

Coolant Valve

Series VNC

Air Operated/External Pilot Solenoid



Cylinder actuation by pilot air

Wide selection of port
size and variations

Threaded type (6A to 50A)
Flange type (32F to 80F)



Low water hammer

For details, refer to page 537.

Large valve capacity

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

Coolant Valve: Air Operated/External Pilot Solenoid Series VNC



[Option]
(Note) CE-compliant: For D or DZ only

How to Order

Seal material

A	NBR seals
B	FKM seals

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

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

Nil	None
B (Note)	With bracket (VNC-16)

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

Air operated
VNC

External pilot solenoid
VNC

2	0	1	A		15A		(Except valve size 8, 9)
2	1	1	A		15A	1	T

Valve size

Symbol	Orifice diameter (mm)
1	ø7
2	ø15 (ø11)
3	ø20 (ø14)
4	ø25 (ø16)
5	ø32 (ø22)
6	ø40 (ø28)
7	ø50 (ø33)
8	ø65 (ø45)
9	ø80 (ø56)

Valve type

Symbol		
1	2	4
N.C. 0.5 MPa	N.O. 1 MPa	N.C. 1 MPa
—	●	●
—	●	●
—	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	●	●
●	—	●
●	—	●

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
32F	1 1/4 B Flange
40A	1 1/2
40F	1 1/2 B Flange
50A	2
50F	2 B Flange
65F	2 1/2 B Flange
80F	3 B Flange

Rated voltage

Nil	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
For other rated voltages, please consult with SMC.

CE-compliant

Nil	—
Q	CE-compliant

(Note) Electrical entry: D or DZ only

Manual override

Nil: Non-locking push type

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

Valve size 1

Nil: Non-locking push type

Valve size 2 to 9

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

CE-compliant

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

Electrical entry/With light/surge voltage suppressor

Symbol	Electrical entry	Valve size 1	Valve size 2 to 9
G	Grommet	●	●
GS	Grommet with surge voltage suppressor	●	●
E	Grommet terminal	●	●
EZ	Grommet terminal with light/surge voltage suppressor	●	●
T	Conduit terminal	●	●
TZ	Conduit terminal with light/surge voltage suppressor	●	●
D	DIN terminal	●	●
DZ	DIN terminal with light/surge voltage suppressor	●	●

VNA

VNB

SGC

SGH

VNC

VNH

VND

VCC

TQ



Model

Model	Port size		Orifice dia. ø (mm)	Flow characteristics		Weight (kg)	
	Threaded	Flange ^{Note)}		Av x 10 ⁻⁶ m ²	Air operated	External pilot solenoid	
VNC1□□□-6A	1/8	—	7	30	0.2	0.3	
VNC1□□□-8A	1/4	—		32			
VNC1□□□-10A		—		36			
VNC2□4□-10A	3/8	—	11	95	0.5	0.7	
VNC2□□□-10A		—	15	120			
VNC2□4□-15A	1/2	—	11	110			
VNC2□□□-15A		—	15	140	0.8	1.0	
VNC3□4□-20A	3/4	—	14	170			
VNC3□□□-20A		—	20	260			
VNC4□4□-25A	1	—	16	220	1.2	1.4	
VNC4□□□-25A		—	25	370			
VNC5□4□-32A	1 1/4	—	22	400	2.2	2.4	
VNC5□□□-32A		—	32	560			
VNC5□4□-32F	—	32	22	400	5.0	5.2	
VNC5□□□-32F		—	32	560			
VNC6□4□-40A	1 1/2	—	28	630	3.6	3.8	
VNC6□□□-40A		—	40	820			
VNC6□4□-40F	—	40	28	720	6.8	7.0	
VNC6□□□-40F		—	40	960			
VNC7□4□-50A	2	—	33	990	5.5	5.7	
VNC7□□□-50A		—	50	1500			
VNC7□4□-50F	—	50	33	1000	10.2	10.4	
VNC7□□□-50F		—	50	1600			

Note) The companion flange is JIS B 2210 10K (standard) or its equivalent.

