High precision, large capacity relief regulator
A 3 port large exhaust capacity pressure reducing valve which utilizes a nozzle flapper mechanism available as air operated or manual types.

Precise pressure setting
Having a relief Cv value that is similar to the supply Cv value, this regulator responds quickly in order to set a precise outlet pressure even when the outlet volume and the pressure fluctuations are large.

High precision
This regulator is well-suited for balancer applications because it minimizes pressure fluctuations with its large-volume supply/exhaust capability, in addition it features high precision F.S. (full span) sensitivity within 0.2% and F.S. repeatability of ±0.5%.

Manifold capable
VVEXB 1/8—Up to 10 stations
VVEX2 1/4—Up to 8 stations

Rich line-up
Port sizes available from M5 to 2 inches, most flow rates and pipes can be accommodated.

Minimum size VEX1 3
- Non-grease only for VEX1 3
- Seal materials (NBR, FKM) only for VEX1 3

Manual knob type
Air operated type
Application Example

Relief Type Regulator
Precise internal tank pressure setting

- Large effective areas of both supply and exhaust sides make it possible to precisely set large-flow internal tank pressure.

Accurate Pressure Setting
Sensitivity within 0.2% F.S. (Full span)
Tension control

Contact Pressure Control

- Pressure is kept steady, responding rapidly to the position change of the piston in the cylinder.

Balance and Drive
Accurate balance pressure setting

- Pressure changes during cylinder actuation are suppressed, balancing the cylinder in both static and dynamic conditions.
## Specifications

