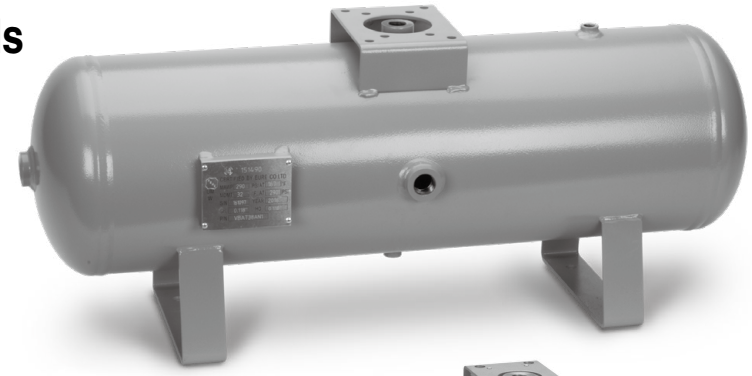
Air Tank for Booster Regulator Compliant with ASME Standards

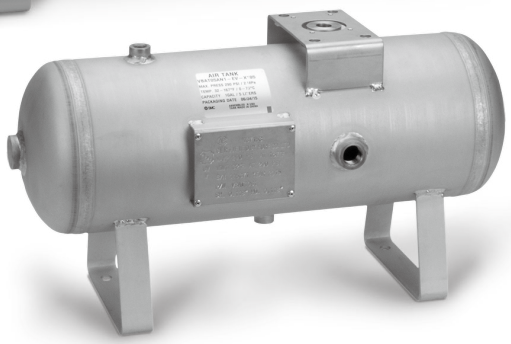
■ Compliant with ASME standards

ASME Section VIII-Division 1
Miniature pressure vessels: UM stamp



■ Series Variations

Material	Tank capacity			
	5 L	10 L	22 L	38 L
Carbon steel	●	●	●	●
Stainless steel	●	●	●	●



■ ASME standards compliant safety valve included

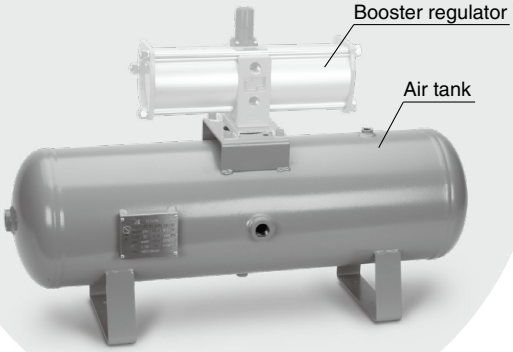
(UV stamp)

■ Manufacturer's certificate of compliance included

(FORM U-3A)

ASME standards compliant safety valve included (UV stamp)

Compact connections are possible with booster regulators.



There are many overseas countries, including but not limited to the U.S., which have adopted the ASME standards as their design safety standards. These products can be used in the following countries by submitting a notification of use (application) in each country.

[Central and South America] Argentina, Bolivia, Chile, Venezuela, Brazil, Mexico
[Asia/Oceania] Malaysia, Singapore, Pakistan, Taiwan, Hong Kong, India, Philippines, New Zealand

Compatible with all series

Overseas Standards Compliant Product Variations

Main country/region	Law	Part no.	Material	Tank capacity
EU	CE Marking/Simple Pressure Vessels Directive	VBAT□-Q	Carbon steel	5 L/10 L/20 L/38 L
China	Regulations on Safety Supervision of Special Equipment/ Simple Pressure Vessels Safety and Technical Regulations	VBAT□-X104	Carbon steel/ Stainless steel	5 L/10 L/20 L*1/38 L
South Korea	Occupational Safety and Health Act/KC Certification*2	VBAT□-X101	Carbon steel/ Stainless steel	5 L/10 L/20 L/38 L

* Refer to the **Web Catalog** for details about models, specifications, etc.
*1 The capacity of the VBAT□-X104 carbon steel tank is 22 L.
*2 The VBAT□-X101 is not within the coverage of the High Pressure Gas Safety Control Act in South Korea as the maximum operating pressure is 0.97 MPa.

VBAT-X105

SMC

VBAT-X105

How to Order

VBAT 05 A N 1 – E V – X105

Tank capacity

Symbol	Internal capacity
05	5 L
10	10 L
20	22 L
38	38 L

Material

Symbol	Material
A	Carbon steel (SA-414)
S	Stainless steel (SA-240 316)

Thread type

Symbol	Thread type
Nil	Rc
N	NPT

Safety valve/Set pressure: 2 MPa (Accessory)

∗ **E**: Safety valve is included.

Option

Symbol	Option
Nil	None
V	Drain valve

ASME Standards Compliant Product

∗ The labels indicating compliance with ASME standards are not based on the International System of Units. Additionally, these products will be sold by SMC Corporation of America. Please contact SMC for ordering procedures and lead times.

Specifications

Model		VBAT05A□1/VBAT05S□1	VBAT10A□1/VBAT10S□1	VBAT20A□1/VBAT20S□1	VBAT38A□1/VBAT38S□1
Fluid		Compressed air			
Tank capacity [L]		5	10	22	38
Max. operating pressure [MPa]		2.0			
IN port size		3/8		1/2	
OUT port size		3/8	1/2	1/2	3/4
Ambient and fluid temperature [°C]		0 to 75			
Mounting		Horizontal (Cannot be mounted to walls or ceilings.)			
Weight [kg]		4.5/3.2	9.1/8.2	15.0/13.2	20.9/20.4
Material	**VBAT□A□1**	Carbon steel SA-414 (Plug for inspection port is made of carbon steel.)			
	VBAT□S□1	Stainless steel SA-240 316 (Plug for inspection port is made of stainless steel.)			
Paint	**VBAT□A□1**	Outside: Silver gray, Inside: Phosphate coated treatment			
Surface treatment	**VBAT□S□1**	Outside: Acid cleaning			
Documents included		• Manufacturer's certificate of compliance • Operation manual			
Included parts		• Safety valve • Accessory kit			

Options/Accessory Numbers

VBAT□□A□1(Carbon steel)

Model	VBAT05AN1	VBAT10AN1	VBAT20AN1	VBAT38AN1	VBAT05A1	VBAT10A1	VBAT20A1	VBAT38A1
Thread type	NPT				Rc			
Accessory kit	VBAT5A-Y-3N	VBAT10A-Y-3N	VBAT20A-Y-3N		VBAT5A-Y-3	VBAT10A-Y-3	VBAT20A-Y-3	
Safety valve	VBAT-E1N				VBAT-E1			
Drain valve	VBAT-V1N				VBAT-V1			

VBAT□□S□1(Stainless steel)

Model	VBAT05SN1	VBAT10SN1	VBAT20SN1	VBAT38SN1	VBAT05S1	VBAT10S1	VBAT20S1	VBAT38S1
Thread type	NPT				Rc			
Accessory kit	VBAT5S-Y-4N	VBAT10S-Y-4N	VBAT20S-Y-4N		VBAT5S-Y-4	VBAT10S-Y-4	VBAT20S-Y-4	
Safety valve	VBAT-E1N				VBAT-E1			
Drain valve	VBAT-V1N				VBAT-V1			

The accessory kit is a set of nos. ① to ④.

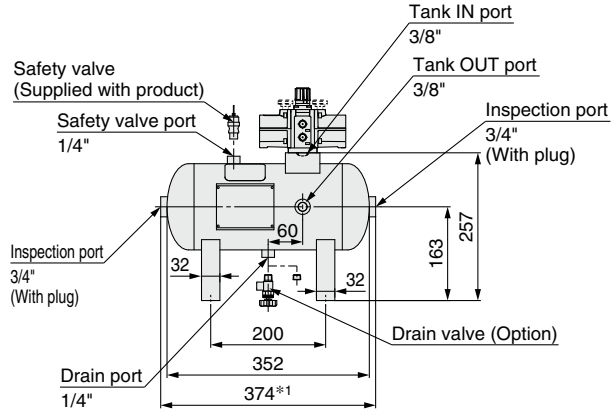
No.	Description \ Model	VBAT5A-Y-3N VBAT5S-Y-4N VBAT5A-Y-3 VBAT5S-Y-4	VBAT10A-Y-3N VBAT10S-Y-4N VBAT10A-Y-3 VBAT10S-Y-4	VBAT20A-Y-3N VBAT20S-Y-4N VBAT20A-Y-3 VBAT20S-Y-4
		Quantity		
①	O-ring	1	1 (VBA1□A) 1 (VBA2□A)	1
②	Hexagon socket head taper screwed plug (For drain port)	1	1	1
③	Hexagon socket head cap screw	4	4 (VBA1□A) 4 (VBA2□A)	4
④	Anchor bolt/nut	—	—	4

Keep the manufacturer's certificate of compliance in a safe place.

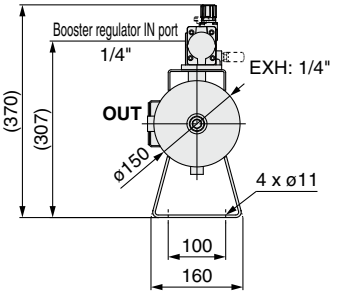
Dimensions

VBAT05AN1-E□-X105/VBAT05A1-E□-X105
VBAT05SN1-E□-X105/VBAT05S1-E□-X105

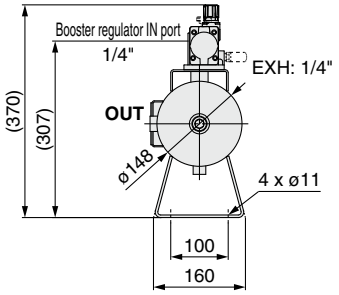
Connected to VBA10A, 11A



VBAT05A(N)1-E□-X105



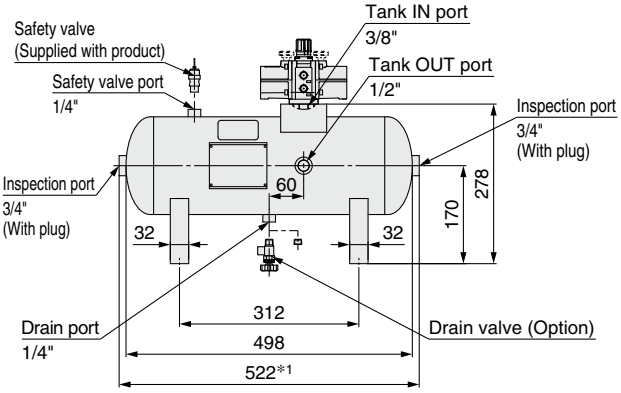
VBAT05S(N)1-E□-X105

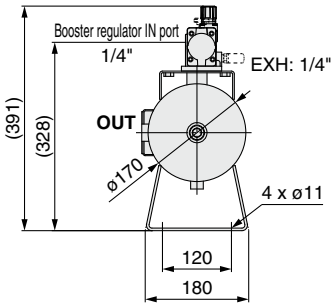


∗ Order the booster regulator VBA separately.
∗1 The length may be longer than the specification if the plugs mounted on the tank are not tightly fitted to the ends.

