

WINMAN AIR GRIPPER (PARALLEL STYLE)

WHFZ SERIES



Specification

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	Ø6,Ø10		0.2~0.7MPa(28~100psi)(2.0~7.0bar)				
	Acting Others			0.1~0.7MPa(15~100psi)(1.0~7.0bar)				
	Single	Ø6,Ø10		0.35~0.7MPa(50~100psi)(3.5~7.0bar)				
	Acting Others			0.25~0.7MPa(36~100psi)(2.5~7.0bar)				
Temperature °C		-20~70						
Lubrication		Not required						
Repeatability mm		±0.01			±0.02			
Max. frequency		180(c.p.m)			60(c.p.m)			
Sensor switches		① DS1-H	CS1-G DS1-G	CS1-G,DS1-G,DS1-H				
Port size		M3x0.5			M5x0.8			

① Sensor switch should be ordered additionally, please refer to P419-442 for detail of sensor switch.

Ordering Code

WHFZ 20 □

Model

- WHFZ: Air finger (Double acting)
- WFSZ: Air finger (Single acting and normally closed)
- WFTZ: Air finger (Single acting and normally opened)

Bore size

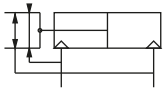
- 6: Ø 6mm
- 10: Ø 10mm
- 16: Ø 16mm
- 20: Ø 20mm
- 25: Ø 25mm
- 32: Ø 32mm
- 40: Ø 40mm

Finger type

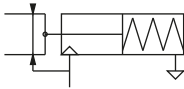
- Blank: Standard
- R: Narrow type
- B: Side mounting type
- W: Side mounting and narrow type
- N: Thru. hole mounting type
- M: Thru. hole mounting and narrow type
- F: Bottom mounting type

Symbol

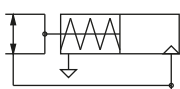
WHFZ: Double acting



WHFTZ: Single acting and normally opened

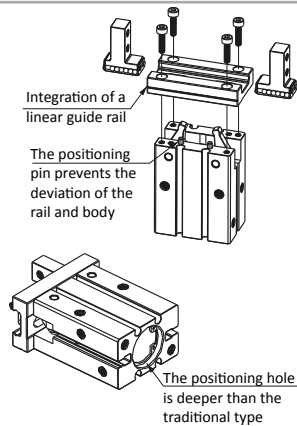


WHFSZ: Single acting and normally closed



Product Feature

1. Integrated design of linear guide rail, high rigidity and high precision.
2. A positioning pin is attached to the bottom of the linear guide rail, which can prevent the deviation of the positioning rail and body.
3. The hole of the body is deeper, which can improve the precision and the consistency of repeated dismounting and positioning.
4. According to the actual using requirements of the actual using requirements of customers, the initial position of clamping jaw can be customized to meet the different needs under different working conditions.

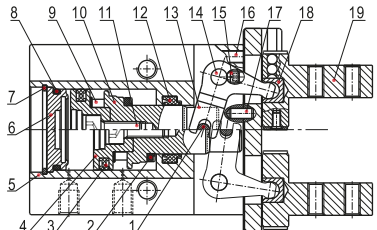


① Ø 6, Ø 32, Ø 40 bore size don't R, W, M type. Add) HFZ series are all attached with magnet.

WINMAN AIR GRIPPER (PARALLEL STYLE)

