

Double Piston Pneumatic Swing Clamp

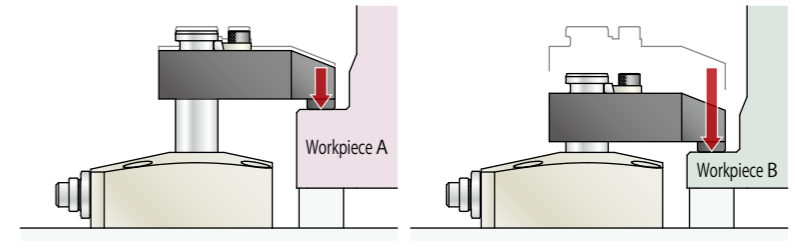
Model WHD



PAT.

Advanced pneumatic swing clamp exerts higher force with double piston mechanism.

Long Stroke allows for different clamping heights of workpieces on the same application.

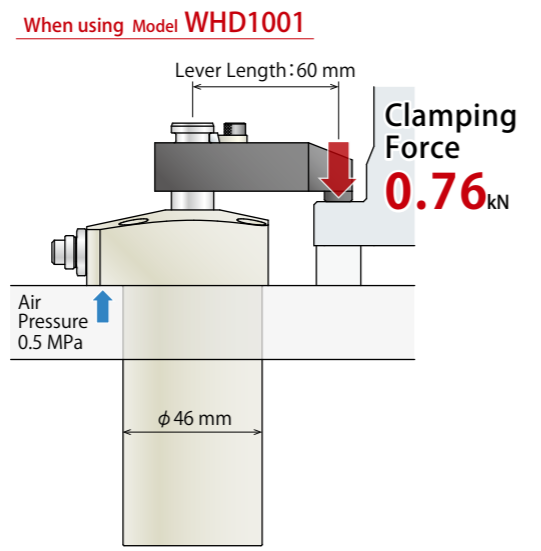


Compared to pneumatic swing clamp Model WHA, it exerts equivalent clamping force even with downsized body.

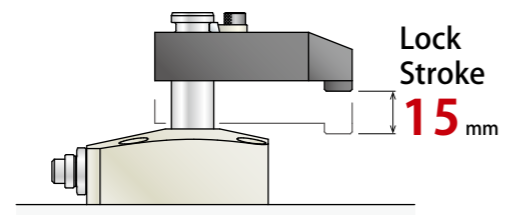
Features

Double Piston Mechanism allows for both higher cylinder force and longer stroke of pneumatic swing clamp.

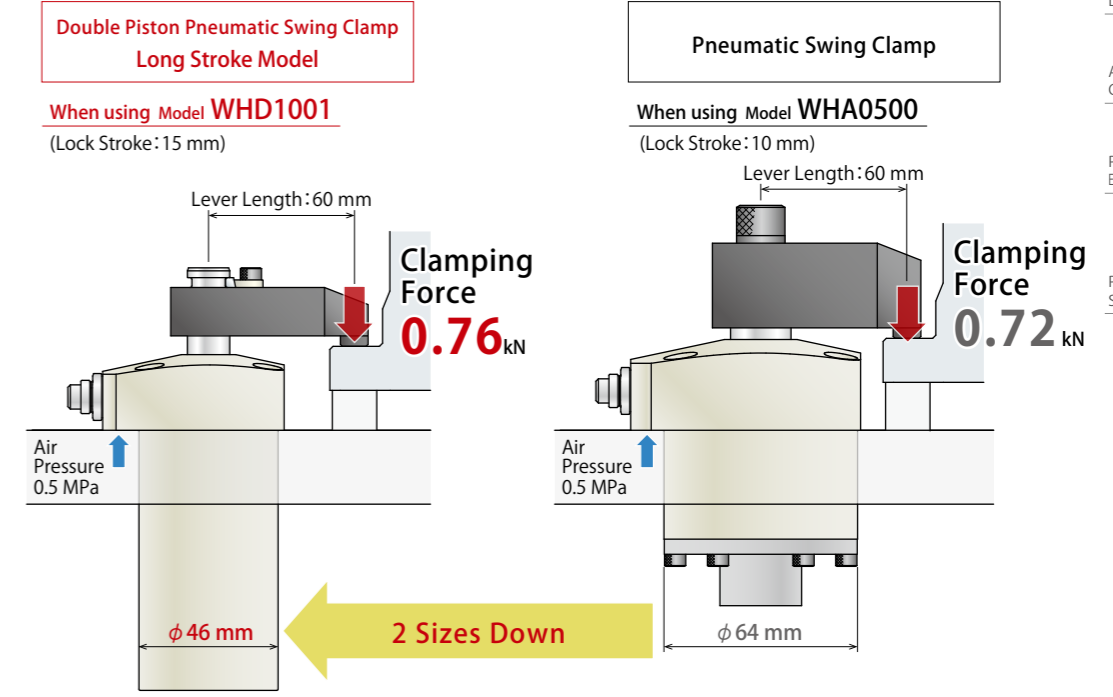
High Cylinder Force



Long Stroke

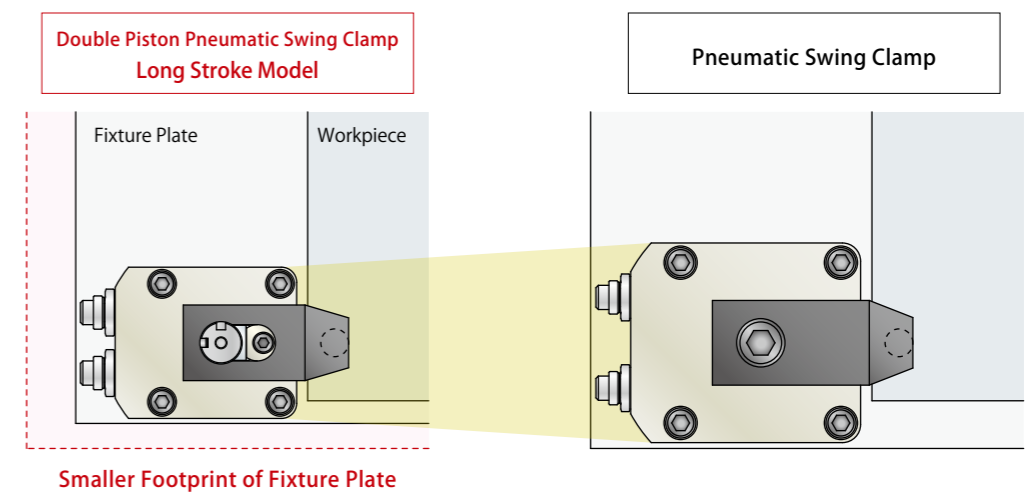


Downsized



Compact Light

Enables smaller footprint and lighter weight of application.



