

Residual Pressure Relief 3 Port Hand Valve Series VHS

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.

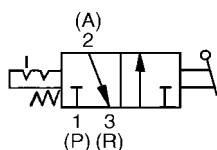
Easy to Operate

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.



JIS Symbol



Model

Piping direction	Left IN1 (P)*	VHS400-02	VHS400-03	VHS400-04	VHS500-06
	Right IN1 (P)*	VHS401-02	VHS401-03	VHS401-04	VHS501-06
Port size		1/4	3/8	1/2	3/4
Effective area (mm ²)	1 (P) → 2 (A)	21	35	57	93
	2 (A) → 3 (R)	35	54	76	105
Weight (kg)		0.25			0.34



*Left or right to the front face of the handle.

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) (Note)	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 (P)
1	Right (P)

Thread type

Nil	Rc
N	NPT
F*	G

Option color

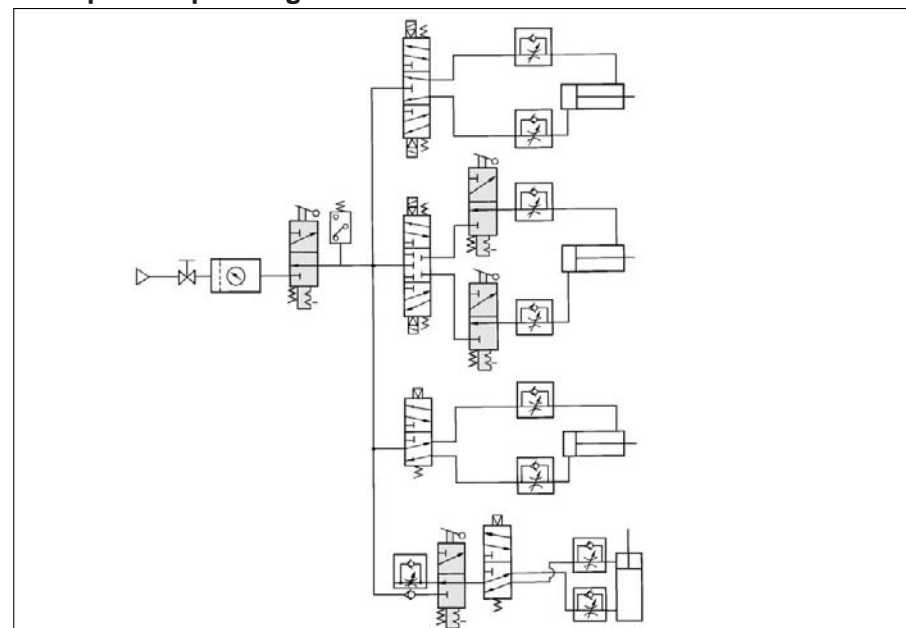
Nil	Standard color
X1	Handle: Silver, Body: Red
X116	Handle: Red

