# Process Valve

## *Series VNB*

## 2 Port Valve For Flow Control

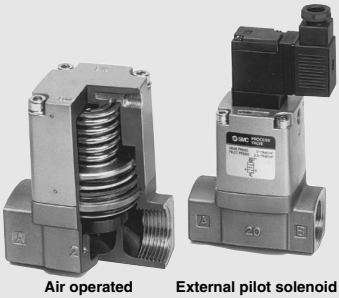
# A wide variety of applicable fluids

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

### Cylinder actuation by external pilot air

### Wide variations

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



**Air operated** **External pilot solenoid**

CE [Option]

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

### 3 Construction

- Select the air operated or external pilot solenoid 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**

| Wetted part Body material | Copper alloy: Standard | | | Aluminum: L | | | Stainless steel: S | | |
|---|---|---|---|---|---|---|---|---|---|
| Wetted part 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) | ● | ● | | ● | ● | | ● | ● | |
| Carbon dioxide ($CO_2$, 0.7 MPa or less) | ● | | | ● | | | ● | | |
| Carbon dioxide ($CO_2$, 0.7 to 1 MPa ) | | ● | ● | | | ● | | | ● |
| Nitrogen gas ($N_2$) | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Argon | ● | ● | | ● | ● | | ● | ● | |
| Helium | | ● | | | ● | | | ● | |
| Water (standard, up to 60°C) | ● | | | | | | ● | | |
| Water (up to 99°C air operated type only) | | ● | ● | | | | | ● | ● |
| Turbine oil | ● | ● | | ● | ● | | ● | ● | |
| Spindle oil | | ● | | | ● | | | ● | |
| Fuel oil Class 3 (C fuel oil) | | ● | | | ● | | | ● | |
| Silicone oil | | ● | | | | | | ● | |
| Naphtha | | ● | | | | | | ● | |
| Ethylene glycol (up to 80°C) | | | ● | | | | | | ● |
| Boiler water | | | | | | | ● | | ● |

### ⚠ Caution

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

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

**Table (2) Combinations between Valve Size and Port Size**

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

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

| Valve size | Electrical entry | | | | Light/Surge voltage suppressor | | Manual override |
|---|---|---|---|---|---|---|---|
| | G | E | T | D | S | Z | |
| 1, 2, 3, 4 | ● | ● | ● | ● | ● | ● | ● |
| 5, 6, 7 | ● | | | ● | ● (Only "G") | ● (Except "G") | |
| | | | | | (Only "G") | (Only "D") | |



SMC

# Process Valve: 2 Port Valve For Flow Control

# *Series VNB*

[Option]
* Electrical entry: D or DZ only.

## How to Order

**Seal material**

| | |
|---|---|
| A | NBR seals |
| B | FKM seals |
| C | EPR seals |

Refer to Table (1) for availability.

**Body material option**

| | |
|---|---|
| Nil | Standard |
| S* | Stainless steel body |
| L* | Aluminum body |

* Threaded port only

**Pilot system option**

| | |
|---|---|
| Nil | Standard |
| V | Vacuum pilot type |

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

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

| | |
|---|---|
| Nil | None |
| B Note) | With bracket |

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

**Thread type**

| | |
|---|---|
| Nil | Rc |
| F | G |
| N | NPT |
| T | NPTF |

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

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

**CE-compliant**

| | |
|---|---|
| Nil | — |
| Q | CE-compliant* |

* Electrical entry: D or DZ only

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

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

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

**Rated voltage**

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

Note 1) Electrical entry: D or DZ only
Note 2) Semi-standard
Note 3) For other rated voltages, please consult with SMC.

