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

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 install 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.

Boost pressure
0.6 MPa

Boost pressure
0.3 MPa

Air Tank/Series VBAT

Booster Regulator/Series VBA

RoHS
Booster Regulator Series VBA

**Improved service life**
- Floating piston structure
- Grease retaining groove
  - Except VBA10A, 11A

**Reduced noise**
- 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.

**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” (VBA22A, 22A)

**Air-operated type**
- Max. operating pressure 1.6 MPa

**Fourfold pressure increase type**
### 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.

<table>
<thead>
<tr>
<th>Body size</th>
<th>Pressure increase ratio</th>
<th>Operation</th>
<th>Max. operating pressure</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot;</td>
<td>0.2 to 1.0 MPa</td>
<td>Handle-operated type (Direct operation)</td>
<td>VBA10A-02 (0.2 to 2.0 MPa)</td>
<td>Carbon steel</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>0.2 to 1.6 MPa</td>
<td>Air-operated type (Remote operation)</td>
<td>VBA22A-03 (0.2 to 1.6 MPa)</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>0.2 to 1.0 MPa</td>
<td>Handle-operated type (Direct operation)</td>
<td>VBA42A-04 (0.2 to 1.6 MPa)</td>
<td>Carbon steel</td>
</tr>
</tbody>
</table>

#### Tank capacity (L)

<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>1.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Material**

- Carbon steel
- Stainless steel

**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.
Booster Regulator
Series VBA

How to Order

VBA 40A - 04 -

Body size

Pressure increase ratio: Twice

Pressure increase ratio: 2 to 4 times

Thread type

Table:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Port size</th>
<th>Applicable series</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>1/4</td>
<td>VBA1 A</td>
</tr>
<tr>
<td>03</td>
<td>3/8</td>
<td>VBA2 A</td>
</tr>
<tr>
<td>04</td>
<td>1/2</td>
<td>VBA4 A</td>
</tr>
</tbody>
</table>

Port size

Option

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

Combination of Thread Type and Options

Body size

Thread type

<table>
<thead>
<tr>
<th>Option</th>
<th>10A</th>
<th>11A</th>
<th>20A</th>
<th>22A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>G</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>N</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>S</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>GN</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>GS</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>LS</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>GLN</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>GLS</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Z</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Air Tank Compatibility Chart

Air tank

<table>
<thead>
<tr>
<th>Booster regulator</th>
<th>VBA1 A</th>
<th>VBA2 A</th>
<th>VBA4 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>

Note: Thread types apply to the IN, OUT, and EXH ports of the VBA1 A and to the IN, OUT, EXH, and gauge ports of the VBA2 A and VBA4 A.

Note) Pressure increase ratio: Twice

Note) Pressure gauge, Silencer

Note) Pressure gauge, High-noise reduction silencer

Note) Elbow silencer

Note) Elbow high-noise reduction silencer

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

Note) Thread type: NPT, NPTF

Under the new measurement law, the pressure unit of “psi” on the pressure gauges cannot be used in Japan.
## Standard Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>VBA10A-02</th>
<th>VBA20A-03</th>
<th>VBA40A-04</th>
<th>VBA22A-03</th>
<th>VBA42A-04</th>
<th>VBA43A-04</th>
<th>VBA11A-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Compressed air</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure increase ratio</td>
<td>Twice</td>
<td>2 to 4 times</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure adjustment mechanism</td>
<td>Handle-operated with relief mechanism Note 1)</td>
<td>Air-operated</td>
<td>Handle-operated with relief mechanism Note 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. flow rate ( \text{m}^3/\text{min} ) (L/min (ANR))</td>
<td>230</td>
<td>1000</td>
<td>1900</td>
<td>1000</td>
<td>1900</td>
<td>1600</td>
<td>70</td>
</tr>
<tr>
<td>Set pressure range (MPa)</td>
<td>0.2 to 2.0</td>
<td>0.2 to 1.0</td>
<td>0.2 to 1.0</td>
<td>0.2 to 1.6</td>
<td>0.2 to 2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply pressure range (MPa)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proof pressure (MPa)</td>
<td>3</td>
<td>1.5</td>
<td>2.4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port size (Rc)</td>
<td>1/4</td>
<td>3/8</td>
<td>1/2</td>
<td>3/8</td>
<td>1/2</td>
<td>3/8</td>
<td></td>
</tr>
<tr>
<td>Pressure gauge port size (Rc) (IN/OUT: 3 locations)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temperature (^{\circ})C</td>
<td>2 to 50 (No freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Installation</td>
<td>Horizontal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Grease (Non-lube)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>0.84</td>
<td>3.9</td>
<td>8.6</td>
<td>3.9</td>
<td>8.6</td>
<td>8.6</td>
<td>0.89</td>
</tr>
</tbody>
</table>