- High-Power Series
- Pneumatic Series
- Hydraulic Series
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others
- Pneumatic Hole Clamp SWA
- Pneumatic Swing Clamp WHA
- Double Piston Pneumatic Swing Clamp WHD
- Pneumatic Link Clamp WCA
- Air Flow Control Valve BZW
- Pneumatic Expansion Locating Pin VWM, VWK
- Pneumatic Sensor Pin WWA

Model No. Indication

Clamp Body

WHD 160 1 -2 A R - A

1 2 3 4 5

1 Cylinder Force

- 060 : Cylinder Force 0.57 kN (at Air Pressure 0.5MPa)
- 100 : Cylinder Force 0.90 kN (at Air Pressure 0.5MPa)
- 160 : Cylinder Force 1.36 kN (at Air Pressure 0.5MPa)
- 250 : Cylinder Force 2.03 kN (at Air Pressure 0.5MPa)
- 400 : Cylinder Force 3.08 kN (at Air Pressure 0.5MPa)

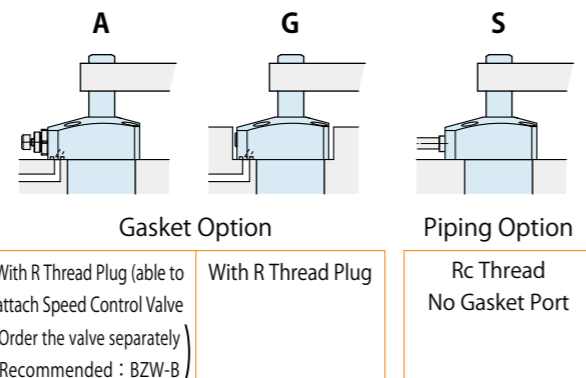
※ Cylinder force is different from clamping force.

2 Design No.

1 : Revision Number

3 Piping Method

- A : Gasket Option (With Ports for Speed Controller)
- G : Gasket Option (with R Thread Plug)
- S : Piping Option (Rc Thread)



※ Speed control valve (BZW) is sold separately. Please refer to P.309.

4 Swing Direction when Clamping

- R : Clockwise
- L : Counter-Clockwise



5 Option

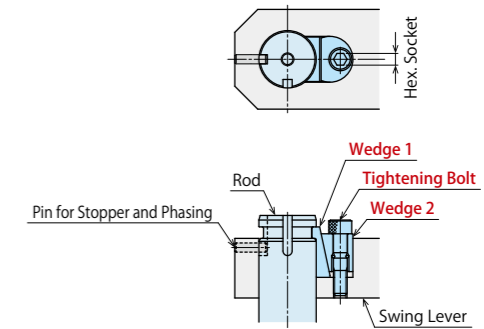
A : Quick Change Lever Option A

※ Please contact us for details of other options.

Tightening Kit for Quick Change Lever Option A

Tightening Kit for mounting Quick Change Lever Option A.
Sold separately from clamp body.

[Contents of Tightening Kit]
• Wedge 1 • Wedge 2 • Tightening Bolt



WHZ 160 1 - W

1 2

1 Corresponding Model No.

- 060 : WHD0601-2□-A 250 : WHD2501-2□-A
- 100 : WHD1001-2□-A 400 : WHD4001-2□-A
- 160 : WHD1601-2□-A

2 Design No.

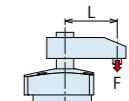
1 : Revision Number

Specifications

Clamp Body

Model No.	WHD0601-2□-A	WHD1001-2□-A	WHD1601-2□-A	WHD2501-2□-A	WHD4001-2□-A
Cylinder Area for Locking	cm ² 11.5	18.0	27.3	40.6	61.6
Clamping Force ※1 (Calculation Formula)	kN $F = \frac{P}{0.8721+0.00280 \times L}$	$F = \frac{P}{0.5570+0.00173 \times L}$	$F = \frac{P}{0.3669+0.00108 \times L}$	$F = \frac{P}{0.2465+0.00067 \times L}$	$F = \frac{P}{0.1624+0.00039 \times L}$
Cylinder Capacity	Lock	24.7	40.4	65.4	103.5
	Release	27.1	43.9	70.2	111.5
Cylinder Inner Diameter ※2	mm 30	37	45	55	68
Rod Diameter ※2	mm 12	14	16	20	25
Full Stroke	mm 21.5	22.5	24	25.5	27
Swing Stroke (90°)	mm 6.5	7.5	9	10.5	12
Lock Stroke	mm	15			
Swing Angle Accuracy	90° ±3°				
Swing Completion Position Repeatability	±0.75°				
Air Pressure	Max. Operating Pressure	MPa 0.5			
	Min. Operating Pressure ※3	MPa 0.2			
	Withstanding Pressure	MPa 0.75			
Operating Temperature	°C 0 ~ 70				
Usable Fluid	Dry Air				
Weight ※4	kg 0.6	0.8	1.2	1.8	3.0

Notes: ※1. F : Clamping Force (kN), P : Supply Air Pressure (MPa), L : Distance between the piston center and the clamping point (mm).
 ※2. Clamping force cannot be calculated from the cylinder inner diameter and rod diameter. Please refer to the clamping force curve.
 ※3. Minimum pressure to operate the clamp without load.
 ※4. It shows the weight of single swing clamp without the tightening kit and swing lever.

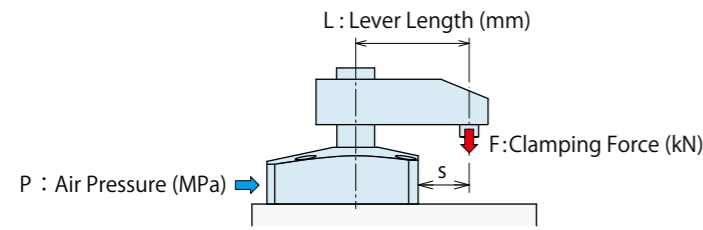


Tightening Kit for Quick Change Lever Option A

Model No.	WHZ0601-W	WHZ1001-W	WHZ1601-W	WHZ2501-W	WHZ4001-W
Corresponding Model No.	WHD0601-2□-A	WHD1001-2□-A	WHD1601-2□-A	WHD2501-2□-A	WHD4001-2□-A
Nominal×Pitch of Tightening Bolt	M4×0.7	M4×0.7	M4×0.7	M5×0.8	M6×1
Hex. Socket	mm 3	3	3	4	5
Tightening Torque	N·m 2.5	2.5	2.5	5.0	8.0

- High-Power Series
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- Hydraulic Series
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- Manual Operation Accessories
- Cautions / Others
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- Pneumatic Swing Clamp WHA
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- Pneumatic Sensor Pin WWA

Clamping Force Curve

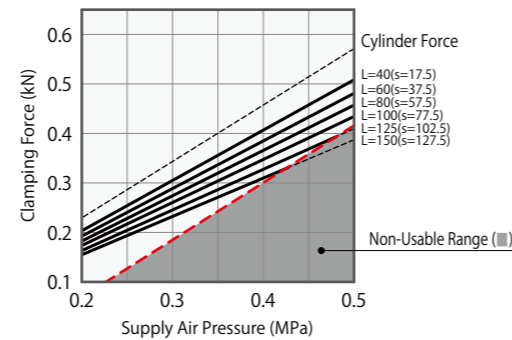


(How to Read the Clamping Force Curve)
In case of WHD1601 : When supply air pressure P is 0.4MPa and lever length L is 60mm, clamping force becomes about 0.93kN.

