Hydraulic Valve INDEX

Kosmek valves are most appropriate for fixtures and setup devices.

Non-Leak Valve (Holding Pressure)

Kosmek valves with non-leak function maintains pressurized condition even when power source is cutoff to the fixture.

Model **BK**
Single Action Model

→ P.911

Model **BEQ**
Double Action Model

→ P.915

Non-Leak Stop Valve (Manual Switching Valve)

It is a manual switching valve that can hold the pressure without power source.

Model **BT**

→ P.919

Sequence Valve

It is a valve that can be easily controlled in the form of line sequence.

Model **BLS**
Pipe/Gasket Model

→ P.921

Model **BLG**
Compact Gasket Model

→ P.921

Pressure Balance Valve

This valve prevents deformation of the work piece during unclamping sequence. This will be useful when using work support and clamp actuator in opposite position.

Model **BLB**

→ P.927

Accumulator

Spring accumulator absorbs pressure fluctuation caused by temperature change in the fixture circuit when disconnected from the pressure source.

Model **JSS**
For Low Pressure
(Max.7MPa)

→ P.931

Model **JS**
For High Pressure
(Max.25MPa)

→ P.931

Pressure Indicator (Pressure Switch)

Detects circuit pressure of the fixture disconnected from the hydraulic pressure source by using a limit switch together.

Model **JKA/JKB**

→ P.941

Pressure Reducing Valve

Non-leak reducing valve to partially reduce hydraulic circuit pressure of a fixture by pipe model reducing valve that doesn' t need a drain port.

NEW Model **BMA**
Pipe/Gasket Model

→ P.945

NEW Model **BMG**
Compact Gasket Model

→ P.945

Booster (Continuous Discharge Booster/One Shot Booster)

One shot booster (Model : BU) and continuous discharge booster (Model : AU) are available. In case of using continuous discharge booster, there is no restrictions on the outgoing side circuit capacity due to continuous discharge.

Model **AU**
Continuous Discharge Booster

→ P.951

Model **BU**
One Shot Booster

→ P.959

Pilot Reducing Valve/Reservoir

Pressure of a fixture circuit disconnected from the hydraulic power source, can be reduced to the set pressure only by pilot operation.

Model **BP**
Pilot Reducing Valve

→ P.965

Model **JPB**
Reservoir

→ P.965

Automatic Air Bleed Valve (Automatic Air Bleed Valve)

Placed on the top of the piping, this valve bleeds air automatically during repetition of the hydraulic pressure ON & OFF.

Model **BX**

→ P.969

Non-Leak Pilot Check Valve

It holds pressure even after the hydraulic supply is cutoff. The mounting surface of modular model is ISO4401-03.

Model **BEP**
Piping Model

→ P.971

Model **BSP**
Modular Model

→ P.971

Non-Leak Valve Unit (Holding Pressure)

This is non-leak valve that operates both electrically and manually.

Model **BH**
Manual Operation Model

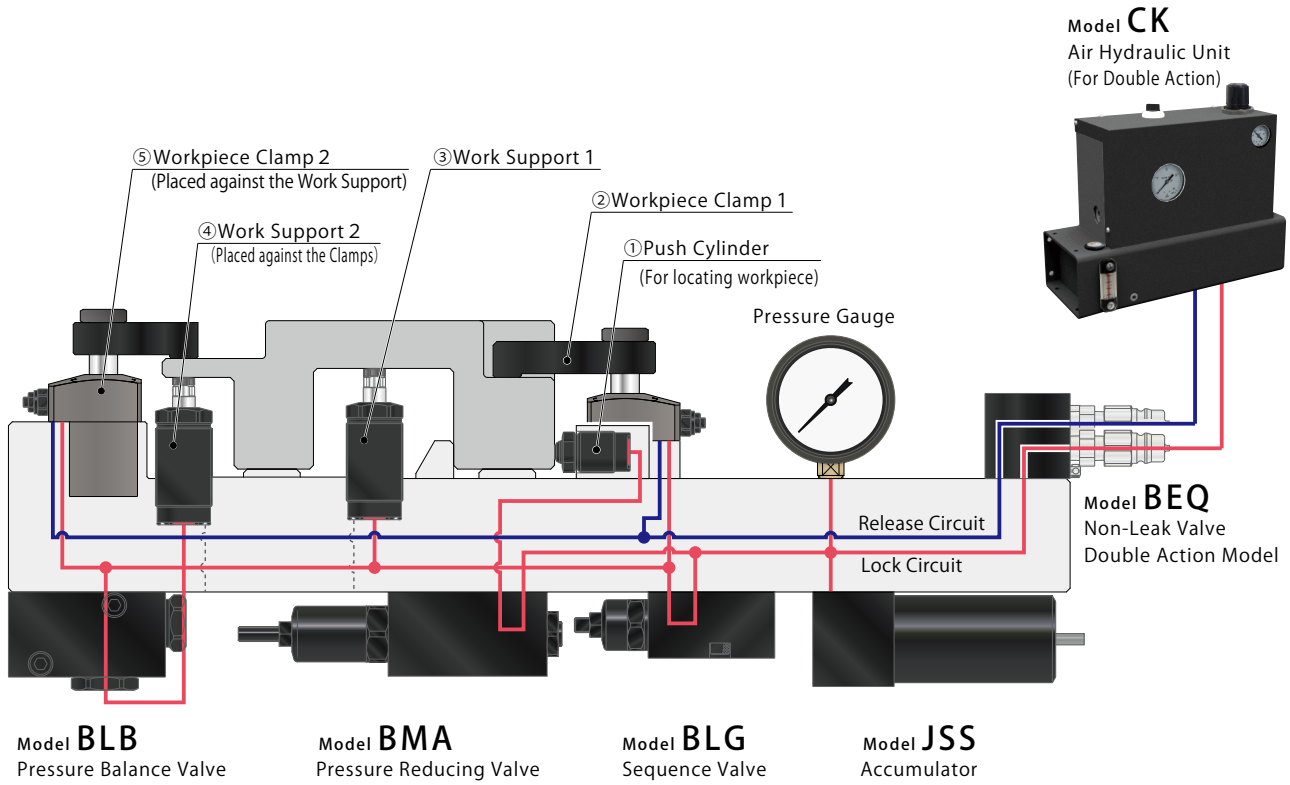
→ P.977

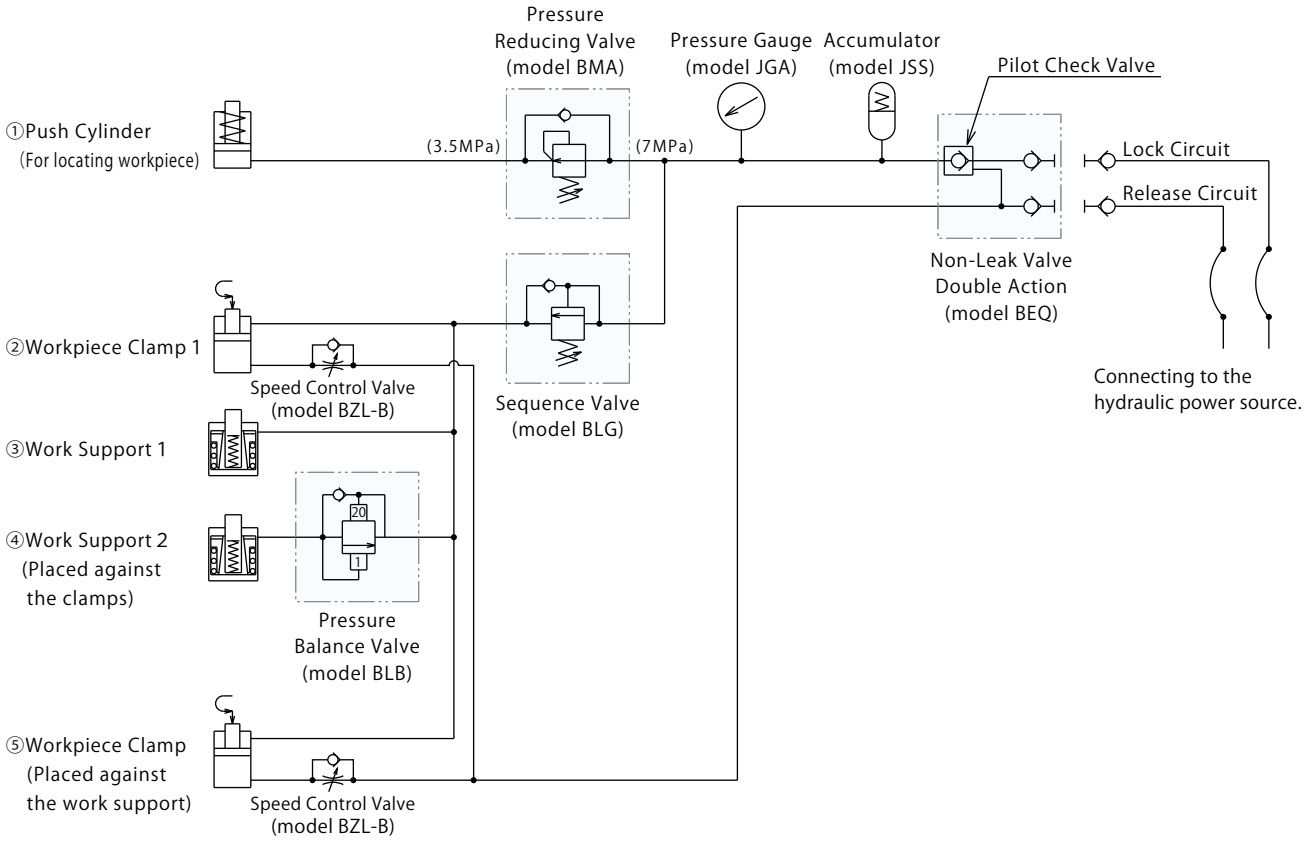
Model **BC**
Electrical Control Model

→ P.979

Hydraulic Valve Double Action Circuit Reference

Disconnected Fixture Example in Double Action Circuit



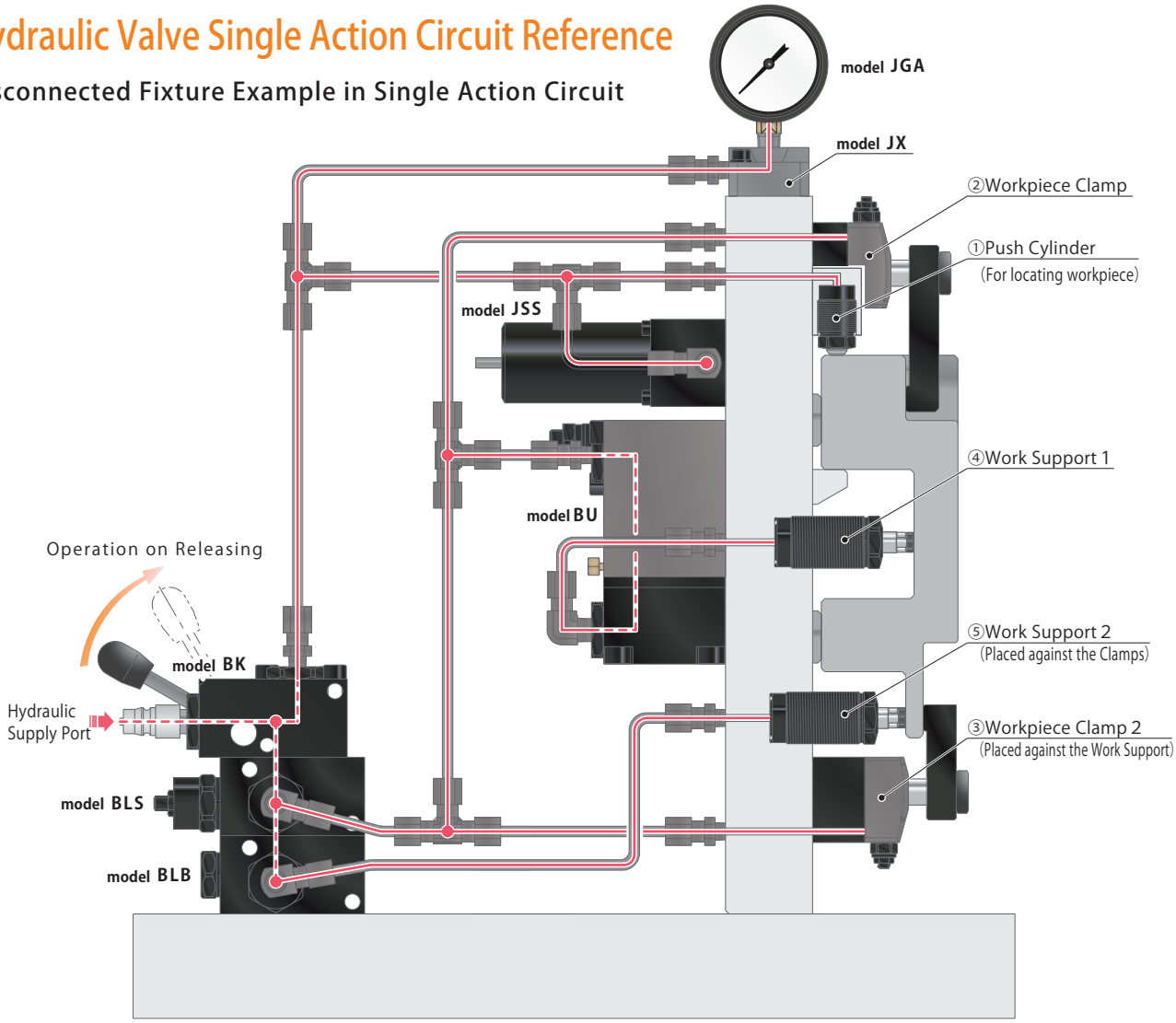


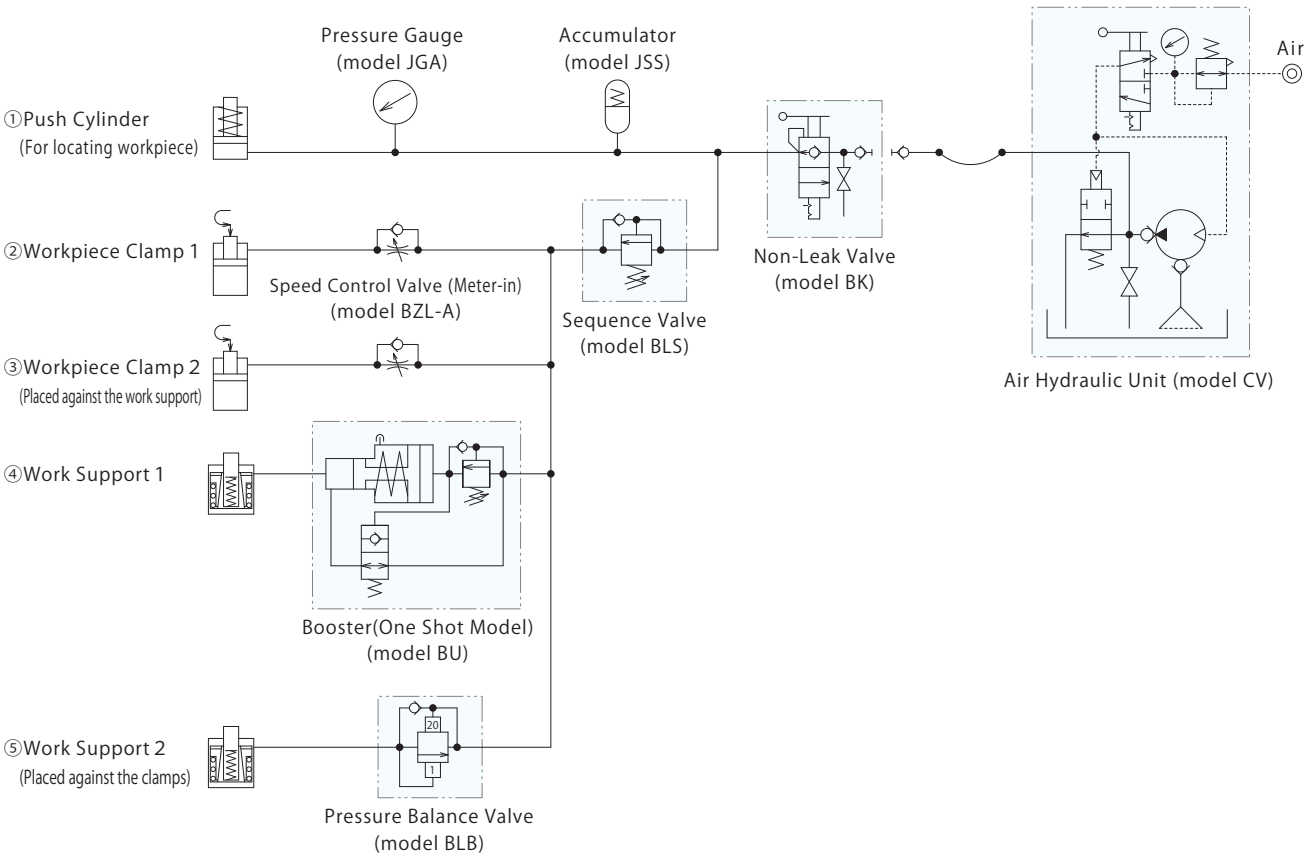
Action Description

	Operation Sequence	Note
When clamping	When releasing.	Release hydraulic pressure turns ON when quick coupler is connected between power unit and BEQ.
	Placing workpiece on fixture.	
	Turns off release hydraulic pressure, and turns on lock pressure.	
	①Push cylinder is activated and it locates workpiece.	The reduced pressure is supplied by reducing valve.
	③④ Work support is activated.	It is activated later than ① by sequence valve.
	②⑤ Work support is activated.	To prevent deformation of the workpiece, activate them later than ③④ by flow control valve.
	Locking action completed.	
	Hydraulic pressure OFF.	
	Non-leak valve is disconnected from hydraulic power source.	
	Machining and transferrin	
When releasing	Connecting hydraulic power source to non-leak valve.	
	When release hydraulic pressure is ON, lock hydraulic pressure is OFF.	
	Pilot check valve of non-leak valve opens.	
	Actuators of ① ② ③ ⑤ are released.	
	④The work support of ④ is released.	Work support is released later than ①②③⑤ by pressure balance valve to prevent deformation of workpiece.
	Release action completed.	

Hydraulic Valve Single Action Circuit Reference

Disconnected Fixture Example in Single Action Circuit





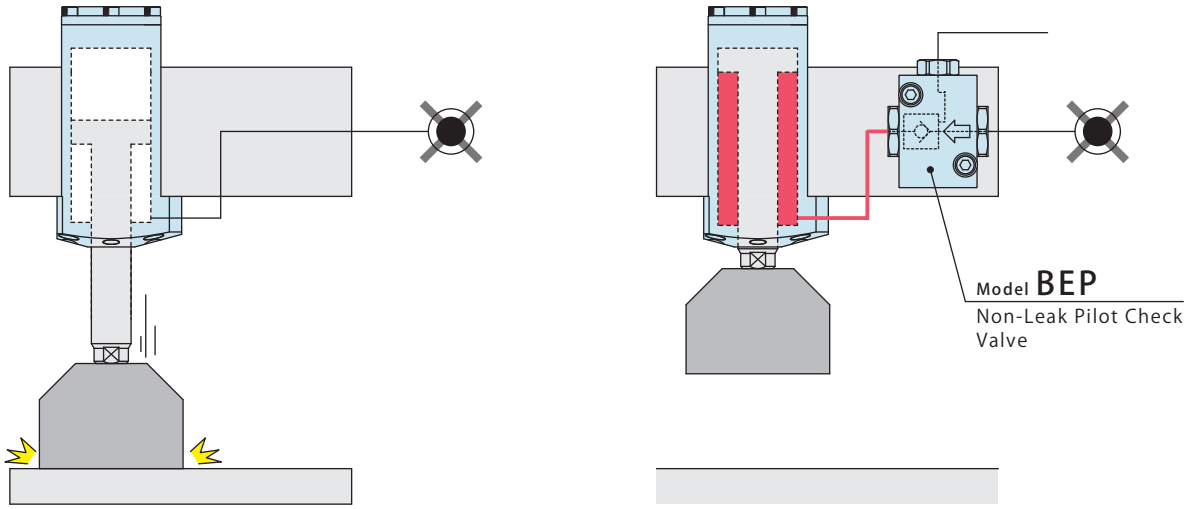
Action Description

	Operation Sequence	Note
When clamping	Release condition.	Hydraulic pressure is OFF when quick coupler is connected with BK valve.
	Placing workpiece on fixture.	
	Hydraulic pressure is ON.	
	①Push cylinder is activated and it locates workpiece.	
	Actuators of ②③④⑤ are activated. (④The boosted pressure is supplied to work support by BU booster.)	It is activated later than ① by sequence valve. ③ clamp cylinders are activated later than ⑤work support by flow control valve to prevent deformation of workpiece.
	Locking action completed.	
	Hydraulic pressure OFF.	
	BK is disconnected from hydraulic power source.	
	Machining and transferring	
When releasing	Connecting hydraulic power source to non-leak valve.	
	BK lever is operated to release.	Holding the lever at release position for about one second, the outgoing side pressure will be released even if the operator removes his/her hand in the middle of unclamping operation.
	The actuators of ①②③④ are released.	
	⑤ work support is released.	It is released later than ①②③④ by pressure balance valve to prevent the deformation of workpiece.
	Release action completed.	

Safety Circuit, Holding the Datum Point

By using non-leak valve, non-leak pilot check valve, it allows to secure safety.

Since the non-leak vale and the non-leak pilot check vale can hold pressure even if power is lost, there is no reason for concern that the workpiece falls off.



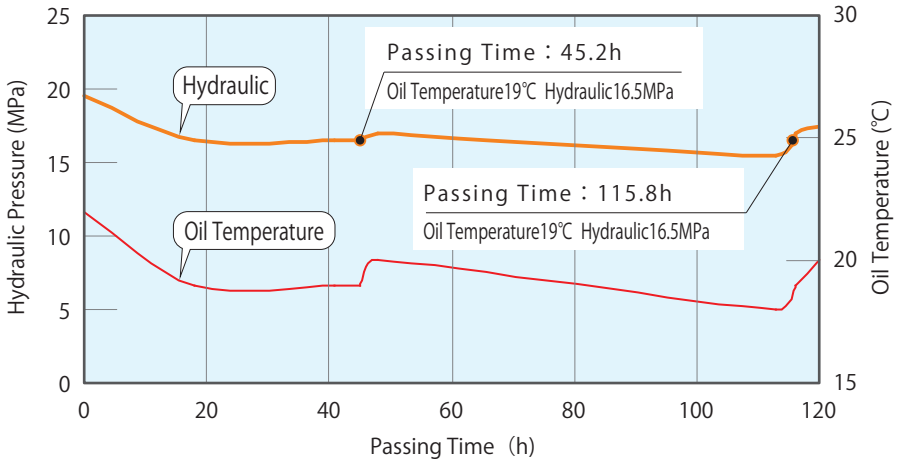
✕ The workpiece falls off by losing the hydraulic power supply.

○ Hold the workpiece in position by maintaining hydraulic pressure.
(Non-leak function allows to hold the position for a long time without leakage.)

The Reliability of Non-Leak Function

The graph below shows the data analysis of the oil temperature, the amount of time and the change in pressure while hydraulic pressure is disconnected from power source.
Due to temperature change, maintained pressure changes but not due to leakage.
You can set the hydraulic circuit more stable when combined with the accumulator.

Non-leak performance test of non-leak valve



Influence of the Temperature Change of the Hydraulic Circuit

Sealed circuit disconnected from power source by non-leak valve etc.
Gets significant affect from ambient temperature change and oil temperature change.
Especially in case of using motor pump unit, the oil temperature is high at the moment of hydraulic pressure provided and it drops rapidly cools off.
Kosmek standard is shown on the right hand side regardless of the amount of oil contained. However, it does differ depending on the amount of air mixed, product kind, piping/hose expansion and temperature condition etc.

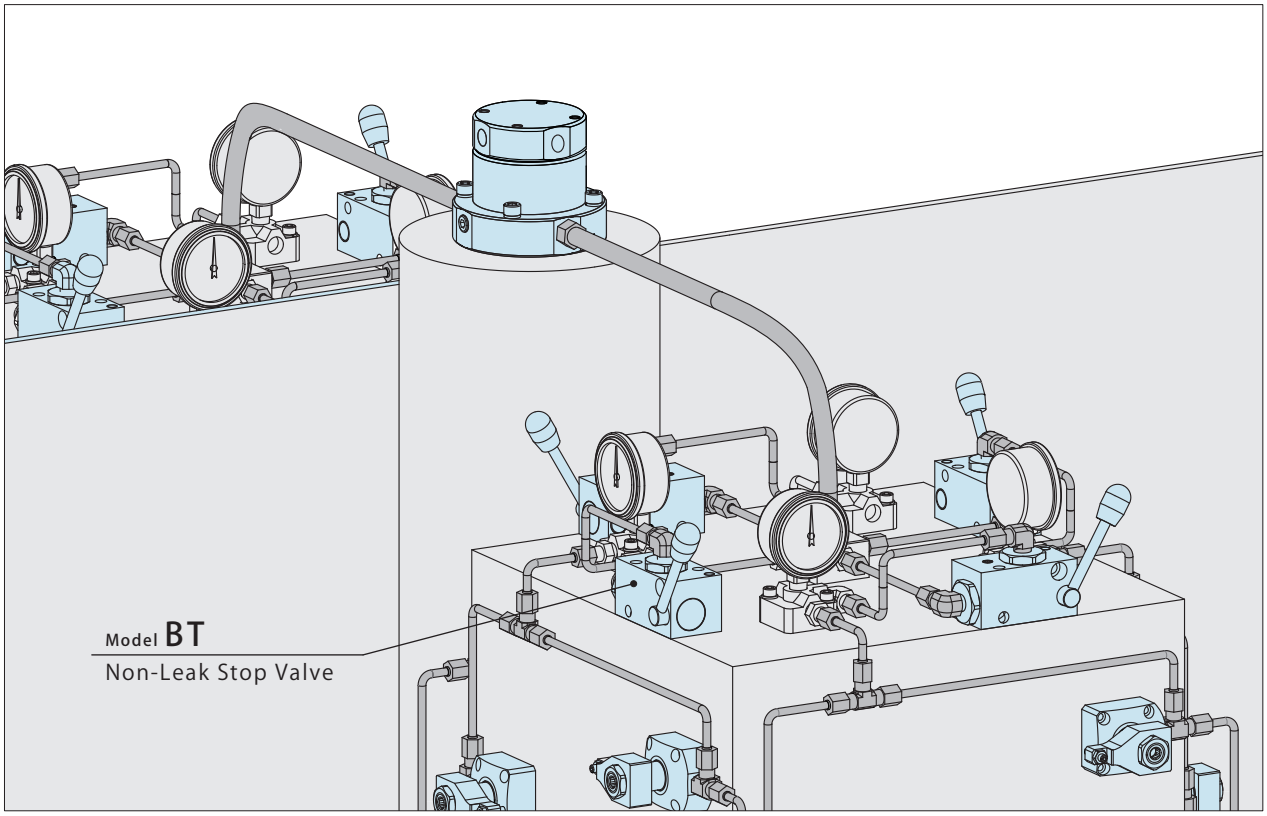
$$\frac{0.69\text{MPa}}{℃}$$

(Increase/decrease of 1℃ will change by 0.69MPa.)

One Touch Workpiece Set Up on 4-Surface Tombstone Fixture

Example for Using Non-Leak Stop Valve on 4-Surface Tombstone Fixture

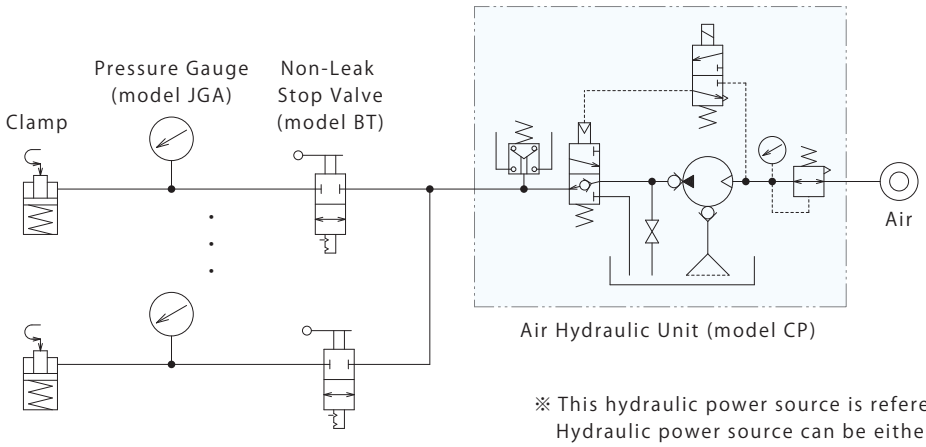
While changing work piece on 4-surface tombstone fixture, using 1pc non-leak stop valve (Model : BT) on each surface, this prevents workpiece from falling off and enables to operate clamp/unclamp.



Action Description

	Operation Sequence
When Clamping	Hydraulic pressure is ON.
	Place the workpiece on.
	When BT valve lever is operated (open circuit), this allows to clamp work piece.
	When BT valve lever is operated (open circuit), this allows to hold pressure.
	Repeat the setup workpiece for each face.
	Locking action completed.

	Operation Sequence
When Releasing	Hydraulic pressure is OFF.
	Holding so that the workpiece does not fall, then BT valve lever is operated (open circuit) and remove the work piece.
	BT valve lever is operated (open circuit).
	Repeat the setup workpiece for each face.
	Release action completed.

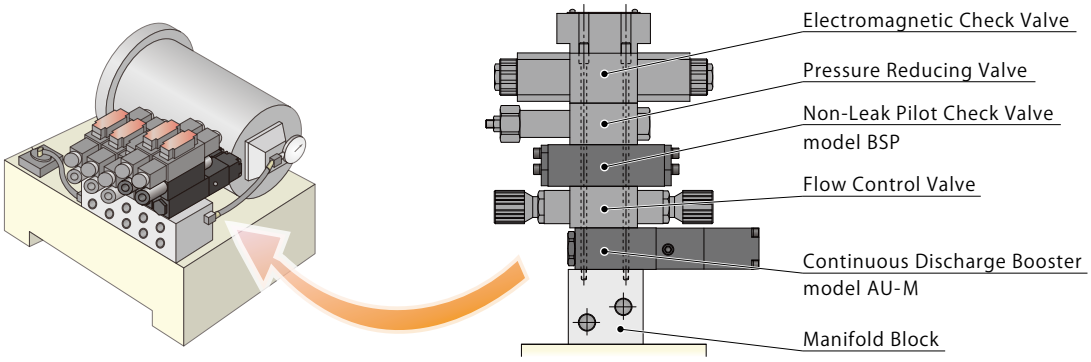


※ This hydraulic power source is referencing.
Hydraulic power source can be either a motor pump etc. or Kosmek CV unit.

Partial Boosting (Partial Boosting on Low Pressure Hydraulic Circuit)

Partial Boosting by Modular Model Valve

Allows to generate high pressure simply by using a continuous discharge booster.
It is not necessary to provide high pressure power source only for partial actuator.
There is no restrictions on the outgoing side circuit capacity due to continuous discharge.
(The mounting surface of modular model is ISO4401-03.)



Partial Boosting Pressure for Fixture Side • Partial Reducing Pressure

We offer not only modular model, but also one shot booster and continuous discharge booster and reducing valve.

Boosting Pressure

Model **AU**
Continuous Discharge Booster

Model **BU**
One Shot Booster

Reducing Pressure

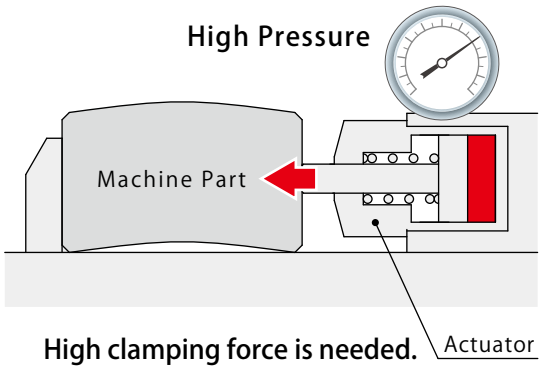
Model **BMA**
Pressure Reducing Valve

Integration of Rough Machining and Finish Machining

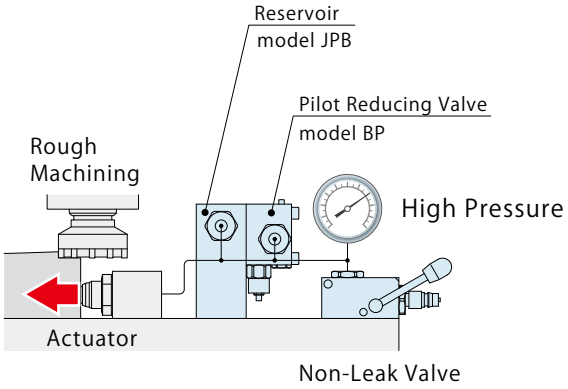
Controlling Clamping Force (Pressure) by Pilot Reducing Valve and Reservoir

It is possible to control clamping force when fixture pressure is disconnected from power source. This valve is useful when it is necessary to have stronger clamping force at initial machining and weaker clamping force at finish machining.

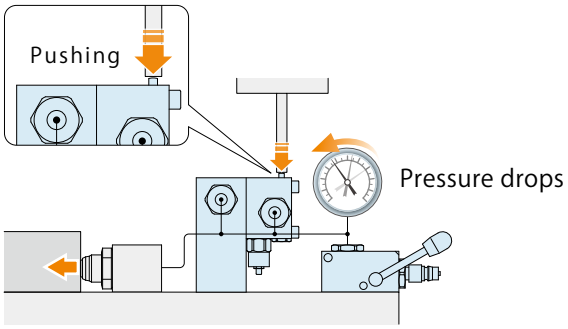
In Initial Rough Machining



High clamping force is needed.

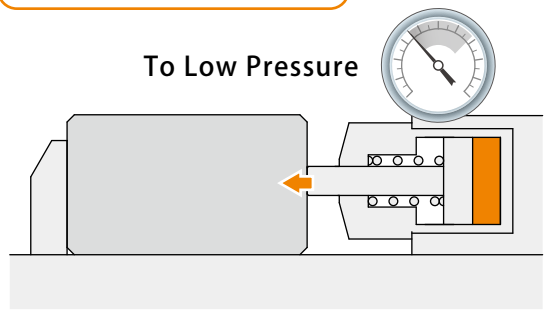


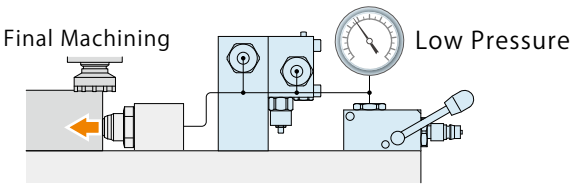
Before final machining, reduce clamping force by reducing pressure.



When you press the push button of BP valve, the oil in the circuit moves to the reservoir, the pressure falls to the set pressure.

At Final Machining





Workpiece deformation is avoided by reducing pressure and clamping force.

Non-Leak Valve Single Action Model

Model BK

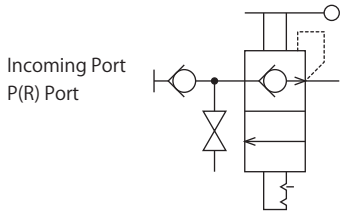
Disconnecting fixture and power source then holding outgoing side pressure completely

This valve reduces set up time, reduces number of circuit, energy saving and secure.

What is a non-leak valve?