**Manual override**

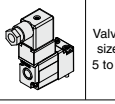
**Nil**: Non-locking push type

**A**: Non-locking push type A (projecting) Note)

**B**: Slotted locking type B (tool required) Note)

Valve size 1 to 4

**Nil**: Non-locking push type



Valve size 5 to 7

Note) Semi-standard

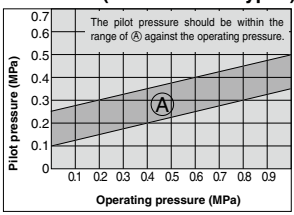
**Electrical entry/With light/surge voltage suppressor**

| Symbol | Electrical entry | Valve size 1 to 4 | Valve size 5 to 7 |
|---|---|---|---|
| G | Grommet | ● | ● |
| GS | Grommet with surge voltage suppressor | ● | ● |
| E | Grommet terminal | ● | |
| EZ | Grommet terminal with light/surge voltage suppressor | ● | |
| T | Conduit terminal | ● | |
| TZ | Conduit terminal with light/surge voltage suppressor | ● | |
| D | DIN terminal | ● | ● |
| DZ | DIN terminal with light/surge voltage suppressor | ● | ● |

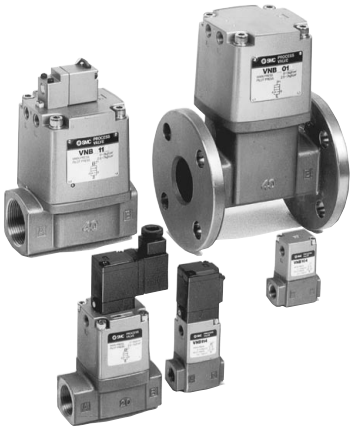
**CE-compliant**

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

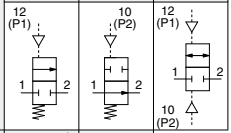
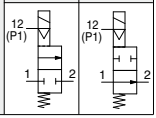
**Graph (4) VNB□□ 2/3 □ Pilot Pressure (N.O. and C.O. types)**




VNA
VNB
SGC
SGH
VNC
VNH
VND
VCC
TQ



## Symbol

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

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

## Option Specifications
## Vacuum pilot valve VNB□□□□V

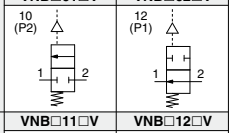
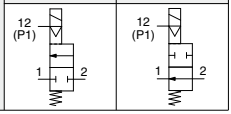
(Valve size 2 to 7)

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

## Specifications (Vacuum pilot type)

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

## Symbol (Vacuum pilot type)

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

## Model

| Model | Port size Rc | Orifice dia. ø (mm) | Flow characteristics | | | | Weight (kg) | |
|---|---|---|---|---|---|---|---|---|
| | | | Measured by air | | | Measured by water | | |
| | | | C [dm³/(bar·sec)] | b | Cv | Av x $10^{-6}$ m² | Air operated | 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 | | Orifice dia. | Flow characteristics | | Weight (kg) | |
|---|---|---|---|---|---|---|---|
| | Rc | Flange[Note] | ø (mm) | Cv | Effective area (mm²) | Air operated | 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.

## Specifications

| | | | |
|---|---|---|---|
| **Fluid** | | | Water/Oil/Air/Vacuum, etc. |
| **Fluid temperature** | **VNB□□□A, VNB□1□$^{B}_{C}$** | | –5 to 60°C Note 1) |
| | **VNB□0□$^{B}_{C}$** | | –5 to 99°C Note 1) (Water, Oil etc. Air Operated only) |
| **Ambient temperature** | | | –5 to 50°C Note 1) (Air operated type: 60°C) |
| **Proof pressure** | | | 1.5 MPa |
| **Applicable pressure range** | **VNB□□1□** | | Low vacuum to 0.5 MPa |
| | **VNB□□$^{3}_{5}$□** | | Low vacuum to 1 MPa |
| **External pilot air** | Pressure | **VNB□□$^{1}_{4}$□** | 0.25 to 0.7 MPa |
| | | **VNB□□$^{2}_{3}$□** | 0.1 + 0.25 x (Operating pressure) to 0.25 + 0.25 x (Operating pressure) MPa Note 3) Refer to "Graph (1)" on page 477. |
| | **Lubrication** | | Not required (Use turbine oil Class 1 ISO VG32, if lubricated. Note 2)) |
| | **Temperature** | | –5 to 50°C (Air operated type: 60°C) |
| **Mounting orientation** | | | Unrestricted Note 5) |