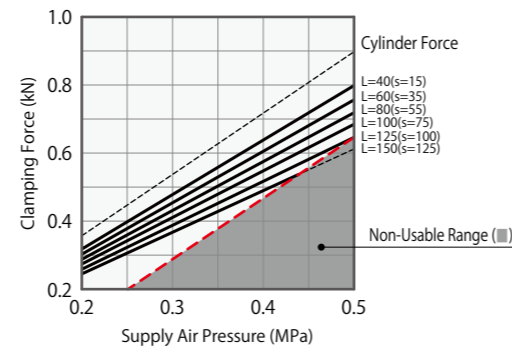
Notes :

- ※1. F : Clamping Force (kN), P : Supply Air Pressure (MPa), L : Lever Length (mm).
- 1. Tables and graphs show the relationship between the clamping force (kN) and supply air pressure (MPa).
- 2. Cylinder force (when L=0) cannot be calculated with the formula of clamping force.
- 3. Lever with a large inertia sometimes does not work depending on supply air pressure and lever mounting position.
- 4. Values in below charts indicate clamping force when the lever locks a workpiece in horizontal position.
- 5. The clamping force varies depending on the lever length. Set the suitable supply air pressure based on the lever length.
- 6. Clamping force in the non-usable range may cause damage and fluid leakage.

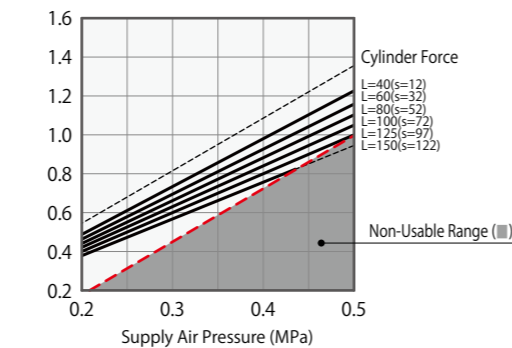
WHD0601		Clamping Force Calculation Formula ^{※1} (kN) $F = \frac{P}{0.8721+0.00280 \times L}$						Maximum Lever Length (mm)
Air Pressure (MPa)	Cylinder Force (kN)	Lever Length L (mm)						
		40	60	80	100	125	150	
0.5	0.57	0.51	0.48	0.46	0.43		120	
0.4	0.46	0.41	0.38	0.37	0.35	0.33	166	
0.3	0.34	0.30	0.29	0.27	0.26	0.25	180	
0.2	0.23	0.20	0.19	0.18	0.17	0.16	180	
Max. Operating Pressure (MPa)	0.5	0.5	0.5	0.5	0.49	0.43		



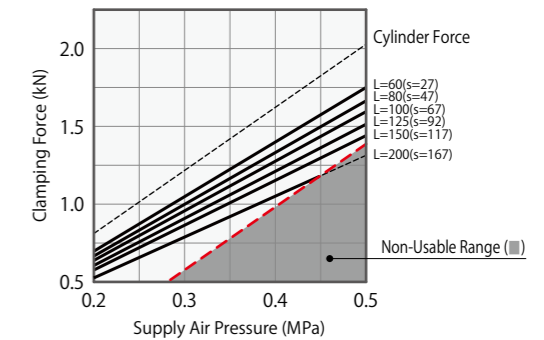
WHD1001		Clamping Force Calculation Formula ^{※1} (kN) $F = \frac{P}{0.5570+0.00173 \times L}$						Maximum Lever Length (mm)
Air Pressure (MPa)	Cylinder Force (kN)	Lever Length L (mm)						
		40	60	80	100	125	150	
0.5	0.90	0.80	0.76	0.72	0.68	0.65	125	
0.4	0.72	0.64	0.61	0.58	0.55	0.52	173	
0.3	0.54	0.48	0.45	0.43	0.41	0.39	180	
0.2	0.36	0.32	0.30	0.29	0.27	0.24	180	
Max. Operating Pressure (MPa)	0.5	0.5	0.5	0.5	0.5	0.44		



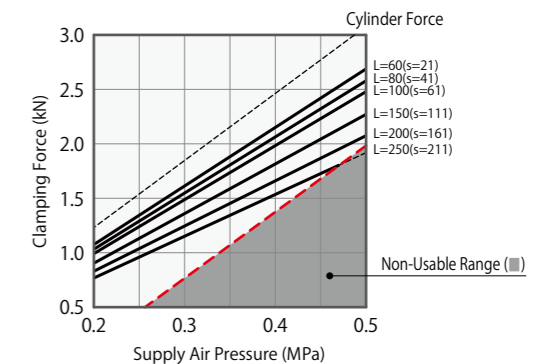
WHD1601		Clamping Force Calculation Formula ^{※1} (kN) $F = \frac{P}{0.3669+0.00108 \times L}$						Maximum Lever Length (mm)
Air Pressure (MPa)	Cylinder Force (kN)	Lever Length L (mm)						
		40	60	80	100	125	150	
0.5	1.36	1.22	1.16	1.10	1.05	1.00	125	
0.4	1.09	0.98	0.93	0.88	0.84	0.80	172	
0.3	0.82	0.73	0.70	0.66	0.63	0.60	200	
0.2	0.55	0.49	0.46	0.44	0.42	0.40	200	
Max. Operating Pressure (MPa)	0.5	0.5	0.5	0.5	0.5	0.44		



WHD2501		Clamping Force Calculation Formula ^{※1} (kN) $F = \frac{P}{0.2465+0.00067 \times L}$						Maximum Lever Length (mm)
Air Pressure (MPa)	Cylinder Force (kN)	Lever Length L (mm)						
		60	80	100	125	150	200	
0.5	2.03	1.74	1.67	1.60	1.51	1.44	170	
0.4	1.62	1.40	1.33	1.28	1.21	1.15	240	
0.3	1.22	1.05	1.00	0.96	0.91	0.86	270	
0.2	0.81	0.70	0.67	0.64	0.61	0.58	270	
Max. Operating Pressure (MPa)	0.5	0.5	0.5	0.5	0.5	0.45		



WHD4001		Clamping Force Calculation Formula ^{※1} (kN) $F = \frac{P}{0.1624+0.00039 \times L}$						Maximum Lever Length (mm)
Air Pressure (MPa)	Cylinder Force (kN)	Lever Length L (mm)						
		60	80	100	150	200	250	
0.5	3.08	2.69	2.58	2.48	2.26	2.07	230	
0.4	2.46	2.15	2.06	1.98	1.81	1.66	330	
0.3	1.85	1.61	1.55	1.49	1.36	1.24	330	
0.2	1.23	1.08	1.03	0.99	0.90	0.83	330	
Max. Operating Pressure (MPa)	0.5	0.5	0.5	0.5	0.5	0.47		



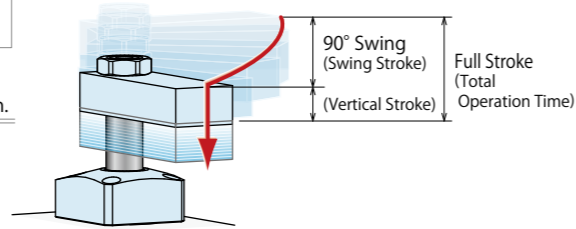
- High-Power Series
- Pneumatic Series
- Hydraulic Series
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others
- Pneumatic Hole Clamp SWA
- Pneumatic Swing Clamp WHA
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- Pneumatic Link Clamp WCA
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- Pneumatic Expansion Locating Pin VWM, VWK
- Pneumatic Sensor Pin WWA

Allowable Swing Time Graph

Adjustment of Swing Time

The graph shows allowable swing time against the moment of inertia of a lever. An operation time should be longer than the operation time shown in the graph.

