New 1-Port Sensing Swing/Link Clamp • Lift Cylinder

One Air Port Can Detect Both Clamp and Unclamp Actions
Completely New Sensing Mechanism

Model LKV
Link Clamp

Model LLV
Lift Cylinder

Model LHV
Swing Clamp

KOSMEK
Harmony in Innovation

1-Port Sensing Lift Cylinder

Hydraulic Double Action

Model LLV

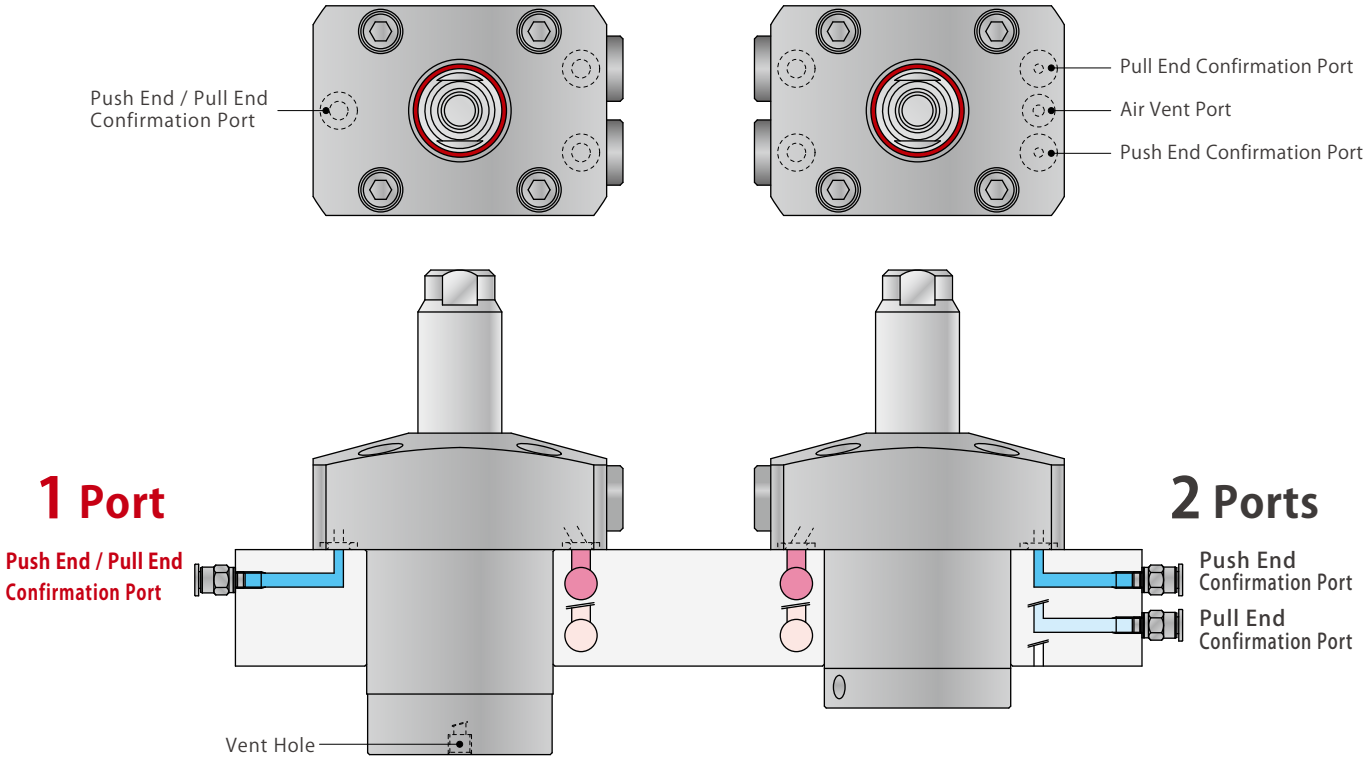
One Air Port Can Detect Both Push and Pull Actions

Suitable for Automated Application with Completely New Sensing Mechanism

The stroke can be set in 5 mm increments.

NEW

One Air Port to Confirm Push and Pull Actions



New Model **New Mechanism**

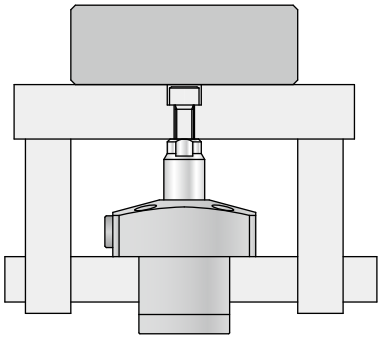
model LLV

1-Port Sensing Lift Cylinder

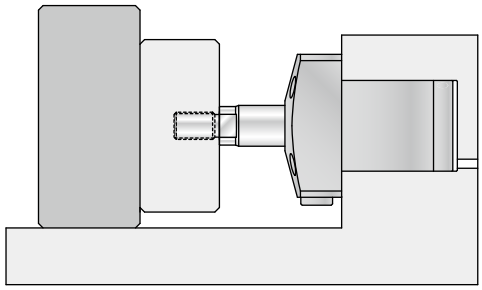
Current

model LLW

Application Examples



For Lifting



For Shifting

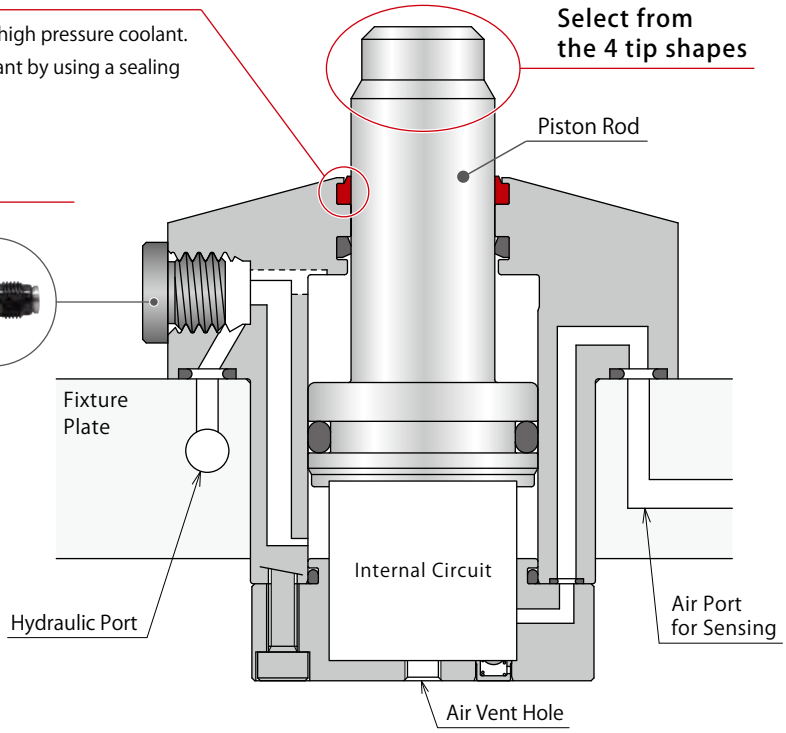
Cross Section

Excellent Coolant Resistance

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

Direct Mount Speed Control Valve

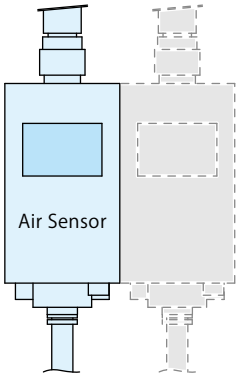
Speed control valve with air bleeding function can be directly mounted to the product. (Speed control valve is sold separately.)



Minimized Number of Sensors

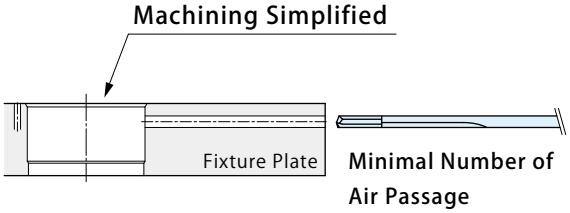
Using with a two-output air sensor allows for one sensing air port, confirms actions both at the push end and pull end, and reduces the number of sensors.