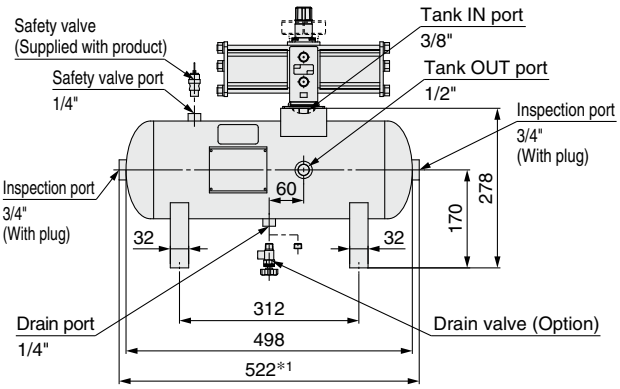
VBAT10AN1-E□-X105/VBAT10A1-E□-X105
VBAT10SN1-E□-X105/VBAT10S1-E□-X105

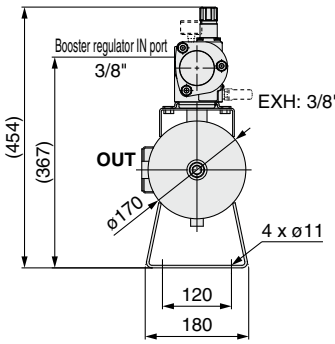
Connected to VBA10A, 11A



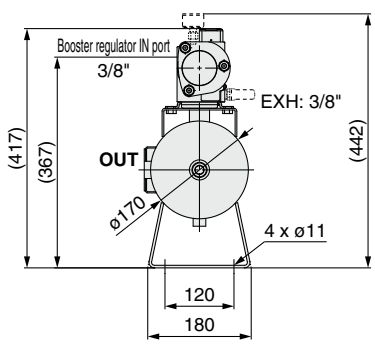


Connected to VBA20A





Connected to VBA22A

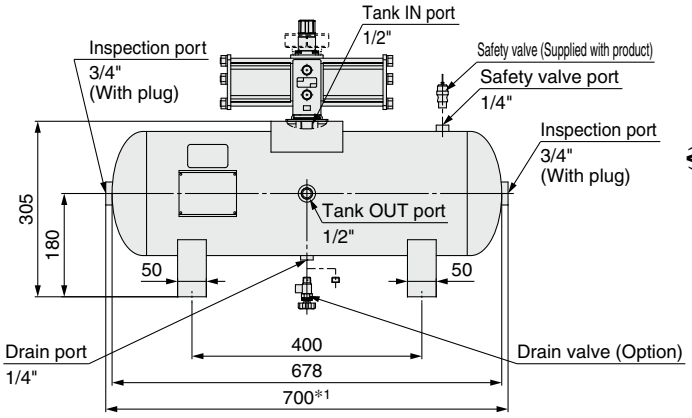


∗ Order the booster regulator VBA separately.
∗1 The length may be longer than the specification if the plugs mounted on the tank are not tightly fitted to the ends.

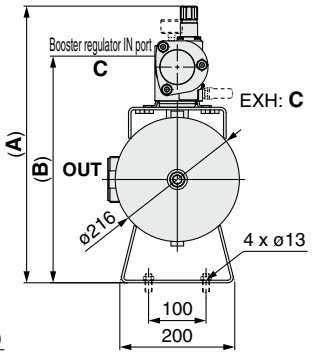
Dimensions

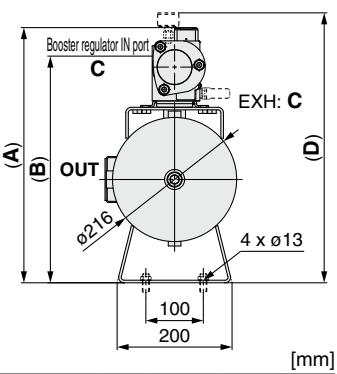
VBAT20AN1-E□-X105/VBAT20A1-E□-X105
VBAT20SN1-E□-X105/VBAT20S1-E□-X105

Connected to VBA20A, 40A, 43A



Connected to VBA22A, 42A





[mm]

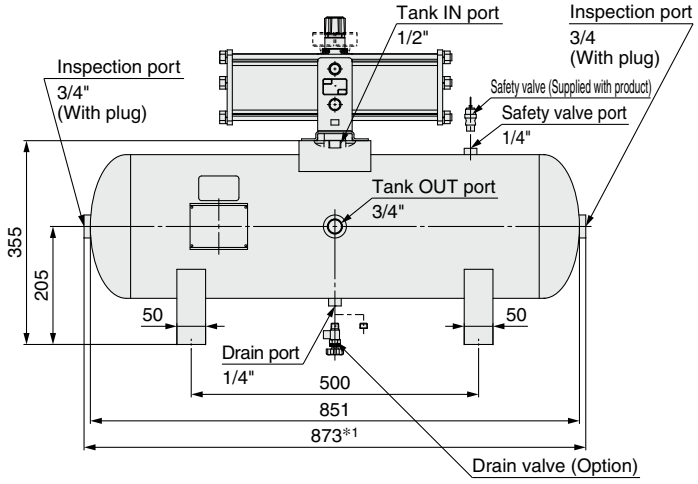
Booster regulator model	A	B	C	D*1
VBA20A	481	394	3/8"	—
VBA40A	520	429.8	1/2"	—
VBA22A	444	394	3/8"	469
VBA42A	477	429.8	1/2"	493
VBA43A	526	429.8	1/2"	—

*1 When option G (pressure gauge) is selected

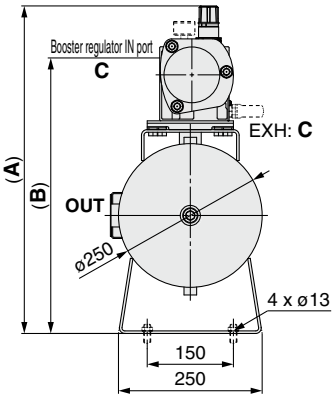
* Order the booster regulator VBA separately.
*1 The length may be longer than the specification if the plugs mounted on the tank are not tightly fitted to the ends.

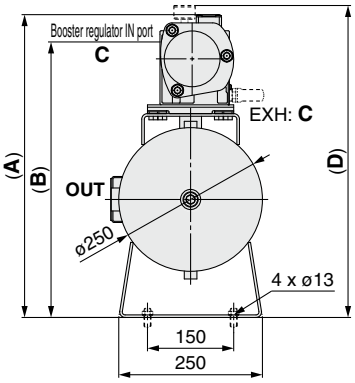
VBAT38AN1-E□-X105/VBAT38A1-E□-X105
VBAT38SN1-E□-X105/VBAT38S1-E□-X105

Connected to VBA20A, 40A, 43A



Connected to VBA22A, 42A





[mm]

Booster regulator model	A	B	C	D*1
VBA20A	531	444	3/8"	—
VBA40A	570	479.8	1/2"	—
VBA22A	494	444	3/8"	519
VBA42A	527	479.8	1/2"	543
VBA43A	576	479.8	1/2"	—

*1 When option G (pressure gauge) is selected

* Order the booster regulator VBA separately.
*1 The length may be longer than the specification if the plugs mounted on the tank are not tightly fitted to the ends.

The booster regulator is not subject to ASME standards.

⚠ **Safety Instructions**	Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.

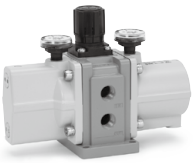
Booster Regulator/Air Tank

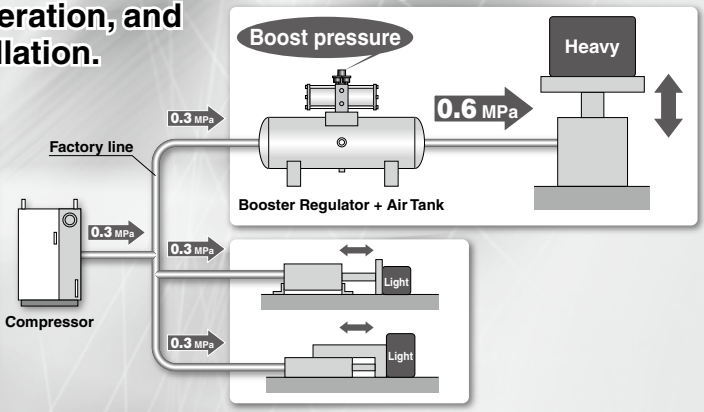
Series ***VBA/VBAT***

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

RoHS

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



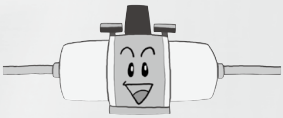


No power supply or wiring needed

There is no need to install dedicated electrical wiring.

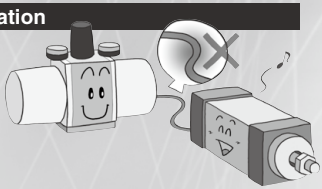
Easy installation

Simply install the unit in the air line. Requires far less space than installing the compressor.



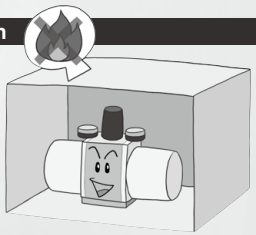
Low heat generation

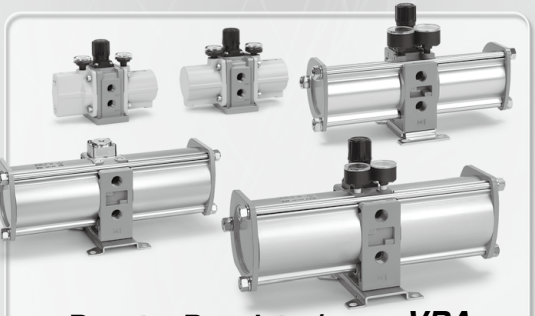
Very little heat is generated because no electricity is used, and there is no impact on cylinders, solenoid valves, etc.



Air-only operation

Operation is safe because no electricity is used.





