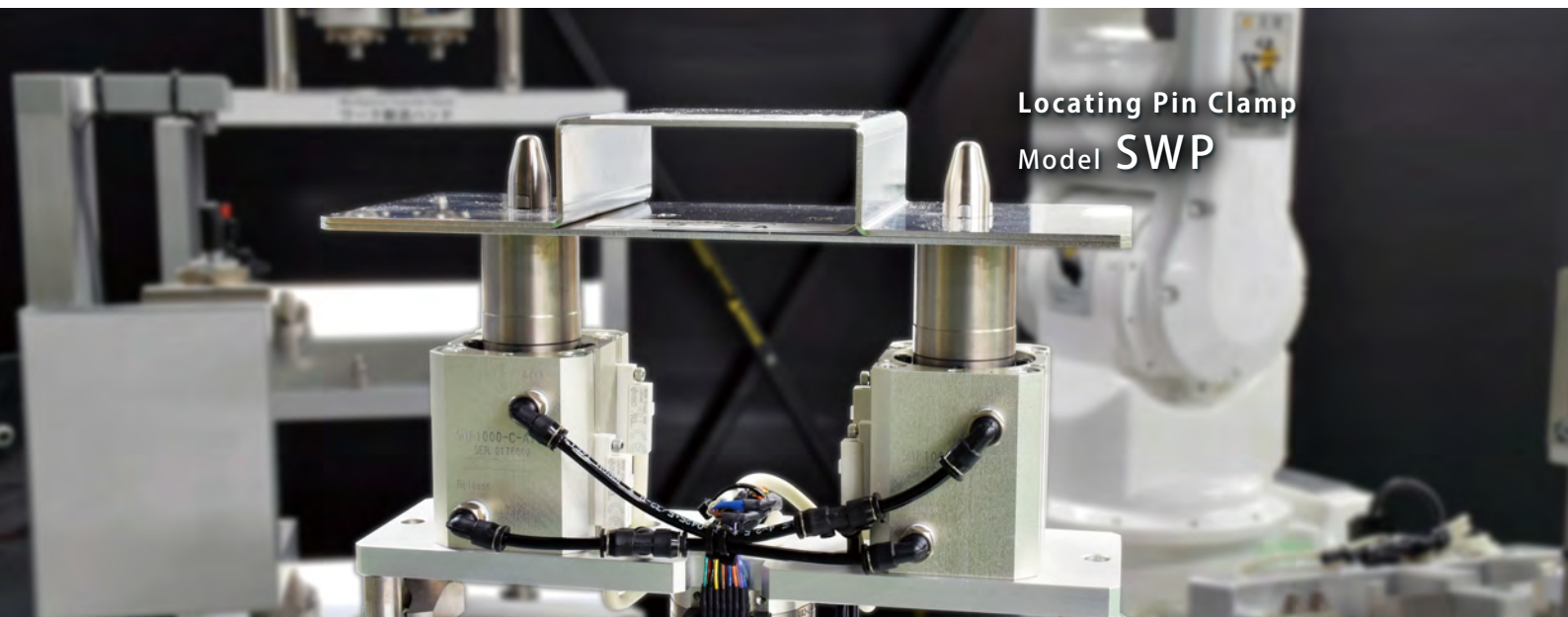New For setup improvement of welding applications

Kosmek Welding Products
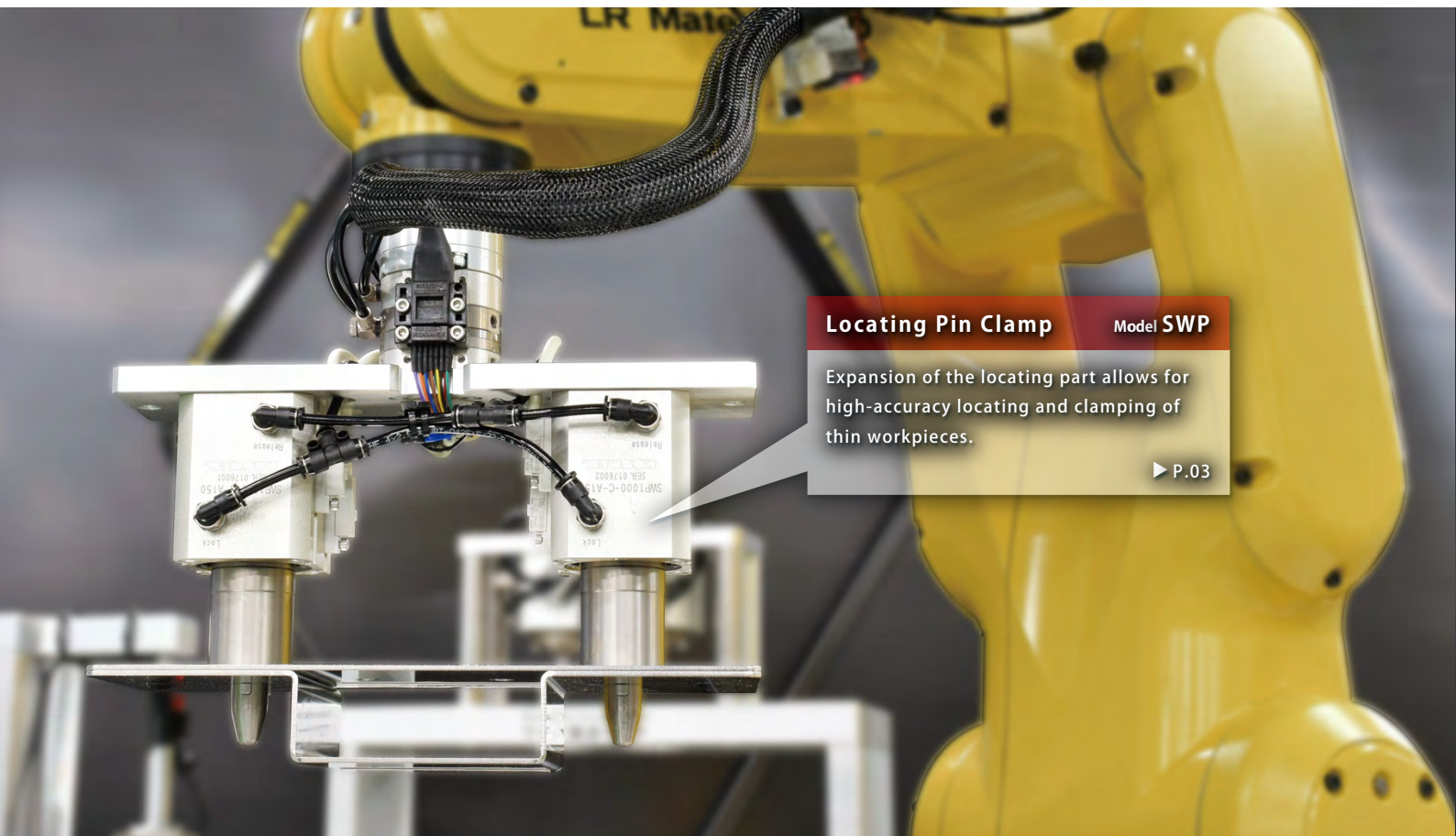
Locating Pin Clamp
Model **SWP**

High-Power Welding
Link Clamp
Model **WCG**
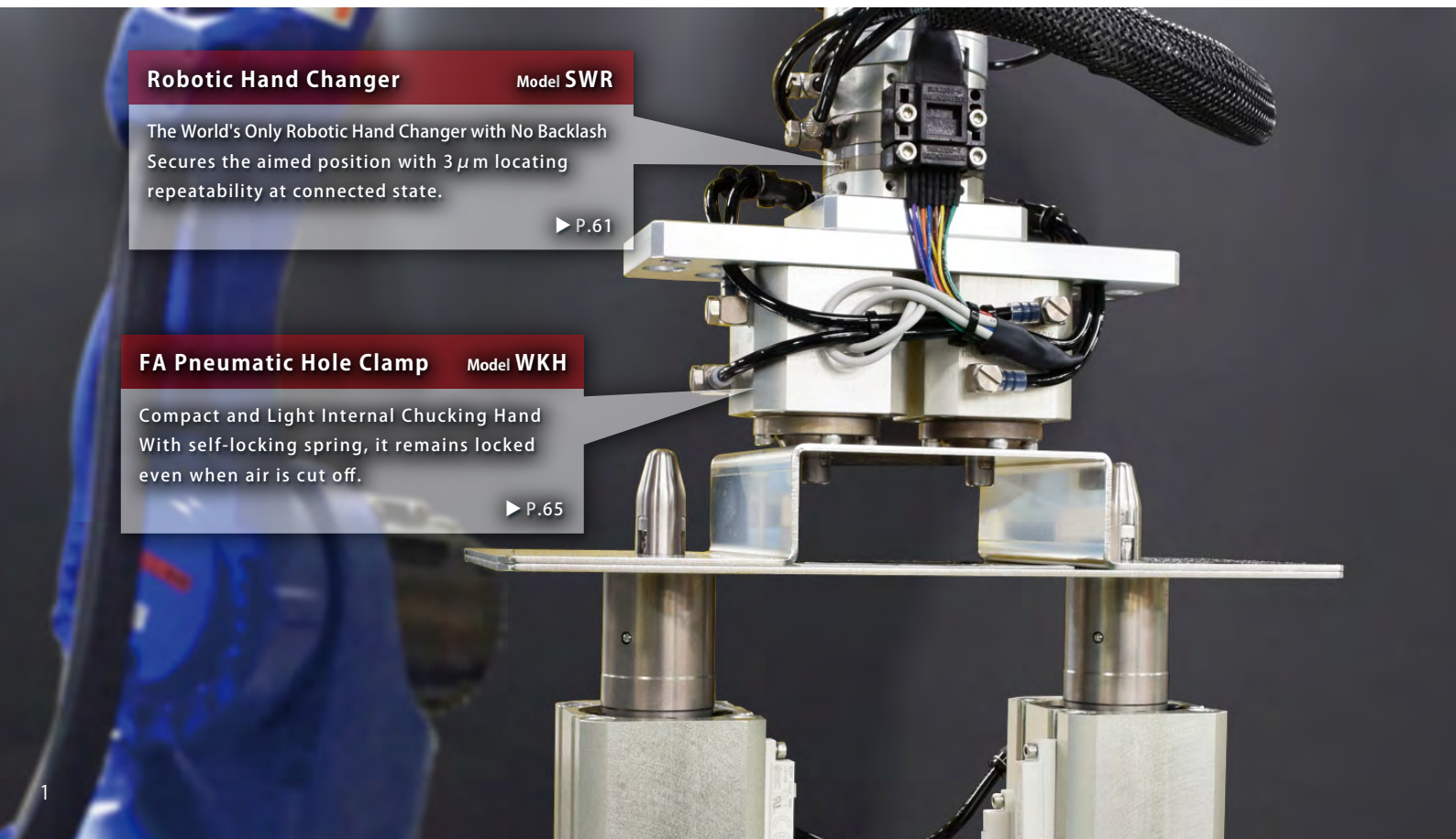
High-Power Welding
Swing Clamp
Model **WHG**

KOSMEK
Harmony in Innovation

Locating Pin Clamp   Model **SWP**

Expansion of the locating part allows for high-accuracy locating and clamping of thin workpieces.

▶ P.03

Spot Welding

Robotic Hand Changer   Model **SWR**

The World's Only Robotic Hand Changer with No Backlash Secures the aimed position with $3\,\mu$m locating repeatability at connected state.

▶ P.61

FA Pneumatic Hole Clamp   Model **WKH**

Compact and Light Internal Chucking Hand With self-locking spring, it remains locked even when air is cut off.

