**Compact Proportional Solenoid Valve**

**PVQ Series**

Repeatability: **3%** or less  
Hysteresis: **10%** or less

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Flow rate control range Note)</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>0 to 6 L/min</td>
<td>PVQ10</td>
</tr>
<tr>
<td></td>
<td>0 to 100 L/min</td>
<td>PVQ30</td>
</tr>
</tbody>
</table>

*Note: Varies depending on the model.*

Control the flow rate smoothly according to the current

![Flow Rate Characteristics Diagram](image)

- **Max. flow rate**
- **Flow rate (L/min)**
- **Start-up current**
- **Control signal (mA)**
- **Rated current**
- **Flow rate curve with decreasing current**
- **Flow rate curve with increasing current**
- **Repeatability**
- **Hysteresis**
**Service life: Lasts 25 million cycles.** *(PVQ30)*  
(SMC in-house life test conditions)  
Specially coated sliding surface realized 25 million cycles within set operating range

**Body material: Equivalent to C37 or Stainless Steel 304** *(PVQ30)*

**Seal material: FKM** *(PVQ10, PVQ30)*

**Valve returns to closed position when power supply is turned off.**

**Leakage amount: 5 cm³/min or less at OFF**

**Can be used with vacuum.** *(Minimum operating pressure 0.1 Pa-abs)*

**Operation noise during opening/closing of the valve reduced**

<table>
<thead>
<tr>
<th></th>
<th>PVQ10</th>
<th>ON 30 dB or less</th>
<th>OFF 32 dB or less</th>
<th>PVQ30</th>
<th>ON 43 dB or less</th>
<th>OFF 50 dB or less</th>
</tr>
</thead>
</table>

*Background noise: 20 to 25 dB*  
*Background noise: 20 to 25 dB*

**Can be mounted on manifolds**

When continuously energizing adjacent valves at the same time, ambient temperature rises since the coil generates heat. Implement measures to exhaust excess heat so that the temperature remains within the range of the table on the right.

---

**Working Principle**

The armature is attracted to the core by electromagnetic force as the coil is energized. When the applied current varies, the attraction force also varies proportionally to it. The flow rate is controlled by the movement (stroke) of the armature, depending on the balance between this attraction force and the spring load.

**Note)** Sliding resistance at this point is the hysteresis of the flow.

---

**Proportional Solenoid Valve**

Flow rate can be controlled smoothly with one proportional solenoid valve by current control.

**Current (2 port valve)**

One 2-port valve is required for each flow rate.
## Applications

### Air-blow
- Blow-off of debris or water.
- Work transportation

### Spin control of handpiece

### Blood pressure gauge

### Vacuum chamber supply flow control
Smooth air supply/exhaust is possible by reducing the initial air supply. Prevents dust being stirred up inside the chamber.

### Valve construction

<table>
<thead>
<tr>
<th>Valve construction</th>
<th>PVQ13</th>
<th>PVQ31</th>
<th>PVQ33</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve type</td>
<td>N.C.</td>
<td>N.C.</td>
<td>N.C.</td>
</tr>
<tr>
<td>Orifice size (mm)</td>
<td>0.3</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Max. operating pressure differential (MPa)</td>
<td>0.7</td>
<td>0.45</td>
<td>0.2</td>
</tr>
<tr>
<td>Flow rate (L/min)</td>
<td>0 to 5</td>
<td>0 to 6</td>
<td>0 to 5</td>
</tr>
<tr>
<td>Applied current (Power supply)</td>
<td>0 to 85 mA (24 VDC)</td>
<td>0 to 170 mA (12 VDC)</td>
<td>0 to 165 mA (24 VDC)</td>
</tr>
<tr>
<td>Port size</td>
<td>M5</td>
<td></td>
<td>1/8</td>
</tr>
</tbody>
</table>

### Model

<table>
<thead>
<tr>
<th>Model</th>
<th>Piping type</th>
<th>PVQ13</th>
<th>PVQ31</th>
<th>PVQ33</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piping type</td>
<td>Base mounted</td>
<td>Body ported</td>
<td>Base mounted</td>
<td></td>
</tr>
</tbody>
</table>

