Air Sensing Lift Cylinder

Hydraulic Double Action

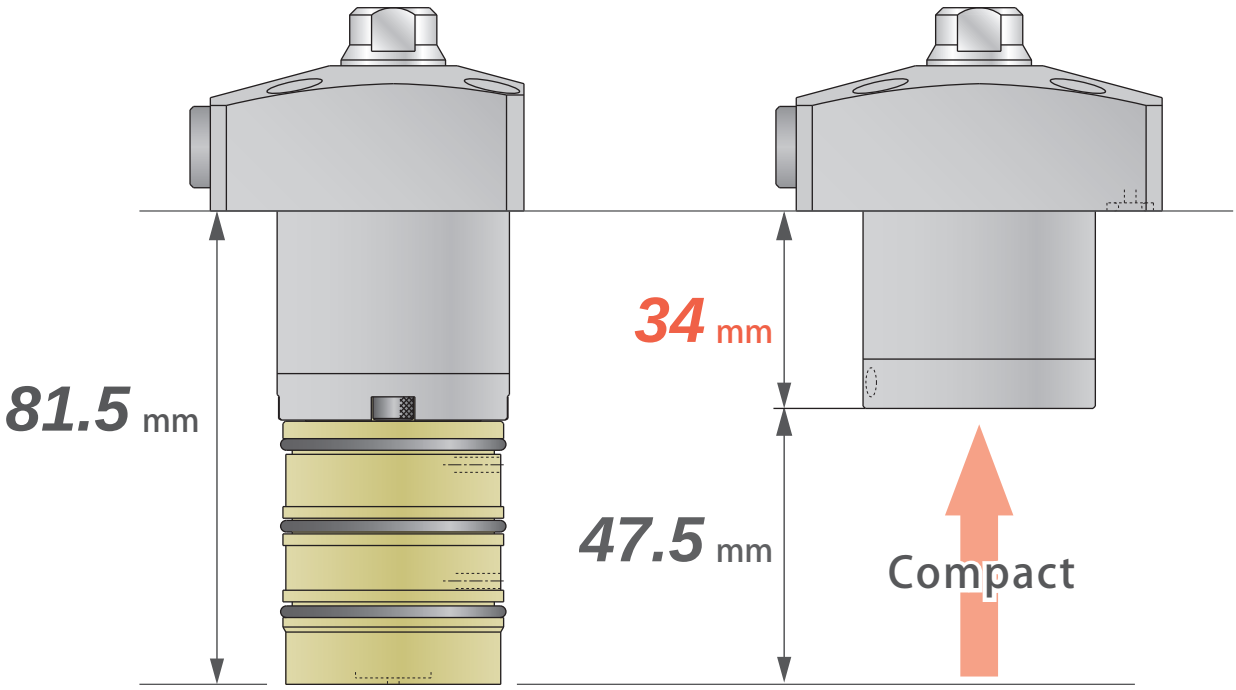
Model LLW

Compact and Space-Saving Lift Cylinder

With built-in action confirmation valve LLW is ideal for automated equipment.
The stroke can be set in 5mm increments.

PAT.

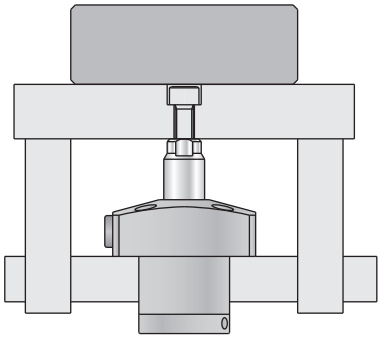
LLW is much more compact than the conventional model LL.



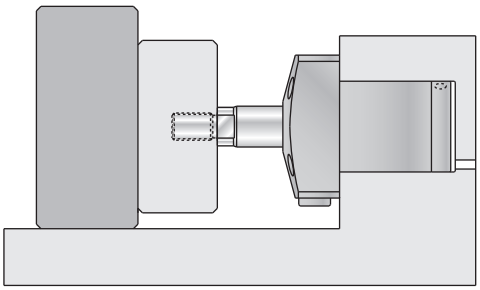
＜Comparison Model＞
LL0400-CAM-025
(Stroke 25mm)

＜Air Sensing Model＞
LLW0401-CAE-025
(Stroke 25mm)

Application Examples

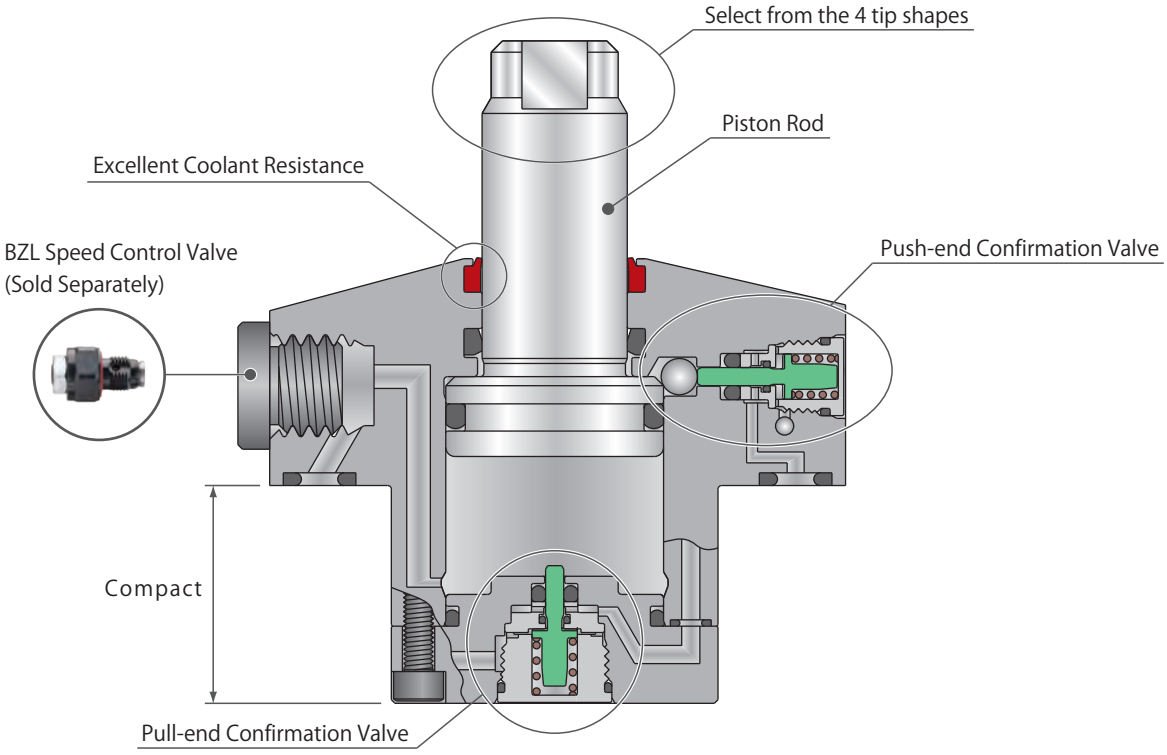


For Lifting



For Shifting

Cross Section

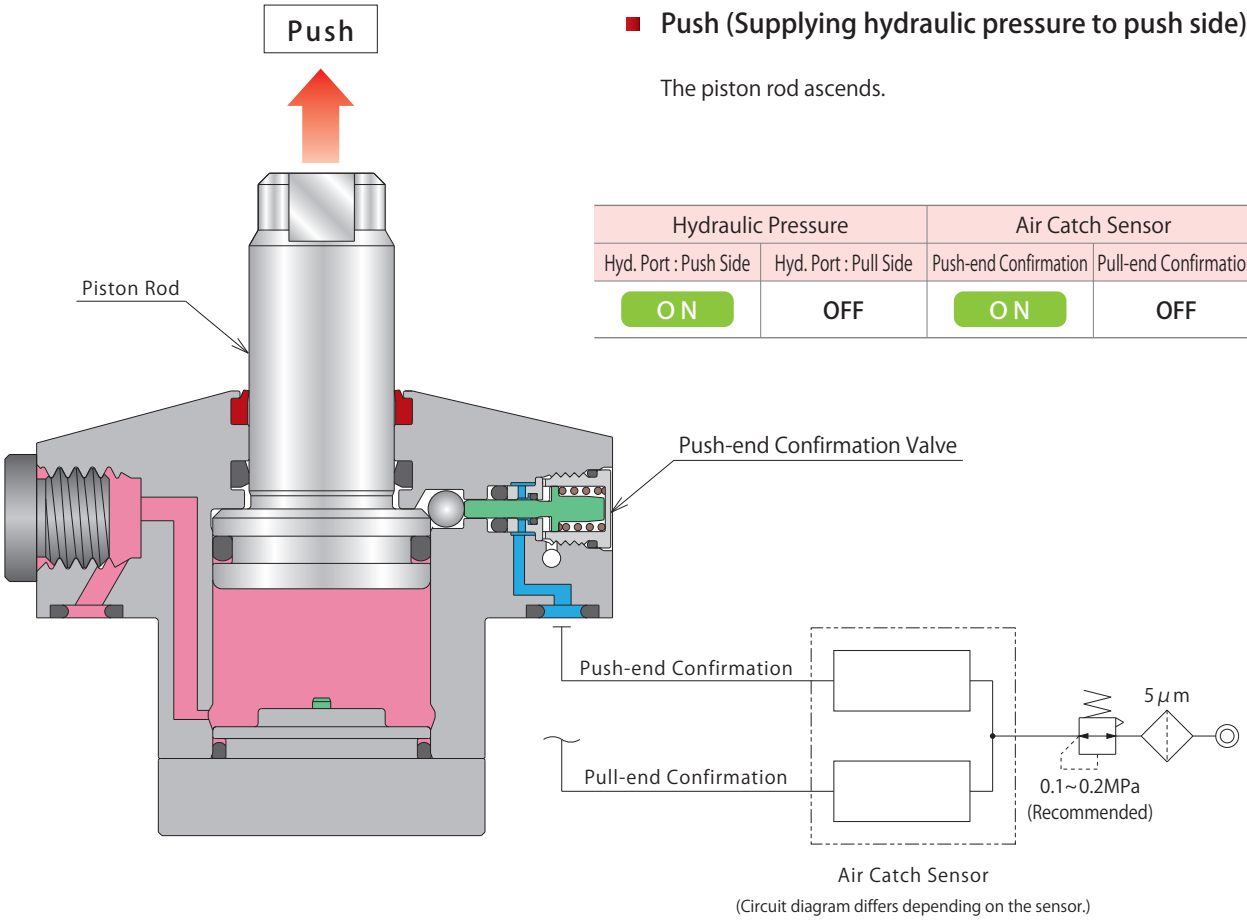


- 3 body sizes which are most suitable to space-saving.
- Built-in sensing valve enables to design an extremely small height fixtures.
  Zero air leakage when the valve is closed. Air sensor with limited flow rate is available.
- The stroke can be set in 5mm increments in the range of 10 ~ 50mm (75mm).※1
  ※1. LLW0361/LLW0401: up to 50mm, LLW0481: up to 75mm
- Tip shape is selectable from 4 types.

