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 *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)

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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.

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**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.

   \(\ast 2\) 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.
警告

1. **确认规格。**
   这种产品仅适用于压缩空气系统。请勿在超过规格范围的压力或温度下操作，否则可能导致损坏或功能故障。
   联系SMC使用除压缩空气（包括真空）外的其他流体。
   我们不保证在规格范围之外使用产品。

2. **气缸驱动**
   当使用气缸（如气缸）作为驱动时，应当采取适当措施（如安装防护装置），以防止气缸操作可能带来的危险。

3. **保持压力（包括真空）**
   自气阀是气密的，它们不适用于保持压力（包括真空）的装置。

4. **不适用于作为紧急切断阀等。**
   这类气阀未设计为安全应用，如紧急切断阀。如果用于此类系统，应采取其他可靠的保证安全的措施。

5. **释放残留压力**
   为了维护目的，安装一个释放残留压力的系统。

6. **操作在真空条件下**
   当气阀用于切换真空时，应采取措施安装一个吸尘器或类似装置，以防止外部灰尘或其他外物进入气阀。在此过程中，应确保在真空条件下进行吸附，以防止真空条件的改变。
   否则，可能导致气阀堵塞，或空气泄漏使工作部件掉落。

7. **关于真空开关阀和真空释放阀**
   如果非真空阀门在中间的管道系统中使用，真空条件不会得到维护。使用设计用于真空条件的阀门。

8. **通风**
   当使用阀门于封闭式控制面板等时，应安装通风开口，以防止控制面板内压力增加。

警告

9. **不要拆卸产品或进行任何修改。**
   不要拆卸产品或进行任何修改，包括额外的加工。这可能导致人身伤害和/or事故。

警告

1. **在低温环境中使用。**
   尽管产品适用于-10℃，但在低温环境下使用时，应采取适当措施避免冻结或凝结。
   其他可靠的保证安全的措施应被采用。

2. **操作用于吹气**
   应该在建立的规格范围内供应压缩空气到外部气动型阀门的口。

3. **安装方向**
   安装方向未规定。

安装

1. **操作手册**
   安装和操作前，请仔细阅读操作手册并理解内容。手册应放在可参考的位置。

2. **维护空间**
   安装产品时，应留有维护空间。

3. **螺丝紧固和紧固适当的紧固力矩**
   安装产品时，应按照列出的紧固力矩进行。

4. **如果泄漏增加或设备不正常运行，请停止操作。**
   当气和动力供应接通时，应检查安装条件。安装后应进行初步功能和泄漏测试。

5. **油漆和涂层**
   警告或规格应打印或标记在产品上，不应被移除或覆盖。请咨询SMC关于树脂部分的油漆，因为油漆中的溶剂可能会对产品有不良影响。
**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**
<table>
<thead>
<tr>
<th>Thread</th>
<th>Proper tightening torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rc 1/8</td>
<td>7 to 9</td>
</tr>
<tr>
<td>Rc 1/2</td>
<td>28 to 30</td>
</tr>
<tr>
<td>Rc3/4</td>
<td>28 to 30</td>
</tr>
<tr>
<td>Rc1</td>
<td>36 to 38</td>
</tr>
</tbody>
</table>
   (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**

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.
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".

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.
**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.

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<th>Possible causes</th>
<th>Countermeasures</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>The pilot valve does not switch.</td>
<td>Pilot pressure decreased.</td>
<td>(1)</td>
</tr>
<tr>
<td>Pilot valve switches. Main valve does not switch. Or, switching is delayed.</td>
<td>Foreign matter caught in the pilot valve or spool valve</td>
<td>(2)</td>
</tr>
<tr>
<td>Sealing failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air leakage from the main valve air exhaust [3(R) port]</td>
<td>O-ring is worn.</td>
<td>(6)</td>
</tr>
<tr>
<td>(For body ported type and N.O. specification, from 1(P) port.)</td>
<td>Lodging of foreign matter.</td>
<td>(3)</td>
</tr>
<tr>
<td>Air leakage from the gasket</td>
<td>Incomplete switch of spool valve</td>
<td>(4)</td>
</tr>
<tr>
<td>Air leakage from the pilot valve air exhaust port (PE port)</td>
<td>Sealing failure of actuators (such as cylinder)</td>
<td>(7)</td>
</tr>
<tr>
<td></td>
<td>Insufficient tightening of the bolt</td>
<td>(8)</td>
</tr>
<tr>
<td></td>
<td>O-ring is swollen.</td>
<td>(6)</td>
</tr>
<tr>
<td></td>
<td>Foreign matter caught in the seat</td>
<td>(2)</td>
</tr>
</tbody>
</table>
### Countermeasures

<table>
<thead>
<tr>
<th>No.</th>
<th>Countermeasures</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Adjust the pressure so that pilot pressure is within the specified range during operation.</td>
</tr>
<tr>
<td>(2)</td>
<td>Replace the pilot valve assembly.</td>
</tr>
<tr>
<td>(3)</td>
<td>Adjust the pressure so that external pilot pressure is within the specified range during operation.</td>
</tr>
<tr>
<td>(4)</td>
<td>* 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.</td>
</tr>
<tr>
<td>(5)</td>
<td>Reduce the supply oil to the amount at which the oil does not splash from the air exhaust port.</td>
</tr>
<tr>
<td>(6)</td>
<td>If air leakage is caused by foreign matter, remove foreign matter in the piping by air blow and replace the valve.</td>
</tr>
<tr>
<td>(7)</td>
<td>Repair or replace the actuators.</td>
</tr>
<tr>
<td>(8)</td>
<td>Stop the air and additionally tighten the bolt.</td>
</tr>
</tbody>
</table>

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

First edition: June 1993