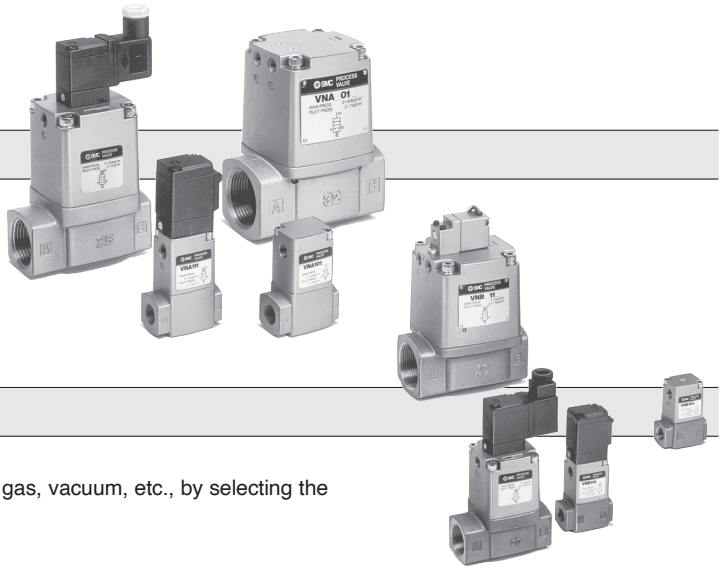
For General Purpose

2/3 Port Valve

Process Valve/VN Series

- ■The cylinder operation by external pilot air
- ■Can be operated with pressure differential zero.
- ■Wide variations

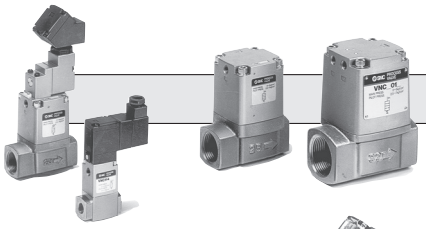


VNA Series

For controlling pneumatic systems or air-hydro circuits.
A balance poppet that enables air to flow forward or backward.

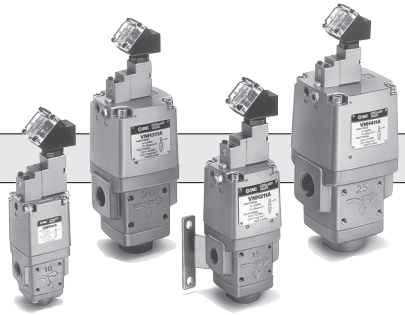
VNB Series

For controlling various fluids
Can operate with a wide range of fluids, such as air, water, oil, gas, vacuum, etc., by selecting the body material and the seal material.



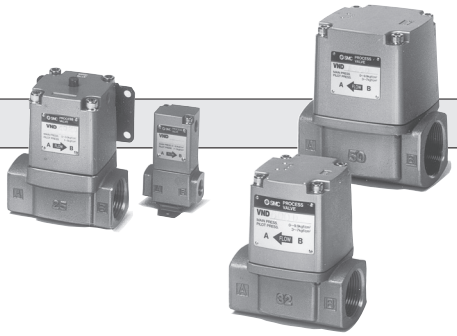
VNC Series

For controlling the cutting oils and coolants used in machine tools.
Metal seals are used for preventing foreign matter such as cutting chips from entering.
Maximum operating pressure: 0.5 MPa, 1 MPa



VNH Series

For controlling the high pressure cutting oils and coolants used in machine tools.
Maximum operating pressure: 3.5 MPa, 7 MPa



VND Series

For steam control
PTFE seal adopted
With indicator (Option)

VN Series

SMC

EMC-VN-A-UK

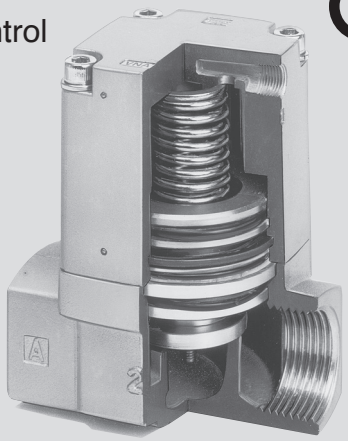
Process Valve

VNA Series

2 Port Valve For Compressed Air and Air-hydro Circuit Control

Exclusively for air pressure system and air-hydro circuit control

Universal 2 Port Valve



Cylinder actuation by external pilot air

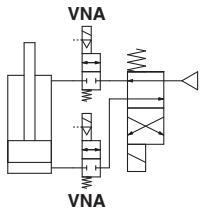
The balance poppet permits normal and reverse flow.

Operation from 0 MPa is possible.

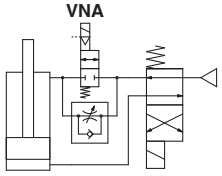
Wide variations
N.C., N.O., C.O., types are available. Threaded type from 6A to 50A is standardized.

Compressed Air Air pressure circuit: Application examples

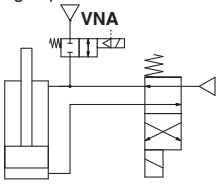
Actuator stop valve
Intermediate stop, inching



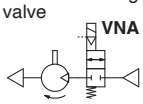
Actuator skip valve
Terminal deceleration, intermediate deceleration, accelerative start



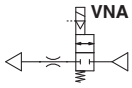
Actuator exhaust valve
High speed operation, high speed exhaust



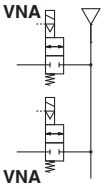
Air motor driving valve



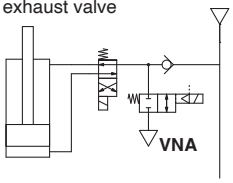
Air blow valve



Line stop valve

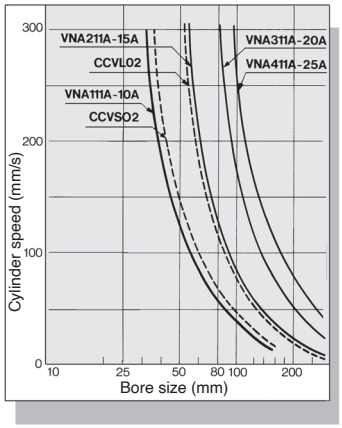


Residual line pressure exhaust valve



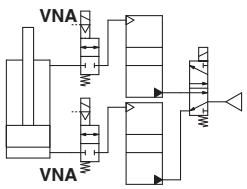
Air-hydro Air pressure circuit: Application examples

Operation Capacity When Used in Air-hydro Units



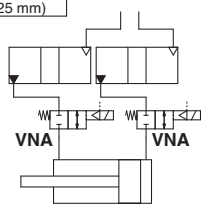
This series can supplement the capacity of current air-hydro valve units. They are suited to operate large bore cylinders as well as to simultaneously operate multiple cylinders and suspend their operation. Thus they can be used in the same way as the current air-hydro units.

Air-hydro circuit: Application example
Basic circuit



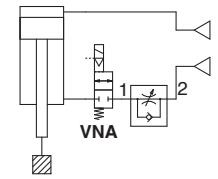
Conditions

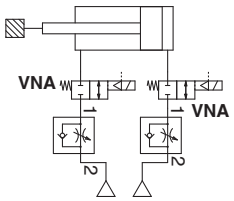
Supply pressure	0.49 MPa	
Hydraulic fluid	ISO VG32	
Load	No load	
Piping length	1 m	
Piping diameter	VNA111A, CCVSO2	3/8B (9 mm)
	VNA211A, CCVLO2	1/2B (13 mm)
	VNA311A	3/4B (19 mm)
	VNA411A	1B (25 mm)



⚠Caution

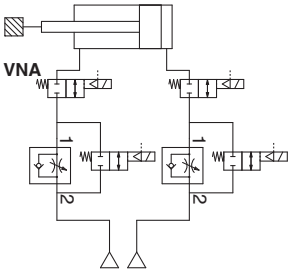
When speed controller is mounted
Connect a speed controller (AS series etc.) to A port of VNA□11 (in order to protect the speed control valve from surges when cylinder operation is suspended, thus improving stopping accuracy).

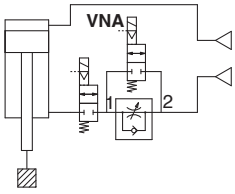




⚠Caution

Skip valve function
Combination of 2 or more valves of VNA series provides a skip valve function. Connect the skip valve to the A port side of a stop valve.





SMC

Process Valve: 2 Port Valve
For Compressed Air and Air-hydro Circuit Control
VNA Series

How to Order

Seal material

A	NBR seals
B	FKM seals
C	EPDM seals

Refer to "Table (1)" for availability.

Thread type

—	Rc
F	G*
N	NPT
T	NPTF

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

Bracket (Valve size: 1/2/3/4.)

—	None
B Note)	With bracket

Note) Only valve sizes 1, 2, 3 and 4.
Shipped after assembled at our factory.
Bracket part no.
Valve size 1: VN1-A16#1 (with thread)
Valve sizes 2 to 4: VN□-16#1 (□: 2 to 4)

Air operated

VNA 2 0 1 A – □ 15A – □

External pilot solenoid

VNA 2 1 1 A – □ 15A – 1 D □ – □ – Q

Valve size

Symbol	Orifice dia. (mm)
1	ø10
2	ø15
3	ø20
4	ø25
5	ø32
6	ø40
7	ø50

Valve type

Symbol 1 N.C.	Symbol 2 N.O.	Symbol 3 Note) C.O.
●	●	●

Port size

Symbol	Port size Rc
6A	1/8
8A	1/4
10A	3/8
10A	3/8
15A	1/2
20A	3/4
25A	1
32A	1 1/4
40A	1 1/2
50A	2

Note) Air operated only

Rated voltage

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

Note 2) Semi-standard

Manual override

—: Non-locking push type **A**: Non-locking push type A Note) (projecting) **B**: Slotted locking type B Note) (tool required)	Valve size 1 to 4
—: Non-locking push type	Valve size 5 to 7

Note) Semi-standard

Electrical entry/With light/surge voltage suppressor

Symbol	Electrical entry	Valve size 1 to 4	Valve size 5 to 7
D	DIN terminal	●	●
DZ	DIN terminal with light/surge voltage supressor	●	●

Table (1) Applicable Fluids

Model	**VNA□□□A** (Valve material: NBR seal)	**VNA□□□B** (Valve material: FKM seal)	**VNA□□□C** (Valve material: EPDM seal)
Fluid	Air (Standard, Dry) Carbon dioxide (CO_2) (Less than 0.7 MPa) Nitrogen gas (N_2) Turbine oil, Hydraulic fluid (Kinematic viscosity 40 to 100 mm²/s)	Argon Helium Turbine oil, Hydraulic fluid (Kinematic viscosity 40 to 100 mm²/s)	Carbon dioxide (CO_2) (0.7 MPa or more)

⚠ Caution

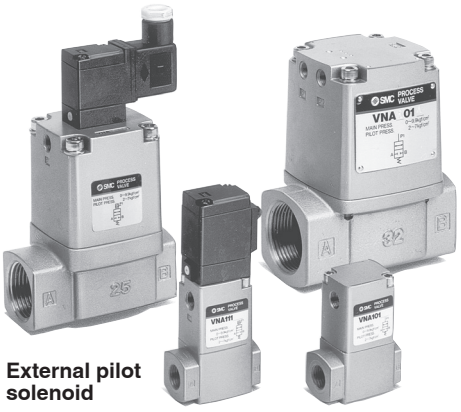
Note 1) This product cannot be used for water application.

Model

Model	Port size Rc	Orifice diameter ø (mm)	Flow rate characteristics					Weight (kg)	
			Measured by air			Measured by water Note)			
			C [dm³/(bar·sec)]	b	Cv	Kv	Conversion Cv	Air operated	External pilot solenoid
VNA1□□□-6A	1/8	10	3.5	0.35	0.88	0.9	1.0	0.1	0.2
VNA1□□□-8A	1/4		5.9	0.24	1.5	1.5	1.7		
VNA1□□□-10A	3/8		7.9	0.16	1.9	1.8	2.1		
VNA2□□□-10A		15	16	0.35	3.8	3.9	4.5	0.3	0.4
VNA2□□□-15A	1/2		23	0.25	4.8	4.6	5.4		
VNA3□□□-20A	3/4	20	34	0.16	7.5	7.5	8.7	0.5	0.6

Note) This product cannot be used for water application.

Model	Port size Rc	Orifice diameter ø (mm)	Flow rate characteristics			Weight (kg)	
			Measured by air	Measured by water			
			Effective area (mm²)	Kv	Conversion Cv	Air operated	External pilot solenoid
VNA4□□□-25A	1	25	220	10.4	12	0.8	0.9
VNA5□□□-32A	1 1/4	32	320	15.6	18	1.3	1.4
VNA6□□□-40A	1 1/2	40	500	24.2	28	2.1	2.2
VNA7□□□-50A	2	50	770	37.2	43	3.1	3.2



External pilot solenoid

Air operated

Specifications

Fluid (Main piping)		Refer to "Table (1)" on page 3
Fluid temperature	**VNA□□□ A**	–5 to 60°C Note 1)
	VNA□□□ B □□□ **C**	–5 to 99°C Note 1) (Air operated type only)
Ambient temperature		–5 to 50°C Note 1) (Air operated type: 60°C)
Proof pressure		1.5 MPa
Operating pressure range		0 to 1 MPa
External pilot air	**Pressure range**	0.2 to 0.7 MPa
	Lubrication	Not required (Use turbine oil Class 1 ISO VG32, if lubricated. Note 2))
	Temperature	–5 to 50°C Note 1) (Air operated type: 60°C)
Mounting orientation		Unrestricted Note 3)

Note 1) No freezing
Note 2) Lubrication is not allowed for use with EPDM seal material.
Note 3) For external pilot solenoid, it is recommended that the pilot solenoid valve be oriented either vertically upward or horizontally.

Pilot Solenoid Valve Specifications

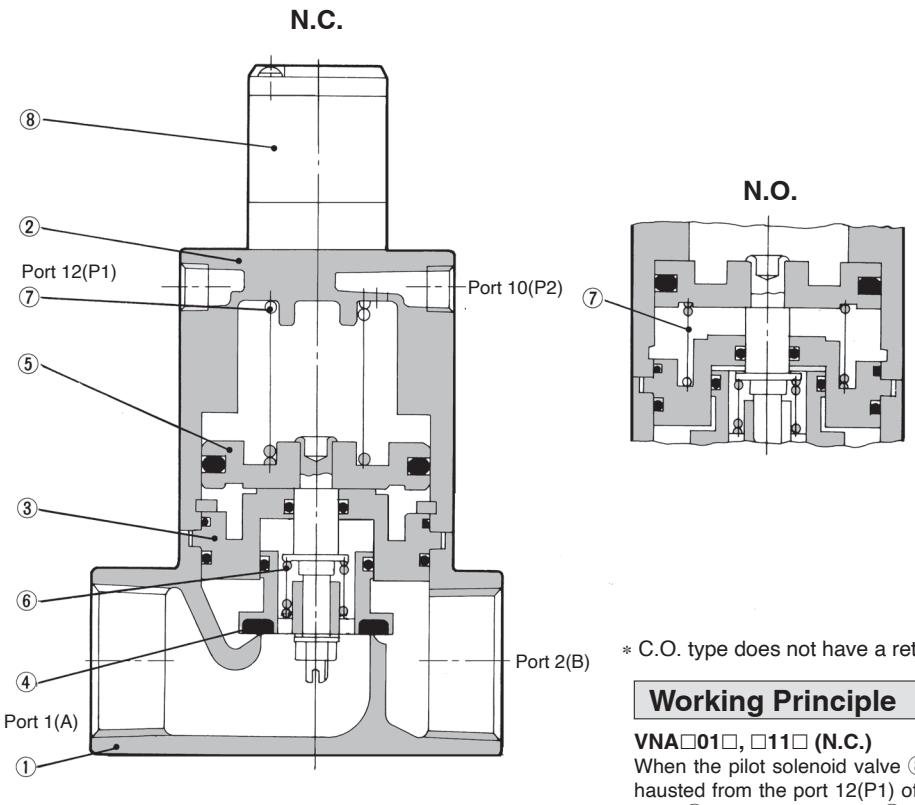
Port size			6A to 25A	32A to 50A
Pilot solenoid valve			**SF4-□□□-23** **SF4-□$^{P}_{DZ}$-23-Q**	**VO307-□□□1** **VO307-□$^{P}_{DZ}$-Q**
Electrical entry			DIN terminal	DIN terminal
Coil rated voltage (V)	**AC (50/60 Hz)**		100 V, 200 V, Other voltage (Semi-standard)	
	DC		24 V, Other voltage (Semi-standard)	
Allowable voltage fluctuation			–15% to +10% of rated voltage	
Temperature rise			35°C or less (When rated voltage is applied.)	50°C or less (When rated voltage is applied.)
Apparent power	**AC**	**Inrush**	5.6 VA (50 Hz), 5.0 VA (60 Hz)	12.7 VA (50 Hz), 10.7 VA (60 Hz)
		Holding	3.4 VA (50 Hz), 2.3 VA (60 Hz)	7.6 VA (50 Hz), 5.4 VA (60 Hz)
Power consumption	**DC**		1.8 W (without light), 2 W (with light)	4 W (without light), 4.2 W (with light)
Manual override			Non-locking push type Other (Semi-standard)	Non-locking push type

Note) For "How to Order" pilot solenoid valves, refer to page 8.