Female Threaded | Female Threaded (With Anti-Rotation Pinhole) | Male Threaded | Pin-Hole Option

- Able to Attach Speed Control Valve Directly
  It is available for directly mounting the speed control valve with air venting function. (Speed control valve is sold separately.)

Action Description



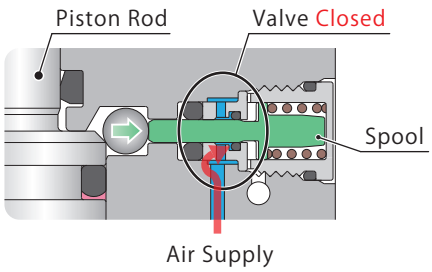
Push (Supplying hydraulic pressure to push side)

The piston rod ascends.

Hydraulic Pressure		Air Catch Sensor	
Hyd. Port : Push Side	Hyd. Port : Pull Side	Push-end Confirmation	Pull-end Confirmation
ON	OFF	ON	OFF

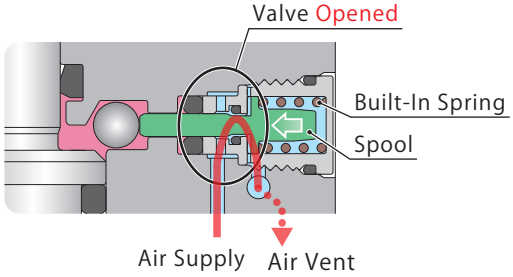
Push-end Confirmation Valve

Supplying Hyd. Pressure to Push Side — Air Catch Sensor ON



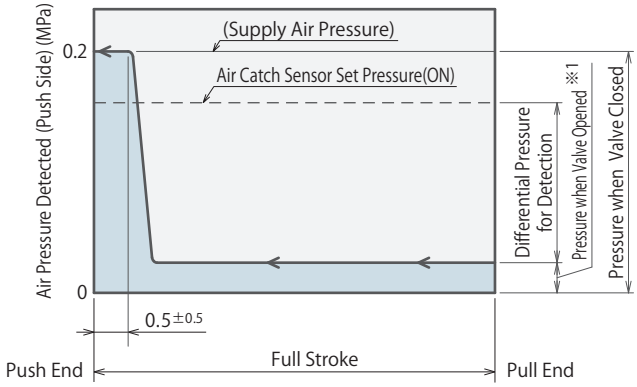
The spool is pushed back by the piston rod, and the valve is closed.

Supplying Hyd. Pressure to Pull Side — Air Catch Sensor OFF



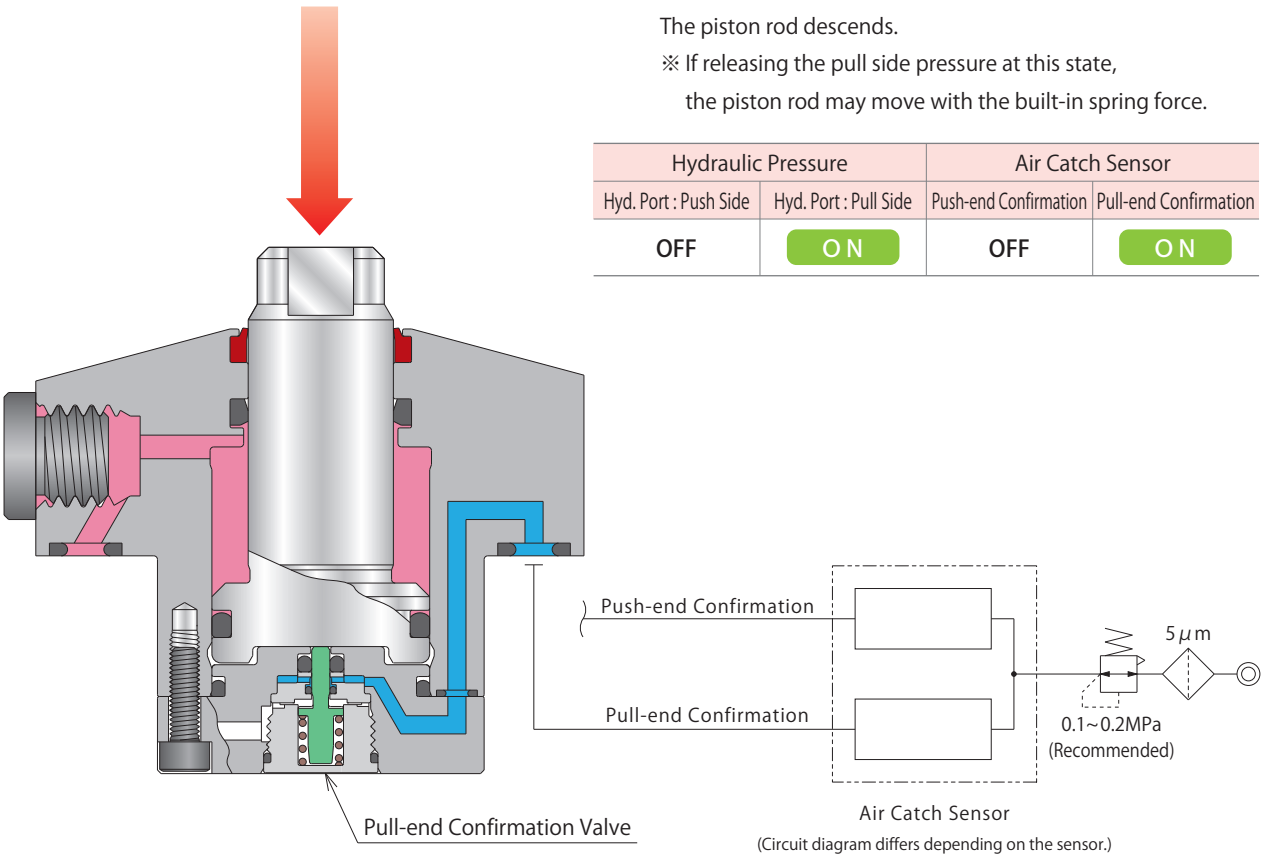
The spool is pushed forward by the built-in spring, and the valve is opened.

Push Side: Sensing Chart



※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.

Pull



Pull (Supplying hydraulic pressure to pull side)

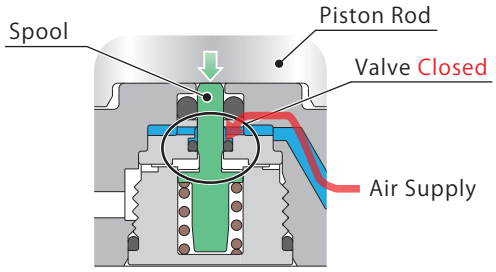
The piston rod descends.

※ If releasing the pull side pressure at this state, the piston rod may move with the built-in spring force.

Hydraulic Pressure		Air Catch Sensor	
Hyd. Port : Push Side	Hyd. Port : Pull Side	Push-end Confirmation	Pull-end Confirmation
OFF	ON	OFF	ON

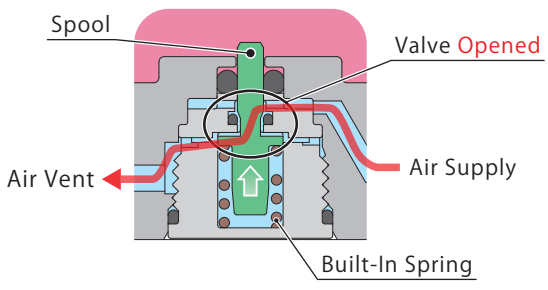
Pull-end Confirmation Valve

Supplying Hyd. Pressure to Pull Side — Air Catch Sensor ON



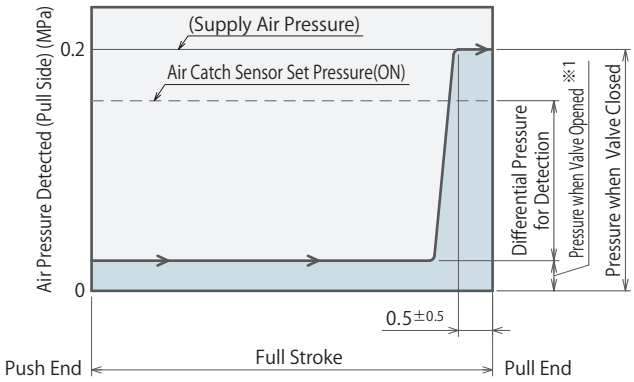
The spool is pushed back by the piston rod, and the valve is closed.

Supplying Hyd. Pressure to Push Side — Air Catch Sensor OFF



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

Pull Side: Sensing Chart



※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 (Explanation about Sensing and Air Sensing Chart)

Action confirmation of the piston rod can be conducted by detecting differential pressure with the air catch sensor connected to the push-end confirmation port and pull-end confirmation port.

Model No. Indication

LLW 048 1 - C [A/B/T/P] [E/H/J] - 050

5 **Sensing Valve**
- **E** : On Both Sides
- **H** : On Push Side
- **J** : On Pull Side

Air Catch Sensor

- Air catch sensor is required in order to conduct action confirmation of the piston rod.

