

# Rigid PVC/Polypropylene Body Single-Seated Control Valve

## Model VNP

### OVERVIEW

The rigid PVC and Polypropylene Body Single-Seated Control Valves (model VNP) are best suited for handling corrosive fluids such as chemicals because the wet-parts are made of corrosion-resistant materials.

The actuator utilizes a compact, powerful multi-spring diaphragm motor integrated with simple mechanism.

### SPECIFICATIONS

#### Body

##### Type

Straight-through type, Plastic globe valve

##### Nominal size

3/4, 1, 1½, 2 inches

##### Pressure rating

For the operating temperature and pressure ranges, refer to the Table 1.

##### End connection

Flanged end FF (RF)

JIS 5K FF (JIS B 2211)

JIS 10K RF/FF (JIS B 2212-1972)

##### Material

Rigid polyvinyl chloride, or polypropylene

##### Bonnet

Plain bonnet (0 to +80°C)

##### Gland type

Screwed gland

##### Packing

V-shaped PTFE packing

*Note) PTFE: Polytetrafluoroethylene*

#### Trim

##### Valve plug

Single seated, contoured type plug

Equal percentage (%C)

Linear (LC)

On-Off

##### Material

Valve plug

Standard..... PTFE

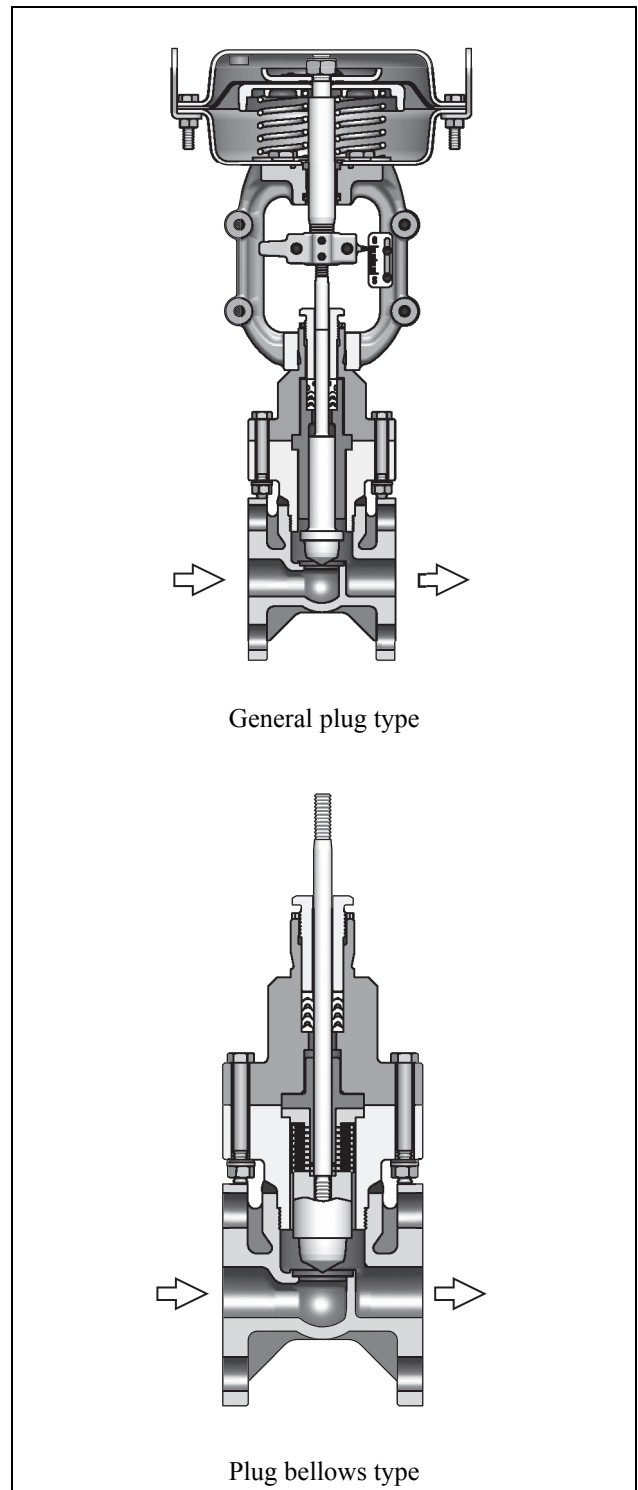
Additional spec.....Glass-reinforced PTFE

ASTM CW-12MW

(equivalent to Hastelloy-C)

Plug stem

SUS316



**Plug design and material combination**

Plug design	Material
General plug type	PTFE
	Glass-reinforced PTFE
	Tantalum
	ASTM CW-12MW
	Rigid polyvinyl chloride
	Polypropylene
Plug bellows type	PTFE

For the operating temperature and pressure ranges of plug bellows type, refer to Figure 1.

