Operation Manual

PRODUCT NAME

3/5 Port Solenoid Valve

MODEL/ Series

VK300/3000 Series

SMC Corporation
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.

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

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.  
   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.
   • 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.
Precautions for 3/5 Port Solenoid Valve 1
Be sure to read before handling.

Design / Selection

⚠️ Warning

1. Confirm the specifications
   This product is designed only for use in compressed air systems (including vacuum).
   Do not operate at pressures or temperatures, etc., beyond the range of specifications, as this can cause damage or malfunction. (Refer to the specifications.)
   Please 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 (such as the installation of a cover or the restricting of access to the product) to prevent potential danger caused by actuator operation.

3. Effect of back pressure when using a manifold
   Use caution when valves are used on a manifold because actuators may malfunction due to back pressure.
   Caution is necessary especially when a single acting cylinder is operated. When there is a danger of such a malfunction, take countermeasures such as using an individual EXH manifold.

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

5. Not suitable for use as an emergency shutoff valve, etc.
   VK series are not designed for safety applications such as an emergency shutoff valve. If the valves are used for the mentioned applications, additional safety measures should be adopted.

6. Release of residual pressure
   For maintenance and inspection purposes install a system for releasing residual pressure.

7. 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 supply a constant supply of vacuum. Failure to do so may result in foreign matter sticking to the adsorption pad or air leakage, causing the workpiece to drop.

8. Regarding a vacuum switch valve and a vacuum release valve
   If a non-vacuum valve is installed in the middle of a piping system that contains a vacuum, the vacuum condition will not be maintained. Use a valve designed for use under vacuum conditions.

9. Ventilation
   Provide ventilation when using a valve in a confined area, such as in a closed control panel. For example, install a ventilation opening, etc. in order to prevent pressure from increasing inside of the confined area and to release the heat generated by the valve.

10. Extended periods of continuous energization
    If a valve will be continuously energized for an extended period of time, the temperature of the valve will increase due to the heat generated by the coil assembly. This will likely adversely affect the performance of the valve and any nearby peripheral equipment. Therefore, when the total energizing time per day is expected to be longer than the total de-energizing time per day, use a continuous duty type valve.
    Depending on the operating conditions, it may be possible to use valves which are not mentioned above. Please contact SMC. In addition, it is possible to shorten the energizing time by using a N.O. (normal open) valve.
    - When the valve is mounted onto a control panel, incorporate measures to limit the heat radiation so that it is within the operating temperature range. Do not touch the valves by bare hand during or after energization.
    For example, the temperature will be high when a 3 station manifold or larger is put next to other valves and continuously energised.

11. Do not disassemble the product or make any modifications, including additional machining.
    Doing so may cause human injury and/or an accident.

⚠️ Caution

1. Leakage voltage
   Take note that the leakage voltage will increase when a resistor is used in parallel with a switching element or when a C-R circuit (surge voltage suppressor) is used for protecting a switching device because of the leakage voltage passing through the C-R circuit. The suppressor residual leakage voltage should be as follows.

<table>
<thead>
<tr>
<th>Type</th>
<th>DC coil</th>
<th>AC coil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2% or less of rated voltage</td>
<td>20% or less of rated voltage</td>
</tr>
</tbody>
</table>

2. Solenoid valve drive for AC with solid state output (SSR, TRIAC output, etc.)

   1) Current leakage
      When using a snubber circuit (C-R element) for surge protection of the output, a very small amount of electrical current will continue to flow even during the OFF state. This may result in damage to the output contacts. Therefore, if an overvoltage or overcurrent is received from an external device, the surge protection element inside the valve is overloaded, causing the element to break. In the worst case, the breakage causes the electric circuit to enter short-circuit status. When energizing continues while in this state, the output may not switch normally. Please contact SMC.

   2) Minimum allowable load amount (Min. load current)
      When the consumption current of a valve is less than the output's minimum allowable load volume or the margin is small, the output may not switch normally. Please contact SMC.