<table>
<thead>
<tr>
<th>Port size</th>
<th>VEX1A33</th>
<th>VEX1B33</th>
<th>VEX113</th>
<th>VEX123</th>
<th>VEX133</th>
<th>VEX153</th>
<th>VEX173</th>
<th>VEX193</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>M5</td>
<td>M5</td>
<td>M5</td>
<td>M5</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
</tr>
<tr>
<td>1(P)</td>
<td>M5</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
<td>3/6</td>
<td>3/6</td>
<td>3/6</td>
<td>3/6</td>
</tr>
<tr>
<td>2(A)</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
</tr>
<tr>
<td>3(R)</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
<td>1/6</td>
</tr>
<tr>
<td>Pilot</td>
<td>Air (Normal, Dry)</td>
<td>Air (Normal, Dry)</td>
<td>Air (Normal, Dry)</td>
<td>Air (Normal, Dry)</td>
<td>Air (Normal, Dry)</td>
<td>Air (Normal, Dry)</td>
<td>Air (Normal, Dry)</td>
<td>Air (Normal, Dry)</td>
</tr>
<tr>
<td>Fluid</td>
<td>Refer to Applicable Fluids.</td>
<td>Refer to Applicable Fluids.</td>
<td>Refer to Applicable Fluids.</td>
<td>Refer to Applicable Fluids.</td>
<td>Refer to Applicable Fluids.</td>
<td>Refer to Applicable Fluids.</td>
<td>Refer to Applicable Fluids.</td>
<td>Refer to Applicable Fluids.</td>
</tr>
<tr>
<td>Supply pressure</td>
<td>(Set pressure + 0.1 MPa) to Max. 1 MPa</td>
<td>(Set pressure + 0.1 MPa) to Max. 1 MPa</td>
<td>(Set pressure + 0.1 MPa) to Max. 1 MPa</td>
<td>(Set pressure + 0.1 MPa) to Max. 1 MPa</td>
<td>(Set pressure + 0.1 MPa) to Max. 1 MPa</td>
<td>(Set pressure + 0.1 MPa) to Max. 1 MPa</td>
<td>(Set pressure + 0.1 MPa) to Max. 1 MPa</td>
<td>(Set pressure + 0.1 MPa) to Max. 1 MPa</td>
</tr>
<tr>
<td>Setting pressure range</td>
<td>0.01 to 0.7 MPa</td>
<td>0.05 to 0.7 MPa</td>
<td>0.05 to 0.7 MPa</td>
<td>0.05 to 0.7 MPa</td>
<td>0.05 to 0.7 MPa</td>
<td>0.05 to 0.7 MPa</td>
<td>0.05 to 0.7 MPa</td>
<td>0.05 to 0.7 MPa</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 to 60˚C (VEX1A33)</td>
<td>0 to 99˚C (VEX1B33)</td>
<td>0 to 99˚C (VEX1B33)</td>
<td>0 to 99˚C (VEX1B33)</td>
<td>0 to 99˚C (VEX1B33)</td>
<td>0 to 99˚C (VEX1B33)</td>
<td>0 to 99˚C (VEX1B33)</td>
<td>0 to 99˚C (VEX1B33)</td>
</tr>
<tr>
<td>Fluid temperature</td>
<td>0 to 60˚C</td>
<td>0 to 60˚C</td>
<td>0 to 60˚C</td>
<td>0 to 60˚C</td>
<td>0 to 60˚C</td>
<td>0 to 60˚C</td>
<td>0 to 60˚C</td>
<td>0 to 60˚C</td>
</tr>
<tr>
<td>Repeatability</td>
<td>Within ±0.5% F.S. (Full span)</td>
<td>Within ±0.5% F.S. (Full span)</td>
<td>Within ±0.5% F.S. (Full span)</td>
<td>Within ±0.5% F.S. (Full span)</td>
<td>Within ±0.5% F.S. (Full span)</td>
<td>Within ±0.5% F.S. (Full span)</td>
<td>Within ±0.5% F.S. (Full span)</td>
<td>Within ±0.5% F.S. (Full span)</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>Within 0.2% F.S. (Full span)</td>
<td>Within 0.2% F.S. (Full span)</td>
<td>Within 0.2% F.S. (Full span)</td>
<td>Within 0.2% F.S. (Full span)</td>
<td>Within 0.2% F.S. (Full span)</td>
<td>Within 0.2% F.S. (Full span)</td>
<td>Within 0.2% F.S. (Full span)</td>
<td>Within 0.2% F.S. (Full span)</td>
</tr>
<tr>
<td>Linearity</td>
<td>—</td>
<td>Within ±1% F.S. (Full span)</td>
<td>Within ±1% F.S. (Full span)</td>
<td>Within ±1% F.S. (Full span)</td>
<td>Within ±1% F.S. (Full span)</td>
<td>Within ±1% F.S. (Full span)</td>
<td>Within ±1% F.S. (Full span)</td>
<td>Within ±1% F.S. (Full span)</td>
</tr>
<tr>
<td>Air consumption</td>
<td>9.5 L/min (ANR) (at supply pressure 1.0 MPa)</td>
<td>9.5 L/min (ANR) (at supply pressure 1.0 MPa)</td>
<td>9.5 L/min (ANR) (at supply pressure 1.0 MPa)</td>
<td>9.5 L/min (ANR) (at supply pressure 1.0 MPa)</td>
<td>9.5 L/min (ANR) (at supply pressure 1.0 MPa)</td>
<td>9.5 L/min (ANR) (at supply pressure 1.0 MPa)</td>
<td>9.5 L/min (ANR) (at supply pressure 1.0 MPa)</td>
<td>9.5 L/min (ANR) (at supply pressure 1.0 MPa)</td>
</tr>
<tr>
<td>Mounting</td>
<td>Free</td>
<td>Free</td>
<td>Free</td>
<td>Free</td>
<td>Free</td>
<td>Free</td>
<td>Free</td>
<td>Free</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>0.15</td>
<td>0.18</td>
<td>0.2</td>
<td>0.3</td>
<td>0.5</td>
<td>1.4</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

Notes:
1) No condensation.
2) Large amount of air is exhausted all the time.
3) Applicable only to air operated type.
4) With sub-plate.
5) Non-lubricated specifications are not available for valve sizes 1 to 9.

