# High-Power Pneumatic Link Clamp

Model WCE

New size WCE0452 added to the lineup. (Aug, 2020)

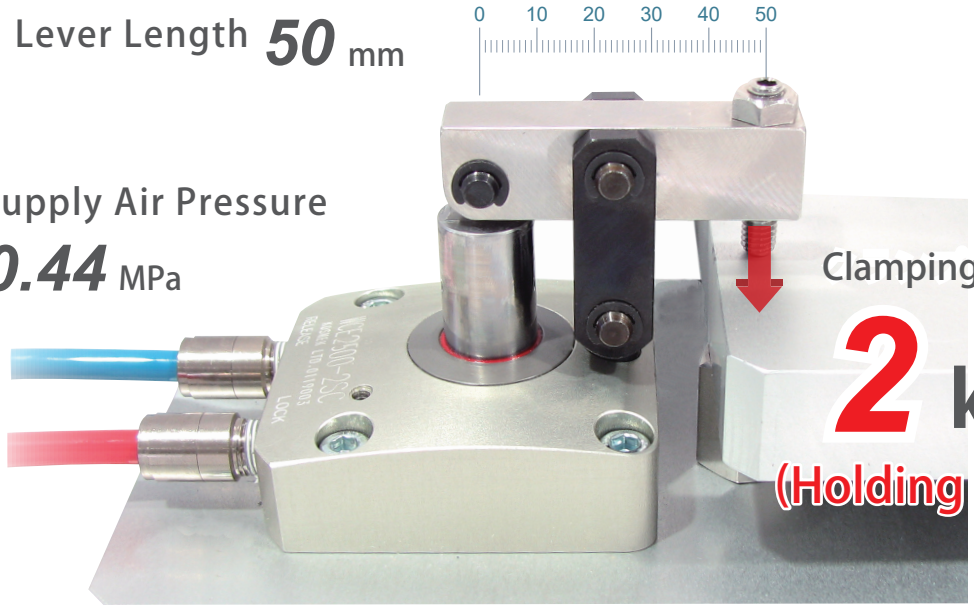
## Clamping force which replaces hydraulic clamp

## Development of high-power pneumatic link clamp PAT.

Lever Length **50** mm

Supply Air Pressure

**0.44** MPa




Clamping Force

**2** kN

(Holding Force is 4kN)

model WCE2502

Clamping Force
(Compared with conventional WCA model) **About 2.5 Times**

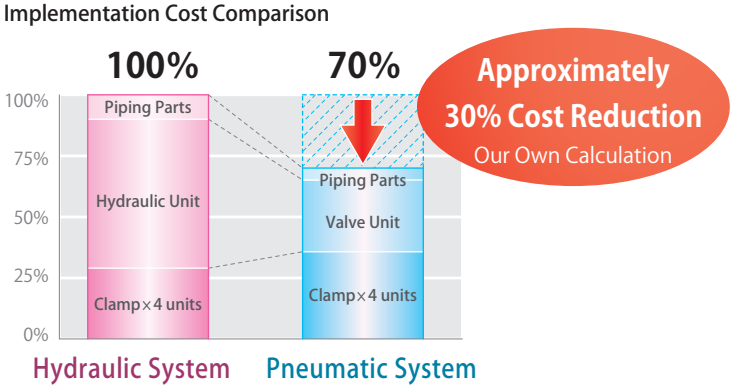
**Available in six body sizes.**

**Cylinder force is *0.20 ~ 3.92kN***

## • Without Hydraulics

The hydraulic power pack and clamping systems can be eliminated by using pneumatic systems.

Implementation Cost Comparison

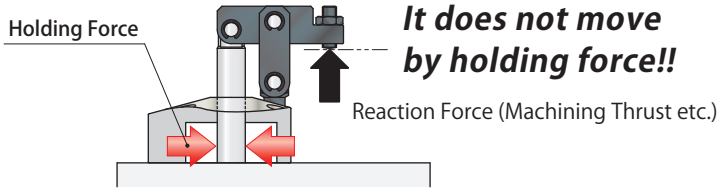



## • Holding Force

Clamping force is suppressed to necessary minimum by the powerful holding force beyond clamping force, and work distortion can be decreased.

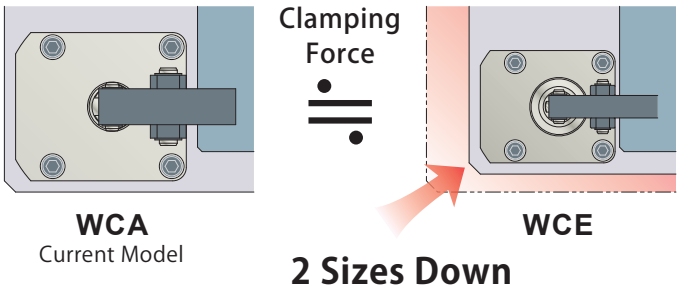
※1. It varies depending on the operating pressure and lever length.

Holding force is 3 times the clamping force by a mechanical lock. ※1



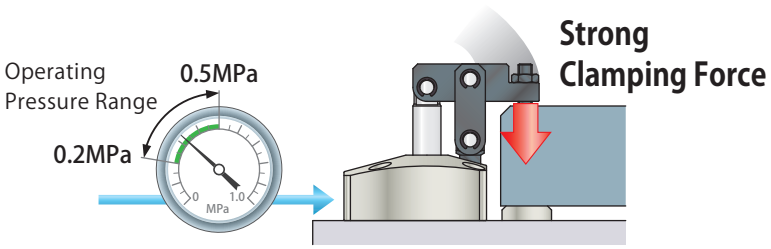

## • Space-Saving

Equivalent clamping force by 2 sizes down than current WCA.

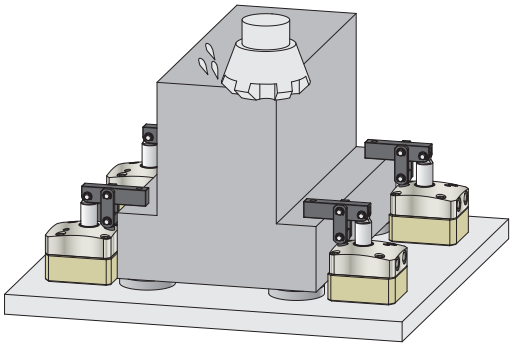



## • Energy Saving

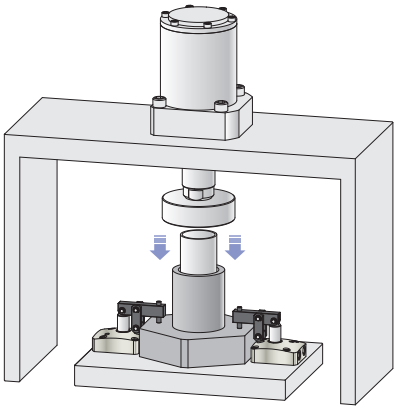
Higher clamping force is achieved by low operating pressure.



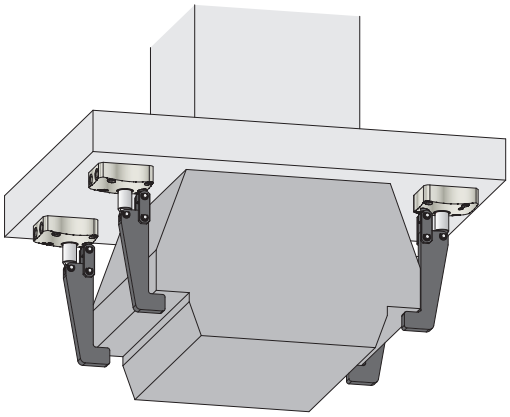
## Application Examples



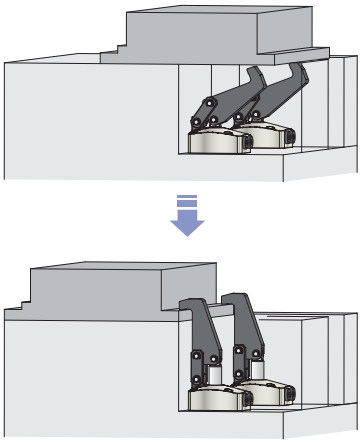
<Machining Process>



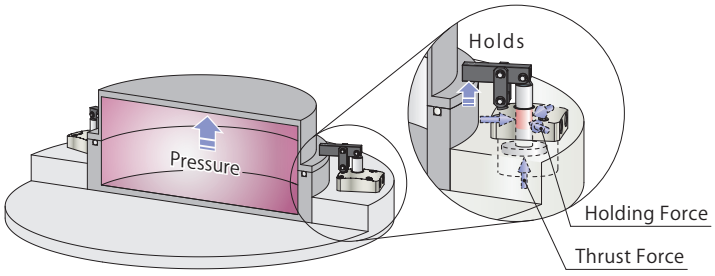
< Press Fit Process >



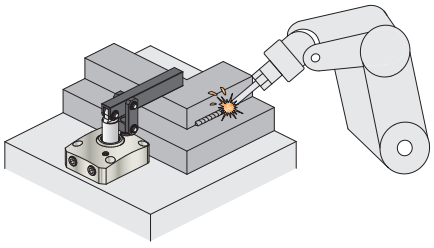
< Transportation・Gantry Loader >



< Interference Prevention >




< Air Leak Tester >



< Welding Process >

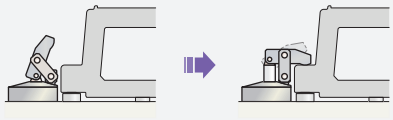
※ Contact us for further information.

## Standard Model

Model **WCE**

External Dimensions
→ P.157

Clamping with link mechanism

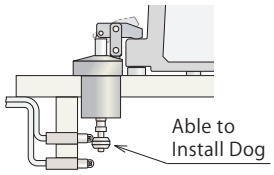


## Double End Rod Option for Dog

Model **WCE-D**

External Dimensions
→ P.159

Piston rod action can be detected by switch etc




Action Description

## Air Sensing Manifold Option

Model **WCE-M**

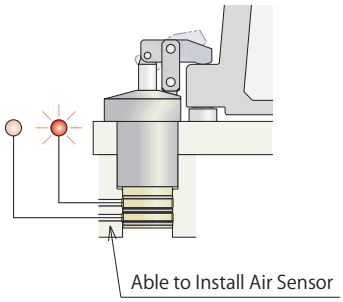
External Dimensions
→ P.161

## Air Sensing Piping Option

Model **WCE-N**

External Dimensions
→ P.163

Clamping action is possible to confirm with an air catch sensor




Option

## Quick Change Lever Option A

Model **WCE-A**

External Dimensions
→ P.165

Quick and easy to change levers with Quick Change Lever Option A

## Accessories

### Lever
Model **WCZ-L**

→ P.170

### Tightening Kit
(for Quick Change Lever Option A)
Model **LZK-W**

→ P.170

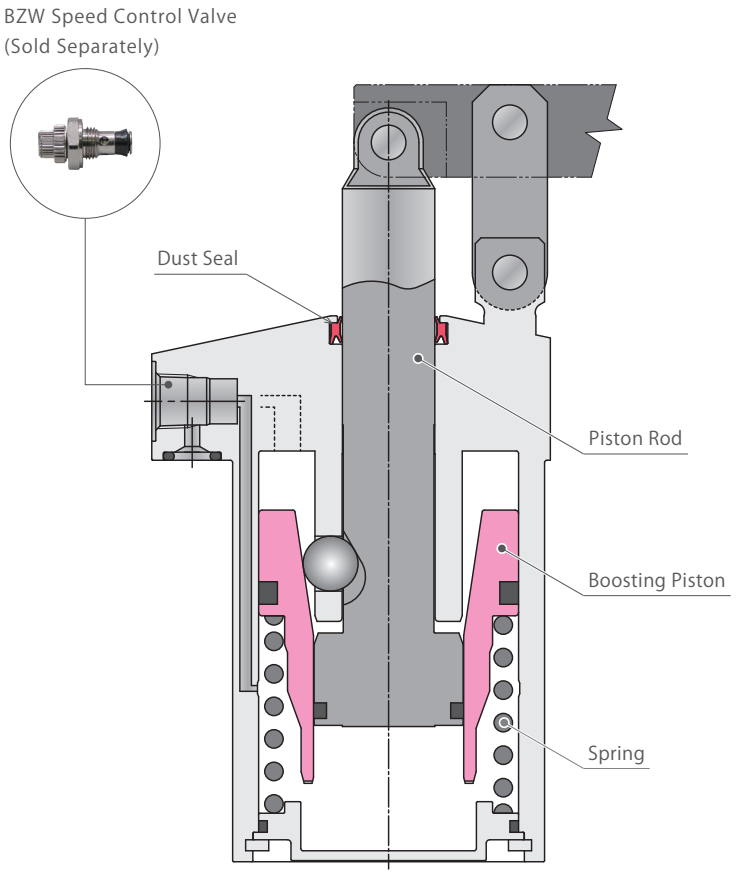
### Manifold Block
Model **WHZ-MD**

→ P.1335

### Air Flow Control Valve
Model **BZW-A**

→ P.309

## Cross Section ※ This is a simplified drawing. Actual components are different.




### ● Strong Clamping Force and Holding Force with Mechanical Lock

The mechanical locking system and pneumatic pressure allows the model WCE to exert about 2.5 times higher clamping force than the same size comparison model WCA. The high holding force enables heavy load machining and high accurate machining.

### ● Compact

The dimension below flange is shortened even with built-in machenical lock.

### ● Excellent Coolant Resistance

Our exclusive dust seal is designed to protect against high pressure coolant. It also has high durability against chlorine-based coolant by using a sealing material with excellent chemical resistance.

### ● Able to Attach Speed Control Valve Directly

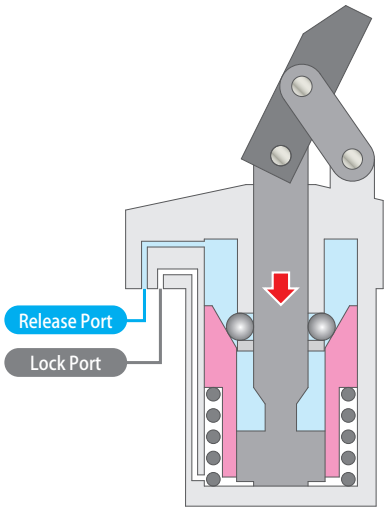
It is able to attach the speed control valve (sold separately) directly to the clamp when selecting the gasket option A.

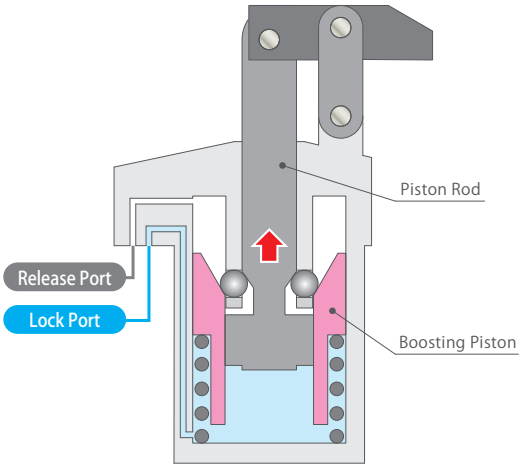
## Action Description

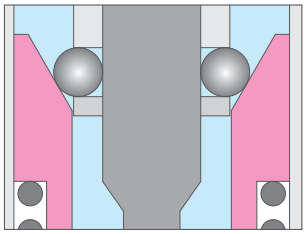
※ This is a simplified drawing. Actual components are different.

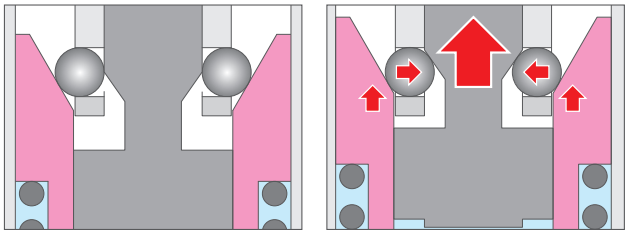
**Released State** — Lock Air Pressure OFF / Release Air Pressure ON

**Locked State** — Lock Air Pressure ON / Release Air Pressure OFF





Released State

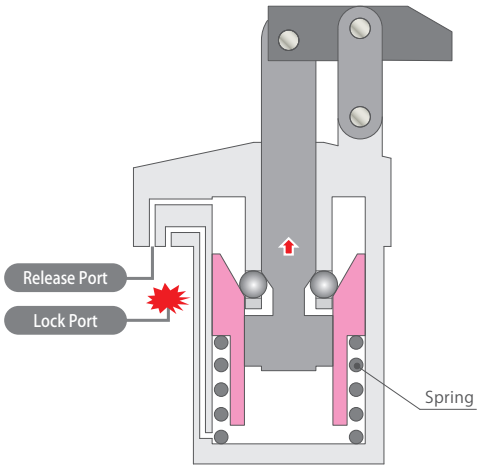
The piston rod descends to release.

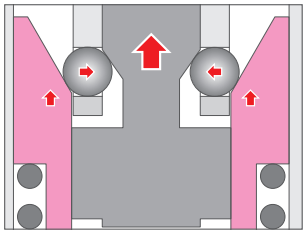
Locking Operation
(Idle Stroke Completed)

Locked State
(Boosting Stroke)

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

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



Self-Locking State
( Spring Force + Mechanical Lock )

If lock air pressure drops to zero in the locked state, some clamping force and holding force is maintained with internal spring and mechanical lock.

## Model No. Indication

WCE 160 2 - 2 A R □ - □

1 2 3 4 5 6

### 1 Cylinder Force

**045** : Cylinder Force 0.4kN (at Air Pressure 0.5MPa)
**060** : Cylinder Force 0.6kN (at Air Pressure 0.5MPa)
**100** : Cylinder Force 0.9kN (at Air Pressure 0.5MPa)
**160** : Cylinder Force 1.6kN (at Air Pressure 0.5MPa)
**250** : Cylinder Force 2.5kN (at Air Pressure 0.5MPa)
**400** : Cylinder Force 3.9kN (at Air Pressure 0.5MPa)

※ Cylinder force differs from clamping force and holding force.

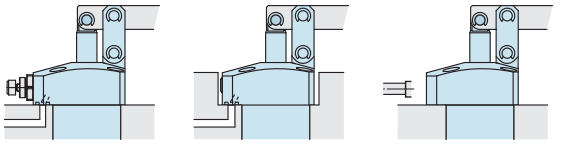
### 2 Design No.

**2** : 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-A) is sold separately.
Please use a meter-in speed control valve for WCE.
In case of using Kosmek model, select BZW□-A.
Refer to P.309 for detail.

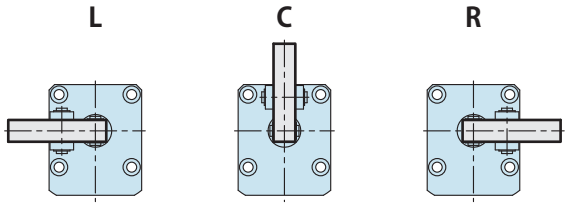



| Gasket Option | | Piping Option |
|---|---|---|
| With R Thread Plug (able to attach Speed Control Valve) ( Order the valve (BZW-A) separately ) | with R Thread Plug | Rc Thread No Gasket Port |

### 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.



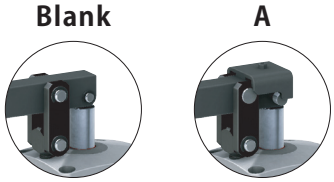

### 5 Action Confirmation Method

**Blank** : None (Standard)
**D** : Double End Rod Option for Dog
**M** : Air Sensing Manifold Option
**N** : Air Sensing Piping Option

※ Only None(Standard) : **Blank** can be selected for 1 Cylinder Force **045**.

### 6 Option

**Blank** : None (Standard)
**A** : Quick Change Lever Option A



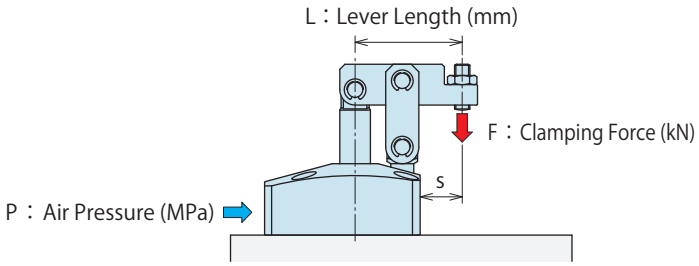

※ Only None(Standard) : **Blank** can be selected for 1 Cylinder Force **045**.

