

Booster Regulator Series VBA

How to order



Made to Order
(Refer to page 11 for details.)

Series VBA **10A**
2□A
4□A

VBA **40A** - **04** **GN** -

Body size

10A	1/4, Handle-operated type
20A	3/8, Handle-operated type
40A	1/2, Handle-operated type
22A	3/8, Air-operated type
42A	1/2, Air-operated type
43A	1/2, Max. operating pressure 1.6 MPa

* Pressure increase ratio: Twice

Thread type ^{Note)}

Symbol	Thread type
Nil	Rc
F	G
N	NPT
T	NPTF

Note) VBA10A: The thread type is applied to the IN, OUT, EXH port.
The thread type of gauge port is Rc.
VBA2□A/4□A: The thread type is applied to the IN, OUT, EXH and gauge port.

Semi-standard

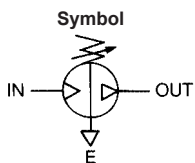
Symbol	Specifications
Nil	Standard
Z ^{Note)}	Pressure unit on the product name label and pressure gauge: psi

Note) Thread type: NPT, NPTF
This product is for overseas use only according to the new Measurement Law. (The SI unit type is provided for use in Japan.)

Option

Symbol	Option
Nil	None
G	Pressure gauge
N	Silencer
S	High-noise reduction silencer ^{Note)}
GN	Pressure gauge, Silencer
GS	Pressure gauge, High-noise reduction silencer ^{Note)}

Note) This option can not be selected for VBA10A-N02 and VBA10A-T02.



Port size

Symbol	Port size	Applicable series
02	1/4	VBA10A
03	3/8	VBA2□A
04	1/2	VBA4□A

Applicable air tank

Air tank	Booster regulator	VBA10A	VBA2□A	VBA4□A
	VBA1111			
VBAT05A		●	—	—
VBAT05S		●	—	—
VBAT10A		●	●	—
VBAT10S		●	●	—
VBAT20A		—	●	●
VBAT20S		—	●	●
VBAT38A		—	●	●
VBAT38S		—	●	●

Series VBA1111

VBA **111 1** - **02** **GN**

Body size

111	1/4
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* Pressure: 2 MPa

Pressure increase ratio

1	4 times
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Thread type ^{Note)}

Symbol	Thread type
Nil	Rc
F	G
N	NPT
T	NPTF

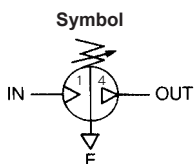
Note) The thread type is applied to the IN, OUT, EXH port.
The thread type of gauge port is Rc.
When the thread type is G then add E at top. (EVBA1111-F02□)
When the thread type is NPTF then add N at top. (NVBA1111-T02□)

Option

Symbol	Option
Nil	None
G	Pressure gauge
N	Silencer
GN	Pressure gauge, Silencer

Port size

Symbol	Port size
02	1/4



Standard Specifications

Model	VBA10A-02	VBA20A-03	VBA40A-04	VBA22A-03	VBA42A-04	VBA43A-04	VBA1111-02
Fluid	Compressed air						
Pressure increase ratio	Twice					Twice	Twice to 4 times
Pressure adjustment mechanism	Handle-operated with relief mechanism <small>Note 1)</small>			Air-operated		Handle-operated with relief mechanism <small>Note 1)</small>	
Max. flow rate <small>Note 2)</small> ℓ/min (ANR)	230	1000	1900	1000	1900	1600	60
Set pressure range MPa	0.2~2.0	0.2~1.0		0.2~1.0		0.2~1.6	0.2~2.0
Supply pressure range MPa	0.1~1.0						
Proof pressure MPa	3	1.5		1.5		2.4	3
Port size (IN/OUT/EXH: 3 locations) Rc	1/4	3/8	1/2	3/8	1/2	1/2	1/4
Pressure gauge port size (IN/OUT: 2 locations) Rc	1/8	1/8	1/8	1/8	1/8	1/8	1/16
Ambient and fluid temperature °C	2 to 50 (No freezing)						
Installation	Horizontal						
Lubrication	Grease (Non-lube)						
Mass kg	0.84	3.9	8.6	3.9	8.6	8.6	0.98

Note 1) If the OUT pressure is higher than the set pressure by the handle, excessive pressure is exhausted from the back of the handle.

Note 2) Flow rate at IN= OUT= 0.5 MPa. The pressure varies depending on the operating conditions. Refer to "Flow Characteristics" on page 3 and 4.

Options/Part No.

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

Description	Model	VBA10A-02	VBA20A-03	VBA40A-04	VBA22A-03	VBA42A-04	VBA43A-04	VBA1111-02
		VBA10A-F02	VBA20A-F03	VBA40A-F04	VBA22A-F03	VBA42A-F04	VBA43A-F04	EVBA1111-F02
Pressure gauge	G	G27-20-01	G36-10-01		KT-VBA22A-7	G36-10-01	G27-20-01	G27-20-R1
Silencer	N	AN200-02	AN300-03	AN400-04	AN300-03	AN400-04	AN400-04	AN200-02
High-noise reduction silencer	S	ANA1-02	ANA1-03	ANA1-04	ANA1-03	ANA1-04	ANA1-04	—

Note 1) In the case of option GN, two pressure gauges and one silencer are included.

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

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

Description	Model	VBA10A-N02※	VBA20A-N03※	VBA40A-N04※	VBA22A-N03※	VBA42A-N04※	VBA43A-N04※	VBA1111-N02
		VBA10A-T02※	VBA20A-T03※	VBA40A-T04※	VBA22A-T03※	VBA42A-T04※	VBA43A-T04※	NVBA1111-T02
Pressure gauge : when Nil	G	G27-20-01	G36-10-N01		KT-VBA22A-7N	G36-10-N01	G27-20-N01	G27-20-R1-X214 <small>Note 5)</small>
Pressure gauge : when "-Z" <small>Note 4)</small>		G27-P20-01	G36-P10-N01		KT-VBA22A-8N	G36-P10-N01	G27-P20-N01	—
Silencer	N	AN200-N02	AN300-N03	AN400-N04	AN300-N03	AN400-N04	AN400-N04	AN200-N02
High-noise reduction silencer	S	—	ANA1-N03	ANA1-N04	ANA1-N03	ANA1-N04	ANA1-N04	—

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

Note 2) KT-VBA22A-7N and 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 of pressure gauge: psi

Note 5) Pressure unit of pressure gauge: psi and MPa

Design Precautions

⚠ Caution

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) at the inlet side of the booster regulator.
- The booster regulator has a sliding part inside, and it generates dust. Also, install a cleaning 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 exhausting sound.

3. Maintenance space

- Allow the sufficient space for maintenance and inspection.

Related Products/Part No.

Mist separator/Exhaust cleaner

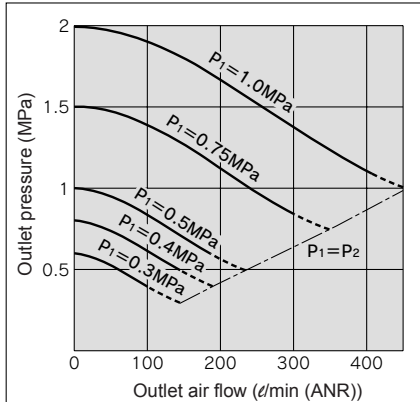
Description	Model	For VBA10A-02 For VBA1111-02	For VBA20A-03 For VBA22A-03	For VBA40A-04 For VBA42A-04 For VBA43A-04
Mist separator		AM250C-02	AM450C-04, 06	AM550C-06, 10
Exhaust cleaner		AMC310-03	AMC510-06	AMC610-10

Note) Refer to Best Pneumatics No. 5 for mist separators and Best Pneumatics No. 6 for exhaust cleaners.

Refer to the operation manual for piping.

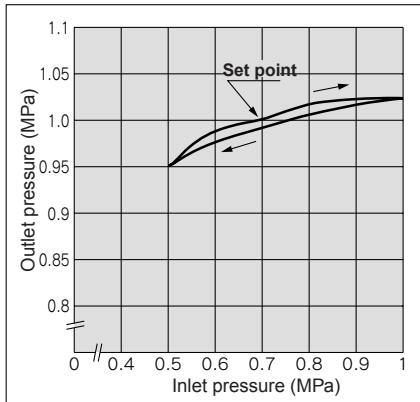
VBA10A

Flow Characteristics

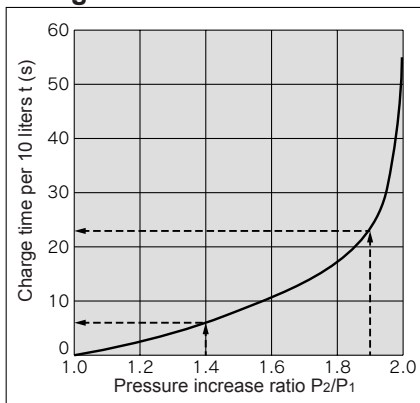


Pressure Characteristics

Inlet pressure: 0.7 MPa
Outlet pressure: 1.0 MPa
Flow rate: 20 l/min (ANR)