### Applicable Fluids

<table>
<thead>
<tr>
<th>Model</th>
<th>VEX1A33</th>
<th>VEX1B33</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air (Normal, Dry)</td>
<td>High temp. air (Max. 99˚C)</td>
</tr>
</tbody>
</table>

### Symbol

- **PA**
- **2(A)**
- **3(R)**

| Air operated type | Manual knob type |
Power Valve/Precision Regulator  
**VEX1 33 Series**

### How to Order

**VEX1**

<table>
<thead>
<tr>
<th>Body size</th>
<th>Port size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>M5</td>
</tr>
<tr>
<td>1(P)</td>
<td>M5</td>
</tr>
<tr>
<td>2(A)</td>
<td>M5</td>
</tr>
<tr>
<td>3(R)</td>
<td>M5</td>
</tr>
</tbody>
</table>

**Option**

- **B**: Bracket
- **F**: Foot
- **G**: Pressure gauge
- **N**: Silencer for bleed port

**Threads (1/8 only)**

- **F**
- **NPT**
- **NPTF**

### Caution

**Using the External Pilot**

1. If a pressure difference over 0.1 MPa between the supply and the set pressure cannot be maintained, change to an external pilot to obtain the necessary pressure difference.
2. If a mist separator cannot be installed on the supply side, change to an external pilot, and make sure to install a mist separator on the pilot side.

**How to Switch to External Pilot**

1. Using a flat head screwdriver, remove the fixed orifice from port P1.
2. Install the fixed orifice facing in the opposite direction (external pilot). Install it carefully to prevent damage to the O-ring.
3. Tighten the fixed orifice again and connect the pilot piping to port P1 using an M5 fitting.

### Dimensions of port P1

- **<Internal pilot>**
- **<External pilot>**

**Fittings for M5**

### Part no.

- **VEX1A33**
- **VEX1B33**
- **VEX113**
- **VEX123**
- **VEX33**
- **VEX33A**
- **VEX353**
- **VEX373**
- **VEX393**

**Note 1)** Not conforming to ISO1179-1.
**Note 2)** The optional parts are shipped in the same package.
**Note 3)** If a pressure gauge other than that which is indicated in the option table is to be used, also enter the part number of the pressure gauge.

Example: VEX1333-03

G36-10-01

---

**Option**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracket (With bolt and washer)</td>
<td>VEX1-18-1A</td>
</tr>
<tr>
<td>Foot (With bolt and washer)</td>
<td>VEX1-18-2A</td>
</tr>
<tr>
<td>Pressure gauge(3)</td>
<td>G27-10-10-01</td>
</tr>
</tbody>
</table>

**Note 1)** Refer to the pressure gauge guide in Best Pneumatics No. 7 for details.

---

**Position for port P1**

**Fixed orifice**

**Dimensions of port P1**
### Sub-plate/Base Gasket Part No.

<table>
<thead>
<tr>
<th>Sub-plate</th>
<th>B</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Port size</strong></td>
<td><strong>Symbol</strong></td>
<td><strong>Thread type</strong></td>
</tr>
<tr>
<td>A</td>
<td>M5</td>
<td>Rc</td>
</tr>
<tr>
<td>B</td>
<td>1/8</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Base gasket</th>
<th>VEXB-4</th>
<th>VEX1-11-2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symbol</strong></td>
<td><strong>Seal material</strong></td>
<td></td>
</tr>
<tr>
<td>Nil</td>
<td>NBR seals</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>FKM seals</td>
<td></td>
</tr>
</tbody>
</table>

Note) Not conforming to ISO1179-1.
## VEX1\(\square\) Series

### Manifold Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>VEX1B33</th>
<th>VEX1233(\square)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Applicable valve</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Valve stations</strong></td>
<td>2 to 10 stations (^{\text{Note}})</td>
<td>2 to 8 stations (^{\text{Note}})</td>
</tr>
<tr>
<td><strong>Air passage</strong></td>
<td>Common supply/exhaust</td>
<td></td>
</tr>
<tr>
<td><strong>Pilot</strong></td>
<td>Internal pilot</td>
<td>Common external pilot</td>
</tr>
<tr>
<td><strong>Pilot port size</strong></td>
<td>(\frac{1}{4}) M5 x 0.8</td>
<td>(\frac{1}{4}) M5 x 0.8</td>
</tr>
<tr>
<td><strong>Port size Port 1(P), 2(A), 3(R)</strong></td>
<td>(\frac{1}{4})</td>
<td>(\frac{1}{4})</td>
</tr>
</tbody>
</table>

### Blanking plate
- **VVX1B33**
  - (With gasket and mounting bolt)
  - Seal material
    - Nil: NBR seals
    - B: FKM seals
- **VVX1233\(\square\)**
  - (With gasket and mounting bolt)

\(^{\text{Note}}\) Pressurize to Port 1(P) and exhaust from Port 3(R) on the both sides for six stations or more of “VEX1B33” and/or five stations or more of “VEX1233”.

