ISO Standard Solenoid Valve
SERIES VQ7-6/7-8
OPERATION MANUAL

Date Nov. 22, '00
Prepared by Prod. Development Dept 1

SMC CORPORATION
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Series VQ7-6/7-8

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by a label of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

⚠️ Caution: Operator error could result in injury or equipment damage.

⚠️ Warning: Operator error could result in serious injury or loss of life.

⚠️ Danger: In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414 : Pneumatic fluid power - Recommendations for the application of equipment to transmission and control systems.

Note 2) JIS B 8370 : General Rules for Pneumatic Systems

⚠️ Warning

1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.
   Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements.

2. Only trained personnel should operate pneumatically operated machinery and equipment.
   Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.
   1. Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
   2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
   3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc. (Bleed air into the system gradually to create back pressure.)

4. Contact SMC if the product is to be used in any of the following conditions:
   1. Conditions and environments beyond the given specifications, or if product is used outdoors.
   2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, press applications, or safety equipment.
   3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.
Precautions on Design

⚠️ Warning

1. Actuator drive
   When an actuator, such as a cylinder, is to be driven using a valve, take appropriate measures to prevent potential danger caused by actuator operation.

2. Intermediate stopping
   When a 3 position closed center valve is used to stop a cylinder at an intermediate position, accurate stopping of the piston in a predetermined position is not possible due to the compressibility of air. Furthermore, since valves and cylinders are not guaranteed for zero air leakage, it may not be possible to hold a stopped position for an extended length of time. Contact SMC if it is necessary to hold a stopped position for an extended time.

3. Effect of back pressure when using a manifold
   Use caution when valves are used on a manifold, as actuator malfunction due to back pressure may occur. Special caution is necessary when using a 3 position exhaust center valve, or when driving a single acting cylinder, etc. When there is a danger of this kind of malfunction, implement countermeasures such as the use of an individual exhaust spacer assembly or exhaust blocking plate.

4. Disposition of pilot exhaust
   Operate the pilot exhaust port (PE) with silencers mounted on both the D and U sides, or with release to atmosphere. If merged with the main exhaust, the main valve may malfunction due to back pressure.

5. Holding of 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.

6. Cannot be used 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.

7. Maintenance space
   The installation should allow sufficient space for maintenance activities.

8. Release of residual pressure
   Provide a residual pressure release function for maintenance purposes. Special consideration should be given to the release of residual pressure between the valve and cylinder in the case of a 3 position closed center type valve.

9. Vacuum applications
   When a valve is used for vacuum switching, etc., take measures against the suction of external dust or other contaminants from vacuum pads and exhaust ports, etc. Moreover, an external pilot type valve should be used in this case. Contact SMC in case of an internal pilot type or air operated valve, etc.

Selection

⚠️ Warning

1. Confirm the specifications.
   The products presented in this catalog are 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 specifications.) Contact SMC when using a fluid other than compressed air (including vacuum).

2. Extended periods of continuous energization
   Contact SMC if valves will be continuously energized for extended periods of time.

⚠️ Caution

1. Momentary energization
   If a double solenoid valve will be operated with momentary energization, it should be energized for at least 0.1 second.

2. Leakage voltage
   Particularly when using a C-R element (surge voltage suppressor) for protection of the switching element, take note that leakage voltage will increase due to leakage current flowing through the C-R element, etc.

   Limit the amount of residual leakage voltage to the following values:
   - With DC coil 2% or less of rated voltage
   - With AC coil 12.5% or less of rated voltage

3. Low temperature operation
   Avoid ambient temperatures outside the range of −10 to 60°C (−5°C minimum for rubber seals). At low temperatures, appropriate measures should be taken to avoid solidification or freezing of drainage and moisture, etc.

4. Operation for air blowing
   When using solenoid valves for air blowing, an external pilot type or direct solenoid operated type should be used. Also, supply to the external pilot port compressed air within the pressure range prescribed in the specifications.

5. Mounting orientation
   In the case of a single solenoid, the mounting orientation is unrestricted. In the case of double solenoid or 3 position valves, mount so that the spool valve is horizontal. Also, when mounting in a location with vibration or impact, mount so that the spool valve is at a right angle to the direction of vibration.
   Do not use in locations where vibration or impact exceeds the product's specifications.
Mounting

⚠️ Warning
1. If air leakage increases or equipment does not operate properly, stop operation.
   After mounting or maintenance, etc., connect the compressed air and power supplies, and perform appropriate function and leakage inspections to confirm that the unit is mounted properly.

2. Instruction manual
   Mount and operate the product after reading the manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

3. Painting and coating
   Warnings or specifications printed or pasted on the product should not be erased, removed or covered up.

Piping

⚠️ 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. Wrapping of pipe tape
   When connecting pipes and fittings, etc., be sure that chips from the pipe threads and sealing material do not get inside the valve.
   Further, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the pipe/fitting.

3. When using closed center valves
   When using closed center type valves, check carefully to be sure there are no air leaks from the piping between the valves and cylinders.

4. Tighten threads with the proper tightening torque.
   When screwing fittings into valves, tighten with the torques given below.

