



# Air gripper—HFP Series

Mechanical parallel style

## 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

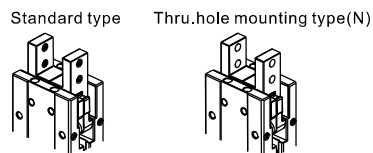
### Structure of lever type gripping

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.

### Anti-abrasion

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

### Two kinds of finger type



### High gripping accuracy

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

### 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.

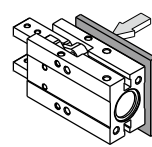
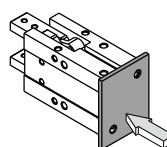
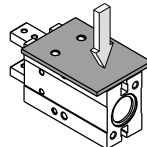
Opened port

Closed port

Surface installation

Tail installation

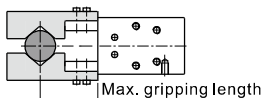
Front installation



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 °C			-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]			CMMSG\DMMSG\EMMSG				CMMSG\DMMSG\EMMSG、CMSSH\DMSSH\EMSSH
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 P565 for detail of sensor switch.



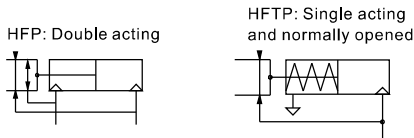
# Air gripper(Mechanical parallel style)

**AirTAC**

## HFP Series



### Symbol

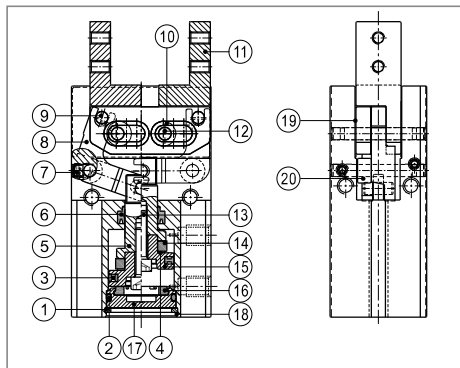


### Ordering code

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

[Note] HFP series are all attached with magnet.

### Inner structure and material of major parts



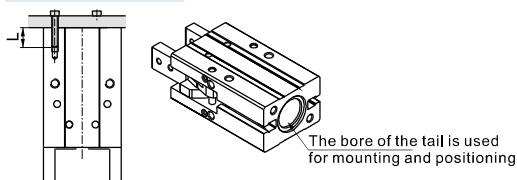
NO.	Item	Material	NO.	Item	Material
1	C clip	Spring steel	11	Gripping jaws	Stainless steel
2	O-ring	NBR	12	Pin	Stainless steel
3	Piston seal	NBR	13	Screw	Carbon steel
4	Magnet washer	NBR	14	Magnet	Sintered metal (Neodymium-iron-boron)
5	Piston rod	Aluminum alloy Stainless steel	15	Piston	Aluminum alloy 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

Note: inner structure & material data sheet is based on certain bore size.  
Please contact AirTAC if you need inner structure & material data sheet for specific bore size.

### Installation and application

- 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.
- Don't use the air gripper under strong external force and impact force.
- When install and fix the air gripper, avoid falling down, collision and damage.
- When fixing the gripping jaw parts, don't twist the gripping jaw.
- There are several kinds of installation method, and the locking torque of fastening screw must be within the prescribed torque range shown in the below chart.  
If the locking torque is too large, it will cause the dysfunctional. If the locking torque is too small, it will cause the position deviation and fall.

#### Tail installation type



Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	1.0N.m	6mm	Φ11mm <sup>+0.05</sup> <sub>0</sub>	1.0mm
16	M4×0.7	2.0N.m	8mm	Φ17mm <sup>+0.05</sup> <sub>0</sub>	1.2mm
20	M5×0.8	4.5N.m	10mm	Φ21mm <sup>+0.05</sup> <sub>0</sub>	1.2mm
25	M6×1.0	7.0N.m	12mm	Φ26mm <sup>+0.05</sup> <sub>0</sub>	1.5mm
32	M6×1.0	7.0N.m	12mm	Φ34mm <sup>+0.05</sup> <sub>0</sub>	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.

