

Conforming to OSHA Standard
Pressure Relief 3 Port Valve with Locking Holes

VHS20/30/40/50, VHS2510/3510/4510/5510 Series

Single Action

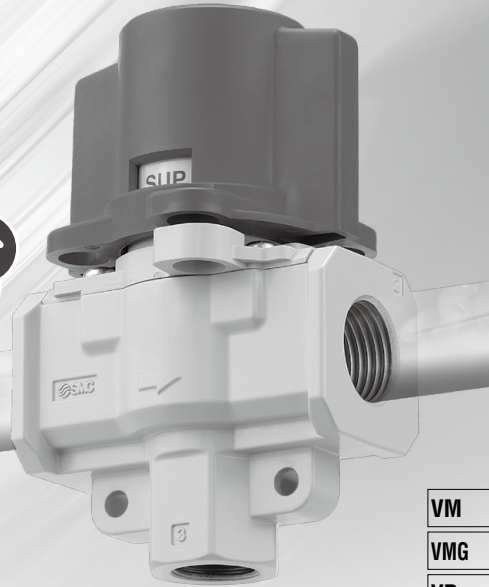
Double Action

RoHS

Weight ↓
 Max. **60%**
 Lighter
 * VHS20

Sonic
 Conductance
 $C[\text{dm}^3/\text{s}\cdot\text{bar}]$
 ↑
 Max. **45%**
 Up

Energy Saving
 Zero blow-by of the air during switching of the handle



- VM
- VMG
- VR
- VR51
- VHK
- VH
- VHS
- VHS

Safety Measure

Double action

Step2

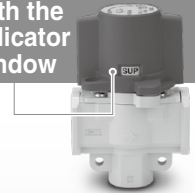
Step1 ↓



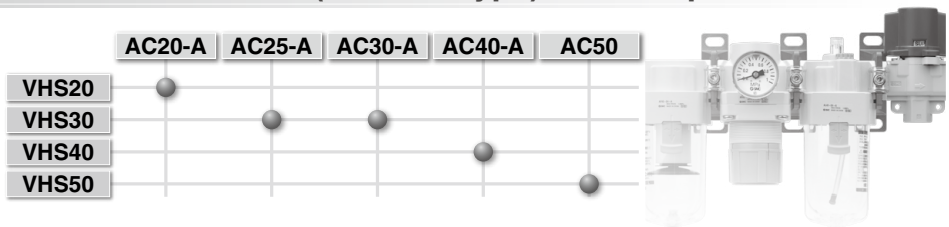
With locking holes



With the indicator window



Combination with a (modular type) F.R.L. is possible.



Lightweight

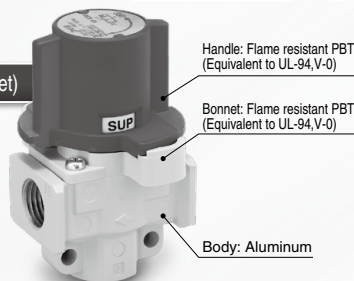
Resin handle and bonnet is standard.

Weight Maximum **60%** Lighter

Material: Resin (Handle, bonnet)

76 g

VHS20 (Aluminum body is standard): 190 g



VHS20-□A

Aluminum handle and bonnet type is available.



VHS20-□B

Safety Measure

Can prevent accidents caused by inadvertent air supply problems.

With the indicator window



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

SUP: Supply **EXH**: Exhaust

Double action

Push the handle and then turn, 2-step action prevents malfunction.

Step1
Push down the handle



Step2
Turn the handle



With locking holes



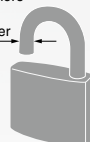
When in the exhaust position, the valve may be padlock secured. Prevents accidental start-ups while personnel are cleaning or servicing equipment.

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.

