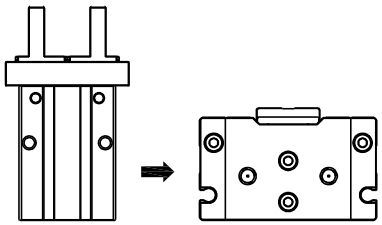
Big size air gripper and air gripper

Compendium of HFD Series

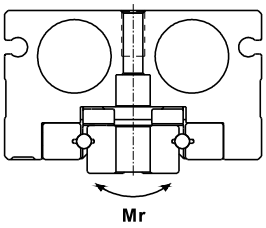
Compact structure

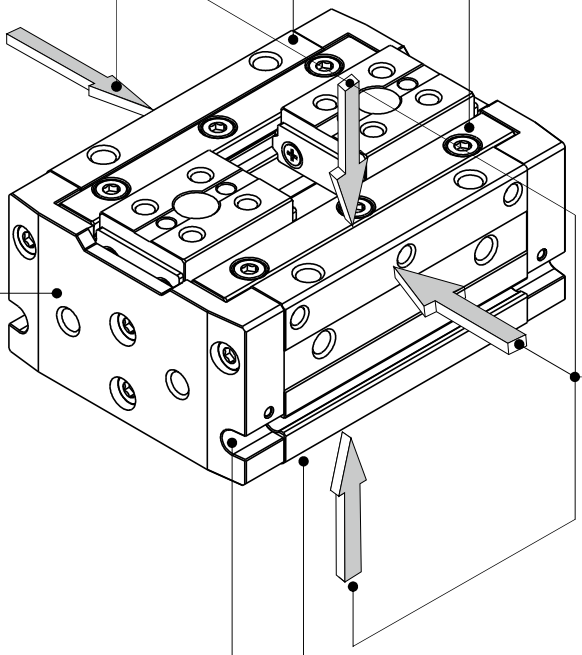
The overall height is reduced by about 50% compared to the parallel jaw product of the same clamping force, effectively reducing the device space and sloshing moment.



Double rail design

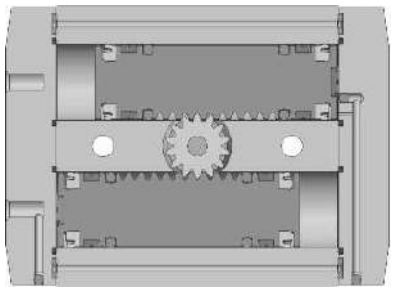
The double-track design increases the load span and the bending moment (Mr) load is better.





Double piston structure

Double piston drive, double output, for greater clamping force.



Fixed on four sides

Can be fixed in four directions and has a high degree of freedom.

With roundness magnetic switch slots

The roundness magnetic switch slots convenient to install DMSH(S)\CMSH type inducting switch.

With positioning hole

The bottom of the body is provided with a positioning hole which can improve the precision and the consistency of repeated dismounting and positioning.

Gripping force and stroke

Bore size	8			12			16			20			25	
Stroke (mm)	8	15	30	10	25	50	15	30	60	20	40	80	40	80
Gripping force per finger Effective value(N)	19			48			90			141			210	
Weight (g)	88.8	105.7	153.4	226.7	303.7	441.9	505.3	642.3	946.7	1019.6	1319.1	1983.3	1693.7	2558.9

[Note] The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm.

Compact air gripper

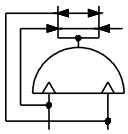
HFD Series

Specification

Bore size (mm)		8	12	16	20	25
Acting type		Double acting				
Fluid		Air(to be filtered by 40μm filter element)				
Operating pressure		0.15~0.7MPa(22~100psi)(1.5~7.0bar)				
Proof pressure		1.2MPa(175psi)(12bar)				
Temperature		-20~70℃				
Lubrication		Not required				
Repeatability mm		±0.05				
Max. frequency	Longer stroke	60(c.p.m)				
	Middle and short stroke	120(c.p.m)				
Sensor switches		CMSH, DMSH(S)				
Port size		M3×0.5	M5×0.8			

Note) Refer to P353 for detail of sensor switch.

Symbol



Product feature

1. The double-track design increases the load span and the bending moment (Mr) load is better.
2. Double piston drive, double output, for greater clamping force.
3. The bottom of the body is provided with a positioning hole which can improve the precision and the consistency of repeated dismounting and positioning.
4. The jaw rails are made of stainless steel for high rigidity and corrosion resistance.
5. Can be fixed in four directions and has a high degree of freedom.
6. The overall height is reduced by about 50% compared to the parallel jaw product of the same clamping force, effectively reducing the device space and sloshing moment.

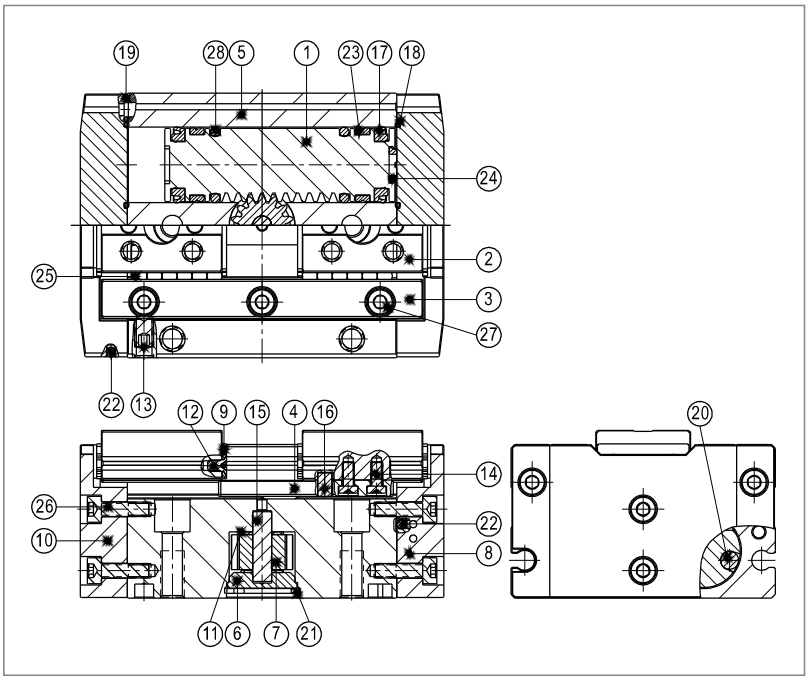
Ordering code

HFD 16 X 15

1 2 3

①Model	②Bore size	③Stroke		
HFD: Compact air finger (Double acting)	8	8	15	30
	12	10	25	50
	16	15	30	60
	20	20	40	80
	25	40	80	

Inner structure and material of major parts

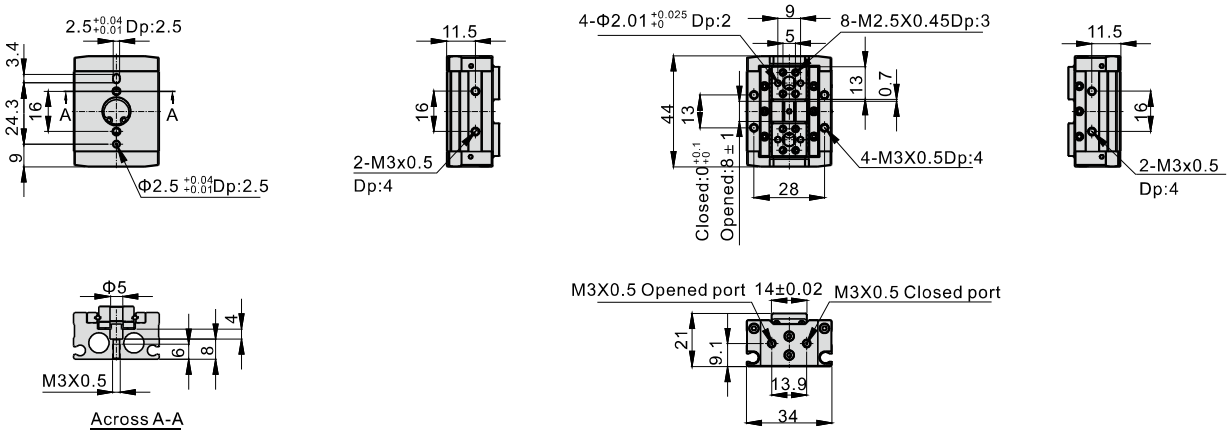


NO.	Item	Material
1	Rack	Stainless steel
2	Jaws	Stainless steel
3	Guide	Stainless steel
4	Joint arm	Cr-Mo steel
5	Body	Aluminum alloy
6	Rack end cap	Aluminum alloy
7	Gear	Cr-Mo steel
8	Back cover	Aluminum alloy
9	Baffle	Stainless steel
10	Front cover	Aluminum alloy
11	Plastic bearing	Wear resistant material
12	Screw	Stainless steel
13	Screw	Stainless steel
14	Screw	Alloy steel
15	Pin	Bearing steel
16	Pin	Bearing steel
17	Piston seal	NBR
18	O-ring	NBR
19	O-ring	NBR
20	Magnet	Rare earth material
21	C clip	Spring steel
22	Steel ball	Stainless steel
23	Wear ring	Wear resistant material
24	Bumper	TPU
25	Steel ball	Bearing steel
26	Bolt	Stainless steel
27	Bolt	Stainless steel
28	O-ring	NBR

Note: HFD8 No. 12 and No. 27 are made of alloy steel.

Dimensions

HFD8X8



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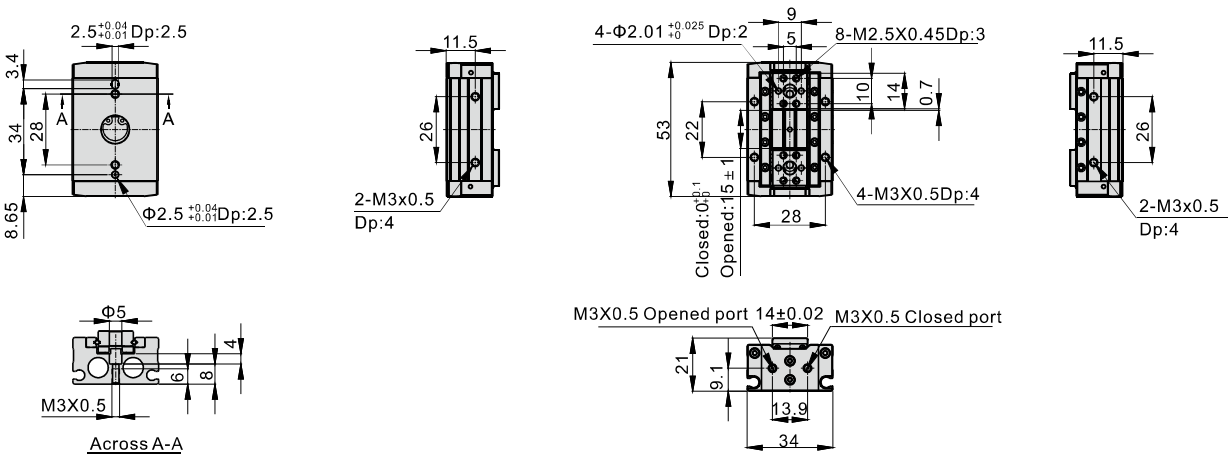

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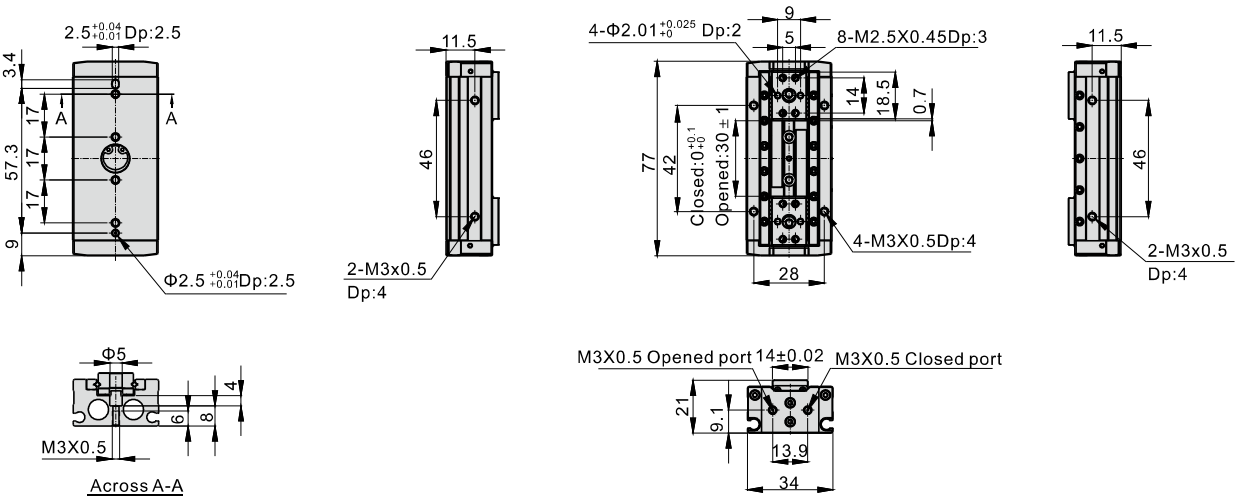

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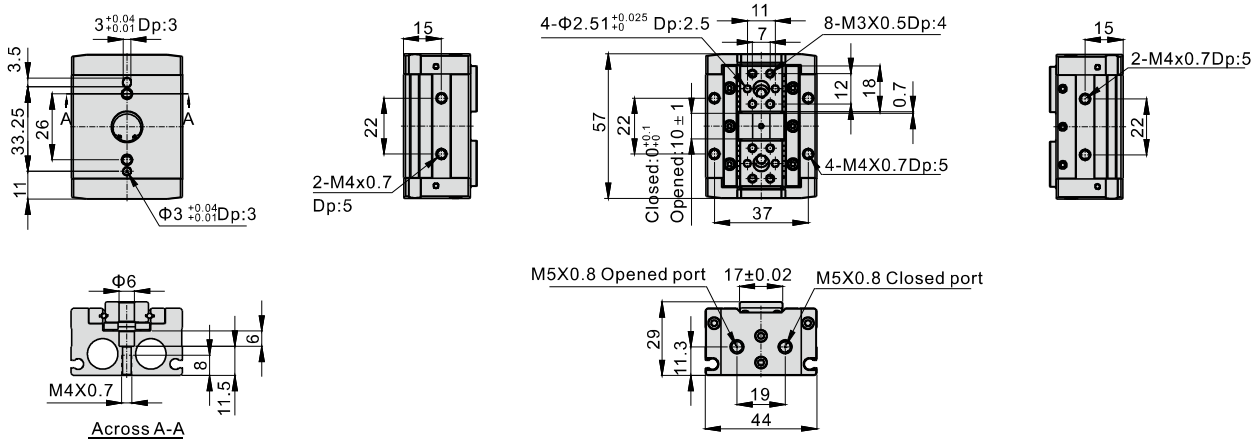
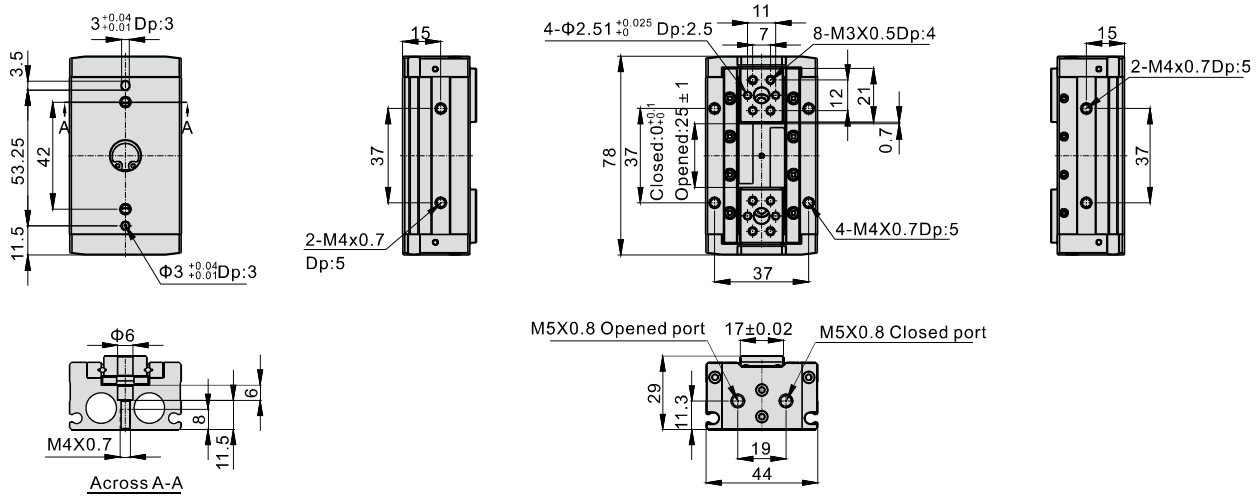
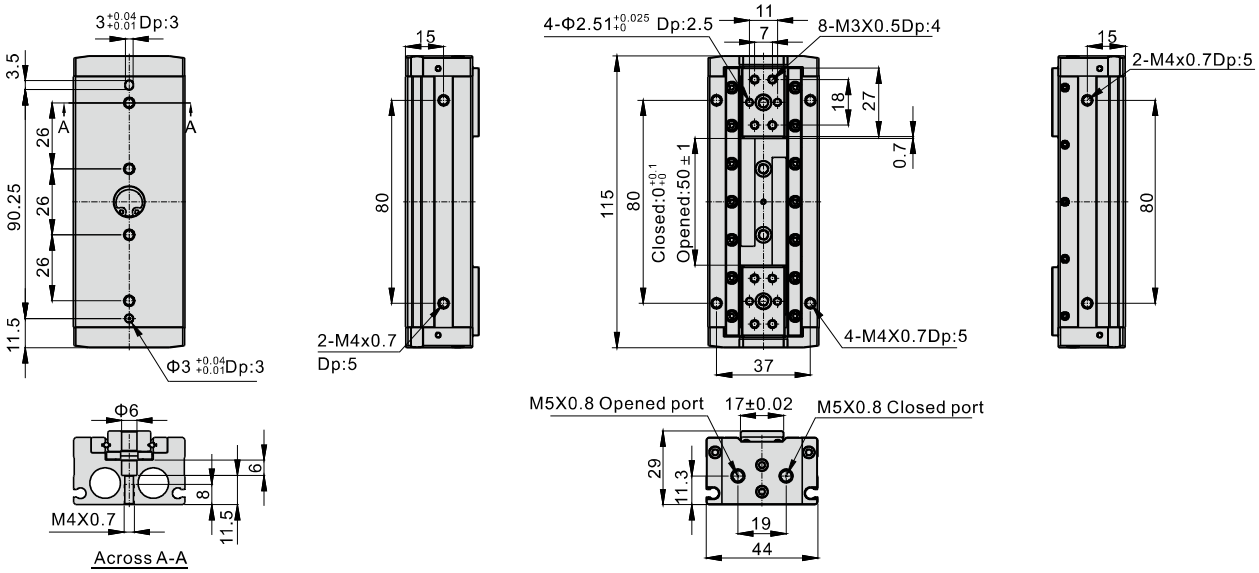


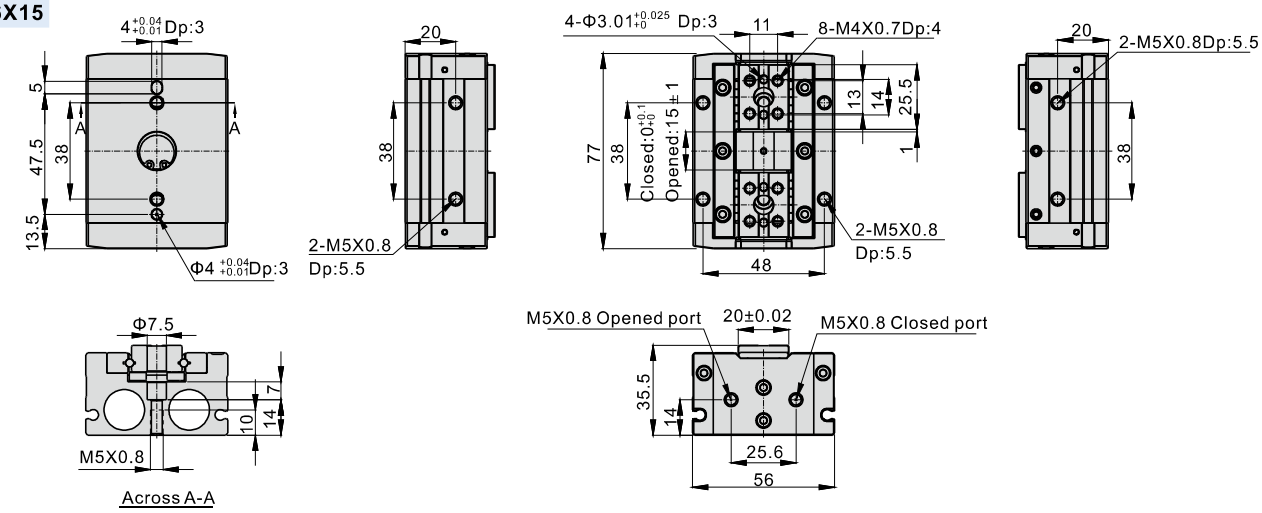
HFD12X25



HFD12X50



HFD16X15



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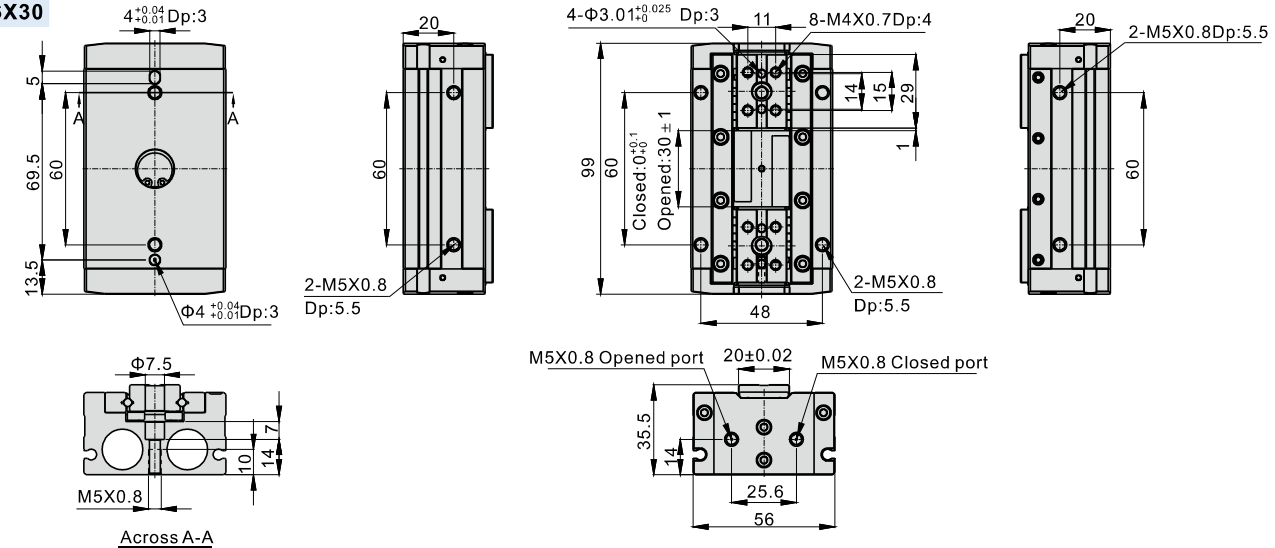

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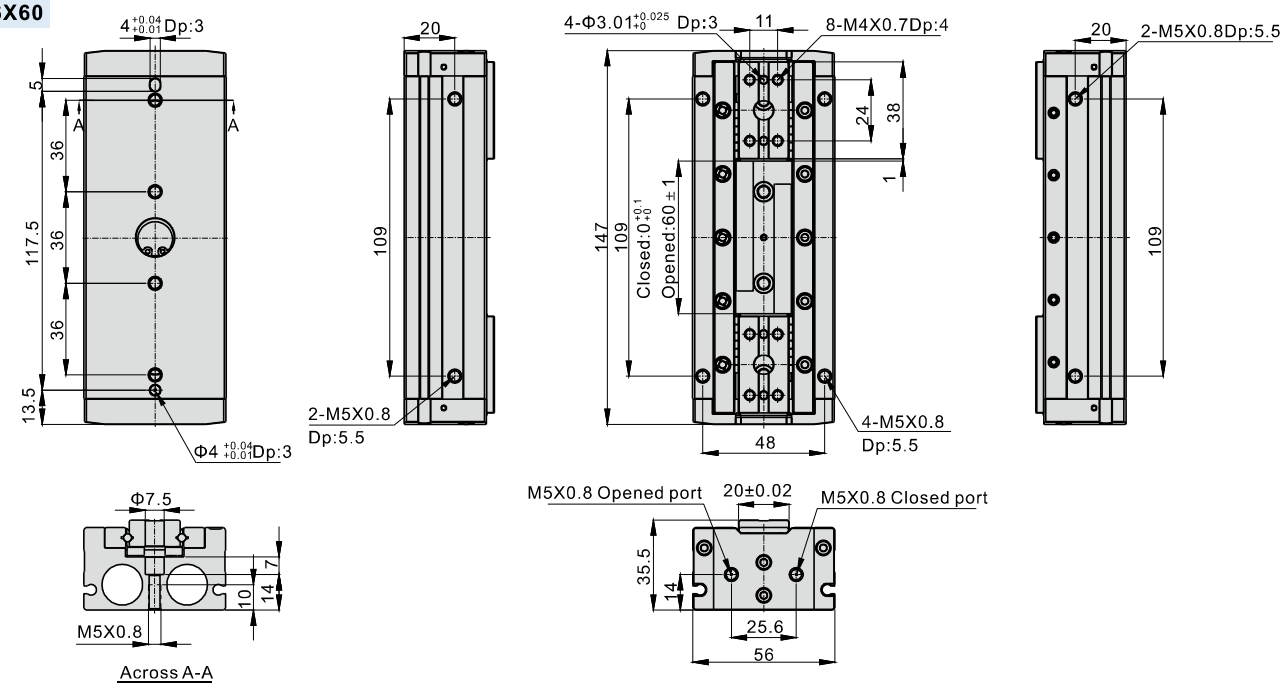
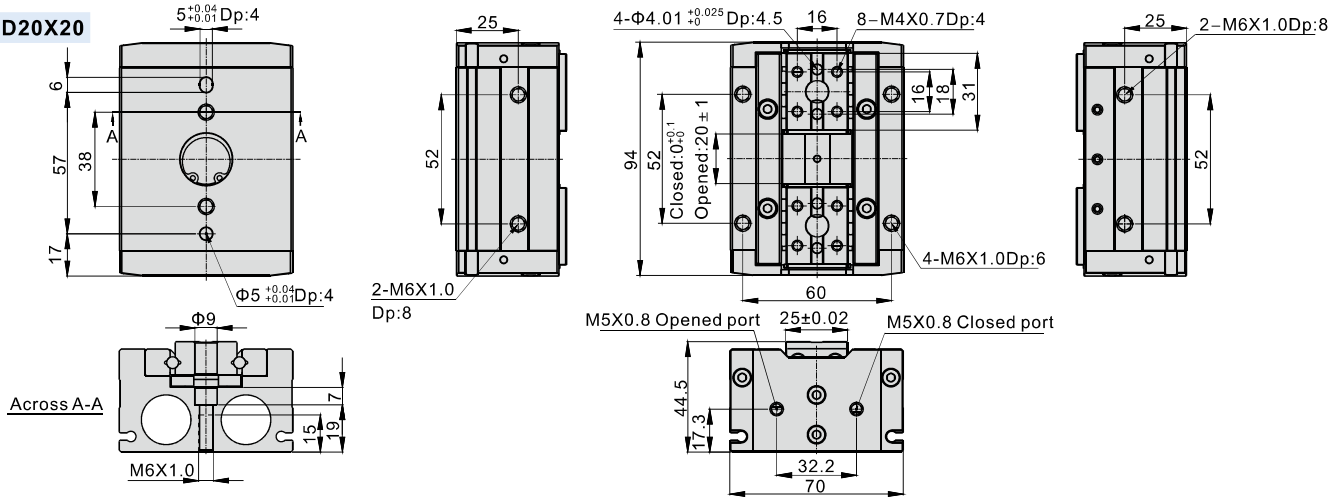


HFD Series

HFD20X20



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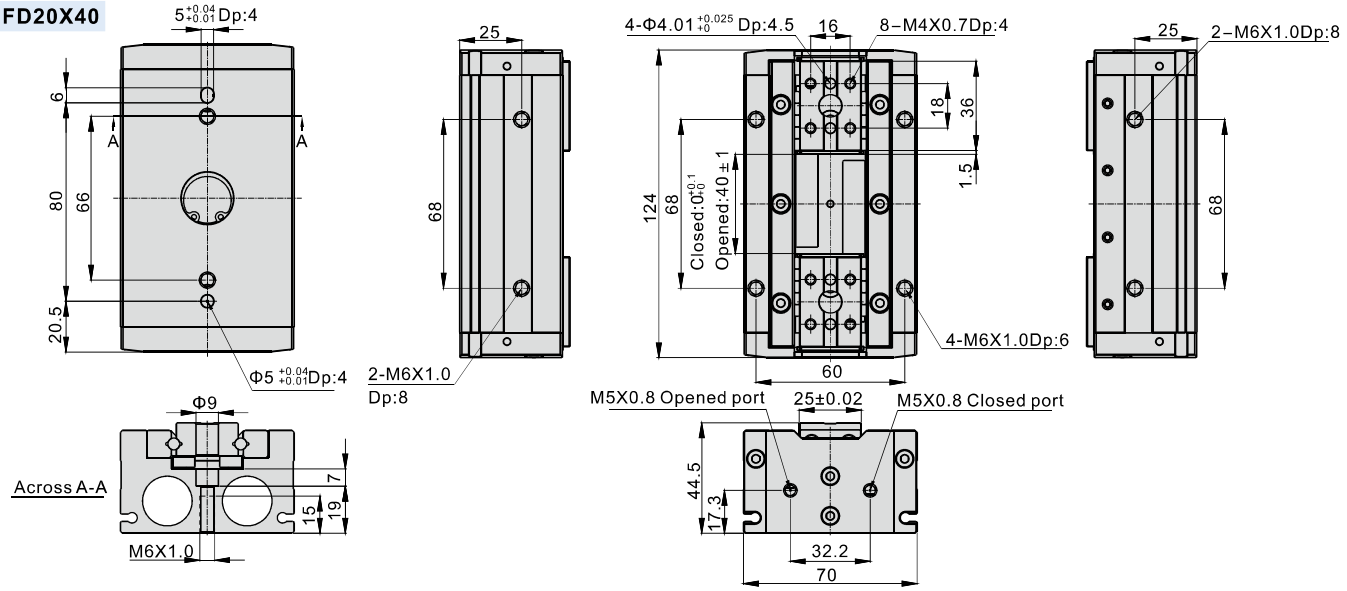

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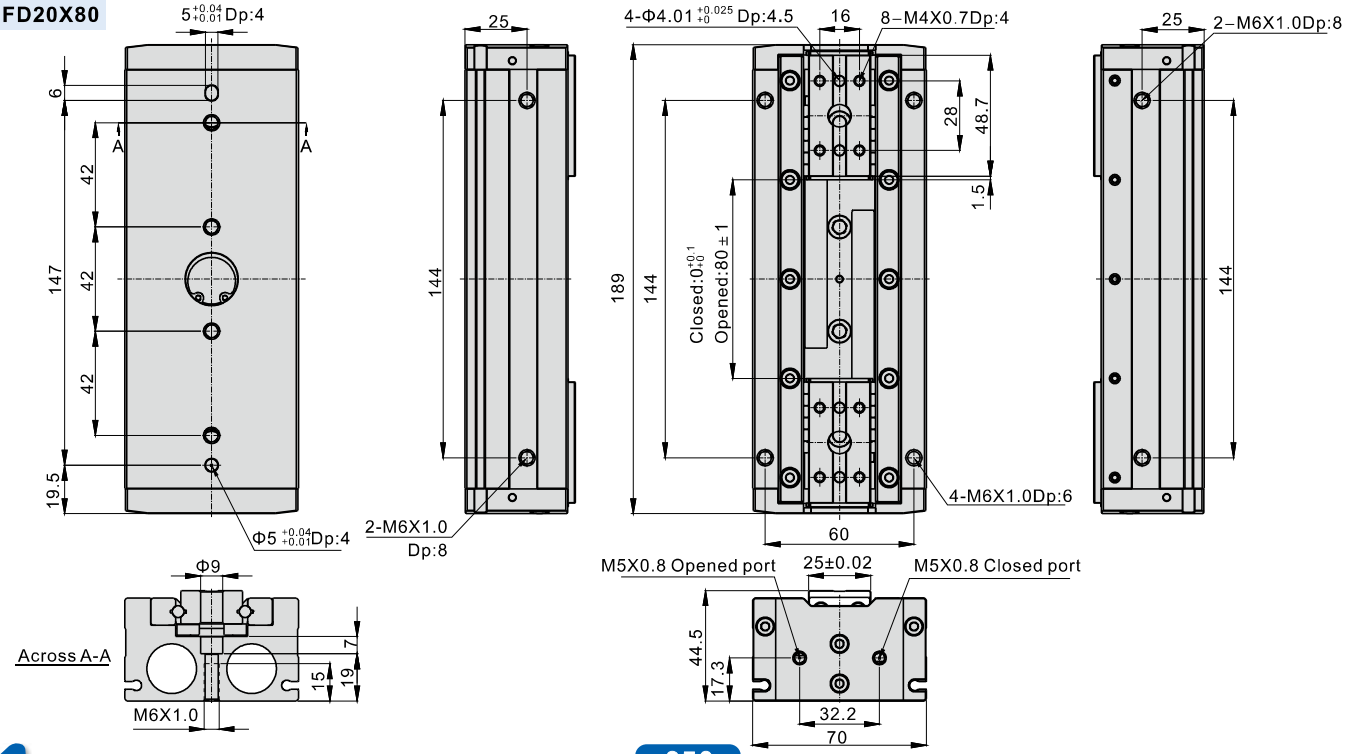