<table>
<thead>
<tr>
<th>Connection threads</th>
<th>Proper tightening torque N·m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rc1/8</td>
<td>7 to 9</td>
</tr>
<tr>
<td>Rc1/4</td>
<td>12 to 14</td>
</tr>
<tr>
<td>Rc3/8</td>
<td>22 to 24</td>
</tr>
<tr>
<td>Rc1/2</td>
<td>28 to 30</td>
</tr>
<tr>
<td>Rc3/4</td>
<td>28 to 30</td>
</tr>
</tbody>
</table>

5. Connection of piping to products
   When connecting piping to a product, refer to its instruction manual to avoid mistakes regarding the supply port, etc.

Wiring

⚠️ Caution
1. Polarity
   None of the series have polarity. (non-polar type)

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

3. Confirm the connections.
   After completing the wiring, confirm that the connections are correct.

Lubrication

⚠️ Caution
1. Lubrication
   1) The valve has been lubricated for life at the factory, and does not require any further lubrication.
   2) In the event that it is lubricated, use Class 1 turbine oil (without additives), ISO VG32. However, once lubrication is applied it must be continued, as the original lubricant may be eliminated leading to malfunction.


**Warning**

1. Use clean 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 malfunction.

**Caution**

1. Install air filters.

Install air filters close to valves at their upstream side. A filtration degree of 5μm or less should be selected.

2. Install an air dryer or after cooler, etc.

Air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer or after cooler, etc.

3. If excessive carbon powder is generated, eliminate it by installing mist separators at the upstream side of valves.

If excessive carbon powder is generated by the compressor, it may adhere to the inside of valves and cause malfunction.

Refer to SMC's "Air Cleaning Equipment" catalog for further details on compressed air quality.

**Operating Environment**

**Warning**

1. Do not use valves in atmospheres of corrosive gases, chemicals, salt water, water or steam, or where there is direct contact with same.

2. Do not use in an explosive atmosphere.

3. Do not use in locations subject to vibration or impact. Confirm the specifications for each series.

4. A protective cover, etc., should be used to shield valves from direct sunlight.

5. Shield valves from radiated heat generated by nearby heat sources.

6. Employ suitable protective measures in locations where there is contact with water droplets, oil or welding spatter, etc.

7. When solenoid valves are mounted in a control panel or are energized for extended periods of time, employ measures to radiate excess heat so that temperatures remain within the valve specification range.

**Maintenance**

**Warning**

1. Perform maintenance procedures as shown in the instruction manual.

If handled improperly, malfunction or damage of machinery or equipment may occur.

2. Equipment removal and supply/exhaust of compressed air

When equipment is removed, first confirm that measures are in place to prevent dropping of work pieces and run-away of equipment, etc. Then cut the supply pressure and power, and exhaust all compressed air from the system using its residual pressure release function.

When the equipment is to be started again after remounting or replacement, first confirm that measures are in place to prevent lurching of actuators, etc., and then confirm that the equipment is operating normally.

3. Low frequency operation

Valves should be switched at least once every 30 days to prevent malfunction. (Use caution regarding the air supply.)

4. Manual override operation

When the manual override is operated, connected equipment will be actuated. Confirm safety before operating.

**Caution**

1. Drainage removal

Remove drainage from air filters regularly. (Refer to specifications.)

2. Lubrication

In the case of rubber seals, once lubrication has been started, it must be continued.

Use Class 1 turbine oil (without additives) VG32. Other lubricating oils will cause malfunction or other trouble.

Contact SMC regarding Class 2 turbine oil (with additives) VG32.

**How to Find the Flow Rate** (at air temperature of 20°C)

Subsonic flow when P1 + 0.1013 < 1.89 (P2 + 0.1013)

\[
Q = 2265 \sqrt{\frac{P}{P + 0.1013}}
\]

Sonic flow when P1 + 0.1013 ≥ 1.89 (P2 + 0.1013)

\[
Q = 1135 \sqrt{P_1 + 0.1013}
\]

Where:

- **Q**: Air flow rate [m³/min (ANR)]
- **S**: Effective area (mm²)
- **ΔP**: Differential pressure (P1-P2) [MPa]
- **P1**: Upstream pressure [MPa]
- **P2**: Downstream pressure [MPa]

*Correction for different air temperatures*

Multiply the flow rate calculated with the above formulas by a coefficient from the table below.

<table>
<thead>
<tr>
<th>Air temperature (°C)</th>
<th>-20</th>
<th>-10</th>
<th>0</th>
<th>10</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correction coefficient</td>
<td>1.08</td>
<td>1.06</td>
<td>1.04</td>
<td>1.02</td>
<td>0.98</td>
<td>0.97</td>
<td>0.95</td>
<td>0.94</td>
</tr>
</tbody>
</table>
⚠️ Warning
Manual Override Operation

Since connected equipment will be actuated when the manual override is operated, first confirm that conditions are safe. The push type is standard (tool required).

Push type (tool required)

Press the manual override all the way down with a small screw driver, etc. The manual override resets when released.

⚠️ Caution
Mounting Valves

After confirming installation of the gasket, securely tighten the bolts with the proper torque shown in the table below.