Excessive action speed can reduce stopping accuracy and damage internal components.



(How to Read the Allowable Swing Time Graph)

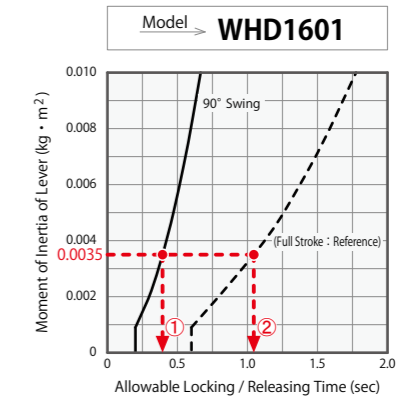
In case of WHD1601

The moment of inertia of a lever : 0.0035kg·m²

① 90° Swing Time : About 0.39 sec or more

② Total Operation Time : About 1.05 sec or more

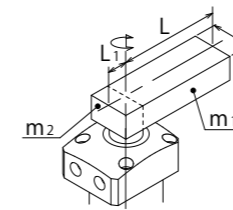
1. The total operation time on the graph represents the allowable operation time when fully stroked.



How to Calculate the Moment of Inertia (Estimated)

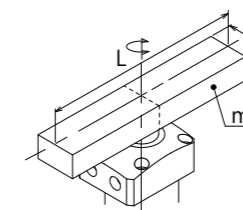
I : Moment of Inertia (kg·m²) L,L₁,L₂,K,b:Length (m) m,m₁,m₂,m₃:Mass (kg)

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



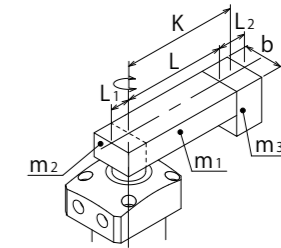
$$I = m_1 \frac{4L^2 + b^2}{12} + m_2 \frac{4L_1^2 + b^2}{12}$$

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

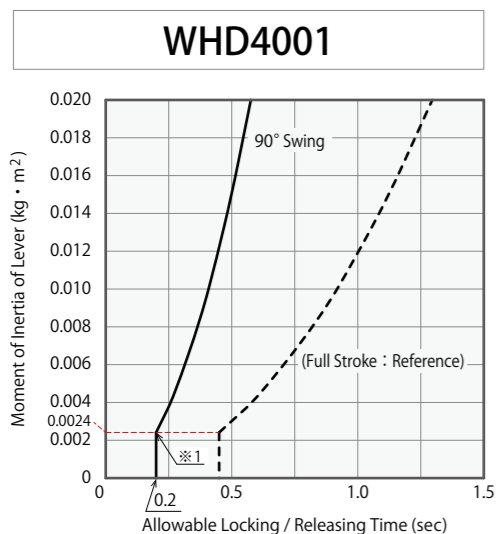
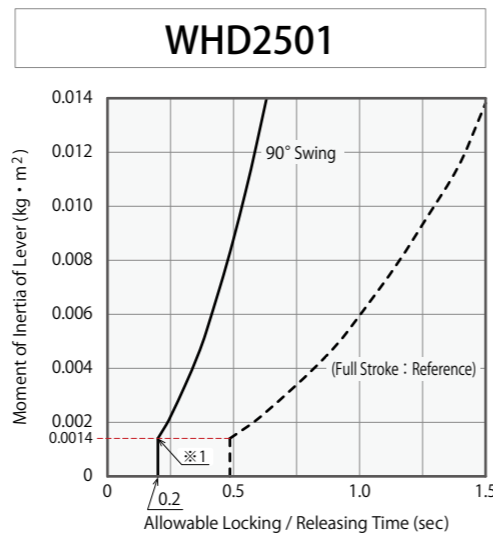
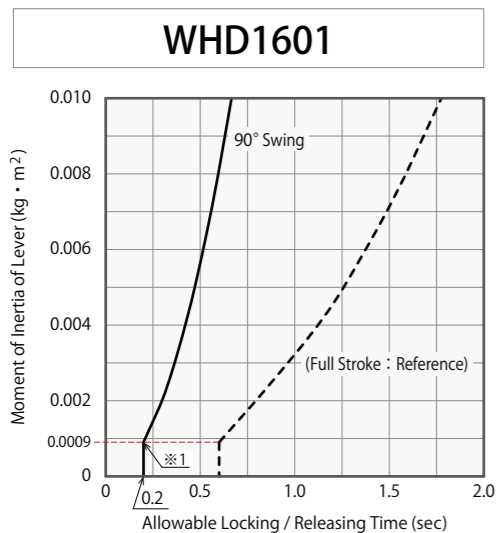
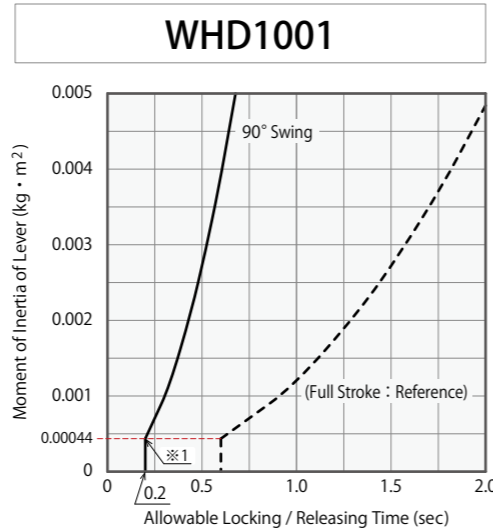
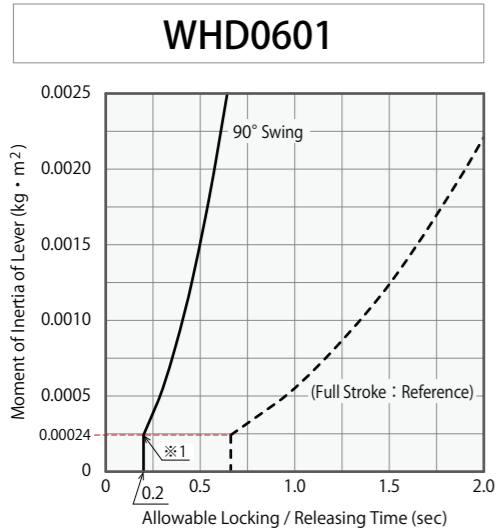


$$I = m \frac{L^2 + b^2}{12}$$

③ Load is applied 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:

- ※1. For any moment of inertia of a lever, the minimum 90° swing time should be 0.2 sec.
- 1. The graph shows the allowable action time with respect to the moment of inertia of lever when the piston rod operates at constant speed.
- 2. Lever with a large inertia sometimes does not work depending on supply air pressure, air flow rate and lever mounting position.
- 3. For speed adjustment of clamp lever, please use meter-out flow control valve. In case of meter-in control, the clamp lever may be accelerated by its own weight during swinging motion (clamp mounted horizontally) or the piston rod may be moving too fast. (Please refer to P.291 for swing speed adjustment.)
- 4. Excessive swing speed can reduce stopping accuracy and damage the internal parts.
- 5. Please contact us if operational conditions differ from those shown on the graphs.