Symbol

Valve type		N.C.	N.O.
Operation		VNC□0□□	VNC□02□
Air operated			
External pilot solenoid		VNC□1□□	VNC□12□

Model	Port size Flange ^{Note)}	Orifice dia. ø (mm)	Flow characteristics		Weight (kg)
			Cv	Effective area (mm ²)	External pilot solenoid
VNC814□-65F	65	45	49	880	15.7
VNC811□-65F		65	70	1260	
VNC914□-80F	80	56	73	1400	21.2
VNC911□-80F		80	100	1800	

Note) The companion flange is JIS B 2210 10K (standard) or its equivalent.

Specifications

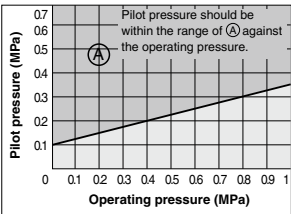
Fluid (Main piping)		Coolant ^{Note 2)}
Fluid	VNC□□□A	-5 to 60°C ^{Note 1)}
temperature	VNC□□□B	-5 to 99°C (Air operated type only) ^{Note 1)}
Ambient temperature		-5 to 50°C (Air operated type: 60°C) ^{Note 1)}
Proof pressure		1.5 MPa
Applicable pressure range	VNC□□1□	0 to 0.5 MPa
	VNC□□2□	0 to 1 MPa
External pilot air	Pressure	VNC□□1□ 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)

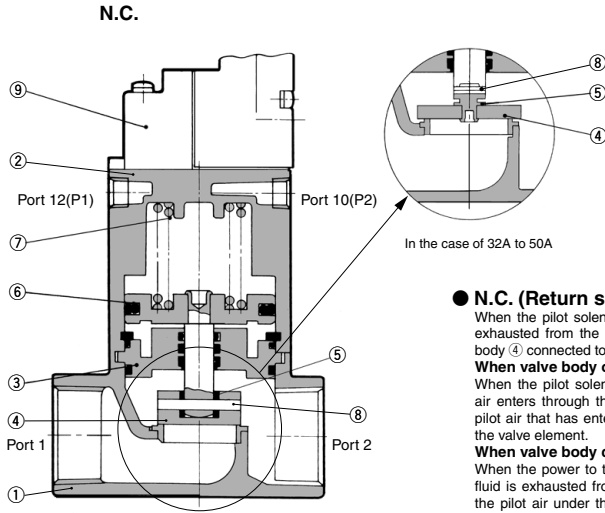


Pilot Solenoid Valve Specifications

Model		VNC1	VNC2 to 9	
Pilot solenoid valve		SF4-□□□-23 SF4-□□□-23-Q	VO307-□□□-1 VO307-□□□-1-Q	
Electrical entry		Grommet Grommet terminal Conduit terminal 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 535 for how to order pilot solenoid valves.

Construction



● 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 style), the valve body ④ connected to the piston ⑥ is closed by the return spring ⑦.

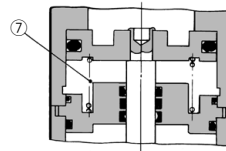
When valve body opens

When the pilot solenoid valve is energized (or when pressurized air enters through the port 12(P1) of the air operated style), 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 style), 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 12(P1) of the air operated style), 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 style), 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	Seal material	NBR FKM	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 FKM	Refer to Note 1)		VN2-A3CA VN2-A3CB	VN3-A3CA VN3-A3CB	VN4-A3CA VN4-A3CB	VN5-A3CA VN5-A3CB	VN6-A3CA VN6-A3CB	VN7-A3CA VN7-A3CB
5	Valve cover (32A to 50A are O-ring)	Seal material	NBR FKM			VN2-12CA VN2-12CB		VN4-12CA VN4-12CB	AS568-010	AS568-011	AS568-012
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-□□□1 (Refer to page 535 for part no.)					