Charge Characteristics



VBA10A

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

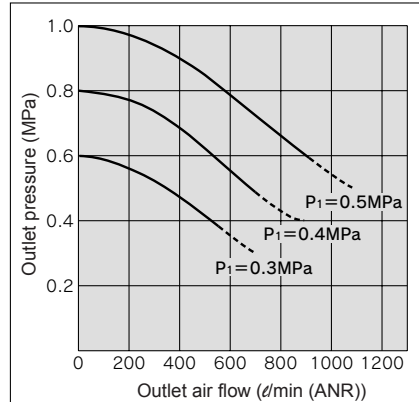
$$\frac{P_2}{P_1} = \frac{0.7}{0.5} = 1.4 \quad \frac{P_2}{P_1} = \frac{0.95}{0.5} = 1.9$$

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:

$$T = t \times \frac{V}{10} = 17 \times \frac{10}{10} = 17 \text{ (s)}$$

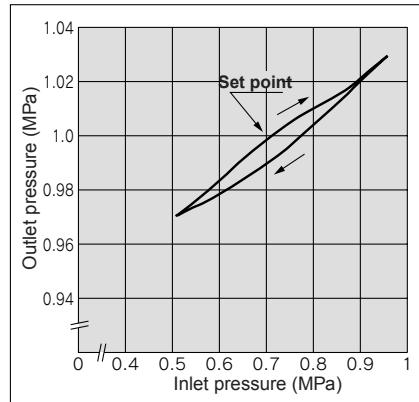
VBA20A, 22A

Flow Characteristics

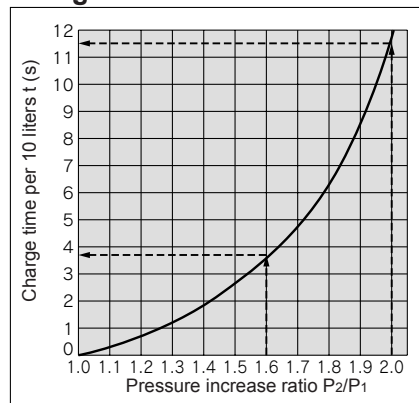


Pressure Characteristics

Inlet pressure: 0.7 MPa
Outlet pressure: 1.0 MPa
Flow rate: 20 l/min (ANR)



Charge Characteristics



VBA20A, 22A

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

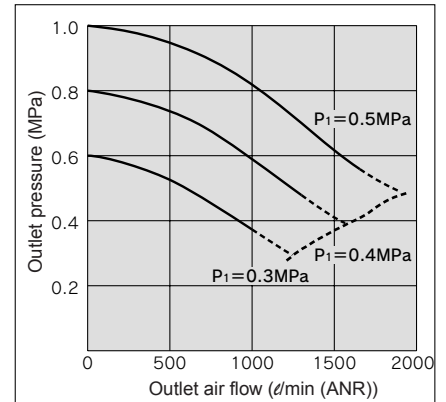
$$\frac{P_2}{P_1} = \frac{0.8}{0.5} = 1.6 \quad \frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0$$

With the pressure increase ratio from 1.6 to 2.0, the charge time of 11.5 – 3.8 = 7.7 sec. (t) is given by the graph. Then, the charge time (T) for a 100 l tank:

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

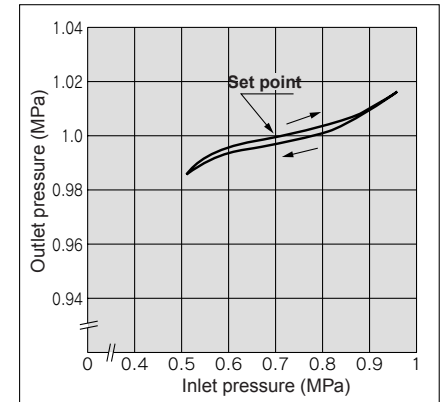
VBA40A, 42A

Flow Characteristics

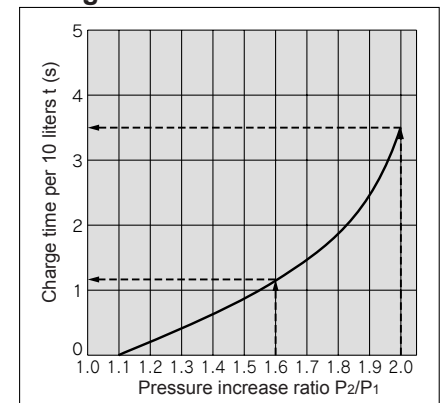


Pressure Characteristics

Inlet pressure: 0.7 MPa
Outlet pressure: 1.0 MPa
Flow rate: 20 l/min (ANR)



Charge Characteristics



VBA40A, 42A

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

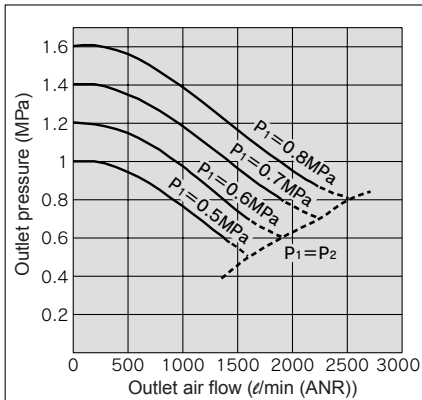
$$\frac{P_2}{P_1} = \frac{0.8}{0.5} = 1.6 \quad \frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0$$

With the pressure increase ratio from 1.6 to 2.0, the charge time of 3.5 – 1.1 = 2.4 sec. (t) is given by the graph. Then, the charge time (T) for a 100 l tank:

$$T = t \times \frac{V}{10} = 2.4 \times \frac{100}{10} = 24 \text{ (s)}$$

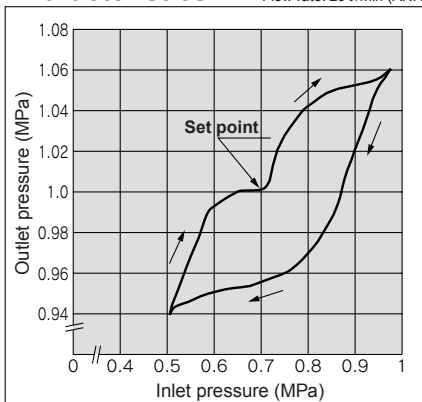
VBA43A

Flow Characteristics

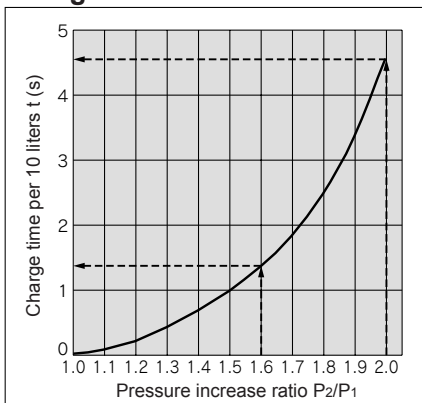


Pressure Characteristics

Inlet pressure: 0.7 MPa
 Outlet pressure: 1.0 MPa
 Flow rate: 20 l/min (ANR)



Charge Characteristics



VBA43A

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

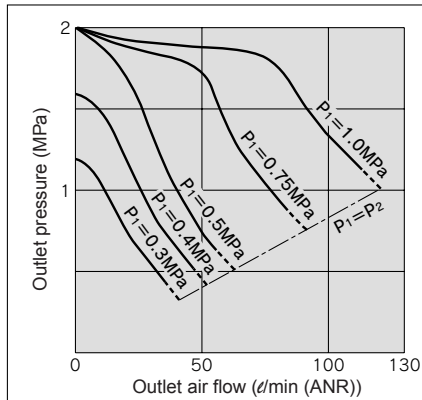
$$\frac{P_2}{P_1} = \frac{0.8}{0.5} = 1.6 \quad \frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0$$

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:

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

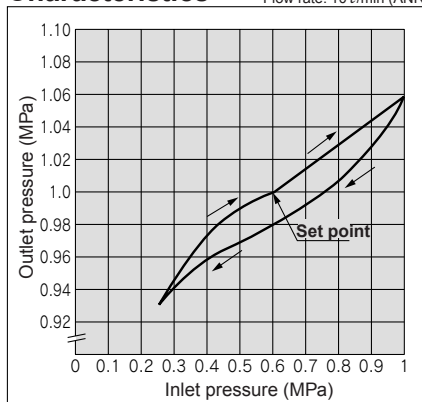
VBA1111

Flow Characteristics

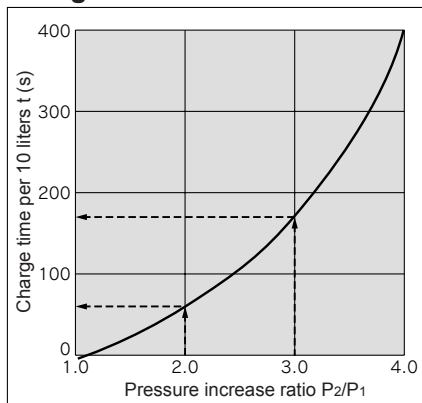


Pressure Characteristics

Inlet pressure: 0.6 MPa
 Outlet pressure: 1.0 MPa
 Flow rate: 10 l/min (ANR)