## Specifications

| Model No. | | | WCE0452-2□□ | WCE0602-2□□□-□ | WCE1002-2□□□-□ | WCE1602-2□□□-□ |
|---|---|---|---|---|---|---|
| Cylinder Force (at 0.5MPa) kN | | | 0.4 | 0.6 | 0.9 | 1.6 |
| Clamping Force | | | Refer to "Clamping Force Curve" on P.149 | | | |
| Holding Force | | | Refer to "Holding Force Curve" on P.151 | | | |
| Clamping Force and Holding Force at 0MPa | | | Refer to "Clamping Force and Holding Force Curve at 0 MPa" on P.153 | | | |
| Full Stroke mm | | | 17 | 19.5 | 22 | 23.5 |
| (Break | Idle Stroke mm | | 13.5 | 16 | 18 | 19.5 |
| down) | Lock Stroke ※1 mm | | 3.5 | 3.5 | 4 | 4 |
| Cylinder Capacity cm³ | Lock | 5 Blank | 8.6 | 12.0 | 22.4 | 35.8 |
| | | 5 D/M/N | - | 11.0 | 20.6 | 33.9 |
| | Release | | 7.7 | 10.5 | 19.9 | 32.1 |
| Spring Force N | | | 22.6 ～ 30.4 | 36.8 ～ 54.4 | 60.8 ～ 78.4 | 83.5 ～ 140.9 |
| 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 | | | |

| Model No. | | | WCE2502-2□□□-□ | WCE4002-2□□□-□ |
|---|---|---|---|---|
| Cylinder Force (at 0.5MPa) kN | | | 2.5 | 3.9 |
| Clamping Force | | | Refer to "Clamping Force Curve" on P.149 | |
| Holding Force | | | Refer to "Holding Force Curve" on P.151 | |
| Clamping Force and Holding Force at 0MPa | | | Refer to "Clamping Force and Holding Force Curve at 0 MPa" on P.153 | |
| Full Stroke mm | | | 27.5 | 33 |
| (Break | Idle Stroke mm | | 23.5 | 29 |
| down) | Lock Stroke ※1 mm | | 4 | 4 |
| Cylinder Capacity cm³ | Lock | 5 Blank | 56.1 | 95.6 |
| | | 5 D/M/N | 53.0 | 91.9 |
| | Release | | 50.6 | 85.2 |
| Spring Force N | | | 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 | |

## Clamping Force Curve



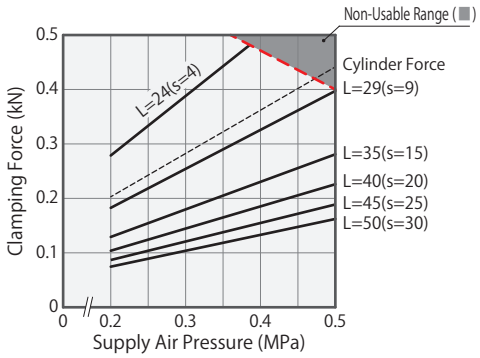

(How to read the clamping force curve)
In case of WCE2502-2□□□-□ : When supply air pressure P is 0.3MPa and lever length L is 50mm, clamping force becomes about 1.46kN.

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. Values in below charts indicate clamping force when the lever locks a workpiece in horizontal position.
4. The clamping force varies depending on the lever length. Set the suitable supply air pressure based on the lever length.
5. Clamping force in the non-usable range may cause damage and fluid leakage.

### WCE0452-2□□

Clamping Force Calculation Formula※1(kN) $F = \frac{10.4 \times P + 0.6}{L - 14.5}$

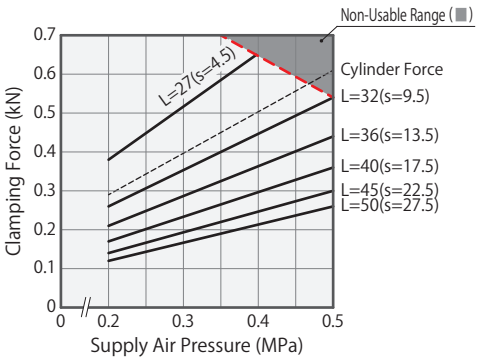
| Air Pressure (MPa) | Cylinder Force (kN) | Clamping Force (kN) Non-Usable Range (■) Lever Length L (mm) | | | | | | Min. Lever Length (mm) |
|---|---|---|---|---|---|---|---|---|
| | | 24 | 29 | 35 | 40 | 45 | 50 | |
| 0.5 | 0.44 | | 0.40 | 0.28 | 0.23 | 0.19 | 0.16 | 29 |
| 0.4 | 0.36 | | 0.33 | 0.23 | 0.19 | 0.15 | 0.13 | 25 |
| 0.3 | 0.28 | 0.39 | 0.25 | 0.18 | 0.14 | 0.12 | 0.10 | 22 |
| 0.2 | 0.20 | 0.28 | 0.18 | 0.13 | 0.10 | 0.09 | 0.07 | 19 |
| Max. Operating Pressure (MPa) | | 0.38 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | |




### WCE0602-2□□□-□

Clamping Force Calculation Formula※1(kN) $F = \frac{14.7 \times P + 1.1}{L - 16}$

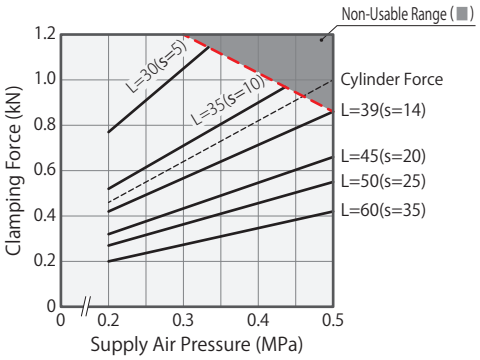
| Air Pressure (MPa) | Cylinder Force (kN) | Clamping Force (kN) Non-Usable Range (■) Lever Length L (mm) | | | | | | Min. Lever Length (mm) |
|---|---|---|---|---|---|---|---|---|
| | | 27 | 32 | 36 | 40 | 45 | 50 | |
| 0.5 | 0.59 | | 0.53 | 0.42 | 0.35 | 0.29 | 0.25 | 32 |
| 0.4 | 0.49 | 0.63 | 0.44 | 0.35 | 0.29 | 0.24 | 0.21 | 27 |
| 0.3 | 0.38 | 0.50 | 0.34 | 0.28 | 0.23 | 0.19 | 0.16 | 24 |
| 0.2 | 0.28 | 0.37 | 0.25 | 0.20 | 0.17 | 0.14 | 0.12 | 23 |
| Max. Operating Pressure (MPa) | | 0.40 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | |




### WCE1002-2□□□-□

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

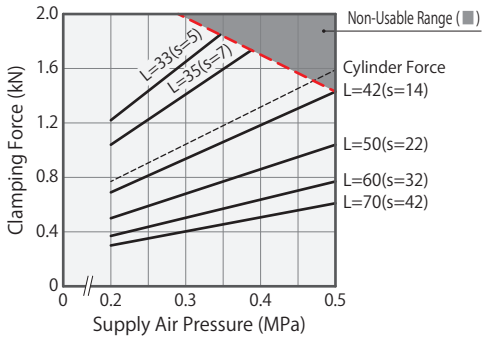
| Air Pressure (MPa) | Cylinder Force (kN) | Clamping Force (kN) Non-Usable Range (■) Lever Length L (mm) | | | | | | Min. Lever Length (mm) |
|---|---|---|---|---|---|---|---|---|
| | | 30 | 35 | 39 | 45 | 50 | 60 | |
| 0.5 | 0.94 | | | 0.85 | 0.65 | 0.54 | 0.41 | 39 |
| 0.4 | 0.78 | | 0.88 | 0.70 | 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 | |



## WCE1602-2□□□-□

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

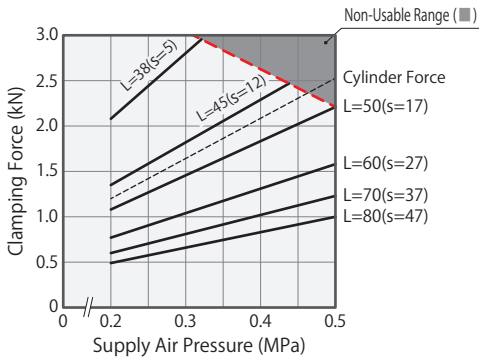
| Air Pressure (MPa) | Cylinder Force (kN) | Clamping Force (kN) Non-Usable Range (■) Lever Length L (mm) | | | | | | Min. Lever Length (mm) |
|---|---|---|---|---|---|---|---|---|
| | | 33 | 35 | 42 | 50 | 60 | 70 | |
| 0.5 | 1.59 | ■ | ■ | 1.43 | 1.04 | 0.77 | 0.61 | 42 |
| 0.4 | 1.32 | ■ | ■ | 1.19 | 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 | |




## WCE2502-2□□□-□

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

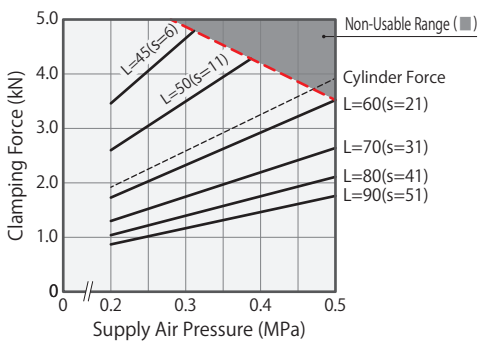
| Air Pressure (MPa) | Cylinder Force (kN) | Clamping Force (kN) Non-Usable Range (■) Lever Length L (mm) | | | | | | Min. Lever Length (mm) |
|---|---|---|---|---|---|---|---|---|
| | | 38 | 45 | 50 | 60 | 70 | 80 | |
| 0.5 | 2.46 | ■ | ■ | 2.21 | 1.58 | 1.23 | 1.00 | 50 |
| 0.4 | 2.04 | ■ | 2.29 | 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 | |



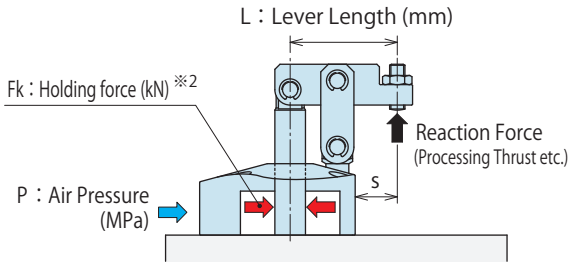

## WCE4002-2□□□-□

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) | | | | | | Min. Lever Length (mm) |
|---|---|---|---|---|---|---|---|---|
| | | 45 | 50 | 60 | 70 | 80 | 90 | |
| 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 | |

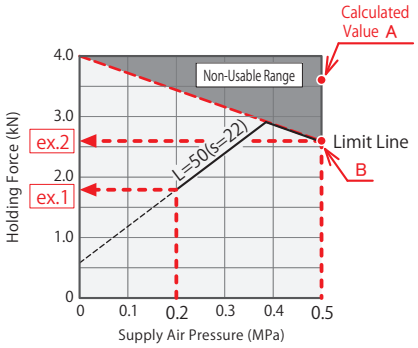


## Holding Force Curve




(Ex.1) In case of WCE1602-2□□□-□ :
When supply air pressure P is 0.2MPa and lever length L is 50mm, holding force becomes about 1.79kN.

(Ex.2) In case of WCE1602-2□□□-□ :
When supply air pressure P is 0.5MPa and lever length L is 50mm, the calculated value is at the point A but it is in the non-usable range. In this case, the value of intersection B becomes the holding force that counters the reaction force, and it is about 2.58kN.




Notes:

※2. Holding force is the force that counters the reaction force in the clamping state, and differs from clamping force.
Please keep in mind that it can produce displacement depending on lever rigidity even if the reaction force is lower than holding force.
(If slight displacement is also not allowed, please keep the reaction force beyond clamping force from being applied.)

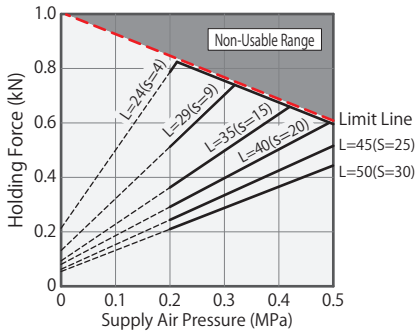
※3. Fk : Holding force (kN), P : Supply air pressure (MPa), L : Lever length (mm).
When a holding force calculated value exceeds the value of a limit line, holding force becomes a value of a limit line.

1. Tables and graphs show the relationship between the holding force (kN) and supply air pressure (MPa).
2. Values in below charts indicate holding force when the lever locks a workpiece in horizontal position.
3. The holding force varies depending on the lever length. Set the suitable supply air pressure based on the lever length.
4. Holding force in the non-usable range may cause damage and fluid leakage.

### WCE0452-2□□

Holding Force Formula ※3 (kN) ( Fk ≦ Limit Line Value ) $Fk = \frac{27.6 \times P + 1.9}{L - 14.5}$

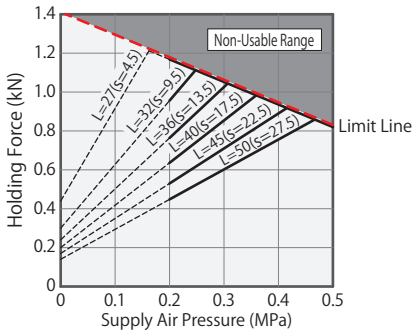
| Supply Air Pressure (MPa) | Holding Force (kN) Non-Usable Range ( ) Lever Length L (mm) | | | | | | Non-Usable Range Limit Line Value (kN) |
|---|---|---|---|---|---|---|---|
| | 24 | 29 | 35 | 40 | 45 | 50 | |
| 0.5 | | 0.61 | 0.61 | 0.61 | 0.52 | 0.44 | 0.61 |
| 0.4 | | 0.69 | 0.63 | 0.51 | 0.43 | 0.37 | 0.69 |
| 0.3 | 0.77 | 0.70 | 0.50 | 0.40 | 0.33 | 0.29 | 0.77 |
| 0.2 | 0.78 | 0.51 | 0.36 | 0.29 | 0.24 | 0.21 | 0.85 |




### WCE0602-2□□□-□

Holding Force Formula ※3 (kN) ( Fk ≦ Limit Line Value ) $Fk = \frac{52.4 \times P + 4.8}{L - 16}$

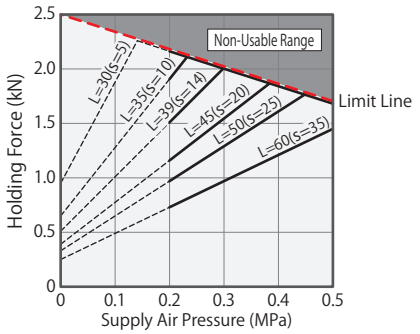
| Supply Air Pressure (MPa) | Holding Force (kN) Non-Usable Range ( ) Lever Length L (mm) | | | | | | Non-Usable Range Limit Line Value (kN) |
|---|---|---|---|---|---|---|---|
| | 27 | 32 | 36 | 40 | 45 | 50 | |
| 0.5 | | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| 0.4 | 0.94 | 0.94 | 0.94 | 0.94 | 0.89 | 0.76 | 0.94 |
| 0.3 | 1.05 | 1.05 | 1.03 | 0.86 | 0.71 | 0.60 | 1.05 |
| 0.2 | 1.17 | 0.96 | 0.76 | 0.64 | 0.53 | 0.45 | 1.17 |




### WCE1002-2□□□-□

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

| Supply Air Pressure (MPa) | Holding Force (kN) Non-Usable Range ( ) Lever Length L (mm) | | | | | | Non-Usable Range Limit Line Value (kN) |
|---|---|---|---|---|---|---|---|
| | 30 | 35 | 39 | 45 | 50 | 60 | |
| 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 |

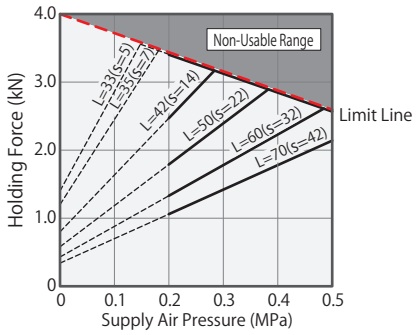


## WCE1602-2□□□-□

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

$$Fk = \frac{175.2 \times P + 16.8}{L - 21}$$

| Supply Air Pressure (MPa) | Holding Force (kN) Non-Usable Range (■) Lever Length L (mm) | | | | | | Non-Usable Range Limit Line Value (kN) |
|---|---|---|---|---|---|---|---|
| | 33 | 35 | 42 | 50 | 60 | 70 | |
| 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 |

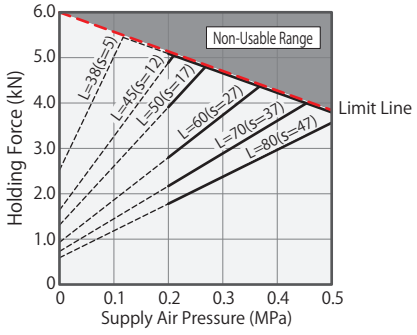



## WCE2502-2□□□-□

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

$$Fk = \frac{325.6 \times P + 32.6}{L - 25}$$

| Supply Air Pressure (MPa) | Holding Force (kN) Non-Usable Range (■) Lever Length L (mm) | | | | | | Non-Usable Range Limit Line Value (kN) |
|---|---|---|---|---|---|---|---|
| | 38 | 45 | 50 | 60 | 70 | 80 | |
| 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 |

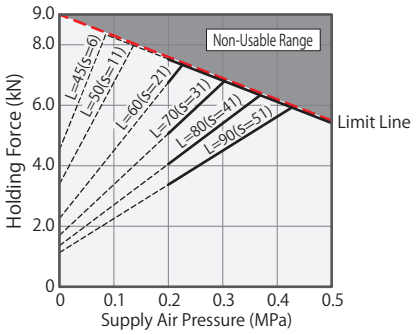



## WCE4002-2□□□-□

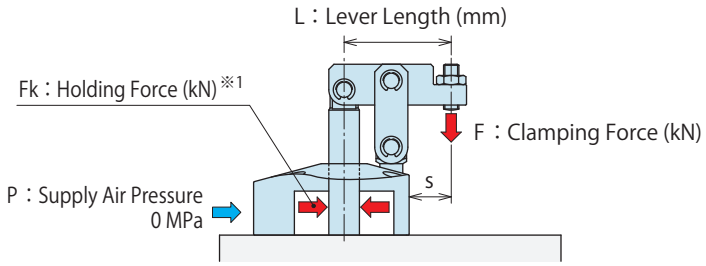
Holding Force Formula ※3 (Fk ≦ Limit Line Value) (kN)

$$Fk = \frac{673.9 \times P + 68}{L - 30}$$

| Supply Air Pressure (MPa) | Holding Force (kN) Non-Usable Range (■) Lever Length L (mm) | | | | | | Non-Usable Range Limit Line Value (kN) |
|---|---|---|---|---|---|---|---|
| | 45 | 50 | 60 | 70 | 80 | 90 | |
| 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



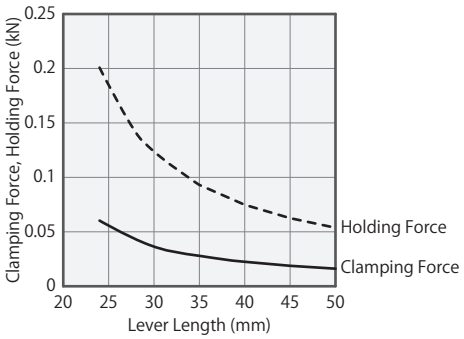

(Reading of the clamping force and holding force curve at 0MPa air pressure)
In case of WCE1602-2□□□-□
When air supply is shut off at clamped state:
Supply Air Pressure = 0MPa
Lever Length L= 50 mm
Clamping force becomes about 0.15 kN.
Holding force becomes about 0.58 kN.

Notes:
※1. Holding force shows the force which can counter to the reaction force in the clamping state, and differ from clamping force.
Moreover, keep in mind that it may produce displacement depending on lever rigidity even if it is the reaction force below holding force.
(When slight displacement is also not allowed, please keep the reaction force beyond clamping force from being applied.)
※2. F : Clamping force (kN) , Fk : Holding force (kN) , L : Lever length (mm).
1. The tables and the graphs show the relationship 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 air pressure show capability when a lever locks in a level position.
3. Clamping force and holding force vary depending on lever length.

