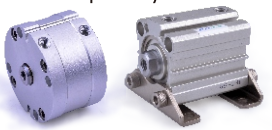


Actuator	ACQ Series compact cylinder  P93	TR Series twin-rod cylinder  P111
	TCL\TCM Series tri-rod cylinder  P116	HLH Series slide table cylinder  P121
	HLQ Series slide table cylinder  P131	HLS Series slide table cylinder  P155
	HRQ Series rotary table cylinder  P179	HFZ Series air gripper  P189
	HFK Series air gripper  P193	HFP Series air gripper  P204
	HFY Series air gripper  P209	HFR Series air gripper  P215
	HFC Series air gripper  P220	
New production forenotice	NFPA Series standard cylinder  P230	British system mini cylinder  P230
	British system compact cylinder  P230/P231	Tube fittings  P231
Sensor	CMSG/DMSG(S) Series  P232	CMSH/DMSH(S) Series  P232
Technical data	How to use AirTAC products P236	Unit Conversion P239



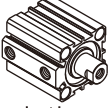
Compact cylinder—ACQ Series

Compendium of ACQ Series

In accordance with JIS standard

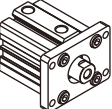
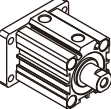
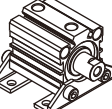
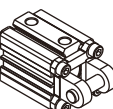
Magnetic switch slots around the cylinder body
There are magnetic switch slots around the cylinder body convenient to install inducting switch.

Two kinds of rod type




Female thread Male thread

Multi-mounting accessories

FA Type FB Type LB Type CB Type

Thirteen bore size are available
Bore size: 12\16\20\25\32\40\50\63\80\100



Multi-type cylinder

ACQ: Compact cylinder (Double acting)	
ASQ: Compact cylinder (Single acting-push)	
ATQ: Compact cylinder (Single acting-pull)	
ACQD: Compact cylinder (Double rod)	
TACQ: Compact cylinder (Double acting with guider)	

Compact structure
C clip is adopted to connect the cylinder body and back cover or front cover, and riveted structure is adopted to connect piston and piston rod to make it compact and reliable.

Installation and application

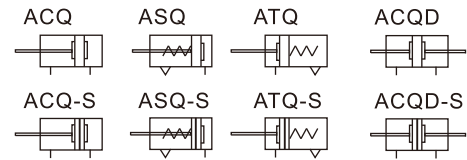


- When load changes in the work, the cylinder with abundant output capacity shall be selected.
- Relative cylinder with high temperature resistance or corrosion resistance shall be chosen under the condition of high temperature or corrosion.
- Necessary protection measure shall be taken in the environment with higher humidity, much dust or water drops, oil dust and welding dregs.
- Dirty substances in the pipe must be eliminated before cylinder is connected with pipeline to prevent the entrance of particles into the cylinder.
- The medium used by cylinder shall be filtered to 40μm or below.
- As both of the front cover and piston of the cylinder are short, typically too large stroke can not be selected.
- Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
- The cylinder shall avoid the influence of side load in operation to maintain the normal work of cylinder and extend the service life.
- If the cylinder is dismantled and stored for a long time, please conduct anti-rust treatment to the surface.
Anti-dust caps shall be added in air inlet and outlet ports. The front and back cover can not be dismantled, which shall be especially noticed.
- C clip Installation:
 - Removal & Installation of C clip must be done with proper tool & care.
 - Ensure C clip is securely fitted into the proper slot to prevent leakage.



Compact cylinder

ACQ Series



Ordering code

ACQ 20X30 S B □ T

1 2 3 4 5 6 7

□ Model	□ Bore size	□ Stroke	④ Magnet	⑤ Rod type	⑥ Mounting type[Note1]	⑦ Thread type
ACQ: Compact cylinder (Double acting)	12 16 20 25 32 40 50 63 80 100	Refer to stroke table for details	Blank: Without magnet	Blank: Female thread	Blank: No accessories FA: FA type FB: FB type CB: CB type LB: LB type	T: NPT [Note2]
ASQ: Compact cylinder (Single acting-push)	12 16 20 25 32 40 50 63					
ATQ: Compact cylinder (Single acting-pull)			Blank: No accessories FA: FA type FB: FB type LB: LB type			
ACQD: Compact cylinder (Double rod)	12 16 20 25 32 40 50 63 80 100					

[Note1] Please refer to page 107~110 for accessory parts. [Note2] Standard thread is blank here.

Stroke

Bore size (mm)		Standard stroke (mm)										Max.std stroke	Max.stroke				
													Standard	With magnet			
12	Double acting	5	10	15	20	25	30	35	40	45	50	50	80	70			
	Single acting	5	10	15	20							20	-	-			
16	Double acting	5	10	15	20	25	30	35	40	45	50	55	60	80	70		
	Single acting	5	10	15	20							20	-	-			
20 25	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100
	Single acting	5	10	15	20	25	30					30	-	-			
32 40 50 63	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100
	Single acting	5	10	15	20	25	30										
80 100	Double acting	5	10	15	20	25	30	35	40	45	50	60	70	75	80	90	100

Note) 1. Please contact the company for other special strokes.

2. The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder.

e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.

Specification

Bore size(mm)	12	16	20	25	32	40	50	63	80	100
Acting type	Double acting Single acting_Push type, Single acting_Pull type									
Fluid	Air(to be filtered by 40μm filter element)									
Operating pressure	Double acting: 22~145psi(0.15~1.0MPa) Single acting: 28~145psi(0.2~1.0MPa)									
Proof pressure	215psi(1.5MPa)									
Temperature	-20~70℃									
Speed range mm/s	Double acting: 30~500 Single acting: 50~500									
Stroke tolerance	Stroke≤100 ^{+1.0} ₀ Stroke>100 ^{+1.5} ₀									
Cushion type	Bumper									
Port size [Note1]	M5×0.8				1/8"		1/4"		3/8"	

[Note1] NPT thread is available.

Add) Refer to P232 for detail of sensor switch.



ACQ Series

Product feature

1. JIS standard is implemented.
2. C clip is adopted to connect the cylinder body and back cover or front cover, and riveted structure is adopted to connect piston and piston rod to make it compact and reliable.
3. The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
4. The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of grease reservation.
5. Compact structure can effectively save installation space.
6. There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
7. Installing accessories with various specifications are optional.

Criteria for selection: Cylinder thrust

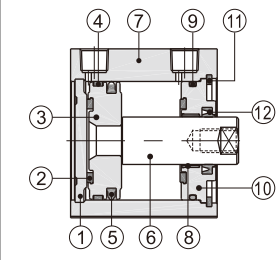
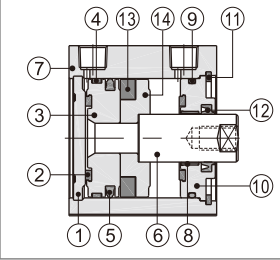
Unit: Newton(N)

Bore size	Rod size	Acting type		Pressure area(mm ²)	Operating pressure(psi)						
					15	30	45	60	75	90	105
12	6	Single acting	Push side	113.1	-	13.6	24.9	36.2	47.5	58.9	70.2
			Pull side	84.8	-	8.0	16.4	24.9	33.4	41.9	50.4
		Double acting	Push side	113.1	11.3	22.6	33.9	45.2	56.5	67.9	79.2
			Pull side	84.8	8.5	17.0	25.4	33.9	42.4	50.9	59.4
16	8	Single acting	Push side	201.1	-	27.0	47.1	67.2	87.3	107.4	127.5
			Pull side	150.8	-	17.0	32.0	47.1	62.2	77.3	92.4
		Double acting	Push side	201.1	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull side	150.8	15.1	30.2	45.2	60.3	75.4	90.5	105.6
20	10	Single acting	Push side	314.2	-	36.8	68.2	99.7	131.1	162.5	193.9
			Pull side	235.6	-	21.1	44.7	68.2	91.8	115.4	138.9
		Double acting	Push side	314.2	31.4	62.8	94.2	125.7	157.1	188.5	219.9
			Pull side	235.6	23.6	47.1	70.7	94.2	117.8	141.4	164.9
25	12	Single acting	Push side	490.9	18.1	67.2	116.3	165.3	214.4	263.5	312.6
			Pull side	377.8	6.8	44.6	82.3	120.1	157.9	195.7	233.4
		Double acting	Push side	490.9	49.1	98.2	147.3	196.3	245.4	294.5	343.6
			Pull side	377.8	37.8	75.6	113.3	151.1	188.9	226.7	264.4
32	16	Single acting	Push side	804.2	27.4	107.8	188.3	268.7	349.1	429.5	510.0
			Pull side	603.2	7.3	67.6	128.0	188.3	248.6	308.9	369.2
		Double acting	Push side	804.2	80.4	160.8	241.3	321.7	402.1	482.5	563.0
			Pull side	603.2	60.3	120.6	181.0	241.3	301.6	361.9	422.2
40	16	Single acting	Push side	1256.6	44.7	170.3	296.0	421.7	547.3	673.0	798.6
			Pull side	1055.6	24.6	130.1	235.7	341.2	446.8	552.3	657.9
		Double acting	Push side	1256.6	125.7	251.3	377.0	502.7	628.3	754.0	879.6
			Pull side	1055.6	105.6	211.1	316.7	422.2	527.8	633.3	738.9
50	20	Single acting	Push side	1963.5	96.3	292.7	489.0	685.4	881.7	1078.1	1274.4
			Pull side	1649.3	64.9	229.9	394.8	559.7	724.7	889.6	1054.5
		Double acting	Push side	1963.5	196.3	392.7	589.0	785.4	981.7	1178.1	1374.4
			Pull side	1649.3	164.9	329.9	494.8	659.7	824.7	989.6	1154.5
63	20	Single acting	Push side	3117.2	141.7	453.4	765.2	1076.9	1388.6	1700.3	2012.1
			Pull side	2803.1	110.3	390.6	670.9	951.2	1231.5	1511.9	1792.2
		Double acting	Push side	3117.2	311.7	623.4	935.2	1246.9	1558.6	1870.3	2182.1
			Pull side	2803.1	280.3	560.6	840.9	1121.2	1401.5	1681.9	1962.2
80	25	Double acting	Push side	5026.5	502.7	1005.3	1508.0	2010.6	2513.3	3015.9	3518.6
			Pull side	4535.7	453.6	907.1	1360.7	1814.3	2267.8	2721.4	3175.0
100	32	Double acting	Push side	7854.0	785.4	1570.8	2356.2	3141.6	3927.0	4712.4	5497.8
			Pull side	7049.7	705.0	1409.9	2114.9	2819.9	3524.9	4229.8	4934.8

Compact cylinder

ACQ Series

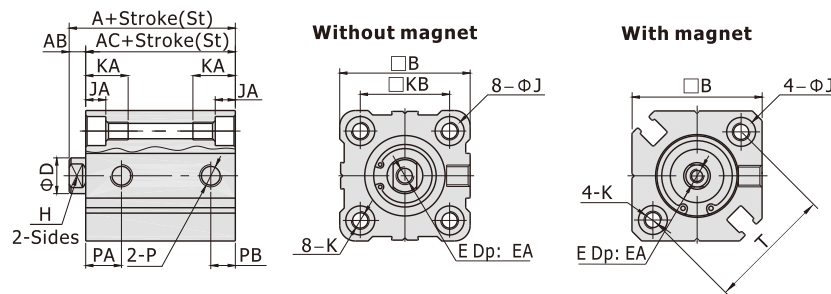
Inner structure and material of major parts

ACQ		NO.	Item	Material
		1	Back cover	No(Φ12, 16)\Aluminum alloy(Others)
		2	Bumper	TPU(Φ12~25)\NBR(Others)
		3	Piston	Brass(Φ12, 16)\Aluminum alloy(Others)
		4	Wear ring	No(Φ12~32)\Wear resistant material(Others)
		5	Piston seal	NBR
		6	Piston rod	Carbon steel with 20μm chrome plated
		7	Body	Aluminum alloy
		8	Bushing	No(Φ12~32)\Wear resistant material(Others)
		9	O-ring	NBR
		10	Front cover	Aluminum alloy
		11	C clip	Spring steel
		12	Front cover packing	NBR
		13	Magnet	Sintered metal(Neodymium-iron-boron)(Φ12~25)\Plastic(Others)
		14	Magnet holder	Brass(Φ12, 16)\Aluminum alloy(Others)
ACQ-S				
				

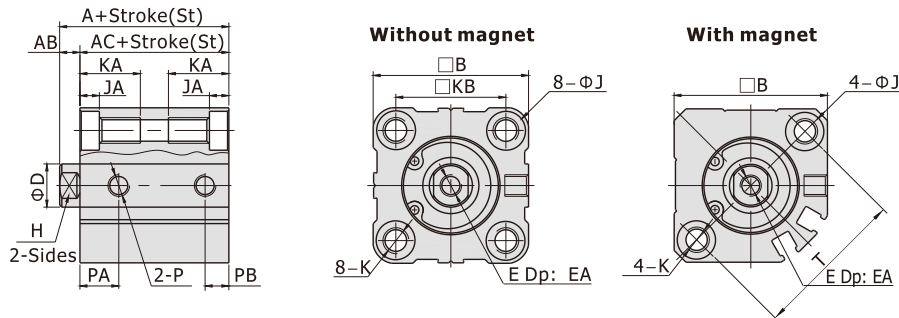
Dimensions

ACQ

Φ12, Φ16



Φ20, Φ25



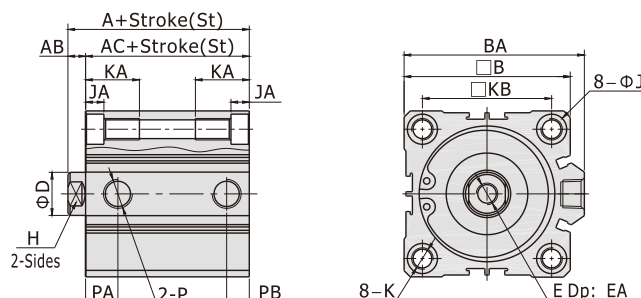
Type Bore size\Item	Without magnet						With magnet		AB	B	D	E	EA	H	J	JA
	A			AC			A	AC								
Stroke	St≤50	St=55	St≥60	St≤50	St=55	St≥60										
12	20.5	-	-	17	-	-	31.5	28	3.5	25	6	M3×0.5	6	5	6	3.5
16	22	22	-	18.5	18.5	-	34	30.5	3.5	29	8	M4×0.7	8	6	6	3.5
20	24	-	34	19.5	-	29.5	36	31.5	4.5	36	10	M5×0.8	7	8	9	5.5
25	27.5	-	37.5	22.5	-	32.5	37.5	32.5	5	40	12	M6×1.0	12	10	9	5.5

Type Bore size\Item	K	KA	KB	P	Without magnet		With magnet		T
					PA	PB	PA	PB	
12	M4×0.7 Thru.hole:Φ3.4	11	15.5	M5×0.8	7.5	5	9	7	22
16	M4×0.7 Thru.hole:Φ3.4	11	20	M5×0.8	8	5.5	9.5	5.5	28
20	M6×1.0 Thru.hole:Φ5.2	17	25.5	M5×0.8	9	5.5	9.5	5.5	36
25	M6×1.0 Thru.hole:Φ5.2	17	28	M5×0.8	11	5.5	11	5.5	40



ACQ Series

Φ32~Φ100 (Stroke≤100)



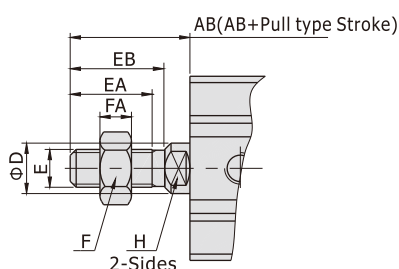
Item Bore size	A(Without magnet)		A (With magnet)	AB	AC(Without magnet)		AC (With magnet)	B	BA	D	E
	St≤50	St≥60			St≤50	St≥60					
32	30	40	40	7	23	33	33	45	49.5	16	M8×1.25
40	36.5	46.5	46.5	7	29.5	39.5	39.5	53	57	16	M8×1.25
50	38.5	48.5	48.5	8	30.5	40.5	40.5	64	71	20	M10×1.5
63	44	54	54	8	36	46	46	77	84	20	M10×1.5
80	53.5	63.5	63.5	10	43.5	53.5	53.5	98	104	25	M16×2.0
100	65	75	75	12	53	63	63	117	123.5	32	M20×2.5

Item Bore size	EA	H	J	JA	K	KA	KB	P	Without magnet		With magnet	
									PA	PB	PA	PB
32	13	14	9	5.5	M6×1.0 Thru.hole:Φ5.2	17	34	1/8"	7.5	6.5	10.5	7.5
									10.5	7.5		
40	13	14	9	5.5	M6×1.0 Thru.hole:Φ5.2	17	40	1/8"	11	8	11	8
50	15	17	10.5	6.5	M8×1.25 Thru.hole:Φ6.7	22	50	1/4"	9	9	10.5	10.5
									10.5	10.5		
63	15	17	14	9	M10×1.5 Thru.hole:Φ8.5	28.5	60	1/4"	14	9.5	15	10.5
									15	10.5		
80	20	22	17	11	M12×1.75 Thru.hole:Φ10.4	35.5	77	3/8"	16	14	16	14
100	26	27	17	11	M12×1.75 Thru.hole:Φ10.4	35.5	94	3/8"	20	17.5	20	17.5

Note) The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder.
e.g. 55mm stroke cylinder has the same dimensions of 60 std. stroke cylinder.

Male thread

(Bore size: Φ12~Φ100, Stroke≤100)

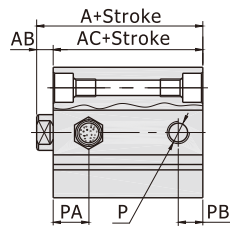


Bore size\Item	AB	D	E	EA	EB	F	FA	H
12	14	6	M5×0.8	9	10.5	8	4	5
16	15.5	8	M6×1.0	10	12	10	5	6
20	18.5	10	M8×1.25	12	14	12	6	8
25	22.5	12	M10×1.25	15	17.5	17	6	10
32	28.5	16	M14×1.5	20.5	23.5	19	8	14
40	28.5	16	M14×1.5	20.5	23.5	19	8	14
50	33.5	20	M18×1.5	26	28.5	27	11	17
63	33.5	20	M18×1.5	26	28.5	27	11	17
80	43.5	25	M22×1.5	32.5	35.5	32	13	22
100	43.5	32	M26×1.5	32.5	35.5	36	13	27

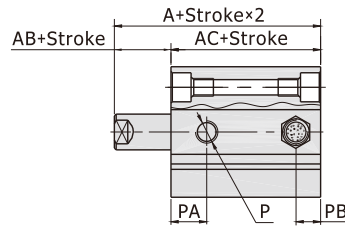
ACQ Series

ASQ **ATQ**

Φ12, Φ16

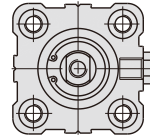


ASQ

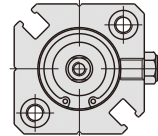


ATQ

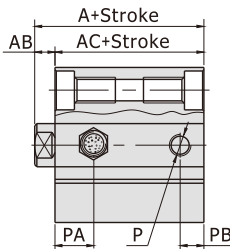
Without magnet



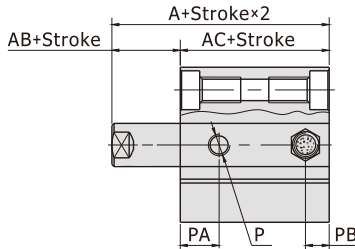
With magnet



Φ20, Φ25

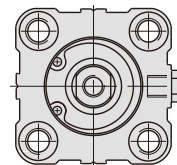


ASQ

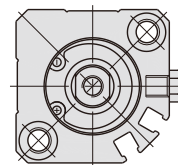


ATQ

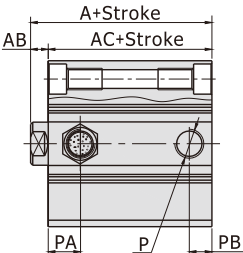
Without magnet



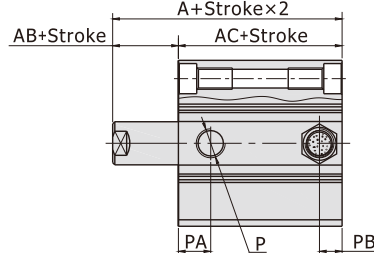
With magnet



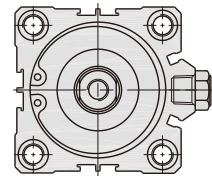
Φ32~Φ63



ASQ



ATQ



Bore size\Item Stroke	A(Without magnet)			A(With magnet)			AB	AC(Without magnet)			AC(With magnet)		
	5\10	15\20	25\30	5\10	15\20	25\30		5\10	15\20	25\30	5\10	15\20	25\30
12	25.5	30.5	-	36.5	41.5	-	3.5	22	27	-	33	38	-
16	27	32	-	39	44	-	3.5	23.5	28.5	-	35.5	40.5	-
20	29	34	39	41	46	51	4.5	24.5	29.5	34.5	36.5	41.5	46.5
25	32.5	37.5	42.5	42.5	47.5	52.5	5	27.5	32.5	37.5	37.5	42.5	47.5
32	35	40	45	45	50	55	7	28	33	38	38	43	48
40	41.5	46.5	51.5	51.5	56.5	61.5	7	34.5	39.5	44.5	44.5	49.5	54.5
50	48.5	53.5	58.5	58.5	63.5	68.5	8	40.5	45.5	50.5	50.5	55.5	60.5
63	54	59	64	64	69	74	8	46	51	56	56	61	66

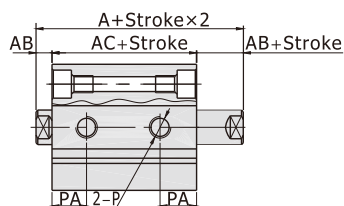
Bore size\Item	P	PA(Without magnet)	PA(With magnet)	PB(Without magnet)	PB(With magnet)
12	M5×0.8	7.5	9	5	7
16	M5×0.8	8	9.5	5.5	5.5
20	M5×0.8	9	9.5	5.5	5.5
25	M5×0.8	11	11	5.5	5.5
32	1/8"	10.5	10.5	7.5	7.5
40	1/8"	11	11	8	8
50	1/4"	10.5	10.5	10.5	10.5
63	1/4"	15	15	10.5	10.5

Remark) The unmarked dimension is the same as ACQ standard type.

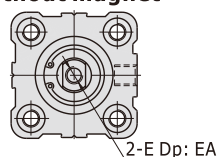
ACQ Series

ACQD

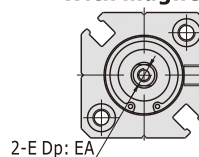
Φ12, Φ16



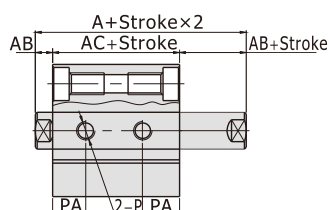
Without magnet



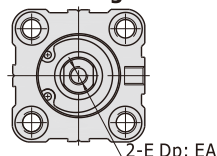
With magnet



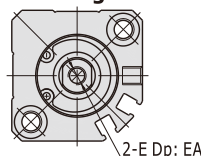
Φ20, Φ25



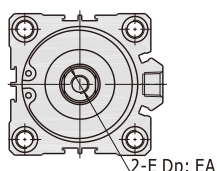
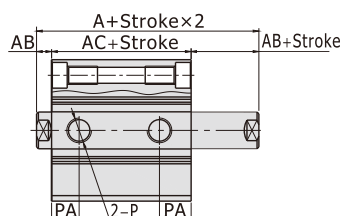
Without magnet



With magnet



Φ32~Φ100

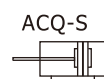
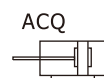


Item Bore size	Without magnet		With magnet		AB	AF	E	EA	FA	PA	R
	A	AC	A	AC							
12	32.2	25.2	39.4	32.4	3.5	17	M3×0.5	6	4	9	M5×0.8
16	33	26	43	36	3.5	21	M4×0.7	8	5	9.5	M6×1.0
20	35	26	47	38	4.5	25	M5×0.8	7	6	9.5	M8×1.25
25	39	29	49	39	5	27	M6×1.0	9.5(St=5)/12(St>5)	6	11	M10×1.25
32	44.5	30.5	54.5	40.5	7	28	M8×1.25	9(St≤10)/13(St>10)	7	10	M12×1.25
40	54	40	64	50	7	28	M8×1.25	11(St≤10)/13(St>10)	7	13	M12×1.25
50	56.5	40.5	66.5	50.5	8	29	M10×1.5	12(St≤10)/15(St>10)	8	13.5	M16×1.5
63	58	42	68	52	8	29	M10×1.5	12(St≤10)/15(St>10)	8	14.5(St=5)/16(St>5)	M16×1.5
80	71	51	81	61	10	35.5	M16×2.0	14(St≤15)/20(St>15)	10	16	M20×1.5
100	84.5	60.5	94.5	70.5	12	42.5	M20×2.5	20(St≤25)/26(St>25)	13.5	21	M27×2.0

Remark) The unmarked dimension is the same as ACQ standard type.

Compact cylinder

ACQ Series—Longer stroke



Ordering code

ACQ 50X150 S B □ T

① ② ③ ④ ⑤ ⑥ ⑦

① Model	② Bore size	③ Stroke	④ Magnet	⑤ Rod type	⑥ Mounting type[Note1]	⑦ Thread type
ACQ: Compact cylinder (Double acting)	32 40 50 63 80 100	Refer to stroke table for details	Blank: Without magnet S: With magnet	Blank: Female thread B: Male thread	Blank: No accessories FA: FA type FB: FB type CB: CB type LB: LB type	T: NPT
ACQD: Compact cylinder (Double rod)					Blank: No accessories FA: FA type FB: FB type LB: LB type	

[Note1] Please refer to page 107~110 for accessory parts.

Stroke

Bore size(mm)	Standard stroke (mm)	Max.std stroke	Max.stroke
32 40 50 63 80 100	125 150 175 200 250 300	300	350

Note) Within allowable stroke scope, when the stroke is larger than the maximum value, it shall be treated as non-standard one.
Please contact the company for other special strokes.

Specification

Bore size(mm)	32	40	50	63	80	100
Acting type	Double acting					
Fluid	Air(to be filtered by 40μm filter element)					
Operating pressure	22~145psi(0.15~1.0MPa)					
Proof pressure	215psi(1.5MPa)					
Temperature	-20~70℃					
Speed range mm/s	30~500					
Stroke tolerance	+1.5 0					
Cushion type	Bumper					
Port size [Note1]	1/8"		1/4"		3/8"	

[Note1] NPT thread is available. Add) Refer to P232 for detail of sensor switch.

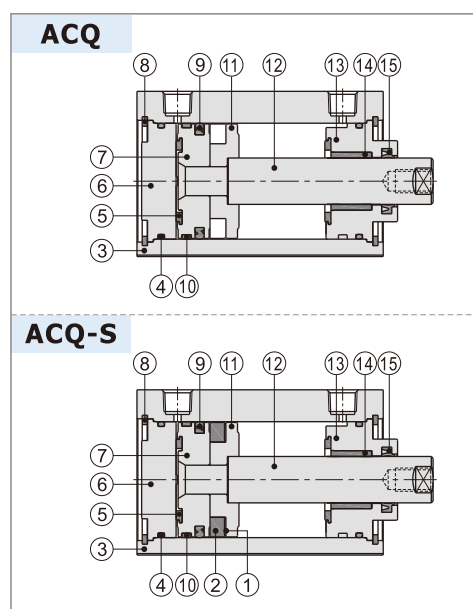
Compact cylinder

ACQ Series——Longer stroke

Product feature

1. JIS standard is implemented.
2. C clip is adopted to connect the cylinder body and back cover or front cover, and riveted structure is adopted to connect piston and piston rod to make it compact and reliable.
3. The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
4. The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of grease reservation.
5. Compact structure can effectively save installation space.
6. There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
7. Installing accessories with various specifications are optional.

Inner structure and material of major parts



NO.	Item	Material	NO.	Item	Material
1	Magnet washer	NBR	10	Wear ring	No(Φ32)\Wear resistant material(Others)
2	Magnet	Plastic	11	Magnet holder	Aluminum alloy
3	Body	Aluminum alloy	12	Piston rod	Carbon steel with 20μm chrome plated
4	O-ring	NBR	13	Front cover	Aluminum alloy
5	Bumper	NBR	14	Bushing	No(Φ32)\Wear resistant material(Others)
6	Back cover	Aluminum alloy	15	Front cover packing	NBR
7	Piston	Aluminum alloy			
8	C clip	Spring steel			
9	Piston seal	NBR			

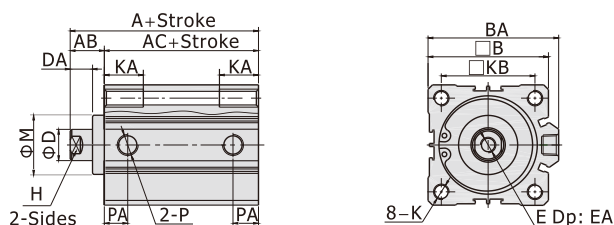
Compact cylinder

ACQ Series—Longer stroke

Dimensions

ACQ

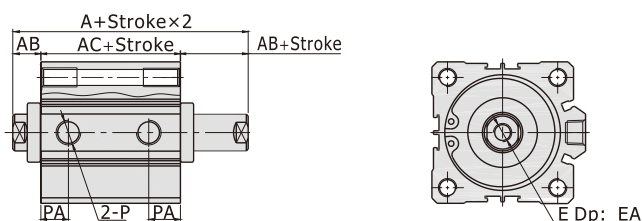
Φ32~Φ100(Stroke>100)



Bore size\Item	A	AB	AC	B	BA	D	DA	E	EA	H	K	KA	KB	M	P	PA
32	62.5	17	45.5	45	49.5	16	12	M8×1.25	13	14	M6×1.0 Thru.hole:Φ5.2	17	34	22	1/8"	12.5
40	72	17	55	53	57	16	12	M8×1.25	13	14	M6×1.0 Thru.hole:Φ5.2	17	40	28	1/8"	14
50	73.5	18	55.5	64	71	20	13	M10×1.5	15	17	M8×1.25 Thru.hole:Φ6.7	22	50	35	1/4"	14
63	75	18	57	77	84	20	13	M10×1.5	15	17	M10×1.5 Thru.hole:Φ8.5	27	60	35	1/4"	16.5
80	86	20	66	98	104	25	15	M16×2.0	21	22	M12×1.75 Thru.hole:Φ10.4	32	77	43	3/8"	19
100	97.5	22	75.5	117	123.5	32	17	M20×2.5	27	27	M12×1.75 Thru.hole:Φ10.4	33	94	59	3/8"	23

ACQD

Φ32~Φ100(Stroke>100)

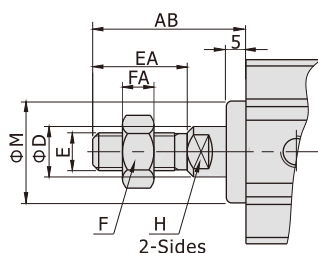


Bore size\Item	A		AB	AC		AF	EA	FA	PA	R
	Without magnet	With magnet		Without magnet	With magnet					
32	79.5	89.5	17	45.5	55.5	28	13	7	12.5	M12×1.25
40	89	99	17	55	65	28	13	7	14	M12×1.25
50	91.5	101.5	18	55.5	65.5	29	15	8	14	M16×1.5
63	93	103	18	57	67	29	15	8	16.5	M16×1.5
80	106	116	20	66	76	35.5	21	10	19	M20×1.5
100	119.5	129.5	22	75.5	85.5	42.5	27	13.5	23	M27×2.0

Remark) The unmarked dimension is the same as ACQ standard type.

Male thread

(Bore size: Φ32~Φ100 Stroke>100 Longer type)



Bore size\Item	AB	D	E	EA	FA	F	H	M
32	38.5	16	M14×1.5	23.5	8	19	14	22
40	38.5	16	M14×1.5	23.5	8	19	14	28
50	43.5	20	M18×1.5	28.5	11	27	17	35
63	43.5	20	M18×1.5	28.5	11	27	17	35
80	53.5	25	M22×1.5	35.5	13	32	22	43
100	53.5	32	M26×1.5	35.5	13	36	27	59

Compact cylinder

TACQ Series—With guider type



Ordering code

TACQ 50X100 S T

① ② ③ ④ ⑤

① Model	② Bore size	③ Stroke	④ Magnet	⑤ Thread type
TACQ: Compact cylinder (Double acting with guider)	12 16 20 25 32 40 50 63 80 100	Refer to stroke table for details	Blank: Without magnet S: With magnet	T: NPT

Stroke

Bore size(mm)	Standard stroke (mm)												Max.std stroke (mm)	Middle stroke range(mm)
	5	10	15	20	25	30	35	40	45	50	75	100		
12 16	●	●	●	●	●	●	×	×	×	×	×	×	30	1~29
20 25	●	●	●	●	●	●	●	●	●	●	×	×	50	1~49
32 40	●	●	●	●	●	●	●	●	●	●	●	●	100	1~99
50 63 80 100	×	●	●	●	●	●	●	●	●	●	●	●	100	5~99

[Note] The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 23mm stroke cylinder has the same dimensions of 25 std. stroke cylinder.
Please contact the company for other special strokes.

Specification

Bore size(mm)	12	16	20	25	32	40	50	63	80	100
Acting type	Double acting									
Fluid	Air(to be filtered by 40μm filter element)									
Operating pressure	22~145psi(0.15~1.0MPa)									
Proof pressure	215psi(1.5MPa)									
Temperature	-20~70℃									
Speed range mm/s	30~500									
Stroke tolerance	+1.0 0									
Cushion type	Bumper									
Port size [Note1]	M5×0.8				1/8"		1/4"		3/8"	
Non-rotating tolerance [Note2]	±0.2°		±0.1°							

[Note1] NPT thread is available.

[Note2] Retract position.

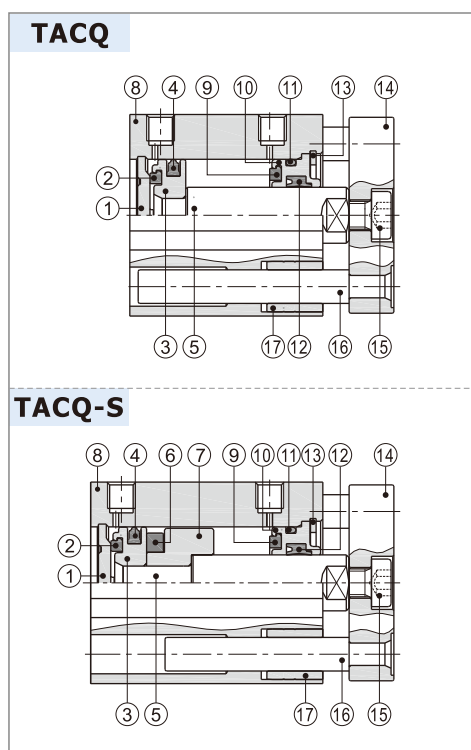
Add) Refer to P232 for detail of sensor switch.

TACQ Series—With guider type

Product feature

1. JIS standard is implemented and with guider.
2. C clip is adopted to connect the cylinder body and back cover or front cover to make it compact and reliable.
3. The internal diameter of the body is treated with rolling followed by the treatment of hard anodizing, forming an excellent abrasion resistance and durability.
4. The seal of piston adopts heterogeneous two-way seal structure. It has compact dimension and the function of greasel reservation.
5. Compact structure can effectively save installation space.
6. There are magnetic switch slots around the cylinder body, which is convenient to install inducting switch.
7. Double rod non-rotating structure enables to bear large working load and lateral load.

Inner structure and material of major parts



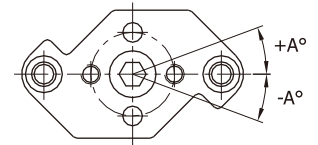
NO.	Item	Material	NO.	Item	Material
1	Back cover	Aluminum alloy	10	Front cover	Aluminum alloy
2	Bumper	NBR	11	O-ring	NBR
3	Piston	Aluminum alloy	12	Front cover packing	NBR
4	Piston seal	NBR	13	C clip	Spring steel
5	Piston rod	Carbon steel with 20μm chrome plated	14	Fixing plate	Aluminum alloy
6	Magnet	Sintered metal (Neodymium-iron-boron)	15	Screw	Carbon steel
7	Magnet holder	Aluminum alloy	16	Leader	Stainless steel
8	Body	Aluminum alloy	17	Bushing	Brass
9	Wear ring	NBR			

TACQ Series—With guider type

Installation and application

1. TACQ series cylinder is designed with double guide rod which is non-rotating.
Make sure the non-rotating accuracy of the fixing plate is in the allowable range.

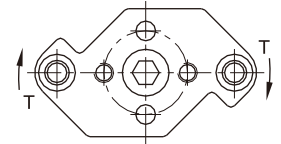
Bore size	12,16	20,25,32,40,50,63,80,100
Non-rotating tolerance	$\pm 0.2^\circ$	$\pm 0.1^\circ$



2. Do not apply reverse torque to the piston rods. The torque beyond the limits may cause malfunction or reduction of the service life.

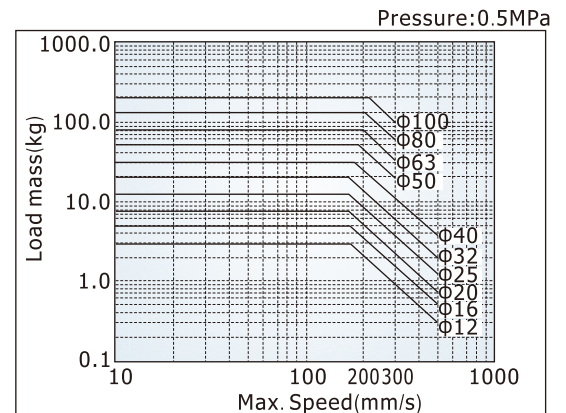
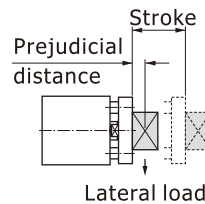
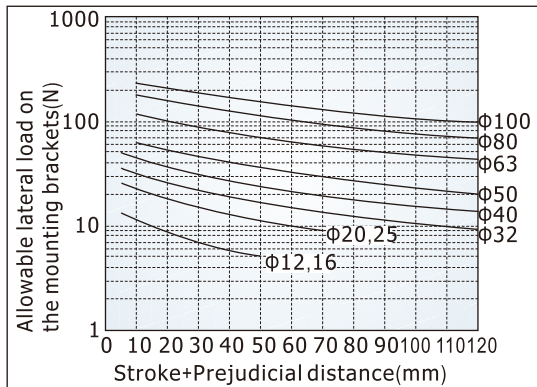
Unit: N·m

Bore size\Stroke	5	10	15	20	25	30	35	40	45	50	75	100
12	0.11	0.10	0.08	0.07	0.07	0.06	-	-	-	-	-	-
16	0.15	0.12	0.11	0.10	0.09	0.08	-	-	-	-	-	-
20	0.37	0.32	0.28	0.25	0.23	0.21	0.19	0.18	0.17	0.16	-	-
25	0.40	0.35	0.31	0.28	0.25	0.23	0.21	0.20	0.18	0.17	-	-
32	0.66	0.59	0.53	0.49	0.45	0.42	0.39	0.36	0.34	0.32	0.25	0.20
40	1.06	0.96	0.88	0.81	0.75	0.70	0.65	0.61	0.58	0.55	0.43	0.36
50	-	1.70	1.56	1.45	1.35	1.26	1.19	1.12	1.06	1.01	0.80	0.67
63	-	3.90	3.62	3.37	3.15	2.96	2.80	2.65	2.51	2.39	1.92	1.61
80	-	7.44	6.98	6.56	6.20	5.87	5.57	5.31	5.07	4.84	3.98	3.37
100	-	11.85	11.19	10.61	10.08	9.60	9.17	8.77	8.41	8.07	6.73	5.77



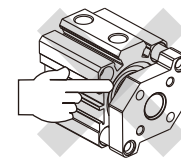
3. Make sure the lateral load on the mounting bracket is within the limits. Any exceeding may cause malfunction or reduction of the service life.

4. Make sure the load quality and the maximum speed are within the limits. Any exceeding may cause malfunction or reduction of the service life.

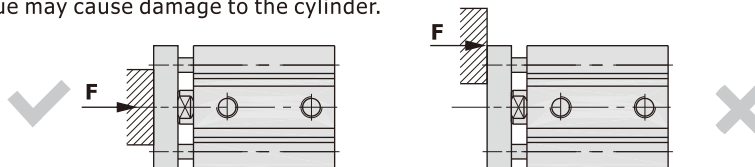


5. Caution before mounting:

5.1) Do not put hands between the mounting bracket and cylinder, which may cause damage to a human body when the piston rod retracts.



5.2) Make sure the external force against the mounting bracket is concentric with the piston rod. Any extra torque may cause damage to the cylinder.



5.3) Install the fixture onto the mounting bracket only when the piston rod is in the retraction state.

Do not apply the installation torque on the guide rod.

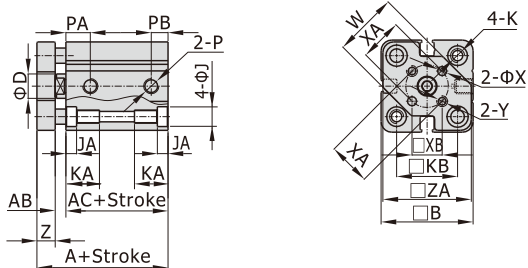
5.4) Avoid any damage on piston rod and guide rod, which may cause damage on seals and air leakage or malfunction.

Compact cylinder

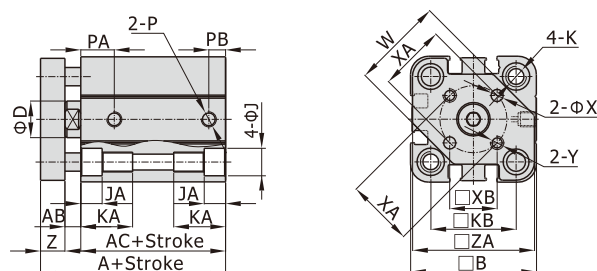
TACQ Series—With guider type

Dimensions

Φ12/Φ16



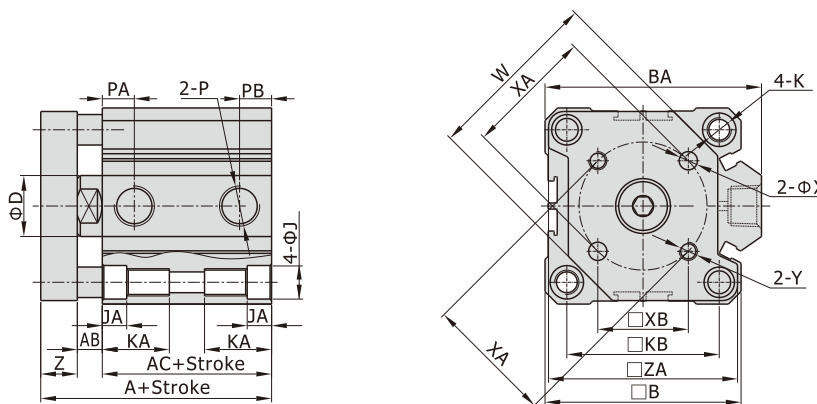
Φ20/Φ25



Item Bore size	A		AC		AB	B	D	J	JA	K
	Without magnet	With magnet	Without magnet	With magnet						
12	26.5	37.5	17.3	28.3	3	26	6	6	3.5	M4×0.7 Thru.hole:Φ3.4
16	28	40	19	31	3	30	8	6	3.5	M4×0.7 Thru.hole:Φ3.4
20	32	44	20.5	32.5	3.5	36	10	9	5.5	M6×1.0 Thru.hole:Φ5.2
25	35.5	45.5	23	33	4.5	41	12	9	5.5	M6×1.0 Thru.hole:Φ5.2

Item Bore size	KA	KB	P	PA		PB		W	X	XA	XB	Y	Z	ZA
				Without magnet	With magnet	Without magnet	With magnet							
12	11.5	15.5	M5×0.8	7.5	9	5	7	15	3	10	7.1	M3×0.5	6	25
16	11.5	20	M5×0.8	8	9.5	5.5	5.5	21	3	14	9.9	M3×0.5	6	29
20	18	25.5	M5×0.8	9	9.5	5.5	5.5	26	4	17	12	M4×0.7	8	35
25	17.5	28	M5×0.8	11	11	5.5	5.5	30	5	22	15.6	M5×0.8	8	40

Φ32~Φ100



Item Bore size	A(Without magnet)		A (With magnet)	AB	AC(Without magnet)		AC (With magnet)	B	BA	D	J	JA	K
	St≤50	St≥75			St≤50	St≥75							
32	40		50	6.5	23.5		33.5	45	49.5	16	9	5.5	M6×1.0 Thru.hole:Φ5.2
40		46.5	56.5	6.6		29.9	39.9	53	57	16	9	5.5	M6×1.0 Thru.hole:Φ5.2
50	50.5	60.5	60.5	7.5	31	41	41	64	71	20	10.5	6.5	M8×1.25 Thru.hole:Φ6.7
63	56	66	66	8	36	46	46	77	84	20	14	9	M10×1.5 Thru.hole:Φ8.5
80	67.5	77.5	77.5	10	43.5	53.5	53.5	98	104	25	17	11	M12×1.75 Thru.hole:Φ10.4
100	81	91	91	12	53	63	63	117	123.5	32	17	11	M12×1.75 Thru.hole:Φ10.4

Item Bore size	KA	KB	P	PA (Without magnet)	PA (With magnet)	PB (Without magnet)	PB (With magnet)	W	X	XA	XB	Y	Z	ZA
32	17.5	34	1/8"	7.5	10.5	6.5	7.5	37	5	28	19.8	M5×0.8	10	43
				10.5		7.5	7.5							
40	17.5	40	1/8"	11	11	8	8	46	5	33	23.3	M5×0.8	10	51
50	22.5	50	1/4"	10.5	10.5	10.5	10.5	58	6	42	29.7	M6×1.0	12	62
63	28.5	60	1/4"	15	15	10.5	10.5	69	6	50	35.4	M6×1.0	12	75
80	35.5	77	3/8"	16	16	14	14	90	8	65	46	M8×1.25	14	95
100	35.5	94	3/8"	20	20	17.5	17.5	113.5	10	80	56.6	M10×1.5	16	114.5



Compact cylinder

ACQ Series—Accessories

List for ordering code of accessories

Accessories	Mounting accessories			Knuckle				Sensor switch
Bore size	LB	FA/FB	CB	I	Y	F	U	
12	F-ACQ12LB	F-ACQ12FA	F-ACQ12CB	F-ACQ12I	F-ACQ12Y	–	F-M5X080U	CMMSG DMSG DMSGs
16	F-ACQ16LB	F-ACQ16FA	F-ACQ16CB	F-ACQ16I	F-ACQ16Y	–	F-M6X100U	
20	F-ACQ20LB	F-ACQ20FA	F-ACQ20CB	F-ACQ20I	F-ACQ20Y	F-M8X125F	F-M8X125U	
25	F-ACQ25LB	F-ACQ25FA	F-ACQ25CB	F-ACQ25I	F-ACQ25Y	F-M10X125F	F-M10X125U	
32	F-ACQ32LB	F-ACQ32FA	F-ACQ32CB	F-ACQ32I	F-ACQ32Y	F-M14X150F	F-M14X150U	CMMSG DMSG DMSGs
40	F-ACQ40LB	F-ACQ40FA	F-ACQ40CB					
50	F-ACQ50LB	F-ACQ50FA	F-ACQ50CB	F-ACQ50I	F-ACQ50Y	F-M18X150F	F-M18X150U	
63	F-ACQ63LB	F-ACQ63FA	F-ACQ63CB					
80	F-ACQ80LB	F-ACQ80FA	F-ACQ80CB	F-ACQ80I	F-ACQ80Y	–	–	
100	F-ACQ100LB	F-ACQ100FA	F-ACQ100CB	F-ACQ100I	F-ACQ100Y	–	F–M26X150U	

Accessory selection

Cylinder model\Accessories			Mounting accessories				Knuckle				Sensor switch	
			LB	FA	FB	CB [1]	I	Y	U	F	CMSSG	DMSG(S)
ACQ	Female thread	Without magnet					×	×	×	×	×	×
		With magnet	●	●	●	●					●	●
	Male thread	Without magnet					●	●	●	●	×	×
		With magnet									●	●
ASQ ATQ	Female thread	Without magnet					×	×	×	×	×	×
		With magnet	●	●	●	●					●	●
	Male thread	Without magnet					●	●	●	●	×	×
		With magnet									●	●
ACQD	Female thread	Without magnet					×	×	×	×	×	×
		With magnet	●	●	×	×					●	●
	Male thread	Without magnet					●	●	●	●	×	×
		With magnet									●	●

[Note1] CB is attached with relevant PIN.

Material of accessories

Accessories Bore size	Mounting accessories				Knuckle			
	LB	FA	FB	CB	I	Y	F	U
12, 15	△	●	●	●	▲	▲	▲	▲
20, 25	△	●	●	●	▲	▲	▲	▲
32~100	△	●	●	■	▲	■	▲	▲

●—Aluminum alloy, ■—Carbon Steel, ▲—S45C, ▢—SPCC

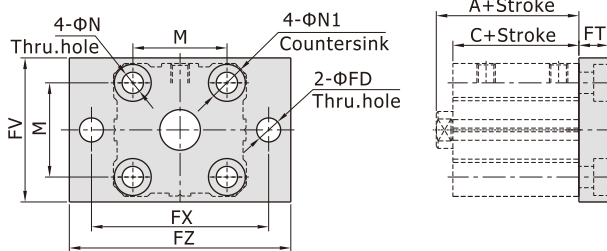
Compact cylinder

ACQ Series—Accessories

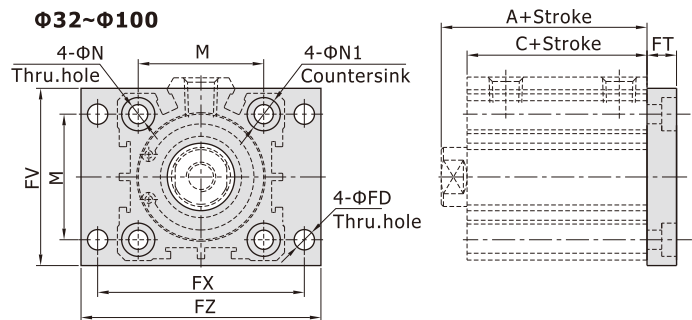
Dimensions

FA/FB

Φ12~Φ25



Φ32~Φ100



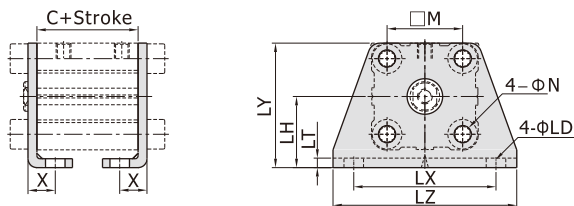
Item Bore size Stroke	A [Note1]				C				M	N	N1	FD	FT	FV	FX	FZ
	Without magnet			With magnet	Without magnet			With magnet								
	≤50	55	≥60		≤50	55	≥60									
12	20.5	-	-	31.5	17	-	-	28	15.5	4.5	7.5	4.5	5.5	25	45	55
16	22	22	-	34	18.5	18.5	-	30.5	20	4.5	7.5	4.5	5.5	30	45	55
20	24	-	34	36	19.5	-	29.5	31.5	25.5	6.5	10.5	6.5	8	39.5	48	60
25	27.5	-	37.5	37.5	22.5	-	32.5	32.5	28	6.5	10.5	6.5	8	42	52	64
32	30	-	40	40	23	-	33	33	34	6.5	10.5	5.5	8	48	56	65
40	36.5	-	46.5	46.5	29.5	-	39.5	39.5	40	6.5	10.5	5.5	8	54	62	72
50	38.5	-	48.5	48.5	30.5	-	40.5	40.5	50	8.5	13.5	6.5	9	67	76	89
63	44	-	54	54	36	-	46	46	60	10.5	16.5	9	10	80	92	108
80	53.5	-	63.5	63.5	43.5	-	53.5	53.5	77	12.5	18.5	11	12	99	116	134
100	65	-	75	75	53	-	63	63	94	12.5	18.5	11	12	117	136	154

[Note] Valve A and C in the above table are only for ACQ series.

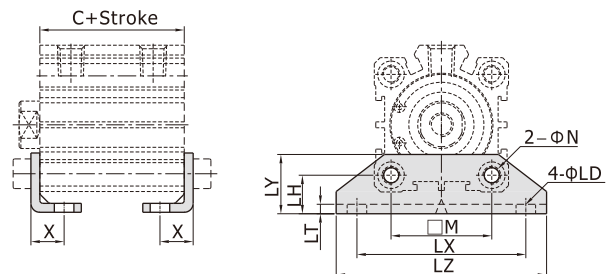
Please refer to relevant content for valve A and C of other series.

LB

Φ12~Φ25



Φ32~Φ100



Bore sizeItem	C [Note]				M	N	X	LD	LH	LT	LX	LY	LZ
	Without magnet			With magnet									
Stroke	≤50	55	≥60										
12	17	-	-	28	15.5	4.5	8	4.5	17	2	34	29.5	44
16	18.5	18.5	-	30.5	20	4.5	8	4.5	19	2	38	33.5	48
20	19.5	-	29.5	31.5	25.5	6.5	9.2	6.5	24	3	48	42	62
25	22.5	-	32.5	32.5	28	6.5	10.7	6.5	26	3	52	46	66
32	23	-	33	33	34	6.5	11.2	6.5	13	3	57	20	71
40	29.5	-	39.5	39.5	40	6.5	11.2	6.5	13	3	64	20	78
50	30.5	-	40.5	40.5	50	8.5	12.2	8.5	14	3	79	22	95
63	36	-	46	46	60	10.5	13.7	10.5	16	3	95	26	113
80	43.5	-	53.5	53.5	77	13	16.5	13	20.5	4.5	118	32	140
100	53	-	63	63	94	13	23	13	24	6	137	36	162

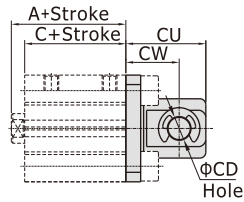
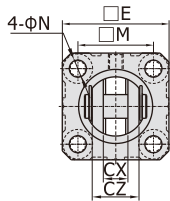
[Note] Valve C in the above table is only for ACQ series. Please refer to relevant content for valve C of other series.

Compact cylinder

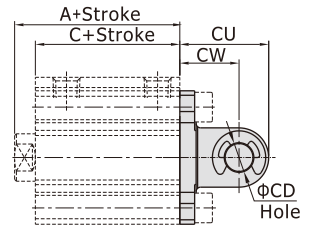
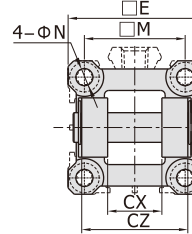
ACQ Series—Accessories

CB

Φ12~Φ25



Φ32~Φ100

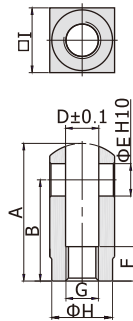
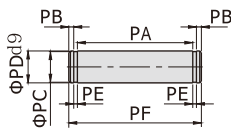


Item	A [Note]				C				E	M	N	CD	CU	CW	CX	CZ
Bore size	Without magnet			With magnet	Without magnet			With magnet								
Stroke	≤50	55	≥60		≤50	55	≥60									
12	20.5	-	-	31.5	17	-	-	28	25	15.5	4.5	5	20	14	5.3	9.8
16	22	22	-	34	18.5	18.5	-	30.5	29	20	4.5	5	21	15	6.8	11.8
20	24	-	34	36	19.5	-	29.5	31.5	36	25.5	6.5	8	27	18	8.3	15.8
25	27.5	-	37.5	37.5	22.5	-	32.5	32.5	40	28	6.5	10	30	20	10.3	19.8
32	30	-	40	40	23	-	33	33	45.5	34	6.5	10	30	20	18.3	35.8
40	36.5	-	46.5	46.5	29.5	-	39.5	39.5	53.5	40	6.5	10	32	22	18.3	35.8
50	38.5	-	48.5	48.5	30.5	-	40.5	40.5	64.5	50	8.5	14	42	28	22.3	43.8
63	44	-	54	54	36	-	46	46	77.5	60	10.5	14	44	30	22.3	43.8
80	53.5	-	63.5	63.5	43.5	-	53.5	53.5	98.5	77	12.5	18	56	38	28.3	55.8
100	65	-	75	75	53	-	63	63	117.5	94	12.5	22	67	45	32.3	63.8

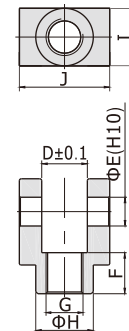
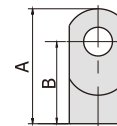
[Note] Valve A and C in the above table are only for ACQ series.
Please refer to relevant content for valve A and C of other series.

Y Knuckle

F-ACQ12Y
F-ACQ16Y
F-ACQ20Y
F-ACQ25Y

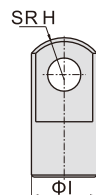
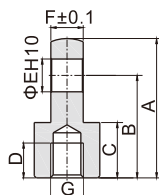


F-ACQ32Y
F-ACQ50Y
F-ACQ80Y
F-ACQ100Y



Type/Item	A	B	D	E	F	G	H	I	J	PA	PB	PC	PD	PE	PF
F-ACQ12Y	22	16	5.3	5	6	M5×0.8	9	10	-	10.2	1.5	4	5	0.7	14.6
F-ACQ16Y	28	21	6.6	5	11	M6×1.0	11	12	-	12.4	1.5	4	5	0.7	16.8
F-ACQ20Y	34	25	8.3	8	8.5	M8×1.25	15	16	-	16.2	1.5	7	8	0.9	21
F-ACQ25Y	41	30	10.3	10	10.5	M10×1.25	19	20	-	20.2	2	8	10	1.1	26.4
F-ACQ32Y	42	30	18.4	10	16	M14×1.5	22	22	36	36.2	2	8	10	1.1	42.4
F-ACQ50Y	56	40	22.4	14	20	M18×1.5	28	28	44	44.2	2	12	14	1.1	50.4
F-ACQ80Y	71	50	28.4	18	23	M22×1.5	38	38	56	56.2	2	15	18	1.7	63.6
F-ACQ100Y	79	55	32.4	22	24	M26×1.5	44	44	64	64.2	2.5	19	22	1.7	72.6

I Knuckle

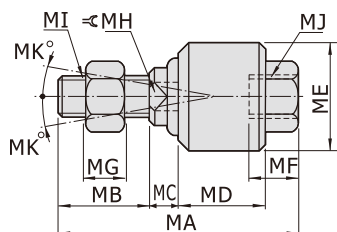


Type/Item	A	B	C	D	E	F	G	H	I
F-ACQ12I	21.5	16	9	6	5	4.7	M5×0.8	6.3	10
F-ACQ16I	32	25	11	8	5	6.2	M6×1.0	8.1	12
F-ACQ20I	34	25	13.5	8.5	8	7.7	M8×1.25	10.3	16
F-ACQ25I	41	30	16	11	10	9.7	M10×1.25	12.8	20
F-ACQ32I	42	30	16	14	10	17.6	M14×1.5	12	22
F-ACQ50I	56	40	20	18	14	21.6	M18×1.5	16	28
F-ACQ80I	71	50	23	21	18	27.6	M22×1.5	21	38
F-ACQ100I	79	55	24	22	22	31.6	M26×1.5	24	44

Compact cylinder

ACQ Series—Accessories

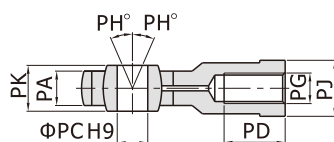
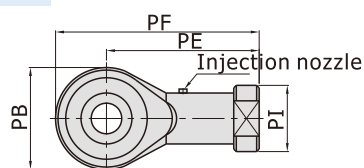
F Knuckle



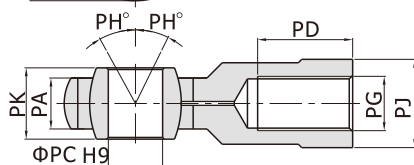
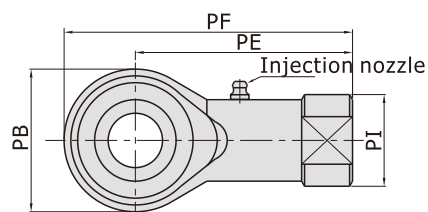
Type\Item	MA	MB	MC	MD	ME	MF	MG	MH	MI	MJ	MK
F-M8X125F	51	20	6	17	24	10.5	6	8	M8×1.25	M8×1.25	13
F-M10X125F	58	22	7	21	26	11	6	10	M10×1.25	M10×1.25	12
F-M14X150F	70	22.5	8.5	28	34.5	16	8	15	M14×1.5	M14×1.5	12
F-M18X150F	92	27	10	41	44.5	21	11	18	M18×1.5	M18×1.5	7

U Knuckle

M8



M10 and above



Type\Item	PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK
F-M5X080U	6	18	5	10	27	36	M5×0.8	13	12.5	10	8
F-M6X100U	6.8	20	6	12	30	40	M6×1.0	13	13	11	9
F-M8X125U	9	24	8	16	36	48	M8×1.25	13	16	14	12
F-M10X125U	11	26	10	20	43	56	M10×1.25	13	19	17	14
F-M14X150U	14	36	14	28	57	75	M14×1.5	13	25	22	19
F-M18X150U	16.5	46	18	30	71	94	M18×1.5	15	31	27	23
F-M26X150U	22	60	25	48	94	124	M26×1.5	15	42	36	31



Twin-rod cylinder——TR Series

Bore size: $\Phi 6$, $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$



Ordering code

TR 20 × 50 S T

① ② ③ ④ ⑤

① Model

TR: Twin-rod cylinder
(Double acting type)

② Bore size

6 10 16 20 25 32

④ Magnet [Note1]

S: With magnet

⑤ Thread type [Note 2]

T: NPT

③ Stroke [Note3]

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	10 20 30 40 50	50
10	10 20 30 40 50 60 70 80 90 100	100
16	10 20 30 40 50 60 70 80 90 100 125 150 175 200	200
20	10 20 30 40 50 60 70 80 90 100 125 150 175 200	200
25	10 20 30 40 50 60 70 80 90 100 125 150 175 200	200
32	10 20 30 40 50 60 70 80 90 100 125 150 175 200	200

[Note1] TR Series are all with magnet.

[Note2] When the thread is standard, the code is blank.

[Note3] When the stroke less then or equal to 100mm, The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 35mm stroke cylinder has the same dimensions of 40 std. stroke cylinder.

Specification

Bore size(mm)	6	10	16	20	25	32
Acting type	Double acting					
Fluid	Air(to be filtered by 40μm filter element)					
Operating pressure	22~145psi(0.15~1.0MPa)					
Proof pressure	215psi(1.5MPa)					
Temperature	-20~70℃					
Speed range mm/s	30~500					
Adjustable stroke mm	-5~0					
Stroke tolerance	≤100 ^{+1.0} ₀ > 100 ^{+1.5} ₀					
Cushion type	Bumper					
Non-rotating tolerance [Note1]	±0.2°	±0.15°			±0.1°	
Port size [Note2]	M5×0.8				1/8	

[Note1] Retract position.

[Note2] NPT thread is available.

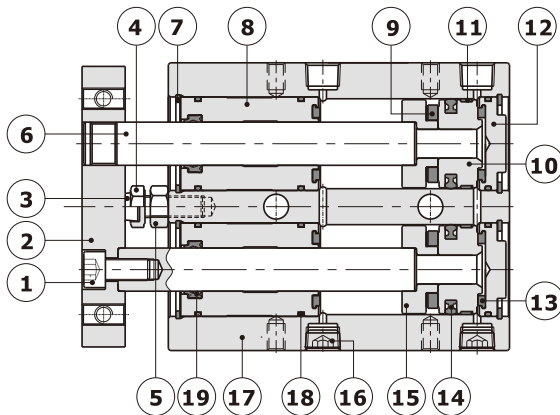


Twin-rod cylinder

TR Series

Bore size: Φ6, Φ10, Φ16, Φ20, Φ25, Φ32

Inner structure and material of major parts



NO.	Item	Material
1	Screw	Carbon steel
2	Fixing plate	Aluminum alloy
3	Bumper	POM
4	Screw	Free cutting steel
5	Nut	Carbon steel
6	Piston rod	Φ25,32 Carbon steel
		Other SUS304
7	C clip	Spring steel
8	Front cover	Aluminum alloy
9	Magnet	Φ32 Plastic
		Other Sintered metal(Neodymium-iron-boron)
10	Piston	Φ6,10 SUS304
		Other Aluminum alloy
11	Wear ring	Nylon 6
12	Back cover	Aluminum alloy
13	Bumper	TPU
14	Piston seal	NBR
15	Magnet holder	Φ6,10 SUS304
		Other Aluminum alloy
16	Screw	Carbon steel
17	Body	Aluminum alloy
18	Back cover O-ring	NBR
19	Wiper seal	NBR

Criteria for selection: Cylinder thrust

Unit:Newton(N)

Bore size	Rod size	Acting type		Pressure area(mm ²)	Operating pressure(psi)						
					15	30	45	60	75	90	105
6	4	Double acting	Push side	56.5	5.7	113.0	17.0	22.6	28.3	33.9	39.6
			Pull side	31.4	3.1	6.3	9.4	12.6	15.7	18.8	22.0
10	6	Double acting	Push side	157.1	15.7	31.4	47.1	62.8	78.6	94.3	110.0
			Pull side	100.5	10.1	20.1	30.2	40.2	50.3	60.3	70.4
16	8	Double acting	Push side	402.1	40.2	80.4	120.6	160.8	201.1	241.3	281.5
			Pull side	301.6	30.2	60.3	90.5	120.6	150.8	181.0	211.1
20	10	Double acting	Push side	628.3	62.8	125.7	188.5	251.3	314.2	377.0	439.8
			Pull side	471.2	47.1	94.2	141.4	188.5	235.6	282.7	329.8
25	12	Double acting	Push side	981.7	98.2	196.4	294.5	392.7	490.9	589.0	687.2
			Pull side	755.6	75.6	151.1	226.7	302.2	377.8	453.4	528.9
32	16	Double acting	Push side	1608.5	160.9	321.7	482.6	643.4	804.3	965.1	1126.0
			Pull side	1206.4	120.6	241.3	361.9	482.6	603.2	723.8	844.5

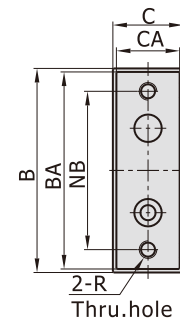
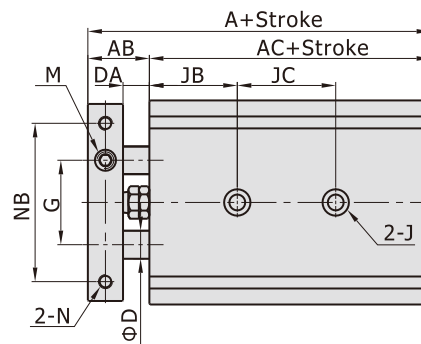
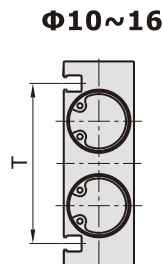
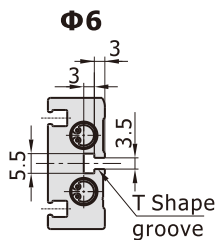
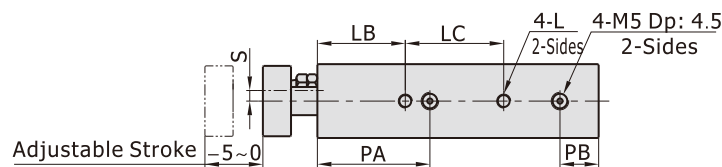
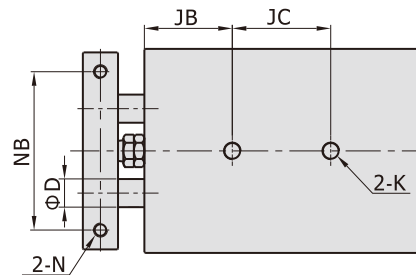
Twin-rod cylinder

TR Series

Bore size: $\Phi 6$, $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$

Dimensions

TR6~16



Bore size\Item Stroke	A	AB	AC	B	BA	C	CA	D	DA	G	JC LC								T
											10~25	30~50	60~80	90~100	125	150	175	200	
6	58.5	13.5	45	37	35	16	14	4	8	16	JC=10+Stroke/2 LC=13+Stroke		-	-	-	-	-	-	26
10	72	17	55	46	44	17	15	6	9	20	30	40	50	60	-	-	-	-	36.5
16	79	19	60	58	56	20	18	8	9	25	25	35	45	55	65	75	145	145	46.5

Bore size\Item	J	JB	K	L	LB	M
6	One side: $\Phi 6.5$ Dp: 3.5 Thru.hole: $\Phi 3.5$	13	-	M3 $\times$ 0.5 Dp: 4.5	10	M3 $\times$ 0.5
10	One side: $\Phi 6.5$ Dp: 3.5 Thru.hole: $\Phi 3.5$	20	M4 $\times$ 0.7 Dp: 7	M3 $\times$ 0.5 Dp: 5	20	M5 $\times$ 0.8
16	One side: $\Phi 8.0$ Dp: 4.5 Thru.hole: $\Phi 4.5$	30	M5 $\times$ 0.8 Dp: 8	M4 $\times$ 0.7 Dp: 5	30	M6 $\times$ 1.0

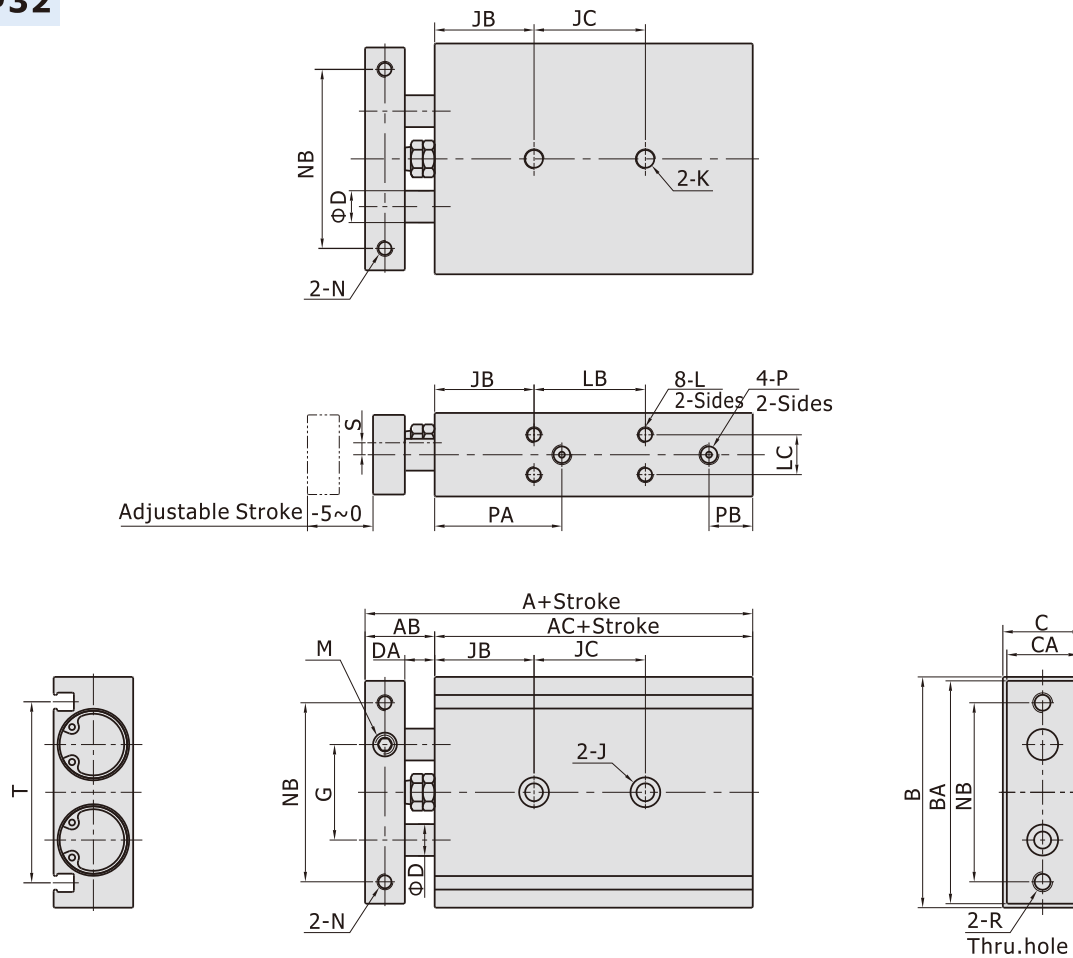
Bore size\Item	N	NB	PA	PB	R	S
6	M3 $\times$ 0.5 Thru.hole	28	24.5	6.5	M3 $\times$ 0.5	4.5
10	M3 $\times$ 0.5 Thru.hole	35	30	8	M4 $\times$ 0.7	3.5
16	M4 $\times$ 0.7 Thru.hole	45	38	8	M5 $\times$ 0.8	5

Twin-rod cylinder

TR Series

Bore size: $\Phi 6$, $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$

TR20~32



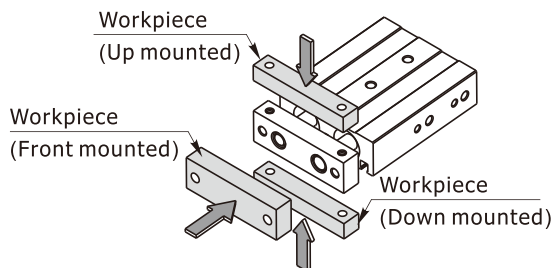
Bore size\Item Stroke	A	AB	AC	B	BA	C	CA	D	DA	G	JB	JC LB						
												10~25	30~50	60~100	125	150	175	200
20	94	24	70	64	62	25	23	10	12	28	30	30	40	60	80	80	100	100
25	96	24	72	80	78	30	28	12	12	35	30	30	40	60	80	80	100	100
32	112	30	82	98	96	38	36	16	14	44	30	40	50	70	90	90	110	110

Bore size\Item	P	PA	PB	J		K	L	LC
20	M5×0.8	46	9	One side: $\Phi 9.5$ Dp:5.5Thru.hole: $\Phi 5.5$		M6×1.0Dp:10	M4×0.7Dp:7	9.5
25	1/8"	43	9	One side: $\Phi 11$ Dp:6.5Thru.hole: $\Phi 7$		M8×1.25Dp:12	M5×0.8Dp:7	13
32	1/8"	53	10	One side: $\Phi 11$ Dp:6.5Thru.hole: $\Phi 7$		M8×1.25Dp:12	M5×0.8Dp:7	20

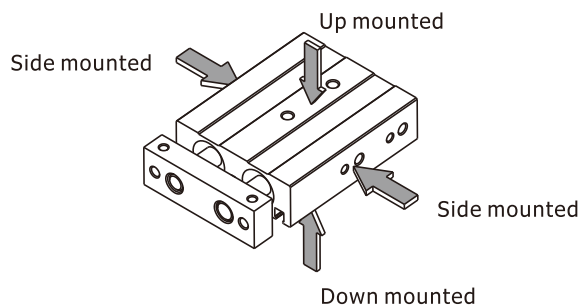
Bore size\Item	M	N	NB	R	S	T
20	M8×1.25	M4×0.7Dp:6	50	M5×0.8	6.5	52
25	M8×1.25	M5×0.8Dp:7.5	60	M6×1.0	9	61
32	M10×1.5	M5×0.8Dp:8	75	M6×1.0	11.5	73

Installation and application

1. How to mount workpiece.



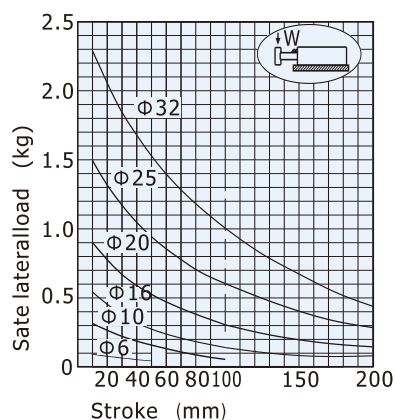
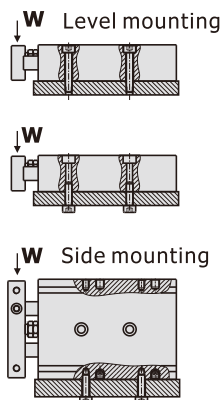
How to mount the workpiece



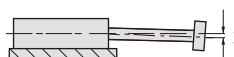
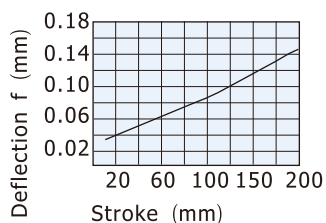
How to mount the cylinder

2. Max. weight of allowable side-load

Mounting type



3. Safe deflection

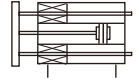


The average value of deflection of rod end of the whole series basically stays in the line showed in the chart on the left.