<table>
<thead>
<tr>
<th>Series</th>
<th>Proper tightening torque N·m</th>
</tr>
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<tr>
<td>VQ7-6</td>
<td>2.3 to 3.7</td>
</tr>
<tr>
<td>VQ7-8</td>
<td>4.0 to 6.0</td>
</tr>
</tbody>
</table>

⚠️ Caution
Installation and Removal of Pilot Valve cover

- **Removal**
  - To remove the pilot valve cover, spread the cover’s hook outward about 1mm with a flat head screw driver, and pull the cover straight off.
  - If it is pulled off at an angle, the pilot valve may be damaged or the protective O-ring may be scratched.

- **Installation**
  - Put the cover back on straight without touching the pilot valve, and push it all the way until the cover’s hook locks, without twisting the protective O-ring. (When pushed in, the hook opens and locks automatically.)

⚠️ Caution
Replacement of Pilot Valve

- **Removal**
  1) Take off the sockets which are installed on the pilot valve pins by pulling them straight upward.
  2) Remove the pilot valve mounting screws with a small screw driver.

- **Installation**
  1) After confirming installation of the gasket, securely tighten the mounting screws with the proper torque shown in the table below.
  2) Put the sockets on straight and install them securely so that the receptacle housings touch the coil surface as shown in the drawing below.

If they are pushed in with excessive force, there is a danger of the sockets coming off of the receptacle housings. Confirm that the sockets do not protrude from the windows on the side of the receptacle housings.

<table>
<thead>
<tr>
<th>Proper tightening torque N·m</th>
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<tbody>
<tr>
<td>0.8 to 1.2</td>
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</table>
Series VQ7-6/7-8
Specific Product Precautions 2
Be sure to read before handling. Refer to pages 37 through 40 for safety instructions and common precautions.

⚠️ Caution
Using a DIN Connector

ISO#: DIN 43650 A compatible
Connections
1. Loosen the holding screw and pull the connector off of the solenoid valve terminal block.
2. After removing the holding screw, insert a flat head screw driver, etc., into the notch at the bottom of the terminal block and pry it up, separating the terminal block and housing.
3. Loosen the terminal screws on the terminal block, insert the cores of the lead wires into the terminals in accordance with the connection method, and fix securely with the terminal screws.
4. Secure the cord by screwing in the ground nut.

Changing the cord entry
After separating the terminal block and housing, the cord entry direction can be changed by attaching the housing in the desired direction (4 directions at 90° intervals).

Precautions
Insert and pull out the connector in a straight line so that it does not tilt at an angle.

Compatible cable
Cord outside diameter: ø6.8 to ø10

⚠️ Caution
Internal Wiring Specifications

Using a Prewired Connector

4 wire round type connector (M12) conforming to NECA (Nippon Electric Control Equipment Industries Association) standard 4202

Prewired connector (M12)

Terminal Nos.
1: A side SOL
2: B side SOL
3: COM terminal

Pin Nos.
1: COM pin
2: B side SOL
3: Not in use
4: A side SOL

DIN connector wiring specification
Prewired connector wiring specification
Series VQ7-6
ISO Standard Solenoid Valve
Size 1/Single Unit

How to Order Valves

VQ7-6 FG S 3 • Connector

- Nil DIN terminal block (with connector)
- O DIN terminal block (without connector)
- SC Pre-wired connector

- Connector

- Nil Without sub plate
- A02 Side port Rc1/4 *
- A03 Side port Rc3/8
- B02 Bottom port Rc1/4 *
- B03 Bottom port Rc3/8
* Port R is Rc3/8

- Sub plate port size

- Seal type

- Nil Metal seal
- R Rubber seal

- Seal type

- Nil None
- N Indicator light
- Z Indicator light with surge voltage suppressor
- V Individual pilot exhaust
* When 2 or more symbols are applicable, show them in alphabetical order.

- Options *

- Coil rating

1 100VAC
2 200VAC
3 24VDC
4 12VDC
9 Other voltage
* Contact SMC regarding other voltages.

- Coil rating

How to Order Sub Plates

VS7-1 A02

Port size

- A02 Side port Rc1/4 *
- A03 Side port Rc3/8
- B02 Bottom port Rc1/4 *
- B03 Bottom port Rc3/8
* Ports 3 (R2) and 5 (R1) are Rc3/8

- Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Piping specifications</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>V77-1</td>
<td>Side Rc1/4 Rc3/8</td>
<td>0.37</td>
</tr>
<tr>
<td>V77-1</td>
<td>Bottom Rc1/4 Rc3/8</td>
<td></td>
</tr>
<tr>
<td>V77-1A</td>
<td>Side Rc3/8</td>
<td></td>
</tr>
<tr>
<td>V77-1A</td>
<td>Bottom Rc3/8</td>
<td></td>
</tr>
<tr>
<td>V77-1B</td>
<td>Side Rc1/4 Rc3/8</td>
<td></td>
</tr>
<tr>
<td>V77-1B</td>
<td>Bottom Rc3/8</td>
<td></td>
</tr>
</tbody>
</table>