3. Surge voltage suppressor
   1) The surge voltage suppressor built into the valve is intended to protect the output contacts so that the surge generated inside the valve does not adversely affect the output contacts. Therefore, if an overvoltage or overcurrent is received from an external peripheral device, the surge voltage protection element inside the valve is overloaded, causing the element to break. In the worst case, the breakage causes the electric circuit to enter short-circuit status. When energizing continues while in this state, the output may also cause a fire. So, take appropriate protective measures, such as the installation of an overcurrent protection circuit in the power supply or a drive circuit to maintain a sufficient level of safety.
Warning
1. Operation Manual (this document)
Install the products and operate them only after reading the operation manual carefully and understanding its contents. Also, keep the manual where it can be referred to as necessary.
2. Ensure sufficient space for maintenance activities.
When installing the products, allow access for maintenance and inspection.
3. Tighten threads with the proper tightening torque.
When installing the products, follow the listed torque specifications.
4. If air leakage increases or 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 on or affixed to the product should not be erased, removed, or covered up. Please consult with SMC before applying paint to resinous parts, as this may have an adverse effect due to the solvent in the paint.

Caution
1. Preparation before 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. Winding of 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 sealant tape is used, leave 1 thread ridge exposed at the end of the threads.
3. Connection of fittings
When screwing fittings into valves, tighten as follows.
(1) Follow the procedures below when installing an SMC fitting, etc.
* M5 types
After tightening the fitting by hand, use a wrench to tighten the fitting an additional approximately 1/6 to 1/4 turn. As a reference value, tightening torque is 1 to 1.5 N·m.
Note) If tightened excessively, the thread of the product may break or the gasket may deform. If tightened insufficiently, the thread of the product may become loose. In either case, air leakage can occur.
(2) Follow the procedure of the manufacturer when fittings other than SMC is used.

Tightening Torque for Piping

<table>
<thead>
<tr>
<th>Connection thread</th>
<th>Proper tightening torque (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rc1/8</td>
<td>3~5</td>
</tr>
</tbody>
</table>
VK300/3000 Series
Precautions for 3/5 Port Solenoid Valve 3
Be sure to read before handling.

Piping

⚠️ Caution

4. Piping to products
When piping to a product, avoid mistakes regarding the supply port, etc.
This product is universal porting type. N.C type, N.O. type, divider type and selector type can be used.

Symbol (Body ported)

![Solenoid Valve Symbol](image)

Warning

1. The solenoid valve is an electrical product. For safety, install an appropriate fuse and circuit breaker before use.

Caution

1. Polarity
When connecting power to a solenoid valve with a DC specification and a light or surge voltage suppressor, check for polarity.
If the polarity connection is wrong, the valve will not operate.

2. Applied voltage:
When electric power is connected to a solenoid valve, be careful to apply the proper voltage. Improper voltage may cause malfunction or coil damage.

3. Check the connections.
Check if the connections are correct after completing all wiring.

4. External force applied to the lead wire
If an excessive force is applied to the lead wire, this may cause faulty wiring. Take appropriate measures so that a force of 30 N or more is not applied to the lead wire.

Wiring

⚠️ Caution

1. Polarity
When connecting power to a solenoid valve with a DC specification and a light or surge voltage suppressor, check for polarity.
If the polarity connection is wrong, the valve will not operate.

2. Applied voltage:
When electric power is connected to a solenoid valve, be careful to apply the proper voltage. Improper voltage may cause malfunction or coil damage.

3. Check the connections.
Check if the connections are correct after completing all wiring.

4. External force applied to the lead wire
If an excessive force is applied to the lead wire, this may cause faulty wiring. Take appropriate measures so that a force of 30 N or more is not applied to the lead wire.