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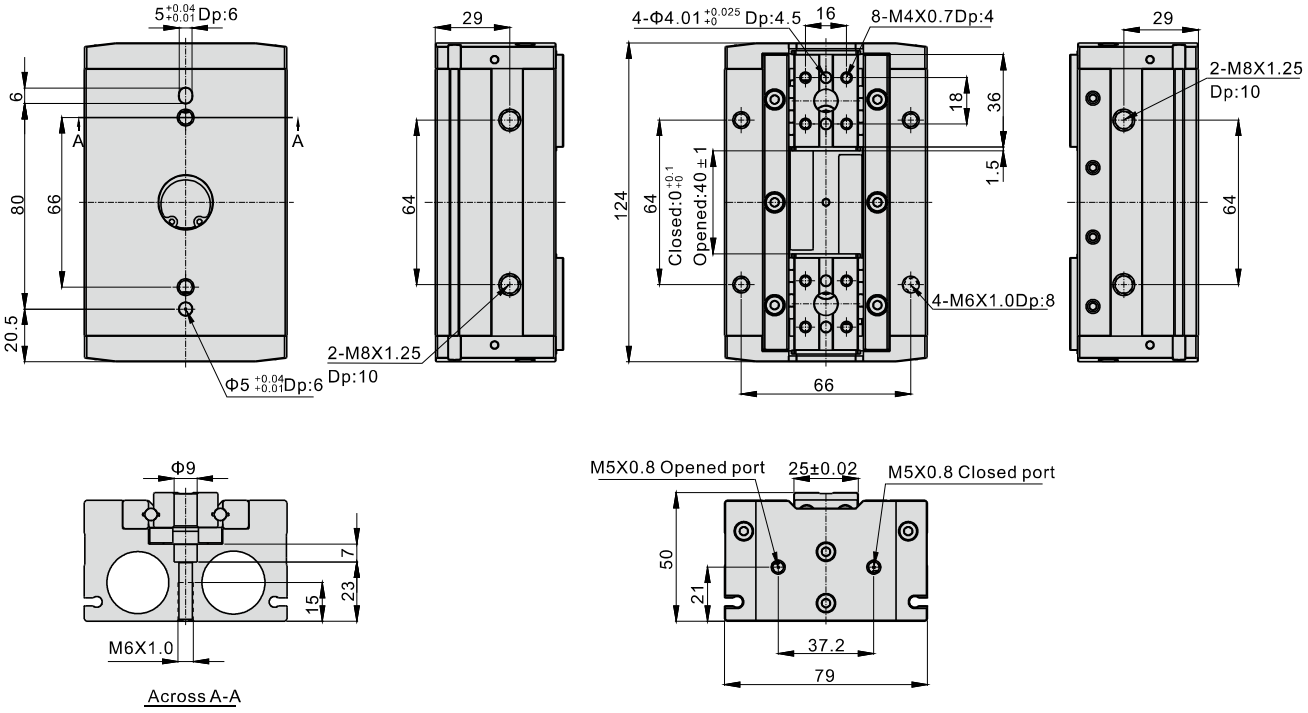

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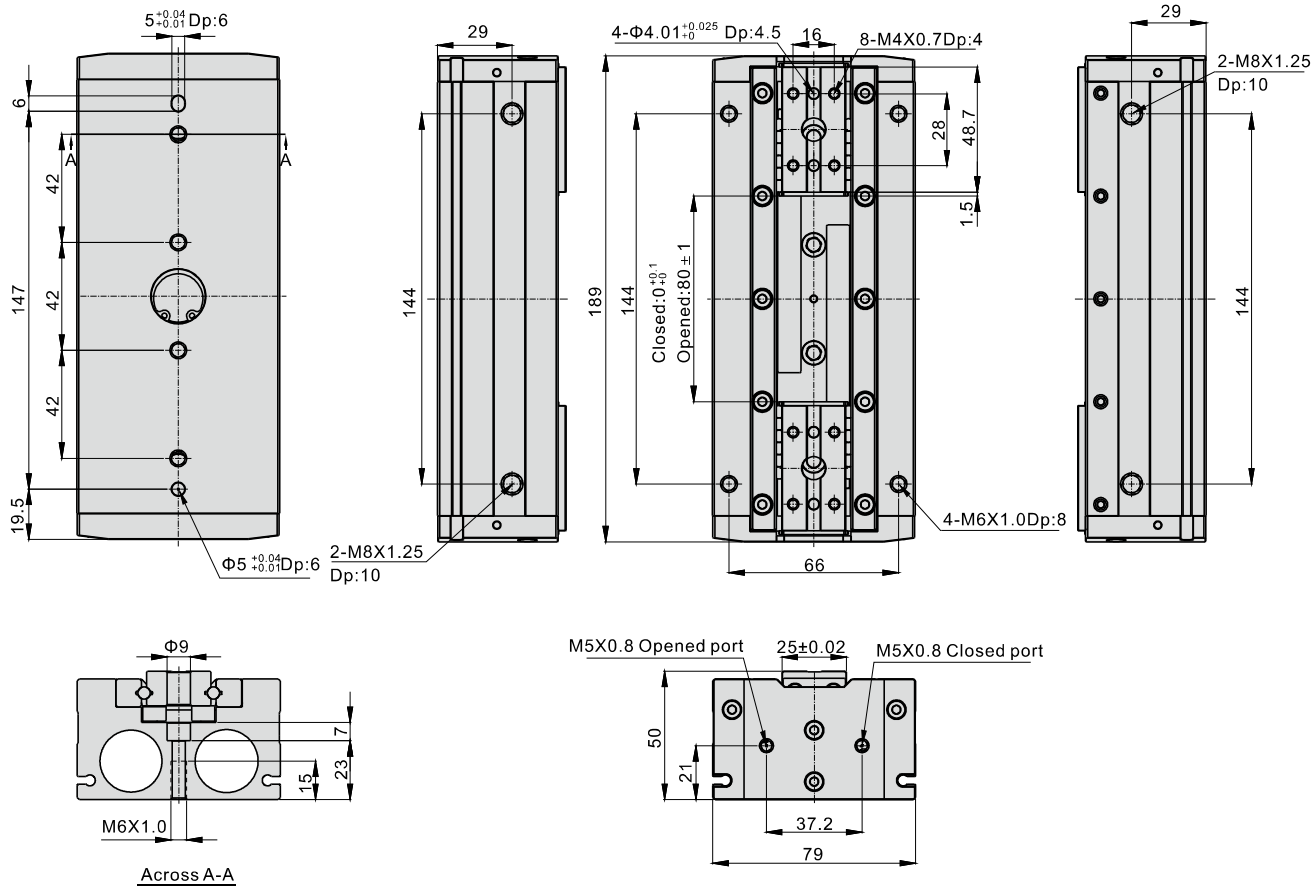


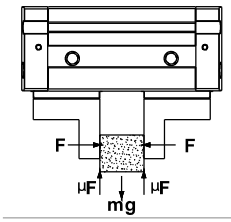
How to select product

Please select pneumatic finger according to the following steps:

①The selection of the effective gripping force → ②The confirmation of the gripping point → ③The 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.

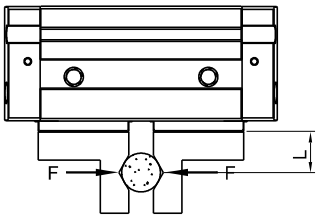


The work-pieces as shown in the left :		μ =0.2	μ =0.1
n: Number of gripping F: Gripping force (N) μ: friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity (=9.8m/s²)	The condition that the work-pieces won't drop is: n×μF>mg so: $F>\frac{mg}{n\times\mu}$ Safety coefficient is a, so F is: $F=\frac{mg}{n\times\mu}\times a$	$F=\frac{mg}{2\times0.2}\times4=10\times mg$	$F=\frac{mg}{2\times0.1}\times4=20\times mg$
		10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

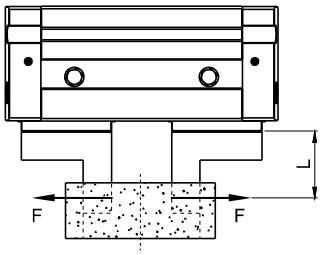
Note) If the friction coefficientμ>0.2, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

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

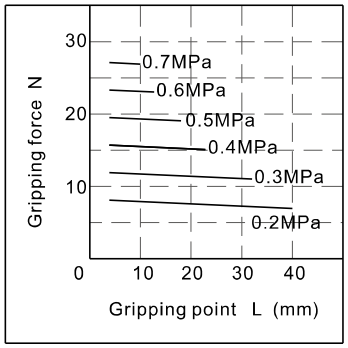
Closed gripping force



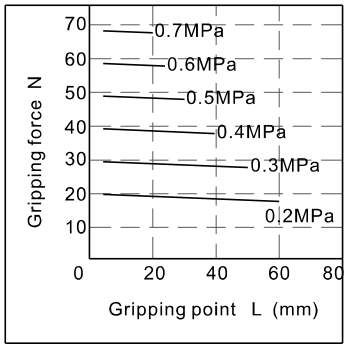
Opened gripping force



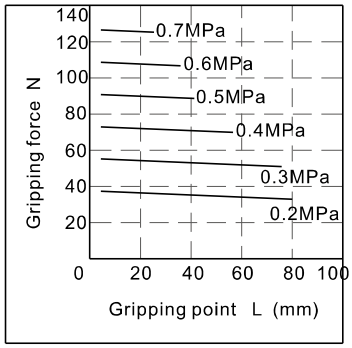
HFD8



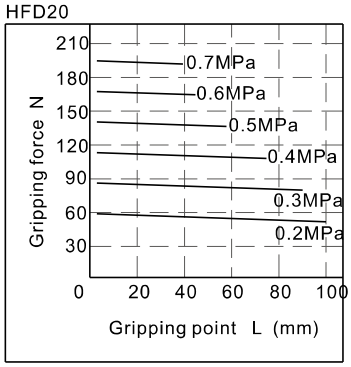
HFD12



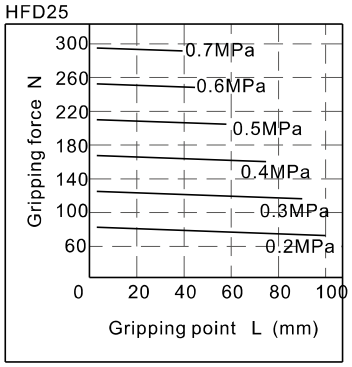
HFD16



HFD20



HFD25

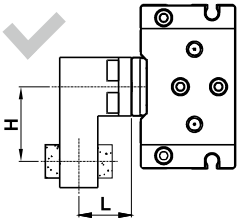


2. The selection of the gripping point

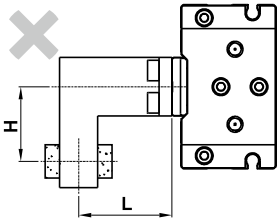
2.1) Please select the gripping point within the limited field shown below.

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

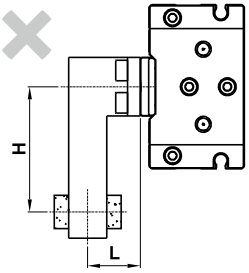
L and H have proper sizes



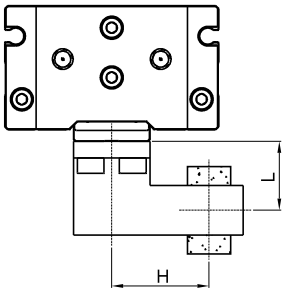
L is too long



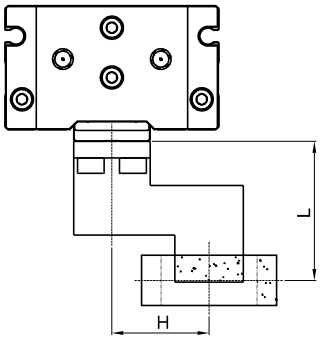
H is too long



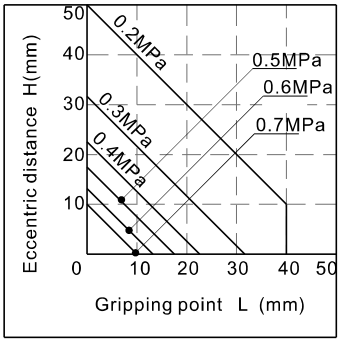
The range of the closed gripping points



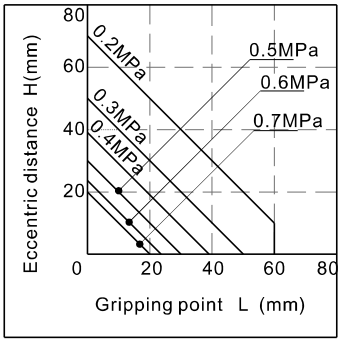
The range of the Opened clamping point



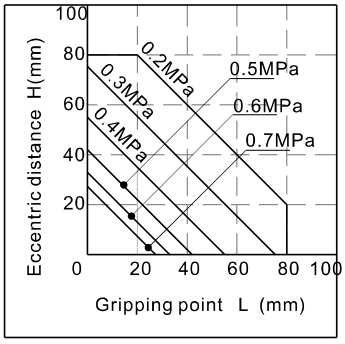
HFD8



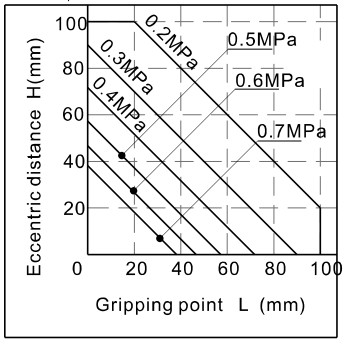
HFD12



HFD16

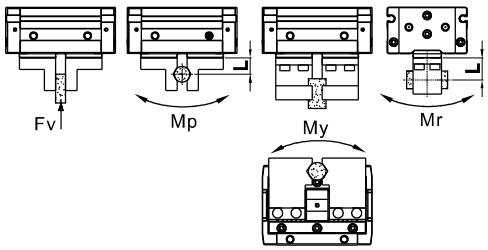


HFD20/HFD25



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.

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



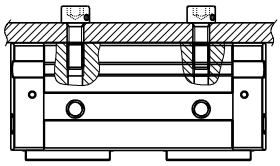
[Note]
The loads and torque values of said are all static values.
L=Distance to load point(mm).

Bore size	The allowed vertical loads Fv(N)	Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
		Mp	My	Mr		
8	58	0.26	0.26	0.64	Allowable load(N) = M(Maximum permissible moment)(N.m) / L×10⁻³ (Unit conversion constant)	In the guide rail of HFD12, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N, Allowable load F= 0.68 / 30×10⁻³ = 22.7(N) Actual load f=10(N) <22.7(N) To meet the using requirements
12	98	0.68	0.68	1.68		
16	176	1.4	1.4	3.36		
20	294	2	2	4.8		
25	294	2	2	4.8		

Installation and application

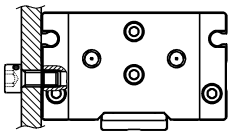
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external 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



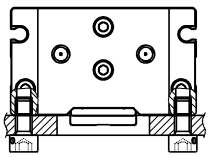
Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)
8	M3×0.5	0.95	6
12	M4×0.7	2.2	8
16	M5×0.8	4.5	10
20	M6×1.0	7.8	15
25	M6×1.0	7.8	15

Side installation type



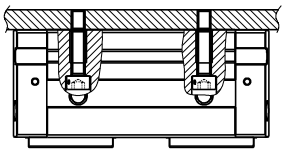
Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)
8	M3×0.5	0.63	4
12	M4×0.7	1.5	5
16	M5×0.8	3	5.5
20	M6×1.0	5.2	8
25	M8×1.25	12	10

Bottom installation type



Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)
8	M3×0.5	0.63	4
12	M4×0.7	1.5	5
16	M5×0.8	3	5.5
20	M6×1.0	5.2	6
25	M6×1.0	5.2	8

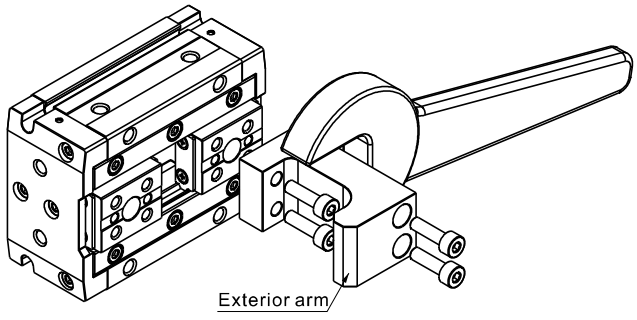
Front installation type



Bore size	The bolts type	Max. locking moment(N.m)
8	M2.5×0.45	0.36
12	M3×0.5	0.63
16	M4×0.7	1.5
20	M5×0.8	5
25	M5×0.8	5

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（N.m）
8	M2.5×0.45	0.36
12	M3×0.5	0.63
16	M4×0.7	1.5
20	M4×0.7	1.5
25	M4×0.7	1.5



Parallel open/close hollow style

Compendium of HFCQ Series

Hollow structure

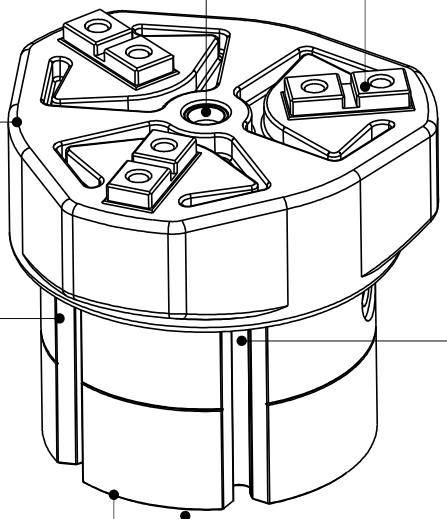
The hollow tube can be matched with the mechanism to achieve the blowing effect.

Stainless steel jaw

The jaws and piston rods are made of high-grade stainless steel, which has high strength, corrosion resistance and small assembly clearance, low shaking and high durability.

Dustproof design

All series are equipped with a dust jacket, which can also be used in special occasions.



Bumper design

The bumper is adopted in the front of piston, which can reduce the noise of metal bump.

With roundness magnetic switch slots

The roundness magnetic switch slots convenient to install CMSH\DMSH(S) type inducting switch.

With positioning hole

A positioning hole is attached to the bottom of the body, which can improve the precision and the consistency of repeated dismounting and positioning.

Push function

The tail end is equipped with a push rod mechanism for the push function.

Cylinder pusher module

Spring pusher module

Gripping force and stroke

Model	Gripping force per finger Effective valve(N)		Opening/Closing stroke (Both sides)(mm)	Weight (g)
	Internal	External		
HFCQ16	15	9	4	100
HFCQ20	26	21	4	140
HFCQ25	45	36	6	220
HFCQ32	77	62	8	430
HFCQ40	118	97	8	560
HFCQ50	187	155	12	950
HFCQ63	329	280	16	1600

Note) The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm(Φ16~Φ25) or L=30mm(Φ32~Φ63).

Add) Please refer to page 268 for the definition of "L".

Installation and application

1. Dirty substances in the pipe must be eliminated before air gripper is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the air gripper is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.

Air gripper(parallel open/close hollow style)

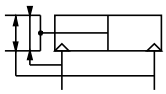
HFCQ Series

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	0.2~0.7MPa(28~100psi)(2.0~7.0bar			0.15~0.7MPa(22~100psi)(1.5~7.0bar			
Temperature ℃	-20~70						
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					
Hollow diameter	$\Phi3^{+0.04}_{+0}$	$\Phi3^{+0.04}_{+0}$	$\Phi4^{+0.048}_{+0}$	$\Phi6^{+0.04}_{+0}$	$\Phi10^{+0.058}_{+0}$	$\Phi12^{+0.07}_{+0}$	$\Phi16^{+0.07}_{+0}$
Push rod mechanism	-			Cylinder or Spring push rod mechanism			
Port size of push rod mechanism	-			M5×0.8			

[Note] Sensor switch should be ordered additionally. Refer to P353 for detail.

Symbol



Product feature

1. The hollow tube can be matched with the mechanism to achieve the blowing effect.
2. The jaws and piston rods are made of high-grade stainless steel, which has high strength, corrosion resistance and small assembly clearance, low shaking and high durability.
3. All series are equipped with a dust jacket, which can also be used in special occasions.
4. A positioning hole is attached to the bottom of the body, which can improve the precision and the consistency of repeated dismounting and positioning.
5. The tail end is equipped with a push rod mechanism for the push function.
6. The sensor grooves of each specification are shared.

Ordering code

HFCQ 20 E

① ② ③

①Model	②Bore size	③Push rod mechanism		
HFCQ: Air finger (Double acting, parallel hollow type)	16 20 25 32 40 50 63	Blank: Without push rod mehanism	E: Cylinder push rod mechanism 	V: Spring push rod mechanism 

[Note]
1. The push rod mechanism can only be used with Φ32/Φ40/Φ50/Φ63.
2. HFCQ series are all attached with magnet.

Push rod mechanism ordering code

F–HFCQ 32 E

① ② ③

①Model	②Bore size	③Push rod mechanism type	
HFCQ: Air finger (Double acting, parallel hollow type)	32 40 50 63	E: Cylinder push rod mechanism 	V: Spring push rod mechanism 

Specification of Cylinder push rod mechanism

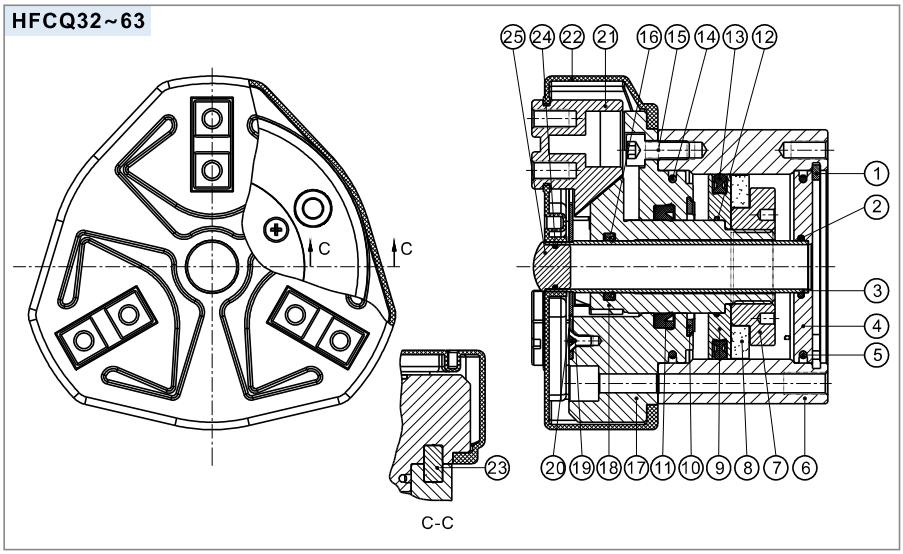
Model	HFCQ32E	HFCQ40E	HFCQ50E	HFCQ63E
Acting type	Double acting			
Fluid	Air(to be filtered by 40μm filter element)			
Operating pressure	0.2~0.7MPa(28~100psi)	0.15~0.7MPa(22~100psi)		
Temperature	-20~70 ℃			
Lubrication	Not required			
Push stroke mm	7	8	14	15
Max. frequency	60(c.p.m)			
Sensor switches	DMSH(S)			
Push force N(0.5MPa)	45	130	204	335
Weight g	560	790	1350	2280

Specification of Spring push rod mechanism

Model	HFCQ32V	HFCQ40V	HFCQ50V	HFCQ63V
Push stroke mm	7	8	14	15
Push spring force N	5~12	9~18	16~31	24~40
Weight g	530	730	1270	2190

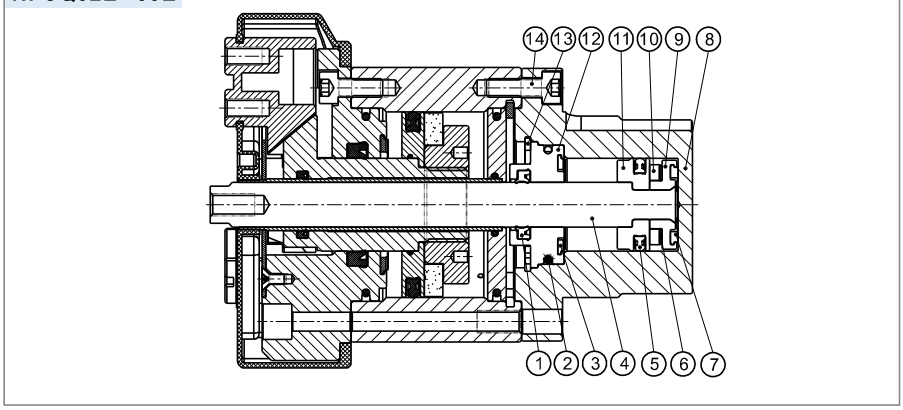
Inner structure and material of major parts

HFCQ32~63



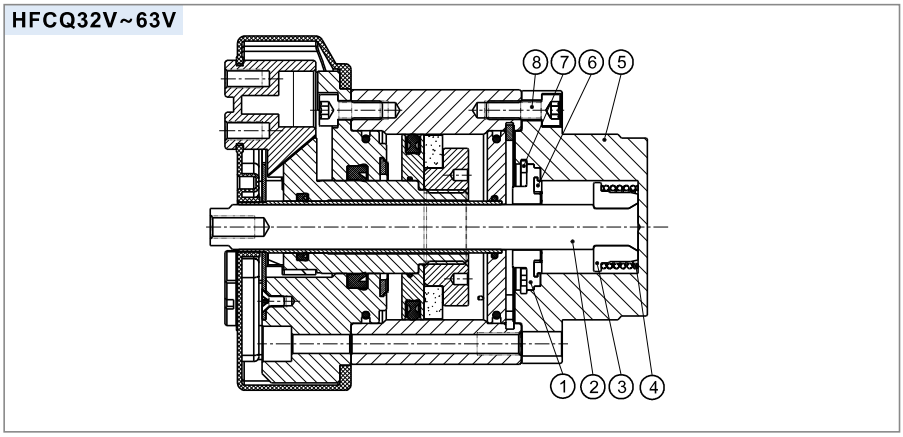
NO.	Item	Material
1	C clip	Spring steel
2	O-ring	NBR
3	Hollow tube	Stainless steel
4	Back cover	Aluminum alloy
5	O-ring	NBR
6	Body	Aluminum alloy
7	Magnet holder	Stainless steel
8	Magnet	Rare earths/Plastic
9	Piston	Aluminum alloy
10	Bumper	TPU
11	Rod packing	NBR
12	O-ring	NBR
13	Piston seal	NBR
14	O-ring	NBR
15	Countersink screw	Carbon steel
16	Rod packing	TPU
17	Front cover	Aluminum alloy
18	Piston rod	Stainless steel
19	Screw	Stainless steel
20	Cover blank	Stainless steel
21	Jaw	Stainless steel
22	Dustproof cover	NBR
23	Pin	Stainless steel
24	O-ring	NBR
25	Dustproof pluger	NBR

HFCQ32E~63E



NO.	Item	Material
1	Rod packing	NBR
2	O-ring	NBR
3	Bumper	TPU/NBR
4	Push rod	Stainless steel
5	Piston seal	NBR
6	Magnet washer	NBR
7	Bumper	TPU/NBR
8	Body	Aluminum alloy
9	Magnet holder	Brass/Aluminum alloy
10	Magnet	Rare earths
11	Piston	Brass/Aluminum alloy
12	Front cover	Aluminum alloy
13	C clip	Spring steel
14	Countersink screw	Carbon steel

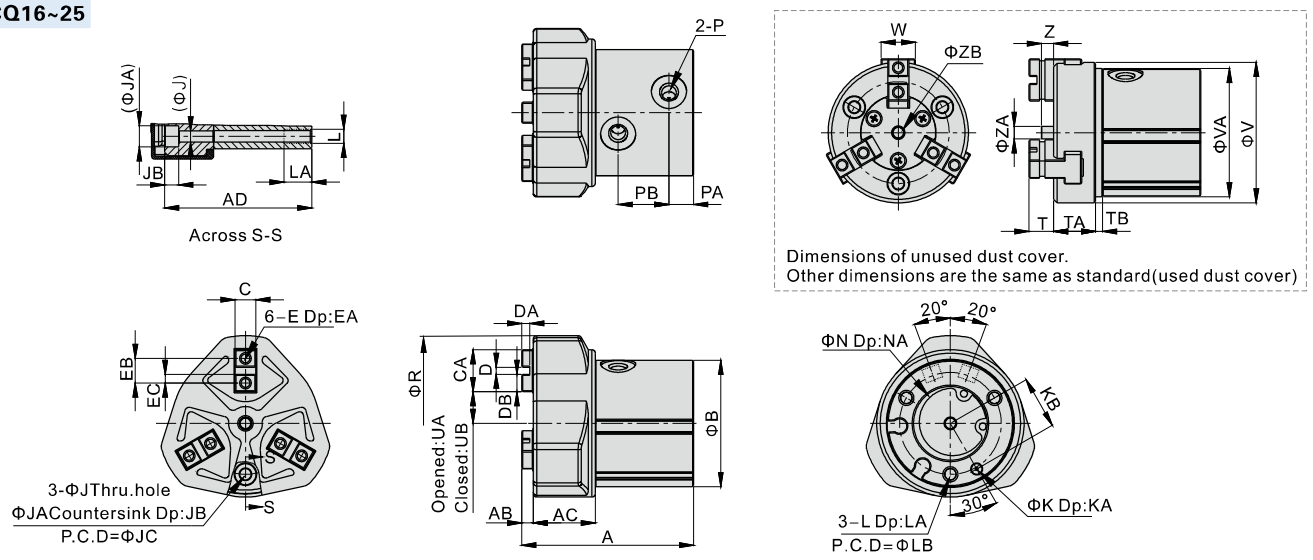
HFCQ32V~63V



NO.	Item	Material
1	Front cover	Aluminum alloy
2	Push rod	Stainless steel
3	Piston	Aluminum alloy
4	Spring	SWPB
5	Body	Aluminum alloy
6	Bumper	TPU/NBR
7	C clip	Spring steel
8	Countersink screw	Carbon steel

Dimensions

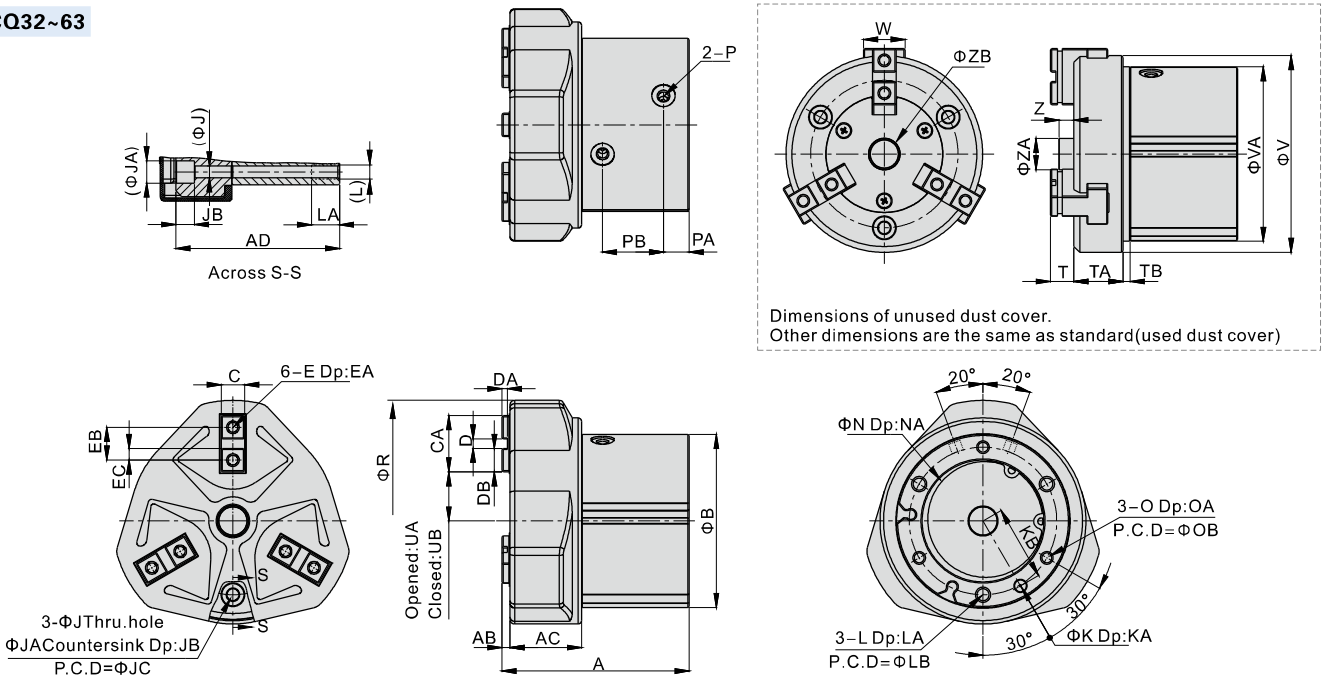
HFCQ16~25



Bore size\Item	A	AB	AC	AD	B	C	CA	D	DA	DB	E	EA	EB	EC	J	JA	JB	JC	K	KA	KB	L	LA	LB
16	46	3	16	39	31	$5^{-0.01}_{-0.03}$	11	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	4.5	M3×0.5	5	6	2	3.2	6	4	24	$3^{+0.04}_{+0.01}$	3	12	M4×0.7	8	24
20	49	3	18	42	36	$6^{-0.01}_{-0.03}$	12	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	5	M3×0.5	5	7	2.5	3.2	6	4	29	$3^{+0.04}_{+0.01}$	3	15	M4×0.7	8	29
25	55	3	20	47	42	$6^{-0.01}_{-0.03}$	14	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	6	M3×0.5	5	8	3	3.2	6	4	34	$3^{+0.04}_{+0.01}$	3	18	M4×0.7	8	34