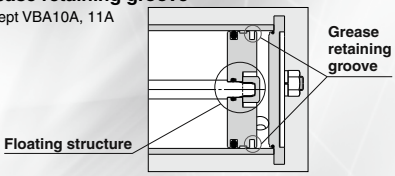
Booster Regulator/*Series* *VBA*

Air Tank/*Series* *VBAT*

Improved service life — Doubled that of the conventional model

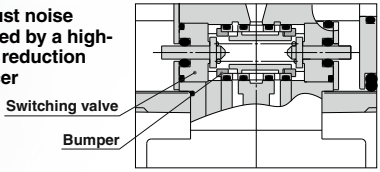
- Floating piston structure
- Grease retaining groove*

* Except VBA10A, 11A



Reduced noise — Reduced by 13 dB (A) compared with the conventional model

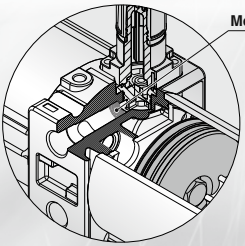
- Metal noise reduced by a bumper on the impact part of the switch valve
- Exhaust noise reduced by a high-noise reduction silencer

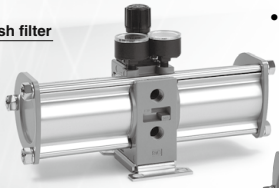


Improved reliability

Built-in mesh filter at IN port

- Prevents operation failure due to foreign matter.



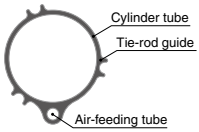


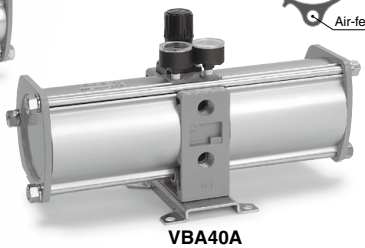
VBA20A

Anti-condensation

Integrated air-feeding tube with the main tube

- Mitigates condensation caused by cooling during exhaust expansion.



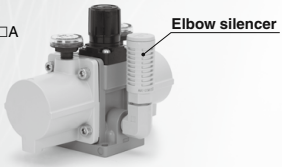


VBA40A

Elbow silencer added* (Option)

Space saving when installed has been realized.

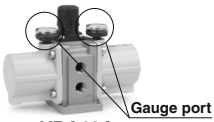
* Except VBA2□A, 4□A



1/8" gauge ports

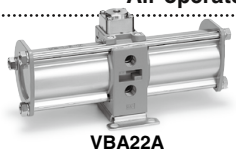
- Allows use of standard fittings for remote pressure monitoring, etc.

* Gauge ports changed from 1/16" to 1/8" (VBA1□A, 2□A)



VBA10A

Air-operated type



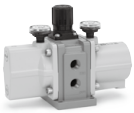
VBA22A

VBA42A

Max. operating pressure 1.6 MPa

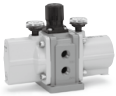
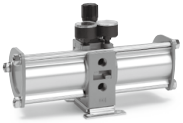
VBA43A

Fourfold pressure increase type



VBA11A

▶P.924

Pressure increase ratio	Twice			2 to 4 times
Operation	Handle-operated type (Direct operation)		Air-operated type (Remote operation)	Handle-operated type (Direct operation)
Set pressure range / Body size	0.2 to 1.0 MPa	0.2 to 1.6 MPa (2.0 MPa)	0.2 to 1.0 MPa	0.2 to 2.0 MPa
1/4"	—	VBA10A-02 (0.2 to 2.0 MPa) 	—	VBA11A-02 
3/8"	VBA20A-03 	—	VBA22A-03 	—
1/2"	VBA40A-04 	VBA43A-04 (0.2 to 1.6 MPa) 	VBA42A-04 	—

Air Tank *Series VBAT*

▶P.935

Perfect fit with a booster regulator

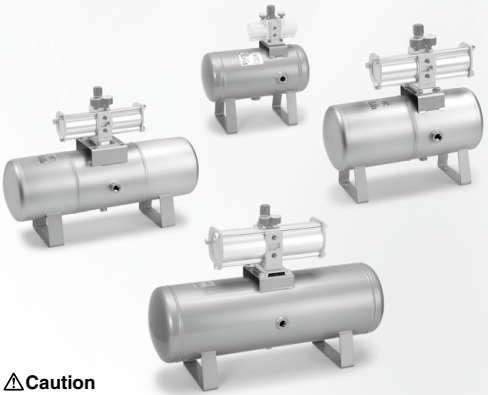
This is an air tank to which a booster regulator can be connected compactly. It can be used alone as a tank. The pressure vessel law is different from country to country, so as an air tank suitable to a country needs to be confirmed.

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.

Model	VBAT05A	VBAT10A	VBAT20A	VBAT38A
Tank capacity (L)	5	10	20	38
Max. operating pressure (MPa)	2.0		1.0	
Material	Carbon steel			

Model	VBAT05S	VBAT10S	VBAT20S	VBAT38S
Tank capacity (L)	5	10	20	38
Max. operating pressure (MPa)	2.0			
Material	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

RoHS

How to Order

Made to Order (For details, refer to page 934.)

VBA 40A – □ 04 □ – □

Body size

10A	1/4", Handle-operated type	Pressure increase ratio: Twice
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	
11A	1/4", Handle-operated type	Pressure increase ratio: 2 to 4 times

Thread type Note)

Symbol	Thread type
Nil	Rc
F	G
N	NPT
T	NPTF

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. The gauge ports of the VBA1□A are Rc thread type regardless of the thread type indication.

Semi-standard

Symbol	Semi-standard
Nil	Standard product
Z Note)	Pressure unit on the product name label and pressure gauge: psi

Note) Thread type: NPT, NPTF
Under the new measurement law, the pressure unit of "psi" on the pressure gauges cannot be used in Japan.

Option

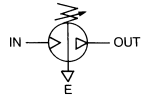
Symbol	Option
Nil	None
G	Pressure gauge
N	Silencer
S	High-noise reduction silencer Note)
GN	Pressure gauge, Silencer
GS	Pressure gauge, High-noise reduction silencer Note)
LN	Elbow silencer Note)
LS	Elbow high-noise reduction silencer Note)
GLN	Pressure gauge, Elbow silencer Note)
GLS	Pressure gauge, Elbow high-noise reduction silencer Note)

Note) Refer to "Combination of Thread Type and Options."

Port size

Symbol	Port size	Applicable series
02	1/4	VBA1□A
03	3/8	VBA2□A
04	1/2	VBA4□A

Symbol



VBA10A-02

VBA11A-02

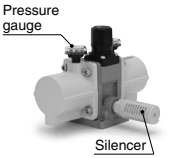
VBA20A-03

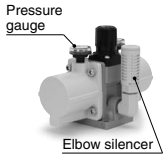
VBA22A-03

VBA40A-04

VBA42A-04

VBA43A-04





Combination of Thread Type and Options

Body size	Thread type	Option										Semi-standard	
		Nil	G	N	S	GN	GS	LN	LS	GLN	GLS	Nil	-Z
10A 11A	Nil	●	●	●	●	●	●	●	●	●	●	●	—
	F	●	●	●	●	●	●	●	●	●	●	●	—
	N	●	●	●	—	●	—	●	—	●	—	●	●
	T	●	●	●	—	●	—	●	—	●	—	●	●
20A 22A	Nil	●	●	●	●	●	●					●	—
	F	●	●	●	●	●	●					●	—
	N	●	●	●	●	●	●					●	●
	T	●	●	●	●	●	●					●	●
40A 42A 43A	Nil	●	●	●	●	●	●					●	—
	F	●	●	●	●	●	●					●	—
	N	●	●	●	●	●	●					●	●
	T	●	●	●	●	●	●					●	●

Air Tank Compatibility Chart

Air tank \ Booster regulator	VBA1□A	VBA2□A	VBA4□A
VBAT05A	●	—	—
VBAT05S			
VBAT10A	●	●	—
VBAT10S			
VBAT20A	—	●	●
VBAT20S			
VBAT38A	—	●	●
VBAT38S			

SMC

Standard Specifications

Model	VBA10A-02	VBA20A-03	VBA40A-04	VBA22A-03	VBA42A-04	VBA43A-04	VBA11A-02
Fluid	Compressed air						
Pressure increase ratio	Twice						2 to 4 times
Pressure adjustment mechanism	Handle-operated with relief mechanism Note 1)			Air-operated		Handle-operated with relief mechanism Note 1)	
Max. flow rate Note 2) (L/min (ANR))	230	1000	1900	1000	1900	1600	70
Set pressure range (MPa)	0.2 to 2.0	0.2 to 1.0		0.2 to 1.0		0.2 to 1.6	0.2 to 2.0
Supply pressure range (MPa)	0.1 to 1.0						
Proof pressure (MPa)	3	1.5				2.4	3
Port size (Rc) (IN/OUT/EXH: 3 locations)	1/4	3/8	1/2	3/8	1/2		1/4
Pressure gauge port size (Rc) (IN/OUT: 2 locations)	1/8						
Ambient and fluid temperature (°C)	2 to 50 (No freezing)						
Installation	Horizontal						
Lubrication	Grease (Non-lube)						
Weight (kg)	0.84	3.9	8.6	3.9	8.6	8.6	0.89

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 IN= OUT= 0.5 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.)

Description \ Model		VBA10A-02 VBA10A-F02	VBA20A-03 VBA20A-F03	VBA40A-04 VBA40A-F04	VBA22A-03 VBA22A-F03	VBA42A-04 VBA42A-F04	VBA43A-04 VBA43A-F04	VBA11A-02 VBA11A-F02
Pressure gauge	G	G27-20-01	G36-10-01		KT-VBA22A-7	G36-10-01	G27-20-01	G27-20-01
Silencer	N	AN20-02	AN30-03	AN40-04	AN30-03	AN40-04	AN40-04	AN20-02
High-noise reduction silencer	S	ANA1-02	ANA1-03	ANA1-04	ANA1-03	ANA1-04	ANA1-04	ANA1-02
Elbow for silencer	L	KT-VBA10A-18	—	—	—	—	—	KT-VBA10A-18

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.)

Description \ Model		VBA10A-N02* VBA10A-T02* *: when "-Z"	VBA20A-N03* VBA20A-T03* *: when "-Z"	VBA40A-N04* VBA40A-T04* *: when "-Z"	VBA22A-N03* VBA22A-T03* *: when "-Z"	VBA42A-N04* VBA42A-T04* *: when "-Z"	VBA43A-N04* VBA43A-T04* *: when "-Z"	VBA11A-N02* VBA11A-T02* *: when "-Z"
Pressure gauge *: when Nil	G	G27-20-01	G36-10-N01		KT-VBA22A-7N	G36-10-N01	G27-20-N01	G27-20-01
Pressure gauge *: when "-Z" Note 4)		G27-P20-01	G36-P10-N01		KT-VBA22A-8N	G36-P10-N01	G27-P20-N01	G27-P20-01
Silencer	N	AN20-N02	AN30-N03	AN40-N04	AN30-N03	AN40-N04	AN40-N04	AN20-N02
High-noise reduction silencer	S	—	ANA1-N03	ANA1-N04	ANA1-N03	ANA1-N04	ANA1-N04	—
Elbow for silencer	L	KT-VBA10A-18N	—	—	—	—	—	KT-VBA10A-18N

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-7N, 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

Description \ Model	For **VBA10-02** For **VBA11-02**	For **VBA20-03** 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 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

⚠Caution

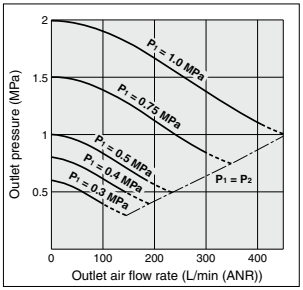
1. System configuration
- The IN port of the booster regulator has metallic mesh to prevent dust from entering the booster regulator. However, it cannot remove dust continuously or separate drainage. Make sure to install a mist separator (AM series) on the inlet side of the booster regulator.
- The booster 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.