Lubrication

⚠️ Caution

1. Lubrication
1) The product has been lubricated for life by the manufacturer and therefore, does not require lubrication while in service.
2) If a lubricant is used in the system, use class 1 turbine oil (no additives), ISO VG32.
   Once a lubricant is used in the system, lubrication must be continued because the original lubricant applied during manufacture will be washed away.
   If turbine oil is used, refer to the Safety Data Sheet (SDS) of the oil.

2. Lubrication amount
If too much oil is supplied, the oil will be accumulated in the product, causing malfunction or response delay.

Air Supply

⚠️ Warning

1. Type of fluids
Please consult with SMC when using the product in applications other than compressed air.

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

3. Drain flushing
If condensation in the drain bowl is not emptied on a regular basis, the bowl will overflow. This may cause the malfunction of pneumatic equipment.
If the drain bowl is difficult to check and remove, the 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 Best Pneumatics catalog.

4. Use clean air.
Do not use compressed air that contains chemicals, synthetic oils that include organic solvents, salt, corrosive gases, etc., as it can cause damage or malfunction.

Caution

1. When extremely dry air is used as the fluid, degradation of the lubrication properties inside the equipment may occur, resulting in reduced reliability (or reduced service life) of the equipment. Please consult with SMC.

2. Install an air filter.
Install an air filter upstream near the valve. Select an air filter with a filtration size of 5 μm or smaller.

3. Take measures to ensure air quality, such as by installing an aftercooler, air dryer, or water separator.
Compressed air that contains a large amount of drainage can cause malfunction of pneumatic equipment such as valves. Therefore, take appropriate measures to ensure air quality, such as by providing an aftercooler, air dryer, or water separator.

4. If an excessive amount of carbon powder is present, install a mist separator on the upstream side of the valve.
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 Best Pneumatics catalog.
**Operating Environment**

⚠️ **Warning**
1. Do not use in an atmosphere containing corrosive gases, chemicals, sea water, water, water steam, or where there is direct contact with any of these.
2. Do not use in an environment where flammable gas or explosive gas exists. Usage may cause a fire or explosion. The products 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.
   Note that the valve is not for outdoor use.
5. Remove any sources of excessive heat.
6. If it is used in an environment where there is possible contact with oil, weld spatter, et., exercise preventive measures.
7. When the solenoid valve is mounted in a control panel or it’s energized for a long period of time, make sure the ambient temperature is within the specifications of the valve.

⚠️ **Caution**
(1) Temperature of ambient environment
Use the valve within the range of the ambient temperature specification of each valve. In addition, pay attention when using the valve in environments where the temperature changes drastically.
(2) Humidity of ambient environment
   - When using the valve in environments with low humidity, take measures to prevent static.
   - If the humidity rises, take measures to prevent the adhesion of water droplets on the valve.

**Maintenance**

⚠️ **Warning**
1. Perform maintenance inspection according to the procedures indicated in the operation manual (this document).
   If handled improperly, human injury and/or malfunction or damage of machinery and equipment may occur.
2. Removal of equipment, and supply/exhaust of compressed air
   Before components are removed, first confirm that measures are in place to prevent workpieces from dropping, run-away equipment, etc. Then, cut off the supply air and electric power, and exhaust all air pressure from the system using the residual pressure release function.
   When the equipment is operated after remounting or replacement, first confirm that measures are in place to prevent the lurching of actuators, etc. Then, confirm that the equipment is operating normally.
3. Low-frequency operation
   Valves should be operated at least once every 30 days to prevent malfunction. (Use caution regarding the air supply.)

4. Manual override
   When a manual override is operated, connected equipment will be actuated.
   Operate only after safety is confirmed.
5. If the volume of air leakage increases or the valve does not operate normally, do not use the valve.
   Perform periodic maintenance on the valve to confirm the operating condition and check for any air leakage.

