

# 1 MPa

New

## Air Swing Clamp



# Air Swing Clamp

Patented in Japan and major foreign countries

## Structure & Features

Compact / high speed / high rigid clamp

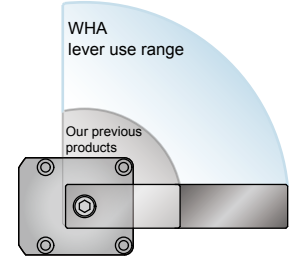
### Excellent coolant resistance

Engineered low friction packing provides tight seal even against high pressure coolant. Material is chemically resistant, especially to chlorate coolant.

### Long Lever

PAT.

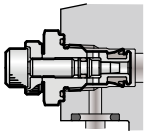
High rigidity is achieved via long guide ratio and parts optimization. Clamping distance can be much greater (up to 2.4 times previous model)



### Easy to adjust the clamping time

Piping method: The speed control valve can be directly mounted on Type A.

Picture of speed control valve (model BZW) installation



(Refer to Page 17)

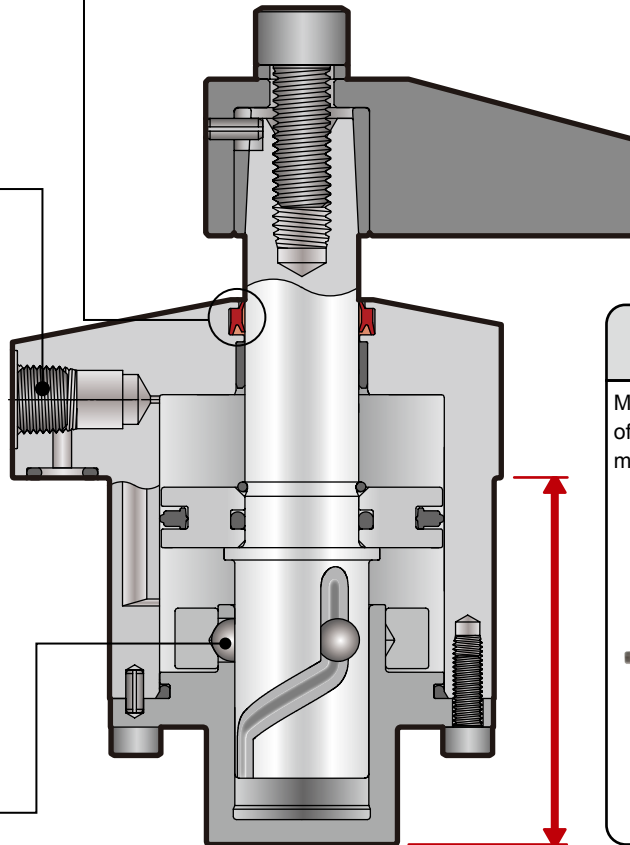
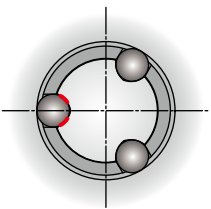
### Designed for high speeds

PAT.

Use of ball type rotary mechanism ensures the high rigidity and high reliability, reducing the full action time by 53% (maximum) compared to our former products. Floating out race improves swing action

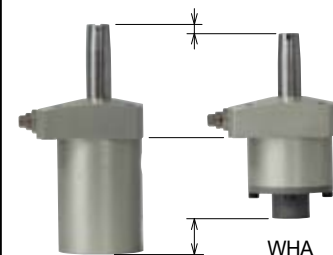
It features high durability against spluttering of air.

Section of three lead gums



### Compact design

Mounting depth is reduced, up to 40% of previous models. This saves space, machining and weight.



### Full option lineup

The lineup includes the following four types. (See page 2 for the picture).

#### [Standard Type]

With taper sleeve as standard, lever design is simplified.

#### [Dual rod type for dog application (-D)]

Detection is made easy with switch. (The lever is the same as that for the standard type.)


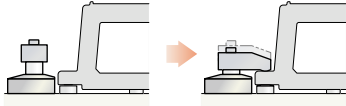

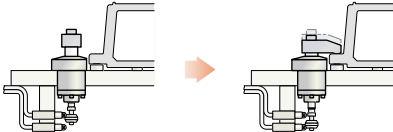

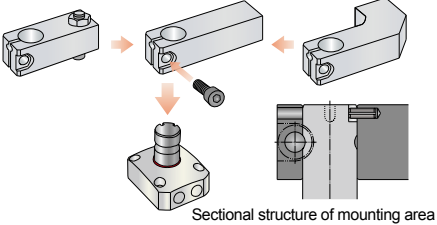

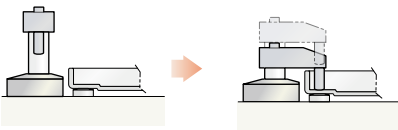

#### [Quick change lever type (-F)]

One wrench can be used to change the lever easily.

#### [Long stroke type (-Q)]

The stroke with wider range can match the necessary work shape.

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<p><b>WHA</b> Standard Type</p>		Clamp with 90° swing		7
<p><b>WHA-D</b> Dual rod type for dog application</p>		The clamp movement can be confirmed via the switch detection		9
<p><b>WHA-F</b> Quick-change lever type</p>		Easy lever changing	 <p>Sectional structure of mounting area</p>	11
<p><b>WHA-Q</b> Long stroke type</p>		The long stroke is applicable to a variety of work shapes.		13
Lever design dimensions/accessories		15		
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# Air Swing Clamp

## Air Swing Clamp

WHA 040 0 - 2 A R D - F

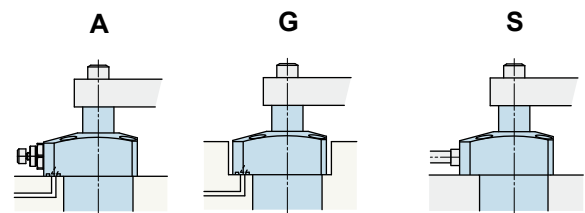
1
2
3
4
5
6

**1 Inner diameter of cylinder**

**2 Design No.**

**3 Piping Method**

- A: Gasket type (This type is applicable to speed control installation)
- G: Gasket type (Rc thread port w/plug)
- S: Pipeline type (Rc thread port)



Gasket Type

Piping Type

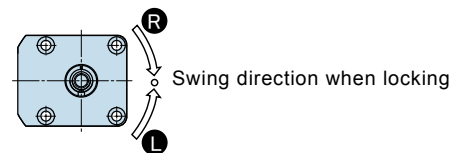
This type is applicable to speed control installation  
R screw plug is packed together  
(The speed control is prepared otherwise)

With R plug

Rc thread port only

**4 Swing direction when locking**

- R: clockwise
- L: counter clockwise



**5 Confirmation Method (rod end style)**

- No marking: standard (no confirmation) ...P7
- D: Double ended rod (threaded) ...P9

No marking

D



**6 Option Model**

- No marking: tapered rod w/ taper sleeve
- F: quick-change lever type ...P11
- Q: Long stroke type ...P13

F

Q



● Speed Control valve \*1

BZW 0 1 0 0 - B

1                      2                      3

**1 R thread size**

1: R1/8

**2 Design No.**

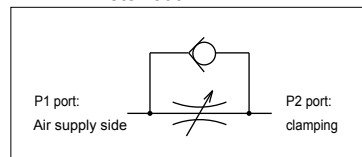
**3 Controlling method**

B: meter-out

\*1. It can only be installed on Piping Method A Type.



BZW-B: meter-out

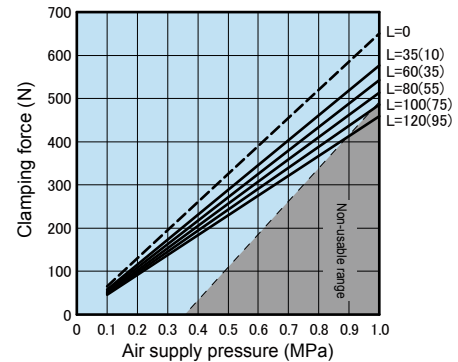


# Air Swing Clamp

## Performance Diagram

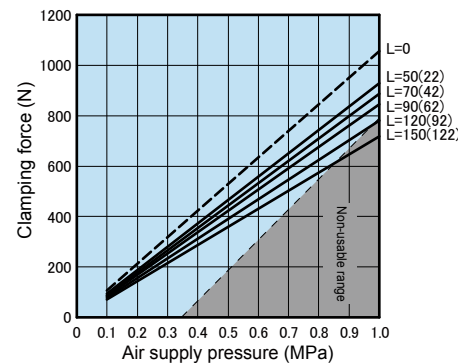
### WHA0320

Air supply pressure (MPa)	Cylinder output (N)	Clamping force (N)								Maximum Lever Length (L) (mm)
		Lever Length L (mm)								
		35	50	60	70	80	90	100	120	
1.0	650	580	560	540	530	510	500	490		103
0.9	590	520	500	490	470	460	450	440	410	120
0.8	520	460	440	430	420	410	400	390	370	147
0.7	460	400	390	380	370	360	350	340	320	190
0.6	390	350	330	320	320	310	300	290	270	190
0.5	330	290	280	270	260	260	250	240	230	190
0.4	260	230	220	220	210	210	200	190	180	190
0.3	200	170	170	160	160	150	150	150	140	190
0.2	130	120	110	110	110	100	100	100	90	190
0.1	70	60	60	50	50	50	50	50	50	190
Maximum Use Pressure (MPa)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9		



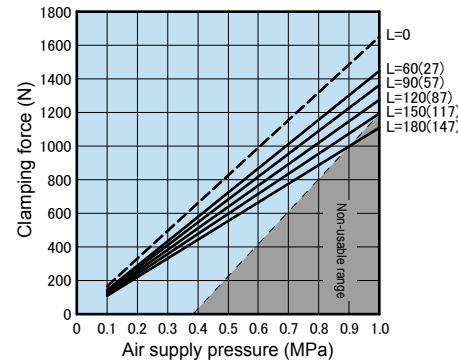
### WHA0400

Air supply pressure (MPa)	Cylinder output (N)	Clamping force (N)								Maximum Lever Length (L) (mm)
		Lever Length L (mm)								
		50	60	70	80	90	100	120	150	
1.0	1060	930	910	890	870	850	820			117
0.9	950	840	820	800	780	760	740	700		137
0.8	840	740	730	710	690	680	660	630	580	171
0.7	740	650	640	620	610	590	580	550	500	200
0.6	630	560	540	530	520	510	490	470	430	200
0.5	530	460	450	440	430	420	410	390	360	200
0.4	420	370	360	350	350	340	330	310	290	200
0.3	320	280	270	270	260	250	250	230	220	200
0.2	210	190	180	180	170	170	160	160	140	200
0.1	110	90	90	90	80	80	80	80	70	200
Maximum Use Pressure (MPa)	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8		



