2/3 Port Valve for General Purpose Fluids Control

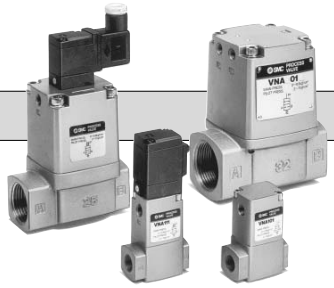
For General Purpose Fluids Control
2/3 Port Valve

Process Valve: *Series VN*

- Cylinder actuation by external air pilot
- Can be operated with a pressure differential of zero.
- Wide variations

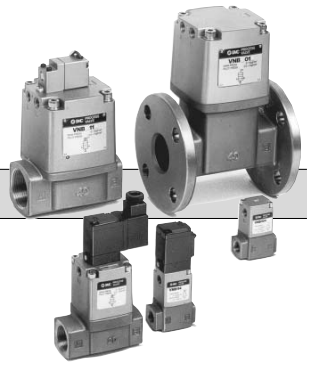
Series VNA

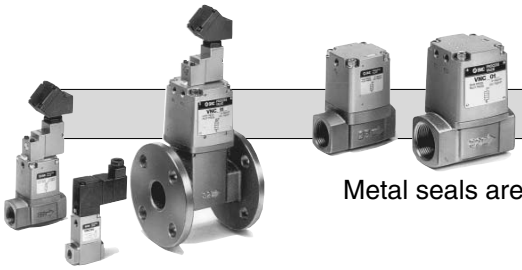
For controlling pneumatic systems or air-hydro circuits.
A balanced poppet that enables air to flow forward or backward.



Series VNB

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.





Series VNC

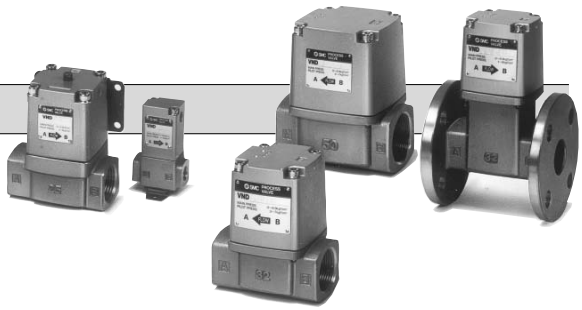
For controlling the cutting oils and coolants used in machine tools.
Metal seals are used for preventing foreign matter such as cutting chips from entering.
Maximum operating pressure: 0.5 MPa, 1 MPa

Series VNH

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

Series VND

For steam control
PTFE seal adopted
With indicator light available (Option)



Process Valves List

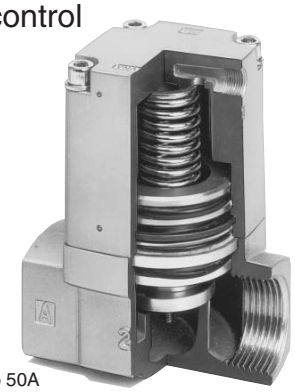
Series			Process valve Series VNA			Process valve Series VNB			Coolant valve Series VNC		High pressure coolant valve Series VNH	Steam valve Series VND	
Valve type			N. C.	N. O.	C. O.	N. C.	N. O.	C. O.	N. C.	N. O.	N. C.	N. C.	N. O.
Applicable fluids	Water		–	–	–	●	●	●	–	–	–	–	–
	Air		●	●	●	●	●	●	–	–	–	–	–
	Oil		●	●	●	●	●	●	–	–	–	–	–
	Low vacuum (1 Torr)		–	–	–	●	●	●	–	–	–	–	–
	Coolant		–	–	–	–	–	–	●	●	●	–	–
	Steam		–	–	–	–	–	–	–	–	–	●	●
Port size	Rc (PT) Rc	1/8	●	●	●	●	●	●	●	●	–	●	●
		1/4	●	●	●	●	●	●	●	●	–	●	●
		3/8	●	●	●	●	●	●	●	●	●	●	●
		1/2	●	●	●	●	●	●	●	●	●	●	●
		3/4	●	●	●	●	●	●	●	●	●	●	●
		1	●	●	●	●	●	●	●	●	●	●	●
		1 1/4	●	●	●	●	●	●	●	●	–	●	●
		1 1/2	●	●	●	●	●	●	●	●	–	●	●
		2	●	●	●	●	●	●	●	●	–	●	●
	Flange	32A	–	–	–	●	●	●	●	●	–	●	●
		40A	–	–	–	●	●	●	●	●	–	●	●
		50A	–	–	–	●	●	●	●	●	–	●	●
		65A	–	–	–	–	–	–	●	–	–	–	–
		80A	–	–	–	–	–	–	●	–	–	–	–
Page			17-4-5			17-4-13			17-4-21		17-4-31	17-4-37	

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

Series VNA

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.

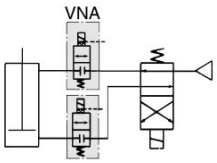
Operation from 0 MPa is possible.

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

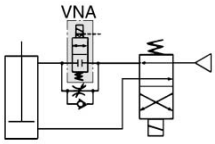
Compressed Air

Air pressure circuit: Application examples

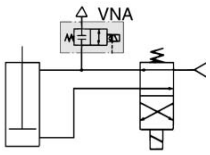
Actuator stop valve
Emergency stop, intermediate stop, inching



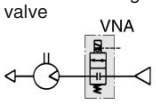
Actuator skip valve
Terminal deceleration, intermediate deceleration, accelerative start



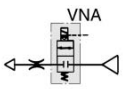
Actuator exhaust valve
High speed operation, high speed exhaust



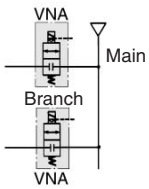
Air motor driving valve



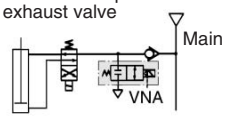
Air blow valve



Line stop valve

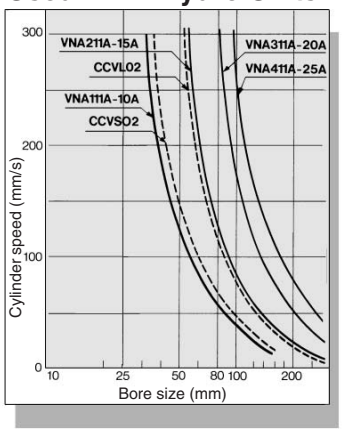


Residual line pressure exhaust valve



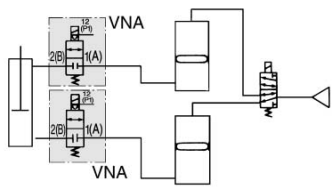
Air-hydro

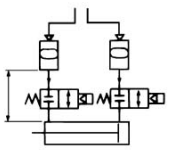
Operation Capacity When Used in Air-hydro Units



This series can supplement the capacity of conventional 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 conventional air-hydro units.

Air-hydro circuit: Application example
Basic circuit





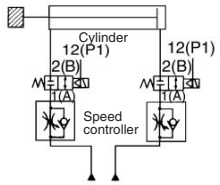
Conditions

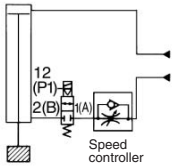
Supply pressure	0.49 MPa	
Hydraulic fluid	ISO VG32	
Load	No load	
Piping length	1 m	
Piping diameter	VNA111A, CCVSO2	3/8B (9 mm)
	VNA211A, CCVLO2	1/2B (13 mm)
	VNA311A	3/4B (19 mm)
	VNA411A	1B (25 mm)

Piping length

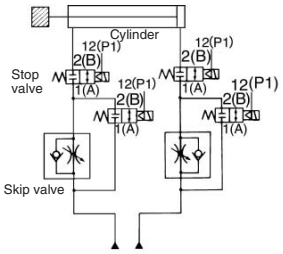
Refer to Air-hydro Unit pages in "Best Pneumatics Vol. 10" for further information on air-hydro.

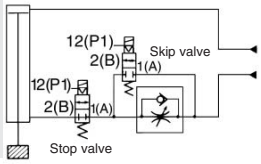
⚠ Caution
When speed controller is mounted
Connect a speed controller (Series AS etc.) to A port (cast in body A) of VNA□11 (in order to protect the speed control valve from surges when cylinder operation is suspended, thus improving stopping accuracy).





⚠ Caution
Skip valve function
Combination of 2 or more valves of Series VNA provides a skip valve function. Connect the skip valve to the A port side of a stop valve as in the case of the speed control valve.





How to Order

Seal material

A	NBR seals
B	FKM seals
C	EPR seals

Refer to "Table (1)" for availability.

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

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

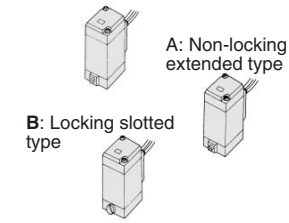
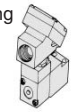
Nil	None
B	With bracket (VN□-16) ∗□:Valve size

Note 1) Valve size 1 comes with NV1-A16 (with thread).
Note 2) Shipped after assembled at our factory.

Air operated VNA 2 0 1 A — □ 15A — □

External pilot solenoid VNA 2 1 1 A — □ 15A — 1 T □ —□

Manual override

Nil: Non-locking push type; A: Non-locking extended type; **B**: Locking slotted type 	Valve size 1 to 4
Nil: Non-locking push type 	Valve size 5 to 7

Valve size

Symbol	Orifice size (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∗	110 VAC 50/60 Hz
4∗	220 VAC 50/60 Hz
5	24 VDC
6∗	12 VDC
7∗	240 VAC 50/60 Hz
9∗	Other

∗ Option

Electrical entry/ With light/surge voltage suppressor

G	Grommet	Valve size 1 to 4
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	
G	Grommet	Valve ∗∗ size 5 to 7
GS	Grommet with surge voltage suppressor	
C	Conduit	
T	Conduit terminal	
TS	Conduit terminal with surge voltage suppressor	
TZ∗	Conduit terminal with light/surge voltage suppressor	
TL∗∗	Conduit terminal with indicator light	
D	DIN terminal	
DL	DIN terminal with indicator light	

∗ Except rated voltage 6, 7, 9.
∗∗ DZ: For DIN terminal with light/surge suppressor protection circuit, add suffix -X200 to the end of the part number. In this case, pilot solenoid valve is VO307-□DZ.

Table (1) Applicable Fluids

Model	VNA□□□A (Valve material: NBR seal)	VNA□□□B (Valve material: FKM seal)	VNA□□□C (Valve material: EPR seal)
Fluid	Air (Standard, Dry) Carbon dioxide (CO_2) (0.7 MPa Max.) Nitrogen gas (N_2) Freon® 11, 113, 114, Turbine oil, Hydraulic fluid (40 to 100 cst)	Argon Helium Turbine oil, Hydraulic fluid (99°C)	Carbon dioxide (CO_2) (0.7 MPa max.)

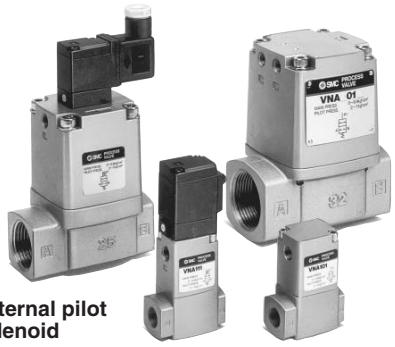
⚠ Caution
Please contact SMC for other fluids, operating conditions, etc.

Model

Model	Port size Rc	Orifice size ø (mm)	Flow characteristics				Weight (kg)	
			Measured by air		Measured by water Note)			
			C [dm³/ (bar·sec)]	b	Cv	Av x 10^{-5} m²	Air operated	External pilot solenoid
VNA1□□□-6A	1/8	10	3.5	0.35	0.88	25	0.1	0.2
VNA1□□□-8A	1/4		5.9	0.24	1.5	41		
VNA1□□□-10A	3/8		7.9	0.16	1.9	51		
VNA2□□□-10A		15	16	0.35	3.8	110	0.3	0.4
VNA2□□□-15A	1/2		23	0.25	4.8	130		
VNA3□□□-20A	3/4	20	34	0.16	7.5	210	0.5	0.6

Note) This product cannot be used for water application.

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



External pilot solenoid

Air operated

Valve Specifications

Fluid		Refer to "Table (1)" on page 17-4-6.
Fluid temperature	**VNA□□□ A**	–5 to 60°C (1)
	VNA□□□ B **□□□ C**	–5 to 99°C (1) (Air operated type only)
Ambient temperature		–5 to 50°C (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.(2))
	Temperature	–5 to 50°C (1) (Air operated type: 60°C)

Note 1) No freezing Note 2) Lubrication is not allowed for use with EPR seal

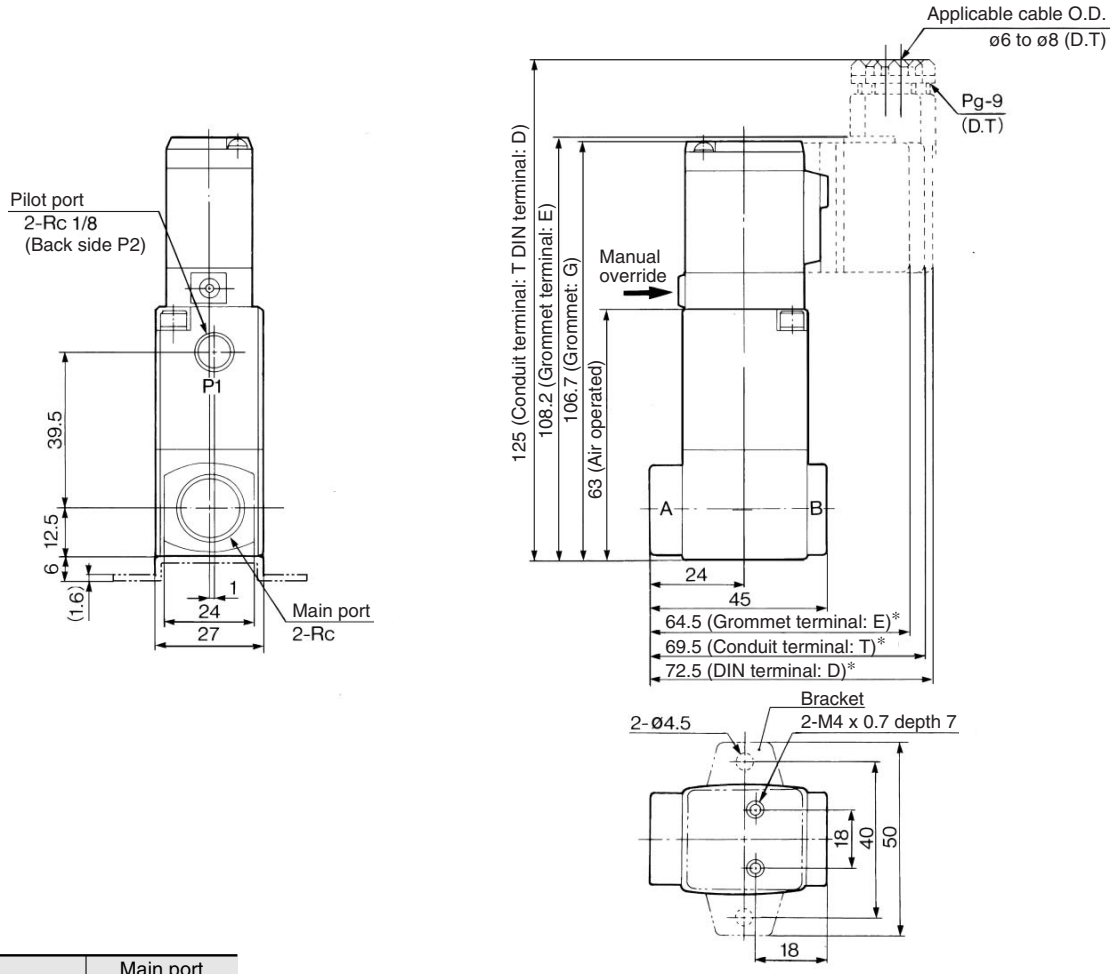
Pilot Solenoid Valve Specifications

Port size			6A to 25A	32A to 50A
Pilot solenoid valve			**SF4-□□□-23**	**VO301-00□□□**
Electrical entry			Grommet, Grommet terminal Conduit terminal DIN terminal	Grommet, Conduit DIN terminal Other (Option)
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	
Coil insulation type			Class B or equivalent (130°C)	
Temperature rise			35°C or less (When rated voltage is applied.)	70°C or less (When rated voltage is applied.)
Apparent power	AC	Inrush	5.6 VA (50 Hz), 5.0 VA (60 Hz)	12 VA (50 Hz), 10.5 VA (60 Hz)
		Holding	3.4 VA (50 Hz), 2.3 VA (60 Hz)	7.5 VA (50 Hz), 6 VA (60 Hz)
Power consumption	DC		1.8 W	4.8 W
Manual override			Non-locking push type Other (Option)	Non-locking push type

JIS Symbol

Style \ 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**	

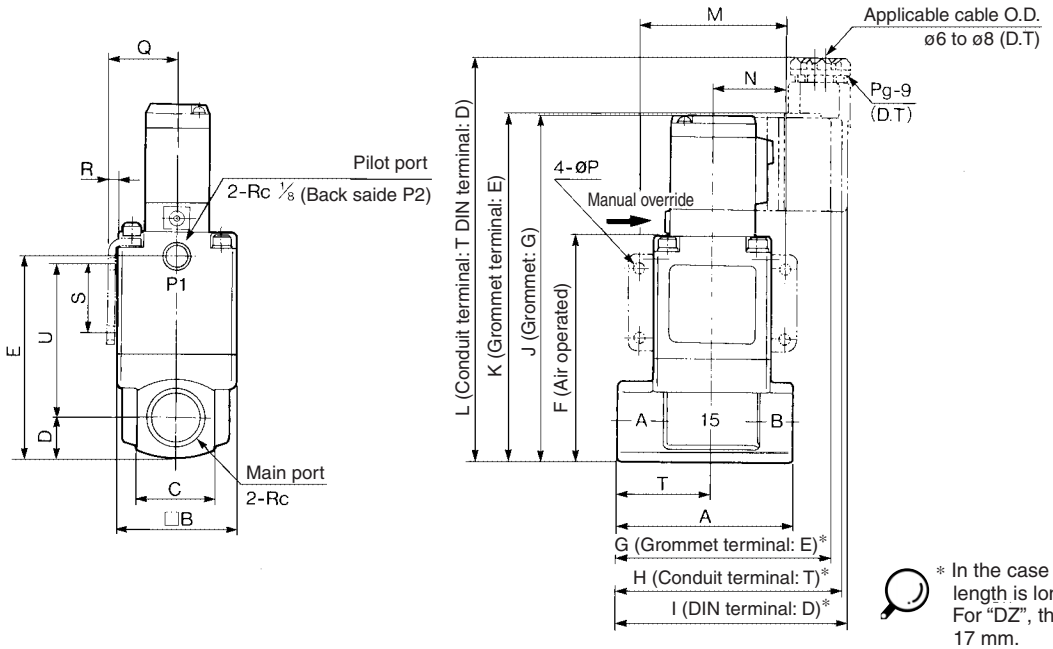
Port size 6A, 8A, 10A



Model	Main port Rc
VNA1□□□-6A	1/8
VNA1□□□-8A	1/4
VNA1□□□-10A	3/8

∗ In the case of “EZ” or “TZ”, the length is longer by 10 mm. For “DZ”, the length is longer by 17 mm.