### Accessories
- Clean gas filter (SFB100 series, etc.)

---

**Vacuum pump**

**Model**
- **PVQ**
- **VR**
- **IC**
- **ITV**
- **ITV X**
- **ITV H**
- **PVQ13**
- **PVQ31**
- **PVQ33**
- **Bracket (Option)**

**Supply**
- 0 to 165 mA (24 VDC)
- 0 to 330 mA (12 VDC)

**Exhaust**
- 0 to 85 mA (24 VDC)
- 0 to 330 mA (12 VDC)
PVQ Series
Model Selection

<To use orifice ø1.6 (See PVQ30: Chart 1)>

Condition 1.  $P_1 = 0.7$ MPa, $P_2 = 0$ MPa (Atmospheric pressure)

Refer to curve A when $\Delta P$ is 0.7 MPa.

- Ex) At increasing current, the flow rate when 140 mA current is applied is 85 L/min. (See ①.)
  - If current decreases at this point, the flow rate may not change by 135 mA due to hysteresis. (See ②.)
  - The flow rate at increasing current and decreasing current are not the same due to hysteresis. (① 85 L/min., ③ 93 L/min.)

Condition 2.  $P_1 = 0.7$ MPa, $P_2 = 0.2$ MPa

Refer to curve B when $\Delta P$ is 0.5 MPa.

- Ex) At increasing current, the flow rate when 150 mA current is applied is 65 L/min. (See ④.)
  - If the outlet pressure $P_2$ increases by 0.15 MPa, $\Delta P$ decreases by 0.15 MPa and becomes 0.35 MPa (See curve C), and the flow rate when the same current is applied is 40 L/min. (See ⑤.)

- The flow rate decreases due to change (increase) in outlet pressure, even if the inlet pressure and current value are the same.

Condition 3.  In a vacuum

- For vacuum specifications, the operating pressure range is from 0.1 Pa-abs to max. operating pressure differential.
- A(2) port is applicable with vacuum pressure.

<Chart 1> PVQ30 (ø1.6)

$\Delta P = (P_1 - P_2)$ MPa
$\Delta P$: Pressure differential
$P_1$: Inlet pressure
$P_2$: Outlet pressure

$\Delta P = (P_1 - P_2)$ MPa
$\Delta P$: Pressure differential
$P_1$: Inlet pressure
$P_2$: Outlet pressure
Q. Required flow rate = 0 to 75 L/min.

P₁ = No conditions, P₂ = 0 MPa (Atmospheric pressure)

In this case, all orifice sizes of PVQ30 series satisfy the required flow rate. (Flow rate when rated current is applied)

The table below shows the pressure differentials to satisfy the required flow rate. In the flow rate characteristics charts, a pressure differential over the flow rate indicated by the dashed line (75 L/min.) up to the max. operating pressure differential will satisfy the required flow rate.

### Table. Pressure differential to satisfy required flow rate = 0 to 75 L/min.

<table>
<thead>
<tr>
<th>Orifice Size (ø)</th>
<th>Pressure Differential (ΔP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø1.6</td>
<td>0.5 to 0.7 MPa</td>
</tr>
<tr>
<td>ø2.3</td>
<td>0.25 to 0.35 MPa</td>
</tr>
<tr>
<td>ø4.0</td>
<td>0.12 MPa</td>
</tr>
</tbody>
</table>

ΔP = (P₁ – P₂) MPa
ΔP: Pressure differential
P₁: Inlet pressure
P₂: Outlet pressure

### Note

1) For this product, the max. operating pressure differential varies by orifice diameter.
   Operate at a pressure differential which is 20% or more of the max. operating pressure differential.
   If the product must be operated at a pressure differential which is less than 20% of the max. operating pressure differential, either change the size of the orifice or change to a size from the PVQ10 series.

2) The smaller the pressure differential the product is operating at is in relation to the max. operating pressure differential, the smaller the controllable flow rate range and electric current range will be. This may result in reduced controlliability, and hunting phenomenon or valve opening failure may occur.

