Coolant Valve

VNC Series

Air Operated/External Pilot Solenoid

CE [Option]

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 626.

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)

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Coolant Valve:
Air Operated/External Pilot Solenoid
VNC Series

CE

[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 (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 (with thread)
Valve sizes 2 to 4: VN□-16 (□: 2 to 4)

Air operated VNC [2] [0] [1] [A] – [ ] [15A] – [ ] **(Except valve size 8, 9)**

External pilot solenoid VNC [2] [1] [1] [A] – [ ] [15A] – [1] [T] [ ] – [ ] – [ ]

CE-compliant

Nil	—
Q	CE-compliant

Note) Electrical entry: D or DZ only

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 N.C. 0.5 MPa	2 N.O. 1 MPa	4 N.C. 1 MPa
1	—	●	●
	—	●	●
	—	●	●
2	●	●	●
	●	●	●
3	●	●	●
4	●	●	●
5	●	●	●
	●	●	●
6	●	●	●
	●	●	●
7	●	●	●
	●	●	●
8	●	—	●
9	●	—	●

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	2B Flange
65F	2 1/2 B Flange
80F	3B Flange

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

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.

Manual override

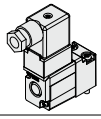
Nil: Non-locking push type

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

* Semi-standard

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	●	●

CE-compliant

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

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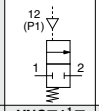
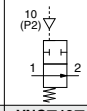
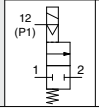
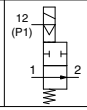
Model

Model	Port size		Orifice dia. ø (mm)	Flow rate characteristics		Weight (kg)	
	Threaded	Flange Note)		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		
VNC5□4□-32F	—	32	22	14.3	17	5.0	5.2
VNC5□□□-32F			32	20.0	23		
VNC6□4□-40A	1 1/2	—	28	22.5	26	3.6	3.8
VNC6□□□-40A			40	29.3	34		
VNC6□4□-40F	—	40	28	25.7	30	6.8	7.0
VNC6□□□-40F			40	34.3	40		
VNC7□4□-50A	2	—	33	35.4	41	5.5	5.7
VNC7□□□-50A			50	53.6	62		
VNC7□4□-50F	—	50	33	35.7	41	10.2	10.4
VNC7□□□-50F			50	57.1	66		
VNC814□-65F	—	65	45	42.4	49	—	15.7
VNC811□-65F			65	60.6	70		
VNC914□-80F	—	80	56	63.1	73	—	21.2
VNC911□-80F			80	86.5	100		

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

Symbol

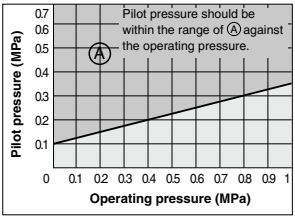
Operation \ Valve type	N.C.	N.O.
	VNC□0 1/4 □	**VNC□02□**
Air operated		
	VNC□1 1/4 □	**VNC□12□**
External pilot solenoid		

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□□2 1/4 □	0 to 1 MPa
External pilot air	**VNC□□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-□ B/Bz -23-Q	VO307-□ B/Bz 1 VO307-□ B/Bz 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 624 for how to order pilot solenoid valves.

VNA
VNB
SGC
SGH
VNC
VNH
VND
VCC
TQ

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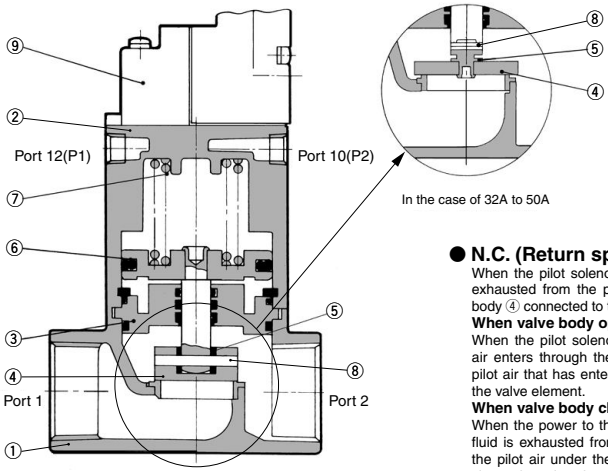
Construction

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.

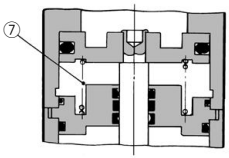
When valve body opens

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-□$^{5}_{6}$2$^{}_{}$1 (Refer to page 624 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.

