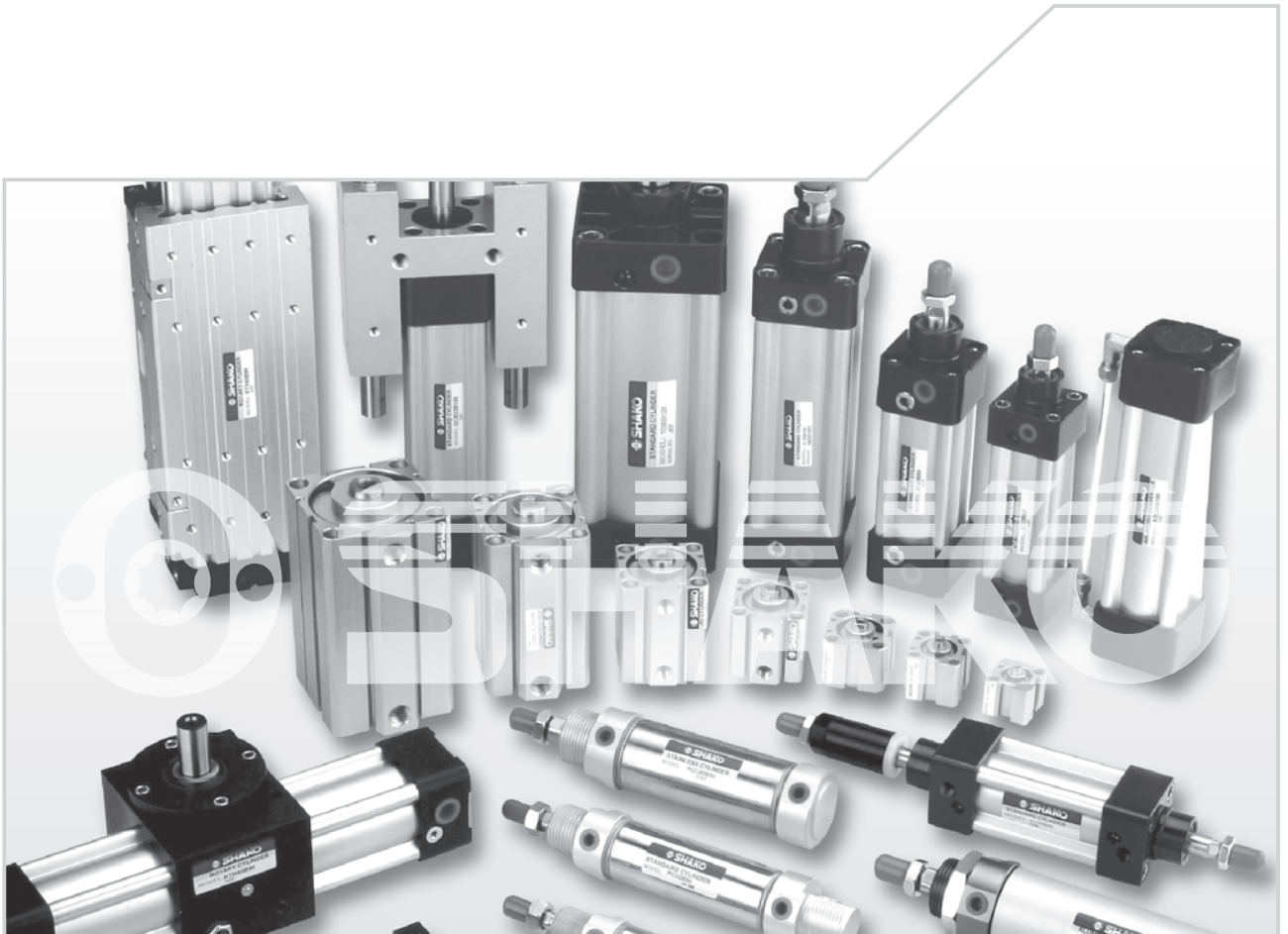


AIR CYLINDERS



Symbol

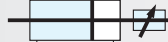
IC : ISO6431 standard type



ICD : Double piston rod type

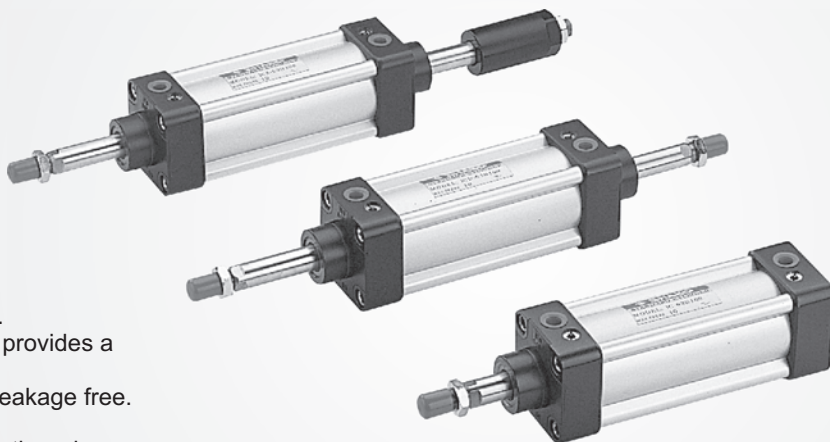


ICA, ICB : Adjustable type



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

※For ϕ IC32~ ϕ IC100 non-rotated type, please contact our sales.

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

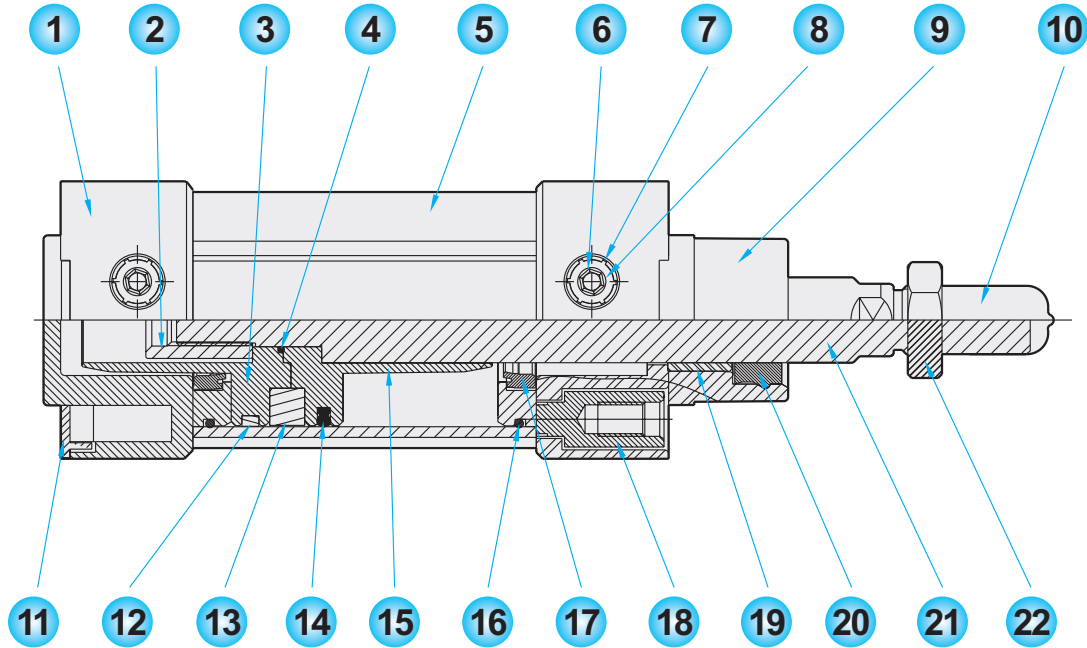
How to order Mounting parts / Rod end joints

IC series	Mounting parts				Rod end joint				Bore size			
ZI	Blank	W/O mounting parts	CA	Male clevis	Blank	W/O rod end joint	32	ϕ 32	100	ϕ 100		
FA	FA	Front flange	CB	Female clevis	FY	Double knuckle joint	40	ϕ 40	125	ϕ 125		
	FB	Rear flange	LB	Foot mounting	FI	Single knuckle joint	50	ϕ 50	160	ϕ 160		
	TC	Central trunnion			P	Eyebolt floating joint	63	ϕ 63	200	ϕ 200		
					T	Basic floating joint	80	ϕ 80				

Specifications

Bore size	ϕ 32	ϕ 40	ϕ 50	ϕ 63	ϕ 80	ϕ 100	ϕ 125	ϕ 160	ϕ 200
Port size	1/8"	1/4"		3/8"		1/2"		3/4"	
Fluid	Compressed air								
Acting	Double acting								
Operating pressure range	1.5 ~ 9.5 kgf/cm ² (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	NBR	2
7	Fixing nut	Brass+Ni	2	18	Fixing bolt	Fe+Ni	8
8	O-ring	NBR	2	19	Bush bearing	Brass	1
9	Front cover	Aluminum alloy	1	20	Rod seal	NBR	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)
φ 32	φ 63	Double acting	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000
φ 40	φ 80		
φ 50	φ 100		

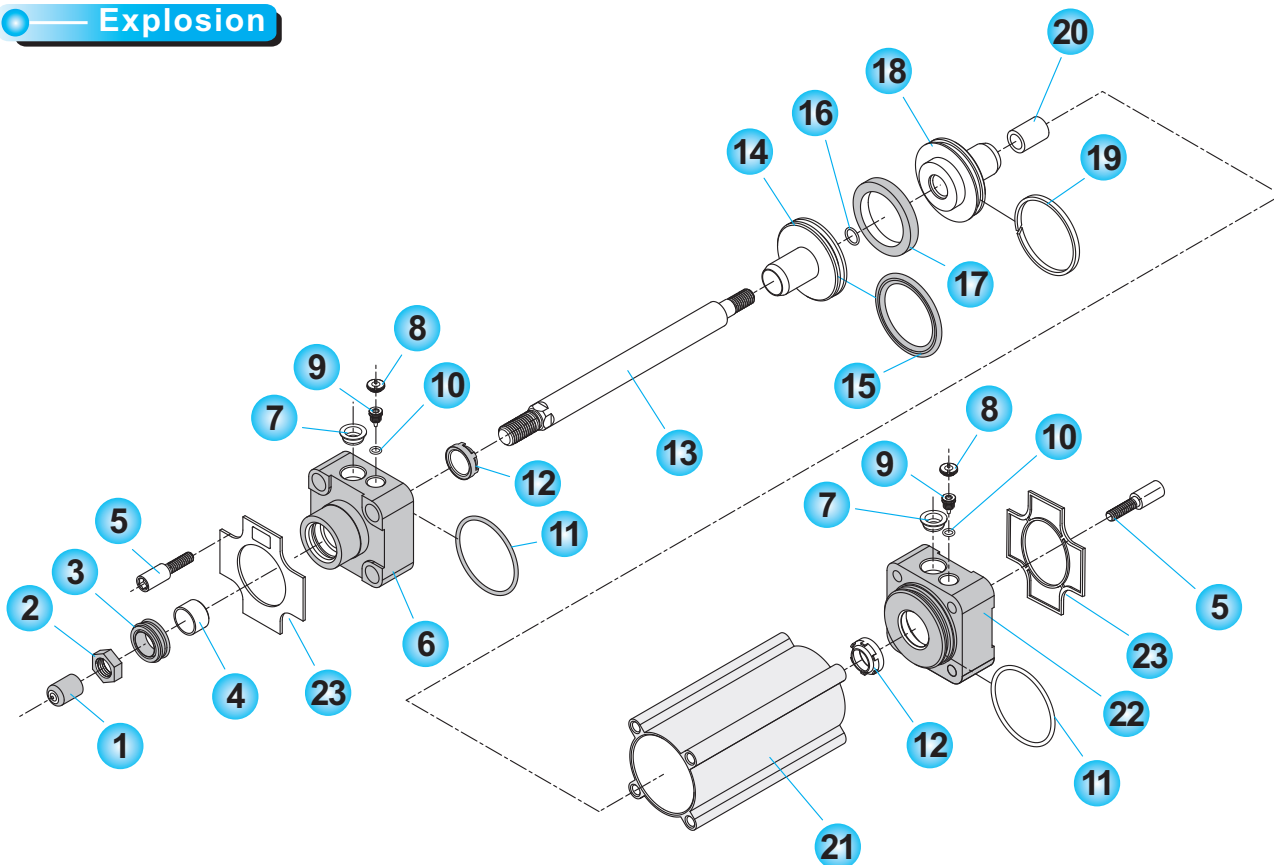
Note: Please contact our sales for non-standard stroke.

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	Bush bearing	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 ²)	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

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

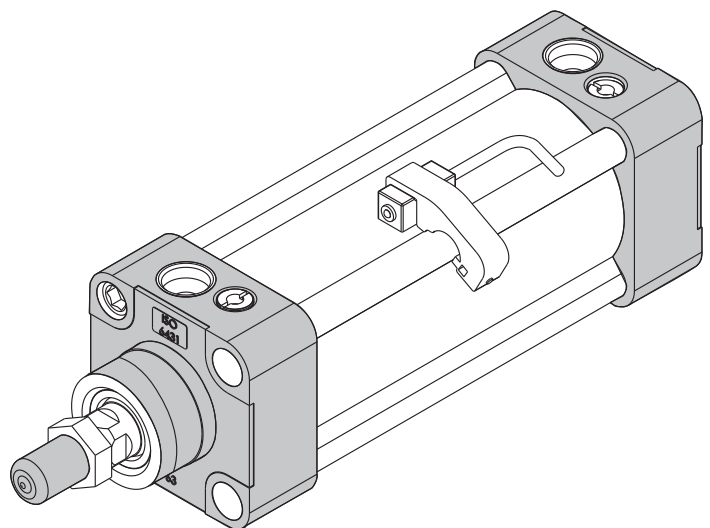
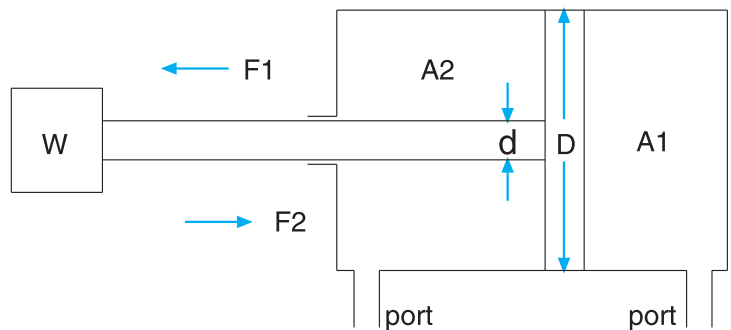
D : Bore size (mm)

d : Rod diameter (mm)

P : Operating pressure (kgf/cm²)

S : Spring force (kgf)

B : Loading rate : Medium speed.....65%
Low speed.....80%
High speed.....Below 50%



Dimensions

ISO6431 standard type



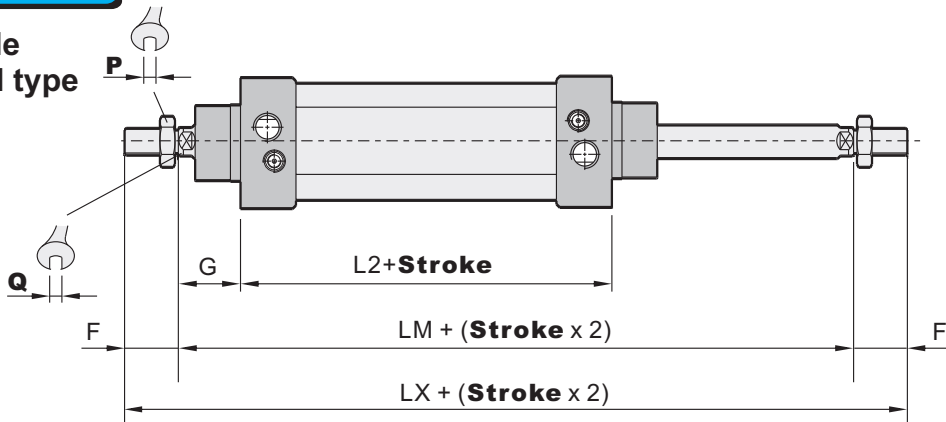
(Unit : mm)

Bore size	A	B	C	D	E	F	G	H	J	K
φ32	18	26	48	3	4.5	22	26	11.5	PS 1/8	φ 30
φ40	20.2	34.4	53	4	4.5	24	29	13.5	PS 1/4	φ 34.5
φ50	28	31	71	4	6	32	39	16	PS 1/4	φ 39.7
φ63	25.2	32.6	70.9	4	6	32	38.9	16	PS 3/8	φ 44.7
φ80	32.5	35.5	86.8	4	6	40	46.8	20.5	PS 3/8	φ 44.7
φ100	37	37	91.2	4.8	5.5	40	51.2	18	PS 1/2	φ 55.3

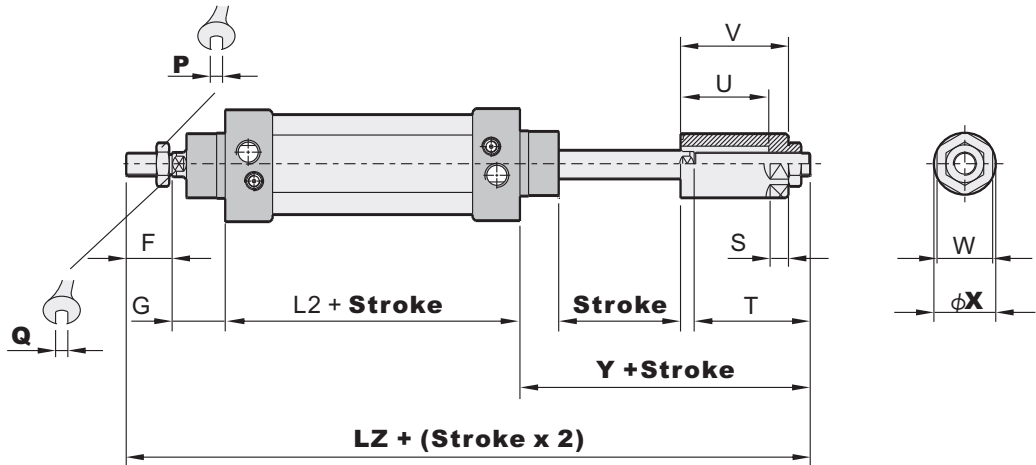
Bore size	L1	L2	L3	M	N	O	P	Q	R	S	T
φ32	42	94	120	M10xP1.25	φ 12	32.5	47	4.3	M6	17	10
φ40	37	105.8	134.8	M12xP1.25	φ 16	38	55	5.3	M6	19	13
φ50	44	106	147	M16xP1.5	φ 20	46.5	65	7	M8	24	17
φ63	55	120.2	159.1	M16xP1.5	φ 20	56.5	78	8	M8	24	17
φ80	57	128	174.8	M20xP1.5	φ 25	72	95	9	M10	30	22
φ100	64	138	189.2	M20xP1.5	φ 25	89	115	13	M10	30	22

Dimensions

ICD Double piston rod type



ICA Stroke adjustable 25mm, ICB Stroke adjustable 50mm



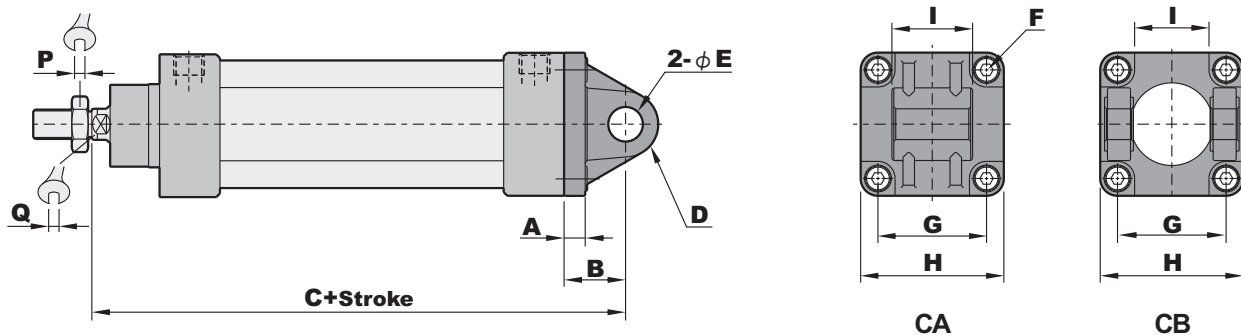
(Unit : mm)

Bore size	F	G	L2	LM	LX	LZ		P	Q	S
						ICA	ICB			
φ32	22	26	94	146	190	215	240	17	10	10
φ40	24	29.5	105	164	212	236	261	19	13	10
φ50	32	39	106	182	246	266	291	24	17	12
φ63	32	38.5	121	196.5	260.5	280.5	305.5	24	17	12
φ80	40	46	128	220	300	318	343	30	22	15
φ100	40	51	138	240	320	333	358	30	22	15

Bore size	T		U		V		W	X	Y	
	ICA	ICB	ICA	ICB	ICA	ICB			ICA	ICB
φ32	47	72	35	62	47	72	22	φ 25	73	98
φ40	48	73	37	62	47	72	27	φ 30	77.5	102.5
φ50	52	77	38	63	53	78	36	φ 40	91	116
φ63	52	77	38	63	53	78	36	φ 40	90.5	115.5
φ80	58	83	40	65	60	85	46	φ 50	104	129
φ100	58	83	40	65	60	85	46	φ 50	104	129

Dimension of mounting parts

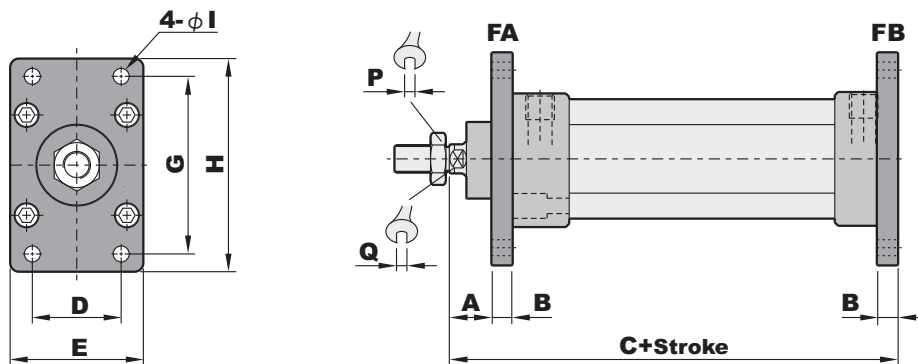
CA, CB Clevis mounting



(Unit : mm)

Bore size	A	B	C	D	E	F	G	H	I	P	Q
φ32	10	22	142	R11	φ 10	M6.0	32.5	46	26	17	10
φ40	10	25	160.8	R13	φ 12	M6.0	38	54	28	19	13
φ50	12	27	170	R13	φ 12	M8.0	46.5	64	32	24	17
φ63	12	32	190	R17	φ 16	M8.0	56.5	77	40	24	17
φ80	16	36	210.8	R17	φ 16	M10.0	72	94	50	30	22
φ100	16	41	230	R21	φ 20	M10.0	89	114	60	30	22

FA, FB Front & Rear flange mounting

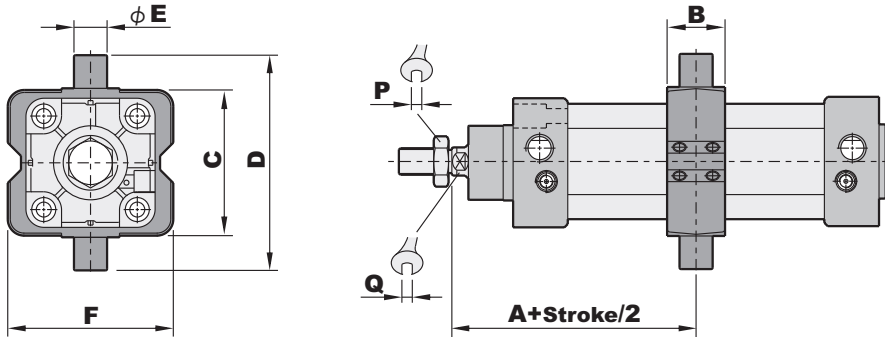


(Unit : mm)

Bore size	A	B	C	D	E	G	H	I	P	Q
φ32	16	10	130	32	50	64	79	7	17	10
φ40	20	10	145	36	55	72	90	9	19	13
φ50	25	12	155	45	65	90	110	9	24	17
φ63	25	12	170	50	75	100	120	9	24	17
φ80	30	16	190	63	95	126	153	12	30	22
φ100	35	16	205	75	115	150	178	14	30	22

Dimension of mounting parts

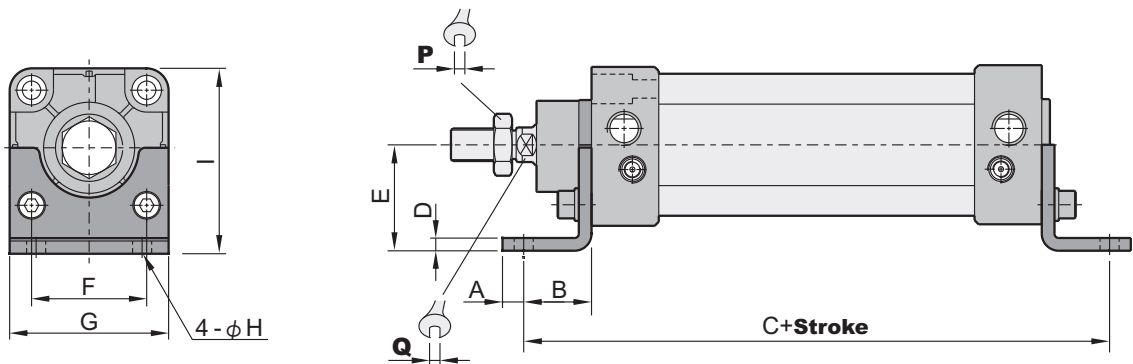
TC Central trunnion mounting



(Unit : mm)

Bore size	A	B	C	D	E	F	P	Q
φ32	73	22	50	74	φ 12 (e8)	58	17	10
φ40	82.5	28	63	95	φ 16 (e8)	70	19	13
φ50	90	32	75	107	φ 16 (e8)	85	24	17
φ63	97.5	35	90	130	φ 20 (e8)	100	24	17
φ80	110	40	110	150	φ 20 (e8)	120	30	22
φ100	120	45	132	182	φ 25 (e8)	145	30	22

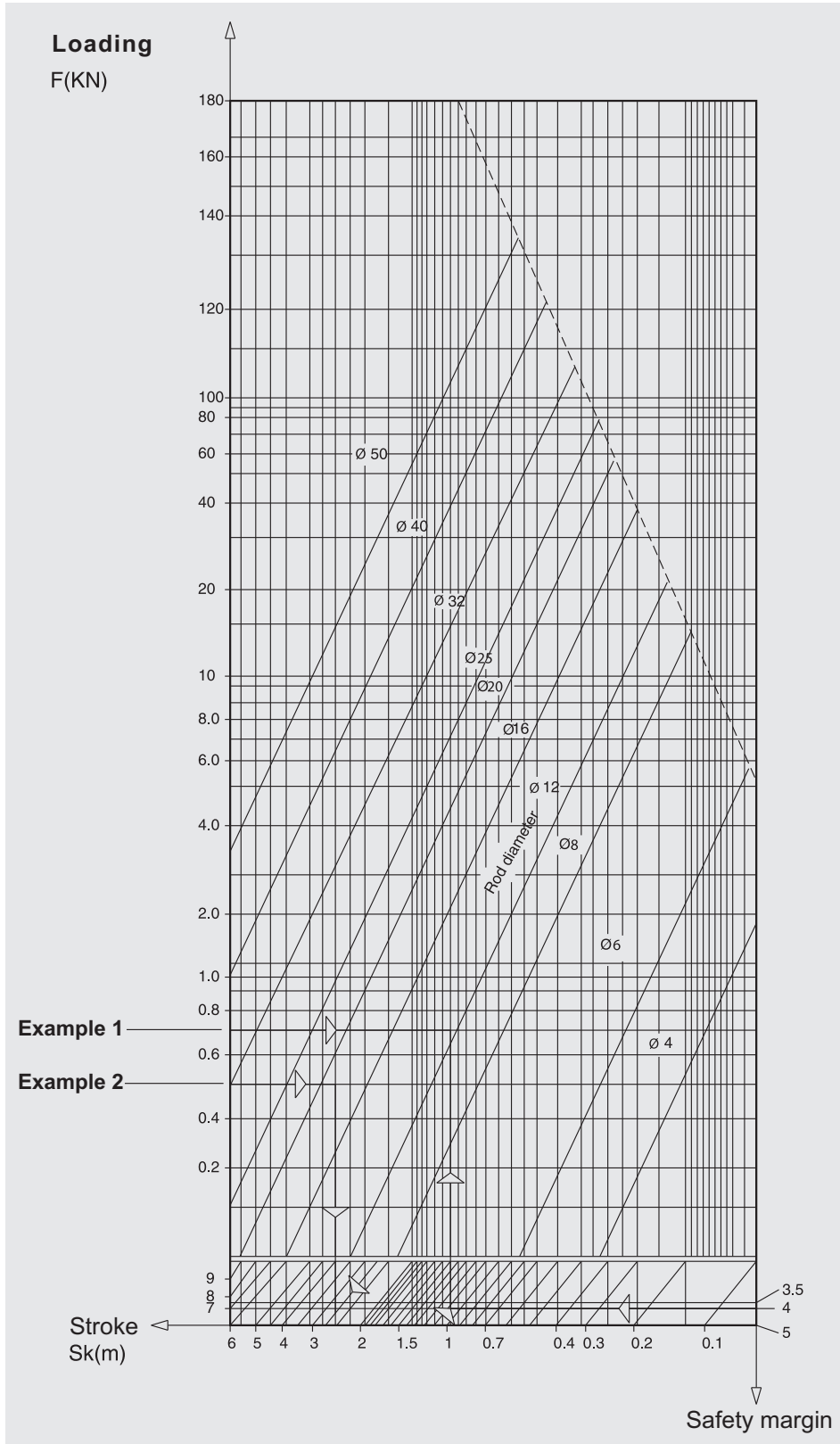
LB Foot mounting



(Unit : mm)

Bore size	A	B	C	D	E	F	G	H	I	P	Q
φ32	8	24	142	4	32	32	47	φ 7	56.5	17	10
φ40	10	28	161	4	36	36	53	φ 9	63.5	19	13
φ50	10	32	170	4	45	45	65	φ 9	77.5	24	17
φ63	10	32	185	4	50	50	75	φ 9	87.5	24	17
φ80	13	41	210	5	63	63	95	φ 12	110	30	22
φ100	13	41	220	6	71	75	115	φ 14	127.5	30	22

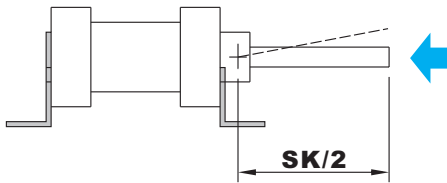
Rod loading chart



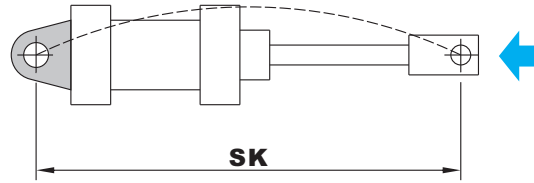
AIR CYLINDERS

Rod swing length

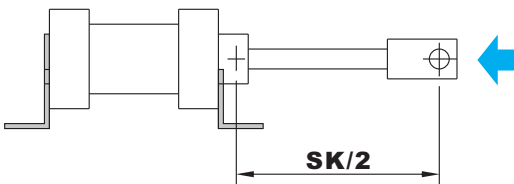
A, C, D



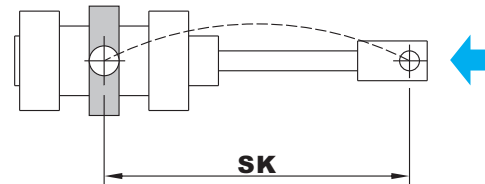
B



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.

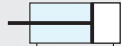
Example 2

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

TC : ISO6430 standard type



TCD : Double piston rod type

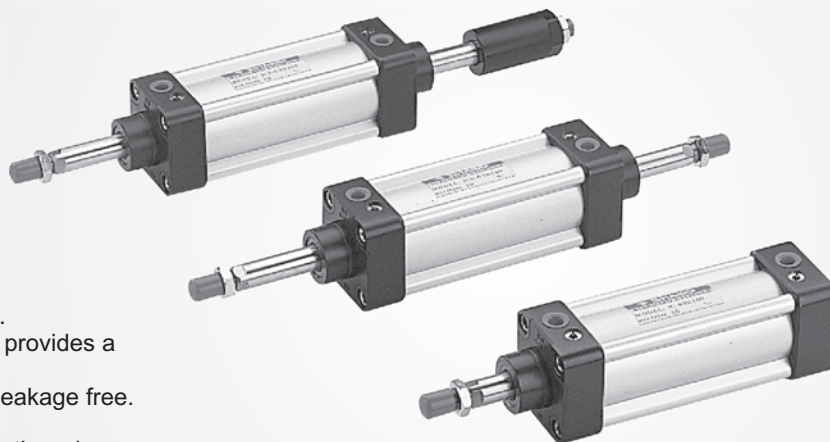


TCA, TCB : Adjustable type



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 ϕ TC32~ ϕ 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 ϕ 32	B W/I magnet	Blank W/O sensor	1 pc 2 pcs	Blank W/O mounting parts	Blank W/O rod end joint								
TCD	Double piston rod type	40 ϕ 40	C W/O magnet	SF LED in front		FA Front flange	Y Double knuckle joint								
TCA	Stroke adjustable 25mm	50 ϕ 50		ST LED on top	FB Rear flange	I Single knuckle joint									
TCB	Stroke adjustable 50mm	63 ϕ 63			TC Central trunnion	P Eyebolt floating joint									
		80 ϕ 80			CA Male clevis	T Basic floating joint									
		100 ϕ 100			CB Female clevis										
					LB Foot mounting										

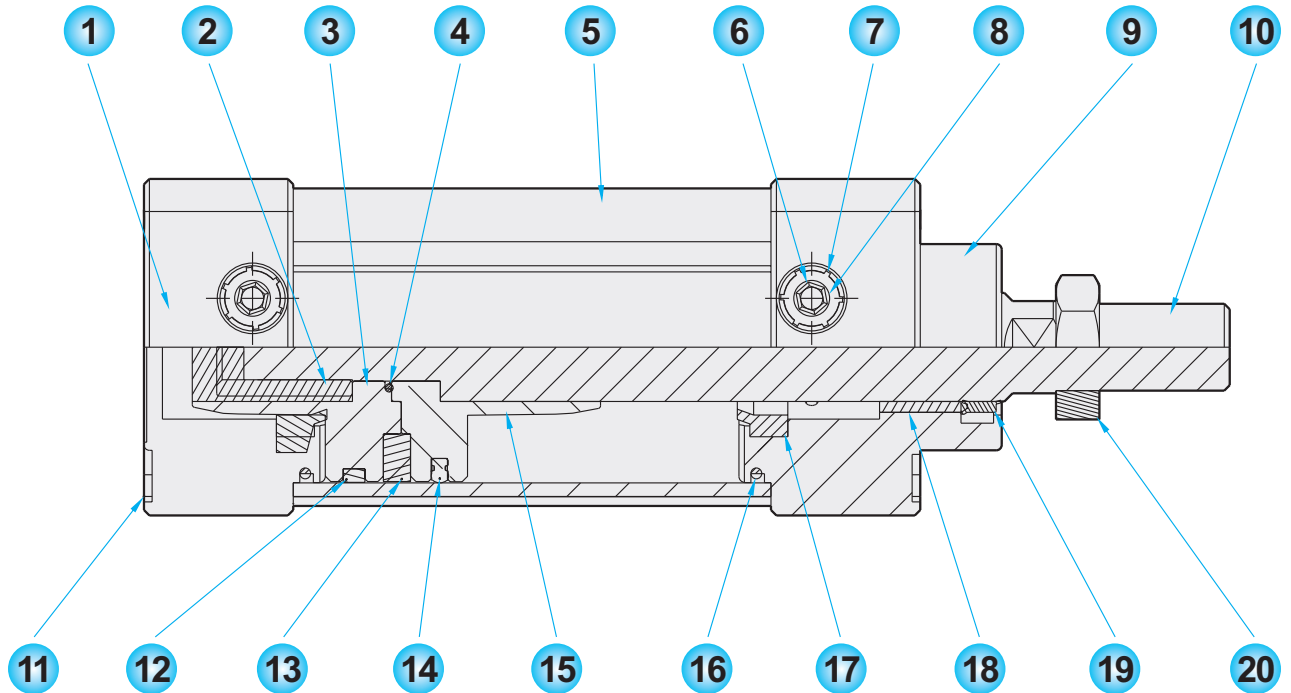
How to order Mounting parts / Rod end joints

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

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	1.5 ~ 9.5 kgf/cm ² (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



AIR CYLINDERS

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	Bush bearing	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)
φ 32	φ 63	Double acting	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000
φ 40	φ 80		
φ 50	φ 100		

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 ²)	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)

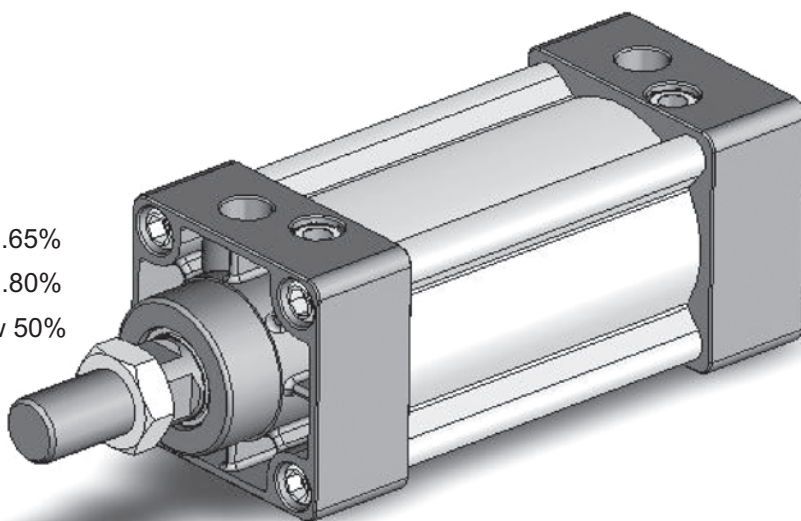
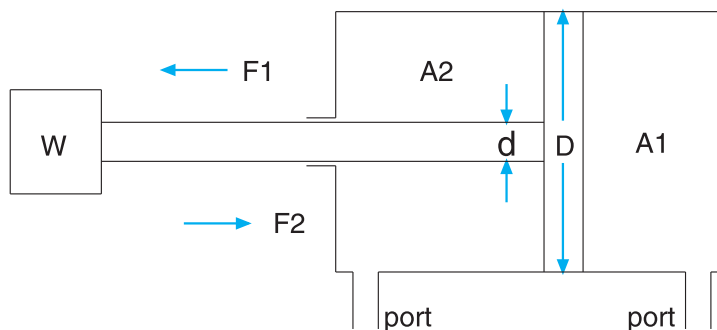
P : Operating pressure (kgf/cm²)

S : Spring force (kgf)

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

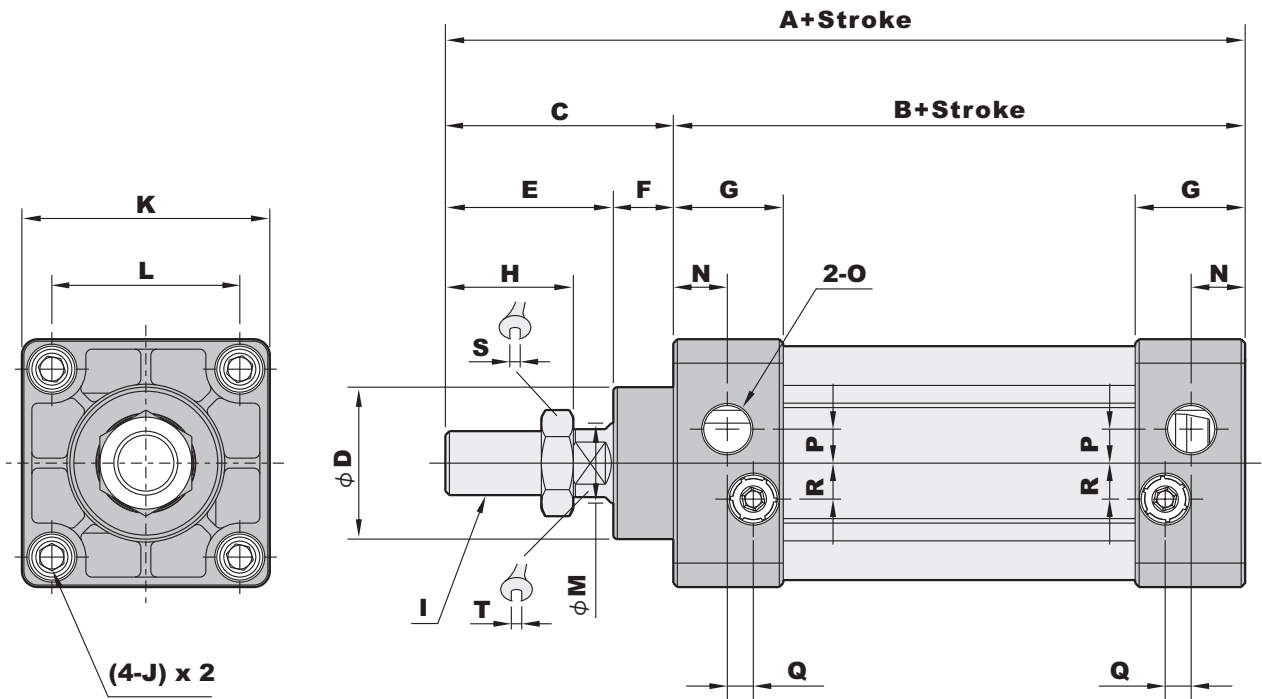
Low speed.....80%

High speed.....Below 50%



Dimensions

ISO6430 standard type



AIR CYLINDERS

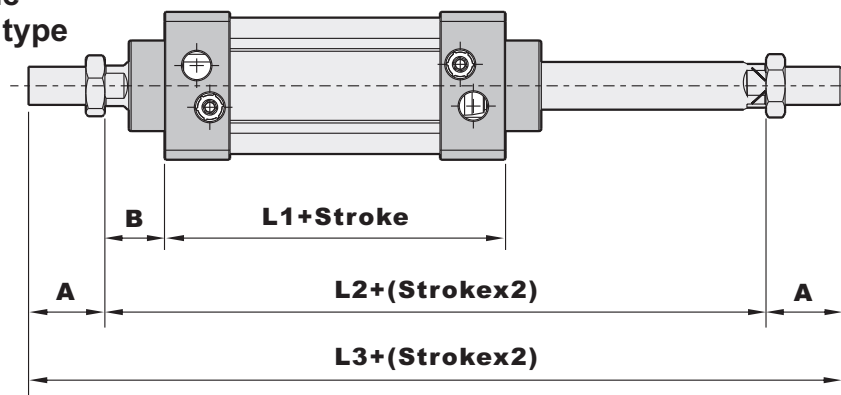
(Unit : mm)

Bore size	A	B	C	D	E	F	G	H	I	J
φ32	140	93	47	φ 28	32	15	27.5	22	M10xP1.25	M6xP1.0
φ40	142	93	49	φ 32	34	15	27.5	24	M12xP1.25	M6xP1.0
φ50	150	93	57	φ 34	42	15	27.5	32	M16xP1.5	M6xP1.0
φ63	153	96	57	φ 34	42	15	29	32	M16xP1.5	M8xP1.25
φ80	183	108	75	φ 47	54	21	33	40	M20xP1.5	M10xP1.5
φ100	189	114	75	φ 47	54	21	33	40	M20xP1.5	M10xP1.5

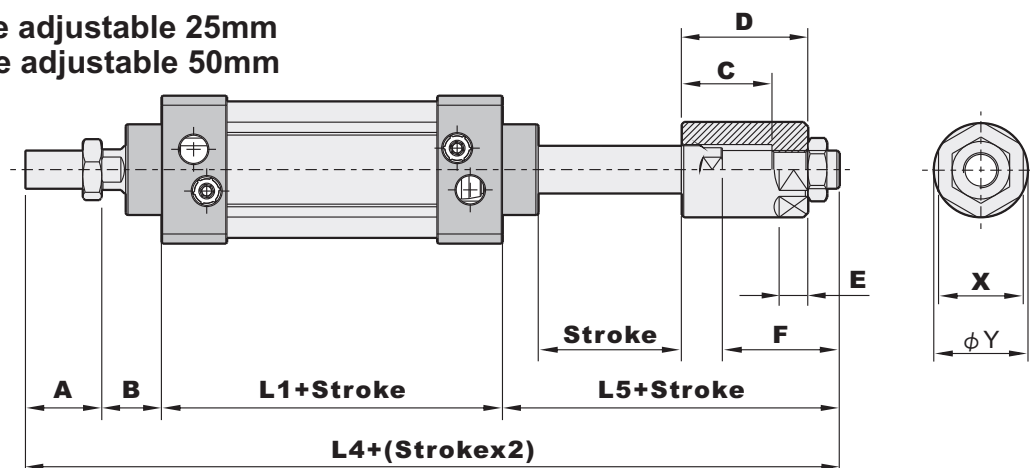
Bore size	K	L	M	N	O	P	Q	R	S	T
φ32	45	33	φ 12	13.75	PS 1/8	3.5	6.5	7	17	10
φ40	50	37	φ 16	13.5	PS 1/4	6	6	7	19	13
φ50	62	47	φ 20	13.5	PS 1/4	8.5	5.5	9	24	17
φ63	75	56	φ 20	14.5	PS 3/8	8.5	5.5	9	24	17
φ80	94	70	φ 25	16.5	PS 3/8	10	7.5	14	30	22
φ100	112	84	φ 25	16.5	PS 1/2	11	7.5	14	30	22