1-Port Sensing Reduces the Number of Sensors



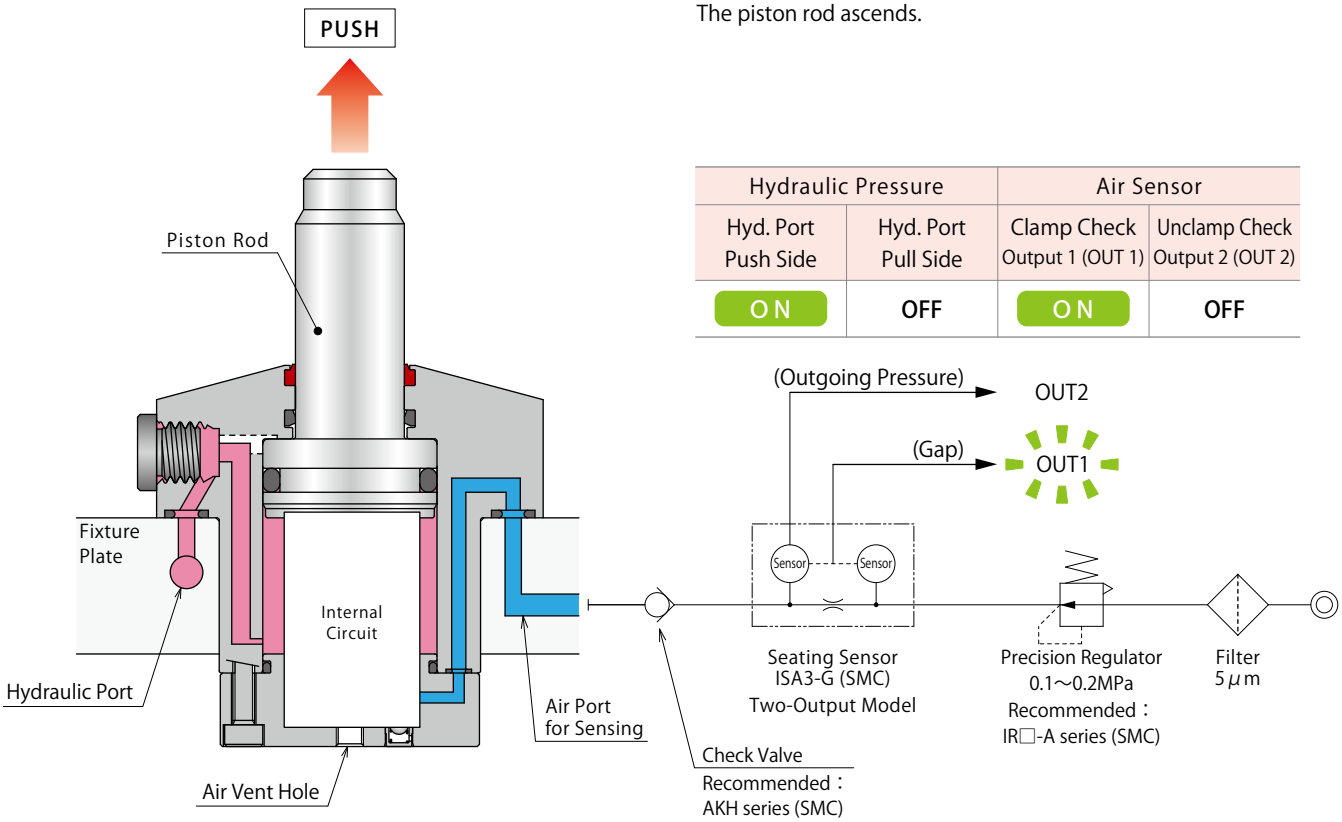
Minimized Number of Ports • Simple Machining

Integrating ports allows for reducing the number of ports for Rotary Joint and machining for air passage of fixture plate, and simplifying the machining of mounting hole. etc.



Action Description (Cross Section)

Push End

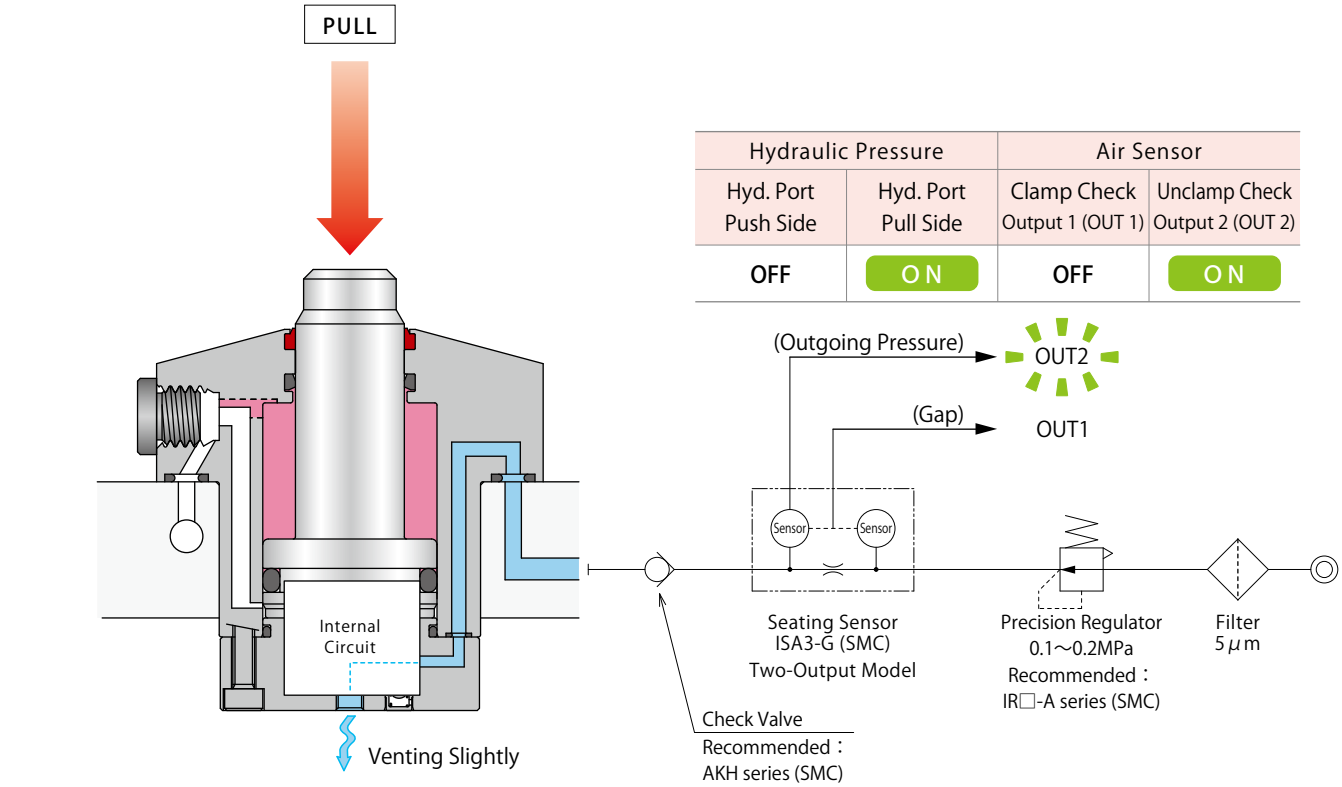


Push (During Hyd. Pressure Supply to Push Side)

The piston rod ascends.

Hydraulic Pressure		Air Sensor	
Hyd. Port Push Side	Hyd. Port Pull Side	Clamp Check Output 1 (OUT 1)	Unclamp Check Output 2 (OUT 2)
ON	OFF	ON	OFF

Pull End



Pull (During Hyd. Pressure Supply to Pull Side)

The piston rod descends.