### WCE0452-2□□

| | |
|---|---|
| Clamping Force Formula at 0MPa Air Pressure ※2 (kN) | $F = \frac{0.6}{L - 14.5}$ |
| Holding Force Formula at 0MPa Air Pressure ※2 (kN) | $Fk = \frac{1.9}{L - 14.5}$ |

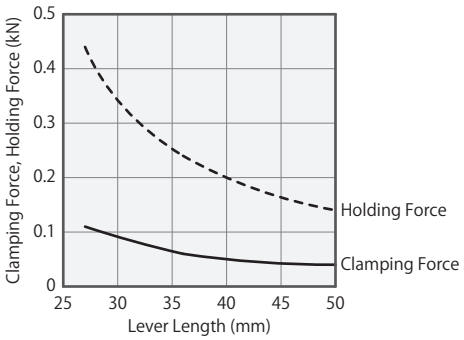
| Lever Length (mm) | 24 | 29 | 35 | 40 | 45 | 50 |
|---|---|---|---|---|---|---|
| Clamping Force Reference Value at 0MPa (kN) | 0.06 | 0.04 | 0.03 | 0.02 | 0.02 | 0.02 |
| Holding Force Reference Value at 0MPa (kN) | 0.20 | 0.13 | 0.09 | 0.07 | 0.06 | 0.05 |




### WCE0602-2□□□-□

| | |
|---|---|
| Clamping Force Formula at 0MPa Air Pressure ※2 (kN) | $F = \frac{1.1}{L - 16}$ |
| Holding Force Formula at 0MPa Air Pressure ※2 (kN) | $Fk = \frac{4.8}{L - 16}$ |

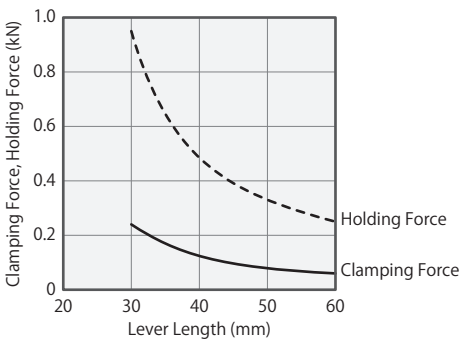
| Lever Length (mm) | 27 | 32 | 36 | 40 | 45 | 50 |
|---|---|---|---|---|---|---|
| Clamping Force Reference Value at 0MPa (kN) | 0.10 | 0.07 | 0.06 | 0.05 | 0.04 | 0.03 |
| Holding Force Reference Value at 0MPa (kN) | 0.44 | 0.30 | 0.24 | 0.20 | 0.17 | 0.14 |




### WCE1002-2□□□-□

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

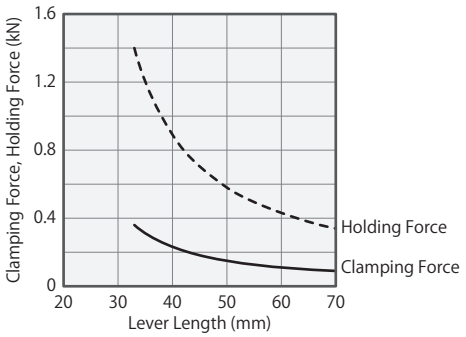
| Lever Length (mm) | 30 | 35 | 39 | 45 | 50 | 60 |
|---|---|---|---|---|---|---|
| Clamping Force Reference Value at 0MPa (kN) | 0.21 | 0.14 | 0.11 | 0.09 | 0.07 | 0.05 |
| Holding Force Reference Value at 0MPa (kN) | 0.95 | 0.65 | 0.51 | 0.39 | 0.33 | 0.25 |



## WCE1602-2□□□-□

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

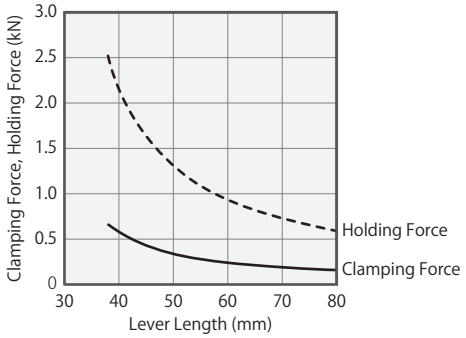
| Lever Length (mm) | 33 | 35 | 42 | 50 | 60 | 70 |
|---|---|---|---|---|---|---|
| Clamping Force Reference Value at 0MPa (kN) | 0.36 | 0.31 | 0.20 | 0.15 | 0.11 | 0.09 |
| Holding Force Reference Value at 0MPa (kN) | 1.40 | 1.20 | 0.80 | 0.58 | 0.43 | 0.34 |




## WCE2502-2□□□-□

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

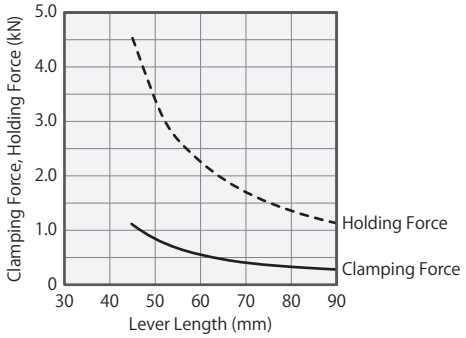
| Lever Length (mm) | 38 | 45 | 50 | 60 | 70 | 80 |
|---|---|---|---|---|---|---|
| Clamping Force Reference Value at 0MPa (kN) | 0.64 | 0.42 | 0.33 | 0.24 | 0.18 | 0.15 |
| Holding Force Reference Value at 0MPa (kN) | 2.51 | 1.63 | 1.30 | 0.93 | 0.72 | 0.59 |



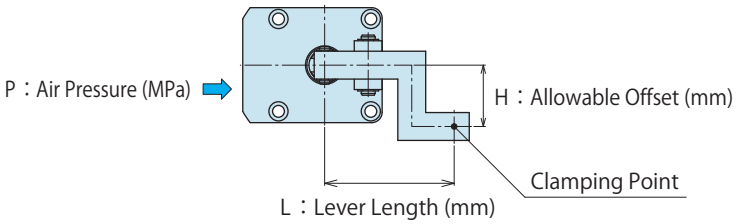

## WCE4002-2□□□-□

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



## Allowable Offset Graph



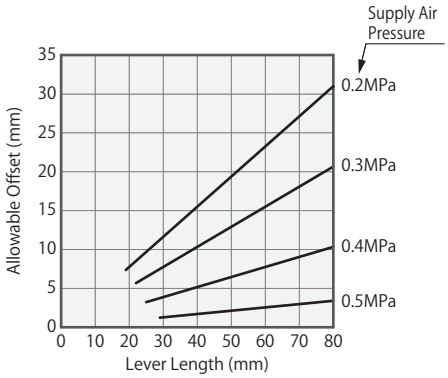

(Ex.) In case of WCE2502-2□□□-□ :
When supply air pressure P is 0.3MPa and lever length L is 50mm, allowable offset becomes about 18mm.

Notes：

1. Tables and graphs show the relationship between the lever length and the allowable offset according to the supply hydraulic pressure.
2. Using the lever beyond allowable offset may cause deformation, seizure and fluid leakage etc.
3. The tables and graphs are only for reference. The design should be carried out with allowance fully taken into consideration.

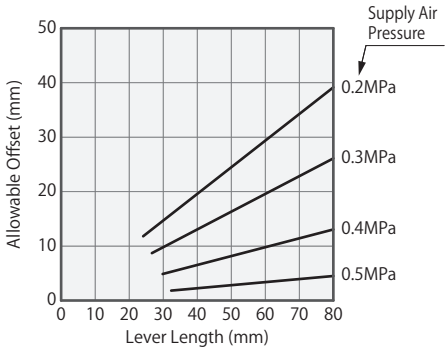
### WCE0452-2□□

| Supply Air Pressure (MPa) | Allowable Offset H (mm) Non-Usable Range ( ) | | | | | |
|---|---|---|---|---|---|---|
| | L=24 | L=29 | L=35 | L=40 | L=45 | L=50 |
| 0.5 | | 1 | 2 | 2 | 2 | 2 |
| 0.4 | | 4 | 5 | 5 | 6 | 7 |
| 0.3 | 7 | 8 | 10 | 11 | 12 | 14 |
| 0.2 | 10 | 12 | 14 | 16 | 18 | 20 |



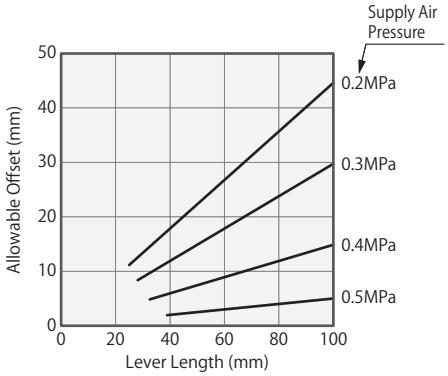

### WCE0602-2□□□-□

| Supply Air Pressure (MPa) | Allowable Offset H (mm) Non-Usable Range ( ) | | | | | |
|---|---|---|---|---|---|---|
| | L=27 | L=32 | L=36 | L=40 | L=45 | L=50 |
| 0.5 | | 2 | 2 | 2 | 3 | 3 |
| 0.4 | 4 | 5 | 6 | 7 | 7 | 8 |
| 0.3 | 9 | 10 | 12 | 13 | 15 | 16 |
| 0.2 | 13 | 16 | 18 | 20 | 22 | 24 |



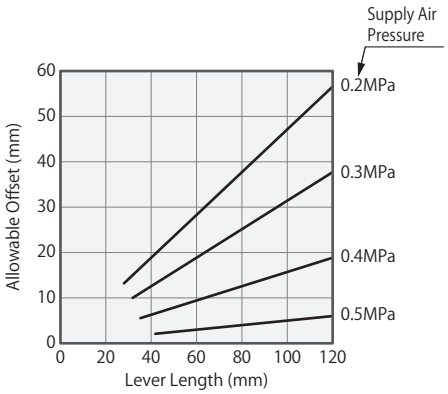

### WCE1002-2□□□-□

| Supply Air Pressure (MPa) | Allowable Offset H (mm) Non-Usable Range ( ) | | | | | |
|---|---|---|---|---|---|---|
| | L=30 | L=35 | L=39 | L=45 | L=50 | L=60 |
| 0.5 | | | 2 | 2 | 3 | 3 |
| 0.4 | | 5 | 6 | 7 | 7 | 9 |
| 0.3 | 9 | 10 | 12 | 13 | 15 | 18 |
| 0.2 | 13 | 16 | 17 | 20 | 22 | 27 |



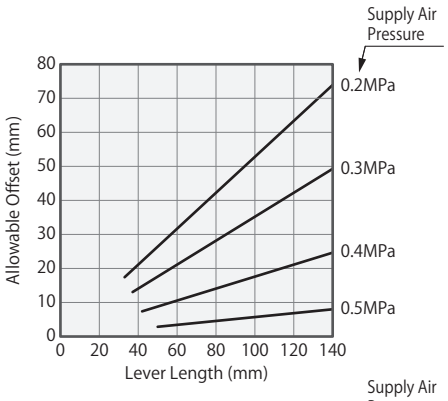
## WCE1602-2□□□-□

| Supply Air Pressure (MPa) | Allowable Offset H (mm) Non-Usable Range ( ) | | | | | |
|---|---|---|---|---|---|---|
| | L=33 | L=35 | L=42 | L=50 | L=60 | L=70 |
| 0.5 | | | 2 | 3 | 3 | 4 |
| 0.4 | | | 7 | 8 | 9 | 11 |
| 0.3 | 10 | 11 | 13 | 16 | 19 | 22 |
| 0.2 | 16 | 17 | 20 | 24 | 28 | 33 |



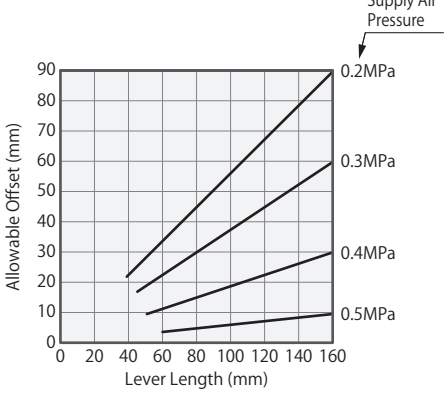

## WCE2502-2□□□-□

| Supply Air Pressure (MPa) | Allowable Offset H (mm) Non-Usable Range ( ) | | | | | |
|---|---|---|---|---|---|---|
| | L=38 | L=45 | L=50 | L=60 | L=70 | L=80 |
| 0.5 | | | 3 | 3 | 4 | 5 |
| 0.4 | | 8 | 9 | 11 | 12 | 14 |
| 0.3 | 13 | 16 | 18 | 21 | 25 | 28 |
| 0.2 | 20 | 24 | 26 | 32 | 37 | 42 |



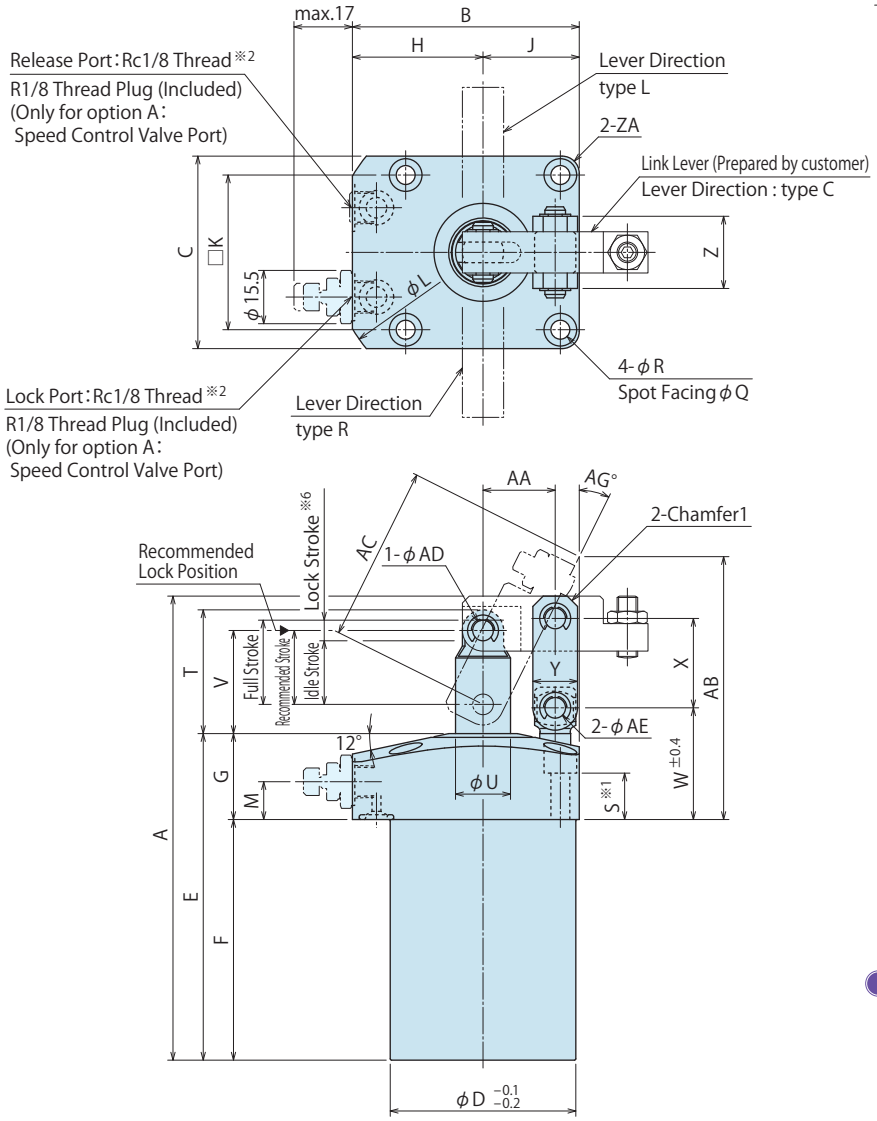

## WCE4002-2□□□-□

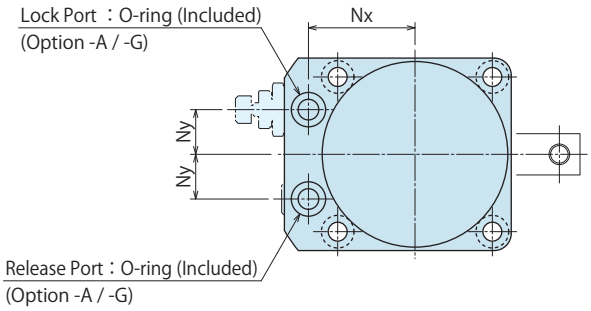
| Supply Air Pressure (MPa) | Allowable Offset H (mm) Non-Usable Range ( ) | | | | | |
|---|---|---|---|---|---|---|
| | L=45 | L=50 | L=60 | L=70 | L=80 | L=90 |
| 0.5 | | | 4 | 4 | 5 | 5 |
| 0.4 | | | 11 | 13 | 15 | 17 |
| 0.3 | 17 | 19 | 22 | 26 | 30 | 34 |
| 0.2 | 25 | 28 | 34 | 39 | 45 | 50 |



## External Dimensions

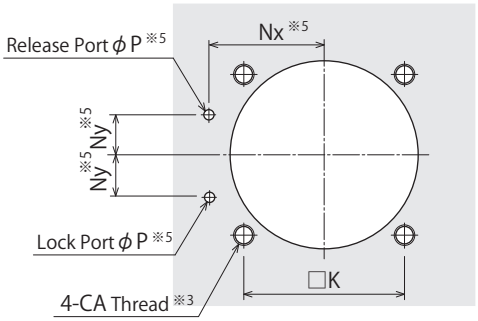
A：Gasket Option
(Speed Control Valve Corresponding Option, Include R Thread Plug)
※The drawing shows the locked state of WCE-2AC.

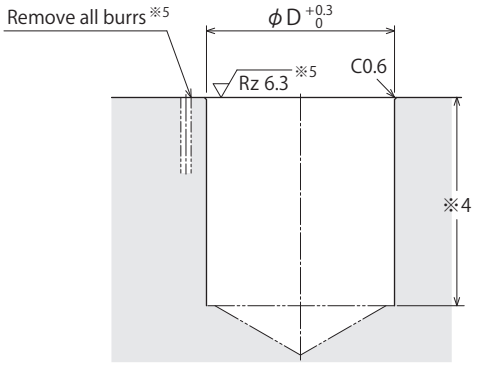



Notes：
※1. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.
※2. Speed control valve is sold separately. Please refer to P.309.
1. Please use the attached pin (equivalent to φADf6, φAEf6, HRC60) as the mounting pin for lever.

## Machininig Dimensions of Mounting Area

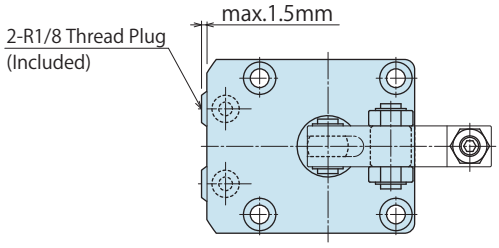


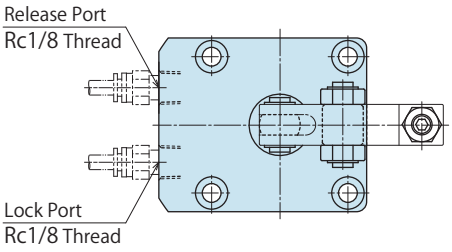

Notes：
※3. CA tapping depth of the mounting bolt should be decided according to the mounting height referring to dimension 'S'.
※4. The depth of the body mounting hole φD should be decided according to the mounting height referring to dimension 'F'.
※5. The machining dimension is for -A/-G：Gasket Option.

## Piping Method

G：Gasket Option (with R Thread Plug)
※The drawing shows the locked state of WCE-2GC.

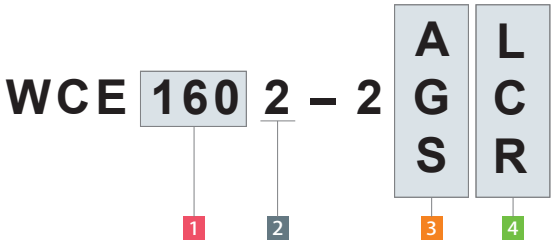



S：Piping Option (Rc Thread)
※The drawing shows the locked state of WCE-2SC.