Bore size\Item	N	NA	P	PA	PB	R	T	TA	TB	UA	UB	V	VA	W	Z	ZA	ZB
16	$17^{+0.05}_{0}$	1.5	M3×0.5	7	14	44	7	10.5	3	9	7	34	31.5	8	3.5	3.7	$3^{+0.04}_{0}$
20	$21^{+0.05}_{0}$	1.5	M5×0.8	7	14	50	7	12	3	10	8	40	36.5	10	3.5	3.7	$3^{+0.04}_{0}$
25	$26^{+0.05}_{0}$	1.5	M5×0.8	8	17	59	8	13	3	12.5	9.5	47	42.5	12	4.5	4.7	$4^{+0.048}_{0}$

HFCQ32~63



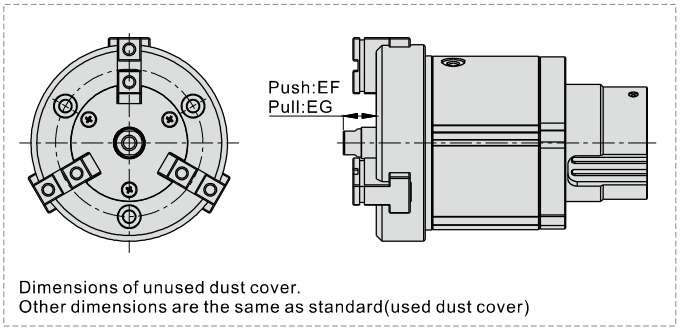
Bore size\Item	A	AB	AC	AD	B	CA	C	D	DA	DB	E	EA	EB	EC	J	JA	JB	JC	K	KA	KB	L	LA	LB	N	NA
32	63	3	24	54	55	20	$8^{-0.01}_{-0.03}$	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	9	M4×0.7	8	11	4.5	4.2	8	7	44	$4^{+0.04}_{+0.01}$	4	22	M5×0.8	10	44	$34^{+0.05}_{0}$	2
40	66	3	26	57	62	21	$8^{-0.01}_{-0.03}$	$3^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	9	M4×0.7	8	12	4.5	4.2	8	7	52	$4^{+0.04}_{+0.01}$	4	26	M5×0.8	10	52	$42^{+0.05}_{0}$	2
50	80	3	31	70	74	24	$10^{-0.01}_{-0.03}$	$4^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	10	M5×0.8	10	14	5	5.1	9.5	8	63	$5^{+0.04}_{+0.01}$	5	32	M6×1.0	12	63	$52^{+0.05}_{0}$	2
63	91	4	37	79	92	28	$12^{-0.01}_{-0.03}$	$6^{+0.04}_{+0.01}$	$3^{+0.2}_{0}$	11	M5×0.8	10	17	5.5	6.6	11	8	78	$6^{+0.04}_{+0.01}$	6	40	M8×1.25	16	78	$65^{+0.05}_{0}$	2.5

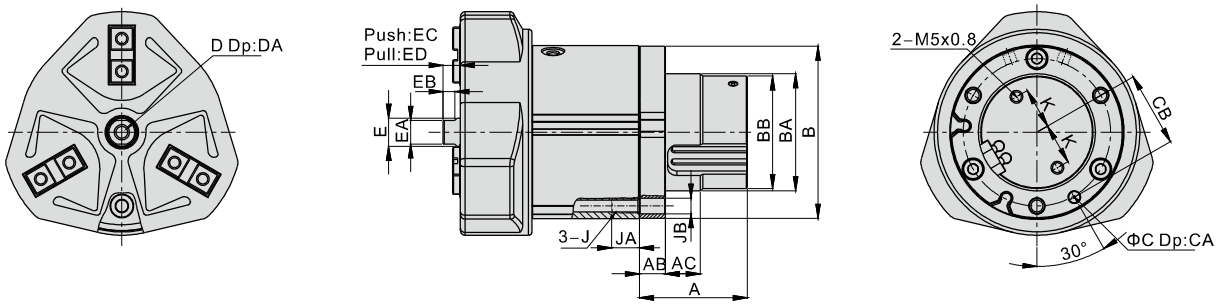
Bore size\Item	O	OA	OB	P	PA	PB	R	UA	UB	T	TA	TB	V	VA	W	Z	ZA	ZB
32	M4×0.7	8	44	M5×0.8	10	19	76	15.5	11.5	9	15.5	2.5	62	55.5	14	5	7.4	$6^{+0.048}_{0}$
40	M4×0.7	8	52	M5×0.8	11	19	86	19	15	9	17.5	2.5	72	62.5	16	5	11.4	$10^{+0.058}_{0}$
50	M5×0.8	10	63	M5×0.8	11	26	103	24	18	10	21	3	84	74.5	18	6	13.4	$12^{+0.07}_{0}$
63	M6×1.0	12	78	M5×0.8	13	29	125	31	23	12	26	3	102	92.5	24	7	17.4	$16^{+0.07}_{0}$

HFCQ Series

HFCQ32E~63E

(With Cylinder push rod mechanism)

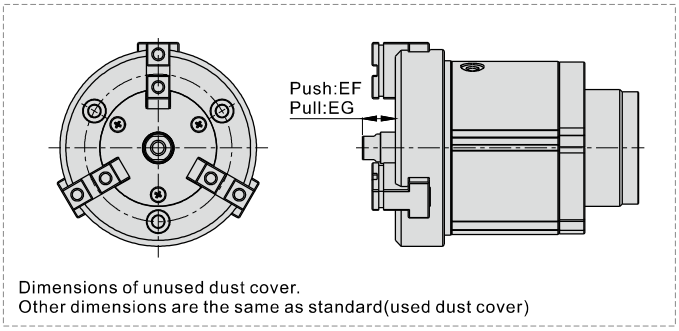


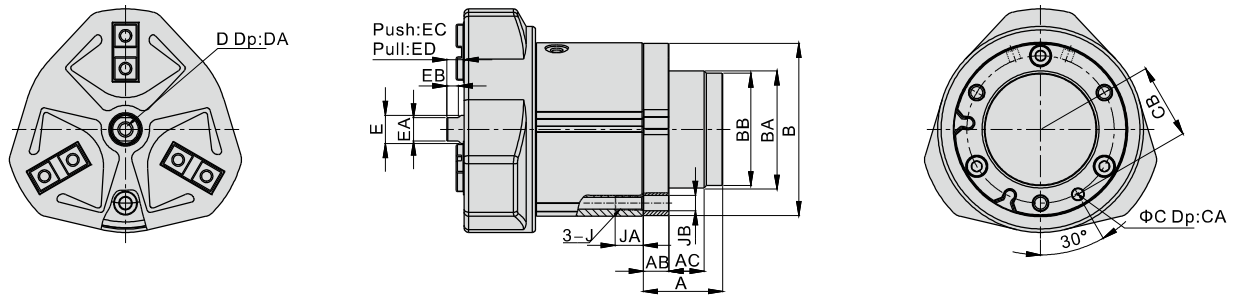


Bore size\Item	A	AB	AC	B	BA	BB	C	CA	CB	D	DA	E	EA	EB	EC	ED	EF	EG	J	JA	JB	K
32	36	9	9	54.5	$32^{0}_{-0.05}$	30	$4^{+0.04}_{+0.01}$	4	22	M3×0.5	6	6	5	3.5	14	7	20	13	M5×0.8	10	5.5	9.5
40	38	9	12	61.5	$40^{0}_{-0.05}$	38	$4^{+0.04}_{+0.01}$	4	26	M5×0.8	10	10	8	4.5	15	7	21	13	M5×0.8	10	5.5	13.5
50	48	11	15	73.5	$50^{0}_{-0.05}$	48	$5^{+0.04}_{+0.01}$	5	32	M6×1.0	12	12	10	5	21	7	28	14	M6×1.0	12	6.6	17.5
63	53	13	18	91.5	$60^{0}_{-0.05}$	58	$6^{+0.04}_{+0.01}$	6	40	M8×1.25	16	16	14	7	24	9	32	17	M8×1.25	16	8.6	20

HFCQ32C~63V

(With Spring push rod mechanism)





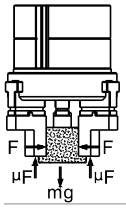
Bore size\Item	A	AB	AC	B	BA	BB	C	CA	CB	D	DA	E	EA	EB	EC	ED	EF	EG	J	JA	JB
32	20	9	11	54.5	$32^{0}_{-0.05}$	-	$4^{+0.04}_{+0.01}$	4	22	M3×0.5	6	6	5	3.5	14	7	20	13	M5×0.8	10	5.5
40	24	9	15	61.5	$40^{0}_{-0.05}$	-	$4^{+0.04}_{+0.01}$	4	26	M5×0.8	10	10	8	4.5	15	7	21	13	M5×0.8	10	5.5
50	34	11	15	73.5	$50^{0}_{-0.05}$	48	$5^{+0.04}_{+0.01}$	5	32	M6×1.0	12	12	10	5	21	7	28	14	M6×1.0	12	6.6
63	40	13	18	91.5	$60^{0}_{-0.05}$	58	$6^{+0.04}_{+0.01}$	6	40	M8×1.25	16	16	14	7	24	9	32	17	M8×1.25	16	8.6

How to select product

Please select pneumatic finger according to the following steps:

①The selection of the effective gripping force >> **②the 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.

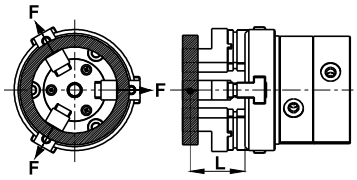


The work-pieces as shown in the left :		μ =0.2	μ =0.1
n: number of gripper F: Gripping force (N) μ: friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity (=9.8m/s²)	The condition that the work-pieces won't drop is: n×μF>mg so: $F>\frac{mg}{n\times\mu}$ Safety coefficient is a, so F is: $F=\frac{mg}{n\times\mu}\times a$	$F=\frac{mg}{2\times0.2}\times4=10\times mg$ 10 times of the mass of the gripped objects	$F=\frac{mg}{2\times0.1}\times4=20\times mg$ 20 times of the mass of the gripped objects

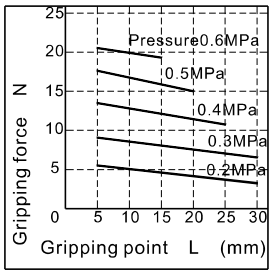
Note) If the friction coefficientμ>0.2, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

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

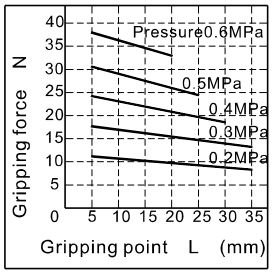
Opened gripping force



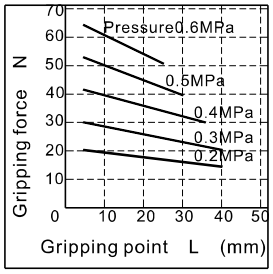
HFCQ16



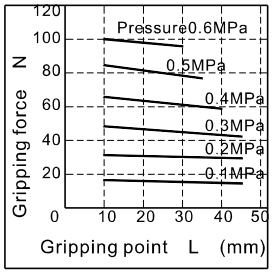
HFCQ20



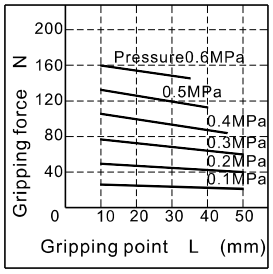
HFCQ25



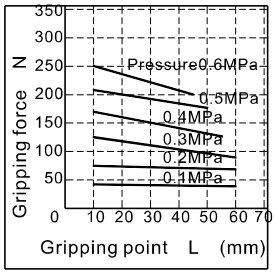
HFCQ32



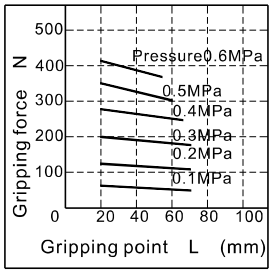
HFCQ40



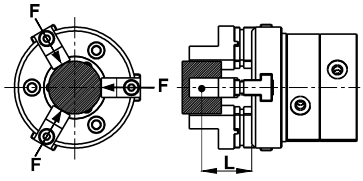
HFCQ50



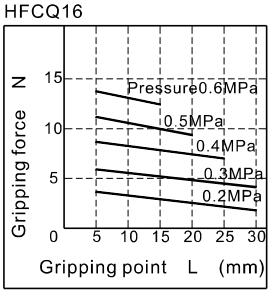
HFCQ63



Closed gripping force



HFCQ16



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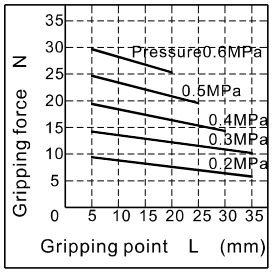

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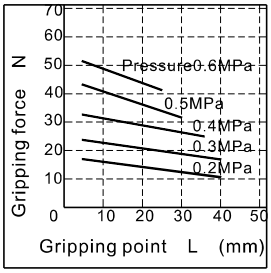

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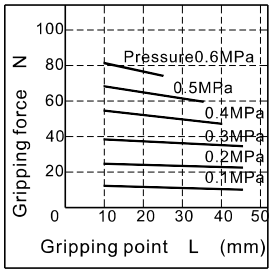

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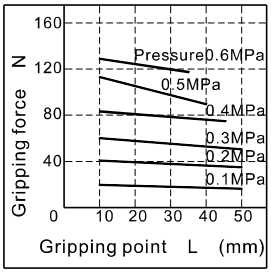

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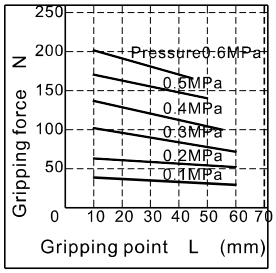

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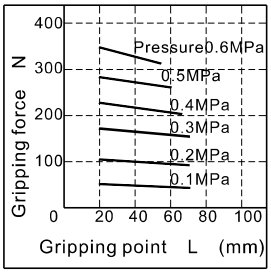
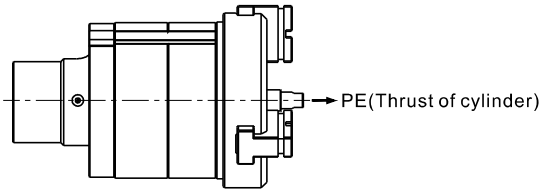
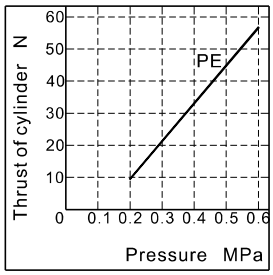


Effective thrust of Push rod mechanism



HFCQ32E



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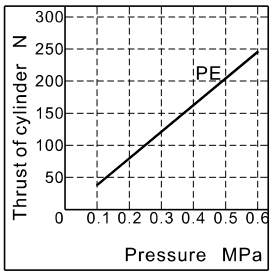

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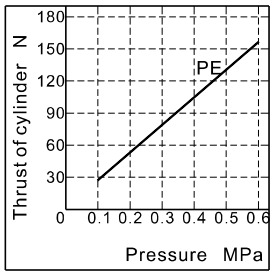

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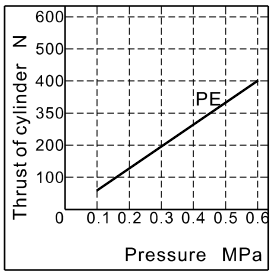

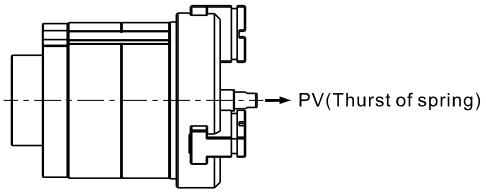

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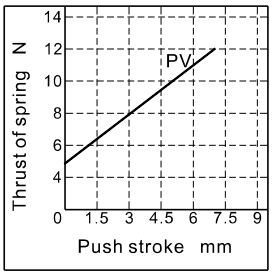

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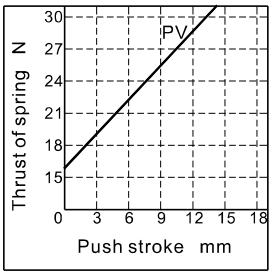

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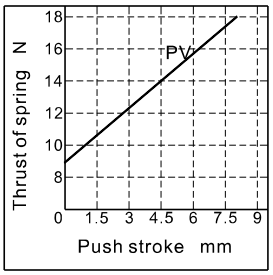

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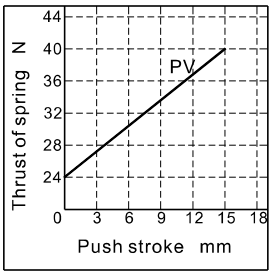
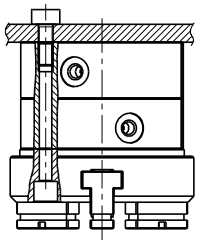


Installation and application

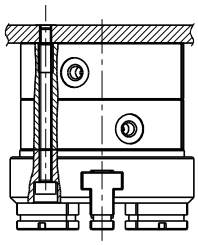
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external 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



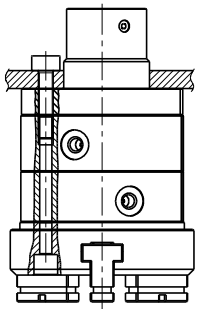
Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)	The aperture of the positioning bore(mm)	The depth of the positioning bore(mm)
16	M4×0.7	2.1	8	Φ17 $^{+0.05}_{0}$	1.5
20	M4×0.7	2.1	8	Φ21 $^{+0.05}_{0}$	1.5
25	M4×0.7	2.1	8	Φ26 $^{+0.05}_{0}$	1.5
32	M4×0.7	2.1	8	Φ34 $^{+0.05}_{0}$	2
	M5×0.8	4.3	10	Φ34 $^{+0.05}_{0}$	2
40	M4×0.7	2.1	8	Φ42 $^{+0.05}_{0}$	2
	M5×0.8	4.3	10	Φ42 $^{+0.05}_{0}$	2
50	M5×0.8	4.3	10	Φ52 $^{+0.05}_{0}$	2
	M6×1.0	7.3	12	Φ52 $^{+0.05}_{0}$	2
63	M6×1.0	7.3	12	Φ65 $^{+0.05}_{0}$	2.5
	M8×1.25	18	16	Φ65 $^{+0.05}_{0}$	2.5

The installation of the front through hole



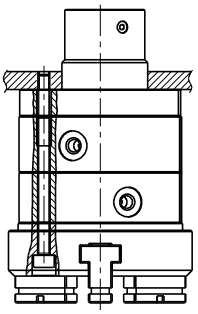
Bore size	The bolts type	Max. locking mement(N.m)
16	M3×0.5	0.88
20	M3×0.5	0.88
25	M3×0.5	0.88
32	M4×0.7	2.1
40	M4×0.7	2.1
50	M5×0.8	4.3
63	M6×1.0	7.3

The installation of the front through hole(with push rod)



Bore size	The bolts type	Max. locking moment(N.m)	Max. screwed depth(mm)	The aperture of the positioning bore(mm)
32	M5×0.8	4.3	10	Φ32 $^{0}_{-0.05}$
40	M5×0.8	4.3	10	Φ40 $^{0}_{-0.05}$
50	M6×1.0	7.3	12	Φ50 $^{0}_{-0.05}$
63	M8×1.25	18	16	Φ60 $^{0}_{-0.05}$

Tail installation type(with push rod)

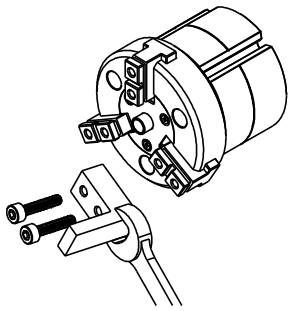


Bore size	The bolts type	Max. locking mement(N.m)
32	M4×0.7	2.1
40	M4×0.7	2.1
50	M5×0.8	4.3
63	M6×1.0	7.3

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 mement(N.m)
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



Parallel with guide/longer stroke/ball bearing style

Compendium of HFKL Series

Four kinds of bore size and three kinds of type

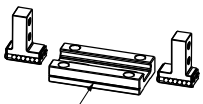
Bore size: 10, 16, 20, 25. HFKL: Double acting
HFSKL: Single acting and normally closed
HFTKL: Single acting and normally opened

Long clamping stroke

The gripping stroke is long and the size of the gripping object is different.

Integrated design of linear guide roller

Integrated design of linear guide roller, high rigidity and high precision.

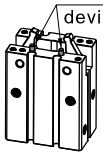


Integration of a linear guide roller

With positioning pin

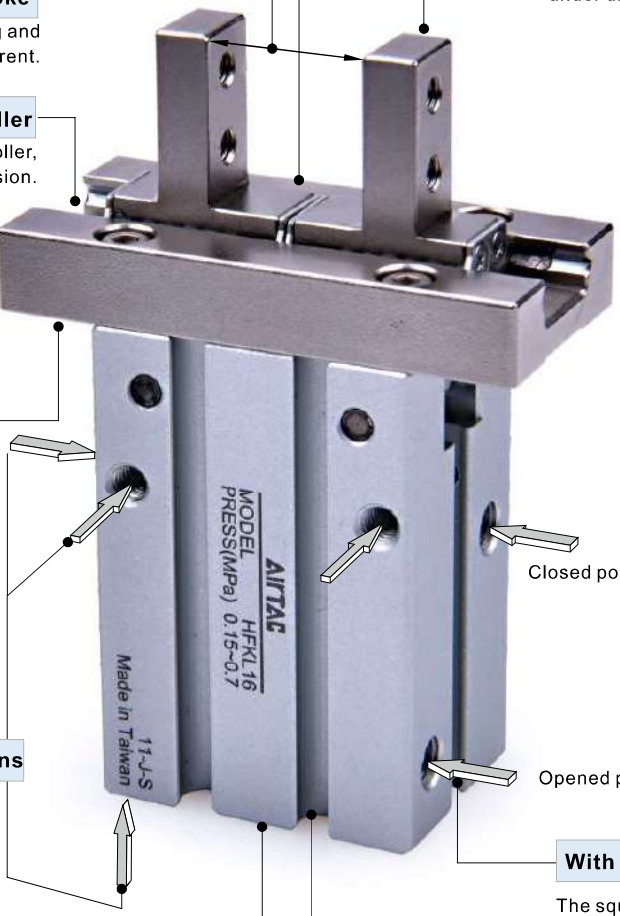
A positioning pin is attached to the bottom of the linear guide rail, which can prevent the deviation of the positioning rail and body.

The positioning pin prevents the deviation of the rail and body

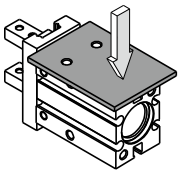


Can be mounted from three directions

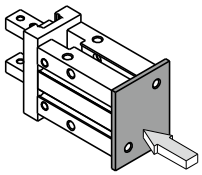
With mounting holes on the side and tail.



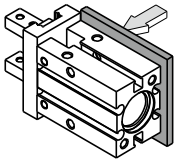
Surface installation



Tail installation

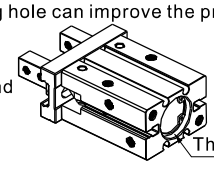


Front installation



With positioning hole

The positioning hole can improve the precision and the consistency of repeated dismounting and positioning.

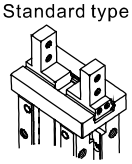


The positioning hole

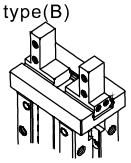
Seven kinds of finger type

According to the actual using requirements of customers, the initial position of clamping jaw can be customized to meet the different needs under different working conditions.

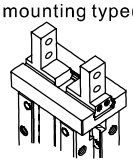
Standard type



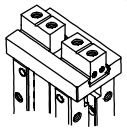
Side mounting type(B)



Thru.hole mounting type(N)



Bottom mounting type(F)



With squareness magnetic switch slots

The squareness magnetic switch slots convenient to install DMSG(S)\CMSG type inducting switch.

With roundness magnetic switch slots

The roundness magnetic switch slots convenient to install DMSH(S)\CMSH type inducting switch.

Bore size (mm)			10	16	20	25
Acting type			Double acting Single acting			
Fluid			Air(to be filtered by 40 μ m filter element)			
Operating pressure	Double acting	Φ10	0.2~0.7MPa(28~100psi)(2.0~7.0bar)			
		Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)			
	Single acting	Φ10	0.35~0.7MPa(50~100psi)(3.5~7.0bar)			
		Others	0.25~0.7MPa(36~100psi)(2.5~7.0bar)			
Temperature ℃			-20~70			
Lubrication			Not required			
Repeatability mm			±0.01			
Max. frequency			120(c.p.m)			
Sensor switches			DMSH(S)\CMSH	DMSG(S)\CMSG, MSH(S)\CMSH		
Port size			M3×0.5	M5×0.8		

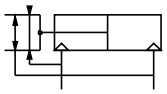
Note) Refer to P353 for detail of sensor switch.

Air gripper(Parallel with guide/longer stroke/ball bearing style)

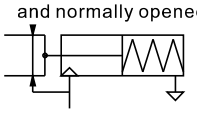
HFKL Series

Symbol

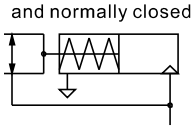
HFKL: Double acting



HFTKL: Single acting and normally opened



HFSKL: Single acting and normally closed



Gripping force and stroke

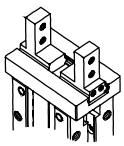
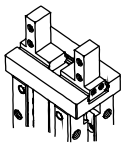
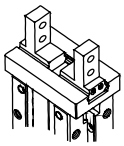
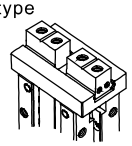
Acting type		Double acting(HFKL)				Single acting_NO (HFTKL)				Single acting_NC (HFSKL)			
Bore size		10	16	20	25	10	16	20	25	10	16	20	25
Gripping force per finger Effective value(N)	External	11	34	45	69	7	27	35	55	-	-	-	-
	Internal	17	45	68	102	-	-	-	-	13	38	59	87
Opening/Closing stroke(Both sides)(mm)		8	12	18	22	8	12	18	22	8	12	18	22
Weight (g)	F Type	64	146	275	484	74	154	294	530	73	154	294	528
	Others	64	146	273	489	73	155	292	525	72	155	292	523

[Note] The gripping force in the above table is in the working pressure of 0.5MPa, and with a gripping point of L=20mm.
Add) Please refer to page 275 for the definition of "L".

Ordering code

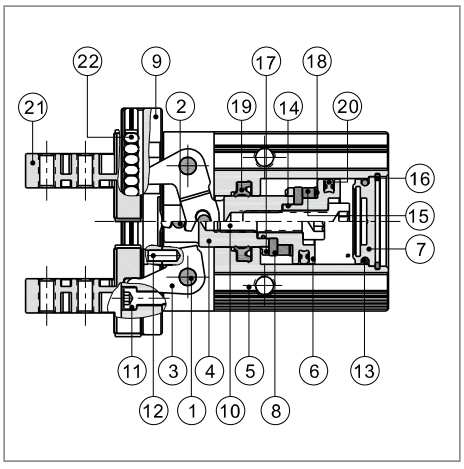
HFKL 20 □

1 2 3

①Model	②Bore size	③Finger type			
HFKL: Air finger(Double acting) HFSKL: Air finger (Single acting and nrmally closed) HFTKL: Air finger (Single acting and normally opened)	10 16 20 25	Blank: Standard 	B: Side mounting type 	N: Thru.hole mounting type 	F: Bottom mounting type 

[Note] HFKL series are all attached with magnet, and sensor switch should be ordered additionally.

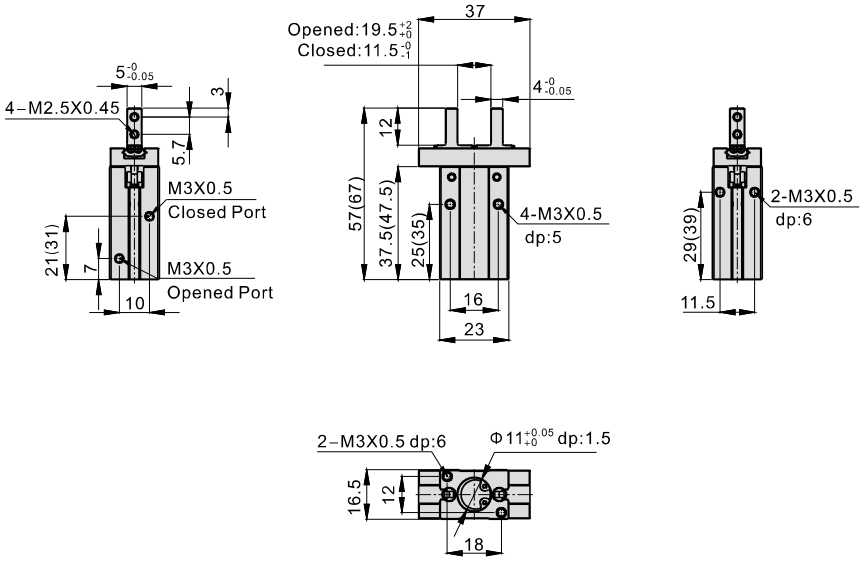
Inner structure and material of major parts



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

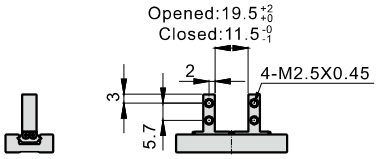
Dimensions

HFKL10

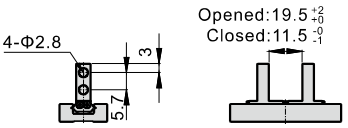


[Note]The values in "()" in the above table are single acting type sizes.

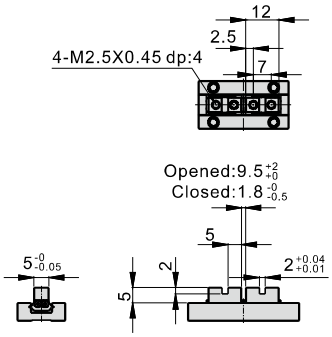
Side mounting type(B type)



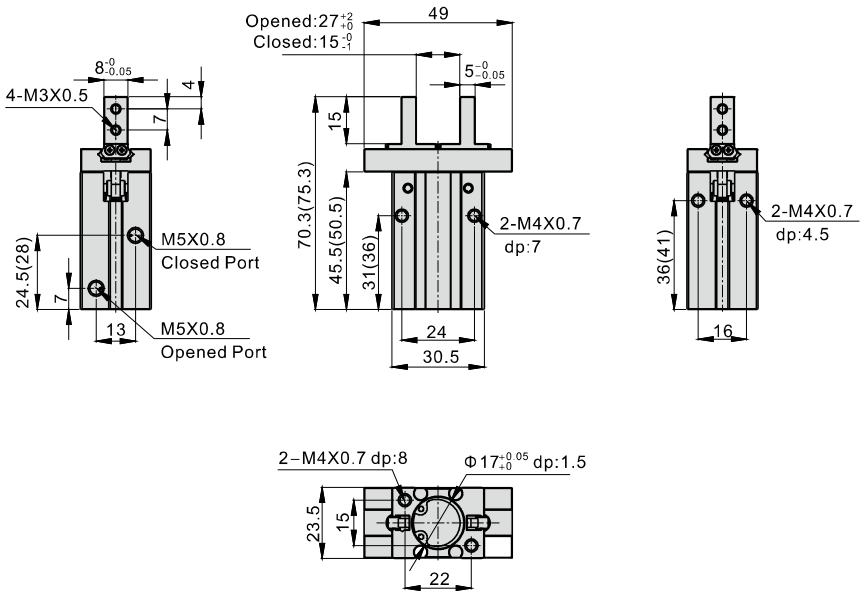
Thru.hole mounting type(N type)



Bottom mounting type(F type)

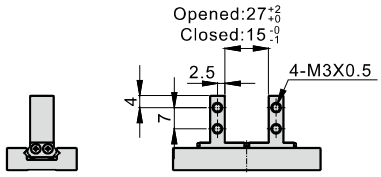


HFKL16

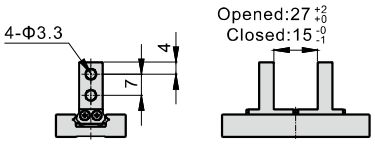


[Note]The values in "()" in the above table are single acting type sizes.