- Specifications
## Series VQ7-6

### Models

<table>
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<th>Positions</th>
<th>Model</th>
<th>Note 1</th>
<th>Note 2</th>
<th>Note 3</th>
</tr>
</thead>
</table>
|        |           |          | Effective area
|        |           |          | mm²(Di factor) | Response time ms | Weight kg |
| VQ7-6  | Single    | Metal seal VQ7-6-FG-S-D | 27.0 (1.5) | 20 or less | 0.40    |
|        | Rubber seal VQ7-6-FG-S-QR | 31.0 (1.7) | 25 or less |        |        |
|        | Double    | Metal seal VQ7-6-FG-D-D | 27.0 (1.5) | 12 or less | 0.45    |
|        | Rubber seal VQ7-6-FG-D-QR | 31.0 (1.7) | 15 or less |        |        |
|        | Closed center | Metal seal VQ7-6-FHG-D-D | 25.5 (1.4) | 40 or less | 0.48    |
|        | Rubber seal VQ7-6-FHG-D-QR | 27.0 (1.5) | 45 or less |        |        |
|        | Exhaust center | Metal seal VQ7-6-FJG-D-D | 27.0 (1.5) | 40 or less | 0.48    |
|        | Rubber seal VQ7-6-FJG-D-QR | 31.0 (1.7) | 45 or less |        |        |
|        | Double check | Metal seal VQ7-6-FPG-D-D | 20.0 (1.1) | 50 or less | 0.84    |
|        | Rubber seal VQ7-6-FPG-D-QR | 20.0 (1.1) | 50 or less |        |        |
|        | Pressure center | Metal seal VQ7-6-FIG-D-D | 27.0 (1.5) | 40 or less | 0.48    |
|        | Rubber seal VQ7-6-FIG-D-QR | 31.0 (1.7) | 45 or less |        |        |

Note 1: Port size Rc1/4: Value when mounted on sub plate.
Note 2: Based on JIS B 8375-1981 (Value for supply pressure of 0.5MPa, with lightsurge voltage suppressor, when using clean air.) Response time values will change depending on pressure and air quality. The value when ON for the double type.
Note 3: The weight without sub plate. (Sub plate: 0.37kg)

### Standard Specifications

**Valve construction**
- Metal seal
- Rubber seal

**Maximum operating pressure**
- 1.0MPa

**Minimum operating pressure**
- Single: 0.15MPa
- Double: 0.15MPa
- 3 position: 0.15MPa

**Ambient and fluid temperature**
- -10 to 60°C (Note 1)
- -5 to 60°C (Note 1)

**Lubrication**
- Not required

**Manual operation**
- Push type (tool required)

**Impact/Vibration resistance**
- 150/30m/s² (Note 2)

**Enclosure**
- IP65 (splash proof/jet proof)

**Rated coil voltage**
- 12VDC, 24VDC, 100VAC, 110VAC, 200VAC, 220VAC (50/60Hz)

**Allowable voltage fluctuation**
- ±10% of rated voltage

**Coil insulation type**
- Class B equivalent

**Power consumption (current)**
- 24VDC: DC1W (42mA)
- 12VDC: DC1W (83mA)
- 100VAC: Inrush 1.2VA (12mA), Holding 1.2VA (12mA)
- 110VAC: Inrush 1.3VA (11.7mA), Holding 1.3VA (11.7mA)
- 200VAC: Inrush 2.4VA (12mA), Holding 2.4VA (12mA)
- 220VAC: Inrush 2.6VA (11.7mA), Holding 2.6VA (11.7mA)

Note 1: For low temperature, use dry air with no condensation.
Note 2: Impact resistance: No malfunction when tested with a drop tester in the axial direction and at a right angle to the main valve and armature, one time each in both energized and deenergized states. (Initial value)
Vibration resistance: No malfunction when tested with one sweep of 8.3 to 2000Hz in the axial direction and at a right angle to the main valve and armature, one time each in both energized and deenergized states. (Initial value)
Series VQ7-6
Construction

DIN Connector Type

Metal seal type
VQ7-6-FG-S-□

Rubber seal type
VQ7-6-FG-S-□R□

VQ7-6-FG-D-□

VQ7-6-FG-D-□R□

VQ7-6-FPG-D-□

VQ7-6-FPG-D-□R□

Valve replacement parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>VQ7-6-FG-S-□</th>
<th>VQ7-6-FG-D-□</th>
<th>VQ7-6-FPG-D-□</th>
<th>VQ7-6-FG-S-□R□</th>
<th>VQ7-6-FG-D-□R□</th>
<th>VQ7-6-FPG-D-□R□</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gasket</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Gasket A</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>Gasket B</td>
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<td>4</td>
<td>Gasket C</td>
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<td>5</td>
<td>O-ring</td>
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<tr>
<td>6</td>
<td>Mini Y seal</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Pilot valve assembly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Double check spacer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Series VQ7-6
Manifold Series VV71

How to order Manifolds

VV71 6 - 02R - 02D

Stations

1 station
1
10
10 stations

Note) When equipped with control unit, 1 or 2 stations are used for mounting.

2(B), 4(A) port piping connection

02R  Rs1/4 (right side)
03R  Rs3/8 (right side)
02L  Rs1/4 (left side)
03L  Rs3/8 (left side)
02Y  Rs1/4 (bottom)
03Y  Rs3/8 (bottom)
C6R  One-touch fitting ø6 (right side)
C8R  One-touch fitting ø8 (right side)
C10R One-touch fitting ø10 (right side)
C6L  One-touch fitting ø6 (left side)
C8L  One-touch fitting ø8 (left side)
C10L One-touch fitting ø10 (left side)
* Mixed

Note) When ports are mixed, indicate piping specifications using the instructions and manifold specification sheet on pages 33 and 34.

