

# Conforming to OSHA Standard Pressure Relief 3 Port Valve With Locking Holes

## Series VHS20/30/40/50



Manually operated valve can be used to prevent accidents caused by residual pressure in pneumatic lines.

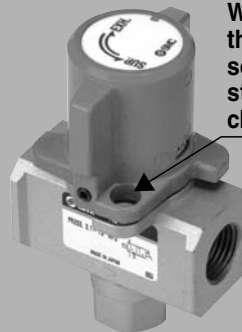


The supply/exhaust status of the air flow can be verified at a glance in the indicating window.

**SUP** : Supply

**EXH** : Exhaust

Can prevent accidents due to inadvertent air supply.



When in the exhaust position, the valve may be padlock secured. Prevents accidental start-ups while personnel are cleaning or servicing equipment.

OSHA standard (Occupational Safety and Health Administration Department of Labor)

For safety control, OSHA rule requires energy sources for certain equipment be turned off or disconnected and that the device either be locked or labelled with a warning tag.

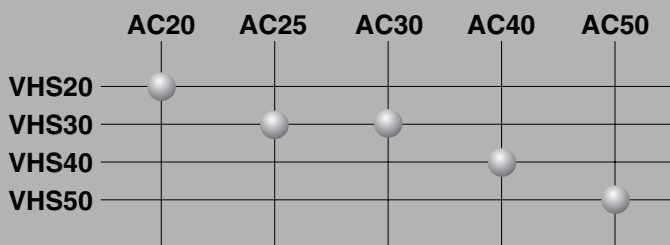
VM

VMG

VR

VH

Combination with a modular style FRL is possible.



# Conforming to OSHA Standard Pressure Relief 3 Port Valve With Locking Holes

# Series VHS20/30/40/50

## How to Order

**VHS 30 - [ ] 03 - RZ - [ ]**

**Pressure relief 3 port valve**

**Body size**

Symbol	Standard port size
20	1/8
30	3/8
40	1/2
50	3/4

**Thread type**

Nil	Rc
N	NPT
F	G

**Made to Order**

Nil	Standard
X1	Body: Red
X502	Built-in silencer (EXH port)

**Optional specifications**

Symbol	Description
B	Knob color: Black
R	Flow direction: Right to left
Z <sup>Note)</sup>	PSI as unit displayed on label

Note) Only for the NPT thread.  
Under the New Measurement Law,  
products for overseas use only  
(SI unit type for use in Japan).

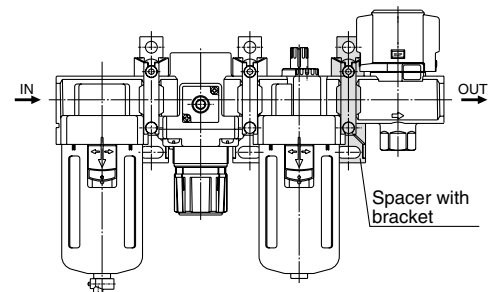
**Port size**

Symbol	Port size	Body size			
		20	30	40	50
01	1/8	●	—	—	—
02	1/4	●	●	●	—
03	3/8	—	●	●	—
04	1/2	—	—	●	—
06	3/4	—	—	●	●
10	1	—	—	—	●

A spacer or spacer with bracket is required if the valve is combined with modular FRL.

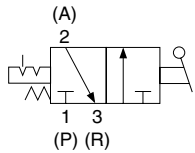
Pressure relief 3 port valve	Spacer part no.	Spacer with bracket part no.	Applicable air preparation equipment
VHS20	Y200	Y200T	AC20
VHS30	Y300	Y300T	AC25, AC30
VHS40	Y400	Y400T	AC40
VHS40-06	Y500	Y500T	AC40-06
VHS50	Y600	Y600T	AC50, AC60 <sup>Note)</sup>

Note) Although connection to AC60 is possible, the flow rate may decrease due to the mounting position.