Dimensions

TCD Double piston rod type



TCA Stroke adjustable 25mm TCB Stroke adjustable 50mm



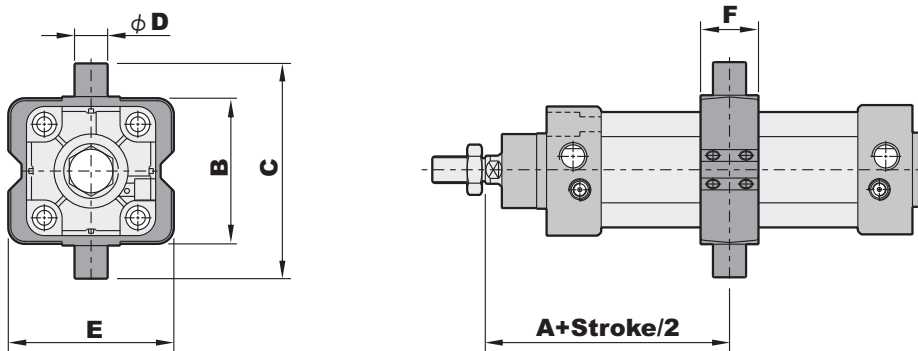
(Unit : mm)

Bore size	A	B	C		D		E	F	
			TCA	TCB	TCA	TCB		TCA	TCB
$\phi 32$	22	25	35	62	47	72	10	47	72
$\phi 40$	24	25	37	62	47	72	10	48	73
$\phi 50$	32	25	38	63	53	78	12	52	77
$\phi 63$	32	25	38	63	53	78	12	52	77
$\phi 80$	40	35	40	65	60	85	15	58	83
$\phi 100$	40	35	40	65	60	85	15	58	83

Bore size	L1	L2	L3	L4		L5		X	Y
				TCA	TCB	TCA	TCB		
$\phi 32$	93	143	187	212	237	72	97	22	$\phi 25$
$\phi 40$	93	143	191	215	240	73	98	27	$\phi 30$
$\phi 50$	93	143	207	227	252	77	102	36	$\phi 40$
$\phi 63$	96	146	210	230	255	77	102	36	$\phi 40$
$\phi 80$	108	178	258	276	301	93	118	46	$\phi 50$
$\phi 100$	114	184	264	282	307	93	118	46	$\phi 50$

Dimension of mounting parts

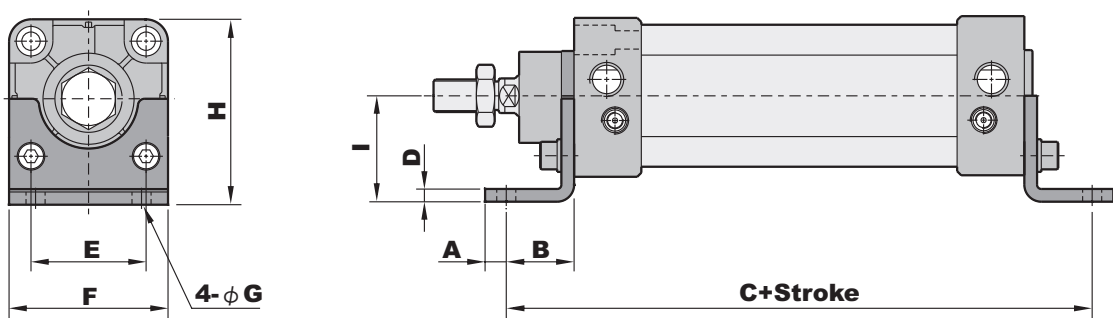
TC Central trunnion



(Unit : mm)

Bore size	A	B	C	D	E	F
φ32	73	55	87	φ 16 (e8)	55	22
φ40	82.5	63	113	φ 25 (e8)	63	28
φ50	90	76	126	φ 25 (e8)	76	32
φ63	97.5	88	138	φ 25 (e8)	88	35
φ80	110	114	164	φ 25 (e8)	114	40
φ100	120	132	182	φ 25 (e8)	132	45

LB Foot mounting

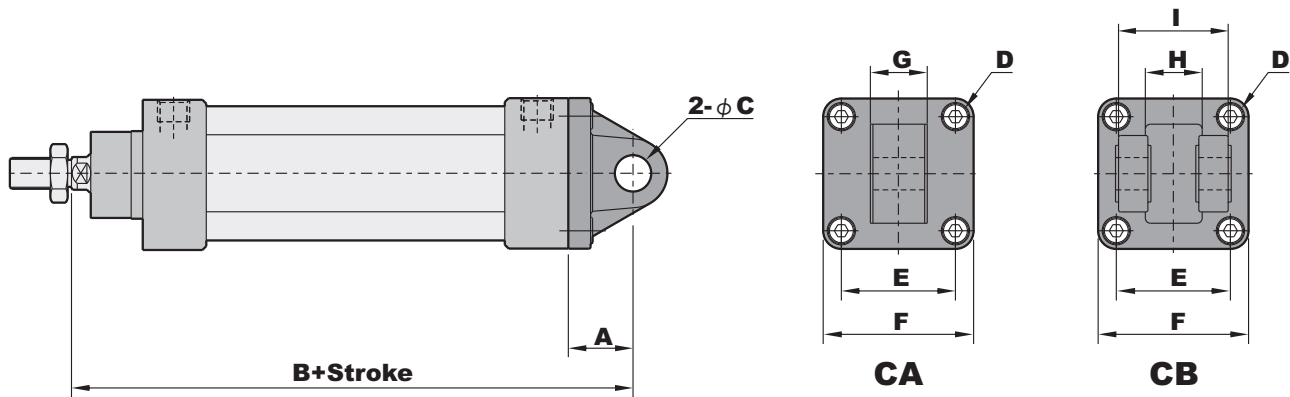


(Unit : mm)

Bore size	A	B	C	D	E	F	G	H	I
φ32	9.5	20.5	134	3	33	50	φ 9	50.5	28
φ40	14.5	23.5	140	3	36	57	φ 12	55	30
φ50	12	28	149	3	47	68	φ 12	67.5	36.5
φ63	13	31	158	3	56	80	φ 12	78.5	41
φ80	16	30	167	4	70	97	φ 14	96	49
φ100	18	30	173	4	84	112	φ 14	113	57

Dimensions

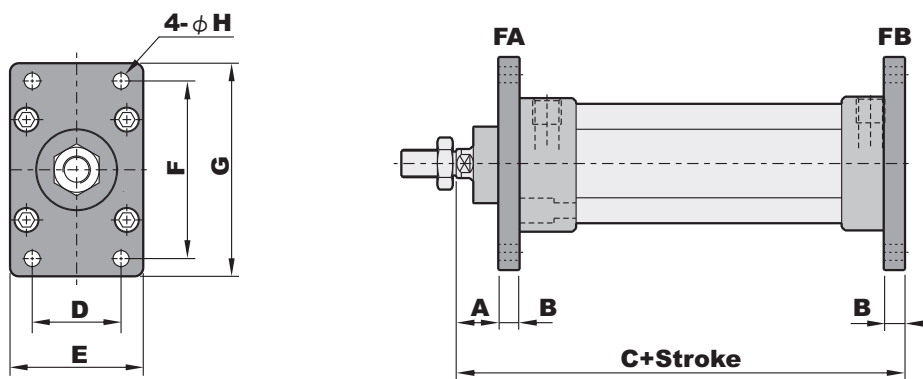
CA, CB clevis



(Unit : mm)

Bore size	A	B	C	D	E	F	G	H	I
φ32	19	137	φ 17	M6XP1.0	33	48	16	16.3	32
φ40	19	137	φ 17	M6XP1.0	37	50	20	20.3	44
φ50	19	137	φ 17	M6XP1.0	47	62	20	20.3	52
φ63	19	140	φ 17	M8XP1.25	56	75	20	20.3	52
φ80	32	175	φ 29	M10XP1.5	70	94	32	32.3	64
φ100	32	175	φ 29	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
φ32	15	10	125	33	47	58	72	φ 7
φ40	15	10	125	36	52	70	84	φ 7
φ50	15	10	125	47	65	86	104	φ 9
φ63	15	12	130	56	76	98	116	φ 9
φ80	19	16	153	70	95	119	143	φ 12
φ100	19	16	153	84	115	138	162	φ 12



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 rod end joint		
PCC	Boss-cut	10 $\phi 10$		C	W/I cushion $\phi 20 \sim \phi 40$	SF	LED in front	FA	Front flange	Y	Double knuckle joint
PCD	Double rod	12 $\phi 12$					1 pc	FB	Rear flange	I	Single knuckle joint
PCA	Stroke adjustable 25mm	16 $\phi 16$					2 pcs	CA	Male clevis	P	Eyebolt floating joint
PCB	Stroke adjustable 50mm	20 $\phi 20$						CB	Female clevis	T	Basic floating joint
PCH	Hollow double rod	25 $\phi 25$						LB	Foot mounting	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										

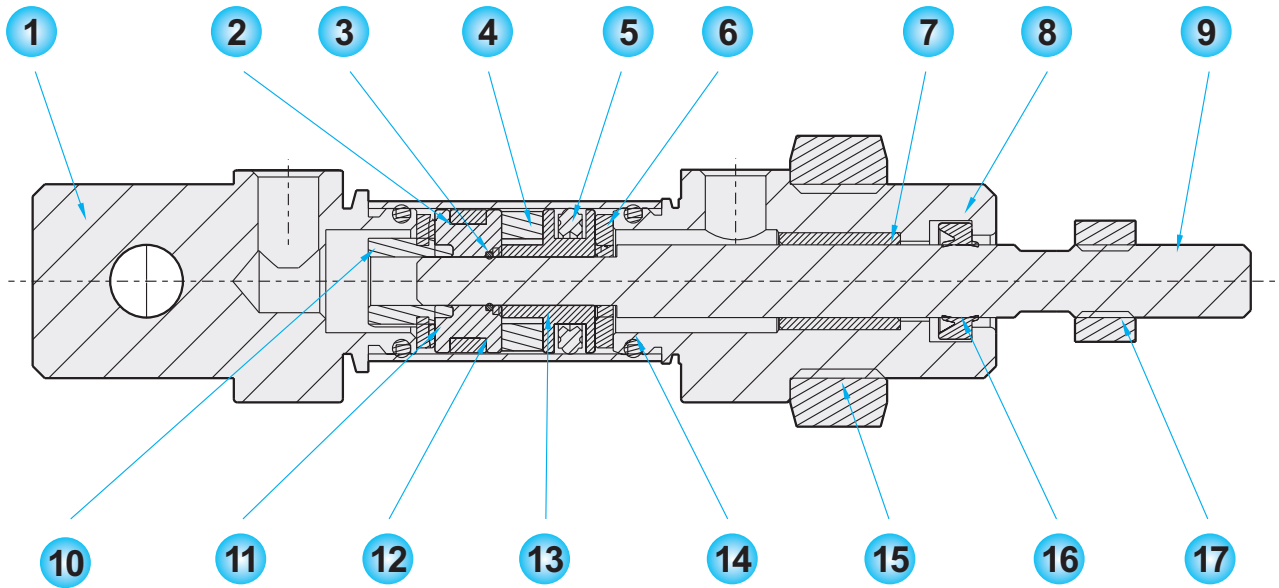
How to order Mounting parts / Rod end joints

ZIP	FA	FY	32
PC series	Mounting parts	Rod end joint	Bore size
	Blank	Blank	8 $\phi 8$
	FA	FY	10 $\phi 10$
	FB	FI	12 $\phi 12$
	CA	P	16 $\phi 16$
	CB	T	20 $\phi 20$
	LB	L	25 $\phi 25$
		F	32 $\phi 32$
			40 $\phi 40$

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 ²							
Max. operating pressure	9.5 kgf/cm ²							
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	Bush bearing	Brass	1	16	Rod seal	NBR	1
8	Front cover	Aluminum alloy	1	17	Nut	Fe+Ni	1
9	Piston rod	S45C+Cr	1				

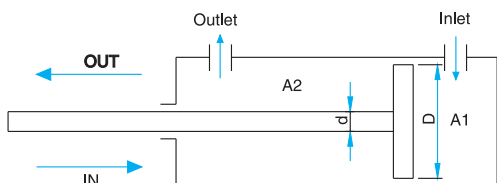
Stroke table

Bore size	Acting	Standard stroke (mm)
φ 8	Double acting	15, 25, 50, 75, 100, 125, 150
φ 10	Double acting	15, 25, 50, 75, 100, 125, 150
φ 12	Double acting	15, 25, 50, 75, 100, 125, 150
φ 16	Double acting	15, 25, 50, 75, 100, 125, 150
φ 20	Single acting	25, 50
φ 20	Double acting	25, 50, 75, 100, 125, 150, 200
φ 25	Single acting	25, 50
φ 25	Double acting	25, 50, 75, 100, 125, 150, 200, 250, 300
φ 32	Single acting	25, 50
φ 32	Double acting	25, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500
φ 40	Single acting	25, 50
φ 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 ²)	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 (cm²)
- D : Diameter of bore (cm)
- d : Diameter of piston (cm)
- F : Theoretical force (kg)
- P : Operating pressure (kgf/cm²)
- N : Newton
- Q : Air consumption l/min
- A1 : Head end effective piston area (cm²)
- A2 : Rod end effective piston area (cm²)
- L : Stroke (cm)
- P : Pressure (kgf/cm²)
- N : Number of strokes per minute
- K : Safety factor=2

AIR CYLINDERS

● 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.

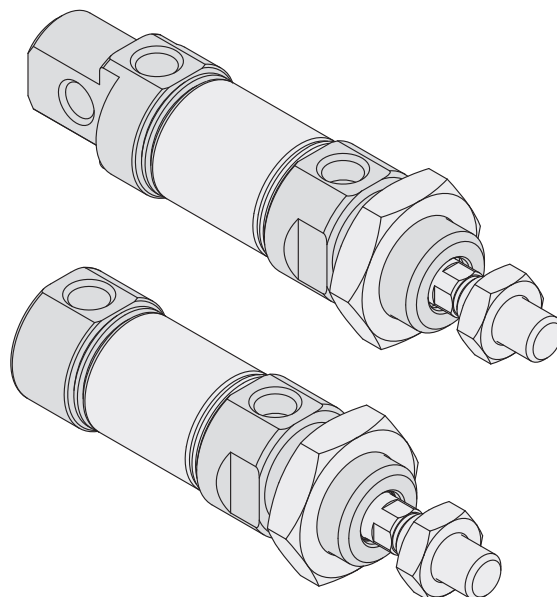
High speed takes less than 50 percent.

Normal operating speed takes 65 percent.

● Calculate of air consumption:

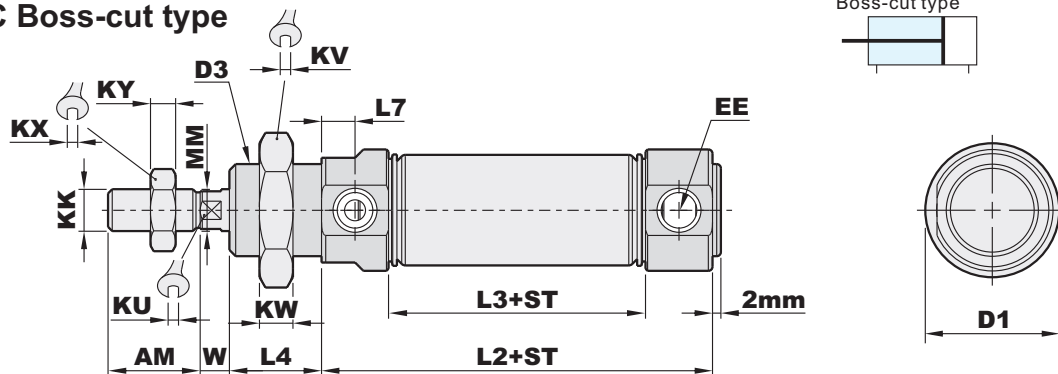
The air consumption is an amount of air to be consumed in cylinder or in the inside of tubing between the cylinder and the selector valve when the selector valve operates in an equipment used with cylinder and it is required to select a compressor.

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

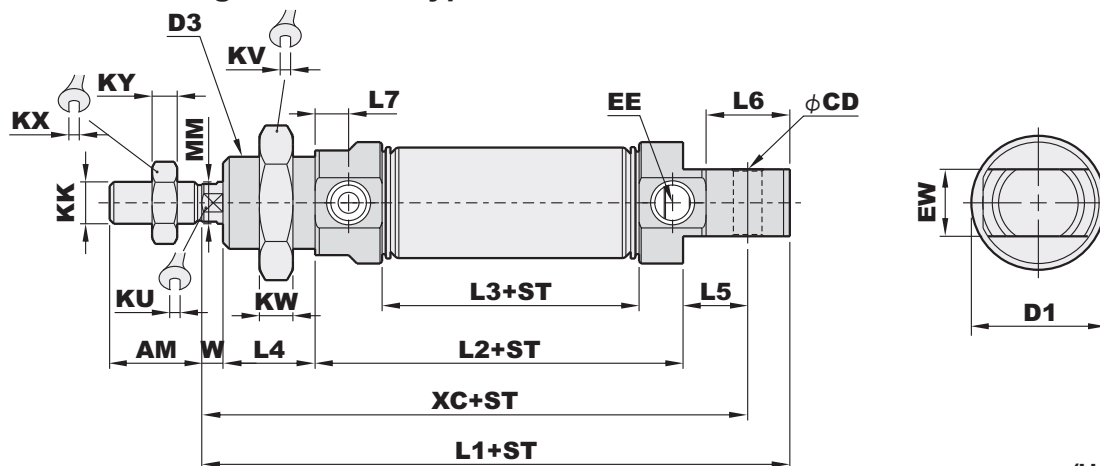


Dimensions

PCC Boss-cut type



PC Standard integrated clevis type



(Unit : mm)

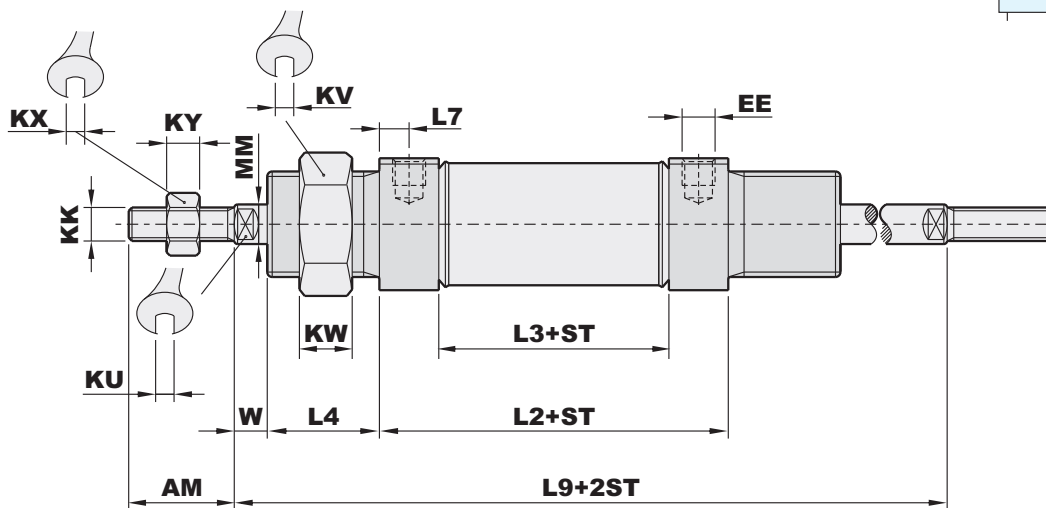
Bore size	AM	D1	φCD	D3	L1	L2	L3	L4	L5	L6	L7
φ8	12	17	φ4	M12xP1.25	71.4	43.4	25.4	12	6	13.4	4.5
φ10	12	17	φ4	M12xP1.25	71.4	43.4	25.4	12	6	13.4	4.5
φ12	16	20	φ6	M16xP1.5	84.4	45	27.4	17	9	18.4	4.5
φ16	16	20	φ6	M16xP1.5	90	50.5	31	17	9	17	5
φ20	20	29	φ8	M22xP1.5	109	67.5	37.5	18	12	18	7.75
φ25	22	29	φ8	M22xP1.5	117.5	69.5	37.5	20	12	20	8
φ32	22	37	φ10	M27xP2.0	133	83.5	47	20	13.5	22	9
φ40	24	45	φ10	M33xP2.0	138	85	49	20	13.5	22	9

Bore size	KK	KU	KV	KW	KX	KY	MM	W	EW	XC	EE
φ8	M4xP0.7	3.4	19	6	7	3.2	φ4	4	8	64	M5xP0.8
φ10	M4xP0.7	3.4	19	6	7	3.2	φ4	4	8	64	M5xP0.8
φ12	M6xP1.0	5	24	8	10	5	φ6	5	12	75	M5xP0.8
φ16	M6xP1.0	5	24	8	10	5	φ8	5	12	82	M5xP0.8
φ20	M8xP1.25	7	32	8	13	6	φ8	6	16	95	PS 1/8
φ25	M10xP1.25	9	32	8	17	6	φ10	8	16	104	PS 1/8
φ32	M10xP1.25	10	35	9.5	17	6	φ12	8	22	120	PS 1/8
φ40	M12xP1.25	14	41	9.5	22	8	φ16	11	26	125	PS 1/8

Dimensions

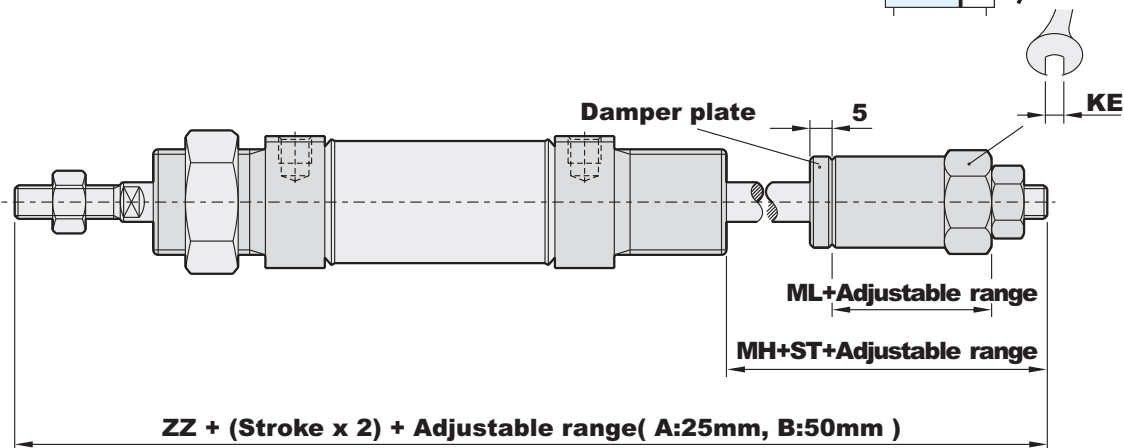
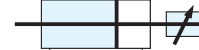
PCD Double rod type

PCD, PCH
Double rod,
Hollow double rod type



PCA Stroke adjustable 25mm PCB Stroke adjustable 50mm

PCA, PCB
Stroke adjustable
25mm, 50mm



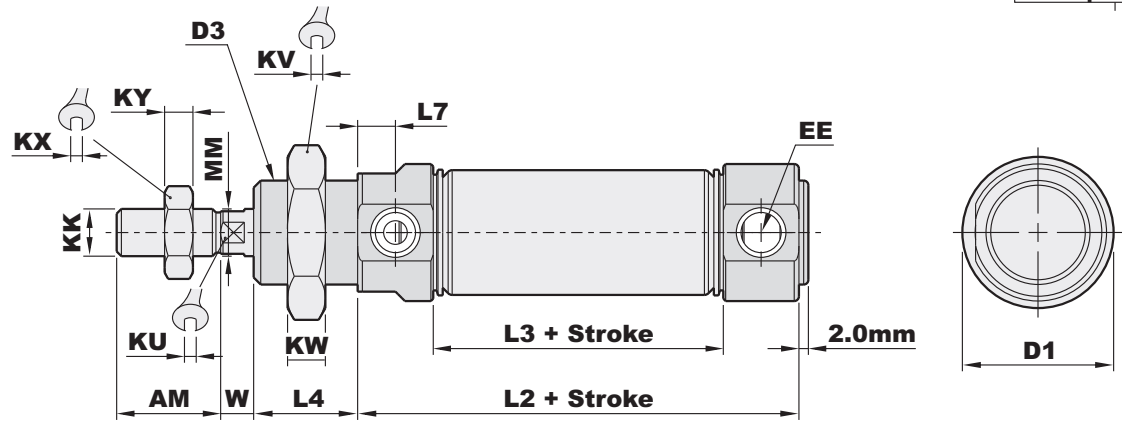
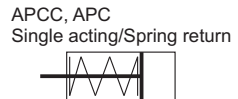
(Unit : mm)

Bore size	AM	L2	L3	L4	L7	L9	EE	KU	KV	KW	KX
φ20	20	67.5	37	18	7.6	116	PS 1/8	7	32	8	13
φ25	22	69.5	37.5	20	8	126	PS 1/8	9	32	8	17
φ32	22	83	47	20	9	139	PS 1/8	10	35	9.5	17
φ40	24	85	49	20	9	147	PS 1/8	14	41	9.5	22

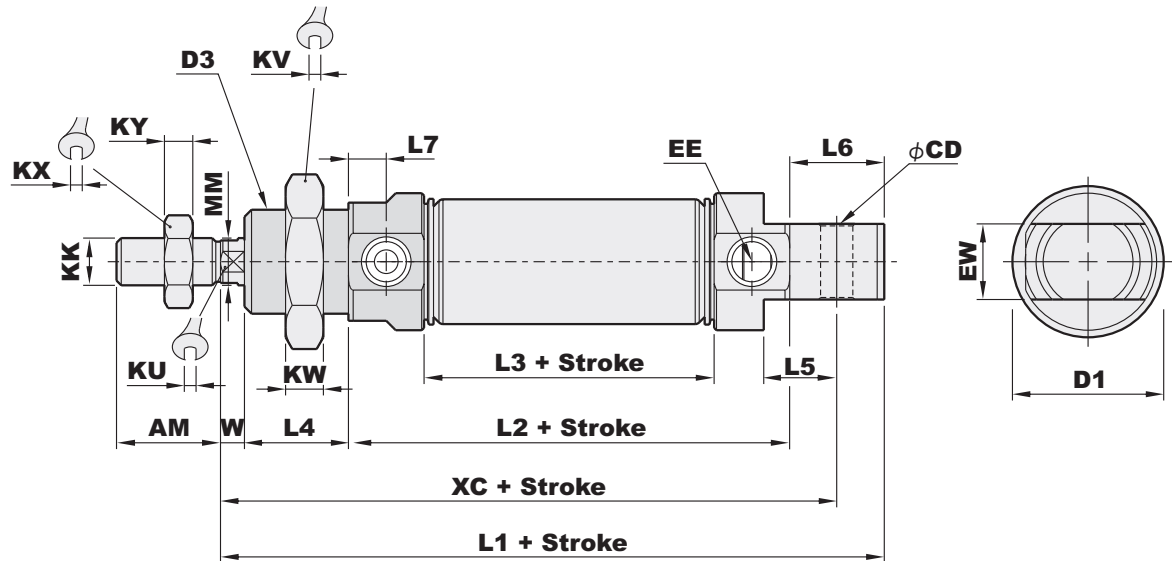
Bore size	KY	MM	W	KK	ZZ	MH	ML	KE
φ20	4	φ 8	4	M8xP1.25	165	33	9	19
φ25	6	φ 10	6	M10xP1.25	175	33	13	19
φ32	6	φ 12	8	M10xP1.25	188	35	15	21
φ40	8	φ 16	11	M12xP1.25	196	36	18	26

Dimensions

APCC Single acting/Spring return/Boss-cut



APC Single acting/Spring return/Standard integrated clevis



(Unit : mm)

Bore size	AM	D1	φCD	D3	L1		L2		L3		L4	L5	L6
					25	50	25	50	25	50			
φ20	20	29	φ 8	M22xP1.5	137	92.5	61	18	12	18			
φ25	22	29	φ 8	M22xP1.5	142.5	94.5	62.5	20	12	20			
φ32	22	37	φ 10	M27xP2.0	158	108.5	72	20	13.5	22			
φ40	24	45	φ 10	M33xP2.0	163	110	74	20	13.5	22			

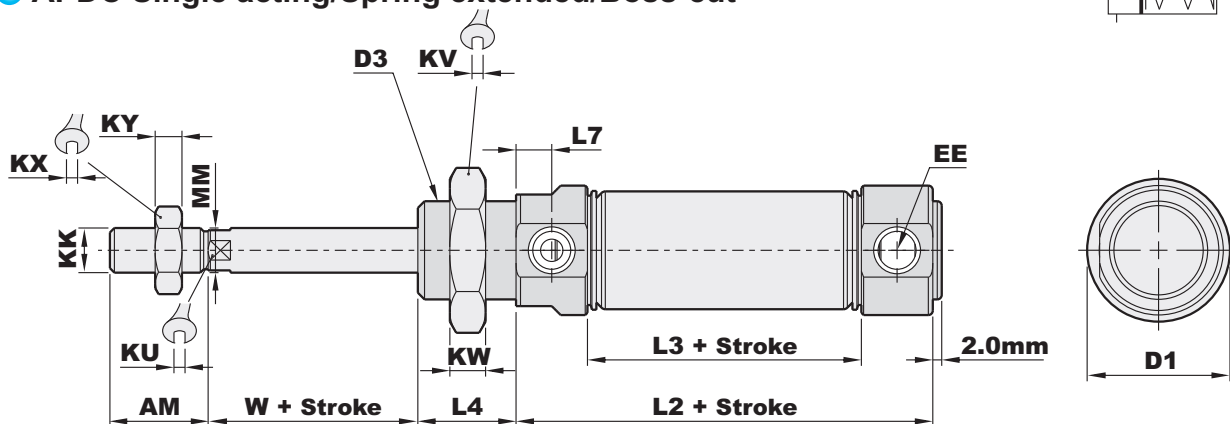
Bore size	L7	KK	KU	KV	KW	KX	KY	MM	W	EW	XC		EE
											25	50	
φ20	7.75	M8xP1.25	7	32	8	13	6	φ 8	6	16	120	PS 1/8	
φ25	8	M10xP1.25	9	32	8	17	6	φ 10	8	16	129	PS 1/8	
φ32	9	M10xP1.25	10	35	9.5	17	6	φ 12	8	22	145	PS 1/8	
φ40	9	M12xP1.25	14	41	9.5	22	8	φ 16	11	26	150	PS 1/8	

AIR CYLINDERS

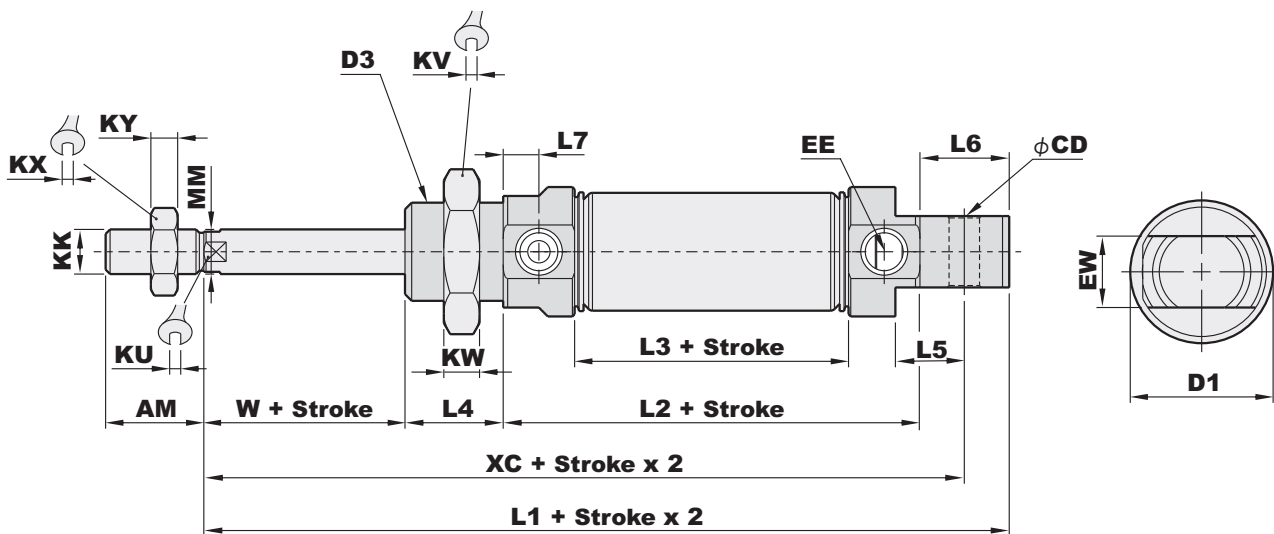
Dimensions

APDC Single acting/Spring extended/Boss-cut

APDC, APD
Single acting/Spring extended



APD Single acting/Spring extended/Standard integrated clevis



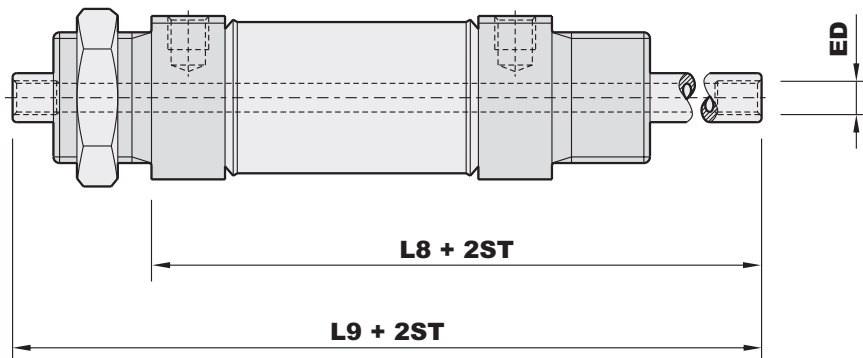
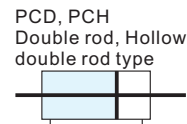
(Unit : mm)

Bore size	AM	D1	φCD	D3	L1		L2		L3		L4	L5	L6
					25	50	25	50	25	50			
φ20	20	29	φ 8	M22xP1.5	137		92.5		61		18	12	18
φ25	22	29	φ 8	M22xP1.5	142.5		94.5		62.5		20	12	20
φ32	22	37	φ 10	M27xP2.0	158		108.5		72		20	13.5	22
φ40	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
											25	50	
φ20	7.75	M8xP1.25	7	32	8	13	6	φ 8	6	16	120		PS 1/8
φ25	8	M10xP1.25	9	32	8	17	6	φ 10	8	16	129		PS 1/8
φ32	9	M10xP1.25	10	35	9.5	17	6	φ 12	8	22	145		PS 1/8
φ40	9	M12xP1.25	14	41	9.5	22	8	φ 16	11	26	150		PS 1/8

Dimensions

PCH Hollow double rod type



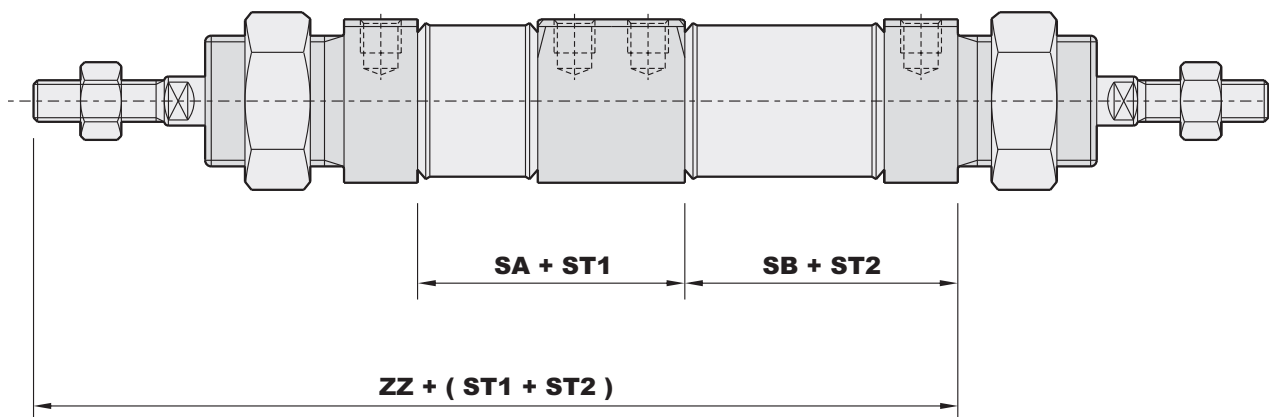
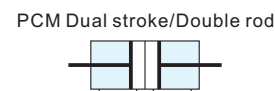
(Unit : mm)

Bore size	L8	L9	ED
φ25	98	126	M5xP0.8x20
φ32	112	140	PT1/8
φ40	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
φ25	85.5	53.5	239
φ32	101.5	65.5	267
φ40	103	67	280

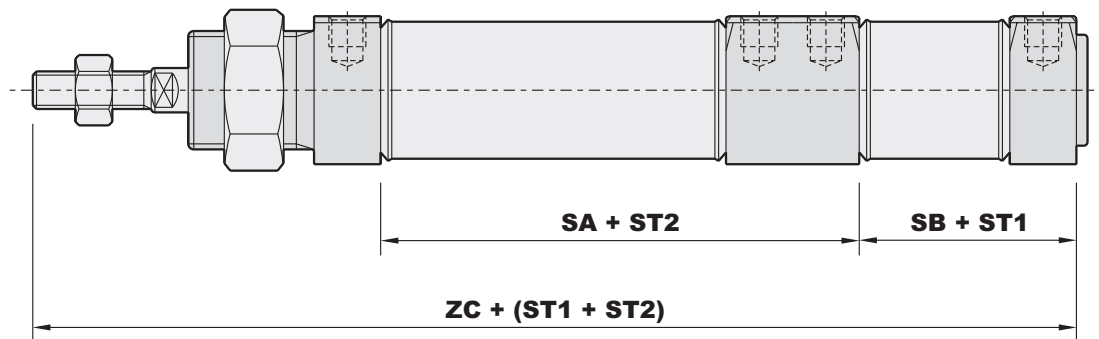
- Two cylinders are constructed as one cylinder in a shrinking back configuration.
- Cylinder stroke could be controlled in three or four steps.
- One end of piston rod is fixed, the cylinder barrel executes the movement, the cylinder must connected with flexible line connections.
- Applicable to positioning 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.

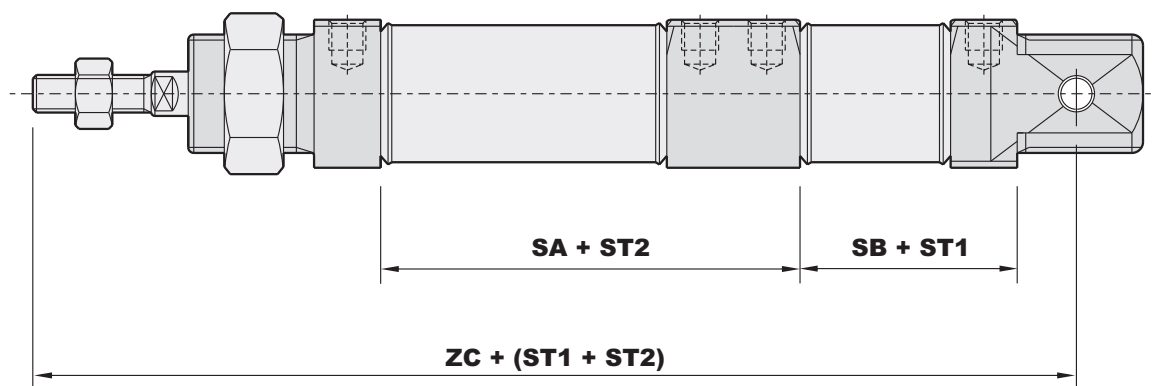
Dimensions

● 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)

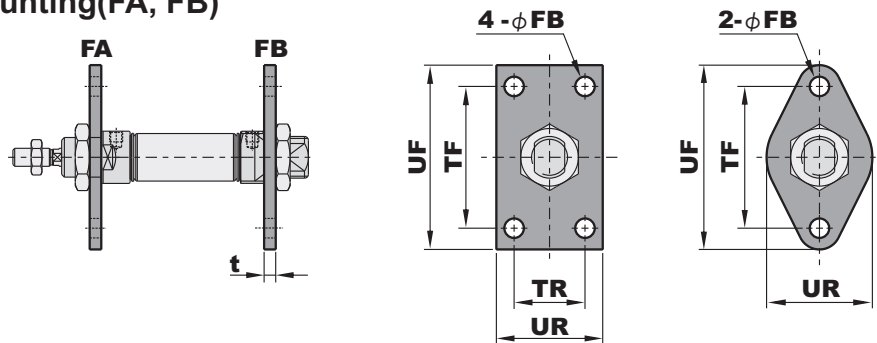
Bore size	SA	SB	ZC	ZT
φ32	101.5	65.5	225.5	217
φ40	103	67	234	225

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.

Dimension of mounting parts

Flange mounting(FA, FB)



(φ32, φ40)

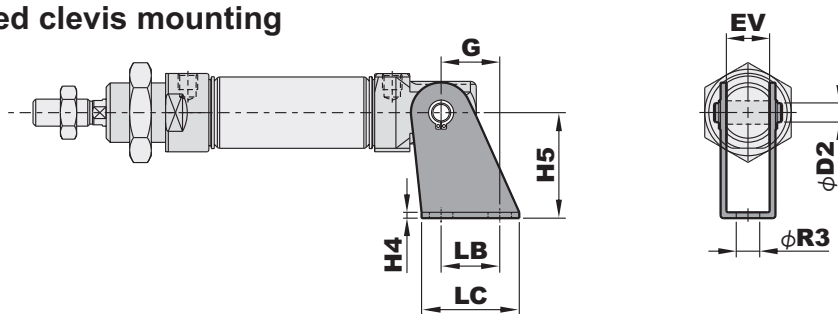
(φ12 ~ φ25)

(Unit : mm)

Bore size	TF	TR	UF	UR	I	φFB
φ12	40	--	52	30	3	φ5.5
φ16	40	--	52	30	3	φ5.5
φ20	50	--	66	40	3	φ6.5

Bore size	TF	TR	UF	UR	I	φFB
φ25	50	--	66	40	3	φ6.5
φ32	50	26	64	40	3	φ7
φ40	54	30	74	50	4	φ7

CB Integrated clevis mounting

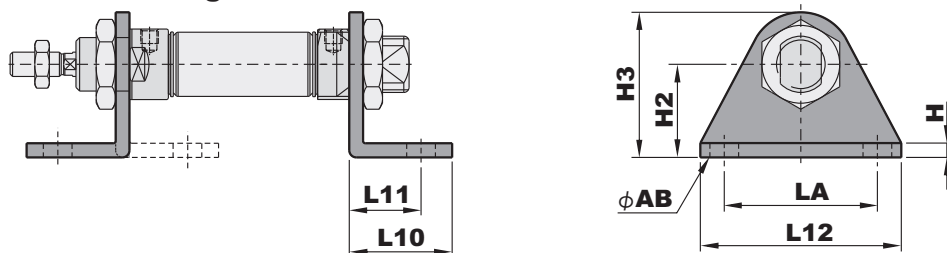


(Unit : mm)

Bore size	LB	LC	EV	H4	H5	G	φD2	φR3
φ12	15	25	12	3	27	15	φ6	φ6
φ16	15	25	12	3	27	15	φ6	φ6
φ20	20	32	16	3	30	18.5	φ8	φ7

Bore size	LB	LC	EV	H4	H5	G	φD2	φR3
φ25	20	32	16	3	30	18.5	φ8	φ7
φ32	25	40	22	3	40	22.5	φ10	φ9
φ40	25	40	26	3	40	22.5	φ10	φ9

LB Axial foot mounting



(Unit : mm)

Bore size	L10	L11	L12	LA	H	H2	H3	φAB
φ12	20.5	14	42	32	3	20	33	φ6
φ16	20.5	14	42	32	3	20	33	φ6
φ20	26	17	54	40	3	25	45	φ7

Bore size	L10	L11	L12	LA	H	H2	H3	φAB
φ25	26	17	54	40	3	25	45	φ7
φ32	25	18	64	50	3.5	28	48	φ7
φ40	30	20	74	54	4	31.5	60	φ7

Features

- * Identical to ISO6432 $\phi 20 \sim \phi 25$.
- * Built in magnet for sensor use.
- * Miniature size and space saving.