## HFP Series

### How to select product

Please select pneumatic finger according to the following steps:

- ① The selection of the effective gripping force
- ② the confirmation of the gripping point
- ③ the confirmation of the external force put on the gripping jaw

#### 1. The selection of the gripping force

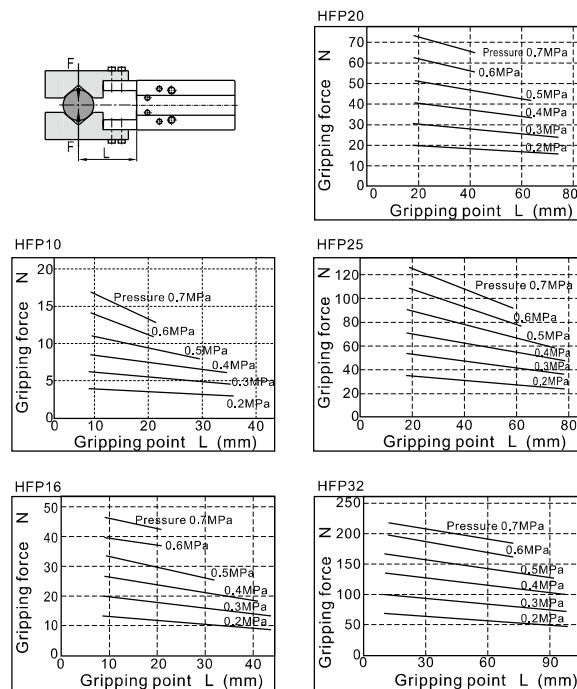
The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient  $a=4$ , have a gripping force that is more than 10-20 times of the mass of the gripped objects.

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

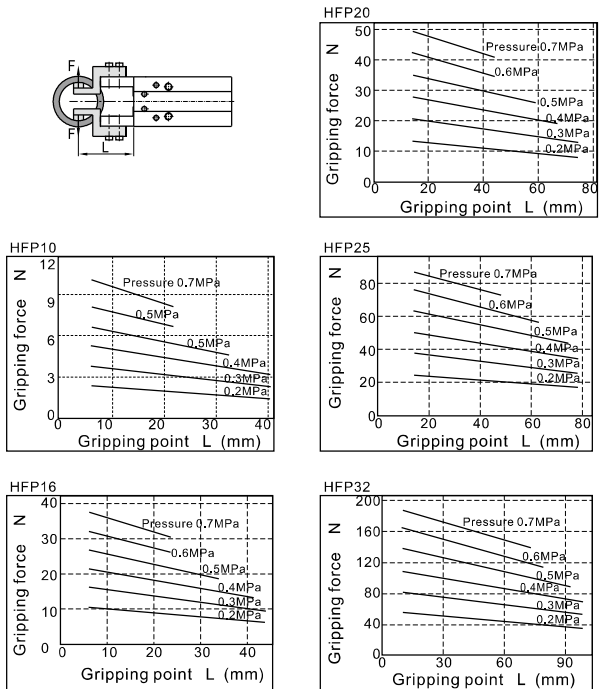
Note) If the friction coefficient  $\mu > 0.2$ , for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

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

#### Double acting type closed gripping force

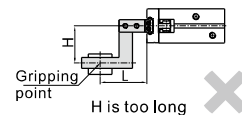
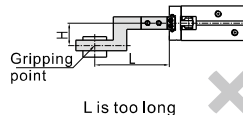
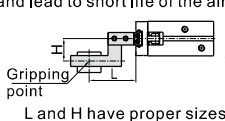


#### Double acting type opened gripping force



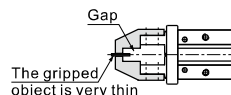
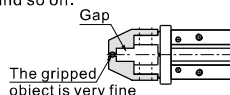
#### 2. The selection of the gripping point