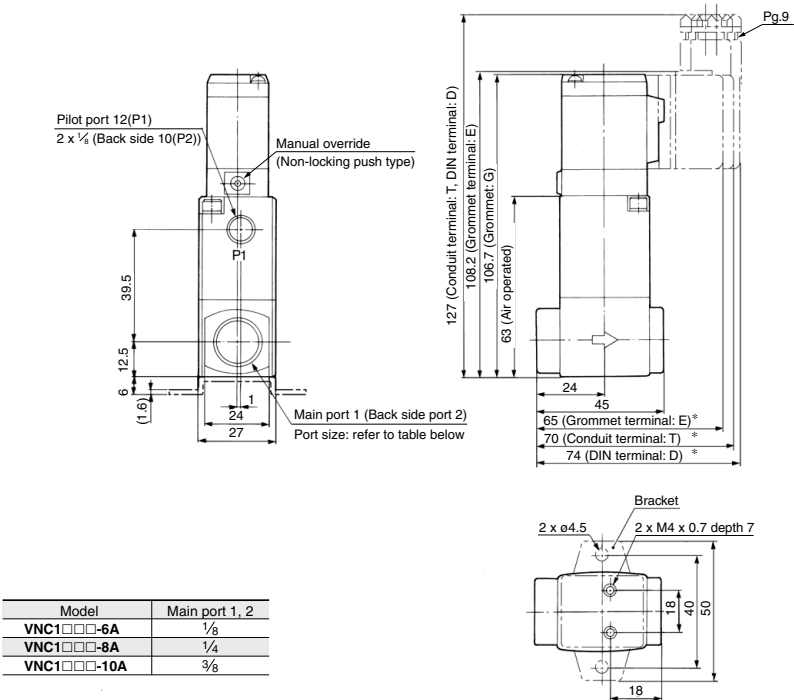
Note 1) Request factory repair.

Note 2) For VNC3□□□ use VN3-60-1, and for VNC3□□□ use VN2-60-1.

Replacement Parts: Applicable Flange

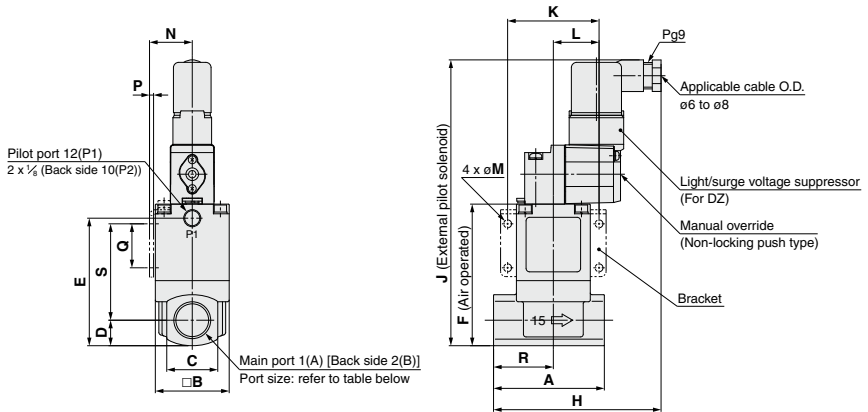
No.	Description	Seal material	NBR FKM	Part no.	VNC811□-65F	VNC911□-80F
3	Plate assembly	Seal material	NBR FKM		VN8-A3CA VN8-A3CB	VN9-A3CA VN9-A3CB
8	Spiral pin				VN7-60-1	
9	Pilot solenoid valve				VO307-□□□1 (Refer to page 535 for part no.)	

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



* In the case of "EZ" or "TZ" or "DZ", the length is longer by 9 mm.