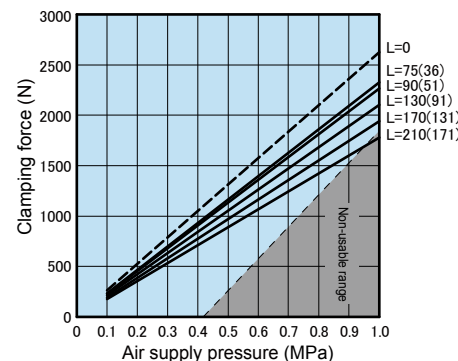
### WHA0500

Air supply pressure (MPa)	Cylinder output (N)	Clamping force (N)								Maximum Lever Length (L) (mm)
		Lever Length L (mm)								
		60	70	80	90	100	120	150	180	
1.0	1650	1450	1420	1390	1360	1340	1280	1200		151
0.9	1480	1300	1280	1250	1230	1200	1150	1080	1000	180
0.8	1320	1160	1140	1110	1090	1070	1020	960	890	236
0.7	1150	1010	990	970	950	940	900	840	780	270
0.6	990	870	850	840	820	800	770	720	670	270
0.5	820	720	710	700	680	670	640	600	560	270
0.4	660	580	570	560	550	530	510	480	440	270
0.3	490	430	430	420	410	400	380	360	330	270
0.2	330	290	280	280	270	270	260	240	220	270
0.1	160	140	140	140	130	130	120	110		270
Maximum Use Pressure (MPa)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9		



### WHA0630

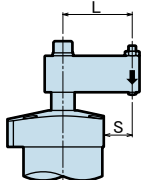
Air supply pressure (MPa)	Cylinder output (N)	Clamping force (N)								Maximum Lever Length (L) (mm)
		Lever Length L (mm)								
		75	90	110	130	150	170	190	210	
1.0	2630	2330	2270	2190	2110	2030	1950	1870		191
0.9	2360	2090	2040	1970	1900	1820	1750	1680	1610	234
0.8	2100	1860	1810	1750	1680	1620	1560	1490	1430	330
0.7	1840	1630	1590	1530	1470	1420	1360	1310	1250	330
0.6	1580	1400	1360	1310	1260	1220	1170	1120	1070	330
0.5	1310	1160	1130	1090	1050	1010	970	930	890	330
0.4	1050	930	910	870	840	810	780	750	710	330
0.3	790	700	680	660	630	610	580	560	540	330
0.2	530	470	450	440	420	410	390	370	360	330
0.1	260	230	230	220	210	200	190	190	180	330
Maximum Use Pressure (MPa)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9		



#### Notes:

- The graphs show the relationship between the clamping force and the Air supply pressure.
- There may be no swinging action for the lever with large inertia moment based on different air supply pressure, flow and lever mounting position.
- The clamping force is shown with lever in the locked position.
- The clamping force varies as per the lever length. Use the Air supply pressure suitable to the lever length.
- Usage outside of indicated range may lead to damage.
- The tables and graphs are only for reference. The exact clamping force should be calculated based on the formula in the specification column.

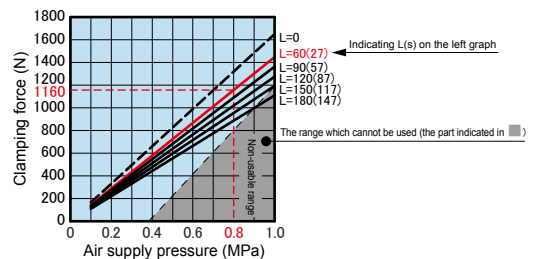
### How to read the Performance Graph



(Example) When WHA0500 is used  
 Conditions: Air supply pressure 0.8MPa  
 Lever length L=60mm  
 The clamping force is about 1160N.

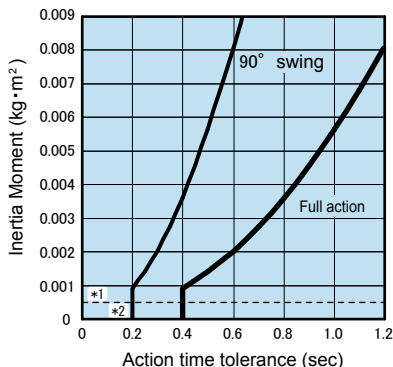
#### Notes:

- The clamping force F can be calculated by inputting the lever length L and Air supply pressure P in the formula in the specification column.
- The cylinder thrust force (when L=0) is calculated according to the formula in the specification column.

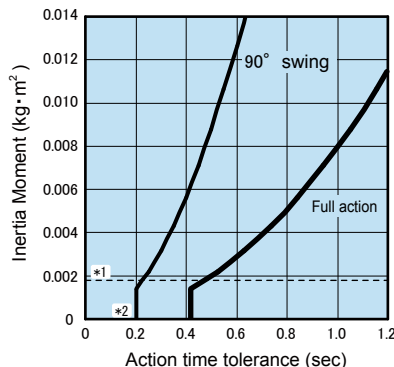


## Action Time Tolerance Graph

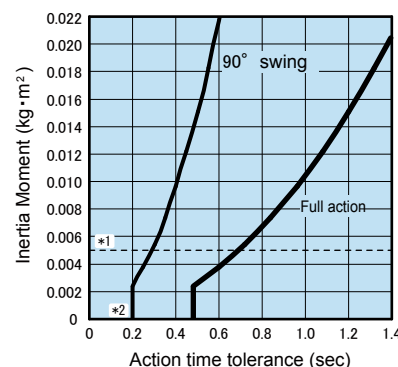
WHA0320



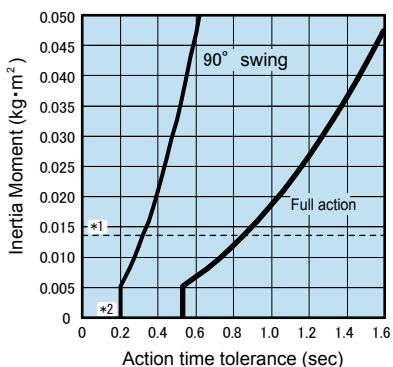
WHA0400



WHA0500

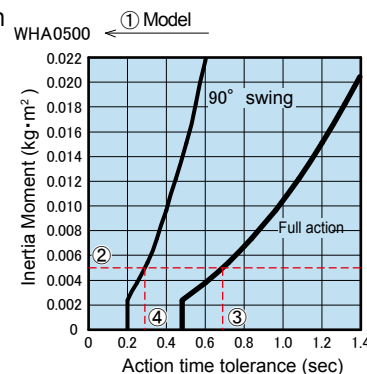


WHA0630



### How to read the Action Time Tolerance Graph

- Example) ① Model: WHA0500  
 ② Lever inertia moment : 0.0050kg·m<sup>2</sup>  
 ③ Full action time tolerance : about 0.69 sec  
 ④ 90°swinging time : about 0.29 sec



### Notes

- In the case of long stroke type, the full action time is different from what is shown on the graph. It should be calculated via the formula below. (The 90° swinging time is the same as shown on the graph.)

### Remarks

- \*1.The inertia moment of lever blank (Page 15: WZH-T) is displayed.
- \*2.Please set the shortest 90° swinging time to 0.2sec.

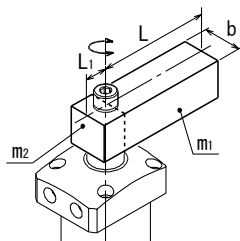
### Calculation formula of full action time

$$\text{Full action time (sec)} = 90^\circ \text{ swinging action time (sec)} \times \frac{\text{Full stroke (mm)}}{\text{Swinging stroke (mm)}}$$

## How to calculate inertia moment (estimation)

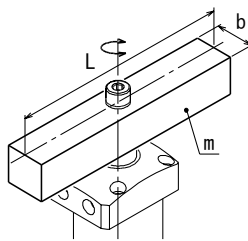
I: Inertia Moment (kg·m<sup>2</sup>) K, L, L<sub>1</sub>, L<sub>2</sub>, b: Length(m) m, m<sub>1</sub>, m<sub>2</sub>, m<sub>3</sub>, Mass(kg)

- ① For a rectangular plate (cuboid), the rotating shaft is vertically on one side of the plate.



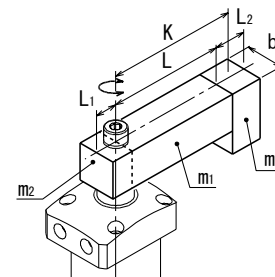
$$I = m_1 \frac{4L^2 + b^2}{12} + m_2 \frac{4L_1^2 + b^2}{12}$$

- ② For a rectangular plate (cuboid), the rotating shaft is vertically on the gravity center of the plate.



$$I = m \frac{L^2 + b^2}{12}$$

- ③ The load is on the lever front end



$$I = m_1 \frac{4L^2 + b^2}{12} + m_2 \frac{4L_1^2 + b^2}{12} + m_3 K^2 + m_3 \frac{L_2^2 + b^2}{12}$$