How to order

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

AIR CYLINDERS

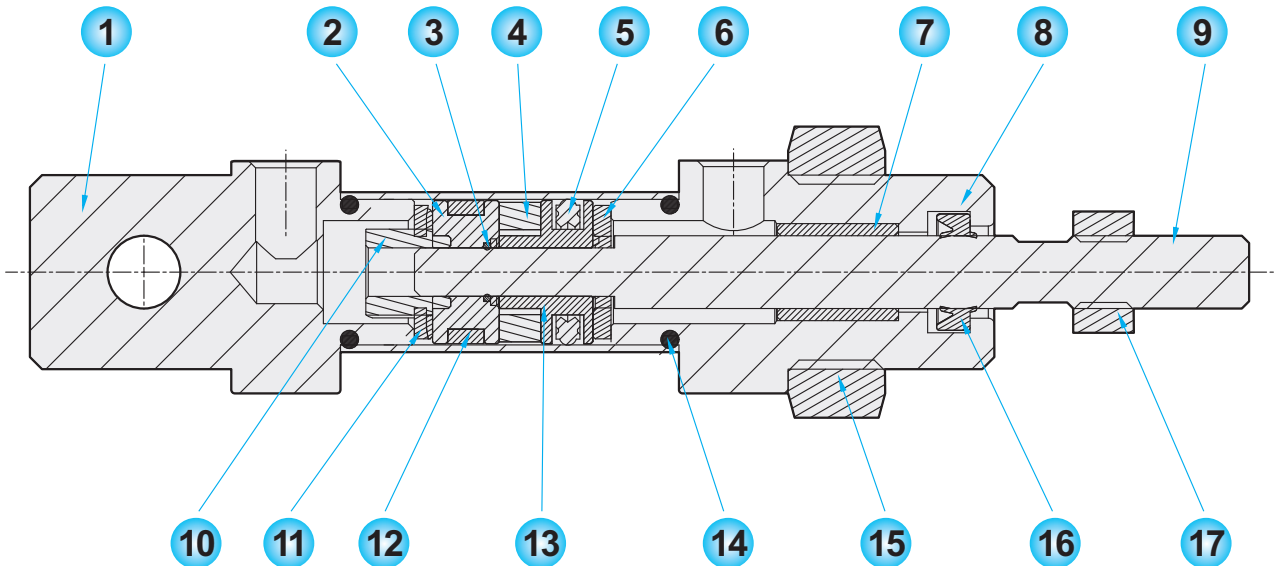
How to order Mounting parts / Rod end joints

ZIP	FA	Y	32
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 $\phi 32$
	TC Central trunnion	P Eyebolt floating joint	40 $\phi 40$
	CB Female clevis	T Basic floating joint	
	LB Foot mounting	L Axial foot type floating joint	
		F Flange type floating joint.	

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 ²			
Max operating pressure	9.5 kgf/cm ²			
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	Bush bearing	Brass	1	16	Rod seal	NBR	1
8	Front cover	Aluminum alloy	1	17	Nut	Fe+Ni	1
9	Piston rod	S45C+Cr	1				

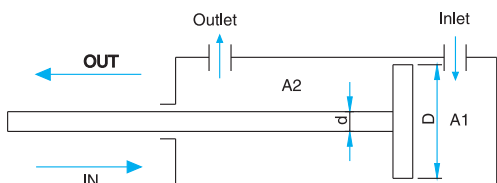
Stroke table

Bore size	Acting	Standard stroke (mm)
φ 20	Single acting	25, 50
φ 20	Double acting	25, 50, 75, 100, 125, 150, 200
φ 25	Single acting	25, 50
φ 25	Double acting	25, 50, 75, 100, 125, 150, 200, 250, 300
φ 32	Single acting	25, 50
φ 32	Double acting	25, 50, 75, 100, 125, 150, 200, 250, 300, 400, 500
φ 40	Single acting	25, 50
φ 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 ²)	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



- A** : Cylinder sectional area (cm²)
- D** : Diameter of bore (cm)
- d** : Diameter of piston (cm)
- F** : Theoretical force (kg)
- P** : Operating pressure (kgf/cm²)
- N** : Newton
- Q** : Air consumption l/min
- A1** : Head end effective piston area (cm²)
- A2** : Rod end effective piston area (cm²)
- L** : Stroke (cm)
- P** : Pressure (kgf/cm²)
- N** : Number of strokes per minute
- K** : Safety factor=2

AIR CYLINDERS

● 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

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

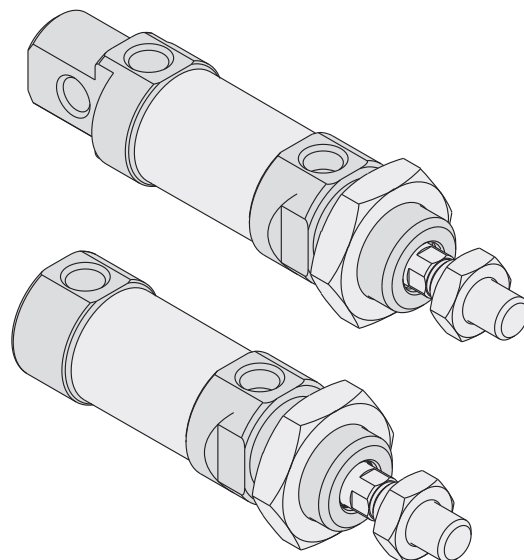
$$F = A \times P$$

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

● 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.

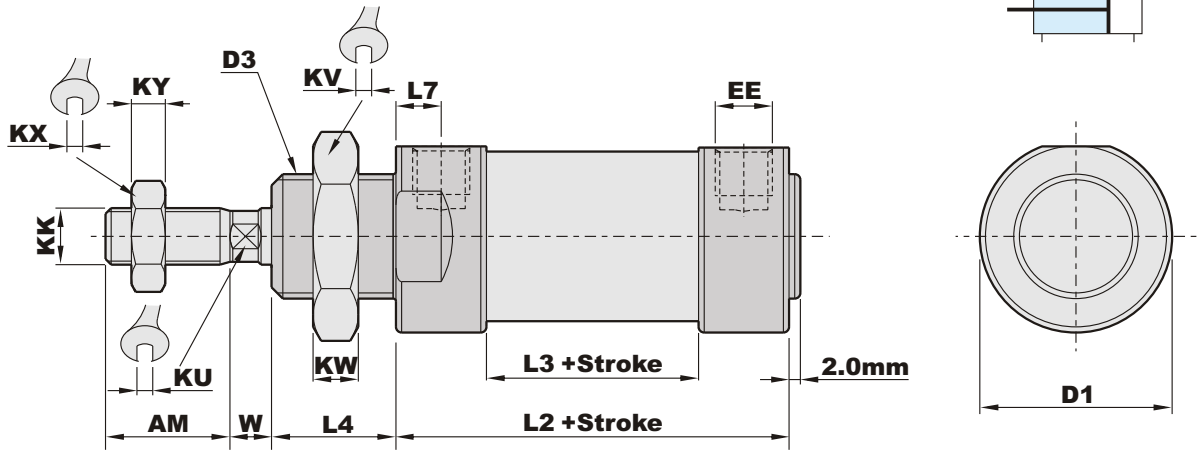
$$Q = \frac{(A1+A2)L(P+1)N}{1000} \text{ (l/min)} \times K$$



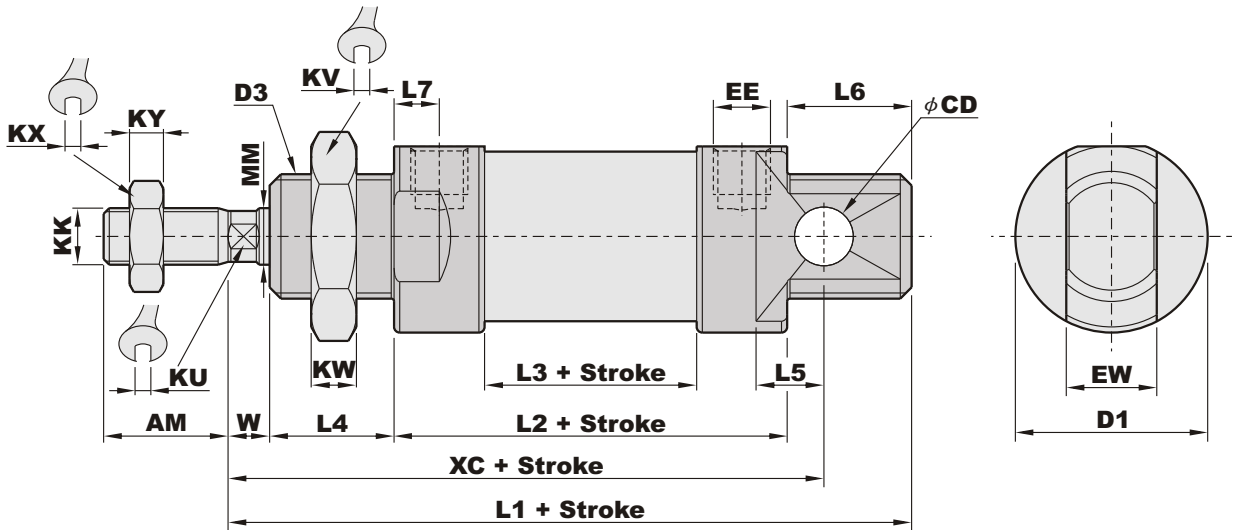
Dimensions

PCCL Boss-cut type

PCL, PCCL
ISO6432 Standard,
Boss-cut type



PCL Standard integrated clevis type



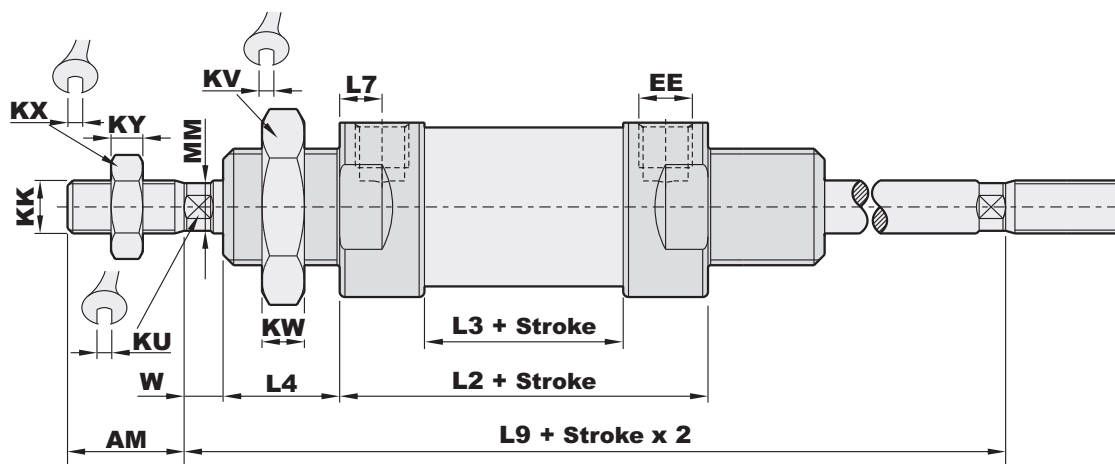
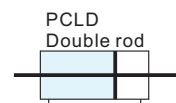
(Unit : mm)

Bore size	AM	D1	φ CD	D3	L1	L2	L3	L4	L5	L6	L7
φ 20	20	29	φ 8	M22xP1.5	109	68	36	18	12	20	7.75
φ 25	22	34	φ 8	M22xP1.5	117.5	69	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	4	32	8	14	4	8	6	16	95	PS 1/8
φ 25	M10xP1.25	6	32	8	17	6	10	6	16	104	PS 1/8
φ 32	M10xP1.25	6	36	9.5	17	6	12	8	22	120	PS 1/8
φ 40	M12xP1.25	8	40.5	9.5	19	8	16	8	26	125	PS 1/8

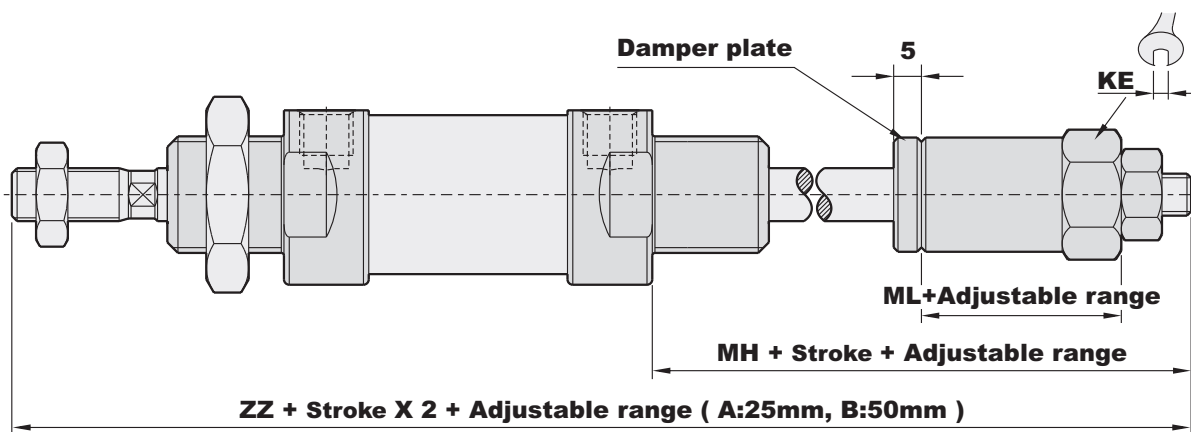
Dimensions

PCLD Double rod type



PCLA Stroke adjustable 25mm PCLB Stroke adjustable 50mm

PCLA, PCLB
Stroke adjustable 25mm, 50mm



(Unit : mm)

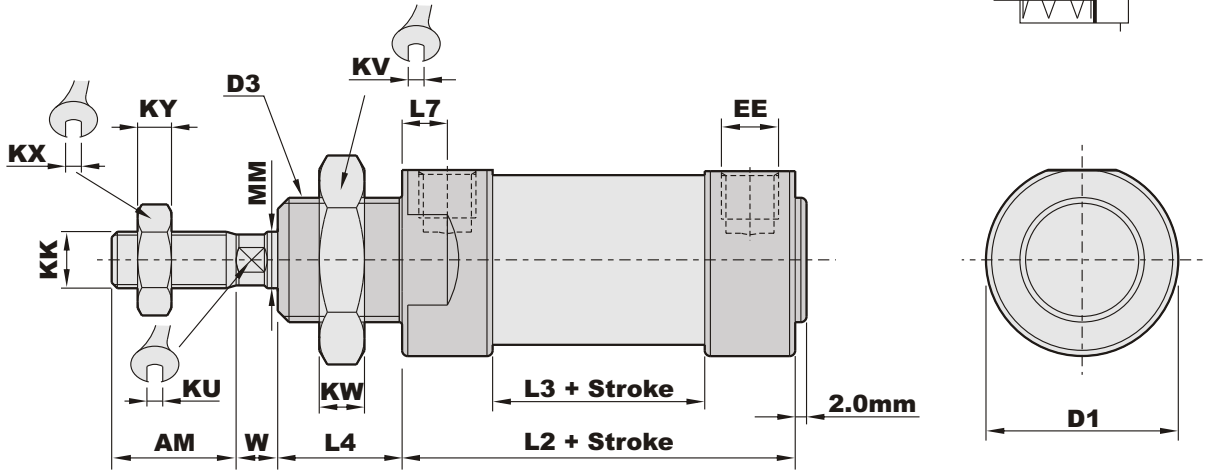
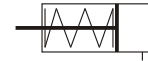
Bore size	AM	L2	L3	L4	L7	EE	KU	KV	KW	KX	KY
φ20	10	68	36	18	7.75	PS 1/8	4	32	8	14	4
φ25	22	69	37.5	20	8	PS 1/8	6	32	8	17	6
φ32	22	83	47	20	9	PS 1/8	6	36	9.5	17	6
φ40	24	85	49	20	9	PS 1/8	8	40.5	9.5	19	8

Bore size	MM	W	KK	L9	ZZ	MH	ML	KE
φ20	φ 8	6	M8xP1.25	112	153	23	9	19
φ25	φ 10	6	M10xP1.25	122	166	26	13	19
φ32	φ 12	8	M10xP1.25	140	184	30	15	21
φ40	φ 16	8	M12xP1.25	147	196	36	18	26

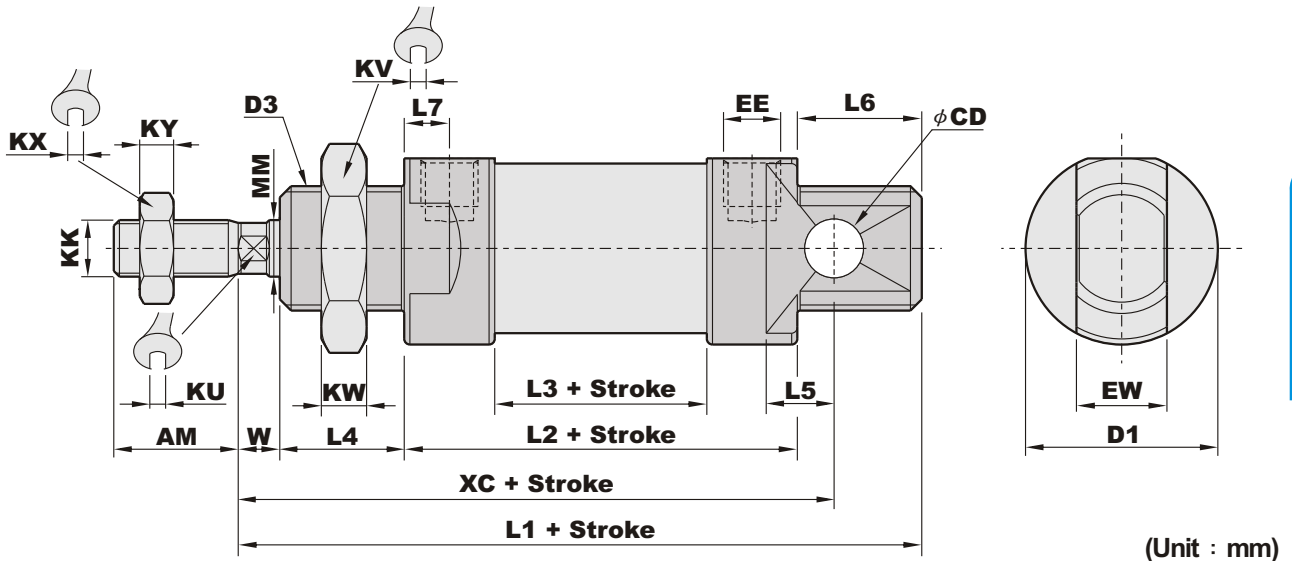
Dimensions

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
					25	50	25	50	25	50			
φ 20	20	29	φ 8	M22xP1.5	134	50	93	25	61	50	18	12	20
φ 25	22	34	φ 8	M22xP1.5	140.5	50	94	25	62.5	50	20	12	20
φ 32	22	39.5	φ 10	M27xP2.0	158	50	108	25	72	50	20	13.5	22
φ 40	24	49	φ 10	M33xP2.0	163	50	110	25	74	50	20	13.5	22

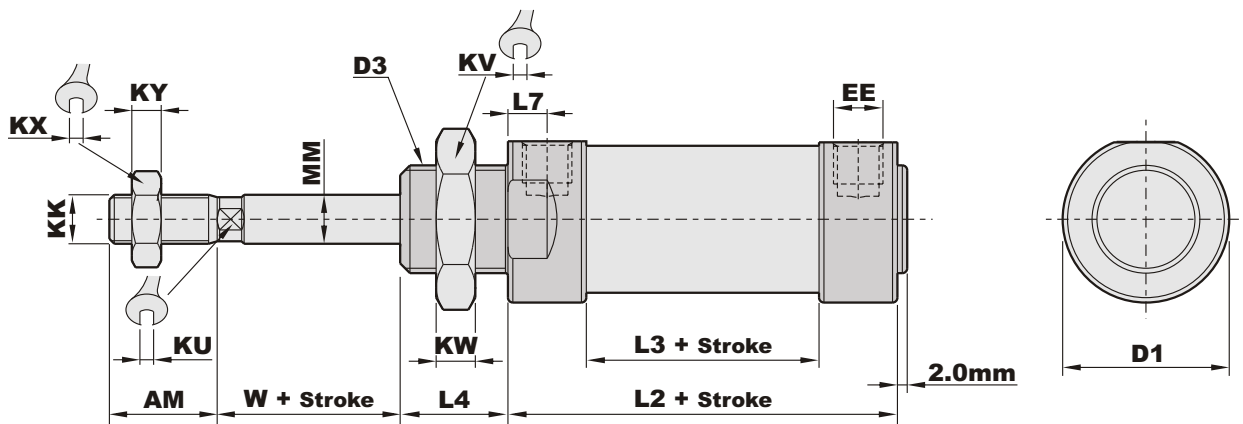
Bore size	L7	KK	KU	KV	KW	KX	KY	MM	W	EW	XC		EE
											25	50	
φ 20	7.75	M8xP1.25	4	32	8	14	4	φ 8	6	16	120	50	PS 1/8
φ 25	8	M10xP1.25	6	32	8	17	6	φ 10	6	16	129	50	PS 1/8
φ 32	9	M10xP1.25	6	36	9.5	17	6	φ 12	8	22	145	50	PS 1/8
φ 40	9	M12xP1.25	8	40.5	9.5	19	8	φ 16	8	26	150	50	PS 1/8

AIR CYLINDERS

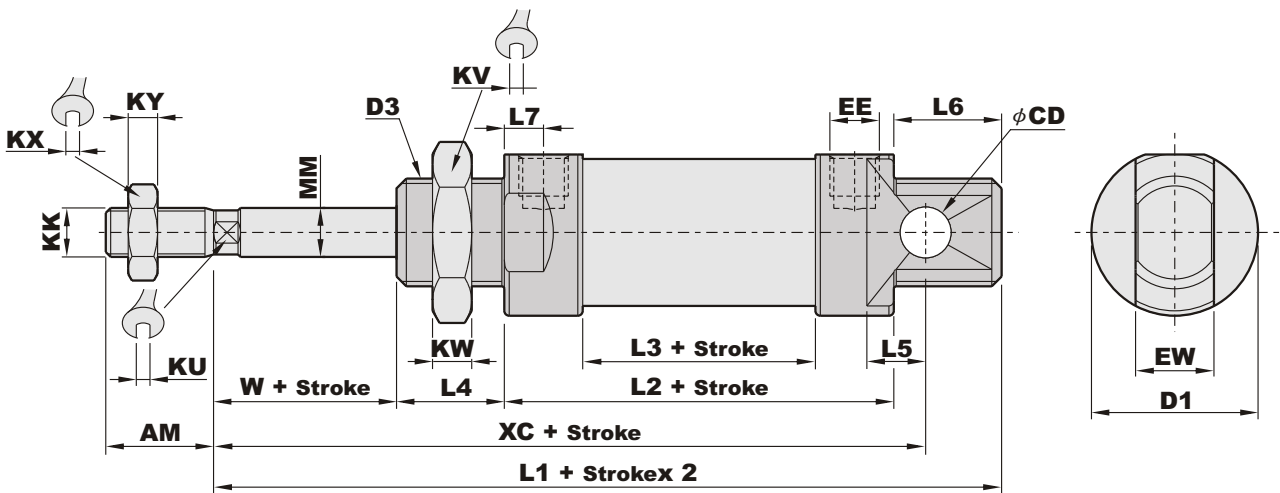
Dimensions

APDCL Single acting/Spring extended/Boss-cut

APDL, APDCL
Single acting/Spring
extended



APDL Single acting/Spring extended/Standard integrated clevis



(Unit : mm)

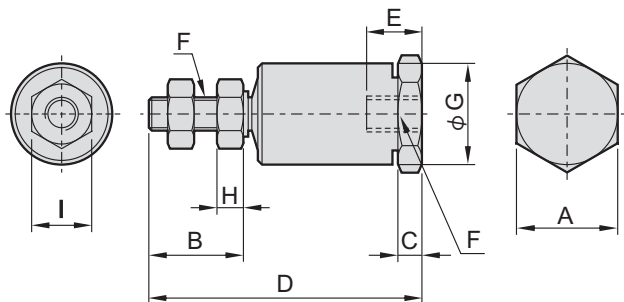
Bore size	AM	D1	φ CD	D3	L1		L2		L3		L4	L5	L6
					25	50	25	50	25	50			
φ 20	20	29	φ 8	M22xP1.5	134	93	61	18	12	20			
φ 25	22	34	φ 8	M22xP1.5	140.5	94	62.5	20	12	20			
φ 32	22	39.5	φ 10	M27xP2.0	158	108	72	20	13.5	22			
φ 40	24	49	φ 10	M32xP2.0	163	110	74	20	13.5	22			

Bore size	L7	KK	KU	KV	KW	KX	KY	MM	W	EW	XC		EE
											25	50	
φ 20	7.75	M8xP1.25	4	32	8	14	4	φ 8	6	16	120	PS 1/8	
φ 25	8	M10xP1.25	6	32	8	17	6	φ 12	6	16	129	PS 1/8	
φ 32	9	M10xP1.25	6	36	9.5	17	6	φ 12	8	22	145	PS 1/8	
φ 40	9	M12xP1.25	8	40.5	9.5	19	8	φ 16	8	26	150	PS 1/8	

Dimensions

Basic type floating joint (T)

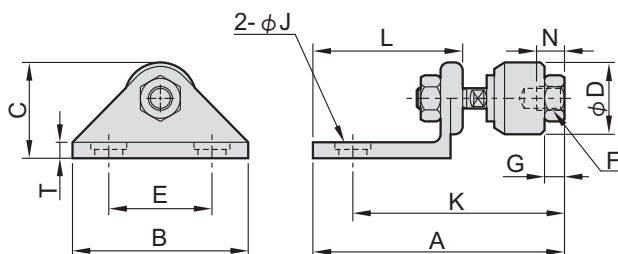
(Unit : mm)



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	33	29	14	102	18	M20xP1.5	53	8	27
φ 100	33	29	14	102	18	M20xP1.5	53	8	27

Axial foot type floating joint (L)

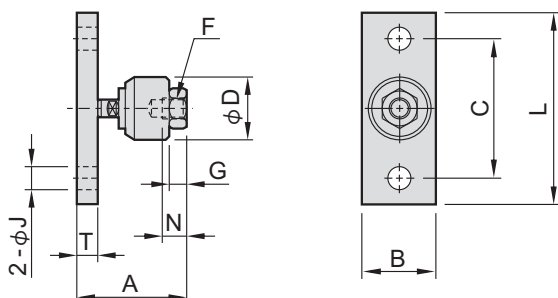
(Unit : mm)



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)

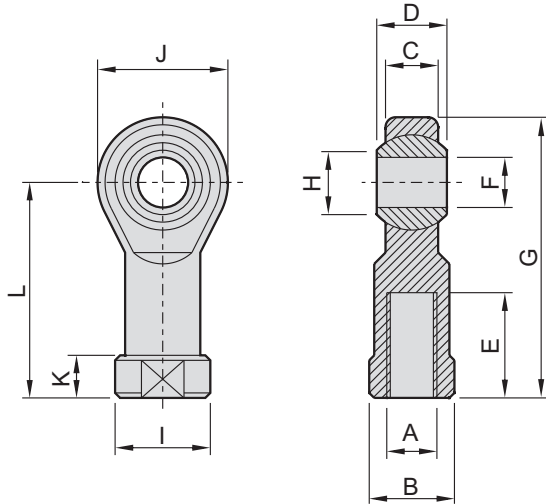
(Unit : mm)



Bore size	A	B	C	D	F	G	J	L	N	T
φ 20	39	25	40	24	M8xP1.25	7	φ 6.6	52	8	6
φ 25	48	32	44	26	M10xP1.25	8	φ 6.6	56	9	9
φ 32	45	32	44	28	M12xP1.25	8	φ 6.6	80	9	9
φ 40	45	32	44	28	M12xP1.25	8	φ 6.6	80	9	9
φ 50	76	74	45	45	M18xP1.5	13	φ 11	-	15	15
φ 63	76	74	45	45	M18xP1.5	13	φ 11	-	15	15
φ 80	87	87	100	62	M20xP1.5	15	φ 14	-	18	18
φ 100	87	87	100	62	M20xP1.5	15	φ 14	-	18	18

Dimensions

Eyebolt floating joint (P)

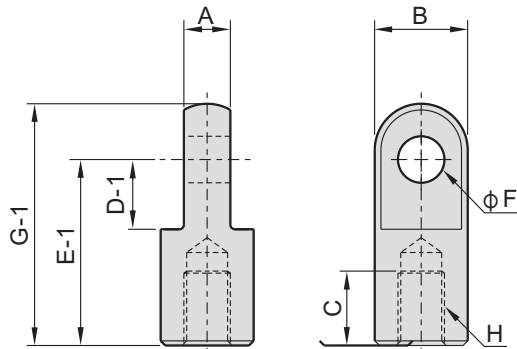
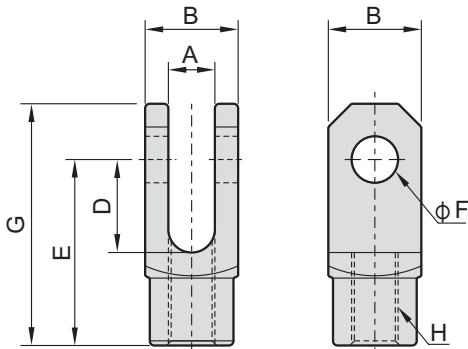


(Unit : mm)

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	M16xP1.5	22	15	21	33	φ16	83	38	64
φ 63	M16xP1.5	22	15	21	33	φ16	83	38	64
φ 80	M20xP1.5	30	18	25	40	φ20	100	46	77
φ 100	M30xP1.5	40	26	37	56	φ30	143.5	67	110

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	8	45	45	M8XP1.25
φ 25	8	19	---	10	10	35	35	8	45	45	M10XP1.25
φ 32	10	20	16	20	14	40	40	10	52	52	M10XP1.25
φ 40	12	25	18	24	16	48	48	12	62	62	M12XP1.25
φ 50	16	32	26	32	20	65	56	16	83	70	M16XP1.5
φ 63	16	32	26	32	20	65	56	16	83	70	M16XP1.5
φ 80	20	40	30	40	30	80	68	20	105	88	M20XP1.5
φ 100	20	40	30	40	30	80	68	20	105	88	M20XP1.5



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 ϕ JC32~ ϕ 100 non-rotated type, please contact our sales for request.

JC

32

B

50

H

M

SS

1

Type		Bore size	
JC	Standard double acting	12	ϕ 12
JCO	Single acting/Spring extended (ϕ 12~ ϕ 50)	16	ϕ 16
		20	ϕ 20
JCI	Single acting/Spring return (ϕ 12~ ϕ 50)	25	ϕ 25
		32	ϕ 32
JCA	Stroke adjustable 25mm (ϕ 20~ ϕ 100)	40	ϕ 40
		50	ϕ 50
JCB	Stroke adjustable 50mm (ϕ 20~ ϕ 100)	63	ϕ 63
		80	ϕ 80
JCDD	Double rod/Double acting (ϕ 20~ ϕ 100)	100	ϕ 100

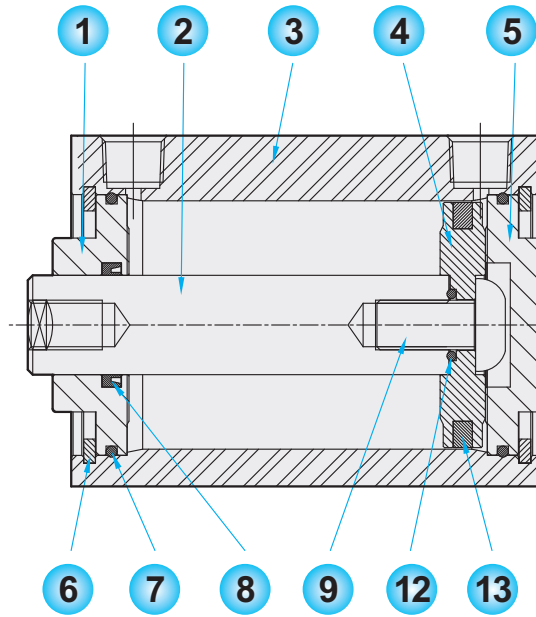
Stroke	Rod thread		Magnet		Sensor type		Number of sensor
	Blank	Female thread	Blank	W/O magnet	Blank	W/O sensor	
H		Male thread	M	W/I magnet	SS	Square type	1 pc
						AL-11R	2 pcs
						SR Round type	
						AL-07R	

Specifications

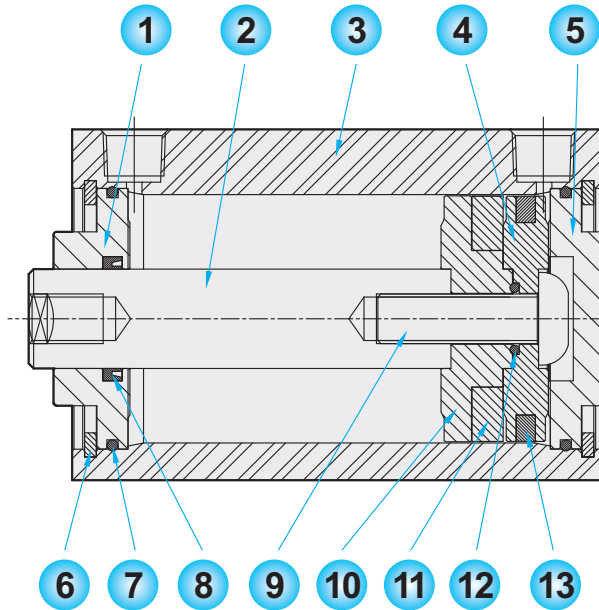
Bore size	ϕ 12	ϕ 16	ϕ 20	ϕ 25	ϕ 32	ϕ 40	ϕ 50	ϕ 63	ϕ 80	ϕ 100
Port size	M5x0.8				1/8"		1/4"		3/8"	
Fluid	Compressed air									
Acting	Double acting or single acting									
Operating pressure range	1.0 ~ 9 kgf/cm ²									
Max operating pressure	9.5 kgf/cm ²									
Barrel material	Aluminum alloy									
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.
1	Front cover	Aluminum alloy	1
2	Piston rod	S45C+Cr	1
3	Barrel	Aluminum alloy	1
4	Piston	Aluminum alloy	1
5	Rear cover	Aluminum alloy	1
6	Snap ring	Spring steel	2
7	O-ring	NBR	2

No.	Description	Material	Qty.
8	Rod packing	NBR	1
9	Hex socket head cap screw	Fe	1
10	Magnet holder	Aluminum	1
11	Magnet	Ferrite magnet	1
12	O-ring	NBR	1
13	U-Piston seal	NBR	1

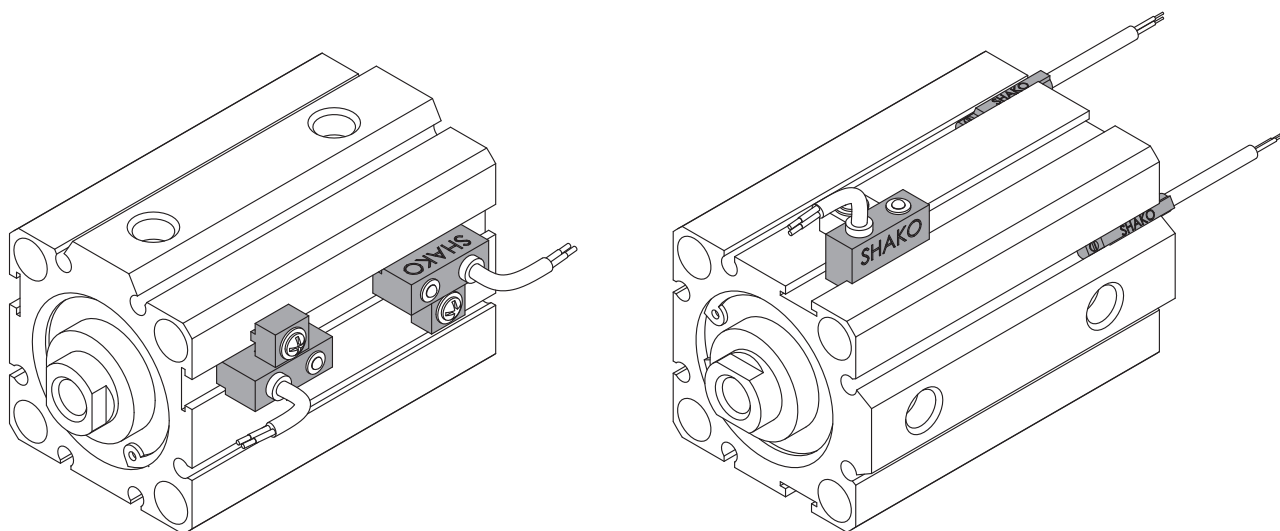
Stroke table

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

Sensor mounting example



Theoretical force

Bore size	Rod diameter	Acting	Piston area mm ²	Operating pressure kgf/cm ²							
				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 acting	Push	85	-	2.26	3.39	4.52	5.65	6.78	7.91
			Pull	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 acting	Push	201	-	4.02	6.03	8.04	10.05	12.06	14.07
			Pull	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 acting	Push	264	-	6.28	9.42	12.56	15.7	18.84	21.98
			Pull	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 acting	Push	490	-	9.8	14.7	19.6	24.5	29.4	34.3
			Pull	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 acting	Push	804	-	16.08	24.12	32.16	40.2	48.24	56.28
			Pull	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 acting	Push	1256	12.56	25.12	37.68	50.24	62.8	75.36	87.92
			Pull	1055	10.55	21.1	31.65	42.2	52.75	63.3	73.85
φ 50	φ 20	Double acting	Push	1963	19.63	39.26	58.89	78.52	98.15	117.78	137.41
			Pull	1649	16.49	32.98	49.47	65.96	82.45	98.94	115.43
φ 63	φ 20	Double acting	Push	3117	31.17	62.34	93.51	124.68	155.85	187.02	218.19
			Pull	2803	28.03	56.06	84.09	112.12	140.15	168.18	196.21
φ 80	φ 25	Double acting	Push	5026	50.26	100.52	150.78	201.04	251.3	301.56	351.82
			Pull	4536	45.36	90.72	136.08	181.44	226.8	272.16	317.52
φ 100	φ 32	Double acting	Push	7853	78.53	157.06	235.59	314.12	392.65	471.18	549.71
			Pull	7049	70.49	140.98	211.47	281.96	352.45	422.94	493.43

AIR CYLINDERS

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)

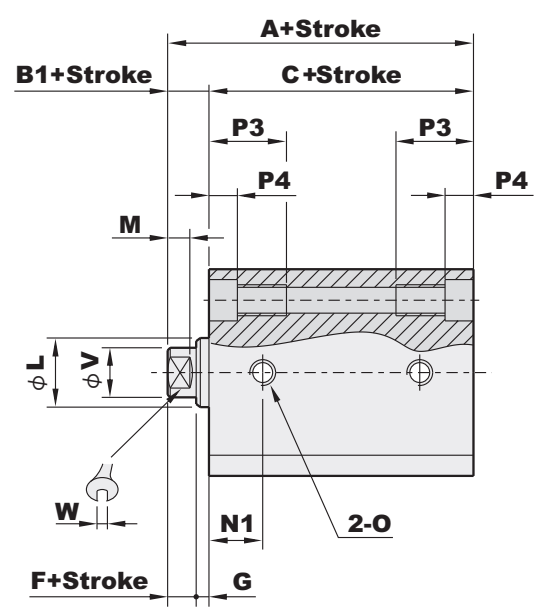
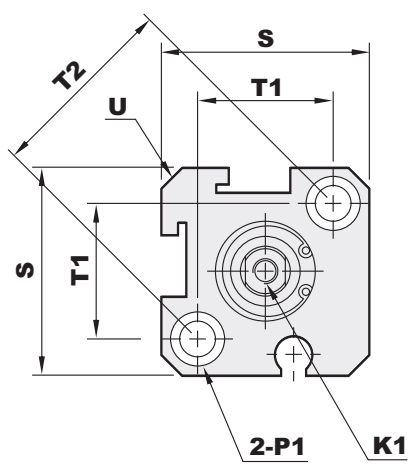
A : Piston area (mm²)

f : Friction (N)

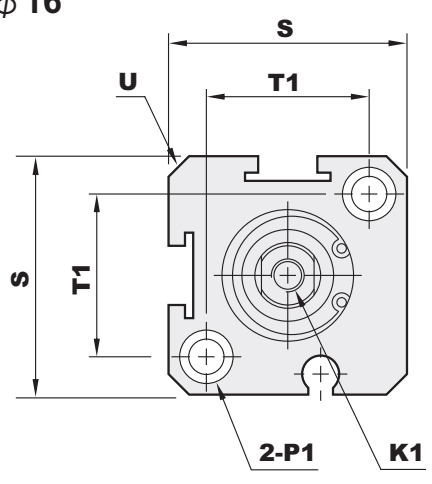
Dimensions

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

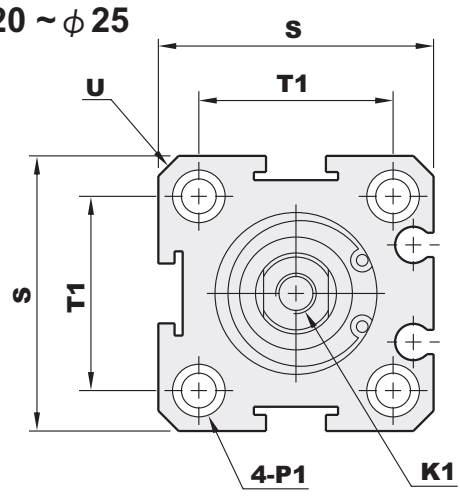
$\phi 12$



$\phi 16$



$\phi 20 \sim \phi 25$



AIR CYLINDERS

(Unit : mm)

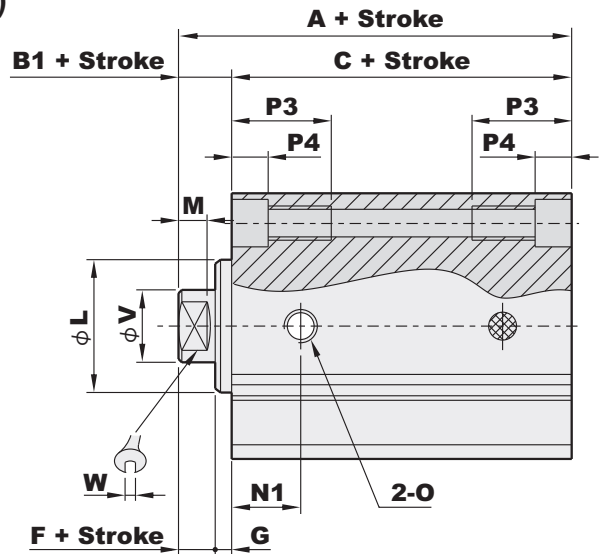
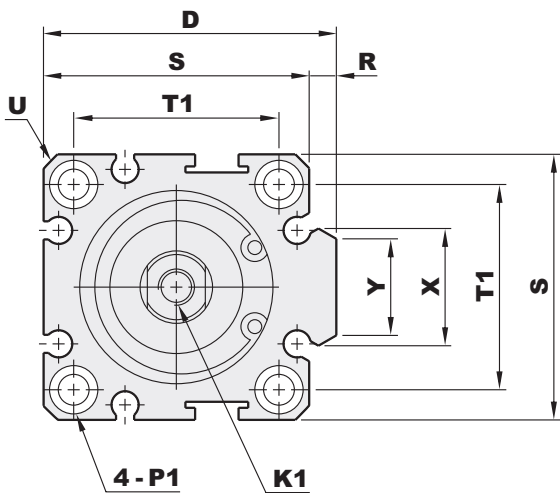
Bore size	W/O magnet			W/I magnet			D	F	G	K1	L	M	N1	O
	A	B1	C	A	B1	C								
$\phi 12$	22	5	17	32	5	27	-	4	1	M3xP0.5xL6	$\phi 11$	3	6.5	M5xP0.8
$\phi 16$	24	5.5	18.5	34	5.5	28.5	-	4	1.5	M3xP0.5xL6	$\phi 11$	3	7	M5xP0.8
$\phi 20$	25	5.5	19.5	35	5.5	29.5	-	4	1.5	M4xP0.7xL8	$\phi 15$	3	7.5	M5xP0.8
$\phi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

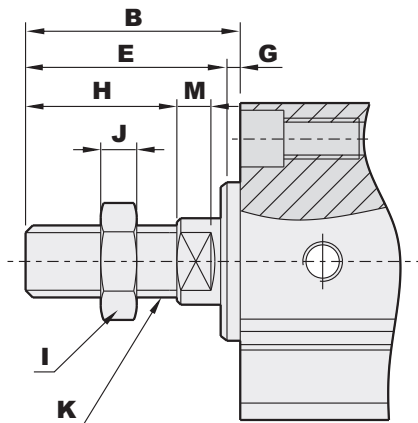
JC Standard double acting

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
$\phi 25$	23	21	17	12	5	M8xP1.25
$\phi 32$	25	22	18	14	6	M10xP1.25
$\phi 40$	35	32	28	19	8	M14xP1.5
$\phi 50$	37	33	28	27	11	M18xP1.5
$\phi 63$	37	33	28	27	11	M18xP1.5
$\phi 80$	44	39	33	32	13	M22xP1.5
$\phi 100$	50	45	38	36	13	M26xP1.5

(Unit : mm)

Bore size	W/O magnet			W/l 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	PS 1/8
$\phi 40$	33	7	26	43	7	36	56.5	4	3	M8xP1.25xL12	$\phi 28$	3	10	PS 1/8
$\phi 50$	37	9	28	47	9	38	70	5	4	M10xP1.5xL15	$\phi 38$	3	10	PS 1/4
$\phi 63$	41	9	32	51	9	42	83	5	4	M10xP1.5xL15	$\phi 40$	3	12	PS 1/4
$\phi 80$	57	11	46	67	11	56	104	6	5	M14xP1.5xL20	$\phi 45$	4	12.5	PS 3/8
$\phi 100$	68	12	56	78	12	66	124	7	5	M18xP1.5xL20	$\phi 55$	4	17	PS 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

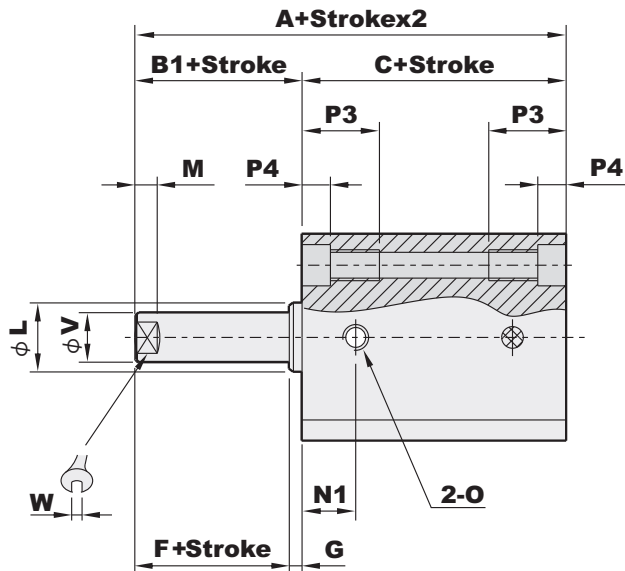
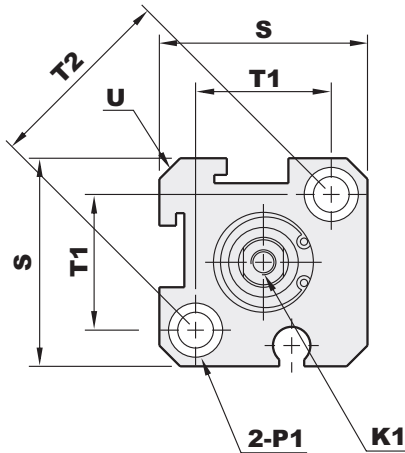
Dimensions