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



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

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



# Air gripper(Mechanical parallel style)

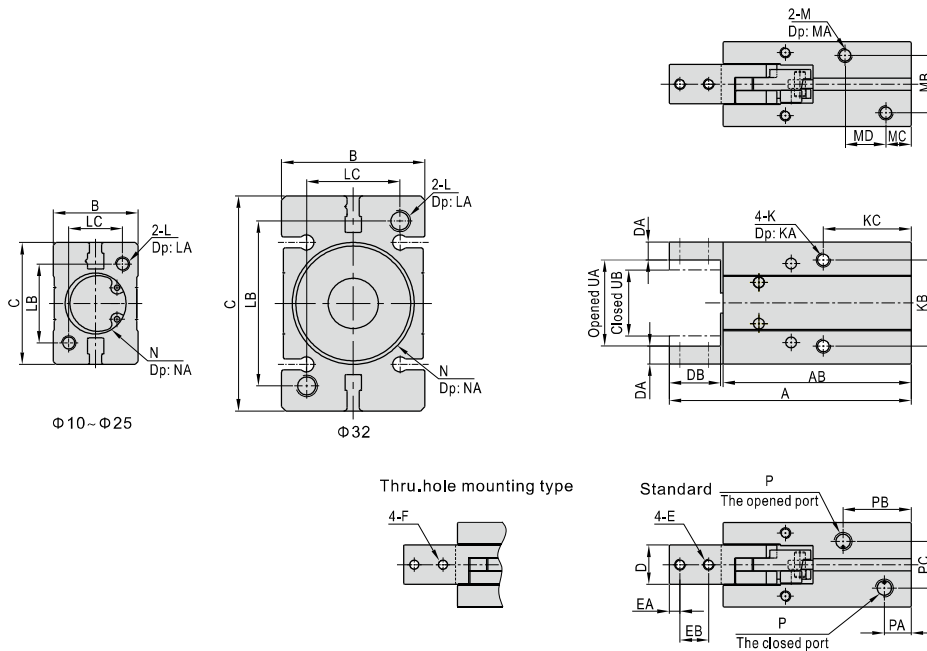
## HFP Series

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

	Bore size	The allowed vertical loads Fv(N)	Max. permissible torque(Nm)			The calculation of allowable forces when moment loads work	Examples of calculation
			Mp	My	Mr		
	10	58	0.26	0.26	0.53	$\text{Allowable load(N)} = \frac{M(\text{Maximum permissible moment(N.m)})}{L \times 10^{-3}}$ $\text{Unit conversion constant}$	<p>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,</p> $\text{Allowable load } F = \frac{0.68}{30 \times 10^{-3}} = 22.7(\text{N})$ <p>Actual load f=10(N)&lt;22.7(N) To meet the using requirements</p>
	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		

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

## 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	12.5	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	15.5	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	20.5	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	25.5	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	29.7	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	Φ11 <sup>+0.05</sup> <sub>0</sub>	1	M3×0.5	6	16.5(23)	10	14.5 <sup>+1.5</sup> <sub>0</sub>	10.5 <sup>0</sup> <sub>-1</sub>
HFP16	22	15	M4×0.7	8	16	6(11)	16	Φ17 <sup>+0.05</sup> <sub>0</sub>	1.2	M5×0.8	7.5	20(25)	13	23.5 <sup>+1.5</sup> <sub>0</sub>	15.5 <sup>0</sup> <sub>-1</sub>
HFP20	32	18	M5×0.8	10	18	8(13)	16	Φ21 <sup>+0.05</sup> <sub>0</sub>	1.2	M5×0.8	7.5	24(29)	15	32.5 <sup>+1.5</sup> <sub>0</sub>	20.5 <sup>0</sup> <sub>-1</sub>
HFP25	40	22	M6×1.0	12	24	8(13)	16	Φ26 <sup>+0.05</sup> <sub>0</sub>	1.5	M5×0.8	8	22(29)	20	35.5 <sup>+1.5</sup> <sub>0</sub>	21.5 <sup>0</sup> <sub>-1</sub>
HFP32	46	26	M6×1.0	12	30	8(16)	20	Φ34 <sup>+0.05</sup> <sub>0</sub>	1.5	M5×0.8	9.5	26(37)	22	42 <sup>+1.5</sup> <sub>0</sub>	26.5 <sup>0</sup> <sub>-1</sub>

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



# Air gripper—HFY Series

Angular style

## 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.

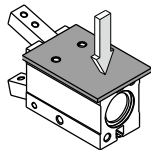
Air port

Air port

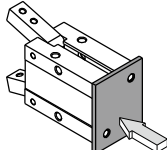
### Can be mounted from three directions

With mounting holes on the side and tail.