3) If this product is used for the charging and discharging of a tank, the valve pressure differential may get smaller due to pressure fluctuations in the tank, which may result in valve opening failure.

4) Flow rate depends on individual differences between valves and piping conditions. Refer to flow rate characteristics chart to select the model with adequate margin for required flow rate.

5) Follow the same procedure for selecting PVQ10 series.
Compact Proportional Solenoid Valve
PVQ10 Series

How to Order

Base mounted PVQ 13 – 5 L – 03 – M5 – A

Valve type
13 N.C.

Voltage
5 24 VDC
6 12 VDC

Electrical entry
L L plug connector
With lead wire
(Length 300 mm)

L plug connector
Without connector

LO M plug connector
With lead wire
(Length 300 mm)

M plug connector
Without connector

Nil

Sub-plate

Symbol

Body/Seal material

Symbol
Body
Seal

A
C36
FKM

Port size

Nil
Without sub-plate
(with mounting screw M1.7 x 17L, 2 pcs.)

M5
With sub-plate
M5 x 0.8

Symbol

Orifice size

Symbol
Orifice dia.

03
0.3 mmø

0.7 MPa

0.4 mmø

0.45 MPa

0.6 mmø

0.2 MPa

0.8 mmø

0.1 MPa

Max. operating pressure differential

Note 2) Maximum operating pressure differential indicates pressure differential (difference between inlet and outlet pressure) which can be allowed for operation with the valve closed or open. If the pressure differential exceeds the max. operating pressure differential of orifice, the valve may leak.

Note 3) For vacuum application, max. operating pressure range is 0.1 Pa·abs to max. operating pressure differential. A(2) port is applicable for vacuum pressure.

Specifications

<table>
<thead>
<tr>
<th>Standard specifications</th>
<th>Valve construction</th>
<th>Fluid</th>
<th>Seal material</th>
<th>Body material</th>
<th>Fluid temperature</th>
<th>Ambient temperature</th>
<th>Action</th>
<th>Mounting orientation</th>
<th>Port size</th>
<th>Power supply</th>
<th>Power current</th>
<th>Power consumption</th>
<th>Coil insulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direct operated poppet</td>
<td>Air</td>
<td>FKM</td>
<td>C36</td>
<td>0 to +50°C</td>
<td>0 to +50°C</td>
<td>N.C. ( Normally closed)</td>
<td>Unrestricted</td>
<td>M5</td>
<td>24 VDC</td>
<td>0 to 85 mA</td>
<td>0 to 2 W</td>
<td>Class B</td>
</tr>
</tbody>
</table>

Coil specifications

<table>
<thead>
<tr>
<th>24 VDC</th>
<th>12 VDC</th>
</tr>
</thead>
</table>

Note 1) Indicates the ambient temperature when the valve is not energized.

When the valve is continuously energized (when applying maximum current) and the ambient temperature is kept at 50°C due to the convection of the air around the valve, the coil outer surface reaches approximately 90°C, and the coil proximal section (1 mm) reaches approximately 60°C. Use the product at a temperature of not more than 50°C.

∗ Refer to page 981 for the different lead wire lengths of L and M plug connectors.

Note 2) For selection, refer to Model Selection on pages 978 and 979.

Note 3) Refer to the Specific Product Precautions “Continuous Energization.”
Flow Rate Characteristics

**PVQ10 (Ø0.3)**

![Graph of flow rate characteristics for PVQ10 (Ø0.3)]

- ∆P = 0.7 MPa
- ∆P = 0.5 MPa
- ∆P = 0.35 MPa
- ∆P = 0.2 MPa

**PVQ10 (Ø0.4)**

![Graph of flow rate characteristics for PVQ10 (Ø0.4)]

- ∆P = 0.45 MPa
- ∆P = 0.35 MPa
- ∆P = 0.25 MPa
- ∆P = 0.15 MPa

**PVQ10 (Ø0.6)**

![Graph of flow rate characteristics for PVQ10 (Ø0.6)]

- ∆P = 0.2 MPa
- ∆P = 0.15 MPa
- ∆P = 0.1 MPa
- ∆P = 0.05 MPa

**PVQ10 (Ø0.8)**

![Graph of flow rate characteristics for PVQ10 (Ø0.8)]

- ∆P = 0.1 MPa
- ∆P = 0.08 MPa
- ∆P = 0.02 MPa
- ∆P = 0.05 MPa

Note: Flow rate varies depending on model differences and piping conditions.
Select the model that fully satisfies the necessary flow rate based on the flow rate characteristics graphs.