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

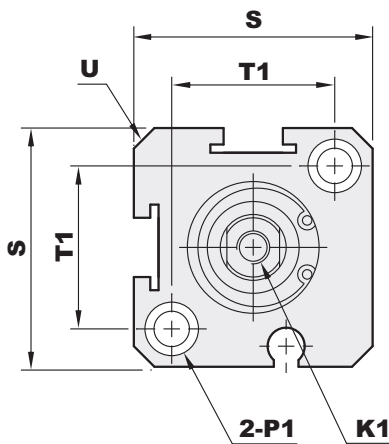


JCO Single acting/Spring extended ($\phi 12 \sim \phi 25$)

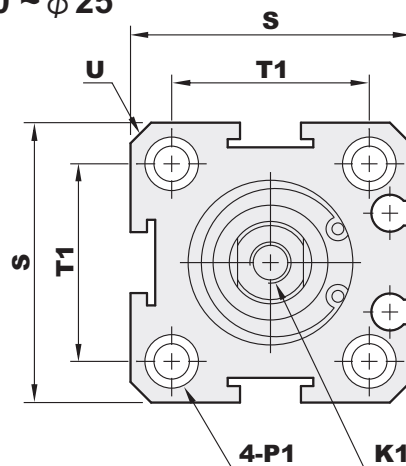
$\phi 12$



$\phi 16$



$\phi 20 \sim \phi 25$



(Unit : mm)

Bore size	W/O magnet			W/I magnet			D	F	G	K1	L	M	N1	O
	A	B1	C	A	B1	C								
$\phi 12$	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

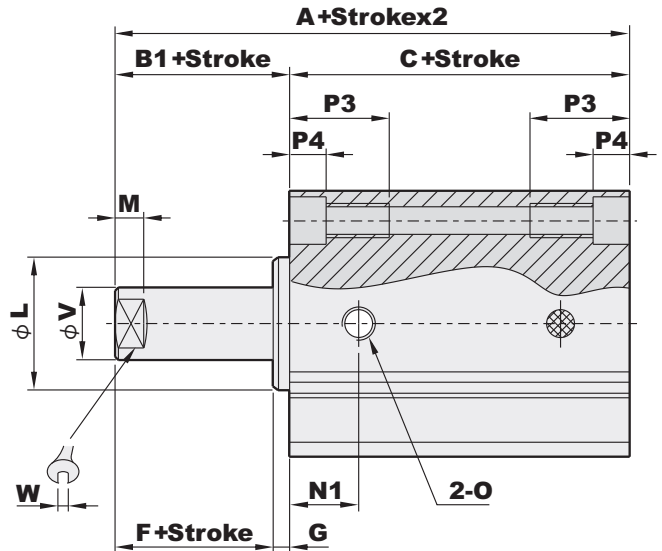
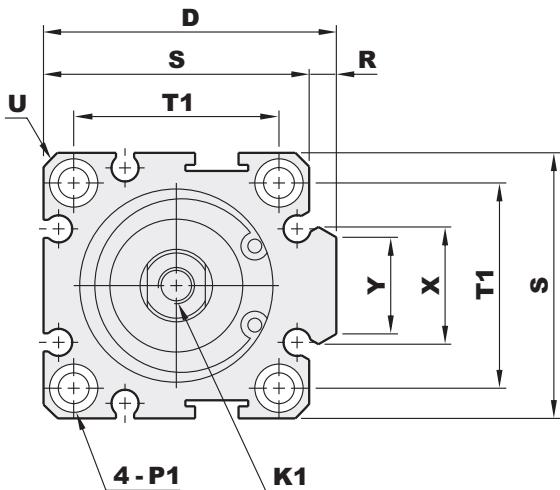
Bore size	P1					P3	P4	R	S	T1	T2	U	V	W	X	Y
$\phi 12$	Two sides $\phi 6.5$ Thread M5xP0.8 Cross hole $\phi 4.3$					12	4.5	-	25	16.3	23	R16	$\phi 6$	5	-	-
$\phi 16$	Two sides $\phi 6.5$ Thread M5xP0.8 Cross hole $\phi 4.3$					12	4.5	-	29	19.8	28	R19	$\phi 6$	5	-	-
$\phi 20$	Two sides $\phi 6.5$ Thread 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

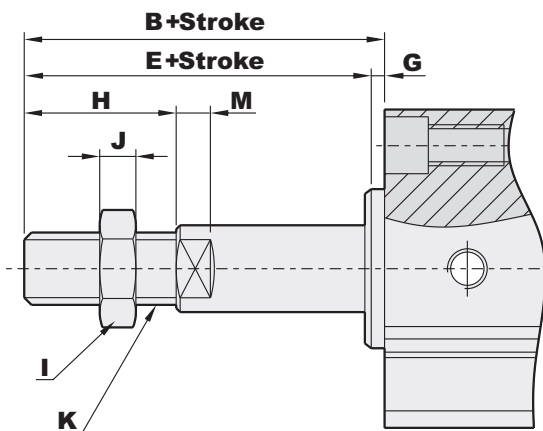
JCO Single acting/Spring extended ($\phi 12 \sim \phi 50$)



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



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
$\phi 32$	25	22	18	14	6	M10xP1.25
$\phi 40$	35	32	28	19	8	M14xP1.5
$\phi 50$	37	33	28	27	11	M18xP1.5

AIR CYLINDERS

(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	PS 1/8
$\phi 40$	43	7	36	53	7	46	56.5	4	3	M8xP1.25xL12	$\phi 28$	3	10	PS 1/8
$\phi 50$	47	9	38	57	9	48	70	5	4	M10xP1.5xL15	$\phi 38$	3	10	PS 1/4

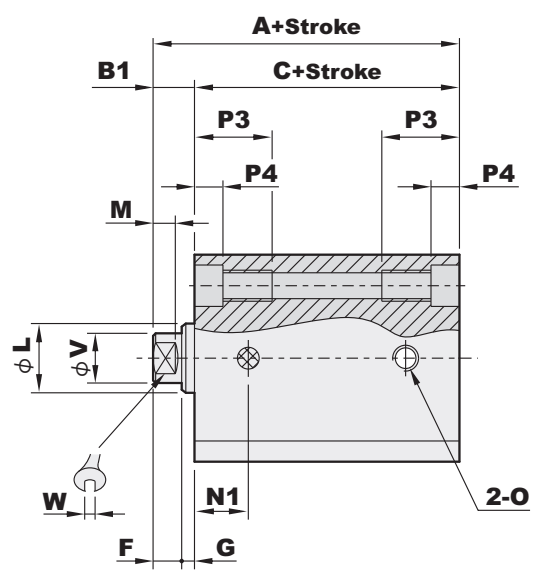
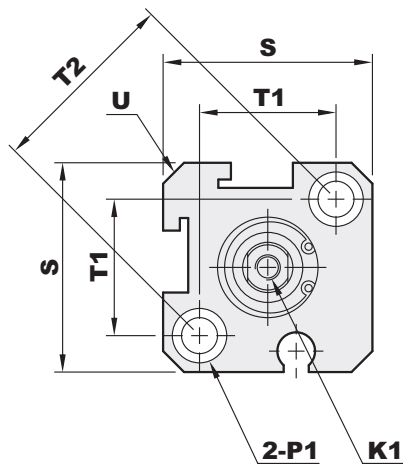
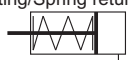
Bore size	P1					P3	P4	R	S	T1	T2	U	V	W	X	Y
$\phi 32$	Two sides $\phi 8.0$ Thread M6xP1.0 Cross hole $\phi 5.1$					16	5.5	4.5	44	34	-	R29.5	$\phi 12$	10	19.5	16
$\phi 40$	Two sides $\phi 9.5$ Thread M8xP1.25 Cross hole $\phi 6.9$					20	7.5	4.5	52	40	-	R35	$\phi 16$	14	19.5	16
$\phi 50$	Two sides $\phi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

Dimensions

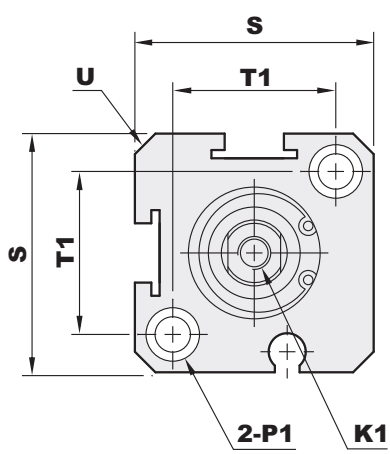
JCI Single acting/Spring return ($\phi 12 \sim \phi 25$)

$\phi 12$

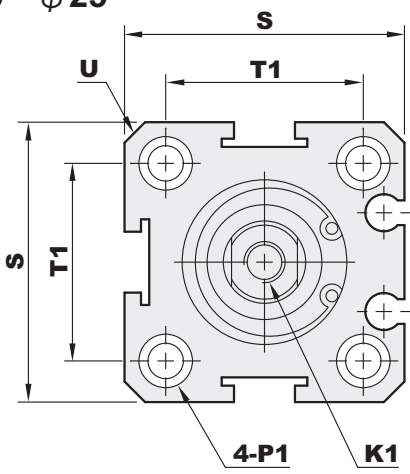
JCI Single acting/Spring return ($\phi 12 \sim \phi 50$)



$\phi 16$



$\phi 20 \sim \phi 25$



AIR CYLINDERS

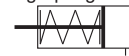
(Unit : mm)

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

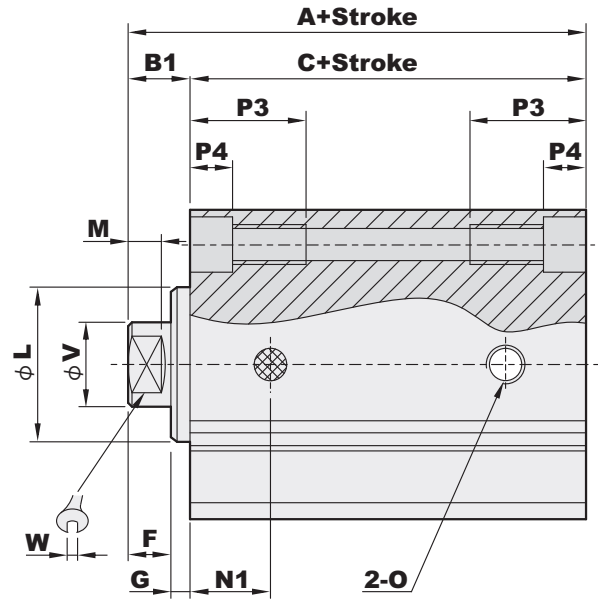
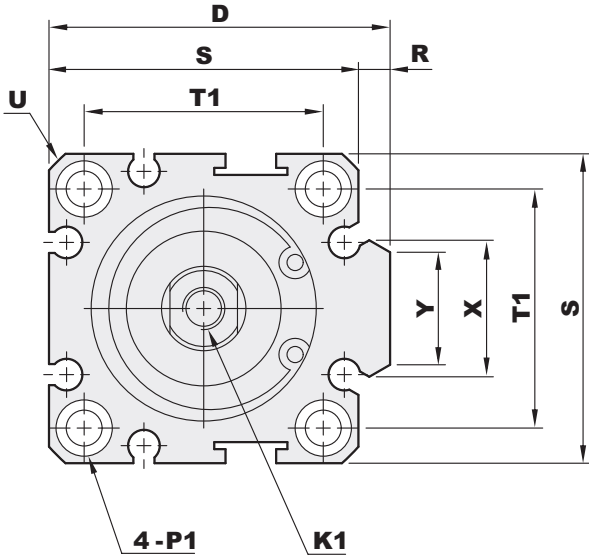
Bore size	P1					P3	P4	R	S	T1	T2	U	V	W	X	Y
	Two sides	ϕ	Thread	Cross hole	ϕ											
$\phi 12$	Two sides	$\phi 6.5$	Thread M5xP0.8	Cross hole	$\phi 4.3$	12	4.5	-	25	16.3	23	R16	$\phi 6$	5	-	-
$\phi 16$	Two sides	$\phi 6.5$	Thread M5xP0.8	Cross hole	$\phi 4.3$	12	4.5	-	29	19.8	28	R19	$\phi 6$	5	-	-
$\phi 20$	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

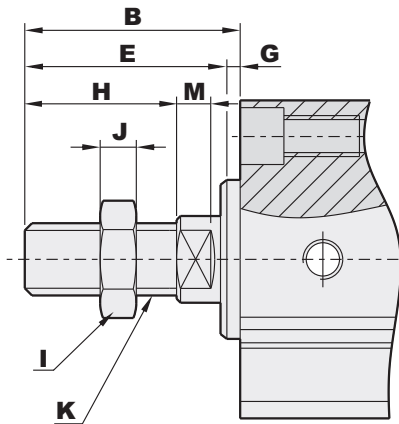
JCI Single acting/Spring return ($\phi 12 \sim \phi 50$)



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
$\phi 32$	25	22	18	14	6	M10xP1.25
$\phi 40$	35	32	28	19	8	M14xP1.5
$\phi 50$	37	33	28	27	11	M18xP1.5

AIR CYLINDERS

(Unit : mm)

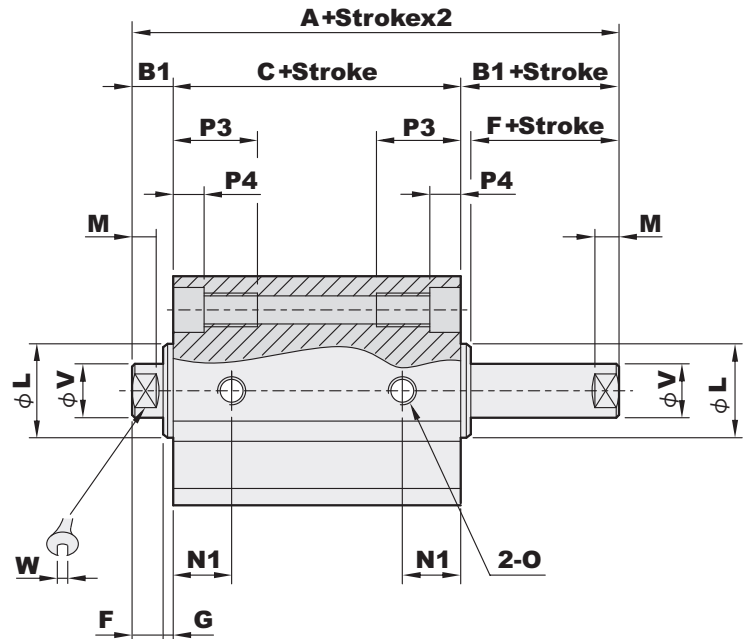
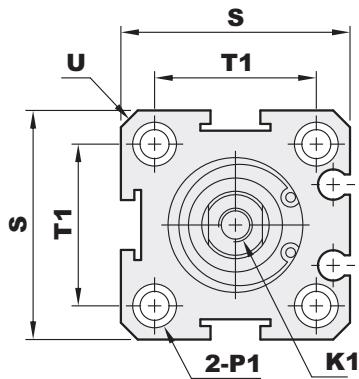
Bore size	W/O magnet			W/I magnet			D	F	G	K1	L	M	N1	O
	A	B1	C	A	B1	C								
$\phi 32$	41.5	7	34.5	51.5	7	44.5	48.5	4	3	M6xP1.0xL12	$\phi 22$	3	9	PS 1/8
$\phi 40$	43	7	36	53	7	46	56.5	4	3	M8xP1.25xL12	$\phi 28$	3	10	PS 1/8
$\phi 50$	47	9	38	57	9	48	70	5	4	M10xP1.5xL15	$\phi 38$	3	10	PS 1/4

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

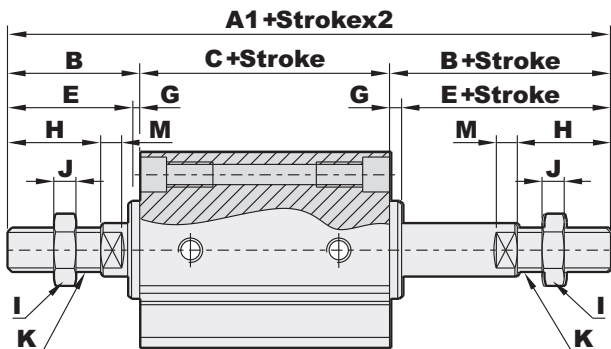
JCDD Double rod/Double acting ($\phi 20 \sim \phi 100$)

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



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	12	5	M8xP1.25
$\phi 32$	74.5	22	22	18	14	6	M10xP1.25
$\phi 40$	96	32	32	28	19	8	M14xP1.5
$\phi 50$	102	33	33	28	27	11	M18xP1.5
$\phi 63$	106	33	33	28	27	11	M18xP1.5
$\phi 80$	134	39	39	33	32	13	M22xP1.5
$\phi 100$	156	45	45	38	36	13	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

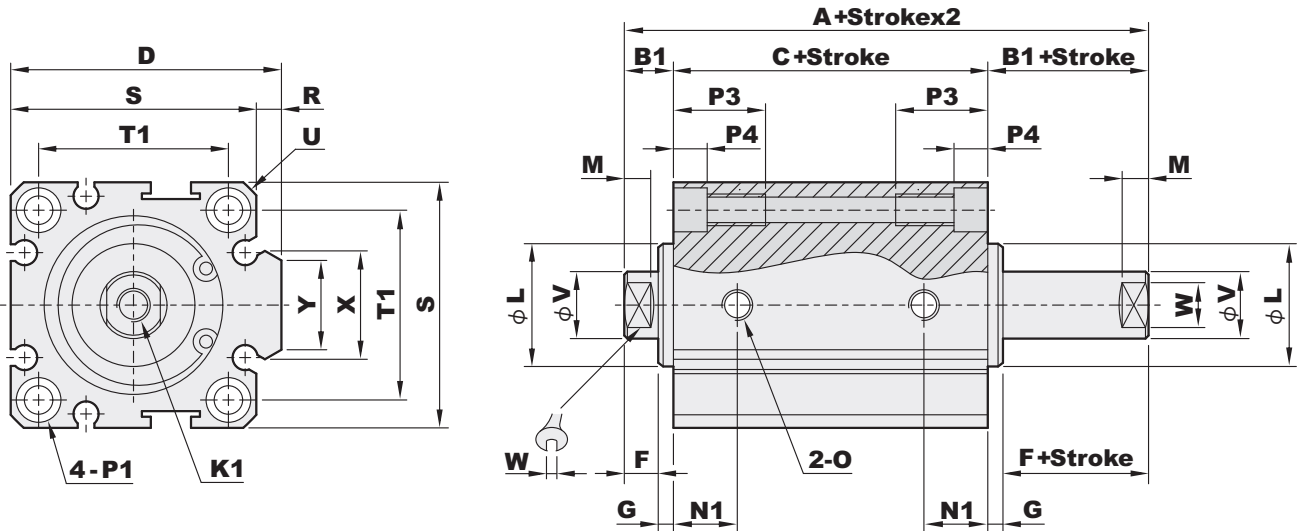
Bore size	P1					P3	P4	R	S	T1	U	V	W	X	Y
$\phi 20$	Two sides $\phi 6.5$ Thread M5xP0.8 Cross hole $\phi 4.3$					14	4.5	-	34	24	R22	$\phi 8$	6	-	-
$\phi 25$	Two sides $\phi 8.0$ Thread M6xP1.0 Cross hole $\phi 5.1$					15	5.5	-	40	28	R25	$\phi 10$	8	-	-

Dimensions

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



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



(Unit : mm)

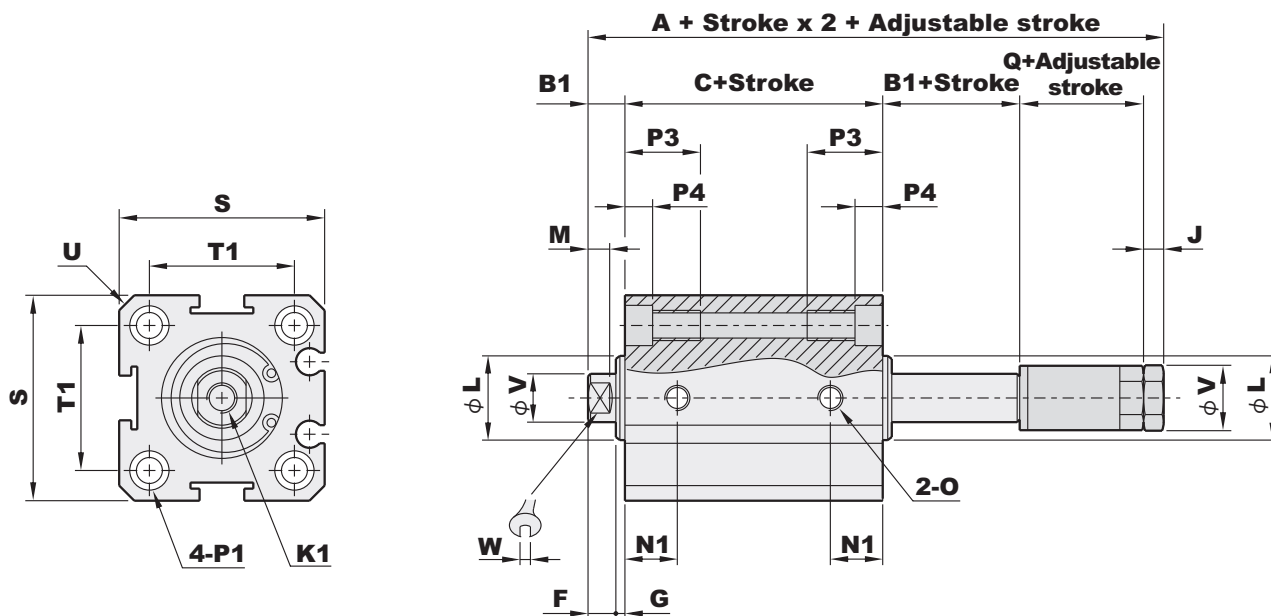
Bore size	W/O magnet			W/l magnet			D	F	G	K1	L	M	N1	O
	A	B1	C	A	B1	C								
$\phi 32$	31.5	7	24.5	41.5	7	34.5	48.5	4	3	M6xP1.0xL12	$\phi 22$	3	9	PS 1/8
$\phi 40$	33	7	26	43	7	36	56.5	4	3	M8xP1.25xL12	$\phi 28$	3	10	PS 1/8
$\phi 50$	37	9	28	47	9	38	70	5	4	M10xP1.5xL15	$\phi 38$	3	10	PS 1/4
$\phi 63$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

Bore size	P1										
	P3	P4	R	S	T1	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

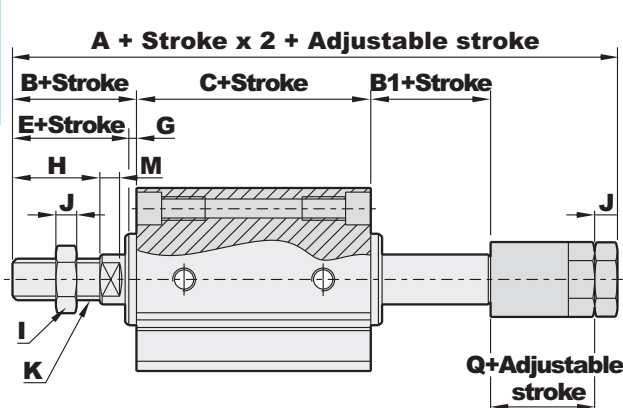
- JCA, JCB Stroke adjustable type
(Adjustable stroke: JCA 0~25mm, JCB 0~50mm)

JCA, JCB Stroke adjustable 25mm, 50mm
($\phi 20 \sim \phi 100$)



AIR CYLINDERS

- Piston rod with male thread



(Unit : mm)

Bore size	A1	B	E	H	I	J	K
$\phi 20$	70.5	20.5	19	15	10	5	M6xP1.0
$\phi 25$	75	23	21	17	12	5	M8xP1.25
$\phi 32$	82.5	25	22	18	14	6	M10xP1.25
$\phi 40$	96	35	32	28	19	8	M14xP1.5
$\phi 50$	105	37	33	28	27	11	M18xP1.5
$\phi 63$	109	37	33	28	27	11	M18xP1.5
$\phi 80$	134	44	39	33	32	13	M22xP1.5
$\phi 100$	151	50	45	38	36	13	M26xP1.5

(Unit : mm)

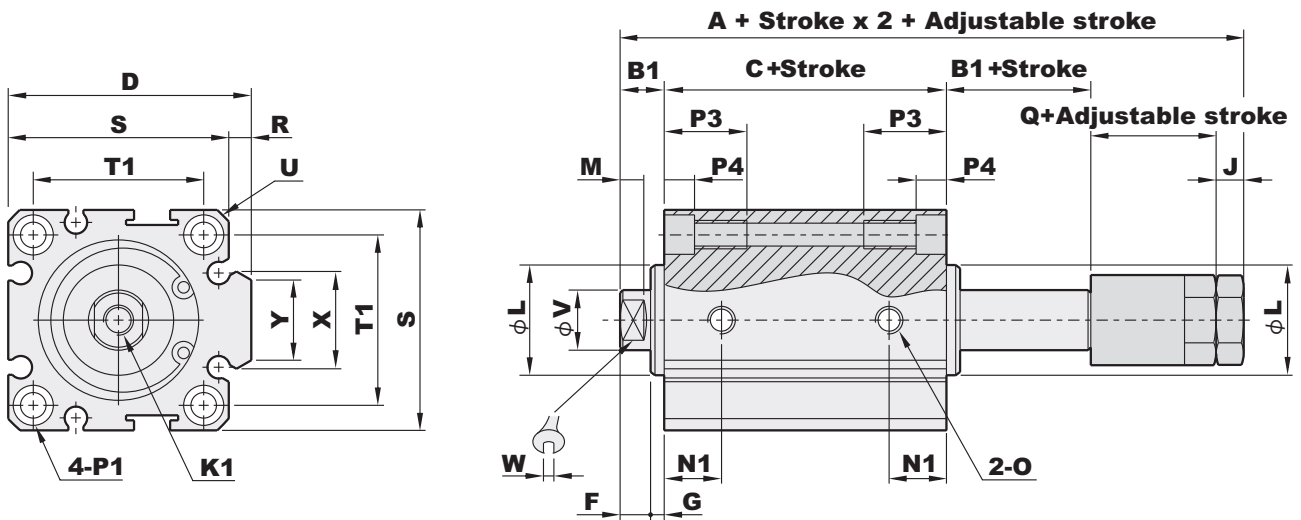
Bore size	W/O magnet			W/l magnet			D	F	G	J	K1	L	M	N1	O
	A	B1	C	A	B1	C									
$\phi 20$	55.5	5.5	19.5	35	5.5	29.5	-	4	1.5	5	M4xP0.7xL8	$\phi 15$	3	7.5	M5xP0.8
$\phi 25$	58	6	21	37	6	31	-	4	2	5	M5xP0.8xL10	$\phi 17$	3	8	M5xP0.8

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

Dimensions

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

JCA, JCB Stroke adjustable 25mm, 50mm
($\phi 20 \sim \phi 100$)



(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									
$\phi 32$	64.5	7	24.5	41.5	7	34.5	48.5	4	3	6	M6xP1.0xL12	22	3	9	PS 1/8
$\phi 40$	68	7	26	43	7	36	56.5	4	3	8	M8xP1.25xL12	28	3	10	PS 1/8
$\phi 50$	77	9	28	47	9	38	70	5	4	11	M10xP1.5xL15	38	3	10	PS 1/4
$\phi 63$	81	9	32	51	9	42	83	5	4	11	M10xP1.5xL15	40	3	12	PS 1/4
$\phi 80$	101	11	46	67	11	56	104	6	5	13	M14xP1.5xL20	45	4	12.5	PS 3/8
$\phi 100$	113	12	56	78	12	66	124	7	5	13	M18xP1.5xL20	55	4	17	PS 3/8

Bore size	P1										P3	P4	Q	R	S	T1	U	V	W	X	Y
$\phi 32$	Two sides $\phi 8.0$ Thread M6xP1.0 Cross hole $\phi 5.1$										16	5.5	22	4.5	44	34	R29.5	12	10	18.8	16
$\phi 40$	Two sides $\phi 9.5$ Thread M8xP1.25 Cross hole $\phi 6.9$										20	7.5	22	4.5	52	40	R35	16	14	19	16
$\phi 50$	Two sides $\phi 11$ Thread M8xP1.25 Cross hole $\phi 6.9$										25	8.5	28	8	62	48	R41	20	17	26	19
$\phi 63$	Two sides $\phi 11$ Thread M8xP1.25 Cross hole $\phi 6.9$										25	8.5	28	8	75	60	R50	20	17	26	19
$\phi 80$	Two sides $\phi 14$ Thread M12xP1.75 Cross hole $\phi 10.5$										25	10.5	35	10	94	74	R62	25	22	37.5	26
$\phi 100$	Two sides $\phi 17.5$ Thread M14xP2 Cross hole $\phi 12.3$										30	13	35	10	114	90	R75	30	27	37.5	26

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.
- * Wide range of dimension to offer.
- * Built-in magnet.



How to order

DR

Type

DR	Standard type
DRD	Slide type

32

Bore size

10	φ 10
16	φ 16
20	φ 20
25	φ 25
32	φ 32

B


50

Stroke

SS

Sensor type

Blank	W/O sensor
SS	Square type



AL-11R

1

Number of sensor

1 pc
2 pcs

Specifications

Bore size	φ 10	φ 16	φ 20	φ 25	φ 32
Port size	M5x0.8			1/8"	
Fluid	Compressed air				
Acting	Double acting				
Operating pressure range	1.5 ~ 7 kgf/cm ²				
Max operating pressure	10.5 kgf/cm ²				
Barrel material	Aluminum alloy				
Magnet	Built-in				
Ambient temperature	-5°C ~ 60°C				
Piston speed mm/Sec	100~500				

Theoretical force

Bore size	φ 10		φ 16		φ 20		φ 25		φ 32		
Rod diameter	φ 6		φ 8		φ 10		φ 12		φ 16		
Acting	Double acting		Double acting		Double acting		Double acting		Double acting		
	Push	Pull	Push	Pull	Push	Pull	Push	Pull	Push	Pull	
Piston area cm ²	1.57	1.01	4.02	3.02	6.28	4.71	9.82	7.56	16.08	12.06	
Operating pressure (kgf/cm ²)	2	3.14	2.02	8.04	6.04	12.56	9.42	19.64	15.12	32.16	24.12
	3	4.71	3.03	12.06	9.06	18.84	14.13	29.46	22.68	48.24	36.18
	4	6.28	4.04	16.08	12.08	25.12	18.84	39.26	30.24	64.32	48.24
	5	7.85	5.05	20.1	15.1	31.4	23.55	49.1	37.8	80.4	60.3
	6	9.42	6.06	24.12	18.12	37.68	28.26	58.92	45.36	96.48	72.36
	7	10.99	7.07	28.14	21.14	43.96	32.97	68.74	52.92	112.56	84.42

Stroke table

DR Standard type

Bore size	Acting	Standard stroke(mm)
φ 10	Double acting	10, 20, 25, 30, 40, 50, 75, 100
φ 16		10, 20, 25, 30, 40, 50, 75, 100, 125, 150, 175
φ 20		10, 20, 25, 30, 40, 50, 75, 100, 125, 150
φ 25		10, 20, 25, 30, 40, 50, 75, 100, 125, 150
φ 32		10, 20, 25, 30, 40, 50, 75, 100, 125, 150

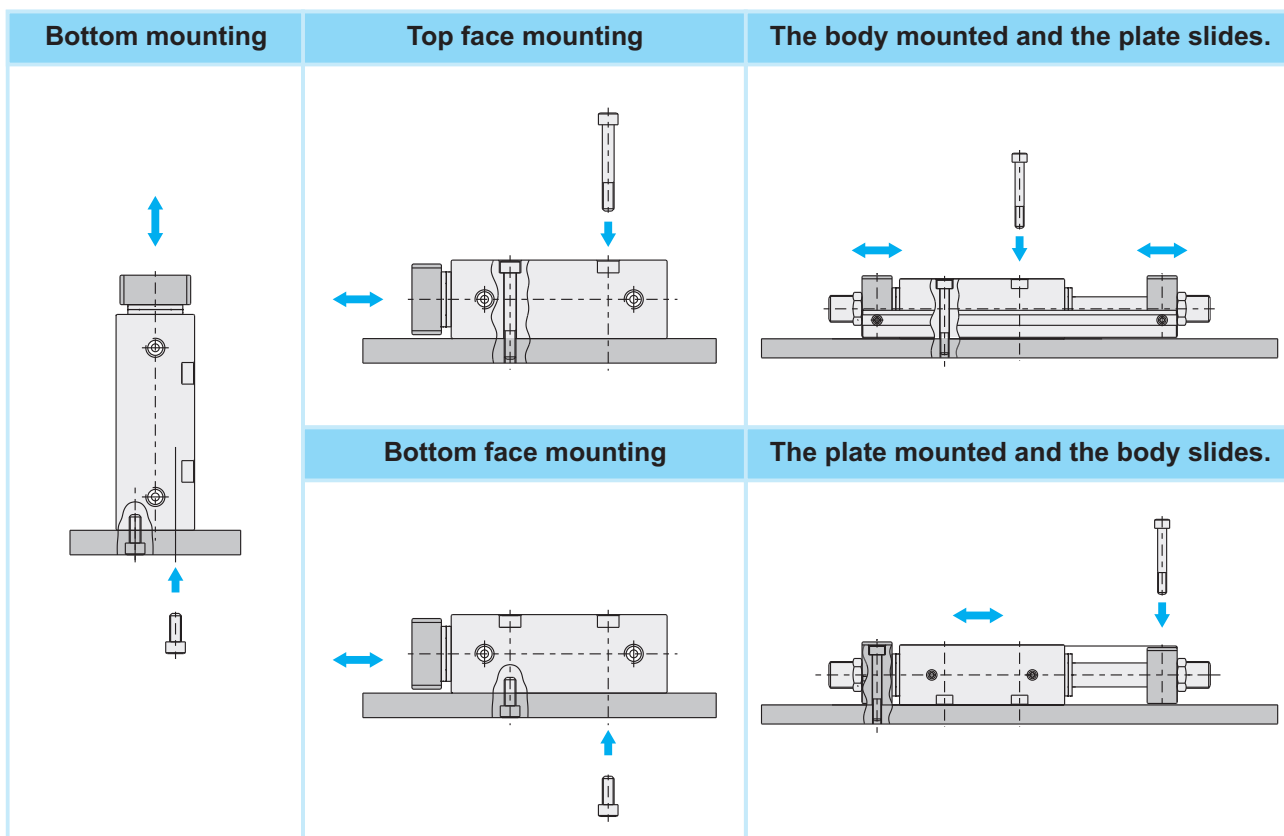
Note: Please contact our sales for non-standard stroke.

DRD Slide type

Bore size	Acting	Standard stroke(mm)
φ 10	Double acting	25, 50, 75, 100
φ 16		25, 50, 75, 100, 125, 150, 175
φ 20		25, 50, 75, 100, 125, 150
φ 25		25, 50, 75, 100, 125, 150
φ 32		25, 50, 75, 100, 125, 150

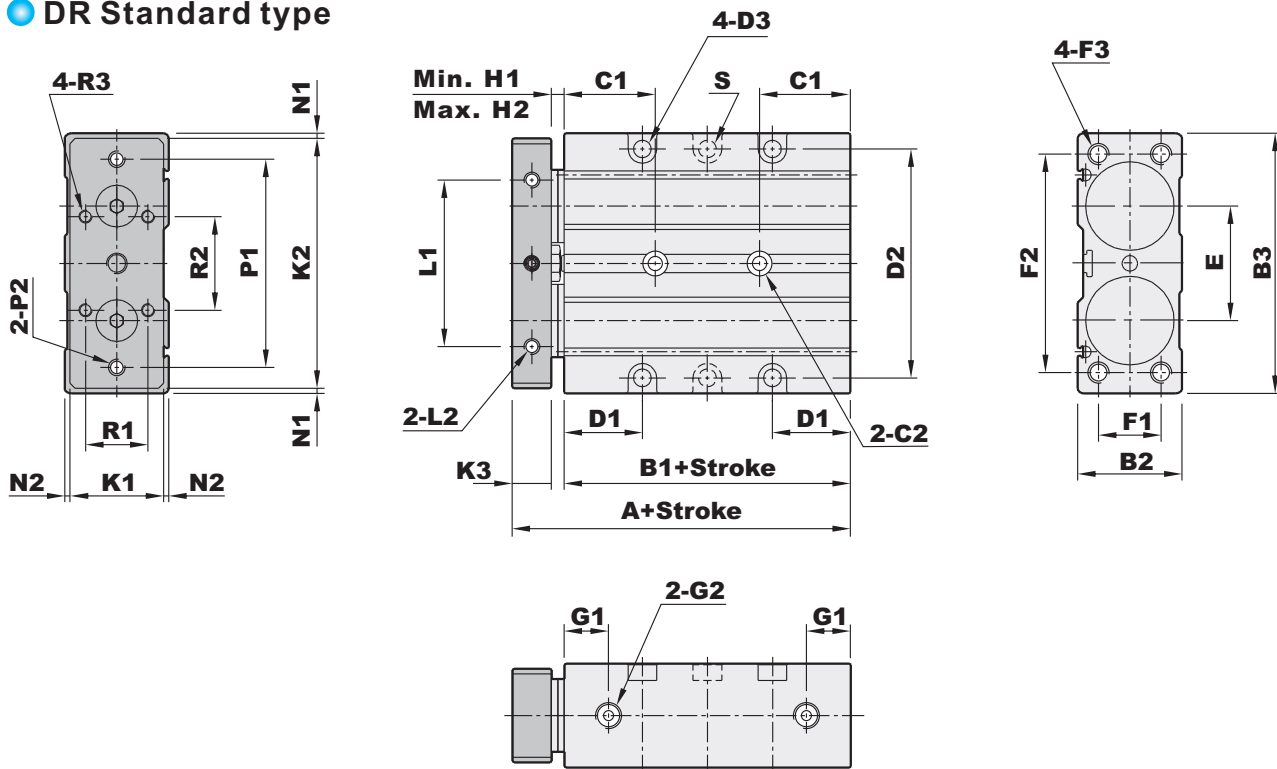
Note: Please contact our sales for non-standard stroke.

Mounting example



Dimensions

DR Standard type



(Unit : mm)

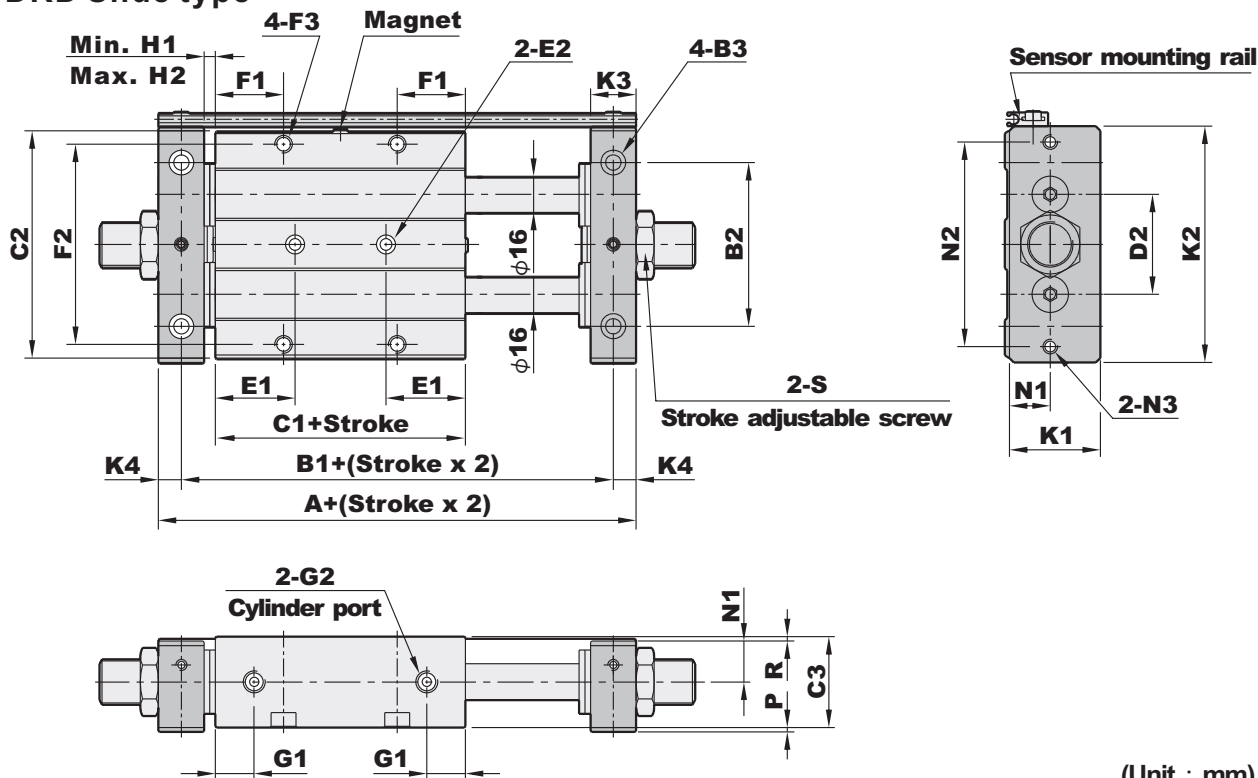
Bore size	A	B1	B2	B3	C1 (Per stroke)								C2	
					10	20	30	40	50	75	100	125		150
φ10	51	40	19	46	15	15	15	15	15	15	15	-	-	φ 3.5 through, Counter bore φ 6, Depth 3.5
φ16	57	45	24	58	17.5	22.5	27.5	27.5	27.5	30	32.5	35	47.5	φ 4.5 through, Counter bore φ 8, Depth 4.5
φ20	65	50	26	68	20	25	30	30	30	32.5	35	37.5	50	φ 4.5 through, Counter bore φ 8, Depth 4.5
φ25	72	55	34	82	22.5	27.5	32.5	32.5	32.5	35	37.5	40	52.5	φ 4.5 through, Counter bore φ 8, Depth 4.5
φ32	80	60	40	100	25	30	35	35	35	37.5	40	42.5	55	φ 5.5 through, Counter bore φ 9.5, Depth 5.5

Bore size	D1	D2	D3	E	F1	F2	F3	G1	G2	H1	H2
φ10	20	40	φ 3.5 through, Counter bore φ 6, Depth 3.5	22	12	38	M4xP0.7 Depth 10	11.5	M5	4	7
φ16	22.5	51	φ 3.5 through, Counter bore φ 6, Depth 3.5	25	14	50	M4xP0.7 Depth 12	12.5	M5	4	7
φ20	25	60	φ 4.5 through, Counter bore φ 8, Depth 4.5	28	16	60	M4xP0.7 Depth 12	13	M5	5	10
φ25	27.5	72	φ 5.5 through, Counter bore φ 9.5, Depth 5.5	36	20	72	M5xP0.8 Depth 12	14.5	M5	5	10
φ32	30	88	φ 6.5 through, Counter bore φ 11, Depth 6.5	44	24	84	M6xP1.0 Depth 15	17	PT1/8	5	10

Bore size	L1	L2	N1	N2	P1	P2	R1	R2	R3	K1	K2	K3
φ10	30	M3xP0.5 Depth 8	1	1	36	M3XP0.5	10	12	M3xP0.5	17	44	7
φ16	34	M4xP0.7 Depth 8	1	1	47	M4XP0.7	14	15	M3xP0.5	22	56	8
φ20	44	M4xP0.7 Depth 10	1	1	55	M4XP0.7	16	20	M4xP0.7	24	66	10
φ25	56	M5xP0.8 Depth 12	1.5	1.5	66	M5XP0.8	20	28	M5xP0.8	31	79	12
φ32	64	M6xP1.0 Depth 15	2	2	80	M6XP1.0	24	36	M5xP0.8	36	96	15

Dimensions

DRD Slide type



(Unit : mm)

Bore size	A	B1	B2	B3	C1	C2	C3	D1	D2	E1(Per stroke)		
										25	50	75
φ10	51	40	19	φ 3.5 through, Counter bore φ 6, Depth 3.5	40	46	19	6	22	15	15	15
φ16	57	45	24	φ 4.5 through, Counter bore φ 8, Depth 4.5	45	58	24	8	25	25	27.5	30
φ20	65	50	26	φ 4.5 through, Counter bore φ 8, Depth 4.5	50	68	26	10	28	27.5	30	32.5
φ25	72	55	34	φ 4.5 through, Counter bore φ 8, Depth 4.5	55	82	34	12	36	30	32.5	35
φ32	80	60	40	φ 5.5 through, Counter bore φ 9.5, Depth 5.5	60	100	40	16	44	32.5	35	37.5

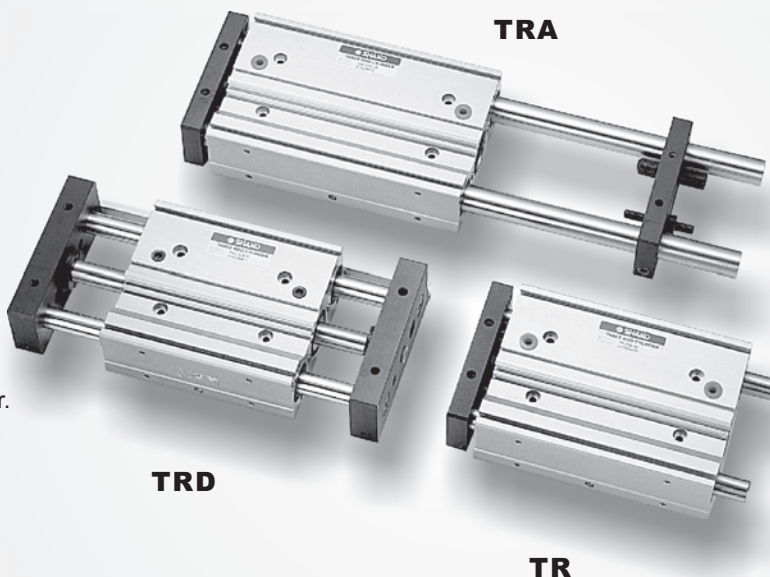
Bore size	E1(Per stroke)			E2	F1	F2	F3	G1	G2
	100	125	150						
φ10	15	-	-	φ 3.5 through, Counter bore φ 6, Depth 3.5	20	40	M4xP0.7 Depth10	11.5	M5
φ16	32.5	35	47.5	φ 4.5 through, Counter bore φ 8, Depth 4.5	22.5	51	M4xP0.7 Depth12	12.5	M5
φ20	35	37.5	50	φ 4.5 through, Counter bore φ 8, Depth 4.5	25	60	M5xP0.8 Depth12	13	M5
φ25	37.5	40	52.5	φ 4.5 through, Counter bore φ 8, Depth 4.5	27.5	72	M6xP1.0 Depth15	14.5	M5
φ32	40	42.5	55	φ 5.5 through, Counter bore φ 9.5, Depth 5.5	30	88	M8xP1.25 Depth 12	17	RS 1/8

Bore size	H1	H2	K1	K2	K3	K4	N1	N2	N3	P	R	S
φ10	4	25	19	49	10	5	8	40	M3XP0.5	1.5	1.5	M8xP1.0x50L
φ16	4	25	24	62	12	6	10	52	M4XP0.7	2	2	M10xP1.0x50L
φ20	5	25	26	72	15	7.5	11	60	M4XP0.7	2	2	M12xP1.0x50L
φ25	5	25	34	86	15	7.5	15	72	M5XP0.8	2	2	M14xP1.5x50L
φ32	5	25	40	104	10	10	18	90	M6XP1.0	2	2	M20xP1.5x50L


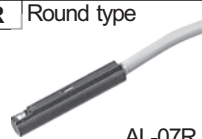
AIR CYLINDERS

Features

- * Hard anodized aluminum body provides corrosion and wear resistance.
- * Miniature size, space saving and double acting force.
- * Compact integration of one piston rod and two guide rods.
- * Strict quality control ensures good performance.
- * Simple maintenance and installation.
- * Wide range of dimension to offer.
- * Built-in magnet.