## Model No. Indication

(Format Example：WCE1002-2AR, WCE2502-2SL)




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

## External Dimensions and Machining Dimensions for Mounting

(mm)

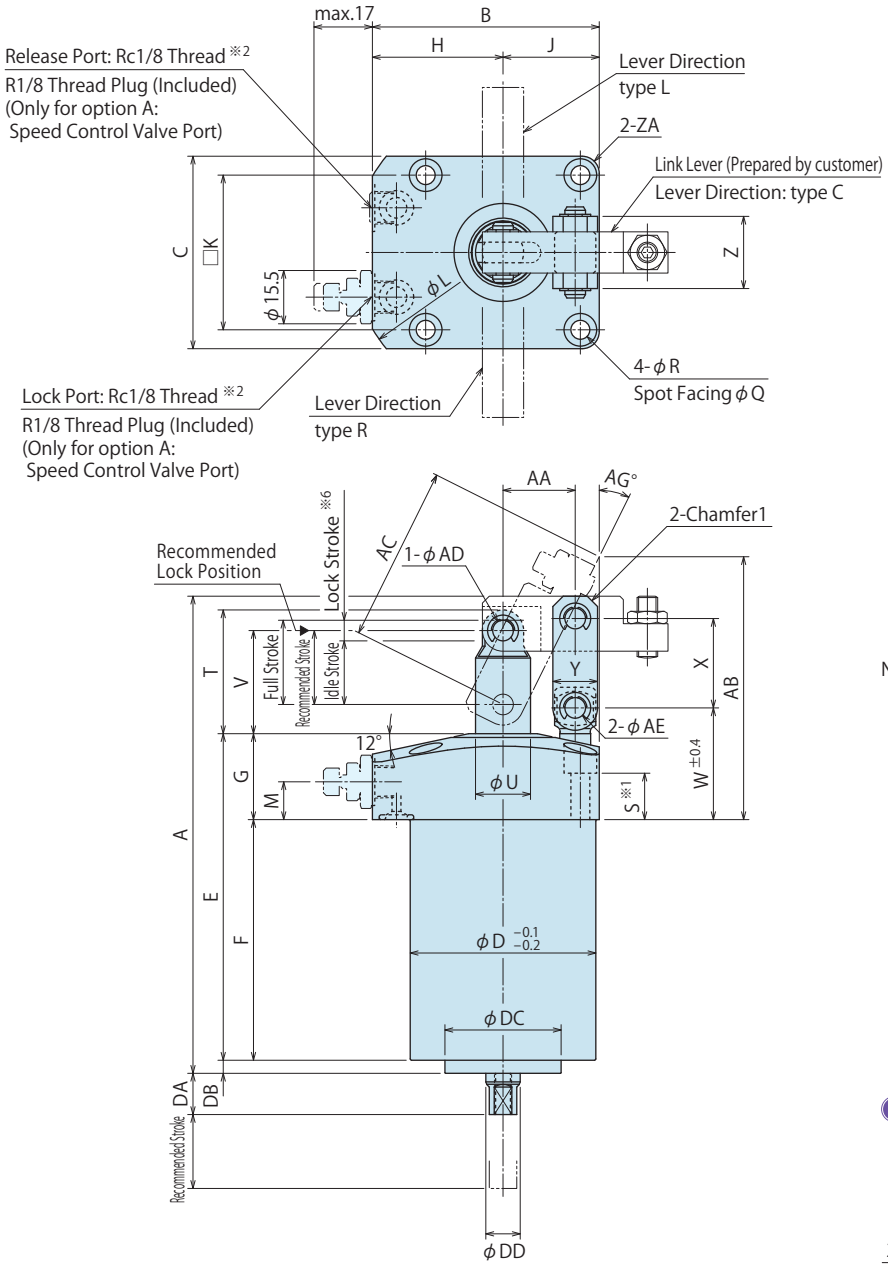
| Model No. | WCE0452-2□□ | WCE0602-2□□ | WCE1002-2□□ | WCE1602-2□□ | WCE2502-2□□ | WCE4002-2□□ |
|---|---|---|---|---|---|---|
| Full Stroke | 17 | 19.5 | 22 | 23.5 | 27.5 | 33 |
| (Break down) Idle Stroke | 13.5 | 16 | 18 | 19.5 | 23.5 | 29 |
| (Break down) Lock Stroke ※6 | 3.5 | 3.5 | 4 | 4 | 4 | 4 |
| Recommended Stroke | 15 | 17.5 | 20 | 21.5 | 25.5 | 31 |
| A | 99 | 111.5 | 123 | 134.5 | 157.5 | 184 |
| B | 50 | 54 | 60 | 66 | 76 | 87 |
| C | 40 | 45 | 50 | 56 | 66 | 78 |
| D | 36 | 40 | 46 | 54 | 64 | 77 |
| E | 71 | 79.5 | 88 | 94.5 | 109.5 | 124.5 |
| F | 46 | 54.5 | 63 | 69.5 | 79.5 | 94.5 |
| G | 25 | 25 | 25 | 25 | 30 | 30 |
| H | 30 | 31.5 | 35 | 38 | 43 | 48 |
| J | 20 | 22.5 | 25 | 28 | 33 | 39 |
| K | 31.4 | 34 | 39 | 45 | 53 | 65 |
| L | 68 | 72 | 79 | 88 | 98 | 113 |
| M | 11 | 11 | 11 | 11 | 11 | 11 |
| Nx | 23.5 | 26 | 28 | 31 | 36 | 41 |
| Ny | 8 | 9 | 10 | 13 | 15 | 20 |
| P | max. $\phi$3 | max. $\phi$3 | max. $\phi$5 | max. $\phi$5 | max. $\phi$5 | max. $\phi$5 |
| Q | 7.5 | 9.5 | 9.5 | 9.5 | 11 | 11 |
| R | 4.5 | 5.5 | 5.5 | 5.5 | 6.8 | 6.8 |
| S | 16.5 | 15.5 | 14 | 13.5 | 16 | 15 |
| T | 24.5 | 28.5 | 31.5 | 36 | 40 | 50.5 |
| U | 8 | 10 | 12 | 14 | 16 | 20 |
| V | 21 | 24 | 27 | 30 | 34 | 42.5 |
| W | 29 | 31 | 31 | 32.5 | 37.5 | 40.5 |
| X | 19.5 | 20.5 | 23.5 | 26 | 32.5 | 39.5 |
| Y | 9 | 11 | 11 | 13 | 16 | 18 |
| Z | 14 | 19 | 19 | 21 | 28 | 37 |
| Chamfer 1 | C2 | C2.5 | C2.5 | C3 | C3 | C5 |
| AA | 14.5 | 16 | 19.5 | 21 | 25 | 30 |
| AB | 65.5 | 76.1 | 72 | 76.5 | 92.2 | 105.7 |
| AC | 39.6 | 49.8 | 46.9 | 50.9 | 62.7 | 74.7 |
| AD | 4 | 5 | 5 | 6 | 6 | 8 |
| AE | 4 | 5 | 5 | 6 | 8 | 10 |
| AG | 24.4° | 21.6° | 26.5° | 26.4° | 26.1° | 25.2° |
| CA (Nominal × Pitch) | M4×0.7 | M5×0.8 | M5×0.8 | M5×0.8 | M6 | M6 |
| ZA (Chamfer) | C2 | C3 | R5 | R5 | R6 | R6 |
| O-ring (Piping Option A/G) | 1BP5 | 1BP5 | 1BP7 | 1BP7 | 1BP7 | 1BP7 |
| Weight ※7 kg | 0.4 | 0.5 | 0.6 | 0.9 | 1.4 | 2.3 |

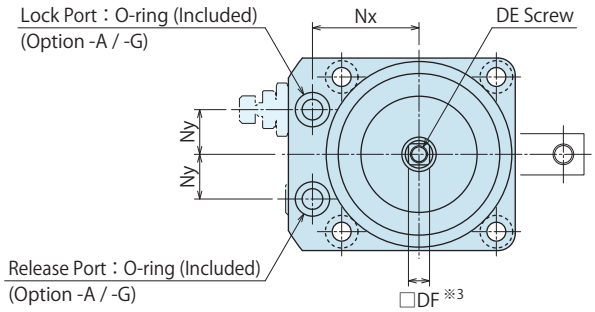
Notes: ※6. The specification value of cylinder force, clamping force and holding force is fulfilled only when clamping within the lock stroke range.
(The specification value is not fulfilled when clamping within the range of idle stroke.)
※7. It shows the weight of single clamp without the link lever.

## External Dimensions

A : Gasket Option
(Speed Control Valve Corresponding Option, Include R Thread Plug)

※The drawing shows the locked state of WCE-2ACD.




Notes：

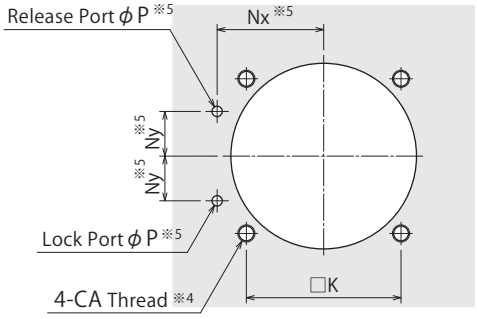
※1. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.

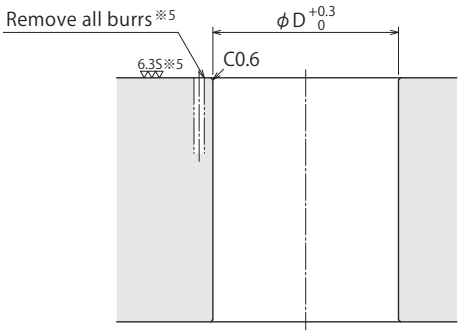
※2. Speed control valve is sold separately. Please refer to P.309.

※3. Mounting direction of □DF is not as indicated in this drawing.

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

## Machining Dimensions of Mounting Area




Notes：

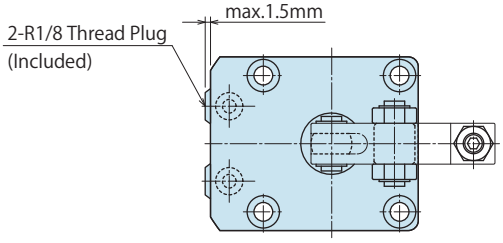
※4. CA tapping depth of the mounting bolt should be decided according to the mounting height referring to dimension 'S'.

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

## Piping Method

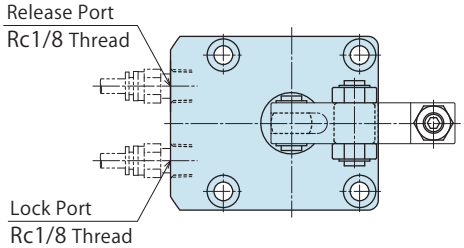
G：Gasket Option (with R Thread Plug)

※The drawing shows the locked state of WCE-2GCD.



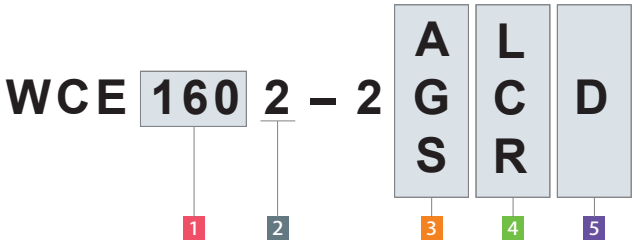

S：Piping Option (Rc Thread)

※The drawing shows the locked state of WCE-2SCD.



## Model No. Indication

(Format Example：WCE1002-2ARD, WCE2502-2SLD)




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

## External Dimensions and Machining Dimensions for Mounting

(mm)

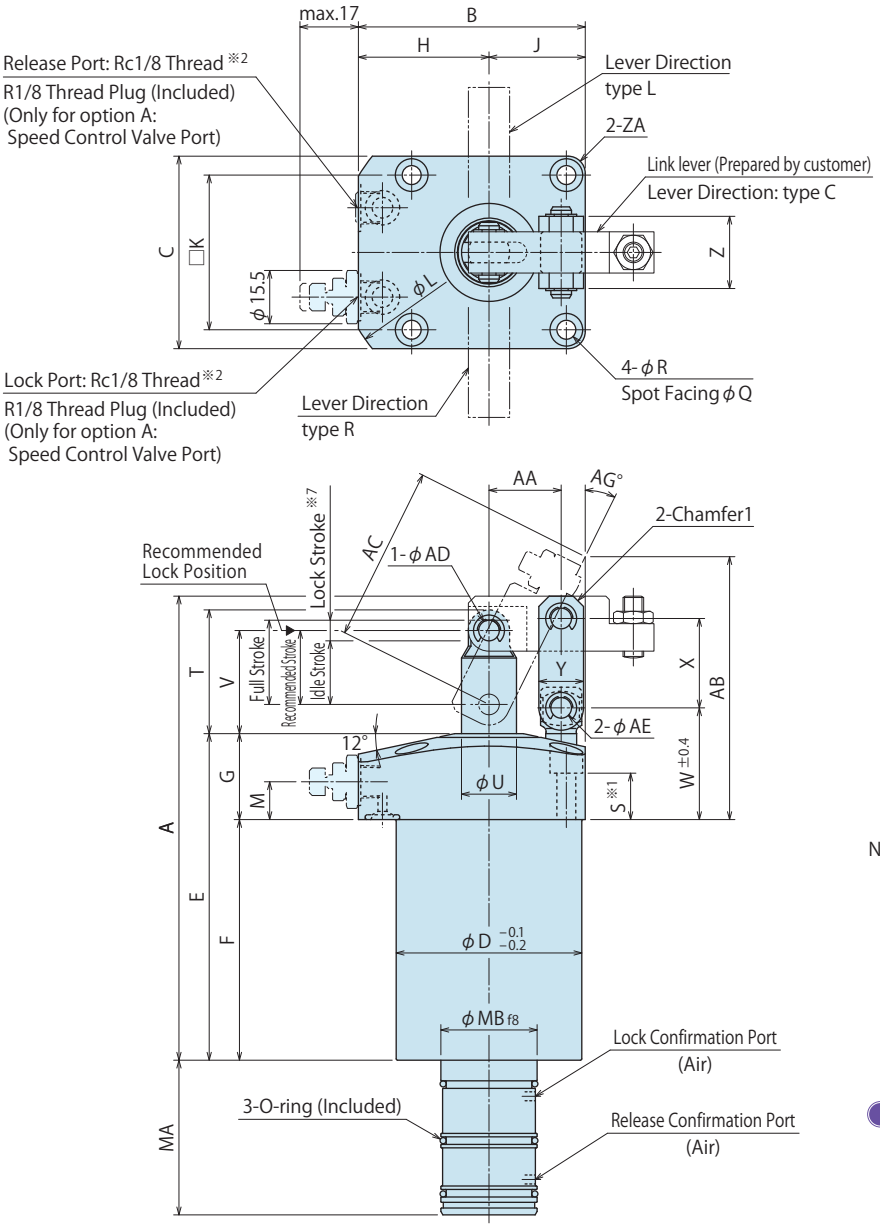
| Model No. | WCE0602-2□□D | WCE1002-2□□D | WCE1602-2□□D | WCE2502-2□□D | WCE4002-2□□D |
|---|---|---|---|---|---|
| Full Stroke | 19.5 | 22 | 23.5 | 27.5 | 33 |
| (Break down) Idle Stroke | 16 | 18 | 19.5 | 23.5 | 29 |
| (Break down) Lock Stroke ※6 | 3.5 | 4 | 4 | 4 | 4 |
| Recommended Stroke | 17.5 | 20 | 21.5 | 25.5 | 31 |
| A | 115.5 | 127 | 138.5 | 162.5 | 188.5 |
| B | 54 | 60 | 66 | 76 | 87 |
| C | 45 | 50 | 56 | 66 | 78 |
| D | 40 | 46 | 54 | 64 | 77 |
| E | 79.5 | 88 | 94.5 | 109.5 | 124.5 |
| F | 54.5 | 63 | 69.5 | 79.5 | 94.5 |
| G | 25 | 25 | 25 | 30 | 30 |
| H | 31.5 | 35 | 38 | 43 | 48 |
| J | 22.5 | 25 | 28 | 33 | 39 |
| K | 34 | 39 | 45 | 53 | 65 |
| L | 72 | 79 | 88 | 98 | 113 |
| M | 11 | 11 | 11 | 11 | 11 |
| Nx | 26 | 28 | 31 | 36 | 41 |
| Ny | 9 | 10 | 13 | 15 | 20 |
| P | max. $\phi$3 | max. $\phi$5 | max. $\phi$5 | max. $\phi$5 | max. $\phi$5 |
| Q | 9.5 | 9.5 | 9.5 | 11 | 11 |
| R | 5.5 | 5.5 | 5.5 | 6.8 | 6.8 |
| S | 15.5 | 14 | 13.5 | 16 | 15 |
| T | 28.5 | 31.5 | 36 | 40 | 50.5 |
| U | 10 | 12 | 14 | 16 | 20 |
| V | 24 | 27 | 30 | 34 | 42.5 |
| W | 31 | 31 | 32.5 | 37.5 | 40.5 |
| X | 20.5 | 23.5 | 26 | 32.5 | 39.5 |
| Y | 11 | 11 | 13 | 16 | 18 |
| Z | 19 | 19 | 21 | 28 | 37 |
| Chamfer 1 | C2.5 | C2.5 | C3 | C3 | C5 |
| AA | 16 | 19.5 | 21 | 25 | 30 |
| AB | 76.1 | 72 | 76.5 | 92.2 | 105.7 |
| AC | 49.8 | 46.9 | 50.9 | 62.7 | 74.7 |
| AD | 5 | 5 | 6 | 6 | 8 |
| AE | 5 | 5 | 6 | 8 | 10 |
| AG | 21.6° | 26.5° | 26.4° | 26.1° | 25.2° |
| CA (Nominal × Pitch) | M5×0.8 | M5×0.8 | M5×0.8 | M6×1 | M6×1 |
| DA | 11.5 | 12 | 12 | 12 | 12 |
| DB | 4 | 4 | 4 | 5 | 4.5 |
| DC | 22.5 | 28 | 33.8 | 41.6 | 54 |
| DD | 8 | 10 | 10 | 12 | 12 |
| DE (Nominal×Pitch×Depth) | M4×0.7×10 | M5×0.8×12 | M5×0.8×12 | M6×1×15 | M6×1×15 |
| DF | 6 | 8 | 8 | 10 | 10 |
| ZA (Chamfer) | C3 | R5 | R5 | R6 | R6 |
| O-ring (Piping Option A/G) | 1BP5 | 1BP7 | 1BP7 | 1BP7 | 1BP7 |
| Weight ※7 kg | 0.5 | 0.6 | 0.9 | 1.4 | 2.3 |

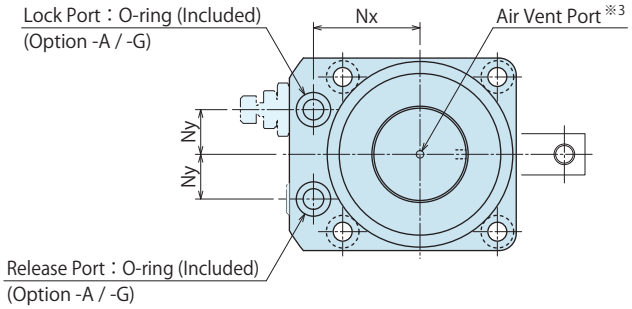
Notes: ※6. The specification value of cylinder force, clamping force and holding force is fulfilled only when clamping within the lock stroke range.
(The specification value is not fulfilled when clamping within the range of idle stroke.)
※7. It shows the weight of single clamp without the link lever.

## External Dimensions

A : Gasket Option
(Speed Control Valve Corresponding Option, Include R Thread Plug)

※The drawing shows the locked state of WCE-2ACM.



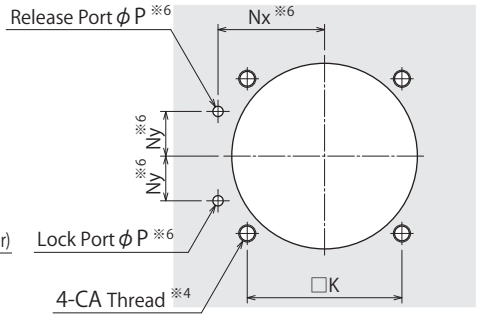



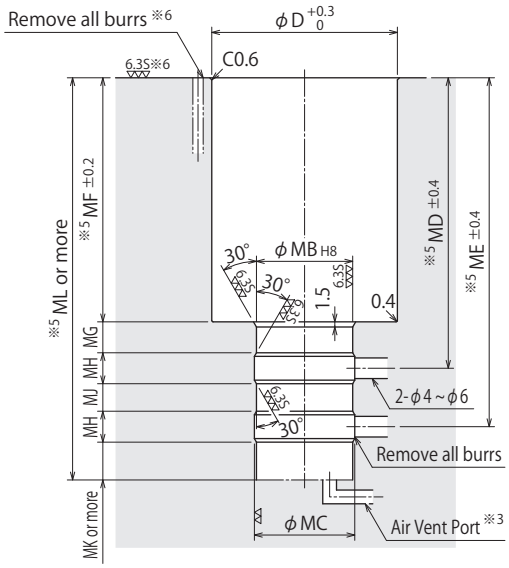

Notes :

※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.309.
1. Please use the attached pin (equivalent to φADf6, φAEf6, HRC60) as the mounting pin for lever.
2. Please refer to P.167~168 for air sensing chart.

## Machining Dimensions of Mounting Area




Notes :

※3. Please keep clear condition at the air vent port, and prevent coolant and chips from entering the port.

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

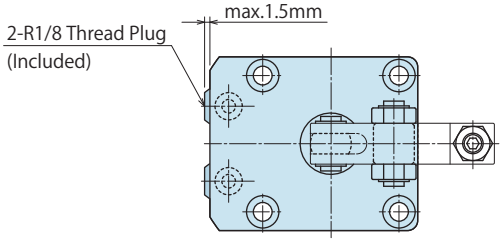
※5. The dimensions indicate those under the flange.

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

## Piping Method

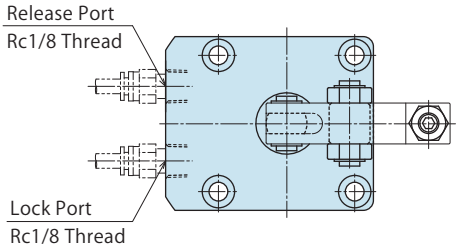
G : Gasket Option (with R Thread Plug)

※The drawing shows the locked state of WCE-2GCM.

