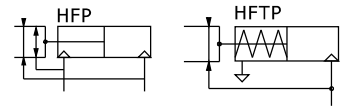




Air gripper—HFP Series

Mechanical parallel style



Ordering code

HFP 20 □



① Model

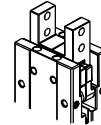
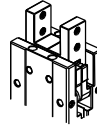
HFP: Air finger(Double acting)
(mechanical parallel style)

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

③ Finger type

Blank: Standard

N: Thru.hole mounting type



② Bore size

10 16 20 25 32

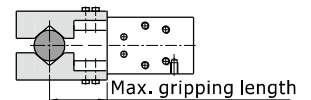
HFP series are all attached with magnet.

Specification

Bore size (mm)		10	16	20	25	32
Acting type		Double acting, Single acting				
Fluid		Air(to be filtered by 40μm filter element)				
Operating pressure	Double acting	Φ10	28~100psi(0.2~0.7MPa)			
		Others	22~100psi(0.15~0.7MPa)			
	Single acting	Φ10	50~100psi(0.35~0.7MPa)			
		Others	36~100psi(0.25~0.7MPa)			
Proof pressure		150psi(1.05MPa)				
Temperature		-20~70°C				
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\EMSG				
Port size		M3×0.5		M5×0.8		

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

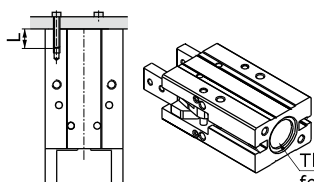
[Note2] Refer to P530 for detail of sensor.



Installation and application

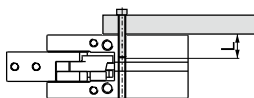
1. Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
2. Don't use the air gripper under strong external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

Tail installation type



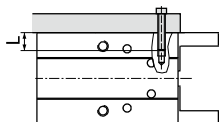
Bore size	The bolts type	Max. locking moment	Max. screwed depth	The aperture of the positioning bore	The depth of the positioning bore
10	M3×0.5	1.0N.m	6mm	Φ11mm ^{+0.05/0}	1.0mm
16	M4×0.7	2.0N.m	8mm	Φ17mm ^{+0.05/0}	1.2mm
20	M5×0.8	4.5N.m	10mm	Φ21mm ^{+0.05/0}	1.2mm
25	M6×1.0	7.0N.m	12mm	Φ26mm ^{+0.05/0}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

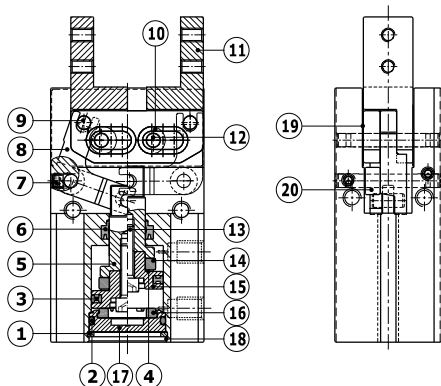
Surface installation type



Bore size	The bolts type		
10	M3×0.5	1.0	6
16	M4×0.7	2.0	8
20	M5×0.8	4.5	10
25	M6×1.0	7.0	12
32	M6×1.0	7.0	12

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

Inner structure



NO.	Item	NO.	Item
1	C clip	11	Gripping jaws
2	O-ring	12	Pin
3	Piston seal	13	Screw
4	Magnet washer	14	Magnet
5	Piston rod	15	Piston
6	Rod packing	16	Bumper
7	Countersink screw	17	Back cover
8	Curved bar	18	Body
9	Pin	19	Retaining ring
10	Guide sleeve	20	Stopper sleeve

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.

How to select product

Please select pneumatic finger according to the following steps:

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

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

1. The selection of the gripping force

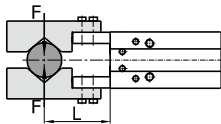
The gripping work-pieces shown below, on the impact condition of ordinary handling state, taking safety coefficient $a=4$, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

The work-pieces as shown in the left :		$\mu=0.2$	$\mu=0.1$
<p>F: Gripping force (N) μ: friction coefficient between fittings and work-pieces. m: mass of work-pieces g: acceleration of gravity (=9.8m/s²)</p>	The condition that the work-pieces won't drop is: $2 \times \mu F > mg$ so: $F > \frac{mg}{2 \times \mu}$ Safety coefficient is a, so F is: $F = \frac{mg}{2 \times \mu} \times a$	$F = \frac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \frac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
		10 times of the mass of the gripped objects	20 times of the mass of the gripped objects

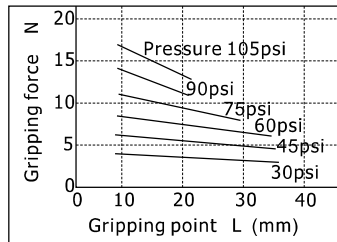
Note) If the friction coefficient $\mu > 0.2$, for safety, please also select clamping force according to the principle of 10~20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

