High Pressure Coolant Valve

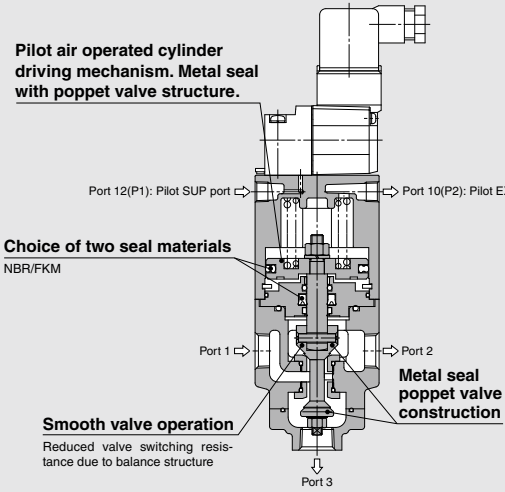
VNH Series

3.5 MPa, 7.0 MPa

Corresponding to high speed grinding and long drilling processes

[Option]

Coolant valve for high pressure coolant liquid (up to 3.5 MPa or 7.0 MPa) that is ideal for lubrication, dust blowing and cooling.
Valve for coolant



Series

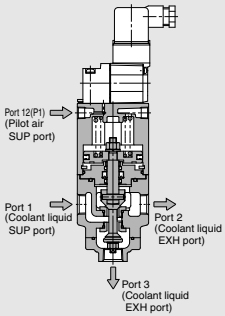
Operating fluid pressure	Port	Port size Rc
3.5 MPa	3 Port	3/8(10A), 1/2(15A) 3/4(20A), 1(25A)
7.0 MPa	2 port (Large flow type)	3/8(10A), 1/2(15A) 3/4(20A), 1(25A)
	3 Port	

Application Example

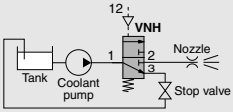
3 port valve (3.5 MPa, 7.0 MPa)

Piping

Inlet side (supply side): port 1, Outlet side (exhaust side): port 2 and port 3. Supply pilot air higher than 0.25 MPa to port 12(P1).

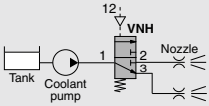


Ex. 1) 3 port valve: Reducing load to pump



For reducing load to pump, coolant liquid is returned from B port to tank each time.

Ex. 2) 3 port valve: Switching nozzle

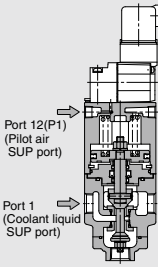


Switching nozzles on supplying coolant liquid.

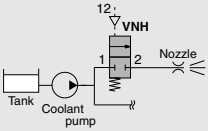
2 port valve (7.0 MPa)

Piping

Inlet side (supply side): port 1, Outlet side (exhaust side): port 2. Supply pilot air higher than 0.25 MPa to port 12(P1).



Ex.1) 2 port valve: Nozzle ON/OFF



High Pressure Coolant Valve: 3.5 MPa, 7.0 MPa

VNH Series

[Option]

How to Order

Air operated VNH 2 1 1 A – □ 15A – □

External pilot solenoid VNH 2 1 1 A – □ 15A – 1 D – □ – □

Note) Silencer is provided as standard on pilot EXH port (P2).

Port

1	3 port
3*	2 port

* 2 port is 7.0 MPa only.

Valve type

1	N.C./3.5 MPa
3	N.C./7.0 MPa

Thread type

Nil	Rc
F	G*
N	NPT
T	NPTF

* For connection, prepare a fitting compliant with ISO 16030 and JIS B 8674.

Seal material

A	NBR seals
B	FKM seals

Valve size / Port size

1	10A	3/8
2	15A	1/2
3	20A	3/4
4	25A	1

Rated voltage

1	100 VAC 50/60 Hz
2	200 VAC 50/60 Hz
3*	110 VAC 50/60 Hz
4*	220 VAC 50/60 Hz
5	24 VDC
6*	12 VDC
7*	240 VAC 50/60 Hz

* Semi-standard
For other rated voltages, please consult with SMC.