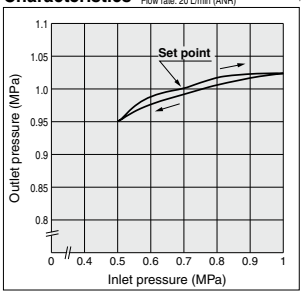
VBA10A

Flow-rate Characteristics

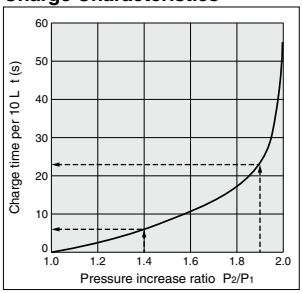


Pressure Characteristics

Inlet pressure: 0.7 MPa
Outlet pressure: 1.0 MPa
Flow rate: 20 L/min (ANR)
(Representative value)



Charge Characteristics



VBA10A

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

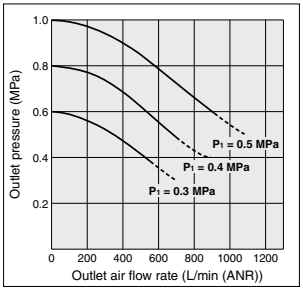
$\frac{P_2}{P_1} = \frac{0.7}{0.5} = 1.4$ $\frac{P_2}{P_1} = \frac{0.95}{0.5} = 1.9$

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:

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

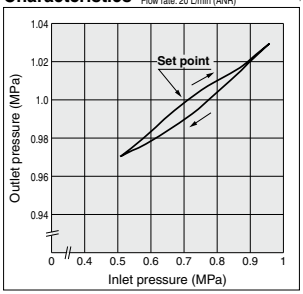
VBA20A, 22A

Flow-rate Characteristics

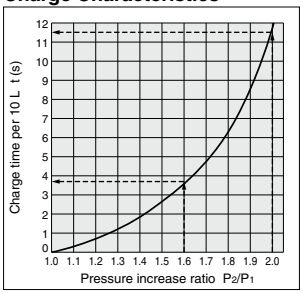


Pressure Characteristics

Inlet pressure: 0.7 MPa
Outlet pressure: 1.0 MPa
Flow rate: 20 L/min (ANR)
(Representative value)



Charge Characteristics



VBA20A, 22A

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

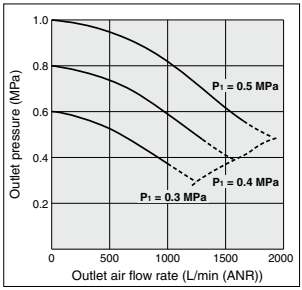
$\frac{P_2}{P_1} = \frac{0.8}{0.5} = 1.6$ $\frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0$

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:

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

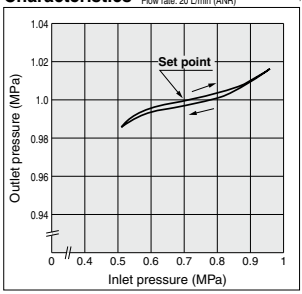
VBA40A, 42A

Flow-rate Characteristics

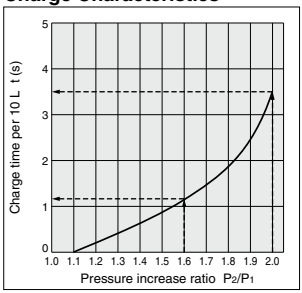


Pressure Characteristics

Inlet pressure: 0.7 MPa
Outlet pressure: 1.0 MPa
Flow rate: 20 L/min (ANR)
(Representative value)



Charge Characteristics



VBA40A, 42A

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

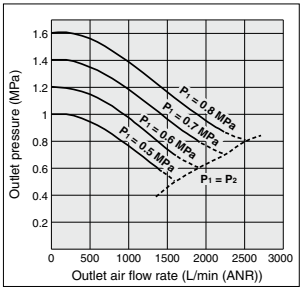
$\frac{P_2}{P_1} = \frac{0.8}{0.5} = 1.6$ $\frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0$

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:

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

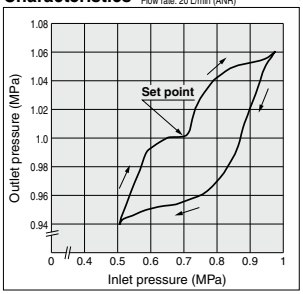
VBA43A

Flow-rate Characteristics

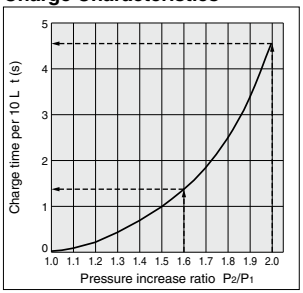


Pressure Characteristics

Inlet pressure: 0.7 MPa
Outlet pressure: 1.0 MPa
Flow rate: 20 L/min (ANR)
(Representative value)



Charge Characteristics



VBA43A

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

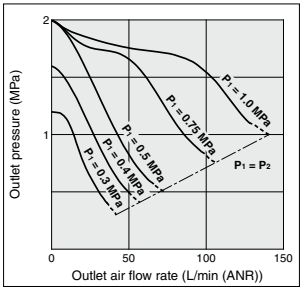
$\frac{P_2}{P_1} = \frac{0.8}{0.5} = 1.6$ $\frac{P_2}{P_1} = \frac{1.0}{0.5} = 2.0$

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:

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

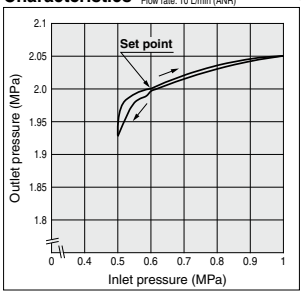
VBA11A

Flow-rate Characteristics

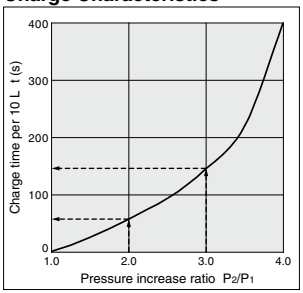


Pressure Characteristics

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



Charge Characteristics



VBA11A

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

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

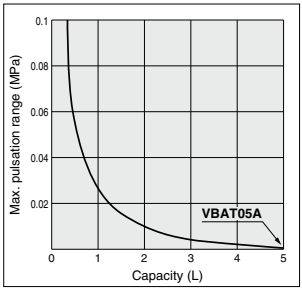
With the pressure increase ratio from 2.0 to 3.0, the charge time of 147 – 58 = 89 sec. (t) is given by the graph. Then, the charge time (T) for a 10 L tank:

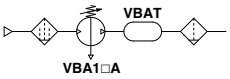
$T = t \times \frac{V}{10} = 89 \times \frac{10}{10} = 89$ (s).

Pulsation/Pulsation is decreased with a tank.

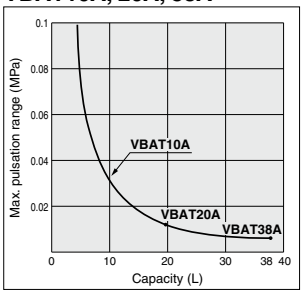
If the outlet capacity is undersized, pulsation may occur.

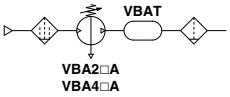
VBAT05A





VBAT10A, 20A, 38A



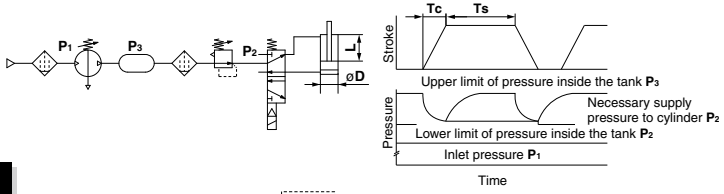


Conditions:
Inlet pressure: 0.5 MPa
Outlet set pressure: 1 MPa
Flow rate: Between 0 and max. flow rate

- 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.

Sizing

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



START

Provide requisite conditions for selection.

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 operating 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) 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.

Calculate required air flow rate Q.

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

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

Select booster regulator size from flow-rate characteristics table.

VBA2□A: Qb = 600 [L/min (ANR)]
VBA4□A: Qb = 1050 [L/min (ANR)]

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

⚠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.

Judgement of flow rate

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

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

Avoid pulsation. (Max. 0.05 MPa)

NO

YES

Select the tank from table below.

Tank model	Internal capacity	Applicable combination model		
VBAT05□	5 L	VBA1□A	—	—
VBAT10□	10 L	VBA1□A	VBA2□A	—
VBAT20□	20 L	—	VBA2□A	VBA4□A
VBAT38□	38 L	—	VBA2□A	VBA4□A

Obtain the tank capacity V.

$$\mathbf{V}\ [\text{L}] = \frac{(\mathbf{Q} - \mathbf{Qb}/2) \times (\mathbf{Tc} \times \mathbf{K}/60)}{(\mathbf{P_3} - \mathbf{P_2}) \times 9.9}$$

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

Select the tank capacity over V.

Select the **VBAT10□**, which can be directly connected to the **VBA2□A**.

Calculate time T from charge characteristics table.

Refer to "Charge Characteristics" on pages 926 and 927.

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

$$\mathbf{T} = \left(\frac{4.6}{10}\right) \times \frac{11.5 - 3.8}{1} = 3.5\ [\text{s}]$$

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.

YES — **YES** — **YES**

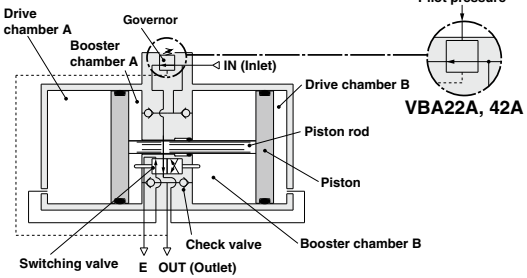
END

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.

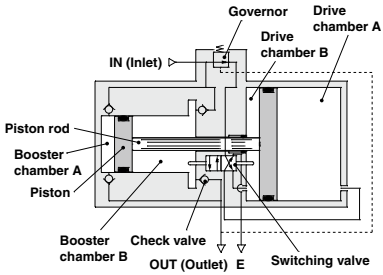
Working Principle

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.