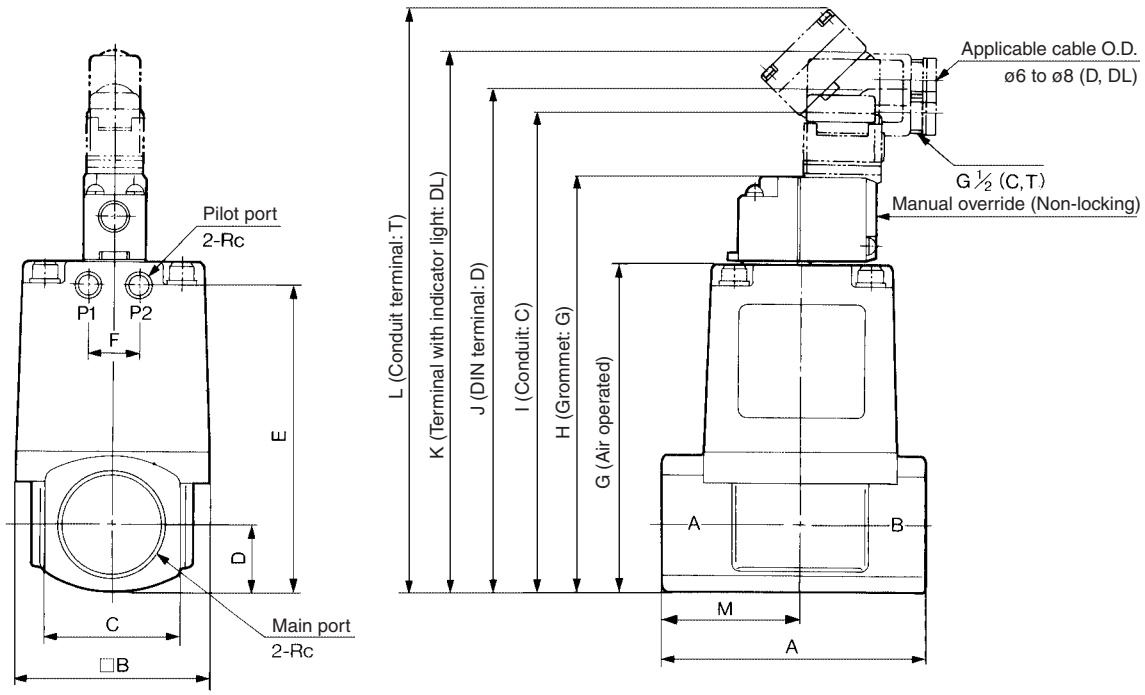
Port size 10A, 15A, 20A, 25A



* In the case of "EZ" or "TZ", the length is longer by 10 mm. For "DZ", the length is longer by 17 mm.

Model	Main port Rc	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U
VNA2□□□-10A	3/8	63	42	28	14	72.5	80.5	74.5	79.5	82.5	124	125.5	142.5	52	26	4.5	24.3	2.3	25	34	55
VNA2□□□-15A	1/2																				
VNA3□□□-20A	3/4	80	50	35	17.5	84	92	83.5	88.5	91.5	135.5	137	154	62	31	5.5	28.3	2.3	30	43	60.5
VNA4□□□-25A	1	90	60	40	20	100	108	89.5	94.5	97.5	151.5	153	170	72	36	6.5	33.3	2.3	35	49	73

Port size 32A, 40A, 50A



Model	Main port Rc	Pilot port Rc	A	B	C	D	E	F	G	H	I	J	K	L	M
VNA5□□□-32A	1 1/4	1/8	105	77	53	26.5	120.5	20	129.5	163	175.5	219.5	222.5	229.5	55
VNA6□□□-40A	1 1/2	1/4	120	96	60	30	137	24	147	180.5	193	237	240	247	63
VNA7□□□-50A	2	1/4	140	113	74	37	160	24	170	203.5	216	260	263	270	74

⚠ Precautions

Be sure to read before handling. Refer to page 17-6-3 for Safety Instructions and Solenoid Valve Precautions.

External Pilot

⚠ Caution

1. 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□1½□
12 (P1)	External pilot	Bleed port	External pilot	External pilot
10 (P2)	Bleed port	External pilot	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.

Piping

⚠ Caution

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

Mounting Direction of Pilot Solenoid Valve

⚠ Caution

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 B 6349) instead of steel pipe, when possible.

⚠ Warning

1. Air bleeding

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

2. Hydraulic fluid

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

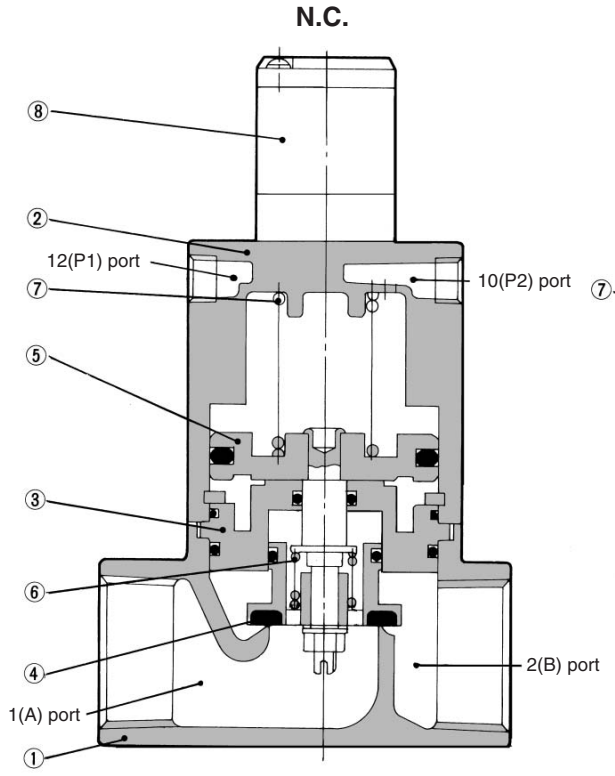
3. Speed control valve

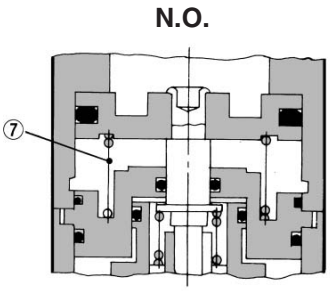
The combination shown in the following table is recommended for best performance of the Series VNA. (Piping: JIS K 6349 high pressure hose)

Combination between Series VNA and Flow Controller (Series AS)

	VNA	AS	Piping (I.D.)
10A	111	420-03	3/8 B (ø9.5)
15A	211	420-04	1/2 B (ø12.7)
20A	311	500-06	3/4 B (ø19.1)
25A	411	600-10	1 B (ø25.4)
32A	511	800-12	1 1/4 B (ø31.8)
40A	611	900-14	1 1/2 B (ø38.1)
50A	711	900-20	2 B (ø50.8)

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)	Plate assembly	Aluminum alloy	Valve material (NBR, FKM, EPR)
④ Note)	Valve element	Aluminum alloy	Valve material (NBR, FKM, EPR)
⑤	Piston assembly	Aluminum alloy	—
⑥	Travel spring	Stainless steel	—
⑦	Return spring	Piano wire	—
⑧	Pilot solenoid valve	—	—

Note) Parts ③ and ④ are for selection of valve composition.

Working Principle

VNA□01□, □11□ (N.C.)
When the pilot solenoid valve ⑧ is not energized (or when air is exhausted from the 12(P1) port of the air operated style), 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 12(P1) port of the air operated style), the pilot air that has entered under the piston moves upward to open the valve element.

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

VNA□02□, □12□ (N.C.)
In contrast with the N.C., when the power to the pilot solenoid valve is turned off (or when air is exhausted from the 10(P2) port of the air operated style), the valve is held open by the return spring. When the pilot solenoid valve is energized (or when pressurized air enters through the 10(P2) port of the air operated style), 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 12(P1) and 10(P2) ports. When pressurized air enters the 12(P1) port (exhaust from the 10(P2) port), the valve element opens, and it closes when pressurized air enters the 10(P2) port.

Replacement Parts

No.	Description			Part no.						
				VNA1□□A -6A, 8A, 10A	**VNA2□□□ -10A, 15A**	**VNA3□□□ -20A**	**VNA4□□□ -25A**	**VNA5□□□ -32A**	**VNA6□□□ -40A**	**VNA7□□□ -50A**
③	Plate assembly	Valve Composition	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
			EPR	VN1-A3AC	VN2-A3AC	VN3-A3AC	VN4-A3AC	VN5-A3AC	VN6-A3AC	VN7-A3AC
④	Valve disc (Valve disc assembly for 25A-50A)	Valve Composition	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
			EPR	VN1-4AC	VN2-4AC	VN3-4AC	VN4-A4AC	VN5-A4AC	VN6-A4AC	VN7-A4AC
⑧	Pilot solenoid valve			SF4-□□□-23 (Refer to page 17-4-12 for details.)				VO301-00□□□ (Refer to page 17-4-12 for details.)		

How to Order Pilot Solenoid Valves

Valve size 1/2/3/4

SF4 — 1 DZ — 23

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
- **9*** — Other

* Option

Manual override
- **Nil** — Non-locking push type
- **A*** — Non-locking extended type
- **B*** — Locking slotted type

* Option

Electrical entry/ With light/surge voltage suppressor

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 5/6/7

VO301-00 □ □ □

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
- **9*** — Other

* Option

Electrical entry
- **G** — Grommet
- **C** — Conduit
- **T** Note) — Conduit terminal
- **D** — DIN terminal
- **DL*** — DIN terminal with indicator light

* Option

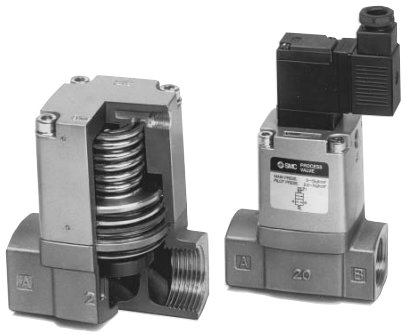
With surge voltage suppressor
- **Nil** — None
- **S** — Surge voltage suppressor (Except "DL")

Note) When the electrical entry is T, the pilot solenoid valve parts are as follows;
V0301-00□T□-X302
- Light/Surge voltage Suppressor
- Coil rated voltage

Accessory
Function plate (D seal, with screw): DXT060-32-4A

Process Valve: 2 Port Valve For Flow Control

Series VNB



Air operated **External pilot solenoid**

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.

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 characteristics (Air, Water)

- To find the flow rate of air or water, refer to the table of flow rate characteristics on page 17-1-15. 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 styles. 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

Body material	BC6: Standard			Aluminum: L			Stainless steel: S		
Seal material	NBR : A	FKM : B	EPR : C	NBR : A	FKM : B	EPR : C	NBR : A	FKM : B	EPR : C
Fluid									
Air (Standard, Dry)	●	●		●	●		●	●	
Low vacuum (Up to −101kPa torr)	●	●		●	●		●	●	
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)		●			●			●	
Brake oil Note)			●			●			●
Silicon oil		●						●	
Naphtha		●						●	
Ethylene glycol (up to 80°C)			●						●
Boiler water							●		●

⚠ Caution

When fluid permits application of multiple body and sealing materials, select the most suitable one according to the ambient environment (FKM or EPR seal material for high temperature) and other conditions (corrosion resistance and viscosity), etc. Please contact SMC if using for other fluids, operating conditions, etc.

Note) Some brake oils are not allowed.

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
	G	E	C	T	D	DL	S	Z	L	
1, 2, 3, 4	●	●	●	●	●		(Only "G")	(Except "G")		●
5, 6, 7	●	●	●	●	●	●	(Except "DL")	(Only "T")	(Only "T")	

How to Order

Seal material

A	NBR seals
B	FKM seals
C	EPR seals

Refer to "Table (1) " on page 17-2-13 for availability.

Body option

Nil	Standard
V*	Vacuum pilot
S**	Stainless steel body
L**	Aluminum body

*Valve size: 2 to 7
**Threaded port only

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

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

Nil	None
B	With bracket (VN□-16) * □ is valve size

Note 1) Valve size 1 comes with VN1-A16 (with thread).
Note 2) Shipped after assembled at our factory.

Air operated VNB 2 0 1 A □ □ 15A □

External pilot solenoid VNB 2 1 1 A □ □ 15A 1 T □ □

Valve size

Symbol	Orifice size (mm)
1	ø7
2	ø11
	ø15
	ø11
	ø15
3	ø14
	ø20
4	ø16
	ø25
5	ø22
	ø32
	ø22
	ø32
6	ø28
	ø40
	ø28
	ø40
7	ø33
	ø50
	ø33
	ø50

Valve type

Symbol	1 N.C. 0.5 MPa	2 N.O.	3 Note) C.O.	4 N.C. 1 MPa
1	—	●	●	●
	—	●	●	●
	—	●	●	●
2	—	—	—	●
	●	●	●	—
	—	—	—	●
	●	●	●	—
3	—	—	—	●
	●	●	●	—
4	—	—	—	●
	●	●	●	—
5	—	—	—	●
	●	●	●	—
	—	—	—	●
	●	●	●	—
6	—	—	—	●
	●	●	●	—
	—	—	—	●
	●	●	●	—
7	—	—	—	●
	●	●	●	—
	—	—	—	●
	●	●	●	—

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

Note) Air operated only

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
9 *	Other

* Option

Manual override

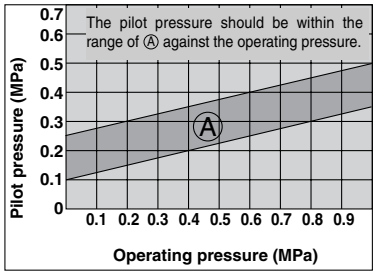
Nil: Non-locking push type A: Non-locking extended type **B**: Locking slotted type	Valve size 1 to 4
Nil: Non-locking push type	Valve size 5 to 7

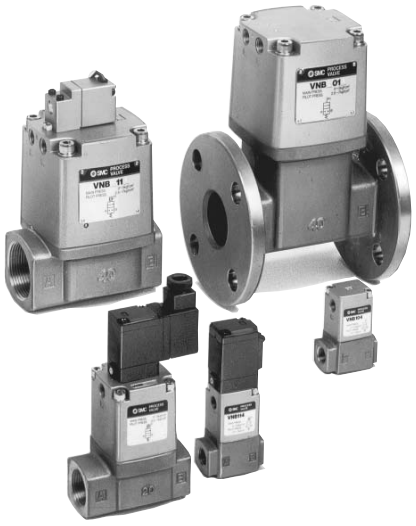
Electrical entry/ With light/surge voltage suppressor

G	Grommet	Valve size 1 to 4
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	
G	Grommet	Valve** size 5 to 7
GS	Grommet with surge voltage suppressor	
C	Conduit	
T	Conduit terminal	
TS	Conduit terminal with surge voltage suppressor	
TZ*	Conduit terminal with light/surge voltage suppressor	
TL*	Conduit terminal with indicator light	
D	DIN terminal	
DL	DIN terminal with indicator light	

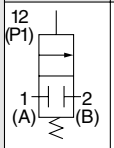
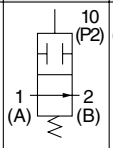
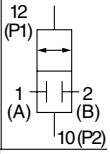
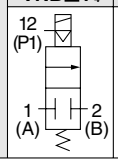
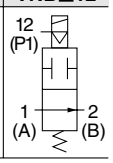
* Except rated voltage 6, 7, 9.
** DZ: For DIN terminal with light/surge suppressor protection circuit, be sure to suffix -X200 at the end of the part number. In this case, pilot solenoid valve is VO307-□DZ.

Graph (1) VNB□□□$^{2}_{3}$□ Pilot Pressure (N.O. and C.O. types)





JIS Symbol

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

Option Specifications
Vacuum pilot valve VNB□□□□V

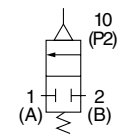
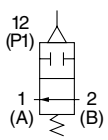
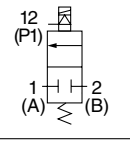
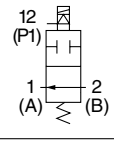
(Valve size 2 to 7)

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

Valve Specifications

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

JIS Symbol (Vacuum pilot type)

Valve type / 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 size ø (mm)	Flow characteristics: Measured by air C [dm³/(bar·sec)]	b	Cv	Flow characteristics: Measured by water Av x 10^{-6} m²	Weight (kg): Air operated	Weight (kg): External pilot solenoid
VNB1□□□-6A	1/8	7	3.3	0.29	0.80	25	0.3	0.4
VNB1□□□-8A	1/4		4.6	0.17	1.0	29		
VNB1□□□-10A	3/8		4.7	0.18	1.1	31		
VNB2□4□-10A		11	9.6	0.40	2.6	71	0.6	0.7
VNB2□□□-10A		15	17	0.32	4.0	110		
VNB2□4□-15A	1/2	11	9.6	0.40	2.6	76		
VNB2□□□-15A		15	19	0.24	4.8	140		
VNB3□4□-20A	3/4	14	18	0.42	5.4	140	0.9	1.0
VNB3□□□-20A		20	35	0.13	7.4	270		

Model	Port size Rc	Port size Flange (Note)	Orifice size ø(mm)	Flow characteristics Cv	Flow characteristics Effective area (mm²)	Weight (kg): Air operated	Weight (kg): External pilot solenoid
VNB4□4□-25A	1	–	16	7	130	1.4	1.5
VNB4□□□-25A			25	12	220		
VNB5□4□-32A	1 1/4	–	22	11	210	2.5	2.6
VNB5□□□-32A			32	18	320		
VNB5□4□-32F	–	32	22	11	210	5.7	5.8
VNB5□□□-32F			32	18	320		
VNB6□4□-40A	1 1/2	–	28	19	330	4.1	4.2
VNB6□□□-40A			40	28	500		
VNB6□4□-40F	–	40	28	19	330	7.7	7.8
VNB6□□□-40F			40	28	500		
VNB7□4□-50A	2	–	33	29	520	6.3	6.4
VNB7□□□-50A			50	43	770		
VNB7□4□-50F	–	50	33	29	520	11.4	11.5
VNB7□□□-50F			50	43	770		

Note) The flange should be JIS B 2210 10K (ordinary style) or its equivalent.