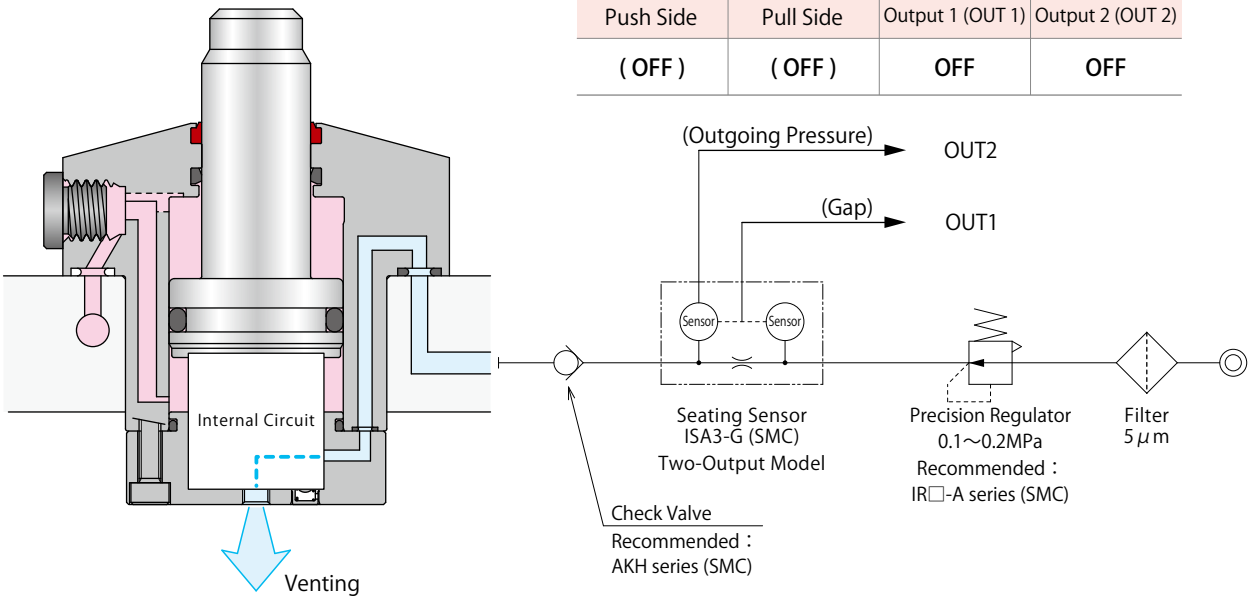
Hydraulic Pressure		Air Sensor	
Hyd. Port Push Side	Hyd. Port Pull Side	Clamp Check Output 1 (OUT 1)	Unclamp Check Output 2 (OUT 2)
OFF	ON	OFF	ON

During Push/Pull Action

■ During Push/Pull Action

The air sensor turns OFF during the stroke with pressure supplied to push side or pull side.
The detail of sensor ON/OFF range is shown in Air Sensing Chart on P48.

Hydraulic Pressure		Air Sensor	
Hyd. Port Push Side	Hyd. Port Pull Side	Clamp Check Output 1 (OUT 1)	Unclamp Check Output 2 (OUT 2)
(OFF)	(OFF)	OFF	OFF



Action Description (Air Sensing Chart Explanation)

Action confirmation can be conducted by detecting differential pressure with the air sensor.

Applicable Model

LLV 040 0 - C A/B/P/T **E - 025**

Air Sensor

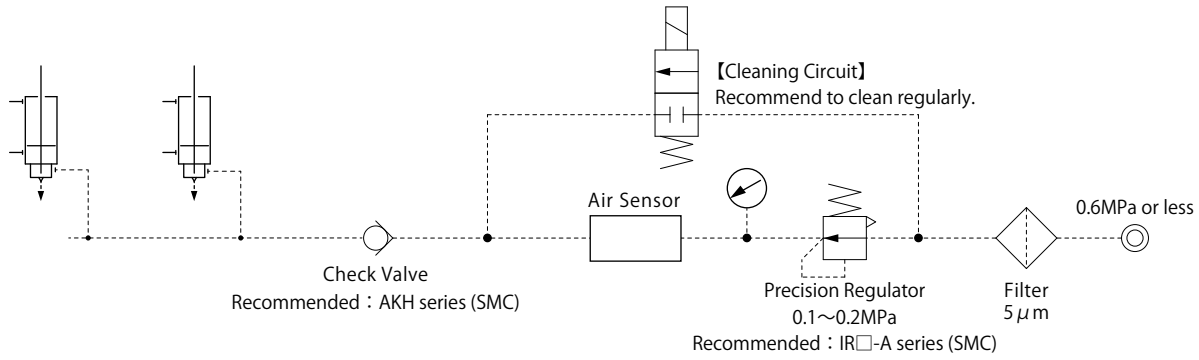
- Requires **Two-Output Air Sensor** in order to confirm both push and pull actions with one air sensor.

Recommended Operating Air Pressure：0.1～0.2MPa

Recommended Air Sensor

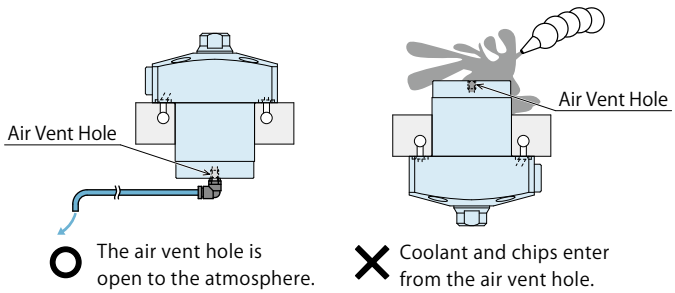
Maker	SMC
Name	Digital Seating Switch
Model No.	ISA3-G□A, ISA3-G□B

- **Number of Cylinders Connected per Air Sensor：1 ~ 2 pcs.**
- Please refer to maker's catalog etc. for the detail of the air sensor.
- Continuously supply air pressure when in use.
- Refer to the drawing below for the air circuit construction.

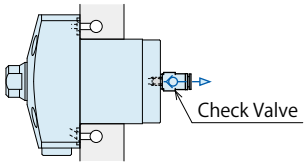


Notes for Design・Installation・Use

- Air vent hole must be open to the atmosphere, and prevent coolant and chips from entering the air vent hole. The air sensor can malfunction if the air vent port is blocked.



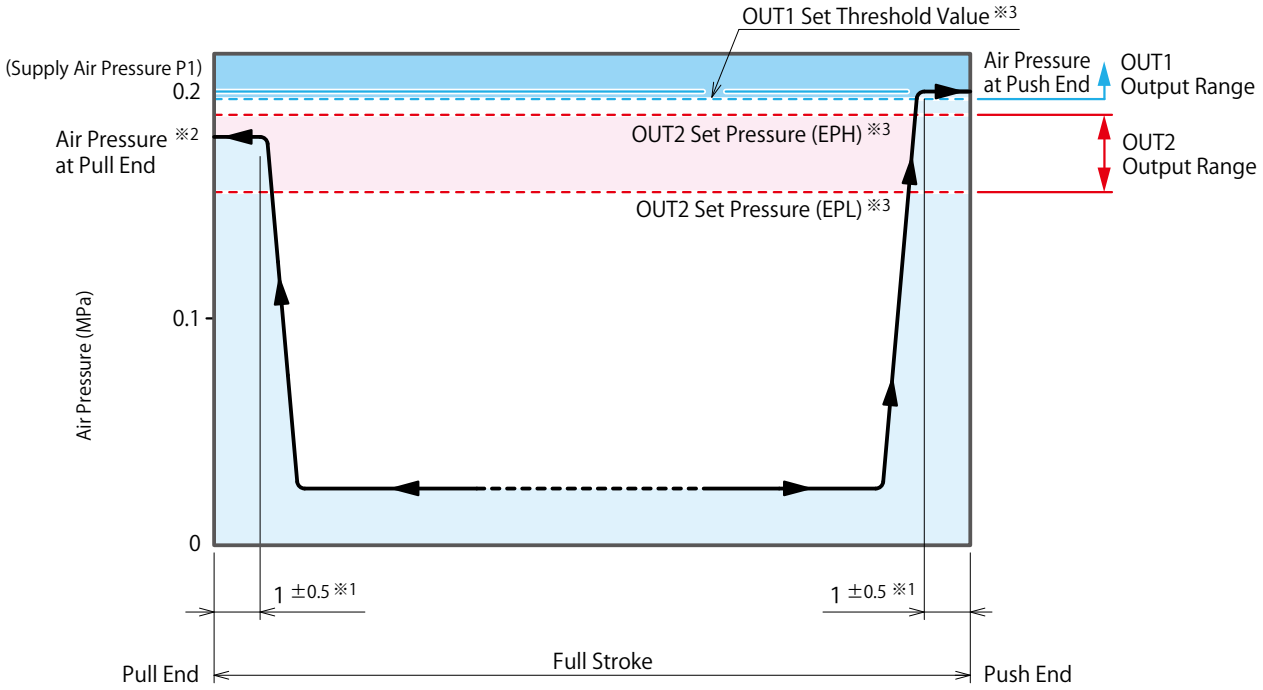
【Prevention of Foreign Substance to the Air Vent Port】
Coolant and chips can be prevented by setting a check valve with low cracking pressure. (Recommended Check Valve: SMC-made AKH series, cracking pressure: 0.005MPa)

