Booster Regulator/Air Tank

Increase factory air pressure by up to 4 times! Air-only operation requires no power supply, reduces heat generation, and allows easy installation.

**NEW**
Renewed model with pressure increase ratio 2 to 4 times (VBA11A)

**No power supply or wiring needed**
There is no need to install dedicated electrical wiring.

**Easy installation**
Simply insert the unit in the air line. Requires far less space than installing the compressor.

**Low heat generation**
Very little heat is generated because no electricity is used, and there is no impact on cylinders, solenoid valves, etc.

**Air-only operation**
Operation is safe because no electricity is used.

Series **VBA/VBAT**
Booster Regulator Series VBA

**Features 1**

- **Improved service life**
  - Doubled that of the conventional model
  - Floating piston structure (PAT. PEND)
  - Grease retaining groove
  - Except VBA10A, 11A

- **Reduced noise**
  - Reduced by 13 dB (A) compared with the conventional model
  - Metal noise reduced by a bumper on the impact part of the switch valve
  - Exhaust noise reduced by a high-noise reduction silencer

- **Improved reliability**
  - Built-in mesh filter at IN port
  - Prevents operation failure due to foreign matter.

- **Anti-condensation**
  - Integrated air-feeding tube with the main tube
  - Mitigates condensation caused by cooling during exhaust expansion.

- **NEW**
  - Elbow silencer added* (Option)
  - Space saving when installed has been realized.
  - Except VBA22A, 42A

- **1/8" gauge ports**
  - Allows use of standard fittings for remote pressure monitoring, etc.
  - Gauge ports changed from 1/16" to 1/8" (VBA10A, 22A)

- **Air-operated type**
  - VBA20A

- **Max. operating pressure 1.6 MPa**
  - VBA40A

- **Fourfold pressure increase type**
  - New
  - VBA11A
### Air Tank Series VBAT

#### Perfect fit with a booster regulator

This is an air tank to which a booster regulator can be connected compactly. It can be used alone as a tank. The pressure vessel law is different from country to country, so as an air tank suitable to a country needs to be confirmed.

#### Extensive product lineup

To meet a variety of usage environment and pressure specifications, models are available in two materials, stainless steel 304 and carbon steel (SS400), and in four sizes ranging from 5 liters to 38 liters.

### Pressure increase ratio

<table>
<thead>
<tr>
<th>Operation</th>
<th>Handle-operated type (Direct operation)</th>
<th>Air-operated type (Remote operation)</th>
<th>Handle-operated type (Direct operation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set pressure range</td>
<td>0.2 to 1.0 MPa</td>
<td>0.2 to 1.6 MPa (2.0 MPa)</td>
<td>0.2 to 1.0 MPa</td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>VBA10A-02 (0.2 to 2.0 MPa)</td>
<td></td>
<td>VBA11A-02</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>VBA20A-03</td>
<td></td>
<td>VBA22A-03</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>VBA40A-04</td>
<td>VBA43A-04 (0.2 to 1.6 MPa)</td>
<td>VBA42A-04</td>
</tr>
</tbody>
</table>

### Features

- **Twice**
  - Handle-operated type (Direct operation)
  - Air-operated type (Remote operation)
  - Handle-operated type (Direct operation)

#### Caution

When used as a single unit (not connected with a booster regulator) and pressurized at over 1 MPa at normal temperatures, the air tank falls under the scope of the "High Pressure Gas Safety Act" in Japan.

---

**Table:**

<table>
<thead>
<tr>
<th>Model</th>
<th>VBAT05A</th>
<th>VBAT10A</th>
<th>VBAT20A</th>
<th>VBAT38A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank capacity (L)</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td>38</td>
</tr>
<tr>
<td>Max. operating pressure (MPa)</td>
<td>2.0</td>
<td></td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Carbon steel</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

**Table:**

<table>
<thead>
<tr>
<th>Model</th>
<th>VBAT05S</th>
<th>VBAT10S</th>
<th>VBAT20S</th>
<th>VBAT38S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank capacity (L)</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td>38</td>
</tr>
<tr>
<td>Max. operating pressure (MPa)</td>
<td></td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Stainless steel</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Booster Regulator Series VBA

## How to Order

### VBA40A-04

<table>
<thead>
<tr>
<th>Body size</th>
<th>Pressure increase ratio: 2 to 4 times</th>
</tr>
</thead>
<tbody>
<tr>
<td>10A</td>
<td>1/4&quot;, Handle-operated type</td>
</tr>
<tr>
<td>20A</td>
<td>3/8&quot;, Handle-operated type</td>
</tr>
<tr>
<td>40A</td>
<td>1/2&quot;, Handle-operated type</td>
</tr>
<tr>
<td>22A</td>
<td>3/8&quot;, Air-operated type</td>
</tr>
<tr>
<td>42A</td>
<td>1/2&quot;, Air-operated type</td>
</tr>
<tr>
<td>43A</td>
<td>1/2&quot;, Max. operating pressure 1.6 MPa</td>
</tr>
<tr>
<td>11A</td>
<td>1/4&quot;, Handle-operated type</td>
</tr>
</tbody>
</table>

### Semi-standard

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Nil</th>
<th>Rc</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>Nil</td>
<td>NPF</td>
<td>NPTF</td>
<td></td>
</tr>
</tbody>
</table>

Note) Thread type: Rp, NPT, NPTF

### Pressure gauge

- Pressure unit on the product name label and pressure gauge: psi
- Under the new measurement law, the pressure unit of "psi" on the pressure gauges cannot be used in Japan.

### Option

**Silencer**
- Pressure gauge, Elbow silencer
- Pressure gauge, High-noise reduction silencer

**Pressure gauge**
- Pressure gauge, Elbow high-noise reduction silencer

Note) Refer to “Combination of Thread Type and Options.”

### Combination of Thread Type and Options

<table>
<thead>
<tr>
<th>Body size</th>
<th>Thread type</th>
<th>Nil</th>
<th>G</th>
<th>S</th>
<th>Gn</th>
<th>Gn</th>
<th>Ln</th>
<th>Ls</th>
<th>Gl</th>
<th>Gl</th>
<th>Nil</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>10A</td>
<td>F</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>11A</td>
<td>T</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>20A</td>
<td>F</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>●</td>
<td>●</td>
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<td>●</td>
<td>●</td>
</tr>
<tr>
<td>22A</td>
<td>T</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>40A</td>
<td>F</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>42A</td>
<td>T</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>43A</td>
<td>T</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>●</td>
<td>●</td>
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<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

### Air Tank Compatibility Chart

<table>
<thead>
<tr>
<th>Air tank</th>
<th>VBA1A-A</th>
<th>VBA2A-A</th>
<th>VBA4A-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBAT05A</td>
<td>●</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>VBAT05S</td>
<td>●</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>VBAT10A</td>
<td>●</td>
<td>●</td>
<td>—</td>
</tr>
<tr>
<td>VBAT10S</td>
<td>●</td>
<td>●</td>
<td>—</td>
</tr>
<tr>
<td>VBAT20A</td>
<td>—</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>VBAT20S</td>
<td>—</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>VBAT38A</td>
<td>—</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>VBAT38S</td>
<td>—</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