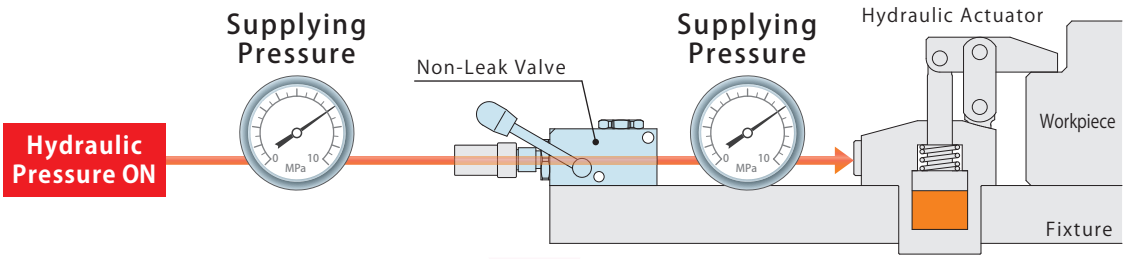
Non-leak valve maintains pressurized condition completely even when power source is cutoff to the fixture.
It is possible to disconnect from hydraulic pressure power source.

Circuit Symbol



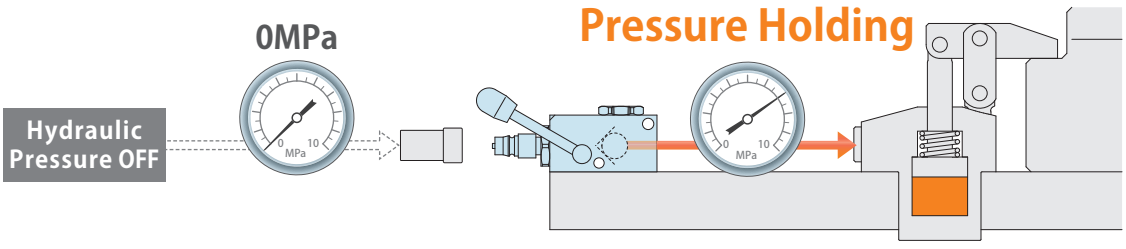
※ Each port has a built-in filter.

【Connected State】



Holding the pressure even after coupler is disconnected.

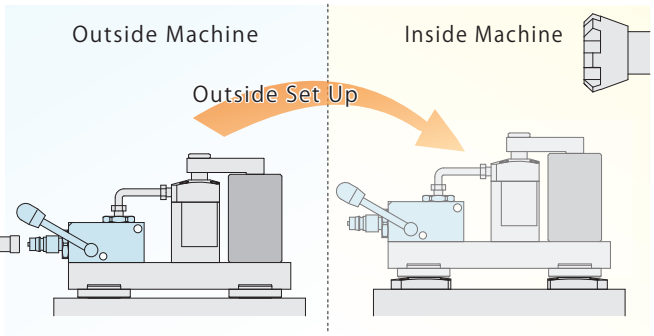
【Pressure Holding State (Disconnected)】



Advantages

Set up outside of machine improves machine operating ratio

Non-leak function allows to disconnect fixture from hydraulic power source and to prepare set up outside machine.
It reduces machine stop time and set up time.

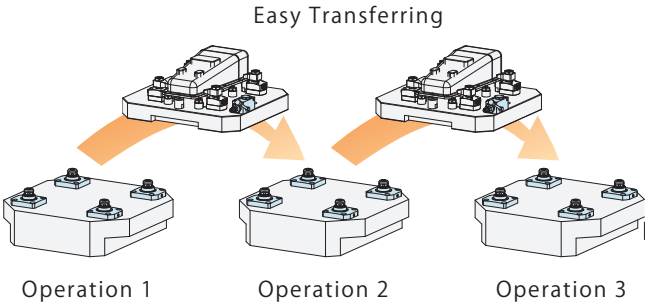


Reduce the number of circuits in the machine

By holding hydraulic pressure, the number of circuit inside machine for fixture can be minimized.

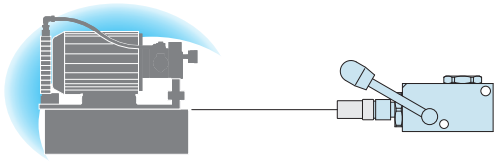
Ideal for transferring FMS pallets.

Because it is possible to cut off the fixture from the hydraulic pressure source, this allows to move the pallet freely without concerns on the handling of the hydraulic hoses, it is perfect for FMS.



Energy-Saving and Safety

The outgoing side circuit hydraulic pressure is held unless the lever is moved.Even if you do not disconnect, you are saving energy by stopping the incoming hydraulic pressure.
If a blackout occurs and the hydraulic pressure is shut off, the work piece will not fall off due to the holding pressure.



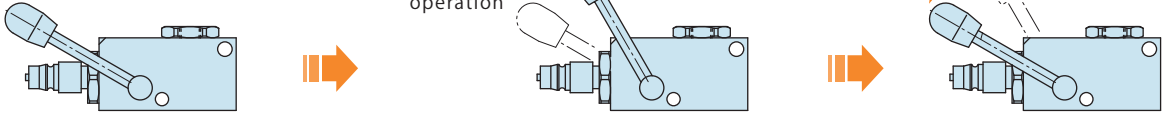
It is possible to stop the hydraulic power source.

The outgoing pressure is maintained as long as release operation is not made.

Action Description

Operation Sequence		Remarks
When clamping	Hydraulic pressure source is connected to the incoming side of non-leak valve.	
	Hydraulic pressure supply is ON.	
	Hydraulic pressure is supplied to the outgoing side, completing the clamping.	
	Hydraulic pressure supply is OFF.	Pressure held condition (out going side)
	Non-leak valve is disconnected from hydraulic power source.	
	Machining and transferring	
When releasing	Hydraulic pressure source is connected to the incoming side of non-leak valve.	
	Release the lever on the non-leak valve.	Holding the lever at release position for about one second, the outgoing side pressure will be released even if the operator removes his/her hand in the middle of unclamping operation.
	Release action completed.	

About release operation



Before releasing operation (Pressure held condition)

Release operation by pulling up the lever.

※Holding the lever at release position for about one second, the outgoing side pressure will be released even if the operator removes his/her hand in the middle of unclamping operation.

The lever is automatically lowered when the lever is released.

Model No. Indication

BK 2 2 1 3 - 0 [ ]

1 2 3 4 5

1 Port Size

2 : Corresponding to Rc1/4

3 : Corresponding to Rc3/8 ※1

2 Operating Pressure Range

2 : 2.0～7.0 MPa

5 : 7.0～30.0MPa

3 Lever Position ※Lever position looking from P(R) port

1 : Right Hand Lever (Standard)

2 : Left Hand Lever ※1

4 Design No.

3 : Revision Number

5 Piping Method ※CYL port position looking from P(R)

Blank : Piping Option (BSPT (Rc-Thread))

GA : Left Side Gasket Option (Only for Right Handle) ※1

GB : Bottom Gasket Option ※1

GC : Right Side Gasket Option (Only for Left Handle) ※1

GS : BLS,BLB and BM Valve Stack Option ※1

Note

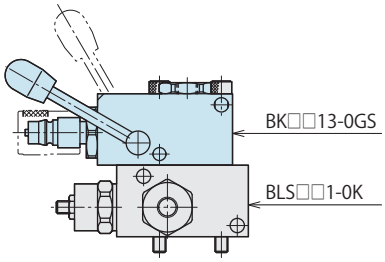
※1. Build to order product. Feel free to ask us about delivery time when placing an order.

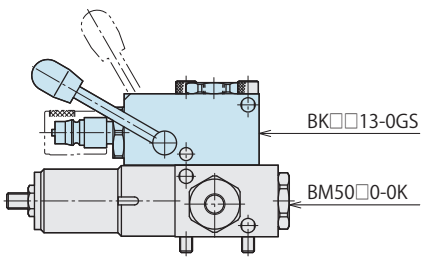
Specifications

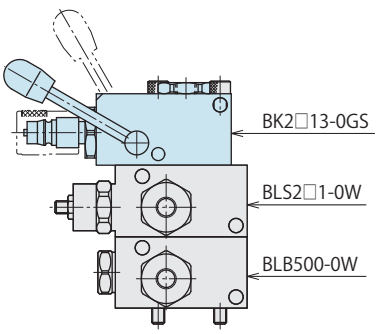
Model No.	BK22□3-0□	BK25□3-0□	BK32□3-0□
Operating Pressure Range MPa	2.0 ～ 7.0	7.0 ～ 30.0	2.0 ～ 7.0
Withstanding Pressure MPa	10.5	37.5	10.5
Min. Passage Area mm^2	17.0	14.2	30.0
Operating Temperature ℃	0 ～ 70		
Usable Fluid	General Hydraulic Oil Equivalent to ISO-VG-32		
Corresponding Coupler/Socket Form※2	2HS	2HS	3HS
Mass kg	1.4		

Note ※2. Shows the format of the quick coupler socket made by Nitto Kohki Co., Ltd..

Combined Model on Valves





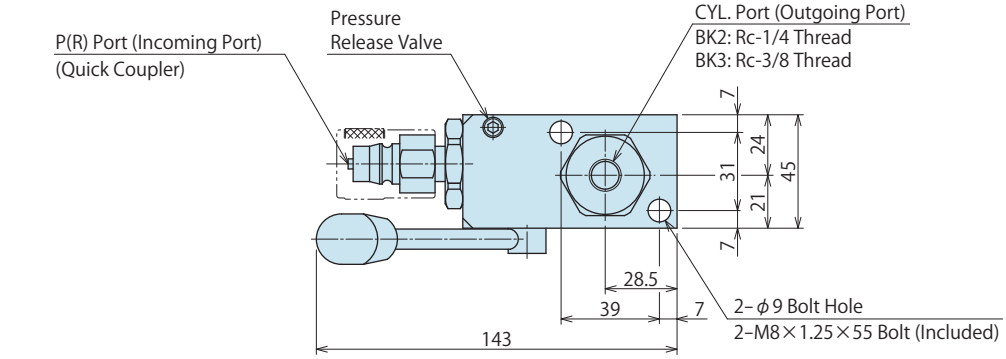


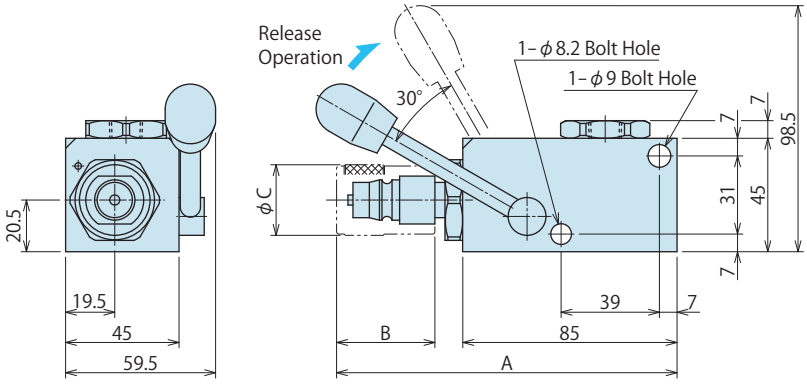
Note

1. The combination of the valve, supplied with different length mounting bolts.

External Dimensions

BK□□13-0 ※ BK□□23-0 is identical but handle is on left side.





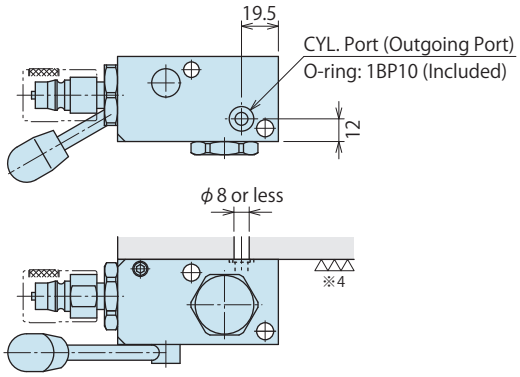
(mm)

Model No.	BK2□13-0	BK3213-0
P(R) Port ※3	2HP	3HP
A	135	144
B	39	46
C	28	33

Notes ※3. Female plug model number made by Nitto Koki.

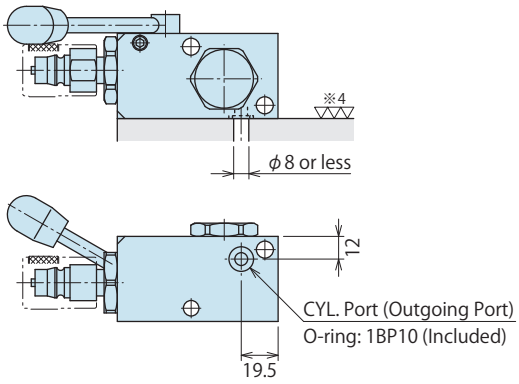
BK□□13-0GA

※ Please refer to BK□□13-0 for other dimensions.



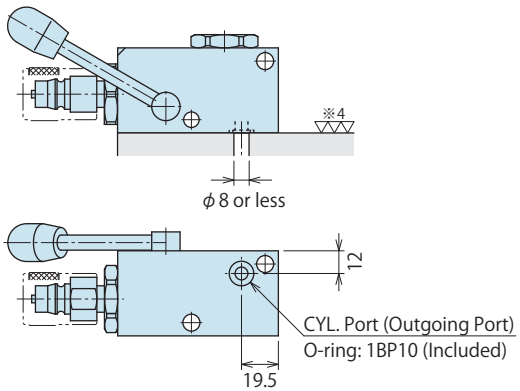
BK□□23-0GC

※ Please refer to BK□□13-0 for other dimensions.



BK□□13-0GB

※ Please refer to BK□□13-0 for other dimensions.



Note
※4. Roughness of mounting surface (O-ring seal surface) should be 6.3S or less.

Non-Leak Valve Double Action Model

Model BEQ

The outgoing side hydraulic pressure(A2) is held by pilot check method

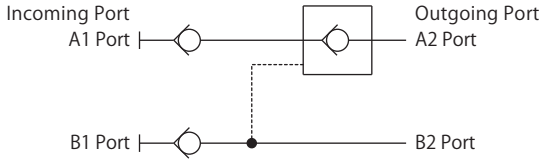
This valve reduces set up time, reduces number of circuit, energy saving and secure.

Non-Leak Valve (Double Action Model)

A non-leak valve (double action model) is equipped with a non-leak function, unless the hydraulic pressure is supplied to B1 port. A2 port side is held even if the hydraulic power source is cut off with hydraulic pressure.

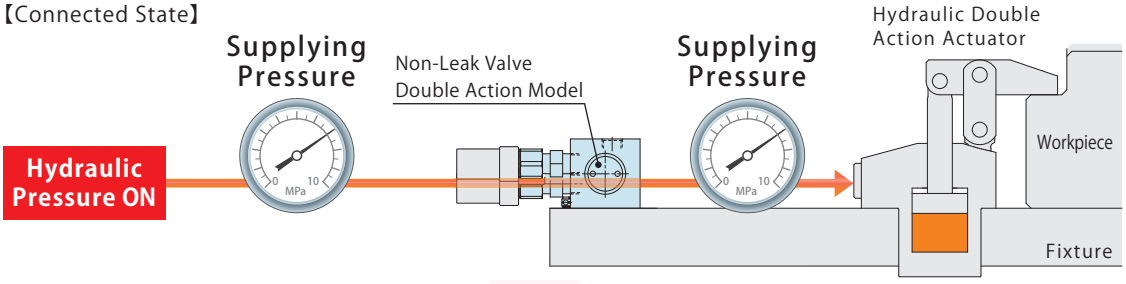
Fall prevention: In case of a blackout, it is possible to separate the hydraulic power source from fixture because the actuator holds pressure inside.

Circuit Symbol



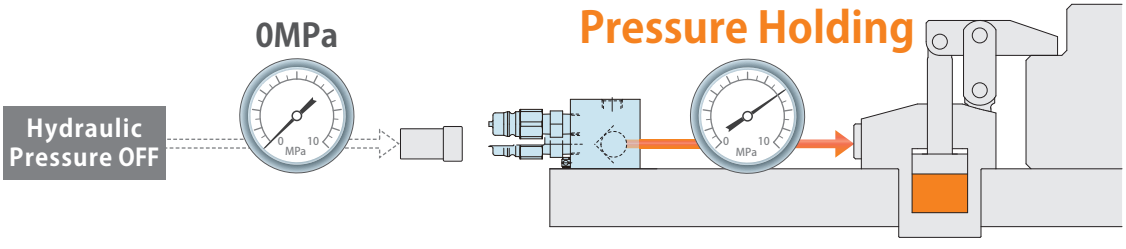
※ Filter is built in A1, A2.

【Connected State】



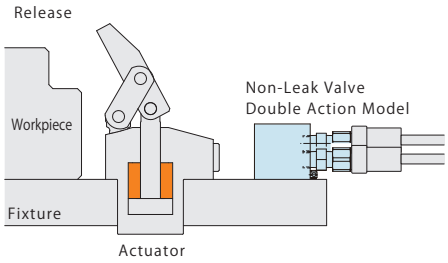
Holding the pressure even after coupler is disconnected.

【Pressure Holding State (Disconnected)】

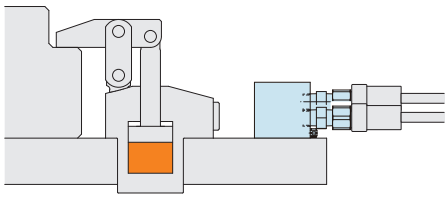


Action Description

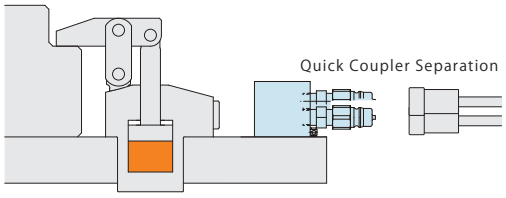
Images



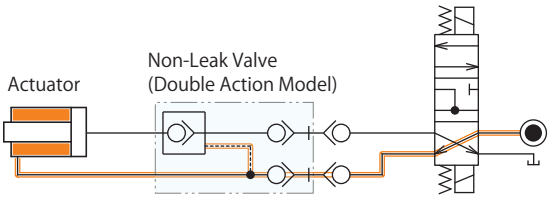
Clamping

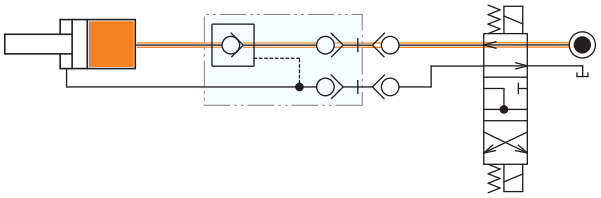


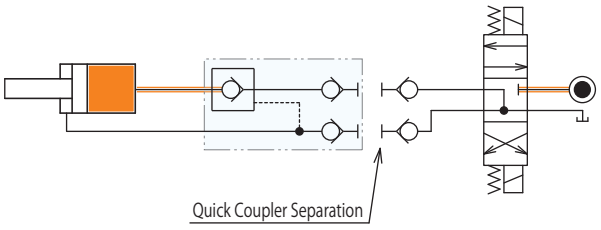
Pressure Holding



Circuit Example







Operation Sequence		Remarks
When clamping	Hydraulic pressure is ON at A1 port side. (hydraulic pressure is OFF at B1port side.)	
	Actuator is locked with hydraulic pressure when supplied to the A2 port side. (Even if the hydraulic pressure is OFF, locking pressure is held.)	
	Hydraulic pressure supply is OFF.	
	Separating A1/B1port from hydraulic power source.	
	Machining and transferring	
When releasing	Connecting A1/B1 port to hydraulic power source.	
	When hydraulic pressure is ON (A1 port side hydraulic pressure OFF) at B1port side, pilot check valve is open and the oil from A2 port (lock side) goes back to the tank.	
	Release action completed.	
In case of an emergency	Hydraulic power source is OFF due to a blackout.	
	The pilot check valve, lock side pressure(A2 port) will maintain the pressure as it was before the blackout.	B2 port side cannot hold the pressure because of no check valve.

Model No. Indication

BEQ02 **2** **0** - **0** ☐

1 2 3

1 Operating Pressure Range

2 : 2.0～7.0MPa
5 : 7.0～30.0MPa

2 Design No.

0 : Revision Number

3 Piping Method ※CYL port position looking from A1port

Blank : Piping Option (BSPT (Rc-Thread))
GA : Backside Gasket Option
GB : Bottom Gasket Option

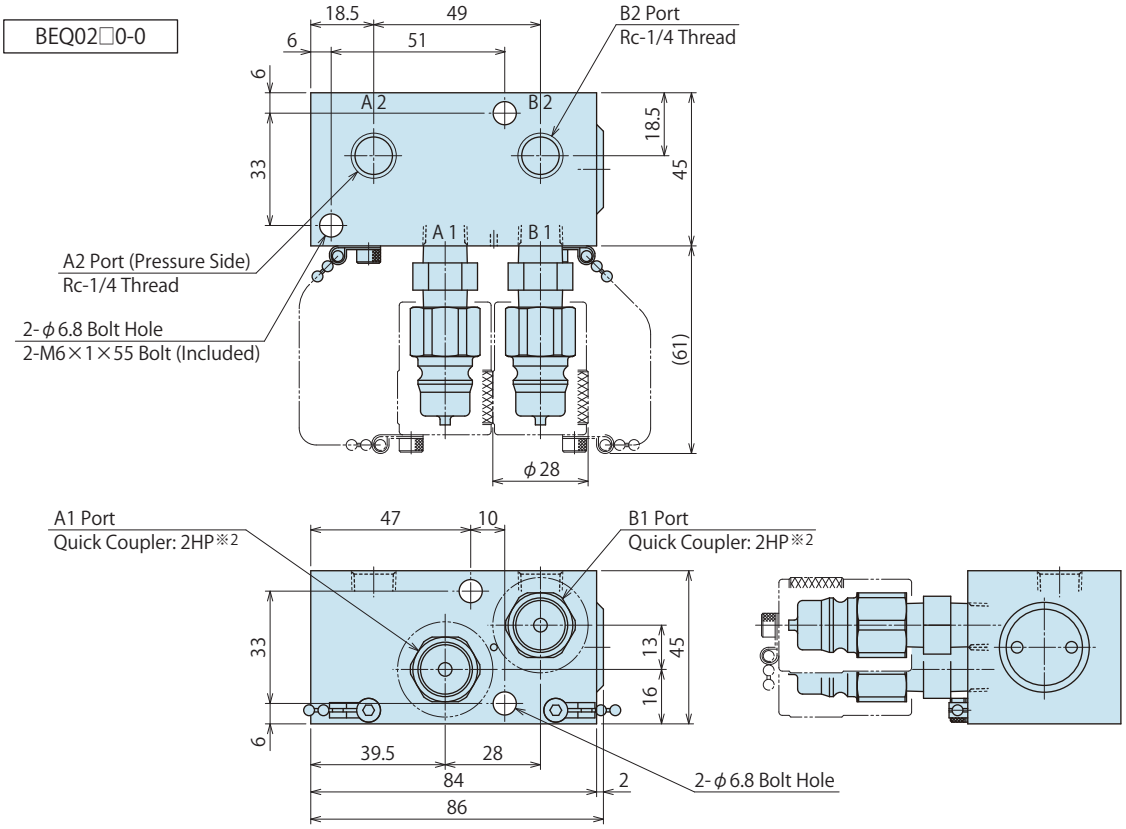
Specifications

Model No.		BEQ0220-0☐	BEQ0250-0☐
Operating Pressure Range	MPa	1.0 ～ 7.0	7.0 ～ 30.0
Withstanding Pressure	MPa	10.5	37.5
Cracking Pressure	MPa	0.07	
Pilot Pressure	MPa	A2 Holding Pressure / 5.5 + 0.3 or more	
Min. Passage Area	mm^2	14.3	
Operating Temperature	℃	0 ～ 70	
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32	
Corresponding Coupler/Socket Form※1		2HS	
Mass	kg	1.3	

Note ※1. Female plug model number made by Nitto Koki.

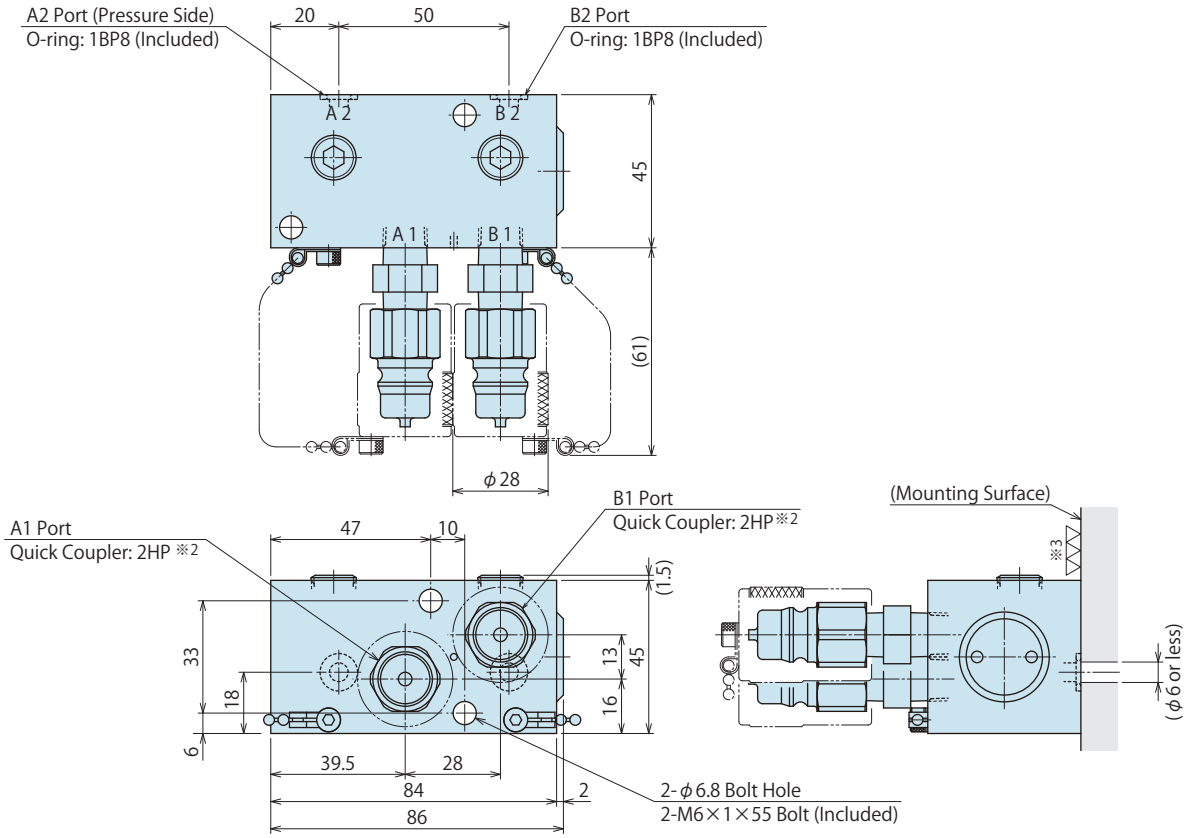
External Dimensions

BEQ02☐0-0

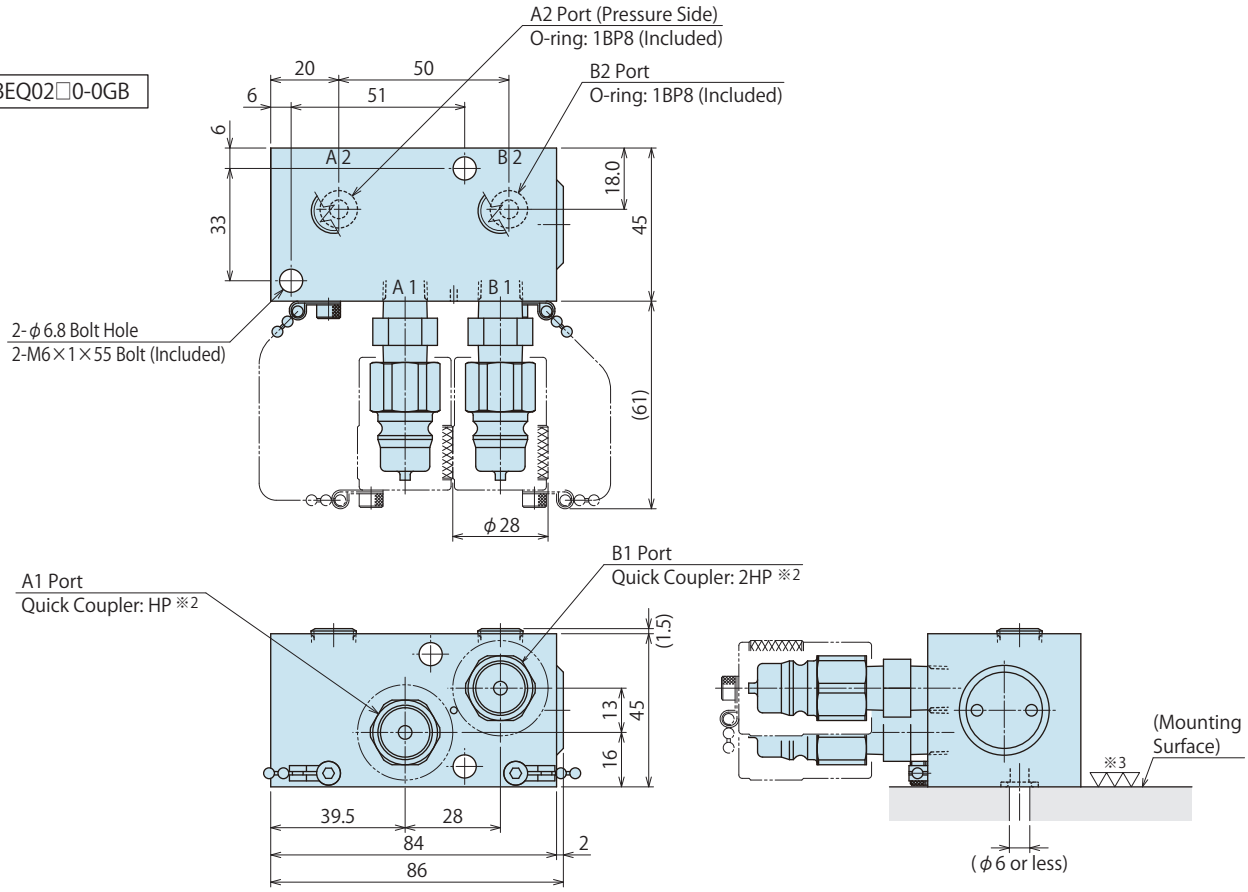


Note ※2. Female plug model number made by Nitto Koki.

BEQ02□0-0GA



BEQ02□0-0GB

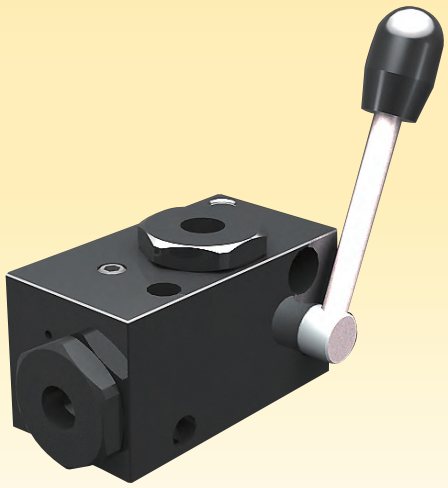


Notes ※2. Female plug model number made by Nitto Koki.
※3. Roughness of mounting surface (O ring seal surface) should be 6.3S or less.

Non-Leak Stop Valve

(Manual Switching Valve)

Model **BT**



Manual switching valve that can hold pressure

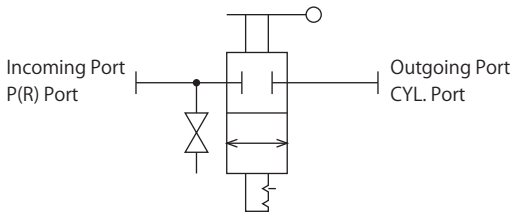
Easy operation

What is a non-leak stop valve?

The stop valve is operated by a manual operation lever. disconnected closed hydraulic circuit holds pressure at the secondary side.

Multiple work pieces can be loaded and loaded by preventing the work piece fall by during the clamping・unclamping operation per workpiece.
When the circuit is closed, the outgoing side pressure is held and will prevent workpiece from falling.

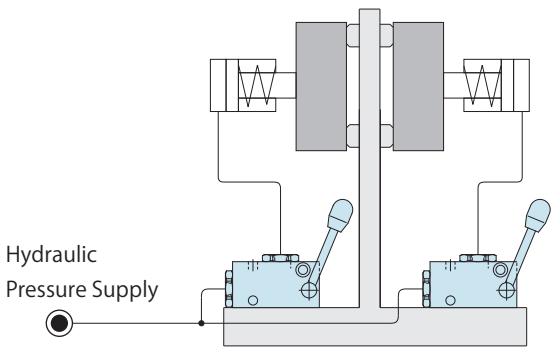
Circuit Symbol



※ Each port has a built-in filter.

Application Examples

Clamping operation is possible with each workpiece.



Fall Prevention of Workpiece
with Individual Operations

KOSMEK Harmony in Innovation

Model No. Indication

BT2 2 1 0 - 0

1 2

1 Operating Pressure Range

2 : 2.0～7.0MPa
5 : 7.0～30.0MPa

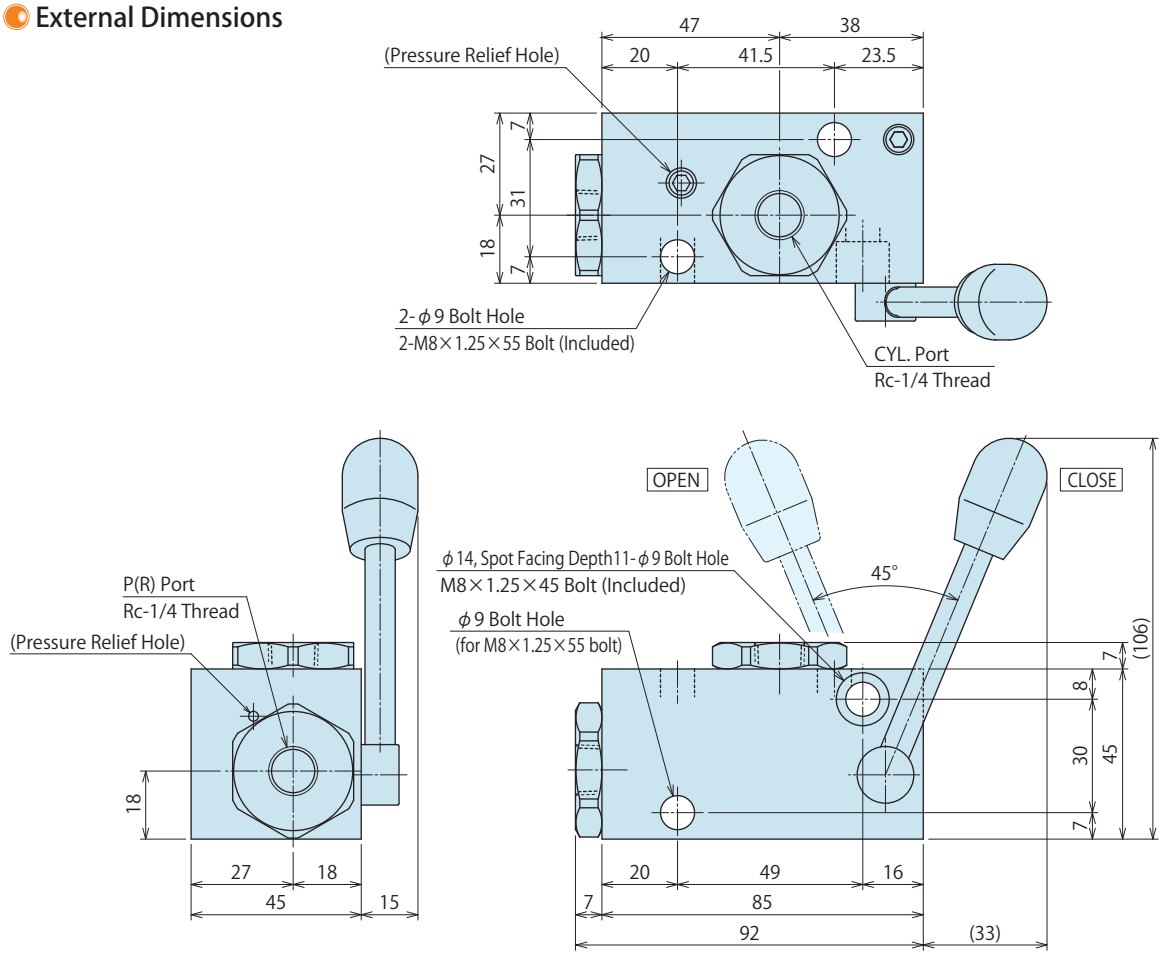
2 Design No.