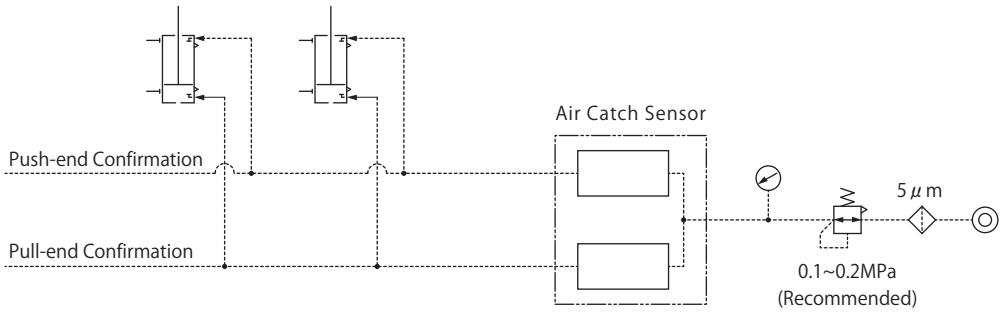
  Sensing can be done by the air catch sensor with small air flow (recommended models are in the table below).

  Recommended Operating Air Pressure : 0.1 ~ 0.2MPa

Recommended Air Catch Sensor

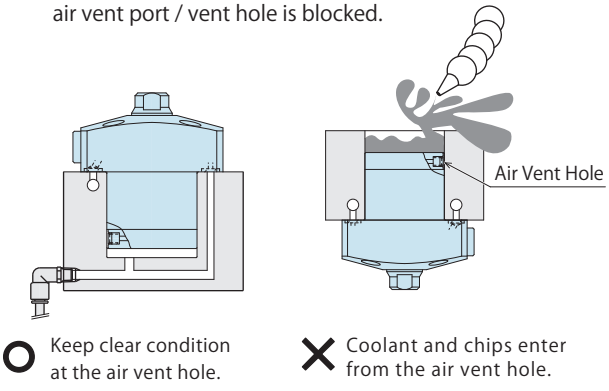
Manufacturer	SMC	CKD
Name	Air Catch Sensor	Gap Switch
Model No.	ISA3-G	GPS3-E

- 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.



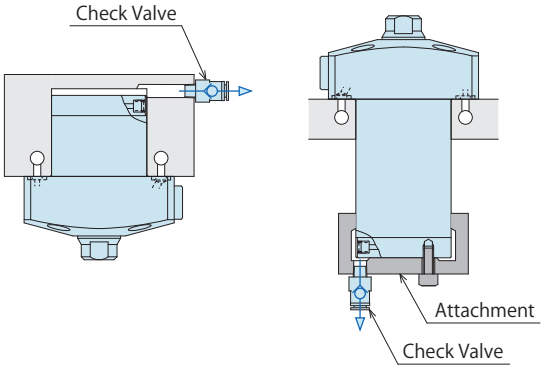
Notes for Design and Installation

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



- Prevention of Contaminants to the Air Vent Port / Vent Hole

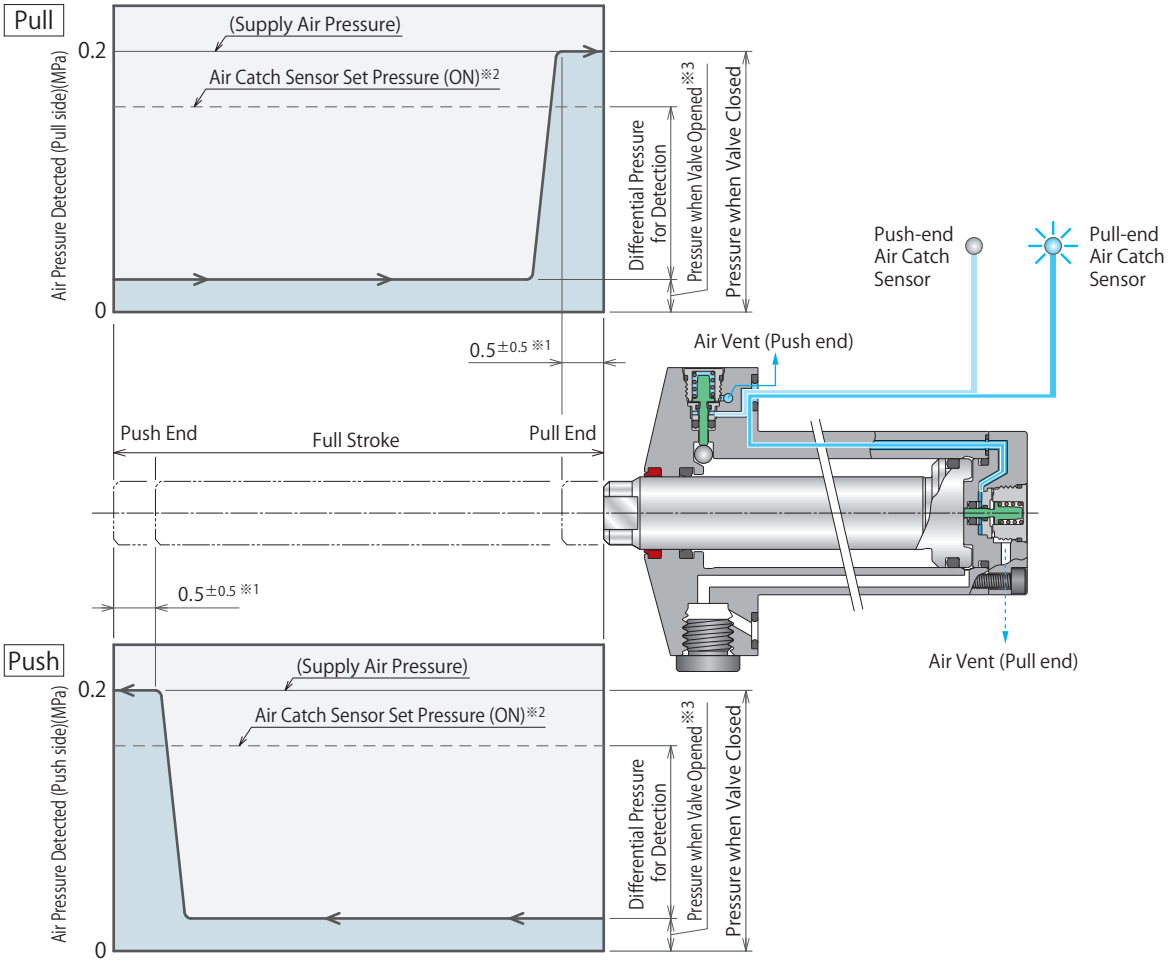
  Coolant and chips can be prevented by setting a check valve with low cracking pressure. (Recommended check valve : SMC-made series AKH, cracking pressure : 0.005MPa)



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

Air Sensing Chart

Number Directly Connected to Clamp : 1



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 push-end confirmation for sensing valve symbol [H], and only pull-end 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.

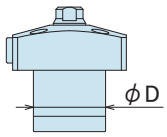
Model No. Indication

LLW 048 1 - C A E - 025
1 2 3 4 5 6

1 Body Size

036 : ϕD=36mm
040 : ϕD=40mm
048 : ϕD=48mm

※ Outer diameter (ϕD) of the cylinder.

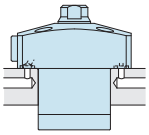


2 Design No.

1 : Revision Number

3 Piping Method

C : Gasket Option (With G Thread Plug)

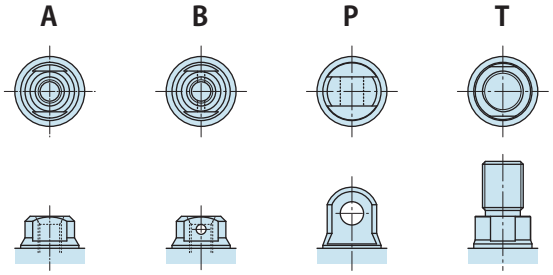


With G Thread Plug
(able to attach Speed Control Valve)
(Order the valve separately
Recommended : BZL-B)

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

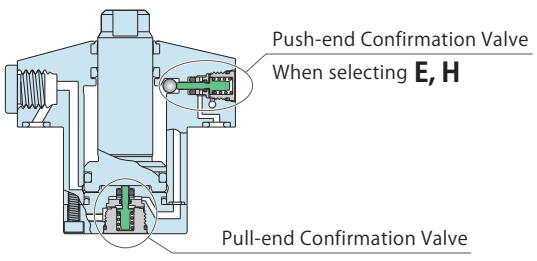
4 Shape of Piston Tip

A : Female Threaded
B : Female Threaded (With Anti-Rotation Pinhole)
P : Pin-Hole
T : Male Threaded



5 Sensing Valve

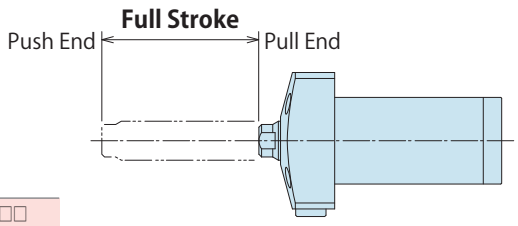
E : Sensing Valves on Both Sides
H : Sensing Valve on Push Side
J : Sensing Valve on Pull Side



6 Stroke

Stroke Value : Full Stroke

※ Full stroke is set in 5mm increments.
Example : Full Stroke 15mm : 015
Full Stroke 50mm : 050
Full Stroke 75mm : 075



Model No.		LLW0361-C□□	LLW0401-C□□	LLW0481-C□□
Full Stroke	mm	10~50 (in 5mm increments)	10~50 (in 5mm increments)	10~75 (in 5mm increments)