How to order

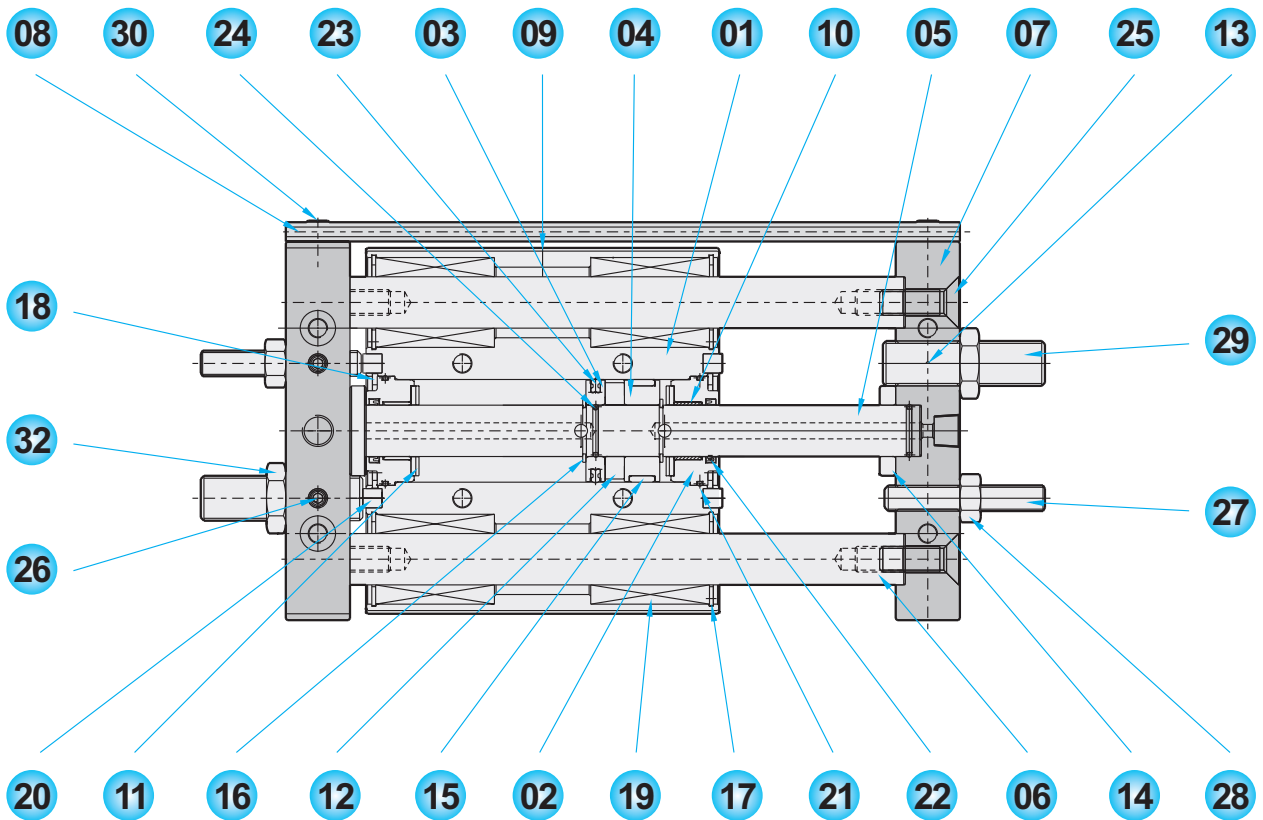
TR		L		32		B		50		A1		SS		1	
Three rod cylinder		Guide rod		Bore size		Stroke		Shock absorber (Only for TRA)		Sensor type		Number of sensor			
TR	Standard type	B	Bush bearing	32	φ 32	Blank	W/O shock absorber	Blank	W/O sensor	SS	Square type	1 pc			
TRD	Slide type	L	Linear bearing			A1	1 pc	 AL-11R		 AL-07R		2 pcs			
TRA	Adjustable type					A2	2 pcs								

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

Specifications

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

Material of parts



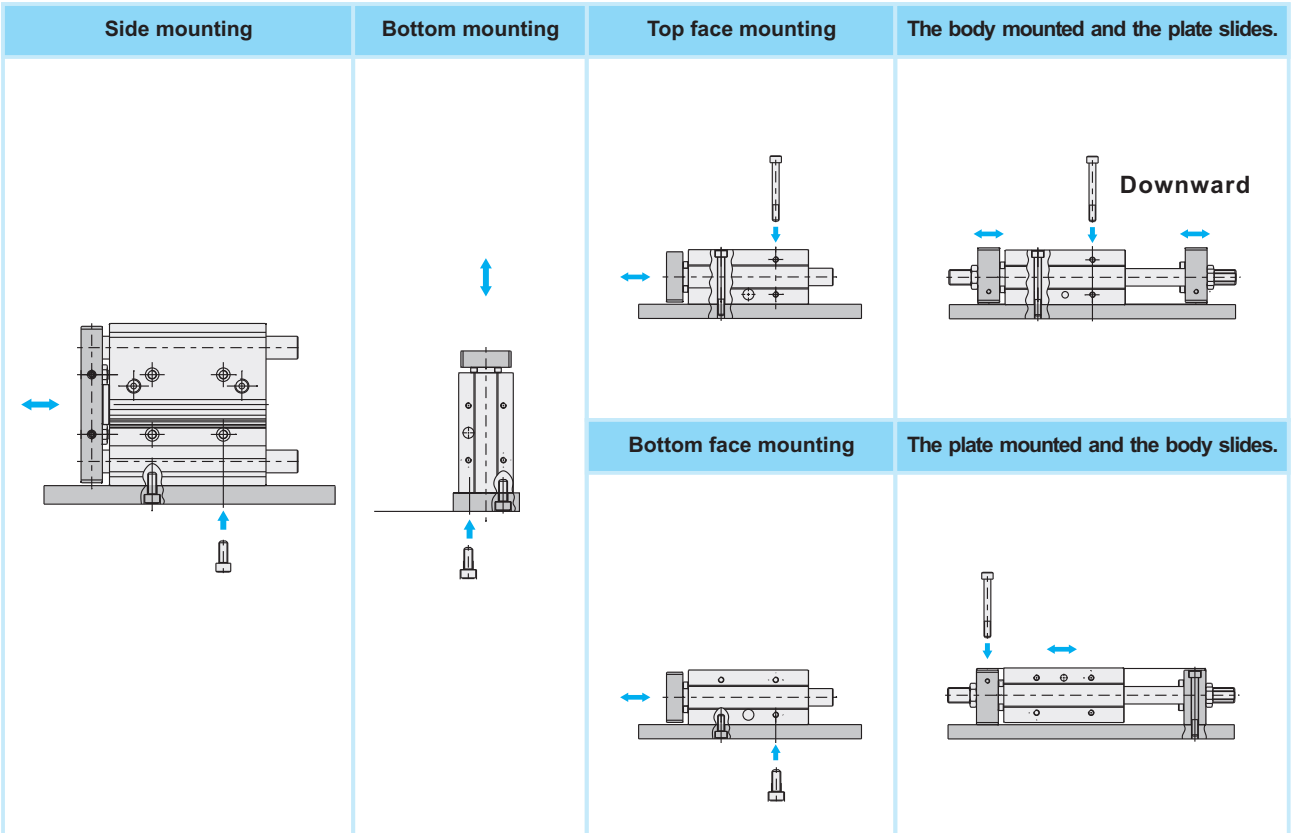
No.	Description	Material	Qty.
1	Barrel	Aluminum alloy	1
2	Rod cover	Aluminum alloy	2
3	Piston	Aluminum alloy	1
4	Wear ring holder	Aluminum alloy	1
5	Piston rod	Stainless steel	1
6	Guide rod	Bearing steel	2
7	Front plate	Aluminum alloy	2
8	Sensor mounting rail	Aluminum alloy	1
9	Magnet	Rare earth magnet	1
10	Drymet(LFB)	Carbon steel	2
11	Impact packing	NBR	2
12	Magnet	Ferrite magnet	1
13	Press unit	Industrial plastic	4
14	Bumper	NBR	4
15	Wear ring	Teflon	1
16	Snap ring	Spring steel	2

No.	Description	Material	Qty.
17	Snap ring	Spring steel	4
18	Snap ring	Spring steel	2
19	Linear bearing	Bearing steel	4(6)
20	Stopper	Bearing steel	4
21	Rod cover O-ring	NBR	2
22	Rod packing	NBR	2
23	Piston packing	NBR	1
24	Piston O-ring	NBR	3
25	Fixing screw	Carbon steel	4
26	Adjustable screw	Carbon steel	4
27	Adjustable screw	Carbon steel	2
28	Nut	Carbon steel	2
29	Adjustable screw	Carbon steel	2
30	Fixing screw	Carbon steel	2
31	Bolt	Carbon steel	4
32	Nut	Carbon steel	2

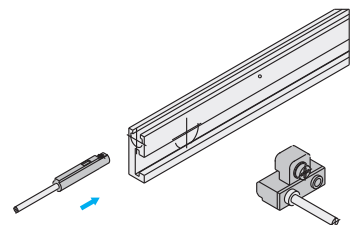
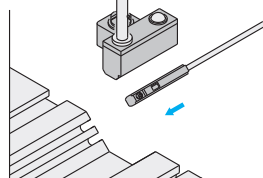
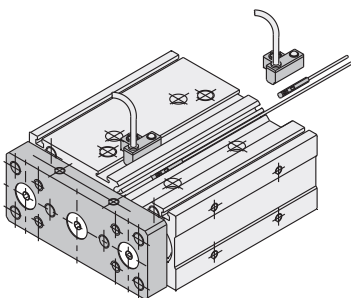
Theoretical force

Bore size	Rod diameter	Acting	Piston area mm ²	Operating pressure kgf/cm ²					
				2	3	4	5	6	7
φ 32	φ 16	Push	8.04	16.08	24.12	32.16	40.2	48.24	56.28
		Pull	3.78	12.06	18.09	24.12	30.15	36.18	42.21

Mounting example

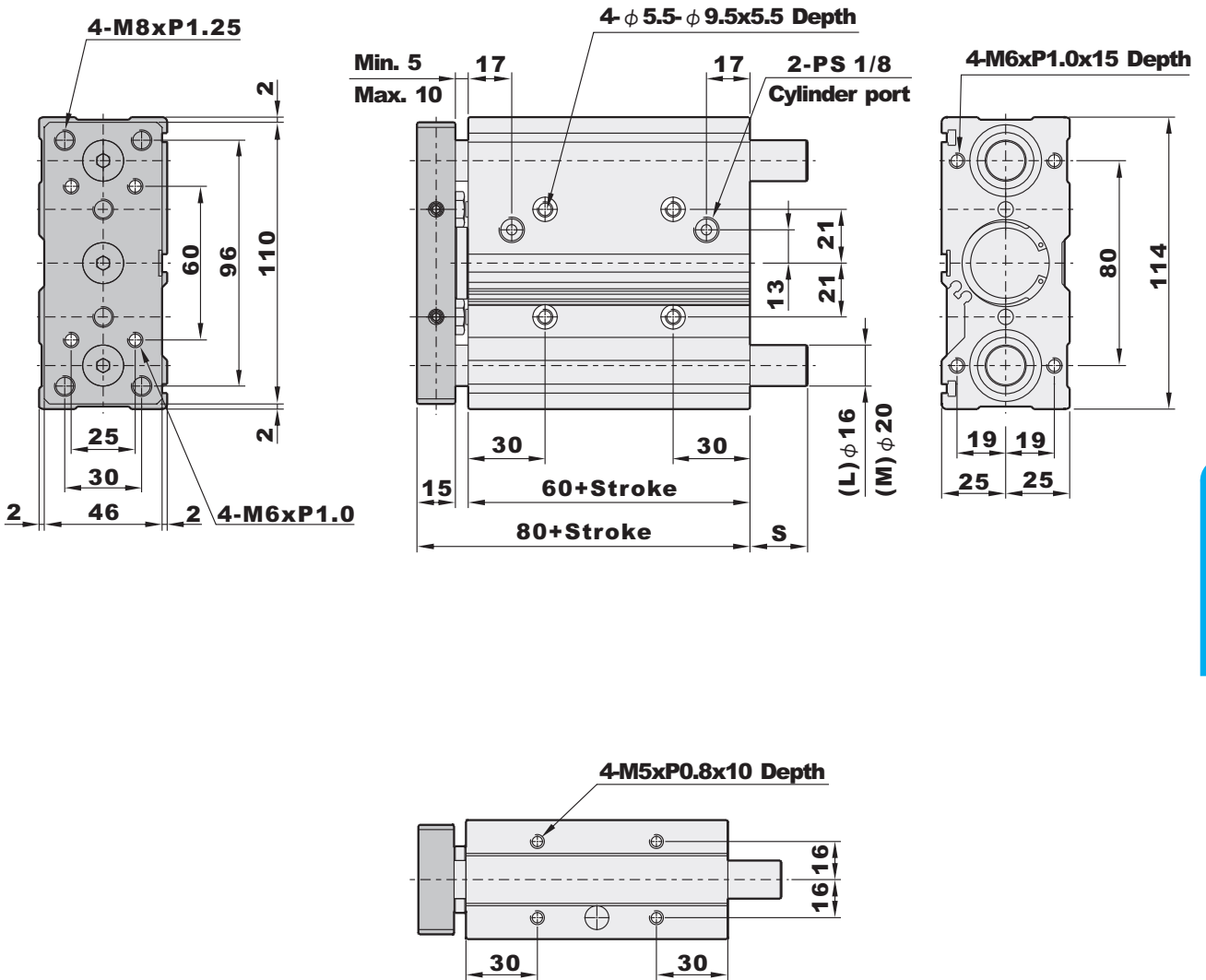


Sensor mounting example



Dimensions

TR series



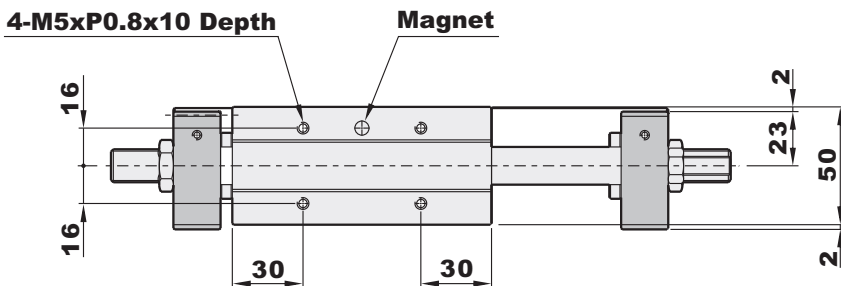
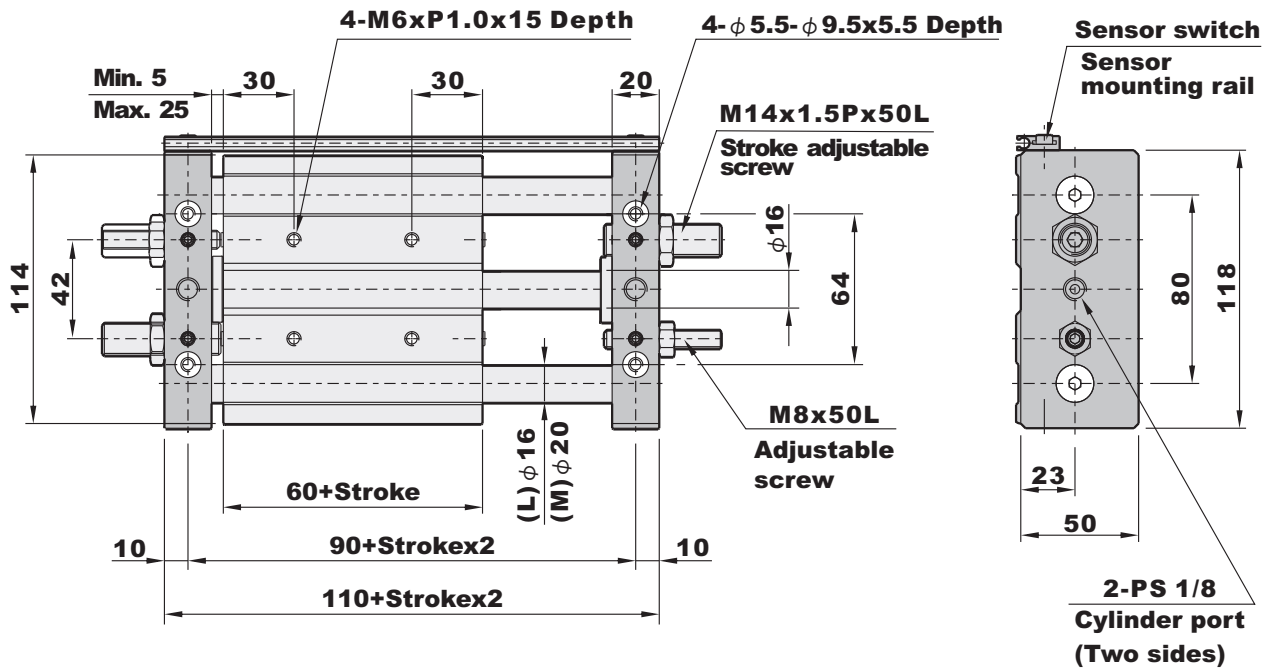
AIR CYLINDERS

(Unit : mm)

Bore size	S (Stroke)					
	25	50	75	100	125	150
φ32	0	0	22.5	22.5	22.5	22.5

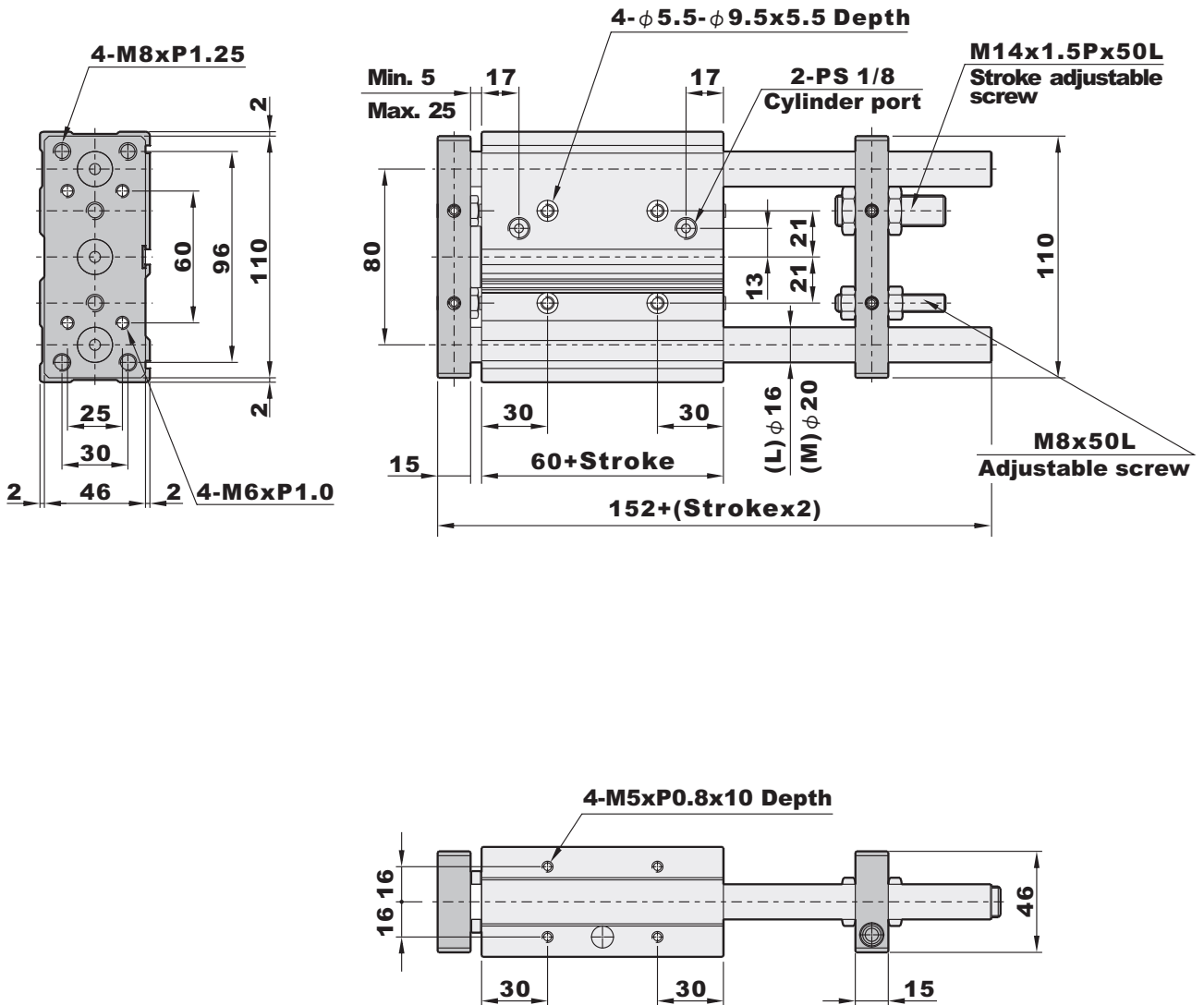
Dimensions

TRD series



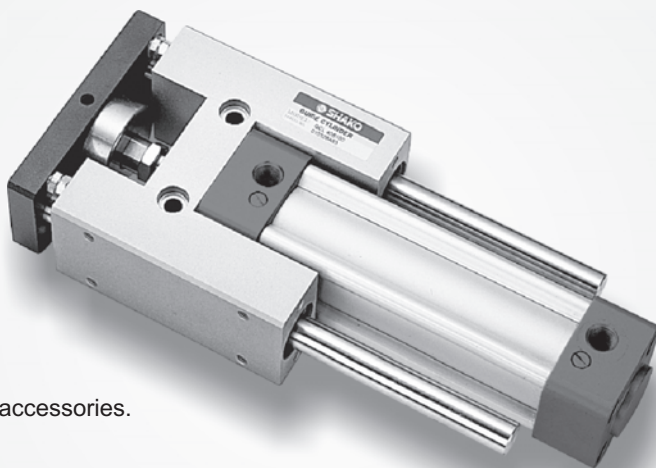
Dimensions

TRA series



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

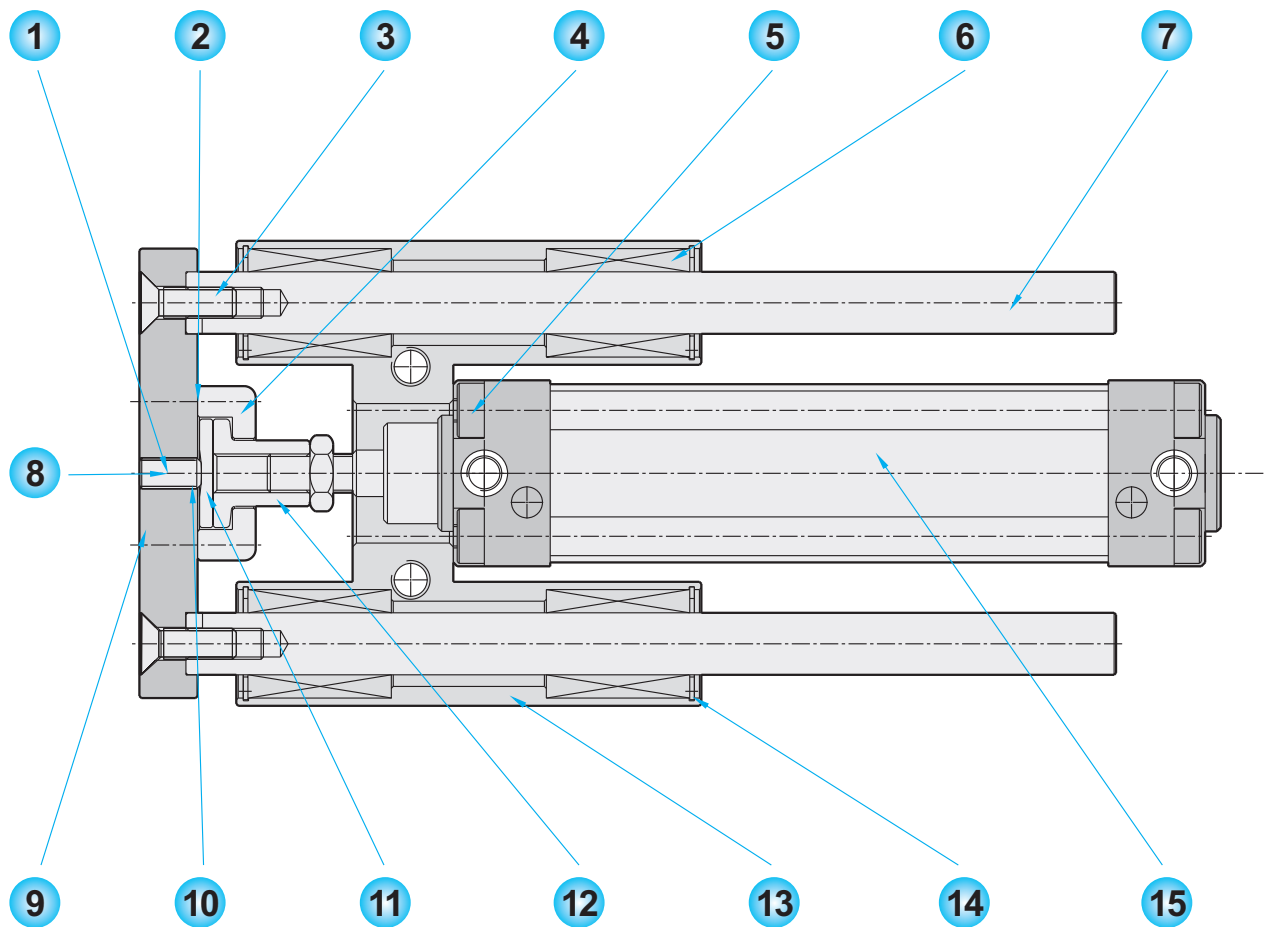
GC	L	32	B	50	A1	F	SF	1
Guide cylinder	Guide rod	Bore size	Stroke	Shock absorber/Number	Shock absorber	Sensor type	Number of sensor	
	B Bush bearing	32 φ 32		A1 1 pc	F Assembly in front	Blank W/O sensor		
	L Linear bearing	40 φ 40		A2 2 pcs	B Assembly in rear	SF LED in front		1 pc
		50 φ 50				ST LED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

- * Please refer to page 6-13 "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 ²					
Max operating pressure	10.5 kgf/cm ²					
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



AIR CYLINDERS

No.	Description	Material	Qty.
1	Press unit	Industrial plastic	1
2	Fixing screw	Carbon steel	4
3	Fixing screw	Carbon steel	2
4	Cap	Carbon steel	1
5	Fixing screw	Carbon steel	4
6	Linear bearing	Bearing steel	4
7	Guide rod	Bearing steel	2
8	Adjustable screw	Carbon steel	1

No.	Description	Material	Qty.
9	Plate	Aluminum alloy	1
10	Adjustable screw	Carbon steel	1
11	Press unit	Carbon steel	2
12	T type adaptor	Carbon steel	1
13	Guide body	Aluminum alloy	1
14	Snap ring	Carbon steel	4
15	ISO6431 standard cylinder	Aluminum alloy	1

Theoretical force

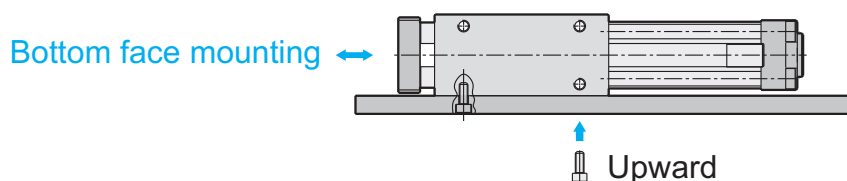
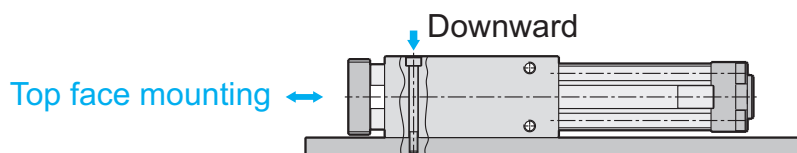
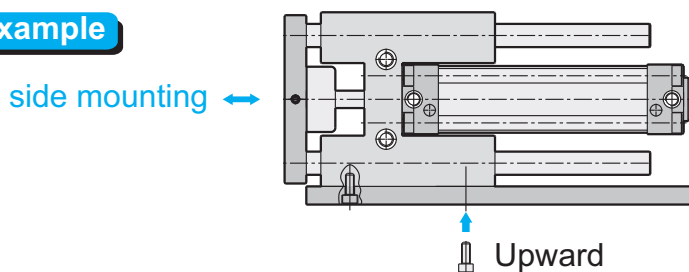
Bore size	Rod diameter	Acting	Piston area cm ²	Operating pressure kgf/cm ²					
				2	3	4	5	6	7
φ 32	φ 12	Push	8.04	16.08	24.12	32.16	40.2	48.24	56.28
		Pull	6.91	13.82	20.73	27.64	34.56	41.46	48.37
φ 40	φ 16	Push	12.57	25.14	37.71	50.28	62.85	75.42	87.99
		Pull	10.56	21.12	31.68	42.24	52.8	63.36	73.92
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

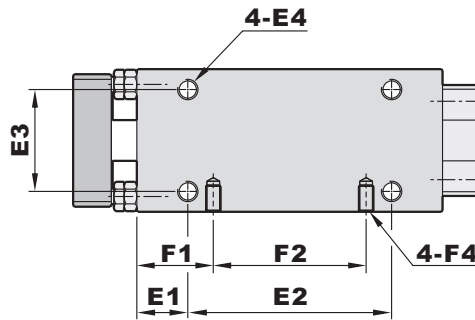
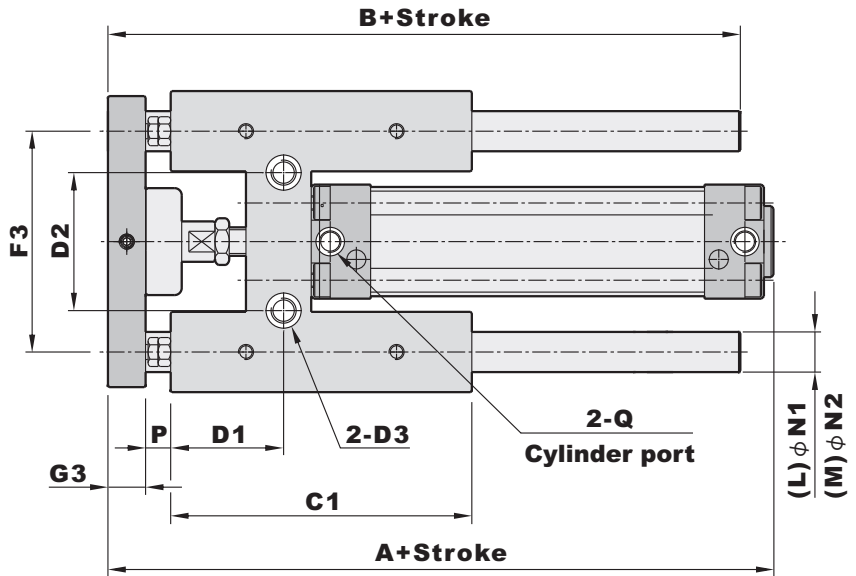
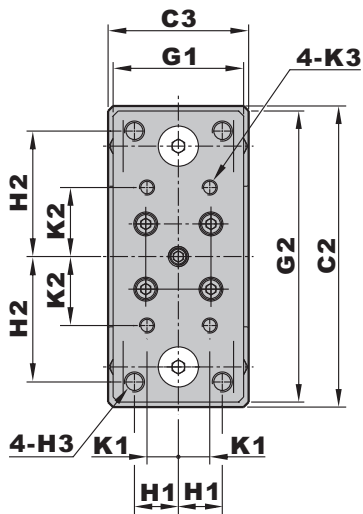
Note: Please contact our sales for non-standard stroke.

Mounting example



— Dimensions

● Standard type



(Unit : mm)

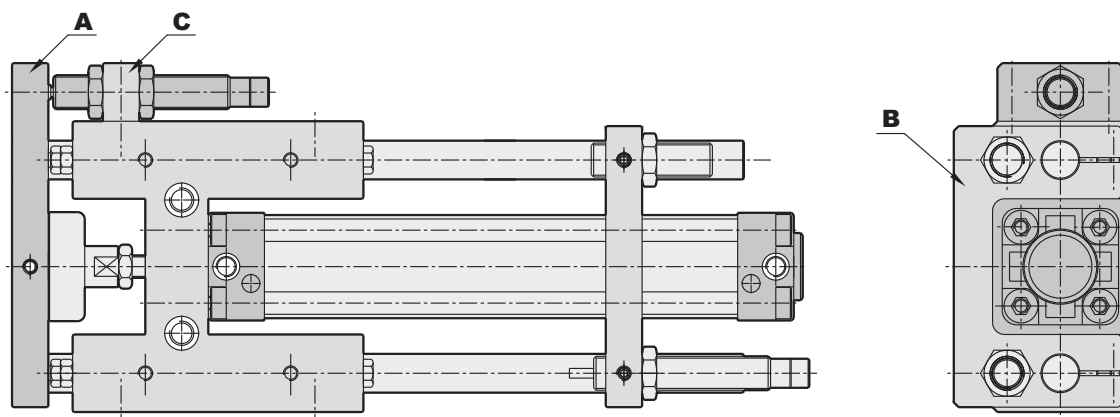
Bore size	A	B	C1	C2	D1	D2	D3	E1	E2	E3	E4	F1	F2	F3
φ32	179	152	120	120	45	55	φ 8.5- φ 14x8.5 Depth	20	80	40	M6xP1.0x15 Depth	30	60	88
φ40	180	152	120	120	45	55	φ 8.5- φ 14x6 Depth	20	80	40	M6xP1.0x15 Depth	30	60	88
φ50	219	200	160	160	65	80	φ 10.5- φ 17x11Depth	30	100	50	M8xP1.25x20 Depth	40	80	120
φ63	236	200	160	160	65	80	φ 10.5- φ 17x7 Depth	30	100	50	M8xP1.25x20 Depth	40	80	120
φ80	280	270	220	220	90	120	φ 12.5- φ 20x13 Depth	40	140	80	M10xP1.5x20 Depth	60	100	170
φ100	290	270	220	220	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
φ32	M6xP1.0x10 Depth	52	116	15	17.5	50	M8xP1.25	12.5	27.5	M6xP1.0	16	20	10	PS 1/8
φ40	M6xP1.0x10 Depth	52	116	15	17.5	50	M8xP1.25	12.5	27.5	M6xP1.0	16	20	10	PS 1/4
φ50	M8xP1.25x15 Depth	74	156	20	25	65	M10xP1.5	20	40	M8xP1.25	20	25	10	PS 1/4
φ63	M8xP1.25x15 Depth	74	156	20	25	65	M10xP1.5	20	40	M8xP1.25	20	25	10	PS 3/8
φ80	M10xP1.5x20 Depth	110	216	25	40	90	M12xP1.75	30	55	M10xP1.5	25	30	10	PS 3/8
φ100	M10xP1.5x20 Depth	110	216	25	40	90	M12xP1.75	30	55	M10xP1.5	25	30	10	PS 1/2

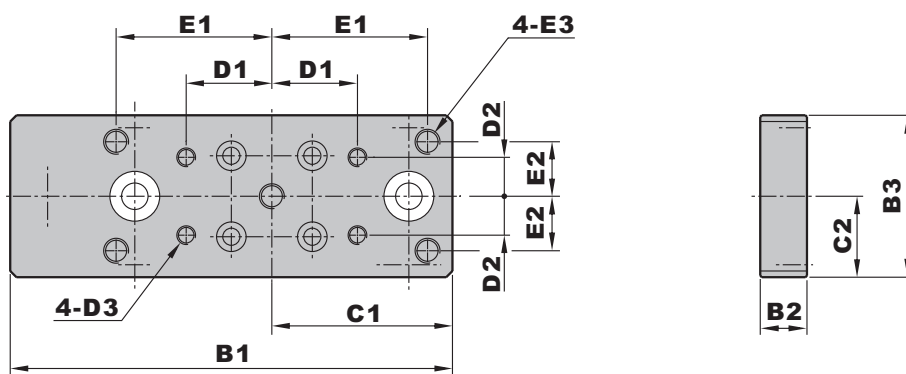
AIR CYLINDERS

Dimensions

Guide cylinder with shock absorber



A : Front plate

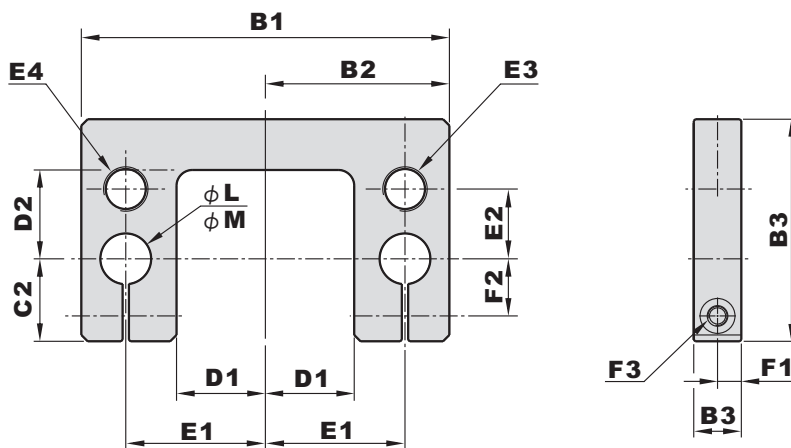


(Unit : mm)

Bore size	B1	B2	B3	C1	C2	D1	D3	E1	E2	E3
φ32	142	15	52	58	26	27.5	M6xP1.0	50	17.5	M8xP1.25
φ40	142	15	52	58	26	27.5	M6xP1.0	50	17.5	M8xP1.25
φ50	190	20	74	78	37	40	M8xP1.25	65	25	M10xP1.5
φ63	190	20	74	78	37	40	M8xP1.25	65	25	M10xP1.5
φ80	258	25	110	108	55	55	M10xP1.5	90	40	M12xP1.75
φ100	258	25	110	108	55	55	M10xP1.5	90	40	M12xP1.75

Dimensions

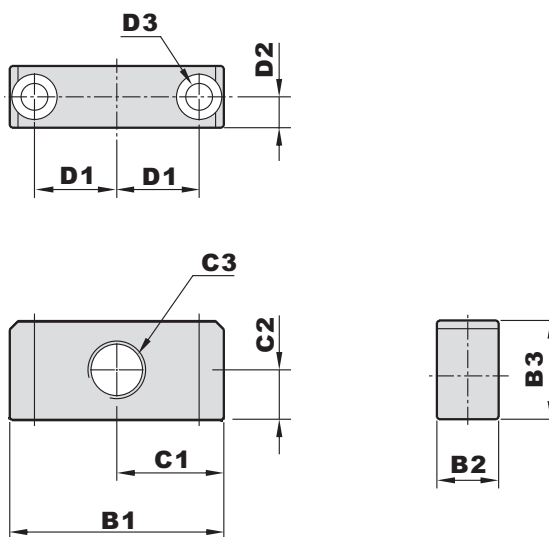
B : End plate



(Unit : mm)

Bore size	B1	B2	B3	C1	C2	D1	D2	E1	E2	E3	E4	F1	F2	F3
φ32	116	15	70	58	26	28	28	44	22	M14xP1.5	M14xP1.5	7.5	18	φ 6.5- φ 9.5x6.5 Depth
φ40	116	15	70	58	26	28	28	44	22	M14xP1.5	M14xP1.5	7.5	18	φ 6.5- φ 9.5x6.5 Depth
φ50	158	20	97	78	37	39	39	60	32	M14xP1.5	M20xP1.5	10	25	φ 8.5- φ 14x8.5 Depth
φ63	158	20	97	78	37	39	39	60	32	M14xP1.5	M20xP1.5	10	25	φ 8.5- φ 14x8.5 Depth
φ80	216	25	140	108	55	57.5	57.5	85	48	M14xP1.5	M25xP1.5	12.5	40	φ 10.5- φ 17x11 Depth
φ100	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

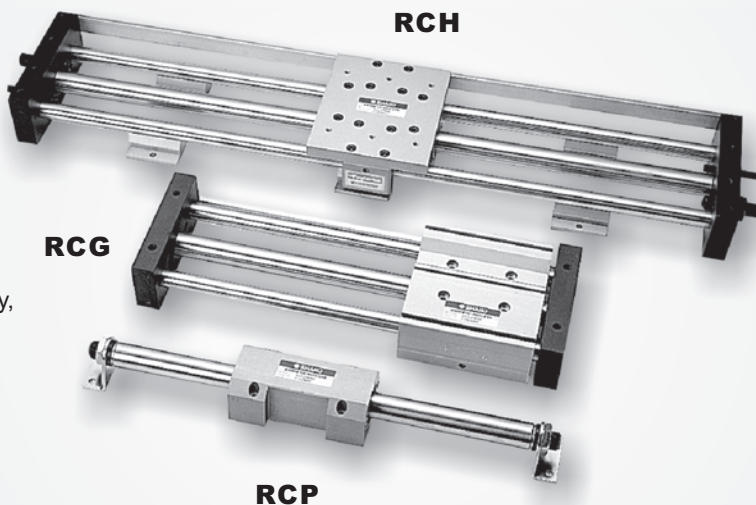


(Unit : mm)

Bore size	B1	B2	B3	C1	C2	C3	D1	D2	F3
φ32	52	15	24	26	12	M14xP1.5	20	7.5	φ 6.5- φ 9.5x6.5 Depth
φ40	52	15	24	26	12	M14xP1.5	20	7.5	φ 6.5- φ 9.5x6.5 Depth
φ50	74	20	32	37	16	M20xP1.5	25	10	φ 8.5- φ 14x8.5 Depth
φ63	74	20	32	37	16	M20xP1.5	25	10	φ 8.5- φ 14x8.5 Depth
φ80	110	25	40	55	20	M25xP1.5	40	12.5	φ 10.5- φ 17x11 Depth
φ100	110	25	40	55	20	M25xP1.5	40	12.5	φ 10.5- φ 17x11 Depth


Features

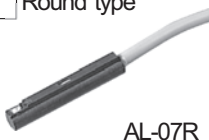
- * Utilize a special magnetic device to move cylinder body instead of piston rod acting, so the length of cylinder is half shorter than standard cylinder.
- * The piston in magnetic device is sealed by stainless steel tube that is completely isolated from cylinder body, which ensures leakage free and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



How to order

RCP		L		32		B		50		A1		SF		1	
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	φ 20	A1	1 pc	Blank	W/O sensor	SS	Square type	1 pc			
RCG	Guide type	L	Linear bearing	25	φ 25	A2	2 pcs	SR	Round type			2 pcs			
RCH	Mono-block with supporting type			32	φ 32										