Tri-rod cylinder—TCL, TCM Series

Bore size: $\Phi 6$, $\Phi 10$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$, $\Phi 50$, $\Phi 63$



Ordering code

TC	M	50 × 50	S	T
①	②	③	④	⑤

① Model

TC: Tri-rod cylinder(Double acting type)

② Bearing type

M: Bronze bearing

L: Linear bearing

③ Bore size Adapt bearing type

6	Bronze bearing(M Type)
10	
12	
16	
20	
25	Linear bearing(L Type) Bronze bearing(M Type)
32	
40	
50	
63	

⑤ Magnet [Note1]

S: With magnet

⑥ Thread type [Note 2]

T:NPT

④ Stroke [Note3]

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	5 10 15 20	20
10	5 10 15 20 25 30	30
12	10 20 25 30 40 50 60 70 75 80 90 100 125 150	150
16	10 20 25 30 40 50 60 70 75 80 90 100 125 150 175 200	200
20 25	20 25 30 40 50 60 70 75 80 90 100 125 150 175 200 225 250	250
32 40 50 63	25 30 40 50 60 70 75 80 90 100 125 150 175 200 225 250	250

[Note1] TC Series are all with magnet.

[Note2] When the thread is standard, the code is blank.

[Note3] When the discrepancy between non-standard stroke and standard stroke is 1~5mm, The dimensions of non-std stroke cylinder has the same dimensions as the next longer stroke std. stroke cylinder. e.g. 86mm stroke cylinder has the same dimensions of 90 std. stroke cylinder. But 84mm stroke cylinder should be ordered by non-standard stroke.

Specification

Bore size(mm)		6	10	12	16	20	25	32	40	50	63
Acting type		Double acting									
Fluid		Air(to be filtered by 40μm filter element)									
Operating pressure		22~100psi(0.15~0.7MPa)			22~145psi(0.15~1.0MPa)						
Proof pressure		175psi(1.2MPa)			215psi(1.5MPa)						
Temperature		-20~70℃									
Speed range mm/s		50~500			30~500						
Stroke tolerance		≤100 ^{+1.0} ₀ >100 ^{+1.5} ₀									
Cushion type		Bumper									
Non-rotating tolerance [Note1]	TCL	-			±0.08°	±0.07°	±0.06°	±0.05°			
	TCM	±0.1°			±0.10°	±0.09°	±0.08°	±0.06°			
Port size [Note2]		M3×0.5			M5×0.8		1/8			1/4	

[Note1] Retract position.

[Note2] NPT thread is available.

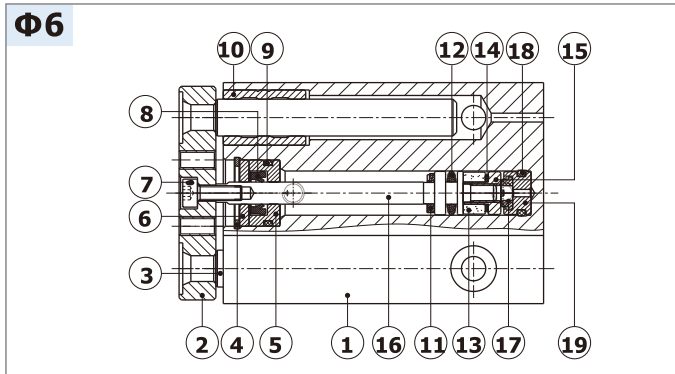


Safe load and torque

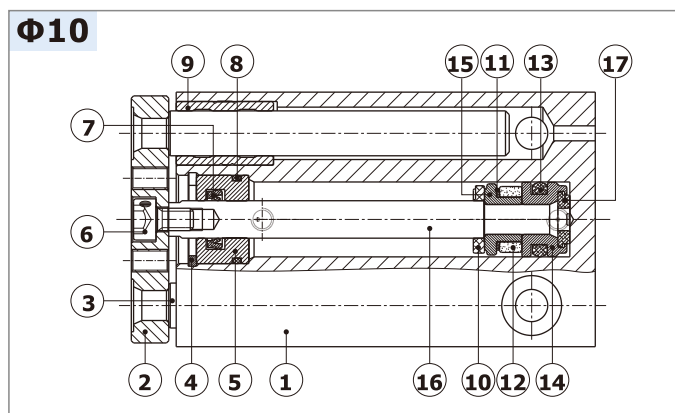
Bore size	Type	Stroke(mm)																			
		5	10	15	20	25	30	40	50	60	70	75	80	90	100	125	150	175	200	225	250
Max. safe load		Unit: Newton (N)																			
																					
12	TCM	-	44	-	33	29	26	41	36	30	28	26	25	24	22	19	17	-	-	-	-
	TCL	-	37	-	27	25	22	35	30	27	24	23	21	19	18	15	12	-	-	-	-
16	TCM	-	67	-	51	42	37	63	58	49	41	37	35	33	32	27	24	22	20	-	-
	TCL	-	54	-	40	37	32	54	47	42	38	35	32	30	28	23	20	17	15	-	-
20	TCM	-	-	-	78	61	57	123	112	99	91	67	84	79	75	66	59	54	49	45	42
	TCL	-	-	-	58	52	48	101	90	83	74	70	69	63	58	62	54	48	43	39	35
25	TCM	-	-	-	93	89	76	142	131	119	107	101	97	90	85	68	79	71	65	61	55
	TCL	-	-	-	82	79	68	132	118	109	99	93	88	81	77	80	70	62	55	50	45
32	TCM	-	-	-	-	203	190	179	164	221	197	182	172	163	157	142	127	116	106	98	91
	TCL	-	-	-	-	191	182	166	157	207	178	164	156	150	144	203	186	171	158	146	137
40	TCM	-	-	-	-	203	190	179	164	221	197	182	172	163	159	142	127	116	106	97	91
	TCL	-	-	-	-	190	182	166	157	210	179	163	156	150	144	203	185	171	158	146	137
50	TCM	-	-	-	-	296	283	268	245	303	288	273	266	253	241	216	195	179	164	155	142
	TCL	-	-	-	-	208	196	185	173	259	232	223	212	207	199	264	242	224	207	195	181
63	TCM	-	-	-	-	296	283	268	245	303	288	273	266	253	241	216	195	179	164	153	142
	TCL	-	-	-	-	206	196	180	171	259	232	221	212	205	196	262	240	221	205	191	178
Max. safe torque		Unit: Newton · Meter(N · m)																			

12	TCM	-	0.90	-	0.79	0.71	0.65	0.77	0.72	0.65	0.53	0.50	0.47	0.41	0.36	0.31	0.27	-	-	-	-
	TCL	-	0.61	-	0.45	0.40	0.35	0.58	0.50	0.44	0.39	0.37	0.35	0.32	0.29	0.24	0.20	-	-	-	-
16	TCM	-	1.21	-	1.04	0.94	0.88	1.23	1.11	0.99	0.72	0.69	0.65	0.61	0.58	0.50	0.44	0.40	0.36	-	-
	TCL	-	0.99	-	0.74	0.66	0.59	0.99	0.86	0.77	0.69	0.65	0.61	0.57	0.52	0.43	0.37	0.32	0.28	-	-
20	TCM	-	-	-	1.57	1.42	1.31	2.39	2.15	1.97	1.90	1.88	1.86	1.72	1.63	1.44	1.28	1.16	1.06	1.01	0.90
	TCL	-	-	-	1.26	1.14	1.03	2.17	1.94	1.79	1.59	1.52	1.46	1.33	1.25	1.34	1.17	1.03	0.93	0.88	0.76
25	TCM	-	-	-	2.40	2.22	2.01	3.66	3.35	3.17	3.06	2.96	2.91	2.77	2.57	2.26	2.02	1.83	1.67	1.57	1.42
	TCL	-	-	-	2.11	1.96	1.75	3.37	3.02	2.71	2.42	2.38	2.33	2.19	1.97	2.05	1.78	1.58	1.41	1.22	1.16
32	TCM	-	-	-	-	6.35	6.00	5.73	5.13	5.98	5.74	5.69	5.62	5.11	4.97	4.42	3.98	3.61	3.31	2.97	2.84
	TCL	-	-	-	-	5.95	5.73	5.44	4.89	5.43	5.15	5.11	5.02	4.70	4.51	6.34	5.79	5.33	4.93	4.33	4.29
40	TCM	-	-	-	-	7.00	6.60	6.11	5.66	6.66	6.31	6.27	6.23	5.86	5.48	4.78	4.38	3.98	3.65	3.34	3.13
	TCL	-	-	-	-	6.55	6.21	5.77	5.39	6.17	5.67	5.62	5.58	5.33	4.96	6.98	6.38	5.87	5.43	5.00	4.72
50	TCM	-	-	-	-	13.00	12.60	11.00	10.80	13.70	12.70	12.00	11.80	11.10	10.80	9.50	8.60	7.86	7.24	6.80	6.24
	TCL	-	-	-	-	9.17	8.75	8.30	7.62	10.30	9.94	9.83	9.77	8.82	8.74	11.60	10.70	9.83	9.12	8.95	7.95
63	TCM	-	-	-	-	14.70	13.60	12.90	12.10	19.40	16.20	13.50	12.70	12.10	11.90	10.70	9.69	8.86	8.16	7.52	7.04
	TCL	-	-	-	-	10.20	9.74	9.20	8.48	17.50	14.00	11.00	10.60	10.20	9.74	13.00	11.90	11.00	10.20	9.63	8.84

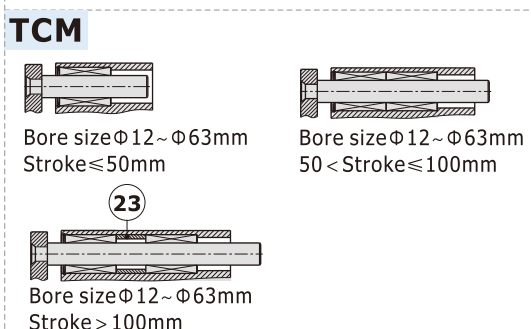
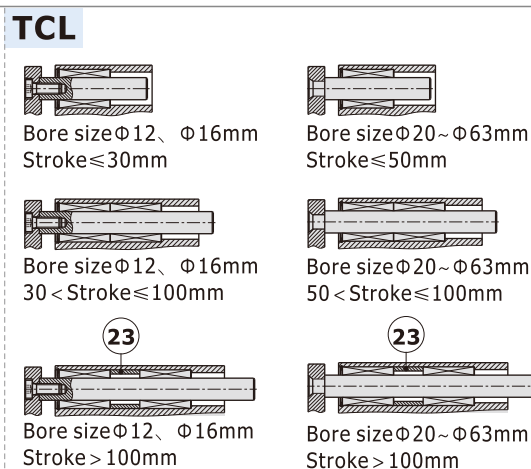
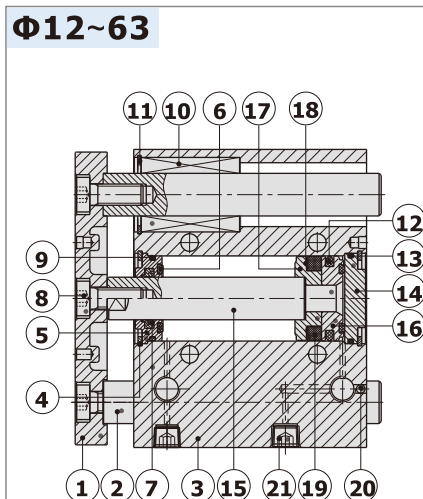
Inner structure and material of major parts



NO.	Item	NO.	Item
1	Body	11	Bumper
2	Fixing plate	12	Piston seal
3	Leader	13	Magnet
4	C clip	14	Magnet washer
5	Front cover	15	Piston
6	O-ring stop block	16	Piston rod
7	Screw	17	Bumper
8	Piston rod O-ring	18	O-ring
9	O-ring	19	Washer stop block
10	Bearing		



NO.	Item	NO.	Item
1	Body	10	Bumper
2	Fixing plate	11	Magnet washer
3	Leader	12	Magnet
4	C clip	13	Piston seal
5	Front cover	14	Piston
6	Screw	15	Magnet holder
7	Piston rod O-ring	16	Piston rod
8	O-ring	17	Bumper
9	Bearing		



NO.	Item
1	Fixing plate
2	Leader
3	Body
4	C clip
5	Front cover
6	Bumper
7	Piston rod O-ring
8	Screw
9	O-ring
10	Bearing
11	C clip
12	Piston seal
13	O-ring
14	Back cover
15	Piston rod
16	Piston
17	Magnet holder
18	Magnet washer
19	Magnet
20	Screw
21	Screw
22	Bearing
23	Spacer

Tri-rod cylinder

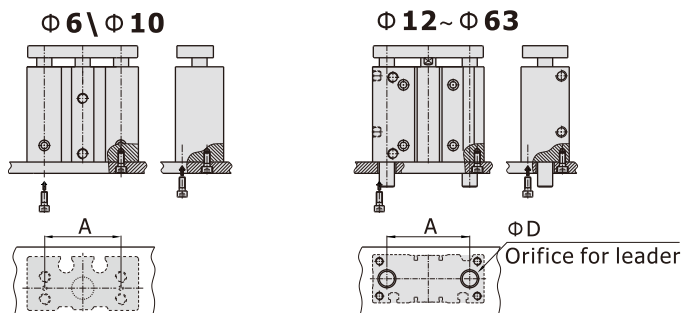
Airtac

TCL, TCM Series

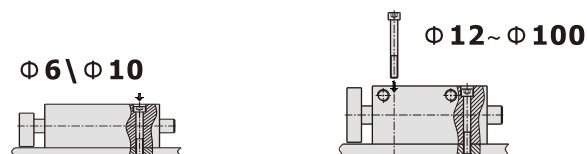
Bore size: $\Phi 6$, $\Phi 10$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$, $\Phi 50$, $\Phi 63$

How to mount

Fixation of screw at back side($\Phi 6 \sim \Phi 63$)



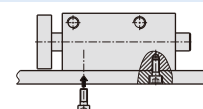
Fixation of screw on top surface($\Phi 6 \sim \Phi 63$)



Fixation of T slot at bottom($\Phi 12 \sim \Phi 63$)



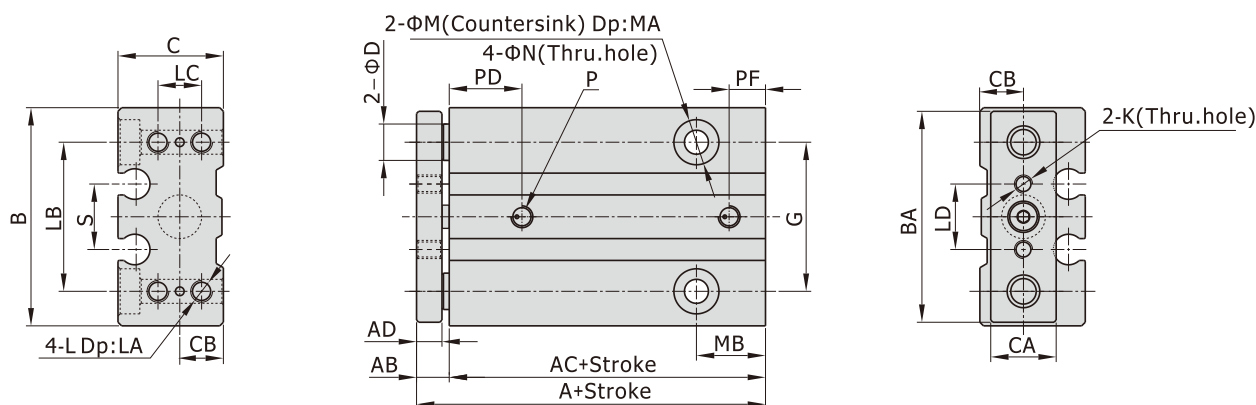
Fixation of screw at bottom surface($\Phi 12 \sim \Phi 63$)



Bore size\Item	6	10	12	16	20	25	32	40	50	63
A	20.5	23	41	46	54	64	78	86	110	124
D (Min)	TCM	X	X	8	10	12	14	18	18	22
	TCL	-	-							

Dimensions

TCM6\TCM10



Bore size\Item	A	AB	AC	AD	B	BA	C	CA	CB	D	G	K	L	LA	LB
6	29.5	6	23.5	5	30	29	14.5	9	6	5	20.5	M2.5X0.45	M3X0.5	5	20.5
10	32	6	26	5	34	33	18	10	7.5	6	23	M3X0.5	M4X0.7	5	23

Bore size\Item	LC	LD	M	MA	MB	N	P	PD	PF
6	6	9	6	3	9.5	3.5	M3X0.5	9.5	5.5
10	8	11	8	4	8.5	4.5	M3X0.5	11.5	5



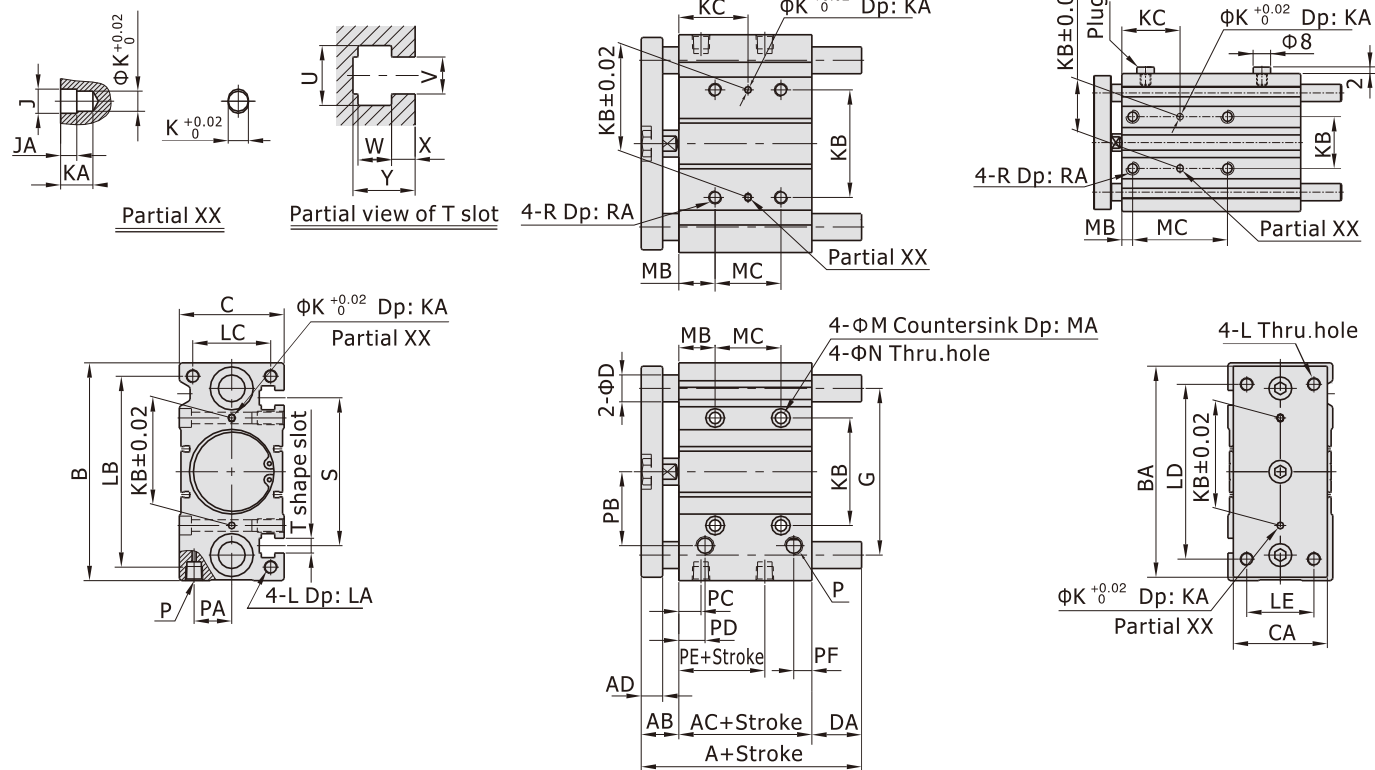
Tri-rod cylinder

AIRTAC

TCL, TCM Series

Bore size: $\Phi 6$, $\Phi 10$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$, $\Phi 50$, $\Phi 63$

TCL/TCM12~63



Bore size\Item	A					DA								MC				KC			
	TCL	TCM	TCL/TCM			TCL				TCM											
Stroke	≤30	≤50	31~100	101~200	>200	≤30	31~100	101~200	>200	≤50	51~100	101~200	>200	≤30	31~100	101~200	>200	≤30	31~100	101~200	>200
12		42	55	85	—	0	13	43	—	0	13	43	—	20	40	110	—	15	25	60	—
16		46	65	95	—	0	19	49	—	0	19	49	—	24	44	110	—	17	27	60	—
20		53	80	104	122	0	27	51	69	0	27	51	69	24	44	120	200	29	39	77	117
25		53.5	82	104.5	122	0	28.5	51	68.5	0	28.5	51	68.5	24	44	120	200	29	39	77	117

Stroke	≤50	≤50	51~100	101~200	>200	≤50	51~100	101~200	>200	≤50	51~100	101~200	>200	≤40	41~100	101~200	>200	≤40	41~100	101~200	>200
32	65	78	102	118	140	5.5	42.5	58.5	80.5	18.5	42.5	58.5	80.5	24	48	124	200	33	45	83	121
40	66	78	102	118	140	0	36	52	74	12	36	52	74	24	48	124	200	34	46	84	122
50	76	89	118	134	161	4	46	62	89	17	46	62	89	24	48	124	200	36	48	86	124
63	77	89	118	134	161	0	41	57	84	12	41	57	84	28	52	128	200	38	50	88	124

Bore size\Item	AB	AC	AD	B	BA	C	CA	D(TCL)	D(TCM)	G	J	JA	K	KA	KB	L	LA	LB	LC	LD
12	13	29	8	58	56	26	22	6	8	41	3.5	3	3	6	23	M4×0.7	10	50	18	48
16	13	33	8	64	62	30	25	8	10	46	3.5	3	3	6	24	M5×0.8	12	56	22	54
20	16	37	10	83	81	36	30	10	12	54	3.5	3	3	6	28	M5×0.8	13	72	24	70
25	16	37.5	10	93	91	42	38	12	16	64	4.5	3	4	6	34	M6×1.0	15	82	30	78
32	22	37.5	12	112	110	48	44	16	20	78	4.5	3	4	6	42	M8×1.25	20	98	34	96
40	22	44	12	120	118	54	44	16	20	86	4.5	3	4	6	50	M8×1.25	20	106	40	104
50	28	44	16	148	146	64	60	20	20	110	6	4	5	8	66	M10×1.5	22	130	46	130
63	28	49	16	162	158	78	70	20	20	124	6	4	5	8	80	M10×1.5	22	142	58	130

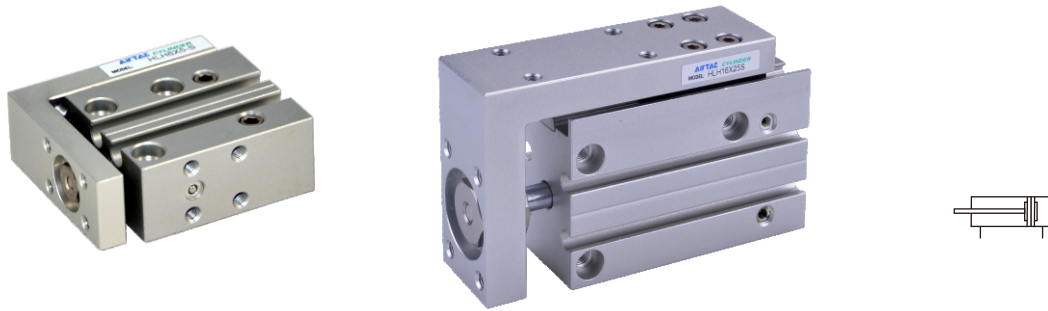
Bore size\Item	LE	M	MA	MB	N	P	PA	PB	PC	PD	PE	PF	R	RA	S	U	V	W	X	Y
12	14	8	4.5	5	4.5	M5×0.8	8	18	11	11	13	7.5	M5×0.8	10	37	7.5	4.5	4	2	6.5
16	16	8	4.5	5	4.5	M5×0.8	10	19	11	11	15	8	M5×0.8	10	38	7.5	4.5	4	2.5	7
20	18	9.5	5.5	17	5.5	1/8	10.5	25	10.5	10.5	12.5	9	M6×1.0	12	44	8.5	5.5	4.5	3	8
25	26	9.5	5.5	17	5.5	1/8	13.5	28.5	11.5	11.5	12.5	9	M6×1.0	12	50	8.5	5.5	4.5	3	8.5
32	30	11	7.5	21	6.5	1/8	15	34	12.5	12.5	7	9	M8×1.25	16	63	10.5	6.5	5.5	3.5	9.5
40	30	11	7.5	22	6.5	1/8	18	38	14	14	13	10	M8×1.25	16	72	10.5	6.5	5.5	4	11
50	40	14	9	24	8.5	1/4	21.5	47	12	14	9	11	M10×1.5	20	92	13.5	8.5	7.5	4.5	13.5
63	50	14	9	24	8.5	1/4	28	55	16.5	16.5	14	13.5	M10×1.5	20	110	18	11	10	7	18.5





Compact slide cylinder—HLH Series

Bore size: $\Phi 6$, $\Phi 10$, $\Phi 16$, $\Phi 20$



Ordering code

TLH 20 × 30 S

① ② ③ ④

① Model

HLH: Compact slide cylinder(Double acting type)

② Bore size

6 10 16 20

④ Magnet

S: With magnet

③ Stroke

Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	5 10 15 20 25 30	30
10	5 10 15 20 25 30 40 50	50
16	5 10 15 20 25 30 40 50 60	60
20	5 10 15 20 25 30 40 50 60	60

[Note] Consult us for non-standard stroke.

Specification

Bore size(mm)	6	10	16	20
Guide rail width mm	5	7	9	12
Acting type	Double acting			
Fluid	Air(to be filtered by 40 μ m filter element)			
Operating pressure	22~100psi(0.15~0.7MPa)			
Proof pressure	175psi(1.2MPa)			
Temperature	-20~70℃			
Speed range mm/s	50~500			
Allowable kinetic energy J	0.008	0.025	0.05	0.1
Stroke tolerance	$\begin{smallmatrix} +1.0 \\ 0 \end{smallmatrix}$			
Cushion type	Bumper			
Sensor switches [Note1]	DS1-H□N , DS1-H□P			
Port size	M5×0.8			



Compact slide cylinder

AIRTAC

HLH Series

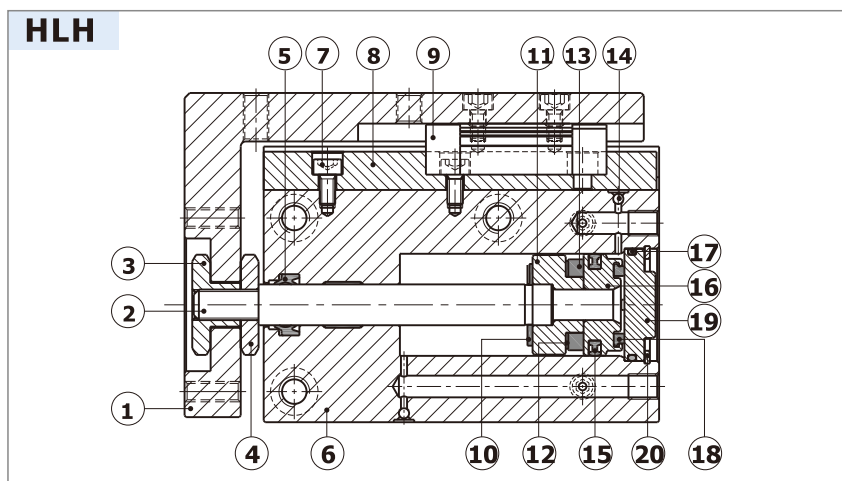
Bore size: Φ6, Φ10, Φ16, Φ20

Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type		Pressure area(mm ²)	Operating pressure(psi)						
					15	30	45	60	75	90	105
6	3	Double acting	Push-side	28.3	-	5.7	8.5	11.3	14.2	17.0	19.8
			Pull-side	21.2	-	4.2	6.4	8.5	10.6	12.7	14.8
10	4	Double acting	Push-side	78.5	7.9	15.7	23.6	31.4	39.3	47.1	55.0
			Pull-side	66.0	6.6	13.2	19.8	26.4	33.0	39.6	46.2
16	6	Double acting	Push-side	201.0	20.1	40.2	60.3	80.4	100.5	120.6	140.7
			Pull-side	172.7	17.3	34.5	51.8	69.1	86.4	103.6	120.9
20	8	Double acting	Push-side	314.0	31.4	62.8	94.2	125.6	157.0	188.4	219.8
			Pull-side	263.8	26.4	52.8	79.1	105.5	131.9	158.3	184.7

Inner structure and material of major parts



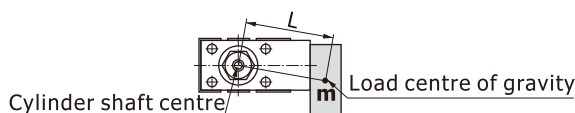
NO.	Item	Material
1	Slide table	Aluminum alloy
2	Piston rod	Stainless steel
3	Hexagon nut	Carbon steel
4	Hexagon nut	Carbon steel
5	Rod seal	NBR
6	Body	Aluminum alloy
7	Screw	Carbon steel
8	Linear guide	Stainless steel
9	Slide block	
10	Bumper	TPU
11	Magnet holder	Aluminum alloy
12	Magnet washer	NBR
13	Magnet	Sintered metal (Neodymium-iron-boron)
14	Steel ball	SUS304
15	Piston seal	NBR
16	Piston	Aluminum alloy
17	O-ring	NBR
18	Bumper	TPU
19	Back cover	Aluminum alloy
20	C clip	Spring steel

Model Selection Method

1. Select the bore size according to the thrust and practicality. Refer to the table on page 60.
2. Determine the selection conditions in order, starting from the upper row in the table below, and choose one of the selection graphs to be used.

	Vertical			Horizontal								
Mounting position												
Maximum speed(mm/s)	≤ 100	≤ 300	≤ 500	≤ 100			≤ 300			≤ 500		
Load offset I(mm)	-	-	-	50	100	200	50	100	200	50	100	200
Selection graph	(1)	(2)	(3)	(4)	(5)	(6)	(8)	(9)	(10)	(11)	(12)	

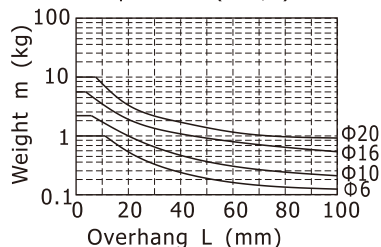
L: Overhang
(the distance from the cylinder shaft centre to the load centre of gravity)



2.1) The relation between loading and overhang(Selection graphs)

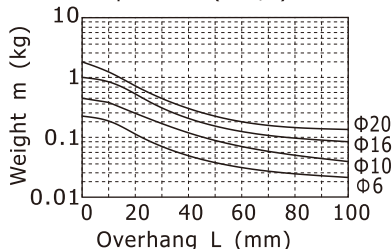
Selection Graphs(1)

Maximum speed 100(mm/s) or less



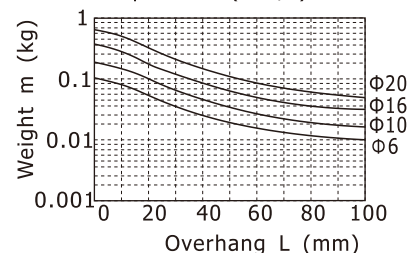
Selection Graphs(2)

Maximum speed 300(mm/s) or less



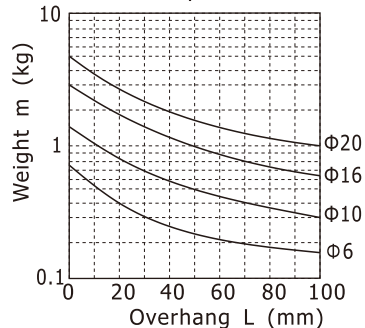
Selection Graphs(3)

Maximum speed 500(mm/s) or less



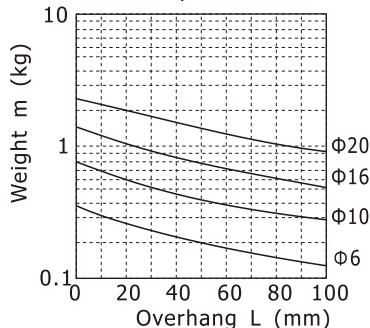
Selection Graphs(4)

Maximum speed 100(mm/s) or less
Load eccentricity 50mm



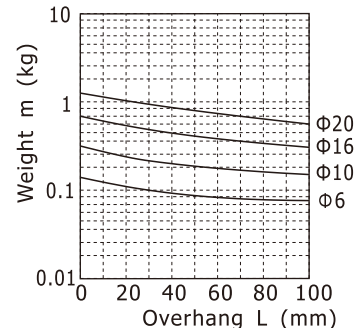
Selection Graphs(5)

Maximum speed 100(mm/s) or less
Load eccentricity 100mm



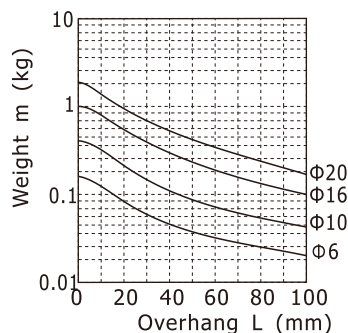
Selection Graphs(6)

Maximum speed 100(mm/s) or less
Load eccentricity 200mm



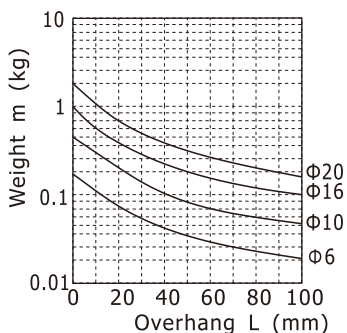
Selection Graphs(7)

Maximum speed 300(mm/s) or less
Load eccentricity 50mm



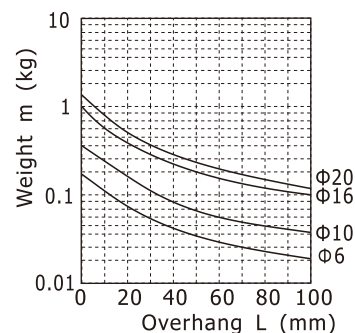
Selection Graphs(8)

Maximum speed 300(mm/s) or less
Load eccentricity 100mm



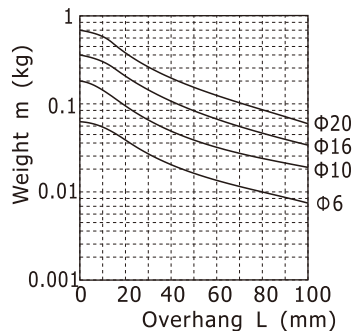
Selection Graphs(9)

Maximum speed 300(mm/s) or less
Load eccentricity 200mm



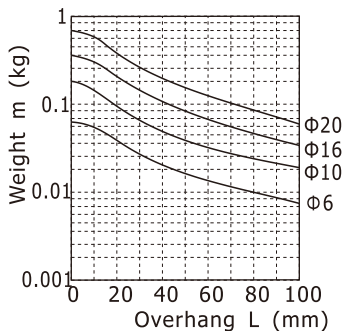
Selection Graphs(10)

Maximum speed 500(mm/s) or less
Load eccentricity 50mm



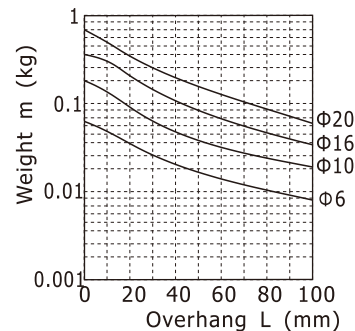
Selection Graphs(11)

Maximum speed 500(mm/s) or less
Load eccentricity 100mm



Selection Graphs(12)

Maximum speed 500(mm/s) or less
Load eccentricity 200mm



2.2) Selection Examples

Example ①: Mounting: Vertical
Maximum speed: 500mm/s
Overhang: 40mm
Load weight: 0.1Kg

Refer to Graph based on vertical mounting and a speed of 500mm/s.

In Graph , find the intersection of a 40mm overhang and load weight of 0.1Kg, which results in a selection of $\Phi 20$.

Example ②: Mounting: Horizontal
Maximum speed: 500mm/s
Load eccentricity: 50mm
Overhang: 30mm
Load weight: 0.1Kg

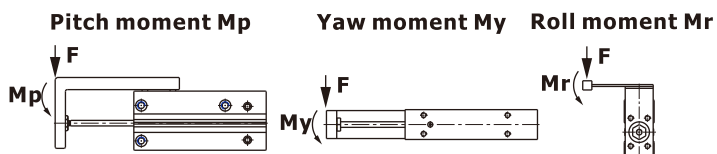
Refer to Graph based on horizontal mounting, a speed of 500mm/s and load eccentricity of 50mm.

In Graph , find the intersection of a 30mm overhang and load weight of 0.1Kg, which results in a selection of $\Phi 16$.

Installation and application

1. The actual loading and moment of cylinder must be less than it's allowable loading and moment:

1.1) The allowable moment of cylinder



Allowable torque (Nm)	HLH6	HLH10	HLH16	HLH20
Pitch moment M_p	0.25	0.95	3.28	6.29
Yaw moment M_y	0.25	0.95	3.28	6.29
Roll moment M_r	0.41	1.49	3.45	6.61

1.2) When the cylinder is subjected to different type of moment, there will be different degree of shift in performance, please refer to the following table for details.

Table deflection due to pitch moment

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.

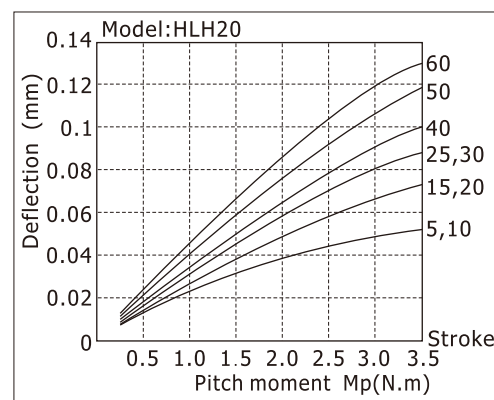
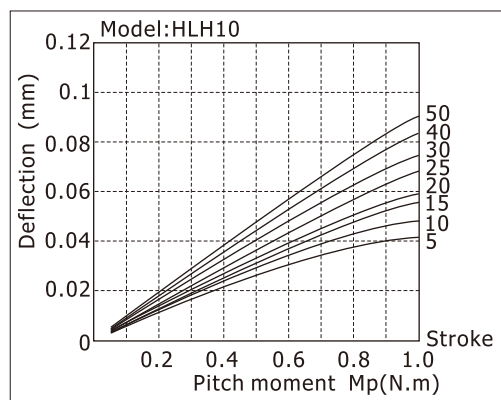
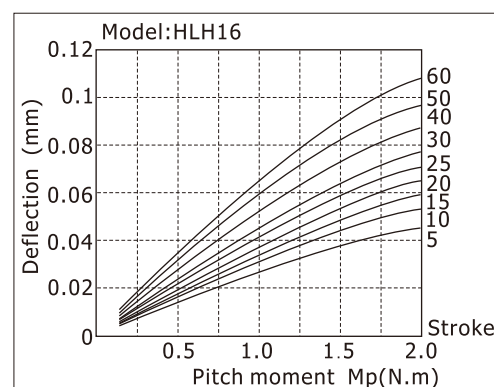
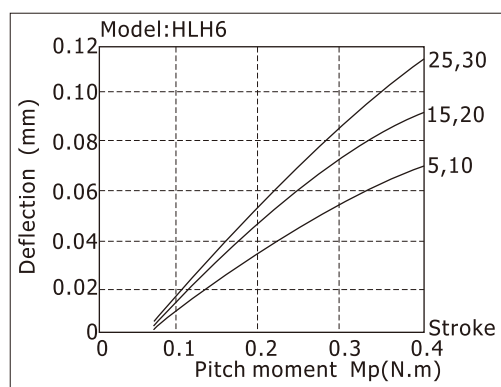
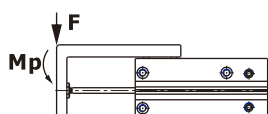


Table deflection due to yaw moment

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.

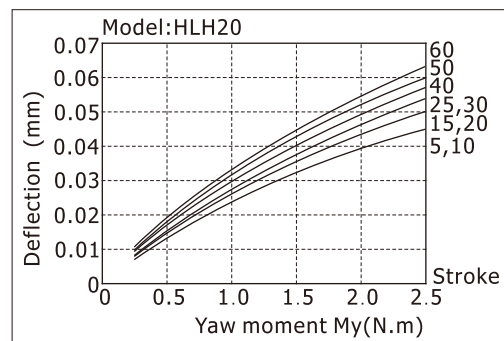
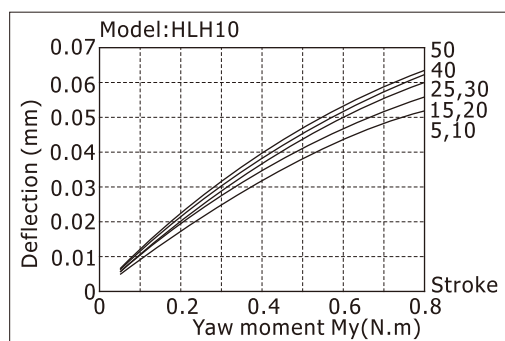
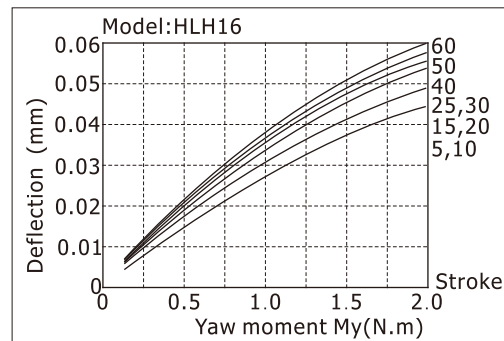
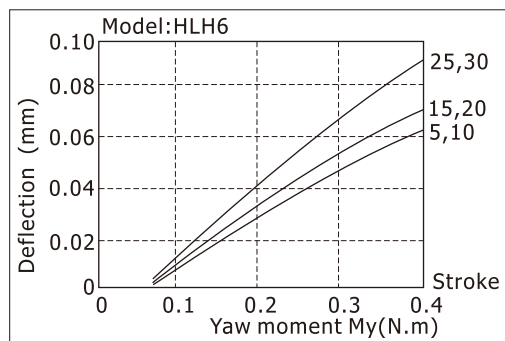
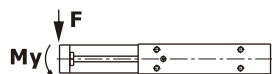
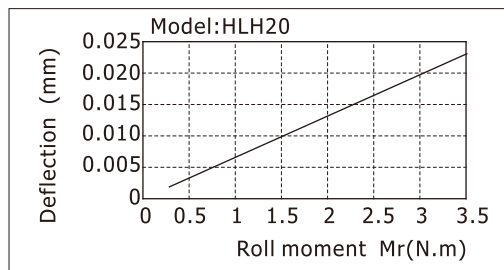
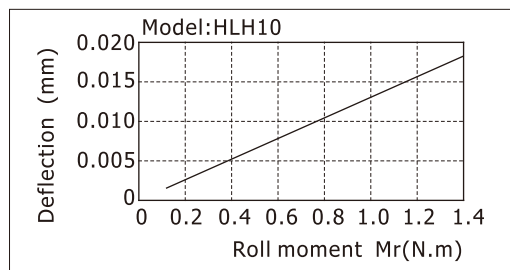
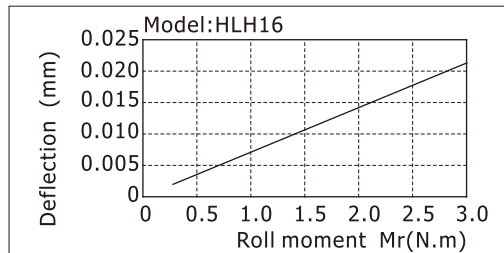
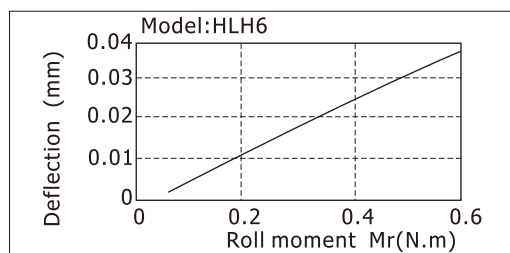
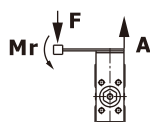


Table deflection due to roll moment

Table deflection(at A) when a load acts upon section F at the full stroke of the compact slide.



Compact slide cylinder

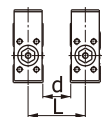
AirTAC

HLH Series

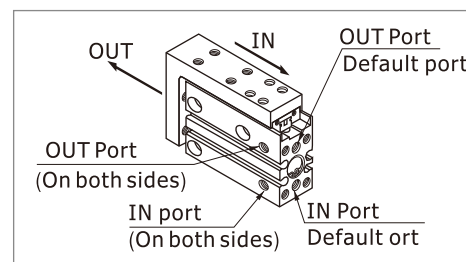
Bore size: $\Phi 6$, $\Phi 10$, $\Phi 16$, $\Phi 20$

2. The compact slide can be piped from 3 directions.
Confirm the pressure ports and operating direction. (See drawing right)

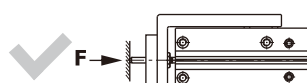
3. In compact slides with sensor switch, there is a danger of sensor switch malfunction if the mounting pitch is less than the dimensions shown in Table below. Be sure to allow at least the indicated interval.



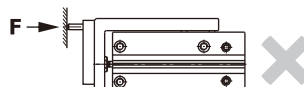
At least indicated interval (mm)/Model	HLH6	HLH10	HLH16	HLH20
d	5	5	10	15
L	21	25	35	47



4. When the output of the compact slide will be directly applied to the table, it should be applied along the rod axis.
(See drawing below.)



The loading and piston rod are coaxial



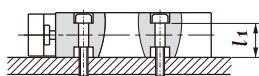
The loading and piston rod are offset

5. Be sure to use a flow control value, and adjust the speed to 500mm/s or less.

6. A compact slide can be mounted from 4 directions.

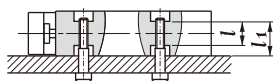
Don't exceed the max. fastening torque then tightening the mounting bolts.

Lateral Mounting(Through Holes)



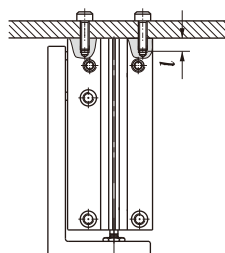
Model	Bolts	Max.fastening torque	L1
HLH6	M3×0.5	1.1(Nm)	12.7
HLH10	M4×0.7	2.5(Nm)	15.6
HLH16	M4×0.7	2.5(Nm)	20.6
HLH20	M5×0.8	5.1(Nm)	24.0

Lateral Mounting(Tapped Holes)



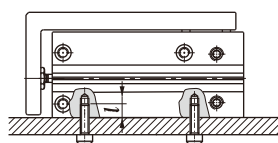
Model	Bolts	Max.fastening torque	L1	L
HLH6	M4×0.7	2.5(Nm)	12.7	9.4
HLH10	M5×0.8	5.1(Nm)	15.6	11.2
HLH16	M5×0.8	5.1(Nm)	20.6	16.2
HLH20	M6×1.0	8.1(Nm)	24.0	16.0

Axial Mounting(Tapped Holes)



Model	Bolts	Max.fastening torque	L
HLH6	M3×0.5	1.1(Nm)	5
HLH10	M4×0.7	2.5(Nm)	6
HLH16	M4×0.7	2.5(Nm)	6
HLH20	M5×0.8	5.1(Nm)	8

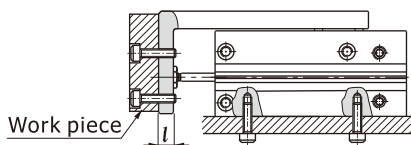
Vertical Mounting(Tapped Holes)



7. Work Piece Mounting

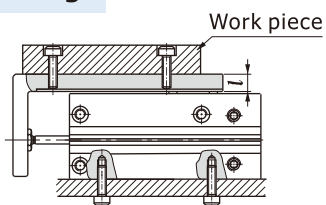
7.1) Work pieces can be mounted on 2 surfaces of the compact slide. When mounting a work piece, tighten the bolts properly at a torque value within the limiting range.

Front Mounting



Model	Bolts	Max.fastening torque	L
HLH6	M3×0.5	1.1(Nm)	5.5
HLH10	M4×0.7	2.5(Nm)	7.5
HLH16	M4×0.7	2.5(Nm)	10
HLH20	M5×0.8	5.1(Nm)	11

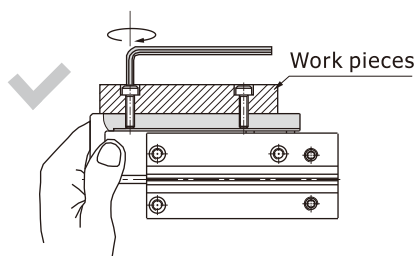
Top Mounting



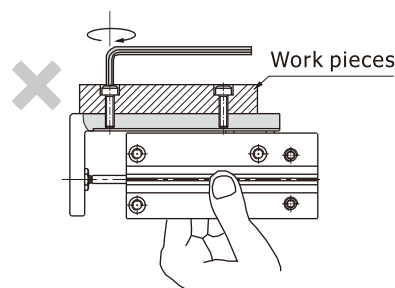
Model	Bolts	Max.fastening torque	L
HLH6	M3×0.5	1.1(Nm)	6.5
HLH10	M4×0.7	2.5(Nm)	8
HLH16	M4×0.7	2.5(Nm)	9
HLH20	M5×0.8	5.1(Nm)	9.5

7.2) Since the table is supported by the linear guide, take care not to apply strong impact or large moment to the guide section.

7.3) Hold the slide when fastening work pieces with bolts, If the body is held while tightening bolts, excessive moment may damage guide section.



Hold the slide and fasten the bolt



Hold the body and fasten the bolt

Compact slide cylinder

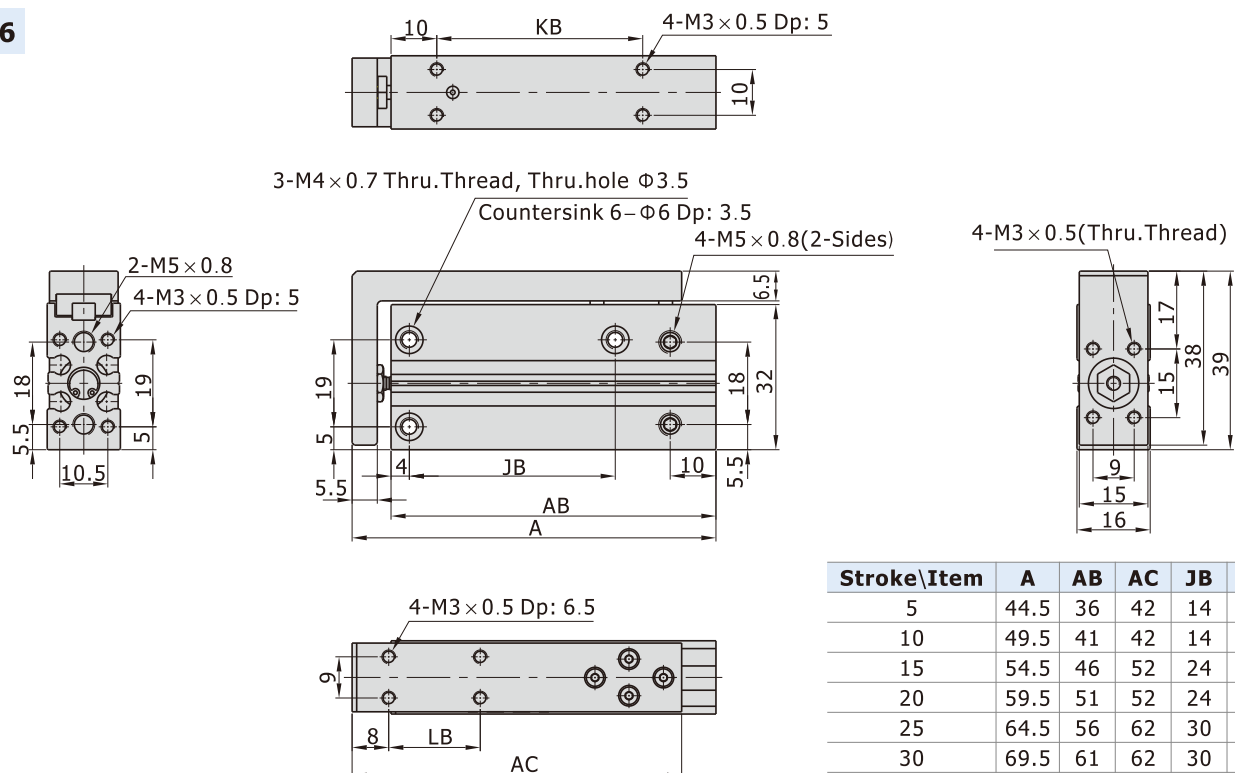
AIRTAC

HLH Series

Bore size: $\Phi 6$, $\Phi 10$, $\Phi 16$, $\Phi 20$

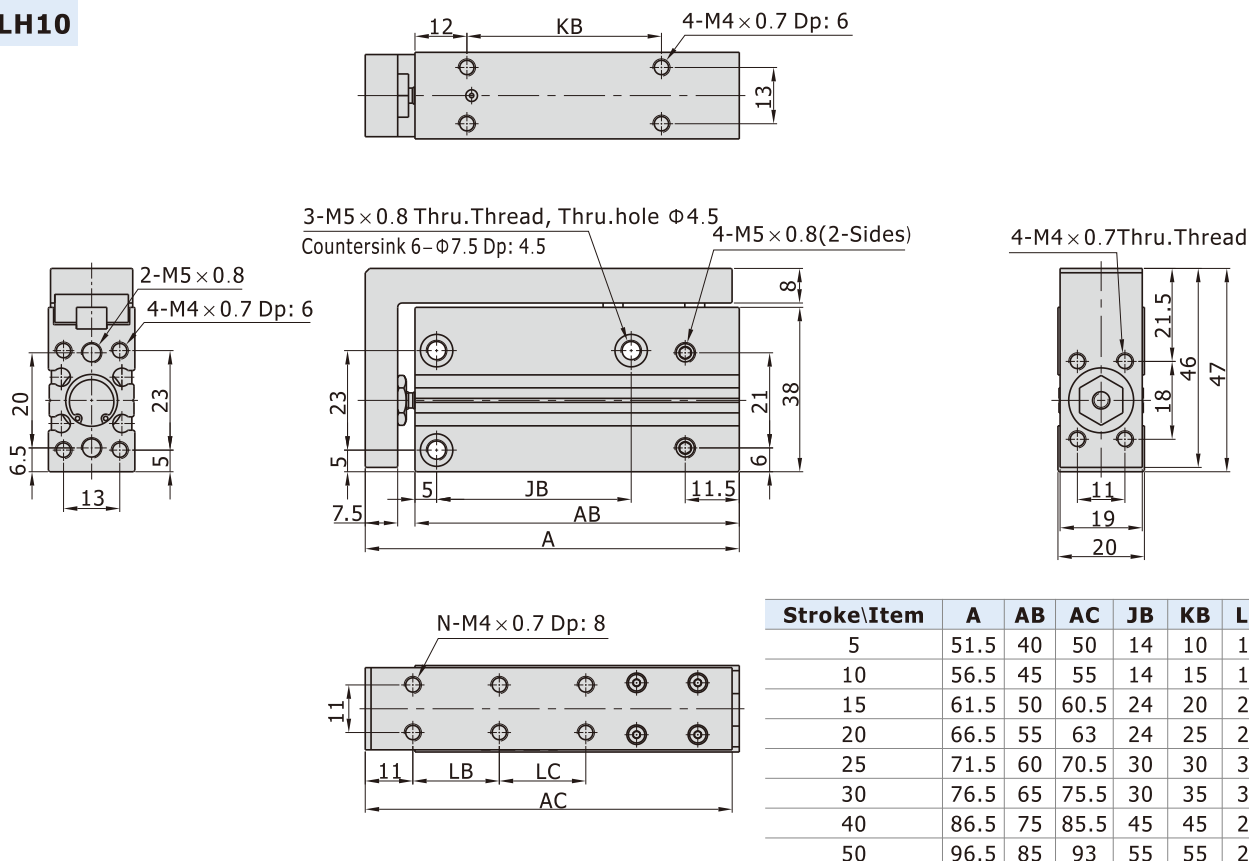
Dimensions

HLH6



Stroke\Item	A	AB	AC	JB	KB	LB
5	44.5	36	42	14	10	10
10	49.5	41	42	14	15	10
15	54.5	46	52	24	20	20
20	59.5	51	52	24	25	20
25	64.5	56	62	30	30	30
30	69.5	61	62	30	35	30

HLH10



Stroke\Item	A	AB	AC	JB	KB	LB	LC	N
5	51.5	40	50	14	10	10	-	4
10	56.5	45	55	14	15	10	-	4
15	61.5	50	60.5	24	20	20	-	4
20	66.5	55	63	24	25	20	-	4
25	71.5	60	70.5	30	30	30	-	4
30	76.5	65	75.5	30	35	30	-	4
40	86.5	75	85.5	45	45	20	20	6
50	96.5	85	93	55	55	25	25	6



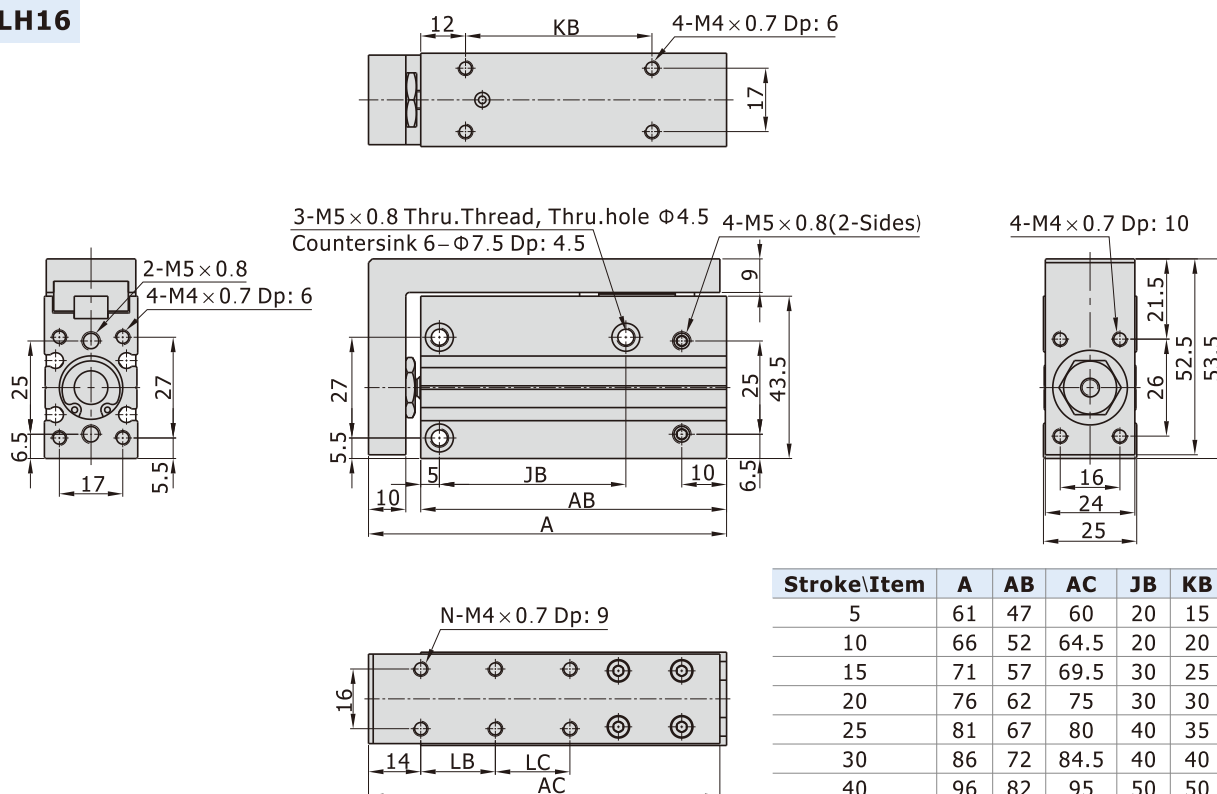
Compact slide cylinder

AIRTAC

HLH Series

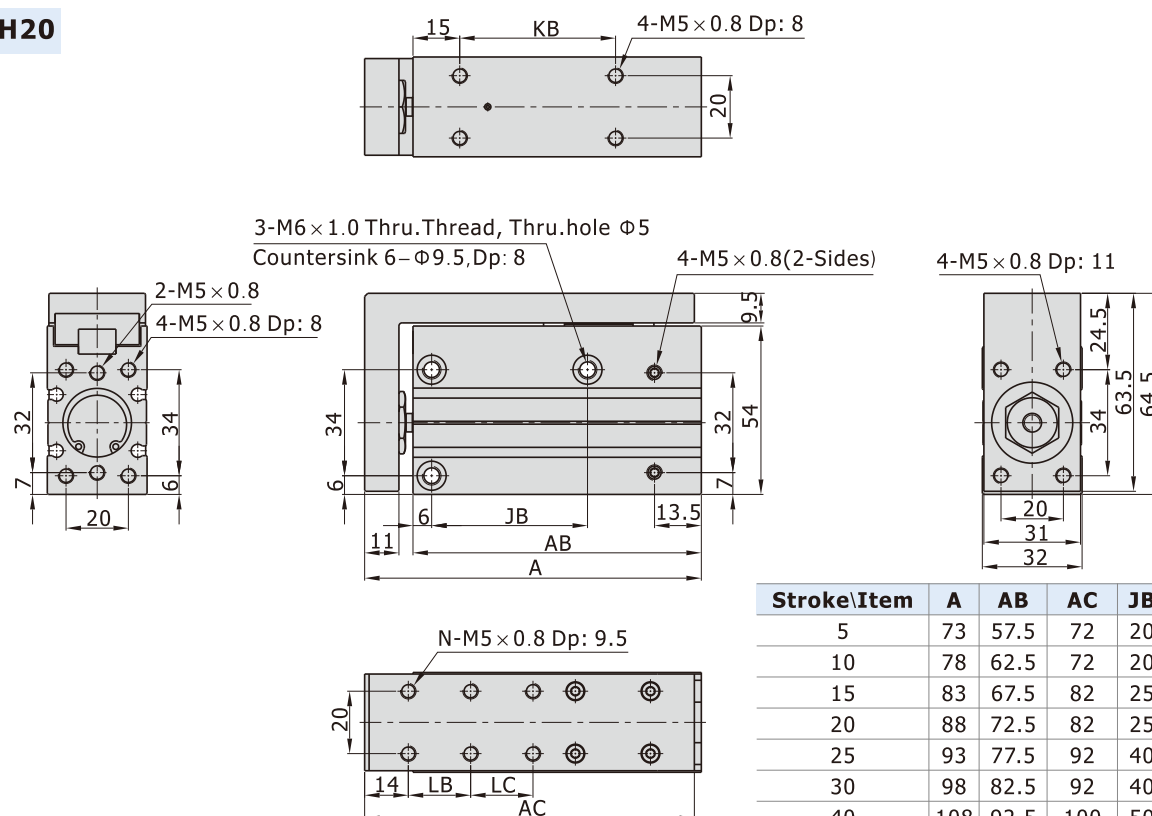
Bore size: $\Phi 6$, $\Phi 10$, $\Phi 16$, $\Phi 20$

HLH16



Stroke\Item	A	AB	AC	JB	KB	LB	LC	N
5	61	47	60	20	15	10	-	4
10	66	52	64.5	20	20	10	-	4
15	71	57	69.5	30	25	20	-	4
20	76	62	75	30	30	20	-	4
25	81	67	80	40	35	30	-	4
30	86	72	84.5	40	40	30	-	4
40	96	82	95	50	50	20	20	6
50	106	92	104.5	60	60	25	25	6
60	116	102	114.5	60	70	30	30	6

HLH20



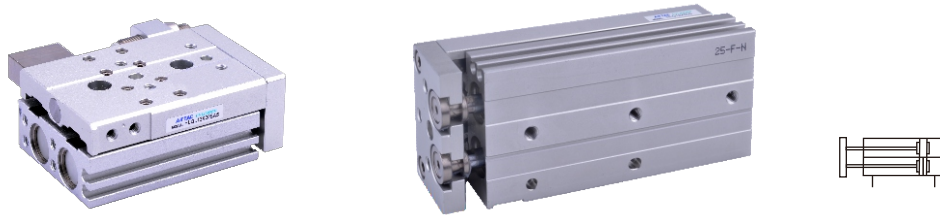
Stroke\Item	A	AB	AC	JB	KB	LB	LC	N
5	73	57.5	72	20	15	10	-	4
10	78	62.5	72	20	20	10	-	4
15	83	67.5	82	25	25	20	-	4
20	88	72.5	82	25	30	20	-	4
25	93	77.5	92	40	35	30	-	4
30	98	82.5	92	40	40	30	-	4
40	108	92.5	100	50	50	20	20	6
50	118	102.5	113.5	70	60	25	25	6
60	128	112.5	122.5	70	70	30	30	6





Compact slide cylinder—HLQ Series

Recirculating linear ball bearing
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$



Ordering code

HLQ 20 × 30 S A S T

① ② ③ ④ ⑤ ⑥

① Model

HLQ: Compact slide cylinder
(Double acting type)
(Recirculating linear ball bearing)

HLQL: Symmetrical Compact slide cylinder
(Double acting type)
(Recirculating linear ball bearing)

② Bore Size

6 8 12 16 20 25

④ Magnet

S: With magnet

⑥ Thread type [Note3]

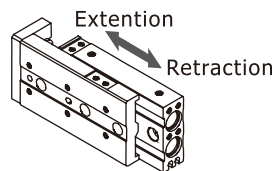
T: NPT

③ Stroke [Note1]

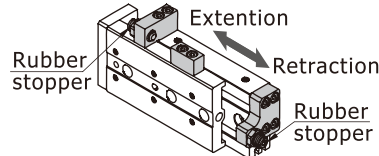
Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	10 20 30 40 50	50
8	10 20 30 40 50 75	75
12	10 20 30 40 50 75 100	100
16	10 20 30 40 50 75 100 125	125
20	10 20 30 40 50 75 100 125 150	150
25	10 20 30 40 50 75 100 125 150	150

⑤ Adjuster option [Note2]

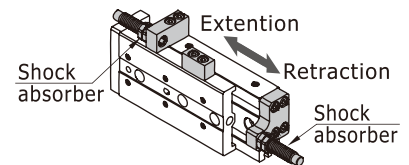
Blank: Without adjuster(Basic type)



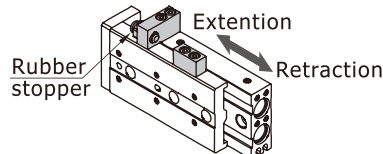
A: Adjustable rubber stopper
(Both ends)



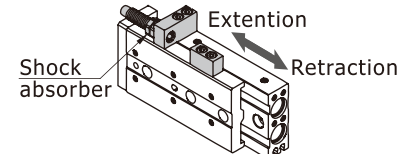
B: Shock absorber(Both ends)



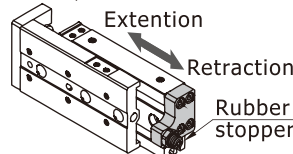
AS: Adjustable rubber stopper
(Extension)



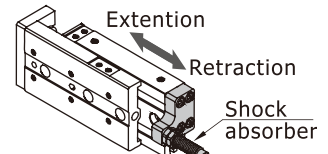
BS: Shock absorber(Extension)



AF: Adjustable rubber stopper
(Retraction)



BF: Shock absorber(Retraction)



[Note1] Consult us for non-standard stroke.

[Note2] B type, BS type, BF type are unavailable for bore size of $\Phi 6$.

[Note3] When the thread is standard, the code is blank.



