



# Operation Manual

PRODUCT NAME

Booster Regulator

MODEL / Series / Product Number

VBA10A-02-X3145

**SMC Corporation**

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# Safety Instructions

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

\*1) 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: Manipulating industrial robots -Safety.

etc.



## Caution

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



## Warning

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



## Danger

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

## 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.



# Safety Instructions

## 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, whichever is first.\*2)

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.

\*2) 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

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

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

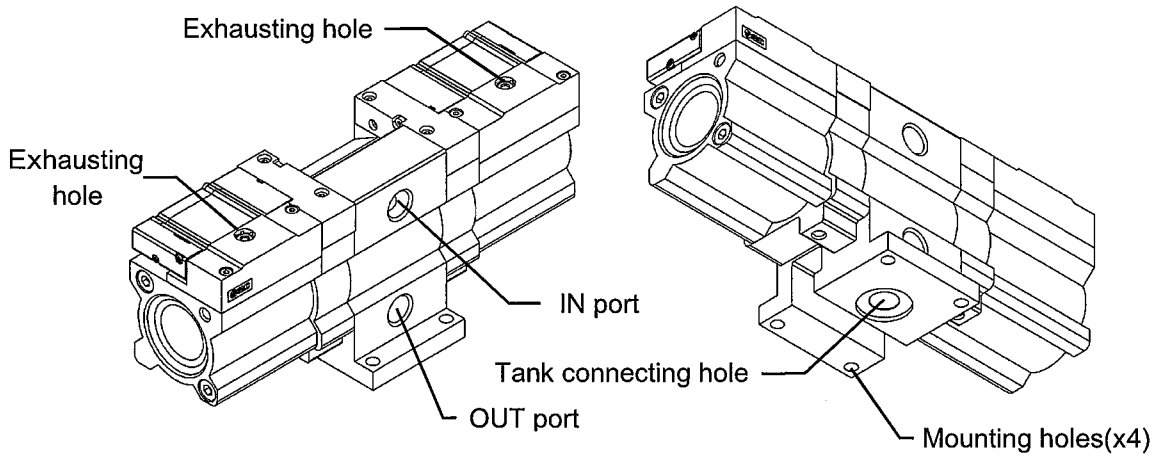
## Caution

**SMC products are not intended for use as instruments for legal metrology.**

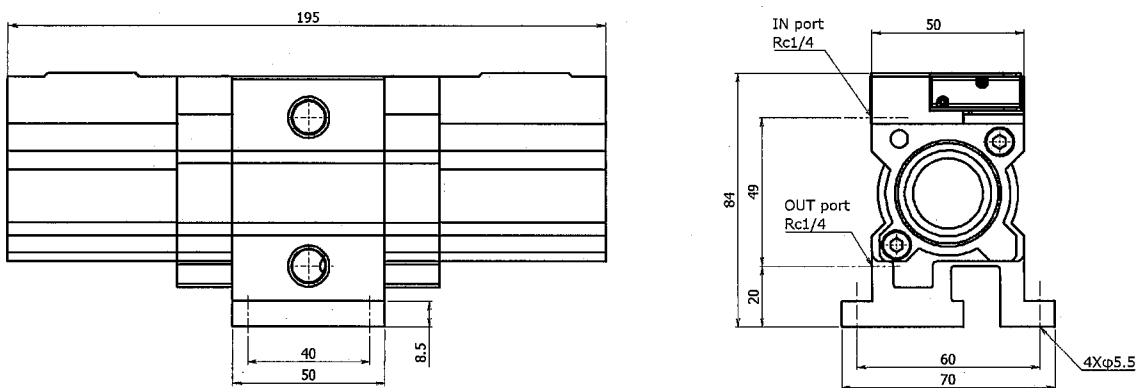
Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.

Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

## 1. Description of the components



## 2. External Dimensions drawing



## 3. Specifications

Pressure increase ratio	1.7 (fixed)
Outlet pressure range	0.3 to 1.2MPa
Inlet pressure range	0.2 to 0.7MPa
Proof pressure	1.8MPa
Max. flow rate	230L/min(ANR) (IN=OUT=0.5MPa)
Ambient and operating fluid temperature	2 to 50°C (No freezing)
Lubrication	Grease (Non-lube)
Installation	Horizontal, Vertical
Pressure adjusting mechanism	None
Weight	1.2kg

