High-Power Welding Link Clamp

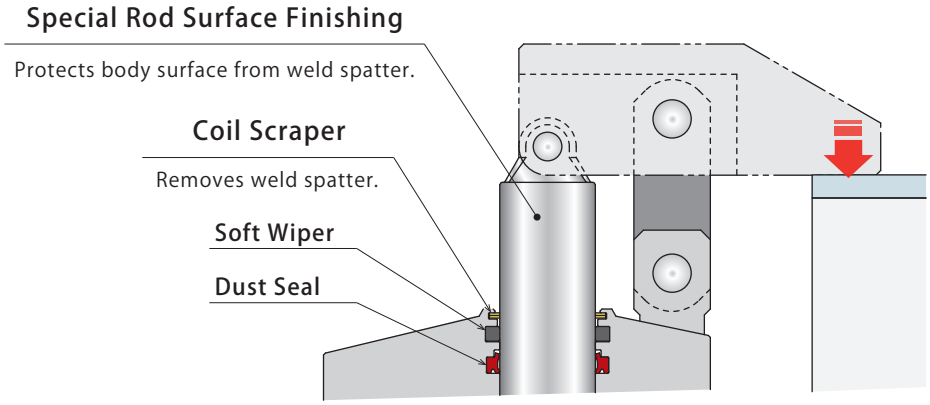
Model WCG

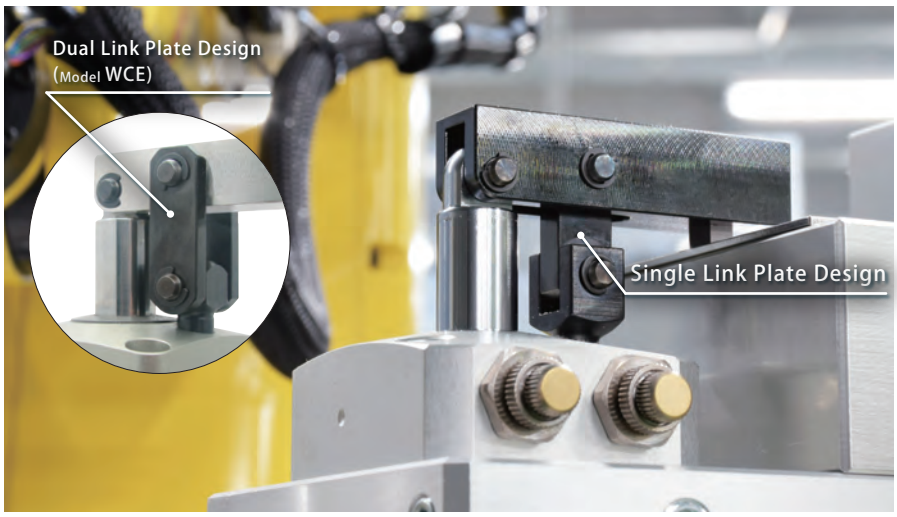
Spatter Resistant High-Power Welding Link Clamp

PAT.

Features

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





Link Mechanism with Single Link Plate

Compared to dual link plate design (model WCE), the link mechanism of Welding Clamp is designed to be spatter resistant with single link plate.

Case Study

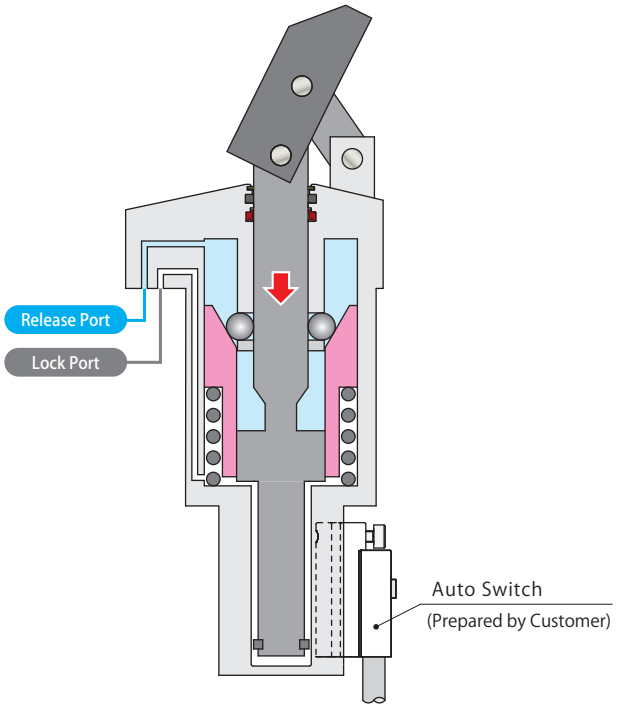
The rod operates without failure even after exposed to spatter for a long time.

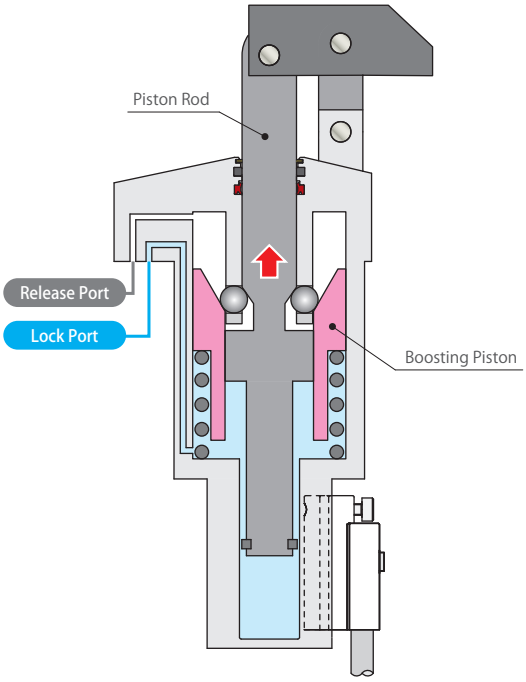
The High-Power Welding Link Clamp is a hybrid system using air pressure and a mechanical lock.

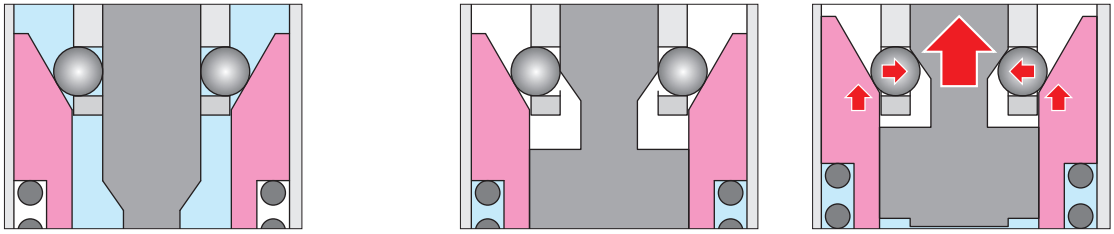
Action Description

Released State — Lock Air OFF / Release Air ON

Locked State — Lock Air ON / Release Air OFF







Released State

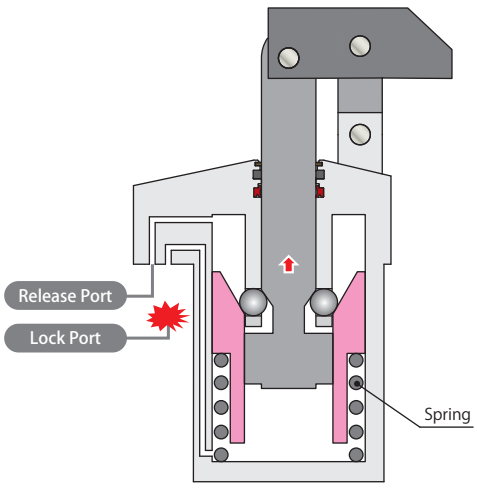
The piston rod descends to release.

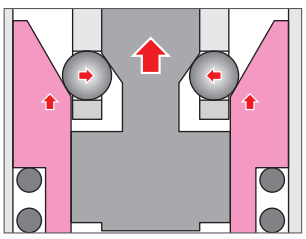
Locking Operation
(Idle Stroke Completed)

Locked State
(Boosting Stroke)

The piston rod ascends and the boosting piston activates. It exerts strong clamping force and holding force with the wedge mechanism.

Self-Locking State — Lock Air OFF / Release Air OFF



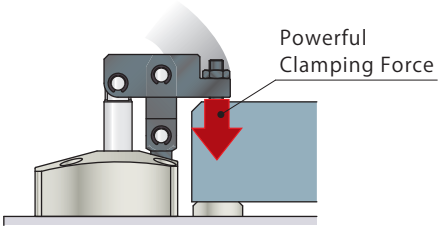


Self-Locking State
(Holding with Spring Force + Mechanical Lock)

If lock air pressure drops to zero at locked state, lock pressure is maintained with the internal spring and mechanical lock.

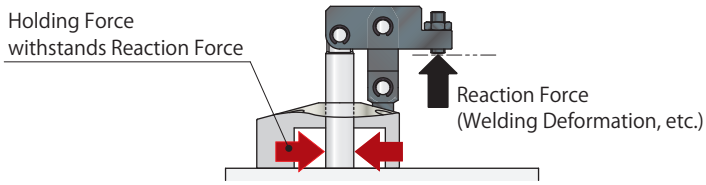
No Hydraulic Use

Welding fixture system with high-power welding clamps exerting equivalent force to hydraulic clamps needs no hydraulic pressure.