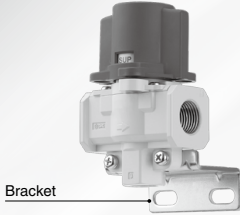
* Recommended lock shackle diameter size: $\phi 5$ or more

Shackle diameter

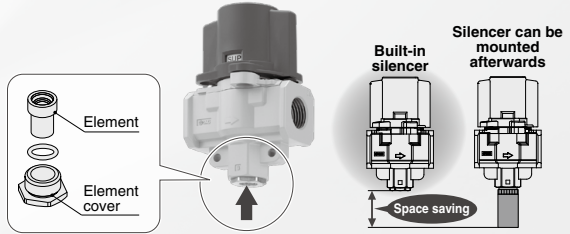


Options

With bracket



Built-in silencer (EXH port)



Made to Order (-X1)

Red body is available.



Variations

Port size 1/8, 1/4, and 3/8 are now available for double action type.

Single action		VHS20	VHS30	VHS40	VHS50
Double action		VHS2510	VHS3510	VHS4510	VHS5510
Port size (Rc, NPT, G)	1/8	●			
	1/4	●	●	●	
	3/8		●	●	
	1/2			●	●
	3/4				●
	1				●

- (Semi-standard) Handle: Black Flow direction: Right → Left
- (Option) With bracket Built-in silencer (EXH port)
- (Made to Order) Body: Red

- VM
- VMG
- VR
- VR51
- VHK
- VH
- VHS□
- VHS



Conforming to OSHA Standard Pressure Relief 3 Port Valve with Locking Holes (Single Action) **VHS20/30/40/50 Series**

RoHS

How to Order

Single action **VHS 40** - **04** **A** - **BS** - - -

Pressure relief 3 port valve

Body size

Symbol	Body size
20	20
30	30
40	40
50	50

Thread type

Symbol	Thread type
Nil	Rc
N	NPT
F	G

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	—	—	—	●

Handle / Bonnet material

Symbol	Material
A	Flame resistant PBT
B	Aluminum

Made to Order

Symbol	Description
X1	Body: Red (Note)

Note) Refer to Photo of X1 in page 1707 for the appearance.

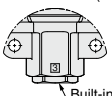
Semi-standard specifications

Symbol	Description
Nil	—
K	Handle color: Black
R	Flow direction: Right → 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).

Options

Symbol	Description
Nil	—
B	With bracket
S	Built-in silencer (EXH port)



A spacer or spacer with bracket is required if the valve is combined with modular F.R.L. Please order it separately.
VHS type can be ordered from How to Order of modular F.R.L. combination.

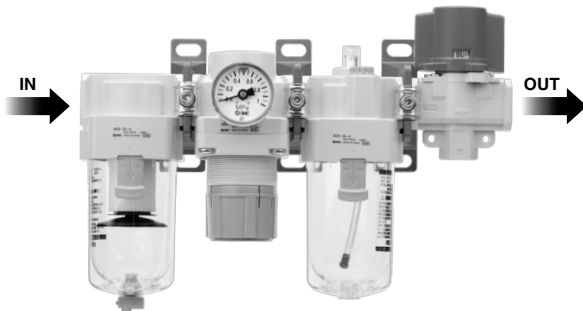
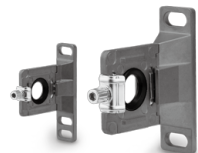
Pressure relief 3 port valve	Spacer part no.	Spacer with bracket part no.	Applicable air preparation equipment
VHS20	Y200-A	Y200T-A	AC20-A, B
VHS30	Y300-A	Y300T-A	AC25-A, B, AC30-A, B
VHS40	Y400-A	Y400T-A	AC40-A, B
VHS40-06	Y500-A	Y500T-A	AC40-06-A, B
VHS50	Y600-A	Y600T-A	AC50-B, AC55-B, AC60-B

* New VHS series compatible with old spacer Y200 (T) to Y600 (T).