Air release valve coil rating

<table>
<thead>
<tr>
<th>Nil</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100VAC 50Hz/60Hz</td>
</tr>
<tr>
<td>2</td>
<td>200VAC 50Hz/60Hz</td>
</tr>
<tr>
<td>3</td>
<td>24VDC</td>
</tr>
<tr>
<td>4</td>
<td>12VDC</td>
</tr>
<tr>
<td>9</td>
<td>Other</td>
</tr>
</tbody>
</table>

Silencer box

<table>
<thead>
<tr>
<th>Nil</th>
<th>Without</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB</td>
<td>With</td>
</tr>
</tbody>
</table>

Note) The silencer box mounting position corresponds to piping connection at ports 3 (R2) and 5 (R1).

1 (P), 3 (R2), 5 (R1) port piping connection

02D  Rs1/4 (bottom)
02U  Rs1/4 (top)
02B  Rs1/4 (both sides)
03D  Rs3/8 (bottom)
03U  Rs3/8 (top)
03B  Rs3/8 (both sides)
C12D One-touch fitting ø12 (bottom)
C12U One-touch fitting ø12 (top)
C12B One-touch fitting ø12 (both sides)
* Mixed

Note) When ports are mixed, indicate piping specifications using the instructions and manifold specification sheet on pages 33 and 34.

Control unit type (see pages 13 and 14 for details)

<table>
<thead>
<tr>
<th>Control equipment</th>
<th>Symbol</th>
<th>Nil</th>
<th>A</th>
<th>AP</th>
<th>M</th>
<th>MP</th>
<th>F</th>
<th>G</th>
<th>C</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air filter with auto drain</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air filter with manual drain</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulator</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air release valve</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure switch</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blank plate (air release valve)</td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blank plate (filter, regulator)</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of manifold blocks required for mounting (stations)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Manifold Specifications

<table>
<thead>
<tr>
<th>Manifold block size</th>
<th>Applicable solenoid valve</th>
<th>Piping specifications</th>
<th>Stations</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO size 1</td>
<td>VQ7-6 ISO size 1 series</td>
<td>Piping direction: Rs1/4 Rs3/8 Rs1/4 Rs3/8 Rs1/4 Rs3/8 Rs1/4 Rs3/8 5 (R1) port size: 10 stations max.</td>
<td>0.43x + 0.49 (n: Stations)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Right, Left</td>
<td>Bottom</td>
<td>0.43x + 0.49 (n: Stations)</td>
<td></td>
</tr>
</tbody>
</table>

Note) When equipped with control unit, 1 or 2 stations are used for mounting.
Optional Manifold Parts

Blank plate assembly
AXT502-9A

This is used by mounting it on a manifold block when a valve is removed for maintenance or when it is planned to install an additional valve in the future, etc.

Blocking plate (for SUP/EXH passages)
AXT502-14

When two or more different high pressures are supplied to one manifold, blocking plates are installed between stations having different pressures.
Also, in cases such as when valve exhaust affects other stations in a circuit, blocking plates are used for exhaust at stations where the exhaust is to be separated.

Individual SUP spacer
VV71-P−03 C10

By mounting individual supply spacers on a manifold block, supply ports can be provided individually for each valve.

Blocking plate (for pilot EXH passage)
AZ503-53A

When a valve's pilot valve exhaust affects other valves in a circuit, blocking plates are used between stations where the pilot exhaust passages are to be separated.

Individual EXH spacer
VV71-R−03 C12

By mounting individual exhaust spacers on a manifold block, exhaust ports can be provided individually for each valve. (3, 5 common exhaust type)

Throttle valve spacer
AXT502-23A

By mounting a throttle valve spacer on a manifold block, a cylinder's speed can be controlled by throttling the exhaust.
Reverse pressure spacer
AXT502-21A-1
With reverse pressure control manifold specifications, when pressure is changed individually on one side (ex. high speed cylinder return), pressure can be supplied individually to the R2 side by mounting a reverse pressure spacer. (port 3 (R2) is individual and 5 (R1) is common)

Residual pressure release valve spacer
VV71-R-AB
This is used by mounting on a manifold block in order to exhaust the residual pressure trapped inside of a cylinder, etc., during an intermediate stop with a 3 position closed center or perfect type valve. Residual pressure at ports A and B is exhausted individually to the outside by manual operation.

R1, R2 individual EXH spacer
VV71-R2-03
By mounting an individual exhaust spacer on a manifold block individual exhaust is possible from both R1 and R2. (3 (R2) and 5 (R1) are individual ports)

Individual SUP spacer with residual pressure release valve
VV71-PR-02
This is used by mounting on a manifold block in order to stop the primary side supply pressure in an individual supply spacer, while at the same time exhausting the residual pressure on the secondary side. Stopping the supply and exhausting the residual pressure are performed by pressing the manual override, which can be locked by turning it.

Main EXH back pressure check plate
AXT503-37A
In cases where back pressure effects actuator operation due to simultaneous operation of manifold valves, etc., this effect can be eliminated by installing a plate between the manifold block and the valve from which back pressure is to be prevented.