**JIS Symbol**



**Specifications**

Model		VHS20		VHS30		VHS40			VHS40-06	VHS50	
Piping port	IN, OUT	1/8	1/4	1/4	3/8	1/4	3/8	1/2	3/4	3/4	1
	EXH	1/8		1/4		3/8			1/2	1/2	
Cv	IN → OUT	0.54	0.76	0.87	1.68	1.46	2.06	2.98	4.17	4.44	6.78
	OUT → EXH	0.60	0.87	0.76	1.57	1.75	2.08	2.12	2.12	2.85	2.93
Fluid		Air									
Proof pressure		1.5 MPa									
Operating pressure range		0.1 to 1.0 MPa									
Ambient and fluid temperature		-5 to 60°C (No freezing)									
Handle switching angle		90°									
Paint color (Standard)		Handle <sup>Note)</sup> : Red, Body: Platinum silver									
Mass (kg)		0.19	0.25	0.25	0.35	0.35	0.42	0.42	0.42	0.77	0.77

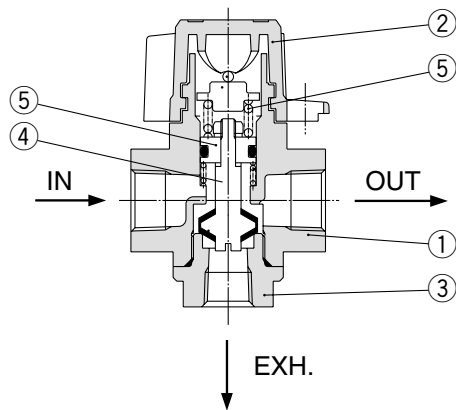
Note) Knob color of black and body color of platinum silver are available as option (for the model number VHS□-□-B).

**OSHA standard (Occupational Safety and Health Administration Department of Labor)**

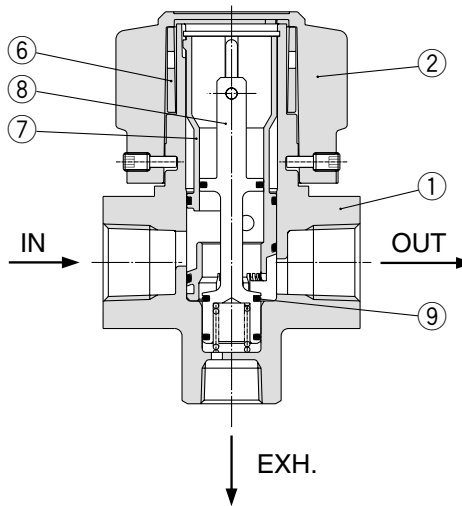
For safety control, OSHA rule requires energy sources for certain equipment be turned off or disconnected and that the device either be locked or labelled with a warning tag.

**Construction**

**VHS20/30**



**VHS40/40-06/50**



**Component Parts**

No.	Description	Material			Note
		VHS20	VHS30	VHS40(-06), 50	
①	Body	Zinc die-casted	Aluminum die-casted	Aluminum die-casted	Platinum silver coated
②	Handle	Zinc die-casted		Aluminum die-casted	Red coated
③	Valve guide	Zinc die-casted			—
④	Valve	Aluminum alloy + HNBR			—
⑤	Piston	Brass			—
⑥	Cam ring	—	—	Zinc die-casted	—
⑦	Ferrule	—	—	POM	—
⑧	Spool	—	—	Brass	Electroless nickel plated
⑨	Seal	—	—	HNBR	—

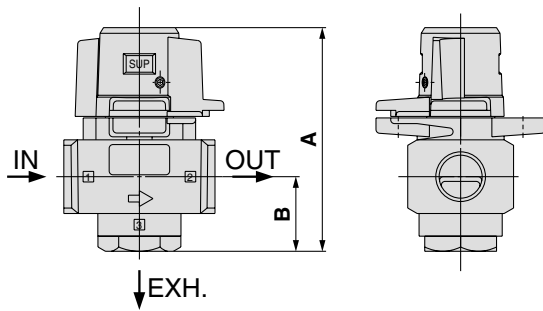
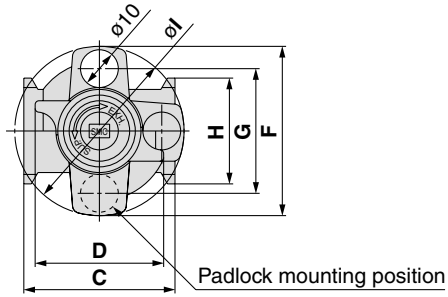
The VHS series cannot be disassembled. Parts cannot be shipped separately.