Electrical entry/With light/surge voltage suppressor

D	DIN terminal
DZ	DIN terminal with light/surge voltage suppressor

Option

Nil	None
B	With bracket

CE/UKCA-compliant

Nil	—
Q	CE/UKCA-compliant

Option

Description		Component part no.			
		VNH1□□	VNH2□□	VNH3□□	VNH4□□
Bracket (With bolt and washer)	B	VNH1-A16	VNH2-A16	VNH3-A16	VNH4-A16

How to Order Pilot Solenoid Valves

VO307 – 5 D 1 – Q

Rated voltage

1	100 VAC 50/60 Hz
2	200 VAC 50/60 Hz
3*	110 VAC 50/60 Hz
4*	220 VAC 50/60 Hz
5	24 VDC
6*	12 VDC
7*	240 VAC 50/60 Hz

* Semi-standard
For other rated voltages, please consult with SMC.

Light/surge voltage suppressor

		CE/UKCA-compliant
D	DIN terminal	●
DZ	DIN terminal with light/surge voltage suppressor	●

CE/UKCA-compliant

Nil	—
Q	CE/UKCA-compliant

Accessory
Function plate for VO307 (D sealing, with thread): DXT152-14-5A

Specifications

Model		3 port valve								2 port valve			
		VNH111A/B -10A	VNH211A/B -15A	VNH311A/B -20A	VNH411A/B -25A	VNH113A/B -10A	VNH213A/B -15A	VNH313A/B -20A	VNH413A/B -25A	VNH133A/B -10A	VNH233A/B -15A	VNH333A/B -20A	VNH433A/B -25A
Operating fluid pressure		0 to 3.5 MPa				0 to 7.0 MPa							
Fluid (Main piping)		Coolant Note 2)											
Operation		External pilot solenoid/Air operated											
Operating fluid temperature	**VNH□□1A**	–5 to 60°C Note 1)/–5 to 60°C Note 1) (NBR seal)											
	VNH□□1B	–5 to 60°C Note 1)/–5 to 99°C Note 1) (FKM seal)											
Pilot air	**Pressure**	0.25 to 0.7 MPa											
	Temperature	–5 to 50°C Note 1)											
	Lubrication	Not required (Use turbine oil Class 1 ISO VG32, if lubricated.)											
Proof pressure		5.5 MPa				10.5 MPa							
Ambient temperature		–5 to 50°C Note 1)											
Max. operating frequency		20 times/min											
Mounting position		Vertical upwards											
Port size		3/8	1/2	3/4	1	3/8	1/2	3/4	1	3/8	1/2	3/4	1
Orifice diameter (mm)		ø7.1 *	ø8.7 *	ø10.6 *	ø14.3 *	ø3.9 *	ø5.2 *	ø6.2 *	ø7.3 *	ø8	ø9.5	ø13	ø15.7
Flow rate characteristics	**Kv**	1.6	3.1	3.9	6.8	0.5	1.0	1.4	2.1	1.9	2.7	5.0	7.5
	Conversion Cv	1.9	3.6	4.5	7.8	0.6	1.2	1.6	2.4	2.2	3.1	5.8	8.7
Pilot port size		1/8		1/4		1/8		1/4		1/8		1/4	
Weight (kg)		2	3.1	5.6	8.2	2	3.1	5.6	8.2	2	3.1	5.6	8.2
Face-to-face dimension (mm)		60	80	100	115	60	80	100	115	60	80	100	115

* Equivalent size
Note 1) No freezing
Note 2) This product cannot be used for water applications.