0 : Revision Number

Specifications

Model No.		BT2210-0	BT2510-0
Operating Pressure Range	MPa	2.0 ～ 7.0	7.0 ～ 30.0
Withstanding Pressure	MPa	10.5	37.5
Min. Passage Area	mm^2	15.9	
Operating Temperature	℃	0 ～ 70	
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32	
Mass	kg	1.4	

External Dimensions



Sequence Valve

Model BLS
Model BLG

Having an actuator sequential operation will reduce the number of ports needed

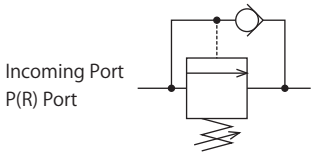
It is possible to have a valve that can control locating and clamping work piece in sequence in one system.

What is a sequence valve?

This valve operates multiple actuators in sequence to perform positioning and clamping.

When incoming port pressure reaches the sequence setting pressure value, the pressure is supplied to outgoing port.

Circuit Symbol

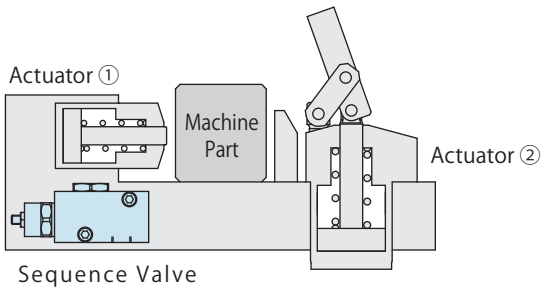


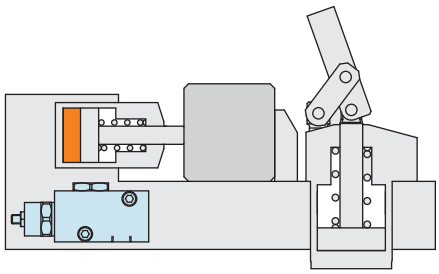
※ Each port has a built-in filter.

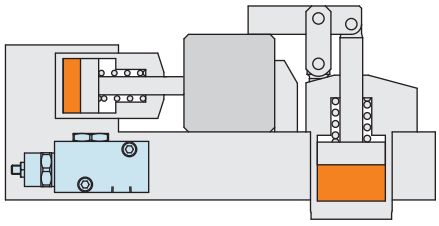
	 Model BLS → P.923			 Model BLG → P.925	
Classification	Sequence Valve			Compact Sequence Valve	
Actuating Pressure Range	1～4MPa	3～8MPa	8～20MPa	1～6MPa	5～18MPa
Operating Pressure Range	2～30MPa			2～35MPa	6～35MPa
Piping Method	Piping Option Manifold Option BK Connecting Option BK/BLB Connecting Option			Double Gasket Option	

Action Description

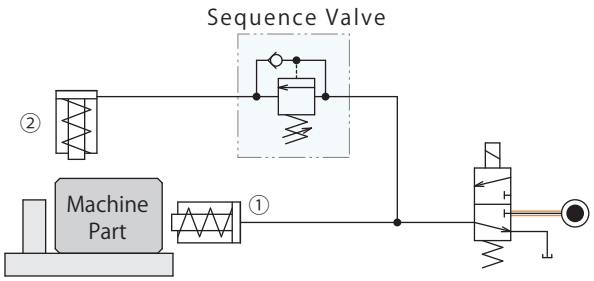
Images

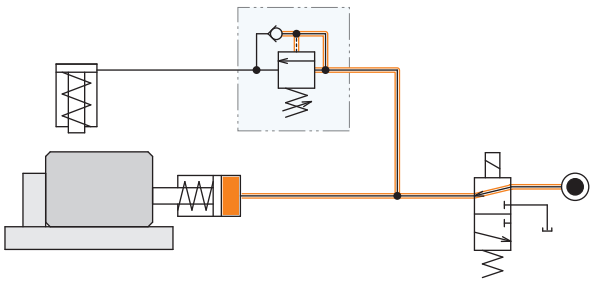


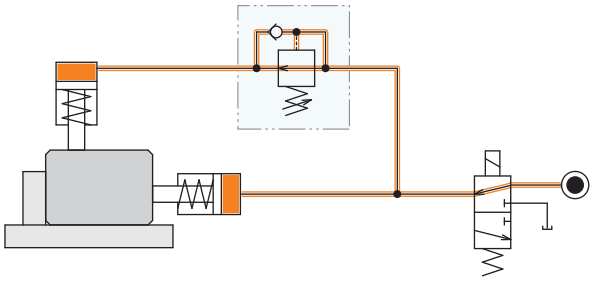




Circuit Example







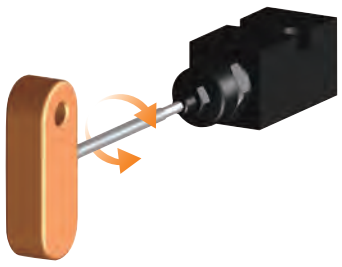
Operation Sequence		Remarks
When clamping	Hydraulic pressure is ON.	
	Actuator ① works.	
	The pressure reaches to the set value for sequence operating pressure.	Provide a difference of more than 1MPa between operating and setting pressure.
	Sequence valve port is open.	
	Actuator ② works.	
	Locking action completed.	
	machining process	
When releasing	Hydraulic pressure is OFF.	
	The actuators ①,② are released at the same time.	When incoming side pressure decreases, internal check valve opens.
	Release action completed.	

Adjustable Set Pressure

Set pressure can be changed per one turn. (MPa/Rev)

Model No.	BLS□31	BLS□51	BLS□71	BLG2830	BLG2860
Set Pressure per One Turn	0.7	1.0	2.6	1.0	2.8

Notes 1. The set pressure value is set according to the model code.
2. Pressure increases by turning clockwise and decreases by turning anti-clockwise.



Model No. Indication

BLS 2 5 1 - 0 ☐ (5.0MPa)

1 2 3 4 5

1 Port Size

2 : Corresponding to Rc1/4

3 : Corresponding to Rc3/8

2 Operating Pressure Range

3 : 1.0～4.0 MPa

5 : 3.0～8.0 MPa

7 : 8.0～20.0MPa

3 Design No.

1 : Revision Number

Notes

※1. Build to order product. Feel free to ask us about delivery time when placing an order.

※2. W option only available with 2：Rc1/4 port.

4 Piping Method

Blank : Piping Option (BSPT (Rc-Thread))

G : Gasket Option (O-ring Seal for P Port ※1)

K : BK Connecting Option ※1

W : BK/BLB Connecting Option ※1 ※2

5 Set Pressure (Set Value for Sequence Operating Pressure)

Please indicate the set pressure when ordering
(Please inform us with proper unit symbols.)

※ Provide a difference of more than 1MPa between operating and setting pressure.

※ When using multiple BLS sequence valves in a parallel fashion, provide each set pressure with a pressure difference more than 1MPa.

Entry Example At 5MPa → **(5.0MPa)** At 3.5MPa → **(3.5MPa)**
At 700PSI → **(700PSI)**

Blank : Pressure Setting Free Option

※ If set pressure is determined by customer, indicate it within "Blank".

※ When shipping, the pressure is set as the minimum pressure indicated in the specification "Actuating Pressure Range".

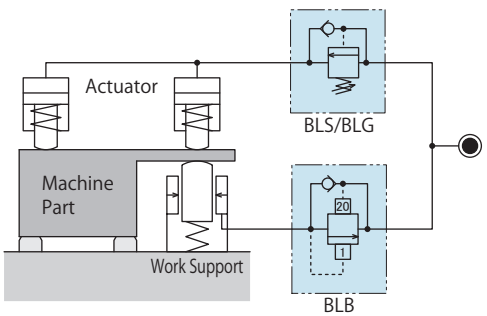
※ For pressure adjustment, please refer to "Sequence Valve Pressure Setting Procedure" included along with the product and "Adjustable Set Pressure" on P.922.

Specifications

Model No.		BLS☐31-0☐☐	BLS☐51-0☐☐	BLS☐71-0☐☐
Actuating Pressure Range	MPa	1.0 ～ 4.0	3.0 ～ 8.0	8.0 ～ 20.0
Operating Pressure Range	MPa	2.0 ～ 30.0		
Withstanding Pressure	MPa	37.5		
Adjusting Screw Turn Ratio	MPa/Rev	0.7	1.0	2.6
Cracking Pressure	MPa	0.01		
Min. Passage Area	mm^2	P(R) → CYL. : 7 / CYL.→P(R) : 27		
Operating Temperature	℃	0 ～ 70		
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32		
Mass	kg	1.2		

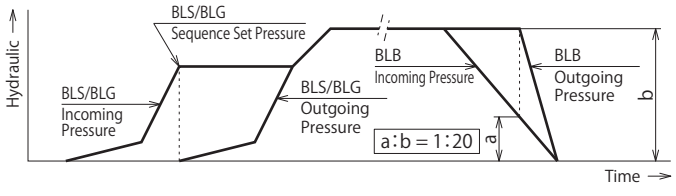
Note 1. If the flow volume of the incoming pressure side is too much, there is a possibility that the proper sequential procedures would not work. In this instance, use a flow control valve to adjust flow volume from the pressure source.

Example of a Combination of BLS and BLB



Operation Sequence (When clamping)
1. Supply hydraulic pressure.
2. The hydraulic pressure passing through the BLB, starts the support action of Work Support. At this time, hydraulic pressure does not reach the actuator side because of BLS.
3. When hydraulic pressure inside the system has exceeded the set pressure of BLS, the hydraulic pressure is supplied to the actuator to lock a work piece.

Operation Sequence (When releasing)
1. Shut off hydraulic pressure supply.
2. Pressure reduction of BLS starts right after the hydraulic pressure supply is shut off and the actuator retracts to release the pressure.
3. BLB reduces hydraulic pressure inside Work Support in proportion to the pressure difference (1:20) between the incoming side (P port) pressure drop and the outgoing side (cylinder port) pressure. Therefore, work piece and fixture damage due to the remaining pressure can be prevented because the work piece is released after the actuator thrust becomes zero.

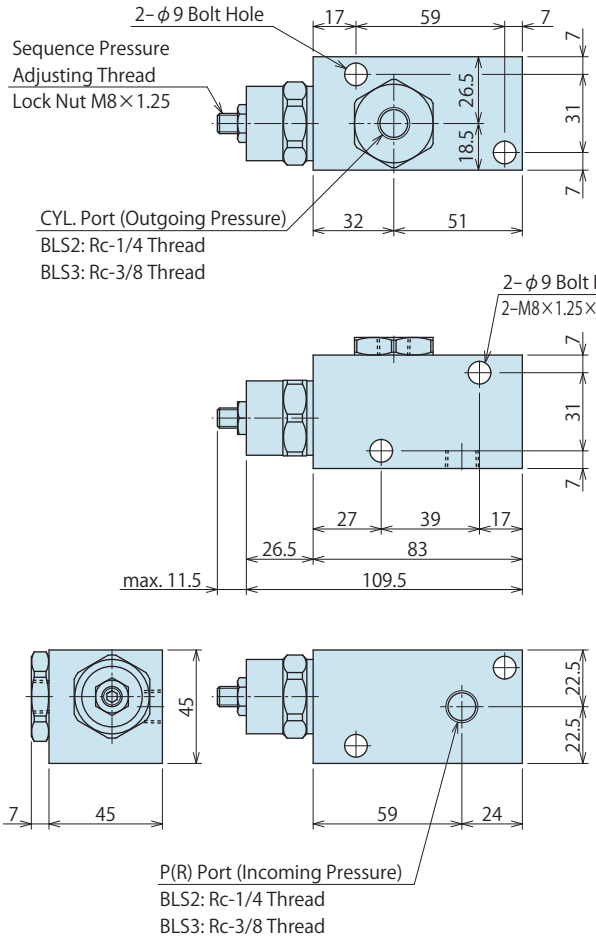


BLS/BLG
When the P port (incoming pressure) is pressurized to exceed the set up pressure of BLS and the valve is opened, then hydraulic pressure is supplied to the cylinder port (outgoing pressure).

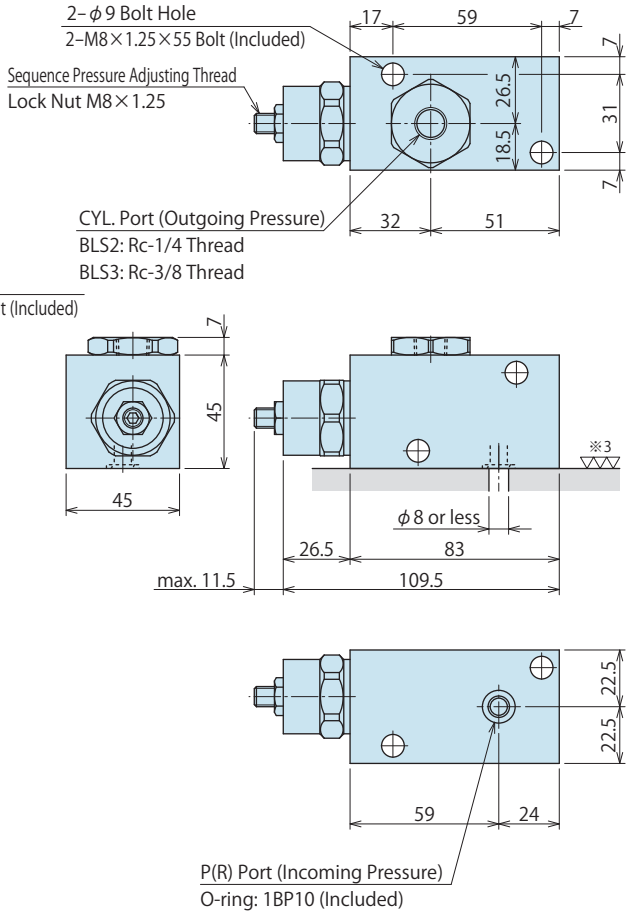
BLB
When the P port (incoming pressure) is reduced to approximately 1/20 times the cylinder port (outgoing pressure), reduction of the outgoing pressure starts and the outgoing pressure is reduced in proportion to the incoming pressure.

External Dimensions

BLS□□1-0□



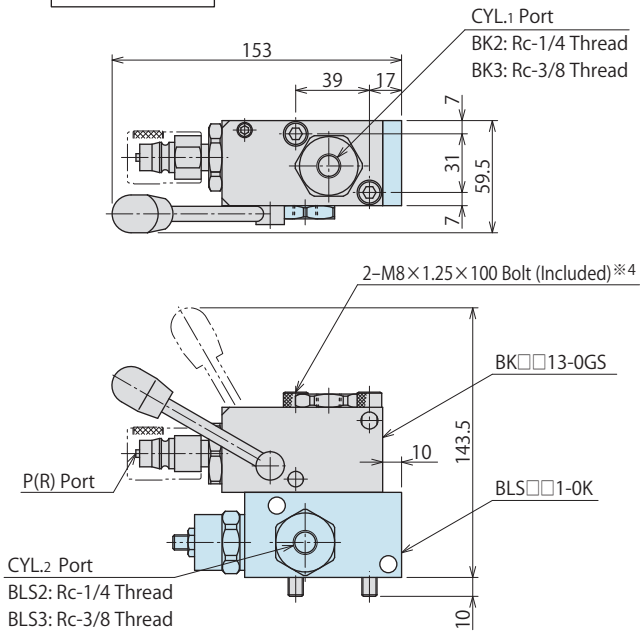
BLS□□1-0G□



Note

※3. Roughness of mounting surface (O-ring seal surface) should be 6.3S or less.

BLS□□1-0K□

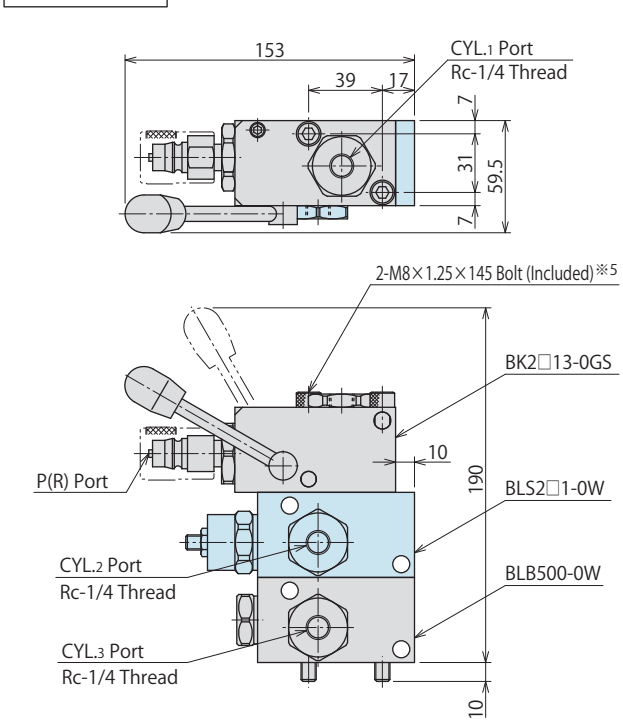


Notes

※4. The BK combination option uses M8×1.25×100 bolts (provided). But without M8×1.25×55 bolts and M8×1.25×145 bolts.

1. BK is sold separately. Prepare it separately.

BLS2□1-0W□



Notes

※5. The BK and BLB combination option uses M8×1.25×145 bolts (provided). But without M8×1.25×55 bolts and M8×1.25×100 bolts.

1. BK/BLS are sold separately. Prepare them separately.

Model No. Indication

BLG28 3 0 - 0 G (5.0MPa)

1 2 3 4

1 Set Value for Sequence Operating Pressure

3 : 1.0～6.0 MPa

6 : 5.0～18.0 MPa

2 Design No.

0 : Revision Number

3 Piping Method ※1

G : Gasket Option

Note

※1. Hydraulic connecting method is only G option (gasket) . Select BLS if piping option is necessary.

4 Set Pressure (Set Value for Sequence Operating Pressure)

Please indicate the set pressure when ordering
(Please inform us with proper unit symbols.)

※ Provide a difference of more than 1MPa between operating and setting pressure.

※ When using multiple BLG sequence valves in a parallel fashion, provide each set pressure with a pressure difference more than 1MPa.

Entry Example At 5MPa → **(5.0MPa)** At 3.5MPa → **(3.5MPa)**
At 700PSI → **(700PSI)**

Blank : Pressure Setting Free Option

※ If set pressure is determined by customer, indicate it within "Blank".

※ When shipping, the pressure is set as the minimum pressure indicated in the specification "Actuating Pressure Range".

※ For pressure adjustment, please refer to "Sequence Valve Pressure Setting Procedure" included along with the product and "Adjustable Set Pressure" on P.922.

Specifications

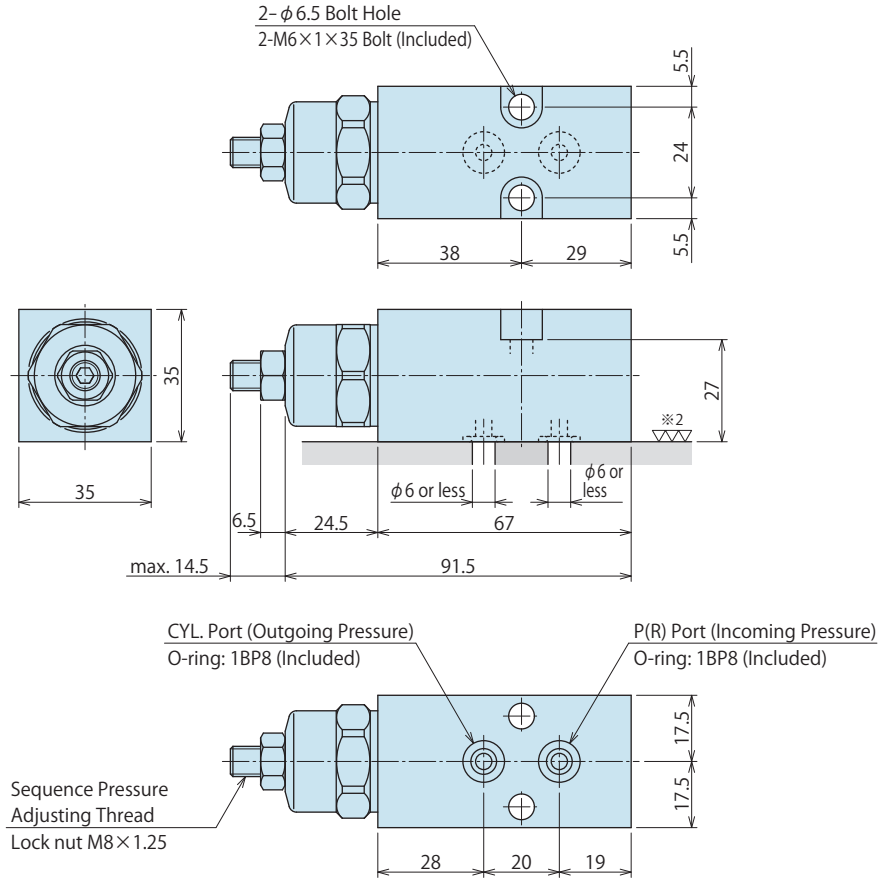
Model No.		BLG2830-0G□	BLG2860-0G□
Actuating Pressure Range	MPa	1.0 ～ 6.0	5.0 ～ 18.0
Operating Pressure Range	MPa	2.0 ～ 35.0	6.0 ～ 35.0
Adjusting Screw Turn Ratio	MPa/Rev	1.0	2.8
Cracking Pressure	MPa	0.01	
Min. Passage Area	mm^2	P(R) → CYL. : 8.7 / CYL.→P(R)：10.2	
Operating Temperature	℃	0 ～ 70	
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32	
Mass	kg	0.6	

Notes 1. If the flow volume of the incoming pressure side is too much, there is a possibility that the proper sequential procedures would not work. In this instance, use a flow control valve to adjust flow volume from the pressure source.

2. Please refer to BLS page for the example of a combination of BLG and BLB.

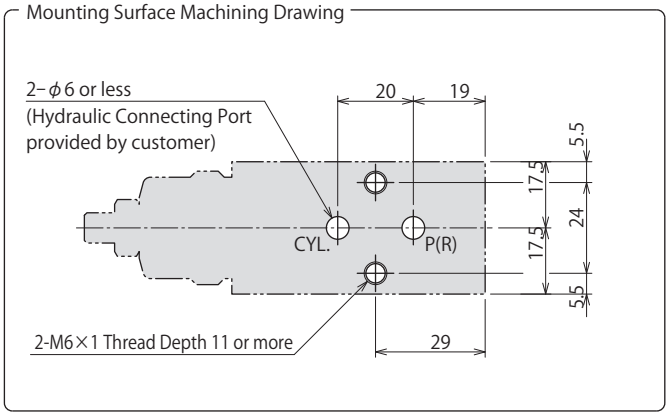
External Dimensions

BLG28□0-0G□



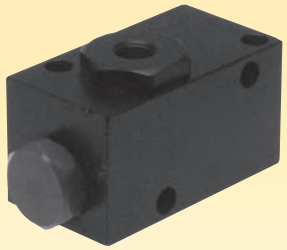
Note

※2. Roughness of mounting surface (O-ring seal surface) should be 6.3S or less.



Pressure Balance Valve

Model **BLB**



A pressure balance valve is actuated in sequence to prevent work piece deformation

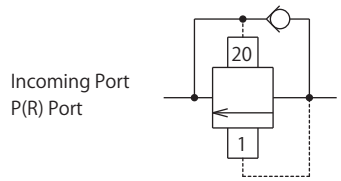
The valve that prevents the deformation of work piece when the work support releases.

What is a pressure balance valve?

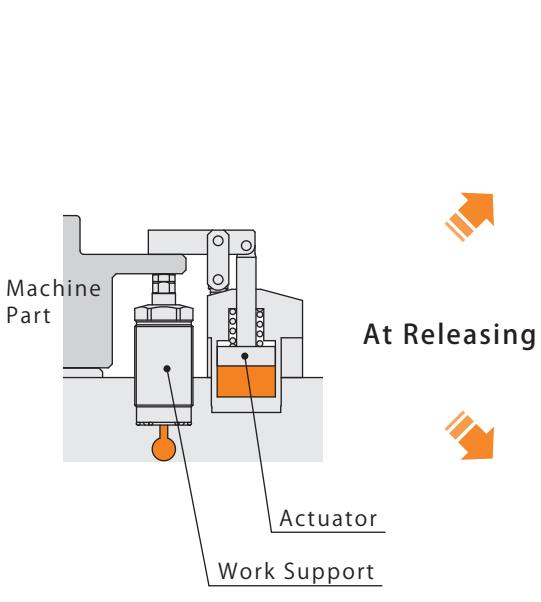
This valve prevents deformation of the work piece during unclamping sequence. This will be useful when using work support and clamp actuator in opposite position.

When releasing, the incoming side pressure reduces around 1/20 of outgoing side pressure. Then outgoing side pressure start to reduce.

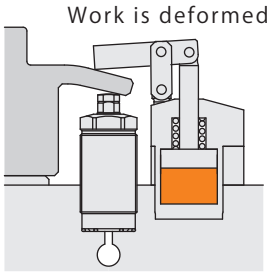
Circuit Symbol



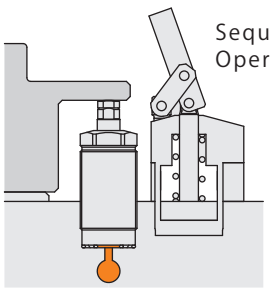
※ CYL. port comes with a built in filter.
Since a filter is not built in the P(R) port, please sufficiently perform flushing of piping and fitting to prevent foreign substances such as cutting chips from entering the circuit.



At Releasing



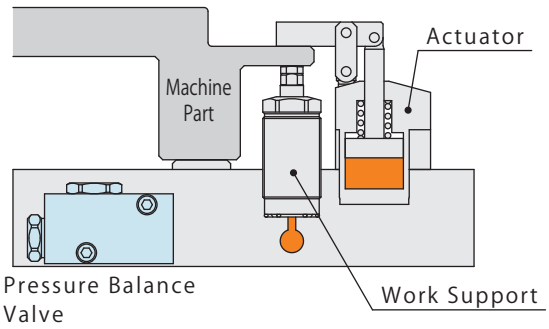
Without Pressure Balance Valve



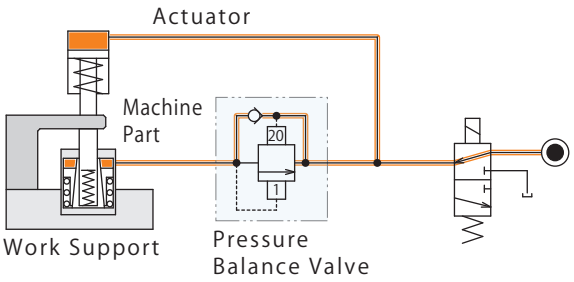
With Pressure Balance Valve

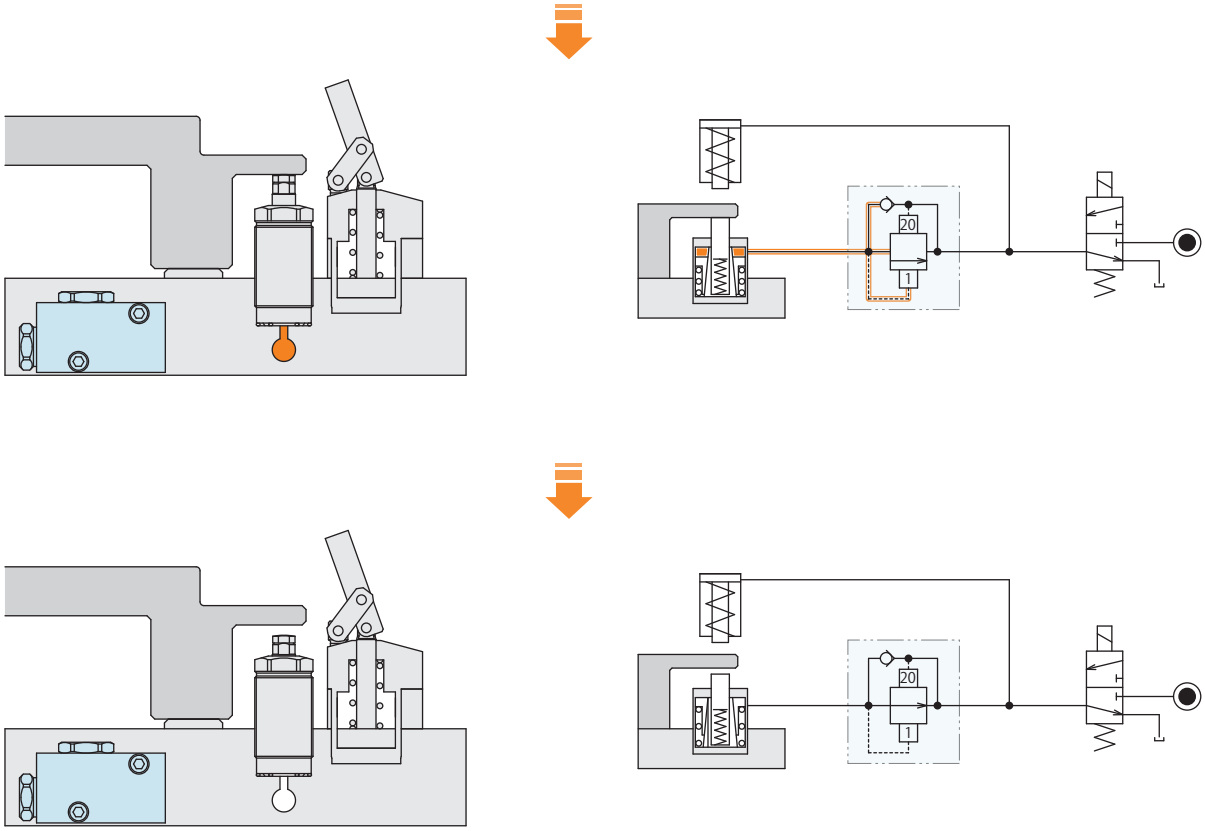
Action Description

Images



Circuit Example





Operation Sequence		Remarks
When Clamping	Hydraulic pressure is ON.	
	The actuator and work support operates almost at the same time.	In the case that the work piece is deformed due to the actuator operating earlier than work support, use the sequence valve(BLS/BLG) or flow control valve in order to operate in sequence.
	Locking action completed.	
	Machining process	
When Releasing	Hydraulic pressure is OFF.	
	Actuator operates the release action.	
	The pressure balance valve circuit opens.	When incoming side pressure reduces up to around 1/20 of outgoing side pressure, circuit opens.
	Work support is released.	
	Release action completed.	

Model No. Indication

BLB50 0 - 0 □

1 2

1 Design No.

0 : Revision Number

2 Piping Method

Blank : Piping Option (BSPT (Rc-Thread)) (Standard)

W : BK/BLS Connecting Option

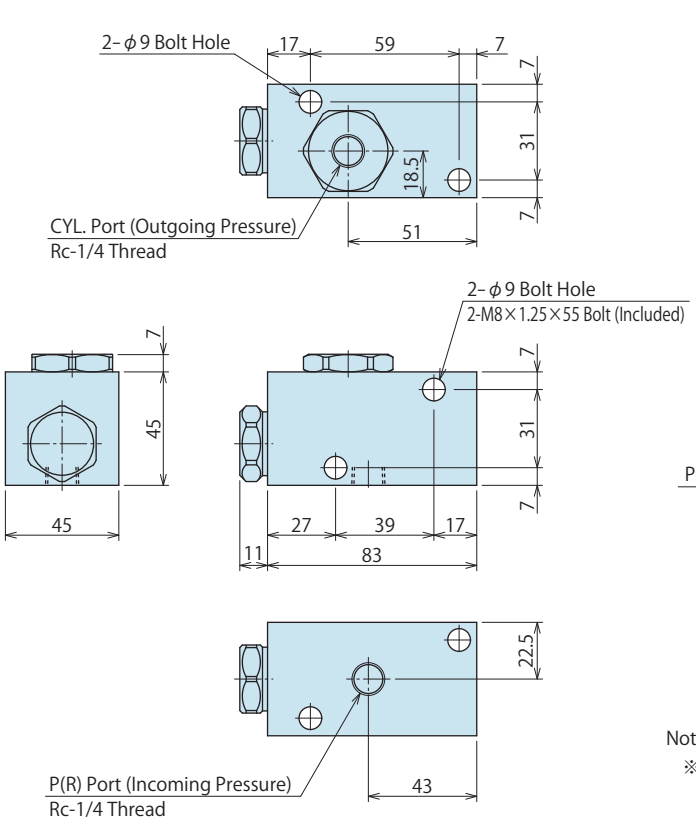
Specifications

Model No.		BLB500-0□
Operating Pressure Range	MPa	2.0 ～ 30.0
Withstanding Pressure	MPa	37.5
Min. Passage Area	mm^2	4.6
Operating Temperature	℃	0 ～ 70
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32
Mass	kg	1.2

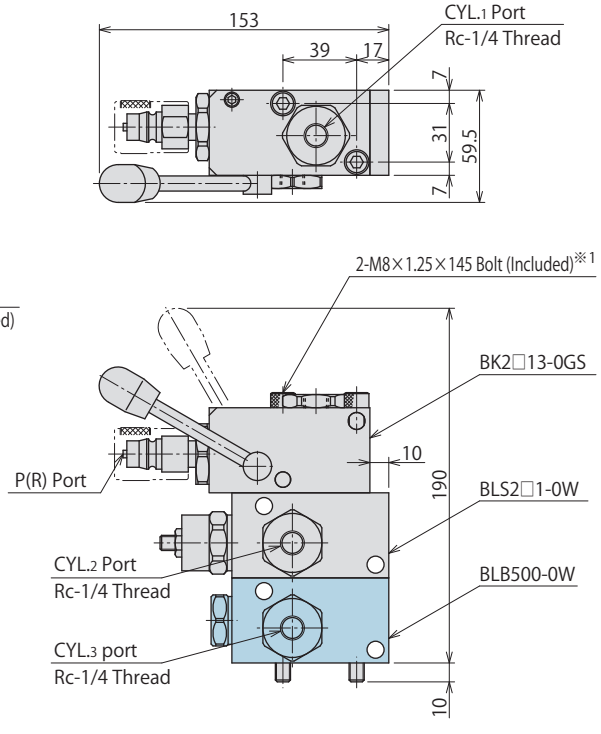
Note 1. Please refer to BLS page for the example of a combination of BLG/BLS and BLB.

External Dimensions

BLB500-0



BLB500-0W



Notes

※1. The BK and BLB combination type uses M8×1.25×145 bolts (provided) . But without M8×1.25×55 bolts and M8×1.25×100 bolts.

1. BK and BLS are not included. Prepare them separately.

MEMO

Accumulator

Model JSS
Model JS

Spring accumulator to absorb pressure fluctuation caused by temperature change to a fixture circuit disconnected from the pressure source

Maintenance-Free spring accumulator.

What is an accumulator?

When fixture is disconnected from the hydraulic pressure source closed circuit, with the change in volume of the hydraulic fluid due to temperature changes, pressure increase and decrease occurs.

Accumulator absorbs the pressure fluctuation so that it prevents work piece from deformation and getting damaged. When the pressure reaches out of range it will prevent work piece falling off due to the reduced pressure.