High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others

Pneumatic Hole Clamp
SWA

Pneumatic Swing Clamp
WHA

Double Piston Pneumatic Swing Clamp
WHD

Pneumatic Link Clamp
WCA

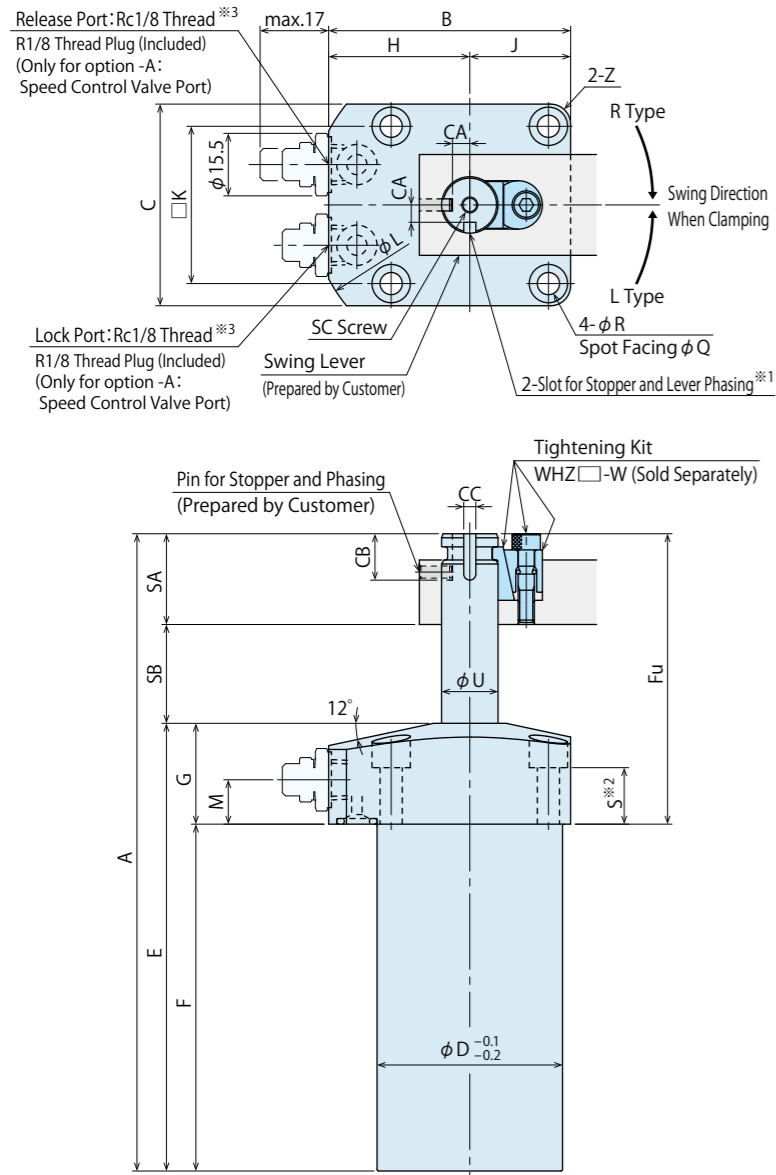
Air Flow Control Valve
BZW

Pneumatic Expansion Locating Pin
VWM
VWK

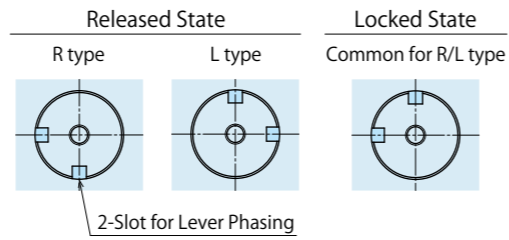
Pneumatic Sensor Pin
WWA

External Dimensions

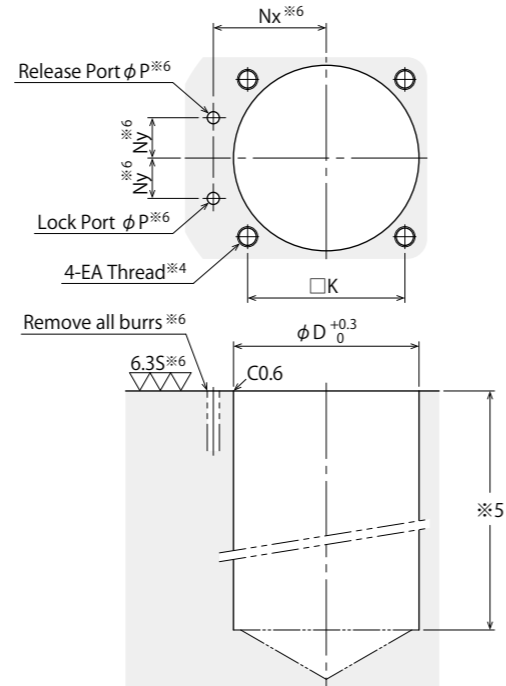
A : Gasket Option (With Ports for Speed Controller : R-Thread Plug Included)
 ※ The drawing shows the released state of WHD□-2AR-A.



※1. Slot for Lever Phasing



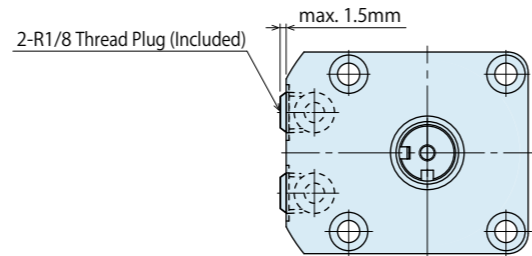
Machining Dimensions of Mounting Area



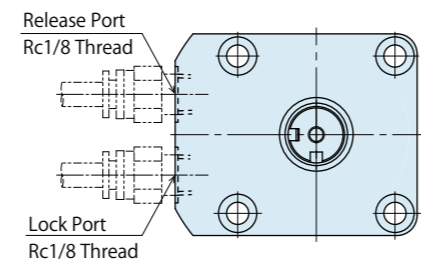
Notes :
 ※4. EA tapping depth of the mounting bolt should be decided according to the mounting height referring to dimension 'S'.
 ※5. The depth of the body mounting hole ϕD should be decided according to the mounting height referring to dimension 'F'.
 ※6. The machining dimension is for -A/-G : Gasket Option.

Piping Method

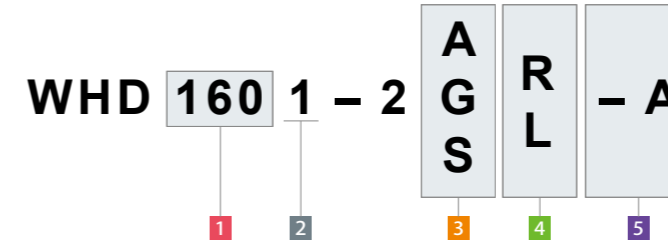
G : Gasket Option (With R Thread Plug)
 ※ The drawing shows the released state of WHD□-2GR-A.



S : Piping Option (Rc Thread)
 ※ The drawing shows the released state of WHD□-2SR-A.