Spacer

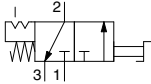


Spacer with bracket





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

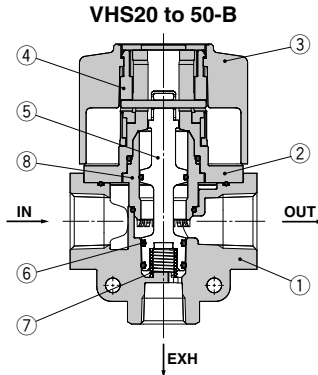
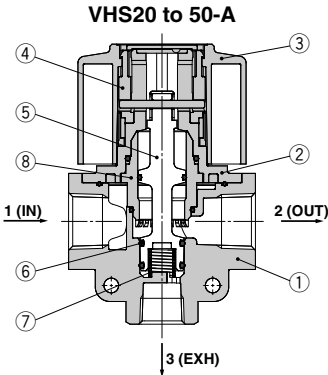
Standard specifications

Model	VHS20	VHS30	VHS40	VHS40-06	VHS50
Fluid	Air				
Ambient and fluid temperature	-5 to 60°C (No freezing)				
Proof pressure	1.5 MPa				
Operating pressure range	0.1 to 1.0 MPa				
Handle switching angle	90°				
Paint color (Standard)	Handle: Red Body: White				
Weight	A (Handle, bonnet: Flame resistant PBT)	76 g	127 g	247 g	532 g
	B (Handle, bonnet: Aluminum)	92 g	156 g	301 g	630 g

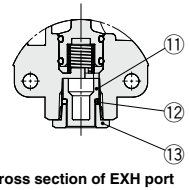
Flow rate characteristics

Model	Port size		Flow rate characteristics					
	IN, OUT	EXH	IN→OUT			OUT→EXH		
			C (dm³/s·bar)	b	Cv	C (dm³/s·bar)	b	Cv
VHS20	1/8	1/8	2.4	0.43	0.65	2.5	0.39	0.69
	1/4		3.3	0.40	0.88	3.1	0.51	0.84
VHS30	1/4	1/4	6.4	0.45	1.7	6.2	0.38	1.7
	3/8		8.3	0.41	2.3	7.0	0.41	1.9
VHS40	1/4	3/8	7.3	0.49	2.0	8.5	0.35	2.3
	3/8		10.9	0.45	3.0	11.6	0.40	3.1
	1/2		14.2	0.39	3.8	13.3	0.43	3.6
VHS40-06	3/4	1/2	18.3	0.31	5.0	17.7	0.37	4.8
	3/4		23.8	0.41	6.4	21.8	0.41	5.9
VHS50	1	1/2	31.9	0.33	8.6	23.5	0.44	6.4

Construction



Built-in silencer (Option)



Component Parts

No.	Description	Material		Note
		VHS20 to 50-A	VHS20 to 50-B	
1	Body	ADC12		White
2	Bonnet	Flame resistant PBT (UL-94 Standard V-0 equivalent)	ADC12	White
3	Handle	Flame resistant PBT (UL-94 Standard V-0 equivalent)	ADC12	Red
4	Cam ring	POM		—
5	Spool	PBT		—
6	Spool O-ring	H-NBR		—
7	Spool spring	Stainless steel		—
8	Sleeve	POM		—

* The VHS series cannot be disassembled. No repair parts available.