▶ P.65

High-Power Welding Swing Clamp — Model WHG

Spatter-Resistant High-Power Pneumatic Swing Clamp for Welding Application.
Special rod coating and triple protective structure prevents contamination. ▶ P.17

High-Power Welding Link Clamp — Model WCG

Spatter-Resistant High-Power Pneumatic Link Clamp for Welding Application. Special rod coating and single link plate allow for spatter resistant. Triple protective structure prevents contaminants from entering the cylinder. ▶ P.35

Arc Welding

Compact Location Clamp — Model SWQ

For Pallet Exchange Automation.
Clamping and locating simultaneously with 3μm locating repeatability ▶ P.69

Auto Coupler

Auto Coupler automatically connects air circuits to provide the air pressure to the pallet when the location clamp is locked. ▶ P.70
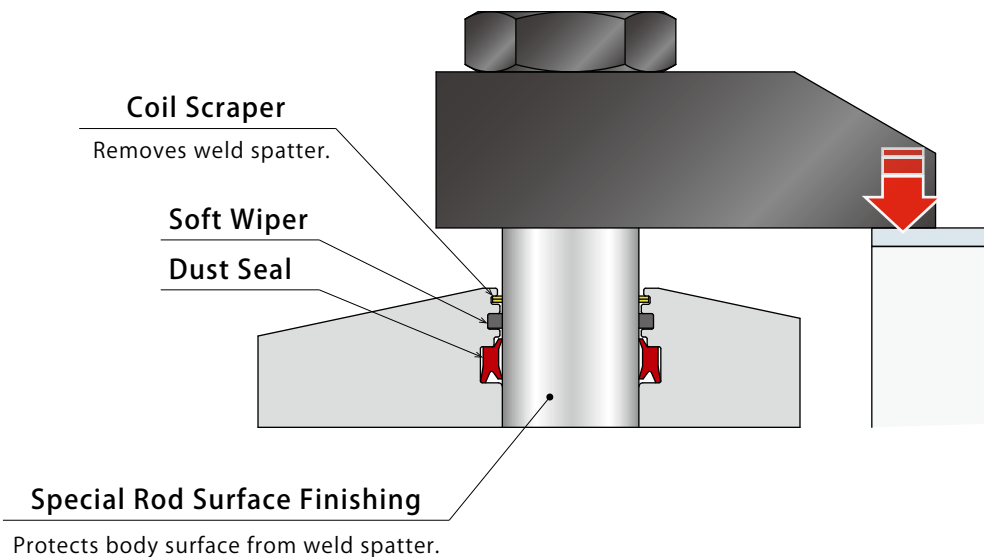
High-Power Welding Swing Clamp

Model **WHG**

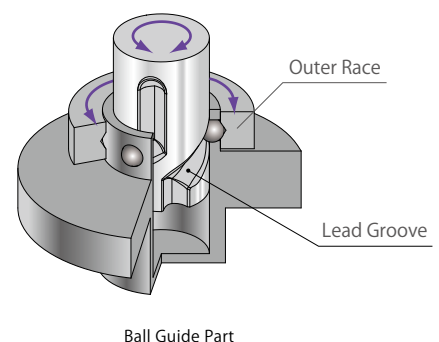## Spatter Resistant
High-Power Welding Swing Clamp

PAT.

◉ **Features**

High Durability   Triple protective structure prevents contaminants from entering the cylinder.

Coil Scraper
Removes weld spatter.

Soft Wiper

Dust Seal

Special Rod Surface Finishing
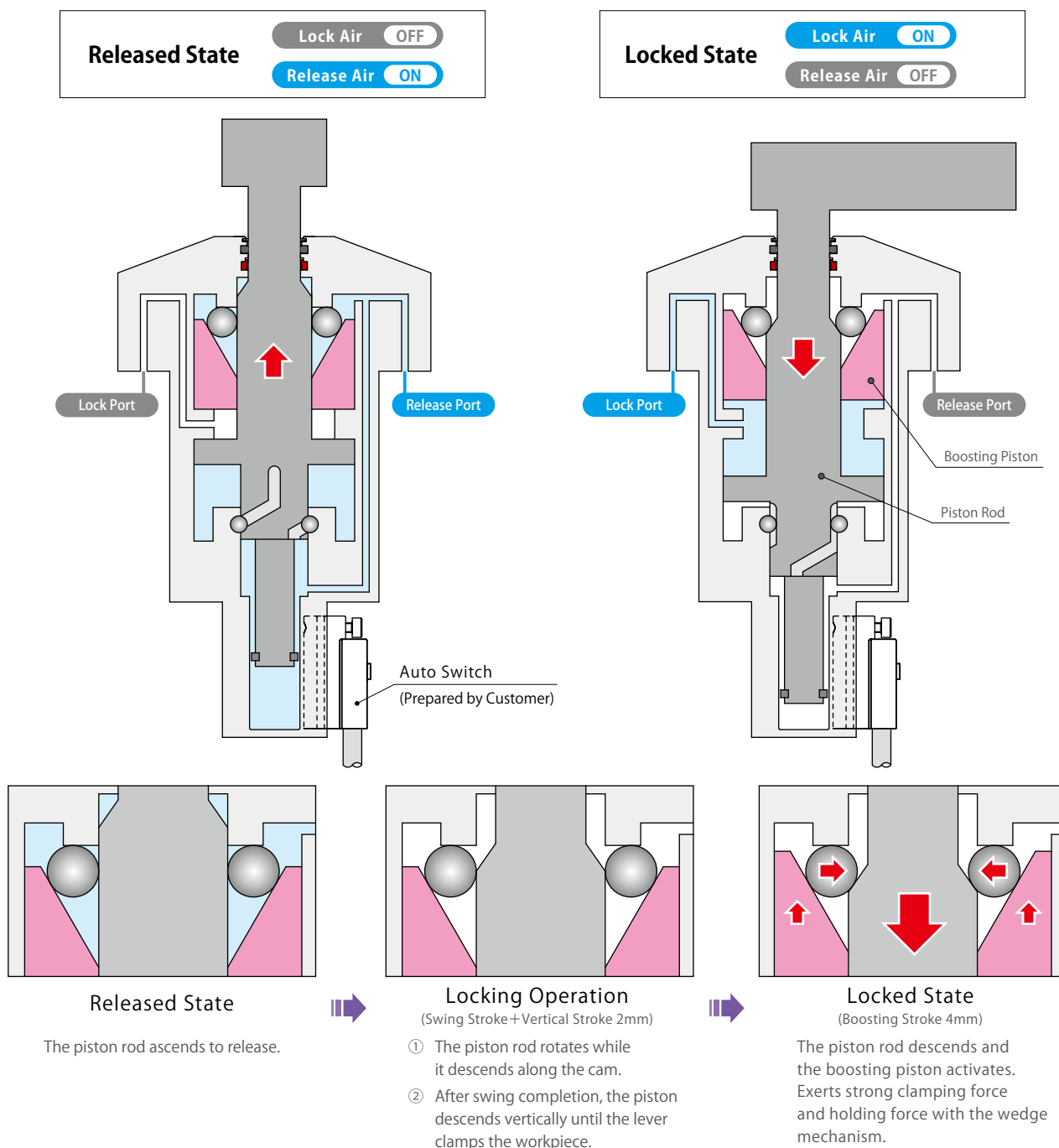Protects body surface from weld spatter.

● **Swing Mechanism with High Speed and High Durability**
Our strong hydraulic clamp mechanism is used to pneumatic clamps.
Makes it faster with 3 lines of lead groove + outer race.
(High Rigidity makes it possible to use a long lever.)

Outer Race

Lead Groove

Ball Guide Part

KOSMEK
Harmony in Innovation

Locating Pin Clamp
SWP
High-Power Welding Swing Clamp
WHG
High-Power Welding Link Clamp
WCG
Air Flow Control Valve
BZW
Manifold Block
WHZ-MD
General Cautions
Welding Related Products
Quick Die Change Systems
Company Profile Sales Offices

The High-Power Welding Swing Clamp is a hybrid system using air pressure and a mechanical lock.

◉ Action Description

Released State — Lock Air OFF / Release Air ON

Locked State — Lock Air ON / Release Air OFF

Lock Port / Release Port

Boosting Piston
Piston Rod

Auto Switch (Prepared by Customer)

Released State
The piston rod ascends to release.

Locking Operation
(Swing Stroke＋Vertical Stroke 2mm)
① The piston rod rotates while it descends along the cam.
② After swing completion, the piston descends vertically until the lever clamps the workpiece.

Locked State
(Boosting Stroke 4mm)
The piston rod descends and the boosting piston activates. Exerts strong clamping force and holding force with the wedge mechanism.
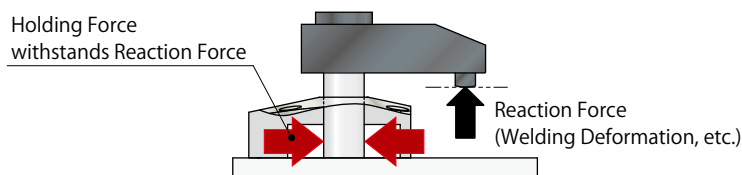
No Hydraulic Use
Welding fixture system with high-power welding clamps exerting equivalent force to hydraulic clamps needs no hydraulic pressure.

Powerful Clamping Force
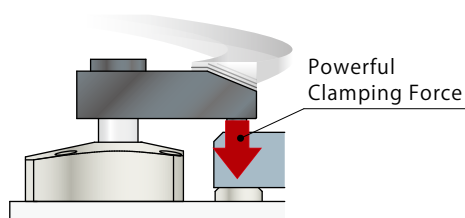
Holding Force
Minimal clamping force and powerful holding force minimize workpiece deformation. Mechanical locking allows holding force to exert 3 times the clamping force at most.

Holding Force withstands Reaction Force

Reaction Force (Welding Deformation, etc.)

18

Smaller Footprint

Exerts three times clamping force compared to the same size general air cylinder. Smaller cylinder allows for more compact fixtures.
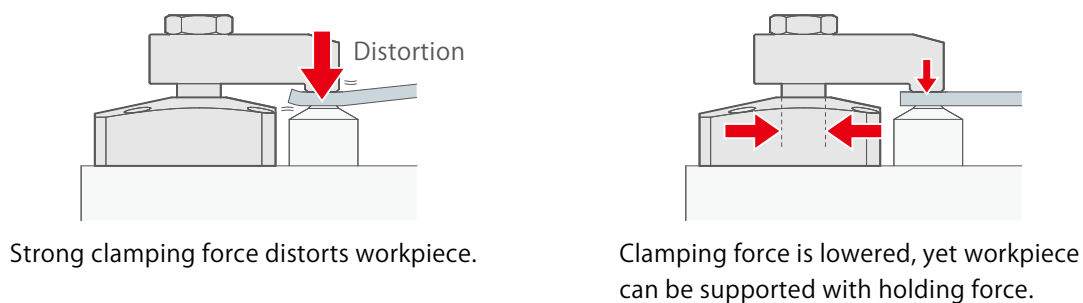
General Air Cylinder High-Power Welding Clamp General Air Cylinder High-Power Welding Clamp

Downsized

Reduced Number of Clamps
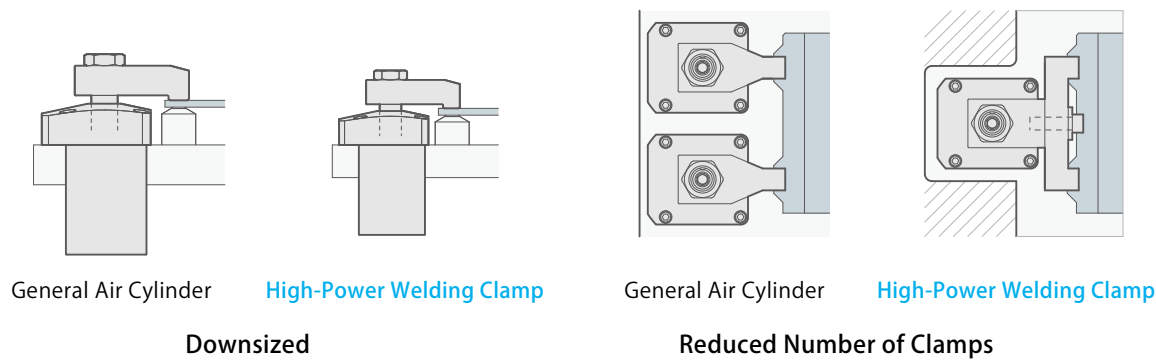
Energy Saving

Energy-saving clamp exerts high clamping force with low pressure.

Operating Pressure Range
0.5MPa
0.2MPa
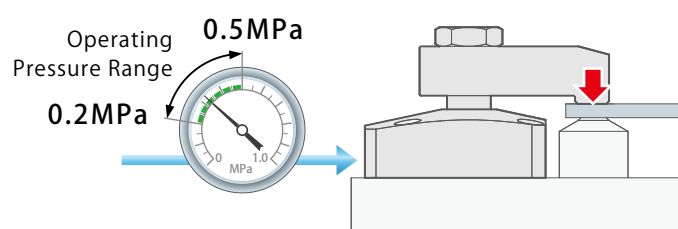
High Quality

Optimum clamping force does not distort workpiece and holding force is strong enough to withstand welding load.