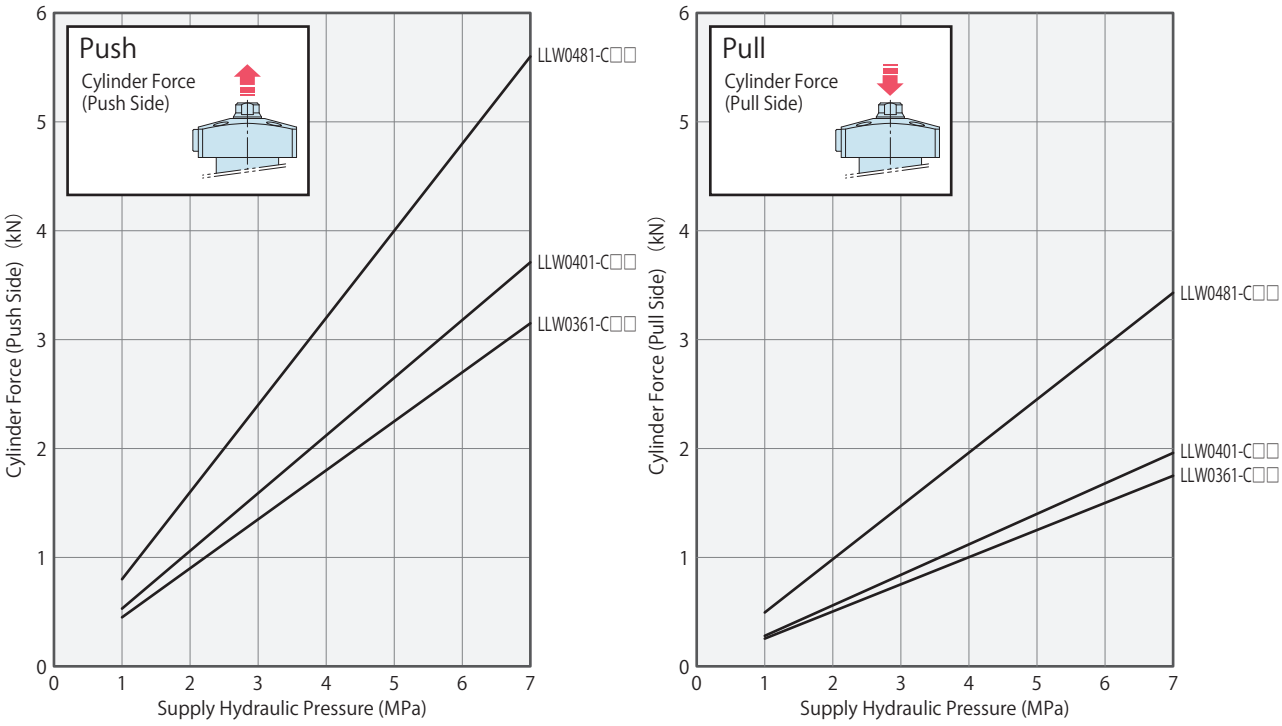
Specifications

Model No.			LLW0361-C□□	LLW0401-C□□	LLW0481-C□□
Full Stroke Y		mm	10~50 (in 5mm increments)	10~50 (in 5mm increments)	10~75 (in 5mm increments)
Cylinder Area	cm2	Push Side	4.5	5.3	8.0
		Pull Side	2.5	2.8	4.9
Cylinder Force ※1 (Calculation Formula)	kN	Push Side	P × 0.45	P × 0.53	P × 0.80
		Pull Side	P × 0.25	P × 0.28	P × 0.49
Cylinder Capacity ※1 (Calculation Formula)	cm3	Push Side	Y × 0.45	Y × 0.53	Y × 0.80
		Pull Side	Y × 0.25	Y × 0.28	Y × 0.49
Cylinder Inside Diameter		mm	ϕ24	ϕ26	ϕ32
Rod Diameter		mm	ϕ16	ϕ18	ϕ20
Hyd. Pressure	Max. Operating Pressure	MPa	7.0		
	Min. Operating Pressure	MPa	1.0		
	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	0.6 ~ 0.8	0.7 ~ 0.9	1.0 ~ 1.6

Note : ※1. P:Supply Hydraulic Pressure (MPa) Y:Full Stroke (mm)

Performance Curve

Model No.	Cylinder Force (Push Side) (kN)							Cylinder Force (Pull Side) (kN)						
	1MPa	2MPa	3MPa	4MPa	5MPa	6MPa	7MPa	1MPa	2MPa	3MPa	4MPa	5MPa	6MPa	7MPa
LLW0361-C□□	0.4	0.9	1.3	1.8	2.2	2.7	3.1	0.2	0.5	0.7	1.0	1.2	1.5	1.7
LLW0401-C□□	0.5	1.0	1.5	2.1	2.6	3.1	3.7	0.2	0.5	0.8	1.1	1.4	1.6	1.9
LLW0481-C□□	0.8	1.6	2.4	3.2	4.0	4.8	5.6	0.4	0.9	1.4	1.9	2.4	2.9	3.4



Notes :

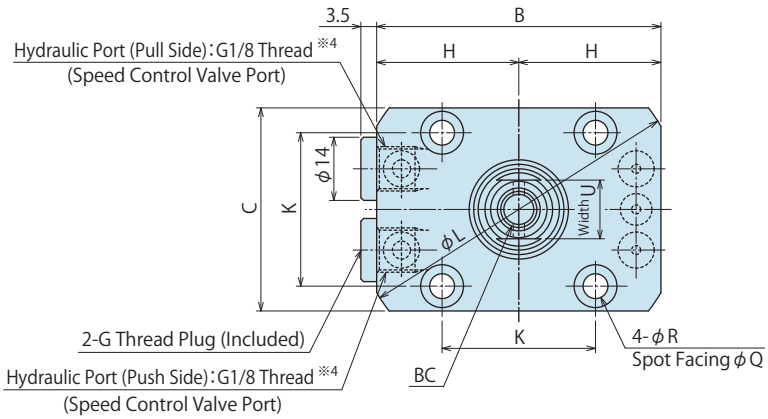
1. The chart and graph show the relationship between the cylinder force and supply hydraulic pressure.
2. Cylinder force (kN) is the theoretical value. Actual force may decrease because of friction and pressure loss.

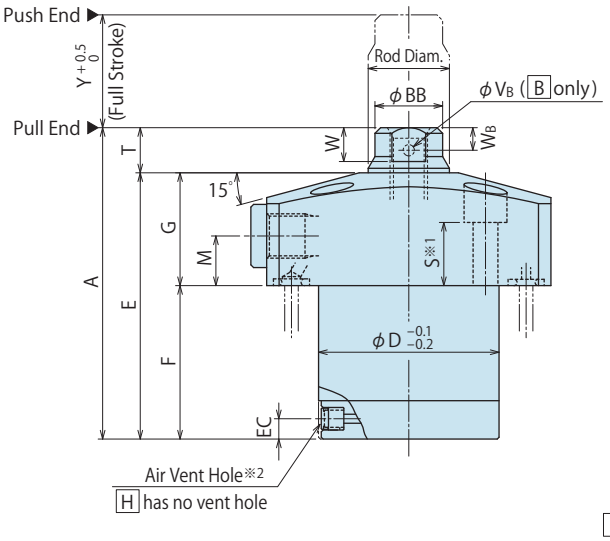
External Dimensions

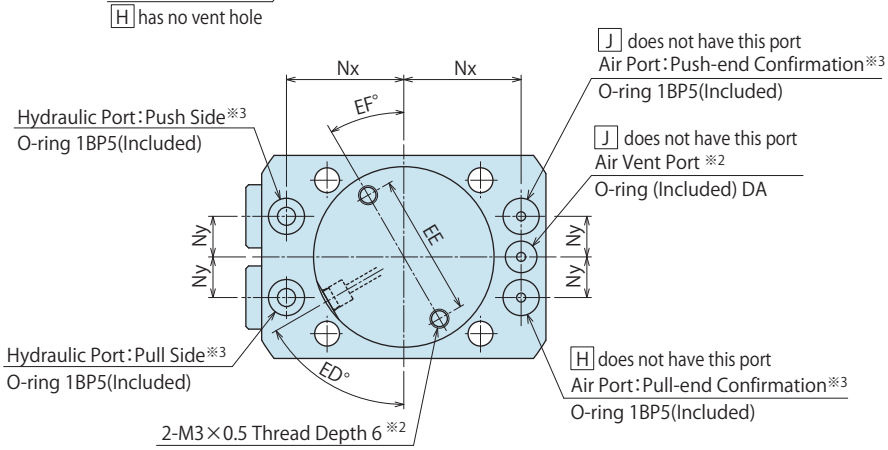
Tip Shape :

A : Female Threaded B : Female Threaded (With Anti-Rotation Pinhole)

※ The drawings show LLW-CAE / LLW-CBE.



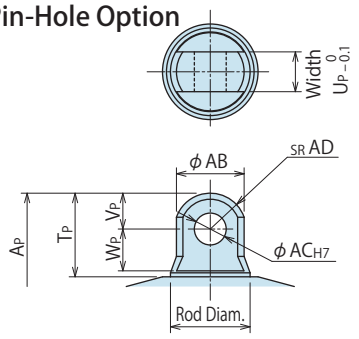




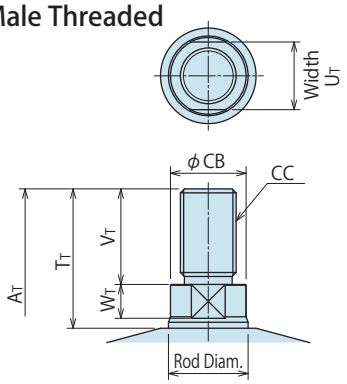
Tip Shape

Refer to A Female Threaded dimension for not mentioned size below.