Symbol

Type \ Valve type	N.C. Normally closed	N.O. Normally open	C.O. Double acting
Air operated	**VNA□01**	**VNA□02**	**VNA□03**
External pilot solenoid	**VNA□11**	**VNA□12**	

Construction



∗ C.O. type does not have a return spring ⑦.

Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Platinum silver painted
2	**Cover assembly**	Aluminum alloy	Platinum silver painted
3 Note 1)	**Plate assembly**	Aluminum alloy Note 2)	Seal material (NBR, FKM, EPDM)
4 Note 1)	**Valve element**	Aluminum alloy	Seal material (NBR, FKM, EPDM)
5	**Piston assembly**	Aluminum alloy	—
6	**Travel spring**	Stainless steel	—
7	**Return spring**	Piano wire	—
8	**Pilot solenoid valve**	—	—

Note 1) Parts ③ and ④ are for selection of valve composition.
Note 2) Brass is used for the VNA1.

Working Principle

VNA□01□, □11□ (N.C.)
When the pilot solenoid valve ⑧ is not energized (or when air is exhausted from the port 12(P1) of the air operated type), the valve element ④ linked to the piston ⑤ is closed by the return spring ⑦.

● **When valve element opens**
When the pilot solenoid valve is energized (or when pressurized air enters through the port 12(P1) of the air operated type), the pilot air that has entered under the piston moves upward to open the valve element.

● **When valve element closes**
When the power to the pilot solenoid valve is turned off (or when fluid is exhausted from the port 12(P1) of the air operated type), the pilot air under the piston is exhausted, and the return spring closes the valve element.

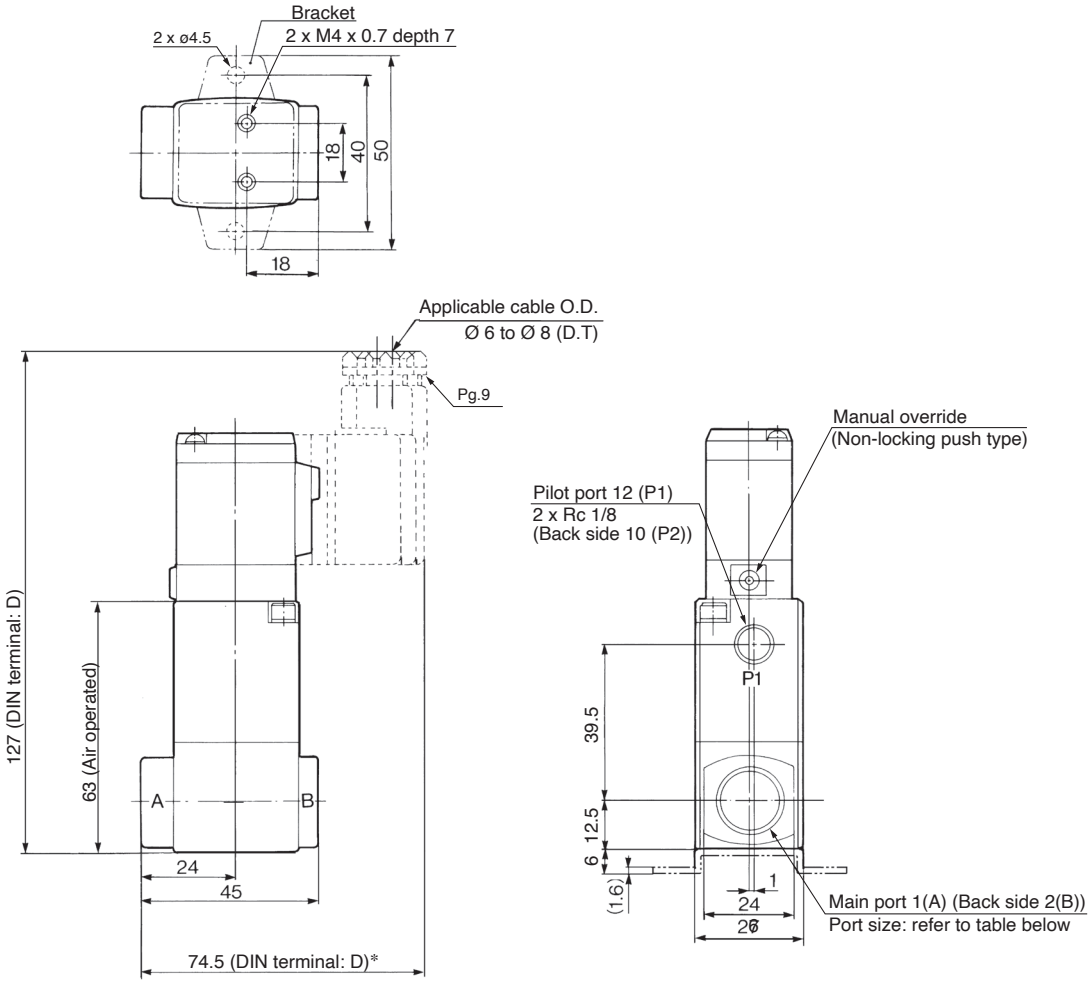
VNA□02□, □12□ (N.O.)
In contrast with the N.C., when the power to the pilot solenoid valve is turned off (or when air is exhausted from the port 10(P2) of the air operated type), the valve is held open by the return spring. When the pilot solenoid valve is energized (or when pressurized air enters through the port 10(P2) of the air operated type), the valve element closes.

VNA□03□ (C.O.)
The valve element of the C.O. type, which has no return spring, is in an arbitrary position when air is exhausted through the ports 12(P1) and 10(P2). When pressurized air enters the port 12(P1) (exhaust from the port 10(P2)), the valve element opens, and it closes when pressurized air enters the port 10(P2) (exhaust from the port 12(P1)).

Replacement Parts

No.	Description			Part no.						
				VNA1□□□ -6A, 8A, 10A	**VNA2□□□ -10A, 15A**	**VNA3□□□ -20A**	**VNA4□□□ -25A**	**VNA5□□□ -32A**	**VNA6□□□ -40A**	**VNA7□□□ -50A**
3	**Plate assembly**	**Seal material**	**NBR**	VN1-A3AA	VN2-A3AA	VN3-A3AA	VN4-A3AA	VN5-A3AA	VN6-A3AA	VN7-A3AA
			FKM	VN1-A3AB	VN2-A3AB	VN3-A3AB	VN4-A3AB	VN5-A3AB	VN6-A3AB	VN7-A3AB
			EPDM	VN1-A3AC	VN2-A3AC	VN3-A3AC	VN4-A3AC	VN5-A3AC	VN6-A3AC	VN7-A3AC
4	**Valve disc** (Valve disc assembly for 25A-50A)	**Seal material**	**NBR**	VN1-4AA	VN2-4AA	VN3-4AA	VN4-A4AA	VN5-A4AA	VN6-A4AA	VN7-A4AA
			FKM	VN1-4AB	VN2-4AB	VN3-4AB	VN4-A4AB	VN5-A4AB	VN6-A4AB	VN7-A4AB
			EPDM	VN1-4AC	VN2-4AC	VN3-4AC	VN4-A4AC	VN5-A4AC	VN6-A4AC	VN7-A4AC
8	**Pilot solenoid valve**			SF4-□□□-23 (Refer to page 8 for details.)				VO307-□□□1 (Refer to page 8 for details.)		

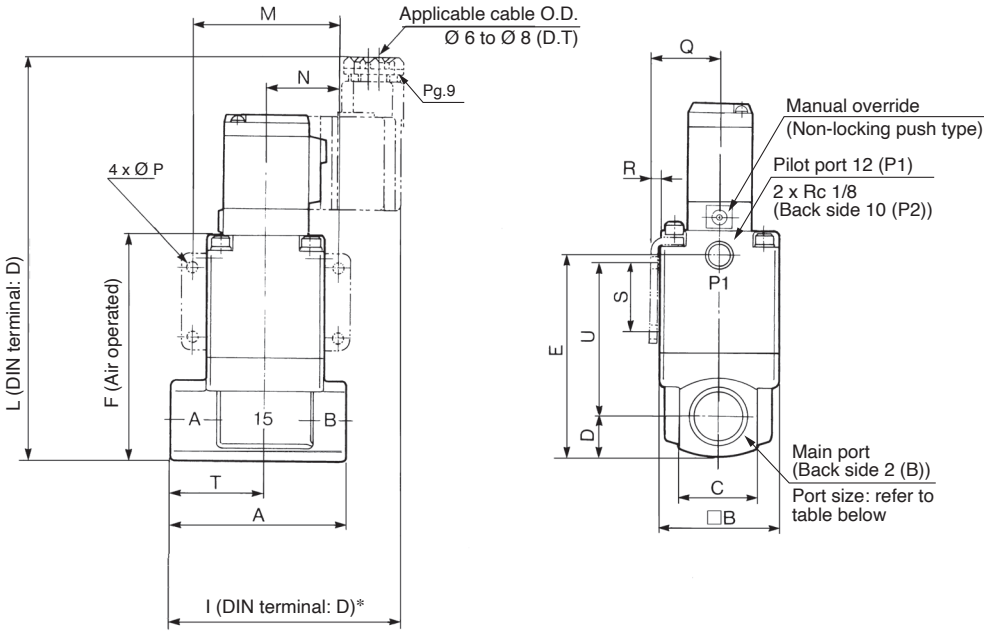
Port size: 6A, 8A, 10A



Model	Main port 1(A), 2(B)
VNA1□□□-6A	1/8
VNA1□□□-8A	1/4
VNA1□□□-10A	3/8

∗ For “DZ”, the length is longer by 17 mm.

Port size: 10A, 15A, 20A, 25A

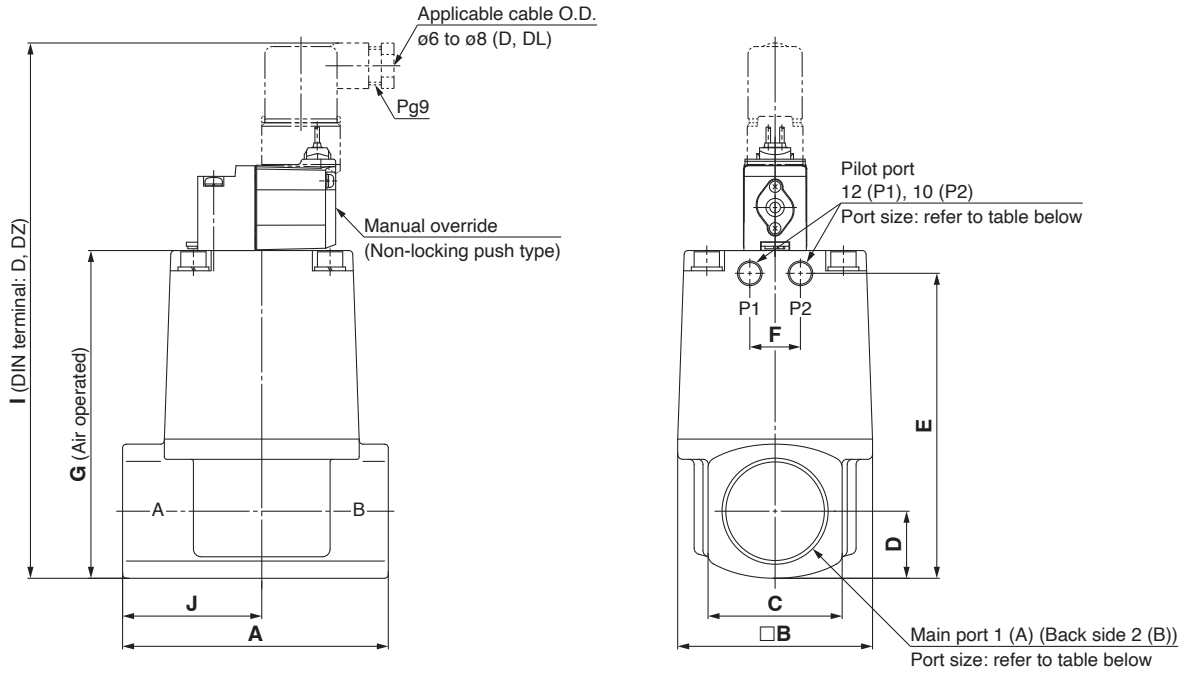


∗ For "DZ", the length is longer by 17 mm.

Model	Main port 1(A), 2(B)	A Note 1)	B	C	D	E	F	I	M	N	P	Q	R	S	T	U
VNA2□□□-10A	3/8	63 (61)	42	29	14.5	72.5	80.5	84.5	52	26	4.5	24.3	2.3	25	34	55
VNA2□□□-15A	1/2															
VNA3□□□-20A	3/4	80 (79)	50	35	17.5	84	92	93.5	62	31	5.5	28.3	2.3	30	43	60.5
VNA4□□□-25A	1	90	60	44	22	100	108	99.5	72	36	6.5	33.3	2.3	35	49	71

Note 1) ( ): G thread

Port size: 32A, 40A, 50A



Model	Main port 1(A), 2(B)	Pilot port 12(P1), 10(P2)	A Note 1)	B	C	D	E	F	G	I	J
VNA5□□□-32A	1 1/4	1/8	105 (104)	77	53	26.5	120.5	20	129.5	211.5	55
VNA6□□□-40A	1 1/2	1/4	120	96	60	30	137	24	147	229	63
VNA7□□□-50A	2	1/4	140	113	74	37	160	24	170	252	74

Note 1) ( ): G thread

How to Order Pilot Solenoid Valves

Valve size 1/2/3/4

SF4 − 5 D □ − 23 − Q

Coil rated voltage

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

Note 1) Semi-standard

Manual override

—I	Non-locking push type
A*	Non-locking push type A (projecting)
B*	Slotted locking type B (tool required)

* Semi-standard

Electrical entry/
With light/surge voltage suppressor

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

Valve size 5/6/7

VO307 − 5 D 1 − Q

Coil rated voltage

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

Note 1) Semi-standard

Electrical entry

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

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

VNA Series
Specific Product Precautions

Be sure to read this before handling the products. Refer to the back cover for safety instructions. Refer to the "Handling Precautions for SMC Products" on the SMC website: https://www.smc.eu

Design

⚠Warning

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 an energy saving type 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.

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.

External Pilot

⚠Caution

Pilot port piping

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

Port	VNA□01□	VNA□02□	VNA□03□	VNA□1$\frac{1}{2}$□
12 (P1)	External pilot	Bleed port	External pilot (*)	External pilot
10 (P2)	Bleed port	External pilot	External pilot (*)	Pilot exhaust

(*) If the pilot air is not supplied, the valve position will not be held. Pressurize Port 12 (P1) or Port 10 (P2) when using the product.

Installing a silencer to the exhaust port and the bleed port is recommended for noise reduction and for dust entry prevention.

Piping

⚠Warning

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.