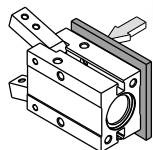
Surface installation



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		0,2~0.7MPa(29~100psi)(2.0~7.0bar)		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 °C			-20~70					
Lubrication			Cylinder: Not required; Gripper jaws: Lubricate grease					
Cushion type			Bumper					
Max. frequency			180(c.p.m)					
Sensor switches [Note1]			CMSh\DMSh\EMSh		CMSh\DMSh\EMSh			
Port size			M3×0.5			M5×0.8		

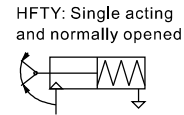
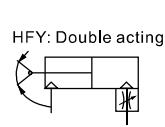
[Note1] Sensor switch should be ordered additionally, please refer to P565 for detail of sensor switch.



## HFY Series



### Symbol



### Gripping force and stroke

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

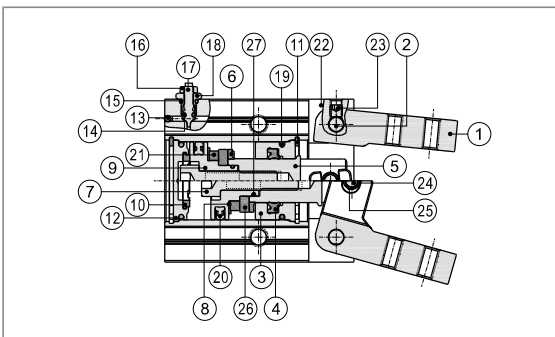
[Note] The P in the gripping torque shown in the above chart represents the actual use of air pressure.

### Ordering code

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

[Note] HFY series are all attached with magnet.

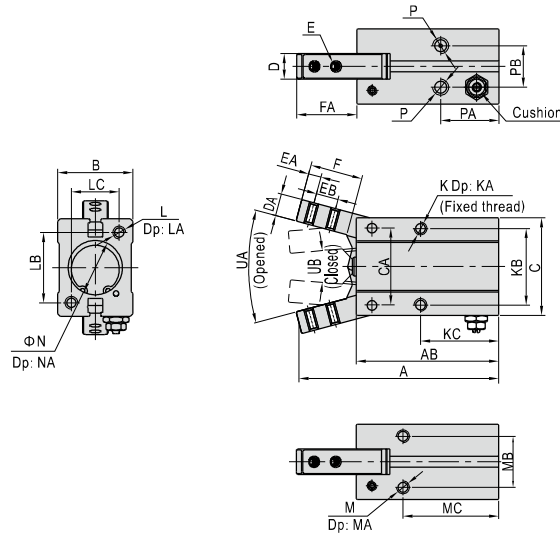
### Inner structure and material of major parts



Note: inner structure & material data sheet is based on certain bore size.  
Please contact AirTAC if you need inner structure & material data sheet for specific bore size.

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	Alloy steel
24	Pin	Stainless steel
25	Pin sheath	Stainless steel
26	Magnet fixed plate	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	18.8	M4×0.7	7	24	24.5	M4×0.7
20	78	55	27.5	42	30	10	8	M4×0.7	5.2	9	20	23.7	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	32.8	M6×1.0	10	36	30	M6×1.0
32	96.5	68	40	60	42	18	10	M6×1.0	6	14	27	30	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 <sup>+0.05</sup> <sub>0</sub>	1.5	M3×0.5	19	1.5	30°	10°
10	6	18	12	M3×0.5	6	11.5	27	11 <sup>+0.05</sup> <sub>0</sub>	1.5	M3×0.5	19	10	30°	10°
16	8	22	15	M4×0.7	8	16	30	17 <sup>+0.05</sup> <sub>0</sub>	1.5	M5×0.8	18.5	13	30°	10°
20	10	32	18	M5×0.8	10	18.5	35	21 <sup>+0.05</sup> <sub>0</sub>	1.5	M5×0.8	22	15	30°	10°
25	12	40	22	M6×1.0	10	22	36.5	26 <sup>+0.05</sup> <sub>0</sub>	1.5	M5×0.8	23.5	20	30°	10°
32	12	46	26	M6×1.0	10	26	30	34 <sup>+0.05</sup> <sub>0</sub>	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/s <sup>2</sup> )	The condition that the work-pieces won't drop is: $2 \times \mu F > mg$ so: $F > \frac{mg}{2 \times \mu}$ Safety coefficient is a, so F is: $F = \frac{mg}{2 \times \mu} \times a$	$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$ 10 times of the mass of the gripped objects	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$ 20 times of the mass of the gripped objects