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) Flow rate at \( \text{IN} = \text{OUT} = 0.5 \text{ MPa} \). The pressure varies depending on the operating conditions. Refer to "Flow-rate Characteristics" on pages 926 and 927.

### Options/Part No.

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure gauge</td>
<td>VBA10A-02, VBA20A-03, VBA40A-04, VBA22A-03, VBA42A-04, VBA43A-04, VBA11A-02</td>
</tr>
<tr>
<td>Silencer</td>
<td>ANA1-N04 G36-10-N01 ANA1-N03 G36-10-01</td>
</tr>
<tr>
<td>High-noise reduction silencer</td>
<td>G27-20-01</td>
</tr>
<tr>
<td>Elbow for silencer</td>
<td>KT-VBA10A-18</td>
</tr>
</tbody>
</table>

Note 1) In the case of options GN, two pressure gauges and one silencer are included in the same container as accessories.

Note 2) KT-VBA22A-7 is a pressure gauge with fitting. (Please order two units when using with IN and OUT.)

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure gauge</td>
<td>VBA10A-02, VBA20A-03, VBA40A-04, VBA22A-03, VBA42A-04, VBA43A-04, VBA11A-02</td>
</tr>
<tr>
<td>Silencer</td>
<td>ANA1-N04 G36-10-N01 ANA1-N03 G36-10-01</td>
</tr>
<tr>
<td>High-noise reduction silencer</td>
<td>G27-20-01</td>
</tr>
<tr>
<td>Elbow for silencer</td>
<td>KT-VBA10A-18</td>
</tr>
</tbody>
</table>

Note 1) In the case of options GN, two pressure gauges and one silencer are included in the same container as accessories.

Note 2) KT-VBA22A-7, KT-VBA22A-8N are pressure gauges with fittings. (Please order two units when using with IN and OUT.)

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

### 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>AM250-02 AM450-04, 06 AM550-06, 10</td>
</tr>
<tr>
<td>Exhaust cleaner</td>
<td>AMC310-03 AMC510-06 AMC610-10</td>
</tr>
</tbody>
</table>

Note) Refer to page 935 for air tanks, page 201 for mist separators and Best Pneumatics No.6 for exhaust cleaners. Refer to the separate operation manual for the connection method.

---

### 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 converged 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.
**Series VBA**

**VBA10A**

**Flow-rate Characteristics**

- Outlet pressure vs. outlet air flow rate (L/min (ANR))

**Pressure Characteristics**

- Inlet pressure: 0.5 MPa
- Outlet pressure vs. inlet pressure (MPa)

**Charge Characteristics**

- Charge time per 10 L tank

- The time required to charge pressure in the tank from 0.7 MPa to 0.95 MPa at 0.5 MPa supply pressure:

  \[ \frac{P_2}{P_1} = \frac{0.7}{0.5} = 1.4 \]

  \[ \frac{P_2}{P_1} = \frac{0.95}{0.5} = 1.9 \]

  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:

  \[ T = t \times \frac{V}{10} = 17 \times \frac{10}{10} = 17 \text{ (s).} \]

**VBA20A, 22A**

**Flow-rate Characteristics**

- Outlet pressure vs. outlet air flow rate (L/min (ANR))

**Pressure Characteristics**

- Inlet pressure: 0.5 MPa
- Outlet pressure vs. inlet pressure (MPa)

**Charge Characteristics**

- Charge time per 10 L tank

- The time required to charge pressure in the tank from 0.8 MPa to 1.0 MPa at 0.5 MPa supply pressure:

  \[ \frac{P_2}{P_1} = \frac{0.8}{0.5} = 1.6 \]

  \[ \frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0 \]

