φ 32	●	●	●	●	●	●	◎	●	◎	●		●	●	●	●	●	◎	●	◎	●		
	φ 40	◎	●	◎	●	◎	●	◎	●	◎	●		◎	●	◎	●	◎	●	◎	●	◎	●	
	φ 50	◎	●	◎	●	◎	●	◎	●	◎	●		◎	●	◎	●	◎	●	◎	●	◎	●	
	φ 63	◎	●	◎	●	◎	●	◎	●	◎	●		◎	●	◎	●	◎	●	◎	●	◎	●	
	φ 80	◎	●	◎	●	◎	●	◎	●	◎	●	●	◎	●	◎	●	◎	●	◎	●	◎	●	●
φ 100	◎	●	◎	●	◎	●	◎	●	◎	●	●	◎	●	◎	●	◎	●	◎	●	◎	●	●	
Single acting	φ 12	●	●									◎	●										
	φ 16	●	●									◎	●										
	φ 20	●	●									◎	●										
	φ 25	●	●									◎	●										
	φ 32	●	●									◎	●										
	φ 40	●	●									◎	●										
φ 50		●		●								●		●									

Note: 1.The body length is increased of 5mm for stroke 15mm, 25mm, 35mm, 45mm, 55mm.  
 2.Strokes on ◎ are optional.  
 3.Special stroke length is on request For cylinder stroke over 75mm, contact our sales

**Sensor mounting example**



**Theoretical force**

Bore size	Rod diameter	Acting	Piston area mm <sup>2</sup>	Operating pressure kgf/cm <sup>2</sup>						
				1	2	3	4	5	6	7
φ 12	φ 6	Single acting	85	-	0.43	1.28	2.13	2.98	3.83	4.68
		Single acting	113	-	0.57	1.7	2.83	3.96	5.09	6.22
		Double Push acting	85	-	2.26	3.39	4.52	5.65	6.78	7.91
		Double Pull acting	113	-	3.62	5.43	7.24	9.05	10.86	12.67
φ 16	φ 6	Single acting	201	-	1.01	3.02	4.03	7.04	9.05	11.06
		Single acting	173	-	0.87	2.6	4.33	6.06	7.79	9.52
		Double Push acting	201	-	4.02	6.03	8.04	10.05	12.06	14.07
		Double Pull acting	173	-	3.46	5.19	6.92	8.65	10.38	12.11
φ 20	φ 8	Single acting	264	-	1.57	4.71	7.85	10.99	14.13	17.27
		Single acting	314	-	1.32	3.96	6.6	9.24	11.88	14.52
		Double Push acting	264	-	6.28	9.42	12.56	15.7	18.84	21.98
		Double Pull acting	314	-	5.28	7.92	10.56	13.2	15.84	18.48
φ 25	φ 10	Single acting	490	-	2.45	7.35	12.25	17.15	22.05	26.95
		Single acting	412	-	2.06	6.18	10.3	14.42	18.54	22.66
		Double Push acting	490	-	9.8	14.7	19.6	24.5	29.4	34.3
		Double Pull acting	412	-	8.24	12.36	16.48	20.6	24.72	28.84
φ 32	φ 12	Single acting	804	-	4.02	12.06	20.1	28.14	36.18	44.22
		Single acting	690	-	3.45	10.35	17.25	24.15	31.05	37.95
		Double Push acting	804	-	16.08	24.12	32.16	40.2	48.24	56.28
		Double Pull acting	690	-	13.8	20.7	27.6	34.5	41.4	48.3
φ 40	φ 16	Single acting	1256	-	6.28	18.84	31.4	43.96	56.52	69.08
		Single acting	1055	-	5.28	15.83	26.38	36.93	47.48	58.03
		Double Push acting	1256	12.56	25.12	37.68	50.24	62.8	75.36	87.92
		Double Pull acting	1055	10.55	21.1	31.65	42.2	52.75	63.3	73.85
φ 50	φ 20	Double Push acting	1963	19.63	39.26	58.89	78.52	98.15	117.78	137.41
		Double Pull acting	1649	16.49	32.98	49.47	65.96	82.45	98.94	115.43
φ 63	φ 20	Double Push acting	3117	31.17	62.34	93.51	124.68	155.85	187.02	218.19
		Double Pull acting	2803	28.03	56.06	84.09	112.12	140.15	168.18	196.21
φ 80	φ 25	Double Push acting	5026	50.26	100.52	150.78	201.04	251.3	301.56	351.82
		Double Pull acting	4536	45.36	90.72	136.08	181.44	226.8	272.16	317.52
φ 100	φ 32	Double Push acting	7853	78.53	157.06	235.59	314.12	392.65	471.18	549.71
		Double Pull acting	7049	70.49	140.98	211.47	281.96	352.45	422.94	493.43

**Formula of cylinder acting force calculation**

Formula of cylinder acting force calculation  $F = P \times A - f$

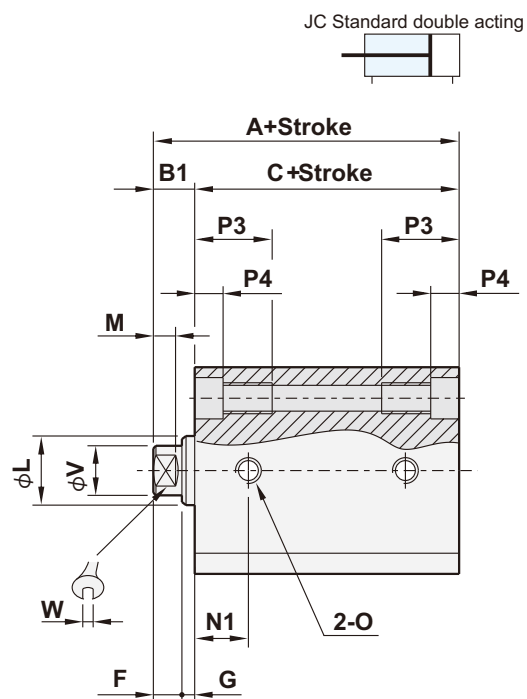
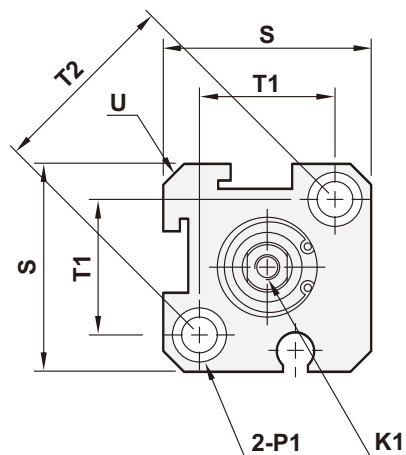
F : Cylinder acting force (N)  
 P : Operating pressure (Mpa)  
 A : Piston area (mm<sup>2</sup>)  
 f : Friction (N)



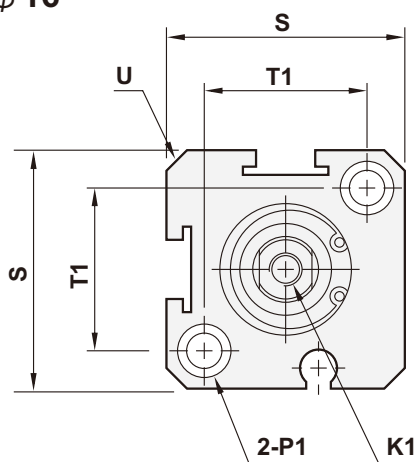
#### Dimensions

##### JC Standard double acting ( $\phi 12 \sim \phi 25$ )

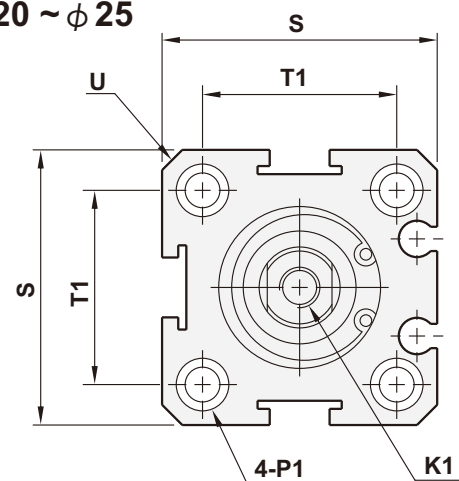
##### $\phi 12$



##### $\phi 16$



##### $\phi 20 \sim \phi 25$



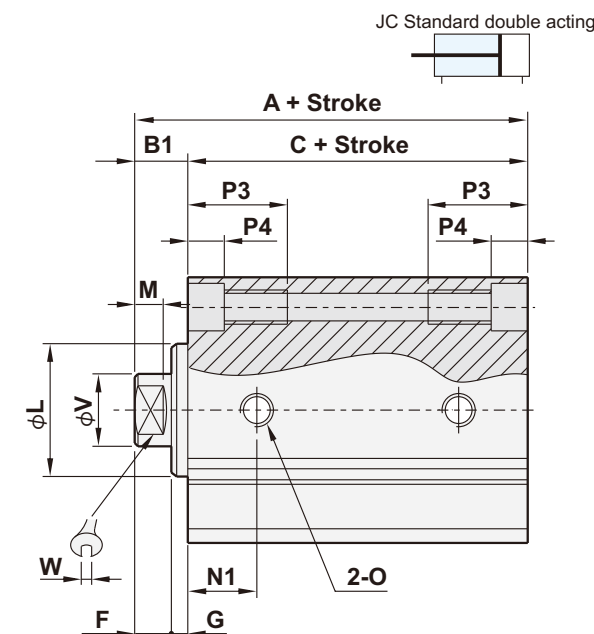
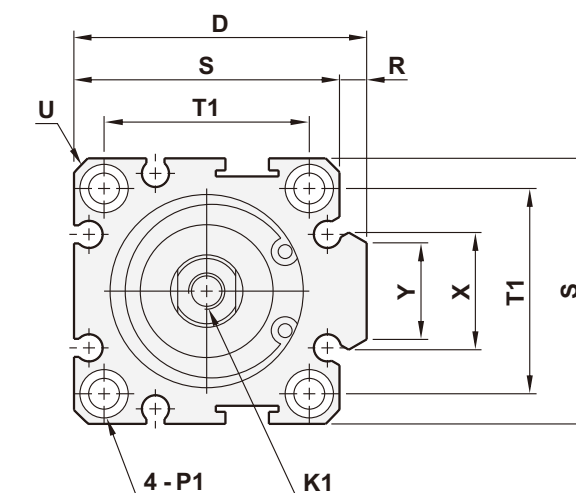
(Unit : mm)

Bore size	W/O magnet			W/I magnet			D	F	G	K1	L	M	N1	O
	A	B1	C	A	B1	C								
$\phi 12$	22	5	17	32	5	27	-	4	1	M3xP0.5xL6	$\phi 11$	3	6.5	M5xP0.8
$\phi 16$	24	5.5	18.5	34	5.5	28.5	-	4	1.5	M3xP0.5xL6	$\phi 11$	3	7	M5xP0.8
$\phi 20$	25	5.5	19.5	35	5.5	29.5	-	4	1.5	M4xP0.7xL8	$\phi 15$	3	7.5	M5xP0.8
$\phi 25$	27	6	21	37	6	31	-	4	2	M5xP0.8xL10	$\phi 17$	3	8	M5xP0.8

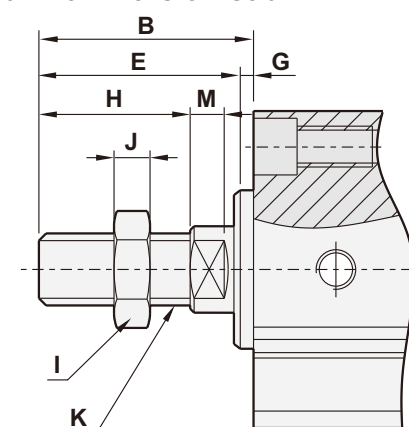
Bore size	P1										P3	P4	R	S	T1	T2	U	V	W	X	Y
$\phi 12$	Two sides $\phi 6.5$ Thread M5xP0.8 Cross hole $\phi 4.3$										12	4.5	-	25	16.3	23	R16	$\phi 6$	5	-	-
$\phi 16$	Two sides $\phi 6.5$ Thread M5xP0.8 Cross hole $\phi 4.3$										12	4.5	-	29	19.8	28	R19	$\phi 6$	5	-	-
$\phi 20$	Two sides $\phi 6.5$ Thread M5xP0.8 Cross hole $\phi 4.3$										14	4.5	-	34	24	-	R22	$\phi 8$	6	-	-
$\phi 25$	Two sides $\phi 8.0$ Thread M6xP1.0 Cross hole $\phi 5.1$										15	5.5	-	40	28	-	R25	$\phi 10$	8	-	-

#### Dimensions

##### JC Standard double acting ( $\phi 32 \sim \phi 100$ )



##### Piston rod with male thread



(Unit : mm)

Bore size	B	E	H	I	J	K
$\phi 12$	17	16	10	8	4	M5xP0.8
$\phi 16$	17.5	16	12	8	4	M5xP0.8
$\phi 20$	20.5	19	15	10	5	M6xP1.0
$\phi 32$	23	21	17	13	6	M8xP1.25
$\phi 40$	25	22	18	17	6	M10xP1.25
$\phi 50$	35	32	28	22	8	M14xP1.5
$\phi 63$	37	33	28	27	10	M18xP1.5
$\phi 80$	37	33	28	27	10	M18xP1.5
	44	39	33	32	8	M22xP1.5
	50	45	38	35	8	M26xP1.5

(Unit : mm)

Bore size	W/O magnet			W/I magnet			D	F	G	K1	L	M	N1	O
	A	B1	C	A	B1	C								
$\phi 32$	31.5	7	24.5	41.5	7	34.5	48.5	4	3	M6xP1.0xL12	$\phi 22$	3	9	G 1/8
$\phi 40$	33	7	26	43	7	36	56.5	4	3	M8xP1.25xL12	$\phi 28$	3	10	G 1/8
$\phi 50$	37	9	28	47	9	38	70	5	4	M10xP1.5xL15	$\phi 38$	3	10	G 1/4
$\phi 63$	41	9	32	51	9	42	83	5	4	M10xP1.5xL15	$\phi 40$	3	12	G 1/4
$\phi 80$	57	11	46	67	11	56	104	6	5	M14xP1.5xL20	$\phi 45$	4	12.5	G 3/8
	68	12	56	78	12	66	124	7	5	M18xP1.5xL20	$\phi 55$	4	17	G 3/8

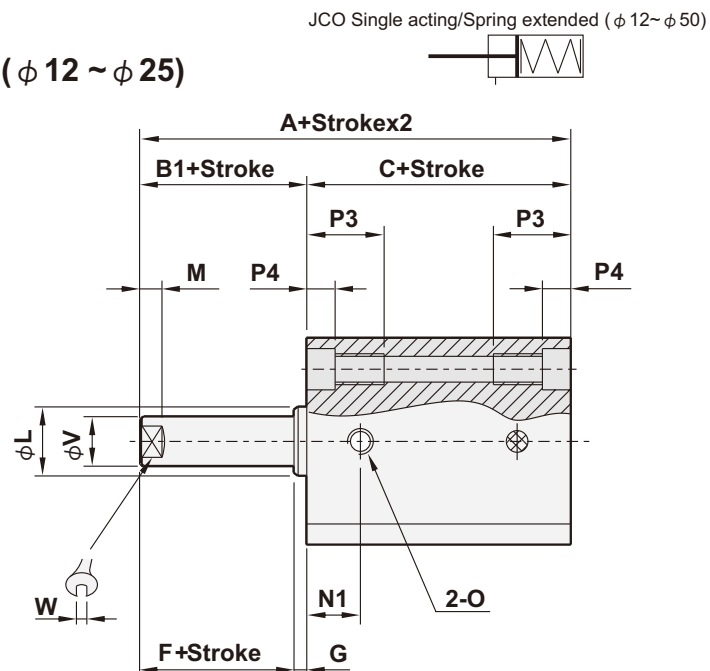
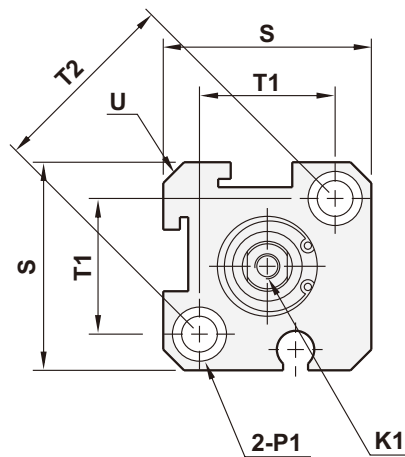
Bore size	P1										P3	P4	R	S	T1	T2	U	V	W	X	Y
$\phi 32$	Two sides $\phi 8.0$ Thread M6xP1.0 Cross hole $\phi 5.1$										16	5.5	4.5	44	34	-	R29.5	$\phi 12$	10	18.8	16
$\phi 40$	Two sides $\phi 9.5$ Thread M8xP1.25 Cross hole $\phi 6.9$										20	7.5	4.5	52	40	-	R35	$\phi 16$	14	19	16
$\phi 50$	Two sides $\phi 11$ Thread M8xP1.25 Cross hole $\phi 6.9$										25	8.5	8	62	48	-	R41	$\phi 20$	17	26	19
$\phi 63$	Two sides $\phi 11$ Thread M8xP1.25 Cross hole $\phi 6.9$										25	8.5	8	75	60	-	R50	$\phi 20$	17	26	19
$\phi 80$	Two sides $\phi 14$ Thread M12xP1.75 Cross hole $\phi 10.5$										25	10.5	10	94	74	-	R62	$\phi 25$	22	37.5	26
$\phi 100$	Two sides $\phi 17.5$ Thread M14xP2 Cross hole $\phi 12.3$										30	13	10	114	90	-	R75	$\phi 30$	27	37.5	26



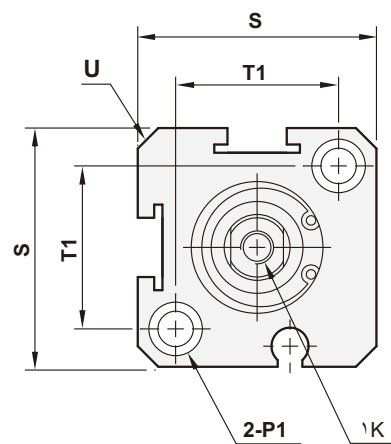
**Dimensions**

**JCO Single acting/Spring extended ( $\phi 12 \sim \phi 25$ )**

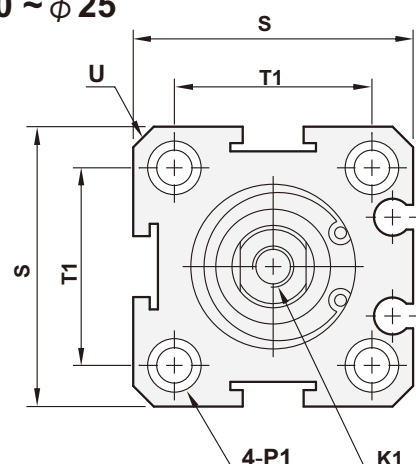
**$\phi 12$**



**$\phi 16$**



**$\phi 20 \sim \phi 25$**



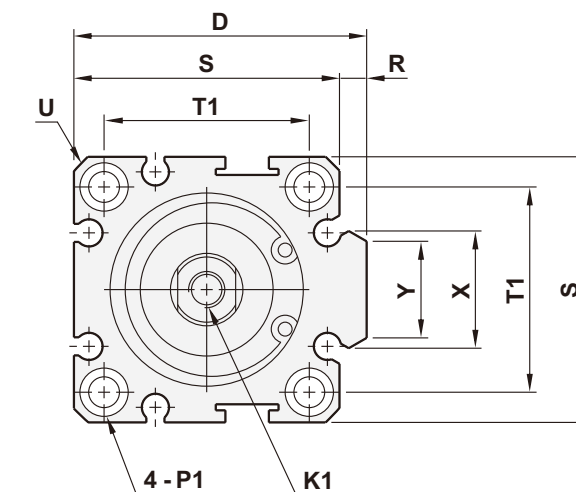
(Unit : mm)

Bore size	W/O magnet			W/I magnet			D	F	G	K1	L	M	N1	O
	A	B1	C	A	B1	C								
$\phi 12$	22	5	17	32	5	27	-	4	1	M3xP0.5xL6	$\phi 11$	3	6.5	M5xP0.8
$\phi 16$	24	5.5	18.5	34	5.5	28.5	-	4	1.5	M3xP0.5xL6	$\phi 11$	3	7	M5xP0.8
$\phi 20$	25	5.5	19.5	35	5.5	29.5	-	4	1.5	M4xP0.7xL8	$\phi 15$	3	7.5	M5xP0.8
$\phi 25$	27	6	21	37	6	31	-	4	2	M5xP0.8xL10	$\phi 17$	3	8	M5xP0.8

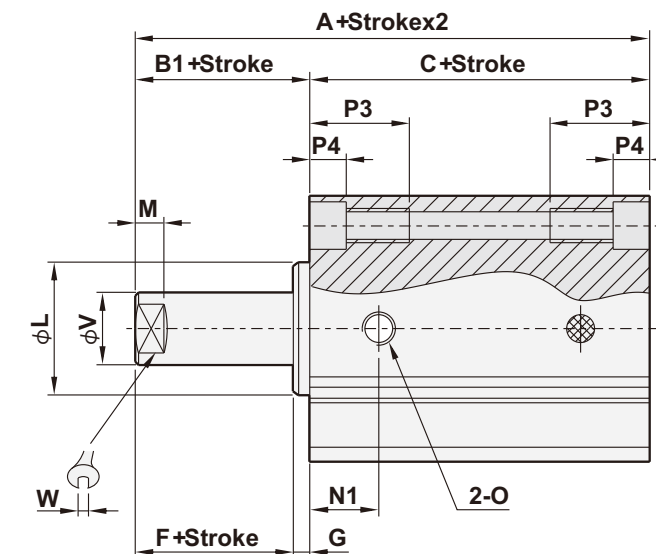
Bore size	P1		P3	P4	R	S	T1	T2	U	V	W	X	Y
	Two sides	Thread											
$\phi 12$	Two sides	$\phi 6.5$ Thread M5xP0.8	12	4.5	-	25	16.3	23	R16	$\phi 6$	5	-	-
$\phi 16$	Two sides	$\phi 6.5$ Thread M5xP0.8	12	4.5	-	29	19.8	28	R19	$\phi 6$	5	-	-
$\phi 20$	Two sides	$\phi 6.5$ Thread M5xP0.8	14	4.5	-	34	24	-	R22	$\phi 8$	6	-	-
$\phi 25$	Two sides	$\phi 8.0$ Thread M6xP1.0	15	5.5	-	40	28	-	R25	$\phi 10$	8	-	-

**Dimensions**

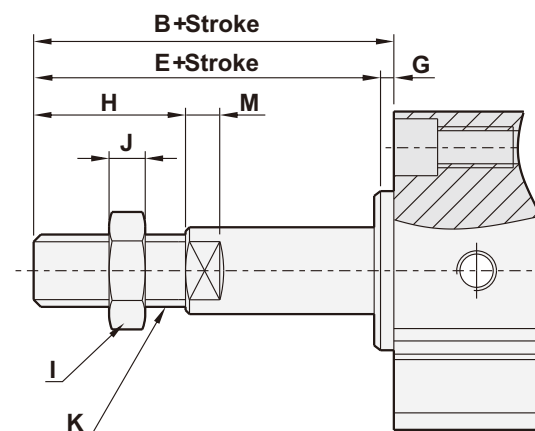
**JCO Single acting/Spring extended ( $\phi 32 \sim \phi 50$ )**



JCO Single acting/Spring extended ( $\phi 12 \sim \phi 50$ )



**Piston rod with male thread**



(Unit : mm)

Bore size	B	E	H	I	J	K
$\phi 12$	17	16	10	8	4	M5xP0.8
$\phi 16$	17.5	16	12	8	4	M5xP0.8
$\phi 20$	20.5	19	15	10	5	M6xP1.0
$\phi 25$	23	21	17	13	6	M8xP1.25
$\phi 40$	25	22	18	17	6	M10xP1.25
$\phi 50$	35	32	28	22	8	M14xP1.5
	37	33	28	27	10	M18xP1.5

(Unit : mm)

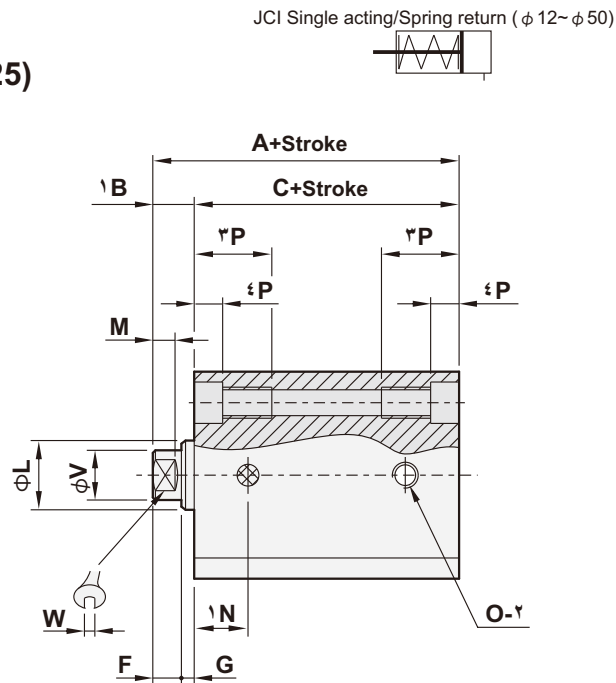
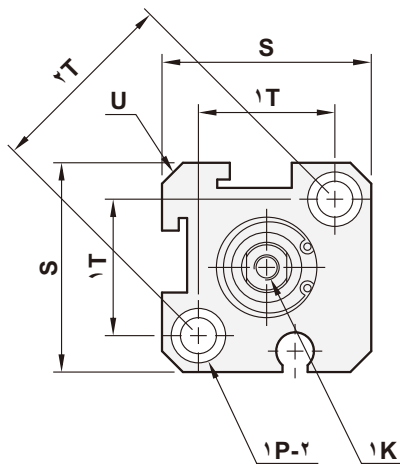
Bore size	W/O magnet			W/I magnet			D	F	G	K1	L	M	N1	O
	A	B1	C	A	B1	C								
$\phi 32$	41.5	7	34.5	51.5	7	44.5	48.5	4	3	M6xP1.0xL12	$\phi 22$	3	9	G 1/8
$\phi 40$	43	7	36	53	7	46	56.5	4	3	M8xP1.25xL12	$\phi 28$	3	10	G 1/8
$\phi 50$	47	9	38	57	9	48	70	5	4	M10xP1.5xL15	$\phi 38$	3	10	G 1/4

Bore size	P1		P3	P4	R	S	T1	T2	U	V	W	X	Y
	Two sides	Thread											
$\phi 32$	Two sides	$\phi 8.0$ Thread M6xP1.0	16	5.5	4.5	44	34	-	R29.5	$\phi 12$	10	19.5	16
$\phi 40$	Two sides	$\phi 9.5$ Thread M8xP1.25	20	7.5	4.5	52	40	-	R35	$\phi 16$	14	19.5	16
$\phi 50$	Two sides	$\phi 11$ Thread M8xP1.25	25	8.5	8	62	48	-	R41	$\phi 20$	17	26.5	19

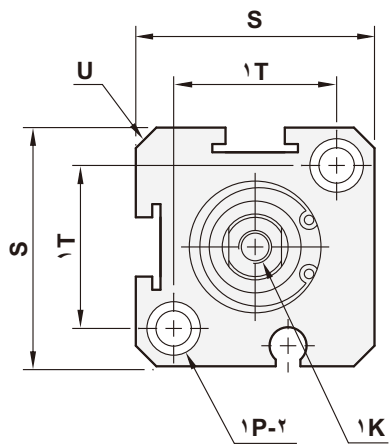
## Dimensions

### JCI Single acting/Spring return ( $\phi 12 \sim \phi 25$ )

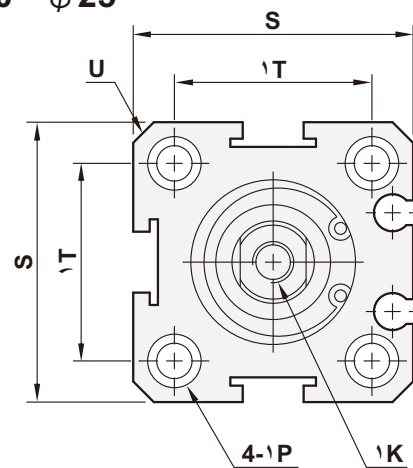
#### $\phi 12$



#### $\phi 16$



#### $\phi 20 \sim \phi 25$



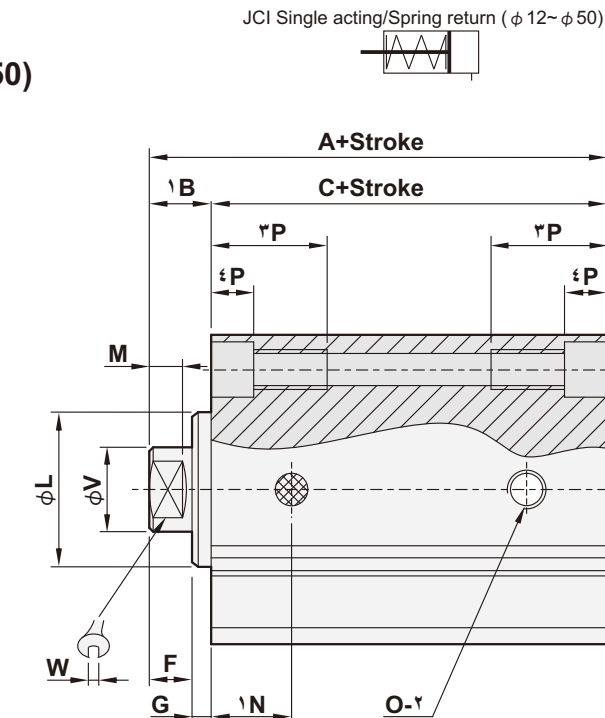
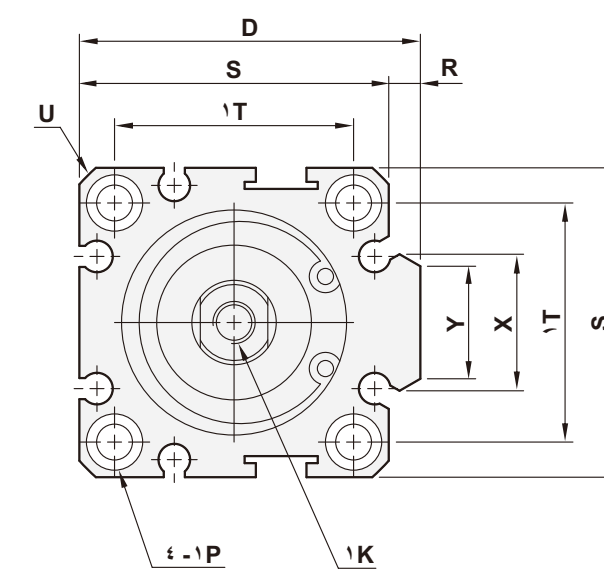
(Unit : mm)

Bore size	W/O magnet			W/I magnet			D	F	G	K1	L	M	N1	O
	A	B1	C	A	B1	C								
$\phi 12$	32	5	27	42	5	37	-	4	1	M3xP0.5xL6	$\phi 11$	3	6.5	M5xP0.8
$\phi 16$	34	5.5	28.5	44	5.5	38.5	-	4	1.5	M3xP0.5xL6	$\phi 11$	3	7	M5xP0.8
$\phi 20$	35	5.5	29.5	45	5.5	39.5	-	4	1.5	M4xP0.7xL8	$\phi 15$	3	7.5	M5xP0.8
$\phi 25$	37	6	31	47	6	41	-	4	2	M5xP0.8xL10	$\phi 17$	3	8	M5xP0.8

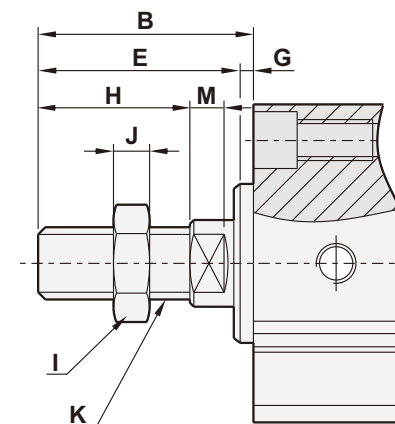
Bore size	P1										P3	P4	R	S	T1	T2	U	V	W	X	Y
$\phi 12$	Two sides $\phi 6.5$ Thread M5xP0.8 Cross hole $\phi 4.3$										12	4.5	-	25	16.3	23	R16	$\phi 6$	5	-	-
$\phi 16$	Two sides $\phi 6.5$ Thread M5xP0.8 Cross hole $\phi 4.3$										12	4.5	-	29	19.8	28	R19	$\phi 6$	5	-	-
$\phi 20$	Two sides $\phi 6.5$ Thread M5xP0.8 Cross hole $\phi 4.3$										14	4.5	-	34	24	-	R22	$\phi 8$	6	-	-
$\phi 25$	Two sides $\phi 8.0$ Thread M6xP1.0 Cross hole $\phi 5.1$										15	5.5	-	40	28	-	R25	$\phi 10$	8	-	-

## Dimensions

### JCI Single acting/Spring return ( $\phi 32 \sim \phi 50$ )



### Piston rod with male thread



(Unit : mm)

Bore size	B	E	H	I	J	K
$\phi 12$	17	16	10	8	4	M5xP0.8
$\phi 16$	17.5	16	12	8	4	M5xP0.8
$\phi 20$	20.5	19	15	10	5	M6xP1.0
$\phi 25$	23	21	17	12	5	M8xP1.25
$\phi 40$	25	22	18	14	6	M10xP1.25
$\phi 50$	35	32	28	19	8	M14xP1.5
	37	33	28	27	11	M18xP1.5

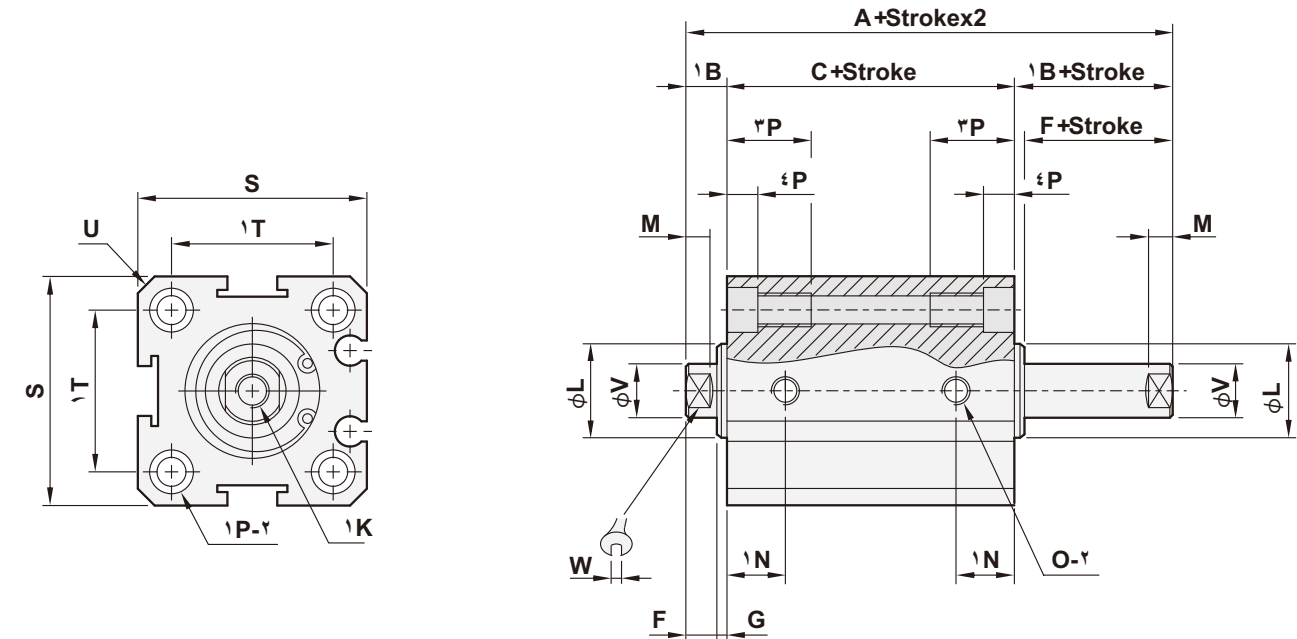
Bore size	W/O magnet			W/I magnet			D	F	G	K1	L	M	N1	O
	A	B1	C	A	B1	C								
$\phi 32$	41.5	7	34.5	51.5	7	44.5	48.5	4	3	M6xP1.0xL12	$\phi 22$	3	9	G 1/8
$\phi 40$	43	7	36	53	7	46	56.5	4	3	M8xP1.25xL12	$\phi 28$	3	10	G 1/8
$\phi 50$	47	9	38	57	9	48	70	5	4	M10xP1.5xL15	$\phi 38$	3	10	G 1/4

Bore size	P1										P3	P4	R	S	T1	T2	U	V	W	X	Y
$\phi 32$	Two sides $\phi 8.0$ Thread M6xP1.0 Cross hole $\phi 5.1$										16	5.5	4.5	44	34	-	R29.5	$\phi 12$	10	19.5	16
$\phi 40$	Two sides $\phi 9.5$ Thread M8xP1.25 Cross hole $\phi 6.9$										20	7.5	4.5	52	40	-	R35	$\phi 16$	14	19.5	16
$\phi 50$	Two sides $\phi 11$ Thread M8xP1.25 Cross hole $\phi 6.9$										25	8.5	8	62	48	-	R41	$\phi 20$	17	26.5	19

**Dimensions**

JCDD Double rod/Double acting ( $\phi 20 \sim \phi 25$ )