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

## Pilot Solenoid Valve Specifications

| | | | | |
|---|---|---|---|---|
| **Port size** | | | 6A to 25A | 32A to 50A |
| **Pilot solenoid valve** Note1) | | | **SF4-□□□-23**<br>**SF4-□$^{B}_{Bz}$-23-Q** | **VO307-□□□1**<br>**VO307-□$^{B}_{Bz}$1-Q** |
| **Electrical entry** | | | Grommet, Grommet terminal<br>Conduit terminal<br>DIN terminal | Grommet, DIN terminal |
| **Coil rated voltage (V)** | **AC (50/60 Hz)** | | 100 V, 200 V, Other voltage (Semi-standard) | |
| | **DC** | | 24 V, Other voltage (Semi-standard) | |
| **Allowable voltage fluctuation** | | | –15% to +10% of rated voltage | |
| **Temperature rise** | | | 35°C or less (When rated voltage is applied.) | 50°C or less (When rated voltage is applied.) |
| **Apparent power** | **AC** | **Inrush** | 5.6 VA (50 Hz), 5.0 VA (60 Hz) | 12.7 VA (50 Hz), 10.7 VA (60 Hz) |
| | | **Holding** | 3.4 VA (50 Hz), 2.3 VA (60 Hz) | 7.6 VA (50 Hz), 5.4 VA (60 Hz) |
| **Power consumption** | **DC** | | 1.8 W (without light), 2 W (with light) | 4 W (without light), 4.2 W (with light) |
| **Manual override** | | | Non-locking push type<br>Other (Semi-standard) | Non-locking push type |

Note 1) For "How to Order" pilot solenoid valves, refer to page 479.
Note 2) Vacuum pilot type pilot solenoid valves will become VO301V-00□□□.
Note 3) Vacuum pilot type CE-compliant pilot solenoid valves will become VO307V-□$^{B}_{Bz}$-Q.

## How to Order Pilot Solenoid Valves

### Valve size 1/2/3/4

**SF4 – 5 D □ – 23 – Q**
**SF4 – 5 D □ – 23**

**CE-compliant**
∗ Electrical entry: D or DZ only

**Manual override**

| | |
|---|---|
| **Nil** | Non-locking push type |
| **A**∗ | Non-locking push type A (projecting) |
| **B**∗ | Slotted locking type B (tool required) |

∗ Semi-standard

**Coil rated voltage**

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

Note 1) Semi-standard
Note 2) For other rated voltages, please consult with SMC.

**Electrical entry/With indicator light/surge voltage suppressor**

| | | CE-compliant |
|---|---|---|
| **G** | Grommet | — |
| **GS** | Grommet with surge voltage suppressor | — |
| **E** | Grommet terminal | — |
| **EZ** | Grommet terminal with light/surge voltage suppressor | — |
| **T** | Conduit terminal | — |
| **TZ** | Conduit terminal with light/surge voltage suppressor | — |
| **D** | DIN terminal | ● |
| **DZ** | DIN terminal with light/surge voltage suppressor | ● |

### Valve size 5/6/7 and vacuum pilot type

**VO307 □ – 5 D 1 – Q**

**CE-compliant**
∗ Electrical entry: D or DZ only

**Body option**

| | |
|---|---|
| **Nil** | Standard |
| **V** | Vacuum pilot |

**Coil rated voltage**

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

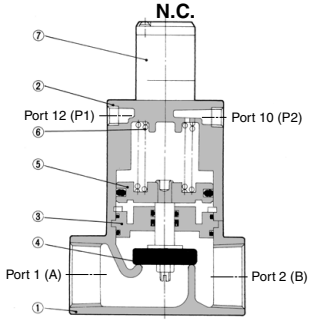
Note 1) Semi-standard
Note 2) For other rated voltages, please consult with SMC.

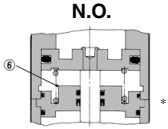
**Electrical entry**

| | | CE-compliant |
|---|---|---|
| **G** | Grommet | — |
| **GS** | Grommet with surge voltage suppressor | — |
| **D** | DIN terminal | ● |
| **DZ** | DIN terminal with light/surge voltage suppressor | ● |

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

## Construction




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

### Component Parts

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

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

### Working Principle (Vacuum pilot type is excluded)

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

- **When valve opens**
  When the pilot solenoid valve is energized (or when pressurized air enters through the port P1 of the air operated 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 port P1 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 port P2 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 port P2 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 ports P1 and P2. When pressurized air enters the port P1 (exhaust from the port P2), the valve element opens, and it closes when pressurized air enters the port P2 (exhaust from the port P1).

