



# Operation Manual

PRODUCT NAME

Air operated valve

MODEL / Series / Product Number

*VGA342R Series*

**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)<sup>\*1)</sup>, 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 10218-1992: 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

### **1. 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 regulations 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.**



## VGA342R Series

# 3-port air operated valve / Precautions (1)

Make sure to read this before handling.

### Design/Selection

#### Warning

##### 1. Confirm the specifications.

This product is designed only for use in compressed air systems. Do not operate at pressures or temperatures, etc., beyond the range of specifications, as this can cause damage or malfunction.

Contact SMC when using a fluid other than compressed air (including vacuum).

We do not guarantee against any damage if the product is used outside of the specification range.

##### 2. Actuator drive

When an actuator, such as a cylinder, is to be driven using a valve, take appropriate measures (cover installation or approach prohibition) to prevent potential danger caused by actuator operation.

##### 3. Holding Pressure (including Vacuum)

Since the valves are subject to air leakage, they cannot be used for applications such as holding pressure (including vacuum) in a pressure vessel.

##### 4. Not suitable for use as an emergency shutoff valve, etc.

The valves presented in this catalog are not designed for safety applications such as an emergency shutoff valve. If the valves are used in this type of system, other reliable safety assurance measures should also be adopted.

##### 5. Release of residual pressure

For maintenance purposes install a system for releasing residual pressure.

##### 6. Operation in a vacuum condition

When a valve is used for switching a vacuum, take measures to install a suction filter or similar to prevent external dust or other foreign matter from entering inside the valve. In addition, at the time of vacuum adsorption, be sure to vacuum at all times.

Failure to do so may result in foreign matter sticking to the adsorption pad, or air leakage causing the workpiece to drop.

##### 7. Regarding a vacuum switch valve and a vacuum release valve

If a non-vacuum valve is installed in the middle of piping system having a vacuum, the vacuum condition will not be maintained. Use a valve designed for use under vacuum condition.

##### 8. Ventilation

When using the valve in a closed control panel, etc., install ventilating openings to prevent an increase of pressure inside the control panel.

##### 9. Do not disassemble the product or make any modifications.

Do not disassemble the product or make any modifications, including additional machining.

This may cause human injury and/or an accident.

#### Caution

##### 1. Use in low temperature environments

Although the product is applicable down to  $-10^{\circ}\text{C}$ , when using the valve in a low temperature environment, take appropriate measures to avoid freezing or solidification of condensate, moisture, etc.

##### 2. Operation for air blowing

Compressed air within the pressure range of the established specifications should be supplied to the external pilot type valve's port.

##### 3. Mounting orientation

Mounting orientation is not specified.

### Installation

#### Warning

##### 1. Operation Manual

Install and operate only after reading the operation manual carefully and understanding the contents. Also, keep the manual where it can be referred to as necessary.

##### 2. Maintenance space

When installing the products, allow access for maintenance.

##### 3. Screw tightening and tightening with proper tightening torque

When installing the products, follow the listed torque specifications.

##### 4. If air leakage increases or the equipment does not operate properly, STOP operation.

Check mounting conditions when air and power supplies are connected. Initial function and leakage tests should be performed after installation.

##### 5. Painting and coating

Warnings or specifications printed or labeled on the product should not be erased, removed or covered. Please consult with SMC before applying paint to resinous parts, as this may have an adverse effect due to the solvent in the paint.



## VGA342R Series

# 3-port air operated valve / Precautions (2)

Make sure to read this before handling.

### Piping

#### ⚠ Caution

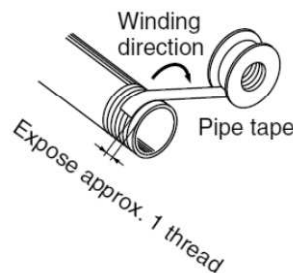
##### 1. Prior to piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

##### 2. Sealant tape

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not enter the piping.

Also, if pipe tape is used, leave 1 thread ridge exposed at the end of the threads



##### 3. Connection of fittings

When screwing the fitting into the valve, tighten it as follows.

- (1) When installing SMC fittings, follow the procedures below.

##### Rc thread

Tighten with the proper torque shown below.

##### Tightening Torque for applicable piping

Thread	Proper tightening torque (Nm)
Rc 1/8	7 to 9
Rc 1/2	28 to 30
Rc3/4	28 to 30
Rc1	36 to 38

- (2) Follow the procedures of the manufacturer when fittings other than SMC are used.

##### 4. Piping to products

When connecting piping to a product, refer to its operation manual to avoid mistakes involving the supply port, etc.