Charge Characteristics



VBA1111

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

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

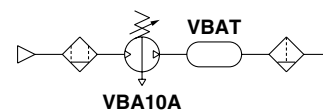
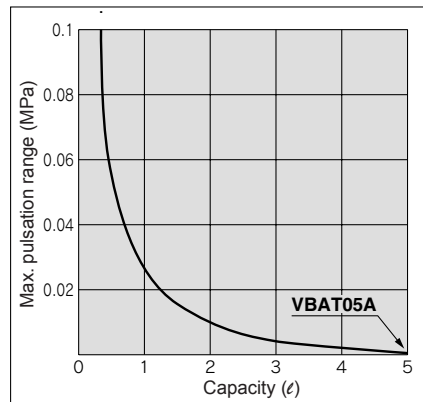
With the pressure increase ratio from 2.0 to 3.0, the charge time of 170 – 60 = 110 sec. (t) is given by the graph. Then, the charge time (T) for a 10 l tank:

$$T = t \times \frac{V}{10} = 110 \times \frac{10}{10} = 110 \text{ (s)}$$

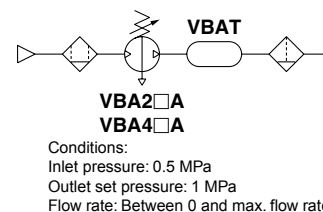
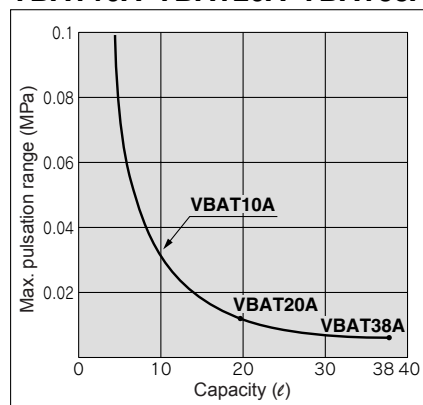
Pulsation/ Pulsation is decreased by using tank.

If the outlet capacity is undersized, pulsation may occur.

VBAT05A



VBAT10A · VBAT20A · VBAT38A



- Performance of air tank
- Alleviates the pulsation generated on the outlet side.
- Manages supply air to be consumed for short periods of time by storing air through raising the tank pressure.

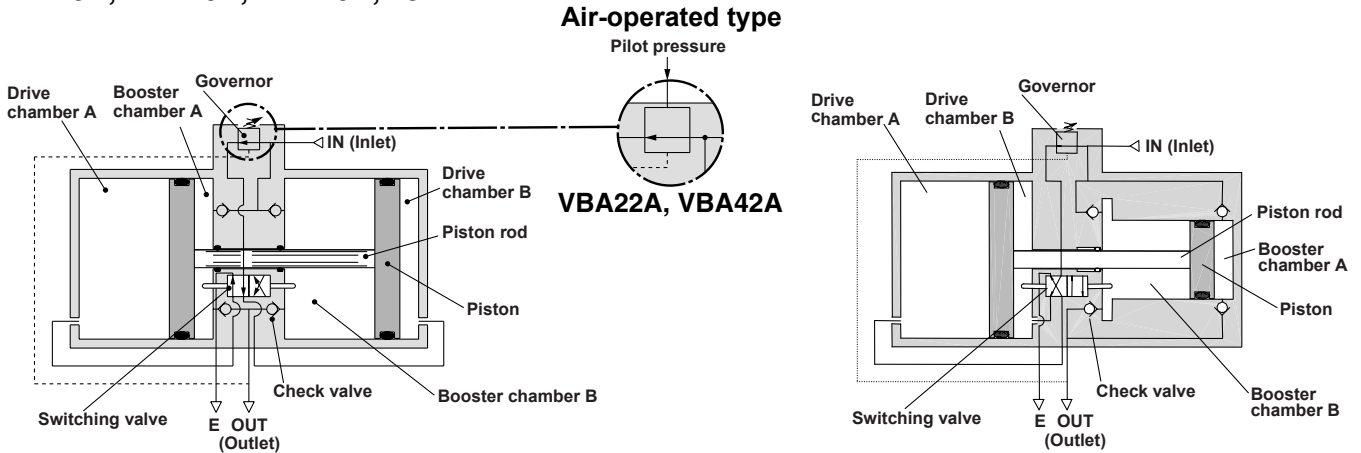
Series VBA

Construction/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 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.

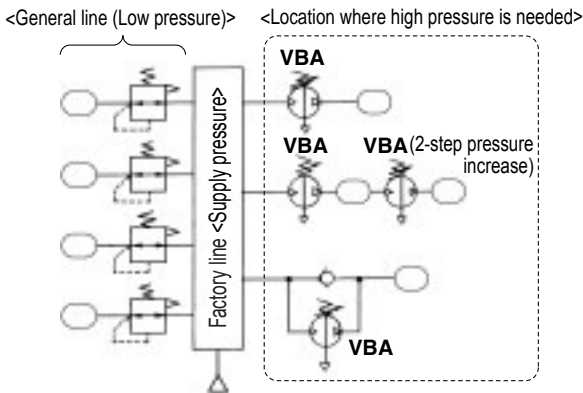
VBA10A, VBA20A, VBA40A, 43A

VBA111

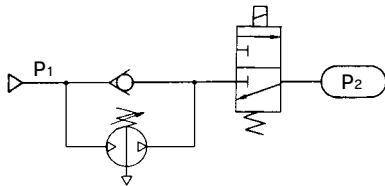


Example of circuit diagram

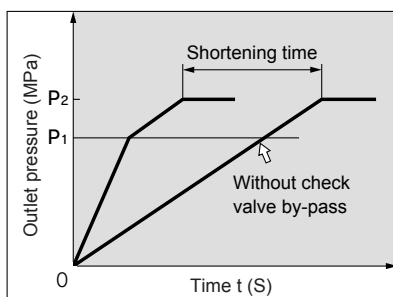
- When certain equipment requires a higher pressure than the factory line pressure.



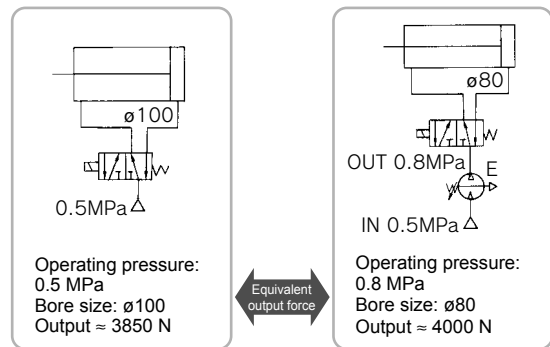
- When the tank must be filled from the atmospheric pressure in a short time.



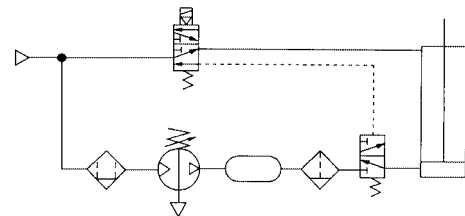
Initially, inlet pressure (P_1) passes through the check valve, fills P_2 , and results in $P_1 = P_2$.



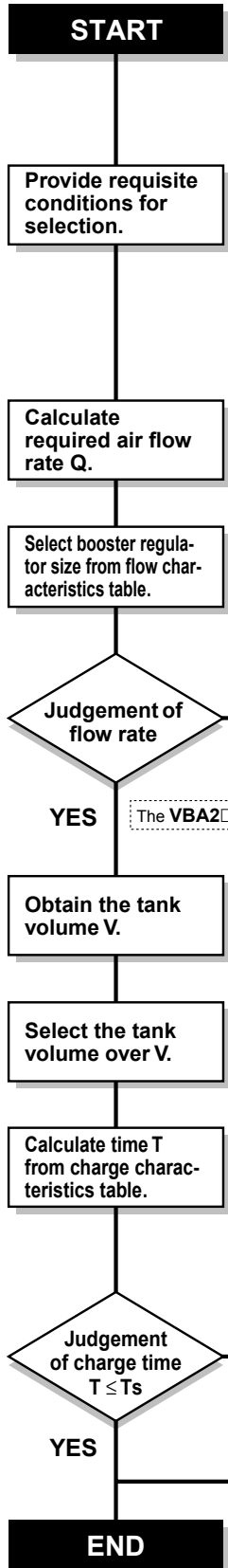
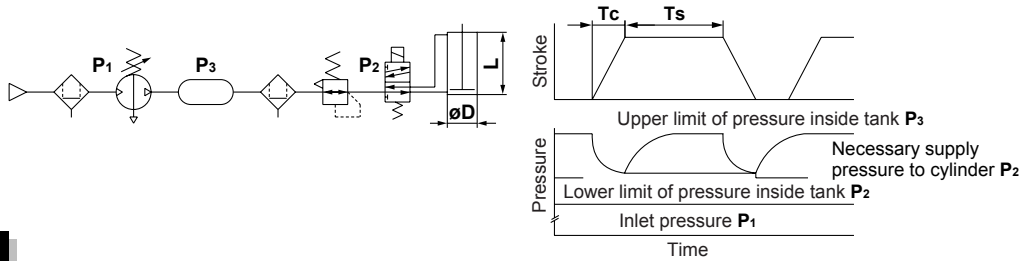
- When the actuator lacks power output for some reason but it is not feasible to replace it with a larger bore cylinder due to space constraints.
- When a small cylinder size is desired while ensuring sufficient power, in order to achieve a compact drive unit.