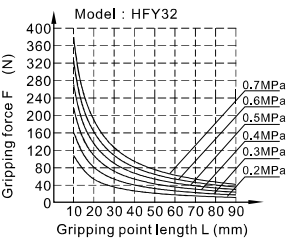
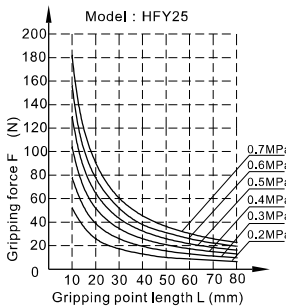
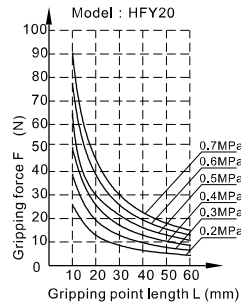
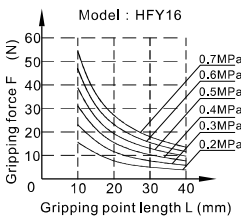
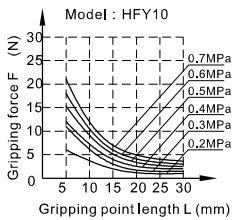
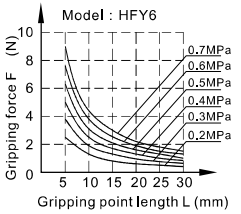
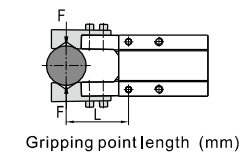
Note) If the friction coefficient  $\mu > 0.2$ , for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

#### 2. The selection of the gripping point

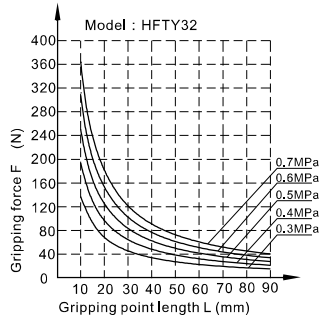
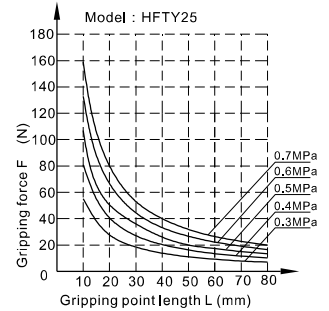
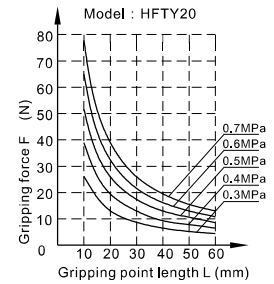
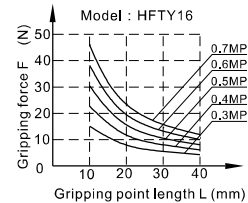
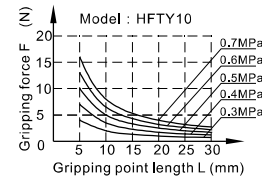
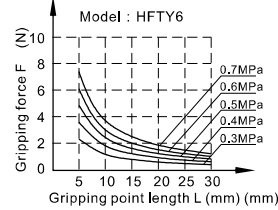
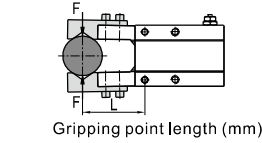
When the gripping force is determined, select the gripping point according to the limitation ranges shown in the below chart. If the gripping point is over the limit, the gripping jaw will be subjected to excessive moment load, and lead to short life of air gripper.