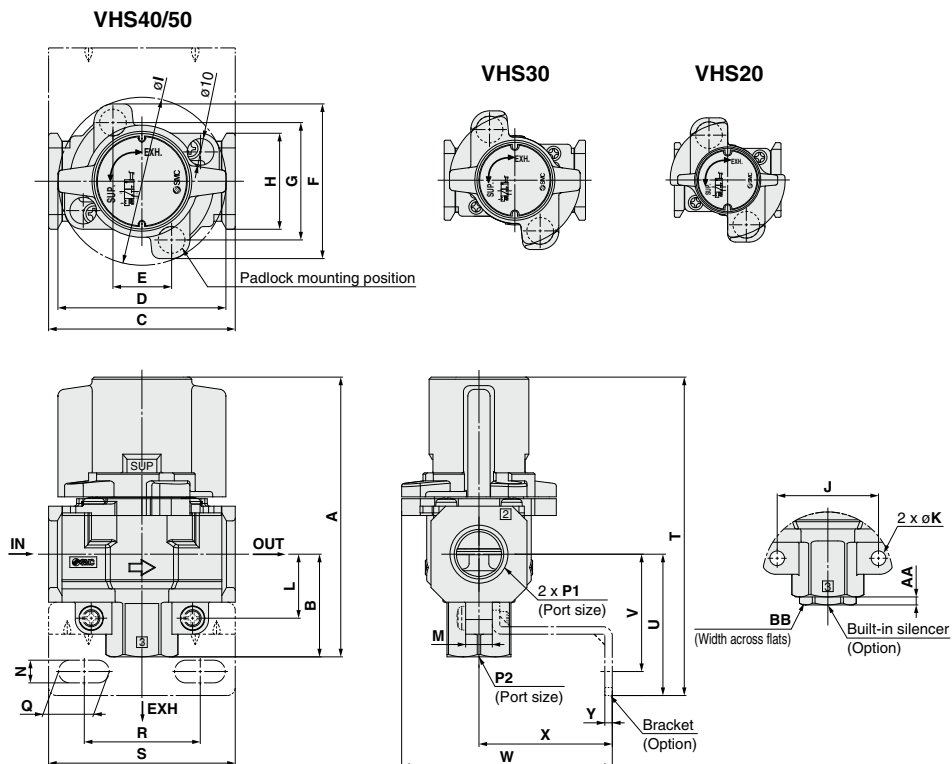
Option Part No.

Model	Bracket assembly part no. Note 1)	Silencer assembly part no. Note 2)
VHS20	VHS20PW-180AS	VHS20PW-190AS
VHS30	VHS30PW-180AS	VHS30PW-190AS
VHS40	VHS40PW-180AS	VHS40PW-190AS
VHS40-06	VHS40PW-180-06AS	VHS40PW-190-06AS
VHS50	VHS50PW-180AS	VHS50PW-190AS

Note 1) Bracket/1pc., mounting screw/2pcs.
 Note 2) Element ①, element O-ring ②, element cover ③
 1pc. for each.

VHS20/30/40/50 Series

Dimensions



Dimensions

(mm)

Model	Standard specifications															
	P1	P2	A	B	C	D	E	F		G	H	I	J	K	L	M
								A type	B type							
VHS20	1/8, 1/4	1/8	66.4	22.3	40	37.5	14	46.6	47.2	33.6	28	43	24	4.5	14.8	9
VHS30	1/4, 3/8	1/4	80.3	29.4	53	49	19	52		38	30	49	30	4.5	19	9
VHS40	1/4, 3/8, 1/2	3/8	104.9	38.5	70	63	22	58		44	36	63	38	5.5	24	10
VHS40-06	3/4	1/2	110.4	42	75	63	22	58		44	44	63	43	5.5	26	10
VHS50	3/4, 1	1/2	134.3	53	90	76	26	76		61	53	81	50	6.5	31	12

Model	Options specifications											
	With bracket										Built-in silencer	
	N	Q	R	S	T	U	V	W	X	Y	AA	BB
VHS20	5.4	8.4	27	40	75.4	31.3	25.3	53.3	30	2.3	3	12
VHS30	6.5	10	36.5	53	90.9	40	33	67	41	2.3	3	14
VHS40	8.5	19	43.5	70	119.4	53	44	79	50	2.8	3	19
VHS40-06	8.5	19	43.5	70	123.4	55	46	79	50	2.8	4	22
VHS50	11	27.5	49.5	90	152.3	71	60	108	70	3.2	4	22

Conforming to OSHA Standard Pressure Relief 3 Port Valve with Locking Holes (Double Action) **VHS2510/3510/4510/5510 Series**