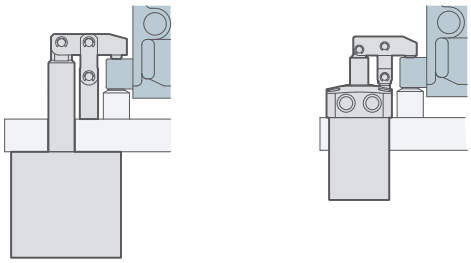
Holding Force

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



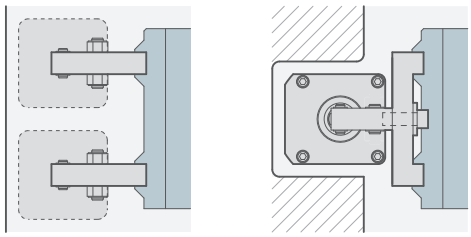
Smaller Footprint

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

Downsized

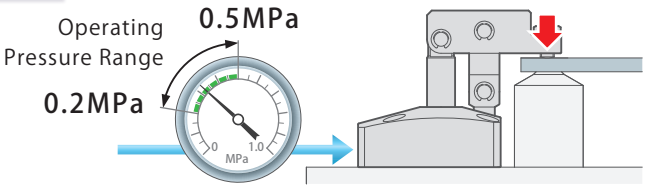


General Air Cylinder　High-Power Welding Clamp

Reduced Number of Clamps

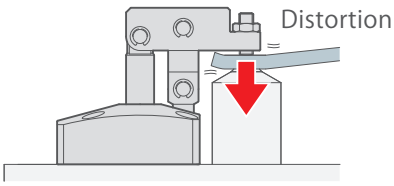
Energy Saving

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

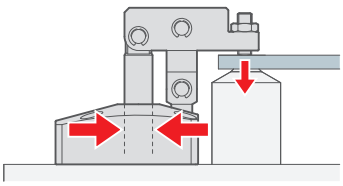


High Quality

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



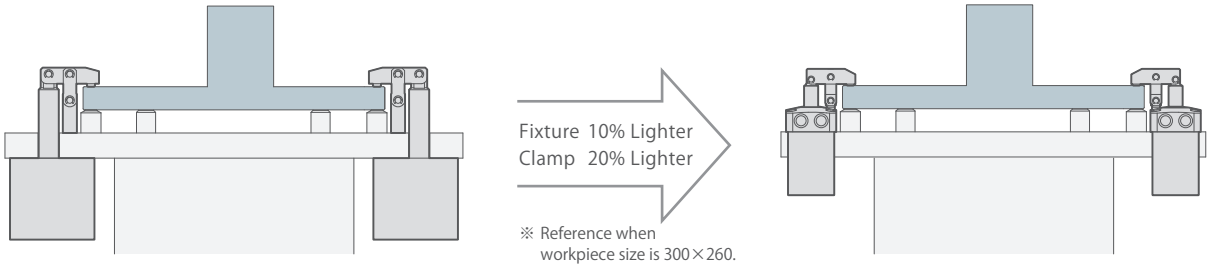
Strong clamping force distorts workpiece.



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.



General Air Cylinder　High-Power Welding Clamp

Action Confirmation

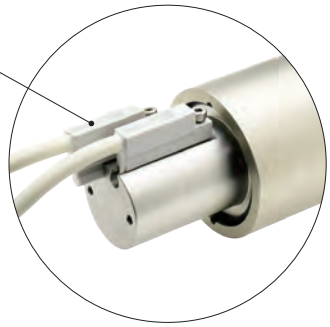
Safely used in automation systems with action confirmation of Auto Switch.

Auto Switch (Prepared by Customer)

Ability to Confirm Lock/Release Actions

Recommended Auto Switch

Magnetic Field Resistant Model：D-P3DWA (made by SMC)
JEP/JES Series (made by KOSMEK) ※1 ※2



Notes :

※1. Please refer to FA・Industrial Robot Related Products Complete Catalog (CATALOG No.FA0020□□-□□-G1B) for the detailed specifications of JEP/JES series.

※2. Please use D-P3DWA (made by SMC) for an environment which generates a magnetic field disturbance. JEP/JES series cannot be used in such an environment.

1. When using an auto switch not made by Kosmek, check specifications of each manufacturer.
2. Auto Switch may be stuck out of the clamp depending on the installation position and direction.

Model No. Indication

WCG 160 0 - 2 A R T

1 2 3 4 5

1 Cylinder Force

100 : Cylinder Force 0.9kN (Air Pressure 0.5MPa)
160 : Cylinder Force 1.6kN (Air Pressure 0.5MPa)
250 : Cylinder Force 2.5kN (Air Pressure 0.5MPa)
400 : Cylinder Force 3.9kN (Air Pressure 0.5MPa)

※ Cylinder force differs from clamping force and holding force.

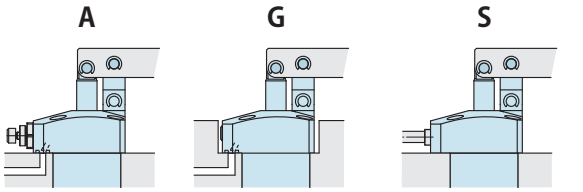
2 Design No.

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.79.

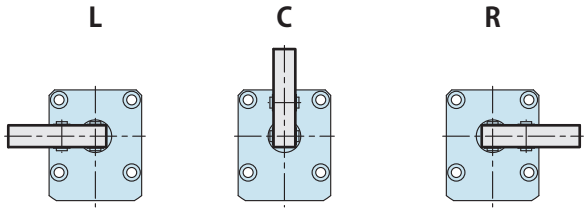


Gasket Option		Piping Option
With Ports for Speed Controller Includes R Thread Plug (order speed controller separately)	with R Thread Plug	Rc Thread No Gasket Port

4 Lever Direction

L : Left
C : Center
R : Right

※ The images show the lever direction when the piping port is placed in front of you.



5 Action Confirmation Method

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

Specifications

Model No.			WCG1000-2□□□	WCG1600-2□□□	WCG2500-2□□□	WCG4000-2□□□
Cylinder Force (at 0.5MPa)		kN	0.9	1.6	2.5	3.9
Clamping Force			Refer to “Clamping Force Curve” on P.67			
Holding Force			Refer to “Holding Force Curve” on P.68			
Clamping Force and Holding Force at 0MPa			Refer to “Clamping Force and Holding Force Curve at 0 MPa” on P.69			
Full Stroke		mm	22	23.5	27.5	33
(Break down)	Idle Stroke	mm	18	19.5	23.5	29
	Lock Stroke ※1	mm	4	4	4	4
Cylinder Capacity cm^3	Lock		22.4	35.8	56.1	95.6
	Release		18.9	32.1	50.6	85.2
Spring Force		N	60.8 ~ 78.4	83.5 ~ 140.9	146.5 ~ 218.8	234.1 ~ 334.6
Max. Operating Pressure		MPa	0.5			
Min. Operating Pressure※2		MPa	0.2			
Withstanding Pressure		MPa	0.75			
Operating Temperature		℃	0 ~ 70			
Usable Fluid			Dry Air			

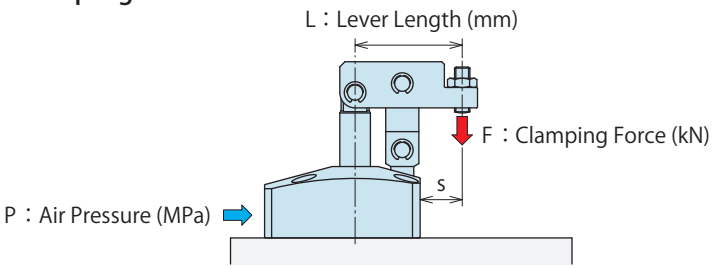
Notes:

※1. The specification value of cylinder force, clamping force and holding force is fulfilled only when clamping within the lock stroke range. (The specification value is not fulfilled when clamping within the range of idle stroke.)

※2. Minimum pressure to operate the clamp without load.

1. Please refer to External Dimensions for the cylinder capacity and the product weight.

Clamping Force Curve



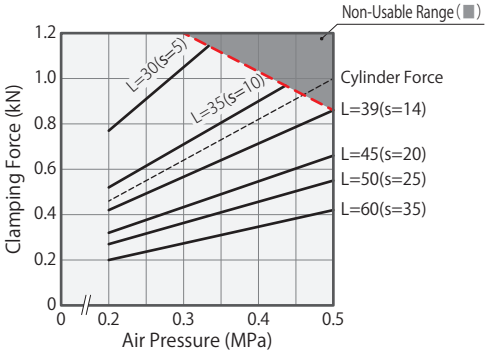
(How to read the Clamping Force Curve)
In case of WCG2500
Supply Air Pressure 0.3MPa
Lever Length L=50mm
Clamping force is about 1.46kN.

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 shows capability when a lever locks in a horizontal position.
4. The clamping force varies as per the lever length. Please use it with supply pneumatic pressure suitable for lever length.
5. Operation in the non-usable range can damage the clamp and lead to fluid leakage.

WCG1000

Clamping Force Calculation Formula※1(kN) $F = \frac{28.6 \times P + 2.2}{L - 19.5}$

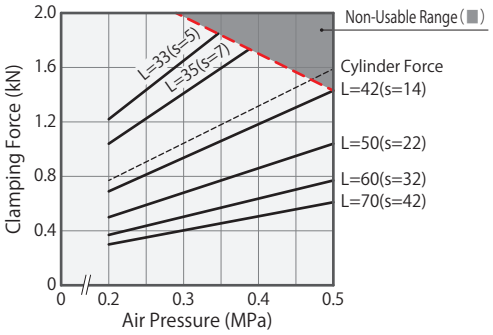
Air Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Non-Usable Range (■) Lever Length L (mm) 30	35	39	45	50	60	Min. Lever Length (mm)
0.5	0.94	■	■	0.85	0.65	0.54	0.41	39
0.4	0.78	■	0.88	0.70	0.54	0.45	0.34	33
0.3	0.62	1.03	0.70	0.55	0.42	0.35	0.27	29
0.2	0.45	0.76	0.51	0.41	0.31	0.26	0.20	25
Max. Operating Pressure (MPa)		0.33	0.43	0.50	0.50	0.50	0.50	



WCG1600

Clamping Force Calculation Formula※1(kN) $F = \frac{51.6 \times P + 4.3}{L - 21}$