Circuit Symbol

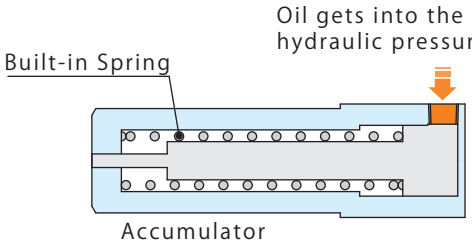
※ Since a filter is not built in each port, please sufficiently perform flushing of piping and fitting to prevent foreign substances such as cutting chips from entering the circuit.

	 Model JSS → P.933	 Model JS → P.937
Division	Spring Accumulator for Low Pressure	Spring Accumulator for High Pressure
Standard Operating Pressure	2/3/4/5/6/7 MPa	14/25 MPa

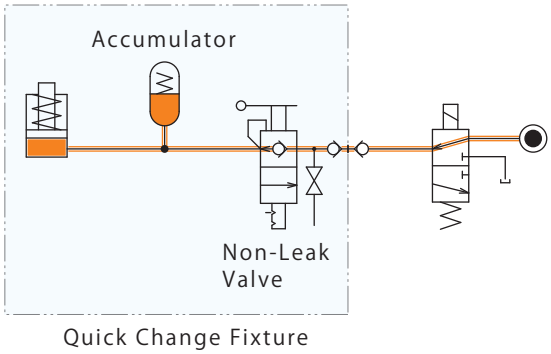
Action Description

The image of an internal accumulator

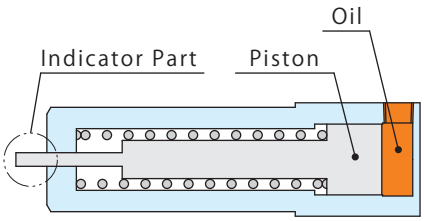
※ Simplified diagram.
The component of parts is different from it's real.

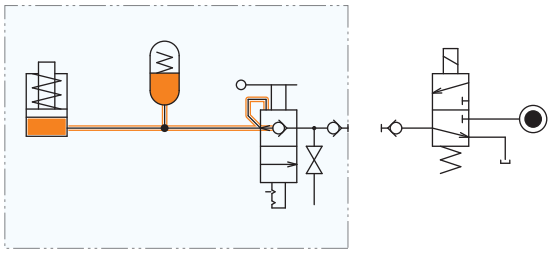


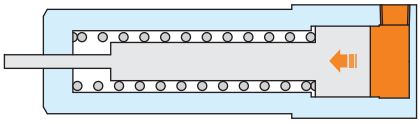
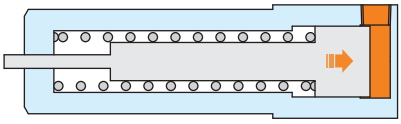
Circuit Example



Quick Change Fixture





Temperature Change	With Accumulator	No Accumulator
Hydraulic temperature goes up	The pressure rises because the hydraulic temperature goes up. Then piston is pushed up by the spring and absorbs the rising pressure. 	The pressure goes up due to the rising of hydraulic temperature There is a possibility for the machine to get damaged and for the work piece to deform by the abnormal high pressure.
Hydraulic temperature goes down	The pressure decreases because the hydraulic temperature decreases. The piston is pushed up by spring and absorbs the lowering pressure. 	The pressure goes down because of decreasing hydraulic temperature Due to the lowering clamping force, there is a possibility for work piece to fall off.

Influence of the Temperature Change of the Hydraulic Circuit

Sealed circuit disconnected from power source by non-leak valve etc. gets significant affect from ambient temperature change and oil temperature change. Especially in case of using motor pump unit, the oil temperature is high at the moment of hydraulic pressure provided and it drops rapidly cools off.
Kosmek standard is shown on the right hand side regardless of the amount of oil contained. However, it does differ depending on the amount of air mixed, product kind, piping/hose expansion and temperature condition etc.

$$\frac{0.69\text{MPa}}{℃}$$ (Increase/decrease of 1℃ will change by 0.69MPa.)

Model No. Indication

JSS 5 02 0 - □ □ □

1 2 3 4 5 6

1 Standard Operating Pressure

2 : 2.0MPa
3 : 3.0MPa
4 : 4.0MPa
5 : 5.0MPa
6 : 6.0MPa
7 : 7.0MPa

2 Amount of Discharge Oil

02 : 2.5cm³
05 : 5.0cm³
10 : 10.0cm³

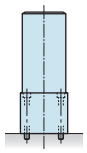
3 Design No.

0 : Revision Number

4 Mounting Direction

H : Horizontal Mounting
V : Vertical Mounting

H : Horizontal Mounting



V : Vertical Mounting

5 Piping Method

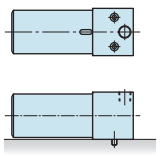
C : Piping Option (BSPP Thread (G-Thread))
S : Piping Option (BSPT (Rc-Thread))
G : Gasket Option
GC : Gasket + Piping Option (BSPP Thread (G-Thread))
GS : Gasket + Piping Option (BSPT (Rc-Thread))

6 Piping Direction

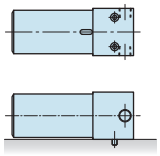
Selected for both H:Horizontal Mounting and Piping Method:C/S/GC/GS

A : Top Piping
B : Side Piping

※ For V: Vertical Mounting, 6 Piping Direction is "Blank".
※ For H: Horizontal Mounting and Piping Method:G, 6 Piping Direction is "Blank".



A:Top Piping



B:Side Piping

Specifications

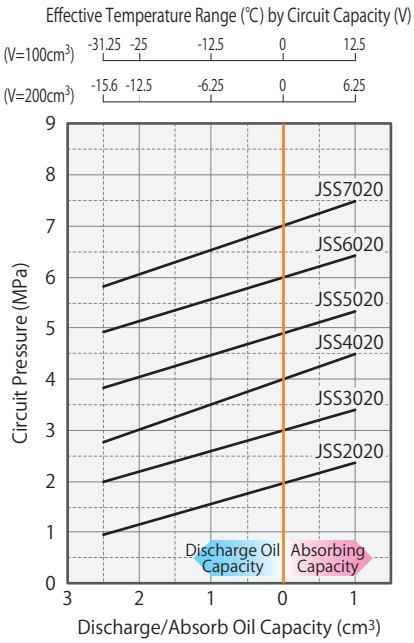
Model No.	JSS2020	JSS2050	JSS2100	JSS3020	JSS3050	JSS3100	JSS4020	JSS4050	JSS4100
Standard Operating Pressure MPa	2.0			3.0			4.0		
Withstanding Pressure MPa	14.0								
Discharge Oil Capacity cm³	2.5	5.0	10.0	2.5	5.0	10.0	2.5	5.0	10.0
Absorbing Capacity cm³	1.0	2.0	4.0	1.0	2.0	4.0	1.0	2.0	4.0
Compression Factor (β) ※1 MPa/cm³	0.40	0.31	0.16	0.40	0.33	0.17	0.49	0.37	0.18
Operating Temperature ℃	0 ~ 70								
Usable Fluid	General Hydraulic Oil Equivalent to ISO-VG-32								
Mass kg	0.8	1.0	1.7	0.8	1.1	1.7	0.8	1.1	2.0

Model No.	JSS5020	JSS5050	JSS5100	JSS6020	JSS6050	JSS6100	JSS7020	JSS7050	JSS7100
Standard Operating Pressure MPa	5.0			6.0			7.0		
Withstanding Pressure MPa	14.0								
Discharge Oil Capacity cm³	2.5	5.0	10.0	2.5	5.0	10.0	2.5	5.0	10.0
Absorbing Capacity cm³	1.0	2.0	4.0	1.0	2.0	4.0	1.0	2.0	4.0
Compression Factor (β) ※1 MPa/cm³	0.43	0.34	0.17	0.43	0.36	0.21	0.48	0.40	0.27
Operating Temperature ℃	0 ~ 70								
Usable Fluid	General Hydraulic Oil Equivalent to ISO-VG-32								
Mass kg	1.4	1.8	2.9	1.5	1.9	3.0	1.7	2.0	3.4

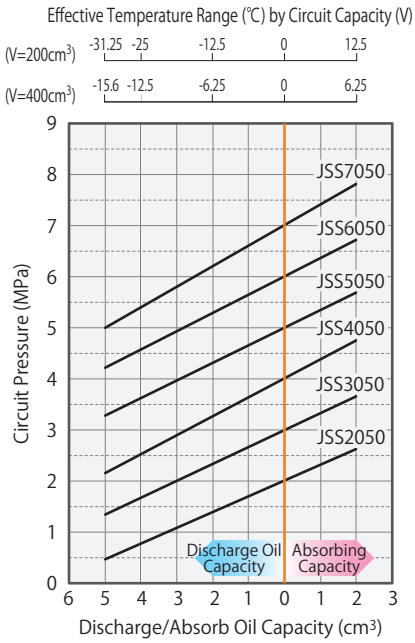
Note ※1. Compression factor (β) means a pressure change (MPa) per 1cm³ charge in oil volume.

Performance Curve

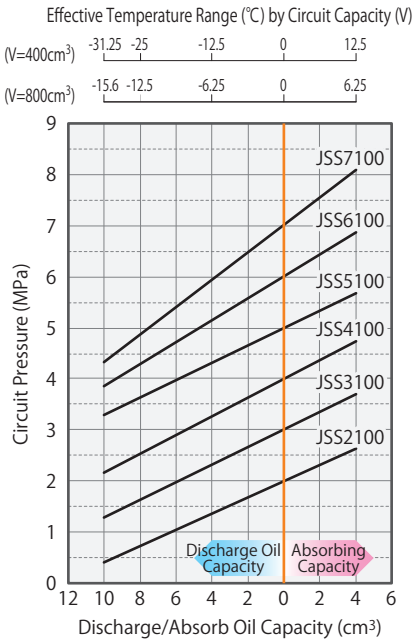
JSS□020



JSS□050



JSS□100



How to read the Characteristic Diagram

Requirements (Reference)

Clamp Used	LHA0650×4 unit (Lock Cylinder Capacity for each : 26.7cm3)
Piping	Inside Diameter φ6×2m (Pipe Capacity per 1m : 28.3cm3)
Valve Capacity	20cm3
Temperature Change : ΔT	-20℃
Operating Pressure : P	4.0MPa
Thermal Expansion Coefficient : α	8×10^{-4}

Selection Method

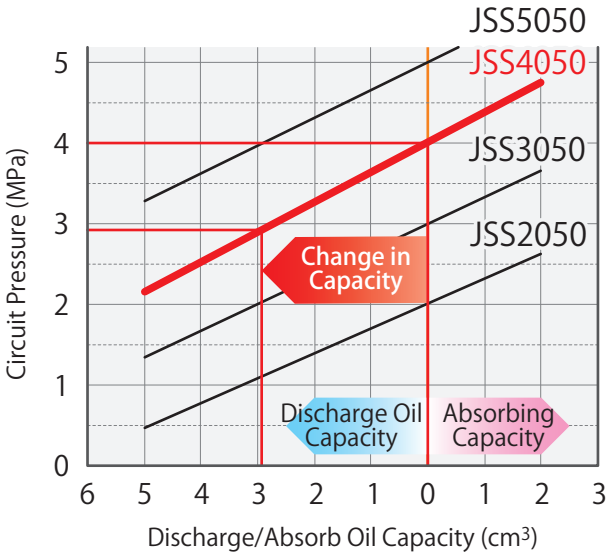
1. Calculate Fixture Circuit Capacity (V)
   Clamp Capacity + Pipe Capacity + Valve Capacity
   V = (26.7×4) + (28.3×2) + 20 = 183.4 cm3

2. Calculate Change in Capacity (ΔV)
   Fixture Circuit Capacity (V) x Thermal Expansion Coefficient (α)
   x Amount of Temperature Change (ΔT)
   ΔV = 183.4 × (8×10^{-4}) × (-20) = -2.93 cm3

3. Select Accumulator Model
   Operating Pressure (P)= 4.0MPa select JSS4□□□
   Change in Capacity (ΔV)= -2.93cm3 select JSS4050.
   (If the required discharge capacity is greater than shown on the graph, select larger accumulator [e.g. JSS4100].)

4. Check the Accumulator Characteristics (Graph on the right)
   Pressure after Temperature Change (-20℃) : 2.92MPa
   Residual Oil Discharge Margin : 2.07cm3

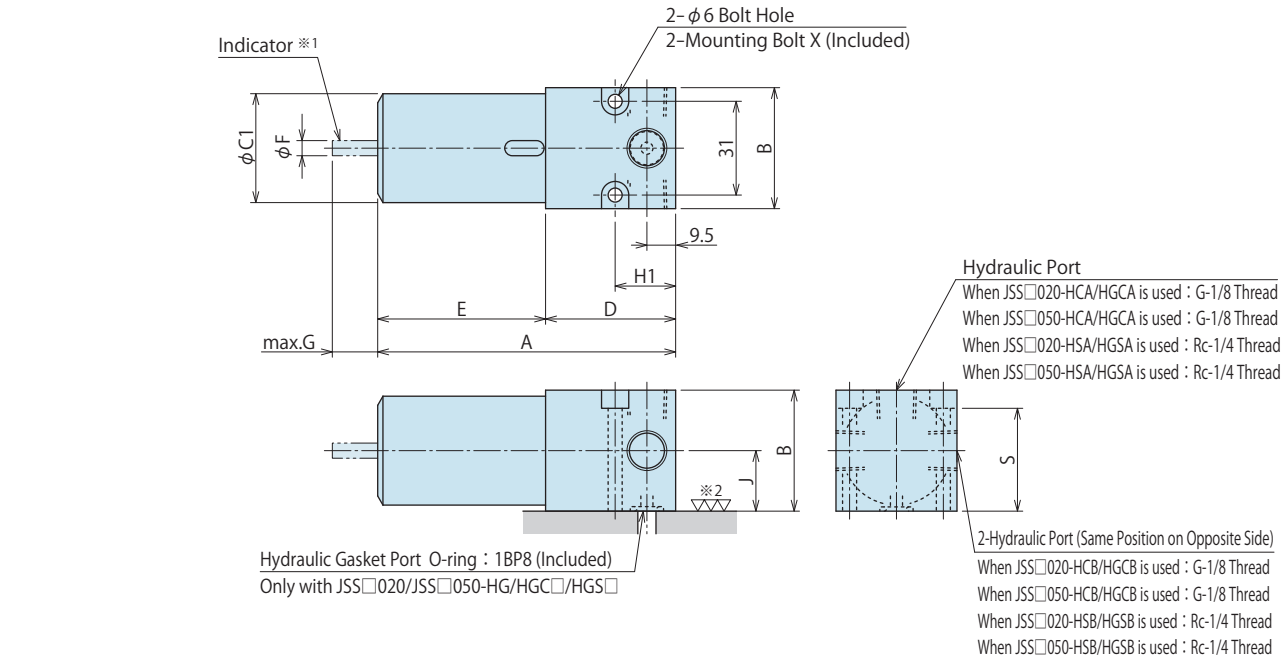
5. Select the Attachment and Piping Methods.



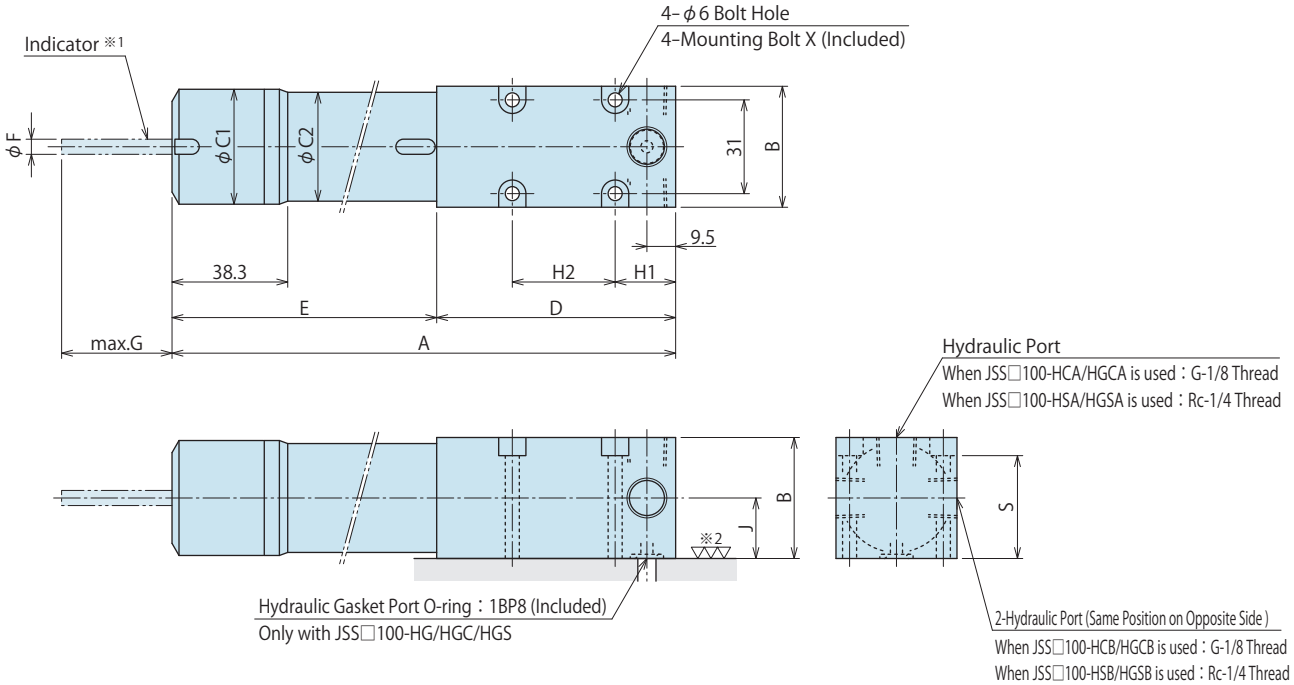
Note
1. When marking your selection, calculate tolerance for the oil capacity taking the spring force deviation into consideration.
【Approximate amount of spare oil : JSS□020・・・0.5cm3、JSS□050・・・1.0cm3、JSS□100・・・1.5cm3】

External Dimensions

JSS□020-H□□、JSS□050-H□□

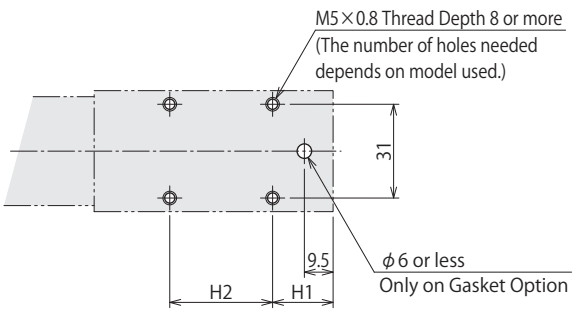


JSS□100-H□□

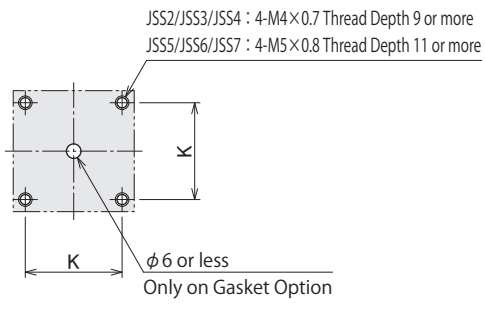


Machining Dimensions of Mounting Area

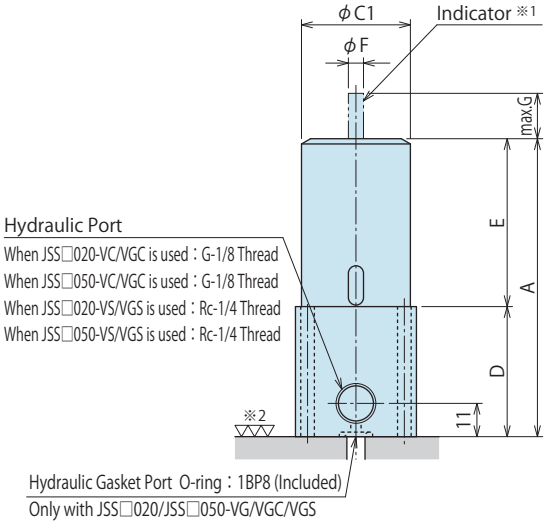
JSS□□0-H□□



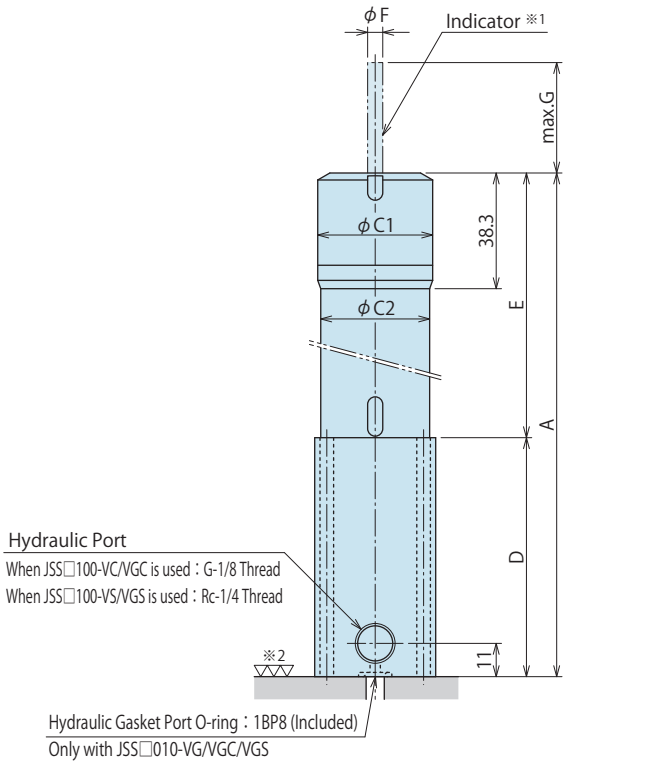
JSS□□0-V□



JSS□020-V□、JSS□050-V□



JSS□100-V□



External Dimensions and Machining Dimensions for Mounting

(mm)

Model No.	JSS2020 JSS3020 JSS4020	JSS2050 JSS3050 JSS4050	JSS2100 JSS3100 JSS4100	JSS5020 JSS6020 JSS7020	JSS5050 JSS6050 JSS7050	JSS5100 JSS6100 JSS7100
A	98.5	136.5	241.5	128.5	164.5	275.5
B	40	40	40	50	50	50
C1	36	36	38	46	46	48
C2	-	-	36	-	-	46
D	43	55	79	43	55	79
E	55.5	81.5	162.5	85.5	109.5	196.5
F	5	5	5	6	6	6
G ※1	15	27	49	15	27	49
H1	20	20	20	20	20	20
H2	-	-	34	-	-	34
J	20	20	20	25	25	25
K	32	32	32	40	40	40
R	4.5	4.5	4.5	5.5	5.5	5.5
S	34	34	34	44	44	44
Mounting Bolt X	M5×0.8×40	M5×0.8×40	M5×0.8×40	M5×0.8×50	M5×0.8×50	M5×0.8×50
Mounting Bolt Y	M4×0.7×50	M4×0.7×60	M4×0.7×85	M5×0.8×50	M5×0.8×65	M5×0.8×85

Notes

※1. Indicator extends proportionally to pressure. Be aware not to interfere with other devices of max. extension dimension when designing.

※2. Roughness of mounting surface（O ring seal surface）should be 6.3S or better.

1. Do not disassemble. Components include pressured spring parts. It is dangerous to disassemble.

Model No. Indication

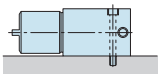
JS A 7 1 1 - 0 A

1 2 3 4 5

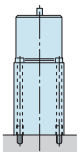
1 Mounting Direction

A : Horizontal Mounting

B : Vertical Mounting



A:Horizontal Mounting



B:Vertical Mounting

2 Standard Operating Pressure

5: 14.0MPa

7: 25.0MPa

3 Amount of Discharge Oil

1: 2.2cm³

2: 4.4cm³

4 Design No.

1 : Revision Number

5 Piping Method

A : Front Side Piping Option (Rc-1/4 Thread) ※1

B : Top Surface Piping Option (Rc-1/4 Thread) ※1

C : Side Surface Piping Option (Rc-1/4 Thread)

G : Gasket Option

※1. When choosing Mounting Direction B: Vertical Mounting, A: Front Side Piping Option and B: Top Surface Piping Option cannot be selected.

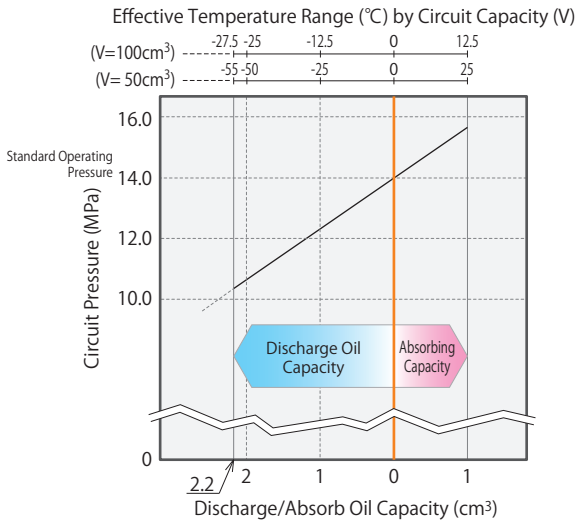
Specifications

Model No.	JS□511	JS□521	JS□711	JS□721
Standard Operating Pressure MPa	14.0		25.0	
Withstanding Pressure MPa	25.0		37.5	
Discharge Oil Capacity cm³	2.2	4.4	2.2	4.4
Absorbing Capacity cm³	1.0	2.0	1.0	2.0
Compression Factor (β) ※1 MPa/cm³	1.65	1.19	2.24	1.93
Operating Temperature ℃	0～70			
Usable Fluid	General Hydraulic Oil Equivalent to ISO-VG-32			
Mass kg	3.0	4.3	5.4	5.9

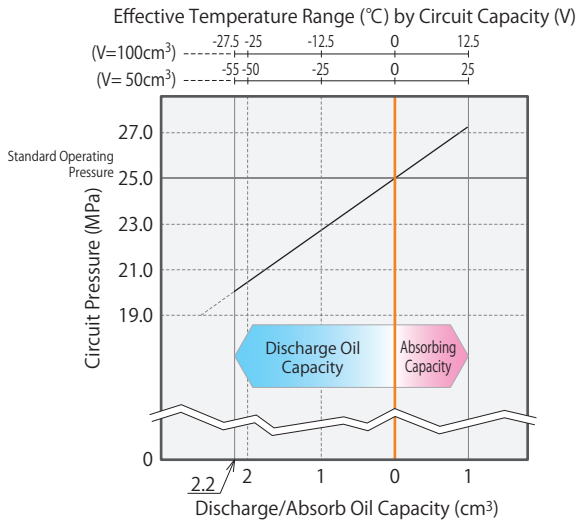
Note ※1. Compression factor (β) means a pressure change (MPa) per 1cm³ charge in oil volume.

Performance Curve

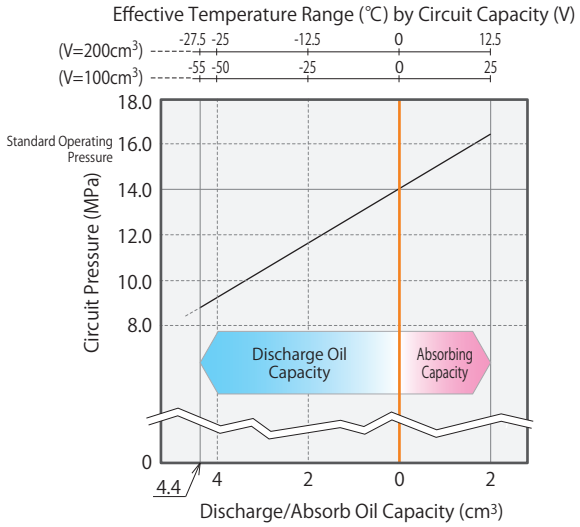
JS□511



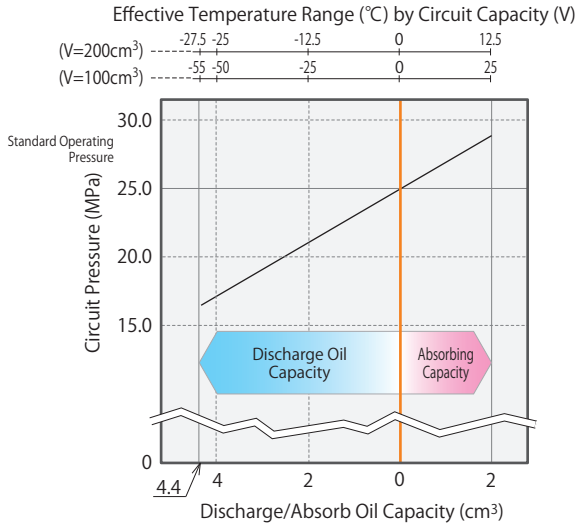
JS□711



JS□521



JS□721

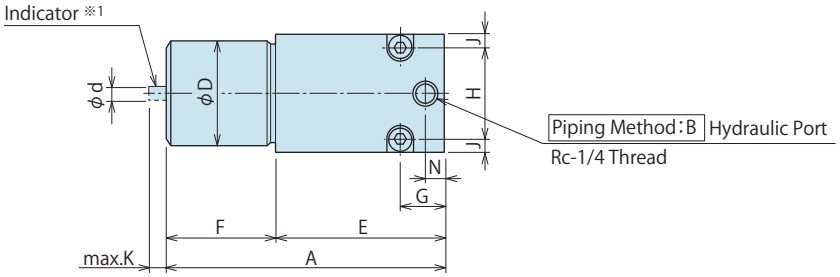


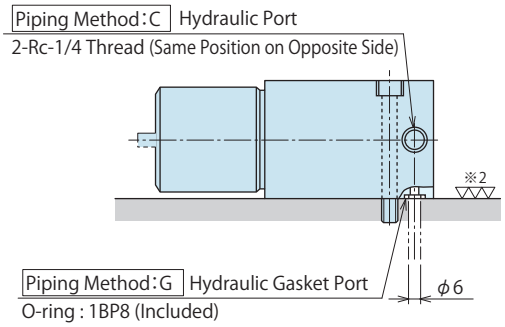
How to read the Characteristic Diagram

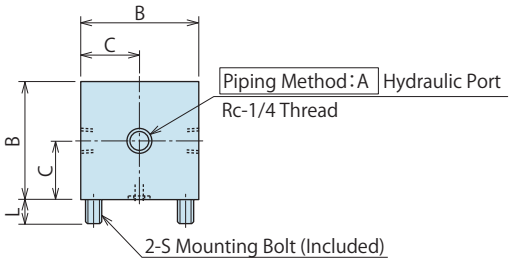
Please refer to the how to read the characteristic diagram on JSS page.

External Dimensions

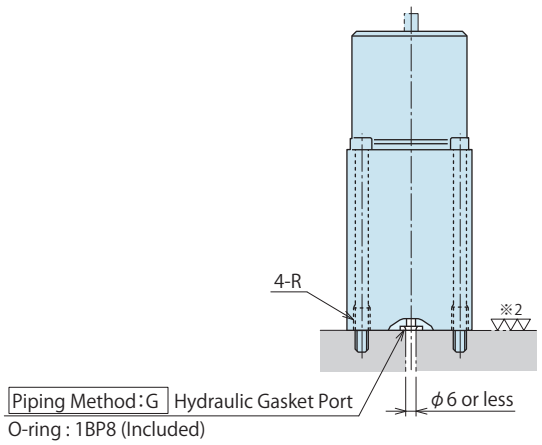
JSA□□1-0A/B/C/G

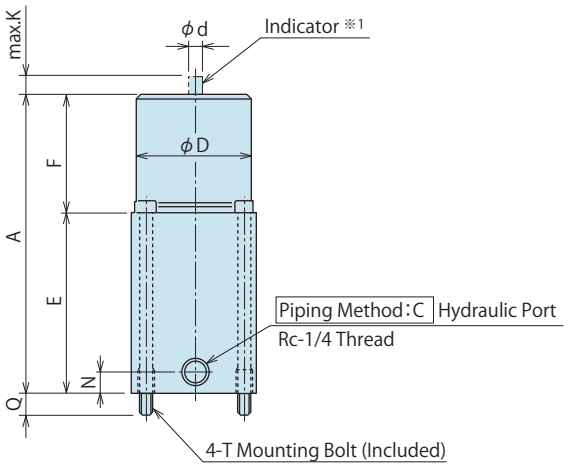


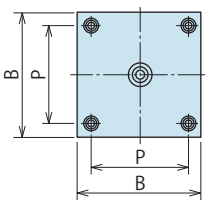




JSB□□1-0C/G







External Dimensions

(mm)

Model No.	JS□511	JS□521	JS□711	JS□721
A	155.5	187.5	210.5	236
B	65		70	
C	32.5		35	
D	58.5		68.5	
d	8		8	
E	82		84	
F	73.5	105.5	126.5	152
G	25		25	
H	51		56	
J	7		7	
K ※1	9	16.5	9.5	17.5
L	13		13	
N	11		11	
P	51		56	
Q	8		11	
R (Nominal×Pitch×Depth)	M8×1.25×16		M8×1.25×16	
Mounting Bolt S	M8×1.25×70		M8×1.25×75	
Mounting Bolt T	M6×1×90		M6×1×95	

Notes

※1. Indicator extends proportionally to pressure. Be aware not to interfere with other devices of max. extension dimension when designing.

※2. Roughness of mounting surface (O-ring seal surface) should be 6.3S or better.

1. Do not disassemble. Components include pressured spring parts. It is dangerous to disassemble.

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

Air Sequence Valve
BWD

Hydraulic Non-Leak Coupler
BGA/BGB
BGC/BGD
BGP/BGS
BBP/BBS
BNP/BNS
BJP/BJS
BFP/BFS

Auto Coupler
JVA/JVB
JVC/JVD
JVE/JVF
JNA/JNB
JNC/JND
JLP/JLS

Rotary Joint
JR

Hydraulic Valve
BK
BEQ
BT
BLS/BLG
BLB
JSS/JS
JKA/JKB
BM/BMG
AU/AU-M
BU
BP/JPB
BX
BEP/BSP
BH
BC

Air Hydraulic Unit
CV
CK
CP
CS
CB
CC
AB/AB-V
AC/AC-V

Pressure Indicator

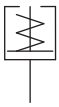
Model JKA
Model JKB

Detects circuit pressure of a fixture disconnected from the hydraulic pressure source

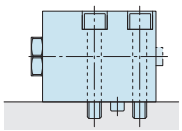
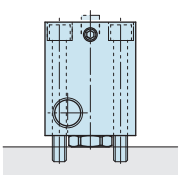
What is pressure indicator?

The circuit pressure of the fixture disconnected from hydraulic power source is able to be detected by using pressure indicator and sensor switch together. It is useful for automatic controlling and detecting abnormal circumstances.

Circuit Symbol



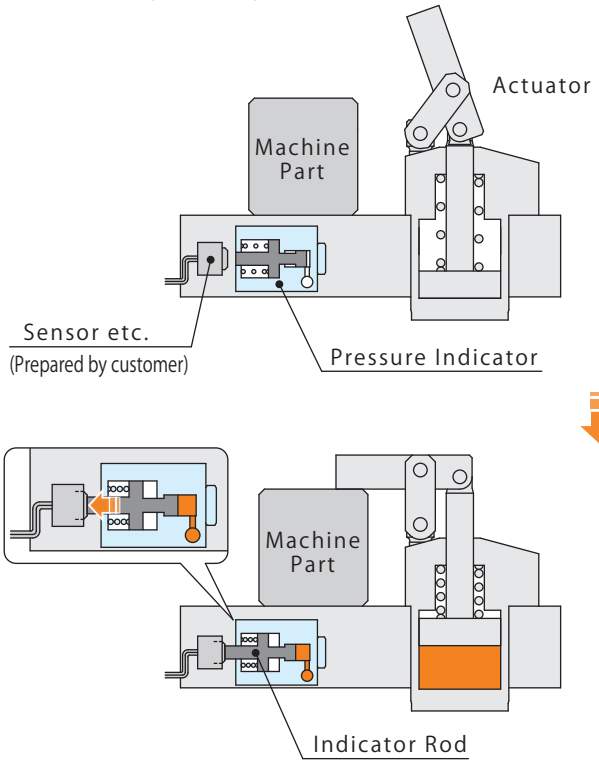
※ Since a filter is not built in each port, please sufficiently perform flushing of piping and fitting to prevent foreign substances such as cutting chips from entering the circuit.