3.5 MPa

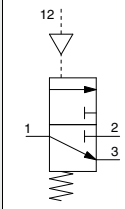
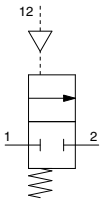
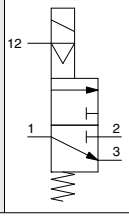
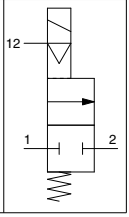
7.0 MPa

Pilot Operated Solenoid Valve Specifications

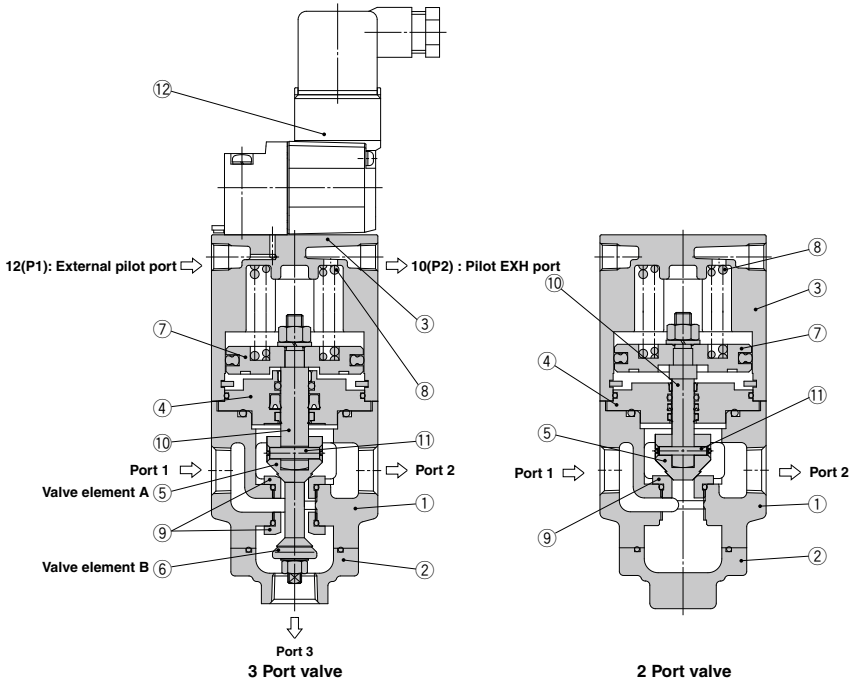
Pilot solenoid valve			VO307-□□1(-Q)
Electrical entry			DIN terminal
Coil rated voltage (V)	**AC (50/60 Hz)**		100 V, 200 V, Other voltage (Semi-standard)
	DC		24 V, Other voltage (Semi-standard)
Allowable voltage fluctuation			–15 to +10% of the rated voltage
Temperature rise			50°C or less (When rated voltage is applied.)
Apparent power	**AC**	**Inrush**	12.7 VA (50 Hz), 10.7 VA (60 Hz)
		Holding	7.6 VA (50 Hz), 5.4 VA (60 Hz)
Power consumption	**DC**		4 W (without light), 4.2 W (with light)
Manual override			Non-locking push type

Note) Refer to page 628 for how to order pilot solenoid valves.