Valve Specifications

Fluid			Water/Oil/Air/Vacuum, etc.
Fluid temperature	**VNB□□□A**		–5 to 60°C (1)
	VNB□□□$^{B}_{C}$		–5 to 99°C (1) (Water, Oil etc. Air Operated only)
Ambient temperature			–5 to 50°C (1) (Air operated type: 60°C)
Proof pressure			1.5 MPa
Applicable pressure range	**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 (3) Refer to "Graph (1) ".
	Lubrication		Not required (Use turbine oil Class 1 ISO VG32, if lubricated. (2))
	Temperature		–5 to 50°C (Air operated type: 60°C)

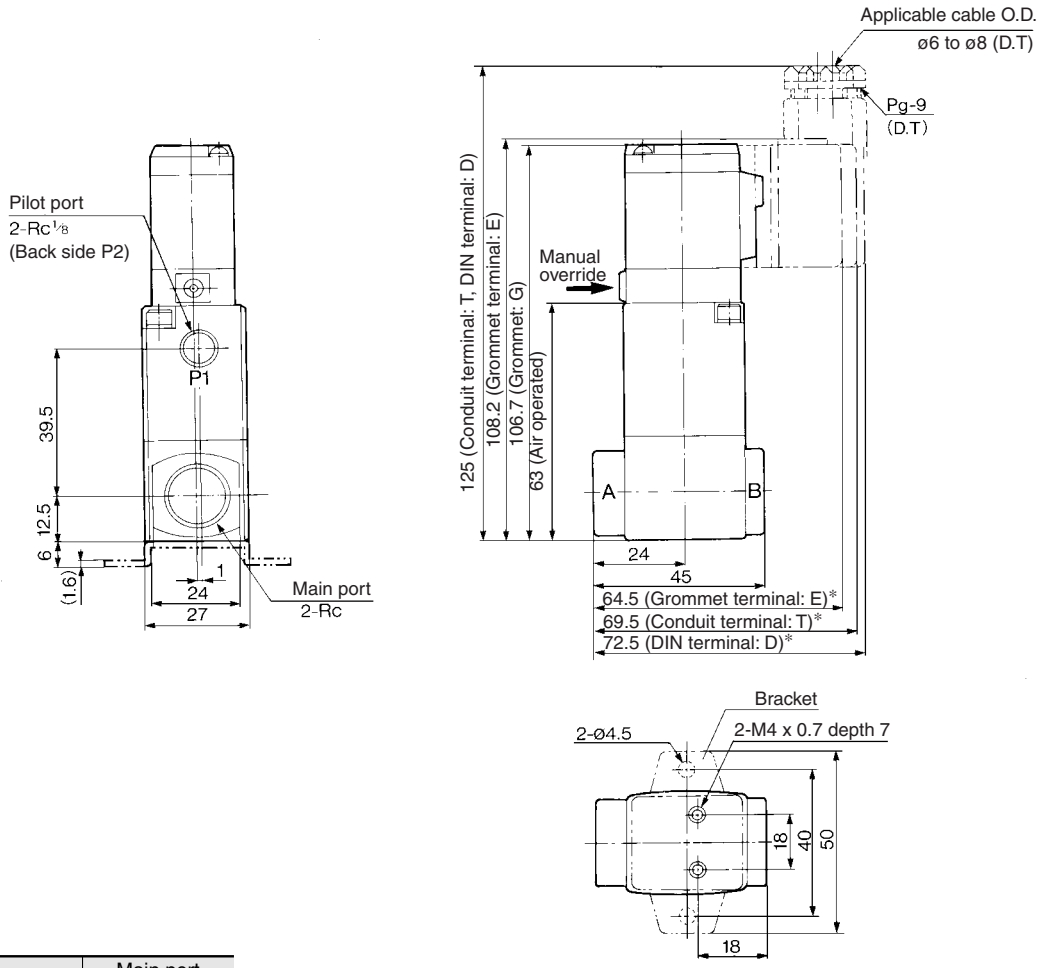
Note 1) No freezing
Note 2) Lubrication is not allowed in the case of seal material EPR.
Note 3) Adjust the operating pressure to 0.1 MPa for low vacuum.

Pilot Solenoid Valve Specifications

Port size			6A to 25A	32A to 50A, 32F to 50F
Pilot solenoid valve			**SF4-□□□-23**	**V0301□-00 □□□**
Electrical entry			Grommet, Grommet terminal, Conduit terminal, DIN terminal	Grommet, Conduit, DIN terminal, Other (Option)
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	
Coil insulation type			Class B or equivalent (130°C)	
Temperature rise			35°C or less (when rated voltage is applied.)	70°C or less (when rated voltage is applied.)
Apparent power	AC	Inrush	5.6 VA (50 Hz), 5.0 VA (60 Hz)	12 VA (50 Hz), 10.5 VA (60 Hz)
		Holding	3.4 VA (50 Hz), 2.3 VA (60 Hz)	7.5 VA (50 Hz), 6 VA (60 Hz)
Power consumption	DC		1.8 W	4.8 W
Manual override			Non-locking push type Other (Option)	Non-locking push type

Port size 6A, 8A, 10A

Standard

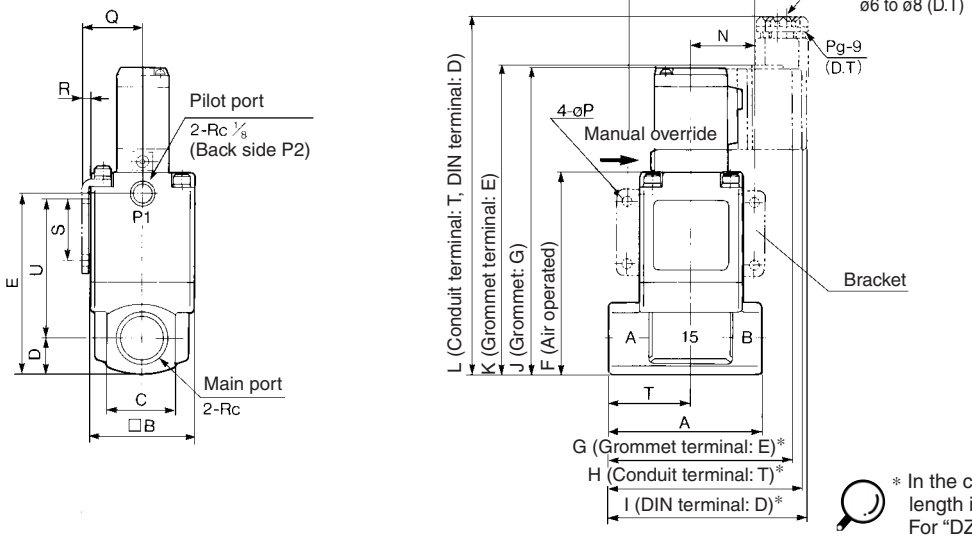


Model	Main port Rc
VNB1□□□-6A	1/8
VNB1□□□-8A	1/4
VNB1□□□-10A	3/8

∗ In the case of “EZ” or “TZ”, the length is longer by 10 mm. For “DZ”, the length is longer by 17 mm.

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

Standard

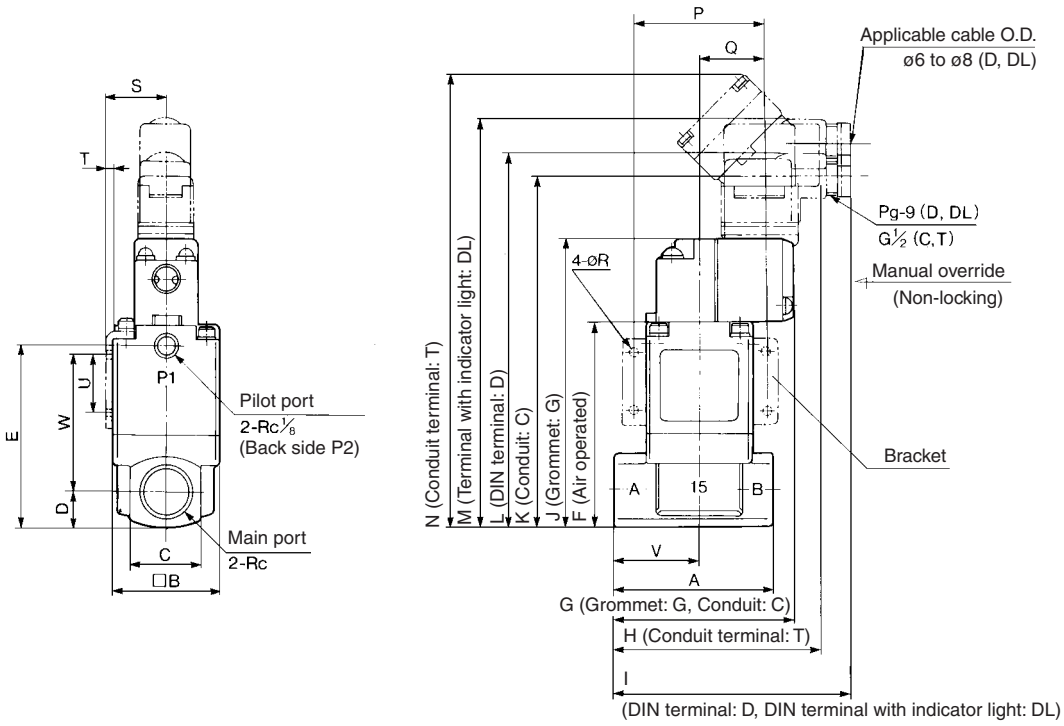


* In the case of "EZ" or "TZ", the length is longer by 10 mm. For "DZ", the length is longer by 17 mm.

Model	Main port Rc	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U
VNB2□□□-10A	3/8	63	42	28	14	72.5	80.5	74.5	79.5	82.5	124	125.5	142.5	52	26	4.5	24.3	2.3	25	34	55
VNB2□□□-15A	1/2																				
VNB3□□□-20A	3/4	80	50	35	17.5	84	92	83.5	88.5	91.5	135.5	137	154	62	31	5.5	28.3	2.3	30	43	60.5
VNB4□□□-25A	1	90	60	40	20	100	108	89.5	94.5	97.5	151.5	153	170	72	36	6.5	33.3	2.3	35	49	73

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

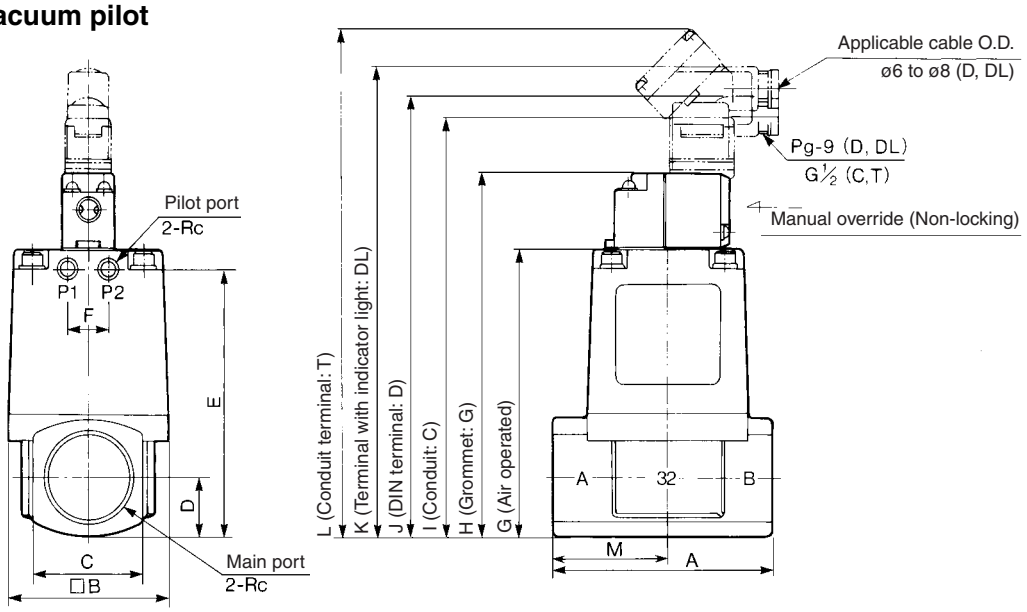
Vacuum pilot



Model	Main port Rc	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	W
VNB2□□□V-10A	3/8	63	42	28	14	72.5	80.5	75	87	97	114	126.5	170.5	173.5	180.5	52	26	4.5	24.3	2.3	25	34	55
VNB2□□□V-15A	1/2																						
VNB3□□□V-20A	3/4	80	50	35	17.5	84	92	80	92	102	125.5	138	182	185	192	62	31	5.5	28.3	2.3	30	43	60.5
VNB4□□□V-25A	1	90	60	40	20	100	108	81	93	103	141.5	154	198	201	208	72	36	6.5	33.3	2.3	35	49	73

Port size 32A, 40A, 50A

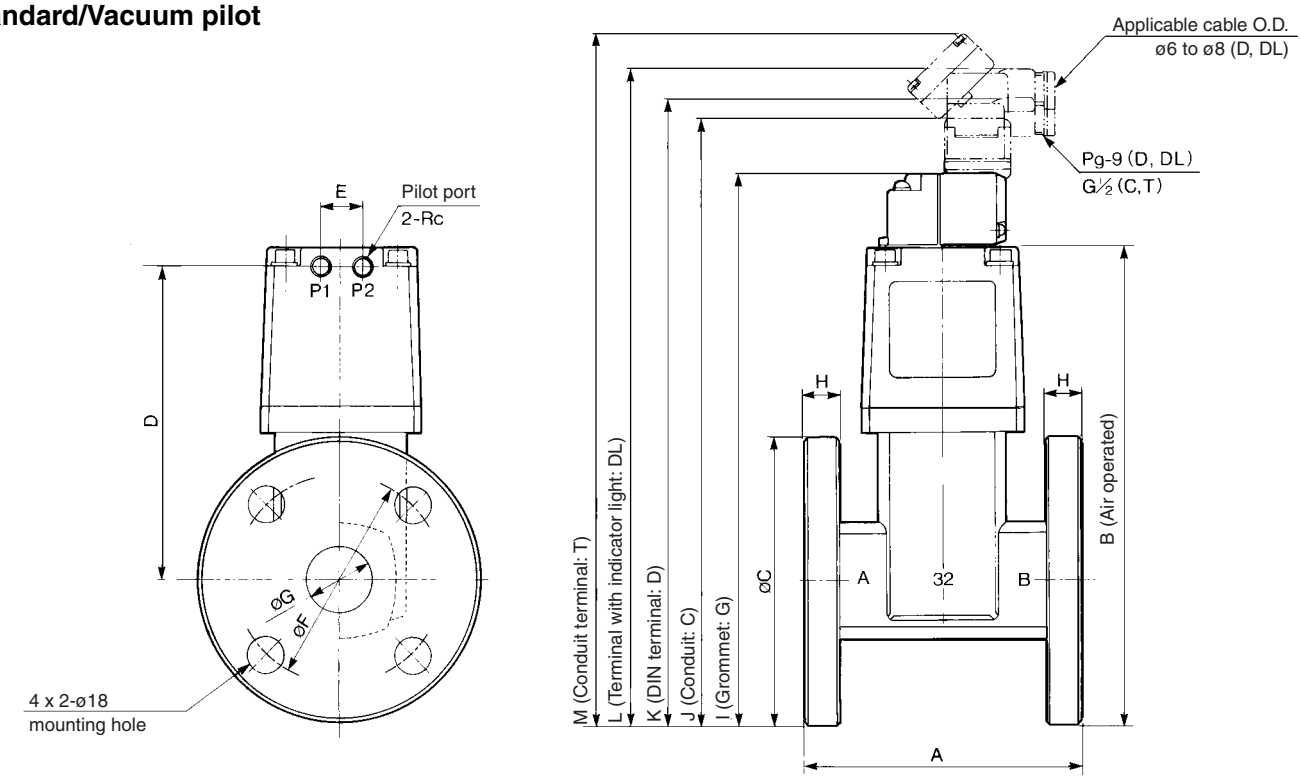
Standard/Vacuum pilot



Model	Main port Rc	Pilot port Rc	A	B	C	D	E	F	G	H	I	J	K	L	M
VNB5□□□□-32A	1 1/4	1/8	105	77	53	26.5	120.5	20	129.5	163	175.5	219.5	222.5	229.5	55
VNB6□□□□-40A	1 1/2	1/4	120	96	60	30	137	24	147	180.5	193	237	240	247	63
VNB7□□□□-50A	2	1/4	140	113	74	37	160	24	170	203.5	216	260	263	270	74

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

Standard/Vacuum pilot



Model	Applicable flange	Pilot port Rc	A	B	C	D	E	F	G	H	I	J	K	L	M
VNB5□□□□-32F	32	1/8	130	210.5	135	134	20	100	36	12	244	256.5	300.5	303.5	310.5
VNB6□□□□-40F	40	1/4	150	226	140	146	24	105	42	12	259.5	272	316	319	326
VNB7□□□□-50F	50	1/4	180	250	155	162.5	24	120	54	14	283.5	296	340	343	350

⚠ Precautions

Be sure to read before handling.
Refer to page 17-6-3 for Safety Instructions and Solenoid Valve Precautions.

External Pilot

⚠ Caution

Pilot port P1 and P2 piping
Please arrange P1 and P2 piping 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

Vacuum pilot

Port	VNB□01□V	VNB□02□V	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

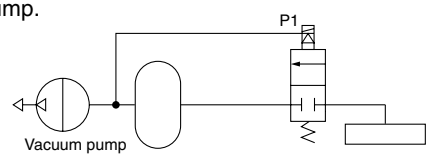
⚠ Caution

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□$^{0}_{1}$ 1□V N.C. 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.

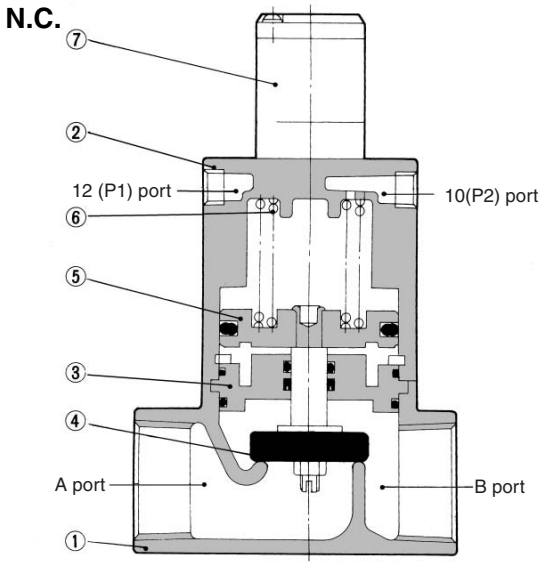


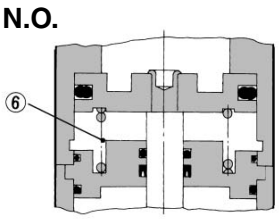
Piping

⚠ Caution

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

Construction





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

Component Parts

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

Note) Parts ③ and ④ are for selection of valve composition.
∗ 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 P1 port 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 P1 port of the air operated style), 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 P1 port of the air operated style), 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 P2 port of the air operated style), the valve is held open by the return spring. When the pilot solenoid valve is energized (or when pressurized air enters through the P2 port of the air operated style), 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 P1and P2 ports. When pressurized air enters the P1 port (exhaust from the P2 port), the valve element opens, and it closes when pressurized air enters the P2 port (exhaust from the P1 port).

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) ③	Plate assembly	Valve material	NBR	VN1-A3BA	VN2-A3BA	VN3-A3BA	VN4-A3BA	VN5-A3BA	VN5-A3BA	VN6-A3BA	VN6-A3BA	VN7-A3BA	VN7-A3BA
			FPM	VN1-A3BB	VN2-A3BB	VN3-A3BB	VN4-A3BB	VN5-A3BB	VN5-A3BB	VN6-A3BB	VN6-A3BB	VN7-A3BB	VN7-A3BB
			EPR	VN1-A3BC	VN2-A3BC	VN3-A3BC	VN4-A3BC	VN5-A3BC	VN5-A3BC	VN6-A3BC	VN6-A3BC	VN7-A3BC	VN7-A3BC
Note) ④	Valve element [32A to 50A come in valve element assembly]	Valve material	NBR	VN1-4BA	VN2-4BA	VN3-4BA	VN4-4BA	VN5-A4BA	VN5-A4BA-3	VN6-A4BA	VN6-A4BA-3	VN7-A4BA	VN7-A4BA-3
			FPM	VN1-4BB	VN2-4BB	VN3-4BB	VN4-4BB	VN5-A4BB	VN5-A4BB-3	VN6-A4BB	VN6-A4BB-3	VN7-A4BB	VN7-A4BB-3
			EPR	VN1-4BC	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.)				VO301□-00□□□ (Refer to the table below.)					