- VM□
- VMG
- VR□
- VH□

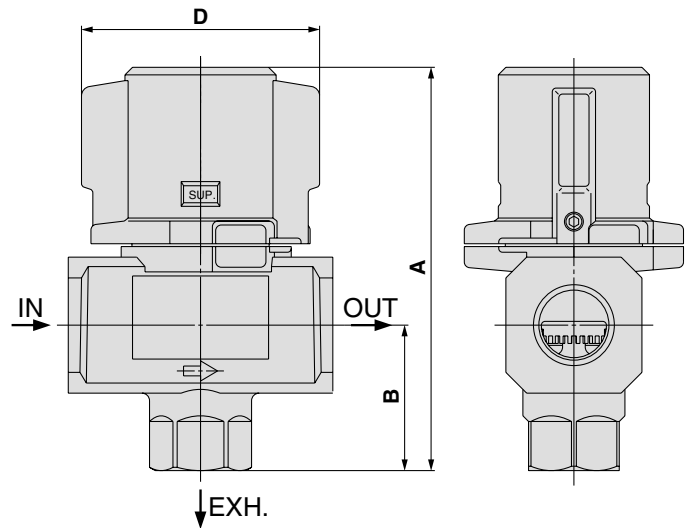
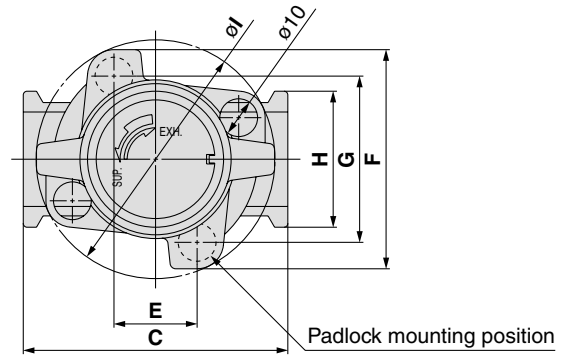
# Series VHS20/30/40/50

## Dimensions

### VHS20/30



### VHS40/40-06/50



Model	Piping port	A	B	C	D	E	F	G	H	I
VHS20	1/8, 1/4	59	20	40	34	—	45	33	28	45
VHS30	1/4, 3/8	78	29	53	46	—	55	42	30	55
VHS40	1/4, 3/8, 1/2	107	39	70	63	22	58	44	36	63
VHS40-06	3/4	110	42	75	67	21	65	50	44	69
VHS50	3/4, 1	134	53	90	78	26	76	61	54	81



# Series VHS20/30/40/50

## Specific Product Precautions

Be sure to read before handling.

Refer to front matters 58 and 59 for Safety Instructions and pages 3 to 7 for 3/4/5 Port Solenoid Valve Precautions.

### Precautions on Design

#### Warning

1. Please consult with SMC in cases where the ambient environment does not permit leakage or if fluid other than air is used.
2. When exhaust piping is connected to the exhaust port (3), select a model with an effective sectional area not smaller than that in the table below.

Model	Effective sectional area (mm <sup>2</sup> ) (Cv)
VHS20	5 (0.27)
VHS30	5 (0.27)

3. Do not apply negative pressure. It may result in malfunction.

### Selection

#### Warning

1. In some cases, mineral oil grease used for internal parts and sealant may be carried to the output side. Please contact SMC if this causes any inconvenience in use.

### Installation and Adjustment

#### Warning

1. Confirm the symbols "1" and "2" before the valve is connected. The port marked "1" is the air inlet and the port marked "2" is the outlet. Pressurization is only possible via the inlet port (1). Reverse connection may cause malfunction. The port symbols and corresponding piping types are shown in the table below:

Port symbol	Piping type
1	Inlet
2	Outlet
3	Exhaust

#### Caution

1. The valve must be switched to each position instantly and securely. Stopping the knob between the extreme positions may cause malfunction.
2. Do not remove the mounting screws from the knob. As this may cause malfunction.

### Piping

#### Warning

1. Before piping is connected, the pipes should be thoroughly blown through with air (flushing) or washed to remove chips, cutting oil and other debris from inside. Should they remain, they could cause malfunction.
2. When connecting pipes and fittings, etc., be sure that neither chips from the pipe threads nor sealing material get inside the valve. When using sealant tape, leave 1.5 to 2 thread ridges exposed at the end of the pipe/fitting.
3. When screwing a piping component into the valve, secure the female threaded side and apply the recommended tightening torque. Under tightening may result in loosening or sealing failure while over tightening may cause damage to threads and other problems.