	 Model JKA → P.943	 Model JKB → P.943
Classification	Horizontal Mounting	Vertical Mounting
Set Pressure Range	4.5～9.5MPa / 9.5～15MPa / 15～22 MPa	
Mounting Direction		

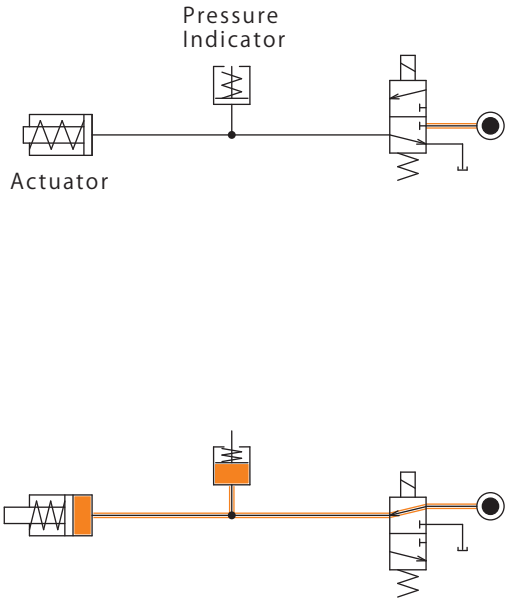
Action Description

Images

※ Simplified diagram.
The component of parts is different from it's real.



Circuit Example



Operation Sequence		Remarks
When clamping	Hydraulic pressure is ON.	
	Supply hydraulic pressure to actuator and pressure indicator.	
	When the pressure reaches the set pressure of pressure indicator, indicator rod is at full stroke ($3^{\pm 0.5}$mm stick out) and if using the sensor or switch, it can be detected.	The indicator rod extends gradually because of the balance between built-in spring and pressure just before reaching set pressure.
When releasing	Hydraulic pressure is OFF.	
	The pressure is released from the actuator and pressure indicator. Then the indicator rod retracts back to the edge of pressure indicator.	

Model No. Indication

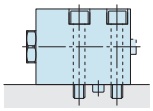
JK A 0 3 0 - 0 S (5.5MPa)

1 2 3 4 5

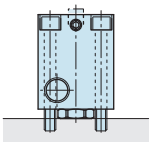
1 Mounting Direction

A : Horizontal Mounting

B : Vertical Mounting



A : Horizontal Mounting



B : Vertical Mounting

2 Set Pressure Code

3: 4.5 ～ 9.5MPa

5: 9.5 ～ 15.0MPa

7: 15.0 ～ 22.0MPa

3 Design No.

0 : Revision Number

4 Piping Method

G : Gasket Option

S : Piping Option (Rc-1/4 Thread)

5 Set Pressure (Set pressure when indicator rod is at full-stroke.)

Please indicate the set pressure when ordering.
(Please inform us with proper unit symbols.)

※ Indicator rod is at full stroke (3±0.5mm) when set pressure is reached.

Entry Example

at 5MPa → **(5.0MPa)**

at 20.5MPa → **(20.5MPa)**

at 700PSI → **(700PSI)**

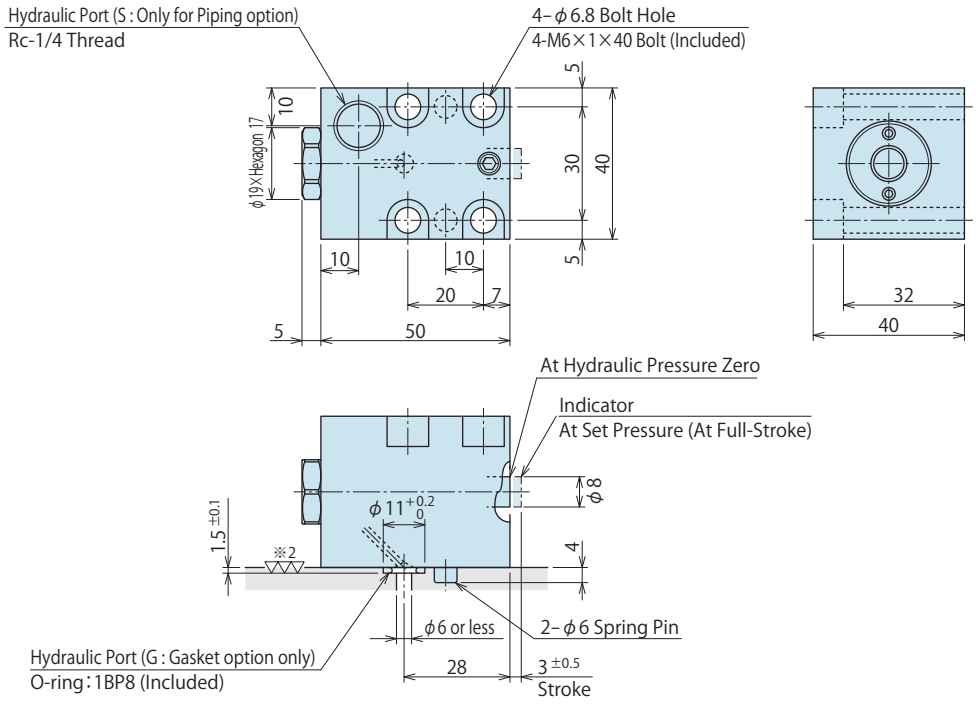
Specifications

Model No.	JK□030	JK□050	JK□070
Set Pressure Range MPa	4.5 ～ 9.5	9.5 ～ 15.0	15.0 ～ 22.0
Withstanding Pressure MPa	37.5		
Pressure Change ※1 MPa/mm	0.65	1.38	2.55
Operating Temperature ℃	0 ～ 70		
Usable Fluid	General Hydraulic Oil Equivalent to ISO-VG-32		
Mass kg	0.5		

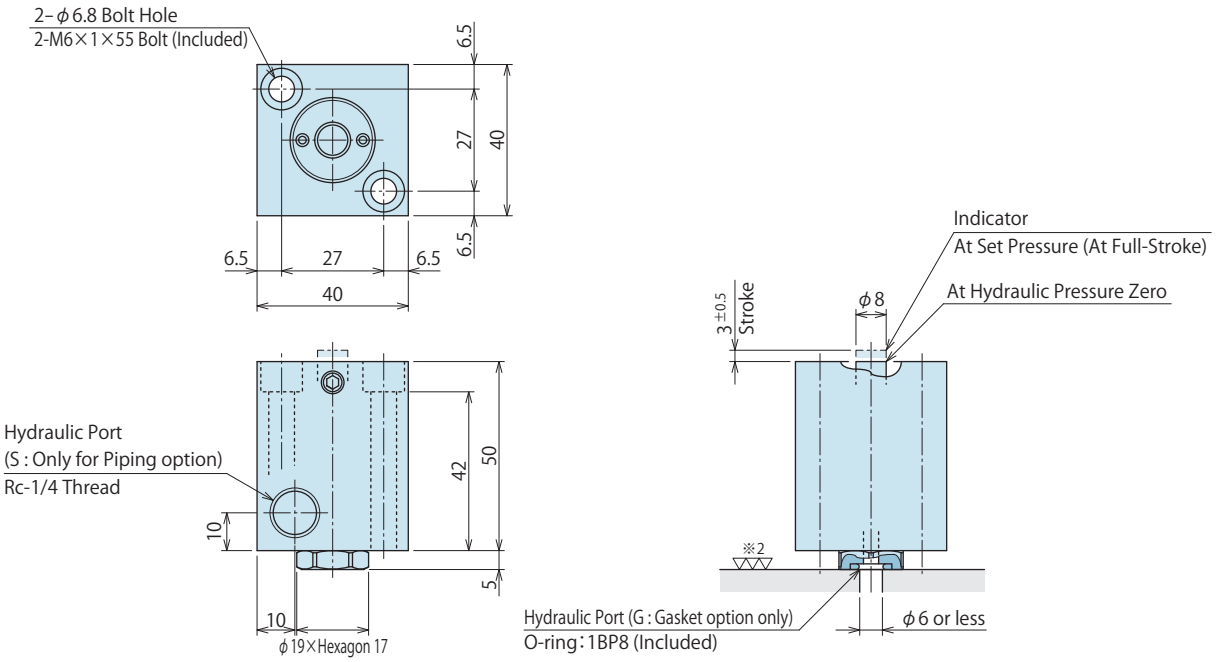
Note ※1. Pressure drop shown will cause indicator rod to retract by 1mm.

External Dimensions

JKA0□0-0□□



JKB0□0-0□□

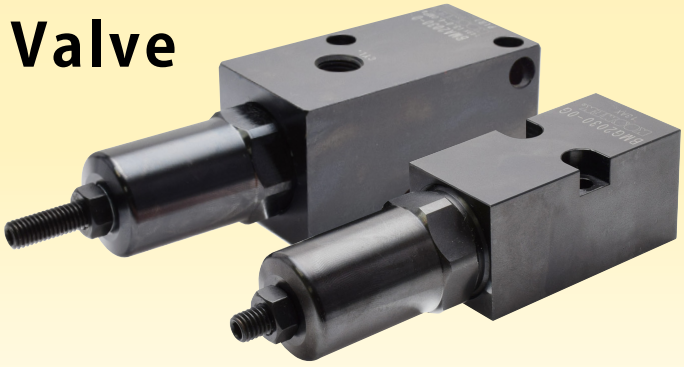


Note

※2. Roughness of mounting surface (O-ring seal surface) should be 6.3S or less.

Non-Leak Reducing Valve

Model BMA
Model BMG



Reducing valve does not need drain port and is used in circuit

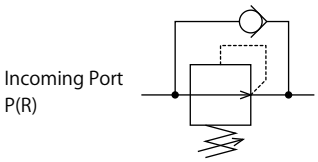
The drain port for pressure reducing is not needed. This allows to reduce the number of circuits.

What is reducing valve?

Non-leak reducing valves reduce hydraulic circuit pressure of a fixture.
Partial in-line circuit pressures can be reduced.
This allows for simple circuit designs and proper quick change fixtures as well as eliminating a need for an exterior drain port.

※ Gasket option is available.

Circuit Symbol

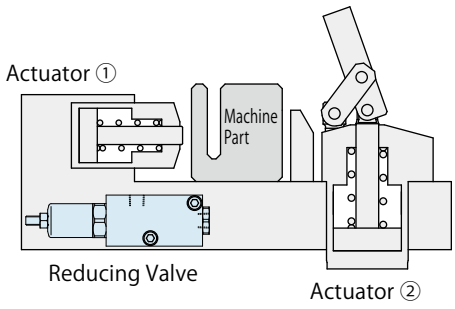


※ Each port has a built-in filter.

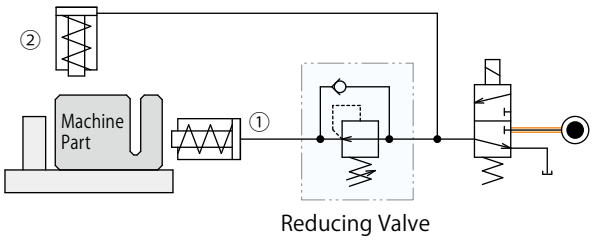
	NEW Model BMA → P.3			NEW Model BMG → P.5		
Classification	Non-Leak Reducing Valve			Compact Non-Leak Reducing Valve		
Incoming Supply Pressure	2～7MPa	6～30MPa	9～30MPa	2～7MPa	6～30MPa	9～30MPa
Outgoing Set Pressure	1～6MPa	3～14MPa	6～27MPa	1～6MPa	3～14MPa	6～27MPa
Piping Method	Piping Option Gasket Option BK Connecting Option			Gasket Option		

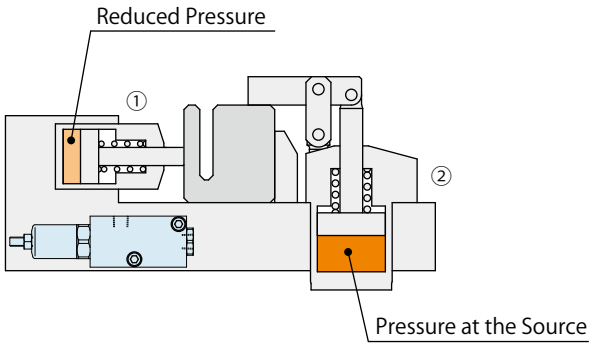
Action Description

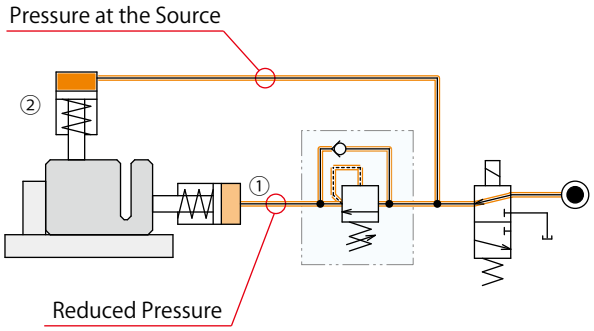
Images



Circuit Example







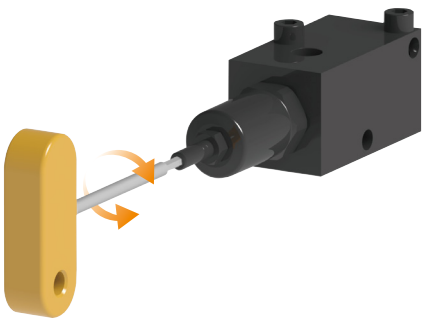
	Operation Sequence	Remarks
When clamping	Hydraulic pressure is ON.	
	Supply hydraulic pressure to actuator ① and ②.	
	Raise the pressure up to the outgoing side set pressure.	
	The valve of reducing valve closes and then supply the outgoing side set pressure to actuator ①.	There is differential pressure between outgoing side pressure and incoming side pressure (please refer to specification).
	The pressure going into actuator ② raise up to the original pressure and lock completes.	
	Machining process	
When releasing	Hydraulic pressure is OFF.	
	The actuators ①,② are released at the same time.	When incoming side pressure reduces, check valve of reducing valve opens.
	Release action completed.	

Adjustable Set Pressure

Set hydraulic pressure can be changed per one rotation. (MPa/Rev)

Model No.	BMA2030-0□ BMG2030-0G	BMA2050-0□ BMG2050-0G	BMA2070-0□ BMG2070-0G
Set Pressure per One Rotation (Reference)	0.3	1.2	3.8

Notes
1. The set pressure value is set according to the model code.
2. The value varies depending on the incoming port pressure.
3. Pressure increases by turning clockwise and decreases by turning counter-clockwise.



Model No. Indication

BMA20 3 0 - 0 G (5-25MPa)

1 2 3 4

1 Outgoing Side Set Pressure

3: 1.0 ～ 6.0MPa

5: 3.0 ～ 14.0MPa

7: 6.0 ～ 27.0MPa

2 Design No.

0 : Revision Number

3 Piping Method

Blank : Piping Option (Rc-1/4 Thread)

G : Gasket Option

K : BK Valve Connecting Option (Rc1/4 Thread in Outgoing Port) ※1

Notes ※1. Please contact us separately for the detailed dimensions of K (BK Stack Model).

4 Set Pressure (Outgoing Set Pressure - Incoming Supply Pressure)

Please indicate the set pressure when ordering.
(Please inform us with proper unit symbols.)

※ Pressure difference of incoming supply pressure and outgoing set pressure should be more than the allowable minimum pressure difference.

Entry Example

Outgoing:5MPa Incoming:25MPa Setting → **(5.0-25.0MPa)**

Outgoing:725PSI Incoming:3625PSI Setting → **(725-3625PSI)**

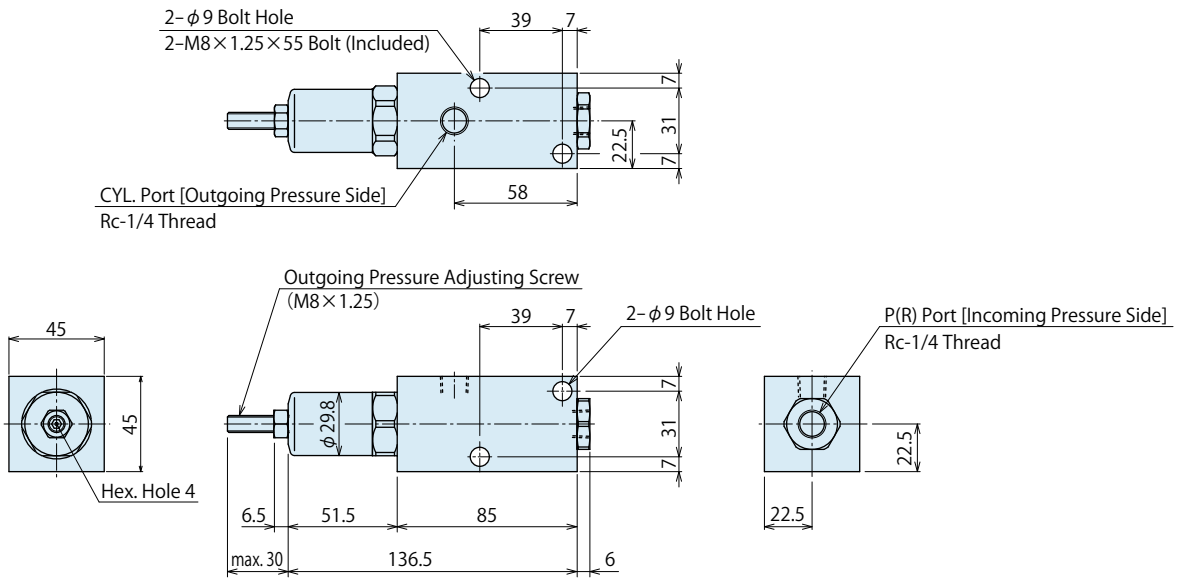
Specifications

Model No.	BMA2030-0□	BMA2050-0□	BMA2070-0□
Incoming Supply Pressure MPa	2.0 ～ 7.0	6.0 ～ 30.0	9.0 ～ 30.0
Outgoing Set Pressure MPa	1.0 ～ 6.0	3.0 ～ 14.0	6.0 ～ 27.0
Allowable Minimum Pressure Difference ※2 MPa	1.0	3.0	3.0
Withstanding Pressure MPa	10.5	37.5	37.5
Min. Passage Area mm^2	23.3		
Operating Temperature ℃	0 ～ 70		
Usable Fluid	General Hydraulic Oil Equivalent to ISO-VG-32		
Mass kg	1.5		

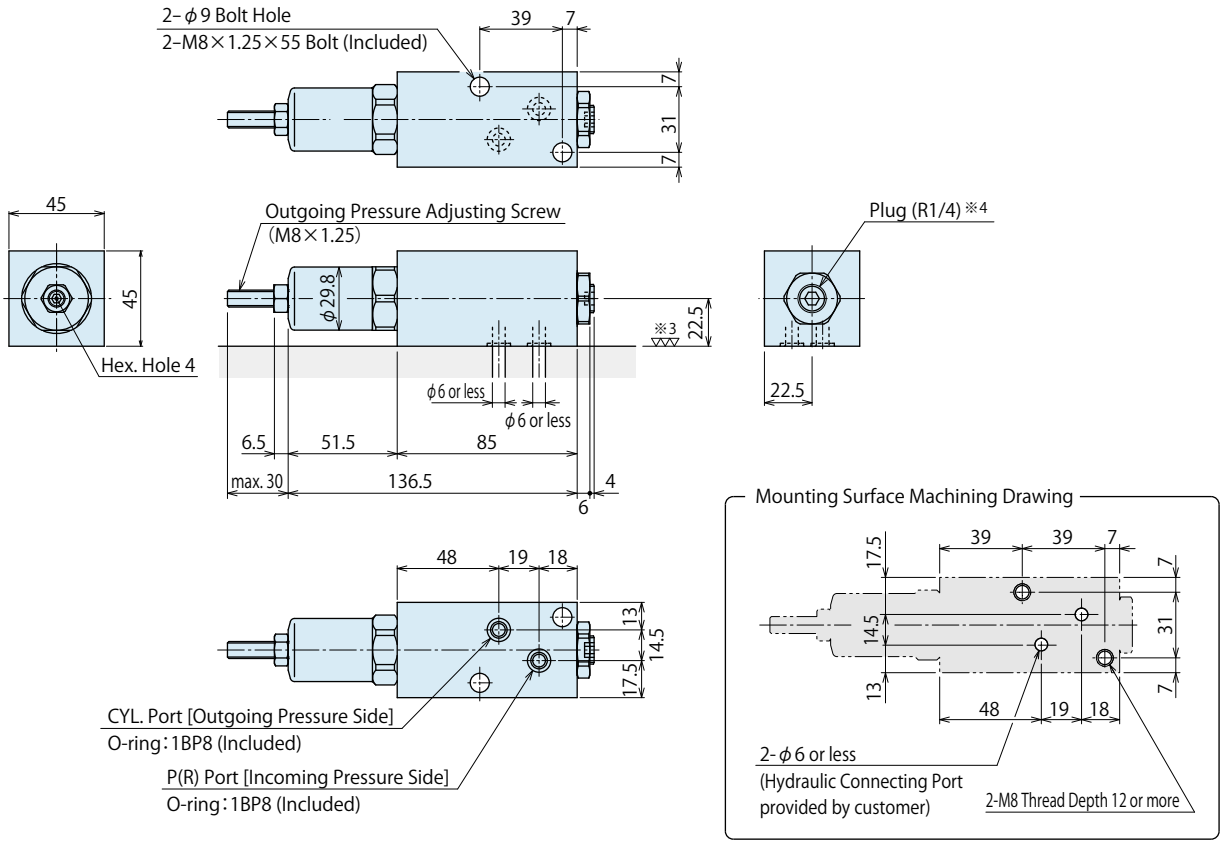
Note ※2. Allowable minimum pressure difference shows the minimum difference between incoming and outgoing pressure.

External Dimensions

BMA20□0-0 ※ This drawing shows piping method (blank) :piping option



BMA20□0-0G ※ This drawing shows piping method (G): gasket option.



Notes

※3. Roughness of mounting surface (O-ring seal surface) should be 6.3S or less.

※4. It can be used as P(R) port by removing the plug.

Model No. Indication

BMG20 5 0 - 0 G (5-25MPa)

1 2 3 4

1 Outgoing Side Set Pressure

3: 1.0 ～ 6.0MPa

5: 3.0 ～ 14.0MPa

7: 6.0 ～ 27.0MPa

2 Design No.

0 : Revision Number

3 Piping Method ※1

G : Gasket Option

Note ※1. Only G (Gasket Option) is available for BMG.
Select BM if connecting with couplers etc.

4 Set Pressure (Outgoing Set Pressure - Incoming Supply Pressure)

Please indicate the set pressure when ordering.
(Please inform us with proper unit symbols.)

※ Allowable minimum pressure difference shows the minimum difference between incoming and outgoing pressure.

Entry Example

Outgoing：5MPa Incoming：25MPa Setting → **(5.0-25.0MPa)**

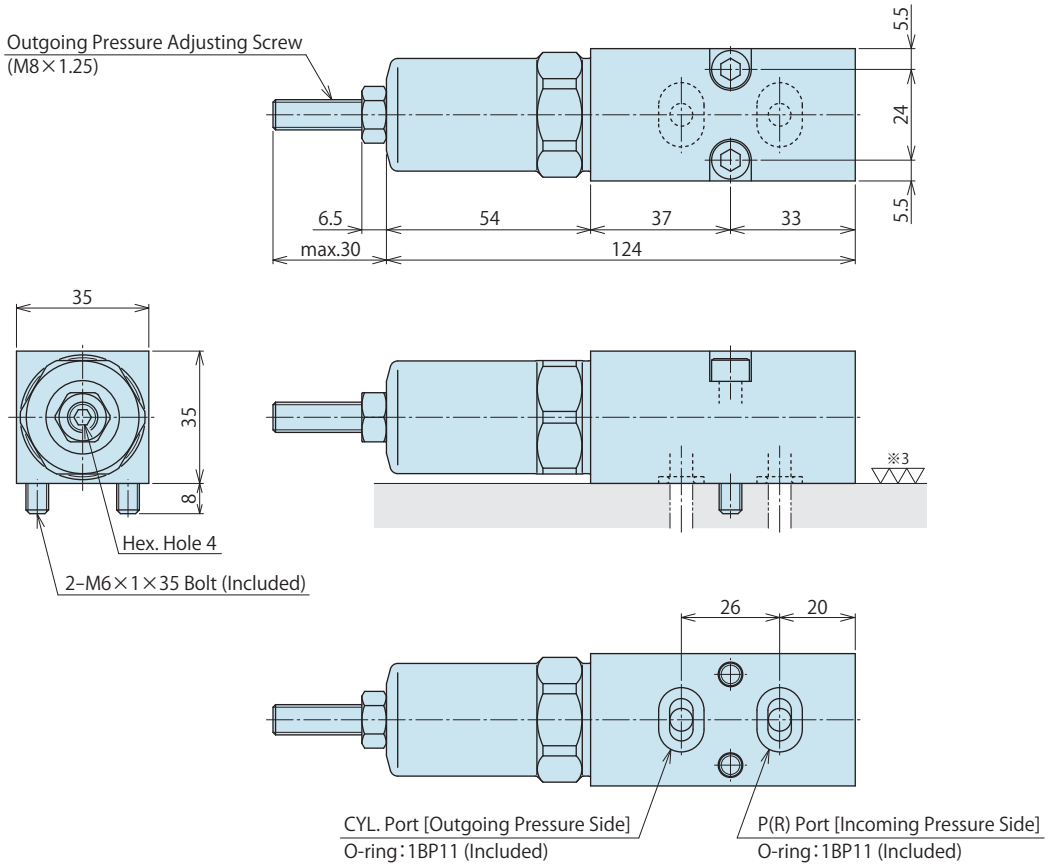
Outgoing：725PSI Incoming：3625PSI Setting → **(725-3625PSI)**

Specifications

Model No.	BMG2030-0G	BMG2050-0G	BMG2070-0G
Incoming Supply Pressure MPa	2.0 ～ 7.0	6.0 ～ 30.0	9.0 ～ 30.0
Outgoing Set Pressure MPa	1.0 ～ 6.0	3.0 ～ 14.0	6.0 ～ 27.0
Allowable Minimum Pressure Difference ※2 MPa	1.0	3.0	3.0
Withstanding Pressure MPa	10.5	37.5	37.5
Min. Passage Area mm^2	23.3		
Operating Temperature ℃	0 ～ 70		
Usable Fluid	General Hydraulic Oil Equivalent to ISO-VG-32		
Mass kg	0.8		

Note ※2. Allowable minimum pressure difference shows the minimum difference between incoming and outgoing pressure.

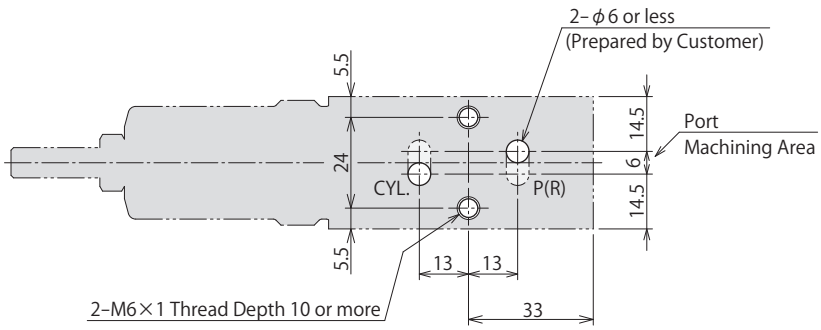
External Dimensions



Note

※3. Roughness of mounting surface (O ring seal surface) should be 6.3S or less.

Mounting Part Machining Drawing



Continuous Discharge Booster

Model **AU**
Model **AU-M**

Continuous discharge booster that has no limitation for the outgoing side circuit capacity

Actuator is made in a compact size by boosting pressure.
High pressure hydraulic power source is not needed by partial boosting pressure.

What is continuous discharge booster?

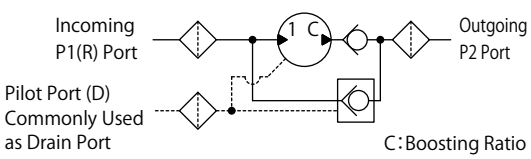
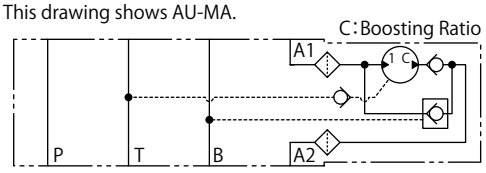
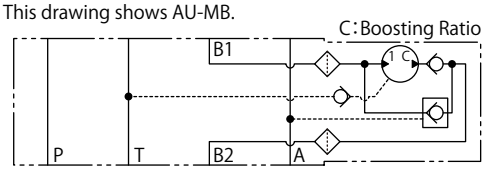
Boost incoming supply pressure by the back and forth action of piston and using bypass to get the boosted pressure to the outgoing side.

There is no limitation in the outgoing side circuit capacity because it continuously discharges the pressure so it is the best for multiple actuator or big circuit volume.

There are modular option and it can be attached to modular valve.

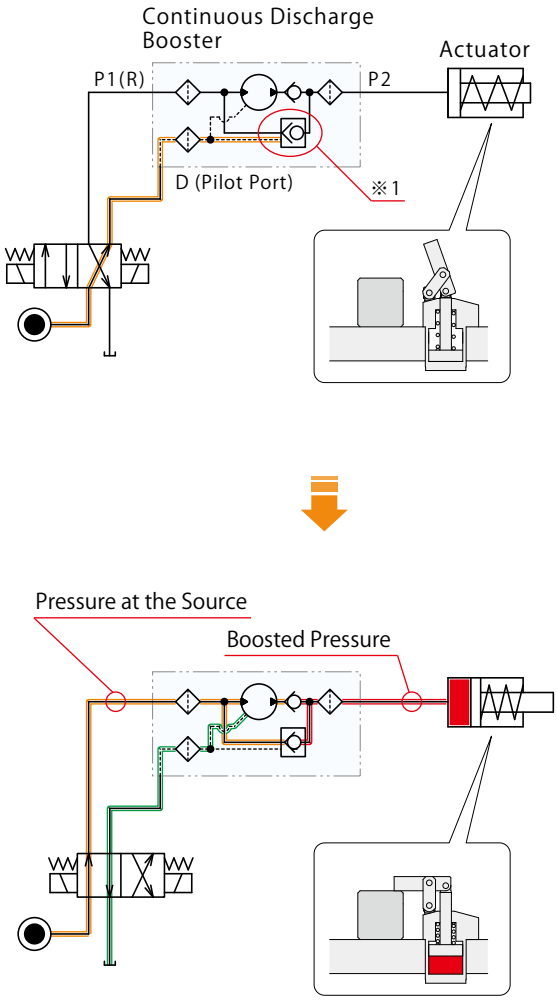
Model **AU** → P.953

Model **AU-M** → P.953

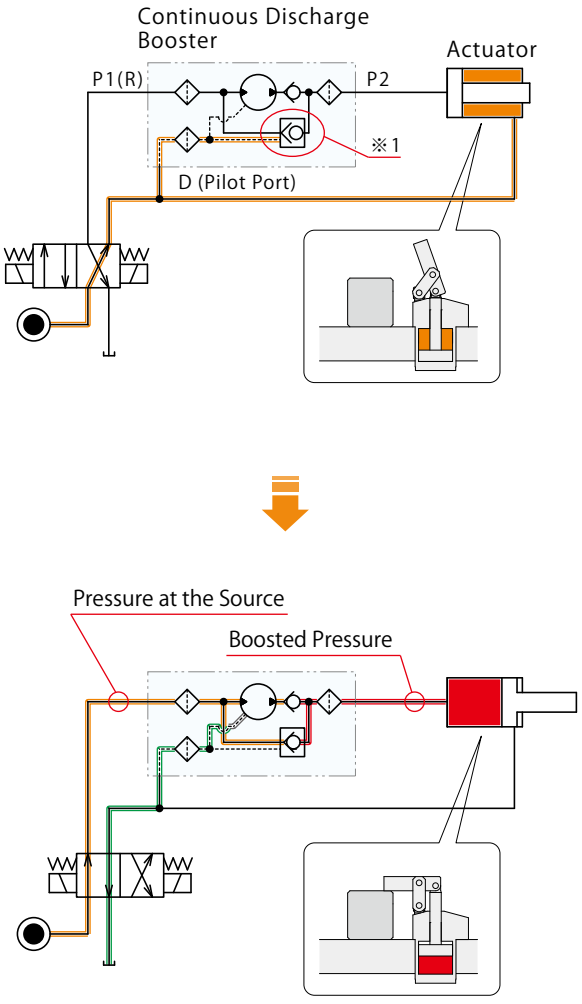
	Piping Option			Modular Option		
Classification						
Incoming Discharge Pressure	3～12.5MPa	2～8.4MPa	2～7MPa	3～12.5MPa	2～8.4MPa	2～5MPa
Outgoing Discharge Pressure	6 ～25MPa	6 ～25MPa	10 ～35MPa	6 ～25MPa	6 ～25MPa	10 ～25MPa
Boosting Ratio	2 times	3 times	5 times	2 times	3 times	5 times
Circuit Symbol				※ This drawing shows AU-MA. 		
	※ Each port has a built-in filter.			※ This drawing shows AU-MB. 		

Action Description

Circuit Example : Single Action Circuit



Circuit Example : Double Action Circuit



Operation Sequence		Remarks
When clamping	Supply hydraulic pressure to continuous discharge booster.	
	Supply oil from outgoing port of continuous discharge booster to actuator.	
	Outgoing side oil is full and the pressure start to rise.	
	Boosting procedure starts inside the continuous discharge booster. Internal piston moves back and forth until the outgoing side pressure is boosted enough and then the pressure rises. Outgoing side circuit capacity has no limitation.	Get the drain connected to tank during boosting.
	Locking action completed.	
	Machining process	
When releasing	Supply hydraulic pressure to pilot port of continuous discharge booster.	
	The pilot valve(※1) opens and lock-side hydraulic pressure goes back to the tank.	The pilot valve(※1) is operated by approximately 10% of outgoing side pressure.
	Actuator operates the release action.	
	Releasing action completed.	

※ This drawing is the explanation of piping option (AU). Please refer to the detail page for modular option (AU-M).

Model No. Indication

AU 2 5 2 1 - 0 ☐

1 2 3 4

1 Outgoing Side Discharge Pressure Code

5 : 6～25MPa

8 : 10～35MPa ※1

※1. It is "8" only for AU2850-0. Modular model: only " 5" can be selected.

2 Boosting Ratio

2 : 2 times

3 : 3 times

5 : 5 times

3 Design No. (Revision Number)

0 : 4 **MA**、**MB** selected

1 : 4 **Blank** selected

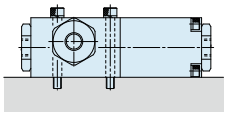
4 Piping Method

Blank : Piping Option (Rc-1/4 Thread)

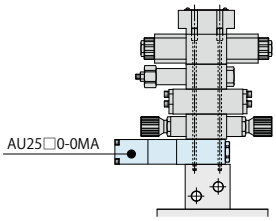
MA : Modular Option (A port is boosted up.)

MB : Modular Option (B port is boosted up.)