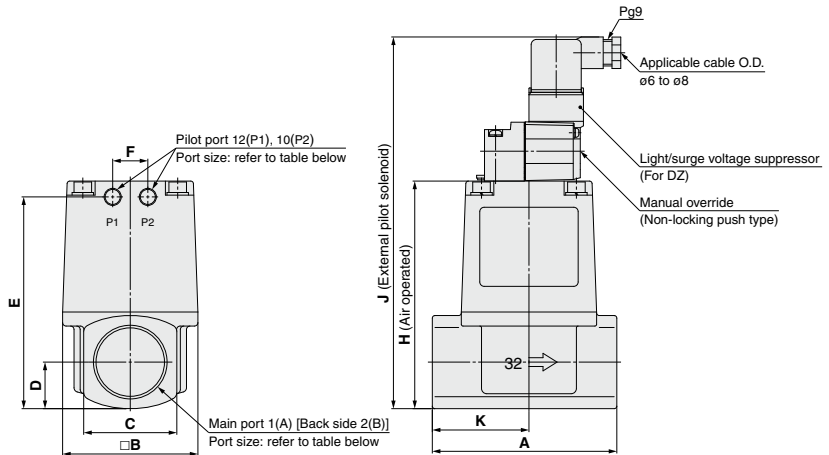
Threaded Type/Port size: 10A, 15A, 20A, 25A



Model	Main port 1, 2	A	B	C	D	E	F	H	J (Note)	K	L	M	N	P	Q	R	S
VNC2□□□-10A	3/8	63	42	29	14.5	72.5	80.5	95.3	162.5 (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	162.5 (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	174 (176)	62	31	5.5	28.3	2.3	30	43	60.5
VNC4□□□-25A	1	90	60	40	20	100	108	101.3	190 (192)	72	36	6.5	33.3	2.3	35	49	73

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

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

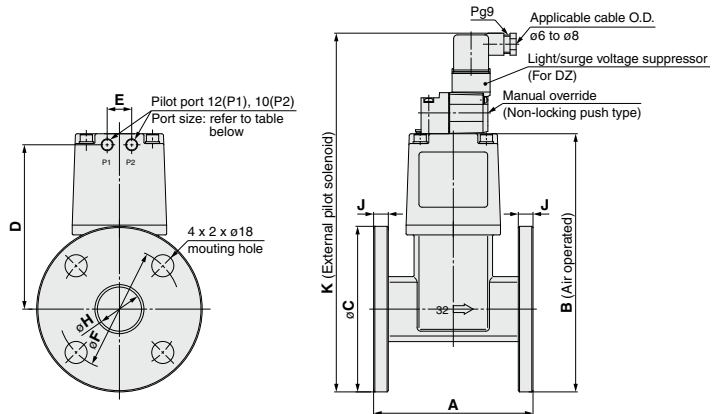


Model	Main port 1, 2	Pilot port 12(P1), 10(P2)	A	B	C	D	E	F	H	J (Note)	K
VNC5□□□-32A	1 1/4	1/8	105	77	53	26.5	120.5	20	129.5	211.5 (213.5)	55
VNC6□□□-40A	1 1/2	1/4	120	96	60	30	137	24	147	229 (231)	63
VNC7□□□-50A	2	1/4	140	113	74	37	160	24	170	252 (254)	74