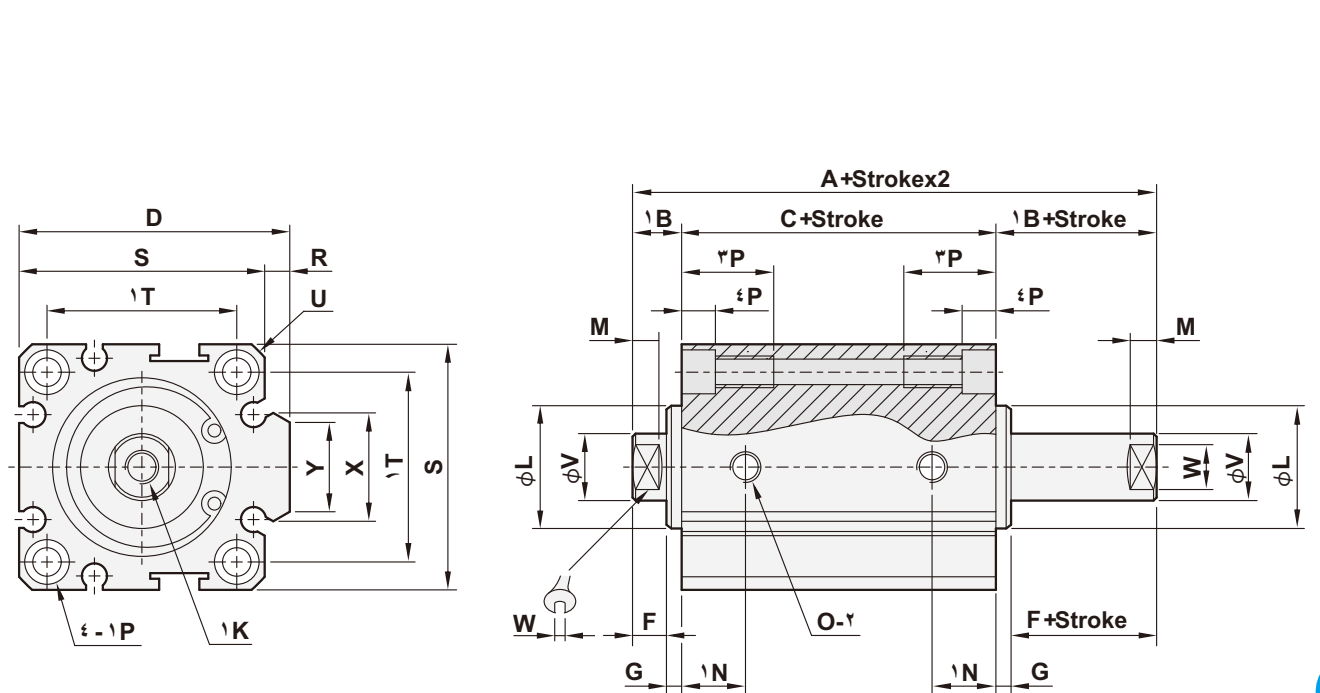
JCDD Double rod/Double acting ( $\phi 20 \sim \phi 100$ )



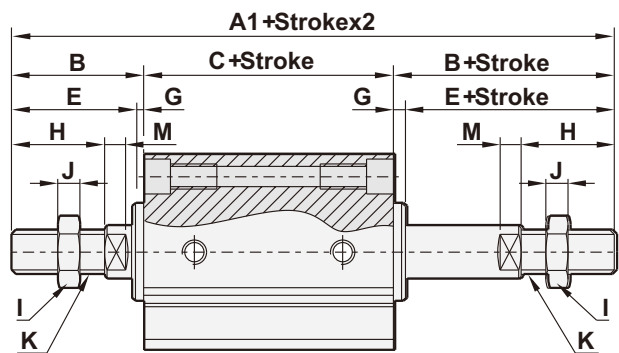
**Dimensions**

JCDD Double rod/Double acting ( $\phi 32 \sim \phi 100$ )

JCDD Double rod/Double acting ( $\phi 20 \sim \phi 100$ )



**Piston rod with male thread**



(Unit : mm)

Bore size	A1	B	E	H	I	J	K
$\phi 20$	60.5	19	19	15	10	5	M6xP1.0
$\phi 25$	67	21	21	17	13	6	M8xP1.25
$\phi 32$	74.5	22	22	18	17	6	M10xP1.25
$\phi 40$	96	32	32	28	22	8	M14xP1.5
$\phi 50$	102	33	33	28	27	10	M18xP1.5
$\phi 63$	106	33	33	28	27	10	M18xP1.5
$\phi 80$	134	39	39	33	32	8	M22xP1.5
$\phi 100$	156	45	45	38	35	8	M26xP1.5

(Unit : mm)

Bore size	W/O magnet			W/I magnet			D	F	G	K1	L	M	N1	O
	A	B1	C	A	B1	C								
$\phi 20$	25	5.5	19.5	35	5.5	29.5	-	4	1.5	M4xP0.7xL8	$\phi 15$	3	7.5	M5xP0.8
$\phi 25$	27	6	21	37	6	31	-	4	2	M5xP0.8xL10	$\phi 17$	3	8	M5xP0.8

(Unit : mm)

Bore size	P1											P3	P4	R	S	T1	U	V	W	X	Y		
	A	B1	C	D	F	G	K1	L	M	N1	O												
$\phi 20$	Two sides $\phi 6.5$	Thread M5xP0.8	Cross hole $\phi 4.3$	14	4.5	-	34	24	R22	$\phi 8$	6	-	-	-	-	-	-	-	-	-	-	-	-
$\phi 25$	Two sides $\phi 8.0$	Thread M6xP1.0	Cross hole $\phi 5.1$	15	5.5	-	40	28	R25	$\phi 10$	8	-	-	-	-	-	-	-	-	-	-	-	-

(Unit : mm)

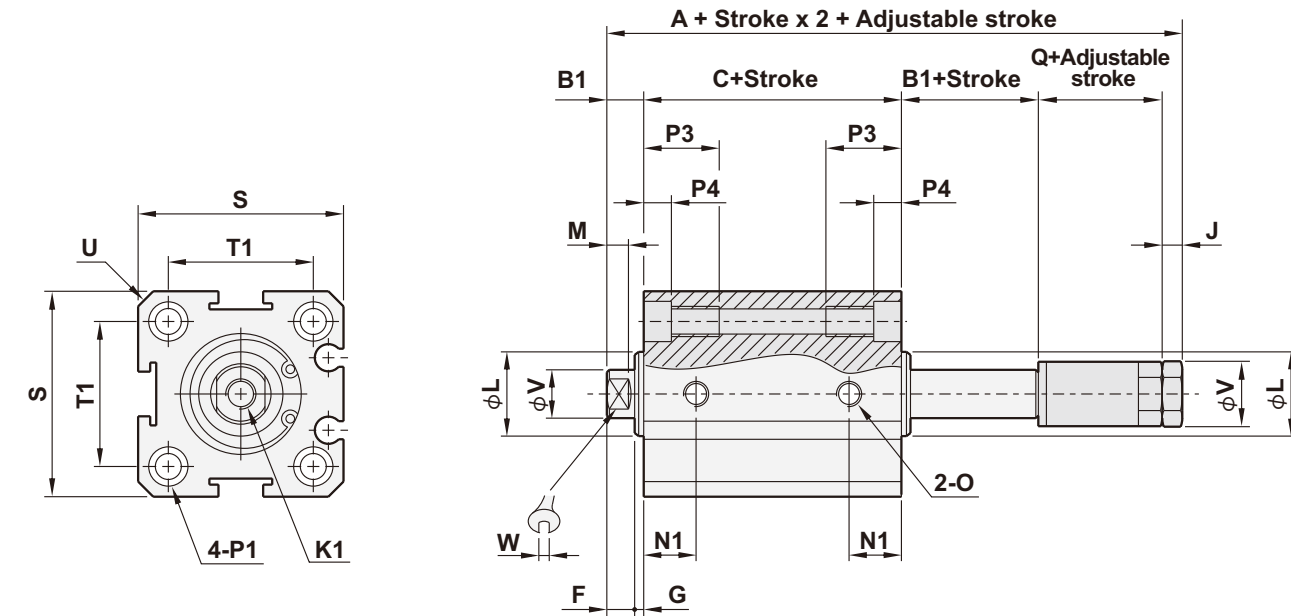
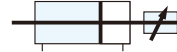
Bore size	W/O magnet			W/I magnet			D	F	G	K1	L	M	N1	O
	A	B1	C	A	B1	C								
$\phi 32$	31.5	7	24.5	41.5	7	34.5	48.5	4	3	M6xP1.0xL12	$\phi 22$	3	9	G 1/8
$\phi 40$	33	7	26	43	7	36	56.5	4	3	M8xP1.25xL12	$\phi 28$	3	10	G 1/8
$\phi 50$	37	9	28	47	9	38	70	5	4	M10xP1.5xL15	$\phi 38$	3	10	G 1/4
$\phi 63$	41	9	32	51	9	42	83	5	4	M10xP1.5xL15	$\phi 40$	3	12	G 1/4
$\phi 80$	57	11	46	67	11	56	104	6	5	M14xP1.5xL20	$\phi 45$	4	12.5	G 3/8
$\phi 100$	68	12	56	78	12	66	124	7	5	M18xP1.5xL20	$\phi 55$	4	17	G 3/8

Bore size	P1											P3	P4	R	S	T1	U	V	W	X	Y	
	A	B1	C	D	F	G	K1	L	M	N1	O											
$\phi 32$	Two sides $\phi 8.0$	Thread M6xP1.0	Cross hole $\phi 5.1$	16	5.5	4.5	44	34	R29.5	$\phi 12$	10	18.8	16	-	-	-	-	-	-	-	-	-
$\phi 40$	Two sides $\phi 9.5$	Thread M8xP1.25	Cross hole $\phi 6.9$	20	7.5	4.5	52	40	R35	$\phi 16$	14	19	16	-	-	-	-	-	-	-	-	-
$\phi 50$	Two sides $\phi 11$	Thread M8xP1.25	Cross hole $\phi 6.9$	25	8.5	8	62	48	R41	$\phi 20$	17	26	19	-	-	-	-	-	-	-	-	-
$\phi 63$	Two sides $\phi 11$	Thread M8xP1.25	Cross hole $\phi 6.9$	25	8.5	8	75	60	R50	$\phi 20$	17	26	19	-	-	-	-	-	-	-	-	-
$\phi 80$	Two sides $\phi 14$	Thread M12xP1.75	Cross hole $\phi 10.5$	25	10.5	10	94	74	R62	$\phi 25$	22	37.5	26	-	-	-	-	-	-	-	-	-
$\phi 100$	Two sides $\phi 17.5$	Thread M14xP2	Cross hole $\phi 12.3$	30	13	10	114	90	R75	$\phi 30$	27	37.5	26	-	-	-	-	-	-	-	-	-

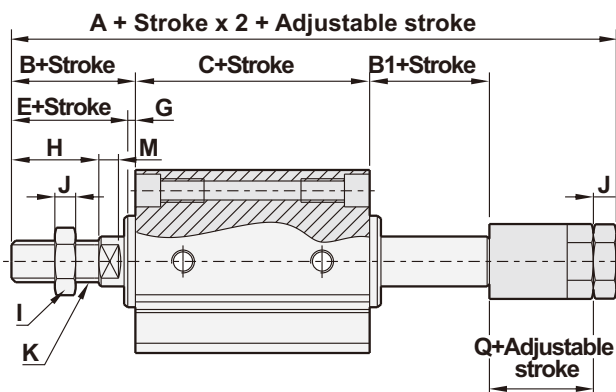
**Dimensions**

JCA, JCB Stroke adjustable type  
(Adjustable stroke: JCA 0~25mm, JCB 0~50mm)

JCA, JCB Stroke adjustable 25mm, 50mm  
(φ20~φ100)



Piston rod with male thread



(Unit : mm)

Bore size	A1	B	E	H	I	J	K
φ20	70.5	20.5	19	15	10	5	M6xP1.0
φ25	75	23	21	17	13	6	M8xP1.25
φ32	82.5	25	22	18	17	6	M10xP1.25
φ40	96	35	32	28	22	8	M14xP1.5
φ63	105	37	33	28	27	10	M18xP1.5
φ80	109	37	33	28	27	10	M18xP1.5
φ100	134	44	39	33	32	8	M22xP1.5
	151	50	45	38	35	8	M26xP1.5

(Unit : mm)

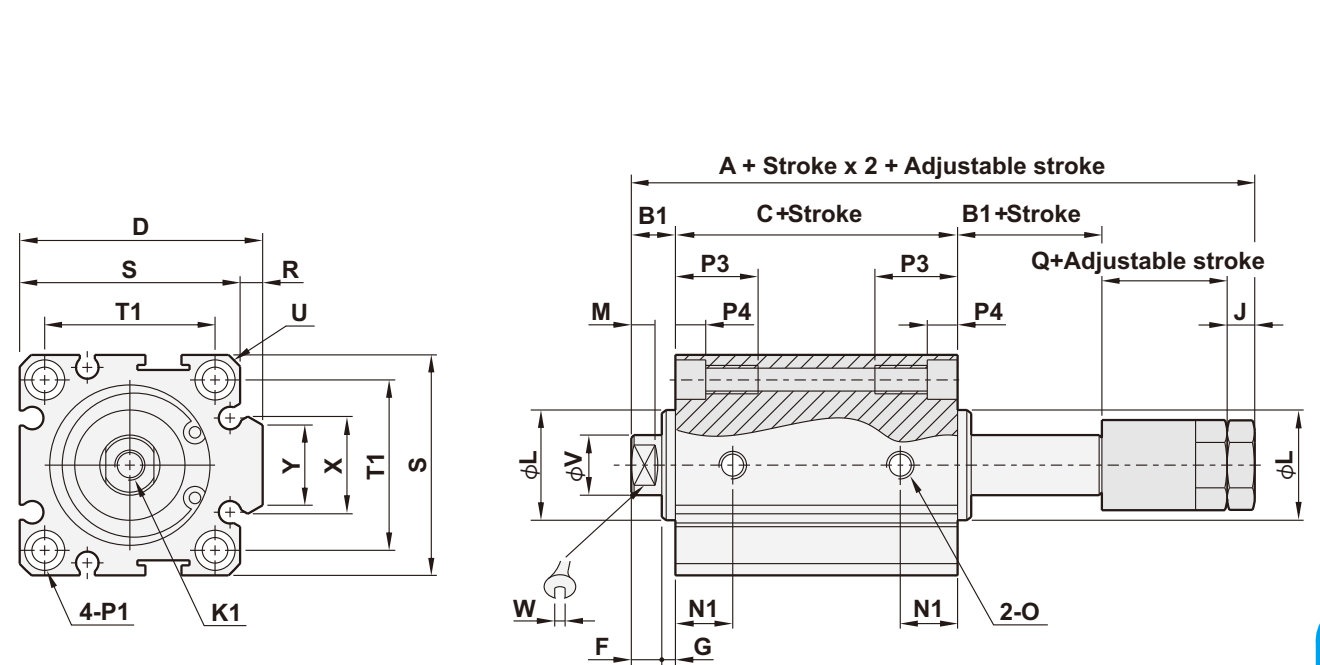
Bore size	W/O magnet			W/I magnet			D	F	G	J	K1	L	M	N1	O
	A	B1	C	A	B1	C									
φ20	55.5	5.5	19.5	35	5.5	29.5	-	4	1.5	5	M4xP0.7xL8	φ15	3	7.5	M5xP0.8
φ25	58	6	21	37	6	31	-	4	2	5	M5xP0.8xL10	φ17	3	8	M5xP0.8

Bore size	P1											P3	P4	Q	R	S	T1	U	V	W	X	Y
	P1																					
φ20	Two sides φ 6.5 Thread M5xP0.8 Cross hole φ 4.3											14	4.5	20	-	34	24	R22	φ 8	6	-	-
φ25	Two sides φ 8.0 Thread M6xP1.0 Cross hole φ 5.1											15	5.5	20	-	40	28	R25	φ 10	8	-	-

**Dimensions**

JCA, JCB Stroke adjustable type  
(Adjustable stroke: JCA 0~25mm, JCB 0~50mm)

JCA, JCB Stroke adjustable 25mm, 50mm  
(φ20~φ100)



(Unit : mm)

Bore size	W/O magnet			W/I magnet			D	F	G	J	K1	L	M	N1	O
	A	B1	C	A	B1	C									
φ32	64.5	7	24.5	41.5	7	34.5	48.5	4	3	6	M6xP1.0xL12	22	3	9	G 1/8
φ40	68	7	26	43	7	36	56.5	4	3	8	M8xP1.25xL12	28	3	10	G 1/8
φ50	77	9	28	47	9	38	70	5	4	11	M10xP1.5xL15	38	3	10	G 1/4
φ63	81	9	32	51	9	42	83	5	4	11	M10xP1.5xL15	40	3	12	G 1/4
φ80	101	11	46	67	11	56	104	6	5	13	M14xP1.5xL20	45	4	12.5	G 3/8
φ100	113	12	56	78	12	66	124	7	5	13	M18xP1.5xL20	55	4	17	G 3/8

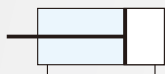
Bore size	P1											P3	P4	Q	R	S	T1	U	V	W	X	Y
	P1																					
φ32	Two sides φ 8.0 Thread M6xP1.0 Cross hole φ 5.1											16	5.5	22	4.5	44	34	R29.5	12	10	18.8	16
φ40	Two sides φ 9.5 Thread M8xP1.25 Cross hole φ 6.9											20	7.5	22	4.5	52	40	R35	16	14	19	16
φ50	Two sides φ 11 Thread M8xP1.25 Cross hole φ 6.9											25	8.5	28	8	62	48	R41	20	17	26	19
φ63	Two sides φ 11 Thread M8xP1.25 Cross hole φ 6.9											25	8.5	28	8	75	60	R50	20	17	26	19
φ80	Two sides φ 14 Thread M12xP1.75 Cross hole φ 10.5											25	10.5	35	10	94	74	R62	25	22	37.5	26
φ100	Two sides φ 17.5 Thread M14xP2 Cross hole φ 12.3											30	13	35	10	114	90	R75	30	27	37.5	26

PNEUMATIC CYLINDER

PNEUMATIC CYLINDER



**Symbol**




**Features**

- \* Hard anodized aluminum barrel provides corrosion and wear resistance as well as long life.
- \* Compact size and space saving.
- \* Strict quality control ensures the product in stability and excellent performance.
- \* Simple maintenance and installation.



**How to order**

<b>HC</b>	<b>10</b>	<b>B</b>	<b>5</b>	<b>SR</b>	<b>1</b>																						
Type	Bore size	Magnet	Stroke	Sensor type	Number of sensor																						
HC Free mounted cylinder	<table border="1"> <tr><td>10</td><td>φ 10</td></tr> <tr><td>16</td><td>φ 16</td></tr> <tr><td>20</td><td>φ 20</td></tr> <tr><td>25</td><td>φ 25</td></tr> </table>	10	φ 10	16	φ 16	20	φ 20	25	φ 25	<table border="1"> <tr><td>B</td><td>W/O magnet</td></tr> <tr><td>C</td><td>W/I magnet</td></tr> </table>	B	W/O magnet	C	W/I magnet	<table border="1"> <tr><td>5</td></tr> <tr><td>10</td></tr> <tr><td>15</td></tr> <tr><td>20</td></tr> </table>	5	10	15	20	<table border="1"> <tr><td>Blank</td><td>W/O sensor</td></tr> <tr><td>SR</td><td>Round type</td></tr> </table> 	Blank	W/O sensor	SR	Round type	<table border="1"> <tr><td>1 pc</td></tr> <tr><td>2 pcs</td></tr> </table>	1 pc	2 pcs
10	φ 10																										
16	φ 16																										
20	φ 20																										
25	φ 25																										
B	W/O magnet																										
C	W/I magnet																										
5																											
10																											
15																											
20																											
Blank	W/O sensor																										
SR	Round type																										
1 pc																											
2 pcs																											

※Please use stainless setting bolts for magnet type cylinder to mount.

**Stroke table**

Bore size	Acting	Stroke table (mm)
φ 10	Double acting	5, 10, 15, 20, 25, 30
φ 16		5, 10, 15, 20, 25, 30, 40, 50
φ 20		
φ 25		

※Please contact our sales standard stroke-for non.

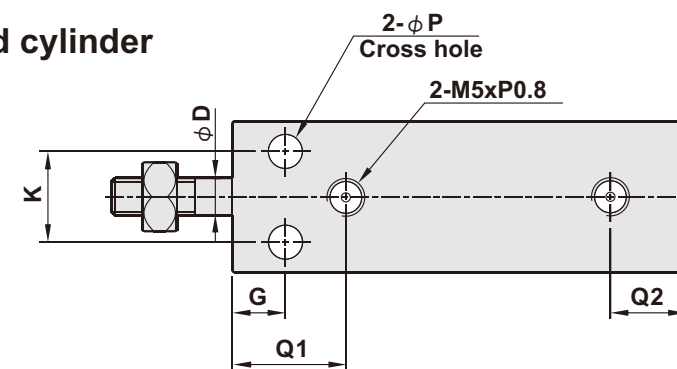
**Specifications**

Bore size	φ 10	φ 16	φ 20	φ 25
Port size	<b>M5</b>			
Fluid	Compressed air			
Acting	Double acting			
Operating pressure range	0.1 ~ 8 kgf/cm <sup>2</sup> (0.01~0.8MPa)			
Proof pressure	10 kgf/cm <sup>2</sup> (1.0MPa)			
Barrel material	Aluminum alloy			
Cushion	Rubber			
Magnet	Option			
Ambient temperature	-5°C ~ 60°C			
Piston speed	50~700mm/sec			

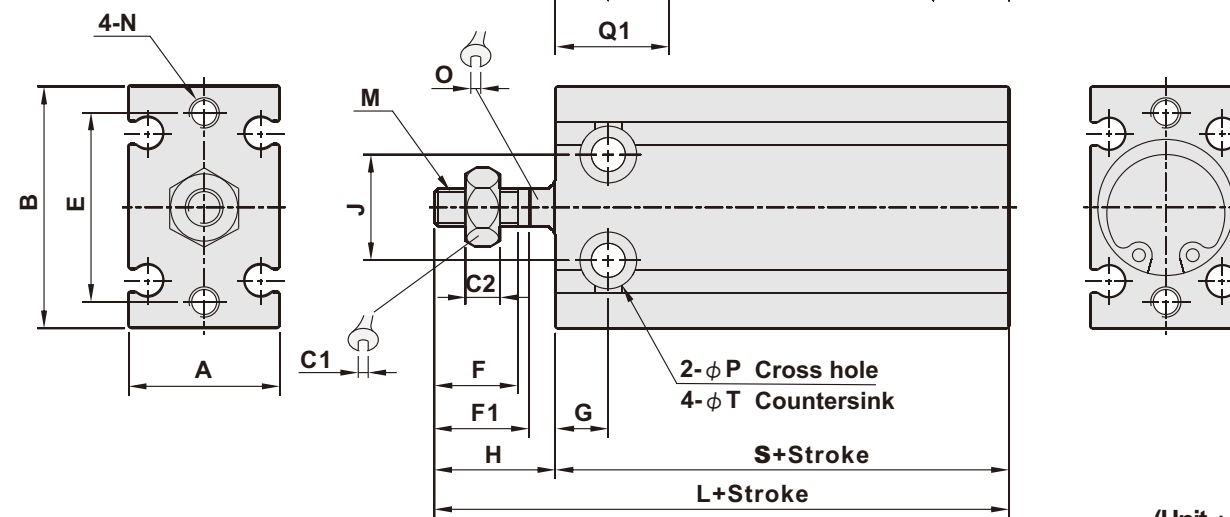
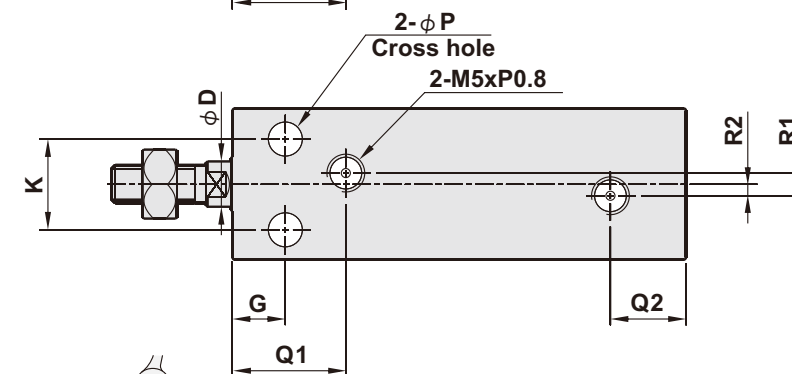
**Dimensions**

**HC Free mounted cylinder**

φ 10



φ 16, φ 20, φ 25

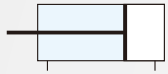


(Unit : mm)

Bore size	A	B	C1	C2	D	E	F	F1	G	H	J	K
φ 10	15	24	7	2.4	4	18	10	—	7	16	11	9
φ 16	20	32	8	4	6	25	11	12.5	7	16	14	12
φ 20	26	40	10	5	8	30	12	14	9	19	16	16
φ 25	32	50	13	5	10	38	15.5	18	10	23	20	20

Bore size	M	N	O	P	Q1	Q2	R1	R2	T	W/O magnet		W/I magnet	
										S	L	S	L
φ 10	M4xP0.7	M3xP0.5deep5.0	---	3.2	16.5	10	---	---	φ 6.0deep5	36	52	46	62
φ 16	M5xP0.8	M4xP0.7deep6.0	5	4.5	15.5	10.5	4	2	φ 7.5deep6.5	30	46	40	56
φ 20	M6xP1.0	M5xP0.8deep8.0	6	5.5	19	12.5	9	4.5	φ 9.3deep 8	36	55	46	65
φ 25	M8xP1.25	M5xP0.8deep8.0	8	5.5	21.5	13.5	9	4.5	φ 9.3deep 9	40	63	50	73

### Symbol



### Features

- \* Hard anodized aluminum body provides corrosion and wear resistance.
- \* Miniature size and double acting force.
- \* One air source supplies two piston rods.
- \* Simple maintenance and installation.
- \* Adjustable stroke range: 0 to -5mm.
- \* Work can be mounted on two direction.



<b>DR</b>	<b>20</b>	<b>B</b>	<b>50</b>	<b>SS</b>	<b>1</b>
Type	Bore size		Stroke	Sensor type	Number of sensor
DR Standard type	10 $\phi$ 10			Blank W/O sensor	1 pc
DRD Slide type	16 $\phi$ 16			SS Square type	2 pcs
	20 $\phi$ 20			AL-11R	
	25 $\phi$ 25			SR Round type	
				AL-07R	

### Specifications

Bore size	$\phi$ 10	$\phi$ 16	$\phi$ 20	$\phi$ 25	$\phi$ 32
Port size	M5x0.8				1/8"
Fluid	Compressed air				
Acting	Double acting				
Operating pressure range	1 ~ 8 kgf/cm <sup>2</sup>				
Max operating pressure	10 kgf/cm <sup>2</sup>				
Barrel material	Aluminum alloy				
Magnet	Built-in				
Cushion	Rubber				
Stroke adjustable range	0 ~ -5mm				
Ambient temperature	-5°C ~ 60°C				
Piston speed mm/Sec	50 ~ 500				

### Theoretical force

Bore size	$\phi$ 10		$\phi$ 16		$\phi$ 20		$\phi$ 25		
Rod diameter	$\phi$ 6		$\phi$ 8		$\phi$ 10		$\phi$ 12		
Acting(N)	Double acting		Double acting		Double acting		Double acting		
	Push	Pull	Push	Pull	Push	Pull	Push	Pull	
Piston area mm <sup>2</sup>	157	101	402	302	628	471	982	756	
Operating pressure (kgf/cm <sup>2</sup> )	1	15.4	9.9	39.4	29.6	61.6	64.2	96.3	74.2
	2	30.8	19.8	78.9	59.3	123.2	92.4	192.7	148.3
	3	46.2	29.7	118.3	88.9	184.8	138.6	289	222.5
	4	61.6	39.6	157.7	118.5	246.4	184.8	385.3	296.7
	5	77	49.5	197.2	148.1	308	231	481.7	370.8
	6	92.4	59.4	236.6	177.8	369.6	277.2	578	445
	7	107.8	69.4	276.1	207.4	431.2	323.4	674.3	519.1
	8	123.2	79.3	315.5	237	492.9	369.6	770.7	593.3

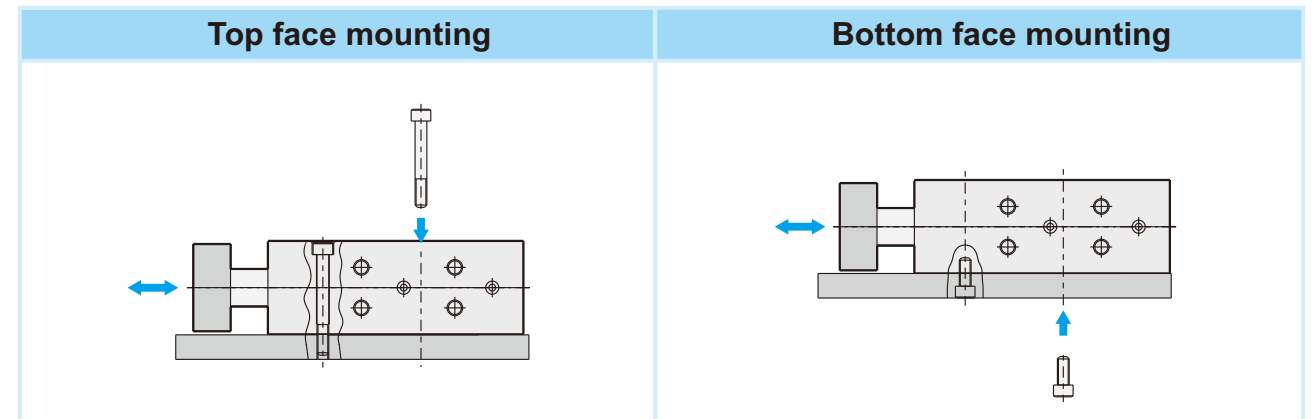
### Stroke table

#### DR Standard type

Bore size	Acting	Standard stroke(mm)	Manufacturable stroke(mm)
$\phi$ 10	Double acting	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 75	80,90,100
$\phi$ 16		10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 75	125,150
$\phi$ 20			
$\phi$ 25			

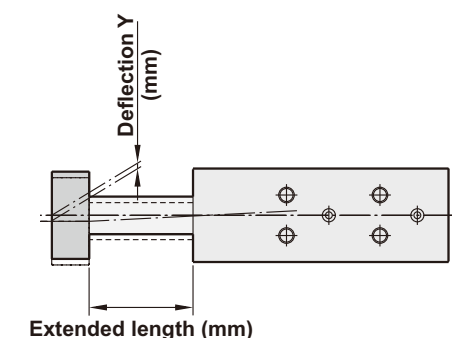
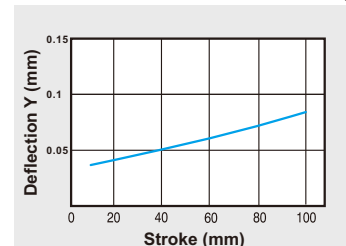
Note: Please contact our sales for non-standard stroke.

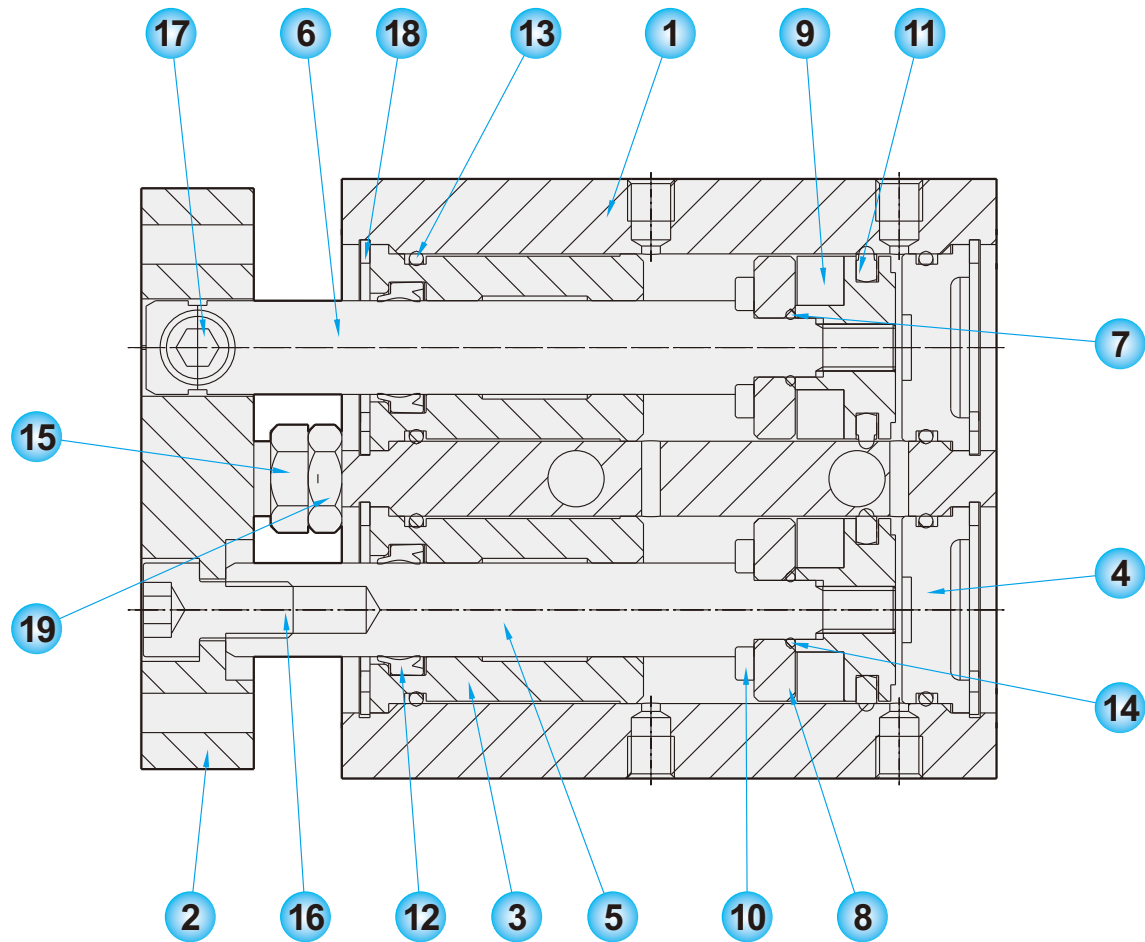
### Mounting example



### Deflection at the plated end

An approximate plate-end deflection Y without a load is shown in the graph below

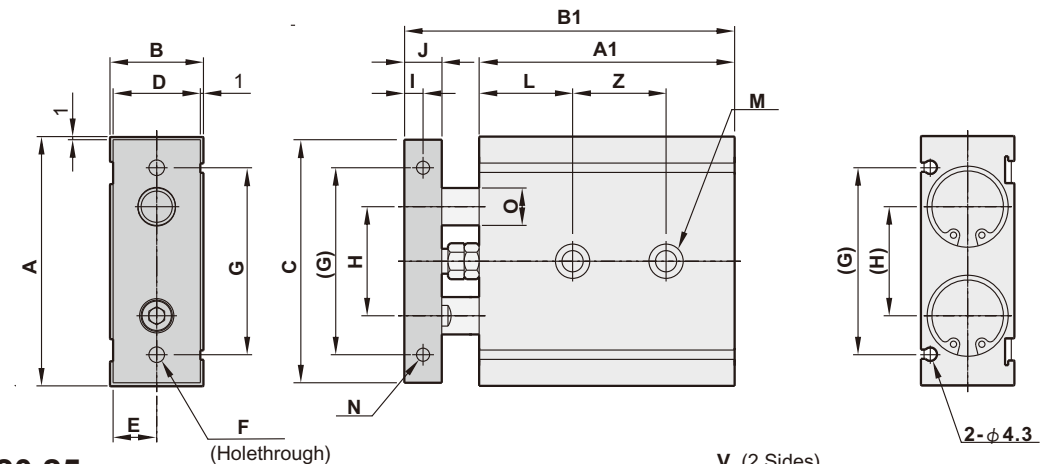
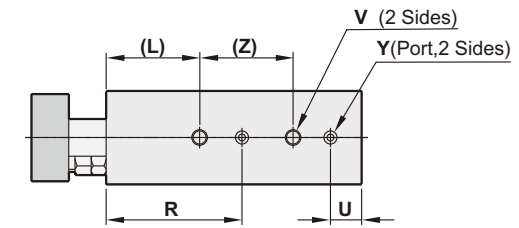




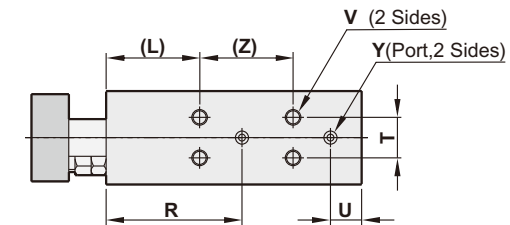
No.	Description	Material	Qty.	No.	Description	Material	Qty.
1	Barrel	Aluminum alloy	1	11	Piston seal	NBR	2
2	Rod cover	Aluminum alloy	1	12	Rod seal	NBR	2
3	Front cover	Aluminum alloy	2	13	O-ring 1	NBR	4
4	Resr cover	Aluminum alloy	2	14	O-ring 2	NBR	2
5	Piston rod	Carbon steel+Cr	1	15	Stroke aligning screw	Fe/Ni+NBR	1
6	Piston rodA	Carbon steel+Cr	1	16	Hex. Scerw	Fe/Ni	1
7	Piston A	Aluminum alloy	2	17	Hex. Scerw	Fe/Ni	1
8	Piston B	Aluminum alloy	2	18	C type clip	Fe/Ni	4
9	Magnet	Rubber magnet	2	19	Hex. mounting nut(M6)	Fe/Ni	1
10	Cushion seal	NBR	2				

### Dimensions

#### DR10,16



#### DR20,25



(Unit : mm)

Bore size	A	B	C	D	E	F	G	H	I	J	L	M
φ 10	46	17	44	15	7.5	2-M4x0.7	35	20	4	8	20	2-φ 3.4Depth,2x2-φ 6.5,Depth3.3(M4x0.7 Hole through)
φ 16	58	22	56	20	10	2-M5x0.8	45	24	5	10	30	2-φ 4.3Depth,2x2-φ 8,Depth4.4(M5x0.8 Hole through)
φ 20	64	25	62	23	11.5	2-M5x0.8	50	28	6	12	30	2-φ 5.5Depth,2x2-φ 9.5,Depth3.3(M6x1.0 Hole through)
φ 25	80	30	78	28	14	2-M6x1.0	60	35	6	12	30	2-φ 6.9Depth,2x2-φ 11,Depth3.3(M8x1.25 Hole through)

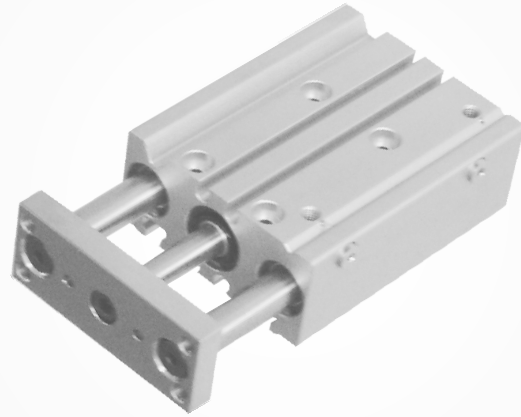
Bore size	N	O	R	U	T	V	Y	Z (Per stroke)				
								10, 15 20, 25	30, 35 40, 45, 50	60, 70 75	80	90, 100
φ 10	2-M3x0.5,Depth4.5	φ 6	33.7	9.5	---	4-M3x0.5,Depth4.5	4-M5x0.8,Depth4.5	30	40	50	---	---
φ 16	2-M4x0.7,Depth6.0	φ 8	36	9.2	---	M4x0.7,Depth5.0	M5x0.8,Depth4.5	25	35	45	45	55
φ 20	2-M4x0.7,Depth6.0	φ 10	42.5	10.5	9.5	8-M4x0.7,Depth5.5	4-M5x0.8,Depth5.0	30	40	60	60	60
φ 25	2-M5x0.8,Depth8.0	φ 12	44	10	13	8-M5x0.8,Depth7.5	4-Rc1/8,Depth6.5	30	40	60	60	60

Bore size	A1 (Per stroke)										B1 (Per stroke)																			
	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100
φ 10	65	70	75	80	85	90	95	100	105	115	125	130	---	---	---	82	87	92	97	102	107	112	117	122	132	142	147	---	---	---
φ 16	70	75	80	85	90	95	100	105	110	120	130	135	140	150	160	89	94	99	104	109	114	119	124	129	139	149	154	159	169	179
φ 20	80	85	90	95	100	105	110	115	120	130	140	145	150	160	170	104	109	114	119	124	129	134	139	144	154	164	169	174	184	194
φ 25	82	87	92	97	102	107	112	117	122	132	142	147	152	162	172	106	111	116	121	126	131	136	141	146	156	166	171	176	186	196

PNEUMATIC CYLINDER

### Features

- \*Hard anodized aluminum body provides corrosion and wear resistance.
- \*Simplified design.
- \*Compact size and space saving.
- \*rotated-Non.
- \*Low deviation.
- \*Built-in magnet.