Compact slide cylinder



HLQ, HLQL Series

Recirculating linear ball bearing
Bore size: Φ6, Φ8, Φ12, Φ16, Φ20, Φ25

Specification

Bore size(mm)	6	8	12	16	20	25
Guide rail width(mm)	10	10	7	9	9	12
Number of guide rail	Single guide rail		Double guide rail			
Acting type	Double acting					
Fluid	Air(to be filtered by 40μm filter element)					
Operating pressure	22~100psi(0.15~0.7MPa)					
Proof pressure	175psi(1.2MPa)					
Temperature	-20~70℃					
Speed range mm/s	50~500					
Stroke tolerance	Stroke≤100 ^{+1.0} ₀ Stroke>100 ^{+1.5} ₀					
Cushion type	Bumper(Both ends)、Shock absorber					
Sensor switches	DS1-H□N、DS1-H□P					
Port size [Note1]	M5×0.8				1/8	

[Note1] NPT thread is available.

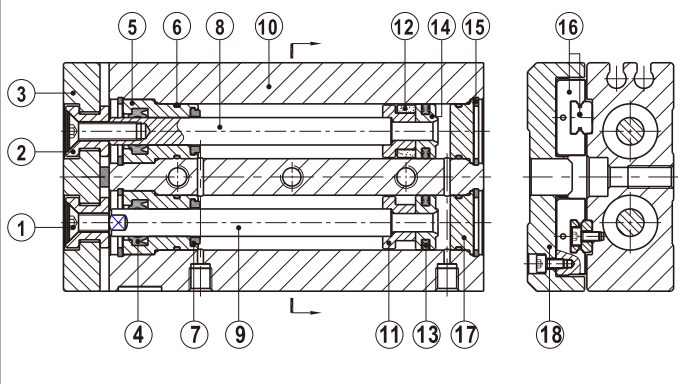
Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type		Pressure area(mm ²)	Operating pressure(psi)					
					30	45	60	75	90	105
6	3	Double acting	Push-side	42	8	13	17	21	25	29
			Pull-side	57	11	17	23	29	34	40
8	4	Double acting	Push-side	75	15	23	30	38	45	53
			Pull-side	101	20	30	40	51	61	71
12	6	Double acting	Push-side	170	34	51	68	85	102	119
			Pull-side	226	45	68	90	113	136	158
16	8	Double acting	Push-side	302	60	91	121	151	181	211
			Pull-side	402	80	121	161	201	241	281
20	10	Double acting	Push-side	471	94	141	188	236	283	330
			Pull-side	628	126	188	251	314	377	440
25	12	Double acting	Push-side	756	151	227	302	378	454	529
			Pull-side	982	186	295	393	491	589	687

Inner structure and material of major parts

Basic type



NO.	Item	Material
1	Screw	Carbon steel
2	Floating joint	Carbon steel
3	Fixing plate	Aluminum alloy
4	Rod seal	NBR
5	Front cover	Aluminum alloy
6	O-ring	NBR
7	Bumper	TPU
8	Piston rod A	Stainless steel
9	Piston rod B	Carbon steel
10	Body	Aluminum alloy
11	Magnet holder	Brass
12	Magnet	Sintered metal (Neodymium-iron-boron)
13	Piston seal	NBR
14	Piston	Brass
15	C clip	Spring steel
16	Linear guide combination	
17	Back cover	Brass
18	Slide table	Aluminum alloy



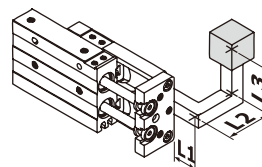
Model Selection Method

Please select compact cylinder's type according to following procedure, and cross reference with data sheets.

A) Operating conditions(According to mounting position and work form)

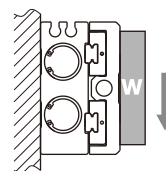
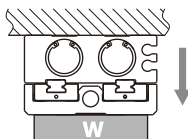
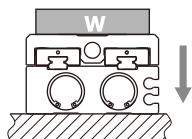
1. Model used(Bore size, Stroke)
2. Type of cushion(Bumper, Shock absorber)
3. Mounting position of work(Top, front)
4. Mounting direction(Axial, Vertical)
5. Average speed V_a (mm/s)
6. Applied load W (N)
7. Overhang L_1, L_2, L_3 (mm)

Fig. 1



Explain: L_1 is the distance of load's center beyond the end plank's plane.
If load's center is not beyond the end plank's plane, L_1 is negative.

Fig. 1: Applied load



B) Kinetic energy check

1. Calculate kinetic energy of load E (J)

$$E = \frac{1}{2} \times \frac{W}{g} \times \left(\frac{1.4 \times V_a}{1000} \right)^2$$

2. Calculate allowable kinetic energy E_a (J)

$$E_a = K \times E_{\max}$$

K : Mounting work coefficient (**Fig 2**)

$E_{\max}$: Maximum allowable kinetic energy (**Table 1**)

3. Check that kinetic energy of load doesn't exceed allowable kinetic energy: $E \leq E_a$

C) Load check

1. Calculate allowable applied load W_a (N)

$$W_a = K \times \beta \times W_{\max}$$

K : Mounting work coefficient (**Fig 2**)

$W_{\max}$: Maximum allowable applied load (**Table 1**)

β : Applied load coefficient (**Fig 3**)

2. Check that load(W) doesn't exceed allowable applied load(W_a): $W \leq W_a$

Fig 2: Mounting work coefficient (K)

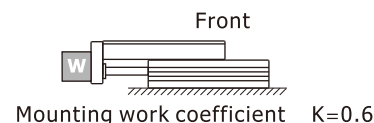
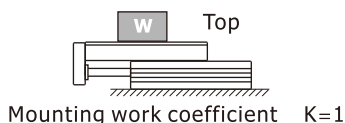
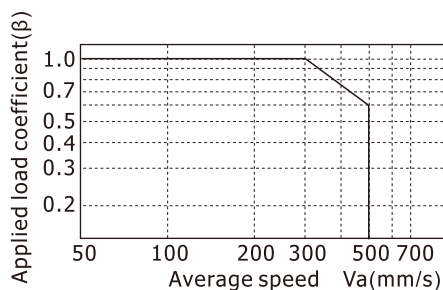


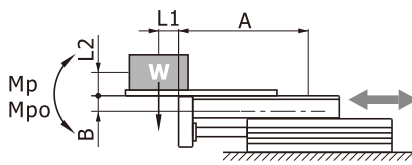
Fig 3: Applied load coefficient (β)



D) Moment check

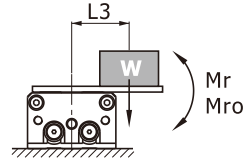
Horizontal

1. Calculate actual moment: M_p , M_{po} , M_y , M_{yo} , M_r , M_{ro} (Nm)



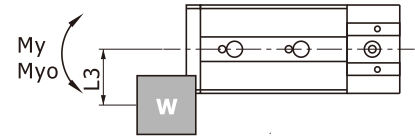
Dynamic moment:
 $M_p = W \times (L1 + A) / 1000$

Static moment:
 $M_{po} = \frac{W \times (L1 + A)}{1000} + \frac{W \times a \times (L2 + B)}{1000 \times g}$



Dynamic moment:
 $M_r = W \times L3 / 1000$

Static moment:
 $M_{ro} = (W \times a \times L3) / 1000g$



Dynamic moment:
 $M_y = 0$

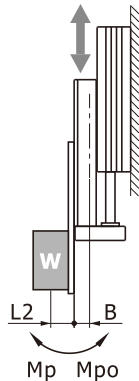
Static moment:
 $M_{yo} = (W \times a \times L3) / 1000g$

2. Check

Dynamic moment:	Static moment:
$\frac{M_p}{M_{p_{max}}} + \frac{M_y}{M_{y_{max}}} + \frac{M_r}{M_{r_{max}}} \leq 1$	$\frac{M_{po}}{M_{po_{max}}} + \frac{M_{yo}}{M_{yo_{max}}} + \frac{M_{ro}}{M_{ro_{max}}} \leq 1$

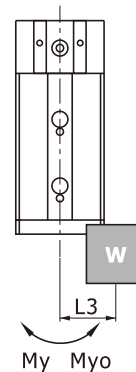
Vertical

1. Calculate actual moment: M_p , M_{po} , M_y , M_{yo} (Nm)



Dynamic moment:
 $M_p = W \times (L2 + B) / 1000$

Static moment:
 $M_{po} = \frac{W \times (L2 + B)}{1000} + \frac{W \times a \times (L2 + B)}{1000 \times g}$



Dynamic moment:
 $M_y = W \times L3 / 1000$

Static moment:
 $M_{yo} = \frac{W \times a \times L3}{1000g} + \frac{W \times L3}{1000}$

2. Check

Dynamic moment:	Static moment:
$\frac{M_p}{M_{p_{max}}} + \frac{M_y}{M_{y_{max}}} \leq 1$	$\frac{M_{po}}{M_{po_{max}}} + \frac{M_{yo}}{M_{yo_{max}}} \leq 1$

Explain:

$L1/L2/L3$: The distance of load center to mount plane (Determined by actuality).

A/B : Correction value for center position distance of moment (Refer to table 2).

$M_{p_{max}}/M_{y_{max}}/M_{r_{max}}/M_{po_{max}}/M_{yo_{max}}/M_{ro_{max}}$: Maximum allowable moment (Refer to table 2).

g : Acceleration of gravity ($g = 9.81 \text{ m/s}^2$).

a : Acceleration of inertia (Bumper: $a = 1600 \times (V_a/1000)^2$, Shock absorber: $a = 400 \times (V_a/1000)^2$)

W : Load weight (Determined by actuality).

Table 1 Maximum allowable kinetic energy (E_{max}) / Maximum allowable applied load (W_{max})

Model	Max. allowable kinetic energy $E_{max}(\text{J})$			Max. allowable applied load $W_{max}(\text{N})$
	Basic type	Rubber stopper type	Shock absorber type	
HLQ6	0.01	0.01	—	4
HLQ8	0.024	0.024	0.048	8
HLQ12	0.05	0.05	0.1	15
HLQ16	0.1	0.1	0.2	30
HLQ20	0.13	0.13	0.26	40
HLQ25	0.22	0.22	0.44	70

HLQ, HLQL Series

Recirculating linear ball bearing Bore size: Φ6, Φ8, Φ12, Φ16, Φ20, Φ25

Table 2 Maximum allowable moment(Nm),
Correction value for center position
distance of moment(mm)

Bore size	Stroke	Static moment			Dynamic moment			Correction value	
		M _{po} _{max}	M _{yo} _{max}	M _{ro} _{max}	M _p _{max}	M _y _{max}	M _r _{max}	A	B
6	10	3.3	3.8	2.6	0.7	0.7	0.6	30	7
	20	3.3	3.8	2.6	0.7	0.8	0.6	40	
	30	3.3	3.8	2.6	0.7	0.8	0.6	50	
	40	7.2	7.9	3.6	1.3	1.3	0.6	60	
	50	12.4	12.7	4.7	1.8	1.8	0.6	70	
8	10	10.1	9.1	8.8	2.5	2.5	2.0	30	7
	20	10.1	9.1	8.8	2.6	2.6	2.0	40	
	30	10.1	9.1	8.8	2.8	2.8	2.0	50	
	40	12.4	10.8	10.1	3.4	3.4	2.3	60	
	50	23.6	24.8	13.9	4.4	4.4	2.1	70	
	75	32.8	35.3	16.4	4.6	4.6	1.8	95	
12	10	8.5	8.5	13.6	2.5	2.5	4	32	11
	20	8.5	8.5	13.6	2.5	2.5	4	44	
	30	8.5	8.5	13.6	2.5	2.5	4	54	
	40	8.5	8.5	13.6	2.5	2.5	4	62	
	50	8.5	8.5	13.6	2.5	2.5	4	72	
	75	52.3	52.3	85.6	18.9	18.9	13	115	
	100	53.9	53.9	86.9	19.5	19.5	13	142	
16	10	33.6	33.6	35.2	8.4	8.4	8.8	49	12
	20	33.6	33.6	35.2	8.4	8.4	8.8	49	
	30	33.6	33.6	35.2	8.4	8.4	8.8	59	
	40	33.6	33.6	35.2	8.4	8.4	8.8	69	
	50	33.6	33.6	35.2	8.4	8.4	8.8	79	
	75	70.2	70.2	62.5	28.1	28.1	25	120	
	100	76.6	76.6	62.5	38.3	38.3	25	150	
	125	78	78	62.5	39	39	25	175	
20	10	34.8	34.8	36.8	8.7	8.7	9.2	53	14
	20	34.8	34.8	36.8	8.7	8.7	9.2	53	
	30	34.8	34.8	36.8	8.7	8.7	9.2	63	
	40	34.8	34.8	36.8	8.7	8.7	9.2	73	
	50	34.8	34.8	36.8	8.7	8.7	9.2	83	
	75	70.2	70.2	74.5	28.1	28.1	29.7	123	
	100	76.6	76.6	74.5	38.3	38.3	29.7	157	
	125	78	78	74.5	39	39	29.7	178	
	150	98.4	98.4	74.5	49.2	49.2	29.7	210	
25	10	56.7	56.7	51	16.2	16.2	17	60	17
	20	56.7	56.7	51	16.2	16.2	17	60	
	30	56.7	56.7	51	16.2	16.2	17	70	
	40	56.7	56.7	51	16.2	16.2	17	80	
	50	56.7	56.7	51	16.2	16.2	17	90	
	75	122.5	122.5	138.5	49	49	55.4	130	
	100	173.8	173.8	138.5	79	79	55.4	168	
	125	217	217	138.5	108.6	108.6	55.4	205	
	150	221.8	221.8	138.5	110.9	110.9	55.4	230	

Note Symbol and unit

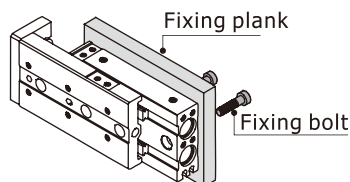
Symbol	Item	Unit
A	Correction value for center position distance of moment	mm
B	Correction value for center position distance of moment	mm
a	Acceleration of inertia	—
E	Kinetic energy	J
Ea	Allowable kinetic energy	J
E _{max}	Maximum allowable kinetic energy	J
g	Acceleration of gravity g=9.81	m/s ²
K	Mounting work coefficient	—
L1 L2 L3	Overhang	mm
M _p M _y M _r	Dynamic moment(Pitch,Yaw,Roll)	Nm
M _p _{max} M _y _{max} M _r _{max}	Maximum allowable dynamic moment (Pitch,Yaw,Roll)	Nm
M _{po} M _{yo} M _{ro}	Static moment(Pitch,Yaw,Roll)	Nm
M _{po} _{max} M _{yo} _{max} M _{ro} _{max}	Maximum allowable static moment (Pitch,Yaw,Roll)	Nm
Va	Average speed	mm/s
W	Applied load	N
W _{max}	Maximum allowable applied load	N
β	Applied load coefficient	-

Installation and application

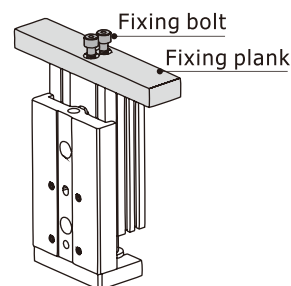
1. How to mount cylinder:

1.1) Cylinder can to be mounted from 3 directions

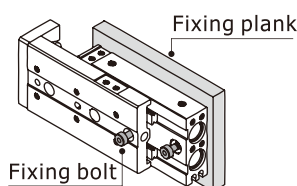
Vertical Mounting(Body thread holes)



Axial Mounting(Body thread holes)

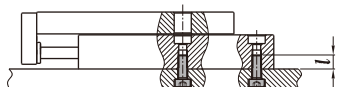


Vertical Mounting(Body through holes)



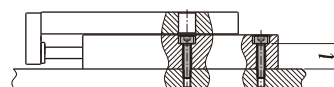
1.2) When mounting a compact slide cylinder, screws of appropriate length should be used and tightened properly within the maximum tightening torque. If screws are tightened beyond designed limits, malfunction may occur. If they are tightened insufficiently, it may result in sliding or falling off from its position.

Vertical Mounting(Body thread holes)



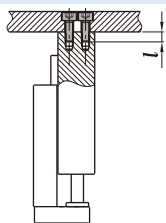
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M4×0.7	2.1	8
HLQ8	M4×0.7	2.1	8
HLQ12	M5×0.8	4.4	10
HLQ16	M6×1.0	4.4	10
HLQ20	M6×1.0	7.4	12
HLQ25	M8×1.25	18.0	16

Vertical Mounting(Body through holes)



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M3×0.5	1.2	8.0
HLQ8	M3×0.5	1.2	9.6
HLQ12	M4×0.7	2.8	13.4
HLQ16	M5×0.8	5.7	16.7
HLQ20	M5×0.8	5.7	22.0
HLQ25	M6×1.0	10.0	27.0

Axial Mounting(Body thread holes)

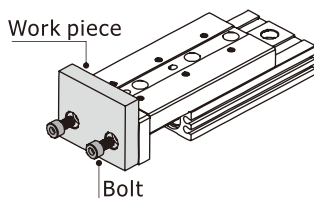


Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M2.5×0.45	0.5	3.5
HLQ8	M3×0.5	0.9	4.0
HLQ12	M4×0.7	2.1	6.0
HLQ16	M5×0.8	4.4	7.0
HLQ20	M5×0.8	4.4	8.0
HLQ25	M6×1.0	7.4	10.0

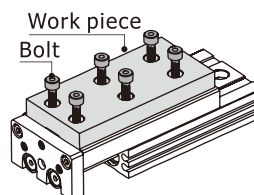
2. Work Piece Mounting:

2.1) Work pieces can be mounted on 2 surfaces of the compact slide.

Front Mounting



Top Mounting

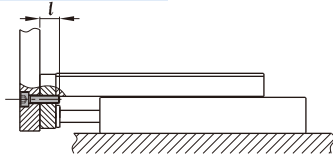


HLQ, HLQL Series

Recirculating linear ball bearing Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

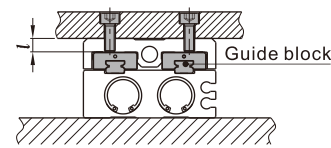
- 2.2) When mounting a work piece, tighten the bolts properly at a torque value within the limiting range. Use bolts at least 0.5mm shorter than maximum thread depth to prevent bolts from contacting the guide block. If the bolts are too long, they hit the guide block and cause damage.

Front Mounting



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M3×0.4	0.9	5
HLQ8	M4×0.7	2.1	6
HLQ12	M5×0.8	4.4	8
HLQ16	M6×1.0	7.4	10
HLQ20	M6×1.0	7.4	13
HLQ25	M8×1.25	18.0	15

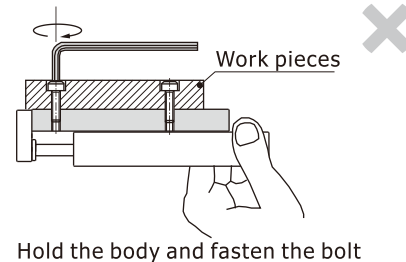
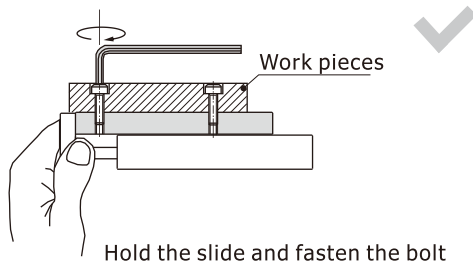
Top Mounting



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLQ6	M3×0.5	0.9	4.7
HLQ8	M3×0.5	0.9	4.7
HLQ12	M4×0.7	2.1	5.0
HLQ16	M5×0.8	4.4	5.0
HLQ20	M5×0.8	4.4	8.0
HLQ25	M6×1.0	7.4	9.0

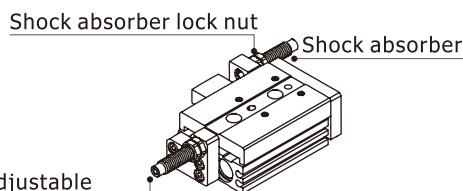
- 2.3) Since the table is supported by the linear guide, take care not to apply strong impact or large moment to the guide section.

- 2.4) Hold the slide when fastening work pieces to it with bolts, If the body is held while tightening bolts, excessive moment may damage guide section.



3. About shock absorber:

- 3.1) Shock absorbers are expendable. Promptly replace them when energy absorbing capacity decreases.
3.2) Never turn or adjust the screws on bottom of the shock absorber body. The screws are not for adjusting. Otherwise would cause oil leakage.
3.3) Follow the table for tightening torque of shock absorber to lock nuts.



The screws are not adjustable otherwise would cause oil leakage.

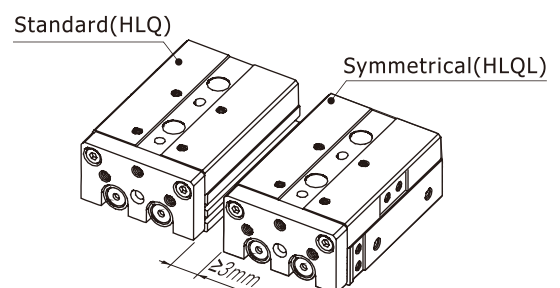
Model	Shock absorber	Tightening torque
HLQ6	Without shock absorber	
HLQ8	ACA0806-1N	1.67(Nm)
HLQ12	ACA0806-1N	1.67(Nm)
HLQ16	ACA1007-1N	3.14(Nm)
HLQ20	ACA1210-1N	3.14(Nm)
HLQ25	ACA1412-1N	10.8(Nm)

4. How to mount sensor switch:

- 4.1) HLQ Series are all with magnet. The matching sensor switches are DS1-H, DS1-HL series.
4.2) Maintain a minimum spacing of at least 3mm if two compact cylinders are used side by side in order to avoid malfunction.

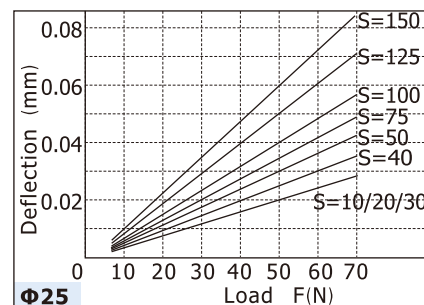
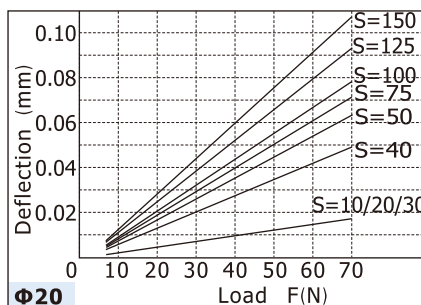
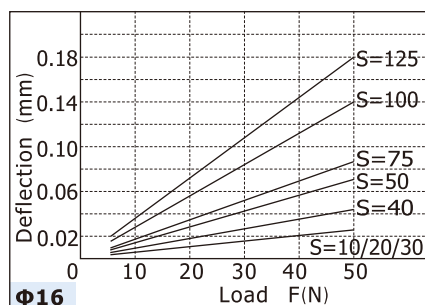
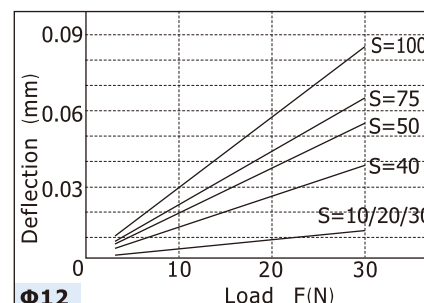
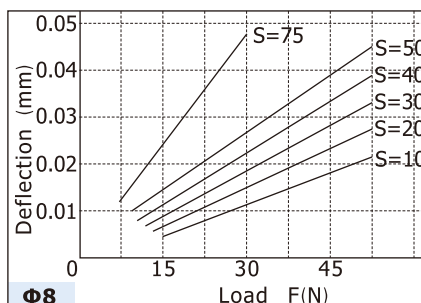
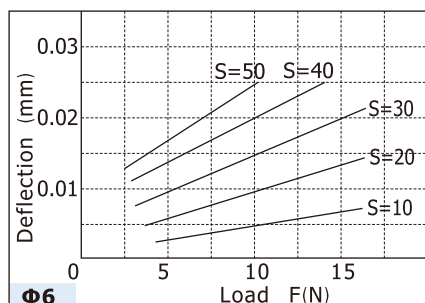
5. Make sure to connect the compact cylinder to speed controller at the meter-out side, and the speed of compact cylinder must below 500mm/s.

6. Don't apply a load beyond the range of the operation limits. Different load or torque will cause different deflection to table, please see below for details.



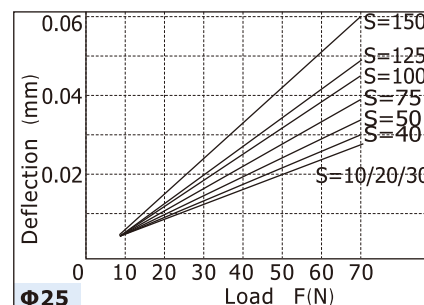
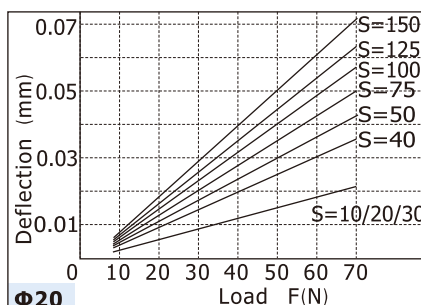
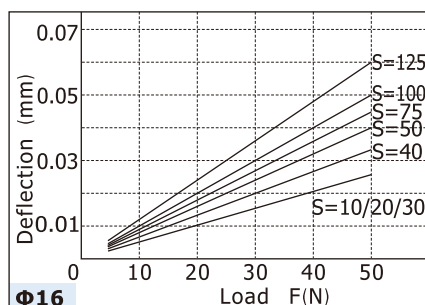
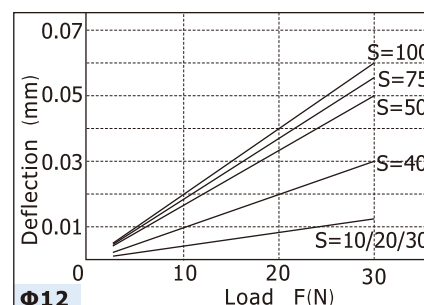
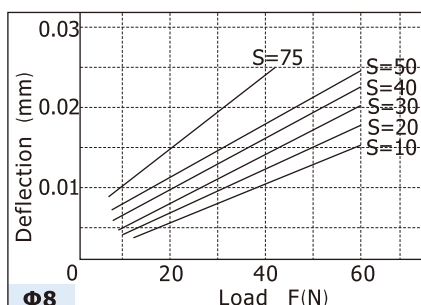
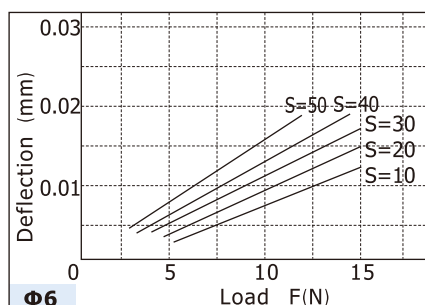
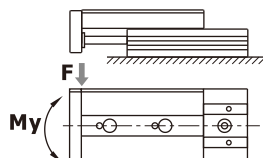
6.1) Table deflection due to pitch moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



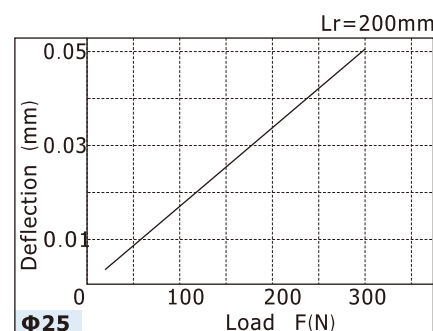
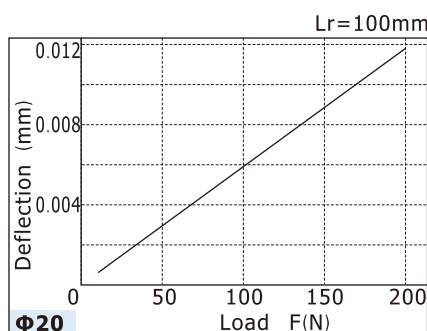
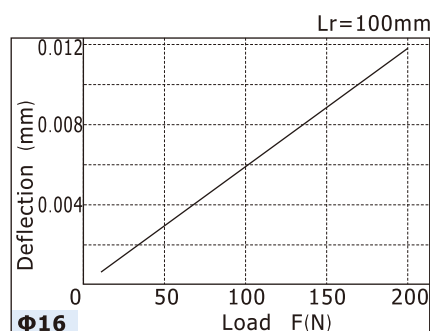
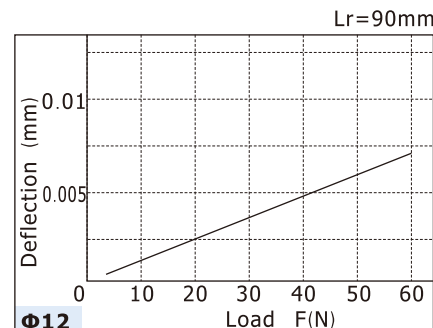
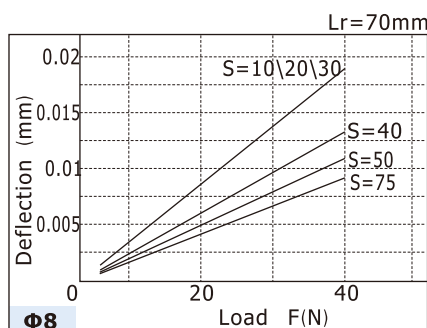
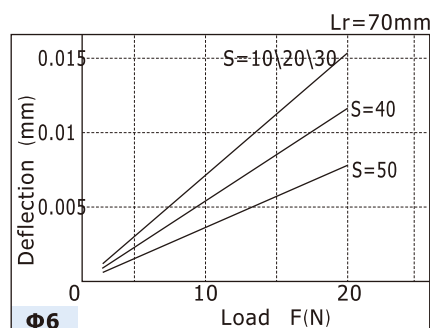
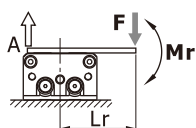
6.2) Table deflection due to yaw moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



6.3) Table deflection due to roll moment:

Table deflects (A) when a load acts upon section F at the full stroke of the compact slide.



Compact slide cylinder

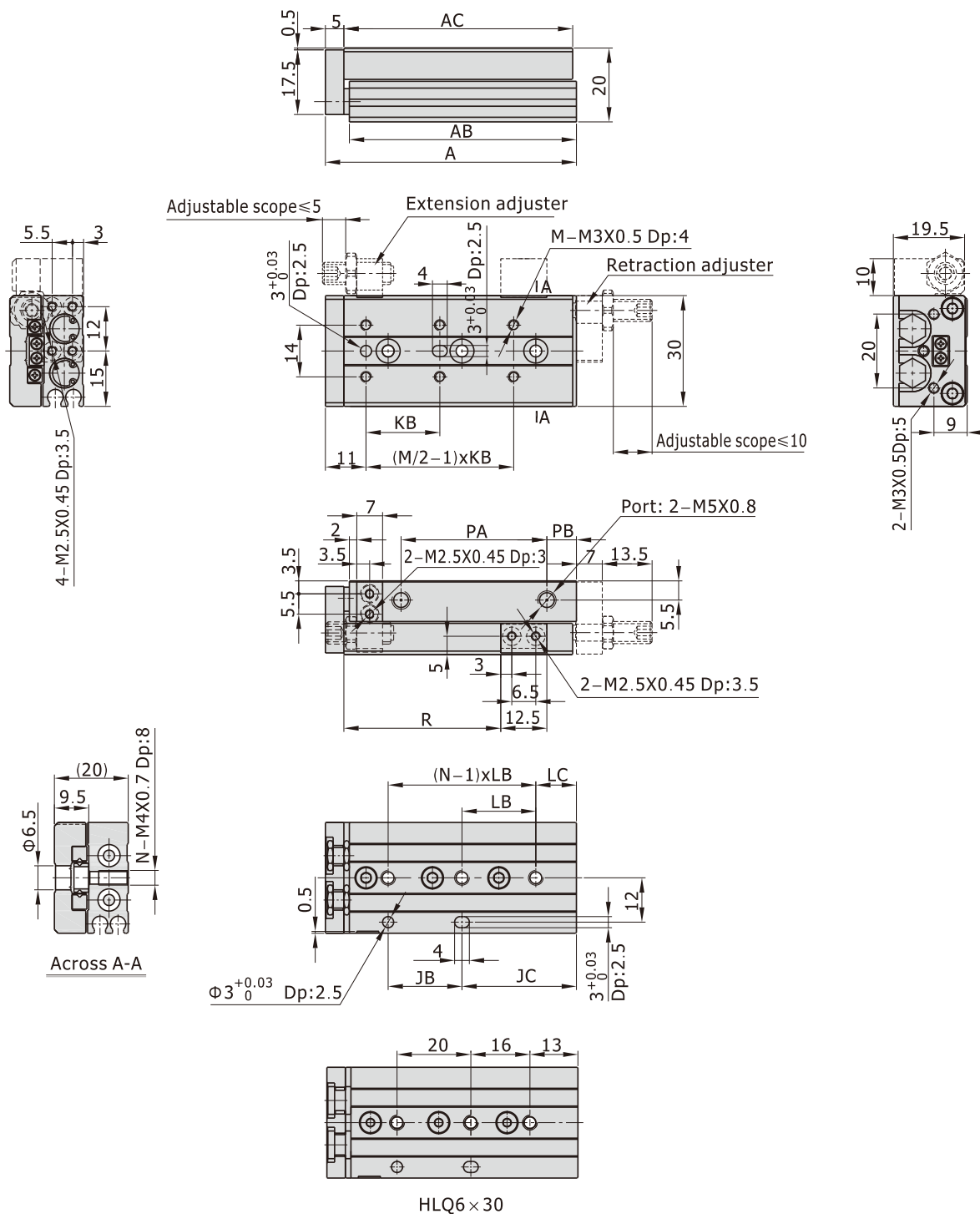
AIRTAC

HLQ, HLQL Series

Recirculating linear ball bearing
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

Dimensions

HLQ6



HLQ6 $\times$ 30

Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	48	41.5	42	16	13	22	23	6	4	2	16	9	21.5
20	58	51.5	52	26	13	25	26	13	4	2	26	9	31.5
30	68	61.5	62	20	29	21	-	-	6	3	36	9	41.5
40	86	79.5	80	28	39	26	28	11	6	3	47	16	51.5
50	96	89.5	90	28	49	27	28	21	6	3	64	9	61.5

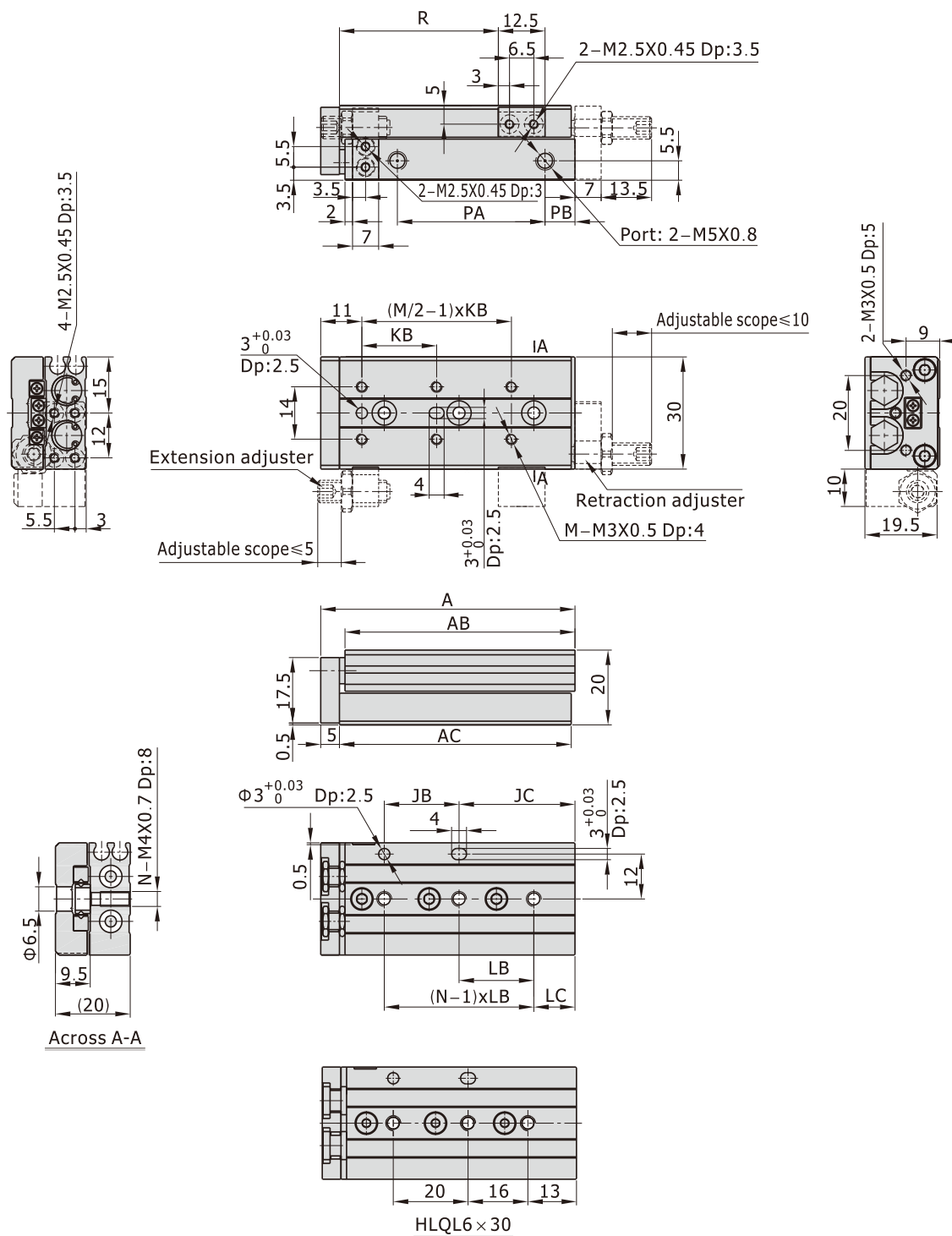


Compact slide cylinder

HLQ, HLQL Series

Recirculating linear ball bearing
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLQL6



Stroke/Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	48	41.5	42	16	13	22	23	6	4	2	16	9	21.5
20	58	51.5	52	26	13	25	26	13	4	2	26	9	31.5
30	68	61.5	62	20	29	21	-	-	6	3	36	9	41.5
40	86	79.5	80	28	39	26	28	11	6	3	47	16	51.5
50	96	89.5	90	28	49	27	28	21	6	3	64	9	61.5

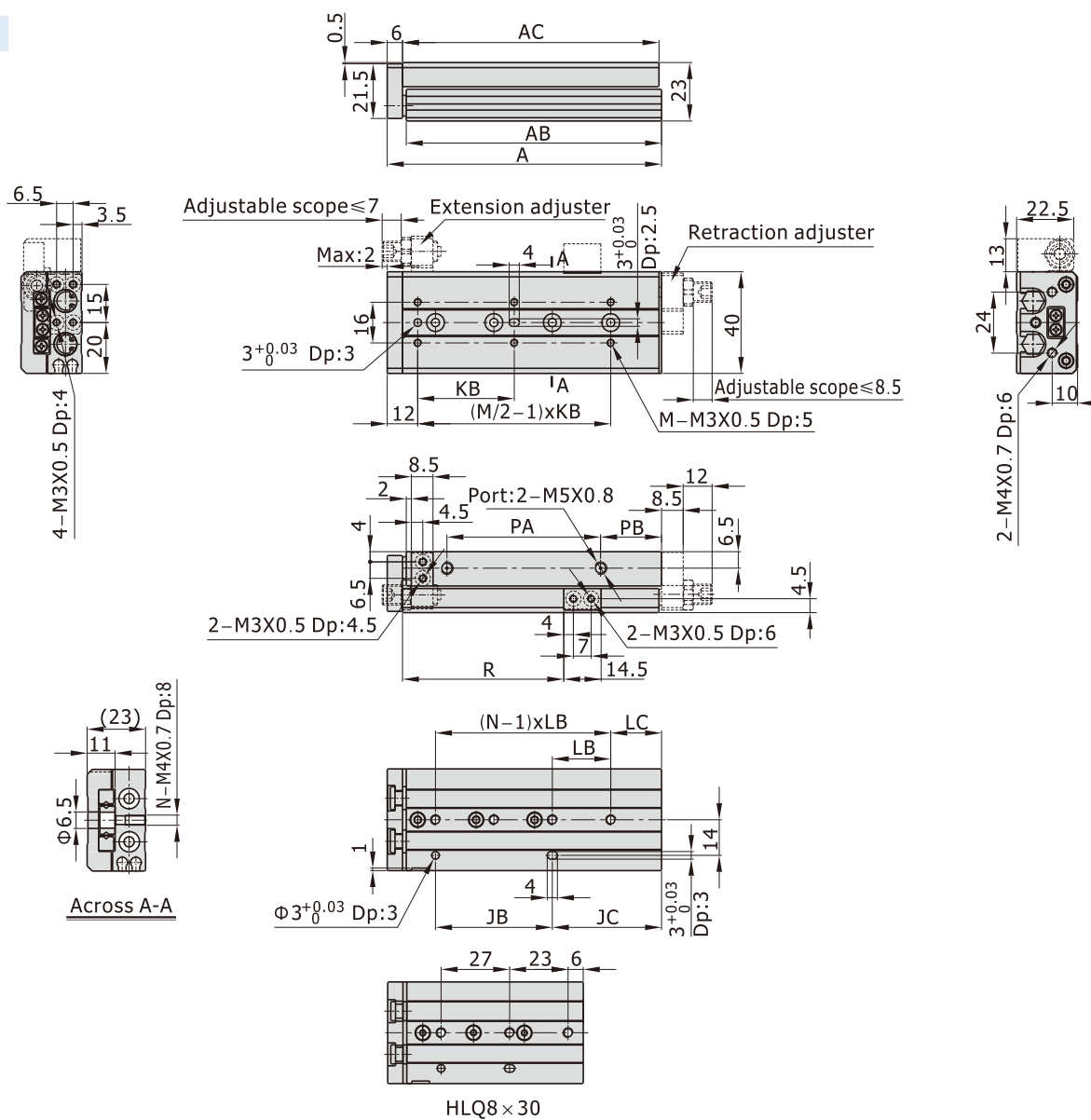
Compact slide cylinder

AIRTAC

HLQ, HLQL Series

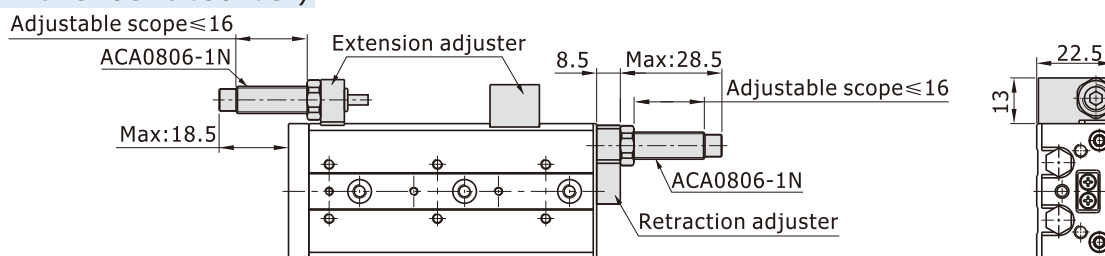
Recirculating linear ball bearing
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLQ8



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	53	45.5	46	19	13	25	25	7	4	2	18	10	23.5
20	63	55.5	56	28	14	25	28	14	4	2	28	10	33.5
30	77	69.5	70	27	29	26	-	-	6	3	42	10	43.5
40	91	83.5	84	31	39	32	31	8	6	3	54	12	53.5
50	116	108.5	109	58	37	46	29	8	6	4	79	12	63.5
75	144	136.5	137	60	61	50	30	31	6	4	107	10	88.5

HLQ8(With shock absorber)

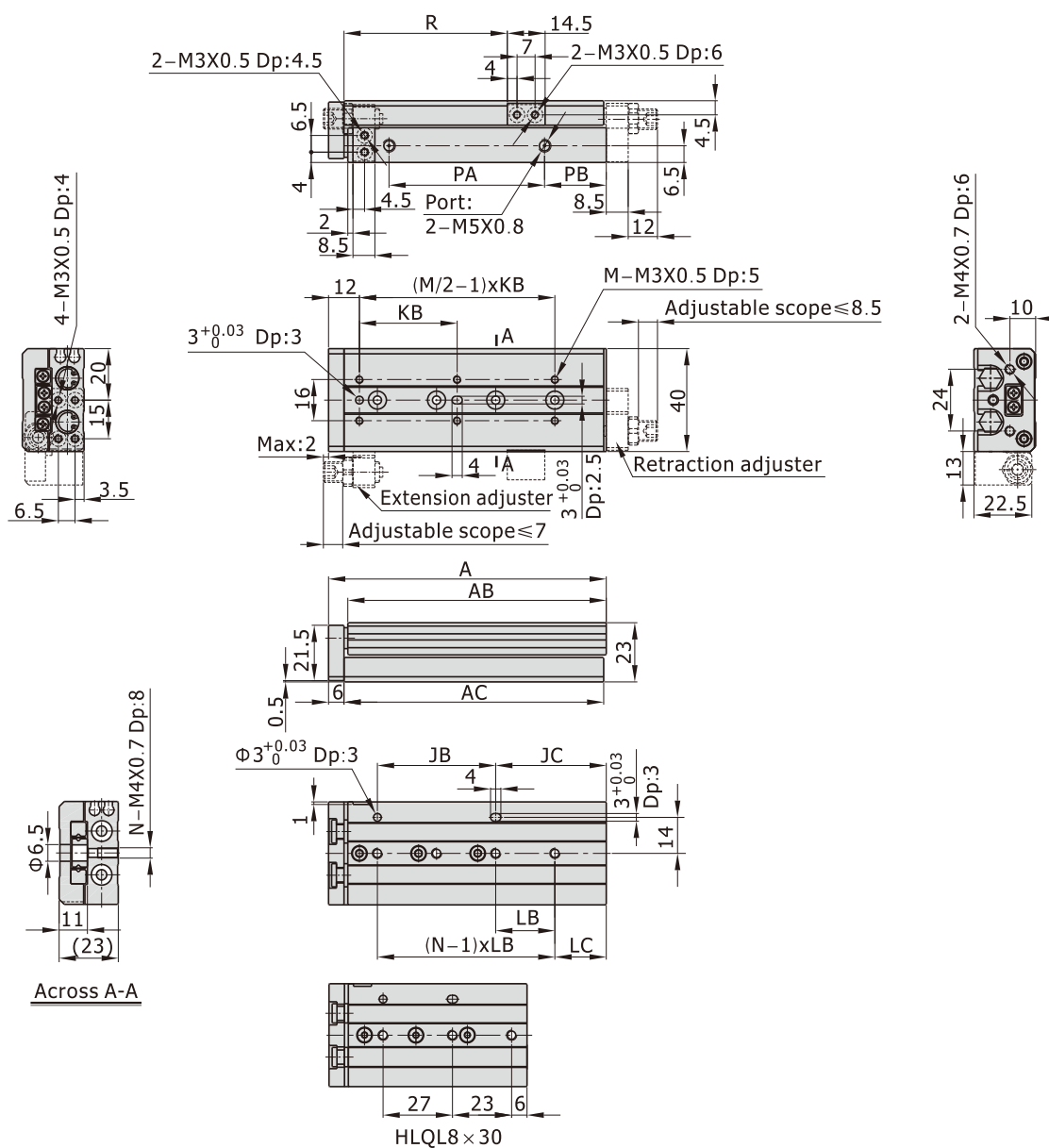


Compact slide cylinder

HLQ, HLQL Series

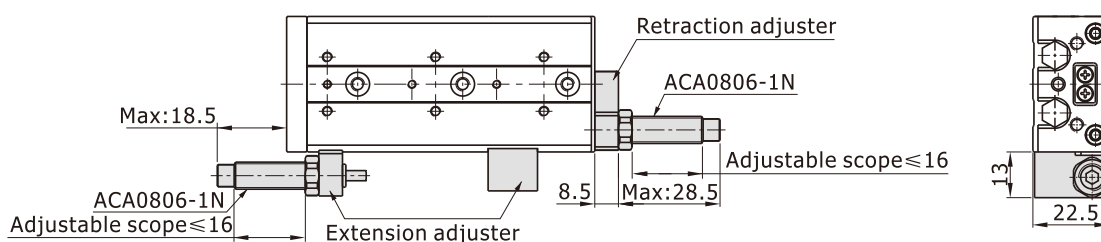
Recirculating linear ball bearing
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLQL8



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	53	45.5	46	19	13	25	25	7	4	2	18	10	23.5
20	63	55.5	56	28	14	25	28	14	4	2	28	10	33.5
30	77	69.5	70	27	29	26	-	-	6	3	42	10	43.5
40	91	83.5	84	31	39	32	31	8	6	3	54	12	53.5
50	116	108.5	109	58	37	46	29	8	6	4	79	12	63.5
75	144	136.5	137	60	61	50	30	31	6	4	107	10	88.5

HLQL8(With shock absorber)



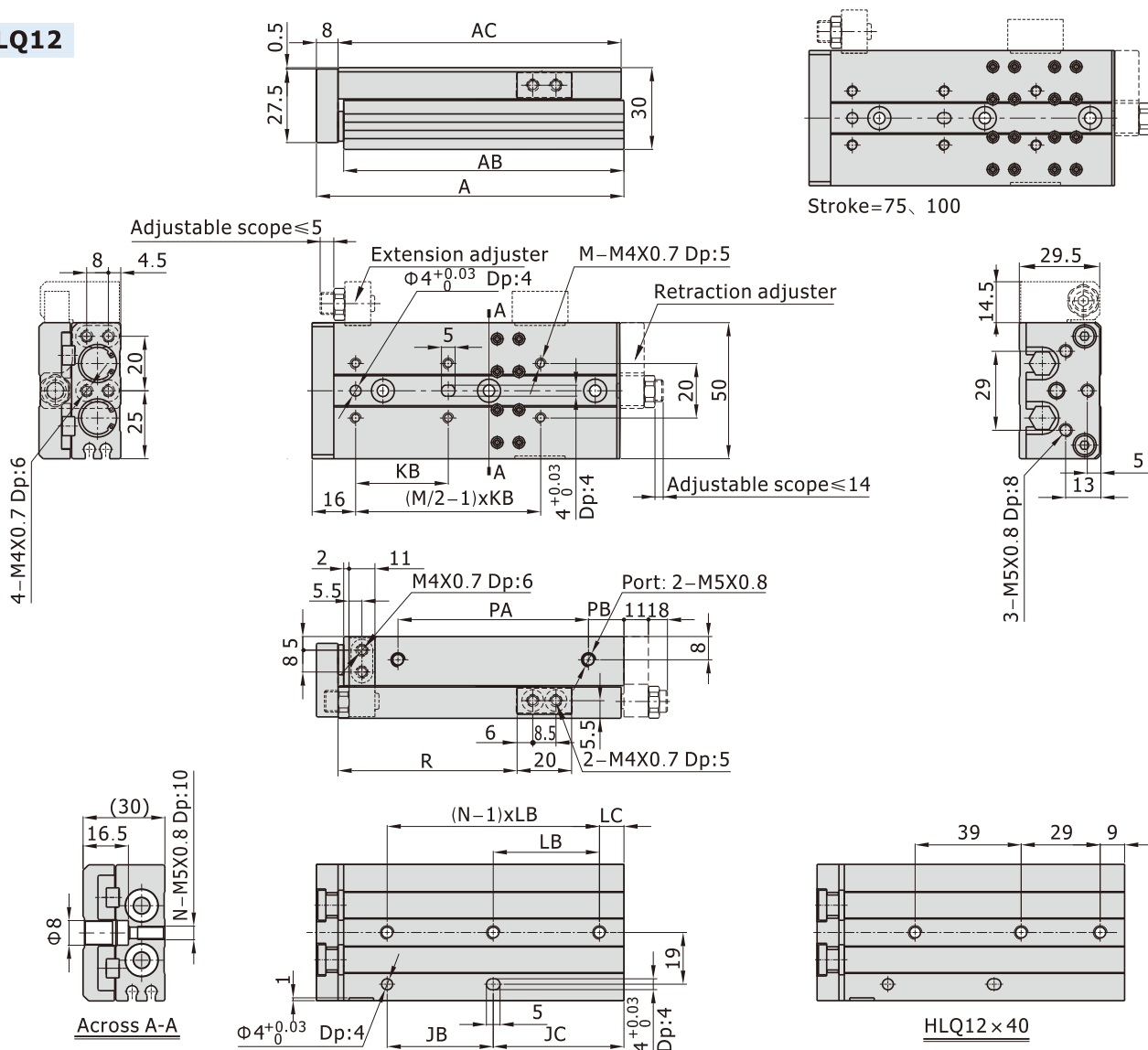
Compact slide cylinder

AirTAC

HLQ, HLQL Series

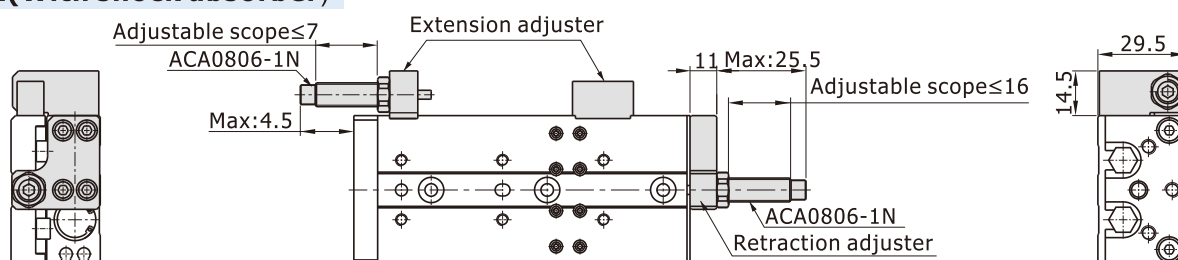
Recirculating linear ball bearing
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLQ12



Stroke/Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	76	66	67	32	18	28	32	18	4	2	32.5	13	35
20	76	66	67	32	18	28	32	18	4	2	32.5	13	45
30	86	76	77	40	20	38	40	20	4	2	42.5	13	55
40	103	93	94	39	38	34	-	-	6	3	59.5	13	65
50	113	103	104	39	48	34	39	9	6	3	69.5	13	75
75	157	147	148	72	59	36	36	23	8	4	113.5	13	99
100	182	172	173	72	84	36	36	12	10	5	134.5	17	124

HLQ12(With shock absorber)



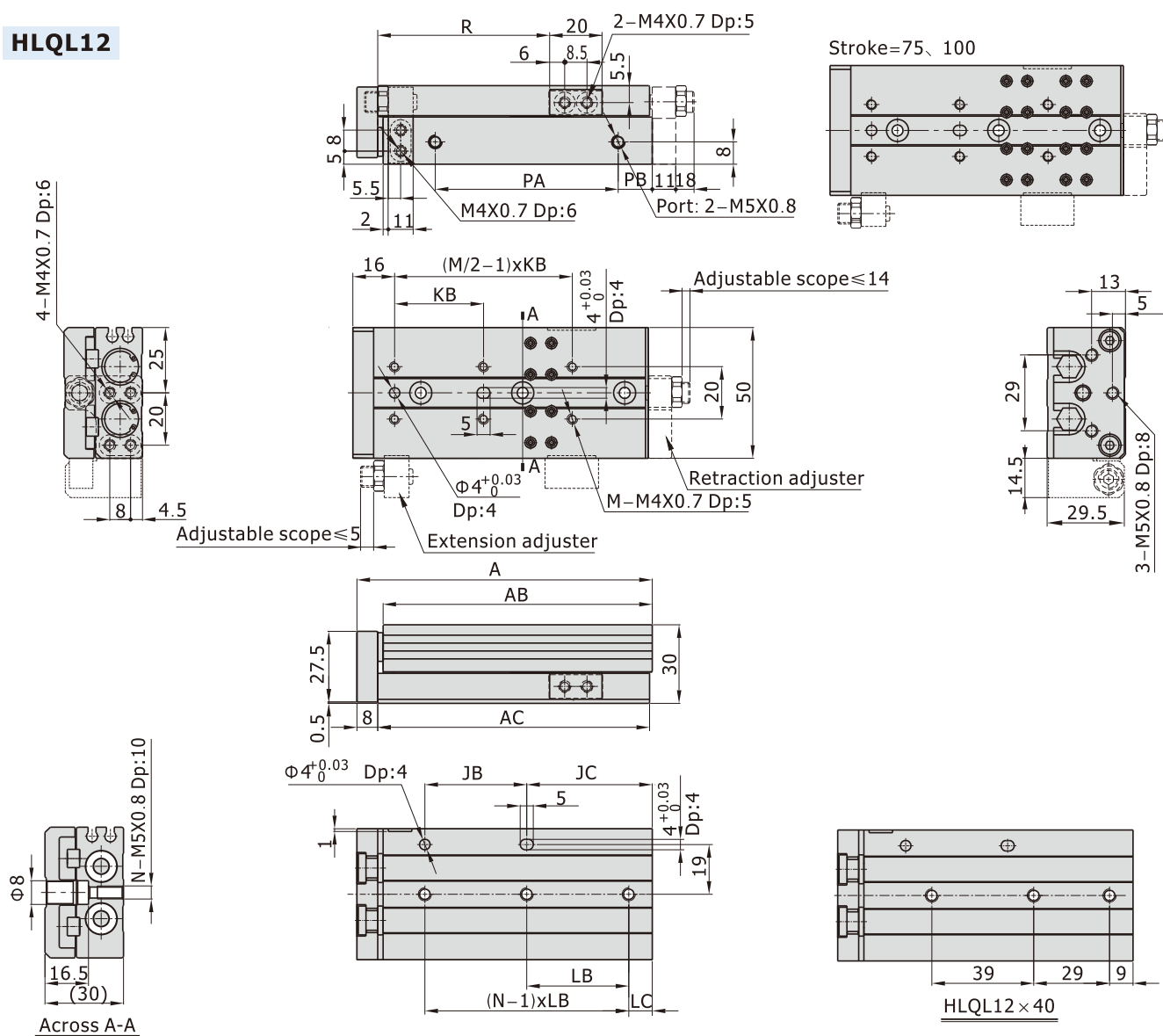
Compact slide cylinder

AIRTAC

HLQ, HLQL Series

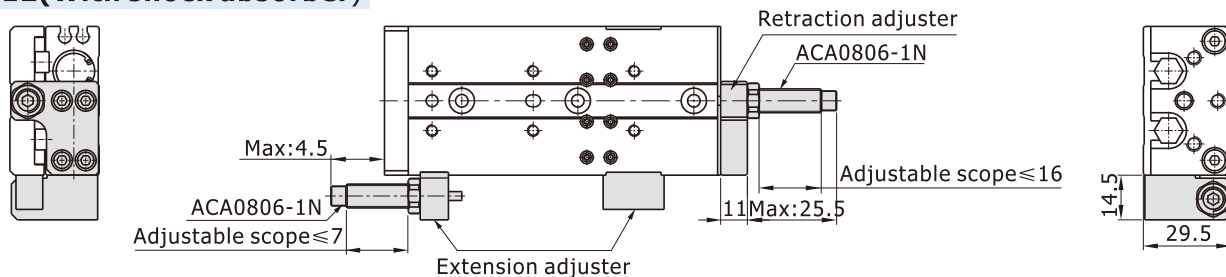
Recirculating linear ball bearing
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLQL12



Stroke/Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	76	66	67	32	18	28	32	18	4	2	32.5	13	35
20	76	66	67	32	18	28	32	18	4	2	32.5	13	45
30	86	76	77	40	20	38	40	20	4	2	42.5	13	55
40	103	93	94	39	38	34	-	-	6	3	59.5	13	65
50	113	103	104	39	48	34	39	9	6	3	69.5	13	75
75	157	147	148	72	59	36	36	23	8	4	113.5	13	99
100	182	172	173	72	84	36	36	12	10	5	134.5	17	124

HLQL12(With shock absorber)



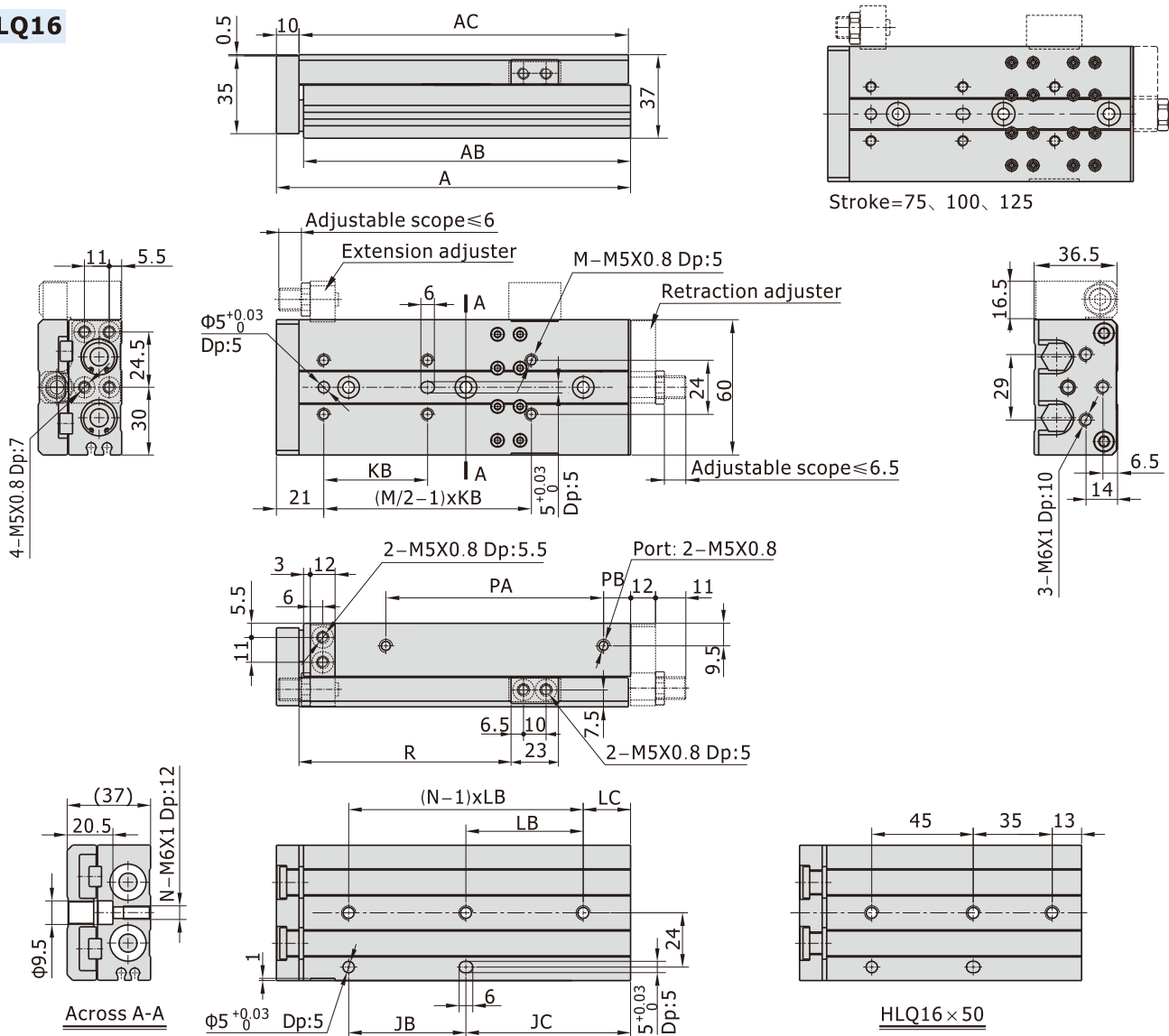
Compact slide cylinder

AirTAC

HLQ, HLQL Series

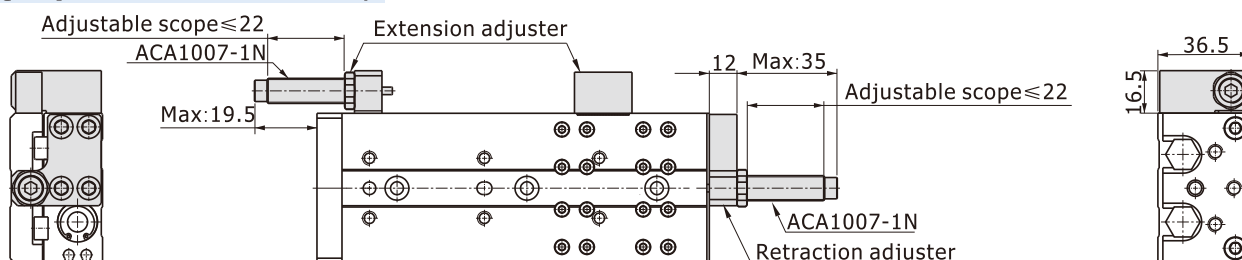
Recirculating linear ball bearing
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLQ16



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	89	77	78	39	18	38	39	18	4	2	40.5	12	28.5
20	89	77	78	39	18	38	39	18	4	2	40.5	12	38.5
30	99	87	88	48	19	48	48	19	4	2	50.5	12	48.5
40	109	97	98	58	19	58	58	19	4	2	60.5	12	58.5
50	125	113	114	45	48	40	-	-	6	3	70.5	18	68.5
75	157	145	146	52	73	46	52	21	6	3	108.5	12	93.5
100	200	188	189	88	80	44	44	36	8	4	151.5	12	118.5
125	225	213	214	88	105	44	44	17	10	5	176.5	12	143.5

HLQ16(With shock absorber)



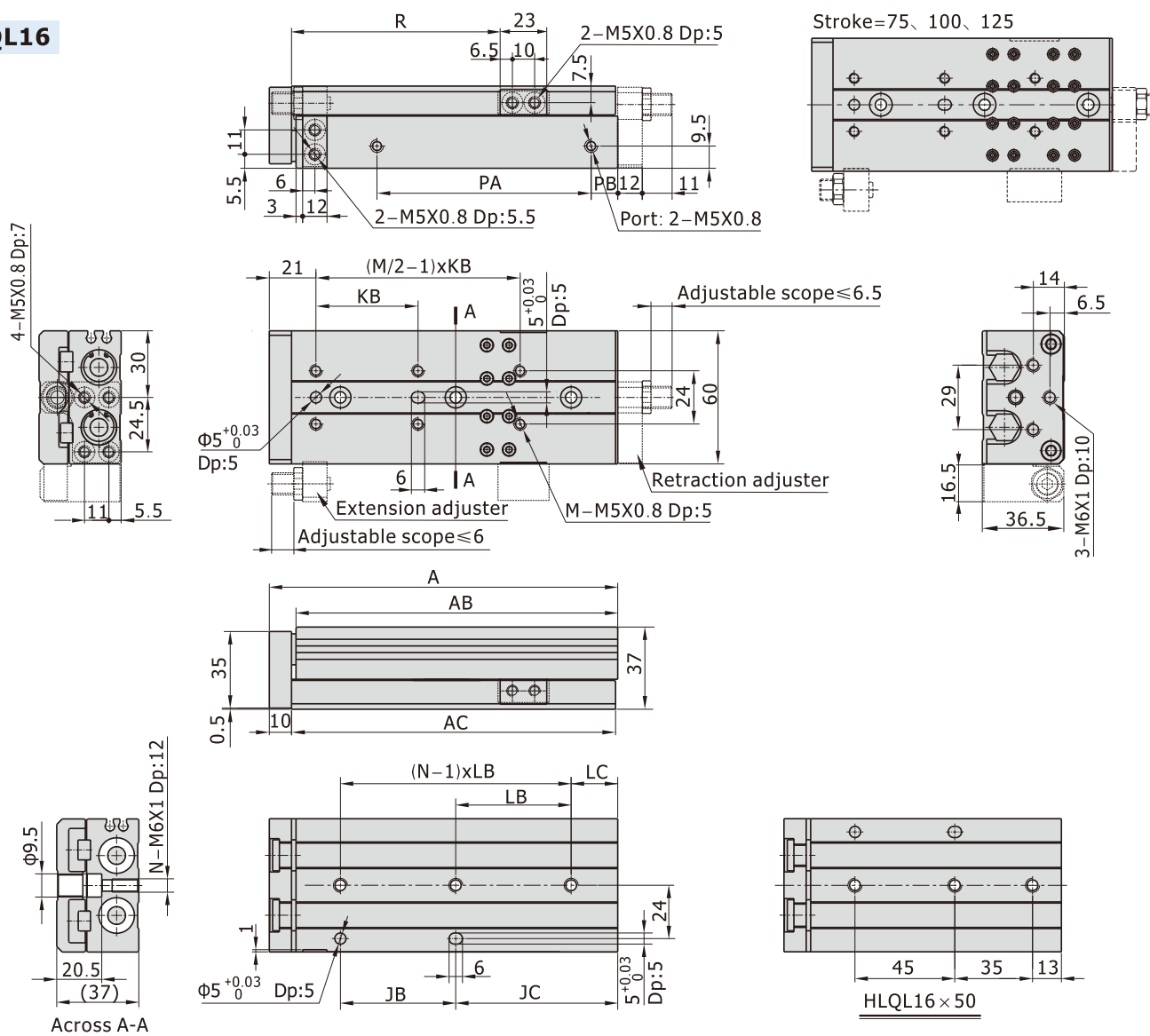
Compact slide cylinder

AIRTAC

HLQ, HLQL Series

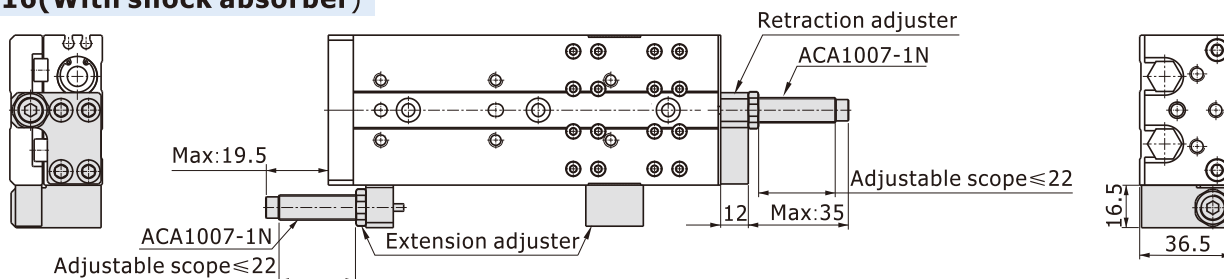
Recirculating linear ball bearing
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLQL16



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	89	77	78	39	18	38	39	18	4	2	40.5	12	28.5
20	89	77	78	39	18	38	39	18	4	2	40.5	12	38.5
30	99	87	88	48	19	48	48	19	4	2	50.5	12	48.5
40	109	97	98	58	19	58	58	19	4	2	60.5	12	58.5
50	125	113	114	45	48	40	-	-	6	3	70.5	18	68.5
75	157	145	146	52	73	46	52	21	6	3	108.5	12	93.5
100	200	188	189	88	80	44	44	36	8	4	151.5	12	118.5
125	225	213	214	88	105	44	44	17	10	5	176.5	12	143.5

HLQL16(With shock absorber)