- When the pressure in one chamber of the cylinder must be boosted.
(In the case of a three-way valve, use a reverse pressure type.)



Sizing (Sizing can be achieved by using SMC Pneumatic System Energy Saving Program Ver. 3.1. Please contact your SMC sales representative.)



Necessary conditions:
D [mm]: Cylinder bore size
L [mm]: Cylinder stroke
W [mm/s]: Cylinder operating speed
C [pc.]: Number of cylinders
Tc [s]: Cylinder operating time
Ts [s]: Cylinder stop time
P1 [MPa]: Inlet pressure
P2 [MPa] ^{Note 1)}: Necessary supply pressure to cylinder

Example
 100
 100
 200
 1
 0.5
 30
 0.5
 0.8

Other conditions:
Q [ℓ/min (ANR)]: Required air flow rate
Qb [ℓ/min (ANR)]: Outlet air flow rate of booster regulator
Tc [s]: Cylinder stroke time
K: Cylinder double-acting: 2, single-acting: 1
P3 [MPa] ^{Note 2)}: Tank charge pressure
T1 [s]: Time to charge (Time to charge to P2)
T2 [s]: Time to charge (Time to charge to P3)
T [s]: Time to charge (Time to charge from P2 to P3)
Z: Number of booster regulators

Note 1) P2 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) P3 is the output pressure of the booster regulator, which is also the upper limit of charge pressure to a tank.

$$Q \text{ [ℓ/min (ANR)]} = \frac{\pi \times D^2 \times W}{4 \times 10^6} \times \frac{(P_2 + 0.101)}{0.101} \times 60 \times C$$

$$Q = \frac{\pi \times 100^2 \times 200}{4 \times 10^6} \times \frac{(0.8 + 0.101)}{0.101} \times 60 \times 1 = 841 \text{ [ℓ/min (ANR)]}$$

VBA2□A: Qb = 600 [ℓ/min (ANR)]
VBA4□A: Qb = 1050 [ℓ/min (ANR)]
 Refer to "Flow Characteristics" on page 3 and 4.

⚠ Caution

- Use the VBA1111 (pressure increase ratio 4) with pressure increase ratio of 2 to 4. Usage of pressure increase ratio below 2 (pressure increase ratio 2) is preferred for the VBA10A. A stable operation and increased life expectancy will result.
- Inlet supply pressure volume is approximately twice the volume of the outlet side. {approx. 2 times (pressure increase ratio 2), approx. 4 times (pressure increase ratio 4)}. Booster regulator requires that the inlet side volume should be 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.

NO: Need no tank The **VBA4□A** can supply necessary pressure.

YES The **VBA2□A** cannot obtain necessary pressure.

$$V \text{ [ℓ]} = \frac{(Q - Q_b/2) \times (T_c \times K/60)}{(P_3 - P_2) \times 9.9}$$

$$V = \frac{(841 - 600/2) \times (0.5 \times 2/60)}{(1.0 - 0.8) \times 9.9} = 4.6 \text{ [ℓ]}$$

Select the **VBA10□A**, which can be directly connected to the **VBA2□A**.

Refer to "Charge Characteristics" on page 3 and 4.

$$T \text{ [s]} = \left(\frac{V}{10}\right) \times \frac{T_2 - T_1}{Z}$$

$$T = \left(\frac{4.6}{10}\right) \times \frac{12 - 3.7}{1} = 3.5 \text{ [s]}$$

NO **Judgement of charge time T ≤ Ts** **NO** **Extend stop time Ts up to charge time T or more.** **NO** **Increase number of booster regulators (Z) to decrease T.**

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.

NO **Avoid pulsation (Max. 0.05 MPa)**

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

Tank part no.	Inner volume	Applicable combination model		
VBAT05□	5 ℓ	VBA10A	—	—
VBAT10□	10 ℓ	VBA10A	VBA2□A	—
VBAT20□	20 ℓ	—	VBA2□A	VBA4□A
VBAT38□	38 ℓ	—	VBA2□A	VBA4□A

Design Precautions

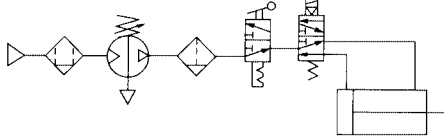
⚠ Warning

1. Warning concerning abnormal outlet pressure

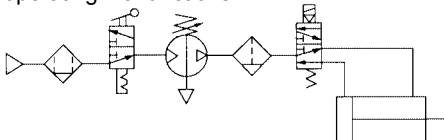
- If there is a likelihood of causing an outlet pressure drop due to unforeseen circumstances such as equipment malfunction, thus leading to a major problem, take safety measures on the system side.
- Because the outlet pressure could exceed its set range if there is a large fluctuation in the inlet 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 below diagram.) 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 valve from moving needlessly and prevents operating malfunctions.



Selection Precautions

⚠ Caution

1. Verify 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 (pressure, flow rate, takt time, etc.) 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 VBA1111 (pressure increase ratio 4) with pressure increase ratio of 2 to 4. Usage of pressure increase ratio below 2 (pressure increase ratio 2) is preferred for the VBA10A. A stable operation and increased life expectancy will result.
- Inlet supply pressure volume is approximately twice the volume of the outlet side. {approx. 2 times (pressure increase ratio 2), approx. 4 times (pressure increase ratio 4)}. Booster regulator requires that the inlet side volume should be 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 more than 0.1 MPa higher than the inlet pressure. A pressure difference less than 0.1 MPa makes the operation unstable and may result in malfunction.

Mounting Precautions

⚠ Caution

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 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.
- The pressure gauge should be mounted with the following torque. R 1/16 for VBA1: 3 to 4 N, R 1/8: 7 to 9 N

Piping Precautions

⚠ Caution

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 Precautions

⚠ Caution

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 Precautions

⚠ Caution

1. Installation location

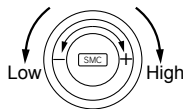
- Do not install this product in an area that is exposed to rain-water or direct sunlight.
- Do not install in locations influenced by vibrations. If it must be used in such an area due to unavoidable circumstances, please contact SMC beforehand.

Handling Precautions

⚠ Caution

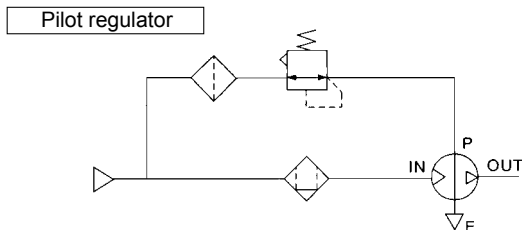
1. Setting the pressure on the handle-operated type

- 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, and rotating it 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.
- 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.



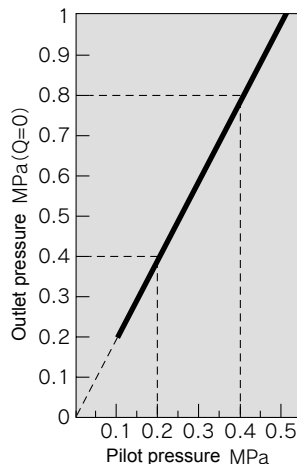
2. Setting the pressure on the air-operated type (VBA22A, 42A)

- Connect the outlet pipe of the pilot regulator for the remote control to the pilot port (P). (Refer to the figure below.)
- Refer to the following figure for 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 the 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.

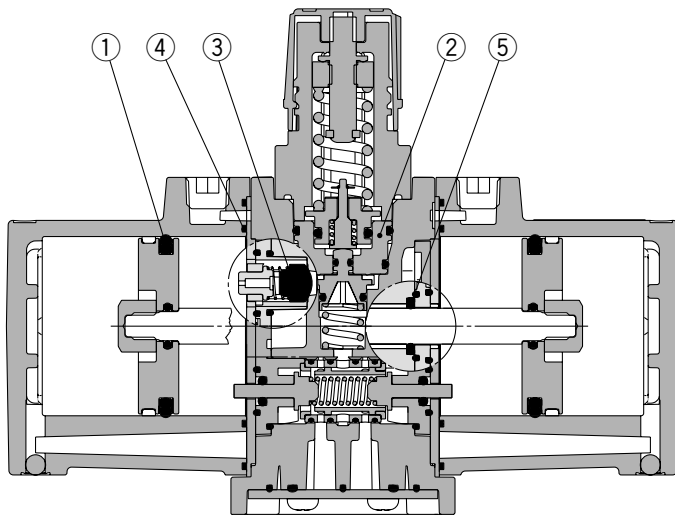
5. Maintenance

- Life expectancy varies depending on the quality of air and the operating conditions. As a symptom of the end of life expectancy, it can be found by breathing all the time beneath the handle, or hearing the exhausting sound from booster regulator in 10 to 20 second intervals despite no air consumption in 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.
- Maintenance should be carried out according to the specified maintenance procedure by individuals possessing enough knowledge and experiences in maintaining pneumatic equipment.
- The list of replacement parts and kit part number are shown on page 9, and the figure shows the position of the parts.