*Note) Seat: Integrated to valve body*

**Actuator**

**Type**

Single acting diaphragm actuator (model PSK)

**Action**

Direct or reverse action

**Diaphragm**

Cloth-embedded ethylene propylene rubber

**Spring range**

20 to 98 kPa {0.2 to 1.0 kgf/cm<sup>2</sup>},

80 to 240 kPa {0.8 to 2.4 kgf/cm<sup>2</sup>},

120 to 290 kPa {1.2 to 3.0 kgf/cm<sup>2</sup>}

*Note) Allowable differential pressure varies depending on spring range and air supply pressure.*

**Supply pressure**

140 to 340 kPa {1.4 to 3.5 kgf/cm<sup>2</sup>}

**Air connection**

Rc1/4 internal thread

**Ambient temperature**

0 to +70°C

**Valve action**

Air-to-close (Direct action actuator is combined)

Air-to-open (Reverse action actuator is combined)

**Optional accessories**

Positioner, Pressure regulator with filter, Limit switch, solenoid valve, and etc.

*Note) For the optional items, refer to the specification sheets and installation drawings of respective accessories.*

**Additional specifications (by special order)**

- Oil/water free treatment
- Copper free treatment
- Stainless steel (SUS304) atmosphere-exposed nuts and bolts
- Vinyl-wrapped copper tubing
- ASTM CW-12MW valve stem

**Performance**

**Rated Cv value**

Refer to Table 2.

**Inherent rangeability**

Trim material	Rated Cv value	Inherent rangeability
PTFE reinforced with glass, Rigid PVC, Polypropylene	1.0 to 1.6	20 : 1
	2.5 to 35	25 : 1
Tantalum, Hastelloy C	0.4 to 35	30 : 1

**Operating temperature and pressure range**

Refer to Table 1

**Allowable differential pressure**

Refer to Table 3.

**Leakage specification**

IEC 60534-4:2006 or JIS B2005-4:2008

Class IV: Leakage less than 0.01% of maximum valve capacity.

**Hysteresis error**

Within 1% F.S. (with positioner)

**Linearity**

Within ± 2% F.S. (with model AVP/HEP positioner)

Within ± 3% F.S. (with model VPE positioner)

**Dimensions**

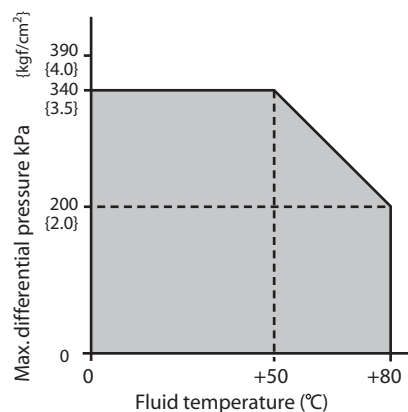
Refer to Figure 2, Table 5 and Table 6.

**Weight**

Refer to Table 7.

**Finish**

Blue (Munsell 10B5/10), silver, or other specified colors.



**Figure 1 Operating temperature and pressure range of bellows bonnet**

*Note) Use plug bellows type and ASTM CW-12MW valve stem for corrosive gas service (i.e. hydrogen sulfide)*

Table 1 Operating temperature and pressure range

[Unit: kgf/cm<sup>2</sup>]

Body material	Rigid PVC		Polypropylene
	0 to +40°C	+41 to +50°C	+51 to +80°C
3/4	590 {6}	590 {6}	340 {3.5}
1	590 {6}	590 {6}	340 {3.5}
1½	590 {6}	590 {6}	340 {3.5}
2	590 {6}	490 {6}	240 {2.5}

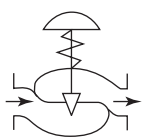
Table 2 Cv value and travel

Valve size (inches)	1						1½		2			
	3/4											
Rated Cv value	1.0	1.6	2.5	4.0	6.0	10	10	15	20	15	20	35
Equal percentage contoured (%C)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Linear contoured (LC)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
On-off	-	-	-	-	✓	✓	-	-	✓	-	-	✓
Rated travel (mm)	19											