### How to Order

**VVX1B33**
- **Body size**: 1
- **Pilot type**: 1 Internal pilot, 2 Common external pilot
- **Port size**: \(\frac{1}{4}\)
- **Valve stations**: 2 (2 stations), 10 (10 stations)

**VVX1233\(\square\)**
- **Body size**: 1
- **Pilot type**: 1 Internal pilot, 2 Common external pilot
- **Port size**: \(\frac{1}{4}\)
- **Valve stations**: 2 (2 stations), 8 (8 stations)

List symbols in the order of precision regulators and blanking plates for manifolds from the left-hand side (Port 2(A) faces this side) of the manifold base.

Ex.) VVEX2-2-5-02
- VEX1233-02 4 pieces
- VEX1-17 1 piece

\(^{\text{Note}}\) Not conforming to ISO1179-1.

### Set Pressure Characteristics

**Air Operated Type**
- **Signal port PA**
- **Pressure (MPa)**

**Manual Knob Type**
- **Port 2(A) pressure (MPa)**
- **Knob rotation (Cycles)**

---

**SMC**

845
VEX1\(\square\)3\(^{0}\) Series

Flow Rate Characteristics

Port 1(P) pressure: 1 MPa

VEX1A33, VEX1B33-01
Port 2(A) pressure (MPa)

VEX113\(^{0}\), VEX123\(^{0}\)-02
Port 2(A) pressure (MPa)

VEX133\(^{0}\)-03
Port 2(A) pressure (MPa)

VEX153\(^{0}\)-06
Port 2(A) pressure (MPa)

VEX173\(^{0}\)-12
Port 2(A) pressure (MPa)

VEX193\(^{0}\)-20
Port 2(A) pressure (MPa)

Pressure Characteristics

Port 1(P) pressure: 0.7 MPa, Port 2(A) pressure: 0.2 MPa, Flow: 0 L/min (ANR)

VEX1A33, VEX1B33

VEX113\(^{0}\), VEX123\(^{0}\)

VEX133\(^{0}\)

VEX153\(^{0}\)

VEX173\(^{0}\)

VEX193\(^{0}\)
Power Valve/Precision Regulator  \( \text{VEX}^{3\text{rd}} \)  Series

Construction/Working Principle

**VEX1A33, VEX1B33**

When set-knob 9 is turned clockwise, the force generated by set spring 1 causes flapper 13 to close nozzle 14, allowing the nozzle back pressure to be applied to the right surface of top diaphragm 11. Then, valve 8 moves to the left, allowing the supply air to flow from port 1(P) to port 2(A). The air pressure that has flowed in is applied to the left surface of top diaphragm 11 and counteracts the force generated by the nozzle back pressure; at the same time, it is applied to the left surface of diaphragm 13, and balances with the set pressure that counteracts the compression force of set spring 10. When the outlet pressure increases higher than the set pressure, it pushes diaphragm 11 towards the right, and the pressure at the right side of top diaphragm 11 decreases, causing top diaphragm 11 to move to the right. Then, valve 8 moves away from the left surface of top diaphragm 11, the outlet pressure flows from port 2(A) via the valve hollow and is discharged through port 3(R) (atmosphere). If set knob 9 is turned counterclockwise, the movement will be the opposite, the outlet pressure will decrease, and will balance with a newly set pressure.