Series VBA

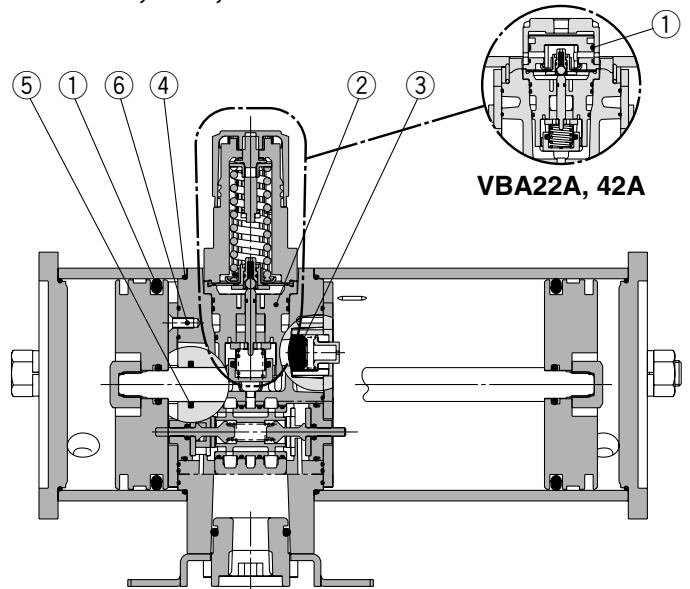
Construction/Replacement Parts

VBA10A

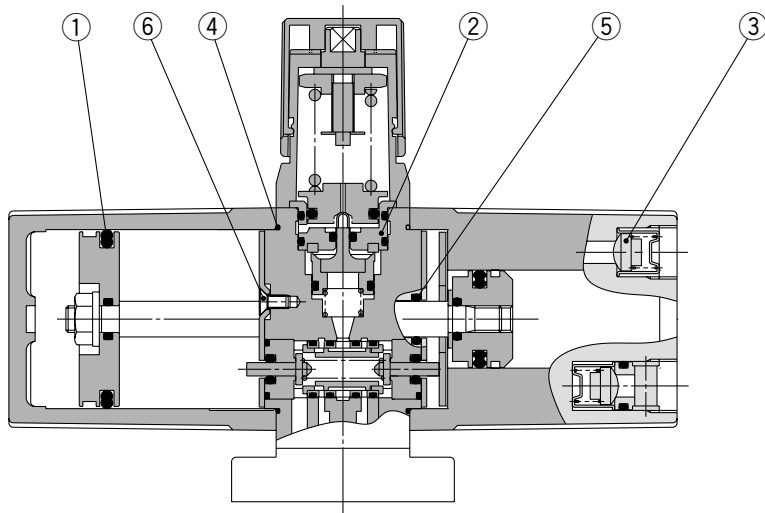


VBA20A, 22A, VBA40A, 42A, 43A

Air-operated type



VBA1111



Replacement Parts/Kit Part No.

Place an order with the following applicable kit part number.

Model	VBA10A	VBA20A	VBA40A	VBA22A	VBA42A	VBA43A	VBA1111
Kit part no.	KT-VBA10A-1	KT-VBA20A-1	KT-VBA40A-1	KT-VBA22A-1	KT-VBA42A-1	KT-VBA43A-1	KT-VBA1111-2

The kit includes the parts from ① to ⑥ and a grease pack.

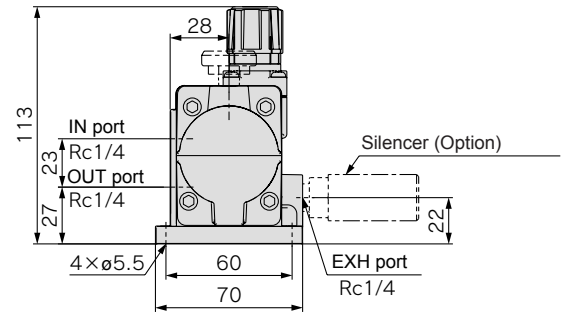
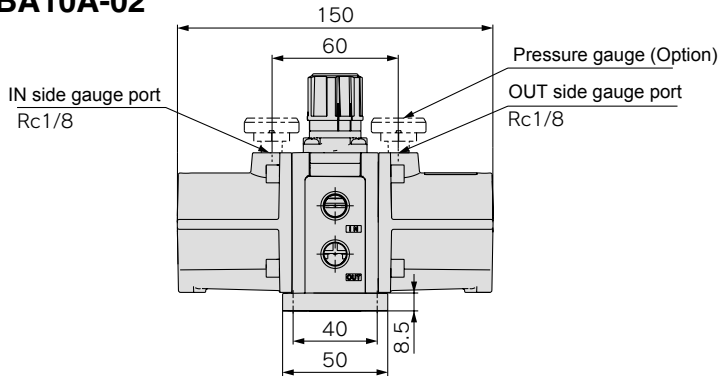
		VBA10A	VBA20A	VBA40A	VBA22A	VBA42A	VBA43A	VBA1111
		Quantity						
1	Piston seal		2		3		2	2
2	Governor assembly				1			
3	Check valve				4			
4	Gasket				2			
5	Rod seal				1			
6	Mounting screw	—	8	12	8	12		8
—	Grease pack	1		2	1	2		1

* The grease pack has 10 g of grease.

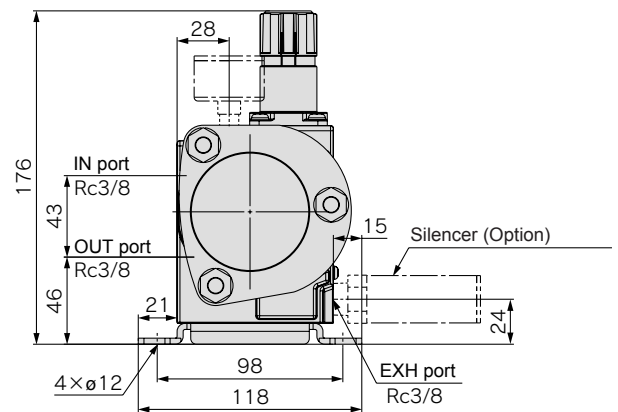
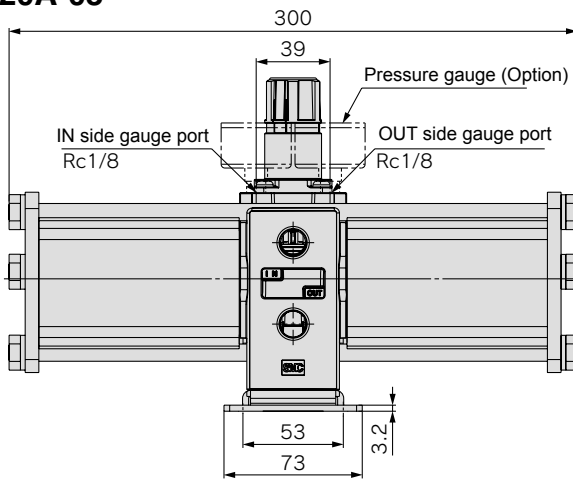
* Make sure to refer to the procedure for maintenance.

Dimensions

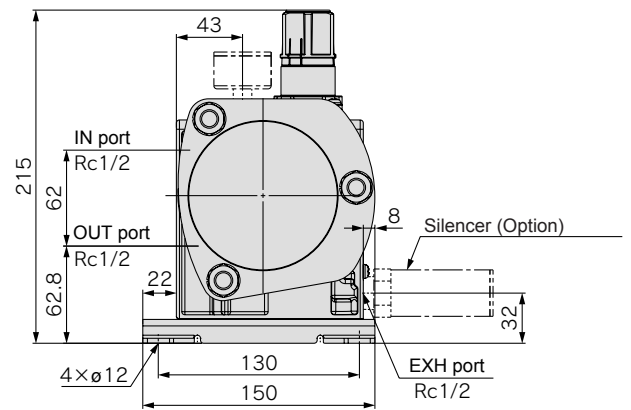
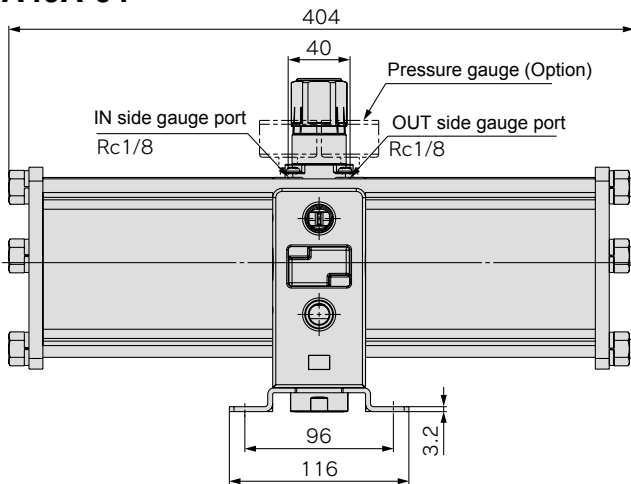
VBA10A-02