Note) ✓ : Available

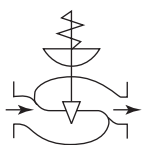
## Allowable differential pressure

Table 3 Air-to-close



Actuator model no.	Supply pressure kPa {kgf/cm <sup>2</sup> }	Spring range kPa {kgf/cm <sup>2</sup> }	Positioner	Pressure differential pressure (by value size (inches)) kPa {kgf/cm <sup>2</sup> }			
				3/4	1	1½	2
PSK1D	140 {1.4}	20 to 98 {0.2 to 1.0}	△	590 {6.0}	490 {5.0}	190 {1.9}	120 {1.2}
	270 {2.8}	20 to 98 {0.2 to 1.0}	✓	-	590 {6.0}	590 {6.0}	590 {6.0}
		80 to 240 {0.8 to 2.4}	✓	590 {6.0}	490 {5.0}	190 {1.9}	120 {1.2}
	340 {3.5}	120 to 290 {1.2 to 3.0}	✓	-	-	240 {2.4}	150 {1.5}

Table 4 Air-to-open



Actuator model no.	Supply pressure kPa {kgf/cm <sup>2</sup> }	Spring range kPa {kgf/cm <sup>2</sup> }	Positioner	Pressure differential pressure (by value size (inches)) kPa {kgf/cm <sup>2</sup> }			
				3/4	1	1½	2
PSK1R	140 {1.4}	20 to 98 {0.2 to 1.0}	△	590 {6.0}	310 {3.2}	120 {1.2}	74 {0.75}
	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	590 {6.0}	590 {6.0}	590 {6.0}	490 {5.0}
		120 to 290 {1.2 to 3.0}	✓	-	590 {6.0}	590 {6.0}	590 {6.0}

Note) 1) ✓ : Positioner is required. △: Can be operated either with or without positioner.

2) When specifying bellows bonnet, select the spring range of 80 to 240 kPa {0.8 to 2.4 kgf/cm<sup>2</sup>} or 120 to 290 kPa {1.2 to 3.0 kgf/cm<sup>2</sup>}.

**DIMENSIONS**

(Unit : mm)

**Table 5 Face-to-face dimensions**

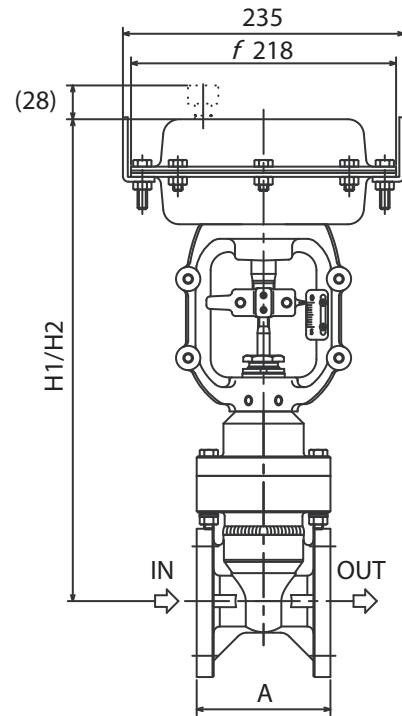
Dimensions (mm)	A			
Nominal size (inches)	3/4	1	1½	2
JIS 5K, 10K	95	110	190	200

**Table 6 External dimensions**

Actuator model no.		PSK1D				PSK1R			
Nominal size (inches)		3/4	1	1½	2	3/4	1	1½	2
Dimensions (mm)	H1 (Plain bonnet)	400	400	430	430	425	425	455	455
	H2 (Bellows bonnet)	435	420	440	460	460	460	465	485

**Table 7 Weight**

Nominal size (inches)	3/4	1	1½	2
Weights (kg)	16	17	19	21



**Figure 2 Face-to-face and external dimensions**

**Ordering Information**

When ordering, please specify;

- |  |   |
|--|---|
| 1) Model Number: VNP                               | 9) Accessories (Positioner, pressure regulator with filter, etc.)                               |
| 2) Valve size or Cv required.                      | 10) Special requirement of oil/water free treatment, copper free treatment, etc.                |
| 3) Rating of body and type of end connection.      | 11) Name of flow medium.  |
| 4) Body and trim material, necessity of hardening. | 12) Normal flow and maximum flow required.  |
| 5) Valve characteristics and type of plug.         | 13) Pressure of flow medium, upstream and downstream pressure at fully closed and fully opened. |
| 6) Type of bonnet.                                 | 14) Temperature and specific gravity of flow medium.  |
| 7) Type of actuator, and supply air pressure.      | 15) Viscosity of flow medium, inclusive or exclusive of slurry or flushing.                     |
| 8) Valve action (direct or reverse)                |   |

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*Specifications are subject to change without notice.*



**Azbil Corporation**

Advanced Automation Company

1-12-2 Kawana, Fujisawa

Kanagawa 251-8522 Japan

URL: <http://www.azbil.com/>

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