AL-11R 

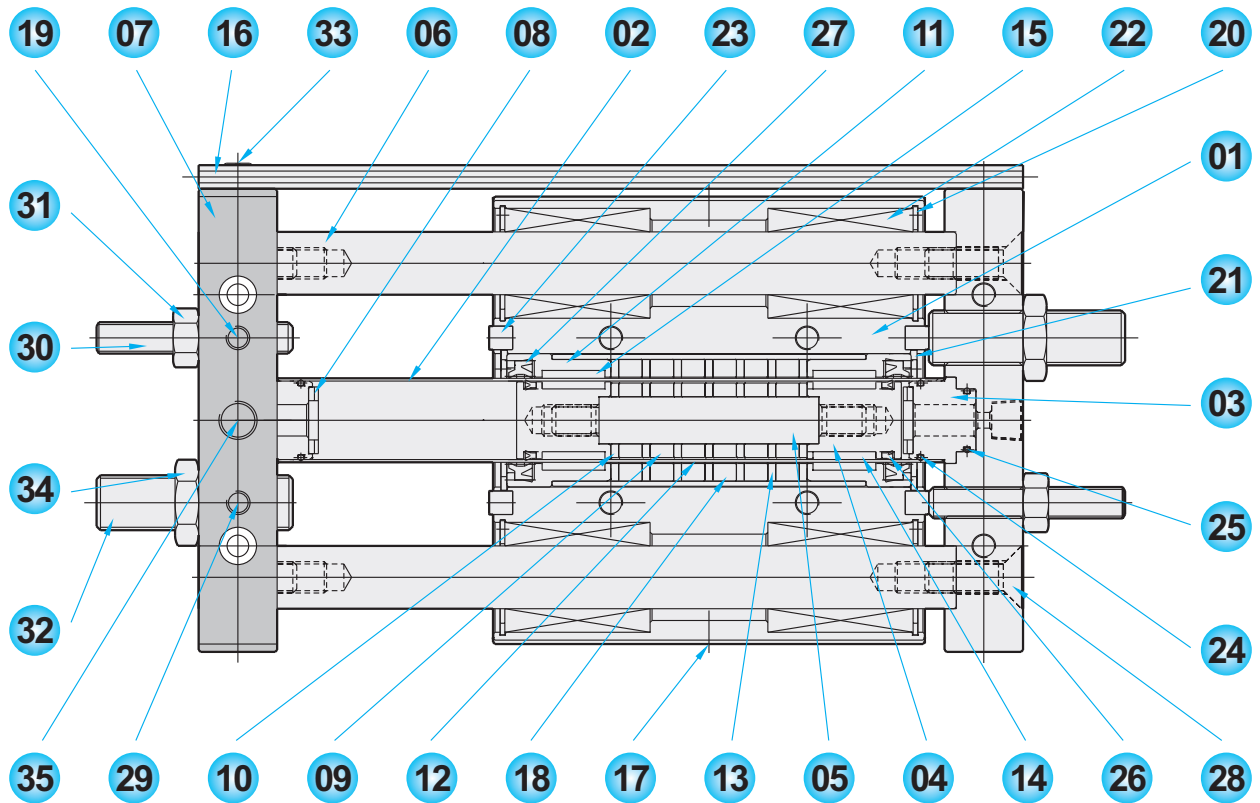
AL-07R 

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

Specifications

Bore size	φ 20	φ 25	φ 32
Port size	1/8"		
Fluid	Compressed air		
Acting	Double acting		
Operating pressure range	2 ~ 7 kgf/cm ²		
Max operating pressure	10.5 kgf/cm ²		
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



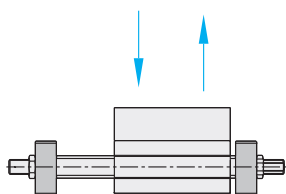
No.	Description	Material	Qty.	No.	Description	Material	Qty.
1	Cylinder body	Aluminum alloy	1	19	Press unit	Industrial plastic	4
2	Piston rod	Stainless steel	1	20	Snap ring	Spring steel	4
3	Top cover	Aluminum alloy	2	21	Snap ring	Spring steel	2
4	Piston	Aluminum alloy	2	22	Linear bearing	Bearing steel	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

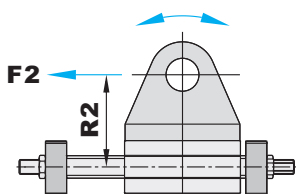
Bore size	Piston area cm ²	Operating pressure kgf/cm ²					
		2	3	4	5	6	7
φ 20	3.14	6.28	9.42	12.56	15.7	18.84	21.98
φ 25	4.91	9.82	14.73	19.64	24.55	29.46	34.37
φ 32	8.04	16.08	24.12	32.16	40.2	48.24	56.28

Allowable loads

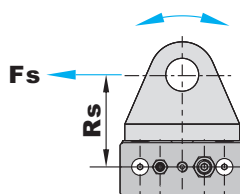
W2



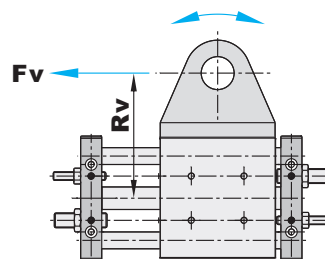
M2=F2XR2



Ms=FsXRr



Mv=FvXRv



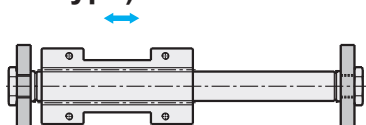
Stroke table

Bore size	Load W2(kgf-cm)	Load M2(kgf-cm)	Load Ms(kgf-cm)	Load Mv(kgf-cm)
φ 20	13	55	11	55
φ 25	20	100	20	100
φ 32	32	160	32	160

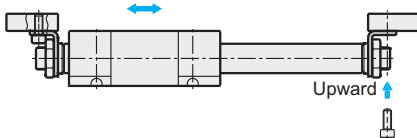
Bore size	Standard stroke(mm)
φ 20	100, 200, 300, 400, 500, 600, 700, 750, 800, 900, 1000
φ 25	
φ 32	

Mounting example

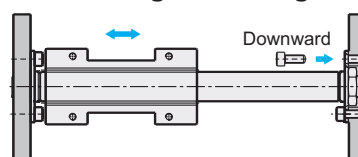
RCP(Mono-block type)



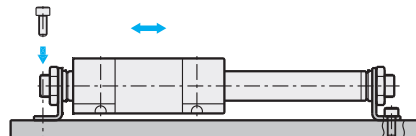
A type foot mounting



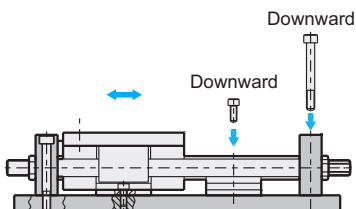
Flange mounting



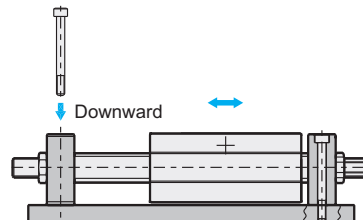
Downward



RCH(Mono-block with supporting type)

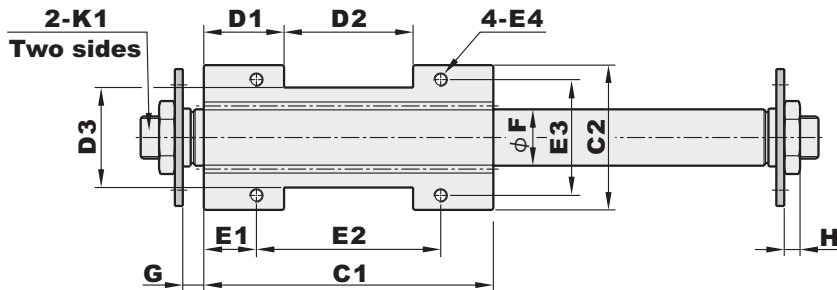


RCG(Guide type)



Dimensions

RCP series



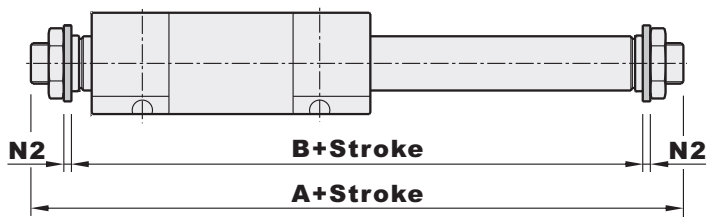
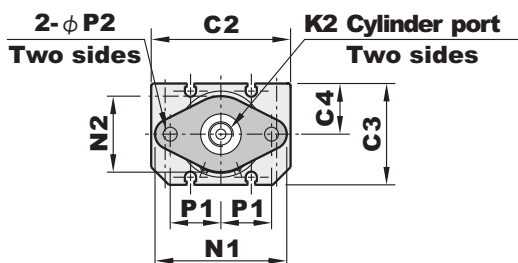
(Unit : mm)

Bore size	A	B	C1	C2	C3	D1	D2	D3	E1	E2	E3	E4	F	G	H
φ20	126	126	110	55	40	30.5	49	38	20	70	44	M5xP0.8x15dp	21.4	8	8
φ25	126	126	110	65	50	30.5	49	48	20	70	54	M5xP0.8x15dp	26.4	8	8
φ32	146	146	120	80	60	29	62	60	20	80	66	M6xP1.0x20dp	33.6	13	8

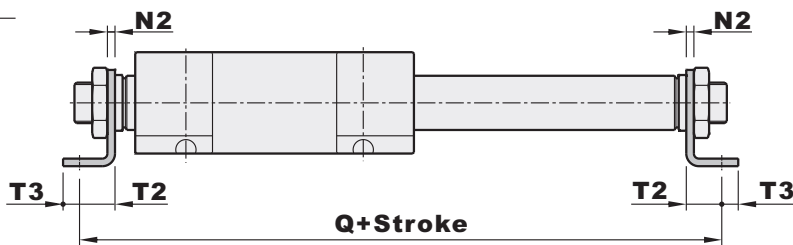
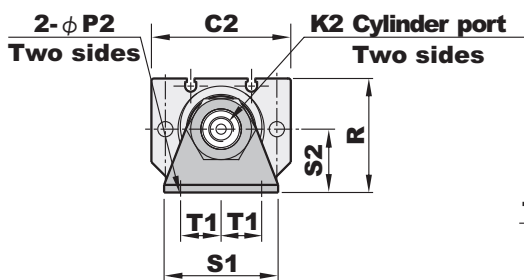
Bore size	K1	K2	N1	N2	N3	P1	P2	Q	R	S1	S2	T1	T2	T3
φ20	M16xP1.5xL16	RS 1/8	52	30	3	20	5.5	154	45	45	25	16	14	6.5
φ25	M22xP1.5xL20	RS 1/8	66	40	3	25	6.5	160	55	55	30	20	17	9
φ32	M22xP1.5xL20	RS 1/8	66	40	3	25	6.5	180	65	65	35	25	17	9

Mounting type

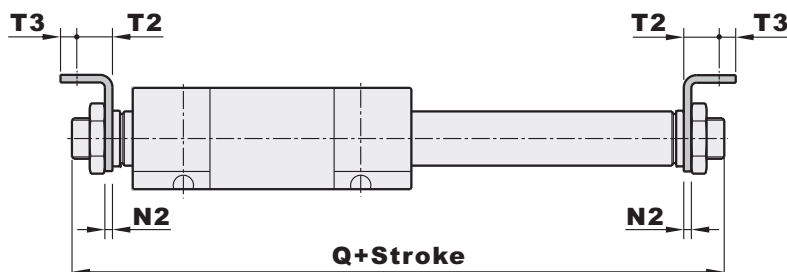
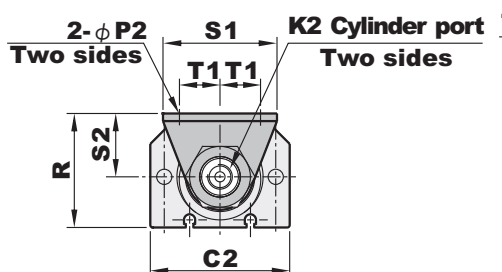
FA Flange mounting



L type foot mounting(Foot downward)

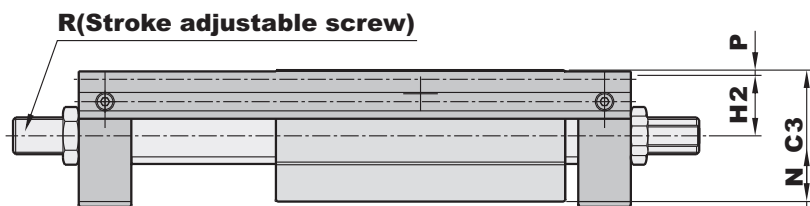
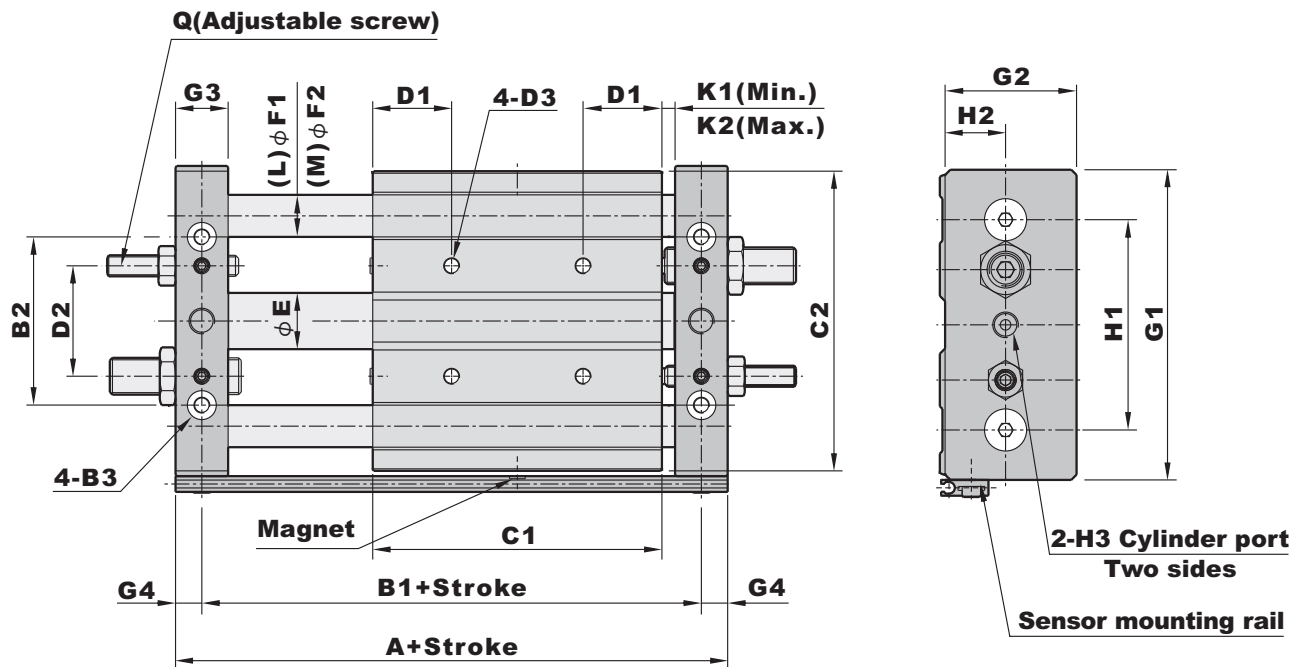


L type foot mounting(Foot upward)



Dimensions

RCG series



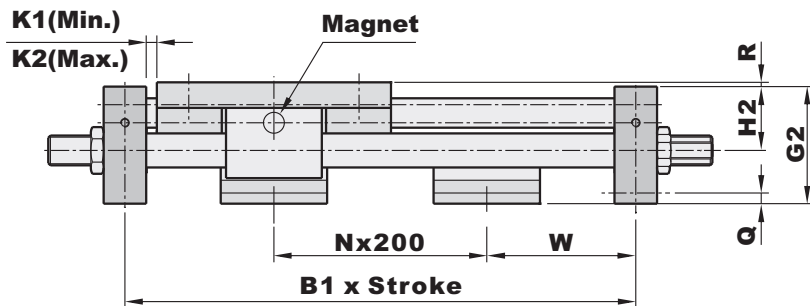
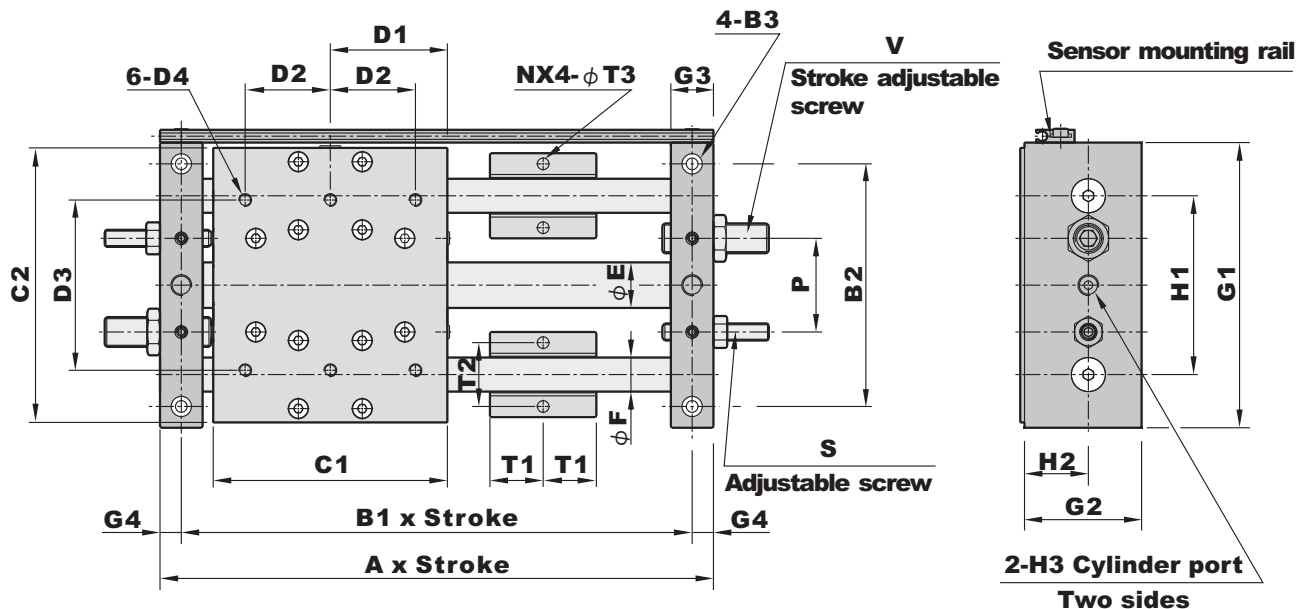
(Unit : mm)

Bore size	A	B1	B2	B3	C1	C2	D1	D2	D3	F1	F2	G1	G2
ϕ 20	126	140	64	ϕ 5.2- ϕ 9.5x5.5dp	110	114	30	42	M6xP1.0x15dp	16	20	118	50
ϕ 25	126	140	74	ϕ 5.2- ϕ 9.5x5.5dp	110	124	30	52	M6xP1.0x15dp	16	20	128	54
ϕ 32	146	165	94	ϕ 6.8- ϕ 11x6.5dp	120	150	35	66	M8xP1.25x20dp	20	25	154	62

Bore size	G3	G4	H1	H2	H3	K1	K2	N	P	Q	R
ϕ 20	20	10	80	23	RS 1/8	5	25	2	2	M8xP1.25xL50	M14xP1.5xL50
ϕ 25	20	10	90	25	RS 1/8	5	25	2	2	M8xP1.25xL50	M14xP1.5xL50
ϕ 32	25	12.5	112	29	RS 1/4	10	25	2	2	M14xP1.5xL50	M20xP1.5xL50

Dimensions

RCH series



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

(Unit : mm)

Bore size	A	B1	B2	B3	C1	C2	D1	D2	D3	D4	E	F	G1	G2	G3
$\phi 20$	160	140	114	$\phi 5.2-\phi 9.5 \times 5.5dp$	110	129	55	40	80	M5xP0.8x15dp	21.4	16	134	55	20
$\phi 25$	160	140	124	$\phi 5.2-\phi 9.5 \times 5.5dp$	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
$\phi 20$	10	84	30	RS 1/8	5	25	44	5	2	M8xP1.25xL50	25	30	5.5	M14xP1.5xL50
$\phi 25$	10	94	35	RS 1/8	5	25	54	5	2	M8xP1.25xL50	25	30	5.5	M14xP1.5xL50

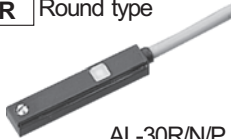


How to order

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 pc
SR	Round type	2 pcs



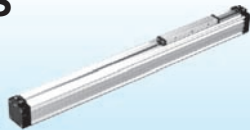
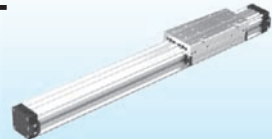



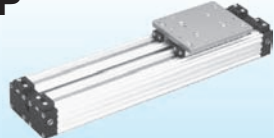
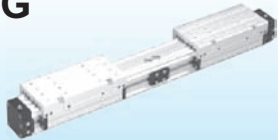
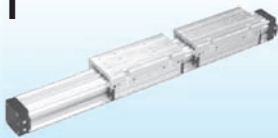
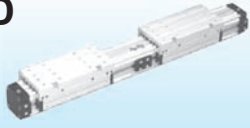
AL-30R/N/P

Stroke table

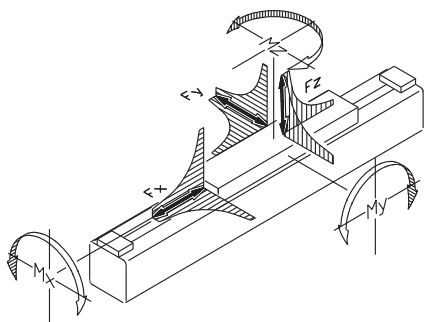
Bore size	Standard stroke (mm)
φ 18	50, 100, 150, 200, 250, 300, 350,
φ 25	400, 450, 500, 550, 600, 650,
φ 32	700, 750, 800, 850, 900, 950,
φ 40	1000, 1050, 1100, 1150, 1200,
φ 50	1250, 1300, 1350, 1400, 1450,
φ 63	1500, 1550, 1600, 1650, 1700,
	1750, 1800, 1850, 1900, 1950,
	2000

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 ²					
Max operating pressure	8 kgf/cm ²					
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 	ZS Standard cylinder With identical fitting length as existing cylinders without piston. 0-stroke compatible.	Standard
ZF 	ZF Guiding cylinder With external and adjustable slide guide. For high loads.	Standard
ZK 	ZK Short cylinder With extremely shortened fitting length. 0-stroke up to 42% shorter.	Standard
ZFF 	ZFF Guiding cylinder With external and adjustable slide guide. For high loads.	Option
ZFK 	ZFK Guiding cylinder With external and adjustable slide guide. For high loads.	Option
ZP 	ZP Parallel cylinder For high loads and movements in every direction double action force central port.	Option
ZG 	ZG Gripping cylinder Gripping and clamping functions. Opening & closing function.	Option
ZT 	ZT Tandem cylinder For high movements in longitudinal direction.	Option
ZD 	ZD Double action cylinder Double action force pressing, embossing, punching...etc.	Option

Loads



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

Note:

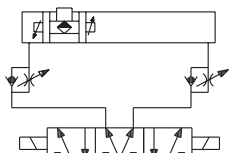
All data concerning forces and torques refer to a speed of $V < 0.35 \text{ m/s}$.

Observation keeping the indicated values ensures maximum service life, minimum noise and optimum noise and optimum operating results.

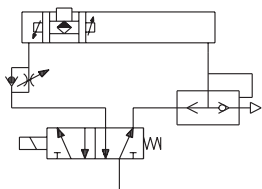
Higher speeds reduce the admissible forces.

Controls

5/3WAY VALVES



5/2WAY VALVES



ZS Standard cylinder

Piston	$V_{\max} \leq 0.35 \text{ m/s}$			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

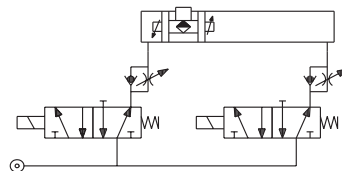
ZK Short cylinder

Piston	$V_{\max} \leq 0.35 \text{ m/s}$			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

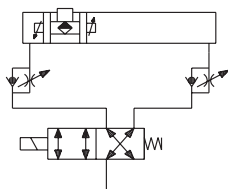
ZF Guiding cylinder

Piston	$V_{\max} \leq 0.35 \text{ m/s}$			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

5/2WAY VALVES

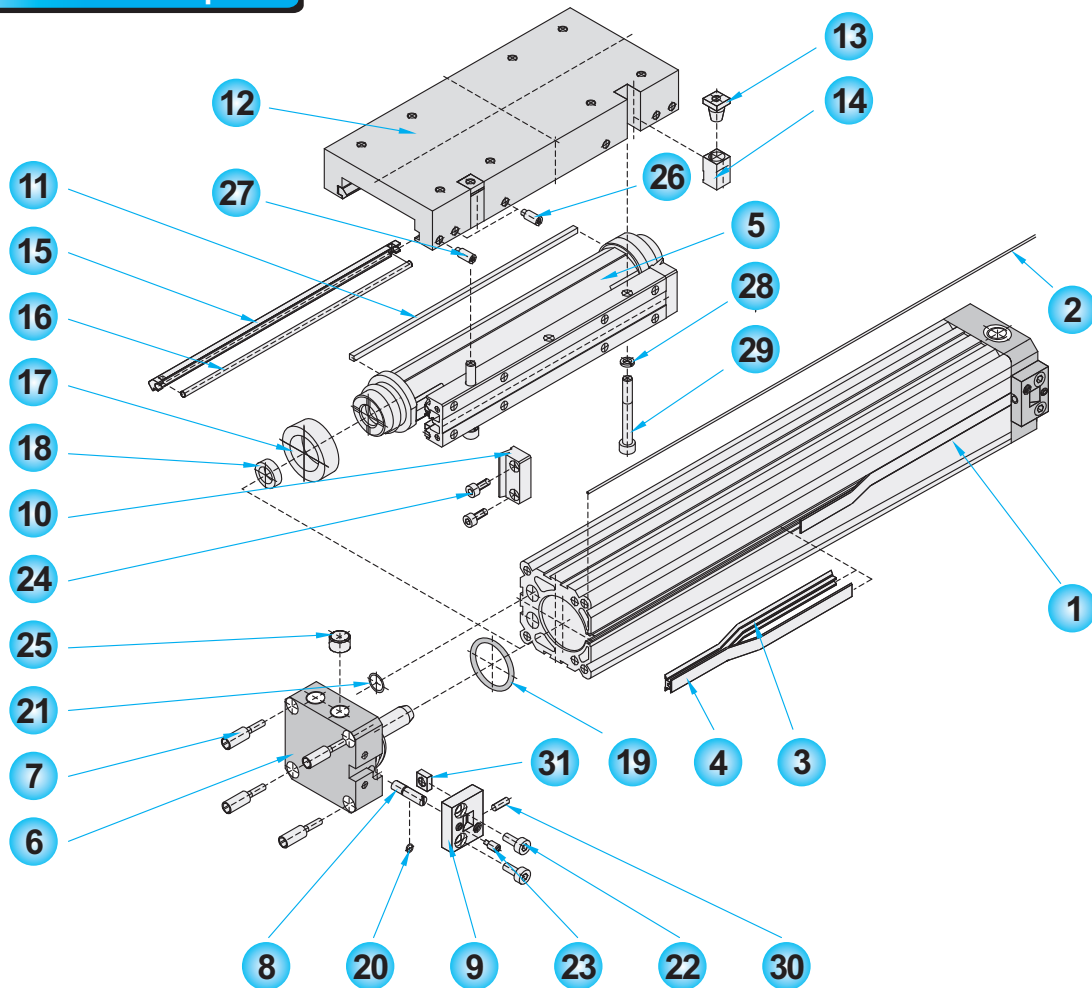


4/2WAY VALVES



- 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



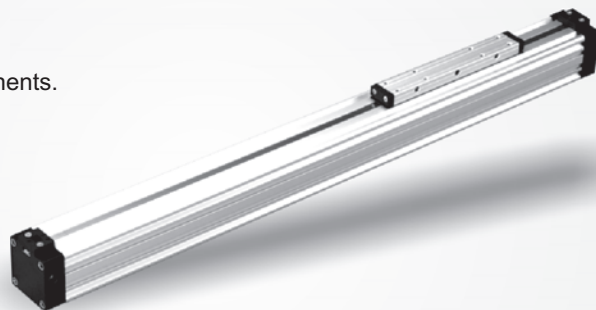
AIR CYLINDERS

No.	Description	Material
1	Tube	Al anodized
2	Round profile	PU
3	Sealing strip	PA
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

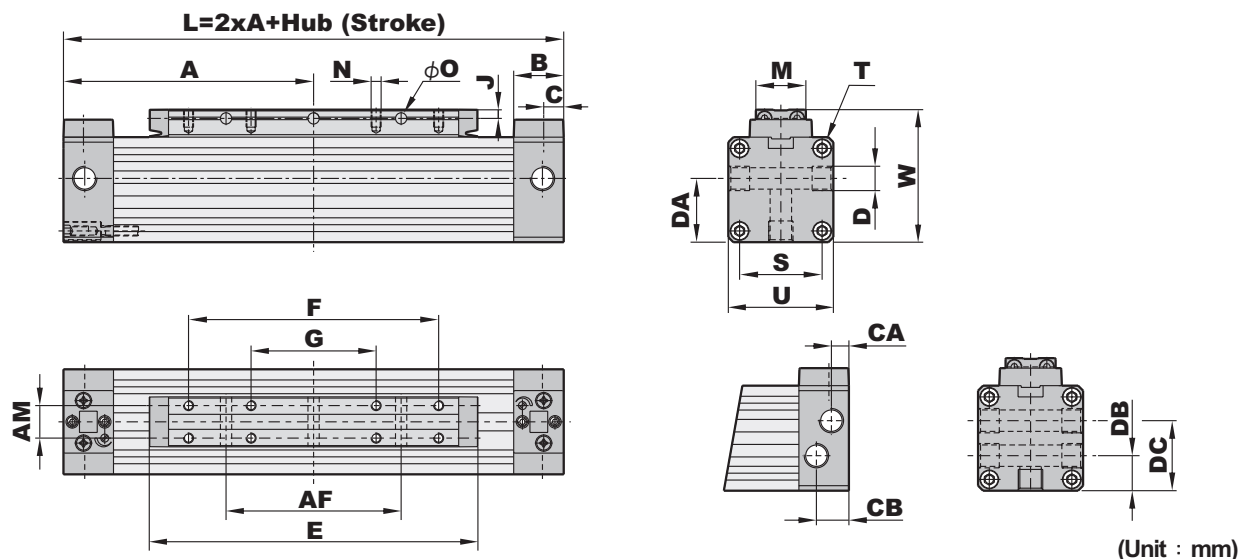
No.	Description	Material
17	Piston seal	PU
18	Cushion ring	NBR
19	O-ring	NBR
20	O-ring	NBR
21	Flat seal	NBR
22	Countersink screw	Zinc-plated steel
23	Grub screw with pin	Zinc-plated steel
24	Cylinder head screw	Zinc-plated steel
25	Plug screw	Zinc-plated steel
26	Grub screw	Browned steel
27	Grub screw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

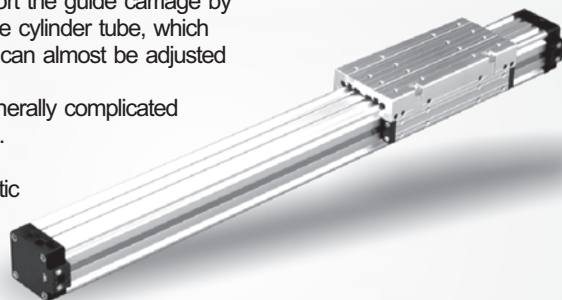


Bore size	A	AF	AM	B	C	CA	CB	D	DA	DB	DD	E
φ18	80	50	10	16.5	6.5	—	—	M7x1/6	15.5	—	—	103
φ25	100	70	13	20	8.5	7	13	G1/8x8	25.5	14	18.5	131
φ32	120	100	16	20	8.5	7	13	G1/8x8	32	16	21	171
φ40	150	140	22	23	13	11	14.5	G1/4x12	37.5	18.5	29.5	220
φ50	180	180	29	23	13	12	14	G1/4x12	47.5	22.5	37	280
φ63	215	215	40	29	13	12.5	15.5	G3/8x12	59.5	24.5	44.5	333

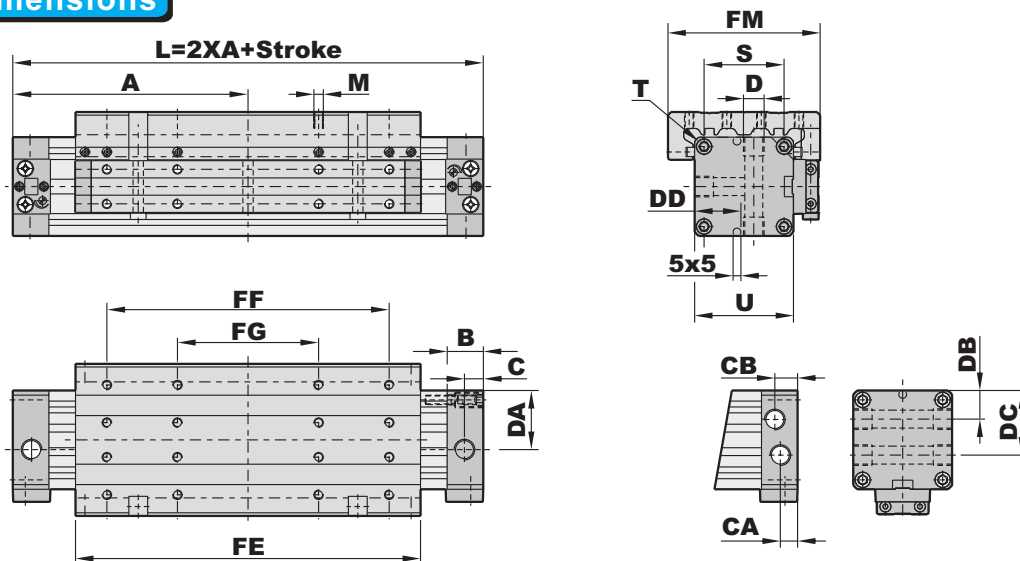
Bore size	F	FE	G	J	M	N	O	S	T	U	W
φ18	75	90	—	3	15.5	M3x6	3.5	23.5	M3x7	30	39
φ25	100	116	50	3.5	20	M4x7	4.5	33	M4x9	42	53
φ32	140	156	70	4.5	25	M5x9	5.5	41	M5x10	52	65
φ40	180	220	90	5	33	M6x10	7	51	M6x12	63	79
φ50	220	260	110	6.5	42	M8x12.5	7	63	M8x12	78	96
φ63	280	313	140	8	54	M8x15	9	78	M8x12	93	113.5

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 sloth 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



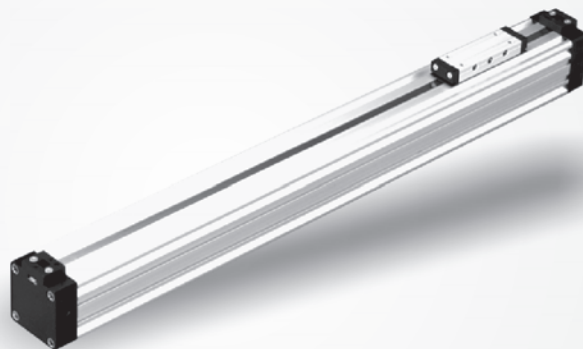
(Unit : mm)

Bore size	A	AF	AM	B	MC	C	CA	CB	D	DA	DB	DC
φ18	80	50	10	16.5	35	6.5	—	—	M7x1/6	17.5	—	—
φ25	100	70	13	20	45	8.5	7	13	G1/8x8	25.5	14	28
φ32	120	100	16	20	55	8.5	7	13	G1/8x8	32	17.5	34.5
φ40	150	140	22	24	70	13	9.5	14.5	G1/4x12	37.5	20	42
φ50	180	180	29	24	85	13	9.5	14	G1/4x12	47.5	26	52
φ63	215	215	40	30	105	13	11	18.5	G3/8x12	59.5	30	62

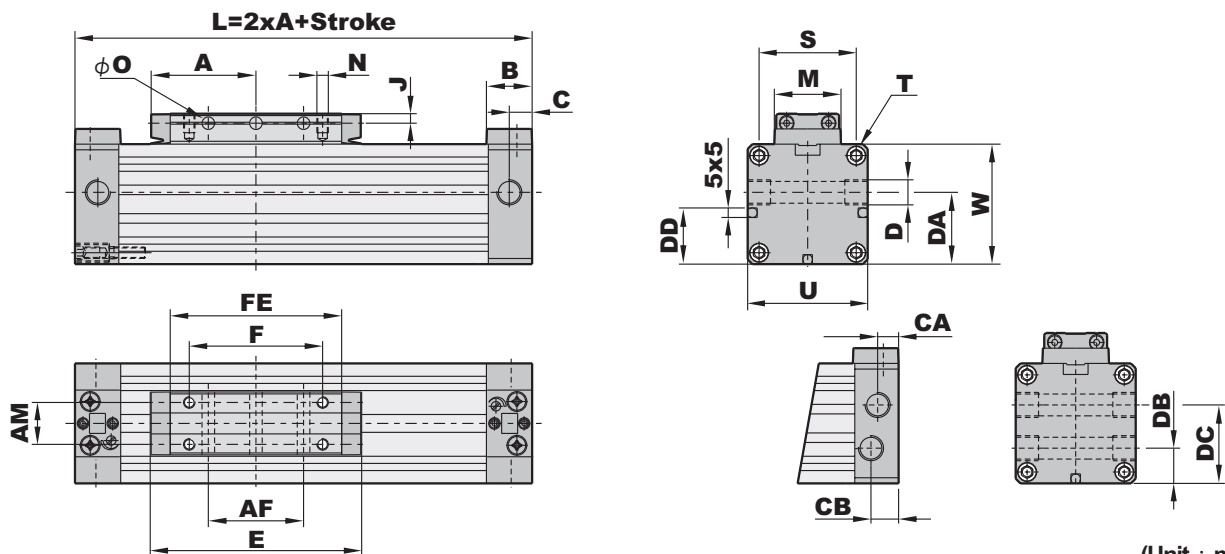
Bore size	DD	FE	FF	FG	FM	FW	N	S	T	U
φ18	—	103	75	—	50	39	M4x7.5	23.5	M3x7	30
φ25	18.5	131	100	50	66	53	M4x8	33	M4x9	42
φ32	21	171	140	70	80	65	M5x10	41	M5x10	52
φ40	29.5	220	180	90	97	79	M6x12	51	M6x12	63
φ50	37	280	220	110	116	96	M8x16	63	M8x12	78
φ63	44.5	333	280	140	136	113.5	M8x16	78	M8x12	93

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



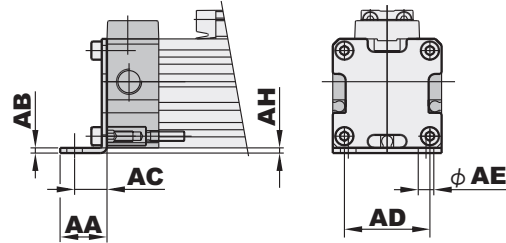
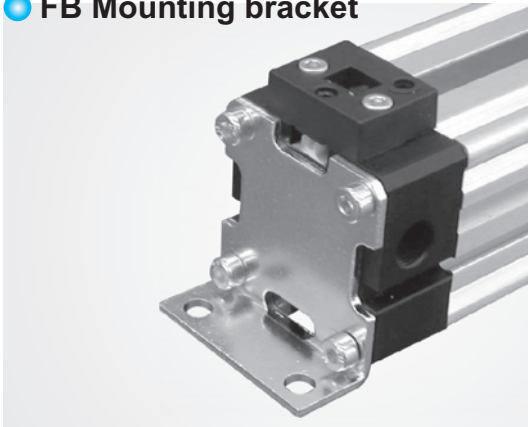
(Unit : mm)

Bore size	A	AF	AM	B	C	CA	CB	D	DA	DB	DD
φ18	57.5	15	10	16.5	6.5	—	—	M7x1/6	17.5	—	—
φ25	67.5	19	13	20	8.5	7	13	G1/8x8	25.5	14	18.5
φ32	77.5	35	16	20	8.5	7	13	G1/8x8	32	17.5	21
φ40	95	50	22	24	13	9.5	14.5	G1/4x12	37.5	20	29.5
φ50	105	46	29	24	13	9.5	14	G1/4x12	47.5	26	37
φ63	125	70	40	30	13	11	18.5	G3/8x12	59.5	30	44.5

Bore size	F	FE	G	J	M	N	O	S	T	U	W
φ18	58	30	90	3	15.5	M3x6	3.5	23.5	M3x7	30	39
φ25	66	35	116	3.5	20	M4x7	4.5	33	M4x9	42	53
φ32	86	55	156	4.5	25	M5x9	5.5	41	M5x10	52	65
φ40	110	70	220	5	33	M6x10	7	51	M6x12	63	79
φ50	130	70	260	6.5	42	M8x12.5	7	63	M8x12	78	96
φ63	153	100	313	8	54	M8x15	9	78	M8x12	93	113.5

Dimension of mounting parts

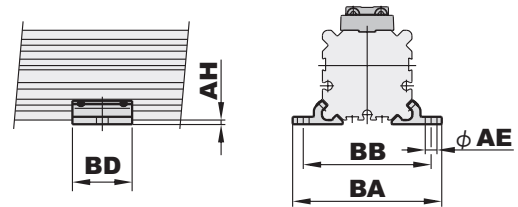
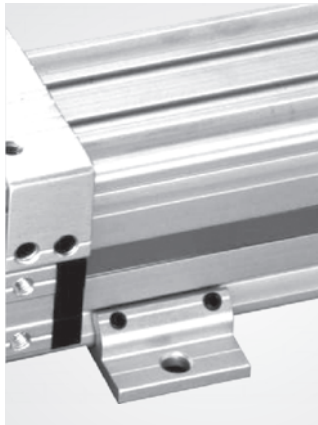
FB Mounting bracket



(Unit : mm)

Bore size	Order code	AA	AB	AC	AD	AE	AH
φ18	1182-0001	15	2	10	20	6	2
φ25	1252-0001	18	2	12.5	30	6	2
φ32	1322-0001	20	2.5	13.5	40	7	3
φ40	1402-0001	30	3	17.5	50	9	3.5
φ50	1502-0001	28	3	20	60	9	3
φ63	1632-0001	30	3	21	75	11	4.5

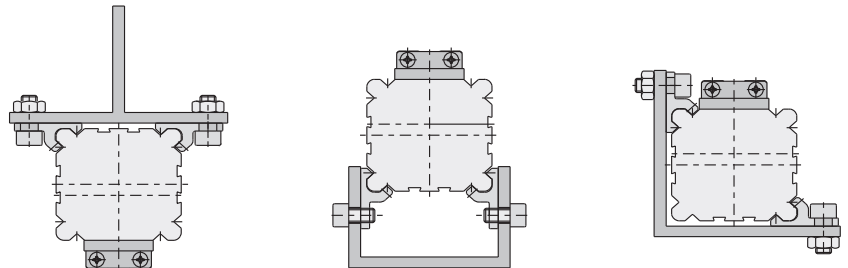
MB Middle support



(Unit : mm)

Bore size	Order code	AE	AH	BA	BB	BC	BD	BE	BF
φ18	1183-0001	6	2	56	46	36.5	23	2.5	8.25
φ25	1253-0001	6	2	70	60	50	28	3.5	11
φ32	1323-0001	7	3	85	73	61.5	33	4	13.8
φ40	1403-0001	9	3	105	90	75	38	4.5	16
φ50	1503-0001	9	3	122	106	91	43	5	19
φ63	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.

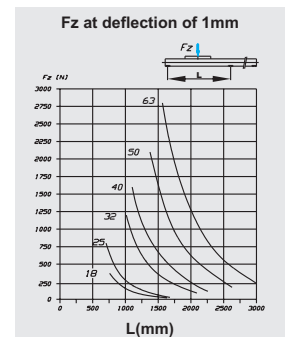
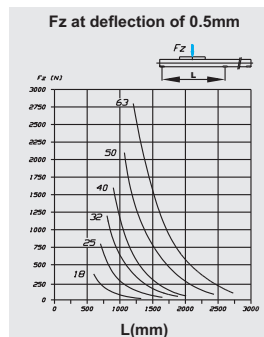
Example:

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

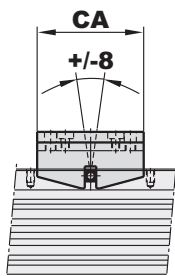
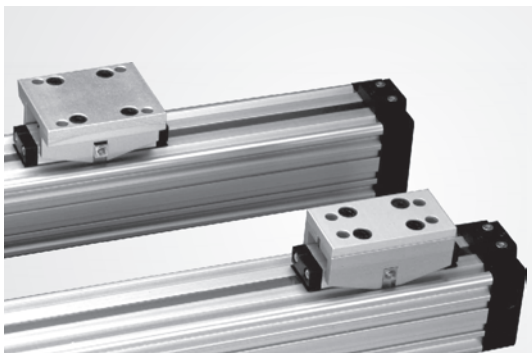
In case very long cylinders are installed without supports, and additional profile can be used as a support.

Examples: all versions with middle support and standard profiles.

