Hydraulic Swing Clamp

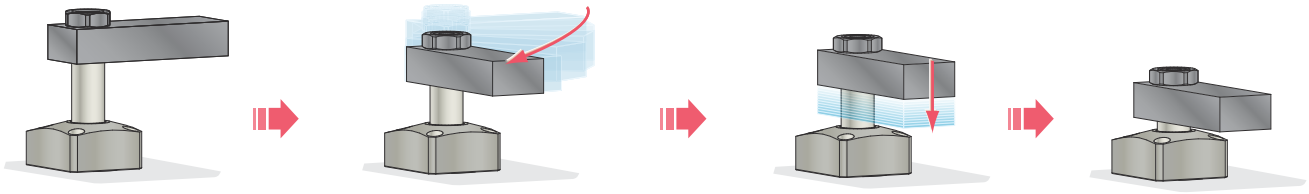
Model LHA
Model LHC
Model LHS
Model LHW
Model LG/LT
Model TLA-2
Model TLA-1
Model TLB-2



High Rigidity • Long Life • High Accuracy

High Speed • High Rigidity • Swing Completion Position Repeatability ±0.5° (±0.75° only for LHS)

Action Description



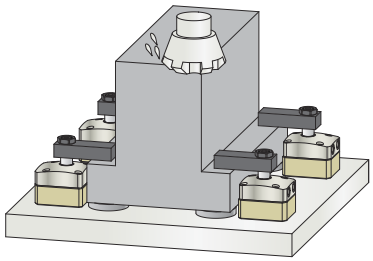
Before Swing
(Released State)

The lever descends as it swings.
(For LHS, the lever swings parallel.)

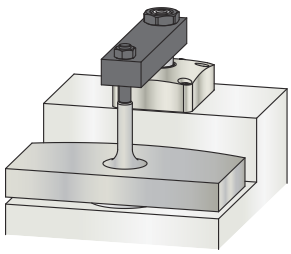
After swing completion,
it descends vertically.

Action completed
(Clamped State)

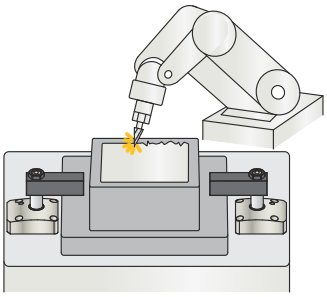
Application Examples



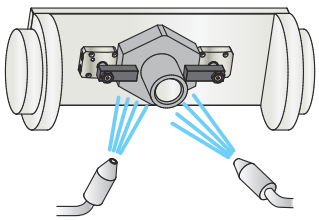
Machining



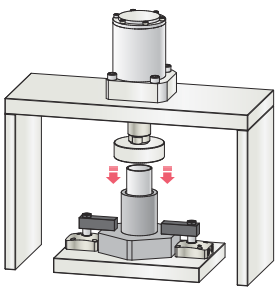
For the applications which require
clamp position repeatability



Deburring



Cleaning



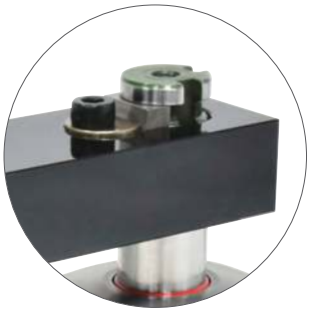
Press Fitting



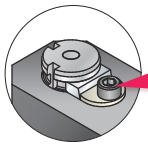
Swing Clamp
Quick Change Lever Option A

Model LHA-A

Only one bolt is required for lever installation and removal.
Allows for the fastest lever setup time.

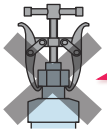


The Fastest Lever Change, with Only One Bolt



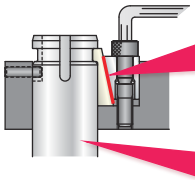
Only One Bolt for Lever Change!

Remove the Lever with One Wrench



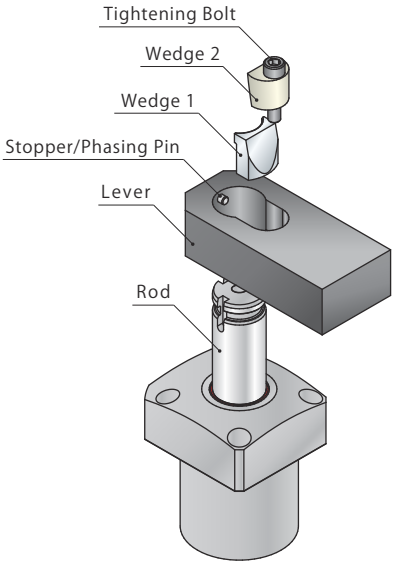
No Special Tools Required! Use One Wrench for Removal!

Secure Lever Tightening Even with Small Torque



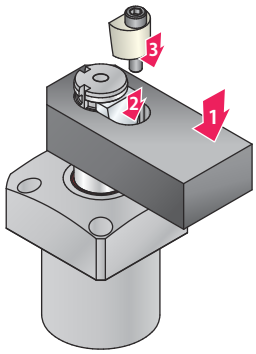
Wedge Mechanism for Lever Tightening with Small Torque

Due to Small Torque, Not Required to Fix the Rod!



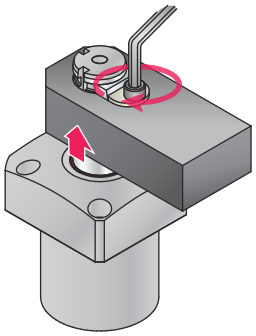
Install the Lever, Wedge1 and 2

- Set Wedge 1 to the slot of the rod.



Tighten the Lever with Tightening Bolt

- Pull the lever towards the wedge side and tighten the tightening bolt with the specified torque.
- When removing the lever, follow the installation procedure reverse to the above.

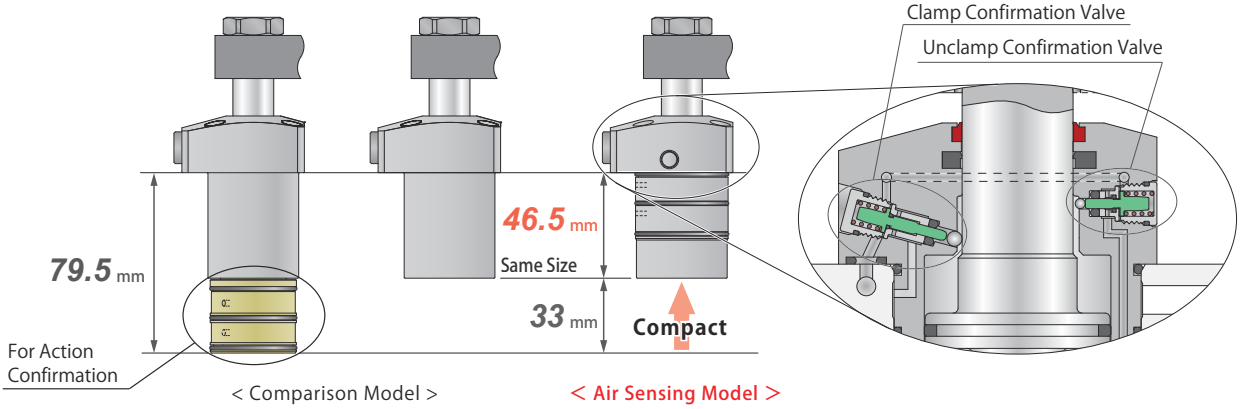




Air Sensing Swing Clamp

Model LHW

Clamp-unclamp confirmation with built-in air catch sensor for smaller footprint fixtures.



< Comparison Model >

LHA0400-C□M
Ability to confirm clamp and unclamp action

LHA0400-C□
No Action Confirmation

< Air Sensing Model >

LHW0401-C□E
Ability to confirm clamp and unclamp action

Low Pressure Model

MAX. 7MPa



Model LHA → P.429



Model LHC → P.463



Model LHS → P.477



Model LHD

Classification			Double Action	Double Action Compact	Double Action Parallel Swing Action	Double Action Double Piston
Operating Pressure Range			1.5 ~ 7MPa	1.5 ~ 7MPa	1.5 ~ 7MPa	1.5 ~ 6MPa
Standard Model			External Dimensions → P.437	External Dimensions → P.471	External Dimensions → P.485	Further information on the website.
Action Confirmation	Double End Rod Option for Dog	 Able to Install Dog	External Dimensions → P.439	—	★	
Action Confirmation	Air Sensing Manifold Option	 Able to Install Air Sensor	External Dimensions → P.441	—	★	
Action Confirmation	Air Sensing Piping Option		External Dimensions → P.443	—	★	
Action Confirmation	Built-in Sensing Valve Model		—	—	—	
Option	Quick Change Lever Option A		External Dimensions → P.445	External Dimensions → P.473	External Dimensions → P.487	
Option	Quick Change Lever Option F		External Dimensions → P.447	★	External Dimensions → P.489	
Option	Balance Lever Option		External Dimensions → P.449	★	External Dimensions → P.491	
Option	Long Stroke Option	 Long	External Dimensions → P.451	—	★	
Option	Swing Angle Selectable Option	 30° 45° 60°	External Dimensions → P.455	★	External Dimensions → P.493	
Accessories	Lever		LZH-T, LZH-F, LZH-B LZH-A, LZH-W → P.461	LZH-T LZH-A, LZH-W → P.476	LZH-T, LZH-F, LZH-B LZH-A, LZH-W → P.497	
Accessories	Manifold Block		LZY-MD → P.1335			
Accessories	Speed Control Valve Plug		BZL, BZX, JZG, BZS → P.947			

※ Please contact us for detail dimension at ★ part.

High Pressure Model

MAX. 35MPa



Model TLA-2 → P.545



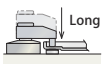
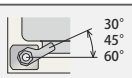
Model TLB-2 → P.571



Model TLA-1 → P.589



Model TLV-2

Classification			Double Action Top Flange	Double Action Bottom Flange	Single Action (Spring Release) Top Flange	Double Action with Action Confirmation
Operating Pressure Range			7 ~ 35MPa	7 ~ 35MPa	7 ~ 35MPa	7 ~ 35MPa
Standard Model			External Dimensions → P.553	External Dimensions → P.579	External Dimensions → P.597	Further information on the website.
Option	Balance Lever Option		External Dimensions → P.557	External Dimensions → P.581	—	
Option	Long Stroke Option	 Long	External Dimensions → P.561	External Dimensions → P.583	—	
Option	Swing Angle Selectable Option	 30° 45° 60°	External Dimensions → P.565	External Dimensions → P.585	—	
Accessories	Lever		TLZ-L2, TLZ-LB → P.569	TLZ-L2, TLZ-LB → P.587	TLZ-L2, TLZ-LB → P.601	
Accessories	Speed Control Valve Plug		BZT, JZG → P.947			
Accessories	G-Thread Fitting		G-Thread Fitting (Made by Ihara Science) → P.1351			

Low Pressure Model

MAX. 7MPa



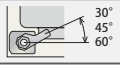
Model **LHW** → P.499



Model **LG/LT** → P.521



Model **LHV**

Classification		Double Action Built-in Sensing Valve	Single Action (Spring Release)	Double Action 1-Port Sensing
Operating Pressure Range		1.5 ~ 7MPa	2.5 ~ 7MPa	1.5 ~ 7MPa
Standard Model		—	External Dimensions → P.531	Further information on the website.
Action Confirmation	Double End Rod Option for Dog 	—	—	
	Air Sensing Manifold Option 	—	—	
	Air Sensing Piping Option	—	—	
	Built-in Sensing Valve Model	External Dimensions → P.511	—	
Option	Quick Change Lever Option A 	External Dimensions → P.517	External Dimensions → P.533	
	Quick Change Lever Option F 	★	External Dimensions → P.535	
	Balance Lever Option 	★	External Dimensions → P.537	
	Long Stroke Option 	—	—	
	Swing Angle Selectable Option 	★	External Dimensions → P.539	
Accessories	Lever 	LZH-T LZH-A, LZH-W → P.520	LZ-LE1, LZ-LE2, LZH-F, LZH-B LZH-A, LZH-W → P.543	
	Manifold Block 	—	LZ-MS → P.1336	
	Speed Control Valve Plug 	BZL, BZX, JZG, BZS → P.947		

※ Please contact us for detail dimension at ★ part.



High-Power Swing Clamp Hydraulic Double Action

Model **LHE**

2 sizes smaller with equivalent clamping force. Mechanical lock and hydraulic pressure allow for strong clamping and holding force.
Refer to P. 11 for further information.

PAT.P.

Air Sensing Swing Clamp

Model LHW

Low Pressure (1.5 ~ 7MPa)

Ideal for automated equipment,

with the built-in action confirmation valve.



Index

Hydraulic Swing Clamp Digest — P.425

Cross Section — P.500

Action Description — P.501

Model No. Indication — P.505

Specifications — P.506

Performance Curve

- Clamping Force Curve — P.507
- Allowable Swing Time Graph — P.509

External Dimensions

- Clamp・Unclamp Confirmation Model (LHW-E) — P.511
- Clamp Confirmation Model (LHW-H) — P.513
- Unclamp Confirmation Model (LHW-J) — P.515
- Quick Change Lever Option A (LHW-A) — P.517

Lever Design Dimensions — P.519

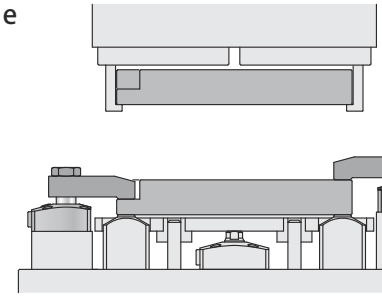
Accessories

- ・Material Swing Lever for LHW — P.520
- ・Speed Control Valve・Plug (Common Items of Other Models) — P.947

Cautions

- Notes for Hydraulic Swing Clamps — P.603
- Cautions (Common) — P.1335
  - ・Installation Notes ・Hydraulic Fluid List ・Notes on Hydraulic Cylinder Speed Control Circuit
  - ・Notes on Handling ・Maintenance/Inspection ・Warranty

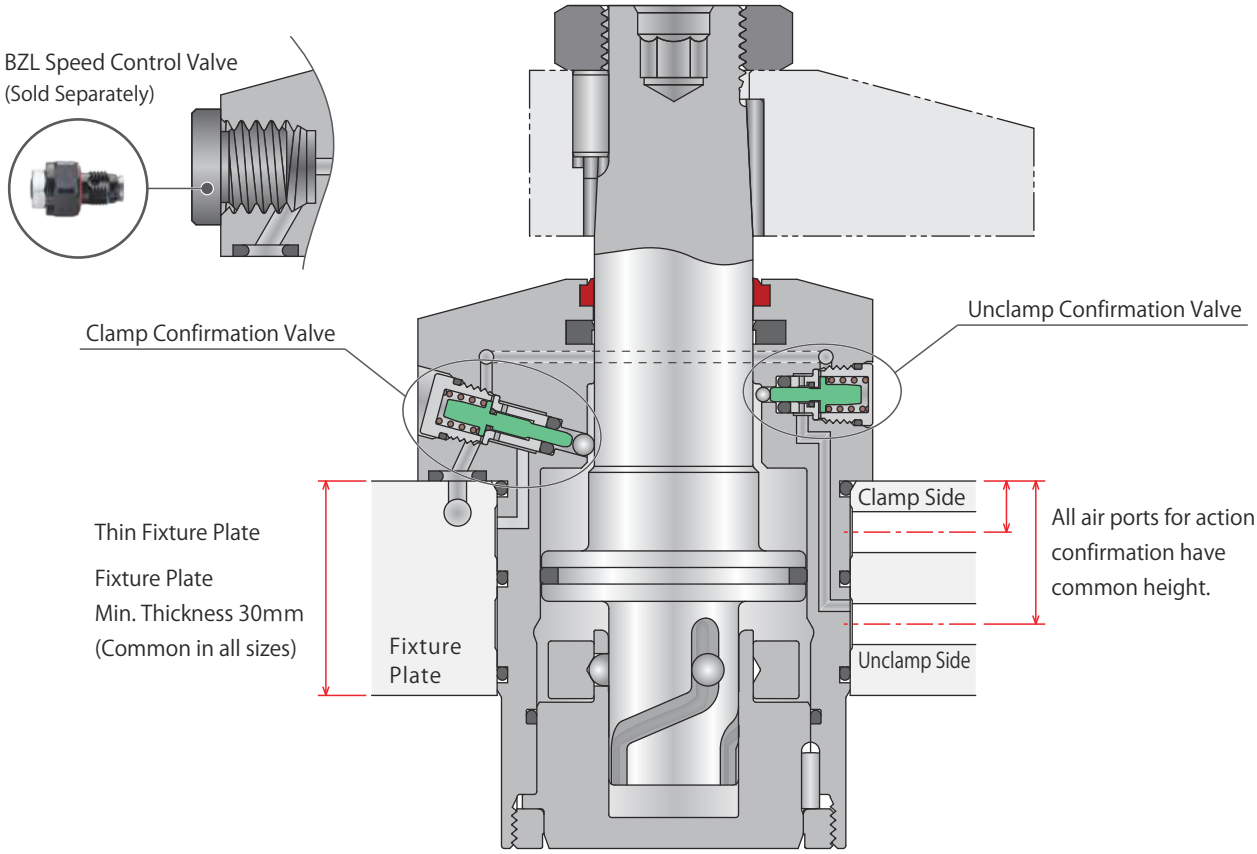
Application Example



For automated setup
requiring action confirmation

Cross Section

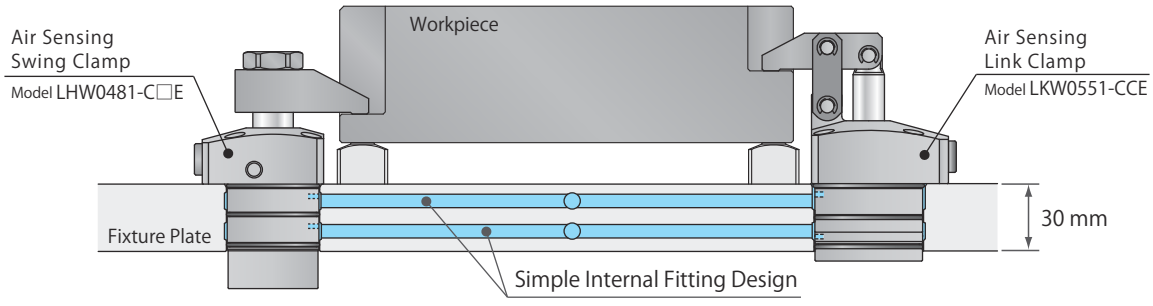
※ This drawing shows clamp - unclamp confirmation model (LHW-C□E).



- Action confirmation allows for safe and secure loading and unloading of workpieces.
- Built-in sensing valves enable for thinner fixture designing.

  Zero air leakage when the valve is closed. Air sensor with limited flow rate is available.
- Simpler Internal Fitting Design

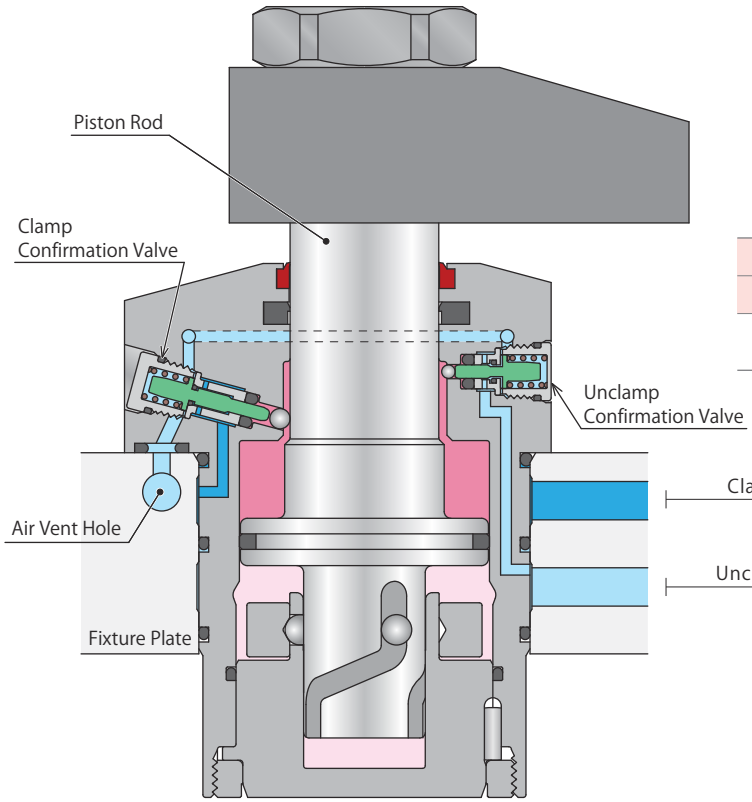
  Common air port height for action confirmation allows for simpler circuit designing as shown below.
  - When using different sizes of swing clamps (Model LHW-C□E).
  - When using swing clamp (Model LHW-C□E) in combination with link clamp (Model LKW-C□E).



Action Description

※ This drawing shows clamp - unclamp confirmation model (LHW-C□E).

Clamp



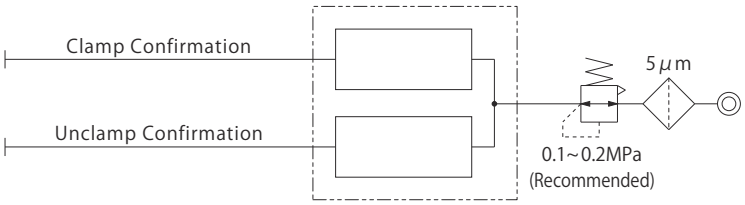
■ **Clamp (Supplying hydraulic pressure to clamp port)**

The piston rod descends as it swings.

↓

After swing action is completed, the piston rod descends vertically and clamps the workpiece.

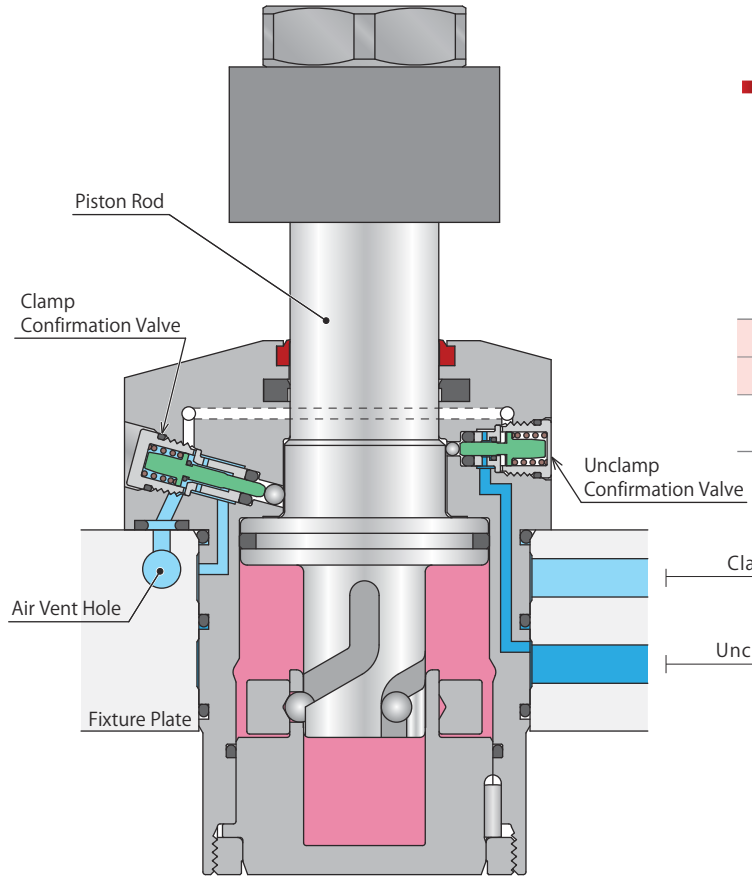
Hydraulic Pressure		Air Catch Sensor	
Clamp Side	Unclamp Side	Clamp Confirmation	Unclamp Confirmation
ON	OFF	ON	OFF



Air Catch Sensor

(Circuit diagram differs depending on the sensor.)

Unclamp



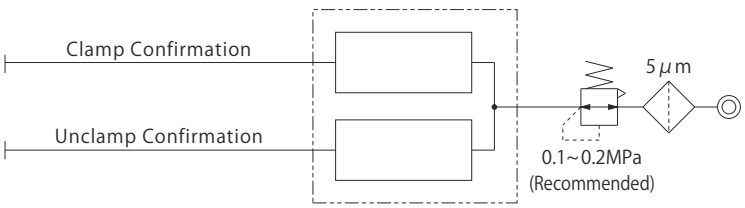
■ **Unclamp (Supplying hydraulic pressure to unclamp port)**

The piston rod ascends vertically (Clamp Stroke Range).

↓

After vertical action is completed, the piston rod ascends as it swings.

Hydraulic Pressure		Air Catch Sensor	
Clamp Side	Unclamp Side	Clamp Confirmation	Unclamp Confirmation
OFF	ON	OFF	ON

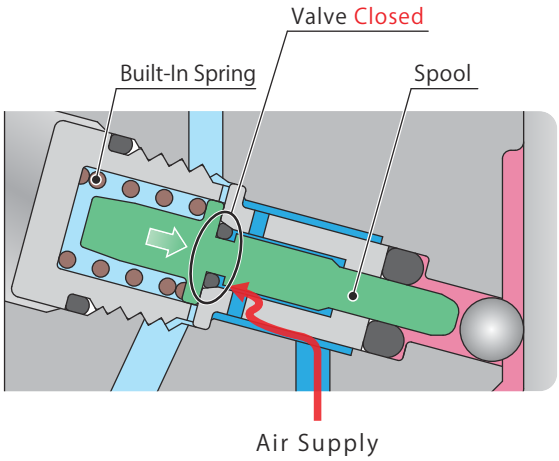


Air Catch Sensor

(Circuit diagram differs depending on the sensor.)