### How to order

<b>TRC</b> Three rod cylinder	<b>M</b> Guide rod M Bush L Linear	<b>12</b> Bore size 12 φ12 16 φ16 20 φ20 25 φ25 32 φ32	<b>B</b> Stroke 50	<b>SS</b> Sensor type Blank W/O sensor SS Square type SR Round type AL-11R AL-07R	<b>1</b> Number of sensor 1pc 2pcs
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\*Rod: M-Carbon steel(Bush bearing)  
L-Bearing steel(Linear bearing)

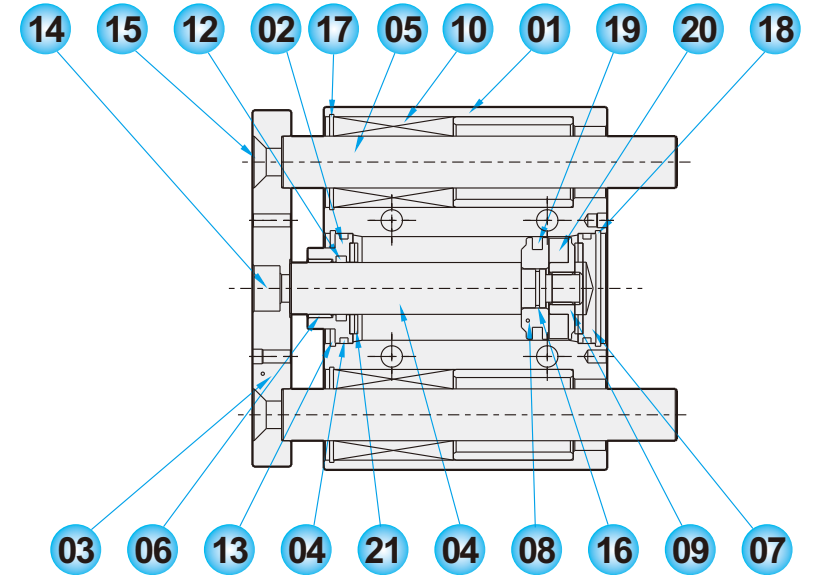
### Specifications

Bore size	φ 12	φ 16	φ 20	φ 25	φ 32
Port size	M5xP0.8		1/8"		
Fluid	Compressed air				
Acting	Double acting				
Operating pressure range	1 ~ 7 kgf/cm <sup>2</sup>				
Max operating pressure	10.5 kgf/cm <sup>2</sup>				
Lubrication	Not required				
Barrel material	Aluminum alloy				
Magnet	Built-in				
Ambient temperature	0°C ~ 60°C				
Piston speed	100~500mm/Sec				

### Material of parts

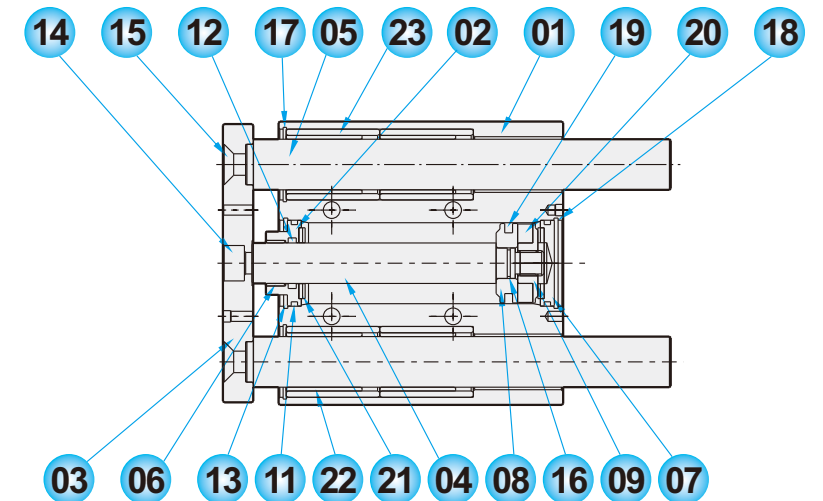
#### TRC-L

Linear bearing type



#### TRC-M

Bush bearing type



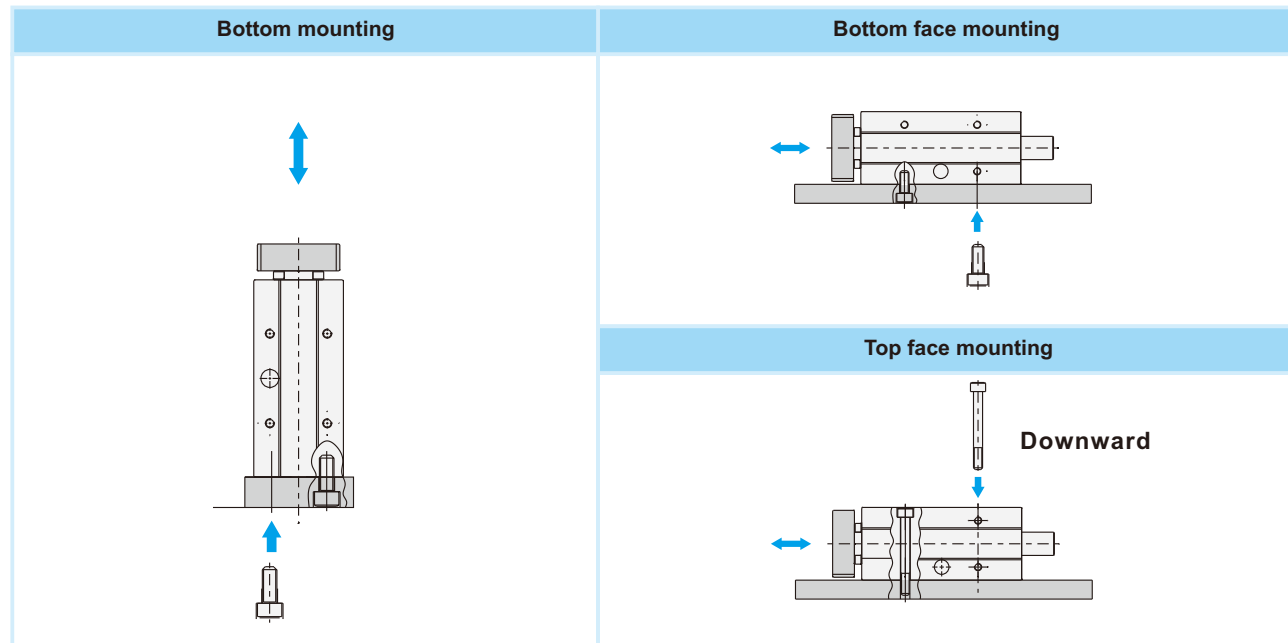
No.	Description	Material	Qty.	No.	Description	Material	Qty.
1	Barrel	Aluminum alloy	1	13	Snap ring	Spring steel	1
2	Front cover	Aluminum alloy	1	14	Fixing screw	Alloy steel	1
3	Front plate	Ferroalloy	1	15	Fixing screw	Alloy steel	2
4	Piston rod	Carbon steel	1	16	Piston O-ring	NBR	1
5	Guide rod	Carbon steel/Bearing steel	2	17	Snap ring	Spring steel	2
6	Bush bearing	Alloy steel	1	18	Snap ring	Spring steel	1
7	Rear cover	Aluminum alloy	1	19	Piston packing	NBR	1
8	Piston	Aluminum alloy	1	20	Magnet	Ferrite magnet	1
9	Magnet holder	Aluminum alloy	1	21	Cushinon plate	NBR	2
10	Linear bearing	Bearing steel	2(4)	22	Bush bearing	Alloy steel	2(4)
11	O-ring	NBR	2	23	Bush bearing support	Aluminum alloy	2(4)
12	Rod packing	NBR	1				



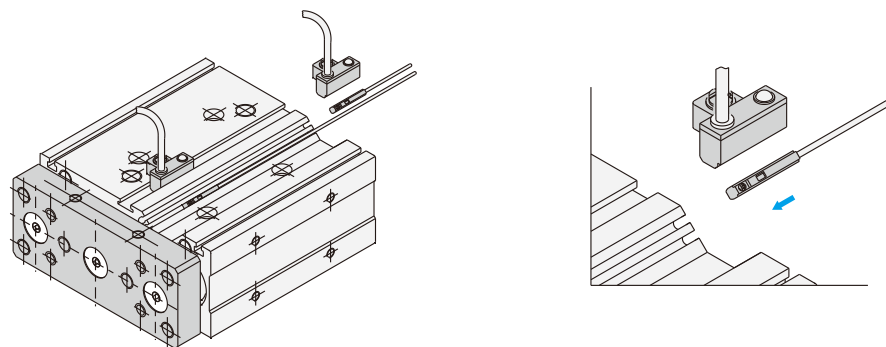
### Theoretical force

Bore size	Rod diameter	Acting	Piston area mm <sup>2</sup>	Operating pressure MPa								
				0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
φ 12	φ 6	Push	113	23	34	45	57	68	79	90	102	113
		Pull	85	17	26	34	43	51	60	68	77	85
φ 16	φ 8	Push	201	40	60	80	101	121	141	161	181	201
		Pull	151	30	45	60	76	91	106	121	136	151
φ 20	φ 10	Push	314	63	94	126	157	188	220	251	283	314
		Pull	236	47	71	94	118	142	165	189	212	236
φ 25	φ 12	Push	491	98	147	196	246	295	344	393	442	491
		Pull	373	76	113	151	189	227	265	302	340	378
φ 32	φ 16	Push	804	161	241	322	402	482	563	643	724	804
		Pull	603	121	181	241	302	362	422	482	543	603

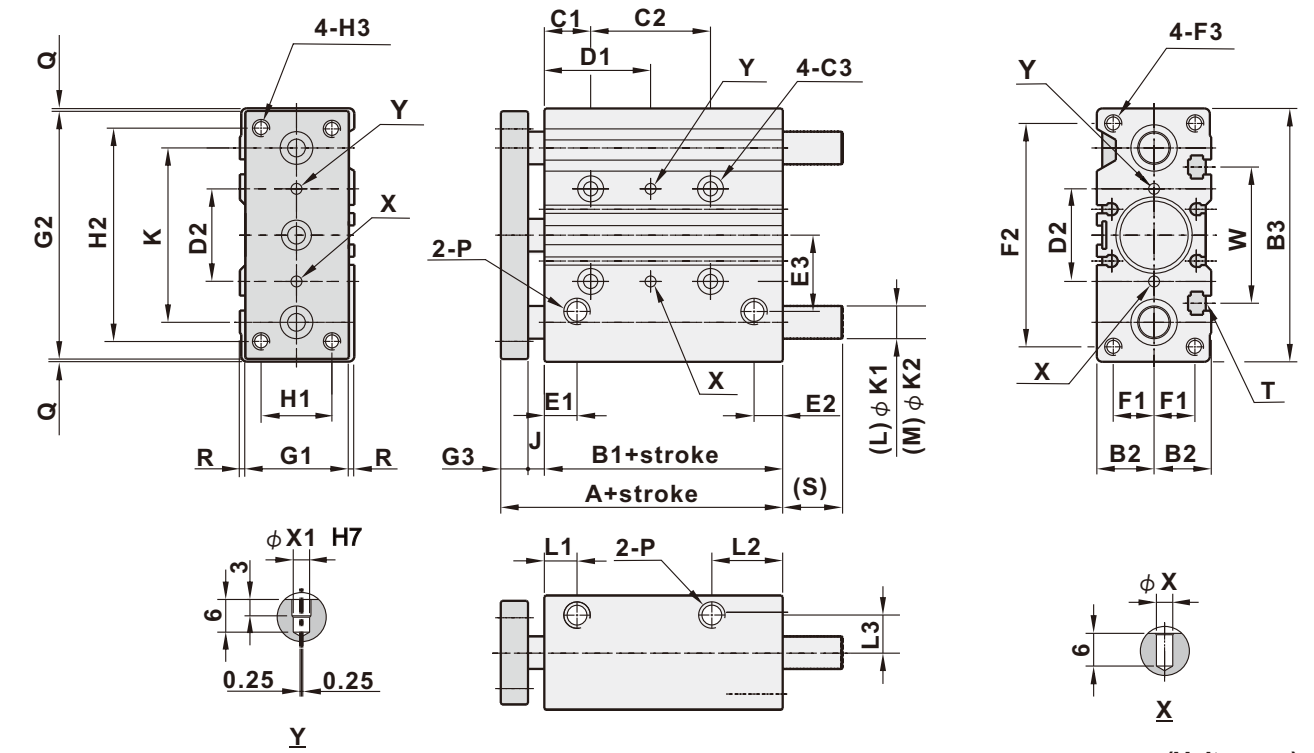
### Mounting example



### Sensor mounting example



### Dimensions



(Unit : mm)

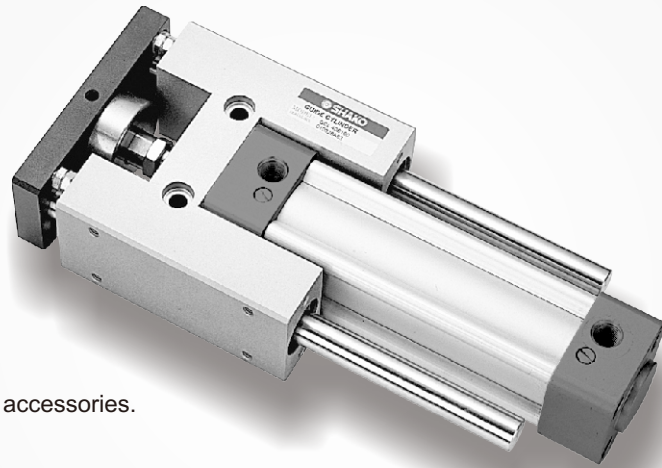
Bore size	A	B1	B2	B3	C1	C2		C3	D1		D2	E1	E2	E3	F1	F2
						Under 30ST	Under 40ST		Over 30ST	Over 40ST						
φ 12	42	29	13	58	5	20	40	M4Countersink,RearM5x0.8Px10dp	15	25	23	11	8	18	9	50
φ 16	46	33	15	64	5	24	44	M4Countersink,RearM5x0.8Px10dp	17	27	24	13	8	17	11	56
φ 20	53	37	18	83	17	24	44	M5Countersink,RearM6x1.0Px12dp	29	39	28	12	9.5	25	12	72
φ 25	53.5	37.5	21	93	17	24	44	M5Countersink,RearM6x1.0Px12dp	29	39	34	12	10.5	28	15	82
φ 32	59.5	37.5	24	112	21	24	48	M6Countersink,RearM8x1.25Px16dp	33	45	42	11	11	32	17	98

Bore size	F3	G1	G2	G3	H1	H2	H3	J	K	K1	K2	L1	L2	L3	P	Q	R	T	W	X1
φ 16	M5x0.8Px12dp	25	62	8	16	54	M4x0.7P	5	46	8	10	13	20	10.5	M5	1	2.5	M4	38	3
φ 20	M5x0.8Px13dp	30	81	10	18	70	M5x0.8P	6	54	10	12	12	24	11.5	PT1/8	1	3	M5	44	3
φ 25	M6x1.0Px15dp	38	91	10	26	78	M5x0.8P	6	64	12	16	12	26	14	PT1/8	1	2	M5	50	4
φ 32	M8x1.25Px20dp	44	110	12	30	96	M8x1.25P	10	78	16	20	11	35	16.5	PT1/8	1	2	M6	63	4

Bore size	S(Linear bearing L)								Bore size	S(Bush bearing M)							
	10	20	25	30	40	50	75	100		10	20	25	30	40	50	75	100
φ 12	1	1	-	1	13	13	13	13	φ 12	0	0	-	0	0	18.5	18.5	18.5
φ 16	3	3	-	3	19	19	19	19	φ 16	0	0	-	0	0	18.5	18.5	18.5
φ 20	-	10	-	10	27	27	27	27	φ 20	-	0	-	0	0	31.5	31.5	31.5
φ 25	-	16	-	16	32	32	32	32	φ 25	-	0	-	0	0	31.5	31.5	31.5
φ 32	-	-	21.5	-	-	21.5	38.5	38.5	φ 32	-	-	37.5	-	-	21.5	42.5	42.5

### Features

- \* Integration of standard cylinder and guide rod.
- \* Cylinder body connected with guide rod by floating joint, without friction in operation.
- \* Two guide rods offer high non-rotating accuracy.
- \* Two guide rod bearings for selection.
- \* The linear bearing is applicable to high speed acting and light loads.
- \* The bush bearing is applicable to low speed acting and heavy loads.
- \* Sensor switch and shock absorber are optional accessories.



### How to order

<b>GC</b>	<b>L</b>	<b>32</b>	<b>B</b>	<b>50</b>	<b>A1</b>	<b>F</b>	<b>SF</b>	<b>1</b>
Guide cylinder	Guide rod	Bore size	Stroke	Shock absorber/Number	Shock absorber	Sensor type	Number of sensor	
M Bush bearing	32 φ 32		A1 1 pc	F Assembly in front	Blank	W/O sensor	1 pc	
L Linear bearing	40 φ 40		A2 2 pcs	B Assembly in rear	SF	LED in front	2 pcs	
	50 φ 50							
	63 φ 63							
	80 φ 80							
	100 φ 100							

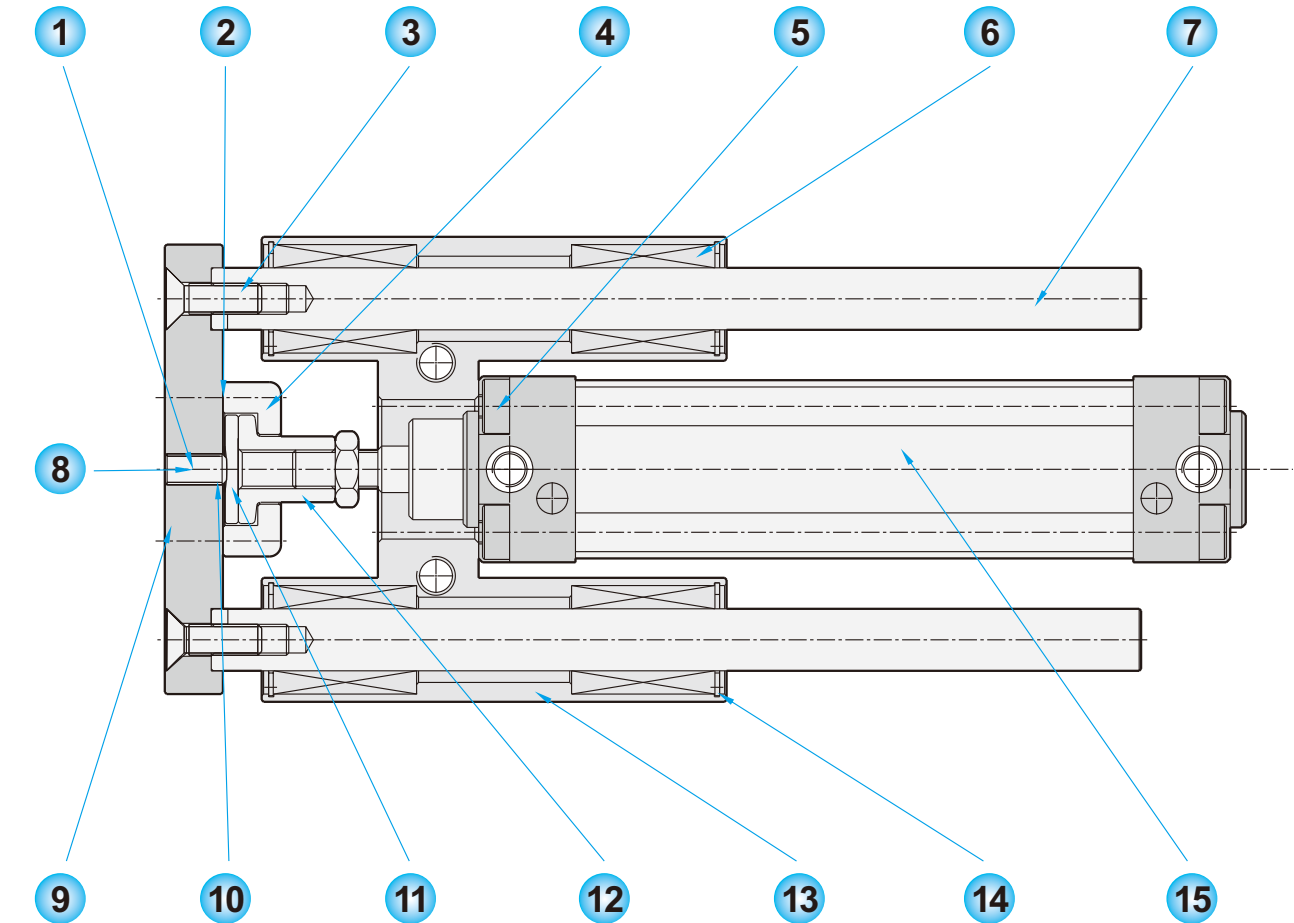
<b>ST</b>	LED on top
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\* Please refer to page 6-15 "SHOCK ABSORBER" for specifications of shock absorber.  
\* Please add stroke 50mm for assembling cushion in rear.

### Specifications

Bore size	φ 32	φ 40	φ 50	φ 63	φ 80	φ 100
Port size	1/8"	1/4"		3/8"		1/2"
Fluid	Compressed air					
Acting	Double acting					
Operating pressure range	2 ~ 9 kgf/cm <sup>2</sup>					
Max operating pressure	10.5 kgf/cm <sup>2</sup>					
Lubrication	Not required					
Barrel material	Aluminum alloy					
Magnet	Built-in					
Ambient temperature	0°C ~ 60°C					
Piston speed mm/Sec	100~500mm					

### Material of parts



No.	Description	Material	Qty.	No.	Description	Material	Qty.
1	Press unit	Industrial plastic	1	9	Plate	Aluminum alloy	1
2	Fixing screw	Carbon steel	4	10	Adjustable screw	Carbon steel	1
3	Fixing screw	Carbon steel	2	11	Press unit	Carbon steel	2
4	Cap	Carbon steel	1	12	T type adaptor	Carbon steel	1
5	Fixing screw	Carbon steel	4	13	Guide body	Aluminum alloy	1
6	Linear bearing	Bearing steel	4	14	Snap ring	Carbon steel	4
7	Guide rod	Bearing steel	2	15	ISO6431 standard cylinder	Aluminum alloy	1
8	Adjustable screw	Carbon steel	1				

### Theoretical force

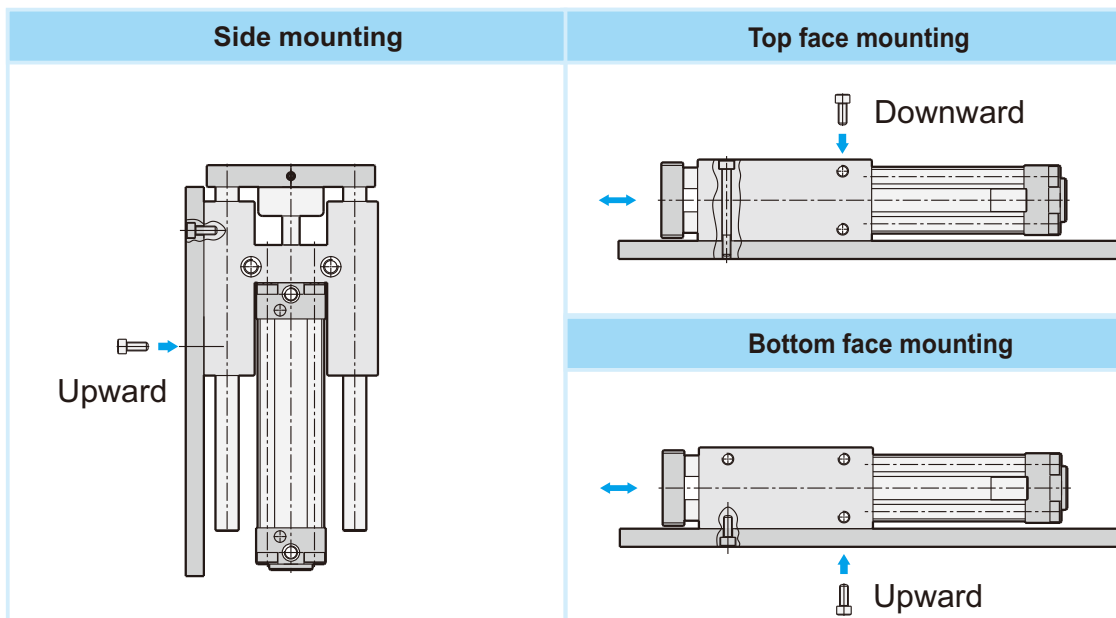
Bore size	Rod diameter	Acting	Piston area cm <sup>2</sup>	Operating pressure kgf/cm <sup>2</sup>					
				2	3	4	5	6	7
φ 32	φ 12	Push	8.04	16.08	24.12	32.16	40.2	48.24	56.28
		Pull	6.91	13.82	20.73	27.64	34.56	41.46	48.37
φ 40	φ 16	Push	12.57	25.14	37.71	50.28	62.85	75.42	87.99
		Pull	10.56	21.12	31.68	42.24	52.8	63.36	73.92
φ 50	φ 20	Push	19.63	39.26	58.89	78.52	98.15	117.78	137.41
		Pull	16.49	32.98	49.47	65.96	82.45	98.94	115.43
φ 63	φ 20	Push	31.17	62.34	93.51	124.68	155.85	187.02	218.19
		Pull	28.03	56.06	84.09	112.12	140.15	168.18	196.21
φ 80	φ 25	Push	50.27	100.54	150.81	201.08	251.35	301.62	351.89
		Pull	45.36	90.72	136.08	181.44	226.8	272.16	317.52
φ 100	φ 25	Push	78.54	157.08	235.62	314.16	392.7	441.78	549.78
		Pull	73.63	147.26	220.89	294.52	368.15	417.24	515.41

### Stroke table

Bore size	Standard stroke (mm)	Max. stroke (mm)
φ 32	50, 100, 150, 200, 250, 300	500
φ 40	50, 100, 150, 200, 250, 300	500
φ 50	50, 100, 150, 200, 250, 300, 350, 400, 450, 500	750
φ 63	50, 100, 150, 200, 250, 300, 350, 400, 450, 500	750
φ 80	50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 750	1000
φ 100	50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 750	1000

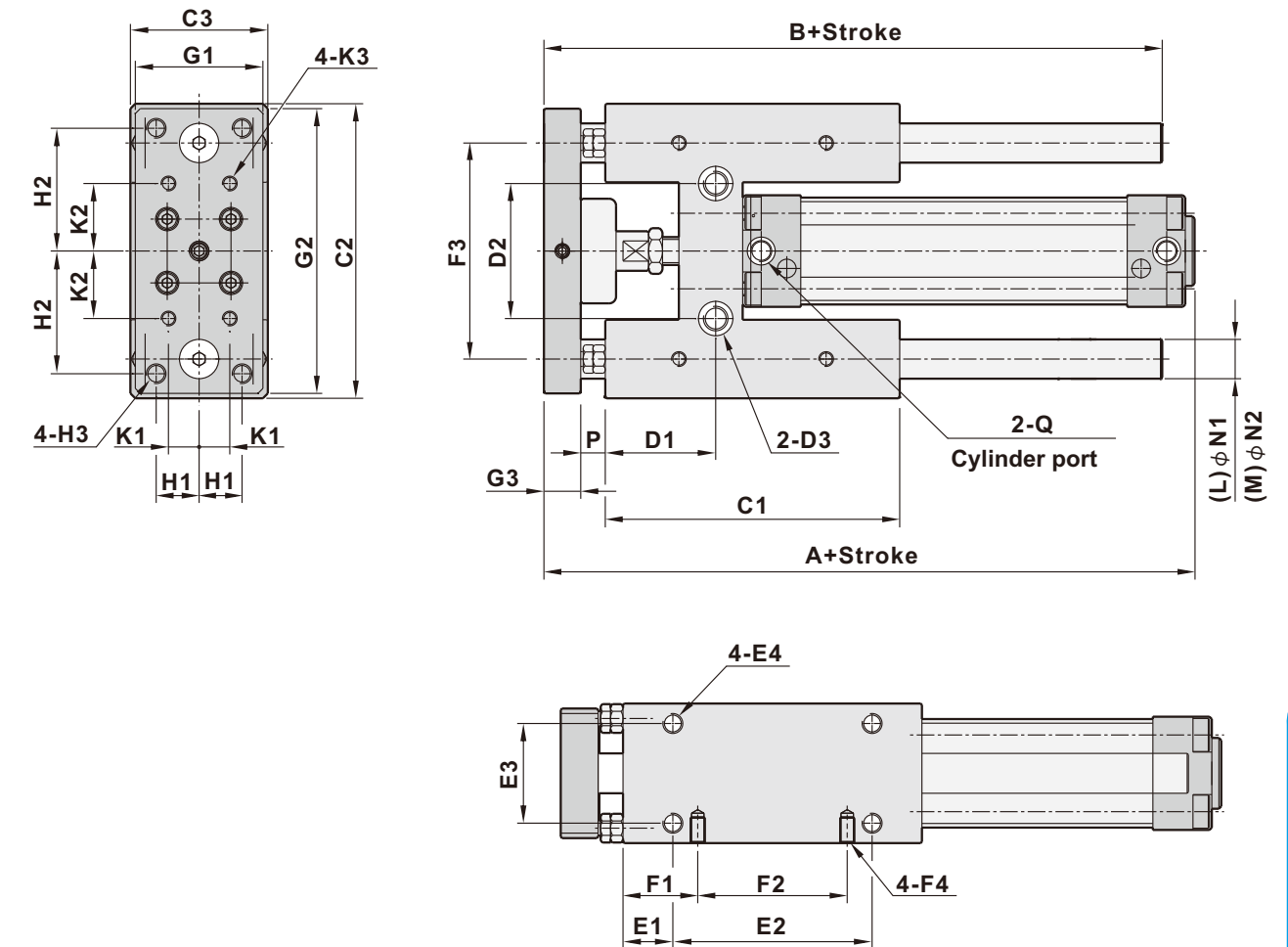
Note: Please contact our sales for non-standard stroke.