Model No. Indication



(Format Example : WHD1001-2AR-A, WHD2501-2SL-A)

External Dimensions and Machining Dimensions for Mounting (mm)

Model No.	WHD0601-2□-A	WHD1001-2□-A	WHD1601-2□-A	WHD2501-2□-A	WHD4001-2□-A
Full Stroke	21.5	22.5	24	25.5	27
Swing Stroke (90°)	6.5	7.5	9	10.5	12
Lock Stroke	15	15	15	15	15
A	150.5	158	168	184	206
B	54	60	66	76	87
C	45	50	56	66	78
D	40	46	54	64	77
E	107	111	117	126.5	141
F	82	86	92	96.5	111
Fu	68.5	72	76	87.5	95
G	25	25	25	30	30
H	31.5	35	38	43	48
J	22.5	25	28	33	39
K	34	39	45	53	65
L	72	79	88	98	113
M	11	11	11	13	13
Nx	26	28	31	36	41
Ny	9	10	13	15	20
P	3	5	5	5	5
Q	9.5	9.5	9.5	11	11
R	5.5	5.5	5.5	6.8	6.8
S	15.5	14	13.5	16	15
U	12	14	16	20	25
Z (Chamfer)	C3	R5	R5	R6	R6
CA	4.3	4.3	5.8	6.8	8.8
CB	10.25	11.5	14	15	17.5
CC	2.5 ^{+0.028} / _{+0.014}	3 ^{+0.028} / _{+0.014}	4 ^{+0.038} / _{+0.020}	4 ^{+0.038} / _{+0.020}	4 ^{+0.038} / _{+0.020}
EA	M5×0.8	M5×0.8	M5×0.8	M6×1	M6×1
SA	20	22.5	25	30	36
SB	23.5	24.5	26	27.5	29
SC (Nominal×Pitch×Depth)	M4×0.7×7	M4×0.7×7	M4×0.7×7	M5×0.8×8	M6×1×11
O-ring (Piping Option -A/-G)	1BP5	1BP7	1BP7	1BP7	1BP7
Pin for Stopper and Phasing	$\phi 2.5(m6) \times 6$	$\phi 3(m6) \times 8$	$\phi 4(m6) \times 8$	$\phi 4(m6) \times 10$	$\phi 4(m6) \times 14$
Cylinder Capacity	Lock	24.7	40.4	65.4	103.5
	Release	27.1	43.9	70.2	111.5
Weight ^{※7}	kg	0.6	0.8	1.2	1.8

Note: ※7. It shows the weight of single swing clamp without the tightening kit and swing lever.

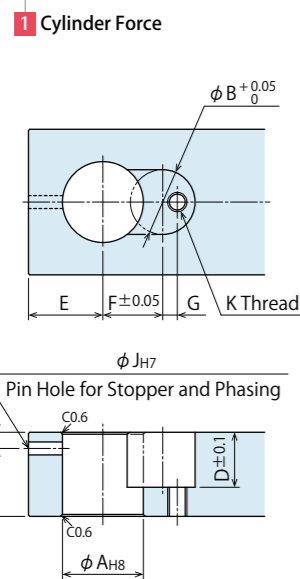
Notes :
 ※2. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.
 ※3. Speed control valve is sold separately. Please refer to P.309.
 1. Please contact us if it has a combination with other options.

- High-Power Series
- Pneumatic Series
- Hydraulic Series
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others
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- Pneumatic Swing Clamp WHA
- Double Piston Pneumatic Swing Clamp WHD
- Pneumatic Link Clamp WCA
- Air Flow Control Valve BZW
- Pneumatic Expansion Locating Pin VWM, VWK
- Pneumatic Sensor Pin WWA

Quick Change Lever Option A Design Dimensions

※ Reference for designing Quick Change Swing Lever Option A.

Corresponding Model No.
WHD 1 - 2 A R - **A**



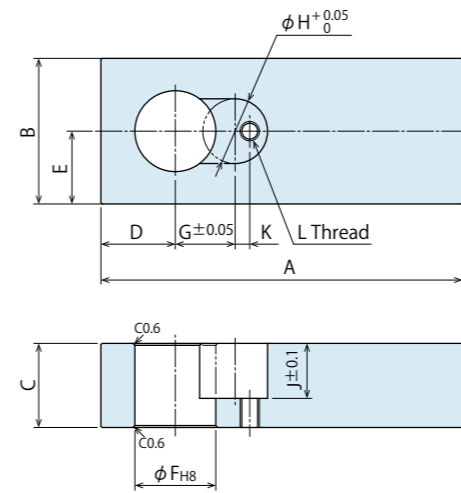
Corresponding Model No.	WHD0601-2□-A	WHD1001-2□-A	WHD1601-2□-A	WHD2501-2□-A	WHD4001-2□-A
A	12 ^{+0.027} ₀	14 ^{+0.027} ₀	16 ^{+0.027} ₀	20 ^{+0.033} ₀	25 ^{+0.033} ₀
B	10.5	12	12	15	20
C	14	16	18	22	26
D	9.5	11	11	13	17
E	10.5	12.5	14	17	23
F	10.75	12	13	16	18.5
G	1.25	2	2	2.5	4.5
H	2.5	3	4	4	4
J	2.5 ^{+0.010} ₀	3 ^{+0.010} ₀	4 ^{+0.012} ₀	4 ^{+0.012} ₀	4 ^{+0.012} ₀
K	M4×0.7	M4×0.7	M4×0.7	M5×0.8	M6×1
Pin for Stopper and Phasing	φ2.5(m6)×6	φ3(m6)×8	φ4(m6)×8	φ4(m6)×10	φ4(m6)×14

Notes :

- Swing lever should be designed with its length according to performance curve on P.283.
- If the swing lever is not in accordance with the dimension shown above, performance may be degraded and damage can occur.
- The pin hole for stopper and phasing (φJ) should be appropriately machined according to the slot for lever phasing on the clamp body. Pin for stopper and phasing (prepared by customer) is used as phasing when mounting the lever and as stopper when removing the lever. If you are not using a pin for stopper and phasing, a stopper is required to remove the lever.
- Tightening Kit (WHZ□-W) for Quick Change Lever Option A is sold separately.

Accessories : Material Swing Lever for Quick Change Lever Option A

Model No. Indication
WHZ 160 0 - **A**



Model No.	WHZ0600-A	WHZ1000-A	WHZ1600-A	WHZ2500-A	WHZ4000-A
Corresponding Model No.	WHD0601-2□-A	WHD1001-2□-A	WHD1601-2□-A	WHD2501-2□-A	WHD4001-2□-A
A	90	90	125	150	170
B	21	25	28	34	45
C	14	16	18	22	26
D	10.5	12.5	14	17	23
E	10.5	12.5	14	17	22.5
F	12 ^{+0.027} ₀	14 ^{+0.027} ₀	16 ^{+0.027} ₀	20 ^{+0.033} ₀	25 ^{+0.033} ₀
G	10.75	12	13	16	18.5
H	10.5	12	12	15	20
J	9.5	11	11	13	17
K	1.25	2	2	2.5	4.5
L	M4×0.7	M4×0.7	M4×0.7	M5×0.8	M6×1

Notes :

- Material : S50CH Surface Finishing : Alkaline Blackening
- If necessary, the front end should be additionally machined and finished.
- The pin hole for stopper and lever phasing should be additionally machined by referring to Quick Change Lever Option A Design Dimensions.
- Tightening Kit (WHZ□-W) for Quick Change Lever Option A is sold separately.