Construction

**Component Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Solenoid coil assembly</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Core</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Return spring</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Armature assembly</td>
<td>Stainless steel, FKM</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Body</td>
<td>Brass (C36)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>O-ring</td>
<td>FKM</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Round head combination screw</td>
<td>Steel</td>
<td>M1.7 x 0.35 x 17L, 2 pcs.</td>
</tr>
<tr>
<td>8</td>
<td>Sub-plate</td>
<td>C36</td>
<td>Part no: PVQ10-15-M5</td>
</tr>
</tbody>
</table>

**Connector assembly**

AXT661 – 14A –

<table>
<thead>
<tr>
<th>Lead wire length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>30</td>
</tr>
</tbody>
</table>

For the product with the lead wire, the lead wire length is 300 mm. To extend the lead wire length to 600 mm or more, select the valve without connector and order the connector assembly separately.
### PVQ10 Series

#### Dimensions

**L plug connector**

**PVQ13-[□]L-[□]-M5**

- **Round head combination screw**
- **2 x ø2.7**
- **M5 x 0.8**
- **1 (IN port)**
- **2 (OUT port)**
- **Sub-plate**
- **Mounting hole**
- **2 x ø1.8**
- **IN O-ring**
- **OUT O-ring**

**M plug connector**

**PVQ13-[□]M-[□]-M5**

- **Round head combination screw**
- **2 x ø2.7**
- **M5 x 0.8**
- **1 (IN port)**
- **2 (OUT port)**
- **Sub-plate**
- **Mounting hole**
- **2 x ø1.8**
- **IN O-ring**
- **OUT O-ring**

---

*Dimensions in mm*
Compact Proportional Solenoid Valve

**PVQ30 Series**

---

### How to Order

- **Valve type**
  - PVQ 31: N.C.
  - PVQ 33: N.C.

- **Port size**
  - 01: 1/8 (6A)
  - Nil: None

- **Option**
  - F: Foot bracket

Note: Bracket is not mounted but is provided at the time of shipment.

---

### Specifications

#### Standard specifications

- **Valve construction**: Direct operated poppet
- **Fluid**: Air
- **Seal material**: FKM
- **Body material**: Brass C37 (Standard), Stainless steel
- **Fluid temperature**: 0 to +50°C
- **Ambient temperature**: 0 to +50°C
- **Action**: N.C. (Normally closed)
- **Mounting orientation**: Unrestricted
- **Enclosure**: IP40
- **Port size**: Rc 1/8
- **Power supply**: 24 VDC
- **Power consumption**: 0 to 165 mA
- **Coil current**: 0 to 165 mA
- **Coil insulation**: Class B

Note 1: Indicates the ambient temperature when the valve is not energized. When the valve is continuously energized (when applying maximum current) and the ambient temperature is kept at 50°C due to the convection of the air around the valve, the coil outer surface reaches approximately 100°C, and the coil proximal section (1 mm) reaches approximately 70°C. Use the product at a temperature of not more than 50°C.

Note 2: Maximum operating pressure differential indicates pressure differential (difference between inlet and outlet pressure) which can be allowed for operation with the valve closed or open. If the pressure differential exceeds the max. operating pressure differential of orifice, the valve may leak.

Note 3: For vacuum application, max. operating pressure range is 0.1 Pa.abs to max. operating pressure differential. A(2) port is applicable for vacuum pressure.