Distortion

Strong clamping force distorts workpiece.

Clamping force is lowered, yet workpiece can be supported with holding force.

Light Weight

High-Power Welding Clamp allows for lighter fixture, minimizing load to the positioner.

Fixture 10% Lighter
Clamp 20% Lighter

※ Reference when workpiece size is 300×260.

General Air Cylinder

High-Power Welding Clamp
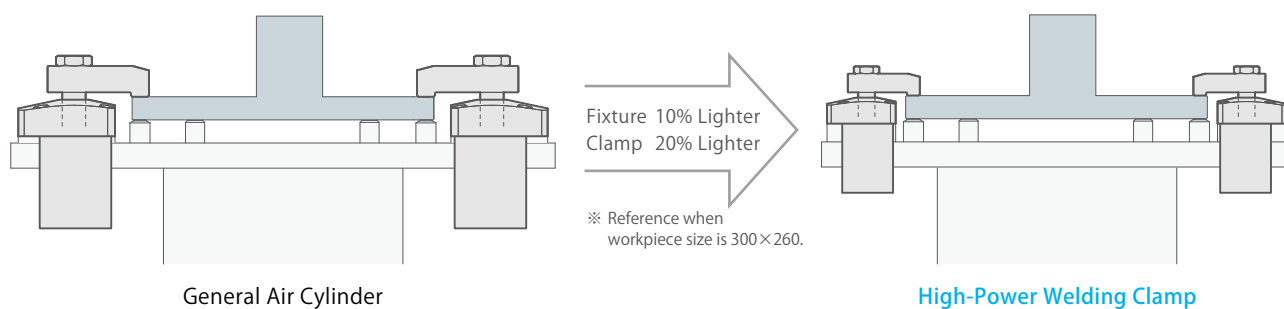
High Accuracy

High locating accuracy at locked position allows for precise clamping.
Swing Complete Position Repeatability：±0.75°

KOSMEK Harmony in Innovation
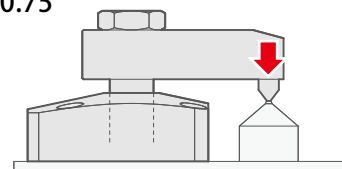
Action Confirmation — Safely used in automation systems with action confirmation of Auto Switch.

Auto Switch (Prepared by Customer)

Ability to Confirm Lock/Release Action

Recommended Auto Switch

JEP Series (KOSMEK)
Magnetic Field Resistant Model：D-P3DWA (SMC)

【Applicable Auto Switch】

Refer to FA・Industrial Robot Related Products (CATALOG No.FA0020□□-□□-GB) for detailed specifications.
Please use D-P3DWA (SMC) for an environment which generates a magnetic field disturbance.
When using an auto switch not made by Kosmek, check specifications of each manufacture.

Auto Switch Model No.	JEP0000-A2	JEP0000-A2L	JEP0000-B2	JEP0000-B2L
Switch Type	Reed Auto Switch		Solid State Auto Switch	
Wiring Method	2-Wire		3-Wire	
Cable Length	1m	3m	1m	3m
Specifications・Electric Circuit Diagram	Refer to FA・Industrial Robot Related Products (CATALOG No.FA0020□□-□□-GB)		Refer to FA・Industrial Robot Related Products (CATALOG No.FA0020□□-□□-GB)	
External Dimensions	M2.5×0.45 Mounting Bolt Tightening Torque 0.25N・m; 2.8; 3.9; (φ2.6); 2.7; 25; Brown Cable (＋); Blue Cable (－); LED Indicator		M2.5×0.45 Mounting Bolt Tightening Torque 0.25N・m; 2.8; 3.9; (φ2.6); 2.7; 25; Brown Cable (＋); Black Cable (Output); Blue Cable (－); LED Indicator	

Auto Switch Model No.	JEP0000-A2V	JEP0000-A2VL	JEP0000-B3	JEP0000-B3L
Switch Type	Reed Auto Switch		Solid State Auto Switch	
Wiring Method	2-Wire		3-Wire	
Cable Length	1m	3m	1m	3m
Specifications・Electric Circuit Diagram	Refer to FA・Industrial Robot Related Products (CATALOG No.FA0020□□-□□-GB)		Refer to FA・Industrial Robot Related Products (CATALOG No.FA0020□□-□□-GB)	
External Dimensions	M2.3×0.4 Mounting Bolt Tightening Torque 0.25N・m; LED Indicator; Brown Cable (＋); Blue Cable (－); 6; 24; 4.6; 2.8; 2.6; 3.9; (φ2.6)		M2×0.4 (Left-Hand Thread) Tightening Torque 0.1N・m; LED Indicator; Brown Cable (＋); Black Cable (Output); Blue Cable (－); 15; 4.8; 2.8; (φ2.8); 2.7; 3.9; 8; 11.2; -B3 :1m; -B3L :3m; High Sensitivity Position	

◉ Model No. Indication

WHG [160] [0] **– 2** [A] [R] [T]
　　　 ① ② 　　 ③ ④ ⑤

① Cylinder Force

100： Cylinder Force 1.0 kN (Air Pressure 0.5MPa)
160： Cylinder Force 1.6 kN (Air Pressure 0.5MPa)
250： Cylinder Force 2.4 kN (Air Pressure 0.5MPa)
400： Cylinder Force 3.9 kN (Air Pressure 0.5MPa)

※ Cylinder force differs from clamping force and holding force.
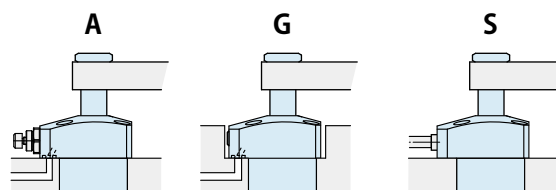
② Design No.

0 ： 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.53.

A　　**G**　　**S**

Gasket Option　　Piping Option

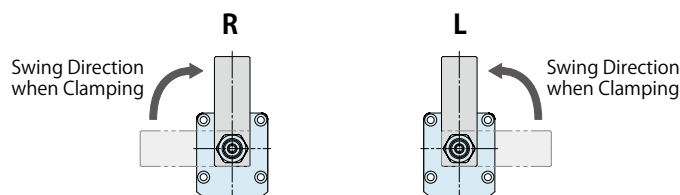| With Ports for Speed Controller Includes R Thread Plug (order speed controller separately)	with R Thread Plug	Rc Thread No Gasket Port

④ Swing Direction when Clamping

R ： Clockwise
L ： Counter-Clockwise

R　　**L**

Swing Direction when Clamping　　Swing Direction when Clamping

⑤ Action Confirmation Method

Blank ： None (Standard)
T ： With Auto Switch Installation Slot

Blank　　**T**

Auto Switch Installation Slot

KOSMEK
Harmony in Innovation
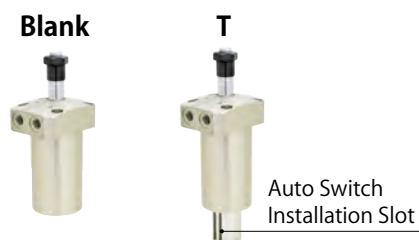
◎ Specifications

Model No.		WHG1000-2□□□	WHG1600-2□□□	WHG2500-2□□□	WHG4000-2□□□
Cylinder Force (at 0.5MPa)	kN	1.0	1.6	2.4	3.9
Clamping Force (Calculation Formula) [1]	kN	$F=(1.8842-0.00346\times L)\times P$	$F=(3.0603-0.00505\times L)\times P$	$F=(4.7875-0.00654\times L)\times P$	$F=(7.6871-0.00947\times L)\times P$
Holding Force (Calculation Formula) [1]	kN	$Fk=\dfrac{4.08\times P}{1-0.0021\times L}$	$Fk=\dfrac{6.628\times P}{1-0.0012\times L}$	$Fk=\dfrac{10.481\times P}{1-0.0008\times L}$	$Fk=\dfrac{16.806\times P}{1-0.0006\times L}$
Full Stroke	mm	14.5	15	17.5	19.5
Swing Stroke (90°)	mm	8.5	9	11.5	13.5
Vertical Stroke	mm	6			
(Break down) Idle Stroke	mm	2			
Lock Stroke [2]	mm	4			
Swing Angle Accuracy		90° ±3°			
Swing Completion Position Repeatability		±0.75°			
Max. Operating Pressure	MPa	0.5			
Min. Operating Pressure [3]	MPa	0.2			
Withstanding Pressure	MPa	0.75			
Operating Temperature	℃	0 ~ 70			
Usable Fluid		Dry Air			

Notes：
[1]. F：Clamping Force (kN), Fk：Holding Force (kN), P：Supply Air Pressure (MPa),
L：Distance between the piston center and the clamping point (mm).
[2]. The specification value of cylinder force, clamping force, holding force and swing completion position repeatability is fulfilled only when clamping within the lock stroke range.
(Please refer to "The specification value is not fulfilled when clamping out of the lock stroke range." on P.33.)
[3]. Minimum pressure to operate the clamp without load.
The clamp may stop in the middle of swing action depending on the lever shape. (Refer to "Notes on Lever Design" on P.33.)
1. Please refer to External Dimensions for the cylinder capacity and the product weight.
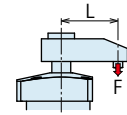
22

◉ Clamping Force Curve

L：Lever Length (mm)

P：Air Pressure (MPa)

F：Clamping Force (kN)

s

(How to read the Clamping Force Curve)
In case of WHG1600
Supply Air Pressure 0.4MPa
Lever Length L=60mm
Clamping force is about 1.1kN.
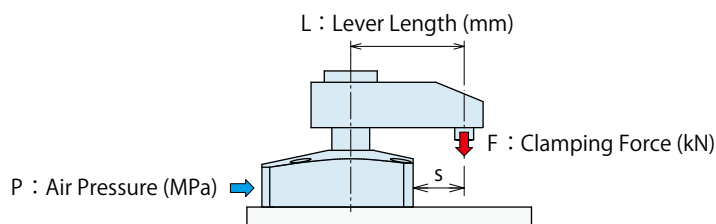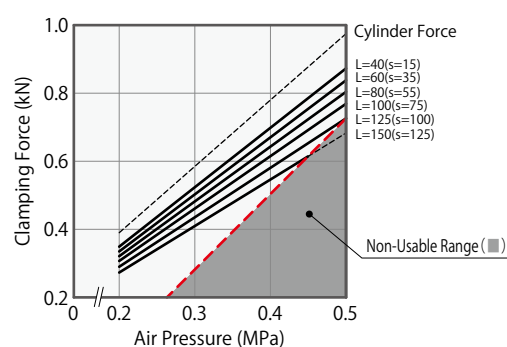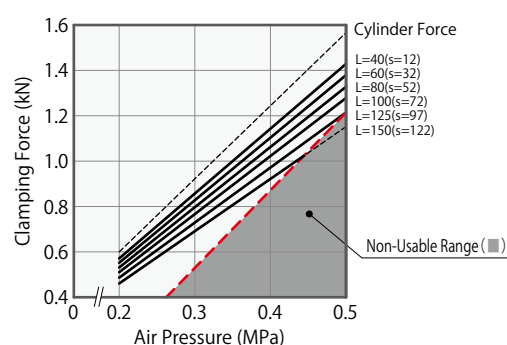
Notes：
※1. F : Clamping Force (kN), P : Supply Air Pressure (MPa), L : Lever Length (mm).
 1. Tables and graphs show the relationship between the clamping force (kN) and supply air pressure (MPa).
 2. Cylinder force (When L=0) cannot be calculated from the calculation formula of clamping force.
 3. Clamping force shown in the below tables and graphs is the value when clamping within the lock stroke range.
   (Please refer to "The specification value is not fulfilled when clamping out of the lock stroke range." on P.33.)
 4. The clamping force is shown with lever in the locked position.
 5. The clamping force varies as per the lever length. Please use it with supply air pressure suitable for lever length.
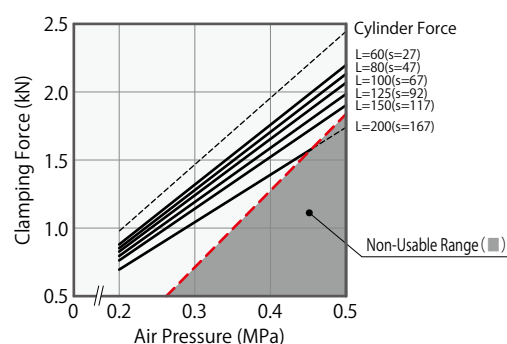 6. Operation in the non-usable range can damage the clamp and lead to fluid leakage.