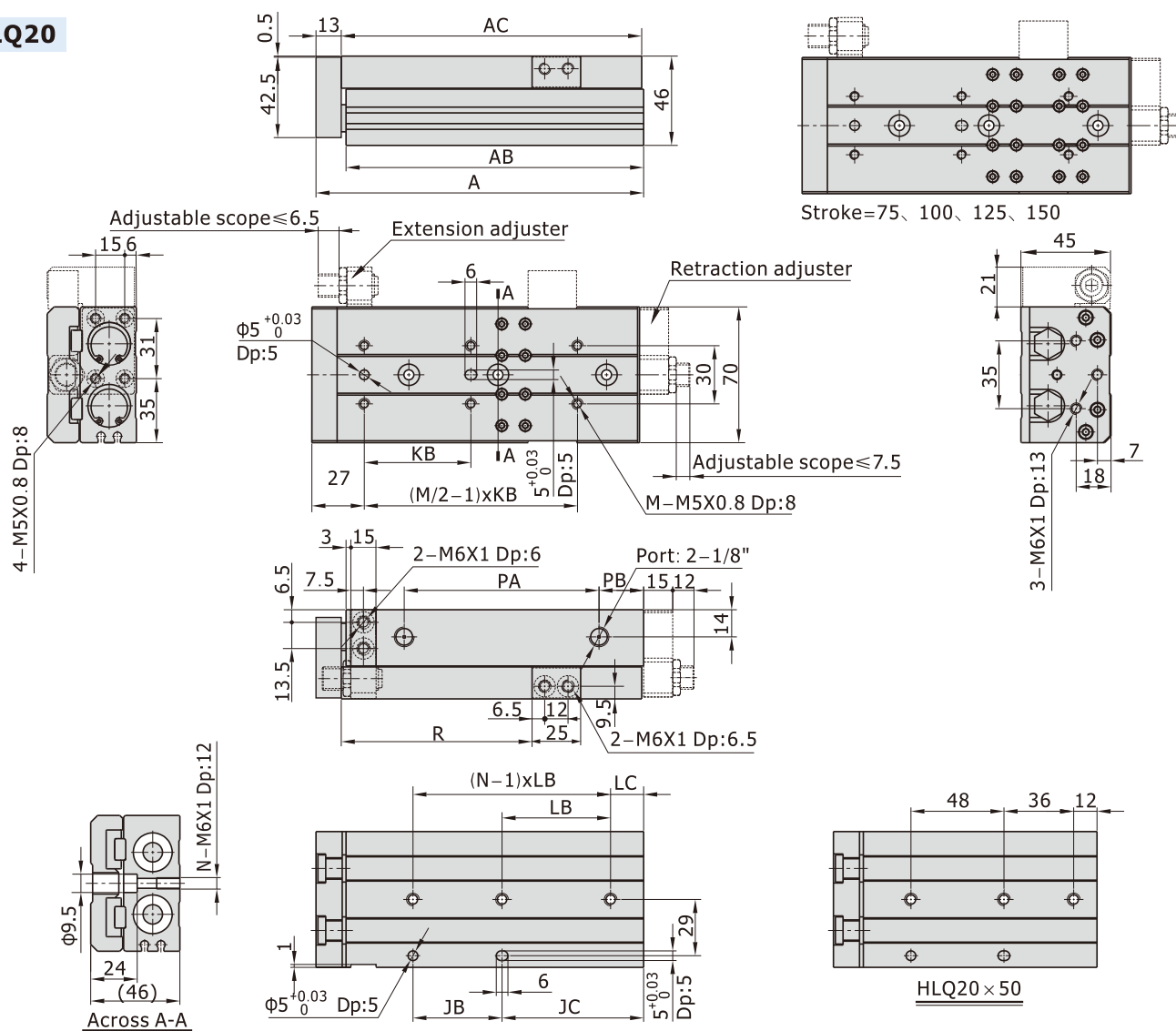
Compact slide cylinder

AirTAC

HLQ, HLQL Series

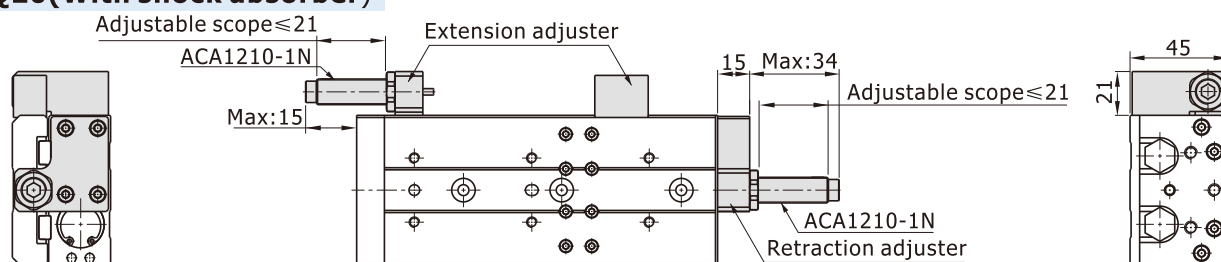
Recirculating linear ball bearing
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLQ20



Stroke	Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10		108	92.5	94	50	18	45	46	22	4	2	46.5	16	32.5
20		108	92.5	94	50	18	40	46	22	4	2	46.5	16	42.5
30		108	92.5	94	50	18	48	46	22	4	2	46.5	16	52.5
40		118	102.5	104	56	22	58	56	22	4	2	56.5	16	62.5
50		136	120.5	122	48	48	42	-	-	6	3	72.5	18	72.5
75		169	153.5	155	56	73	55	56	17	6	3	98.5	25	97.5
100		226	210.5	212	112	74	50	56	18	8	4	155.5	25	122.5
125		254	238.5	240	118	96	55	59	37	8	4	183.5	25	147.5
150		282	266.5	268	124	118	62	62	56	8	4	211.5	25	172.5

HLQ20(With shock absorber)



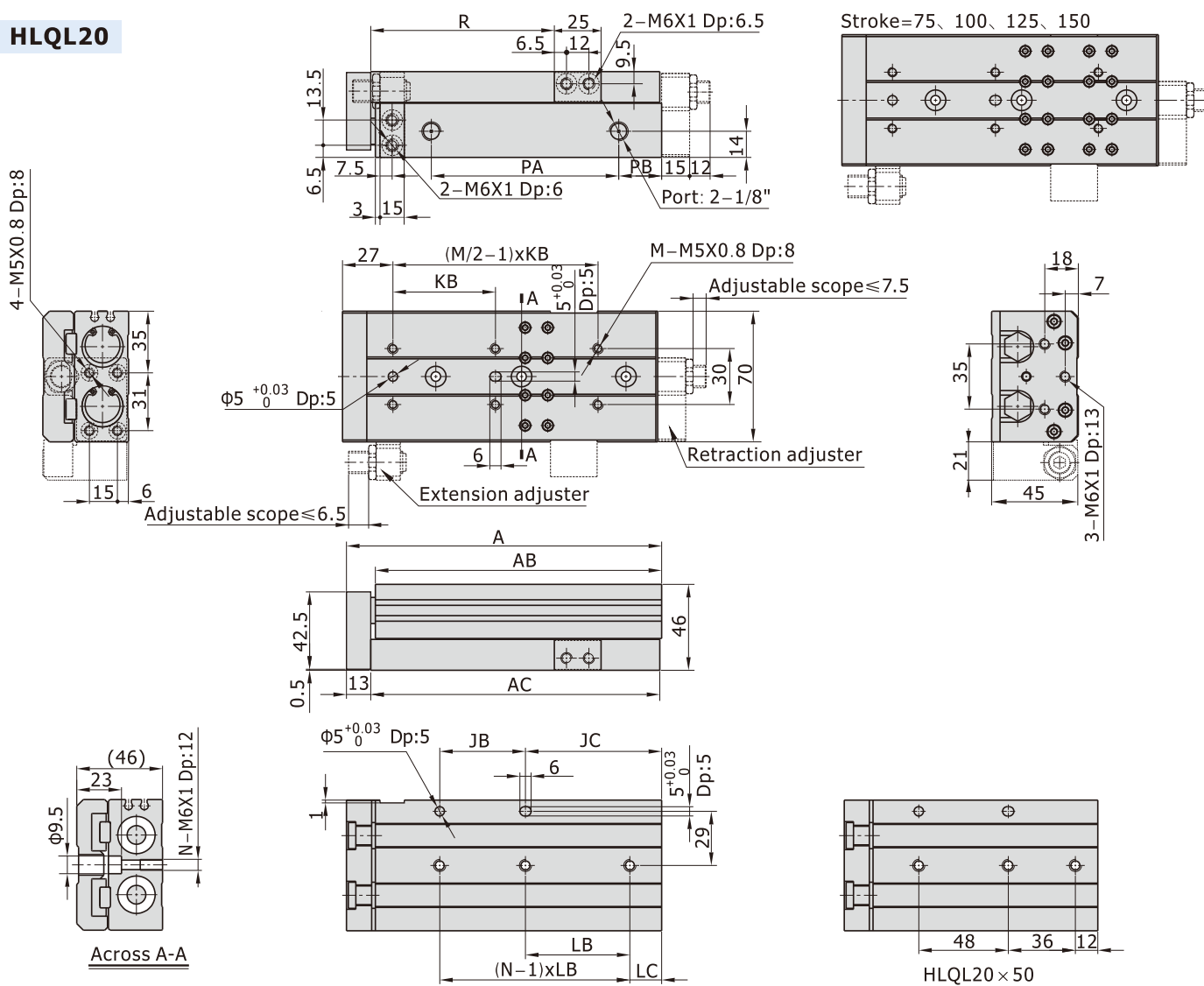
Compact slide cylinder

AirTAC

HLQ, HLQL Series

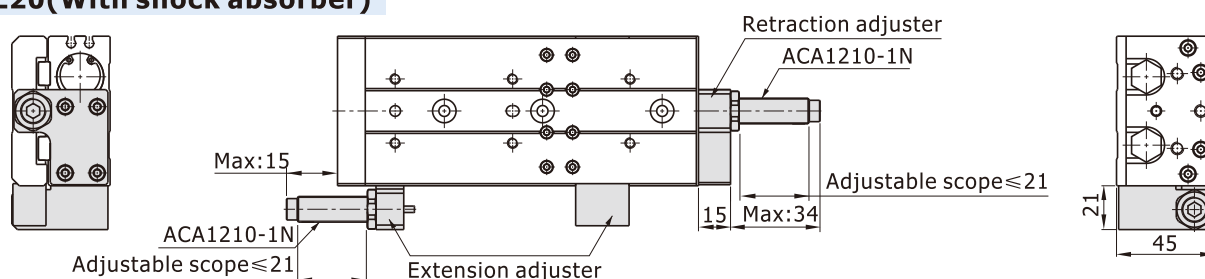
Recirculating linear ball bearing
Bore size: Φ6, Φ8, Φ12, Φ16, Φ20, Φ25

HLQL20



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	108	92.5	94	50	18	45	46	22	4	2	46.5	16	32.5
20	108	92.5	94	50	18	40	46	22	4	2	46.5	16	42.5
30	108	92.5	94	50	18	48	46	22	4	2	46.5	16	52.5
40	118	102.5	104	56	22	58	56	22	4	2	56.5	16	62.5
50	136	120.5	122	48	48	42	-	-	6	3	72.5	18	72.5
75	169	153.5	155	56	73	55	56	17	6	3	98.5	25	97.5
100	226	210.5	212	112	74	50	56	18	8	4	155.5	25	122.5
125	254	238.5	240	118	96	55	59	37	8	4	183.5	25	147.5
150	282	266.5	268	124	118	62	62	56	8	4	211.5	25	172.5

HLQL20(With shock absorber)

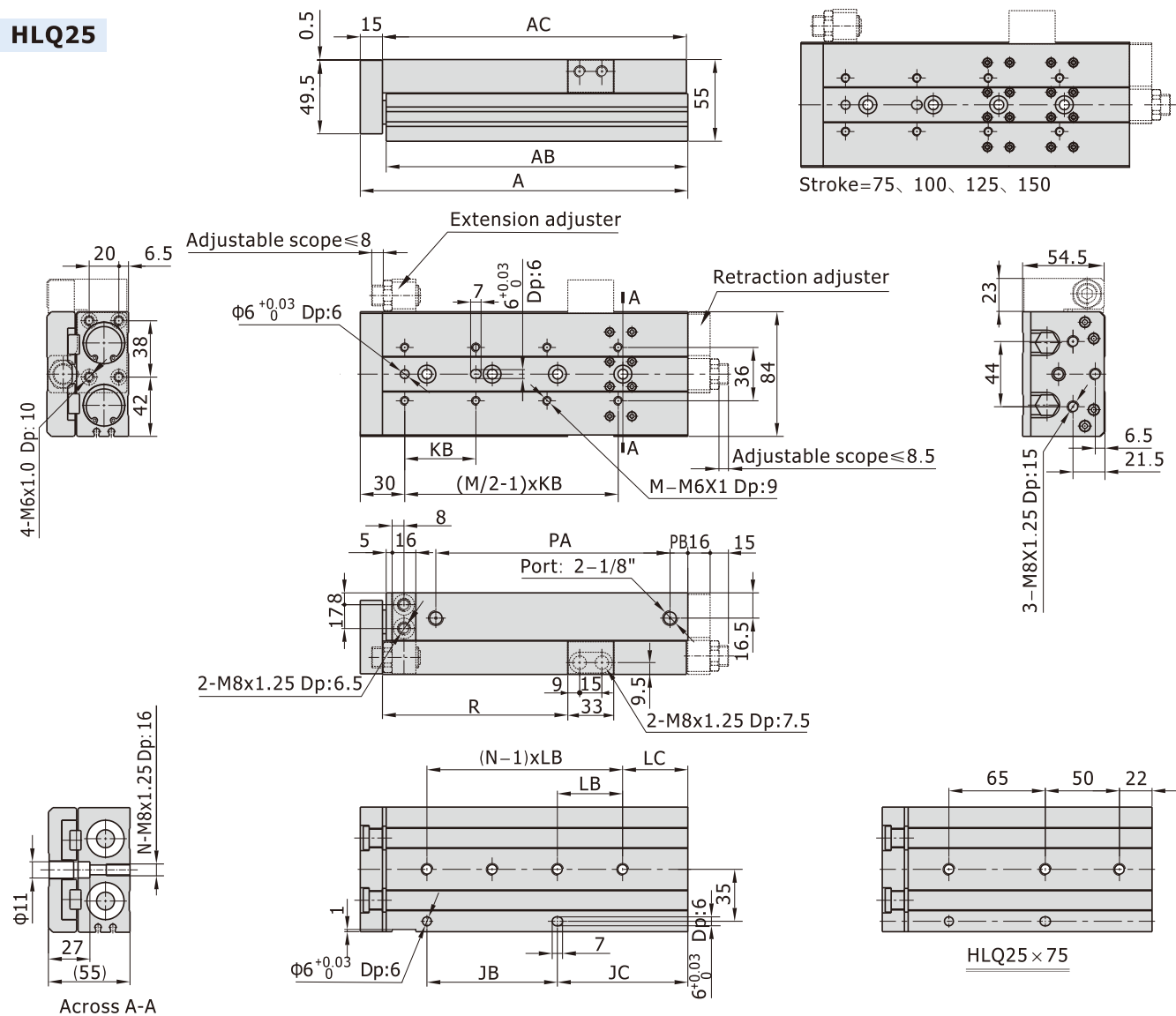


HLQ, HLQL Series

AirTAC

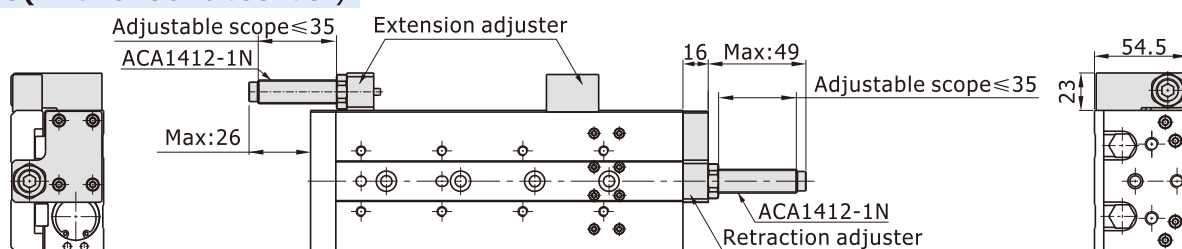
Recirculating linear ball bearing
Bore size: Φ6, Φ8, Φ12, Φ16, Φ20, Φ25

HLQ25



StrokeItem	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	123	105.5	107	55	23	55	55	23	4	2	58	12	35
20	123	105.5	107	55	23	46	55	23	4	2	58	12	45
30	123	105.5	107	55	23	55	55	23	4	2	58	12	55
40	133	115.5	117	65	23	65	65	23	4	2	68	12	65
50	157	139.5	141	80	32	75	80	32	4	2	92	14	75
75	182	164.5	166	65	72	60	–	–	6	3	117	12	100
100	221	203.5	205	88	88	48	44	44	8	4	156	12	125
125	274	256.5	258	132	97	60	66	31	8	4	209	12	150
150	299	281.5	283	132	122	65	66	56	8	4	234	12	175

HLQ25(With shock absorber)



HLQ, HLQL Series

Recirculating linear ball bearing
Bore size: Φ6, Φ8, Φ12, Φ16, Φ20, Φ25

4-M6x1.0 Dp: 10

42

38

20

6.5

55

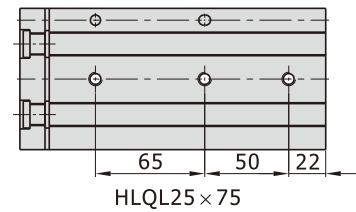
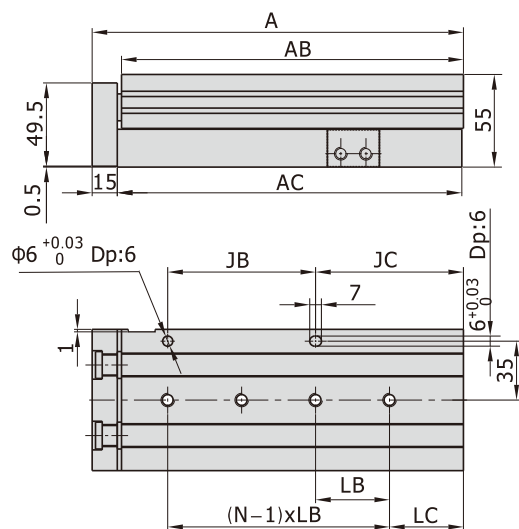
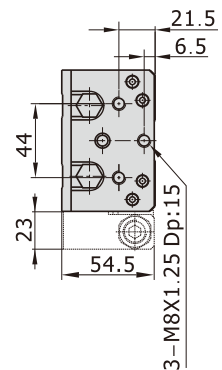
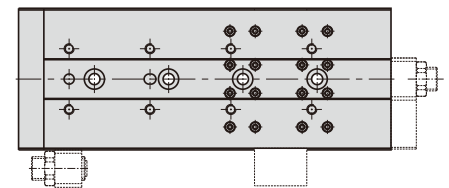
27

φ11

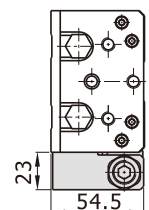
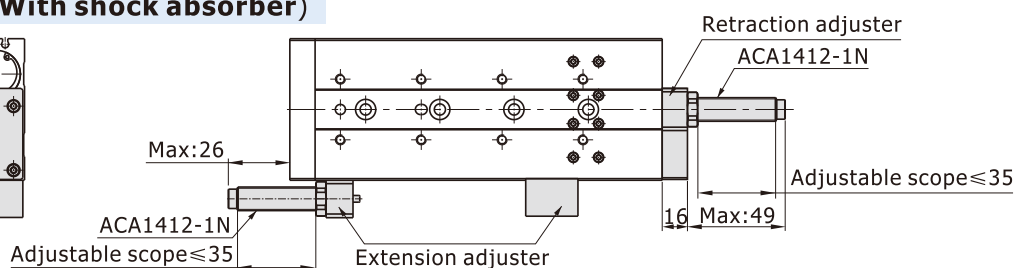
5

N-M8x1.25 Dp: 16

Across A-A



StrokeItem	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	123	105.5	107	55	23	55	55	23	4	2	58	12	35
20	123	105.5	107	55	23	46	55	23	4	2	58	12	45
30	123	105.5	107	55	23	55	55	23	4	2	58	12	55
40	133	115.5	117	65	23	65	65	23	4	2	68	12	65
50	157	139.5	141	80	32	75	80	32	4	2	92	14	75
75	182	164.5	166	65	72	60	–	–	6	3	117	12	100
100	221	203.5	205	88	88	48	44	44	8	4	156	12	125
125	274	256.5	258	132	97	60	66	31	8	4	209	12	150
150	299	281.5	283	132	122	65	66	56	8	4	234	12	175



Compact slide cylinder

HLQ, HLQL Series



Recirculating linear ball bearing Accessories

Accessory ordering code

F - HLQ 20 AS

1

2

3

4

① Accessory

② Cylinder model

HLQ: Compact slide cylinder (Double acting type)
(Recirculating linear ball bearing)

HLQL: Symmetrical Compact slide cylinder (Double acting type)
(Recirculating linear ball bearing)

③ Bore Size

6 8 12 16 20 25

□ Accessory type

A: Adjustable rubber stopper(Both ends)

AS: Adjustable rubber stopper(Extension)

AF: Adjustable rubber stopper(Retraction)

B: Shock absorber(Both ends)

BS: Shock absorber(Extension)

BF: Shock absorber(Retraction)

Accessory selection

	Accessories\Bore size		6	8	12
Standard (HLQ)	Both ends	A(Adjustable rubber stopper)	F-HLQ6A	F-HLQ8A	F-HLQ12A
		B(Shock absorber)	×	F-HLQ8B	F-HLQ12B
	Extension	AS(Adjustable rubber stopper)	F-HLQ6AS	F-HLQ8AS	F-HLQ12AS
		BS(Shock absorber)	×	F-HLQ8BS	F-HLQ12BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQ6AF	F-HLQ8AF	F-HLQ12AF
		BF(Shock absorber)	×	F-HLQ8BF	F-HLQ12BF
	Accessories\Bore size		16	20	25
Standard (HLQ)	Both ends	A(Adjustable rubber stopper)	F-HLQ16A	F-HLQ20A	F-HLQ25A
		B(Shock absorber)	F-HLQ16B	F-HLQ20B	F-HLQ25B
	Extension	AS(Adjustable rubber stopper)	F-HLQ16AS	F-HLQ20AS	F-HLQ25AS
		BS(Shock absorber)	F-HLQ16BS	F-HLQ20BS	F-HLQ25BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQ16AF	F-HLQ20AF	F-HLQ25AF
		BF(Shock absorber)	F-HLQ16BF	F-HLQ20BF	F-HLQ25BF
	Accessories\Bore size		6	8	12
Symmetrical (HLQL)	Both ends	A(Adjustable rubber stopper)	F-HLQL6A	F-HLQL8A	F-HLQL12A
		B(Shock absorber)	×	F-HLQL8B	F-HLQL12B
	Extension	AS(Adjustable rubber stopper)	F-HLQL6AS	F-HLQL8AS	F-HLQL12AS
		BS(Shock absorber)	×	F-HLQL8BS	F-HLQL12BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQL6AF	F-HLQL8AF	F-HLQL12AF
		BF(Shock absorber)	×	F-HLQL8BF	F-HLQL12BF
	Accessories\Bore size		16	20	25
Symmetrical (HLQL)	Both ends	A(Adjustable rubber stopper)	F-HLQL16A	F-HLQL20A	F-HLQL25A
		B(Shock absorber)	F-HLQL16B	F-HLQL20B	F-HLQL25B
	Extension	AS(Adjustable rubber stopper)	F-HLQL16AS	F-HLQL20AS	F-HLQL25AS
		BS(Shock absorber)	F-HLQL16BS	F-HLQL20BS	F-HLQL25BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQL16AF	F-HLQL20AF	F-HLQL25AF
		BF(Shock absorber)	F-HLQL16BF	F-HLQL20BF	F-HLQL25BF

Note): A=AS+AF; B=BS+BF.



Compact slide cylinder

AIRTAC

HLQ, HLQL Series

Recirculating linear ball bearing Accessories

Dimensions

AS: Adjustable rubber stopper(Extension)

Body Mounting

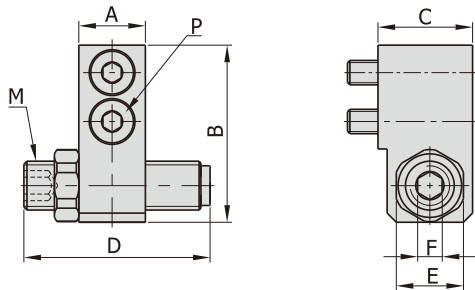
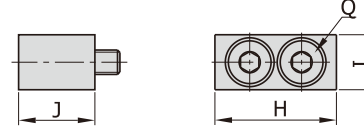


Table Mounting



Bore size\Item	Adjusting stroke range	A	B	C	D	E	F	M	P	H	I	J	Q
6	5	7	19	10.5	16.5	8	3	M6×1.0	M2.5Length:10	12.5	6.5	10.5	M2.5Length:10
8	5	8.5	22	14	21.5	11	4	M8×1.0	M3Length:14	14.5	8	12	M3Length:14
12	5	11	29	15.5	30.5	11	4	M8×1.0	M4Length:16	20	9	12.5	M4Length:12
16	5	12	36	17.5	24	14	5	M10×1.0	M5Length:16	23	10.5	17	M5Length:16
20	5	15	44.5	22	28	17	6	M12×1.0	M6Length:20	25	12.5	21	M6Length:20
25	5	16	54	24	32	19	6	M14×1.5	M8Length:20	33	16.5	23	M8Length:20

BS: Shock absorber(Extension)

Body Mounting

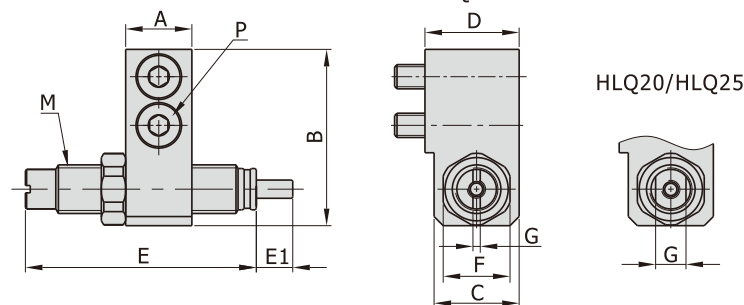
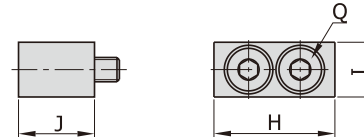
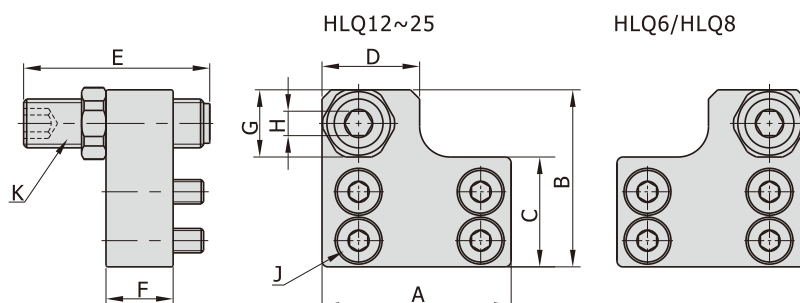


Table Mounting



Bore size\Item	A	B	C	D	E	E1	F	G	M	P	H	I	J	Q
8	8.5	22	12.5	14	38	6	11	1.2	M8×1.0	M3Length:14	14.5	8	12	M3Length:14
12	11	29	14	15.5	38	6	11	1.2	M8×1.0	M4Length:16	20	9	12.5	M4Length:12
16	12	36	16	17.5	48	7	14	1.2	M10×1.0	M5Length:16	23	10.5	17	M5Length:16
20	15	44.5	20	22	50	10	17	11	M12×1.0	M6Length:20	25	12.5	21	M6Length:20
25	16	54	22	24	66	12	19	12	M14×1.5	M8Length:20	33	16.5	23	M8Length:20

AF: Adjustable rubber stopper(Retraction, for standard)



Bore size\Item	Adjusting stroke range	A	B	C	D
6	5	18	19	11	8
8	5	24	22.2	13	14
12	5	31	29	18	16
16	5	37	36	21.5	18
20	5	45.5	44	25.5	23
25	5	54	53.6	31.6	28

Bore size\Item	E	F	G	H	J	K
6	21.5	7	8	3	M2.5Length:6	M6×1.0
8	21.5	8.5	8	3	M3Length:8	M6×1.0
12	30.5	11	11	4	M4Length:12	M8×1.0
16	24	12	14	5	M5Length:12	M10×1.0
20	28	15	17	6	M5Length:16	M12×1.0
25	32	16	19	6	M6Length:18	M14×1.5

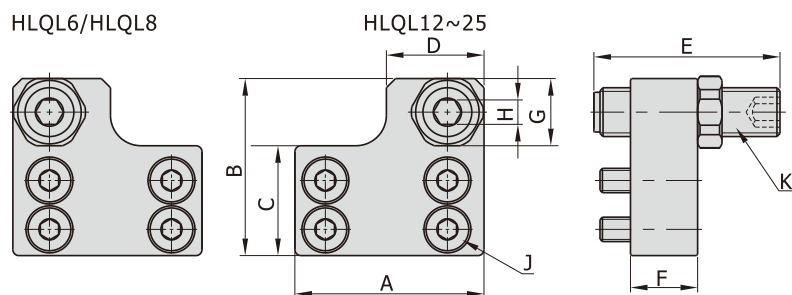


Compact slide cylinder

HLQ, HLQL Series

Recirculating linear ball bearing Accessories

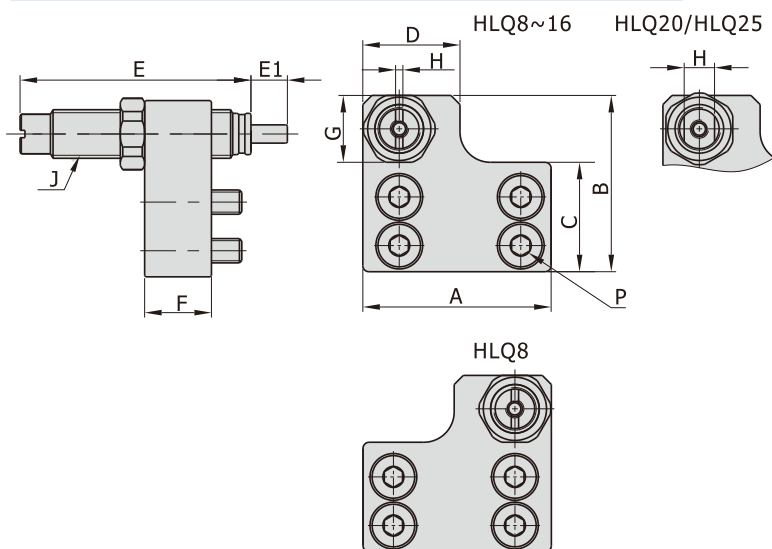
AF: Adjustable rubber stopper(Retraction, for symmetrical)



Bore size\Item	Adjusting stroke range	A	B	C	D
6	5	18	19	11	8
8	5	24	22.2	13	14
12	5	31	29	18	16
16	5	37	36	21.5	18
20	5	45.5	44	25.5	23
25	5	54	53.6	31.6	28

Bore size\Item	E	F	G	H	J	K
6	21.5	7	8	3	M2.5Length:6	M6×1.0
8	21.5	8.5	8	3	M3Length:8	M6×1.0
12	30.5	11	11	4	M4Length:12	M8×1.0
16	24	12	14	5	M5Length:12	M10×1.0
20	28	15	17	6	M5Length:16	M12×1.0
25	32	16	19	6	M6Length:18	M14×1.5

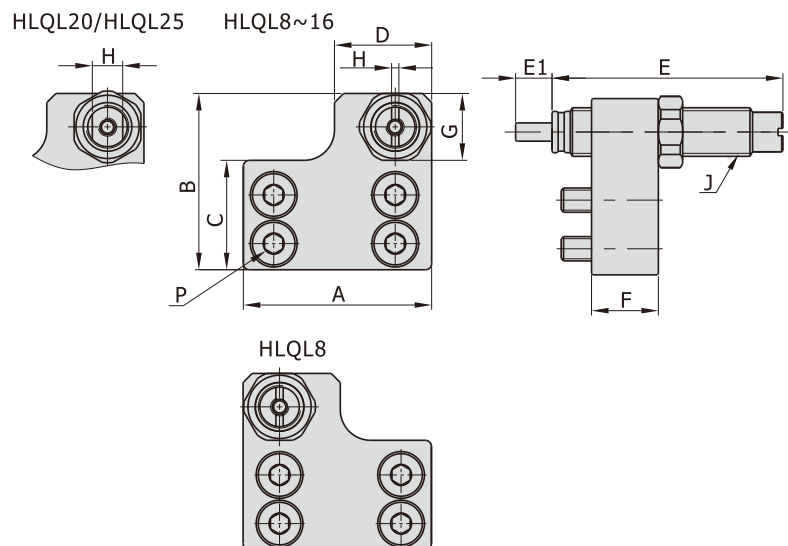
BF: Shock absorber(Retraction, for standard)



Bore size\Item	A	B	C	D	E	E1	F
8	24	23.5	13	14	38	6	8.5
12	31	29	18	16	38	6	11
16	37	36	21.5	18	48	7	12
20	45.5	44	25.5	23	50	10	15
25	54	53.6	31.6	28	66	12	16

Bore size\Item	G	H	J	P
8	11	1.2	M8×1.0	M3Length:8
12	11	1.2	M8×1.0	M4Length:12
16	14	1.2	M10×1.0	M5Length:12
20	17	11	M12×1.0	M5Length:16
25	19	12	M14×1.5	M6Length:18

BF: Shock absorber(Retraction, for symmetrical)



Bore size\Item	A	B	C	D	E	E1	F
8	24	23.5	13	14	38	6	8.5
12	31	29	18	16	38	6	11
16	37	36	21.5	18	48	7	12
20	45.5	44	25.5	23	50	10	15
25	54	53.6	31.6	28	66	12	16

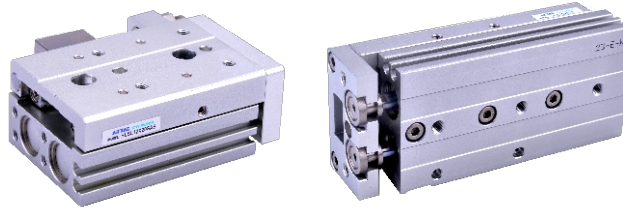
Bore size\Item	G	H	J	P
8	11	1.2	M8×1.0	M3Length:8
12	11	1.2	M8×1.0	M4Length:12
16	14	1.2	M10×1.0	M5Length:12
20	17	11	M12×1.0	M5Length:16
25	19	12	M14×1.5	M6Length:18



Compact slide cylinder—HLS Series

Roller bearing

Bore size: Φ6, Φ8, Φ12, Φ16, Φ20, Φ25



Ordering code

HLS 20 × 30 S A S T



① Model

HLS: Compact slide cylinder
(Double acting type)
(Roller bearing)

HLSL: Symmetrical Compact slide cylinder
(Double acting type)
(Roller bearing)

② Bore Size

6 8 12 16 20 25

④ Magnet

S: With magnet

⑥ Thread type [Note3]

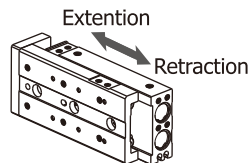
T: NPT

③ Stroke [Note1]

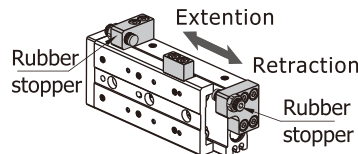
Bore size (mm)	Standard stroke (mm)	Max.std stroke
6	10 20 30 40 50	50
8	10 20 30 40 50 75	75
12	10 20 30 40 50 75 100	100
16	10 20 30 40 50 75 100 125	125
20	10 20 30 40 50 75 100 125 150	150
25	10 20 30 40 50 75 100 125 150	150

⑤ Adjuster option [Note2]

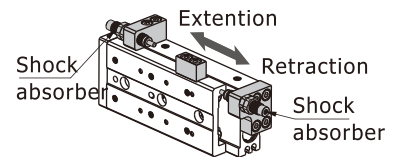
Blank: Without adjuster(Basic type)



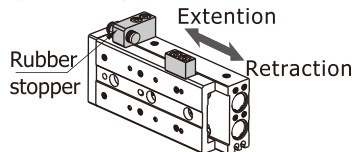
A: Adjustable rubber stopper
(Both ends)



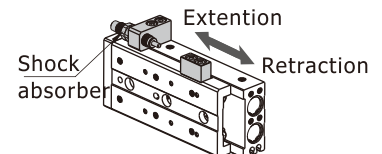
B: Shock absorber(Both ends)



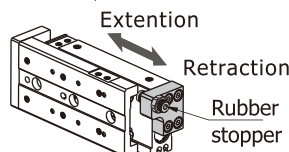
AS: Adjustable rubber stopper
(Extension)



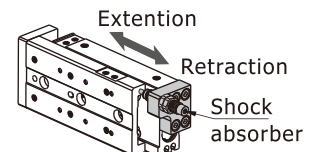
BS: Shock absorber(Extension)



AF: Adjustable rubber stopper
(Retraction)



BF: Shock absorber(Retraction)



[Note1] Consult us for non-standard stroke.

[Note2] B type, BS type, BF type are
unavailable for bore size of Φ6.

[Note3] When the thread is standard,
the code is blank.



Compact slide cylinder

HLS, HLSL Series

Roller bearing

Bore size: Φ6, Φ8, Φ12, Φ16, Φ20, Φ25

Specification

Bore size(mm)	6	8	12	16	20	25
Acting type	Double acting					
Fluid	Air(to be filtered by 40μm filter element)					
Operating pressure	22~100psi(0.15~0.7MPa)					
Proof pressure	175psi(1.2MPa)					
Temperature	-20~70℃					
Speed range mm/s	50~500					
Stroke tolerance	Stroke≤100 ^{+1.0} ₀ Stroke>100 ^{+1.5} ₀					
Cushion type	Bumper(Both ends)、Shock absorber					
Sensor switches	DS1-H□N、DS1-H□P					
Port size [Note1]	M5×0.8				1/8	

[Note1] NPT thread is available.

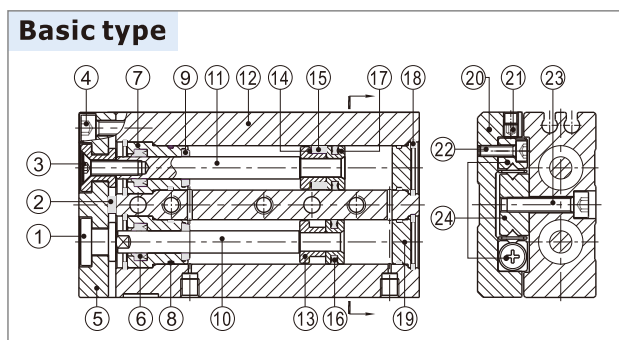
Criteria for selection: Cylinder thrust

Unit: Newton(N)

Bore size	Rod size	Acting type		Pressure area(mm ²)	Operating pressure(psi)					
					30	45	60	75	90	105
6	3	Double acting	Push-side	42	8	13	17	21	25	29
			Pull-side	57	11	17	23	29	34	40
8	4	Double acting	Push-side	75	15	23	30	38	45	53
			Pull-side	101	20	30	40	51	61	71
12	6	Double acting	Push-side	170	34	51	68	85	102	119
			Pull-side	226	45	68	90	113	136	158
16	8	Double acting	Push-side	302	60	91	121	151	181	211
			Pull-side	402	80	121	161	201	241	281
20	10	Double acting	Push-side	471	94	141	188	236	283	330
			Pull-side	628	126	188	251	314	377	440
25	12	Double acting	Push-side	756	151	227	302	378	454	529
			Pull-side	982	186	295	393	491	589	687

Inner structure and material of major parts

Basic type



NO.	Item	Material
7	Front cover	Aluminum alloy
8	O-ring	NBR
9	Bumper	TPU
10	Piston rod A	Carbon steel
11	Piston rod B	Stainless steel
12	Body	Aluminum alloy
13	Magnet holder	Brass
14	Magnet washer	NBR
15	Magnet	Sintered metal (Neodymium-iron-boron)
16	Piston seal	NBR
17	Piston	Brass
18	C clip	Spring steel
19	Back cover	Aluminum alloy
20	Slide table	Aluminum alloy
21	Nut	Carbon steel
22	Screw	Carbon steel
23	Screw	Carbon steel
24	Slide guidecombination	subassembly

NO.	Item	Material
1	Floating joint	Carbon steel
2	Bumper	TPU
3	Screw	Carbon steel
4	Screw	Carbon steel
5	Fixing plate	Aluminum alloy
6	Rod seal	NBR
7	Front cover	Aluminum alloy

Model Selection Method

Please select compact cylinder's type according to following procedure, and cross reference with data sheets.

A) Operating conditions(According to mounting position and work form)

1. Model used(Bore size, Stroke)
2. Type of cushion(Bumper, Shock absorber)
3. Mounting position of work(Top, front)
4. Mounting direction(Axial, Vertical)
5. Average speed V_a (mm/s)
6. Applied load W (N)
7. Overhang L_1, L_2, L_3 (mm)

Fig. 1

Explain: L_1 is the distance of load's center beyond the end plank's plane.
If load's center is not beyond the end plank's plane, L_1 is negative.

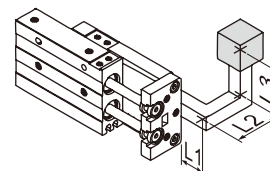
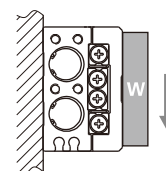
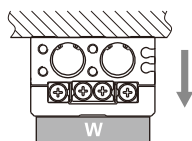
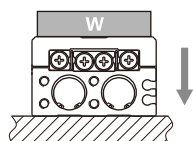


Fig. 1: Applied load



B) Kinetic energy check

1. Calculate kinetic energy of load E (J)
$$E = \frac{1}{2} \times \frac{W}{g} \times \left(\frac{1.4 \times V_a}{1000} \right)^2$$
2. Calculate allowable kinetic energy E_a (J)
 $E_a = K \times E_{max}$
 K : Mounting work coefficient (**Fig 2**)
 E_{max} : Maximum allowable kinetic energy (**Table 1**)
3. Check that kinetic energy of load doesn't exceed allowable kinetic energy: $E \leq E_a$

C) Load check

1. Calculate allowable applied load W_a (N)
 $W_a = K \times \beta \times W_{max}$
 K : Mounting work coefficient (**Fig 2**)
 W_{max} : Maximum allowable applied load (**Table 1**)
 β : Applied load coefficient (**Fig 3**)
2. Check that load(W) doesn't exceed allowable applied load(W_a): $W \leq W_a$

Fig 2: Mounting work coefficient (K)

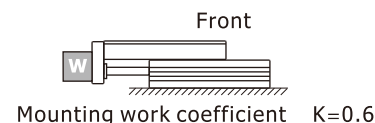
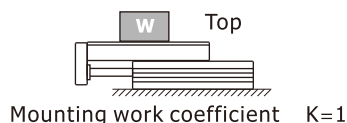
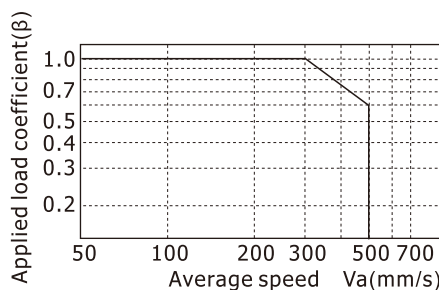


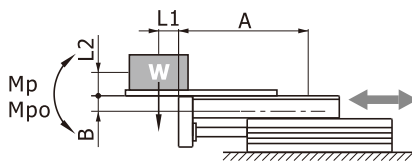
Fig 3: Applied load coefficient (β)



D) Moment check

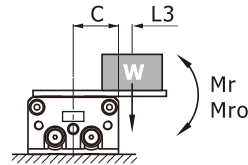
Horizontal

1. Calculate actual moment: M_p , M_{po} , M_y , M_{yo} , M_r , M_{ro} (Nm)



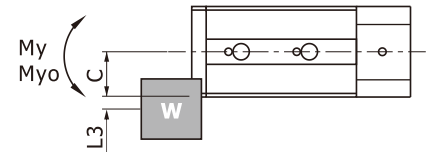
Dynamic moment:
 $M_p = W \times (L_1 + A) / 1000$

Static moment:
 $M_{po} = \frac{W \times (L_1 + A)}{1000} + \frac{W \times a \times (L_2 + B)}{1000 \times g}$



Dynamic moment:
 $M_r = W \times (C + L_3) / 1000$

Static moment:
 $M_{ro} = (W \times a \times (C + L_3)) / 1000g$



Dynamic moment:
 $M_y = 0$

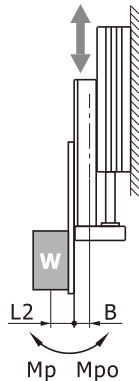
Static moment:
 $M_{yo} = (W \times a \times (C + L_3)) / 1000g$

2. Check

Dynamic moment:	Static moment:
$\frac{M_p}{M_{p_{max}}} + \frac{M_y}{M_{y_{max}}} + \frac{M_r}{M_{r_{max}}} \leq 1$	$\frac{M_{po}}{M_{po_{max}}} + \frac{M_{yo}}{M_{yo_{max}}} + \frac{M_{ro}}{M_{ro_{max}}} \leq 1$

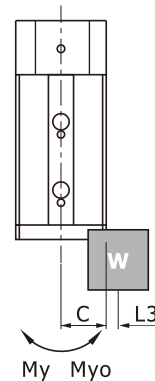
Vertical

1. Calculate actual moment: M_p , M_{po} , M_y , M_{yo} (Nm)



Dynamic moment:
 $M_p = W \times (L_2 + B) / 1000$

Static moment:
 $M_{po} = \frac{W \times (L_2 + B)}{1000} + \frac{W \times a \times (L_2 + B)}{1000 \times g}$



Dynamic moment:
 $M_y = W \times (C + L_3) / 1000$

Static moment:
 $M_{yo} = \frac{W \times a \times (C + L_3)}{1000g} + \frac{W \times (C + L_3)}{1000}$

2. Check

Dynamic moment:	Static moment:
$\frac{M_p}{M_{p_{max}}} + \frac{M_y}{M_{y_{max}}} \leq 1$	$\frac{M_{po}}{M_{po_{max}}} + \frac{M_{yo}}{M_{yo_{max}}} \leq 1$

Explain:

$L_1/L_2/L_3$: The distance of load center to mount plane (Determined by actuality).

$A/B/C$: Correction value for center position distance of moment (Refer to table 2).

$M_{p_{max}}/M_{y_{max}}/M_{r_{max}}/M_{po_{max}}/M_{yo_{max}}/M_{ro_{max}}$: Maximum allowable moment (Refer to table 2).

g : Acceleration of gravity ($g = 9.81 \text{ m/s}^2$).

a : Acceleration of inertia (Bumper: $a = 1600 \times (V_a/1000)^2$, Shock absorber: $a = 400 \times (V_a/1000)^2$)

W : Load weight (Determined by actuality).

Table 1 Maximum allowable kinetic energy (E_{max}) / Maximum allowable applied load (W_{max})

Model	Max. allowable kinetic energy $E_{max}(\text{J})$			Max. allowable applied load $W_{max}(\text{N})$
	Basic type	Rubber stopper type	Shock absorber type	
HLS6	0.01	0.01	—	4
HLS8	0.024	0.024	0.048	8
HLS12	0.05	0.05	0.1	15
HLS16	0.1	0.1	0.2	30
HLS20	0.13	0.13	0.26	40
HLS25	0.22	0.22	0.44	70

Table 2 Maximum allowable moment(Nm),
Correction value for center position
distance of moment(mm)

Bore size	Stroke	Static moment			Dynamic moment			Correction value		
		Mpo _{max}	Myo _{max}	Mro _{max}	Mp _{max}	My _{max}	Mr _{max}	A	B	C
6	10	3.3	3.8	2.6	0.7	0.7	0.6	27	7.3	16
	20	3.3	3.8	2.6	0.7	0.8	0.6	42		
	30	3.3	3.8	2.6	0.7	0.8	0.6	52		
	40	7.2	7.9	3.6	1.3	1.3	0.6	72		
	50	12.4	12.7	4.7	1.8	1.8	0.6	87		
8	10	10.1	9.1	8.8	2.5	2.5	2.0	32	8.5	20
	20	10.1	9.1	8.8	2.6	2.6	2.0	42		
	30	10.1	9.1	8.8	2.8	2.8	2.0	57		
	40	12.4	10.8	10.1	3.4	3.4	2.3	72		
	50	23.6	24.8	13.9	4.4	4.4	2.1	92		
	75	32.8	35.3	16.4	4.6	4.6	1.8	132		
12	10	33.0	34.3	30.9	7.3	7.3	5.8	48	10	25
	20	33.0	34.3	30.9	7.6	7.6	5.8	58		
	30	33.0	34.3	30.9	7.8	7.8	5.8	68		
	40	33.0	34.3	30.9	8.0	8.0	5.8	78		
	50	53.4	49.6	39.7	9.8	9.8	5.8	88		
	75	78.8	71.9	48.6	14.2	14.2	6.8	125		
	100	78.8	71.9	48.6	14.7	14.7	6.8	160		
16	10	33.0	34.3	30.9	8.8	8.8	7.6	43	11	30
	20	33.0	34.3	30.9	9.2	9.2	7.6	53		
	30	33.0	34.3	30.9	9.5	9.5	7.6	63		
	40	33.0	34.3	30.9	10.0	10.0	7.6	78		
	50	53.4	49.6	39.7	12.2	12.2	7.6	93		
	75	78.8	71.9	48.6	17.6	17.6	8.9	130		
	100	78.8	71.9	48.6	18.2	18.2	8.9	165		
	125	143.7	144.5	53.3	24.8	24.8	7.8	204		
20	10	60.1	50.5	72.8	14.5	14.5	15.2	47	16.5	35
	20	60.1	50.5	72.8	15.2	15.2	15.2	57		
	30	60.1	50.5	72.8	15.7	15.7	15.2	67		
	40	60.1	50.5	72.8	16.3	16.3	15.2	82		
	50	60.1	50.5	72.8	16.6	16.6	15.2	92		
	75	169.3	154.3	114.4	41.2	41.2	22.0	136		
	100	169.3	154.3	114.4	42.8	42.8	22.0	176		
	125	169.3	154.3	114.4	43.6	43.6	22.0	205		
	150	267.5	286.6	145.6	49.0	49.0	20.5	249		
25	10	60.1	50.5	72.8	16.3	16.3	17.6	52	20.3	42
	20	60.1	50.5	72.8	17.0	17.0	17.6	62		
	30	60.1	50.5	72.8	17.4	17.4	17.6	72		
	40	60.1	50.5	72.8	17.8	17.8	17.6	82		
	50	60.1	50.5	72.8	18.2	18.2	17.6	96		
	75	169.3	154.3	114.4	45.2	45.2	25.3	141		
	100	169.3	154.3	114.4	46.2	46.2	25.3	165		
	125	169.3	154.3	114.4	48.0	48.0	25.3	210		
	150	267.5	286.6	145.6	65.0	65.0	28.3	254		

Note Symbol and unit

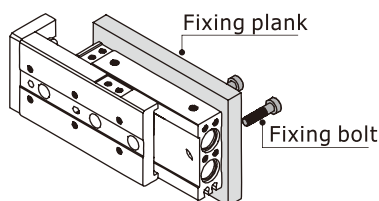
Symbol	Item	Unit
A B C	Correction value for center position distance of moment	mm
a	Acceleration of inertia	—
E	Kinetic energy	J
Ea	Allowable kinetic energy	J
E _{max}	Maximum allowable kinetic energy	J
g	Acceleration of gravity g=9.81	m/s ²
K	Mounting work coefficient	—
L1 L2 L3	Overhang	mm
Mp My Mr	Dynamic moment(Pitch,Yaw,Roll)	Nm
Mp _{max} My _{max} Mr _{max}	Maximum allowable dynamic moment (Pitch,Yaw,Roll)	Nm
Mpo Myo Mro	Static moment(Pitch,Yaw,Roll)	Nm
Mpo _{max} Myo _{max} Mro _{max}	Maximum allowable static moment (Pitch,Yaw,Roll)	Nm
Va	Average speed	mm/s
W	Applied load	N
W _{max}	Maximum allowable applied load	N
β	Applied load coefficient	-

Installation and application

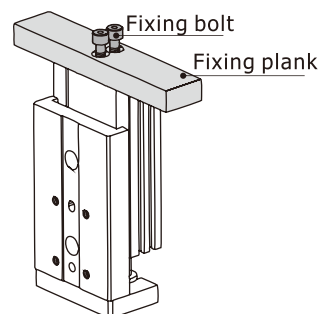
1. How to mount cylinder:

1.1) Cylinder can to be mounted from 3 directions

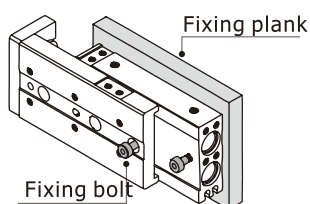
Vertical Mounting(Body thread holes)



Axial Mounting(Body thread holes)

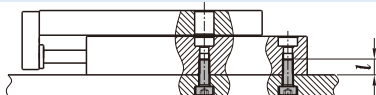


Vertical Mounting(Body through holes)



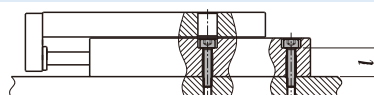
1.2) When mounting an compact slide cylinder, screws of appropriate length should be used and tightened properly within the maximum tightening torque. If screws are tightened beyond designed limits, malfunction may occur. If they are tightened insufficiently, it may result in sliding or falling off from its position.

Vertical Mounting(Body thread holes)



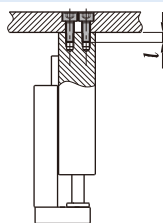
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLS6	M4×0.7	2.1	8
HLS8	M4×0.7	2.1	8
HLS12	M5×0.8	4.4	10
HLS16	M6×1.0	4.4	10
HLS20	M6×1.0	7.4	12
HLS25	M8×1.25	18.0	16

Vertical Mounting(Body through holes)



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLS6	M3×0.5	1.2	11.0
HLS8	M3×0.5	1.2	12.5
HLS12	M4×0.7	2.8	18.0
HLS16	M5×0.8	5.7	25.0
HLS20	M5×0.8	5.7	28.0
HLS25	M6×1.0	10.0	36.2

Axial Mounting(Body thread holes)

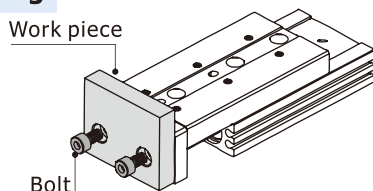


Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLS6	M2.5×0.45	0.5	3.5
HLS8	M3×0.5	0.9	4.0
HLS12	M4×0.7	2.1	6.0
HLS16	M5×0.8	4.4	7.0
HLS20	M5×0.8	4.4	8.0
HLS25	M6×1.0	7.4	10.0

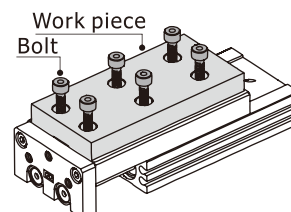
2. Work Piece Mounting:

2.1) Work pieces can be mounted on 2 surfaces of the compact slide.

Front Mounting



Top Mounting



Compact slide cylinder

AIRTAC

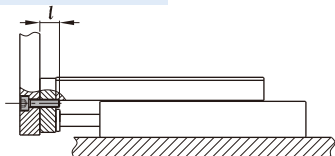
HLS, HLSL Series

Roller bearing

Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

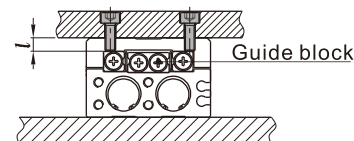
- 2.2) When mounting a work piece, tighten the bolts properly at a torque value within the limiting range. Use bolts at least 0.5mm shorter than maximum thread depth to prevent bolts from contacting the guide block. If the bolts are too long, they hit the guide block and cause damage.

Front Mounting



Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLS6	M3×0.4	0.9	5
HLS8	M4×0.7	2.1	6
HLS12	M5×0.8	4.4	8
HLS16	M6×1.0	7.4	10
HLS20	M6×1.0	7.4	13
HLS25	M8×1.25	18.0	15

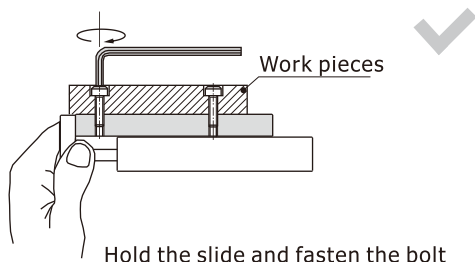
Top Mounting



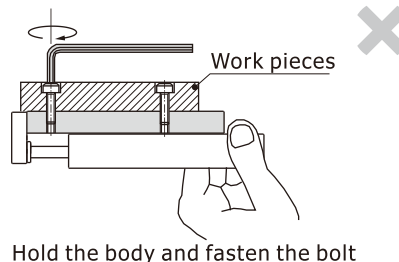
Model	Bolt used	Max. tightening torque (Nm)	Max. screw-in depth(mm)
HLS6	M3×0.5	0.9	4.0
HLS8	M3×0.5	0.9	5.0
HLS12	M4×0.7	2.1	5.5
HLS16	M5×0.8	4.4	6.0
HLS20	M5×0.8	4.4	10.0
HLS25	M6×1.0	7.4	13.0

- 2.3) Since the table is supported by the linear guide, take care not to apply strong impact or large moment to the guide section.

- 2.4) Hold the slide when fastening work pieces to it with bolts, If the body is held while tightening bolts, excessive moment may damage guide section.



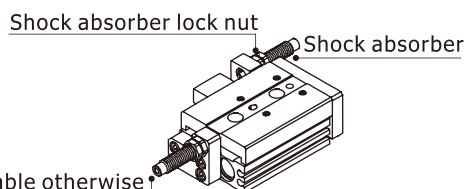
Hold the slide and fasten the bolt



Hold the body and fasten the bolt

3. About shock absorber:

- 3.1) Shock absorbers are expendable. Promptly replace them when energy absorbing capacity decreases.
3.2) Never turn or adjust the screws on bottom of the shock absorber body. The screws are not for adjusting. Otherwise would cause oil leakage.
3.3) Follow the table for tightening torque of shock absorber to lock nuts.



The screws are not adjustable otherwise would cause oil leakage.

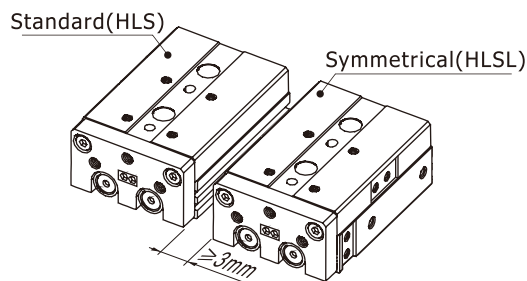
Model	Shock absorber	Tightening torque
HLS6	Without shock absorber	
HLS8	ACA0806-1N	1.67(Nm)
HLS12	ACA0806-1N	1.67(Nm)
HLS16	ACA1007-1N	3.14(Nm)
HLS20	ACA1210-1N	3.14(Nm)
HLS25	ACA1412-1N	10.8(Nm)

4. How to mount sensor switch:

- 4.1) HLS Series are all with magnet. The matching sensor switches are DS1-H, DS1-HL series.
4.2) Maintain a minimum spacing of at least 3mm if two compact cylinders are used side by side in order to avoid malfunction.

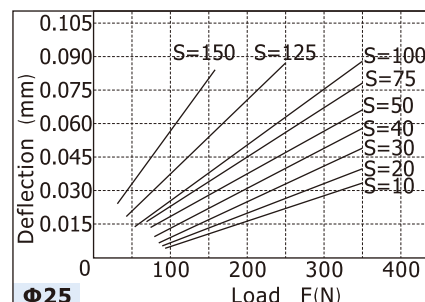
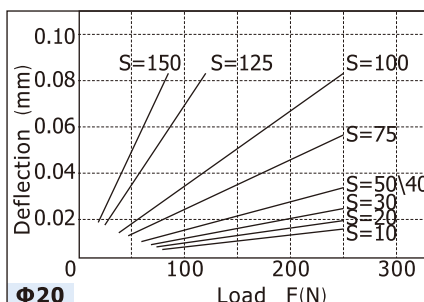
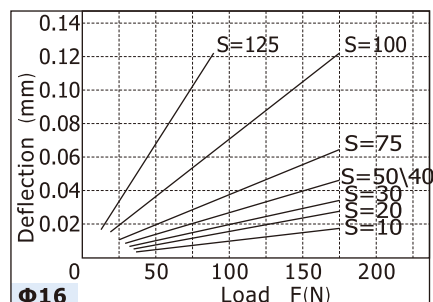
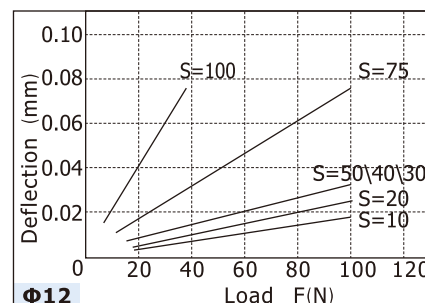
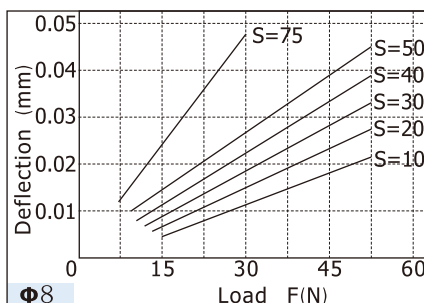
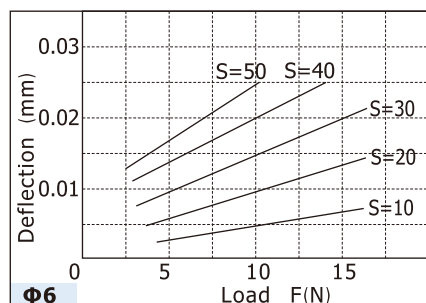
5. Make sure to connect the compact cylinder to speed controller at the meter-out side, and the speed of compact cylinder must below 500mm/s.

6. Don't apply a load beyond the range of the operation limits. Different load or torque will cause different deflection to table, please see below for details.



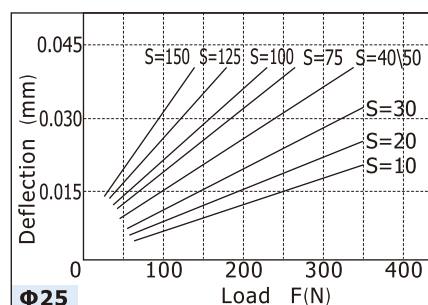
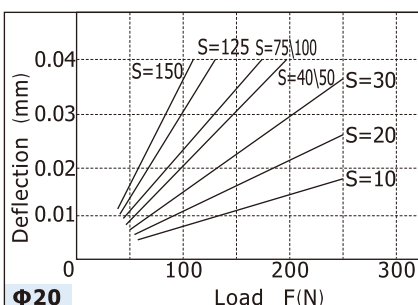
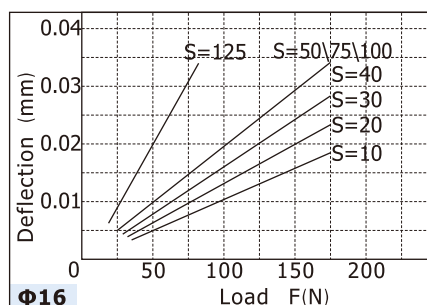
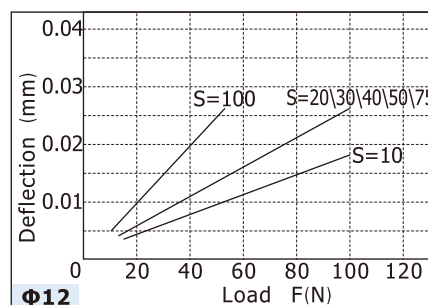
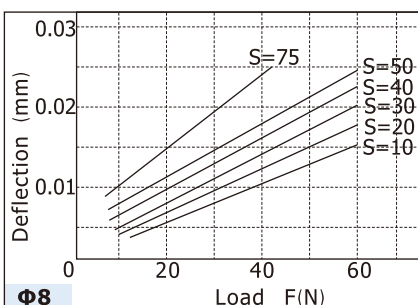
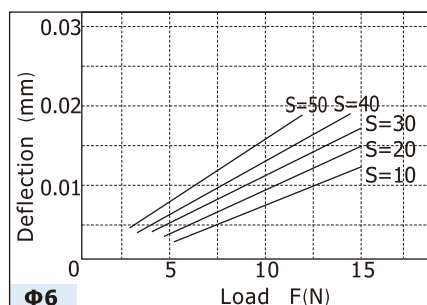
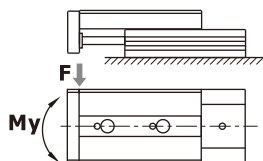
6.1) Table deflection due to pitch moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



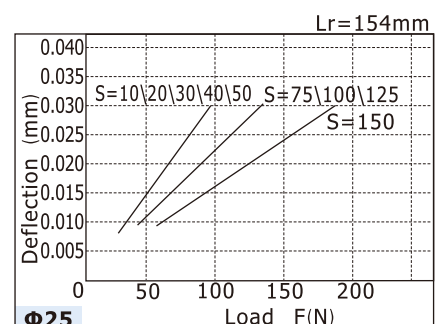
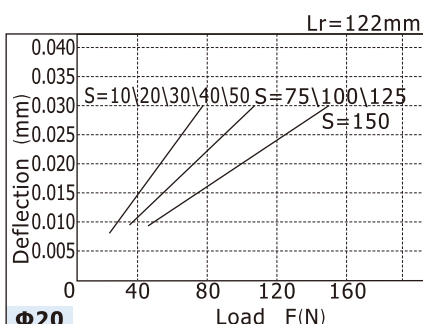
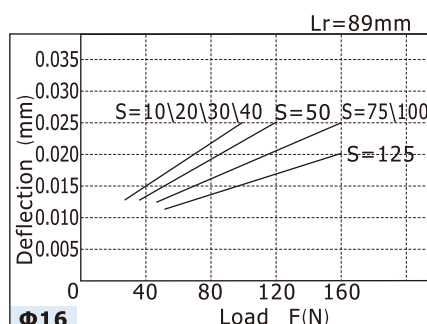
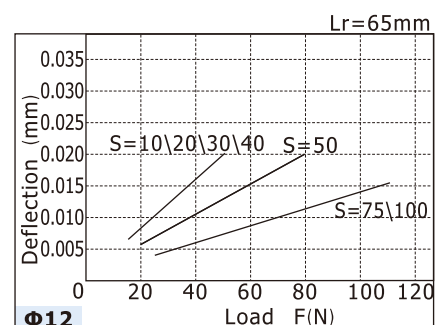
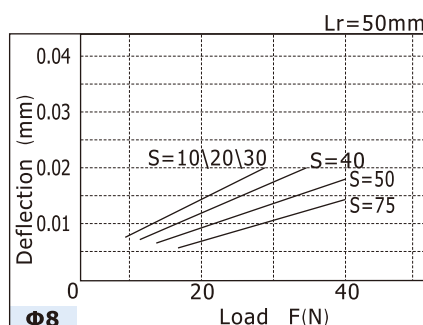
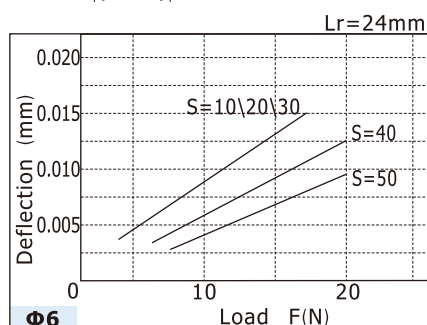
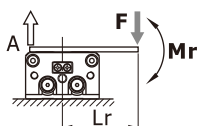
6.2) Table deflection due to yaw moment:

Table deflection (arrow) when a load acts upon the section marked with the arrow at the full stroke of the compact slide.



6.3) Table deflection due to roll moment:

Table deflects (A) when a load acts upon section F at the full stroke of the compact slide.