  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:

  \[ T = t \times \frac{V}{10} = 7.7 \times \frac{100}{10} = 77 \text{ (s).} \]

**VBA40A, 42A**

**Flow-rate Characteristics**

- Outlet pressure vs. outlet air flow rate (L/min (ANR))

**Pressure Characteristics**

- Inlet pressure: 0.5 MPa
- Outlet pressure vs. inlet pressure (MPa)

**Charge Characteristics**

- Charge time per 10 L tank

- The time required to charge pressure in the tank from 0.8 MPa to 1.0 MPa at 0.5 MPa supply pressure:

  \[ \frac{P_2}{P_1} = \frac{0.8}{0.5} = 1.6 \]

  \[ \frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0 \]

  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:

  \[ T = t \times \frac{V}{10} = 2.4 \times \frac{100}{10} = 24 \text{ (s).} \]
### VBA43A

**Flow-rate Characteristics**

![Flow-rate Characteristics Graph](graph_url)

**Pressure Characteristics**

- Inlet pressure: 0.5 MPa
- Outlet pressure: 1.0 MPa (ANR)
- Flow rate: 30 L/min (ANR)

![Pressure Characteristics Graph](graph_url)

**Charge Characteristics**

![Charge Characteristics Graph](graph_url)

- **VBA43A**
  - The time required to charge pressure in the tank from 0.8 MPa to 1.0 MPa at 0.5 MPa supply pressure:
    
    \[
    \frac{P_2}{P_1} = \frac{0.8}{0.5} = 1.6 \quad \frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0
    \]

    With the pressure increase ratio from 1.6 to 2.0, the charge time of 4.5 – 1.3 = 3.2 sec. \((t)\) is given by the graph. Then, the charge time \(T\) for a 100 L tank:

    \[
    T = t \times \frac{V}{10} = 3.2 \times \frac{100}{10} = 32 \text{ (s)}.
    \]

### VBA11A

**Flow-rate Characteristics**

![Flow-rate Characteristics Graph](graph_url)

**Pressure Characteristics**

- Inlet pressure: 0.5 MPa
- Outlet pressure: 2.0 MPa

![Pressure Characteristics Graph](graph_url)

**Charge Characteristics**

![Charge Characteristics Graph](graph_url)

- **VBA11A**
  - The time required to charge pressure in the tank from 1.0 MPa to 1.5 MPa at 0.5 MPa supply pressure:
    
    \[
    \frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0 \quad \frac{P_2}{P_1} = \frac{1.5}{0.5} = 3.0
    \]

    With the pressure increase ratio from 2.0 to 3.0, the charge time of 147 – 58 = 89 sec. \((t)\) is given by the graph. Then, the charge time \(T\) for a 10 L tank:

    \[
    T = t \times \frac{V}{10} = 89 \times \frac{10}{10} = 89 \text{ (s)}.
    \]

### Pulsation/Pulsation is decreased with a tank.

If the outlet capacity is undersized, pulsation may occur.

### VBA05A

**Flow-rate Characteristics**

![Flow-rate Characteristics Graph](graph_url)

**Pressure Characteristics**

- Inlet pressure: 0.5 MPa
- Outlet pressure: 1.0 MPa (ANR)
- Flow rate: Between 0 and max. flow rate

**Capacity (L)**

![Capacity Graph](graph_url)

### VBA10A, 20A, 38A

**Flow-rate Characteristics**

![Flow-rate Characteristics Graph](graph_url)

**Pressure Characteristics**

- Inlet pressure: 0.6 MPa
- Outlet pressure: 2.0 MPa
- Flow rate: 10 L/min (ANR)

**Capacity (L)**

![Capacity Graph](graph_url)

**Max. pulsation range (MPa)**

![Max Pulsation Graph](graph_url)

- **VBA10A**
  - 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 set pressure: 1 MPa
- Flow rate: Between 0 and max. flow rate

**Booster Regulator Series VBA**

**Representative values**

- VBAT05A
- VBAT10A, 20A, 38A
- VBA20A
- VBA40A

**VBA10A**

- The time required to charge pressure in the tank from 1.0 MPa to 1.5 MPa at 0.5 MPa supply pressure:

\[
\frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0 \quad \frac{P_2}{P_1} = \frac{1.5}{0.5} = 3.0
\]

With the pressure increase ratio from 2.0 to 3.0, the charge time of 147 – 58 = 89 sec. \((t)\) is given by the graph. Then, the charge time \(T\) for a 10 L tank:

\[
T = t \times \frac{V}{10} = 89 \times \frac{10}{10} = 89 \text{ (s)}.
\]
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 \( Q \).