WHFZ Series

Inner structure and material of major parts



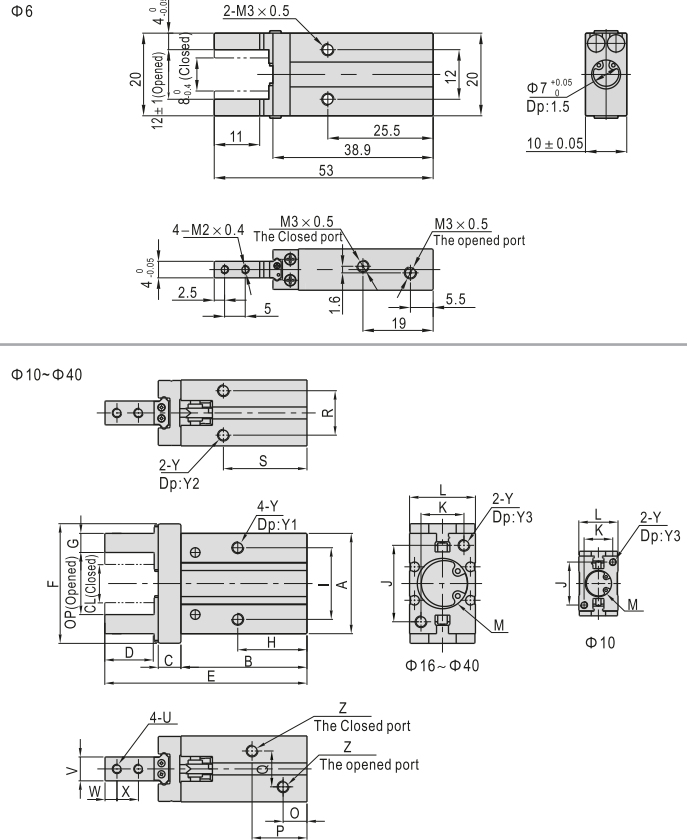
NO.	Item	Material
1	Pin	Stainless steel
2	Bumper	TPU
3	Piston seal	NBR
4	Piston	Aluminum alloy/Stainless steel
5	Body	Aluminum alloy
6	Back cover	Aluminum alloy
7	C clip	Spring steel
8	O-ring	NBR
9	Magnet	Sintered metal(Neodymium-iron-boron)
10	Piston rod	Aluminum alloy/Stainless steel
11	Screw	Carbon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

Gripping force and stroke

Acting	Model	Gripping force per finger Effective valve(N)		Opening/Closing stroke (Both sides)(mm)	Weight (g)		
		External	Internal		F Type	Others	
Double acting		3.3	6.1	4	24	25	
		11	17	4	56	56	
		34	45	6	124	124	
		45	68	10	236	236	
		69	102	14	418	428	
		160	195	22	750	729	
Single acting		255	320	30	1340	1268	
	Normally opened	WHFTZ6	1.9	-	4	25	26
		WHFTZ10	7	-	4	57	57
		WHFTZ16	27	-	6	125	125
		WHFTZ20	35	-	10	238	238
		WHFTZ25	55	-	14	420	430
		WHFTZ32	133	-	22	799	778
	Normally closed	WHFTZ40	220	-	30	1437	1365
		WHFSZ6	-	3.7	4	25	26
		WHFSZ11	-	13	4	57	57
		WHFSZ16	-	38	6	125	125
		WHFSZ20	-	59	10	238	238
WHFSZ25		-	87	14	420	430	
WHFSZ32	-	163	22	799	778		
WHFSZ40	-	270	30	1437	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 381 for the definition of "L".

Standard type



Model\Item	A	B	C	D	E	F	G	H	I	J
WHFZ10	23	37.6	6	12	57	29	4 ⁰ / _{-0.05}	23	16	18
WHFZ16	30.6	42.5	7.5	15	67.3	38	5 ⁰ / _{-0.05}	24.5	24	22
WHFZ20	42	52.8	9.5	20	84.7	50	8 ⁰ / _{-0.05}	29	30	32
WHFZ25	52	63.6	11	25	102.7	63	10 ⁰ / _{-0.05}	30	36	40
WHFZ32	60	67(76)	12	29	113(122)	97	12 ⁰ / _{-0.05}	40(49)	46	46
WHFZ40	72	83(96)	15	36	139(152)	119	14 ⁰ / _{-0.05}	49(62)	56	56

Model\Item	K	L	M	O	P	Q	R	S	U	W	
WHFZ10	12	16.4	Φ11 ^{+0.05} / ₀	Dp:2	7.5	19	10	11.4	27	M2.5×0.45	3
WHFZ16	15	23.6	Φ17 ^{+0.05} / ₀	Dp:2	7.5	19	13	16	30	M3×0.5	4
WHFZ20	18	27.6	Φ21 ^{+0.05} / ₀	Dp:3	9.7	23	15	18.6	35	M4×0.7	5
WHFZ25	22	33.6	Φ26 ^{+0.05} / ₀	Dp:3.5	10	23.8	20	22	36.5	M5×0.8	6
WHFZ32	26	40	Φ34 ^{+0.05} / ₀	Dp:4	11	31(40)	24	26	48(57)	M6×1.0	7
WHFZ40	32	48	Φ42 ^{+0.05} / ₀	Dp:4	12	38(50)	28	32	58(71)	M8×1.25	9