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Zinc alloy die-casted</td>
</tr>
<tr>
<td>2</td>
<td>Bonnet</td>
<td>Aluminum alloy die-casted</td>
</tr>
<tr>
<td>3</td>
<td>Upper diaphragm</td>
<td>NBR/FKM</td>
</tr>
<tr>
<td>4</td>
<td>Spring</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>5</td>
<td>Valve guide</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>6</td>
<td>Valve</td>
<td>NBR/FKM</td>
</tr>
<tr>
<td>7</td>
<td>Retainer</td>
<td>Resin</td>
</tr>
<tr>
<td>8</td>
<td>Lower diaphragm</td>
<td>NBR/FKM</td>
</tr>
</tbody>
</table>

**Component Parts**

**Replacing Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Knob</td>
<td>VBA1-10</td>
</tr>
</tbody>
</table>

**VEX113, VEX123, VEX133, VEX153, VEX173, VEX193**

When set-knob 9 is turned clockwise, the force generated by set spring 1 causes flapper 13 to close nozzle 14, allowing the nozzle back pressure to be applied to the top of piston 3. Then, via shaft 7, poppet valve (supply air) 6 opens, allowing the supply air to flow from port 1(P) to port 2(A). The air pressure that has flowed in is applied to the bottom surface of piston 3 and counteracts the force generated by the nozzle back pressure; at the same time, it is applied to the bottom surface of diaphragm 13, and balances with the set pressure that counteracts the compression force of set spring 10. When the outlet pressure increases higher than the set pressure, it pushes the diaphragm 11 upward, the pressure at the top surface of piston 3 decreases, causes piston 3 to move upward, opens poppet valve (exhaust) 6 via shaft 7, and is discharged through port 3(R) to the atmosphere. If set-knob 9 is turned counterclockwise (if the set pressure of the pressure-reducing valve connected to the signal port is decreased), the movement will be the opposite; the outlet pressure will decrease and balance with a newly set pressure.

Note) Those indicated in parentheses are for the air operated type.

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Aluminum alloy die-casted</td>
</tr>
<tr>
<td>2</td>
<td>Bonnet</td>
<td>Aluminum alloy die-casted</td>
</tr>
<tr>
<td>3</td>
<td>Regulating piston</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>4</td>
<td>Spring</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>5</td>
<td>Valve guide</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>6</td>
<td>Poppet valve</td>
<td>NBR</td>
</tr>
<tr>
<td>7</td>
<td>Shaft</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>8</td>
<td>Valve guide</td>
<td>Aluminum alloy</td>
</tr>
</tbody>
</table>

**Component Parts**

**Replacement Parts**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Knob</td>
<td>VBA1-10</td>
</tr>
</tbody>
</table>
**VEX1□3 Series**

**Body Ported**

**VEX1A33-M5, 01**

A section view

2 x M3 thread depth 6.5
(For bracket and foot mounting)
4 x ø4.5 (Mounting hole)

Pressure gauge (Option)
G27-10-R1-X207

Foot (Option)

Bracket (Option)

3 x \(\frac{3}{8}\), M5

2 x ø4.5 (Mounting hole)

Note) ( ) are the dimensions of “M5”.

**VEX113□-01, 02**

A section view

2 x M3 thread depth 6.5
(For bracket and foot mounting)
4 x ø4.5 (Mounting hole)

Pressure gauge (Option)
G27-10-01

Foot (Option)

Bracket (Option)

Air operated type

2 x M3 thread depth 6.5
(For bracket and foot mounting)
4 x ø4.5 (Mounting hole)

Bracket E
VEX1-18-1A (Option)
Power Valve/Precision Regulator  

**VEX133\(\frac{3}{3}\)-02, 03, 04**  
Pressure gauge (Option)  
G36-10-01  

- 4 x M5 thread depth 8  
- For bracket mounting  

**VEX153\(\frac{3}{3}\)-04, 06, 10**  
Pressure gauge (Option)  
G46-10-01  

- 2 x M6 thread depth 9  
- For bracket mounting  

**Body Ported**

Air operated type
Base Mounted

VEX1B33-M5, 01

VEX123  -01, 02

Power Valve/Precision Regulator VEX1□3  Series
Manifold: VVEXB-□-□-01

Applicable valve: VEX1B33

Valve mounting side

Blanking plate

Port 2(A)

Pressure gauge (Option)

Port 3(R): \( \frac{3}{8} \)

For 6 manifold stations or more, exhaust from the both sides.