WHG1000

Clamping Force Calculation Formula ※1(kN) $F = (1.8842 - 0.00346 \times L) \times P$

Air Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Non-Usable Range (▨)						Max. Lever Length (mm)
		Lever Length L (mm)						
		40	60	80	100	125	150	
0.5	0.98	0.87	0.84	0.80	0.77	0.73		125
0.4	0.78	0.70	0.67	0.64	0.62	0.58	0.55	180
0.3	0.59	0.52	0.50	0.48	0.46	0.44	0.41	190
0.2	0.39	0.35	0.34	0.32	0.31	0.29	0.27	190
Max. Operating Pressure (MPa)		0.5	0.5	0.5	0.5	0.5	0.44	

Cylinder Force
L=40(s=15)
L=60(s=35)
L=80(s=55)
L=100(s=75)
L=125(s=100)
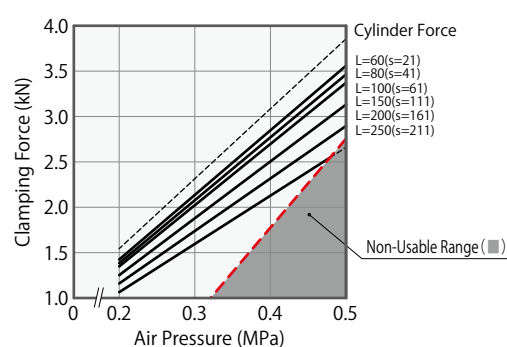L=150(s=125)
Non-Usable Range (▨)

WHG1600

Clamping Force Calculation Formula ※1(kN) $F = (3.0603 - 0.00505 \times L) \times P$

Air Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Non-Usable Range (▨)						Max. Lever Length (mm)
		Lever Length L (mm)						
		40	60	80	100	125	150	
0.5	1.57	1.43	1.38	1.33	1.28	1.22		125
0.4	1.25	1.14	1.10	1.06	1.02	0.97	0.92	174
0.3	0.94	0.86	0.83	0.80	0.77	0.73	0.69	200
0.2	0.63	0.57	0.55	0.53	0.51	0.49	0.46	200
Max. Operating Pressure (MPa)		0.5	0.5	0.5	0.5	0.5	0.44	

Cylinder Force
L=40(s=12)
L=60(s=32)
L=80(s=52)
L=100(s=72)
L=125(s=97)
L=150(s=122)
Non-Usable Range (▨)

WHG2500

Clamping Force Calculation Formula ※1(kN) $F = (4.7875 - 0.00654 \times L) \times P$

Air Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Non-Usable Range (▨)						Max. Lever Length (mm)
		Lever Length L (mm)						
		60	80	100	125	150	200	
0.5	2.44	2.20	2.13	2.07	1.99	1.90		170
0.4	1.96	1.76	1.71	1.65	1.59	1.52	1.39	245
0.3	1.47	1.32	1.28	1.24	1.19	1.14	1.04	270
0.2	0.98	0.88	0.85	0.83	0.79	0.76	0.70	270
Max. Operating Pressure (MPa)		0.5	0.5	0.5	0.5	0.5	0.45	

Cylinder Force
L=60(s=27)
L=80(s=47)
L=100(s=67)
L=125(s=92)
L=150(s=117)
L=200(s=167)
Non-Usable Range (▨)

WHG4000

Clamping Force Calculation Formula ※1(kN) $F = (7.6871 - 0.00947 \times L) \times P$

Air Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Non-Usable Range (▨)						Max. Lever Length (mm)
		Lever Length L (mm)						
		60	80	100	150	200	250	
0.5	3.86	3.56	3.46	3.37	3.13	2.90		230
0.4	3.09	2.85	2.77	2.70	2.51	2.32	2.13	330
0.3	2.32	2.14	2.08	2.02	1.88	1.74	1.60	330
0.2	1.54	1.42	1.39	1.35	1.25	1.16	1.06	330
Max. Operating Pressure (MPa)		0.5	0.5	0.5	0.5	0.5	0.48	

Cylinder Force
L=60(s=21)
L=80(s=41)
L=100(s=61)
L=150(s=111)
L=200(s=161)
L=250(s=211)
Non-Usable Range (▨)

KOSMEK Harmony in Innovation

◉ Holding Force Curve

L : Lever Length (mm)

Fk : Holding Force (kN) ※2

P : Air Pressure (MPa)

Reaction Force (Machining Thrust etc.)
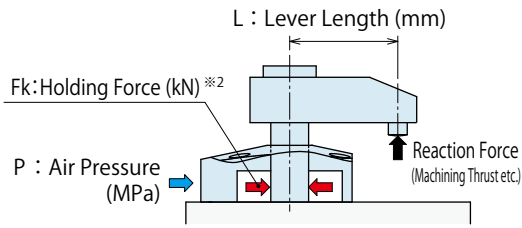
(How to read the Holding Force Curve : ex.1)
In case of WHG1600,
Supply Air Pressure 0.3MPa, Lever Length L=50mm
Holding force is about 2.1kN.

(How to read the Holding Force Curve : ex.2)
In case of WHG1600,
Supply Air Pressure 0.3MPa, Lever Length L=100mm
The calculated value is the holding force of point A, but it is in the non-usable range.
The value of intersection B is the holding force that counters the reaction force, and it is about 1.5kN.
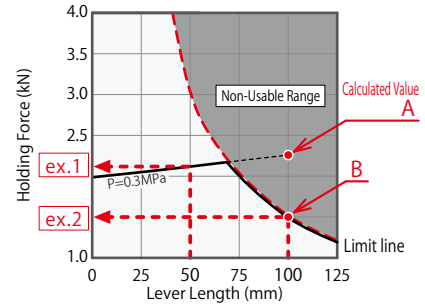

Notes :
※2. Holding force shows the force which can counter to reaction force in the clamping state, and differ from clamping force.
Please note that it may produce displacement depending on lever rigidity even if the reaction force is below the holding force.
(When slight displacement is also not allowed, please keep the reaction force beyond clamping force from being added.)
※3. Fk : Holding Force (kN) , P : Supply Air Pressure (MPa) , L : Lever Length (mm).
When a holding force calculated value exceeds the value of a limit line, holding force becomes a value of a limit line.
1. The table and the graph show the relation between holding force (kN) and lever length (mm).
2. Holding force shown in the below tables and graphs is the value when clamping within the lock stroke range.
(Please refer to "The specification value is not fulfilled when clamping out of the lock stroke range." on P.33.)
3. Holding force indicates the value when the lever locks a workpiece in horizontal position.
4. Holding force varies depending on the lever length. Set the supply air pressure suitable to the lever length.
5. Using in the non-usable range may damage the clamp and lead to fluid leakage.

WHG1000

Holding Force Formula ※3 (Fk ≦ Limit Line Value) (kN)

$$Fk = \frac{4.08 \times P}{1 - 0.0021 \times L}$$

Air Pressure (MPa)	Holding Force (kN) Non-Usable Range(▨)					
	Lever Length L (mm)					
	40	60	80	100	125	150
0.5	2.23	1.51	1.13	0.91	0.73	
0.4	1.78	1.51	1.13	0.91	0.73	0.61
0.3	1.34	1.40	1.13	0.91	0.73	0.61
0.2	0.89	0.93	0.98	0.91	0.73	0.61
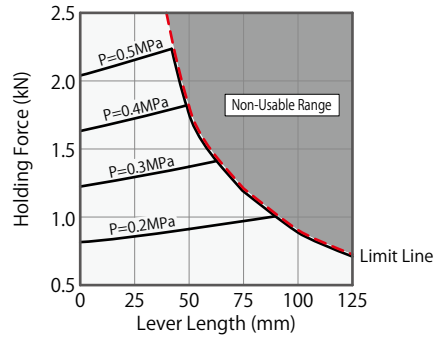
WHG1600

Holding Force Formula ※3 (Fk ≦ Limit Line Value) (kN)

$$Fk = \frac{6.628 \times P}{1 - 0.0012 \times L}$$

Air Pressure (MPa)	Holding Force (kN) Non-Usable Range(▨)					
	Lever Length L (mm)					
	40	60	80	100	125	150
0.5	3.48	2.53	1.90	1.52	1.22	
0.4	2.79	2.53	1.90	1.52	1.22	1.01
0.3	2.09	2.14	1.90	1.52	1.22	1.01
0.2	1.39	1.43	1.47	1.51	1.22	1.01
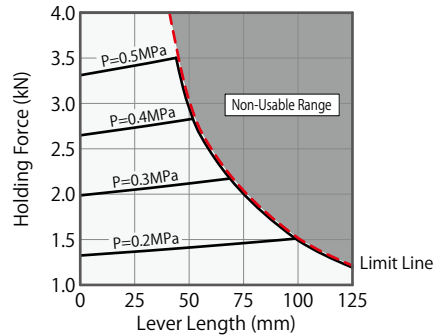
WHG2500

Holding Force Formula ※3 (Fk ≦ Limit Line Value) (kN)

$$Fk = \frac{10.481 \times P}{1 - 0.0008 \times L}$$

Air Pressure (MPa)	Holding Force (kN) Non-Usable Range(▨)					
	Lever Length L (mm)					
	60	80	100	125	150	200
0.5	5.21	3.91	3.12	2.50	2.08	
0.4	4.40	3.91	3.12	2.50	2.08	1.56
0.3	3.30	3.36	3.12	2.50	2.08	1.56
0.2	2.20	2.24	2.28	2.33	2.08	1.56
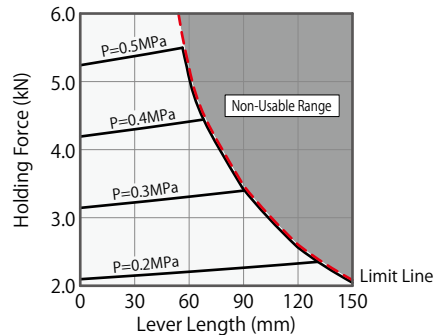
WHG4000

Holding Force Formula ※3 (Fk ≦ Limit Line Value) (kN)

$$Fk = \frac{16.806 \times P}{1 - 0.0006 \times L}$$

Air Pressure (MPa)	Holding Force (kN) Non-Usable Range(▨)					
	Lever Length L (mm)					
	60	80	100	150	200	250
0.5	8.72	7.92	6.34	4.22	3.17	
0.4	6.97	7.06	6.34	4.22	3.17	2.53
0.3	5.23	5.30	5.36	4.22	3.17	2.53
0.2	3.49	3.53	3.58	3.69	3.17	2.53
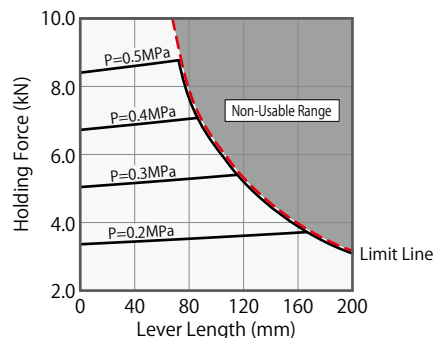
## ◉ Allowable Swing Time Graph

Adjustment of Swing Time

The graph shows allowable swing time against lever inertia moment. Please make sure that <u>an operation time is more than the operation time shown in the graph.</u>
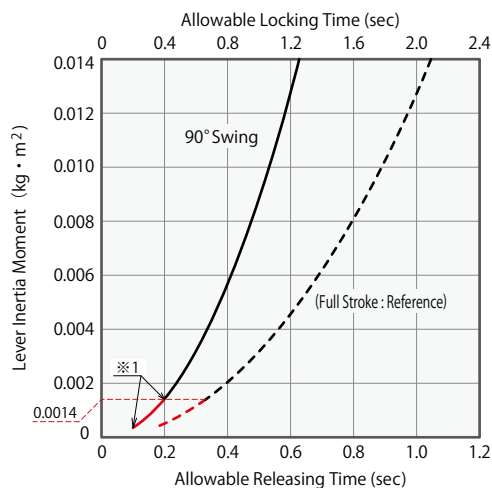
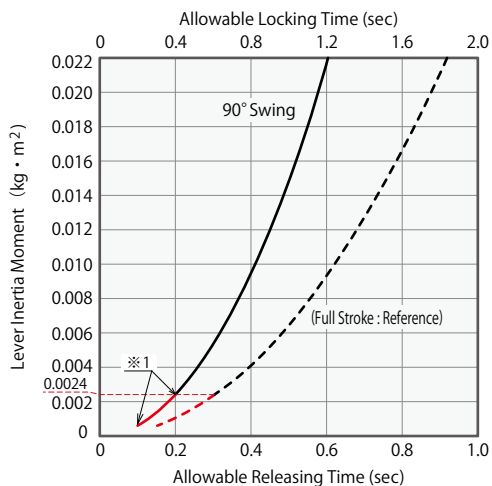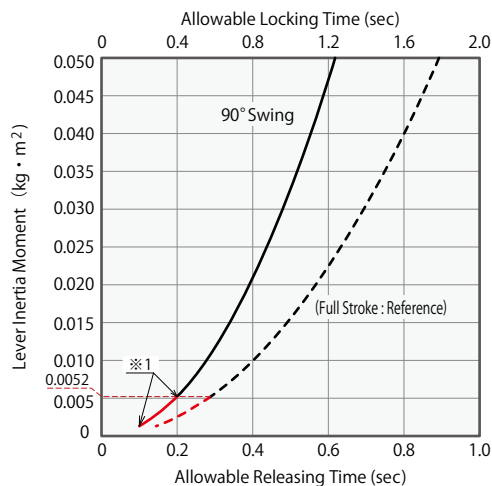Excessive action speed can reduce stopping accuracy and damage internal parts.