Use with Air-hydro Unit

⚠Warning

1. Piping

Surge pressure is generated between the cylinder and the VNA during intermediate stoppage. To directly thread in the cylinder, use durable fittings (Stainless steel square nipples etc,) instead of ductile iron fittings (JIS B 2301) or steel pipe fittings (JIS B 2302). When VNA is installed away from the cylinder, use a high-pressure rubber hose (JIS K 6349) instead of steel pipe, when possible.

2. Air bleeding

The VNA series valves have no air bleeding port. Bleed air comes from the middle piping. Bleeding by a vacuum pump is more effective.

3. Hydraulic fluid

Turbine oil, Grade 1 ISO VG32, with petroleum hydraulic fluid is recommended.

4. Speed control valve

The combination shown in the following table is recommended for best performance of the VNA series. (Piping: JIS K 6349 high pressure hose)

Combination between the VNA series and Speed controller (AS series)

	VNA	AS	Piping (I.D.)
10A	VNA111	AS420-03	3/8B (ø9.5)
15A	VNA211	AS420-04	1/2B (ø12.7)
20A	VNA311	AS500-06	3/4B (ø19.1)
25A	VNA411	AS600-10	1B (ø25.4)
32A	VNA511	AS800-12	1 1/4B (ø31.8)
40A	VNA611	AS900-14	1 1/2B (ø38.1)
50A	VNA711	AS900-20	2B (ø50.8)

For details about speed control valve (AS series), refer to www.smc.eu.

Process Valve

VNB Series

2 Port Valve For Flow Control

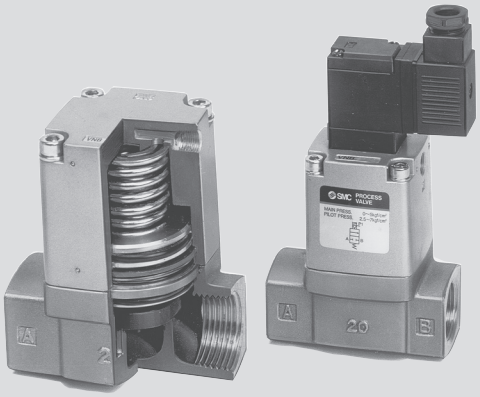
A wide variety of applicable fluids

Proper selection with body and sealing materials permits application with a wide variety of fluids such as air, water, oil, gas and vacuum.

Cylinder actuation by external pilot air

Wide variations

N.C., N.O., C.O., types are available. Screw-in type (6A to 50A) and the flange (32F to 50F) are standardized.



Air operated **External pilot solenoid**

Selection Procedure

1 Applicable fluids

- Refer to "Table (1)" to check that the desired fluid is applicable.
- Select the body and sealing materials, depending on the fluid.

2 Flow rate characteristics (Air, Water)

- To find the flow rate of air or water, refer to the table of flow rate characteristics on page 10 to 16. Use the flow rate calculation equation to find the exact answer. Although the flow rate is the same, the operating pressure differs according to the valve size. Therefore, select the proper valve size from applicable valves.
- Refer to "Table (2)" to select the port size of the threaded type (6A to 50A) and flanges (32F to 50F).

3 Construction

- Select the air operated or external pilot solenoid types. Valves come in N.C. (normally closed), N.O. (normally open), C.O. (double acting), and N.C. 1 MPa (normally closed) types. Select the proper one according to the operating conditions.

4 Power voltage and electrical entry (External pilot solenoid)

- Select the AC/DC power source and choose the electrical entry according to "Table (3)".

Table (1) Applicable Fluids Check List

Wetted part Body material	Copper alloy: Standard			Aluminum: L			Stainless steel: S		
Wetted part Seal material	NBR	FKM	EPDM	NBR	FKM	EPDM	NBR	FKM	EPDM
Fluid	: A	: B	: C	: A	: B	: C	: A	: B	: C
Air (Standard, Dry)	●	●		●	●		●	●	
Low vacuum (Up to –101kPa)	●	●		●	●		●	●	
Carbon dioxide (CO_2, 0.7 MPa or less)	●			●			●		
Carbon dioxide (CO_2, 0.7 to 1 MPa)		●			●			●	
Nitrogen gas (N_2)	●	●	●	●	●	●	●	●	●
Argon	●	●		●	●		●	●	
Helium		●			●			●	
Water (standard, up to 60°C)	●						●		
Water (up to 99°C air operated type only)		●	●					●	●
Turbine oil	●	●		●	●		●	●	
Spindle oil		●			●			●	
Fuel oil Class 3 (C fuel oil)		●			●			●	
Silicone oil		●						●	
Naphtha		●						●	
Ethylene glycol (up to 80°C)			●						●
Boiler water									●

⚠ Caution

Note 1) When fluid permits application of multiple body and sealing materials, select the most suitable one according to the ambient environment (FKM or EPDM seal material for high temperature) and other conditions (corrosion resistance and viscosity), etc.

Note 2) Test fluids to see if it will wash out cleaning liquid such as grease.

Table (2) Combinations between Valve Size and Port Size

Valve size	Port size											
	6A	8A	10A	15A	20A	25A	32A	32F	40A	40F	50A	50F
1	●	●	●									
2			●	●								
3					●							
4						●						
5							●					
6										●		
7												●

Table (3) Combinations between Electrical Entry and Light/Surge Voltage Suppressor

Valve size	Electrical entry	Light/Surge voltage suppressor	Manual override
	D	Z	
1, 2, 3, 4	●	●	●
5, 6, 7	●	● (Only "D")	

Process Valve: 2 Port Valve For Flow Control

VNB Series

How to Order

Seal material

A	NBR seals
B	FKM seals
C	EPDM seals

Refer to Table (1) for availability.

Body material option

—	Standard
S*	Stainless steel body
L*	Aluminum body

* Threaded port only

Pilot system option

—	Standard
V	Vacuum pilot type

Note) Symbol V is for vacuum pilot valve specification, for both main pressure and pilot pressure, valve size 2 to 7.

Thread type

—	Rc
F	G*
N	NPT
T	NPTF

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

Bracket (valve size: 1/2/3/4.)

—	None
B Note)	With bracket

Note) Only valve sizes 1, 2, 3 and 4. Shipped after assembled at our factory. Bracket part no.
Valve size 1: VN1-A16#1 (with thread)
Valve sizes 2 to 4: VN□-16#1 (□: 2 to 4)

Air operated VNB 2 0 1 A □ □ – □ 15A –

External pilot solenoid VNB 2 1 1 A □ □ – □ 15A – 1 D □ – □ – Q

Valve size / Valve type / Port size

Symbol	Orifice dia. (mm)	Symbol 1 N.C. 0.5 MPa	2 N.O. 1 MPa	3 Note 1) C.O. 1 MPa	4 N.C. 1 MPa	Symbol	Port size Rc
1	ø7	—	●	●	●	6A	1/8
		—	●	●	●	8A	1/4
		—	●	●	●	10A	3/8
2	ø11	—	—	—	●	10A	3/8
	ø15	●	●	●	—		
	ø11	—	—	—	●	15A	1/2
	ø15	●	●	●	—		
3	ø14	—	—	—	●	20A	3/4
	ø20	●	●	●	—		
4	ø16	—	—	—	●	25A	1
	ø25	●	●	●	—		
5	ø22	—	—	—	●	32A	1 1/4
	ø32	●	●	●	—		
6	ø28	—	—	—	●	40A	1 1/2
	ø40	●	●	●	—		
7	ø33	—	—	—	●	50A	2
	ø50	●	●	●	—		

Note 1) Air operated only
Note 2) The valve type symbols for vacuum pilot type are 1 (N.C.) and 2 (N.O.) only.

Rated voltage

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

Note 1) Semi-standard

Manual override

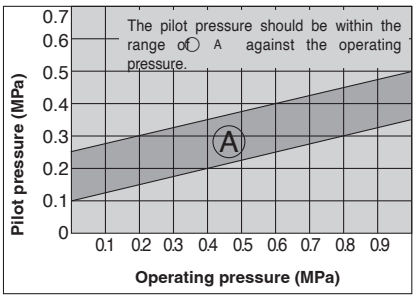
—: Non-locking push type A: Non-locking push type A (projecting) Note) B: Slotted locking type B (tool required) Note)	Valve size 1 to 4
—: Non-locking push type	Valve size 5 to 7

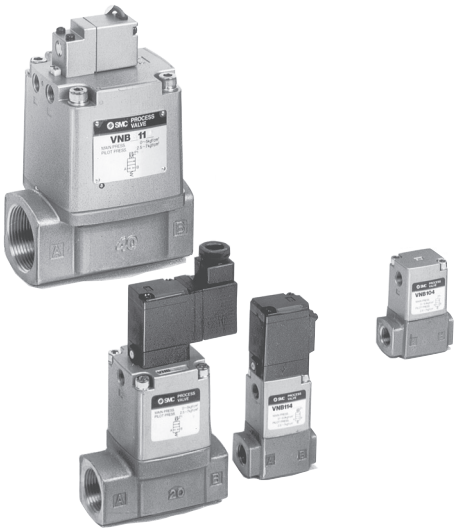
Note) Semi-standard

Electrical entry/With light/surge voltage suppressor

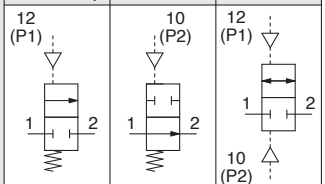
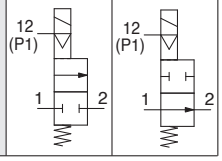
Symbol	Electrical entry	Valve size 1 to 4	Valve size 5 to 7
D	DIN terminal	●	●
DZ	DIN terminal with light/surge voltage suppressor	●	●

Graph (4) VNB□□ 2/3 □ Pilot Pressure (N.O. and C.O. types)





Symbol

Type \ Valve type	N.C.	N.O.	C.O.
	Normally closed	Normally open	Double acting
	VNB□0$^{1}_{4}$	**VNB□02**	**VNB□03**
Air operated			
	VNB□1$^{1}_{4}$	**VNB□12**	
External pilot solenoid			

Note) Flow direction should be from port 1(A) to port 2(B) for vacuum applications.

Option Specifications
Vacuum pilot valve VNB□□□□V

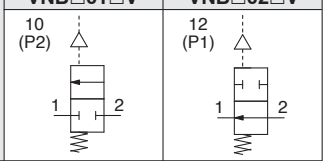
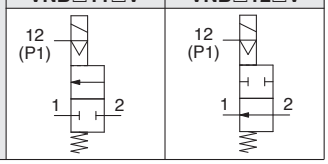
(Valve size 2 to 7)

It is used when the valve is to be operated by the main vacuum in the absence of pressurized air.

Specifications (Vacuum pilot type)

Fluid	Vacuum
Operating pressure range	–101 kPa to Atmospheric pressure
Pilot pressure range	–101 to – 47.9 kPa

Symbol (Vacuum pilot type)

Type \ Valve type	N.C.	N.O.
	Normally closed	Normally open
	VNB□01□V	**VNB□02□V**
Air operated		
	VNB□11□V	**VNB□12□V**
External pilot solenoid		

Model

Model	Port size Rc	Orifice dia. ø (mm)	Flow rate characteristics: Measured by air C [dm³/(bar.sec)]	b	Cv	Flow rate characteristics: Measured by water Kv	Conversion Cv	Weight (kg) Note 2): Air operated	External pilot solenoid
VNB1□□□□□-6A	1/8	7	3.3	0.29	0.80	0.9	1.0	0.3 (0.1)	0.4 (0.2)
VNB1□□□□□-8A	1/4		4.6	0.17	1.0	1.0	1.2		
VNB1□□□□□-10A	3/8		4.7	0.18	1.1	1.1	1.3		
VNB2□4□□□-10A		11	9.6	0.40	2.6	2.5	2.9	0.6 (0.3)	0.7 (0.4)
VNB2□□□□□-10A		15	17	0.32	4.0	3.9	4.5		
VNB2□4□□□-15A	1/2	11	9.6	0.40	2.6	2.7	3.1		
VNB2□□□□□-15A		15	19	0.24	4.8	5.0	5.8		
VNB3□4□□□-20A	3/4	14	18	0.42	5.4	5.0	5.8	0.9 (0.5)	1 (0.6)
VNB3□□□□□-20A		20	35	0.13	7.4	9.6	11		

Model		Orifice dia. ø (mm)	Flow rate characteristics: Measured by air Effective area (mm²)	Measured by water Kv	Conversion Cv	Weight (kg) Note 2): Air operated	External pilot solenoid
VNB4□4□□□-25A	1	16	130	6.1	7.0	1.4 (0.8)	1.5 (0.9)
VNB4□□□□□-25A		25	220	10.4	12		
VNB5□4□□□-32A	1 1/4	22	210	9.8	11	2.5 (1.3)	2.6 (1.4)
VNB5□□□□□-32A		32	320	15.6	18		
VNB6□4□□□-40A	1 1/2	28	330	16.4	19	4.1 (2.1)	4.2 (2.2)
VNB6□□□□□-40A		40	500	24.2	28		
VNB7□4□□□-50A	2	33	520	25.1	29	6.3 (3.1)	6.4 (3.2)
VNB7□□□□□-50A		50	770	37.2	43		

Note 1) The values inside the ( ) are for "Body option L: Aluminum."

Specifications

Fluid			Water/Oil/Air/Vacuum, etc.
Fluid temperature	**VNB□□□A, VNB□1□$^{B}_{C}$**		–5 to 60°C Note 1)
	VNB□0□$^{B}_{C}$		–5 to 99°C Note 1) (Water, Oil etc. Air Operated only)
Ambient temperature			–5 to 50°C Note 1) (Air operated type: 60°C)
Proof pressure			1.5 MPa
Applicable pressure range Note 4)	**VNB□□1□**		Low vacuum to 0.5 MPa
	VNB□□$^{2}_{3}$□		Low vacuum to 1 MPa
External pilot air	Pressure	**VNB□□$^{1}_{4}$□**	0.25 to 0.7 MPa
		VNB□□$^{2}_{3}$□	0.1 + 0.25 x (Operating pressure) to 0.25 + 0.25 x (Operating pressure) MPa Note 3) Refer to "Graph (1)" on page 11.
	Lubrication		Not required (Use turbine oil Class 1 ISO VG32, if lubricated. Note 2))
	Temperature		–5 to 50°C (Air operated type: 60°C)
Mounting orientation			Unrestricted Note 5)

Note 1) No freezing
Note 2) Lubrication is not allowed in the case of seal material EPDM.
Note 3) Adjust the operating pressure range from 0.125 MPa to 0.275 MPa for low vacuum.
Note 4) The pressure differential between Port 1 (A) and 2 (B) must not exceed the maximum operating pressure.
Note 5) For external pilot solenoid, it is recommended that the pilot solenoid valve be oriented either vertically upward or horizontally.

Pilot Solenoid Valve Specifications

Port size			6A to 25A	32A to 50A
Pilot solenoid valve Note1)			**SF4-□□□-23** **SF4-□$^{D}_{DZ}$-23-Q**	**VO307-□□□1** **VO307-□$^{D}_{DZ}$1-Q**
Electrical entry			DIN terminal	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 rated voltage	
Temperature rise			35°C or less (When rated voltage is applied.)	50°C or less (When rated voltage is applied.)
Apparent power	**AC**	**Inrush**	5.6 VA (50 Hz), 5.0 VA (60 Hz)	12.7 VA (50 Hz), 10.7 VA (60 Hz)
		Holding	3.4 VA (50 Hz), 2.3 VA (60 Hz)	7.6 VA (50 Hz), 5.4 VA (60 Hz)
Power consumption	**DC**		1.8 W (without light), 2 W (with light)	4 W (without light), 4.2 W (with light)
Manual override			Non-locking push type Other (Semi-standard)	Non-locking push type

Note 1) For "How to Order" pilot solenoid valves, refer to page 13.
Note 2) Vacuum pilot type pilot solenoid valves will become VO301V-00□□□.
Note 3) Vacuum pilot type CE/UKCA-compliant pilot solenoid valves will become VO307V-□$^{D}_{DZ}$-Q.