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

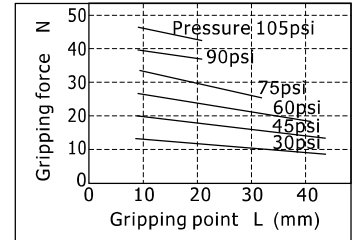
Double acting type closed gripping force



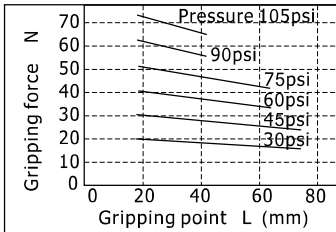
HFP10



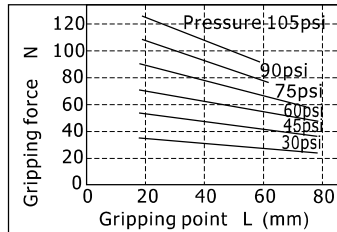
HFP16



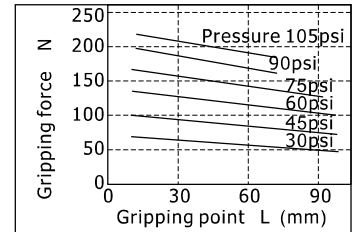
HFP20



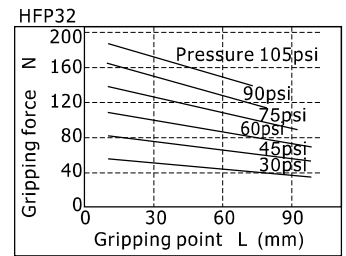
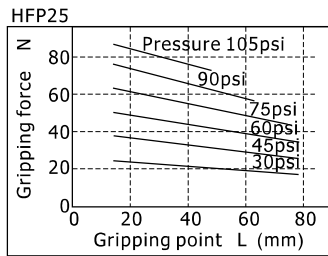
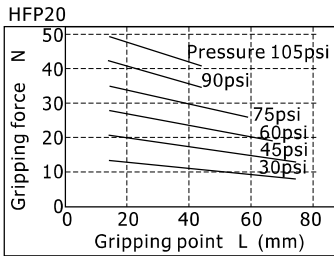
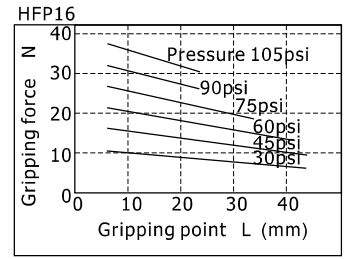
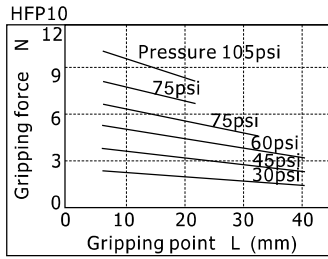
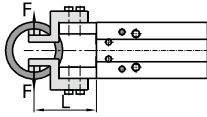
HFP25



HFP32

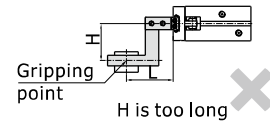
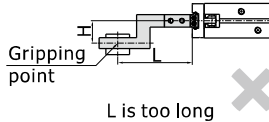
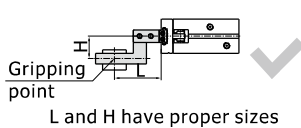


Double acting type opened gripping force



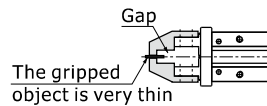
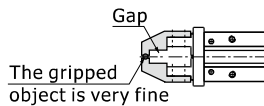
2. The selection of the gripping point

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



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

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



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

Bore size	The allowed vertical loads 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	Allowable load(N) $\frac{M(\text{Maximum permissible moment})(\text{N.m})}{L \times 10^{-3}}$ Unit conversion constant	In the guide rail of HFP16, the external force of the pitching moment static loads put on the point of L=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
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		