### Notes

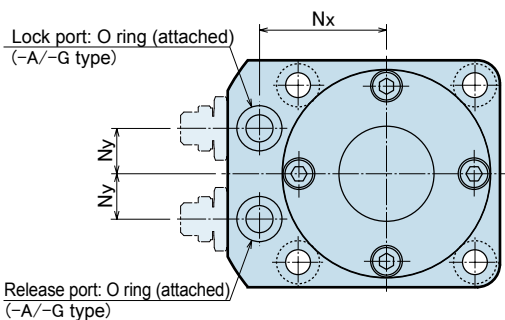
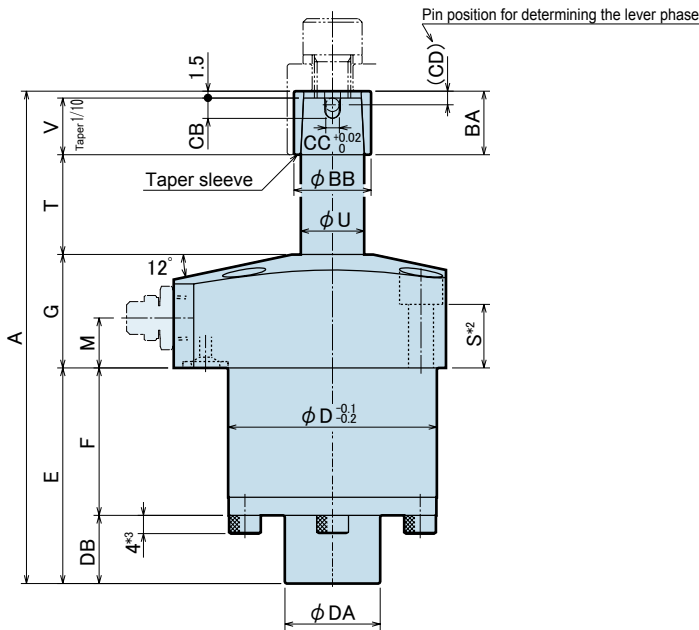
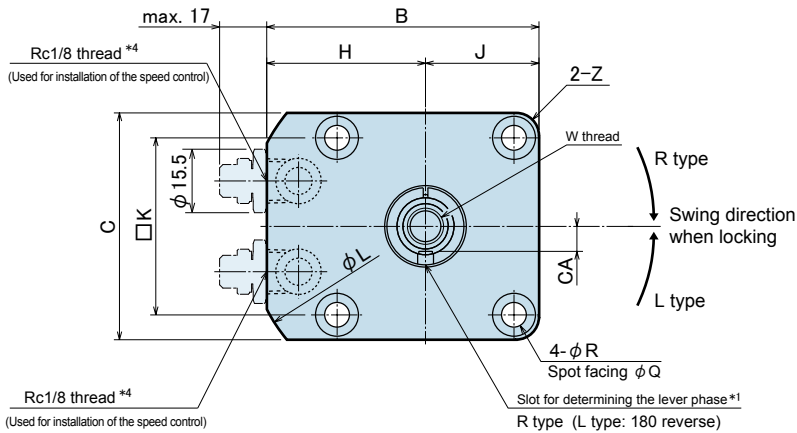
- The graph shows the action time tolerance with regard to the lever inertia moment when the clamp piston is operating at constant speed.
- There may be no swinging action for the lever with large inertia based on different Air supply pressure, flow and lever mounting position.
- For speed adjustment, the meter-out is recommended to keep clamping speed constant
- During swinging, the speed adjustment can be carried out via meter-out in case the lever accelerates its speed due to its own weight (when the clamp is horizontally mounted), or the piston rod has drastic action with meter-in control. (Refer to Page 19 for adjustment of swinging speed.)
- Excessive action speed can reduce stopping accuracy and harm internal parts.
- Please contact us if operational conditions differ from those shown on the graphs.

# Air Swing Clamp

## External Dimensions

A: Gasket type (for speed control installation with R screw plug installed)

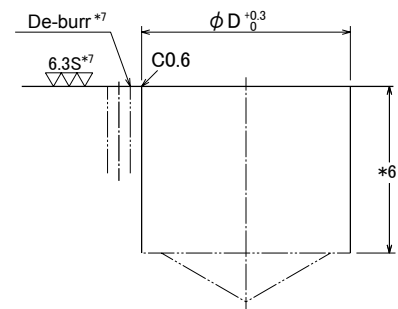
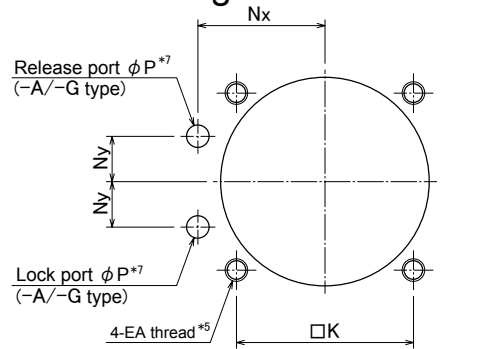
※This drawing shows the release position of WHA-2AR.



### Caution

- \*1. The slot for determining the lever phase faces the port side if locked.
- \*2. Mounting bolts are not provided. Customer should prepare based on dimension "S".
- \*3. The number of bottom bolts may vary as per different type.
- \*4. The speed control valve is not included. It should be provided otherwise as per page 17.

## Processing dimensions for the mounting area



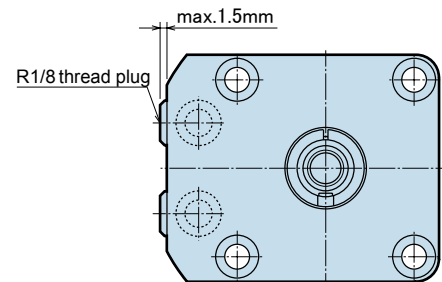
### Notes

- \*5. EA tapping depth should be calculated so that mounting bolts engage fixture by at least 1.5 x bolt diameter.
- \*6. The φD depth of the body mounting hole should be decided from dimension E.
- \*7. This process indicates -A/-G: Gasket Type.

## Piping Method

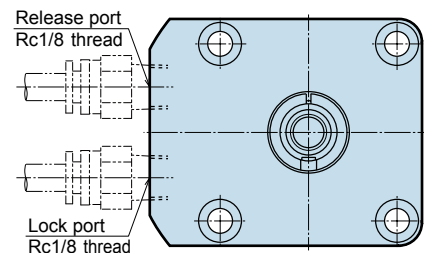
### G: Gasket type (with R thread plug)

※ This drawing shows the release position of WHA-2GR.



### S: Piping type (Rc thread)

※ This drawing shows the release position of WHA-2SR.





## Specifications

Model	WHA0320	WHA0400	WHA0500	WHA0630
Locking cylinder area	cm <sup>2</sup> 6.50	10.56	16.49	26.26
Clamping force (calculation formula) *8	N $F = P(625-1.4L)$	$F = P(1034-2.1L)$	$F = P(1616-2.8L)$	$F = P(2626-4L)$
Full stroke	mm 20	21	24	26.5
Swinging stroke (90°)	mm 10	11	14	16.5
Locking stroke	mm 10	10	10	10
Cylinder capacity	at locked	13.0	22.2	39.6
	at released	16.1	26.4	47.1
Max. operating pressure	MPa		1.0	
Minimum operation pressure *9	MPa		0.1	
Max rated pressure	MPa		1.5	
Use temperature	°C		0 ~ 70	
90° swinging angle precision			90° ± 3°	
Lock angle repeatability			± 0.5°	
Mass *10	kg 0.5	0.6	1.0	1.7

### Remarks:

\*8. F: clamping force (N) P: Air supply pressure (MPa) L: distance between the piston center and the clamping point (mm).

\*9. Minimum pressure to operate the clamp with no load.

The swinging may stop in the middle of action due to the lever shape. (Refer to page 19 for Consideration for Lever Design.)

\*10. Mass per clamp with taper sleeve.

## List of External Dimensions & Processing Dimensions for Mounting Area (mm)

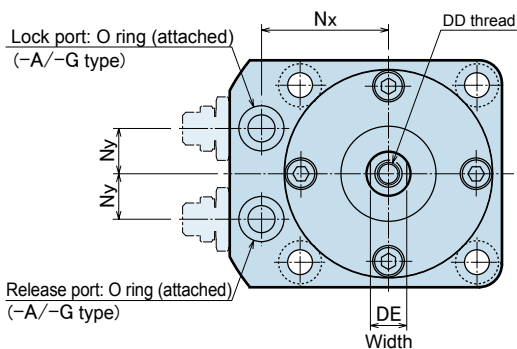
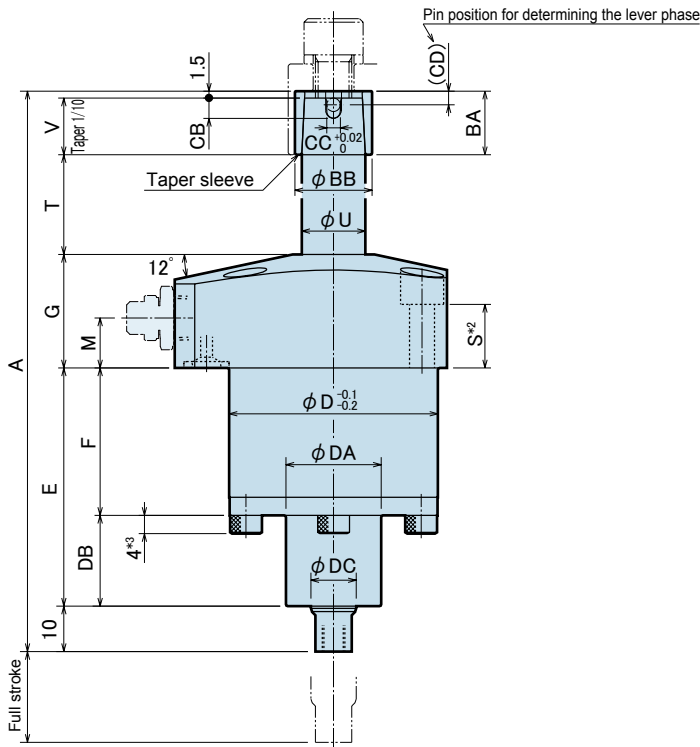
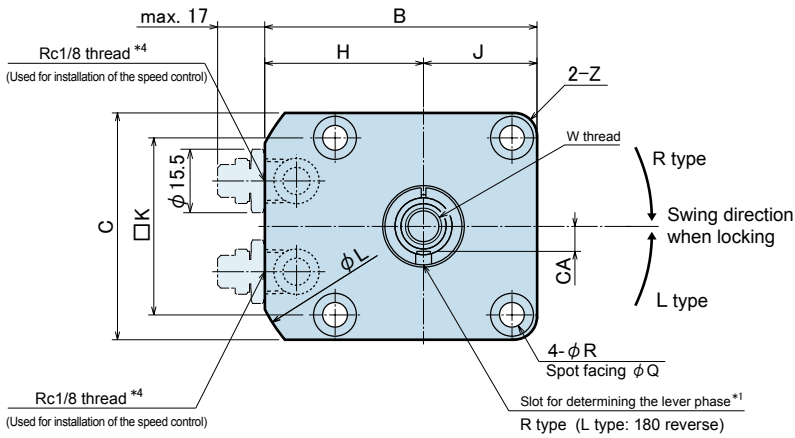
Model	WHA0320	WHA0400	WHA0500	WHA0630
A	108.5	117.5	136	149
B	60	66	76	87
C	50	56	66	78
D	46	54	64	77
E	47.5	51.5	58	66.5
F	32.5	35	41	46.5
G	25	25	30	30
H	35	38	43	48
J	25	28	33	39
K	39	45	53	65
L	79	88	98	113
M	11	11	13	13
Nx	28	31	36	41
Ny	10	13	15	20
P	5	5	5	5
Q	9.5	9.5	11	11
R	5.5	5.5	6.8	6.8
S	14	13.5	16	15
T	22	23	26	28.5
U	14	16	20	25
V	12.5	16.5	20.5	22.5
W (nominal designation X depth)	M8 × 16	M8 × 16	M10 × 20	M12 × 24
Z (chamfer)	R5	R5	R6	R6
BA	14	18	22	24
BB	17	19	24	29
CA	5.5	5.5	6.5	9
CB	4.5	4.5	5.5	5.5
CC	3	3	4	4
(CD)	3	3	3.5	3.5
DA	21	24	27	34
DB	15	16.5	17	20
EA	M5 × 0.8	M5 × 0.8	M6	M6
O ring (-A/-G type)	1BP7	1BP7	1BP7	1BP7