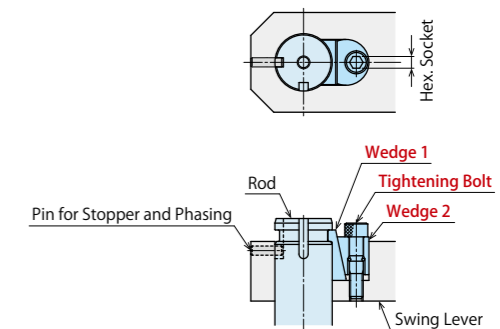
Accessory : Tightening Kit for Quick Change Lever Option A

Tightening Kit for mounting Quick Change Lever Option A.
 Sold separately from clamp body.

[Contents of Tightening Kit]
 • Wedge 1 • Wedge 2 • Tightening Bolt

WHZ 160 1 - **W**

1 **2**



1 Corresponding Model No.

060 : WHD0601-2□-A **250** : WHD2501-2□-A
100 : WHD1001-2□-A **400** : WHD4001-2□-A
160 : WHD1601-2□-A

2 Design No.

1 : Revision Number

Model No.	WHZ0601-W	WHZ1001-W	WHZ1601-W	WHZ2501-W	WHZ4001-W
Corresponding Model No.	WHD0601-2□-A	WHD1001-2□-A	WHD1601-2□-A	WHD2501-2□-A	WHD4001-2□-A
Nominal×Pitch of Tightening Bolt	M4×0.7	M4×0.7	M4×0.7	M5×0.8	M6×1
Hex. Socket	mm	2.5	2.5	3	4
Tightening Torque	N·m	2.5	2.5	5.0	8.0

High-Power Series

Pneumatic Series

Hydraulic Series

Valve / Coupler Hydraulic Unit

Manual Operation Accessories

Cautions / Others

Pneumatic Hole Clamp SWA

Pneumatic Swing Clamp WHA

Double Piston Pneumatic Swing Clamp WHD

Pneumatic Link Clamp WCA

Air Flow Control Valve BZW

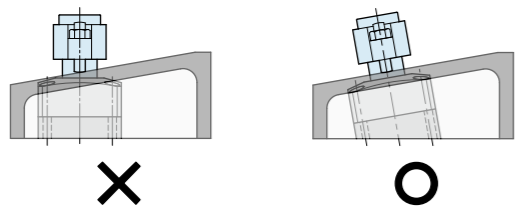
Pneumatic Expansion Locating Pin VWM VWK

Pneumatic Sensor Pin WWA

Cautions

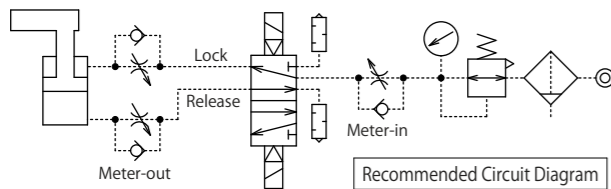
Notes for Design

- 1) Check Specifications
 - Please use each product according to the specifications.
- 2) Notes for Circuit Design
 - Ensure there is no possibility of supplying air pressure to the lock port and the release port simultaneously. Improper circuit design may lead to malfunctions and damages.
- 3) Swing lever should be designed to make the moment of inertia small.
 - Large inertia moment will degrade the lever's stopping accuracy and cause undue wear to the clamp. Additionally, the clamp may not function, depending on supplied air pressure and lever mounting position.
 - Set the allowable operation time after the moment of inertia is calculated. Refer to "Allowable Swing Time Graph" and make sure to operate clamps within the allowable operation time.
 - If supplying a large amount of air right after installation, action time will be extremely fast leading to severe damage on a clamp. Install the speed controller (Meter-in) near the air source and gradually supply air pressure.
- 4) Protect the exposed area of the piston rod when using a welding fixture.
 - If spatter attaches to the sliding surface it could lead to malfunction and air leakage.
- 5) When clamping on a sloped surface of the workpiece
 - Make sure the clamping surface and the mounting surface of the clamp are parallel.



Swing Speed Adjustment

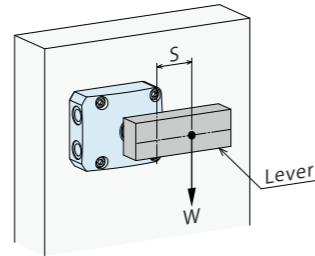
- Adjust the speed following "Allowable Swing Time Graph". If the clamp operates too fast the parts will be worn out leading to premature damage and ultimately complete equipment failure.
- Install a speed control valve (meter-out) and gradually control the flow rate from the low-speed side (small flow) to the designated speed. Controlling from the high-speed side (large flow) causes excessive surge pressure or overload to the clamp leading to damage of a machine or device.



- When operating multiple clamps simultaneously, please install the speed controller (meter-out) to each clamp.

Notes for Lever Design

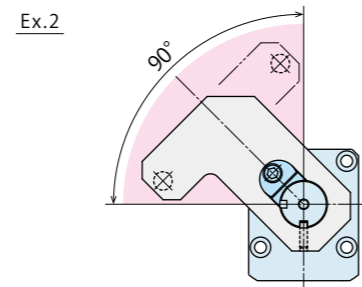
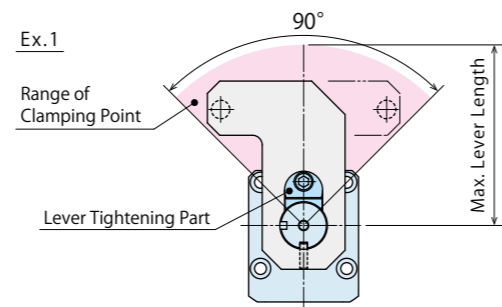
- Please design the lever as light as possible, and it should be no larger than necessary. The clamp may not function depending on supplying air pressure, mounting position and shape of the lever. If using a large lever in the mounting position as shown below, it may stop in the middle of swing action. Please use a lever with (Lever Weight W) × (Gravity Center S) lighter than shown in the following table.



Model No.	(Lever Weight W) × (Gravity Center S) (N·m)
WHD0601	0.08
WHD1001	0.10
WHD1601	0.20
WHD2501	0.45
WHD4001	0.90

When using an offset lever.

- Clamping point should be in the range of 90° towards the lever tightening part.



Installation Notes

- 1) Check the Usable Fluid
 - Please supply filtered clean dry air. (Install the drain removing device.)
 - Oil supply with a lubricator etc. is unnecessary. Oil supply with a lubricator may cause loss of the initial lubricant. The operation under low pressure and low speed may be unstable. (When using secondary lubricant, please supply lubricant continuously. Otherwise, the initial grease applied from KOSMEK will be removed from the secondary lubricant.)
- 2) Procedure before Piping
 - The pipeline, piping connector and fixture circuits should be cleaned by thorough flushing. Dust and cutting chips in the circuit can lead to air leakage and malfunction.
 - There is no filter provided with this product that prevents contamination in the air circuit.
- 3) Applying Sealing Tape
 - Wrap with tape 1 to 2 times following the screw direction.
 - Pieces of the sealing tape can lead to air leakage and malfunction.
 - In order to prevent contamination during the piping work, it should be carefully cleaned before working.

Installation of the Product

- When mounting the product use four hexagonal socket bolts (with tensile strength of 12.9) and tighten them with the torque shown in the list below. Tightening with greater torque than recommended can dent the seating surface or break the bolt.