Model\Item	V	X	Y	Y1	Y2	Y3	Z	OP	CL
WHFZ10	5 ⁰ / _{-0.05}	5.7	M3×0.5	5.5	6	6	M3×0.5	15.2 ⁺² / ₀	11.2 ⁰ / _{-0.7}
WHFZ16	8 ⁰ / _{-0.05}	7	M4×0.7	8	4.5	8	M5×0.8	20.9 ⁺² / ₀	14.9 ⁰ / _{-0.7}
WHFZ20	10 ⁰ / _{-0.05}	9	M5×0.8	10	8	10	M5×0.8	26.3 ⁺² / ₀	16.3 ⁰ / _{-0.7}
WHFZ25	12 ⁰ / _{-0.05}	12	M6×1.0	12	10	12	M5×0.8	33.3 ^{+2.5} / ₀	19.3 ⁰ / _{-0.8}
WHFZ32	15 ⁰ / _{-0.05}	14	M6×1.0	13	10	13	M5×0.8	48 ^{+2.5} / ₀	26 ⁰ / _{-0.5}
WHFZ40	18 ⁰ / _{-0.05}	17	M8×1.25	16	13	17	M5×0.8	60 ^{+2.5} / ₀	30 ⁰ / _{-0.5}

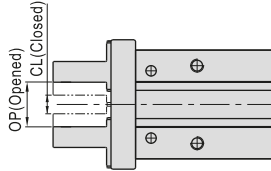
Note) The values in "()" in the above table are single acting type sizes.

WINMAN AIR GRIPPER (PARALLEL STYLE)

WHFZ Series

Narrow type (R type)

Φ10~Φ25

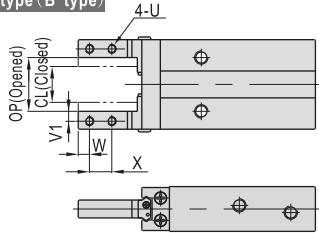


Model\Item	OP	CL
WHFZ10-R	9.7 ^{+2.0} ₀	5.7 ⁰ _{-0.4}
WHFZ16-R	12.6 ^{+2.0} ₀	6.6 ⁰ _{-0.4}
WHFZ20-R	17.2 ^{+2.0} ₀	7.2 ⁰ _{-0.4}
WHFZ25-R	22.8 ^{+2.5} ₀	8.8 ⁰ _{-0.4}

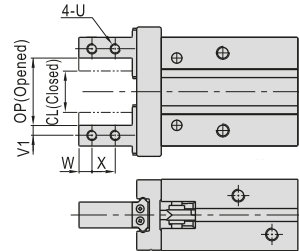
Note) The other dimensions are the same as standard type.

Side mounting type (B type)

Φ6



Φ10~Φ40

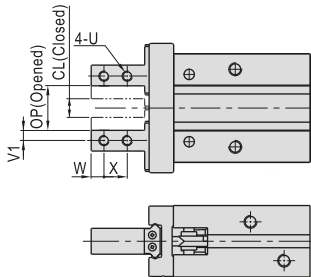


Model\Item	U	V1	W	X	OP	CL
WHFZ6-B	M2 × 0.4	2	2.5	5	12 ± 1	8 ⁰ _{-0.4}
WHFZ10-B	M2.5 × 0.45	2	3	5.7	15.2 ^{+2.0} ₀	11.2 ⁰ _{-0.7}
WHFZ16-B	M3 × 0.5	2.5	4	7	20.9 ^{+2.0} ₀	14.9 ⁰ _{-0.7}
WHFZ20-B	M4 × 0.7	4	5	9	26.3 ^{+2.0} ₀	16.3 ⁰ _{-0.7}
WHFZ25-B	M5 × 0.8	5	6	12	33.3 ^{+2.5} ₀	19.3 ⁰ _{-0.8}
WHFZ32-B	M6 × 1.0	6	7	14	48 ^{+2.5} ₀	26 ⁰ _{-0.5}
WHFZ40-B	M8 × 1.25	7	9	17	60 ^{+2.5} ₀	30 ⁰ _{-0.5}

Note) The other dimensions are the same as standard type.