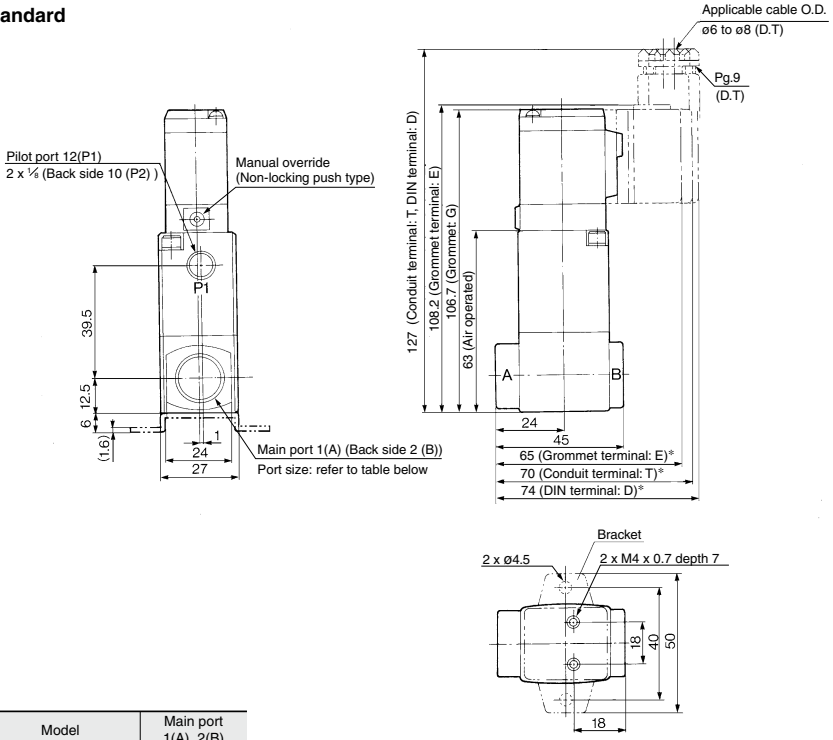
### Replacement Parts

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

Note 1) In the case of body options "S" and "L", the materials of the part nos. ③ and ④ are as follows: (Example): **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
Note 2) Please request a factory repair.

## Port size: 6A, 8A, 10A

### Standard

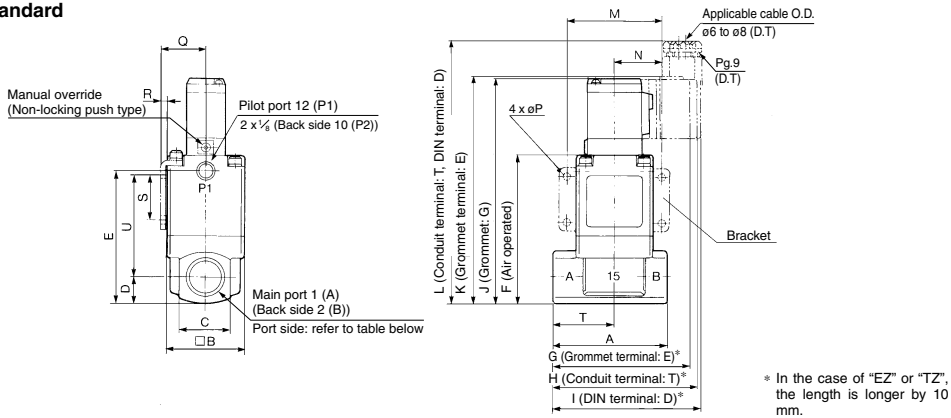



| Model | Main port 1(A), 2(B) |
|---|---|
| **VNB1□□□-6A** | 1/8 |
| **VNB1□□□-8A** | 1/4 |
| **VNB1□□□-10A** | 3/8 |