## 4.Design

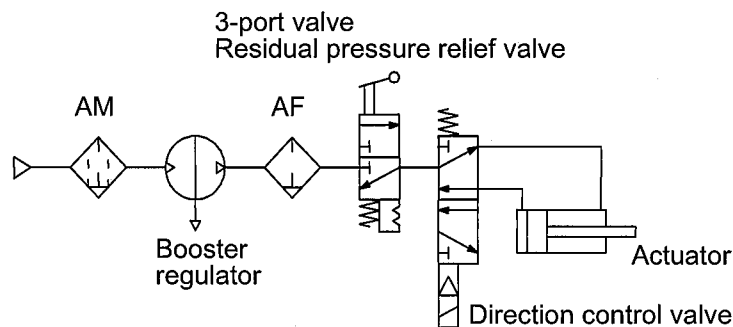
### Warning

#### 1. Warning concerning abnormal outlet pressure

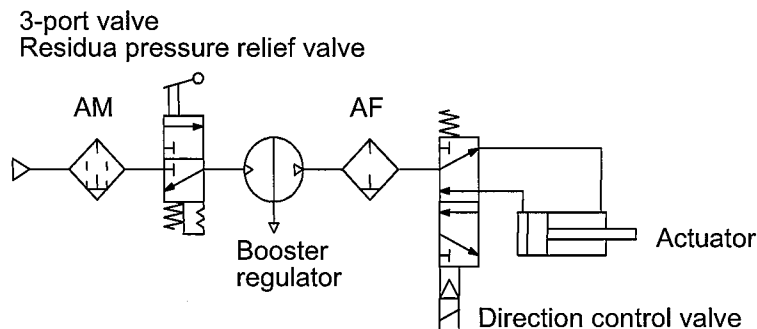
- If there is a likelihood of causing an outlet pressure drop due to unforeseen circumstances such as equipment malfunction, thus leading to a major problem, take safety measures on the system side.
- Because the outlet pressure could exceed its set range if there is a large fluctuation in the inlet pressure, leading to unexpected accidents, take safety measures against abnormal pressures.
- Even when the booster regulator cannot correctly boost the pressure due to the regulator reaching the end of its life or malfunctioning, supply air continues coming out from OUT port and the exhausting hole.
- 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 air consumption.



## 5.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

- Since the booster regulator is a compressor powered by the air, it consumes the air. The air consumption is approximately 0.7 times larger than the outlet side volume. Therefore, the booster regulator requires a supply capacity of the inlet side volume that is approximately 1.7 times larger than the outlet side volume.
- When operating the booster regulator continuously for longer periods of time, particularly confirm its service life.
- The service life of the booster regulator depends on the operating cycles. The operating cycles depend on the outlet flow of the booster regulator. Thus, when more outlet flow of the booster regulator is used, its service life becomes shorter.

## 6.Mounting

### Caution

#### 1. Mounting

- Since the booster regulator vibrates due to the reciprocation of the internal piston, mount 4 bolts onto the mounting holes and tighten them completely.

Model	Bolt size	Tightening torque
VBA10A-X3145	M5	3N·m

- If vibration of the booster regulator may cause problems, take countermeasures in your application to prevent vibration.
- Ensure there is enough space for maintenance.
- When connecting the booster regulator with the VBAT tank, be sure to read the operation manual and use the accessories provided with the tank.

## 7.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. If the piping is too thin, the function will be reduced due to the pressure loss.

#### 3. Piping

- Connect IN port with the air source, and OUT port with an actuator.
- Piping on each port should be tightened to the tightening torque specified below.

Port size	1/4
Tightening torque	12 to 14N·m

#### 4. Particle generation

- Since there are sliding parts in the booster regulator, particles are generated. Mount air purification equipment such as an air filter or a mist separator on the outlet side as necessary.
- Lubrication (grease) from inside the booster regulator is contained in the exhaust air.

## 8.Air Supply

### Caution

#### 1. Quality of air source

- 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.
- Connect the lubricator only at the outlet. Accumulation of oil in the booster regulator may cause malfunction.



## 9. 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.

## 10. Handling

#### 1. 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.

#### 2. 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 following.
  - ① Even when there is no air consumption on the outlet side, air exhaust noise can be heard from the booster regulator.  
(When the interval of air exhaust noise is less than 30 seconds, the seals are being worn out or damaged)
  - ② The silencer mounted on the exhaust turns back due to dirt.  
(Seals are getting worn out, so particles get stuck in the silencer.)
- When maintenance is required, please contact SMC.

## 11. Troubleshooting

Trouble	Possible cause	Time of occurrence	Countermeasures
Pressure doesn't increase.	IN and OUT piping connected the wrong way round.	Beginning	· Reconnect the piping properly.
	Insufficient supply of inlet pressure and flow rate. Outlet flow rate (amount used) is too much.	Beginning Middle	· Decrease the operating pressure and flow rate. · Increase the number of the booster regulator (for parallel and series).
Doesn't operate.	The pressure was lower than the minimum operating pressure.	Beginning Middle	· If the inlet pressure fluctuation is large, stabilize it with a regulator.
Operation doesn't stop.	Air is leaking from the equipment or piping on the downstream side of the outlet.	Beginning	· Check where the air is leaking from and fix it.
	Sealing is worn out or broken due to intrusion of foreign matter or lubrication running out.	Middle Later	Change the seals.

Revision history

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.  
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