# Air Swing Clamp

## External Dimensions

A: Gasket type (for speed control installation with R screw plug installed)

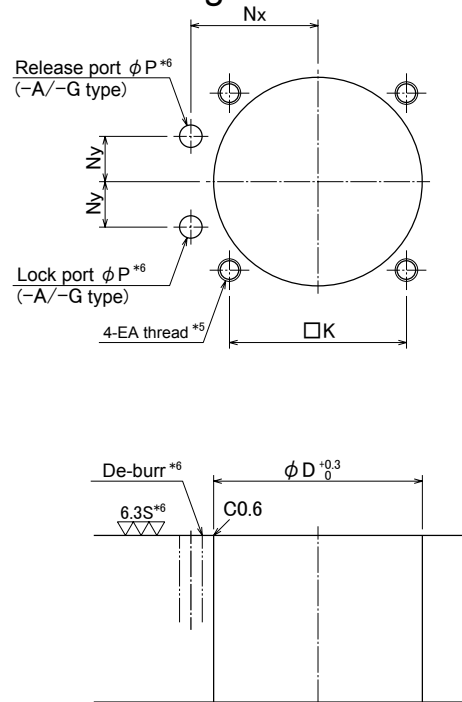
※This drawing shows the release position of WHA-2ARD.



### Caution

- \*1. The slot for determining the lever phase faces the port side if locked.
- \*2. Mounting bolts are not provided. Customer should prepare based on dimension "S".
- \*3. The number of bottom bolts may vary as per different type.
- \*4. The speed control valve is not included. It should be provided otherwise as per page 17.

## Processing dimensions for the mounting area



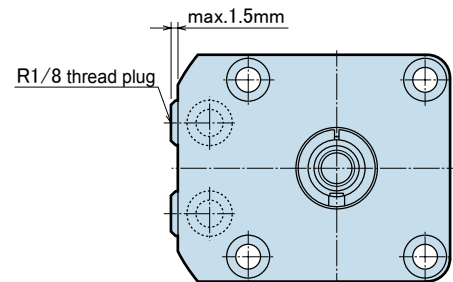
### Notes

- \*5. EA tapping depth should be calculated so that mounting bolts engage fixture by at least 1.5 x bolt diameter.
- \*6. This process indicates -A/-G: Gasket Type.

## Piping Method

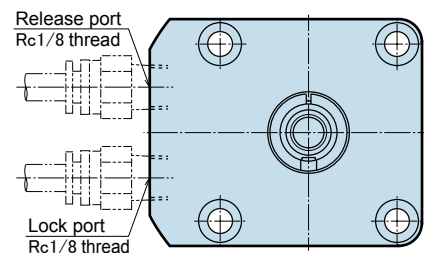
G: Gasket type (with R thread plug)

※This drawing shows the release position of WHA-2GRD.



S: Piping type (Rc thread)

※This drawing shows the release position of WHA-2SRD.



## Specifications

Model	WHA0320-D	WHA0400-D	WHA0500-D	WHA0630-D	
Locking cylinder area	cm <sup>2</sup>	6.50	10.56	16.49	26.26
Clamping force (calculation formula) *7	N	F = P(625-1.4L)	F = P(1034-2.1L)	F = P(1616-2.8L)	F = P(2626-4L)
Full stroke	mm	20	21	24	26.5
Swinging stroke (90°)	mm	10	11	14	16.5
Locking stroke	mm	10	10	10	10
Cylinder capacity	at locked	13.0	22.2	39.6	69.6
	at released	14.5	24.0	43.4	78.5
Max. operating pressure	MPa			1.0	
Minimum operation pressure *8	MPa			0.1	
Max rated pressure	MPa			1.5	
Use temperature	°C			0 ~ 70	
90°swinging angle precision				90° ± 3°	
Lock angle repeatability				±0.5°	
Mass *9	kg	0.5	0.7	1.1	1.7

### Remarks:

\*7. F: clamping force (N) P: Air supply pressure (MPa) L: distance between the piston center and the clamping point (mm).

\*8. Minimum pressure to operate the clamp with no load.

The swinging may stop in the middle of action due to the lever shape. (Refer to page 19 for Consideration for Lever Design.)

\*9. Mass per clamp with taper sleeve.

## List of External Dimensions & Processing Dimensions for Mounting Area (mm)

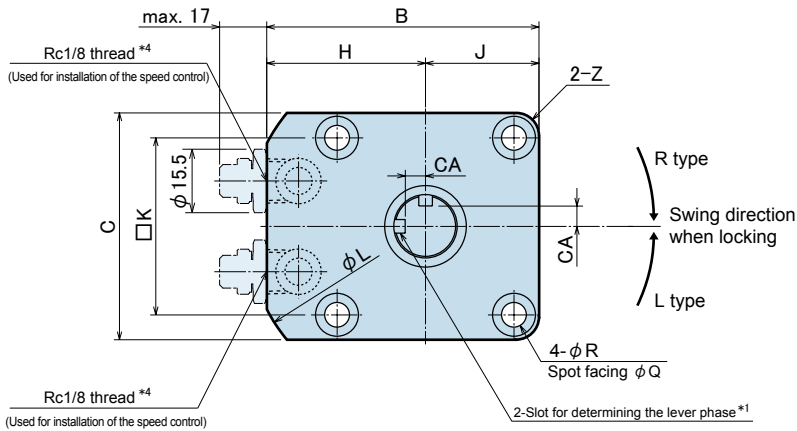
Model	WHA0320-D	WHA0400-D	WHA0500-D	WHA0630-D
A	123.5	133	151.5	164
B	60	66	76	87
C	50	56	66	78
D	46	54	64	77
E	52.5	57	63.5	71.5
F	32.5	35	41	46.5
G	25	25	30	30
H	35	38	43	48
J	25	28	33	39
K	39	45	53	65
L	79	88	98	113
M	11	11	13	13
Nx	28	31	36	41
Ny	10	13	15	20
P	5	5	5	5
Q	9.5	9.5	11	11
R	5.5	5.5	6.8	6.8
S	14	13.5	16	15
T	22	23	26	28.5
U	14	16	20	25
V	12.5	16.5	20.5	22.5
W (nominal designation X depth)	M8 × 16	M8 × 16	M10 × 20	M12 × 24
Z (chamfer)	R5	R5	R6	R6
BA	14	18	22	24
BB	17	19	24	29
CA	5.5	5.5	6.5	9
CB	4.5	4.5	5.5	5.5
CC	3	3	4	4
(CD)	3	3	3.5	3.5
DA	21	24	27	34
DB	20	22	22.5	25
DC	10	12	14	14
DD (nominal designation X depth)	M5 × 0.8 × 12	M6 × 15	M8 × 18	M8 × 18
DE	8	10	12	12
EA	M5 × 0.8	M5 × 0.8	M6	M6
O ring (-A/-G type)	1BP7	1BP7	1BP7	1BP7

# Air Swing Clamp

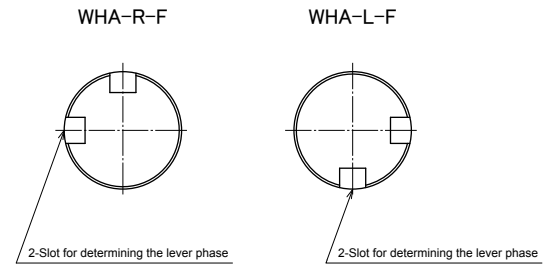
## External Dimensions

A: Gasket type (for speed control installation with R screw plug installed)

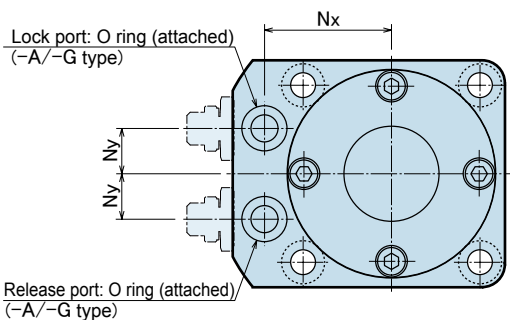
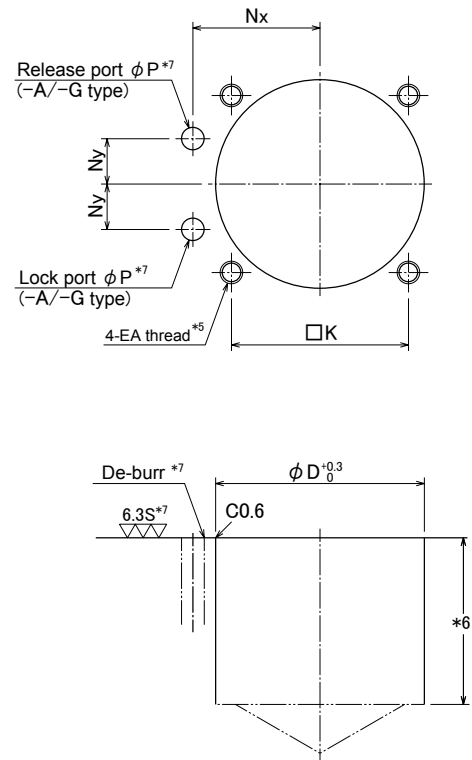
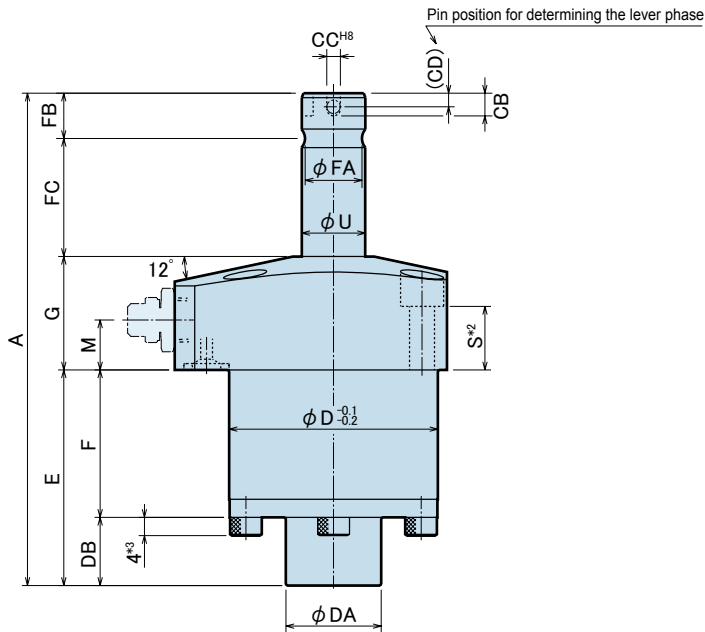
※This drawing shows the release position of WHA-2AR-F.