RoHS

How to Order

Double action VHS 4 510 - [] 04 A - BS - [] - []

Pressure relief 3 port valve

Body size

Symbol	Body size
2	2
3	3
4	4
5	5

Double action

Thread type

Symbol	Thread type
Nil	Rc
N	NPT
F	G

Port size

Symbol	Port size	Body size			
		2	3	4	5
01	1/8	●	—	—	—
02	1/4	●	●	—	—
03	3/8	—	●	●	—
04	1/2	—	—	●	—
06	3/4	—	—	●	●
10	1	—	—	—	●

Handle / Bonnet material

Symbol	Material
A	Flame resistant PBT
B	Aluminum

Made to Order

Symbol	Description
X1	Body: Red Note)

Note) Refer to Photo of X1 in page 1707 for the appearance.

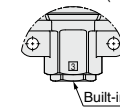
Semi-standard specifications

Symbol	Description
Nil	—
K	Handle color: Black
R	Flow direction: Right → 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).

Options

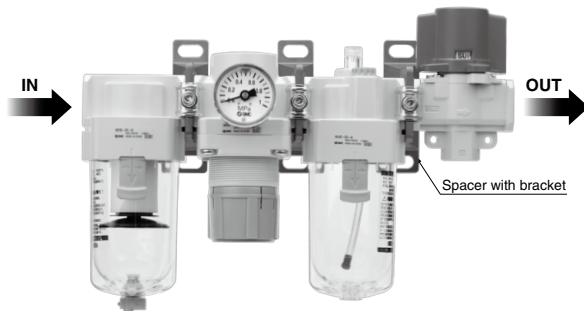
Symbol	Description
Nil	—
B	With bracket
S	Built-in silencer (EXH port)



A spacer or spacer with bracket is required if the valve is combined with modular F.R.L. Please order it separately.

Pressure relief 3 port valve	Spacer part no.	Spacer with bracket part no.	Applicable air preparation equipment
VHS2510	Y200-A	Y200T-A	AC20-A, B
VHS3510	Y300-A	Y300T-A	AC25-A, B, AC30-A, B
VHS4510	Y400-A	Y400T-A	AC40-A, B
VHS4510-06	Y500-A	Y500T-A	AC40-06-A, B
VHS5510	Y600-A	Y600T-A	AC50-B, AC55-B, AC60-B

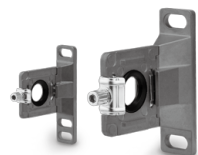
* New VHS series compatible with old spacer Y200 (T) to Y600 (T).



Spacer



Spacer with bracket



VM

VMG

VR

VR51

VHK

VH

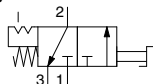
VHS

VHS

VHS2510/3510/4510/5510 Series



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

Standard specifications

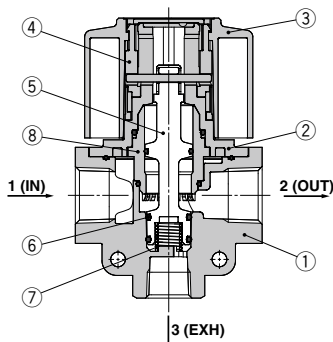
Model	VHS2510	VHS3510	VHS4510	VHS4510-06	VHS5510
Fluid	Air				
Ambient and fluid temperature	-5 to 60°C (No freezing)				
Proof pressure	1.5 MPa				
Operating pressure range	0.1 to 1.0 MPa				
Handle switching angle	90°				
Paint color (Standard)	Handle: Red Body: White				
Weight	A (Handle, bonnet: Flame resistant PBT)	77 g	129 g	250 g	536 g
	B (Handle, bonnet: Aluminum)	93 g	158 g	304 g	635 g

