

Design

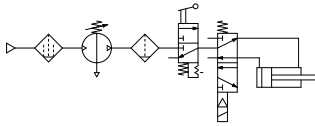
⚠ Warning

1. Warning concerning abnormal outlet pressure

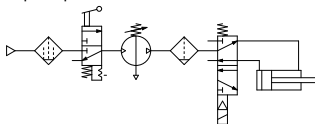
- If there is a likelihood of causing an outlet pressure drop due to unforeseen circumstances such as equipment malfunction, thus leading to a major problem, take safety measures on the system side.
- Because the outlet pressure could exceed its set range if there is a large fluctuation in the inlet pressure, leading to unexpected accidents, take safety measures against abnormal pressures. If operation at a flow rate that falls within the unstable area ($P_1 \geq P_2$) occurs due to outlet pressure consumption, install an air tank, etc. (Refer to page 1277.)
- Operate the equipment within its maximum operating pressure and set pressure range.

2. Residual pressure measures

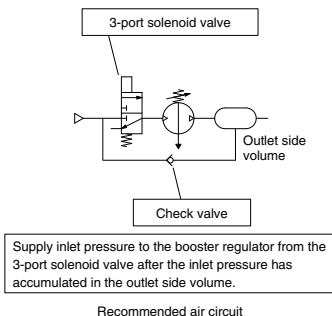
- Connect a 3-port valve to the OUT side of the booster regulator if the residual pressure must be released quickly from the outlet pressure side for maintenance, etc. (Refer to the diagram below.) The residual outlet pressure side cannot be released even if the 3-port valve is connected to the IN side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



- After operation is complete, release the inlet supply pressure. By doing this, unnecessary booster regulator operation and malfunction can be prevented.
- When stopping the booster regulator, after the pressure has risen, exhaust the pressure starting from the inlet side, and then stop the product.



- If operated so that the inlet pressure and outlet pressure are exhausted every operational cycle, the flow rate will occasionally fall within the unstable area shown in the "Flow Rate Characteristics" graphs on pages 1276 and 1277, which may result in the switching valve stopping at an intermediate position and failing to operate. (The restart method is shown on page 1283.)
- When exhausting inlet pressure or outlet pressure (residual pressure), supply inlet pressure to the booster regulator after supplying the inlet pressure to the outlet side volume.



Design

⚠ Caution

1. System configuration

- Be sure to secure an air supply capacity of the minimum operating pressure (0.1 MPa) or more. If the internal operating pressure becomes less than the minimum operating pressure, the switching valve may remain in the intermediate position, which may cause a restart failure.
- 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.
If a lubricator is connected to the inlet side, oil will accumulate on the sliding parts of the switching valve in the booster regulator, which may result in increased sliding resistance and the malfunction of the product.

2. Exhaust air measures

- Provide a dedicated pipe to release the exhaust air from each booster regulator. If centralized piping is used for the exhaust air, the switching valve may stop halfway and fail to increase the pressure due to the influence of other exhaust.
In the same manner, if a silencer or exhaust cleaner other than those designated by SMC is used, back pressure will be generated due to the clogging of the silencer, which may result in the switching valve stopping halfway and failing to increase the pressure.
- 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.