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

VNA
VNB
SGC
SGH
VNC
VNH
VND
VCC
TQ

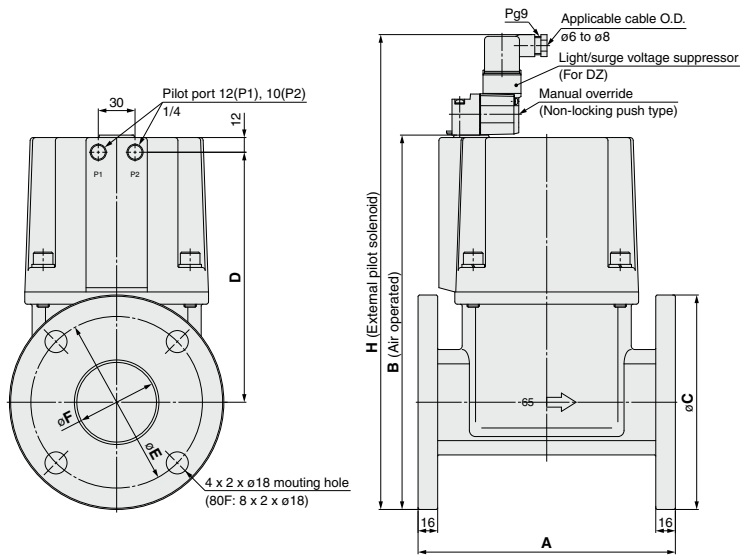
Flange Type/Port size: 32F, 40F, 50F



Model	Applicable flange Port 1, 2	Pilot port 12(P1), 10(P2)	A	B	C	D	E	F	H	J	K (Note)
VNC5□□□-32F	32	1/8	130	210.5	135	134	20	100	36	12	292.5 (294.5)
VNC6□□□-40F	40	1/4	150	226	140	146	24	105	42	12	308 (310)
VNC7□□□-50F	50	1/4	180	250	155	162.5	24	120	54	14	332 (334)

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

Flange Type/Port size: 65F, 80F



Model	Applicable flange Port 1, 2	A	B	C	D	E	F	H (Note)
VNC81□□-65F	65	210	305.5	175	204	140	65	387.5 (389.5)
VNC91□□-80F	80	240	341.5	185	235	150	80	423.5 (425.5)

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

How to Order Pilot Solenoid Valves

Valve size 1

SF4-**5****D****□**-23-**Q**
 SF4-**5****D****□**-23

CE-compliant
 Note) Electrical entry: D or DZ only

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

For other rated voltages, please consult with SMC.

Manual override

Nil	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

		CE-compliant
G	Grommet	—
GS	Grommet with surge voltage suppressor	—
E	Grommet terminal	—
EZ	Grommet terminal with light/surge voltage suppressor	—
T	Conduit terminal	—
TZ	Conduit terminal 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

CE-compliant

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

* Semi-standard

For other rated voltages, please consult with SMC.

Light/surge voltage suppressor

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

Accessory

Function plate for VO307 (D seal, with thread): DXT152-14-1A

VNA
 VNB
 SGC
 SGH
VNC
 VNH
 VND
 VCC
 TQ



Series VNC

Specific Product Precautions 1

Be sure to read this before handling.

Refer to front matter 41 for Safety Instructions, and pages 17 to 19 for 2 Port Solenoid Valves 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 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.

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 material (especially hard objects like glass chips), may cause damage to the valve, will reduce sealing performance, and may cause early failure.



Series VNC

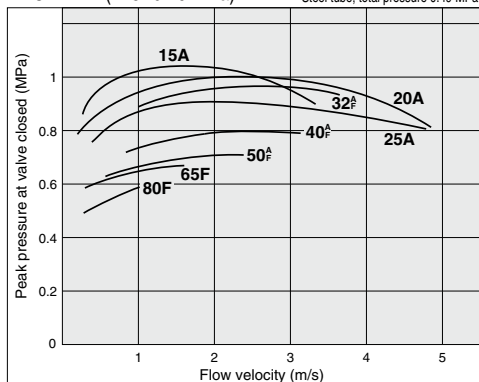
Specific Product Precautions 2

Be sure to read this before handling.

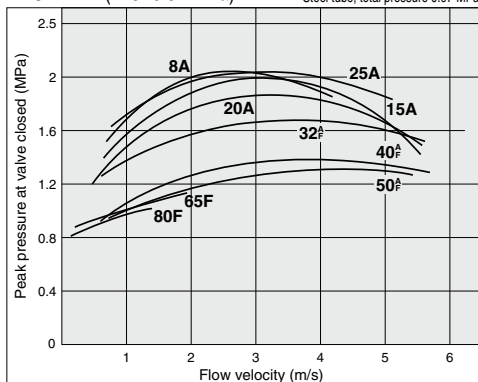
Refer to front matter 41 for Safety Instructions, and pages 17 to 19 for 2 Port Solenoid Valves for Fluid Control Precautions.

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)

VNA

VNB

SGC

SGH

VNC

VNH

VND

VCC

TQ