### Double acting type closed gripping force



### Single acting closed gripping force



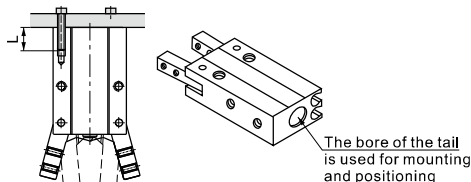


## HFY Series

### Installation and application

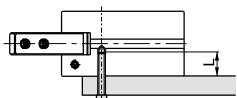
1. Due to the abrupt changes, the pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external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



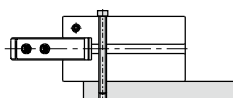
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
6	-	-	-	Φ7mm <sup>+0.04</sup> <sub>-0.01</sub>	1.5mm
10	M3×0.5	0.88N.m	6mm	Φ11mm <sup>+0.04</sup> <sub>-0.01</sub>	1.5mm
16	M4×0.7	2.1N.m	8mm	Φ17mm <sup>+0.05</sup> 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

#### The installation of the front threaded hole

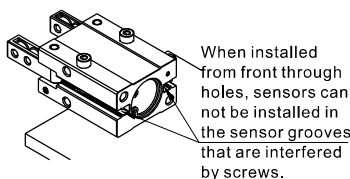


Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
6	M3×0.5	0.69	5
10	M3×0.5	0.69	5
16	M4×0.7	2.1	7
20	M5×0.8	4.3	8
25	M6×1.0	7.3	10
32	M6×1.0	7.3	10

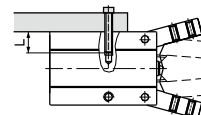
#### The installation of the front through hole



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



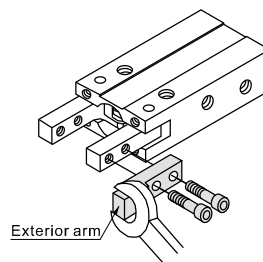
#### Surface installation type



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



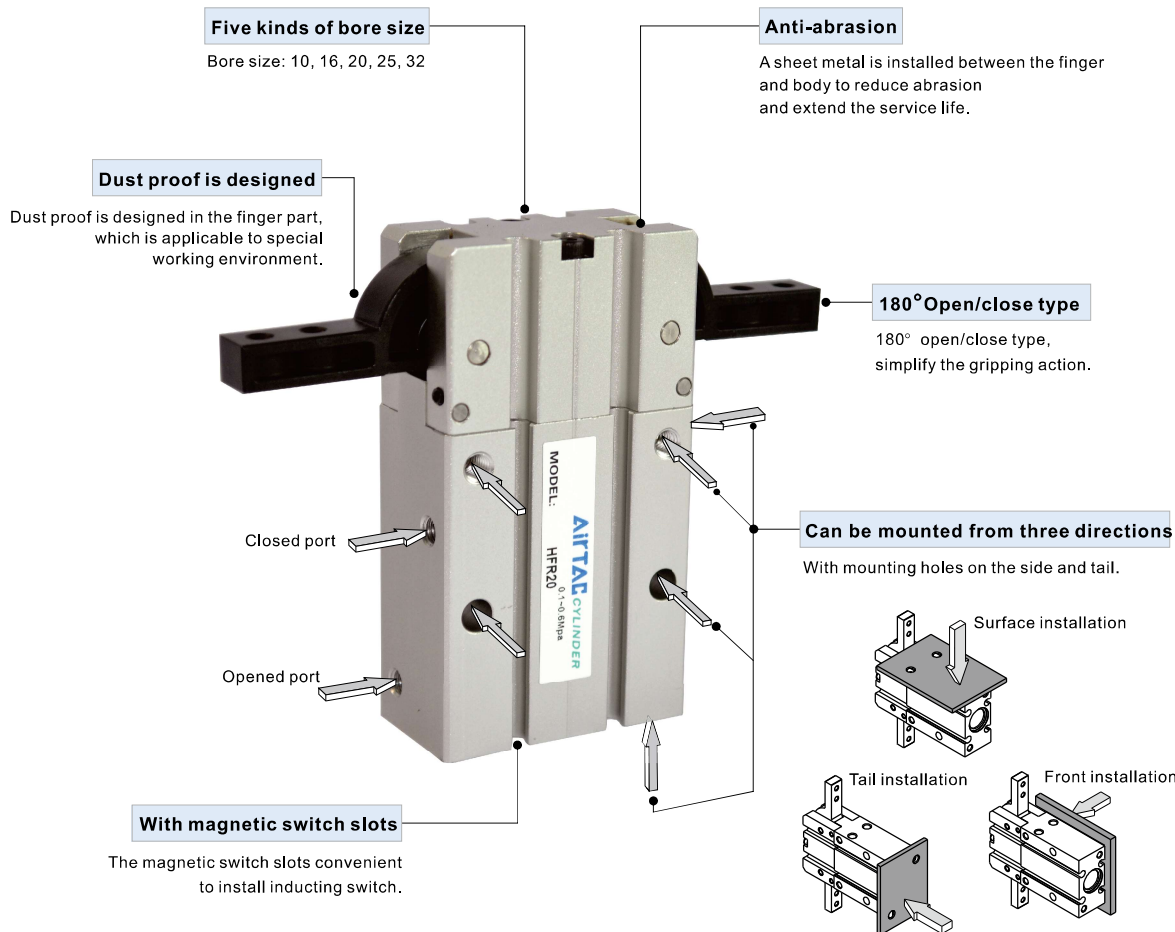
7. When gripping work-piece, the work-piece must be located in the center line of the two gripping jaws, and the two gripping jaws also need to touch the work-piece at the same time, otherwise they will be easily damaged.
8. Confirm that there is no additional external forces that are exerted on the 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.