Adapter plate for locking cylinder
AXT502-26A
When using a locking cylinder with 2 valves for control, this spacer can be used by mounting on a manifold block. It consists of a circuit equipped with a function to prevent lurching during release.
Optional Manifold Parts

Silencer box
VV71-□□□□-□□-SB
This can be provided as a unit on the end plate to reduce manifold exhaust noise and piping labor.

Pilot EXH silencer
AN110-01
This is used by mounting on the pilot exhaust port in order to reduce manifold and single type pilot exhaust noise, and to prevent the entry of dust.

Release valve spacer
AXT502-17A
Double check spacer

**VV71-FPG**

By combining a 3 position exhaust center valve with a double check spacer, an intermediate stopping position of a cylinder can be held for an extended period. It can also be used for drop prevention at the cylinder stroke end when releasing residual supply pressure, by combination with a 2 position single or double valve.

### Specifications

<table>
<thead>
<tr>
<th>Double check spacer part no.</th>
<th>VV71-FPG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable solenoid or air operated valve</td>
<td>Series VQ7-6</td>
</tr>
<tr>
<td>Leakage cm/min (ANR)</td>
<td></td>
</tr>
<tr>
<td>One solenoid energized (One pilot pressurized)</td>
<td>P</td>
</tr>
<tr>
<td>Both solenoids unenergized (Both pilots unpressurized)</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>A</td>
</tr>
</tbody>
</table>

**Double check spacer with residual pressure release valve**

**VV71-FPGR**

This is a double check spacer equipped with a residual pressure release function, to release residual pressure inside a cylinder during maintenance or adjustment, etc.

⚠️ Handling precautions

- Since extended cylinder stops are not possible if there are leaks from piping between the valve and cylinder or from fittings, etc., check for leakage using a neutral liquid detergent.
- Since One-touch fittings allow for some air leakage, threaded piping is recommended in cases of extended intermediate cylinder stops.
- This spacer cannot be combined with a 3 position closed center valve.
- Set the load weight so that the cylinder side pressure is less than two times the supply side pressure.
- When using the residual pressure release function, confirm the action of actuators, etc., and operate after providing for safety measures.

Interface regulator

**ARB250-00-A**

By mounting an interface regulator on a manifold block, it is possible to regulate each valve.

⚠️ Handling precautions

- When combining a pressure center valve and interface regulator with reduced pressure at ports A and B, use model ARB210-B.
  Further, it cannot be used with reduced pressure at port P.
- When combining a reverse pressure valve and interface regulator, use model ARB210-A.
- When combining a double check valve and interface regulator, use a manifold or sub plate as a base, and assemble by stacking in the order of double check spacer, interface regulator and valve.
- When combining a closed center valve and interface regulator with reduced pressure at ports A and B, it cannot be used for intermediate cylinder stops because of air leakage from the regulator's relief port.
Control Units

Control equipment (filters, regulators, pressure switches, air release valves) has been made into standardized units which can be mounted on manifolds without any modifications.

Control unit specifications

| Filter (with auto drain/with manual drain) | Filtration degree | 5um |
| Regulator | Set pressure (downstream pressure) | 0.05 to 0.85MPa |
| Pressure switch | Pressure adjustment range | 0.1 to 0.7MPa |
| Contact | Rated current | 1A (induction load) 125VAC 15A, 250VAC 15A |
| Air release valve (single only) | Operating pressure range | 0.15 to 1.0MPa |

Options

| Blank plate | AXT502-9A (for manifold) |
| Release valve adapter plate | AXT502-18A (for release valve adapter plate) |
| Control equipment | MP2 (for control equipment/filter regulator) |
| Pressure switch | MP3 (for pressure switch) |
| VAW-A (adapter plate, filter with auto drain cock, regulator) |
| IS3100-X230 |

Control unit types

| Control equipment | Ordering symbol | Nil | A | AP | M | MP | F | G | C | E |
| Air filter with auto drain | ○ | ○ | | | | | | | | |
| Air filter with manual drain | ○ | ○ | ○ | ○ | | | | | | |
| Regulator | ○ | ○ | ○ | ○ | | | | | | |
| Air release valve | ○ | ○ | ○ | ○ | | | | | | |
| Pressure switch | | | | | | | | | | |
| Blank plate (air release valve) | ○ | ○ | | | | | | | | |
| Blank plate (filter, regulator) | | | | | | | | | | |
| Number of manifold blocks required for mounting (stations) | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 |

Use of control units

<Construction and piping>

1) The supply pressure (Po) passes through the regulator with filter 1, and is adjusted to the prescribed pressure. Next, it goes through the release valve 2 (downstream residual pressure switching function used as normally ON) and is supplied to the manifold base side (P).
2) When the release valve 2 is OFF, the supply pressure from port Po is blocked, and the air which was being supplied to the manifold side port P passes through the release valve 2 and is discharged from port R1.
3) The pressure switch is piped into the downstream side of the release valve 2. (It operates when the release valve 2 is energized.) Also, since there is an internal voltage drop of 4V, it may not be possible to confirm the OFF and ON states with a tester, etc.