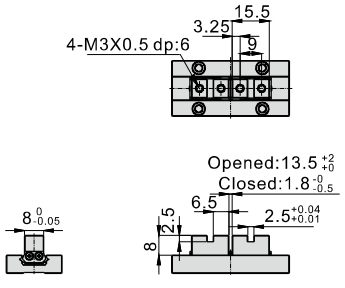
Side mounting type(B type)



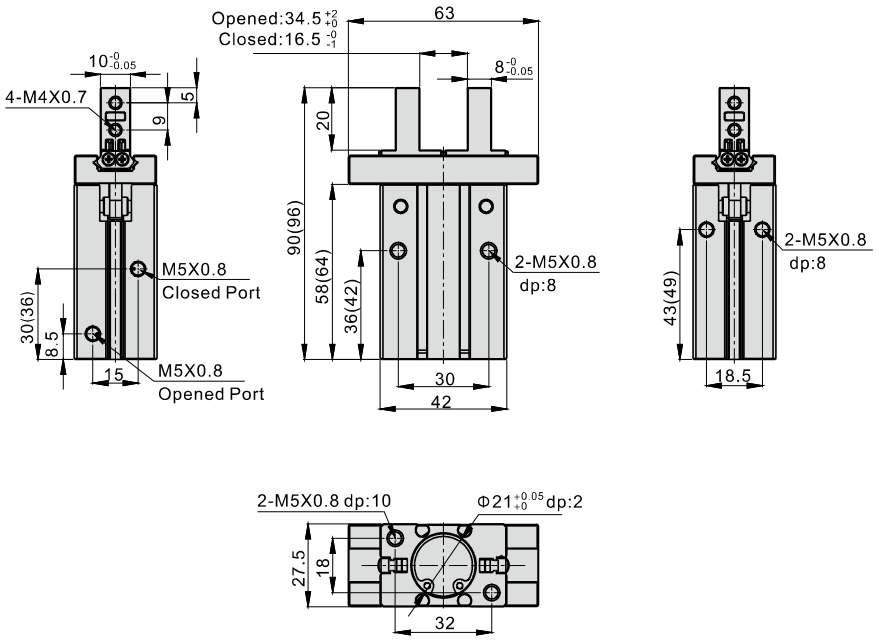
Thru.hole mounting type(N type)



Bottom mounting type(F type)

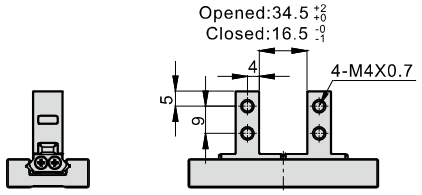


HFKL20

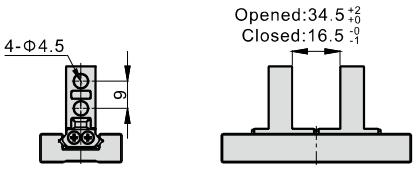


[Note]The values in "()" in the above table are single acting type sizes.

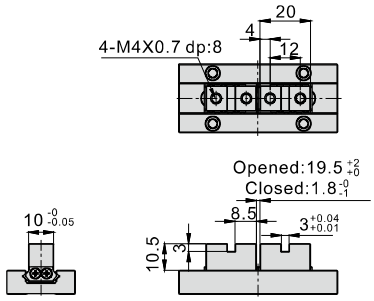
Side mounting type(B type)



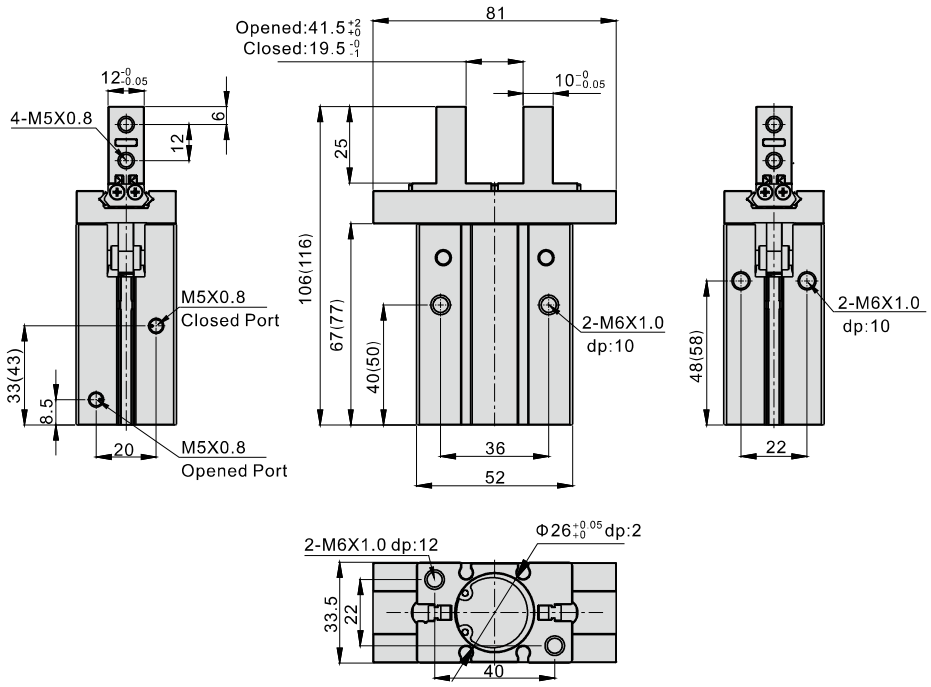
Thru.hole mounting type(N type)



Bottom mounting type(F type)

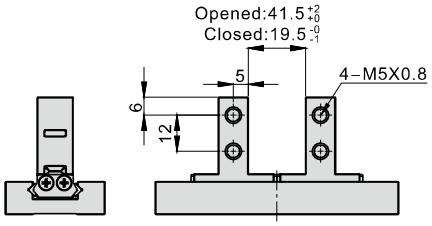


HFKL25

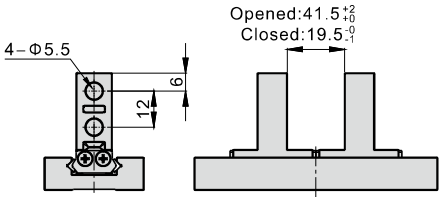


[Note]The values in "()" in the above table are single acting type sizes.

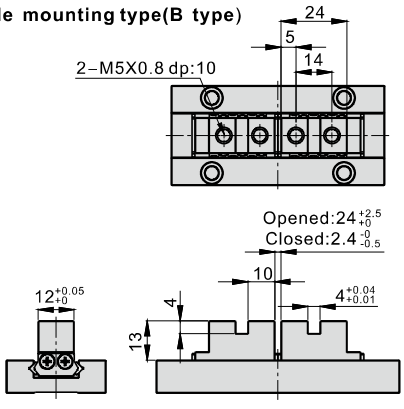
Side mounting type(B type)



Thru.hole mounting type(N type)



Side mounting type(B type)



HFKL Series

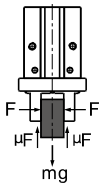
How to select product

Please select pneumatic finger according to the following steps:

①The selection of the effective gripping force >> ②the confirmation of the gripping point >> ③the 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.

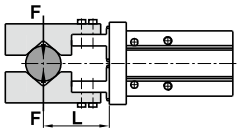


The work-pieces as shown in the left :		μ =0.2	μ =0.1
F: Gripping force (N) μ : friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity (=9.8m/s²)	The condition that the work-pieces won't drop is: $2\times\mu F>mg$ so: $F>\frac{mg}{2\times\mu}$ Safety coefficient is a, so F is: $F=\frac{mg}{2\times\mu}\times a$	$F=\frac{mg}{2\times0.2}\times4=10\times mg$	$F=\frac{mg}{2\times0.1}\times4=20\times mg$
		10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

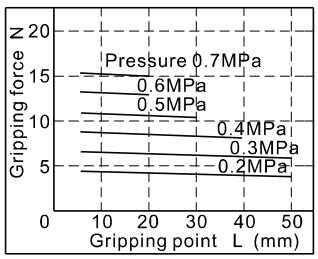
Note) If the friction coefficientμ>0.2, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

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

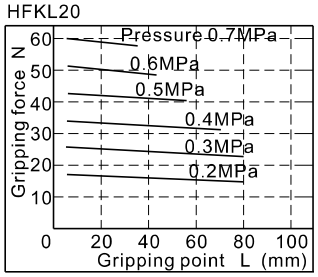
Double acting type closed gripping force



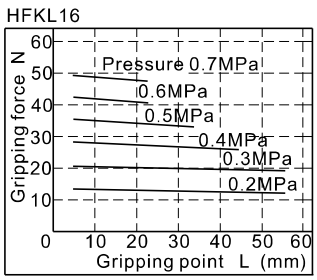
HFKL10



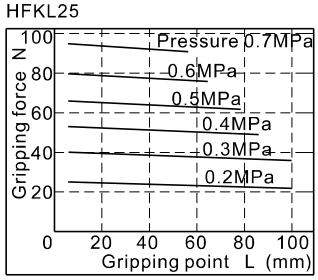
HFKL20



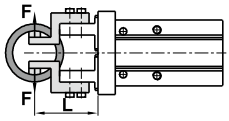
HFKL16



HFKL25



Double acting type opened gripping force



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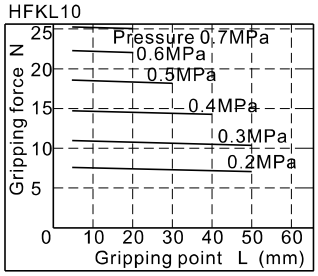

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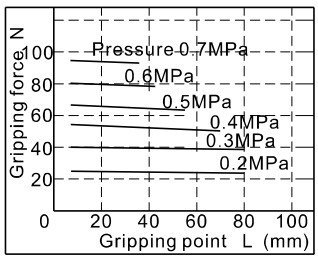
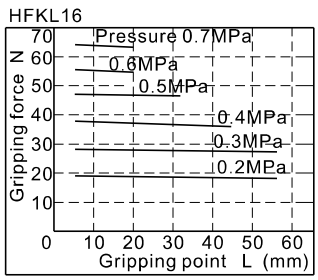


HFKL16



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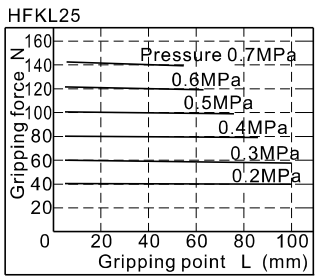
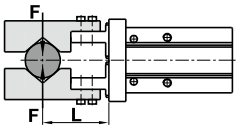
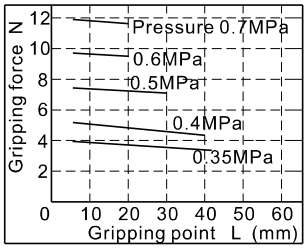


HFKL Series

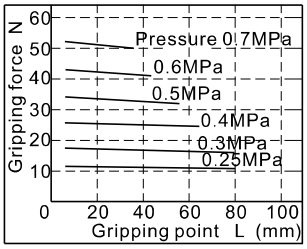
Single acting normally opened gripping force



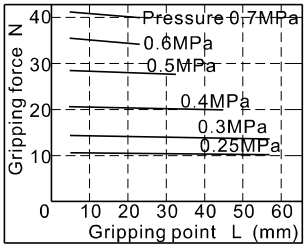
HFTKL10



HFTKL20



HFTKL16



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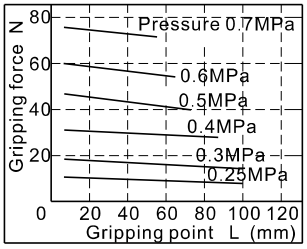
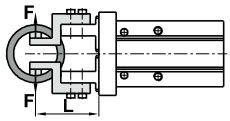


Single acting normally closed clamping force



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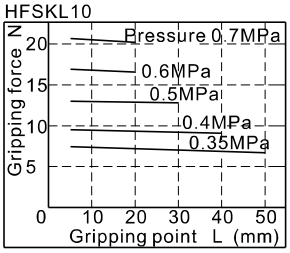

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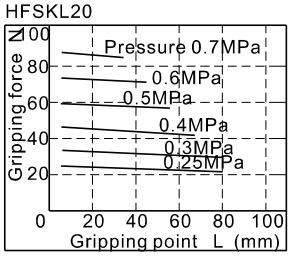

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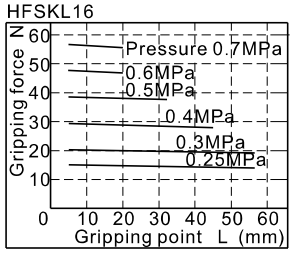

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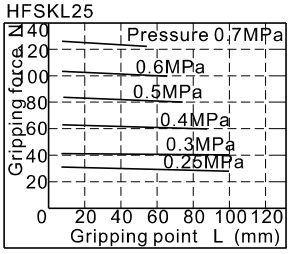
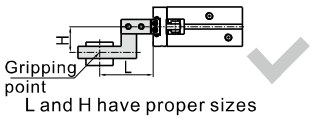
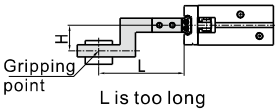


2. The selection of the gripping point

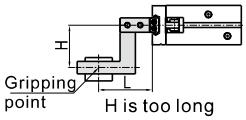
2.1) Please select the gripping point within the limited field shown below.
Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



L and H have proper sizes



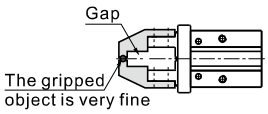
L is too long

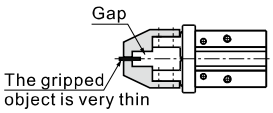


H is too long

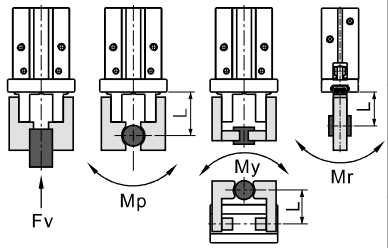
2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

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.

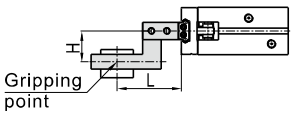


[Note] The loads and torque values of said are all static values.

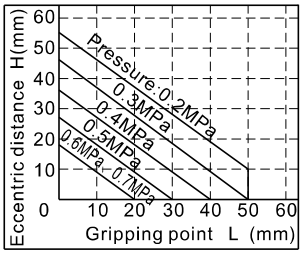
Bore size	The allowed vertical loads Fv(N)	Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
		Mp	My	Mr		
10	87	0.26	0.26	0.53	Allowable load(N) = M(Maximum permissible moment)(N.m) / L×10^{-3} (Unit conversion constant)	In the guide rail of HFKL16, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N, Allowable load F= 0.68/(30×10^{-3}) = 22.7(N) Actual load f=10(N)<22.7(N) To meet the using requirements
16	147	0.68	0.68	1.36		
20	221	1.32	1.32	2.65		
25	382	1.94	1.94	3.88		

HFKL Series

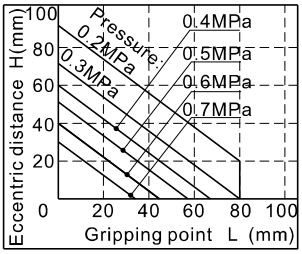
The range of the closed gripping points



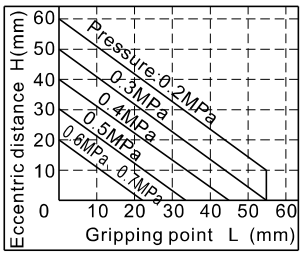
HFKL10



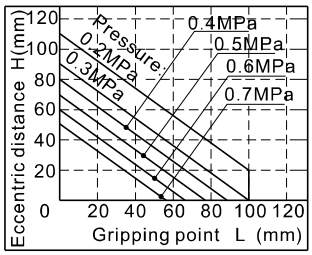
HFKL20



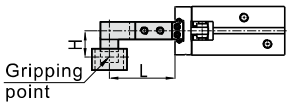
HFKL16



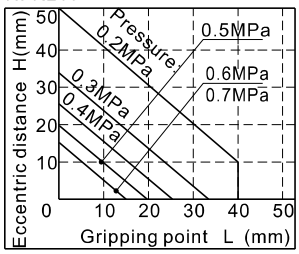
HFKL25



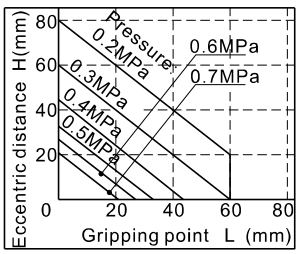
The range of the opened clamping point



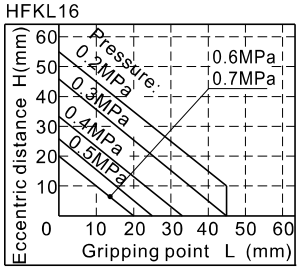
HFKL10



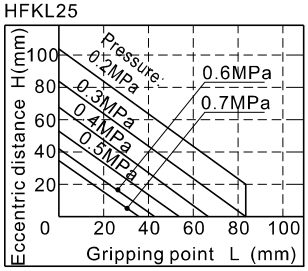
HFKL20



HFKL16



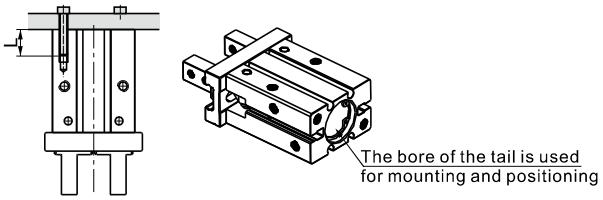
HFKL25



Installation and application

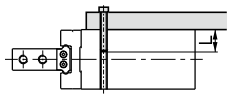
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external 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 torgue 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



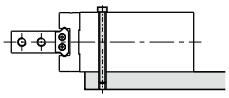
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	0.88N.m	6mm	Φ11mm $^{+0.05}_{0}$	1.5mm
16	M4×0.7	2.1N.m	8mm	Φ17mm $^{+0.05}_{0}$	1.5mm
20	M5×0.8	4.3N.m	10mm	Φ21mm $^{+0.05}_{0}$	2mm
25	M6×1.0	7.3N.m	12mm	Φ26mm $^{+0.05}_{0}$	2mm

The installation of the front threaded hole



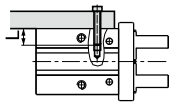
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	0.69	5
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10

The installation of the front through hole



Bore size	The bolts type	Max. locking moment（Nm）	Max. screwed depth（mm）
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

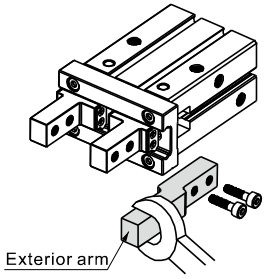
Surface installation type



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

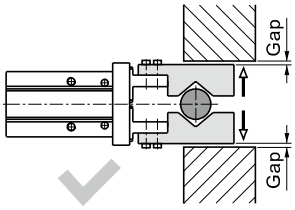
7. The installation method of the gripping jaw fittings
When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise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

Bore size	The bolts type	Max. locking moment (Nm)
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

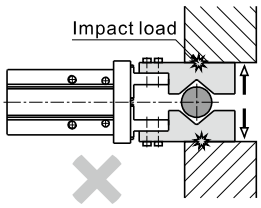


8. Confirm that there is no external forces exerted on the gripping jaw.
Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.

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

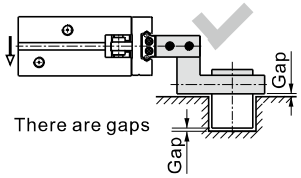


There are gaps

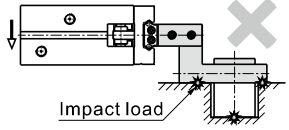


There aren't gaps

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

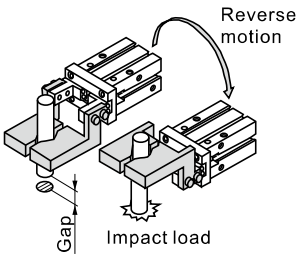


There are gaps

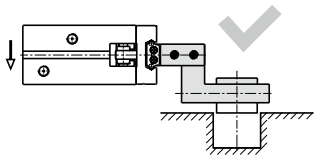


There aren't gaps

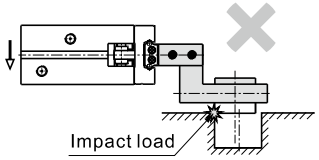
8.3) Reverse motion state
When reverse motion state, the gripping point must be precision, otherwise in the reverse motion state the air gripper maybe impact with ambience and will cause impact load .



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.



Center coaxial



Center offset

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.

Parallel style with guide track——ball bearing

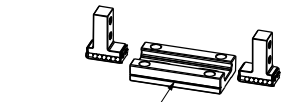
Compendium of HFZ Series

Seven kinds of bore size and three kinds of type

Bore size: 6, 10, 16, 20, 25, 32, 40,
HFZ: Double acting
HFSZ: Single acting and normally closed
HFTZ: Single acting and normally opened

Integrated design of linear guide rail

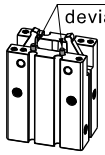
Integrated design of linear guide rail, high rigidity and high precision.



Integration of a linear guide rail

With positioning pin

A positioning pin is attached to the bottom of the linear guide rail, which can prevent the deviation of the positioning rail and body.



The positioning pin prevents the deviation of the rail and body

Closed port

Opened port

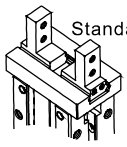
With squareness magnetic switch slots

The squareness magnetic switch slots convenient to install DMSG(S)\CMSG type inducting switch.

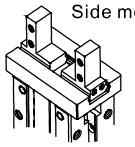
With roundness magnetic switch slots

The roundness magnetic switch slots convenient to install DMSH(S)\CMSH type inducting switch.

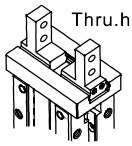
Four kinds of finger type



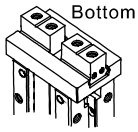
Standard type(Φ6~Φ40)



Side mounting type(B)(Φ6)



Thru.hole mounting type(N)(Φ6)



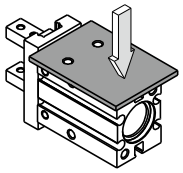
Bottom mounting type(F)(Φ6)

According to the actual using requirements of customers, the initial position of clamping jaw can be customized to meet the different needs under different working conditions.

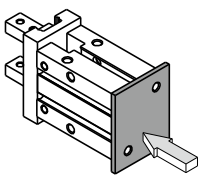
Can be mounted from three directions

With mounting holes on the side and tail.

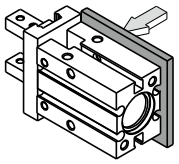
Surface installation



Tail installation

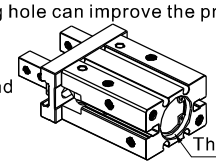


Front installation



With positioning hole

The positioning hole can improve the precision and the consistency of repeated dismounting and positioning.



The positioning hole

Bore size (mm)			6	10	16	20	25	32	40
Acting type			Double acting Single acting						
Fluid			Air(to be filtered by 40 μ m filter element)						
Operating pressure	Double acting	Φ6, Φ10	0.2~0.7MPa(28~100psi)(2.0~7.0bar)						
		Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)						
	Single acting	Φ6, Φ10	0.35~0.7MPa(50~100psi)(3.5~7.0bar)						
		Others	0.25~0.7MPa(36~100psi)(2.5~7.0bar)						
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)\CMSH		DMSG(S)\CMSG, DMSH(S)\CMSH				
Port size			M3×0.5		M5×0.8				

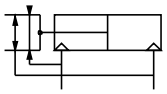
Note) Refer to P353 for detail of sensor switch.

Air gripper(parallel style——ball bearing)

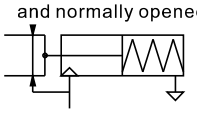
HFZ Series

Symbol

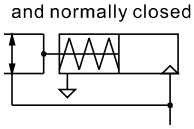
HFZ: Double acting



HFTZ: Single acting and normally opened



HFSZ: Single acting and normally closed



Gripping force and stroke

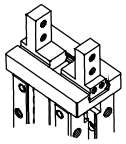
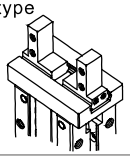
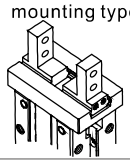
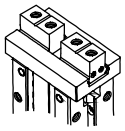
Acting type		Double acting(HFZ)							Single acting_NO (HFTZ)							Single acting_NC (HFSZ)						
Bore size		6	10	16	20	25	32	40	6	10	16	20	25	32	40	6	10	16	20	25	32	40
Gripping force per finger Effective value(N)	External	3.3	11	34	45	69	160	255	1.9	7	27	35	55	133	220	-	-	-	-	-	-	-
	Internal	6.1	17	45	68	102	195	320	-	-	-	-	-	-	-	3.7	13	38	59	87	163	270
Opening/Closing stroke(Both sides)(mm)		3	4	6	10	14	22	30	3	4	6	10	14	22	30	3	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 0.5MPa, and with a gripping point of L=20mm.
Add) Please refer to page 285 for the definition of "L".

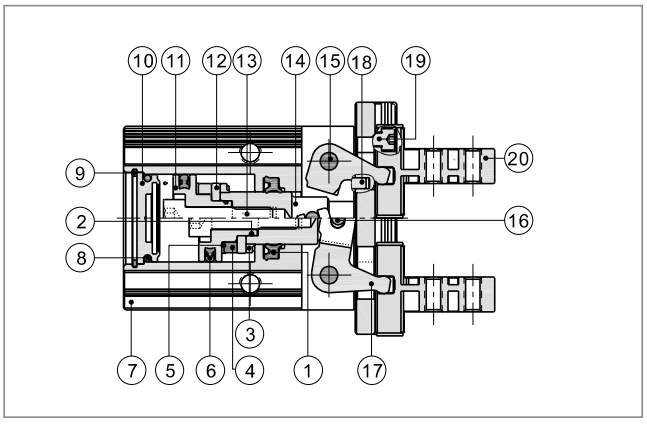
Ordering code

HFZ 20 □

1 2 3

①Model	②Bore size	③Finger type			
HFZ: Air finger(Double acting) HFSZ: Air finger (Single acting and nrmally closed) HFTZ: Air finger (Single acting and normally opened)	6 10 16 20 25 32 40	Blank:Standard 			
	6	B:Side mounting type 	N:Thru.hole mounting type 	F:Bottom mounting type 	HFZ series are all attached with magnet.

Inner structure and material of major parts



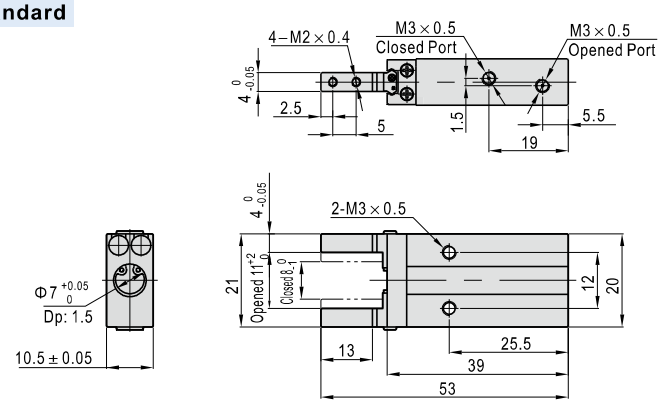
NO.	Item	Material
1	Rod packing	NBR
2	O-ring	NBR
3	Bumper	TPU
4	Magnet	Sintered metal(Neodymium-iron-boron)
5	Magnet washer	NBR
6	Piston seal	NBR
7	Body	Aluminum alloy
8	O-ring	NBR
9	C clip	Spring steel
10	Back cover	Aluminum alloy
11	Piston	Aluminum alloy/Stainless steel
12	Magnet fixed flake	Stainless 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

HFZ Series

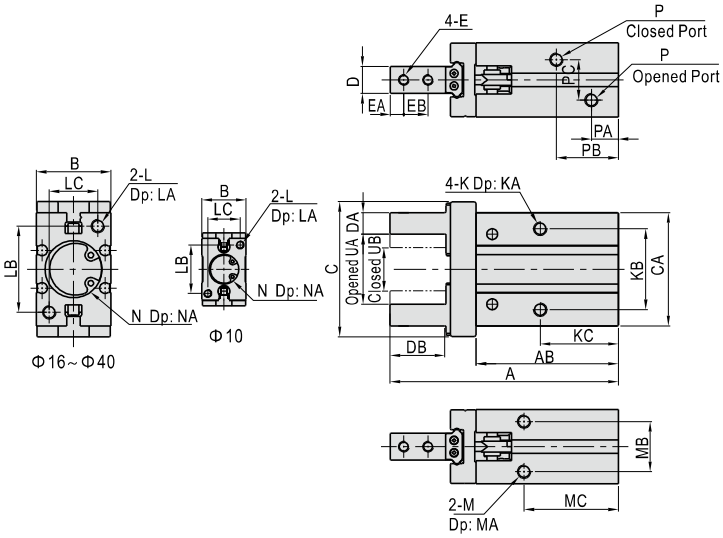
Dimensions

Standard

Φ6



Φ10~Φ40



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

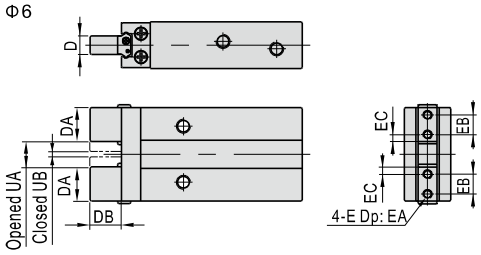
Model\Item	EB	K	KA	KB	KC	L	LA	LB	LC	M	MA	MB
HFZ10	5.7	M3×0.5	5	16	23	M3×0.5	6	18	12	M3×0.5	6	11.5
HFZ16	7	M4×0.7	7	24	24.5	M4×0.7	8	22	15	M4×0.7	4.5	16
HFZ20	9	M5×0.8	8	30	29	M5×0.8	10	32	18	M5×0.8	8	18.5
HFZ25	12	M6×1.0	10	36	30	M6×1.0	12	40	22	M6×1.0	10	22
HFZ32	14	M6×1.0	10	46	40(49)	M6×1.0	12	46	26	M6×1.0	10	26
HFZ40	17	M8×1.25	12	56	49(62)	M8×1.25	16	56	32	M8×1.25	12	32

Model\Item	MC	N	NA	P	PA	PB	PC	UA(Opened)	UB(Closed)
HFZ10	27	$\Phi11^{+0.05}_{0}$	1.5	M3×0.5	7	19	10	15.5^{+2}_{0}	11.5^{0}_{-1}
HFZ16	30	$\Phi17^{+0.05}_{0}$	1.5	M5×0.8	7.5	19	13	21^{+2}_{0}	15^{0}_{-1}
HFZ20	35	$\Phi21^{+0.05}_{0}$	2	M5×0.8	9.5	23	15	26.5^{+2}_{0}	16.5^{0}_{-1}
HFZ25	36.5	$\Phi26^{+0.05}_{0}$	2	M5×0.8	9	24	20	33.5^{+2}_{0}	19.5^{0}_{-1}
HFZ32	48(57)	$\Phi34^{+0.05}_{0}$	2.5	M5×0.8	9.5	31(40)	24	$48^{+2.5}_{0}$	26^{0}_{-1}
HFZ40	58(71)	$\Phi42^{+0.05}_{0}$	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.

Bottom mounting type(F type)

Φ6

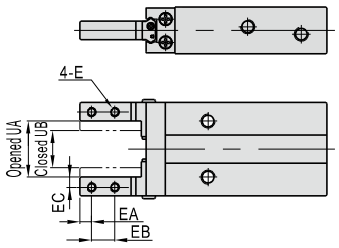


Model\Item	D	DA	DB	EA	EB	E
HFZ6-F	$4^{0}_{-0.05}$	7.5	7	3	3.5	M2×0.4

Model\Item	UA(Opened)	UB(Closed)
HFZ6-F	$5^{+1.5}_{0}$	$1.8^{0}_{-0.5}$

Side mounting type(B type)

Φ6

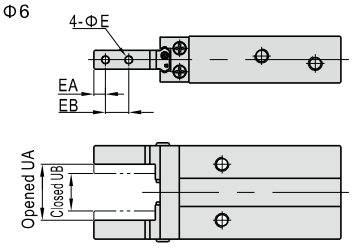


Model\Item	E	EA	EB	EC
HFZ6-B	M2×0.4	2.5	5	2

Model\Item	UA(Opened)	UB(Closed)
HFZ6-B	11^{+2}_{0}	8^{0}_{-1}

Thru.hole mounting type(N type)

Φ6



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.

Parallel style with guide track——roller bearing

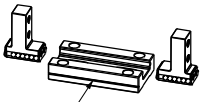
Compendium of HFK Series

Six kinds of bore size and three kinds of type

Bore size: 10, 16, 20, 25, 32, 40,
HFK: Double acting
HFSK: Single acting and normally closed
HFTK: Single acting and normally opened

Integrated design of linear guide roller

Integrated design of linear guide roller, high rigidity and high precision.