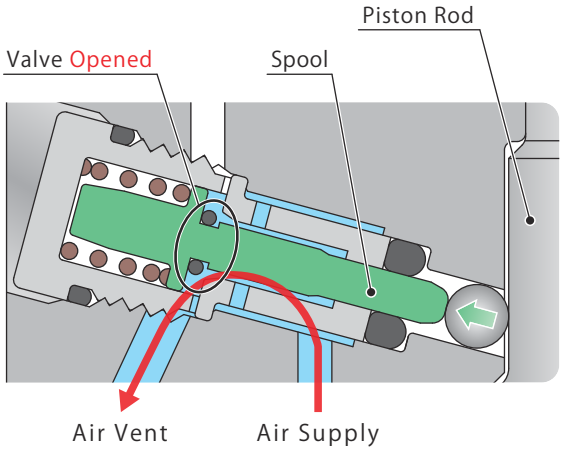
Clamp Confirmation Valve

Hyd. Pressure to Clamp Port Air Catch Sensor **ON**



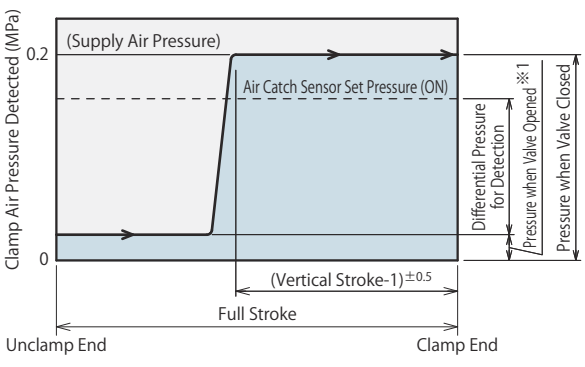
The spool is pushed forward by the built-in spring.
The valve is closed when stroking 1mm after swing stroke.

Hyd. Pressure to Unclamp Port Air Catch Sensor **OFF**



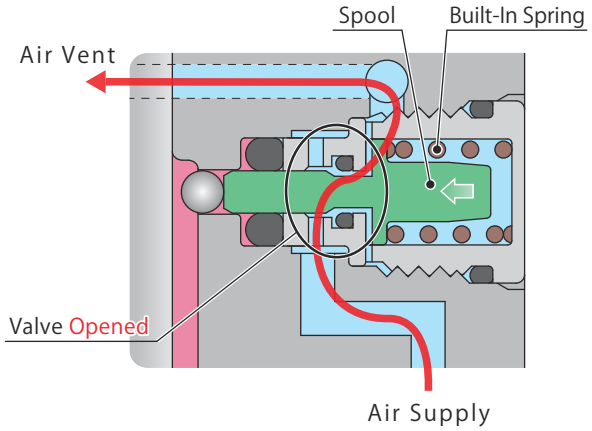
The spool is pushed back by the piston rod, and the valve is opened.

Sensing Chart for Clamp Confirmation



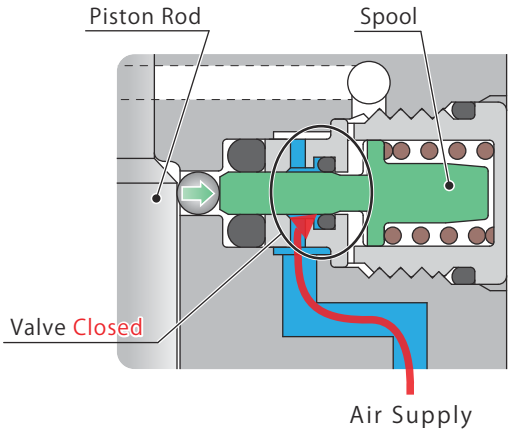
Unclamp Confirmation Valve

Hyd. Pressure to Clamp Port Air Catch Sensor **OFF**



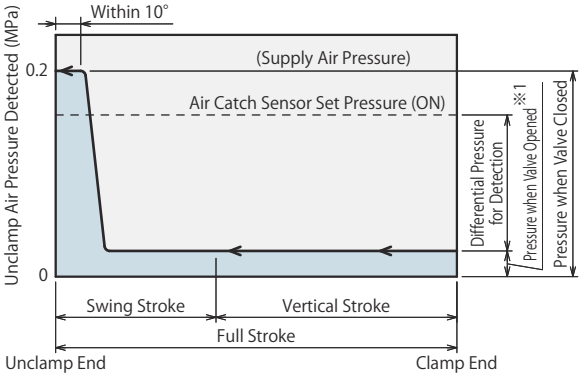
The spool is pushed forward by the built-in spring, and the valve is opened.

Hyd. Pressure to Unclamp Port Air Catch Sensor **ON**



The spool is pushed back by the piston rod, and the valve is closed.

Sensing Chart for Unclamp Confirmation



※1. The sensor pressure for opening the valve depends on the sensor.
With air sensor with large air flow, the sensor pressure for opening the valve is higher and the differential pressure for detection is lower.

Action Description (Air Sensing Chart Explanation)

Action confirmation can be conducted by detecting differential pressure with the built-in valve for air catch sensor.

Applicable Model

LHW 048 1 - C [R/L] [E/H/J] - [Blank/A]

5 Sensing Valve
- E : Clamp - Unclamp Confirmation (Both)
- H : Clamp Confirmation Only
- J : Unclamp Confirmation Only

Air Catch Sensor

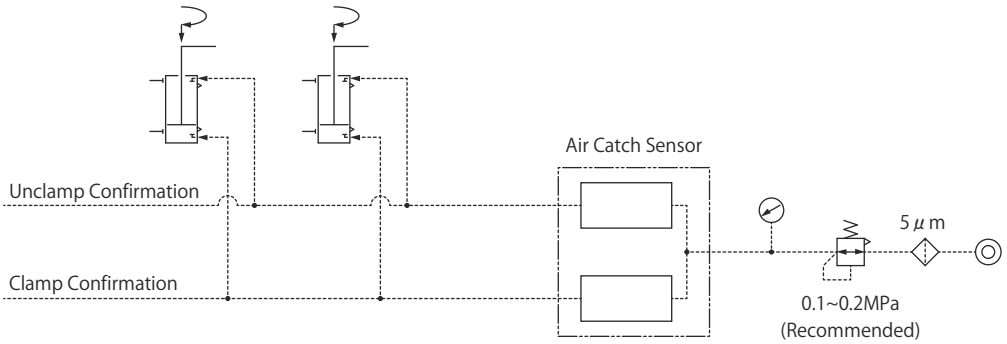
- Air catch sensor is required in order to conduct the action confirmation.
  Sensing can be done by the air catch sensor with small air flow (recommended models are in the chart below).

  Recommended Operating Air Pressure : 0.1 ~ 0.2MPa

Recommended Air Catch Sensor

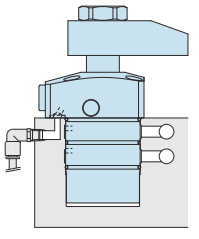
Maker	SMC	CKD
Name	Air Catch Sensor	Gap Switch
Model No.	ISA3-G	GPS3-E

- Please refer to manufacturer's catalog or other documents for the details about the air catch sensor.
- The air pressure to the air catch sensor should be 0.1~ 0.2MPa.
- Please keep supplying air pressure when in use.
- Refer to the drawing below for the air circuit structure.

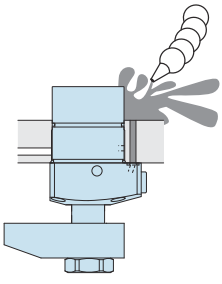


Notes for Design・Installation・Use

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



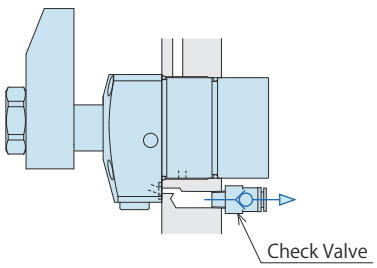
O Keep clear condition at the air vent hole.



× Coolant and chips enter from the air vent port.

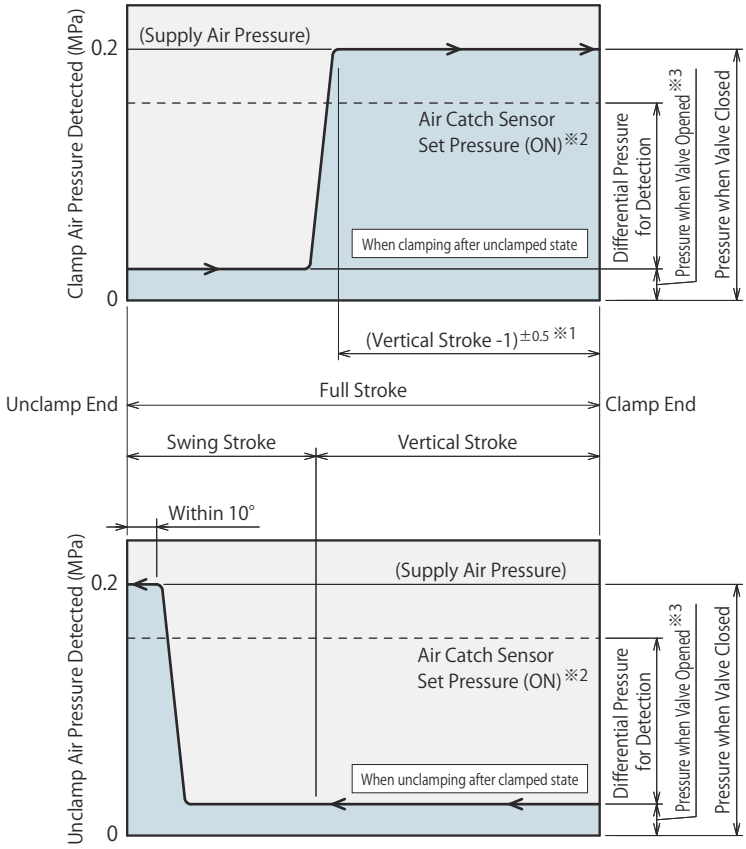
- Keep supplying air pressure to the air port when in use.

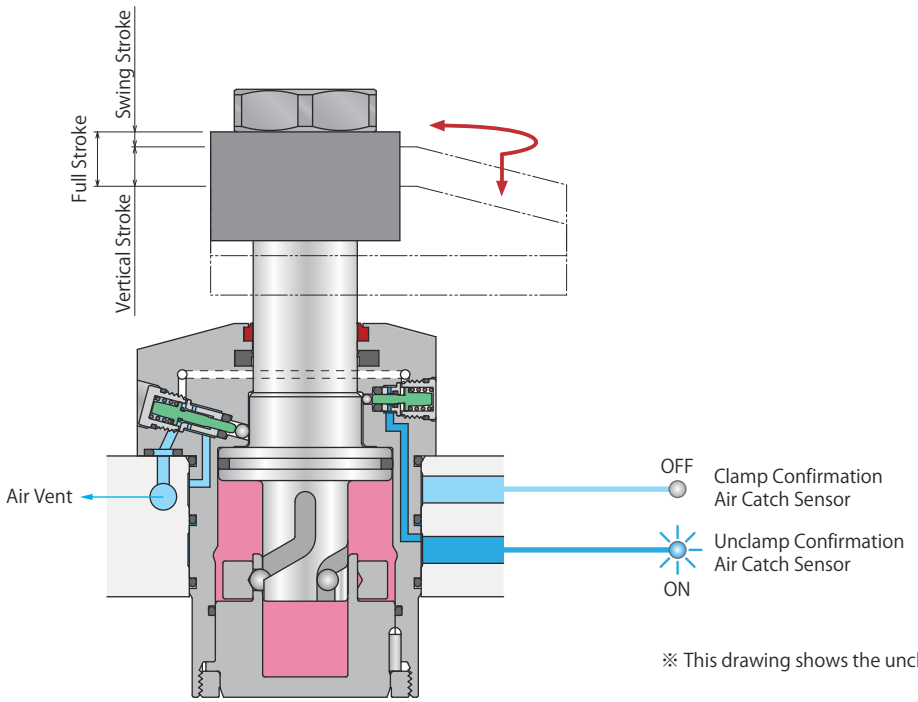
- Prevention of Contaminants to the Air Vent Port
  Coolant and chips can be prevented by setting a check valve with low cracking pressure. (Recommended check valve: SMC-made series AKH, cracking pressure: 0.005MPa)



Air Sensing Chart

Number Directly Connected to Clamp : 1





※ This drawing shows the unclamped state.

Notes :

1. The sensing chart shows the relationship between the stroke and detection circuit air pressure.
2. The specifications may vary depending on the air circuit. The length of hose should be as short as possible. (Suggest shorter than 5m)
3. There is only clamp confirmation for sensing valve symbol [H], and only unclamp confirmation for sensing valve symbol [J].

※1. There is a certain tolerance with regard to the position where the pressure for closing the valve is reached depending on the sensor structure. (Refer to the sensing chart.)

※2. The location of a signal from air sensor output varies depending on the sensor setting.

※3. The sensor pressure for opening the valve depends on the sensor.
With air sensor with large air flow, the sensor pressure for opening the valve is higher and the differential pressure for detection is lower.

High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LG/LT
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LJ/LM
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Linear Cylinder / Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA/DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
BZS
Pallet Clamp
VS/VT
Expansion Locating Pin
VFL/VFM
VFJ/VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

Model No. Indication

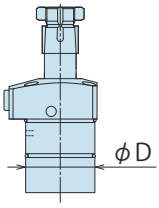
LHW 048 1 - C R E - ☐

1 2 3 4 5 6

1 Body Size

040 : ϕD=40mm
048 : ϕD=48mm
055 : ϕD=55mm
065 : ϕD=65mm
075 : ϕD=75mm

※ Outer diameter (ϕD) of the cylinder.



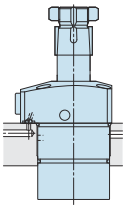
2 Design No.

1 : Revision Number

3 Piping Method

C : Gasket Option (With G Thread Plug)

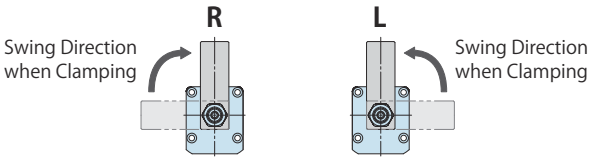
※ Speed control valve (BZL) is sold separately.
Please refer to P. 947.



With G Thread Plug
(able to attach Speed Control Valve)
(Order the valve separately
Recommended : BZL-B)

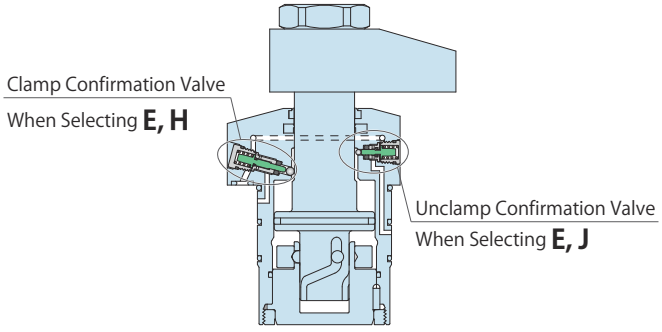
4 Swing Direction when Clamping

R : Clockwise
L : Counter-Clockwise



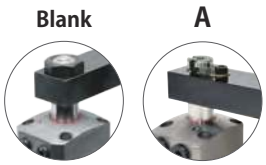
5 Sensing Valve

E : Clamp - Unclamp Confirmation (Both)
H : Clamp Confirmation Only
J : Unclamp Confirmation Only



6 Option

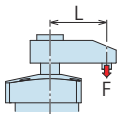
Blank : None (Standard : Taper Lock Lever Option)
A : Quick Change Lever Option A



Specifications

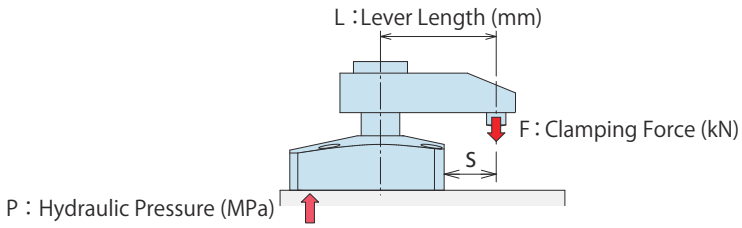
Model No.		LHW0401	LHW0481	LHW0551	LHW0651	LHW0751
Cylinder Area for Clamping cm²		5.00	6.95	10.3	13.4	20.3
Cylinder Inner Diameter ※1 mm		31	37	44	51	62
Rod Diameter ※1 mm		18	22	25	30	35.5
Clamping Force ※2 (Calculation Formula) kN		$F=\frac{P(1-0.0016\times L)}{2.0920+0.0040\times L}$	$F=\frac{P(1-0.0009\times L)}{1.4892+0.0018\times L}$	$F=\frac{P(1-0.0011\times L)}{1.0039+0.0011\times L}$	$F=\frac{P(1-0.0009\times L)}{0.7822+0.0010\times L}$	$F=\frac{P(1-0.0007\times L)}{0.5175+0.0006\times L}$
Cylinder Capacity cm³	Clamp	7.3	10.8	19.0	26.7	48.7
	Unclamp	10.9	16.7	28.1	40.9	72.5
Full Stroke mm		14.5	15.5	18.5	20	24
Swing Stroke (90°) mm		6.5	7.5	8.5	10	12
Vertical Stroke mm		8	8	10	10	12
Swing Angle Accuracy		90° ±3°				
Swing Complete Position Repeatability		±0.5°				
Hydraulic Pressure	Max. Operating Pressure MPa	7.0				
	Min. Operating Pressure ※3 MPa	1.5				
	Withstanding Pressure MPa	10.5				
Recommended Operating Air Pressure MPa		0.1 ~ 0.2				
Recommended Air Catch Sensor		ISA3-G (SMC) / GPS3-E (CKD)				
Operating Temperature ℃		0 ~ 70				
Weight kg	6 Option **Blank** ※4	0.9	1.4	2.0	2.9	4.2
	6 Option **A** ※5	0.9	1.3	1.9	2.8	4

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



High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LG/LT
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LJ/LM
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Linear Cylinder / Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA/DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
BZS
Pallet Clamp
VS/VT
Expansion Locating Pin
VFL/VFM
VFJ/VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

Clamping Force Curve



Applicable Model

LHW □ 1 - C R L E H J - Blank A

1 Body Size

(Ex.) In case of LHW0481 :
When supply hydraulic pressure P is 5.0MPa and lever length L is 50mm, clamping force becomes about 3.1kN.

Notes :

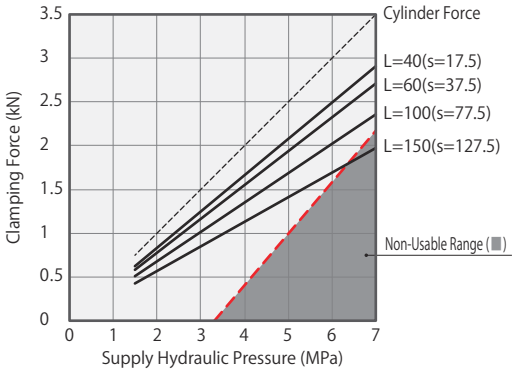
1. Tables and graphs show the relationship between the clamping force (kN) and supply hydraulic pressure (MPa).
2. Cylinder force (when L=0) cannot be calculated from the formula of clamping force.
3. Lever with a large inertia sometimes does not work depending on supply hydraulic pressure, lever mounting position, etc.
4. Values in below charts indicate clamping force when the lever locks a workpiece in horizontal position.
5. The clamping force varies depending on the lever length. Set the suitable supply hydraulic pressure based on the lever length.
6. Clamping force in the non-usable range may cause damage and fluid leakage.
7. The tables and graphs are only for reference. The exact results should be calculated based on the clamping force calculation formula.

※1. F：Clamping Force (kN), P：Supply Hydraulic Pressure (MPa), L：Lever Length (mm).

LHW0401

Clamping Force Calculation Formula ※1 (kN) $F = P(1-0.0016\times L) / (2.0920+0.0040\times L)$

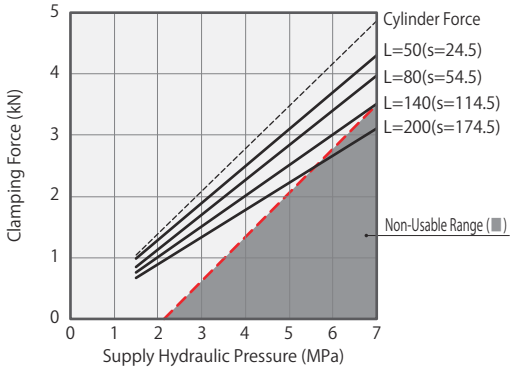
Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm) L=40	L=50	L=60	L=70	L=80	L=100	L=120	L=150	Max. Lever Length (L) (mm)
7	3.50	3.0	2.9	2.8	2.7	2.6	2.4	2.2		124
6.5	3.25	2.7	2.7	2.6	2.5	2.4	2.2	2.1		144
6	3.00	2.5	2.5	2.4	2.3	2.2	2.1	1.9	1.7	171
5.5	2.75	2.3	2.3	2.2	2.1	2.0	1.9	1.8	1.6	210
5	2.50	2.1	2.1	2.0	1.9	1.9	1.7	1.6	1.5	210
4.5	2.25	1.9	1.9	1.8	1.7	1.7	1.6	1.5	1.3	210
4	2.00	1.7	1.7	1.6	1.5	1.5	1.4	1.3	1.2	210
3.5	1.75	1.5	1.4	1.4	1.4	1.3	1.2	1.1	1.0	210
3	1.50	1.3	1.2	1.2	1.2	1.1	1.1	1.0	0.9	210
2.5	1.25	1.1	1.0	1.0	1.0	0.9	0.9	0.8	0.8	210
2	1.00	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.6	210
1.5	0.75	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5	210
Max. Operating Pressure (MPa)		7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.4	



LHW0481

Clamping Force Calculation Formula ※1 (kN) $F = P(1-0.0009\times L) / (1.4892+0.0018\times L)$

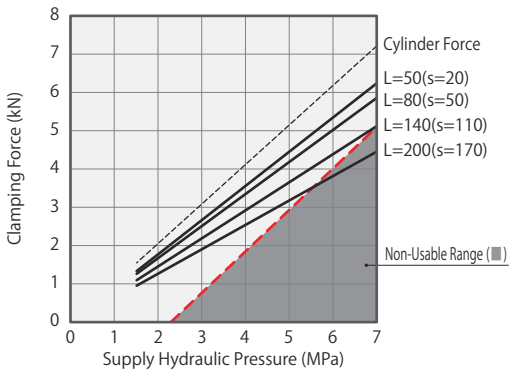
Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm) L=50	L=60	L=80	L=100	L=120	L=140	L=160	L=200	Max. Lever Length (L) (mm)
7	4.87	4.3	4.2	4.0	3.9	3.7	3.6			141
6.5	4.52	4.0	3.9	3.7	3.6	3.4	3.3			157
6	4.17	3.7	3.6	3.5	3.3	3.2	3.1	2.9		178
5.5	3.82	3.4	3.3	3.2	3.0	2.9	2.8	2.7	2.5	204
5	3.48	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.3	230
4.5	3.13	2.8	2.7	2.6	2.5	2.4	2.3	2.2	2.0	230
4	2.78	2.5	2.4	2.3	2.2	2.1	2.1	2.0	1.8	230
3.5	2.43	2.2	2.1	2.0	2.0	1.9	1.8	1.7	1.6	230
3	2.09	1.9	1.8	1.7	1.7	1.6	1.6	1.5	1.4	230
2.5	1.74	1.6	1.5	1.5	1.4	1.4	1.3	1.2	1.2	230
2	1.39	1.3	1.2	1.2	1.1	1.1	1.0	1.0	0.9	230
1.5	1.04	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.7	230
Max. Operating Pressure (MPa)		7.0	7.0	7.0	7.0	7.0	7.0	6.6	5.7	



LHW0551

Clamping Force Calculation Formula ※1 (kN) $F = P(1-0.0011\times L) / (1.0039+0.0011\times L)$