---

#### Orifice size

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Orifice dia.</th>
<th>Max. operating pressure differential</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>1.6 mmø</td>
<td>0.7 MPa</td>
</tr>
<tr>
<td>23</td>
<td>2.3 mmø</td>
<td>0.35 MPa</td>
</tr>
<tr>
<td>40</td>
<td>4 mmø</td>
<td>0.12 MPa</td>
</tr>
</tbody>
</table>

**Note** For selection, refer to Model Selection on pages 978 and 979.

---

#### Characteristic specifications

- **Orifice diameter (mmø)**
  - 1.6
  - 2.3
  - 4.0

- **Max. operating pressure differential (MPa)**
  - 0.7
  - 0.35
  - 0.12

- **Min. operating pressure (MPa)**
  - 0 Pa.abs

- **Flow rate (L/min) (at max. operating pressure differential)**
  - 0 to 100
  - 0 to 75

- **Hysteresis (at max. operating pressure differential)**
  - 10% or less
  - 13% or less

- **Repeatability (at max. operating pressure differential)**
  - 3% or less

- **Start-up current (at max. operating pressure differential)**
  - 50% or less
  - 65% or less

---

**Note 1)** Indicates the ambient temperature when the valve is not energized.

**Note 2)** Maximum operating pressure differential indicates pressure differential (difference between inlet and outlet pressure) which can be allowed for operation with the valve closed or open. If the pressure differential exceeds the max. operating pressure differential of orifice, the valve may leak.

**Note 3)** For vacuum application, max. operating pressure range is 0.1 Pa.abs to max. operating pressure differential. A(2) port is applicable for vacuum pressure.
**Flow Rate Characteristics**

Air

**PVQ30 (ø1.6)**

![Graph 1](image1)

**PVQ30 (ø2.3)**

![Graph 2](image2)

**PVQ30 (ø4.0)**

![Graph 3](image3)

Note: Flow rate varies depending on model differences and piping conditions. Select the model that fully satisfies the necessary flow rate based on the flow rate characteristics graphs.

**Construction**

![Diagram](image4)

**Component Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Solenoid coil assembly</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Coil cover</td>
<td>SPCE</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Magnetic plate</td>
<td>SUY</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Adjusting screw</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Tube assembly</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Return spring</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Armature assembly</td>
<td>Stainless steel, PPS, PTFE, FKM</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Body</td>
<td>Brass or Stainless steel</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Nut</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Wave washer</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Round head combination screw</td>
<td>Copper</td>
<td>Base mounted only</td>
</tr>
<tr>
<td>12</td>
<td>Sub-plate</td>
<td>Brass or Stainless steel</td>
<td>Part no.: PVQ30-15A-01</td>
</tr>
<tr>
<td>13</td>
<td>O-ring</td>
<td>FKM</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>O-ring</td>
<td>FKM</td>
<td></td>
</tr>
</tbody>
</table>

Option (Body ported only)

- Bracket assembly: VDW20-15A-1

**Sub-plate Part No.**

PVQ30-15 □ -01

<table>
<thead>
<tr>
<th>Material</th>
<th>Thread type</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>C36</td>
</tr>
<tr>
<td>S</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>
Compact Proportional Solenoid Valve **PVQ30 Series**

### Dimensions

**PVQ31**

[Diagram of PVQ31 dimensions]

- **Dimensions**:
  - Width: 27 mm
  - Height: 20 mm
  - Depth: 27 mm
  - Connection: Rc 1/8
  - Ports:
    - IN: 1
    - OUT: 2
- **Additional Details**:
  - Round head combination screw: ø20.5
  - Base mounting hole: ø3.5
  - OUT O-ring: ø13.6
  - IN O-ring: ø4

**PVQ33**

[Diagram of PVQ33 dimensions]

- **Dimensions**:
  - Width: 30 mm
  - Height: 27 mm
  - Depth: 23 mm
  - Connection: Rc 1/8
  - Ports:
    - IN: 1
    - OUT: 2
- **Additional Details**:
  - Round head combination screw: ø3.4
  - Base mounting hole: ø3.4
  - OUT O-ring: ø13.6
  - IN O-ring: ø4

[Further diagrams showing additional dimensions and assembly parts such as bracket assembly, sub-plate, and machining dimension of base side]
Proportional control
Control the fluid proportionally according to input signal (current).