P : Pin-Hole Option



T : Male Threaded



Notes :

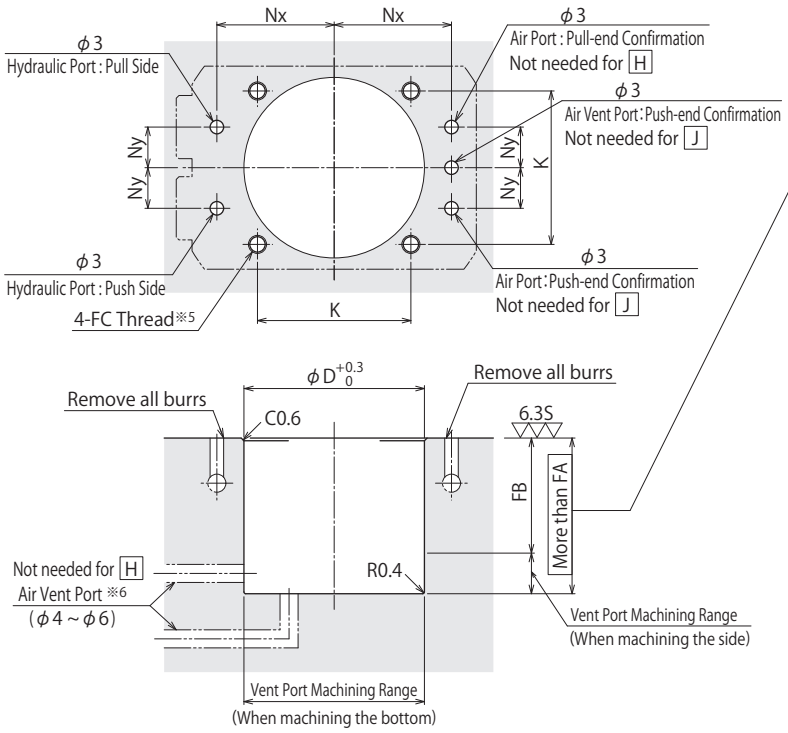
※1. Mounting bolts are not provided. Please prepare based on dimension S.

※2. Please keep clear condition at the air vent hole, and prevent coolant and chips from entering the hole.
If exposed to coolant, install an attachment to M3 thread to prevent coolant and chips, but do not block the air vent hole.

※3. The port names are marked on the body surface. (PUSH HYD. : Hydraulic port on the push side, PULL HYD. : Hydraulic port on the pull side, PUSH CHECK : Air port on the push side, PULL CHECK : Air port on the pull side, VENT : Air vent port)

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

Machining Dimensions for Mounting Area



Notes :
※5. The FC depth of the mounting bolt should be decided from dimension S.
※6. Air vent port is not required when mounting the product to a through hole.

External Dimensions and Machining Dimensions for Mounting

A : Female Threaded B : Female Threaded (With Anti-Rotation Pinhole) (mm)

Model No.	LLW0361-CA□		LLW0401-CA□		LLW0481-CA□	
Full Stroke Y	10, 15	20 ~ 50 (in 5mm increments)	10, 15	20 ~ 50 (in 5mm increments)	10, 15	20 ~ 75 (in 5mm increments)
A	58	Y+43	59	Y+44	62	Y+47
B	58		63		71	
C	40		45		51	
D	36		40		48	
E	49	Y+34	49	Y+34	51	Y+36
F	24	Y+9	24	Y+9	23	Y+8
G	25		25		28	
H	29		31.5		35.5	
K	31.4		34		40	
L	66		73		83	
M	11		11		12	
Nx	23.5		26		30	
Ny	8		9		11	
Q	7.5		9.5		9.5	
R	4.5		5.5		5.5	
S	16		14		15.5	
T	9		10		11	
U	12		13		14	
W	7.5		7.5		8.5	
BB	14		15		17	
BC (Nominal×Pitch×Depth)	M6×1×12		M8×1.25×16		M8×1.25×16	
VB 【B only】	2		2.5		2.5	
WB 【B only】	5.5		5		6	
EC	4.5		4.5		4.5	
ED	45°		60°		60°	
EE	30		31.6		39	
EF	30°		0°		0°	
FA	24.5	Y+9.5	24.5	Y+9.5	23.5	Y+8.5
FB	15.5	Y+0.5	15.5	Y+0.5	14.5	Y-0.5
FC (Nominal×Pitch)	M4×0.7		M5×0.8		M5×0.8	
O-ring DA	AS568-006(90°)		AS568-007(90°)		1BP5	

(ex.) LLW0361-CA□-010 [Y=10, A=58, E=49, F=24]
LLW0361-CA□-030 [Y=30, A=73, E=64, F=39]

P : Pin-Hole Option Refer to the dimensions of option A for unlisted dimensions. (mm)

Model No.	LLW0361-CP□		LLW0401-CP□		LLW0481-CP□	
Full Stroke Y	10, 15	20 ~ 50 (in 5mm increments)	10, 15	20 ~ 50 (in 5mm increments)	10, 15	20 ~ 75 (in 5mm increments)
AP	64	Y+49	68	Y+53	72	Y+57
AB	12		15		17	
AC	$6^{+0.012}_{0}$		$8^{+0.015}_{0}$		$8^{+0.015}_{0}$	
AD	6		8		9	
TP	15		19		21	
UP	6		8		10	
VP	6		8		9	
WP	7.5		9.5		10.5	

T : Male Threaded Refer to the dimensions of option A for unlisted dimensions. (mm)

Model No.	LLW0361-CT□		LLW0401-CT□		LLW0481-CT□	
Full Stroke Y	10, 15	20 ~ 50 (in 5mm increments)	10, 15	20 ~ 50 (in 5mm increments)	10, 15	20 ~ 75 (in 5mm increments)
AT	74	Y+59	79	Y+64	86	Y+71
TT	25		30		35	
UT	12		14		17	
VT	16		20		24	
WT	7.5		7.5		8.5	
CB	14		17		19	
CC (Nominal×Pitch)	M10×1.25		M12×1.25		M14×1.5	

Cautions

Notes for Design

1) Check Specifications
- Please use each product according to the specifications.

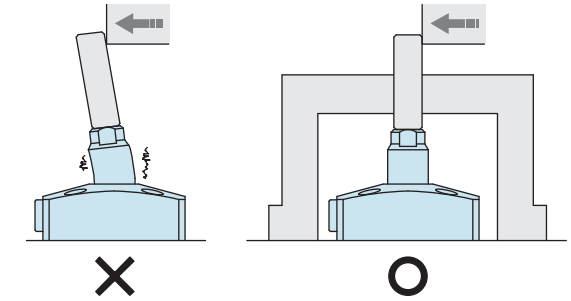
2) Notes for Circuit Design
- Please read "Notes on Hydraulic Cylinder Speed Control Unit" for proper hydraulic circuit design. Improper circuit design may lead to malfunctions and damages. (Refer to P.1356)
- Ensure there is no possibility of supplying hydraulic pressure to the push side and the pull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

3) Notes for Pipe Design
- It is recommended to select as large diameter pipe as possible. The back pressure is proportional to the pipe size, so if the pipes are small the releasing and locking times will be longer.

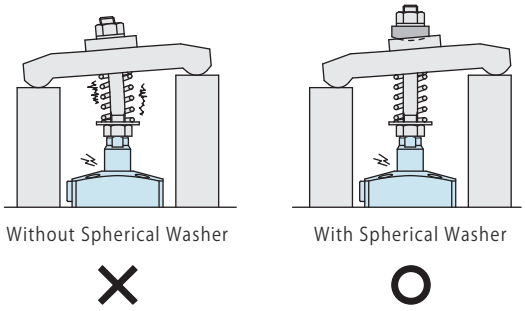
4) Protect the exposed area of the piston rod when using on a welding fixture.
- If spatter attaches to the sliding surface it could lead to malfunction and fluid leakage.

5) The Load Direction Given to the Piston Rod
- Make sure no force is applied to the piston rod except from the axial direction. Usage like the one shown in the figure below will apply a large bending stress to the piston rod and must be avoided.

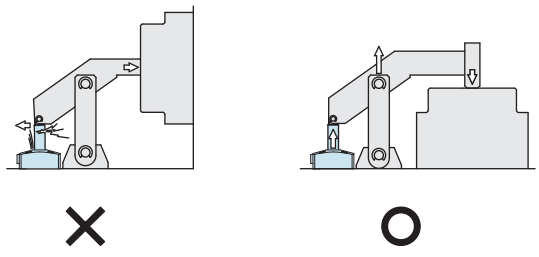
In case a load is applied except from the axial direction



When clamping workpieces of different heights

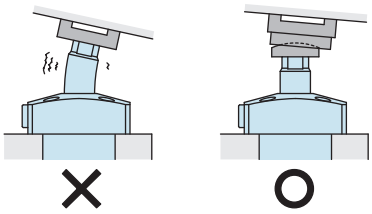


A Combination with Link Mechanism

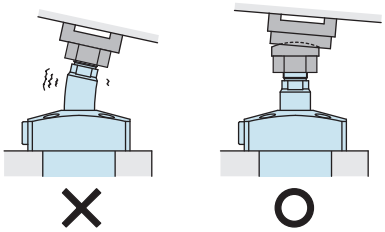


6) When Clamping on a Sloped Surface of a Workpiece
- When clamping an inclined surface, make sure that the clamping area is level when looking from the cylinder side. The clamping surface and the cylinder mounting surface should be parallel. A workpiece may move and a piston rod may slip when a cylinder is used on an inclined surface. (When the workpiece is a casting, it is recommended that a spiked attachment be used for a cylinder on draft angle.)

Female Threaded



Male Threaded



7) Notes on Sensing Valve
- Please refer to the notes for design, installation and use on P. 827.

Installation Notes

1) Check the Usable Fluid

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

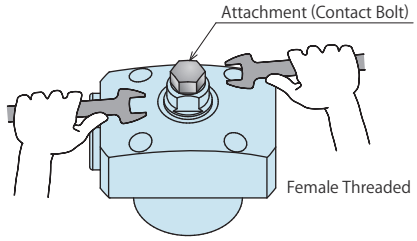
2) Installation of the Cylinder

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

Model No.	Thread Size	Tightening Torque (N·m)
LLW0361	M4×0.7	3.2
LLW0401	M5×0.8	6.3
LLW0481	M5×0.8	6.3

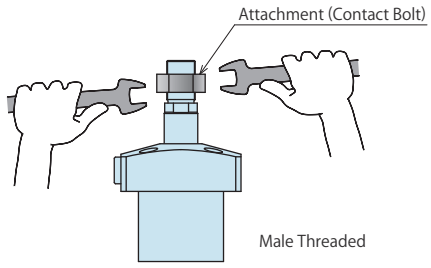
3) Installation / Removal of Attachment

- When installing or removing an attachment, always use a wrench on the piston rod to keep it from turning, and tighten it with the torque shown below.