Select booster regulator size from flow-rate characteristics table.

Judgement of flow rate

NO: Need no tank. The VBA4\( \text{A} \) can supply necessary pressure.

YES

VBA2\( \text{A} \) cannot obtain necessary pressure.

Obtain the tank capacity \( V \).

Select the tank capacity over \( V \).

Calculate time \( T \) from charge characteristics table.

Judgement of charge time \( T \leq T_s \)

NO

YES

Increase number of booster regulators (\( Z \)) to decrease \( T \).

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.

Necessary conditions:
- \( D \) [mm]: Cylinder bore size
- \( L \) [mm]: Cylinder stroke
- \( W \) [mm/s]: Cylinder operating speed
- \( C \) [pc.]: Number of cylinders
- \( T_c \) [s]: Cylinder operating time
- \( T_s \) [s]: Cylinder stop time
- \( P_1 \) [MPa]: Inlet pressure
- \( P_2 \) [MPa]: Inlet pressure to cylinder
- \( P_3 \) [MPa]: Upper limit of pressure inside the tank

Other conditions:
- \( Q \) [L/min (ANR)]: Required air flow rate
- \( Q_b \) [L/min (ANR)]: Outlet air flow rate of booster regulator
- \( T_c \) [s]: Cylinder operating time
- \( T_s \) [s]: Cylinder stop time
- \( P_1 \) [MPa]: Tank charge pressure
- \( T \) [s]: Time to charge (Time to charge from \( P_2 \) to \( P_3 \))
- \( Z \) [pc.]: Number of booster regulators

Example

\[ Q = \pi \times D^2 \times W \times (P_2 + 0.101) x 60 x C \]

\[ Q = \frac{\pi \times 100^2 \times 200 \times (0.8 + 0.101) \times 60 \times 1 \times 841 \text{ [L/min (ANR)]}}{4 \times 0.101} \]

\[ Q = 841 \text{ [L/min (ANR)]} \times 4 \times 10^6 / 0.101 \]

Refer to “Flow-rate Characteristics” on pages 926 and 927.

VBA2\( \text{A} \): \( Q_b = 600 \text{ [L/min (ANR)]} \)

VBA4\( \text{A} \): \( Q_b = 1050 \text{ [L/min (ANR)]} \)

Select the \( \text{VBAT10} \), which can be directly connected to the \( \text{VBA2} \).

\[ V = \frac{(Q - Q_b) \times (T_c \times K / 60)}{(P_2 - P_1) \times 9.9} \]

\[ V = \frac{(841 - 600) \times 0.5 \times 0.02}{9.9} \]

Refer to “Charge Characteristics” on pages 926 and 927.

T [s] = \( V \times \frac{T_s - T_1}{Z} \)

Note 1) \( P_2 \) is the necessary supply pressure to a cylinder, and set the pressure below the lower limit of pressure inside the tank with a regulator. Adjust the pressure taking the maximum operating pressure of equipment in use into consideration.

Note 2) \( P_3 \) is the output pressure of the booster regulator, which is also the upper limit of charge pressure to the tank.

\[ T = \frac{3.5}{Z} \times \frac{15.5}{1} = 3.5 \text{ [s]} \]

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.
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. The 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 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 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 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.
**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.

   ![Diagram of 3-port valve connection](image)

   - 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: –23°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.
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.

   ![Diagram](image)

   • The outlet pressure is twice the pilot pressure.
   • When the inlet pressure is 0.4 MPa:

   ![Graph](image)

<table>
<thead>
<tr>
<th>Pilot pressure</th>
<th>Outlet pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2 MPa to 0.4 MPa</td>
<td>0.4 MPa to 0.8 MPa</td>
</tr>
</tbody>
</table>

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
   • Exhauiting 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 932, and the figure shows the position of the parts.
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>Description</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</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Governor assembly</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Check valve</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Gasket</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Rod seal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</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>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Grease pack</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

* The grease pack has 10 g of grease.