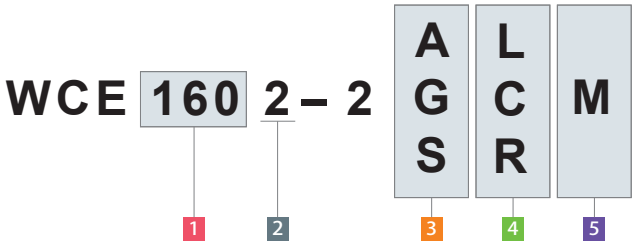



S : Piping Option (Rc Thread)

※The drawing shows the locked state of WCE-2SCM.



## Model No. Indication




(Format Example：WCE1002-2ARM, WCE2502-2SLM)

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

## External Dimensions and Machining Dimensions for Mounting

(mm)

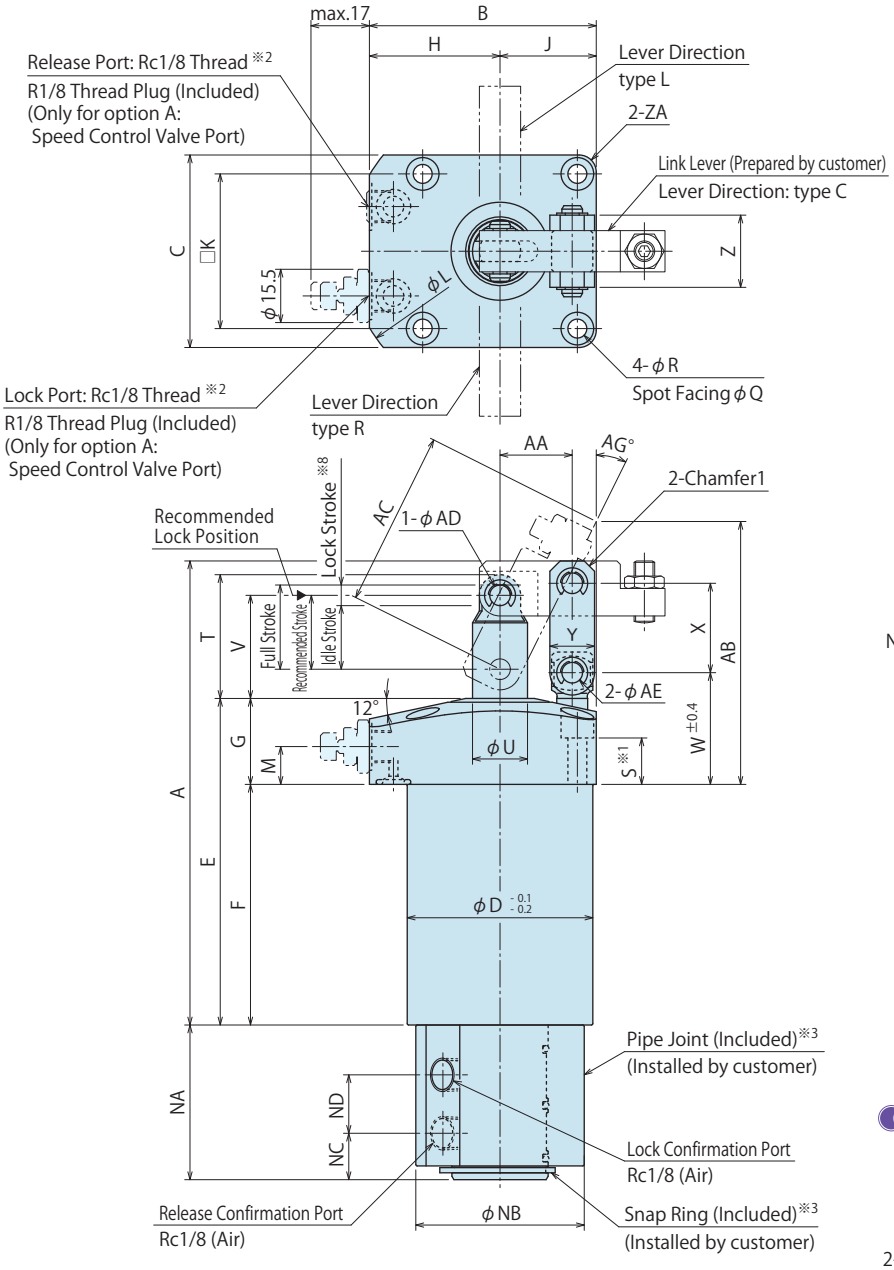
| Model No. | WCE0602-2□□M | WCE1002-2□□M | WCE1602-2□□M | WCE2502-2□□M | WCE4002-2□□M |
|---|---|---|---|---|---|
| Full Stroke | 19.5 | 22 | 23.5 | 27.5 | 33 |
| (Break down) Idle Stroke | 16 | 18 | 19.5 | 23.5 | 29 |
| (Break down) Lock Stroke ※7 | 3.5 | 4 | 4 | 4 | 4 |
| Recommended Stroke | 17.5 | 20 | 21.5 | 25.5 | 31 |
| A | 111.5 | 123 | 134.5 | 157.5 | 184 |
| B | 54 | 60 | 66 | 76 | 87 |
| C | 45 | 50 | 56 | 66 | 78 |
| D | 40 | 46 | 54 | 64 | 77 |
| E | 79.5 | 88 | 94.5 | 109.5 | 124.5 |
| F | 54.5 | 63 | 69.5 | 79.5 | 94.5 |
| G | 25 | 25 | 25 | 30 | 30 |
| H | 31.5 | 35 | 38 | 43 | 48 |
| J | 22.5 | 25 | 28 | 33 | 39 |
| K | 34 | 39 | 45 | 53 | 65 |
| L | 72 | 79 | 88 | 98 | 113 |
| M | 11 | 11 | 11 | 11 | 11 |
| Nx | 26 | 28 | 31 | 36 | 41 |
| Ny | 9 | 10 | 13 | 15 | 20 |
| P | max. $\phi$3 | max. $\phi$5 | max. $\phi$5 | max. $\phi$5 | max. $\phi$5 |
| Q | 9.5 | 9.5 | 9.5 | 11 | 11 |
| R | 5.5 | 5.5 | 5.5 | 6.8 | 6.8 |
| S | 15.5 | 14 | 13.5 | 16 | 15 |
| T | 28.5 | 31.5 | 36 | 40 | 50.5 |
| U | 10 | 12 | 14 | 16 | 20 |
| V | 24 | 27 | 30 | 34 | 42.5 |
| W | 31 | 31 | 32.5 | 37.5 | 40.5 |
| X | 20.5 | 23.5 | 26 | 32.5 | 39.5 |
| Y | 11 | 11 | 13 | 16 | 18 |
| Z | 19 | 19 | 21 | 28 | 37 |
| Chamfer1 | C2.5 | C2.5 | C3 | C3 | C5 |
| AA | 16 | 19.5 | 21 | 25 | 30 |
| AB | 76.1 | 72 | 76.5 | 92.2 | 105.7 |
| AC | 49.8 | 46.9 | 50.9 | 62.7 | 74.7 |
| AD | 5 | 5 | 6 | 6 | 8 |
| AE | 5 | 5 | 6 | 8 | 10 |
| AG | 21.6° | 26.5° | 26.4° | 26.1° | 25.2° |
| CA (Nominal × Pitch) | M5×0.8 | M5×0.8 | M5×0.8 | M6×1 | M6×1 |
| MA | 40 | 43.5 | 45 | 50 | 55 |
| MB f8 | $20^{-0.020}_{-0.053}$ | $28^{-0.020}_{-0.053}$ | $28^{-0.020}_{-0.053}$ | $38^{-0.025}_{-0.064}$ | $38^{-0.025}_{-0.064}$ |
| MB H8 | $20^{+0.033}_{0}$ | $28^{+0.033}_{0}$ | $28^{+0.033}_{0}$ | $38^{+0.039}_{0}$ | $38^{+0.039}_{0}$ |
| MC | 21.2 | 29.2 | 29.2 | 39.2 | 39.2 |
| MD | 68 | 77.5 | 84 | 95 | 112 |
| ME | 82 | 92.5 | 101 | 115 | 134 |
| MF | 55.5 | 64 | 70.5 | 80.5 | 95.5 |
| MG | 8 | 9 | 9 | 10 | 12 |
| MH | 9 | 9 | 9 | 9 | 9 |
| MJ | 5 | 6 | 8 | 11 | 13 |
| MK | 10 | 11.5 | 11 | 12 | 13 |
| ML | 96.5 | 108.5 | 116.5 | 131.5 | 151.5 |
| ZA (Chamfer) | C3 | R5 | R5 | R6 | R6 |
| O-ring (Piping Option A/G) | 1BP5 | 1BP7 | 1BP7 | 1BP7 | 1BP7 |
| 3-O-ring | AS568-016 (70° ) | AS568-021 (70° ) | AS568-021 (70° ) | AS568-028 (70° ) | AS568-028 (70° ) |
| Weight ※8 kg | 0.6 | 0.7 | 1.0 | 1.6 | 2.5 |

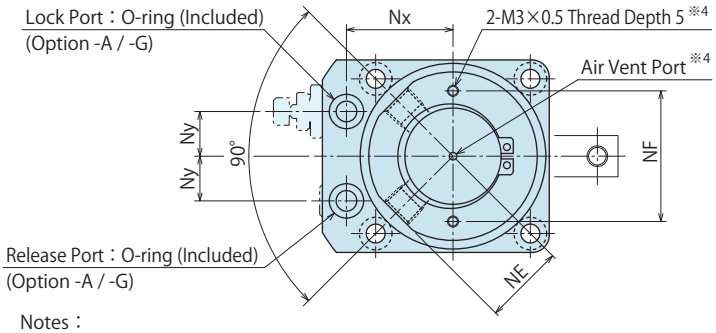
Notes: ※7. The specification value of cylinder force, clamping force and holding force is fulfilled only when clamping within the lock stroke range. (The specification value is not fulfilled when clamping within the range of idle stroke.)
※8. It shows the weight of single clamp without the link lever.

## External Dimensions

A : Gasket Option
(Speed Control Valve Corresponding Option, Include R Thread Plug)

※The drawing shows the locked state of WCE-2ACN (mounting state of pipe joint).




Notes：

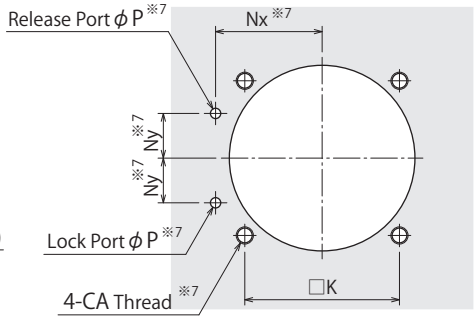
※1. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.

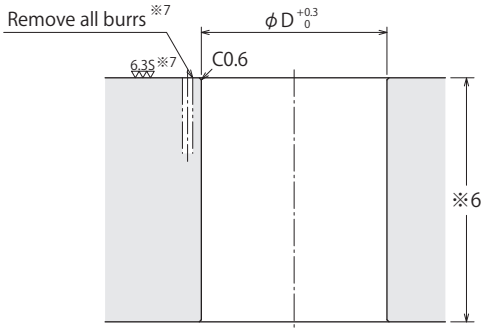
※2. Speed control valve is sold separately. Please refer to P.309.

※3. Piping joint and snap ring will be shipped as attachments. Make sure not to damage O-ring and insert in order of ① piping joint and ② snap ring from the bottom of the cylinder. (As for piping joint, M3 screw side should face downward when mounting.) For WCE0602 and WCE1002, make sure to mount the piping joint and snap ring only after installing the clamp body.

1. Please use the attached pin (equivalent to φADf6, φAEf6, HRC60) as the mounting pin for lever.
2. Please refer to P.167~168 for air sensing chart.

## Machining Dimensions of Mounting Area




Notes：

※4. Please keep clear condition at the air vent port, and prevent coolant and chips from entering the port. If exposed to coolant and chips, use M3 thread of the bottom and install an attachment to prevent contamination, but do not block the air vent port.

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

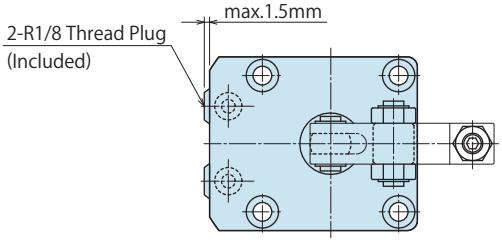
※6. The depth of the body mounting hole of WCE0602 and WCE1002 φD should be less than 'Dimension F'.

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

## Piping Method

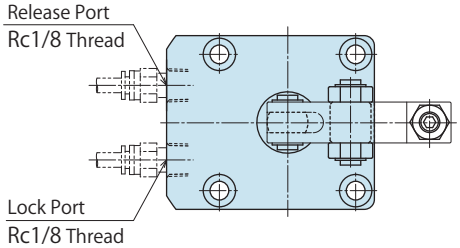
G：Gasket Option (with R Thread Plug)

※The drawing shows the locked state of WCE-2GCN.



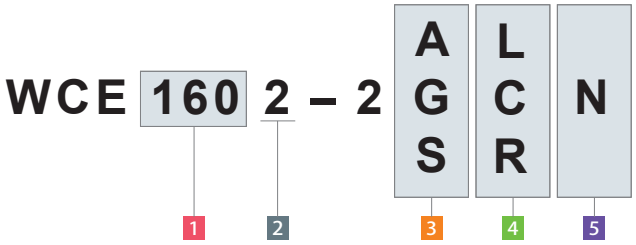

S：Piping Option (Rc Thread)

※The drawing shows the locked state of WCE-2SCN.



## Model No. Indication

(Format Example：WCE1002-2ARN, WCE2502-2SLN)




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

## External Dimensions and Machining Dimensions for Mounting

(mm)

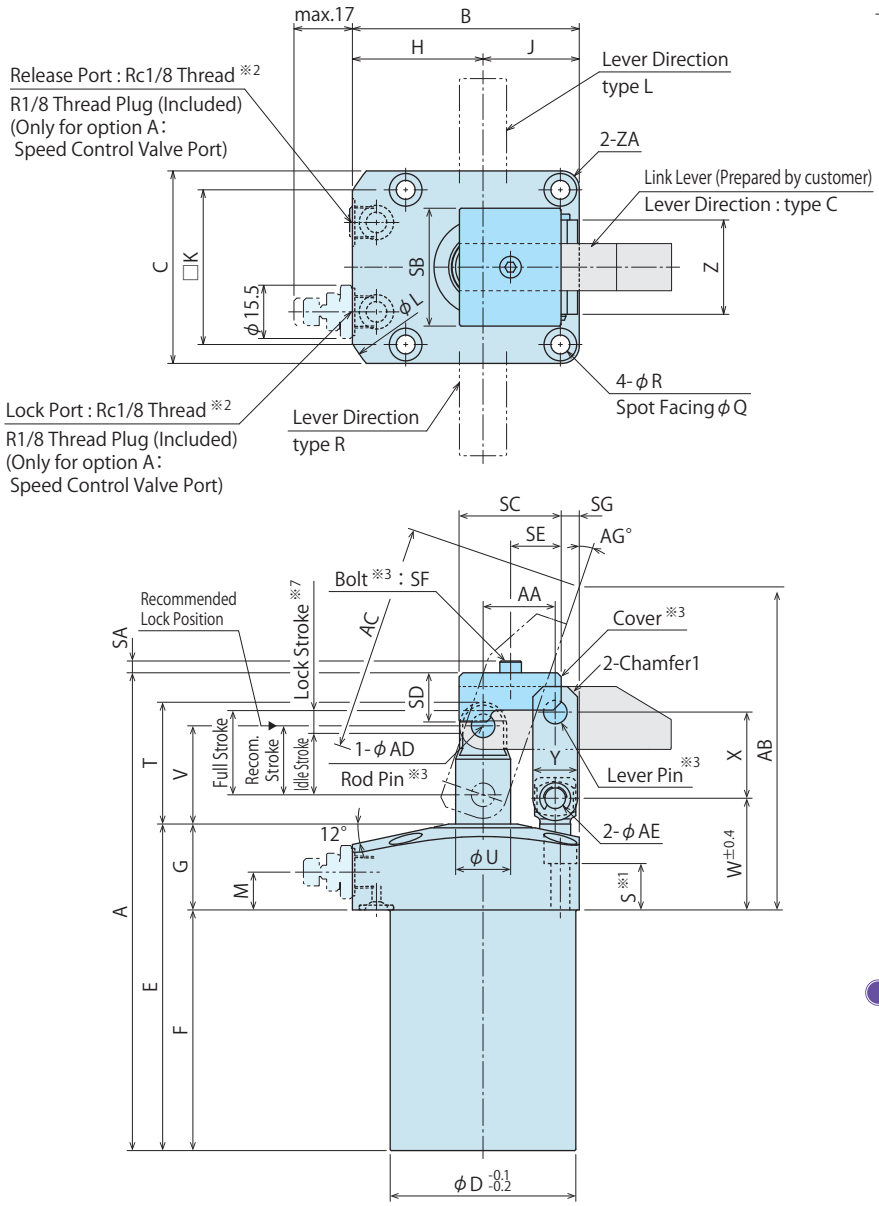
| Model No. | WCE0602-2□□N | WCE1002-2□□N | WCE1602-2□□N | WCE2502-2□□N | WCE4002-2□□N |
|---|---|---|---|---|---|
| Full Stroke | 19.5 | 22 | 23.5 | 27.5 | 33 |
| (Break down) Idle Stroke | 16 | 18 | 19.5 | 23.5 | 29 |
| (Break down) Lock Stroke ※8 | 3.5 | 4 | 4 | 4 | 4 |
| Recommended Stroke | 17.5 | 20 | 21.5 | 25.5 | 31 |
| A | 111.5 | 123 | 134.5 | 157.5 | 184 |
| B | 54 | 60 | 66 | 76 | 87 |
| C | 45 | 50 | 56 | 66 | 78 |
| D | 40 | 46 | 54 | 64 | 77 |
| E | 79.5 | 88 | 94.5 | 109.5 | 124.5 |
| F | 54.5 | 63 | 69.5 | 79.5 | 94.5 |
| G | 25 | 25 | 25 | 30 | 30 |
| H | 31.5 | 35 | 38 | 43 | 48 |
| J | 22.5 | 25 | 28 | 33 | 39 |
| K | 34 | 39 | 45 | 53 | 65 |
| L | 72 | 79 | 88 | 98 | 113 |
| M | 11 | 11 | 11 | 11 | 11 |
| Nx | 26 | 28 | 31 | 36 | 41 |
| Ny | 9 | 10 | 13 | 15 | 20 |
| P | max. $\phi$3 | max. $\phi$5 | max. $\phi$5 | max. $\phi$5 | max. $\phi$5 |
| Q | 9.5 | 9.5 | 9.5 | 11 | 11 |
| R | 5.5 | 5.5 | 5.5 | 6.8 | 6.8 |
| S | 15.5 | 14 | 13.5 | 16 | 15 |
| T | 28.5 | 31.5 | 36 | 40 | 50.5 |
| U | 10 | 12 | 14 | 16 | 20 |
| V | 24 | 27 | 30 | 34 | 42.5 |
| W | 31 | 31 | 32.5 | 37.5 | 40.5 |
| X | 20.5 | 23.5 | 26 | 32.5 | 39.5 |
| Y | 11 | 11 | 13 | 16 | 18 |
| Z | 19 | 19 | 21 | 28 | 37 |
| Chamfer1 | C2.5 | C2.5 | C3 | C3 | C5 |
| AA | 16 | 19.5 | 21 | 25 | 30 |
| AB | 76.1 | 72 | 76.5 | 92.2 | 105.7 |
| AC | 49.8 | 46.9 | 50.9 | 62.7 | 74.7 |
| AD | 5 | 5 | 6 | 6 | 8 |
| AE | 5 | 5 | 6 | 8 | 10 |
| AG | 21.6° | 26.5° | 26.4° | 26.1° | 25.2° |
| CA (Nominal × Pitch) | M5×0.8 | M5×0.8 | M5×0.8 | M6×1 | M6×1 |
| NA | 40 | 43.5 | 45 | 50 | 55 |
| NB | 42 | 49 | 49 | 59 | 59 |
| NC | 12.5 | 14 | 13.5 | 14.5 | 15.5 |
| ND | 16 | 15 | 17 | 20 | 22 |
| NE | 19.5 | 23.5 | 23.5 | 28.5 | 28.5 |
| NF | 30 | 38 | 38 | 48 | 48 |
| Snap Ring (Included) | STW-20 | STW-28 | STW-28 | STW-38 | STW-38 |
| ZA (Chamfer) | C3 | R5 | R5 | R6 | R6 |
| O-ring (Piping Option A/G) | 1BP5 | 1BP7 | 1BP7 | 1BP7 | 1BP7 |
| Weight ※9 kg | 0.7 | 0.8 | 1.1 | 1.8 | 2.7 |

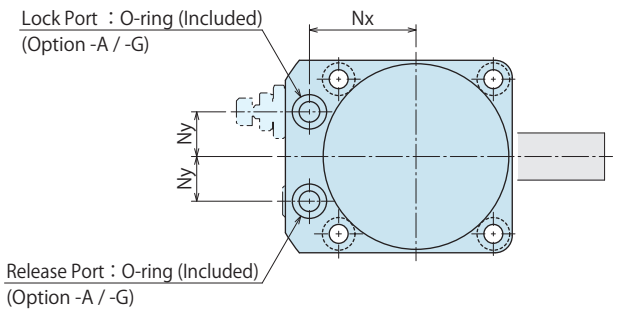
Notes: ※8. The specification value of cylinder force, clamping force and holding force is fulfilled only when clamping within the lock stroke range.
(The specification value is not fulfilled when clamping within the range of idle stroke.)
※9. It shows the weight of single clamp without the link lever.