90° Swing (Swing Stroke)

Full Stroke (Total Operation Time)

(Vertical Stroke)
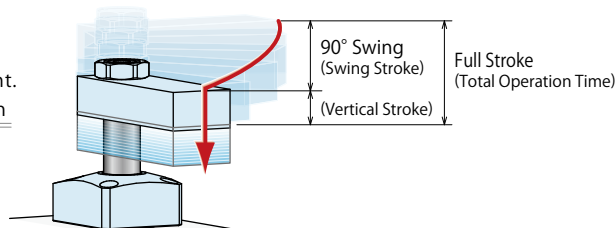
WHG1000
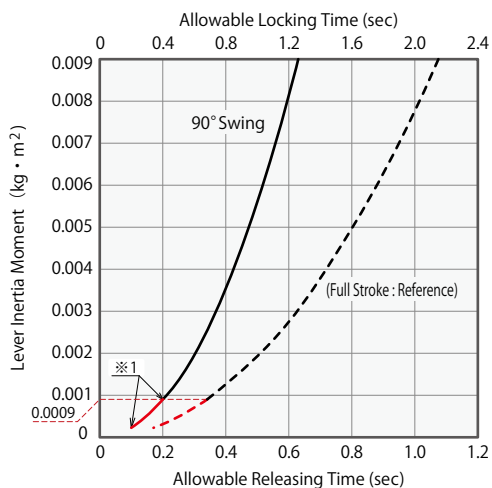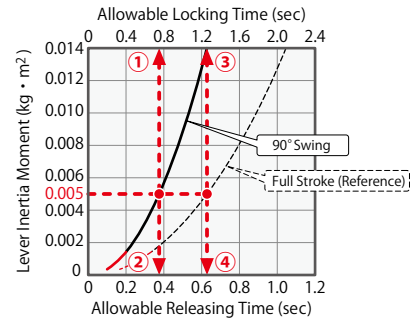

WHG1600

WHG2500

WHG4000

Notes：
　※1. For any lever inertia moment, minimum 90° swing time should be 0.2 sec.
　1. There may be no lever swing action with large inertia depending on supply air pressure, flow and lever mounting position.
　2. 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.33 for speed adjustment.)
　3. Please contact us if operational conditions differ from those shown on the graphs.

Locating
Pin Clamp
SWP

High-Power Welding Swing Clamp
WHG

High-Power Welding Link Clamp
WCG

Air Flow Control Valve
BZW

Manifold Block
WHZ-MD

General Cautions

Welding Related Products

Quick Die Change Systems

Company Profile Sales Offices

(How to read the Allowable Swing Time Graph)

   In case of WHG1600

   Lever Inertia Moment : 0.005 kg·m^2

   ① 90° Swing Time when Locking   : About 0.76 sec or more

   ② 90° Swing Time when Releasing   : About 0.38 sec or more

   ③ Total Lock Operation Time   : About 1.27 sec or more

   ④ Total Release Operation Time   : About 0.63 sec or more

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

Allowable Locking Time (sec)

Lever Inertia Moment (kg · m^2)

90° Swing

Full Stroke (Reference)

Allowable Releasing Time (sec)

How to calculate inertia moment (Estimated)

I：Inertia Moment（kg·m^2） L, L_1, L_2, K, b：Length(m) m, m_1, m_2, m_3：Mass(kg)

① For a rectangular plate (cuboid), the rotating shaft is vertically on one side of the plate.
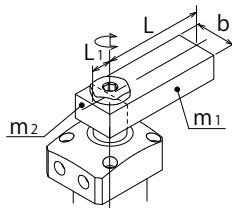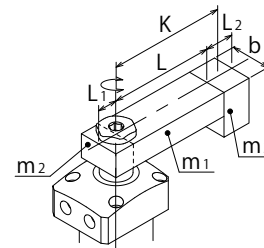
$$I = m_1 \frac{4L^2 + b^2}{12} + m_2 \frac{4L_1^2 + b^2}{12}$$

② For a rectangular plate (cuboid), the rotating shaft is vertically on the gravity center of the plate.
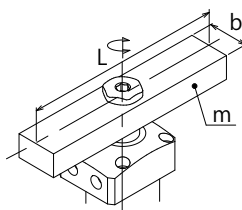
$$I = m \frac{L^2 + b^2}{12}$$

③ The load is applied on the lever front end.

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

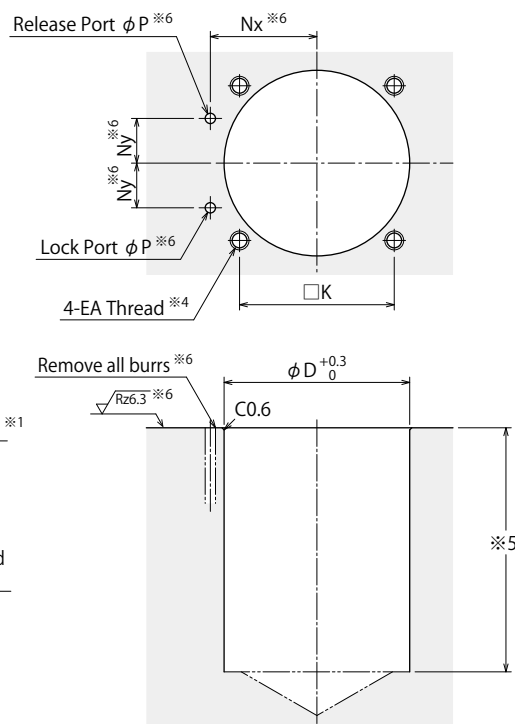## ◉ External Dimensions

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

Release Port : Rc1/8 Thread ※3
R1/8 Thread Plug (Included)
(Only for option A :
 Speed Control Valve Port)

max.17

B
H | J
2-Z
φ15.5
Hex. Socket Y
□K
CA $^{0}_{-0.05}$
φL
R type
Swing Direction when Clamping
L type
C

Lock Port : Rc1/8 Thread ※3
R1/8 Thread Plug (Included)
(Only for option A :
 Speed Control Valve Port)

4-φR
Spot Facing φQ
φCC $^{+0.05}_{0}$ Slot for Lever Phasing ※1
R type (L type：180° Reverse)

Hexagon AA × φAC
Nut (Included)
X Thread
Idle Stroke
Swing Stroke
Recommended Stroke
Recommended Lock Position
AB
W
Taper 1/10
V
BA
CB
Taper Sleeve (Included)
φBB
T
Lock Stroke ※7
Vertical Stroke
Full Stroke
Fu
12°
G
φU
M
S ※2
A
E
F
φD $^{-0.1}_{-0.2}$

Lock Port : O-ring (Included)
(Option -A / -G)
Nx
Ny Ny
Ny Ny
Release Port : O-ring (Included)
(Option -A / -G)

Notes：
※1. The slot for lever phasing faces the port side when locked.
※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.53.

◉ Machining Dimensions of Mounting Area

Release Port φP ※6
Nx ※6
Ny ※6
Ny Ny ※6
Lock Port φP ※6
4-EA Thread ※4
□K

Remove all burrs ※6
φD $^{+0.3}_{0}$
Rz6.3 ※6
C0.6
※5
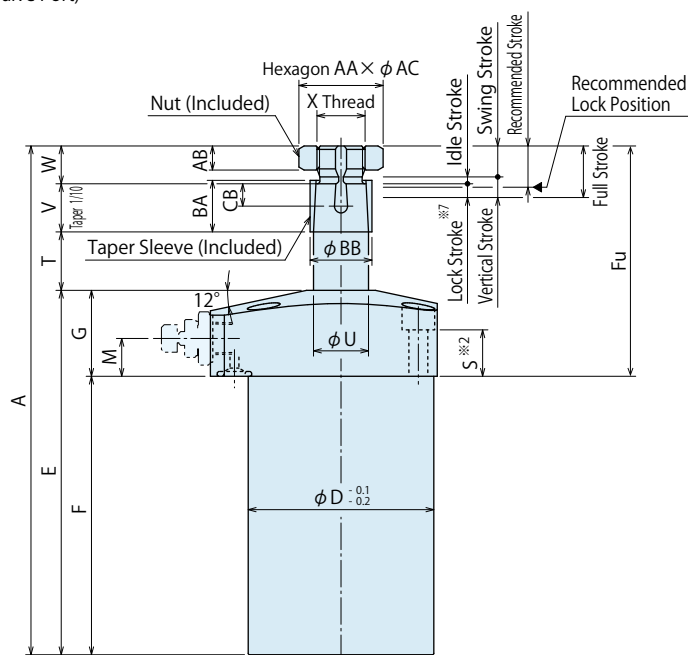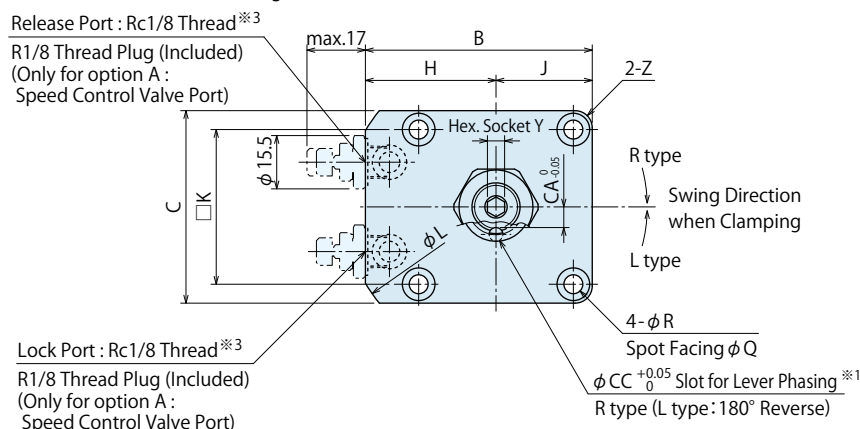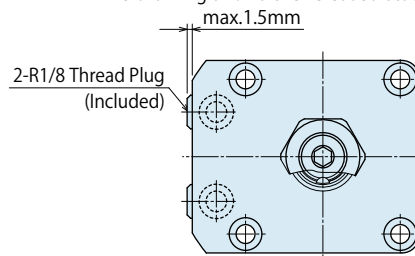
Notes：
※4. EA tapping depth of the mounting bolt should be
 decided according to the mounting height referring
 to dimension 'S'.
※5. The depth of the body mounting hole φD should be
 decided according to the mounting height referring
 to dimension 'F'.
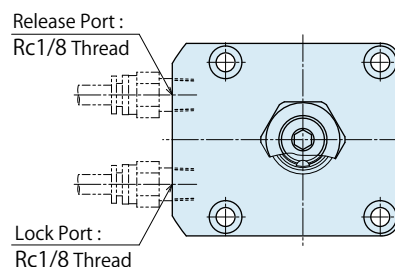※6. The machining dimension is for -A/-G：Gasket Option.