### Mounting example



### Dimensions

#### Standard type



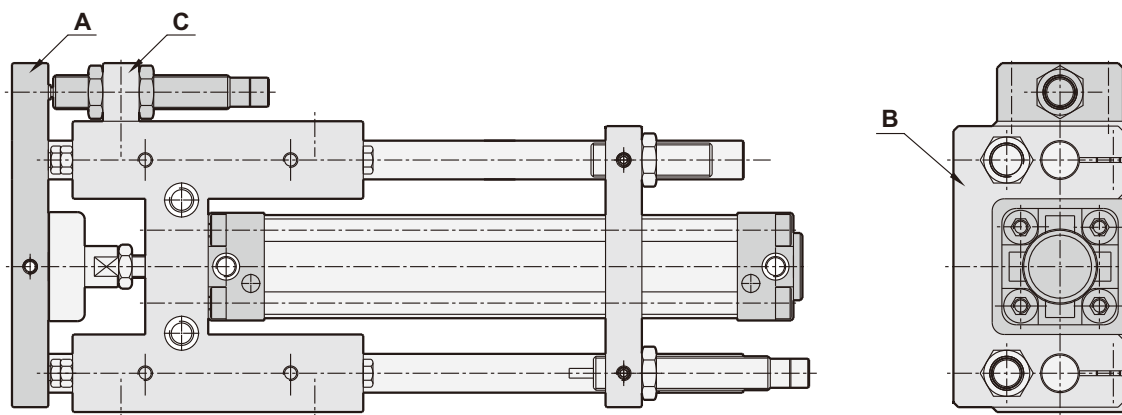
(Unit : mm)

Bore size	A	B	C1	C2	C3	D1	D2	D3	E1	E2	E3	E4	F1	F2	F3
φ 32	179	152	120	120	56	45	55	φ 8.5-φ 14x8.5 Depth	20	80	40	M6xP1.0x15 Depth	30	60	88
φ 40	190	152	120	120	56	45	55	φ 8.5-φ 14x6 Depth	20	80	40	M6xP1.0x15 Depth	30	60	88
φ 50	220	200	160	160	78	65	80	φ 10.5-φ 17x11 Depth	30	100	50	M8xP1.25x20 Depth	40	80	120
φ 63	236	200	160	160	78	65	80	φ 10.5-φ 17x7 Depth	30	100	50	M8xP1.25x20 Depth	40	80	120
φ 100	280	270	220	220	115	90	120	φ 12.5-φ 20x13 Depth	40	140	80	M10xP1.5x20 Depth	60	100	170
	290	270	220	220	115	90	120	φ 12.5-φ 20x12 Depth	40	140	80	M10xP1.5x20 Depth	60	100	170

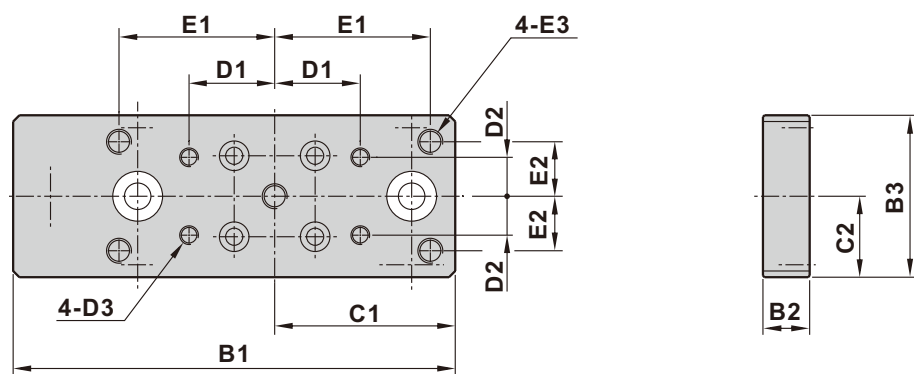
Bore size	F4	G1	G2	G3	H1	H2	H3	K1	K2	K3	N1	N2	P	Q
φ 32	M6xP1.0x10 Depth	52	116	15	17.5	50	M8xP1.25	12.5	27.5	M6xP1.0	16	20	10	G 1/8
φ 40	M6xP1.0x10 Depth	52	116	15	17.5	50	M8xP1.25	12.5	27.5	M6xP1.0	16	20	10	G 1/4
φ 50	M8xP1.25x15 Depth	74	156	20	25	65	M10xP1.5	20	40	M8xP1.25	20	25	10	G 1/4
φ 63	M8xP1.25x15 Depth	74	156	20	25	65	M10xP1.5	20	40	M8xP1.25	20	25	10	G 3/8
φ 80	M10xP1.5x20 Depth	110	216	25	40	90	M12xP1.75	30	55	M10xP1.5	25	30	10	G 3/8
	M10xP1.5x20 Depth	110	216	25	40	90	M12xP1.75	30	55	M10xP1.5	25	30	10	G 1/2

**Dimensions**

**Guide cylinder with shock absorber**



**A : Front plate**

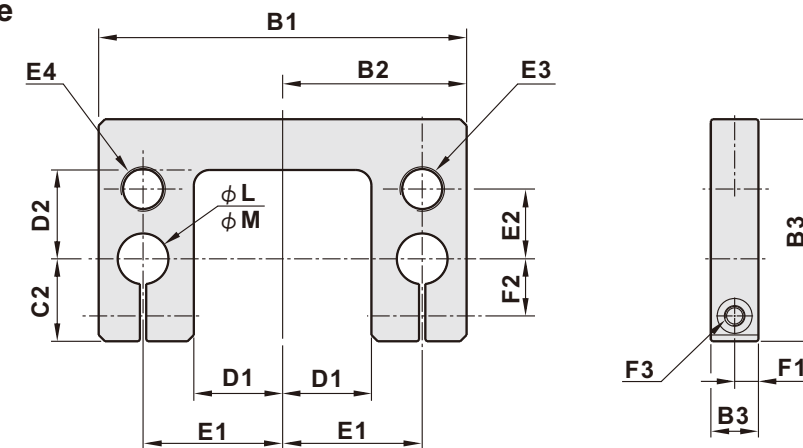


(Unit : mm)

Bore size	B1	B2	B3	C1	C2	D1	D3	E1	E2	E3
φ 32	142	15	52	58	26	27.5	M6xP1.0	50	17.5	M8xP1.25
φ 40	142	15	52	58	26	27.5	M6xP1.0	50	17.5	M8xP1.25
φ 50	190	20	74	78	37	40	M8xP1.25	65	25	M10xP1.5
φ 63	190	20	74	78	37	40	M8xP1.25	65	25	M10xP1.5
φ 80	258	25	110	108	55	55	M10xP1.5	90	40	M12xP1.75
φ 100	258	25	110	108	55	55	M10xP1.5	90	40	M12xP1.75

**Dimensions**

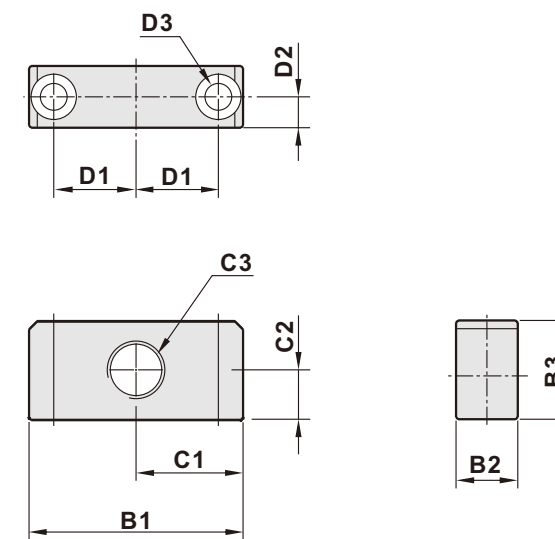
**B : End plate**



(Unit : mm)

Bore size	B1	B2	B3	C1	C2	D1	D2	E1	E2	E3	E4	F1	F2	F3
φ 32	116	15	70	58	26	28	28	44	22	M14xP1.5	M14xP1.5	7.5	18	φ 6.5- φ 9.5x6.5 Depth
φ 40	116	15	70	58	26	28	28	44	22	M14xP1.5	M14xP1.5	7.5	18	φ 6.5- φ 9.5x6.5 Depth
φ 50	158	20	97	78	37	39	39	60	32	M14xP1.5	M20xP1.5	10	25	φ 8.5- φ 14x8.5 Depth
φ 63	158	20	97	78	37	39	39	60	32	M14xP1.5	M20xP1.5	10	25	φ 8.5- φ 14x8.5 Depth
φ 80	216	25	140	108	55	57.5	57.5	85	48	M14xP1.5	M25xP1.5	12.5	40	φ 10.5- φ 17x11 Depth
φ 100	216	25	140	108	55	57.5	57.5	85	48	M14xP1.5	M25xP1.5	12.5	40	φ 10.5- φ 17x11 Depth

**C : Mounting block**



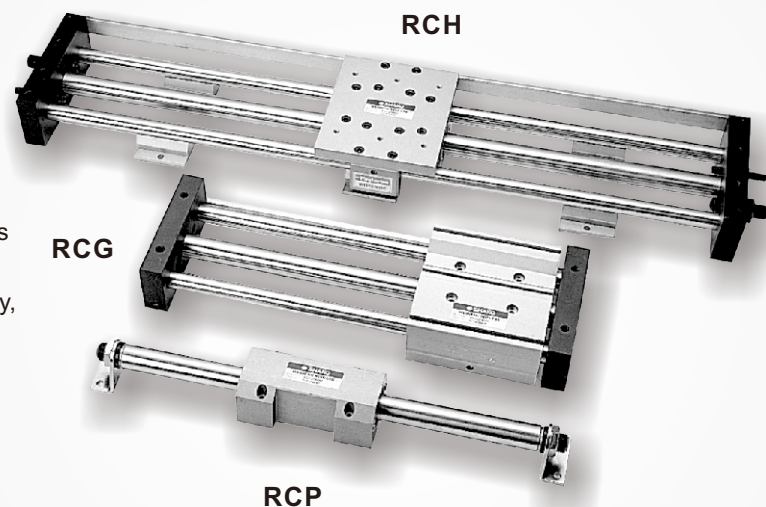
(Unit : mm)

Bore size	B1	B2	B3	C1	C2	C3	D1	D2	F3
φ 32	52	15	24	26	12	M14xP1.5	20	7.5	φ 6.5- φ 9.5x6.5 Depth
φ 40	52	15	24	26	12	M14xP1.5	20	7.5	φ 6.5- φ 9.5x6.5 Depth
φ 50	74	20	32	37	16	M20xP1.5	25	10	φ 8.5- φ 14x8.5 Depth
φ 63	74	20	32	37	16	M20xP1.5	25	10	φ 8.5- φ 14x8.5 Depth
φ 80	110	25	40	55	20	M25xP1.5	40	12.5	φ 10.5- φ 17x11 Depth
φ 100	110	25	40	55	20	M25xP1.5	40	12.5	φ 10.5- φ 17x11 Depth



### Features

Utilize a special magnetic device to move cylinder body instead of piston rod acting, so the length of cylinder is half shorter than standard cylinder. The piston in magnetic device is sealed by stainless steel tube that is completely isolated from cylinder body, which ensures leakage free and long life. Moving magnetically provides stable quality, accuracy, and vibration free. Automation quality test ensures excellent performance. Simple installation and maintenance.



### How to order

<b>RCP</b>	<b>L</b>	<b>32</b>	<b>B</b>	<b>50</b>	<b>A1</b>	<b>SF</b>	<b>1</b>	
Rodless magnetic cylinder	Guide rod	Bore size	Stroke		Shock absorber/Number	Sensor type		Number of sensor
RCP Mono-block type (W/O guide rod)	B Bush bearing	20 $\phi$ 20	50		A1 1 pc	Blank SS	W/O sensor	1 pc
	L Linear bearing	25 $\phi$ 25	50		A2 2 pcs	SR	Square type	2 pcs
RCG Guide type		32 $\phi$ 32						
RCH Mono-block with supporting type								

AL-11R

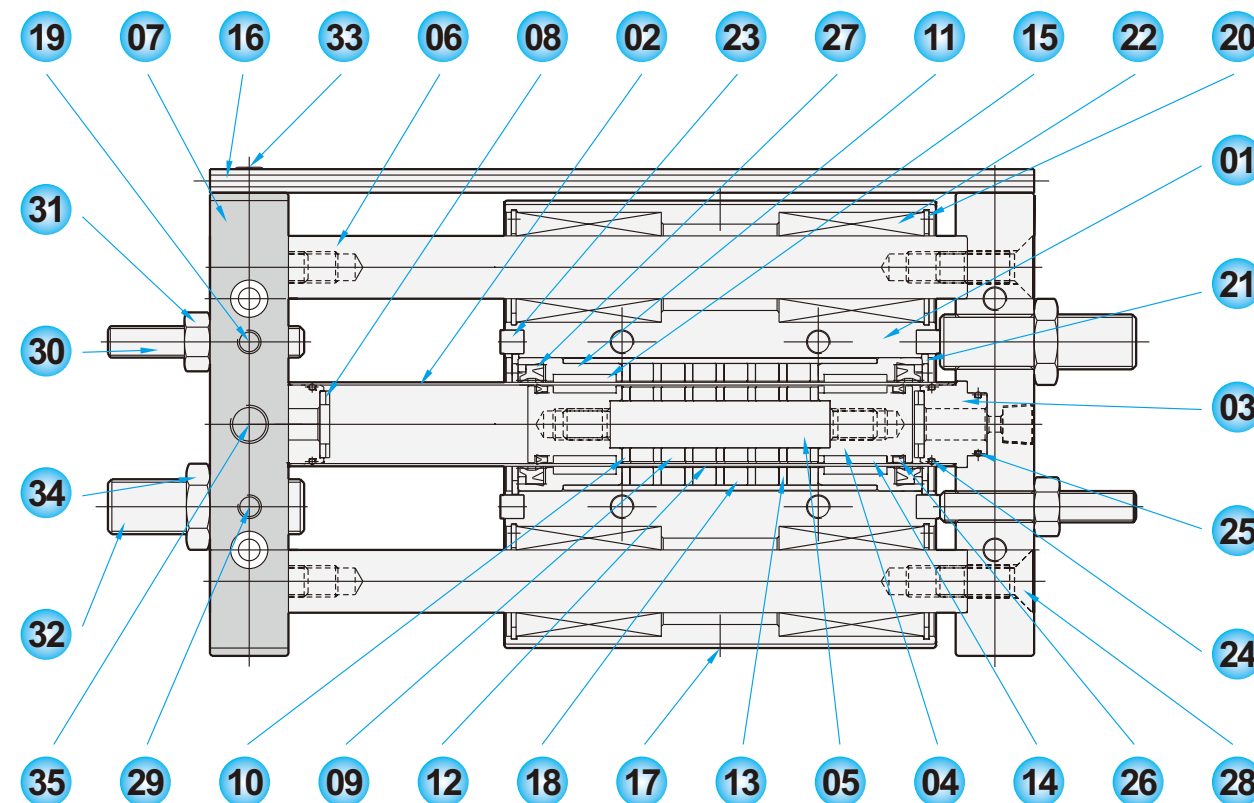
AL-07R

\* Please refer to page 6-13 "SHOCK ABSORBER" for specifications of shock absorber.

### Specifications

Bore size	$\phi$ 20	$\phi$ 25	$\phi$ 32
Port size	1/8"		
Fluid	Compressed air		
Acting	Double acting		
Operating pressure range	2 ~ 7 kgf/cm <sup>2</sup>		
Max operating pressure	10.5 kgf/cm <sup>2</sup>		
Barrel material	Aluminum alloy		
Lubrication	Not required		
Lubricant on outside rod	Required		
Magnet	Built-in		
Ambient temperature	0°C ~ 60°C		
Piston speed	500 mm/Sec		
Bush bearing	Applicable to low speed acting(Heavy loads)		
Linear bearing	Applicable to high speed acting(Light loads)		

### Material of parts



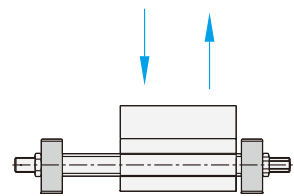
No.	Description	Material	Qty.	No.	Description	Material	Qty.
1	Cylinder body	Aluminum alloy	1	19	Press unit	Industrial plastic	4
2	Piston rod	Stainless steel	1	20	Snap ring	Spring steel	4
3	Top cover	Aluminum alloy	2	21	Snap ring	Spring steel	2
4	Piston	Aluminum alloy	2	22	Linear bearing	Bearing steel	4
5	Center rod	Stainless steel	1	23	Stopper	Bearing steel	4
6	Guide rod	Bearing steel	2	24	O-ring	NBR	2
7	Front plate	Aluminum alloy	2	25	O-ring	NBR	2
8	Bumper	NBR	2	26	Piston packing	NBR	2
9	Piston magnet	Ferrite magnet	6	27	Rod packing	NBR	2
10	Piston magnet holder	Ferrite	7	28	Fixing screw	Carbon steel	4
11	Body end cover	Aluminum alloy	2	29	Socket screw	Carbon steel	4
12	Magnet tube	Aluminum alloy	1	30	Adjustable screw	Carbon steel	2
13	Body magnet holder	Ferrite	7	31	Nut	Carbon steel	2
14	Piston wear ring	Teflon	2	32	Adjustable screw	Carbon steel	2
15	Wear ring cover	Teflon	2	33	Fixing screw	Carbon steel	2
16	Sensor mounting rail	Aluminum	1	34	Nut	Carbon steel	2
17	Magnet	Ferrite magnet	1	35	Bolt	Carbon steel	2
18	Outside magnet	Ferrite magnet	6				

### Theoretical force

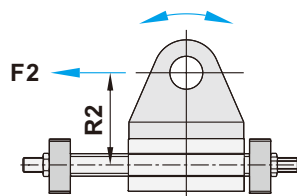
Bore size	Piston area cm <sup>2</sup>	Operating pressure kgf/cm <sup>2</sup>					
		2	3	4	5	6	7
φ 20	3.14	6.28	9.42	12.56	15.7	18.84	21.98
φ 25	4.91	9.82	14.73	19.64	24.55	29.46	34.37
φ 32	8.04	16.08	24.12	32.16	40.2	48.24	56.28

### Allowable loads

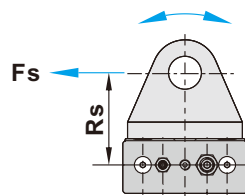
#### W2



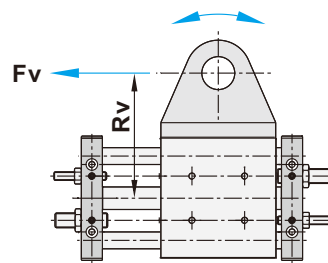
#### M2=F2XR2



#### Ms=FsXR<sub>s</sub>



#### Mv=FvXR<sub>v</sub>

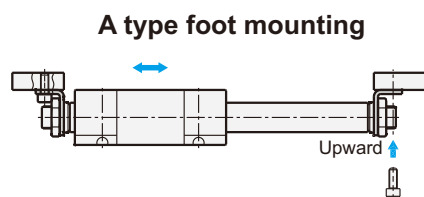
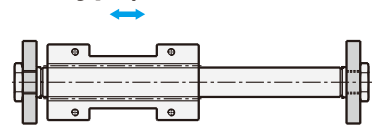


### Stroke table

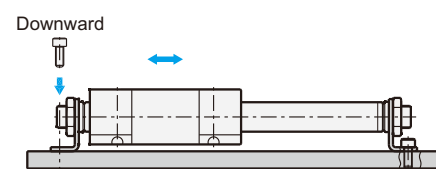
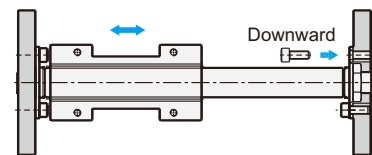
Bore size	Load W2(kgf-cm)	Load M2(kgf-cm)	Load Ms(kgf-cm)	Load Mv(kgf-cm)	Bore size	Standard stroke(mm)
φ 20	13	55	11	55	φ 20	100, 200, 300, 400, 500, 600, 700, 750, 800, 900, 1000
φ 25	20	100	20	100	φ 25	
φ 32	32	160	32	160	φ 32	

### Mounting example

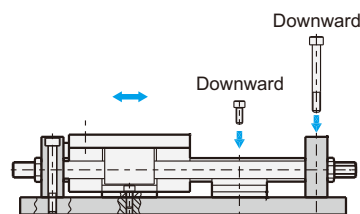
#### RCP(Mono-block type)



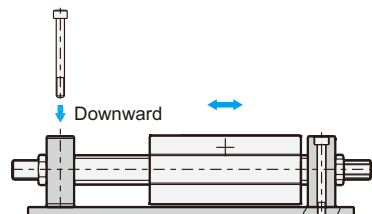
#### Flange mounting



#### RCH(Mono-block with supporting type)

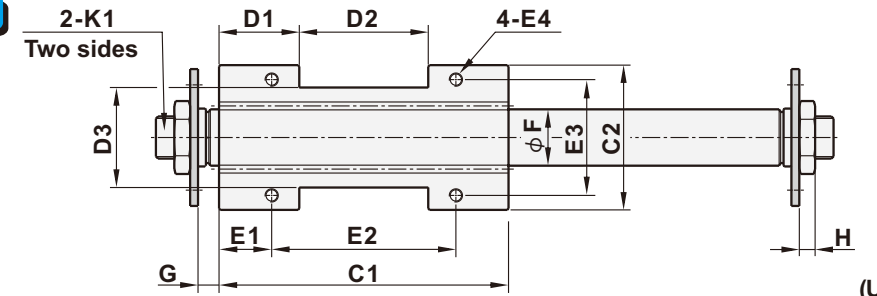


#### RCG(Guide type)



### Dimensions

#### RCP series



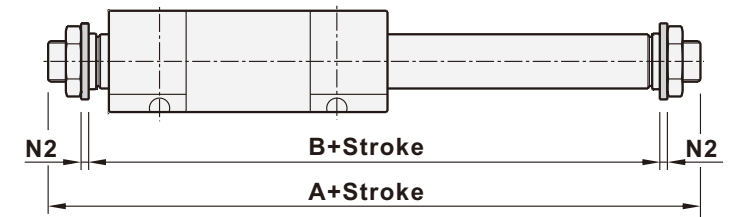
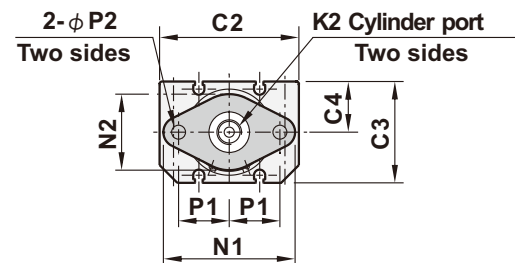
(Unit : mm)

Bore size	A	B	C1	C2	C3	D1	D2	D3	E1	E2	E3	E4	F	G	H
φ 20	156	126	110	55	40	30.5	49	38	20	70	44	M5xP0.8x15dp	21.4	8	8
φ 25	166	126	110	65	50	30.5	49	48	20	70	54	M5xP0.8x15dp	26.4	8	8
φ 32	186	146	120	80	60	29	62	60	20	80	66	M6xP1.0x20dp	33.6	13	8

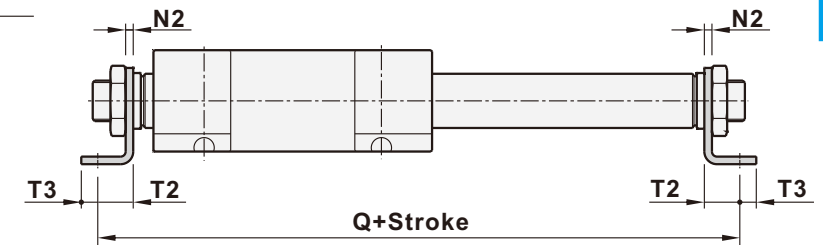
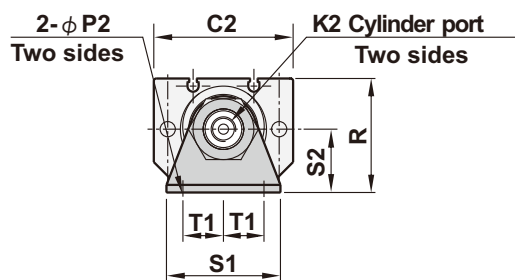
Bore size	K1	K2	N1	N2	N3	P1	P2	Q	R	S1	S2	T1	T2	T3
φ 20	M16xP1.5xL16	RS 1/8	52	30	3	20	5.5	154	45	45	25	16	14	6.5
φ 25	M22xP1.5xL20	RS 1/8	66	40	3	25	6.5	160	55	55	30	20	17	9
φ 32	M22xP1.5xL20	RS 1/8	66	40	3	25	6.5	180	65	65	35	25	17	9

### Mounting type

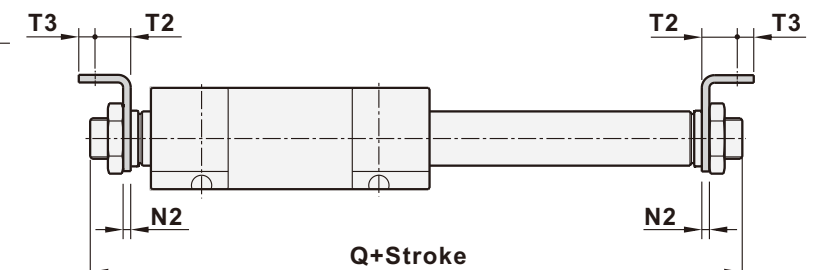
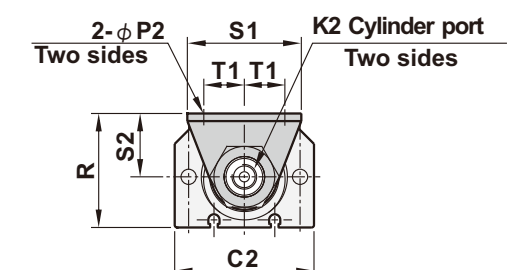
#### FA Flange mounting



#### L type foot mounting(Foot downward)

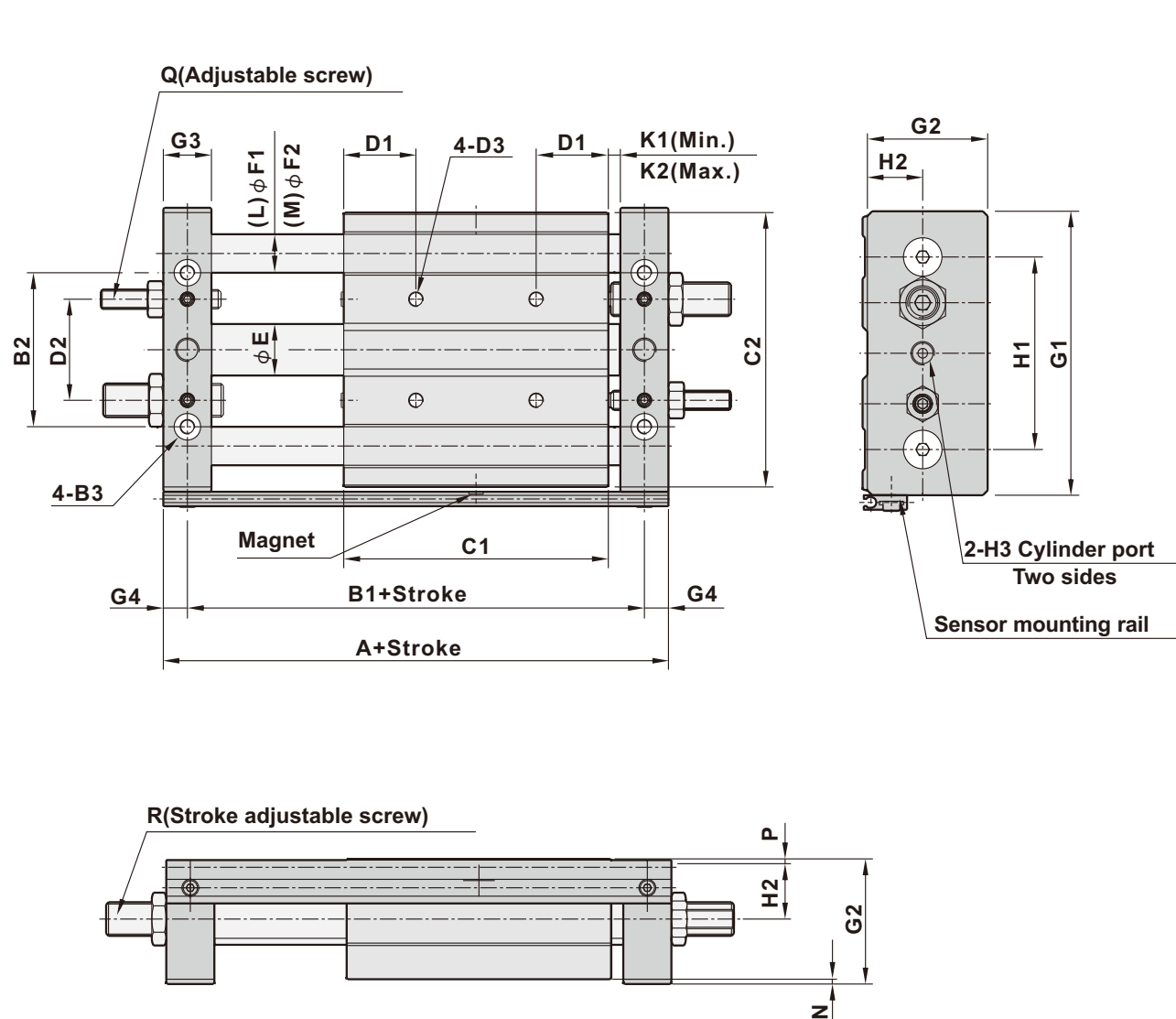


#### L type foot mounting(Foot upward)



Dimensions

RCG series



(Unit : mm)

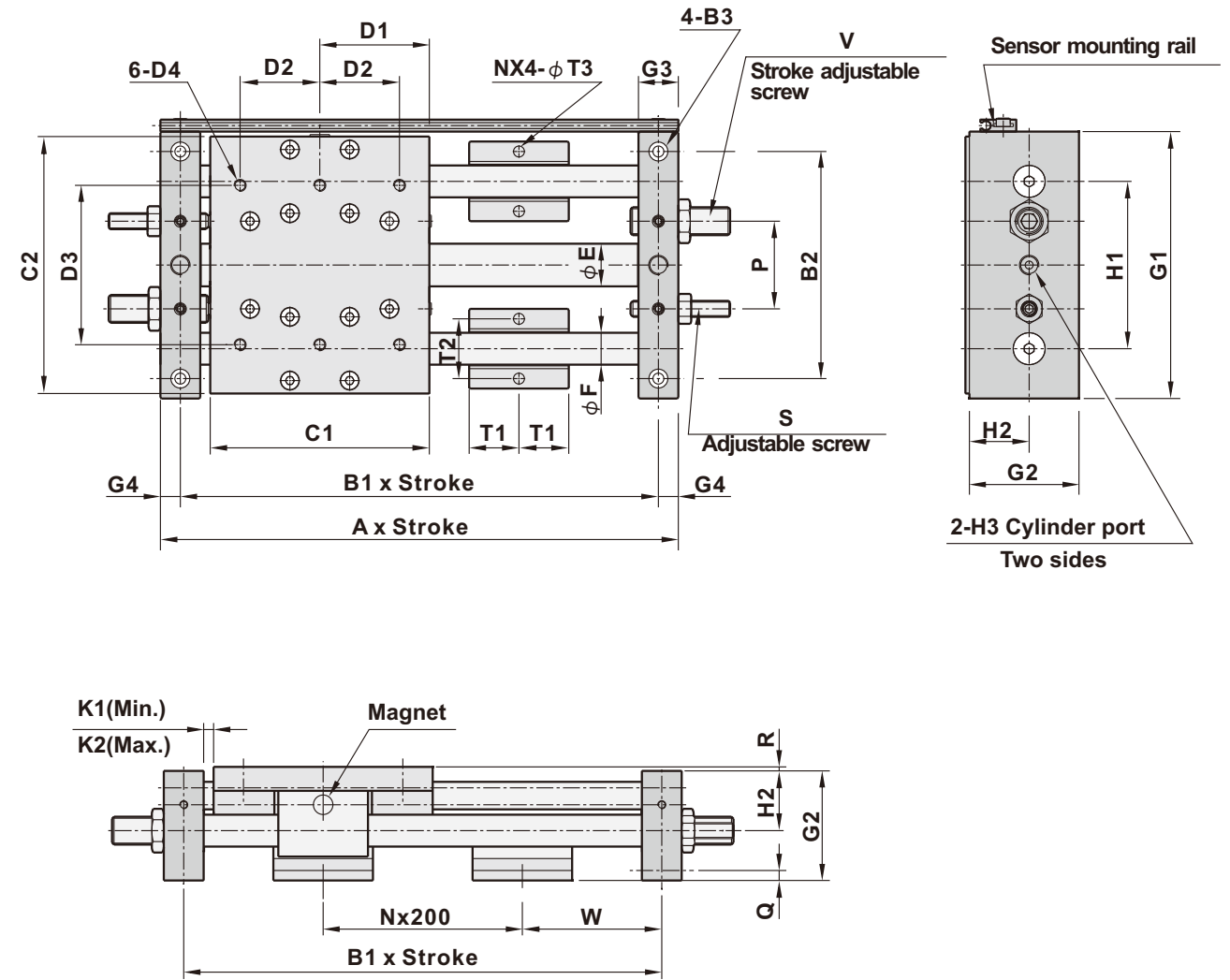
Bore size	A	B1	B2	B3	C1	C2	D1	D2	D3	E	F1	F2	G1
φ20	160	140	64	φ5.2-φ9.5x5.5dp	110	114	30	42	M6xP1.0x15dp	21.4	16	20	118
φ25	160	140	74	φ5.2-φ9.5x5.5dp	110	124	30	52	M6xP1.0x15dp	26.4	16	20	128
φ32	190	165	94	φ6.8-φ11x6.5dp	120	150	35	66	M8xP1.25x20dp	33.6	20	25	154

Bore size	G3	G4	H1	H2	H3	K1	K2	N	P	Q	R
φ20	20	10	80	23	RS 1/8	5	25	2	2	M8xP1.25xL50	M14xP1.5xL50
φ25	20	10	90	25	RS 1/8	5	25	2	2	M8xP1.25xL50	M14xP1.5xL50
φ32	25	12.5	112	29	RS 1/4	10	25	2	2	M14xP1.5xL50	M20xP1.5xL50

Dimensions

RCH series



(Unit : mm)

Stroke	500	1000	1500
N	2	5	7
W	120	70	120

Bore size	A	B1	B2	B3	C1	C2	D1	D2	D3	D4	E	F	G1	G2	G3
φ20	160	140	114	φ5.2-φ9.5x5.5dp	110	129	55	40	80	M5xP0.8x15dp	21.4	16	134	55	20
φ25	160	140	124	φ5.2-φ9.5x5.5dp	110	139	55	40	100	M5xP0.8x15dp	26.4	16	144	64	20

Bore size	G4	H1	H2	H3	K1	K2	P	Q	R	S	T1	T2	T3	V
φ20	10	84	30	RS 1/8	5	25	44	5	2	M8xP1.25xL50	25	30	5.5	M14xP1.5xL50
φ25	10	94	35	RS 1/8	5	25	54	5	2	M8xP1.25xL50	25	30	5.5	M14xP1.5xL50





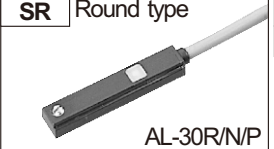
### How to order

ZF 32 B 50 SR 1

Rodless pneumatic cylinder		Bore size	
ZS	Standard type	18	φ 18
ZF	Guiding type	25	φ 25
ZK	Short type	32	φ 32
		40	φ 40
		50	φ 50
		63	φ 63

Stroke	Sensor type	Number of sensor
Blank	W/O sensor	1 pcs
	Round type	2 pcs



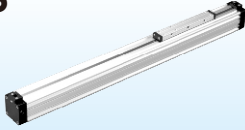
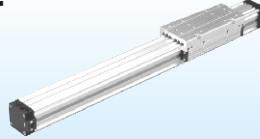

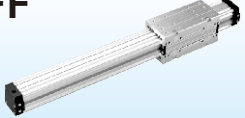
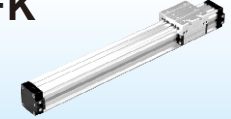
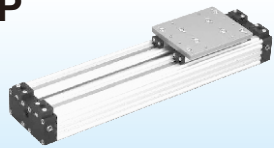
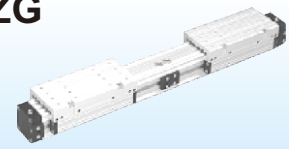
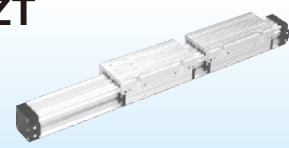
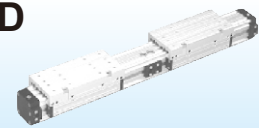
AL-30R/N/P

### Stroke table

Bore size	Standard stroke (mm)
φ 18	50, 100, 150, 200, 250, 300, 350,
φ 25	400, 450, 500, 550, 600, 650,
φ 32	700, 750, 800, 850, 900, 950,
φ 40	1000, 1050, 1100, 1150, 1200,
φ 50	1250, 1300, 1350, 1400, 1450,
φ 63	1500, 1550, 1600, 1650, 1700,
	1750, 1800, 1850, 1900, 1950,
	2000

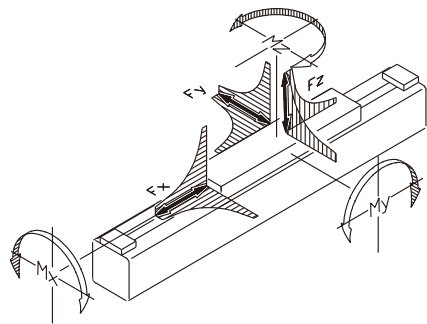
### Specifications

Bore size	φ 18	φ 25	φ 32	φ 40	φ 50	φ 63
Port size	M5	1/8"		1/4"		3/8"
Carrying force	140N	270N	440N	680N	1060N	1680N
Cushioning	15mm	18mm	24mm	34mm	40mm	49mm
Cushion	Adjustable					
Stroke	Variable up to 6000mm, option for longer than 6000mm					
Acting	Double acting					
Fluid	Filtered compressed air without lubricant, or slightly lubricated only					
Operating pressure range	2 ~ 8 kgf/cm <sup>2</sup>					
Max operating pressure	8 kgf/cm <sup>2</sup>					
Lubrication	Not required or few					
Barrel material	Aluminum alloy					
Magnet	Built-in					
Ambient temperature	-20°C ~ 80°C					
Piston speed	2000mm/Sec(Max)					
Weight of ZS carriage	0.3kg	0.6kg	1.1kg	1.8kg	3.2kg	5.6kg
Weight of ZK carriage	0.2kg	0.4kg	0.7kg	1.2kg	2.0kg	3.2kg
Weight of ZF carriage	0.4kg	0.9kg	1.5kg	2.8kg	4.9kg	8.0kg
Weight of stroke 1000mm barrel	1.5kg	2.6kg	4.8kg	6kg	7.4kg	10kg

Model	Summary	Order
ZS 	<b>ZS Standard cylinder</b> With identical fitting length as existing cylinders without piston. 0-stroke compatible.	Standard
ZF 	<b>ZF Guiding cylinder</b> With external and adjustable slide guide. For high loads.	Standard
ZK 	<b>ZK Short cylinder</b> With extremely shortened fitting length. 0-stroke up to 42% shorter.	Standard
ZFF 	<b>ZFF Guiding cylinder</b> With external and adjustable slide guide. For high loads.	Option
ZFK 	<b>ZFK Guiding cylinder</b> With external and adjustable slide guide. For high loads.	Option
ZP 	<b>ZP Parallel cylinder</b> For high loads and movements in every direction double action force central port.	Option
ZG 	<b>ZG Gripping cylinder</b> Gripping and clamping functions. Opening & closing function.	Option
ZT 	<b>ZT Tandem cylinder</b> For high movements in longitudinal direction.	Option
ZD 	<b>ZD Double action cylinder</b> Double action force pressing, embossing, punching...etc.	Option



### Loads



$$\text{Formula} = F = F_{zul} = \sqrt{F_x + F_y + F_z}$$

Note:

All data concerning forces and torques refer to a speed of  $V < 0.35 \text{ m/s}$ .  
Observation keeping the indicated values ensures maximum service life, minimum noise and optimum noise and optimum operating results.  
Higher speeds reduce the admissible forces.