How to Order Pilot Solenoid Valves

Valve size 1/2/3/4

SF4 − 5 D □ − 23 − Q

Coil rated voltage

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

Note 1) Semi-standard

Manual override

—	Non-locking push type
A*	Non-locking push type A (projecting)
B*	Slotted locking type B (tool required)

* Semi-standard

Electrical entry/With indicator light/ surge voltage suppressor

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

Valve size 5/6/7 and vacuum pilot type

VO307 □ − 5 D 1 − Q

Body option

—	Standard
V	Vacuum pilot

Coil rated voltage

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

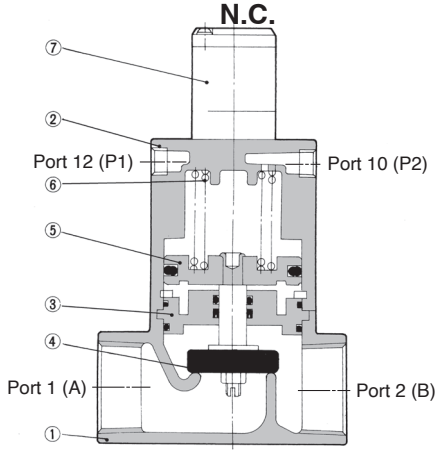
Note 1) Semi-standard

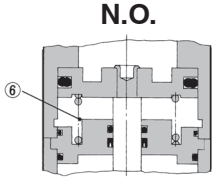
Electrical entry

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

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

Construction





* C.O. type does not have a return spring ⑥.

Component Parts

No.	Description	Material	Note
1	**Body**	Bronze Note 2)	Clear coated
2	**Cover assembly**	Aluminum alloy	Platinum silver painted
3 Note 1)	**Plate assembly**	Brass Note 2)	Seal material (NBR, FKM, EPDM)
4 Note 1)	**Valve element**	Stainless steel or brass Note 2)	Seal material (NBR, FKM, EPDM)
5	**Piston assembly**	Aluminum alloy	—
6	**Return spring**	Piano wire	—
7	**Pilot solenoid valve**	—	—

Note 1) Parts ③ and ④ are for selection of valve composition.
Note 2) The body option "S" is stainless steel, and "L" is aluminum.

Working Principle (Vacuum pilot type is excluded)

VNB□0$\frac{1}{4}$□, □1$\frac{1}{4}$□ (N.C.)
When the pilot solenoid valve ⑦ is not energized (or when air is exhausted from the port P1 of the air operated type), the valve element ④ linked to the piston ⑤ is closed by the return spring ⑥.

- **When valve opens**
  When the pilot solenoid valve is energized (or when pressurized air enters through the port P1 of the air operated type), the pilot air that has entered under the piston moves upward to open the valve element.
- **When valve closes:**
  When the power to the pilot solenoid valve is turned off (or when fluid is exhausted from the port P1 of the air operated type), the pilot air under the piston is exhausted, and the return spring closes the valve element.

VNB□02□, □12□ (N.O.)
In contrast with the N.C., when the power to the pilot solenoid valve is turned off (or when air is exhausted from the port P2 of the air operated type), the valve is held open by the return spring. When the pilot solenoid valve is energized (or when pressurized air enters through the port P2 of the air operated type), the valve element closes.

VNB□03□ (C.O.)
The valve element for the C.O. type, which has no return spring, is in an arbitrary position when air is exhausted through the ports P1 and P2. When pressurized air enters the port P1 (exhaust from the port P2), the valve element opens, and it closes when pressurized air enters the port P2 (exhaust from the port P1).

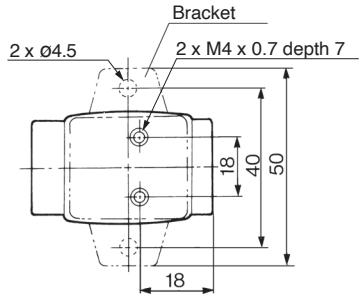
Replacement Parts

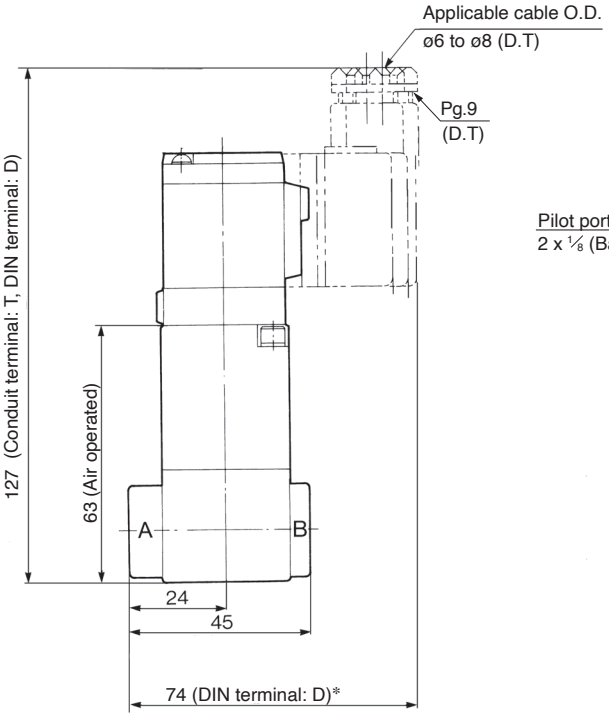
No.	Description			Part no.									
				VNB1□□□ -6A, 8A, 10A	VNB2□□□ -10A, 15A	VNB3□□□ -20A	VNB4□□□ -25A	VNB5□□□ -32A, 32F	VNB5□ 4 □ -32A, 32F	VNB6□□□ -40A, 40F	VNB6□ 4 □ -40A, -40F	VNB7□□□ -50A, 50F	VNB7□ 4 □ -50A, 50F
Note 1) 3	Plate assembly	Seal material	NBR	Refer to Note 2)	VN2-A3BA	VN3-A3BA	VN4-A3BA	VN5-A3BA	VN5-A3BA	VN6-A3BA	VN6-A3BA	VN7-A3BA	VN7-A3BA
			FKM		VN2-A3BB	VN3-A3BB	VN4-A3BB	VN5-A3BB	VN5-A3BB	VN6-A3BB	VN6-A3BB	VN7-A3BB	VN7-A3BB
			EPDM		VN2-A3BC	VN3-A3BC	VN4-A3BC	VN5-A3BC	VN5-A3BC	VN6-A3BC	VN6-A3BC	VN7-A3BC	VN7-A3BC
Note 1) 4	Valve element [32A to 50A come in valve element assembly]	Seal material	NBR		VN2-4BA	VN3-4BA	VN4-4BA	VN5-A4BA	VN5-A4BA-3	VN6-A4BA	VN6-A4BA-3	VN7-A4BA	VN7-A4BA-3
			FKM		VN2-4BB	VN3-4BB	VN4-4BB	VN5-A4BB	VN5-A4BB-3	VN6-A4BB	VN6-A4BB-3	VN7-A4BB	VN7-A4BB-3
			EPDM		VN2-4BC	VN3-4BC	VN4-4BC	VN5-A4BC	VN5-A4BC-3	VN6-A4BC	VN6-A4BC-3	VN7-A4BC	VN7-A4BC-3
7	Pilot solenoid valve			SF4-□□□-23 (Refer to the table below.)				VO307-□□□1 (Refer to the table below.)					

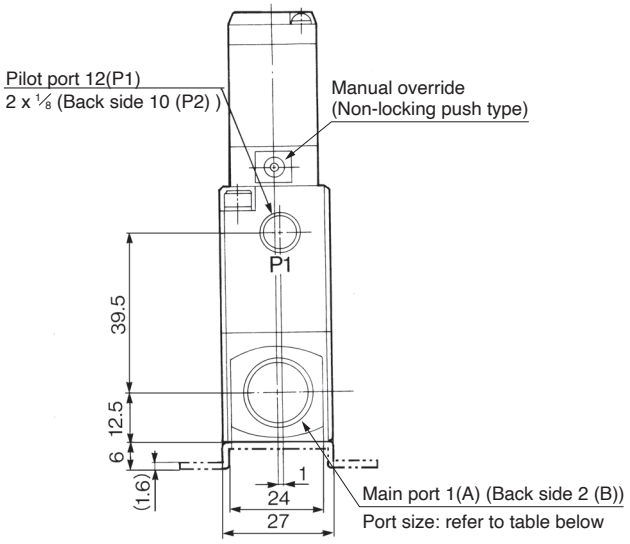
Note 1) In the case of body options "S" and "L", the materials of the part nos. ③ and ④ are as follows: (Example): **VN2-A3B□A**
However all brackets of valve element VNB 1 to 4 are made of stainless steel. (No need to add options "S" and "L".) └ **L**: Aluminum, **S**: Stainless steel
Note 2) Please request a factory repair.

Port size: 6A, 8A, 10A

Standard





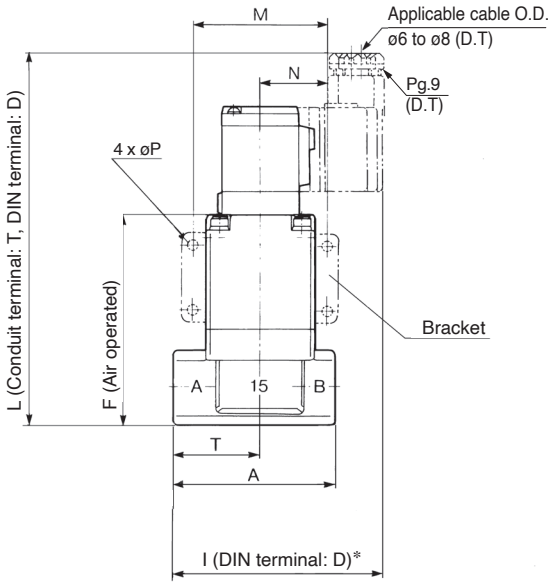


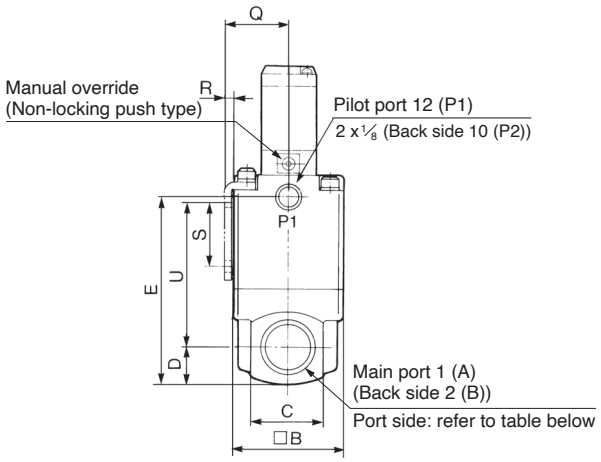
∗ For “DZ”, the length is longer by 17 mm.

Model	Main port 1(A), 2(B)
VNB1□□□-6A	1/8
VNB1□□□-8A	1/4
VNB1□□□-10A	3/8

Port size: 10A, 15A, 20A, 25A

Standard



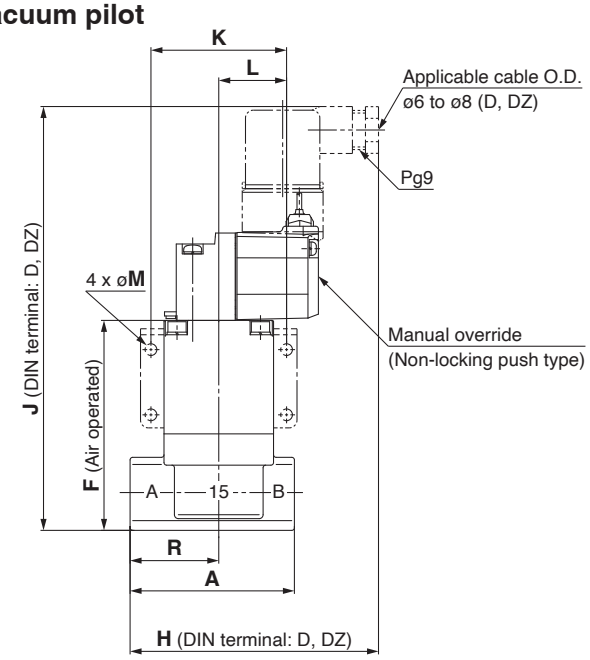


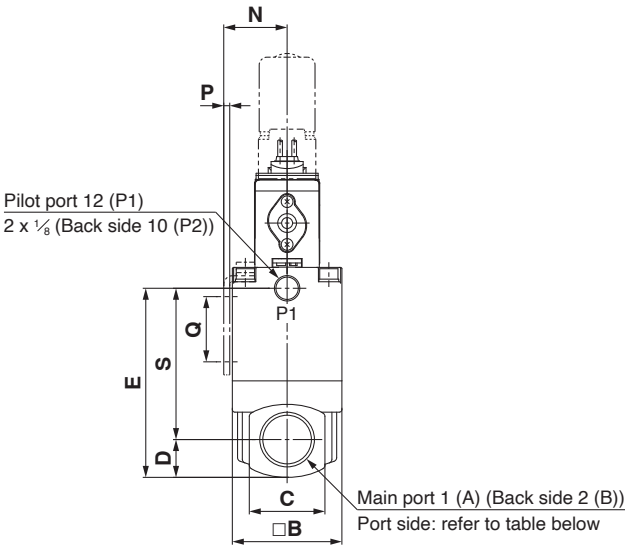
∗ For "DZ", the length is longer by 17 mm.

Model	Main port 1(A), 2(B)	A	B	C	D	E	F	I	M	N	P	Q	R	S	T	U
VNB2□□□-10A	3/8	63	42	29	14.5	72.5	80.5	84.5	52	26	4.5	24.3	2.3	25	34	55
VNB2□□□S-10A				28	14											55.5
VNB2□□□L-10A				35	17.5	75.5	83.5									
VNB2□□□-15A	1/2			29	14.5	72.5	80.5									
VNB2□□□S-15A				28	14											55.5
VNB2□□□L-15A				35	17.5	75.5	83.5									55
VNB3□□□-20A	3/4	80	50	35	17.5	84	92	93.5	62	31	5.5	28.3	2.3	30	43	60.5
VNB3□□□S-20A																
VNB3□□□L-20A				40	20	86.5	94.5									
VNB4□(1,2,3)□-25A	1	90	60	40	20	100	108	99.5	72	36	6.5	33.3	2.3	35	49	75
VNB4□4□-25A				44	22											73
VNB4□□□S-25A				40	20											75
VNB4□□□L-25A				44	22											73