Selection

⚠ Caution

1. Selection

- Based on the conditions (such as pressure, flow rate and cycle time) required for the outlet side of the booster regulator, check the selection procedures described in this catalog or model selection software for size selection of the booster regulator. Model selection can be done using the selection software on the SMC website. Go to Documents/Downloads → Model Selection Software → Booster Regulators
- Since the booster regulator is a compressor powered by the air, it consumes the air. The air consumption is approximately 1.2 times (pressure increase ratio 2) or 3.7 times (pressure increase ratio 4) larger than the outlet side volume. Therefore, the booster regulator requires a supply capacity of the inlet side volume that is approximately 2.2 times (pressure increase ratio 2) or 4.7 times (pressure increase ratio 4) larger than the outlet side volume.
- Set the pressure of the VBA10A, VBA20A, VBA22A, VBA40A, VBA42A or VBA43A (pressure increase ratio 2) to a level that is at least 0.1 MPa higher than the inlet pressure. If the pressure differential is less than 0.1 MPa, the internal operating pressure becomes the minimum operating pressure or less and the switching valve may remain at the intermediate position, causing a restart failure.
- Set the pressure increase ratio of the VBA11A (pressure increase ratio 4) to 2 or more. When the VBA11A is used at a pressure increase ratio of less than 2 or a pressure differential of less than 0.3 MPa, the internal operating pressure drops below the min. operating pressure, and the switching valve may remain at an intermediate position, causing a restart failure.
- Confirm the service life of the booster regulator according to the operating conditions using our selection software.
- The service life of the booster regulator depends on not the operation hours but the operating cycles (piston sliding distance). The operating cycles (piston sliding distance) 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. Selecting a booster regulator of a larger size will result in reduced operation frequency, thus increasing the service life of the product.
- When using two booster regulators for 2-stage pressure boost, be sure to provide a stable supply of pressure to the downstream booster regulator, and install a pressure vessel such as an air tank, etc., between the booster regulators. (Refer to the circuit diagram shown on page 1280.)

Mounting

⚠ Caution

1. Transporting

- When transporting this product, hold it lengthwise with both hands. Never hold it by the black knob that protrudes from the center because the knob 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. The product will not operate if mounted vertically.
- 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 any foreign matter enters the inside of the booster regulator, an unexpected malfunction or reduced service life may result.

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, an unexpected malfunction or reduced service life may result.
- 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.

2. Pressure fluctuation

- Provide a stable supply of pressure for the inlet pressure. If the inlet pressure supply is unstable, operation also becomes unstable, which may result in the switching valve stopping at an intermediate position and failing to operate.
- When starting up the compressor, be sure to wait for the pressure to stabilize at the min. operating pressure (0.1 MPa) or higher before supplying air so that pressure less than the min. operating pressure isn't being supplied to the booster regulator.

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.

Handling

⚠ Caution

1. Setting the pressure on the knob-operated type

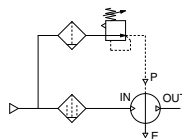
- If air is supplied to the product in the shipped state, the air will be released.
- Set the pressure by quickly pulling up on the governor knob, releasing the lock, and rotating the knob in the direction of the arrow (+).
- There is an upper and lower limit for the knob rotation. If over-rotating the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

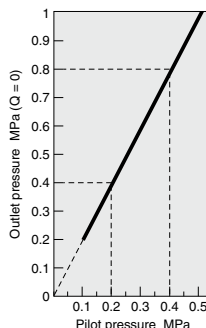
- Connect the outlet pipe of the pilot regulator for the remote control to the pilot port (P). (Refer to the diagram below.)
- Refer to the graph below for the relationship between the pilot pressure and outlet pressure.
- The AR20 and AW20 are recommended for the pilot regulator.

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



Handling

⚠ Caution

3. Draining

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

4. Exhaust

- If the air on the OUT side is not consumed for a long period of time when the pressure increase ratio is set to 2 or less, there may be delays in the left and right switching operation of the piston, which may result in air leakage from the exhaust port. This phenomenon is not considered abnormal. The leak will stop once the air on the OUT side is consumed.

5. Maintenance

Booster regulator

- 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:
 - 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.
- 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 1284, and the figure shows the position of the parts.

Silencer

It is normal for the silencer to change in color due to the turbine oil, grease, and drain contained in the exhaust, the surrounding atmosphere, etc. Back pressure will be generated if the silencer is clogged, which may result in the switching valve stopping at an intermediate position and failing to increase the pressure. Therefore, be sure to regularly replace the silencer.

6. Restart method when the pressure will not increase

- With the inlet side in a pressurized state, use your finger, a finger valve, etc., to block the exhaust port, let the exhaust pressure rise, and then quickly release it.
- Release inlet and outlet pressure air and, after confirming the safety of the downstream devices, resupply the air.