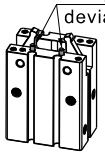


Integration of a linear guide roller

With positioning pin

A positioning pin is attached to the bottom of the linear guide rail, which can prevent the deviation of the positioning rail and body.

The positioning pin prevents the deviation of the rail and body



Closed port

Opened port

With squareness magnetic switch slots

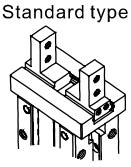
The squareness magnetic switch slots convenient to install DMSG(S)\CMSG type inducting switch.

With roundness magnetic switch slots

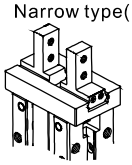
The roundness magnetic switch slots convenient to install DMSH(S)\CMSH type inducting switch.

Seven kinds of finger type

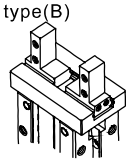
Standard type



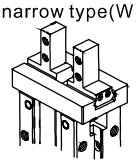
Narrow type(R)



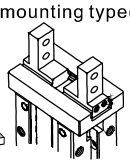
Side mounting type(B)



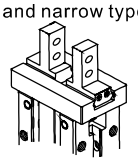
Side mounting and narrow type(W)



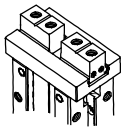
Thru.hole mounting type(N)



Thru.hole mounting and narrow type(M)



Bottom mounting type(F)

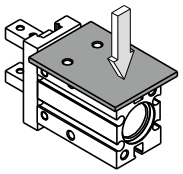


According to the actual using requirements of customers, the initial position of clamping jaw can be customized to meet the different needs under different working conditions.

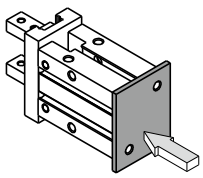
Can be mounted from three directions

With mounting holes on the side and tail.

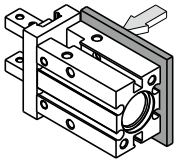
Surface installation



Tail installation

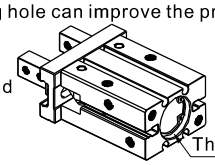


Front installation



With positioning hole

The positioning hole can improve the precision and the consistency of repeated dismounting and positioning.



The positioning hole

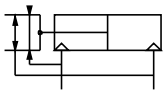
Bore size (mm)			10	16	20	25	32	40
Acting type			Double acting Single acting					
Fluid			Air(to be filtered by 40 μ m filter element)					
Operating pressure	Double acting	Φ10	0.2~0.7MPa(28~100psi)(2.0~7.0bar)					
		Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)					
	Single acting	Φ10	0.35~0.7MPa(50~100psi)(3.5~7.0bar)					
		Others	0.25~0.7MPa(36~100psi)(2.5~7.0bar)					
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)\CMSH	DMSG(S)\CMSG, DMSH(S)\CMSH				
Port size			M3×0.5	M5×0.8				

Note) Refer to P353 for detail of sensor switch.

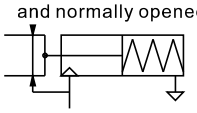
HFK Series

Symbol

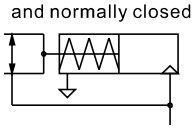
HFK: Double acting



HFTK: Single acting and normally opened



HFSK: Single acting and normally closed



Gripping force and stroke

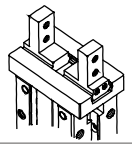
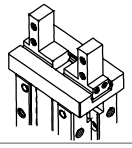
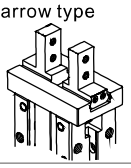
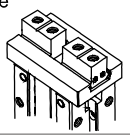
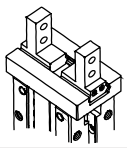
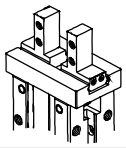
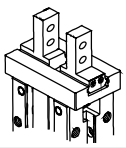
Acting type		Double acting(HFK)						Single acting_NO (HFTK)						Single acting_NC (HFSK)					
Bore size		10	16	20	25	32	40	10	16	20	25	32	40	10	16	20	25	32	40
Gripping force per finger Effective value(N)	External	11	34	45	69	160	255	7	27	35	55	133	220	-	-	-	-	-	-
	Internal	17	45	68	102	195	320	-	-	-	-	-	-	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 0.5MPa, and with a gripping point of L=20mm.
Add) Please refer to page 285 for the definition of "L".

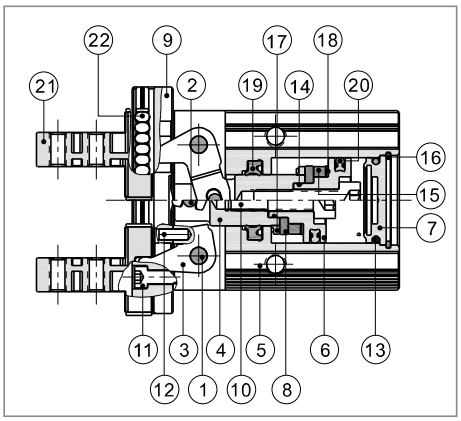
Ordering code

HFK 20 □

1 2 3

①Model	②Bore size	③Finger type			
HFK: Air finger(Double acting) HFSK: Air finger (Single acting and nrmally closed) HFTK: Air finger (Single acting and normally opened)	10 16 20 25 32 40	Blank: Standard 	B: Side mounting type 	R: Narrow type 	F: Bottom mounting type 
	10 16 20 25	N: Thru.hole mounting type 	W: Side mounting and narrow type 	M: Thru.hole mounting and narrow type 	HFK series are all attached with magnet.

Inner structure and material of major parts

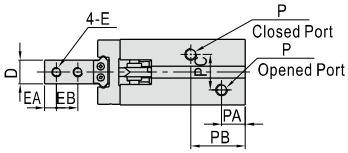


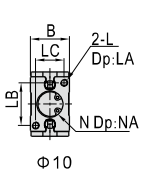
NO.	Item	Material	NO.	Item	Material
1	Pin	Stainless steel	12	Pin	Bearing steel
2	Pin	Stainless steel	13	O-ring	NBR
3	Curved bar	Stainless steel	14	O-ring	NBR
4	Piston rod	Aluminum alloy/Stainless steel	15	Magnet	Sintered metal(Neodymium-iron-boron)
5	Body	Aluminum alloy	16	C clip	Spring steel
6	Piston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

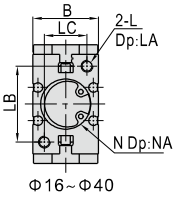
HFK Series

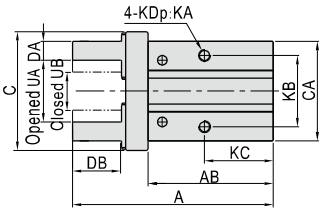
Dimensions

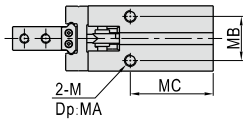
Standard











Model\Item	A	AB	B	C	CA	D	DA	DB	E	EA
HFK10	57	37.5	16.5	30	23	$5^{0}_{-0.05}$	$4^{0}_{-0.05}$	12	M2.5×0.45	3
HFK16	67.5	42.5	23.5	39	30.5	$8^{0}_{-0.05}$	$5^{0}_{-0.05}$	15	M3×0.5	4
HFK20	85	53	27.5	53	42	$10^{0}_{-0.05}$	$8^{0}_{-0.05}$	20	M4×0.7	5
HFK25	103	64	33.5	71	52	$12^{0}_{-0.05}$	$10^{0}_{-0.05}$	25	M5×0.8	6
HFK32	113(122)	67(76)	40	106	60	$15^{0}_{-0.05}$	$12^{0}_{-0.05}$	29	M6×1.0	7
HFK40	139(152)	83(96)	48	132	72	$18^{0}_{-0.05}$	$14^{0}_{-0.05}$	36	M8×1.25	9

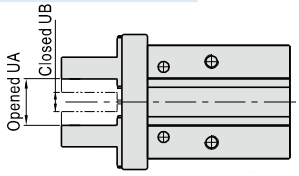
Model\Item	EB	K	KA	KB	KC	L	LA	LB	LC	M	MA	MB
HFK10	5.7	M3×0.5	5	16	23	M3×0.5	6	18	12	M3×0.5	6	11.5
HFK16	7	M4×0.7	7	24	24.5	M4×0.7	8	22	15	M4×0.7	4.5	16
HFK20	9	M5×0.8	8	30	29	M5×0.8	10	32	18	M5×0.8	8	18.5
HFK25	12	M6×1.0	10	36	30	M6×1.0	12	40	22	M6×1.0	10	22
HFK32	14	M6×1.0	10	46	40(49)	M6×1.0	12	46	26	M6×1.0	10	26
HFK40	17	M8×1.25	12	56	49(62)	M8×1.25	16	56	32	M8×1.25	12	32

Model\Item	MC	N	NA	P	PA	PB	PC	UA(Opened)	UB(Closed)
HFK10	27	$\Phi11^{+0.05}_{0}$	1.5	M3×0.5	7	19	10	15.5^{+2}_{0}	11.5^{0}_{-1}
HFK16	30	$\Phi17^{+0.05}_{0}$	1.5	M5×0.8	7.5	19	13	21^{+2}_{0}	15^{0}_{-1}
HFK20	35	$\Phi21^{+0.05}_{0}$	2	M5×0.8	9.5	23	15	26.5^{+2}_{0}	16.5^{0}_{-1}
HFK25	36.5	$\Phi26^{+0.05}_{0}$	2	M5×0.8	9	24	20	33.5^{+2}_{0}	19.5^{0}_{-1}
HFK32	48(57)	$\Phi34^{+0.05}_{0}$	2.5	M5×0.8	9.5	31(40)	24	$48^{+2.5}_{0}$	26^{0}_{-1}
HFK40	58(71)	$\Phi42^{+0.05}_{0}$	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.

Narrow type(R type)

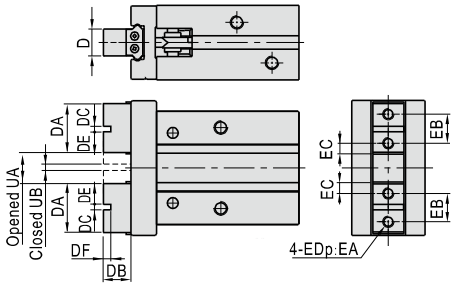
Φ10~Φ25



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}

Bottom mounting type(F type)

Φ10~Φ40

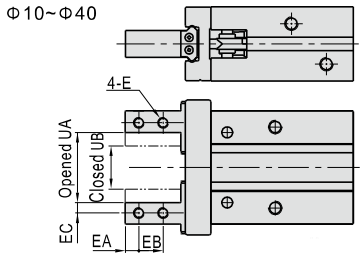


Model\Item	D	DA	DB	DC	DE	E
HFK10-F	$5^{0}_{-0.05}$	11	5	$2^{+0.04}_{+0.01}$	4.5	M2.5×0.45
HFK16-F	$8^{0}_{-0.05}$	14	8	$2.5^{+0.04}_{+0.01}$	5.8	M3×0.5
HFK20-F	$10^{0}_{-0.05}$	18	10.5	$3^{+0.04}_{+0.01}$	7.5	M4×0.7
HFK25-F	$12^{0}_{-0.05}$	22	13	$4^{+0.04}_{+0.01}$	9	M5×0.8
HFK32-F	$15^{0}_{-0.05}$	34.5	18	$5^{+0.04}_{+0.01}$	14.8	M6×1.0
HFK40-F	$18^{0}_{-0.05}$	41.5	22	$6^{+0.04}_{+0.01}$	17.7	M8×1.25

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}	$3.4^{0}_{-0.5}$

Side mounting type(B type)

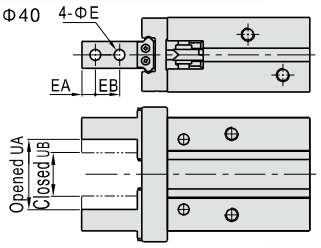
Φ10~Φ40



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)

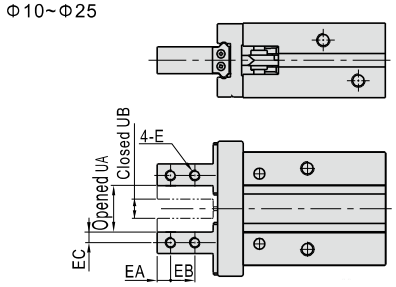
Φ10~Φ40



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)

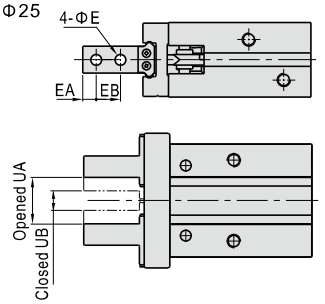
Φ10~Φ25



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)

Φ10~Φ25



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}

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

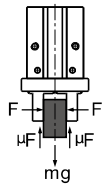
How to select product

Please select pneumatic finger according to the following steps:

①The selection of the effective gripping force ➤ ②the confirmation of the gripping point ➤ ③the 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.



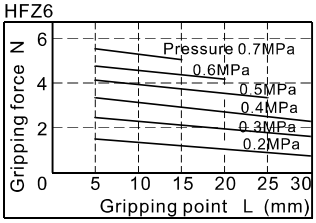
The work-pieces as shown in the left :		μ =0.2	μ =0.1
F: Gripping force (N) μ : friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity (=9.8m/s²)	The condition that the work-pieces won't drop is: 2× μ F>mg so: $F>\frac{mg}{2\times\mu}$ Safety coefficient is a, so F is: $F=\frac{mg}{2\times\mu}\times a$	$F=\frac{mg}{2\times0.2}\times4=10\times mg$	$F=\frac{mg}{2\times0.1}\times4=20\times mg$
		10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

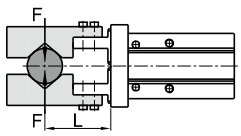
Note) If the friction coefficientμ>0.2, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

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

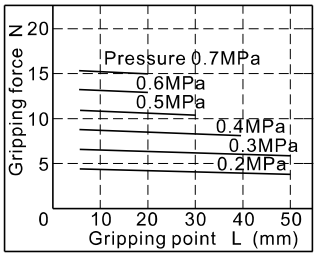
Double acting type closed gripping force

HFZ6

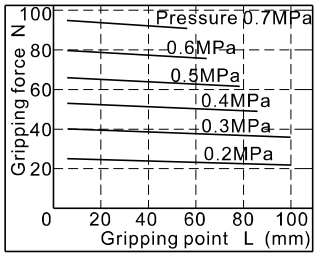




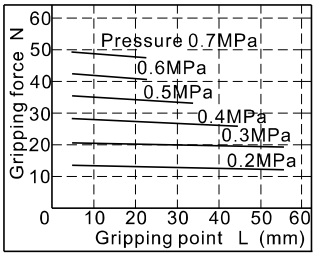
HFZ10\HFK10



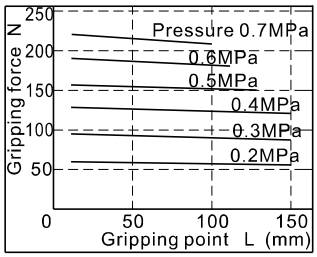
HFZ25\HFK25



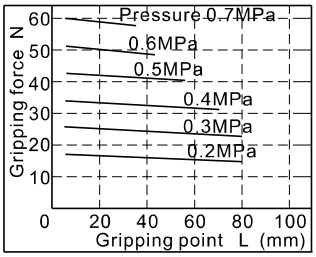
HFZ16\HFK16



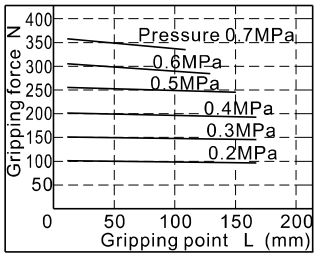
HFZ32\HFK32



HFZ20\HFK20

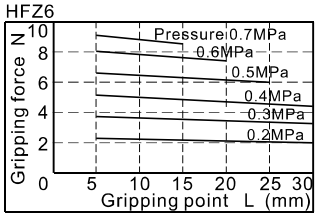


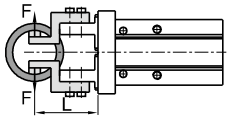
HFZ40\HFK40



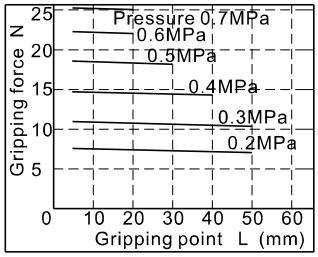
Double acting type opened gripping force

HFZ6

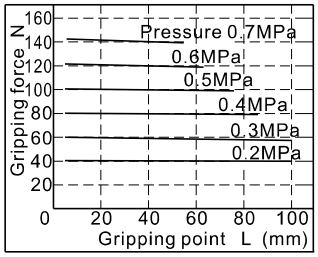




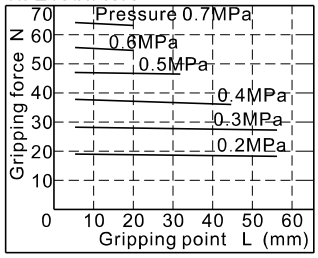
HFZ10\HFK10



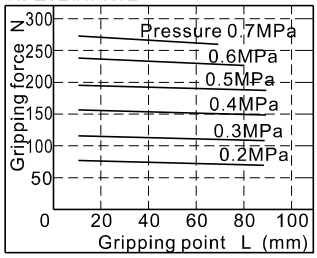
HFZ25\HFK25



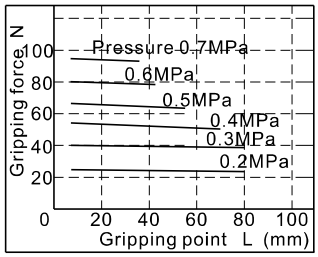
HFZ16\HFK16



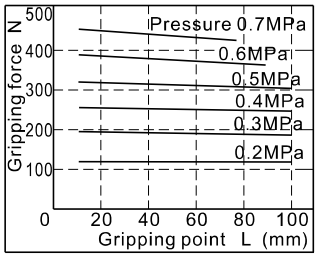
HFZ32\HFK32



HFZ20\HFK20



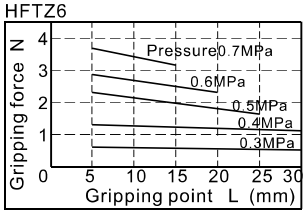
HFZ40\HFK40

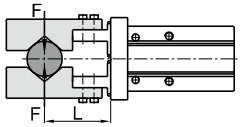


HFK Series

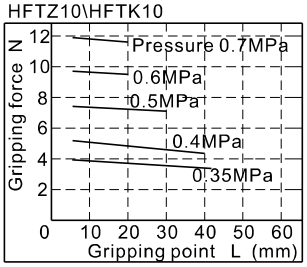
Single acting normally opened gripping force

HFTZ6

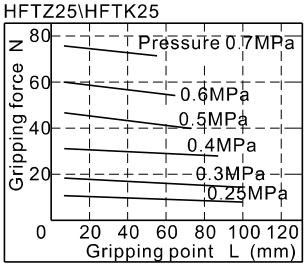




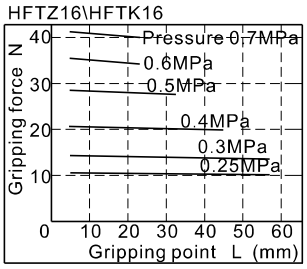
HFTZ10\HFTK10



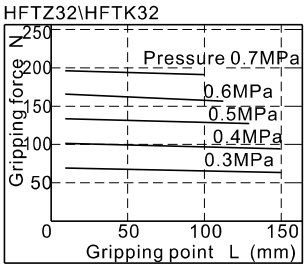
HFTZ25\HFTK25



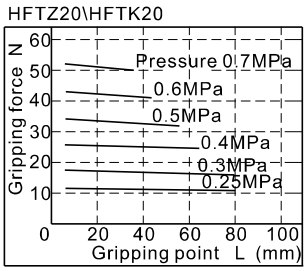
HFTZ16\HFTK16



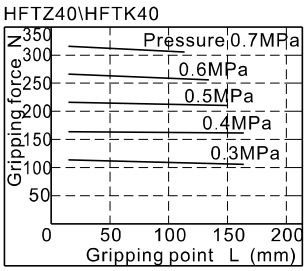
HFTZ32\HFTK32



HFTZ20\HFTK20

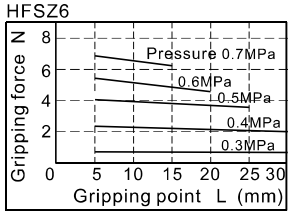


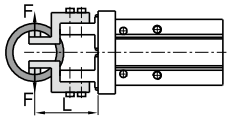
HFTZ40\HFTK40



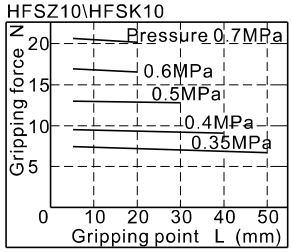
Single acting normally closed clamping force

HFSZ6

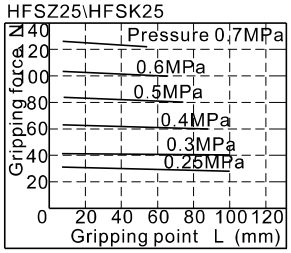




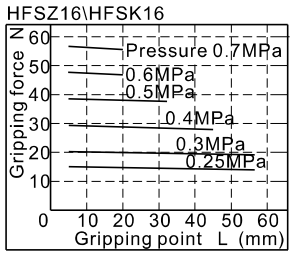
HFSZ10\HFSK10



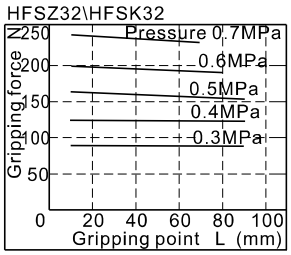
HFSZ25\HFSK25



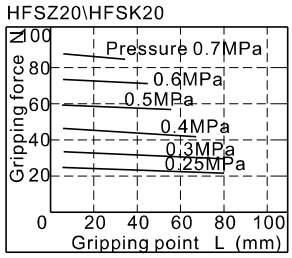
HFSZ16\HFSK16



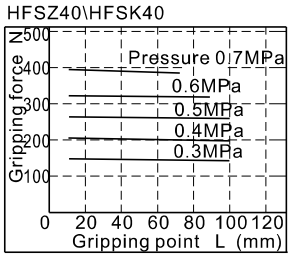
HFSZ32\HFSK32



HFSZ20\HFSK20



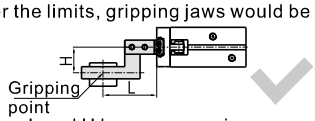
HFSZ40\HFSK40



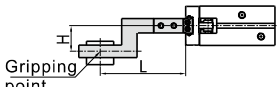
2. The selection of the gripping point

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

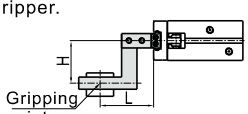
Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



L and H have proper sizes



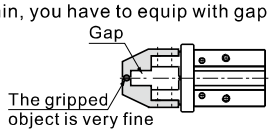
L is too long

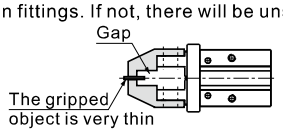


H is too long

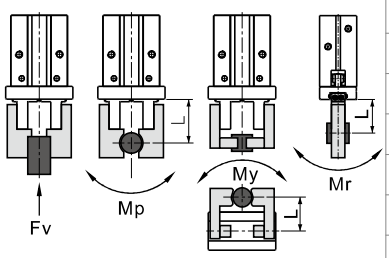
2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.

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.



[Note] The loads and torque values of said are all static values.

Bore size	The allowed vertical loads Fv(N)		Max. permissible torque(Nm)		
	HFZ	HFK	Mp	My	Mr
6	10	-	0.04	0.04	0.08
10	58	87	0.26	0.26	0.53
16	98	147	0.68	0.68	1.36
20	147	221	1.32	1.32	2.65
25	255	382	1.94	1.94	3.88
32	343	514	3	3	6
40	490	735	4.5	4.5	9

The calculation of allowable forces when moment loads work

$$\text{Allowable load(N)} = \frac{\text{M(Maximum permissible moment)(N.m)}}{L \times \underbrace{10^{-3}}_{\text{Unit conversion constant}}}$$

Examples of calculation

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,

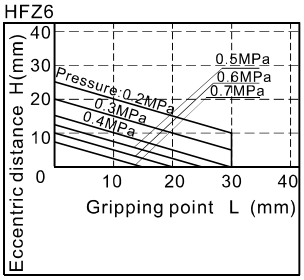
$$\text{Allowable load } F = \frac{0.68}{30 \times 10^{-3}} = 22.7(\text{N})$$

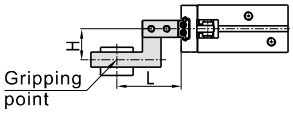
Actual load f=10(N)<22.7(N)
To meet the using requirements

HFK Series

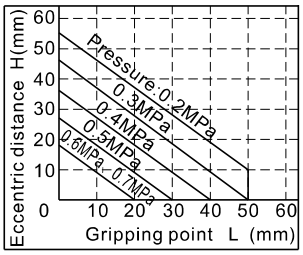
The range of the closed gripping points

HFZ6

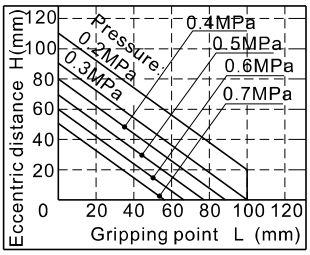




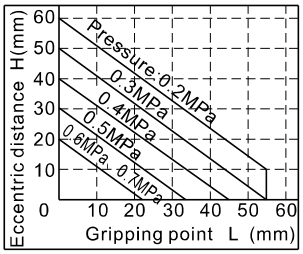
HFZ10\HFK10



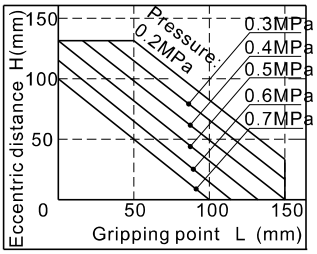
HFZ25\HFK25



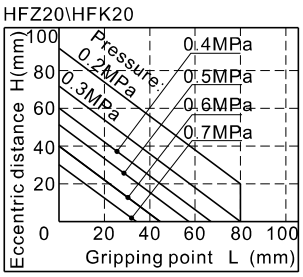
HFZ16\HFK16



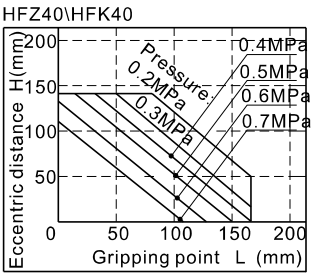
HFZ32\HFK32



HFZ20\HFK20

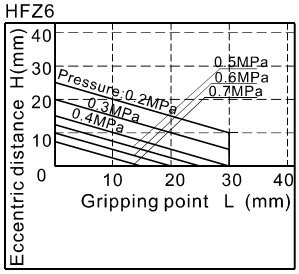


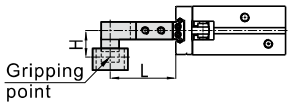
HFZ40\HFK40



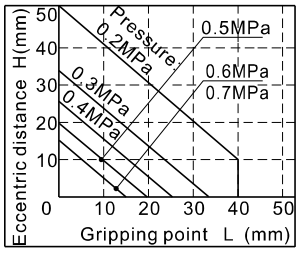
The range of the opened clamping point

HFZ6

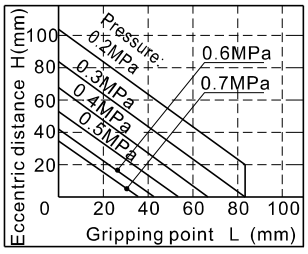




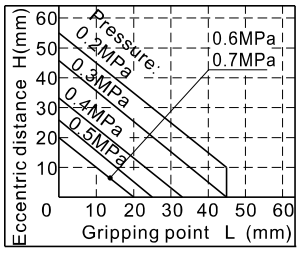
HFZ10\HFK10



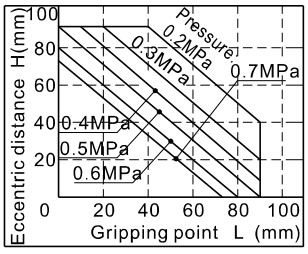
HFZ25\HFK25



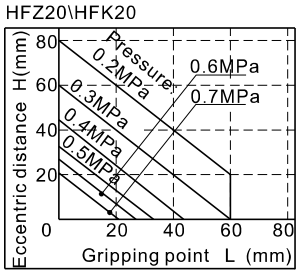
HFZ16\HFK16



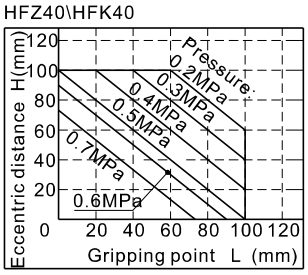
HFZ32\HFK32



HFZ20\HFK20



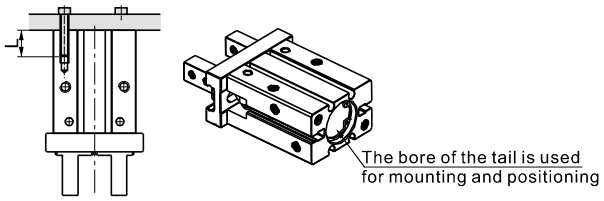
HFZ40\HFK40



Installation and application

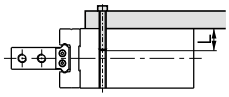
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external 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 torgue 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



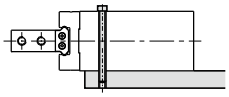
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	0.88N.m	6mm	Φ11mm $^{+0.05}_{0}$	1.5mm
16	M4×0.7	2.1N.m	8mm	Φ17mm $^{+0.05}_{0}$	1.5mm
20	M5×0.8	4.3N.m	10mm	Φ21mm $^{+0.05}_{0}$	2mm
25	M6×1.0	7.3N.m	12mm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

The installation of the front threaded hole



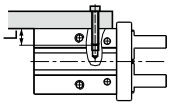
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M3×0.5	0.88	10
10	M3×0.5	0.69	5
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10
32	M6×1.0	7.9	12
40	M8×1.25	17.7	12

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

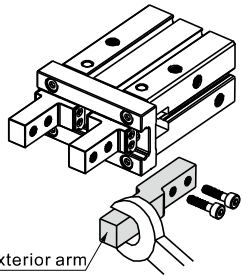
Surface installation type



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

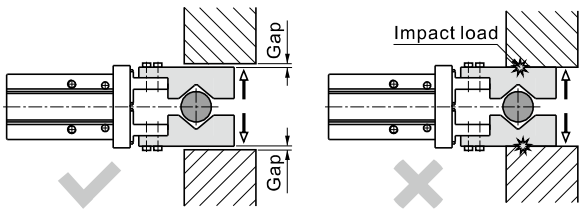
7. The installation method of the gripping jaw fittings
When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise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

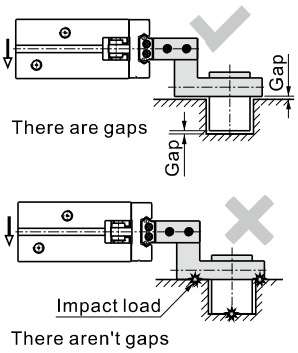


8. Confirm that there is no external forces exerted on the gripping jaw.
Transverse load acts on the gripping jaw, which will cause impact load and leads to the shaking and damage of gripping jaw. Equip with gaps so that the air gripper will not crash into work-pieces and accessories at the end of its trip.

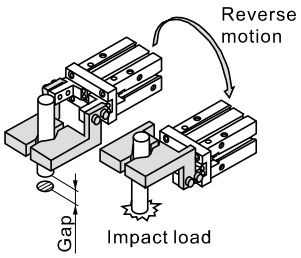
8.1) The end of stroke under the open state of air gripper



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.

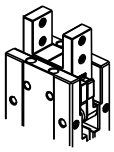
Compendium of HFP Series

Five kinds of bore size and two kinds of type

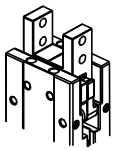
Bore size: 10, 16, 20, 25, 32
HFP: Double acting
HFTP: Single acting and normally opened

Two kinds of finger type

Standard type



Thru.hole mounting type(N)



Structure of lever type gripping

A structure of lever type gripping is designed to reduce the cost under the premise of accuracy. The finger clamps when the piston rod pushes out and stretches when the piston rod retracts. The gripping force is 20%~30% greater than the tensile force.

High gripping accuracy

The contact area between finger and body is enlarged to reduce shaking and enhance the gripping accuracy.

Anti-abrasion

A sheet metal is installed between the finger and body to reduce abrasion and extend the service life.

Opened port

Closed port

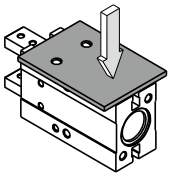
Can be mounted from two directions

With mounting holes on the side and tail.