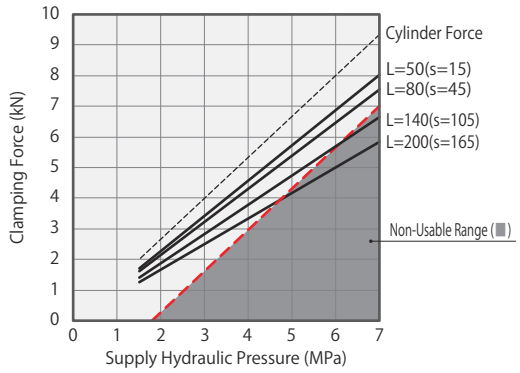
Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm) L=50	L=60	L=80	L=100	L=120	L=140	L=160	L=200	Max. Lever Length (L) (mm)
7	7.21	6.3	6.2	5.9	5.6	5.4	5.2			142
6.5	6.69	5.8	5.7	5.5	5.2	5.0	4.8			159
6	6.18	5.4	5.3	5.1	4.8	4.6	4.4	4.2		180
5.5	5.66	5.0	4.8	4.6	4.4	4.2	4.1	3.9	3.6	209
5	5.15	4.5	4.4	4.2	4.0	3.9	3.7	3.5	3.2	245
4.5	4.63	4.1	4.0	3.8	3.6	3.5	3.3	3.2	2.9	245
4	4.12	3.6	3.5	3.4	3.2	3.1	3.0	2.8	2.6	245
3.5	3.60	3.2	3.1	3.0	2.8	2.7	2.6	2.5	2.3	245
3	3.09	2.7	2.7	2.6	2.4	2.3	2.2	2.1	2.0	245
2.5	2.57	2.3	2.2	2.1	2.0	2.0	1.9	1.8	1.6	245
2	2.06	1.8	1.8	1.7	1.6	1.6	1.5	1.4	1.3	245
1.5	1.54	1.4	1.4	1.3	1.2	1.2	1.1	1.1	1.0	245
Max. Operating Pressure (MPa)		7.0	7.0	7.0	7.0	7.0	7.0	6.4	5.6	



LHW0651

Clamping Force Calculation Formula ※1 (kN) $F = P(1-0.0009\times L) / (0.7822+0.0010\times L)$

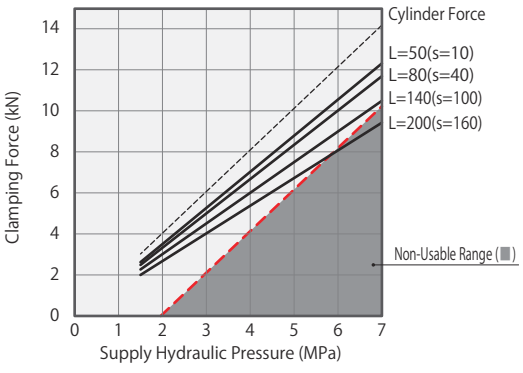
Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm) L=50	L=60	L=80	L=100	L=120	L=140	L=160	L=200	Non-Usable Range(■) Max. Lever Length (L) (mm)
7	9.35	8.1	7.9	7.6	7.3					115
6.5	8.68	7.5	7.3	7.0	6.7	6.5				127
6	8.02	6.9	6.8	6.5	6.2	6.0	5.7			142
5.5	7.35	6.4	6.2	6.0	5.7	5.5	5.3	5.0		161
5	6.68	5.8	5.7	5.4	5.2	5.0	4.8	4.6		187
4.5	6.01	5.2	5.1	4.9	4.7	4.5	4.3	4.1	3.8	221
4	5.34	4.6	4.5	4.4	4.2	4.0	3.8	3.7	3.4	260
3.5	4.68	4.1	4.0	3.8	3.7	3.5	3.4	3.2	3.0	260
3	4.01	3.5	3.4	3.3	3.1	3.0	2.9	2.8	2.5	260
2.5	3.34	2.9	2.9	2.7	2.6	2.5	2.4	2.3	2.1	260
2	2.67	2.3	2.3	2.2	2.1	2.0	1.9	1.9	1.7	260
1.5	2.00	1.8	1.7	1.7	1.6	1.5	1.5	1.4	1.3	260
Max. Operating Pressure (MPa)		7.0	7.0	7.0	7.0	6.8	6.1	5.6	4.8	



LHW0751

Clamping Force Calculation Formula ※1 (kN) $F = P(1-0.0007\times L) / (0.5175+0.0006\times L)$

Hydraulic Pressure (MPa)	Cylinder Force (kN)	Clamping Force (kN) Lever Length L (mm) L=50	L=60	L=80	L=100	L=120	L=140	L=160	L=200	Non-Usable Range(■) Max. Lever Length (L) (mm)
7	14.21	12.4	12.2	11.7	11.3	10.9	10.5			147
6.5	13.19	11.5	11.3	10.9	10.5	10.2	9.8	9.5		163
6	12.18	10.6	10.4	10.1	9.7	9.4	9.0	8.7		184
5.5	11.16	9.7	9.6	9.2	8.9	8.6	8.3	8.0	7.5	209
5	10.15	8.9	8.7	8.4	8.1	7.8	7.5	7.3	6.8	244
4.5	9.13	8.0	7.8	7.6	7.3	7.0	6.8	6.6	6.1	280
4	8.12	7.1	7.0	6.7	6.5	6.3	6.0	5.8	5.4	280
3.5	7.10	6.2	6.1	5.9	5.7	5.5	5.3	5.1	4.8	280
3	6.09	5.3	5.2	5.1	4.9	4.7	4.5	4.4	4.1	280
2.5	5.07	4.5	4.4	4.2	4.1	3.9	3.8	3.7	3.4	280
2	4.06	3.6	3.5	3.4	3.3	3.2	3.0	2.9	2.7	280
1.5	3.04	2.7	2.6	2.5	2.5	2.4	2.3	2.2	2.1	280
Max. Operating Pressure (MPa)		7.0	7.0	7.0	7.0	7.0	7.0	6.9	5.9	

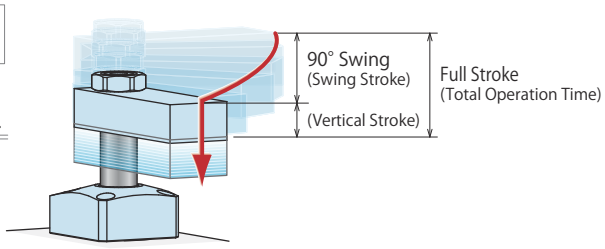


Allowable Swing Time Graph

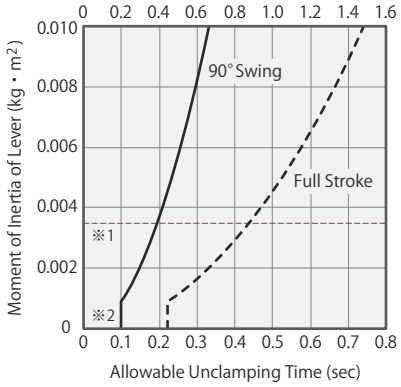
Adjustment of Swing Time

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

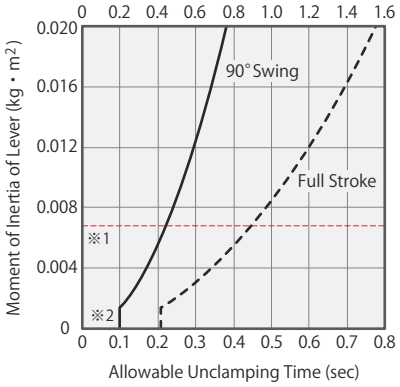
Excessive action speed can reduce stopping accuracy and damage internal components.



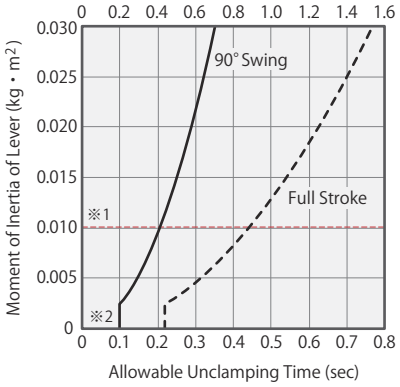
LHW0401 Allowable Clamping Time (sec)



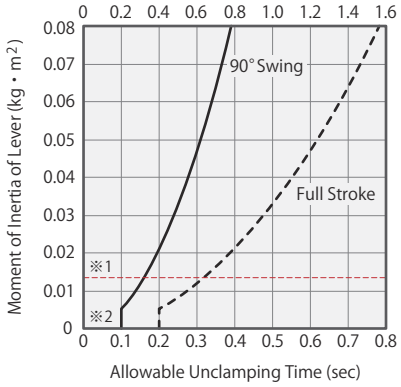
LHW0481 Allowable Clamping Time (sec)



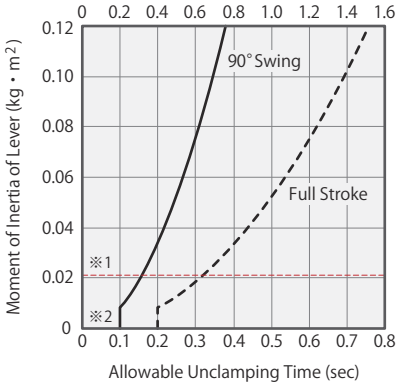
LHW0551 Allowable Clamping Time (sec)



LHW0651 Allowable Clamping Time (sec)



LHW0751 Allowable Clamping Time (sec)

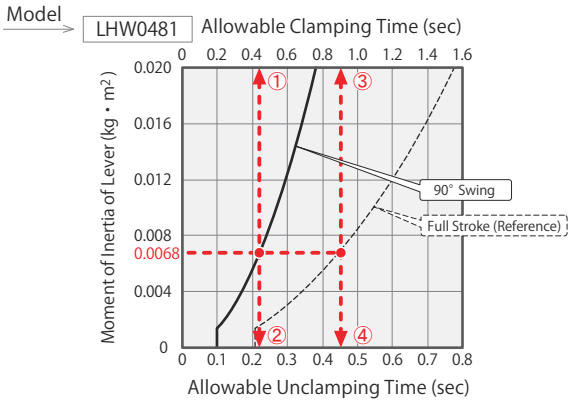


Notes :

※1. It shows the moment of inertia of material lever (LZH□-T).

※2. For any moment of inertia of a lever, the minimum 90° swing time should be 0.2 sec for clamping and 0.1 sec for unclamping or more.

1. The graph shows the allowable action time in regard to the moment of inertia of lever when the piston rod operates at constant speed.
2. There may be no lever swing action with large inertia depending on supply hydraulic pressure, oil flow and lever mounting position.
3. For speed adjustment of clamp lever, please use meter-out flow control valve.
   In case of meter-in control, the clamp lever may be accelerated by its own weight during swinging motion (clamp mounted horizontally) or the piston rod may be moving too fast. Please refer to P.1356 for speed control of the hydraulic cylinder.
4. Excessive swing speed can reduce stopping accuracy and damage the internal components.
5. Please contact us if operational conditions differ from those shown on the graphs.



(How to read the allowable swing time graph)

In case of LHW0481

The moment of inertia of a lever : 0.0068kg・m²

① 90° Swing Time when Clamping : About 0.44 sec or more

② 90° Swing Time when Unclamping : About 0.22 sec or more

③ Total Clamp Operation Time : About 0.9 sec or more

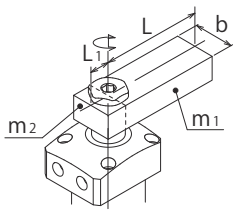
④ Total Unclamp Operation Time : About 0.45 sec or more

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

How to Calculate the Moment of Inertia (Estimated)

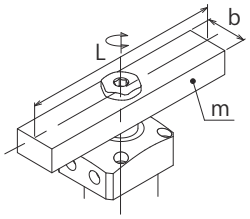
I : Moment of Inertia (kg・m²) L,L₁,L₂,K,b : Length (m) m,m₁,m₂,m₃ : Mass (kg)

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



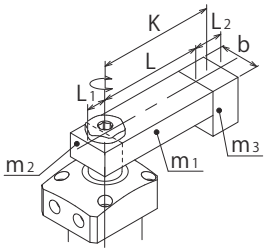
$$I = m_1 \frac{4L^2+b^2}{12} + m_2 \frac{4L_1^2+b^2}{12}$$

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



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

③ Load is applied on the lever front end.

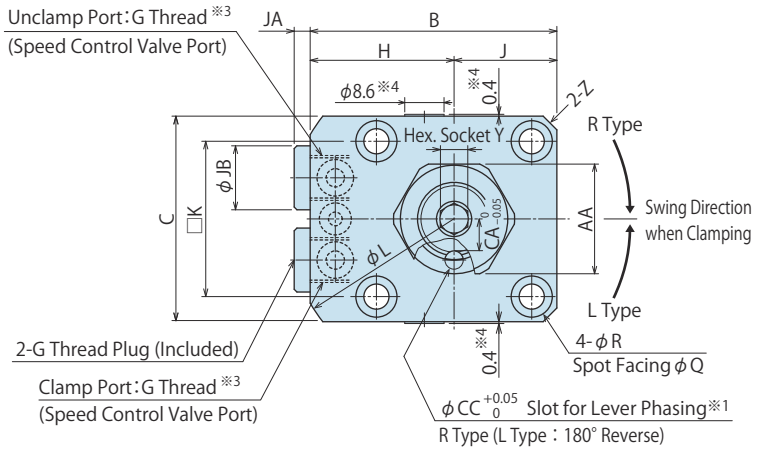


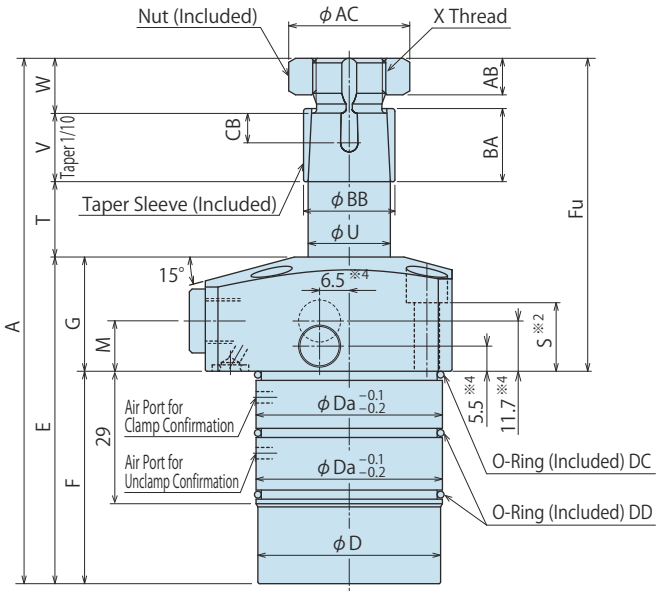
$$I = m_1 \frac{4L^2+b^2}{12} + m_2 \frac{4L_1^2+b^2}{12} + m_3K^2 + m_3 \frac{L_2^2+b^2}{12}$$

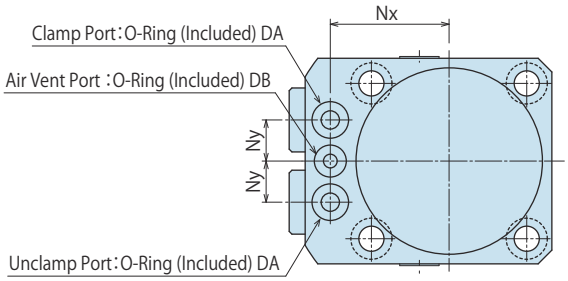
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LG/LT
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LJ/LM
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Linear Cylinder / Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA/DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
BZS
Pallet Clamp
VS/VT
Expansion Locating Pin
VFL/VFM
VFJ/VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

External Dimensions (Clamp - Unclamp Confirmation)

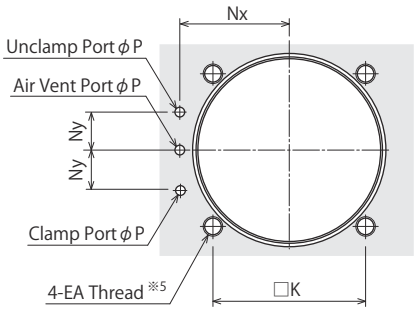
※The drawing shows the unclamped state of LHW-CRE.



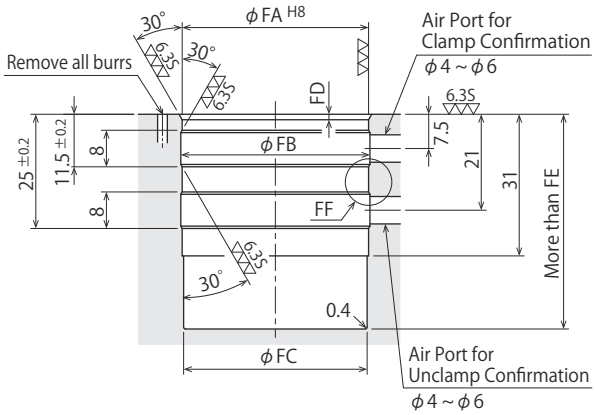




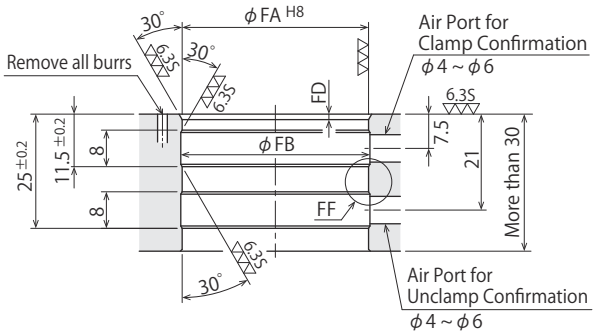
Machining Dimensions of Mounting Area

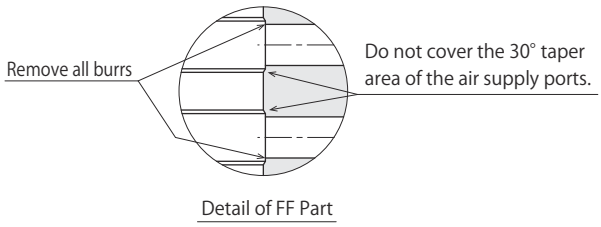


For Blind Hole



For Through Hole





Notes:

※1. The slot for lever phasing faces the port side when clamped.

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

※3. Speed control valve is sold separately. Please refer to P.947.

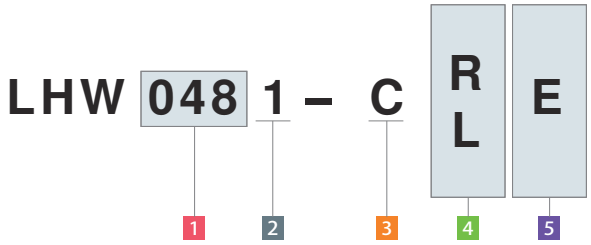
※4. The valve of LHW0401 is protruded as shown in the drawing.

Note:

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

Model No. Indication

(Format Example：LHW0481-CRE, LHW0551-CLE)



1 Body Size
2 Design No.
3 Piping Method
4 Swing Direction when Clamping
5 Sensing Valve
(E：Clamp - Unclamp Confirmation)
6 Option (Blank)

External Dimensions and Machining Dimensions of Mounting

(mm)

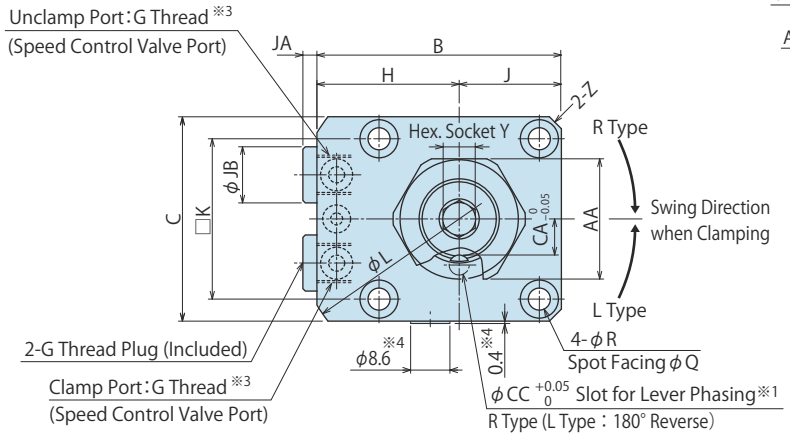
Model No.		LHW0401-C□E	LHW0481-C□E	LHW0551-C□E	LHW0651-C□E	LHW0751-C□E
Full Stroke		14.5	15.5	18.5	20	24
Swing Stroke (90°)		6.5	7.5	8.5	10	12
Vertical Stroke		8	8	10	10	12
A		115	128.5	145.5	156	181
B		54	61	69	81	92
C		45	51	60	70	80
D		40	48	55	65	75
Da		40.8	49	56	66	76
E		71.5	79	89	94	109
F		46.5	51	59	63	71
Fu		68.5	77.5	86.5	93	110
G		25	28	30	31	38
H		31.5	35.5	39	46	52
J		22.5	25.5	30	35	40
K		34	40	47	55	63
L		73	83	88	106	116
M		11	13	12	13	16
Nx		26	30	33.5	39.5	45
Ny		9	11	12	15	16
P		3	3	3	5	5
Q		9	9	11	11	14
R		5.5	5.5	6.8	6.8	9
S		15	17.5	17	17	21
T		16.5	17.5	20.5	22	26
U		18	22	25	30	35.5
V		15	18	21	24	30
W		12	14	15	16	16
X (Nominal × Pitch)		M16×1.5	M20×1.5	M22×1.5	M27×1.5	M30×1.5
Y		6	8	8	10	10
Z (Chamfer)		C3	C3	C3	C4	C5
AA		24	30	32	41	46
AB		8	9	10	11	11
AC		26.5	33	35.5	45	50
BA		16	19	22	25	31
BB		20	25	28	34	40
CA		7	9	10	12.5	14
CB		6.5	7.5	9.5	11.5	12.5
CC		4	5	6	6	8
EA (Nominal × Pitch)		M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25
FA		40.8 $^{+0.039}_{0}$	49 $^{+0.039}_{0}$	56 $^{+0.046}_{0}$	66 $^{+0.046}_{0}$	76 $^{+0.046}_{0}$
FB		41.4	49.6	56.6	66.6	76.6
FC		40.5	48.5	55.5	65.5	75.5
FD		1.2	1.2	1.5	1.5	1.5
FE		47	51.5	59.5	63.5	71.5
JA		3.5	3.5	3.5	4.5	4.5
JB		14	14	14	19	19
Clamp Port：G Thread Unclamp Port：G Thread		G1/8	G1/8	G1/8	G1/4	G1/4
O-Ring	DA	1BP5	1BP5	1BP5	1BP7	1BP7
	DB	AS568-007 (90°)	1BP5	1BP5	1BP7	1BP7
	DC	38×1.5 (Internal diameter× Wire diameter)	AS568-031(70°)	AS568-034(70°)	AS568-037(70°)	AS568-040(70°)
	DD	38×1.5 (Internal diameter× Wire diameter)	AS568-031(70°)	AS568-033(70°)	AS568-036(70°)	AS568-040(70°)

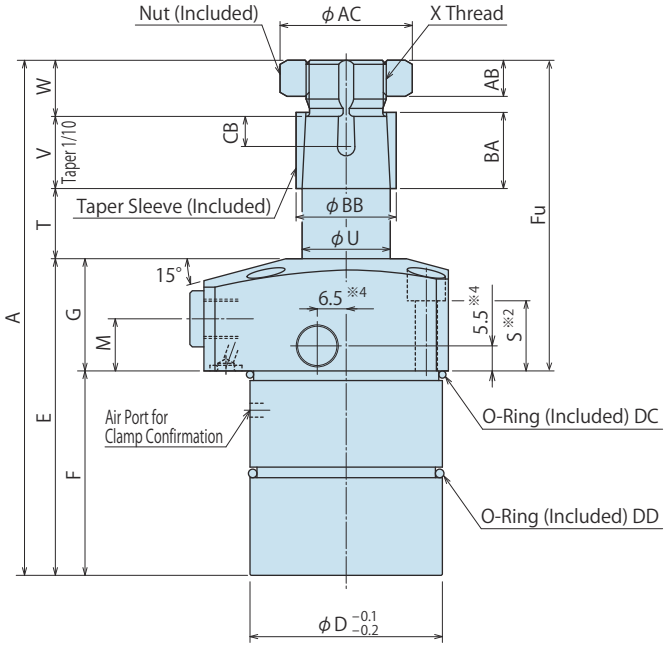
High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others

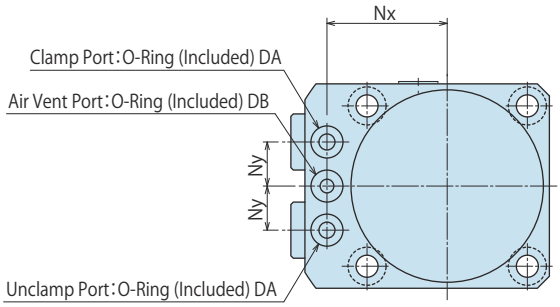
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LG/LT
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LJ/LM
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Linear Cylinder / Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA/DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
BZS
Pallet Clamp
VS/VT
Expansion Locating Pin
VFL/VFM
VFJ/VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

External Dimensions (Clamp Confirmation Only)

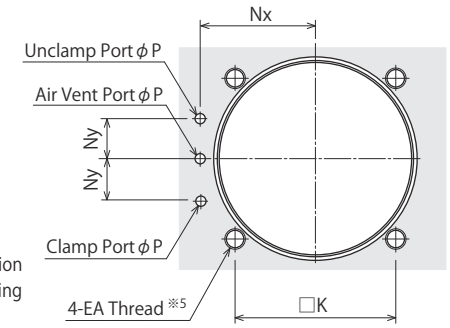
※The drawing shows the unclamped state of LHW-CRH.