### ZS Standard cylinder

Piston	Vmax 0.35m/s			F force admissible of			Torques		
	Fx(N) Acting force of 6 bar	Fy(N)	Fz(N)	0.75 m/s	1 m/s	1.5 m/s	Mx(Nm) Fy/Fz	My(Nm) Fx/Fz	Mz(Nm) Fx/Fy
φ 18	140	80	300	80	40	20	1	3	3
φ 25	270	110	480	155	90	40	2	13	13
φ 32	440	165	650	280	155	70	3.5	25	25
φ 40	680	225	800	500	290	125	5.5	40	40
φ 50	1060	325	1060	790	420	195	10	65	65
φ 63	1680	435	1680	1500	850	370	16	100	100

### ZK Short cylinder

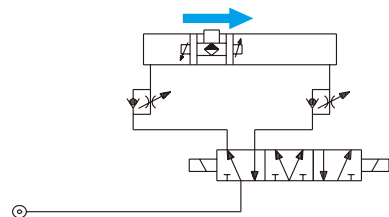
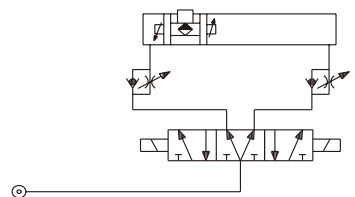
Piston	Vmax 0.35m/s			F force admissible of			Torques		
	Fx(N) Acting force of 6 bar	Fy(N)	Fz(N)	0.75 m/s	1 m/s	1.5 m/s	Mx(Nm) Fy/Fz	My(Nm) Fx/Fz	Mz(Nm) Fx/Fy
φ 18	140	40	300	80	40	20	1	3	3
φ 25	270	55	230	90	50	25	0.7	2.7	2.7
φ 32	440	70	320	200	110	45	1	5	5
φ 40	680	100	400	420	240	110	2	8.5	8.5
φ 50	1060	140	480	750	440	190	3.5	13	13
φ 63	1680	180	590	1500	850	380	50	18	18

### ZF Guiding cylinder

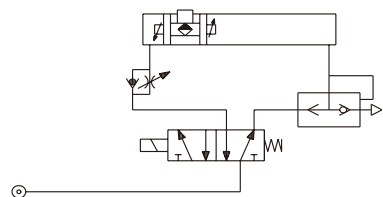
Piston	Vmax 0.35m/s			F force admissible of			Torques		
	Fx(N) Acting force of 6 bar	Fy(N)	Fz(N)	0.75 m/s	1 m/s	1.5 m/s	Mx(Nm) Fy/Fz	My(Nm) Fx/Fz	Mz(Nm) Fx/Fy
φ 18	140	370	370	100	58	26	3.5	6	6
φ 25	270	800	800	280	160	65	10	20	20
φ 32	440	200	200	510	300	140	25	45	45
φ 40	680	1600	1600	1000	550	250	40	75	75
φ 50	1060	2100	2100	1500	850	380	80	150	150
φ 63	1680	2800	2800	2500	1400	610	110	250	250

### Controls

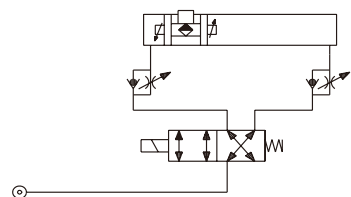
#### 5/3WAY VALVES



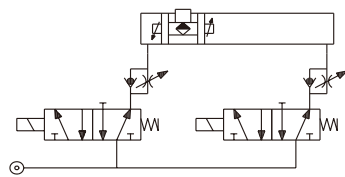
#### 5/2WAY VALVES



#### 4/2WAY VALVES

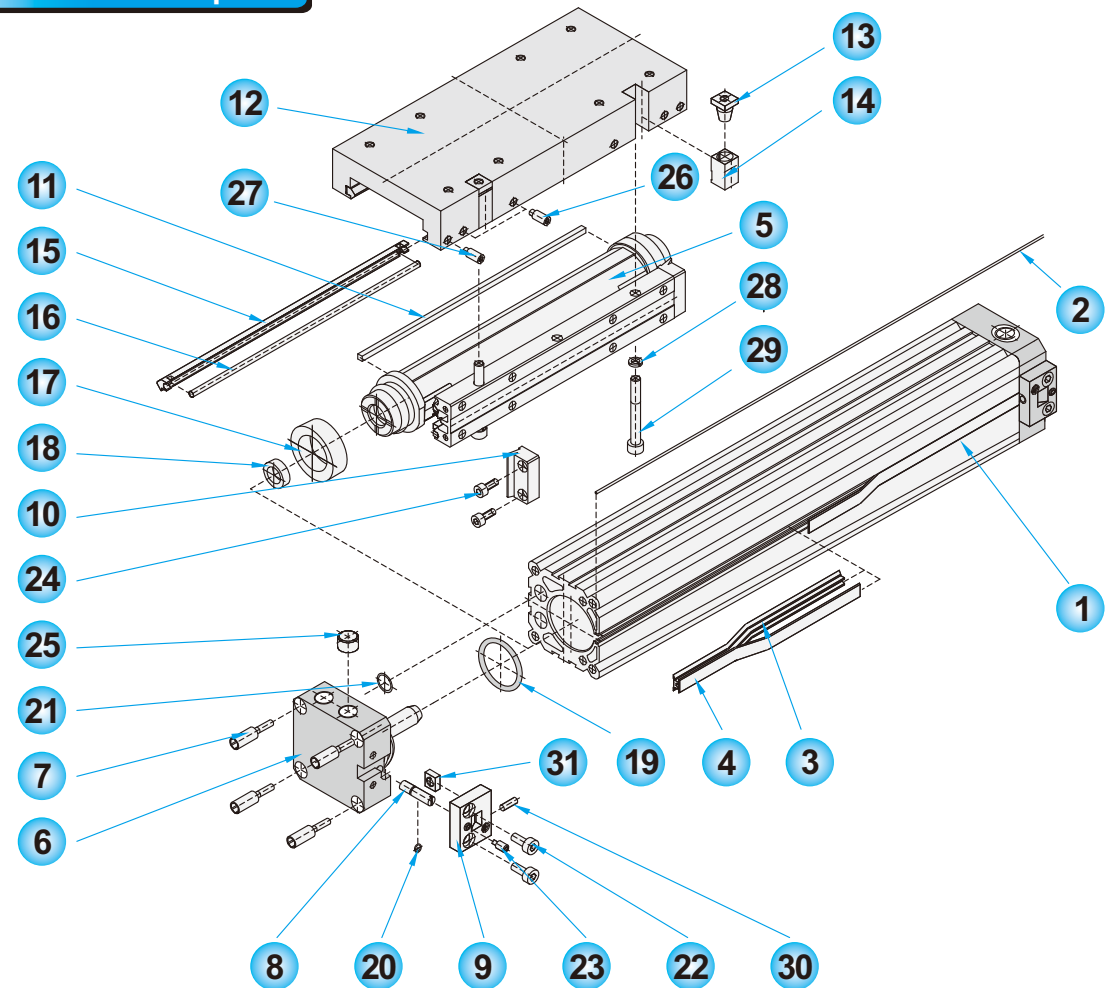


#### 5/2WAY VALVES



- Strike cylinder always with pressure on both sides, bleed until in movement direction.
- Speed regulation by exhaust restrictor (one-way flow restrictor) A control of the cylinder without flow restriction causes an enormous acceleration. The resulting kinetic energy can destroy the cylinder and the whole equipment.
- Slow run; at 6 bar reduced by flow restrictor up to 0.05m/sec.
- Operation speed up to 2m/sec depending on loads.

### Material of parts



No.	Description	Material
1	Tube	Al anodized
2	Round profile	PU
3	Sealing strip	PU
4	Cover strip	Stainless steel
5	Yoke	Al anodized/POM
6	End cap	Al anodized
7	Special screw	Zinc-plated steel
8	Cushioning pin	Stainless steel
9	Strip cover	POM
10	Head wiper	POM
11	Wiper	POM
12	Carriage	Al anodized
13	Cone nut	Zinc-plated steel
14	Clamp wedge	Al anodized
15	Guiding bar	POM
16	Press bar	Stainless steel

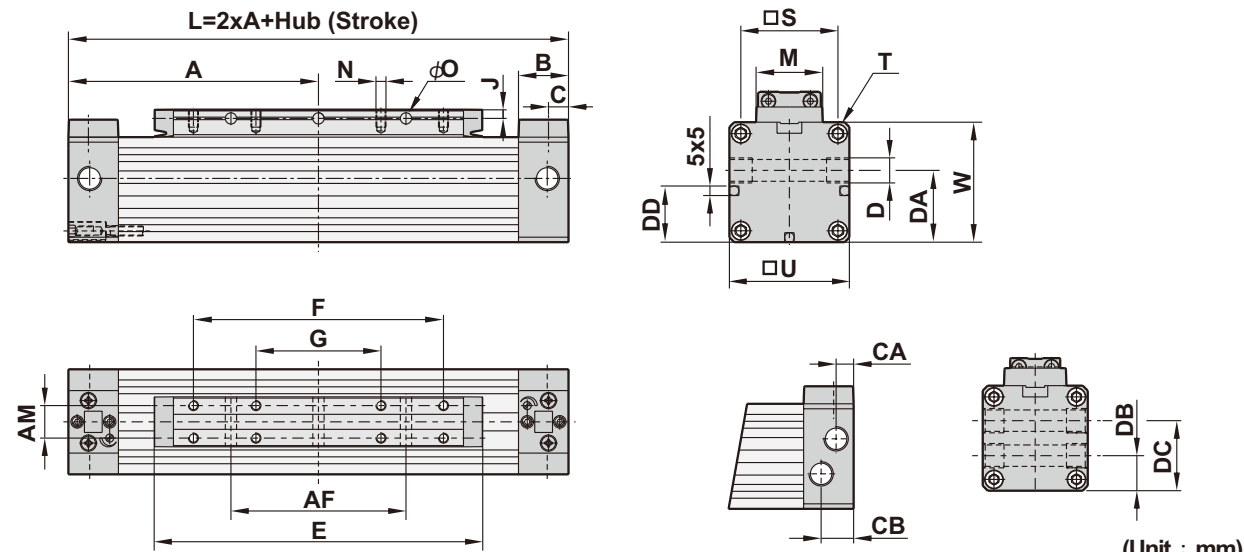
No.	Description	Material
17	Piston seal	PU
18	Cushion ring	NBR
19	O-ring	NBR
20	O-ring	NBR
21	Flat seal	NBR
22	Countersink screw	Zinc-plated steel
23	Grub screw with pin	Zinc-plated steel
24	Cylinder head screw	Zinc-plated steel
25	Plug screw	Zinc-plated steel
26	Grub screw	Browned steel
27	Grub screw with pin	Browned steel
28	Plain washer	Zinc-plated steel
29	Cylinder head screw	Zinc-plated steel
30	Grub screw	Browned steel
31	Square nut	Zinc-plated steel

### Features

- \* High-strength aluminum-extruded section to reduce deflection and increase the slot width.
- \* Front and side wipers on the yoke.
- \* Grooves in tube profile for fixing various additional components.
- \* Fixation at the front can be turned by 4 x 90°.
- \* New pin type cushioning.
- \* Large clamping surface on the yoke.
- \* Guiding over the entire stroke length.
- \* One-side connections possible.
- \* Torsion-proof.
- \* Exchangeable wear parts.
- \* High section modulus in all load directions.
- \* Adjustable slide guides save additional guiding systems.
- \* Carriage can be installed at a later date.



### Dimensions

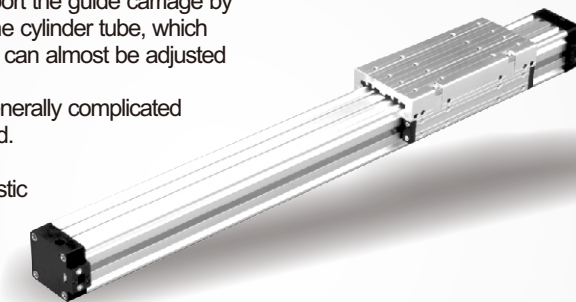


Bore size	A	AF	AM	B	C	CA	CB	D	DA	DB	DC	DD	E
φ 18	80	50	10	16.5	6.5	—	—	M7x1/6	15.5	—	—	—	103
φ 25	100	70	13	20	8.5	7	13	G1/8x8	25.5	14	28	18.5	131
φ 32	120	100	16	20	8.5	7	13	G1/8x8	32	16	34.5	21	171
φ 40	150	140	22	23	13	11	14.5	G1/4x12	37.5	18.5	41	29.5	220
φ 50	180	180	29	23	13	12	14	G1/4x12	47.5	22.5	47.5	37	280
	215	215	40	29	13	12.5	15.5	G3/8x12	59.5	24.5	59.5	44.5	333

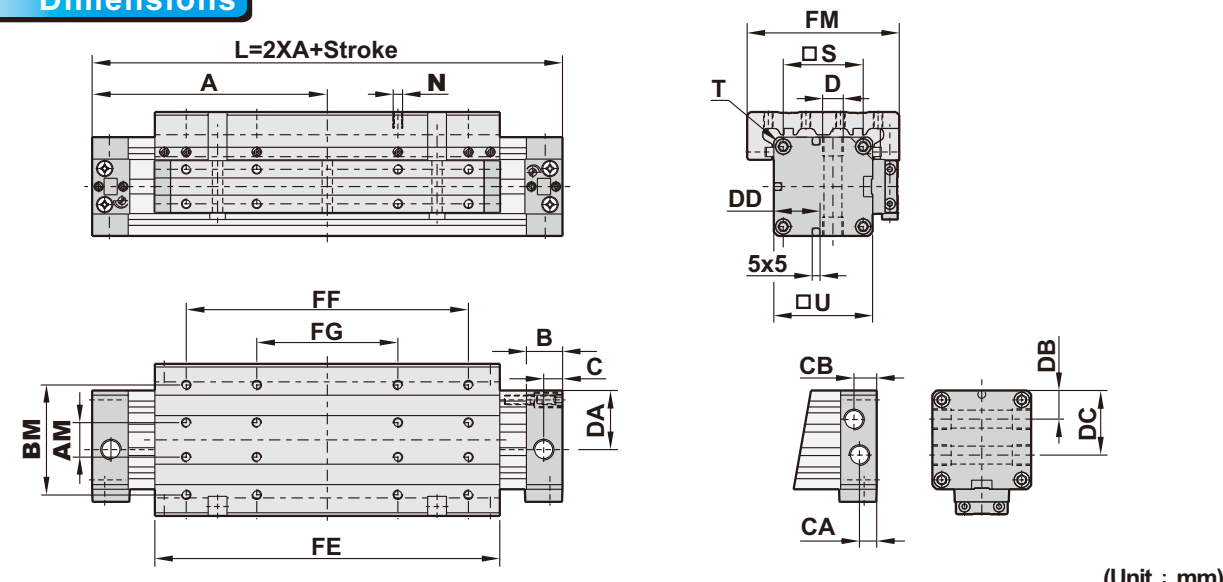
Bore size	F	FE	G	J	M	N	O	S	T	U	W
φ 18	75	90	—	3	15.5	M3x6	3.5	23.5	M3x7	30	39
φ 25	100	116	50	3.5	20	M4x7	4.5	33	M4x9	42	53
φ 32	140	156	70	4.5	25	M5x9	5.5	41	M5x10	52	65
φ 40	180	220	90	5	33	M6x10	7	51	M6x12	63	79
φ 50	220	260	110	6.5	42	M8x12.5	7	63	M8x12	78	96
φ 63	280	313	140	8	54	M8x15	9	78	M8x12	93	113.5

### Features

- \* Accuracy and high loading capacity.
- \* The cylinder provides V-guide grooves on outer side which support the guide carriage by means of slide bars, the guide carriage is fitted to the sides of the cylinder tube, which means that the increase of the slot width has no influence and can almost be adjusted without backlash.
- \* As the guide grooves are integrated into the cylinder tube, the generally complicated and expensive installation of additional guide profiles is eliminated.
- \* The adjustable slide bars are made of high-strength plastic. In combination with the anodized surface of the cylinder, these plastic gibes ensure a very favorable sliding effect.
- \* Exceptionally compact and space saving.
- \* Suitable for lower end supports, center supports, solenoid switch systems.
- \* Utilizing cross supports, two guiding cylinders can be connected to form portal support systems with infinitely chosen stroke, which is applicable to variety of applications.
- \* Provide highly versatile linear drive element which allows all designers and machine makers to implement future-oriented concepts at reasonable prices.



### Dimensions



Bore size	A	AM	B	BM	C	CA	CB	D	DA	DB	DC
φ 18	80	10	16.5	35	6.5	—	—	M7x1/6	17.5	—	—
φ 25	100	13	20	45	8.5	7	13	G1/8x8	25.5	14	28
φ 32	120	16	20	55	8.5	7	13	G1/8x8	32	17.5	34.5
φ 40	150	22	24	70	13	9.5	14.5	G1/4x12	37.5	20	42
φ 50	180	29	24	85	13	9.5	14	G1/4x12	47.5	26	52
	215	40	30	105	13	11	18.5	G3/8x12	59.5	30	62

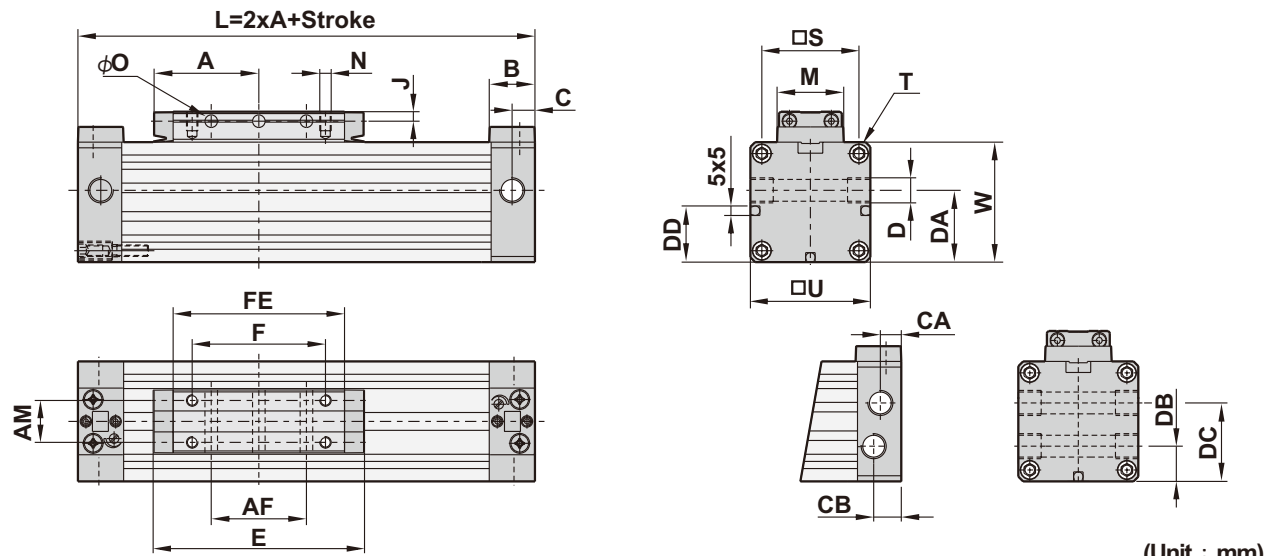
Bore size	DD	FE	FF	FG	FM	FW	N	S	T	U
φ 18	—	103	75	—	50	39	M4x7.5	23.5	M3x7	30
φ 25	18.5	131	100	50	66	53	M4x8	33	M4x9	42
φ 32	21	171	140	70	80	65	M5x10	41	M5x10	52
φ 40	29.5	220	180	90	97	79	M6x12	51	M6x12	63
φ 50	37	280	220	110	116	96	M8x16	63	M8x12	78
φ 63	44.5	333	280	140	136	113.5	M8x16	78	M8x12	93

### Features

- \* Basic length (0-stroke) up to 42% shorter.
- \* Space-saving also in comparison to short-stroke standard cylinders with piston rod.
- \* Shorter total fitting length.
- \* Money-saving compact construction.



### Dimensions



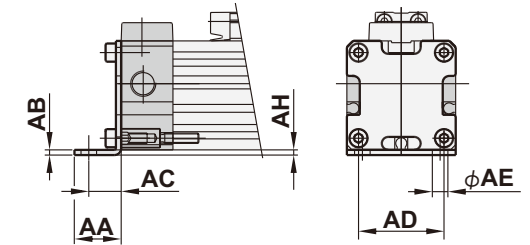
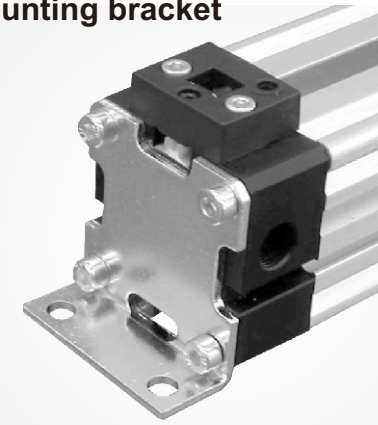
(Unit : mm)

Bore size	A	AF	AM	B	C	CA	CB	D	DA	DB	DC	DD	E
φ 18	57.5	15	10	16.5	6.5	—	—	M7x1/6	17.5	—	—	—	58
φ 25	67.5	19	13	20	8.5	7	13	G1/8x8	25.5	14	28	18.5	66
φ 32	77.5	35	16	20	8.5	7	13	G1/8x8	32	17.5	34.5	21	86
φ 40	95	50	22	23	13	9.5	14.5	G1/4x12	37.5	20	42	29.5	110
φ 50	105	46	29	23	13	9.5	14.5	G1/4x12	47.5	26	52	37	130
φ 63	125	70	40	29	13	11	18.5	G3/8x12.5	59.5	30	62	44.5	153

Bore size	F	FE	J	M	N	O	S	T	U	W
φ 18	30	45	3	15.5	M3x6	3.5	23.5	M3x7	30	39
φ 25	35	51	3.5	20	M4x7	4.5	33	M4x9	42	53
φ 32	55	71	4.5	25	M5x9	5.5	41	M5x10	52	65
φ 40	70	90	5	33	M6x10	7	51	M6x12	63	79
φ 50	70	110	6.5	42	M8x12.5	7	63	M8x12	78	96
φ 63	100	133	8	54	M8x15	9	78	M8x12	93	113.5

### Dimension of mounting parts

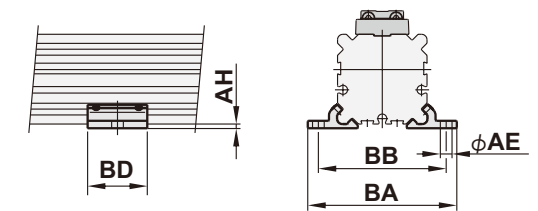
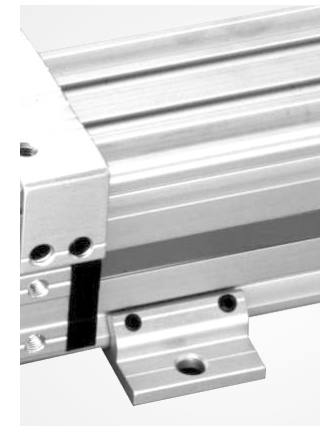
#### FB Mounting bracket



(Unit : mm)

Bore size	Order code	AA	AB	AC	AD	AE	AH
φ 18	1182-0001	15	2	10	20	6	2
φ 25	1252-0001	18	2	12.5	30	6	2
φ 32	1322-0001	20	2.5	13.5	40	7	3
φ 40	1402-0001	30	3	17.5	50	9	3.5
φ 50	1502-0001	28	3	20	60	9	3
φ 63	1632-0001	30	3	21	75	11	4.5

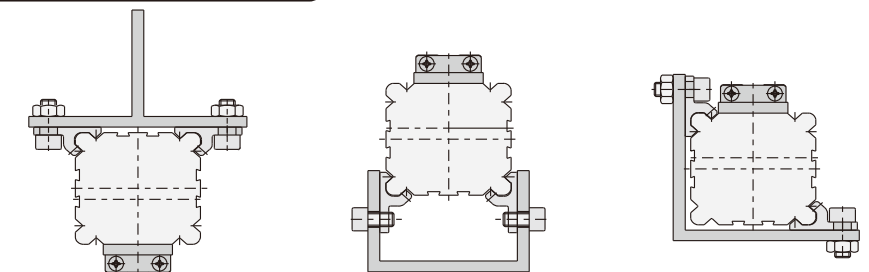
#### MB Middle support



(Unit : mm)

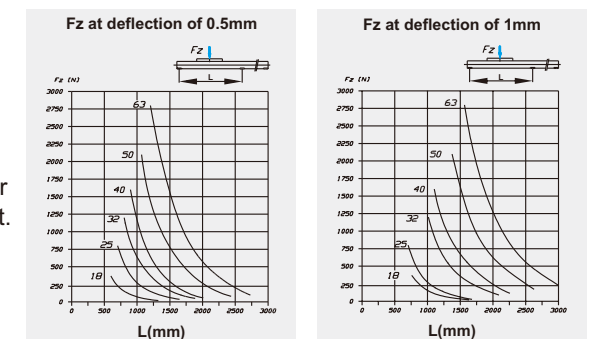
Bore size	Order code	AE	AH	BA	BB	BC	BD	BE	BF
φ 18	1183-0001	6	2	56	46	36.5	23	2.5	8.25
φ 25	1253-0001	6	2	70	60	50	28	3.5	11
φ 32	1323-0001	7	3	85	73	61.5	33	4	13.8
φ 40	1403-0001	9	3	105	90	75	38	4.5	16
φ 50	1503-0001	9	3	122	106	91	43	5	19
φ 63	1633-0001	11	4.5	144	125	107	48	6	22

### Mounting example for MB middle support



### Deflection diagram

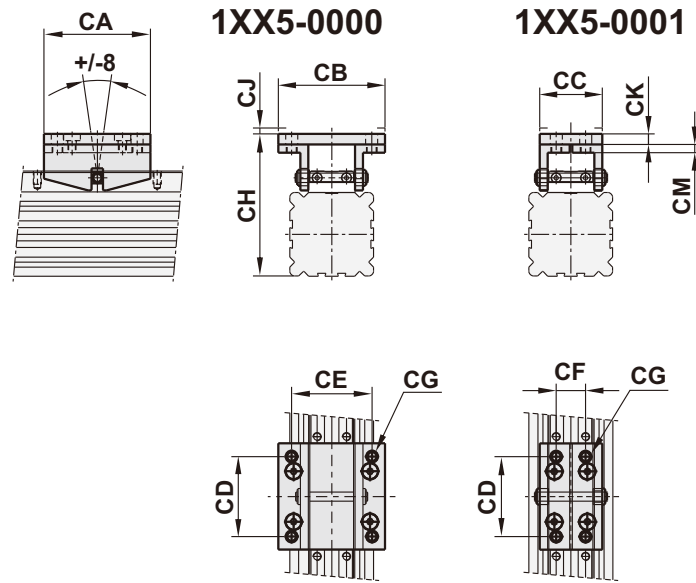
When using very long cylinders or applying heavy loads, the tube deflection is to be taken into consideration. One or more middle supports are to be used according to the admissible deflection. Example: A cylinder φ25 should deflect by a maximum of 0.5mm when applying a force Fz of 500N. According to the diagram the cylinder can be 750mm long. Longer cylinders must have a middle support. Other possibilities In case very long cylinders are installed without supports, and additional profile can be used as a support. Examples: all versions with middle support and standard profiles.



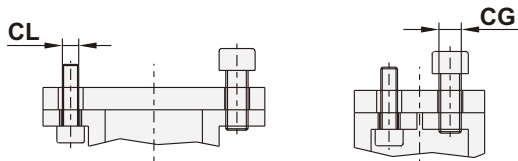


## Dimensions

### PB Swinging bridge

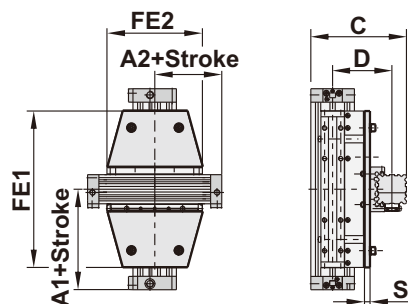


## Mounting



Bore size	Order code	CA	CB	CD	CE	CF	CG	CH	CJ	CK	CM	CL
φ18	1185-0000 1185-0001	50	41.5	30	34	9	M5	54	2.5	4	4	M4
φ25	1255-0000 1255-0001	60	50	40	38	14	M5	70	3	4	4	M4
φ32	1325-0000 1325-0001	70	60	50	48	16	M6	86	3.5	6	6	M5
φ40	1405-0000 1405-0001	80	80	60	60	22	M8	107	4.5	8	8	M6
φ50	1505-0000 1505-0001	90	95	70	70	30	M8	123	4.5	8	8	M6
φ63	1635-0000 1635-0001	100	120	80	80	40	M10	145.5	5	8	8	M8

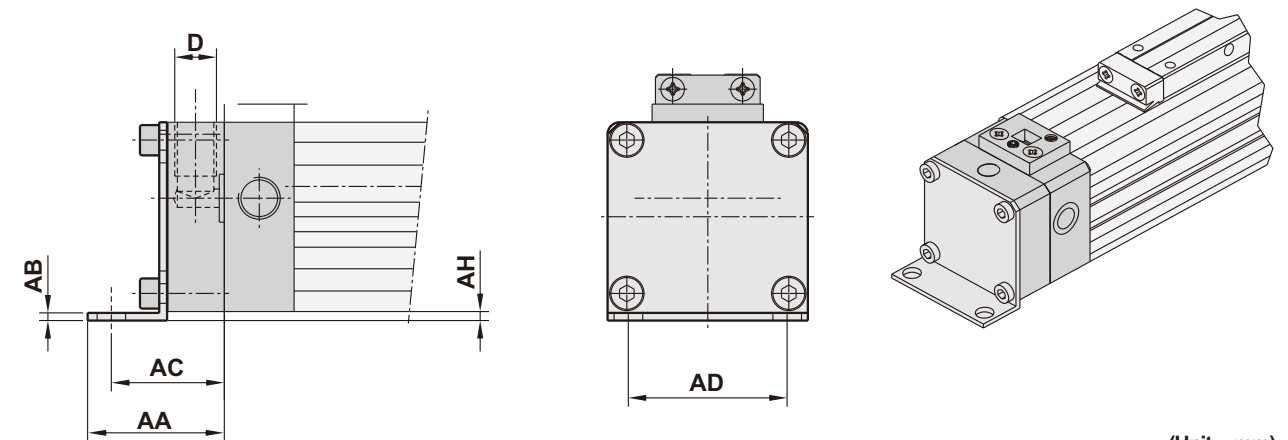
### KT Cross support



Bore size	Order code	A1	A2	C	D	FE1	FE2	S
φ18: φ18	1186-0000	80	80	84	54	103	103	6
φ25: φ25	1256-0000	100	100	114	72	131	131	8
φ32: φ32	1326-0000	120	120	140	88	171	171	10
φ40: φ40	1406-0000	150	150	168	105	220	220	10
φ50: φ50	1506-0000	180	180	204	126	280	280	12
φ63: φ63	1636-0000	215	215	239	146	333	333	12
Bore size	Order code	A1	A2	C	D	FE1	FE2	S
φ25: φ25	1256-0001	100	80	100	64	131	131	8
φ32: φ32	1326-0001	120	100	128	81	171	171	10
φ40: φ40	1406-0001	150	120	154	96.5	220	220	10
φ50: φ50	1506-0001	180	150	187	116.5	280	280	12
φ63: φ63	1636-0001	215	180	221.5	136	333	333	12
Bore size	Order code	A1	A2	C	D	FE1	FE2	S
φ32: φ32	1326-0002	120	80	112	71	171	103	8
φ40: φ40	1406-0002	150	100	142	142	220	131	10
φ50: φ50	1506-0002	180	120	171	171	280	171	10
φ63: φ63	1636-0002	215	150	204.5	204.5	333	220	12

## Dimensions

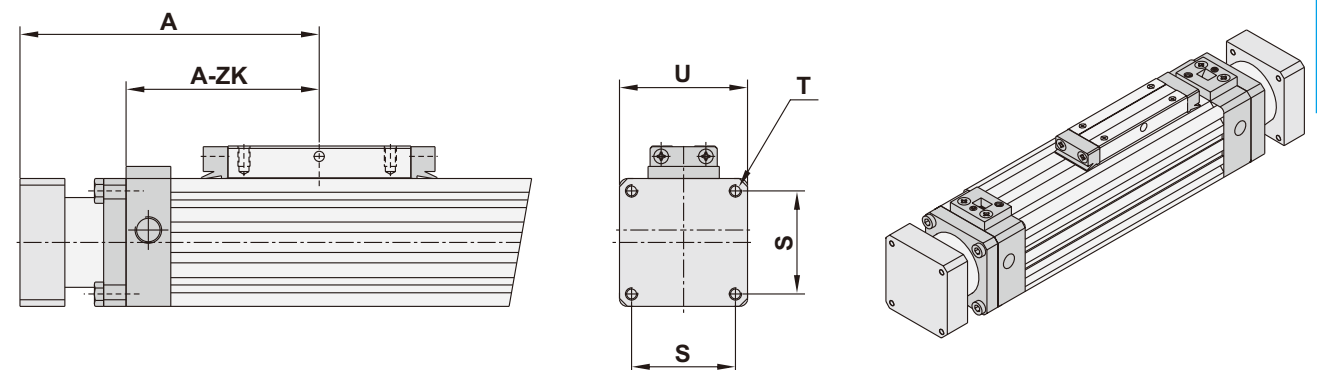
### KA Yoke side port (FB Mounting brackets)



- \* All cylinder types can be fitted with a yoke-side-port by an additional front plate.
- \* The front plate will be mounted on the cylinder over the mounting brackets.
- \* Other port threads or brackets available in case of enquiry.

Bore size	AA	AB	AC	AH	D
φ18	26	2	21	2	M7x1/6
φ25	32	2	26.5	2	G1/8x7.7
φ32	34	2.5	27.5	3	G1/8x7.7
φ40	43	3	35.5	3	G1/4x11.7
φ50	46	3	38	3	G1/4x11.7
φ63	54	3	45	4.5	G3/8x11.7

### AP Adaptor (Transform ZK Short cylinder to ZS Standard cylinder)

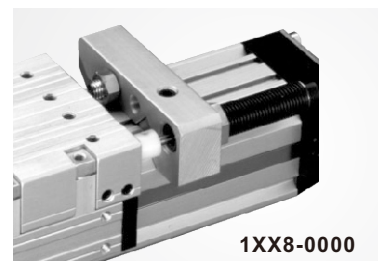


Bore size	Order code	A	S	T	U
φ18	AP00018	80	23.5	M3x6	30
φ25	AP00025	100	33	M4x7	42
φ32	AP00032	120	41	M5x9	52
φ40	AP00040	150	51	M6x10	63
φ50	AP00050	180	63	M8x12.5	78
φ63	AP00063	215	78	M8x15	93



### Dimensions

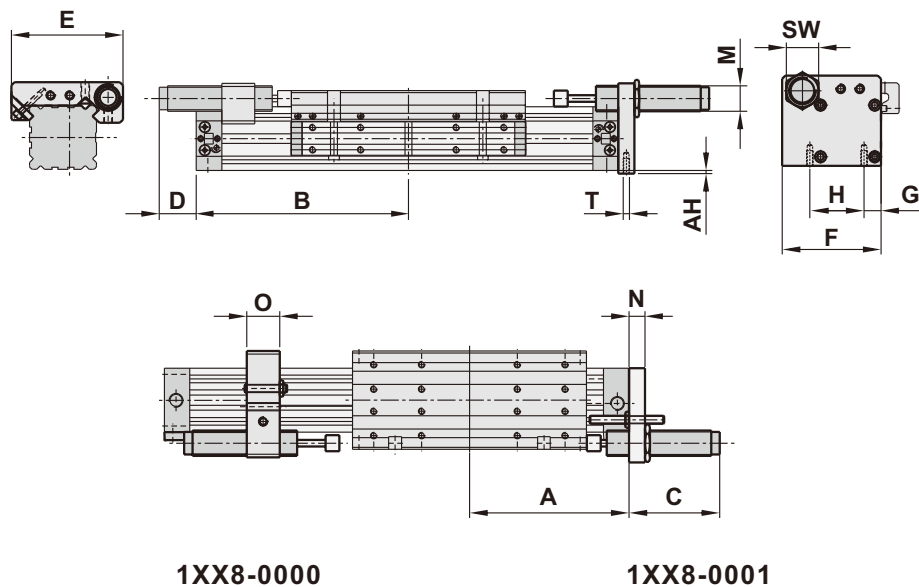
### AS Stop adjustment



1XX8-0000



1XX8-0001



1XX8-0000

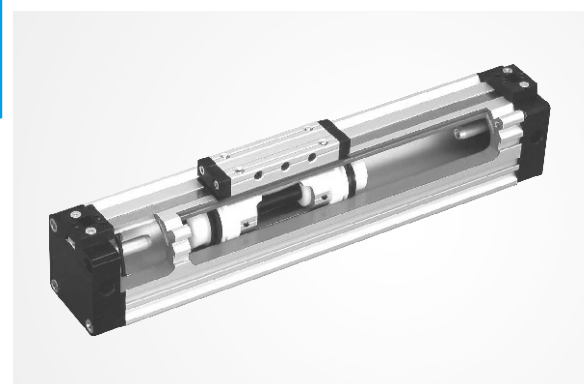
1XX8-0001

(Unit : mm)

Bore size	Order code		A		B		C	D	E	F	G	H	M	N	O	SW	T	Shock absorber	
	ZF	ZFK	AH	ZF	ZFK														
φ18	1188-0000	1188-0001	80	57.5	2	113	90.5	32	Max25	57	43.5	8	23.5	M10x1.0	8	15	13	M3x10	PMx10M-1B,2B,3B
φ25	1258-0000	1258-0001	100	67.5	2	117.5	85	37	Max40	72	57	12.5	33	M14x1.5	10	20	17	M4x10	PMx10M-1B,2B,3B
φ32	1328-0000	1328-0001	120	77.5	3	135.5	90	70	Max30	84	70	14.5	41	M14x1.5	12	20	17	M5x12	SPM25MC-1B,2B,3B
φ40	1408-0000	1408-0001	150	95	3	165	110	65	Max50	105	93	16	51	M25x1.5	15	30	32	M6x15	PM100MF-1B,2B,3B
φ50	1508-0000	1508-0001	180	105	3	195	140	80	Max65	126	102	22.5	63	M25x1.5	15	30	32	M8x20	PM100MF-1B,2B,3B
φ63	1638-0000	1638-0001	215	125	4.5	250	160	80	65	140	118.5	20	78	M25x1.5	15	40	32	M8x20	PM100MF-1B,2B,3B

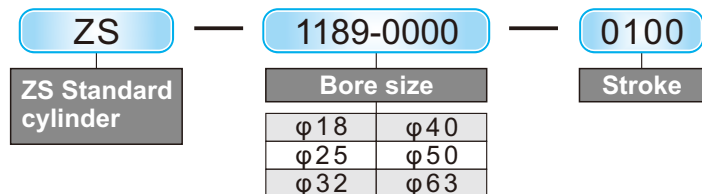
Shock absorber is available in case of enquiry.