LLW□-CA□ / LLW□-CB□ : Female Threaded

Model No.	Thread Size	Tightening Torque (N·m)
LLW0361–CA/B□	M6×1	10
LLW0401–CA/B□	M8×1.25	16
LLW0481–CA/B□	M8×1.25	16



LLW□-CT□ :Male Threaded

Model No.	Thread Size	Tightening Torque (N·m)
LLW0361–CT□	M10×1.25	40
LLW0401–CT□	M12×1.25	63
LLW0481–CT□	M14×1.5	80

4) Speed Adjustment

- Adjust the rod operating speed of both the push and pull sides to be less than 100mm/sec. Excessive cylinder speed will accelerate wear and lead to component damage.
- Please make sure to release air from the circuit before adjusting the 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.

※ 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.

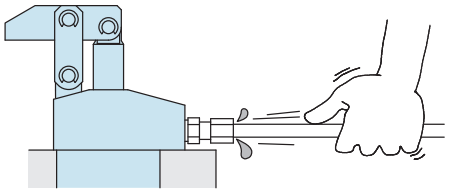
3) Applying Sealing Tape

- 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.

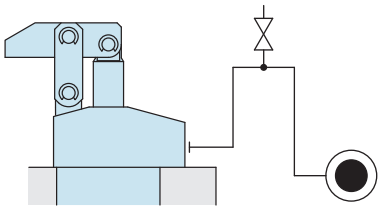
4) Air Bleeding of the Hydraulic Circuit

- 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	

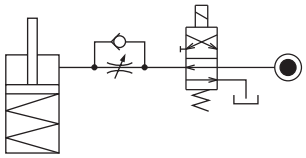
Note : Please contact manufacturers when customers require products in the list above.

Notes on Hydraulic Cylinder Speed Control Unit

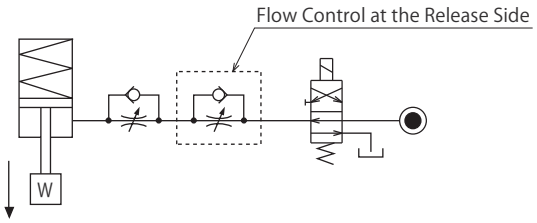
Please pay attention to the cautions below. Design the hydraulic circuit for controlling the action speed of hydraulic cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

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.



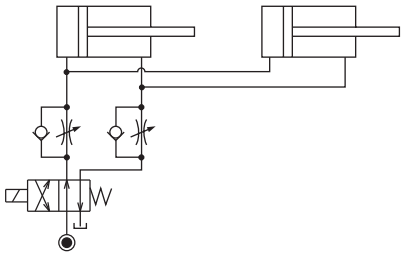
Accelerated clamping speed by excessive hydraulic flow to the cylinder may sustain damage. In this case add flow control to regulate flow. (Please add flow control to release flow if the lever weight is put on at the time of release action when using swing clamps.)



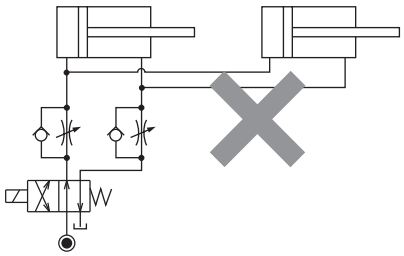
Flow Control Circuit for Double Acting Cylinder

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)

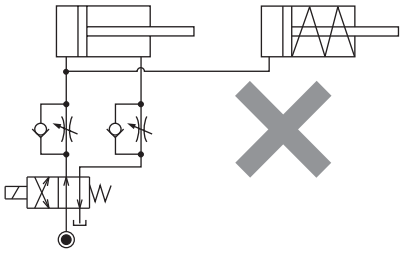


【Meter-in Circuit】(LKE/TMA/TLA must be controlled with meter-in.)



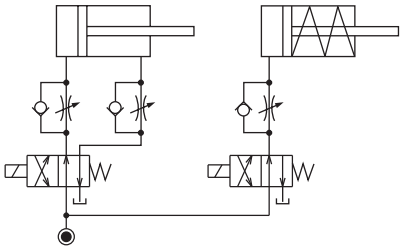
In the case of meter-out circuit, the hydraulic circuit should be designed with the following points.

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.

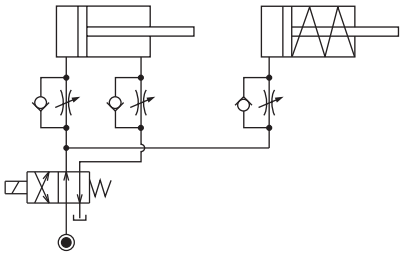


Refer to the following circuit when both the single acting cylinder and double acting cylinder are used together.

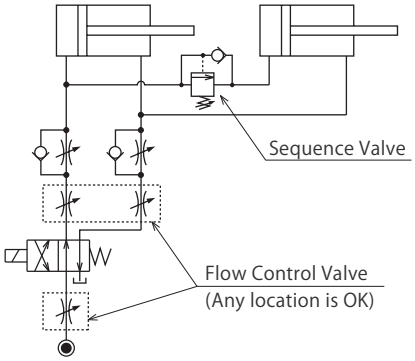
○ Separate the control circuit.



○ 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.



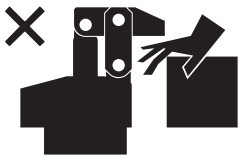
Cautions

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.

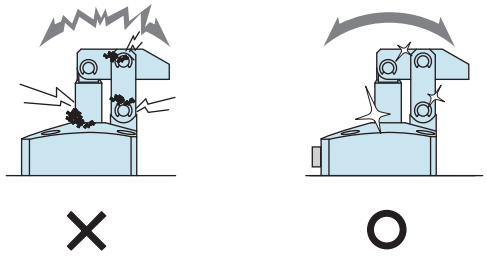


4) Do not disassemble or modify.
- If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

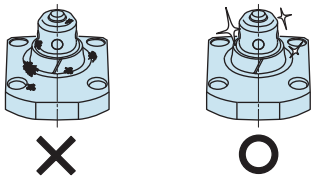
Maintenance and Inspection

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

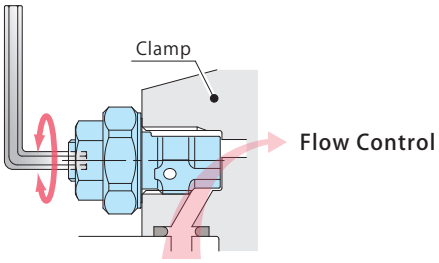
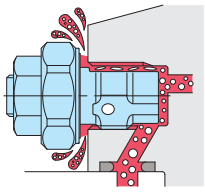
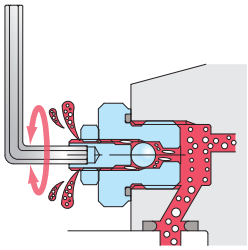
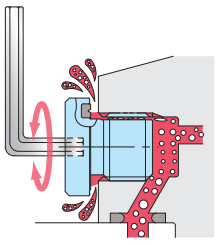
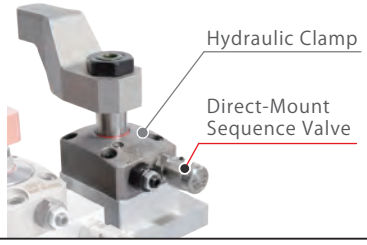
Model BZX

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. 

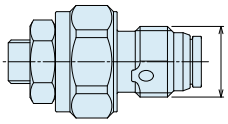
Model No. Indication (Speed Control Valve for Low Pressure)

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.

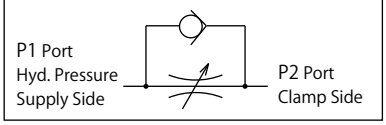
1 : Revision Number

3 Control Method

A : Meter-in
B : Meter-out

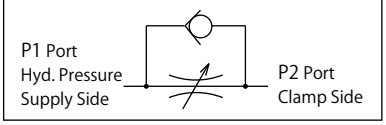
A

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□□-□				

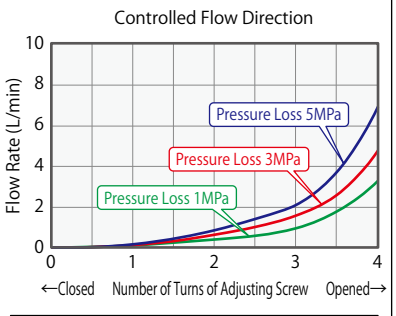
Model No.	LGV (Single Action) Swing Clamp	LKA (Double Action) Link Clamp	LKC (Double Action) Link Clamp	LKE (Double Action) High-Power Link Clamp	LKK (Double Action) Universal Clamp	LKV (Double Action) Link Clamp	LKW (Double Action) Link Clamp	LM (Single Action) Link Clamp	LJ (Single Action) Link Clamp
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□□-□							

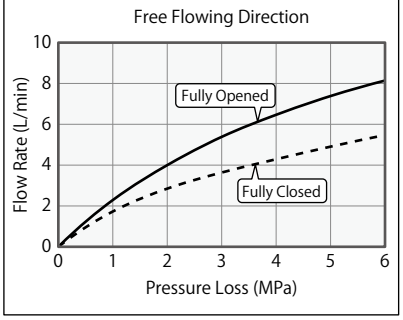
Model No.	LJV (Single Action) Link Clamp	LFW (Double Action) Link Clamp	LFA (Double Action) Link Clamp	LSA (Double Action) Side Clamp	LSE (Double Action) High-Power Side Clamp	LL (Double Action) Linear Cylinder	LLR (Double Action) Linear Cylinder	LLV (Double Action) Lift Cylinder	LLW (Double Action) 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.