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RoHS

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**Note**
- Used in Japan.
- Unit of "psi" on the pressure gauges cannot be used in Japan.
### Standard Specifications

#### Model
- VBA10A-02
- VBA20A-03
- VBA40A-04
- VBA22A-03
- VBA42A-04
- VBA43A-04
- VBA11A-02

#### Fluid
Compressed air

#### Pressure increase ratio
Twice

#### Pressure adjustment mechanism
Handle-operated with relief mechanism

#### Air-operated
Handle-operated with relief mechanism

#### Max. flow rate (L/min ANR)

<table>
<thead>
<tr>
<th>Model</th>
<th>Rate (L/min ANR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBA10A-02</td>
<td>235</td>
</tr>
<tr>
<td>VBA20A-03</td>
<td>1000</td>
</tr>
<tr>
<td>VBA40A-04</td>
<td>1900</td>
</tr>
<tr>
<td>VBA22A-03</td>
<td>1000</td>
</tr>
<tr>
<td>VBA42A-04</td>
<td>1900</td>
</tr>
<tr>
<td>VBA43A-04</td>
<td>1600</td>
</tr>
<tr>
<td>VBA11A-02</td>
<td>70</td>
</tr>
</tbody>
</table>

#### Set pressure range (MPa)

<table>
<thead>
<tr>
<th>Model</th>
<th>Range (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBA10A-02</td>
<td>0.2 to 2.0</td>
</tr>
<tr>
<td>VBA20A-03</td>
<td>0.2 to 1.0</td>
</tr>
<tr>
<td>VBA40A-04</td>
<td>0.2 to 1.0</td>
</tr>
<tr>
<td>VBA22A-03</td>
<td>0.2 to 1.6</td>
</tr>
<tr>
<td>VBA42A-04</td>
<td>0.2 to 2.0</td>
</tr>
</tbody>
</table>

#### Supply pressure range (MPa)

<table>
<thead>
<tr>
<th>Model</th>
<th>Range (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBA10A-02</td>
<td>0.1 to 1.0</td>
</tr>
</tbody>
</table>

#### Proof pressure (MPa)

<table>
<thead>
<tr>
<th>Model</th>
<th>Pressure (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBA10A-02</td>
<td>3</td>
</tr>
<tr>
<td>VBA20A-03</td>
<td>1.5</td>
</tr>
<tr>
<td>VBA40A-04</td>
<td>2.4</td>
</tr>
<tr>
<td>VBA11A-02</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Port size (Rc)

<table>
<thead>
<tr>
<th>Model</th>
<th>Port Size (Rc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBA10A-02</td>
<td>1/4</td>
</tr>
<tr>
<td>VBA20A-03</td>
<td>3/8</td>
</tr>
<tr>
<td>VBA40A-04</td>
<td>1/2</td>
</tr>
<tr>
<td>VBA11A-02</td>
<td>3/8</td>
</tr>
</tbody>
</table>

#### Pressure gauge port size (Rc)

<table>
<thead>
<tr>
<th>Model</th>
<th>Port Size (Rc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBA10A-02</td>
<td>1/8</td>
</tr>
</tbody>
</table>

#### Ambient and fluid temperature (°C)

<table>
<thead>
<tr>
<th>Model</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBA10A-02</td>
<td>2 to 50 (No freezing)</td>
</tr>
</tbody>
</table>

#### Options/Part No.

#### Pressure Gauge, Silencer (When thread type is Rc or G.)

<table>
<thead>
<tr>
<th>Description</th>
<th>Pressure Gauge Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silencer</td>
<td>VBA10A-02</td>
</tr>
<tr>
<td>High-noise reduction silencer</td>
<td>VBA20A-03</td>
</tr>
<tr>
<td>Elbow for silencer</td>
<td>VBA40A-04</td>
</tr>
<tr>
<td>Pressure gauge</td>
<td>VBA22A-03</td>
</tr>
<tr>
<td>Pressure gauge</td>
<td>VBA42A-04</td>
</tr>
<tr>
<td>Pressure gauge</td>
<td>VBA43A-04</td>
</tr>
<tr>
<td>Pressure gauge</td>
<td>VBA11A-02</td>
</tr>
</tbody>
</table>

#### Pressure Gauge, Silencer (When thread type is NPT or NPTF.)

<table>
<thead>
<tr>
<th>Description</th>
<th>Pressure Gauge Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure gauge</td>
<td>VBA10A-N02</td>
</tr>
<tr>
<td>Pressure gauge</td>
<td>VBA20A-N03</td>
</tr>
<tr>
<td>Pressure gauge</td>
<td>VBA40A-N04</td>
</tr>
<tr>
<td>Pressure gauge</td>
<td>VBA22A-N03</td>
</tr>
<tr>
<td>Pressure gauge</td>
<td>VBA42A-N04</td>
</tr>
<tr>
<td>Pressure gauge</td>
<td>VBA43A-N04</td>
</tr>
<tr>
<td>Pressure gauge</td>
<td>VBA11A-N02</td>
</tr>
</tbody>
</table>

#### Related Products/Part No.

#### Mist Separator, Exhaust Cleaner

<table>
<thead>
<tr>
<th>Description</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mist separator</td>
<td>AMES00C-02 AMES00-04 AMES00-06</td>
</tr>
<tr>
<td>Exhaust cleaner</td>
<td>AMCS100-03 AMCS10-06</td>
</tr>
</tbody>
</table>

### Notes
- Note 1: If the OUT pressure is higher than the set pressure by the handle, excess pressure is exhausted from the back of the handle.
- Note 2: Pressure unit on the pressure gauge: psi
- Note 3: Under the new measurement law, the pressure unit of "psi" on the pressure gauges cannot be used in Japan.
- Note 4: Pressure unit on the pressure gauge: psi

### Capsules

#### Design

1. **System configuration**
   - The IN port of the booster regulator has metallic mesh to prevent dust from entering the booster regulator. However, it cannot remove dust continuously or separate drainage. Make sure to install a mist separator (AM series) on the inlet side of the booster regulator.
   - The booster regulator has a sliding part inside, and it generates dust. Also, install an air purification device such as an air filter or a mist separator on the outlet side as necessary.
   - Connect a lubricator to the outlet side, because the accumulated oil in the booster regulator may result in a malfunction.

2. **Exhaust air measures**
   - Provide a dedicated pipe to release the exhaust air from each booster regulator. If exhaust air is converted into a pipe, the back pressure that is created could cause improper operation.
   - Depending on the necessity, install a silencer or an exhaust cleaner on the exhaust port of the booster regulator to reduce the exhaust noise.

3. **Maintenance space**
   - Allow the sufficient space for maintenance and inspection.