VBA10A, 20A, 40A, 43A

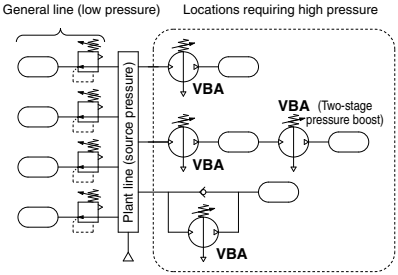


VBA11A

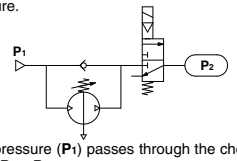


Circuit Example

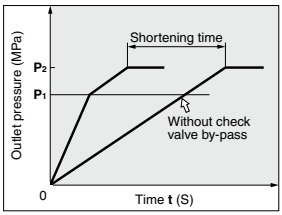
- When only some of the machines in the plant require high-pressure air, booster regulators can be installed for only the equipment that requires it. This allows the overall system to use low-pressure air while accommodating machines requiring high-pressure air.



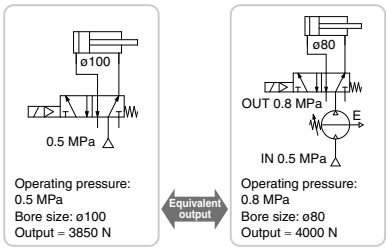
- When charging a tank or the like from a source at atmospheric pressure, a circuit with a check valve can be used to reduce the charge time by allowing air to pass through the check valve up to the inlet pressure.



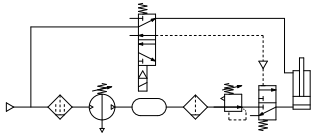
Initially, inlet pressure (**P1**) passes through the check valve, fills **P2**, and results in **P1** = **P2**.



- 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.

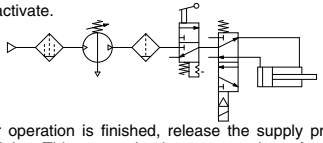


Design

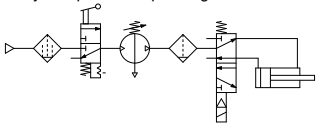
⚠Warning

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

2. Residual pressure measures
- Connect a 3-port valve to the OUT side of the booster regulator if the residual pressure must be released quickly from the outlet pressure side for maintenance, etc. (Refer to the diagram below.) The residual outlet pressure side cannot be released even if the 3-port valve is connected to the IN side because the check valve in the booster regulator will activate.



- After operation is finished, release the supply pressure at the inlet. This stops the booster regulator from moving needlessly and prevents operating malfunctions.



Selection

⚠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

⚠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 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

⚠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

⚠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: –23°C or less) is used, the life expectancy may be shortened because dry air will accelerate evaporation of grease inside.

Operating Environment

⚠Caution

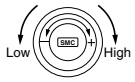
1. Installation location
- Do not install this product in an area that is exposed to rainwater or direct sunlight.
- Do not install in locations influenced by vibrations. If it must be used in such an area due to unavoidable circumstances, please contact SMC beforehand.

Handling

⚠Caution

1. Setting the pressure on the handle-operated type

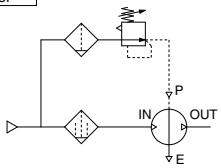
- If air is supplied to the product in the shipped state, the air will be released.
  Set the pressure by quickly pulling up on the governor handle, releasing the lock, and rotating the handle in the direction of the arrow (+).
- There is an upper and lower limit for the handle rotation. If over-rotating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



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

- Connect the outlet pipe of the pilot regulator for the remote control to the pilot port (P). (Refer to the diagram below.)
- Refer to the graph below for the relationship between the pilot pressure and outlet pressure.
- The AR20 and AW20 are recommended for the pilot regulator.

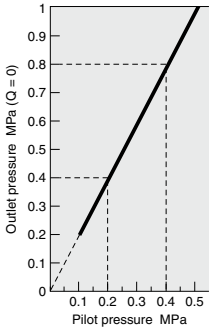
Pilot regulator



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

Pilot pressure
0.2 MPa to 0.4 MPa

Outlet pressure
0.4 MPa to 0.8 MPa



3. Draining

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

4. Exhaust

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

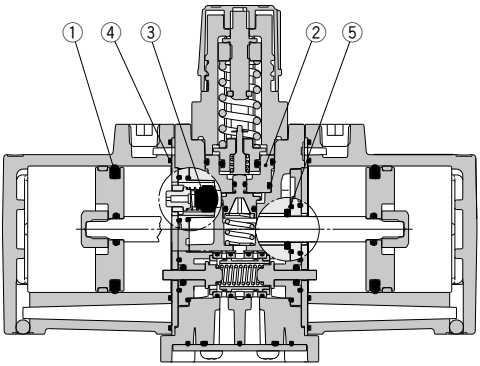
5. Maintenance

- Life expectancy varies depending on the quality of air and the operating conditions. Signs that the unit is reaching the end of its service life include the following:
  - Constant bleed from under the handle.
  - Air exhaust noise can be heard from the booster regulator at 10 to 20 second intervals even when there is no air consumption on the outlet side.

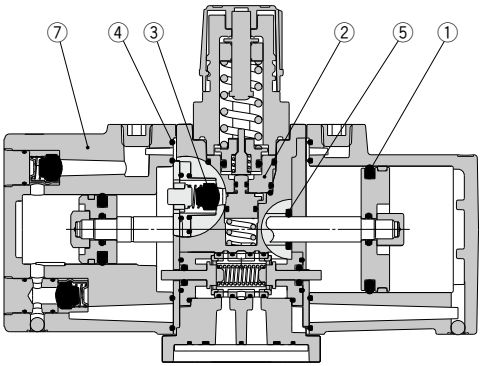
  Conduct maintenance earlier than scheduled in such cases.
- When maintenance is required, confirm the model and serial number of the booster regulator, and please contact SMC for maintenance kit.
- Conduct maintenance according to the specified maintenance procedure by individuals possessing enough knowledge and experiences in maintaining pneumatic equipment.
- The list of replacement parts and kit number are shown on page 932, and the figure shows the position of the parts.

Construction/Replacement Parts

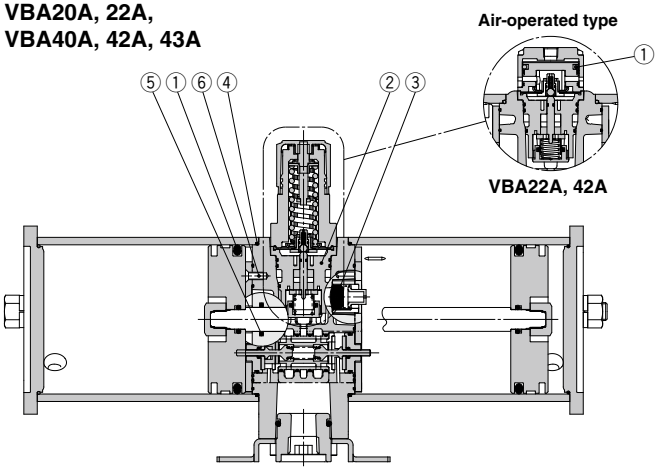
VBA10A



VBA11A



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



Replacement Parts/Kit No.

Place an order with the following applicable kit number.

Model	VBA10A	VBA20A	VBA40A	VBA22A	VBA42A	VBA43A	VBA11A
Kit no.	KT-VBA10A-1	KT-VBA20A-1	KT-VBA40A-1	KT-VBA22A-1	KT-VBA42A-1	KT-VBA43A-1	KT-VBA11A-20

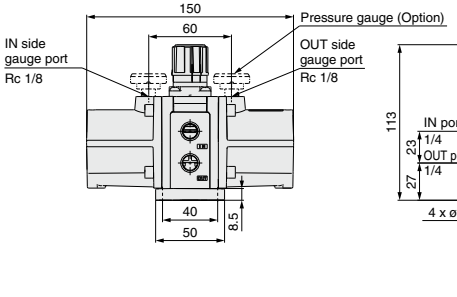
The kit includes the parts from ① to ⑦ and a grease pack.

No.	Description \ Model	VBA10A	VBA20A	VBA40A	VBA22A	VBA42A	VBA43A	VBA11A
		Quantity						
1	**Piston seal**	2			2 large 1 small		2	1 each large and small
2	**Governor assembly**	1						
3	**Check valve**	4						2
4	**Gasket**	2						
5	**Rod seal**	1						
6	**Mounting screw**	—	8	12	8	12		—
7	**Cover C assembly**	—						1
—	**Grease pack**	1		2	1	2		1

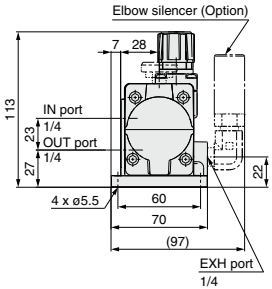
∗ The grease pack has 10 g of grease.
∗ Make sure to refer to the procedure for maintenance.

Dimensions

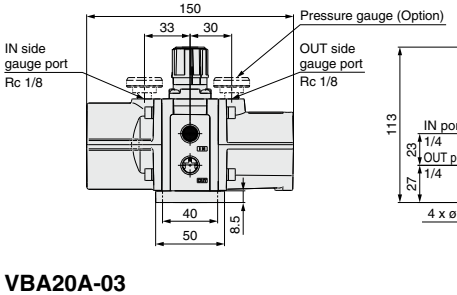
VBA10A-02



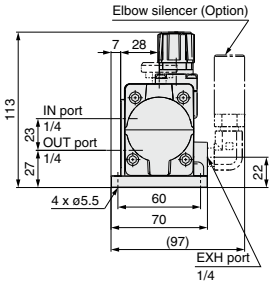
With elbow silencer (Option)



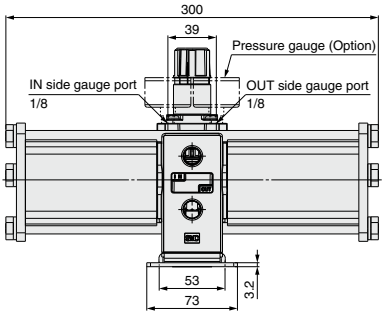
VBA11A-02

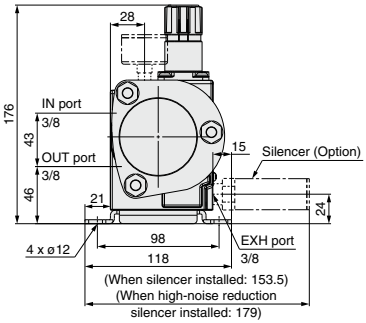


With elbow silencer (Option)