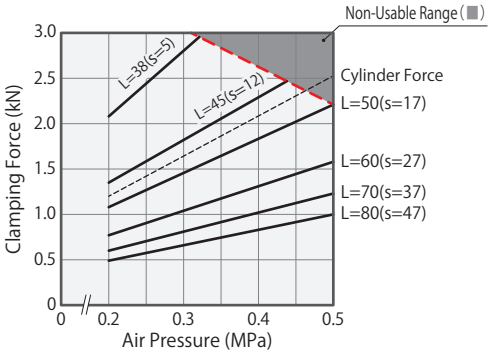
Air Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Non-Usable Range (■) Lever Length L (mm) 33	35	42	50	60	70	Min. Lever Length (mm)
0.5	1.59	■	■	1.43	1.04	0.77	0.61	42
0.4	1.32	■	■	1.19	0.86	0.64	0.51	36
0.3	1.05	1.65	1.41	0.94	0.68	0.51	0.40	31
0.2	0.77	1.22	1.04	0.70	0.50	0.37	0.30	28
Max. Operating Pressure (MPa)		0.35	0.39	0.50	0.50	0.50	0.50	



WCG2500

Clamping Force Calculation Formula※1(kN) $F = \frac{93.9 \times P + 8.3}{L - 25}$

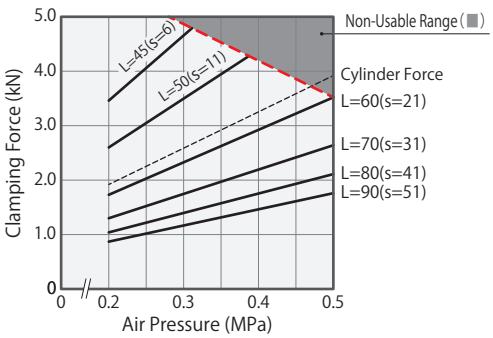
Air Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Non-Usable Range (■) Lever Length L (mm) 38	45	50	60	70	80	Min. Lever Length (mm)
0.5	2.46	■	■	2.21	1.58	1.23	1.00	50
0.4	2.04	■	2.29	1.83	1.31	1.02	0.83	42
0.3	1.62	2.81	1.82	1.46	1.04	0.81	0.66	37
0.2	1.20	2.08	1.35	1.08	0.77	0.60	0.49	33
Max. Operating Pressure (MPa)		0.32	0.43	0.50	0.50	0.50	0.50	



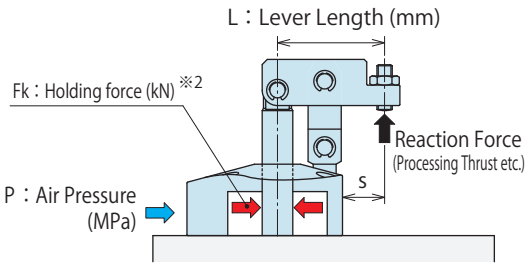
WCG4000

Clamping Force Calculation Formula※1(kN) $F = \frac{179.2 \times P + 16.1}{L - 30}$

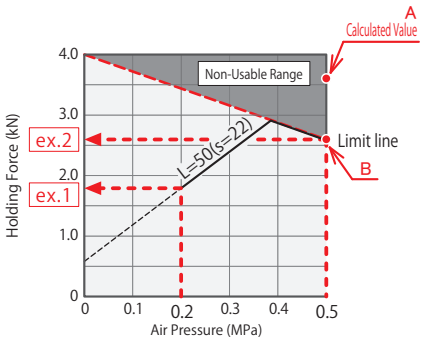
Air Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Non-Usable Range (■) Lever Length L (mm) 45	50	60	70	80	90	Min. Lever Length (mm)
0.5	3.92	■	■	3.52	2.64	2.11	1.76	60
0.4	3.25	■	■	2.93	2.19	1.76	1.46	51
0.3	2.59	4.66	3.49	2.33	1.75	1.40	1.16	44
0.2	1.92	3.46	2.60	1.73	1.30	1.04	0.87	39
Max. Operating Pressure (MPa)		0.31	0.39	0.50	0.50	0.50	0.50	



Holding Force Curve



(How to read the Holding Force Curve : ex.1)
In case of WCG1600,
Supply Air Pressure 0.2MPa, Lever Length L=50mm
Holding force is about 1.79kN.
(How to read the Holding Force Curve : ex.2)
In case of WCG1600,
Supply Air Pressure 0.5MPa, Lever Length L=50mm
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 2.58kN.



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.)

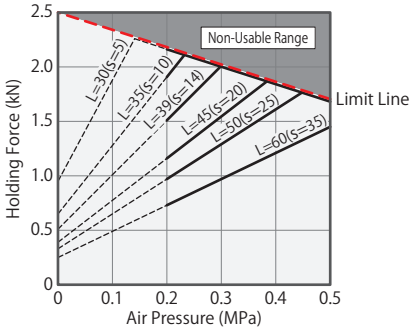
※3. Fk : Holding force (kN) , P : Supply air pressure (MPa) , L : Lever length (mm).
When a holding force calculated value exceeds the value of a limit line, holding force becomes a value of a limit line.

1. The table and the graph show the relation between holding force (kN) and supply air pressure (MPa).
2. Holding force indicates the value when the lever locks a workpiece in horizontal position.
3. Holding force varies depending on the lever length. Set the supply air pressure suitable to the lever length.
4. Operation in the non-usable range can damage the clamp and lead to fluid leakage.

WCG1000

Holding Force Formula ※3 (Fk ≦ Limit Line Value) (kN) $Fk = \frac{97.6 \times P + 10.0}{L - 19.5}$

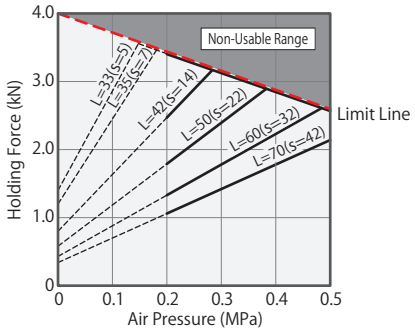
Air Pressure (MPa)	Holding Force (kN) Non-Usable Range( ) Lever Length L (mm) 30	35	39	45	50	60	Non-Usable Range Limit Line Value (kN)
0.5			1.67	1.67	1.67	1.45	1.67
0.4		1.84	1.84	1.84	1.61	1.21	1.84
0.3	2.01	2.01	2.01	1.54	1.29	0.97	2.01
0.2	2.18	1.90	1.51	1.16	0.97	0.73	2.18



WCG1600

Holding Force Formula ※3 (Fk ≦ Limit Line Value) (kN) $Fk = \frac{175.2 \times P + 16.8}{L - 21}$

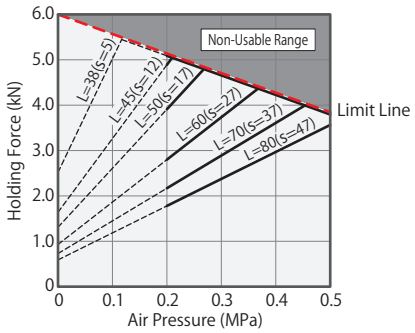
Air Pressure (MPa)	Holding Force (kN) Non-Usable Range( ) Lever Length L (mm) 33	35	42	50	60	70	Non-Usable Range Limit Line Value (kN)
0.5			2.58	2.58	2.58	2.13	2.58
0.4			2.86	2.86	2.23	1.77	2.86
0.3	3.14	3.14	3.14	2.39	1.78	1.42	3.14
0.2	3.42	3.42	2.47	1.79	1.33	1.06	3.42



WCG2500

Holding Force Formula ※3 (Fk ≦ Limit Line Value) (kN) $Fk = \frac{325.6 \times P + 32.6}{L - 25}$

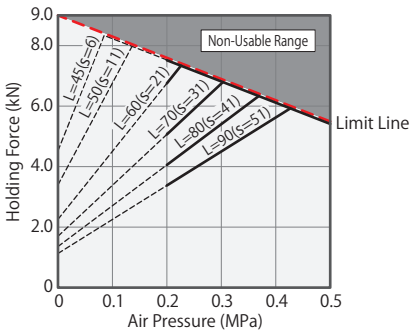
Air Pressure (MPa)	Holding Force (kN) Non-Usable Range( ) Lever Length L (mm) 38	45	50	60	70	80	Non-Usable Range Limit Line Value (kN)
0.5			3.81	3.81	3.81	3.55	3.81
0.4		4.24	4.24	4.24	3.62	2.96	4.24
0.3	4.67	4.67	4.67	3.72	2.90	2.37	4.67
0.2	5.10	4.89	3.91	2.79	2.17	1.78	5.10



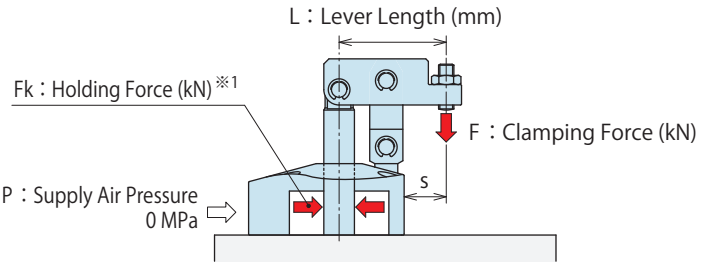
WCG4000

Holding Force Formula ※3 (Fk ≦ Limit Line Value) (kN) $Fk = \frac{673.9 \times P + 68}{L - 30}$

Air Pressure (MPa)	Holding Force (kN) Non-Usable Range( ) Lever Length L (mm) 45	50	60	70	80	90	Non-Usable Range Limit Line Value (kN)
0.5			5.48	5.48	5.48	5.48	5.48
0.4			6.16	6.16	6.16	5.63	6.16
0.3	6.85	6.85	6.85	6.75	5.40	4.50	6.85
0.2	7.53	7.53	6.76	5.07	4.06	3.38	7.53



Clamping Force and Holding Force Curve at 0MPa



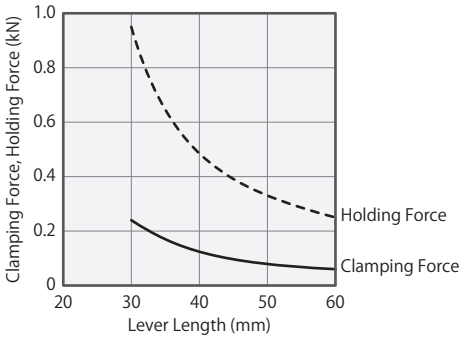
(How to read the Clamping Force and Holding Force Curve at 0MPa)
In case of WCG1600
When air pressure is shut off at clamped state:
Supply Air Pressure = 0MPa, Lever Length L=50 mm
Clamping force becomes about 0.15 kN.
Holding force becomes about 0.58 kN.