Note) In the case of body options "S" and "L", the materials of the part nos. ③ and ④ are as follows: (Example): VN1-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

How to Order Pilot Solenoid Valves

Valve size 1/2/3/4

SF4 — 1 DZ □ — 23

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
9* — Other

∗ Option

Manual override
Nil — Non-locking push type
A* — Non-locking extended type
B* — Locking slotted type

∗ Option

Electrical entry/With indicator light/ surge voltage suppressor

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 5/6/7

VO301 □ — 00 □ □ □

Body option
Nil — Standard
V — Vacuum pilot

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
9* — Other

∗ Option

Electrical entry
G — Grommet
C — Conduit
T Note) — Conduit terminal
D — DIN terminal
DL* — DIN terminal with indicator light

∗ Option

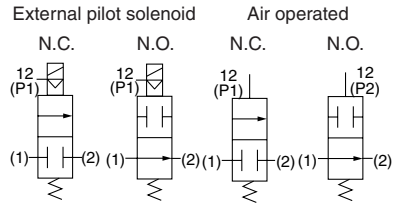
Note) When the electrical entry is T, the pilot solenoid valve parts are as follows;
V0301□-00□T□-X302
Coil rated voltage └ └ Light/Surge voltage suppressor

With surge voltage suppressor
Nil — None
S — Surge voltage suppressor (Except "DL")

Accessory
Function plate (D sealing, with thread) : DXT060-32-4A

Coolant Valve:
Air Operated/External Pilot Solenoid
Series VNC

Cylinder actuation by pilot air



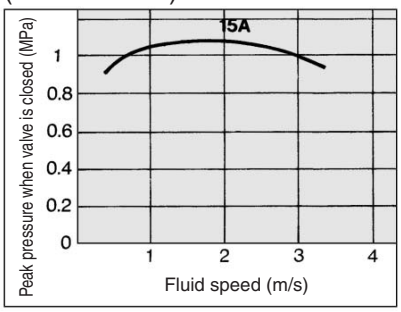
Wide selection of port size and variations

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

Low water hammer

Max.1.2 MPa

In the case of VNC211A
(N.C. 0.5 MPa)



Conditions: Piping length/30 m
Steel tube, full pressure/0.5 MPa

Large valve capacity

Av factor 3.0 x 10^{-5} to 160 x 10^{-5}
(VNC1 to VNC7)
Cv factor 49 to 100
(VNC8 to VNC9)

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	With bracket (VN□-16) ∗ □ is valve size

Note 1) Valve size 1 comes with VN1-A16 (with thread).
Note 2) Shipped after assembled at our factory.

Air operated VNC **2** **0** **1** **A** — □ **15A** — □ (Except valve size 8, 9)

External pilot solenoid VNC **2** **1** **1** **A** — □ **15A** — **1** **T** □ — □

Valve size

Valve type

Port size

Symbol	Orifice size (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
		●	●	●	**32F**	1 1/4 B Flange
6	ø40 (ø28)	●	●	●	**40A**	1 1/2
		●	●	●	**40F**	1 1/2 B Flange
7	ø50 (ø33)	●	●	●	**50A**	2
		●	●	●	**50F**	2B Flange
8	ø65 (ø45)	●	–	●	**65F**	2 1/2 B Flange
9	ø80 (ø56)	●	–	●	**80F**	3B Flange

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

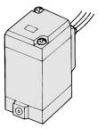
Rated voltage

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
9*	Other

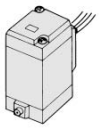
∗ Option

Manual override

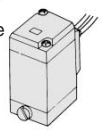
Nil: Non-locking push type



A: Non-locking extended type

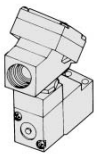


B: Locking slotted type



Valve size 1

Nil: Non-locking push type

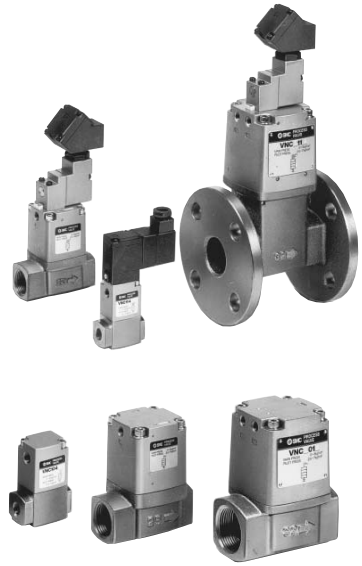


Valve size 2 to 9

Electrical entry/With light/surge voltage suppressor

Nil	Air operated	
G	Grommet	Valve size 1
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	
T	Conduit terminal	Valve** size 2 to 9
TS	Conduit terminal with surge voltage suppressor	
TZ*	Conduit terminal with light/surge voltage suppressor	
TL*	Conduit terminal with indicator light	

∗ Except rated voltage: 6, 7 and 9.
∗∗ DZ: For DIN terminal with light/surge suppressor protection circuit, be sure to add suffix -X200 at the end of the part number.
In this case, pilot solenoid valve is VO307-□DZ.



Model

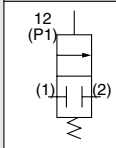
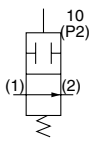
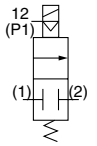
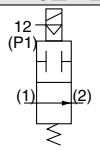
Model	Port size		Orifice size ø (mm)	Flow characteristics	Weight (kg)	
	Threaded	Flange Note)		Av x 10^{-6} m^2	Air operated	External pilot Solenoid
VNC1□□□-6A	1/8	–	7	30	0.2	0.3
VNC1□□□-8A	1/4	–		32		
VNC1□□□-10A	3/8	–		36		
VNC2□4□-10A			11	95	0.5	0.7
VNC2□□□-10A			15	120		
VNC2□4□-15A	1/2	–	11	110		
VNC2□□□-15A			15	140		
VNC3□4□-20A	3/4	–	14	170	0.8	1.0
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.

Model	Port size Flange Note)	Orifice size 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.

JIS 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		

Valve specifications

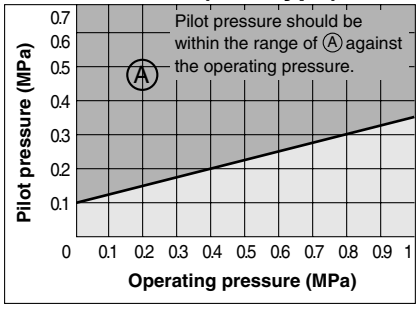
Fluid			Coolant
Fluid temperature	**VNC□□□A**		–5 to 60°C*
	VNC□□□B		–5 to 99°C* (Air operated type only)
Ambient temperature			–5 to 50°C (Air operated type: 60°C) *
Proof pressure			1.5 MPa
Applicable pressure range	**VNC□□1□**		0 to 0.5 MPa
	VNC□□ 2/4 □		0 to 1 MPa
External pilot air	Pressure	**VNC□□ 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) *

* No freezing

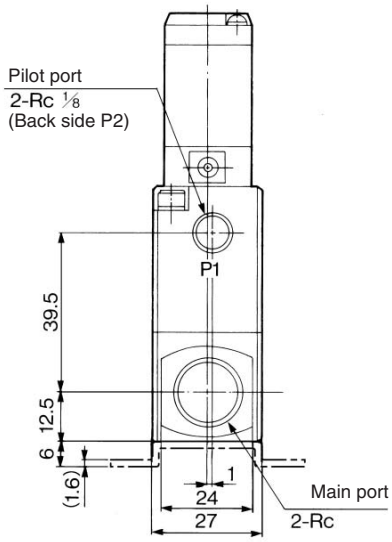
Pilot Solenoid Valve Specifications

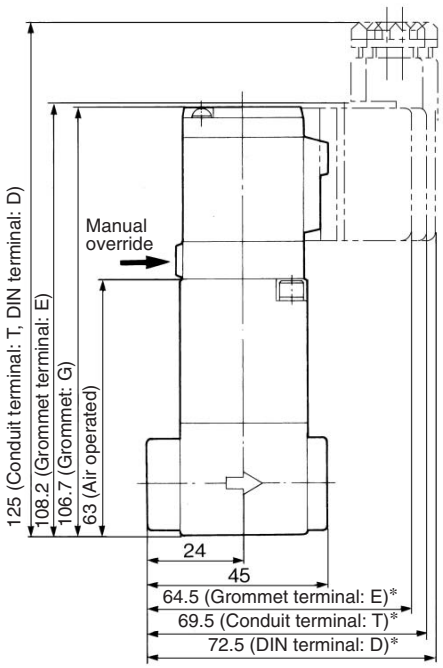
Model			**VNC1□□□**	**VNC2□□□ to 9□□□**
Pilot solenoid valve			SF4-□□□-23	VO301-00□T□-X302
Electrical entry			Grommet Grommet terminal Conduit terminal DIN terminal	Conduit terminal
Coil rated voltage (V)	AC (50/60 Hz)		100 V, 200 V, Other voltage (Option)	
	DC		24 V, Other voltage (Option)	
Allowable voltage fluctuation			–15% to +10% of rated voltage	
Coil insulation type			Class B or equivalent (130°C)	
Temperature rise			35°C or less (when rated voltage is applied.)	70°C or less (when rated voltage is applied.)
Apparent power	AC	Inrush	5.6 VA (50 Hz) 5.0 VA (60 Hz)	12 VA (50 Hz) 10.5 VA (60 Hz)
		Holding	3.4 VA (50 Hz) 2.3 VA (60 Hz)	7.5 VA (50 Hz) 6 VA (60 Hz)
Power consumption	DC		1.8 W	4.8 W
Manual override			Non-locking push type, Other (Option)	Non-locking push type

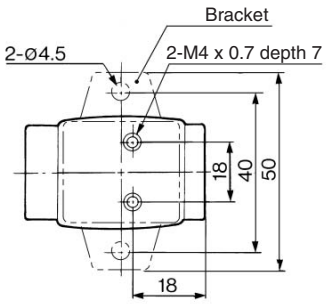
Graph (1) VNC□□2□ Pilot Pressure (N.O. type)



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



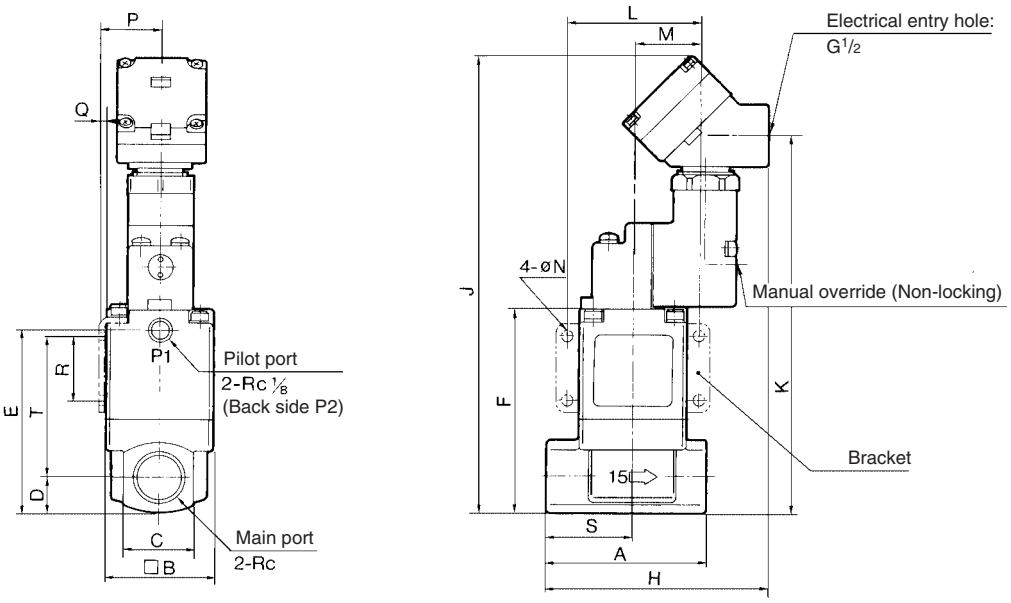




Model	Main port Rc
VNC1□□□-6A	1/8
VNC1□□□-8A	1/4
VNC1□□□-10A	3/8

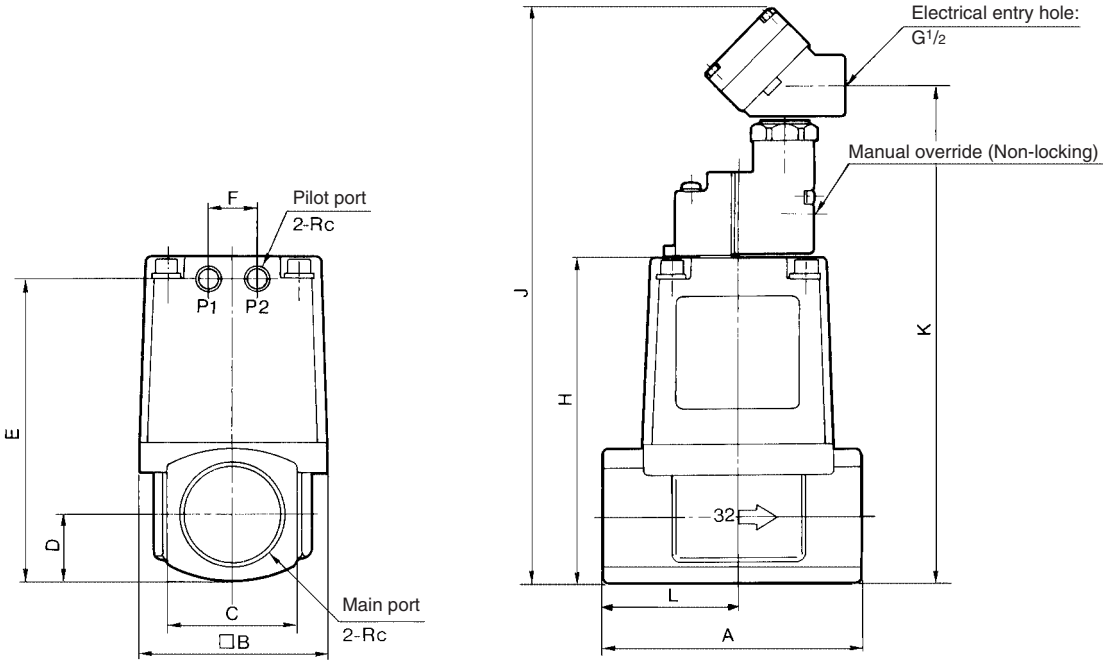
∗ In the case of “EZ” or “TZ” or “DZ”, the length is longer by 9 mm.

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



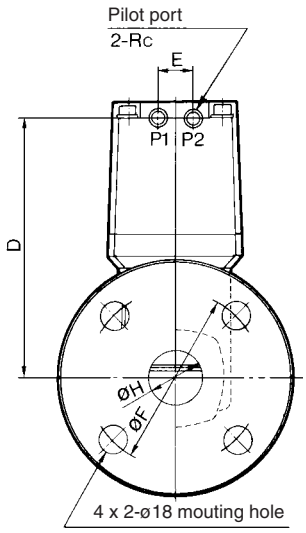
Model	Main port Rc	A	B	C	D	E	F	H	J	K	L	M	N	P	Q	R	S	T
VNC2□□□-10A	3/8	63	42	28	14	72.5	80.5	87	180.5	148	52	26	4.5	24.3	2.3	25	34	55
VNC2□□□-15A	1/2	63	42	28	14	72.5	80.5	87	180.5	148	52	26	4.5	24.3	2.3	25	34	55
VNC3□□□-20A	3/4	80	50	35	17.5	84	92	92	192	159.5	62	31	5.5	28.3	2.3	30	43	60.5
VNC4□□□-25A	1	90	60	40	20	100	108	93	208	175.5	72	36	6.5	33.3	2.3	35	49	73

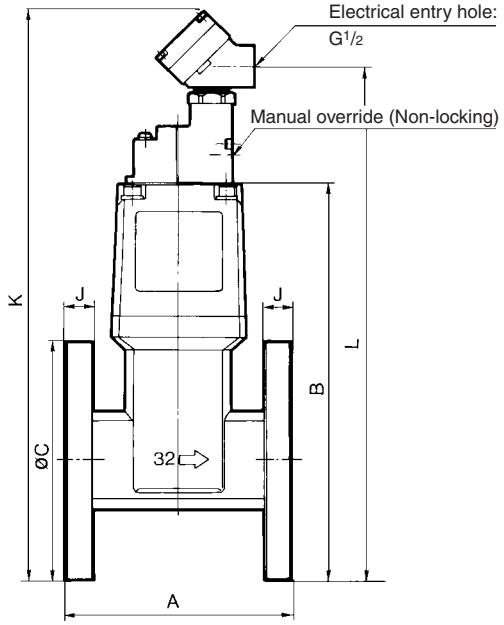
Threaded Type Port size: 32A, 40A, 50A



Model	Main port Rc	Pilot port Rc	A	B	C	D	E	F	H	J	K	L
VNC5□□□-32A	1 1/4	1/8	105	77	53	26.5	120.5	20	129.5	229.5	197	55
VNC6□□□-40A	1 1/2	1/4	120	96	60	30	137	24	147	247	214.5	63
VNC7□□□-50A	2	1/4	140	113	74	37	160	24	170	270	237.5	74

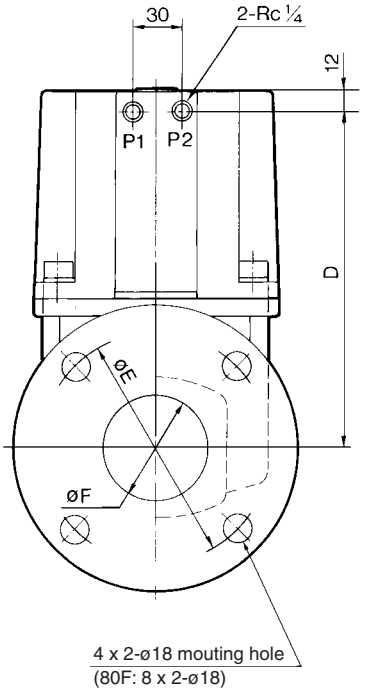
Flange Type — Port size: 32F, 40F, 50F

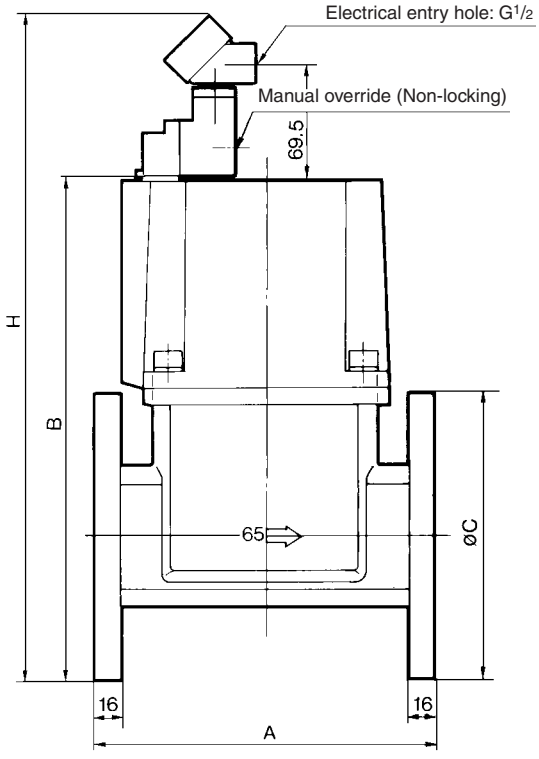




Model	Applicable flange	Pilot port Rc	A	B	C	D	E	F	H	J	K	L
VNC5□□□-32F	32	1/8	130	210.5	135	134	20	100	36	12	310.5	278
VNC6□□□-40F	40	1/4	150	226	140	146	24	105	42	12	326	293.5
VNC7□□□-50F	50	1/4	180	250	155	162.5	24	120	54	14	350	317.5

Flange Type — Port size: 65F, 80F





Model	Applicable flange	A	B	C	D	E	F	H
VNC81¼□-65F	65	210	305.5	175	204	140	65	405.5
VNC91¼□-80F	80	240	341.5	185	235	150	80	441.5

⚠ Precautions

Be sure to read before handling.
Refer to page 17-6-3 for Safety Instructions and Solenoid Valve Precautions.