\*1. Details of the slot for determining the lever phase (when released)  
The slot position varies as per the lock swinging direction.



## Processing dimensions for the mounting area



### Notes

- \*5. EA tapping depth should be calculated so that mounting bolts engage fixture by at least 1.5 x bolt diameter.
- \*6. The φD depth of the body mounting hole should be decided from dimension E.
- \*7. This process indicates -A/-G: Gasket Type.

### Caution

- \*2. Mounting bolts are not provided. Customer should prepare based on dimension "S".
- \*3. The number of bottom bolts may vary as per different type.
- \*4. The speed control valve is not included. It should be provided otherwise as per page 17.

## Specifications

Model	WHA0320-F	WHA0400-F	WHA0500-F	WHA0630-F
Locking cylinder area	6.50	10.56	16.49	26.26
Clamping force (calculation formula)*8	$F = P(625-1.4L)$	$F = P(1034-2.1L)$	$F = P(1616-2.8L)$	$F = P(2626-4L)$
Full stroke	20	21	24	26.5
Swinging stroke (90°)	10	11	14	16.5
Locking stroke	10	10	10	10
Cylinder capacity	at locked	22.2	39.6	69.6
	at released	16.1	26.4	47.1
Max. operating pressure	MPa		1.0	
Minimum operation pressure *9	MPa		0.1	
Max rated pressure	MPa		1.5	
Use temperature	°C		0 ~ 70	
90°swinging angle precision			90° ± 3°	
Lock angle repeatability			±0.5°	
Mass*10	kg	0.5	1.0	1.7

Remarks:

\*8. F: clamping force (N) P: Air supply pressure (MPa) L: distance between the piston center and the clamping point (mm).

\*9. Minimum pressure to operate the clamp with no load.

The swinging may stop in the middle of action due to the lever shape. (Refer to page 19 for Consideration for Lever Design.)

\*10. Mass per clamp.

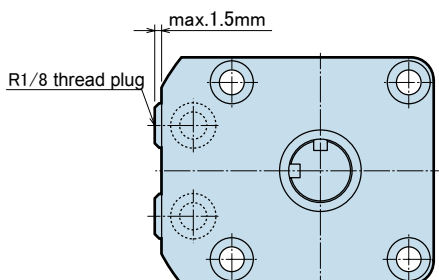
## List of External Dimensions & Processing Dimensions for Mounting Area (mm)

Model	WHA0320-F	WHA0400-F	WHA0500-F	WHA0630-F
A	114.5	121.5	142	160
B	60	66	76	87
C	50	56	66	78
D	46	54	64	77
E	47.5	51.5	58	66.5
F	32.5	35	41	46.5
G	25	25	30	30
H	35	38	43	48
J	25	28	33	39
K	39	45	53	65
L	79	88	98	113
M	11	11	13	13
Nx	28	31	36	41
Ny	10	13	15	20
P	5	5	5	5
Q	9.5	9.5	11	11
R	5.5	5.5	6.8	6.8
S	14	13.5	16	15
U	14	16	20	25
Z (chamfer)	R5	R5	R6	R6
CA	4.5	5.5	6.8	9.3
CB	5	5	6.5	6.5
CC	$3^{+0.014}$	$3^{+0.014}$	$4^{+0.018}$	$4^{+0.018}$
(CD)	2.5	2.5	3.5	3.5
DA	21	24	27	34
DB	15	16.5	17	20
EA	M5 × 0.8	M5 × 0.8	M6	M6
FA	12.5	14.5	18	22.5
FB	10	11	14	17.5
FC	32	34	40	46
O ring (-A/-G type)	1BP7	1BP7	1BP7	1BP7

## Piping Method

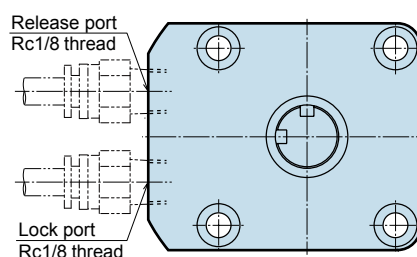
G: Gasket type (with R thread plug)

※This drawing shows the release position of WHA-2GR-F.



S: Piping type (Rc thread)

※This drawing shows the release position of WHA-2SR-F.

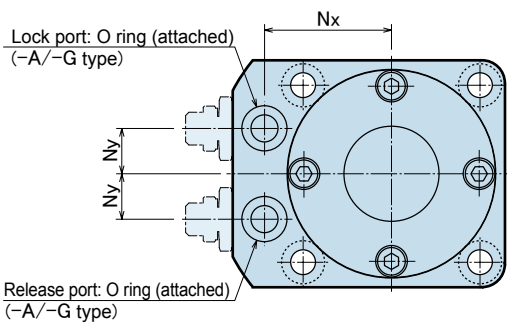
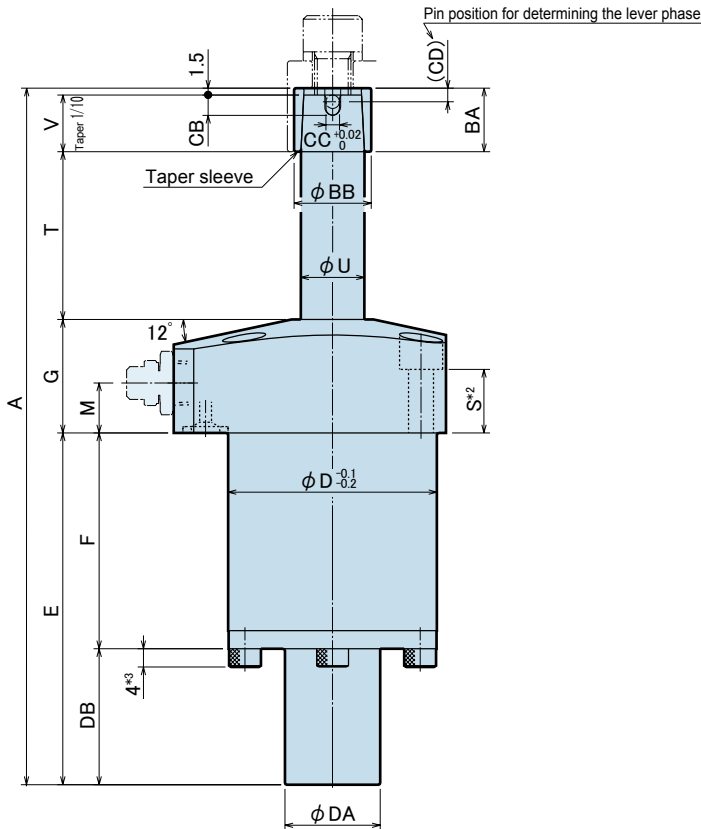
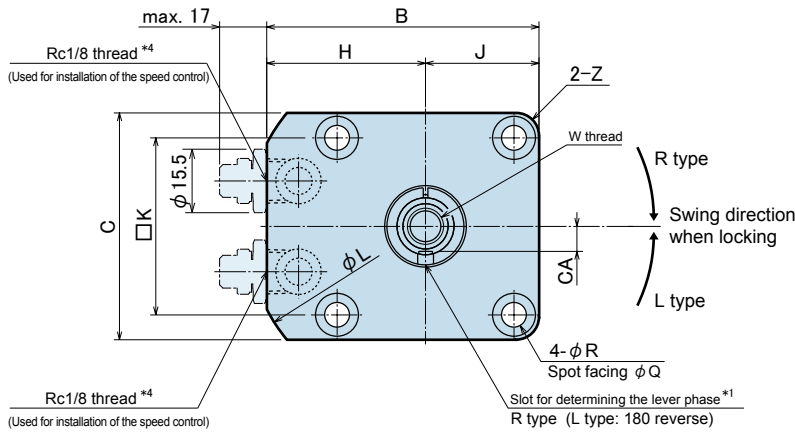


# Air Swing Clamp

## External Dimensions

A: Gasket type (for speed control installation with R screw plug installed)

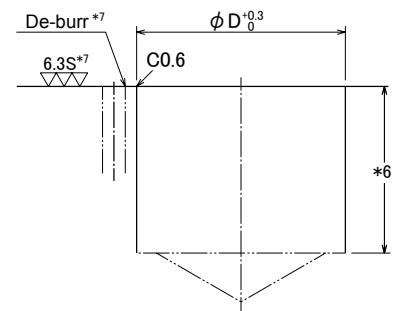
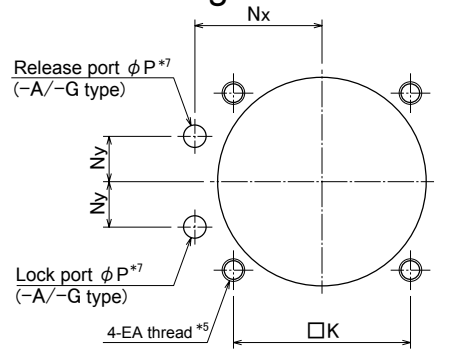
※This drawing shows the release position of WHA-2AR-Q.



### Caution

- \*1. The slot for determining the lever phase faces the port side if locked.
- \*2. Mounting bolts are not provided. Customer should prepare based on dimension "S".
- \*3. The number of bottom bolts may vary as per different type.
- \*4. The speed control valve is not included. It should be provided otherwise as per page 17.