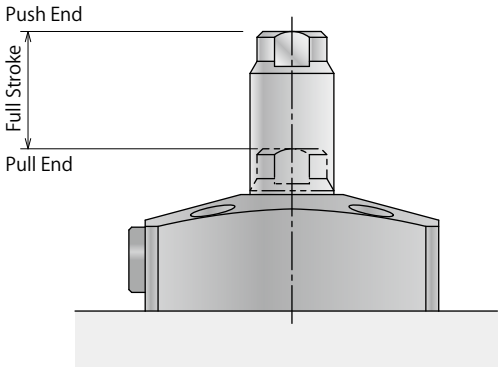


- Continuously supply air pressure to the air port for sensing when in use.
- Set a check valve with low cracking pressure to the detection port of the air sensor. (Recommended Check Valve: SMC-made AKH series, cracking pressure: 0.005MPa)

Air Sensing Chart

When Connected to 1 Cylinder, Supply Air Pressure 0.2MPa





Notes:

1. Sensing chart shows the relationship between the stroke and detection circuit air pressure.
2. The specifications may vary depending on the air circuit construction.
   Because it may affect the responsiveness of the air sensor, use the piping tube with outer diameter ϕ6 (inner diameter ϕ4) for the outgoing side of the sensor and its length should be as short as possible.
3. Sensor Setting should be as follows: Detect with OUT1 (Threshold Value) for push side action confirmation, OUT2 (Pressure Set Value) for pull side action confirmation. Hysteresis for both OUT1 and OUT2 should be set as 0. Make sure to use the recommended air sensor.

※1. There is a certain tolerance with regard to the position where it reaches push end air pressure and pull end air pressure depending on the cylinder structure. (Refer to the sensing chart.)
※2. Pressure at the pull end may vary according to the condition of air circuit.
※3. The position where the air sensor turns ON signal output varies depending on the sensor setting. Set according to using systems. Please refer to the maker's instruction manual, etc. for detail of the air sensor.

Model No. Indication

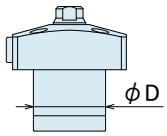
LLV 048 0 - C A E - 025

1 2 3 4 5

1 Body Size

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

※ Indicates the cylinder outer diameter (φD).



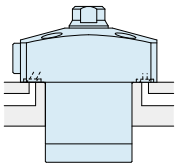
2 Design No.

0 : Revision Number

3 Piping Method

C : Gasket Option (With G Thread Plug)

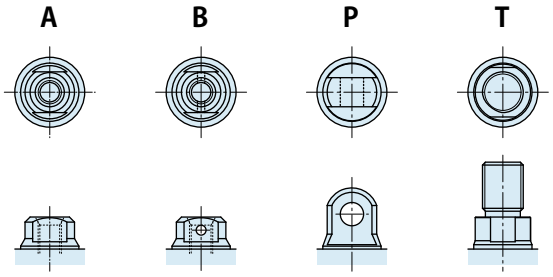
※ Speed control valve (BZL) is sold separately.
Please refer to P.55.



With G Thread Plug
Able to attach speed control valve

4 Shape of Piston Tip

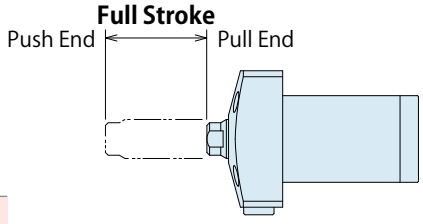
A : Female Threaded
B : Female Threaded (With Anti-Rotation Pinhole)
P : Pin-Hole
T : Male Threaded



5 Stroke

Stroke Value : Full Stroke

※ Full stroke is set in 5mm increments.
Example : Full Stroke 15mm : 015
Full Stroke 20mm : 020
Full Stroke 35mm : 035



Model No.		LLV0360-C□E	LLV0400-C□E	LLV0480-C□E
Full Stroke	mm	10~25 (in 5mm increments)	10~25 (in 5mm increments)	10~35 (in 5mm increments)

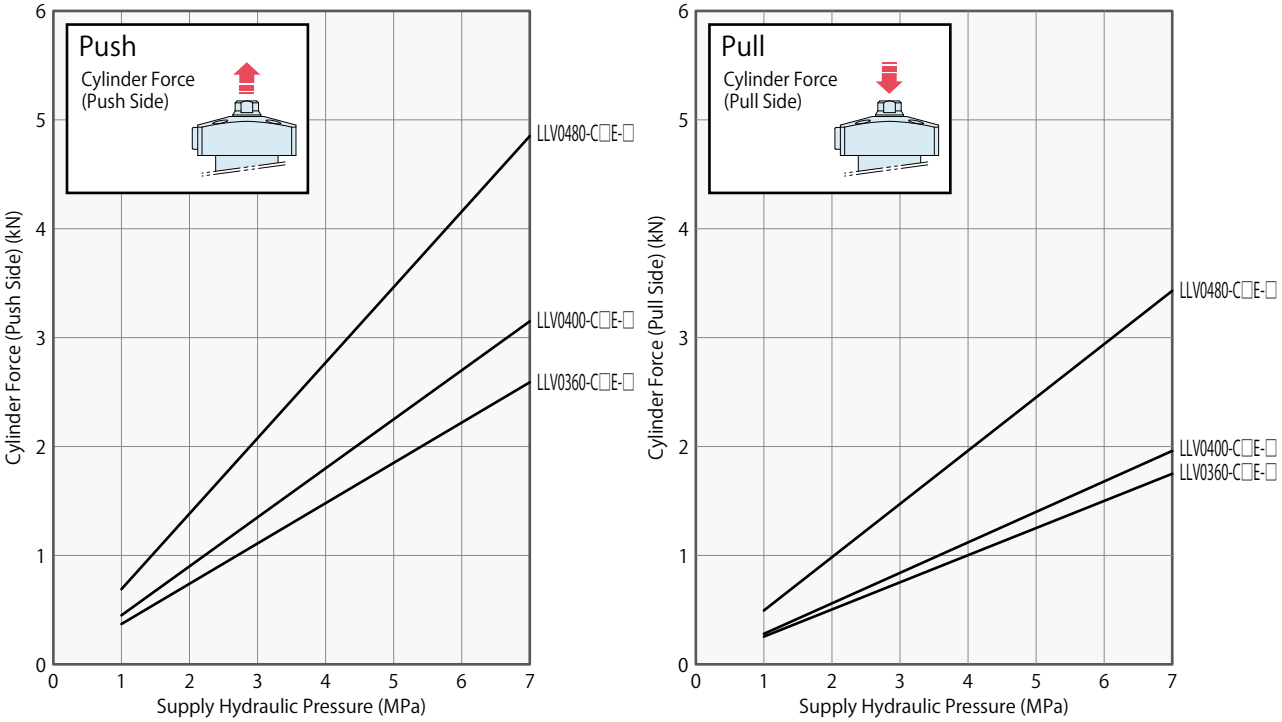
Specifications

Model No.			LLV0360-C□E-□	LLV0400-C□E-□	LLV0480-C□E-□
Full Stroke Y		mm	10~25 (in 5mm increments)	10~25 (in 5mm increments)	10~35 (in 5mm increments)
Cylinder Area	cm2	Push Side	3.7	4.5	6.9
		Pull Side	2.5	2.8	4.9
Cylinder Force ※1 (Calculation Formula)	kN	Push Side	P × 0.37	P × 0.45	P × 0.69
		Pull Side	P × 0.25	P × 0.28	P × 0.49
Cylinder Force ※1 (Calculation Formula)	cm3	Push Side	Y × 0.37	Y × 0.45	Y × 0.69
		Pull Side	Y × 0.25	Y × 0.28	Y × 0.49
Cylinder Inner Diameter		mm	ϕ24	ϕ26	ϕ32
Rod Diameter		mm	ϕ16	ϕ18	ϕ20
Hydraulic 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 Sensor ※2			Seating Switch ISA3-G (2-Output Model) : SMC		
Operating Temperature		℃	0~70		
Usable Fluid			General Hydraulic Oil Equivalent to ISO-VG-32		
Mass		kg	0.7~0.8	0.8~1.0	1.3~1.5

Notes: ※1. P : Supply Hydraulic Pressure (MPa) Y : Full Stroke (mm)
※2. The number of cylinders connected per air sensor is 1 ~ 2 pcs.