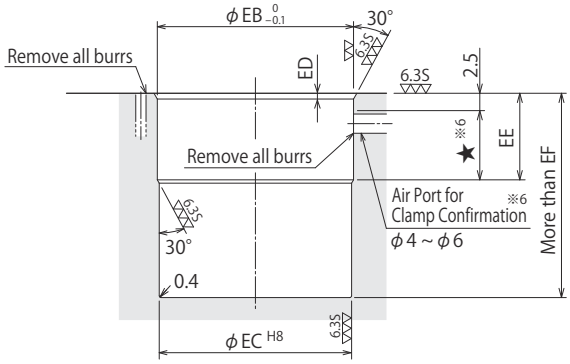




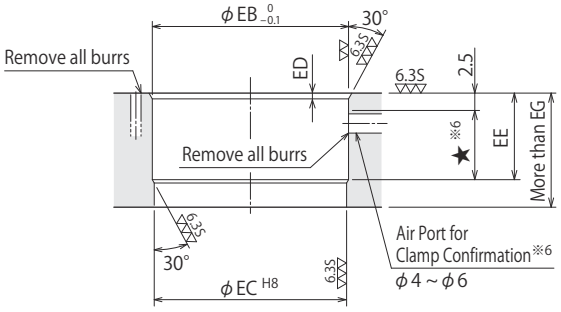
Machining Dimensions of Mounting Area



For Blind Hole



For Through Hole



Notes:

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

※6. Provide the air port for clamp confirmation within the part ★.

Notes:

※1. The slot for lever phasing faces the port side when clamped.

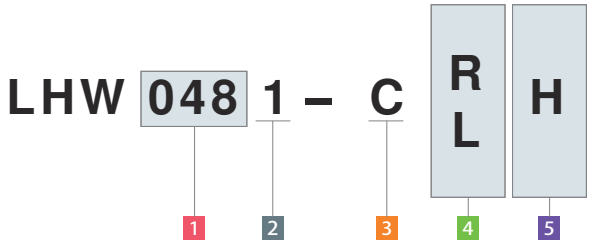
※2. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.

※3. Speed control valve is sold separately. Please refer to P.947.

※4. The valve of LHW0401 is protruded as shown in the drawing.

Model No. Indication

(Format Example：LHW0481-CRH, LHW0551-CLH)



1 Body Size
2 Design No.
3 Piping Method
4 Swing Direction when Clamping
5 Sensing Valve
(H：Clamp Confirmation Only)
6 Option (Blank)

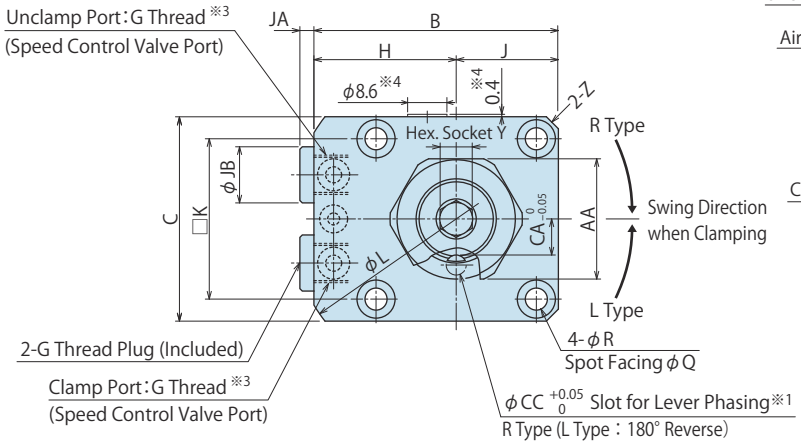
External Dimensions and Machining Dimensions of Mounting

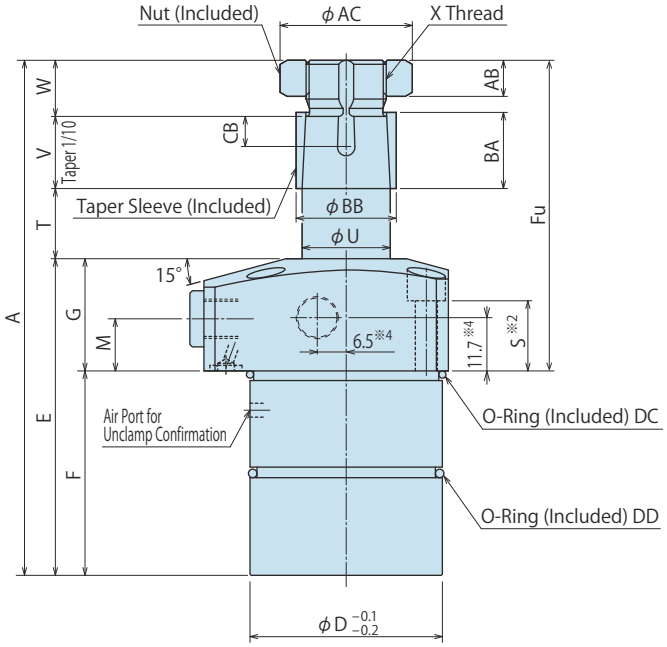
(mm)

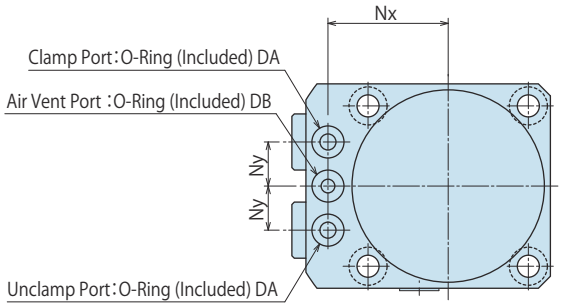
Model No.		LHW0401-C□H	LHW0481-C□H	LHW0551-C□H	LHW0651-C□H	LHW0751-C□H
Full Stroke		14.5	15.5	18.5	20	24
Swing Stroke (90°)		6.5	7.5	8.5	10	12
Vertical Stroke		8	8	10	10	12
A		115	128.5	145.5	156	181
B		54	61	69	81	92
C		45	51	60	70	80
D		40	48	55	65	75
E		71.5	79	89	94	109
F		46.5	51	59	63	71
Fu		68.5	77.5	86.5	93	110
G		25	28	30	31	38
H		31.5	35.5	39	46	52
J		22.5	25.5	30	35	40
K		34	40	47	55	63
L		73	83	88	106	116
M		11	13	12	13	16
Nx		26	30	33.5	39.5	45
Ny		9	11	12	15	16
P		3	3	3	5	5
Q		9	9	11	11	14
R		5.5	5.5	6.8	6.8	9
S		15	17.5	17	17	21
T		16.5	17.5	20.5	22	26
U		18	22	25	30	35.5
V		15	18	21	24	30
W		12	14	15	16	16
X (Nominal × Pitch)		M16×1.5	M20×1.5	M22×1.5	M27×1.5	M30×1.5
Y		6	8	8	10	10
Z (Chamfer)		C3	C3	C3	C4	C5
AA		24	30	32	41	46
AB		8	9	10	11	11
AC		26.5	33	35.5	45	50
BA		16	19	22	25	31
BB		20	25	28	34	40
CA		7	9	10	12.5	14
CB		6.5	7.5	9.5	11.5	12.5
CC		4	5	6	6	8
EA (Nominal × Pitch)		M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25
EB		40.8	49	56	66	76
EC		$40^{+0.039}_{0}$	$48^{+0.039}_{0}$	$55^{+0.046}_{0}$	$65^{+0.046}_{0}$	$75^{+0.046}_{0}$
ED		1.2	1.2	1.5	1.5	1.5
EE		20	20	24	24	34
EF		47	51.5	59.5	63.5	71.5
EG		26	26	30	30	40
JA		3.5	3.5	3.5	4.5	4.5
JB		14	14	14	19	19
Clamp Port：G Thread Unclamp Port：G Thread		G1/8	G1/8	G1/8	G1/4	G1/4
O-Ring	DA	1BP5	1BP5	1BP5	1BP7	1BP7
	DB	AS568-007(90°)	1BP5	1BP5	1BP7	1BP7
	DC	38×1.5 (Internal diameter × Wire diameter)	AS568-031(70°)	AS568-034(70°)	AS568-037(70°)	AS568-040(70°)
	DD	AS568-028(70°)	AS568-031(70°)	AS568-033(70°)	AS568-036(70°)	AS568-039(70°)

External Dimensions (Unclamp Confirmation Only)

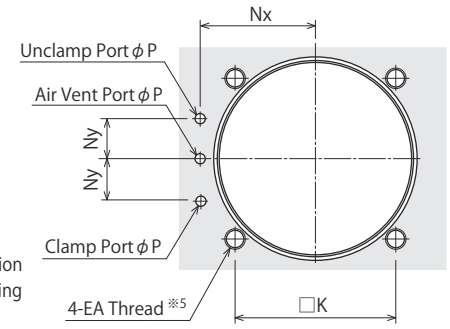
※The drawing shows the unclamped state of LHW-CRJ.



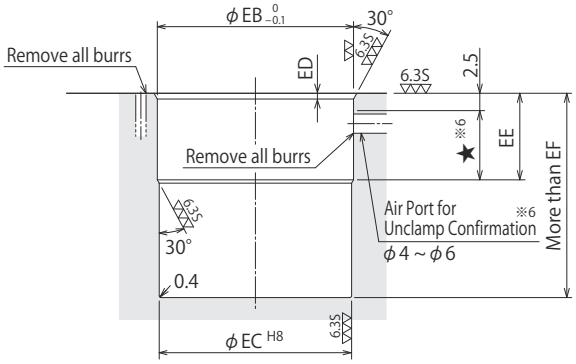




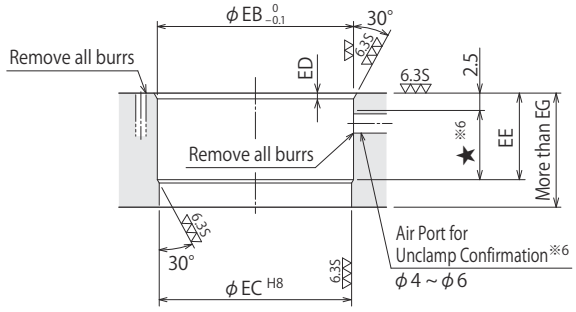
Machining Dimensions of Mounting Area



For Blind Hole



For Through Hole



Notes:

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

※6. Provide the air port for unclamp confirmation within the part ★.

Notes:

※1. The slot for lever phasing faces the port side when clamped.

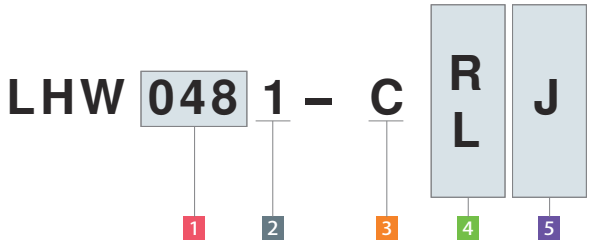
※2. Mounting bolts are not provided. Please prepare them according to the mounting height referring to dimension 'S'.

※3. Speed control valve is sold separately. Please refer to P.947.

※4. The valve of LHW0401 is protruded as shown in the drawing.

Model No. Indication

(Format Example：LHW0481-CRJ, LHW0551-CLJ)



1 Body Size
2 Design No.
3 Piping Method
4 Swing Direction when Clamping
5 Sensing Valve
(J：Unclamp Confirmation Only)
6 Option (Blank)

External Dimensions and Machining Dimensions of Mounting

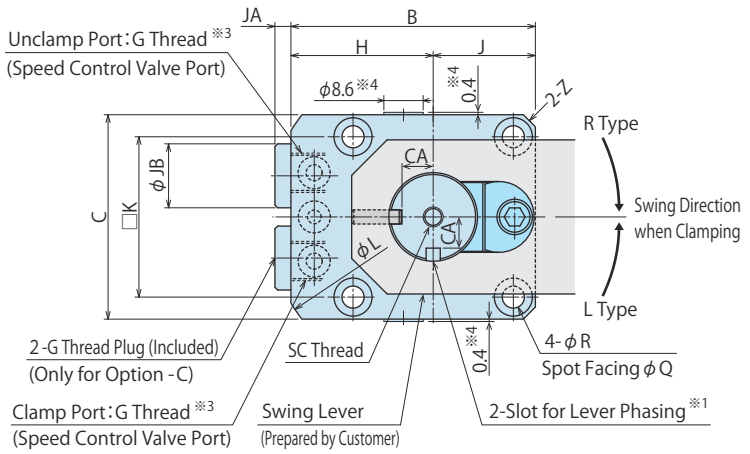
(mm)

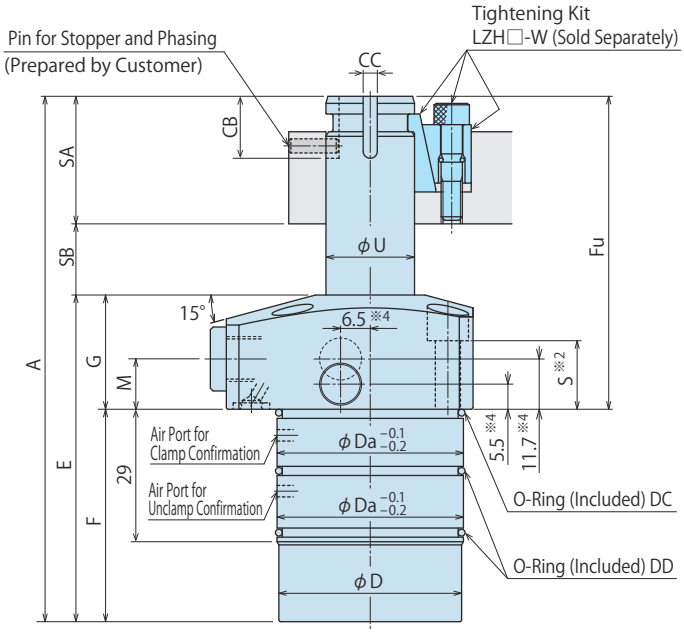
Model No.		LHW0401-C□J	LHW0481-C□J	LHW0551-C□J	LHW0651-C□J	LHW0751-C□J
Full Stroke		14.5	15.5	18.5	20	24
Swing Stroke (90°)		6.5	7.5	8.5	10	12
Vertical Stroke		8	8	10	10	12
A		115	128.5	145.5	156	181
B		54	61	69	81	92
C		45	51	60	70	80
D		40	48	55	65	75
E		71.5	79	89	94	109
F		46.5	51	59	63	71
Fu		68.5	77.5	86.5	93	110
G		25	28	30	31	38
H		31.5	35.5	39	46	52
J		22.5	25.5	30	35	40
K		34	40	47	55	63
L		73	83	88	106	116
M		11	13	12	13	16
Nx		26	30	33.5	39.5	45
Ny		9	11	12	15	16
P		3	3	3	5	5
Q		9	9	11	11	14
R		5.5	5.5	6.8	6.8	9
S		15	17.5	17	17	21
T		16.5	17.5	20.5	22	26
U		18	22	25	30	35.5
V		15	18	21	24	30
W		12	14	15	16	16
X (Nominal × Pitch)		M16×1.5	M20×1.5	M22×1.5	M27×1.5	M30×1.5
Y		6	8	8	10	10
Z (Chamfer)		C3	C3	C3	C4	C5
AA		24	30	32	41	46
AB		8	9	10	11	11
AC		26.5	33	35.5	45	50
BA		16	19	22	25	31
BB		20	25	28	34	40
CA		7	9	10	12.5	14
CB		6.5	7.5	9.5	11.5	12.5
CC		4	5	6	6	8
EA (Nominal × Pitch)		M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25
EB		40.8	49	56	66	76
EC		$40^{+0.039}_{0}$	$48^{+0.039}_{0}$	$55^{+0.046}_{0}$	$65^{+0.046}_{0}$	$75^{+0.046}_{0}$
ED		1.2	1.2	1.5	1.5	1.5
EE		20	20	24	24	34
EF		47	51.5	59.5	63.5	71.5
EG		26	26	30	30	40
JA		3.5	3.5	3.5	4.5	4.5
JB		14	14	14	19	19
Clamp Port：G Thread Unclamp Port：G Thread		G1/8	G1/8	G1/8	G1/4	G1/4
O-Ring	DA	1BP5	1BP5	1BP5	1BP7	1BP7
	DB	AS568-007(90°)	1BP5	1BP5	1BP7	1BP7
	DC	38×1.5 (Internal diameter × Wire diameter)	AS568-031(70°)	AS568-034(70°)	AS568-037(70°)	AS568-040(70°)
	DD	AS568-028(70°)	AS568-031(70°)	AS568-033(70°)	AS568-036(70°)	AS568-039(70°)

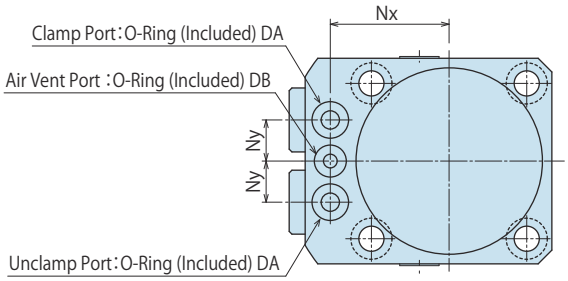
High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LG/LT
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LJ/LM
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Linear Cylinder / Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA/DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
BZS
Pallet Clamp
VS/VT
Expansion Locating Pin
VFL/VFM
VFJ/VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

External Dimensions (Clamp - Unclamp Confirmation)

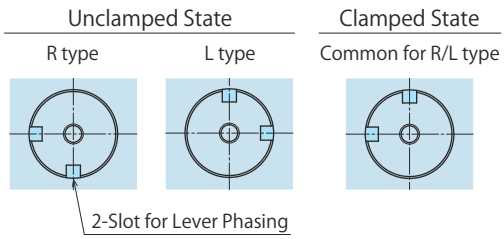
※The drawing shows the unclamped state of LHW-CRE-A.



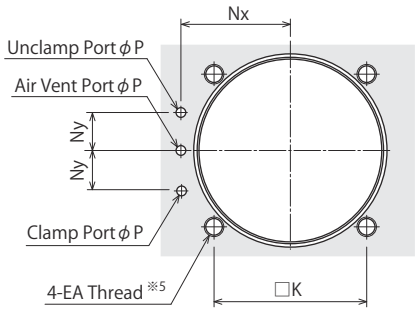




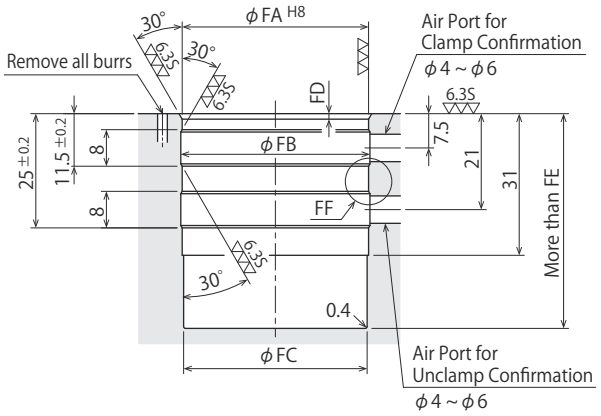
※1. Slot for Lever Phasing



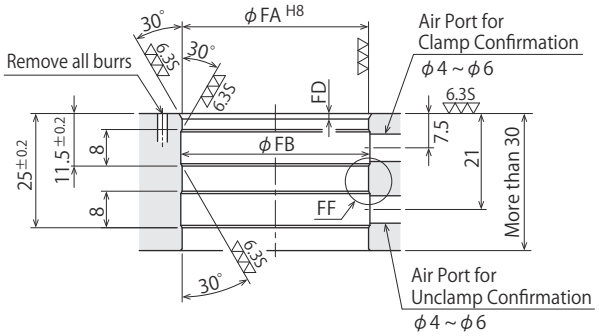
Machining Dimensions of Mounting Area

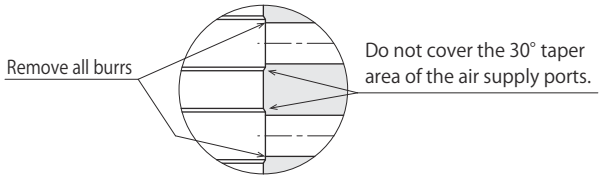


For Blind Hole



For Through Hole





Detail of FF Part

Notes :

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

※3. Speed control valve is sold separately. Please refer to P.947.

※4. The valve of LHW0401 is protruded as shown in the drawing.

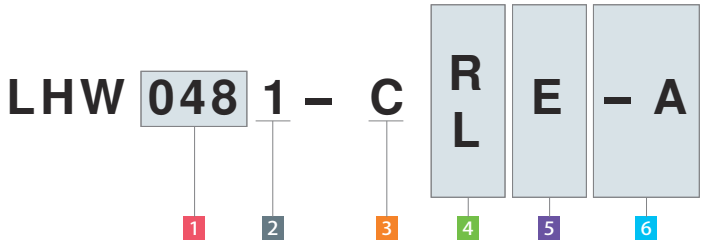
1. Please contact us if it has a combination with other detection methods.

Note :

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

Model No. Indication

(Format Example：LHW0481-CRE-A, LHW0551-CLE-A)



1 Body Size
2 Design No.
3 Piping Method
4 Swing Direction when Clamping
5 Sensing Valve
(When Selecting E：Clamp - Unclamp Confirmation)
6 Option A

External Dimensions and Machining Dimensions of Mounting

(mm)

Model No.		LHW0401-C□E-A	LHW0481-C□E-A	LHW0551-C□E-A	LHW0651-C□E-A	LHW0751-C□E-A
Full Stroke		14.5	15.5	18.5	20	24
Swing Stroke (90°)		6.5	7.5	8.5	10	12
Vertical Stroke		8	8	10	10	12
A		115	128.5	145.5	156	181
B		54	61	69	81	92
C		45	51	60	70	80
D		40	48	55	65	75
Da		40.8	49	56	66	76
E		71.5	79	89	94	109
F		46.5	51	59	63	71
Fu		68.5	77.5	86.5	93	110
G		25	28	30	31	38
H		31.5	35.5	39	46	52
J		22.5	25.5	30	35	40
K		34	40	47	55	63
L		73	83	88	106	116
M		11	13	12	13	16
Nx		26	30	33.5	39.5	45
Ny		9	11	12	15	16
P		3	3	3	5	5
Q		9	9	11	11	14
R		5.5	5.5	6.8	6.8	9
S		15	17.5	17	17	21
U		18	22	25	30	35.5
Z (Chamfer)		C3	C3	C3	C4	C5
CA ※6		5.8	7.8	8.8	10.5	12.5
CB ※6		15	16	17.5	21.5	21.5
CC ※6		4 $^{+0.038}_{+0.020}$	4 $^{+0.038}_{+0.020}$	4 $^{+0.038}_{+0.020}$	6 $^{+0.038}_{+0.020}$	6 $^{+0.038}_{+0.020}$
EA (Nominal × Pitch)		M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25
SA ※6		27	32	36	40	46
SB ※6		16.5	17.5	20.5	22	26
SC (Nominal × Pitch× Depth) ※6		M5×0.8×8	M5×0.8×8	M6×1×11	M6×1×11	M8×1.25×13
FA		40.8 $^{+0.039}_{0}$	49 $^{+0.039}_{0}$	56 $^{+0.046}_{0}$	66 $^{+0.046}_{0}$	76 $^{+0.046}_{0}$
FB		41.4	49.6	56.6	66.6	76.6
FC		40.5	48.5	55.5	65.5	75.5
FD		1.2	1.2	1.5	1.5	1.5
FE		47	51.5	59.5	63.5	71.5
JA		3.5	3.5	3.5	4.5	4.5
JB		14	14	14	19	19
Clamp Port：G Thread Unclamp Port：G Thread		G1/8	G1/8	G1/8	G1/4	G1/4
O-Ring	DA	1BP5	1BP5	1BP5	1BP7	1BP7
	DB	AS568-007(90°)	1BP5	1BP5	1BP7	1BP7
	DC	38×1.5 (Internal Diam.× Wire Diam.)	AS568-031(70°)	AS568-034(70°)	AS568-037(70°)	AS568-040(70°)
	DD	38×1.5 (Internal Diam.× Wire Diam.)	AS568-031(70°)	AS568-033(70°)	AS568-036(70°)	AS568-040(70°)
Pin for Stopper and Phasing ※6		ϕ4(m6)×10	ϕ4(m6)×12	ϕ4(m6)×14	ϕ6(m6)×14	ϕ6(m6)×16

Note： ※6. It shows different dimensions than 6 **Blank**：Standard.
Also, the dimensions of ※6 are the same when selecting 6 **A** for 5 **H/J**.

Taper Lock Lever Design Dimensions

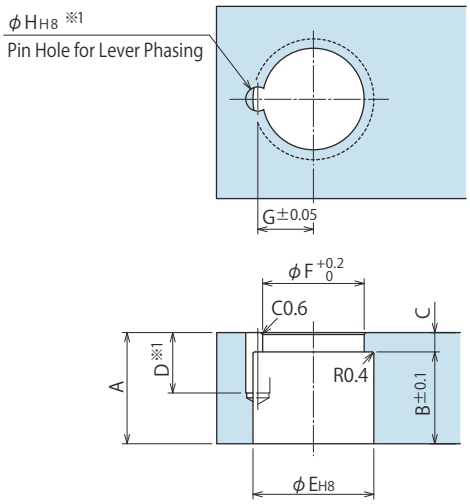
※ Reference for designing a taper lock swing lever.

Corresponding Model No.