Replacement Parts: Applicable Flange

No.	Description			Part no.	
				VNC811□-65F	**VNC911□-80F**
3	**Plate assembly**	Seal material	**NBR**	VN8-A3CA	VN9-A3CA
			FKM	VN8-A3CB	VN9-A3CB
8	**Spiral pin**			VN7-60-1	
9	**Pilot solenoid valve**			VO307-□$^{5}_{6}$2$^{}_{}$1 (Refer to page 624 for part no.)	

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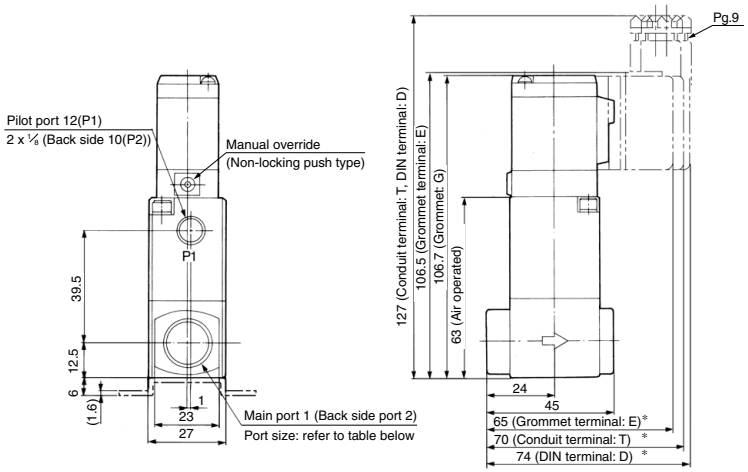
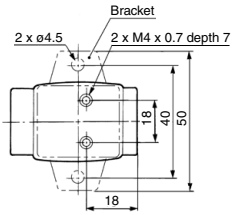
Threaded Type/Port size: 6A, 8A, 10A





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

∗ In the case of “EZ” or “TZ” or “DZ”, the length is longer by 9 mm.

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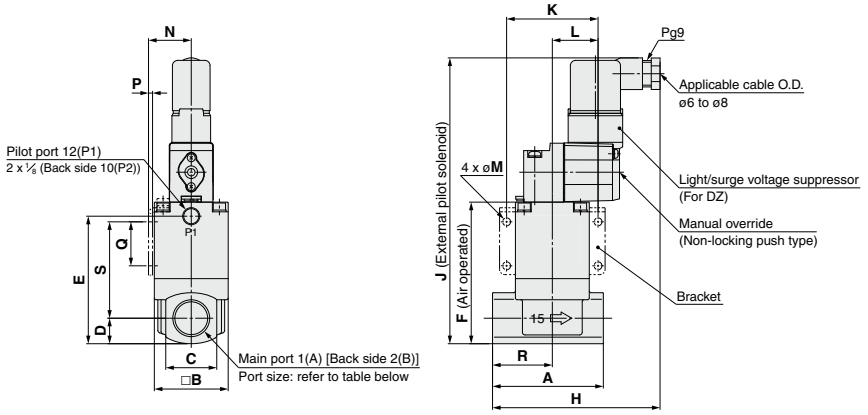
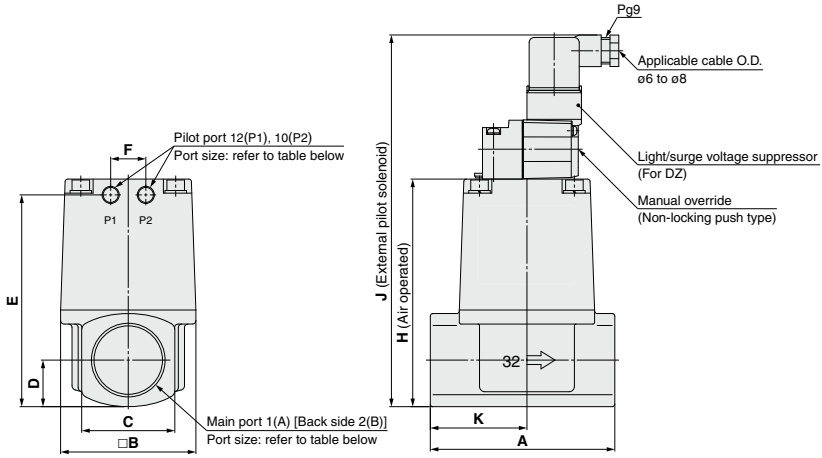
Threaded Type/Port size: 10A, 15A, 20A, 25A



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)