#### Recommended tightening torque

Unit: N·m

Connection thread	1/8	1/4	3/8	1/2	3/4	1
Torque	7 to 9	12 to 14	22 to 24	28 to 30	28 to 30	36 to 38

### Air Supply

#### Warning

1. Use clean air. Do not use compressed air which contains chemicals, synthetic oils containing organic solvents, salts or corrosive gases, etc., as this can cause damage or malfunction.
2. Install an air dryer or after cooler on the upstream side of the pressure release 3 port valve because air containing excessive drainage may cause malfunction.

#### Caution

1. Install an air filter of 5 μm filtration on the inlet side.
2. Install a mist separator on the inlet side to remove carbon powder from the compressor or other equipment. An excessive amount of carbon dust ingress via the inlet may cause the valve to malfunction.

Refer to SMC's "Air Cleaning Equipment" catalog for further details on compressed air quality.

### Operating Environment

#### Warning

1. Do not use valves where there is direct contact with, or in atmospheres of, corrosive gases, chemicals, salt water, water or steam.
2. Do not use in an explosive atmosphere.
3. Do not use in locations subject to vibration or impact. Confirm the specifications for each series.
4. A protective cover should be used to shield valves from direct sunlight.
5. Shield valves from radiated heat generated by nearby heat sources.
6. Employ suitable protective measures in locations where there is contact with water droplets, oil, or welding spatter.
7. Install a silencer into port (3) to prevent the ingress of dust if there is a lot of dust in the atmosphere. If dust enters the valve via port (3), it may cause air leakage.

### Maintenance

#### Warning

1. Perform maintenance procedures as shown in the instruction manual. If handled improperly, malfunction or damage of machinery or equipment may occur.
2. Do not disassemble the product. Improper handling will cause malfunction or breakage of the machinery or equipment.
3. When equipment is to be removed, first confirm that measures are in place to prevent dropping of driven objects and run-away of equipment, etc. Then cut the supply air pressure and electric power, and exhaust all compressed air from the system using its residual pressure release function. When the equipment is to be started again after remounting or replacement, first confirm that measures are in place to prevent lurching of actuators and then confirm that equipment operates normally.

#### Caution

1. Once a lubricant is introduced, be sure to continue lubrication. If it is discontinued, malfunction may result due to loss of the initial lubricant. Apply class 1 turbine oil (ISO VG32) as a lubricant. Use of other lubricants may cause malfunction.

VM

VMG

VR

VH

# Conforming to OSHA Standard Pressure Relief 3 Port Valve With Locking Holes (Double Action Type) Series **VHS4510/5510**

When in the exhaust position, the valve may be padlock secured. This prevents erroneous operation.

Push the handle and then turn. Double action construction prevents erroneous operation.

Combination with modular type FRL is possible.



## Model

Model	VHS4510			VHS4510-06	VHS5510		
Port size	1 (P) · 2 (A)	1/4	3/8	1/2	3/4	3/4	1
	3 (R)	3/8			1/2	1/2	
Effective area (mm <sup>2</sup> )	1 (P) → 2 (A)	27	38	55	77	82	125
	2 (A) → 3 (R)	36	40	42	49	50	53
Mass (kg)	0.36			0.42	0.77		

## Specifications

Fluid	Air	
Proof pressure	0.1 to 1.0 MPa	
Operating pressure range	1.5 MPa	
Ambient and fluid temperature	-5 to 60°C (No freezing)	
Handle switching angle	90°	
Paint color (Standard)	VHS4510, 5510	Handle: Red, Body: Platinum silver

VHS 4510 and 5510 can be locked from either side.