### Lubrication

#### ⚠ Warning

##### Lubrication

1. The product has been lubricated for life by the manufacturer, and does not require additional lubrication while in service.
2. If a lubricant is used in the system, use class 1 turbine oil (no additive), ISO VG32. Once lubricant is utilized within the system, since the original lubricant applied within the product during manufacturing will be washed away, please continue to supply lubrication to the system. Without continued lubrication, malfunctions could occur.  
If turbine oil is used, refer to the Material Safety Data sheet (MSDS) of the turbine oil.
3. Please contact SMC regarding Class 2 turbine oil (with additives), ISO VG32.

### Air Supply

#### ⚠ Warning

##### (1) Type of fluids

Please contact SMC when using the product in applications other than with compressed air.

##### (2) When there is a large amount of condensate

Compressed air containing a large amount of drainage can cause malfunction of pneumatic equipment. An air dryer or water droplet separator should be installed upstream from the filters.

##### (3) Drain flushing

If condensate in the drain bowl is not emptied on a regular basis, the bowl will overflow and this may cause the malfunction of pneumatic equipment. If the drain bowl is difficult to check and remove, installation of a drain bowl with an auto drain option is recommended.

For detailed information regarding the quality of the compressed air described above, refer to SMC's "Air Cleaning Systems".

##### (4) Types of air

Do not use compressed air which contains chemicals, synthetic oils containing organic solvents, salts or corrosive gases, etc., as this can cause damage or a malfunction.



## VGA342R Series

# 3-port air operated valve / Precautions (3)

Make sure to read this before handling.

### Air Supply

#### Caution

1. If ultra dry air is used as a fluid, the lubrication characteristics of the equipment will deteriorate and this can affect the reliability (life) of the product. Contact SMC beforehand, if using ultra dry air.
2. Install an air filter.  
Install an air filter upstream near the valve.  
Select an air filter with a filtration size of 5µm or smaller.
3. Install an aftercooler, air dryer or drain catch before the filter and take appropriate measures.  
Compressed air that contains a large amount of drainage can cause malfunction of pneumatic equipment such as valves. Take measures to ensure air quality, such as installing an aftercooler, air dryer, or water separator.
4. If excessive carbon powder is generated, eliminate it by installing mist separators on the upstream side of valves.  
If excessive carbon dust is generated by the compressor, it may adhere to the inside of a valve and cause it to malfunction.

For detailed information regarding the quality of the compressed air described above, refer to SMC's "Air Cleaning Systems".

### Environment

#### Warning

- 1) Do not use in an environment where corrosive gases, chemicals, sea water, water or steam are present.
- 2) Do not use in an environment where flammable gas or explosive gas exists. Usage may cause a fire or an explosion. The product do not have an explosion proof construction.
- 3) Do not use in a place subject to heavy vibration and/or shock.
- 4) The valve should not be exposed to prolonged sunlight. Use a protective cover.
- 5) Remove any sources of excessive heat.
- 6) If it is used in an environment where there is possible contact with oil, weld spatter, etc., exercise preventive measures.

### Maintenance and Inspection

#### Warning

- (1) Maintenance should be performed according to the procedure indicated in the Operation Manual (this copy).  
Improper handling can cause an injury; damage and/or malfunction of equipment and machinery.
- (2) Removal of equipment, and supply/exhaust of compressed air  
When components are removed, first confirm that measures are in place to prevent workpieces from dropping, run-away equipment, etc. Then, cut off the supply pressure and electric power, and exhaust all compressed air from the system using its residual pressure release function.  
When the equipment is operated after remounting or replacement, first confirm that measures are in place to prevent lurching of actuators, etc. Then, confirm that the equipment is operating normally.
- (3) Low frequency operation  
Valve should be operated at least once every 30 days to prevent malfunction. (Use caution regarding the air supply.)

#### Caution

##### 1. Draining

Remove drainage from air filters regularly.

##### 2. Lubrication

Lubrication must be continued once it has been used in the system.

Use class 1 turbine oil (with no additive), ISO VG32.

If other lubricant oil is used, it may cause malfunction. Please contact SMC for suggested class 2 turbine oil (with additives), ISO VG32.



## VGA342R Series

### 3-port air operated valve/Specific Product Precaution

**Make sure to read this before handling.**

#### **Pilot pressure/external pilot type**

When the operating pressure is less than 0.2MPa, adjust the pilot pressure and external pilot pressure to 0.2MPa.

When the operating pressure is 0.2MP or more, adjust the pressure to the value the same as the operating pressure.