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
LLV0360-C□E-□	0.4	0.7	1.1	1.5	1.9	2.2	2.6	0.3	0.5	0.8	1.0	1.3	1.5	1.8
LLV0400-C□E-□	0.5	0.9	1.4	1.8	2.3	2.7	3.2	0.3	0.6	0.8	1.1	1.4	1.7	2.0
LLV0480-C□E-□	0.7	1.4	2.1	2.8	3.5	4.1	4.8	0.5	1.0	1.5	2.0	2.5	2.9	3.4



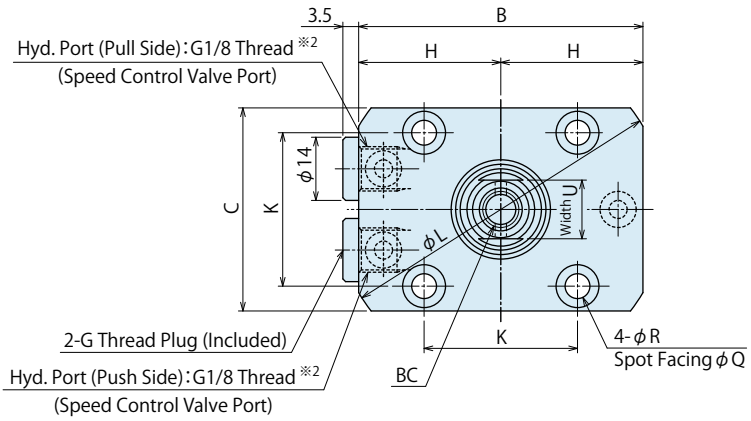
Notes:
1. The chart and graph show the relationship between the cylinder force and supply hydraulic pressure.
2. Cylinder force (kN) is the theoretical value. Actual force may decrease because of friction and pressure loss.

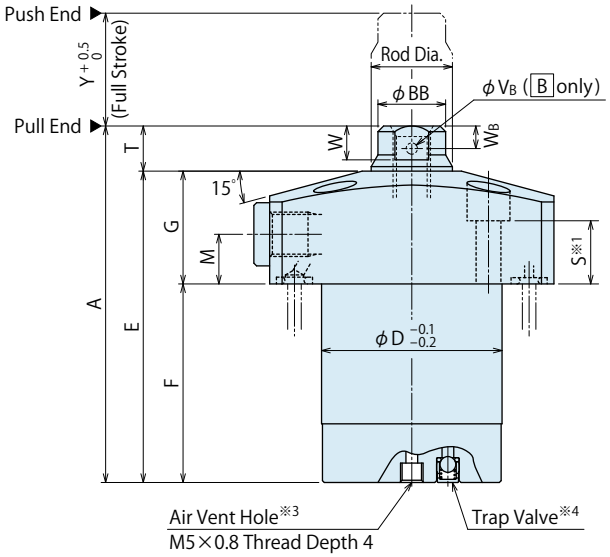
External Dimensions

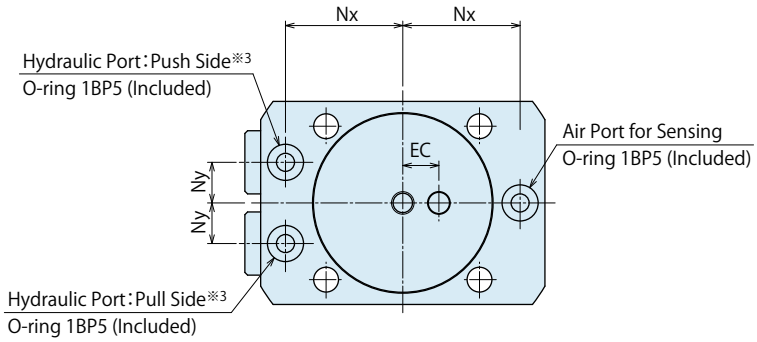
Tip Shape :

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

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



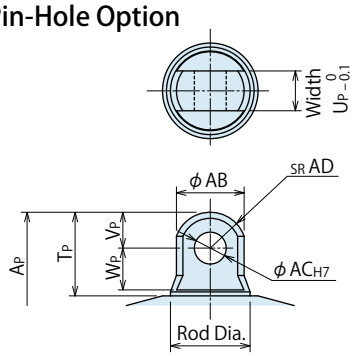




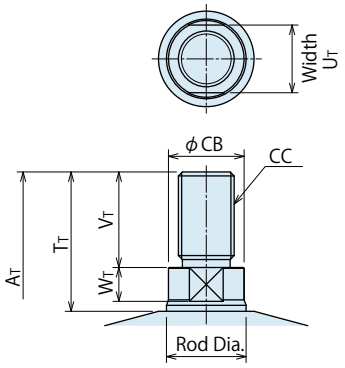
Tip Shape

Refer to A : Female Threaded for unlisted dimensions.

P : Pin-Hole Option



T : Male Threaded



Notes:

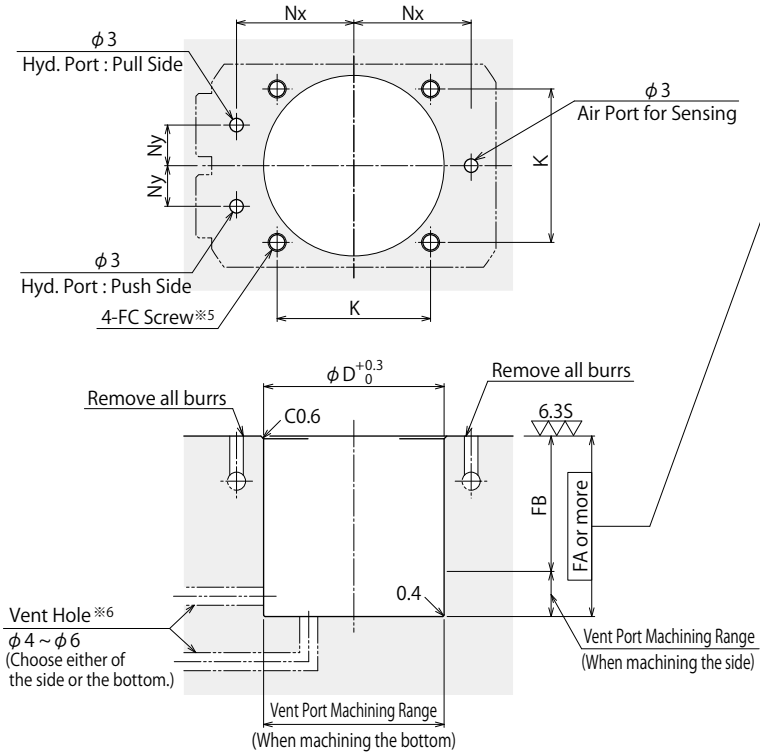
※ 1. Mounting bolts are not provided with the product. Please prepare them according to the mounting height referring to dimension 'S'.

※ 2. Speed control valve is sold separately. Please refer to P.55 for detail.

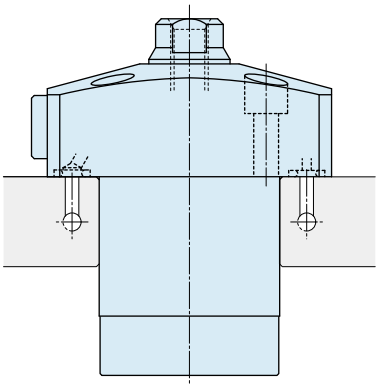
※ 3. Air vent hole must be open to the atmosphere, and prevent coolant and chips from entering the air vent hole.
If exposed to coolant, use M5 screw and prepare piping to prevent coolant and chips, but do not block the air vent hole.