Port size

02	1/4	VHS40□
03	3/8	
04	1/2	
06	3/4	VHS50□

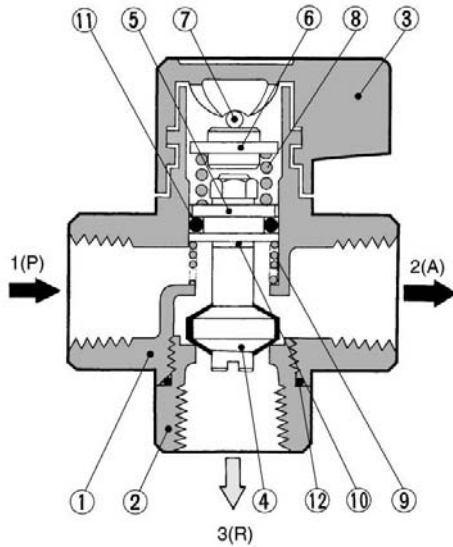
* Applicable port size: 1/4, 3/8

Example of Operating Circuit



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

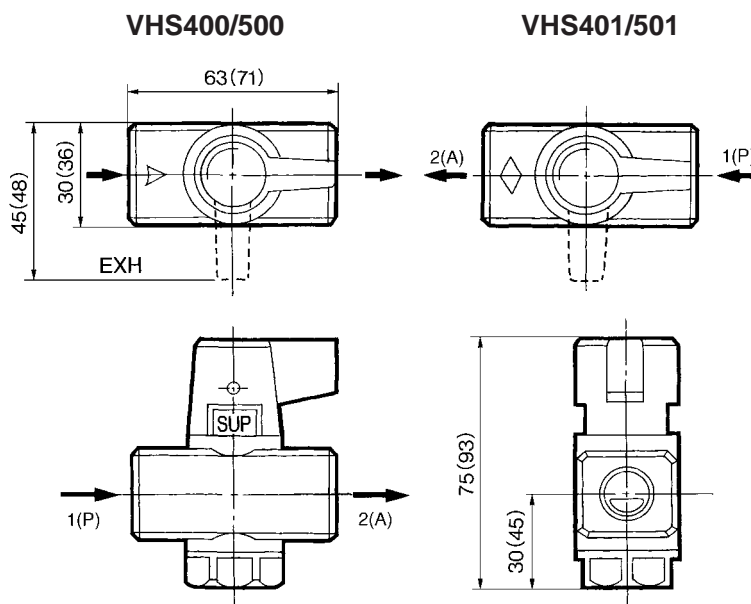
Construction



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	Steel	
⑦	Parallel pin	Steel	Zinc chromated
⑧	Spring	Steel	Zinc chromated
⑨	Valve spring	Stainless steel	
⑩	Packing	PVC	
⑪	O-ring	NBR	JIS B 2401 P12.5
⑫	O-ring	NBR	Special

Dimensions



(): VHS500

⚠ Precautions

Be sure to read before handling.
Refer to pages 5-11-2 to 6 for
Safety Instruction and 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 ²)
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.

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.

Conforming to OSHA Standard Pressure Relief 3 Port Valve With Locking Holes Series *VHS20/30/40/50*



S□A

V□A

S□A

V□A

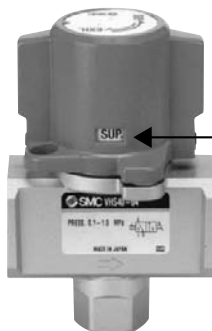
VM

VR

VH

VHS

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

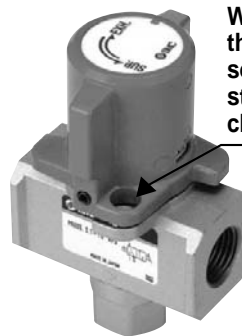


The supply/exhaust status of the air flow can be verified at a glance in the indicating window.

SUP : Supply

EXH : Exhaust

Can prevent accidents due to inadvertent air supply.



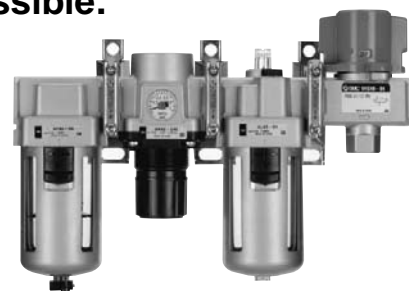
When in the exhaust position, the valve may be padlock secured. Prevents accidental start-ups while personnel are cleaning or servicing equipment.

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.

Combination with a modular style FRL is possible.

	AC20	AC25	AC30	AC40	AC50
VHS20	●				
VHS30		●	●		
VHS40				●	
VHS50					●



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

—	Rc
N	NPT
F	G

Optional specifications

Symbol	Description
B	Knob color: Black
R	Flow direction: Right to left
Z ^{Note)}	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).

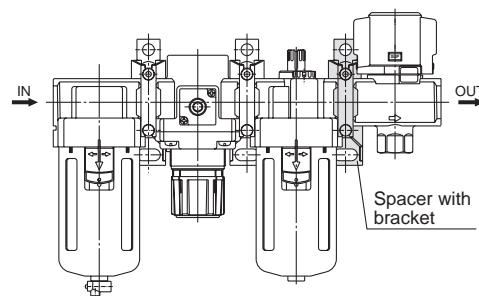
Port size

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

An interface part is required if a spacer or spacer with bracket shown in the table below is attached to a modular FRL.

Pressure relief 3 port valve	Interface P/N	Spacer with bracket P/N	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 ^{Note)}

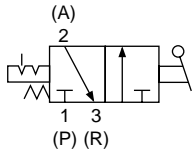
Note) Although connection to AC60 is possible, the flow rate may decrease due to the mounting position.



Conforming to OSHA Standard Pressure Relief 3 Port Valve with Locking Hole **Series VHS**



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.