### Repair kits



Bore size	ZS	ZK	ZF
φ18	ZS-1189-0000-□□□□	ZK-2189-0000-□□□□	ZF-3189-0000-□□□□
φ25	ZS-1259-0000-□□□□	ZK-2259-0000-□□□□	ZF-3259-0000-□□□□
φ32	ZS-1329-0000-□□□□	ZK-2329-0000-□□□□	ZF-3329-0000-□□□□
φ40	ZS-1409-0000-□□□□	ZK-2409-0000-□□□□	ZF-3409-0000-□□□□
φ50	ZS-1509-0000-□□□□	ZK-2509-0000-□□□□	ZF-3509-0000-□□□□
φ63	ZS-1639-0000-□□□□	ZK-2639-0000-□□□□	ZF-3639-0000-□□□□

### How to order



### Details included

No.	Description	Qty.
1	Round profile/m	1
2	Sealing strip/m	1
3	Cover strip(Steel)/m	1
4	Head wiper	2
5	Wiper	2
6	Guiding bar	2
7	Piston seal	2
8	Cushion ring	2
9	End cap O-ring	2
10	Cushion pin O-ring	2
11	Cylinder head screw plain ISO4762	4



### Technical information

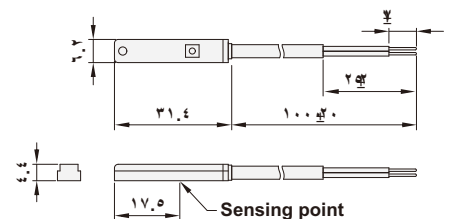
- \* The reed switch will be operated by the magnetic field of the permanent magnets inside the yoke.
- \* The magnetic piston will be built in as standard.
- \* The end positions and additional intermediate positions of the yoke can be read out.

### Specifications

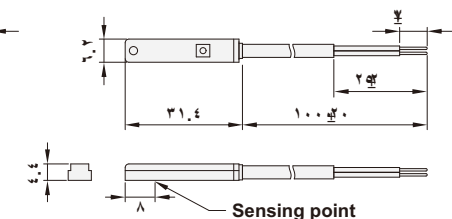
Model	AL-30R	AL-30N	AL-30P
Switching logic	SPST Normally open	Solid state output, Normally open	
Sensor type	Reed switch	NPN current sinking	PNP current sourcing
Operating voltage	5~120 VDC/AC		5~28 VDC
Switching current	100mA	200mA	
Switching rating	10W(VA)	6W	
Current consumption	None	15mA max. at 24V(switch active)	16mA max. at 24V(switch active)
Voltage drop	2.5V max. at 40mA DC	1.5V at 200mA 24VDC	
Leakage current	None	0.01mA max.	
Indicator	Red LED	Red LED	Green LED
Cable	2.8 φ , 2C, Gray PVC		2.8 φ , 3C, Black PVC
Sensitivity(note 1)	40 Gauss		
Max. Switching frequency	200Hz	1000Hz	
Temperature range	-10°C ~ 70°C		
Shock (note 2)	30G	50G	
Vibration (note 3)	9G		
Enclosure classification	IP67 (NEMA6)		
Protection circuit	None	Reverse Polarity	
Sensor circuit diagram			

### Dimensions

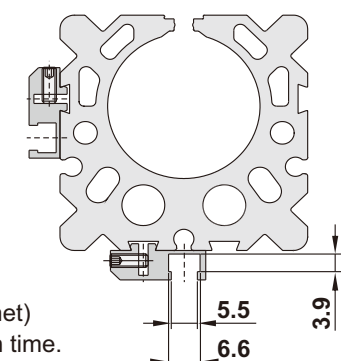
#### AL-30R



#### AL-30N, AL-30P



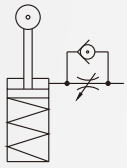
### Sensor bracket



### Note

1. Measure standard target: φ15.5 x φ8.5t(Anisotropy Rubber Magnet)
2. Sin wave/X.Y.Z 3 Dimensions/3 times each direction/ 11mS Each time.
3. Double amplitude 1.5mm/10 Hz~55Hz~10Hz(Sweep 1min)/X.Y.Z 3 Dimensions/ 1 Hour Each time.

**Symbol**



**Features**

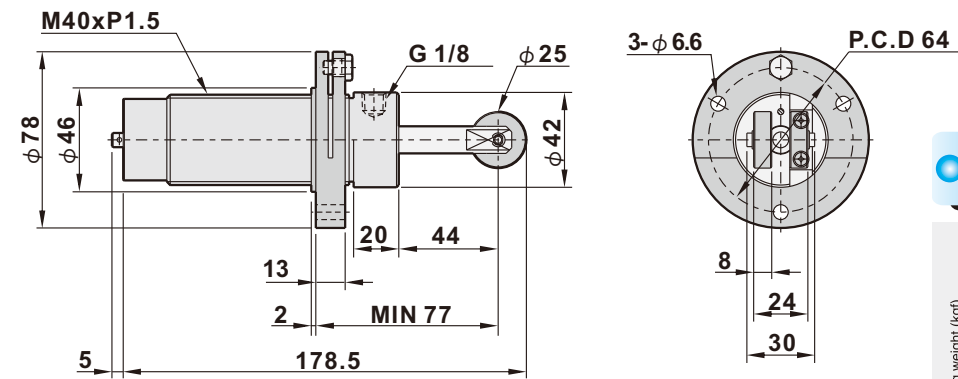
- \* Stopper cylinder utilizes the top roller spring return as a stopper for work carrier.
- \* It is usually applicable to work carrier positioning and stop.
- \* It is often used for conveyor line.



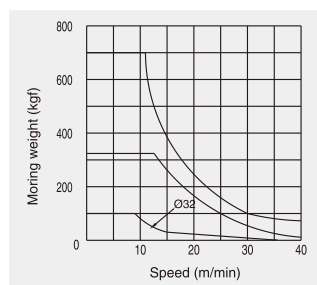
**How to order**

SC      32      B      30  
 Stopper cylinder      Bore size      Stroke  
 32     $\phi$  32

**Dimensions**



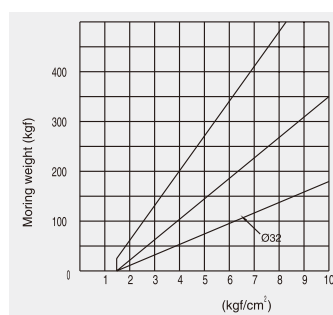
**Allowance stop chart**



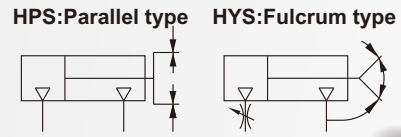
**Specifications**

<b>Bore size</b>	$\phi$ 32
Port size	1/8"
Fluid	Compressed air
Acting	Single acting
Operation	Roller type
Operating pressure range	2 ~ 9.9 kgf/cm <sup>2</sup>
Max. operating pressure	15 kgf/cm <sup>2</sup>
Cushion	NBR
Lubrication	Not required
Body material	Brass or aluminum alloy
Ambient temperature	5°C ~ 50°C
Weight	1350g

**Loading chart**

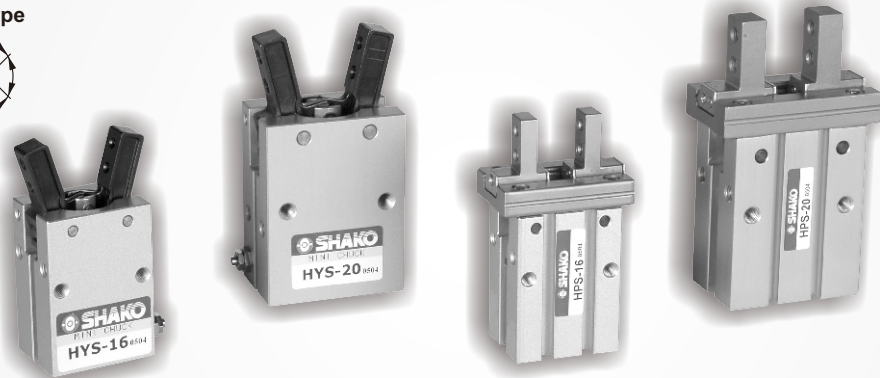


#### Symbol



#### Features

Identical to SMC mounting hole.  
Precision and no vibration.  
Endurable and strong mechanism.  
SUS440C gripper provides a long life of product.  
Aluminum alloy body with hard anodizing for wear and corrosion resistance.



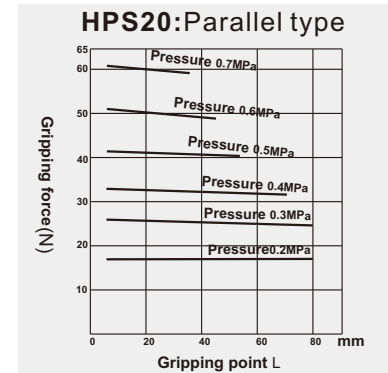
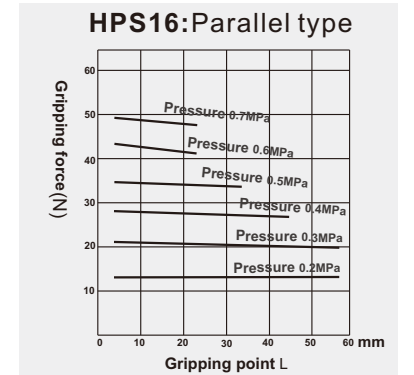
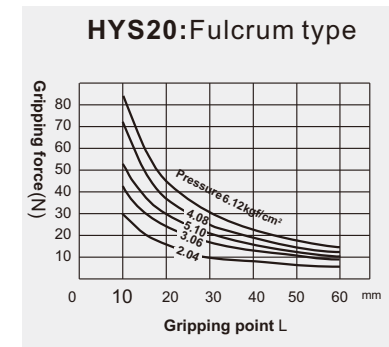
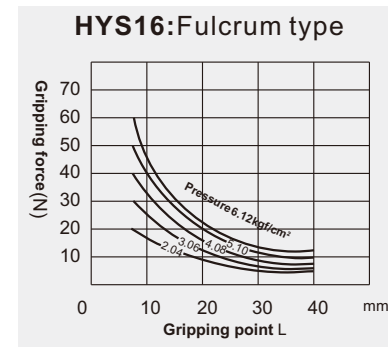
#### How to order

<b>HPS</b>	<b>16</b>	<b>N</b>	<b>SR</b>	<b>1</b>
Mini chuck	Bore size	Type of gripper (For HPS only)	Sensor type	Number of sensor
HPS Parallel type (Linear mechanism)	16 $\phi$ 16	W Wide	Blank W/O sensor	1 pc
HYS Fulcrum type	20 $\phi$ 20	N Narrow	SS Square type (HPS)	2 pcs
			AL-11R	
			SR Round type	
			AL-07R	

#### Specifications

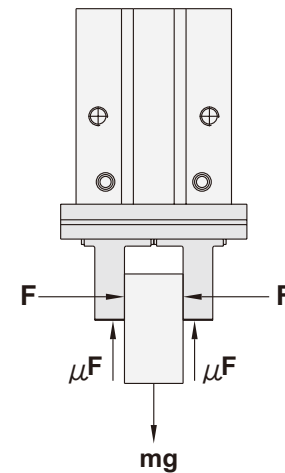
Bore size	$\phi$ 16	$\phi$ 20
Port size	M5	
Gripping gap distance (Wide type)	When open : 22mm, When closed : 14mm	When open : 26mm, When closed : 16mm
Gripping gap distance (Narrow type)	When open : 15.2mm, When closed : 7mm	When open : 17.2mm, When closed : 7.7mm
Internal gripping force( For HPS)	40N	65.5N
External gripping force(For HPS)	30N	42N
Fluid	Compressed air	
Acting	Double acting	
Operating pressure range	Fulcrum type : 1.0~6.1 kgf/cm <sup>2</sup> , Parallel type : 1.0~7 kgf/cm <sup>2</sup>	
Max. operating pressure	7 kgf/cm <sup>2</sup>	
Lubrication	Not required or few	
Body material	Aluminum alloy (6061T6)	
Gripper material	SUS(Parallel type) , S45C(Fulcrum type)	
Magnet	Built-in	
Ambient temperature	0°C ~ 60°C	
Operating frequency	HPS: 160 c.p.m. HYS:180 c.p.m	
Operating angle (For HYS)	-10° ~ 30°	

#### Gripping force graph



Pressure/Gripping point/Gripping force graph  
Please note that gripping force need 10~20 times greater than the work piece weight.

#### Effective gripping force calculation



When gripping a work piece as in the left figure , the following definitions are applied :

- F**: Gripping force (N)
- $\mu$ : Coefficient of friction between the attachments and the work piece
- m**: Work piece mass (kg)
- g**: Gravitational acceleration (=9.8m/s<sup>2</sup>)
- mg**: Work piece weight (N)

the conditions under which the work piece will not drop are~

$$2 \times \mu F > mg$$

Number of fingers

and therefore

$$F > \frac{mg}{2 \times \mu}$$

With "a" representing the extra margin, F is determined by the following formula:

$$F > \frac{mg}{2 \times \mu} \times a$$

※Even in cases where the coefficient of friction is greater than  $\mu = 0.2$ , for reasons of safety, a gripping force should be selected at least 10 to 20 times greater than the work piece weight.

※It is necessary to allow a greater margin for high accelerations and strong impacts.

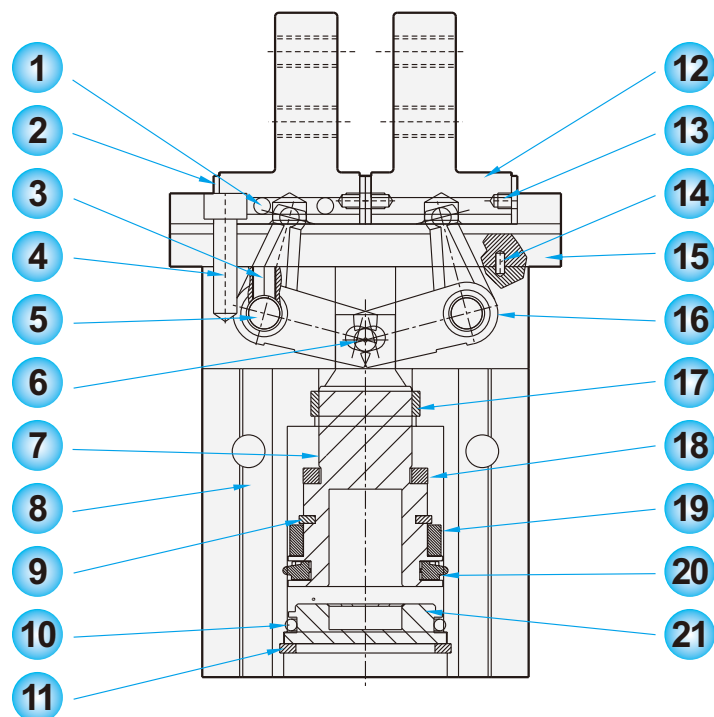
Example:  
<The "10 to 20 times or more of the work piece weight">

When $\mu = 0.2$	When $\mu = 0.1$
$F = \frac{mg}{2 \times 0.2} \times 4$ $= 10 \times mg$	$F = \frac{mg}{2 \times 0.1} \times 4$ $= 20 \times mg$
10 x work piece weight	20 x work piece weight



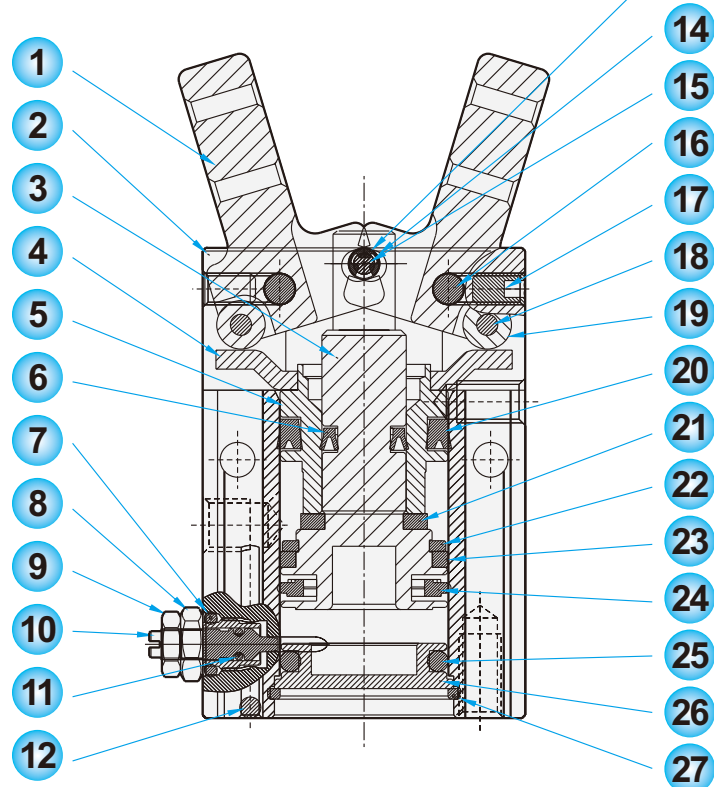
Material of parts

HPS : Parallel type



No.	Description	Material	Qty
1	Steel ball	Carbon steel	24
2	Roller stopper	Stainless steel	4
3	Plug	Fe+Ni	2
4	Hex socket head cap screw	Stainless steel	4
5	Lever shaft	Stainless steel	2
6	Center pin	Stainless steel	1
7	Piston	Aluminum alloy	1
8	Body	Aluminum alloy	1
9	Snap ring	Fe+Ni	1
10	O-ring	NBR	1
11	C type snap ring	Stainless steel	1
12	Gripper	Stainless steel	2
13	Screw	Fe+Ni	8
14	Parallel pin	Stainless steel	2
15	Guide	Stainless steel	1
16	Lever	Stainless steel	2
17	U-ring	NBR	1
18	Bumper	PU	1
19	Magnet	Rare earth magnet	1
20	U-piston seal	NBR	1
21	End cover	Aluminum alloy	1

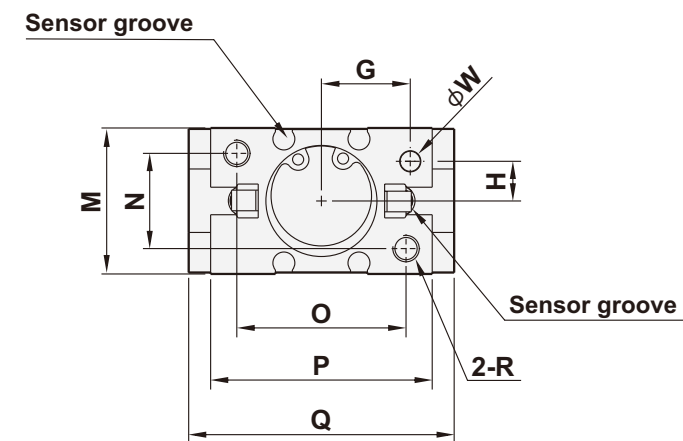
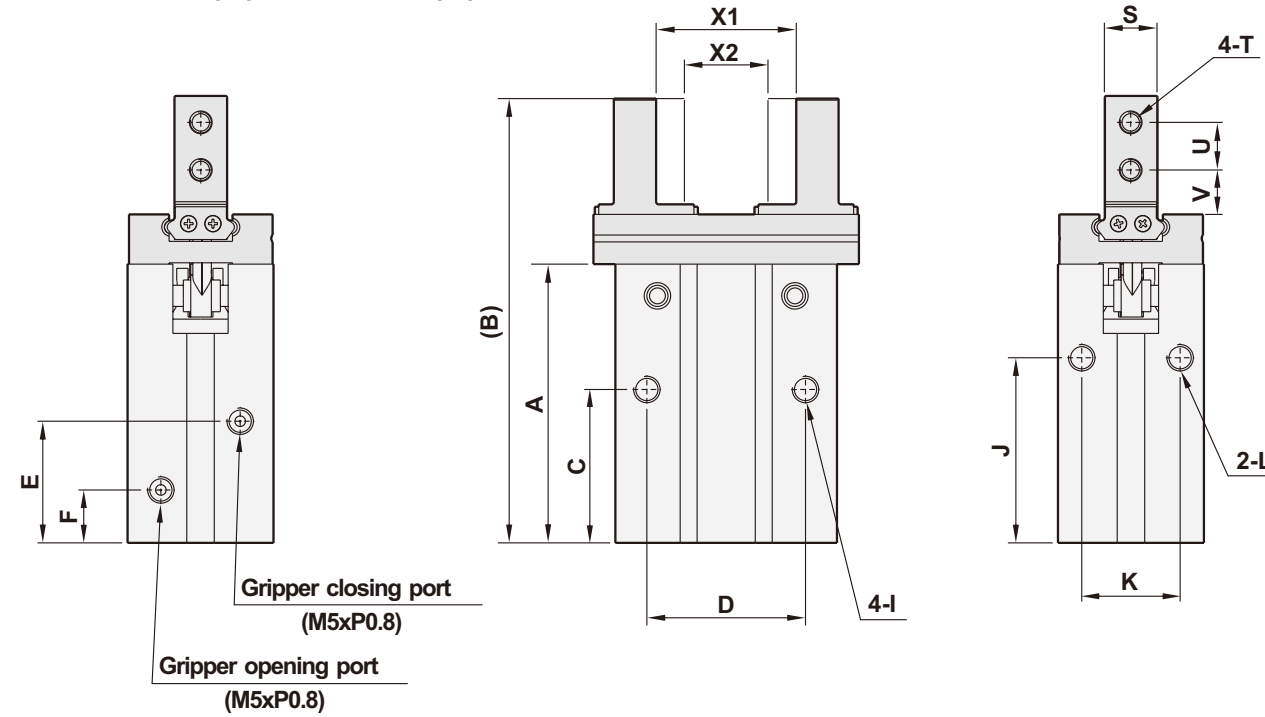
HYS : Fulcrum type



No.	Description	Material	Qty
1	Gripper	Carbon steel	2
2	Body	Aluminum alloy	1
3	Piston	Aluminum alloy	1
4	Plate	Carbon steel	1
5	Sleeve	Aluminum alloy	1
6	U-ring	NBR	1
7	O-ring	NBR	1
8	Bolt	Cu	1
9	Nut	Fe+Ni	1
10	Speed regulating needle	Cu	1
11	O-ring	NBR	1
12	Steel ball	Carbon steel	1
13	Snap ring	Stainless steel	1
14	Center roller	Stainless steel	2
15	Center pin	Stainless steel	1
16	Lever shaft	Stainless steel	2
17	Plug	Fe+Ni	2
18	Roller pin	Stainless steel	2
19	Roller	Stainless steel	2
20	U-ring	NBR	1
21	Bumper	PU	1
22	Snap ring	Fe+Ni	1
23	Magnet	Rare earth magnet	1
24	U-piston ring	NBR	1
25	O-ring	NBR	1
26	End cover	Aluminum alloy	1
27	C type snap ring	Stainless steel	1

Dimensions

HPS-16W(N), HPS-20W(N)



(Unit : mm)

Model	A	B	C	D	E	F	G	H	I	J	K	L
HPS-16W	42.4	67	24.5	24	19	7.5	11	6.5	M4xP0.7xL8.0	30	16	M4xP0.7xL4.5
HPS-16N	42.4	67	24.5	24	19	7.5	11	6.5	M4xP0.7xL8.0	30	16	M4xP0.7xL4.5
HPS-20W	52.7	84	29	30	23	10	16.8	7.5	M5xP0.8xL10.0	35	18.6	M5xP0.8xL10.0
HPS-20N	52.7	84	29	30	23	10	16.8	7.5	M5xP0.8xL10.0	35	18.6	M5xP0.8xL10.0

Model	M	N	O	P	Q	R	S	T	U	V	W	X1	X2
HPS-16W	23.6	15	22	30.6	38.1	M4xP0.7xL8.0	8	M3xP0.5	7	6.3	3	22	14
HPS-16N	23.6	15	22	30.6	38.1	M4xP0.7xL8.0	8	M3xP0.5	7	6.3	3	15.2	7
HPS-20W	27.6	18	32	42	50.2	M5xP0.8xL10.0	10	M4xP0.7	9	8.4	4	26	16
HPS-20N	27.6	18	32	42	50.2	M5xP0.8xL10.0	10	M4xP0.7	9	8.4	4	17.2	7.7

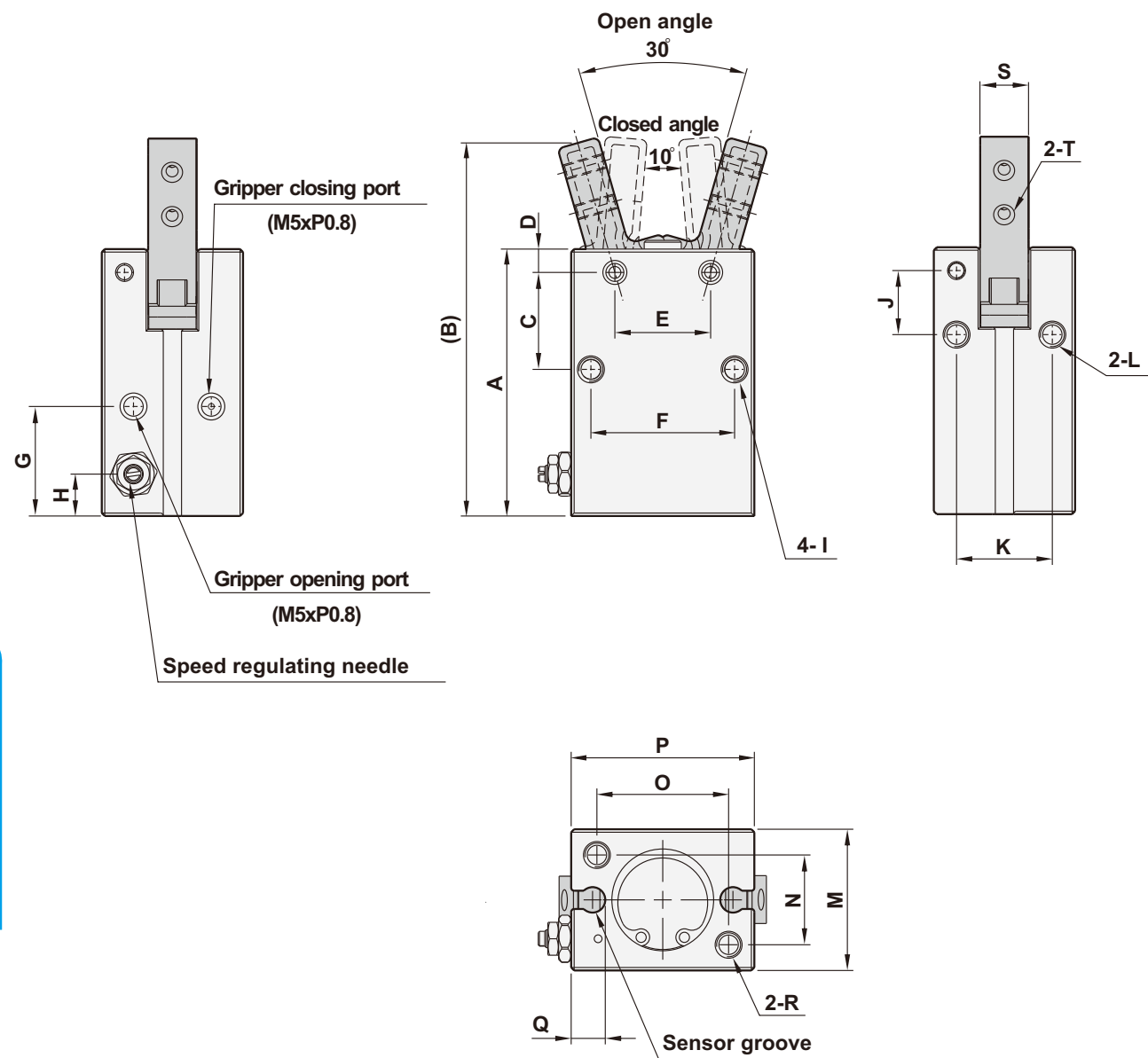
PNEUMATIC CYLINDER

PNEUMATIC CYLINDER



**Dimensions**

HYS-16, HYS-20



(Unit : mm)

Model	A	B	C	D	E	F	G	H	I	J	K
HYS-16	44.6	62.5	16.2	3.9	16	24	18.3	7	M4xP0.7xL8.0	10.7	16
HYS-20	55.2	77.7	21.7	4.5	20	30	22.2	7.5	M5xP0.8xL10.0	15.7	18.6

Model	L	M	N	O	P	Q	R	S	T
HYS-16	M4xP0.7xL6.5	23.6	15	22	30.6	5.7	M4xP0.7xL8.0	8	M3xP0.5 through
HYS-20	M5xP0.8xL8.0	27.6	18	32	42	8.8	M5xP0.8xL10.0	10	M4xP0.7 through

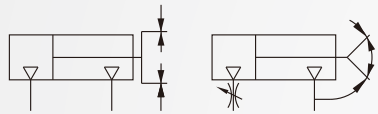


PNEUMATIC CYLINDER

PNEUMATIC CYLINDER

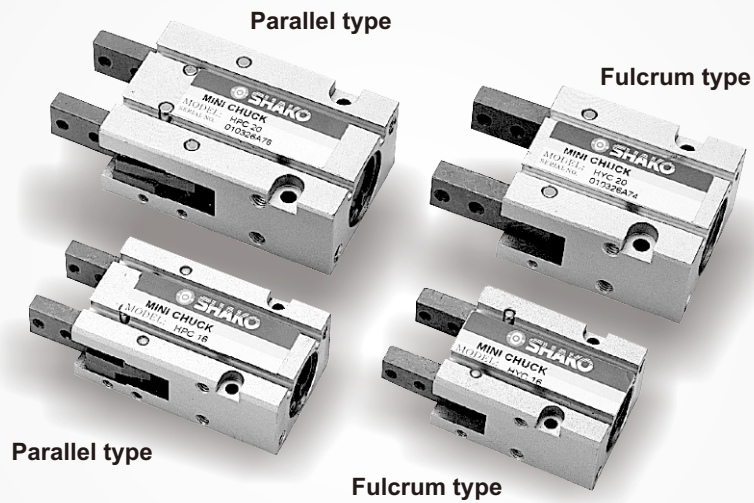
#### Symbol

HPC:Parallel type    HYC:Fulcrum type

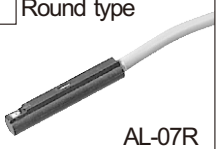


#### Features

- \* The gripper open and close are controlled by pneumatic system.
- \* Miniature design, space saving.
- \* Sensor installation is available.



#### How to order

<b>HYC</b>		<b>32</b>	<b>SR</b>		<b>1</b>
Mini chuck		Bore size	Sensor type		Number of sensor
HPC	Parallel type	10    φ 10	Blank	W/O sensor	1 pc
HYC	Fulcrum type	16    φ 16	SR	Round type	2 pcs
		20    φ 20	 AL-07R		
		25    φ 25			
		32    φ 32			

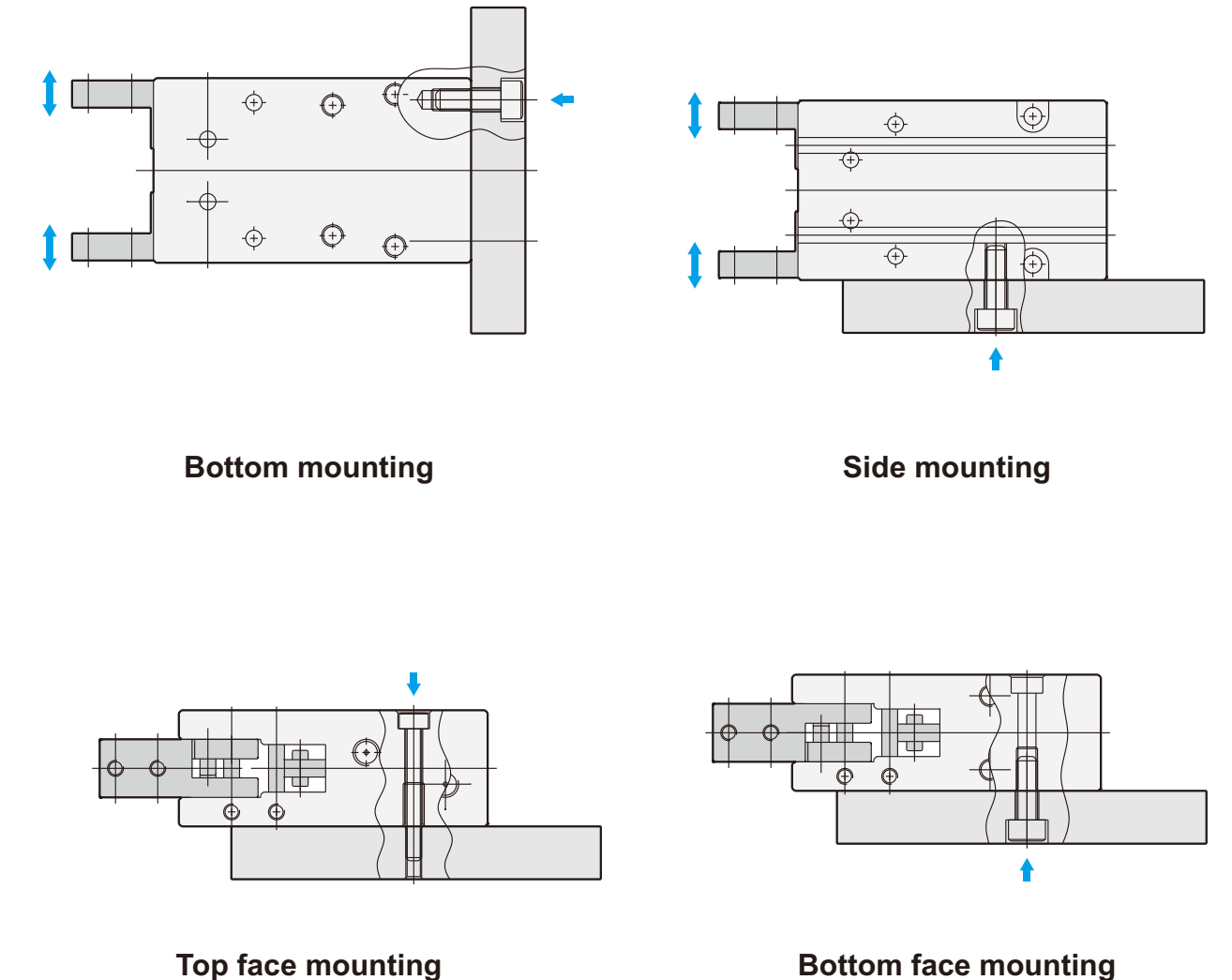
#### Specifications

Bore size	φ 10	φ 16	φ 20	φ 25	φ 32
Port size	M3		M5		
Gripping gap distance (For HPC)	4mm	8mm	12mm	14mm	16mm
Gripping force (For HPC)	5N	17.6N	34.3N	58.8N	83.3N
Operating angle (For HYC)	-10° ~ +30°				
Fluid	Compressed air				
Acting	Double acting				
Operating pressure range	1.5 ~ 7 kgf/cm <sup>2</sup>				
Max. operating pressure	10.5 kgf/cm <sup>2</sup>				
Lubrication	Not required or few				
Body material	Aluminum alloy				
Magnet	Built-in				
Ambient temperature	0°C ~ 60°C				
Operating frequency	50 ~ 700 mm/Sec.				