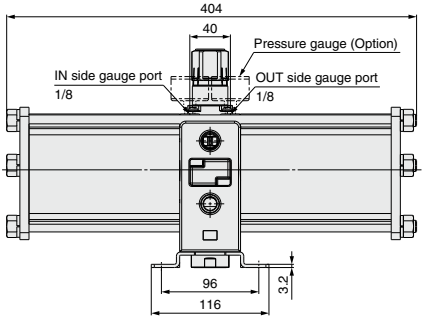


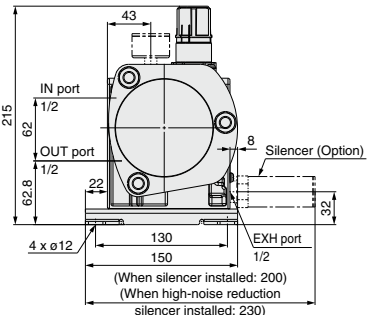
VBA20A-03





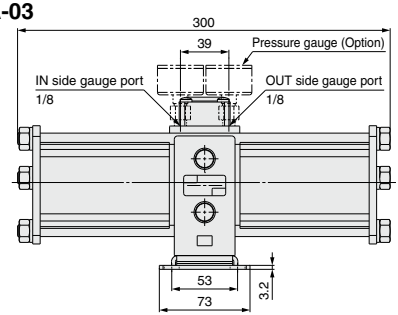
VBA40A-04

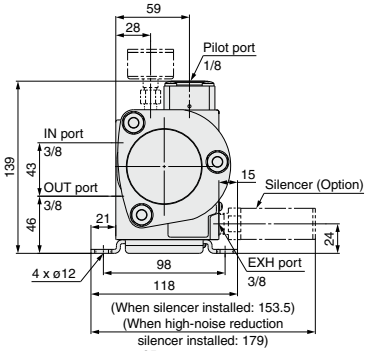




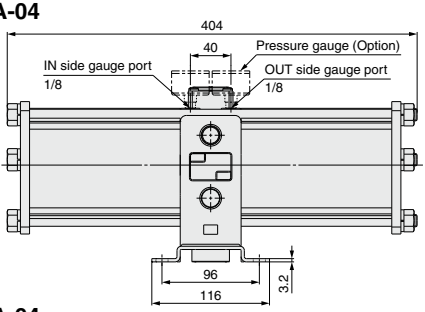
Dimensions

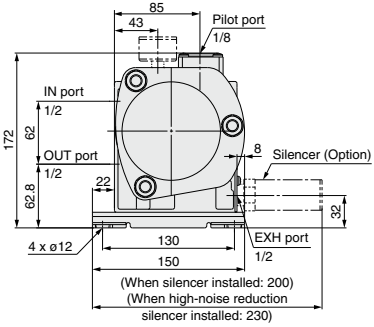
VBA22A-03



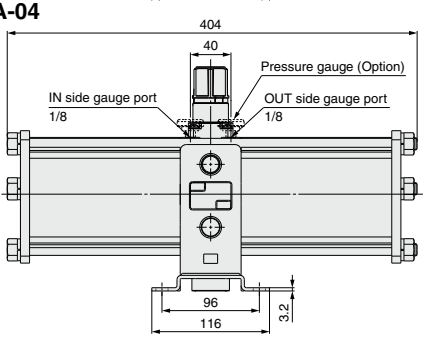


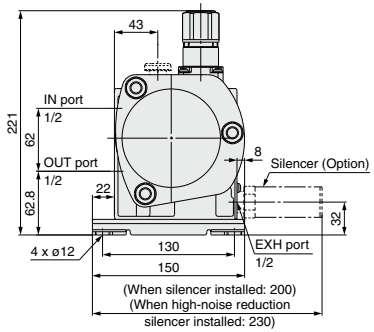
VBA42A-04





VBA43A-04





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

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.

20 — Standard model no.

- **Made to Order**
  Copper-free/Fluorine-free

∗ For booster regulator with pressure gauge, please consult SMC.
∗ 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) are used for the rubber parts of the standard model.

Air Tank

Series VBAT

CE RoHS

How to Order

Made to Order (For details, refer to page 937.)

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

VBAT05A1

VBAT10S1

VBAT20S1

VBAT38A1

Standard Product (For Japanese Market)

Note) The thread type for each port is Rc.

VBAT 10 A 1 – S □

Tank internal capacity

Symbol	Internal capacity
05	5 L
10	10 L
20	20 L
38	38 L

Material

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

Option

Symbol	Option
Nil	None
V	Drain valve

Option

Symbol	Option	Applicable model
Nil	None Note)	All models
R	Safety valve (Set pressure: 1 MPa)	VBAT05A1, VBAT10A1 VBAT20A1, VBAT38A1
S	Safety valve (Set pressure: 2 MPa)	VBAT05A1 VBAT10A1

Note) A safety valve port is provided only when option R or S is selected.

CE Certified Product

VBAT 10 A F – SV – Q

Tank internal capacity

Symbol	Internal capacity
05	5 L
10	10 L
20	20 L
38	38 L

Material

Symbol	Material
A	Carbon steel (SS400)

Thread type

Symbol	Thread type
Nil	Rc
F	G

CE certified product (Self-declaration document attached)

Accessories

Symbol	Accessories	Applicable model
RV	Safety valve (Set pressure: 1 MPa) Drain valve	VBAT20A VBAT38A
SV	Safety valve (Set pressure: 2 MPa) Drain valve	VBAT05A VBAT10A

Product Not Applicable to the ASME Standard

VBAT 05 A N 1 – SV – X11

Tank internal capacity

Symbol	Internal capacity
05	5 L
10	10 L

Material

Symbol	Material
A	Carbon steel (SS400)

Thread type

Symbol	Thread type
Nil	Rc
N	NPT Note)

Note) Pressure unit of NPT products: psi. 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 Note 1)
V	Drain valve Note 1)
S	Safety valve (Set pressure: 2 MPa) Note 2)
SV	Safety valve (Set pressure: 2 MPa) Note 2) Drain valve

Product not applicable to the ASME standard

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)

Model		VBAT05□1	VBAT10□1	VBAT20□1	VBAT38□1
Fluid		Compressed air			
Tank capacity (L)		5	10	20	38
Max. operating pressure (MPa)	VBAT□A1	2.0		1.0	
	VBAT□S1	2.0			
IN port size		3/8	3/8	1/2	1/2
OUT port size		3/8	1/2	1/2	3/4
Ambient and fluid temperature (°C)		0 to 75			
Weight (kg)	VBAT□A1	6.6	10	14	21
	VBAT□S1	3.2	4.9	12	19
Material	VBAT□A1	Carbon steel (SS400)			
	VBAT□S1	Stainless steel 304			
Paint	VBAT□A1	Outside: Silver paint, Inside: Rustproof paint			
	VBAT□S1	None			

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

CE Certified Product

Model	VBAT05A □-SV-Q	VBAT10A □-SV-Q	VBAT20A □-RV-Q	VBAT38A □-RV-Q
Fluid	Compressed air			
Tank capacity (L)	5	10	20	38
Max. operating pressure (MPa)	2.0		1.0	
IN port size	3/8	1/2	3/4	3/4
OUT port size	3/8	1/2	1/2	3/4
Ambient and fluid temperature (°C)	0 to 75			
Weight (kg)	6.6	10	14	21
Material	Carbon steel (SS400)			
Paint	Outside: Silver paint, Inside: Rustproof paint			

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

Product Not Applicable to the ASME Standard

Model	VBAT05A□1-□-X11	VBAT10A□1-□-X11
Fluid	Compressed air	
Tank capacity (L)	5	10
Max. operating pressure (MPa)	2.0	
IN port size	3/8	3/8
OUT port size	3/8	1/2
Ambient and fluid temperature (°C)	0 to 75	
Weight (kg)	6.6	11
Material	Carbon steel (SS400)	
Paint	Outside: Silver paint, Inside: Rustproof paint	

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

List of Air Tank for Overseas

Country/Region	Law	Exportable models		Details	Option (Order it separately.)
		Material: Carbon steel	Material: Stainless steel		
South Korea	High Pressure Gas Safety Control Act Occupational Safety and Health Act	VBAT05A-X101	VBAT05S-X101	Exempted product Max. operating pressure: 0.97 MPa	VBAT-K (Safety valve) VBAT-V1 (Drain valve)
		VBAT10A-X101	VBAT10S-X101		
		VBAT20A-X101	VBAT20S-X101		
		VBAT38A-X101	VBAT38S-X101		
Singapore, Malaysia	Factory Act	VBAT05A-SV-X102		Product complies with ASME specifications JBA (Japan Boiler Association) certification attached	
		VBAT10A-SV-X102			
		VBAT20A-RV-X102			
		VBAT38A-RV-X102			
Thailand, Taiwan	No applicable standard	Standard product			

Design

⚠Warning

1. Operating pressure

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

2. Connection

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

		Booster regulator		
		VBA1□A	VBA2□A	VBA4□A
Air tank	VBAT05A VBAT05S	●	—	—
	VBAT10A VBAT10S	●	●	—
	VBAT20A VBAT20S	—	●	●
	VBAT38A VBAT38S	—	●	●

Selection

⚠Caution

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

Mounting

⚠Caution

1. Accessories

- Refer to the operation manual regarding combining booster regulators with older model air tanks.
- The accessories are secured by bands to the feet of the air tank. Once removed, make sure not to lose them.

2. Installation

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

Maintenance

⚠Warning

1. Inspection

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

2. Draining

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

Options/Accessories/Part No.

<Standard Product>

For VBAT□A1 (Carbon Steel)

Model	VBAT05A1-□	VBAT10A1-□	VBAT20A1-□	VBAT38A1-□
Accessory kit	VBAT5A-Y-3	VBAT10A-Y-3	VBAT20A-Y-3	
Safety valve (When selecting an option) Note 1) 2)	VBAT-R (Set pressure: 1 MPa), VBAT-S (Set pressure: 2 MPa)		VBAT-R (Set pressure: 1 MPa)	
Drain valve (When selecting an option)	VBAT-V1			

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)

Model	VBAT05S1-□	VBAT10S1-□	VBAT20S1-□	VBAT38S1-□
Accessory kit	VBAT5S-Y-4	VBAT10S-Y-4	VBAT20S-Y-4	
Drain valve (When selecting an option)	VBAT-V1			

<CE Compliant Product>

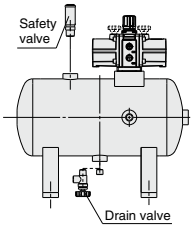
Model	VBAT05A□-SV-Q	VBAT10A□-SV-Q	VBAT20A□-RV-Q	VBAT38A□-RV-Q
Accessory kit	VBAT5A-Y-2	VBAT10A-Y-2	VBAT20A-Y-2	
Safety valve	VBAT-S (Set pressure: 2 MPa)		VBAT-R (Set pressure: 1 MPa)	
Drain valve	VBAT-V1			