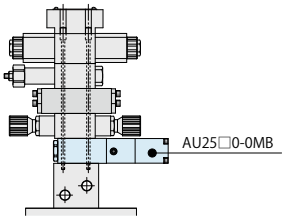
Blank



MA



MB



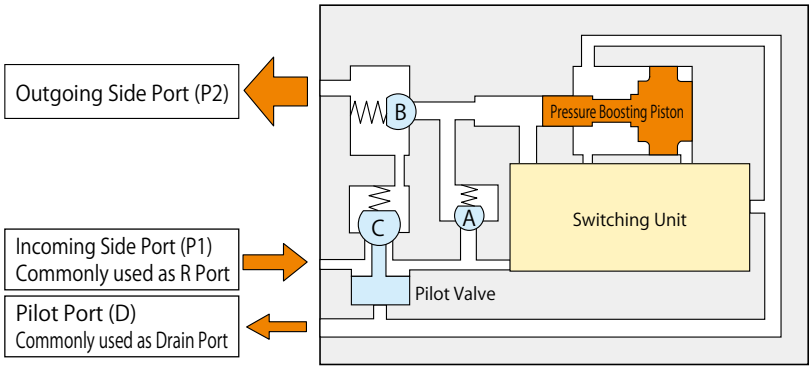
Notes

1. Please see the variation for the circuit drawing.

Specifications

Model No.		AU2521-0	AU2520-0MA AU2520-0MB	AU2531-0	AU2530-0MA AU2530-0MB	AU2851-0	AU2550-0MA AU2550-0MB
Boosting Ratio		2 times		3 times		5 times	
Incoming Supply Pressure	MPa	3.0 ～ 12.5		2.0 ～ 8.4		2.0 ～ 7.0	2.0 ～ 5.0
Outgoing Set Pressure	MPa	6.0 ～ 25.0		6.0 ～ 25.0		10.0 ～ 35.0	10.0 ～ 25.0
Min. Passage Area	mm^2	14.5	12.5	14.5	12.5	14.5	12.5
Incoming Side Supply Rate	L/min	2 ～ 10		2 ～ 10		2 ～ 10	
Pilot Valve Opening Pressure		Approx. 1/6 or more of the outgoing pressure					
Operating Temperature	℃	0 ～ 70					
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32					
Mass	kg	1.1	2.3	1.1	2.3	1.1	2.3

Action Description ※ This is referencing to the model drawing of AU2□□1-0.



Pressure Boosting (Discharge)

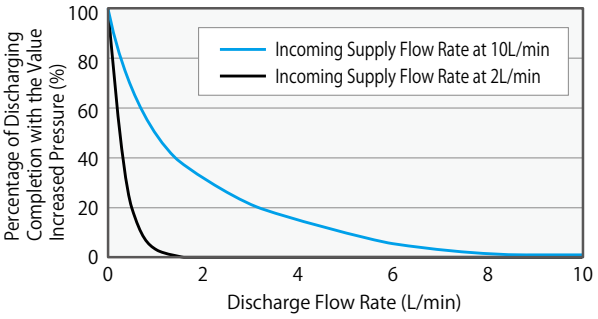
1. Having hydraulic pressure supplied from the incoming side port oil passes through the built-in check valve C (A and B) to flow to the outgoing side port.
2. As the outgoing pressure comes close to the incoming pressure, the check valve C (A and B) is shut to operate the built-in switching unit. The boosting piston boosts the incoming pressure remaining between the check valves A and B.
   The switching unit is operated and the boosting piston boosts the incoming pressure remaining between the check valves A and B.
3. The boosted pressure forces the check valve B to open so that oil having the boosted pressure flows to the outgoing side.
4. When the boosting piston reaches the stroke end, the check valve B is shut to operate the switching unit. So that oil having the incoming pressure flows through the check valve A to push the pressure boosting piston back.
5. When the pressure boosting piston reaches the back end, the check valve A is shut to operate the switching unit again to return to the step 2.
   These steps are repeated to allow the AU to discharge continuously.

Reducing Pressure (Discharge)

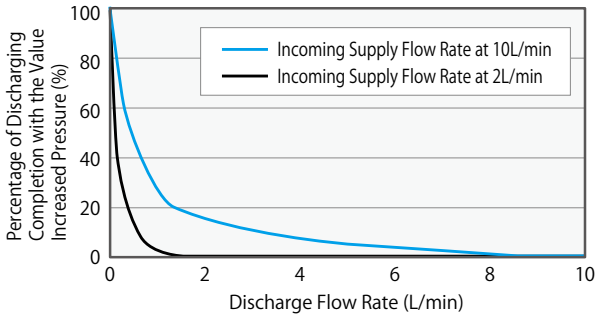
1. The incoming pressure is supplied through the pilot port.
2. The pilot valve opens the check valve C to release the outgoing pressure.
   ※Please refer to the pilot valve opening pressure on specification of the pressure that makes pilot valve activated.

AU Continuous Discharge Booster Flow Characteristic Diagram

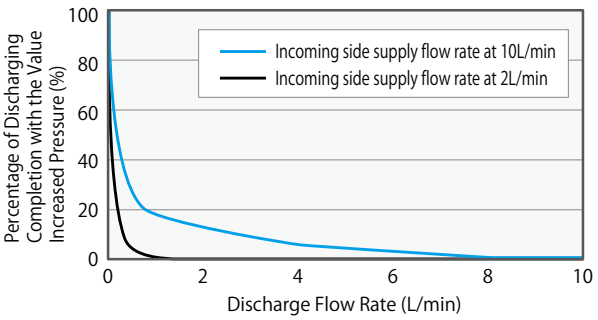
AU2521-0□/AU2520-0M□ Outgoing Discharge Flow Characteristic Diagram



AU2531-0□/AU2530-0M□ Outgoing Discharge Flow Characteristic Diagram



AU2851-0/AU2550-0M□ Outgoing Discharge Flow Characteristic Diagram



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

Air Sequence Valve
BWD

Hydraulic Non-Leak Coupler
BGA/BGB
BGC/BGD
BGP/BGS
BBP/BBS
BNP/BNS
BJP/BJS
BFP/BFS

Auto Coupler
JVA/JVB
JVC/JVD
JVE/JVF
JNA/JNB
JNC/JND
JLP/JLS

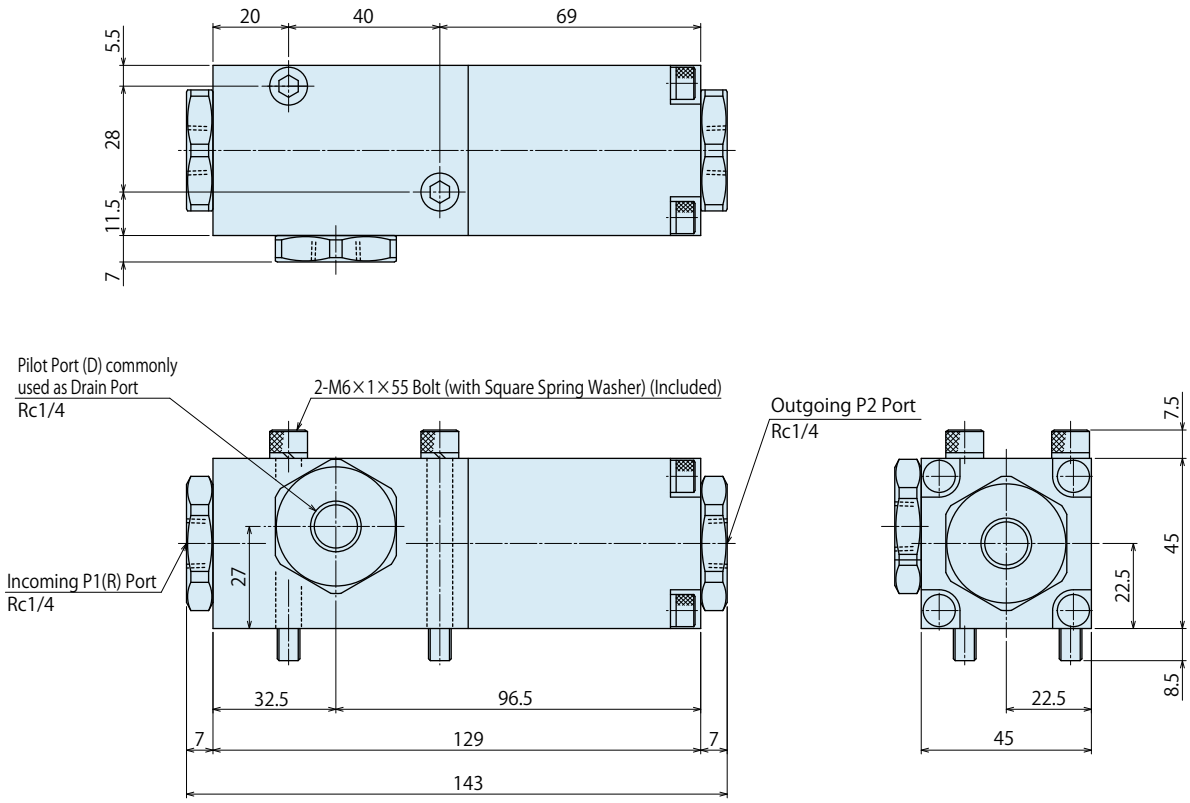
Rotary Joint
JR

Hydraulic Valve
BK
BEQ
BT
BLS/BLG
BLB
JSS/JS
JKA/JKB
BMA/BMG
AU/AU-M
BU
BP/JPB
BX
BEP/BSP
BH
BC

Air Hydraulic Unit
CV
CK
CP/CPB
CPC/CQC
CB
CC
AB/AB-V
AC/AC-V

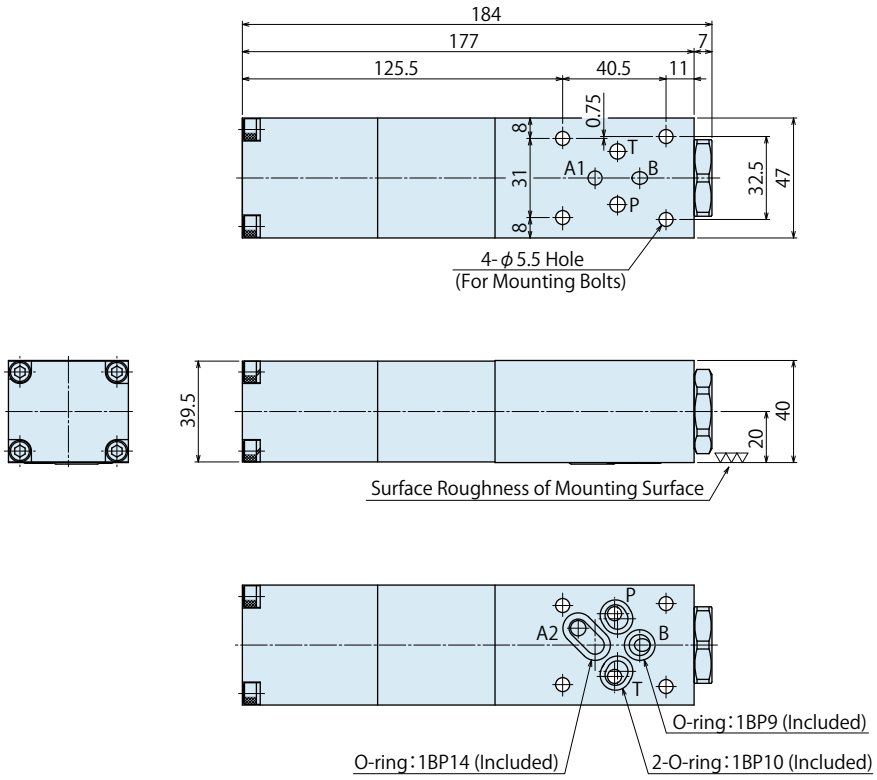
External Dimensions (Piping Option)

AU2521-0 / AU2531-0 / AU2851-0



External Dimensions (Modular Option)

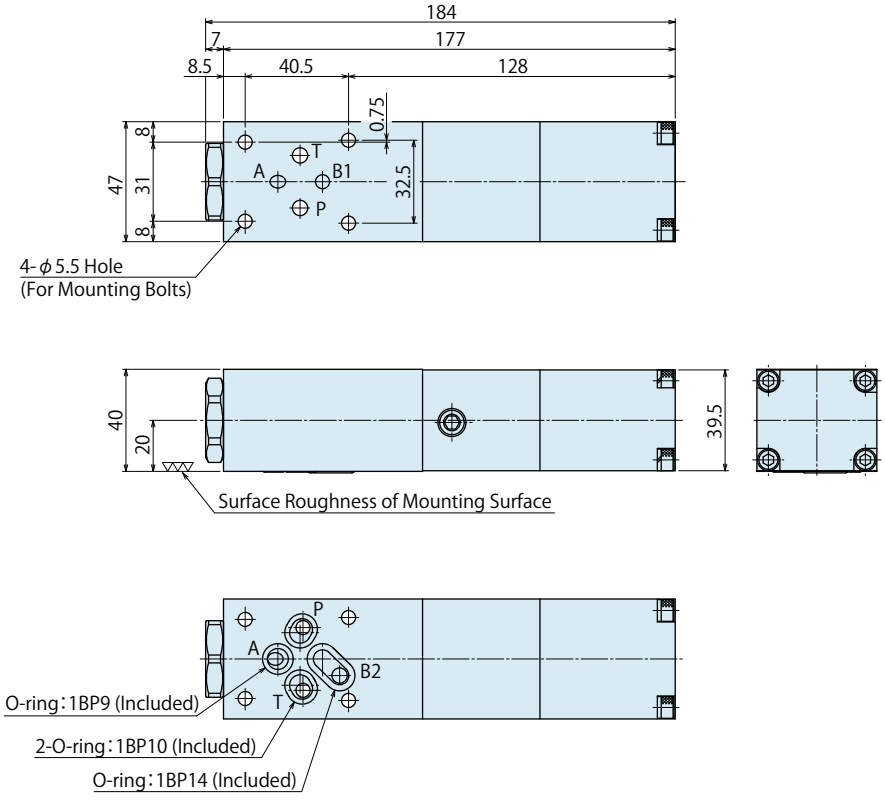
AU2520-0MA / AU2530-0MA / AU2550-0MA



Note

1. Mounting surface dimension is ISO4401-03.

AU2520-0MB / AU2530-0MB / AU2550-0MB



Note

1. Mounting surface dimension is ISO4401-03.

Cautions (AU)

Cautions (Common)

1. The increase of the outgoing load (pressure rising) results in the decrease of the discharge rate (see left diagram).
   Please refer to Flow Characteristic Diagram.
   Please make sure that the timing of stroke becomes longer because discharge flow is reduced due to the larger load during the time when the outgoing side actuator is activated.
2. If there is a leak in the outgoing circuit, normal pressure increase can not be performed.
   Do not connect a general modular solenoid valve to the P2 port because it has internal leakage.
3. Due to the mechanical structure, internal leakage normally occurs between the incoming port (P1) and the pilot port (D).
   - When a balance-stop pump (AA, AB or AC pump manufactured by KOSMEK) is used for hydraulic power supply, the pump may be subjected to continuous operation. Leading to reduction of pump life, because the internal leakage in AU does not allow the pump to balance-stop.
   - When supply pressure lowers or stops temporarily, pressure in the circuit outgoing of P2 port of AU is held by non-leakage function. However, pressure in the circuit incoming of P1 port is not held due to internal leakage between P1 port and D port.
4. Please stop the hydraulic supply prior to disconnection from hydraulic power source with auto coupler etc.
   Please refer to the reference circuit.
5. Depending on incoming supply flow rate, circuit volume on outgoing side etc., surging may occur on incoming supply side. This may result by increasing too much set pressure on outgoing side.
   In that case, please prevent surging by installing accumulator or reducing incoming supply etc.
6. If you set up multiple AU on low pressure hydraulic unit and make the circuit high pressure, the pressure difference is too much and there may be chances of unstable hydraulic supply.

Cautions for Piping Option

1. In a stopped state, the oil pressure supplied to the (P1) the primary port, and to maintain retention performance on the outgoing side of the high pressure port (P2), a filter is placed in each port to hold high pressure at outgoing side port (P2).
   Please flush the system sufficiently.
2. If you tighten mounting bolt too much, it cannot work properly. Please refer to the bottom table for (maximum) tightening torque.

Model No.	Bolt Size	Tightening Torque (N·m)
AU2□□1-0	M6×1	MAX. 10

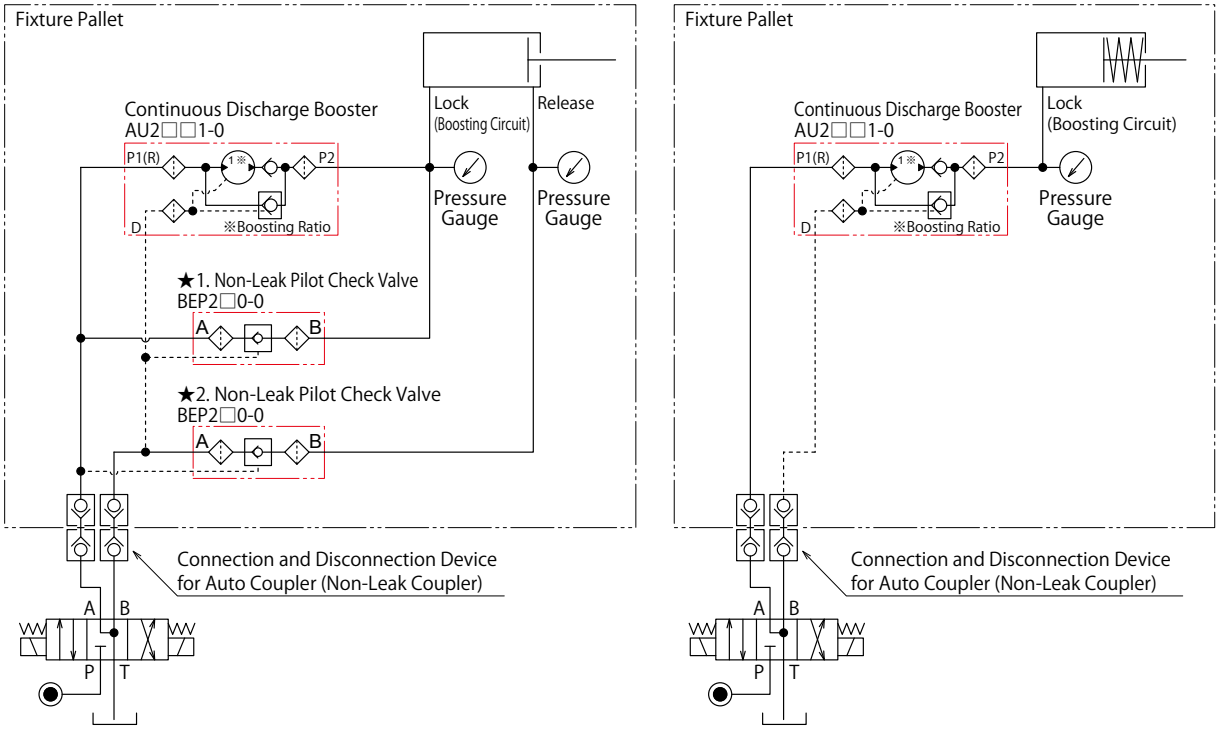
Cautions for Modular Option

1. Please flush carefully to the pipe and fitting even though the filter is placed in the outgoing and incoming of boosting ports (AU25□0-0MA: A1、A2 port、AU2□0-0MB: B1、B2port).
2. In the case that 3 position solenoid valve is used, please select the ABT connection as the port model in the middle position.
3. When switching to a neutral state while the outgoing circuit pressure is held. Depending on solenoid specification (closed centered etc.), pressure being supplied to the P port turns to B or port A by an internal leak. It will release the pressure on the outgoing side.

   Please supply hydraulic pressure to the boosting port(A1 or B1) after the outgoing side actuator has released.
   If supply the hydraulic pressure during release action with hydraulic pressure remained at boosting port, it takes longer to finish boosting pressure.

Circuit Reference

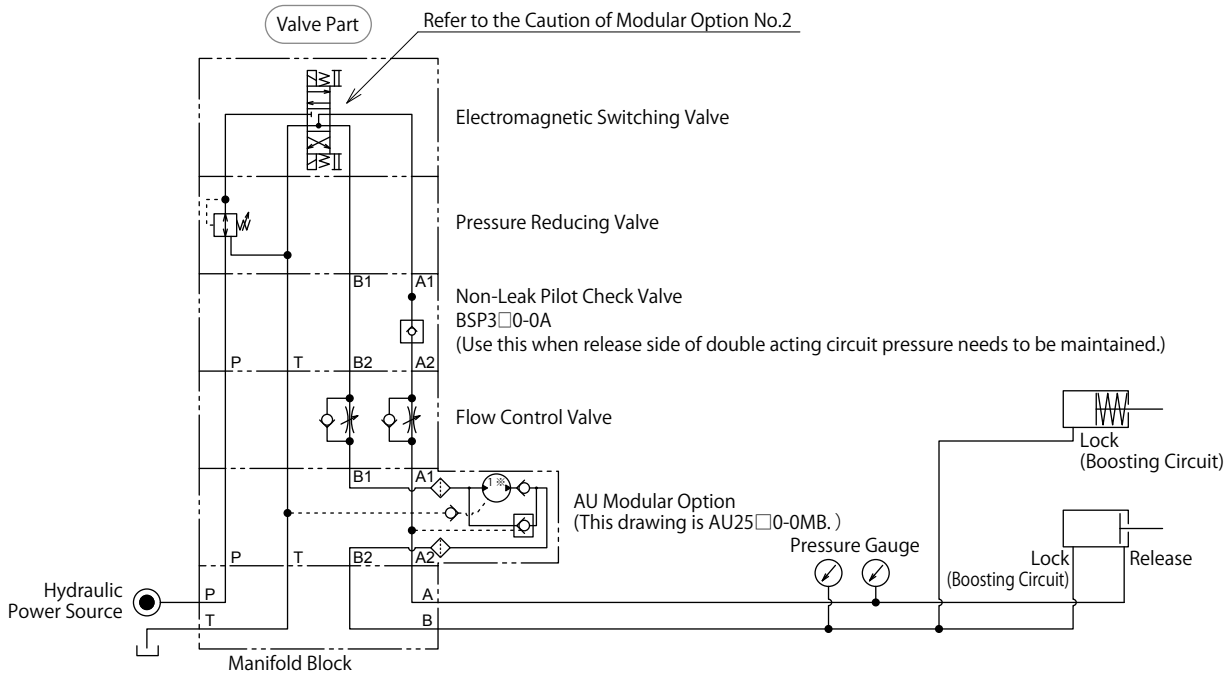
<In the case of separating hydraulic power source from fixture with auto coupler etc.>



Points

1. AU makes it easier to boost pressure. (Release action is operated by low pressure.)
2. Use the 3-position solenoid valve (center position ABT(ABR) connection), stop hydraulic power supply by switching the valve before activation of connect/disconnect device.
   Even in that case, the hydraulic pressure to the outgoing side port (P2) is held by the check valve built in AU.
3. ★1BEP non-leak pilot check valve is AU bypass circuit.
   If the passage area of the AU is small, the requiring operating speed of cylinder can not be obtained, by providing a bypass circuit, the operation speed can be accelerated. The amount of oil passes through both clamp side and unclamp side are enlarged.
4. ★2 BEP non-leak pilot check valve is the reference example for the case when hydraulic pressure needs to be held during release action.
5. Because there is an internal leakage between P1(R) port and D port, it can not be a non-leak circuit when P1(R) port is connected to the actuator which is not boosted.
   Please make separate circuits. Refer to the common caution. No.3

<In the Case of Modular Option in Use>



One Shot Booster

Model **BU**

BU booster valve is placed in line circuit, compact, the best for boosting pressure partially in fixture

It matches our product AB/AC pump (balance stop pump) and is the best for quick change fixture.

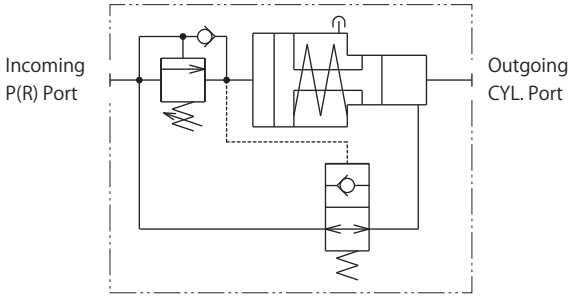
What is one shot booster?

One-shot booster is placed in line circuit type and it is able to boost the hydraulic pressure of the circuit partially with non-leak function.

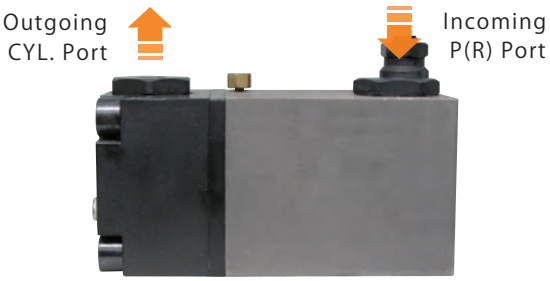
It has larger capacity of outgoing side circuit than general booster due to built-in sequence valve and check valve.
The check valve with non-leak function holds the outgoing side pressure with zero leakage.

It is possible to design simple circuit and it is appropriate for quick change fixture.

Circuit Symbol



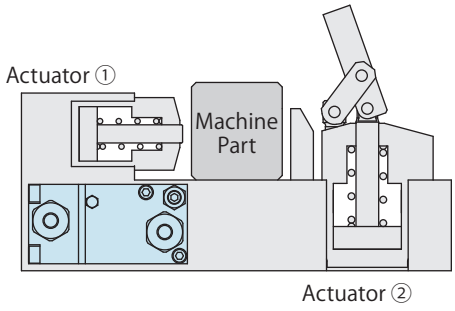
※ Each port has a built-in filter.



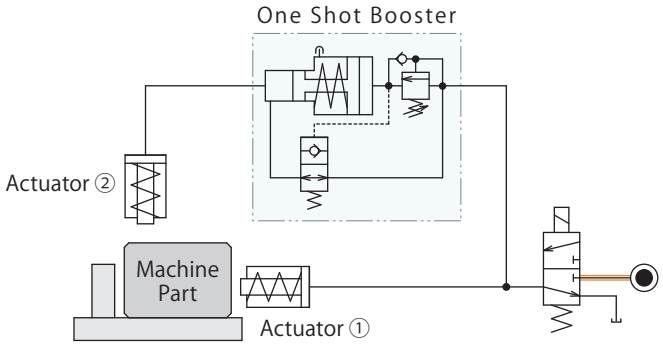
Boosting the pressure just by connecting incoming side and outgoing side.

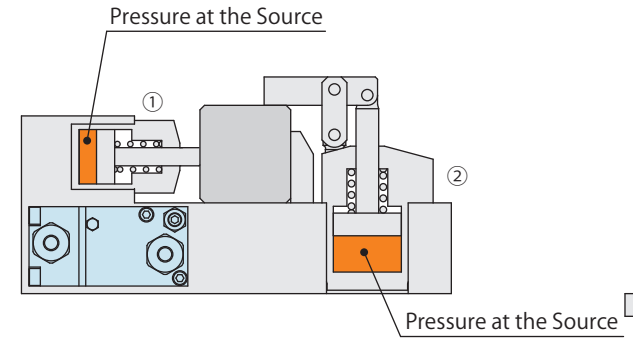
Action Description

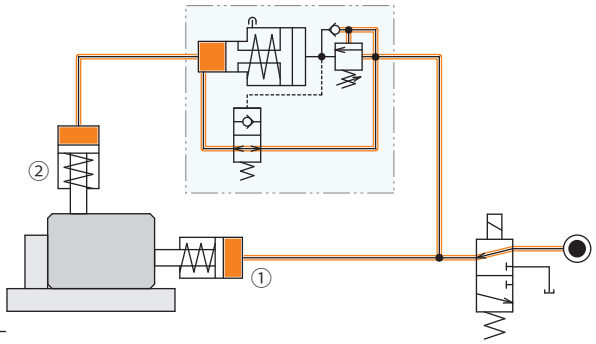
Images

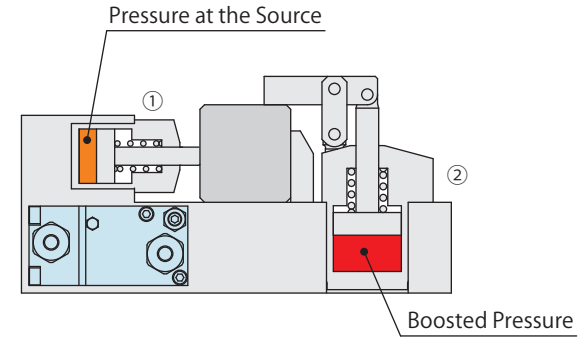


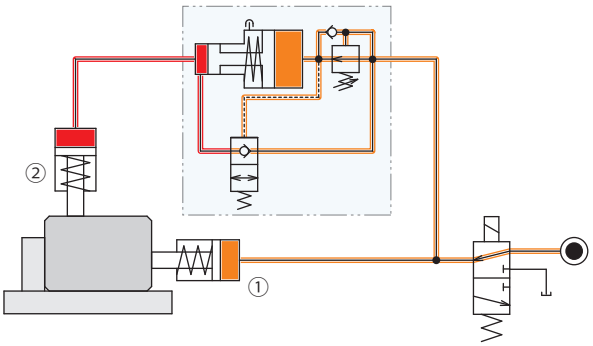
Circuit Example











	Operation Sequence	Remarks
When clamping	Hydraulic pressure is ON.	
	Both actuator ①and ② are activated.	
	When the pressure reaches up to the built-in sequence set pressure, built-in non-leak check valve is closed.	
	Boosting pressure process starts inside the booster and the internal piston is pushed, then the outgoing side pressure is boosted.	The outgoing side circuit capacity is limited because it is one shot model.
	The pressure of actuator ② is boosted.	
	Locking action completed.	
	Machining process	
When releasing	Hydraulic pressure is OFF.	
	The actuators ①,② are released at the same time.	
	Releasing action completed.	

Model No. Indication

BU50 2 0 - 0 (10.5MPa)

1 2 3

1 Boosting Ratio

2: 2.2 times

3: 3.0 times

6: 6.0 times

2 Design No.

0 : Revision Number

3 Incoming Supply Pressure

Please inform us of the incoming supply pressure.
(Please inform us with proper unit symbols.)

Entry Example

Incoming Supply Pressure : 5MPa → **(5.0MPa)**

Incoming Supply Pressure : 700PSI → **(700PSI)**

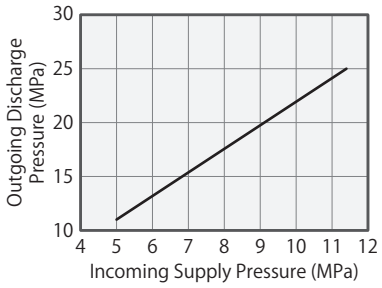
Specifications

Model No.	BU5020-0□	BU5030-0□	BU5060-0□
Boosting Ratio ※1	2.2 times	3 times	6 times
Incoming Supply Pressure MPa	5.0 ～ 11.4	3.0 ～ 8.4	1.5 ～ 4.2
Sequence Set Pressure ※2 MPa	4.0 ～ 9.1	2.3 ～ 6.7	1.1 ～ 3.2
Outgoing Discharge Pressure MPa	11.0 ～ 25.0	9.0 ～ 25.2	9.0 ～ 25.2
Withstanding Pressure MPa	37.5		
Discharge Volume during Boosting Process ※3 cm^3	30	23	12
Min. Passage Area mm^2	14.1		
Operating Temperature ℃	0 ～ 70		
Usable Fluid	General Hydraulic Oil Equivalent to ISO-VG-32		
Mass kg	4.4		

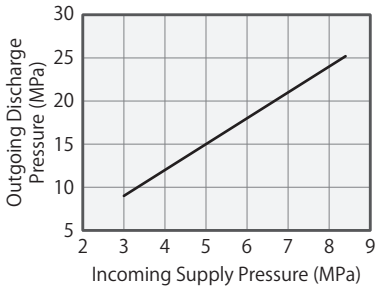
Notes ※1. Boosting ratio is slightly different depending on packing seal resistance and spring force.
※2. Sequence set pressure should be 70 ～ 80% of incoming supply pressure.
※3. Discharge volume during boosting process is the total oil discharge volume during boosting after exceeds sequence set pressure.

Performance Graph

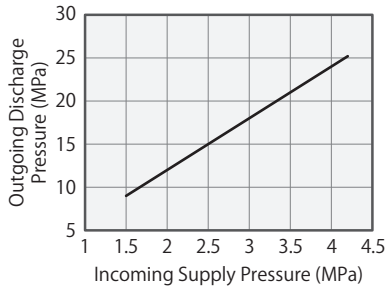
BU5020-0□



BU5030-0□



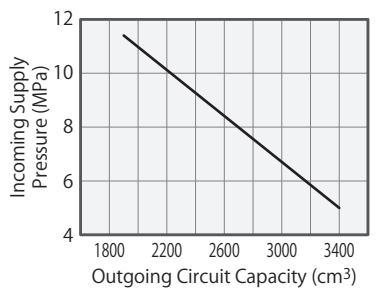
BU5060-0□



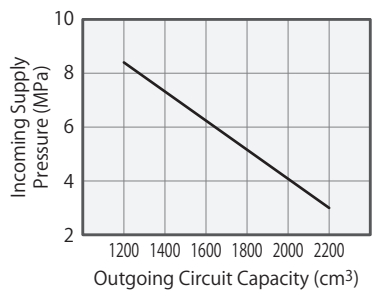
Approximate Volume Possible to Boost

※ Since BU is one shot booster, it has a limitation in the volume of outgoing circuit.

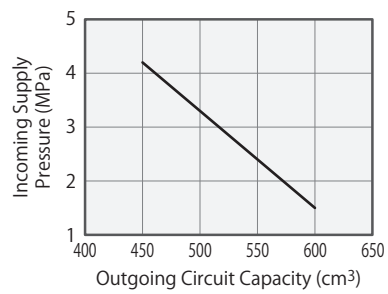
BU5020-0□



BU5030-0□



BU5060-0□

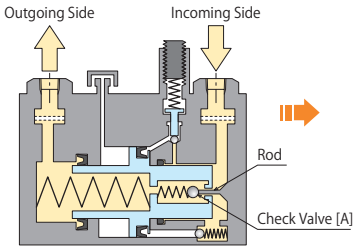


Note 1. Performance graph curve is referencing.
(Referencing condition : All piping material shall be steel. Air in the circuit shall be completely flushed, and work piece and attachment (lever) shall be securely fastened.)

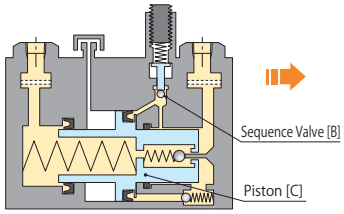
Action Description

When supplied

<Charging Process>

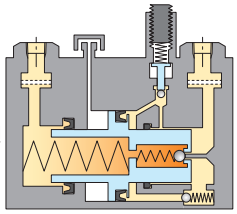


① Check valve [A] is always kept in "Open" position by the rod. Incoming pressure flows to outgoing side through check valve [A], then outgoing side actuators are activated completely.

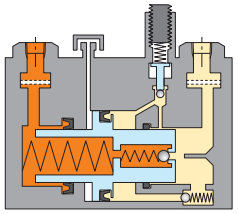


② When the pressure reaches the sequence set pressure, sequence valve [B] opens.
③ The incoming pressure having passed through sequence valve [B] extends piston [C] ahead.

<Boosting Process>

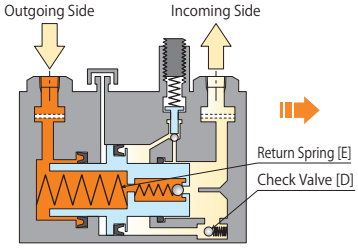


④ When piston [C] extends ahead a little, check valve [A] comes off from the rod, then it closes. Up to this time incoming and outgoing pressure are same pressure.
⑤ When check valve [A] closes, outgoing circuit becomes closed circuit, and pressure is boosted according to area ratio of piston [C].

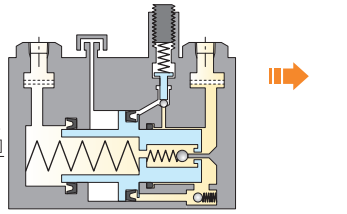


⑥ Piston [C] stops at the time the area and the pressure are balanced.
⑦ Pressure boosting is completed.