* Make sure to refer to the procedure for maintenance.
Dimensions

VBA22A-03

300

<table>
<thead>
<tr>
<th>IN side gauge port</th>
<th>OUT side gauge port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>1/8</td>
</tr>
</tbody>
</table>

Pressure gauge (Option)

VBA42A-04

404

<table>
<thead>
<tr>
<th>IN side gauge port</th>
<th>OUT side gauge port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>1/8</td>
</tr>
</tbody>
</table>

Pressure gauge (Option)

VBA43A-04

404

<table>
<thead>
<tr>
<th>IN side gauge port</th>
<th>OUT side gauge port</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>1/8</td>
</tr>
</tbody>
</table>

Pressure gauge (Option)

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 has been changed to general resin.

2 CE explosion-proof directive (ATEX) compliant

56 — Standard model no.
Made to Order
CE explosion-proof directive (ATEX): Category 3GD

80 — Standard model no.
Made to Order
Ozone resistant

* For booster regulator with pressure gauge, please consult SMC.
* This option cannot be selected for air tank with safety valve.

80 — Standard model no.
Made to Order
Ozone resistant

* Weather resistant NBR (diaphragm) and hydrogenated NBR (valve) are used for the rubber parts of the standard model.
Air Tank
Series VBAT

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)

- **VBAT 10 A 1 - S**
  - **Symbol**
  - **Material**
    - A: Carbon steel (SS400)
    - S: Stainless steel 304
  - **Tank internal capacity**
    - Symbol | Internal capacity
    - 05    | 5 L
    - 10    | 10 L
    - 20    | 20 L
    - 38    | 38 L

- **Option**
  - **Symbol**
  - **Option**
    - Nil: None
    - V: Drain valve

Note: The thread type for each port is Rc.

### CE Certified Product
(Self-declaration document attached)

- **VBAT 10 A F - SV - Q**
  - **Symbol**
  - **Material**
    - A: Carbon steel (SS400)
  - **Tank internal capacity**
    - Symbol | Internal capacity
    - 05    | 5 L
    - 10    | 10 L
    - 20    | 20 L
    - 38    | 38 L

- **Accessories**
  - **Symbol**
  - **Accessories**
    - RV: Safety valve (Set pressure: 1 MPa)
    - SV: Safety valve (Set pressure: 2 MPa)
  - **Applicable model**
    - VBAT05A1
    - VBAT10A1
    - VBAT20A1
    - VBAT38A1

- **Thread type**
  - **Symbol**
  - **Thread type**
    - Nil
    - F: Rc

### Product Not Applicable to the ASME Standard

- **VBAT 05 A N 1 - SV - X11**
  - **Symbol**
  - **Material**
    - A: Carbon steel (SS400)
  - **Tank internal capacity**
    - Symbol | Internal capacity
    - 05    | 5 L
    - 10    | 10 L

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

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>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>VBAT-A1</td>
<td>VBAT-A1</td>
<td>VBAT-S1</td>
<td>VBAT-S1</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>0 to 75</td>
<td>0 to 75</td>
<td>0 to 75</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>VBAT-A1</td>
<td>6.6</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Material</td>
<td>VBAT-A1</td>
<td>Carbon steel (SS400)</td>
<td>VBAT-S1</td>
<td>Stainless steel 304</td>
</tr>
<tr>
<td>Paint</td>
<td>VBAT-A1</td>
<td>Outside: Silver paint, Inside: Rustproof paint</td>
<td>VBAT-S1</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>
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<tr>
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</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>1.0</td>
<td>1.0</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>0 to 75</td>
<td>0 to 75</td>
<td>0 to 75</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>6.6</td>
<td>10</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>Material</td>
<td>Carbon steel (SS400)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paint</td>
<td>Outside: Silver paint, Inside: Rustproof paint</td>
<td></td>
<td></td>
<td></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>VBAT05A</th>
<th>VBAT10A</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>0 to 75</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>6.6</td>
<td>11</td>
</tr>
<tr>
<td>Material</td>
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</tr>
<tr>
<td>Paint</td>
<td>Outside: Silver paint, Inside: Rustproof paint</td>
<td></td>
</tr>
</tbody>
</table>