## External Dimensions

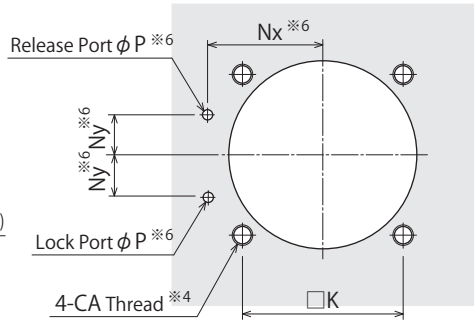
A：Gasket Option
(Speed Control Valve Corresponding Option, Include R Thread Plug)

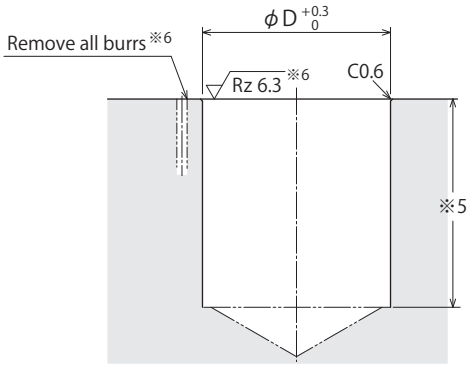
※The drawing shows the locked state of WCE-2AC-A.




## 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'.

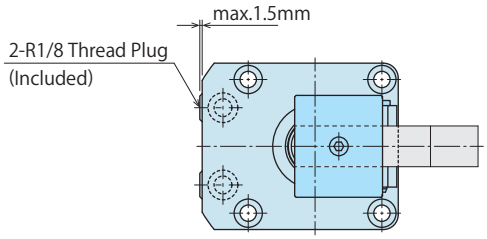
※5. The depth of the body mounting hole φD should be decided according to the mounting height referring to dimension 'F'.

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

## Piping Method

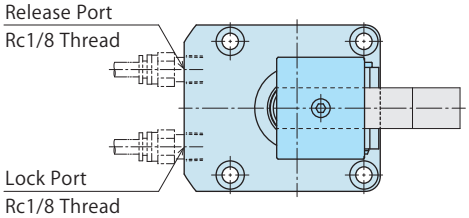
G：Gasket Option (with R Thread Plug)

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




S：Piping Option (Rc Thread)

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




Notes：

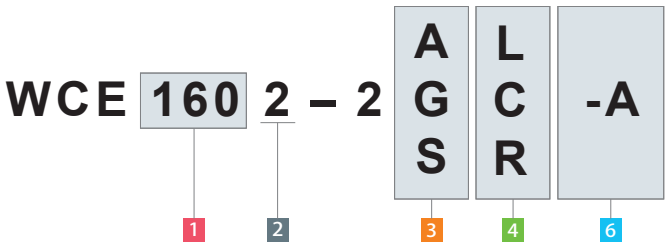
※1. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.

※2. Speed control valve is sold separately. Please refer to P.309.

※3. Tightening Kit (LZK□-W) including the cover (with bolt), rod pin and lever pin is sold separately.

## Model No. Indication

(Format Example：WCE1002-2AR-A, WCE2502-2SL-A)




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

Note :
1. When selecting 6 Option **A**, unlike **Blank**, the lever mounting pin is not included.

## External Dimensions and Machining Dimensions for Mounting

(mm)

| Model No. | WCE0602-2□□-A | WCE1002-2□□-A | WCE1602-2□□-A | WCE2502-2□□-A | WCE4002-2□□-A |
|---|---|---|---|---|---|
| Full Stroke | 19.5 | 22 | 23.5 | 27.5 | 33 |
| (Breakdown) Idle Stroke | 16 | 18 | 19.5 | 23.5 | 29 |
| (Breakdown) Lock Stroke ※7 | 3.5 | 4 | 4 | 4 | 4 |
| Recommended Stroke | 17.5 | 20 | 21.5 | 25.5 | 31 |
| A | 114.7 | 126.2 | 137.7 | 162 | 188.5 |
| B | 54 | 60 | 66 | 76 | 87 |
| C | 45 | 50 | 56 | 66 | 78 |
| D | 40 | 46 | 54 | 64 | 77 |
| E | 79.5 | 88 | 94.5 | 109.5 | 124.5 |
| F | 54.5 | 63 | 69.5 | 79.5 | 94.5 |
| G | 25 | 25 | 25 | 30 | 30 |
| H | 31.5 | 35 | 38 | 43 | 48 |
| J | 22.5 | 25 | 28 | 33 | 39 |
| K | 34 | 39 | 45 | 53 | 65 |
| L | 72 | 79 | 88 | 98 | 113 |
| M | 11 | 11 | 11 | 11 | 11 |
| Nx | 26 | 28 | 31 | 36 | 41 |
| Ny | 9 | 10 | 13 | 15 | 20 |
| P | max. ϕ3 | max. ϕ5 | max. ϕ5 | max. ϕ5 | max. ϕ5 |
| Q | 9.5 | 9.5 | 9.5 | 11 | 11 |
| R | 5.5 | 5.5 | 5.5 | 6.8 | 6.8 |
| S | 15.5 | 14 | 13.5 | 16 | 15 |
| T | 28.5 | 31.5 | 36 | 40 | 50.5 |
| U | 10 | 12 | 14 | 16 | 20 |
| V | 24 | 27 | 30 | 34 | 42.5 |
| W | 31 | 31 | 32.5 | 37.5 | 40.5 |
| X | 20.5 | 23.5 | 26 | 32.5 | 39.5 |
| Y | 11 | 11 | 13 | 16 | 18 |
| Z | 19 | 19 | 21 | 28 | 37 |
| Chamfer 1 | C2.5 | C2.5 | C3 | C3 | C5 |
| AA | 16 | 19.5 | 21 | 25 | 30 |
| AB | 76.1 | 72 | 76.5 | 92.2 | 105.7 |
| AC | 49.8 | 46.9 | 50.9 | 62.7 | 74.7 |
| AD | 5 | 5 | 6 | 6 | 8 |
| AE | 5 | 5 | 6 | 8 | 10 |
| AG | 21.6° | 26.5° | 26.4° | 26.1° | 25.2° |
| CA (Nominal × Pitch) | M5×0.8 | M5×0.8 | M5×0.8 | M6×1 | M6×1 |
| SA | 3 | 3 | 3 | 3 | 4 |
| SB | 24 | 24 | 26 | 35 | 45 |
| SC | 21 | 21 | 24 | 29 | 34.5 |
| SD | 10.7 | 10.7 | 11.2 | 17.5 | 20.5 |
| SE | 11 | 11 | 12.5 | 16.5 | 18.5 |
| SF | M3×0.5×6 | M3×0.5×6 | M3×0.5×6 | M3×0.5×8 | M4×0.7×8 |
| SG | 5.5 | 4 | 7 | 7.5 | 9 |
| ZA (Chamfer) | C3 | R5 | R5 | R6 | R6 |
| O-ring (Piping Option A/G) | OR NBR-90 P5-N | OR NBR-90 P7-N | OR NBR-90 P7-N | OR NBR-90 P7-N | OR NBR-90 P7-N |
| Weight ※8 kg | 0.5 | 0.6 | 0.9 | 1.4 | 2.3 |

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.

## Air Sensing Option (Action Confirmation Method･･･M：Air Sensing Manifold Option / N：Air Sensing Piping Option)

Action confirmation can be conducted by detecting differential pressure with the air catch sensor connected to the lock confirmation port and the release confirmation port.

Applicable Model

WCE 160 2 - 2 [A/G/S] [L/C/R] [M/N]

5 Action Confirmation Method
：When M/N is chosen

### About Air Catch Sensor

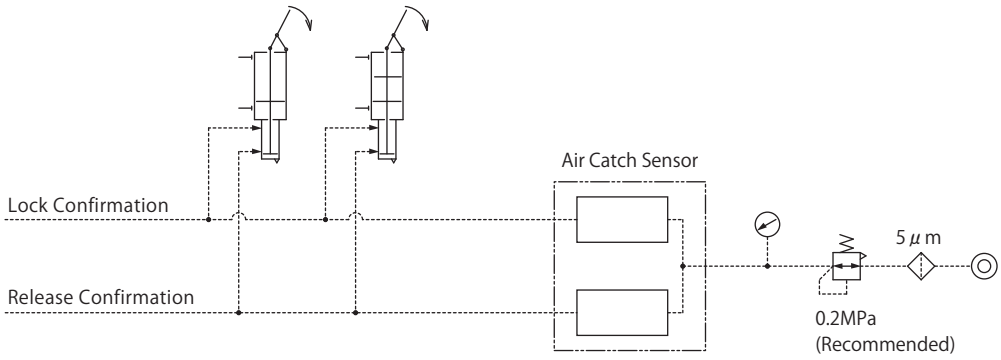
Requires an air catch sensor to confirm piston rod actions.

Recommended Operating Air Pressure : 0.2 MPa

Recommended Air Catch Sensor

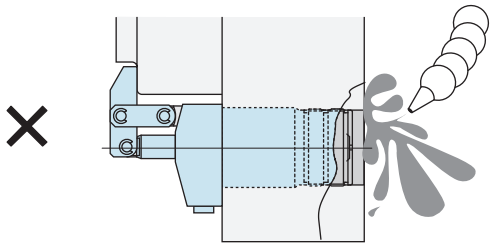
| Maker | SMC | CKD |
|---|---|---|
| Name | Air Catch Sensor | Gap Switch |
| Model No. | ISA3-G | GPS3-E |

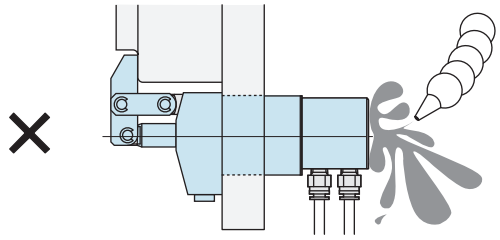
In order to carry out stabilized detection, the number of clamps connected per air catch sensor should be no more than 4.
The air pressure to the air catch sensor should be 0.2MPa.
Refer to the drawing below for the air circuit structure.




### Notes for Use and Installation

- Please keep clear condition at the air vent port, and prevent coolant and chips from entering the port.
  The air catch sensor can malfunction if the air vent port is blocked.

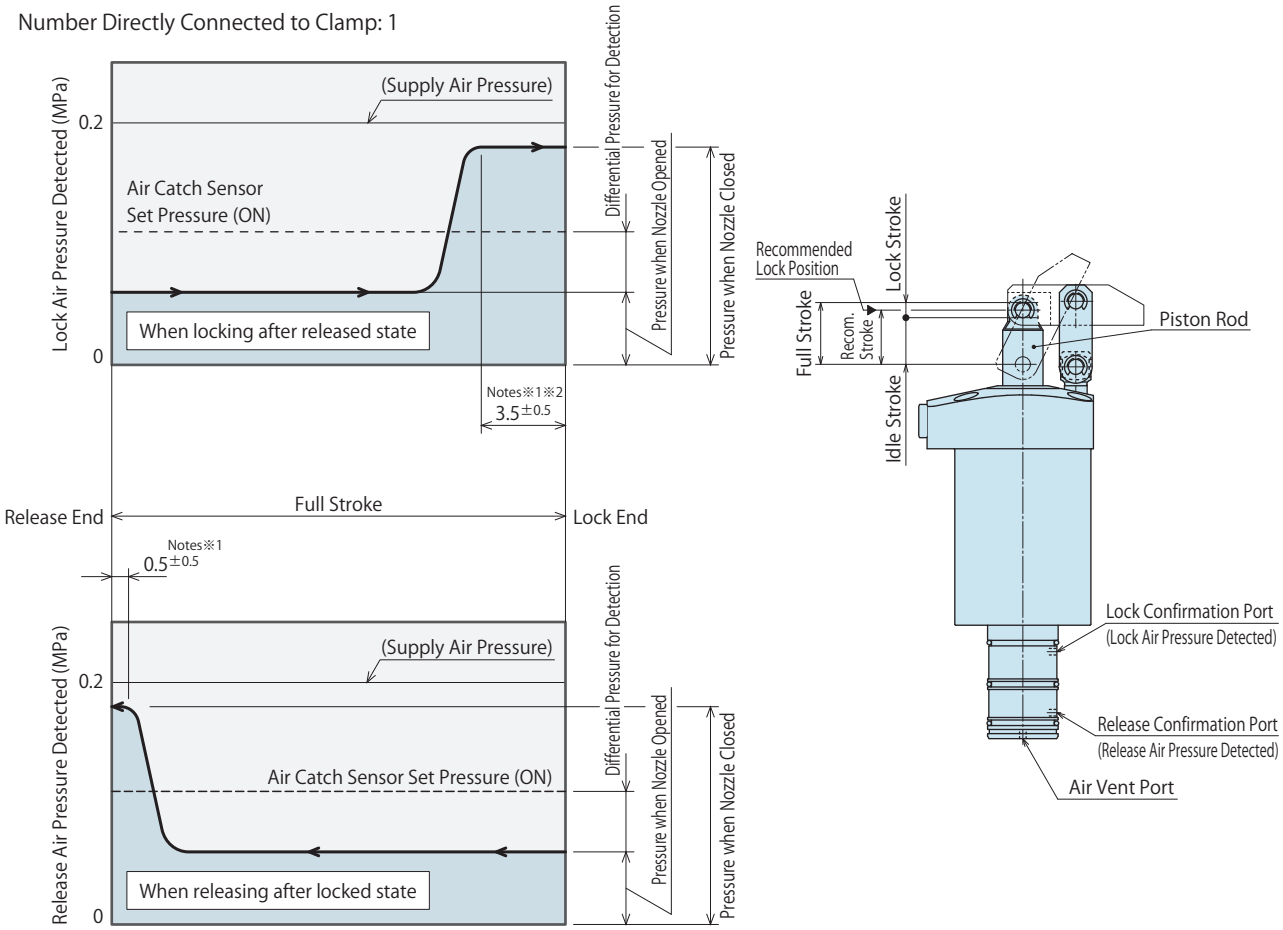




- Apply adequate amounts of grease on O-ring of the clamp before installation.
  O-ring can be twisted or damaged in the dry state.
  If too much amount of grease is applied, the air catch sensor can malfunction due to overflow grease blocking the detection port.

## Air Sensing Chart

Number Directly Connected to Clamp: 1




Notes :

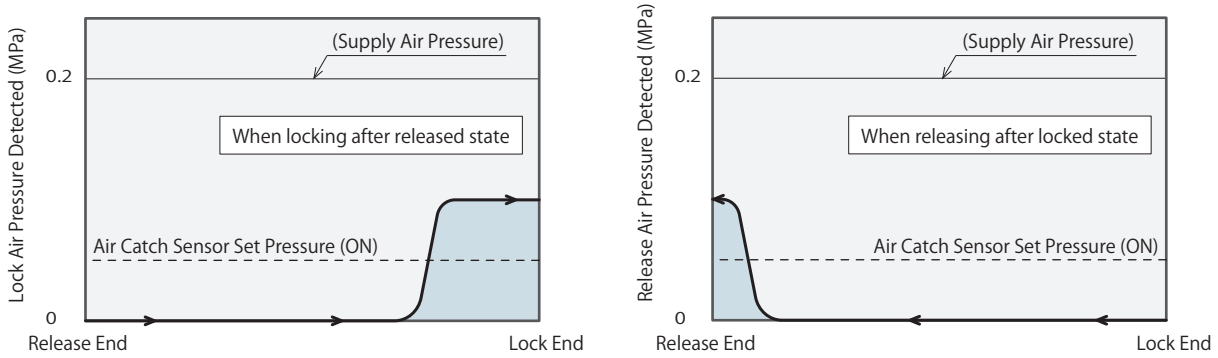
1. The sensing chart shows the relationship between the cylinder stroke and detection circuit air pressure.
2. The location of a signal from air sensor output varies depending on the sensor setting.
3. The detection pressure varies depending on the number of clamps connected per circuit. (Maximum number of clamps connected: 4)
4. The features may vary depending on the air circuit structure. Please contact us for further information.

※1. There is certain tolerance with regard to the position where the pressure for fully closing the detection nozzle is reached depending on the clamp structure. (Refer to the sensing chart.)

※2. WCE0602-2□□M/N : the position where the pressure for fully closing the detection nozzle is $3.0^{\pm 0.5}$ mm.

| Model No. | | WCE0602-2□□M/N | WCE1002-2□□M/N | WCE1602-2□□M/N | WCE2502-2□□M/N | WCE4002-2□□M/N |
|---|---|---|---|---|---|---|
| Full Stroke | mm | 19.5 | 22 | 23.5 | 27.5 | 33 |

Number Directly Connected to Clamp: 4 (for reference)



## Link Lever Design Dimension

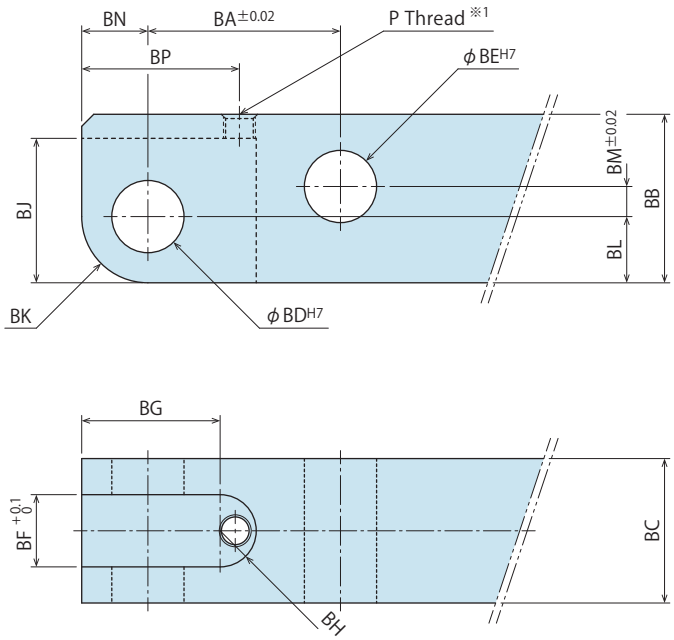
※ Reference for designing link lever.

Model No.

WCE □ 2 - (A G S / L C R / Blank D M N) - (Blank A)

1 Body Size

6 Option




## Calculation List of Link Lever Design Dimension

(mm)

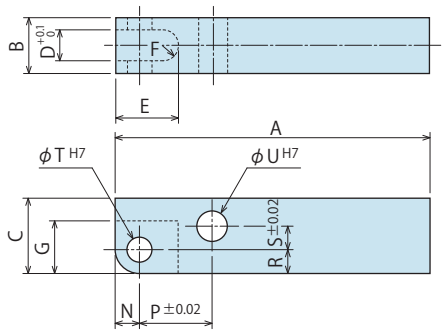
| Corresponding Model No. | WCE0452 | WCE0602 | WCE1002 | WCE1602 | WCE2502 | WCE4002 |
|---|---|---|---|---|---|---|
| BA | 14.5 | 16 | 19.5 | 21 | 25 | 30 |
| BB | 11 | 12.5 | 12.5 | 16 | 20 | 25 |
| BC | 8 $^{0}_{-0.1}$ | 10 $^{0}_{-0.2}$ | 10 $^{0}_{-0.2}$ | 12 $^{0}_{-0.3}$ | 16 $^{0}_{-0.3}$ | 19 $^{0}_{-0.3}$ |
| BD | 4 $^{+0.012}_{0}$ | 5 $^{+0.012}_{0}$ | 5 $^{+0.012}_{0}$ | 6 $^{+0.012}_{0}$ | 6 $^{+0.012}_{0}$ | 8 $^{+0.015}_{0}$ |
| BE | 4 $^{+0.012}_{0}$ | 5 $^{+0.012}_{0}$ | 5 $^{+0.012}_{0}$ | 6 $^{+0.012}_{0}$ | 8 $^{+0.015}_{0}$ | 10 $^{+0.015}_{0}$ |
| BF | 4.5 | 5 | 5 | 6 | 8 | 10 |
| BG | 8.5 | 10 | 10 | 13 | 13 | 17 |
| BH | R2.25 | R2.5 | R2.5 | R3 | R4 | R5 |
| BJ | 8.5 | 10 | 10 | 13 | 13 | 17.5 |
| BK | R4 | R4.5 | R4.5 | R6 | R6 | R8 |
| BL | 4 | 4.5 | 4.5 | 6 | 6 | 8 |
| BM | 2.5 | 2.5 | 2.5 | 3.5 | 6 | 7.5 |
| BN | 4 | 4.5 | 4.5 | 6 | 6 | 8 |
| BP | - | 10.5 | 14.5 | 14.5 | 15 | 19.5 |
| P (Nominal×Pitch×Depth)※1 | - | M3×0.5 Through Hole | M3×0.5×4 | M3×0.5 Through Hole | M3×0.5×6 | M4×0.7 Through Hole |

Notes :

1. Link lever should be designed with its length according to 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. For 6 Option **Blank**, use the attached pin (equivalent to ϕADf6, ϕAEf6, HRC60) as the lever mounting pin.
   (Refer to external dimensions of the clamp body for the dimensions of ϕAD, ϕAE.)
4. For 6 Option **A**, the lever mounting pin is not included in the clamp.
   Please order Tightening Kit for Quick Change Lever Option A (LZK□-W).