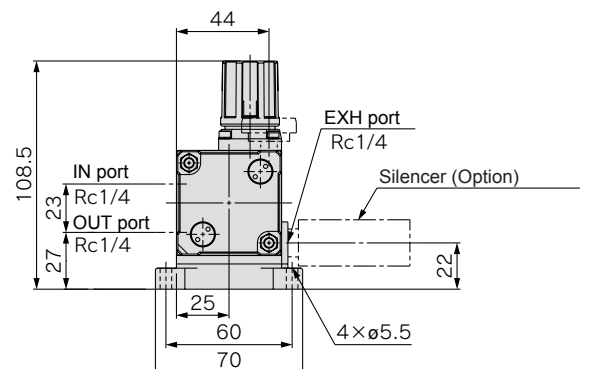
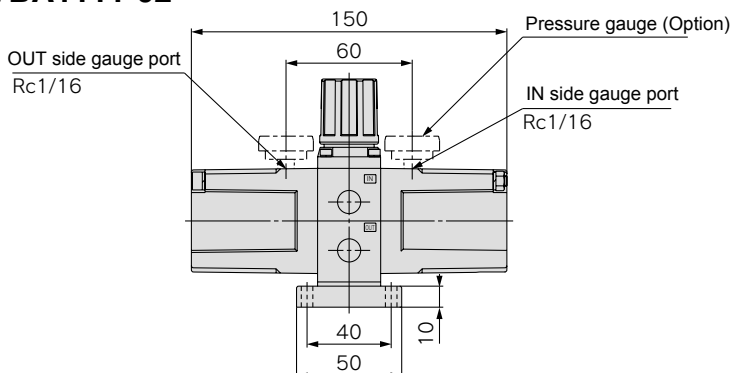
VBA20A-03



VBA40A-04



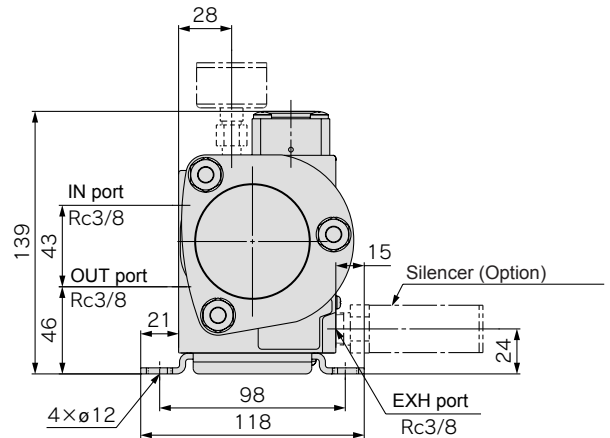
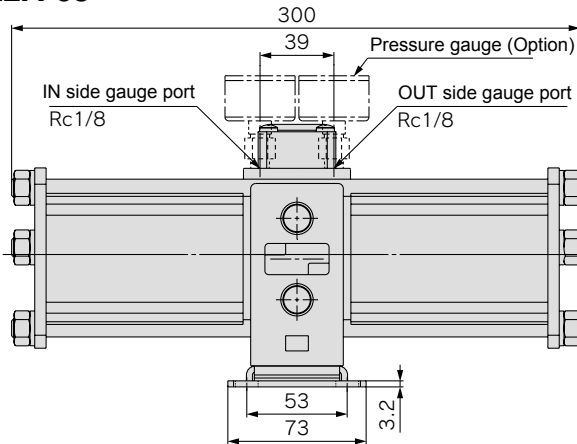
VBA1111-02



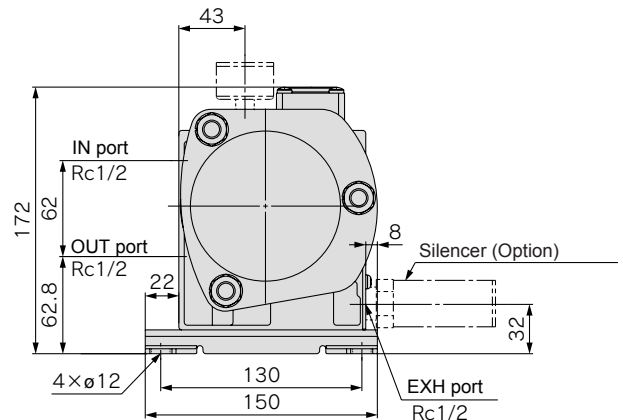
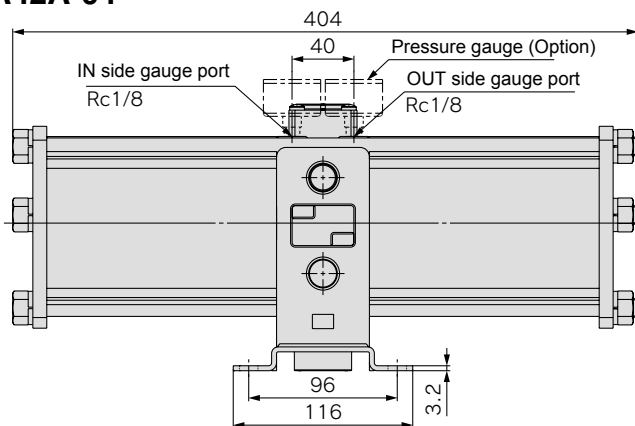
Series VBA

Dimensions

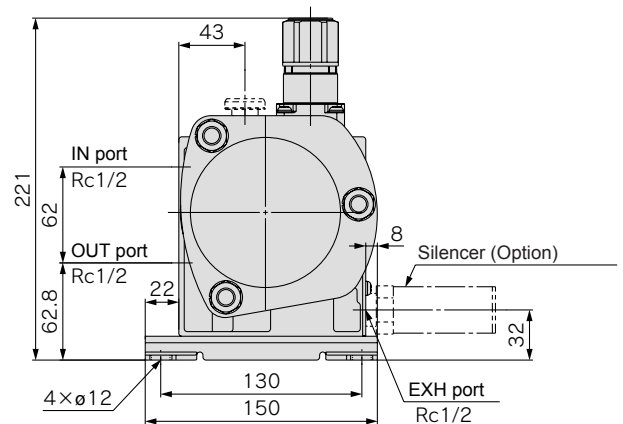
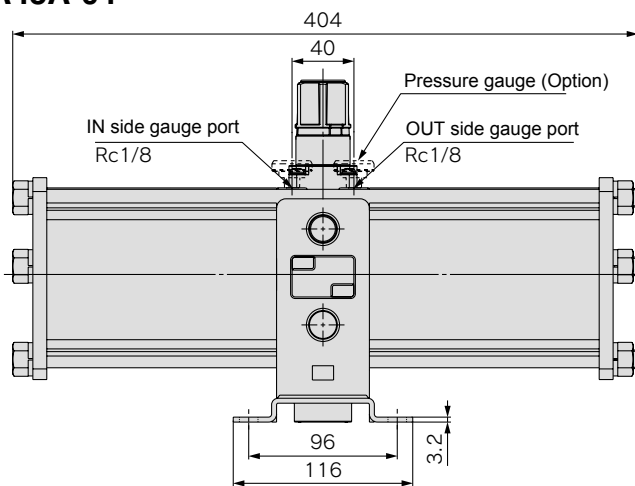
VBA22A-03



VBA42A-04



VBA43A-04



Please contact SMC for detailed dimensions, specifications, and lead times.

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.

20 — Standard model no.

• Made to Order
Copper-free/Fluorine-free

* Inquire about booster regulator with pressure gauge.
* This option cannot be selected for air tank with safety valve.

2 CE explosion-proof directive (ATEX) compliant

56 — Standard model no.

• Made to Order
CE explosion-proof directive (ATEX): Category 3GD

3 Ozone resistant

Ozone resistance is strengthened through the use of fluororubber (diaphragm) and hydrogenated NBR (valve, rod seal) for the rubber parts of the seal material.

80 — Standard model no.

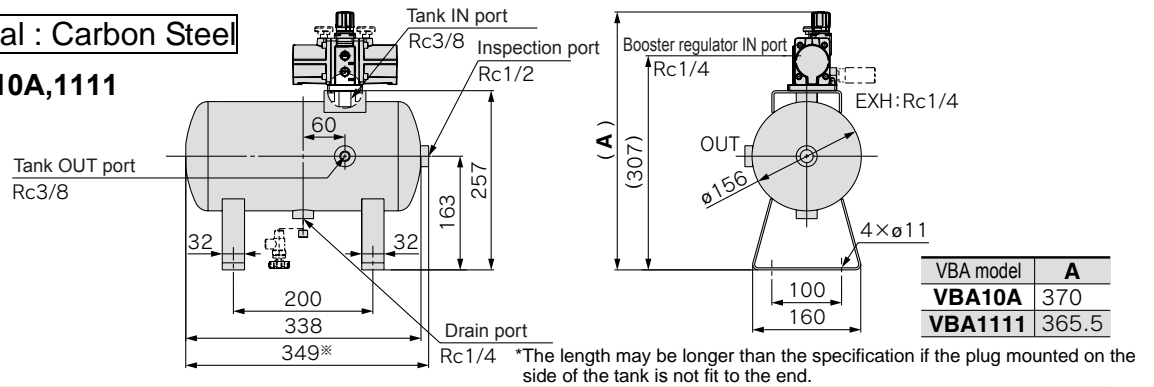
• Made to Order
Ozone resistant

* Weather resistant NBR (diaphragm) and hydrogenated NBR (valve) is used for the rubber parts of standard products.