External Pilot

⚠ Caution

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

P1 and 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.

Piping

⚠ Caution

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

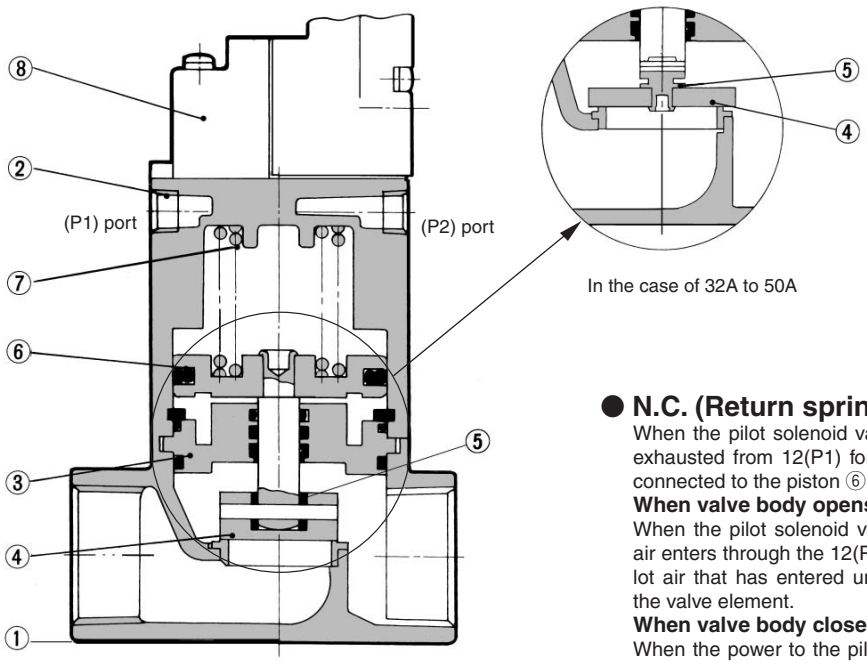
Mounting Direction of Pilot Solenoid Valve

⚠ Caution

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

Construction

N.C.



● N.C. (Return spring normally closed)

When the pilot solenoid valve ⑧ is not energized (or when air is exhausted from 12(P1) for air operated style), the valve body ④ connected to the piston ⑥ is closed by the return spring ⑦.

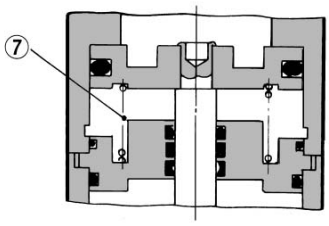
When valve body opens

When the pilot solenoid valve is energized (or when pressurized air enters through the 12(P1) port 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 12(P1) port 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 10(P2) port 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 10(P2) port 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	Valve composition, 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	Pilot solenoid valve	—	

Note) ③⑤ 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	Valve material	NBR	VN1-A3CA	VN2-A3CA	VN3-A3CA	VN4-A3CA	VN5-A3CA	VN6-A3CA	VN7-A3CA
			FKM	VN1-A3CB	VN2-A3CB	VN3-A3CB	VN4-A3CB	VN5-A3CB	VN6-A3CB	VN7-A3CB
⑤	Valve cover (32A to 50A are O-ring.)	Valve material	NBR	–	VN2-12CA		VN4-12CA	AS568-010	AS568-011	AS568-012
			FKM	–	VN2-12CB		VN4-12CB			
⑧	Pilot solenoid valve			SF4-□□□-23	VO301-00□T□-X302 (Refer to page 17-4-29 for part no.)					

Replacement Parts: Applicable Flange

No.	Description			Part no.	
				VNC811□-65F	**VNC911□-80F**
③	Plate assembly	Valve material	NBR	VN8-A3CA	VN9-A3CA
			FKM	VN8-A3CB	VN9-A3CB
⑧	Pilot solenoid valve			VO301-00□T□-X302 (Refer to page 17-4-29 for part no.)	

How to Order Pilot Solenoid Valves

Valve size 1

SF4 — 1 D Z □ — 23

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
- **9*** — Other

* Option

Electrical entry
- **G** — Grommet
- **E** — Grommet terminal
- **T** — Conduit terminal
- **D** — DIN terminal

Light/Surge voltage suppressor
- **Nil** — None
- **Z** — With light/Surge voltage suppressor (Except type "G")
- **S** — With surge voltage suppressor (Type "G" only)

Manual override
- **Nil** — Non-locking push type
- **A*** — Non-locking extended type
- **B*** — Locking slotted type

* Option

Valve size 2 to 9

VO301-00 □ T □ — X302

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
- **9*** — Other

* Option

Light/surge voltage suppressor
- **Nil** — None
- **S** — With surge voltage suppressor
- **Z*** — With light/surge voltage suppressor
- **L*** — With indicator light

* Except 12 VDC, 240 VAC, other voltages.

Accessory
Function plate (D seal, with thread): DXT060-32-4A

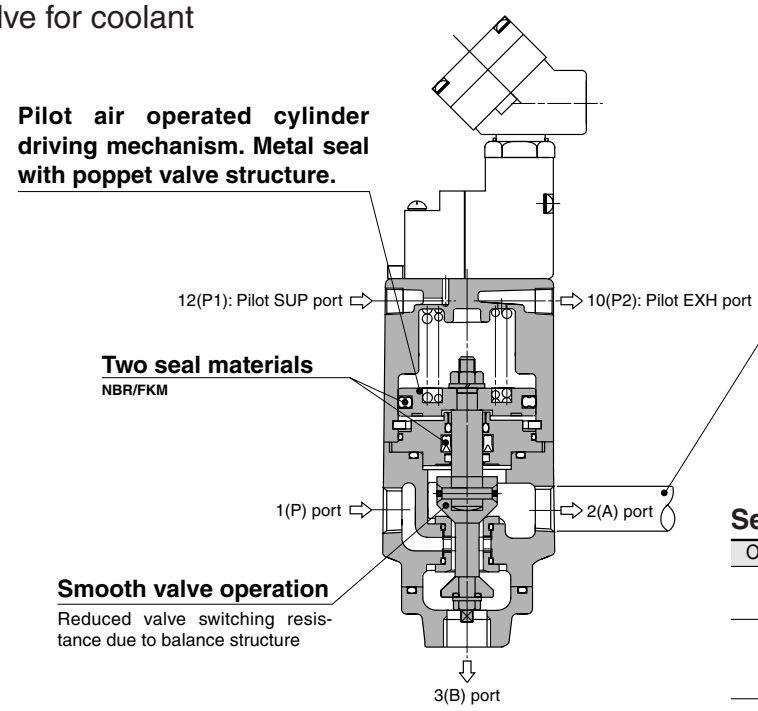
High Pressure Coolant Valve: 3.5 MPa, 7.0 MPa

Series VNH

Corresponding to high speed grinding and long drilling processes

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	

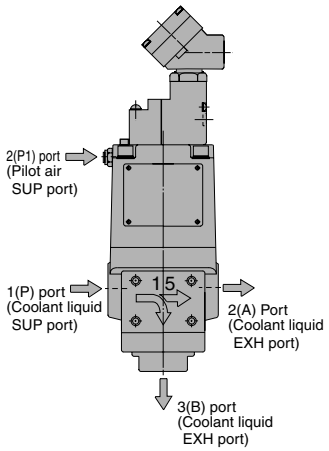
Application Example

3 port valve (3.5 MPa, 7.0 MPa)

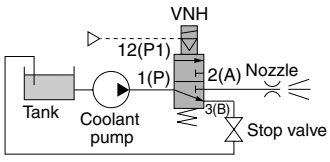
Piping

Inlet side (supply side): P port, Outlet side (exhaust side): A and B port.

Supply pilot air higher than 0.25 MPa to P1 port

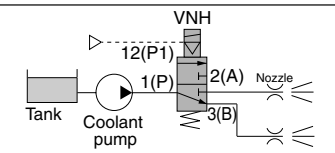


Ex. 1) 3 port valve: Reducing load to pump



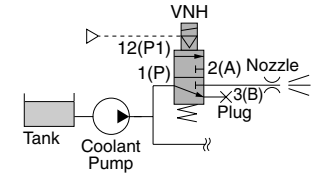
For reducing load to pump, coolant liquid is returned from B port to tank each time.

Ex. 2) 3 port valve: Switching nozzle



Switching nozzles on supplying coolant liquid.

Ex. 3) 2 port valve: Nozzle ON/OFF



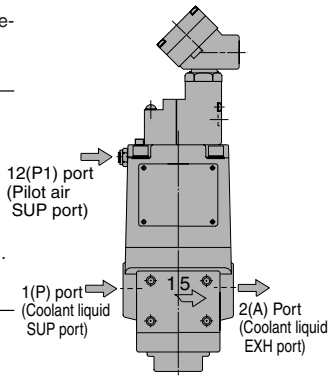
2 port valve application

(Not applicable for 7.0 MPa model)

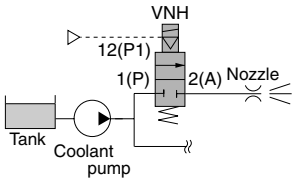
2 port valve (7.0 MPa)

Piping

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



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



How to Order

VNH 2 1 1 A — □ 15A — 1 T — □

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

Gasket material

A	NBR seals
B	FKM seals

Valve size / Port size

1	10A	Rc 3/8
2	15A	Rc 1/2
3	20A	Rc 3/4
4	25A	Rc1

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

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
9*	Other

* Option

Electrical entry/With light/surge voltage suppressor

T	Conduit terminal
TS	Conduit terminal with surge voltage suppressor
TZ*	Conduit terminal with light/surge voltage suppressor
TL*	Conduit terminal with indicator light

* Rated voltage: Except 6, 7, 9.

Bracket

Nil	None
B	With bracket

Option

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

How to Order Pilot Solenoid Valves

VO301-00 □ T □ — X302

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
9*	Other

* Option

Light/surge voltage suppressor

Nil	None
S	With surge voltage suppressor
Z	With light/surge voltage suppressor
L	With indicator light

Accessory
Function plate (D sealing, with thread): DXT060-32-4A

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		Coolant											
Operation		External pilot solenoid/Air operated											
Operating fluid temperature	VNH□□$^{1}_{3}$A	–5 to 60°C */–5 to 60°C * (NBR seal)											
	VNH□□$^{1}_{3}$B	–5 to 60°C */–5 to 99°C * (FKM seal)											
Pilot air	Pressure	0.25 to 0.7 MPa											
	Temperature	–5 to 50°C *											
	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 *											
Max. operating frequency		20 times/min											
Mounting position		Vertical upwards											
Port size		Rc 3/8	Rc 1/2	Rc 3/4	Rc1	Rc 3/8	Rc 1/2	Rc 3/4	Rc1	Rc 3/8	Rc 1/2	Rc 3/4	Rc1
Orifice size (mm)		ø7.1 **	ø8.7 **	ø10.6 **	ø14.3 **	ø3.9 **	ø5.2 **	ø6.2 **	ø7.3 **	ø8	ø9.5	ø13	ø15.7
Flow characteristics Av x 10^{-5}		46	86	110	190	15	29	38	58	54	75	140	210
Pilot port size		Rc 1/8		Rc 1/4		Rc 1/8		Rc 1/4		Rc 1/8		Rc 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

* No freezing
** Equivalent size

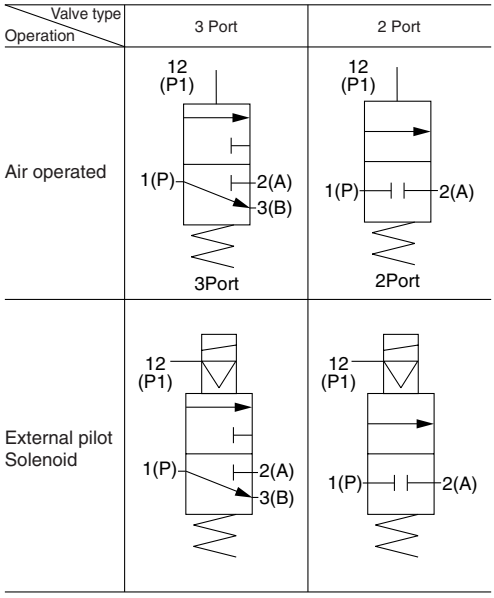
3.5 MPa

7.0 MPa

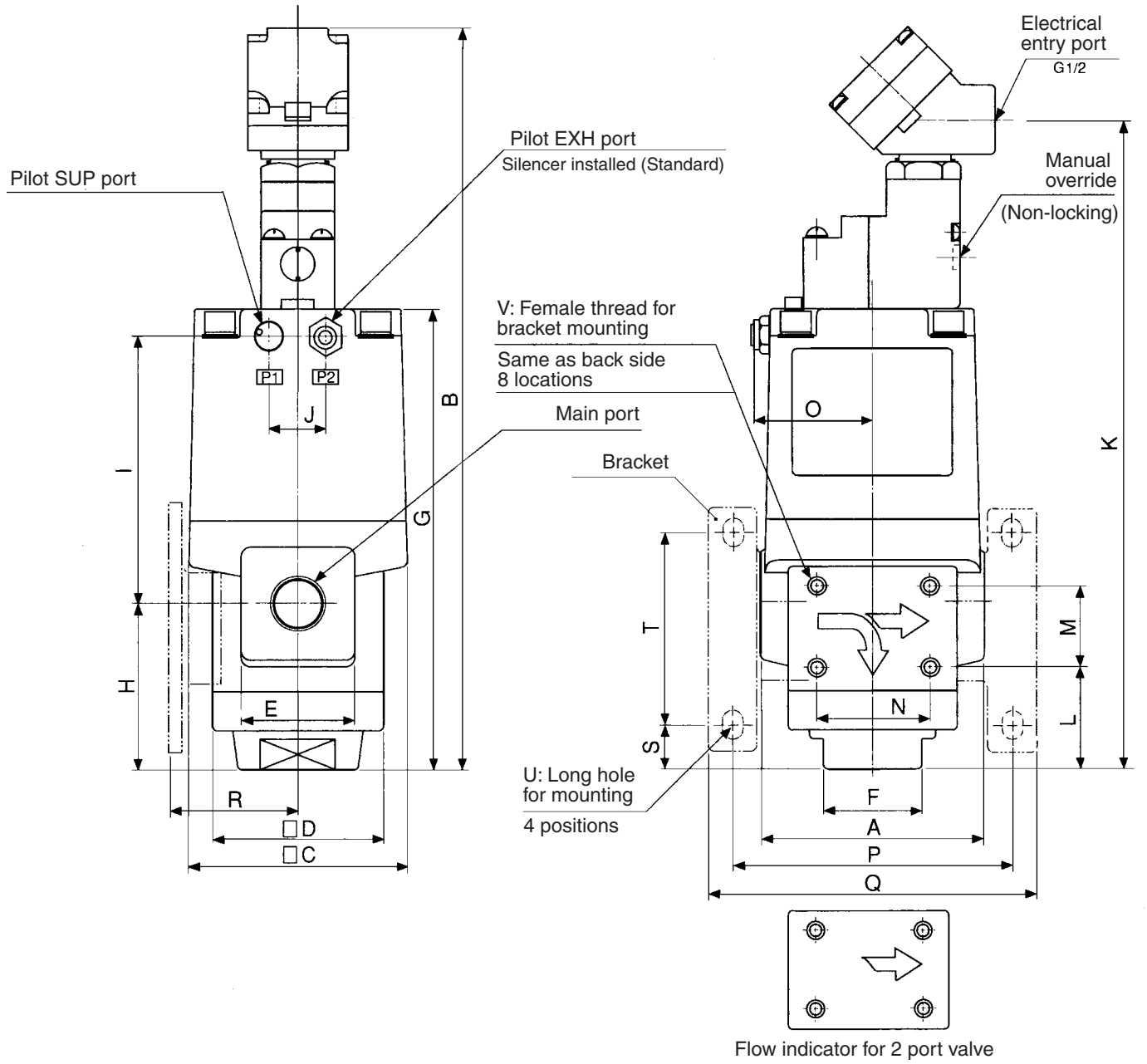
Pilot Operated Solenoid Valve Specifications

Pilot solenoid valve			VO301-00□T□-X302
Electrical entry			Conduit 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 the rated voltage
Coil insulation type			Class B or equivalent (130°C)
Temperature rise			70°C or less (When rated voltage is applied.)
Apparent power	AC	Inrush	12 VA (50 Hz), 10.5 AV (60 Hz)
		Holding	7.5 VA (50 Hz), 6 VA (60 Hz)
Power consumption	DC		4.8 W
Manual override			Non-locking push type

JIS Symbol



Dimensions



Dimensions

(mm)

Model	Main port		Pilot port	A	B	C	D	E	F	G	H	I
	2 Port	3 Port										
VNH1□□$^{A}_{B}$-10A	2-Rc 3/8	3-Rc 3/8	Rc 1/8	60	235.5	60	46	34	24	135	50	77
VNH2□□$^{A}_{B}$-15A	2-Rc 1/2	3-Rc 1/2	Rc 1/8	80	265	77	60	40	36	164.5	60	95.5
VNH3□□$^{A}_{B}$-20A	2-Rc 3/4	3-Rc 3/4	Rc 1/4	100	300	96	76	50	41	200	79	111
VNH4□□$^{A}_{B}$-25A	2-Rc1	3-Rc1	Rc 1/4	115	319.5	113	85	60	50	219	90	119

Model	J	K	L	M	N	O	P	Q	R	S	T	U	V
VNH1□□$^{A}_{B}$-10A	–	202.5	29	25	30	37	75	88	34	10.5	62	6 x 8	M5 x 0.8 depth 5.5
VNH2□□$^{A}_{B}$-15A	20	232	36	30	40	43	100	118	44.5	16	70	7 x 10	M6 x 1 depth 6
VNH3□□$^{A}_{B}$-20A	24	267	48	35	50	50.5	126	148	60.5	19.5	92	9 x 12	M8 x 1.25 depth 6
VNH4□□$^{A}_{B}$-25A	24	286.5	51	38	56	58.5	141	163	66.5	15.5	109	9 x 12	M8 x 1.25 depth 6

⚠ Precautions

Be sure to read before handling.
Refer to page 17-6-3 for Safety Instructions and Solenoid Valve Precautions.