External pilot port

Without thread: Internal pilot VVEXB-1

With M5 thread: Common external pilot VVEXB-2

n x port 2(A): \( \frac{3}{8} \)

For 6 manifold stations or more, exhaust from the both sides.

L Dimension

\[ L_1 = 31n + 25, \quad L_2 = 31n + 12 \quad n: \text{Station} \]

<table>
<thead>
<tr>
<th>n</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>87</td>
<td>118</td>
<td>149</td>
<td>180</td>
<td>211</td>
<td>242</td>
<td>273</td>
<td>304</td>
<td>335</td>
</tr>
<tr>
<td>L2</td>
<td>74</td>
<td>105</td>
<td>136</td>
<td>167</td>
<td>198</td>
<td>229</td>
<td>260</td>
<td>291</td>
<td>322</td>
</tr>
</tbody>
</table>
Power Valve/Precision Regulator

Manifold: VVEX2-

Applicable valve: VEX123

Valve mounting side

Pilot port

Internal pilot VVEX2-1

Common external pilot VVEX2-2

Port 2(A)

Mounting hole

Pressure gauge (Option)

Blanking plate VEX1-17

Port 3(R): ¼

For 5 manifold stations or more, exhaust from the both sides.

L1 = 31n + 29, L2 = 31n + 14  n: Station

<table>
<thead>
<tr>
<th>n</th>
<th>L1</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>91</td>
<td>76</td>
</tr>
<tr>
<td>3</td>
<td>122</td>
<td>107</td>
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<tr>
<td>4</td>
<td>153</td>
<td>138</td>
</tr>
<tr>
<td>5</td>
<td>184</td>
<td>169</td>
</tr>
<tr>
<td>6</td>
<td>215</td>
<td>200</td>
</tr>
<tr>
<td>7</td>
<td>246</td>
<td>231</td>
</tr>
<tr>
<td>8</td>
<td>277</td>
<td>262</td>
</tr>
</tbody>
</table>
Precautions

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 387 to 391 for Precautions on every series.

Operating Fluid

**Caution**
1. If drainage or debris is present in the supply pressure line, the fixed orifice becomes clogged, resulting in a malfunction. Therefore, in addition to the air filter (SMC’s AF series), make sure to use a mist separator (SMC’s AM, AFM series). Concerning the quality of the operating air, refer to SMC’s the air preparation equipment selection guide (pages 2 and 3).
2. Make sure to perform a maintenance periodically on air filter and mist separator (by discharging the drain and cleaning a filter element or replacing with new one).
3. Never use a lubricator on the supply side with the internal pilot remaining in place, doing so will cause the fixed orifice to become clogged, invariably leading to a malfunction.
4. When lubrication to terminal device is required: Connect a lubricator on the supply [port 1(P)] side using the external pilot type. Use mist separator passage on the pilot air [port P1] side.
5. Use a supply pressure in the recommended range (the range indicated in the diagram below).

VEX1A33, VEX1B33

**VEX1A33, VEX1B33**

Supply pressure range

Set pressure (MPa)

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7

Supply pressure (MPa)

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7

Piping

**Warning**
1. Use the flow rate characteristics on page 846 as reference to select a regulator size so that the required flow rates on the reduced pressure supply and relief exhaust sides have sufficient allowances. If the reduced pressure supply and relief exhaust that may cause extreme changes in flow rate are repeated (main valve is fully opened and closed repeatedly), the nozzle flapper is deformed. This may cause the pressure set value to deviate or the diaphragm to break early. So, do not use under such conditions.

**Caution**
1. Tightening the fittings and their torque
When screwing fittings into the valve, make sure to tighten them to the proper torque values given below.
- **Connection thread: M5**
  - First, tighten by hand, then use a wrench appropriate for the hexagon flats of the body to tighten an additional 1/6 to 1/4 turn. A reference value for the tightening torque is 1 to 1.5 N·m.
  - Use the fitting with sealant as the Uni One-touch fitting cannot be used.
  - For the fitting with sealant R or NPT, first, tighten it by hand, then use a wrench appropriate for the hexagon flats of the body to tighten it a further two or three turns. For a tightening torque guide, refer to the table below.