Side mounting and narrow type (W type)

Φ10~Φ25

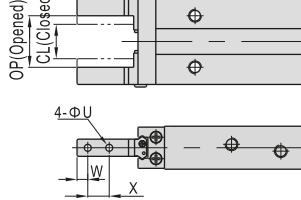


Model\Item	U	V1	W	X	OP	CL
WHFZ10-W	M2.5 × 0.45	2	3	5.7	9.7 ^{+2.0} ₀	5.7 ⁰ _{-0.4}
WHFZ16-W	M3 × 0.5	2.5	4	7	12.6 ^{+2.0} ₀	6.6 ⁰ _{-0.4}
WHFZ20-W	M4 × 0.7	4	5	9	17.2 ^{+2.0} ₀	7.2 ⁰ _{-0.4}
WHFZ25-W	M5 × 0.8	5	6	12	22.8 ^{+2.5} ₀	8.8 ⁰ _{-0.4}

Note) The other dimensions are the same as standard type.

Thru. hole mounting type (N type)

Φ6



Model\Item	U	W	X	OP	CL
WHFZ6-N	2.4	2.5	5	12 ± 1	8 ⁰ _{-0.4}
WHFZ10-N	2.9	3	5.7	15.2 ^{+2.0} ₀	11.2 ⁰ _{-0.7}
WHFZ16-N	3.3	4	7	20.9 ^{+2.0} ₀	14.9 ⁰ _{-0.7}
WHFZ20-N	4.5	5	9	26.3 ^{+2.0} ₀	16.3 ⁰ _{-0.7}
WHFZ25-N	5.5	6	12	33.3 ^{+2.5} ₀	19.3 ⁰ _{-0.8}
WHFZ32-N	6.6	7	14	48 ^{+2.5} ₀	26 ⁰ _{-0.5}
WHFZ40-N	9	9	17	60 ^{+2.5} ₀	30 ⁰ _{-0.5}

Note) The other dimensions are the same as standard type.

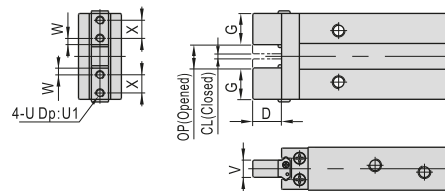
Thru. hole mounting and narrow type (M type)

Model\Item	U	W	X	OP	CL
WHFZ10-M	2.9	3	5.7	9.7 ^{+2.0} ₀	5.7 ⁰ _{-0.4}
WHFZ16-M	3.3	4	7	12.6 ^{+2.0} ₀	6.6 ⁰ _{-0.4}
WHFZ20-M	4.5	5	9	17.2 ^{+2.0} ₀	7.2 ⁰ _{-0.4}
WHFZ25-M	5.5	6	12	22.8 ^{+2.5} ₀	8.8 ⁰ _{-0.4}

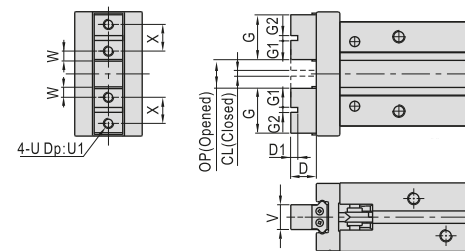
Note) The other dimensions are the same as standard type.

Bottom mounting type (F type)

Φ6



Φ10~Φ40



Model\Item	D	D1	G	G1	G2	U	U1
WHFZ6-F	7.2	-	7.5	-	-	M2 × 0.4	3
WHFZ10-F	5.2	2	10.9	4.45	2H9 ^{+0.025} ₀	M2.5 × 0.45	4
WHFZ16-F	8.3	2.5	14.1	5.8	2.5H9 ^{+0.025} ₀	M3 × 0.5	6
WHFZ20-F	10.5	3	17.9	7.45	3H9 ^{+0.025} ₀	M4 × 0.7	8
WHFZ25-F	13.1	4	21.8	8.9	4H9 ^{+0.030} ₀	M5 × 0.8	10
WHFZ32-F	18	5	34.6	14.8	5H9 ^{+0.030} ₀	M6 × 1.0	12
WHFZ40-F	22	6	41.4	17.7	6H9 ^{+0.030} ₀	M8 × 1.25	16