HLS, HLSL Series

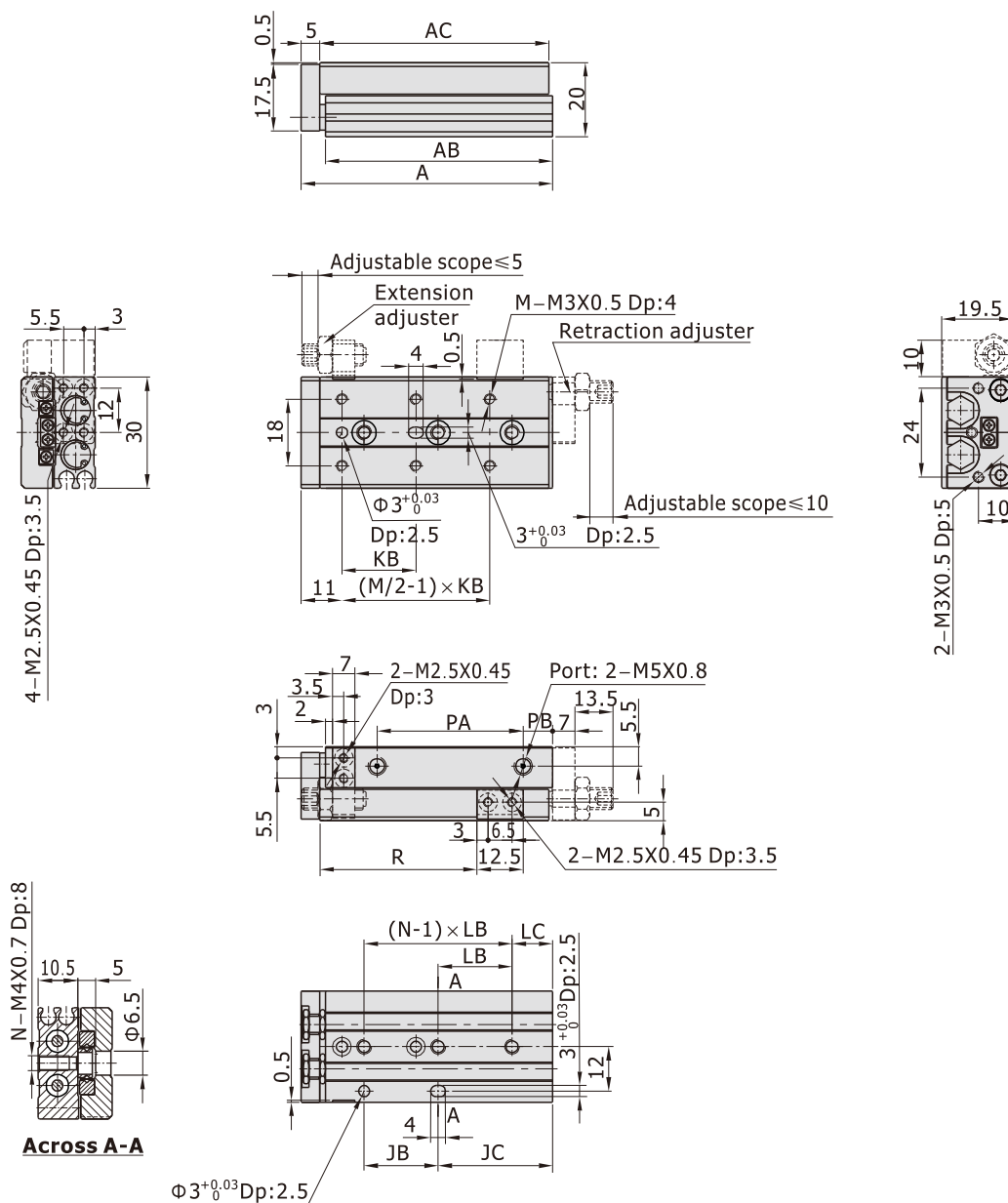
AirTAC

Roller bearing

Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

Dimensions

HLS6



Stroke/Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	48	41.5	42	20	11	20	25	6	4	2	19	8	21.5
20	58	51.5	52	20	21	30	35	6	4	2	28	9	31.5
30	68	61.5	62	20	31	20	20	11	6	3	39	8	41.5
40	90	83.5	84	30	43	28	30	13	6	3	51	18	51.5
50	106	99.5	100	48	41	38	24	17	6	4	61	24	61.5

Compact slide cylinder

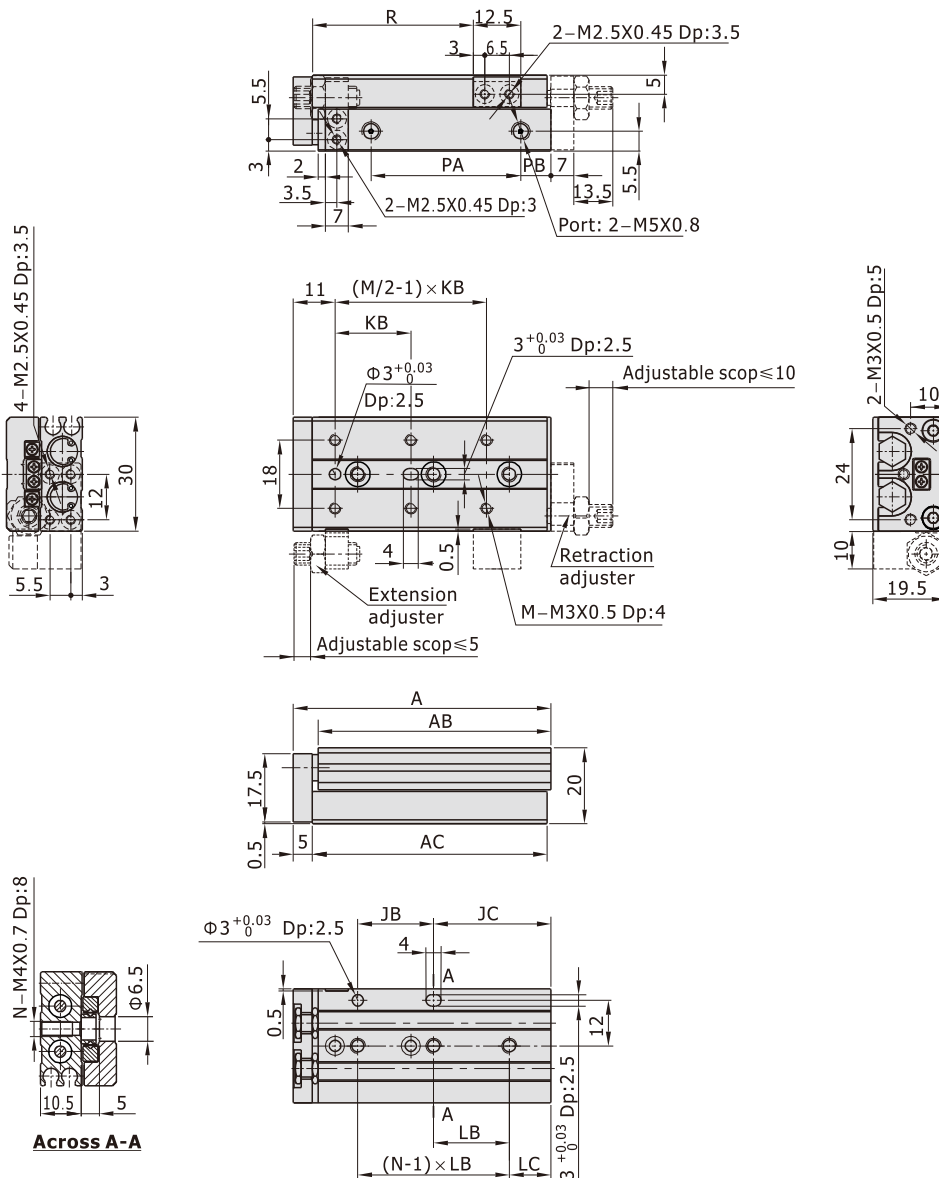
AIRTAC

HLS, HLSL Series

Roller bearing

Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLSL6



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	48	41.5	42	20	11	20	25	6	4	2	19	8	21.5
20	58	51.5	52	20	21	30	35	6	4	2	28	9	31.5
30	68	61.5	62	20	31	20	20	11	6	3	39	8	41.5
40	90	83.5	84	30	43	28	30	13	6	3	51	18	51.5
50	106	99.5	100	48	41	38	24	17	6	4	61	24	61.5



Compact slide cylinder

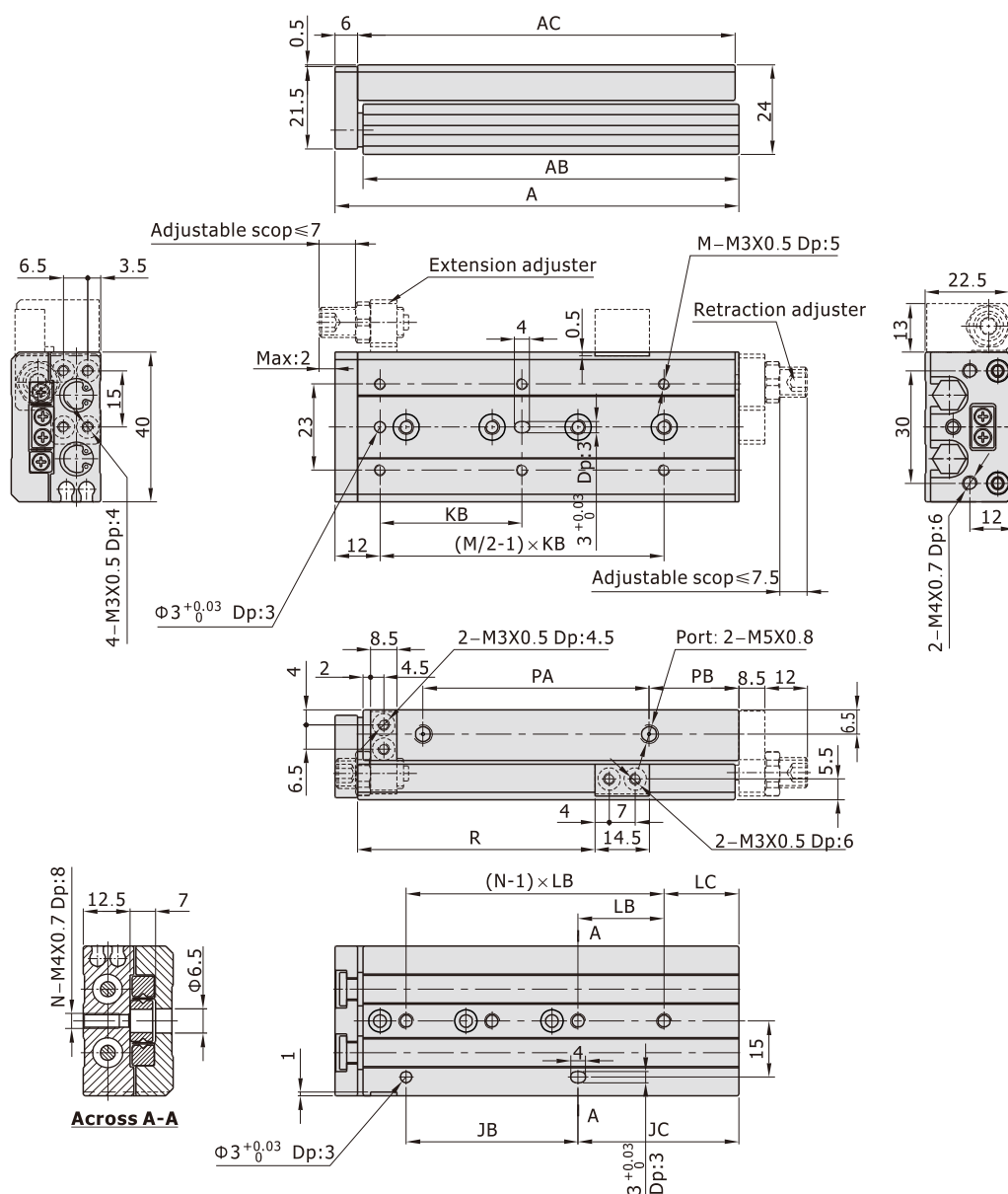
AirTAC

HLS, HLSL Series

Roller bearing

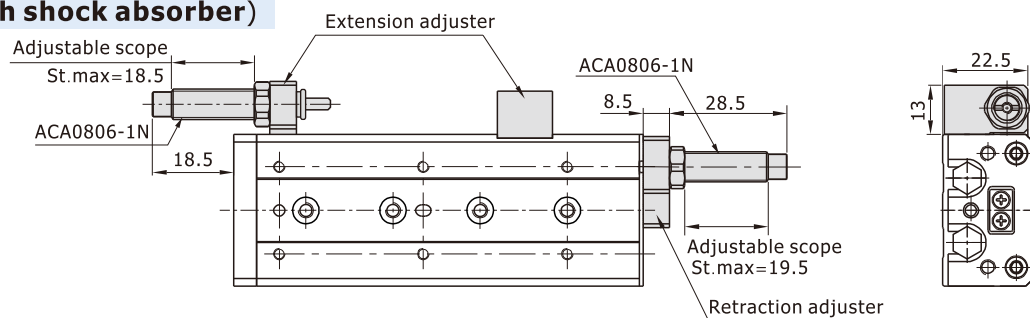
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLS8



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	56	48.5	49	20	17	25	28	9	4	2	20	12	23.5
20	61	53.5	54	30	12	25	30	12	4	2	30	7	33.5
30	72	64.5	65	20	33	40	20	13	4	3	41	7	43.5
40	90	82.5	83	28	43	50	28	15	4	3	56	10	53.5
50	108	100.5	101	46	43	38	23	20	6	4	61	23	63.5
75	158	150.5	151	56	83	50	28	27	6	5	94	40	88.5

HLS8(With shock absorber)



Compact slide cylinder

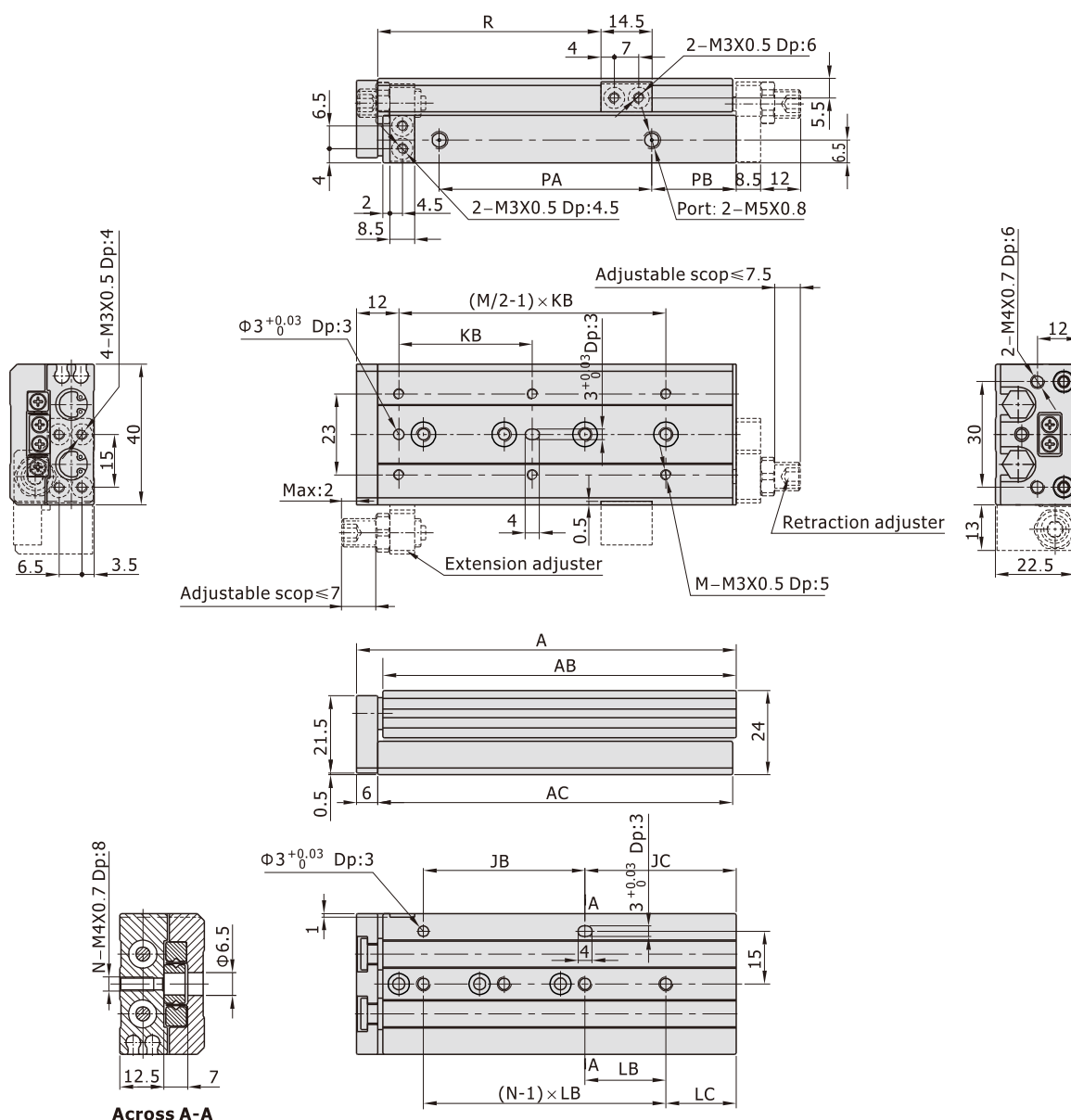
AIRTAC

HLS, HLSL Series

Roller bearing

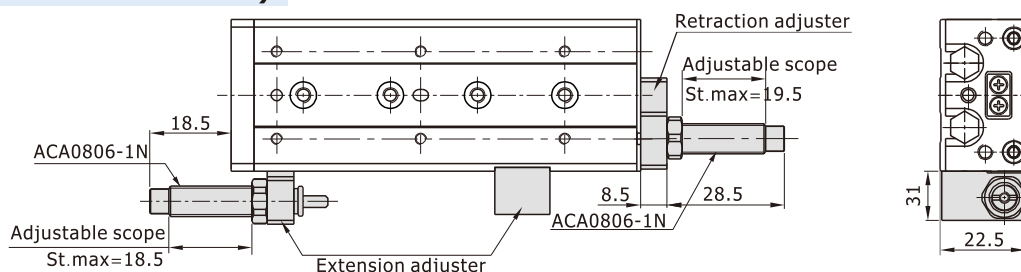
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLSL8



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	56	48.5	49	20	17	25	28	9	4	2	20	12	23.5
20	61	53.5	54	30	12	25	30	12	4	2	30	7	33.5
30	72	64.5	65	20	33	40	20	13	4	3	41	7	43.5
40	90	82.5	83	28	43	50	28	15	4	3	56	10	53.5
50	108	100.5	101	46	43	38	23	20	6	4	61	23	63.5
75	158	150.5	151	56	83	50	28	27	6	5	94	40	88.5

HLSL8(With shock absorber)



Compact slide cylinder

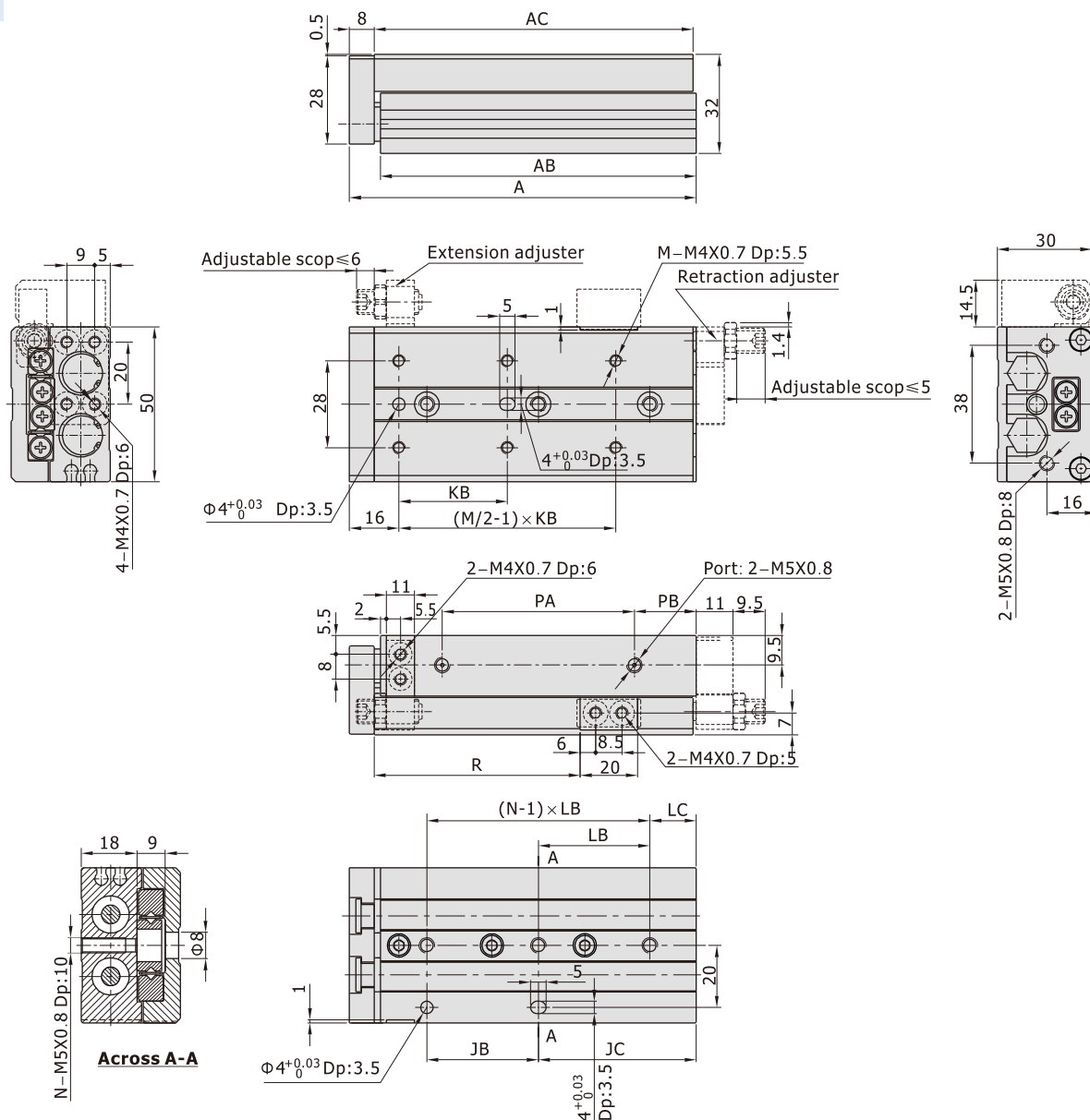
AirTAC

HLS, HLSL Series

Roller bearing

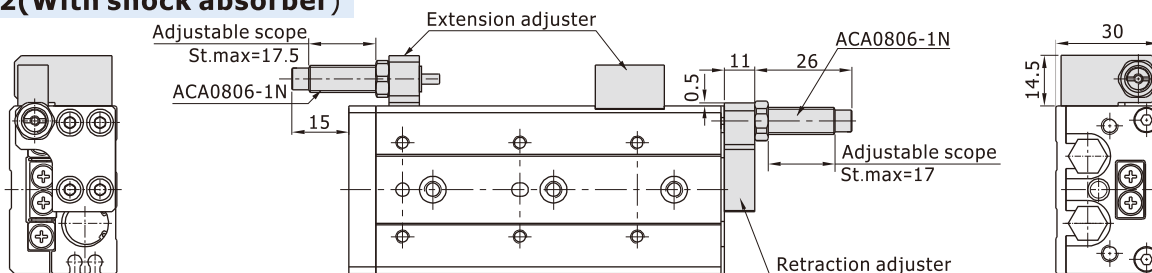
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLS12



Stroke/Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	80	70	71	40	15	35	40	15	4	2	39.5	10	25
20	80	70	71	40	15	35	40	15	4	2	39.5	10	35
30	80	70	71	40	15	35	40	15	4	2	39.5	10	45
40	92	82	83	25	42	50	25	17	4	3	51.5	10	55
50	112	102	103	36	51	35	36	15	6	3	61.5	20	65
75	158	148	149	72	61	55	36	25	6	4	87.5	40	90
100	212	202	203	76	111	65	38	35	6	5	131.5	50	115

HLS12(With shock absorber)



Compact slide cylinder

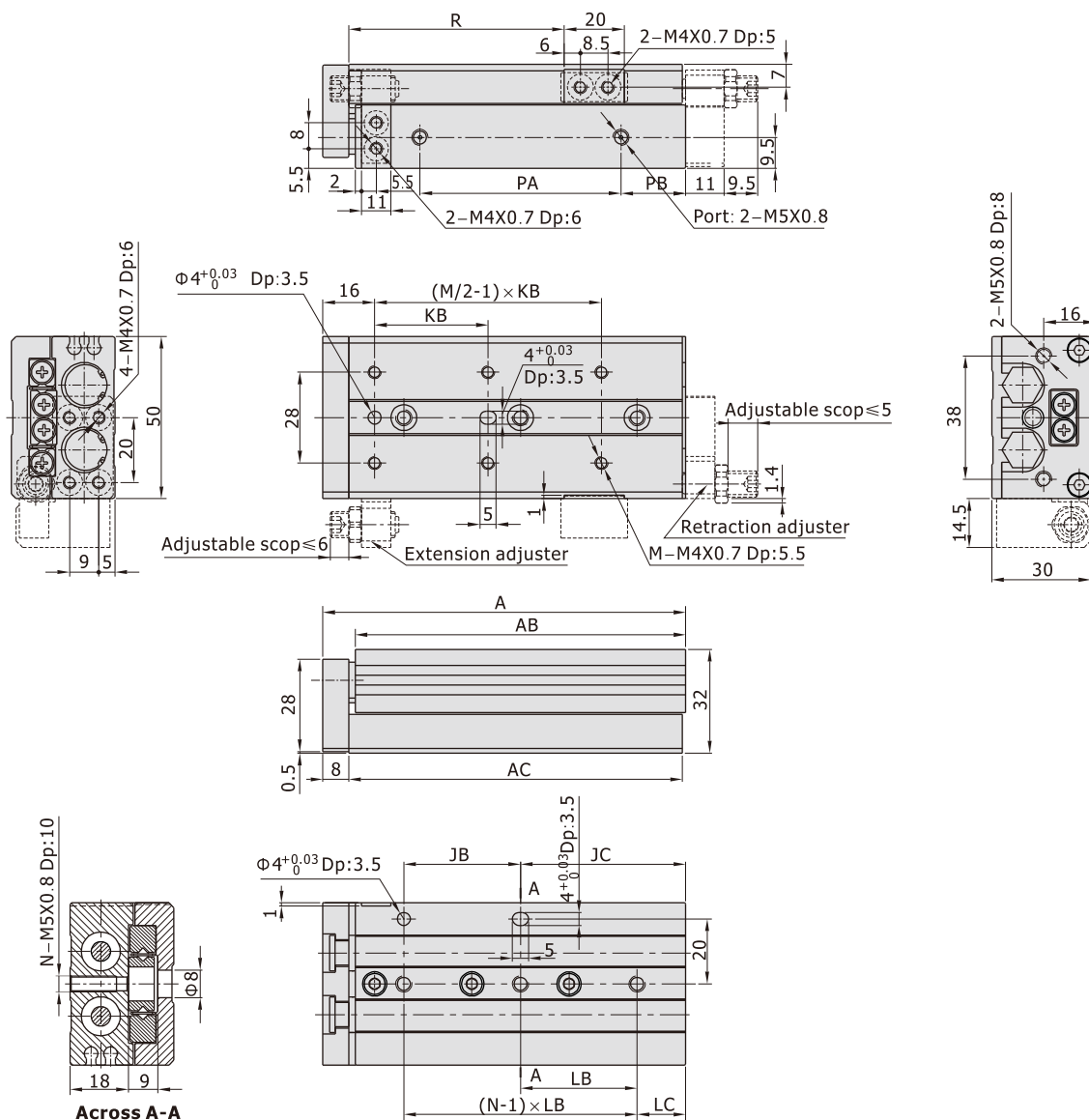
AIRTAC

HLS, HLSL Series

Roller bearing

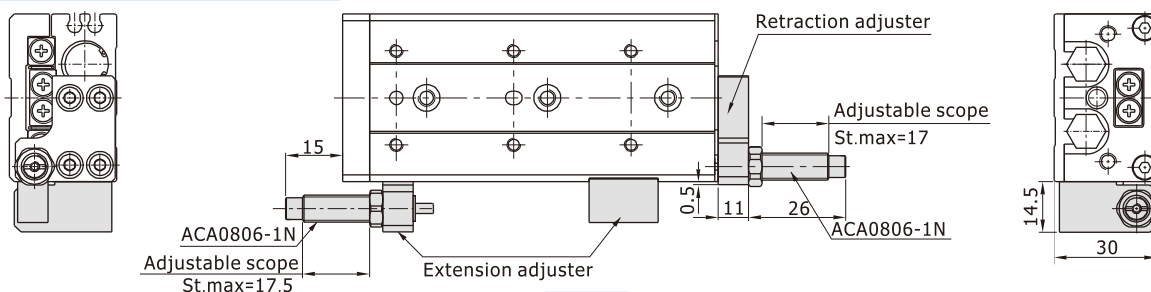
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLSL12



Stroke/Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	80	70	71	40	15	35	40	15	4	2	39.5	10	25
20	80	70	71	40	15	35	40	15	4	2	39.5	10	35
30	80	70	71	40	15	35	40	15	4	2	39.5	10	45
40	92	82	83	25	42	50	25	17	4	3	51.5	10	55
50	112	102	103	36	51	35	36	15	6	3	61.5	20	65
75	158	148	149	72	61	55	36	25	6	4	87.5	40	90
100	212	202	203	76	111	65	38	35	6	5	131.5	50	115

HLSL12(With shock absorber)



Compact slide cylinder

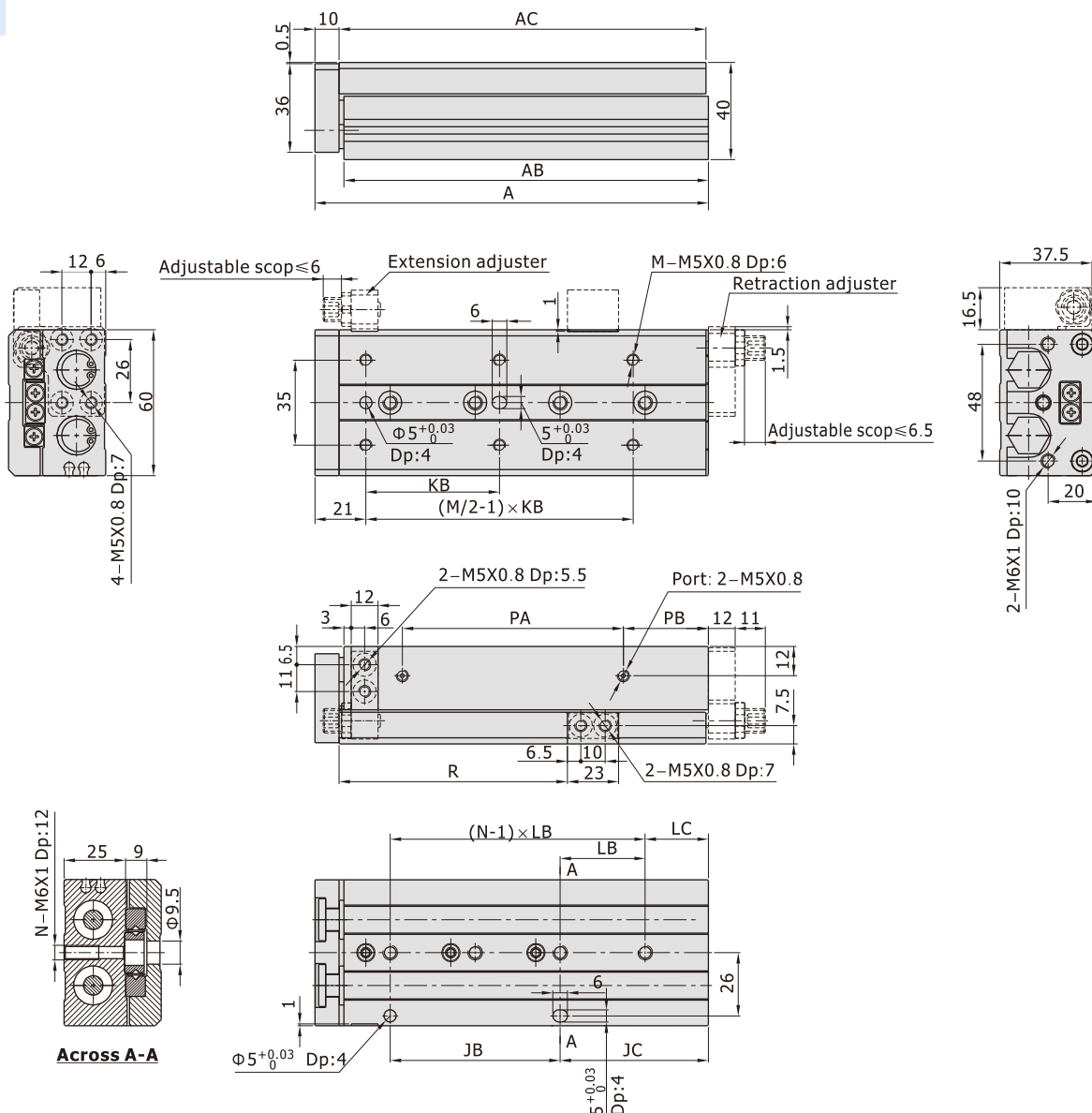
AIRTAC

HLS, HLSSL Series

Roller bearing

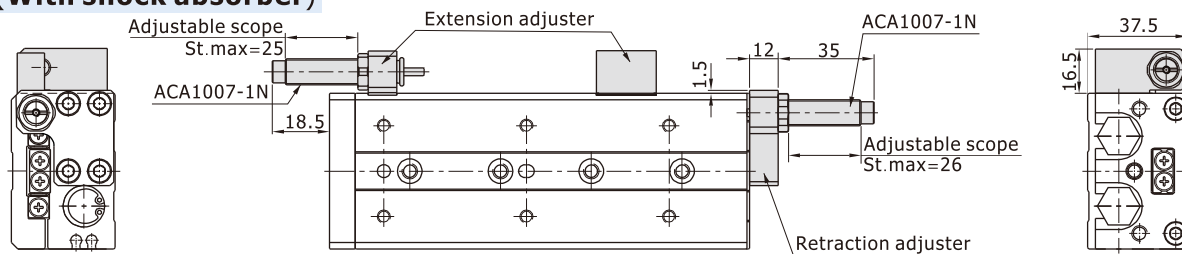
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLS16



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	87	75	76	40	16	35	40	16	4	2	42.5	8	28.5
20	87	75	76	40	16	35	40	16	4	2	42.5	8	38.5
30	87	75	76	40	16	35	40	16	4	2	42.5	8	48.5
40	97	85	86	50	16	40	50	16	4	2	52.5	8	58.5
50	112	100	101	30	51	30	30	21	6	3	63.5	12	68.5
75	162	150	151	70	61	55	35	26	6	4	90.5	35	93.5
100	210	198	199	70	109	65	35	39	6	5	118.5	55	118.8
125	260	248	249	70	159	70	35	19	8	7	153.5	70	143.5

HLS16(With shock absorber)



Compact slide cylinder

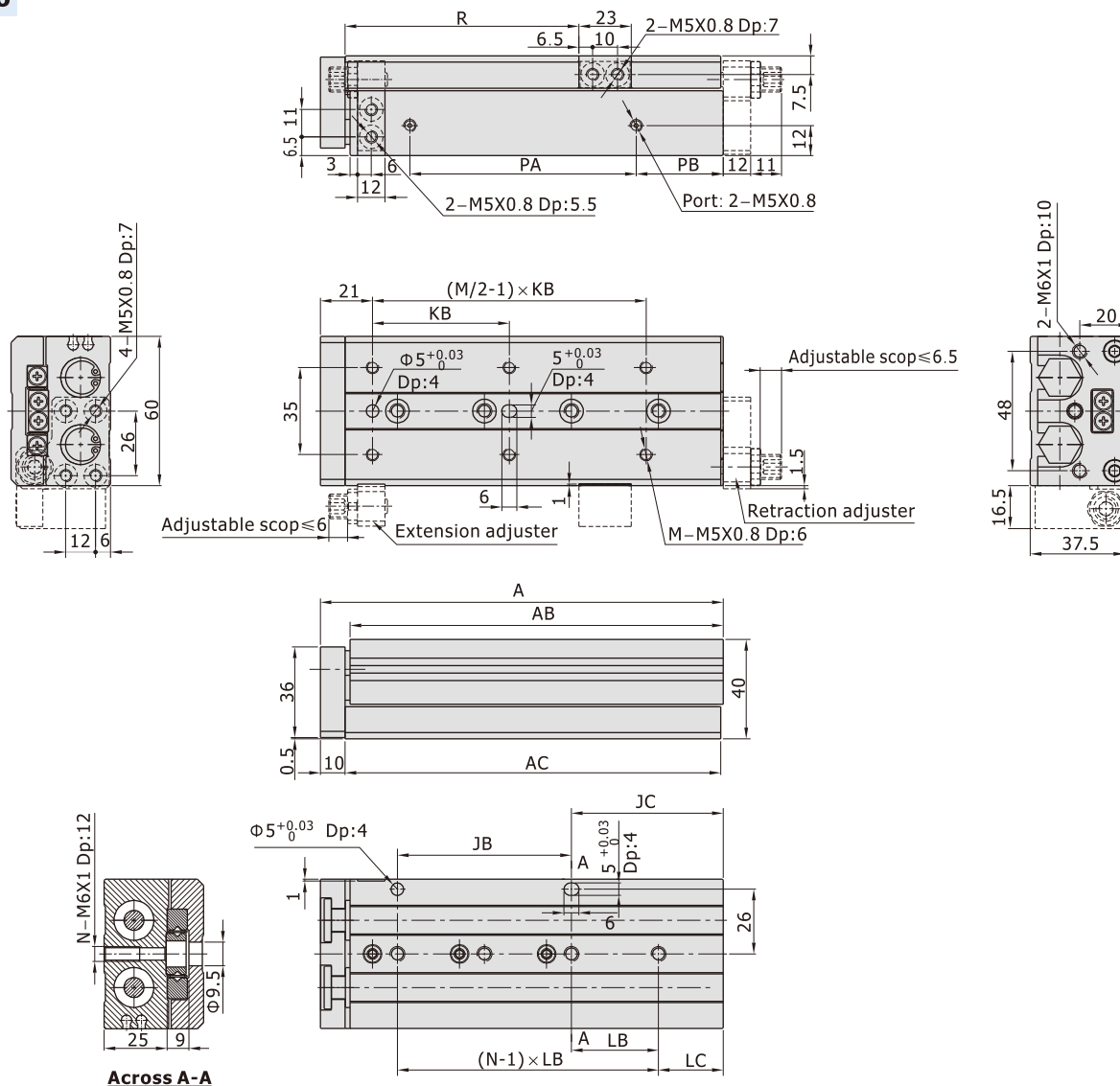
AIRTAC

HLS, HLSL Series

Roller bearing

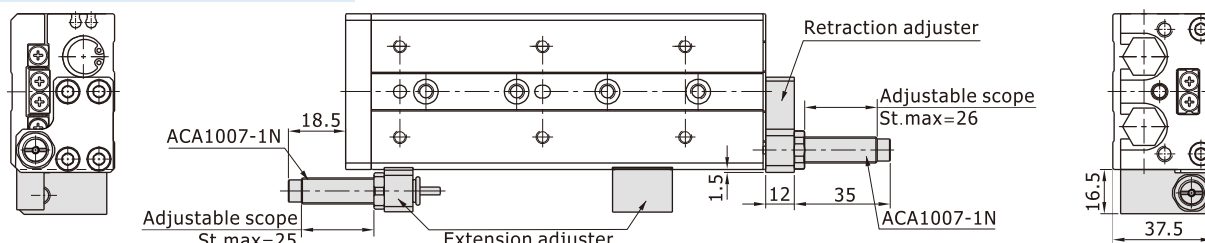
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLSL16



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	PA	PB	R
10	87	75	76	40	16	35	40	16	4	2	42.5	8	28.5
20	87	75	76	40	16	35	40	16	4	2	42.5	8	38.5
30	87	75	76	40	16	35	40	16	4	2	42.5	8	48.5
40	97	85	86	50	16	40	50	16	4	2	52.5	8	58.5
50	112	100	101	30	51	30	30	21	6	3	63.5	12	68.5
75	162	150	151	70	61	55	35	26	6	4	90.5	35	93.5
100	210	198	199	70	109	65	35	39	6	5	118.5	55	118.8
125	260	248	249	70	159	70	35	19	8	7	153.5	70	143.5

HLSL16(With shock absorber)



HLS, HLSL Series

Roller bearing

Bore size: Φ6, Φ8, Φ12, Φ16, Φ20, Φ25

Technical drawing of the M5000 series hydraulic cylinder, showing front, side, and cross-sectional views with detailed dimensions and labels.

Front View (Top): Shows the cylinder body with dimensions: 13, 45, 0.5, 50, 13, AC, AB, A. Labels include "Adjustable scop ≤ 6.5 ", "Extension adjuster", "Retraction adjuster", "M-M5X0.8 Dp:10", and "Adjustable scop ≤ 7.5 ".

Side View (Middle): Shows the cylinder body with dimensions: 18, 6, 30, 70, 30, 6-M5X0.8 Dp:8, 46, 27, KB, $(M/2-1) \times KB$, 6, 1.5, 1, 5, $5^{+0.03}_0 \text{ Dp:5}$, 2-M6X1 Dp:6, Port: 2-1/8", PA, PB, 15, 12, 15, 12, 2-M6X1 Dp:6.5, R, 6.5, 12, 25, 13.5, 8, 3, 7.5, 15, 3, 12, 28, 12, $\phi 9.5$, N-M6X1 Dp:12, **Across A-A**.

Side View (Bottom): Shows the cylinder body with dimensions: 1, 6, 30, $\phi 5^{+0.03}_0 \text{ Dp:5}$, JB, A, JC, $5^{+0.03}_0 \text{ Dp:5}$, $(N-1) \times LB$, LB, LC, 1, 6, 30, $\phi 5^{+0.03}_0 \text{ Dp:5}$.

Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	S	PA	PB	R
10	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	32.5
20	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	42.5
30	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	52.5
40	107	91.5	93	35	35	60	55	15	4	2	50	53.5	10	62.5
50	122	106.5	108	35	50	35	35	15	6	3	35	68.5	10	72.5
75	161	145.5	147	70	54	60	35	19	6	4	60	107.5	10	97.5
100	214	198.5	200	70	107	70	35	37	6	5	70	115.5	55	122.5
125	268	252.5	254	76	155	70	38	41	8	6	70	154.5	70	147.5
150	320	304.5	306	88	195	80	44	19	8	7	80	186.5	90	172.5

Technical drawing of the shock absorber assembly (ACA1210-1N) showing dimensions and components. The drawing includes a side view of the shock absorber and a detail view of the mounting bracket.

Dimensions and components shown:

- Adjustable scope: St. max = 23.5
- ACA1210-1N
- Extension adjuster
- 0.5
- 15
- 34
- ACA1210-1N
- Adjustable scope: St. max = 25
- Retraction adjuster
- 46.5
- 21

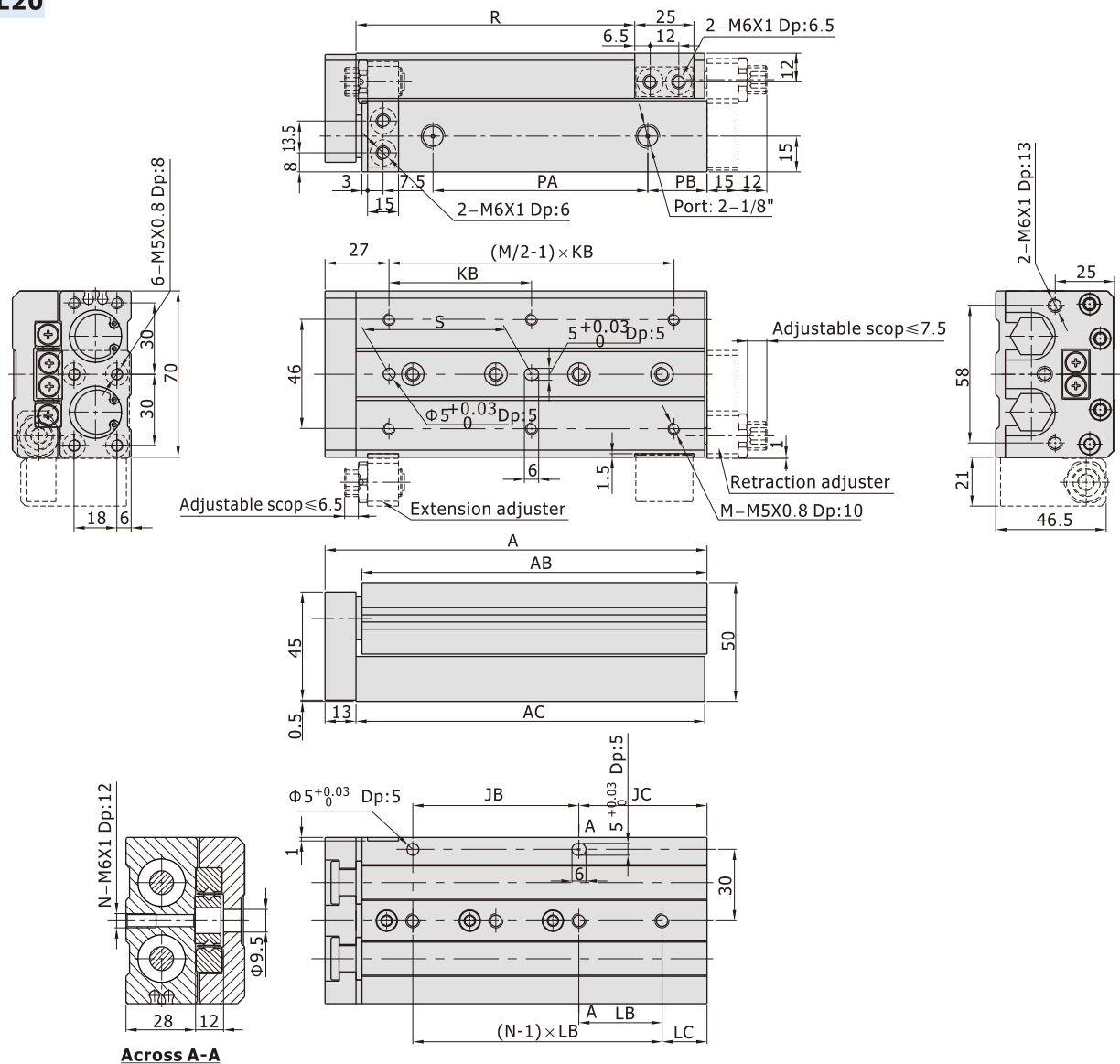
HLS, HLSL Series



Roller bearing

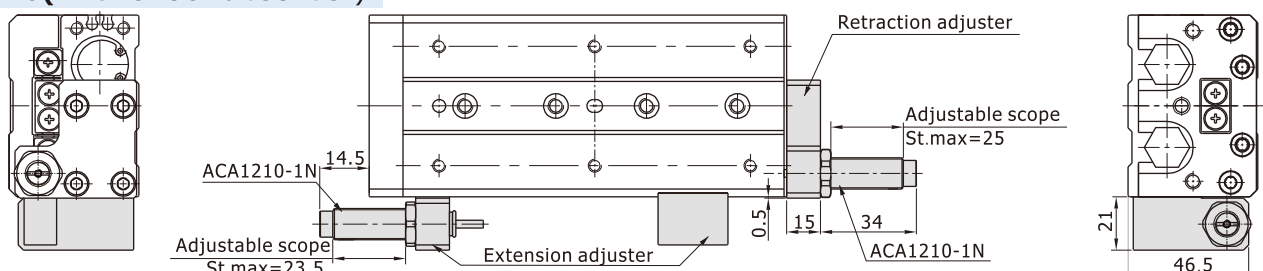
Bore size: Φ6, Φ8, Φ12, Φ16, Φ20, Φ25

HLSL20



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	S	PA	PB	R
10	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	32.5
20	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	42.5
30	97	81.5	83	35	25	50	45	15	4	2	40	43.5	10	52.5
40	107	91.5	93	35	35	60	55	15	4	2	50	53.5	10	62.5
50	122	106.5	108	35	50	35	35	15	6	3	35	68.5	10	72.5
75	161	145.5	147	70	54	60	35	19	6	4	60	107.5	10	97.5
100	214	198.5	200	70	107	70	35	37	6	5	70	115.5	55	122.5
125	268	252.5	254	76	155	70	38	41	8	6	70	154.5	70	147.5
150	320	304.5	306	88	195	80	44	19	8	7	80	186.5	90	172.5

HLSL20(With shock absorber)



Compact slide cylinder

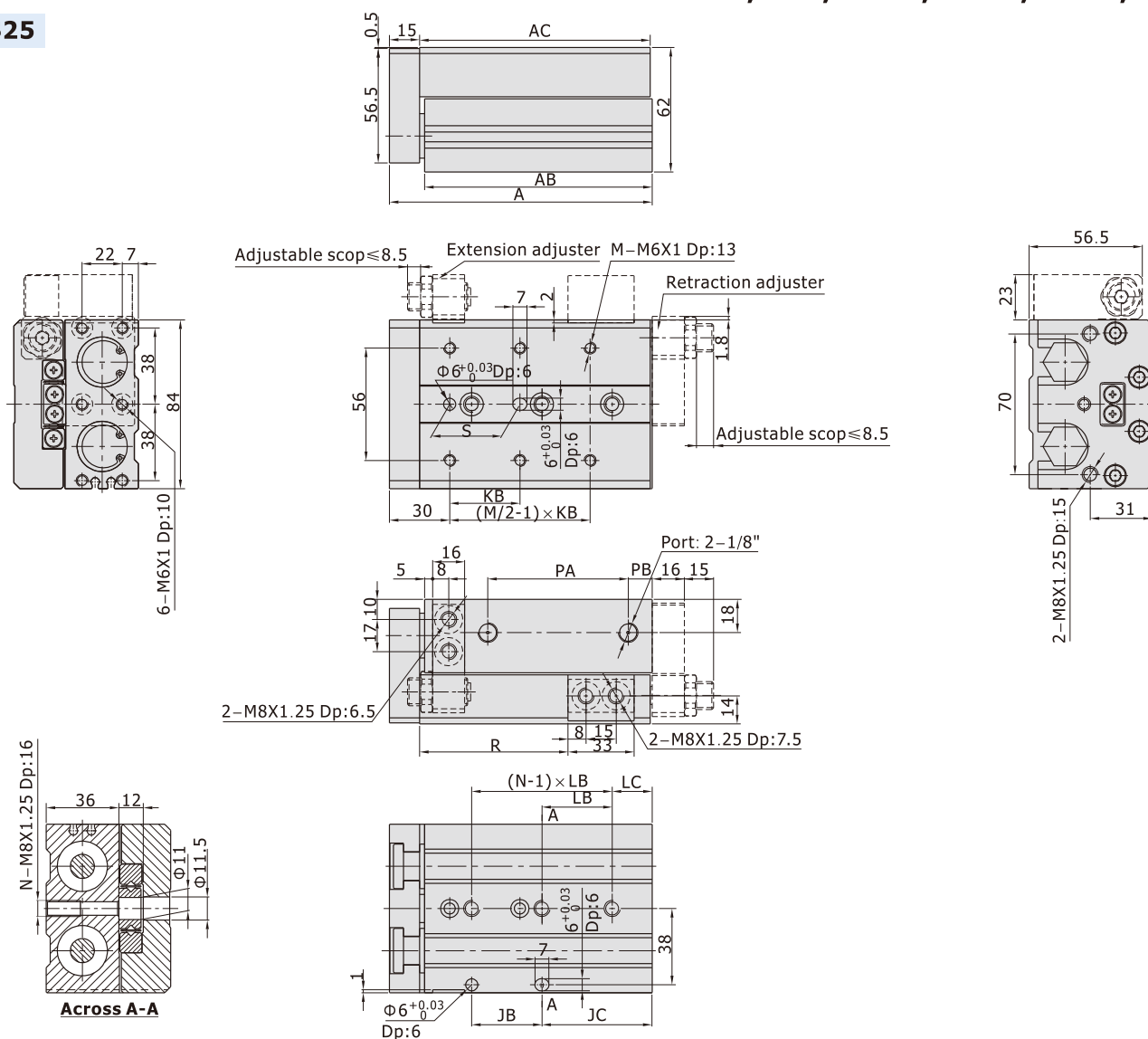
AirTAC

HLS, HLSL Series

Roller bearing

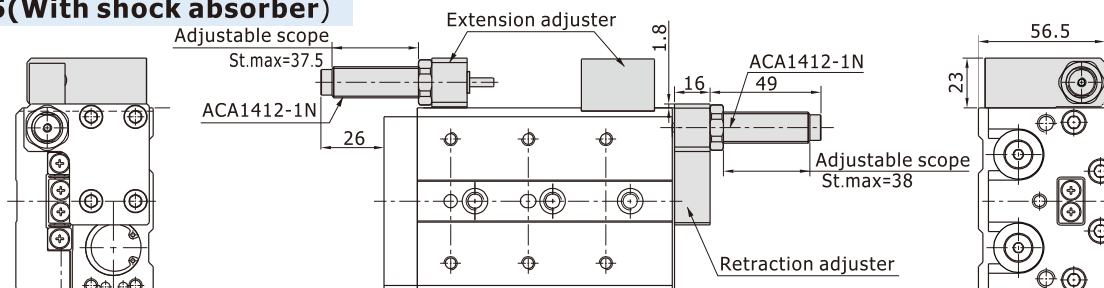
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLS25



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	S	PA	PB	R
10	108	90.5	92	45	22	50	45	22	4	2	40	47	12	35
20	108	90.5	92	45	22	50	45	22	4	2	40	47	12	45
30	108	90.5	92	45	22	50	45	22	4	2	40	47	12	55
40	118	100.5	102	55	22	60	55	22	4	2	50	57	12	65
50	131	113.5	115	35	55	35	35	20	6	3	35	70	12	75
75	172	154.5	156	70	61	60	35	26	6	4	60	90	33	100
100	213	195.5	197	70	102	70	35	32	6	5	70	119	45	125
125	271	253.5	255	76	154	75	38	40	8	6	75	155	67	150
150	311	293.5	295	80	190	80	40	30	8	7	80	180	82	175

HLS25(With shock absorber)



Compact slide cylinder

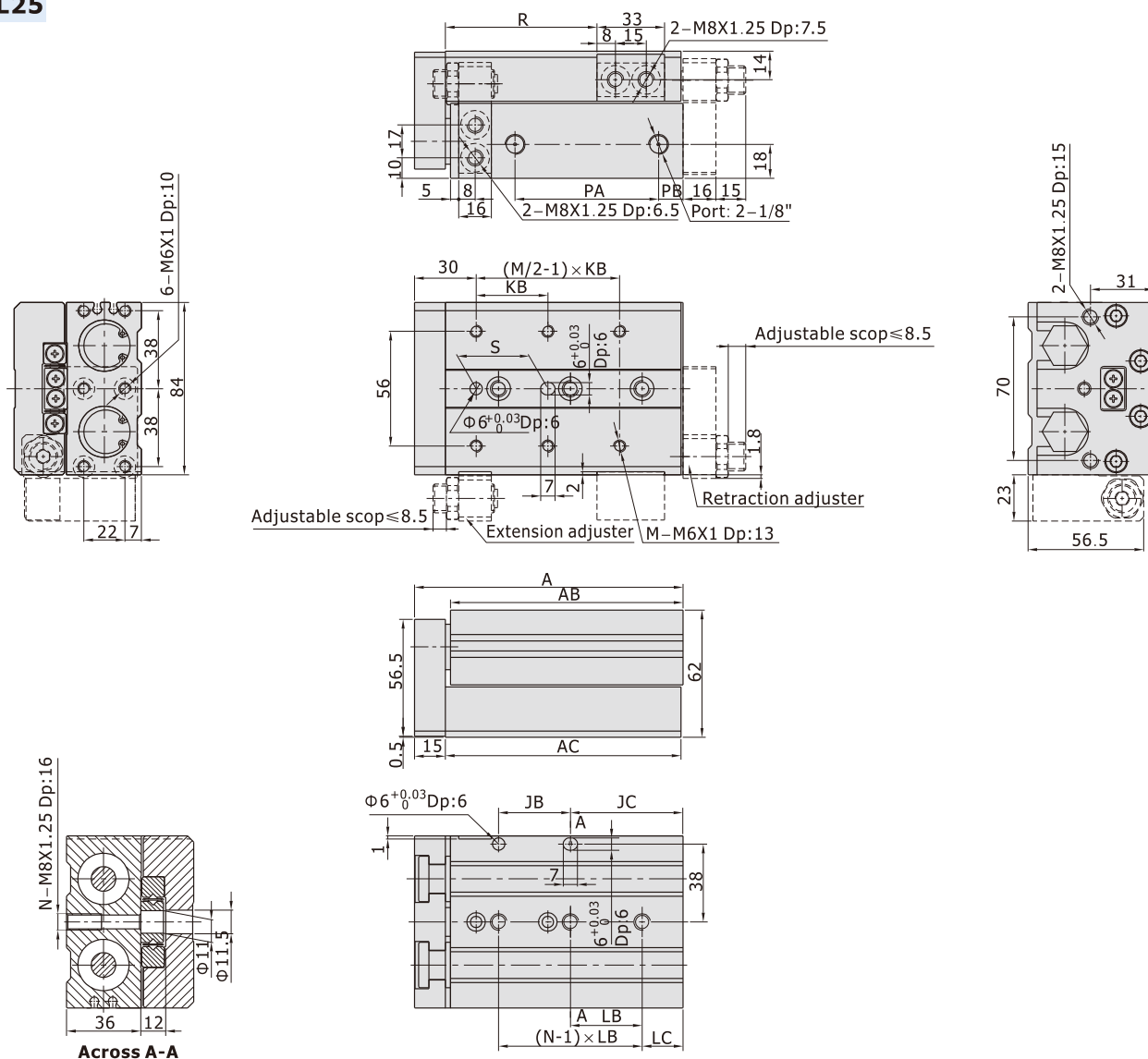
AIRTAC

HLS, HLSL Series

Roller bearing

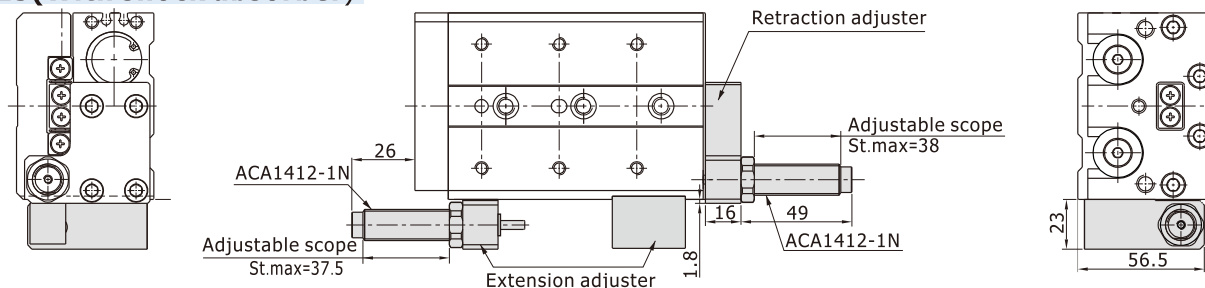
Bore size: $\Phi 6$, $\Phi 8$, $\Phi 12$, $\Phi 16$, $\Phi 20$, $\Phi 25$

HLSL25



Stroke\Item	A	AB	AC	JB	JC	KB	LB	LC	M	N	S	PA	PB	R
10	108	90.5	92	45	22	50	45	22	4	2	40	47	12	35
20	108	90.5	92	45	22	50	45	22	4	2	40	47	12	45
30	108	90.5	92	45	22	50	45	22	4	2	40	47	12	55
40	118	100.5	102	55	22	60	55	22	4	2	50	57	12	65
50	131	113.5	115	35	55	35	35	20	6	3	35	70	12	75
75	172	154.5	156	70	61	60	35	26	6	4	60	90	33	100
100	213	195.5	197	70	102	70	35	32	6	5	70	119	45	125
125	271	253.5	255	76	154	75	38	40	8	6	75	155	67	150
150	311	293.5	295	80	190	80	40	30	8	7	80	180	82	175

HLSL25(With shock absorber)



Compact slide cylinder

HLS, HLSL Series



Roller bearing Accessories

Accessory ordering code

F - HLS 20 AF

①

②

③

④

① Accessory

② Cylinder model

HLS: Compact slide cylinder (Double acting type)
(Roller bearing)

HLSL: Symmetrical Compact slide cylinder (Double acting type)
(Roller bearing)

③ Bore Size

6 8 12 16 20 25

④ Accessory type [Note]

A: Adjustable rubber stopper(Both ends)

AF: Adjustable rubber stopper(Retraction)

B: Shock absorber(Both ends)

BF: Shock absorber(Retraction)

[Note]The list accessories are for HLS cylinder. Accessories that are adaptable to other cylinder are not shown. Please refer to accessory list for selection and ordering information.

Accessory selection

	Accessories\Bore size		6	8	12
Standard (HLS)	Both ends	A(Adjustable rubber stopper)	F-HLQ6A	F-HLS8A	F-HLS12A
		B(Shock absorber)	×	F-HLS8B	F-HLS12B
	Extention	AS(Adjustable rubber stopper)	F-HLQ6AS	F-HLQ8AS	F-HLQ12AS
		BS(Shock absorber)	×	F-HLQ8BS	F-HLQ12BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQ6AF	F-HLS8AF	F-HLS12AF
		BF(Shock absorber)	×	F-HLS8BF	F-HLS12BF
	Accessories\Bore size		16	20	25
Standard (HLS)	Both ends	A(Adjustable rubber stopper)	F-HLS16A	F-HLS20A	F-HLS25A
		B(Shock absorber)	F-HLS16B	F-HLS20B	F-HLS25B
	Extention	AS(Adjustable rubber stopper)	F-HLQ16AS	F-HLQ20AS	F-HLQ25AS
		BS(Shock absorber)	F-HLQ16BS	F-HLQ20BS	F-HLQ25BS
	Retraction	AF(Adjustable rubber stopper)	F-HLS16AF	F-HLS20AF	F-HLS25AF
		BF(Shock absorber)	F-HLS16BF	F-HLS20BF	F-HLS25BF
	Accessories\Bore size		6	8	12
Symmetrical (HLSL)	Both ends	A(Adjustable rubber stopper)	F-HLQL6A	F-HLSL8A	F-HLSL12A
		B(Shock absorber)	×	F-HLSL8B	F-HLSL12B
	Extention	AS(Adjustable rubber stopper)	F-HLQ6AS	F-HLQ8AS	F-HLQ12AS
		BS(Shock absorber)	×	F-HLQ8BS	F-HLQ12BS
	Retraction	AF(Adjustable rubber stopper)	F-HLQL6AF	F-HLSL8AF	F-HLSL12AF
		BF(Shock absorber)	×	F-HLSL8BF	F-HLSL12BF
	Accessories\Bore size		16	20	25
Symmetrical (HLSL)	Both ends	A(Adjustable rubber stopper)	F-HLSL16A	F-HLSL20A	F-HLSL25A
		B(Shock absorber)	F-HLSL16B	F-HLSL20B	F-HLSL25B
	Extention	AS(Adjustable rubber stopper)	F-HLQ16AS	F-HLQ20AS	F-HLQ25AS
		BS(Shock absorber)	F-HLQ16BS	F-HLQ20BS	F-HLQ25BS
	Retraction	AF(Adjustable rubber stopper)	F-HLSL16AF	F-HLSL20AF	F-HLSL25AF
		BF(Shock absorber)	F-HLSL16BF	F-HLSL20BF	F-HLSL25BF

Note): A=AS+AF; B=BS+BF.



Compact slide cylinder

HLS, HLSL Series

AirTAC

Roller bearing Accessories

Dimensions

AS: Adjustable rubber stopper(Extension)

Body Mounting

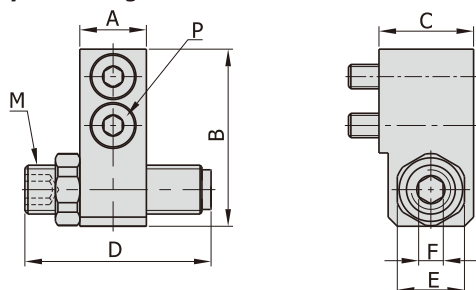
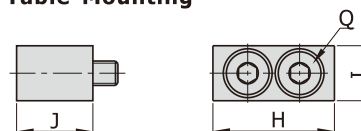


Table Mounting



Bore size\Item	Adjusting stroke range	A	B	C	D	E	F	M	P	H	I	J	Q
6	5	7	19	10.5	16.5	8	3	M6×1.0	M2.5Length:10	12.5	6.5	10.5	M2.5Length:10
8	5	8.5	22	14	21.5	11	4	M8×1.0	M3Length:14	14.5	8	12	M3Length:14
12	5	11	29	15.5	30.5	11	4	M8×1.0	M4Length:16	20	9	12.5	M4Length:12
16	5	12	36	17.5	24	14	5	M10×1.0	M5Length:16	23	10.5	17	M5Length:16
20	5	15	44.5	22	28	17	6	M12×1.0	M6Length:20	25	12.5	21	M6Length:20
25	5	16	54	24	32	19	6	M14×1.5	M8Length:20	33	16.5	23	M8Length:20

BS: Shock absorber(Extension)

Body Mounting

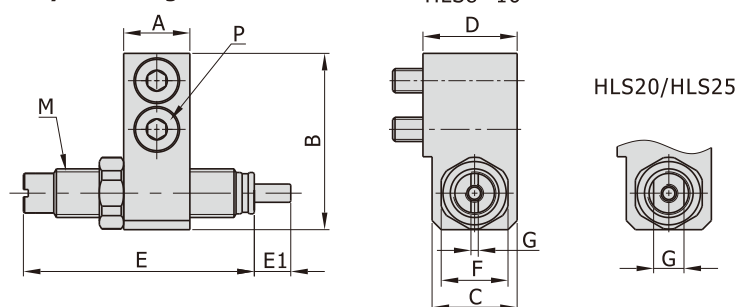
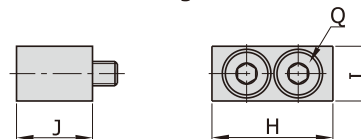
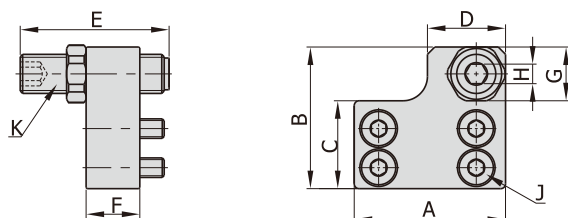


Table Mounting



Bore size\Item	A	B	C	D	E	E1	F	G	M	P	H	I	J	Q
8	8.5	22	12.5	14	38	6	11	1.2	M8×1.0	M3Length:14	14.5	8	12	M3Length:14
12	11	29	14	15.5	38	6	11	1.2	M8×1.0	M4Length:16	20	9	12.5	M4Length:12
16	12	36	16	17.5	48	7	14	1.2	M10×1.0	M5Length:16	23	10.5	17	M5Length:16
20	15	44.5	20	22	50	10	17	11	M12×1.0	M6Length:20	25	12.5	21	M6Length:20
25	16	54	22	24	66	12	19	12	M14×1.5	M8Length:20	33	16.5	23	M8Length:20

AF: Adjustable rubber stopper(Retraction for standard)



Bore size\Item	Adjusting stroke range	A	B	C	D
6	5	18	19	11	8
8	5	24	23.5	13	14
12	5	31	29	18	16
16	5	37	37.5	23	18
20	5	45.5	47	28.5	23
25	5	54	56	34	28

Bore size\Item	E	F	G	H	J	K
6	21.5	7	8	3	M2.5Length:6	M6×1.0
8	21.5	8.5	11	3	M3Length:8	M8×1.0
12	21.5	11	11	4	M4Length:12	M8×1.0
16	24	12	14	5	M5Length:12	M10×1.0
20	28	15	17	6	M5Length:16	M12×1.0
25	32	16	19	6	M6Length:18	M14×1.5



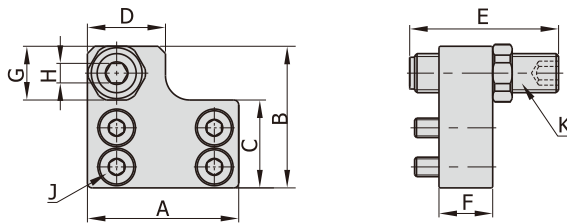
Compact slide cylinder

HLS, HLSL Series

AirTAC

Roller bearing Accessories

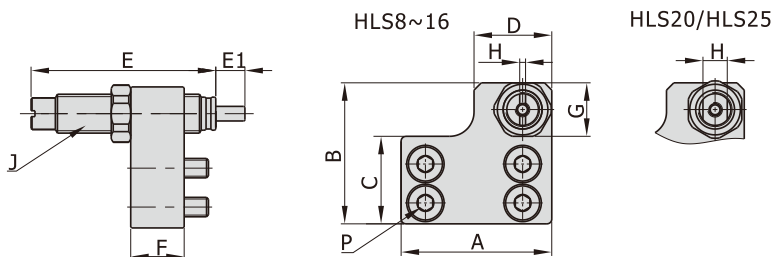
AF: Adjustable rubber stopper(Retraction, for symmetrical)



Bore size\Item	Adjusting stroke range	A	B	C	D
6	5	18	19	11	8
8	5	24	23.5	13	14
12	5	31	29	18	16
16	5	37	37.5	23	18
20	5	45.5	47	28.5	23
25	5	54	56	34	28

Bore size\Item	E	F	G	H	J	K
6	21.5	7	8	3	M2.5Length:6	M6×1.0
8	21.5	8.5	11	3	M3Length:8	M8×1.0
12	21.5	11	11	4	M4Length:12	M8×1.0
16	24	12	14	5	M5Length:12	M10×1.0
20	28	15	17	6	M5Length:16	M12×1.0
25	32	16	19	6	M6Length:18	M14×1.5

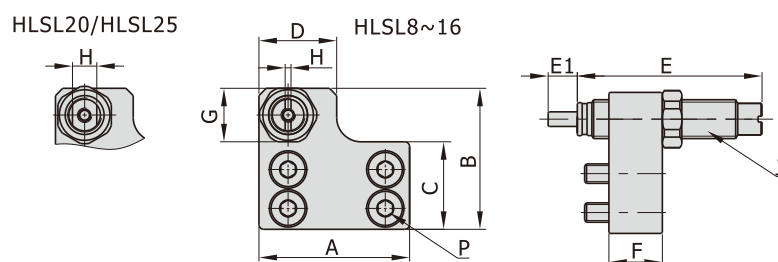
BF: Shock absorber(Retraction, for standard)



Bore size\Item	A	B	C	D	E	E1	F
8	24	23.5	13	14	38	6	8.5
12	31	29	18	16	38	6	11
16	37	37.5	23	18	48	7	12
20	45.5	47	28.5	23	50	10	15
25	54	56	34	28	66	12	16

Bore size\Item	G	H	J	P
8	11	1.2	M8×1.0	M3Length:8
12	11	1.2	M8×1.0	M4Length:12
16	14	1.2	M10×1.0	M5Length:12
20	17	11	M12×1.0	M5Length:16
25	19	12	M14×1.5	M6Length:18

BF: Shock absorber(Retraction, for symmetrical)



Bore size\Item	A	B	C	D	E	E1	F
8	24	23.5	13	14	38	6	8.5
12	31	29	18	16	38	6	11
16	37	37.5	23	18	48	7	12
20	45.5	47	28.5	23	50	10	15
25	54	56	34	28	66	12	16

Bore size\Item	G	H	J	P
8	11	1.2	M8×1.0	M3Length:8
12	11	1.2	M8×1.0	M4Length:12
16	14	1.2	M10×1.0	M5Length:12
20	17	11	M12×1.0	M5Length:16
25	19	12	M14×1.5	M6Length:18





Rotary table cylinder—HRQ Series

Specification: 2, 3, 7, 10, 20, 30, 50, 70, 100, 200



Ordering code

HRQ 20 A T

① ② ③ ④

① Model

HRQ: Rotary Table/Rack
& Pinion Style

② Specification

2 3 7 10 20 30 50 70 100 200

③ Cushion type

Specification	Cushion type
2 3 7	Blank: With adjustment bolt
10 20 30 50	Blank: With adjustment bolt
70 100 200	A: With internal shock absorber

[Note] HRQ series are all attached with magnet.

④ Thread type

Specification	Thread type
2 3 7 10 20	No this code
30 50 70 100 200	T: NPT

Specification

Specification		2	3	7	10	20	30	50	70	100	200
Acting type		Double rack and pinion(Double acting)									
Fluid		Air(to be filtered by 40μm filter element)									
Operating pressure	With adjustment bolt	22~100psi(0.15~0.7MPa)									
	With internal shock absorber	-			22~100psi(0.15~0.7MPa)						
Proof pressure		175psi(1.2MPa)									
Temperature		-20~70℃									
Angle adjustment range		0~190°							0~190°		
Repeatable precision	With adjustment bolt	0.2°									
	With internal shock absorber	-			0.05°						
Theoretic moment (Nm)(0.5MPa)		0.2	0.33	0.63	1.1	2.2	2.8	5.0	7.5	11.0	22.0
Cushion type	With adjustment bolt	Rubber bumper									
	With internal shock absorber	-			Shock absorber						
Port size	End ports	M5×0.8					1/8" [Note1]				
	Side ports						M5×0.8				
Weight g		120	175	270	535	940	1260	2060	2890	4100	7650

[Note1] NPT thread is available.

Product feature

1. Rack and pinion design, stable functioning.
2. Double cylinder structure, double output could be achieved.
3. The manufacturing precision of working platform is high, and is easy for installation , and is of precise orientation.
4. The center of working platform has a through hole, and pipe can be located and passed through this hole;
5. Guide hole is designed on the both side of the cylinder body (10~200) or undersurface (2~7), which is simply to install.
6. Two modes of buffer could be chosen, adjustment bolt buffer and internal shock absorber, the maximum buffer energy of internal shock absorber is 3-5 times that of adjustment bolt buffer.



Maximum allowed movement energy and rotation times

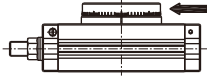
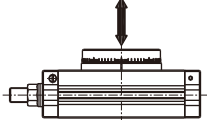
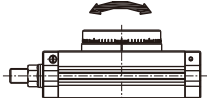
Model	Maximal allowed energy (J)		Rotation times (s/90°)	
	With adjustment bolt	With internal shock absorber	With adjustment bolt	With internal shock absorber
HRQ2	0.0015	-	0.2~0.7	-
HRQ3	0.002	-	0.2~0.7	-
HRQ7	0.006	-	0.2~1.0	-
HRQ10	0.01	0.04	0.2~1.0	0.2~0.7
HRQ20	0.025	0.12	0.2~1.0	0.2~0.7
HRQ30	0.05	0.12	0.2~1.0	0.2~0.7
HRQ50	0.08	0.30	0.2~1.0	0.2~0.7
HRQ70	0.24	1.1	0.2~1.5	0.2~1.0
HRQ100	0.32	1.6	0.2~2.0	0.2~1.0
HRQ200	0.56	2.9	0.2~2.5	0.2~1.0

[Note]

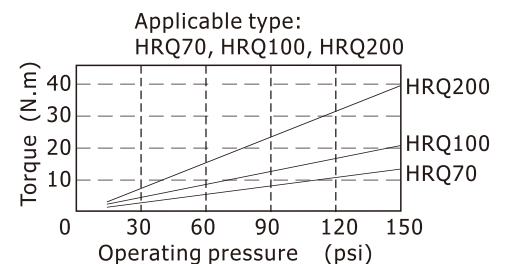
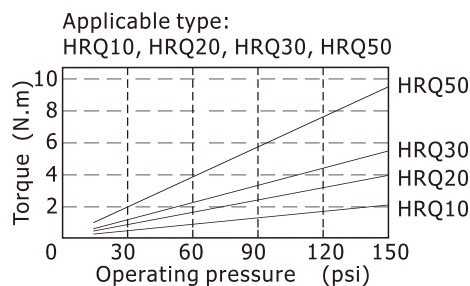
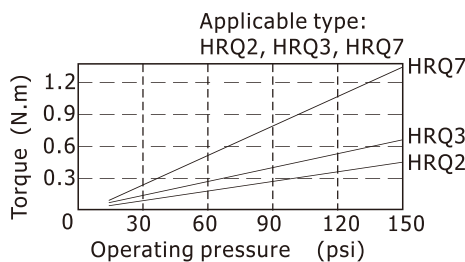
1: The movement energy should not exceed the allowed maximum energy, or the inner accessories of product would be damaged;

2: When the rotation times of with shock absorber is larger than the allowed tolerance, the bigger effect will be lost.