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

List of Air Tank for Overseas

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Law</th>
<th>Exportable models</th>
<th>Details</th>
<th>Option (Order it separately)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>Simple Pressure Vessels Safety and Technical Regulations</td>
<td>VBAT05A-X101-VBAT10A-X101</td>
<td>Safety valve/Pressure gauge set and product certificate are included.</td>
<td></td>
</tr>
<tr>
<td>South Korea</td>
<td>High Pressure Gas Safety Control Act</td>
<td>VBAT05A-X101-VBAT10A-X101</td>
<td>Exempted product Max. operating pressure 0.97 MPa</td>
<td>VBAT-K (Safety valve) VBAT-V1 (Drain valve)</td>
</tr>
<tr>
<td>Thailand</td>
<td>Exempted product</td>
<td>VBAT05A-X101-VBAT10A-X101</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

List of Air Tank for Overseas

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<td>VBAT-K (Safety valve) VBAT-V1 (Drain valve)</td>
</tr>
<tr>
<td>Thailand</td>
<td>Exempted product</td>
<td>VBAT05A-X101-VBAT10A-X101</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

Caution

1. Consider the operating conditions and operate this product within the specification range.
2. When using the air tank with a booster regulator, refer to “Sizing” on page 928 or SMC Pneumatic System Energy Saving Program.

Mounting

1. Accessories
   - Refer to the operation manual regarding boosting 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 to place the tank near people.

Maintenance

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 leak out, leading to equipment malfunction or corrosion inside the tank. Therefore, drain the tank before use.
Options/Accessories/Part No.

<Standard Product>

For VBAT□1 (Carbon Steel)

<table>
<thead>
<tr>
<th>Model</th>
<th>VBAT05A-□</th>
<th>VBAT10A-□</th>
<th>VBAT20A-□</th>
<th>VBAT38A-□</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety valve</td>
<td>VBAT-R (Set pressure: 1 MPa), VBAT-S (Set pressure: 2 MPa)</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain valve</td>
<td>VBAT-V1</td>
<td>VBAT-V1</td>
<td>VBAT-V1</td>
<td>VBAT-V1</td>
</tr>
</tbody>
</table>

Note 1) The set pressure of the safety valve cannot be changed.

Note 2) The safety valve is a safety measure that protects the tank from excess pressure. 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>VBAT05S1-□</th>
<th>VBAT10S1-□</th>
<th>VBAT20S1-□</th>
<th>VBAT38S1-□</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety valve</td>
<td>VBAT-S (Set pressure: 2 MPa)</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain valve</td>
<td>VBAT-V1</td>
<td>VBAT-V1</td>
<td>VBAT-V1</td>
<td>VBAT-V1</td>
</tr>
</tbody>
</table>

<CE Compliant Product>

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

<Product Not Applicable to the ASME Standard>

<table>
<thead>
<tr>
<th>Model</th>
<th>VBAT05A-□-X11</th>
<th>VBAT10A-□-X11</th>
<th>VBAT05AN1-□-X11</th>
<th>VBAT10AN1-□-X11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thread type</td>
<td>Rc</td>
<td>NPT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety valve</td>
<td>VBAT-S (Set pressure: 2 MPa)</td>
<td>VBAT-R (Set pressure: 1 MPa)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain valve</td>
<td>VBAT-V1</td>
<td>VBAT-V1</td>
<td>VBAT-V1N</td>
<td>VBAT-V1N</td>
</tr>
</tbody>
</table>

The Accessory Kit is a Set of Nos. ① to ④. (For CE Compliant Product: ⑤⑥)

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>O-ring</td>
<td>VBAT55S-□-Y-4</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Hexagon socket head screw plug (For drain port)</td>
<td>VBAT10S-□-Y-4</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Hexagon socket head cap screw</td>
<td>VBAT20S-□-Y-4</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Anchor bolt/nut</td>
<td>VBAT20S-□-Y-4</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Bushing assembly</td>
<td>VBAT20S-□-Y-4</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Hexagon socket head screw plug (For safety valve port)</td>
<td>VBAT10A-□-Y-2</td>
<td>1</td>
</tr>
</tbody>
</table>

Made to Order

1 Copper-free/Fluorine-free

VBAT-V2 (A set of stainless steel needle valve and fitting) is included with the standard product.