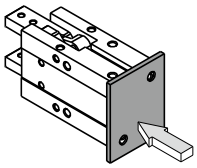
With magnetic switch slots

The magnetic switch slots convenient to install inducting switch.

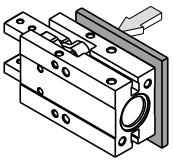
Surface installation



Tail installation

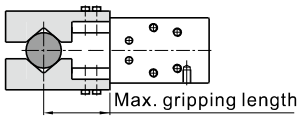


Front installation



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	0.2~0.7MPa(28~100psi)(2.0~7.0bar)				
		Others	0.15~0.7MPa(22~100psi)(1.5~7.0bar)				
	Single acting	Φ10	0.35~0.7MPa(50~100psi)(3.5~7.0bar)				
		Others	0.25~0.7MPa(36~100psi)(2.5~7.0bar)				
Proof pressure			1.05MPa(150psi)(10.5bar)				
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)			CMSG\DMSG(S)、CMSH\DMSH(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, please refer to P353 for detail of sensor switch.



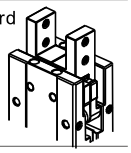
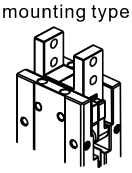
Air gripper(Mechanical parallel style)

HFP Series

Ordering code

HFP 20 □

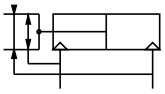
1 2 3

①Model	②Bore size	③Finger type
HFP: Air finger(Double acting) (mechanical parallel style) HFTP: Air finger (Single acting and normally opened) (mechanical parallel style)	10 16 20 25 32	Blank: Standard  N: Thru.hole mounting type 

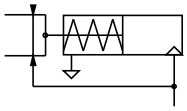
[Note] HFP series are all attached with magnet.

Symbol

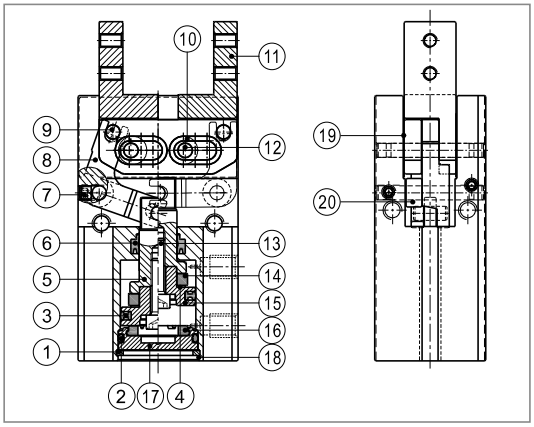
HFP: Double acting



HFTP: Single acting and normally opened



Inner structure and material of major parts

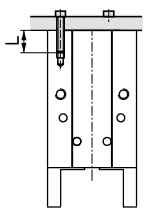


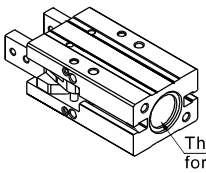
NO.	Item	Material	NO.	Item	Material
1	C clip	Spring steel	11	Gripping jaws	Stainless steel
2	O-ring	NBR	12	Pin	Stainless steel
3	Piston seal	NBR	13	Screw	Carbon steel
4	Magnet washer	NBR	14	Magnet	Sintered metal (Neodymium-iron-boron)
5	Piston rod	Aluminum alloy Stainless steel	15	Piston	Aluminum alloy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

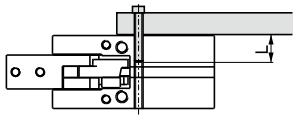
Tail installation type





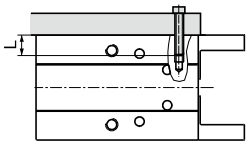
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	1.0N.m	6mm	Φ11mm $^{+0.05}_{0}$	1.0mm
16	M4×0.7	2.0N.m	8mm	Φ17mm $^{+0.05}_{0}$	1.2mm
20	M5×0.8	4.5N.m	10mm	Φ21mm $^{+0.05}_{0}$	1.2mm
25	M6×1.0	7.0N.m	12mm	Φ26mm $^{+0.05}_{0}$	1.5mm
32	M6×1.0	7.0N.m	12mm	Φ34mm $^{+0.05}_{0}$	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 HFZ. Refer to the "Installation and Operation" instruction of HFZ.

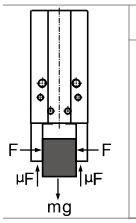
How to select product

Please select pneumatic finger according to the following steps:

①The selection of the effective gripping force > ②the confirmation of the gripping point > ③the 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.

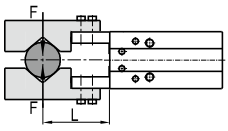


The work-pieces as shown in the left :		μ =0.2	μ =0.1
F: Gripping force (N) μ : friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity (=9.8m/s²)	The condition that the work-pieces won't drop is: 2× μ F>mg so: $F>\frac{mg}{2\times\mu}$ Safety coefficient is a, so F is: $F=\frac{mg}{2\times\mu}\times a$	$F=\frac{mg}{2\times0.2}\times4=10\times mg$	$F=\frac{mg}{2\times0.1}\times4=20\times mg$
		10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

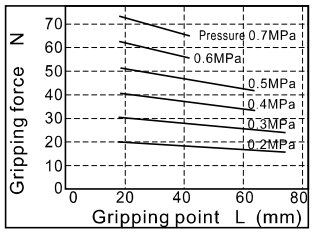
Note) If the friction coefficientμ>0.2, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

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

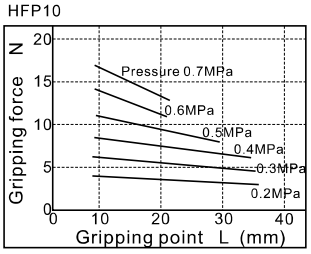
Double acting type closed gripping force



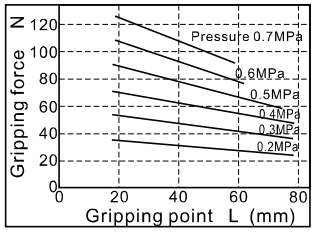
HFP20



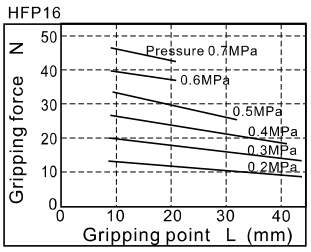
HFP10



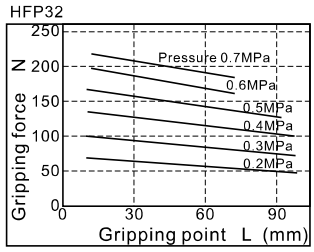
HFP25



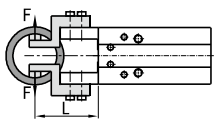
HFP16



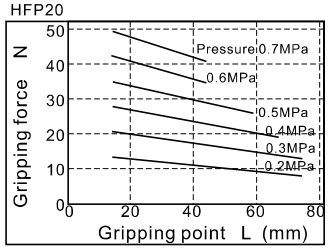
HFP32



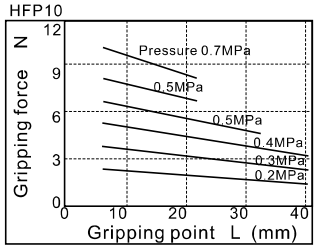
Double acting type opened gripping force



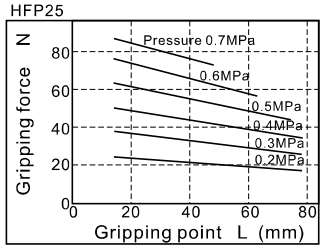
HFP20



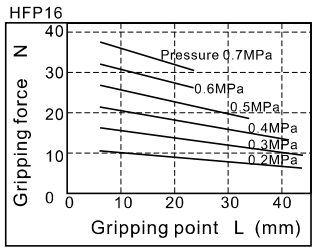
HFP10



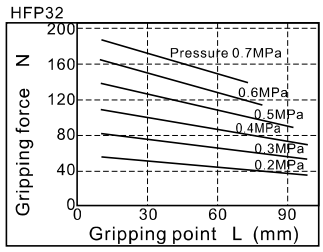
HFP25



HFP16

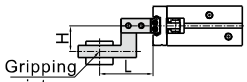


HFP32

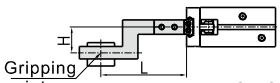


2. The selection of the gripping point

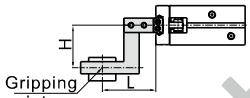
2.1) Select the gripping point within the maximum gripping length range. Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.



L and H have proper sizes



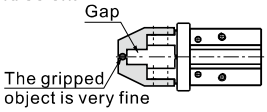
L is too long

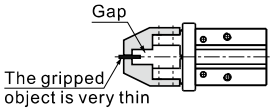


H is too long

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.

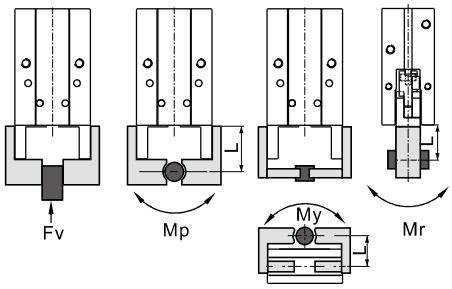
2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.





HFP Series

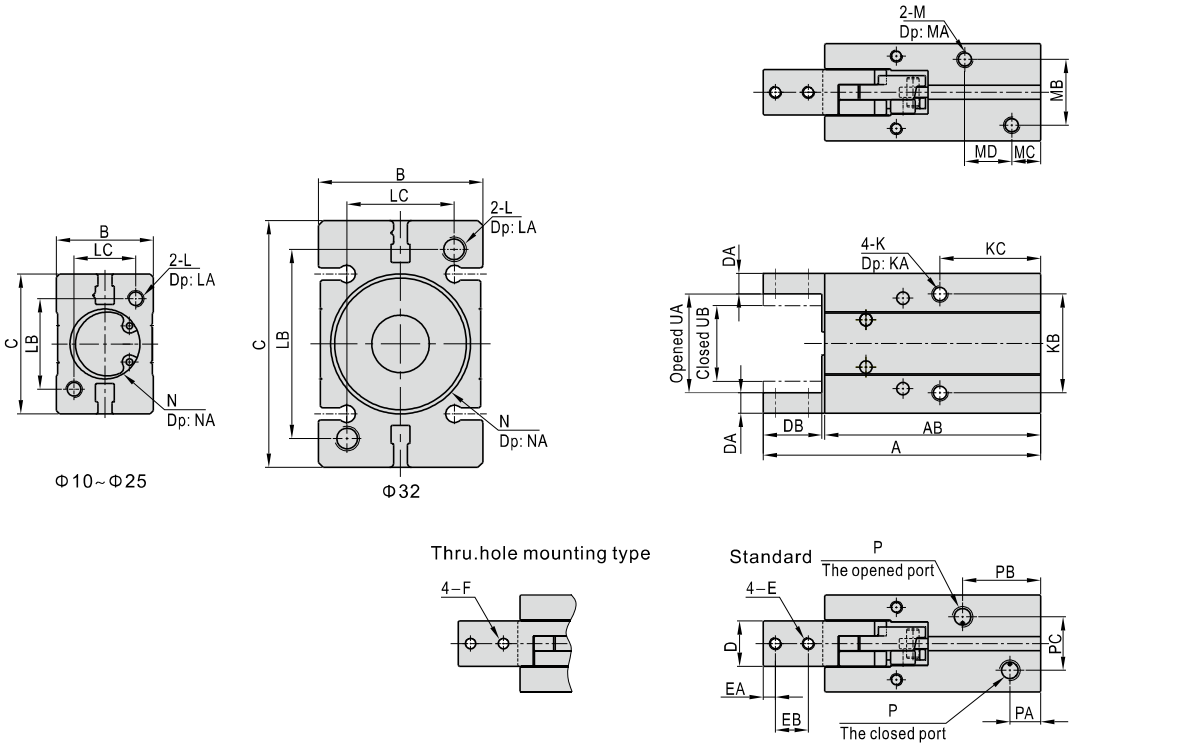
3. The confirmation of the external force put on the gripping jaw.



[Note] The loads and torque values of said are all static values.

Bore size	The allowed vertical loads Fv(N)	Max. permissible torque(Nm) Mp	My	Mr	The calculation of allowable forces when moment loads work	Examples of calculation
10	58	0.26	0.26	0.53	Allowable load(N) = M(Maximum permissible moment)(N.m) / L×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=30mm is f=10 N, Allowable load F= 0.68 / 30×10⁻³ = 22.7(N) Actual load f=10(N)<22.7(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		

Dimensions



Model\Item	A	AB	B	C	D	DA	DB	E	EA	EB	F	K	KA	KB	KC	L	LA
HFP10	57(62)	44.5(49.5)	16	23	7	4	12	M2.5×0.45	3	5.5	Φ2.8	M3×0.5	5	16	23(28)	M3×0.5	6
HFP16	72(77)	56.5(61.5)	23.5	34	11	5	15	M3×0.5	4	7	Φ3.3	M4×0.7	8	24	29(34)	M4×0.7	8
HFP20	89.5(94.5)	69(74)	27.5	45	12	6	20	M4×0.7	5	9	Φ4.5	M5×0.8	10	30	34(39)	M5×0.8	10
HFP25	104.5(109.5)	78.5(83.5)	33.5	52	14	8	25	M5×0.8	6	12	Φ5.5	M6×1.0	12	36	31.5(36.5)	M6×1.0	12
HFP32	118(126)	88(96)	40	60	18	9	29	M6×1.0	7	14	Φ6.5	M6×1.0	12	46	37.5(45.5)	M6×1.0	12

Model\Item	LB	LC	M	MA	MB	MC	MD	N	NA	P	PA	PB	PC	UA(Opened)	UB(Closed)
HFP10	18	12	M3×0.5	6	10	6(11)	10	$\Phi 11^{+0.05}_{0}$	1	M3×0.5	6	16.5(23)	10	$14.5^{+1.5}_{0}$	10.5^{0}_{-1}
HFP16	22	15	M4×0.7	8	16	6(11)	16	$\Phi 17^{+0.05}_{0}$	1.2	M5×0.8	7.5	20(25)	13	$23.5^{+1.5}_{0}$	15.5^{0}_{-1}
HFP20	32	18	M5×0.8	10	18	8(13)	16	$\Phi 21^{+0.05}_{0}$	1.2	M5×0.8	7.5	24(29)	15	$32.5^{+1.5}_{0}$	20.5^{0}_{-1}
HFP25	40	22	M6×1.0	12	24	8(13)	16	$\Phi 26^{+0.05}_{0}$	1.5	M5×0.8	8	22(29)	20	$35.5^{+1.5}_{0}$	21.5^{0}_{-1}
HFP32	46	26	M6×1.0	12	30	8(16)	20	$\Phi 34^{+0.05}_{0}$	1.5	M5×0.8	9.5	26(37)	22	$42^{+1.5}_{0}$	26.5^{0}_{-1}

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

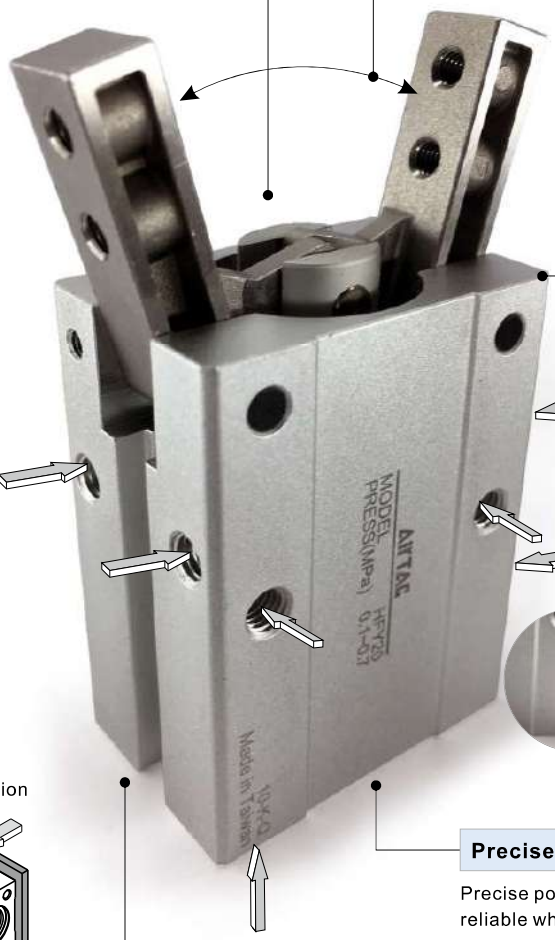
Compendium of HFY Series

Six kinds of bore size and two kinds of type

Bore size: 6, 10, 16, 20, 25, 32
HFY: Double acting
HFTY: Single acting and normally opened

Reasonable gripping angle

Reasonable gripping angle,
wide range of actual use.



Single piston structure

Using a single piston structure,
large gripping torque.

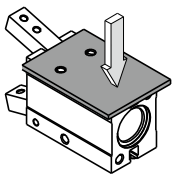
Air port

Air port

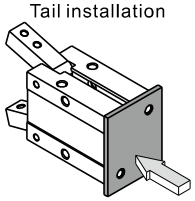
Can be mounted from three directions

With mounting holes on the side and tail.

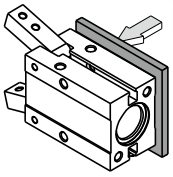
Surface installation



Tail installation



Front installation



Integrated with variable flow valve

Integrated with variable flow valve,
it is easy and convenient to adjust the
speed of opening and closing of gripping jaw.

Precise positioning accuracy

Precise positioning accuracy, it is more accurate and
reliable when gripping work-piece.

With magnetic switch slots

The magnetic switch slots convenient
to install inducting switch.

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		0.15~0.7MPa(22~100psi)(1.5~7.0bar)					
	Single acting	Φ6	0.3~0.7MPa(45~100psi)(3.0~7.0bar)					
		Φ10~Φ32	0.25~0.7MPa(36~100psi)(2.5~7.0bar)					
Temperature ℃			-20~70					
Lubrication			Cylinder: Not required; Gripper jaws: Lubricate grease					
Cushion type			Bumper					
Max. frequency			180(c.p.m)					
Sensor switches [Note1]			CMSH\DMSH(S)	CMSG\DMSG(S)				
Port size			M3×0.5		M5×0.8			

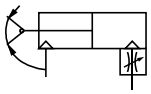
[Note1] Sensor switch should be ordered additionally, please refer to P353 for detail of sensor switch.

Air gripper(Angular style)

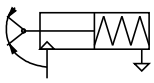
HFY Series

Symbol

HFY: Double acting



HFTY: Single acting and normally opened



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 griping 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.

Ordering code

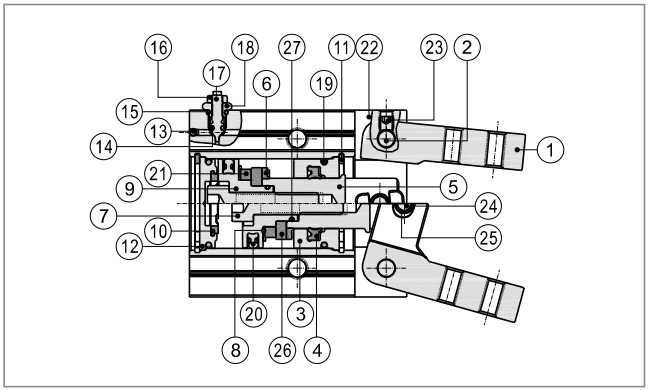
HFY 20

① ②

①Model	②Bore size
HFY: Air finger (Angle style, Double acting)	6 10 16
HFTY: Air finger (Angle style, Single acting and normally opened)	20 25 32

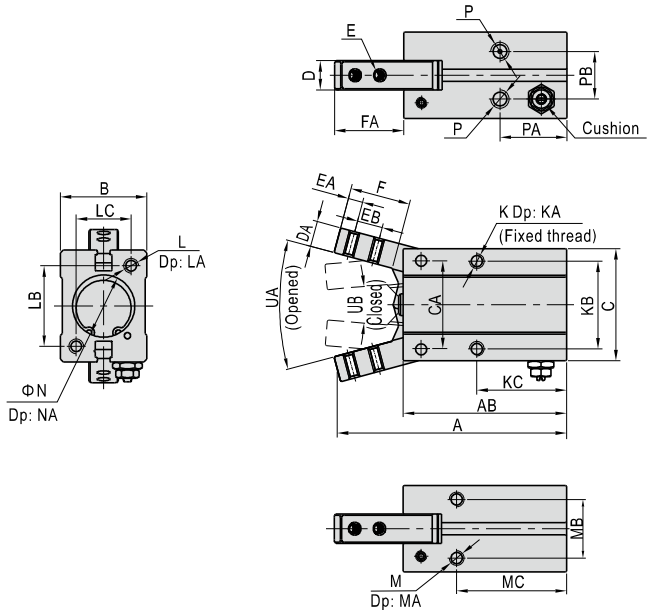
[Note] HFY series are all attached with magnet.

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

Dimensions

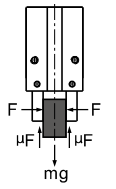


Bore size\Item	A	AB	B	C	CA	D	DA	E	EA	EB	F	FA	K	KA	KB	KC	L
6	47.5	36	10.5	20	14	4	4	M2×0.4	2.5	5	11	12	M3×0.5	Thru. thread	12	26	-
10	52.5	38.5	16.5	23	14	6.4	4	M2.5×0.45	3	5.7	12	14.5	M3×0.5	5	16	23	M3×0.5
16	62.5	44.5	23.5	30.5	24	8	7	M3×0.5	4	7	16	19	M4×0.7	7	24	24.5	M4×0.7
20	78	55	27.5	42	30	10	8	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°

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.



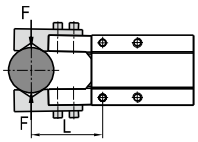
The work-pieces as shown in the left :		μ=0.2	μ=0.1
F: Gripping force (N) μ: friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity (=9.8m/s²)	The condition that the work-pieces won't drop is: 2×μF>mg so: $F>\frac{mg}{2\times\mu}$ Safety coefficient is a, so F is: $F=\frac{mg}{2\times\mu}\times a$	$F=\frac{mg}{2\times0.2}\times4=10\times mg$	$F=\frac{mg}{2\times0.1}\times4=20\times mg$
		10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

Note) If the friction coefficientμ>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.

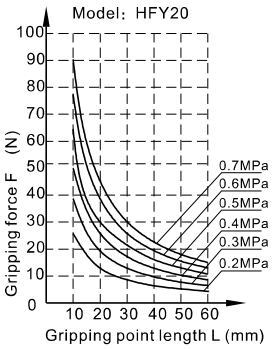
2. The selection of the gripping point
   When the gripping force is determined, select the gripping point according to the limitation ranges shown in the below chart. If the gripping point is over the limit, the gripping jaw will be subjected to excessive moment load, and lead to short life of air gripper.

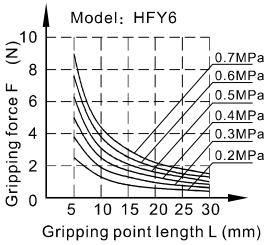
HFY Series

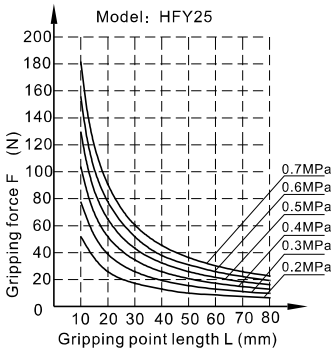
Double acting type closed gripping force

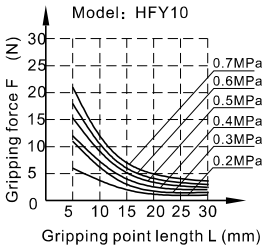


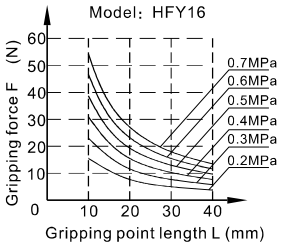
Gripping point length (mm)

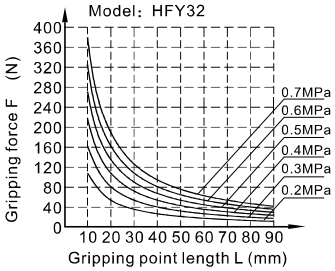




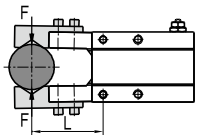




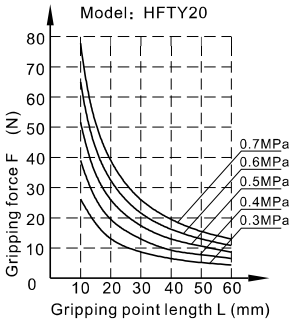


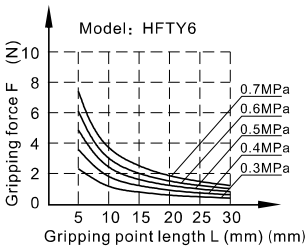


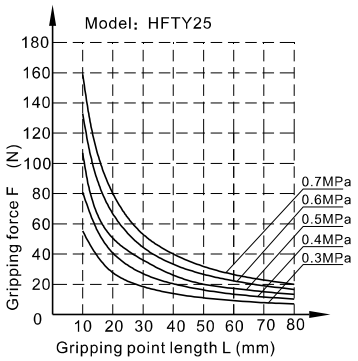
Single acting closed gripping force

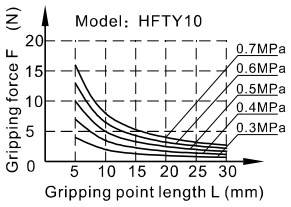


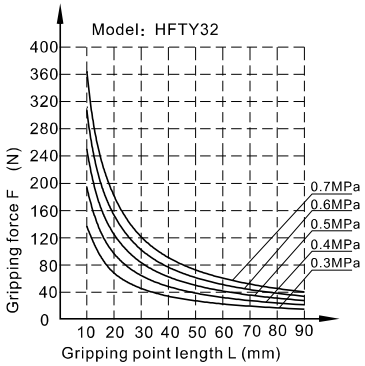
Gripping point length (mm)

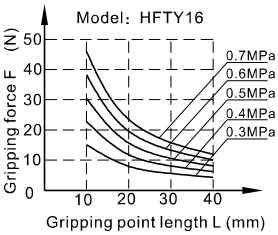








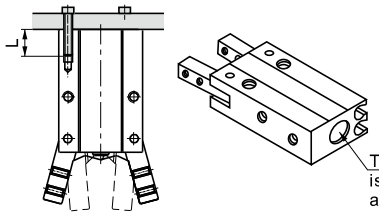




Installation and application

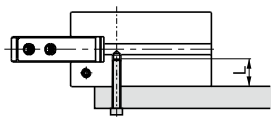
1. Due to the abrupt changes, the pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external 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



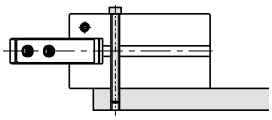
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
6	–	–	-	Φ7mm $^{+0.04}_{+0.01}$	1.5mm
10	M3×0.5	0.88N.m	6mm	Φ11mm $^{+0.04}_{+0.01}$	1.5mm
16	M4×0.7	2.1N.m	8mm	Φ17mm $^{+0.05}_{0}$	1.5mm
20	M5×0.8	4.3N.m	10mm	Φ21mm $^{+0.05}_{0}$	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 installation of the front threaded hole



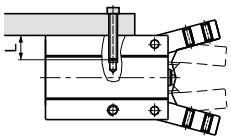
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M3×0.5	0.69	5
10	M3×0.5	0.69	5
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10
32	M6×1.0	7.3	10

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

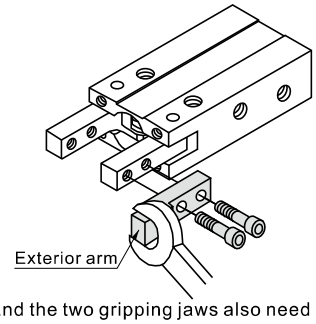
Surface installation type



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



7. 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.
8. 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.
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.

Compendium of HFR Series

Five kinds of bore size

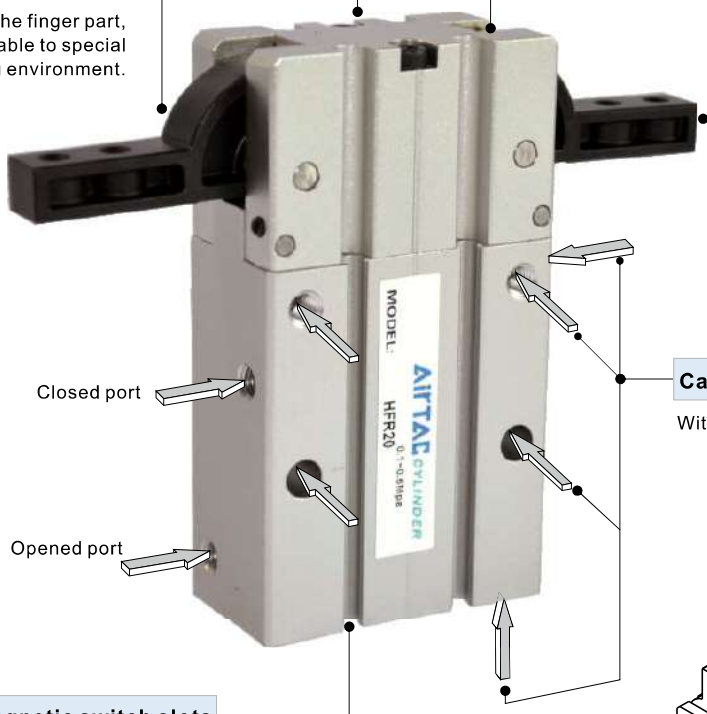
Bore size: 10, 16, 20, 25, 32

Anti-abrasion

A sheet metal is installed between the finger and body to reduce abrasion and extend the service life.

Dust proof is designed

Dust proof is designed in the finger part, which is applicable to special working environment.

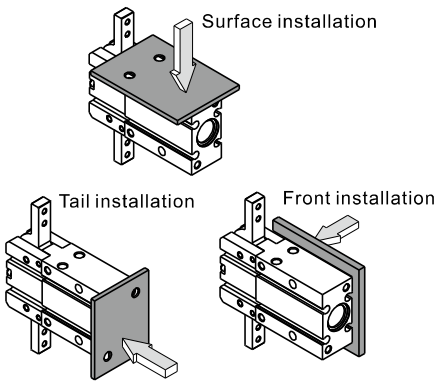


180° Open/close type

180° open/close type, simplify the gripping action.

Can be mounted from three directions

With mounting holes on the side and tail.



With magnetic switch slots

The magnetic switch slots convenient to install inducting switch.

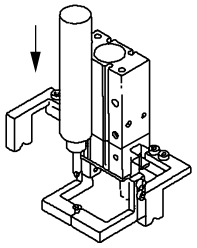
Bore size (mm)	10	16	20	25	32
Acting type	Double acting				
Fluid	Air(to be filtered by 40 μ m filter element)				
Operating pressure	0.15~0.7MPa(21~100psi)(1.5~7.0bar)				
Temperature ℃	-20~70				
Lubrication	Cylinder: Not required; Gripper jaws: Lubricate grease				
Cushion type	Bumper				
Max. frequency	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 0.5Mpa.

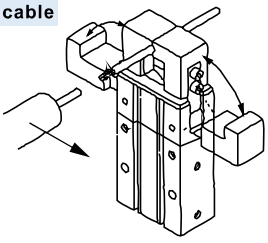
[Note2] Sensor switch should be ordered additionally, please refer to P353 for detail of sensor switch.

Example

Screw down

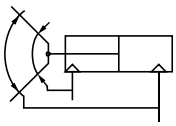


Clamping cable



HFR Series

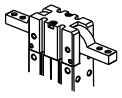
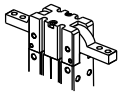
Symbol



Ordering code

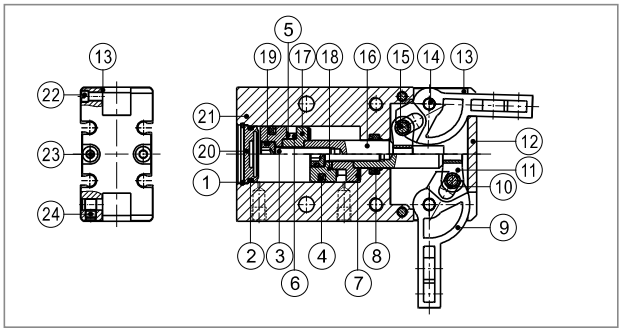
HFR 20 □

1 2 3

① Model	②Bore size	③ Mounting type
HFR: 180° open/close air gripper	10 16 20 25 32	Blank: Mounting through tapped holes  N: Mounting through holes (tapped in open/close direction) 

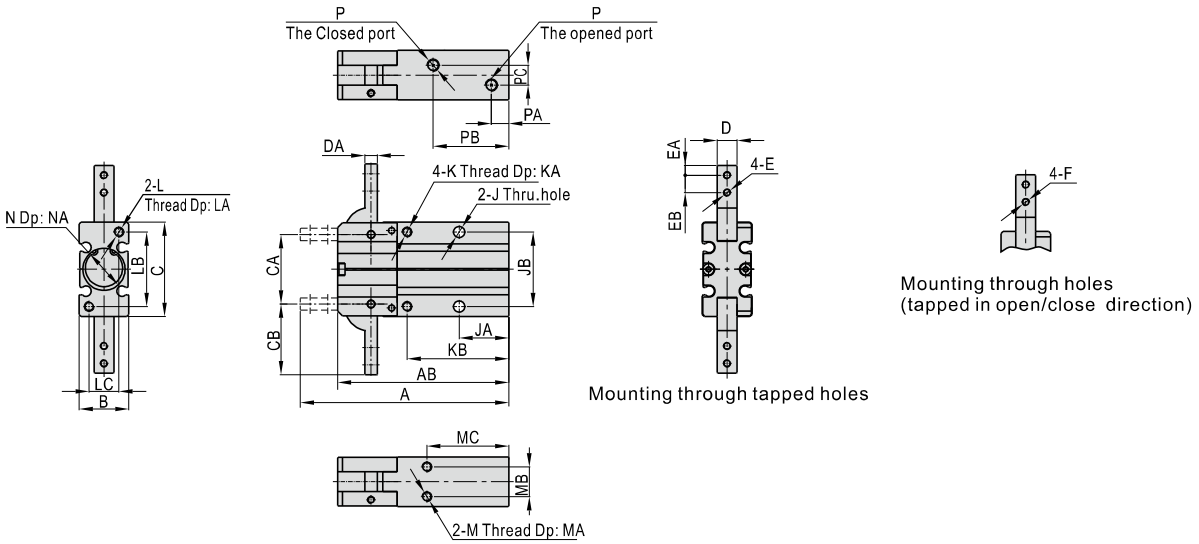
[Note] HFR series are all attached with magnet.