※4. Do not block the trap valve, and it must be open to the atmosphere.

Machining Dimensions for Mounting Area



When the mounting hole is a through hole, there is no need to follow dimension FA. Determine FA according to the plate thickness.



Notes:
※5. The FC depth of the mounting bolts should be decided from dimension S.
※6. No need of air vent hole if the mounting hole is a through hole.

External Dimensions and Machining Dimensions for Mounting

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

Model No.	LLV0360-CAE-□		LLV0400-CAE-□		LLV0480-CAE-□	
Full Stroke Y	10,15	20,25 (in 5mm INC.)	10,15	20,25 (in 5mm INC.)	10,15	20～35 (in 5mm INC.)
A	68	Y+53	69	Y+54	71	Y+56
B	58		63		71	
C	40		45		51	
D	36		40		48	
E	59	Y+44	59	Y+44	60	Y+45
F	34	Y+19	34	Y+19	32	Y+17
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)	M6×1×10		M8×1.25×12		M8×1.25×12	
VB 【B only】	2		2.5		2.5	
WB 【B only】	5.5		5		6	
EC	8		8		10	
FA	34.5	Y+19.5	34.5	Y+19.5	32.5	Y+17.5
FB	21	Y+6	21	Y+6	18.5	Y+3.5
FC	M4×0.7		M5×0.8		M5×0.8	

(ex.) LLV0360-CA□-010 [Y=10、A=68、E=59、F=34]
LLV0360-CA□-025 [Y=25、A=78、E=69、F=44]

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

Model No.	LLV0360-CPE-□		LLV0400-CPE-□		LLV0480-CPE-□	
Full Stroke Y	10,15	20,25 (in 5mm INC.)	10,15	20,25 (in 5mm INC.)	10,15	20～35 (in 5mm INC.)
AP	74	Y+59	78	Y+63	81	Y+66
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 Option A for unlisted dimensions. (mm)

Model No.	LLV0360-CTE-□		LLV0400-CTE-□		LLV0480-CTE-□	
Full Stroke Y	10,15	20,25 (in 5mm INC.)	10,15	20,25 (in 5mm INC.)	10,15	20～35 (in 5mm INC.)
AT	84	Y+69	89	Y+74	95	Y+80
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" to assist with proper hydraulic circuit designing. Improper circuit design may lead to malfunctions and damages. (Refer to P.60)
- Ensure there is no possibility of supplying hydraulic pressure to the push side and pull side simultaneously.

3) Notes for Piping Design

- It is recommended to select as large diameter piping as possible. The back pressure is proportional to the pipe size, so if the piping is small the unclamping and clamping time will be longer.

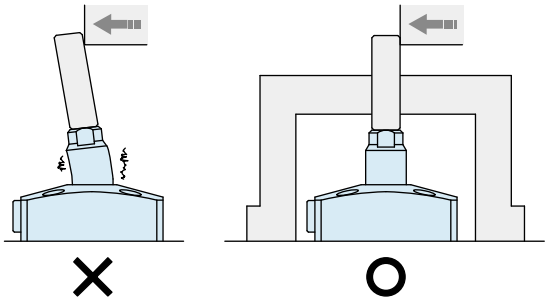
4) When using on a welding fixture, the exposed area of piston rod should be protected.

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

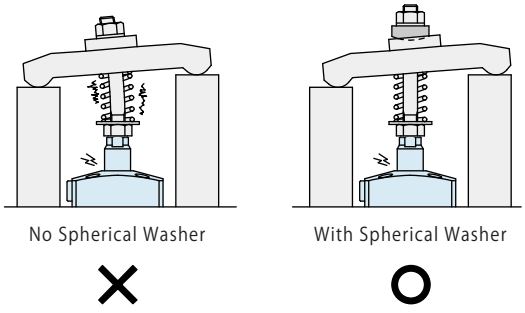
5) The Load Direction Given to the Piston Rod

- 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.

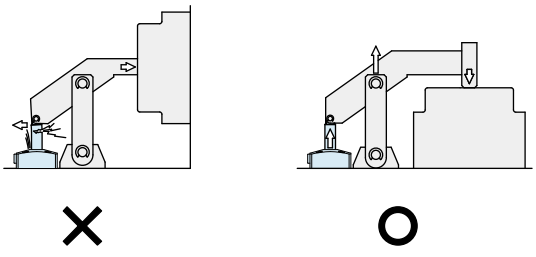
In case that load if applied except from the axial direction



When clamping workpieces of different heights



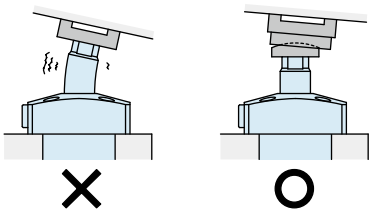
A Combination with Link Mechanism



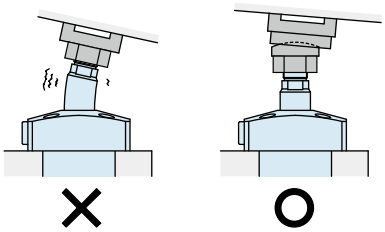
6) When Clamping on a Sloped Surface on the Workpiece

- When clamping an inclined surface, make sure that the clamping area is level when looking from the cylinder side. The clamping surface and cylinder mounting surface should be parallel. Workpieces may move and piston rods may slip when cylinders are used on inclined surfaces. (When the workpiece is a casting, it is recommended that spiked attachments be used for clamps on draft angles.)

Female Threaded



Male Threaded



7) Vent Hole and Check Valve of Air Sensor

- Make sure to check the notes for design, installation and use on P. 47. when using an air sensor.

Installation Notes

1) Check the Usable Fluid

- Please use the appropriate fluid by referring to the Hydraulic Fluid List (P.59).

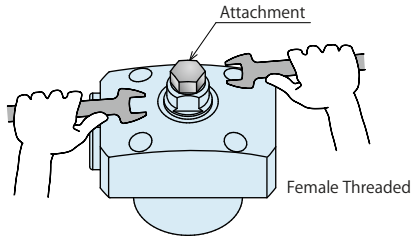
2) Installation of the Cylinder

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

Model No.	Mounting Bolt Size	Tightening Torque (N·m)
LLV0360-C□E-□	M4×0.7	3.2
LLV0400-C□E-□	M5×0.8	6.3
LLV0480-C□E-□	M5×0.8	6.3

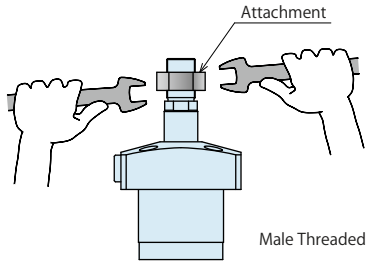
3) Installation / Removal of the Attachment

- When mounting or removing the attachment, stop the piston rod with a spanner at its front end and tighten it with torque as shown in the table below.