∗ 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

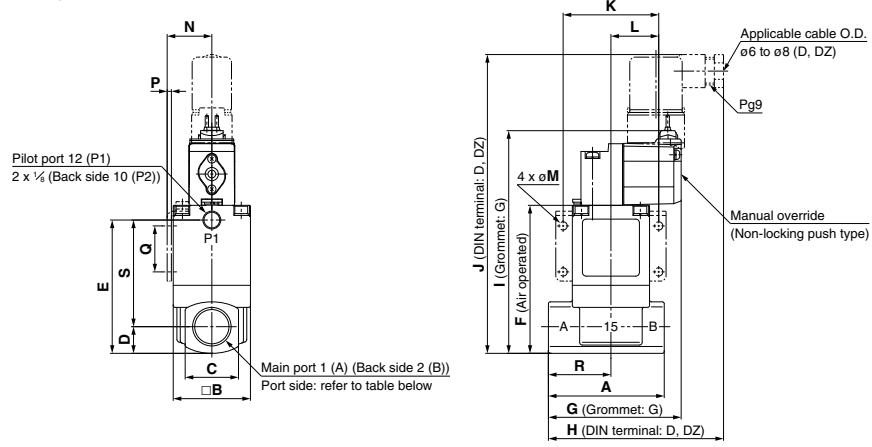



* In the case of "EZ" or "TZ", the length is longer by 10 mm.
For "DZ", the length is longer by 17 mm.

| Model | Main port 1(A), 2(B) | 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 | 75 | 80 | 84.5 | 124 | 125.5 | 144.5 | 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 | 84 | 89 | 93.5 | 135.5 | 137 | 156 | 62 | 31 | 5.5 | 28.3 | 2.3 | 30 | 43 | 60.5 |
| **VNB4□□□-25A** | 1 | 90 | 60 | 44 | 22 | 100 | 108 | 90 | 95 | 99.5 | 151.5 | 153 | 172 | 72 | 36 | 6.5 | 33.3 | 2.3 | 35 | 49 | 73 |

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

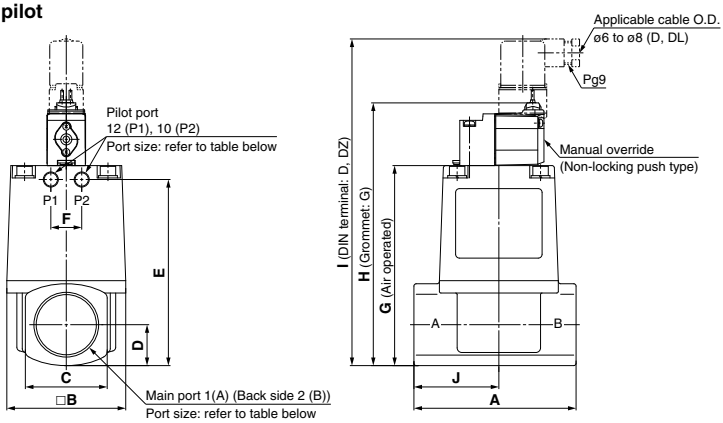
### Vacuum pilot




| Model | Main port 1(A), 2(B) | A | B | C | D | E | F | G | H | I | J | K | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VNB2□□□V-10A** | 3/8 | 63 | 42 | 28 | 14 | 72.5 | 80.5 | 72.2 | 95.3 | 121.1 | 162.5 | 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 | 77.2 | 100.3 | 132.6 | 174 | 62 | 31 | 5.5 | 28.3 | 2.3 | 30 | 43 | 60.5 |
| **VNB4□□□V-25A** | 1 | 90 | 60 | 44 | 22 | 100 | 108 | 78.2 | 101.3 | 148.6 | 190 | 72 | 36 | 6.5 | 33.3 | 2.3 | 35 | 49 | 73 |