## How to Order

VHS 4 5 1 0 - [ ] 01 - [ ] - [ ]

- Pressure relief 3 port valve**
- With locking holes**
- Body size**

4	1/2
5	1
- Double action**
- Thread type**

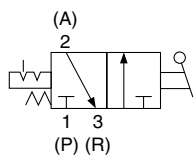
Nil	Rc
F	G
N	NPT
- Port size**

02	1/4
03	3/8
04	1/2
06	3/4
10	1
- Paint color**

Nil	Standard color
X1	Handle, body: Red
- Optional specifications**

R	Flow direction: Right → Left
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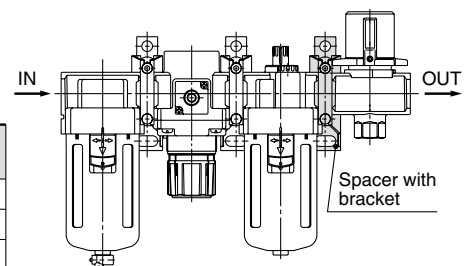
## JIS Symbol



**OSHA standard (Occupational Safety and Health Administration Department of Labor)**  
For safety control, OSHA rule requires energy sources for certain equipment be turned off or disconnected and that the device either be locked or labelled with a warning tag.

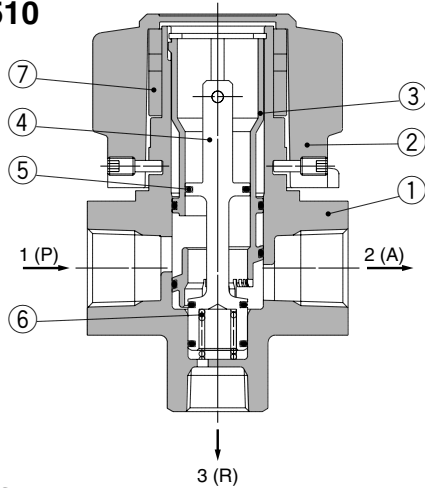
A spacer is required if the valve is combined with modular FRL.

Pressure relief 3 port valve	Spacer part no.	Applicable FRL
VHS4510	Y400	AC40
VHS4510-06	Y500	AC40-06
VHS5510	Y600	AC50/55/60



## Construction

### VHS4510-5510



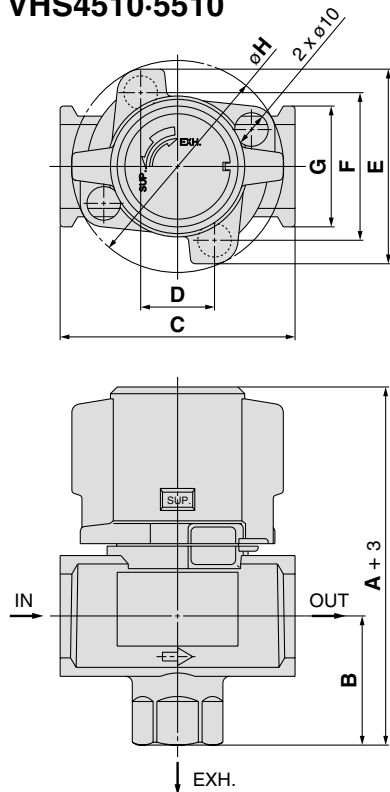
### Component Parts

No.	Description	Material	Note
①	<b>Body</b>	Aluminum die-casted	Platinum silver coated
②	<b>Handle</b>	Aluminum die-casted	Red coated
③	<b>Sleeve</b>	POM	
④	<b>Spool</b>	Brass	Electroless nickel plated
⑤	<b>O-ring</b>	NBR	
⑥	<b>Spring</b>	Stainless steel	
⑦	<b>Cam ring</b>	Zinc alloy	

The VHS series cannot be disassembled. Parts cannot be shipped separately.

## Dimensions

### VHS4510-5510



Model	A	B	C	D	E	F	G	H
VHS4510	107	39	70	22	58	44	36	63.2
VHS4510-06	110	42	75	21	65	50	44	69.2
VHS5510	134	53	90	26	76	61	54	81.3

## ⚠ Precautions

Be sure to read before handling. Refer to front matters 58 and 59 for Safety Instructions and pages 3 to 7 for 3/4/5 Port Solenoid Valve Precautions.

### Caution on Design

#### ⚠ Warning

- (1) Do not supply air pressure from ports other than the 1 (P) port. The valve will malfunction when air pressure is supplied from other ports.
- (2) Do not use the valve under negative pressure. It will lead to malfunction due to air leakage.