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**Notice:**
- The model number is for guidance only. Please refer to the current specification sheet for the latest information.
- The data contained herein represents typical performance and is subject to change without notice.
- The information provided is intended for use in conjunction with professional engineering judgment.

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**Disclaimer:**
- The information contained in this document is for general guidance only and should not be relied upon as authoritative. Users should conduct their own analysis and testing to verify the suitability of the product for their specific application.
Series VBA

VBA10A

Flow-rate Characteristics

Pressure Characteristics

Charge Characteristics

VBA20A, 22A

Flow-rate Characteristics

Pressure Characteristics

Charge Characteristics

VBA40A, 42A

Flow-rate Characteristics

Pressure Characteristics

Charge Characteristics

Notes:
- The time required to charge pressure in the tank from 0.7 MPa to 0.95 MPa at 0.5 MPa supply pressure:
  \[ P_2 = 0.7 \quad P_1 = 0.5 \]
  \[ P_2 = 0.95 \quad P_1 = 0.5 \]
  With the pressure increase ratio from 1.4 to 1.9, the charge time of 23 – 6 = 17 sec. (\( t \)) is given by the graph. Then, the charge time (\( T \)) for a 10 L tank:
  \[ T = t \times \frac{V}{10} = 17 \times \frac{10}{10} = 17 \text{ (s)} \].

- The time required to charge pressure in the tank from 0.8 MPa to 1.0 MPa at 0.5 MPa supply pressure:
  \[ P_2 = 0.8 \quad P_1 = 0.5 \]
  \[ P_2 = 1.0 \quad P_1 = 0.5 \]
  With the pressure increase ratio from 1.6 to 2.0, the charge time of 11.5 – 3.8 = 7.7 sec. (\( t \)) is given by the graph. Then, the charge time (\( T \)) for a 100 L tank:
  \[ T = t \times \frac{V}{10} = 7.7 \times \frac{100}{10} = 77 \text{ (s)} \].

- The time required to charge pressure in the tank from 0.8 MPa to 1.0 MPa at 0.5 MPa supply pressure:
  \[ P_2 = 0.8 \quad P_1 = 0.5 \]
  \[ P_2 = 1.0 \quad P_1 = 0.5 \]
  With the pressure increase ratio from 1.6 to 2.0, the charge time of 3.5 – 1.1 = 2.4 sec. (\( t \)) is given by the graph. Then, the charge time (\( T \)) for a 100 L tank:
  \[ T = t \times \frac{V}{10} = 2.4 \times \frac{100}{10} = 24 \text{ (s)} \].
Booster Regulator  **Series VBA**

### VBA43A  Flow-rate Characteristics

**Pressure Characteristics**

- Inlet pressure: 0.5 MPa
- Outlet pressure: 1.5 MPa
- Flow rate: 10 L/min (ANR)

**Charge Characteristics**

- Charge time per 10 L

<table>
<thead>
<tr>
<th>Pressure increase ratio: P2/P1</th>
<th>Charge time per 10 L (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>10</td>
</tr>
<tr>
<td>1.0</td>
<td>10</td>
</tr>
<tr>
<td>1.6</td>
<td>10</td>
</tr>
<tr>
<td>2.0</td>
<td>10</td>
</tr>
</tbody>
</table>

**VBA11A  Flow-rate Characteristics**

**Pressure Characteristics**

- Inlet pressure: 0.5 MPa
- Outlet pressure: 1.5 MPa
- Flow rate: 10 L/min (ANR)

**Charge Characteristics**

- Charge time per 10 L

<table>
<thead>
<tr>
<th>Pressure increase ratio: P2/P1</th>
<th>Charge time per 10 L (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>10</td>
</tr>
<tr>
<td>1.0</td>
<td>10</td>
</tr>
<tr>
<td>1.5</td>
<td>10</td>
</tr>
<tr>
<td>2.0</td>
<td>10</td>
</tr>
</tbody>
</table>

**Pulsation**

Pulsation is decreased with a tank. If the outlet capacity is undersized, pulsation may occur.

### VBAT05A

**Max. pulsation range (MPa)**

- VBAT05A
- VBAT10A
- VBAT20A
- VBAT38A

### VBAT10A, 20A, 38A

**Max. pulsation range (MPa)**

- VBAT10A
- VBAT20A
- VBAT38A

### Performance of air tank

- Alleviates the pulsation generated on the outlet side.
- When air consumption exceeds air supply during intermittent operation, required air will be accumulated in the tank for use. This does not apply for continuous operation.

---

**Conditions:**

- inlet pressure: 0.5 MPa
- Outlet pressure: 1.5 MPa
- Flow rate: Between 2.0 and max. flow rate

**VBA-D.qxd  10.8.19 2:12 PM  Page 7**

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Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
**Series VBA**

**Sizing**

(Sizing can be achieved with the SMC Pneumatic System Energy Saving Program Ver. 3.1, which can be downloaded from the SMC website: http://www.smcworld.com/)

---

**START**

Provide requisite conditions for selection.

**Calculate required air flow rate Q.**

- \( Q \) [L/min (ANR)] = \( \frac{x D^2 \times W}{4 \times 10^4} \) x \( 60 \times C \) [MPa] 0.101

**Select booster regulator size from flow-rate characteristics table.**

- VBA2□□A: \( Qb \geq 600 \) [L/min (ANR)]
- VBA4□□A: \( Qb \geq 1600 \) [L/min (ANR)]

Refer to “Flow-rate Characteristics” on pages 3 and 4.

**Judgement of flow rate**

- **YES**: Need no tank
- **NO**: The VBA□□A can supply necessary pressure

**Obtain the tank capacity V.**

- \( V \) [L] = \( \frac{(Q - Qb) \times (Tc \times K160)}{(P2 - P1) \times 9.9} \)

**Select the tank capacity over V.**

**Calculate time T from charge characteristics table.**

- \( T \) [s] = \( \frac{V}{4.5 \times 10^4} + \frac{11.5 \times 3.8}{100} + \frac{3.5}{Z} \)

**Judgement of charge time**

- **YES**: \( T \geq Tc \)
- **NO**: Increase number of booster regulators (2) to decrease T.

**Avoid pulsation. (Max. 0.05 MPa)**

- **YES**: Select the tank from table below.

**Note 1)** \( P2 \) is the necessary supply pressure to a cylinder, and set the pressure below the lower limit of pressure inside the tank.

**Note 2)** \( P3 \) is the output pressure of the booster regulator, which is also the upper limit of charge pressure to the tank.

---

**Caution**

- Use the VBA11A (pressure increase ratio 4) with pressure increase ratio 2 to 4. Usage of pressure increase ratio below 2 is preferred for the VBA10A (pressure increase ratio 2). A stable operation and increased life expectancy will result.

- Inlet supply pressure volume is (approximately twice (pressure increase ratio 2)), approx. 4 times (pressure increase ratio 4) the volume of the outlet side. Booster regulator requires the inlet side volume which is the sum of the flow volume running into the outlet side and the volume exhausted from E port (for driving), because air is the power source.