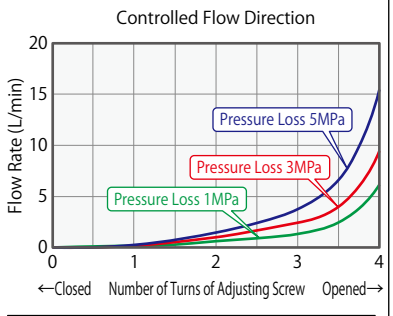
Flow Rate Graph ＜Hydraulic Fluids ISO-VG32（25～35℃）＞

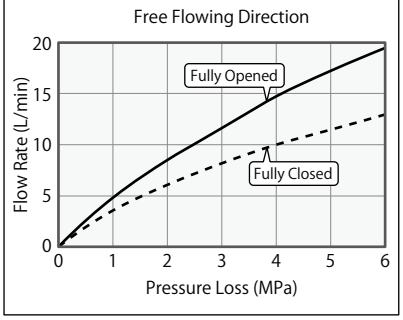
BZL0101-A：Meter-in



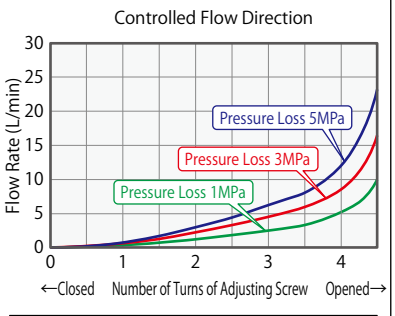


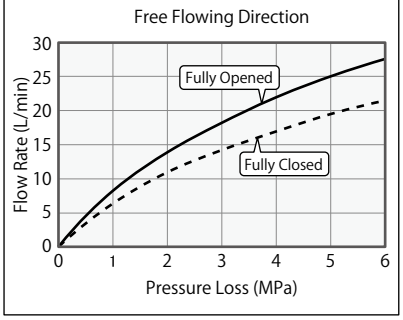
BZL0201-A：Meter-in





BZL0301-A：Meter-in





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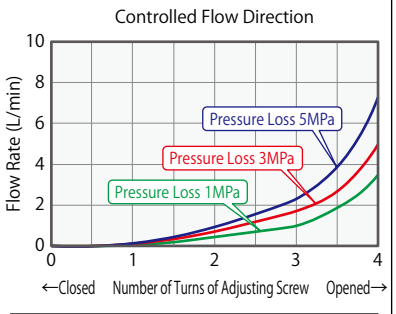
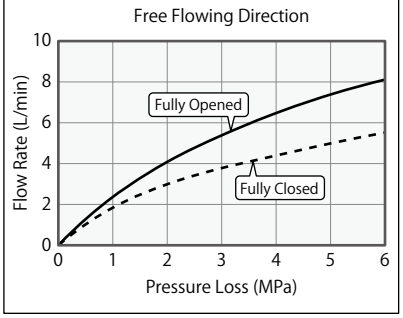
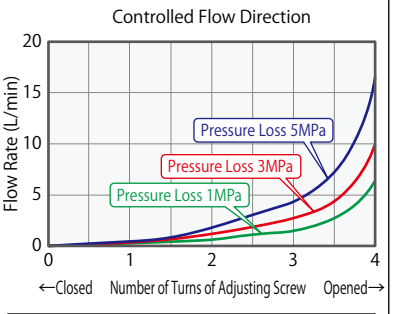
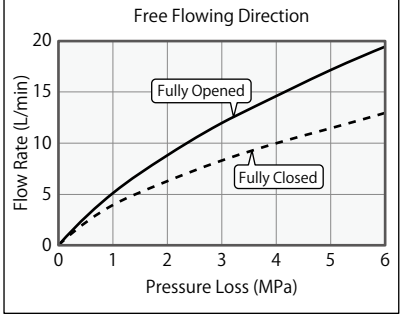


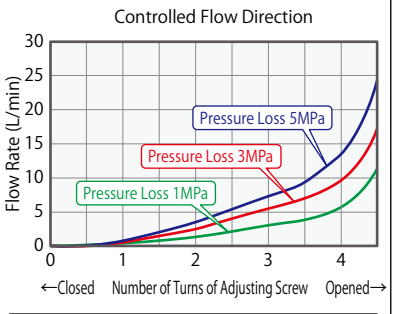


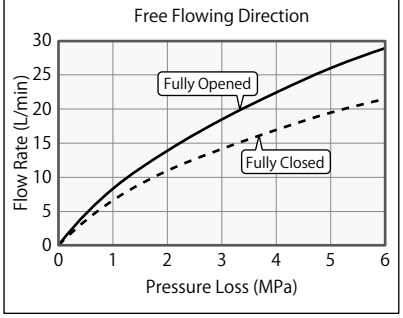
BZL0201-B：Meter-out



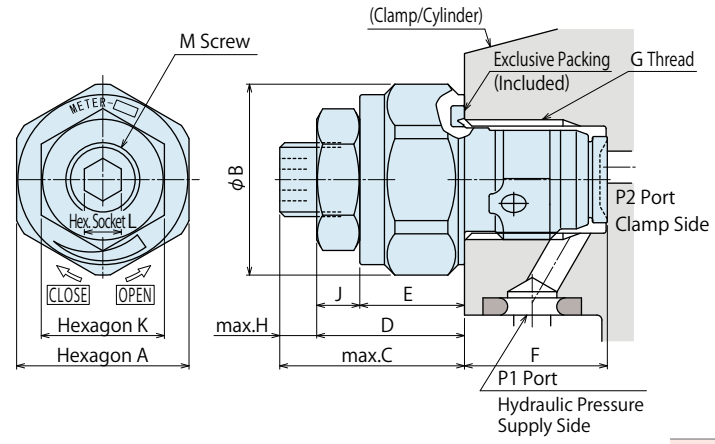


BZL0301-B：Meter-out

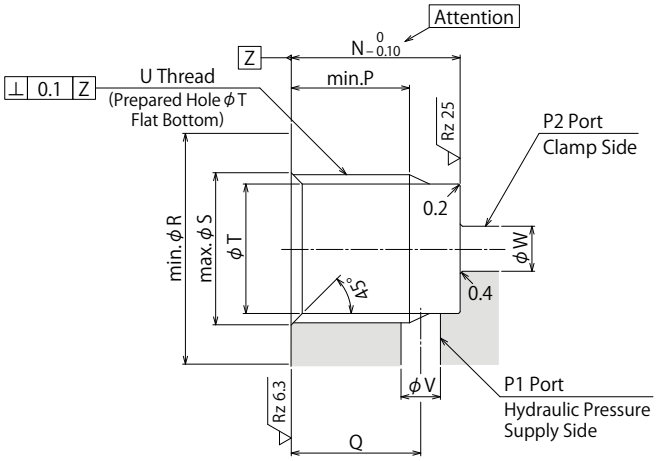




External Dimensions



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.)

Model No. Indication (Air Bleed Valve)

BZX0 1 0

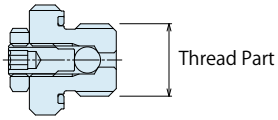
1 2

1 G Thread Size

1 : Thread Part G1/8A Thread

2 : Thread Part G1/4A Thread

3 : Thread Part G3/8A Thread



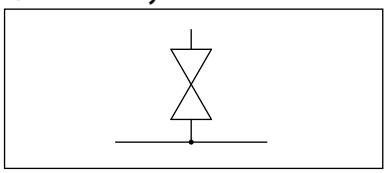
2 Design No.

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

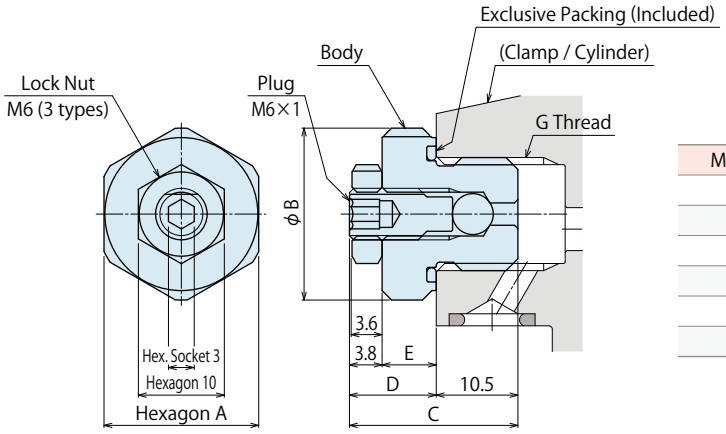
Model No.	LHA (Double Action) Swing Clamp	LHC (Double Action) Swing Clamp	LHD (Double Action) Swing Clamp	LHE (Double Action) High-Power Swing Clamp	LHS (Double Action) Swing Clamp	LHV (Double Action) Swing Clamp	LHW (Double Action) Swing Clamp	LT (Single Action) Swing Clamp	LG (Single Action) Swing 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

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

JZG0 1 0

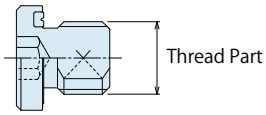
1 2

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□□-□		

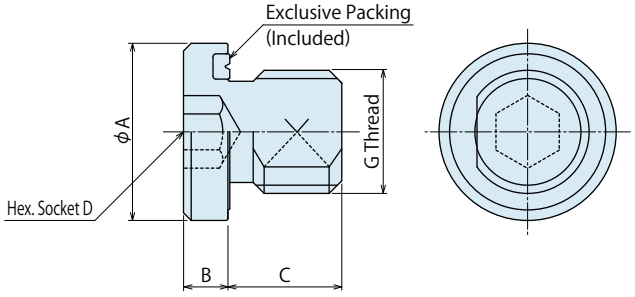
Applicable Products

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

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.

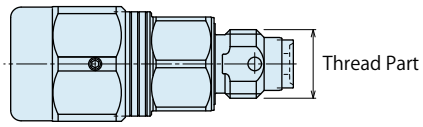
Model No. Indication

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.