Port size: 10A, 15A, 20A, 25A

Vacuum pilot

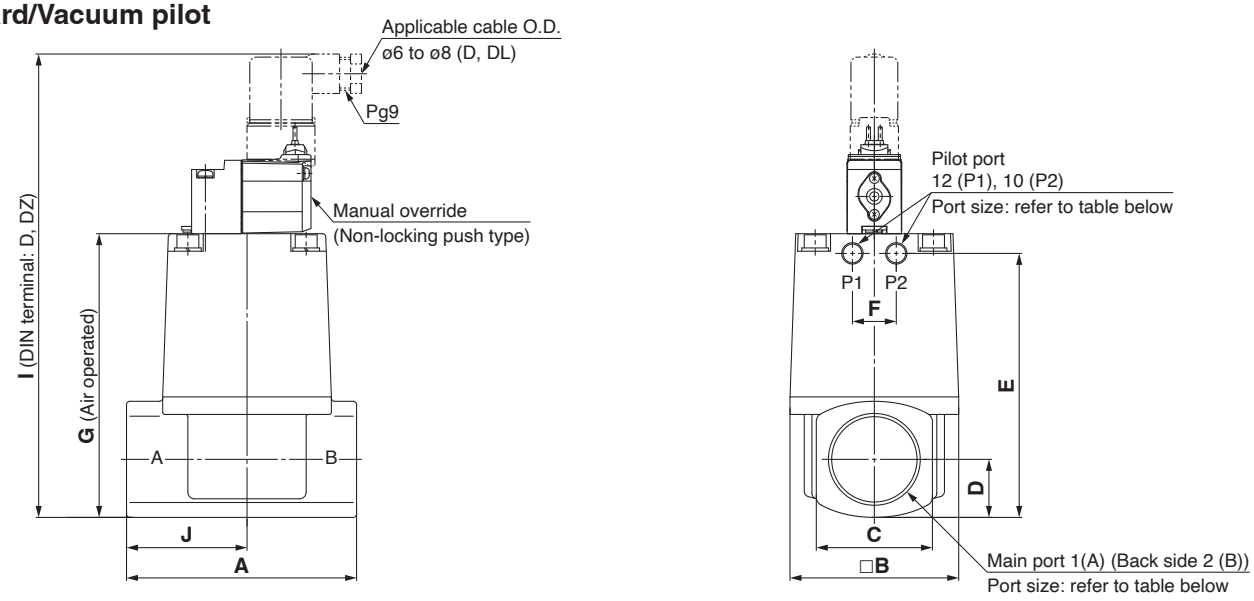




Model	Main port 1(A), 2(B)	A	B	C	D	E	F	H	J	K	L	M	N	P	Q	R	S
VNB2□□□V-10A	3/8	63	42	29	14.5	72.5	80.5	95.3	162.5	52	26	4.5	24.3	2.3	25	34	58
VNB2□□□SV-10A				28	14												58.5
VNB2□□□LV-10A				35	17.5	75.5	83.5		165.5								
VNB2□□□V-15A	1/2			29	14.5	72.5	80.5		162.5								58
VNB2□□□SV-15A				28	14												58.5
VNB2□□□LV-15A				35	17.5	75.5	83.5		165.5								58
VNB3□□□V-20A	3/4	80	50	35	17.5	84	92	100.3	174	62	31	5.5	28.3	2.3	30	43	66.5
VNB3□□□SV-20A																	
VNB3□□□LV-20A				40	20	86.5	94.5		176.5								
VNB4□(1,2,3)□V-25A	1	90	60	40	20	100	108	101.3	190	72	56	6.5	33.3	2.3	35	49	80
VNB4□4□V-25A				44	22												78
VNB4□□□SV-25A				40	20												80
VNB4□□□LV-25A				44	22												78

Port size: 32A, 40A, 50A

Standard/Vacuum pilot



Model	Main port 1(A), 2(B)	Pilot port 12(P1), 10(P2)	A	B	C	D	E	F	G	I	J
VNB5□□□□-32A	1 1/4	1/8	105	77	53	26.5	120.5	20	129.5	211.5	55
VNB6□□□□-40A	1 1/2	1/4	120	96	60	30	137	24	147	229	63
VNB7□□□□-50A	2	1/4	140	113	74	37	160	24	170	252	74

VNB Series
Specific Product Precautions

Be sure to read this before handling the products. Refer to the back cover for safety instructions. Refer to the "Handling Precautions for SMC Products" on the SMC website: https://www.smc.eu

Design

⚠Warning

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 an energy saving type 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.

Fluid Quality

⚠Warning

If a fluid that contains foreign matter is used, foreign matter may enter the rod sliding part, causing malfunction or seal failure. If seal failure occurs in the rod sliding part, the fluid backflows in the pilot air piping and may enter units in the circuit connected to the pilot air piping, causing adverse effect. So, perform the maintenance work periodically or take preventive measures appropriately.

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.

Piping

⚠Caution

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

Wiring

⚠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.

External Pilot

⚠Warning

Pilot port piping

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

Standard

Port	VNB□0^{1}_{4}□	VNB□02□	VNB□03□	VNB□1^{1}_{4}□
12 (P1)	External pilot	Bleed port	External pilot (∗)	External pilot
10 (P2)	Bleed port	External pilot	External pilot (∗)	Pilot exhaust

(∗) If the pilot air is not supplied, the valve position will not be held. Pressurize Port 12 (P1) or Port 10 (P2) when using the product.

Vacuum pilot

Port	VNB□01V□	VNB□02V□	VNB□1^{1}_{2}V□
12 (P1)	Bleed port	External pilot	External pilot
10 (P2)	External pilot	Bleed port	Pilot exhaust

Installing a silencer to the exhaust port and the bleed port is recommended for noise reduction and for dust entry prevention.

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

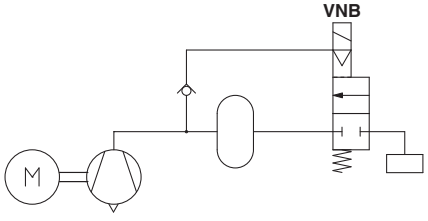
Direction of mounting

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

Vacuum Pilot

⚠Caution

When using the VNB□$^{0}_{1}$□V. vacuum pilot, maintain the specified pilot pressure by providing a tank with an appropriate capacity or by acquiring the pilot pressure from an area near the vacuum pump.



Coolant Valve

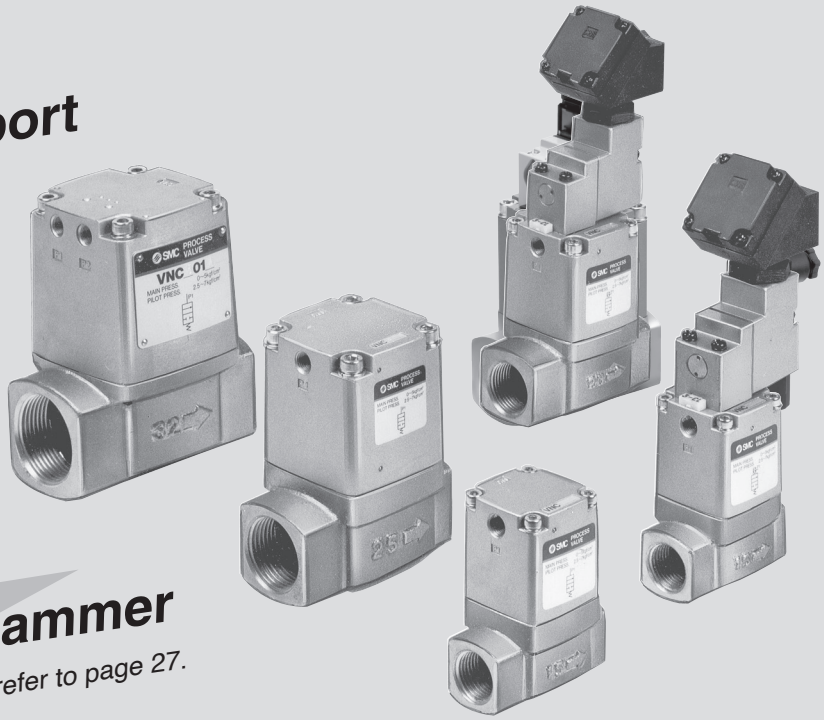
VNC Series

Air Operated/External Pilot Solenoid

Cylinder actuation by pilot air

Wide selection of port size and variations

Threaded type (6A to 50A)



Low water hammer

For details, refer to page 27.

Large valve capacity

Av factor 30 x 10^{-6} to 1600 x 10^{-6}
(VNC1 to VNC7)
Cv factor 49 to 100
(VNC8 to VNC9)

Coolant Valve:
Air Operated/External Pilot Solenoid
VNC Series

How to Order

Seal material

A	NBR seals
B	FKM seals

Thread type

—	Rc
F	G
N	NPT
T	NPTF

Bracket (Valve size: 1/2/3/4)

—	None
B Note)	With bracket (VN□-16)

Note) Only valve sizes 1, 2, 3 and 4. Shipped after assembled at our factory.
Bracket part no.
Valve size 1: VN1-A16#1 (with thread)
Valve sizes 2 to 4: VN□-16#1
└ 2 to 4

Air operated VNC **2** **0** **1** **A** – □ **15A** – □

External pilot solenoid VNC **2** **1** **1** **A** – □ **15A** – **1** **D** □ – □ – **Q**

Valve size

Valve type

Port size

Symbol	Orifice diameter (mm)	Symbol 1 N.C. 0.5 MPa	Symbol 2 N.O. 1 MPa	Symbol 4 N.C. 1 MPa	Symbol	Port size Rc
1	ø7	—	●	●	**6A**	1/8
		—	●	●	**8A**	1/4
		—	●	●	**10A**	3/8
2	ø15 (ø11)	●	●	●	**10A**	3/8
		●	●	●	**15A**	1/2
3	ø20 (ø14)	●	●	●	**20A**	3/4
4	ø25 (ø16)	●	●	●	**25A**	1
5	ø32 (ø22)	●	●	●	**32A**	1 1/4
6	ø40 (ø28)	●	●	●	**40A**	1 1/2
7	ø50 (ø33)	●	●	●	**50A**	2

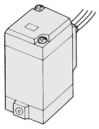
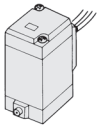
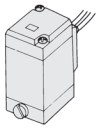
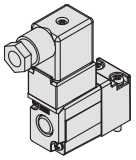
Values in parentheses are N.C. at 1 MPa.

Rated voltage

—	Air operated
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

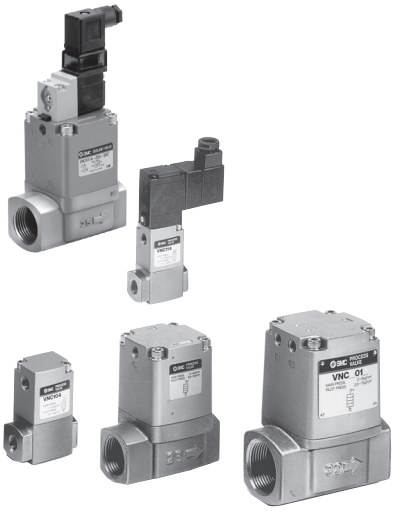
Manual override

—: Non-locking push type  **A**: Non-locking * push type A (projecting)  **B**: Slotted locking type B * (tool required) 	Valve size 1
—: Non-locking push type 	Valve size 2 to 9

* Semi-standard

Electrical entry/With light/surge voltage suppressor

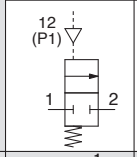
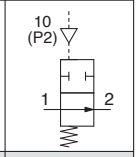
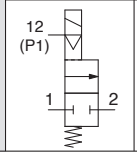
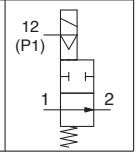
Symbol	Electrical entry	Valve size 1	Valve size 2 to 9
D	DIN terminal	●	●
DZ	DIN terminal with light/surge voltage suppressor	●	●



Model

Model	Port size	Orifice dia. ø (mm)	Flow rate characteristics		Weight (kg)	
	Threaded		Kv	Conversion Cv	Air operated	External pilot solenoid
VNC1□□□-6A	1/8	7	1.1	1.2	0.2	0.3
VNC1□□□-8A	1/4		1.1	1.3		
VNC1□□□-10A	3/8		1.3	1.5		
VNC2□4□-10A		11	3.4	3.9	0.5	0.7
VNC2□□□-10A		15	4.3	5.0		
VNC2□4□-15A	1/2	11	3.9	4.5		
VNC2□□□-15A		15	5.0	5.8		
VNC3□4□-20A	3/4	14	6.1	7.0	0.8	1.0
VNC3□□□-20A		20	9.3	11		
VNC4□4□-25A	1	16	7.9	9.1	1.2	1.4
VNC4□□□-25A		25	13.2	15		
VNC5□4□-32A	1 1/4	22	14.3	17	2.2	2.4
VNC5□□□-32A		32	20.0	23		
VNC6□4□-40A	1 1/2	28	22.5	26	3.6	3.8
VNC6□□□-40A		40	29.3	34		
VNC7□4□-50A	2	33	35.4	41	5.5	5.7
VNC7□□□-50A		50	53.6	62		

Symbol

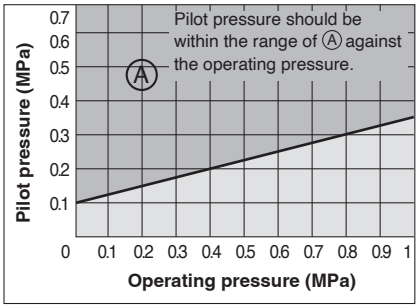
Operation \ Valve type	N.C.	N.O.
Air operated	**VNC□0$\frac{1}{4}$□**	**VNC□02□**
		
External pilot solenoid	**VNC□1$\frac{1}{4}$□**	**VNC□12□**
		

Specifications

Fluid (Main piping)			Coolant Note 2)
Fluid temperature	**VNC□□□A** **VNC□1□B**		–5 to 60°C Note 1)
	VNC□0□B		–5 to 99°C Note 1)
Ambient temperature			–5 to 50°C (Air operated type: 60°C) Note 1)
Proof pressure			1.5 MPa
Applicable pressure range	**VNC□□1□**		0 to 0.5 MPa
	VNC□□$\frac{2}{4}$□		0 to 1 MPa
External pilot air	Pressure	**VNC□□$\frac{1}{4}$□**	0.25 to 0.7 MPa
		VNC□□2□	0.1 + 0.25 x (Operating pressure) to 0.7 MPa Refer to "Graph (1)".
	Lubrication		Not required (Use turbine oil Class 1 ISO VG32, if lubricated.)
	Temperature		–5 to 50°C (Air operated type: 60°C) Note 1)
Mounting orientation			Unrestricted Note 3)

Note 1) No freezing
Note 2) This product cannot be used in water.
Note 3) For external pilot solenoid, it is recommended that the pilot solenoid valve be oriented either vertically upward or horizontally.

Graph (1) VNC□□2□ Pilot Pressure (N.O. type)



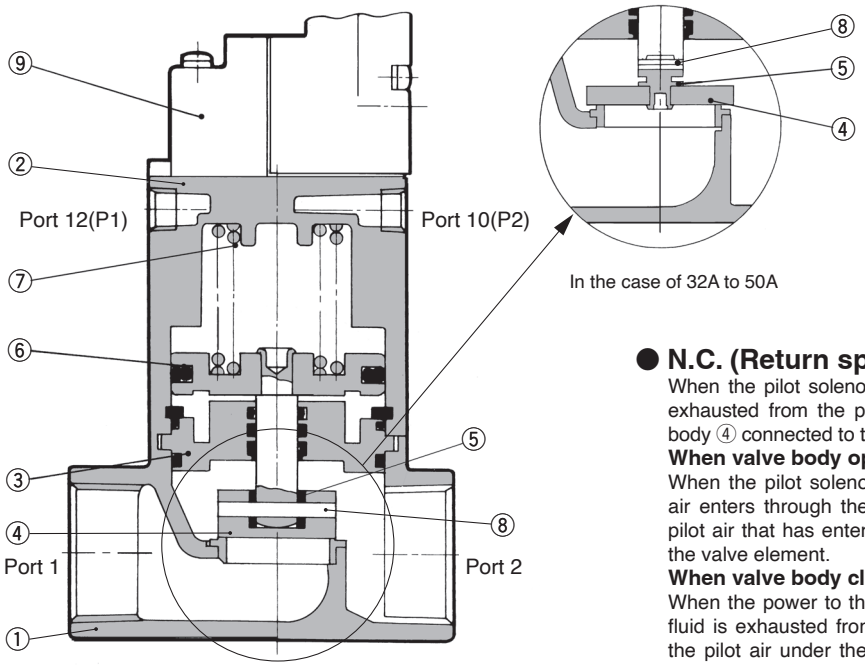
Pilot Solenoid Valve Specifications

Model			VNC1	VNC2 to 9
Pilot solenoid valve			SF4-□□□-23 SF4-□$^{D}_{DZ}$-23-Q	VO307-□$^{D}_{DZ}$1 VO307-□$^{D}_{DZ}$1-Q
Electrical entry			DIN terminal	DIN terminal
Coil rated voltage (V)	**AC (50/60 Hz)**		100 V, 200 V, Other voltage (Option)	
	DC		24 V, Other voltage (Option)	
Allowable voltage fluctuation			–15% to +10% of rated voltage	
Temperature rise			35°C or less (when rated voltage is applied.)	50°C or less (when rated voltage is applied.)
Apparent power	**AC**	Inrush	5.6 VA (50 Hz) 5.0 VA (60 Hz)	12.7 VA (50 Hz) 10.7 VA (60 Hz)
		Holding	3.4 VA (50 Hz) 2.3 VA (60 Hz)	7.6 VA (50 Hz) 5.4 VA (60 Hz)
Power consumption	**DC**		1.8 W (without light), 2 W (with light)	4 W (without light), 4.2 W (with light)
Manual override			Non-locking push type, Other (Option)	Non-locking push type

Note) Refer to page 25 for how to order pilot solenoid valves.