---

**END**

When running continuously for longer periods of time, confirm the life expectancy. When the life expectancy is shorter than required, select a larger sized booster regulator.

---

**Approved**

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Working Principle

The IN air passes through the check valve to booster chambers A and B. Meanwhile, air is supplied to drive chamber B via the governor and the switching valve. Then, the air pressure from drive chamber B and booster chamber A are applied to the piston, boosting the air in booster chamber B. As the piston travels, the boosted air is pushed via the check valve to the OUT side. When the piston reaches to the end, the piston causes the switching valve to switch, so that drive chamber B is in the exhaust state and drive chamber A is in the supply state respectively. Then, the piston reverses its movement, this time, the pressures from booster chamber B and drive chamber A boosts the air in booster chamber A and sends it to the OUT side. This process described above is repeated to continuously supply highly pressurized air from the IN to the OUT side. The governor establishes the outlet pressure by handle operation and pressure adjustment in the drive chamber by feeding back the outlet pressure.

Circuit Example

- When only some of the machines in the plant require high-pressure air, booster regulators can be installed for only the equipment that requires it. This allows the overall system to use low-pressure air while accommodating machines requiring high-pressure air.
- When the actuator output is insufficient but space limitations prohibit switching to a larger cylinder diameter, a booster regulator can be used to increase the pressure. This makes it possible to boost the output without replacing the actuator.
- When a certain level of output is required but the cylinder size must be kept small so that the driver remains compact.
- When charging a tank or the like from a source at atmospheric pressure, a circuit with a check valve can be used to reduce the charge time by allowing air to pass through the check valve up to the inlet pressure.
- When only one side of the cylinder is used for work, booster regulators can be installed only on the lines that require them to reduce the overall air consumption volume.
Series VBA

**Warning**

1. Warning concerning abnormal outlet pressure
   - If there is a likelihood of causing an outlet pressure drop due to unforeseen circumstances such as equipment malfunction, thus leading to a major problem, take safety measures on the system side.
   - Because the outlet pressure could exceed its set range if there is a large fluctuation in the inlet pressure, leading to unexpected accidents, take safety measures against abnormal pressures.
   - Operate the equipment within its maximum operating pressure and set pressure range.

2. Residual pressure measures
   - Connect a 3-port valve to the OUT side of the booster regulator if the residual pressure must be released quickly from the outlet pressure side for maintenance, etc. (Refer to the diagram below.) The residual outlet pressure side cannot be released even if the 3-port valve is connected to the IN side because the check valve in the booster regulator will activate.
   - After operation is finished, release the supply pressure at the inlet. This stops the booster regulator from moving needlessly and prevents operating malfunctions.

**Caution**

1. Check the specifications.
   - Consider the operating conditions and operate this product within the specification range that is described in this catalog.

2. Selection
   - Based on the conditions (such as pressure, flow rate, takt time) required for the outlet side of the booster regulator, select the size of the booster regulator in accordance with the selection procedures described in this catalog or model selection program.
   - Use the VBA11A (pressure increase ratio 4) with pressure increase ratio 2 to 4. Usage of pressure increase ratio below 2 is preferred for the VBA10A (pressure increase ratio 2). A stable operation and increased life expectancy will result.
   - Inlet supply pressure volume is (approximately twice (pressure increase ratio 2), approx. 4 times (pressure increase ratio 4)) the volume of the outlet side. Booster regulator requires the inlet side volume which is the sum of the flow volume running into the outlet side and the volume exhausted from E port (for driving), because air is the power source.
   - When running continuously for longer periods of time, confirm the life expectancy. The life expectancy of a booster regulator is dependent upon the operational cycle. Thus, when used for driving cylinders, etc. in the outlet side, life expectancy will be reduced.
   - Make sure the outlet pressure is set 0.1 MPa or higher than the inlet pressure. A pressure difference below 0.1 MPa makes the operation unstable and may result in a malfunction.

**Mounting**

1. Transporting
   - When transporting this product, hold it lengthwise with both hands. Never hold it by the black handle that protrudes from the center because the handle could become detached from the body, causing the body to fall and leading to injury.

2. Installation
   - Install this product so that the silver-colored tie-rods and cover are placed horizontally. If mounted vertically, it may result in a malfunction.
   - Because the piston cycle vibration is transferred, use the following mounting bolts (VBA1: M5; VBA2: 4: M10) and tighten them with the specified torque (VBA1: 3 N·m; VBA2: 4: 24 N·m).
   - If the transmission of vibration is not preferred, insert an isolating rubber material before installation.
   - Mount the pressure gauge with a torque of 7 to 9 N·m.

**Piping**

1. Flushing
   - Use an air blower to flush the piping to thoroughly remove any cutting chips, cutting oil, or debris from the piping inside, before connecting them. If they enter the inside of the booster regulator, they could cause the booster regulator to malfunction or its durability could be affected.

2. Piping size
   - To bring the booster regulator's ability into full play, make sure to match the piping size to the port size.

**Air Supply**

1. Quality of air source
   - Connect a mist separator to the inlet side near the booster regulator. If the quality of the compressed air is not thoroughly controlled, the booster regulator could malfunction (without being able to boost) or its durability could be affected.
   - If dry air (atmospheric pressure dew point: –17 °C or less) is used, the life expectancy may be shortened because dry air will accelerate evaporation of grease inside.

**Operating Environment**

1. Installation location
   - Do not install this product in an area that is exposed to rainwater or direct sunlight.
   - Do not install in locations influenced by vibrations. If it must be used in such an area due to unavoidable circumstances, please contact SMC beforehand.

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VBA-D.qxd 10.8.19 2:12 PM  Page 10
**Handling**

**Caution**

1. Setting the pressure on the handle-operated type
   - If air is supplied to the product in the shipped state, the air will be released.
   - Set the pressure by quickly pulling up on the governor handle, releasing the lock, and rotating the handle in the direction of the arrow (+).
   - There is an upper and lower limit for the handle rotation. If over-rotating the handle even after reaching to the limit, the internal parts may be damaged. If the handle suddenly feels heavy while being turned, stop turning the handle.
   - Once the setting is completed, push the handle down and lock it.
   - To decrease the outlet pressure, after the pressure has been set, rotate the handle in the direction of the arrow (–). The residual air will be released from the area of the handle, due to the relief construction of the governor.
   - To reset the pressure, first reduce the pressure so that it is lower than the desired pressure; then, set it to the desired pressure.

2. Setting the pressure on the air-operated type (VBA22A, 42A)
   - Connect the outlet pipe of the pilot regulator for the remote control to the pilot port (P). (Refer to the diagram below.)
   - Refer to the graph below for the relationship between the pilot pressure and outlet pressure.
   - The AR20 and AW20 are recommended for the pilot regulator.
   - The outlet pressure is twice the pilot pressure.
   - When the inlet pressure is 0.4 MPa:
     - Pilot pressure 0.2 MPa to 0.4 MPa
     - Outlet pressure 0.4 MPa to 0.8 MPa

3. Draining
   - If this product is used with a large amount of drainage accumulated in the filter, mist separator or tank, the drainage could flow out, leading to equipment malfunction. Therefore, drain the system once a day. If it is equipped with an auto drain, check its operation once a day.