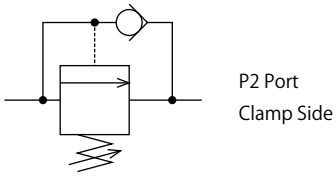
0 : Revision Number

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□□-□		

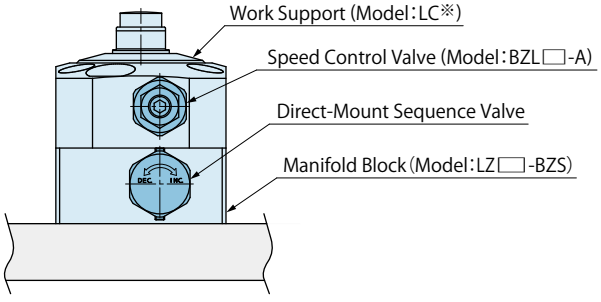
Model No.	LKK (Double Action) Universal Clamp	LKV (Double Action) Link Clamp	LKW (Double Action) Link Clamp	LM (Single Action) Link Clamp	LJ (Single Action) Link Clamp	LJV (Single Action) Link Clamp
BZS0100	LKK0360-C-□ LKK0400-C-□ LKK0480-C-□ LKK0550-C-□	LKV0400-C□E-□ LKV0480-C□E-□ LKV0550-C□E-□	LKW0401-C□□-□ 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□□-□-□		

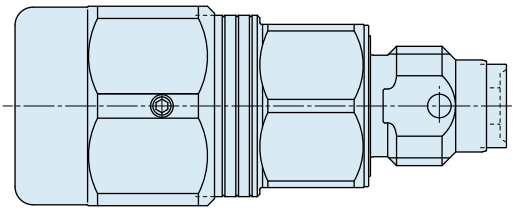
Note : ※1. It is not possible to install two BZS valves to FVC1000.

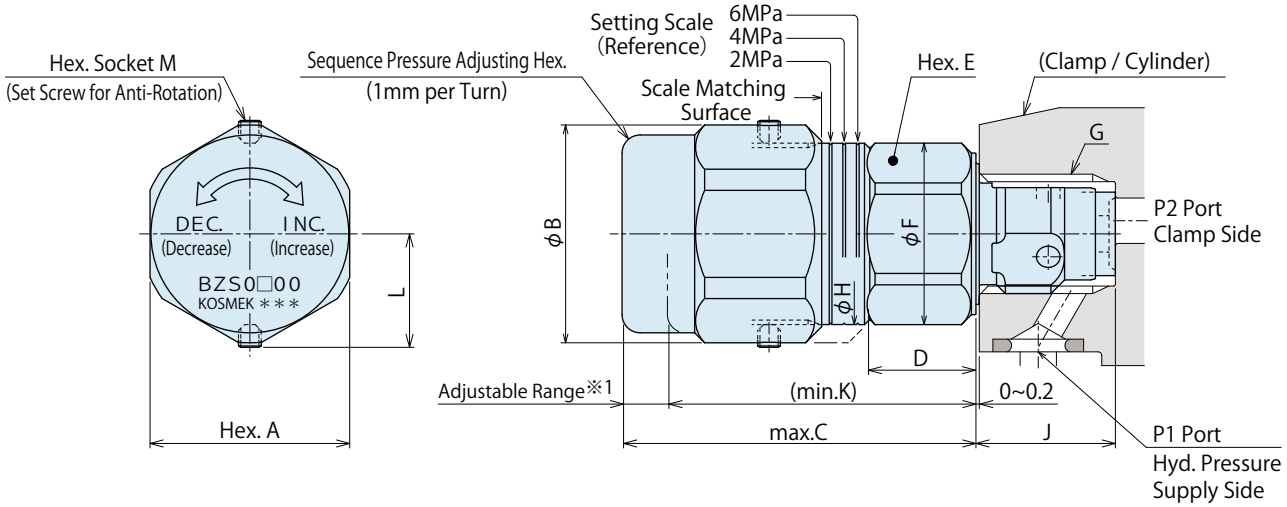
【In case of Work Support】

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

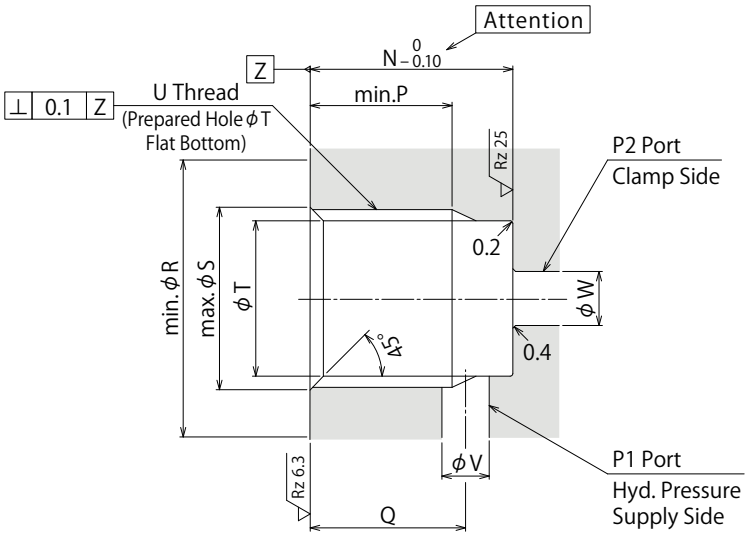




(mm)

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

Machining Dimensions of Mounting Area



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.

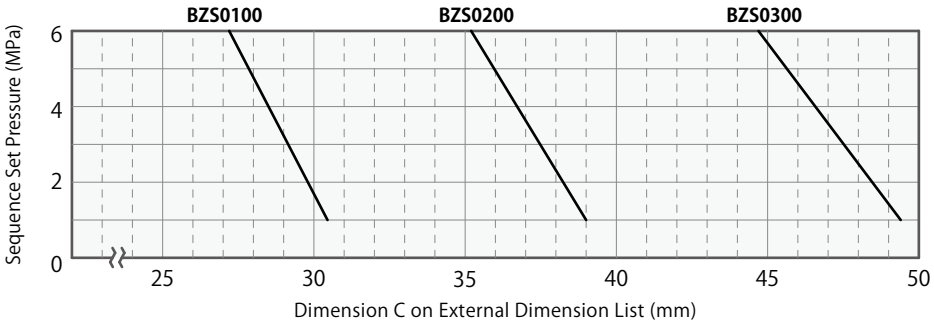
※1. Use the sequence pressure adjusting hex. within the adjustable range of ※2 (the dimensions K~C in the above).
Please note that if it is loosened further than max. C, pressure adjusting hex. part and internal spring will come off.

※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.

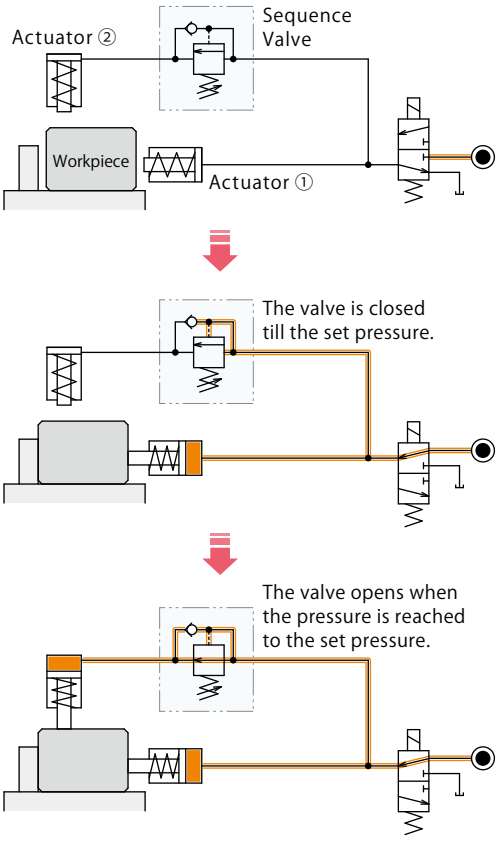
Cautions

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.	

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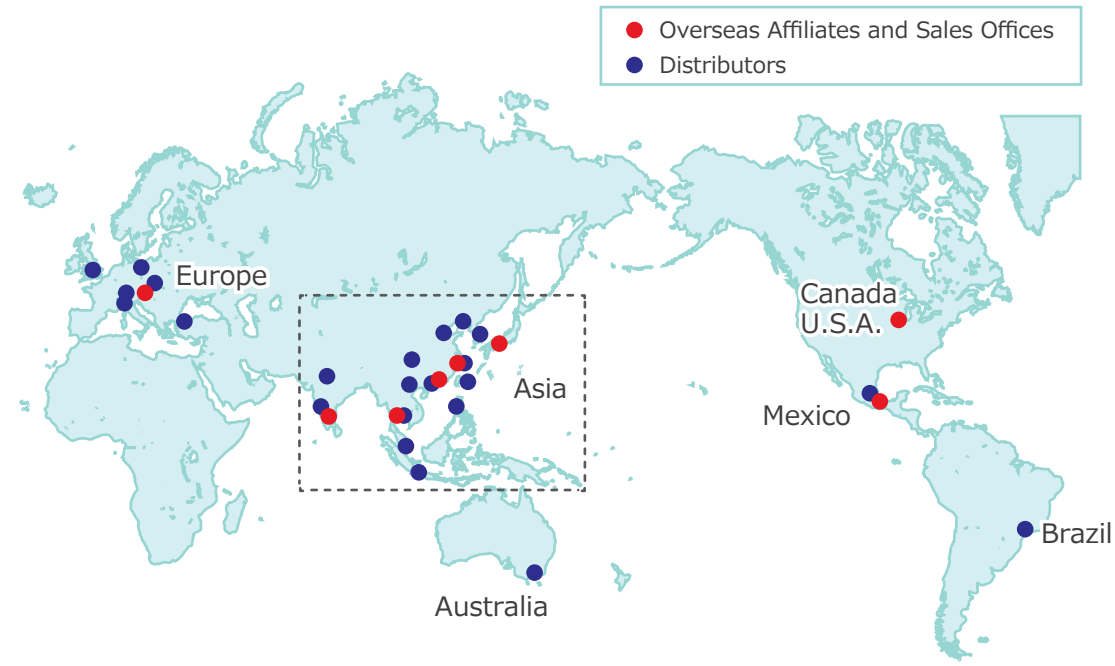
Global Network



Asia Detailed Map

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