Symbol

Valve type / Operation	3 Port	2 Port
Air operated		
External pilot Solenoid		

Construction



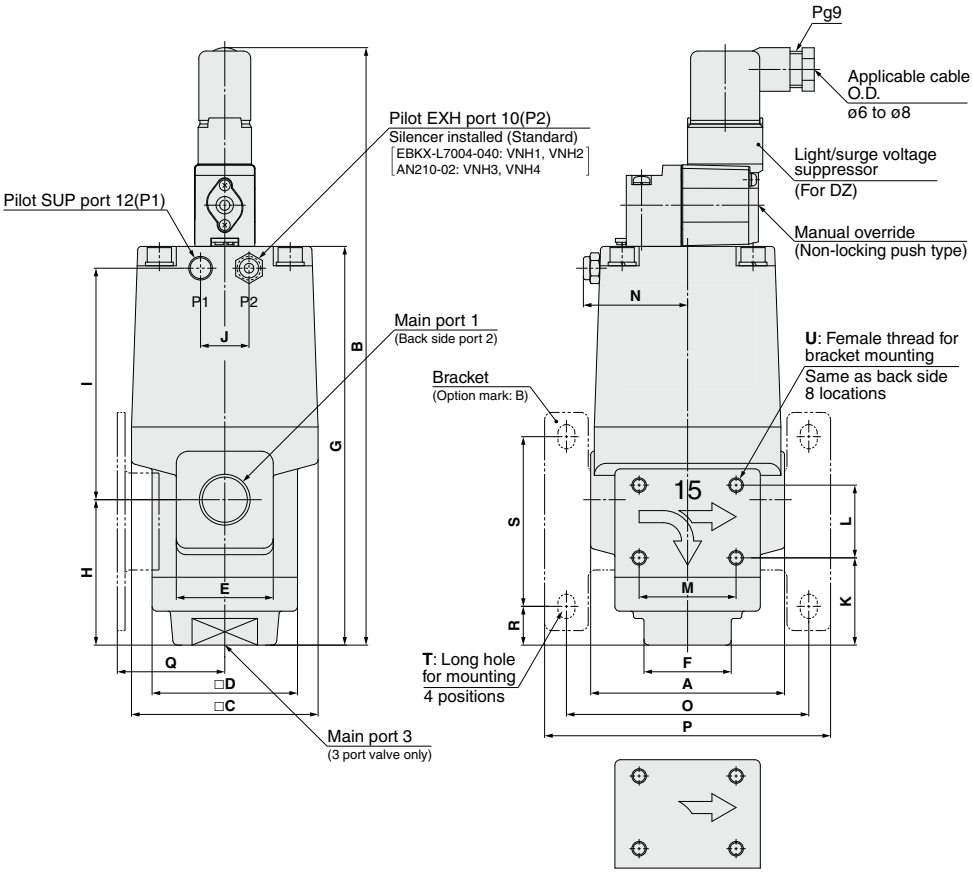
Working Principle

When the pilot operated solenoid valve ⑫ is not energized, the valve element A ⑤ connected to the piston ⑦ is closed by the return spring ⑧. Then valve element B ⑥ connected to the valve element A ⑤ is open. When the pilot operated solenoid valve ⑫ is energized (or when pressurized air enters through the port 12(P1) of the air operated type), the pilot air supplied to the bottom of the piston ⑦ moves upward to open the valve element A ⑤ and closes the valve element B ⑥.

Component Parts

No.	Description	Material	Note
1	**Body**	Cast iron	Plated
2	**Undercover**	Cast iron	Plated
3	**Cover**	Aluminum alloy	
4	**Plate**	Iron	
5	**Valve element A**	Stainless steel	
6	**Valve element B**	Stainless steel	
7	**Piston**	Aluminum alloy	
8	**Return spring**	Piano wire	
9	**Valve seat**	Stainless steel	
10	**Rod**	Stainless steel	
11	**Parallel pin**	Stainless steel	
12	**Pilot solenoid valve**	Refer to "How to Order Pilot Solenoid Valves" on page 628.	

Dimensions



Dimensions

(mm)

Model	Main port 1, 2, 3		Pilot port	A	B Note)	C	D	E	F	G	H	I
	2 Port	3 Port	12(P1), 10(P2)									
VNH1□□$^{A}_{B}$-10A	2 x 3/8	3 x 3/8	1/8	60	217 (219)	60	46	34	24	135	50	77
VNH2□□$^{A}_{B}$-15A	2 x 1/2	3 x 1/2	1/8	80	246.5 (248.5)	77	60	40	36	164.5	60	95.5
VNH3□□$^{A}_{B}$-20A	2 x 3/4	3 x 3/4	1/4	100	282 (284)	96	76	50	41	200	79	111
VNH4□□$^{A}_{B}$-25A	2 x 1	3 x 1	1/4	115	301 (303)	113	85	60	50	219	90	119