4. Exhaust
   - Exhausting time from E port may be longer for a booster regulator which is set to switch in longer hour intervals. This is not an abnormal phenomenon.

5. Maintenance
   - Life expectancy varies depending on the quality of air and the operating conditions. Signs that the unit is reaching the end of its service life include the following:
     - Constant bleed from under the handle.
     - Air exhaust noise can be heard from the booster regulator at 10 to 20 second intervals even when there is no air consumption on the outlet side.
     - Conduct maintenance earlier than scheduled in such cases.
     - When maintenance is required, confirm the model and serial number of the booster regulator, and please contact SMC for maintenance kit.
     - Conduct maintenance according to the specified maintenance procedure by individuals possessing enough knowledge and experiences in maintaining pneumatic equipment.
     - The list of replacement parts and kit number are shown on page 9, and the figure shows the position of the parts.

---

**Booster Regulator Series VBA**

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Approved

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Series VBA

Construction/Replacement Parts

VBA10A

VBA11A

VBA20A, 22A, VBA40A, 42A, 43A

Air-operated type

VBA22A, 42A

Replacement Parts/Kit No.

Place an order with the following applicable kit number.

<table>
<thead>
<tr>
<th>Model</th>
<th>VBA10A</th>
<th>VBA20A</th>
<th>VBA40A</th>
<th>VBA22A</th>
<th>VBA42A</th>
<th>VBA43A</th>
<th>VBA11A</th>
</tr>
</thead>
</table>

The kit includes the parts from 1 to 7 and a grease pack.

<table>
<thead>
<tr>
<th>No.</th>
<th>Model</th>
<th>VBA10A</th>
<th>VBA20A</th>
<th>VBA40A</th>
<th>VBA22A</th>
<th>VBA42A</th>
<th>VBA43A</th>
<th>VBA11A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Piston seal</td>
<td>2</td>
<td>2 large</td>
<td>1 small</td>
<td>2</td>
<td>1 each large and small</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Governor assembly</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Check valve</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Gasket</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rod seal</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Mounting screw</td>
<td></td>
<td>8</td>
<td>12</td>
<td>8</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cover C assembly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Grease pack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

* The grease pack has 10 g of grease.

* Make sure to refer to the procedure for maintenance.

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Series VBA

Dimensions

### VBA22A-03

![Diagram of VBA22A-03]

- **IN side gauge port**: Rc 1/8
- **OUT side gauge port**: Rc 1/8
- **Pressure gauge (Option)**: 300

### VBA42A-04

![Diagram of VBA42A-04]

- **IN side gauge port**: Rc 1/8
- **OUT side gauge port**: Rc 1/8
- **Pressure gauge (Option)**: 404

### VBA43A-04

![Diagram of VBA43A-04]

- **IN side gauge port**: Rc 1/8
- **OUT side gauge port**: Rc 1/8
- **Pressure gauge (Option)**: 404

Made to Order

1. **Copper-free/Fluorine-free**
   
The inner or outer copper parts material has been changed to stainless steel or aluminum. The fluorine resin parts have been changed to general resin.

2. **CE explosion-proof directive (ATEX) compliant**
   
   Made to Order
   CE explosion-proof directive (ATEX): Category 3GD

3. **Ozone resistant**
   
   Made to Order
   Ozone resistant

4. **Copper-free/Fluorine-free**

   ![Diagram of Copper-free/Fluorine-free]

   For booster regulator with pressure gauge, please consult SMC.

   Weather resistant NBR (diaphragm) and hydrogenated NBR (valve) are used for the rubber parts of the standard model.

For detailed dimensions, specifications, and lead times, please contact SMC.

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Air Tank
Series VBAT
RoHS

How to Order

- Compact connections are possible with booster regulators.
- It can be used alone as a tank.
- Also partially compatible with overseas standards

Standard Product
(For Japanese Market)

<table>
<thead>
<tr>
<th>VBAT10 A1-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
</tr>
<tr>
<td>05</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>38</td>
</tr>
</tbody>
</table>

Material
Symbol | Material
A | Carbon steel (SS400)
S | Stainless steel 304

Option
Symbol | Option | Applicable model
Nil | None |
V | Drain valve |

CE Certified Product
(For overseas use)

<table>
<thead>
<tr>
<th>VBAT10 A F-SV-Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
</tr>
<tr>
<td>05</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>38</td>
</tr>
</tbody>
</table>

Material
Symbol | Material
A | Carbon steel (SS400)

Option
Symbol | Option | Applicable model
Nil | None |
R | Safety valve (Set pressure: 1 MPa) |
S | Safety valve (Set pressure: 2 MPa) |

Accessories
Symbol | Accessories | Applicable model
RV | Safety valve | VBAT05A, VBAT10A1, VBAT20A, VBAT38A |
SV | Drain valve | VBAT05A, VBAT10A1, VBAT20A, VBAT38A |

Thread type
Symbol | Thread type
Nil | Rc |
F | G |

Product Not Applicable to the ASME Standard

<table>
<thead>
<tr>
<th>VBAT05 A N1-SV-X11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
</tr>
<tr>
<td>05</td>
</tr>
<tr>
<td>10</td>
</tr>
</tbody>
</table>

Material
Symbol | Material
A | Carbon steel (SS400)

Option
Symbol | Option |
Nil | None |
V | Drain valve |
S | Safety valve (Set pressure: 2 MPa) |
SV | Safety valve (Set pressure: 2 MPa) |

Product not applicable to the ASME standard

| Symbol | Option |
Nil | None |
|--------|--------|
V | Drain valve |
S | Safety valve |
SV | Safety valve |

Note 1) Customers are responsible for preparing a safety valve.
Note 2) Safety valve does not meet ASME specifications.