#### Theoretical force

Bore size	Piston area cm <sup>2</sup>	Operating pressure    kgf/cm <sup>2</sup>					
		2	3	4	5	6	7
φ 10	0.79	1.58	2.37	3.16	3.95	4.74	5.53
φ 16	2.01	4.02	6.03	8.04	10.5	12.06	14.07
φ 20	3.14	6.28	9.42	12.56	15.7	18.84	21.98
φ 25	4.91	9.82	14.73	19.64	24.55	29.46	34.37
φ 32	8.04	16.08	24.12	32.16	40.2	48.24	56.28

#### Mounting example

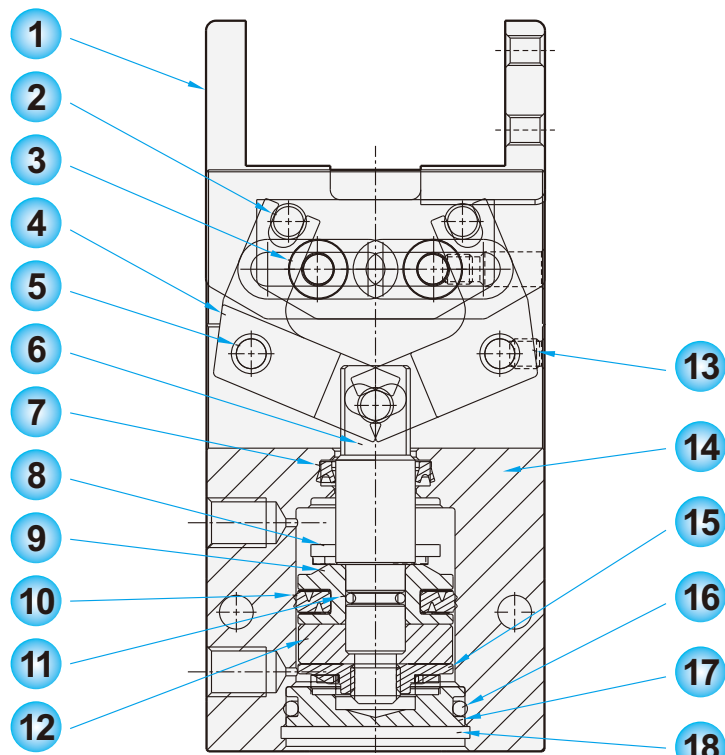


PNEUMATIC CYLINDER

PNEUMATIC CYLINDER

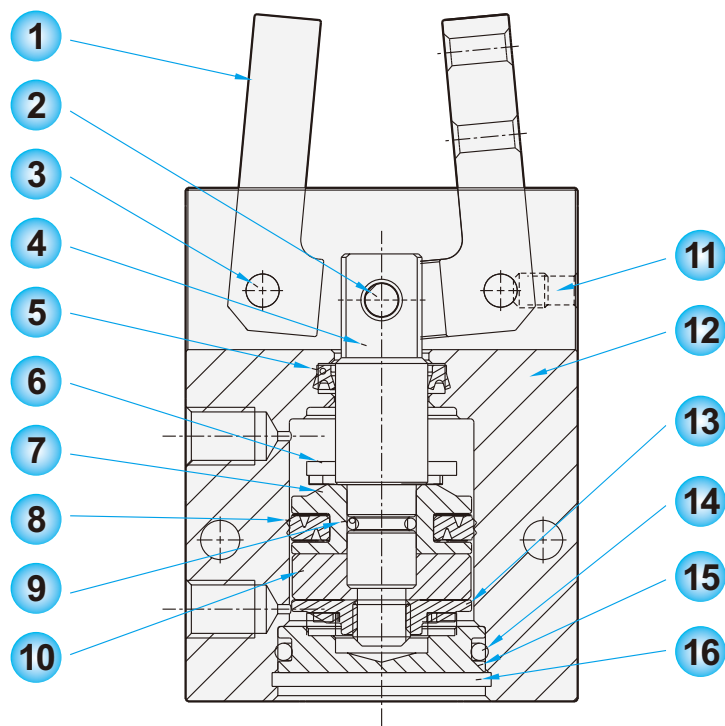
Material of parts

HPC : Parallel type



No.	Description	Material	Qty
1	Gripper	Stainless steel	2
2	Pin	Carbon steel	3
3	Roller	Carbon steel	4
4	Lever	Stainless steel	2
5	Lever shaft	Carbon steel	4
6	Piston rod	S45C+Cr	1
7	U-ring	NBR	1
8	Gasket	NBR	2
9	Piston	Aluminum alloy	1
10	U-piston seal	NBR	1
11	O-ring	NBR	1
12	Magnet	Ferrite magnet	1
13	Plug	Carbon steel	4
14	Body	Aluminum alloy	1
15	Magnet holder	Aluminum alloy	1
16	O-ring	NBR	1
17	End cover	Aluminum alloy	1
18	C type snap ring	Fe+Ni	1

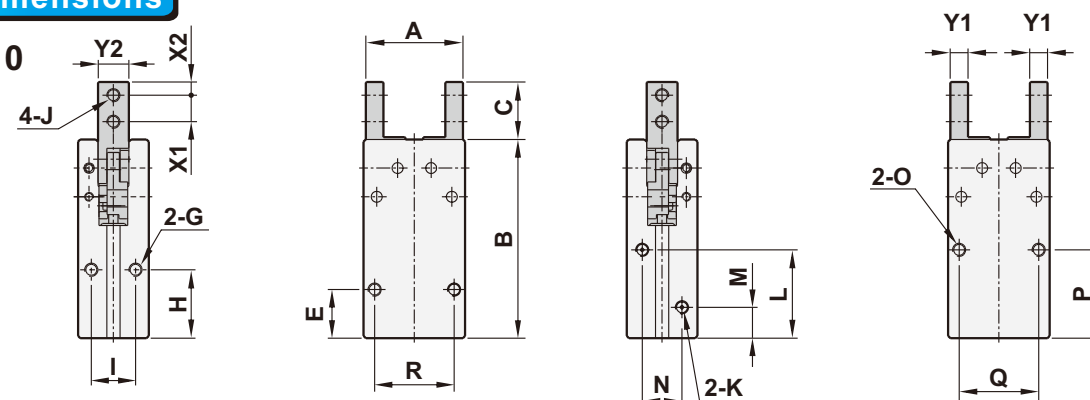
HYC : Fulcrum type



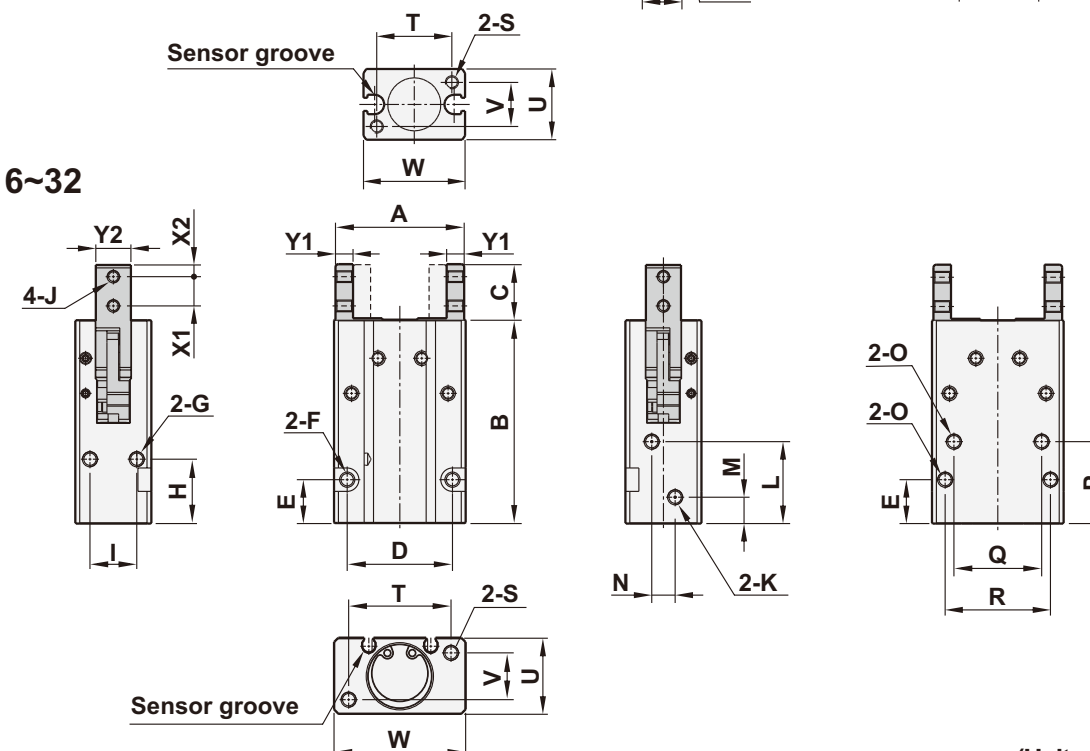
No.	Description	Material	Qty
1	Gripper	Stainless steel	2
2	Pin	Carbon steel	1
3	Lever shaft	Carbon steel	2
4	Piston rod	S45C+Cr	1
5	U-ring	NBR	1
6	Gasket	NBR	2
7	Piston	Aluminum alloy	1
8	U-piston ring	NBR	1
9	O-ring	NBR	1
10	Magnet	Ferrite magnet	1
11	Plug	Carbon steel	2
12	Body	Aluminum alloy	1
13	Magnet holder	Aluminum alloy	1
14	O-ring	NBR	1
15	End cover	Aluminum alloy	1
16	C type snap ring	Fe+Ni	1

Dimensions

HPC-10



HPC-16~32



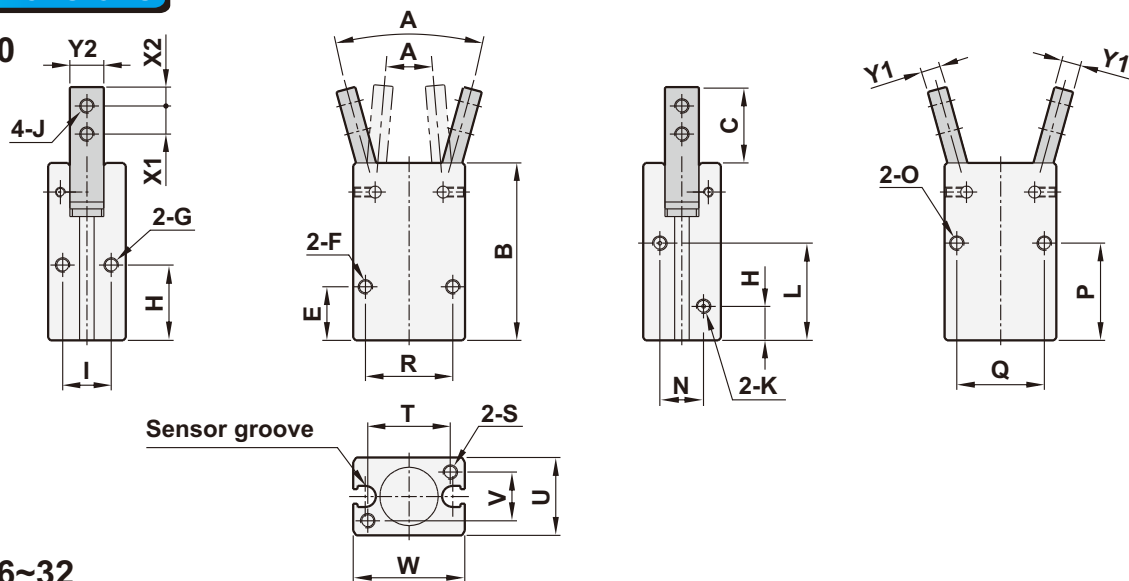
(Unit : mm)

Model	A		B	C	D	E	F	G	H	I	J
	Open	Closed									
HPC-10	22	18	45	13	18	11	M3xP0.5xL8.0	M3xP0.5xDepth5.0	15.5	10	M3xP0.5 through
HPC-16	33	25	58.5	15	28	14	φ3.4 through, 6 Counter bore x Depth3.5	M4xP0.7xDepth8.0	21	14	M3xP0.5 through
HPC-20	44	32	69.5	19	36	15	φ4.3 through, φ8 Counter bore x Depth4.5	M5xP0.8xDepth10.0	22	16	M4xP0.7 through
HPC-25	51	37	79.5	24	40	16	φ5.3 through, φ9.5 Counter bore x Depth5.5	M6xP1.0xDepth12.0	24.5	20	M5xP0.8 through
HPC-32	60	44	88	31	50	18	φ5.3 through, φ9.5 Counter bore x Depth5.5	M6xP1.0xDepth15.0	30	26	M6xP1.0 through

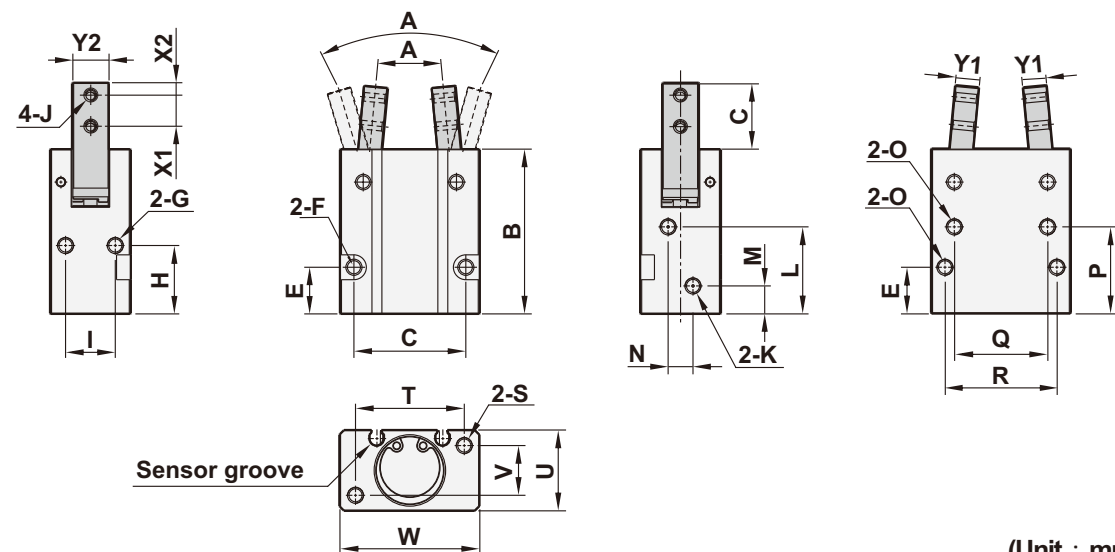
Model	K	L	M	N	O	P	Q	R	S	T	U	V	W	X1	X2	Y1	Y2
HPC-10	M3xP0.5	20	7	9	M3xP0.5xL8.0	20	18	—	M3xP0.5xL5.0	17	16	10	23	6	3	4	7
HPC-16	M5xP0.8	23	8	6	M4xP0.7xL8.0	25.5	24	28	M4xP0.7xL7.0	26	22	14	34	8	3	5	11
HPC-20	M5xP0.8	28	9	8	M5xP0.8xL10.0	28	30	36	M5xP0.8xL10.0	35	26	16	45	10	4	6	12
HPC-25	M5xP0.8	30.5	9.5	18	M6xP1.0xL12.0	31.5	36	40	M6xP1.0xL10.0	40	32	20	52	12	5	8	14
HPC-32	M5xP0.8	34	10	24	M6xP1.0xL15.0	37.5	44	50	M6xP1.0xL10.0	46	40	26	60	15	7	9	18

**Dimensions**

**HYC-10**



**HYC-16~32**



(Unit : mm)

Model	A		B	C	D	E	F	G	H	I	J
	Open	Closed									
HYC-10	30°	-10°	36.5	15.7	18	11	M3xP0.5xL8.0	M3xP0.5xL5.0	15.5	10	M3xP0.5 through
HYC-16	30°	-10°	45.5	17.5	28	14	φ3.4 through, 6 Counter bore x L3.5	M4xP0.7xL8.0	21	14	M3xP0.5 through
HYC-20	30°	-10°	53	22	36	15	φ4.3 through, φ8 Counter bore x L4.5	M5xP0.8xL10.0	22	16	M4xP0.7 through
HYC-25	30°	-10°	61	26	40	16	φ5.3 through, φ9.5 Counter bore x L5.5	M6xP1.0xL12.0	24.5	20	M5xP0.8 through
HYC-32	30°	-10°	68	30	50	18	φ5.3 through, φ9.5 Counter bore x L5.5	M6xP1.0xL15.0	30	26	M6xP1.0 through

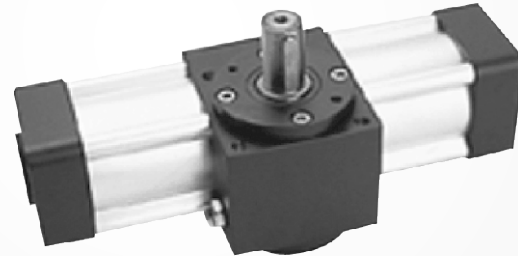
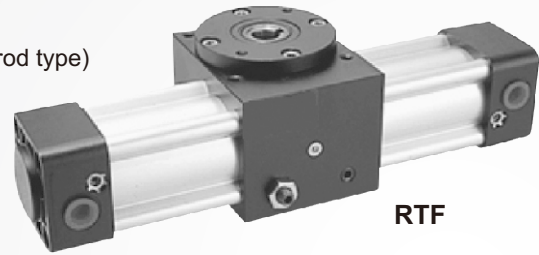
Model	K	L	M	N	O	P	Q	R	S	T	U	V	W	X1	X2	Y1	Y2
HYC-10	M3xP0.5	20	7	9	M3xP0.5xL8.0	20	18	—	M3xP0.5xL8.0	17	16	10	23	6	3	4	7
HYC-16	M5xP0.8	23	8	6	M4xP0.7xL8.0	25.5	24	28	M4xP0.7xL8.0	26	22	14	34	8	3	6	9
HYC-20	M5xP0.8	28	9	8	M5xP0.8xL10.0	28	30	36	M5xP0.8xL10.0	35	26	16	45	10	4	7	12
HYC-25	M5xP0.8	30.5	9.5	18	M6xP1.0xL12.0	31.5	36	40	M6xP1.0xL10.0	40	32	20	52	12	5	9	14
HYC-32	M5xP0.8	34	10	24	M6xP1.0xL15.0	37.5	44	50	M6xP1.0xL10.0	46	40	26	60	14	6	10	18





### Allowable offer

- RTH Male pivot gear (Standard type)
- RTH-D Male pivot gear (Double end rod type)
- RTF Female pivot gear



### Features

- \* Simple operation.
- \* Hard anodized aluminum alloy body
- \* Pinion and rack made of carbon steel offer a strong mechanism.

### How to order

<b>RTH</b>	<b>40</b>	<b>B</b>	<b>90</b>	<b>D</b>	<b>SF</b>	<b>1</b>
Rotary cylinder	Bore size	Rotating angle	Rod	Sensor type	Number of sensor	
RTH Male pivot gear (Standard)	40 φ40 63 φ63 80 φ80	90° 180°	Blank Single rod D Double rod	Blank W/O sensor SF LED in front ST LED on top	1 pc 2 pcs	

### Specifications

Model	RTH, RTF		
Bore size	φ40	φ63	φ80
Shaft diameter	φ16	φ24	φ28
Port size	1/4"	3/8"	3/8"
Max. axial thrust	10kg	12kg	20kg
Rotation angle	90±5°, 180±5°		
Fluid	Compressed air		
Acting	Double acting		
Operating pressure range	1.5 ~ 7 kgf/cm <sup>2</sup>		
Max. operating pressure	7 kgf/cm <sup>2</sup>		
Body material	Aluminum alloy (6061T6)		
Ambient temperature	-10°C ~ 60°C		

### Compressed air consumption for a complete cycle

(Unit : l/min)

Model	Rotating angle	Operating pressure (MPa)									
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
RTH40/RTF40	90°	0.1571	0.2352	0.3133	0.3915	0.4696	0.5477	0.6259	0.704	0.7821	0.8603
	180°	0.3141	0.4704	0.6267	0.7829	0.9392	1.0955	1.2517	1.408	1.5643	1.7205
RTH63/RTF63	90°	0.4383	0.6564	0.8744	1.0925	1.3105	1.5286	1.7466	1.9647	2.1828	2.4088
	180°	0.8766	1.3127	1.7488	2.185	2.6211	3.0572	3.4933	3.9294	4.3655	4.8016
RTH80/RTF80	90°	0.848	1.2698	1.6917	2.1135	2.5354	2.9572	3.3791	3.8009	4.2228	4.6447
	180°	1.6959	2.5396	3.3834	4.2271	5.0708	5.9145	6.7582	7.6019	8.4456	9.2893

### Compressed air consumption calculation

$$Q = 2 \times K \times A \times n \times Dg \times \frac{P+0.101}{0.101} \times 10^{-6}$$

Q: Compressed air consumption(l/cycle)

A: Piston area

Dg: Rotation

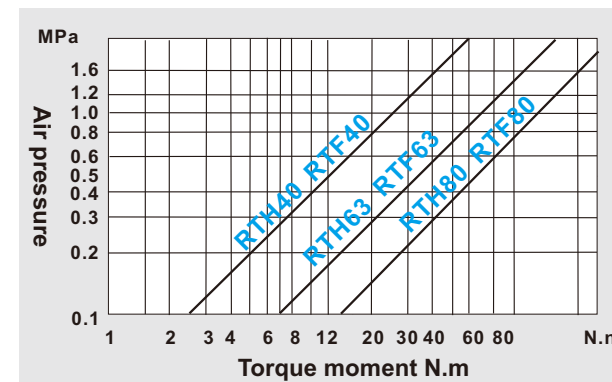
P: Air pressure

K: Constant

n: Cycle of operation(cycle/min)

Model	RTH, RTF		
Bore size (mm)	40	63	80
Constant K	0.3491	0.3927	0.4712

### Output Torque table

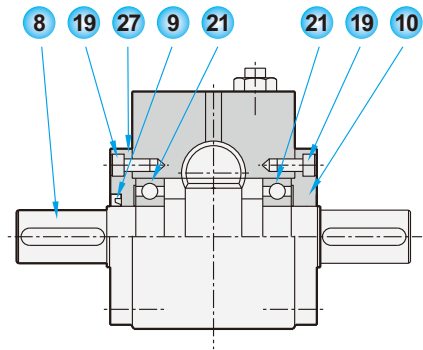
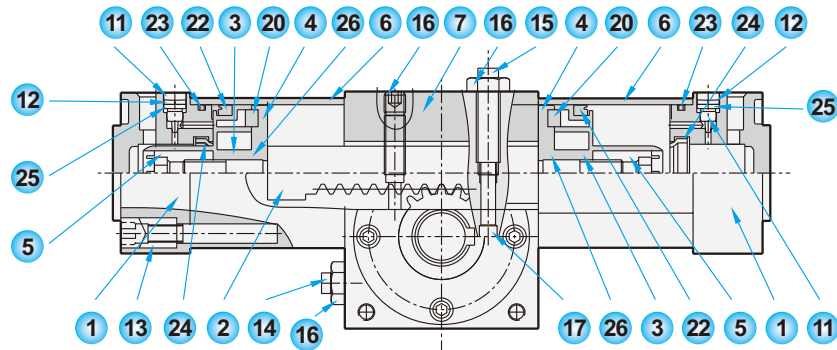


### RTH/RTF Repair kit

Model	Order code	Details
RTH-φ40	RTHSK40	Piston packing X 2
RTH-φ63	RTHSK63	Cylinder gasket X 2
RTH-φ80	RTHSK80	Cushion packing X 2
RTF-φ40	RTFSK40	Needle gasket X 2
RTF-φ63	RTFSK63	Piston gasket X 2
RTF-φ80	RTFSK80	Rod packing X 1

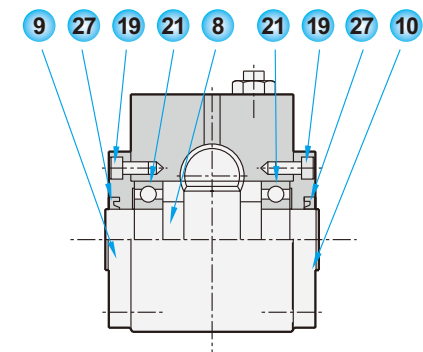
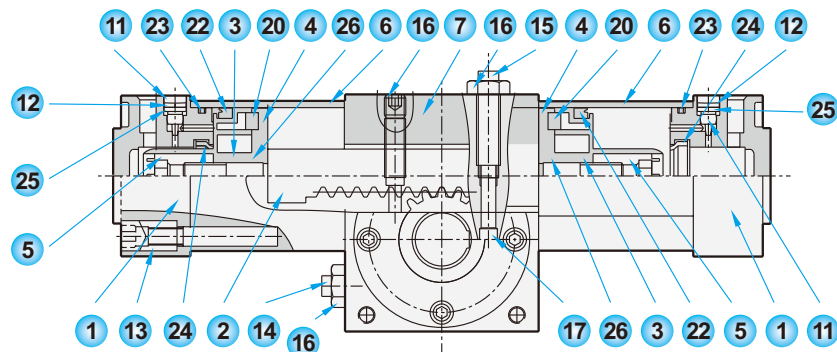
### Material of parts

#### RTH, RTH-D



No.	Description	Qty	No.	Description	Qty	No.	Description	Qty
1	End cap	2	10	End cover	1	19	Hexagon socket head screw	8
2	Rack	1	11	Cushion needle	2	20	Magnet	2
3	Piston	2	12	Washer	2	21	Ball bearing	2
4	Magnet holder	2	13	Tie bolt	8	22	Piston packing	2
5	Piston nut	2	14	Adjusting screw	1	23	Cylinder gasket	2
6	Cylinder tube	2	15	Adjusting screw	1	24	Cushion packing	2
7	Housing	1	16	Lock nut	2	25	Needle gasket	2
8	Pinion shaft	1	17	Stopper pin	1	26	Piston gasket	2
9	Rod packing	1	18	Set screw	1	27	End cover	1

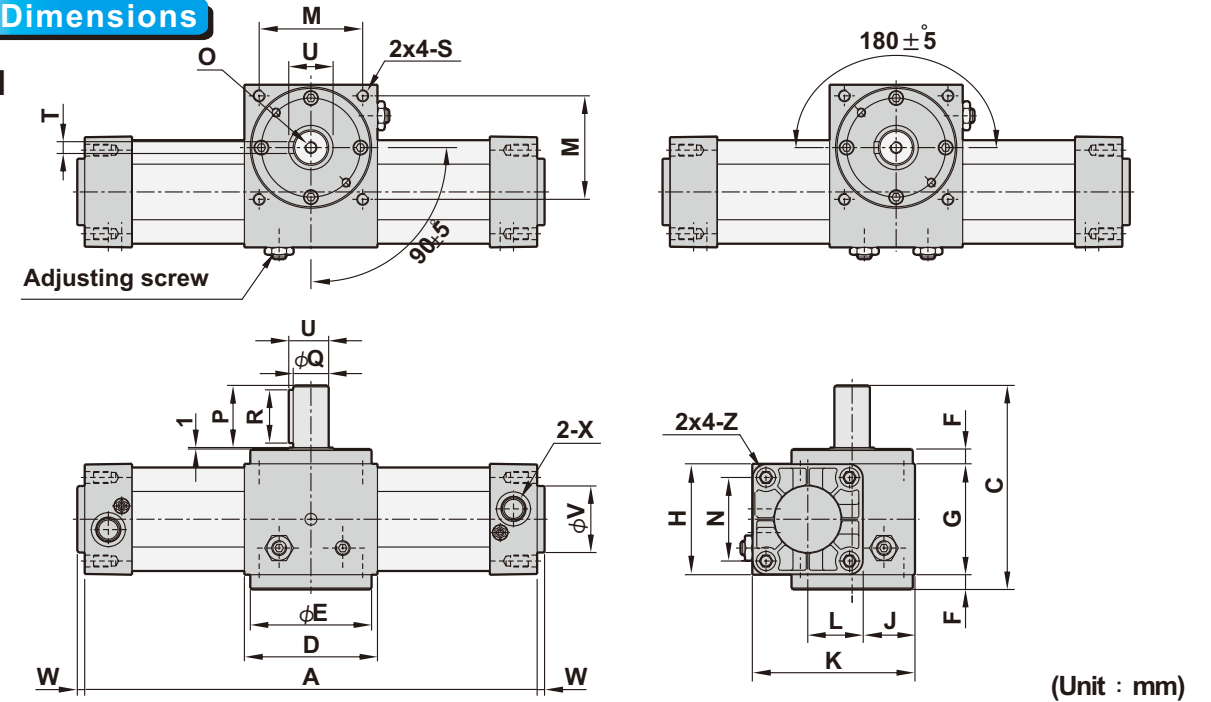
#### RTF



No.	Description	Qty	No.	Description	Qty	No.	Description	Qty
1	End cap	2	10	End cover	1	19	Hexagon socket head screw	8
2	Rack	1	11	Cushion needle	2	20	Magnet	2
3	Piston	2	12	Washer	2	21	Ball bearing	2
4	Magnet holder	2	13	Tie bolt	8	22	Piston packing	2
5	Piston nut	2	14	Adjusting screw	1	23	Cylinder gasket	2
6	Cylinder tube	2	15	Adjusting screw	1	24	Cushion packing	2
7	Housing	1	16	Lock nut	2	25	Needle gasket	2
8	Pinion shaft	1	17	Stopper pin	1	26	Piston gasket	2
9	End cover	1	18	Set screw	1	27	Rod packing	1

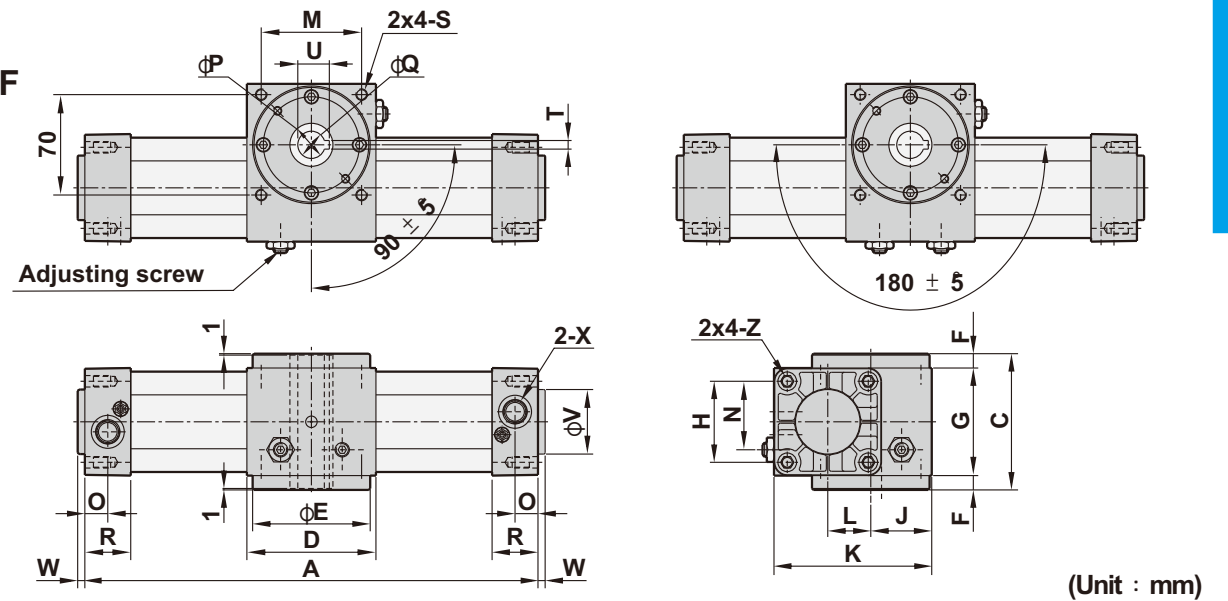
### Dimensions

#### RTH



Model	A		C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Z
	90°	180°																						
RTH40	263	326	112	75	72	8	65	53	37.5	93	27.5	60	38	M5	30	16	25	M6	5	18	35	4	G1/4	M6
RTH63	306	377	138	90	82	10	75	75	42.5	110	30	70	56.5	M8	42	24	36	M8	8	27	45	5	G3/8	M8
RTH80	343	428	170	105	96	12	95	95	51.5	135	36	82	72	M8	28	28	45	M10	8	31	45	6	G3/8	M10

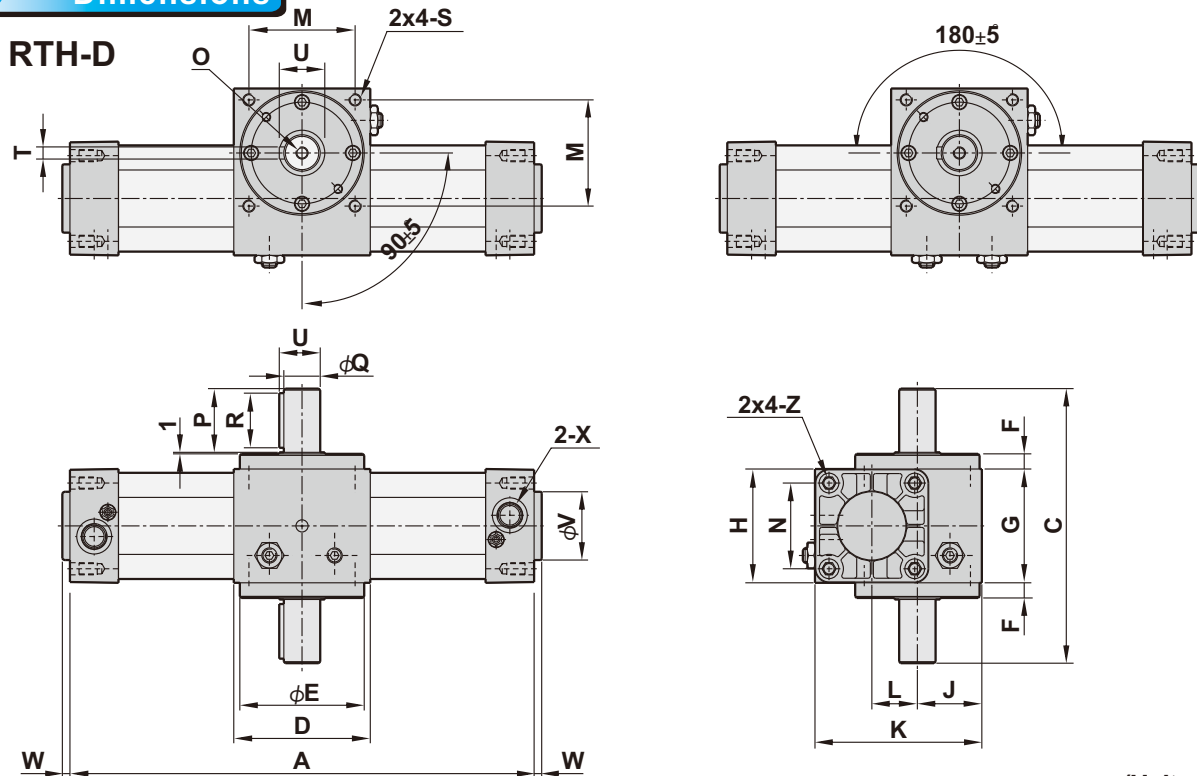
#### RTF



Model	A		C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Z
	90°	180°																						
RTF40	263	326	81	75	72	8	65	53	37.5	93	27.5	60	38	15	25	14	30	M6	5	16.5	35	4	G1/4	M6
RTF63	306	377	95	90	82	10	75	75	42.5	110	30	70	56.5	16	30	19	32	M8	6	22	45	5	G3/8	M8
RTF80	343	428	119	105	96	12	95	95	51.5	135	36	82	72	19	35	24	38	M10	6	27.5	45	6	G3/8	M10

**Dimensions**

**RTH-D**

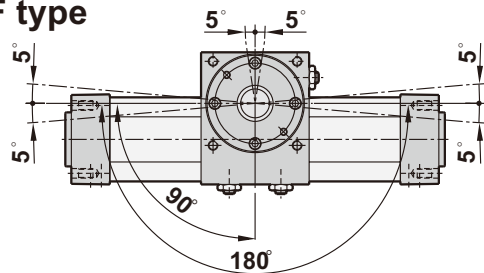


(Unit : mm)

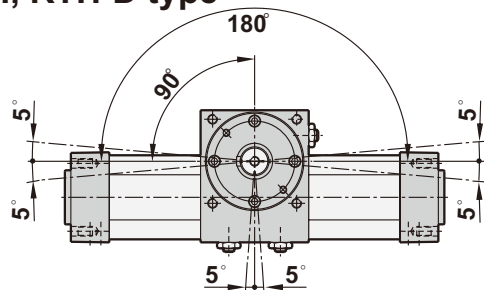
Model	A		C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Z
	90°	180°																						
RTH40-D	263	326	143	75	72	8	65	53	37.5	93	27.5	60	38	M5	30	16	25	M6	5	18	35	4	G1/4	M6
RTH63-D	306	377	181	90	82	10	75	75	42.5	110	30	70	56.5	M8	42	24	36	M8	8	27	45	5	G3/8	M8
RTH80-D	343	428	221	105	96	12	95	95	51.5	135	36	82	72	M8	28	28	45	M10	8	31	45	6	G3/8	M10

**Rotating direction and adjustable angle**

**RTF type**

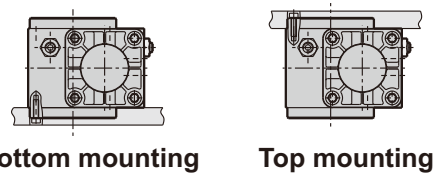


**RTH, RTH-D type**

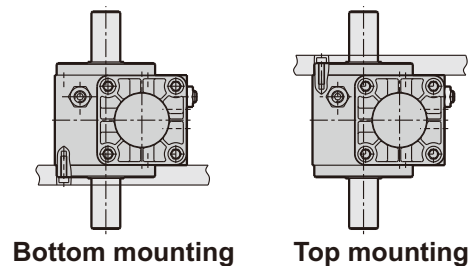


**Mounting type**

**RTF type**

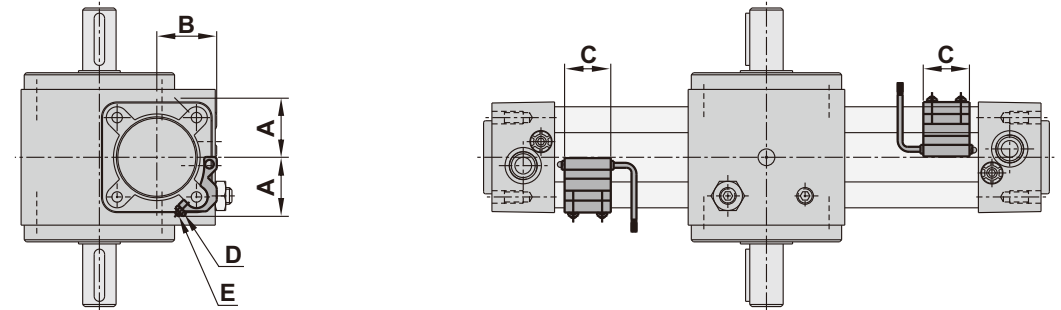


**RTH, RTH-D type**

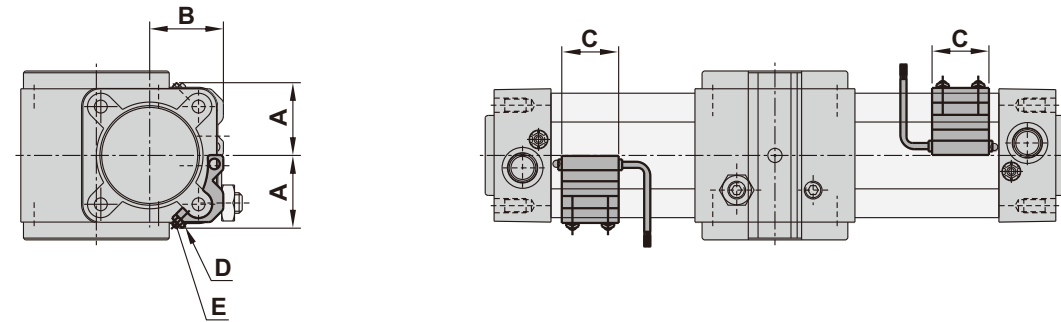


**Installation of sensor switch**

**RTH, RTH-D**



**RTF**



(Unit : mm)

Bore size	Sensor bracket	Weight	A	B	C	D	E
φ40	FXX0500321	0.065	29	32	32	M4xL8	M4
φ63	FXX0500631	0.066	40	43	32	M4xL10	M4
φ80	FXX0500801	0.086	49.5	52	32	M4xL12	M4

**Weight**

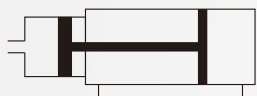
(Unit : kg)

Bore size	RTF		RTH		RTH-D	
	90°	180°	90°	180°	90°	180°
φ40	2.84	2.94	3	3.1	3.05	3.15
φ63	5.07	5.47	5.4	5.8	5.55	5.95
φ80	9.19	9.74	9.75	10.3	9.99	10.54



**Symbol**

Single pressure type  
Dual pressure type



**Features**

- \* Shako booster is an efficient way of generating high pressure of hydraulic fluid.
- \* Compact size design to save space and energy.
- \* Suitable for shaping, forming, punching, riveting, shearing, welding, and testing industry.