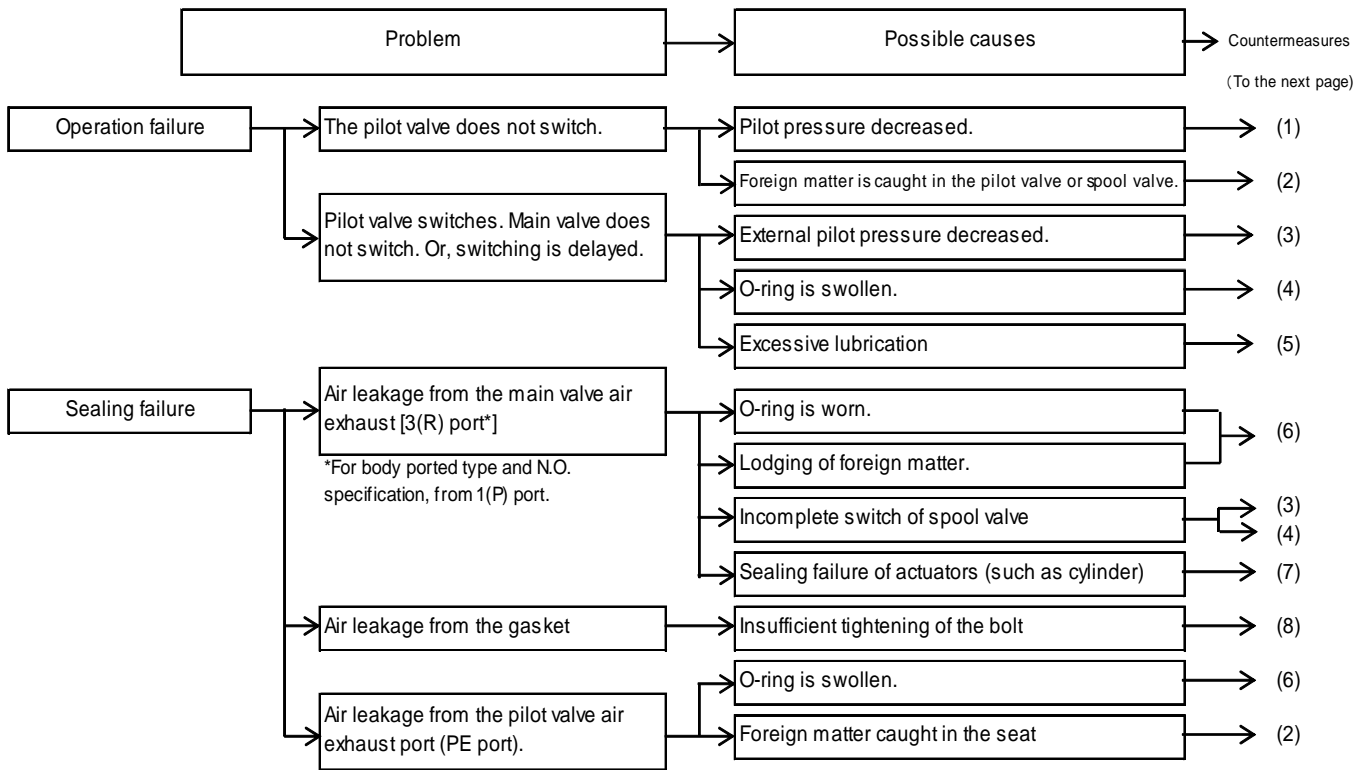
#### **Handling precautions**

1. As the PE port is the exhaust port of the pilot valve, do not plug or restrict it.
2. The X port is the pressure supply port of the pilot valve and PE port is the exhaust port of the pilot valve. Pay attention that these ports should be connected correctly.



# Trouble shooting

Perform troubleshooting with higher possibility based on the failure phenomenon.



## Countermeasures

No.	Countermeasures
(1)	Adjust the pressure so that pilot pressure is within the specified range during operation.
(2)	- Replace the pilot valve assembly.
(3)	Adjust the pressure so that external pilot pressure is within the specified range during operation.
(4)	* If incorrect oil has been used for lubrication, remove the oil with air blow, and replace the valve with a new one. If a lubricant is used in the system after the replacing the valve, use turbine oil Class 1 (with no additive) ISO VG32.  If there is a large amount of condensate or condensate cannot be removed completely, mount an auto drain or install a dryer and replace the valve.
(5)	Reduce the supply oil to the amount at which the oil does not splash from the air exhaust port.
(6)	If air leakage is caused by foreign matter, remove foreign matter in the piping by air blow and replace the valve.
(7)	Repair or replace the actuators.
(8)	Stop the air and additionally tighten the bolt.

If the countermeasures above are not effective, there may be a problem with the valve. Stop using the valve immediately.

If any of the examples below are applicable, there may be an internal problem in the valve. Stop using the valve immediately.

1. Oils other than specified were supplied.
2. Lubrication was stopped in the middle of lubrication. Or, lubrication was interrupted temporarily
3. Directly exposed to water
4. Severe impact was applied.
5. Foreign matter such as condensate or rubber entered.
6. Other than those specified, if precautions on the operation manual apply.

\*If the product has failed, then please return the valve as it is.

Revision history

☐ Complete revision

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## SMC Corporation

4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021 JAPAN  
Tel: + 81 3 5207 8249 Fax: +81 3 5298 5362  
URL <http://www.smcworld.com>

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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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