Flow rate characteristics

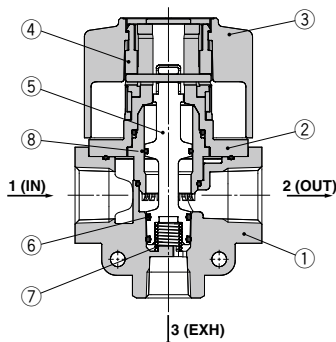
Model	Port size		Flow rate characteristics					
	IN, OUT	EXH	IN→OUT			OUT→EXH		
			C (dm³/s·bar)	b	Cv	C (dm³/s·bar)	b	Cv
VHS2510	1/8	1/8	2.4	0.43	0.65	2.5	0.39	0.69
	1/4		3.3	0.40	0.88	3.1	0.51	0.84
VHS3510	1/4	1/4	6.4	0.45	1.7	6.2	0.38	1.7
	3/8		8.3	0.41	2.3	7.0	0.41	1.9
VHS4510	1/4	3/8	7.3	0.49	2.0	8.5	0.35	2.3
	3/8		10.9	0.45	3.0	11.6	0.40	3.1
VHS4510-06	1/2	3/8	14.2	0.39	3.8	13.3	0.43	3.6
	3/4		18.3	0.31	5.0	17.7	0.37	4.8
VHS5510	3/4	1/2	23.8	0.41	6.4	21.8	0.41	5.9
	1		31.9	0.33	8.6	23.5	0.44	6.4

Construction

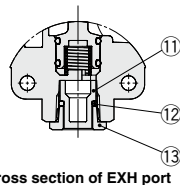
VHS2510 to 5510-A



VHS2510 to 5510-B



Built-in silencer (Option)



Cross section of EXH port

Component Parts

No.	Description	Material		Note
		VHS2510 to 5510-A	VHS2510 to 5510-B	
1	Body	ADC12		White
2	Bonnet	Flame resistant PBT (UL-94 Standard V-0 equivalent)	ADC12	White
3	Handle	Flame resistant PBT (UL-94 Standard V-0 equivalent)	ADC12	Red
4	Cam ring	POM		—
5	Spool	PBT		—
6	Spool O-ring	H-NBR		—
7	Spool spring	Stainless steel		—
8	Sleeve	POM		—

Option Part No.

Model	Bracket assembly part no. (Note 1)	Bracket assembly part no. (Note 2)
VHS2510	VHS20PW-180AS	VHS20PW-190AS
VHS3510	VHS30PW-180AS	VHS30PW-190AS
VHS4510	VHS40PW-180AS	VHS40PW-190AS
VHS4510-06	VHS40PW-180-06AS	VHS40PW-190-06AS
VHS5510	VHS50PW-180AS	VHS50PW-190AS

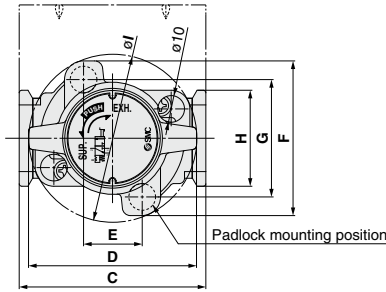
Note 1) Bracket/1pc., mounting screw/2pcs.

Note 2) Element ①, element O-ring ②, element cover ③ 1pc. for each.

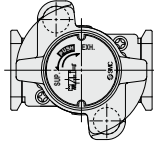
* The VHS series cannot be disassembled. No repair parts available.

Dimensions

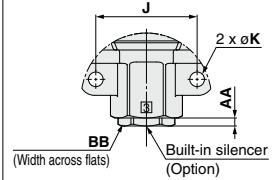
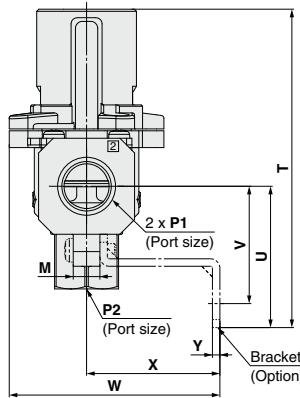
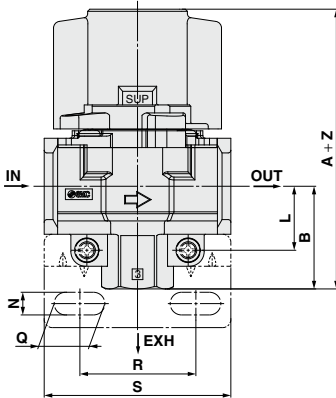
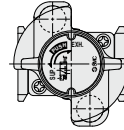
VHS4510/5510