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		1.5MPa									
Operating pressure range		0.1 to 1.0MPa									
Ambient and fluid temperature		-5 to 60°C (No freezing)									
Handle switching angle		90°									
Paint color (Standard)		Handle ^{Note)} : Red, Body: Platinum silver									
Weight (kg)		0.19		0.25		0.35		0.42		0.77	

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

S□A

V□A

S□A

V□A

VM

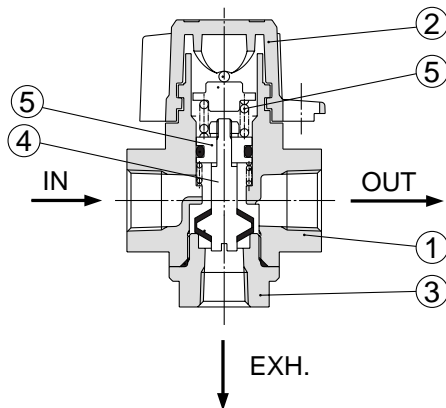
VR

VH

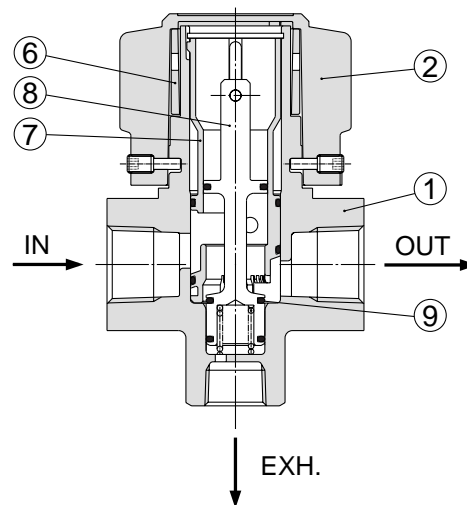
VHS

Construction

VHS20/30



VHS40/40-06/50



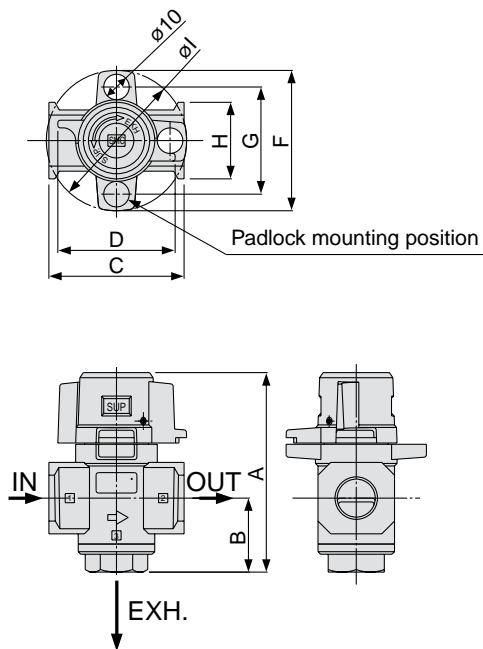
Component Parts

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	Packing	—		HNBR	

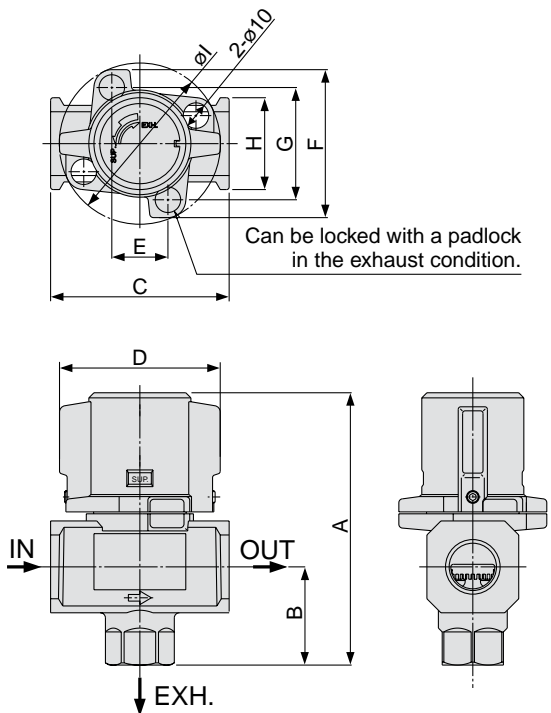
Series VHS

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 VHS

Specific Product Precautions

Be sure to read before handling.

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 ²) (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 mm 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 "Best Pneumatics Vol. 14" 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.

S□A

V□A

S□A

V□A

VM

VR

VH

VHS