◉ Piping Method

G : Gasket Option (With R Thread Plug)
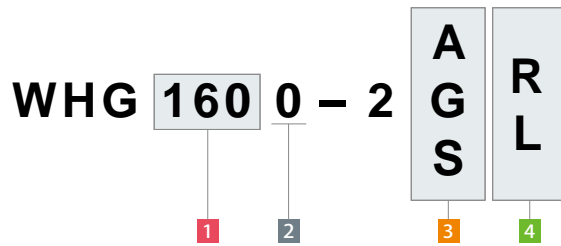※The drawing shows the released state of WHG-2GR.
max.1.5mm
2-R1/8 Thread Plug
(Included)

S : Piping Option (Rc Thread)
※The drawing shows the released state of WHG-2SR.
Release Port :
Rc1/8 Thread
Lock Port :
Rc1/8 Thread

| Action Description | Features | Model No. Indication Specifications | Performance Curve | External Dimensions | Lever Design Dimensions | Accessories | Cautions |

KOSMEK Harmony in Innovation

◉ Model No. Indication

（Format Example：WHG1000-2AR, WHG2500-2SL）

WHG [160] 0 – 2 [A G S] [R L]

[1] [2] [3] [4]

[1] Cylinder Force

[2] Design No.

[3] Piping Method

[4] Swing Direction when Clamping

[5] Action Confirmation (When Blank is chosen)

◉ External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.	WHG1000-2□□	WHG1600-2□□	WHG2500-2□□	WHG4000-2□□
Full Stroke	14.5	15	17.5	19.5
Swing Stroke (90°)	8.5	9	11.5	13.5
Vertical Stroke		6		
(Break · Idle Stroke		2		
down) · Lock Stroke ※7		4		
Recommended Stroke	11.5	12	14.5	16.5
A	138.5	148	174	192.5
B	60	66	76	87
C	50	56	66	78
D	46	54	64	77
E	99.5	106	124.5	135
F	74.5	81	94.5	105
Fu	64	67	79.5	87.5
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	max. ϕ5	max. ϕ5	max. ϕ5	max. ϕ5
Q	9.5	9.5	11	11
R	5.5	5.5	6.8	6.8
S	14	13.5	16	15
T	16.5	17	19.5	21.5
U	14	16	20	25
V	12	14	17	21
W	10.5	11	13	15
X (Nominal × Pitch)	M12×1.5	M14×1.5	M16×1.5	M22×1.5
Y	5	5	6	8
Z (Chamfer)	R5	R5	R6	R6
AA	19	22	24	32
AB	6.5	7	8	10
AC	21.2	24.5	26.5	35.5
BA	13	15	18	22
BB	16	18	22	28
CA	5	6	8	10
CB	4.5	6.5	5.5	9.5
CC	4	4	4	6
EA (Nominal×Pitch)	M5×0.8	M5×0.8	M6×1	M6×1
O-ring (Option A/G)	1BP7	1BP7	1BP7	1BP7
Cylinder Capacity · Lock	21.8	35.5	61.3	103.8
cm³ · Release	25.5	40.3	69.2	117.6
Weight ※8 kg	0.8	1.0	1.8	2.9

Notes：
　※7. The specification value of cylinder force, clamping force, holding force and swing completion position repeatability is fulfilled
　　　only when clamping within the lock stroke range.
　　　(The specification value is not fulfilled when clamping within the range of swing stroke and idle stroke.)
　※8. It shows the weight of single swing clamp including taper sleeve and nut.

◉ External Dimensions

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

Release Port : Rc1/8 Thread[※3]
R1/8 Thread Plug (Included)
(Only for option A :
 Speed Control Valve Port)

Lock Port : Rc1/8 Thread[※3]
R1/8 Thread Plug (Included)
(Only for option A :
 Speed Control Valve Port)

max.17

Hex. Socket Y

ϕ15.5

R type
L type

Swing Direction
when Clamping

4-ϕR
Spot Facing ϕQ
ϕCC$^{+0.05}_{0}$ Slot for Lever Phasing[※1]
R type (L type：180° Reverse)

Hexagon AA×ϕAC
Nut (Included)
X Thread

Idle Stroke
Swing Stroke
Recommended Stroke
Recommended Lock Position
Full Stroke

Taper Sleeve (Included)
ϕBB

12°
ϕU

ϕD$^{-0.1}_{-0.2}$

Head Cover[※4]

ϕUB

2-ϕUF
Auto Switch Installation Slot
Lock Port : O-ring (Included)
(Option -A / -G)

Release Port : O-ring (Included)
(Option -A / -G)

2-M3×0.5 Thread Depth 6[※4]

Notes：
※1. The slot for lever phasing faces the port side when locked.
※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.53.
※4. The direction of the Head Cover is not as indicated in the drawing.
    Adjust the direction as you need.
    Use M3 tapped holes on the bottom to fix the head cover with bracket.

◉ Machining Dimensions of Mounting Area

Release Port ϕP[※7]   Nx[※7]
Lock Port ϕP[※7]
4-EA Thread[※5]
□K

Remove all burrs[※7]
ϕD$^{+0.3}_{0}$
Rz6.3[※7]
C0.6
※6
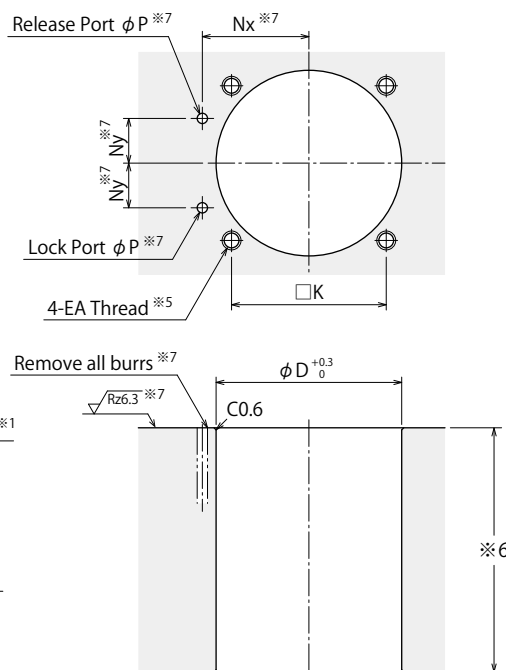
Notes：
※5. EA tapping depth of the mounting bolt should be
    decided according to the mounting height referring
    to dimension 'S'.
※6. The depth of the body mounting hole ϕD should be
    decided according to the mounting height referring
    to dimension 'F'.
※7. The machining dimension is for -A/-G：Gasket Option.
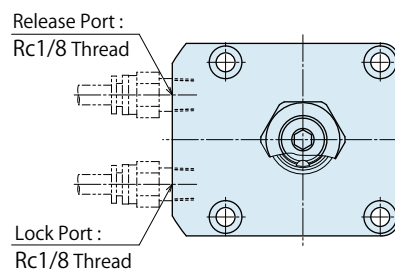
◉ Piping Method

G : Gasket Option (With R Thread Plug)
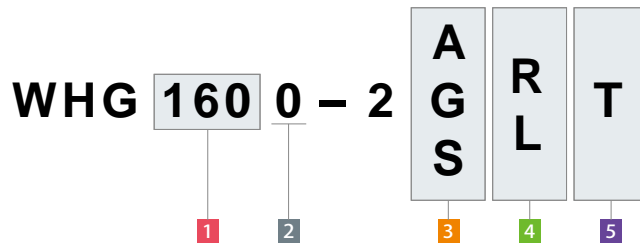※The drawing shows the released state of WHG-2GRT.
max.1.5mm
2-R1/8 Thread Plug (Included)
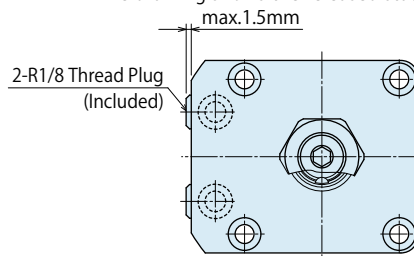
S : Piping Option (Rc Thread)
※The drawing shows the released state of WHG-2SRT.
Release Port : Rc1/8 Thread
Lock Port : Rc1/8 Thread

KOSMEK Harmony in Innovation

◉ Model No. Indication

（Format Example：WHG1000-2ART, WHG2500-2SLT）

WHG [160] 0 – 2 [A/G/S] [R/L] [T]

[1] [2] [3] [4] [5]

[1] Cylinder Force
[2] Design No.
[3] Piping Method
[4] Swing Direction when Clamping
[5] Action Confirmation (When T is chosen)

◉ External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.	WHG1000-2☐☐T	WHG1600-2☐☐T	WHG2500-2☐☐T	WHG4000-2☐☐T
Full Stroke	14.5	15	17.5	19.5
Swing Stroke (90°)	8.5	9	11.5	13.5
Vertical Stroke			6	
(Break down) Idle Stroke			2	
Lock Stroke ※8			4	
Recommended Stroke	11.5	12	14.5	16.5
A	138.5	148	174	192.5
B	60	66	76	87
C	50	56	66	78
D	46	54	64	77
E	99.5	106	124.5	135
F	74.5	81	94.5	105
Fu	64	67	79.5	87.5
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	max. φ5	max. φ5	max. φ5	max. φ5
Q	9.5	9.5	11	11
R	5.5	5.5	6.8	6.8
S	14	13.5	16	15
T	16.5	17	19.5	21.5
U	14	16	20	25
V	12	14	17	21
W	10.5	11	13	15
X (Nominal × Pitch)	M12×1.5	M14×1.5	M16×1.5	M22×1.5
Y	5	5	6	8
Z (Chamfer)	R5	R5	R6	R6
AA	19	22	24	32
AB	6.5	7	8	10
AC	21.2	24.5	26.5	35.5
BA	13	15	18	22
BB	16	18	22	28
CA	5	6	8	10
CB	4.5	6.5	5.5	9.5
CC	4	4	4	6
EA (Nominal×Pitch)	M5×0.8	M5×0.8	M6×1	M6×1
UA	35	35	38	40
UB	27	27	30	30
UC	31	31.5	34	36
UD	9.5	9.5	11	11
UE	7	7	7	7
UF	4.3	4.3	4.3	4.3
UG	12.1	12.1	13.6	13.6
UH	3	3	3	3
UJ	20	20	22	22
O-ring (Option A/G)	1BP7	1BP7	1BP7	1BP7
Cylinder Capacity cm³ Lock	21.8	35.5	61.3	103.8
Release	25.5	40.3	69.2	117.6
Weight ※9 kg	0.9	1.1	1.9	3.0

Notes：
　※8. The specification value of cylinder force, clamping force, holding force and swing completion position repeatability is fulfilled
　　　only when clamping within the lock stroke range.
　　　(The specification value is not fulfilled when clamping within the range of swing stroke and idle stroke.)
　※9. It shows the weight of single swing clamp including taper sleeve and nut.

30

◗ Taper Lock Lever Design Dimensions

※ Reference for designing taper lock swing lever.

Corresponding Model No.