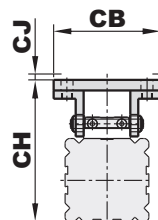


Dimensions

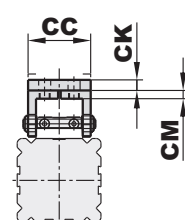
PB Swinging bridge



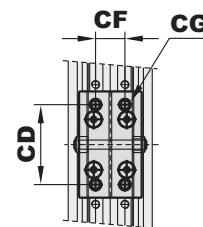
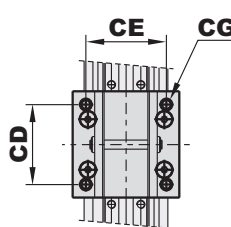
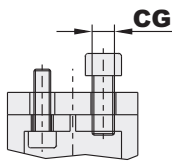
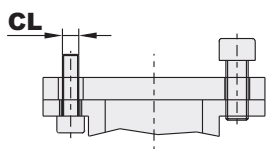
1XX5-0000



1XX5-0001



Mounting

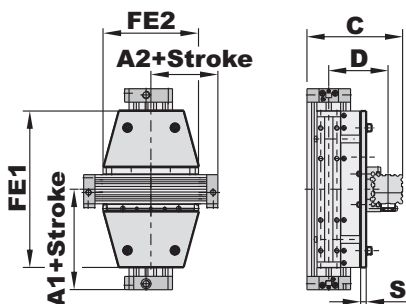


(Unit : mm)

Bore size	Order code		CA	CB	CD	CE	CF	CG	CH	CJ	CK	CM	CL
φ 18	1185-0000	1185-0001	50	41.5	30	34	9	M5	54	2.5	4	4	M4
φ 25	1255-0000	1255-0001	60	50	40	38	14	M5	70	3	4	4	M4
φ 32	1325-0000	1325-0001	70	60	50	48	16	M6	86	3.5	6	6	M5
φ 40	1405-0000	1405-0001	80	80	60	60	22	M8	107	4.5	8	8	M6
φ 50	1505-0000	1505-0001	90	95	70	70	30	M8	123	4.5	8	8	M6
φ 63	1635-0000	1635-0001	100	120	80	80	40	M10	145.5	5	8	8	M8

KT Cross support

(Unit : mm)



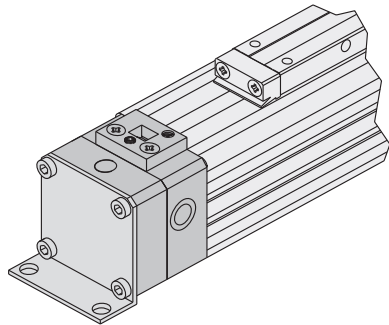
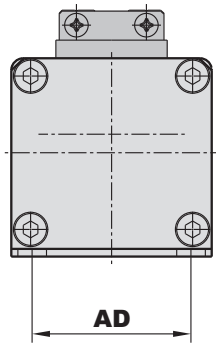
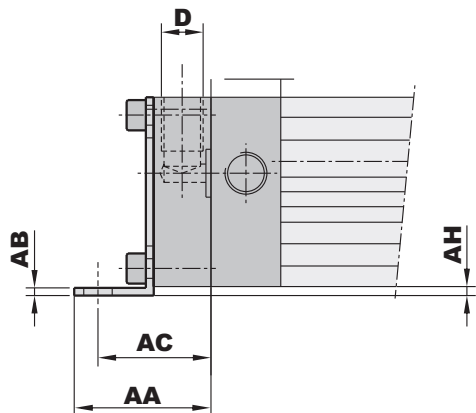
Bore size	Order code	A1	A2	C	D	FE1	FE2	S
φ 18: φ 18	1186-0000	80	80	84	54	103	103	6
φ 25: φ 25	1256-0000	100	100	114	72	131	131	8
φ 32: φ 32	1326-0000	120	120	140	88	171	171	10
φ 40: φ 40	1406-0000	150	150	168	105	220	220	10
φ 50: φ 50	1506-0000	180	180	204	126	280	280	12
φ 63: φ 63	1636-0000	215	215	239	146	333	333	12

Bore size	Order code	A1	A2	C	D	FE1	FE2	S
φ 25: φ 25	1256-0001	100	80	100	64	131	131	8
φ 32: φ 32	1326-0001	120	100	128	81	171	171	10
φ 40: φ 40	1406-0001	150	120	154	96.5	220	220	10
φ 50: φ 50	1506-0001	180	150	187	116.5	280	280	12
φ 63: φ 63	1636-0001	215	180	221.5	136	333	333	12

Bore size	Order code	A1	A2	C	D	FE1	FE2	S
φ 32: φ 32	1326-0002	120	80	112	71	171	103	8
φ 40: φ 40	1406-0002	150	100	142	142	220	131	10
φ 50: φ 50	1506-0002	180	120	171	171	280	171	10
φ 63: φ 63	1636-0002	215	150	204.5	204.5	333	220	12

Dimensions

KA Yoke side port (FB Mounting brackets)

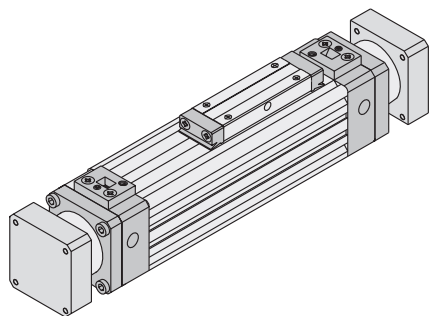
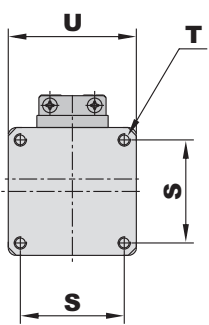
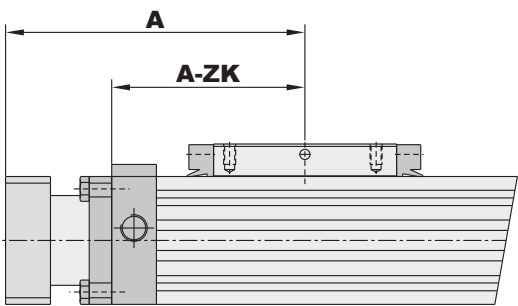


(Unit : mm)

- * 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
φ 18	26	2	21	2	M7x1/6
φ 25	32	2	26.5	2	G1/8x7.7
φ 32	34	2.5	27.5	3	G1/8x7.7
φ 40	43	3	35.5	3	G1/4x11.7
φ 50	46	3	38	3	G1/4x11.7
φ 63	54	3	45	4.5	G3/8x11.7

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



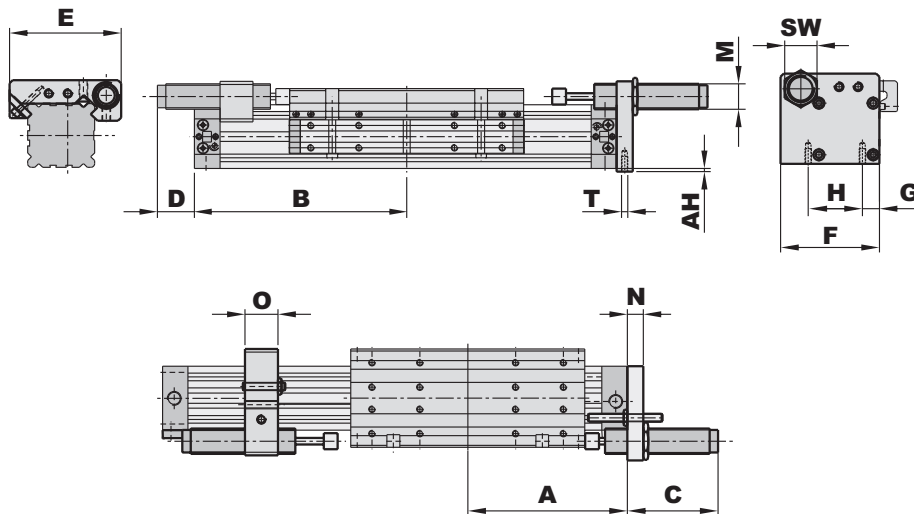
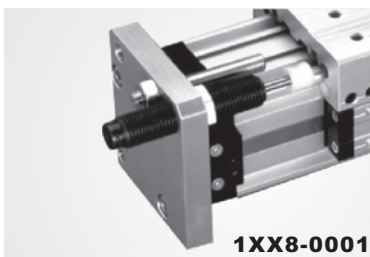
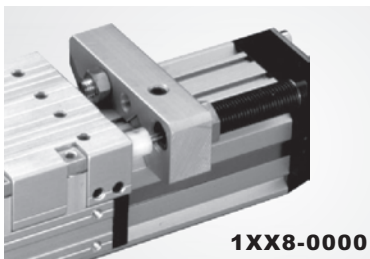
(Unit : mm)

Bore size	Order code	A	S	T	U
φ 18	AP00018	80	23.5	M3x6	30
φ 25	AP00025	100	33	M4x7	42
φ 32	AP00032	120	41	M5x9	52
φ 40	AP00040	150	51	M6x10	63
φ 50	AP00050	180	63	M8x12.5	78
φ 63	AP00063	215	78	M8x15	93

AIR CYLINDERS

Dimensions

AS Stop adjustment



1XX8-0000

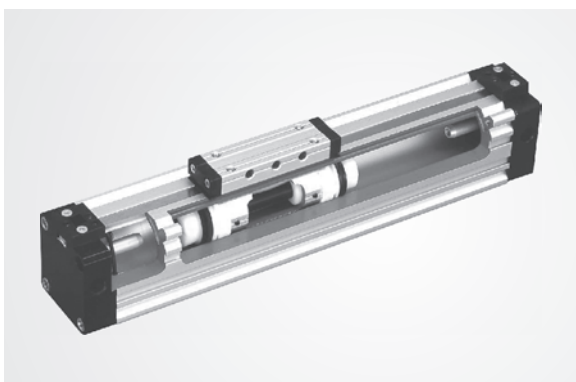
1XX8-0001

(Unit : mm)

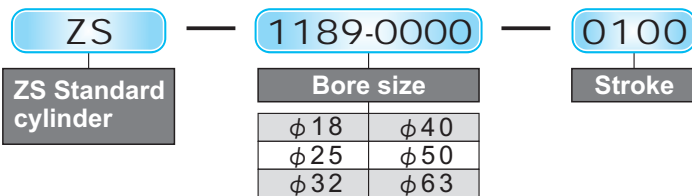
Bore size	Order code		A		B			C	D	E	F	G	H	M	N	O	SW	T	Shock absorber
			ZF	ZFK	AH	ZF	ZFK												
φ 18	1188-0000	1188-0001	80	57.5	2	113	90.5	32	Max25	57	43.5	8	23.5	M10x1.0	8	15	13	M3x10	PMx10M-1B,2B,3B
φ 25	1258-0000	1258-0001	100	67.5	2	117.5	85	37	Max40	72	57	12.5	33	M14x1.5	10	20	17	M4x10	PMx10M-1B,2B,3B
φ 32	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
φ 40	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
φ 50	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
φ 63	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



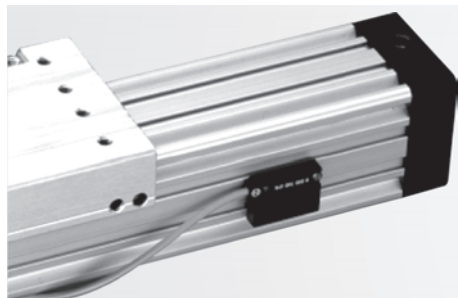
How to order



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

Bore size	ZS	ZK	ZF
φ 18	ZS-1189-0000-□□□□	ZK-2189-0000-□□□□	ZF-3189-0000-□□□□
φ 25	ZS-1259-0000-□□□□	ZK-2259-0000-□□□□	ZF-3259-0000-□□□□
φ 32	ZS-1329-0000-□□□□	ZK-2329-0000-□□□□	ZF-3329-0000-□□□□
φ 40	ZS-1409-0000-□□□□	ZK-2409-0000-□□□□	ZF-3409-0000-□□□□
φ 50	ZS-1509-0000-□□□□	ZK-2509-0000-□□□□	ZF-3509-0000-□□□□
φ 63	ZS-1639-0000-□□□□	ZK-2639-0000-□□□□	ZF-3639-0000-□□□□



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.

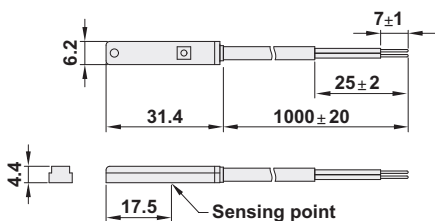
Specifications

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			

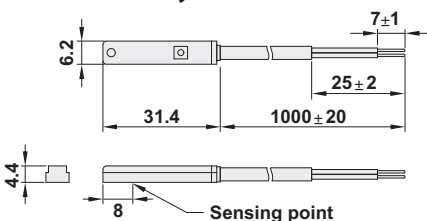
AIR CYLINDERS

Dimensions

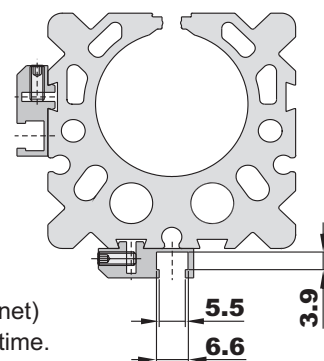
AL-30R



AL-30N, AL-30P



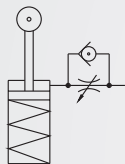
Sensor bracket



Note

1. Measure standard target: φ 15.5 x φ 8.5t(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

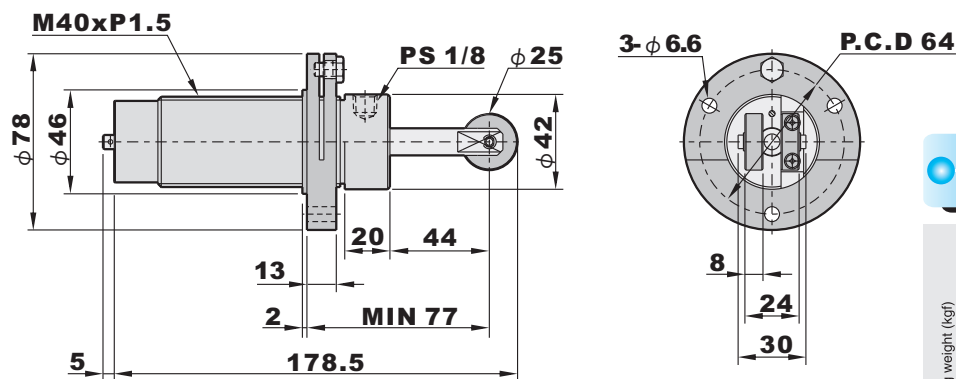
- * Stopper cylinder utilizes the top roller spring return as a stopper for work carrier.
- * It is usually applicable to work carrier positioning and stop.
- * It is often used for conveyor line.



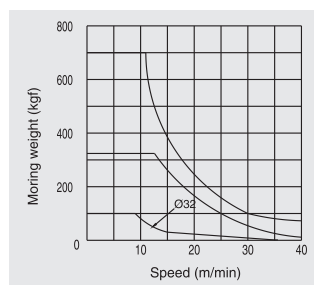
How to order

SC	32	B	30
Stopper cylinder	Bore size		Stroke
	32	φ 32	

Dimensions



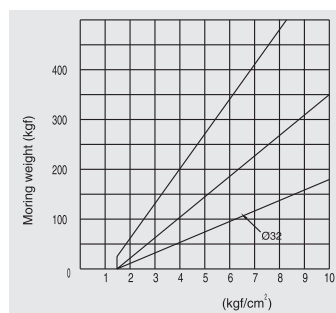
Allowance stop chart



Specifications

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

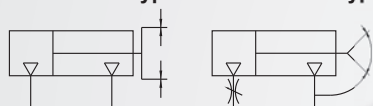
Loading chart





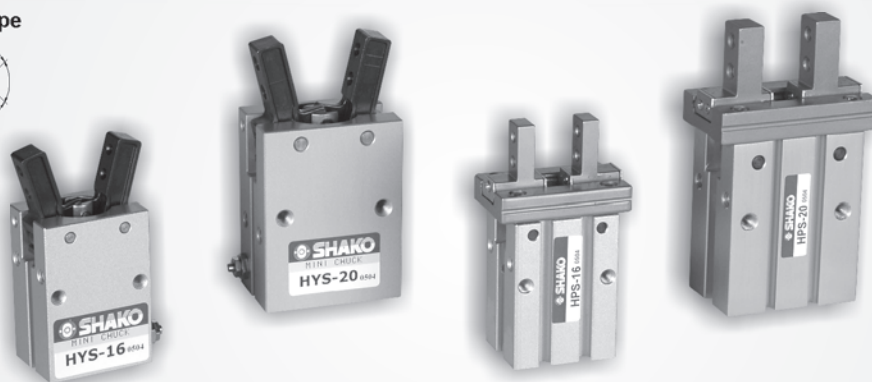
Symbol

HPS:Parallel type HYS:Fulcrum type



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

HPS

Mini chuck

HPS	Parallel type (Linear mechanism)
HYS	Fulcrum type

16

Bore size

16	φ 16
20	φ 20

N


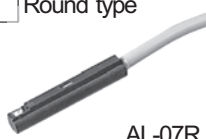
Type of gripper (For HPS only)

W	Wide
N	Narrow

SR

Sensor type

Blank	W/O sensor
SS	Square type (HPS)
SR	Round type

1

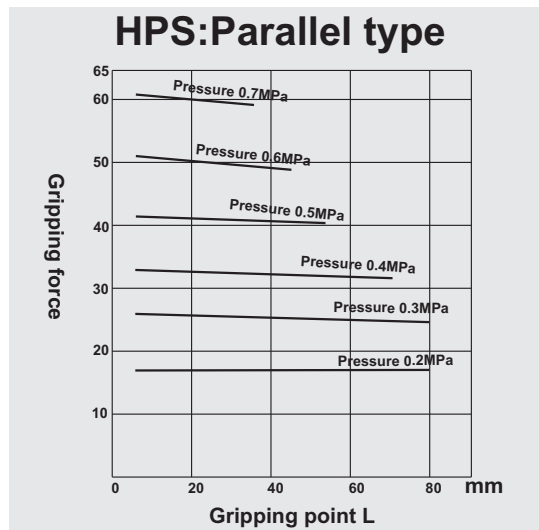
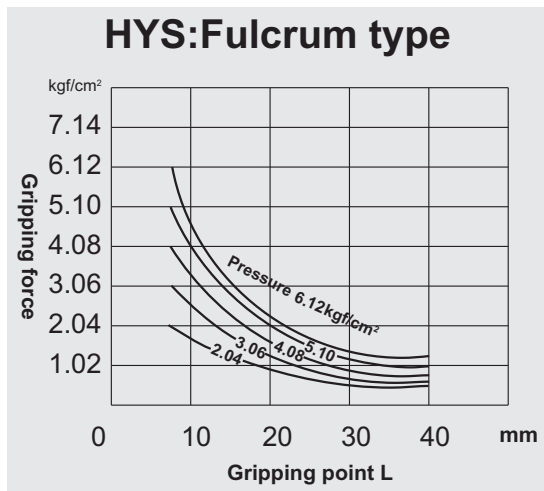
Number of sensor

1 pc
2 pcs

Specifications

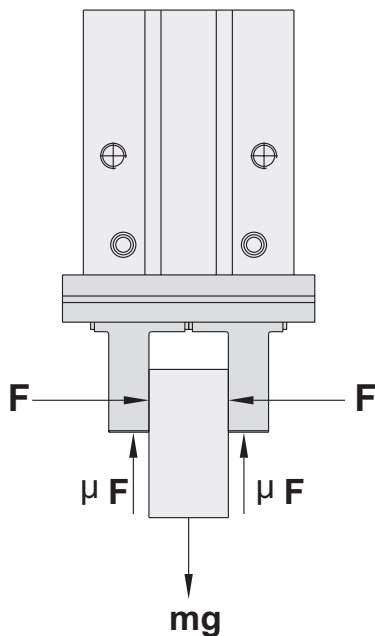
Bore size	φ 16	φ 20
Port size	M5	
Gripping gap distance (Wide type)	When open : 22mm, When closed : 14mm	When open : 26mm, When closed : 16mm
Gripping gap distance (Narrow type)	When open : 15.2mm, When closed : 7mm	When open : 17.2mm, When closed : 7.7mm
Internal gripping force(For HPS)	40N	65.5N
External gripping force(For HPS)	30N	42N
Fluid	Compressed air	
Acting	Double acting	
Operating pressure range	Fulcrum type : 1.0~6.1 kgf/cm ² , Parallel type : 1.0~7 kgf/cm ²	
Max. operating pressure	7 kgf/cm ²	
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)
- μ** : Coefficient of friction between the attachments and the work piece
- m**: Work piece mass (kg)
- g**: Gravitational acceleration (=9.8m/s²)
- mg**: Work piece weight (N)

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

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

↑
Number of fingers

and therefore

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

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

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

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

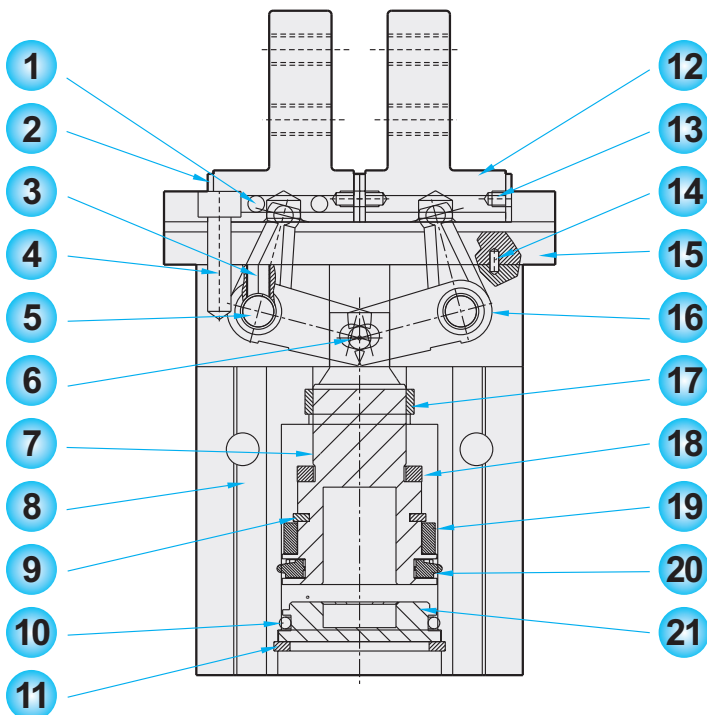
When μ =0.2	When μ =0.1
$F = \frac{mg}{2 \times 0.2} \times 4$ $= 10 \times mg$	$F = \frac{mg}{2 \times 0.1} \times 4$ $= 20 \times mg$
10 x work piece weight	20 x work piece weight

※Even in cases where the coefficient of friction is greater than μ =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.

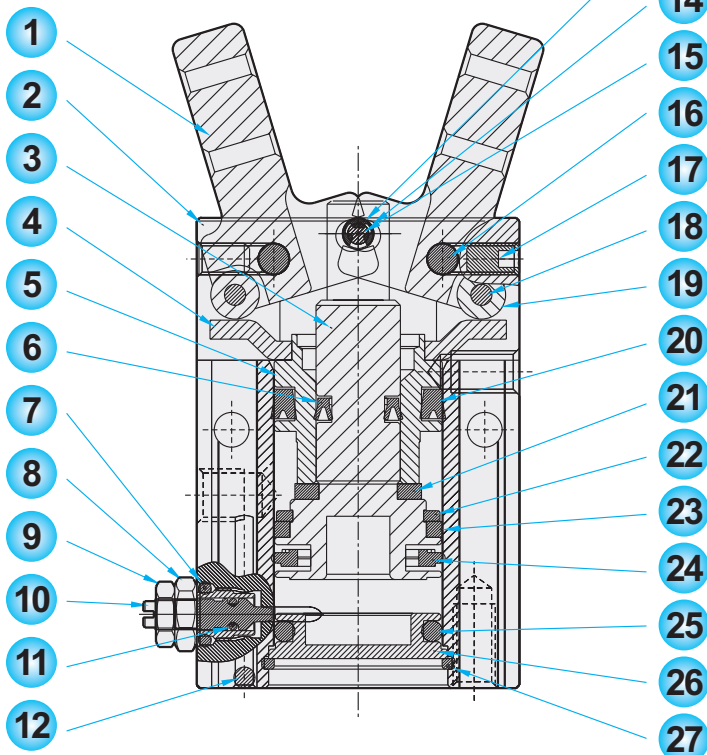
Material of parts

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

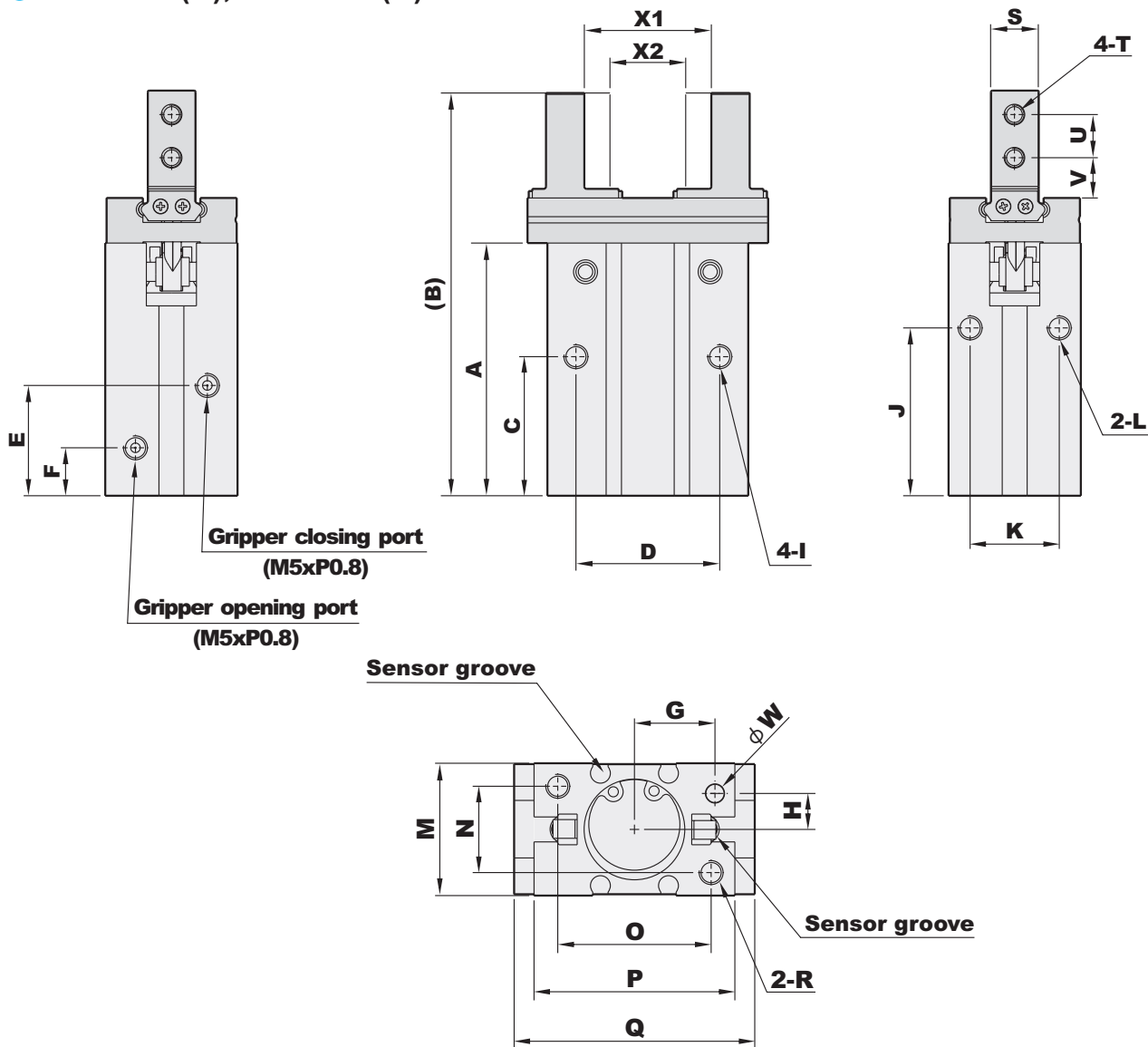
HYS : Fulcrum type



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)



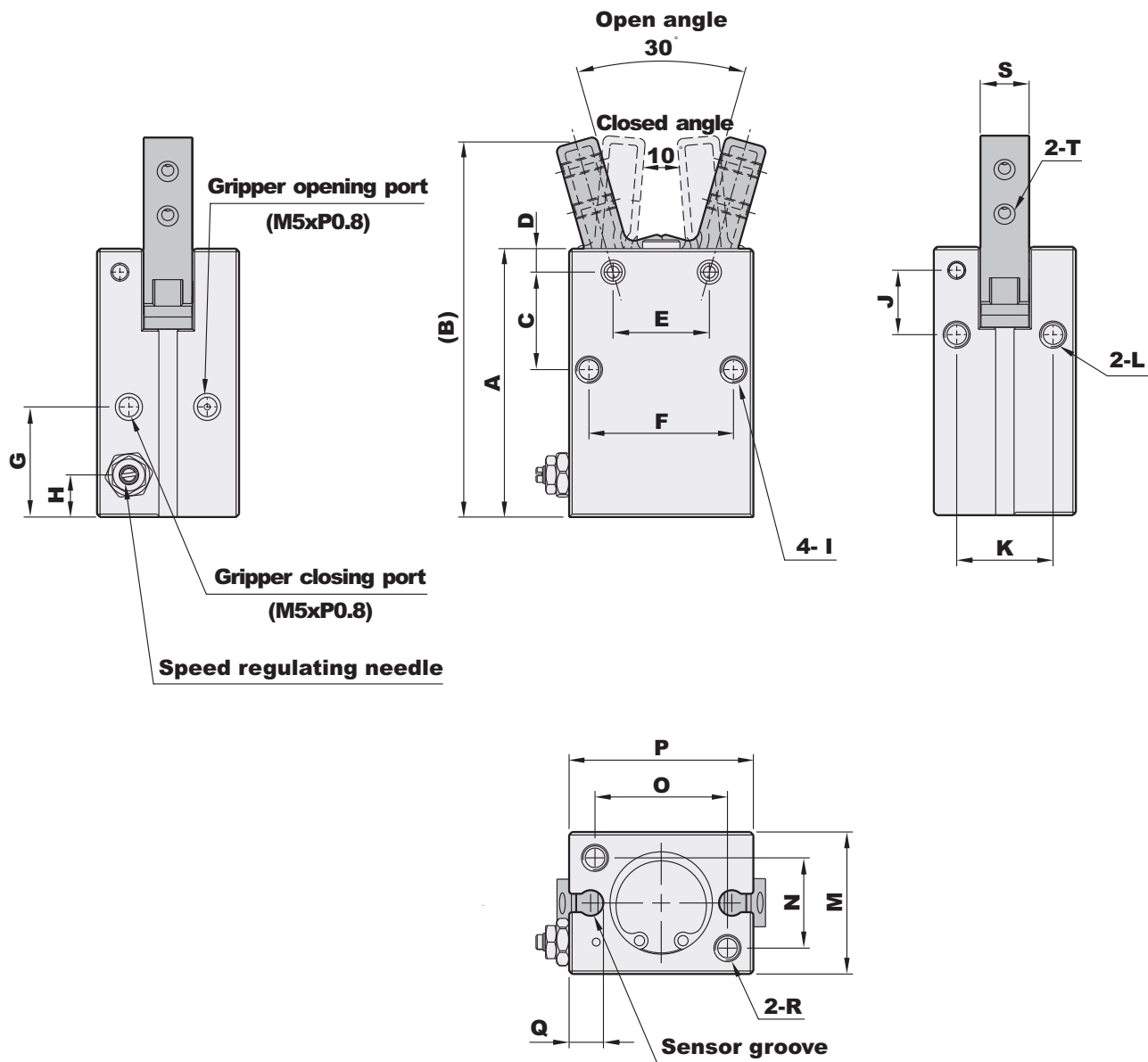
(Unit : mm)

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

Dimensions

HYS-16, HYS-20



(Unit : mm)

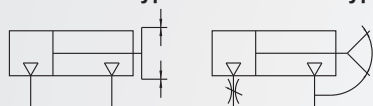
Model	A	B	C	D	E	F	G	H	I	J	K
HYS-16	44.6	62.5	16.2	3.9	16	24	18.3	7	M4xP0.7xL8.0	10.7	16
HYS-20	55.2	77.7	21.7	4.5	20	30	22.2	7.5	M5xP0.8xL10.0	15.7	18.6

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	M4xP0.7xL6.5
HYS-20	M5xP0.8xL8.0	27.6	18	32	42	8.8	M5xP0.8xL10.0	10	M5xP0.8xL8.0



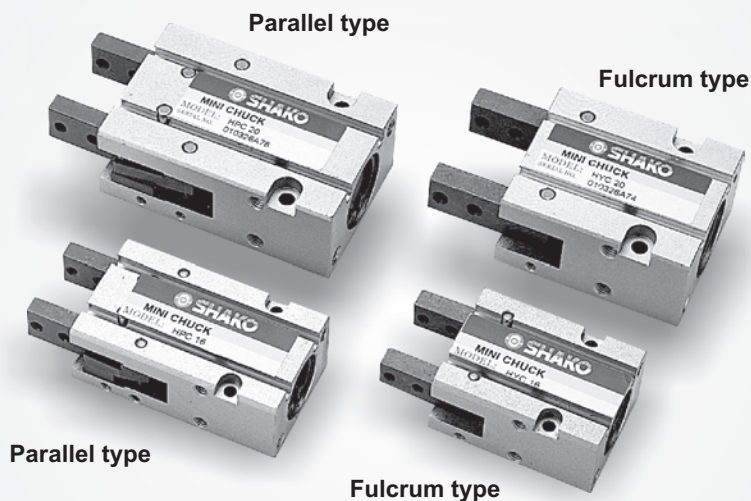
Symbol

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

HYC

Mini chuck

HPC	Parallel type
HYC	Fulcrum type

32

Bore size

10	φ 10
16	φ 16
20	φ 20
25	φ 25
32	φ 32

SR

Sensor type

Blank	W/O sensor
SR	Round type

AL-07R

1

Number of sensor

1 pc
2 pcs

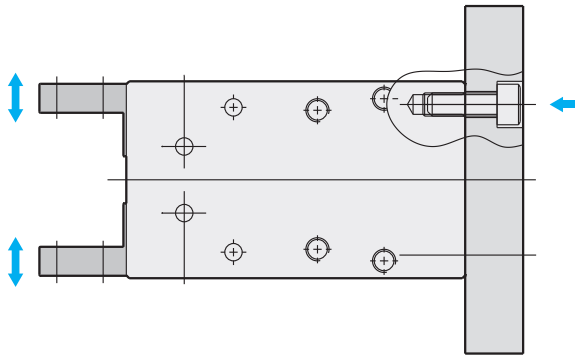
Specifications

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 ²		
Max. operating pressure			10.5 kgf/cm ²		
Lubrication			Not required or few		
Body material			Aluminum alloy		
Magnet			Built-in		
Ambient temperature			0°C ~ 60°C		
Operating frequency			50 ~ 700 mm/Sec.		

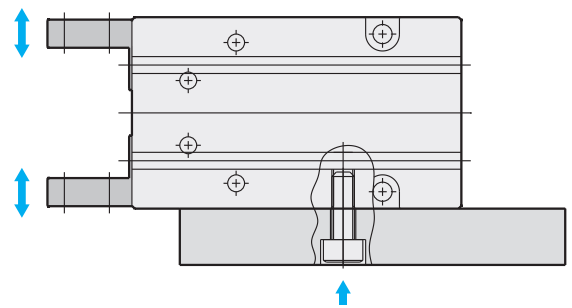
Theoretical force

Bore size	Piston area cm ²	Operating pressure kgf/cm ²					
		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

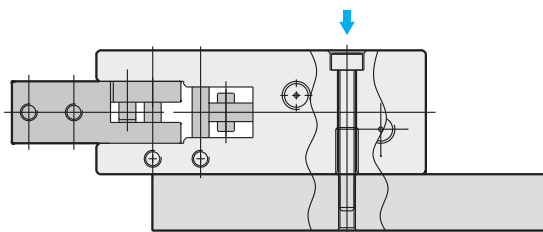
Mounting example



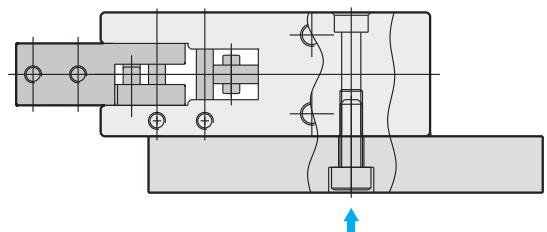
Bottom mounting



Side mounting



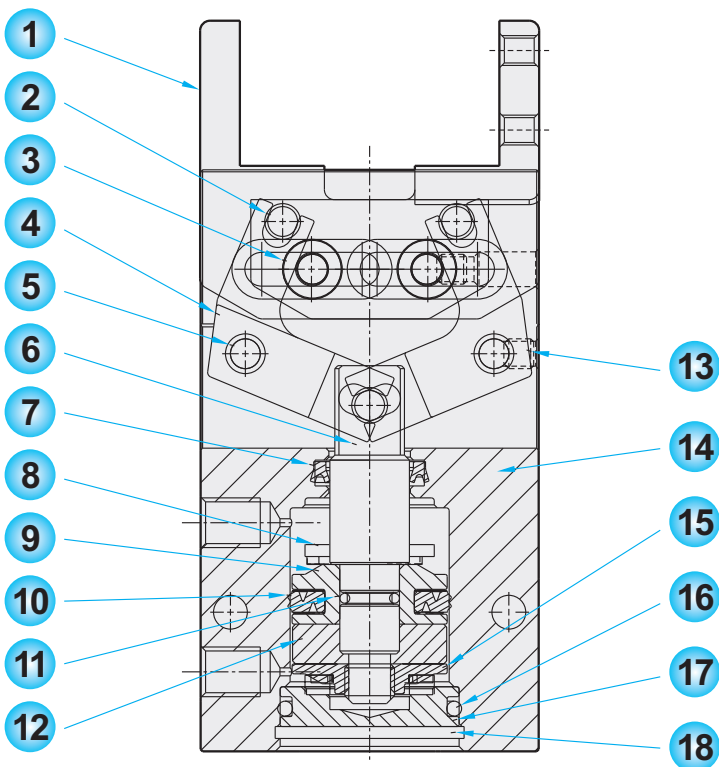
Top face mounting



Bottom face mounting

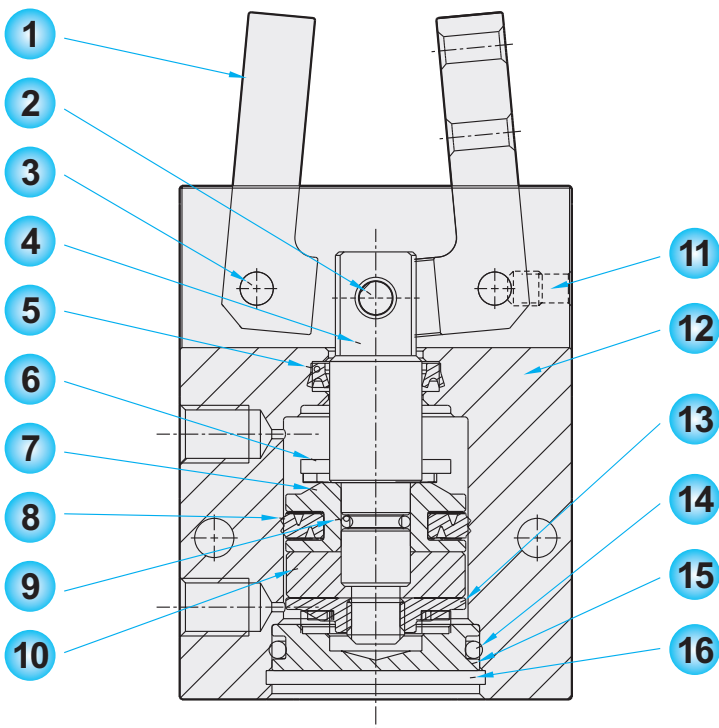
Material of parts

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

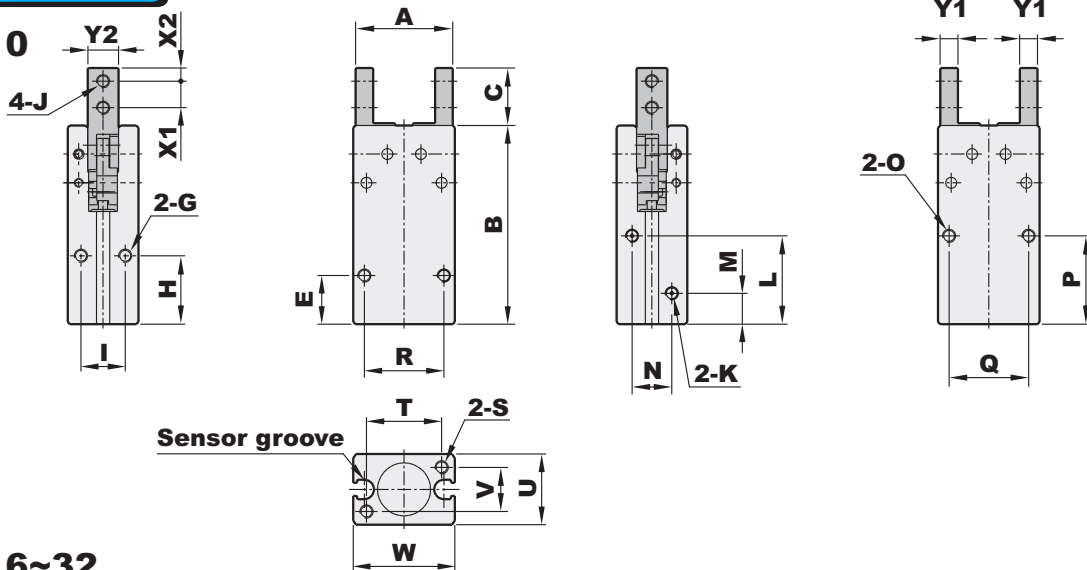
HYC : Fulcrum type



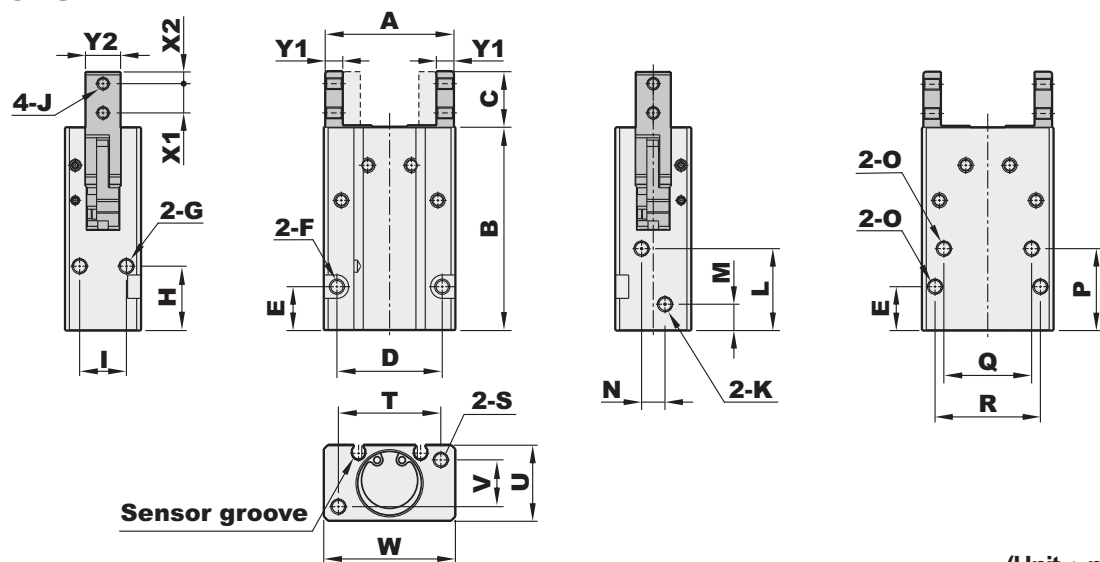
No.	Description	Material	Qty
1	Gripper	Stainless steel	2
2	Pin	Carbon steel	1
3	Lever shaft	Carbon steel	2
4	Piston rod	S45C+Cr	1
5	U-ring	NBR	1
6	Gasket	NBR	2
7	Piston	Aluminum alloy	1
8	U-piston seal	NBR	1
9	O-ring	NBR	1
10	Magnet	Ferrite magnet	1
11	Plug	Carbon steel	2
12	Body	Aluminum alloy	1
13	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



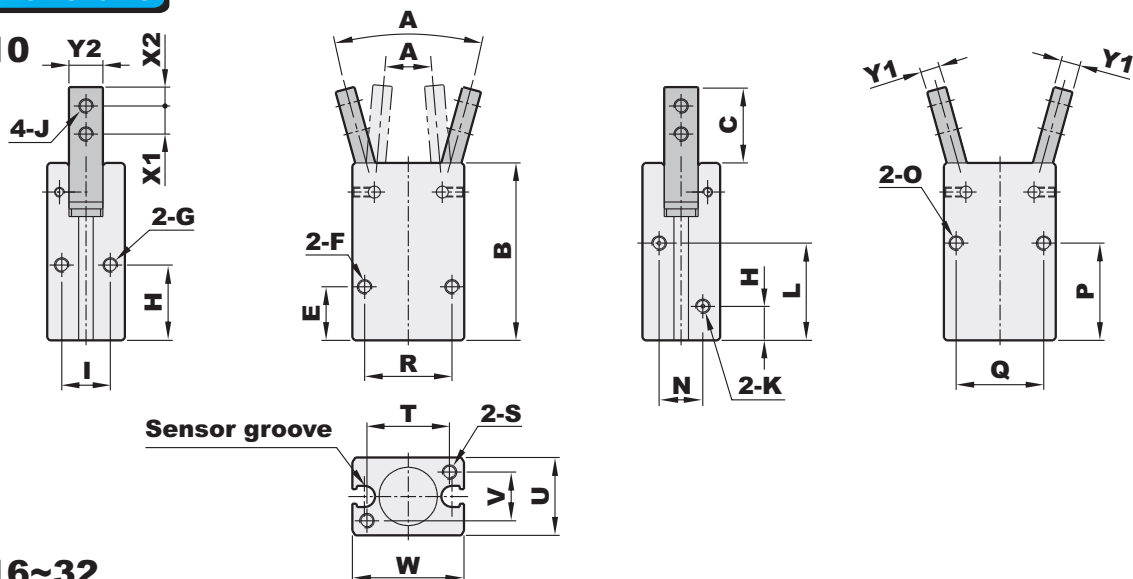
(Unit : mm)