Caution
When used as a single unit (not connected with a booster regulator) and pressurized at over 1 MPa at normal temperatures, the air tank falls under the scope of the “High Pressure Gas Safety Act” in Japan.
### Specifications

#### Standard Product (For Japanese Market)

<table>
<thead>
<tr>
<th>Model</th>
<th>VBAT05S</th>
<th>VBAT10S</th>
<th>VBAT20S</th>
<th>VBAT38S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Compressed air</td>
<td>Compressed air</td>
<td>Compressed air</td>
<td>Compressed air</td>
</tr>
<tr>
<td>Tank capacity (L)</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td>38</td>
</tr>
<tr>
<td>Max. operating pressure (MPa)</td>
<td>VBAT05A: 2.0</td>
<td>VBAT10A: 2.0</td>
<td>VBAT20A: 2.0</td>
<td>VBAT38A: 2.0</td>
</tr>
<tr>
<td>IN port size</td>
<td>3/8</td>
<td>3/8</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>OUT port size</td>
<td>3/8</td>
<td>1/2</td>
<td>1/2</td>
<td>3/4</td>
</tr>
<tr>
<td>Ambient and fluid temperature (°C)</td>
<td>0 to 75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>VBAT05A: 6.6</td>
<td>VBAT10A: 3.2</td>
<td>VBAT20A: 10</td>
<td>VBAT38A: 14</td>
</tr>
<tr>
<td>Material</td>
<td>VBAT05A: Carbon steel (SS400)</td>
<td>VBAT10A: Stainless steel 304</td>
<td>VBAT20A:</td>
<td>VBAT38A:</td>
</tr>
<tr>
<td>Paint</td>
<td>Outside: Silver paint, inside: Rustproof paint</td>
<td>Outside: Silver paint, inside: Rustproof paint</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Note) The accessories and options are included in the same container.

#### CE Certified Product

<table>
<thead>
<tr>
<th>Model</th>
<th>VBAT05A</th>
<th>VBAT10A</th>
<th>VBAT20A</th>
<th>VBAT38A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Compressed air</td>
<td>Compressed air</td>
<td>Compressed air</td>
<td>Compressed air</td>
</tr>
<tr>
<td>Tank capacity (L)</td>
<td>5</td>
<td>10</td>
<td>20</td>
<td>38</td>
</tr>
<tr>
<td>Max. operating pressure (MPa)</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>IN port size</td>
<td>3/8</td>
<td>1/2</td>
<td>3/4</td>
<td>3/4</td>
</tr>
<tr>
<td>OUT port size</td>
<td>3/8</td>
<td>1/2</td>
<td>1/2</td>
<td>3/4</td>
</tr>
<tr>
<td>Ambient and fluid temperature (°C)</td>
<td>0 to 75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>6.6</td>
<td>10</td>
<td>14</td>
<td>21</td>
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<tr>
<td>Material</td>
<td>Carbon steel (SS400)</td>
<td>Carbon steel (SS400)</td>
<td>Carbon steel (SS400)</td>
<td>Carbon steel (SS400)</td>
</tr>
<tr>
<td>Paint</td>
<td>Outside: Silver paint, inside: Rustproof paint</td>
<td>Outside: Silver paint, inside: Rustproof paint</td>
<td>Outside: Silver paint, inside: Rustproof paint</td>
<td>Outside: Silver paint, inside: Rustproof paint</td>
</tr>
</tbody>
</table>

Note) The accessories and options are included in the same container.

#### Product Not Applicable to the ASME Standard

<table>
<thead>
<tr>
<th>Model</th>
<th>VBAT05A1</th>
<th>VBAT10A1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Compressed air</td>
<td>Compressed air</td>
</tr>
<tr>
<td>Tank capacity (L)</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Max. operating pressure (MPa)</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>IN port size</td>
<td>3/8</td>
<td>3/8</td>
</tr>
<tr>
<td>OUT port size</td>
<td>3/8</td>
<td>1/2</td>
</tr>
<tr>
<td>Ambient and fluid temperature (°C)</td>
<td>0 to 75</td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>6.6</td>
<td>11</td>
</tr>
<tr>
<td>Material</td>
<td>Carbon steel (SS400)</td>
<td>Carbon steel (SS400)</td>
</tr>
<tr>
<td>Paint</td>
<td>Outside: Silver paint, inside: Rustproof paint</td>
<td>Outside: Silver paint, inside: Rustproof paint</td>
</tr>
</tbody>
</table>

Note) The accessories and options are included in the same container.

### Design

#### Warning

1. **Operating pressure**
   - Operate this product below the maximum operating pressure. If it is necessary, take appropriate safety measures to ensure that the maximum operating pressure is not exceeded.
   - When the tank alone is used, use a pressure switch or a safety valve to ensure that the maximum operating pressure is not exceeded.

2. **Connection**
   - Connect a filter or a mist separator to the OUT side of the tank. Because the inner surface of the tank is untreated, there is a possibility of dust flowing out to the outlet side.
   - A VBA booster regulator can be connected directly with the tank accessories as indicated combinations below.

#### Caution

1. **Accessories**
   - Refer to the operation manual (VBAT-M1, M2, M3, M4) regarding combination booster regulators with older model air tanks.
   - The accessories are secured by bands to the feet of the air tank. Once removed, make sure not to lose them.

2. **Installation**
   - Install the tank away from people. It is dangerous if the accumulated air inside the tank were to seep out.
   - Do not mount the air tank on a moving part or a place with vibration.
   - When connecting a booster regulator with the tank, refer to the operation manual first, which is provided with the air tank before assembling.
   - Refer to the operation manual regarding mounting methods when using long bolts.
   - Mount the air tank on a floor surface, use the four holes to secure the tank with bolts or anchor bolts.

### Mounting

#### Warning

1. **Inspection**
   - The use of pressure vessels could lead to an unexpected accident due to external damage or internal corrosion caused by drainage. Therefore, make sure to check periodically for external damage, or the extent of internal corrosion through the port hole. An ultrasonic thickness indicator may also be used to check for any reduction in material thickness.

2. **Draining**
   - If this product is used with a large amount of drainage, the drainage could flow out, leading to equipment malfunction or corrosion inside the tank. Therefore, drain the system once a day.

### Maintenance

#### Warning

1. **Inspection**
   - The use of pressure vessels could lead to an unexpected accident due to external damage or internal corrosion caused by drainage. Therefore, make sure to check periodically for external damage, or the extent of internal corrosion through the port hole. An ultrasonic thickness indicator may also be used to check for any reduction in material thickness.

2. **Draining**
   - If this product is used with a large amount of drainage, the drainage could flow out, leading to equipment malfunction or corrosion inside the tank. Therefore, drain the system once a day.
List of Air Tank for Overseas

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Law</th>
<th>Exportable models</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore, Malaysia</td>
<td>Factory Act</td>
<td>VBAT05A-SV-X102</td>
<td>VBAT10A-SV-X102</td>
</tr>
<tr>
<td>Thailand, Taiwan</td>
<td>No applicable standard</td>
<td>VBAT20A-RV-X102</td>
<td>VBAT38A-RV-X102</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Safety valve VBAT-R, VBAT-S</th>
<th>VBAT-V1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain valve VBAT-V1</td>
<td></td>
</tr>
</tbody>
</table>

Options/Accessories/Part No.