<Product Not Applicable to the ASME Standard>

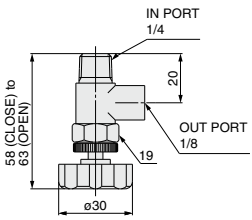
Model	VBAT05A1-□-X11	VBAT10A1-□-X11	VBAT05AN1-□-X11	VBAT10AN1-□-X11
Thread type	Rc		NPT	
Accessory kit	VBAT5A-Y-3	VBAT10A-Y-3	VBAT5A-Y-3-X11	VBAT10A-Y-3-X11
Safety valve (When selecting an option)	VBAT-S (Set pressure: 2 MPa)		VBAT-SN (Set pressure: 2 MPa)	
Drain valve (When selecting an option)	VBAT-V1		VBAT-V1N	

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

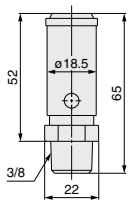
No.	Description \ Model	VBAT5A-Y-3□ / VBAT5S-Y-4	VBAT10A-Y-3□ / VBAT10S-Y-4	VBAT20A-Y-3 / VBAT20S-Y-4	VBAT5A-Y-2	VBAT10A-Y-2	VBAT20A-Y-2
		Quantity					
①	O-ring	1	1 (VBA1□A) 1 (VBA2□A)	1	1	1 (VBA1□A) 1 (VBA2□A)	1
②	Hexagon socket head taper screwed plug (For drain port)	1	1	1	1	1	1
③	Hexagon socket head cap screw	4	4 (VBA1□A) 4 (VBA2□A)	4	4	4 (VBA1□A) 4 (VBA2□A)	4
④	Anchor bolt/nut	—	—	4	—	—	4
⑤	Bushing assembly	—	—	—	1	1	1
⑥	Hexagon socket head taper screwed plug (For safety valve port)	—	—	—	1	1	1



Drain valve VBAT-V1*



Safety valve VBAT-R, VBAT-S*



(Width acrass flats 19)

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

Made to Order

1 Copper-free/Fluorine-free

20 — VBAT 10 A 1 — V

- 20: Made to Order Copper-free/Fluorine-free
- 10: Tank internal capacity
- A: Material
- 1: With drain valve

Symbol	Internal capacity
05	5 L
10	10 L
20	20 L
38	38 L

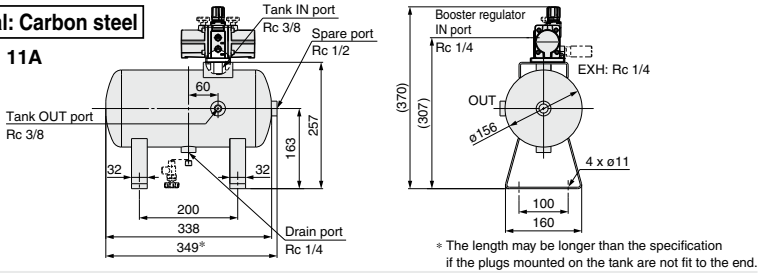
Symbol	Material
A	Carbon steel (SS400)
S	Stainless steel 304

Note 1) The thread type for each port is Rc.
Note 2) A stainless steel fitting and a drain valve are included in the same container as accessories. (For detailed dimensions, please contact SMC.) A safety valve cannot be selected.
Note 3) Since neither copper nor fluorine parts are used for the tank, a standard model can be used when options (safety valve and drain valve) are not necessary.

Dimensions: Standard Product (For Japanese Market)

VBAT05A1 Material: Carbon steel

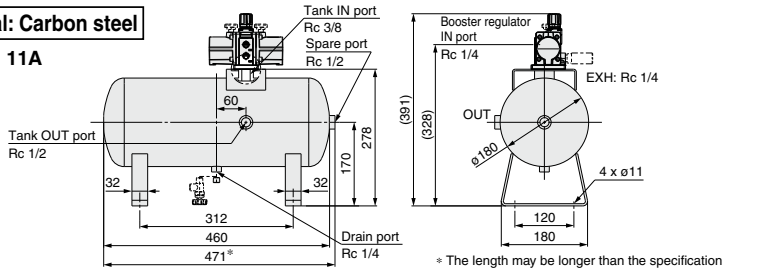
Connected to VBA10A, 11A



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

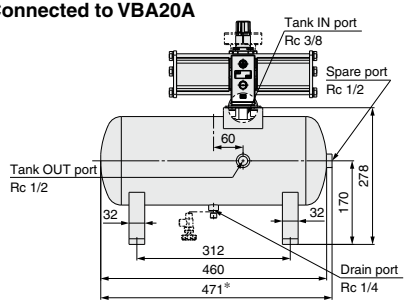
VBAT10A1 Material: Carbon steel

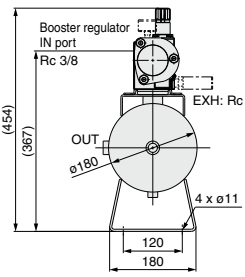
Connected to VBA10A, 11A



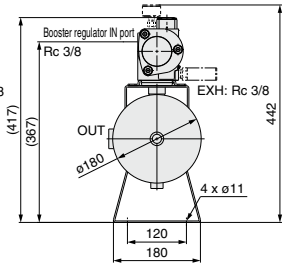
* The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

Connected to VBA20A





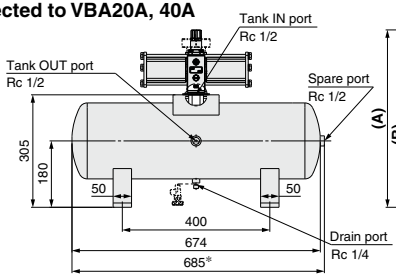
Connected to VBA22A

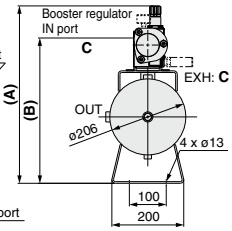


* The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

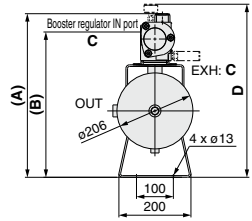
VBAT20A1 Material: Carbon steel

Connected to VBA20A, 40A





Connected to VBA22A, 42A



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

(mm)

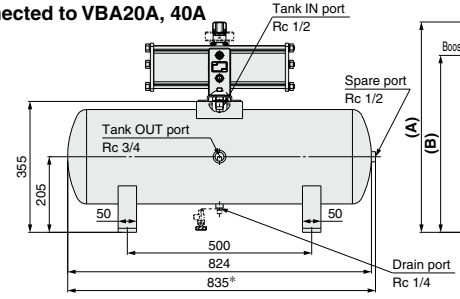
Booster regulator model	A	B	C	D Note)
VBA20A	481	394	Rc 3/8	—
VBA40A	520	429.8	Rc 1/2	—
VBA22A	444	394	Rc 3/8	469
VBA42A	477	429.8	Rc 1/2	493

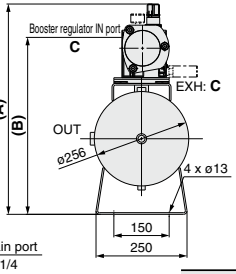
Note) When option G (pressure gauge) is selected

Dimensions: Standard Product (For Japanese Market)

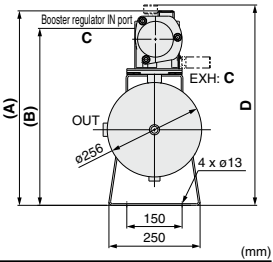
VBAT38A1 Material: Carbon steel

Connected to VBA20A, 40A





Connected to VBA22A, 42A



(mm)

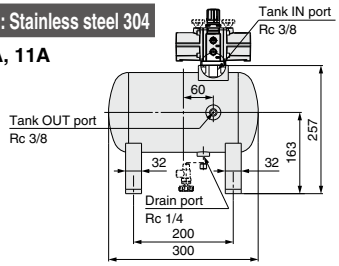
Booster regulator model	A	B	C	D Note)
VBA20A	531	444	Rc 3/8	—
VBA40A	570	479.8	Rc 1/2	—
VBA22A	494	444	Rc 3/8	519
VBA42A	527	479.8	Rc 1/2	543

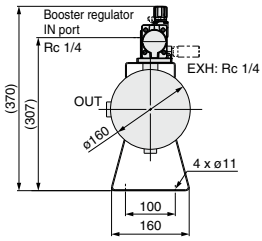
Note) When option G (pressure gauge) is selected

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

VBAT05S1 Material: Stainless steel 304

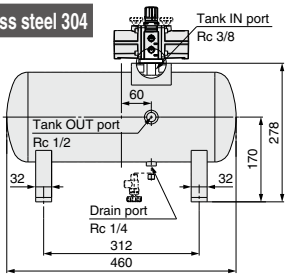
Connected to VBA10A, 11A

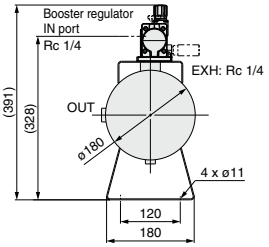




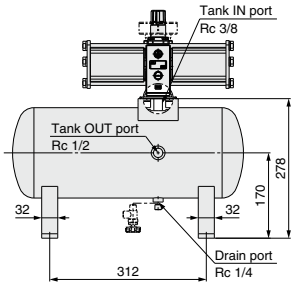
VBAT10S1 Material: Stainless steel 304

Connected to VBA10A, 11A

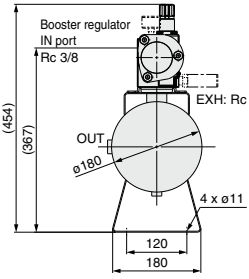


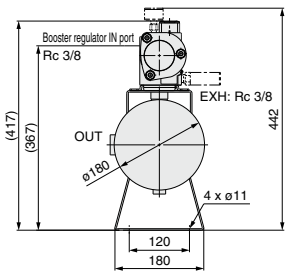


Connected to VBA20A



Connected to VBA22A

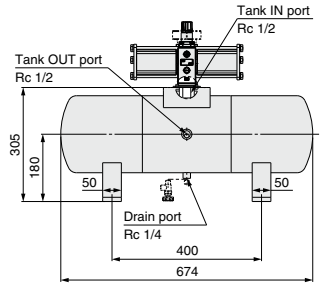


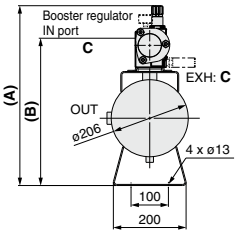


Dimensions: Standard Product (For Japanese Market)

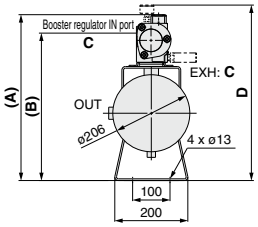
VBAT20S1 Material: Stainless steel 304

Connected to VBA20A, 40A





Connected to VBA22A, 42A, 43A



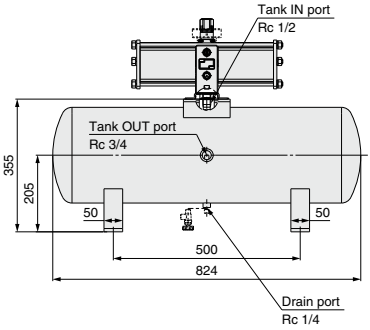
(mm)