VHS3510



VHS2510



Dimensions

Model	Standard specifications															(mm)	
	P1	P2	A	B	C	D	E	F		G	H	I	J	K	L	M	Z
								A type	B type								
VHS2510	1/8, 1/4	1/8	66.4	22.3	40	37.5	14	46.6	47.2	33.6	28	43	24	4.5	14.8	9	3.2
VHS3510	1/4, 3/8	1/4	80.3	29.4	53	49	19		52	38	30	49	30	4.5	19	9	3.2
VHS4510	1/4, 3/8, 1/2	3/8	104.9	38.5	70	63	22		58	44	36	63	38	5.5	24	10	4.2
VHS4510-06	3/4	1/2	110.4	42	75	63	22		58	44	44	63	43	5.5	26	10	4.2
VHS5510	3/4, 1	1/2	134.3	53	90	76	26		76	61	53	81	50	6.5	31	12	4.2

Model	Options specifications											
	With bracket										Built-in silencer	
	N	Q	R	S	T	U	V	W	X	Y	AA	BB
VHS2510	5.4	8.4	27	40	75.4	31.3	25.3	53.3	30	2.3	3	12
VHS3510	6.5	10	36.5	53	90.9	40	33	67	41	2.3	3	14
VHS4510	8.5	19	43.5	70	119.4	53	44	79	50	2.8	3	19
VHS4510-06	8.5	19	43.5	70	123.4	55	46	79	50	2.8	4	22
VHS5510	11	27.5	49.5	90	152.3	71	60	108	70	3.2	4	22

- VH
- VMG
- VR
- VR51
- VHK
- VH
- VHS



VHS20/30/40/50 Series

VHS2510/3510/4510/5510 Series Specific Product Precautions 1

Be sure to read this before handling the products.

Refer to back page 50 for Safety Instructions and pages 3 to 9 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. Do not apply negative pressure. It may result in malfunction.
3. 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.
4. We recommend using a lock with a shackle diameter of $\phi 5$ or more. If a lock with a shackle diameter of less than $\phi 5$ is to be used, please test it on the actual machine.

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 bonnet.
As this may cause malfunction.
3. Double action type requires two actions (push the handle + turn). Confirm that the handle is pushed properly before turning it. If the handle is not pushed properly to the end, the internal parts will be broken by turning the handle.

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 or less 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 Air Preparation System” for further details on compressed air quality.



VHS20/30/40/50 Series

VHS2510/3510/4510/5510 Series Specific Product Precautions 2

Be sure to read this before handling the products.

Refer to back page 50 for Safety Instructions and pages 3 to 9 for 3/4/5 Port Solenoid Valve Precautions.

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 (R) to prevent the ingress of dust if there is a lot of dust in the atmosphere.

If dust enters the valve via port 3 (R) , it may cause air leakage.

If above conditions (1 to 7) are applicable, use metal handle/bonnet type for your safety.

Maintenance

Warning

1. Perform maintenance procedures as shown in the operation 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.

Built-in Silencer (Option) Bronze Sintered Metal Element

Caution

Products made of bronze may contain uneven color due to the oxidization process of the atmosphere.

However, this oxidization process occurs in the limited range of less than 1 μm of thickness and is so thin as to not affect the product characteristics.

The uneven color occurs depending on the storage duration before utilization (stock as a product, stock in customer)

* If this is a problem, please contact SMC so that SMC can pre-treat them with nickel plating.

VM

VMG

VR

VR51

VHK

VH

VHS

VHS