LHW □ 1 - C R L E H J - Blank

1 Body Size

6 Option Blank



(mm)

Corresponding Model No.※3	LHW0401	LHW0481	LHW0551	LHW0651	LHW0751
A	19	23	26	29	35
B	16	19	22	25	31
C	3	4	4	4	4
D	10.5	12.5	14.5	16.5	17.5
E	$20^{+0.033}_{0}$	$25^{+0.033}_{0}$	$28^{+0.033}_{0}$	$34^{+0.039}_{0}$	$40^{+0.039}_{0}$
F	17	21	23.5	29	33
G	9	11.5	13	15.5	18
H	$4^{+0.018}_{0}$	$5^{+0.018}_{0}$	$6^{+0.018}_{0}$	$6^{+0.018}_{0}$	$8^{+0.022}_{0}$
Phasing Pin※2 (Reference)	ϕ4(h8)×10	ϕ5(h8)×12	ϕ6(h8)×14	ϕ6(h8)×16	ϕ8(h8)×16

Notes :

1. Swing lever should be designed with its length according to performance curve.
2. If the swing lever is not in accordance with the dimension shown above, performance may be degraded and damage can occur.

※1. The pin hole (ϕH) for determining the lever phase should be added, if necessary.
※2. Phasing pin is not included. Prepare it separately.
※3. Refer to Design Dimensions of Quick Change Lever Option A for -A (Quick Change Lever Option A).

Quick Change Lever Option A Design Dimensions

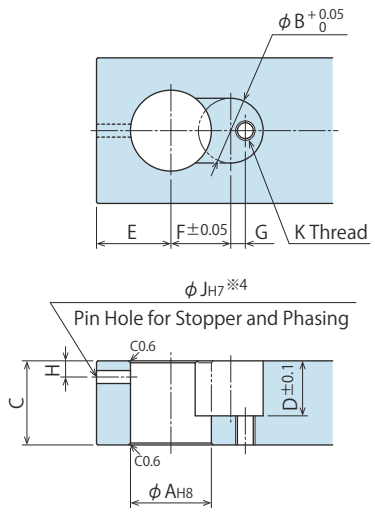
※ Reference for designing Quick Change Swing Lever Option A.

Corresponding Model No.

LHW □ 1 - C R L E H J - A

1 Body Size

6 Option A



(mm)

Corresponding Model No.	LHW0401 -□□□-A	LHW0481 -□□□-A	LHW0551 -□□□-A	LHW0651 -□□□-A	LHW0751 -□□□-A
A	$18^{+0.027}_{0}$	$22^{+0.033}_{0}$	$25^{+0.033}_{0}$	$30^{+0.033}_{0}$	$35.5^{+0.039}_{0}$
B	15	18	20	24	28
C	19	23	26	29	35
D	13	15.5	17	19	21
E	16	20	23	25	29
F	15	16.5	18.5	20.5	25
G	2.5	4	4.5	6.5	6.5
H	4	4	4	6	6
J	$4^{+0.012}_{0}$	$4^{+0.012}_{0}$	$4^{+0.012}_{0}$	$6^{+0.012}_{0}$	$6^{+0.012}_{0}$
K	M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25
Pin for Stopper※4 and Phasing	ϕ4(m6) ×10	ϕ4(m6) ×12	ϕ4(m6) ×14	ϕ6(m6) ×14	ϕ6(m6) ×16

Notes :

1. Swing lever should be designed with its length according to performance curve.
2. If the swing lever is not in accordance with the dimension shown above, performance may be degraded and damage can occur.
3. Tightening Kit (LZH□-W) for Quick Change Lever Option A is sold separately.

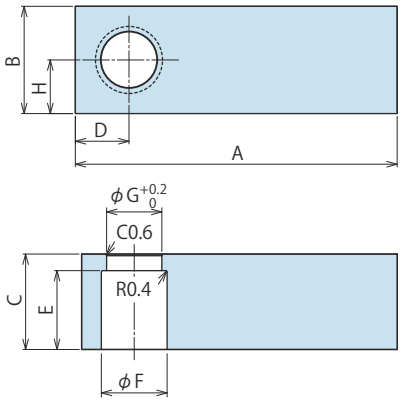
※4. The pin hole for stopper and phasing (ϕJ) should be appropriately machined according to the slot for lever phasing on the clamp body. Pin for stopper and phasing (prepared by customer) is used as phasing when mounting the lever and as stopper when removing the lever. If you are not using a pin for stopper and phasing, a stopper is required to remove the lever.

Accessories：Material Swing Lever for Taper Lock Option

Model No. Indication

LZH 048 0 – T

- 048: Size (Refer to the table.)
- 0: Design No. (Revision Number)
- T: -T (Taper Lock Lever Option)



(mm)

Model No.	LZH0400 -T	LZH0480 -T	LZH0550 -T	LZH0650 -T	LZH0750 -T
Corresponding Model No.※5	LHW0401	LHW0481	LHW0551	LHW0651	LHW0751
A	145	160	170	175	185
B	32	40	45	50	58
C	19	23	26	29	35
D	16	20	23	25	29
E	16	19	22	25	31
F	20	25	28	34	40
G	17	21	23.5	29	33
H	16	20	22.5	25	29

Notes：

1. Material : S50CH　Surface Finishing：Alkaline Blackening
2. If necessary, the front end should be additionally machined and finished.
3. When determining the phase, refer to taper lock lever design dimensions for each model for the additional machining.

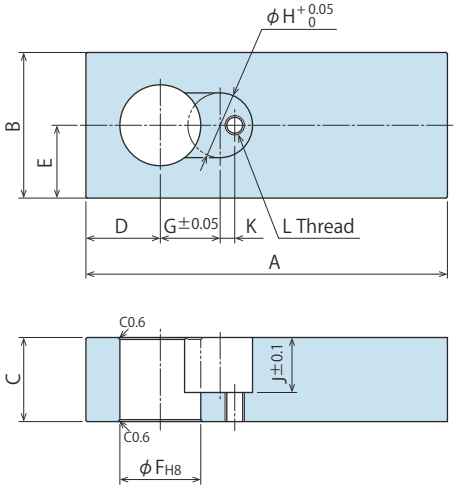
※5. Refer to Accessory of Quick Change Lever Option A for -A (Quick Change Lever Option A).

Accessories：Material Swing Lever for Quick Change Lever Option A

Model No. Indication

LZH 048 0 – A

- 048: Size (Refer to the table.)
- 0: Design No. (Revision Number)
- A: -A (Quick Change Lever Option A)



(mm)

Model No.	LZH0400 -A	LZH0480 -A	LZH0550 -A	LZH0650 -A	LZH0750 -A
Corresponding Model No.	LHW0401 -□□□-A	LHW0481 -□□□-A	LHW0551 -□□□-A	LHW0651 -□□□-A	LHW0751 -□□□-A
A	145	160	170	175	185
B	32	40	45	50	58
C	19	23	26	29	35
D	16	20	23	25	29
E	16	20	22.5	25	29
F	$18^{+0.027}_{0}$	$22^{+0.033}_{0}$	$25^{+0.033}_{0}$	$30^{+0.033}_{0}$	$35.5^{+0.039}_{0}$
G	15	16.5	18.5	20.5	25
H	15	18	20	24	28
J	13	15.5	17	19	21
K	2.5	4	4.5	6.5	6.5
L	M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25

Notes：

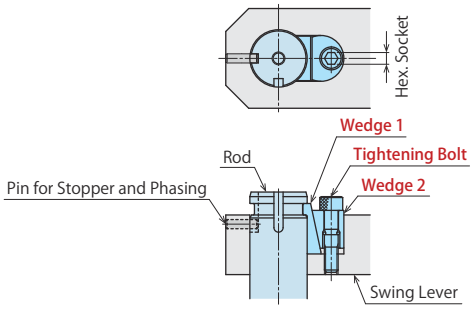
1. Material : S50CH　Surface Finishing：Alkaline Blackening
2. If necessary, the front end should be additionally machined and finished.
3. The pin hole for stopper and lever phasing should be additionally machined by referring to Quick Change Lever Option A Design Dimensions.
4. Tightening Kit (LZH□-W)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

Accessories：Tightening Kit for Quick Change Lever Option A

Model No. Indication

LZH 048 1 – W

- 048: Size (Refer to the table.)
- 1: Design No. (Revision Number)
- W: -W (Tightening Kit)



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

【Contents of Tightening Kit】
・Wedge 1　・Wedge 2　・Tightening Bolt

Model No.	LZH0401 -W	LZH0481 -W	LZH0551 -W	LZH0651 -W	LZH0751 -W
Corresponding Model No.	LHW0401 -□□□-A	LHW0481 -□□□-A	LHW0551 -□□□-A	LHW0651 -□□□-A	LHW0751 -□□□-A
Nominal×Picth of Tightening Bolt	M5×0.8	M5×0.8	M6×1	M6×1	M8×1.25
Hex. Socket mm	3	3	4	4	5
Tightening Torque N•m	5.0	5.0	8.0	8.0	20

Cautions

Notes for Design

1) Check Specifications

- Please use each product according to the specifications.

2) Notes for Circuit Design

- Please read "Notes on Hydraulic Cylinder Speed Control Unit" for proper hydraulic circuit design. Improper circuit design may lead to malfunctions and damages. (Refer to P.1356)
- Ensure there is no possibility of supplying hydraulic pressure to the lock port and the release port simultaneously.

3) Swing lever should be designed to make the moment of inertia small.

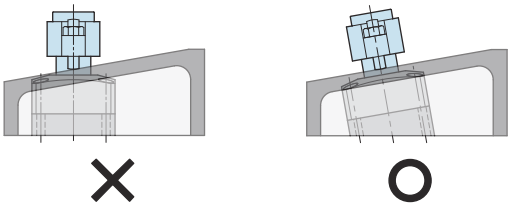
- Large moment of inertia will degrade the lever's stopping accuracy and cause undue wear to the clamp.
  Additionally, the clamp may not function, depending on supplied hydraulic pressure and lever mounting position.
- Set the allowable operation time after the moment of inertia is calculated. Refer to "Allowable Swing Time Graph" and make sure to operate clamps within the allowable operation time.

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.

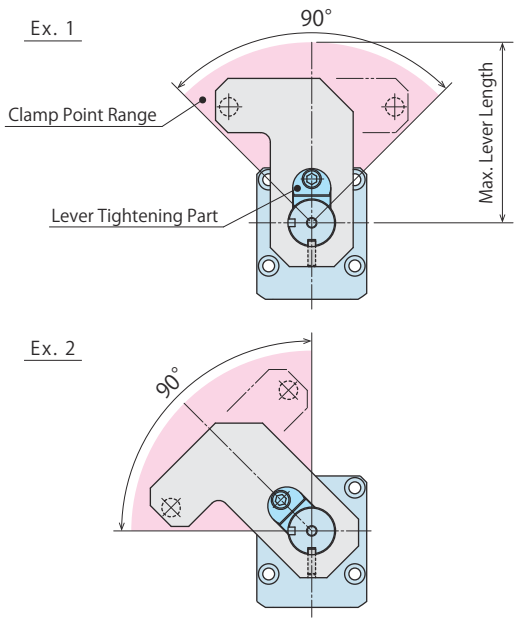


6) Notes for LHA-M/N, LHW

- When using air sensing swing clamp (LHA-M/N, LHW), make sure to check the Notes for Design・Installation・Use (Pages shown below).
  ・Swing clamp with air sensing option LHA-M/N：Refer to P.457.
  ・Swing clamp with air sensing valve LHW：Refer to P.503.

7) When using an offset lever for Quick Change Lever Option A.

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



Installation Notes

1) Check the Usable Fluid

- Please use the appropriate fluid by referring to the Hydraulic Fluid List (P.1355).

2) Installation of the Product

- When mounting the clamp, use hexagonal socket bolts as multiple bolt holes for mounting (with tensile strength of 12.9) and tighten them with the torque shown in the table below. Tightening with greater torque than recommended can dent the seating surface or break the bolt.

Model No.		Thread Size	Tightening Torque (N·m)
LHA LHC LHS LHW	LHA0360 / LHC0360 LHS0360	M4×0.7	4.0
	LHA0400 / LHC0400 LHS0400 / LHW0401	M5×0.8	8.0
	LHA0480 / LHC0480 LHS0480 / LHW0481	M5×0.8	8.0
	LHA0550 / LHC0550 LHS0550 / LHW0551	M6×1	14
	LHA0650 / LHC0650 LHS0650 / LHW0651	M6×1	14
	LHA0750 LHS0750 / LHW0751	M8×1.25	33
	LHA0900 LHS0900	M10×1.5	65
	LHA1050 LHS1050	M12×1.75	114
LG LT	LG0301 / LT0301	M4×0.7	3.2
	LG0361 / LT0361	M4×0.7	3.2
	LG0401 / LT0401	M5×0.8	6.3
	LG0481 / LT0481	M5×0.8	6.3
	LG0551 / LT0551	M6×1	10
	LG0651 / LT0651	M6×1	10
	LG0751 / LT0751	M8×1.25	25
	LG0901	M10×1.5	58.8
	LG1051	M12×1.75	98
TLA-2 TLB-2 TLA-1	TLA0401-2 / TLB0401-2 TLA0402-1	M5×0.8	6.9
	TLA0601-2 / TLB0601-2 TLA0602-1	M6×1	11.8
	TLA0801-2 / TLB0801-2 TLA0802-1	M6×1	11.8
	TLA1001-2 / TLB1001-2 TLA1002-1	M8×1.25	25
	TLA1601-2 / TLB1601-2 TLA1602-1	M8×1.25	25
	TLA2001-2 / TLB2001-2 TLA2002-1	M10×1.5	58.8
	TLA2501-2 / TLB2501-2 TLA2502-1	M10×1.5	58.8
	TLA4001-2 / TLB4001-2 TLA4002-1	M12×1.75	98

3) Installation / Removal of the Swing Lever

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

LHA/LHC/LHS/LHW/LG/LT Standard：Taper Lock Lever

Model No.		Thread Size	Tightening Torque (N·m)
LHA LHC LHS LHW	LHA0360 / LHC0360 LHS0360	M14×1.5	21 ~ 25
	LHA0400 / LHC0400 LHS0400 / LHW0401	M16×1.5	33 ~ 40
	LHA0480 / LHC0480 LHS0480 / LHW0481	M20×1.5	54 ~ 65
	LHA0550 / LHC0550 LHS0550 / LHW0551	M22×1.5	84 ~ 100
	LHA0650 / LHC0650 LHS0650 / LHW0651	M27×1.5	120 ~ 145
	LHA0750 LHS0750 / LHW0751	M30×1.5	175 ~ 210
	LHA0900 LHS0900	M39×1.5	280 ~ 335
	LHA1050 LHS1050	M48×1.5	333 ~ 400
LG LT	LG0301 / LT0301	M8×1	8 ~ 10
	LG0361 / LT0361	M10×1	15 ~ 18
	LG0401 / LT0401	M12×1.5	24 ~ 29
	LG0481 / LT0481	M16×1.5	37 ~ 45
	LG0551 / LT0551	M18×1.5	59 ~ 71
	LG0651 / LT0651	M22×1.5	93 ~ 112
	LG0751 / LT0751	M28×1.5	147 ~ 177
	LG0901	M36×1.5	235 ~ 282
	LG1051	M45×1.5	300 ~ 360

LHA-A/LHC-A/LHS-A/LHW-A/LG-A/LT-A：Quick Change Lever Option A

Model No.		Thread Size	Tightening Torque (N·m)
LHA-A LHC-A LHS-A LHW-A LG-A LT-A	LG0301-A / LT0301-A	M4×0.7	2.5
	LHA0360-A / LHC0360-A LHS0360-A LG0361-A / LT0361-A	M4×0.7	2.5
	LHA0400-A / LHC0400-A LHS0400-A / LHW0401-A LG0401-A / LT0401-A	M5×0.8	5.0
	LHA0480-A / LHC0480-A LHS0480-A / LHW0481-A LG0481-A / LT0481-A	M5×0.8	5.0
	LHA0550-A / LHC0550-A LHS0550-A / LHW0551-A LG0551-A / LT0551-A	M6×1	8.0
	LHA0650-A / LHC0650-A LHS0650-A / LHW0651-A LG0651-A / LT0651-A	M6×1	8.0
	LHA0750-A LHS0750-A / LHW0751-A LG0751-A / LT0751-A	M8×1.25	20
	LHA0900-A LHS0900-A LG0901-A	M10×1.5	40
	LHA1050-A LHS1050-A LG1051-A	M10×1.5	45

LHA-F/LHS-F/LG-F/LT-F：Quick Change Lever Option F,
TLA-2/TLB-2/TLA-1：Standard

Model No.		Thread Size	Tightening Torque (N·m)
LHA–F LHS–F LG–F LT–F	LG0301-F / LT0301-F	M5×0.8	7.5
	LHA0360-F / LHS0360-F LG0361-F / LT0361-F	M6×1	14
	LHA0400-F / LHS0400-F LG0401-F / LT0401-F	M8×1	33
	LHA0480-F / LHS0480-F LG0481-F / LT0481-F	M10×1.25	65
	LHA0550-F / LHS0550-F LG0551-F / LT0551-F	M12×1.5	100 ~ 114
	LHA0650-F / LHS0650-F LG0651-F / LT0651-F	M14×1.5	160 ~ 180
	LHA0750-F / LHS0750-F LG0751-F / LT0751-F	M16×1.5	250 ~ 280
	LHA0900-F / LHS0900-F LG0901-F	M20×2	500 ~ 540
	LHA1050-F / LHS1050-F LG1051-F	M24×2	760 ~ 810
TLA-2 TLB-2 TLA-1	TLA0401-2 / TLB0401-2 TLA0402-1	M6×1	13
	TLA0601-2 / TLB0601-2 TLA0602-1	M8×1	32
	TLA0801-2 / TLB0801-2 TLA0802-1	M8×1	32
	TLA1001-2 / TLB1001-2 TLA1002-1	M10×1.25	63
	TLA1601-2 / TLB1601-2 TLA1602-1	M12×1.5	100
	TLA2001-2 / TLB2001-2 TLA2002-1	M14×1.5	160
	TLA2501-2 / TLB2501-2 TLA2502-1	M16×1.5	250
	TLA4001-2 / TLB4001-2 TLA4002-1	M20×2	500

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

Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LG/LT
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LJ/LM
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Linear Cylinder / Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA/DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
BZS
Pallet Clamp
VS/VT
Expansion Locating Pin
VFL/VFM
VFJ/VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

Cautions

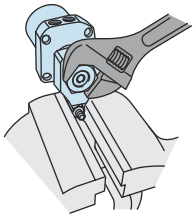
Installation Notes

In case of Taper Lock Lever

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

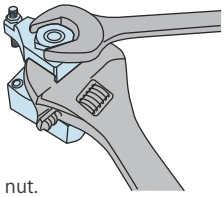
Installation Procedure

① With a clamp positioned to a jig, determine the lever position, and tighten the nut for fixing the lever (temporal tightening).



② Remove the clamp from the jig, fix the lever with a machine vise etc., and tighten the nut.

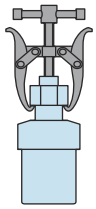
③ If tightening the nut with the clamp positioned to the jig, use a wrench to the hexagon part of piston rod, or fix the lever with a spanner. It is best to bring the lever to the middle of the swing stroke before tightening the nut.



Removal Procedure

① While the clamp is on the jig or vise, use a hex wrench to bring the lever to the middle of the swing stroke and then loosen the nut.

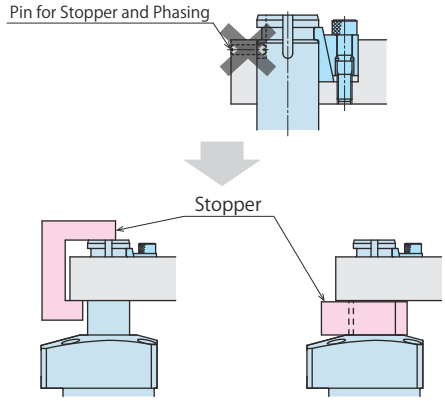
② Loosen the nut after securing the lever two or three turns then remove the lever with a puller without any rotational torque applied on the piston rod.



In case of Quick Change Lever Option A

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

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



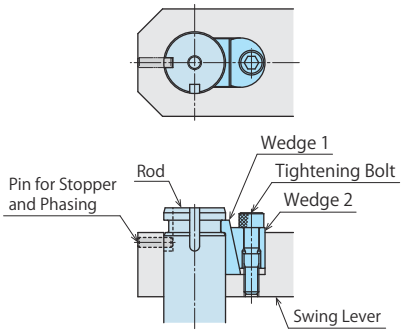
Installation Procedure

① Install in order of swing lever, wedge 1, wedge 2 to the rod.

② Pull the lever towards the wedge side and tighten the tightening bolt with the specified torque.

Removal Procedure

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



4) Swing Speed Adjustment

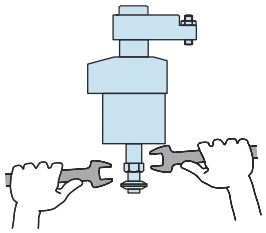
- Adjust the speed following "Allowable Swing Time Graph". If the clamp operates too fast the parts will be worn out leading to premature damage and ultimately complete equipment failure.
- Please make sure to release air from the circuit before adjusting speed. It will be difficult to adjust the speed accurately with air mixed in the circuit.
- Turn the speed control valve gradually from the low-speed side (small flow) to the high-speed side (large flow) to adjust the speed.

5) Checking Looseness and Retightening

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

6) Notes on dual rod option (-D) for dog application.

- When attaching dog, set up the piston so that it will not turn around. Please secure the dog or cam and prevent any rotation or torque on the piston rod. Tightening torque of mounting screw is shown in the table below.



Model No.	Thread Size	Tightening Torque (N·m)
LHA0360–□□D	M4×0.7	3.2
LHA0400–□□D	M6×1	10
LHA0480–□□D	M8×1.25	25
LHA0550–□□D	M8×1.25	25
LHA0650–□□D	M8×1.25	25
LHA0750–□□D	M10×1.5	50
LHA0900–□□D	M10×1.5	50
LHA1050–□□D	M10×1.5	50

※ Please refer to P.1355 for common cautions. • Installation Notes • Hydraulic Fluid List • Notes on Hydraulic Cylinder Speed Control Circuit • Notes on Handling • Maintenance/Inspection • Warranty

Cautions

Installation Notes (For Hydraulic Series)

1) Check the Usable Fluid

- Please use the appropriate fluid by referring to the Hydraulic Fluid List.

2) Procedure before Piping

- The pipeline, piping connector and fixture circuits should be cleaned by thorough flushing.
- The dust and cutting chips in the circuit may lead to fluid leakage and malfunction.
- There is no filter provided with Kosmek's product except for a part of valves which prevents foreign materials and contaminants from getting into the circuit.

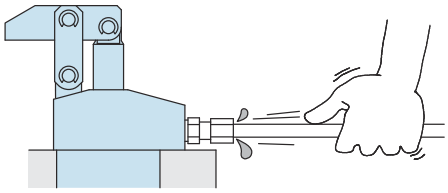
3) Applying Sealing Tape

- Wrap with tape 1 to 2 times following the screw direction.
- Pieces of the sealing tape can lead to oil leakage and malfunction.
- Please implement piping construction in a clear environment to prevent anything getting in products.

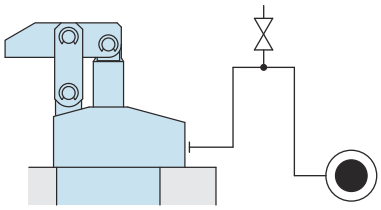
4) Air Bleeding of the Hydraulic Circuit

- If the hydraulic circuit has excessive air, the action time may become very long. If air enters the circuit after connecting the hydraulic port or under the condition of no air in the oil tank, please perform the following steps.

① Reduce hydraulic pressure to less than 2MPa.
② Loosen the cap nut of pipe fitting closest to the clamp by one full turn.
③ Shake the pipeline to loosen the outlet of pipe fitting.
Hydraulic fluid mixed with air comes out.



④ Tighten the cap nut after bleeding.
⑤ It is more effective to release air at the highest point inside the circuit or at the end of the circuit.
(Set an air bleeding valve at the highest point inside the circuit.)



5) Checking Looseness and Retightening

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

Hydraulic Fluid List

ISO Viscosity Grade ISO-VG-32

Maker	Anti-Wear Hydraulic Oil	Multi-Purpose Hydraulic Oil
Showa Shell Sekiyu	Tellus S2 M 32	Morlina S2 B 32
Idemitsu Kosan	Daphne Hydraulic Fluid 32	Daphne Super Multi Oil 32
JX Nippon Oil & Energy	Super Hyrando 32	Super Mulpus DX 32
Cosmo Oil	Cosmo Hydro AW32	Cosmo New Mighty Super 32
ExxonMobil	Mobil DTE 24	Mobil DTE 24 Light
Matsumura Oil	Hydol AW-32	
Castrol	Hyspin AWS 32	

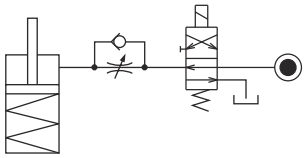
Note : Please contact manufacturers when customers require products in the list above.