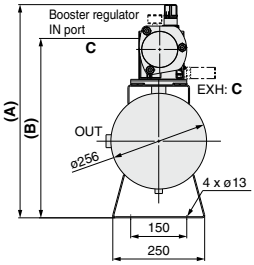
Booster regulator model	A	B	C	D Note)
VBA20A	481	394	Rc 3/8	—
VBA40A	520	429.8	Rc 1/2	—
VBA22A	444	394	Rc 3/8	469
VBA42A	477	429.8	Rc 1/2	493
VBA43A	526	—	—	—

Note) When option G (pressure gauge) is selected

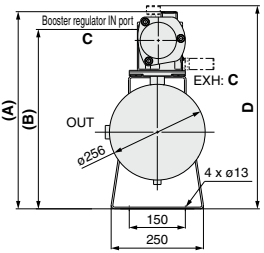
VBAT38S1 Material: Stainless steel 304

Connected to VBA20A, 40A





Connected to VBA22A, 42A, 43A



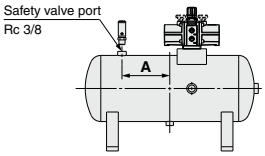
(mm)

Booster regulator model	A	B	C	D Note)
VBA20A	531	444	Rc 3/8	—
VBA40A	570	479.8	Rc 1/2	—
VBA22A	494	444	Rc 3/8	519
VBA42A	527	479.8	Rc 1/2	543
VBA43A	576	—	—	—

Note) When option G (pressure gauge) is selected

VBAT$^{05}_{10}$A1-$^{R}_{S}$

With safety valve

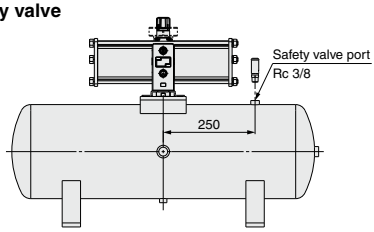


(mm)

Tank model	A
VBAT05	60
VBAT10	130

VBAT$^{20}_{38}$A1-$^{R}_{S}$

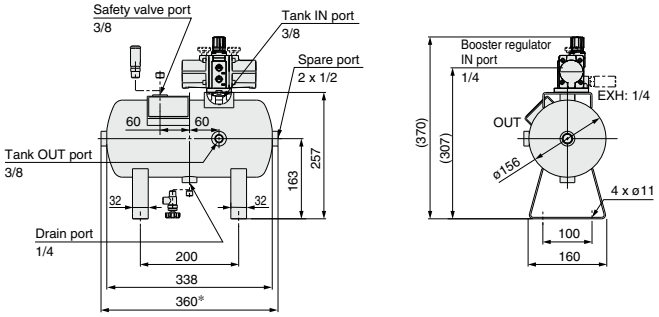
With safety valve



Dimensions: CE Certified Product

VBAT05A-Q Material: Carbon steel

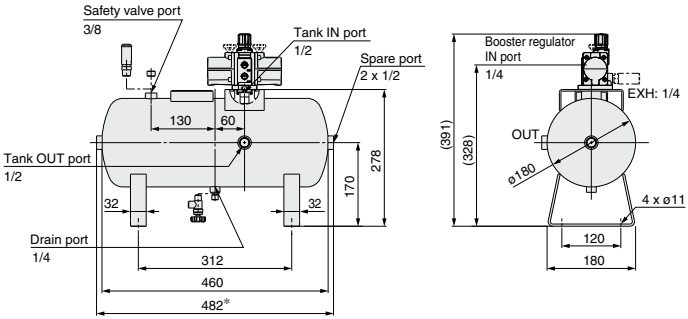
Connected to VBA10A, 11A



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

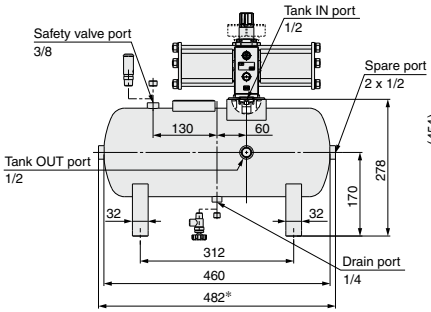
VBAT10A-Q Material: Carbon steel

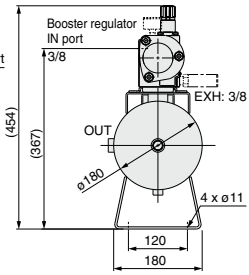
Connected to VBA10A, 11A



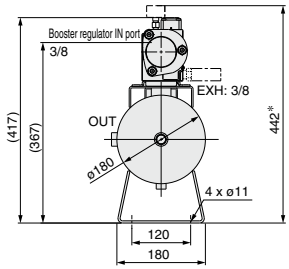
* The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.
The length of G thread type is about 6 mm longer due to plug type differences.

Connected to VBA20A





Connected to VBA22A



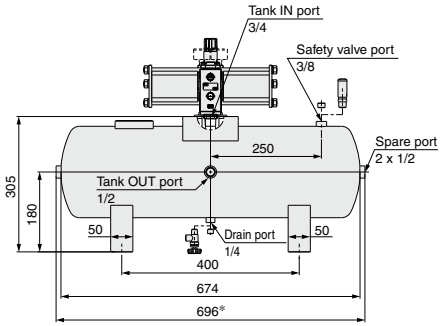
* When option G (pressure gauge) is selected

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

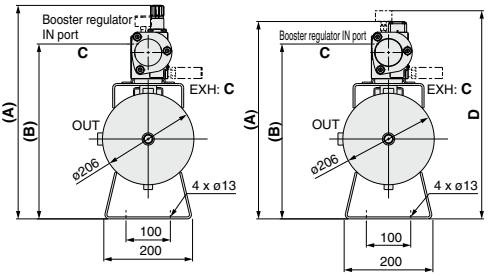
Dimensions: CE Certified Product

VBAT20A-Q Material: Carbon steel

Connected to VBA20A, 40A



Connected to VBA22A, 42A



∗ 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.

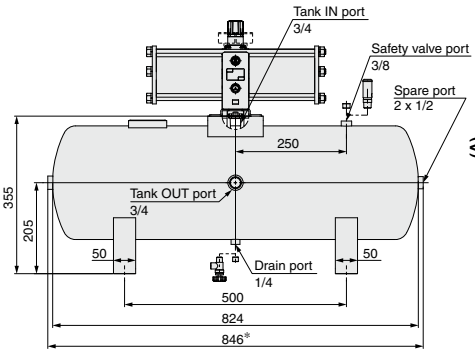
(mm)

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

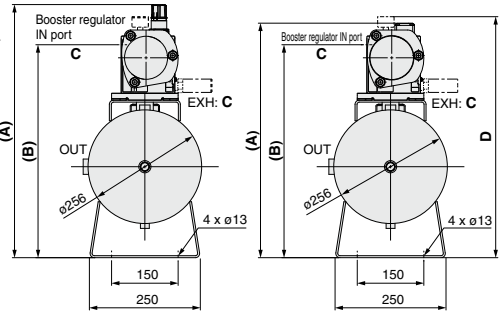
Note) When option G (pressure gauge) is selected

VBAT38A-Q Material: Carbon steel

Connected to VBA20A, 40A



Connected to VBA22A, 42A



∗ 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.

(mm)

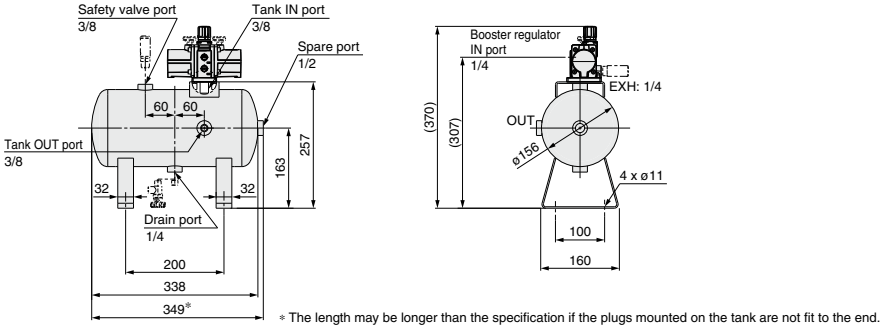
Booster regulator model	A	B	C	D Note)
VBA20A	531	444	3/8	—
VBA40A	570	479.8	1/2	—
VBA22A	494	444	3/8	519
VBA42A	527	479.8	1/2	543

Note) When option G (pressure gauge) is selected

Dimensions: Product Not Applicable to the ASME Standard

VBAT05A1-X11 Material: Carbon steel

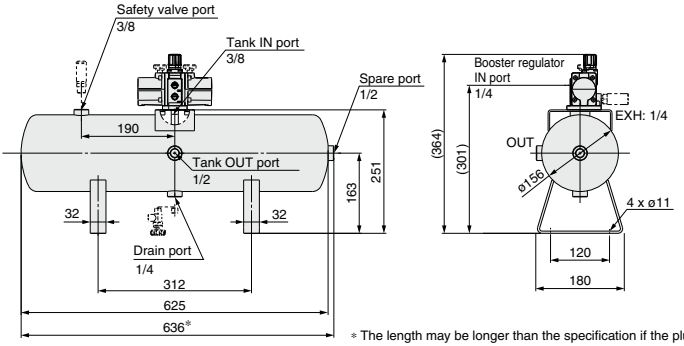
Connected to VBA10A, 11A



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

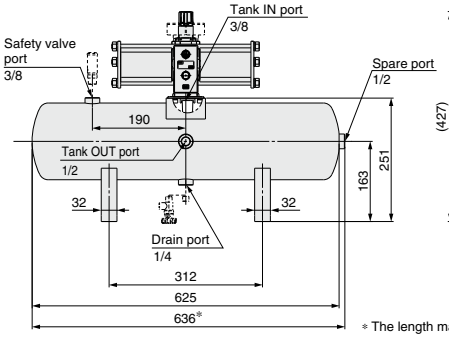
VBAT10A1-X11 Material: Carbon steel

Connected to VBA10A, 11A

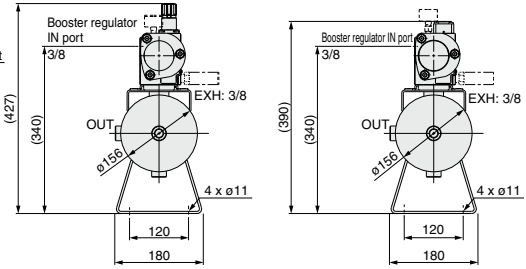


* The length may be longer than the specification if the plugs mounted on the tank are not fit to the end.

Connected to VBA20A



Connected to VBA22A



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