# Air gripper—HFR Series

180° open/close style

## Compendium of HFR Series



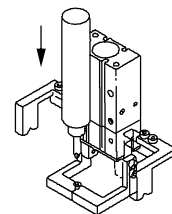
Bore size (mm)	10	16	20	25	32
Acting type	Double acting				
Fluid	Air(to be filtered by 40μm filter element)				
Operating pressure	Φ10: 0.2~0.7MPa(29~100psi)(2.0~7.0bar) Others: 0.15~0.7MPa(22~100psi)(1.5~7.0bar)				
Temperature ℃	-20~70				
Lubrication	Cylinder: Not required; Gripper jaws: Lubricate 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]	CM5H\DM5H\EM5H				

[Note1] The gripping force is the value when the operating pressure is 0.5Mpa.

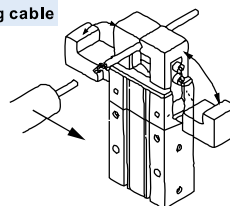
[Note2] Sensor switch should be ordered additionally, please refer to P565 for detail of sensor switch.

## Example

### Screw down



### Clamping cable



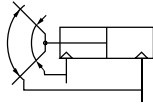
# Air gripper(180° open/close style)

**AIRTAC**

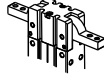
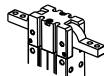
## HFR Series



### Symbol

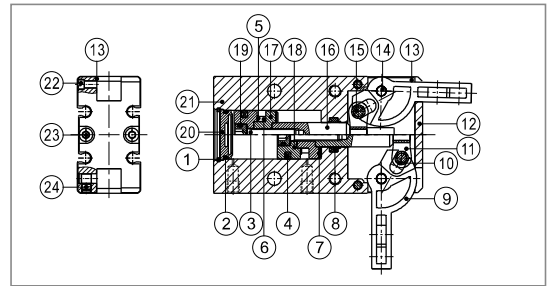


### Ordering code

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

[Note] HFR series are all attached with magnet.

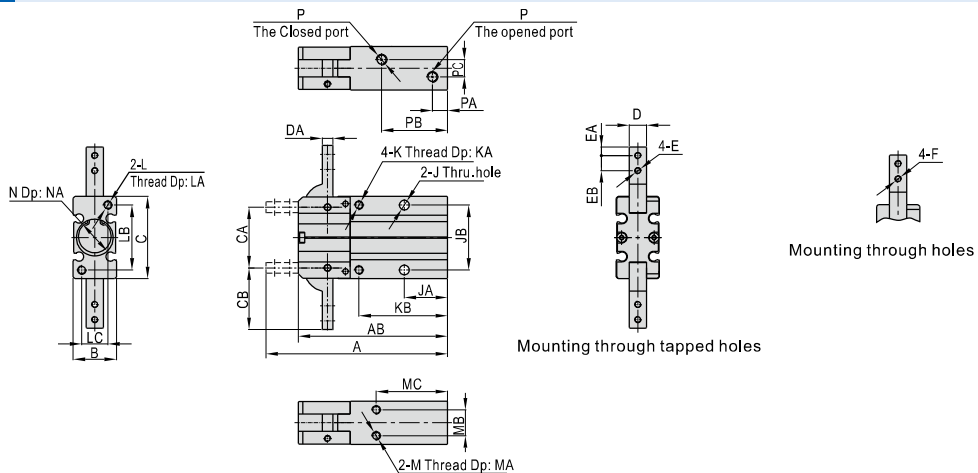
### Inner structure and material of major parts