Model No.	Thread Size	Tightening Torque (N·m)
WHD0601	M5×0.8	6.3
WHD1001	M5×0.8	6.3
WHD1601	M5×0.8	6.3
WHD2501	M6×1	10
WHD4001	M6×1	10

Installation of the Flow Control Valve

- Tightening torque for installing flow control valve is 5 to 7 N·m.

Installation / Removal of the Swing Lever

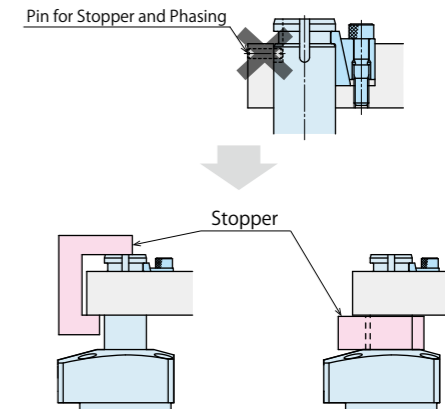
- Oil or debris on the tightened parts of the lever, taper sleeve or piston rod may cause the lever to loosen. Please clean them thoroughly before installation.
- Tighten the tightening bolt of swing lever with the torque shown below. Tightening with greater torque than recommended can damage the bolt and lever tightening function.

WHD-A : Quick Change Lever Option A

Model No.	Tightening Bolt Size	Tightening Torque (N·m)
WHD0601-2□-A	M4×0.7	2.5
WHD1001-2□-A	M4×0.7	2.5
WHD1601-2□-A	M4×0.7	2.5
WHD2501-2□-A	M5×0.8	5
WHD4001-2□-A	M6×1	8

- A pin for stopper and phasing (prepared by customer) is used for phasing when mounting the lever and as a stopper when removing the lever. If you are not using the pin for stopper and phasing, a stopper is required to remove the lever.

Stopper example for lever removal when not using the pin for stopper and phasing.

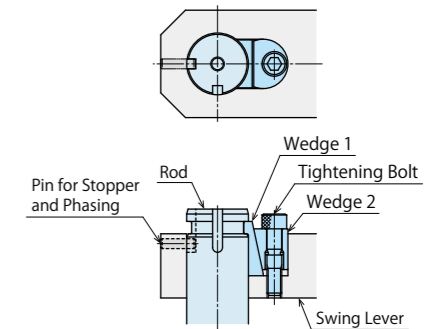


Installation Procedure

- ① Install in order of swing lever, wedge 1, wedge 2 to the rod.
- ② Pull the lever towards the wedge side and tighten the tightening bolt with the specified torque.

Removal Procedure

- ① By loosening the tightening bolt, the wedges are released and the lever can be removed.



Swing Speed Adjustment

- Adjust the speed following "Allowable Swing Time Graph". If the clamp operates too fast the parts will be worn out leading to premature damage and ultimately complete equipment failure.
- Turn the speed control valve gradually from the low-speed side (small flow) to the high-speed side (large flow) to adjust the speed.

Checking Looseness and Retightening

- At the beginning of the product installation, the bolt and nut may be tightened lightly. Check the looseness and re-tighten as required.

※ Please refer to P.1357 for common cautions.

• Notes on Handling • Maintenance/Inspection • Warranty

High-Power Series

Pneumatic Series

Hydraulic Series

Valve / Coupler Hydraulic Unit

Manual Operation Accessories

Cautions / Others

Pneumatic Hole Clamp SWA

Pneumatic Swing Clamp WHA

Double Piston Pneumatic Swing Clamp WHD

Pneumatic Link Clamp WCA

Air Flow Control Valve BZW

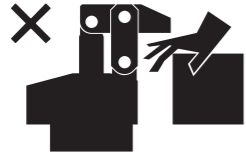
Pneumatic Expansion Locating Pin VWM, VWK

Pneumatic Sensor Pin WWA

Cautions

● Notes on Handling

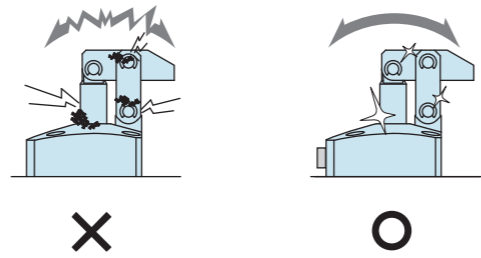
- 1) It should be operated by qualified personnel.
 - The hydraulic machine and air compressor should be operated and maintained by qualified personnel.
- 2) Do not operate or remove the product unless the safety protocols are ensured.
 - ① The machine and equipment can only be inspected or prepared when it is confirmed that the safety devices are in place.
 - ② Before the product is removed, make sure that the above-mentioned safety devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
 - ③ After stopping the product, do not remove until the temperature drops.
 - ④ Make sure there is no abnormality in the bolts and respective parts before restarting the machine or equipment.
- 3) Do not touch a clamp (cylinder) while it is working. Otherwise, your hands may be injured due to clinching.



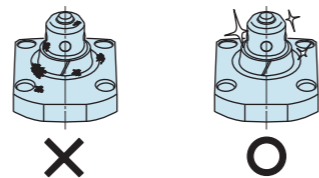
- 4) Do not disassemble or modify.
 - If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

● Maintenance and Inspection

- 1) Removal of the Machine and Shut-off of Pressure Source
 - Before the machine is removed, make sure that safety devices and preventive devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
 - Make sure there is no abnormality in the bolts and respective parts before restarting.
- 2) Regularly clean the area around the piston rod and plunger.
 - If it is used when the surface is contaminated with dirt, it may lead to packing seal damage, malfunctioning and fluid leakage.



- 3) Please clean out the reference surfaces on a regular basis (taper reference surface and seating surface) of the locating products. (VS/VT/VFL/VFM/VFJ/VFK/WVS/VWM/VWK/VX/VXE/VXF)
 - The locating products, except VX/VXE/VXF model, can remove contaminants with cleaning functions. However, hardened cutting chips, adhesive coolant and others may not be removed. Make sure there are no contaminants before installing a workpiece/pallet.
 - Continuous use with contaminant on components will lead to locating accuracy failure, malfunction and fluid leakage.



- 4) If disconnecting by couplers, air bleeding should be carried out on a regular basis to avoid air mixed in the circuit.
- 5) Regularly tighten nut, bolt, pin, cylinder, pipe line and others to ensure proper use.
- 6) Make sure the hydraulic fluid has not deteriorated.
- 7) Make sure there is a smooth action without an irregular noise.
 - Especially when it is restarted after left unused for a long period, make sure it can be operated correctly.
- 8) The products should be stored in the cool and dark place without direct sunshine or moisture.
- 9) 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.
 - 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 judgment, resulting in defect.
 - ③ If it is used or operated in an 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 repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.
 - ⑥ Other caused by natural disasters or calamities not attributable to our company.
 - ⑦ Parts or replacement expenses due to parts consumption and deterioration. (Such as rubber, plastic, seal material and some electric components.)

Damages excluding from direct result of a product defect shall be excluded from the warranty.

- High-Power Series
- Pneumatic Series
- Hydraulic Series
- Valve / Coupler Hydraulic Unit
- Manual Operation Accessories
- Cautions / Others

- Cautions
 - Installation Notes (For Hydraulic Series)
 - Hydraulic Fluid List
 - Notes on Hydraulic Cylinder Speed Control Circuit
 - Notes on Handling
 - Maintenance/Inspection
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