LLV□-CAE-□ / LLV□-CBE-□ : Female Threaded

Model No.	Thread Size	Tightening Torque (N·m)
LLV0360-C $\frac{A}{B}$ E-□	M6×1	10
LLV0400-C $\frac{A}{B}$ E-□	M8×1.25	16
LLV0480-C $\frac{A}{B}$ E-□	M8×1.25	16



LLV□-CTE-□ : Male Threaded

Model No.	Thread Size	Tightening Torque (N·m)
LLV0360-CTE-□	M10×1.25	40
LLV0400-CTE-□	M12×1.25	63
LLV0480-CTE-□	M14×1.5	80

4) Speed Adjustment

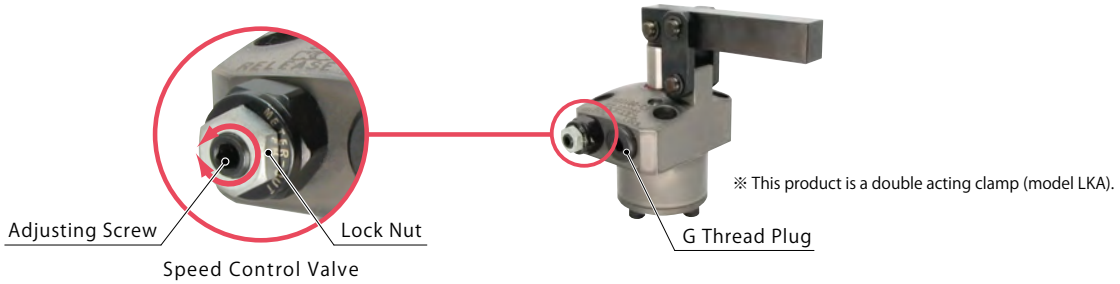
- Adjust the operating speed less than 100mm/sec for both the push and pull sides.
  Excessive cylinder speed will accelerate wear and lead to component damage.
- Adjust the speed only after releasing the air from the circuit.
  If air is mixed in the circuit it is not able to adjust the speed accurately.
- 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.59 for common cautions.
・Installation Notes ・Hydraulic Fluid List ・Notes on Hydraulic Cylinder Speed Control Circuit
・Notes on Handling ・Maintenance/Inspection ・Warranty

Speed Control Valve (For Low Pressure)

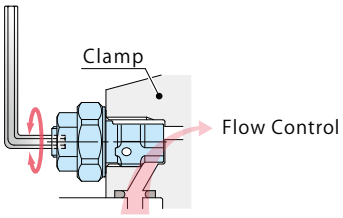
Directly Mounted to Clamps

Speed Control Valve (model BZL) is directly mounted to hydraulic clamps with piping method: type C.

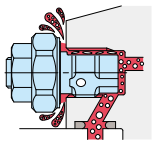


Action Description

Adjust the flow by wrench.
Able to adjust the clamping action speed individually.



Able to bleed the air in the circuit by loosening the Speed Control Valve.



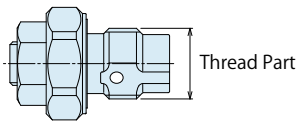
Model No. Indication (Speed Control Valve for Low Pressure)

BZL 0 10 1 - B

1 2 3

1 G Thread Size

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



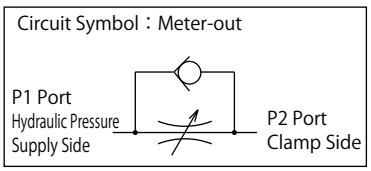
2 Design No.

1 ：Revision Number

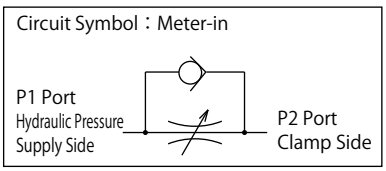
3 Control Method

B ：Meter-out (Recommended※1)
A ：Meter-in

B



A



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

Specifications

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

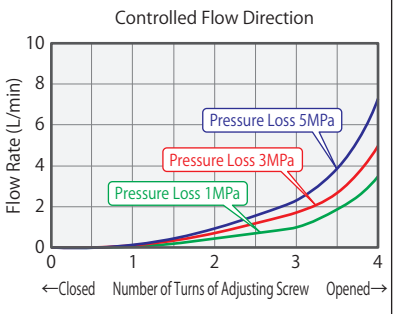
Notes : 1. It must be mounted with recommended torque. Because of the structure of the metal seal, if mounting torque is insufficient, the flow control valve may not be able to adjust the flow rate.
2. Do not attach a used BZL to other clamps. Flow control may not be done because the bottom depth difference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

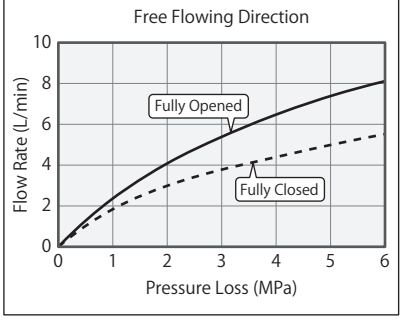
Applicable Products

Model No.	LHV (Double Action) Swing Clamp	LKV (Double Action) Link Clamp	LLV (Double Action) Lift Cylinder
BZL0101-B	LHV0400-C□E-□ LHV0480-C□E-□ LHV0550-C□E-□	LKV0400-C□E-□ LKV0480-C□E-□ LKV0550-C□E-□	LLV0360-C□E-□ LLV0400-C□E-□ LLV0480-C□E-□
BZL0101-A	(LHV0400-C□E-□) (LHV0480-C□E-□) (LHV0550-C□E-□)	(LKV0400-C□E-□) (LKV0480-C□E-□) (LKV0550-C□E-□)	(LLV0360-C□E-□) (LLV0400-C□E-□) (LLV0480-C□E-□)
BZL0201-B	LHV0650-C□E-□ LHV0750-C□E-□	LKV0650-C□E-□ LKV0750-C□E-□	
BZL0201-A	(LHV0650-C□E-□) (LHV0750-C□E-□)	(LKV0650-C□E-□) (LKV0750-C□E-□)	

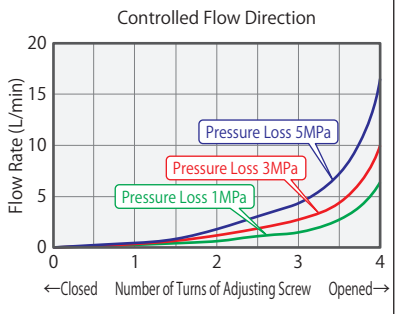
Flow Rate Graph <Hydraulic Fluids ISO-VG32 (25～35℃)>

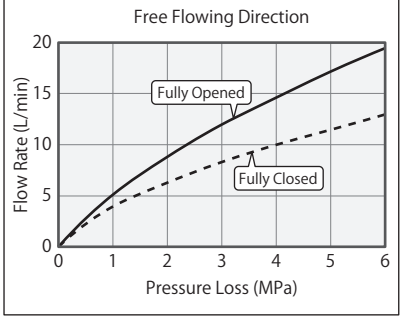
BZL0101-B：Meter-out



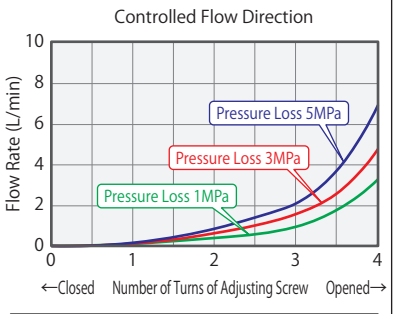


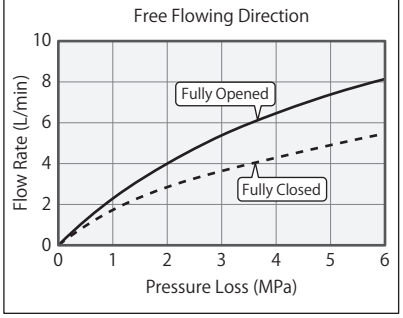
BZL0201-B：Meter-out



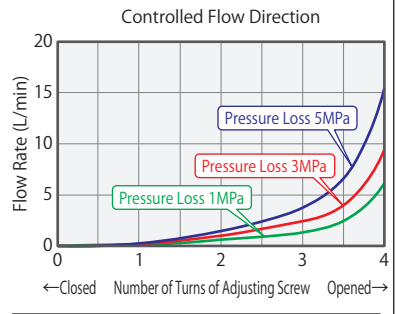


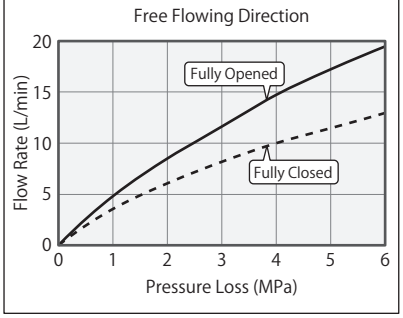
BZL0101-A：Meter-in



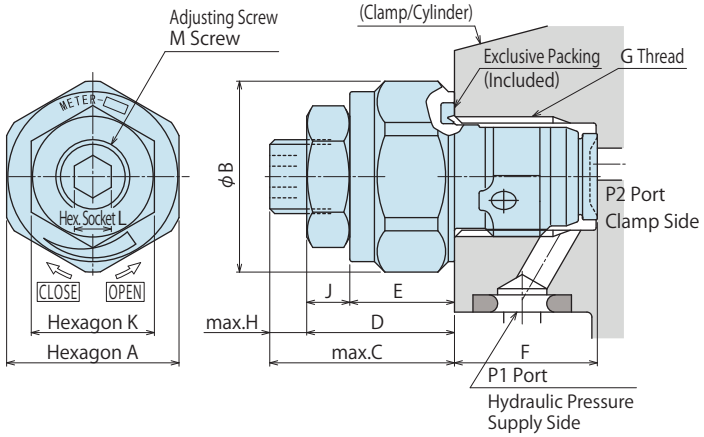


BZL0201-A：Meter-in





External Dimensions



(mm)

