

High Pressure Coolant Valve

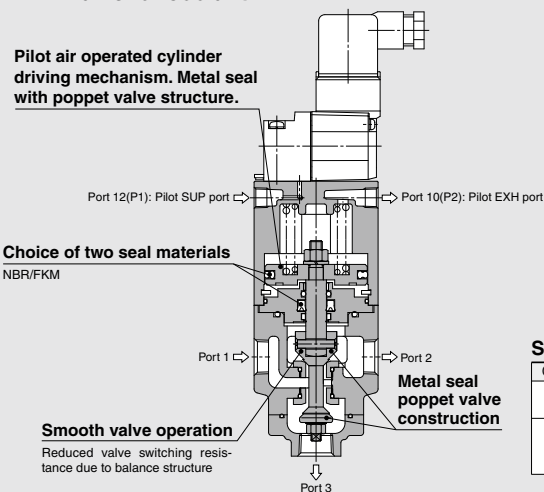
VNH Series

3.5 MPa, 7.0 MPa

Corresponding to high speed grinding and long drilling processes



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 Port	3/8(10A), 1/2(15A) 3/4(20A), 1(25A)

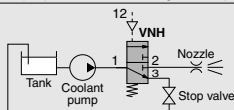
Application Example

3 port valve (3.5 MPa, 7.0 MPa)

Piping

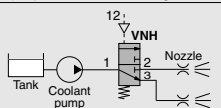
Inlet side (supply side): port 1, Outlet side (exhaust side): port 2 and port 3. Supply pilot air higher than 0.25 MPa to port 12(P1).

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

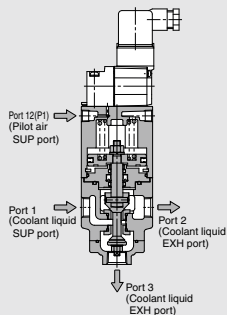


For reducing load to pump, coolant liquid is returned from B port to tank each time.

Ex. 2) 3 port valve: Switching nozzle



Switching nozzles on supplying coolant liquid.

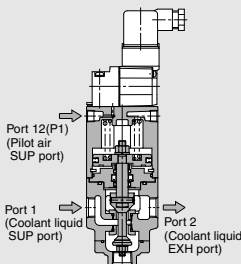
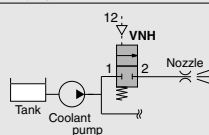


2 port valve (7.0 MPa)

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



VNA
VNB
SGC
SGH
VNC
VNH
VND
VCC
TQ



High Pressure Coolant Valve: 3.5 MPa, 7.0 MPa **VNH Series**



How to Order

Air operated

External pilot solenoid

VNH 2 1 1 A - 15A -

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

Seal material

A	NBR seals
B	FKM seals

Valve size

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

Thread type

Nll	Rc
F	G
N	NPT
T	NPTF

CE-compliant

Nll	—
Q	CE-compliant

Option

Nll	None
B	With bracket

Electrical entry/With light/surge voltage suppressor

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

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

Option

Description		Component part no.			
		VNH1□□	VNH2□□	VNH3□□	VNH4□□
Bracket (With bolt and washer)	B	VNH1-16	VNH2-16	VNH3-16	VNH4-16

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

CE-compliant

Nll	—
Q	CE-compliant

Light/surge voltage suppressor

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

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

Accessory

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

Specifications

Model		3 port valve								2 port valve			
		VNH111 ^A _B -10A	VNH211 ^A _B -15A	VNH311 ^A _B -20A	VNH411 ^A _B -25A	VNH113 ^A _B -10A	VNH213 ^A _B -15A	VNH313 ^A _B -20A	VNH413 ^A _B -25A	VNH133 ^A _B -10A	VNH233 ^A _B -15A	VNH333 ^A _B -20A	VNH433 ^A _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□□:A	-5 to 60°C ^{Note 1)/} -5 to 60°C ^{Note 1)} (NBR seal)											
	VNH□□:B	-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.

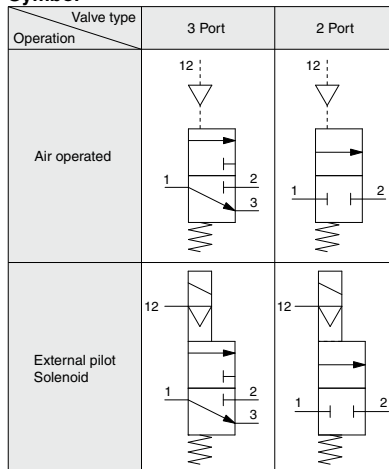


Pilot Operated Solenoid Valve Specifications

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	12.7 VA (50 Hz), 10.7 VA (60 Hz)
	Inrush Holding	7.6 VA (50 Hz), 5.4 VA (60 Hz)
Power consumption		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