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
4	Piston seal	NBR	15	Pin	Stainless steel
5	Magnet washer	NBR	16	Piston rod	Stainless steel
6	Magnet	Sintered metal (Neodymium-iron-boron)	17	Magnet holder	Aluminum alloy
7	Bumper	TPU	18	Piston	Aluminum alloy
8	Rod packing	NBR	19	O-ring	NBR
9	Gripping jaws	Stainless steel	20	Back cover	Aluminum alloy
10	Pin sheath	Stainless steel	21	Body	Aluminum alloy
11	Push block	Stainless steel	22	Pin	Stainless steel
			23	Countersink screw	Carbon steel
			24	Countersink screw	Carbon steel

Note: inner structure & material data sheet is based on certain bore size. Please contact Airtac if you need inner structure & material data sheet for specific bore size.

### Dimensions



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

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

## HFR Series

### 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.

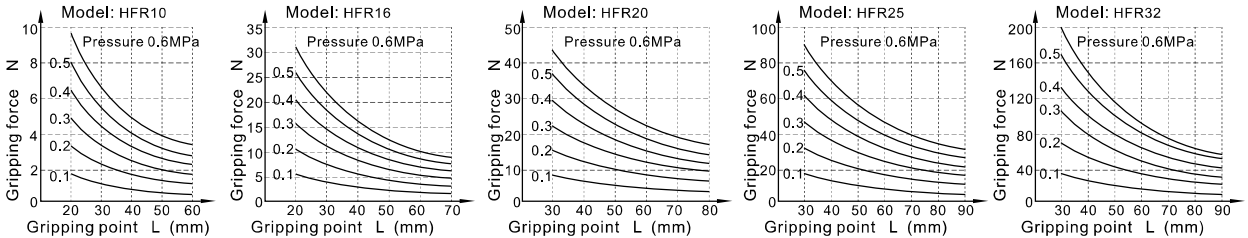
Example: When the workpiece weight is 0.05 and the gripping point distance L is 30mm, the operating pressure will be 5kgf/cm<sup>2</sup>.

Effective gripping force=0.05kg×20 times×9.8m/s<sup>2</sup>=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.

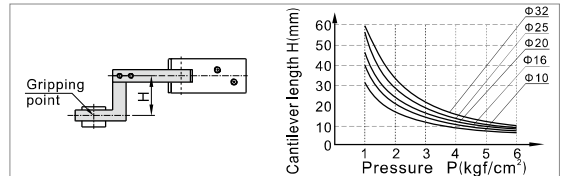
- 1.3) The finger thrust is expressed as F, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

#### 2. Connection between gripping force and gripping point distance



#### 3. The selection of the gripping point

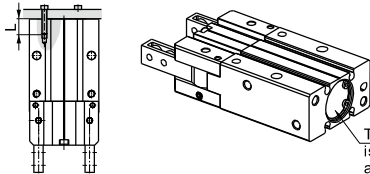
- 3.1) Please select the gripping point within the limited field shown left. Over the limits, gripping jaws would be subjected to excessive torque loads, and lead to short life of the air gripper.
- 3.2) In the allowable range of gripping point, it is better to design for short and light fittings. If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

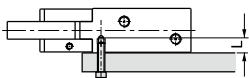
#### Tail installation type



The bore of the tail is used for mounting and positioning

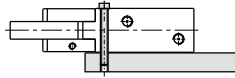
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	1.0N.m	6mm	Φ11mmH9	1.5mm
16	M4×0.7	2.0N.m	8mm	Φ17mmH9	1.5mm
20	M5×0.8	4.5N.m	10mm	Φ21mmH9	1.5mm
25	M6×1.0	7.0N.m	12mm	Φ26mmH9	1.5mm
32	M6×1.0	7.0N.m	14mm	Φ34mmH9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

#### The installation of the front threaded hole



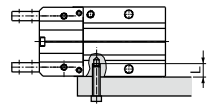
Bore size	The bolts type	Max. locking moment(Nm)	Max. screwed depth(mm)
10	M3×0.5	1.0	6
16	M4×0.7	2.0	8
20	M5×0.8	4.5	10
25	M6×1.0	7.0	12
32	M6×1.0	7.0	14

#### 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