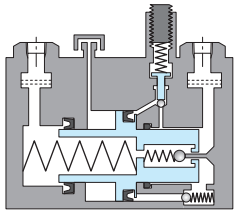
At discharged (Discharging Process)



① When incoming pressure is released, check valve [D] opens. Sequence valve [B] closes almost simultaneously.
② Piston [C] is pushed back by outgoing pressure and return spring [E], and outgoing pressure drops.

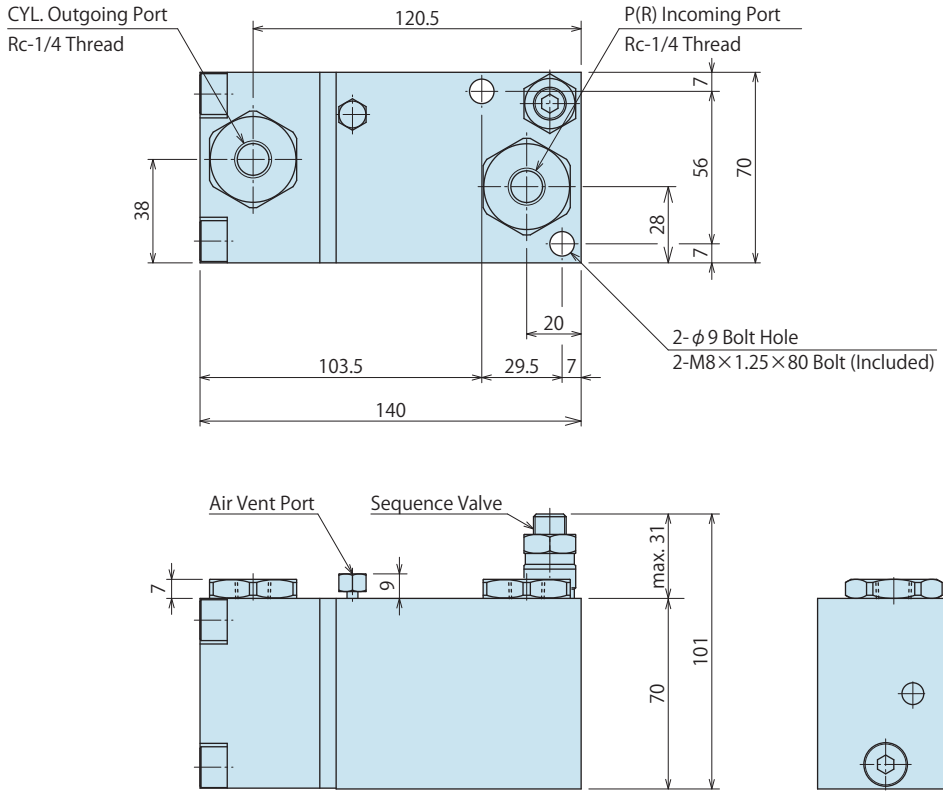


③ Check valve [A] is opened and pushed by the rod at the time just before piston [C] finishing moving back.
Release of the discharge oil from outgoing side actuator is released through the check valve [A].



④ When the outgoing pressure is completely released and the piston [C] fully retracts back, check valve [D] closes.
⑤ Discharge is finished.

External Dimensions



Cautions

1. When supply oil volume to incoming port is large, BU booster may not operate normally.
   Install a flow control valve with check valve just before incoming port or adjust flow rate at hydraulic pressure power source.
2. If a large amount of air is mixed in outgoing circuit may result in boosting failure.
   If it does not work normally, remove air sufficiently from the circuit.
3. If there is a large volume of oil capacity in outgoing circuit may result in boosting failure.
   Please refer to the outgoing side volume shown in the specifications.
4. Using hydraulic hoses in outgoing circuit may result in insufficient boosting because the volume changes during boosting.
   Please use steel pipes as much as possible referring to the discharge rate of boosting process shown in specification.
5. In case of using an accumulator in outgoing circuit may result in boosting failure by the similar reason.
   In case of using an accumulator, please select a proper one referring to the discharge rate of boosting process shown in specification.
6. Install of a pressure gauge is recommended.
   Install a pressure gauge in the outgoing circuit allows to check boosting result easily.
7. Please do not use flow control valves on actuator end in outgoing circuit. Boosting process may be finished before full stroke of actuators, it results in boosting failure.

MEMO

Pilot Reducing Valve Reservoir

Model BP
Model JPB

Reducing internal circuit hydraulic pressure while it is disconnected from pressure power source

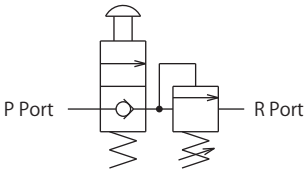
Reduce pressure easily by pilot operation.

What is a pilot reducing valve?

It is possible to reduce internal circuit pressure of disconnected fixture from hydraulic power source by pilot operation.

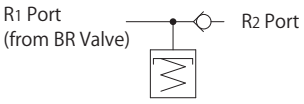
Kosmek reservoir can hold the oil discharged from pilot reducing valve temporarily.
The reservoir also has a non-leak check valve in it.

Circuit Symbol: Pilot Reducing Valve (BP)

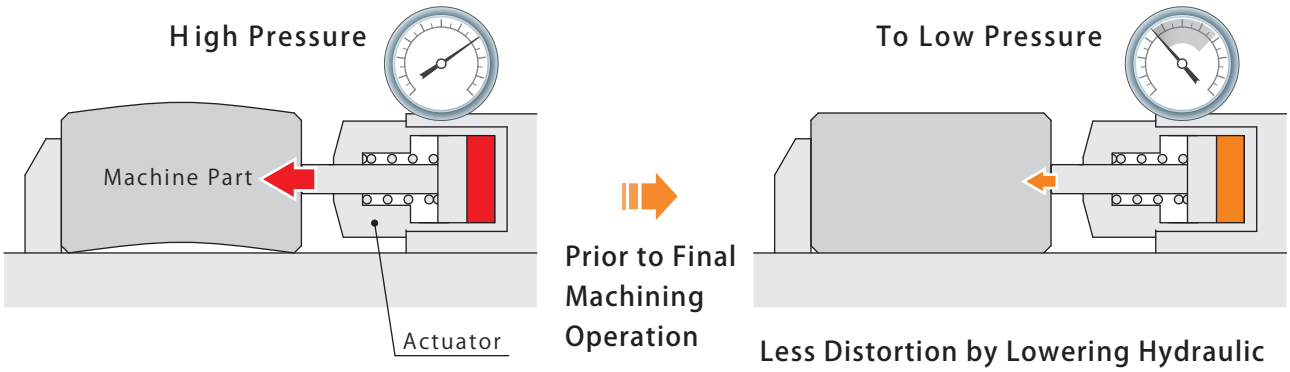


※ A filter is built in P port.
Since a filter is not built in the R port, please sufficiently perform flushing of piping and fitting to prevent foreign substances such as cutting chips from entering the circuit.

Circuit Symbol: Reservoir (JPB)



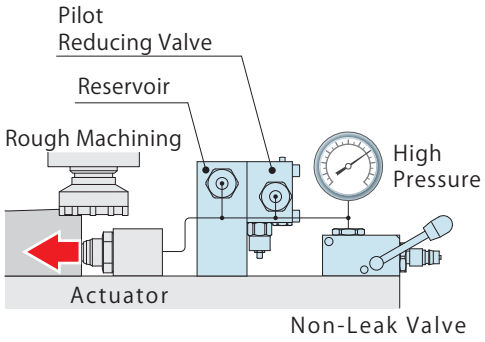
※ A filter is built in R2 port.
Since a filter is not built in the R1 port, please sufficiently perform flushing of piping and fitting to prevent foreign substances such as cutting chips from entering the circuit.

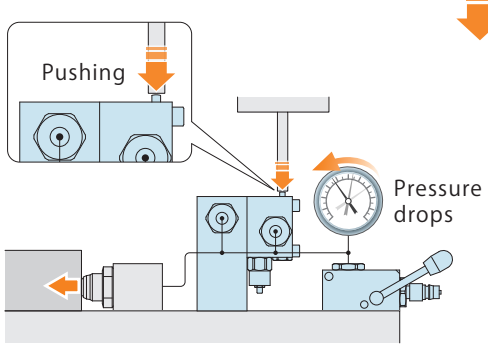


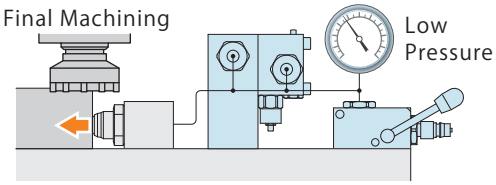
Less Distortion by Lowering Hydraulic Pressure (Lowering Clamping Force)

Action Description

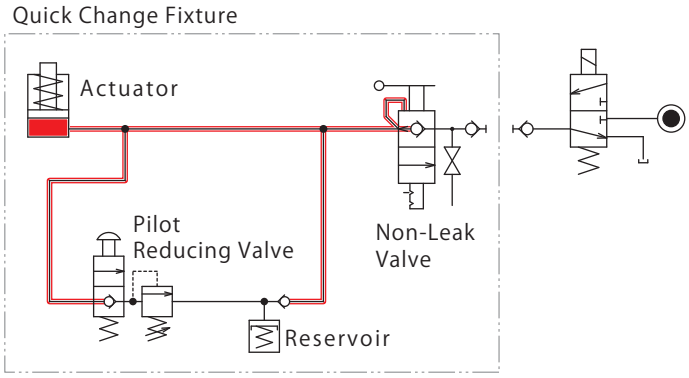
Images

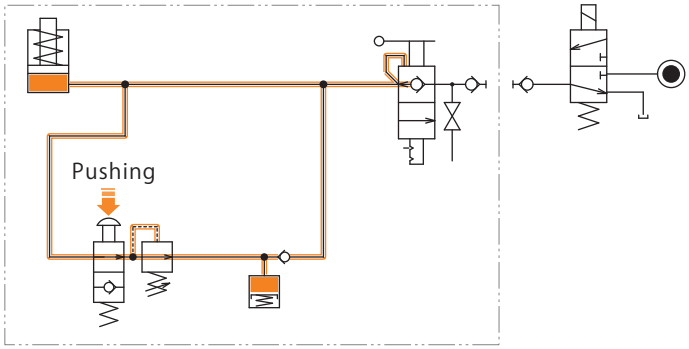


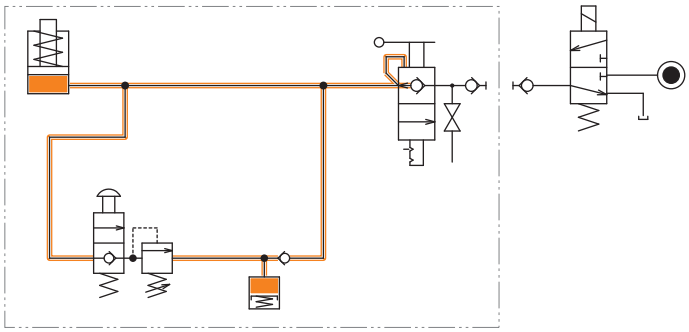




Circuit Example







Operation Sequence		Note
	Disconnection is completed when it is locked.	
	Rough machining (Large thrust machining).	
When pressure is reduced	When the push button of pilot reducing valve is pushed by main spindle or manually, the circuit is connected to the reservoir and reduces the pressure to the relief set pressure.	Lowering clamping force prior to final machining operation, it allows to prevent or minimize distortion of workpiece.
	Release the push button.	
	Start the final machining operation.	
When releasing	When the hydraulic power source is OFF, connect the fixture and then release the non-leak valve.	
	When the circuit pressure becomes lower than the pressure held in reservoir tank, check valve opens and hydraulic oil returns to tank.	

Model No. Indication

BP 203 0 - 0 G (2.5MPa)

1 2 3 4

1 Pressure Code

203 : Operating Pressure 2.0～7.0MPa
Relief Pressure 1.5～5.0MPa

507 : Operating Pressure 7.0～30.0MPa
Relief Pressure 5.0～15.0MPa

2 Design No.

0 : Revision Number

3 Piping Method

Blank : Piping Option (Rc-1/4 Thread)

G : Gasket Option

4 Set Pressure (Relief Set Pressure)

Please let us know the relief set pressure.
(Please inform us with proper unit symbols.)

Entry Example

Relief Pressure: 4MPa → **(4.0MPa)**

Relief Pressure: 1200PSI → **(1200PSI)**

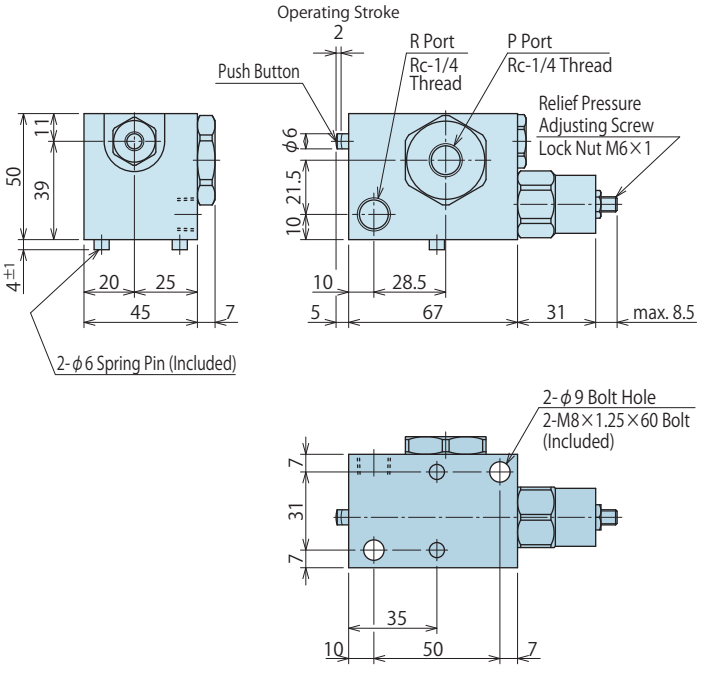
Specifications

Model No.		BP2030-0□□	BP5070-0□□
Operating Pressure※1	MPa	2.0 ～ 7.0	7.0 ～ 30.0
Relief Pressure※2	MPa	1.5 ～ 5.0	5.0 ～ 15.0
Withstanding Pressure	MPa	10.5	37.5
Pilot Operating Force※3	kN	0.06 ～ 0.22	0.22 ～ 1.00
Min. Passage Area	mm2	9.1	
Operating Temperature	℃	0 ～ 70	
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32	
Mass	kg	1.4	

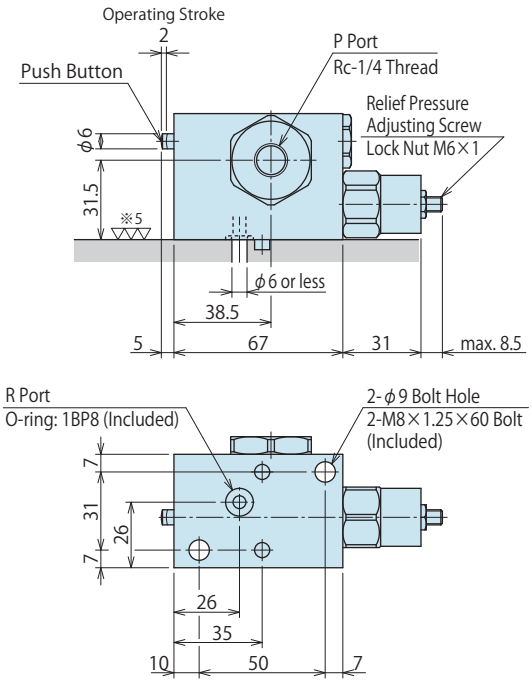
Notes ※1. Operating pressure shows initial operating pressure.
※2. Relief pressure shows the relief set pressure after operating pilot.
※3. Set the pilot operating force at more than minimum operating force (=More than operating pressure ×0.032) and less than 1.5kN.

External Dimensions

BP□0-0□ : Piping Option



BP□0-0G□ : Gasket Option ※4



Notes ※4. The dimension that hasn't been mentioned on BP□0-0G□ (gasket option) area, please refer to BP□0-0□ (piping option). They are the same.
※5. Roughness of mounting surface (O-ring seal surface) should be 6.3S or better.

Model No. Indication

JPB 5 4 0 - 0 P
1 2 3 4

1 Pressure Code

2 : Operating Pressure Range 2.0～ 7.0MPa

5 : Operating Pressure Range 5.0～ 30.0MPa

2 Tank Capacity

4 : 40cm³

6 : 60cm³

3 Design No.

0 : Revision Number

4 Piping Method

P : BP Stack Option

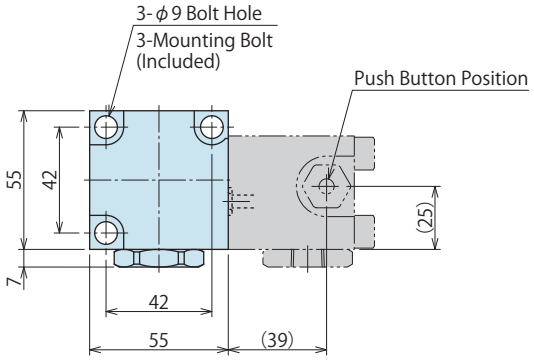
S : Piping Option (BSPT (Rc-Thread))

Specifications

Model No.		JPB240-0□	JPB260-0□	JPB540-0□	JPB560-0□
Operating Pressure Range※7	MPa	2.0 ～ 7.0		5.0 ～ 30.0	
Withstanding Pressure※7	MPa	10.5		37.5	
Tank Capacity※6	cm³	40.0	60.0	40.0	60.0
Circuit Capacity※6	cm³	800 or less	800 ～ 1200	800 or less	800 ～ 1200
Operating Temperature	℃	0 ～ 70			
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32			
Mass	kg	2.1	2.2	2.1	2.2

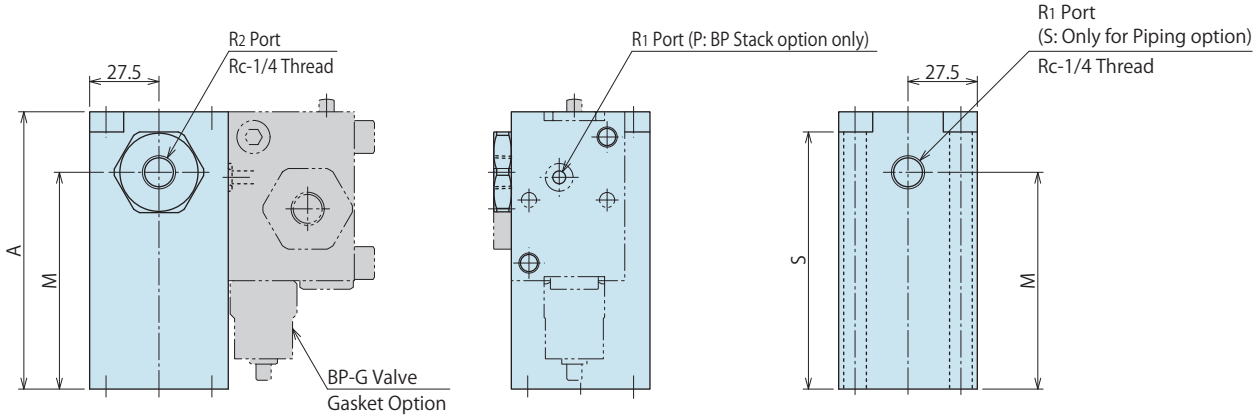
Notes ※6. Select the tank capacity based on the circuit capacity to be used.
※7. Operating pressure and design pressure are the pressure which is connected to R2 port. Please refer to circuit symbol.

External Dimensions



(mm)

Model No.	JPB□40-0□	JPB□60-0□
A	110	126
M	86	102
S	102	118
Mounting Bolt	M8×1.25×115	M8×1.25×130



Automatic Air Bleed Valve

Model **BX**

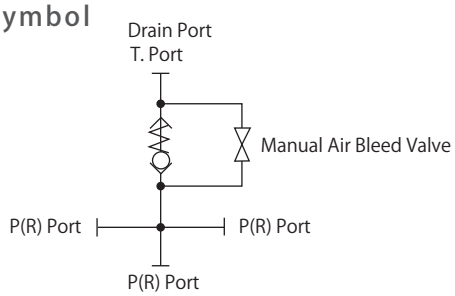
Drains air out automatically in the hydraulic circuit

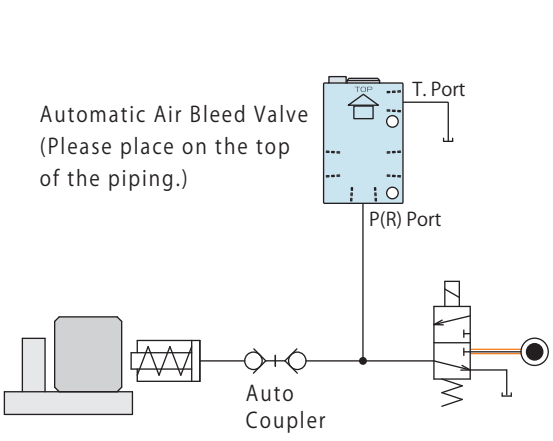
With manual air bleed valve.

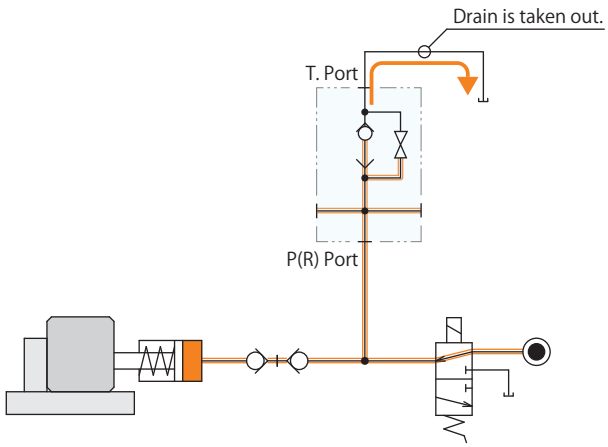
What is an automatic air bleed valve?

Placed on the top of the piping, this valve bleeds air automatically during repetition of the hydraulic pressure ON & OFF.

Circuit Symbol







Operation Sequence	Note
Hydraulic pressure is OFF	
Hydraulic pressure is ON	
The air and oil is drained out from drain port of auto air bleed valve.	Drains air or oil out each time of hydraulic pressure is switched. (Please refer to the specification for the drain volume.)
The check valve of auto air bleed valve is closed and drain-out is stopped.	There is no oil leakage from check valve after drain-out.

Model No. Indication

BX 001 0 - 0 2

- Port Size
  - **2** : Rc-1/4 Thread
  - **3** : Rc-3/8 Thread
- Design No. (Revision Number)

Specifications

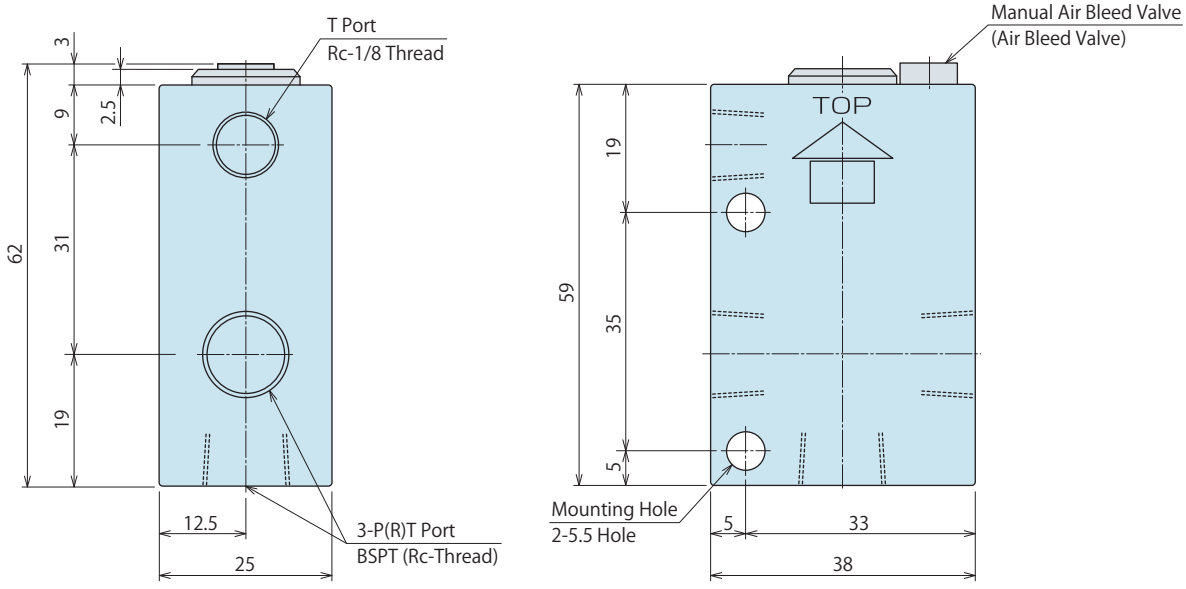
Model No.		BX0010-02	BX0010-03
Max. Operating Pressure	MPa	25	
Cracking Pressure	MPa	0.04	
Withstanding Pressure	MPa	37.5	
Operating Temperature	℃	0 ～ 70	
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32	
Drain Volume ※1	Air only	10cm³ / Action	
	Oil only	0.6cm³ / Action	
Minimum Oil Flow Rate		50cm³/min.	
Mounting Position		Vertical Upward (See Outline Drawing)	
Mass	kg	0.4	
3-P(R) Port		Rc-1/4 Thread	Rc-3/8 Thread

Notes

※1. It shows the drain volume returning from valve to tank at the moment when the circuit pressure switches from zero to normal operating pressure.

1. Please placed on the top of the piping in the hydraulic circuit.
2. Air and oil are exhausted from T-port. Please make sure to connect drain piping to tank.
3. Please make sure to mount this as shown in the drawing. In case of an incorrect position, air cannot be bled out.

External Dimensions



Non-Leak Pilot Check Valve

Model BEP
Model BSP

Pressure is held even if pressure supply from the hydraulic power source is stopped

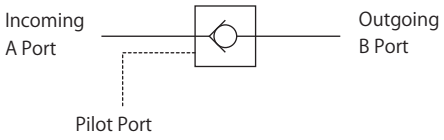
It holds the pressure until hydraulic pressure is supplied to pilot port.

What is a non-leak pilot check valve?

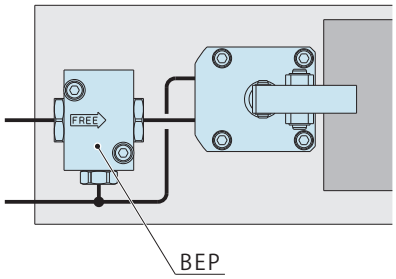
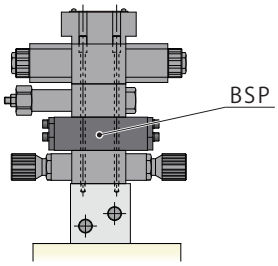
Even if pressure supply from the hydraulic power source is stopped, the outgoing side pressure is held until the pressure is supplied to pilot port.

Even if the hydraulic power source is cut off due to energy saving (Stop hydraulic supply to incoming side) or blackout etc., it holds the pressure and prevents the work piece drop off.

Circuit Symbol (BEP)

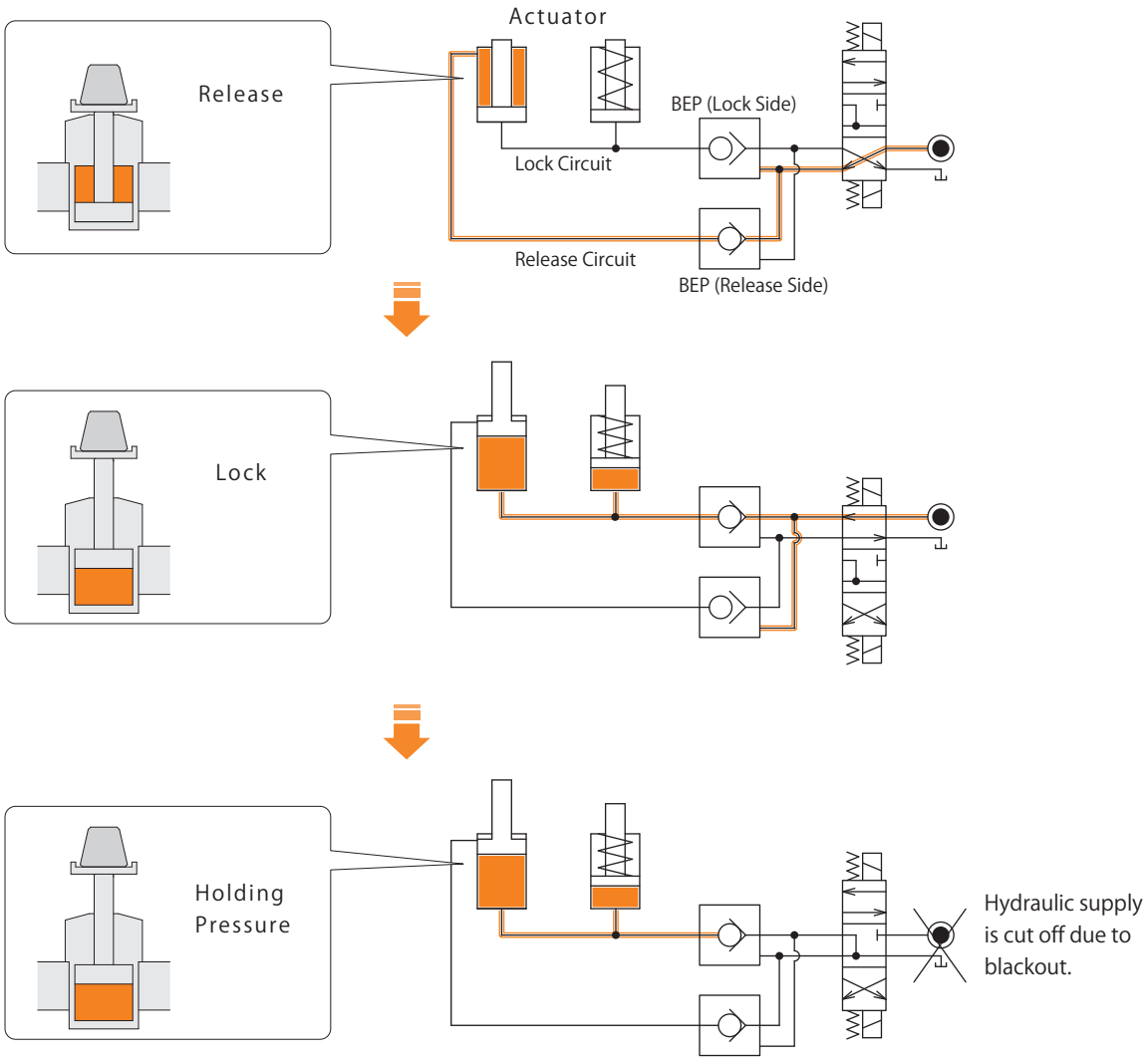


※ This drawing shows BEP. (Please refer to the BSP page for the BSP circuit symbol.)
A filter is built in each A port and B port.
Since a filter is not built in the pilot port, please sufficiently perform flushing of piping and fitting to prevent foreign substances such as cutting chips from entering the circuit.

	 Model BEP → P.973	 Model BSP → P.975
Classification	Piping Model	Modular Model
Operating Pressure Range	1.0～7.0MPa / 7.0～30.0MPa	2.5～7.0MPa / 7.0～25.0MPa
Application Examples		

Action Description

Circuit Example ※2 of non-leak pilot check valves model BEP are used in this drawing.



Operation Sequence		Remarks
When clamping	Lock hydraulic pressure is ON. (Release hydraulic pressure is OFF.)	
	BEP pilot check valve (release side) opens and releases. The circuit pressure returns to tank.	
	Actuator locks by supplying hydraulic pressure to locking side.	
	(Holding lock pressure even after hydraulic power source is OFF.)	
	machining process	
When releasing	Release side hydraulic pressure is ON. (Locking side pressure is OFF.)	
	BEP pilot check valve (locking side) opens and the hydraulic oil in locking side circuit returns to tank.	
	Actuator releases by supplying the hydraulic pressure to release side.	
	(It holds releasing pressure even if hydraulic power source is OFF.)	
In case of an emergency	Hydraulic power source is OFF due to a blackout.	
	The actuator will remain in the same state as it was before blackout by non-leak pilot check valve.	

Model No. Indication

BEP2 2 0 - 0

1 2

1 Pressure Code

2 : Operating Pressure Range 1.0～7.0MPa

5 : Operating Pressure Range 7.0～30.0MPa

2 Design No.

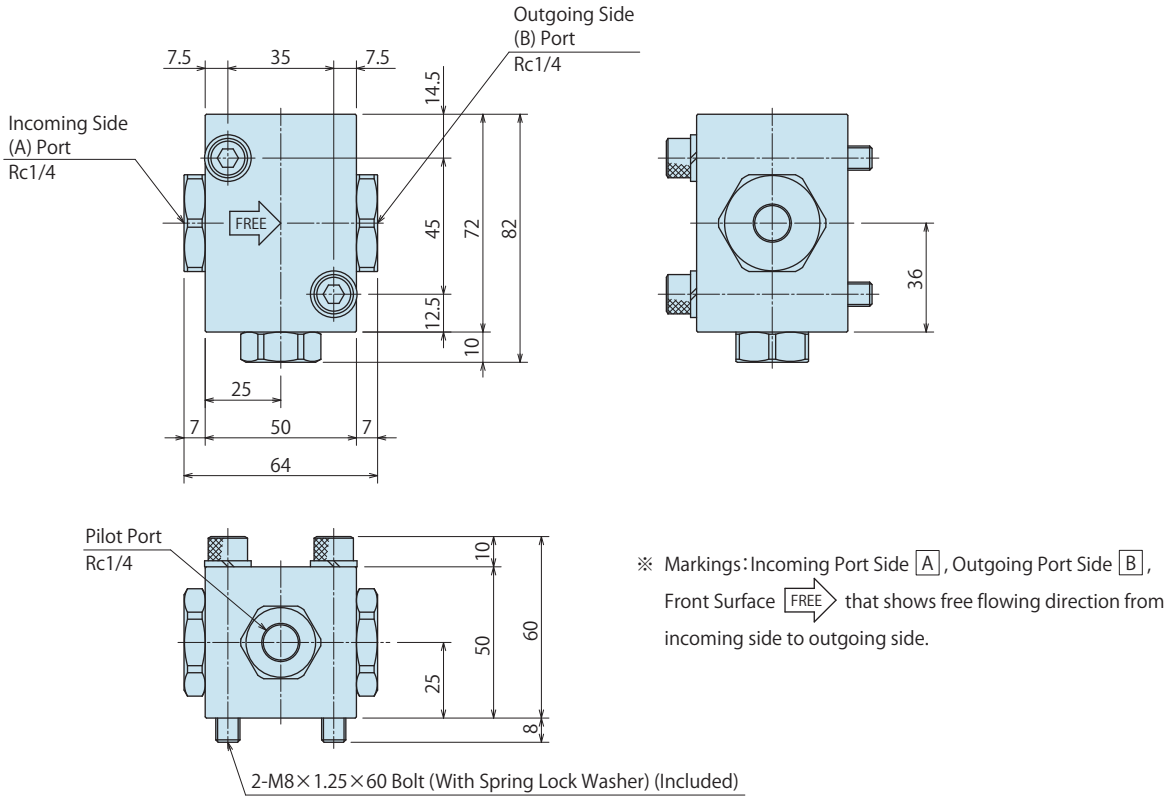
0 : Revision Number

Specifications

Model No.		BEP220-0	BEP250-0
Operating Pressure Range	MPa	1.0 ～ 7.0	7.0 ～ 30.0
Withstanding Pressure	MPa	10.5	37.5
Cracking Pressure	MPa	0.24	
Min. Passage Area	mm²	28.3	
Operating Temperature	℃	0 ～ 70	
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32	
Pilot Hydraulic Pressure	Operating Pressure at 25MPa	-	6.8MPa or more
	Operating Pressure at 14MPa	-	3.8MPa or more
	Operating Pressure at 7MPa	2.0MPa or more	-
Mass	kg	1.4	1.4

External Dimensions

BEP220-0 / BEP250-0



※ Markings : Incoming Port Side [A], Outgoing Port Side [B], Front Surface [FREE] that shows free flowing direction from incoming side to outgoing side.