### Selection

#### ⚠ Caution

- (1) Stopping the handle between the extreme positions may cause malfunction and air leakage. The valve must be switched to each position instantly and securely.
- (2) Do not remove the mounting screws from the handle as this may cause malfunction.

### Piping

#### ⚠ Warning

- (1) The port marked with an arrow (>) is the 1 (P) port (IN) and one on the opposite side is the 2 (A) port (OUT). The port at a right angle to them is the 3 (R) port (EXH). Be sure to confirm before connecting since erroneous connection will cause malfunction.
- (2) When the valve is exposed to a large amount of dust and debris, install a silencer on the 3(R) port (EXH) to protect the valve. Otherwise, dust will ingress from the 3 (R) port and cause air leakage.

### Air Supply

#### ⚠ Warning

- (1) Install an air filter on the inlet side in proximity to the valve. Filtration degree should be 5 μm or less.

VM

VMG

VR

VH

# Residual Pressure Relief 3 Port Hand Valve **VHS400/500**

Series VHS is a safety manual switching valve for preventing accidents that can be caused by the residual pressure while performing maintenance service on a pneumatic system.

## Easy to Operate

The direction of air flow can be verified at a glance by the orientation of the handle.

The valve is compact, yet provides a large capacity.



## Model

Piping direction	Left 1(P)*	VHS400-02	VHS400-03	VHS400-04	VHS500-06
	Right 1(P)*	VHS401-02	VHS401-03	VHS401-04	VHS501-06
Port size		1/4	3/8	1/2	3/4
Effective area (mm <sup>2</sup> )	1(P)→2(A)	21	35	57	93
	2(A)→3(R)	35	54	76	105
Mass (kg)		0.25			0.34



\* The front face of the handle is the reference position.

## Specifications

Fluid	Air
Operating pressure	0.1 to 1.0 MPa
Ambient temperature and operating fluid temperature	-5 to 60°C (No freezing)
Handle switching angle	90°
Required switching force	73.6 N (at 1.0 MPa)
Paint color (Standard) <sup>Note</sup>	Handle: Black, Body: Platinum silver



Note) Handle: Silver, Body: Red (Made to order "-X1")

## How to Order

**VHS 4 0 0 - 02 -**

Residual relief 3 port valve

Body size

4	1/2
5	3/4

Piping direction

0	Left 1(P)
1	Right 1(P)

Thread type

Nil	Rc
N	NPT
F*	G

Option color

Nil	Standard color
X1	Handle: Silver, Body: Red
X116	Handle: Red

Port size

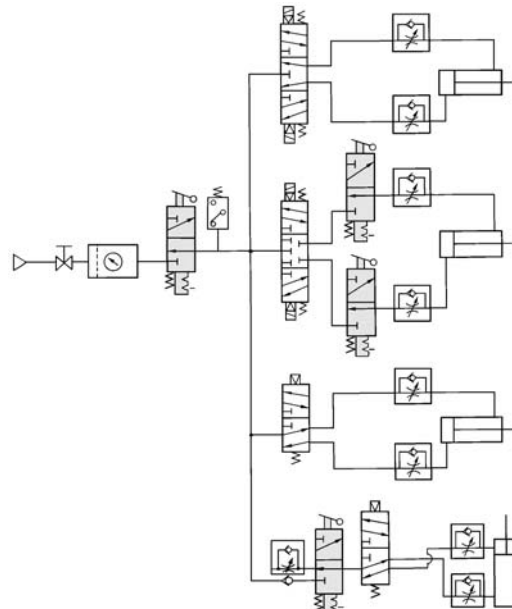
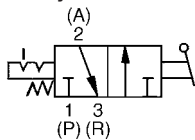
02	1/4	VHS40□
03	3/8	
04	1/2	
06	3/4	



\* Applicable port size: 1/4, 3/8

## Example of Operating Circuit

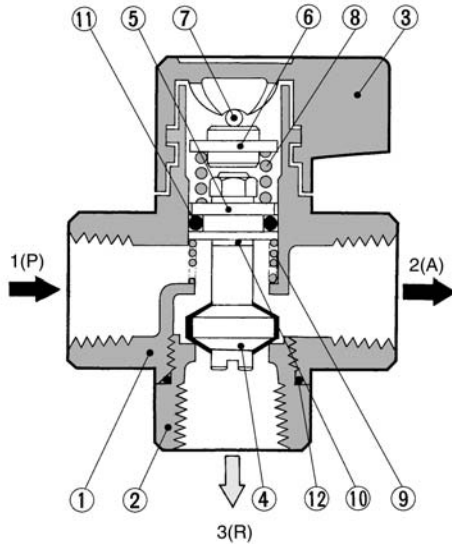
### JIS Symbol



\* When using the valve, please refer to the table of applicable effective areas for the respective exhaust ports.