## Processing dimensions for the mounting area



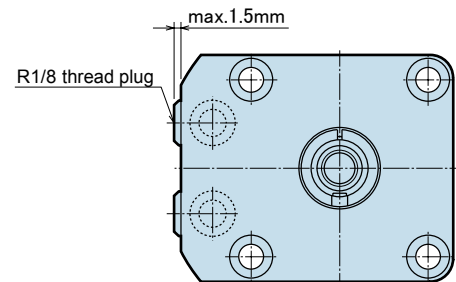
### Notes

- \*5. EA tapping depth should be calculated so that mounting bolts engage fixture by at least 1.5 x bolt diameter.
- \*6. The φ D depth of the body mounting hole should be decided from dimension E.
- \*7. This process indicates -A/-G: Gasket Type.

## Piping Method

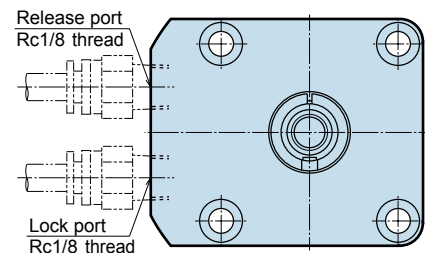
G: Gasket type (with R thread plug)

※This drawing shows the release position of WHA-2GR-Q.



S: Piping type (Rc thread)

※This drawing shows the release position of WHA-2SR-Q.



## Specifications

Model	WHA0320-Q25	WHA0400-Q25	WHA0500-Q25	WHA0630-Q25
Locking cylinder area cm <sup>2</sup>	6.50	10.56	16.49	26.26
Clamping force (calculation formula) *8 N	F = P(625-1.4L)	F = P(1034-2.1L)	F = P(1616-2.8L)	F = P(2626-4L)
Full stroke mm	35	36	39	41.5
Swinging stroke (90°) mm	10	11	14	16.5
Locking stroke mm	25	25	25	25
Cylinder capacity cm <sup>3</sup>	at locked	38.0	64.3	109.0
	at released	28.1	45.3	76.6
Max. operating pressure MPa			1.0	
Minimum operation pressure *9 MPa			0.1	
Max rated pressure MPa			1.5	
Use temperature °C			0 ~ 70	
90°swinging angle precision			90° ± 3°	
Lock angle repeatability			±0.5°	
Mass*10 kg	0.5	0.7	1.1	1.8

Remarks:

\*8. F: clamping force (N) P: Air supply pressure (MPa) L: distance between the piston center and the clamping point (mm).

\*9. Minimum pressure to operate the clamp with no load.

The swinging may stop in the middle of action due to the lever shape. (Refer to page 19 for Consideration for Lever Design.)

\*10. Mass per clamp with taper sleeve.

## List of External Dimensions & Processing Dimensions for Mounting Area (mm)

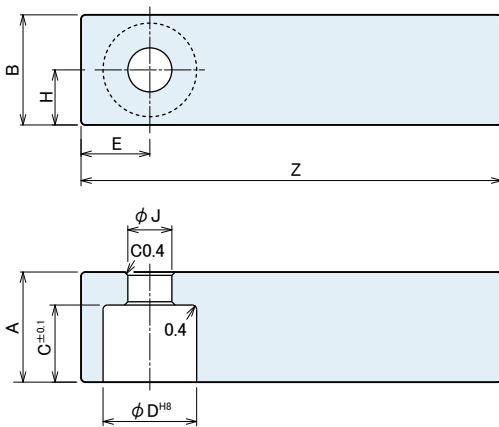
Model	WHA0320-Q25	WHA0400-Q25	WHA0500-Q25	WHA0630-Q25
A	153.5	162.5	181	194
B	60	66	76	87
C	50	56	66	78
D	46	54	64	77
E	77.5	81.5	88	96.5
F	47.5	50	56	61.5
G	25	25	30	30
H	35	38	43	48
J	25	28	33	39
K	39	45	53	65
L	79	88	98	113
M	11	11	13	13
Nx	28	31	36	41
Ny	10	13	15	20
P	5	5	5	5
Q	9.5	9.5	11	11
R	5.5	5.5	6.8	6.8
S	14	13.5	16	15
T	37	38	41	43.5
U	14	16	20	25
V	12.5	16.5	20.5	22.5
W (nominal designation X depth)	M8 × 16	M8 × 16	M10 × 20	M12 × 24
Z (chamfer)	R5	R5	R6	R6
BA	14	18	22	24
BB	17	19	24	29
CA	5.5	5.5	6.5	9
CB	4.5	4.5	5.5	5.5
CC	3	3	4	4
(CD)	3	3	3.5	3.5
DA	21	24	27	34
DB	30	31.5	32	35
EA	M5 × 0.8	M5 × 0.8	M6	M6
O ring (-A/-G type)	1BP7	1BP7	1BP7	1BP7

# Air Swing Clamp

## Accessory

### Lever material (taper lock type): WHZ-T

(mm)



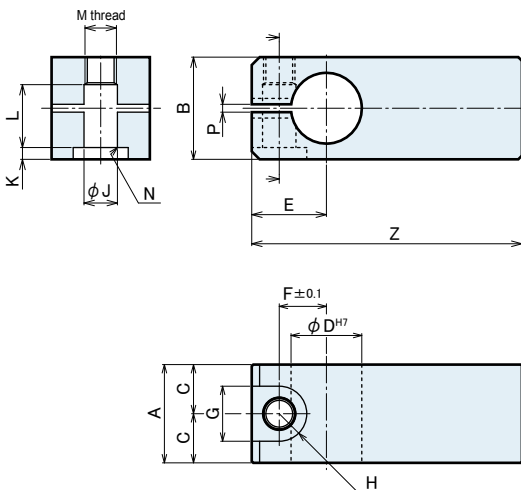
Model	WHZ0320-T	WHZ0400-T	WHZ0500-T	WHZ0630-T
Corresponding Product Model	WHA0320	WHA0400	WHA0500	WHA0630
A	20	22	28	35
B	20	22	28	35
C	14	18	22	24
D	17 <sup>+0.027</sup> <sub>0</sub>	19 <sup>+0.033</sup> <sub>0</sub>	24 <sup>+0.033</sup> <sub>0</sub>	29 <sup>+0.033</sup> <sub>0</sub>
E	12.5	13	16	19
H	10	11	14	17.5
J	9	9	11	14
Z	90	125	150	180

#### Notes

1. Material S45C
2. If necessary, the front end should be additionally processed.
3. For the phase determination, the design dimensions of swinging lever should be additionally processed by referring to the taper lock type.

### Lever material (quick change type): WHZ-F

(mm)



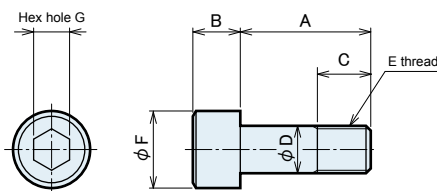
Model	WHZ0320-F	WHZ0400-F	WHZ0500-F	WHZ0630-F
Corresponding Product Model	WHA0320-F	WHA0400-F	WHA0500-F	WHA0630-F
A	20	22	28	35
B	22	22	26	32
C	10	11	14	17.5
D	14 <sup>+0.018</sup> <sub>0</sub>	16 <sup>+0.018</sup> <sub>0</sub>	20 <sup>+0.021</sup> <sub>0</sub>	25 <sup>+0.021</sup> <sub>0</sub>
E	14.5	15.5	20	24.5
F	9.25	10.25	13	16.25
G	11	11	14	17.5
H	R5.5	R5.5	R7	R8.75
J	6.5	6.5	8.5	10.5
K	2	2	3	4
L	13.5	13.5	16	18
M	M6	M6	M8 × 1	M10 × 1.25
N	C0.4	C0.4	C0.6	C0.6
P	2	2	2	2
Z	90	125	150	180

#### Notes

1. Material S45C
2. If necessary, the front end should be additionally processed.
3. For the phase determination, the design dimensions of swinging lever should be additionally processed by referring to the quick change type (-F).

### Tightening bolt for quick-change lever: LZH-B

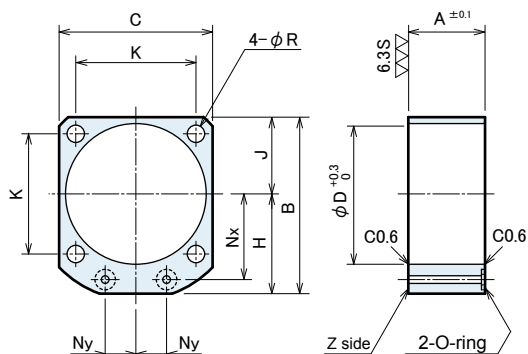
(mm)



Model	LZH0360-B	LZH0400-B	LZH0480-B
Corresponding Product Model	WHA0320-F/WHA0400-F	WHA0500-F	WHA0630-F
A	20	23	28
B	6	8	10
C	7	10	11
D	6	8	10
E	M6	M8 × 1	M10 × 1.25
F	10	13	16
G	5	6	8



### Manifold block:WHZ-MD



(mm)

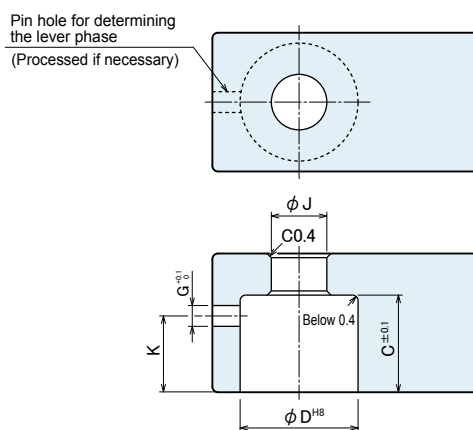
Model	WHZ0320-MD	WHZ0400-MD	WHZ0500-MD	WHZ0630-MD
Corresponding Product Model	WHA0320	WHA0400	WHA0500	WHA0630
A	25	27	31	35
B	60	67	77	88.5
C	50	58	68	81
D	46	54	64	77
H	35	38	43	48
J	25	29	34	40.5
K	39	45	53	65
Nx	28	31	36	41
Ny	10	13	15	20
R	5.5	5.5	6.5	6.5
O-ring	1BP7	1BP7	1BP7	1BP7

Notes

1. Material A2017BE-T4
2. Mounting bolts are not provided. Customer should prepare based on dimension "A".
3. Z side should be additionally processed for use if it is necessary to have the area beyond the block thickness (A dimension). Moreover, refer to this drawing for fabrication.