⚠️ Caution

- In the case of air filters with auto drain or manual drain, mount so that the air filter is at the bottom.
Series VQ7-8
ISO Standard Solenoid Valve
Size 2/SINGLE UNIT

How to Order Valves

VQ7-8 FG S 3

Passage symbol

- Optional

Number of solenoids
S Single
D Double

Connector
Nil DIN terminal block (with connector)
O DIN terminal block (without connector)
SC Prewired connector

Sub plate port size
Nil Without sub plate
A03 Side port Rc3/8
A04 Side port Rc1/2
A06 Side port Rc3/4
B03 Bottom port Rc3/8
B04 Bottom port Rc1/2
B06 Bottom port Rc3/4

Seal type
Nil Metal seal
R Rubber seal

Options
N Indicator light
Z Indicator light with surge voltage suppressor
V Individual pilot exhaust
* When two or more symbols are applicable, indicate in alphabetical order.

Coil rating
1 100VAC
2 200VAC
3 24VDC
4 12VDC

How to Order Sub Plates

VS7-2 A03

Port size
A03 Side port Rc3/8
A04 Side port Rc1/2
A06 Side port Rc3/4
B03 Bottom port Rc3/8
B04 Bottom port Rc1/2
B06 Bottom port Rc3/4

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Piping direction</th>
<th>Port size</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS7-2-A03</td>
<td>Side</td>
<td>Rc3/8</td>
<td>0.68</td>
</tr>
<tr>
<td>VS7-2-A04</td>
<td>Side</td>
<td>Rc1/2</td>
<td></td>
</tr>
<tr>
<td>VS7-2-A06</td>
<td>Side</td>
<td>Rc3/4</td>
<td>1.29</td>
</tr>
<tr>
<td>VS7-2-B03</td>
<td>Bottom</td>
<td>Rc3/8</td>
<td>0.68</td>
</tr>
<tr>
<td>VS7-2-B04</td>
<td>Bottom</td>
<td>Rc1/2</td>
<td></td>
</tr>
<tr>
<td>VS7-2-B06</td>
<td>Bottom</td>
<td>Rc3/4</td>
<td>1.29</td>
</tr>
</tbody>
</table>

* Contact SMC regarding other voltages.
### Models

<table>
<thead>
<tr>
<th>Series</th>
<th>Number of positions</th>
<th>Models</th>
<th>Note 1</th>
<th>Note 2</th>
<th>Note 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>VQ7-8</td>
<td>2 position</td>
<td>Single</td>
<td>Metal seal</td>
<td>VQ7-8-FG-S-□</td>
<td>58.0 (3.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rubber seal</td>
<td>VQ7-8-FG-S-□DR</td>
<td>58.0 (3.2)</td>
<td>45 or less</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Double</td>
<td>Metal seal</td>
<td>VQ7-8-FG-D-□</td>
<td>58.0 (3.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rubber seal</td>
<td>VQ7-8-FG-D-□DR</td>
<td>58.0 (3.2)</td>
<td>20 or less</td>
</tr>
<tr>
<td></td>
<td>Closed center</td>
<td>Metal seal</td>
<td>VQ7-8-FHG-D-□</td>
<td>50.4 (2.8)</td>
<td>45 or less</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rubber seal</td>
<td>VQ7-8-FHG-D-□DR</td>
<td>50.4 (2.8)</td>
<td>50 or less</td>
</tr>
<tr>
<td></td>
<td>Exhaust center</td>
<td>Metal seal</td>
<td>VQ7-8-FJG-D-□</td>
<td>54.0 (3.0)</td>
<td>45 or less</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rubber seal</td>
<td>VQ7-8-FJG-D-□DR</td>
<td>58.0 (3.2)</td>
<td>50 or less</td>
</tr>
<tr>
<td></td>
<td>Double check</td>
<td>Metal seal</td>
<td>VQ7-8-FPG-D-□</td>
<td>40.0 (2.2)</td>
<td>60 or less</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rubber seal</td>
<td>VQ7-8-FPG-D-□DR</td>
<td>40.0 (2.2)</td>
<td>60 or less</td>
</tr>
<tr>
<td></td>
<td>Pressure center</td>
<td>Metal seal</td>
<td>VQ7-8-FIG-D-□</td>
<td>54.0 (3.0)</td>
<td>45 or less</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rubber seal</td>
<td>VQ7-8-FIG-D-□DR</td>
<td>58.0 (3.2)</td>
<td>50 or less</td>
</tr>
</tbody>
</table>

Note 1) Port size Rc3/8: Value when mounted on sub plate
Note 2) Based on JIS B 8375-1981 (Value for supply pressure of 0.5MPa, with light and surge voltage suppressor and using clean air.) Response time values will change depending on the pressure and air quality. Value when ON for double type.
Note 3) Weight without sub plate (Sub plate: Rc3/8, 1/2: 0.68kg, Rc3/4: 1.29kg)

### Standard Specifications

**Valve structure**

<table>
<thead>
<tr>
<th></th>
<th>Metal seal</th>
<th>Rubber seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Air, Inert gas</td>
<td></td>
</tr>
<tr>
<td>Maximum operating pressure</td>
<td>1.0MPa</td>
<td></td>
</tr>
<tr>
<td>Minimum operating pressure</td>
<td>Single: 0.15MPa, 0.20MPa</td>
<td>Double: 0.15MPa, 0.15MPa</td>
</tr>
<tr>
<td>3 position</td>
<td>0.15MPa, 0.20MPa</td>
<td></td>
</tr>
</tbody>
</table>

| Ambient and fluid temperature | –10 to 60°C (Note 1) | –5 to 60°C (Note 1) |
| Lubrication | Not required |
| Manual operation | Push type (tool required) |
| Impact/Vibration resistance | 150/30 m/s² (Note 2) |
| Enclosure | IP65 (splash proof, jet proof) |