Notes on Hydraulic Cylinder Speed Control Unit

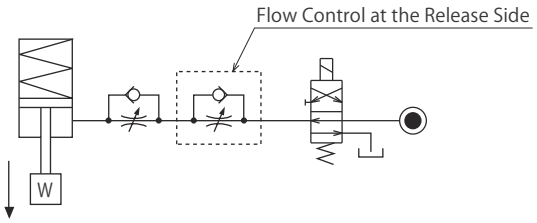
Please pay attention to the cautions below. Design the hydraulic circuit for controlling the action speed of hydraulic cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

Flow Control Circuit for Single Acting Cylinder

For spring return single acting cylinders, restricting flow during release can extremely slow down or disrupt release action. The preferred method is to control the flow during the lock action using a valve that has free-flow in the release direction. It is also preferred to provide a flow control valve at each actuator.



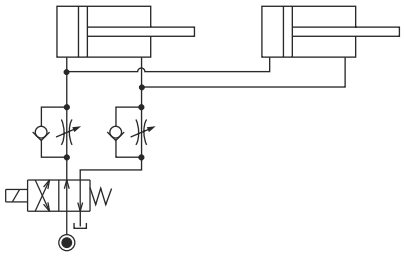
Accelerated clamping speed by excessive hydraulic flow to the cylinder may sustain damage. In this case add flow control to regulate flow. (Please add flow control to release flow if the lever weight is put on at the time of release action when using swing clamps.)



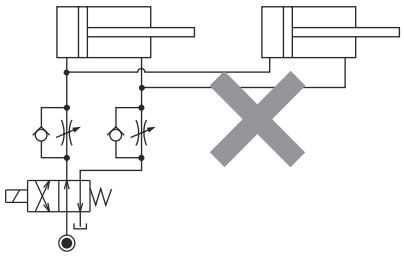
Flow Control Circuit for Double Acting Cylinder

Flow control circuit for double acting cylinder should have meter-out circuits for both the lock and release sides. Meter-in control can have adverse effect by presence of air in the system.
However, in the case of controlling LKE, TMA, TLA, both lock side and release side should be meter-in circuit.
Refer to P.75 for speed adjustment of LKE.
For TMA and TLA, if meter-out circuit is used, abnormal high pressure is created, which causes oil leakage and damage.

【Meter-out Circuit】(Except LKE/TMA/TLA)

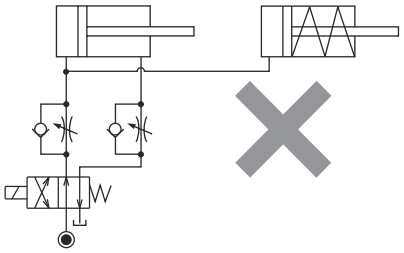


【Meter-in Circuit】(LKE/TMA/TLA must be controlled with meter-in.)



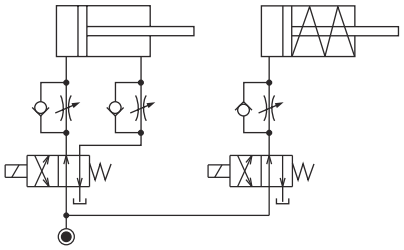
In the case of meter-out circuit, the hydraulic circuit should be designed with the following points.

① Single acting components should not be used in the same flow control circuit as the double acting components.
The release action of the single acting cylinders may become erratic or very slow.

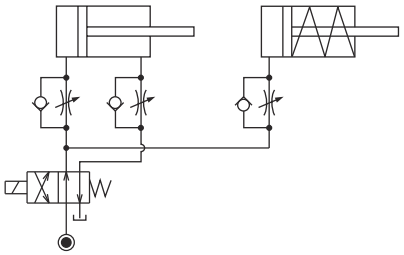


Refer to the following circuit when both the single acting cylinder and double acting cylinder are used together.

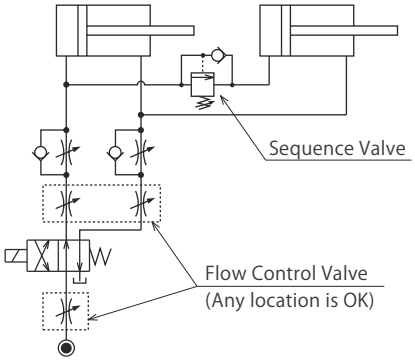
○ Separate the control circuit.



○ Reduce the influence of double acting cylinder control unit. However, due to the back pressure in tank line, single action cylinder is activated after double action cylinder works.



② In the case of meter-out circuit, the inner circuit pressure may increase during the cylinder action because of the fluid supply. The increase of the inner circuit pressure can be prevented by reducing the supplied fluid beforehand via the flow control valve. Especially when using sequence valve or pressure switches for clamping detection. If the back pressure is more than the set pressure then the system will not work as it is designed to.



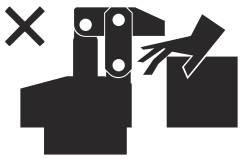
Cautions

Notes on Handling

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

2) Do not operate or remove the product unless the safety protocols are ensured.
① The machine and equipment can only be inspected or prepared when it is confirmed that the safety devices are in place.
② Before the product is removed, make sure that the above-mentioned safety devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
③ After stopping the product, do not remove until the temperature drops.
④ Make sure there is no abnormality in the bolts and respective parts before restarting the machine or equipment.

3) Do not touch a clamp (cylinder) while it is working.
Otherwise, your hands may be injured due to clinching.

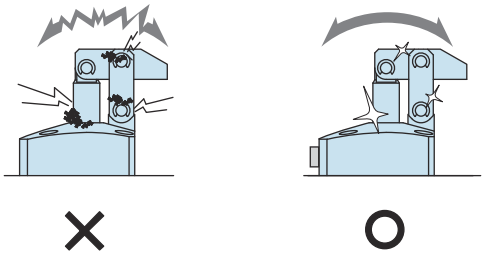


4) Do not disassemble or modify.
- If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

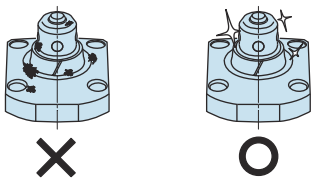
Maintenance and Inspection

1) Removal of the Machine and Shut-off of Pressure Source
- Before the machine is removed, make sure that safety devices and preventive devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
- Make sure there is no abnormality in the bolts and respective parts before restarting.

2) Regularly clean the area around the piston rod and plunger.
- If it is used when the surface is contaminated with dirt, it may lead to packing seal damage, malfunctioning and fluid leakage.



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



4) If disconnecting by couplers, air bleeding should be carried out on a regular basis to avoid air mixed in the circuit.

5) Regularly tighten nut, bolt, pin, cylinder, pipe line and others to ensure proper use.

6) Make sure the hydraulic fluid has not deteriorated.

7) Make sure there is a smooth action without an irregular noise.
- Especially when it is restarted after left unused for a long period, make sure it can be operated correctly.

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

9) Please contact us for overhaul and repair.

Warranty

1) Warranty Period

- The product warranty period is 18 months from shipment from our factory or 12 months from initial use, whichever is earlier.

2) Warranty Scope

- If the product is damaged or malfunctions during the warranty period due to faulty design, materials or workmanship, we will replace or repair the defective part at our expense.
  Defects or failures caused by the following are not covered.

① If the stipulated maintenance and inspection are not carried out.
② If the product is used while it is not suitable for use based on the operator's judgment, resulting in defect.
③ If it is used or operated in an inappropriate way by the operator. (Including damage caused by the misconduct of the third party.)
④ If the defect is caused by reasons other than our responsibility.
⑤ If repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.
⑥ Other caused by natural disasters or calamities not attributable to our company.
⑦ Parts or replacement expenses due to parts consumption and deterioration.
(Such as rubber, plastic, seal material and some electric components.)

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

Control Valve

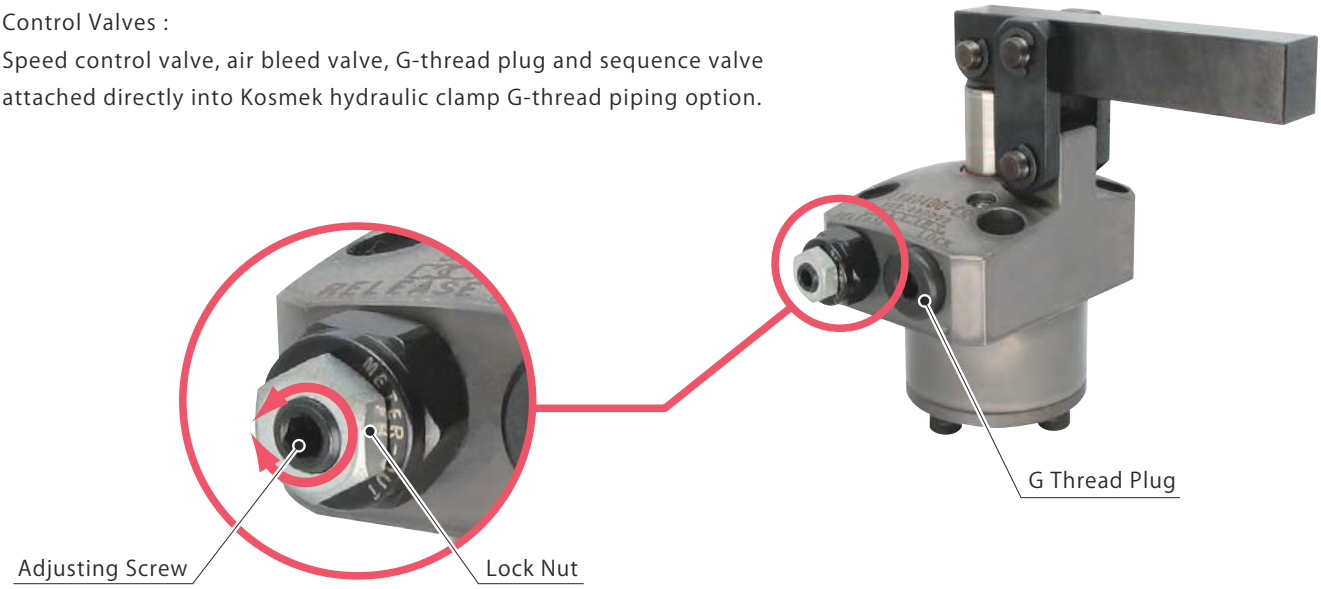
Model BZL
Model BZT
Model BZX
Model JZG
Model BZS



Directly-Attached Speed Control Valve, Air Bleed Valve, G-Thread Plug and Sequence Valve

Directly Attached to Clamps

Control Valves :
Speed control valve, air bleed valve, G-thread plug and sequence valve attached directly into Kosmek hydraulic clamp G-thread piping option.



Speed Control Valve



Speed Control Valve

Model BZL
Model BZT



Air Bleed Valve

Model BZX



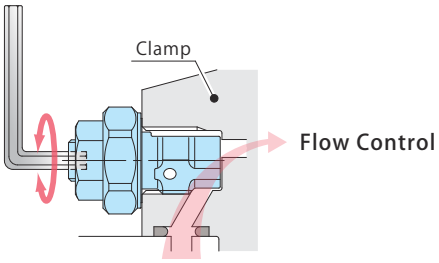
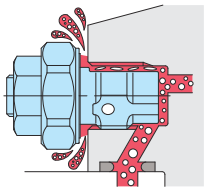
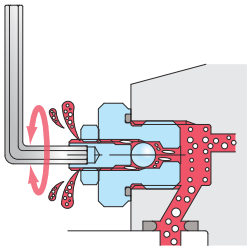
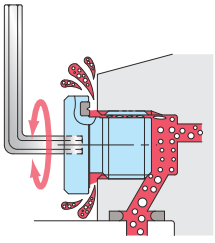
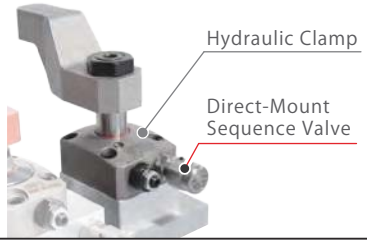
G Thread Plug

Model JZG



Direct-Mount Sequence Valve

Model BZS

	Operating Pressure Range	Action Description
Speed Control Valve (For Low Pressure) Model **BZL** → P.949 	7MPa or less	Adjust the flow rate with a wrench. Able to adjust the clamping speed individually. 
Speed Control Valve (For High Pressure) Model **BZT** → P.953	35MPa or less	Air bleeding in the circuit is possible by loosening the speed control valve. 
Air Bleed Valve Model **BZX** → P.955 	25MPa or less	Air bleeding in the circuit is possible by wrench. 
G Thread Plug Model **JZG** → P.957 	35MPa or less	Air bleeding in the circuit is possible by loosening the G thread plug. 
Direct-Mount Sequence Valve Model **BZS** → P.959 	7MPa or less	Sequence Valve directly attaches to KOSMEK hydraulic clamp's G-thread piping option. Controls the operating sequence of each actuator. 

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

Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LG/LT
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LJ/LM
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Linear Cylinder / Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA/DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
BZS
Pallet Clamp
VS/VT
Expansion Locating Pin
VFL/VFM
VFJ/VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

Model No. Indication (Speed Control Valve for Low Pressure)

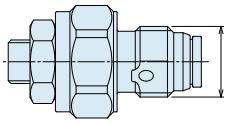


BZL 0 10 1 - B

1 2 3

1 G Thread Size

10 : Thread Part G1/8A Thread
20 : Thread Part G1/4A Thread
30 : Thread Part G3/8A Thread



2 Design No.

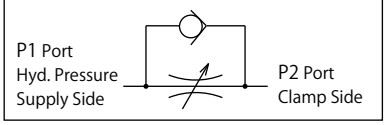
1 : Revision Number

3 Control Method

A : Meter-in
B : Meter-out

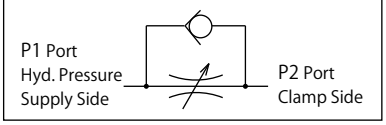
A

Circuit Symbol : Meter-in



B

Circuit Symbol : Meter-out



Specifications

Model No.		BZL0101-A	BZL0201-A	BZL0301-A	BZL0101-B	BZL0201-B	BZL0301-B
Max. Operating Pressure	MPa	7					
Withstanding Pressure	MPa	10.5					
Control Method		Meter-in			Meter-out		
G Thread Size		G1/8A	G1/4A	G3/8A	G1/8A	G1/4A	G3/8A
Cracking Pressure	MPa	0.04			0.12		
Max. Passage Area	mm^2	2.6	5.0	11.6	2.6	5.0	10.2
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32					
Operating Temperature	℃	0 ~ 70					
Tightening Torque for Main Body	N·m	10	25	35	10	25	35
Weight	g	12	26	48	12	26	48

Notes : 1. It must be mounted with recommended torque. Because of the structure of the metal seal, if mounting torque is insufficient, the flow control valve may not be able to adjust the flow rate.
2. Do not attach a used BZL to other clamps. Flow control will not be made because the bottom depth difference of G thread makes metal seal insufficient.

Applicable Products

Model No.	DBA (Double Action) Block Cylinder	DBC (Double Action) Block Cylinder	FVA (Double Action) Centering Vise	FVC (Double Action) Centering Vise	FVD (Double Action) Centering Vise	LC (Single Action) Work Support	LCW (Single Action) Work Support
BZL0101-A	(DBA0250-C□) (DBA0320-C□)	(DBC0250-C□) (DBC0320-C□)	(FVA0401) (FVA0631) (FVA1001)	(FVC0630)	(FVD1600) (FVD2500)	LC0263-C□-□ LC0303-C□□-□ LC0363-C□□-□ LC0403-C□□-□ LC0483-C□□-□ LC0553-C□□-□ LC0653-C□□-□	LCW0363-C□ LCW0403-C□ LCW0483-C□ LCW0553-C□ LCW0653-C□
BZL0101-B	DBA0250-C□ DBA0320-C□	DBC0250-C□ DBC0320-C□	FVA0401 FVA0631 FVA1001	FVC0630	FVD1600 FVD2500		
BZL0201-A	(DBA0400-C□) (DBA0500-C□)	(DBC0400-C□) (DBC0500-C□)		(FVC1000) (FVC1600)	(FVD4000)	LC0753-C□□-□ LC0903-C□□-□	
BZL0201-B	DBA0400-C□ DBA0500-C□	DBC0400-C□ DBC0500-C□		FVC1000 FVC1600	FVD4000		

Applicable Products

Model No.	LHA (Double Action) Swing Clamp	LHC (Double Action) Swing Clamp	LHD (Double Action) Swing Clamp	LHE (Double Action) High-Power Swing Clamp	LHS (Double Action) Swing Clamp	LHV (Double Action) Swing Clamp	LHW (Double Action) Swing Clamp	LT (Single Action) Swing Clamp	LG (Single Action) Swing Clamp
BZL0101-A	(LHA0360-C□□-□) (LHA0400-C□□-□) (LHA0480-C□□-□) (LHA0550-C□□-□)	(LHC0360-C□□-□) (LHC0400-C□□-□) (LHC0480-C□□-□) (LHC0550-C□□-□)	(LHD0400-C□-□) (LHD0480-C□-□) (LHD0550-C□-□)		(LHS0360-C□□-□) (LHS0400-C□□-□) (LHS0480-C□□-□) (LHS0550-C□□-□)	(LHV0400-C□E-□) (LHV0480-C□E-□) (LHV0550-C□E-□)	(LHW0401-C□□-□) (LHW0481-C□□-□) (LHW0551-C□□-□)	LT0301-C□-□ LT0361-C□-□ LT0401-C□-□ LT0481-C□-□ LT0551-C□-□	LG0301-C□-□ LG0361-C□-□ LG0401-C□-□ LG0481-C□-□ LG0551-C□-□
BZL0101-B	LHA0360-C□□-□ LHA0400-C□□-□ LHA0480-C□□-□ LHA0550-C□□-□	LHC0360-C□□-□ LHC0400-C□□-□ LHC0480-C□□-□ LHC0550-C□□-□	LHD0400-C□-□ LHD0480-C□-□ LHD0550-C□-□	LHE0300-C□ LHE0360-C□ LHE0400-C□ LHE0480-C□ LHE0550-C□	LHS0360-C□□-□ LHS0400-C□□-□ LHS0480-C□□-□ LHS0550-C□□-□	LHV0400-C□E-□ LHV0480-C□E-□ LHV0550-C□E-□	LHW0401-C□□-□ LHW0481-C□□-□ LHW0551-C□□-□		
BZL0201-A	(LHA0650-C□□-□) (LHA0750-C□□-□)	(LHC0650-C□□-□)			(LHS0650-C□□-□) (LHS0750-C□□-□)	(LHV0650-C□E-□) (LHV0750-C□E-□)	(LHW0651-C□□-□) (LHW0751-C□□-□)	LT0651-C□-□ LT0751-C□-□	LG0651-C□-□ LG0751-C□-□
BZL0201-B	LHA0650-C□□-□ LHA0750-C□□-□	LHC0650-C□□-□			LHS0650-C□□-□ LHS0750-C□□-□	LHV0650-C□E-□ LHV0750-C□E-□	LHW0651-C□□-□ LHW0751-C□□-□		
BZL0301-A	(LHA0900-C□□-□) (LHA1050-C□□-□)				(LHS0900-C□□-□) (LHS1050-C□□-□)				LG0901-C□-□ LG1051-C□-□
BZL0301-B	LHA0900-C□□-□ LHA1050-C□□-□				LHS0900-C□□-□ LHS1050-C□□-□				

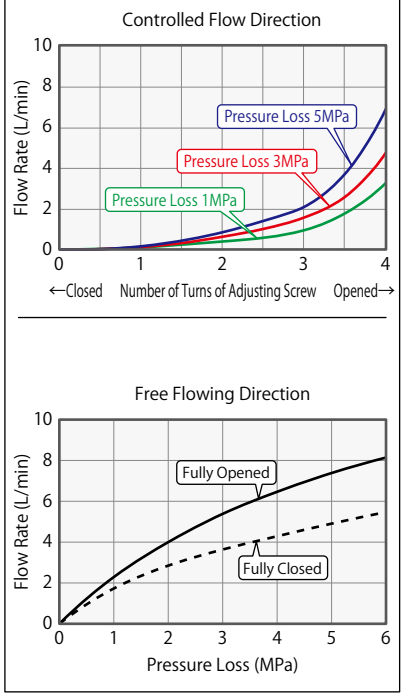
Model No.	LGV (Single Action) Swing Clamp	LKA (Double Action) Link Clamp	LKC (Double Action) Link Clamp	LKE (Double Action) High-Power Link Clamp	LKK (Double Action) Universal Clamp	LKV (Double Action) Link Clamp	LKW (Double Action) Link Clamp	LM (Single Action) Link Clamp	LJ (Single Action) Link Clamp
BZL0101-A	LGV0400-C□□ LGV0480-C□□ LGV0550-C□□	(LKA0360-C□□-□) (LKA0400-C□□-□) (LKA0480-C□□-□) (LKA0550-C□□-□)	(LKC0400-C□-□) (LKC0480-C□-□) (LKC0550-C□-□)	LKE0300-C□ LKE0360-C□ LKE0400-C□ LKE0480-C□ LKE0550-C□	(LKK0360-C-□) (LKK0400-C-□) (LKK0480-C-□) (LKK0550-C-□)	(LKV0400-C□E-□) (LKV0480-C□E-□) (LKV0550-C□E-□)	(LKW0401-C□□-□) (LKW0481-C□□-□) (LKW0551-C□□-□)	LM0300-C□ LM0360-C□ LM0400-C□ LM0480-C□ LM0550-C□	LJ0302-C□ LJ0362-C□ LJ0402-C□ LJ0482-C□ LJ0552-C□
BZL0101-B		LKA0360-C□□-□ LKA0400-C□□-□ LKA0480-C□□-□ LKA0550-C□□-□	LKC0400-C□-□ LKC0480-C□-□ LKC0550-C□-□		LKK0360-C-□ LKK0400-C-□ LKK0480-C-□ LKK0550-C-□	LKV0400-C□E-□ LKV0480-C□E-□ LKV0550-C□E-□	LKW0401-C□□-□ LKW0481-C□□-□ LKW0551-C□□-□		
BZL0201-A	LGV0650-C□□ LGV0750-C□□	(LKA0650-C□□-□) (LKA0750-C□□-□)	(LKC0650-C□-□)		(LKK0650-C-□)	(LKV0650-C□E-□) (LKV0750-C□E-□)	(LKW0651-C□□-□) (LKW0751-C□□-□)	LM0650-C□ LM0750-C□	LJ0652-C□ LJ0752-C□
BZL0201-B		LKA0650-C□□-□ LKA0750-C□□-□	LKC0650-C□-□		LKK0650-C-□	LKV0650-C□E-□ LKV0750-C□E-□	LKW0651-C□□-□ LKW0751-C□□-□		
BZL0301-A		(LKA0900-C□□-□) (LKA1050-C□□-□)							LJ0902-C□ LJ1052-C□
BZL0301-B		LKA0900-C□□-□ LKA1050-C□□-□							

Model No.	LJV (Single Action) Link Clamp	LFW (Double Action) Link Clamp	LFA (Double Action) Link Clamp	LSA (Double Action) Side Clamp	LSE (Double Action) High-Power Side Clamp	LL (Double Action) Linear Cylinder	LLR (Double Action) Linear Cylinder	LLV (Double Action) Lift Cylinder	LLW (Double Action) Lift Cylinder
BZL0101-A	LJV0400-C□□ LJV0480-C□□ LJV0550-C□□	(LFW0480-C□J) (LFW0550-C□J)	(LFA0480-C□□) (LFA0550-C□□)	(LSA0360-C-□)	LSE0360-C-□	(LL0360-C□□-□) (LL0400-C□□-□) (LL0480-C□□-□) (LL0550-C□□-□)	(LLR0360-C□□-□-□) (LLR0400-C□□-□-□) (LLR0480-C□□-□-□) (LLR0550-C□□-□-□)	(LLV0360-C□E-□) (LLV0400-C□E-□) (LLV0480-C□E-□)	(LLW0361-C□□-□) (LLW0401C□□-□) (LLW0481-C□□-□)
BZL0101-B		LFW0480-C□J LFW0550-C□J	LFA0480-C□□ LFA0550-C□□	LSA0360-C-□		LL0360-C□□-□ LL0400-C□□-□ LL0480-C□□-□ LL0550-C□□-□	LLR0360-C□□-□-□ LLR0400-C□□-□-□ LLR0480-C□□-□-□ LLR0550-C□□-□-□	LLV0360-C□E-□ LLV0400-C□E-□ LLV0480-C□E-□	LLW0361-C□□-□ LLW0401-C□□-□ LLW0481-C□□-□
BZL0201-A	LJV0650-C□□ LJV0750-C□□	(LFW0650-C□J) (LFW0750-C□J)	(LFA0650-C□□) (LFA0750-C□□)			(LL0650-C□□-□) (LL0750-C□□-□)	(LLR0650-C□□-□-□) (LLR0750-C□□-□-□)		
BZL0201-B		LFW0650-C□J LFW0750-C□J	LFA0650-C□□ LFA0750-C□□			LL0650-C□□-□ LL0750-C□□-□	LLR0650-C□□-□-□ LLR0750-C□□-□-□		
BZL0301-A						(LL0900-C□□-□) (LL1050-C□□-□)	(LLR0900-C□□-□-□) (LLR1050-C□□-□-□)		
BZL0301-B						LL0900-C□□-□ LL1050-C□□-□	LLR0900-C□□-□-□ LLR1050-C□□-□-□		

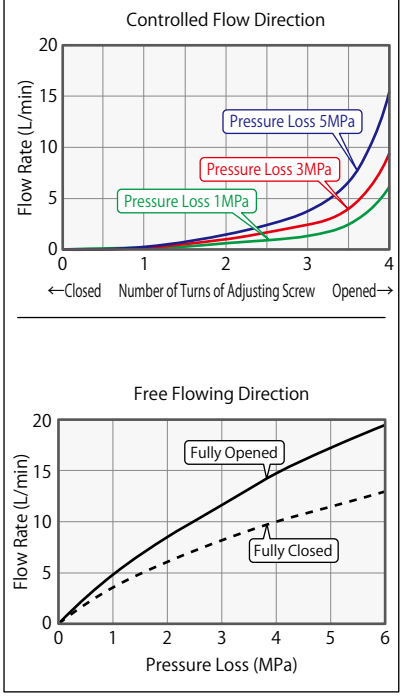
Note : 1. Flow control circuit for double acting cylinder should have meter-out circuits for both the lock and release sides (except model LKE/LSE). Meter-in circuits can be adversely affected by any air in the system.