Dimensions

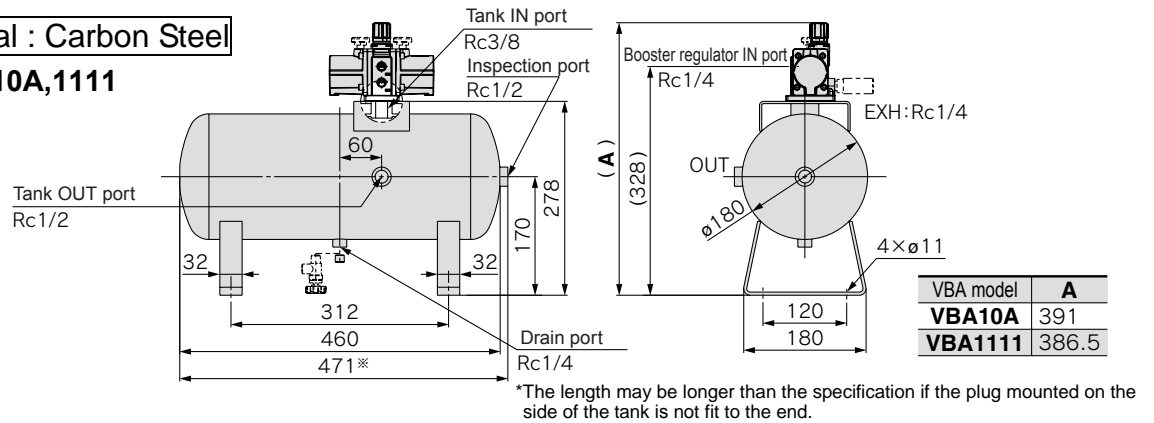
VBAT05A Material : Carbon Steel

Connected to VBA10A,1111

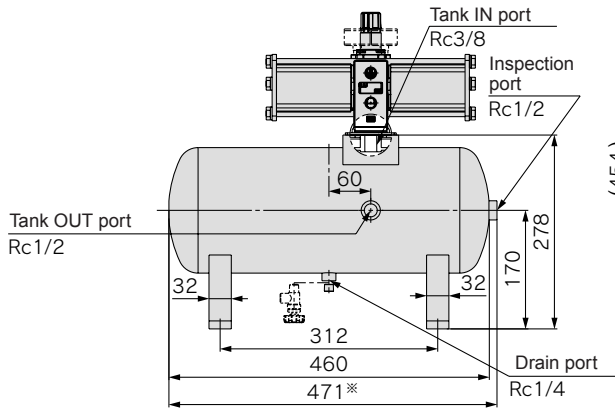


VBAT10A Material : Carbon Steel

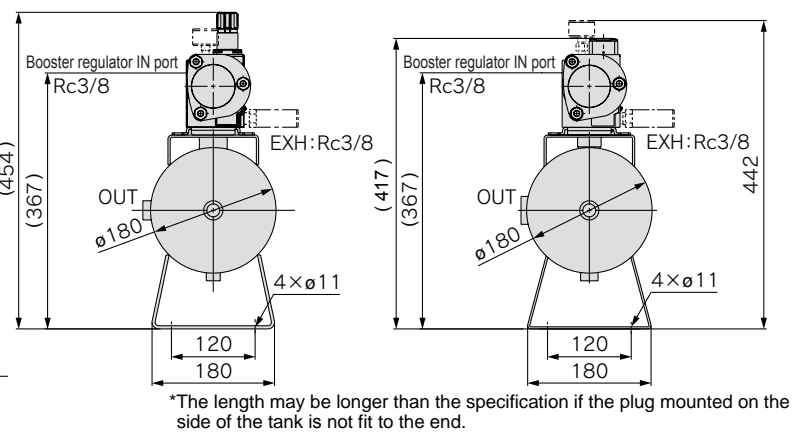
Connected to VBA10A,1111



Connected to VBA20A

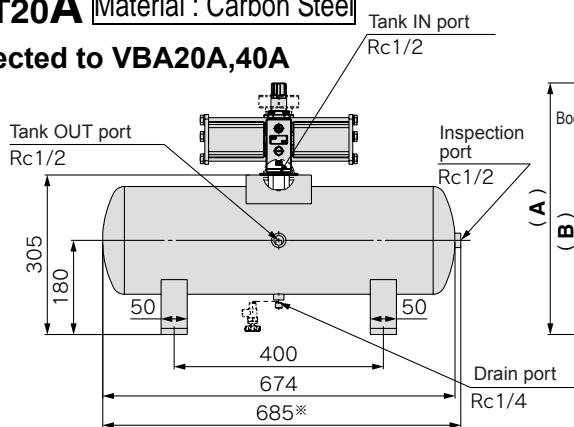


Connected to VBA22A

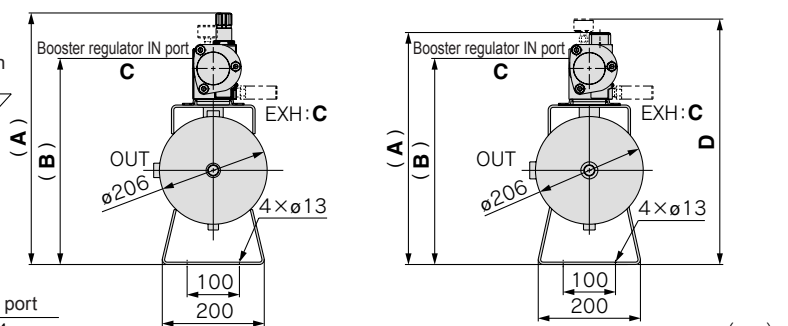


VBAT20A Material : Carbon Steel

Connected to VBA20A,40A



Connected to VBA22A,42A



*The length may be longer than the specification if the plug mounted on the side of the tank is not fit to the end.

VBA model	A	B	C	D ^{Note}
VBA20A	481	394	Rc3/8	—
VBA40A	520	429.8	Rc1/2	—
VBA22A	444	394	Rc3/8	469
VBA42A	477	429.8	Rc1/2	493

(mm)

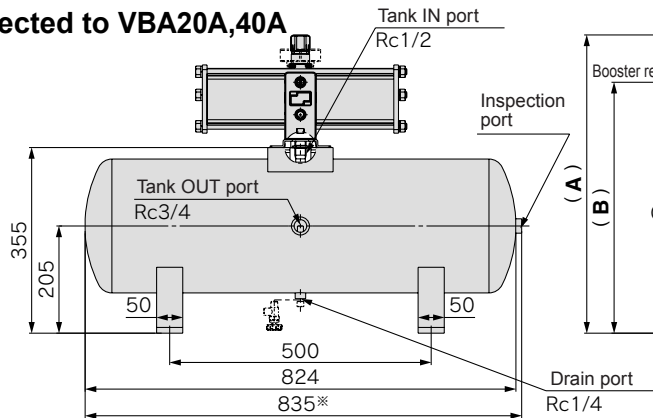
Note) Option: when G (pressure gauge) is selected

Series VBAT

Dimensions

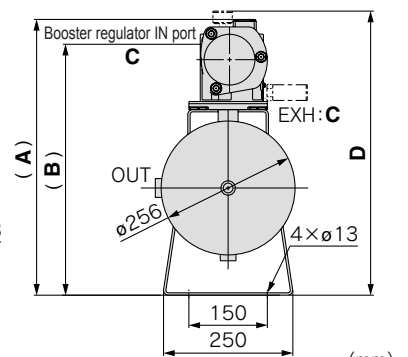
VBAT38A Material : Carbon Steel

Connected to VBA20A,40A



*The length may be longer than the specification if the plug mounted on the side of the tank is not fit to the end.

Connected to VBA22A,42A

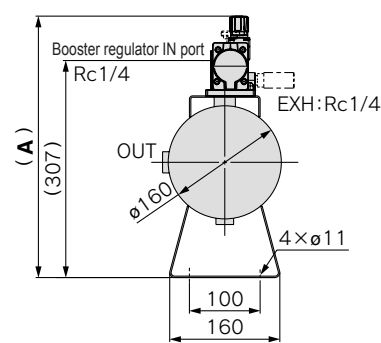
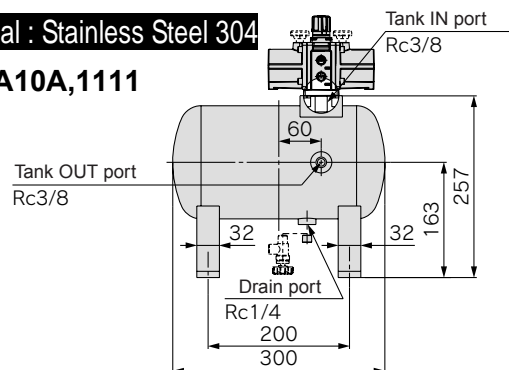


VBA model	A	B	C	D ^{Note}
VBA20A	531	444	Rc3/8	—
VBA40A	570	479.8	Rc1/2	—
VBA22A	494	444	Rc3/8	519
VBA42A	527	479.8	Rc1/2	543