<Standard Product>

For VBAT-A1 (Carbon Steel)

<table>
<thead>
<tr>
<th>Model</th>
<th>Accessory kit</th>
<th>Safety valve (When selecting an option)</th>
<th>Drain valve (When selecting an option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBAT05A-1-&lt; X102</td>
<td>VBAT05A-Y-3</td>
<td>VBAT-R (Set pressure: 1 MPa), VBAT-S (Set pressure: 2 MPa)</td>
<td>VBAT-V1</td>
</tr>
<tr>
<td>VBAT10A-1-&lt; X102</td>
<td>VBAT10A-Y-3</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
</tr>
<tr>
<td>VBAT20A-1-&lt; X102</td>
<td>VBAT20A-Y-3</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
</tr>
<tr>
<td>VBAT38A-1-&lt; X102</td>
<td>VBAT38A-Y-3</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) The safety valve cannot be selected. The valve opens automatically when the specified pressure is reached, releasing excess pressure inside the tank. The valve closes again when the pressure drops below a designated value. Select a pressure valve appropriate for the maximum operating pressure specification of the tank.

For VBAT-S1 (Stainless Steel)

<table>
<thead>
<tr>
<th>Model</th>
<th>Accessory kit</th>
<th>Safety valve (When selecting an option)</th>
<th>Drain valve (When selecting an option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBAT05S1-&lt; X102</td>
<td>VBAT05S1-Y-4</td>
<td>VBAT-S (Set pressure: 2 MPa)</td>
<td>VBAT-V1</td>
</tr>
<tr>
<td>VBAT10S1-&lt; X102</td>
<td>VBAT10S1-Y-4</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
</tr>
<tr>
<td>VBAT20S1-&lt; X102</td>
<td>VBAT20S1-Y-4</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
</tr>
<tr>
<td>VBAT38S1-&lt; X102</td>
<td>VBAT38S1-Y-4</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) The thread type for each port is Rc. The valve opens automatically when the specified pressure is reached, releasing excess pressure inside the tank. The valve closes again when the pressure drops below a designated value. Select a pressure valve appropriate for the maximum operating pressure specification of the tank.

<CE Certified Product>

<table>
<thead>
<tr>
<th>Model</th>
<th>Accessory kit</th>
<th>Safety valve (When selecting an option)</th>
<th>Drain valve (When selecting an option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBAT05A-SV-Q</td>
<td>VBAT05A-Y-2</td>
<td>VBAT-S (Set pressure: 2 MPa)</td>
<td>VBAT-V1</td>
</tr>
<tr>
<td>VBAT10A-SV-Q</td>
<td>VBAT10A-Y-2</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
</tr>
<tr>
<td>VBAT20A-RV-Q</td>
<td>VBAT20A-Y-2</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
</tr>
<tr>
<td>VBAT38A-RV-Q</td>
<td>VBAT38A-Y-2</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) The thread type for each port is Rc. The valve opens automatically when the specified pressure is reached, releasing excess pressure inside the tank. The valve closes again when the pressure drops below a designated value. Select a pressure valve appropriate for the maximum operating pressure specification of the tank.

<Product Not Applicable to the ASME Standard>

<table>
<thead>
<tr>
<th>Model</th>
<th>Accessory kit</th>
<th>Safety valve (When selecting an option)</th>
<th>Drain valve (When selecting an option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBAT05A1-&lt; X11</td>
<td>VBAT05A-Y-3</td>
<td>VBAT-S (Set pressure: 2 MPa)</td>
<td>VBAT-V1</td>
</tr>
<tr>
<td>VBAT10A1-&lt; X11</td>
<td>VBAT10A-Y-3</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
</tr>
<tr>
<td>VBAT20A1-&lt; X11</td>
<td>VBAT20A-Y-3</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
</tr>
<tr>
<td>VBAT38A1-&lt; X11</td>
<td>VBAT38A-Y-3</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) The thread type for each port is Rc. The valve opens automatically when the specified pressure is reached, releasing excess pressure inside the tank. The valve closes again when the pressure drops below a designated value. Select a pressure valve appropriate for the maximum operating pressure specification of the tank.

Made to Order

1 Copper-free/Fluorine-free

<table>
<thead>
<tr>
<th>Material</th>
<th>Symbol</th>
<th>Internal capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon steel (SS400)</td>
<td>A</td>
<td>5 L</td>
</tr>
<tr>
<td>Stainless steel 304</td>
<td>S</td>
<td>10 L</td>
</tr>
</tbody>
</table>

Note 1) The thread type for each port is Rc. The valve opens automatically when the specified pressure is reached, releasing excess pressure inside the tank. The valve closes again when the pressure drops below a designated value. Select a pressure valve appropriate for the maximum operating pressure specification of the tank.

Note 2) A stainless steel fitting and a drain valve are included in the same container as accessories. (For detailed dimensions, please contact SMC) A safety valve cannot be selected.

Note 3) Since neither copper nor fluorine parts are used for the tank, a standard model can be used when options (safety valve and drain valve) are not necessary.

For detailed dimensions, specifications and lead times, please contact SMC.
Series VBAT

Dimensions: Standard Product (For Japanese Market)

VBAT05A1 [Material: Carbon steel]
Connected to VBA10A, 11A

VBAT10A1 [Material: Carbon steel]
Connected to VBA10A, 11A

Connected to VBA20A

VBAT20A1 [Material: Carbon steel]
Connected to VBA20A, 40A

Connected to VBA22A

Note) When option G (pressure gauge) is selected

---

* The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

---

Linked to VBA20A, 40A

VBAT22A, 42A

---

Material: Carbon steel

---

Connected to VBA10A, 11A

VBAT10A, 11A

---

Connected to VBA22A, 42A

VBAT20A, 42A

---

Booster regulator model A B C D (mm)
VBAT20A 481 394 Rc 3/8 —
VBAT40A 530 429.8 Rc 1/2 —
VBAT22A 444 394 Rc 3/8 469
VBAT42A 477 429.8 Rc 1/2 493

Note) When option G (pressure gauge) is selected
Dimensions: Standard Product (For Japanese Market)

**VBAT38A1**  Material: Carbon steel

Connected to VBA20A, 40A

---

**VBAT05S1**  Material: Stainless steel 304

Connected to VBA10A, 11A

---

**VBAT10S1**  Material: Stainless steel 304

Connected to VBA10A, 11A

---

**Connected to VBA20A**

---

**Connected to VBA22A**

---

Note: When option G (pressure gauge) is selected

---

The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

---

Material: Stainless steel 304

---

Dimensions: Standard Product (For Japanese Market)

---

Connected to VBA20A, 40A

---

Connected to VBA22A, 42A

---

Note) When option G (pressure gauge) is selected

---

The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

---

Material: Carbon steel

---

Dimensions: Standard Product (For Japanese Market)

---

Connected to VBA20A, 40A

---

Connected to VBA22A, 42A

---

Note) When option G (pressure gauge) is selected

---

The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

---

Material: Stainless steel 304

---

Dimensions: Standard Product (For Japanese Market)

---

Connected to VBA20A, 40A

---

Connected to VBA22A, 42A

---

Note) When option G (pressure gauge) is selected

---

The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

---

Material: Carbon steel

---

Dimensions: Standard Product (For Japanese Market)

---

Connected to VBA20A, 40A

---

Connected to VBA22A, 42A

---

Note) When option G (pressure gauge) is selected

---

The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

---

Material: Stainless steel 304

---

Dimensions: Standard Product (For Japanese Market)