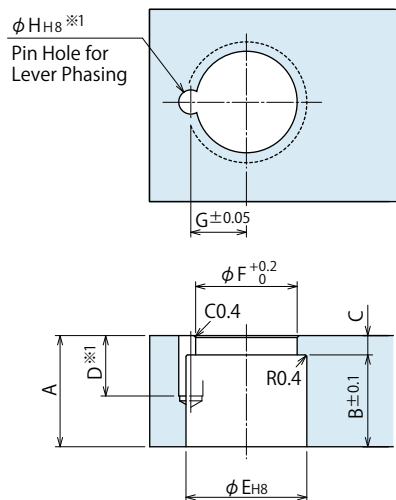**WHG** ☐ **0 - 2** | A G S | L R | Blank T |

1 Cylinder Force

ϕH H8 ※1
Pin Hole for
Lever Phasing

G±0.05

ϕF $^{+0.2}_{0}$
C0.4
D ※1
A
R0.4
C
B±0.1
ϕE H8

(mm)

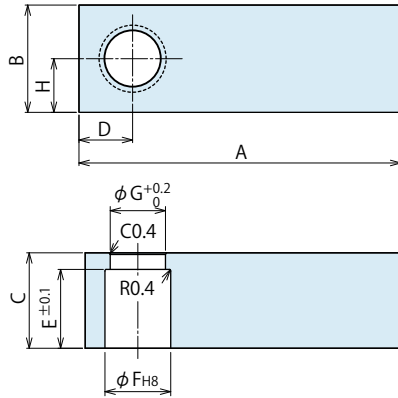| Corresponding Model No.	WHG1000-2☐☐☐	WHG1600-2☐☐☐	WHG2500-2☐☐☐	WHG4000-2☐☐☐
A	16	18	22	26
B	13	15	18	22
C	3	3	4	4
D	8.5	10.5	10.5	14.5
E	$16^{+0.027}_{0}$	$18^{+0.027}_{0}$	$22^{+0.033}_{0}$	$28^{+0.033}_{0}$
F	13	15	17	23.5
G	7.1	8.1	10.1	13.1
H	$4^{+0.018}_{0}$	$4^{+0.018}_{0}$	$4^{+0.018}_{0}$	$6^{+0.018}_{0}$
Phasing Pin (Reference) ※2	ϕ4(h8)×8	ϕ4(h8)×10	ϕ4(h8)×10	ϕ6(h8)×14

Notes：
1. Swing lever should be designed with its length according to performance curve.
2. If the swing lever is not in accordance with the dimensions shown above, performance may be degraded and damage can occur.
※1. The pin hole (ϕH) for determining the lever phase should be added, if necessary.
※2. Phasing pin is not included. Prepare it separately.

KOSMEK
Harmony in Innovation

◉ Accessories：Material Swing Lever for Taper Lock Option

Model No. Indication

WHZ 160 0 – T

Size
(Refer to the table.)

Design No.
(Revision Number)

(mm)

Model No.	WHZ1000-T	WHZ1600-T	WHZ2500-T	WHZ4000-T
Corresponding Model No.	WHG1000-2□□□	WHG1600-2□□□	WHG2500-2□□□	WHG4000-2□□□
A	90	125	150	170
B	25	28	34	45
C	16	18	22	26
D	12.5	14	17	23
E	13	15	18	22
F	$16 {}^{+0.027}_{0}$	$18 {}^{+0.027}_{0}$	$22 {}^{+0.033}_{0}$	$28 {}^{+0.033}_{0}$
G	13	15	17	23.5
H	12.5	14	17	22.5

Notes：
1. Material : S50C
2. If necessary, the front end should be additionally machined.
3. When determining the phase, refer to taper lock lever design dimensions for each model for the additional machining.

◉ 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 so that the inertia moment is 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.
● Please set the operating time after the inertia moment is calculated. Please make sure that the clamps work within allowable operating time referring to the allowable operating time graph.
● 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) When clamping on a sloped surface of the workpiece
● Make sure the clamping surface and the mounting surface of the clamp are parallel.
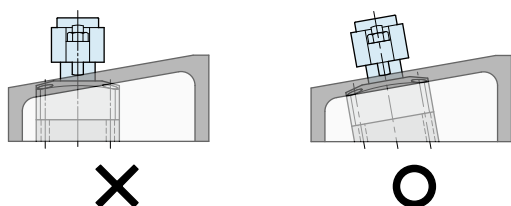

5) Swing Speed Adjustment
● If the clamp operates too fast the parts will wear out leading to premature damage and ultimately complete equipment failure. Adjust the speed following "Allowable Swing Time Graph".
● Install a speed control valve (meter-out) and gradually control the flow rate from the low-speed 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.

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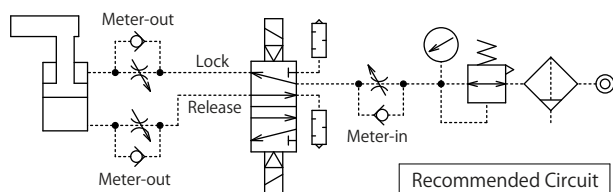
● When operating multiple clamps simultaneously, please install the speed controller (meter-out) to each clamp.

6) 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 with the mounting position 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.
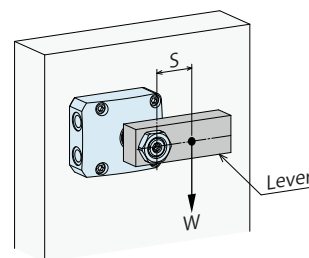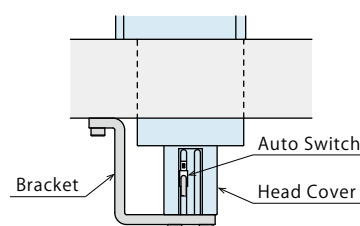

Model No.	(Lever Length W) × (Center of Gravity S) (N·m)
WHG1000	0.10
WHG1600	0.20
WHG2500	0.45
WHG4000	0.90

7) The specification value is not fulfilled when clamping out of the lock stroke range.
● The mechanical lock function will not work when clamping within the range of swing stroke and idle stroke, and the specification value of cylinder force, clamping force, holding force and swing completion position repeatability will not be fulfilled.

 The actual stroke of the piston that descends from the release-end to lock-end should be designed to have the same value as the recommended stroke listed in the external dimensions.
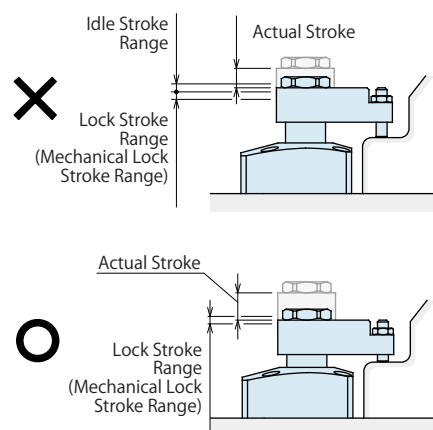
8) Adjust the direction of the head cover as you need. Use M3 tapped holes on the bottom to fix the head cover with bracket.

Locating
Pin Clamp

SWP

**High-Power
Welding
Swing Clamp**

WHG

High-Power
Welding
Link Clamp

WCG

Air Flow
Control Valve

BZW

Manifold
Block

WHZ-MD

General Cautions

Welding
Related Products

Quick Die
Change Systems

Company Profile
Sales Offices

● Installation Notes

1) Check the fluid to use.
● Please supply filtered clean dry air. (Install a 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 and flushed thoroughly.
The dust and cutting chips in the circuit may lead to fluid leakage and malfunction.
● There is no filter provided with this product for prevention of contaminants in the air circuit.

3) Applying Sealing Tape
● Wrap with tape 1 to 2 times following the screw direction.
Wrapping in the wrong direction will cause leakage and malfunction.
● Pieces of the sealing tape can lead to air leakage and malfunction.
● When piping, be careful that contaminant such as sealing tape does not enter in products.

4) Installation of the Product
● When mounting the product use four hexagon socket bolts (with tensile strength of 12.9) and tighten them with the torque shown in the table below. Tightening with greater torque than recommended can depress the seating surface or break the bolt.

Model	Thread Size	Tightening Torque (N・m)
WHG1000	M5×0.8	6.3
WHG1600	M5×0.8	6.3
WHG2500	M6×1	10
WHG4000	M6×1	10

5) Installation of the Flow Control Valve
● Tightening torque for installing flow control valve is 5 to 7 N・m.

6) Installation / Removal of the Swing Lever
● Oil or debris on the mating surfaces of the lever, taper sleeve or piston rod can cause the lever to loosen.
Please clean them thoroughly before installation.
● Tightening torque for the swing lever is shown below.

Standard：Taper Lock Lever Option

Model	Thread Size	Tightening Torque (N・m)
WHG1000	M12×1.5	17 ~ 20
WHG1600	M14×1.5	21 ~ 25
WHG2500	M16×1.5	33 ~ 40
WHG4000	M22×1.5	84 ~ 100

● If the piston rod is subjected to excessive torque or shock, the rod or the internal mechanism may be damaged.
Observe the following points to prevent such shock.

Installation Procedure
① With a clamp positioned to a jig, determine the lever position, and tighten the nut for fixing the lever (temporal tightening).
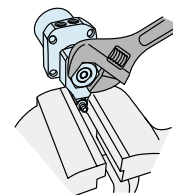
② Remove the clamp from the jig, fix the lever with a machine vise etc., and tighten the nut.

③ If tightening the nut with the clamp positioned to the jig, use a wrench to the hexagon part of piston rod, or fix the lever with a spanner.
It is best to bring the lever to the middle of the swing stroke before tightening the nut.
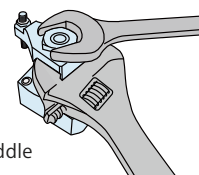
Removal Procedure
① While the clamp is on the jig or vise, use a hex wrench to bring the lever to the middle of the swing stroke and then loosen the nut.

② Loosen the nut after securing the lever two or three turns then remove the lever with a puller without any rotational torque applied on the piston rod.
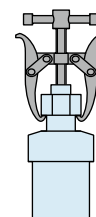
7) Swing Speed Adjustment
● Adjust the speed following "Allowable Swing Time Graph".
If the clamp operates too fast the parts will wear out leading to premature damage and ultimately complete equipment failure.
● Turn the speed control valve gradually from the low-speed side (small flow) to the high-speed side (large flow) to adjust the speed.

8) Checking Looseness and Retightening
● At the beginning of the machine installation, the bolt and nut may be tightened lightly. Check the looseness and re-tighten as required.

◉ Cautions

● Notes on Handling

1) It should be handled by qualified personnel.
   ● The hydraulic machine and air compressor should be handled and maintained by qualified personnel.

2) Do not handle 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 preventive devices are in place.
   ② Before the product is removed, make sure that the above-mentioned safety measures 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 the clamp (cylinder) while it is working. Otherwise, your hands may be injured due to clinching.
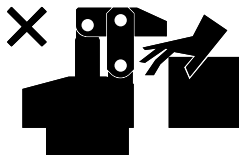
4) Do not disassemble or modify.
   ● If the product is taken apart or modified, the warranty will be voided even within the warranty period.

● Maintenance and Inspection

1) Removal of the Product and Shut-off of Pressure Source
   ● Before the product is removed, make sure that safety measures 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.
   ● If it is used when the surface is contaminated with dirt, it may lead to packing seal damage, malfunctioning, fluid leakage and air leaks.
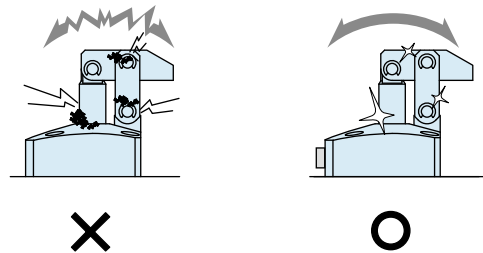
3) Regularly tighten pipings, mounting bolts, nuts, snap rings and cylinders to ensure proper use.

4) Make sure there is smooth action and no abnormal noise.
   ● Especially when it is restarted after left unused for a long period, make sure it can be operated correctly.

5) The products should be stored in the cool and dark place without direct sunshine or moisture.

6) 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 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 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.

Air Flow Control Valve

Model **BZW**

Directly mounted to clamps, easy adjusting

● **Directly Mounted to Clamps**

BZW is the flow control valve for Rc thread that enable to mount to the piping method : option -A of WHG/WCG.
It is best used in a circuit where the flow control valve cannot be mounted or if necessary to synchronize individual speed.