Note) ( ): CE/UKCA-compliant product (-Q)

Model	J	K	L	M	N	O	P	Q	R	S	T	U
VNH1□□$^{A}_{B}$-10A	–	29	25	30	37	75	88	36	10.5	62	6 x 8	M5 x 0.8 depth 5.5
VNH2□□$^{A}_{B}$-15A	20	36	30	40	43	100	118	44.4	16	70	7 x 10	M6 x 1 depth 6
VNH3□□$^{A}_{B}$-20A	24	48	35	50	50.5	126	148	57.7	19.5	92	9 x 12	M8 x 1.25 depth 6
VNH4□□$^{A}_{B}$-25A	24	51	38	56	58.5	141	163	66.4	15.5	109	9 x 12	M8 x 1.25 depth 6

VNH Series
Specific Product Precautions

Be sure to read this before handling the products.
Refer to back page 50 for Safety Instructions and pages 17 to 19 for 2 Port Solenoid Valve for Fluid Control Precautions.

Design

⚠Warning

1. Extended periods of continuous energization

If a valve is continuously energized for long periods, heat generation of the coil may result in reduced performance and shorter service life. This may also have an adverse effect on the peripheral equipment in proximity. Should a valve be continuously energized for long periods, or its daily energized state exceeds its non energized state, please use a valve with DC specifications. Additionally, when using with AC, energizing for long periods of time continously, select the air-operated valve and use the continuous duty type of the VT307 for a pilot valve.

Mounting

⚠Warning

1. Do not apply external force to the coil section.

When tightening is performed, apply a wrench or other tool to the outside of the piping connection parts.

2. Do not warm the coil assembly with a heat insulator, etc.

Use tape, heaters, etc., for freeze prevention on the piping and body only. They can cause the coil to burn out.

3. Avoid sources of vibration, or adjust the arm from the body to the minimum length so that resonance will not occur.

4. When mounted in the vertical downward direction, foreign matter can remain in the plate assembly part if there are foreign matters in the coolant. For this reason, avoid mounting in the vertical downward direction as much as possible.

5. Mount the VNH series vertically top side up.

Piping

⚠Caution

1. Applied voltage

When electric power is connected to a solenoid valve, be careful to apply the proper voltage. Improper voltage may cause malfunction or coil damage.

2. Confirm the connections.

After completing the wiring, confirm that the connections are correct.

Piping

⚠Caution

When high temperature fluids are used, use fittings and tubing with heat resistant features.
(Self-align fittings, PTFE tubing, Copper tubing, etc.)

Mounting Direction of Pilot Solenoid Valve

⚠Warning

With external pilot solenoids, the pilot solenoid valves are not splash proof specifications, and so care must be taken not to get fluid on oneself such as when performing maintenance.

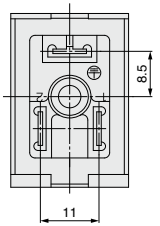
⚠Caution

Direction of mounting

When replacing a valve, if an external pilot solenoid valve is mounted in the wrong direction, it may malfunction or leak air.

Pitch between terminals of the DIN terminal

Refer to the drawing below for the pitch between terminals of the DIN terminal.



External Pilot

⚠Caution

Pilot port piping

12 (P1) and 10 (P2) piping should be as follows according to the model.

Port	Air operated	Solenoid
12 (P1)	External pilot	External pilot
10 (P2)	Bleed port	Pilot exhaust

Fluid quality

⚠Caution

Please note that using fluids that contain foreign mterial (especially hard objects like glass chips), may cause damage to the valve, will reduce sealing performance, and may cause early failure.

Back Pressure of 3 Port Valve (VNH series)

⚠Caution

1. Ensure that back pressure of 3 port from VNH□13 is less than 5 MPa.