### Swinging lever design dimensions

#### Taper lock lever type



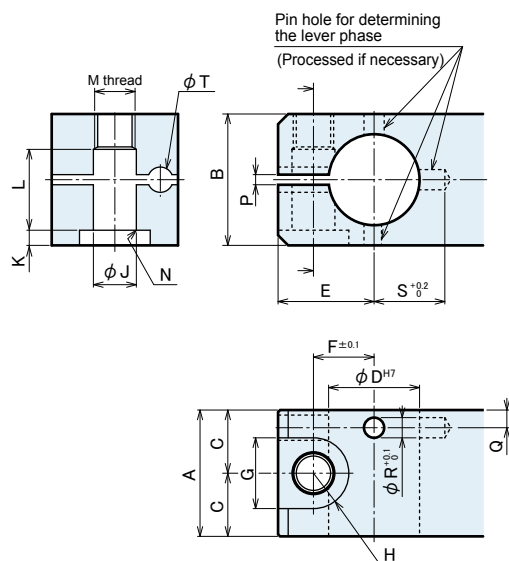
(mm)

Corresponding Product Model	WHA0320	WHA0400	WHA0500	WHA0630
C	14	18	22	24
D	17 <sup>+0.027</sup> <sub>0</sub>	19 <sup>+0.033</sup> <sub>0</sub>	24 <sup>+0.033</sup> <sub>0</sub>	29 <sup>+0.033</sup> <sub>0</sub>
G	3	3	4	4
J	9	9	11	14
K	11	15	18.5	20.5
Phase determining pin (reference)	φ 3 × 6	φ 3 × 6	φ 4 × 8	φ 4 × 10

Notes

1. Swing lever should be designed with its length according to performance graph shown on Page 5.
2. If the swing lever is not in accordance with the dimension shown above, performance may be degraded and damage can occur.
3. The pin hole (φ G) for determining the lever phase should be added, if necessary.

#### Quick Change Type (-F)



(mm)

Corresponding Product Model	WHA0320-F	WHA0400-F	WHA0500-F	WHA0630-F
A	20	22	28	35
B	22	22	26	32
C	10	11	14	17.5
D	14 <sup>+0.018</sup> <sub>0</sub>	16 <sup>+0.018</sup> <sub>0</sub>	20 <sup>+0.021</sup> <sub>0</sub>	25 <sup>+0.021</sup> <sub>0</sub>
E	14.5	15.5	20	24.5
F	9.25	10.25	13	16.25
G	11	11	14	17.5
H	R5.5	R5.5	R7	R8.75
J	6.5	6.5	8.5	10.5
K	2	2	3	4
L	13.5	13.5	16	18
M	M6	M6	M8 × 1	M10 × 1.25
N	C0.4	C0.4	C0.6	C0.6
P	2	2	2	2
Q	2.5	2.5	3.5	3.5
R	3	3	4	4
S	13	14	15	19.5
T	3.4	3.4	4.5	4.5
Phase determining pin (reference)	φ 3 × 8	φ 3 × 8	φ 4 × 8	φ 4 × 10

Notes

1. Swing lever should be designed with its length according to performance graph shown on Page 5.
2. If the swing lever is not in accordance with the dimension shown above, performance may be degraded and damage can occur.
3. The pin hole (φ R) for determining the lever phase should be added, if necessary.

# Air Swing Clamp

## Speed Control Valve: BZW0100-B\*1

BZW is the R screw specific speed control valve where direct mounting is allowed for the piping method: Type A It is best used in the circuit where the flow governing valve cannot be mounted, or the synchronized and individual adjustment is necessary.

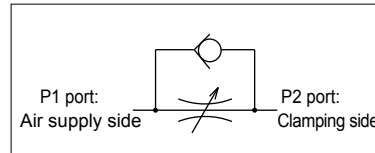
\*1.Piping Method A Type.



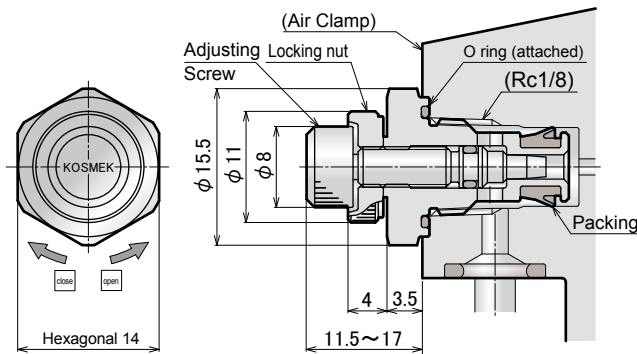
### Specifications

Model	BZW0100-B
Controlling Method	Meter-out
Used Pressure MPa	0.1 ~ 1.0
Max rated pressure MPa	1.5
Number of rotations for adjusting screw	10 Rotations
Tightening Torque N·m	5 ~ 7

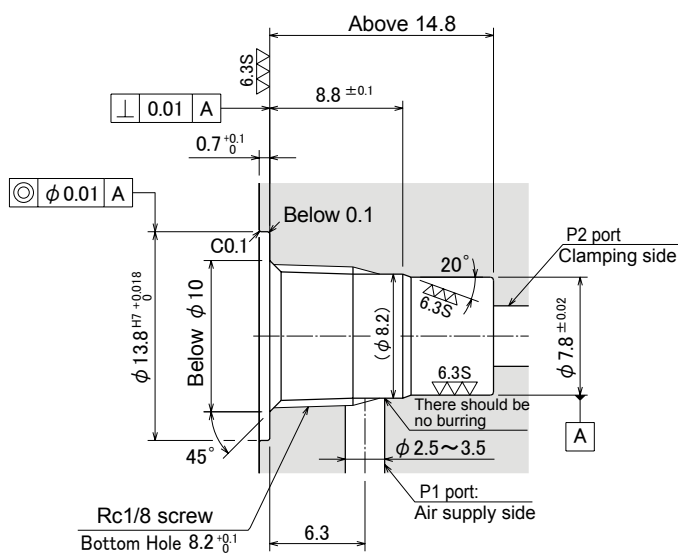
### Circuit Symbols



### External Dimensions



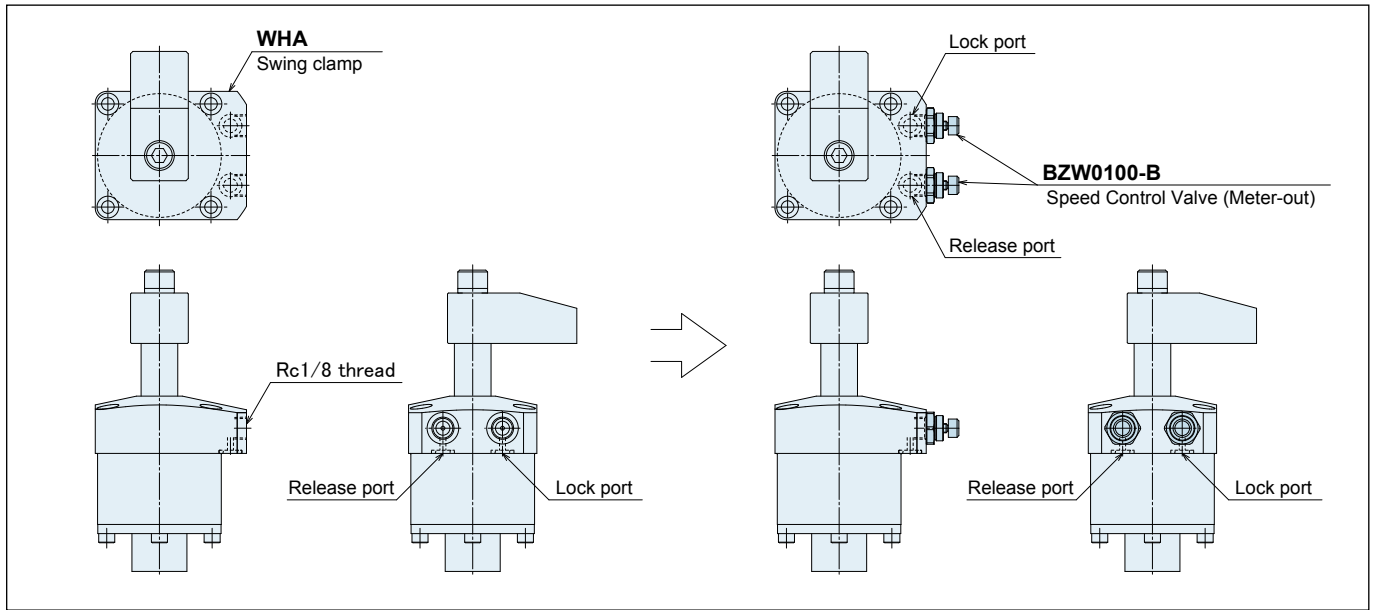
### Processing dimensions for the mounting area



#### Notes

1. As the  $\nabla\nabla\nabla$  area is sealing part, pay attention not to damage it .
2. Pay attention to have no cutting powder and burring at the tolerance part of the processing hole.
3. As shown in the drawing, P1 port is used as the air supply side and P2 port as the clamping side.

## Application Example



### Notes

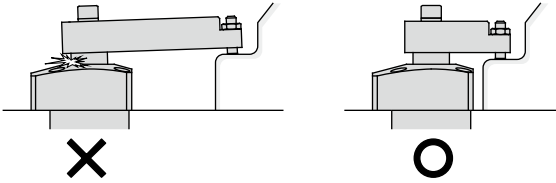
1. The speed control valve (BZW) can be mounted only on the Piping Method type A.

# Air Swing Clamp

## Notes for design

### 1) Specification confirmation

- The maximum used pressure is 1.0 MPa and minimum operating pressure is 0.1 MPa. However, the maximum used pressure and clamping force vary as per the swinging lever length. If unreasonable load is inflicted with the use range exceeded, it may lead to deformation, getting stuck and air leakage. Use the appropriate pressure based on the length of the used lever by referring to Performance Graph on page 5.



### 2) Consideration for circuit design

- Do not supply pressure to lock and release ports simultaneously. This can lead to malfunction and damage.

### 3) Endeavor to minimize swing lever inertial moment.

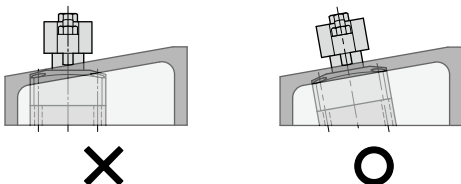
- If there is big inertia moment, it may lead to deterioration of lever stopping precision and clamp damage. Moreover, the rotation may not be done because of the air pressure and lever mounting position.
- Set the swinging time based on the inertia moment. It should be operated within the tolerance time with reference to Action Tolerance Time Graph. (Refer to Page 6)
- If large flow air is supplied right after installation, the action time may become extremely fast, resulting in major clamp damage. Install the speed controller (meter-in) beside the air source and gradually supply air.