Construction

N.C.



● N.C. (Return spring normally closed)

When the pilot solenoid valve ⑨ is not energized (or when air is exhausted from the port 12(P1) for air operated type), the valve body ④ connected to the piston ⑥ is closed by the return spring ⑦.

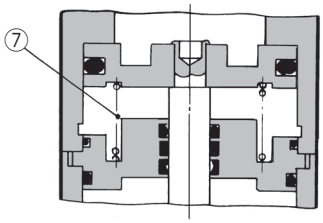
When valve body opens

When the pilot solenoid valve is energized (or when pressurized air enters through the port 12(P1) of the air operated type), the pilot air that has entered under the piston moves upward to open the valve element.

When valve body closes

When the power to the pilot solenoid valve is turned off (or when fluid is exhausted from the port 12(P1) of the air operated type), the pilot air under the piston is exhausted, and the return spring closes the valve element.

N.O.



● N.O. (Return spring normally open)

In contrast with the N.C., when the pilot solenoid valve is not energized (or when air is exhausted from the port 10(P2) of the air operated type), the valve body is opened by the return spring. When the pilot solenoid valve is energized (or when pressurized air enters through the port 10(P2) of the air operated type), the valve body closes.

Component Parts

No.	Description	Material	Note
1	**Body assembly**	Cast iron	Plated
2	**Cover assembly**	Aluminum alloy	Platinum silver painted
3	**Plate assembly**	Iron	Seal material (NBR, FKM)
4	**Valve element**	Stainless steel	
5	**Valve cover**	NBR, FKM	32A to 50A are O-ring.
6	**Piston assembly**	Aluminum alloy	
7	**Return spring**	Piano wire	
8	**Spiral pin**	Stainless steel	
9	**Pilot solenoid valve**	—	

Note) 3, 5 components determine the valve composition.

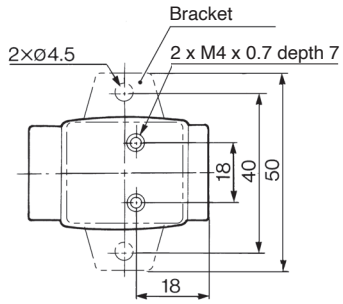
Replacement Parts

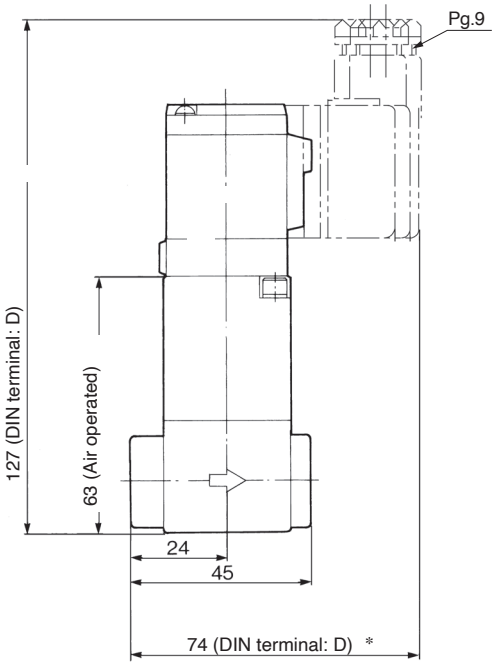
No.	Description			Part no.					
				VNC1□□□ -6A, 8A, 10A	**VNC2□□□ -10A, 15A**	**VNC3□□□ -20A**	**VNC4□□□ -25A**	**VNC5□□□ -32A, 32F**	**VNC6□□□ -40A, 40F**	**VNC7□□□ -50A, 50F**
3	**Plate ass'y**	Seal material	**NBR**	Refer to Note 1)	VN2-A3CA	VN3-A3CA	VN4-A3CA	VN5-A3CA	VN6-A3CA	VN7-A3CA
			FKM		VN2-A3CB	VN3-A3CB	VN4-A3CB	VN5-A3CB	VN6-A3CB	VN7-A3CB
5	**Valve cover** (32A to 50A are O-ring.)	Seal material	**NBR**		VN2-12CA		VN4-12CA	AS568-010	AS568-011	AS568-012
			FKM		VN2-12CB		VN4-12CB			
8	**Spiral pin**				VN2-60-1	Refer to Note 2)	VN4-60-1	VN5-60-1	VN6-60-1	VN7-60-1
9	**Pilot solenoid valve**			SF4-□□□-23	VO307-$\square^{P}_{DZ}$1 (Refer to page 25 for part no.)					

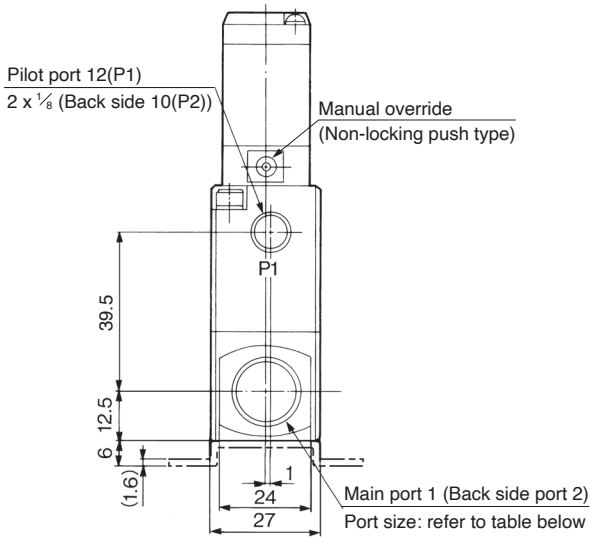
Note 1) Request factory repair.

Note 2) For VNC3□$^{1}_{2}$□ use VN3-60-1, and for VNC3□4□ use VN2-60-1.

Threaded Type/Port size: 6A, 8A, 10A



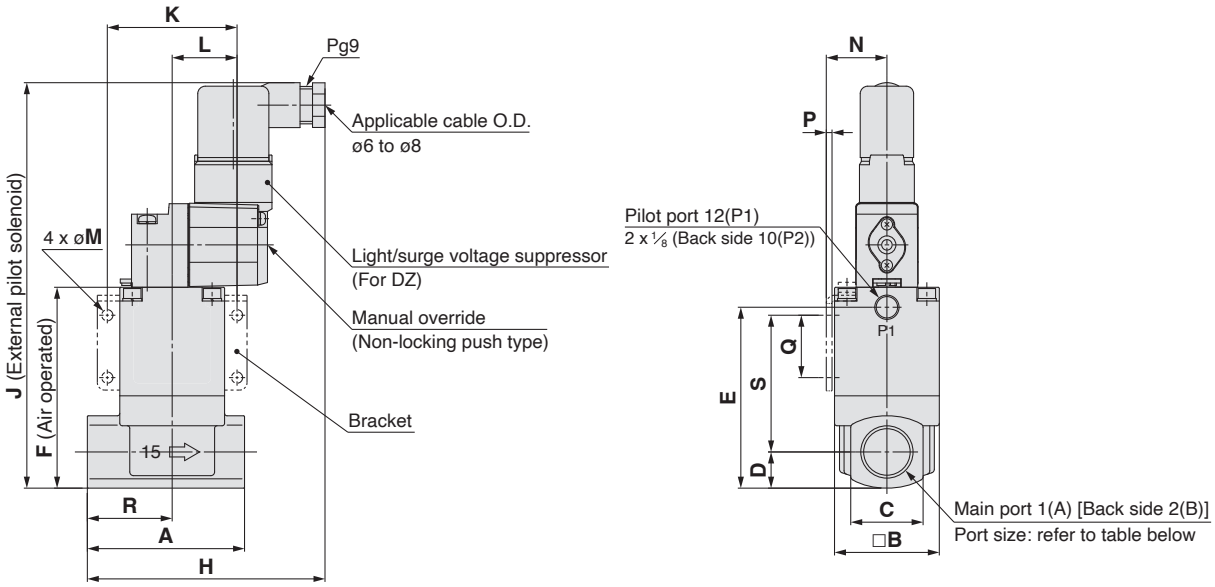




Model	Main port 1, 2
VNC1□□□-6A	1/8
VNC1□□□-8A	1/4
VNC1□□□-10A	3/8

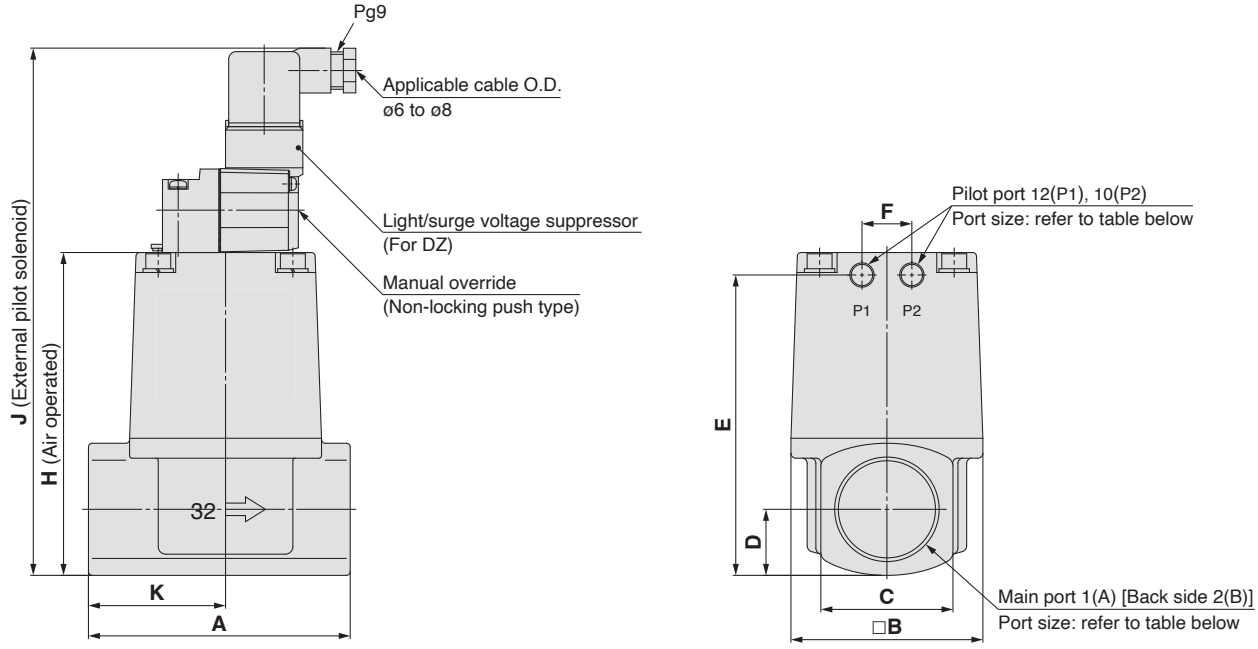
* "DZ", the length is longer by 9 mm.

Threaded Type/Port size: 10A, 15A, 20A, 25A



Model	Main port 1, 2	A	B	C	D	E	F	H	J	K	L	M	N	P	Q	R	S
VNC2□□□-10A	3/8	63	42	29	14.5	72.5	80.5	95.3	164.5	52	26	4.5	24.3	2.3	25	34	55
VNC2□□□-15A	1/2	63	42	29	14.5	72.5	80.5	95.3	164.5	52	26	4.5	24.3	2.3	25	34	55
VNC3□□□-20A	3/4	80	50	35	17.5	84	92	100.3	176	62	31	5.5	28.3	2.3	30	43	60.5
VNC4□□□-25A	1	90	60	44	22	100	108	101.3	192	72	36	6.5	33.3	2.3	35	49	71

Threaded Type/Port size: 32A, 40A, 50A



Model	Main port 1, 2	Pilot port 12(P1), 10(P2)	A Note 1)	B	C	D	E	F	H	J	K Note 1)
VNC5□□□-32A	1 1/4	1/8	105 (103)	77	53	26.5	120.5	20	129.5	213.5	55 (54)
VNC6□□□-40A	1 1/2	1/4	120 (118)	96	60	30	137	24	147	231	63 (62)
VNC7□□□-50A	2	1/4	140	113	74	37	160	24	170	254	74

Note 1) ( ): G thread

How to Order Pilot Solenoid Valves

Valve size 1

SF4 − 5 D ☐ − 23 − Q

Coil 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

Manual override

—	Non-locking push type
A*	Non-locking push type A (projecting)
B*	Slotted locking type B (tool required)

* Semi-standard

Electrical entry/
With light/surge voltage suppressor

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

Valve size 2 to 9

VO307 − 5 D 1 − Q

Coil 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

Light/surge voltage suppressor

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

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

VNC Series
Specific Product Precautions 1

Be sure to read this before handling the products. Refer to the back cover for safety instructions. Refer to the "Handling Precautions for SMC Products" on the SMC website: https://www.smc.eu

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 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.

Wiring

⚠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
	VNC□0 $\frac{1}{4}$□	**VNC□02□**	**VNC□1 $\frac{1}{2}$ $\frac{1}{4}$□**
12 (P1)	External pilot	Bleed port	External pilot
10 (P2)	Bleed port	External pilot	Pilot exhaust

Installing a silencer to the exhaust port and the bleed port is recommended for noise reduction and for dust entry prevention.

Fluid quality

⚠Caution

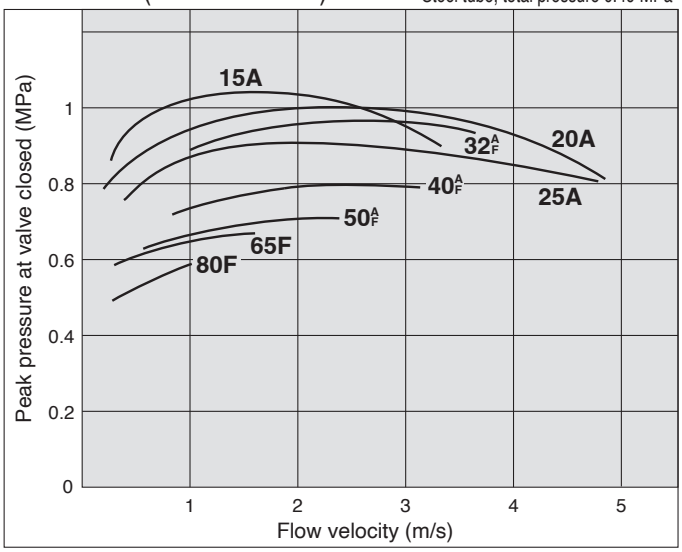
Please note that using fluids that contain foreign mterial (especially hard objects like glass chips), may cause damage to the valve, will reduce sealing performance, and may cause early failure.