Model No.	BZL0101-□	BZL0201-□
A	14	18
B	15.5	20
C	15	16
D	12	13
E	8.5	9.5
F	(11.6)	(15.1)
G	G1/8	G1/4
H	3	3
J	3.5	3.5
K	10	10
L	3	3
M	M6×0.75	M6×0.75

Notes

1. Please read "Notes on Hydraulic Cylinder Speed Control Circuit" to assist with proper hydraulic circuit design.
   If there is something wrong with the circuit design, it leads to the applications malfunction and damage. (Refer to P.60)
2. It is dangerous to bleed air under high pressure. It must be done under lower pressure.
   (For reference: the minimum operating range of the product within the circuit.)
3. Flow control circuit for double action cylinder should have meter-out circuits for both the lock and release sides (except model LKE/TLA/TMA). Meter-in circuits can be adversely affected by any air in the system.

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 prevent foreign materials and contaminants from getting into the circuit.

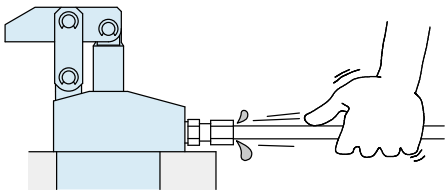
3) Applying Sealing Tape

- Wrap with tape 1 to 2 times following the screw direction.
- Pieces of the sealing tape can lead to oil leakage and malfunction.
- In order to prevent a foreign substance from going into the product during the piping work, it should be carefully cleaned before working.

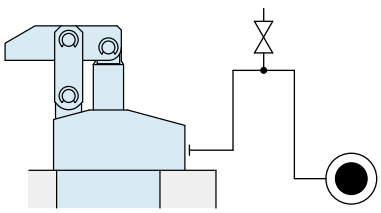
4) Air Bleeding of the Hydraulic Circuit

- 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, cylinder, work support, etc. by one full turn.
③ Wiggle 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 bleed 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 product 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	

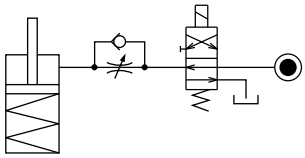
Note As it may be difficult to purchase the products as shown in the table from overseas, please contact the respective manufacturer.

Notes on Hydraulic Cylinder Speed Control Unit

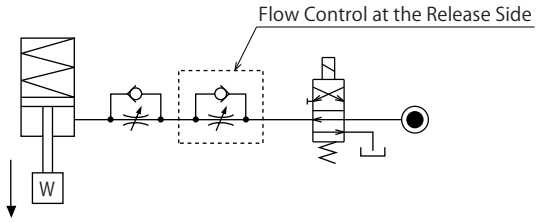
Please pay attention to the cautions below. Design the hydraulic circuit for controlling the action speed of hydraulic cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

Speed Control Circuit for Single Acting Cylinder

For spring return single acting cylinders, restricting flow during release can extremely slow down or disturb release action. The preferred method is to control the flow during the lock action only. It is also preferred to provide a flow control valve at each actuator which has limited action speed (swing clamp, hydraulic compact cylinder, etc.)



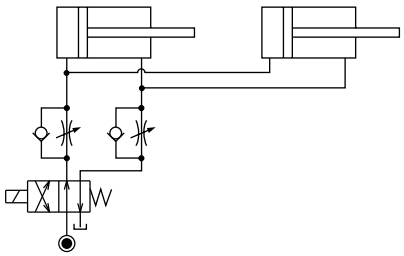
If the cylinder may be damaged by the load from the releasing action direction, provide the flow control valve to the releasing side as well. (Provide the flow control valve to the releasing side if the lever weight is applied during release action.)



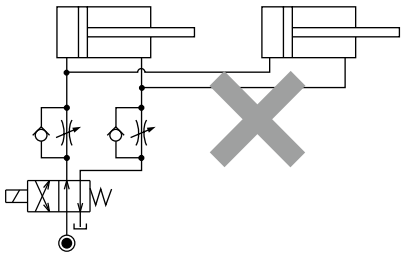
Speed Control Circuit for Double Acting Cylinder

Speed control circuit for double action cylinder should have meter-out circuits for both the lock and release sides (except model LKE/TLA/TMA). Meter-in circuits can be adversely affected by any air in the system. However, in the case of controlling LKE, TMA, TLA, both lock side and release side should be meter-in circuit.
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)

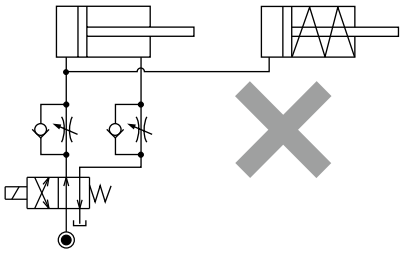


【Meter-in Circuit】(LKE/TMA/TLA must be controlled with meter-in.)



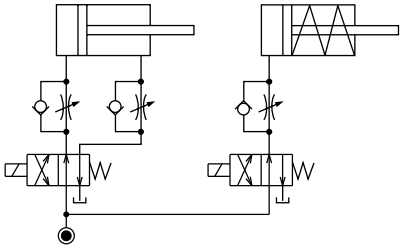
In the case of meter-out circuit, the hydraulic circuit should be designed with the following points.

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.

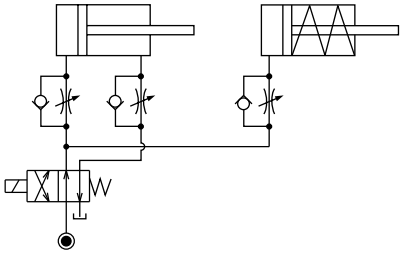


Refer to the following circuit when both the single acting cylinder and double acting cylinder are used together.

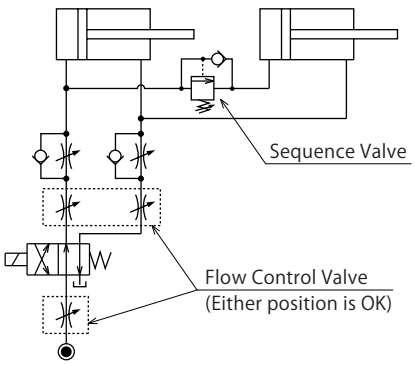
○ Separate the control circuit.



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



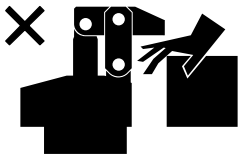
Cautions

Notes on Handling

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

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

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

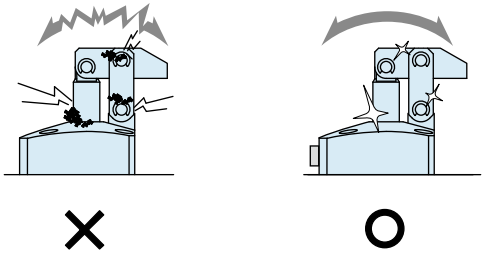


4) Do not disassemble or modify.
- If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

Maintenance and Inspection

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

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



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

4) Regularly tighten piping, mounting bolts, snap rings and cylinders to ensure proper use.

5) Make sure the hydraulic fluid has not deteriorated.

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

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

8) Please contact us for overhaul and repair.

Warranty

1) Warranty Period

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

2) Warranty Scope

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

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

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

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- For Further Information on Unlisted Specifications and Sizes, Please call us.
- Specifications in this Leaflet are Subject to Change without Notice.

JQA-QMA10823
KOSMEK HEAD OFFICE

JAB CM009

CAT.NO. SBR-LHV001-01-GB
Printed in Japan

2019/1 First 2Ry