<table>
<thead>
<tr>
<th>Proper tightening torque (N·m)</th>
<th>1/8</th>
<th>1/4</th>
<th>3/8</th>
<th>1/2</th>
<th>5/8</th>
<th>3/4</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>3 to 5</td>
<td>8 to 12</td>
<td>15 to 20</td>
<td>20 to 25</td>
<td>25 to 35</td>
<td>30 to 38</td>
<td>35 to 42</td>
</tr>
<tr>
<td>1/4</td>
<td>7 to 10</td>
<td>12 to 18</td>
<td>20 to 25</td>
<td>25 to 35</td>
<td>30 to 38</td>
<td>35 to 42</td>
<td>40 to 50</td>
</tr>
<tr>
<td>3/8</td>
<td>12 to 18</td>
<td>20 to 25</td>
<td>25 to 35</td>
<td>30 to 38</td>
<td>35 to 42</td>
<td>40 to 50</td>
<td>45 to 50</td>
</tr>
<tr>
<td>1/2</td>
<td>17 to 25</td>
<td>25 to 35</td>
<td>30 to 38</td>
<td>35 to 42</td>
<td>40 to 50</td>
<td>45 to 50</td>
<td>50 to 55</td>
</tr>
<tr>
<td>5/8</td>
<td>22 to 30</td>
<td>30 to 38</td>
<td>35 to 42</td>
<td>40 to 50</td>
<td>45 to 50</td>
<td>50 to 55</td>
<td>55 to 60</td>
</tr>
<tr>
<td>3/4</td>
<td>27 to 35</td>
<td>35 to 42</td>
<td>40 to 50</td>
<td>45 to 50</td>
<td>50 to 55</td>
<td>55 to 60</td>
<td>60 to 65</td>
</tr>
<tr>
<td>1</td>
<td>32 to 38</td>
<td>38 to 45</td>
<td>45 to 55</td>
<td>50 to 60</td>
<td>55 to 65</td>
<td>60 to 70</td>
<td>65 to 75</td>
</tr>
</tbody>
</table>

2. Ordinarily, air is discharged from the bleed port (PE). The consumption of air through this discharge is normal, owing to the construction of the precision pressure regulator.

Regulator for Signals (Air operated type only)

**Caution**
- **Applicable model**
  - Regulator IR2000 series
  - VEX1_33 series
- **In the case of multiple pressure control, consider using ITV series or the E-P HYREG® VY series, which can simplify your system.**

Zero Adjustment Screw

**Caution**
- The zero adjustment screw has been adjusted at the time of shipment to set the signal pressure and the output pressure as close to 1:1 as possible. Thus, it is not necessary to adjust it for operational purposes.

Vibration

**Caution**
Vibration is likely to occur under the following conditions.
1. Supply pressure is relatively high (approx. 0.5 MPa or higher), set pressure is low (approx. 0.1 MPa or lower) and the outlet side is open to the atmosphere.
2. Capacity of the precision regulator outlet side is extremely small. The following measures can be taken.
   - a. Set the supply pressure extremely low (+0.1 MPa or more of the set pressure).
   - b. Make the capacity of the precision regulator outlet side larger.
   - c. Install an exhaust throttle valve with a silencer (ASN2-M5) on the bleed port (PE). Vibration can be avoided by adjusting the exhaust throttle. However, if the bleed is throttled too much, sensitivity may be reduced, resulting in poor performance. Be sure not to apply excessive throttle.

**Related Products:**

**Silencer (AN series)**
- Noise reduction capability of over 30 dB.
- Provides a sufficient effective area.

For details, refer to Best Pneumatics No. 7.

**Exhaust cleaner (AMC series)**
- Provides noise reduction and oil mist recovery functions.
- Can also be used in an intensive piping system.
- Oil mist removal of 99.9%
- Noise reduction of over 35 dB.

For details, refer to Best Pneumatics No. 7.