Back Pressure of 3 Port Valve (VNH□13)

⚠Caution

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

Quality of Operating Fluid

⚠Caution

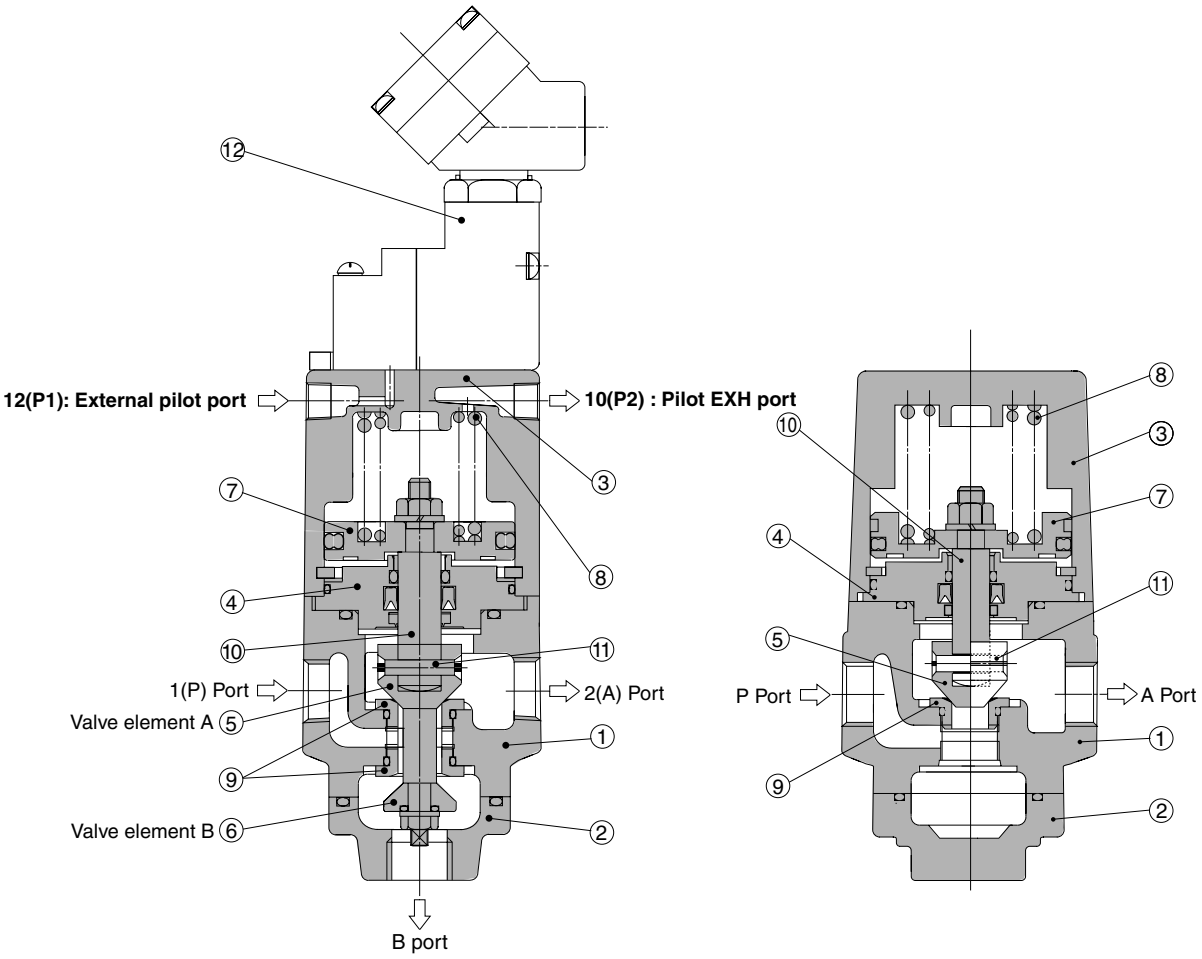
Please note that using fluids that contain foreign mterial (especially hard objects like glass chips), may cause damage to the valve, will reduce sealing performance, and may cause early failure.

Piping

⚠Caution

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

Construction



3 Port valve **2 Port valve**

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, 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. Because rod ⑩ is connected to valve element A ⑤ by parallel pin ⑪. Valve element becomes free to incline and it reaches valve seat ⑨.

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” in page 17-4-32.	

Steam Valve: 2 Port Valve For Steam

Series VND

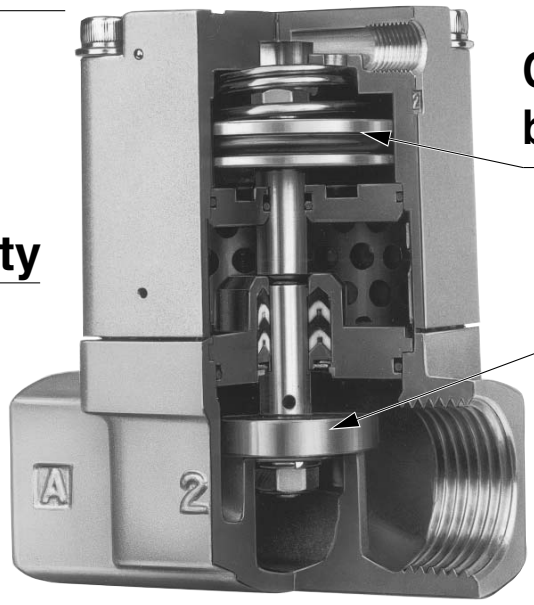
2 Port Valve for Steam Max. 180°C

With indicator light (Option)

Possible to mount the operation confirmation indicator on all valves.

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

Body material: Bronze, Stainless steel



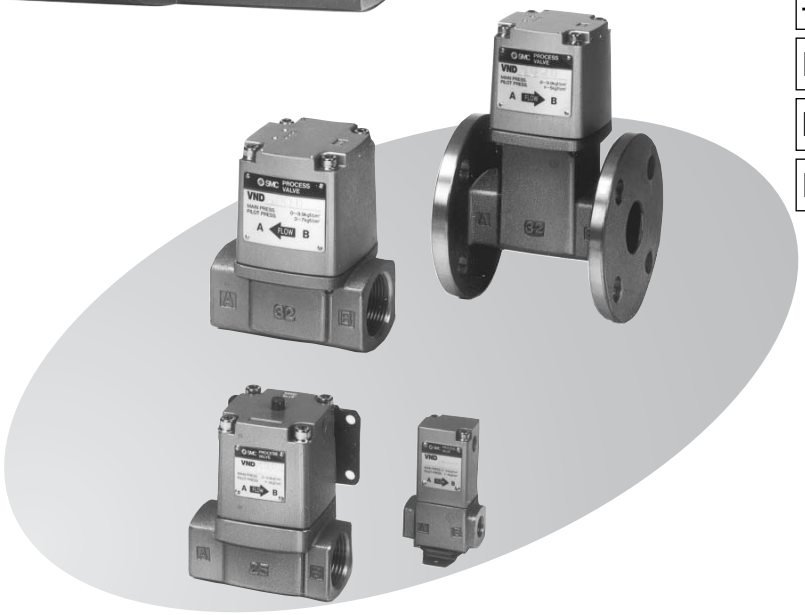
Cylinder actuation by external pilot air

Large valve capacity

PTFE seal

Wide variations

2 types — N.C., N.O.
Threaded type (6A to 50A)
Flange type (32F to 50F)



How to Order

Body option

Nil	Standard
S*	Stainless steel body

* Threaded type only

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

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

Option

Nil	None
B*	With bracket (VN□-16)
L	With indicator light
BL*	With bracket and indicator light

* 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 (with thread)
Valve size 2 to 4: VN□-16 (□: 2 to 4)

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

Symbol	Orifice size (mm)	Symbol 0 N.C.	Symbol 2 N.O.	Symbol 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
		●	●	–	**32F**	1 1/4 B Flange
6	ø40	●	●	–	**40A**	1 1/2
		●	●	–	**40F**	1 1/2 B Flange
7	ø50	●	●	–	**50A**	2
		●	●	–	**50F**	2 B Flange

Model

Model	Port size		Orifice size ø (mm)	Flow characteristics	Weight (kg)
	Rc	Flange Note)		Av x 10^{-5}	
VND10□D-6A	1/8	–	7	26	0.3
VND10□D-8A	1/4	–		28	
VND10□D-10A	3/8	–		31	
VND20□D-10A		–	15	120	0.6
VND20□D-15A	1/2	–		130	
VND30□D-20A	3/4	–	20	240	0.9
VND40□D-25A	1	–	25	380	1.4
VND50□D-32A	1 1/4	–	32	440	2.3
VND50□D-32F	–	32			5.5
VND60□D-40A	1 1/2	–	40	920	3.6
VND60□D-40F	–	40			7.2
VND70□D-50A	2	–	50	1500	5.7
VND70□D-50F	–	50			10.8

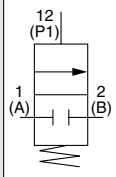
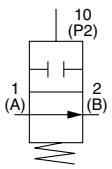
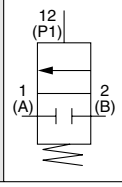
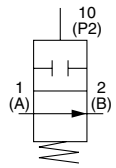
Note) The companion flange is JIS B 2210 10K (standard) or its equivalent.

Valve Specifications

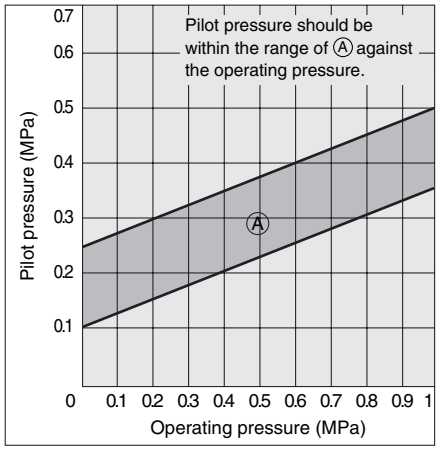
Fluid			Steam
Fluid temperature			–5 to 180°C *
Ambient temperature			–5 to 60°C *
Proof pressure			1.5 MPa
Operating pressure range			0 to 0.97 MPa
External pilot air	Pressure	N.C.	0.3 to 0.7 MPa
		N.O.	0.1 + 0.25 x (Operating pressure) to 0.25 + 0.25 x (Operating pressure) MPa Refer to below “Graph (1)”.
	Lubrication		Not required (Use turbine oil Class 1 ISO VG32, if lubricated.)
	Temperature		–5 to 60°C *

* No freezing

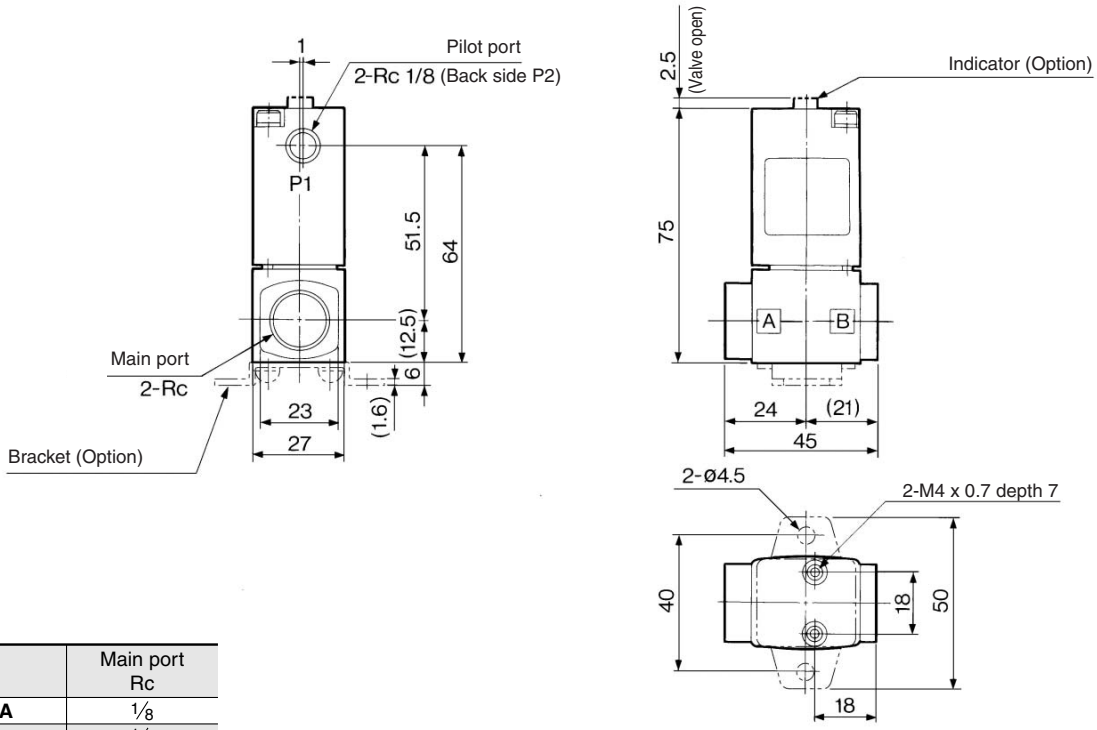
JIS Symbol

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)

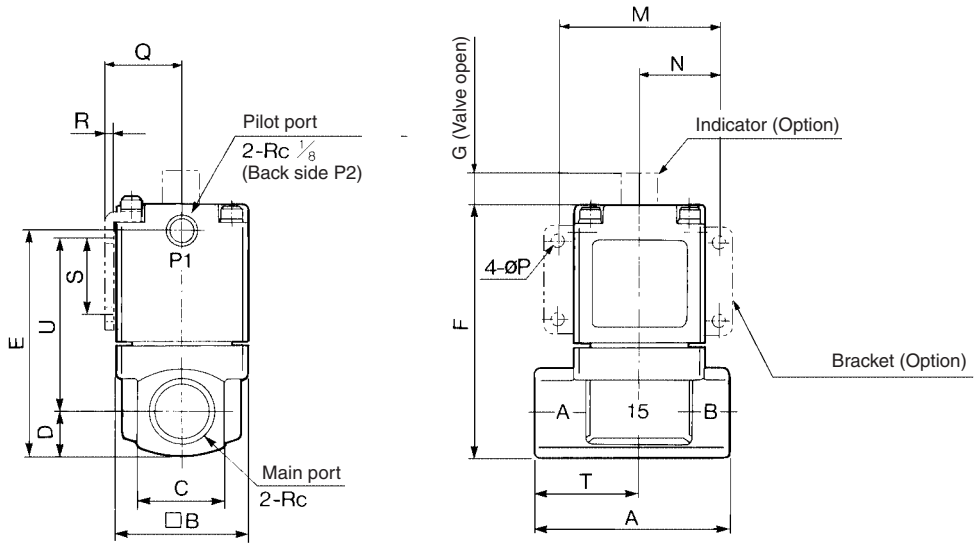


Port size 6A, 8A, 10A



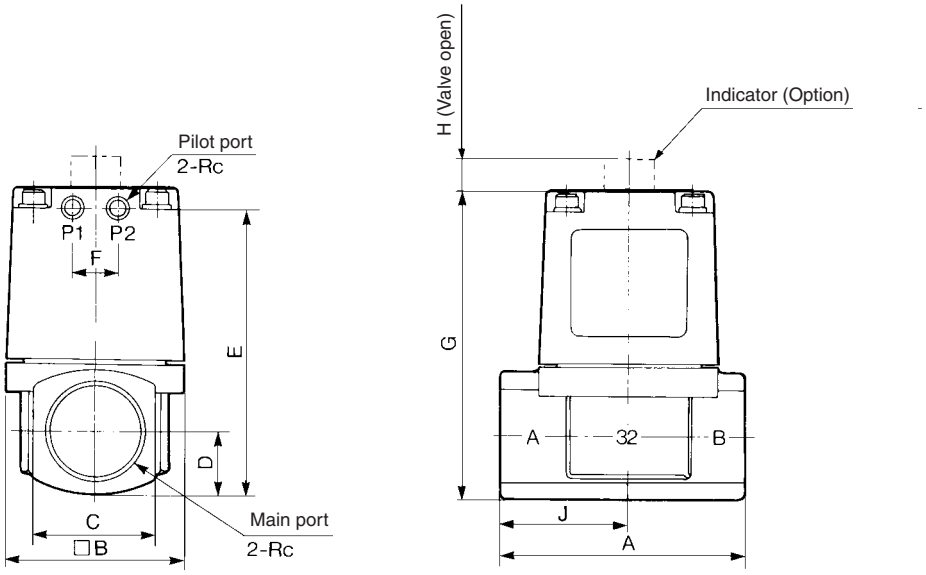
Model	Main port Rc
VND10□D-6A	1/8
VND10□D-8A	1/4
VND10□D-10A	3/8

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



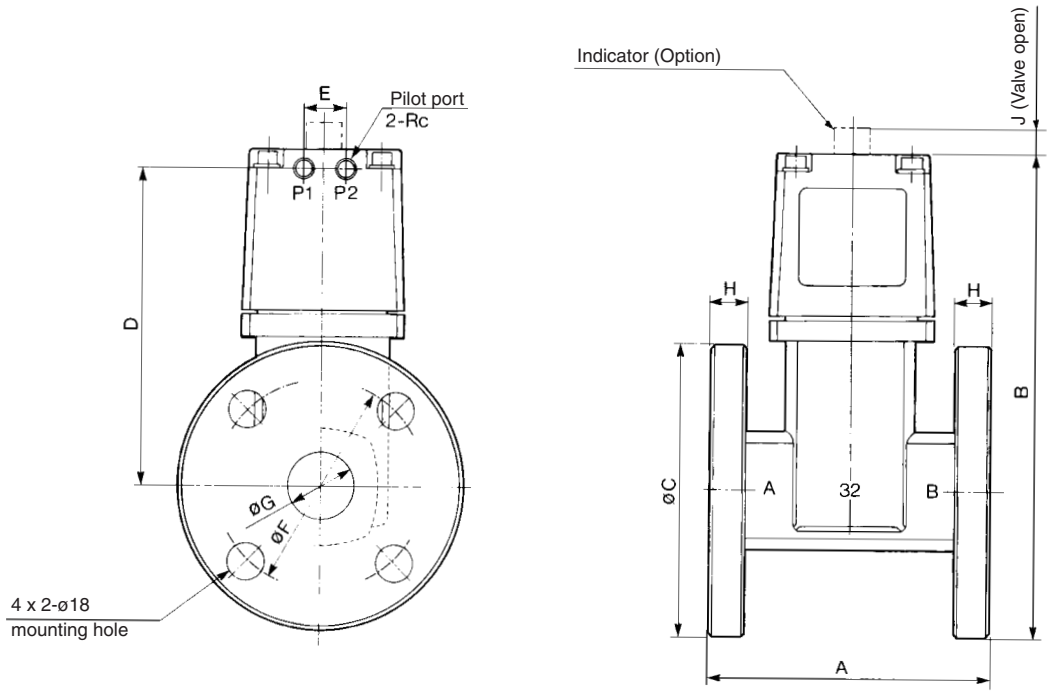
Model	Main port Rc	A	B	C	D	E	F	G	M	N	P	Q	R	S	T	U
VND20□D-10A	3/8	63	42	28	14	73.5	81.5	4	52	26	4.5	24.3	2.3	25	34	56
VND20□D-15A	1/2															
VND30□D-20A	3/4	80	50	35	17.5	85	93	5	62	31	5.5	28.3	2.3	30	43	61.5
VND40□D-25A	1	90	60	40	20	101	109	6	72	36	6.5	33.3	2.3	35	49	74

Port size 32A, 40A, 50A



Model	Main port Rc	Pilot port Rc	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

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



Model	Applicable flange	Pilot port Rc	A	B	C	D	E	F	G	H	J
VND50□D-32F	32	1/8	130	211.5	135	135	20	100	36	12	8
VND60□D-40F	40	1/4	150	227	140	147	24	105	42	12	10
VND70□D-50F	50	1/4	180	251	155	163.5	24	120	54	14	12

⚠ Precautions

Be sure to read before handling.
Refer to page 17-6-3 for Safety Instructions and Solenoid Valve Precautions.