Note) Option : when G (pressure gauge) is selected

VBAT05S Material : Stainless Steel 304

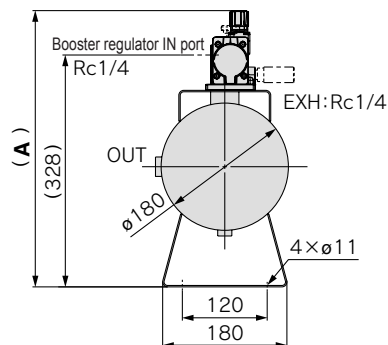
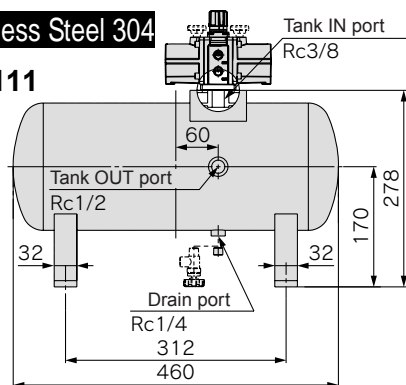
Connected to VBA10A,111



VBA model	A
VBA10A	370
VBA1111	365.5

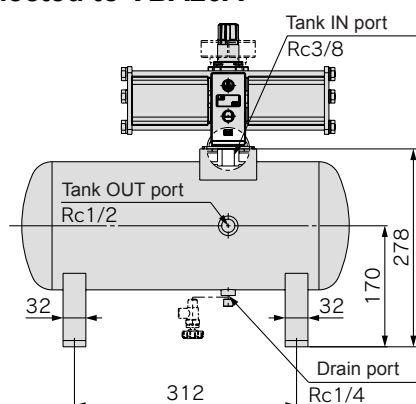
VBAT10S Material : Stainless Steel 304

Connected to VBA10A,111

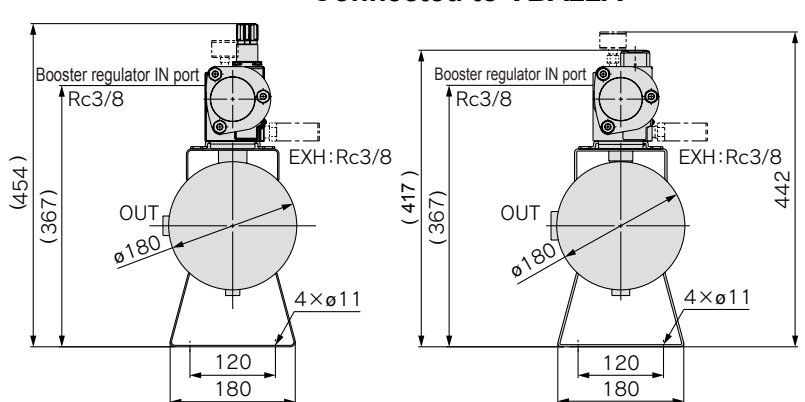


VBA model	A
VBA10A	391
VBA1111	386.5

Connected to VBA20A



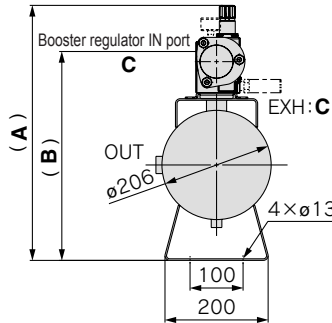
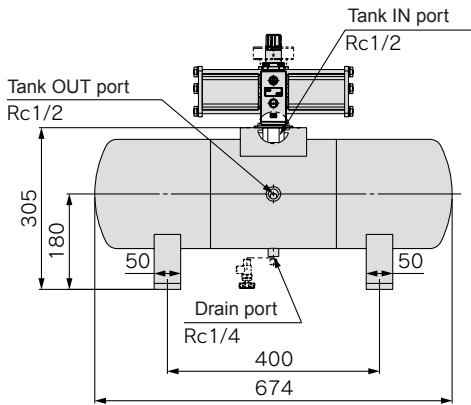
Connected to VBA22A



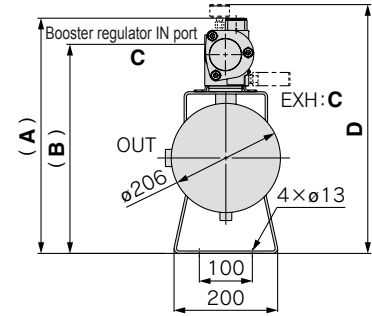
Dimensions

VBAT20S Material : Stainless Steel 304

Connected to VBA20A,40A



Connected to VBA22A,42A,43A



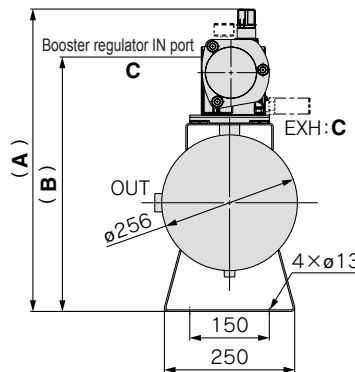
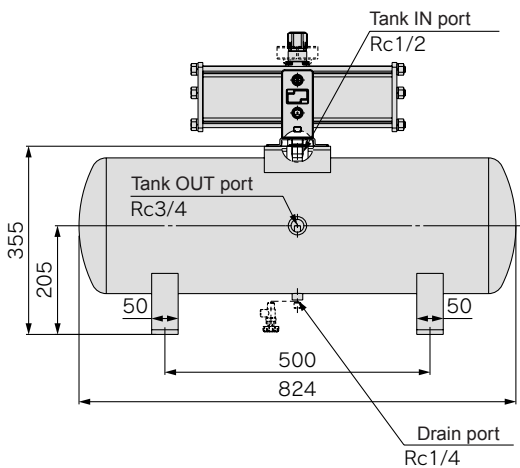
VBA model	A	B	C	D ^{Note)}
VBA20A	481	394	Rc3/8	—
VBA40A	520	429.8	Rc1/2	—
VBA22A	444	394	Rc3/8	469
VBA42A	477	429.8	Rc1/2	493
VBA43A	526	—	—	—

Note) Option: when G (pressure gauge) is selected

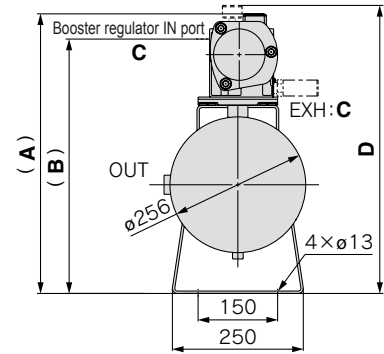
479.8

VBAT38S Material : Stainless Steel 304

Connected to VBA20A,40A



Connected to VBA22A,42A,43A

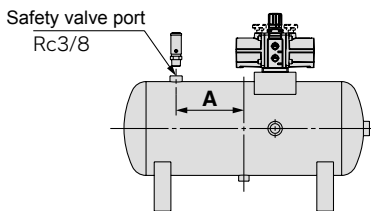


VBA model	A	B	C	D ^{Note)}
VBA20A	531	444	Rc3/8	—
VBA40A	570	479.8	Rc1/2	—
VBA22A	494	444	Rc3/8	519
VBA42A	527	479.8	Rc1/2	543
VBA43A	576	—	—	—

Note) Option: when G (pressure gauge) is selected

VBAT⁰⁵₁₀A1-R

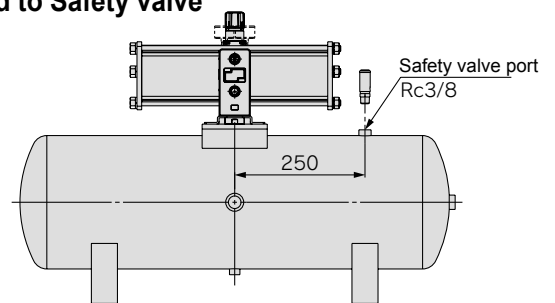
Connected to Safety valve



Tank model	A
VBAT05	60
VBAT10	130


VBAT²⁰₃₈A1-R


Connected to Safety valve




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), Japan Industrial Standards (JIS)^{*1)} and other safety regulations^{*2)}.

 **Caution:** Operator error could result in serious injury or equipment damage.

 **Warning:** Operator error could result in serious injury or loss of life.

 **Danger :** In extreme conditions, there is a possibility of serious injury or loss of life.

※1) ISO 4414: Pneumatic fluid power -- General rules relating to systems.
ISO 4413: Hydraulic fluid power -- General rules relating to systems.
IEC 60204-1: Safety of machinery -- Electrical equipment of machines.
(Part 1: General requirements)

ISO 10218-1992: Manipulating industrial robots -Safety.
JIS B 8370: General rules for pneumatic equipment.
JIS B 8361: General rules for hydraulic equipment.
JIS B 9960-1: Safety of machinery -- Electrical equipment of machines.
(Part 1: General requirements)
JIS B 8433-1993:Manipulating industrial robots - Safety.
etc.

※2) Labor Safety and Sanitation Law, etc.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided 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.

1. 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.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

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

The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary. If anything is unclear, contact your nearest sales branch.

Limited Warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited Warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

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.^{*3)}

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

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.

***3) 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.

Compliance Requirements

When the product is exported, strictly follow the laws required by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Law).

Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

SMC Corporation