Notes:
※1. 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.)
※2. F : Clamping force (kN) , Fk : Holding force (kN) , L : Lever length (mm).
1. The table and the graph show the relation between lever length (mm) and the clamping force (kN) and holding force (kN) at the time of 0MPa.
2. The clamping force and holding force at the time of zero pneumatic pressure show capability when a lever locks a workpiece in horizontal position.
3. Clamping force and holding force vary depending on the lever length.

WCG1000

Clamping Force Formula at 0MPa ※2	(kN)	$F = \frac{2.2}{L - 19.5}$
Holding Force Formula at 0MPa ※2	(kN)	$Fk = \frac{10.0}{L - 19.5}$

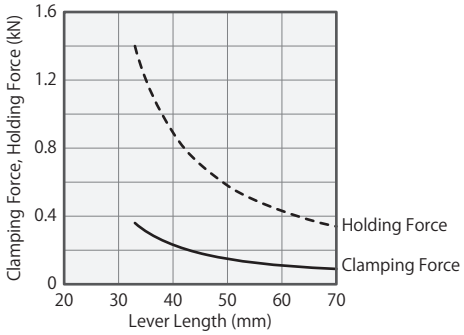
Lever Length	(mm)	30	35	39	45	50	60
Clamping Force Reference Value at 0MPa	(kN)	0.21	0.14	0.11	0.09	0.07	0.05
Holding Force Reference Value at 0MPa	(kN)	0.95	0.65	0.51	0.39	0.33	0.25



WCG1600

Clamping Force Formula at 0MPa ※2	(kN)	$F = \frac{4.3}{L - 21}$
Holding Force Formula at 0MPa ※2	(kN)	$Fk = \frac{16.8}{L - 21}$

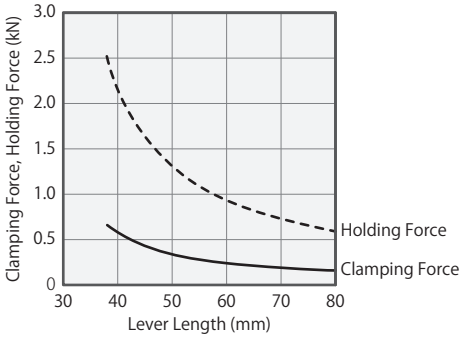
Lever Length	(mm)	33	35	42	50	60	70
Clamping Force Reference Value at 0MPa	(kN)	0.36	0.31	0.20	0.15	0.11	0.09
Holding Force Reference Value at 0MPa	(kN)	1.40	1.20	0.80	0.58	0.43	0.34



WCG2500

Clamping Force Formula at 0MPa ※2	(kN)	$F = \frac{8.3}{L - 25}$
Holding Force Formula at 0MPa ※2	(kN)	$Fk = \frac{32.6}{L - 25}$

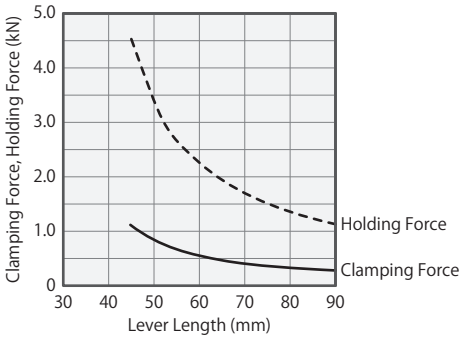
Lever Length	(mm)	38	45	50	60	70	80
Clamping Force Reference Value at 0MPa	(kN)	0.64	0.42	0.33	0.24	0.18	0.15
Holding Force Reference Value at 0MPa	(kN)	2.51	1.63	1.30	0.93	0.72	0.59



WCG4000

Clamping Force Formula at 0MPa ※2	(kN)	$F = \frac{16.1}{L - 30}$
Holding Force Formula at 0MPa ※2	(kN)	$Fk = \frac{68.0}{L - 30}$

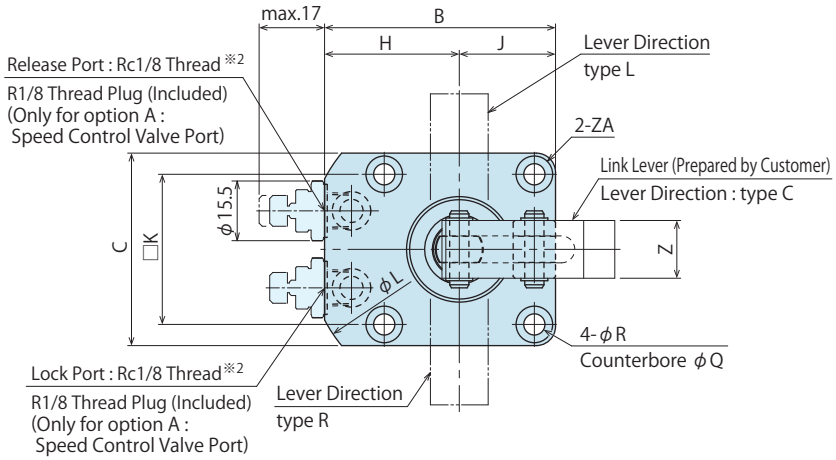
Lever Length	(mm)	45	50	60	70	80	90
Clamping Force Reference Value at 0MPa	(kN)	1.07	0.80	0.54	0.40	0.32	0.27
Holding Force Reference Value at 0MPa	(kN)	4.53	3.40	2.27	1.70	1.36	1.13

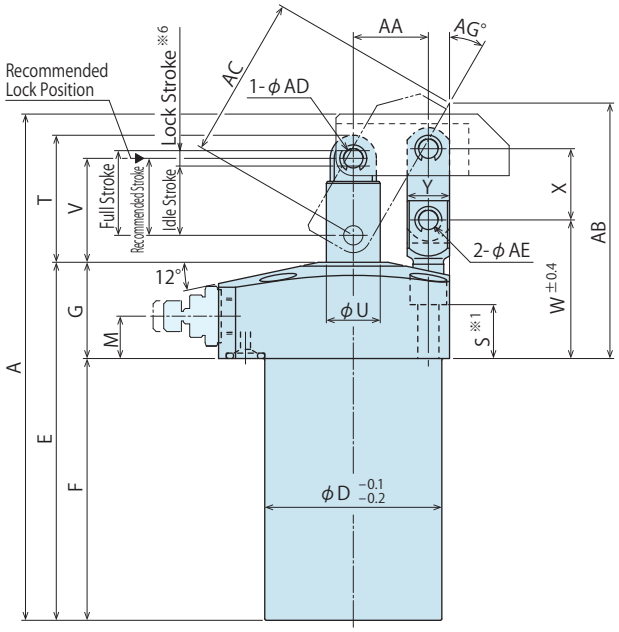


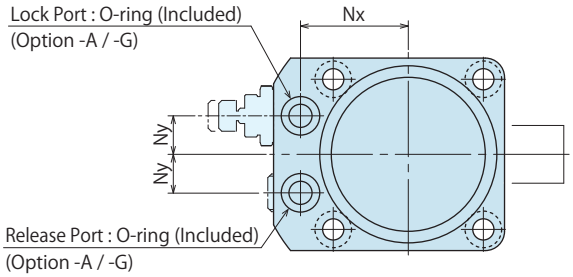
External Dimensions

A：Gasket Option (With Ports for Speed Controller：R-Thread Plug Included)

※The drawing shows the locked state of WCG-2AC.







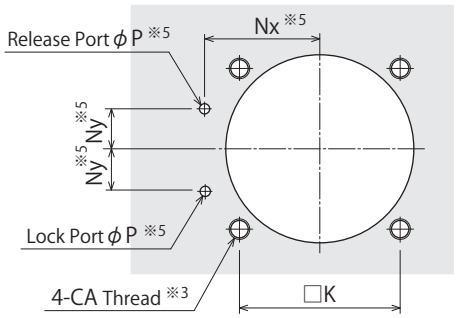
Notes：

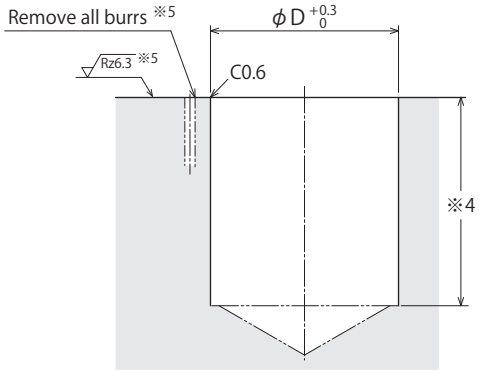
※1. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.

※2. Speed control valve is sold separately. Please refer to P.79.

1. Please use the attached pin (equivalent to ϕADf6, ϕAEf6, HRC60) as the mounting pin for lever.

Machininig Dimensions of Mounting Area





Notes：

※3. CA tapping depth of the mounting bolt should be decided according to the mounting height referring to dimension 'S'.

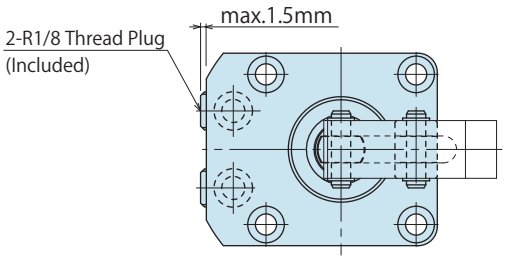
※4. The depth of the body mounting hole ϕD should be decided according to the mounting height referring to dimension 'F'.

※5. The machining dimension is for -A/-G：Gasket Option.