Maximum allowed loading

Loading type	Model									
	HRQ2	HRQ3	HRQ7	HRQ10	HRQ20	HRQ30	HRQ50	HRQ70	HRQ100	HRQ200
Maximum allowed radial loading (N) 	18	30	50	80	150	200	300	330	390	540
Maximum allowed axial loading (N) 	35	50	70	80	150	200	300	300	500	740
Maximum allowed bending moment (Nm) 	0.8	1.1	1.5	2.5	4.0	5.5	10.0	12.0	18.0	25.0

Actual torque output

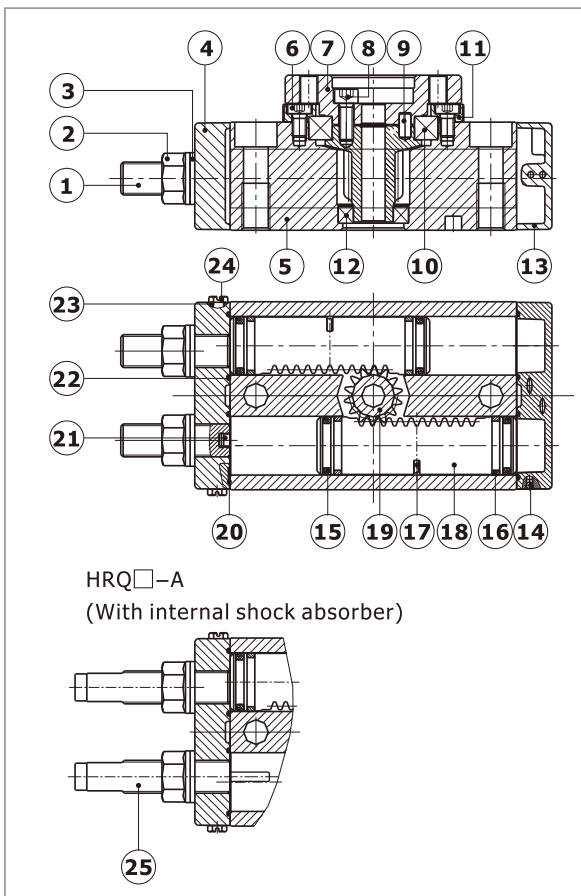


Rotary table cylinder

HRQ Series

Specification: 2, 3, 7, 10, 20, 30, 50, 70, 100, 200

Inner structure and material of major parts



NO.	Item	Material
1	Adjustment bole	Carbon steel
2	Hexagon nut	Carbon steel
3	Seal washer	Carbon steel & Rubber
4	Front cover	Aluminum alloy
5	Body	Aluminum alloy
6	Hexagon socket head set bole	Carbon steel
7	Table	Aluminum alloy
8	Hexagon socket head set bole	Carbon steel
9	Guide pin/flat key	Carbon steel
10	Deep-groove bearing	Subassembly
11	Bearing retainer	Aluminum alloy
12	Deep-groove bearing/Needle bearing	Subassembly
13	Back cover	Aluminum alloy
14	Steel ball	Stainless steel
15	Piston seal	NBR
16	Wear ring	Wear resistant material
17	Magnet	Rare earths
18	Rack	Stainless steel/Carbon steel
19	Pinion	Chrome molybdenum steel
20	O-ring	NBR
21	Bumper	NBR
22	O-ring	NBR
23	O-ring	NBR
24	Hexagon screw	Stainless steel
25	Shock absorber	Subassembly

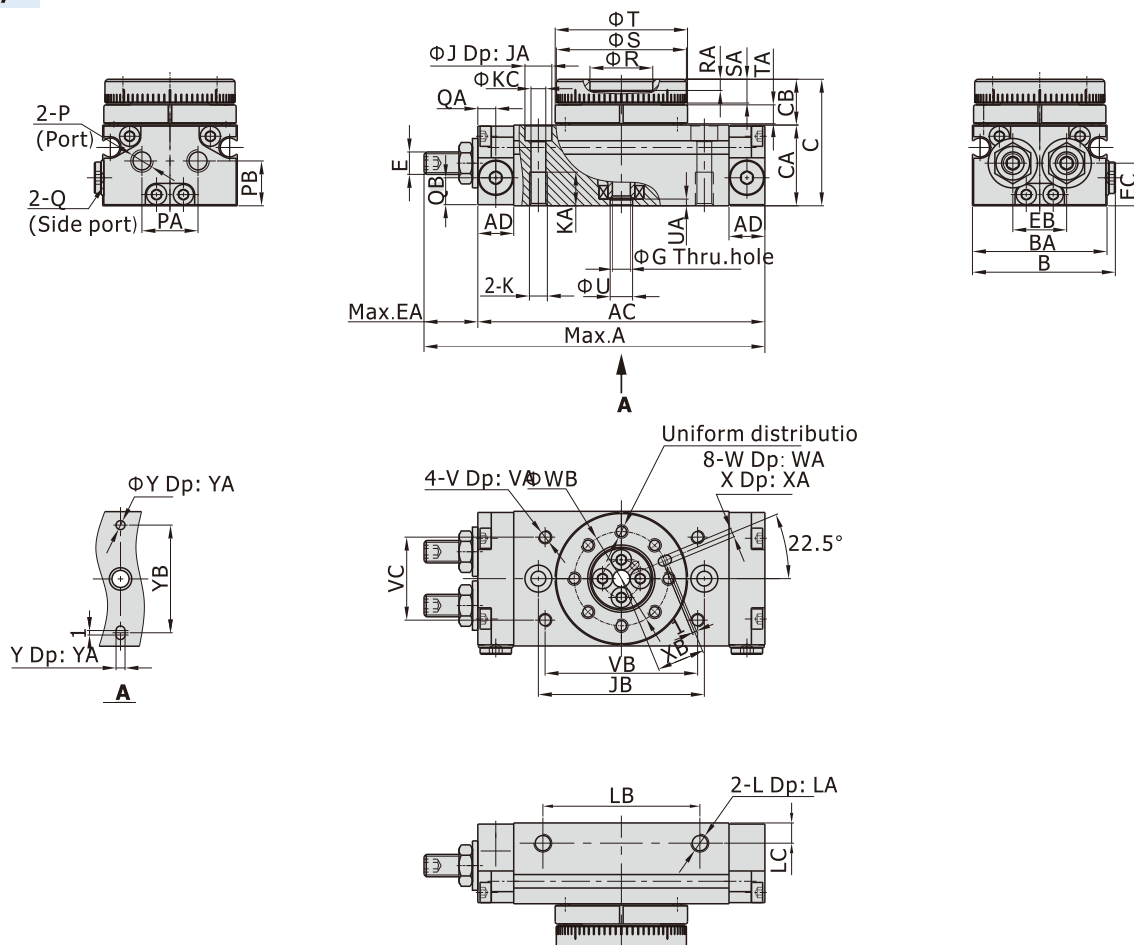
Rotary table cylinder

HRQ Series

Specification: 2, 3, 7, 10, 20, 30, 50, 70, 100, 200

Dimensions

HRQ2/3/7



Type\Item	A	AC	AD	B	BA	C	CA	CB	E	EA	EB	EC	G
2	76	64	8	32	30	28	18	10	M5×0.8	12	12	9.5	4
3	82	70	8	36.5	34.5	30.5	20.5	10	M5×0.8	12	15.5	10.5	5
7	94.5	79.5	8	43	41	34.5	23	11.5	M6×1.0	15	18.5	12	6

Type\Item	J	JA	JB	K	KA	KC	L	LA	LB	LC	P	PA
2	6	3.5	37	M4×0.7	7.5	3.5	M4×0.7	4	35	4.5	M5×0.8	12.5
3	7.5	4.5	43	M5×0.8	8.5	4.5	M4×0.7	4	40	4.5	M5×0.8	15.5
7	7.5	4.5	50	M5×0.8	8.5	4.5	M5×0.8	5	50	5	M5×0.8	18.5

Type\Item	PB	Q	QA	QB	R	RA	S	SA	T	TA	U	UA
2	10	M5×0.8	4	6	14(H9)	2.5	29(h9)	5.5	29.5(h9)	4	5(H9)	1.5
3	12	M5×0.8	4	7.5	17(H9)	2.5	33(h9)	5.5	34(h9)	4	6(H9)	1.5
7	14	M5×0.8	4	9	20(H9)	3	39(h9)	6.5	40(h9)	4.5	7(H9)	1.5

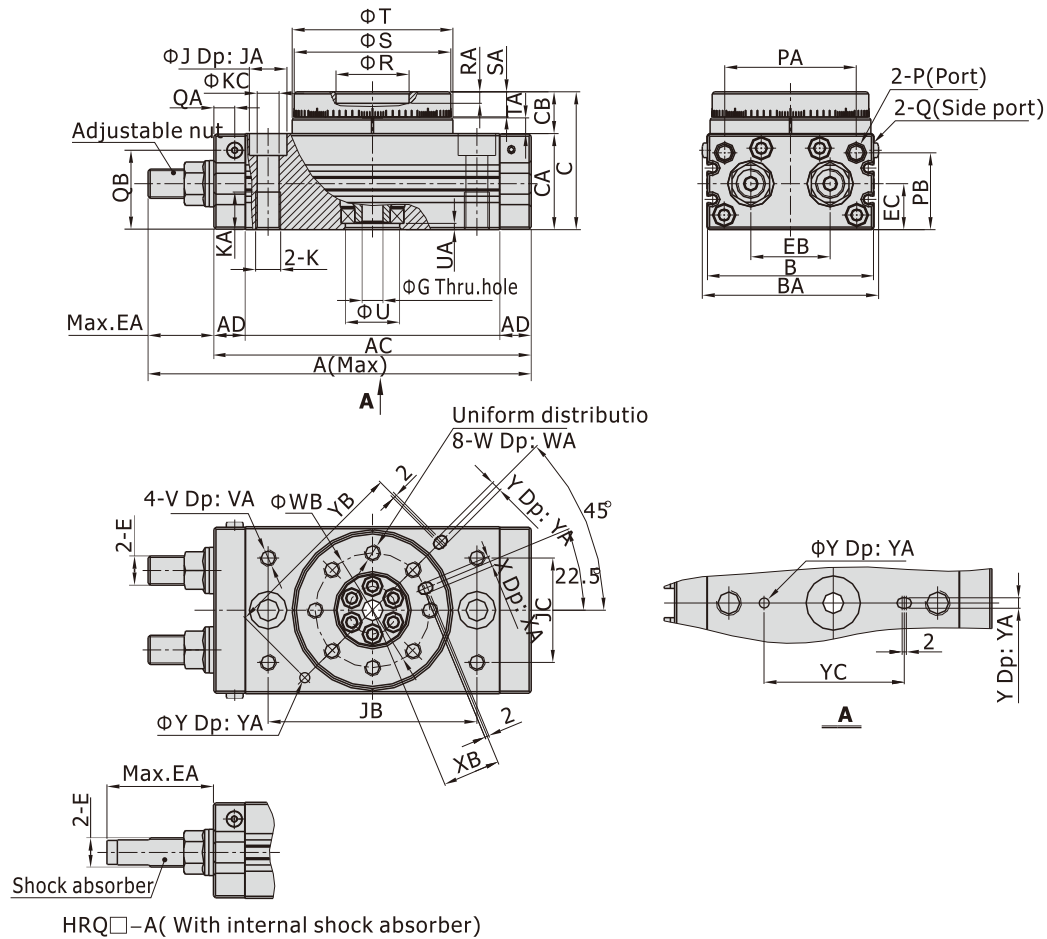
Type\Item	V	VA	VB	VC	W	WA	WB	X	XA	XB	Y	YA	YB
2	M3×0.5	3.5	34	18.5	M3×0.5	5.5	21	2(H9)	2	10.5	2(H9)	2	24
3	M3×0.5	3.5	38	23	M3×0.5	5.5	25	2(H9)	2	12.5	2(H9)	2	28
7	M4×0.7	4.5	45	30	M4×0.7	6.5	29	3(H9)	3	14.5	3(H9)	3	32

Rotary table cylinder

HRQ Series

Specification: 2, 3, 7, 10, 20, 30, 50, 70, 100, 200

HRQ10~50



Type\Item	A(With internal shock absorber)	A(With adjustment bolt)	AC	AD	B	BA	C	CA	CB
10	121	112	92	9.5	50	54	47	34	13
20	169	143	117	11	65	69	54	37	17
30	178.5	152.5	127	11.5	70	74	57	40	17
50	212	183.5	152	15	80	84	66	46	20

Type\Item	E	EA(With internal shock absorber)	EA(With adjustment bolt)	EB	EC	G	J	JA
10	M10×1.0	29	20	20.5	14	5	11	6.5
20	M12×1.0	52	26	27.5	16	9	14	8.5
30	M12×1.0	51.5	25.5	29	18.5	9	14	8.5
50	M14×1.5	60	31.5	38	22	10	18	10.5

Type\Item	JB	JC	K	KA	KC	P	PA	PB	Q	QA	QB	R	RA	S	SA
10	60	27	M8×1.25	12	6.5	M5×0.8	34.5	28	M5×0.8	4.5	29	20(H9)	4.5	45(h9)	8
20	76	34	M10×1.5	15	8.5	M5×0.8	47	30	M5×0.8	6	30	28(H9)	6.5	60(h9)	10
30	84	37	M10×1.5	15	8.5	1/8"	50	32	M5×0.8	6.5	34	32(H9)	5	65(h9)	10
50	100	50	M12×1.75	18	10.5	1/8"	63	38	M5×0.8	10	38	35(H9)	5.5	75(h9)	12

Type\Item	T	TA	U	UA	V	VA	W	WA	WB	X	XA	XB	Y	YA	YB	YC
10	46(h9)	4.5	15(H9)	3	M5×0.8	8	M5×0.8	8	32	3(H9)	3.5	16	3(H9)	3.5	56	40
20	61(h9)	6.5	17(H9)	2.5	M6×1.0	8	M6×1.0	10	43	4(H9)	4.5	21.5	4(H9)	4.5	74	50
30	67(h9)	6.5	22(H9)	3	M6×1.0	8	M6×1.0	10	48	4(H9)	5	24	4(H9)	4.5	80	58
50	77(h9)	7.5	26(H9)	3	M8×1.25	8	M8×1.25	12	55	5(H9)	6	27.5	5(H9)	5.5	92	68

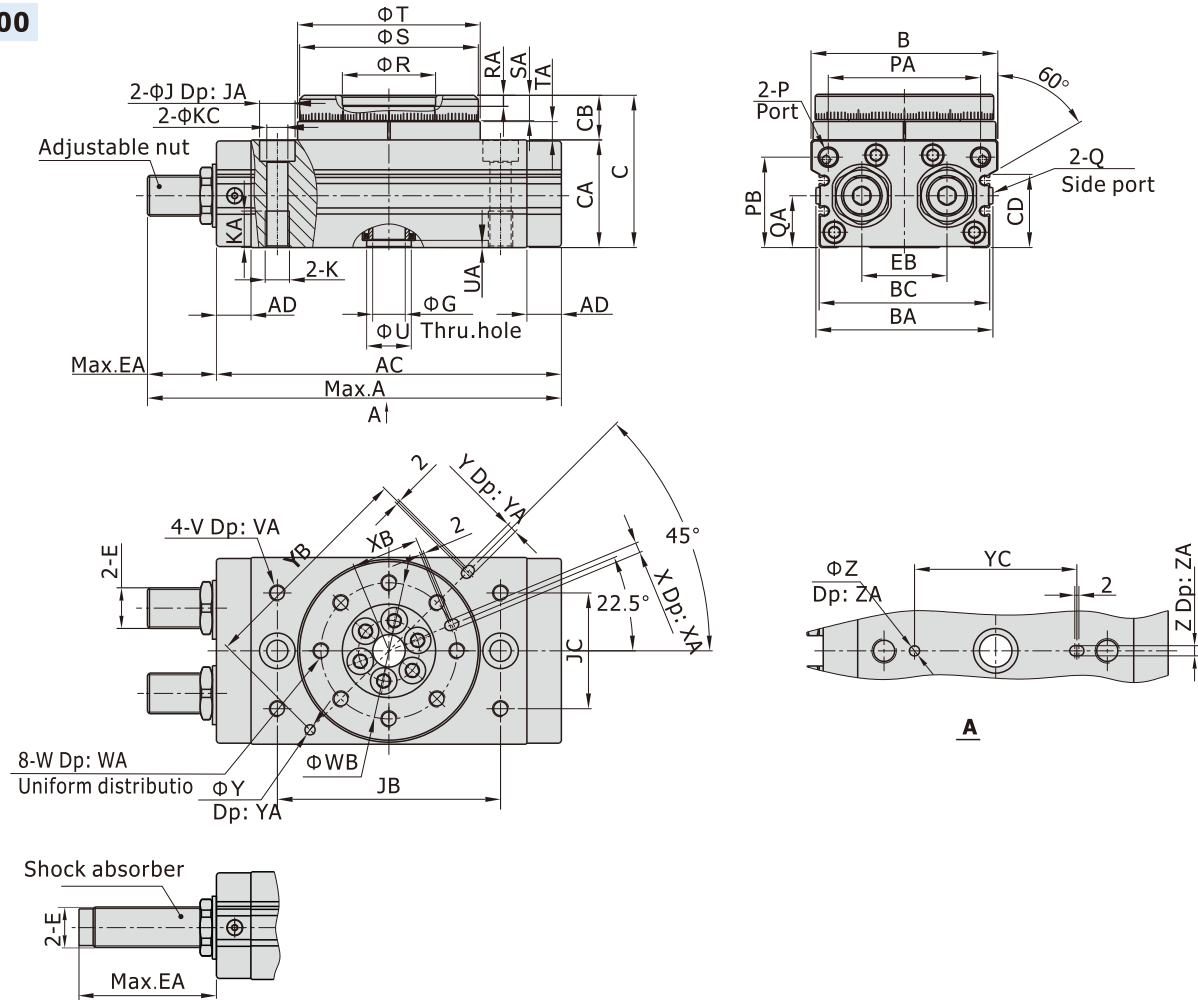
Rotary table cylinder

Airtac

HRQ Series

Specification: 2, 3, 7, 10, 20, 30, 50, 70, 100, 200

HRQ70~200



HRQ□-A(With internal shock absorber)

Type\Item	A(With adjustment bolt)	A(With internal shock absorber)	AC	AD	B	BA	BC	C	CA	CB
70	204	244	170	17	92	88	84	75	53	22
100	223	263	189	17	102	99	95	86	59	27
200	276.5	316.5	240	24	120	117	113	106	74	32

Type\Item	CD	E	EA(With adjustment bolt)	EA(With internal shock absorber)	EB	G	J	JA	JB
70	36	M20×1.5	34	74	42	16	17.5	10.5	110
100	42	M20×1.5	34	74	50	19	17.5	10.5	130
200	57	M27×1.5	36.5	76.5	60	24	20	12.5	150

Type\Item	JC	K	KA	KC	P	PA	PB	Q	QA	R	RA	S	SA	T	TA	U	UA
70	57	M12×1.75	18	10.5	1/8"	75	44.5	M5×0.8	25.5	46(h9)	5	88(h9)	12.5	90(h9)	9	22(H9)	3.5
100	66	M12×1.75	18	10.5	1/8"	85	50.5	M5×0.8	29.5	56(h9)	6	98(h9)	14.5	100(h9)	12	24(H9)	3.5
200	80	M16×2.0	25	14	1/8"	103	63	M5×0.8	36.5	64(h9)	9	116(h9)	16.5	118(h9)	15	32(H9)	5.5

Type\Item	V	VA	W	WA	WB	X	XA	XB	Y	YA	YB	YC	Z	ZA
70	M8×1.25	10	M8×1.25	12.5	67	5(H9)	5.5	33.5	5(H9)	3.5	110	80	5(H9)	3.5
100	M8×1.25	10	M10×1.5	14.5	77	6(H9)	6.5	38.5	6(H9)	4.5	120	100	6(H9)	4.5
200	M12×1.75	13	M12×1.75	16.5	90	8(H9)	8.5	45	8(H9)	4.5	140	110	8(H9)	6.5



How to select product

1. Determine the following working conditions according to the actual situation:

- 1.1) Rotation angle θ : The actual rotation angle must be within the maximum allowed range of rotation angle of cylinder.
- 1.2) Rotation time t : The rotation time must be within the maximum allowed range of rotation time of cylinder.
- 1.3) Installation position of cylinder: Allow enough installation space, so as to ensure leaving adequate space for rotation of cylinder and workpieces.
- 1.4) Determination of loading mass and loading shape.

2. Calculation of necessary forgue needed when loading rotation (T(N.m)):

Calculate the necessary moment required for loading rotation according to the formula below, and combine with the forgue diagram of actual effect, to choose pneumatic cylinder with suitable forgue output.

2.1) Calculation method of moment of inertia in different conditions

$T = K \times I \times \omega$ $\dot{\omega} = \frac{2\theta}{t^2}$	T: Necessary forgue required for loading rotation (N.m)
	K: Coefficient of allowance, K is defined as 5
	I: Moment of inertia (kg.m ²)
	ω : Angular acceleration (rad/s ²)
	θ : Rotation Angle (rad)
	t: Rotation time (s)

Diagram	Description	Calculation formula of moment of inertia	Rotation radius
	d: Diameter (m) m: Mass (kg)	$I = \frac{md^2}{8}$	$\frac{d^2}{8}$
Note: no special installation direction			
	d ₁ : Diameter (m) d ₂ : Diameter (m) m ₁ : d ₁ Mass (kg) m ₂ : d ₂ Mass (kg)	$I = \frac{m_1 d_1^2 + m_2 d_2^2}{8}$	$\frac{d_1^2 + d_2^2}{8}$
Note: compare d ₁ with d ₂ , disregard d ₁ if d ₁ is extremely tiny			
	d: Diameter (m) m: Mass (kg)	$I = \frac{md^2}{16}$	$\frac{d^2}{16}$
Note: no special installation direction			
	r: Radius (m) m: Mass (kg)	$I = \frac{2mr^2}{5}$	$\frac{2r^2}{5}$
Note: no special installation direction			
	a ₁ : Length of stick (m) a ₂ : Length of stick (m) m ₁ : a ₁ Mass (kg) m ₂ : a ₂ Mass (kg)	$I = \frac{m_1 a_1^2 + m_2 a_2^2}{3}$	$\frac{a_1^2 + a_2^2}{3}$
Note: 1. horizontal installation. 2. pay attention to the change of movement time when vertical installation.			
	a ₁ : Sheet length (m) a ₂ : Sheet length (m) b: Length of side (m) m ₁ : a ₁ Mass (kg) m ₂ : a ₂ Mass (kg)	$I = \frac{m_1(4a_1^2 + b^2) + m_2(4a_2^2 + b^2)}{12}$	$\frac{2a_1^2 + 2a_2^2 + b^2}{6}$
Note: 1. horizontal installation. 2. pay attention to the change of movement time when vertical installation.			

Diagram	Description	Calculation formula of moment of inertia	Rotation radius
	a: Sheet length (m) b: Length of side (m) m: Mass (kg)	$I = \frac{m(a^2 + b^2)}{12}$	$\frac{a^2 + b^2}{12}$
Note: no special installation direction			
	a: Sheet length (m) m: Mass (kg)	$I = \frac{ma^2}{12}$	$\frac{a^2}{12}$
Note: no special installation direction			
	a: Sheet length (m) m: Mass (kg)	$I = \frac{ma^2}{3}$	$\frac{a^2}{3}$
Note: 1. horizontal installation. 2. pay attention to the change of movement time when vertical installation.			
	a: Sheet length (m) b: Distance between the rotation axis and the gravity center of loading (m) m: Mass (kg)	$I = \frac{ma^2}{12} + mb^2$	$\frac{a^2}{12} + b^2$
Note: the cuboids are same too.			
	a: Tooth number of gear b: Tooth number of loading gear	$I_a = \left(\frac{a}{b}\right)^2 I_b$	
	a ₁ : Vertical distance between the rotation axis and the concentrated loading (m) a ₂ : Length of arm (m) m ₁ : Mass of concentrated loading (kg) m ₂ : Mass of arm (kg)	$I = m_1 a_1^2 + \frac{m_2 a_2^2}{3} + m_1 K$	
Note: 1. horizontal installation. 2. compared with m, disregard if m is extremely tiny. 3. calculate K according to the shape of concentrated loading row by row. For example, when the loading is spheroid, $K = 2r^2/5$			

3. Calculation of maximum movement energy E_{max} (J):

Calculate the maximum movement energy E_{max} according to the formula below, and make sure that the maximum movement energy is within allowed energy angle of the chosen pneumatic cylinder, excessive large movement energy would lead to damage of inner parts, please choose rotation cylinder attached with shock absorber when the movement energy is fairly large.

$$E_{max} = \frac{1}{2} I \omega_{max}^2 \quad \omega_{max} = \frac{2\theta}{t} \quad \omega_{max}: \text{Maximal angular velocity (rad/s)}$$

4. Calculation of loading rate

Calculate the loading rate according to the formula below, and the loading rate must not be more than 1.

$$\text{Loading rate} = \frac{W_s}{\text{Maximal allowed axial loading}} + \frac{W_r}{\text{Maximal allowed radial loading}} + \frac{M}{\text{Maximal allowed bending moment of working platform}} \leq 1$$

W_s : Actual axial loading W_r : Actual radial loading M : Actual loaded bending moment of working platform

5. Determination method

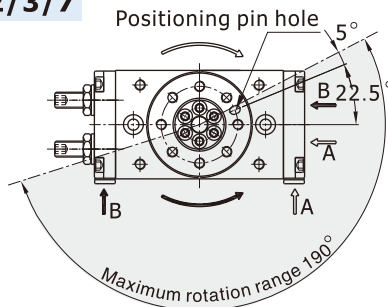
It could be used only when the chosen pneumatic cylinder must meet the requirements of article 2, 3 and 4 simultaneously.

Installation and application

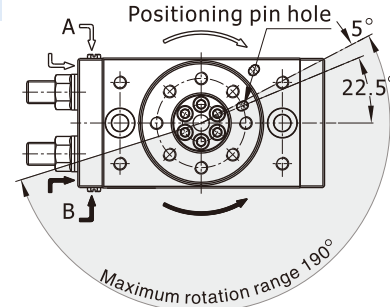
1. Rotation Direction and Rotation Angle

1.1) Rotation Direction

HRQ2/3/7



HRQ10~200



A) By adjusting the adjustment bolt, the rotation end can be set within the range shown in the up drawing:

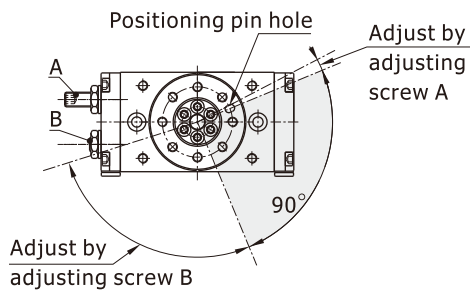
Maximum rotation is 190° ;

B) The rotary table turns in the clockwise direction when the A port is pressurized, and in the counter-clockwise direction when the B port is pressurized.

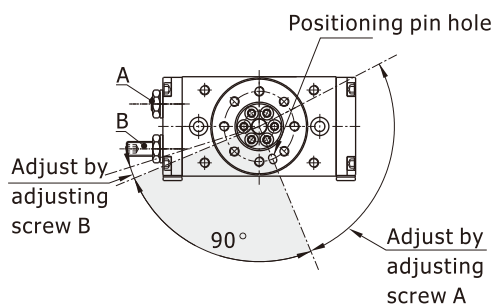
1.2) Rotation Range Example(90° Rotation)

HRQ2/3/7

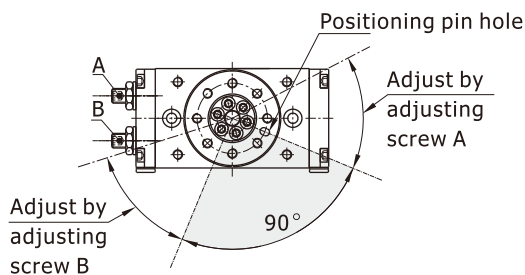
Adjustment amount by adjustment bolt B



Adjustment amount by adjustment bolt A

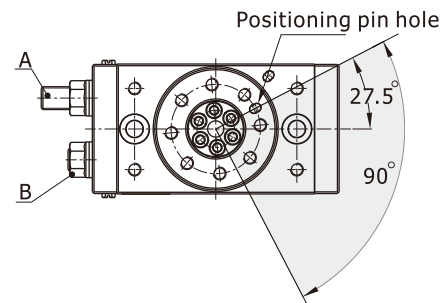


Adjustment amount by adjustment bolt A, B

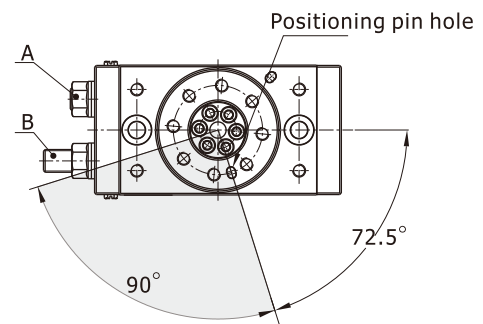


HRQ10~200

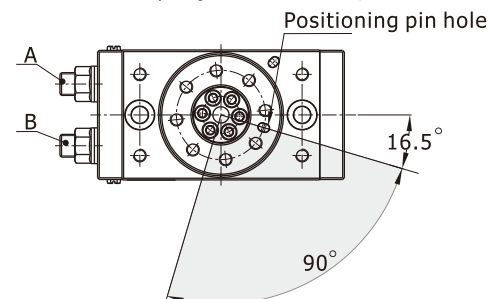
Adjustment amount by adjustment bolt B



Adjustment amount by adjustment bolt A



Adjustment amount by adjustment bolt A, B



1.3) The rotation angle can also be set on a type with internal absorber.

Model	Adjustment angle per rotation of angle(adjustment screw)
HRQ2	11.5°
HRQ3	10.9°
HRQ7	10.2°
Model	Adjustment angle per rotation of angle(adjustment screw or shock absorber)
HRQ10	10.2°
HRQ20	6.5°
HRQ30	6.5°
HRQ50	8.2°
HRQ70	7.0°
HRQ100	6.1°
HRQ200	4.9°

- The range of rotation angle has been adjusted to the maximum in the factory, please do not enlarge the rotation angle any more.
- The movement energy should not exceed the allowed maximum energy, or the inner parts will be damaged.
- The rotary parts need no lubrication.
- Series HRQ is equipped with a rubber bumper or shock absorber. Therefore, perform rotation adjustment in the pressurized condition(minimum operation pressure: 0.1 Mpa or more for adjustment bolt and internal shock absorber types, and 0.2 MPa or more for external shock absorber type.)
- Refer to the table below for tightening torques of the shock absorber setting nut.

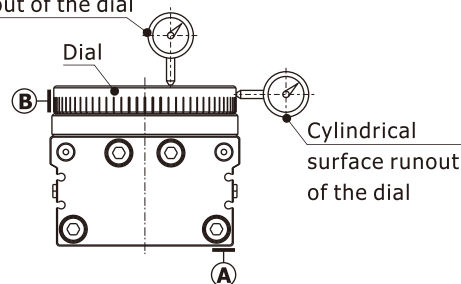
Shock absorber size	Max. tightening torque(Nm)
M10	3.5
M12	8.0
M14	11.0
M20	24.0
M27	63.0

- Never loosen the bottom screw of the shock absorber. (It is not an adjustment screw.) That may cause oil leakage.
- Shock absorbers are consumable parts.
When a decrease in energy absorption capacity is noticed, it must be replaced.

Rotary table cylinder	Shock absorber
HRQ10	ACA1006-3N
HRQ20\HRQ30	ACA1215-3N
HRQ50	ACA1416-3N
HRQ70\HRQ100	ACA2020-3N
HRQ200	ACA2725-3N

9. Strictly control run out and parallelism of the dial according to the requirements of the following table.

Plane parallelism and runout of the dial

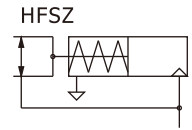
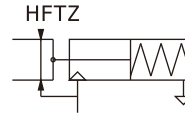
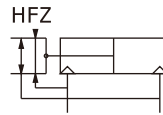


Items	Specific requirements	Relative datum
Plane parallelism of the dial	0.1	A
Plane runout of the dial	0.1	A
Cylindrical surface runout of the dial	0.1	A



Air gripper—HFZ Series

Parallel style with guide track—Ball bearing



Ordering code

HFZ 20 ☐

①

②

③

① Model

HFZ: Air finger(Double acting)

HFSZ: Air finger
(Single acting and normally closed)

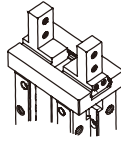
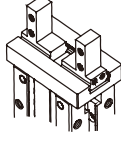
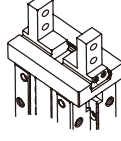
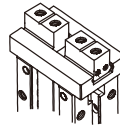
HFTZ: Air finger
(Single acting and normally opened)

② Bore size

6 10 16 20 25 32 40

HFZ series are all attached with magnet.

③ Finger type

Bore size	Finger type	
6 10 16 20 25 32 40	Blank: Standard 	
6	B: Side mounting type 	N: Thru.hole mounting type 
	F: Bottom mounting type 	

Specification

Bore size (mm)			6	10	16	20	25	32	40	
Acting type			Double acting			Single acting				
Fluid			Air(to be filtered by 40μm filter element)							
Operating pressure	Double acting	Φ6, Φ10	28~100psi(0.2~0.7MPa)							
		Others	22~100psi(0.15~0.7MPa)							
	Single acting	Φ6, Φ10	50~100psi(0.35~0.7MPa)							
		Others	36~100psi(0.25~0.7MPa)							
Temperature			-20~70℃							
Lubrication			Not required							
Repeatability mm			±0.01						±0.02	
Max. frequency			180(c.p.m)						60(c.p.m)	
Sensor switches			DMSH(S)	CMSG DMSG(H)	CMSG, DMSG(S), DMSH(S)					
Port size			M3×0.5			M5×0.8				



Air gripper(parallel style——Ball bearing)

HFZ Series

Bore size: $\Phi 6$, $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$

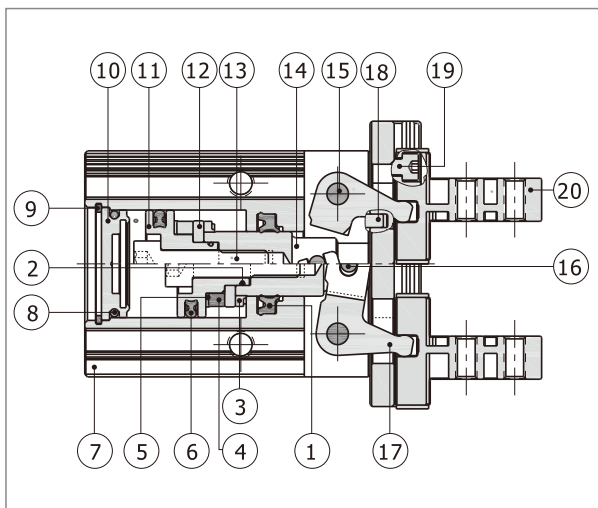
Gripping force and stroke

Acting type		Double acting(HFZ)							Single acting_NO (HFTZ)							Single acting_NC (HFSZ)						
Bore size		6	10	16	20	25	32	40	6	10	16	20	25	32	40	6	10	16	20	25	32	40
Gripping force per finger Effective value(N)	External	3.3	11	34	45	69	160	255	1.9	7	27	35	55	133	220	-	-	-	-	-	-	-
	Internal	6.1	17	45	68	102	195	320	-	-	-	-	-	-	-	3.7	13	38	59	87	163	270
Opening/Closing stroke(Both sides)(mm)		4	4	6	10	14	22	30	4	4	6	10	14	22	30	4	4	6	10	14	22	30
Weight (g)	F Type	24	-	-	-	-	-	-	25	-	-	-	-	-	-	25	-	-	-	-	-	-
	Others	25	56	124	236	428	729	1268	26	57	125	238	430	778	1365	26	57	125	238	430	778	1365

[Note] The gripping force in the above table is in the working pressure of 75psi, and with a gripping point of L=20mm.

Add) Please refer to page 197 for the definition of "L".

Inner structure and material of major parts



NO.	Item	Material
1	Rod packing	NBR
2	O-ring	NBR
3	Bumper	TPU
4	Magnet	Sintered metal(Neodymium-iron-boron)
5	Magnet washer	NBR
6	Piston seal	NBR
7	Body	Aluminum alloy
8	O-ring	NBR
9	C clip	Spring steel
10	Back cover	Aluminum alloy
11	Piston	Aluminum alloy/Stainless steel
12	Magnet fixed flake	Stainless steel
13	Screw	Carbon steel
14	Piston rod	Aluminum alloy/Stainless steel
15	Pin	Stainless steel
16	Pin	Stainless steel
17	Curved bar	Stainless steel
18	Pin	Stainless steel
19	Countersink screw	Carbon steel
20	Assembly of clamping jaw and guide rail	Stainless steel

Air gripper(parallel style——Ball bearing)

AirTAC

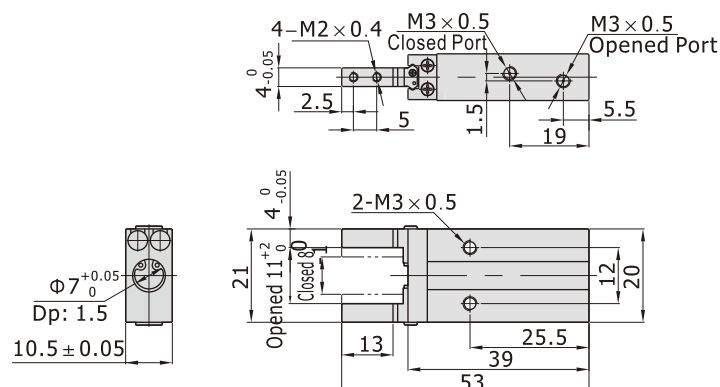
HFZ Series

Bore size: $\Phi 6$, $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$

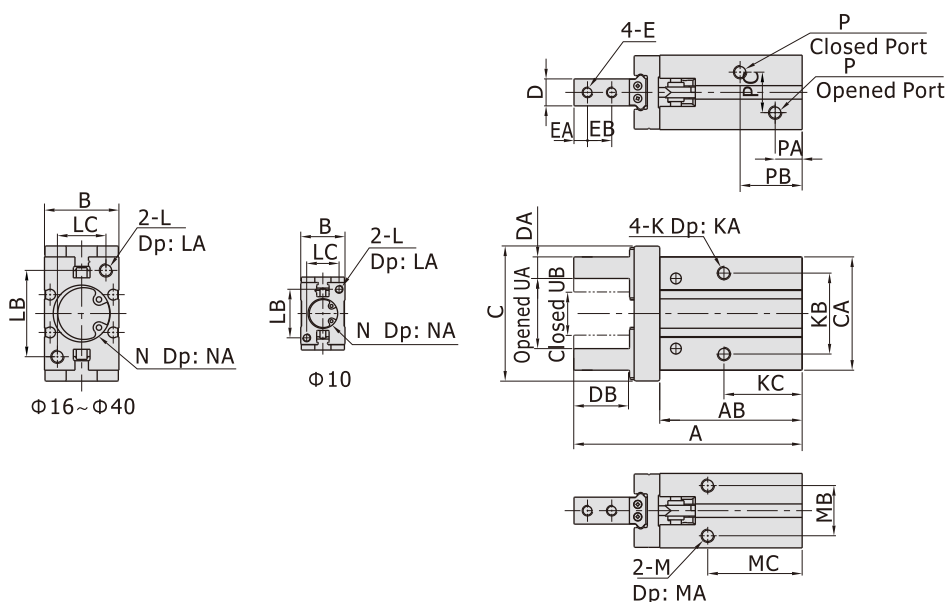
Dimensions

Standard

$\Phi 6$



$\Phi 10 \sim \Phi 40$



Model\Item	A	AB	B	C	CA	D	DA	DB	E	EA	EB	K	KA	KB	KC	L
HFZ10	57	37.5	16.5	30	23	5 ^{-0.05/0}	4 ^{-0.05/0}	12	M2.5×0.45	3	5.7	M3×0.5	5	16	23	M3×0.5
HFZ16	67.5	42.5	23.5	39	30.5	8 ^{-0.05/0}	5 ^{-0.05/0}	15	M3×0.5	4	7	M4×0.7	7	24	24.5	M4×0.7
HFZ20	85	53	27.5	53	42	10 ^{-0.05/0}	8 ^{-0.05/0}	20	M4×0.7	5	9	M5×0.8	8	30	29	M5×0.8
HFZ25	103	64	33.5	71	52	12 ^{-0.05/0}	10 ^{-0.05/0}	25	M5×0.8	6	12	M6×1.0	10	36	30	M6×1.0
HFZ32	113(122)	67(76)	40	106	60	15 ^{-0.05/0}	12 ^{-0.05/0}	29	M6×1.0	7	14	M6×1.0	10	46	40(49)	M6×1.0
HFZ40	139(152)	83(96)	48	132	72	18 ^{-0.05/0}	14 ^{-0.05/0}	36	M8×1.25	9	17	M8×1.25	12	56	49(62)	M8×1.25

Model\Item	LA	LB	LC	M	MA	MB	MC	N	NA	P	PA	PB	PC	UA(Opened)	UB(Closed)
HFZ10	6	18	12	M3×0.5	6	11.5	27	Φ11 ^{+0.05/0}	1.5	M3×0.5	7	19	10	15.5 ^{+2/0}	11.5 ^{0/-1}
HFZ16	8	22	15	M4×0.7	4.5	16	30	Φ17 ^{+0.05/0}	1.5	M5×0.8	7.5	19	13	21 ^{+2/0}	15 ^{0/-1}
HFZ20	10	32	18	M5×0.8	8	18.5	35	Φ21 ^{+0.05/0}	2	M5×0.8	9.5	23	15	26.5 ^{+2/0}	16.5 ^{0/-1}
HFZ25	12	40	22	M6×1.0	10	22	36.5	Φ26 ^{+0.05/0}	2	M5×0.8	9	24	20	33.5 ^{+2/0}	19.5 ^{0/-1}
HFZ32	12	46	26	M6×1.0	10	26	48(57)	Φ34 ^{+0.05/0}	2.5	M5×0.8	9.5	31(40)	24	48 ^{+2.5/0}	26 ^{0/-1}
HFZ40	16	56	32	M8×1.25	12	32	58(71)	Φ42 ^{+0.05/0}	2.5	M5×0.8	10.5	38(50)	28	60 ^{+2.5/0}	30 ^{0/-1}

[Note]The values in "()" in the above table are single acting type sizes.



Air gripper(parallel style——Ball bearing)

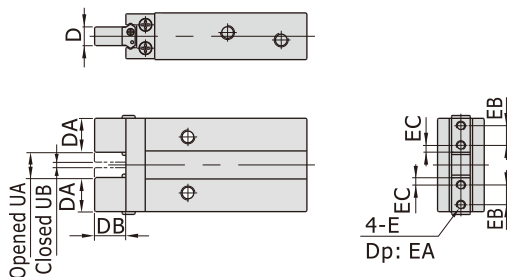
AirTAC

HFZ Series

Bore size: $\Phi 6$, $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$

Bottom mounting type(F type)

$\Phi 6$

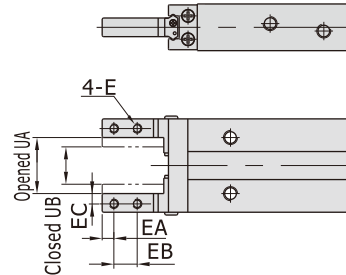


Model\Item	D	DA	DB	EA	EB	E
HFZ6-F	4 ⁰ _{-0.05}	7.5	7	3	3.5	M2×0.4

Model\Item	UA(Opened)	UB(Closed)
HFZ6-F	4 ^{+1.5} ₀	1.8 ⁰ _{-0.5}

Side mounting type(B type)

$\Phi 6$

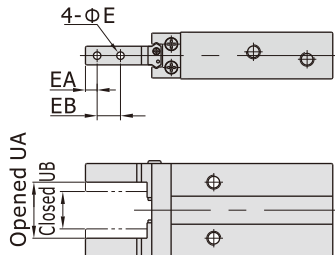


Model\Item	E	EA	EB	EC
HFZ6-B	M2×0.4	2.5	5	2

Model\Item	UA(Opened)	UB(Closed)
HFZ6-B	11 ⁺² ₀	8 ⁰ ₋₁

Thru.hole mounting type(N type)

$\Phi 6$



Model\Item	E	EA	EB
HFZ6-N	2.3	2.5	5

Model\Item	UA(Opened)	UB(Closed)
HFZ6-N	11 ⁺² ₀	8 ⁰ ₋₁

[Note] The other dimensions are the same as standard type.

How to select product \ Installation and application

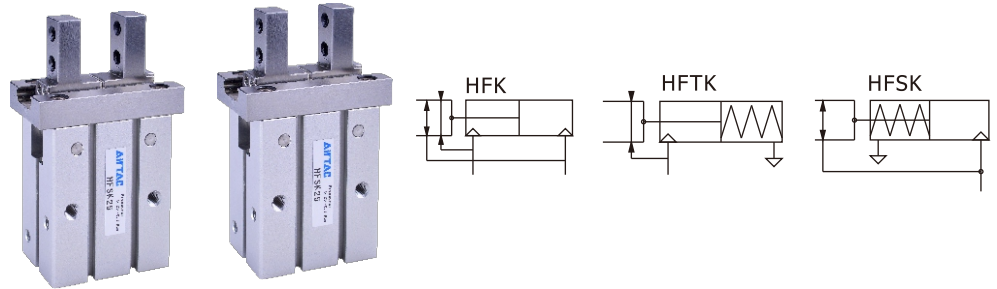
Please refer to HFK series for details.





Air gripper—HFK Series

Parallel style with guide track—Roller bearing



Ordering code

HFK 20 ☐

1

2

3

① Model

HFK: Air finger(Double acting)

HFSK: Air finger
(Single acting and normally closed)

HFTK: Air finger
(Single acting and normally opened)

② Bore size

10 16 20 25 32 40

HFK series are all attached with magnet.

③ Finger type

Bore size	Finger type	
10 16 20 25 32 40	Blank: Standard	B: Side mounting type
	R: Narrow type	F: Bottom mounting type
	N: Thru.hole mounting type	W: Side mounting and arrow type
10 16 20 25		
	M: Thru.hole mounting and narrow type	

Specification

Bore size (mm)			10	16	20	25	32	40
Acting type			Double acting		Single acting			
Fluid			Air(to be filtered by 40μm filter element)					
Operating pressure	Double acting	Φ10	28~100psi(0.2~0.7MPa)					
		Others	22~100psi(0.15~0.7MPa)					
	Single acting	Φ10	50~100psi(0.35~0.7MPa)					
		Others	36~100psi(0.25~0.7MPa)					
Temperature			-20~70□					
Lubrication			Not required					
Repeatability mm			±0.01				±0.02	
Max. frequency			180(c.p.m)				60(c.p.m)	
Sensor switches			DMSH(S)	CMSG, DMSG(S), DMSH(S)				
Port size			M3×0.5	M5×0.8				



Air gripper(parallel style——roller bearing)

HFK Series

Bore size: $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$

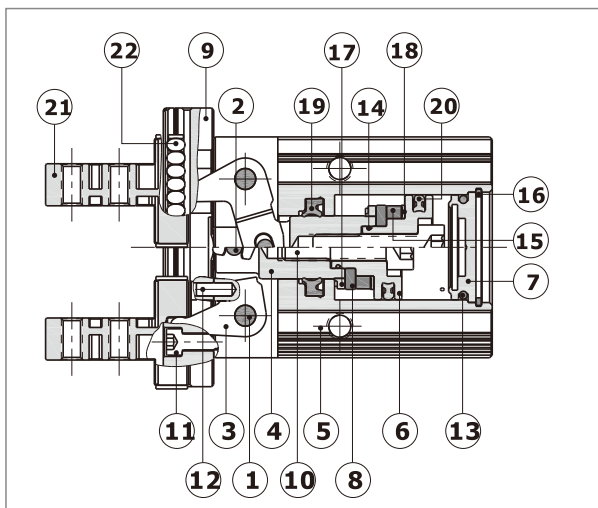
Gripping force and stroke

Acting type		Double acting(HFK)						Single acting_NO (HFTK)						Single acting_NC (HFSK)					
Bore size		10	16	20	25	32	40	10	16	20	25	32	40	10	16	20	25	32	40
Gripping force per finger Effective value(N)	External	11	34	45	69	160	255	7	27	35	55	133	220	-	-	-	-	-	-
	Internal	17	45	68	102	195	320	-	-	-	-	-	-	13	38	59	87	163	270
Opening/Closing stroke(Both sides)(mm)		4	6	10	14	22	30	4	6	10	14	22	30	4	6	10	14	22	30
Weight (g)	F Type	56	124	236	418	750	1340	57	125	238	420	799	1437	57	125	238	420	799	1437
	Others	56	124	236	428	729	1268	57	125	238	430	778	1365	57	125	238	430	778	1365

[Note] The gripping force in the above table is in the working pressure of 75psi, and with a gripping point of L=20mm.

Add) Please refer to page 197 for the definition of "L".

Inner structure and material of major parts

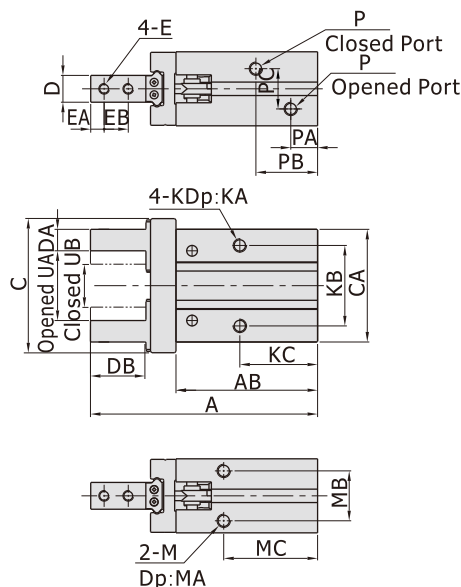


NO.	Item	Material
1	Pin	Stainless steel
2	Pin	Stainless steel
3	Curved bar	Stainless steel
4	Piston rod	Aluminum alloy/Stainless steel
5	Body	Aluminum alloy
6	Piston	Aluminum alloy/Stainless steel
7	Back cover	Brass/Aluminum alloy
8	Magnet fixed flake	Aluminum alloy/Stainless steel
9	Bearing steel	Stainless steel
10	Countersink screw	Carbon steel
11	Countersink screw	Carbon steel
12	Pin	Bearing steel
13	O-ring	NBR
14	O-ring	NBR
15	Magnet	Sintered metal(Neodymium-iron-boron)
16	C clip	Spring steel
17	Bumper	TPU
18	Magnet washer	NBR
19	Rod packing	NBR
20	Piston seal	NBR
21	Clamping jaw	Bearing steel
22	Guide roller	Bearing steel

AirTAC

Bore size: $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$

Standard



[Note]The values in “()” in the above table are single acting type sizes.

The figure consists of two schematic diagrams of a mechanical assembly. The left diagram shows the assembly in two states: 'Opened UA' and 'Closed UB'. In the 'Opened UA' state, the top part is raised, and dimensions DA, DC, DE, and DF are indicated. In the 'Closed UB' state, the top part is lowered, and dimension DB is indicated. The right diagram shows the assembly in its '4-EDp:EA' state, with dimensions EC and EB indicated.

Model\Item	DF	EA	EB	EC	UA(Opened)	UB(Closed)
HFK10-F	2	4	6	2.45	5.5 ⁺² ₀	1.8 ⁰ _{-0.5}
HFK16-F	2.5	6	8	3.05	7.5 ⁺² ₀	1.8 ⁰ _{-0.5}
HFK20-F	3	8	10	3.95	11.5 ⁺² ₀	1.8 ⁰ _{-0.5}
HFK25-F	4	10	12	4.9	16 ^{+2.5} ₀	2.4 ⁰ _{-0.5}
HFK32-F	5	12	20	7.3	25 ^{+2.5} ₀	3.4 ⁰ _{-0.5}
HFK40-F	6	16	24	8.7	33 ⁺³ ₀	3.4 ⁰ _{-0.5}

[Note] The other dimensions are the same as standard type.

Air gripper(parallel style—roller bearing)

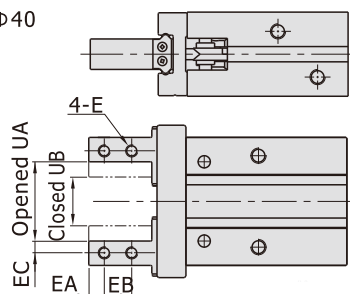
AIRTAC

HFK Series

Bore size: $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$

Side mounting type(B type)

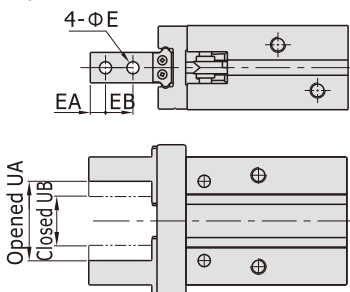
$\Phi 10 \sim \Phi 40$



Model\Item	E	EA	EB	EC	UA(Opened)	UB(Closed)
HFK10-B	M2.5×0.45	3	5.7	2	15.5 $^{+2}_0$	11.5 $^{+0}_{-1}$
HFK16-B	M3×0.5	4	7	2.5	21 $^{+2}_0$	15 $^{+0}_{-1}$
HFK20-B	M4×0.7	5	9	4	26.5 $^{+2}_0$	16.5 $^{+0}_{-1}$
HFK25-B	M5×0.8	6	12	5	33.5 $^{+2}_0$	19.5 $^{+0}_{-1}$
HFK32-B	M6×1.0	7	14	6	48 $^{+2.5}_0$	26 $^{+0}_{-1}$
HFK40-B	M8×1.25	9	17	7	60 $^{+2.5}_0$	30 $^{+0}_{-1}$

Thru.hole mounting type(N type)

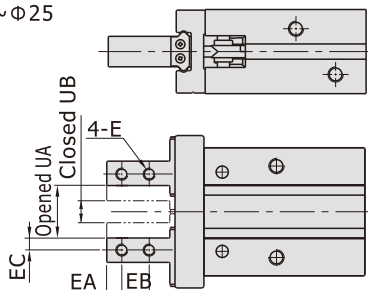
$\Phi 10 \sim \Phi 40$



Model\Item	E	EA	EB	UA(Opened)	UB(Closed)
HFK10-N	2.8	3	5.7	15.5 $^{+2}_0$	11.5 $^{+0}_{-1}$
HFK16-N	3.3	4	7	21 $^{+2}_0$	15 $^{+0}_{-1}$
HFK20-N	4.5	5	9	26.5 $^{+2}_0$	16.5 $^{+0}_{-1}$
HFK25-N	5.5	6	12	33.5 $^{+2}_0$	19.5 $^{+0}_{-1}$
HFK32-N	6.5	7	14	48 $^{+2.5}_0$	26 $^{+0}_{-1}$
HFK40-N	9	9	17	60 $^{+2.5}_0$	30 $^{+0}_{-1}$

Side mounting and narrow type(W type)

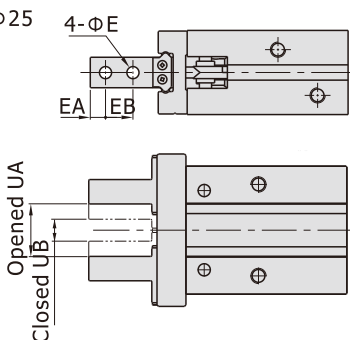
$\Phi 10 \sim \Phi 25$



Model\Item	E	EA	EB	EC	UA(Opened)	UB(Closed)
HFK10-W	M2.5×0.45	3	5.7	2	10 $^{+2}_0$	6 $^{+0}_{-1}$
HFK16-W	M3×0.5	4	7	2.5	12.5 $^{+2}_0$	6.5 $^{+0}_{-1}$
HFK20-W	M4×0.7	5	9	4	17 $^{+2}_0$	7 $^{+0}_{-1}$
HFK25-W	M5×0.8	6	12	5	23 $^{+2.5}_0$	9 $^{+0}_{-1}$

Thru.hole mounting and narrow type(M type)

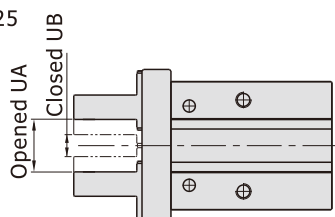
$\Phi 10 \sim \Phi 25$



Model\Item	E	EA	EB	UA(Opened)	UB(Closed)
HFK10-M	2.8	3	5.7	10 $^{+2}_0$	6 $^{+0}_{-1}$
HFK16-M	3.3	4	7	12.5 $^{+2}_0$	6.5 $^{+0}_{-1}$
HFK20-M	4.5	5	9	17 $^{+2}_0$	7 $^{+0}_{-1}$
HFK25-M	5.5	6	12	23 $^{+2.5}_0$	9 $^{+0}_{-1}$

Narrow type(R type)

$\Phi 10 \sim \Phi 25$



Model\Item	UA(Opened)	UB(Closed)
HFK10-R	10 $^{+2}_0$	6 $^{+0}_{-1}$
HFK16-R	12.5 $^{+2}_0$	6.5 $^{+0}_{-1}$
HFK20-R	17 $^{+2}_0$	7 $^{+0}_{-1}$
HFK25-R	23 $^{+2.5}_0$	9 $^{+0}_{-1}$

How to select product

Please select pneumatic finger according to the following steps:

① The selection of the effective gripping force

② the confirmation of the gripping point

③ the confirmation of the external force put on the gripping jaw

1. The selection of the gripping force

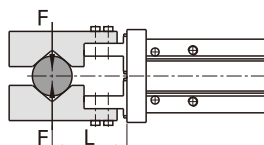
The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient $a=4$, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

	The work-pieces as shown in the left :		$\mu=0.2$	$\mu=0.1$
	F: Gripping force (N) μ : friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity ($=9.8m/s^2$)	The condition that the work-pieces won't drop is: $2 \times \mu F > mg$ so: $F > \frac{mg}{2 \times \mu}$ Safety coefficient is a, so F is: $F = \frac{mg}{2 \times \mu} \times a$	$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$ 10 times of the mass of the gripped objects	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$ 20 times of the mass of the gripped objects

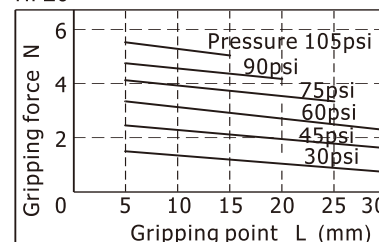
Note) If the friction coefficient $\mu > 0.2$, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

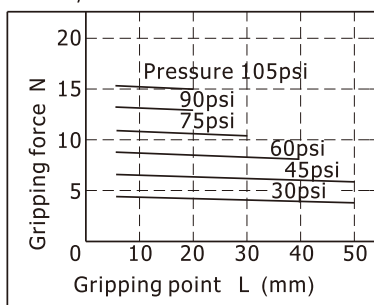
Double acting type closed gripping force



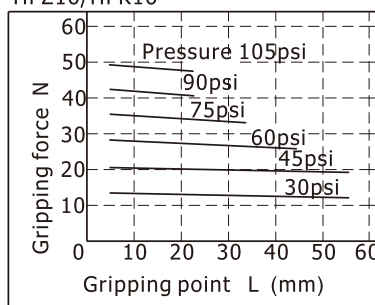
HFZ6



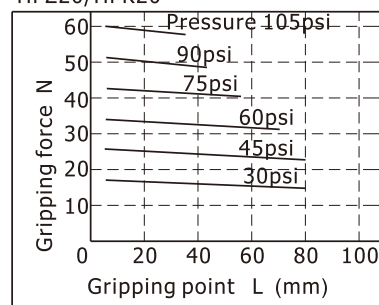
HFZ10/HFK10



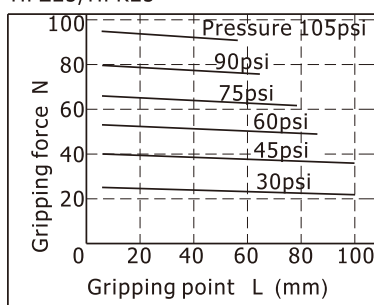
HFZ16/HFK16



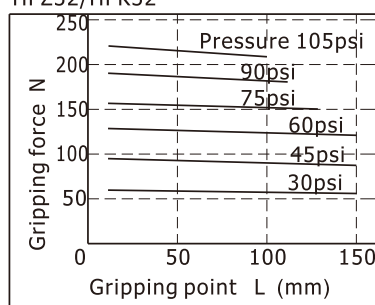
HFZ20/HFK20



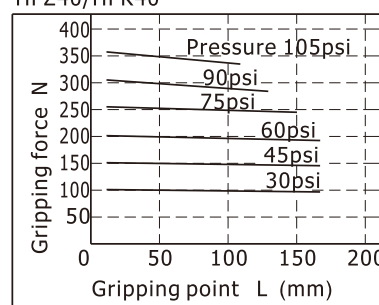
HFZ25/HFK25



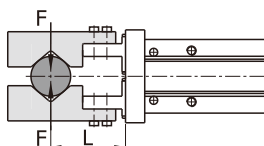
HFZ32/HFK32



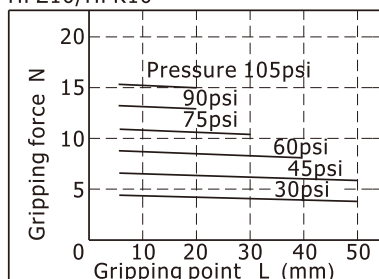
HFZ40/HFK40



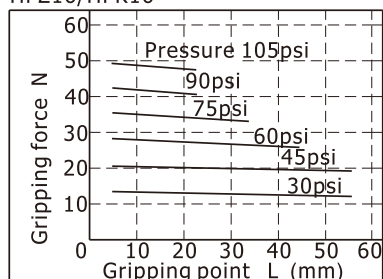
Double acting type closed gripping force



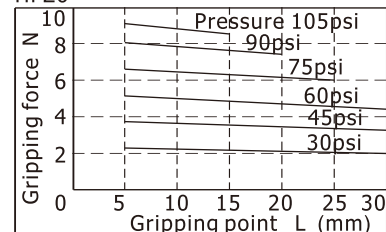
HFZ10/HFK10



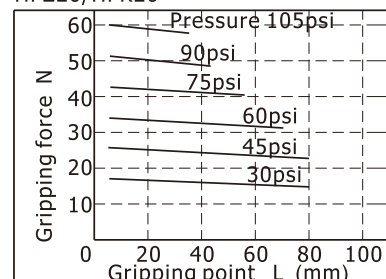
HFZ16/HFK16



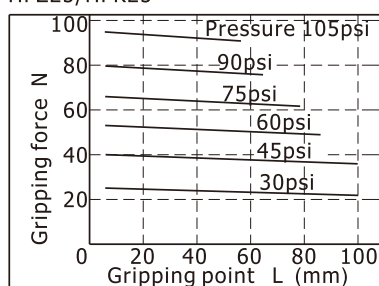
HFZ6



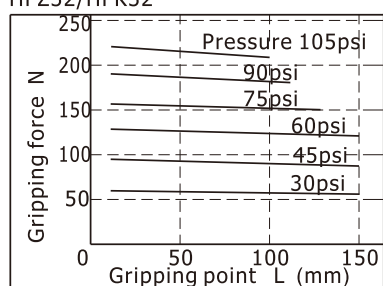
HFZ20/HFK20



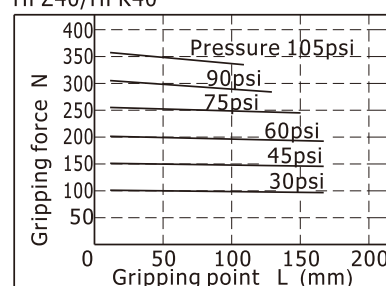
HFZ25/HFK25



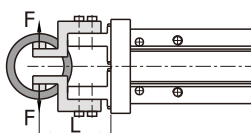
HFZ32/HFK32



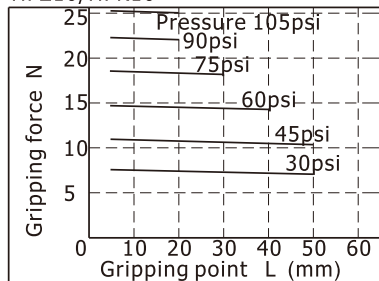
HFZ40/HFK40



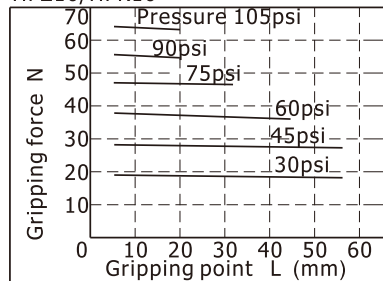
Double acting type opened gripping force



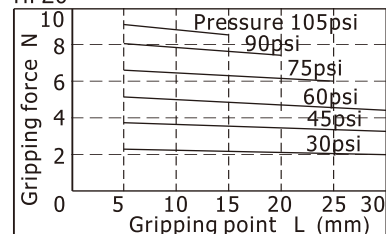
HFZ10/HFK10



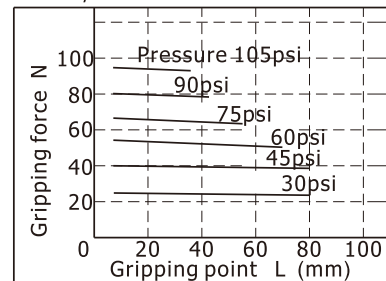
HFZ16/HFK16



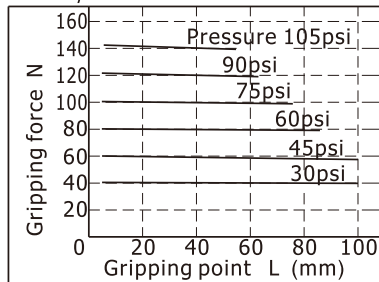
HFZ6



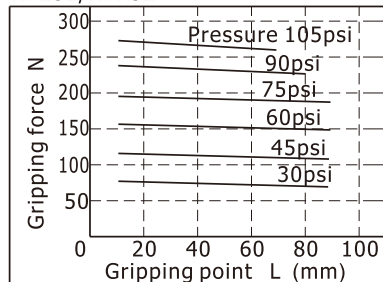
HFZ20/HFK20



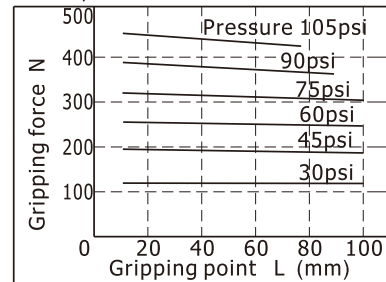
HFZ25/HFK25



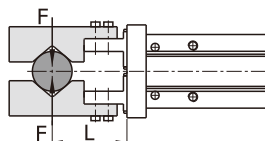
HFZ32/HFK32



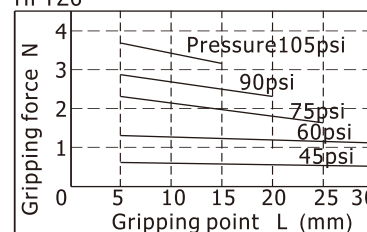
HFZ40/HFK40



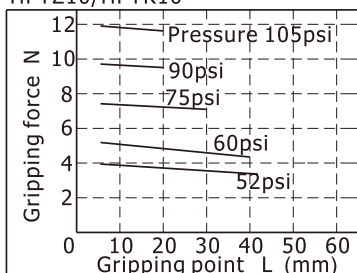
Single acting normally opened gripping force



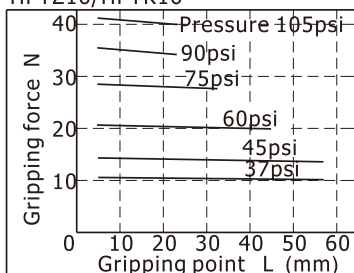
HFTZ6



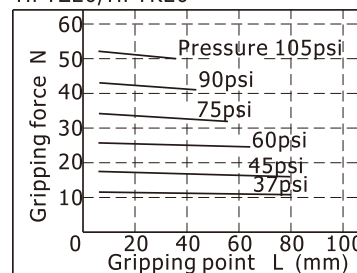
HFTZ10/HFTK10



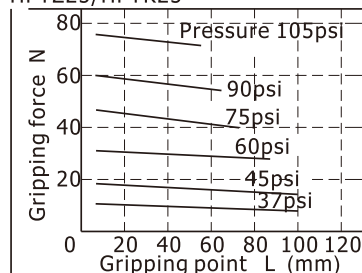
HFTZ16/HFTK16



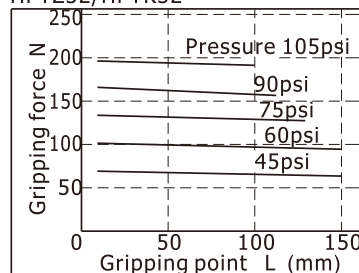
HFTZ20/HFTK20



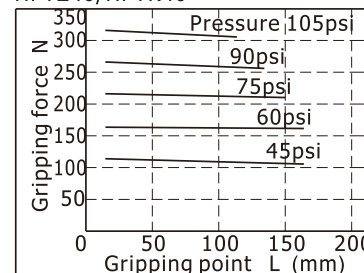
HFTZ25/HFTK25



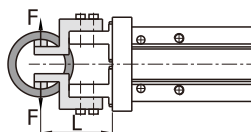
HFTZ32/HFTK32



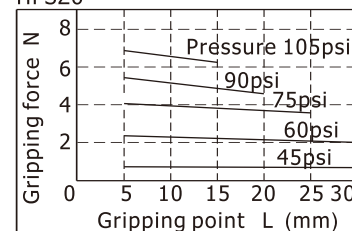
HFTZ40/HFTK40



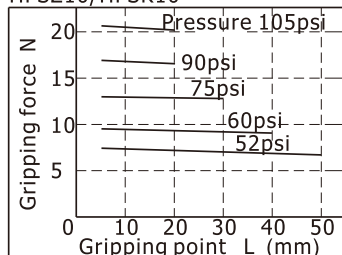
Single acting normally closed clamping force



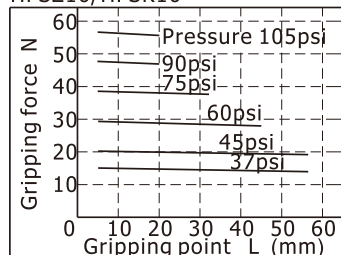
HFSZ6



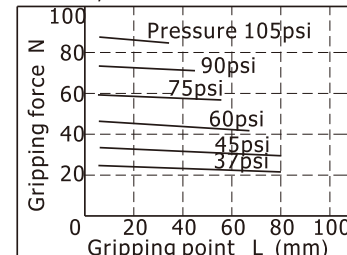
HFSZ10/HFSK10



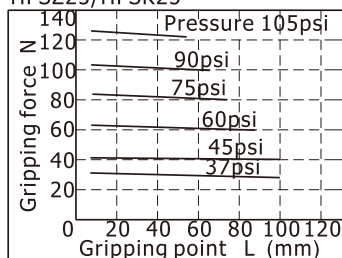
HFSZ16/HFSK16



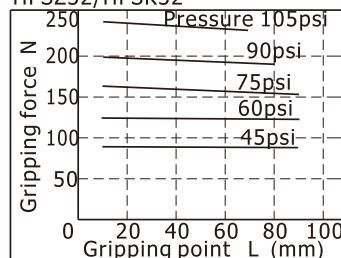
HFSZ20/HFSK20



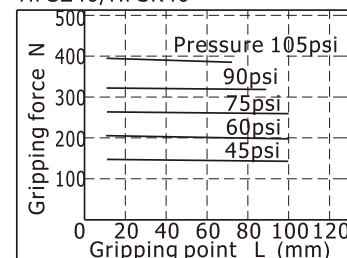
HFSZ25/HFSK25



HFSZ32/HFSK32



HFSZ40/HFSK40



Air gripper(parallel style——roller bearing)

AirTAC

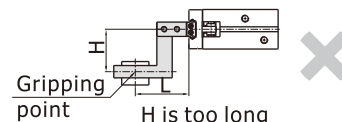
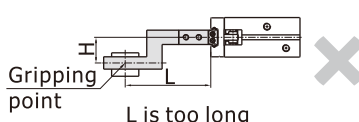
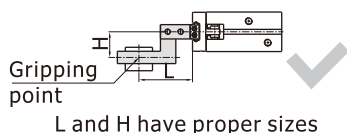
HFK Series

Bore size: Φ10, Φ16, Φ20, Φ25, Φ32, Φ40

2. The selection of the gripping point

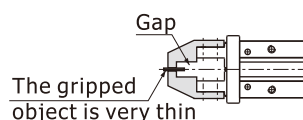
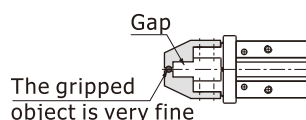
2.1) Please select the gripping point within the limited field shown below.

Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

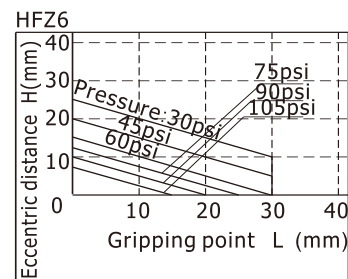
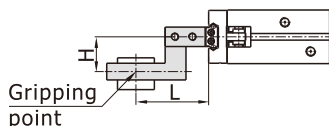
2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.