※1. Machining of P Thread is required only when using Tightening Kit for Quick Change Lever Option A (LZK□-W).

## Accessories : Material Link Lever




Model No. Indication

**WCZ 160 0 – L2**

160: Size (Refer to following table)
0: Design No. (Revision Number)
L2

(mm)

| Model No. | WCZ0450-L2 | WCZ0600-L2 | WCZ1000-L2 | WCZ1600-L2 | WCZ2500-L2 | WCZ4000-L2 |
|---|---|---|---|---|---|---|
| Corresponding Model No. | WCE0452 | WCE0602 | WCE1002 | WCE1602 | WCE2502 | WCE4002 |
| A | 80 | 80 | 90 | 100 | 115 | 140 |
| B | 8 $^{0}_{-0.1}$ | 10 $^{0}_{-0.2}$ | 10 $^{0}_{-0.2}$ | 12 $^{0}_{-0.3}$ | 16 $^{0}_{-0.3}$ | 19 $^{0}_{-0.3}$ |
| C | 11 | 12.5 | 12.5 | 16 | 20 | 25 |
| D | 4.5 | 5 | 5 | 6 | 8 | 10 |
| E | 10.75 | 12.5 | 12.5 | 16 | 17 | 22 |
| F | R2.25 | R2.5 | R2.5 | R3 | R4 | R5 |
| G | 8.5 | 10 | 10 | 13 | 13 | 17.5 |
| N | 4 | 4.5 | 4.5 | 6 | 6 | 8 |
| P | 14.5 | 16 | 19.5 | 21 | 25 | 30 |
| R | 4 | 4.5 | 4.5 | 6 | 6 | 8 |
| S | 2.5 | 2.5 | 2.5 | 3.5 | 6 | 7.5 |
| T | 4 $^{+0.012}_{0}$ | 5 $^{+0.012}_{0}$ | 5 $^{+0.012}_{0}$ | 6 $^{+0.012}_{0}$ | 6 $^{+0.012}_{0}$ | 8 $^{+0.015}_{0}$ |
| U | 4 $^{+0.012}_{0}$ | 5 $^{+0.012}_{0}$ | 5 $^{+0.012}_{0}$ | 6 $^{+0.012}_{0}$ | 8 $^{+0.015}_{0}$ | 10 $^{+0.015}_{0}$ |

Notes :

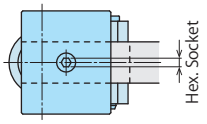
1. Material S45C Surface Finishing : Alkaline Blackening
2. If necessary, the front end should be additionally machined and finished.
3. For 6 Option **Blank**, use the attached pin (equivalent to φADf6, φAEf6, HRC60) as the lever mounting pin.
4. For 6 Option **A**, the lever mounting pin is not included in the clamp.
   Please order Tightening Kit for Quick Change Lever Option A (LZK□-W).
5. When using Tightening Kit for Quick Change Lever Option A (LZK□-W), a tapped hole should be additionally machined.
   Refer to the link lever design dimensions (P Thread part) for additional machining.

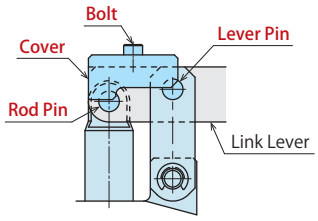
## Accessories : Tightening Kit for Quick Change Lever Option A

Model No. Indication

**LZK 040 0 – W**

040: Size (Refer to the table.)
0: Design No. (Revision Number)
W




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

【Contents of Tightening Kit】
・Cover (with Bolt) ・Rod Pin ・Lever Pin

| Model No. | LZK0360-W | LZK0400-W | LZK0550-W | LZK0650-W |
|---|---|---|---|---|
| Corresponding Model No. | WCE0602-□-A<br>WCE1002-□-A | WCE1602-□-A | WCE2502-□-A | WCE4002-□-A |
| Nominal×Pitch of Bolt | M3×0.5 | M3×0.5 | M3×0.5 | M4×0.7 |
| Hex. Socket mm | 2.5 | 2.5 | 2.5 | 3 |
| Tightening Torque N•m | 1.3 | 1.3 | 1.3 | 3.2 |

## Accessories：Others

● We offer other accessories shown below.

### Air Flow Control Valve
Model **BZW-A**

※Please use BZW□-A for WCE.

Refer to P.309 for detail.

### Manifold Block
Model **WHZ-MD**

Refer to P.1335 for detail.

# Cautions

## Notes for Design

1) Check Specifications

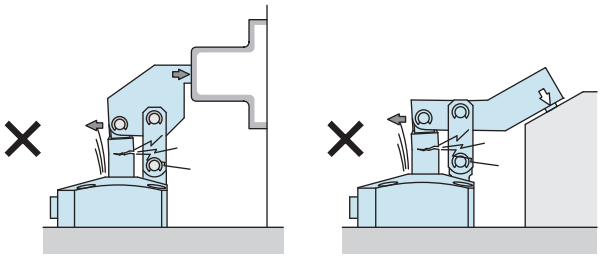
- Please use each product according to the specifications.
- The mechanical lock mechanism of this clamp has the clamping force and holding force even when air pressure drops to 0MPa. (Refer to "Clamping Force and Holding Force Curve at 0MPa".)

2) Notes for Circuit Design

- Ensure there is no possibility of supplying air pressure to the lock port and the release port simultaneously.

3) Notes for Link Lever Design

- Make sure no force is applied to the piston rod except from the axial direction. (Make sure the clamp surface and the mounting surface on the workpiece are parallel.) The usage like the one shown in the drawing below will apply a large bending stress to the piston rod and must be avoided.

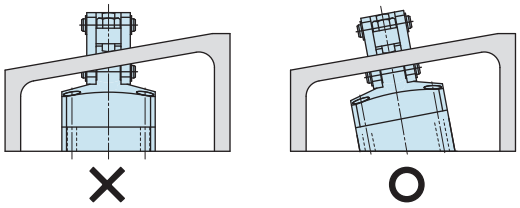


4) Protect the exposed area of the piston rod when using on a welding fixture.

- If spatter attaches to the sliding surface it could lead to malfunction and fluid leakage.

5) When clamping on a sloped surface of the workpiece

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

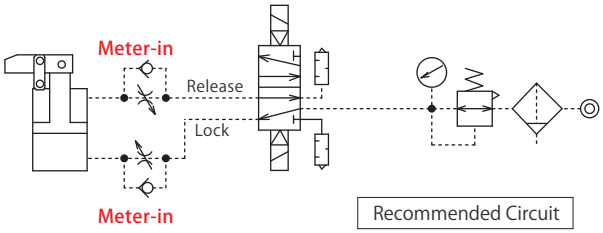


6) When using in a dry environment.

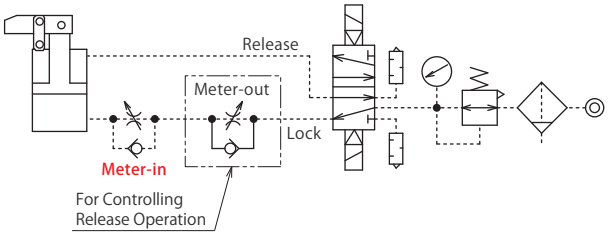
- The link pin can be dried out. Grease it periodically or use a special pin. Contact us for the specifications for the special pin.

7) Speed Adjustment

- If the clamp operates too fast the parts will be worn 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.)



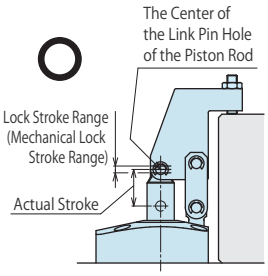

Please set one speed controller (meter-in) to each clamp when operating multiple clamps simultaneously.
When large thrust force is applied to the releasing direction in releasing action, install a meter-out speed controller to the lock port side for speed adjustment.




8) 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.




※ The actual stroke for WCE0602 should be −1.5mm ~ +2mm of recommended lock position.

## Cautions

### 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) Procedure before 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.

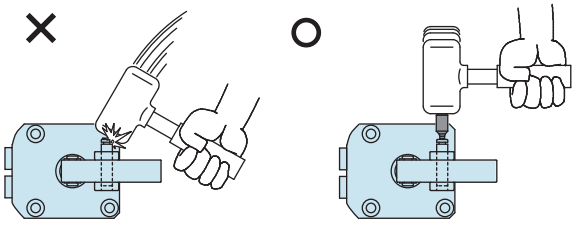
3) Applying Sealing Tape
- Wrap with tape 1 to 2 times following the screwing direction.
  Wrapping in the wrong direction will cause air leakage and malfunction.
- Pieces of the sealing tape can lead to air leakage and malfunction.
- When piping, be careful that contaminants such as sealing tape do 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 list below. Tightening with greater torque than recommended can dent the seating surface or break the bolt.

| Model No. | Mounting Bolt Size | Tightening Torque (N·m) |
|---|---|---|
| **WCE0452** | M4×0.7 | 3.2 |
| **WCE0602** | M5×0.8 | 6.3 |
| **WCE1002** | M5×0.8 | 6.3 |
| **WCE1602** | M5×0.8 | 6.3 |
| **WCE2502** | M6×1 | 10 |
| **WCE4002** | M6×1 | 10 |

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

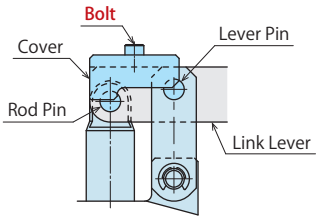
6) Installation / Removal of the Link Lever
- When inserting the link pin, do not hit the pin directly with a hammer. When using a hammer to insert the pin, always use a cover plate with a smaller diameter than the snap ring groove on the pin.



- Tighten the bolt for Quick Change Lever Option A with the torque shown below.

Quick Change Lever Option A

| Model No. | Bolt Thread Size | Tightening Torque (N·m) |
|---|---|---|
| **WCE0602-2□□-A** | M3×0.5 | 1.3 |
| **WCE1002-2□□-A** | M3×0.5 | 1.3 |
| **WCE1602-2□□-A** | M3×0.5 | 1.3 |
| **WCE2502-2□□-A** | M3×0.5 | 1.3 |
| **WCE4002-2□□-A** | M4×0.7 | 3.2 |




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 be worn out leading to premature damage and ultimately complete equipment failure.
- Turn the speed control valve gradually from the low-speed side (small flow) to the high-speed side (large flow) to adjust the speed.

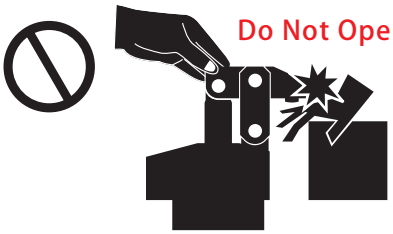
8) Checking Looseness and Retightening
- At the beginning of the machine installation, bolts may be tightened lightly. Check looseness and re-tighten as required.

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.

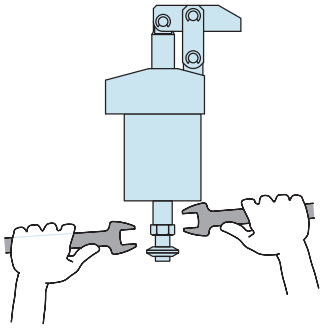



10) Cautions for Trial Operation

- 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.

11) Notes on Double End Rod Option for Dog (-D)

- When installing a dog, secure the dog and prevent any rotation or torque on the piston rod, and fix the square part of the rod end with a spanner. Tightening torque for screw parts are shown below.



| Model No. | Thread Size | Tightening Torque (N·m) |
|---|---|---|
| **WCE0602–2□□D** | M4×0.7 | 3.2 |
| **WCE1002–2□□D** | M5×0.8 | 6.3 |
| **WCE1602–2□□D** | M5×0.8 | 6.3 |
| **WCE2502–2□□D** | M6×1 | 10 |
| **WCE4002–2□□D** | M6×1 | 10 |

※ Please refer to P.1357 for common cautions. • Notes on Handling • Maintenance/Inspection • Warranty

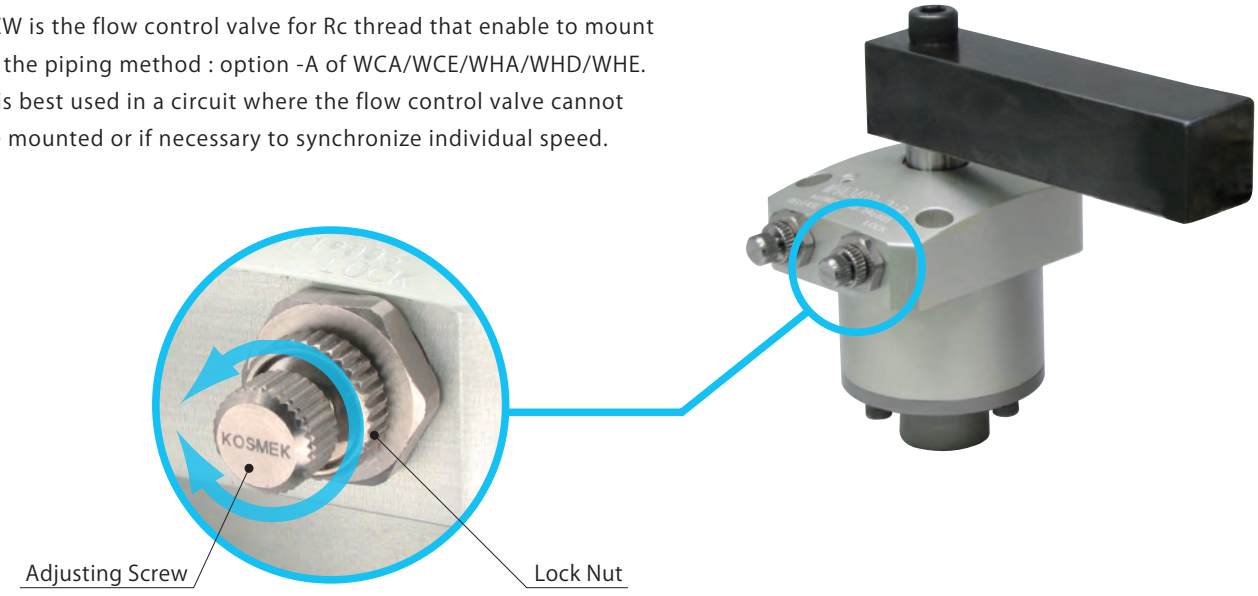
# Air Flow Control Valve

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 WCA/WCE/WHA/WHD/WHE. 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

| Clamps | BZW Model No. | Clamp Model No. |
|---|---|---|
| High-Power Pneumatic Link Clamp | BZW0100-**A** | **WCE**□2-2**A**□ |
| High-Power Pneumatic Swing Clamp | BZW0100-**B** | WHE□0-2**A**□ |
| Pneumatic Swing Clamp | | WHA□0-2**A**□ |
| Double Piston Pneumatic Swing Clamp | | WHD□0-2**A**□ |
| Pneumatic Link Clamp | | WCA□1-2**A**□ |

Corresponding to piping method -A option.

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

## Model No. Indication

**BZW 010 0 – B**

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

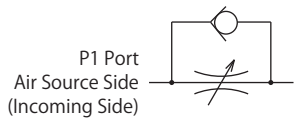
※ Select **A** : Meter-in when using BZW for WCE.

## Specifications

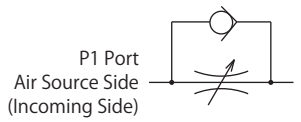
| Model No. | BZW0100-B | BZW0100-A |
|---|---|---|
| Control Method | Meter-out | Meter-in |
| Operating Pressure MPa | 0.1 ~ 1.0 | |
| Withstanding Pressure MPa | 1.5 | |
| Adjusting Screw Number of Rotations | 10 | |
| Tightening Torque N•m | 5 ~ 7 | |
| Weight g | 13 | 13 |
| Corresponding Model No. | WHE□0-2A□<br>WHA□0-2A□<br>WHD□0-2A□<br>WCA□1-2A□ | WCE□2-2A□ |

## Circuit Symbol

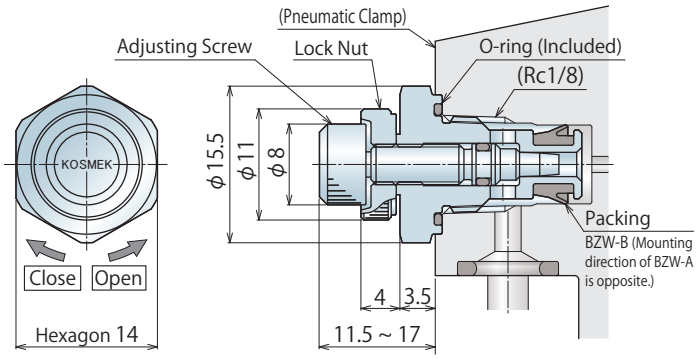
### BZW0100-B : Meter-out



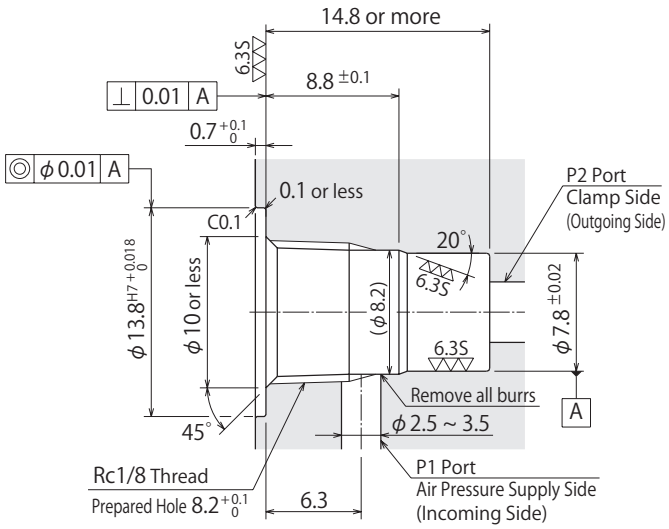

### BZW0100-A : Meter-in




## External Dimensions

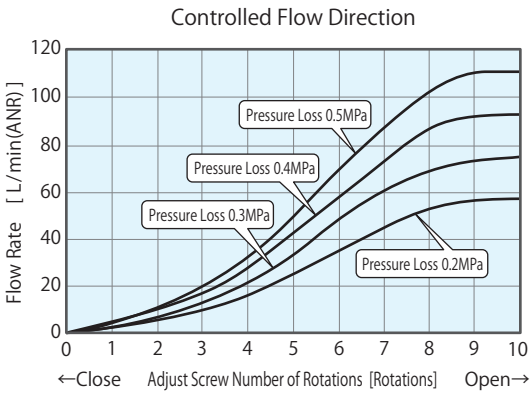


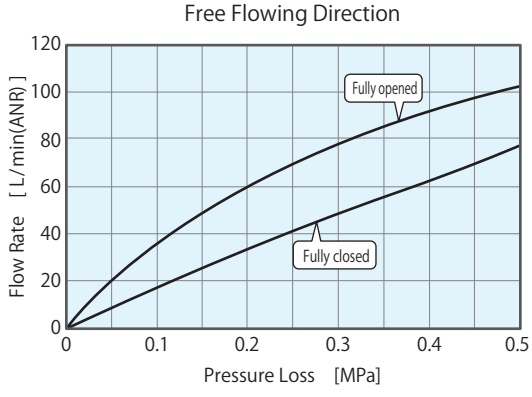

## Machining Dimensions of Mounting Area




## Flow Rate Graph

### BZW0100-B/BZW0100-A common




Notes :

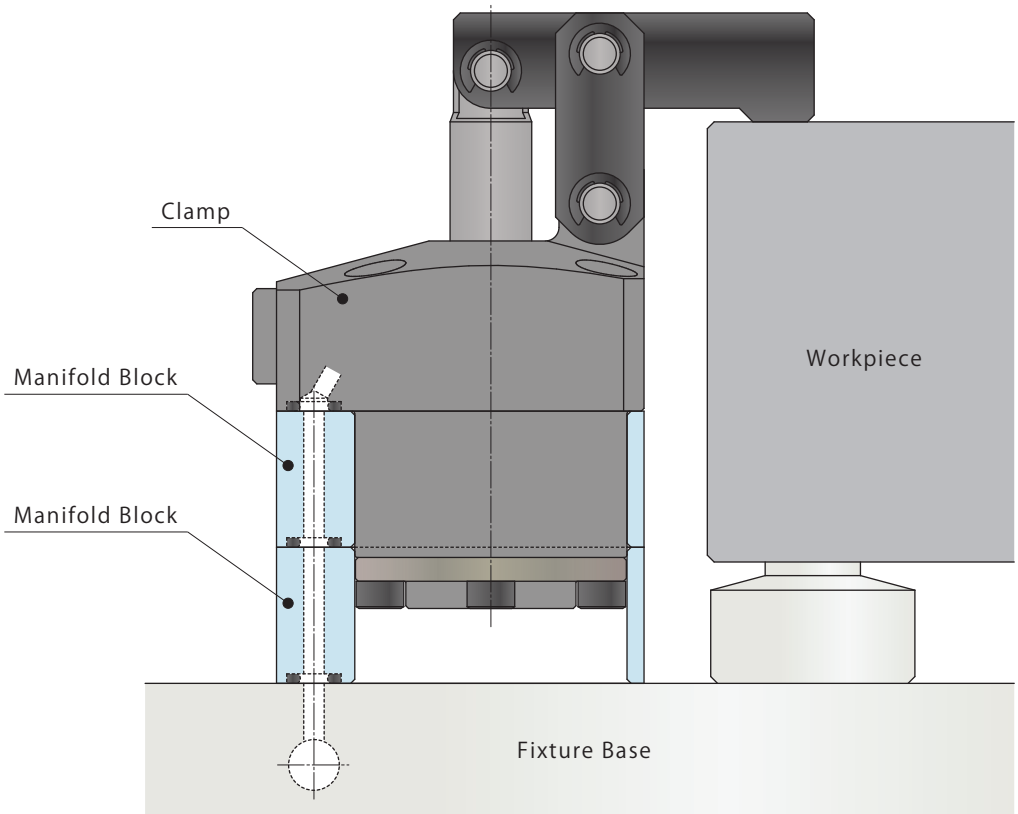
1. Since the ▽▽▽ area is sealing part, be careful not to damage it.
2. No cutting chips or burr shoud be at the tolerance part of machining hole.
3. As shown in the drawing, P1 port is used as the air supply side and P2 port as the clamp side.