## Construction

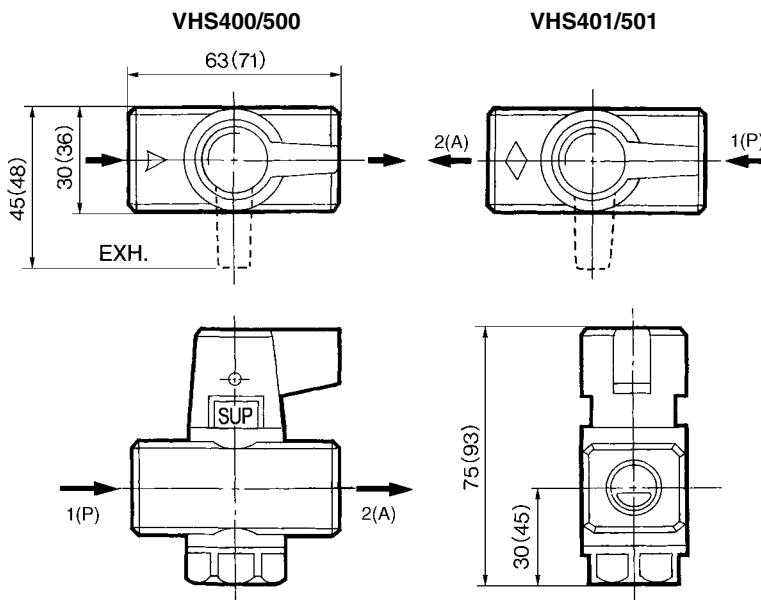


## Component Parts

No.	Description	Material	Note
1	Body	Aluminium die-casted	Chromated
2	Valve guide	Zinc die-casted	Chromated
3	Handle	Zinc alloy	Chromated
4	Valve	Brass	
5	Piston	Brass	
6	Spring holder	Structural steel	
7	Parallel pin	Steel	Zinc chromated
8	Spring	Steel	Zinc chromated
9	Valve spring	Stainless steel	
10	Seal	PVC	
11	O-ring	NBR	JIS B 2401 P12.5
12	O-ring	NBR	Special

\* The VHS series cannot be disassembled.  
Components parts are not available.

## Dimensions



( ): VHS500

## ⚠ Precautions

Be sure to read before handling.  
Refer to front matters 58 and 59  
for Safety Instructions and  
pages 3 to 7 for 3/4/5 Port  
Solenoid Valve Precautions.

## Design

## ⚠ Warning

- When connecting the exhaust piping onto 3(R) port, confirm that the effective area is larger than the figure shown below. If the effective area is smaller than the figure listed below, back pressure will induce air leakage.

Model	Effective area (mm <sup>2</sup> )
VHS400/401	5
VHS500/501	8

- Do not supply air pressure from ports other than 1(P) port. The valve will malfunction when air pressure is supplied from other ports.
- Do not use the valve under negative pressure. Air leakage may cause malfunction.

## Selection

## ⚠ Caution

- The valve must be switched to each position instantly and securely. Stopping the handle between the extreme positions may cause malfunction.
- Do not remove the mounting screws from the handle as this may cause malfunction.

## Piping

## ⚠ Warning

- The port marked with an arrow is 1(P) port (IN) and one on the opposite side is 2(A) port (OUT). The port at a right angle to them is 3(R) port (EXH). Be sure to confirm before connecting since erroneous connection will cause malfunction.
- When the valve is exposed to a large amount of dust and debris, install a silencer on 3(R) port (EXH) to protect the valve. Otherwise, dust will ingress from 3(R) port and cause air leakage. When dust enters the valve from the port "3(R)", it may cause malfunction.

## Air Supply

## ⚠ Caution

- Install an air filter on the inlet side in proximity to the valve. Filtration degree should be 5 μm or less.

VM

VMG

VR

VH