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	φ 3.4 through, φ 6 Counter bore x Depth3.5	M4xP0.7xDepth8.0	21	14	M3xP0.5 through
HPC-20	44	32	69.5	19	36	15	φ 4.3 through, φ 8 Counter bore x Depth4.5	M5xP0.8xDepth10.0	22	16	M4xP0.7 through
HPC-25	51	37	79.5	24	40	16	φ 5.3 through, φ 9.5 Counter bore x Depth5.5	M6xP1.0xDepth12.0	24.5	20	M5xP0.8 through
HPC-32	60	44	88	31	50	18	φ 5.3 through, φ 9.5 Counter bore x Depth5.5	M6xP1.0xDepth15.0	30	26	M6xP1.0 through

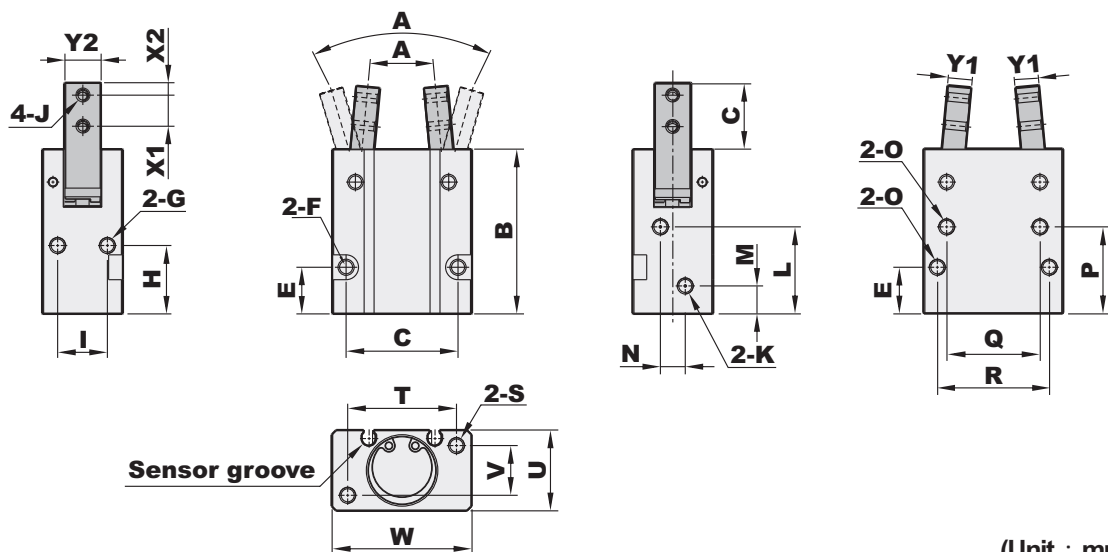
Model	K	L	M	N	O	P	Q	R	S	T	U	V	W	X1	X2	Y1	Y2
HPC-10	M3xP0.5	20	7	9	M3xP0.5xL8.0	20	18	—	M3xP0.5xL5.0	17	16	10	23	6	3	4	7
HPC-16	M5xP0.8	23	8	6	M4xP0.7xL8.0	25.5	24	28	M4xP0.7xL7.0	26	22	14	34	8	3	5	11
HPC-20	M5xP0.8	28	9	8	M5xP0.8xL10.0	28	30	36	M5xP0.8xL10.0	35	26	16	45	10	4	6	12
HPC-25	M5xP0.8	30.5	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)

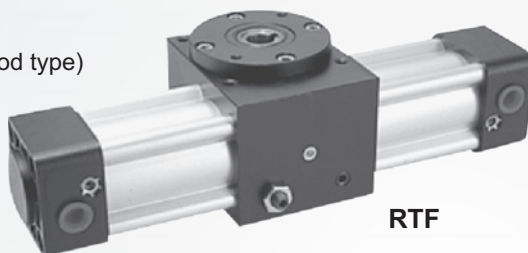
Model	A		B	C	D	E	F	G	H	I	J
	Open	Closed									
HYC-10	30°	-10°	36.5	15.7	18	11	M3xP0.5xL8.0	M3xP0.5xL5.0	15.5	10	M3xP0.5 through
HYC-16	30°	-10°	45.5	17.5	28	14	φ 3.4 through, φ 6 Counter bore x L3.5	M4xP0.7xL8.0	21	14	M3xP0.5 through
HYC-20	30°	-10°	53	22	36	15	φ 4.3 through, φ 8 Counter bore x L4.5	M5xP0.8xL10.0	22	16	M4xP0.7 through
HYC-25	30°	-10°	61	26	40	16	φ 5.3 through, φ 9.5 Counter bore x L5.5	M6xP1.0xL12.0	24.5	20	M5xP0.8 through
HYC-32	30°	-10°	68	30	50	18	φ 5.3 through, φ 9.5 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



RTF

Features

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



RTH

How to order

RTH		40	B	90	D	SF	1
Rotary cylinder		Bore size	Rotating angle	Rod	Sensor type	Number of sensor	
RTH	Male pivot gear (Standard)	40 φ40	90°	Blank	Blank	1 pc	
		63 φ63	180°	D	SF	2 pcs	
RTF	Female pivot gear	80 φ80			ST		

AL-20R

AL-21R

AIR CYLINDERS

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 ²		
Max. operating pressure	7 kgf/cm ²		
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

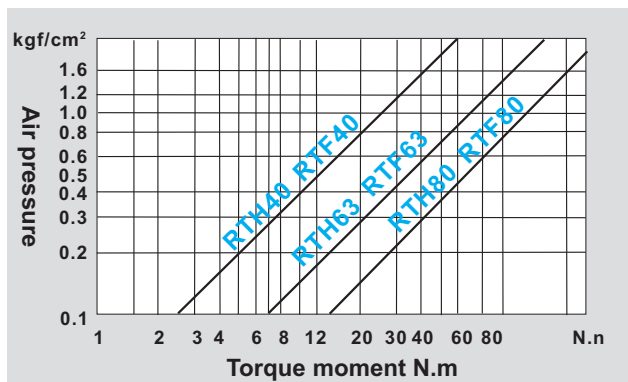
P: Air pressure

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

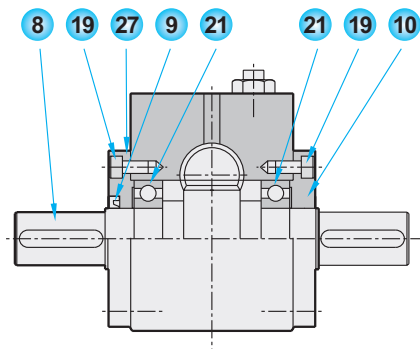
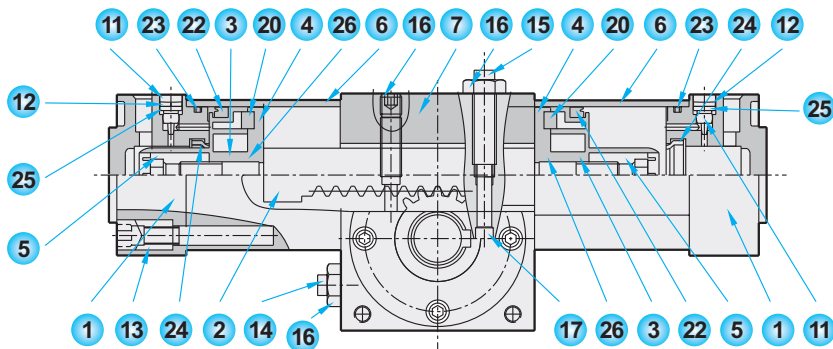


RTH/RTF Repair kit

Model	Order code	Details
RTH-φ 40	RTHSK40	Piston packing X 2
RTH-φ 63	RTHSK63	Cylinder gasket X 2
RTH-φ 80	RTHSK80	Cushion packing X 2
RTF-φ 40	RTFSK40	Needle gasket X 2
RTF-φ 63	RTFSK63	Piston gasket X 2
RTF-φ 80	RTFSK80	Rod packing X 1

Material of parts

RTH, RTH-D

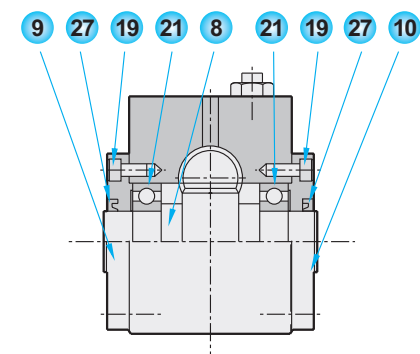
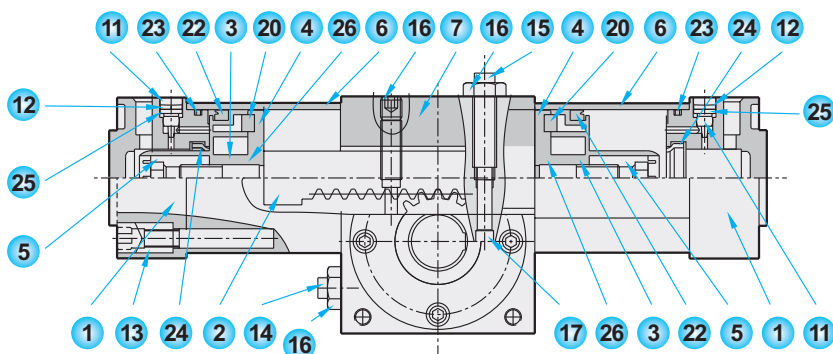


No.	Description	Qty
1	End cap	2
2	Rack	1
3	Piston	2
4	Magnet holder	2
5	Piston nut	2
6	Cylinder tube	2
7	Housing	1
8	Pinion shaft	1
9	Rod packing	1

No.	Description	Qty
10	End cover	1
11	Cushion needle	2
12	Washer	2
13	Tie bolt	8
14	Adjusting screw	1
15	Adjusting screw	1
16	Lock nut	2
17	Stopper pin	1
18	Set screw	1

No.	Description	Qty
19	Hexagon socket head screw	8
20	Magnet	2
21	Ball bearing	2
22	Piston packing	2
23	Cylinder gasket	2
24	Cushion packing	2
25	Needle gasket	2
26	Piston gasket	2
27	End cover	1

RTF



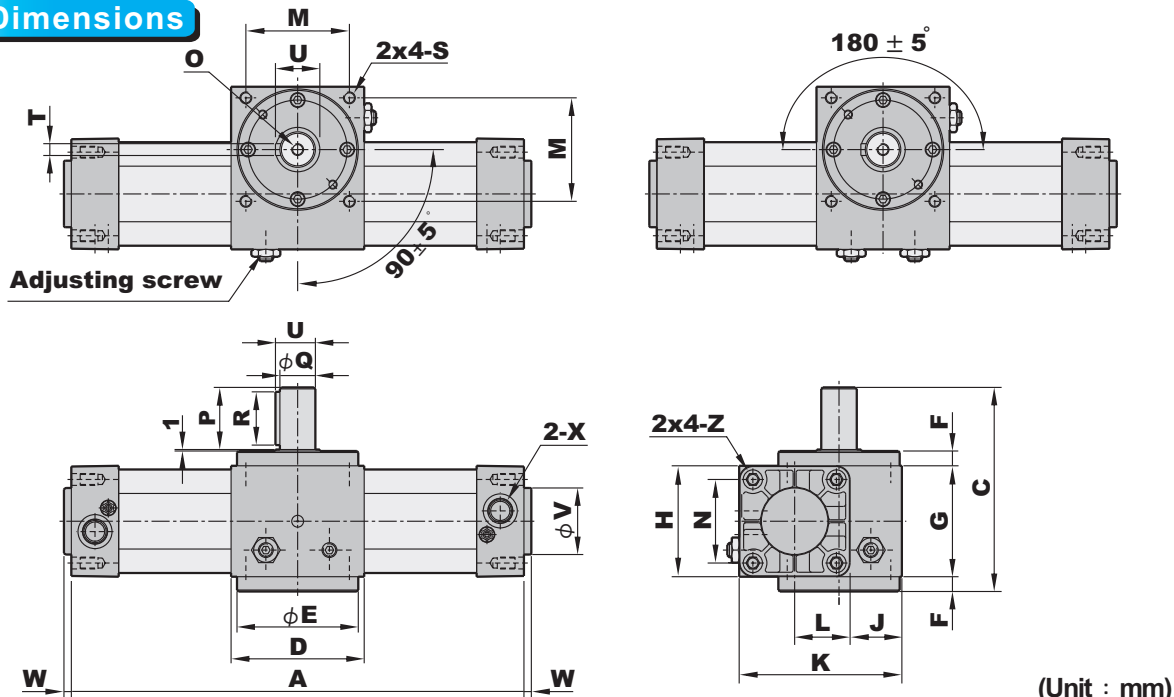
No.	Description	Qty
1	End cap	2
2	Rack	1
3	Piston	2
4	Magnet holder	2
5	Piston nut	2
6	Cylinder tube	2
7	Housing	1
8	Pinion shaft	1
9	End cover	1

No.	Description	Qty
10	End cover	1
11	Cushion needle	2
12	Washer	2
13	Tie bolt	8
14	Adjusting screw	1
15	Adjusting screw	1
16	Lock nut	2
17	Stopper pin	1
18	Set screw	1

No.	Description	Qty
19	Hexagon socket head screw	8
20	Magnet	2
21	Ball bearing	2
22	Piston packing	2
23	Cylinder gasket	2
24	Cushion packing	2
25	Needle gasket	2
26	Piston gasket	2
27	Rod packing	1

Dimensions

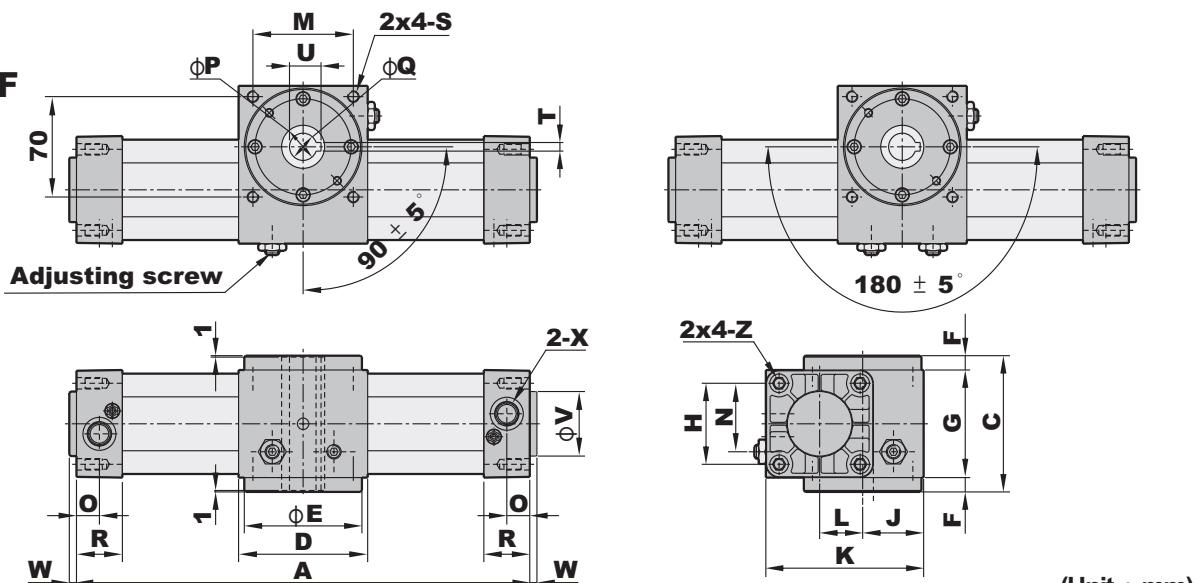
RTH



(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	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

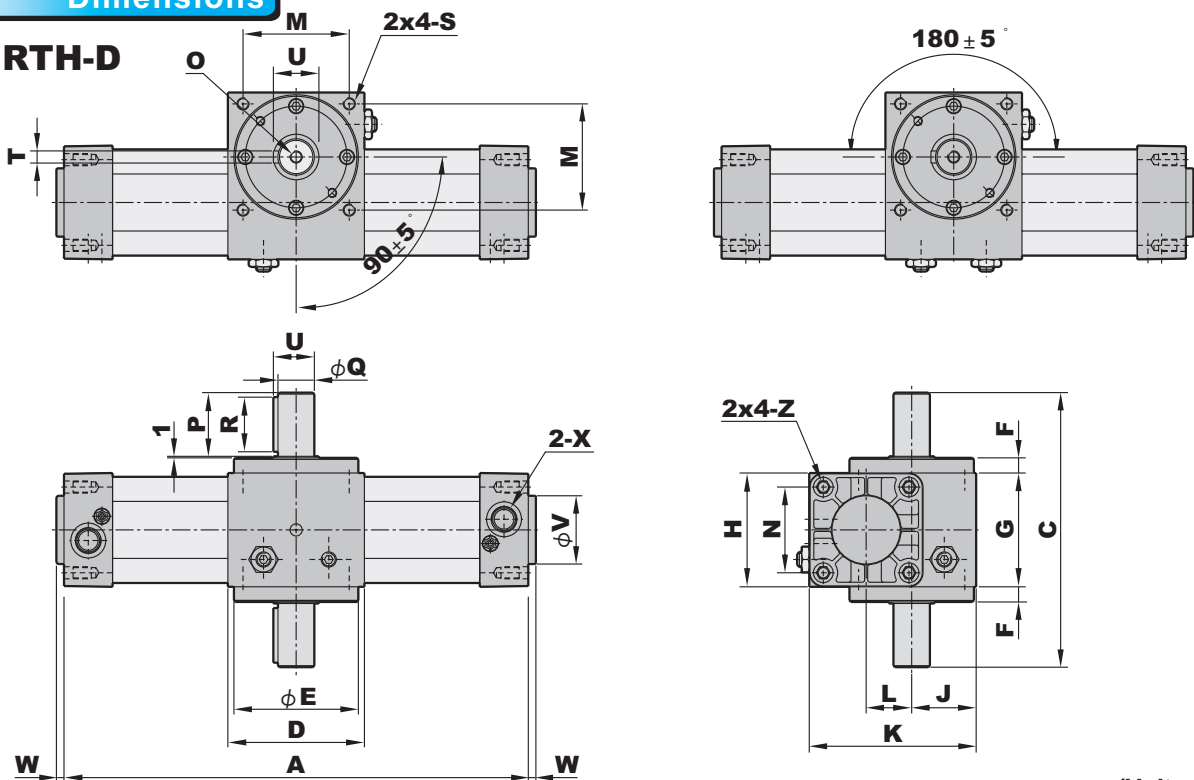


(Unit : mm)

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°																						
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

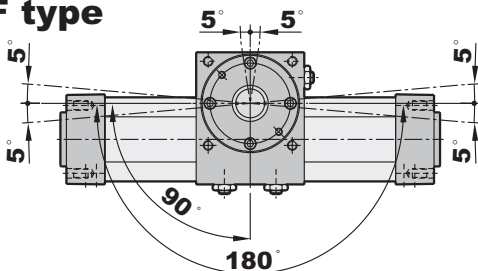


(Unit : mm)

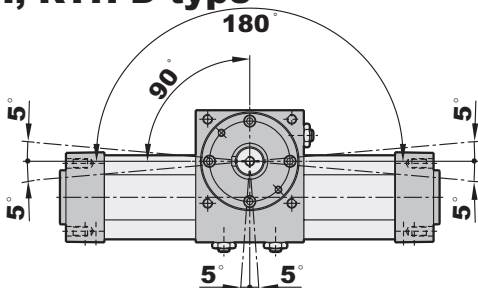
Model	A		C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Z
	90°	180°																						
RTH40-D	263	326	143	75	72	8	65	53	37.5	93	27.5	60	38	M5	30	16	25	M6	5	18	35	4	G1/4	M6
RTH63-D	306	377	181	90	82	10	75	75	42.5	110	30	70	56.5	M8	42	24	36	M8	8	27	45	5	G3/8	M8
RTH80-D	343	428	221	105	96	12	95	95	51.5	135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

Rotating direction and adjustable angle

RTF type

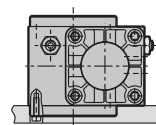


RTH, RTH-D type

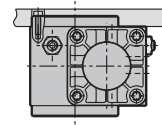


Mounting type

RTF type

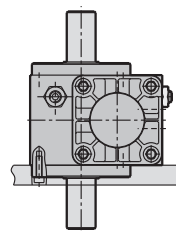


Bottom mounting

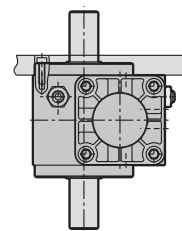


Top mounting

RTH, RTH-D type



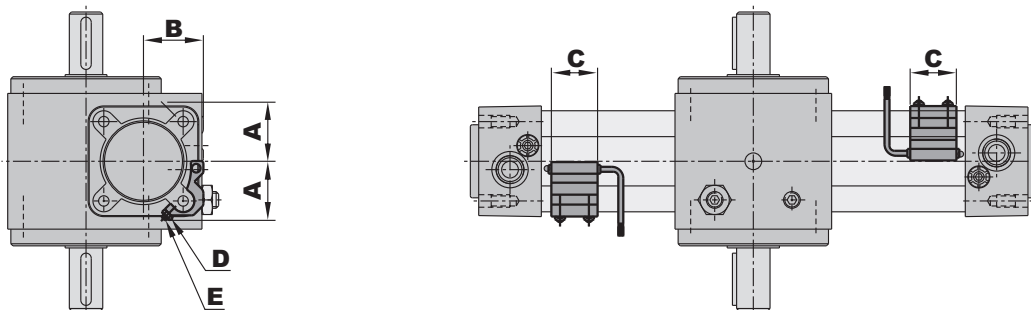
Bottom mounting



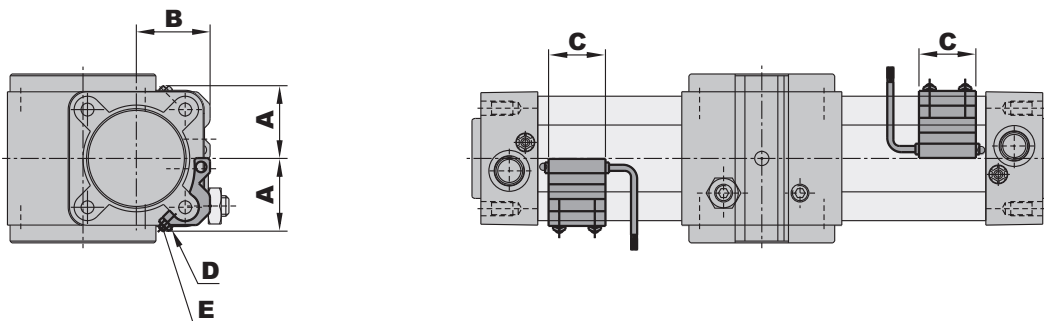
Top mounting

Installation of sensor switch

RTH, RTH-D



RTF



(Unit : mm)

Bore size	Sensor bracket	Weight	A	B	C	D	E
φ 40	FXX0500321	0.065	29	32	32	M4xL8	M4
φ 63	FXX0500631	0.066	40	43	32	M4xL10	M4
φ 80	FXX0500801	0.086	49.5	52	32	M4xL12	M4

AIR CYLINDERS

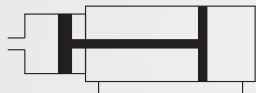
Weight

(Unit : mm)

Bore size	RTF		RTH		RTH-D	
	90°	180°	90°	180°	90°	180°
φ 40	2.84	2.94	3	3.1	3.05	3.15
φ 63	5.07	5.47	5.4	5.8	5.55	5.95
φ 80	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

AHS	Single pressure type
AHD	Dual pressure type

110

Intensified pressure ratio

078	7.8 Doubles
110	11 Doubles
250	25 Doubles

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 ²					
Max. operating pressure	7 kgf/cm ²					
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 $P_2 = \text{Intensified pressure ratio } R \times P$ (Air pressure MPa)

Hydraulic cylinder force $F = A \times P_2 = _N$

A : Piston area of hydraulic cylinder mm^2

P : Air pressure

D : Bore size

P2 : Booster output pressure

F : Hydraulic cylinder force

R : Intensified pressure ratio

Dual pressure booster

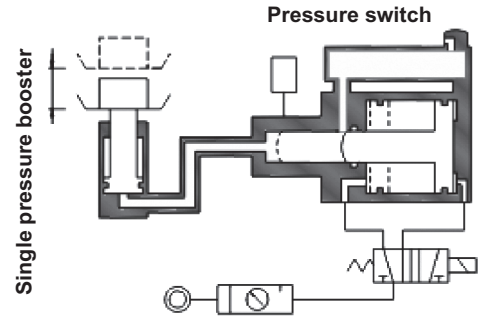
Quick traverse	Intensified feeding	Swift reverse
<p>When the air is charged from the port P1, the oil in the tank will forward the hydraulic cylinder quickly. The pressure is the same as the air pressure, but the inflow of oil is large in volume.</p>	<p>When the air is charged from the port P2, a ram 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.



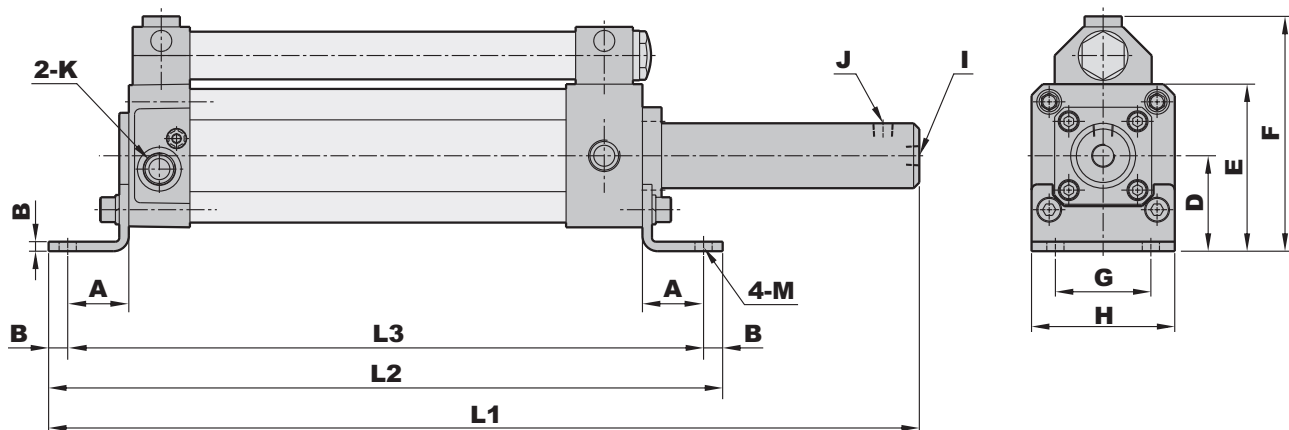
AIR CYLINDERS

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

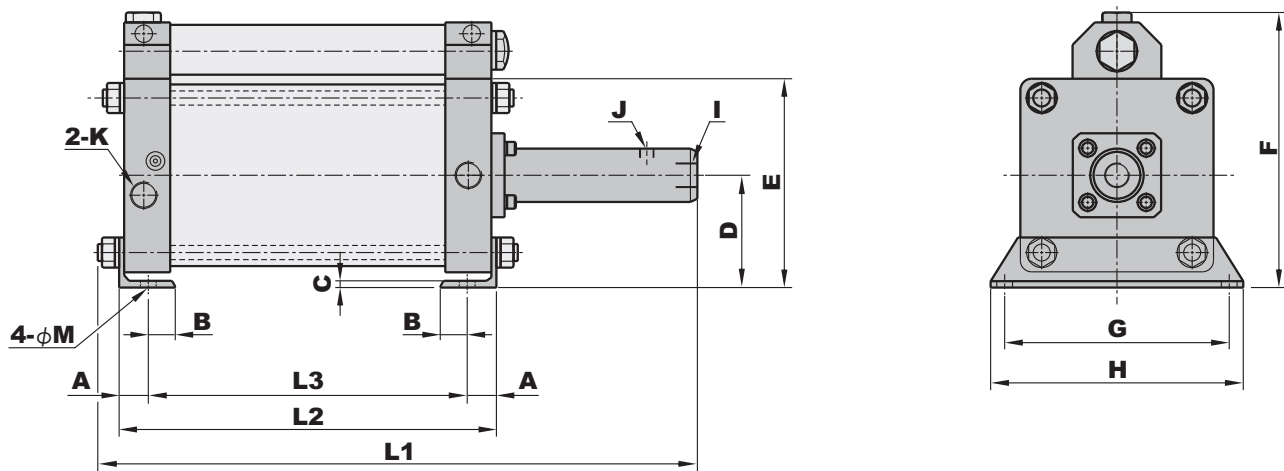
Dimensions-Single pressure type

AHS078, AHS110



AIR CYLINDERS

AHS250

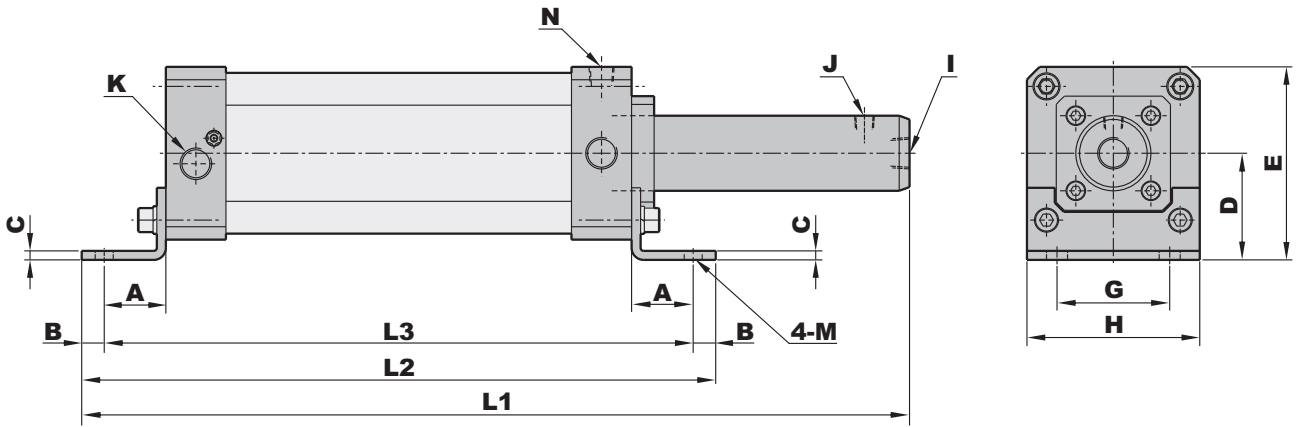


(Unit : mm)

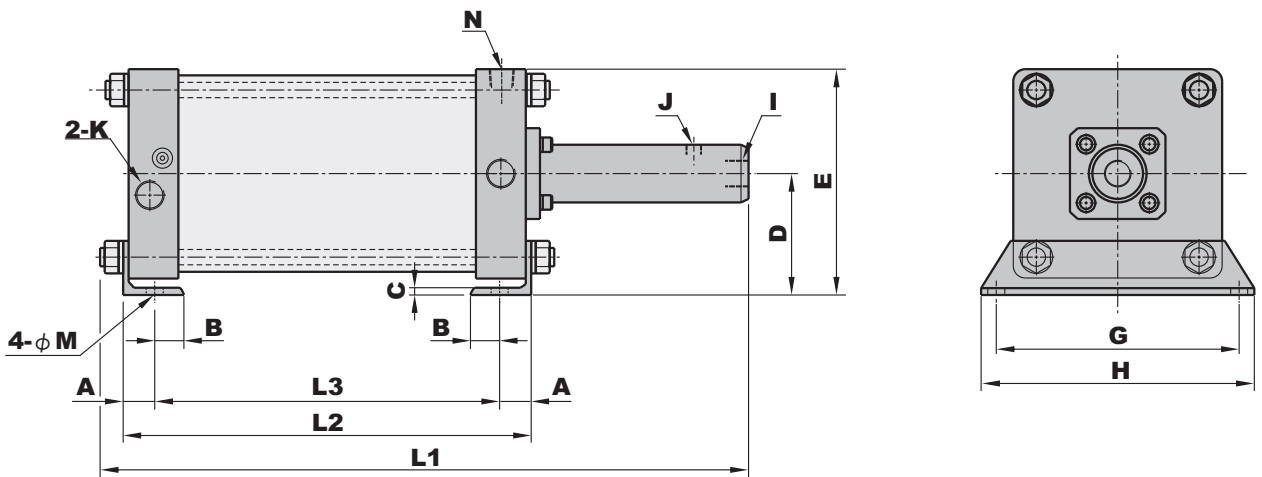
Model	A	B	C	D	E	F	G	H	I	J	K	L1	L2	L3	M
AHS078	32	10	5	50	87.5	123	50	75	PS 1/4	PS 1/4	PS 3/8	456	353	333	9
AHS110	41	15	6	71	128.5	187.5	75	115	PS 1/2	PS 1/4	PS 1/2	551	422	392	14
AHS250	24	26	6	100	186	245	200	225	PS 1/2	PS 1/4	PS 1/2	534	336	284	14

— Dimensions-Single pressure type

● AHD078, AHD110



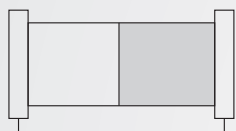
● AHD250



(Unit : mm)

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

AOF

40

B

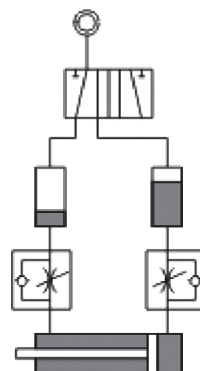
150

Air-Hydro converter	
AOF	Flange mounting
AOL	Foot mounting

Bore size	
40	φ 40
63	φ 63
80	φ 80
100	φ 100

Stroke	
150	150 mm
175	175 mm
200	200 mm
Max. length	500 mm

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.

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 : Piston area of work cylinder (mm²)

L : Stroke of work cylinder (mm)

V : Volume of work cylinder (cm³)

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 ²			
Body material	Anodized aluminum alloy			
Ambient temperature	-10°C ~ 60°C			

Volume of cylinder (Table 1)

Unit: cm³/1000

Bore size mm	Cylinder stroke (mm)										
	25	50	75	100	125	150	200	250	300	350	400
φ 20	0.0079	0.0157	0.0236	0.0314	0.0393	0.0471	0.0268	0.0785	0.0942	0.1099	0.1256
φ 25	0.0123	0.0245	0.0368	0.049	0.0613	0.0735	0.098	0.1225	1.147	0.1715	0.196
φ 32	0.0201	0.0402	0.0602	0.0803	0.1004	0.0205	0.0606	0.2008	0.2409	0.2811	0.3212
φ 40	0.0314	0.0628	0.0942	0.1256	0.157	0.0884	0.2512	0.314	0.3768	0.4396	0.5024
φ 50	0.049	0.098	0.1472	0.1963	0.245	0.294	0.393	0.491	0.589	0.687	0.785
φ 63	0.062	0.156	0.238	0.3117	0.39	0.468	0.623	0.78	0.935	1.091	1.247
φ 80	0.125	0.251	0.377	0.502	0.628	0.753	1.005	1.256	1.507	1.759	2.01
φ 100	0.196	0.293	0.589	0.785	0.981	1.178	1.57	1.962	---	---	---

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
φ 40	94	110	125	141	157	172	188	204	220	235	251	267	282	298	314
φ 63	237	277	316	356	395	435	475	514	554	594	633	673	712	752	791
φ 80	377	440	502	565	628	691	754	816	880	942	1005	1068	1131	1194	1256
φ 100	589	687	785	883	981	1080	1178	1276	1374	1472	1570	1666	1767	1865	1963

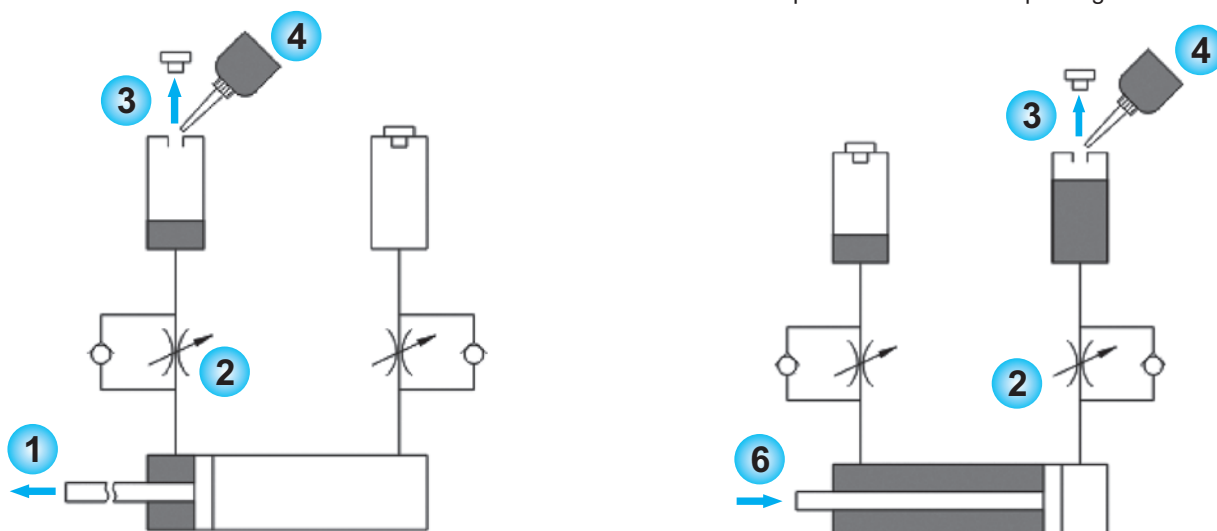
Note: Above volume have keep 50% space in advance.

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.

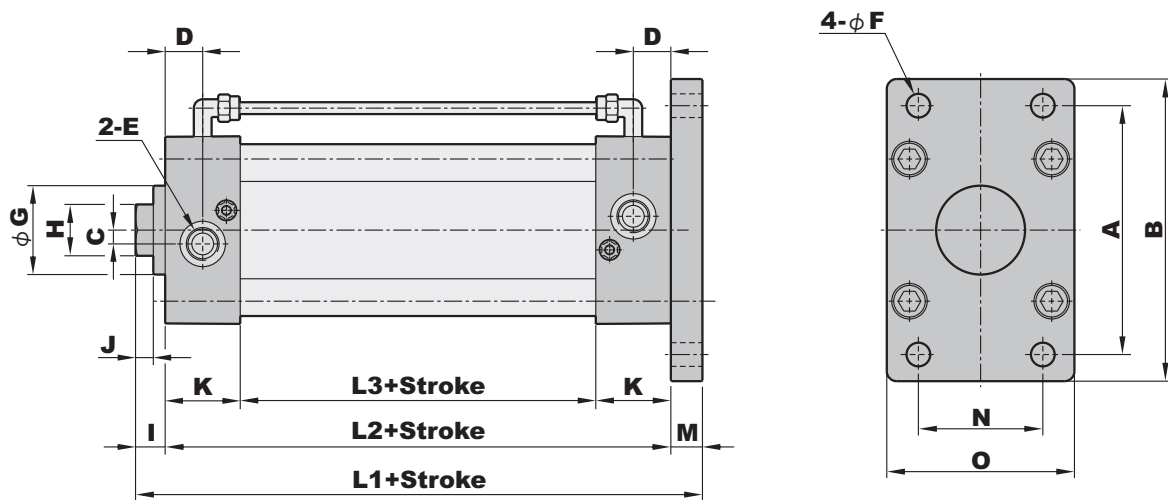
Lubricating procedure

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.



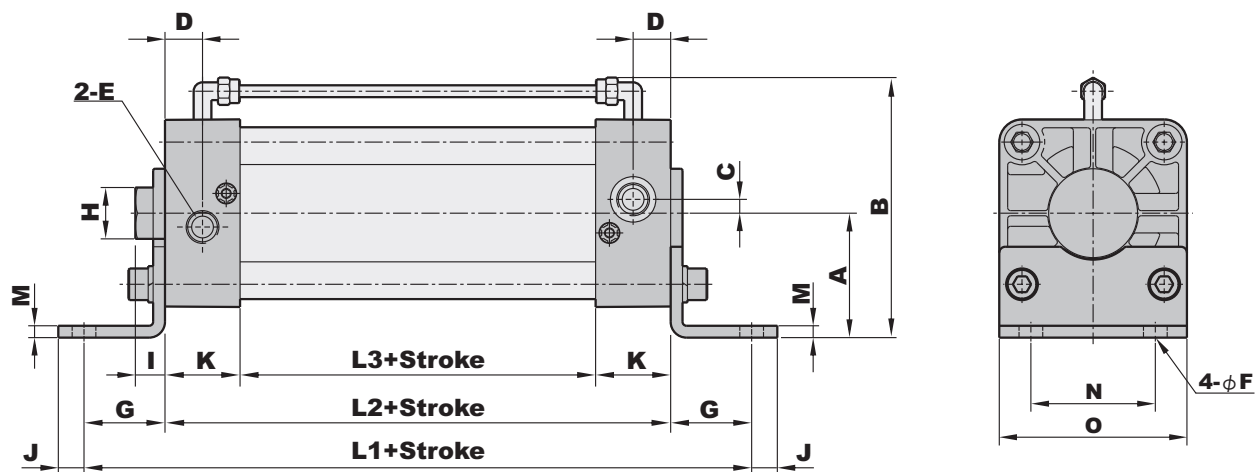
Dimensions

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



Theoretical force

Unit: cm³

Bore size (mm)		12	16	20	25	32	40	50	63	80	100	125	160	200	
Rod diameter (mm)		6	6	6	10	12	16	20	20	25	25	32	40	40	
Piston area (mm ²)	A	113	201	314	491	804	1257	1963	3117	5027	7854	12271	201000	314100	
	B	85	173	264	412	691	1056	1649	2803	4536	7363	11309	188400	301500	
Operating pressure (MPa)	0.1	A	11	20	31	49	80	126	196	312	502	785	1227	20100	31410
		B	85	17	26	41	69	106	165	280	453	736	1131	18840	30150
	0.2	A	23	40	63	98	161	251	393	623	1005	1571	2454	40210	62830
		B	17	35	53	82	138	211	330	561	907	1473	2262	37690	60310
	0.3	A	34	60	94	147	241	377	589	935	1508	2356	3681	60310	94240
		B	25	52	79	124	207	317	495	841	1361	2209	3393	56540	90470
	0.4	A	45	80	126	196	322	503	785	1247	2011	3142	4908	80420	125660
		B	34	69	106	165	276	422	660	1121	1814	2945	4524	75390	120620
	0.5	A	57	101	157	245	402	629	982	1559	2514	3927	6135	100530	157080
		B	42	67	132	206	346	528	825	1402	2268	3682	5655	94240	150780
	0.6	A	68	121	189	294	482	754	1178	1870	3016	4712	7363	120630	188490
		B	51	104	158	247	415	634	989	1682	2722	4418	6785	113090	180940
	0.7	A	79	141	220	343	563	880	1374	2182	3519	5498	8589	140740	219910
		B	59	121	185	289	484	739	1154	1962	3175	5154	7916	131940	211090
	0.8	A	90	161	251	393	643	1006	1570	2494	4022	6283	9816	160840	251320
		B	68	138	211	330	553	845	1319	2242	3629	5890	9047	150790	241250
	0.9	A	102	181	283	442	724	1131	1767	2805	4524	7069	11043	180950	282740
		B	76	155	238	371	622	950	1484	2523	4082	6627	10178	169640	271410
1.0	A	113	201	314	491	804	1257	1963	3117	5027	7854	12271	201020	314090	
	B	85	173	264	412	691	1056	1649	2803	4536	7363	11309	188460	301530	

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

AIR CYLINDERS

Cylinder force calculation

Cylinder force calculation $F = P \times A - f$

F: Cylinder force (N)

P: Air pressure (MPa)

A: Piston area (mm²)

f: Friction force (N)

Pressure interchange chart

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

Compressed air consumption

Unit: l/min

Bore size(mm)	12	16	20	25	32	40	50	63	80	100	125	160	200	
Rod diameter(mm)	6	6	6	10	12	16	20	20	25	25	32	40	40	
Piston area (mm ²)	A	113	201	314	491	804	1257	1963	3117	5027	7854	12271	17671	31410
	B	85	173	264	412	691	1056	1649	2803	4536	7363	11309	16415	30150
Operating pressure (MPa)	0.1	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	0.059	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	0.079	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	0.099	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	0.119	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	0.138	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	0.158	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	0.178	0.366	0.52	0.812	1.945	2.08	3.25	5.325	8.602	13.689	21.213	30.662	54.912
	0.9	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	0.218	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

$$Q_n = (A_1 + A_2) \times L \times \frac{P+0.101}{0.101} \times n \times 10^{-6}$$

Q_n : Compressed air consumption (l/min)

A₁ : A₁ Piston area on rod side (mm²)

A₂ : A₂ Piston area on head side(mm²)

L : Cylinder stroke (mm)

P : Air pressure (MPa)

n : Cycle of operation (cycle/min)

Pressure interchange chart

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