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

Dimensions: Standard Product (For Japanese Market)

**VBAT20S1** Material: Stainless steel 304

Connected to VBA20A, 40A

<table>
<thead>
<tr>
<th>Booster regulator model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBA20A</td>
<td>481</td>
<td>394</td>
<td>Rc 3/8</td>
<td>—</td>
</tr>
<tr>
<td>VBA40A</td>
<td>520</td>
<td>429.8</td>
<td>Rc 1/2</td>
<td>—</td>
</tr>
<tr>
<td>VBA22A</td>
<td>444</td>
<td>394</td>
<td>Rc 3/8</td>
<td>469</td>
</tr>
<tr>
<td>VBA42A</td>
<td>477</td>
<td>429.8</td>
<td>Rc 1/2</td>
<td>493</td>
</tr>
<tr>
<td>VBA43A</td>
<td>526</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Note) When option G (pressure gauge) is selected

**VBAT38S1** Material: Stainless steel 304

Connected to VBA22A, 42A, 43A

<table>
<thead>
<tr>
<th>Booster regulator model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBA20A</td>
<td>531</td>
<td>444</td>
<td>Rc 3/8</td>
<td>—</td>
</tr>
<tr>
<td>VBA40A</td>
<td>570</td>
<td>479.8</td>
<td>Rc 1/2</td>
<td>—</td>
</tr>
<tr>
<td>VBA22A</td>
<td>494</td>
<td>444</td>
<td>Rc 3/8</td>
<td>519</td>
</tr>
<tr>
<td>VBA42A</td>
<td>527</td>
<td>479.8</td>
<td>Rc 1/2</td>
<td>543</td>
</tr>
<tr>
<td>VBA43A</td>
<td>576</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Note) When option G (pressure gauge) is selected

**VBAT 05 A1-S**

With safety valve

**VBAT 20 A1-S**

With safety valve

Material: Stainless steel 304

Series VBAT

Connected to VBA20A, 40A

Connected to VBA22A, 42A, 43A

<table>
<thead>
<tr>
<th>Booster regulator model</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>VBA20A</td>
<td>531</td>
<td>444</td>
<td>Rc 3/8</td>
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</tr>
<tr>
<td>VBA42A</td>
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</tr>
<tr>
<td>VBA43A</td>
<td>576</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Note) When option G (pressure gauge) is selected
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.

Connecting to VBA10A, 11A
Series VBAT

Dimensions: CE Certified Product

**VBAT20A-Q** [Material: Carbon steel]

Connected to VBA20A, 40A

* 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.

**VBAT38A-Q** [Material: Carbon steel]

Connected to VBA20A, 40A

* 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.

---

**Booster regulator model**

| VBA20A | 481 | 394 | 3/8 | — |
| VBA40A | 520 | 429.8 | 1/2 | — |
| VBA22A | 444 | 394 | 3/8 | 469 |
| VBA42A | 477 | 429.8 | 1/2 | 493 |

Note) When option G (pressure gauge) is selected
Dimensions: Product Not Applicable to the ASME Standard

**VBAT05A1-X11** Material: Carbon steel

Connected to VBA10A, 11A

- Safety valve port: 3/8
- Tank IN port: 3/8
- Tank OUT port: 3/8
- Drain port: 1/4
- Spare port: 1/2

*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

- Safety valve port: 3/8
- Tank IN port: 3/8
- Tank OUT port: 3/8
- Drain port: 1/4
- Booster regulator IN port: 1/4
- Booster regulator OUT port: 1/4

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

Connected to VBA20A

- Safety valve port: 3/8
- Tank IN port: 3/8
- Tank OUT port: 1/2
- Drain port: 1/4

Connected to VBA22A

- Booster regulator IN port: 3/8
- Booster regulator OUT port: 3/8

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