Model\Item	OP	CL	V	W	X
WHFZ6-F	5 ^{+1.2} _{-0.8}	1 ^{+0.2} ₀	4 ⁰ _{-0.05}	2	3.5
WHFZ10-F	5.4 ^{+2.2} ₀	1.4 ⁰ _{-0.2}	5 ⁰ _{-0.05}	2.45	6
WHFZ16-F	7.4 ^{+2.2} ₀	1.4 ⁰ _{-0.2}	8 ⁰ _{-0.05}	3.05	8
WHFZ20-F	11.6 ^{+2.3} ₀	1.4 ⁰ _{-0.2}	10 ⁰ _{-0.05}	3.95	10
WHFZ25-F	16 ^{+2.5} ₀	1.8 ⁰ _{-0.2}	12 ⁰ _{-0.05}	4.9	12
WHFZ32-F	25 ^{+2.7} ₀	3 ⁰ _{-0.2}	15 ⁰ _{-0.05}	7.3	20
WHFZ40-F	33 ^{+2.9} ₀	3 ⁰ _{-0.2}	18 ⁰ _{-0.05}	8.7	24

Note) The other dimensions are the same as standard type.

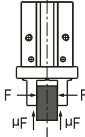
WINMAN AIR GRIPPER (PARALLEL STYLE)

WHFZ Series

How to select product

Please select pneumatic finger according to the following steps:
 The selection of the effective gripping force → the confirmation of the gripping point
 → the confirmation of the external force put on the gripping jaw.

1. The selection of the gripping force



The work-pieces as shown in the left:
 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: $2 \times \mu F > mg$

$$\text{so: } F > \frac{mg}{2 \times \mu}$$

Safety coefficient is a, so F is:

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

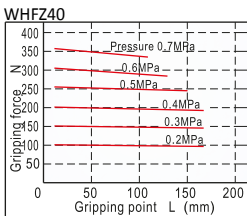
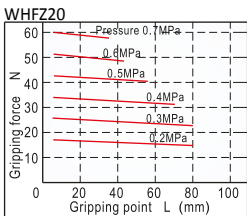
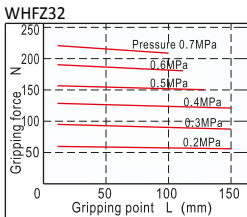
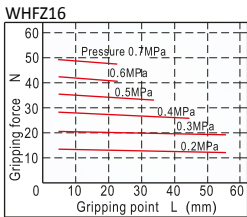
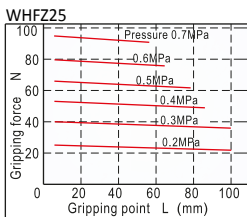
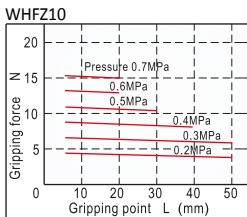
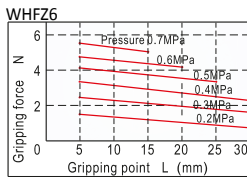
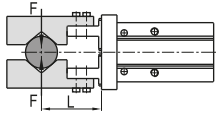
The gripping work-pieces shown above, on the impact condition of ordinary handling state, taking safety coefficient a=4, have a gripping force that is more than 10-20 times of the mass of the gripped objects.

$\mu = 0.2$ $F = \frac{mg}{2 \times 0.2} \times 4$ $= 10 \times mg$ <p>10 times of the mass of the gripped objects</p>	$\mu = 0.1$ $F = \frac{mg}{2 \times 0.1} \times 4$ $= 20 \times mg$ <p>20 times of the mass of the gripped objects</p>
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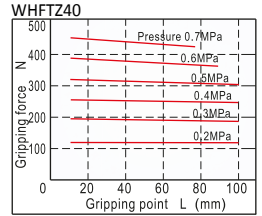
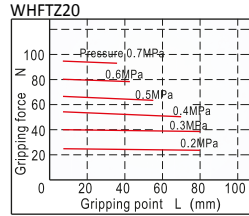
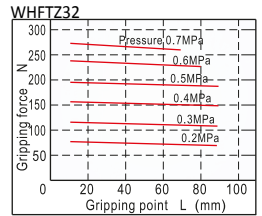
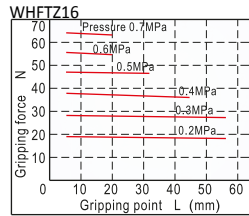
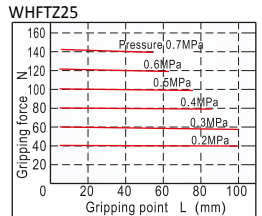
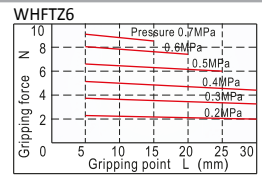
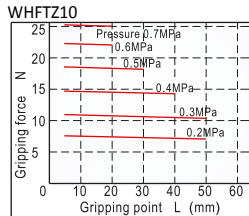
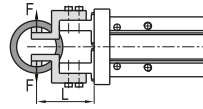
Note) If the friction coefficient $\mu > 0.2$, for safety, please also select clamping force according to the principle of 10-20 times of the mass of the clamped objects. As for large acceleration and shock, it requires for greater safety coefficient.