### 4) When the welding fixture is used, the exposed area of piston rod should be protected.

- Spattering on the sliding surfaces can lead to damage and air leakage.

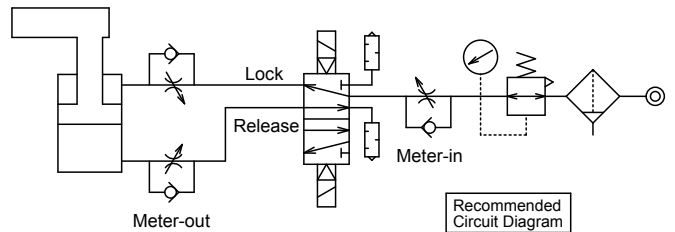
### 5) When the workpiece inclined side is clamped

- The clamping side and clamp mounting side should be made parallel.



### 6) Swinging speed adjustment

- If the clamp action is extremely fast, the parts may be worn out and damaged soon, resulting in fault. Adjust the swinging action time by referring to Action Tolerance Time Graph on page 6.
- Install the speed controller (meter-out), and gradually adjust the speed to the setting from low speed (the status of small flow). If the speed control is carried out from high speed (the status of big flow), the machine and equipment may be damaged.

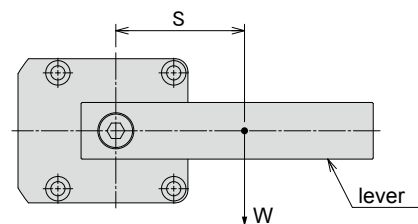


- Please set one speed controller for each clamp (meter-out) if multiple clamps are synchronized for action.

### 7) Consideration for lever design

- The lever should be as light as possible. The rotation may not be done because of the air pressure, lever mounting position and shape. The swinging may be stopped in the middle of action if a large lever horizontally mounted is used. Use the lever where the value of (lever weight  $W$ )  $\times$  (gravity center  $S$ ) is below that in the table below.

Model	(lever weight $W$ ) $\times$ (gravity center $S$ )	(N.m)
WHA0320	0.10	
WHA0400	0.20	
WHA0500	0.45	
WHA0630	0.90	



## Notes on installation

### 1) Used fluid confirmation

- Air should be clean and free of contaminants.
- Make sure not to supply oil via lubricator.  
In case oil is supplied via lubricator, the action may become unstable under low pressure and low speed conditions.

### 2) Treatment before the piping

- The fluid holes such as pipeline, piping connector and fixture should be cleaned by thorough flushing before use.
- The waste and cutting powder in the circuit may lead to air leakage and malfunctioning.
- This product is not equipped with filters for the air supply.

### 3) Applying seal tape

- Wind it around the screw end by 1-2 more turns.
- The breaking side of the seal tape may be the reason for air leakage and malfunctioning.
- In order to prevent foreign substance going into the product during the piping work, it should be carefully cleaned before the work is started.

### 4) Mounting the body

- Use four bolts with hex holes (strength division 12.9) and tighten the body with torque as shown in the table below. If the tightening torque is more than that recommended, it may lead to immersion of the seat and bolt burning.

Model	Nominal designation of mounting bolt	Tightening torque (N.m)
WHA0320	M5 × 0.8	6.3
WHA0400	M5 × 0.8	6.3
WHA0500	M6	10.0
WHA0630	M6	10.0

### 5) Installation of speed control valve

- Tighten the speed control valve with the tightening torque of 5-7 Nm.

### 6) Mounting and removal of swinging lever

- If the tightening part of the lever/taper sleeve/piston rod is contaminated with oil or foreign substance, the lever may be loosened. Thoroughly degrease and flush it to get rid of oil and foreign substance.
- Tighten the swinging lever with torque as shown in the table below.

(Standard: taper lock lever type)

Model	thread size	Tightening torque (N.m)
WHA0320	M8	20 ~ 24
WHA0400	M8	20 ~ 24
WHA0500	M10	32 ~ 38
WHA0630	M12	63 ~ 76

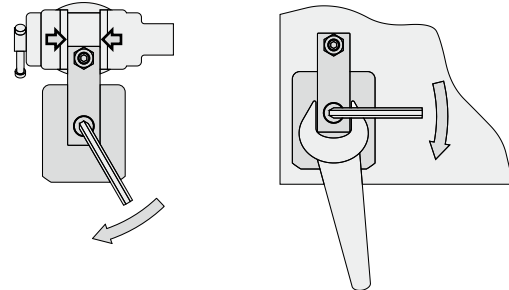
(-F: Quick-change lever type)

Model	thread size	Tightening torque (N.m)
WHA0320-F	M6	14
WHA0400-F	M6	14
WHA0500-F	M8 × 1	33
WHA0630-F	M10 × 1.25	65

- If excessive load is inflicted on the piston rod, the internal rotation mechanism may be damaged. Operate in the manner as described below in order to inflict no torque on the piston rod.

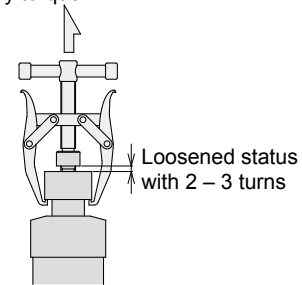
### During mounting

- ① Fix the swinging lever with vise or spanner and tighten it with lever fixing torque.



### During removal

- ① Fix the swinging lever with vise or spanner and loosen it by 2-3 turns with lever fixing torque.
- ② Pull out the swinging lever with coupler while the piston rod is not inflicted with rotary torque.



### 7) Swinging speed adjustment

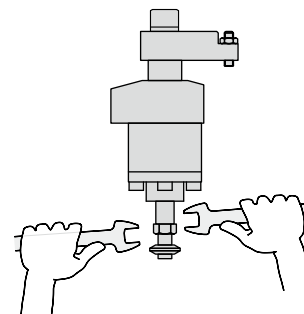
- Adjust the speed with reference to Action Tolerance Time Graph described in page 6.  
If the clamp action is extremely fast, the parts may be worn out and damaged soon, resulting in fault.
- Adjust the speed control valve slowly from the low speed side (low flow) to high speed side (large flow).

### 8) Checking looseness and retightening

- At the beginning of the equipment installation, the bolt tightening force for tightening the lever is low due to initial messing. Check its looseness and retighten it.

### 9) Notes on dual rod type (-D) for dog application

- When the dog is mounted, prevent the piston rod from rotating. Fix the width part at the front of the dog and then mount it. The tightening torque for the screws is shown in the table below.



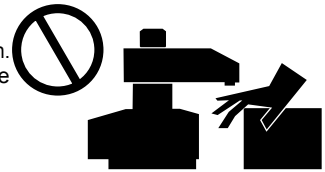
Model	thread size	Tightening torque (N.m)
WHA0320-D	M5 × 0.8	6.3
WHA0400-D	M6	10
WHA0500-D	M8	25
WHA0630-D	M8	25

# Air Swing Clamp

## Notes on handling

- 1) It should be handled by qualified personnel with sufficient knowledge.
  - The hydraulic machine/air compressor should be handled and maintained by qualified personnel with sufficient experience and knowledge.
- 2) Do not handle or disassemble the machine unless the safety is ensured.
  - ① The machine and equipment can only be inspected or prepared when it is confirmed that the preventive devices against falling of driven articles and reckless operation preventive device are in place.
  - ② Before the machine is removed, make sure that the above-mentioned safety measures are in place, shut off the pressure source and power, and make sure that no pressure exists in the pneumatic circuit.
  - ③ After stopping the machine, do not disassemble it until its temperature cools down.
  - ④ Make sure there is no abnormality in the bolts and respective parts before restarting the machine/equipment.

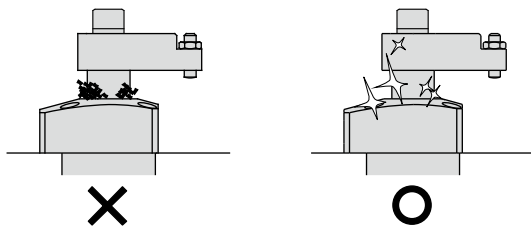
- 3) Do not touch the lamp when the swinging clamp is in operation. Otherwise, your hands may be injured due to clinching.



- 4) Do not disassemble or modify it.
  - If it is disassembled or modified, the warranty will become invalid even if it is still within the warranty period.

## Maintenance/Inspection

- 1) Removal of the machine and shutoff of pressure source
  - Before the machine is removed, make sure that the preventive devices against falling of driven articles and reckless operation preventive device are in place, shut off the pressure source and power, and make sure that no pressure exists in the pneumatic circuit.
  - Make sure there is no abnormality in the bolts and respective parts before restarting.
- 2) Regularly clean the area around the piston rod.
  - If it is used when the surface is contaminated with dirt, it may lead to packing seal damage, malfunctioning and air leakage.



- 3) Check whether the pipeline, mounting bolt and bolt for fixing the lever are loosened or not. Retighten it on the regular basis.
- 4) Make sure the air supply is clean.
- 5) Make sure that the action is smooth and there is no abnormal noise.
  - Especially when it is restarted after left unused for a long period, make sure it can be operated correctly.
- 6) The products should be stored in the cold and dark place without direct sunshine and moisture.
- 7) Please contact us for overhaul and repair.

## Warranty

- 1) Warranty Period
    - The product warranty period is 18 months from shipment from our factory or 12 months from initial use, whichever is earlier.
  - 2) Warranty Scope
    - If the product is damaged or malfunctions during the warranty period due to faulty design, materials or workmanship, we will replace or repair the defective part at our expense. Defects or failures caused by the following are not covered. (including damage caused by the misconduct of the third party.)
      - ① If the stipulated maintenance and inspection are not carried out.
      - ② If the product is used while it is not suitable for use based on the operator's judgement, resulting in defect.
      - ③ If it is used or handled in inappropriate way by the operator. (including damage caused by the misconduct of the third party.)
      - ④ If the defect is caused by reasons other than our responsibility.
      - ⑤ If it is caused by reform or repair other than carried out by us, or without our approval and confirmation.
      - ⑥ Other caused by natural disasters or calamities not attributable to our company.
      - ⑦ Parts expenses or replacement expenses due to parts consumption and deterioration. (such as gum, plastic, seal material and some electric components).
- Moreover, the damages in connection with or resulting from the product defect shall be excluded from the warranty.



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