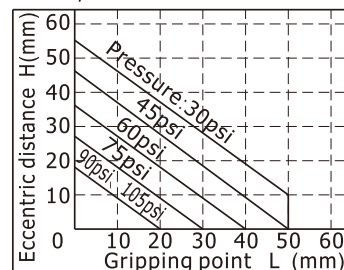
3. The confirmation of the external force put on the gripping jaw.

	Bore size	The allowed vertical loads Fv(N)		Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
		HFK	HFZ	Mp	My	Mr		
 [Note] The loads and torque values of said are all static values.	6	-	10	0.04	0.04	0.08	$\text{Allowable load(N)} = \frac{M(\text{Maximum permissible moment})(\text{N.m})}{L \times 10^{-3}}$ Unit conversion constant	In the guide rail of HFK16, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N, Allowable load F= $\frac{0.68}{30 \times 10^{-3}} = 22.7(\text{N})$ Actual load f=10(N) < 22.7(N) To meet the using requirements
	10	87	58	0.26	0.26	0.53		
	16	147	98	0.68	0.68	1.36		
	20	221	147	1.32	1.32	2.65		
	25	382	255	1.94	1.94	3.88		
	32	514	343	3	3	6		
	40	735	490	4.5	4.5	9		

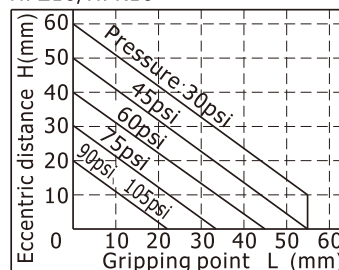
The range of the closed gripping points



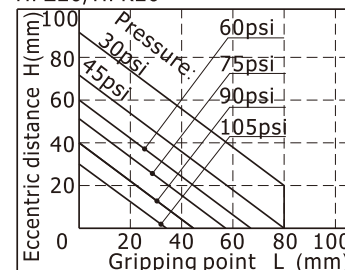
HFZ10/HFK10



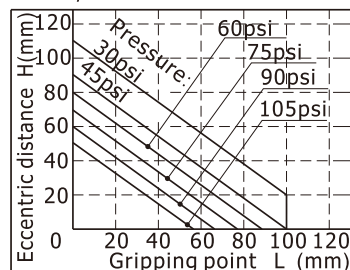
HFZ16/HFK16



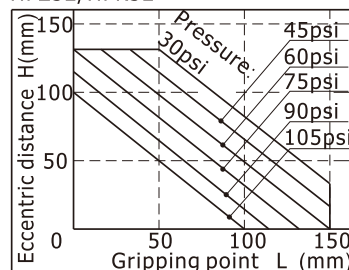
HFZ20/HFK20



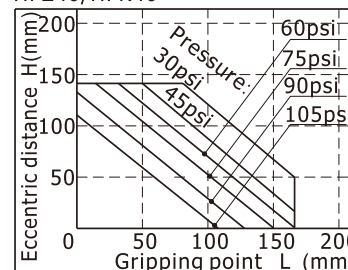
HFZ25/HFK25



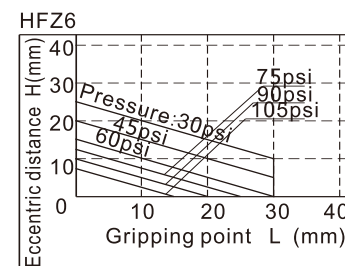
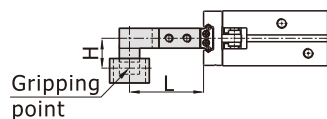
HFZ32/HFK32



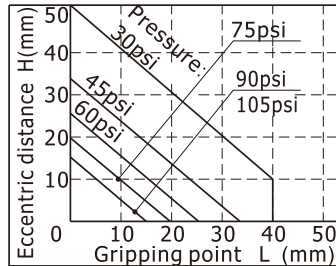
HFZ40/HFK40



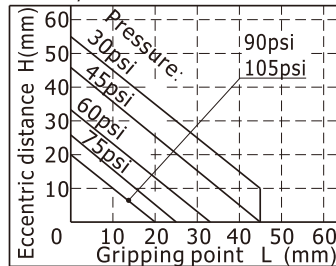
The range of the opened clamping point



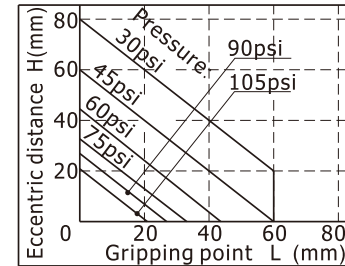
HFZ10/HFK10



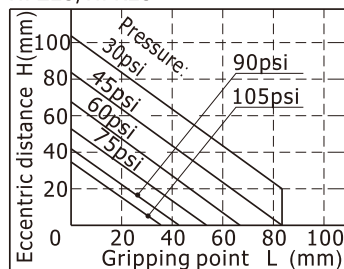
HFZ16/HFK16



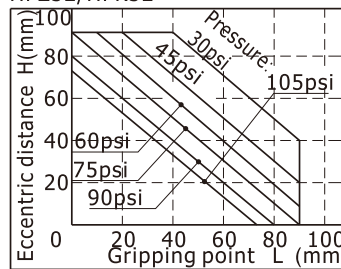
HFZ20/HFK20



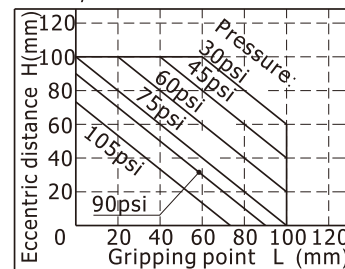
HFZ25/HFK25



HFZ32/HFK32



HFZ40/HFK40



Air gripper(parallel style——roller bearing)

AirTAC

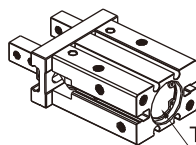
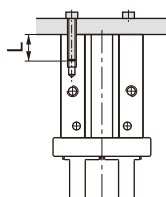
HFK Series

Bore size: Φ10, Φ16, Φ20, Φ25, Φ32, Φ40

Installation and application

1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. Please contact with us when the single acting type clamps only with the spring force.
4. When install and fix the air gripper, avoid falling down, collision and damage.
5. When fixing the gripping jaw parts, don't twist the gripping jaw.
6. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

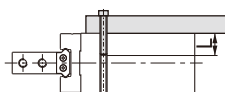
Tail installation type



The bore of the tail is used for mounting and positioning

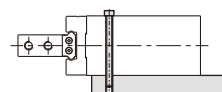
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	0.88N.m	6mm	Φ11mm $\begin{smallmatrix} +0.05 \\ 0 \end{smallmatrix}$	1.5mm
16	M4×0.7	2.1N.m	8mm	Φ17mm $\begin{smallmatrix} +0.05 \\ 0 \end{smallmatrix}$	1.5mm
20	M5×0.8	4.3N.m	10mm	Φ21mm $\begin{smallmatrix} +0.05 \\ 0 \end{smallmatrix}$	2mm
25	M6×1.0	7.3N.m	12mm	Φ26mm $\begin{smallmatrix} +0.05 \\ 0 \end{smallmatrix}$	2mm
32	M6×1.0	7.9N.m	12mm	Φ34mm $\begin{smallmatrix} +0.05 \\ 0 \end{smallmatrix}$	2.5mm
40	M8×1.25	17.7N.m	16mm	Φ42mm $\begin{smallmatrix} +0.05 \\ 0 \end{smallmatrix}$	2.5mm

The installation of the front threaded hole



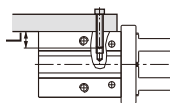
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M3×0.5	0.88	10
10	M3×0.5	0.69	5
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10
32	M6×1.0	7.9	12
40	M8×1.25	17.7	12

The installation of the front through hole



Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
6	M2.5×0.45	0.49	-
10	M2.5×0.45	0.49	5
16	M3×0.5	0.88	8
20	M4×0.7	2.1	10
25	M5×0.5	4.3	12
32	M5×0.8	4.3	13
40	M6×1.0	7.3	16

Surface installation type



Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
10	M3×0.5	0.9	6
16	M4×0.7	1.6	4.5
20	M5×0.8	3.3	8
25	M6×1.0	5.9	10
32	M6×1.0	5.9	10
40	M8×1.25	13.7	12



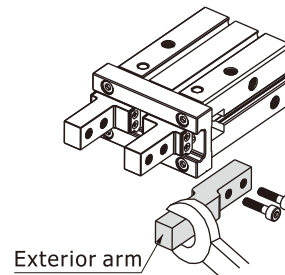
Air gripper(parallel style——roller bearing)

HFK Series

Bore size: $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$

7. The installation method of the gripping jaw fittings When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

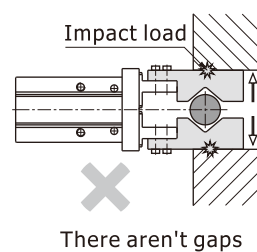
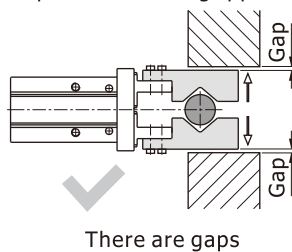
Bore size	The bolts type	Max. locking moment (Nm)
6	M2×0.4	0.15
10	M2.5×0.45	0.31
16	M3×0.5	0.59
20	M4×0.7	1.4
25	M5×0.8	2.8
32	M6×1.0	4.9
40	M8×1.25	11.8



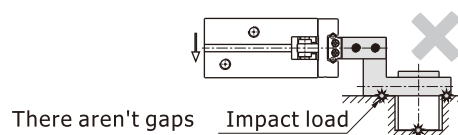
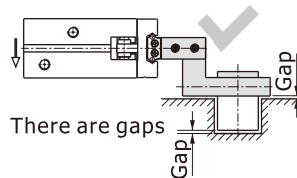
8. Confirm that there is no external forces exerted on the gripping jaw.

Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.

- 8.1) The end of stroke under the open state of air gripper

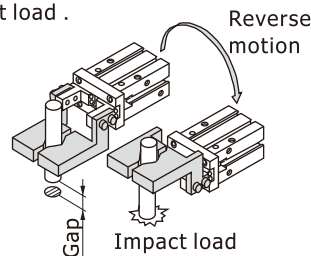


- 8.2) The end of stroke under the move state of air gripper

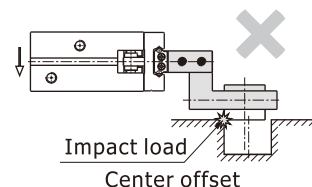
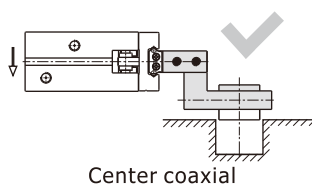


- 8.3) Reverse motion state

When reverse motion state, the gripping point must be precision, otherwise in the reverse motion state the air gripper maybe impact with ambience and will cause impact load .



9. When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.



10. Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.

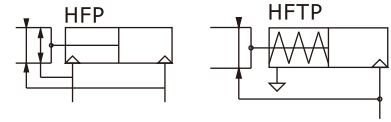
11. People can not enter the movement path of air gripper and articles can not be placed on the path too.

12. Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.



Air gripper—HFP Series

Mechanical parallel style



Ordering code

HFP 20 ☐

① ② ③

① Model

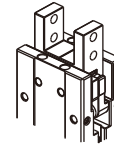
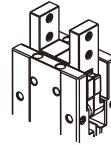
HFP: Air finger(Double acting)
(mechanical parallel style)

HFTP: Air finger
(Single acting and normally closed)
(mechanical parallel style)

③ Finger type

Blank: Standard

N: Thru.hole mounting type



② Bore size

10 16 20 25 32

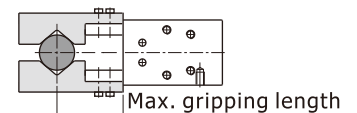
HFP series are all attached with magnet.

Specification

Bore size (mm)			10	16	20	25	32	
Acting type			Double acting, Single acting					
Fluid			Air(to be filtered by 40μm filter element)					
Operating pressure	Double acting	Φ10	28~100psi(0.2~0.7MPa)					
		Others	22~100psi(0.15~0.7MPa)					
	Single acting	Φ10	50~100psi(0.35~0.7MPa)					
		Others	36~100psi(0.25~0.7MPa)					
Proof pressure			150psi(1.05MPa)					
Temperature			-20~70℃					
Lubrication			Cylinder: Not required; Gripper jaws: Lubricate grease					
Max. gripping length [Note1] mm			30	40	60	70	90	
Max. frequency			180(c.p.m)					60(c.p.m)
Sensor switches [Note2]				CMSG\DMSG(S)				
Port size			M3×0.5	M5×0.8				

[Note1] Refer to right graph for the definition of max. gripping length.

[Note2] Sensor switch should be ordered additionally.

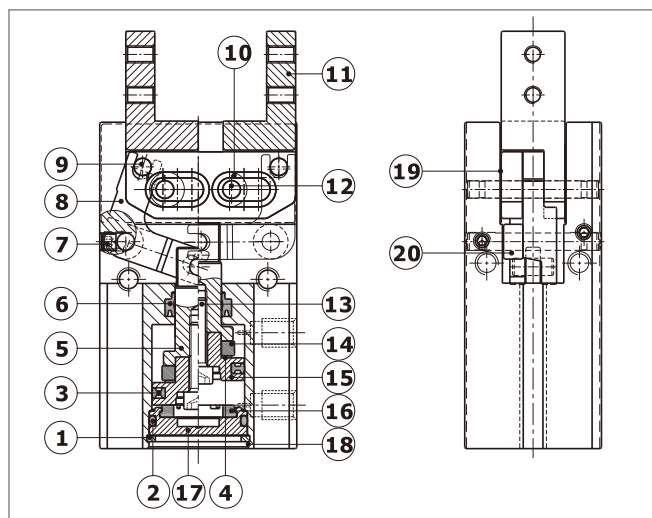


Air gripper(Mechanical parallel style)

HFP Series

Bore size: $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$

Inner structure and material of major parts

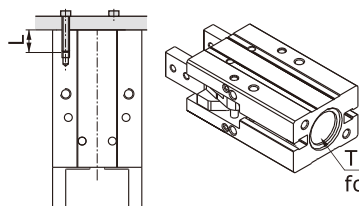


NO.	Item	Material
1	C clip	Spring steel
2	O-ring	NBR
3	Piston seal	NBR
4	Magnet washer	NBR
5	Piston rod	Aluminum alloy Stainless steel
6	Rod packing	NBR
7	Countersink screw	Carbon steel
8	Curved bar	Stainless steel
9	Pin	Stainless steel
10	Guide sleeve	Stainless steel
11	Gripping jaws	Stainless steel
12	Pin	Stainless steel
13	Screw	Carbon steel
14	Magnet	Sintered metal (Neodymium-iron-boron)
15	Piston	Aluminum alloy Stainless steel
16	Bumper	TPU
17	Back cover	Aluminum alloy
18	Body	Aluminum alloy
19	Retaining ring	Stainless steel
20	Stopper sleeve	Stainless steel

Installation and application

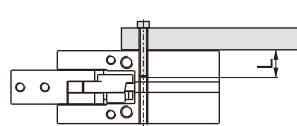
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

Tail installation type



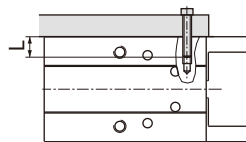
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	1.0N.m	6mm	$\Phi 11\text{mm} \begin{smallmatrix} +0.05 \\ 0 \end{smallmatrix}$	1.0mm
16	M4×0.7	2.0N.m	8mm	$\Phi 17\text{mm} \begin{smallmatrix} +0.05 \\ 0 \end{smallmatrix}$	1.2mm
20	M5×0.8	4.5N.m	10mm	$\Phi 21\text{mm} \begin{smallmatrix} +0.05 \\ 0 \end{smallmatrix}$	1.2mm
25	M6×1.0	7.0N.m	12mm	$\Phi 26\text{mm} \begin{smallmatrix} +0.05 \\ 0 \end{smallmatrix}$	1.5mm
32	M6×1.0	7.0N.m	12mm	$\Phi 34\text{mm} \begin{smallmatrix} +0.05 \\ 0 \end{smallmatrix}$	1.5mm

The installation of the front threaded hole



Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	0.7	5
16	M4×0.7	2.0	8
20	M5×0.8	4.5	10
25	M6×1.0	7.0	12
32	M6×1.0	7.0	12

Surface installation type



Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
10	M3×0.5	1.0	6
16	M4×0.7	2.0	8
20	M5×0.8	4.5	10
25	M6×1.0	7.0	12
32	M6×1.0	7.0	12

6. Other contents of installation and operation are the same with those of HFK. Refer to the "Installation and Operation" instruction of HFK.

How to select product

Please select pneumatic finger according to the following steps:

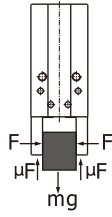
① The selection of the effective gripping force

② the confirmation of the gripping point

③ the confirmation of the external force put on the gripping jaw

1. The selection of the gripping force

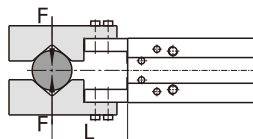
The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient $a=4$, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

	The work-pieces as shown in the left :		$\mu = 0.2$	$\mu = 0.1$
	F: Gripping force (N) μ : friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity ($=9.8\text{m/s}^2$)	The condition that the work-pieces won't drop is: $2 \times \mu F > mg$ so: $F > \frac{mg}{2 \times \mu}$ Safety coefficient is a, so F is: $F = \frac{mg}{2 \times \mu} \times a$	$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$ 10 times of the mass of the gripped objects	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$ 20 times of the mass of the gripped objects

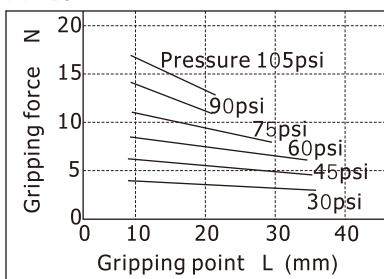
Note) If the friction coefficient $\mu > 0.2$, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

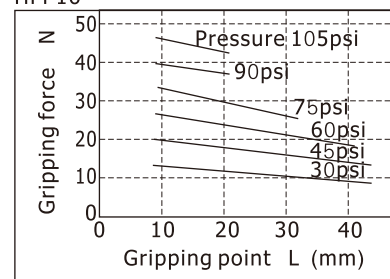
Double acting type closed gripping force



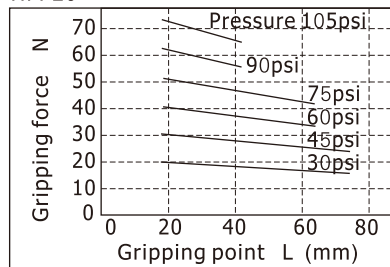
HFP10



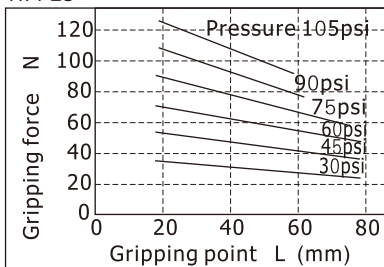
HFP16



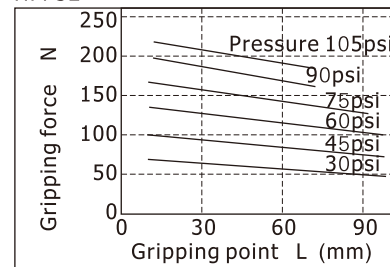
HFP20



HFP25



HFP32



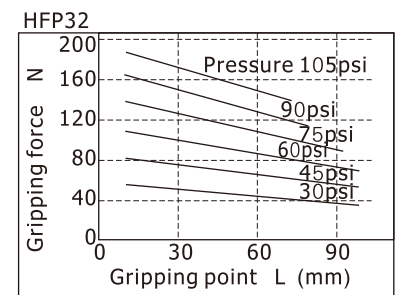
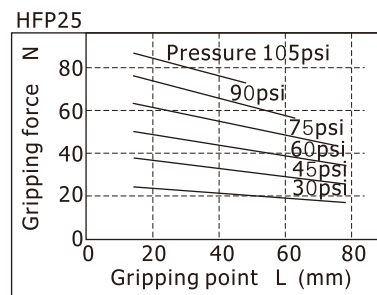
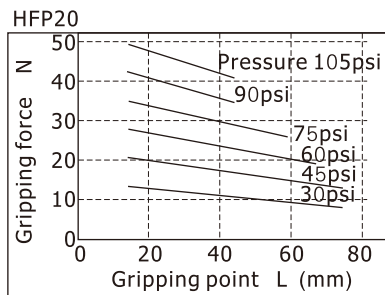
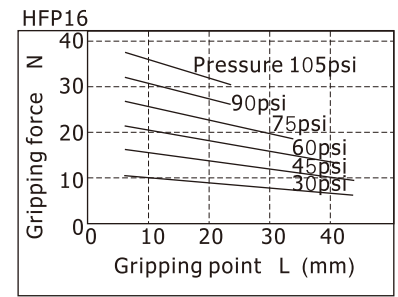
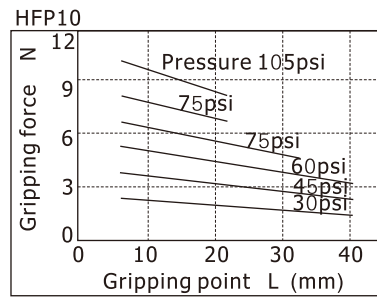
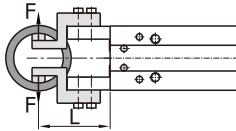
Air gripper(Mechanical parallel style)

AIRTAC

HFP Series

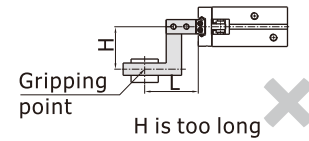
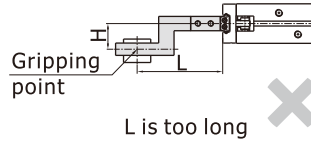
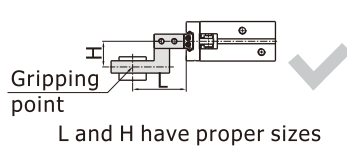
Bore size: $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$

Double acting type opened gripping force



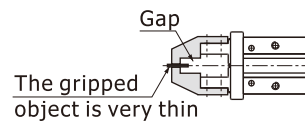
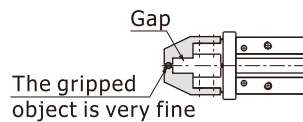
2. The selection of the gripping point

- 2.1) Select the gripping point within the maximum gripping length range. Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



- 2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

- 2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.



3. The confirmation of the external force put on the gripping jaw.

	Bore size	The allowed vertical loads F_v (N)	Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
			M_p	M_y	M_r		
[Note] The loads and torque values of said are all static values.	10	58	0.26	0.26	0.53	$\text{Allowable load(N)} = \frac{M(\text{Maximum permissible moment})(\text{N.m})}{L \times 10^{-3}}$ Unit conversion constant	In the guide rail of HFP16, the external force of the pitching moment static loads put on the point of $L=30\text{mm}$ is $f=10\text{N}$, $\text{Allowable load } F = \frac{0.68}{30 \times 10^{-3}} = 22.7(\text{N})$ Actual load $f=10(\text{N}) < 22.7(\text{N})$ To meet the using requirements
	16	98	0.68	0.68	1.36		
	20	147	1.32	1.32	2.65		
	25	255	1.94	1.94	3.88		
	32	343	3	3	6		



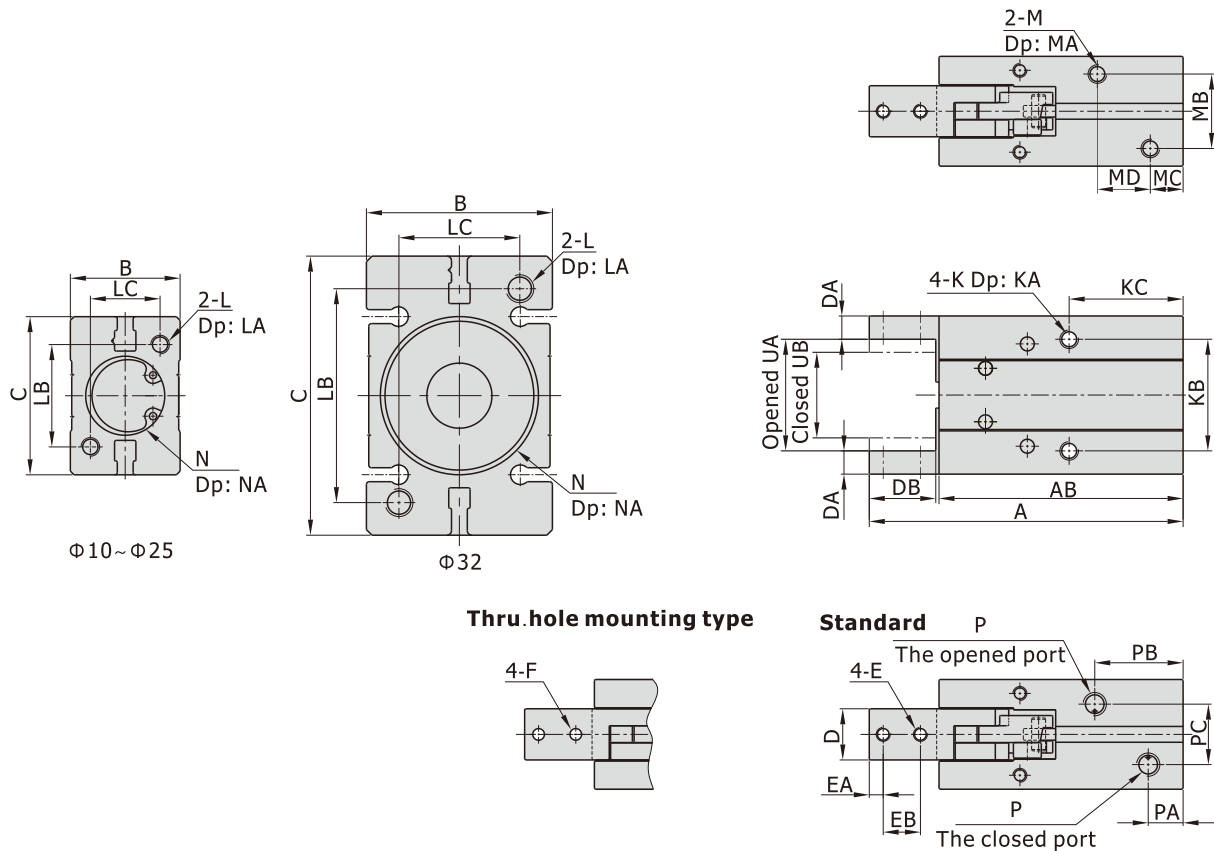
Air gripper(Mechanical parallel style)

AirTAC

HFP Series

Bore size: $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$

Dimensions



Model\Item	A	AB	B	C	D	DA	DB	E	EA	EB	F	K	KA	KB
HFP10	57(62)	44.5(49.5)	16	23	7	4	12	M2.5×0.45	3	5.5	$\Phi 2.8$	M3×0.5	5	16
HFP16	72(77)	56.5(61.5)	23.5	34	11	5	15	M3×0.5	4	7	$\Phi 3.3$	M4×0.7	8	24
HFP20	89.5(94.5)	69(74)	27.5	45	12	6	20	M4×0.7	5	9	$\Phi 4.5$	M5×0.8	10	30
HFP25	104.5(109.5)	78.5(83.5)	33.5	52	14	8	25	M5×0.8	6	12	$\Phi 5.5$	M6×1.0	12	36
HFP32	118(126)	88(96)	40	60	18	9	29	M6×1.0	7	14	$\Phi 6.5$	M6×1.0	12	46

Model\Item	KC	L	LA	LB	LC	M	MA	MB	MC	MD	N	NA	P
HFP10	23(28)	M3×0.5	6	18	12	M3×0.5	6	10	6(11)	10	$\Phi 11^{+0.05}_0$	1	M3×0.5
HFP16	29(34)	M4×0.7	8	22	15	M4×0.7	8	16	6(11)	16	$\Phi 17^{+0.05}_0$	1.2	M5×0.8
HFP20	34(39)	M5×0.8	10	32	18	M5×0.8	10	18	8(13)	16	$\Phi 21^{+0.05}_0$	1.2	M5×0.8
HFP25	31.5(36.5)	M6×1.0	12	40	22	M6×1.0	12	24	8(13)	16	$\Phi 26^{+0.05}_0$	1.5	M5×0.8
HFP32	37.5(45.5)	M6×1.0	12	46	26	M6×1.0	12	30	8(16)	20	$\Phi 34^{+0.05}_0$	1.5	M5×0.8

Model\Item	PA	PB	PC	UA(Opened)	UB(Closed)
HFP10	6	16.5(23)	10	$14.5^{+1.5}_0$	$10.5^{+0.5}_0$
HFP16	7.5	20(25)	13	$23.5^{+1.5}_0$	$15.5^{+0.5}_0$
HFP20	7.5	24(29)	15	$32.5^{+1.5}_0$	$20.5^{+0.5}_0$
HFP25	8	22(29)	20	$35.5^{+1.5}_0$	$21.5^{+0.5}_0$
HFP32	9.5	26(37)	22	$42^{+1.5}_0$	$26.5^{+0.5}_0$

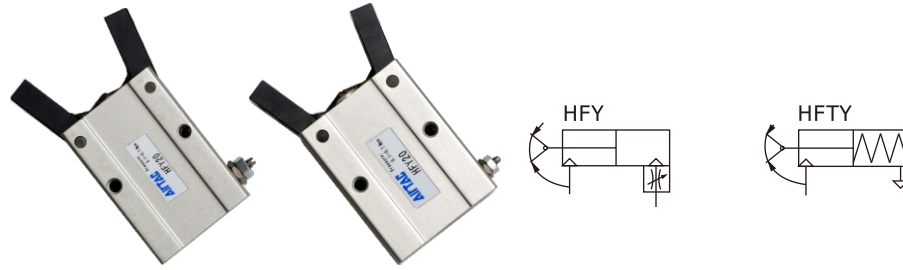
[Note] The values in "()" in the above table are single acting type sizes.





Air gripper—HFY Series

Angular style



Ordering code

HFY 20

① ②

① Model

HFY: Air finger(Angle style, Double acting)

HFTY: Air finger(Angle style, Single acting and normally opened)

② Bore size

6 10 16 20 25 32

[Note] HFY series are all attached with magnet.

Specification

Bore size (mm)			6	10	16	20	25	32
Acting type			Double acting		Single acting			
Fluid			Air(to be filtered by 40μm filter element)					
Operating pressure	Double acting		22~100psi(0.15~0.7MPa)					
	Single acting	Φ6	45~100psi(0.3~0.7MPa)					
		Φ10~Φ32	36~100psi(0.25~0.7MPa)					
Temperature			-20~70℃					
Lubrication			Cylinder: Not required;Gripper jaws: Lubricate grease					
Cushion type			Bumper					
Max. frequency			180(c.p.m)					
Sensor switches [Note1]			CMSG/DMSG(S)					
Port size			M3×0.5			M5×0.8		

[Note1] Sensor switch should be ordered additionally.

Gripping force and stroke

Acting type		Double acting(HFY)						Single acting Normally opened(HFTY)					
Bore size		6	10	16	20	25	32	6	10	16	20	25	32
Theoretical gripping torque (N·cm)	Closed	7.4×P	17.6×P	90×P	152×P	304×P	637×P	5.7×P	11.8×P	71.2×P	122.4×P	252×P	589×P
	Opened	10.6×P	29.4×P	129×P	252×P	473×P	904×P	-	-	-	-	-	-
Max. length of gripping point (L)(mm)		30	30	40	60	70	85	30	30	40	60	70	85
Opening angle (°)		30 ⁺³ ₀											
Closing angle (°)		-10 ⁰ ₋₃											

[Note] The P in the gripping torque shown in the above chart represents the actual use of air pressure.

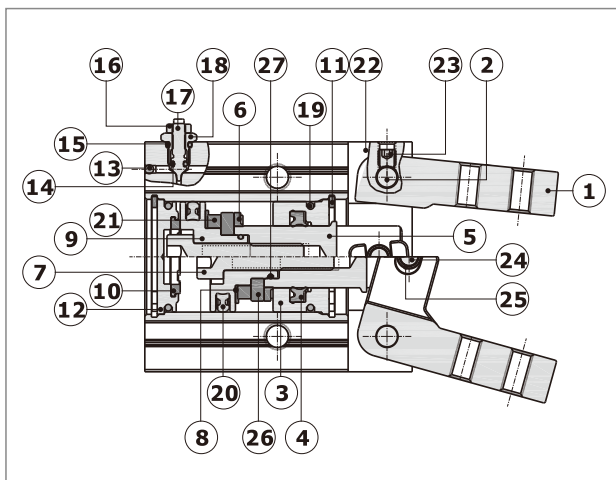


Air gripper(Angular style)

HFY Series

Bore size: Φ6, Φ10, Φ16, Φ20, Φ25, Φ32

Inner structure and material of major parts

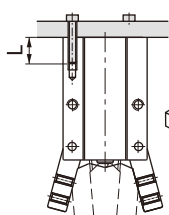


NO.	Item	Material
1	Gripping jaws	Carbon steel
2	Pin	Stainless steel
3	Front cover	Aluminum alloy
4	Rod packing	NBR
5	Piston rod	Aluminum alloy/Stainless steel
6	Bumper	TPU
7	Countersink screw	Carbon steel
8	Magnet washer	NBR
9	Piston	Aluminum alloy/Stainless steel
10	Bumper	TPU
11	C clip	Spring steel
12	Back cover	Aluminum alloy
13	Steel ball	Stainless steel
14	O-ring	NBR
15	O-ring	NBR
16	Screw cap	Carbon steel
17	Adjustable nut	Brass
18	Fixed nut	Brass
19	O-ring	NBR
20	Piston seal	NBR
21	Magnet	Sintered metal(Neodymium-iron-boron)
22	Body	Aluminum alloy
23	Countersink screw	Carbon steel
24	Pin	Stainless steel
25	Pin sheath	Stainless steel
26	Magnet fixed flake	Stainless steel
27	O-ring	NBR

Installation and application

1. Due to the abrupt changes, the pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the torque of fastening screw must be within the prescribed moment range shown in the below chart. If the locking moment is too large, it will cause the dysfunctional. If the locking moment is too small, it will cause the position deviation and fall.

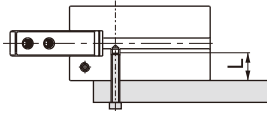
Tail installation type



Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
6	—	—	—	Φ7mm ^{+0.04} / _{+0.01}	1.5mm
10	M3×0.5	0.88N.m	6mm	Φ11mm ^{+0.04} / _{+0.01}	1.5mm
16	M4×0.7	2.1N.m	8mm	Φ17mm ^{+0.05} / ₀	1.5mm
20	M5×0.8	4.3N.m	10mm	Φ21mm ^{+0.05} / ₀	1.5mm
25	M6×1.0	7.3N.m	12mm	Φ26mm ^{+0.05} / ₀	1.5mm
32	M6×1.0	7.3N.m	12mm	Φ34mm ^{+0.05} / ₀	2.0mm

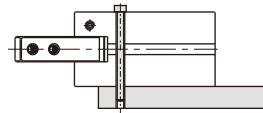
The bore of the tail is used for mounting and positioning

The installation of the front threaded hole



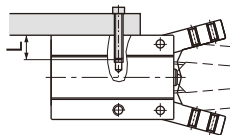
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M3×0.5	0.69	5
10	M3×0.5	0.69	5
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10
32	M6×1.0	7.3	10

The installation of the front through hole



Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M2.5×0.45	0.49	5
10	M2.5×0.45	0.49	5
16	M3×0.5	0.88	7
20	M4×0.7	2.1	8
25	M5×0.8	4.3	10
32	M5×0.8	4.3	10

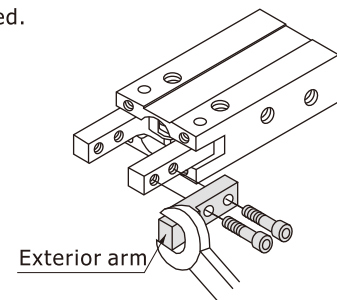
Surface installation type



Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	-	-	-
10	M3×0.5	0.88	6
16	M4×0.7	1.6	6.5
20	M5×0.8	3.3	8
25	M6×1.0	5.9	10
32	M6×1.0	5.9	10

6. The installation method of the gripping jaw fittings When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

Bore size	The bolts type	Max. locking moment (Nm)
6	M2×0.4	0.15
10	M2.5×0.45	0.31
16	M3×0.5	0.59
20	M4×0.7	1.4
25	M5×0.8	2.8
32	M6×1.0	4.9



- When gripping work-piece, the work-piece must be located in the center line of the two gripping jaws, and the two gripping jaws also need to touch the work-piece at the same time, otherwise they will be easily damaged.
- Confirm that there is no additional external forces that are exerted on the gripping jaw. Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.
- When the work-pieces are inserted, the center line should be coaxial, no offset, in case there are external force generated on gripping jaw. When testing, it is specially required that the manual operation should be reduced, the pressure should be used to run it at a low speed, and guarantee the safety and no impact.
- Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.
- People can not enter the movement path of air gripper and articles can not be placed on the path too.
- Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.

How to select product

1. The selection of the gripping force

The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient $a=4$, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

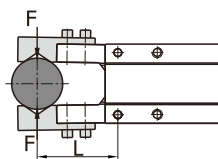
	The work-pieces as shown in the left :		$\mu = 0.2$	$\mu = 0.1$
	F: Gripping force (N) μ : friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity ($=9.8\text{m/s}^2$)	The condition that the work-pieces won't drop is: $2 \times \mu F > mg$ so: $F > \frac{mg}{2 \times \mu}$ Safety coefficient is a, so F is: $F = \frac{mg}{2 \times \mu} \times a$	$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
			10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

Note) If the friction coefficient $\mu > 0.2$, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

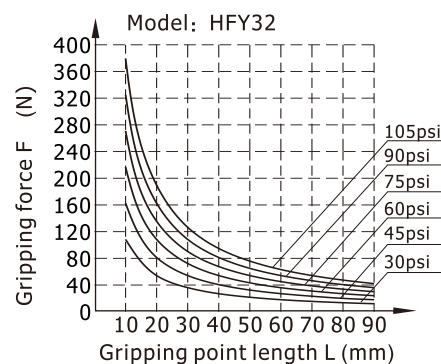
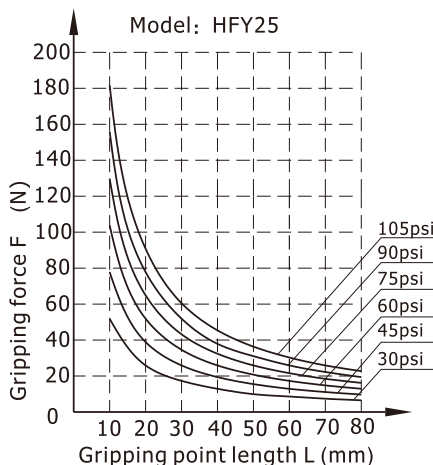
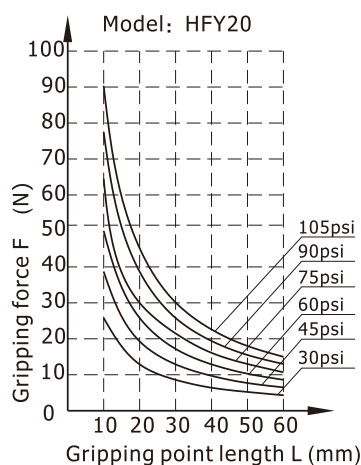
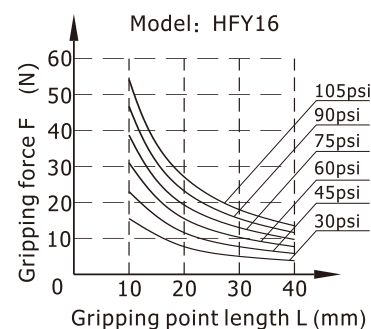
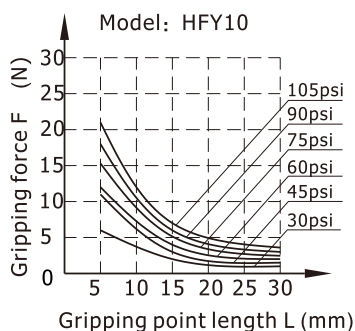
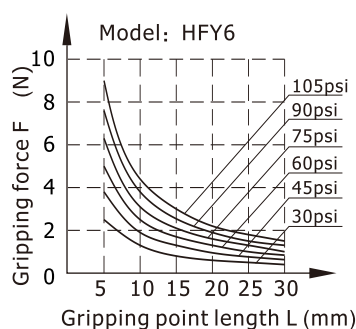
2. The selection of the gripping point

When the gripping force is determined, select the gripping point according to the limitation ranges shown in the below chart. If the gripping point is over the limit, the gripping jaw will be subjected to excessive moment load, and lead to short life of air gripper.

Double acting type closed gripping force



Gripping point length (mm)



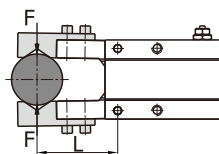
Air gripper(Angular style)

AirTAC

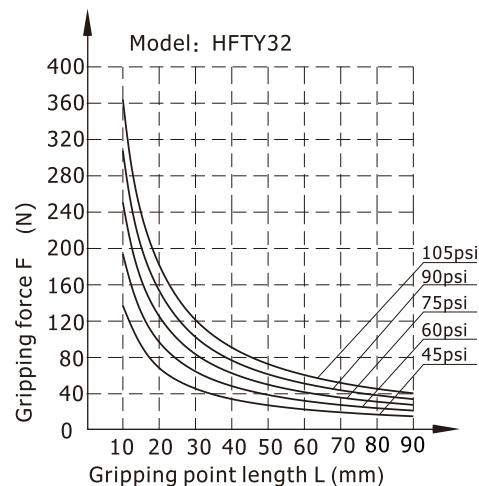
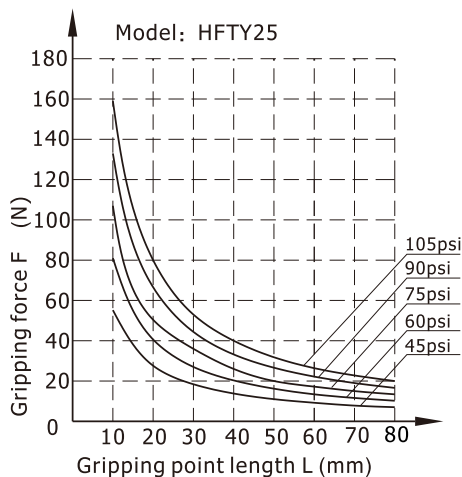
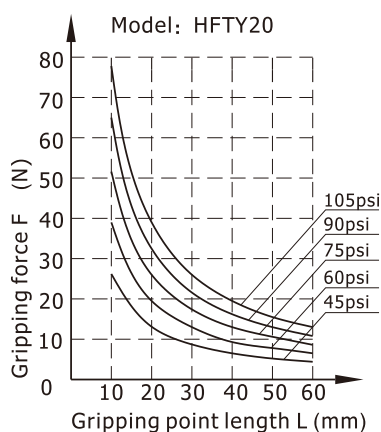
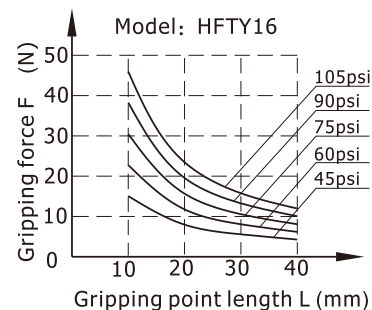
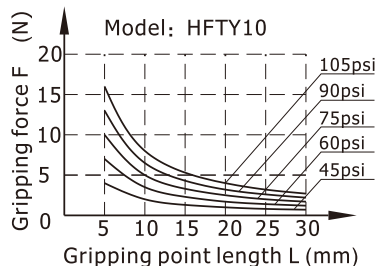
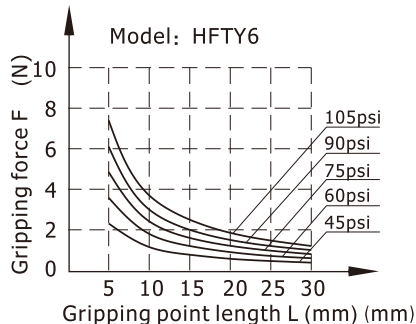
HFY Series

Bore size: $\Phi 6$, $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$

Single acting closed gripping force



Gripping point length (mm)



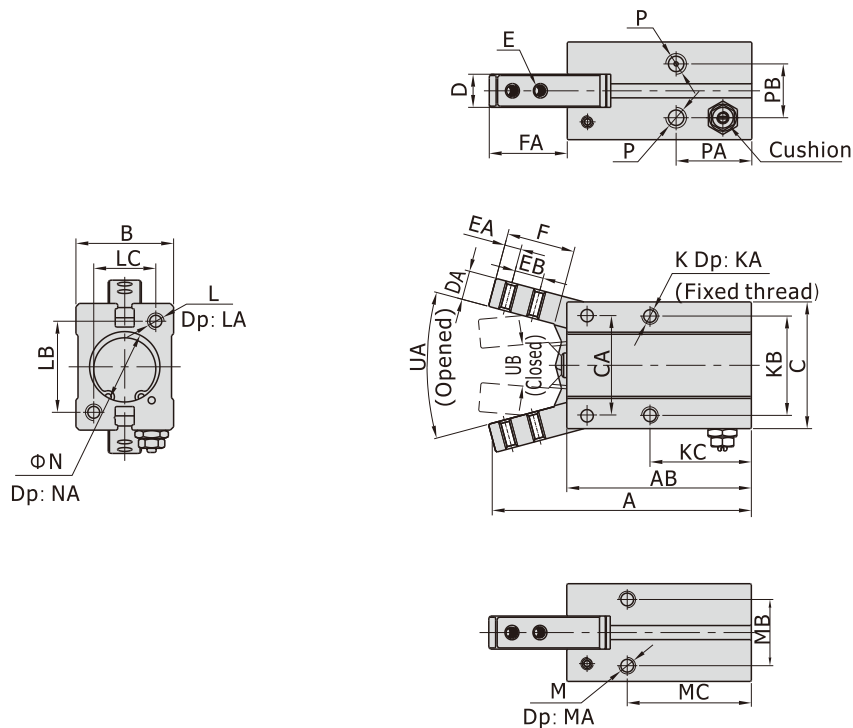
Air gripper(Angular style)

AirTAC

HFY Series

Bore size: Φ6, Φ10, Φ16, Φ20, Φ25, Φ32

Dimensions



Bore size/Item	A	AB	B	C	CA	D	DA	E	EA	EB	F	FA	K	KA	KB	KC	L
6	47.5	36	10.5	20	14	4	4	M2×0.4	2.5	5	11	12	M3×0.5	Thru. thread	12	26	-
10	52.5	38.5	16.5	23	14	6.4	4	M2.5×0.45	3	5.7	12	14.5	M3×0.5	5	16	23	M3×0.5
16	62.5	44.5	23.5	30.5	24	8	7	M3×0.5	4	7	16	19	M4×0.7	7	24	24.5	M4×0.7
20	78	55	27.5	42	30	10	8	M4×0.7	5	9	20	23.5	M5×0.8	8	30	29	M5×0.8
25	92	60.5	33.5	52	36	12	10	M5×0.8	8	12	27	33	M6×1.0	10	36	30	M6×1.0
32	96.5	68	40	60	42	18	10	M6×1.0	6	14	27	29.5	M6×1.0	10	44	37.5	M6×1.0

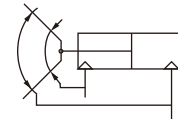
Bore size/Item	LA	LB	LC	M	MA	MB	MC	N	NA	P	PA	PB	UA(Opened)	UB(Closed)
6	-	-	-	-	-	-	-	7 ^{+0.05} ₀	1.5	M3×0.5	19	1.5	30°	10°
10	6	18	12	M3×0.5	6	11.5	27	11 ^{+0.05} ₀	1.5	M3×0.5	19	10	30°	10°
16	8	22	15	M4×0.7	8	16	30	17 ^{+0.05} ₀	1.5	M5×0.8	18.5	13	30°	10°
20	10	32	18	M5×0.8	10	18.5	35	21 ^{+0.05} ₀	1.5	M5×0.8	22	15	30°	10°
25	12	40	22	M6×1.0	10	22	36.5	26 ^{+0.05} ₀	1.5	M5×0.8	23.5	20	30°	10°
32	12	46	26	M6×1.0	10	26	30	34 ^{+0.05} ₀	2	M5×0.8	31	24	30°	10°





Air gripper—HFR Series

180° open/close style



Ordering code

HFR 20 ☐

1

2

3

① Model

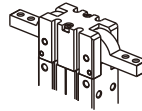
HFR: 180° open/close air gripper

② Bore size

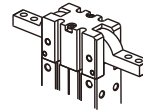
10 16 20 25 32

③ Mounting type

Blank: Mounting through tapped holes



N: Mounting through holes (tapped in open/close direction)



HFR series are all attached with magnet.

Specification

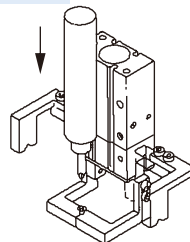
Bore size (mm)	10	16	20	25	32
Acting type	Double acting				
Fluid	Air(to be filtered by 40μm filter element)				
Operating pressure	21~100psi(0.15~0.7MPa)				
Temperature	-20~70℃				
Lubrication	Cylinder: Not required; Gripper jaws:Lubricate grease				
Cushion type	Bumper				
Max. frequency	60(c.p.m)				
Repeatability	±0.2mm				
Gripping force [Note1]	0.16N.m	0.55N.m	1.10N.m	2.30N.m	5.00N.m
Open or close angle	Open: -2° ~ -5°		Close: 180° ± 2°		
Port size	M5×0.8				
Sensor switches [Note2]	CMSH\DMSH(S)				

[Note1] The gripping force is the value when the operating pressure is 75psi.

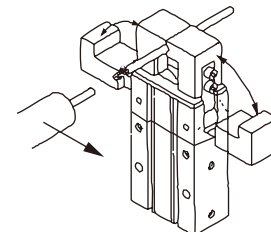
[Note2] Sensor switch should be ordered additionally.

Example

Screw down



Clamping cable

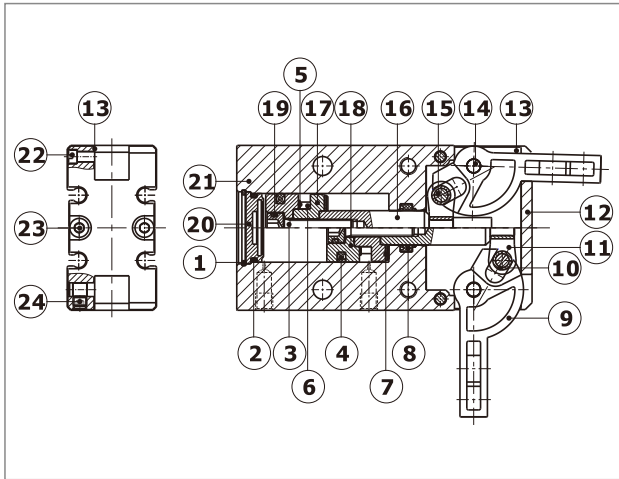


Air gripper(180° open/close style)

HFR Series

Bore size: $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$

Inner structure and material of major parts



NO.	Item	Material
1	C clip	Spring steel
2	O-ring	NBR
3	Countersink screw	Carbon steel
4	Piston seal	NBR
5	Magnet washer	NBR
6	Magnet	Sintered metal(Neodymium-iron-iron)
7	Bumper	TPU
8	Rod packing	NBR
9	Gripping jaws	Stainless steel
10	Pin sheath	Stainless steel
11	Push block	Stainless steel
12	Front cover	Aluminum alloy
13	Sheet metal	Stainless steel
14	Pin	Stainless steel
15	Pin	Stainless steel
16	Piston rod	Stainless steel
17	Magnet holder	Aluminum alloy
18	Piston	Aluminum alloy
19	O-ring	NBR
20	Back cover	Aluminum alloy
21	Body	Aluminum alloy
22	Pin	Stainless steel
23	Countersink screw	Carbon steel
24	Countersink screw	Carbon steel

Air gripper(180° open/close style)

AirTAC

HFR Series

Bore size: Φ10, Φ16, Φ20, Φ25, Φ32

How to select product

1. Confirmation of effective gripping force

1.1) Though the coefficient of friction between the attachments and the workpiece is different, select a gripping force which is 10 to 20 times greater than the workpiece weight.

1.2) If high acceleration or impact forces are encountered during motion, a further margin of safety should be considered.

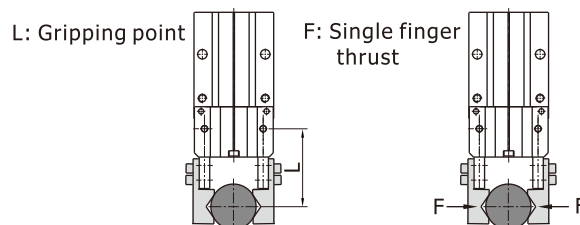
Example: When the workpiece weight is 0.05

and the gripping point distance L is 30mm,
the operating pressure will be 5kgf/cm².

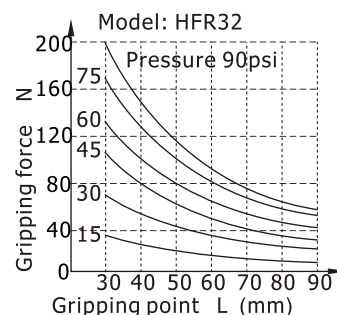
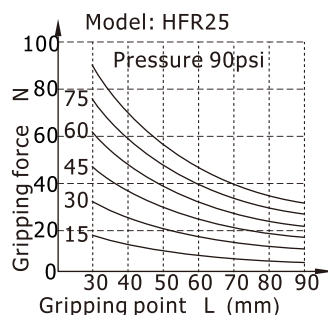
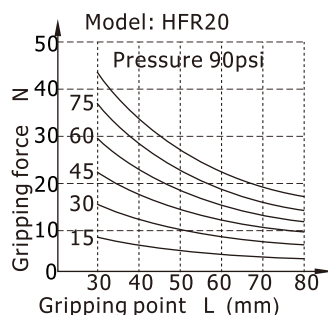
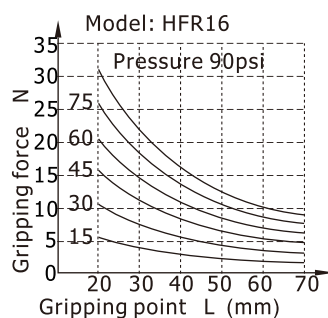
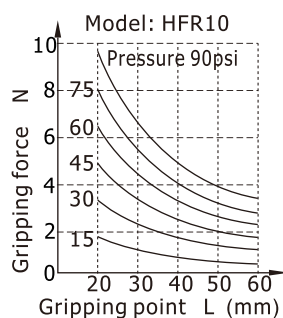
Effective gripping force = $0.05\text{kg} \times 20 \text{ times} \times 9.8\text{m/s}^2 = \text{more than } 10\text{N}$

Model selection: HFR16 is recommended. The effective gripping force is 17N,
which is 20 times greater than the set value of gripping force.

1.3) The finger thrust is expressed as F, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.



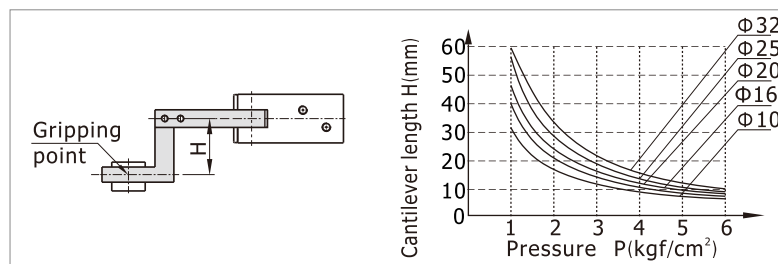
2. Connection between gripping force and gripping point distance



3. The selection of the gripping point

3.1) Please select the gripping point within the limited field shown left. Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.

3.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.



Air gripper(180° open/close style)

AIRTAC

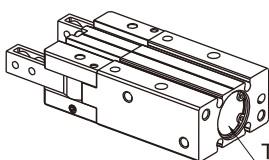
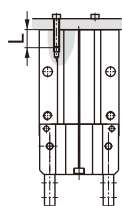
HFR Series

Bore size: $\Phi 10$, $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$

Installation and application

1. Due to the abrupt changes, the pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the torque of fastening screw must be within the prescribed moment range shown in the below chart. If the locking moment is too large, it will cause the dysfunctional.
If the locking moment is too small, it will cause the position deviation and fall.

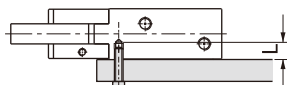
Tail installation type



The bore of the tail is used for mounting and positioning

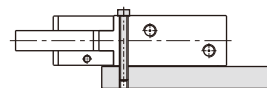
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	1.0N.m	6mm	$\Phi 11\text{mmH9}$	1.5mm
16	M4×0.7	2.0N.m	8mm	$\Phi 17\text{mmH9}$	1.5mm
20	M5×0.8	4.5N.m	10mm	$\Phi 21\text{mmH9}$	1.5mm
25	M6×1.0	7.0N.m	12mm	$\Phi 26\text{mmH9}$	1.5mm
32	M6×1.0	7.0N.m	14mm	$\Phi 34\text{mmH9}$	2.0mm

The installation of the front threaded hole



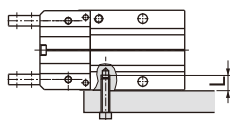
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	1.0	6
16	M4×0.7	2.0	8
20	M5×0.8	4.5	10
25	M6×1.0	7.0	12
32	M6×1.0	7.0	14

The installation of the front through hole



Bore size	The bolts type	Max. locking moment (Nm)
10	M3×0.5	1.0
16	M4×0.7	2.0
20	M5×0.8	4.5
25	M6×1.0	7.0
32	M6×1.0	7.0

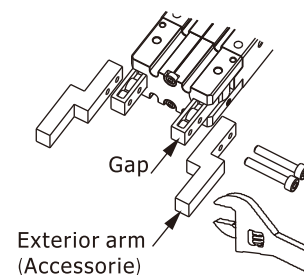
Surface installation type



Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	0.6	4
16	M4×0.7	1.5	5
20	M5×0.8	3.5	8
25	M6×1.0	6.0	10
32	M6×1.0	6.0	12

6. The installation method of the gripping jaw fittings. When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.
7. Other contents of installation and operation are the same with those of HFY. Refer to the "Installation and Operation" instruction of HFY.

Bore size	The bolts type	Max. locking moment (Nm)
10	M3×0.5	0.6
16	M3×0.5	0.6
20	M4×0.7	0.8
25	M5×0.8	1.5
32	M6×1.0	3.0



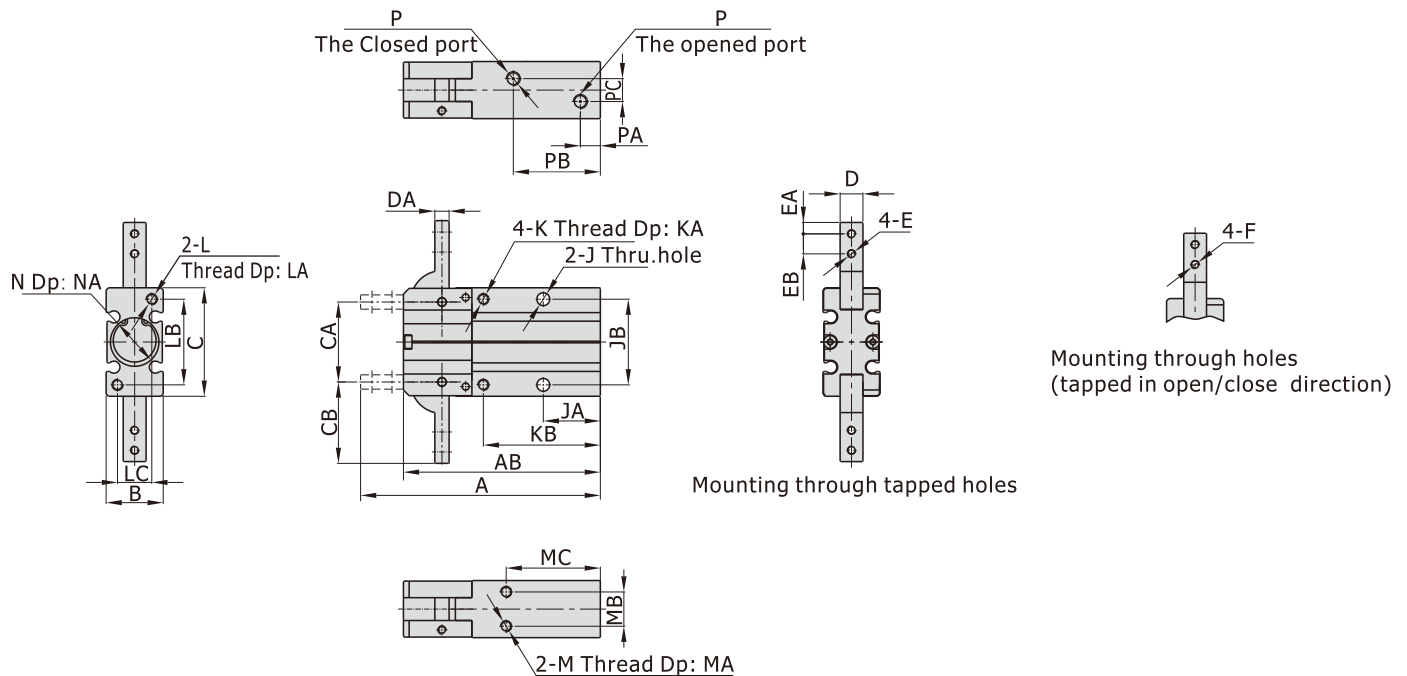
Air gripper(180° open/close style)

AIRTAC

HFR Series

Bore size: Φ10, Φ16, Φ20, Φ25, Φ32

Dimensions



Bore size\Item	A	AB	B	C	CA	CB	D	DA	E	F	EA	EB	J	JA	JB	K	KA
10	71	58	15	30	22	23.5	6	4	M3×0.5	Φ3.3	3	6	Φ3.3	18	24	M3×0.5	6
16	84	69	20	38	28	28.5	8	5	M3×0.5	Φ3.3	4	7	Φ4.5	20	30	M4×0.7	8
20	106	86	26	48	36	37	10	8	M4×0.7	Φ4.5	5	9	Φ5.5	25	36	M5×0.8	10
25	131	107	30	58	45	45	12	10	M5×0.8	Φ5.5	6	12	Φ6.5	30	42	M6×1.0	12
32	158.5	122	40	72	55	62.5	14	12	M6×1.0	Φ6.5	9	16	Φ6.5	35	46	M6×1.0	12

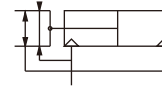
Bore size\Item	KB	L	LA	LB	LC	M	MA	MB	MC	N	NA	P	PA	PB	PC
10	35	M3×0.5	6	24	9	M3×0.5	4	9	30	Φ11 ^{+0.05} ₀	1.5	M5×0.8	7	28.5	3
16	41	M4×0.7	8	30	12	M4×0.7	5	12	33	Φ17 ^{+0.05} ₀	1.5	M5×0.8	7	30.5	8
20	50	M5×0.8	10	38	16	M5×0.8	8	14	42	Φ21 ^{+0.05} ₀	1.5	M5×0.8	8	38.5	12
25	60	M6×1.0	12	46	18	M6×1.0	10	16	50	Φ26 ^{+0.05} ₀	1.5	M5×0.8	8	48	14
32	64	M6×1.0	14	46	26	M6×1.0	12	26	59	Φ34 ^{+0.05} ₀	2	M5×0.8	9	56	18





Air gripper—HFC Series

Parallel open/close style



Ordering code

HFC Y 20

1 2 3

① Model

HFC: Air finger
(Double acting, parallel type)

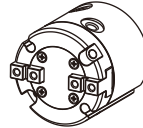
③ Bore size

16 20 25 32 40 50 63

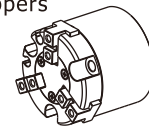
HFC series are all attached with magnet.

② Finger type

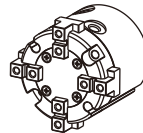
I: Two grippers



Y: Three grippers



X: Four grippers



Specification

Bore size (mm)	16	20	25	32	40	50	63
Acting type	Double acting						
Fluid	Air(to be filtered by 40μm filter element)						
Operating pressure	28~100psi(0.2~0.7MPa)			22~100psi(0.15~0.7MPa)			
Temperature				-10~60℃			
Lubrication	Not required						
Repeatability mm	±0.01						
Max. frequency	120(c.p.m)			60(c.p.m)			
Sensor switches	CMSH / DMSH(S)						
Port size	M3×0.5	M5×0.8					

[Note] Sensor switch should be ordered additionally.

Product feature

1. Uniform block is adopted in the interior of the air gripper to afford larger gripper force.
2. The bumper is adopted in the front of piston, which can reduce the noise of metal bump.
3. A positioning hole is attached to the bottom of the body, which can improve the precision and the consistency of repeated dismounting and positioning.
4. Precision repeating snatch which adopted roboticized equipment.
5. Kinds of series and styles for you to choice which snatch multiiform workpiece.



Air gripper(parallel open/close style)

HFC Series

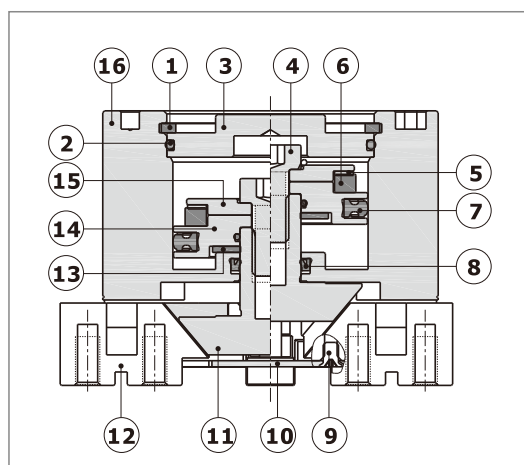
Bore size: $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$, $\Phi 50$, $\Phi 63$

Gripping force and stroke

Model		Gripping force per finger Effective valve(N)		Opening/Closing stroke (Both sides)(mm)
		Internal	External	
2 grippers	HFCI16	23	21	4
	HFCI20	42	37	4
	HFCI25	71	63	6
	HFCI32	123	111	8
	HFCI40	195	177	8
	HFCI50	306	280	12
	HFCI63	537	502	16
3 grippers	HFCY16	16	14	4
	HFCY20	28	25	4
	HFCY25	47	42	6
	HFCY32	82	74	8
	HFCY40	130	118	8
	HFCY50	204	187	12
	HFCY63	359	335	16
4 grippers	HFCX16	12	10	4
	HFCX20	21	19	4
	HFCX25	35	31	6
	HFCX32	61	55	8
	HFCX40	97	88	8
	HFCX50	153	140	12
	HFCX63	268	251	16

Note) The gripping force in the above table is in the working pressure of 75psi,
and with a gripping point of L=20mm($\Phi 16 \sim \Phi 25$) or L=30mm($\Phi 32 \sim \Phi 63$).
Add) Please refer to page 222 for the definition of "L".