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

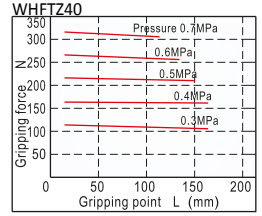
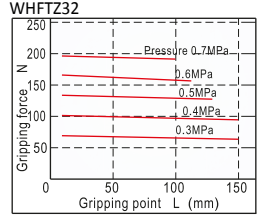
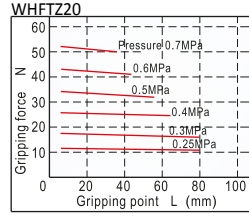
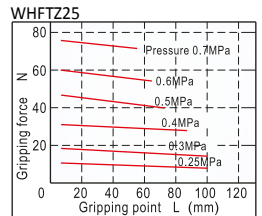
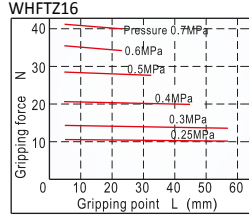
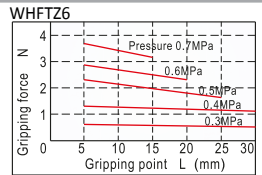
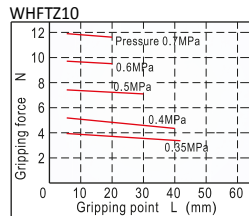
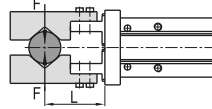
Double acting type closed gripping force



Double acting type opened gripping force



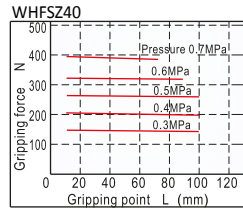
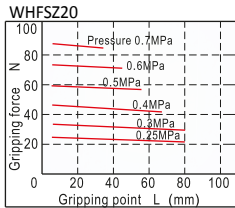
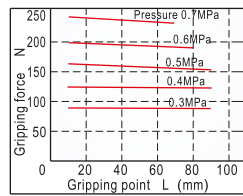
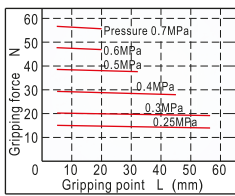
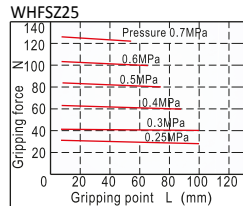
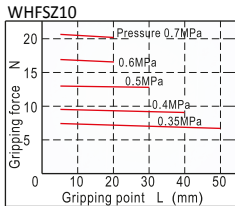
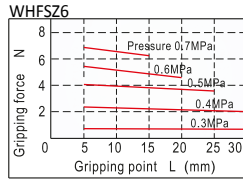
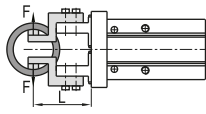
Single acting normally opened gripping force



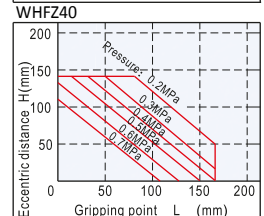
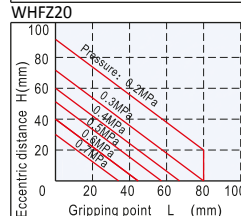
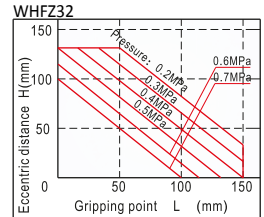
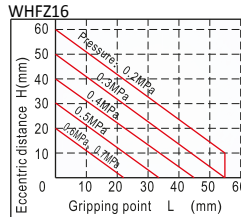
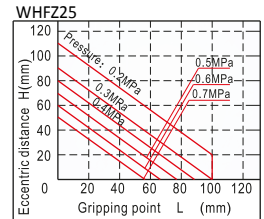
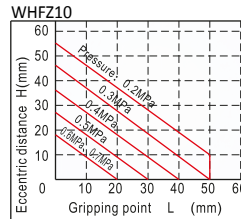
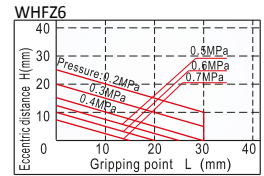
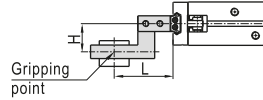
WINMAN AIR GRIPPER (PARALLEL STYLE)