Piping Method

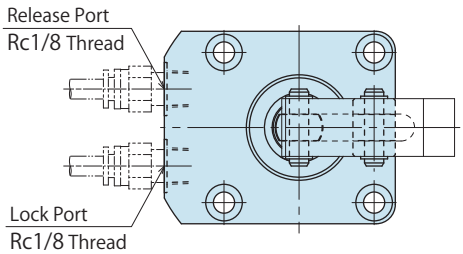
G：Gasket Option (with R Thread Plug)

※The drawing shows the locked state of WCG-2GC.



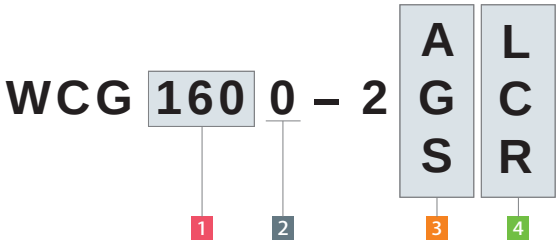
S：Piping Option (Rc Thread)

※The drawing shows the locked state of WCG-2SC.



Model No. Indication

(Format Example：WCG1000-2AR, WCG2500-2SL)



1 Cylinder Force
2 Design No.
3 Piping Method
4 Lever Direction
5 Action Confirmation (When Blank is chosen)

External Dimensions and Machining Dimensions for Mounting

(mm)

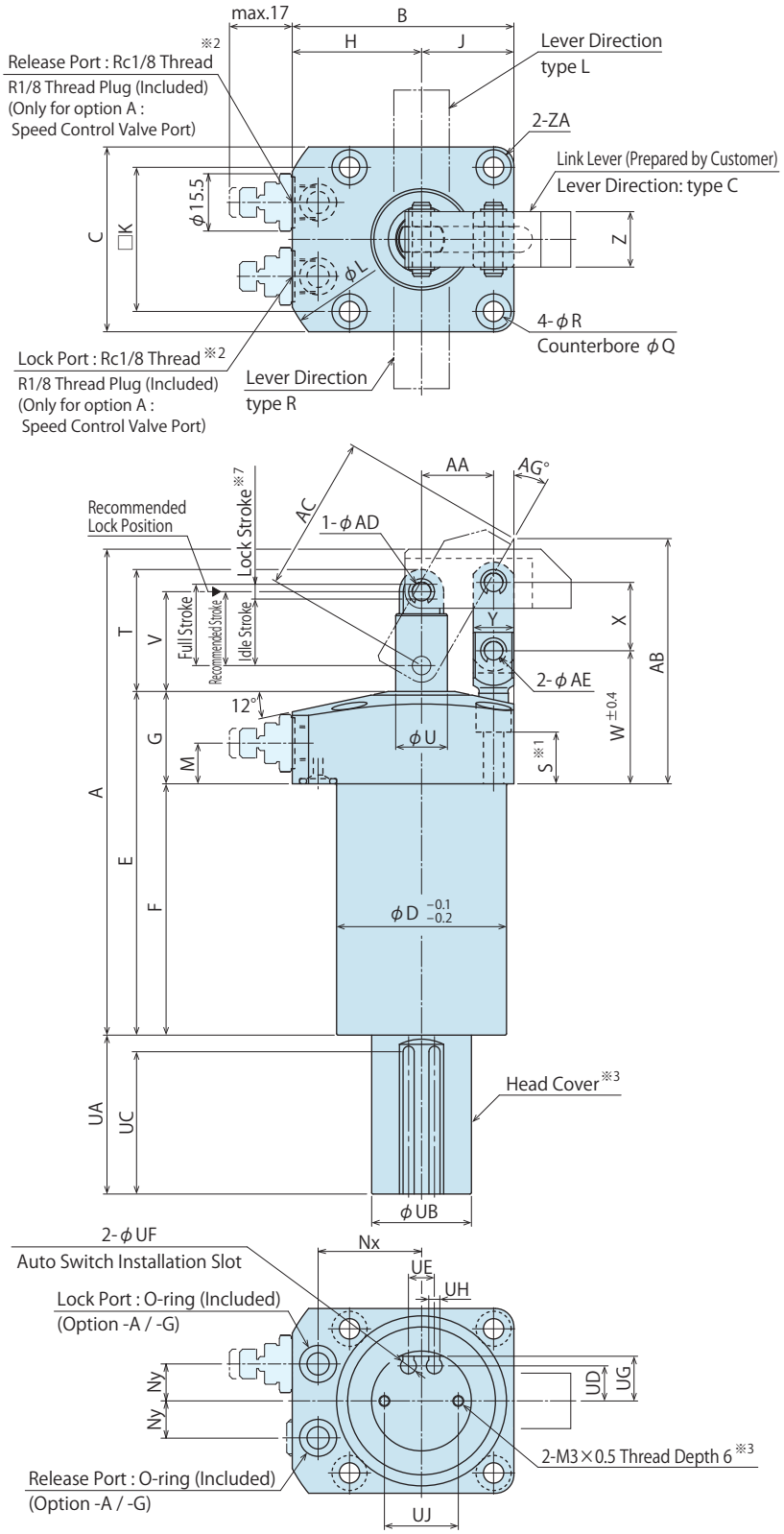
Model No.		WCG1000-2□□	WCG1600-2□□	WCG2500-2□□	WCG4000-2□□
Full Stroke		22	23.5	27.5	33
(Break down)	Idle Stroke	18	19.5	23.5	29
	Lock Stroke ※6	4	4	4	4
Recommended Stroke		20	21.5	25.5	31
A		131.5	143.5	169	197.5
B		60	66	76	87
C		50	56	66	78
D		46	54	64	77
E		93	99.5	117	133
F		68	74.5	87	103
G		25	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	11	11
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		33	36	40	50.5
U		14	14	16	20
V		27	30	34	42.5
W		36	37.5	43.5	49
X		18.5	21	26.5	31
Y		11	13	16	18
Z		15	16	19	25
AA		19.5	21	25	30
AB		66.4	70.5	84	93.4
AC		42.3	46	55.8	64.4
AD		5	6	6	8
AE		5	6	8	10
AG		30°	29.7°	29.8°	29.8°
CA (Nominal × Pitch)		M5×0.8	M5×0.8	M6×1	M6×1
ZA (Chamfer)		R5	R5	R6	R6
O-ring (Option A/G)		1BP7	1BP7	1BP7	1BP7
Weight ※7	kg	0.6	0.9	1.5	2.4

Notes : ※6. The specification value of cylinder force, clamping force and holding force is fulfilled only when clamping within the lock stroke range.
(The specification value is not fulfilled when clamping within the range of idle stroke.)
※7. It shows the weight of single clamp without the link lever.

External Dimensions

A：Gasket Option (With Ports for Speed Controller：R-Thread Plug Included)

※The drawing shows the locked state of WCG-2ACT.



Notes：

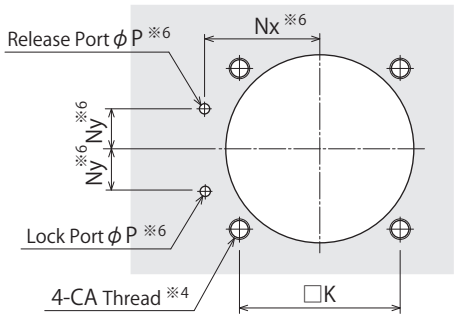
※1. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.

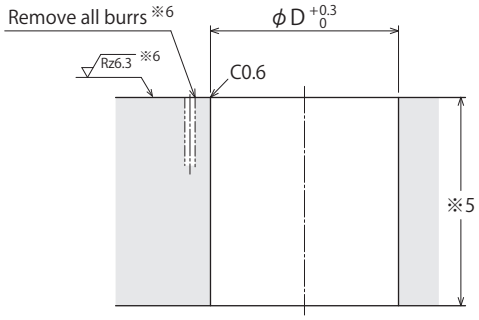
※2. Speed control valve is sold separately. Please refer to P.79.

※3. 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.

1. Please use the attached pin (equivalent to ϕADf6, ϕAEf6, HRC60) as the mounting pin for lever.

Machininig Dimensions of Mounting Area





Notes：

※4. CA tapping depth of the mounting bolt should be decided according to the mounting height referring to dimension 'S'.

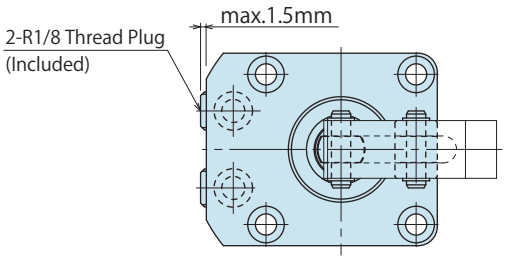
※5. The depth of the body mounting hole ϕD should be decided according to the mounting height referring to dimension 'F'.

※6. The machining dimension is for -A/-G：Gasket Option.

Piping Method

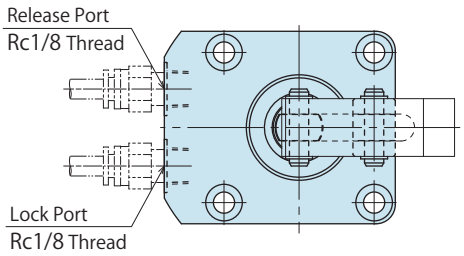
G：Gasket Option (with R Thread Plug)

※The drawing shows the locked state of WCG-2GCT.



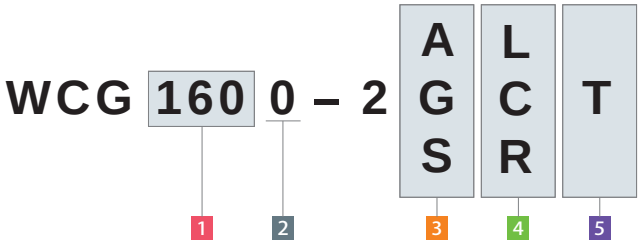
S：Piping Option (Rc Thread)

※The drawing shows the locked state of WCG-2SCT.