Inner structure and material of major parts



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

Dimensions

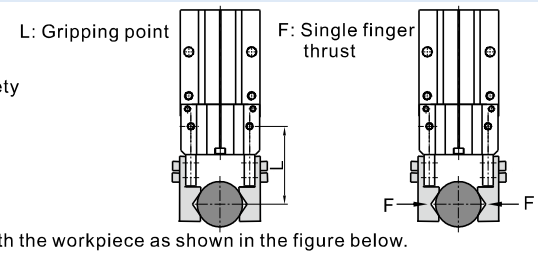


Bore size\Item	A	AB	B	C	CA	CB	D	DA	E	F	EA	EB	J	JA	JB	K	KA
10	71	58	15	30	22	23.5	6	4	M3×0.5	Φ3.3	3	6	Φ3.3	18	24	M3×0.5	6
16	84	69	20	38	28	28.5	8	5	M3×0.5	Φ3.3	4	7	Φ4.5	20	30	M4×0.7	8
20	106	86	26	48	36	37	10	8	M4×0.7	Φ4.5	5	9	Φ5.5	25	36	M5×0.8	10
25	131	107	30	58	45	45	12	10	M5×0.8	Φ5.5	6	12	Φ6.5	30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

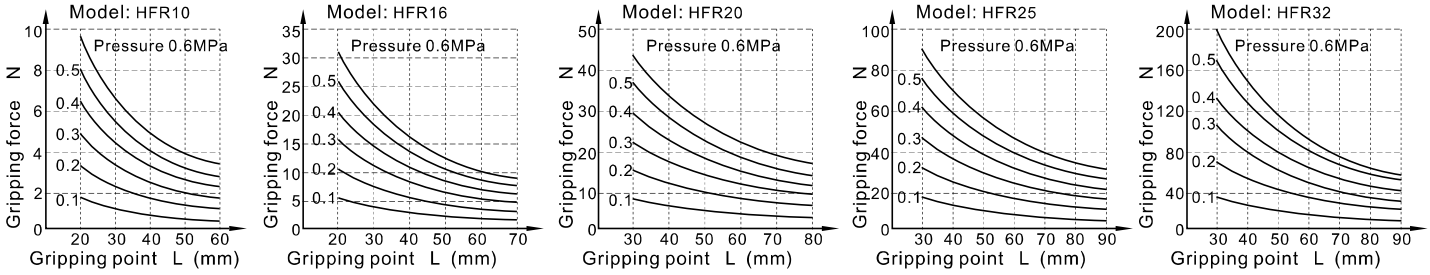
Bore size\Item	KB	L	LA	LB	LC	M	MA	MB	MC	N	NA	P	PA	PB	PC
10	35	M3×0.5	6	24	9	M3×0.5	4	9	30	$\Phi 11^{+0.05}_{0}$	1.5	M5×0.8	7	28.5	3
16	41	M4×0.7	8	30	12	M4×0.7	5	12	33	$\Phi 17^{+0.05}_{0}$	1.5	M5×0.8	7	30.5	8
20	50	M5×0.8	10	38	16	M5×0.8	8	14	42	$\Phi 21^{+0.05}_{0}$	1.5	M5×0.8	8	38.5	12
25	60	M6×1.0	12	46	18	M6×1.0	10	16	50	$\Phi 26^{+0.05}_{0}$	1.5	M5×0.8	8	48	14
32	64	M6×1.0	14	46	26	M6×1.0	12	26	59	$\Phi 34^{+0.05}_{0}$	2	M5×0.8	9	56	18

How to select product

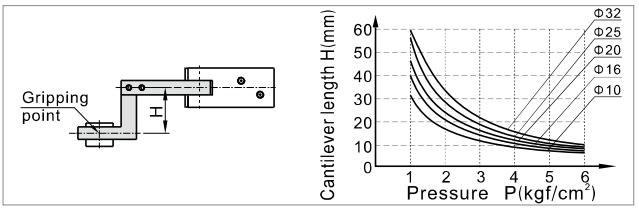
1. Confirmation of effective gripping force
   1.1) Though the coefficient of friction between the attachments and the workpiece is different, select a gripping force which is 10 to 20 times greater than the workpiece weight.
   1.2) If high acceleration or impact forces are encountered during motion, 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/cm^2.
   Effective gripping force=0.05kg×20 times×9.8m/s^2=more than 10N
   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



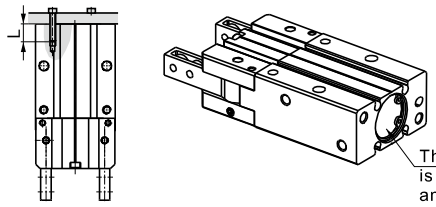
3. The selection of the gripping point
   3.1) Please select the gripping point within the limited field shown left.Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.
   3.2) In the allowable range of gripping point, it is better to 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.



Installation and application

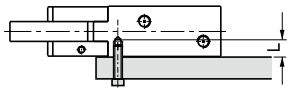
1. Due to the abrupt changes, the pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external 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



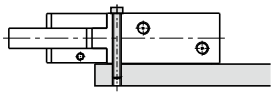
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	1.0N.m	6mm	Φ11mmH9	1.5mm
16	M4×0.7	2.0N.m	8mm	Φ17mmH9	1.5mm
20	M5×0.8	4.5N.m	10mm	Φ21mmH9	1.5mm
25	M6×1.0	7.0N.m	12mm	Φ26mmH9	1.5mm
32	M6×1.0	7.0N.m	14mm	Φ34mmH9	2.0mm

The installation of the front threaded hole



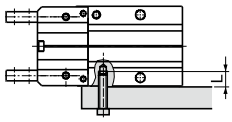
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	1.0	6
16	M4×0.7	2.0	8
20	M5×0.8	4.5	10
25	M6×1.0	7.0	12
32	M6×1.0	7.0	14

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

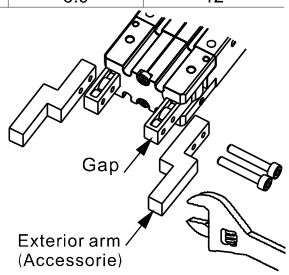
Surface installation type



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



Compendium of HFC Series

Seven kinds of bore size

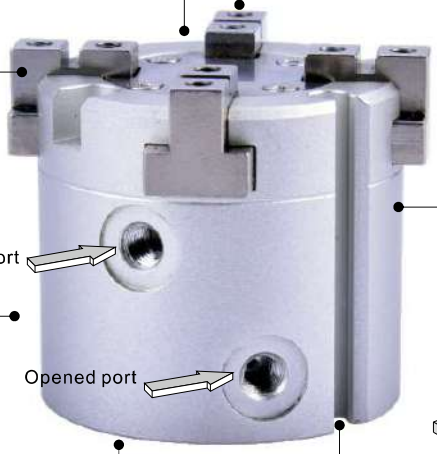
Bore size: 16, 20, 25, 32, 40, 50, 63

Three kinds of finger type

Two fingers (I Type) | Three fingers (Y Type) | Four fingers (X Type)

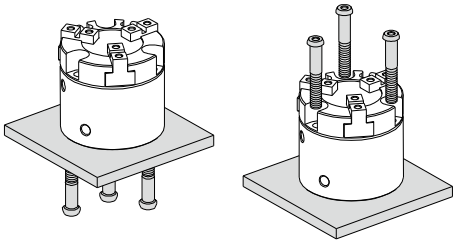
Cuniform block construct

Cuniform block is adopted in the interior of the air gripper to afford larger gripper force.



Can be mounted from two directions

Tail installation (thread hole) | Front installation (thru.hole)



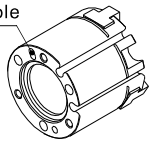
Bumper design

The bumper is adopted in the front of piston, which can reduce the noise of metal bump.

With positioning hole

A positioning hole is attached to the bottom of the body, which can improve the precision and the consistency of repeated dismounting and positioning.

The positioning hole



With roundness magnetic switch slots

The roundness magnetic switch slots convenient to install CMSH\DMSH(S) type inducting switch.

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 0.5MPa, and with a gripping point of L=20mm(Φ16~Φ25) or L=30mm(Φ32~Φ63).

Add) Please refer to page 305 for the definition of "L".

Installation and application

1. Dirty substances in the pipe must be eliminated before air gripper is connected with pipeline to prevent the entrance of impurities into the cylinder.
2. The medium used by cylinder shall be filtered to 40μm or below.
3. Anti-freezing measure shall be adopted under low temperature environment to prevent moisture freezing.
4. If the air gripper is dismantled and stored for a long time, pay attention to conduct anti-rust treatment to the surface. Anti-dust caps shall be added in air inlet and outlet ports.

Air gripper(parallel open/close style)

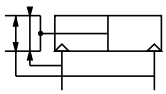
HFC Series

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	0.2~0.7MPa(28~100psi)(2.0~7.0bar)			0.15~0.7MPa(22~100psi)(1.5~7.0bar)			
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) [Note]						
Port size	M3×0.5	M5×0.8					

[Note] Sensor switch should be ordered additionally, please refer to P353 for detail of sensor switch.

Symbol



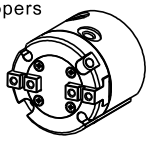
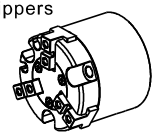
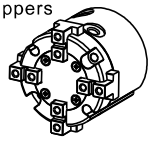
Product feature

1. Cuniform 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 multiform workpiece.

Ordering code

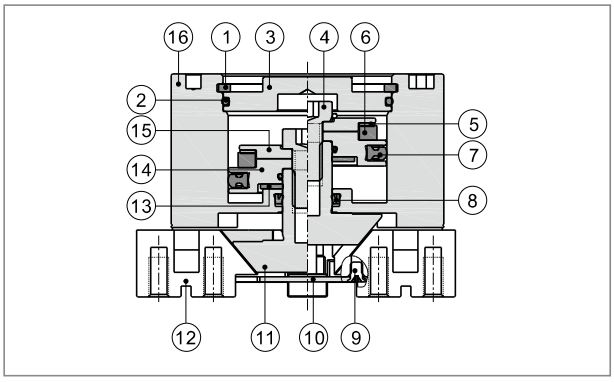
HFC Y 20

1 2 3

①Model	②Finger type			③Bore size
HFC: Air finger (Double acting, parallel type)	I: Two grippers 	Y: Three grippers 	X: Four grippers 	16 20 25 32 40 50 63

Note: HFC series are all attached with magnet.

Inner structure and material of major parts



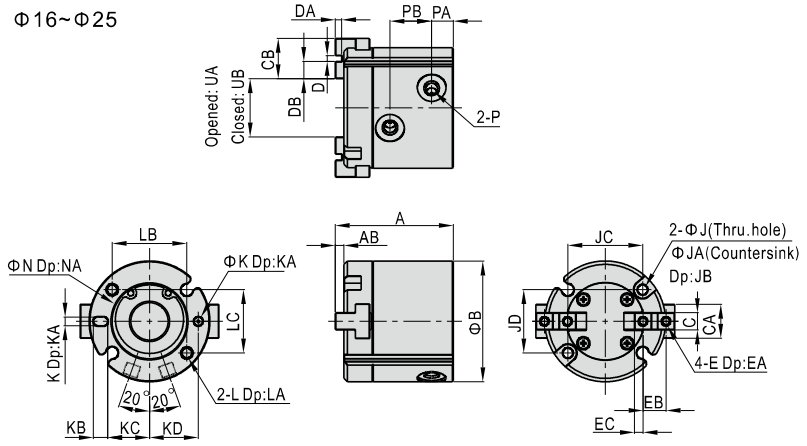
NO.	Item	Material
1	C clip	Spring steel
2	O-ring	NBR
3	Back cover	Aluminum alloy
4	Screw	Carbon steel
5	Magnet washer	NBR
6	Magnet	Sintered metal(Neodymium-iron-boron)
7	Piston seal	NBR
8	Rod packing	NBR
9	Countersink screw	Stainless steel
10	Cover blank	Stainless steel
11	Piston rod	Stainless steel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

HFC Series

Dimensions

Two grippers

Φ16~Φ25

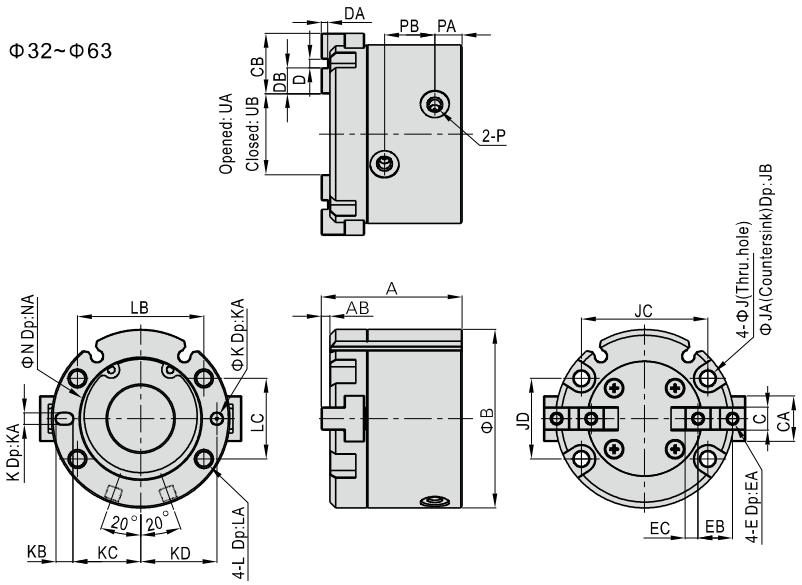


Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
HFCI16	35	3	30	$5^{-0.01}_{-0.03}$	8	10	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	4	M3×0.5	5
HFCI20	39	3	36	$6^{-0.01}_{-0.03}$	10	12	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	5	M3×0.5	5
HFCI25	41	3	42	$6^{-0.01}_{-0.03}$	12	14	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	6	M3×0.5	5

Model\Item	EB	EC	J	JA	JB	JC	JD	K	KA	KB	KC	KD
HFCI16	6	2	3.4	6	6	18	16	$2^{+0.04}_{+0.01}$	2	3	11	12.5
HFCI20	7	2.5	3.4	6	6	24	18	$2^{+0.04}_{+0.01}$	2	3	13	14.5
HFCI25	8	3	3.4	6	6	26	22	$3^{+0.04}_{+0.01}$	3	5	14.5	17

Model\Item	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCI16	M4×0.7	8	18	16	$17^{+0.05}_{0}$	1.5	M3×0.5	7	10	14	10
HFCI20	M4×0.7	8	24	18	$21^{+0.05}_{0}$	1.5	M5×0.8	7	13	16	12
HFCI25	M4×0.7	8	26	22	$26^{+0.05}_{0}$	1.5	M5×0.8	7.5	14.5	20	14

Φ32~Φ63

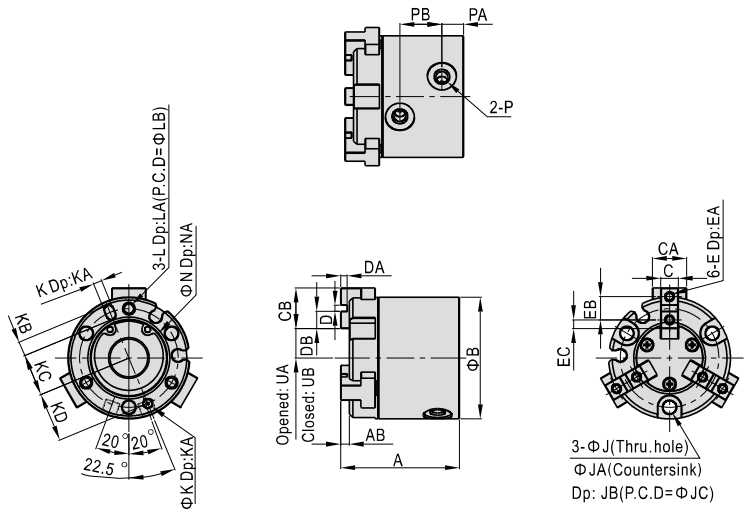


Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
HFCI32	45	3	55	$8^{-0.01}_{-0.03}$	14	20	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	9	M4×0.7	8
HFCI40	49	3	62	$8^{-0.01}_{-0.03}$	16	21	$3^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	9	M4×0.7	8
HFCI50	57	3	70	$10^{-0.01}_{-0.03}$	18	24	$4^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	10	M5×0.8	9
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

Model\Item	EB	EC	J	JA	JB	JC	JD	K	KA	KB	KC	KD
HFCI32	11	4.5	4.2	8	9	38	25	$3^{+0.04}_{+0.01}$	3	5	20.5	23
HFCI40	12	4.5	5.2	9.5	9	44	28	$4^{+0.04}_{+0.01}$	4	6	23.5	26.5
HFCI50	14	5	5.2	9.5	12	52	34	$4^{+0.04}_{+0.01}$	4	6	28	31
HFCI63	17	5.5	5.2	9.5	14	66	38	$5^{+0.04}_{+0.01}$	5	7	34.5	38

Model\Item	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCI32	M5×0.8	10	38	25	$34^{+0.05}_{0}$	2	M5×0.8	8.5	16	24	16
HFCI40	M6×1.0	12	44	28	$42^{+0.05}_{0}$	2	M5×0.8	9.5	17.5	28	20
HFCI50	M6×1.0	12	52	34	$52^{+0.05}_{0}$	2	M5×0.8	9.5	21	34	22
HFCI63	M6×1.0	12	66	38	$65^{+0.05}_{0}$	2.5	M5×0.8	12	24	46	30

Three grippers



Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
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
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
HFCY25	41	3	42	$8^{-0.01}_{-0.03}$	12	14	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	6	M3×0.5	5
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
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
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
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

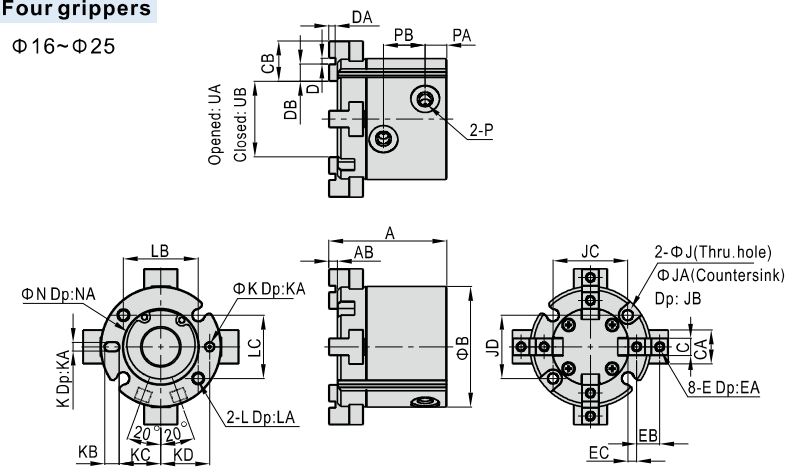
Model\Item	EB	EC	J	JA	JB	JC	K	KA	KB	KC	KD	L
HFCY16	6	2	3.4	6	6	25	$2^{+0.04}_{+0.01}$	2	3	11	12.5	M3×0.5
HFCY20	7	2.5	3.4	6	6	29	$2^{+0.04}_{+0.01}$	2	3	13	14.5	M3×0.5
HFCY25	8	3	4.5	8	9	34	$3^{+0.04}_{+0.01}$	3	5	14.5	17	M4×0.7
HFCY32	11	4.5	4.5	8	9	44	$3^{+0.04}_{+0.01}$	3	5	19.5	22	M4×0.7
HFCY40	12	4.5	5.5	9.5	9	53	$4^{+0.04}_{+0.01}$	4	6	23.5	26.5	M5×0.8
HFCY50	14	5	5.5	9.5	12	62	$4^{+0.04}_{+0.01}$	4	6	28	31	M5×0.8
HFCY63	17	5.5	6.6	11	14	76	$5^{+0.04}_{+0.01}$	5	7	34.5	38	M6×1.0

Model\Item	LA	LB	N	NA	P	PA	PB	UA	UB
HFCY16	6	25	$17^{+0.05}_{0}$	1.5	M3×0.5	7	10	7	5
HFCY20	6	29	$21^{+0.05}_{0}$	1.5	M5×0.8	7	13	8	6
HFCY25	8	34	$26^{+0.05}_{0}$	1.5	M5×0.8	7.5	14.5	10	7
HFCY32	8	44	$34^{+0.05}_{0}$	2	M5×0.8	8.5	16	12	8
HFCY40	10	53	$42^{+0.05}_{0}$	2	M5×0.8	9.5	17.5	14	10
HFCY50	10	62	$52^{+0.05}_{0}$	2	M5×0.8	9.5	21	17	11
HFCY63	12	76	$65^{+0.05}_{0}$	2.5	M5×0.8	12	24	23	15

HFC Series

Four grippers

Φ16~Φ25

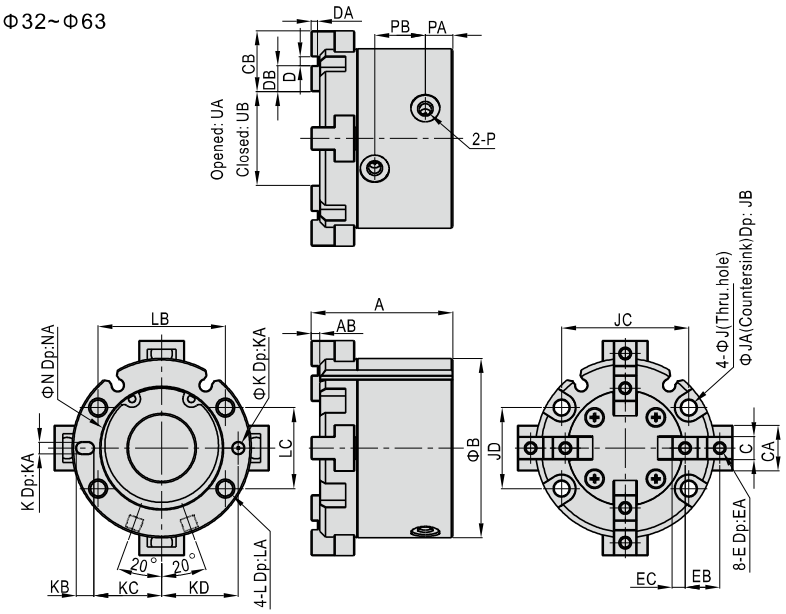


Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
HFCX16	35	3	30	$5^{-0.01}_{-0.03}$	8	10	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	4	M3×0.5	5
HFCX20	39	3	36	$6^{-0.01}_{-0.03}$	10	12	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	5	M3×0.5	5
HFCX25	41	3	42	$6^{-0.01}_{-0.03}$	12	14	$2^{+0.04}_{+0.01}$	$2^{+0.2}_{0}$	6	M3×0.5	5

Model\Item	EB	EC	J	JA	JB	JC	JD	K	KA	KB	KC	KD
HFCX16	6	2	3.4	6	6	18	16	$2^{+0.05}_{0}$	2	3	11	12.5
HFCX20	7	2.5	3.4	6	6	24	18	$2^{+0.05}_{0}$	2	3	13	14.5
HFCX25	8	3	3.4	6	6	26	22	$3^{+0.05}_{0}$	3	5	14.5	17

Model\Item	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCX16	M4×0.7	8	18	16	$17^{+0.05}_{0}$	1.5	M3×0.5	7	10	17	13
HFCX20	M4×0.7	8	24	18	$21^{+0.05}_{0}$	1.5	M5×0.8	7	13	19	15
HFCX25	M4×0.7	8	26	22	$26^{+0.05}_{0}$	1.5	M5×0.8	7.5	14.	26	20

Φ32~Φ63



Model\Item	A	AB	B	C	CA	CB	D	DA	DB	E	EA
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
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
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
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

Model\Item	EB	EC	J	JA	JB	JC	JD	K	KA	KB	KC	KD
HFCX32	11	4.5	4.2	8	9	38	25	$3^{+0.04}_{+0.01}$	3	5	20.5	23
HFCX40	12	4.5	5.2	9.5	9	44	28	$4^{+0.04}_{+0.01}$	4	6	23.5	26.5
HFCX50	14	5	5.2	9.5	12	52	34	$4^{+0.04}_{+0.01}$	4	6	28	31
HFCX63	17	5.5	5.2	9.5	14	66	38	$5^{+0.04}_{+0.01}$	5	7	34.5	38

Model\Item	L	LA	LB	LC	N	NA	P	PA	PB	UA	UB
HFCX32	M5×0.8	10	38	25	$34^{+0.05}_{0}$	2	M5×0.8	8.5	16	28	20
HFCX40	M6×1.0	12	44	28	$42^{+0.05}_{0}$	2	M5×0.8	9.5	17.5	32	24
HFCX50	M6×1.0	12	52	34	$52^{+0.05}_{0}$	2	M5×0.8	9.5	21	38	26
HFCX63	M6×1.0	12	66	38	$65^{+0.05}_{0}$	2.5	M5×0.8	12	24	51	35

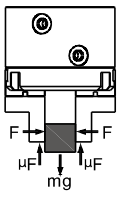
How to select product

Please select pneumatic finger according to the following steps:

①The selection of the effective gripping force >> **②the 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 :

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/s²)

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:

$F = \frac{mg}{n \times \mu} \times a$

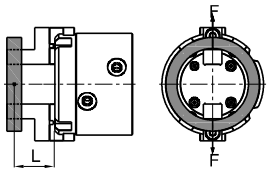
μ =0.2	μ =0.1
$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

Note) If the friction coefficientμ>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.

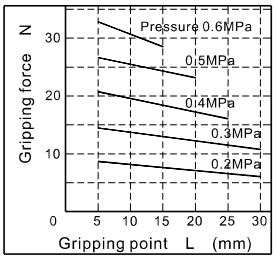
1.1) The actual gripping force must be within the effective gripping forces of different pneumatic fingers specifications shown in the below chart.

HFC Series

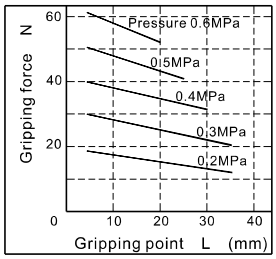
Opened gripping force(I Type)



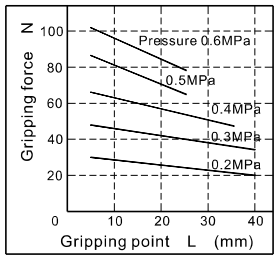
HFCI16



HFCI20



HFCI25



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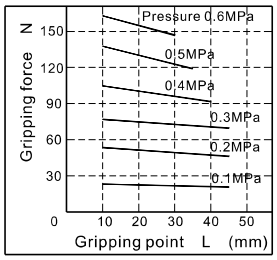

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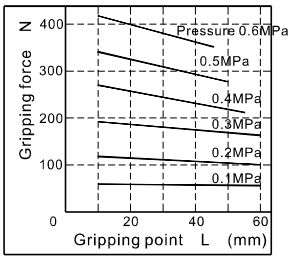

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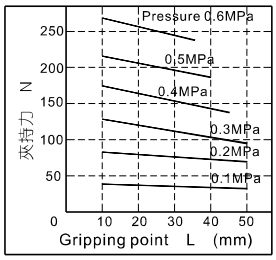

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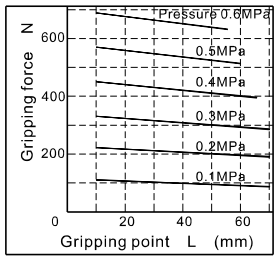
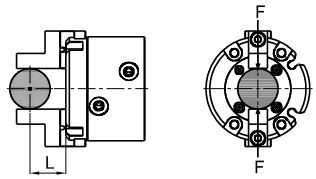


Closed gripping force(I Type)



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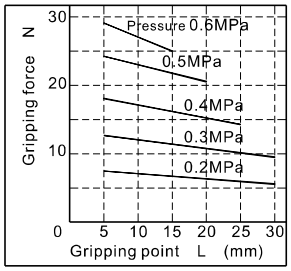

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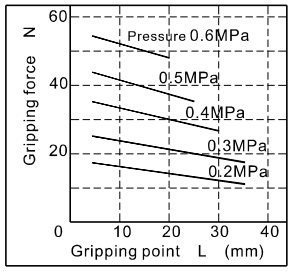

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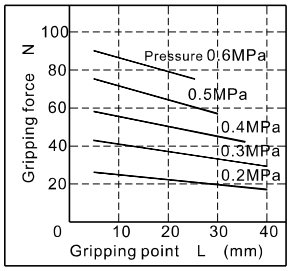

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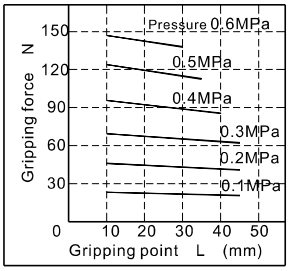

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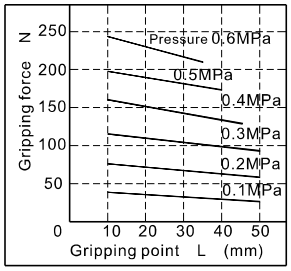
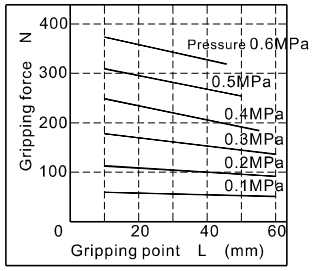


HFCI50



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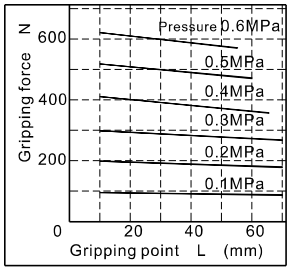
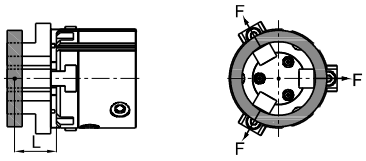
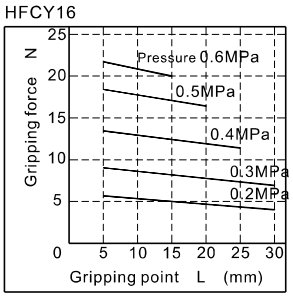


Opened gripping force(Y Type)



HFCY16



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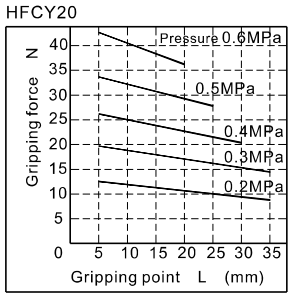

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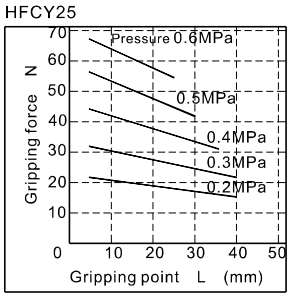

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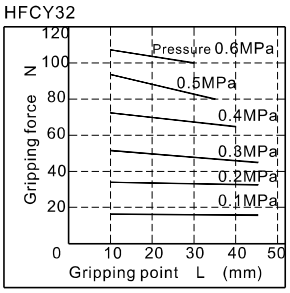

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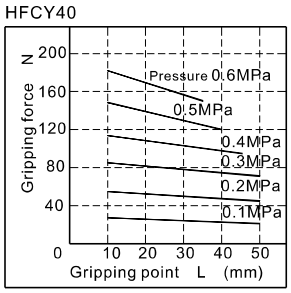

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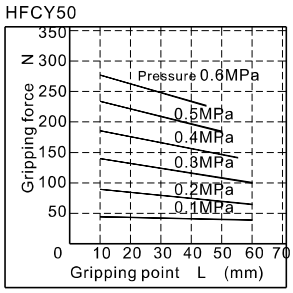