External Pilot

⚠ Caution

Piping of pilot port (P1, P2)

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

Port	VND□O□D	VND□O2D
P1	External pilot	Bleed port
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

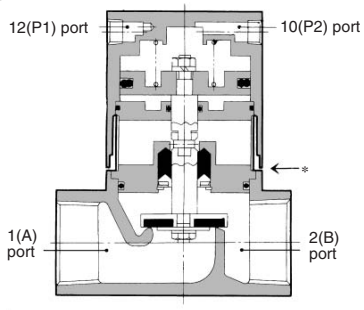
⚠ Caution

To use the piping with a high temperature fluid, use heat resistant fittings and tubing (Self-align fittings, Teflon® tubing or Copper piping, etc.). Teflon® is a registered trademark of E.I. du Pont de Nemours and Company.

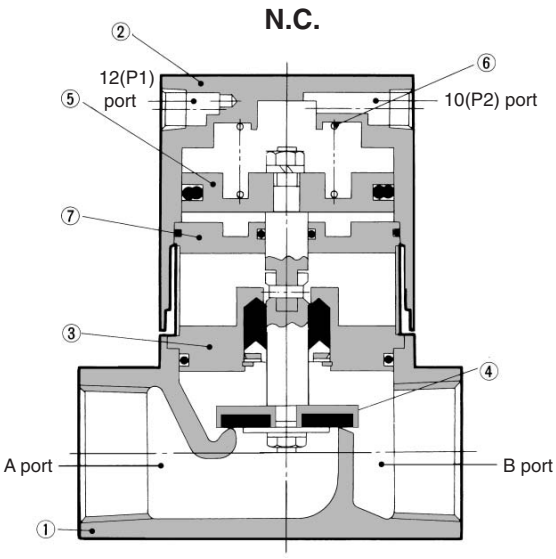
Adiabatic Space

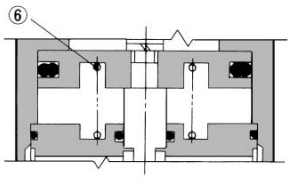
⚠ Caution

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



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, EPR, 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 P1 port, the valve ④ connected with the piston ⑤ is closed by the return spring ⑥.

- **When valve opens**
  When pressurized air enters through the P1 port, 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 P1 port, 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 P2 port, the return spring opens the valve element. Pressurized air that enters through the P2 port closes the valve element.

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of **"Caution", "Warning"** or **"Danger"**. To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

⚠ **Caution :** Operator error could result in injury or equipment damage.

⚠ **Warning :** Operator error could result in serious injury or loss of life.

⚠ **Danger :** In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power--General rules relating to systems.
Note 2) JIS B 8370: General Rules for Pneumatic Equipment

⚠ Warning

1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

4. Contact SMC if the product is to be used in any of the following conditions:

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

2/3 Port Process Valve Precautions 1

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Caution on Design

⚠ Warning

1. Cannot be used as an emergency shutoff valve, etc.
The valves presented in this catalog are not designed for safety applications such as an emergency shutoff valve. If the valves are used in this type of system, other reliable safety assurance measures should also be adopted.

2. Extended periods of continuous energization
Please consult with SMC if valves will be continuously energized for extended periods of time.

3. Solenoid valves are not allowed to use as an explosion proof one.

4. Maintenance space
The installation should allow sufficient space for maintenance activities (removal of valve, etc.).

5. Liquid rings
In cases with a flowing liquid, provide a by-pass valve in the system to prevent the liquid from entering the liquid seal circuit.

6. Operation of actuator
When an actuator, such as a cylinder, is to be driven using a valve, take appropriate measures to prevent potential danger caused by actuator operation.

7. Holding pressure (including vacuum)
Since the valve may have slight internal air leakage, it may not be suitable for holding pressure (including vacuum) in a tank or other vessel for an extended period of time.

8. When the conduit type is used as equivalent to an IP65 enclosure, install a wiring conduit, etc. (Series VC)
For details, refer to page 17-6-7.

Selection

⚠ Warning

1. Check the specifications.
Give careful consideration to operating conditions such as the application, fluid and environment, and use within the operating ranges specified in this catalog.

2. Operating fluids
1) Type of operating fluids
Select model according to the operating fluid for its material. Viscosity of the operating fluids must be less than 50 cst in general.
Please contact SMC for further information.
2) Flammable oil or gases
Confirm the specifications for the internal/external leakage.
3) Corrosive gases
Since corrosive gases may cause stress corrosion, cracking or other accidents, it is not applicable for valves in this catalog.
4) Use a Non-lube valve when impurities such as oil should not be in the fluid passage.
5) Option and fluids may not be usable on the operating conditions. General use of option and fluids are shown in the catalog to be referred for model selection.

Selection

⚠ Warning

3. Quality of operating fluids
Since the use of fluid which contains foreign matter can cause problems such as malfunction and seal failure by promoting wear of the valve seat and core, and by sticking to the sliding parts of the armature, etc., install a suitable filter (strainer) immediately upstream from the valve. As a general rule, use 80 to 100 mesh.
When used to supply water to boilers, substances such as calcium and magnesium which generate hard scale and sludge are included. Since this scale and sludge can cause valve malfunction, install water softening equipment, and a filter (strainer) directly upstream from the valve to remove these substances.

4. Quality of operating air
1) **Use clean air.**
If the compressed air supply includes chemicals, synthetic materials (including organic solvents), salinity, corrosive gas, etc., it can lead to damage or malfunction.
2) **Install an air filter.**
Install an air filter at the up stream side to the valve. Filtration degree should be 5 μm or less.
3) **Install an air dryer, after cooler, etc.**
Compressed air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer or after cooler, etc.
4) **If excessive carbon powder is seen, install a mist separatoron the upstream side of the valve.**
If excessive carbon powder is generated by the compressor, it may adhere to the inside of valves and cause malfunction.
For compressed air quality, refer to “Air Cleaning Equipment” catalog.

5. Ambient environment
Operate within the ambient operating temperature range. After confirming the compatibility of the product’s component materials with the ambient environment, operate so that fluid does not adhere to the product’s exterior surfaces.

6. Countermeasures for static electricity
Since static electricity may be generated depending on the fluid being used, implement suitable countermeasures.

2/3 Port Process Valve Precautions 2

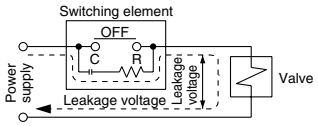
Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Selection

⚠ Caution

1. Leakage voltage

Particularly when using a resistor in parallel with a switching element and using a C-R element (surge voltage suppressor) to protect the switching element, take note that leakage current will flow through the resistor and C-R element, etc., creating a danger that the valve may not shut OFF.



Series VC, VD, VQ

AC coil: 10% or less of rated voltage
DC coil: 2% or less of rated voltage

Series VX

AC coil: 20% or less of rated voltage
DC coil: 2% or less of rated voltage

Series VN

AC coil: 15% or less of rated voltage
DC coil: 3% or less of rated voltage

2. Low temperature operation

1) Valve use is possible to temperature extremes of –10°C. Take appropriate measures to avoid freezing of drainage, moisture etc. by using an air dryer.
2) When using valves for water application in cold climates, take appropriate countermeasures to prevent the freezing in tubing after cutting the water supply from the pump, e.g. drain the water, etc. When heating by steam, be careful not to expose the coil portion to steam. Installation of dryer, heat retaining of the body are recommended to prevent the freezing in condition that dew-point temperature is high and ambient temperature is low.

Mounting

⚠ Warning

1. If air leakage increases or equipment does not operate properly, stop operation.

Check mounting conditions after air and power supplies are connected. Initial function and leakage tests should be performed after installation.

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

Apply spanner to the external connection part when tightening.

3. Avoid installing the coil downward.

Foreign materials in the fluid may stick to the armature and it could cause malfunction. (In the case of VX series)

4. Do not warm the coil assembly part by the heat insulating material, etc.

Tape heater for anti-freezing is applicable to use only for piping or body.

5. Other than fittings made of stainless steel or copper should be tightened with a bracket.

6. Do not use in locations subjected to vibrations. If impossible, arm from the body should be as short as possible to prevent resonance.

7. Instruction manual

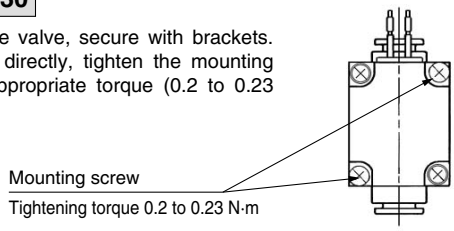
Install only after reading and understanding the safety instructions. Keep the catalog on life so that it can be referred to when necessary.

8. Coating

Warnings or specifications indicated on the product should not be erased, removed, or covered up.

Series VQ20/30

When mounting the valve, secure with brackets. When mounting it directly, tighten the mounting screws with the appropriate torque (0.2 to 0.23 N·m).



Port Direction

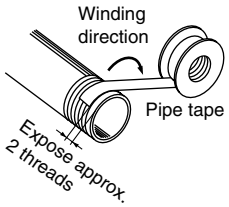
⚠ Caution

1. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.
Install piping so that it does not apply pulling, pressing, bending or other forces on the valve body.

2. Sealant tape

When installing piping or fitting into a port, ensure that sealant material does not enter the port internally. Furthermore, when sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



3. Avoid connection of ground lines to piping, as this may cause electric corrosion of the system.

4. Always tighten threads with the proper tightening torque.

When screwing fittings into valves, tighten with the proper tightening torque shown below.

Tightening Torque for Piping

Connection thread	Applicable tightening torque (N·m)
M5	1.5 to 2
Rc 1/8	7 to 9
Rc 1/4	12 to 14
Rc 3/8	22 to 24
Rc 1/2	28 to 30
Rc 3/4	28 to 30
Rc 1	36 to 38
Rc 11/4	40 to 42
Rc 11/2	48 to 50
Rc 2	48 to 50

∗ Reference
How to tighten M5 threads on the fittings
After tightening by hand, use a tightening tool to add about 1/6 turn more. But when using miniature fittings, after tightening by hand, use a tightening tool to add 1/4 turn more. (When there are gaskets for universal elbow, universal tee, etc. in 2 locations, tighten them with twice as 1/2 turn.)

5. Connection of piping to products

When connecting piping to a product, avoid mistakes regarding the supply port, etc.

6. Steam generated in a boiler contains a large amount of drainage.
Be sure to operate with a drain trap installed.

7. In applications such as vacuum and non-leak specifications, use caution specifically against the contamination of foreign matters or airtightness of the fittings.

2/3 Port Process Valve Precautions 3

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Port Direction

⚠ Caution

Series LV

1. Use the tightening torques shown below when making connections to the pilot port.

Operating Port Tightening Torque

Operating port	Torque (N·m)
M5	1/6 turn with a tightening tool after first tightening by hand 0.8 to 1.0
Rc, NPT 1/8	0.8 to 1.0

2. Use of metal fittings
Do not use metal fittings for piping on taper threads made of resin, as this may cause damage to the threads.

3. Use pilot ports and sensor (breathing) ports as indicated below.

	PA Port	PB port	Sensor (breathing) port
N.C.	Pressure	Exhaust	Exhaust
N.O.	Exhaust	Pressure	Exhaust
Double acting	Pressure	Pressure	Exhaust

In the case of N.C. and N.O. types, the port which does not receive operating pressure is released to atmosphere. When intake and exhaust directly from the valve is not desired due to problems with the ambient environment or scattering of dust, etc., install piping and perform intake and exhaust at a location which does not present a problem.

4. For tubing connections, refer to pages 17-5-38 to 39.

Wiring

⚠ Caution

1. Use electrical wires for piping with more than 0.5 to 1.25 mm².
Further, do not allow excessive force to be applied to the lines.

2. Use electrical circuits which do not generate chattering in their contacts.

3. Use voltage which is within 10% of the rated voltage. In cases with a DC power supply where importance is placed on responsiveness, stay within 5% of the rated value. The voltage drop is the value in the lead wire section connecting the coil.

4. When electrical circuit is not acceptable for surge voltage generated by solenoid, install a surge absorber in parallel to the solenoid or use a optional type with surge killer.
(VCB, VCL: Class H coil, Series VCS, VDW, VX, VQ)

5. Series VX, VQ
Use the option with surge voltage suppressor, with surge voltage protection circuit.

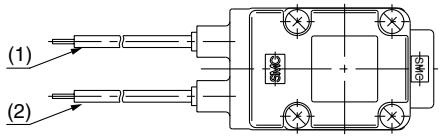
Electrical Connections

⚠ Caution

Series VC

Grommet

Class H coil: AWG18
Class B coil: AWG20



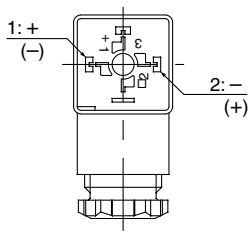
Rated voltage	Lead wire color	
	(1)	(2)
DC (Type B only)	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Gray	Gray

∗ There is no polarity.

Series VC, VX

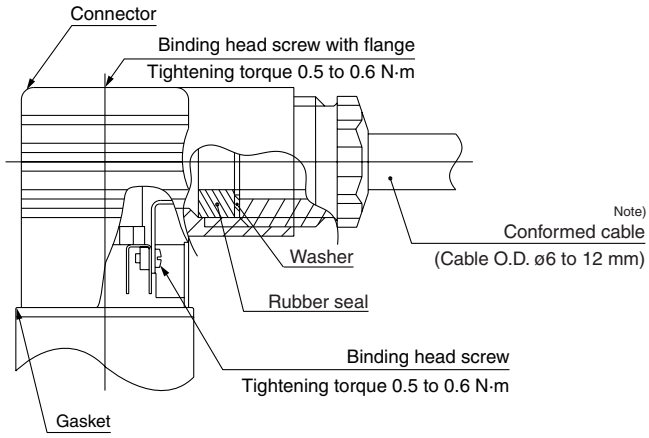
DIN terminal (Class B only)

The figure below shows the internal connection of DIN terminal, so connect DIN terminals with power supply.



Terminal no.	1	2
DIN terminal	+ (–)	– (+)

∗ There is no polarity.
• Heavy-duty cord can be used up to the cable O.D. ø6 to 12.
• Use the tightening torques below for each section.



Note) For the one with outside diameter of the cable ø9 to 12 mm, remove the internal parts of the rubber seal before using.

2/3 Port Process Valve Precautions 4

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Electrical Connections

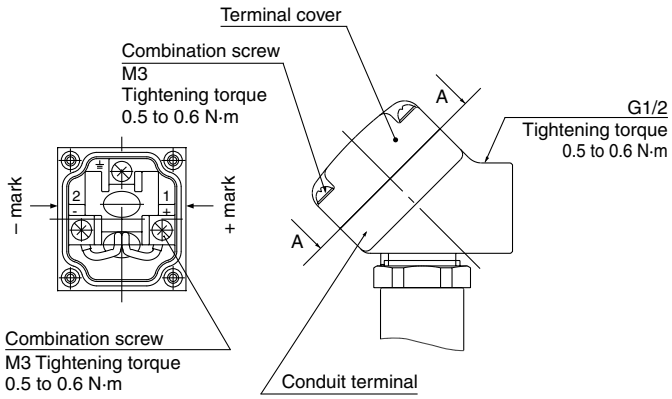
⚠ Warning

Series VC, VX

Conduit terminal

In the case of the conduit terminal, make connections according to the marks shown below.

- Use the tightening torques below for each section.
- Properly seal the terminal connection (G 1/2) with the special wiring conduit, etc.



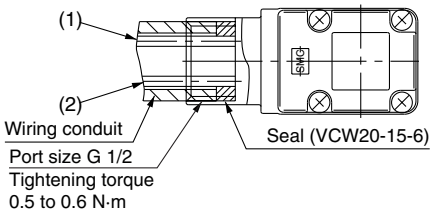
View A-A
(Internal connection diagram)

Series VC

Conduit

When used as an IP65 equivalent, use seal (Part no. VCW20-15-6) to install the wiring conduit. Also, use the tightening torque below for the conduit.

Class H coil: AWG18
Class B coil: AWG20



Rated voltage	Lead wire color	
	(1)	(2)
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Gray	Gray

∗ There is no polarity.

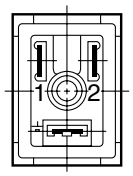
Description	Part no.
Seal	VCW20-15-6

Note) Please order separately.

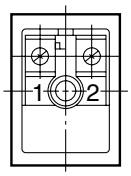
Series VN

The figures below show the internal connection of DIN terminal or terminal box, so connect them with power supply.

With DIN terminal box

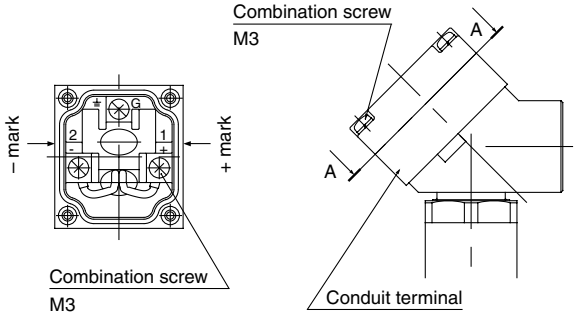


With terminal box



Terminal no.	1	2
DIN terminal	+	–
Terminal	+	–

Connect the conduit terminal according to the marks shown below.



View A-A
(Internal connection diagram)

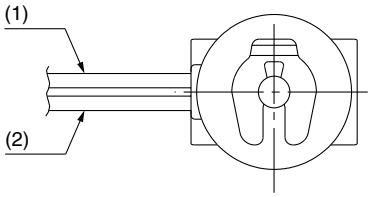
2/3 Port Process Valve Precautions 5

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Electrical Connections

⚠ Caution

Series VDW

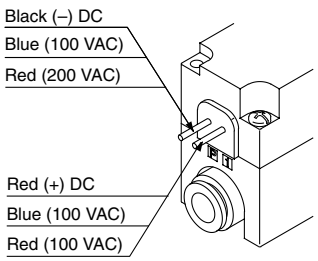


Rated voltage	Lead wire color	
	(1)	(2)
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Gray	Gray

∗ There is no polarity.