Model No. Indication

(Format Example：WCG1000-2ART, WCG2500-2SLT)



1 Cylinder Force
2 Design No.
3 Piping Method
4 Lever Direction
5 Action Confirmation (When T is chosen)

External Dimensions and Machining Dimensions for Mounting

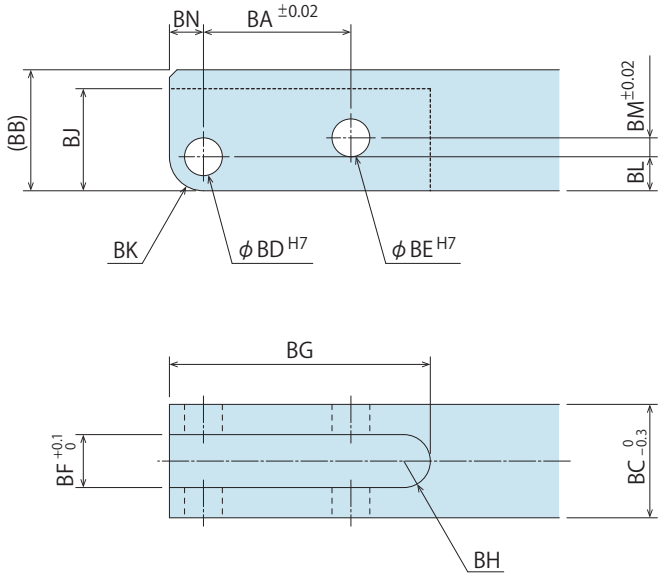
(mm)

Model No.		WCG1000-2□□T	WCG1600-2□□T	WCG2500-2□□T	WCG4000-2□□T
Full Stroke		22	23.5	27.5	33
(Break down)	Idle Stroke	18	19.5	23.5	29
(Break down)	Lock Stroke ※7	4	4	4	4
Recommended Stroke		20	21.5	25.5	31
A		131.5	143.5	169	197.5
B		60	66	76	87
C		50	56	66	78
D		46	54	64	77
E		93	99.5	117	133
F		68	74.5	87	103
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	11	11
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		33	36	40	50.5
U		14	14	16	20
V		27	30	34	42.5
W		36	37.5	43.5	49
X		18.5	21	26.5	31
Y		11	13	16	18
Z		15	16	19	25
AA		19.5	21	25	30
AB		66.4	70.5	84	93.4
AC		42.3	46	55.8	64.4
AD		5	6	6	8
AE		5	6	8	10
AG		30°	29.7°	29.8°	29.8°
CA (Nominal × Pitch)		M5×0.8	M5×0.8	M6×1	M6×1
ZA (Chamfer)		R5	R5	R6	R6
UA		43	45.5	50.5	55.5
UB		27	27	30	30
UC		38.5	40	44	49.5
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
Weight ※8	kg	0.7	1.0	1.6	2.6

Notes : ※7. The specification value of cylinder force, clamping force and holding force is fulfilled only when clamping within the lock stroke range.
(The specification value is not fulfilled when clamping within the range of idle stroke.)
※8. It shows the weight of single clamp without the link lever.

Link Lever Design Dimension

※ Reference for designing link lever.



Calculation List of Link Lever Design Dimension

(mm)

Corresponding Model No.	WCG1000	WCG1600	WCG2500	WCG4000
BA	19.5	21	25	30
BB	16	20	24	30
BC	15	16	19	25
BD	$5^{+0.012}_{0}$	$6^{+0.012}_{0}$	$6^{+0.012}_{0}$	$8^{+0.015}_{0}$
BE	$5^{+0.012}_{0}$	$6^{+0.012}_{0}$	$8^{+0.015}_{0}$	$10^{+0.015}_{0}$
BF	7	7	8	12
BG	35.5	39.5	46	56
BH	R3.5	R3.5	R4	R6
BJ	13.5	17	21	26.5
BK	R4.5	R6	R6	R8
BL	4.5	6	6	8
BM	2.5	3.5	6	7.5
BN	4.5	6	6	8

Notes:

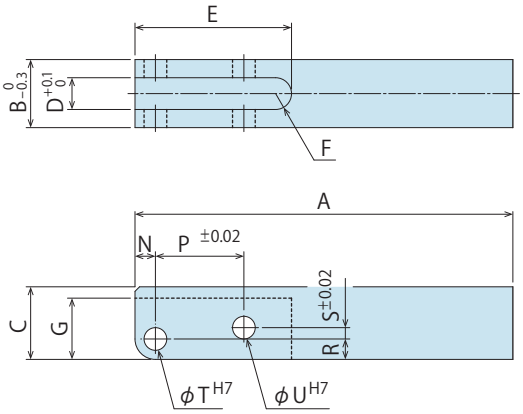
1. Design the link lever length according to the performance curve.
2. If the link lever is not in accordance with the dimension shown above, performance may be degraded and damage can occur.
3. Please use the attached pin (equivalent to φADf6, φAEf6, HRC60) as the mounting pin for lever.
   (Please refer to each external dimension of WCG for the dimensions φAD and φAE.)

Accessories : Material Link Lever

Model No. Indication

WCZ 160 0 – L3

- 160: Size (Refer to following table)
- 0: Design No. (Revision Number)
- L3



(mm)

Model No.	WCZ1000-L3	WCZ1600-L3	WCZ2500-L3	WCZ4000-L3
Corresponding Model No.	WCG1000	WCG1600	WCG2500	WCG4000
A	90	100	115	140
B	15	16	19	25
C	16	20	24	30
D	7	7	8	12
E	35.5	39.5	46	56
F	R3.5	R3.5	R4	R6
G	13.5	17	21	26.5
N	4.5	6	6	8
P	19.5	21	25	30
R	4.5	6	6	8
S	2.5	3.5	6	7.5
T	$5^{+0.012}_{0}$	$6^{+0.012}_{0}$	$6^{+0.012}_{0}$	$8^{+0.015}_{0}$
U	$5^{+0.012}_{0}$	$6^{+0.012}_{0}$	$8^{+0.015}_{0}$	$10^{+0.015}_{0}$

Notes :

1. Material S45C
2. If necessary, the front end should be additionally machined.
3. Please use the attached pin (equivalent to φADf6, φAEf6, HRC60) as the mounting pin for lever.
   (Refer to the external dimensions for φAD, φAE)

Cautions

Notes for Design

1) Check Specifications

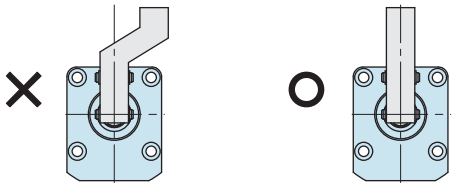
- Please use each product according to the specifications.
- The mechanical lock mechanism of this clamp maintains clamping force and holding force even when air pressure falls to zero. (Refer to “Clamping Force and Holding Force Curve at 0MPa” .)

2) Notes for Circuit Design

- Ensure there is no possibility of supplying air pressure to the lock and release ports simultaneously. Improper circuit design may lead to malfunctions and damages.

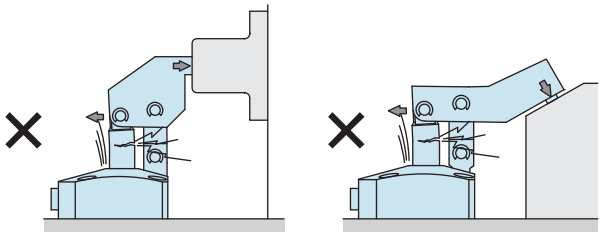
3) Do not apply offset load.

- Do not apply offset load on the link part. The point of load (clamping point) should be within the width of the link lever.



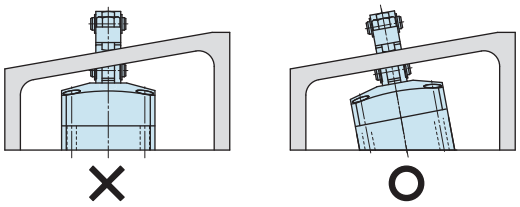
4) Notes for Link Lever Design

- Make sure no force except from the axial direction is applied to the piston rod. The usage like the one shown in the drawing below will apply a large bending stress to the piston rod and must be avoided.



5) When clamping on a sloped surface of the workpiece

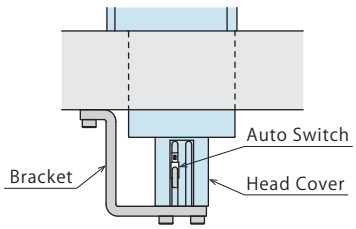
- Make sure the clamping surface and the mounting surface of the clamp are parallel.



6) When using in a dry environment

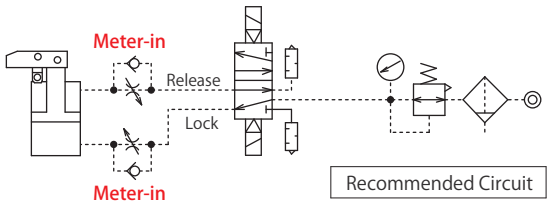
- The link pin may dry out. Grease it periodically or use a special pin. Contact us for the specifications for the special pin.

7) Adjust the direction of the head cover as you need.
Use M3 tapped holes on the bottom to fix the head cover with bracket.

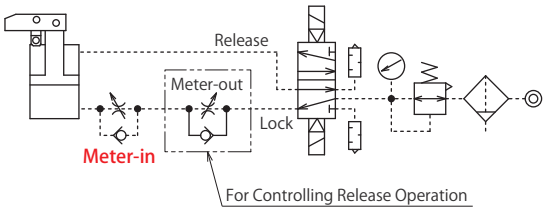


8) Speed Adjustment

- If the clamp operates too fast the parts will wear out and become damaged more quickly leading to equipment failure. Do not adjust with a meter-out valve outside the cylinder because there is an orifice of meter-out connected internally. (The operating time of mechanical locking system will be very long if there is back pressure in the circuit.) Install a meter-in speed controller and adjust the operating time to within 0.5 seconds. If the operating time is slower than this, pressure rising will slow down taking more time to achieve the clamping force corresponding to the catalog data. Even if there is stiff or sudden movement under low pressure and small volume of air, it isn't malfunction. (Please note that the above condition will occur when you have to adjust operating time over 1.0 second.)