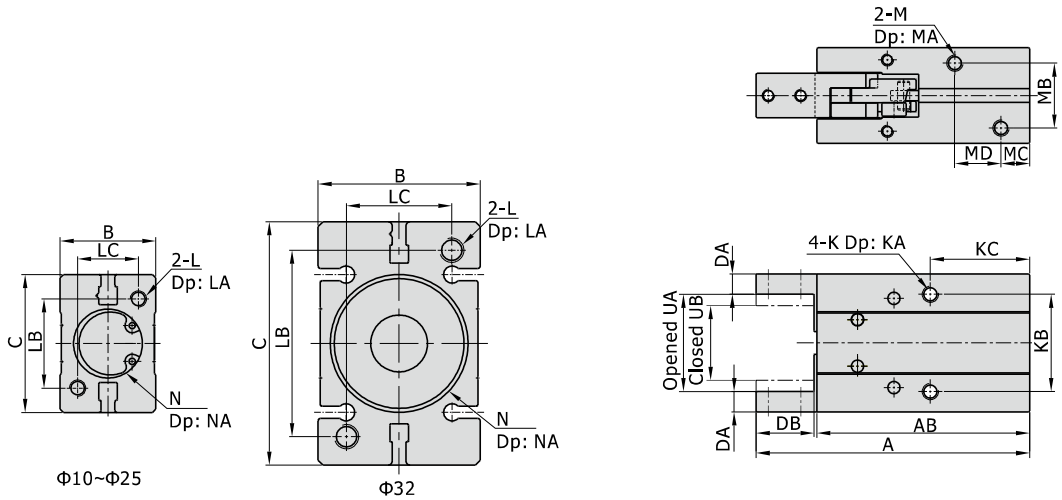
[Note] The loads and torque values of said are all static values.

Air gripper(Mechanical parallel style)

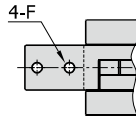
HFP Series

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

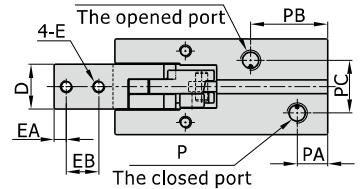
Dimensions



Thru.hole mounting type



Standard P



[Unit: mm]

Model\Item	A	AB	B	C	D	DA	DB	E	EA	EB	F	K	KA	KB
HFP10	57(62)	44.5(49.5)	16	23	7	4	12.5	M2.5×0.45	3	5.5	$\Phi 2.8$	M3×0.5	5	16
HFP16	72(77)	56.5(61.5)	23.5	34	11	5	15.5	M3×0.5	4	7	$\Phi 3.3$	M4×0.7	8	24
HFP20	89.5(94.5)	69(74)	27.5	45	12	6	20.5	M4×0.7	5	9	$\Phi 4.5$	M5×0.8	10	30
HFP25	104.5(109.5)	78.5(83.5)	33.5	52	14	8	25.5	M5×0.8	6	12	$\Phi 5.5$	M6×1.0	12	36
HFP32	118(126)	88(96)	40	60	18	9	29.7	M6×1.0	7	14	$\Phi 6.5$	M6×1.0	12	46

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

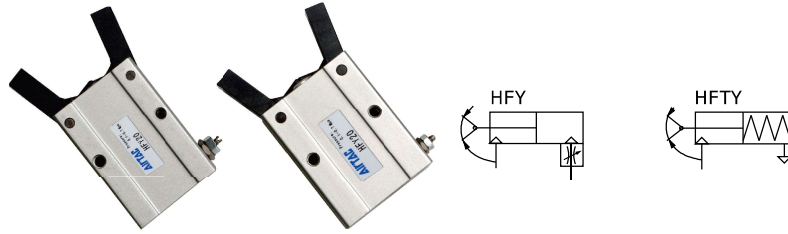
Model\Item	PA	PB	PC	UA(Opened)	UB(Closed)
HFP10	6	16.5(23)	10	$14.5^{+1.5}_0$	10.5^{+0}_-1
HFP16	7.5	20(25)	13	$23.5^{+1.5}_0$	15.5^{+0}_-1
HFP20	7.5	24(29)	15	$32.5^{+1.5}_0$	20.5^{+0}_-1
HFP25	8	22(29)	20	$35.5^{+1.5}_0$	21.5^{+0}_-1
HFP32	9.5	26(37)	22	$42^{+1.5}_0$	26.5^{+0}_-1

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



Air gripper—HFY Series

Angular style



Ordering code

HFY 20

① ②

① Model

HFY: Air finger(Angle style, Double acting)

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

② Bore size

6 10 16 20 25 32

[Note] HFY series are all attached with magnet.

Specification

Bore size (mm)		6	10	16	20	25	32
Acting type		Double acting			Single acting		
Fluid		Air(to be filtered by 40μm filter element)					
Operating pressure	Double acting	Φ6/10	29~100psi(0.2~0.7MPa)				
		Φ16~Φ32	22~100psi(0.15~0.7MPa)				
	Single acting	Φ6	45~100psi(0.3~0.7MPa)				
		Φ10~Φ32	36~100psi(0.25~0.7MPa)				
Temperature		-20~70°C					
Lubrication		Cylinder: Not required; Gripper jaws: Lubricate grease					
Cushion type		Bumper					
Max. frequency		180(c.p.m)					
Sensor switches [Note1]		CM5G/DMSG/EM5G					
Port size		M3×0.5			M5×0.8		

[Note1] Refer to P530 for detail of sensor.

Gripping force and stroke

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

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