Series VQ20/30

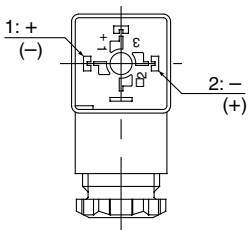
Grommet



∗ For energy-saving circuit, there is the polarity.

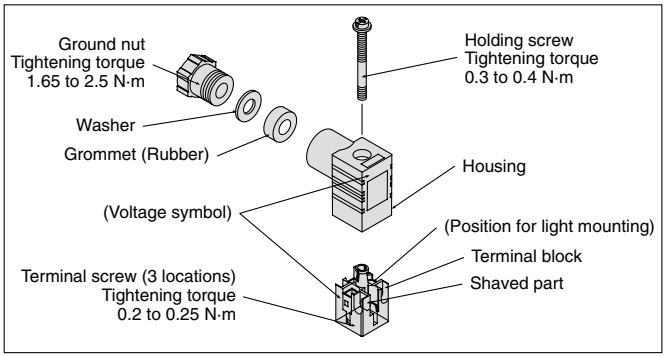
DIN terminal

Since internal connections are as shown below for the DIN terminal, make connections to the power supply accordingly.



Terminal no.	1	2
DIN terminal	+	–

∗ For energy-saving circuit, there is the polarity.
Heavy-duty cord can be used up to the cable O.D. ø3.5 to 7.



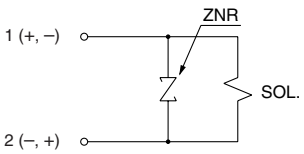
Electrical Circuit

⚠ Caution

Series VC (Class B coil)

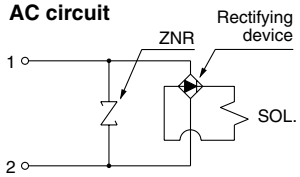
Grommet, Conduit, Conduit terminal, DIN connector

DC circuit



Without indicator light

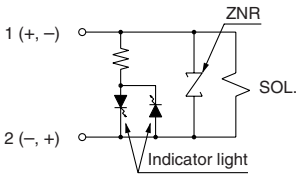
AC circuit



Without indicator light

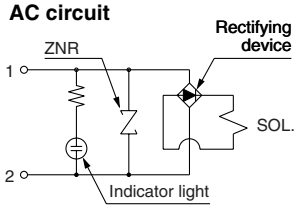
Conduit terminal, DIN terminal

DC circuit



With indicator light

AC circuit

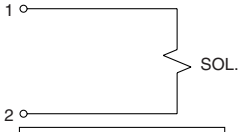


With indicator light

Series VC (Class H coil)

Grommet, Conduit, Conduit terminal

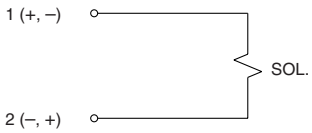
AC circuit



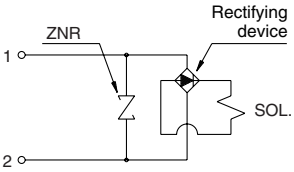
Without indicator light

Series VDW

DC circuit



AC circuit



2/3 Port Process Valve Precautions 6

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

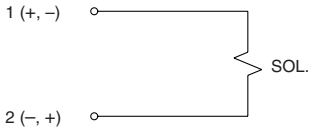
Electrical Circuit

⚠ Caution

Series VX

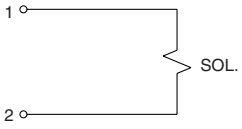
Grommet, Conduit, Conduit terminal, DIN connector

DC circuit



Without indicator light

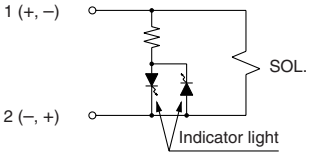
AC circuit



Without indicator light

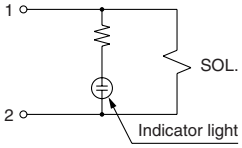
Conduit terminal, DIN terminal

DC circuit



With indicator light

AC circuit

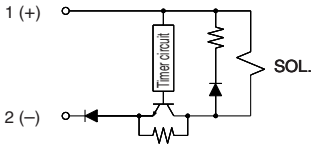


With indicator light

Series VQ20/30

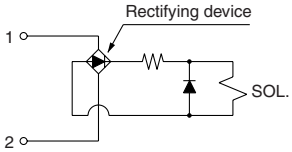
Grommet, DIN terminal

DC voltage
(With energy-saving circuit)



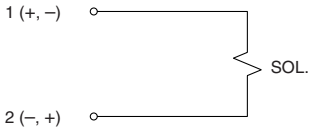
Without indicator light

AC circuit



Without indicator light

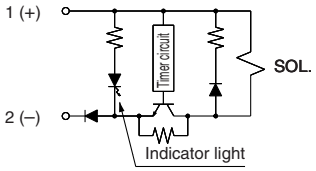
DC circuit



With indicator light

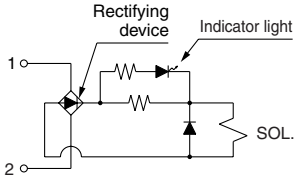
Grommet

DC voltage
(With energy-saving circuit)



With indicator light

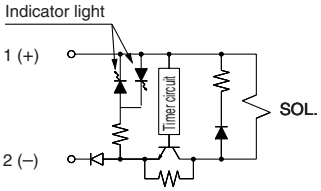
AC circuit



With indicator light

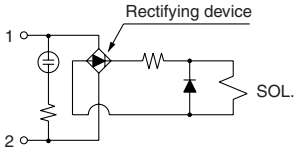
DIN terminal

DC voltage
(With energy-saving circuit)



With indicator light

AC circuit



With indicator light

2/3 Port Process Valve Precautions 7

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Operating Environment

⚠ Warning

1. **Do not use valves in atmospheres of corrosive gases, chemicals, salt water, water or steam, or where there is direct contact with same.**
2. **Do not use in explosive atmospheres.**
3. **Do not use in locations where vibration or impact occurs.**
4. **Do not use in locations subject to emissive heat.**
5. **Employ suitable protective measures in locations where there is contact with water droplets, oil or welding spatter, etc.**

Lubrication

⚠ Caution

1. **The valve has been lubricated for life at manufacture, and does not require lubrication in service.**
   If a lubricant is used in the system, use turbine oil Class 1, ISO VG32 (no additive). But do not lubricate the valve with EPR seal.
   Refer to the below brand name table of lubricants compliant to Class 1 turbine oil (without additive), ISO VG32.

Class 1 Turbine Oil (with no additive), ISO VG32

Classification of viscosity (cst) (40°C)	Viscosity according to ISO Grade	32
Idemitsu Kosan Co.,Ltd.		Turbine oil P-32
Nippon Mitsubishi Oil Corp.		Turbine oil 32
Cosmo Oil Co.,Ltd.		Cosmo turbine 32
Japan Energy Corp.		Kyodo turbine 32
Kygnus Oil Co.		Turbine oil 32
Kyushu Oil Co.		Stork turbine 32
NIPPON OIL CORPORATION		Mitsubishi turbine 32
Showa Shell Sekiyu K.K.		Turbine 32
Tonen General Sekiyu K.K.		General R turbine 32
Fuji Kosan Co.,Ltd.		Fucoal turbine 32

Please contact SMC regarding Class 2 turbine oil (with additives), ISO VG32.

Maintenance and Inspection

⚠ Warning

1. **Removing the product**
   The valve will reach high temperatures from high temperature fluids such as steam. Confirm that the valve has cooled sufficiently before performing work. If touched inadvertently, there is a danger of being burned.
   1) Shut off the fluid supply and release the fluid pressure in the system.
   2) In the case of air pilot or air-operated type, shut off the supply air source and discharge the compressed air inside a pilot piping.
   3) Shut off the power supply.
   4) Remove the product.
2. **Remove any remaining chemicals and carefully replace them with pure water or air, etc., before beginning work activities. (Series LV)**
3. **Low frequency operation**
   In order to prevent malfunction, conduct a switching operation of a valve every 30 days. Also, in order to use it under the optimum state, conduct a regular inspection once a half year.
4. **Manual override**
   When the manual override is operated, connected equipment will be actuated.
   Operate after safety is confirmed.
5. **Do not disassemble the product. Products which have been disassembled cannot be guaranteed.**
   If disassembly is necessary, please contact SMC.

Maintenance and Inspection

⚠ Caution

1. **Filters and strainers**
   1) Be careful regarding clogging of filters and strainers.
   2) Replace filters after one year of use, or earlier if the amount of pressure drop reaches 0.1 MPa.
   3) Clean the strainer when pressure drop exceeds 0.1 MPa.
2. **Lubrication**
   If operated with lubrication, be sure to continue the lubrication.
3. **How to store for a long period of time**
   Remove water completely from valves before storing for a long period of time to avoid the dust generation and damage to the rubber material.
4. **Flush drainage from filters regularly.**

Precautions on Handling

⚠ Warning

1. **Valves will reach high temperatures from high temperature fluids. Use caution, as there is a danger of being burned if a valve is touched directly.**

⚠ Caution

Series LV

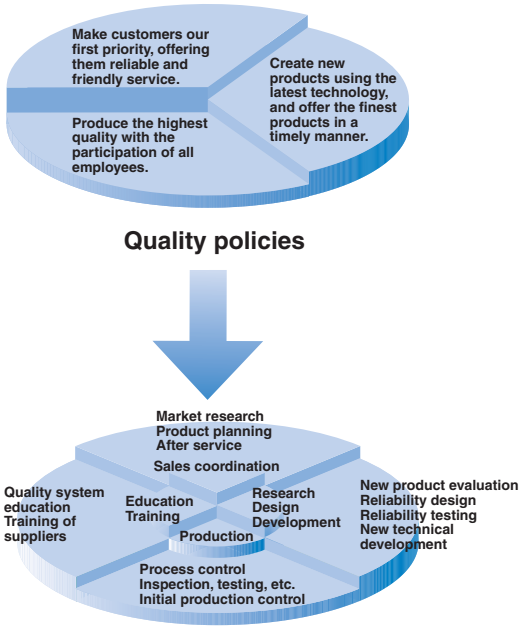
1. **When the diaphragm is made of PTFE**
   Please note that when the product is shipped from the factory, gases such as N2 and air may leak from the valve at a rate of 1 cm^3/min (when pressurized).
2. **When operated at a very low flow rate, the series LV□ with flow rate adjustment may vibrate, etc. depending on the operating conditions. Therefore, operate it after careful examination of the flow rate, pressure and piping conditions.**
3. **In the series LV□, water hammering may occur depending on the fluid pressure conditions. In most cases, improvement is possible by adjusting the pilot pressure with a speed controller, etc., but the flow rate, pressure and piping conditions should be reviewed.**
4. **To adjust the flow rate for the series LV□ with flow rate adjustment, open gradually starting from the fully closed condition.**
   Opening is accomplished by turning the adjustment knob counterclockwise. It is in the fully closed condition when the product is shipped from the factory.
5. **After a long period of nonuse, perform a test run before beginning regular operation.**
6. **Since the LVC is packaged in a clean room use sufficient care in handling when opened.**

Quality Assurance Information (ISO 9001, ISO 14001)

Reliable quality of products in the global market

To enable our customers throughout the world to use our products with even greater confidence, SMC has obtained certification for international standards “ISO 9001” and “ISO 14001”, and created a complete structure for quality assurance and environmental controls. SMC products pursue to meet its customers’ expectations while also considering company’s contribution in society.

SMC’s quality control system



Quality management system

ISO 9001

This is an international standard for quality control and quality assurance. SMC has obtained a large number of certifications in Japan and overseas, providing assurance to our customers throughout the world.



Environmental management system

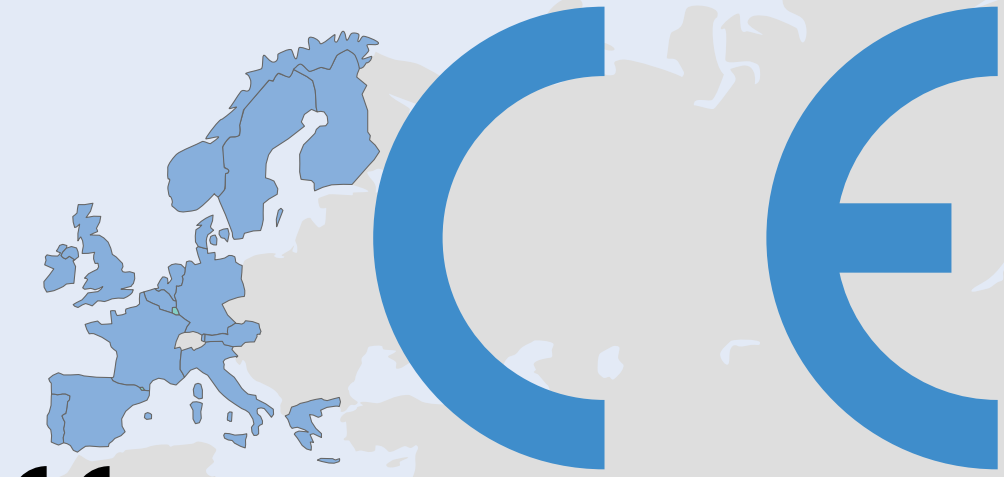
ISO 14001

This is an international standard related to environmental management systems and environmental inspections. While promoting environmentally friendly automation technology, SMC is also making diligent efforts to preserve the environment.



SMC Product Conforming to Inter

SMC products complying with EN/ISO, CSA/UL standards are supporting



CE Mark

The CE mark indicates that machines and components meet essential requirements of all the EC Directives applied.
It has been obligatory to apply CE marks indicating conformity with EC Directives when machines and components are exported to the member Nations of the EU.
Once “A manufacturer himself” declares a product to be safe by means of CE marking (declaration of conformity by manufacturer), free distribution inside the member Nations of the EU is permissible.

■ CE Mark

SMC provides CE marking to products to which EMC and Low Voltage Directives have been applied, in accordance with CETOP (European hydraulics and pneumatics committee) guide lines.

■ As of February 1998, the following 18 countries will be obliged to conform to CE mark legislation

Iceland, Ireland, United Kingdom, Italy, Austria, Netherlands, Greece, Liechtenstein, Sweden, Spain, Denmark, Germany, Norway, Finland, France, Belgium, Portugal, Luxembourg

■ EC Directives and Pneumatic Components

• Machinery Directive

The Machinery Directive contains essential health and safety requirements for machinery, as applied to industrial machines e.g. machine tools, injection molding machines and automatic machines. Pneumatic equipment is not specified in Machinery Directive. However, the use of SMC products that are certified as conforming to EN Standards, allows customers to simplify preparation work of the Technical Construction File required for a Declaration of Conformity.

• Electromagnetic Compatibility (EMC) Directive

The EMC Directive specifies electromagnetic compatibility. Equipment which may generate electromagnetic interference or whose function may be compromised by electromagnetic interference is required to be immune to electromagnetic affects (EMS/immunity) without emitting excessive electromagnetic affects (EMI/emission).

• Low Voltage Directive

This directive is applied to products, which operate above 50 VAC to 1000 VAC and 75 VDC to 1500 VDC operating voltage, and require electrical safety measures to be introduced.

• Simple Pressure Vessels Directive

This directive is applied to welded vessels whose maximum operating pressure (PS) and volume of vessel (V) exceed 50 bar/L. Such vessels require EC type examination and then CE marking.

national Standards

you to comply with EC directives and CSA/UL standards.

Mark of compliance for CSA/UL

Mark of compliance for CSA

NRTL /C

■ CSA Standards & UL Standards

UL and CSA standards have been applied in North America (U.S.A. and Canada) symbolizing safety of electric products, and are defined to mainly prevent danger from electric shock or fire, resulting from trouble with electric products. Both UL and CSA standards are acknowledged in North America as the first class certifying body. They have a long experience and ability for issuing product safety certificate. Products approved by CSA or UL standards are accepted in most states and governments beyond question.
Since CSA is a test certifying body as the National Recognized Testing Laboratory (NRTL) within the jurisdiction of Occupational Safety and Health Administration (OSHA), SMC was tested for compliance with CSA Standards and UL Standards at the same time and was approved for compliance with the two Standards. The above CSA NRTL/C logo is described on a product label in order to indicate that the product is approved by CSA and UL Standards.

■ TSSA (MCCR) Registration Products

TSSA is the regulation in Ontario State, Canada. The products that the operating pressure is more than 5 psi (0.03 MPa) and the piping size is bigger than 1 inch. fall into the scope of TSSA regulation.

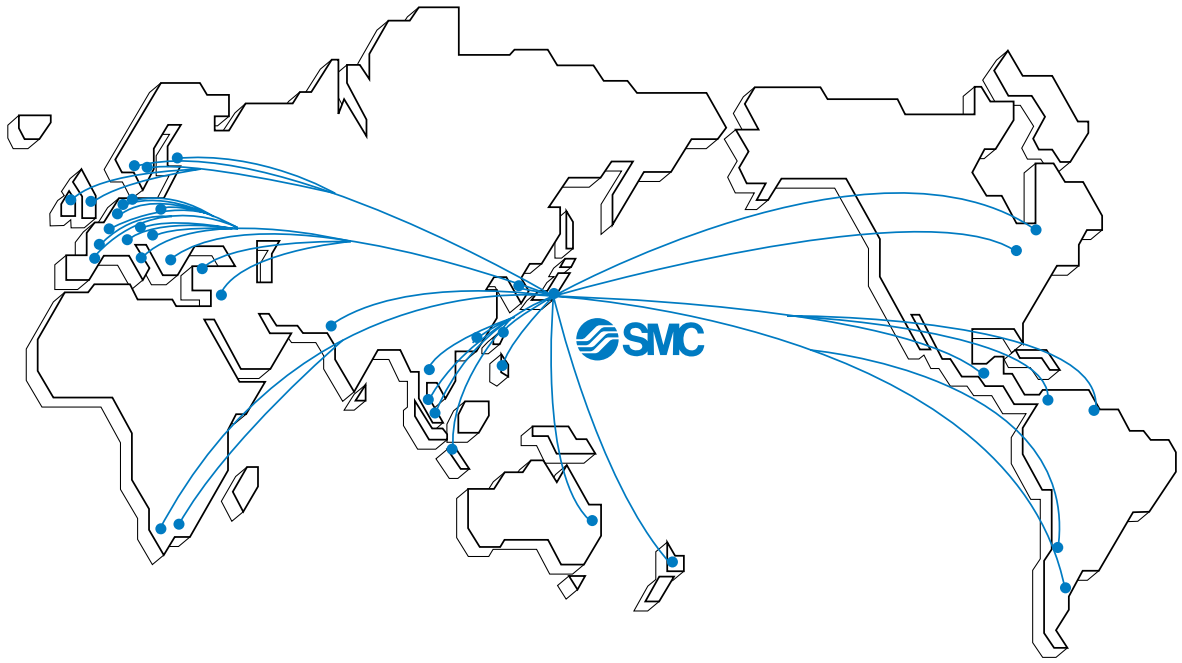
Products conforming to CE Standard

CE **With CE symbol for simple visual recognition**

In this catalog each accredited product series is indicated with a CE mark symbol. However, in some cases, every available models may not meet CE compliance. Please visit our web site for the latest selection of available models with CE mark.

http://www.smcworld.com

SMC's Global Service Network



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