Specific Product Precautions 2

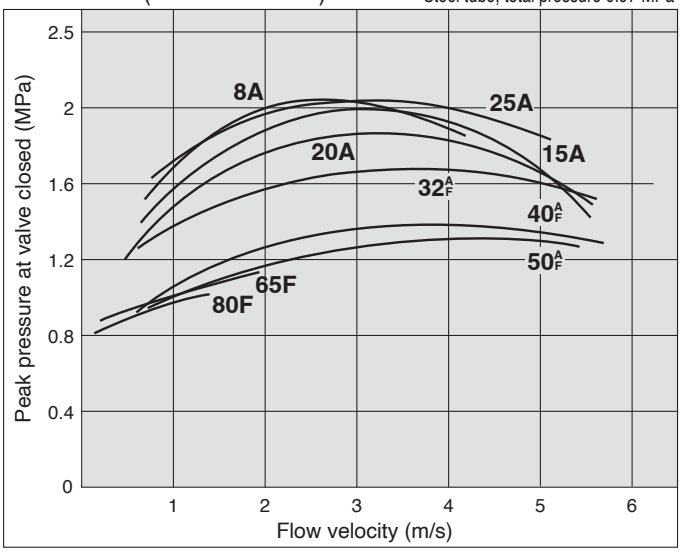
Be sure to read this before handling the products. Refer to the back cover for safety instructions. Refer to the "Handling Precautions for SMC Products" on the SMC website: https://www.smc.eu

Water Hammer Characteristics

VNC□□1□ (N.C. 0.49 MPa) Conditions: Piping 30 m, Steel tube, total pressure 0.49 MPa



VNC□□4□ (N.C. 0.97 MPa) Conditions: Piping 30 m, Steel tube, total pressure 0.97 MPa



Calculating the Flow Velocity

$$v = 21.2 \times Q/d^2$$

(Symbol)
v: flow velocity (m/s)
Q: flow rate (L/min)
d: piping inner diameter (mm)

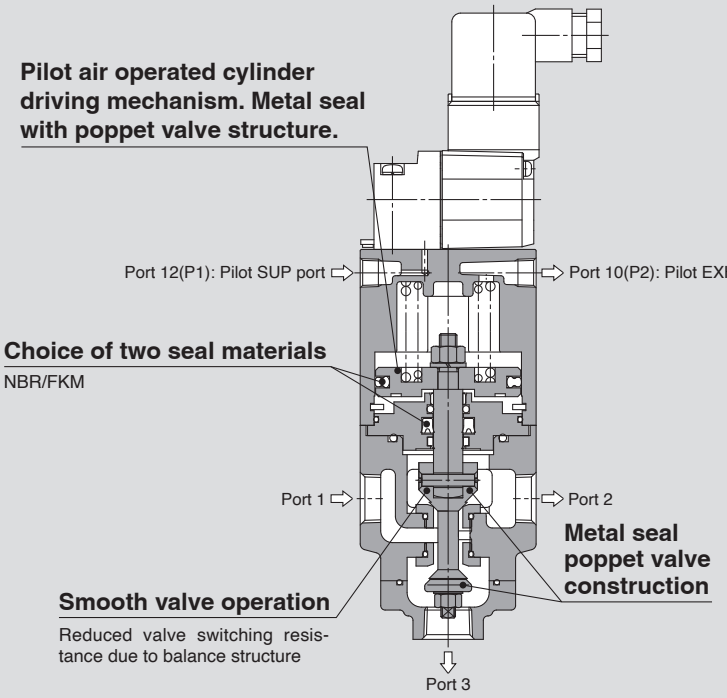
High Pressure Coolant Valve

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

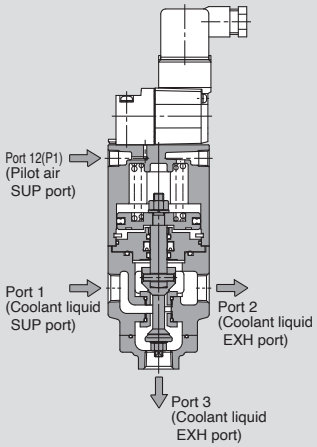
Operating fluid pressure	Port	Port size Rc
3.5 MPa	3 Port	3/8(10A), 1/2(15A) 3/4(20A), 1(25A)
7.0 MPa	2 port (Large flow type)	3/8(10A), 1/2(15A) 3/4(20A), 1(25A)
	3 Port	

Application Example

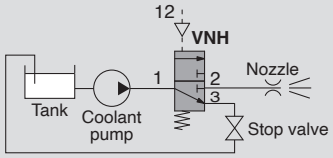
3 port valve (3.5 MPa, 7.0 MPa)

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).

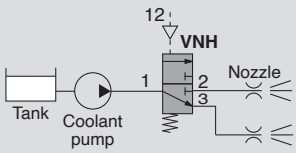


Ex. 1) 3 port valve: Reducing load to pump



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

Ex. 2) 3 port valve: Switching nozzle

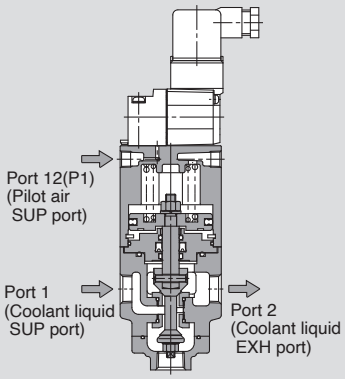


Switching nozzles on supplying coolant liquid.

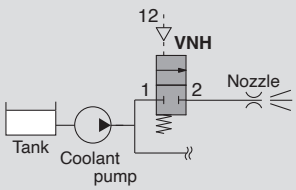
2 port valve (7.0 MPa)

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

How to Order

Air operated VNH 2 1 1 A – ☐ 15A – ☐

External pilot solenoid VNH 2 1 1 A – ☐ 15A – 1 D – ☐ – Q

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

—	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

Option

—	None
B	With bracket

Electrical entry/With light/surge voltage suppressor

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

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

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

Light/surge voltage suppressor

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

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□□$^{1}_{3}$A**	–5 to 60°C Note 1)/–5 to 60°C Note 1) (NBR seal)											
	VNH□□$^{1}_{3}$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.

3.5 MPa

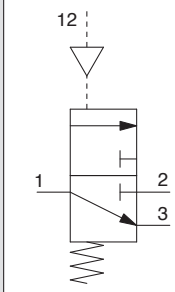
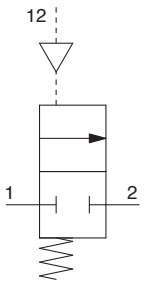
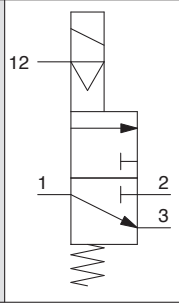
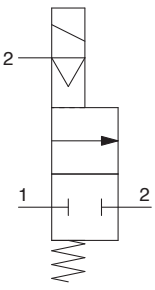
7.0 MPa

Pilot Operated Solenoid Valve Specifications

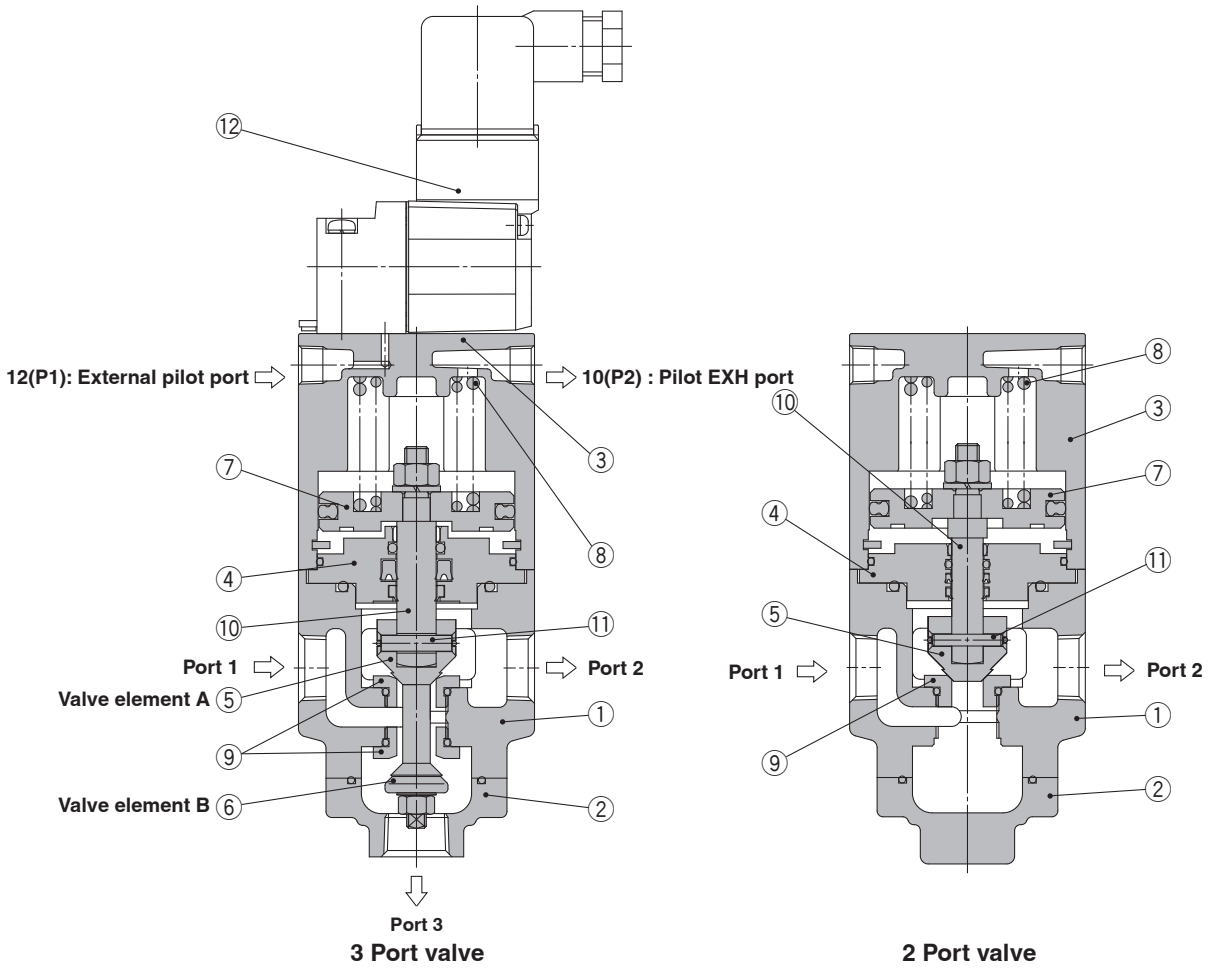
Pilot solenoid valve			VO307-□$^{D}_{DZ}$1(-Q)
Electrical entry			DIN terminal
Coil rated voltage (V)	**AC (50/60 Hz)**		100 V, 200 V, Other voltage (Semi-standard)
	DC		24 V, Other voltage (Semi-standard)
Allowable voltage fluctuation			–15 to +10% of the rated voltage
Temperature rise			50°C or less (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 29 for how to order pilot solenoid valves.

Symbol

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

Construction



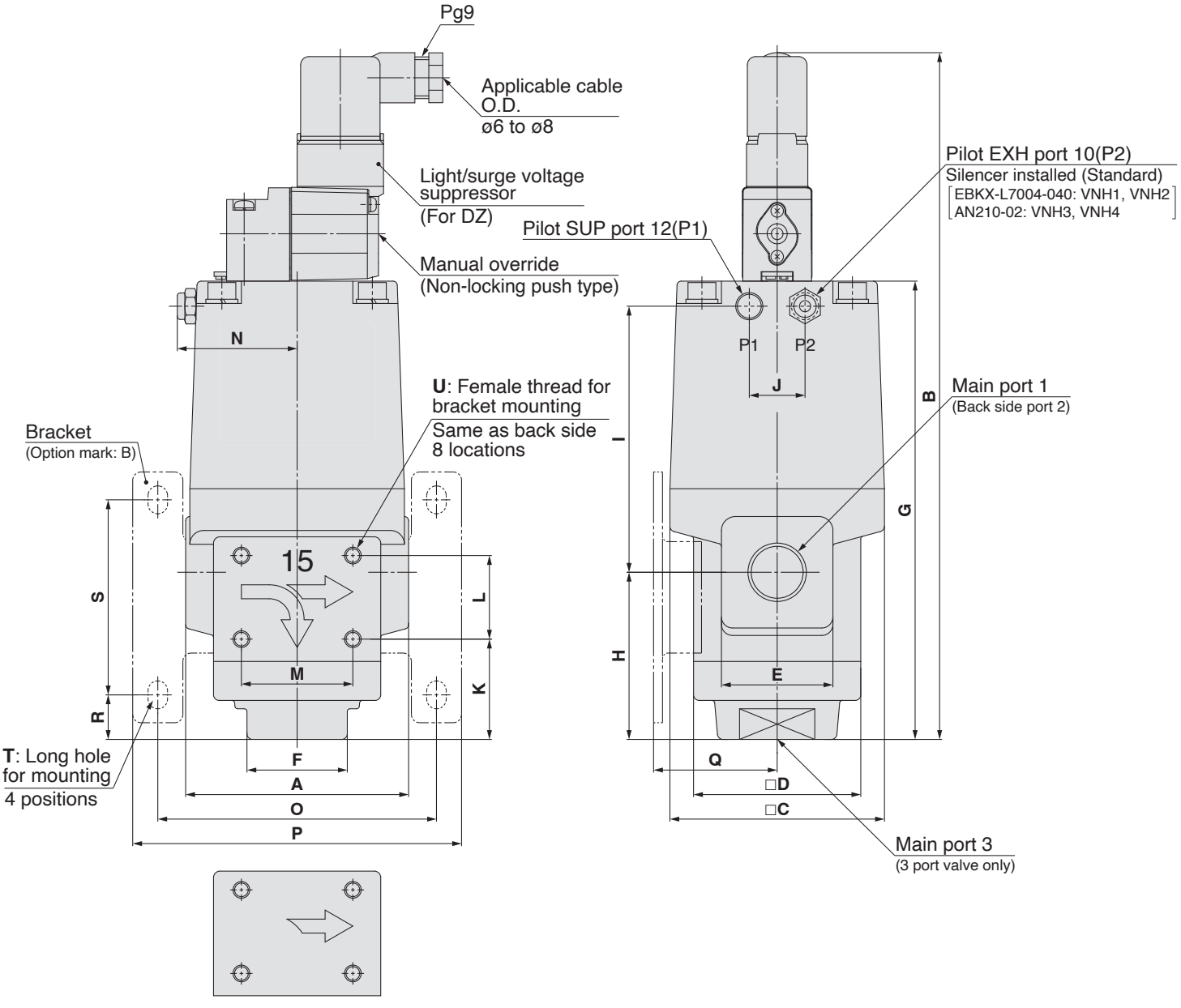
Working Principle

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 29.	

Dimensions



Flow indicator for 2 port valve

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 the back cover for safety instructions. Refer to the "Handling Precautions for SMC Products" on the SMC website: https://www.smc.eu

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.

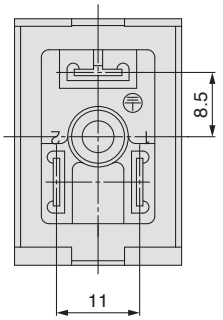
⚠Caution

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.

Steam Valve

VND Series

2 Port Valve for Steam

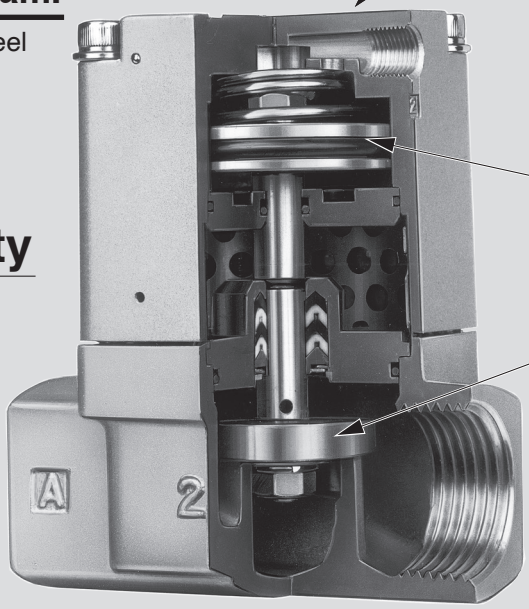
2 Port Valve for Steam Max. 180°C

With indicator (Option)

Selectable with indicator (for visual verification of operation)

By adopting of PTFE seal, the valve is suited for steam.