# Manifold Block

Model WHZ-MD
Model LZY-MD
Model LZ-MS
Model LZ-MP
Model TMZ-1MB
Model TMZ-2MB
Model DZ-MG□
Model DZ-MS□


## Manifold Block

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

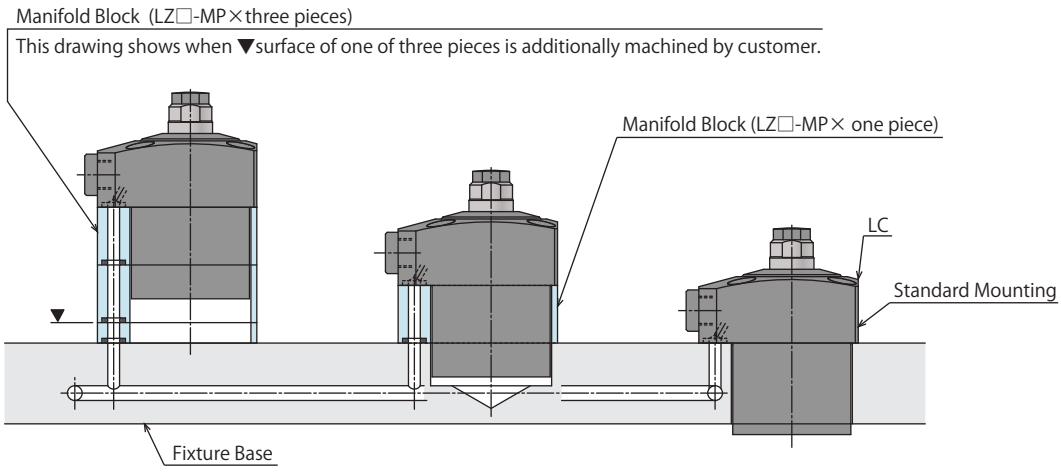


## Applicable Model

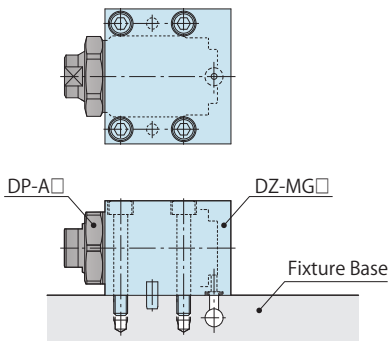
| Manifold Block Model No. | Corresponding Item Model No. |
|---|---|
| Model WHZ-MD | Model WCA, Model WHA, Model WCE, Model WHE |
| Model LZY-MD | Model LKA, Model LKE, Model LHC, Model LHS, Model LKC, Model LHA, Model LHE, Model LL |
| Model LZ-MS | Model LJ, Model LG, Model LM, Model LT |
| Model LZ-MP | Model LC, Model TC |
| Model TMZ-1MB | Model TMA-1 |
| Model TMZ-2MB | Model TMA-2 |
| Model DZ-MG□/MS□ | Model DP |

## Application Examples

### Work Support (LC) Application Example




### Push Cylinder (DP) Application Example

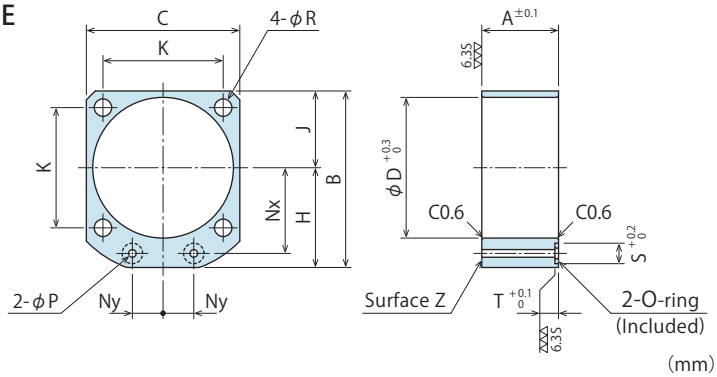


## Manifold Block for WCA/WCE/WHA/WHE

Model No. Indication

**WHZ 048 0 – MD**

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




(mm)

| Model No. | WHZ0450-MD | WHZ0600-MD | WHZ0320-MD | WHZ0400-MD | WHZ0500-MD | WHZ0630-MD |
|---|---|---|---|---|---|---|
| Corresponding Model No. | WCE0452 WHE0450 | WCE0602 WHE0600 | WCA0321 WCE1002 WHA0320 WHE1000 | WCA0401 WCE1602 WHA0400 WHE1600 | WCA0501 WCE2502 WHA0500 WHE2500 | WCA0631 WCE4002 WHA0630 WHE4000 |
| A | 20 | 23 | 25 | 27 | 31 | 35 |
| B | 49 | 54 | 60 | 67 | 77 | 88.5 |
| C | 40 | 45 | 50 | 58 | 68 | 81 |
| D | 36 | 40 | 46 | 54 | 64 | 77 |
| H | 29 | 31.5 | 35 | 38 | 43 | 48 |
| J | 20 | 22.5 | 25 | 29 | 34 | 40.5 |
| K | 31.4 | 34 | 39 | 45 | 53 | 65 |
| Nx | 23.5 | 26 | 28 | 31 | 36 | 41 |
| Ny | 8 | 9 | 10 | 13 | 15 | 20 |
| P | 3 | 3 | 5 | 5 | 5 | 5 |
| R | 4.5 | 5.5 | 5.5 | 5.5 | 6.5 | 6.5 |
| S | 8 | 8 | 10 | 10 | 10 | 10 |
| T | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| O-ring | 1BP5 | 1BP5 | 1BP7 | 1BP7 | 1BP7 | 1BP7 |
| Weight kg | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 |

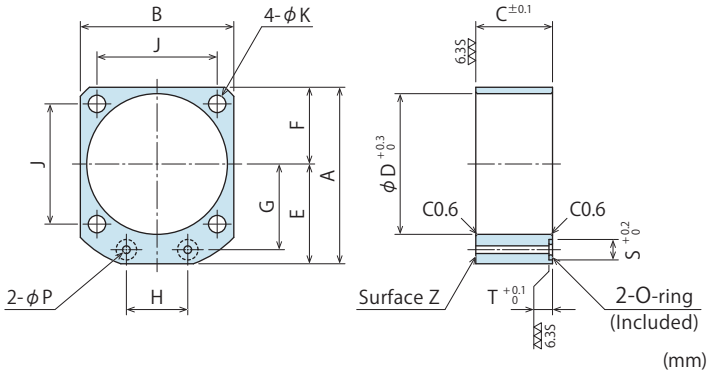
Notes : 1. Material : A2017BE-T4 Surface Finishing : Zircon Finishing (Zirconium Chemical Conversion Treatment)
2. Mounting bolts are not provided. Prepare mounting bolts according to the mounting height using the dimension A as a reference.
3. For other block thickness (dim. A), machine the surface Z or design a block referring to the drawing and apply surface treatment if necessary.

## Manifold Block for LKA/LKC/LKE/LHA/LHC/LHE/LHS/LL

Model No. Indication

**LZY 048 0 – MD**

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




(mm)

| Model No. | LZY0360-MD | LZY0400-MD | LZY0480-MD | LZY0550-MD | LZY0650-MD | LZY0750-MD | LZY0900-MD | LZY1050-MD |
|---|---|---|---|---|---|---|---|---|
| Corresponding Model No. | LKA0360 / LKE0360 LHA0360 / LHC0360 LHE0360 / LHS0360 LL0360 | LKA0400 / LKC0400 LKE0400 / LHA0400 LHC0400 / LHE0400 LHS0400 / LL0400 | LKA0480 / LKC0480 LKE0480 / LHA0480 LHC0480 / LHE0480 LHS0480 / LL0480 | LKA0550 / LKC0550 LKE0550 / LHA0550 LHC0550 / LHE0550 LHS0550 / LL0550 | LKA0650 / LKC0650 LHA0650 / LHC0650 LHS0650 LL0650 | LKA0750 LHA0750 LHS0750 LL0750 | LKA0900 LHA0900 LHS0900 LL0900 | LKA1050 LHA1050 LHS1050 LL1050 |
| A | 49 | 54 | 61 | 69 | 81 | 92 | 107 | 122 |
| B | 40 | 45 | 51 | 60 | 70 | 80 | 95 | 110 |
| C | 20 | 20 | 27 | 30 | 32 | 37 | 45 | 50 |
| D | 36 | 40 | 48 | 55 | 65 | 75 | 90 | 105 |
| E | 29 | 31.5 | 35.5 | 39 | 46 | 52 | 59.5 | 67 |
| F | 20 | 22.5 | 25.5 | 30 | 35 | 40 | 47.5 | 55 |
| G | 23.5 | 26 | 30 | 33.5 | 39.5 | 45 | 52.5 | 60 |
| H | 16 | 18 | 22 | 24 | 30 | 32 | 37 | 45 |
| J | 31.4 | 34 | 40 | 47 | 55 | 63 | 75 | 88 |
| K | 4.5 | 5.5 | 5.5 | 6.8 | 6.8 | 9 | 11 | 14 |
| P | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 |
| S | 8 | 8 | 8 | 8 | 10 | 10 | 10 | 10 |
| T | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| O-ring | 1BP5 | 1BP5 | 1BP5 | 1BP5 | 1BP7 | 1BP7 | 1BP7 | 1BP7 |
| Weight kg | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.8 | 1.2 | 1.7 |

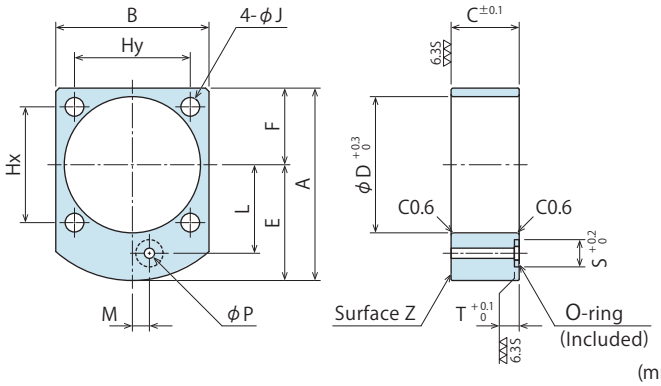
Notes : 1. Material : S45C Surface Finishing : Alkaline Blackening
2. Mounting bolts are not provided. Prepare mounting bolts according to the mounting height using the dimension C as a reference.
3. For other block thickness (dim. C), machine the surface Z or design a block referring to the drawing and apply surface treatment if necessary.

## Manifold Block for LJ/LM/LG/LT

Model No. Indication

**LZ 048 0 – MS**

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




(mm)

| Model No. | LZ0300-MS | LZ0360-MS | LZ0400-MS | LZ0480-MS | LZ0550-MS | LZ0650-MS | LZ0750-MS | LZ0900-MS | LZ1050-MS |
|---|---|---|---|---|---|---|---|---|---|
| Corresponding Model No. | LG0301 / LT0301 LJ0302 / LM0300 | LG036□ / LT036□ LJ0362 / LM0360 | LG040□ / LT040□ LJ0402 / LM0400 | LG048□ / LT048□ LJ0482 / LM0480 | LG055□ / LT055□ LJ0552 / LM0550 | LG065□ / LT065□ LJ0652 / LM0650 | LG075□ / LT075□ LJ0752 / LM0750 | LG090□ LJ0902 | LG105□ LJ1052 |
| A | 48 | 51.5 | 56.5 | 62 | 70 | 82 | 93 | 107 | 122 |
| B | 34 | 40 | 45 | 51 | 60 | 70 | 80 | 95 | 110 |
| C | 18 | 20 | 20 | 27 | 30 | 32 | 37 | 45 | 50 |
| D | 30 | 36 | 40 | 48 | 55 | 65 | 75 | 90 | 105 |
| E | 28.5 | 31.5 | 34 | 36.5 | 40 | 47 | 53 | 59.5 | 67 |
| F | 19.5 | 20 | 22.5 | 25.5 | 30 | 35 | 40 | 47.5 | 55 |
| Hx | 30 | 31.4 | 34 | 40 | 47 | 55 | 63 | 75 | 88 |
| Hy | 23 | 31.4 | 34 | 40 | 47 | 55 | 63 | 75 | 88 |
| J | 4.5 | 4.5 | 5.5 | 5.5 | 6.8 | 6.8 | 9 | 11 | 14 |
| L | 20.5 | 23.5 | 26 | 30 | 33.5 | 39.5 | 45 | 52.5 | 60 |
| M | 3 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| P | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 |
| S | 8 | 8 | 8 | 8 | 8 | 10 | 10 | 10 | 10 |
| T | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| O-ring | 1BP5 | 1BP5 | 1BP5 | 1BP5 | 1BP5 | 1BP7 | 1BP7 | 1BP7 | 1BP7 |
| Weight kg | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.8 | 1.2 | 1.7 |

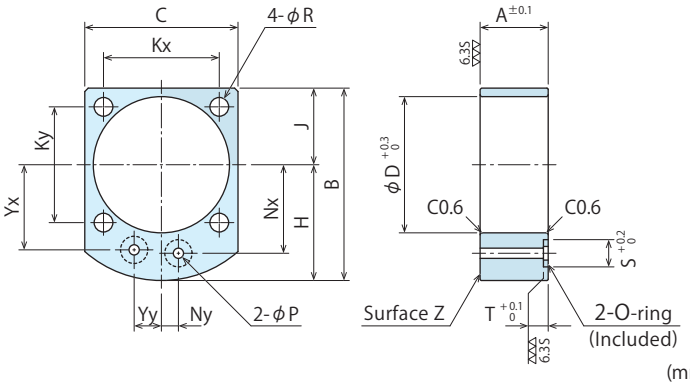
Notes : 1. Material : S45C Surface Finishing : Alkaline Blackening
2. Mounting bolts are not provided. Prepare mounting bolts according to the mounting height using the dimension C as a reference.
3. For other block thickness (dim. C), machine the surface Z or design a block referring to the drawing and apply surface treatment if necessary.

## Manifold Block for LC/TC

Model No. Indication

**LZ 048 0 – MP**

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




(mm)

| Model No. | LZ0260-MP | LZ0300-MP | LZ0360-MP | LZ0400-MP | LZ0480-MP | LZ0550-MP | LZ0650-MP | LZ0750-MP | LZ0900-MP |
|---|---|---|---|---|---|---|---|---|---|
| Corresponding Model No. | LC0262 | LC0302 | LC0362 | LC0402 / TC0402 | LC0482 / TC0482 | LC0552 / TC0552 | LC0652 / TC0652 | LC0752 / TC0752 | LC0902 |
| A | 18 | 18 | 20 | 20 | 27 | 30 | 32 | 37 | 45 |
| B | 43 | 48 | 51.5 | 56.5 | 62 | 70 | 82 | 93 | 107 |
| C | 29 | 34 | 40 | 45 | 51 | 60 | 70 | 80 | 95 |
| D | 26 | 30 | 36 | 40 | 48 | 55 | 65 | 75 | 90 |
| H | 26.5 | 28.5 | 31.5 | 34 | 36.5 | 40 | 47 | 53 | 59.5 |
| J | 16.5 | 19.5 | 20 | 22.5 | 25.5 | 30 | 35 | 40 | 47.5 |
| Kx | 25 | 30 | 31.4 | 34 | 40 | 47 | 55 | 63 | 75 |
| Ky | 21 | 23 | 31.4 | 34 | 40 | 47 | 55 | 63 | 75 |
| Nx | 18.5 | 20.5 | 23.5 | 26 | 30 | 33.5 | 39.5 | 45 | 52.5 |
| Ny | 3 | 3 | 5 | 5 | 0 | 0 | 0 | 0 | 0 |
| R | 3.4 | 4.5 | 4.5 | 5.5 | 5.5 | 6.8 | 6.8 | 9 | 11 |
| Yx | 18.5 | 20.5 | 23.5 | 25 | 28 | 31 | 37 | 42.5 | 50 |
| Yy | 7 | 7 | 8 | 8 | 11 | 13 | 14 | 15 | 15 |
| P | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 5 |
| S | 8 | 8 | 8 | 8 | 8 | 8 | 10 | 10 | 10 |
| T | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| O-ring | 1BP5 | 1BP5 | 1BP5 | 1BP5 | 1BP5 | 1BP5 | 1BP7 | 1BP7 | 1BP7 |
| Weight kg | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.8 | 1.2 |

Notes : 1. Material : S45C Surface Finishing : Alkaline Blackening
2. Mounting bolts are not provided. Prepare mounting bolts according to the mounting height using the dimension A as a reference.
3. For other block thickness (dim. A), machine the surface Z or design a block referring to the drawing and apply surface treatment if necessary.

# Sales Offices

## Sales Offices across the World

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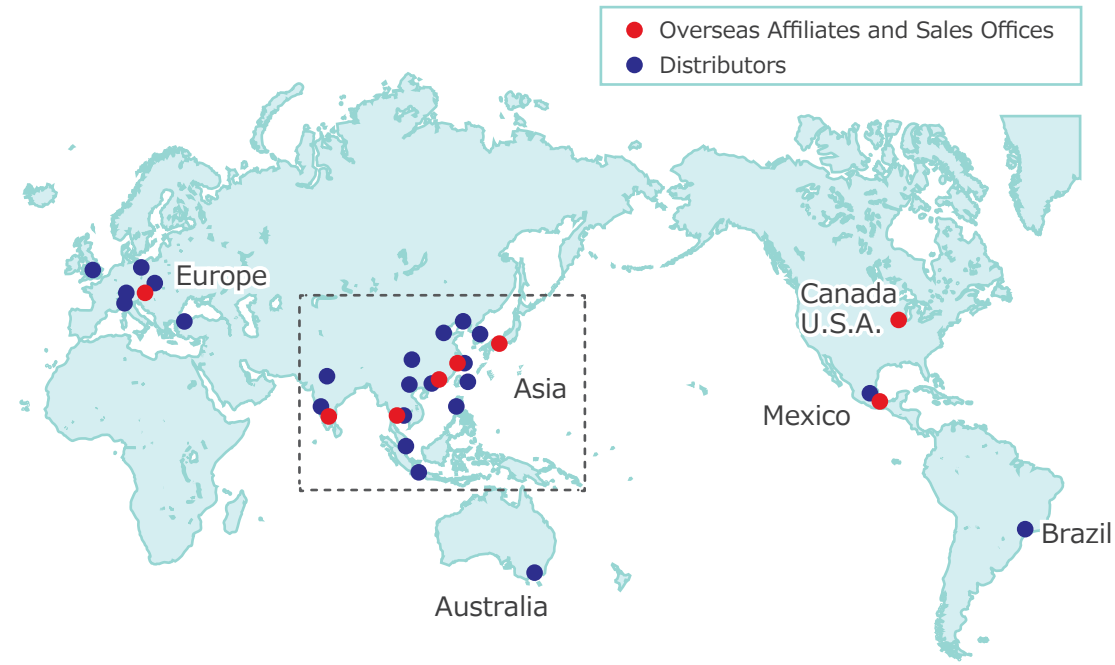
# Global Network




Asia Detailed Map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