WHFZ Series

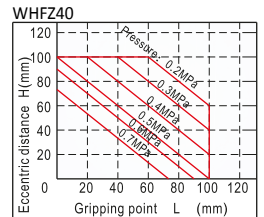
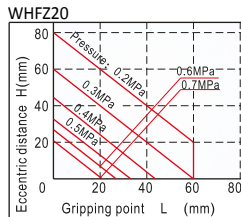
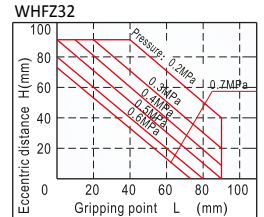
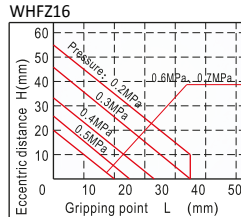
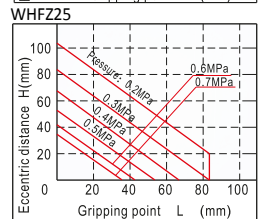
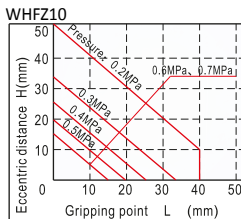
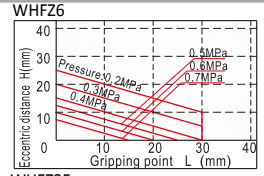
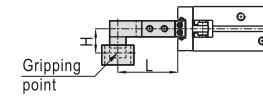
Single acting normally closed clamping force



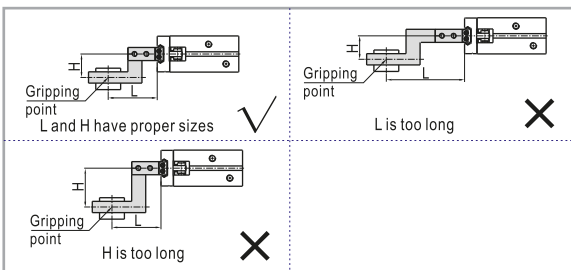
The range of the closed gripping points



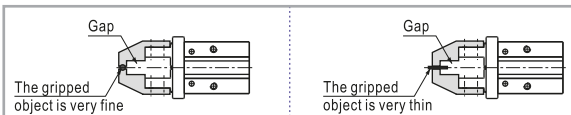
The range of the opened clamping point



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



- 2.2) In the allowable range of gripping point, it is better to design for short and light fittings. If the fittings are long and heavy, the inertia force when the finger is open and close will become larger, and the performance of gripping jaw will be degraded, at the same time it will affect the life.
- 2.3) When the gripped object is very fine and thin, you have to equip with gap between fittings. If not, there will be unstable clamp, resulting in a position offset and adverse clamping and so on.



WINMAN AIR GRIPPER (PARALLEL STYLE)

WHFZ Series

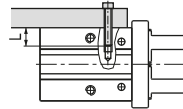
3. The confirmation of the external force put on the gripping jaw.

Bore size	The allowed vertical loads Fv(N)	Max. permissible torque (Nm)		
		Mp	My	Mr
6	10	0.04	0.04	0.08
10	58	0.26	0.26	0.53
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
40	490	4.5	4.5	9

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

The calculation of allowable forces when moment loads work	Examples of calculation
Allowable load(N) $= \frac{M(\text{Maximum permissible moment})(N \cdot m)}{L \times 10^{-3}}$ Unit conversion constant	In the guide rail of WHFZ16, the external force of the pitching moment static loads put on the point of L=30mm is f=10 N. Allowable load $F = \frac{0.68}{30 \times 10^{-3}} = 22.7(N)$ Actual load $f=10(N) < 22.7(N)$ To meet the using requirements

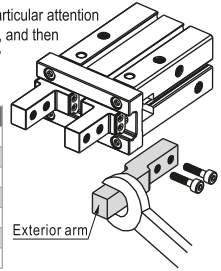
Surface installation type



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	13

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.