**How to order**

**AHS**

Booster

<b>AHS</b>	Single pressure type
<b>AHD</b>	Dual pressure type

**110**

Intensified pressure ratio

<b>078</b>	7.8
<b>110</b>	11
<b>250</b>	25

**Repair kit**

Model	Order code
AHS078	AHSSK078
AHD078	AHDSK078
AHS110	AHSSK110
AHD110	AHDSK110
AHS250	AHSSK250
AHD250	AHDSK250

**Specifications**

Model	AHS078	AHS110	AHS250	AHD078	AHD110	AHD250
Port size	3/8"	1/2"	1/2"	3/8"	1/2"	1/2"
Discharging volume	50cc	120cc	120cc	50cc	120cc	120cc
Fluid	Compressed air					
Working fluid	Hydraulic work oil viscosity					
Operating pressure range	2 ~ 7 kgf/cm <sup>2</sup>					
Max. operating pressure	7 kgf/cm <sup>2</sup>					
Body material	Aluminum alloy					
Ambient temperature	5°C ~ 60°C					
Mounting	Side foot type					
Weight	3.4 kg	10.1 kg	34.5 kg	3.1 kg	9.1 kg	33.5 kg

**Acting theory**

The booster can transform low pressure input to high pressure output in a efficient way.

**The method of calculation (Hydraulic cylinder force)**

Piston area of hydraulic cylinder  $A = (\text{Bore size})^2 \times \frac{\pi}{4} \text{ mm}^2$

Booster output pressure  $P2 = \text{Intensified pressure ratio } R \times P$  (Air pressure MPa)

Hydraulic cylinder force  $F = A \times P2 = \_N$

A : Piston area of hydraulic cylinder mm<sup>2</sup>

D : Bore size

F : Hydraulic cylinder force

P : Air pressure

P2 : Booster output pressure

R : Intensified pressure ratio

**Dual pressure booster**

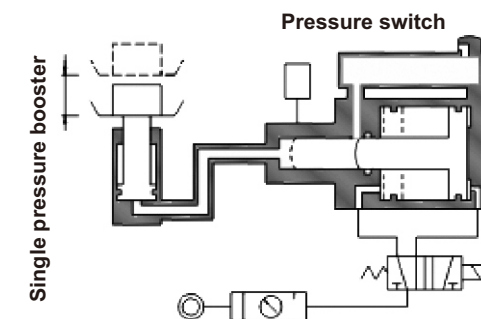
Quick traverse	Intensified feeding	Swift reverse
<p>When the air is charged from the port P1, the oil in the tank will forward the hydraulic cylinder quickly. The pressure is the same as the air pressure, but the inflow of oil is large in volume.</p>	<p>When the air is charged from the port P2, a ram will advance. The high pressured fluid will come in to the hydraulic cylinder which will be forwarded by large thrust.</p>	<p>When the air is send into port P4 and P3, the hydraulic cylinder is swiftly reversed and at the same time the ram goes back.</p>

**Points in usage**

1. The booster must be leveled, otherwise, hydraulic oil will be overflowing from exhaust port.
2. Standard booster are designed for use with petroleum base hydraulic oil.
3. The booster must be higher than the work cylinder. when hydraulic oil is filled, the air bubble will be automatically drained. If the booster is lower than the work cylinder, it is necessary to wait until the air bubble completely drained before installing the work cylinder.
4. Fill hydraulic oil until the oil up to the mid of oil scale. Please do not overfill, this will make oil spray when booster operate.
5. Frequency of use should be 6 times/min or less.

**Single pressure booster**

Optimum for high output short stroke cylinder.



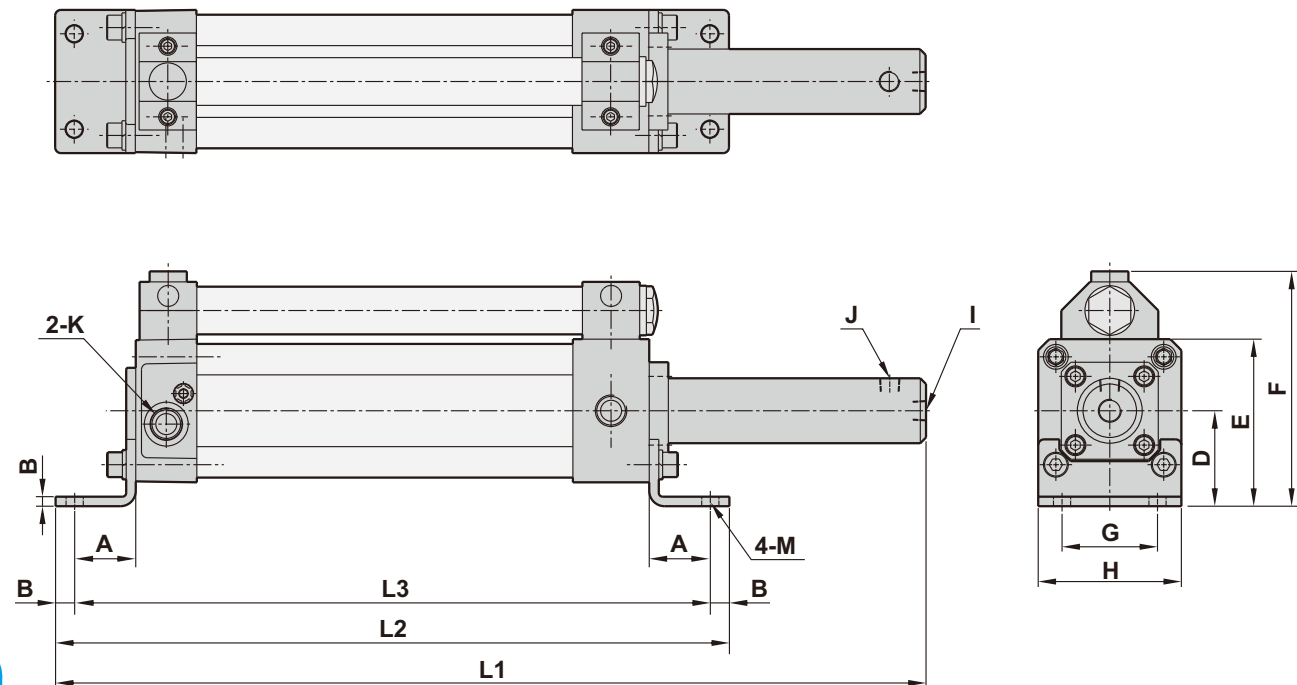
**Compressed air consumption**

Model	Air pressure (MPa)					
	0.2	0.3	0.4	0.5	0.6	0.7
AHS078 AHD078	2.4	3.19	3.98	4.78	5.56	6.36
AHS110 AHD110	7.58	10.07	12.57	15.07	17.57	20.06
AHS250 AHD250	18.09	24.06	30.02	35.99	41.95	47.92

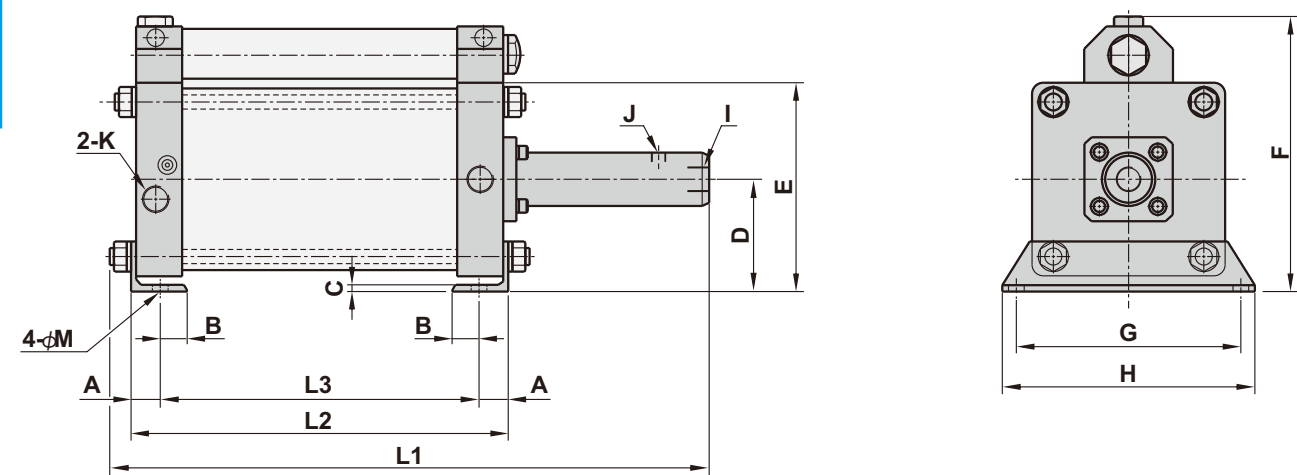


— Dimensions-Single pressure type

● AHS078, AHS110



● AHS250

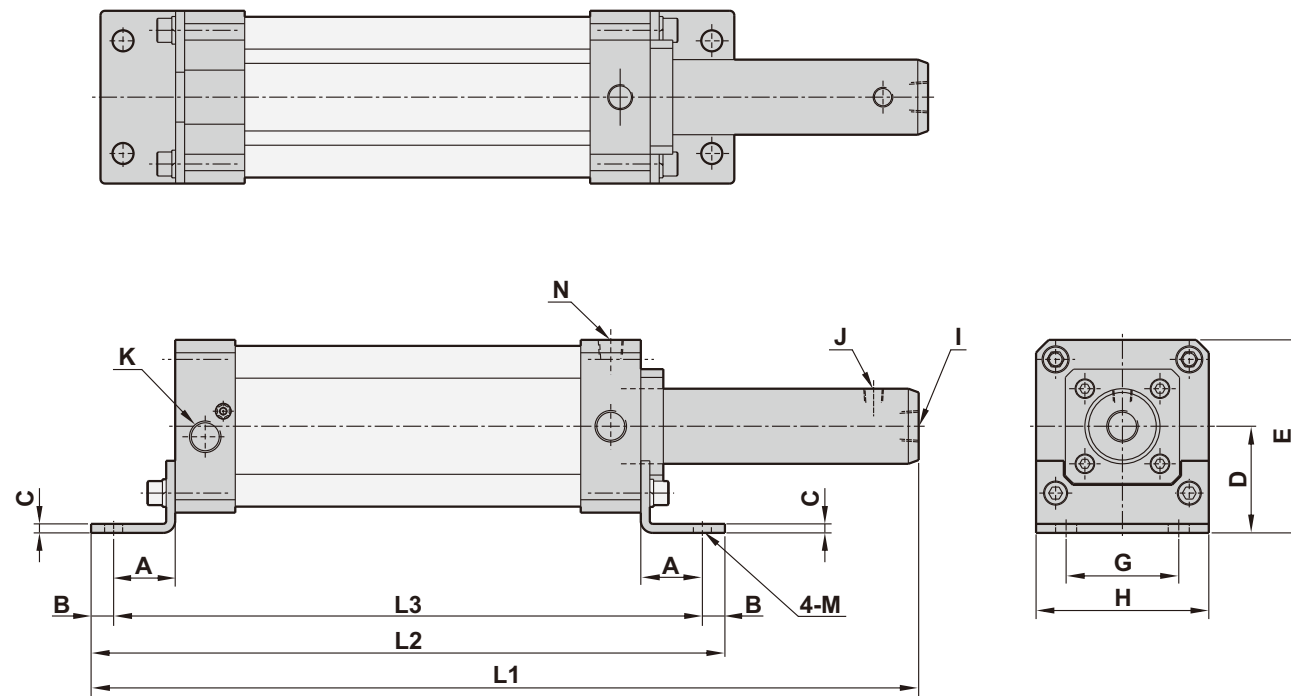


(Unit : mm)

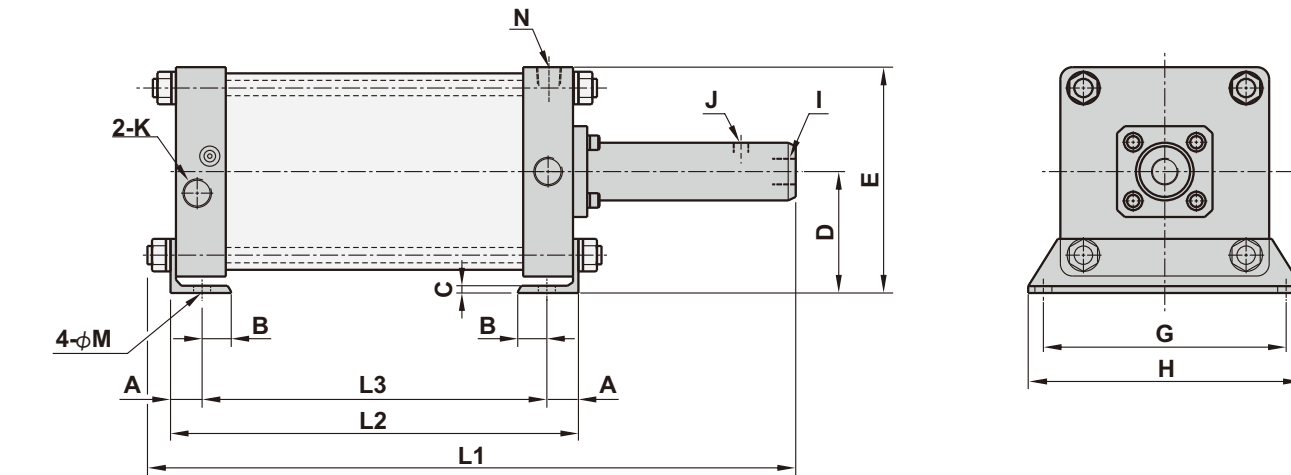
Model	A	B	C	D	E	F	G	H	I	J	K	L1	L2	L3	M
AHS078	32	10	5	50	87.5	123	50	75	G 1/4	G 1/4	G 3/8	456	353	333	9
AHS110	41	15	6	71	128.5	187.5	75	115	G 1/2	G 1/4	G 1/2	551	422	392	14
AHS250	24	26	6	100	186	245	200	225	G 1/2	G 1/4	G 1/2	534	336	284	14

— Dimensions-Single pressure type

● AHD078, AHD110



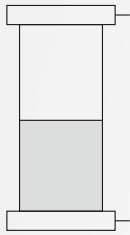
● AHD250



(Unit : mm)

Model	A	B	C	D	E	F	G	H	I	J	K	L1	L2	L3	M
AHD078	32	10	5	50	87.5	123	50	75	G 1/4	G 1/4	G 3/8	456	353	333	9
AHD110	41	15	6	71	128.5	187.5	75	115	G 1/2	G 1/4	G 1/2	551	422	392	14
AHD250	24	26	6	100	186	245	200	225	G 1/2	G 1/4	G 1/2	534	336	284	14

### Symbol



### Features

- \* Air/Oil systems combine the speed and low cost of air operation with the smooth.
- \* Hydraulic cylinder is motivated by standard air line source.



### How to order

<b>AOF</b>	<b>40</b>	<b>B</b>	<b>150</b>
Air-Hydro converter	Bore size		Stroke
AOF Flange mounting	40 φ40		150 150 mm
AOL Foot mounting	63 φ63		175 175 mm
	80 φ80		200 200 mm
	100 φ100		Max. length 500 mm

### Sizing the air-hydro converter

Determine the volume of fluid displaced by the work cylinder by multiplying stroke by piston area.

$$V = \frac{\pi D^2}{4} \times L \times 10^{-3}$$

D : Inner diameter (mm)

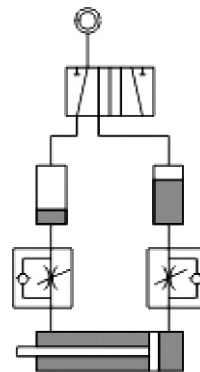
L : Stroke of work cylinder (mm)

V : Volume of work cylinder (cm<sup>3</sup>)

### Specifications

Model	AOF, AOL			
Bore size	φ40	φ63	φ80	φ100
Port size	1/4"	3/8"	3/8"	1/2"
Fluid	ISO VG32 oil			
Standard length	From 150~500 mm with every 25mm as an unit increased			
Max. pressure	10.5 kgf/cm <sup>2</sup>			
Body material	Anodized aluminum alloy			
Ambient temperature	-10°C ~ 60°C			

### Example



Air/Oil systems combine the speed and low cost of air operation with the smooth, even actuator control of oil from a standard air line source.

### Volume of cylinder (Table 1)

Bore size mm	Cylinder stroke (mm)											Unit: cm <sup>3</sup>
	25	50	75	100	125	150	200	250	300	350	400	
φ20	7.9	15.7	23.6	31.4	39.3	47.1	26.8	78.5	94.2	109.9	125.6	
φ25	12.3	24.5	36.8	49	61.3	73.5	98	122.5	114.7	171.5	196	
φ32	20.1	40.2	60.2	80.3	100.4	20.5	60.6	200.8	240.9	281.1	321.2	
φ40	31.4	62.8	94.2	125.6	157	88.4	251.2	314	376.8	439.6	502.4	
φ50	49	98	147.2	196.3	245	294	393	491	589	687	785	
φ63	62	156	238	311.7	390	468	623	780	935	1091	1247	
φ80	125	251	377	502	628	753	1005	1256	1507	1759	2010	
φ100	196	293	589	785	981	1178	1570	1962	---	---	---	

### Maximum useable capacities (Table 2)

Bore size mm	Converter length (mm)														
	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500
φ40	94	110	125	141	157	172	188	204	220	235	251	267	282	298	314
φ63	237	277	316	356	395	435	475	514	554	594	633	673	712	752	791
φ80	377	440	502	565	628	691	754	816	880	942	1005	1068	1131	1194	1256
φ100	589	687	785	883	981	1080	1178	1276	1374	1472	1570	1666	1767	1865	1963

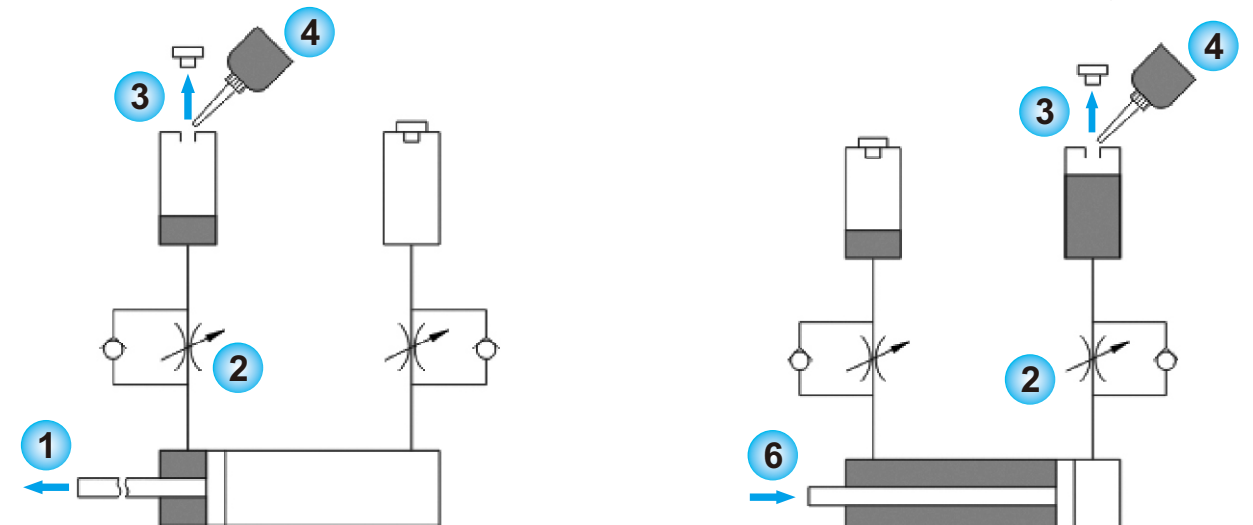
Note: Above volume have keep 50% space in advance.

### Remark

- \* Refer to table 2 to find the bore and length equal to or greater than this volume. In general, longer converter with smaller bore size are the most economical.
- \* Suggested minimum internal length is 150mm.
- \* AIR-HYDRO converter should be sized so that the coil level does not change more than 150mm/sec.
- \* AIR-HYDRO converter should be mounted vertically at the highest point in the system to allow self-bleeding of the converter.

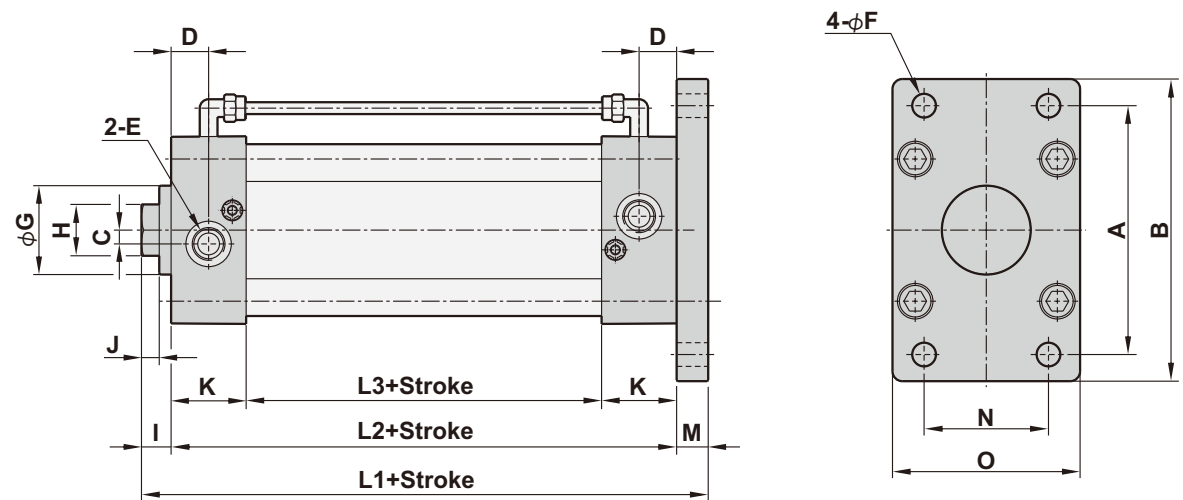
### Lubricating procedure

1. Please pull the piston to the location of oil supply.
2. Throttle valve opens fully.
3. Open the bolt of oil hole between the top center of Air-Hydro converter.
4. Pour into oil from down side inlet by power.
5. Feed the oil to max. of oil tank capacity and lock bolt (Close oil hole).
6. Use about 0.2MPa pressure to pour oil into and push piston to another side.
7. Repeat step 2 to step 5 on the other end.
8. Use about 0.2 MPa pressure to return piston about 2~3, times after completion the work of oil pouring into.



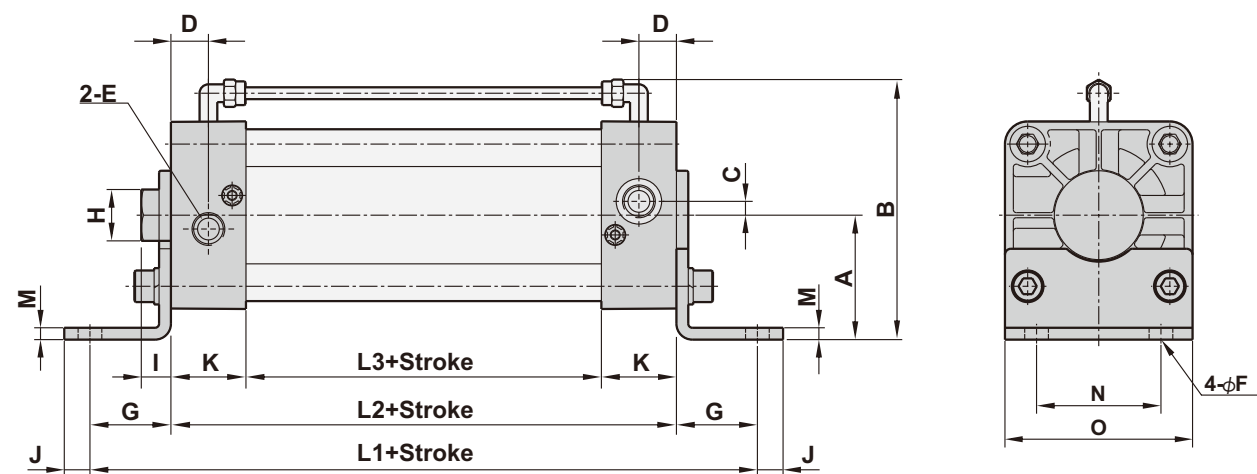
**Dimensions**

**AOF**



Bore size	A	B	C	D	E	F	G	H	I	J	K	L1	L2	L3	M	N	O
φ40	72	90	4	15	G1/4	9	35	26	14	5	30	114	90	30	10	36	55
φ63	100	120	7	16	G3/8	9	15	26	14	5	32	120	94	30	12	50	75
φ80	126	153	7	19	G3/8	12	15	26	15	6	38	137	106	30	16	63	95
φ100	150	178	7	20	G3/8	14	55	26	15	6	40	141	110	30	16	75	115

**AOL**



Bore size	A	B	C	D	E	F	G	H	I	J	K	L1	L2	L3	M	N	O
φ40	36	84	4	15	PS 1/4	9	28	26	14	10	30	146	90	30	5	36	53
φ63	50	109	7	16	PS 3/8	9	32	26	14	10	32	158	94	30	5	50	75
φ80	63	132	7	19	PS 3/8	12	41	26	15	13	38	188	106	30	6	63	95
φ100	71	150	7	20	PS 3/8	14	41	26	15	15	40	192	110	30	6	75	115

PNEUMATIC CYLINDER

PNEUMATIC CYLINDER



## Theoretical force

Unit: N

Bore size (mm)	10	12	16	20	25	32	40	50	63	80	100	125	160	200		
Rod diameter (mm)	4	6	6	6	10	12	16	20	20	25	25	32	40	40		
Piston area (mm <sup>2</sup> )	A	78	113	201	314	491	804	1257	1963	3117	5027	7854	12271	20100	31410	
	B	66	85	173	264	412	691	1056	1649	2803	4536	7363	11309	18840	30150	
Operating pressure (MPa)	0.1	A	7.85	11	20	31	49	80	126	196	312	502	785	1227	2010	3141
		B	6.6	8.5	17	26	41	69	106	165	280	453	736	1131	1884	3015
	0.2	A	15.7	23	40	63	98	161	251	393	623	1005	1571	2454	4021	6283
		B	13.2	17	35	53	82	138	211	330	561	907	1473	2262	3769	6031
	0.3	A	23.55	34	60	94	147	241	377	589	935	1508	2356	3681	6031	9424
		B	19.8	25	52	79	124	207	317	495	841	1361	2209	3393	5654	9047
	0.4	A	31.4	45	80	126	196	322	503	785	1247	2011	3142	4908	8042	12566
		B	26.4	34	69	106	165	276	422	660	1121	1814	2945	4524	7539	12062
	0.5	A	39.25	57	101	157	245	402	629	982	1559	2514	3927	6135	10053	15708
		B	33	42	67	132	206	346	528	825	1402	2268	3682	5655	9424	15078
	0.6	A	47.1	68	121	189	294	482	754	1178	1870	3016	4712	7363	12063	18849
		B	39.6	51	104	158	247	415	634	989	1682	2722	4418	6785	11309	18094
	0.7	A	54.95	79	141	220	343	563	880	1374	2182	3519	5498	8589	14074	21991
		B	46.2	59	121	185	289	484	739	1154	1962	3175	5154	7916	13194	21109
	0.8	A	62.8	90	161	251	393	643	1006	1570	2494	4022	6283	9816	16084	25132
		B	52.8	68	138	211	330	553	845	1319	2242	3629	5890	9047	15079	24125
	0.9	A	70.65	102	181	283	442	724	1131	1767	2805	4524	7069	11043	18095	28274
		B	59.4	76	155	238	371	622	950	1484	2523	4082	6627	10178	16964	27141
1.0	A	78.5	113	201	314	491	804	1257	1963	3117	5027	7854	12271	20102	31409	
	B	66	85	173	264	412	691	1056	1649	2803	4536	7363	11309	18846	30153	

Note: Above data are for reference only. Actual practice, frictional force and the mechanical efficiency have to be taken into consideration.

## Cylinder force calculation

Cylinder force calculation

$$F = P \times A - f$$

F: Cylinder force (N)

P: Air pressure (MPa)

A: Piston area (mm<sup>2</sup>)

B: Piston area (mm<sup>2</sup>)

f: Friction force (N)

$$F = P \times B - f$$

## Pressure interchange chart

	Pa	kPa	MPa	bar	mbar	kgf/cm <sup>2</sup>	cmH <sub>2</sub> O	mmH <sub>2</sub> O	mmHg	p.s.i.
Pa	1	10 <sup>-3</sup>	10 <sup>-6</sup>	10 <sup>-5</sup>	10 <sup>-2</sup>	10.2x10 <sup>-6</sup>	10.2x10 <sup>-3</sup>	101.97x10 <sup>-3</sup>	7.5x10 <sup>-3</sup>	0.15x10 <sup>-3</sup>
kPa	10 <sup>3</sup>	1	10 <sup>-3</sup>	10 <sup>-2</sup>	10	10.2x10 <sup>-3</sup>	10.2	101.97	7.5	0.15
MPa	10 <sup>6</sup>	10 <sup>3</sup>	1	10	10 <sup>4</sup>	10.2	10.2x10 <sup>3</sup>	101.97x10 <sup>3</sup>	7.5x10 <sup>3</sup>	0.15x10 <sup>3</sup>
bar	10 <sup>5</sup>	10 <sup>2</sup>	10 <sup>-1</sup>	1	10 <sup>3</sup>	1.02	1.02x10 <sup>3</sup>	10.2x10 <sup>3</sup>	750.06	14.5
mbar	10 <sup>2</sup>	10 <sup>-1</sup>	10 <sup>-4</sup>	10 <sup>-3</sup>	1	1.02x10 <sup>-3</sup>	1.02	10.2	0.75	14.5x10 <sup>-3</sup>
kgf/cm <sup>2</sup>	98066.5	98.07	98.07x10 <sup>-3</sup>	0.98	980.67	1	1000	10000	735.56	14.22
cmH <sub>2</sub> O	98.0665	98.07x10 <sup>-3</sup>	98.07x10 <sup>-6</sup>	0.98x10 <sup>-3</sup>	0.98	10 <sup>-3</sup>	1	10	0.74	14.22x10 <sup>-3</sup>
mmH <sub>2</sub> O	9.80665	9.807x10 <sup>-3</sup>	9.807x10 <sup>-6</sup>	9.807x10 <sup>-6</sup>	98.07x10 <sup>-3</sup>	10 <sup>-4</sup>	0.1	1	73.56x10 <sup>-3</sup>	1.42x10 <sup>-3</sup>
mmHg	133.32	133.32x10 <sup>-3</sup>	133.32x10 <sup>-6</sup>	1.33x10 <sup>-3</sup>	1.33	1.36x10 <sup>-3</sup>	1.36	13.6	1	19.34x10 <sup>-3</sup>
p.s.i.	6894.76	6.89	6.89x10 <sup>-3</sup>	68.95x10 <sup>-3</sup>	68.95	70.31x10 <sup>-3</sup>	70.31	703.07	51.71	1

## Compressed air consumption

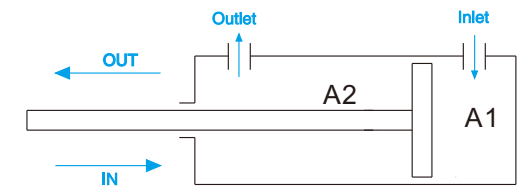
Unit:L(ANR)

Bore size(mm)	10	12	16	20	25	32	40	50	63	80	100	125	160	200	
Rod diameter(mm)	4	6	6	6	10	12	16	20	20	25	25	32	40	40	
Piston area (mm <sup>2</sup> )	A	78.5	113	201	314	491	804	1257	1963	3117	5027	7854	12271	17671	31410
	B	66	85	173	264	412	691	1056	1649	2803	4536	7363	11309	16415	30150
Operating pressure (MPa)	0.1	0.03	0.04	0.075	0.116	0.181	0.299	0.462	0.722	1.183	1.912	3.042	4.714	6.814	12.25
	0.2	0.043	0.059	0.112	0.173	0.271	0.448	0.693	1.083	1.775	2.867	4.563	7.071	10.221	18.345
	0.3	0.057	0.079	0.15	0.231	0.361	0.598	0.924	1.444	2.367	3.823	6.084	9.428	13.628	24.439
	0.4	0.072	0.099	0.187	0.289	0.451	0.747	1.156	1.805	2.959	4.779	7.605	11.785	17.035	30.534
	0.5	0.086	0.119	0.224	0.347	0.542	0.897	1.387	2.167	3.55	5.734	9.126	14.142	20.441	36.69
	0.6	0.100	0.138	0.262	0.405	0.632	1.046	1.618	2.528	4.142	6.69	10.647	16.499	23.848	42.723
	0.7	0.115	0.158	0.299	0.463	0.722	1.196	1.849	2.889	4.734	7.648	12.168	18.856	27.255	48.817
	0.8	0.13	0.178	0.366	0.52	0.812	1.295	2.08	3.25	5.325	8.602	13.689	21.213	30.662	54.912
	0.9	0.143	0.198	0.374	0.578	0.903	1.495	2.311	3.611	5.917	9.557	15.209	23.57	34.069	61.006
	1.0	0.158	0.218	0.411	0.636	0.993	1.644	2.542	3.972	6.509	10.513	16.927	25.927	37.476	67.101

Note: The table is for a complete cycle in 100mm stroke.

## Compressed air consumption calculation

$$Q_n = (A1 + A2) \times L \times \frac{P+0.101}{0.101} \times n \times 10^{-6}$$



Q<sub>n</sub> : Compressed air consumption (l/min)

A1 A1 Piston area on rod side (mm<sup>2</sup>)

A2 A2 Piston area on head side(mm<sup>2</sup>)

L Cylinder stroke (mm)

P : Air pressure (MPa)

n : Cycle of operation (cycle/min)

## Pressure interchange chart

	m <sup>3</sup> / s	l / s	cm <sup>3</sup> / s	m <sup>3</sup> / h	m <sup>3</sup> / min	l / h	l / min	ft <sup>3</sup> / min (scfm)	gallon min UK	gallon min USA
m <sup>3</sup> / s	1	10 <sup>3</sup>	10 <sup>6</sup>	3.6x10 <sup>6</sup>	60	3.6x10 <sup>6</sup>	60x10 <sup>3</sup>	2.12x10 <sup>3</sup>	13.2x10 <sup>3</sup>	15.85x10 <sup>3</sup>
l / s	10 <sup>-3</sup>	1	10 <sup>3</sup>	3.6	60x10 <sup>-3</sup>	3.6x10 <sup>3</sup>	60	2.12	13.2	15.85
cm <sup>3</sup> / s	10 <sup>-6</sup>	10 <sup>-3</sup>	1	3.6x10 <sup>-3</sup>	60x10 <sup>-6</sup>	3.6	60x10 <sup>-3</sup>	2.12x10 <sup>-3</sup>	13.2x10 <sup>-3</sup>	15.8x10 <sup>-3</sup>
m <sup>3</sup> / h	0.28x10 <sup>-3</sup>	0.28	0.28x10 <sup>3</sup>	1	16.67x10 <sup>-3</sup>	10 <sup>3</sup>	16.67	0.59	3.67	4.4
m <sup>3</sup> / min	16.67x10 <sup>-3</sup>	16.67	16.67x10 <sup>3</sup>	60	1	60x10 <sup>3</sup>	10 <sup>3</sup>	35.31	219.97	264.17
l / h	0.28x10 <sup>-6</sup>	0.28x10 <sup>-3</sup>	0.28	10 <sup>-3</sup>	16.67x10 <sup>-6</sup>	1	16.67x10 <sup>-3</sup>	0.59x10 <sup>-3</sup>	3.67x10 <sup>-3</sup>	4.4x10 <sup>-3</sup>
l / min	16.67x10 <sup>-6</sup>	16.67x10 <sup>-3</sup>	16.67	60x10 <sup>-3</sup>	10 <sup>-3</sup>	60	1	35.31x10 <sup>-3</sup>	219.97x10 <sup>-3</sup>	264x10 <sup>-3</sup>
ft <sup>3</sup> / min(scfm)	0.47x10 <sup>-3</sup>	0.47	0.47x10 <sup>3</sup>	1.699	28.32x10 <sup>-3</sup>	1.699x10 <sup>3</sup>	28.32	1	6.23	7.48
gallon min UK	75.79x10 <sup>-6</sup>	75.77x10 <sup>-3</sup>	75.77	0.273	4.55x10 <sup>-3</sup>	0.273x10 <sup>3</sup>	4.55	0.16	1	1.2
gallon min USA	63.09x10 <sup>-6</sup>	63.09x10 <sup>-3</sup>	63.09	0.227	3.79x10 <sup>-3</sup>	0.227x10 <sup>3</sup>	3.79	0.13	0.83	1