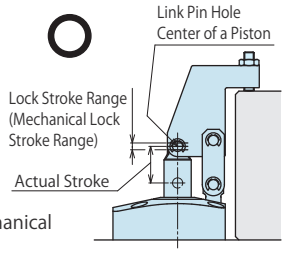
Please set one speed controller (meter-in) to each clamp when operating multiple clamps simultaneously.
When large thrust force is applied to the releasing direction in releasing action, install a meter-out speed controller to the lock port side for speed adjustment.



9) The specification value will not be fulfilled when clamping out of the lock stroke (mechanical lock stroke) range.

- When the center of link pin hole of piston rod clamps out of the lock stroke range, the mechanical lock function does not work. As a result, the specification value of clamping force and holding force will not be fulfilled. Moreover, there will be no clamping or holding force at 0MPa air pressure.

Make sure the actual stroke to be ±2 mm of recommended lock position. (The specification value will be fulfilled since the center of link pin hole of piston rod is within the lock stroke (mechanical lock stroke) range.)



10) For Use of Auto Switch

- Select an auto switch depending on the environment.
- Please use a magnetic field resistant auto switch for an environment which generates a magnetic field disturbance. Recommended Auto Switch：D-P3DWA (made by SMC)
- An auto switch may be stuck out of the clamp depending on the installation position and direction.

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 lubricant, please supply lubricant oil continuously.
  Otherwise, the initial grease applied by KOSMEK will be removed.)

2) Preparation for Piping
- The pipeline, piping connector and fixture circuits should be cleaned and flushed thoroughly.
  Dust and cutting chips in the circuit can lead to air leakage and malfunction.
- There is no filter provided with this product for prevention of contaminants in the air circuit.

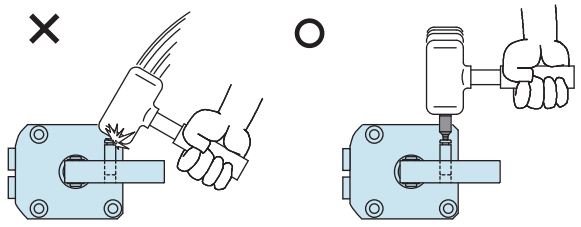
3) Applying Sealing Tape
- Wrap with tape 1 to 2 times following the screwing direction.
  Wrapping in the wrong direction will cause air leakage and malfunction.
- Pieces of the sealing tape can lead to air leakage and malfunction.
- When piping, be careful that contaminants such as sealing tape do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

4) 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 table below. Tightening with greater torque than recommended can depress the seating surface or break the bolt.

Model No.	Thread Size	Tightening Torque (N·m)
WCG1000	M5×0.8	6.3
WCG1600	M5×0.8	6.3
WCG2500	M6×1	10
WCG4000	M6×1	10

5) Installation of the Speed Control Valve
- Tightening torque for speed control valve : 5 to 7 N·m.

6) Installation / Removal of the Link Lever
- When inserting the link pin, do not hit the pin directly with a hammer. When using a hammer to insert the pin, always use a cover plate with a smaller diameter than the snap ring groove on the pin.



7) Speed Adjustment
- Adjust the speed so that the operating time is within 0.5 sec.
  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 installation, bolts may be tightened lightly. Check looseness and re-tighten as required.

9) Do Not Operate the Clamp Manually
- At the time of not supplying air pressure, when a piston rod is raised by manual operation and it goes into the lock stroke range, the mechanical lock will be activated by built-in spring and the clamp will be locked (the piston rod at the lock end). Clamping force at 0MPa will be generated as well. Since this will cause an injury and accident, never operate the clamp manually.

In order to avoid such accidents, the product is set in the locked state (with mechanical lock activated) before shipping.
It is recommended to set the clamp in locked state (with mechanical lock activated) when shipping to a user after installing the clamp to a fixture or system.

In the locked state, clamps cannot be operated manually because of the mechanical lock. Supplying release air pressure is required to conduct release action.

10) Cautions for Trial Operation
- If air pressure with large flow rate is supplied just after installation, operating time will be extremely fast leading to severe damage on the clamp. Install a meter-in speed controller near the air source and supply air pressure gradually.

※ Please refer to P.83 for general cautions. • Notes on Handling • Maintenance/Inspection • Warranty

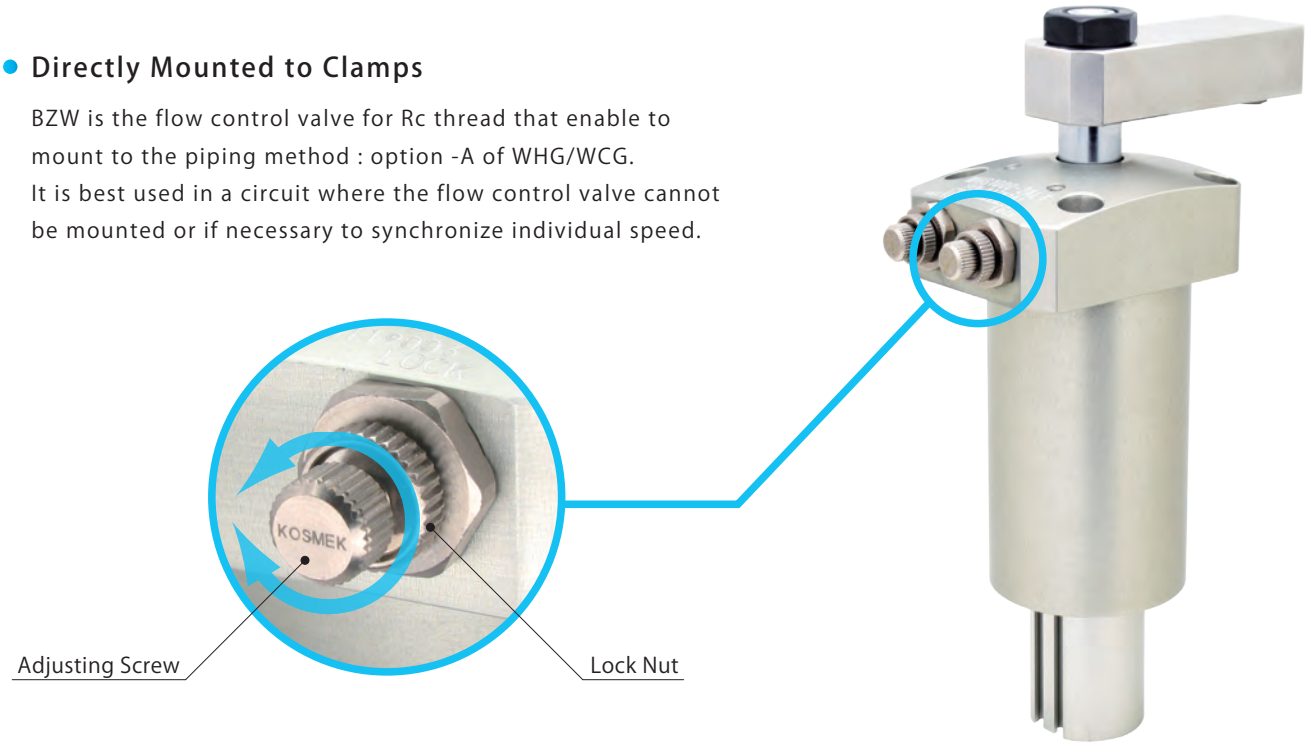
Air Flow Control Valve

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.



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

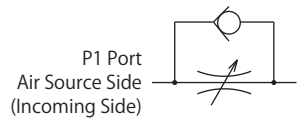
- Control Method
  B : Meter-out
  A : Meter-in
- Design No.
  0 : Revision Number
- R Thread Size
  010 : Rc1/8

Specifications

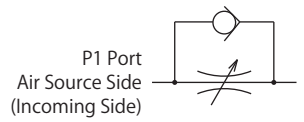
Model No.	BZW0100-B	BZW0100-A
Control Method	Meter-out	Meter-in
Operating Pressure MPa	0.1 ~ 1.0	
Withstanding Pressure MPa	1.5	
Adjust Screw Number of Rotations	10 Rotations	
Tightening Torque N•m	5 ~ 7	
Weight g	13	
Corresponding Model No.	WHG□-2A□	WCG□-2A□