## Port size: 32A, 40A, 50A

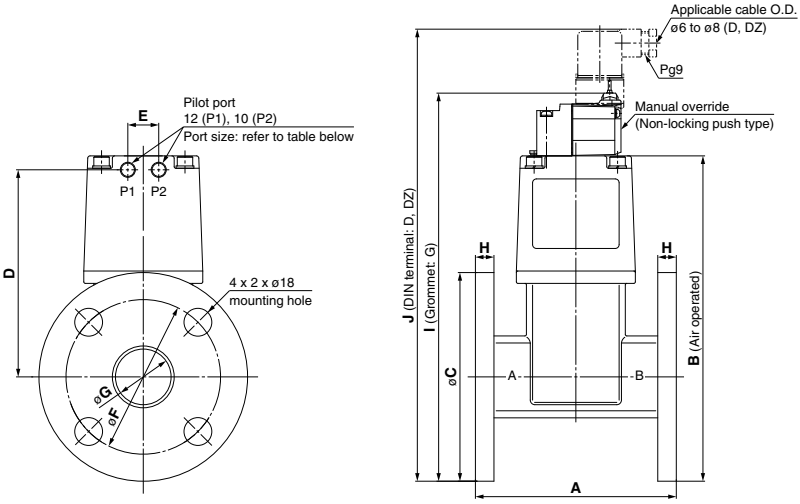
### Standard/Vacuum pilot




| Model | Main port 1(A), 2(B) | Pilot port 12(P1), 10(P2) | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VNB5□□□□-32A** | 1 1/4 | 1/8 | 105 | 77 | 53 | 26.5 | 120.5 | 20 | 129.5 | 170.1 | 211.5 | 55 |
| **VNB6□□□□-40A** | 1 1/2 | 1/4 | 120 | 96 | 60 | 30 | 137 | 24 | 147 | 187.6 | 229 | 63 |
| **VNB7□□□□-50A** | 2 | 1/4 | 140 | 113 | 74 | 37 | 160 | 24 | 170 | 210.6 | 252 | 74 |

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

### Standard/Vacuum pilot




| Model | Applicable flange 1(A), 2(B) | Pilot port 12(P1), 10(P2) | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VNB5□□□□-32F** | 32 | 1/8 | 130 | 210.5 | 135 | 134 | 20 | 100 | 36 | 12 | 251.1 | 292.5 |
| **VNB6□□□□-40F** | 40 | 1/4 | 150 | 226 | 140 | 146 | 24 | 105 | 42 | 12 | 266.6 | 308 |
| **VNB7□□□□-50F** | 50 | 1/4 | 180 | 250 | 155 | 162.5 | 24 | 120 | 54 | 14 | 290.6 | 332 |

# Series VNB
# Specific Product Precautions

**Be sure to read before handling. Refer to front matter 41 for Safety Instructions, and pages 17 to 19 for 2 Port Solenoid Valves for Fluid Control Precautions.**

## Design

### ⚠Warning

**Extended periods of continuous energization**

If a valve is continuously energized for long periods, heat generation of the coil may result in reduced performance and shorter service life. This may also have an adverse effect on the peripheral equipment in proximity. Should a valve be continuously energized for long periods, or its daily energized state exceeds its non energized state, please use an energy saving type valve with DC specifications. Additionally, when using with AC, energizing for long periods of time continously, select the air-operated valve and use the continuous duty type of the VT307 for a pilot valve.

## Fluid Quality

### ⚠Warning

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

## Mounting

### ⚠Warning

**1. Do not apply external force to the coil section.**

When tightening is performed, apply a wrench or other tool to the outside of the piping connection parts.

**2. Do not warm the coil assembly with a heat insulator, etc.**

Use tape, heaters, etc., for freeze prevention on the piping and body only. They can cause the coil to burn out.

**3. Avoid sources of vibration, or adjust the arm from the body to the minimum length so that resonance will not occur.**

## Piping

### ⚠Caution

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

## Wiring

### ⚠Caution

**1. Applied voltage**

When electric power is connected to a solenoid valve, be careful to apply the proper voltage. Improper voltage may cause malfunction or coil damage.

**2. Confirm the connections.**

After completing the wiring, confirm that the connections are correct.

## External Pilot

### ⚠Warning

**Pilot port piping**

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

**Standard**

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

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

**Vacuum pilot**

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

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

## Mounting Direction of Pilot Solenoid Valve

### ⚠Warning

With external pilot solenoids, the pilot solenoid valves are not splash proof specifications, and so care must be taken not to get fluid on oneself such as when performing maintenance.

### ⚠Caution

**Direction of mounting**

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

## Vacuum Pilot

### ⚠Caution

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