⚠️ **Caution**
1. Drain flushing
   Remove drainage from the air filters regularly.
2. Lubrication
   Once lubrication has been started, it must be continued.
   Use class 1 turbine oil (with no additives), VG32. If other lubricant oil is used, it may cause a malfunction.
How to Wire DIN Terminal

● Connection
1. Loosen the set screw and pull out the DIN connector from the terminal block of the solenoid.
2. Remove screw and insert screwdriver into the slit area near the bottom of terminal block to separate block and housing.
3. Loosen the terminal screws (slotted screws) on the terminal block, insert the core of the lead wire into the terminal, and attach securely with the terminal screws.
4. Tighten the ground nut to secure the cable.

Caution
Use caution in wiring because it will not meet the IP65 (enclosure) standard if you use the other cable than prescribed heavy-duty cable of size ($3.5 \text{ to } 7$).
Tighten the ground nut and set screw within the specified range of torque.

● Change of electrical entry (Orientation)
After separating terminal block and housing, the cable entry direction can be changed by attaching the housing in the desired direction (4 directions in 90 increments).
* In the case of w/ indicator light, avoid damaging the light with lead wire.

● Precautions
Plug a connector in or out vertically, never at an angle.

● Applicable cable
O.D.: $3.5 \text{ to } 7$
(Reference)
0.5 mm$^2$ 2 core and 3 core wires equivalent to JIS C 3306

● Connector part no.: VK300-82-1
● Part no. of connector with indicator light

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>Voltage symbol</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 VAC</td>
<td>100V</td>
<td>VK300-82-2-01</td>
</tr>
<tr>
<td>110 VAC</td>
<td>110V</td>
<td>VK300-82-2-03</td>
</tr>
<tr>
<td>200 VAC</td>
<td>200V</td>
<td>VK300-82-2-02</td>
</tr>
<tr>
<td>220 VAC</td>
<td>220V</td>
<td>VK300-82-2-04</td>
</tr>
<tr>
<td>240 VAC</td>
<td>240V</td>
<td>VK300-82-2-07</td>
</tr>
<tr>
<td>6 VDC</td>
<td>6V</td>
<td>VK300-82-4-51</td>
</tr>
<tr>
<td>12 VDC</td>
<td>12V</td>
<td>VK300-82-4-06</td>
</tr>
<tr>
<td>24 VDC</td>
<td>24V</td>
<td>VK300-82-3-05</td>
</tr>
<tr>
<td>48 VDC</td>
<td>48V</td>
<td>VK300-82-3-53</td>
</tr>
</tbody>
</table>

● Circuit with indicator light

![Circuit Diagram]

Caution

Light/Surge Voltage Suppressor

Precautions on connection of 24 V or more DC
Grommet type should be connected as following; Red lead wire for (+) side, Black lead wire for (−) side respectively.

With the DIN terminal, connect the positive (+) side to the connector’s no. 1 terminal, and the negative (−) side to the no. 2 terminal. [Refer to the marks on the terminal board.]
* For 12 VDC or below, there is no positive (+) or negative (−) directionality.

* The light comes with the DIN connector.
**VK300/3000 Series**

**Specific Product Precautions 2**

Be sure to read this before handling the products.

---

### Light/Surge Voltage Suppressor

**Caution**

- Grommet type

### Valve Mounting Direction

**Warning**

When mounting a valve on the manifold base or sub-plate, etc. the mounting orientation is already decided. If mounted in a wrong direction, the equipment to be connected may result in malfunction. Therefore check the mounting direction, and if it is correct, mount the valve.

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**Vacuum Spec. Type: VK33□V(VK33□W)**

In contrast to the standard product, this vacuum specification valve has less air leakage at low pressures, a feature that should be taken into consideration when using this valve for vacuum applications.

**Caution**

Since this valve has slight air leakage, it can not be used for holding vacuum (including positive pressure holding) in the pressure container.

**Continuous Duty Type: VK33□E**

Recommended for continuous duty with long time loading.