Max. operating pressure differential
Indicates max. pressure differential (difference between inlet and outlet pressure) which is allowed for operation with the valve closed or open.

Max. operating pressure
This indicates the limit of pressure that can be applied to the inlet. (The pressure differential of the proportional valve must be no more than the maximum operating pressure differential.)

Orifice diameter
Diameter of the hole for sealing the valve body of the proportional valve. This does not indicate the effective cross section.

Hysteresis
Greatest flow rate difference between current increase and current decrease (with the same current). (Percentage divided by max. flow rate)

Repeatability
Deviation of output flow rate when the same current is applied. (Percentage divided by max. flow rate)

Start-up current
Current at which the flow rate is actually output while increasing current from zero. (Percentage divided by rated current)
**PVQ Series**

**Specific Product Precautions**

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions.

---

**Power Source Selection**

⚠️ **Caution**

This product makes proportional control possible with constant current.

If controlled with voltage, the output flow rate cannot be kept constant due to current fluctuation. Use stable DC power source of sufficient capacity without much ripple.

---

**Handling**

⚠️ **Caution**

1. This product is adjusted to the respective specifications at SMC factory before delivery.
   
   Do not disassemble the product or remove parts as it could cause breakdown of the product.

2. Flow rate is controlled by balancing the valve body.
   
   Do not expose the product to external vibration and impact as it changes the flow rate.
   
   Vibration may occur depending on the piping conditions or control methods.

---

**Pressure Difference**

⚠️ **Caution**

Leakage from the valve may be caused if the pressure difference is larger than the maximum operating pressure differential of the respective models.

---

**Flow Rate**

⚠️ **Caution**

Flow rate varies depending on model differences and piping conditions.

Select the model that fully satisfies the necessary flow rate based on the flow rate characteristics graphs.

---

**Operation in Vacuum**

⚠️ **Caution**

When the product is used in vacuum, apply vacuum pressure to A (2) port.

The pressure at P(1) port should be larger than the pressure at A(2) port.

---

**Valve Mounting**

⚠️ **Caution**

When mounting a valve to the sub-plate, tighten the screw securely with the tightening torque shown in the table below after checking the installation condition of the O-ring on the interface side.

<table>
<thead>
<tr>
<th>Model Selection</th>
<th>Proper Tightening Torque (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVQ10 (Base mounted)</td>
<td>PVQ30 (Base mounted)</td>
</tr>
<tr>
<td>0.15 to 0.22</td>
<td>0.8 to 1.0</td>
</tr>
</tbody>
</table>

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**Warning**

1. **Ambient temperature and outer surface temperature**

When the valve is continuously energized (when applying maximum current) and the ambient temperature is kept at 50°C due to the convection of the air around the valve, the coil outer surface reaches approximately 90°C for the PVQ10 series and 100°C for the PVQ30 series.

The valve proximal section (approx. 1 mm) reaches approximately 60°C for the PVQ10 series and 70°C for the PVQ30 series.

When the valve is mounted inside the enclosed control panel (in a state without convection of air), however, the above temperature may be exceeded due to the rise in coil temperature or the influence of other equipment. Take measures to release the heat, for example, to create a convection of the air around the valve or provide an air vent.

2. **Do not touch the valve directly with hands.**

The coil can be hot depending on the ambient temperature or energizing time.

Install a protective cover over the valve if it can be touched directly with hands.

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**Continuous Energization**

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**Model Selection**

1. **For this product, the max. operating pressure differential varies by orifice diameter.**

Operate at a pressure differential which is 20% or more of the max. operating pressure differential.

If the product must be operated at a pressure differential which is less than 20% of the max. operating pressure differential, either change the size of the orifice or change to a size from the PVQ10 series.

2. **The smaller the pressure differential the product is operating at is in relation to the max. operating pressure differential, the smaller the controllable flow rate range and electric current range will be. This may result in reduced controllability, and hunting phenomenon or valve opening failure may occur.**

3. **If this product is used for the charging and discharging of a tank, the valve pressure differential may get smaller due to pressure fluctuations in the tank, which may result in valve opening failure.**