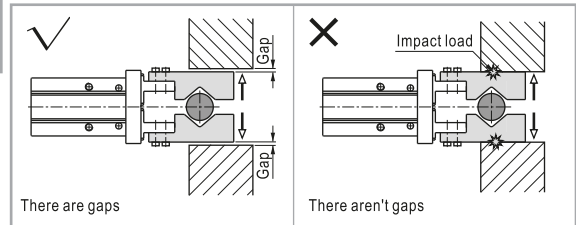


Bore size	The bolts type	Max. locking moment (Nm)
6	M2 × 0.4	0.15
10	M2.5 × 0.45	0.31
16	M3 × 0.5	0.59
20	M4 × 0.7	1.4
25	M5 × 0.8	2.8
32	M6 × 1.0	4.9
40	M8 × 1.25	11.8

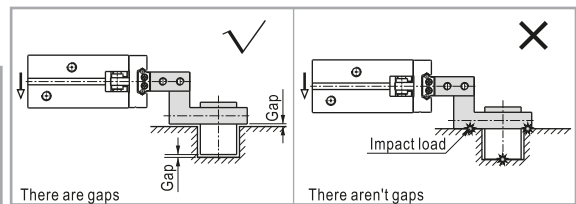
8. Confirm that there is no external forces exerted on the gripping jaw.

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

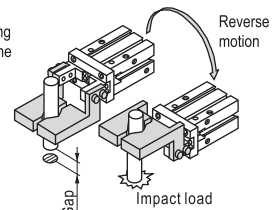


8.2) The end of stroke under the move state of air gripper

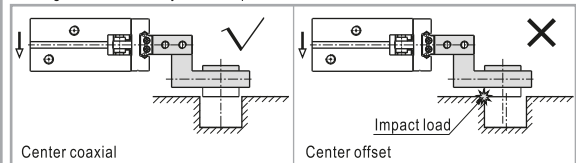


8.3) Reverse motion state

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.

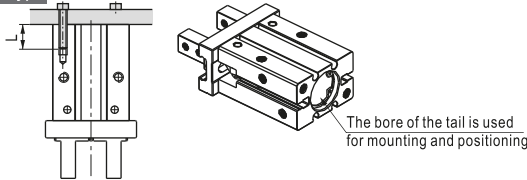


- Please use the flow control valve to adjust the opening and closing speed of gripping jaw if too fast.
- People can not enter the movement path of air gripper and articles can not be placed on the path too.
- Before removing the air gripper, please confirm that it is out of working state, and then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

Installation and application

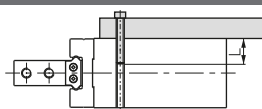
- Due to the abrupt changes, the circuit pressure is low, which will lead to the decrease of the gripping force and falling of the work-pieces. In order to avoid the harm to the human body and damage to the equipment, anti-dropping device must be equipped.
- Don't use the air gripper under strong external force and impact force.
- Please contact with us when the single acting type clamps only with the spring 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



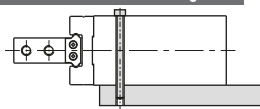
Bore size	The bolts type	Max. locking moment (Nm)	Max. screwed depth (mm)	The aperture of the positioning bore(mm)	The depth of the positioning bore(mm)
10	M3 × 0.5	0.88	6	Φ11 ^{+0.05} ₀	2
16	M4 × 0.7	2.1	8	Φ17 ^{+0.05} ₀	2
20	M5 × 0.8	4.3	10	Φ21 ^{+0.05} ₀	3
25	M6 × 1.0	7.3	12	Φ26 ^{+0.05} ₀	3.5
32	M6 × 1.0	7.9	13	Φ34 ^{+0.05} ₀	4
40	M8 × 1.25	17.7	17	Φ42 ^{+0.05} ₀	4

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	8
20	M5 × 0.8	4.3	10
25	M6 × 1.0	7.3	12
32	M6 × 1.0	7.9	13
40	M8 × 1.25	17.7	16

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 × 0.8	4.3	12
32	M5 × 0.8	4.3	13
40	M6 × 1.0	7.3	16