Flow Rate Graph ＜Hydraulic Fluids ISO-VG32（25～35℃）＞

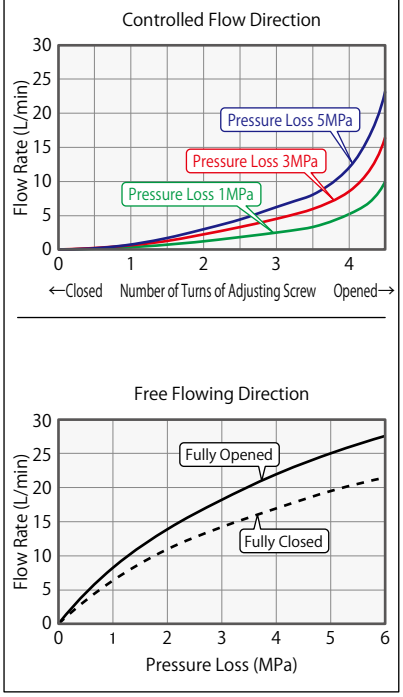
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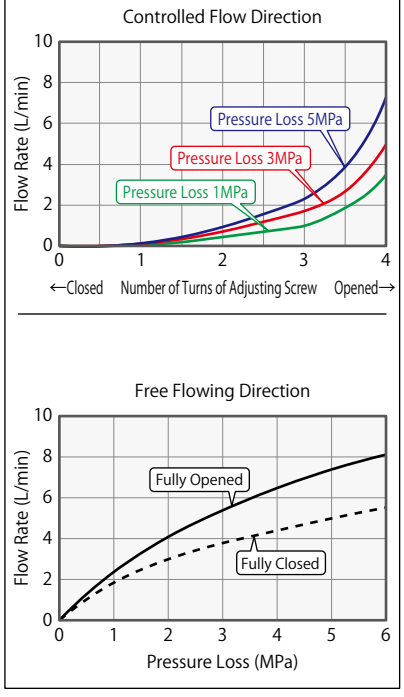
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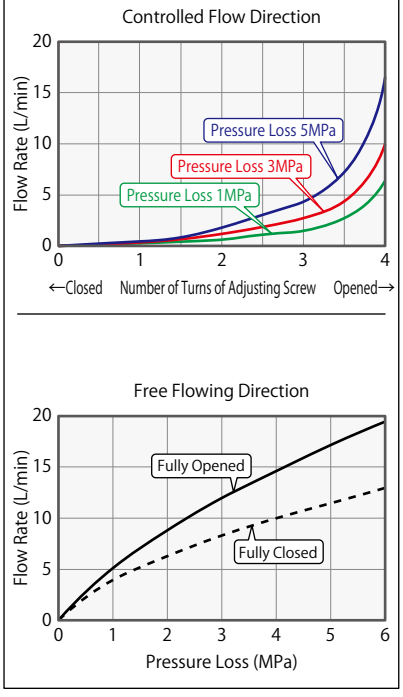
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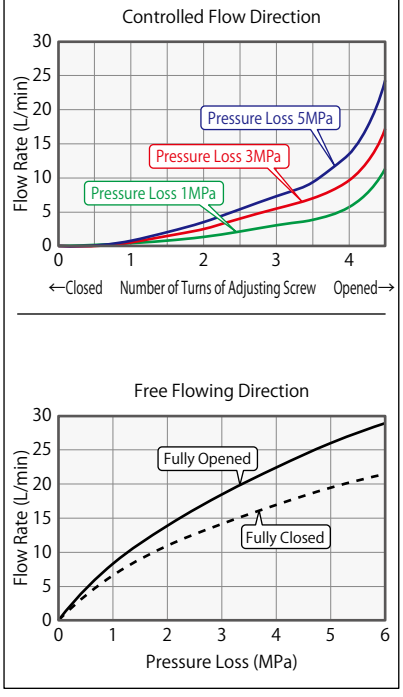
BZL0101-B：Meter-out



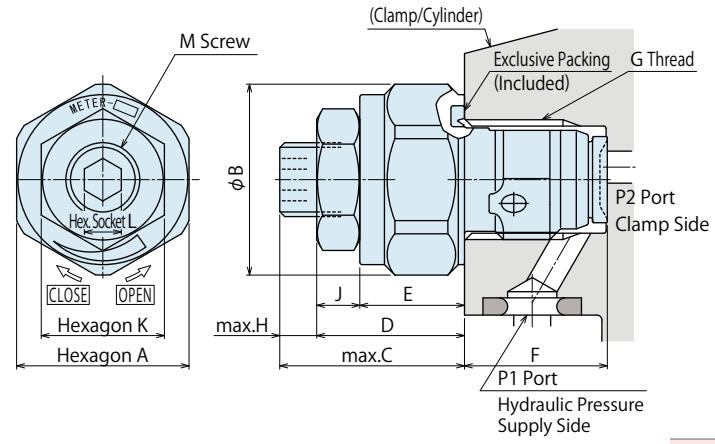
BZL0201-B：Meter-out



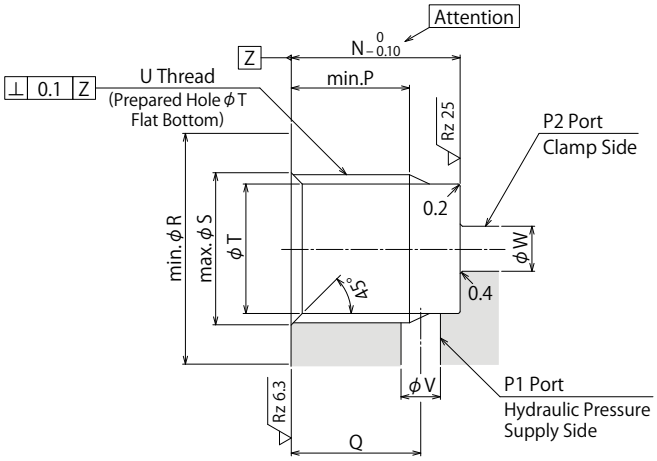
BZL0301-B：Meter-out



External Dimensions



Machining Dimensions of Mounting Area



(mm)

Model No.	BZL0101-□	BZL0201-□	BZL0301-□
A	14	18	22
B	15.5	20	24
C	15	16	19
D	12	13	16
E	8.5	9.5	11
F	(11.6)	(15.1)	(17.6)
G	G1/8	G1/4	G3/8
H	3	3	3
J	3.5	3.5	5
K	10	10	13
L	3	3	4
M (Nominal×Pitch)	M6×0.75	M6×0.75	M8×0.75
N	11.5	15	17.5
P	8.5	11※1	13
Q	9	11.5	13
R (Flat Surface Area)	16	20.5	24.5
S	10	13.5	17
T	8.7	11.5	15
U	G1/8	G1/4	G3/8
V	2 ~ 3	3 ~ 4	4 ~ 5
W	2.5 ~ 5	3.5 ~ 7	4.5 ~ 9

Notes :

1. Since the ▽Rz 6.3 area is sealing part, be careful not to damage it.
2. Since the ▽Rz 12.5 area is the metal sealing part of BZL, be careful not to damage it. (Especially when deburring)
3. No cutting chips or burr should be at the tolerance part of machining hole.
4. As shown in the drawing, P1 port is used as the hydraulic supply side and P2 port as the clamp side.
5. If mounting plugs or fittings with G thread specification available in the market, the dimension '※1' should be 12.5.

Notes

1. Please read "Notes on Hydraulic Cylinder Speed Control Unit" for proper hydraulic circuit design.
   Improper circuit design may lead to malfunctions and damages. (Refer to P.1356)
2. It is dangerous to release the air under high pressure. It must be done under lower pressure.
   (For reference : the minimum operating range of the product within the circuit.)

High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LG/LT
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LJ/LM
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Linear Cylinder / Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA/DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
BZS
Pallet Clamp
VS/VT
Expansion Locating Pin
VFL/VFM
VFJ/VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

Model No. Indication (Air Bleed Valve)

BZX0 1 0

1 2

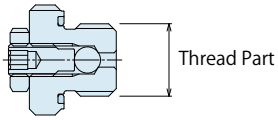


1 G Thread Size

1 : Thread Part G1/8A Thread

2 : Thread Part G1/4A Thread

3 : Thread Part G3/8A Thread



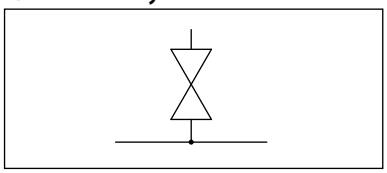
2 Design No.

0 : Revision Number

Specifications

Model No.		BZX010	BZX020	BZX030
Max. Operating Pressure	MPa	35		
Withstanding Pressure	MPa	42		
G Thread Size		G1/8A	G1/4A	G3/8A
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32		
Operating Temperature	℃	0 ~ 70		
Tightening Torque for Main Body	N·m	10	25	35
Weight	g	12	23	36

Circuit Symbol



Notes : 1. Do not over-loosen the plug during air venting.
(Do not loosen further than 2 turns from the fully closed position.)
2. Air bleeding under high pressure is dangerous. It must be done under lower pressure.
(For reference : the minimum operation pressure range of the product within the circuit)
3. Refer to the machining dimensions of BZL mounting area when installing BZX into a hydraulic circuit.

Applicable Products

Model No.	DBA (Double Action) Block Cylinder	DBC (Double Action) Block Cylinder	FVA (Double Action) Centering Vise	FVC (Double Action) Centering Vise	FVD (Double Action) Centering Vise	LC (Single Action) Work Support	LCW (Single Action) Work Support	TC (Single Action) Work Support
BZX010	DBA0250-C□ DBA0320-C□	DBC0250-C□ DBC0320-C□	FVA0401 FVA0631 FVA1001	FVC0630	FVD1600 FVD2500	LC0263-C□-□ LC0303-C□□-□ LC0363-C□□-□ LC0403-C□□-□ LC0483-C□□-□ LC0553-C□□-□ LC0653-C□□-□	LCW0363-C□ LCW0403-C□ LCW0483-C□ LCW0553-C□ LCW0653-C□	TC0403-C□-□-□ TC0483-C□-□-□ TC0553-C□-□-□ TC0653-C□-□-□ TC0753-C□-□-□
BZX020	DBA0400-C□ DBA0500-C□	DBC0400-C□ DBC0500-C□		FVC1000 FVC1600	FVD4000	LC0753-C□□-□ LC0903-C□□-□		

Applicable Products

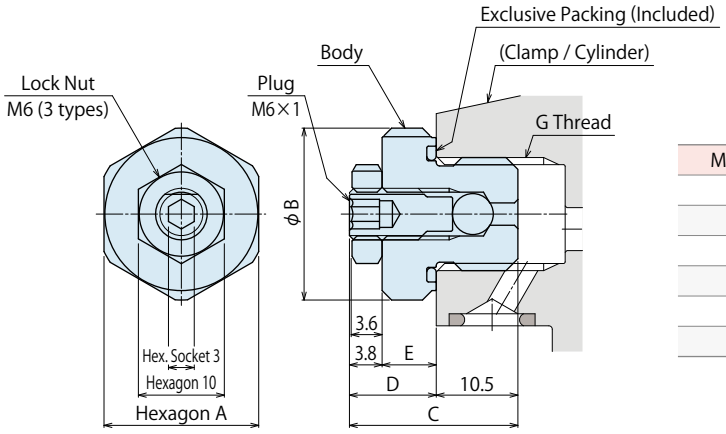
Model No.	LHA (Double Action) Swing Clamp	LHC (Double Action) Swing Clamp	LHD (Double Action) Swing Clamp	LHE (Double Action) High-Power Swing Clamp	LHS (Double Action) Swing Clamp	LHV (Double Action) Swing Clamp	LHW (Double Action) Swing Clamp	LT (Single Action) Swing Clamp	LG (Single Action) Swing Clamp
BZX010	LHA0360-C□□-□ LHA0400-C□□-□ LHA0480-C□□-□ LHA0550-C□□-□	LHC0360-C□□-□ LHC0400-C□□-□ LHC0480-C□□-□ LHC0550-C□□-□	LHD0400-C□-□ LHD0480-C□-□ LHD0550-C□-□	LHE0300-C□ LHE0360-C□ LHE0400-C□ LHE0480-C□ LHE0550-C□	LHS0360-C□□-□ LHS0400-C□□-□ LHS0480-C□□-□ LHS0550-C□□-□	LHV0400-C□E-□ LHV0480-C□E-□ LHV0550-C□E-□	LHW0401-C□□-□ LHW0481-C□□-□ LHW0551-C□□-□	LT0301-C□-□ LT0361-C□-□ LT0401-C□-□ LT0481-C□-□ LT0551-C□-□	LG0301-C□-□ LG0361-C□-□ LG0401-C□-□ LG0481-C□-□ LG0551-C□-□
BZX020	LHA0650-C□□-□ LHA0750-C□□-□	LHC0650-C□□-□			LHS0650-C□□-□ LHS0750-C□□-□	LHV0650-C□E-□ LHV0750-C□E-□	LHW0651-C□□-□ LHW0751-C□□-□	LT0651-C□-□ LT0751-C□-□	LG0651-C□-□ LG0751-C□-□
BZX030	LHA0900-C□□-□ LHA1050-C□□-□				LHS0900-C□□-□ LHS1050-C□□-□				LG0901-C□-□ LG1051-C□-□

Model No.	LGV (Single Action) Swing Clamp
BZX010	LGV0400-C□□ LGV0480-C□□ LGV0550-C□□
BZX020	LGV0650-C□□ LGV0750-C□□
BZX030	

Model No.	LKA (Double Action) Link Clamp	LKC (Double Action) Link Clamp	LKE (Double Action) High-Power Link Clamp	LKK (Double Action) Universal Clamp	LKV (Double Action) Link Clamp	LKW (Double Action) Link Clamp	LM (Single Action) Link Clamp	LJ (Single Action) Link Clamp	LJV (Single Action) Link Clamp
BZX010	LKA0360-C□□-□ LKA0400-C□□-□ LKA0480-C□□-□ LKA0550-C□□-□	LKC0400-C□-□ LKC0480-C□-□ LKC0550-C□-□	LKE0300-C□ LKE0360-C□ LKE0400-C□ LKE0480-C□ LKE0550-C□	LKK0360-C-□ LKK0400-C-□ LKK0480-C-□ LKK0550-C-□	LKV0400-C□E-□ LKV0480-C□E-□ LKV0550-C□E-□	LKW0401-C□□-□ LKW0481-C□□-□ LKW0551-C□□-□	LM0300-C□ LM0360-C□ LM0400-C□ LM0480-C□ LM0550-C□	LJ0302-C□ LJ0362-C□ LJ0402-C□ LJ0482-C□ LJ0552-C□	LJV0400-C□□ LJV0480-C□□ LJV0550-C□□
BZX020	LKA0650-C□□-□ LKA0750-C□□-□	LKC0650-C□-□		LKK0650-C-□	LKV0650-C□E-□ LKV0750-C□E-□	LKW0651-C□□-□ LKW0751-C□□-□	LM0650-C□ LM0750-C□	LJ0652-C□ LJ0752-C□	LJV0650-C□□ LJV0750-C□□
BZX030	LKA0900-C□□-□ LKA1050-C□□-□							LJ0902-C□ LJ1052-C□	

Model No.	LFW (Double Action) Link Clamp	LFA (Double Action) Link Clamp	LSA (Double Action) Side Clamp	LSE (Double Action) High-Power Side Clamp	LL (Double Action) Linear Cylinder	LLR (Double Action) Linear Cylinder	LLV (Double Action) Lift Cylinder	LLW (Double Action) Lift Cylinder	TTA (Double Action) Linear Cylinder
BZX010	LFW0480-C□J LFW0550-C□J	LFA0480-C□□ LFA0550-C□□	LSA0360-C-□	LSE0360-C-□	LL0360-C□□-□ LL0400-C□□-□ LL0480-C□□-□ LL0550-C□□-□	LLR0360-C□□-□-□ LLR0400-C□□-□-□ LLR0480-C□□-□-□ LLR0550-C□□-□-□	LLV0360-C□E-□ LLV0400-C□E-□ LLV0480-C□E-□	LLW0361-C□□-□ LLW0401-C□□-□ LLW0481-C□□-□	TTA0360-C□-□ TTA0400-C□-□ TTA0480-C□-□ TTA0550-C□-□
BZX020	LFW0650-C□J LFW0750-C□J	LFA0650-C□□ LFA0750-C□□			LL0650-C□□-□ LL0750-C□□-□	LLR0650-C□□-□-□ LLR0750-C□□-□-□			TTA0650-C□-□
BZX030					LL0900-C□□-□ LL1050-C□□-□	LLR0900-C□□-□-□ LLR1050-C□□-□-□			

External Dimensions



(mm)

Model No.	BZX010	BZX020	BZX030
A	14	18	22
B	15.5	20	24
C	19.8	20.6	20.6
D	9.3	10.1	10.1
E	5.5	6.3	6.3
G	G1/8	G1/4	G3/8

High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LG/LT
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LJ/LM
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Linear Cylinder / Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA/DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
BZS
Pallet Clamp
VS/VT
Expansion Locating Pin
VFL/VFM
VFJ/VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

Model No. Indication (G Thread Plug with Air Bleeding Function) PAT.

JZG0 1 0

1 2

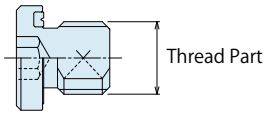


1 G Thread Size

1 : Thread Part G1/8A Thread

2 : Thread Part G1/4A Thread

3 : Thread Part G3/8A Thread



2 Design No.

0 : Revision Number

Specifications

Model No.		JZG010	JZG020	JZG030
Max. Operating Pressure	MPa	35		
Withstanding Pressure	MPa	42		
G Thread Size		G1/8A	G1/4A	G3/8A
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32		
Operating Temperature	℃	0 ~ 70		
Tightening Torque for Main Body N·m	Female Thread Side Material : Steel	10	25	35
	Female Thread Side Material : Aluminum (For LT/LM※1)	8	20	28
Weight	g	7	15	23

Notes : 1. Air bleeding under high pressure is dangerous. It must be done under lower pressure.
(For reference : the minimum operation pressure range of the product within the circuit)
2. Refer to the machining dimensions of BZL mounting area when installing JZG into a hydraulic circuit.
※1. Body material of LT/LM is aluminum alloy, so install it with the tightening torque for aluminum.

Applicable Products

Model No.	LHA (Double Action) Swing Clamp	LHC (Double Action) Swing Clamp	LHD (Double Action) Swing Clamp	LHE (Double Action) High-Power Swing Clamp	LHS (Double Action) Swing Clamp	LHV (Double Action) Swing Clamp	LHW (Double Action) Swing Clamp	LT (Single Action) Swing Clamp	LG (Single Action) Swing Clamp
JZG010	LHA0360-C□□-□ LHA0400-C□□-□ LHA0480-C□□-□ LHA0550-C□□-□	LHC0360-C□□-□ LHC0400-C□□-□ LHC0480-C□□-□ LHC0550-C□□-□	LHD0400-C□-□ LHD0480-C□-□ LHD0550-C□-□	LHE0300-C□ LHE0360-C□ LHE0400-C□ LHE0480-C□ LHE0550-C□	LHS0360-C□□-□ LHS0400-C□□-□ LHS0480-C□□-□ LHS0550-C□□-□	LHV0400-C□E-□ LHV0480-C□E-□ LHV0550-C□E-□	LHW0401-C□□-□ LHW0481-C□□-□ LHW0551-C□□-□	LT0301-C□-□ LT0361-C□-□ LT0401-C□-□ LT0481-C□-□ LT0551-C□-□	LG0301-C□-□ LG0361-C□-□ LG0401-C□-□ LG0481-C□-□ LG0551-C□-□
JZG020	LHA0650-C□□-□ LHA0750-C□□-□	LHC0650-C□□-□			LHS0650-C□□-□ LHS0750-C□□-□	LHV0650-C□E-□ LHV0750-C□E-□	LHW0651-C□□-□ LHW0751-C□□-□	LT0651-C□-□ LT0751-C□-□	LG0651-C□-□ LG0751-C□-□
JZG030	LHA0900-C□□-□ LHA1050-C□□-□				LHS0900-C□□-□ LHS1050-C□□-□				LG0901-C□-□ LG1051-C□-□

Model No.	LGV (Single Action) Swing Clamp	DBA (Double Action) Block Cylinder	DBC (Double Action) Block Cylinder	FVA (Double Action) Centering Vise	FVC (Double Action) Centering Vise	FVD (Double Action) Centering Vise	LC (Single Action) Work Support	LCW (Single Action) Work Support	TC (Single Action) Work Support
JZG010	LGV0400-C□□ LGV0480-C□□ LGV0550-C□□	DBA0250-C□ DBA0320-C□	DBC0250-C□ DBC0320-C□	FVA0401 FVA0631 FVA1001	FVC0630	FVD1600 FVD2500	LC0263-C□-□ LC0303-C□□-□ LC0363-C□□-□ LC0403-C□□-□ LC0483-C□□-□ LC0553-C□□-□ LC0653-C□□-□	LCW0363-C□ LCW0403-C□ LCW0483-C□ LCW0553-C□ LCW0653-C□	TC0403-C□-□-□ TC0483-C□-□-□ TC0553-C□-□-□ TC0653-C□-□-□ TC0753-C□-□-□
JZG020	LGV0650-C□□ LGV0750-C□□	DBA0400-C□ DBA0500-C□	DBC0400-C□ DBC0500-C□		FVC1000 FVC1600	FVD4000	LC0753-C□□-□ LC0903-C□□-□		

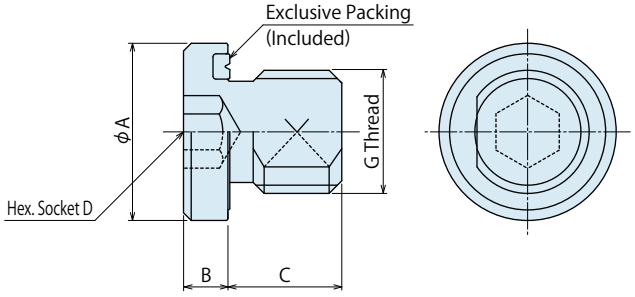
Applicable Products

Model No.	LKA (Double Action) Link Clamp	LKC (Double Action) Link Clamp	LKE (Double Action) High-Power Link Clamp	LKK (Double Action) Universal Clamp	LKV (Double Action) Link Clamp	LKW (Double Action) Link Clamp	LM (Single Action) Link Clamp	LJ (Single Action) Link Clamp	LJV (Single Action) Link Clamp
JZG010	LKA0360-C□□-□ LKA0400-C□□-□ LKA0480-C□□-□ LKA0550-C□□-□	LKC0400-C□-□ LKC0480-C□-□ LKC0550-C□-□	LKE0300-C□ LKE0360-C□ LKE0400-C□ LKE0480-C□ LKE0550-C□	LKK0360-C-□ LKK0400-C-□ LKK0480-C-□ LKK0550-C-□	LKV0400-C□E-□ LKV0480-C□E-□ LKV0550-C□E-□	LKW0401-C□□-□ LKW0481-C□□-□ LKW0551-C□□-□	LM0300-C□ LM0360-C□ LM0400-C□ LM0480-C□ LM0550-C□	LJ0302-C□ LJ0362-C□ LJ0402-C□ LJ0482-C□ LJ0552-C□	LJV0400-C□□ LJV0480-C□□ LJV0550-C□□
JZG020	LKA0650-C□□-□ LKA0750-C□□-□	LKC0650-C□-□		LKK0650-C-□	LKV0650-C□E-□ LKV0750-C□E-□	LKW0651-C□□-□ LKW0751-C□□-□	LM0650-C□ LM0750-C□	LJ0652-C□ LJ0752-C□	LJV0650-C□□ LJV0750-C□□
JZG030	LKA0900-C□□-□ LKA1050-C□□-□							LJ0902-C□ LJ1052-C□	

Model No.	TLA-1 (Single Action) Swing Clamp	TLA-2 (Double Action) Swing Clamp	TLB-2 (Double Action) Swing Clamp	TLV-2 (Double Action) Swing Clamp	TMA-1 (Double Action) Link Clamp	TMA-2 (Double Action) Link Clamp	TMV-2 (Double Action) Link Clamp
JZG010	TLA0402-1C□ TLA0602-1C□ TLA0802-1C□ TLA1002-1C□ TLA1602-1C□	TLA0401-2C□-□ TLA0601-2C□-□ TLA0801-2C□-□ TLA1001-2C□-□ TLA1601-2C□-□	TLB0401-2C□-□ TLB0601-2C□-□ TLB0801-2C□-□ TLB1001-2C□-□ TLB1601-2C□-□	TLV0800-2C□□ TLV1000-2C□□ TLV1600-2C□□	TMA0250-1C□ TMA0400-1C□ TMA0600-1C□ TMA1000-1C□	TMA0250-2C□ TMA0400-2C□ TMA0600-2C□ TMA1000-2C□	TMV0400-2C□□ TMV0600-2C□□ TMV1000-2C□□
JZG020	TLA2002-1C□ TLA2502-1C□ TLA4002-1C□	TLA2001-2C□-□ TLA2501-2C□-□ TLA4001-2C□-□	TLB2001-2C□-□ TLB2501-2C□-□ TLB4001-2C□-□	TLV2000-2C□□	TMA1600-1C□ TMA2500-1C□ TMA3200-1C□	TMA1600-2C□ TMA2500-2C□ TMA3200-2C□	TMV1600-2C□□

Model No.	LFA (Double Action) Link Clamp	LFW (Double Action) Link Clamp	LSA (Double Action) Side Clamp	LSE (Double Action) High-Power Side Clamp	LL (Double Action) Linear Cylinder	LLR (Double Action) Linear Cylinder	LLV (Double Action) Lift Cylinder	LLW (Double Action) Lift Cylinder	TTA (Double Action) Linear Cylinder
JZG010	LFA0480-C□□ LFA0550-C□□	LFW0480-C□J LFW0550-C□J	LSA0360-C-□	LSE0360-C-□	LL0360-C□□-□ LL0400-C□□-□ LL0480-C□□-□ LL0550-C□□-□	LLR0360-C□□-□-□ LLR0400-C□□-□-□ LLR0480-C□□-□-□ LLR0550-C□□-□-□	LLV0360-C□E-□ LLV0400-C□E-□ LLV0480-C□E-□	LLW0361-C□□-□ LLW0401-C□□-□ LLW0481-C□□-□	TTA0360-C□-□ TTA0400-C□-□ TTA0480-C□-□ TTA0550-C□-□
JZG020	LFA0650-C□□ LFA0750-C□□	LFW0650-C□J LFW0750-C□J			LL0650-C□□-□ LL0750-C□□-□	LLR0650-C□□-□-□ LLR0750-C□□-□-□			TTA0650-C□-□
JZG030					LL0900-C□□-□ LL1050-C□□-□	LLR0900-C□□-□-□ LLR1050-C□□-□-□			

External Dimensions



(mm)

Model No.	JZG010	JZG020	JZG030
A	14	18	22
B	3.5	4.5	4.5
C	8	9	10
D	5	6	8
G	G1/8A	G1/4A	G3/8A

High-Power Series
Pneumatic Series
Hydraulic Series
Valve / Coupler Hydraulic Unit
Manual Operation Accessories
Cautions / Others
Hole Clamp
SFA
SFC
Swing Clamp
LHA
LHC
LHS
LHW
LG/LT
TLA-2
TLB-2
TLA-1
Link Clamp
LKA
LKC
LKW
LJ/LM
TMA-2
TMA-1
Work Support
LD
LC
TNC
TC
Air Sensing Lift Cylinder
LLW
Linear Cylinder / Compact Cylinder
LL
LLR
LLU
DP
DR
DS
DT
Block Cylinder
DBA/DBC
Centering Vise
FVA
FVD
FVC
Control Valve
BZL
BZT
BZX/JZG
BZS
Pallet Clamp
VS/VT
Expansion Locating Pin
VFL/VFM
VFJ/VFK
Pull Stud Clamp
FP
FQ
Customized Spring Cylinder
DWA/DWB

PAT.P.