---

Connected to VBA20A, 40A

---

Connected to VBA22A, 42A

---

Note) When option G (pressure gauge) is selected

---

The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

---

Material: Carbon steel

---

Dimensions: Standard Product (For Japanese Market)

---

Connected to VBA20A, 40A

---

Connected to VBA22A, 42A

---
**Series VBAT**

**Dimensions: Standard Product (For Japanese Market)**

**VBAT20S1**  
*Material: Stainless steel 304*  
*Connected to VBA20A, 40A*

**VBAT38S1**  
*Material: Stainless steel 304*  
*Connected to VBA20A, 40A*

**VBAT05A1-R**  
*With safety valve*  
*Connected to VBA22A, 42A, 43A*

**VBAT20A1-R**  
*With safety valve*  
*Connected to VBA22A, 42A, 43A*

---

**VBAT20S1**  
*Connected to VBA22A, 42A, 43A*

---

**VBAT05A1-R**  
*With safety valve*  
*Connected to VBA22A, 42A, 43A*

---

**VBAT20A1-R**  
*With safety valve*  
*Connected to VBA22A, 42A, 43A*

---

**Booster regulator**

**Note:** When option G (pressure gauge) is selected

---

**Material:** Stainless steel 304

---

**Series VBAT**

---

**Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Mail Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com**
When option G (pressure gauge) is selected

The length may be longer than the specification if the plugs mounted on the tank are not fit to the end. The length of G thread type is about 6 mm longer due to plug type differences.

Material: Carbon steel

Dimensions: CE Certified Product

 Connected to VBA10A, 11A

 Connected to VBA20A

 Connected to VBA22A

* When option G (pressure gauge) is selected
Series VBAT

Dimensions: CE Certified Product

VBAT20A-Q Material: Carbon steel
Connected to VBA20A, 40A

VBAT38A-Q Material: Carbon steel
Connected to VBA20A, 40A

Note) When option G (pressure gauge) is selected

Booster regulator IN port

Booster regulator IN port

Dimensions: CE Certified Product
Material: Carbon steel
Connected to VBA20A, 40A

Connected to VBA22A, 42A

Booster regulator model | A | B | C | D (Note)
------------------------|---|---|---|---
VBA20A                 | 481 | 394 | Rc 3/8 | —
VBA40A                 | 520 | 429.8 | Rc 1/2 | —
VBA22A                 | 444 | 394 | Rc 3/8 | 469
VBA42A                 | 477 | 429.8 | Rc 1/2 | 493

Note) When option G (pressure gauge) is selected

The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.
The length of G thread type is about 6 mm longer due to plug type differences.

Dimensions (mm)

Booster regulator model | A | B | C | D (Note)
------------------------|---|---|---|---
VBA20A                 | 531 | 444 | Rc 3/8 | —
VBA40A                 | 570 | 479.8 | Rc 1/2 | —
VBA22A                 | 494 | 444 | Rc 3/8 | 519
VBA42A                 | 527 | 479.8 | Rc 1/2 | 543

Note) When option G (pressure gauge) is selected

Dimensions: CE Certified Product
Material: Carbon steel
Connected to VBA20A, 40A

Connected to VBA22A, 42A

Booster regulator model | A | B | C | D (Note)
------------------------|---|---|---|---
VBA20A                 | 355 | 205 | — | —
VBA40A                 | 530 | 250 | — | —
VBA22A                 | 494 | 250 | — | —
VBA42A                 | 527 | 250 | — | —

Note) When option G (pressure gauge) is selected

The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.
The length of G thread type is about 6 mm longer due to plug type differences.

Dimensions: CE Certified Product
Material: Carbon steel
Connected to VBA20A, 40A

Connected to VBA22A, 42A

Booster regulator model | A | B | C | D (Note)
------------------------|---|---|---|---
VBA20A                 | 355 | 205 | — | —
VBA40A                 | 530 | 250 | — | —
VBA22A                 | 494 | 250 | — | —
VBA42A                 | 527 | 250 | — | —

Note) When option G (pressure gauge) is selected

The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.
The length of G thread type is about 6 mm longer due to plug type differences.
Air Tank Series VBAT

Dimensions: Product Not Applicable to the ASME Standard

**VBAT05A1-X11** Material: Carbon steel
Connected to VBA10A, 11A

- The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

**VBAT10A1-X11** Material: Carbon steel
Connected to VBA10A, 11A

- The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

**Connected to VBA20A**

- The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

**Connected to VBA22A**

- The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)1), and other safety regulations.

1. The compatibility of the product is the responsibility of the person who designs the product or decides its specifications. Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be determined by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment. The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Caution

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Warning

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

Danger

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Edition C

Change of dimensions of air tank, VBAT series

* Addition of booster regulator, air-operated type, VBA22A/42A
* Addition of booster regulator with max. operating pressure of 1.6 MPa, VBA43A
* Number of pages increased from 24 to 28

Edition DE

* Addition of booster regulator, VBA10A
* Deletion of booster regulator, VBA1110
* Change of accessories/part no. of air tank, VBAT series
* Change of dimensions of air tank, VBAT series
* Number of pages decreased from 28 to 20

Revision History

BOOB0004

* Addition of booster regulator, VBA11A
* Deletion of booster regulator, VBA1111
* Addition of air tanks, CE certified
* Addition of air tanks, not applicable to the ASME standard
* Addition of an elbow silencer to options
* Number of pages increased from 20 to 24

BOOB000E

* Addition of booster regulator, VBA111
* Deletion of booster regulator, VBA1111
* Addition of air tanks, CE certified
* Addition of air tanks, not applicable to the ASME standard
* Addition of an elbow silencer to options
* Number of pages increased from 20 to 24

OW

SMC Corporation
Akabara UDX 15F,
4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, JAPAN
Phone: 03-5207-8249 Fax: 03-5298-5362
URL http://www.smcworld.com
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Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.

1st printing MP printing OW 7150SZ Printed in Japan.

Approved

D-DN 1st printing MP printing OW 7150SZ Printed in Japan.

SMC Corporation, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370 Main Office: (650) 588-9200 Outside Local Area: (800) 258-9200 www.stevenengineering.com

Caution

1. The product is provided for use in manufacturing industries.
   The product herein described is basically provided for peaceful use in manufacturing industries. If considering the use of other products, consult SMC beforehand and exchange specifications or a contract if necessary.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.2) Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

3. The products of SMC or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local regulations governing that export are known and followed.

Caution

1. ISO 4414: Pneumatic fluid power – General rules relating to systems.
2) ISO 4411: Pneumatic fluid power – General rules relating to systems.

(Part 1: General requirements)

ISO 10218-1: Manipulating industrial robots - Safety.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local regulations governing that export are known and followed.

1) Vacuum pads are excluded from this 1 year warranty. A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

2) Vacuum pads are excluded from this 1 year warranty.