**Caution**

1. This model is for continuous duty, not for high cycle rates. But even in low cycle rates, if energizing the valve more than once a day, please consult with SMC.
2. Energizing solenoid should be done at least once in 30 days.
3. As a rectifier is mounted to the product with continuous duty AC specification, diodes are included. (The specifications of G / GS and D / DS are the same.)
**VK300/3000 Series**

**Specific Product Precautions 3**

Be sure to read this before handling the products.

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### Manifold Specifications

<table>
<thead>
<tr>
<th>VK300</th>
</tr>
</thead>
</table>

**Caution**

1. Mounting direction is fixed, do not mount on opposite side.
2. The VK300 series can be mounted on the manifold base VV5K3 of VK 3000 series. Refer to page 11 for details.

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#### Combinations of Solenoid Valve, Manifold Gasket and Manifold Base

- **3 port body ported: VK332**
- **3 port base mounted: VK334**

#### Combinations of Blanking Plate Assembly and Manifold Base

- **Blanking plate assembly: VK300-42-1A**

---

#### Caution

- **Mounting Screw Tightening Torques**
- M3: 0.6 N·m

<table>
<thead>
<tr>
<th>Manifold gasket and screw assembly</th>
<th>Body ported</th>
<th>Base mounted</th>
</tr>
</thead>
<tbody>
<tr>
<td>VK300-41-1A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VK300-41-2A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

#### Common SUP/ Common EXH

- **Type 20 (VV3K3-20):** Body ported (A port top ported)
- **Type 40 (VV3K3-40):** Base mounted (A port bottom ported)
- **Type 42 (VV3K3-42):** Base mounted (A port side ported)
- **Type S42 (VV3K3-S42):** (Solenoids on the same side of A port)

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#### Common SUP/ Individual EXH

- **Type 21 (VV3K3-21):** Body ported (A port top ported)
**Caution**

1. Mounting direction is fixed, do not mount on opposite side.

**Mixed Mounting of VK300 and Manifold Base of VK3000 Series**

**Type VV5K3-20**

![Image](image1)

**Type VV5K3-40**

![Image](image2)

1. In the case of VV5K3-20/40
   - When installing the 3 port valve on the manifold base, plug the "R" port at the corresponding mark side with the rubber plug (VK3000-8-1) as shown in the figures on the right.

2. Other manifold
   - 3 port valve can be mounted without any work.

**Caution**

Mounting Screw Tightening Torques
M3: 0.9 N·m

- Note 1) Remove the plug if changing the 3 port valve to a 5 port valve.
- Note 2) In case a 3 port valve VK300 is mounted on the manifold base for a 5 port valve VK3000, switching type is normally closed (N.C.). If requiring a normally open type (N.O.), plug the "A" port on the 5 port valve.
- Note 3) "A" port of a 3 port valve for base mounted type becomes "A" port of a 5 port valve. Plug that "A" port to avoid mistaking "B" port for the "A" port.

**Combinations of Solenoid Valve, Manifold Gasket and Manifold Base**

**port body ported: VK3120**

![Image](image3)

**5 port base mounted: VK3140**

- M3 x 6 Round head combination screw
- DXT10-23-4

**Caution**

Mounting Screw Tightening Torques
M3: 6.6 N·m

**Combination of Blanking Plate Assembly and Manifold Base**

Blanking plate assembly: VK3000-7-1A

<table>
<thead>
<tr>
<th>Manifold gasket Screw assembly</th>
<th>Body ported</th>
<th>Base mounted</th>
</tr>
</thead>
<tbody>
<tr>
<td>VK3000-6-1A</td>
<td>VK3000-6-2A</td>
<td></td>
</tr>
</tbody>
</table>

**Combination of Blank Plate**

![Image](image4)

- Applicable base: In common for all types of VV5K3 (-Q) models

**Caution**

Mounting Screw Tightening Torques
M3: 0.6 N·m
Common SUP/Common EXH
Type 20 (VV5K3-20): Body ported
(A, B port top ported)
Type 40 (VV5K3-40): Base mounted
(A, B port bottom ported)
Type 41 (VV5K3-41): Base mounted
(A, B port side ported)
Type 42 (VV5K3-42): Base mounted
(A, B port side ported)

Common SUP/Individual EXH
Type 21 (VV5K3-21): Body ported
(A, B port top ported)

Be sure to read this before handling the products.
TROUBLESHOOTING

Should any trouble be found during operation, trace the source of the trouble in the following order and take corrective action.