Circuit Symbol

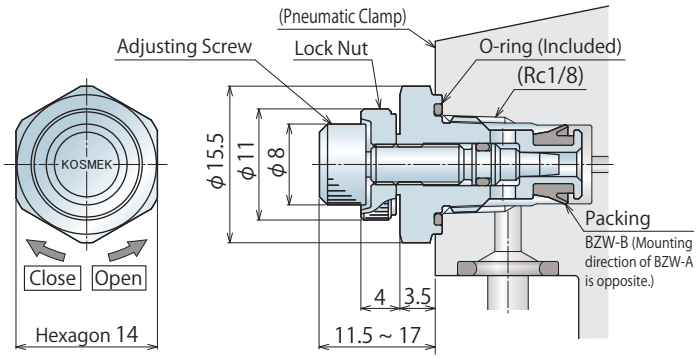
BZW0100-B : Meter-out



BZW0100-A : Meter-in

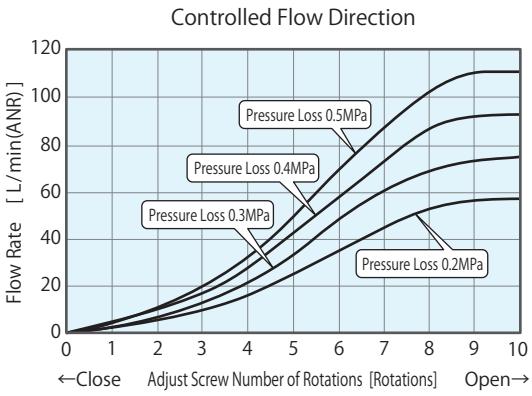


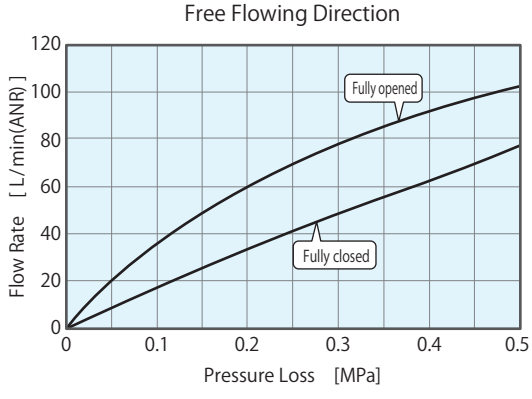
External Dimensions



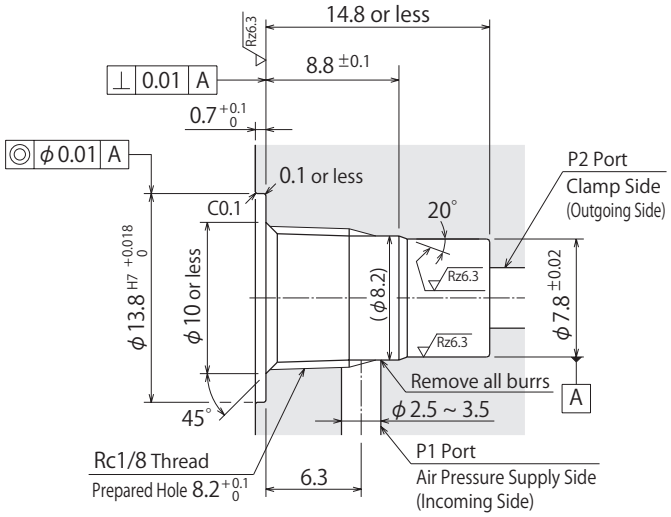
Flow Rate Graph

BZW0100-B/BZW0100-A common





Machining Dimensions of Mounting Area



Notes :

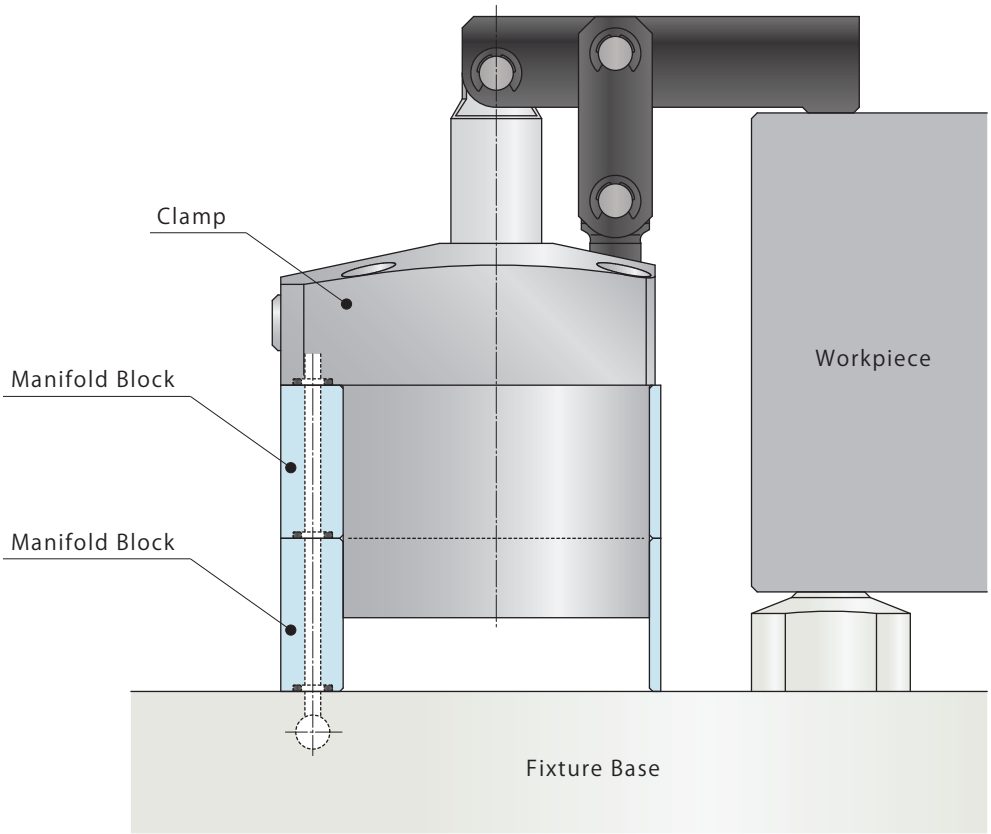
1. Since the $\sqrt{Rz6.3}$ area is sealing part, be careful not to damage it.
2. No cutting chips or burr should be at the tolerance part of machining hole.
3. As shown in the drawing, P1 port is used as the air supply side and P2 port as the clamp side.

Manifold Block

Model **WHZ-MD**

Manifold Block

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



Applicable Model

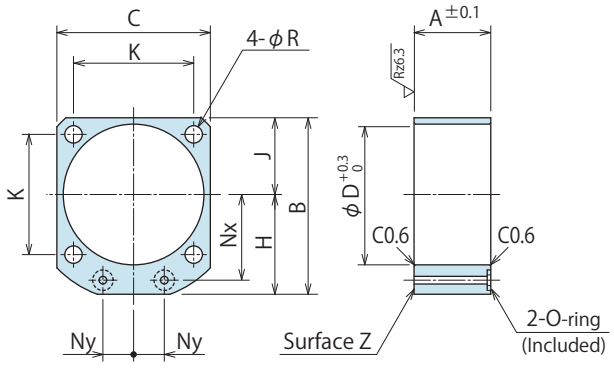
Manifold Block Model No.	Corresponding Item Model No.
Model WHZ-MD	Model WCG Model WHG

Manifold Block for WCG/WHG

Model No. Indication

WHZ 048 0 – MD

- 048: Size (Refer to following table)
- 0: Design No. (Revision Number)



(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.

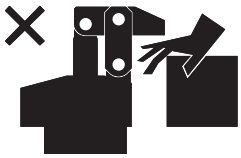
Cautions

Notes on Handling

1) It should be operated by qualified personnel.
- Hydraulic and/or pneumatic machines and devices 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 removing the product, 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 circuits.
③ After stopping the product, do not remove until the temperature drops.
④ Make sure there is no trouble/issue 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.

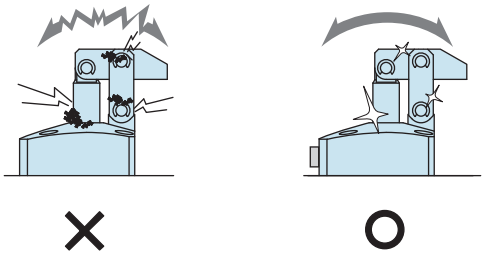


4) Do not disassemble or modify.
- If the product is taken apart or modified, the warranty will be voided even within the warranty period.

Maintenance and Inspection

1) Removal of the Product and Shut-off of Pressure Source
- Before removing the product, 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.
- If it is used when the surface is contaminated with dirt, it may lead to packing seal damage, malfunctioning and fluid leakage.



3) Regularly tighten pipes, mounting bolts, nuts, snap rings, cylinders and others to ensure proper use.

4) 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.

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 Failure caused by the use of the non-confirming state at the user's discretion.
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.

Company Profile

KOSMEK LTD. Head Office

Company Name	KOSMEK LTD.
Established	May 1986
Capital	¥99,000,000
President & CEO	Koji Kimura
Employee Count	270
Group Company	KOSMEK LTD.　KOSMEK ENGINEERING LTD. KOSMEK (USA) LTD.　KOSMEK EUROPE GmbH KOSMEK (CHINA) LTD.　KOSMEK LTD. - INDIA
Business Fields	Design, production and sales of precision products, and hydraulic and pneumatic equipment
Customers	Manufacturers of automobiles, industrial machinery, semiconductors and electric appliances
Banks	Resona bank, Tokyo-Mitsubishi bank

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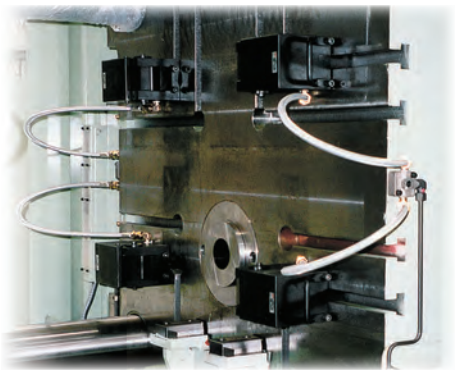
Product Line-up

■ Quick Die Change Systems

FOR PRESS MACHINES

■ Kosmek Factory Automation Systems

FACTORY AUTOMATION INDUSTRIAL ROBOT RELATED PRODUCTS

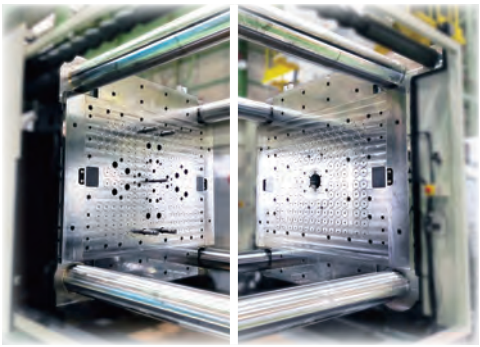


■ Diecast Clamping Systems

FOR DIECAST MACHINES

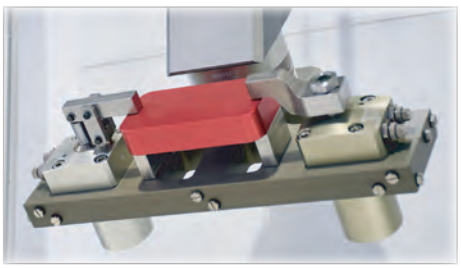
■ Kosmek Work Clamping Systems

MACHINE TOOL RELATED PRODUCTS



■ Quick Mold Change Systems

FOR INJECTION MOLDING MACHINES



■ Washing Application Products

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- Specifications in this Leaflet are Subject to Change without Notice.

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