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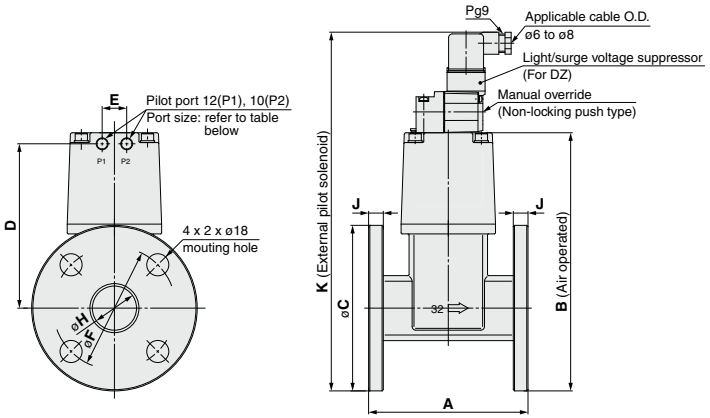
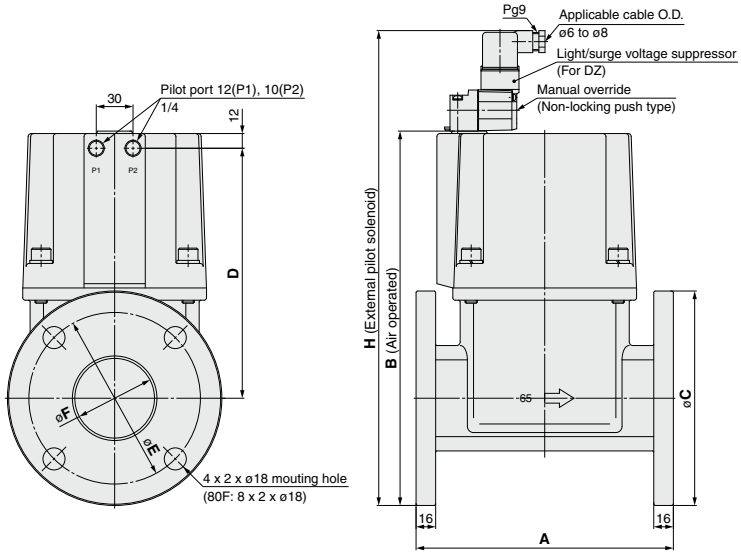
Flange Type/Port size: 32F, 40F, 50F



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$^{1}_{4}$□-65F	65	210	305.5	175	204	140	65	387.5 (389.5)
VNC91$^{1}_{4}$□-80F	80	240	341.5	185	235	150	80	423.5 (425.5)

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

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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
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)

* 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

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

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): DXT152-14-5A

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VNC Series
Specific Product Precautions 1

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

Design

⚠Warning

1. Extended periods of continuous energization

If a valve is continuously energized for long periods, heat generation of the coil may result in reduced performance and shorter service life. This may also have an adverse effect on the peripheral equipment in proximity. Should a valve be continuously energized for long periods, or its daily energized state exceeds its non energized state, please use 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 $\frac{1}{4}$□**
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.

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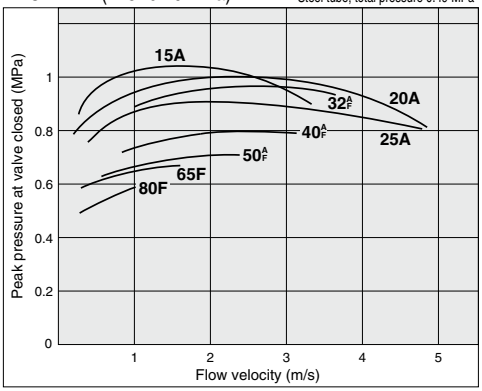
Specific Product Precautions 2

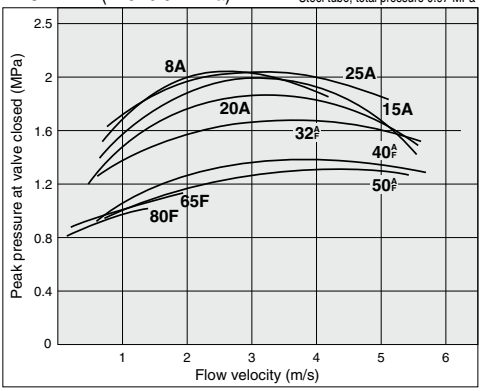
Be sure to read this before handling the products.
Refer to back page 50 for Safety Instructions and pages 17 to 19 for 2 Port Solenoid Valve for Fluid Control Precautions.

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)

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