VNA

VNB

SGC

SGH

VNC

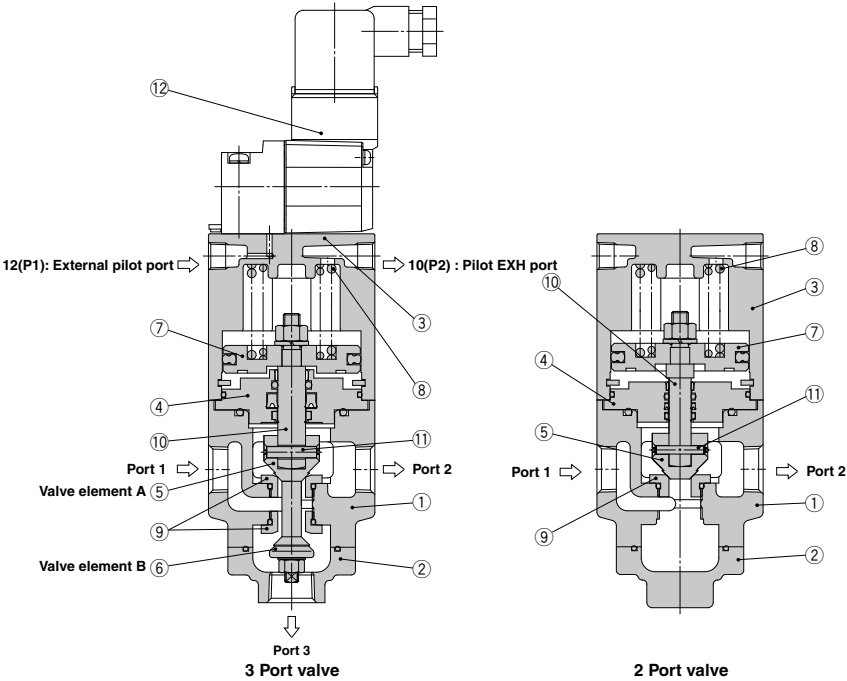
VNH

VND

VCC

TQ

Construction



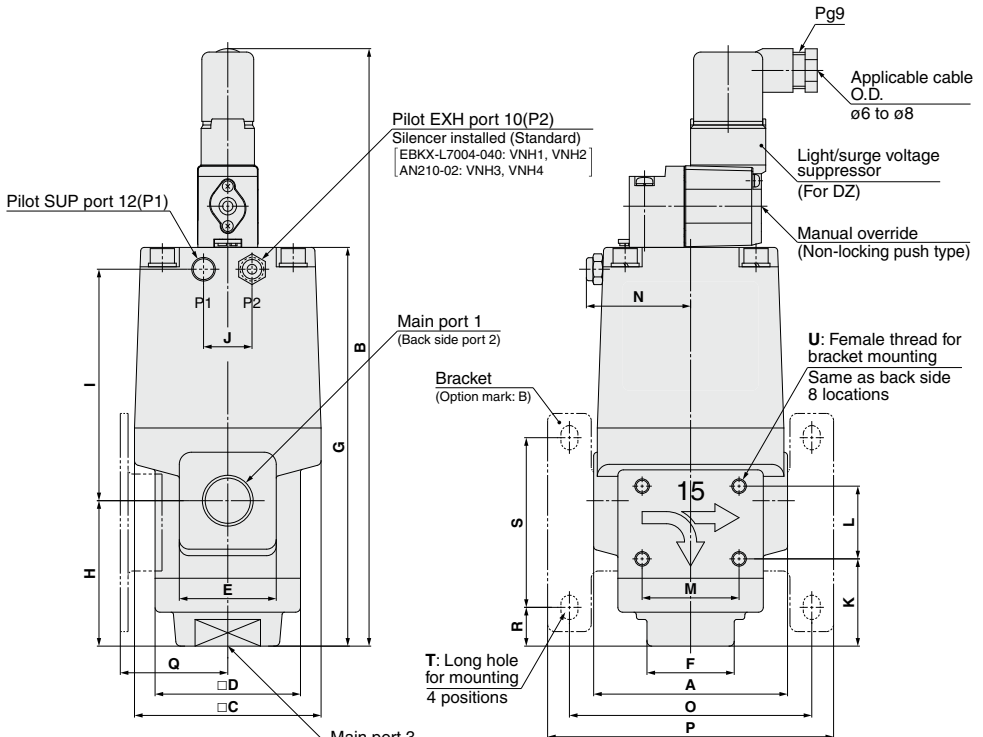
Working Principle

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

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

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

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

VNA

VNB

SGC

SGH

VNC

VNH

VND

VCC

TQ



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 continuously, 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.

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 material (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.