<table>
<thead>
<tr>
<th>Trouble phenomenon</th>
<th>Cause expected</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faulty operation</td>
<td>Valve is not operated</td>
<td>Faulty wiring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blown fuse or disconnection lead wire</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor contact at contactor wire or connection part</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foreign matter caught in the spool valve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Swollen spool valve</td>
</tr>
<tr>
<td></td>
<td>Burned coil</td>
<td>Higher voltage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coil splashed by water, etc.</td>
</tr>
<tr>
<td>Leakage</td>
<td>Leakage from the connecting port.</td>
<td>Leakage at actuator (cylinder, etc.) side</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intrusion of foreign matter</td>
</tr>
<tr>
<td></td>
<td>Leakage from vent</td>
<td>Wear of packings of the spool valve</td>
</tr>
<tr>
<td></td>
<td>Leakage from the gasket (manifold)</td>
<td>Inferior tightening of installation screw</td>
</tr>
<tr>
<td>Buzzing (AC coil)</td>
<td>A big continuous buzzing sound is emitted when the power is turned on.</td>
<td>Foreign matter caught in core of solenoid valve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worn core</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low line voltage</td>
</tr>
</tbody>
</table>
## Remedy

<table>
<thead>
<tr>
<th>No.</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Re-wire correctly.</td>
</tr>
<tr>
<td>②</td>
<td>Replace part.</td>
</tr>
<tr>
<td>③</td>
<td>Replace part or re-wire positively.</td>
</tr>
<tr>
<td>④</td>
<td>Replace valve.</td>
</tr>
<tr>
<td></td>
<td>・If wrong oil is used, completely air blow to remove oil, and replace valve. After valve is replaced, use turbine oil class 1 (ISO VG32).</td>
</tr>
<tr>
<td>⑤</td>
<td>・When a large quantity of drain is given and cannot carry out drain omission surely, install either an auto-drain or a dryer. The valve should be replaced.</td>
</tr>
<tr>
<td>⑥</td>
<td>Check voltage. Replace valve.</td>
</tr>
<tr>
<td>⑦</td>
<td>Protect the valve so that water does not splash the coil. Replace valve.</td>
</tr>
<tr>
<td>⑧</td>
<td>In case of intrusion of foreign matter, to remove foreign matter by air blow of piping and then replace valve.</td>
</tr>
<tr>
<td>⑨</td>
<td>Repair or replace actuators.</td>
</tr>
<tr>
<td>⑩</td>
<td>After stopping air and re-tighten the bolts.</td>
</tr>
<tr>
<td>⑪</td>
<td>Regulate voltage so that the voltage at the time of the operation becomes specifications range.</td>
</tr>
</tbody>
</table>

If no improvement is achieved in spite of the above countermeasure, inside of the valve may have some abnormality. In this case, stop using the valve immediately.

If any of followings are carried out, inside of the valve may have some failure. In this case, stop using the valve immediately.

1. Voltage out of rated voltage has been used.
2. Oil other than the specified one has been lubricated.
3. Lubrication has been stopped intermediately, or lubrication was suspended temporary.
5. Strong impact was given.
6. Alien substance such as drain and particle got into. Drain or garbage invaded a valve.
7. Prohibited way of using the valve which is written at "Precautions" section in this operation manual was carried out excluding above-mentioned.

In addition, in the case of trouble, please send it back to the supplier for repair or replacement.
Revision history

[A] Renewal
MZ
[B] Safety Instructions
Po
[C] Safety Instructions
WR

1st printing : TZ