Cautions (BEP)

1. Don't place any devices that occurs oil leakage between outgoing side (B) port and actuators.
2. Non-leak function doesn't work properly if there is an oil leakage inside actuators.
3. Connecting the hydraulic source to outgoing (B) port and controlling hydraulic supply of A port with pilot port will lead to sealing malfunction. We offer other compatible products. Please contact us.

Model No. Indication

BSP3 5 0 - 0 W 6R (8.0MPa)

1 2 3 4 5

1 Pressure Code

2 : Operating Pressure Range 2.5～7.0MPa

5 : Operating Pressure Range 7.0～25.0MPa
(Please refer to the specification for pressure compensating valve.)

2 Design No.

0 : Revision Number

3 Circuit Symbol

A : A Port Check

W : A/B Port Check

4 Pressure Compensating Valve / Relief Set Pressure Range

Blank : Without Pressure Compensating Valve

4R : With Pressure Compensating Valve, Relief Set Pressure Range 3.5～8.0 $^{+1.5}_{0}$ MPa

6R : With Pressure Compensating Valve, Relief Set Pressure Range 8.5～17.0 $^{+2}_{0}$ MPa

7R : With Pressure Compensating Valve, Relief Set Pressure Range 17.5～27.0 $^{+2.5}_{0}$ MPa

5 Operating Pressure (Only with Pressure Compensating Valve)

Please inform us of operating pressure (Supply pressure to P-port).
(Please inform us with proper unit symbols.)

※Please refer to the specification for relief set pressure.

Entry Example

Blank : Without Pressure Compensating Valve

With Pressure Compensating Valve, Operating Pressure (P Port Supply Pressure) : 4MPa → **(4.0MPa)**

With Pressure Compensating Valve, Operating Pressure (P Port Supply Pressure) : 1200PSI → **(1200PSI)**

Specifications

Without Pressure Compensating Valve

Model No.		BSP320-0A	BSP350-0A	BSP320-0W	BSP350-0W
Operating Pressure Range	MPa	2.5 ～ 7.0	7.0 ～ 25.0	2.5 ～ 7.0	7.0 ～ 25.0
Cracking Pressure	MPa	0.05			
Pilot Hydraulic Pressure	MPa	More than one third of A2 port holding pressure		More than one third of A2 (B2) port holding pressure	
Min. Passage Area	mm^2	24			
Operating Temperature	℃	0 ～ 70			
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32			
Mass	kg	1.1	1.1	1.5	1.5

With Pressure Compensating Valve

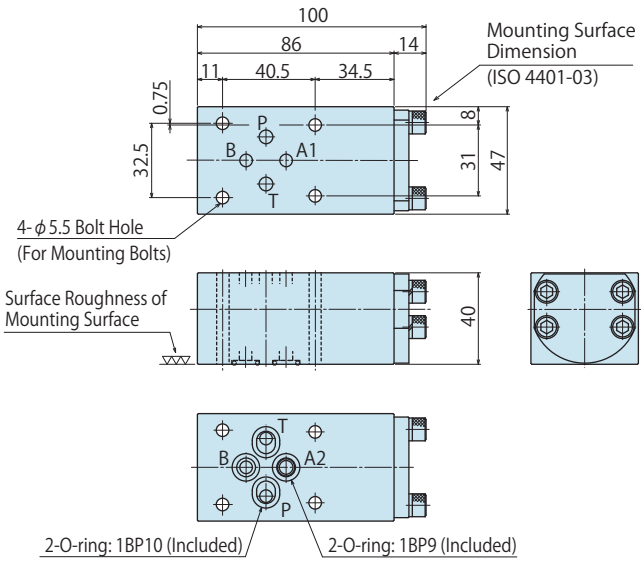
Model No.		BSP320-0A4R□	BSP350-0A6R□	BSP350-0A7R□	BSP320-0W4R□	BSP350-0W6R□	BSP350-0W7R□
Operating Pressure Range	MPa	2.5 ～ 7.0	7.0 ～ 15.5	15.5 ～ 25.0	2.5 ～ 7.0	7.0 ～ 15.5	15.5 ～ 25.0
Relief Set Pressure Range	MPa	3.5 ～ 8.0 $^{+1.5}_{0}$	8.5 ～ 17.0 $^{+2}_{0}$	17.5 ～ 27.0 $^{+2.5}_{0}$	3.5 ～ 8.0 $^{+1.5}_{0}$	8.5 ～ 17.0 $^{+2}_{0}$	17.5 ～ 27.0 $^{+2.5}_{0}$
Relief Set Pressure	MPa	Operating Pressure + 1 $^{+1.5}_{0}$	Operating Pressure + 1.5 $^{+2}_{0}$	Operating Pressure + 2 $^{+2.5}_{0}$	Operating Pressure + 1 $^{+1.5}_{0}$	Operating Pressure + 1.5 $^{+2}_{0}$	Operating Pressure + 2 $^{+2.5}_{0}$
Cracking Pressure	MPa	0.05					
Pilot Hydraulic Pressure	MPa	More than one third of A2 port holding pressure			More than one third of A2 (B2) port holding pressure		
Min. Passage Area	mm^2	24					
Operating Temperature	℃	0 ～ 70					
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32					
Mass	kg	1.1	1.1	1.1	1.5	1.5	1.5

Cautions (BSP)

1. Please take consider of pressure drop caused by hydraulic temperature drop in the use of holding the hydraulic pressure of A2(B2) port while stop the hydraulic supply to A1(B1) port.
2. This pressure relief valve is used for relieving the amount of hydraulic pressure by which of volume increases because of hydraulic temperature rise. This product can not be used for relieving the supply pressure that is out of relief set pressure range.
3. Note for with pressure compensating valve : When it has back-pressure at T port, there is a possibility that it is not able to do relief action normally. Please contact us.

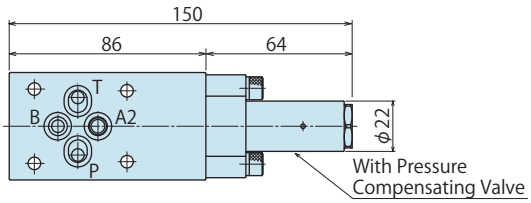
External Dimensions

BSP3□0-0A

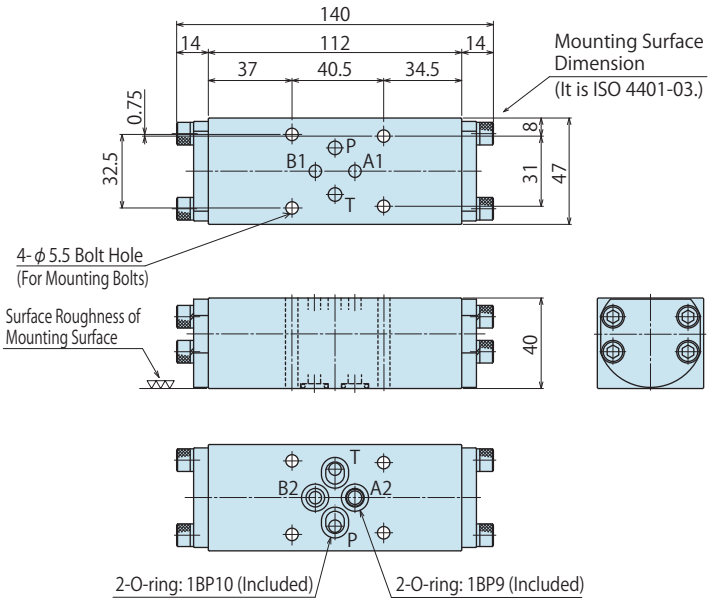


BSP320-0A4R□ / BSP350-0A6R□ / BSP350-0A7R□

※Please refer to BSP3□0-0A for any dimensions that has not been mentioned.

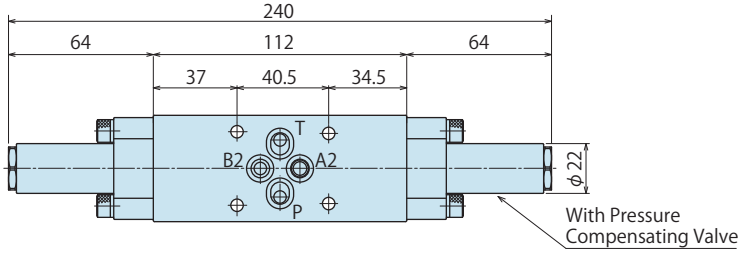


BSP3□0-0W

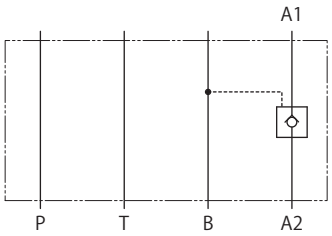


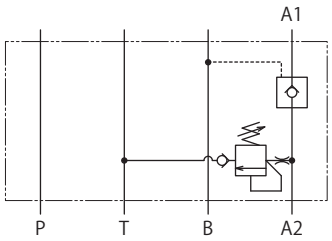
BSP320-0W4R□ / BSP350-0W6R□ / BSP350-0W7R□

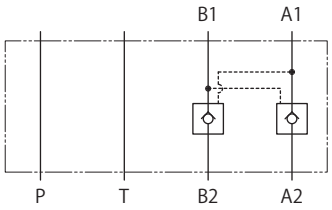
※Please refer to BSP3□0-0W for any dimensions that has not been mentioned.

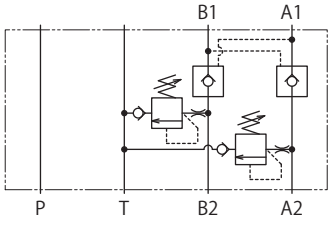


Circuit Symbol









Non-Leak Valve Unit

Manual Operation Model

Model **BH**

Manual direction control valve with non-leak function

A variety of circuits and combination options.

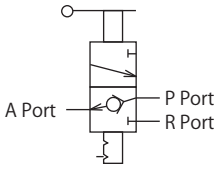
What is a manual operating non-leak valve unit ?

It is a manual operated direction control valve. It holds outgoing side hydraulic pressure even after the pressure power supply is cut off.

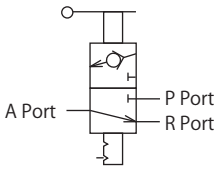
Even if the hydraulic power source is cut off due to energy saving (Stop hydraulic supply to incoming side) or blackout etc., it holds the pressure and prevents the workpiece drop off.

Circuit Symbol

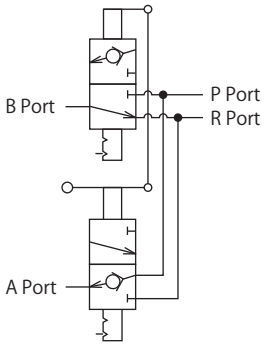
A Normal Open



B Normal Close



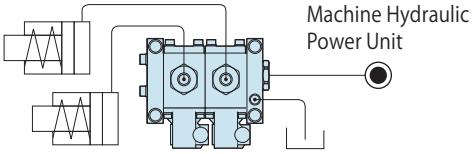
NN Exclusively used for Double Action Circuit



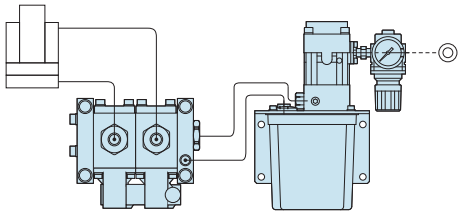
※A filter is built in each port other than R ports.

Application Examples

Activate the single action actuator manually by AA circuit.

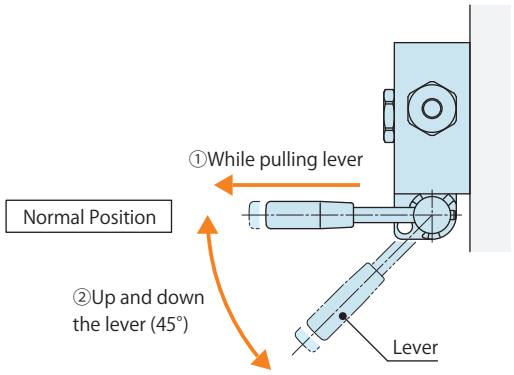


Activate the double action actuator manually by NN circuit.



model CB/CC Unit

Operation Sequence



Operation Sequence
While pulling lever (to prevent wrong operation)
Operate the lever up and down.

KOSMEK Harmony in Innovation

Model No. Indication

BH00 [4] [1] - [NN] - [0] - [ ] [ ] (7.0MPa)

1 2 3 4 5 6 7

1 Pressure Code

4 : Operating Pressure Range 2.5～7.0MPa
7 : Operating Pressure Range 6.0～30.0MPa

※ Pressure cord is the same as BC unit if it is with pressure switch option or with 5 pressure gauge option.

2 Design No.

1 : Revision Number

3 Circuit Symbol

A : Normal Open
B : Normal Close
NN : Exclusively used for Double Action Circuit
(Example) A, AA, AB, ANN, NNNN

4 Usable Fluid

0 : General Hydraulic Oil
(Please refer to Hydraulic Fluid List)
S : Silicon Oil
G : Water-Glycol

5 Option

Blank : None (Standard: piping block is only on the right side.)
GR : With Pressure Gauge installed on right side. (Piping Block is on both sides.)
GL : With Pressure Gauge installed on left side. (Piping Block is on both sides.)
H : With Piping Block installed on the left side. (P_H Port)

6 Unit of Pressure Gauge

Blank : MPa (Standard)
P : PSI / Rc Thread Fitting

7 Normal Operating Pressure

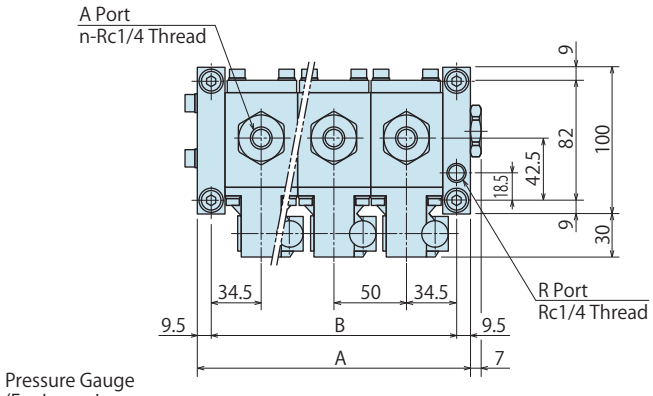
Normal operating pressure is shown.
(Please indicate the pressure and the unit of measurement.)
(Example) (7.0MPa) (20.0MPa) (2000PSI) (200kg/cm^2)

Specifications

Model No.		BH0041	BH0071
Operating Pressure Range	MPa	2.5 ～ 7.0	6.0 ～ 30.0
Withstanding Pressure ※1	MPa	10.5	37.5
Operating Temperature	℃	0 ～ 70	
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32	

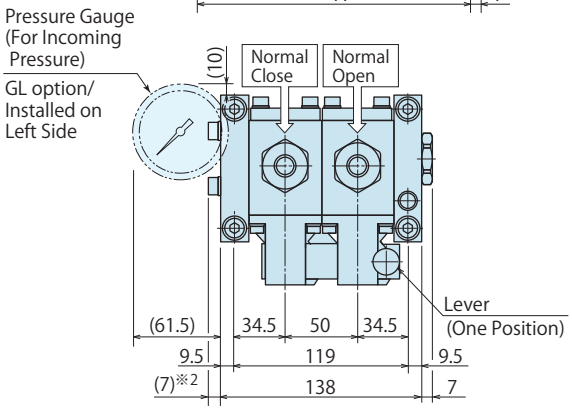
Note
※1. Design pressure is in the case of without a pressure gauge.

External Dimensions

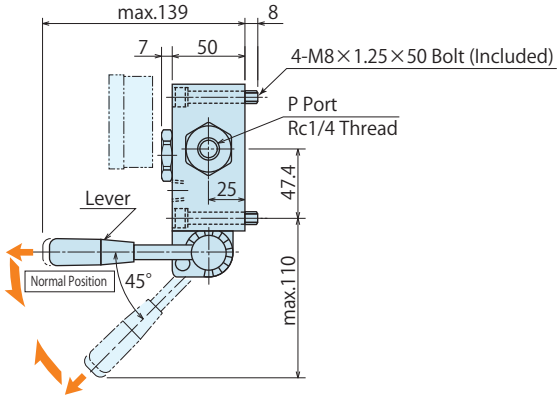


(mm)

The Number of Valves (n)	1	2	3	4
A	88	138	188	238
B	69	119	169	219



NN Circuit / Exclusively used for Double Action Circuit



Note ※2. It shows the outline dimensions of valve unit with left hand side piping block option.

Non-Leak Valve Unit

Electrical Control Model

Model **BC**

Electrical direction control valve with non-leak valve

A variety of circuits and combination options.

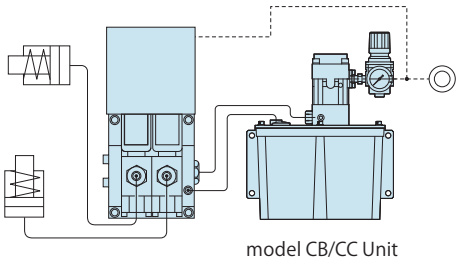
What is a non-leak valve unit (Electrical Control Model) ?

It is a electrical directional control valve. It operates built-in non-leak valves by switching air solenoid valve electrically. Even if the pressure supply is cut off from the hydraulic power source, it maintains the pressure in outgoing side circuit.

Even if the hydraulic power source is cut off due to energy saving (Stop hydraulic supply to incoming side) or blackout etc., it holds the pressure and prevents the work piece drop off.

Application Examples

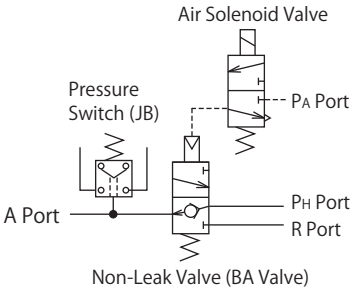
Control lock and release action of actuators electrically.



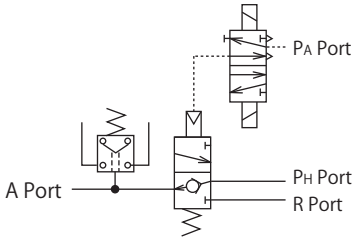
model CB/CC Unit

Circuit Symbol

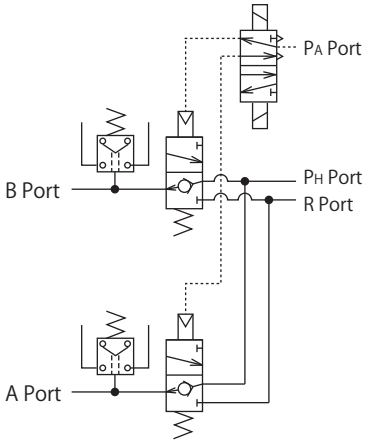
C Normal Open



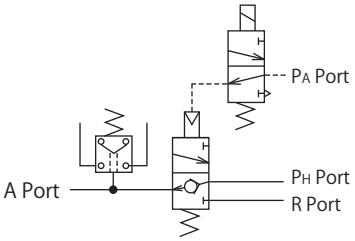
U Double Solenoid Valve Option



YY Exclusively used for Double Action Circuit



Z Normal Close



※ Filter is built in other than PA port and R port.

KOSMEK Harmony in Innovation

Model No. Indication

BC00 4 1 - CC - 1 0 - ( ) ( ) (7.0MPa)

1 2 3 4 5 6 7 8

1 Pressure Code (Operating Pressure Range)

3 : 2.5～7.0MPa
4 : 4.0～7.0MPa
5 : 6.0～11.0MPa
6 : 10.0～17.5MPa
7 : 15.5～30.0MPa

2 Design No.

1 : Revision Number

3 Circuit Symbol

C : Normal Open
Z : Normal Close
U : Double Solenoid Valve Option
YY : Exclusively used for Double Action Circuit
(Example) C, CZ, UU, UUYY
※ Please contact us if a different circuit is needed other than what it is shown.

4 Control Voltage

1 : AC100V
2 : AC200V
3 : AC110V
4 : AC220V
5 : DC24V

5 Usable Fluid

0 : General Hydraulic Oil (Please refer to Hydraulic Fluid List)
S : Silicon Oil
G : Water-Glycol

6 Option

Blank : None (Standard: piping block is only on the right side.)
GR : With Pressure Gauge installed on right side. (Piping Block is on both sides.)
GL : With Pressure Gauge installed on left side. (Piping Block is on both sides.)
H : With Piping Block installed on the left side. (P_H Port)

7 Unit of Pressure Gauge

Blank : MPa (Standard)
P : PSI / Rc Thread Fitting

8 Normal Operating Pressure

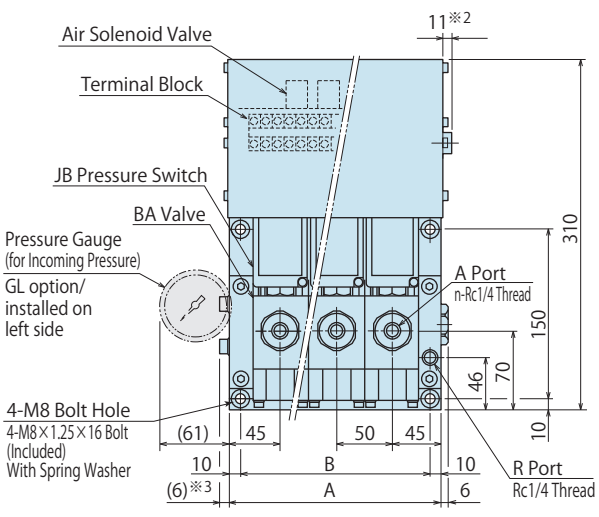
Normal operating pressure is shown.
(Please indicate the pressure and the unit of measurement.)
(Example) (7.0MPa) (20.0MPa) (2000PSI) (200kg/cm^2)

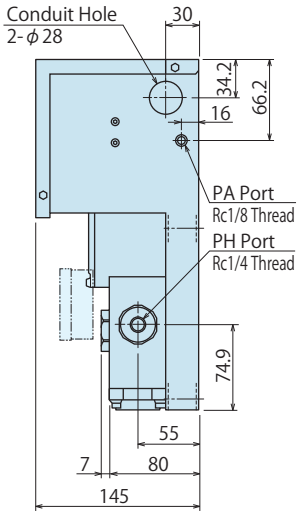
Specifications

Model No.		BC0031	BC0041	BC0051	BC0061	BC0071
Operating Pressure Range	MPa	2.5 ～ 4.5	4.0 ～ 7.0	6.0 ～ 11.0	10.0 ～ 17.5	15.5 ～ 30.0
Withstanding Pressure ※1	MPa	10.5		37.5		
Non-Leak Valve Part Number		BA2011-0		BA5011-0		
Pressure Switch Part Number		JB0400-M0	JB1000-M0		JB2800-M0	
Operating Temperature	℃	0 ～ 70				
Usable Fluid		General Hydraulic Oil Equivalent to ISO-VG-32 (It depends on fluid code.)				

Notes ※1. Design pressure is in the case of without a pressure gauge.
1. Increase. setting (pressure rise detection) of the JB pressure switch is performed at 70% of operating pressure. In case of the other pressure setting, please contact us.
2. In case of the unit with a pressure gauge option (for incoming pressure), piping ports are provided on both sides.

External Dimensions





(mm)

The Number of Valves (n)	1	2	3	4
A	90	140	190	240
B	70	120	170	220

Notes
※2. Circuit symbol U and YY are shown.
※3. It shows the outline dimensions of valve unit with left hand side piping block option.

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.

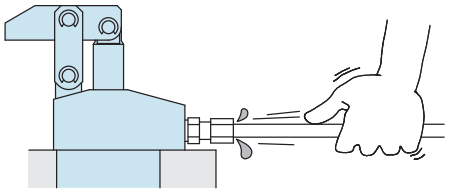
3) Applying Sealing Tape

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

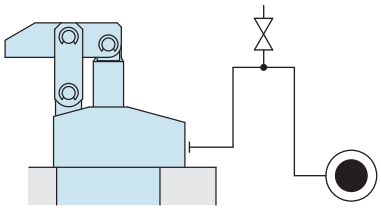
4) Air Bleeding of the Hydraulic Circuit

- 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 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 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	

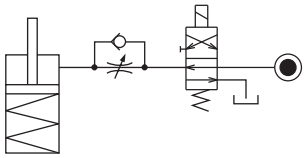
Note As it may be difficult to purchase the products as shown in the table from overseas, please contact the respective manufacturer.

Notes on Hydraulic Cylinder Speed Control Unit

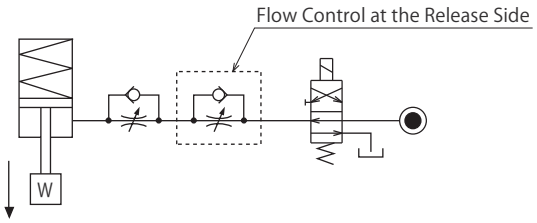
Please pay attention to the cautions below. Design the hydraulic circuit for controlling the action speed of hydraulic cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

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.



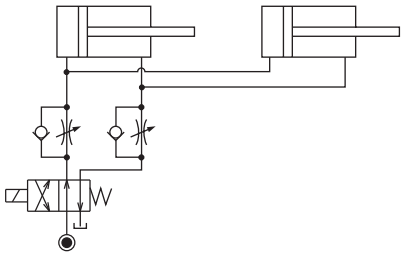
Accelerated clamping speed by excessive hydraulic flow to the cylinder may sustain damage. In this case add flow control to regulate flow. (Please add flow control to release flow if the lever weight is put on at the time of release action when using swing clamps.)



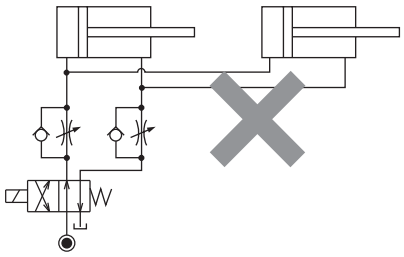
Flow Control Circuit for Double Acting Cylinder

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.47 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)

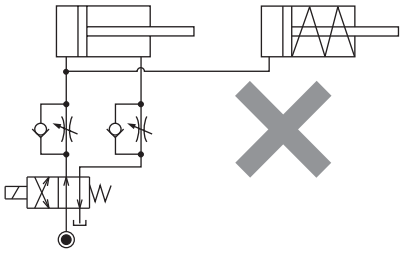


【Meter-in Circuit】(LKE/TMA/TLA must be controlled with meter-in.)



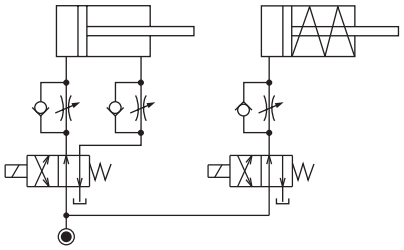
In the case of meter-out circuit, the hydraulic circuit should be designed with the following points.

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.

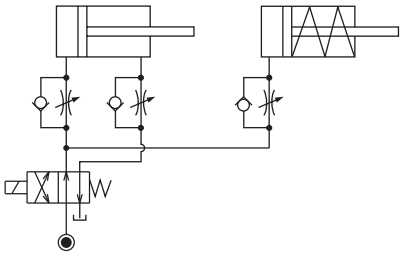


Refer to the following circuit when both the single acting cylinder and double acting cylinder are used together.

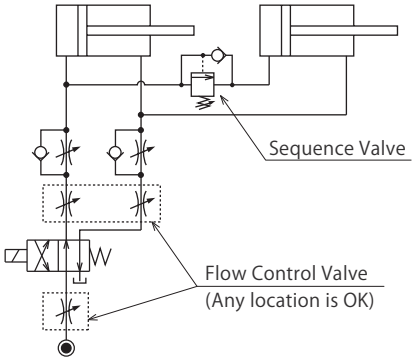
○ Separate the control circuit.



○ 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.



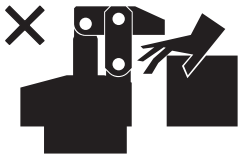
Cautions

Notes on Handling

1) It should be 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 machine 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 machine is removed, make sure that the above-mentioned safety measures are in place. Shut off the air of hydraulic source and make sure no pressure exists in the hydraulic and air circuit.
③ After stopping the machine, 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 clamps (cylinder) while clamps (cylinder) is working. Otherwise, your hands may be injured due to clinching.

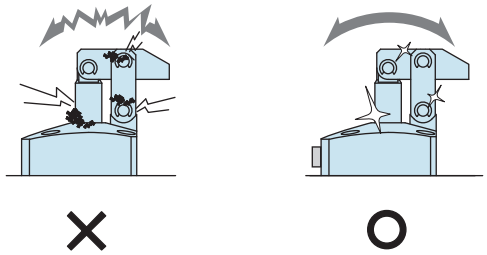


4) Do not disassemble or modify.
- If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

Maintenance and Inspection

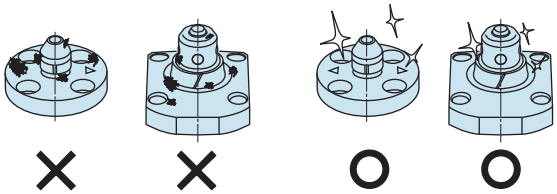
1) Removal of the Machine and Shut-off of Pressure Source
- Before the machine is removed, make sure that the above-mentioned safety measures are in place. Shut off the air of hydraulic source and make sure no pressure exists in the hydraulic and air circuit.
- Make sure there is no abnormality in the 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) Please clean out the reference surface regularly (taper reference surface and seating surface) of locating machine .(VS/VT/VL/VM/VJ/VK/WVS/WM/WK/VX/VXF)

- Location products, except VX/VXF model, can remove contaminants with cleaning functions.
  When installing pallets makes sure there is no thick sludge like substances on pallets.
- Continuous use with dirt on components will lead to locating functions not work properly, leaking and malfunction.



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

5) Regularly tighten nuts, bolts, pins, cylinders and pipe line to ensure proper use.

6) Make sure the hydraulic fluid has not deteriorated.

7) 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 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 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.

Sales Offices

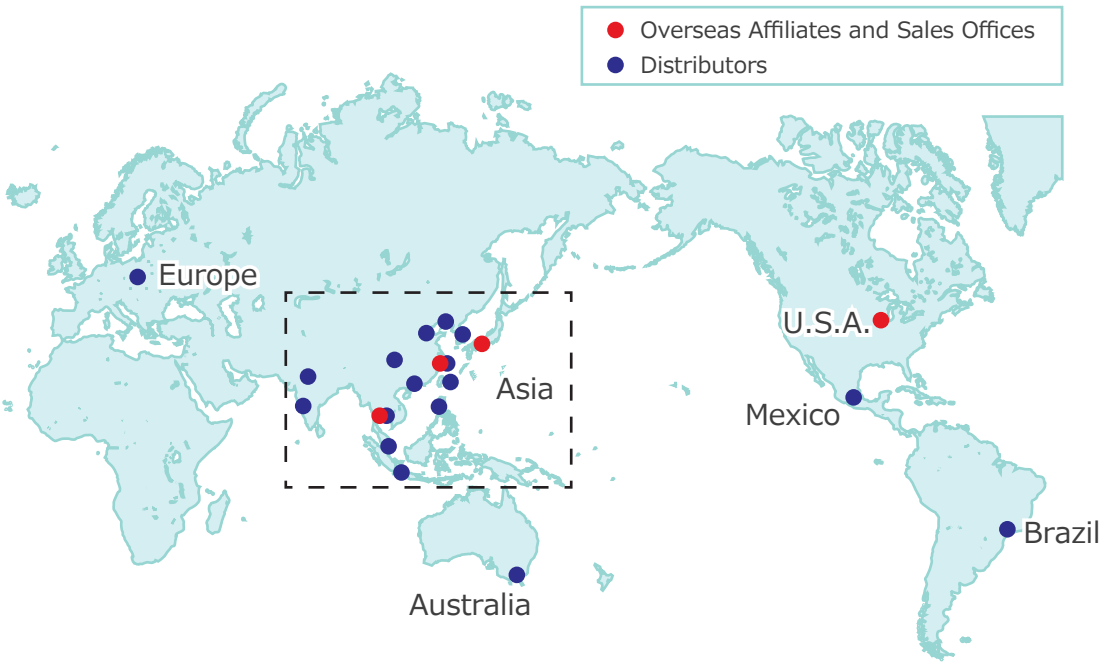
Sales Offices across the World

Japan Overseas Sales	**TEL. +81-78-991-5162**	FAX. +81-78-991-8787 KOSMEK LTD. 1-5, 2-chome, Murotani, Nishi-ku, Kobe-city, Hyogo, Japan 651-2241 〒651-2241　兵庫県神戸市西区室谷2丁目1番5号
USA KOSMEK（USA）LTD.	**TEL. +1-630-241-3465**	FAX. +1-630-241-3834 1441 Branding Avenue, Suite 110, Downers Grove, IL 60515 USA
China KOSMEK（CHINA）LTD. 考世美(上海)貿易有限公司	**TEL.+86-21-54253000**	FAX.+86-21-54253709 21/F, Orient International Technology Building, No.58, Xiangchen Rd, Pudong Shanghai 200122., P.R.China 中国上海市浦东新区向城路58号东方国际科技大厦21F室 200122
Thailand Thailand Representative Office	**TEL. +66-2-715-3450**	FAX. +66-2-715-3453 67 Soi 58, RAMA 9 Rd., Suanluang, Suanluang, Bangkok 10250, Thailand
Taiwan (Taiwan Exclusive Distributor) Full Life Trading Co., Ltd. 盈生貿易有限公司	**TEL. +886-2-82261860**	FAX. +886-2-82261890 16F-4, No.2, Jian Ba Rd., Zhonghe District, New Taipei City Taiwan 23511 台湾新北市中和區建八路2號 16F－4（遠東世紀廣場）
Philippines (Philippines Exclusive Distributor) G.E.T. Inc, Phil.	**TEL.+63-2-310-7286**	FAX. +63-2-310-7286 Victoria Wave Special Economic Zone Mt. Apo Building, Brgy. 186, North Caloocan City, Metro Manila, Philippines 1427
Europe (Europe Exclusive Distributor) KOS-MECH GmbH	**TEL. +43-463-287587-10**	FAX. +43-463-287587-20 Schleppeplatz 2 9020 Klagenfurt Austria
Indonesia (Indonesia Exclusive Distributor) P.T PANDU HYDRO PNEUMATICS	**TEL. +62-21-5818632**	FAX. +62-21-5814857 Ruko Green Garden Blok Z-Ⅱ No.51 Rt.005 Rw.008 Kedoya Utara-Kebon Jeruk Jakarta Barat 11520 Indonesia

Sales Offices in Japan

Head Office Osaka Sales Office Overseas Sales	**TEL.078-991-5115**	FAX.078-991-8787 〒651-2241　兵庫県神戸市西区室谷2丁目1番5号
Tokyo Sales Office	**TEL.048-652-8839**	FAX.048-652-8828 〒331-0815　埼玉県さいたま市北区大成町4丁目81番地
Nagoya Sales Office	**TEL.0566-74-8778**	FAX.0566-74-8808 〒446-0076　愛知県安城市美園町2丁目10番地1
Fukuoka Sales Office	**TEL.092-433-0424**	FAX.092-433-0426 〒812-0006　福岡県福岡市博多区上牟田1丁目8-10-101

Global Network



Asia Detailed Map

KOSMEK
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