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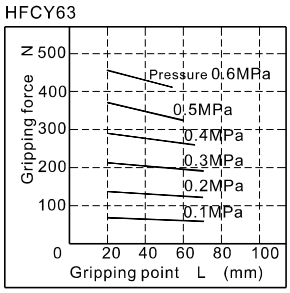
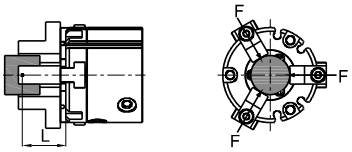


HFC Series

Closed gripping force(Y Type)



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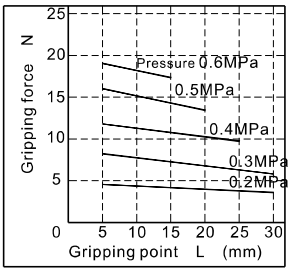

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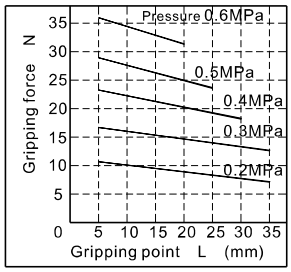

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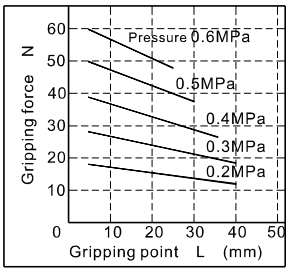

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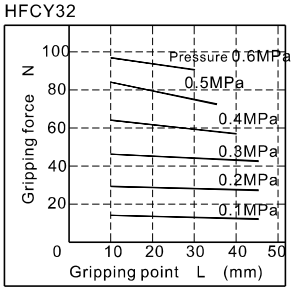
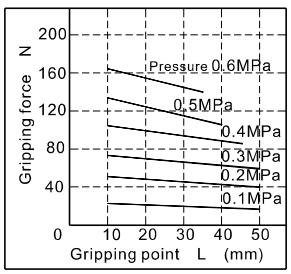


HFCY40



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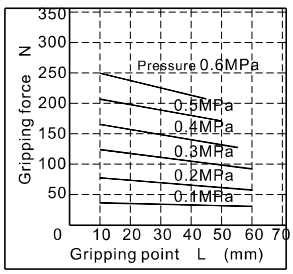

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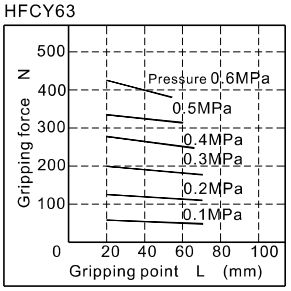
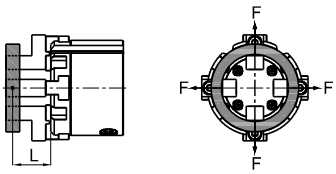


Opened gripping force(X Type)



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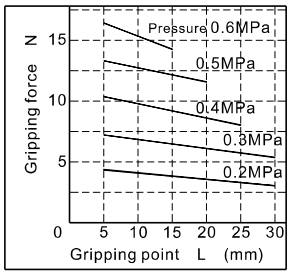
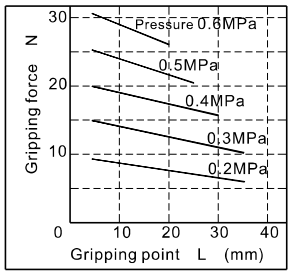


HFCX20



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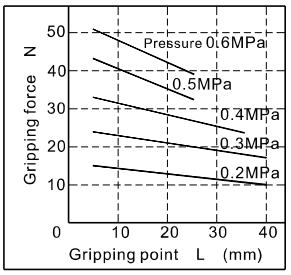

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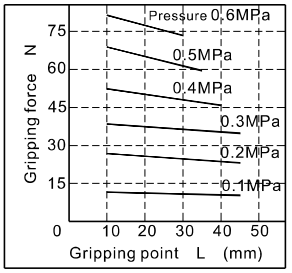

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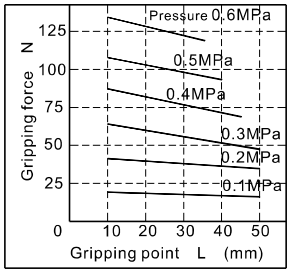

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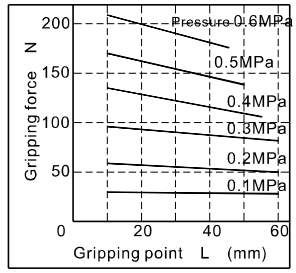

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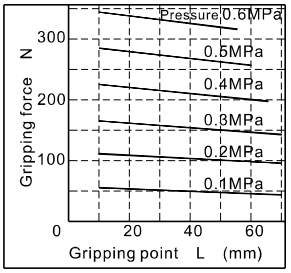
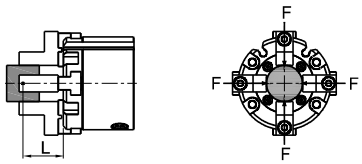


Closed gripping force(X Type)



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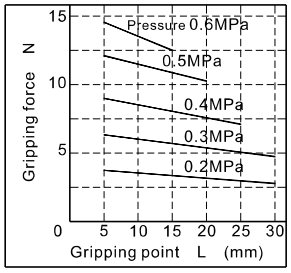

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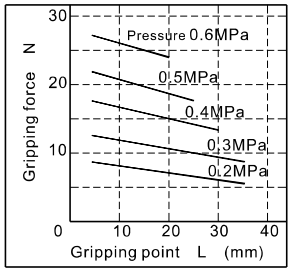

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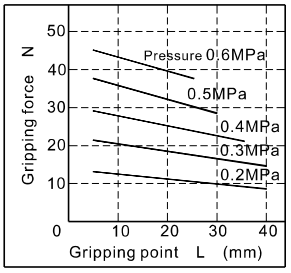

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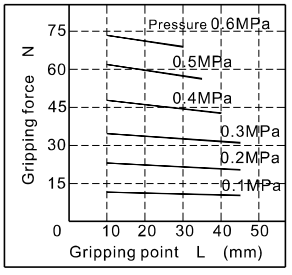

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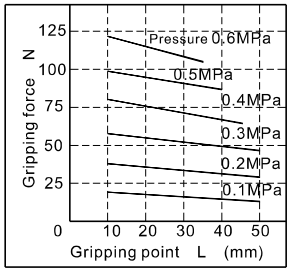

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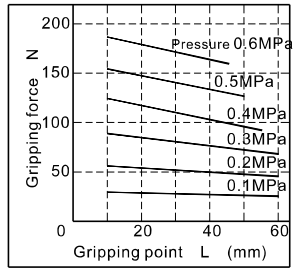

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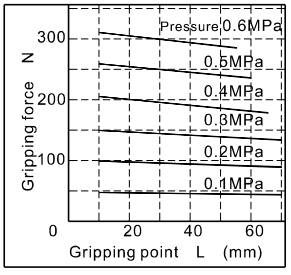
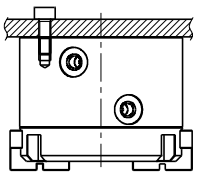


Installation and application

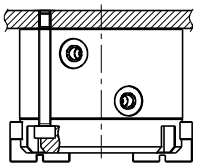
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external 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 torgue 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
	63	M6×1.0	7.3	12	Φ65 $^{+0.05}_{0}$	2.5
HFCY	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

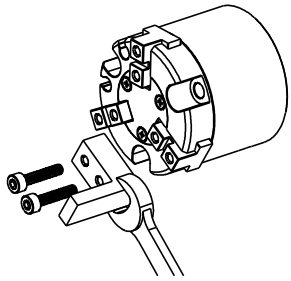
The installation of the front through hole



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
	63	M5×0.8	4.3
HFCY	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

Compendium of HFT Series

Rack & pinion mechanism

The gripper opening or closing can be precisely synchronized with the rack & pinion mechanism.

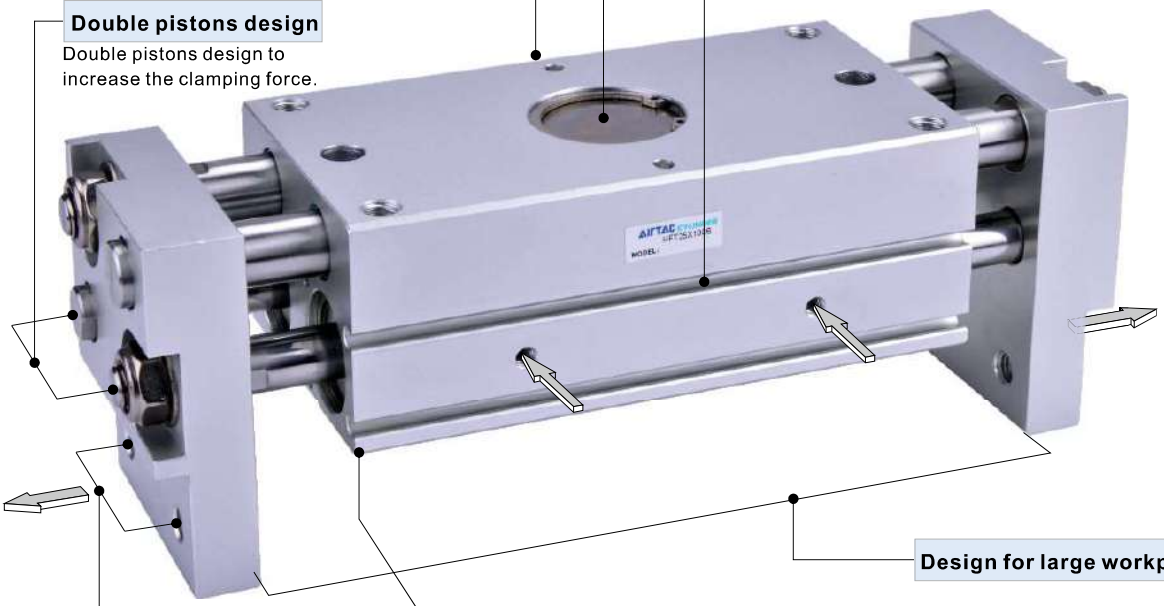
With magnetic switch slots

Five kinds of bore size

Bore size: 10,16,20,25,32

Double pistons design

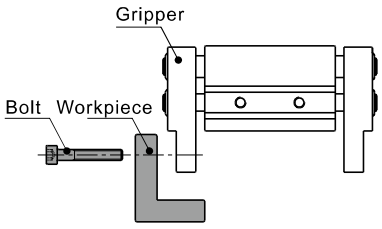
Double pistons design to increase the clamping force.

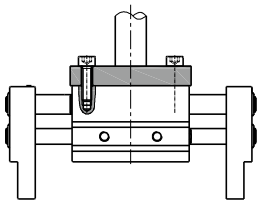


Design for large workpiece

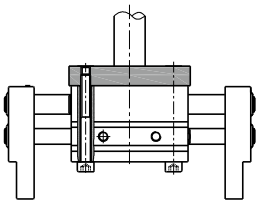
Convenience to mount workpiece

Be mounted from three directions

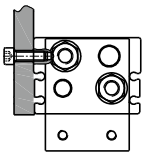




Axial mounted(thread hole)



Axial mounted(through hole)



Besides mounted

Air gripper(wide style)

HFT Series

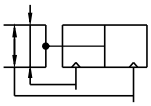
Specification

Bore size (mm)	10	16	20	25	32
Acting type	Double acting				
Fluid	Air(to be filtered by 40μm filter element)				
Operating pressure	0.25~0.7MPa(35~100psi)	0.15~0.7MPa(22~100psi)			
Proof pressure	1.2MPa(175psi)				
Temperature	-20~70℃				
Lubrication	Cylinder: No necessary				
Cushion type	Bumper				
Repeatablity	±0.1mm				
Gripping force (N)[Note1]	14	45	74	131	228
Max. frequency	40 cycle/minute				20 cycle/minute
Port size	M5×0.8				1/8"

[Note1] Pressure 0.5MPa and gripping length 40mm(Ø10 ~ Ø25) or 80mm(Ø32)。

Add) Refer to P353 for detail of sensor switch.

Symbol



Product feature

1. Design for large workpiece.
2. Double pistons design to increase the clamping force.
3. Magnet is included in the standard configuration.
4. The gripper opening or closing can be precisely synchronized with the rack & pinion mechanism.

Stroke

Bore size (mm)	Standard stroke (mm)	Max. stroke (mm)
10	20 30 40 60	60
16	30 40 60 80	80
20	40 60 80 100	100
25	40 60 80 100	100
32	60 80 100 150	150

[Note] Consult us for non-standard stroke.

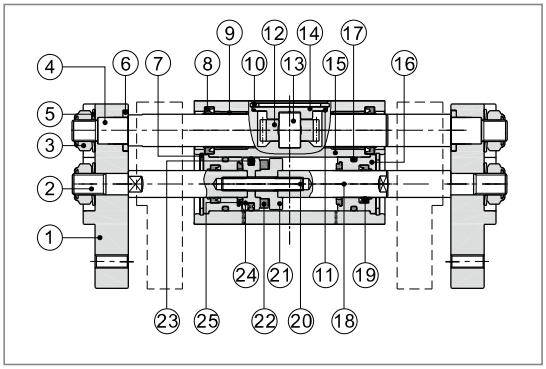
Ordering code

HFT 10 ×20 S □

1 2 3 4 5

①Model	②Bore size	③Stroke	④Magnet	⑤Thread type
HFT: Wide air gripper (Double acting)	10	20 30 40 60	S: With magnet	No this code
	16	30 40 60 80		
	20	40 60 80 100		
	25	40 60 80 100		
	32	60 80 100 150		Blank: PT G: G T: NPT

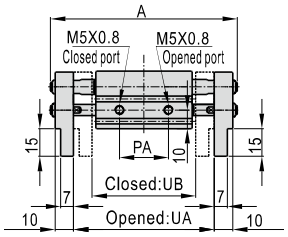
Inner structure and material of major parts

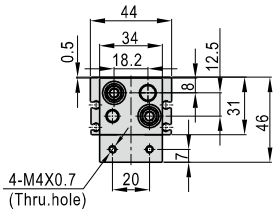


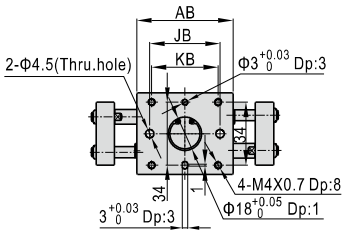
NO.	Item	Material	NO.	Item	Material
1	Faceplate	Aluminum alloy	14	Gear cover	Carbon steel
2	Piston rod A	Stainless steel	15	Body	Aluminum alloy
3	Locknut	Carbon steel	16	Front cover	Aluminum alloy
4	Leader	Stainless steel	17	O-ring	NBR
5	Washer	Spring steel	18	Piston rod B	Stainless steel
6	Gasket	Carbon steel	19	O-ring	NBR
7	C clip	Spring steel	20	Joint bole	Stainless steel
8	Dustproof ring	TPU	21	Magnet seat	Brass/Aluminum alloy
9	Bearing	Wear resistant material	22	Magnet	Sintered metal (Neodymium-iron-boron)
10	C clip	Spring steel			
11	O-ring	NBR	23	Piston O-ring	NBR
12	Gear	Chrome molybdenum steel	24	Piston	Brass/Aluminum alloy
13	Gear axes	Bearing steel	25	Bumper	TPU

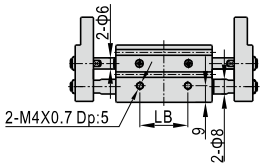
Dimensions

HFT10



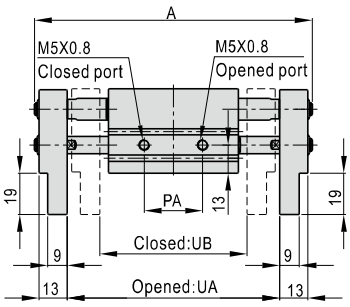


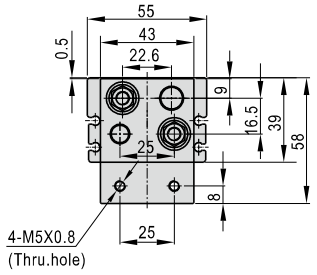


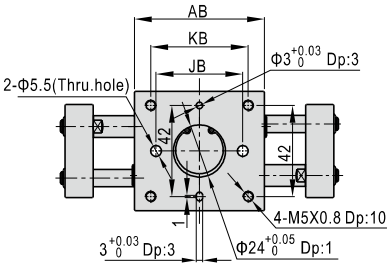


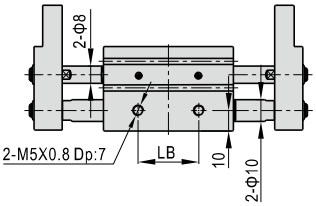
Item\Stroke	20	30	40	60
A	101	121	141	181
AB	52	60	68	86
JB	38	46	54	72
KB	36	44	52	70
LB	26	34	42	60
PA	23	30	35	45
UA(Opened)	76	96	116	156
UB(Closed)	56	66	76	96

HFT16



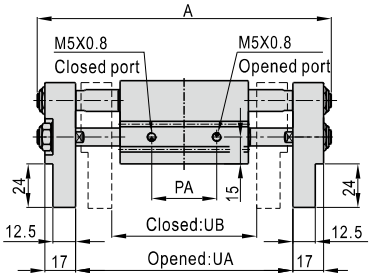


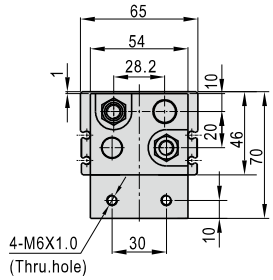


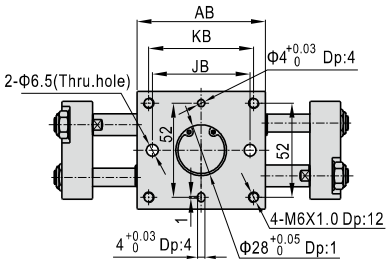


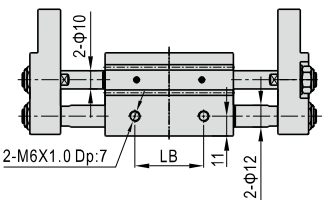
Item\Stroke	30	40	60	80
A	128	148	194	234
AB	60	70	90	110
JB	40	50	70	90
KB	45	55	75	95
LB	28	38	58	78
PA	29	34	44	54
UA(Opened)	98	118	164	204
UB(Closed)	68	78	104	124

HFT20



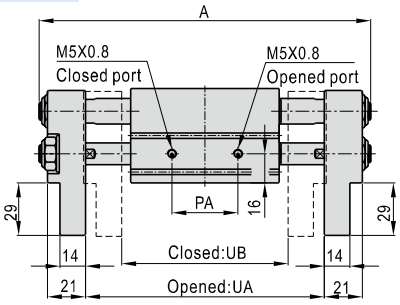


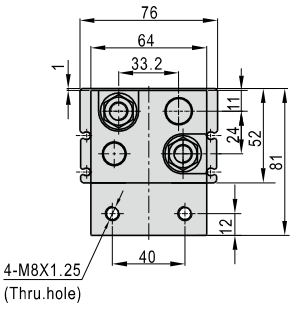


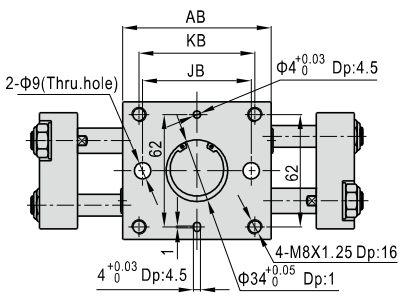


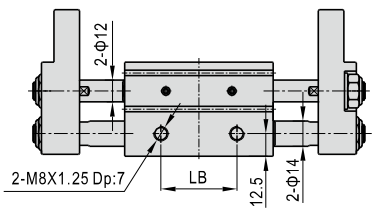
Item\Stroke	40	60	80	100
A	163	203	255	295
AB	71	91	113	133
JB	54	74	96	116
KB	58	78	100	120
LB	38	58	80	100
PA	36	46	56	66
UA(Opened)	120	160	212	252
UB(Closed)	80	100	132	152

HFT25





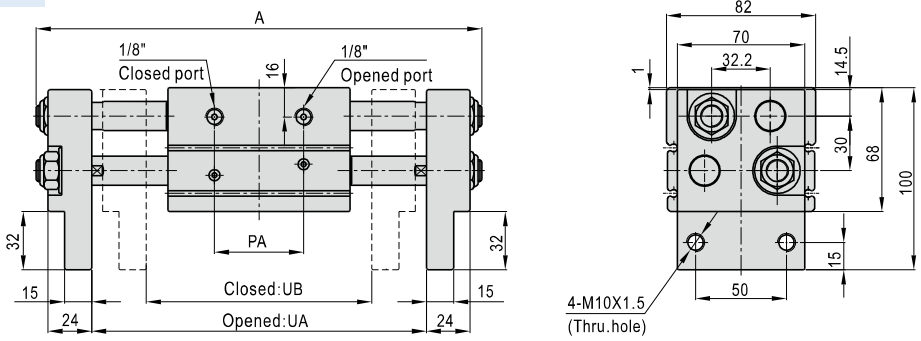


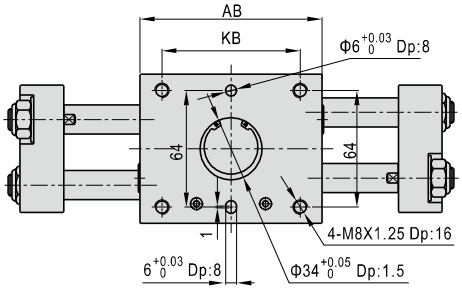


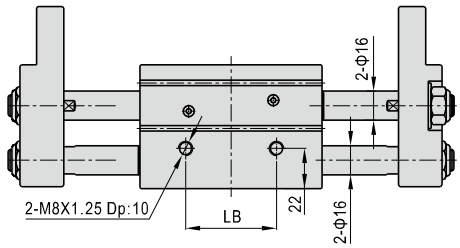
Item\Stroke	40	60	80	100
A	183	223	277	317
AB	82	102	122	142
JB	56	66	100	120
KB	60	70	104	124
LB	38	48	82	102
PA	36.5	46.5	56.5	66.5
UA(Opened)	132	172	226	266
UB(Closed)	92	112	146	166

HFT Series

HFT32







Item\Stroke	A	AB	KB	LB	PA	UA(Opened)	UB(Closed)
60	245	100	76	50	48	184	124
80	285	120	86	60	58	224	144
100	343	158	134	108	68	282	182
150	443	208	184	158	93	382	232

How to select product

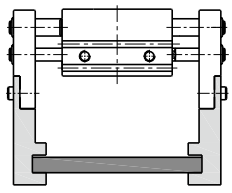
1.Please select pneumatic finger according to the following steps:

Confirmation of conditions → **Select possible type according to the work length** → **Calculation of required gripping force** → **Selection of model by gripping force graph**

Work form
Diameter x Length
200 mm x 20 mm plate

→ Work length: From the dimensions of models that have an opening width of 200 mm or more
HFT16×80
HFT20×80/HFT20×100
HFT25×80/HFT25×100

Work mass: 0.3 kg

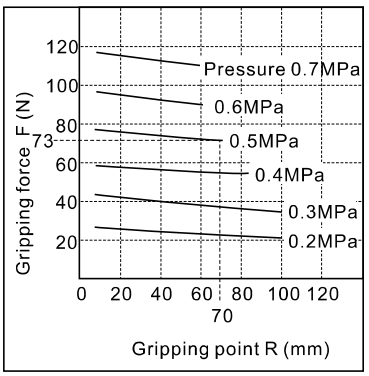


→ 1.Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times the workpiece mass, or more.
2. Further allowance should be provided when great acceleration or impact is expected during workpiece transfer.
Example: For setting the gripping force to be at least 20 times the workpiece mass:
Required gripping force = 0.3kg x 20 x 9.8 m/s² □ 60 N

Gripping point R = 70 mm →

Operating pressure: 0.5 MPa →

HFT20×80/HFT20×100

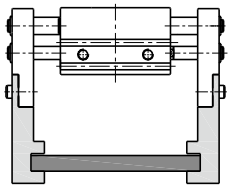


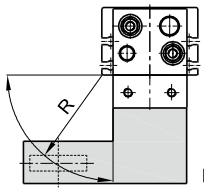
1.Selecting the HFT20×80 A gripping force of 73 N is obtained from the intersection point of gripping point position R= 70 and a pressure 0.5 MPa.
2.The gripping force is 24 times greater than the workpiece mass, and therefore satisfies a gripping force setting value of 20 times or more.

2. Gripping Point

2.1) The workpiece gripping point distance should be within the gripping force ranges given for each pressure in the effective gripping force graphs below.

2.2) If operated with the workpiece gripping point beyond the indicated ranges, the load that will be applied to the fingers or the guide will become excessively unbalanced. As a result, the fingers could become loosened and adversely affect the service life of the unit.

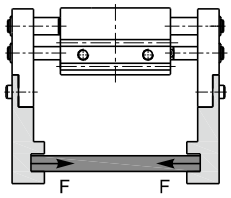




R: Gripping position (mm)

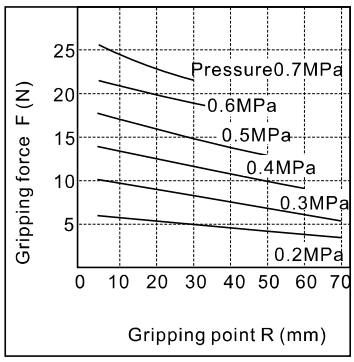
3. Effective Gripping Force

The gripping force shown in the tables represents the gripping force of one finger when all fingers and attachments are in contact with the work.

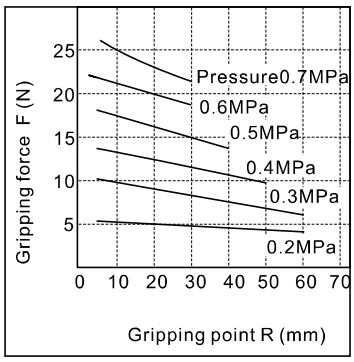


F = one finger thrust.

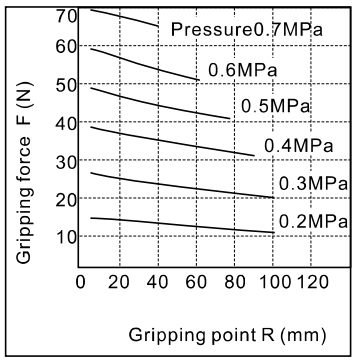
HFT10×20/HFT10×30



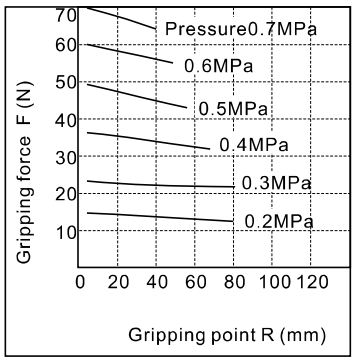
HFT10×40/HFT10×60



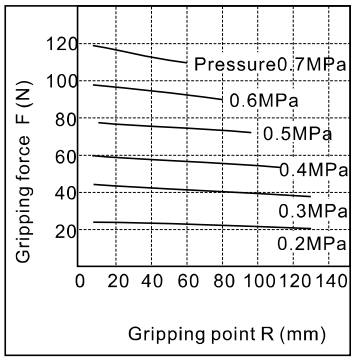
HFT16×30/HFT16×40



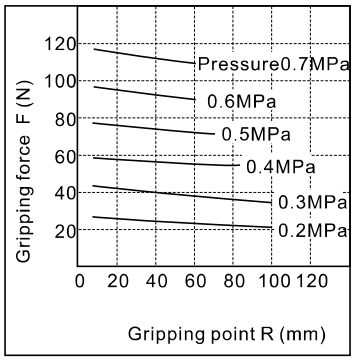
HFT16×60/HFT16×80



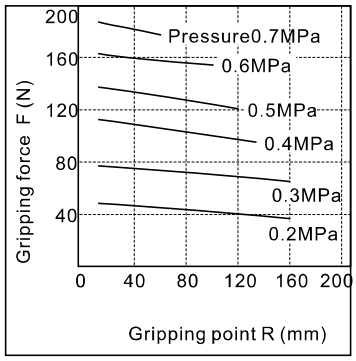
HFT20×40/HFT20×60



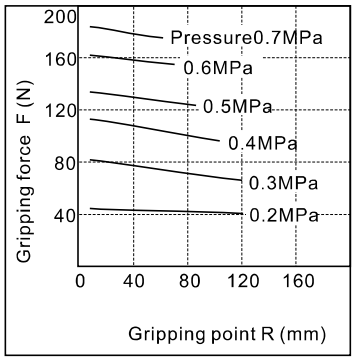
HFT20×80/HFT20×100



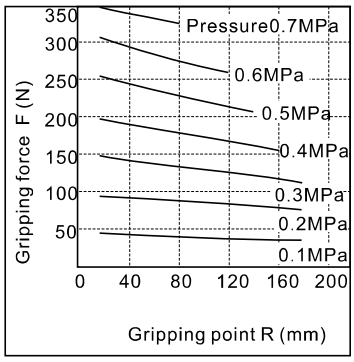
HFT25×40/HFT25×60



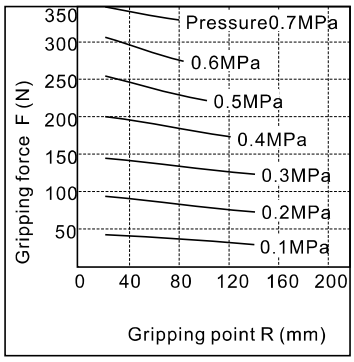
HFT25×80/HFT25×100



HFT32×60/HFT32×80

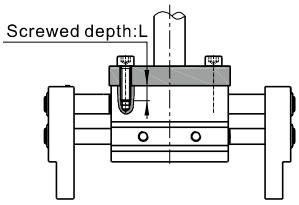


HFT32×100/HFT32×150



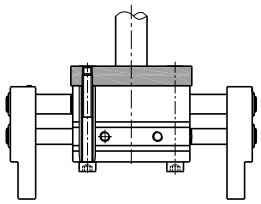
Installation and application

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 torgue 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.



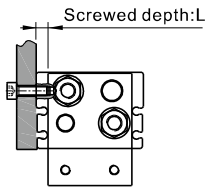
Axial mounted(thread hole)

Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
10	M4×0.7	2.1	8
16	M5×0.8	4.3	10
20	M6×1.0	7.3	12
25	M8×1.25	17.7	16
32	M8×1.25	17.7	16



Axial mounted(through hole)

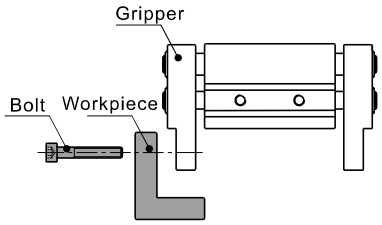
Bore size	The bolts type	Max. locking moment (Nm)
10	M4×0.7	2.1
16	M5×0.8	4.3
20	M6×1.0	7.3
25	M8×1.25	17.7
32	No Axial mounted(through hole)	



Besides mounted

Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)
10	M4×0.7	1.4	5
16	M5×0.8	2.8	7
20	M6×1.0	4.8	7
25	M8×1.25	12	7
32	M8×1.25	12	10

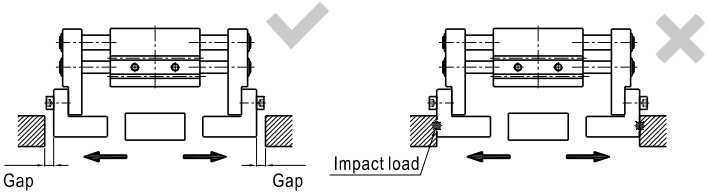
6. The installation method of the gripping jaw fittings
When install the gripping jaw fittings, you have to pay particular attention that you can only hold the gripping jaw by using spanner, and then lock the screws with allen wrench. Never clamp the body directly and then lock the screws, otherwise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



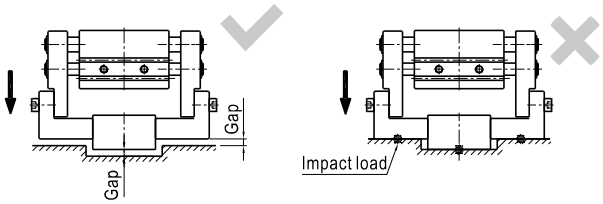
Bore size	The bolts type	Max. locking moment(Nm)
10	M4×0.7	1.4
16	M5×0.8	2.8
20	M6×1.0	4.8
25	M8×1.25	12
32	M10×1.5	24

7. 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.

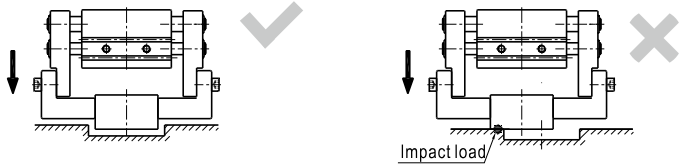
7.1) The end of stroke under the open state of air gripper



7.2) The end of stroke under the move state of air gripper



8. 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.



9. Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.
10. People can not enter the movement path of air gripper and articles can not be placed on the path too.
11. Before removing the air gripper, please confirm that it is out of working state, and then discharge of compressed air.