Inner structure and material of major parts



NO.	Item	Material
1	C clip	Spring steel
2	O-ring	NBR
3	Back cover	Aluminum alloy
4	Screw	Carbon steel
5	Magnet washer	NBR
6	Magnet	Sintered metal(Neodymium-iron-boron)
7	Piston seal	NBR
8	Rod packing	NBR
9	Countersink screw	Stainless steel
10	Cover blank	Stainless steel
11	Piston rod	Stainless steel
12	Gripper	Stainless steel
13	Bumper	TPU
14	Piston	Aluminum alloy
15	Magnet holder	Aluminum alloy
16	Body	Aluminum alloy

Air gripper(parallel open/close style)

HFC Series

Bore size: $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$, $\Phi 50$, $\Phi 63$

How to select product

Please select pneumatic finger according to the following steps:

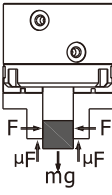
① The selection of the effective gripping force



② the confirmation of the gripping point

1. The selection of the gripping force

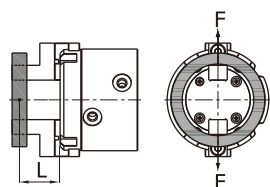
The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient $a=4$, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

The work-pieces as shown in the left :		$\mu = 0.2$	$\mu = 0.1$
 n: number of gripper F: Gripping force (N) μ: friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity ($=9.8m/s^2$)	The condition that the work-pieces won't drop is: $n \times \mu F > mg$ so: $F > \frac{mg}{n \times \mu}$ Safety coefficient is a, so F is: $F = \frac{mg}{n \times \mu} \times a$	$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
		10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

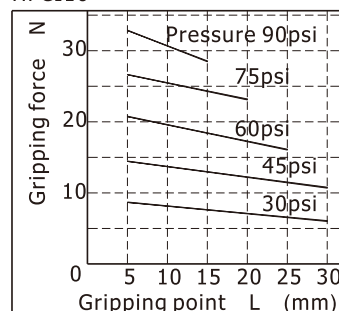
Note) If the friction coefficient $\mu > 0.2$, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

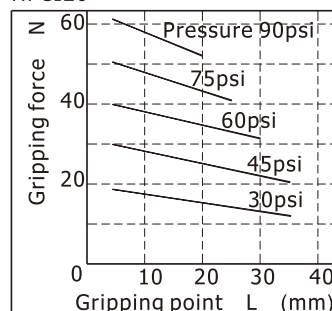
Opened gripping force(I Type)



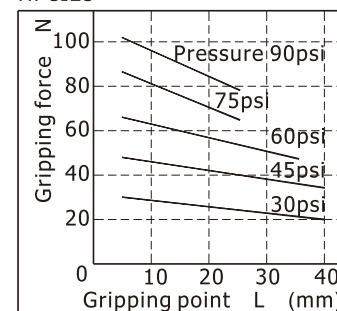
HFCI16



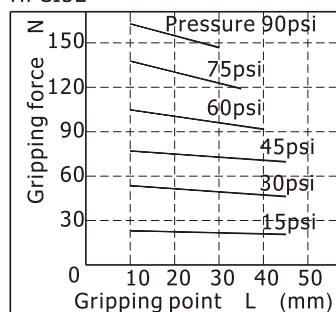
HFCI20



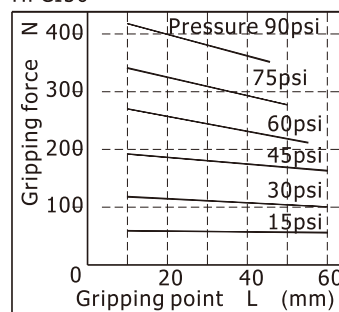
HFCI25



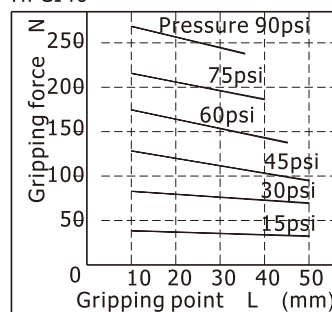
HFCI32



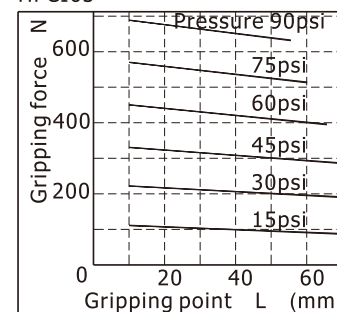
HFCI50



HFCI40



HFCI63



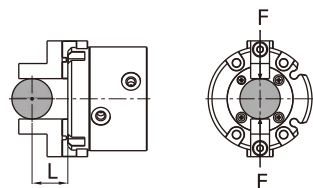
Air gripper(parallel open/close style)

AIRTAC

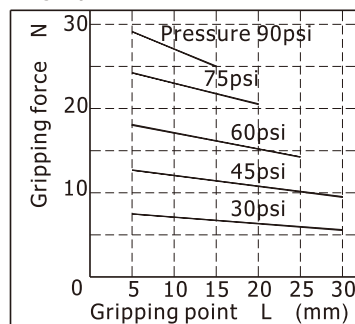
HFC Series

Bore size: $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$, $\Phi 50$, $\Phi 63$

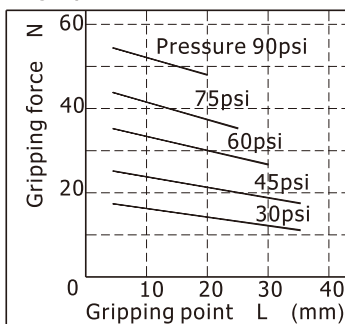
Closed gripping force(I Type)



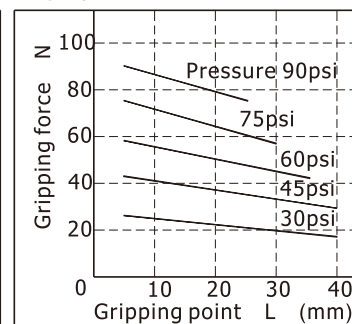
HFCI16



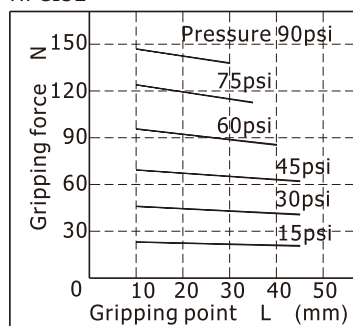
HFCI20



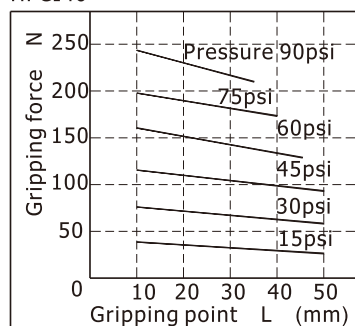
HFCI25



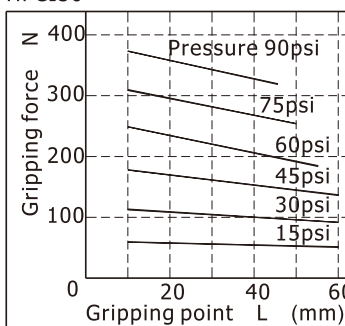
HFCI32



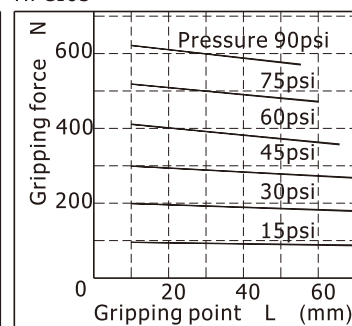
HFCI40



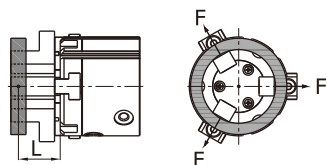
HFCI50



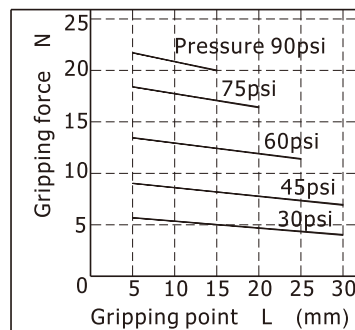
HFCI63



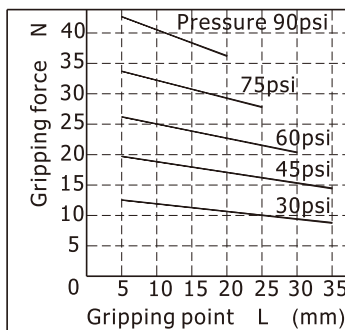
Opened gripping force(Y Type)



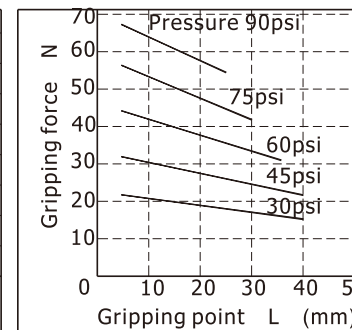
HFCY16



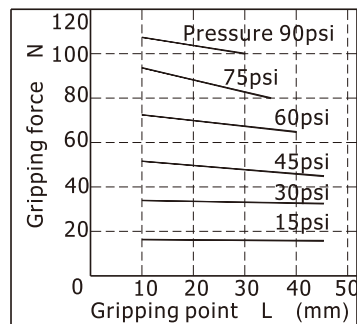
HFCY20



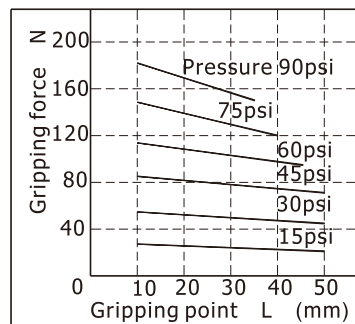
HFCY25



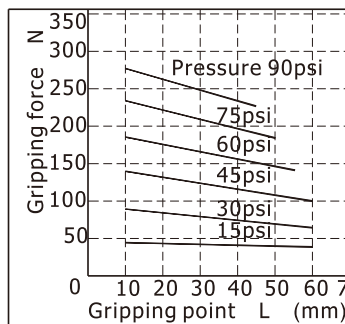
HFCY32



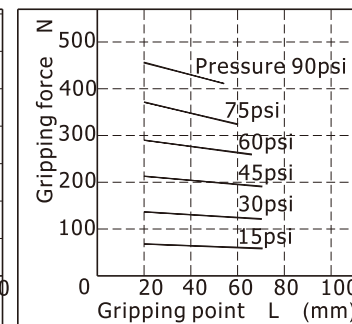
HFCY40



HFCY50



HFCY63



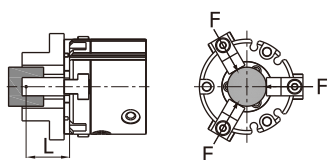
Air gripper(parallel open/close style)

AIRTAC

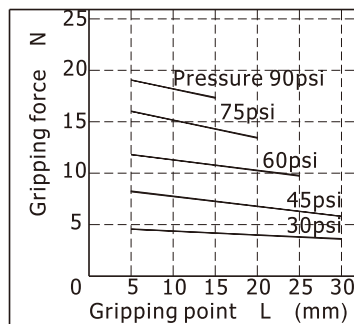
HFC Series

Bore size: $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$, $\Phi 50$, $\Phi 63$

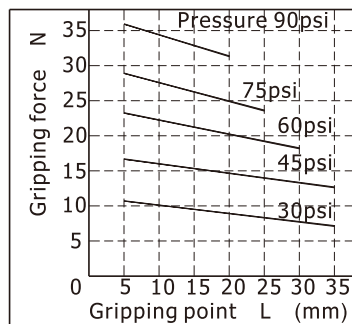
Closed gripping force(Y Type)



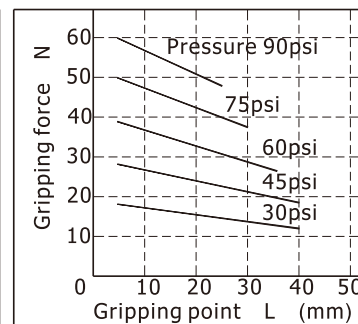
HFCY16



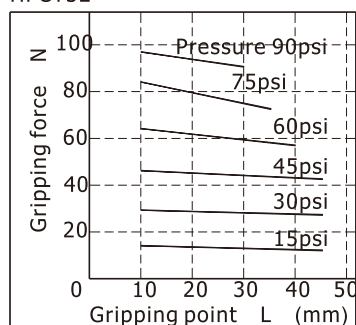
HFCY20



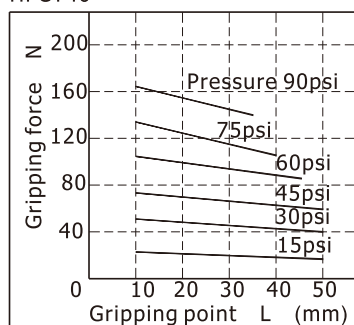
HFCY25



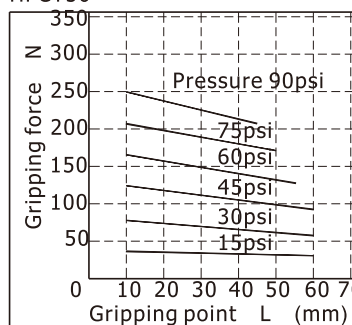
HFCY32



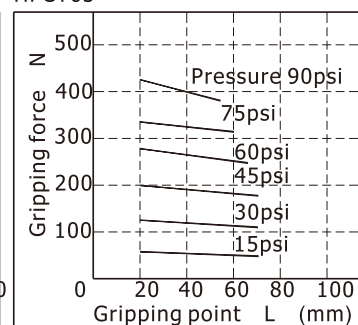
HFCY40



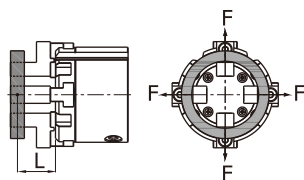
HFCY50



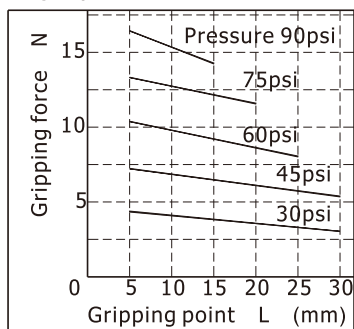
HFCY63



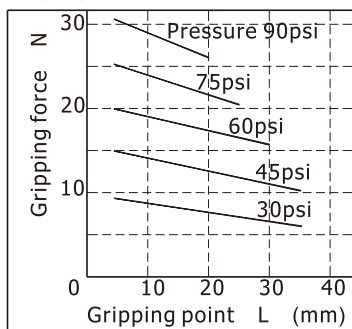
Opened gripping force(X Type)



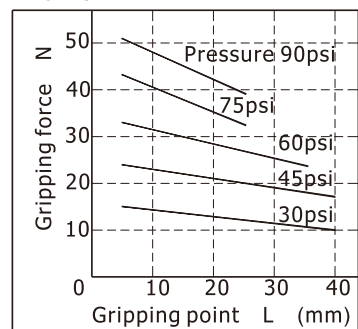
HFCX16



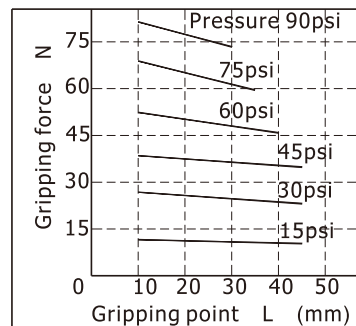
HFCX20



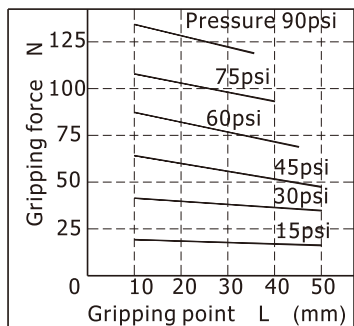
HFCX25



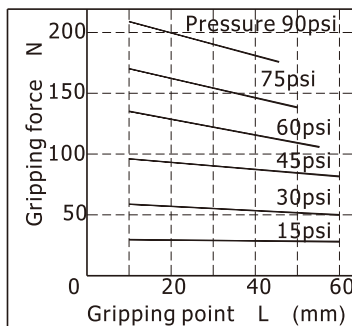
HFCX32



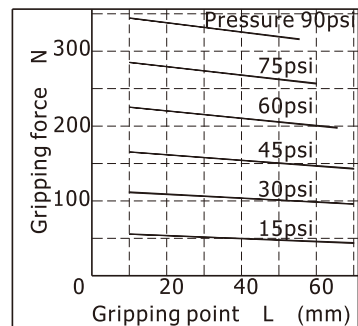
HFCX40



HFCX50



HFCX63

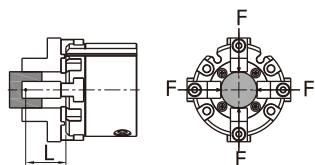


Air gripper(parallel open/close style)

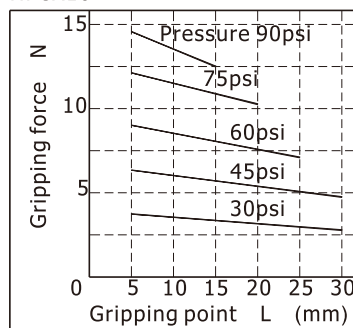
HFC Series

Bore size: $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$, $\Phi 50$, $\Phi 63$

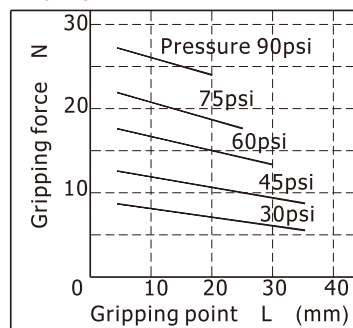
Closed gripping force(X Type)



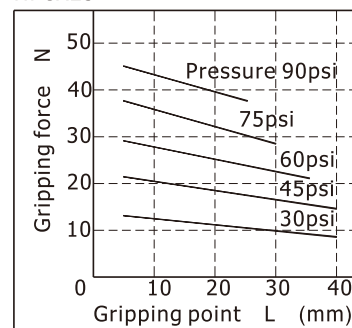
HFCX16



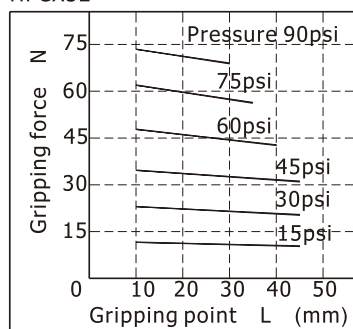
HFCX20



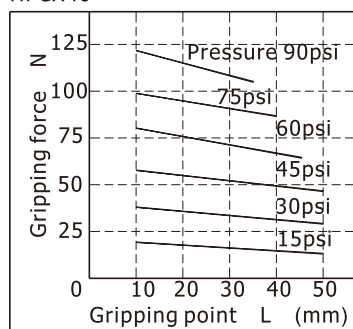
HFCX25



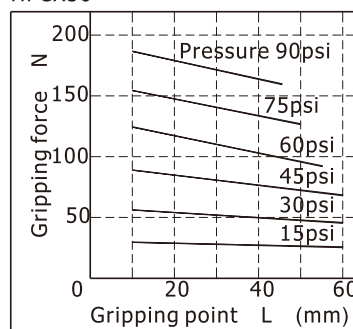
HFCX32



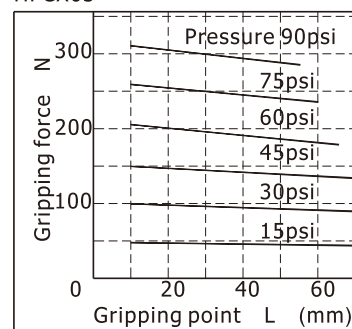
HFCX40



HFCX50



HFCX63



Air gripper(parallel open/close style)

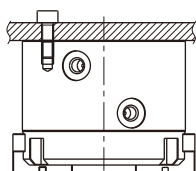
HFC Series

Bore size: Φ16, Φ20, Φ25, Φ32, Φ40, Φ50, Φ63

Installation and application

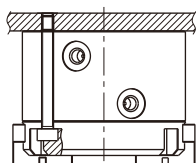
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external force and impact force.
3. When install and fix the air gripper, avoid falling down, collision and damage.
4. When fixing the gripping jaw parts, don't twist the gripping jaw.
5. There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart. If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

Tail installation type



Model	Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)	The aperture of the positioning bore(mm)	The depth of the positioning bore(mm)
HFCI HFCX	16	M4×0.7	2.1	8	Φ17 ^{+0.05} ₀	1.5
	20	M4×0.7	2.1	8	Φ21 ^{+0.05} ₀	1.5
	25	M4×0.7	2.1	8	Φ26 ^{+0.05} ₀	1.5
	32	M5×0.8	4.3	10	Φ34 ^{+0.05} ₀	2
	40	M6×1.0	7.3	12	Φ42 ^{+0.05} ₀	2
	50	M6×1.0	7.3	12	Φ52 ^{+0.05} ₀	2
HFCY	63	M6×1.0	7.3	12	Φ65 ^{+0.05} ₀	2.5
	16	M3×0.5	0.88	6	Φ17 ^{+0.05} ₀	1.5
	20	M3×0.5	0.88	6	Φ21 ^{+0.05} ₀	1.5
	25	M4×0.7	2.1	8	Φ26 ^{+0.05} ₀	1.5
	32	M4×0.7	2.1	8	Φ34 ^{+0.05} ₀	2
	40	M5×0.8	4.3	10	Φ42 ^{+0.05} ₀	2
	50	M5×0.8	4.3	10	Φ52 ^{+0.05} ₀	2
	63	M6×1.0	7.3	12	Φ65 ^{+0.05} ₀	2.5

The installation of the front through hole

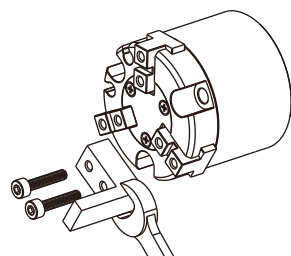


Model	Bore size	The bolts type	Max. locking moment(Nm)
HFCI HFCX	16	M3×0.5	0.88
	20	M3×0.5	0.88
	25	M3×0.5	0.88
	32	M4×0.7	2.1
	40	M5×0.8	4.3
	50	M5×0.8	4.3
HFCY	63	M5×0.8	4.3
	16	M3×0.5	0.88
	20	M3×0.5	0.88
	25	M4×0.7	2.1
	32	M4×0.7	2.1
	40	M5×0.8	4.3
	50	M5×0.8	4.3
	63	M6×1.0	7.3

6. The installation method of the gripping jaw fittings

When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise the parts will be easily damaged.

Install the gripping jaw fittings



Bore size	The bolts type	Max. locking moment(Nm)
16	M3×0.5	0.59
20	M3×0.5	0.59
25	M3×0.5	0.59
32	M4×0.7	1.4
40	M4×0.7	1.4
50	M5×0.8	2.8
63	M5×0.8	2.8

Air gripper(parallel open/close style)

AIRTAC

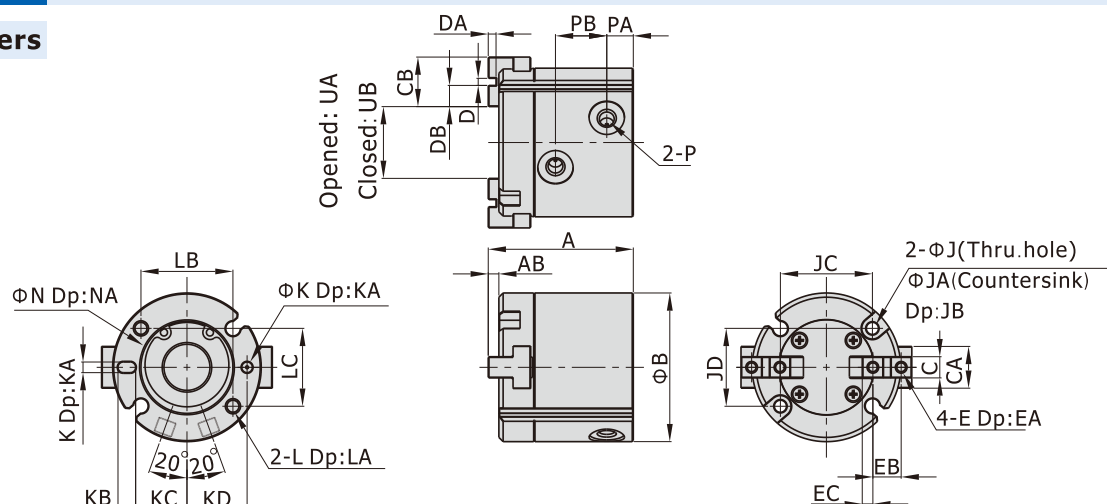
HFC Series

Bore size: $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$, $\Phi 50$, $\Phi 63$

Dimensions

Two grippers

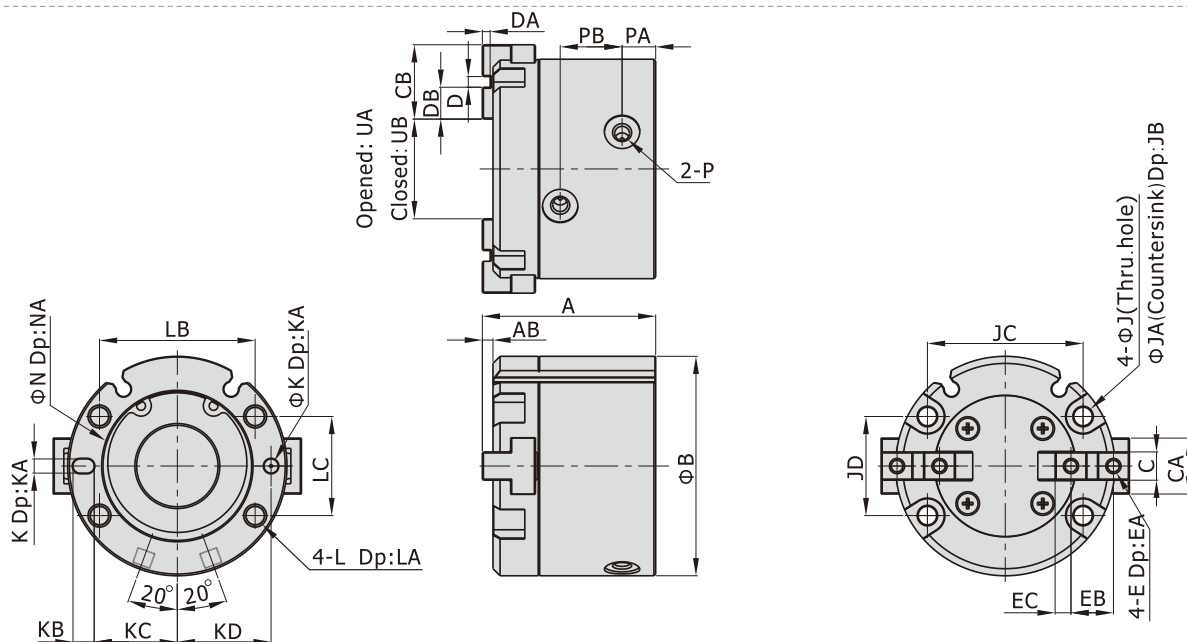
$\Phi 16 \sim \Phi 25$



Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA	EB	EC	J	JA	JB	JC	JD
HFCI16	35	3	30	5 ^{+0.01} _{-0.03}	8	10	2 ^{+0.04} _{+0.01}	2 ^{+0.2} ₀	4	M3×0.5	5	6	2	3.4	6	6	18	16
HFCI20	39	3	36	6 ^{+0.01} _{-0.03}	10	12	2 ^{+0.04} _{+0.01}	2 ^{+0.2} ₀	5	M3×0.5	5	7	2.5	3.4	6	6	24	18
HFCI25	41	3	42	6 ^{+0.01} _{-0.03}	12	14	2 ^{+0.04} _{+0.01}	2 ^{+0.2} ₀	6	M3×0.5	5	8	3	3.4	6	6	26	22

Model\Item	K	KA	KB	KC	KD	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCI16	2 ^{+0.04} _{+0.01}	2	3	11	12.5	M4×0.7	8	18	16	17 ^{+0.05} ₀	1.5	M3×0.5	7	10	14	10
HFCI20	2 ^{+0.04} _{+0.01}	2	3	13	14.5	M4×0.7	8	24	18	21 ^{+0.05} ₀	1.5	M5×0.8	7	13	16	12
HFCI25	3 ^{+0.04} _{+0.01}	3	5	14.5	17	M4×0.7	8	26	22	26 ^{+0.05} ₀	1.5	M5×0.8	7.5	14.5	20	14

$\Phi 32 \sim \Phi 63$



Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA	EB	EC	J	JA	JB	JC	JD
HFCI32	45	3	55	8 ^{+0.01} _{-0.03}	14	20	2 ^{+0.04} _{+0.01}	2 ^{+0.2} ₀	9	M4×0.7	8	11	4.5	4.2	8	9	38	25
HFCI40	49	3	62	8 ^{+0.01} _{-0.03}	16	21	3 ^{+0.04} _{+0.01}	2 ^{+0.2} ₀	9	M4×0.7	8	12	4.5	5.2	9.5	9	44	28
HFCI50	57	3	70	10 ^{+0.01} _{-0.03}	18	24	4 ^{+0.04} _{+0.01}	2 ^{+0.2} ₀	10	M5×0.8	9	14	5	5.2	9.5	12	52	34
HFCI63	68	4	86	12 ^{+0.01} _{-0.03}	24	28	6 ^{+0.04} _{+0.01}	3 ^{+0.2} ₀	11	M5×0.8	9	17	5.5	5.2	9.5	14	66	38

Model\Item	K	KA	KB	KC	KD	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCI32	3 ^{+0.04} _{+0.01}	3	5	20.5	23	M5×0.8	10	38	25	34 ^{+0.05} ₀	2	M5×0.8	8.5	16	24	16
HFCI40	4 ^{+0.04} _{+0.01}	4	6	23.5	26.5	M6×1.0	12	44	28	42 ^{+0.05} ₀	2	M5×0.8	9.5	17.5	28	20
HFCI50	4 ^{+0.04} _{+0.01}	4	6	28	31	M6×1.0	12	52	34	52 ^{+0.05} ₀	2	M5×0.8	9.5	21	34	22
HFCI63	5 ^{+0.04} _{+0.01}	5	7	34.5	38	M6×1.0	12	66	38	65 ^{+0.05} ₀	2.5	M5×0.8	12	24	46	30



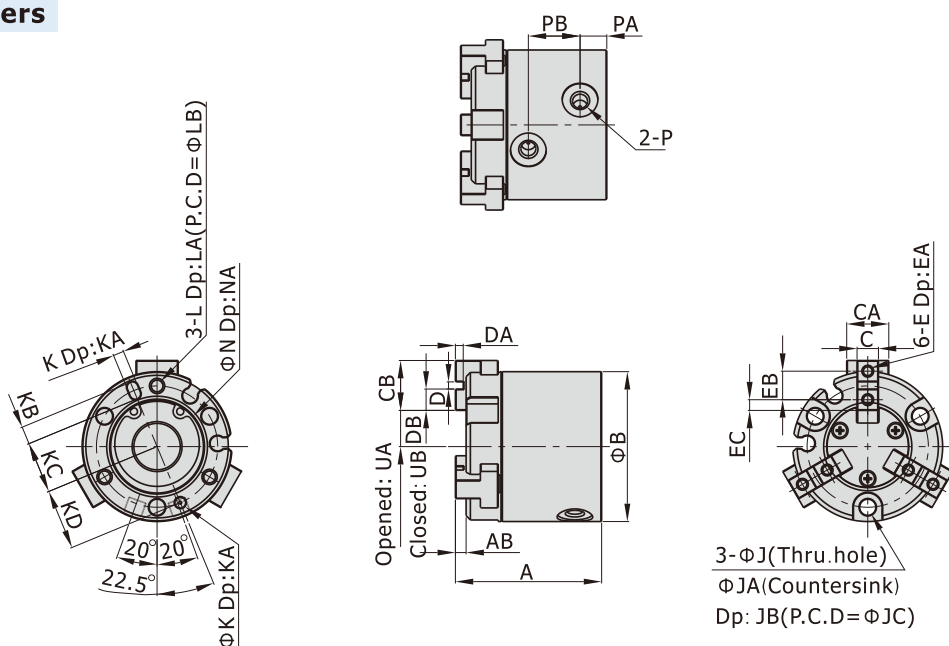
Air gripper(parallel open/close style)

AIRTAC

HFC Series

Bore size: $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$, $\Phi 50$, $\Phi 63$

Three grippers



Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA	EB	EC	J	JA	JB	JC
HFCY16	35	3	30	5 ^{+0.01} _{-0.03}	8	10	2 ^{+0.04} _{+0.01}	2 ^{+0.2} ₀	4	M3×0.5	5	6	2	3.4	6	6	25
HFCY20	39	3	36	6 ^{+0.01} _{-0.03}	10	12	2 ^{+0.04} _{+0.01}	2 ^{+0.2} ₀	5	M3×0.5	5	7	2.5	3.4	6	6	29
HFCY25	41	3	42	6 ^{+0.01} _{-0.03}	12	14	2 ^{+0.04} _{+0.01}	2 ^{+0.2} ₀	6	M3×0.5	5	8	3	4.5	8	9	34
HFCY32	45	3	52	8 ^{+0.01} _{-0.03}	14	20	2 ^{+0.04} _{+0.01}	2 ^{+0.2} ₀	9	M4×0.7	8	11	4.5	4.5	8	9	44
HFCY40	49	3	62	8 ^{+0.01} _{-0.03}	16	21	3 ^{+0.04} _{+0.01}	2 ^{+0.2} ₀	9	M4×0.7	8	12	4.5	5.5	9.5	9	53
HFCY50	57	3	70	10 ^{+0.01} _{-0.03}	18	24	4 ^{+0.04} _{+0.01}	2 ^{+0.2} ₀	10	M5×0.8	9	14	5	5.5	9.5	12	62
HFCY63	68	4	86	12 ^{+0.01} _{-0.03}	24	28	6 ^{+0.04} _{+0.01}	3 ^{+0.2} ₀	11	M5×0.8	9	17	5.5	6.6	11	14	76

Model\Item	K	KA	KB	KC	KD	L	LA	LB	N	NA	P	PA	PB	UA	UB
HFCY16	2 ^{+0.04} _{+0.01}	2	3	11	12.5	M3×0.5	6	25	17 ^{+0.05} ₀	1.5	M3×0.5	7	10	7	5
HFCY20	2 ^{+0.04} _{+0.01}	2	3	13	14.5	M3×0.5	6	29	21 ^{+0.05} ₀	1.5	M5×0.8	7	13	8	6
HFCY25	3 ^{+0.04} _{+0.01}	3	5	14.5	17	M4×0.7	8	34	26 ^{+0.05} ₀	1.5	M5×0.8	7.5	14.5	10	7
HFCY32	3 ^{+0.04} _{+0.01}	3	5	19.5	22	M4×0.7	8	44	34 ^{+0.05} ₀	2	M5×0.8	8.5	16	12	8
HFCY40	4 ^{+0.04} _{+0.01}	4	6	23.5	26.5	M5×0.8	10	53	42 ^{+0.05} ₀	2	M5×0.8	9.5	17.5	14	10
HFCY50	4 ^{+0.04} _{+0.01}	4	6	28	31	M5×0.8	10	62	52 ^{+0.05} ₀	2	M5×0.8	9.5	21	17	11
HFCY63	5 ^{+0.04} _{+0.01}	5	7	34.5	38	M6×1.0	12	76	65 ^{+0.05} ₀	2.5	M5×0.8	12	24	23	15



Air gripper(parallel open/close style)

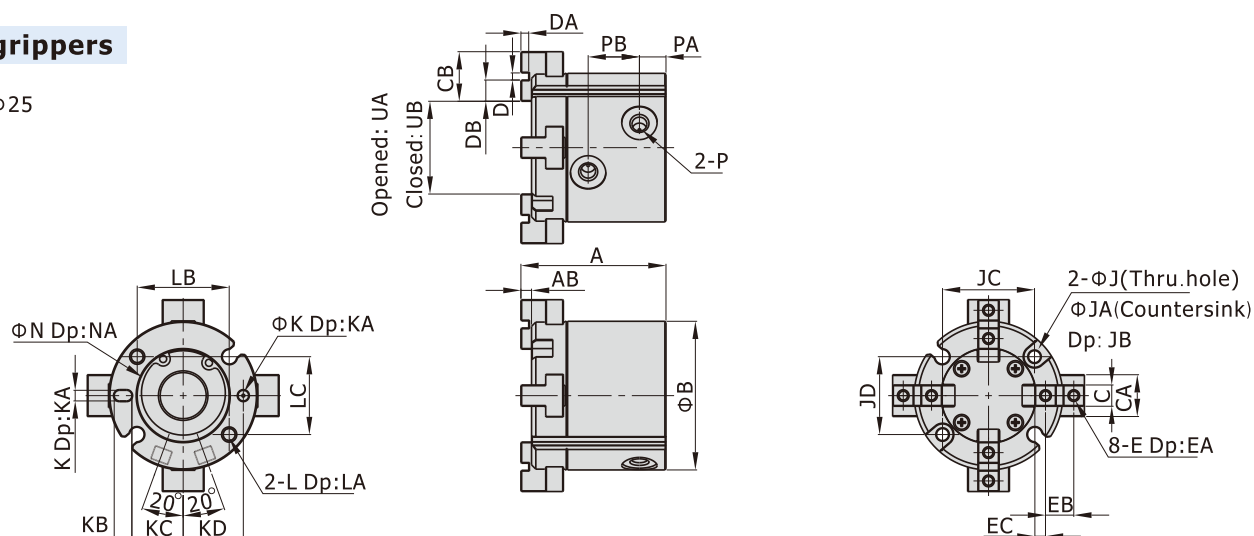
AIRTAC

HFC Series

Bore size: $\Phi 16$, $\Phi 20$, $\Phi 25$, $\Phi 32$, $\Phi 40$, $\Phi 50$, $\Phi 63$

Four grippers

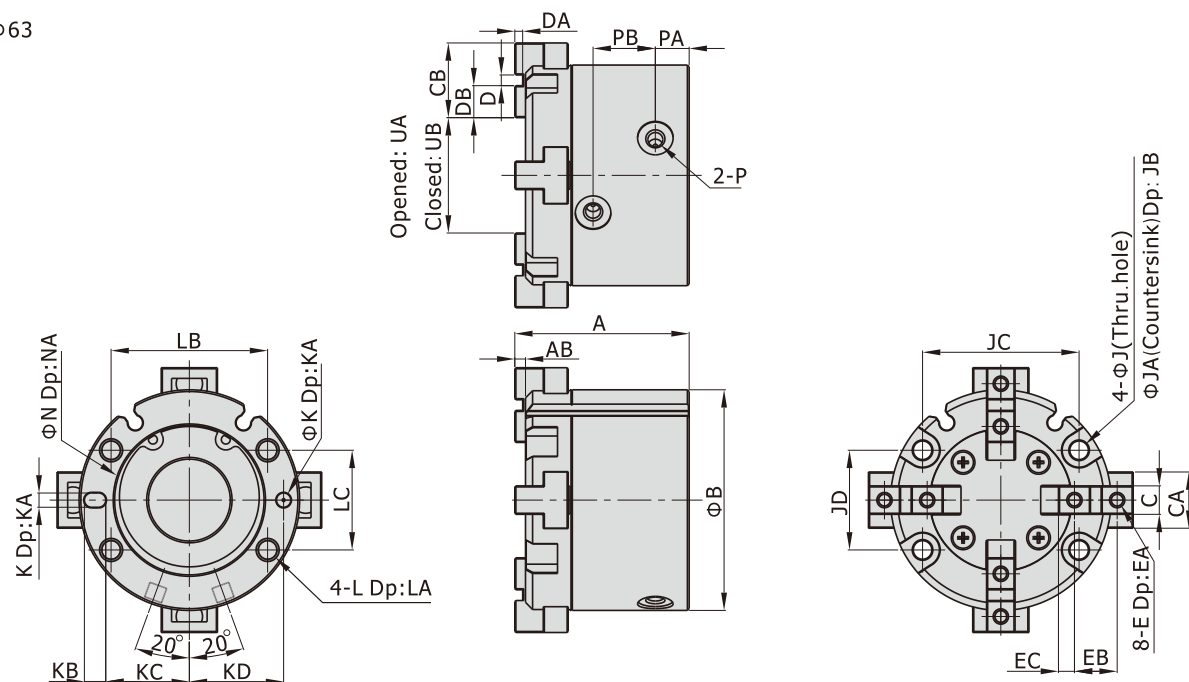
$\Phi 16 \sim \Phi 25$



Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA	EB	EC	J	JA	JB	JC	JD
HFCX16	35	3	30	5 ^{-0.01/-0.03}	8	10	2 ^{+0.04/+0.01}	2 ^{+0.2/0}	4	M3×0.5	5	6	2	3.4	6	6	18	16
HFCX20	39	3	36	6 ^{-0.01/-0.03}	10	12	2 ^{+0.04/+0.01}	2 ^{+0.2/0}	5	M3×0.5	5	7	2.5	3.4	6	6	24	18
HFCX25	41	3	42	6 ^{-0.01/-0.03}	12	14	2 ^{+0.04/+0.01}	2 ^{+0.2/0}	6	M3×0.5	5	8	3	3.4	6	6	26	22

Model\Item	K	KA	KB	KC	KD	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCX16	2 ^{+0.05/0}	2	3	11	12.5	M4×0.7	8	18	16	17 ^{+0.05/0}	1.5	M3×0.5	7	10	17	13
HFCX20	2 ^{+0.05/0}	2	3	13	14.5	M4×0.7	8	24	18	21 ^{+0.05/0}	1.5	M5×0.8	7	13	19	15
HFCX25	3 ^{+0.05/0}	3	5	14.5	17	M4×0.7	8	26	22	26 ^{+0.05/0}	1.5	M5×0.8	7.5	14.5	26	20

$\Phi 32 \sim \Phi 63$



Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA	EB	EC	J	JA	JB	JC	JD
HFCX32	45	3	55	8 ^{-0.01/-0.03}	14	20	2 ^{+0.04/+0.01}	2 ^{+0.2/0}	9	M4×0.7	8	11	4.5	4.2	8	9	38	25
HFCX40	49	3	62	8 ^{-0.01/-0.03}	16	21	3 ^{+0.04/+0.01}	2 ^{+0.2/0}	9	M4×0.7	8	12	4.5	5.2	9.5	9	44	28
HFCX50	57	3	70	10 ^{-0.01/-0.03}	18	24	4 ^{+0.04/+0.01}	2 ^{+0.2/0}	10	M5×0.8	9	14	5	5.2	9.5	12	52	34
HFCX63	68	4	86	12 ^{-0.01/-0.03}	24	28	6 ^{+0.04/+0.01}	3 ^{+0.2/0}	11	M5×0.8	9	17	5.5	5.2	9.5	14	66	38

Model\Item	K	KA	KB	KC	KD	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCX32	3 ^{+0.04/+0.01}	3	5	20.5	23	M5×0.8	10	38	25	34 ^{+0.05/0}	2	M5×0.8	8.5	16	28	20
HFCX40	4 ^{+0.04/+0.01}	4	6	23.5	26.5	M6×1.0	12	44	28	42 ^{+0.05/0}	2	M5×0.8	9.5	17.5	32	24
HFCX50	4 ^{+0.04/+0.01}	4	6	28	31	M6×1.0	12	52	34	52 ^{+0.05/0}	2	M5×0.8	9.5	21	38	26
HFCX63	5 ^{+0.04/+0.01}	5	7	34.5	38	M6×1.0	12	66	38	65 ^{+0.05/0}	2.5	M5×0.8	12	24	51	35





New production forenotice

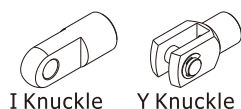
NFPA standard cylinder

Will be listed in the 2 quarter of 2018.

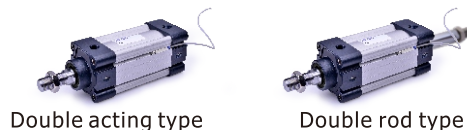
NFPA Standard cylinder

Bore size: 1-1/2", 2", 2-1/2", 3-1/4", 4", 5"

Three kinds of cylinder joints



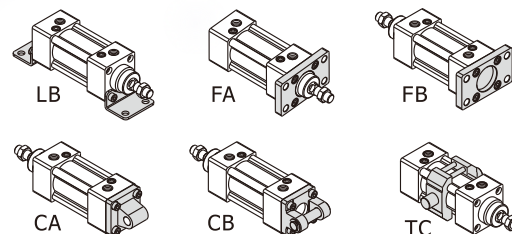
Multi-type cylinder



Adjustable air buffer

With adjustable air buffer on the front and back cover

Multi-mounting accessories



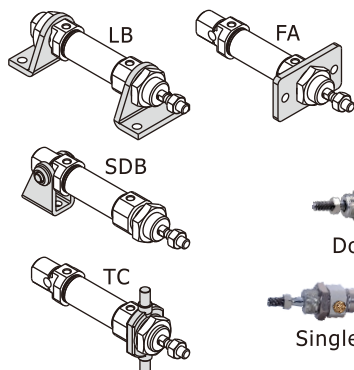
British system Mini cylinder

Will be listed in the 2 quarter of 2018.

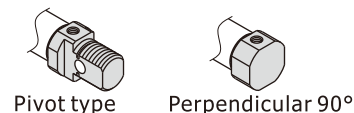
British system cylinder

Bore size: 5/16", 7/16", 9/16", 3/4", 7/8", 1-1/16", 1-1/4", 1-1/2", 1-3/4", 2", 2-1/2"

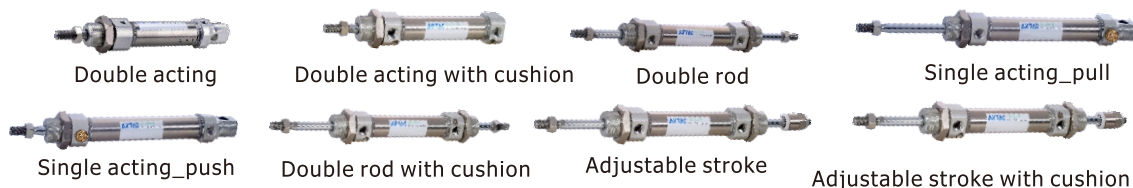
Multi-mounting accessories



Two kinds of back cover type



Multi-type cylinder



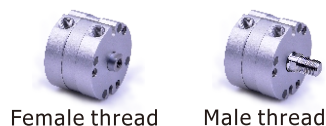
British system circular compact cylinder

Will be listed in the 2 quarter of 2018.

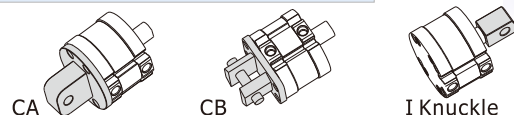
British system cylinder

Bore size: 9/16", 3/4", 1-1/16", 1-1/2", 2", 2-1/2", 3", 4"

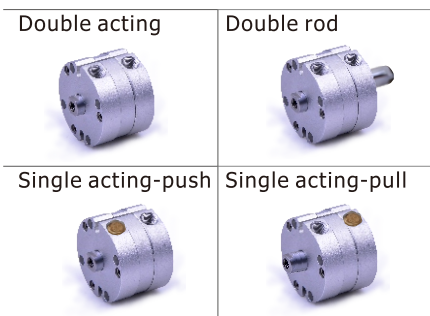
Two kinds of rod type



Multi-mounting accessories



Multi-type cylinder



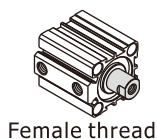
British system compact cylinder

Will be listed in the 2 quarter of 2018.

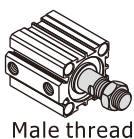
British system cylinder

Multi-type cylinder

Two kinds of rod type

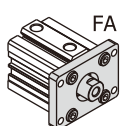


Female thread

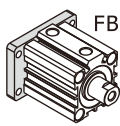


Male thread

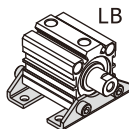
Multi-mounting accessories



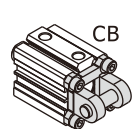
FA



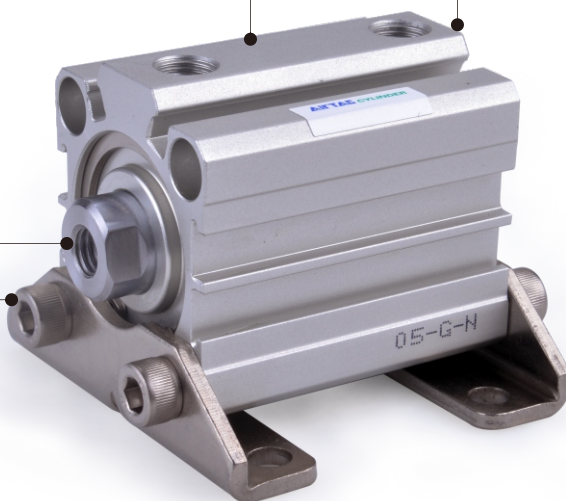
FB



LB



CB



Double acting	
Single acting-push	
Single acting-pull	
Double rod	
Adjustable stroke	

One-touch fittings

Will be listed in the 2 quarter of 2018.

Two colors



Black



Grey

Multi-kinds of I.D.

Φ1/8"、Φ5/32"、Φ3/16"、Φ1/4"

Φ5/16", Φ3/8", Φ1/2" are available.

Multi-kinds of thread size

10-32UNF、NPT1/8、NPT1/4、NPT3/8、NPT1/2 are available.



Multi-type be selected

Tube_thread type		
		
		
		
Tube_tube type		
		
		
		
Thread type		



Silencer



Speed Controller, Finger valve



Ordering code for DMS

DMS G-□ 020-□

① ② ③ ④ ⑤

G

H

C08

GS

HS

C12

① Model	DMS: Solid State Sensor			
② Specifications	G	GS	H	HS
③ Output type	Blank: 2 wire		N: NPN	P: PNP
④ Lead wire length	020: 2m		030: 3m	050: 5m
⑤ Additional specification	C08: 150mm with M8 plug connector		C12: 150mm with M12 plug connector	
	Blank: General type		W: Waterproof type IP68 [note1]	

[Note 1] There is no waterproof type for C08 & C12.
The sockets of C08 and C12 need additional order.

Ordering code for CMS

CMSG -020-□

① ② ③ ④

G

H

C08

C12

① Model	CMS: Reed Sensor			
② Specifications	G	H		
③ Lead wire length	020: 2m		030: 3m	050: 5m
④ Additional specification	C08: 150mm with M8 plug connector		C12: 150mm with M12 plug connector	
	Blank: General type		H: Heat resistant [note2]	

[Note 2] There is no heat resistant type for C08 & C12.
The sockets of C08 and C12 need additional order.

Ordering code for Socket

F-DMS C08 2 020

① ② ③ ④ ⑤



① Category code	F: Accessory		
② Specification code	DMS: Digital Magnetic Sensor		
③ Socket type	C08: M8 socket	C12: M12 socket	
④ Wire type	2: 2-wire type		3: 3-wire type
⑤ Wire length	020: 2 meters	030: 3 meters	050: 5 meters



DMS Specifications

Item	DMS		
Model	2-wire	NPN	PNP
Power supply voltage	10V ~ 28V DC	5V ~ 30V DC	
Switching current	2.5mA ~ 100mA	30V/200mA Max.	
Contact capacity	2.8W Max.	6.0W Max.	
Current consumption	3mA Max.	5mA Max.	
Internal voltage drop	2.7V Max.	0.7V Max.	
Leakage current	0.05mA Max.	0.01mA Max.	
Switching frequency	1000Hz		
Impact resistance	50G		
Circuit protection	Reverse polarity protection Surge protection		
Operating Temp.	-10℃ ~ 70℃		
Enclosure	IP64/IP68		
Standard	CE marking, RoHS		

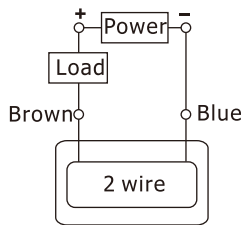
CMS Specifications

Item	CMS	
Model	General	Heat resistant
Power supply voltage	5V ~ 240V AC/DC	
Switching current	100mA	
Contact capacity	10W Max.	
Current consumption	N/A	
Internal voltage drop	2.5V Max. @100mA DC	N/A
Leakage current	N/A	
Switching frequency	200Hz	
Impact resistance	50G	
Circuit protection	N/A	
Operating Temp.	-10°C ~ 70°C	-10°C ~ 125°C
Enclosure	IP64	
Standard	CE marking, RoHS	

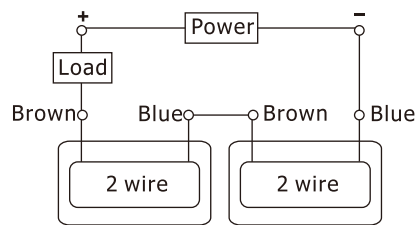
Connection method

2 wire, reed sensor connection

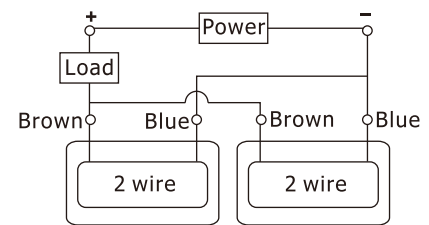
1.General connection



2.Series connection(And)



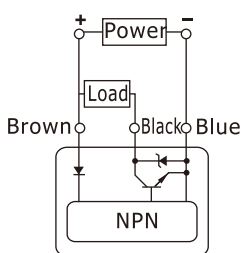
3.Parallel connection(OR)



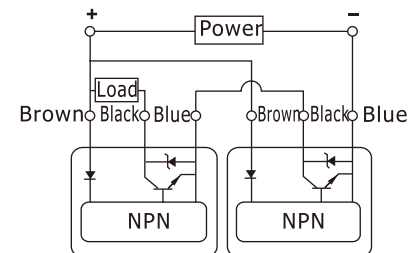
3 wire, solid state NPN connection

Note: The indicator lights will light up when both auto switches are turned NO.

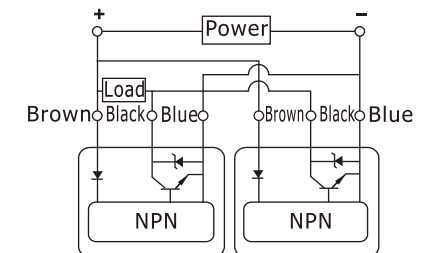
1.General connection



2.Series connection(And)



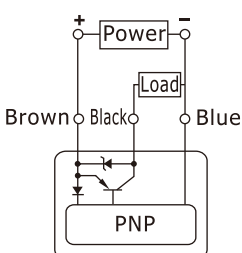
3.Parallel connection(OR)



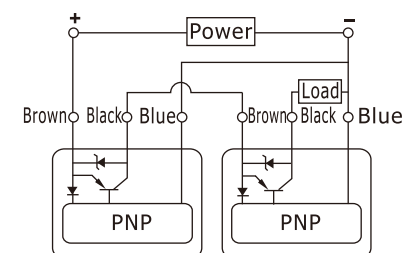
3 wire, solid state PNP connection

Note: The indicator lights will light up when both auto switches are turned NO.

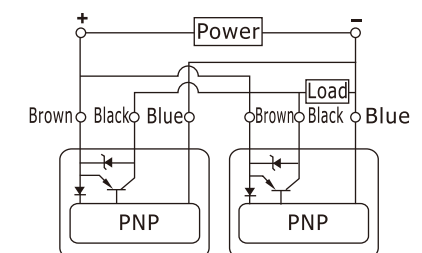
1.General connection



2.Series connection(And)



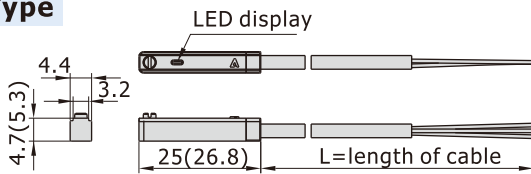
3.Parallel connection(OR)





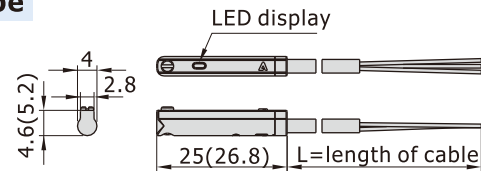
Dimensions

G Type



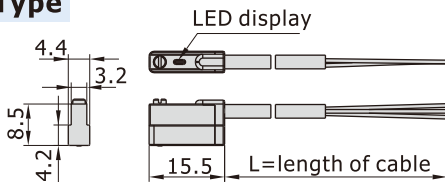
Note: a number in the bracket is the dimension of CMSG.

H Type

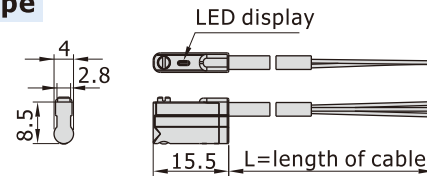


Note: a number in the bracket is the dimension of CMSH.

GS Type



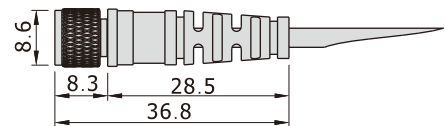
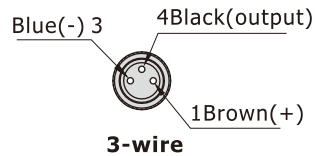
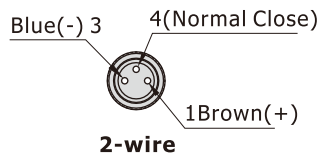
HS Type



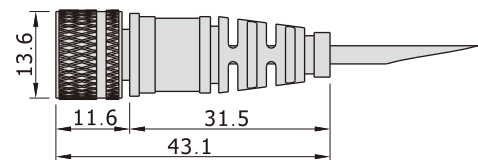
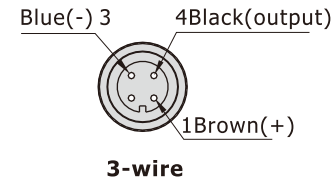
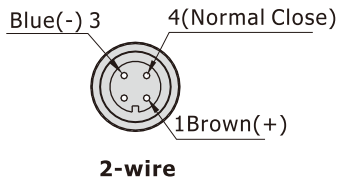
length of cable specification	length of cable(L)
020 Type	2000mm
030 Type	3000mm
050 Type	5000mm

Socket

M8 socket



M12 socket



How to selection

DMSG(S)	CMSG	TCL\TCM								ACQ\TACQ										TR						HFK					
		12	16	20	25	32	40	50	63	12	16	20	25	32	40	50	63	80	100	6	10	16	20	25	32	10	16	20	25	32	40
		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
		HFP				HFY																									
		10	16	20	25	32	6	10	16	20	25	32																			
		●	●	●	●	●	●	●	●	●	●	●																			

DMSH(S)	CMSH	ACQ\TACQ			TC	HFY	HFP	HFR				HFC				HRQ															
		125	140	160	6	10	6	32	10	16	20	25	32	16	20	25	32	40	50	63	2	3	7	10	20	30	50	70	100	200	
		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
		HLH			HLQ\HLQL				HLS\HLSL				HFK																		
		6	10	16	20	6	8	12	16	20	25	6	8	12	16	20	25	10	16	20	25	32	40								
		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								



How to mounting

Sensor model	Procedure		
DMSG(S)/CMSG	1	2	3
DMSH(S)/CMSH	1	2	3

Instruction

- Sensor shall not fall down or bear great impact when it is installed.
- The wire of the Sensor shall not move with the action of cylinder.
- Clamping torque shall be within the allowable scope when the Sensor is installed(0.15~0.2Nm).
- Sensor shall be installed in the middle position of the action scope.
- Sensor wiring:
 - The wire is unable to bear repetitive torsion and tension. Please wire an external load before switch the power on.
 - No poor insulation in wire.
 - Do not wire with power line, high voltage line or use one wiring pipe.
 - Please wire the circuit correctly base on the circuit diagram.
- Execute scheduled maintenance by the following guidelines:
 - Make sure the sensor is firmly fixed.
 - Make sure the wire is intact.
 - Make sure that LED indicate the movement of cylinder correctly.
- Application of environment:
 - It is Not allow to use the sensor in the environment with explosive gas.
 - Magnetic sensor shall not be used in the environment with external magnetism.
 - Magnetic sensor shall not be used in the environment that is always eroded by water.
 - Magnetic sensor shall not be used in the environment with oil moisture or chemical substance.
 - Magnetic sensor shall not be used in the environment with periodically changing temperature.
 - Magnetic sensor shall not be used in the environment with excessively great impact.
 - Magnetic sensor shall not be used in the environment with sources of electrical pulse.
 - Avoid the environment with accumulated iron power and dense magnetic objects.



How to Use AirTAC Products

When designing, producing and using pneumatic system devices, one must be familiar with the requests and attentions of pneumatic components and pneumatic system. Use and operate system devices under the situation that necessary examinations have been conducted and the machinery framework, pneumatic control loop and the electrical control system of pneumatic system are ensured to be in safe condition.

For using our AirTAC products safely, the selection, operation and proper maintenance and management of the products are very important!

To guarantee to use safely, please make sure to operate according to this instruction completely!

Requests of Pneumatic System on Design-Selector and User

- Confirmation of product models and specifications prior to use The designer of pneumatic system and selector of pneumatic components shall consider the security and faults that may occur according to the requests on performance of pneumatic system and decide the specification of pneumatic components according to the latest product catalog and data. If it is necessary, they shall make relevant analysis and experiment. When the system is used in some newly developed industries or special industries, they should cooperate with the manufacturer of pneumatic components to carry out the selection.



Attention

- Special attention to the following conditions
 - Once the compressed air is wrongly used, it is dangerous. Thus the assembly, operation and maintenance of the pneumatic equipment shall be done by welltrained person with certain practical experience.
 - Before making sure that it is safe, prohibit to use pneumatic equipment or to disassemble pneumatic components from the equipment.



Danger

- After confirming that the above safe treatment has been conducted, cut off the power and air source, release the remaining air, and conduct maintenance or disassembly on the equipment.
- Before starting the equipment, make sure that the piston rod will not stick out rapidly.



Warning

Requests of Pneumatic System at Application Environment

- It is not allowed to use the system in the environment that includes corrosive gas, chemicals (such as organic solvent), seawater, water and steam or the place with the above substances.
- It is not allowed to use it in the place with explosive gas. (If necessary, consider adopting explosion-proof measure).
- It is not allowed to use it in the situation with oscillation and impact, or the component capacity to resist to oscillation and impact shall accord with the specification in this catalog.
- It is not allowed to use it in the place that has heat source around or is influenced by radiant heat. Otherwise, it is better to adopt measures to interdict the radiant heat.



Attention

- Add shields in the place with direct sunshine.
- In case the system is used in the place with large humidity and much dust or the place with water drop, oil drop, cutting oil and dispersing cooling fluid, proper protective measures shall be taken.
- The cylinder with magnet can not be used in the environment with strong magnetic field.



Danger

- In special temperature environment:
High temperature environment: please use seals resisting high temperature Low temperature environment: moisture in loop may freeze and affect the action, at this moment, the moisture shall be eliminated to avoid freeze.



Warning





Attentions on the Design and Selection of Pneumatic System

- Use the product under the stipulated application condition and scope

This catalogue stipulates the operation scope and condition. Please operate according to it. Any operation beyond the scope and condition may cause fault of and damage to the components, even result in danger and harm. Therefore, please contact our company in case that the products are used under the condition beyond the specified application condition and range, or any other fluid except the compressed air is used.



- Please design and install protective devices in the device part which may cause personal injury. The drive part of the cylinder may cause personal injury, please design and install protective devices to make sure people cannot directly contact the drive part when it works.

- Please effectively fasten the drive part of the cylinder to avoid the looseness of connective part. Especially under the circumstance with high action frequency or larger oscillation, effective fastness must be strengthened.

- Design necessary buffer loop or buffer devices

When drive objects have higher speed or heavier weight, it is difficult to absorb impact solely by cylinder cushion. Therefore, buffer loop or external buffer must be designed or used to absorb the impact. Moreover, the rigidity of the machinery devices must be considered.

- When designing the system, the devices and personal safety shall be considered under the situation of power failure or air failure.

For the clamping framework, if the pressure of system loop declines due to power failure and air failure, it will result in falling off of the components and further the harm on machinery devices and people, therefore, it is necessary to consider designing antifalling loop or devices.

- When designing the system, please consider the possibility that power source may produce faults. Please adopt relevant measures to make sure that the drive devices such as air pressure and electrical power will not result in personal injury or damages of devices when the power source has faults.

- Please make a loop that can prevent it from flying out when designing system. When pneumatic system is debugged or overhauled after releasing the remaining pressure, the system starts to pressurize the piston at one side, and the driven object may be pushed in high speed. In this situation, please design loop or device which can prevent cylinder from rapidly flying out to avoid personal injury or machinery damage.



- When designing the system, please consider the action status in emergency stop situation.

The design shall make sure that the action of cylinder will not cause personal injury or component and device damage under the situation that the system is in abnormal status such as emergency stop or power failure and that the safety devices and the machinery stop.



- When designing the system, please consider the actions during restarting after emergency stop and abnormal stop.

The design shall make sure that the system will not cause personal injury or component damage when it restarts. In addition, for safely operation, please design return device.

- Intermediate stop

When the cylinder stop in the middle position controlled by three-position closed center type valve, due to the compressibility of the air, it is hard to control the precise position of the cylinder. In addition, it can not avoid the air leakage of valve or cylinder absolutely, so the stop position is difficult to keep on for a long time. Therefore, please design necessary devices when a long-term stay in stop position is required.

- Synchronization of several cylinders in the system

Due to the compressibility of the air, it is difficult to control several cylinders precisely by the same direction control valve. In this situation, special devices or loop shall be taken into consideration when designing.

- Please use the purified dry air in the air loop.

Do not use the air with synthetic oil (including chemicals and organic solvent), salinity and corrosive gas to avoid component damage or poor action.

Attention for the Use of Lubricant for Pneumatic System

- Generally, the pneumatic components have been lubricated by grease when producing. Therefore, they can be used without additional lubrication for a long time.



- In case of using additional lubrication, please use turbine oil (without additive) ISO-VG32. Engine oil, spindle oil or other oils are not allowed to avoid soaking and expanding of the seals like NBR.

- If lubrication is stopped in the midway, the original lubricated grease in side may have been flushed off, then the lack of lubrication will cause poor action of elements and accelerate the abrasion of relevant parts. Therefore, please make sure to supply oil constantly and an oil misting device with proper flow shall be equipped.

- When lubricating the compressed air, the oil mist quantity can not surpass 25mg/m.

- When the system runs normally, the oil mist quantity is set as 0.2-1 drop or 0.5-5 drops/1000L.

- The simple method for testing the oil mist quantity is: put one piece of white paper at the port of cylinder control valve which is the most far from lubricator, after a while, the white paper takes on lemon yellow. If there are oil drops falling down from the white paper, it indicates the excessive lubrication.





How to Use AirTAC Products

Requests of Pneumatic System to Compressed Air

- The compressed air ejected by air compressor can not be directly used in the air loop, since it has certain moisture, oil content and dust, which should be gaseous in the high temperature of about 140-170℃ through the compressor.

- Make sure to use compressed air that has been purified

- The filtration precision of common machinery and common pneumatic loop is □ 50μm;
- The filtration precision of logic elements, jet elements and air motors is □ 10μm;
- The filtration precision of food, medicine, electron, tobacco and liquor and pneumatic bearing is □ 5μm;



Attention

- The oil mist in compressed air may gather in the container of gas tank, pipeline and pneumatic system and forms combustibles which may cause harm to pneumatic system.

- The degenerative lubricant will make rubber, plastic and seals materials go bad and block the port, which may cause action failure of valve.

- Moisture and dust will cause erosion and rustiness of metal parts, abrade and trap the action parts, block the ports and lead to transmission abnormality of air pressure signal. In cold area, the freezing of moisture will cause freeze and frost-crack of pipeline and the failure of elements and components.



Danger

- It is not allowed to use the compressed air with harmful gas (such as acid and alkali). Acid and alkali will cause damage to internal parts of pneumatic components.

- The compressed air without the content of oxygenated oil of air compressor, tar and carbon shall be used.

- If the oxygenated oil, tar and carbon get into air pressure elements and become additive to them, the resistance of slipping parts will be increased and poor action will be caused. The mixture of oxygenated oil, tar and carbon with lubricant will abrade the slipping parts of air pressure elements.



Warning

- It is not suitable to use dry air in air pressure elements. Please use the elements corresponding to ultra-dry air. The ultra-dry compressed air will shorten the service life of air pressure elements.

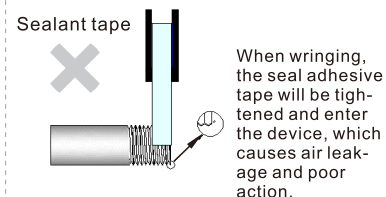
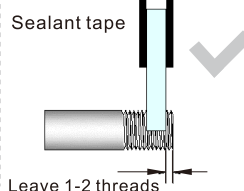
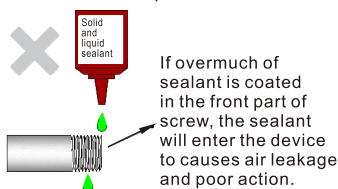
Tubing and Installation Pneumatic System

- Please obey the following stipulations on the entwining method of sealant tape when connecting fitting and tube. Please start to entwine sealant tape from 1st-2nd screw thread at the front part of tube thread and on both of positive direction and inverse direction of the thread. If the sealant tape entwines out of the front part of the tubing thread, it will be torn into fragments which will cause faults and wrong action if they get in the system.

Solid and liquid sealant



Solid and liquid sealant



- When connecting the tubing, please fasten with proper torque to prevent air leakage and thread damage.

Table one □ Reference value of Fasten torque

Unit □ N.m

Connective thread	M3	M5	1/8"	1/4"	3/8"	1/2"	3/4"	1"
Fasten torque	0.3~0.6	1.0~1.5	7.0~9.0	12~14	22~24	28~30	28~30	36~40



Attention

- Pay attention to the following matters when using nylon tube or polyurethane tube materials:

- Please use flame retardant tube or metal tubing in the environment with high temperature spark;



Warning

The proof pressure is different according to the bore size of tube and the working temperature

Table two: Reference data of maximum proof pressure

(Unit: kgf/cm²)

OD/ID(mm)		4/2.5									
Maximum pressure(-40℃~20℃)	Nylon tube	28	31	25	19	24	18	15	18	15	15
	PU tube	10	11	9	9	9	9	-	-	-	-
Minimum bending radius (mm)	Nylon tube	25	2	30	50	60	75	90	95	125	160
	PU tube	6	7	9	16	17	25	-	-	-	-
Using in different working temperatures, the maximum proof pressure shall multiply the following coefficient.		+30□		+40□		+50□		+60□		+70□	
		0.83		0.72		0.64		0.57		0.47	

- The pipeline shall be cleaned with compressed air prior to connecting the tubing and fittings to the pneumatic components.





Convert American system and British system unit to international (SI) unit

Length unit

American and british system	Conversion rates	International
1 in	= 25.4	mm
1 ft	= 0.3048	m
1 mile	= 1609.3	m
1 micron	= 10^{-6}	m

Quality unit

American and british system	Conversion rates	International
1 lb	= 453.6	g
1 cwt	= 50.8	kg
1 ton(imp)	= 1016	kg
1 ton(us)	= 907.2	kg
1 tonne	= 1000	kg

Moment unit

American and british system	Conversion rates	International
1 inlb	= 0.113	Nm
1 ft lb	= 1.356	Nm
1 kgm	= 9.807	Nm
1 ft poundal	= 0.0421	Nm

Temperature unit

American and british system	International
$(^{\circ}\text{F}-32) \times 5/9$	= $^{\circ}\text{C}$
K-273.15	= $^{\circ}\text{C}$

Flow unit

Cv value	= It's the constant value of flow, when the water flow(US gal/min)is under 60 F, the D-value of pressure between intake and outlet is 1psi (Cv $\times$ 1000=L/min)
kv value	= It's the constant value of flow, when the water flow(L/min)is under 20°C, the D-value of pressure between intake and outlet is 1kgf/cm ²
KV value	= It's the constant value of flow, when the water flow(m ³ /min)is under 20°C, the D-value of pressure between intake and outlet is 1kgf/cm ²
S.T.P	= Standard temperature and pressure (0°C and 101.3kPa absolute pressure)
N.T.P	= Normal temperature and pressure (20°C and 101.3kPa absolute pressure)
M.S.C	= Standard of metric system (15°C and 101.3kPa absolute pressure)
ANR	= Temperature : 20°C and relative humidity : 65%

Equivalence conversion

1 psi	=6.895	kPa	=0.07	kg/cm ²	=0.06895	bar	=0.0703	atm
1 standard atmosphere	=14.7	psi	=101.3	kPa	=1.01325	bar		
1 kg/cm ²	=98.07	kPa	=14.22	psi	=28.96	ins mercury		
1 ft lb	=0.13826	kgm	=1.356	Nm				
1 L	=1000	cm ³	=1.7598	pint	=10 ⁶	mm ³		
1 tonne	=1000	kg	=0.984	ton	=2205	lb		
1 m ³	=10 ⁶	cm ³						
1 cu ft/min.	=28.3	l/min	=0.0283	m ³ /min				
1 Pa	=28.3	l/min	=0.0283	m ³ /min				

Area unit

American and british system	Conversion rates	International
1 in ²	= 6.45	cm ²
1 ft ²	= 0.093	m ²

Pressure unit

American and british system	Conversion rates	International
1 psi	= 6.89	kPa
1 kgf/cm ²	= 98.07	kPa
1 bar	= 100	kPa
1 bar	= 14.5	psi
1 atmosphere	= 98.1	kPa
1" (STANDARD)	= 101.33	kPa
1 cm water	= 97.89	Pa
1 in water	= 248.64	Pa
1 mm mercury	= 133.3	Pa
1 in mercury	= 3.39	kPa
1 Torr	= 133.3	Pa
1 ft water	= 0.0298	bar
1 bar	= 33.33	ft water

Unit of work and energy

American and british system	Conversion rates	International
1 lbft	= 1.356	J
1 Nm	= 1	J
1 kgm	= 9.807	J
1 kW/hr	= 3.6	MJ

Volume unit

American and british system	Conversion rates	International
1 litre	= 0.001	m ³
1 cu.ft.	= 0.0283	m ³
1 cu.in.	= 16.39	cm ³
1 gal(imp)	= 4.546	L
1 gal(us)	= 3.79	L
1 fluid oz.(imp)	= 28.41	mL
1 fluid oz.(us)	= 29.57	mL

Force unit

American and british system	Conversion rates	International
1 lbf	= 4.45	N
1 kgf	= 9.81	N
1 kp(kilopond)	= 9.81	N
1 poundal	= 138.3	mN
1 ton force	= 9.964	kM

Power unit

American and british system	Conversion rates	International
1 lbft/sec	= 1.356	W
1 kgm/sec	= 9.807	W
1 Nm/sec	= 1	W
1 Joule/sec	= 1	W
1 H.P.(imp)	= 745.7	W

Unit compilation

Unit full name	Abbreviation
Pascal	Pa
Newton	N
metre	m
litre	L
Watt	W
Newton metre	Nm
Jonle	J
Megajoule	MJ
Kelvin	K





Alphanumeric Index

3	3L	Push-Pull Valve.....	P23
4	4F	Foot Pedal Valve.....	P46
	4H	Hand Lever Valve.....	P20
	4HV	Hand Lever Valve.....	P29
	4HVL	Hand Lever Valve.....	P29
	4L	Push-Pull Valve.....	P25
7	7S	Solenoid Valve.....	P18
	7V	Solenoid Valve.....	P12
A	ACQ	Ultra-Compact Cylinder.....	P93
	ASC	Flow Control Valve.....	P48
C	CMS	Sensor.....	P232
	CPV	Solenoid Valve.....	P4
D	DMS	Sensor.....	P232
	DPS	Digital Display Pressure Switch.....	P87
G	GAC	F.R.L combination.....	P54
	GAF	Filter.....	P67
	GAFC	FR.L combination.....	P57
	GAFR	Filter & regulator.....	P60
	GAL	Lubricator.....	P77
	GAR	Regulator.....	P74
	GF	Pressure Gauge.....	P92
	GS	Pressure Gauge.....	P92
	GS200	Short PC bowl type.....	P80
	GU	Pressure Gauge.....	P92
	GPF	Oil Mist Filter.....	P64
	GPR	Precision Regulator.....	P70

H	HFC	Air Gripper.....	P220
	HFK	Air Gripper.....	P193
	HFP	Air Gripper.....	P204
	HFR	Air Gripper.....	P215
	HFY	Air Gripper.....	P209
	HFZ	Air Gripper.....	P189
	HLH	Strict Slide Table Cylinder.....	P121
	HLQ	Strict Slide Table Cylinder.....	P131
	HLQL	Strict Slide Table Cylinder.....	P131
	HLS	Strict Slide Table Cylinder.....	P155
	HLSL	Strict Slide Table Cylinder.....	P155
	HRQ	Rotary Table Cylinder.....	P179
	HSV	Hand slide valve(3/2 Way).....	P27

M	M3	Control Valve.....	P36
	M5	Control Valve.....	P41

N	NRV	Non-Return Valve.....	P50
----------	------------	-----------------------	-----

P	PCV	Pilot no-return valve.....	P52
----------	------------	----------------------------	-----

S	S3	Control Valve.....	P32
	SDR	Regulator.....	P84
	SR	Regulator.....	P82

T	TCL	Tri-Rod Cylinder.....	P116
	TCM	Tri-Rod Cylinder.....	P116
	TR	Tri-Rod Cylinder.....	P111

NFPA standard cylinder..... P230
 British system Mini cylinder..... P230
 British system circular compact cylinder..... P230
 British system compact cylinder..... P231
 Tube fittings..... P231



P.I. Base 2000 • C/ Cuatro 13 • Lorquí 30564 • Murcia
www.picazosl.com • picazo@picazosl.com
 Tel. 968 676 155 • Movil 647 668 539 • Fax 968 103 053