Direct-Mount Sequence Valve

Model BZS



Attaches directly into Kosmek hydraulic clamps G-thread piping option.
Easily and securely controls the operating sequence of actuators.

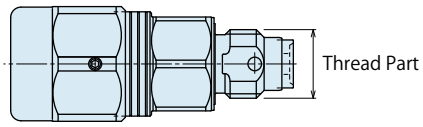
Model No. Indication

BZS 0 10 0

1 2

1 G Thread Size

10 : G1/8A Thread
20 : G1/4A Thread
30 : G3/8A Thread



2 Design No.

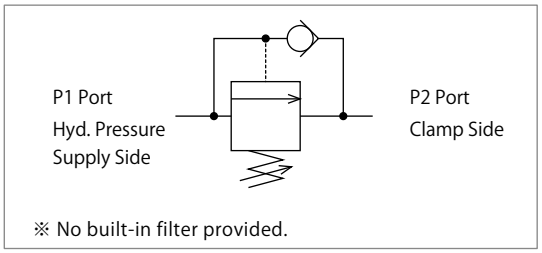
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Specifications

Model No.		BZS0100	BZS0200	BZS0300
Sequence Operating Pressure Adjustable Range MPa		1.0 ~ 6.0		
Operating Pressure Range MPa		2.0 ~ 7.0		
Withstanding Pressure MPa		10.5		
G Thread Size		G1/8A	G1/4A	G3/8A
Cracking Pressure MPa		0.03		
Adjusting Screw Turn Ratio:Reference MPa/Rev		1.5	1.3	1.1
Min. Passage Area	P1 → P2	2.0	5.7	8.5
mm^2	P2 → P1	2.0	5.0	8.2
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32		
Operating Temperature ℃		0 ~ 70		
Tightening Torque N·m		10	25	35
Weight g		35	82	155

Notes:
1. Please mount to an actuator using Hex. E shown in External Dimensions on P.961A with the tightening torque shown in the list above. Insufficient or excessive tightening torque leads to malfunction.
2. Do not attach a used BZS to other clamps. Sequence movement may not be done because the bottom depth difference of G thread makes metal sealing insufficient.
3. The difference between the set pressure and the supplying pressure should be 1MPa or more.
4. For using multiple sequence valves to operate cylinders in sequence, the difference of each set pressure should be 1MPa or more.
5. Depending on circuit system (actuator capacity, hydraulic pipe diameter, passage length, etc.), sometimes it is necessary to reduce hydraulic flow rate to achieve proper sequence movement. Make sure you are able to control flow rate. (Since BZS is directly mounted on and used exclusively for one actuator, it is easily affected by hydraulic flow rate.)
6. Filter is not built in this product. Please note that contaminants such as cutting chips and sealing tapes entering into the product cause malfunction. Also when internal parts are damaged, it will not operate properly even after removing contaminants.

Circuit Symbol



※ No built-in filter provided.

What is a Sequence Valve?

The sequence valve controls the clamping and positioning sequence of multiple actuators.

When the incoming side pressure (P1 port) reaches the sequence setting pressure value, the pressure will be supplied to the outgoing side (P2 port). Refer to P.961B for the action description.

Applicable Products

Model No.	DBA (Double Action) Block Cylinder	DBC (Double Action) Block Cylinder	FVA (Double Action) Centering Vise	FVC (Double Action) Centering Vise	FVD (Double Action) Centering Vise	LHA (Double Action) Swing Clamp	LHC (Double Action) Swing Clamp	LHD (Double Action) Swing Clamp	LHE (Double Action) High-Power Swing Clamp
BZS0100	DBA0250-C□ DBA0320-C□	DBC0250-C□ DBC0320-C□	FVA0401 FVA0631 FVA1001	FVC0630	FVD1600 FVD2500	LHA0360-C□□-□ LHA0400-C□□-□ LHA0480-C□□-□ LHA0550-C□□-□	LHC0360-C□□-□ LHC0400-C□□-□ LHC0480-C□□-□ LHC0550-C□□-□	LHD0400-C□-□ LHD0480-C□-□ LHD0550-C□-□	LHE0300-C□ LHE0360-C□ LHE0400-C□ LHE0480-C□ LHE0550-C□
BZS0200	DBA0400-C□ DBA0500-C□	DBC0400-C□ DBC0500-C□		FVC1000 FVC1600※1	FVD4000	LHA0650-C□□-□ LHA0750-C□□-□	LHC0650-C□□-□		
BZS0300						LHA0900-C□□-□ LHA1050-C□□-□			

Model No.	LHS (Double Action) Swing Clamp	LHV (Double Action) Swing Clamp	LHW (Double Action) Swing Clamp	LT (Single Action) Swing Clamp	LG (Single Action) Swing Clamp	LGV (Single Action) Swing Clamp	LKA (Double Action) Link Clamp	LKC (Double Action) Link Clamp	LKE (Double Action) High-Power Link Clamp
BZS0100	LHS0360-C□□-□ LHS0400-C□□-□ LHS0480-C□□-□ LHS0550-C□□-□	LHV0400-C□E-□ LHV0480-C□E-□ LHV0550-C□E-□	LHW0401-C□□-□ LHW0481-C□□-□ LHW0551-C□□-□	LT0301-C□-□ LT0361-C□-□ LT0401-C□-□ LT0481-C□-□ LT0551-C□-□	LG0301-C□-□ LG0361-C□-□ LG0401-C□-□ LG0481-C□-□ LG0551-C□-□	LGV0400-C□□ LGV0480-C□□ LGV0550-C□□	LKA0360-C□□-□ LKA0400-C□□-□ LKA0480-C□□-□ LKA0550-C□□-□	LKC0400-C□-□ LKC0480-C□-□ LKC0550-C□-□	LKE0300-C□ LKE0360-C□ LKE0400-C□ LKE0480-C□ LKE0550-C□
BZS0200	LHS0650-C□□-□ LHS0750-C□□-□	LHV0650-C□E-□ LHV0750-C□E-□	LHW0651-C□□-□ LHW0751-C□□-□	LT0651-C□-□ LT0751-C□-□	LG0651-C□-□ LG0751-C□-□	LGV0650-C□□ LGV0750-C□□	LKA0650-C□□-□ LKA0750-C□□-□	LKC0650-C□-□	
BZS0300	LHS0900-C□□-□ LHS1050-C□□-□				LG0901-C□-□ LG1051-C□-□		LKA0900-C□□-□ LKA1050-C□□-□		

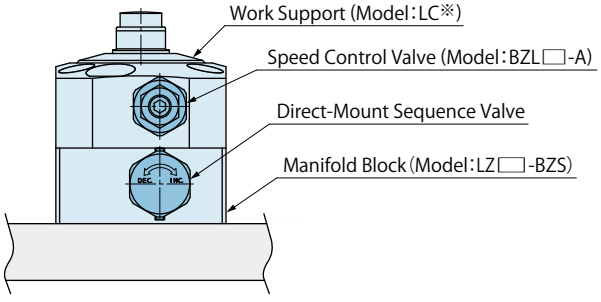
Model No.	LKK (Double Action) Universal Clamp	LKV (Double Action) Link Clamp	LKW (Double Action) Link Clamp	LM (Single Action) Link Clamp	LJ (Single Action) Link Clamp	LJV (Single Action) Link Clamp
BZS0100	LKK0360-C-□ LKK0400-C-□ LKK0480-C-□ LKK0550-C-□	LKV0400-C□E-□ LKV0480-C□E-□ LKV0550-C□E-□	LKW0401-C□□-□ LKW0481-C□□-□ LKW0551-C□□-□	LM0300-C□ LM0360-C□ LM0400-C□ LM0480-C□ LM0550-C□	LJ0302-C□ LJ0362-C□ LJ0402-C□ LJ0482-C□ LJ0552-C□	LJV0400-C□□ LJV0480-C□□ LJV0550-C□□
BZS0200	LKK0650-C-□	LKV0650-C□E-□ LKV0750-C□E-□	LKW0651-C□□-□ LKW0751-C□□-□	LM0650-C□ LM0750-C□	LJ0652-C□ LJ0752-C□	LJV0650-C□□ LJV0750-C□□
BZS0300					LJ0902-C□ LJ1052-C□	

Model No.	LFW (Double Action) Link Clamp	LFA (Double Action) Link Clamp	LSA (Double Action) Side Clamp	LSE (Double Action) High-Power Side Clamp	LL (Double Action) Linear Cylinder	LLR (Double Action) Linear Cylinder	LLV (Double Action) Lift Cylinder	LLW (Double Action) Lift Cylinder
BZS0100	LFW0480-C□J LFW0550-C□J	LFA0480-C□□ LFA0550-C□□	LSA0360-C-□	LSE0360-C-□	LL0360-C□□-□ LL0400-C□□-□ LL0480-C□□-□ LL0550-C□□-□	LLR0360-C□□-□-□ LLR0400-C□□-□-□ LLR0480-C□□-□-□ LLR0550-C□□-□-□	LLV0360-C□E-□ LLV0400-C□E-□ LLV0480-C□E-□	LLW0361-C□□-□ LLW0401-C□□-□ LLW0481-C□□-□
BZS0200	LFW0650-C□J LFW0750-C□J	LFA0650-C□□ LFA0750-C□□			LL0650-C□□-□ LL0750-C□□-□	LLR0650-C□□-□-□ LLR0750-C□□-□-□		
BZS0300					LL0900-C□□-□ LL1050-C□□-□	LLR0900-C□□-□-□ LLR1050-C□□-□-□		

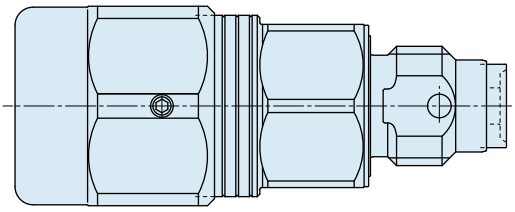
Note : ※1. It is not possible to install two BZS valves to FVC1000.

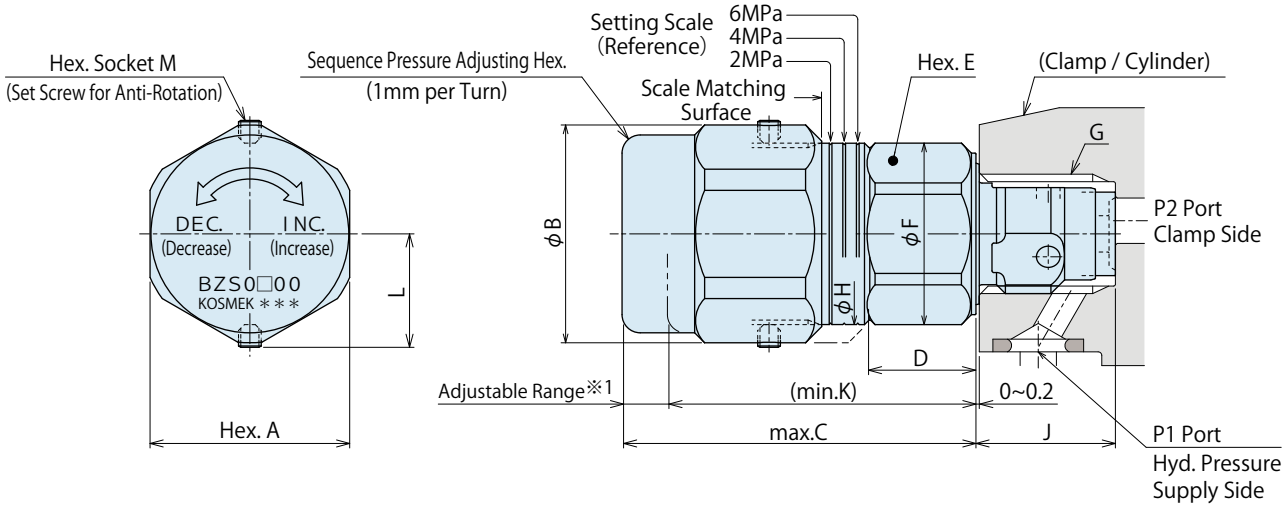
【In case of Work Support】

For using Direct-Mount Sequence Valve for Work Support (Model:LC※), mount Speed Control Valve (Model:BZL□-A) on Work Support and mount Direct-Mount Sequence Valve on the Manifold Block as shown in the drawing below.
Please refer to P.962A for Manifold Block (Model:LZ□-BZS).
※Please contact us when considering the installation to model LCW.

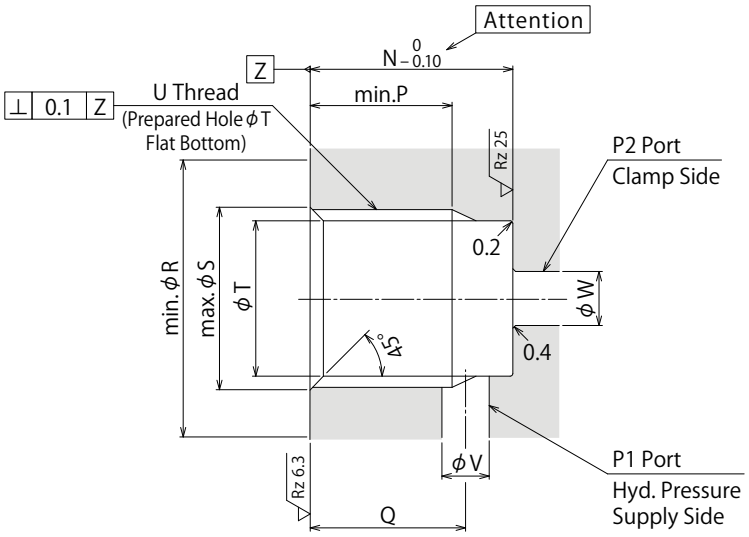


External Dimensions





Machining Dimensions of Mounting Area



(mm)

Model No.	BZS0100	BZS0200	BZS0300
A	16	22	27
B	17.5	24	29.5
C	30.5	39	49.5
D	7.5	12	15
E	14	18	22
F	15.5	20	24
G	G1/8	G1/4	G3/8
H	13.8	20	24
J ※2	(11.6)	(15.1)	(17.6)
K	(26.5)	(34)	(44)
L	9.5	12.5	15
M	1.3	1.3	1.5
N	11.5	15	17.5
P	8.5	11※3	13
Q	9	11.5	13
R (Flat Surface Area)	16	20.5	24.5
S	10	13.5	17
T	8.7	11.5	15
U	G1/8	G1/4	G3/8
V	2 ~ 3	3 ~ 4	4 ~ 5
W	2.5 ~ 5	3.5 ~ 7	4.5 ~ 9

Notes:

1. Since the ▽Rz 6.3 area is sealing part, be careful not to damage it.
2. Since the ▽Rz 12.5 area is the metal sealing part at the edge of BZS, be careful not to damage it (especially when deburring).
3. No cutting chips or burr should be at the tolerance part of machining hole.
4. As shown in the drawing, P1 port is used as the hydraulic supply and P2 port as the clamp side.

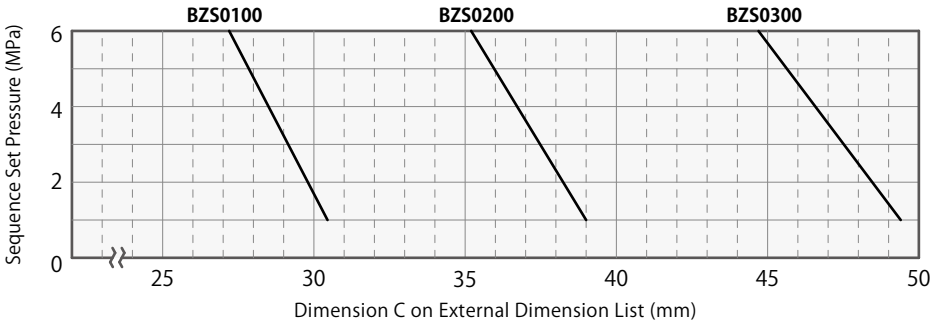
※1. Use the sequence pressure adjusting hex. within the adjustable range of ※2 (the dimensions K~C in the above).
Please note that if it is loosened further than max. C, pressure adjusting hex. part and internal spring will come off.

※2. Dimension when mounted. (+0.5mm before mounted.)

※3. If mounting plugs or fittings with G thread specification available in the market, the dimension '※3' should be 12.5.

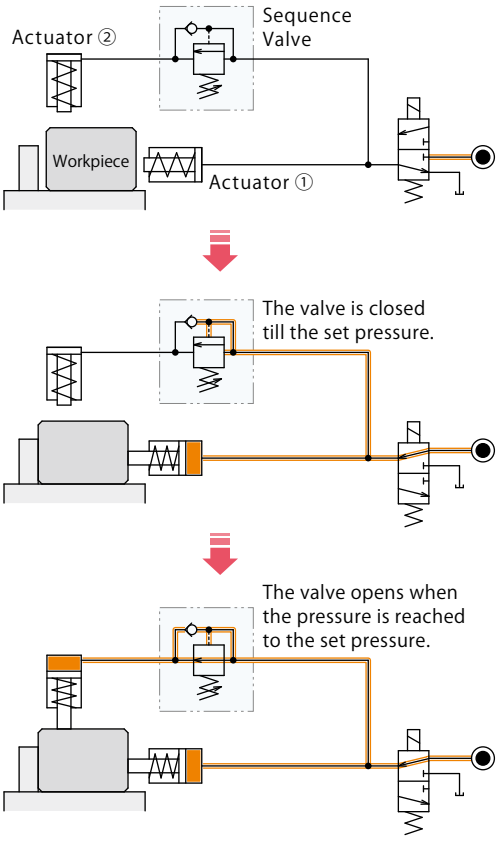
Cautions

1. Please design hydraulic circuit properly. Improper circuit design may lead to malfunctions and damages.
2. Filter is not built in this product. Be aware that contaminants such as cutting chips and sealing tapes entering into the product cause malfunction. Also when internal parts are damaged, it will not operate properly even after removing contaminants.
3. Depending on circuit system (actuator capacity, hydraulic pipe diameter, passage length, etc.), sometimes it is necessary to reduce hydraulic flow rate to achieve proper sequence movement. Make sure you are able to control flow rate. (Since BZS is directly mounted on and used exclusively for one actuator, it is easily affected by hydraulic flow rate.)
4. The difference between the set pressure and the supplying pressure should be 1MPa or more.
5. For using multiple sequence valves to operate cylinders in sequence, the difference of each set pressure should be 1MPa or more.
6. For using multiple sequence valves to operate cylinders simultaneously, adjust them gradually by checking their actions.
7. Please keep in mind that the minimum passage area of each actuator will be decreased by mounting this product and thus operating time may become longer.
8. Please mount to an actuator using Hex. E shown in External Dimensions on P.961 with the tightening torque shown in the specification list on P.959. Insufficient or excessive tightening torque leads to malfunction.
9. Air bleeding is required as air mixed in the circuit causes malfunction.
10. At shipment, sequence pressure is not adjusted. Please adjust it by referring to the graph below. Install a pressure gauge on the circuit to check pressure as necessary. After adjustment, tighten one or more set screw for anti-rotation. (Tightening torque：0.2N･m)



(This graph is a reference, and the values will not be guaranteed.)

Action Description



	Operating Procedure	Note
Locking	Hydraulic pressure is ON.	
	Actuator ① is activated.	
	Pressure increases to the sequence operation set pressure.	The difference between the operating pressure and the sequence operation set pressure should be 1MPa or more.
	The sequence valve circuit opens.	
	Actuator ② is activated.	
	Locking action is completed.	
	Machining, etc.	
Releasing	Hydraulic pressure is OFF.	
	The actuators ① and ② are released almost simultaneously.	The check valve in the sequence valve opens when the incoming side pressure decreases.
	Releasing action is completed.	

Sales Offices

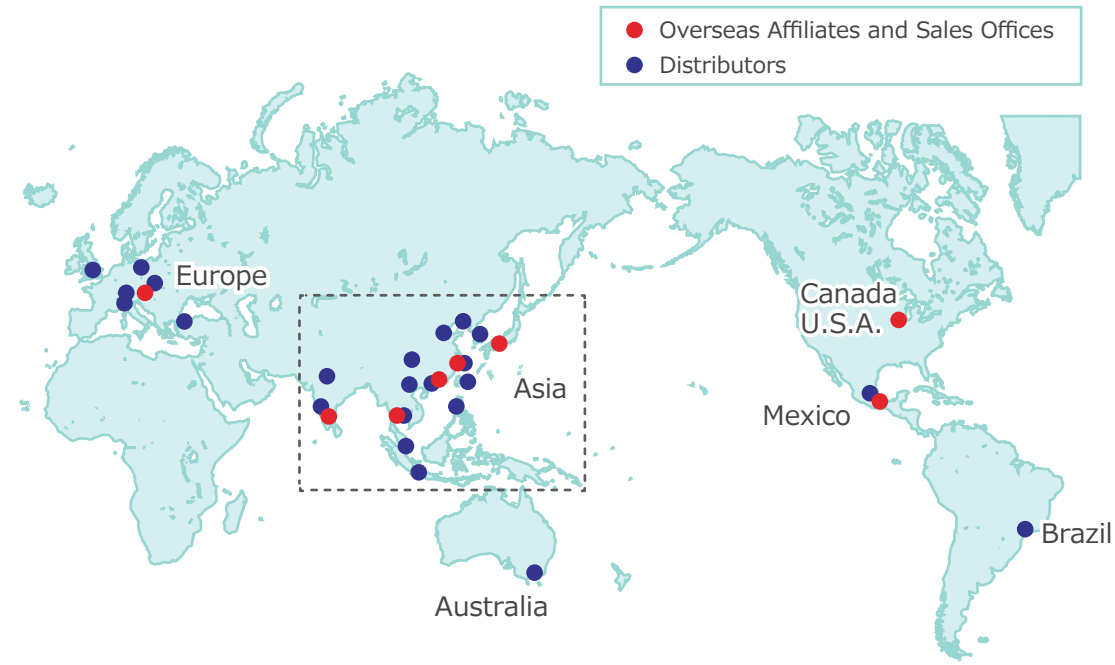
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