Adjusting Screw　　　　　　　　　　　Lock Nut
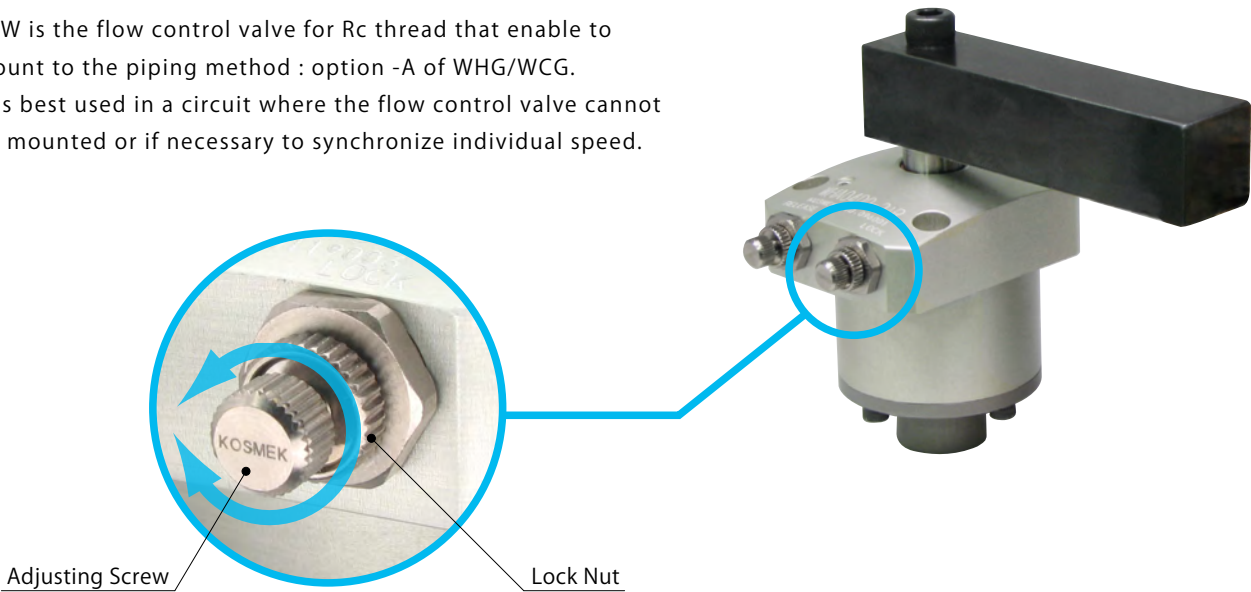
Corresponding Product Model

Clamp	BZW Model No.	Clamp Model No.
High-Power Welding Link Clamp	BZW0100-**A**	WCG☐0-2 **A**☐
High-Power Welding Swing Clamp	BZW0100-**B**	WHG☐0-2 **A**☐

Corresponding to piping method -A option.

※ When mounting BZW to piping method G, take off R thread plug and remove the seal tape not to get inside cylinder.

Model No. Indication

BZW 010 0 – B

Control Method
B : Meter-out
A : Meter-in

Design No.
0 : Revision Number

R Thread Size
010 : Rc1/8

Specifications

Model No.	BZW0100-B	BZW0100-A
Control Method	Meter-out	Meter-in
Operating Pressure MPa	0.1 ~ 1.0	
Withstanding Pressure MPa	1.5	
Adjust Screw Number of Rotations	10 Rotations	
Tightening Torque N·m	5 ~ 7	
Corresponding Model No.	WHG☐–2A☐	WCG☐–2A☐

Circuit Symbol

BZW0100-B：Meter-out

P1 Port
Air Source Side
(Incoming Side)

P2 Port
Clamp Side
(Outgoing Side)

BZW0100-A：Meter-in

P1 Port
Air Source Side
(Incoming Side)

P2 Port
Clamp Side
(Outgoing Side)

External Dimensions

Adjusting Screw
Lock Nut
(Pneumatic Clamp)
O-ring (Included)
(Rc1/8)

ϕ15.5
ϕ11
ϕ8

KOSMEK

Close　Open

Hexagon 14

Packing
BZW-B (Mounting
direction of BZW-A
is opposite.)

4　3.5
11.5 ~ 17

Machining Dimensions of Mounting Area

Rz6.3
14.8 or less
⊥ 0.01 A
8.8 ±0.1
0.7 $^{+0.1}_{0}$
◎ ϕ0.01 A
0.1 or less
C0.1
20°
Rz6.3

P2 Port
Clamp Side
(Outgoing Side)

ϕ13.8 H7 $^{+0.018}_{0}$
ϕ10 or less
(ϕ8.2)
ϕ7.8 ±0.02
Rz6.3
Remove all burrs
A
45°
ϕ2.5 ~ 3.5

Rc1/8 Thread
Prepared Hole 8.2 $^{+0.1}_{0}$
6.3
P1 Port
Air Pressure Supply Side
(Incoming Side)

Flow Rate Graph

BZW0100-B/BZW0100-A common

Controlled Flow Direction

Flow Rate [L/min(ANR)]

Pressure Loss 0.5MPa
Pressure Loss 0.4MPa
Pressure Loss 0.3MPa
Pressure Loss 0.2MPa

←Close　Adjust Screw Number of Rotations [Rotations]　Open→

Free Flowing Direction

Flow Rate [L/min(ANR)]

Fully opened
Fully closed

Pressure Loss [MPa]

Notes :
1. Since the $\sqrt{}$ Rz6.3 area is sealing part, be careful not to damage it.
2. No cutting chips or burr should be at the tolerance part of machining hole.
3. As shown in the drawing, P1 port is used as the air supply side and P2 port as the clamp side.
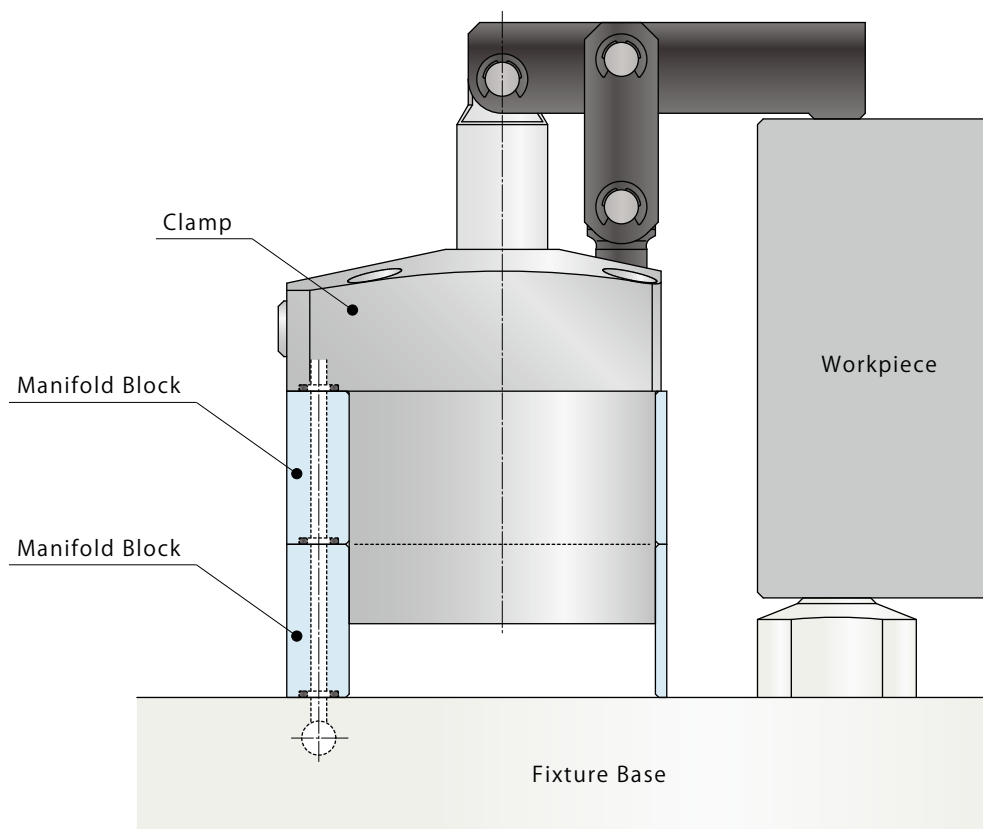
Manifold Block

Model **WHZ-MD**

- ## Manifold Block

   The mounting height of clamp is adjustable with the manifold block.

Clamp

Manifold Block

Manifold Block

Workpiece

Fixture Base

Manifold Block
Applicable Model/Application Examples

Manifold Block
Model No. Indication/External Dimensions

KOSMEK
Harmony in Innovation

Applicable Model

Manifold Block Model No.	Corresponding Item Model No.	
Model WHZ-MD	Model WCG	Model WHG

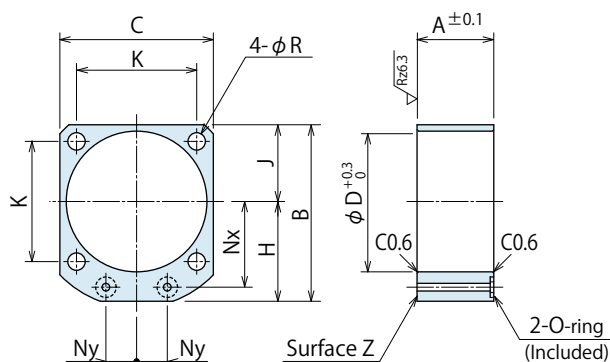### Manifold Block for WCG/WHG

Model No. Indication

WHZ 048 0 – MD

Size
(Refer to
following table)

Design No.
(Revision Number)

C
K
4-φR
A ±0.1
Rz6.3
φD +0.3/0
J
B
K
Nx
H
C0.6   C0.6
Ny   Ny
Surface Z
2-O-ring
(Included)

(mm)

Model No.	WHZ0320-MD	WHZ0400-MD	WHZ0500-MD	WHZ0630-MD
Corresponding Item Model Number	WCG1000 WHG1000	WCG1600 WHG1600	WCG2500 WHG2500	WCG4000 WHG4000
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
Weight kg	0.1	0.1	0.2	0.2

Notes : 1. Material：A2017BE-T4

2. Mounting bolts are not provided. Prepare mounting bolts according to the mounting height using the dimension A as a reference.

3. If thickness other than A is required, perform additional machining on surface Z. Please refer to the drawing.

KOSMEK

Harmony in Innovation

KOSMEK LTD. ▶ http://www.kosmek.com/

HEAD OFFICE   1-5, 2-chome, Murotani, Nishi-ku, Kobe-city, Hyogo, Japan 651-2241
TEL.+81-78-991-5162   FAX.+81-78-991-8787

United States of America SUBSIDIARY	KOSMEK (USA) LTD. 650 Springer Drive, Lombard, IL 60148 USA TEL. +1-630-620-7650 FAX. +1-630-620-9015
MEXICO REPRESENTATIVE OFFICE	KOSMEK USA Mexico Office Av. Santa Fe #103 int 59 Col. Santa Fe Juriquilla C.P. 76230 Queretaro, Qro Mexico TEL. +52-442-161-2347
EUROPE SUBSIDIARY	KOSMEK EUROPE GmbH Schleppeplatz 2 9020 Klagenfurt am Wörthersee Austria TEL. +43-463-287587 FAX. +43-463-287587-20
CHINA SUBSIDIARY	KOSMEK (CHINA) LTD. Room601, RIVERSIDE PYRAMID No.55, Lane21, Pusan Rd, Pudong Shanghai 200125, China TEL. +86-21-54253000
INDIA BRANCH OFFICE	KOSMEK LTD. - INDIA F 203, Level-2, First Floor, Prestige Center Point, Cunningham Road, Bangalore -560052 India TEL.+91-9880561695
THAILAND REPRESENTATIVE OFFICE	KOSMEK Thailand Representation Office 67 Soi 58, RAMA 9 Rd., Suanluang, Suanluang, Bangkok 10250, Thailand TEL. +66-2-300-5132 FAX. +66-2-300-5133
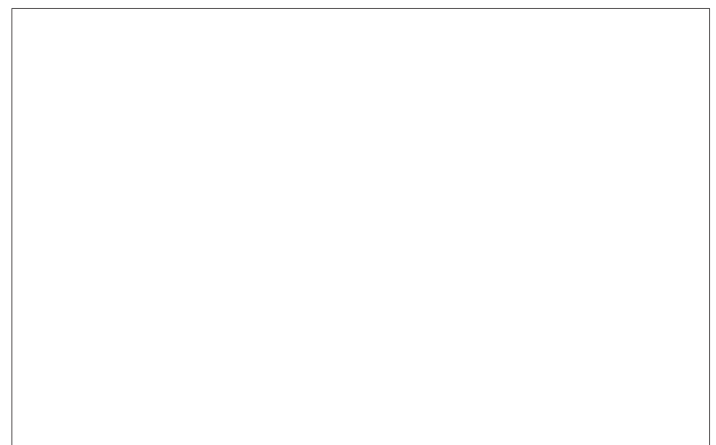
■ For Further Information on Unlisted Specifications and Sizes, Please call us.
■ Specifications in this Leaflet are Subject to Change without Notice.

JQA-QMA10823
KOSMEK HEAD OFFICE

ISO 9001

JAB
MS
CM009