Body material: Bronze, Stainless steel



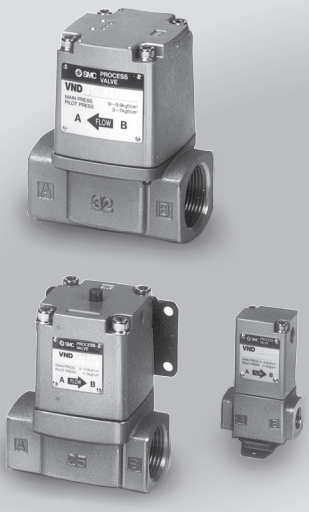
Cylinder actuation by external pilot air

Large valve capacity

PTFE seal

Wide variations

2 types — N.C., N.O.
Threaded type (6A to 50A)



Steam Valve: 2 Port Valve
For Steam
VND Series

How to Order

Body option

—	Standard (Copper alloy)
S*	Stainless steel body

* Threaded type only

Thread type

—	Rc
F	G*
N	NPT
T	NPTF

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

Air operated **VND 2 0 □ D S – □ 15A – □**

Option

—	None
B*	With bracket
L	With indicator (visual verification of operation)
BL*	With bracket and indicator (visual verification of operation)

* Brackets (for valve size 1/2/3/4 only) will be assembled at the time of shipment.
Bracket part no.
Valve size 1: VN1-A16#1 (with thread)
Valve size 2 to 4: VN□-16#1
(□: 2 to 4)

Valve size / **Valve type** / **Port size**

Symbol	Orifice dia. (mm)	Valve type Symbol 0 N.C.	2 N.O.	4 N.C.	Symbol	Port size Rc
1	ø7	—	●	●	**6A**	1/8
		—	●	●	**8A**	1/4
		—	●	●	**10A**	3/8
2	ø15	●	●	—	**10A**	3/8
		●	●	—	**15A**	1/2
3	ø20	●	●	—	**20A**	3/4
4	ø25	●	●	—	**25A**	1
5	ø32	●	●	—	**32A**	1 1/4
6	ø40	●	●	—	**40A**	1 1/2
7	ø50	●	●	—	**50A**	2

Model

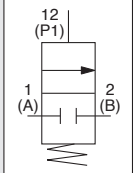
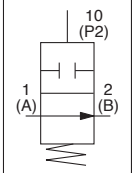
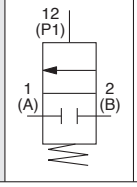
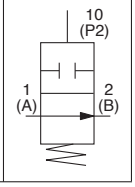
Model	Port size	Orifice dia.	Flow rate characteristics		Weight (kg)
	Rc	ø (mm)	Kv	Conversion Cv	
VND10□D-6A	1/8	7	0.9	1.1	0.3
VND10□D-8A	1/4		1.0	1.2	
VND10□D-10A	3/8		1.1	1.3	
VND20□D-10A		15	4.3	5.0	0.6
VND20□D-15A	1/2		4.6	5.4	
VND30□D-20A	3/4	20	8.6	9.9	0.9
VND40□D-25A	1	25	13.6	16	1.4
VND50□D-32A	1 1/4	32	15.7	18	2.3
VND60□D-40A	1 1/2	40	32.9	38	3.6
VND70□D-50A	2	50	53.6	62	5.7

Valve Specifications

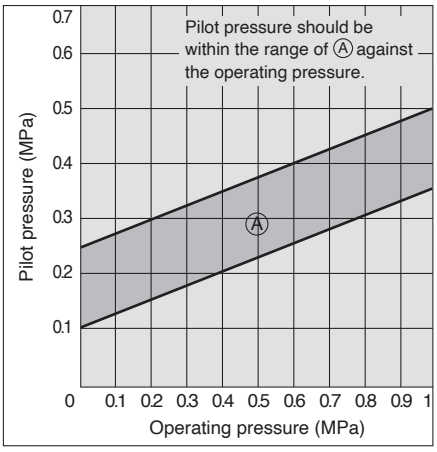
Fluid (Main piping)			Steam
Fluid temperature			–5 to 180°C Note 1)
Ambient temperature			–5 to 60°C Note 1)
Proof pressure			1.5 MPa
Operating pressure range			0 to 0.97 MPa
External pilot air	**Pressure**	**N.C.**	0.3 to 0.7 MPa
		N.O.	0.1 + 0.25 x (Operating pressure) to 0.25 + 0.25 x (Operating pressure) MPa Refer to below “Graph (1)”.
	Lubrication		Not required
	Temperature		–5 to 60°C Note 1)
Mounting orientation			Unrestricted

Note 1) No freezing
Note 2) Non-lubricant specifications are not available for this product.

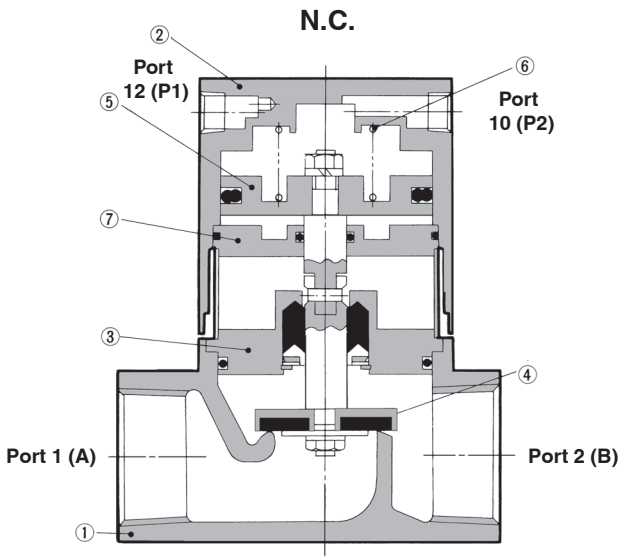
Symbol

Valve type / Valve size	N.C. Normally closed	N.O. Normally open
VND1		
VND 2 3 4 5 6 7		

Graph (1)
VND□ 02 D Pilot Pressure (N.O. type)



Construction



Component Parts

No.	Description	Material	Note
1	**Body**	Bronze*	Clear coated
2	**Cover assembly**	Aluminum alloy	Platinum silver painted
3	**Plate assembly**	Brass*	PTFE, EPDM, FKM
4	**Valve element**	Brass*, PTFE	—
5	**Piston assembly**	Aluminum alloy	—
6	**Return spring**	Piano wire	—
7	**Second plate assembly**	Aluminum alloy	—

∗ Body option S is made of stainless steel.

Working Principle

VND□0$^{0}_{4}$□ (N.C.)

When fluid is exhausted from the port 12(P1), the valve ④ connected with the piston ⑤ is closed by the return spring ⑥.

• When valve opens

When pressurized air enters through the port 12(P1), the valve piston moves upward by the pilot air that enters below the piston and the valve element opens.

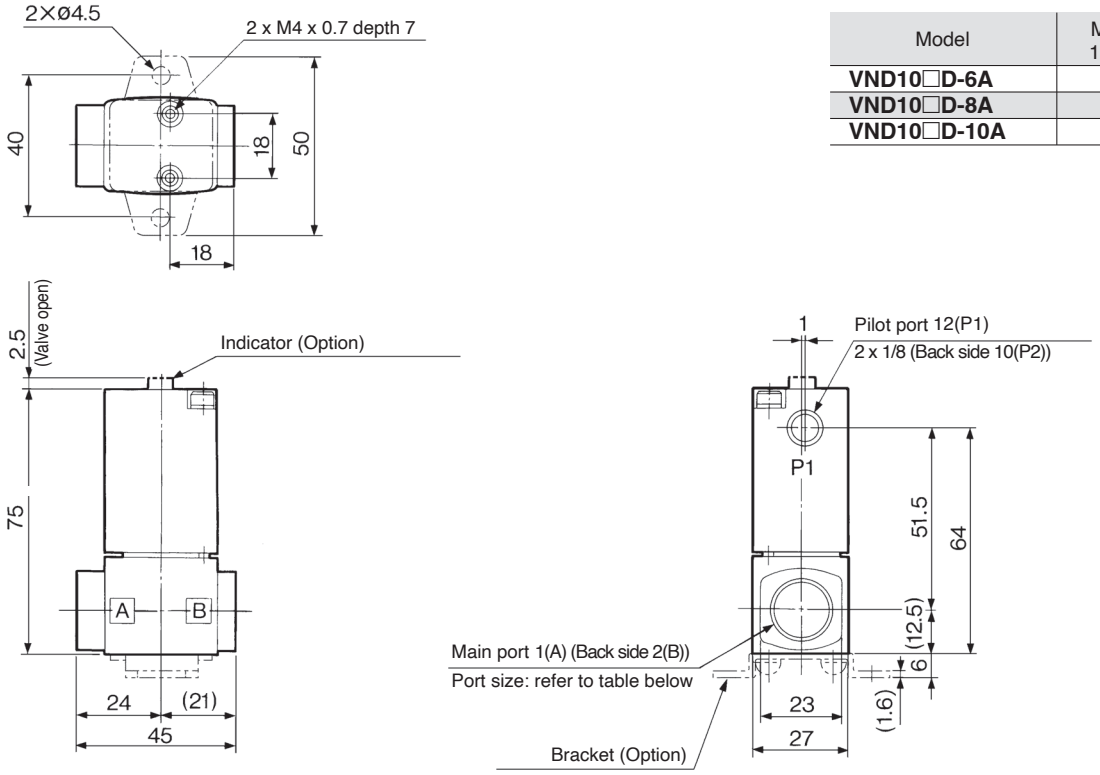
• When valve closes

When fluid is exhausted from the port 12(P1), the pilot air below the piston is exhausted and the valve element is closed by the return spring.

VND□02□ (N.O.)

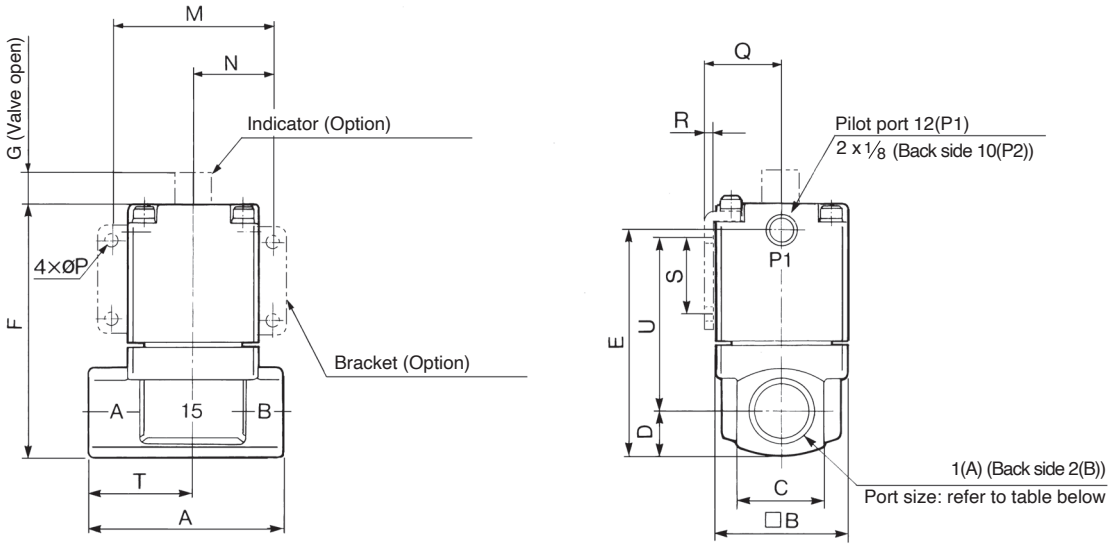
In contrast with the N.C., when air is exhausted from the port 10(P2), the return spring opens the valve element. Pressurized air that enters through the port 10(P2) closes the valve element.

Port size: 6A, 8A, 10A



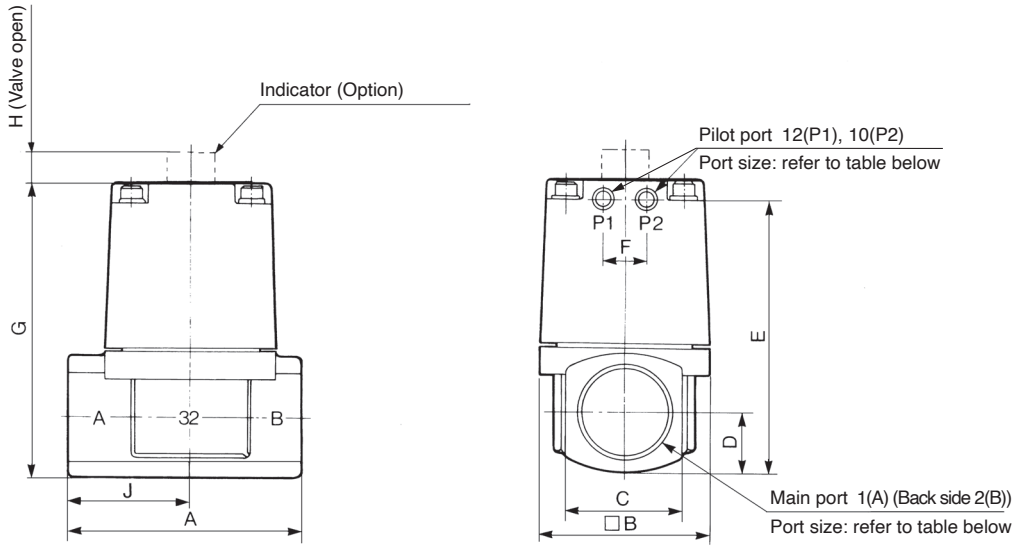
Model	Main port 1(A), 2(B)
VND10□D-6A	1/8
VND10□D-8A	1/4
VND10□D-10A	3/8

Port size: 10A, 15A, 20A, 25A



Model	Main port 1(A), 2(B)	A	B	C	D	E	F	G	M	N	P	Q	R	S	T	U
VND20□D-10A	3/8	63	42	29	14.5	73.5	81.5	4	52	26	4.5	24.3	2.3	25	34	56
VND20□S-10A				28	14											56.5
VND20□D-15A	1/2			29	14.5											56
VND20□S-15A				28	14											56.5
VND30□D-20A	3/4	80	50	35	17.5	85	93	5	62	31	5.5	28.3	2.3	30	43	61.5
VND30□S-20A																
VND40□D-25A	1	90	60	40	20	101	109	6	72	36	6.5	33.3	2.3	35	49	76
VND40□S-25A																

Port size: 32A, 40A, 50A



Model	Main port 1(A), 2(B)	Pilot port 12(P1), 10(P2)	A	B	C	D	E	F	G	H	J
VND50□D-32A	1 1/4	1/8	105	77	53	26.5	121.5	20	130.5	8	55
VND60□D-40A	1 1/2	1/4	120	96	60	30	138	24	148	10	63
VND70□D-50A	2	1/4	140	113	74	37	161	24	171	12	74

VND Series
Specific Product Precautions

Be sure to read this before handling the products. Refer to the back cover for safety instructions. Refer to the "Handling Precautions for SMC Products" on the SMC website: https://www.smc.eu

External Pilot

⚠ Caution

Pilot port 12(P1) and 10(P2) piping

P1 and P2 piping should be as follows according to the model.

Port	VND□O□D	VND□O2D
12(P1)	External pilot	Bleed port
10(P2)	Bleed port	External pilot

Installing a silencer to the exhaust port and the bleed port is recommended for noise reduction and for dust entry prevention.

Piping

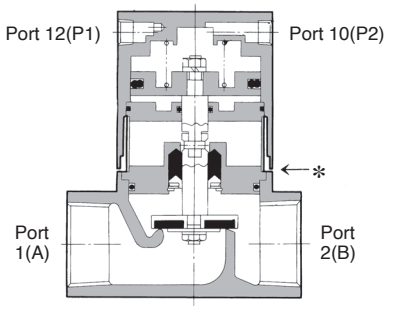
⚠ Caution

To use the piping with a high temperature fluid, use heat resistant fittings and tubing (Self-align fittings, PTFE tubing or Copper piping, etc.).

Adiabatic Space

⚠ Caution

There is a space between body and cover (∗: approximate 1 mm) for adiabatic effect.



⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) [1], and other safety regulations.

⚠ **Danger:**	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
⚠ **Warning:**	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Caution:**	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

1) ISO 4414: Pneumatic fluid power – General rules and safety requirements for systems and their components.
ISO 4413: Hydraulic fluid power – General rules and safety requirements for systems and their components.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.
etc.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.
1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Our products cannot be used beyond their specifications.
Our products are not developed, designed, and manufactured to be used under the following conditions or environments.
Use under such conditions or environments is not covered.
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogues and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

⚠ Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.
Use in non-manufacturing industries is not covered.
Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.
The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first. [2] Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

2) Vacuum pads are excluded from this 1 year warranty.
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

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