**Electrical specifications**

| Rated coil voltage | DC 12V, 24VAC, 110VAC, 200VAC, 220VAC (50/60Hz) |
| Allowable voltage fluctuation | ±10% of rated voltage |
| Coil insulation type | Class B equivalent |
| Power consumption (current) | 24VDC: D1W (42mA), DC1W (83mA) |
| 12VDC: D1W (12mA), DC1W (83mA) |
| 100VAC: Start-up 1.2VA (12mA), Holding 1.2VA (12mA) |
| 110VAC: Start-up 1.3VA (11.7mA), Holding 1.3VA (11.7mA) |
| 200VAC: Start-up 2.4VA (12mA), Holding 2.4VA (12mA) |
| 220VAC: Start-up 2.6VA (11.7mA), Holding 2.6VA (11.7mA) |

Note 1) For low temperature, use dry air with no condensation.
Note 2) Impact resistance: No malfunction when tested with a drop tester in the axial direction and at a right angle to the main valve and armature, one time each in both energized and deenergized states. (Initial value)
Vibration resistance: No malfunction when tested with one sweep from 8.3 to 2000Hz in the axial direction and at a right angle to the main valve and armature, one time each in both energized and deenergized states. (Initial value)
## Series VQ7-8 Construction

### DIN Connector Type

#### Metal seal type
- **VQ7-8-FG-S-□**

#### Rubber seal type
- **VQ7-8-FG-S-□R□**

#### VQ7-8-FD-□

#### VQ7-8-FP-D-□

#### VQ7-8-FPG-D-□

### Valve replacement parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>VQ7-8-FG-S-□</th>
<th>VQ7-8-FG-D-□</th>
<th>VQ7-8-FG-□D-□</th>
<th>VQ7-8-FFG-D□</th>
<th>VQ7-8-FFS-C□/□</th>
<th>VQ7-8-FG-D□R□</th>
<th>VQ7-8-FP-D□R□</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gasket</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Gasket A</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3</td>
<td>Gasket B</td>
<td>NBR</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Gasket C</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>O-ring</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>37 x 1.6</td>
</tr>
<tr>
<td>6</td>
<td>Mini Y seal</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MYN-16</td>
<td>MYN-14</td>
</tr>
<tr>
<td>7</td>
<td>Mini Y seal</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MYN-8</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Pilot valve assembly</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VQ21100-□</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Double check spacer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VV72-FPG</td>
<td></td>
</tr>
</tbody>
</table>

---

-19-
Series VQ7-8
Manifold Series VV72

How to Order Manifolds

VV72 6 - 03R - 04D

Stations
1 1 station
1 1
10 10 stations

Air release valve coil rating

<table>
<thead>
<tr>
<th>Nil</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100VAC 50Hz/60Hz</td>
</tr>
<tr>
<td>2</td>
<td>200VAC 50Hz/60Hz</td>
</tr>
<tr>
<td>3</td>
<td>24VDC</td>
</tr>
<tr>
<td>4</td>
<td>12VDC</td>
</tr>
<tr>
<td>9</td>
<td>Other</td>
</tr>
</tbody>
</table>

Silencer box
Nil Without
SB With
Note) The mounting position of the silencer box corresponds to 3 (R2) and 5 (R1) port connections.

1 (P), 3 (R2), 5 (R1) port connection

<table>
<thead>
<tr>
<th>04D</th>
<th>Rc1/2 (bottom)</th>
</tr>
</thead>
<tbody>
<tr>
<td>04U</td>
<td>Rc1/2 (top)</td>
</tr>
<tr>
<td>04B</td>
<td>Rc1/2 (both sides)</td>
</tr>
<tr>
<td>06D</td>
<td>Rc3/4 (bottom)</td>
</tr>
<tr>
<td>06U</td>
<td>Rc3/4 (top)</td>
</tr>
<tr>
<td>06B</td>
<td>Rc3/4 (both sides)</td>
</tr>
</tbody>
</table>

Air release valve
Nil Without
E With air release valve

Manifold specifications

<table>
<thead>
<tr>
<th>Manifold block size</th>
<th>Applicable solenoid valves</th>
<th>Piping specifications</th>
<th>Stations</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO size 2 (VQ7-8)</td>
<td>ISO size 2 series</td>
<td>2 (B), 4 (A) port size</td>
<td>Max. 10 stations</td>
<td>0.96n + 0.77 (n: stations)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 (P), 3 (R2), 5 (R1) port size</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rc3/8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rc1/2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rc3/8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rc1/2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rc3/4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Optional Manifold Parts

Blank plate assembly
AXT512-9A
This is used by mounting it on a manifold block, when a valve is removed for maintenance or when it is planned to install an additional valve in the future, etc.

Blocking plate (for SUP/EXH passages)
AXT512-14-1A (for SUP)
AXT512-14-2A (for EXH)
When two or more different high pressures are supplied to one manifold, blocking plates are installed between stations having different pressures. Also, in cases such as when valve exhaust effects other stations in a circuit, blocking plates are used for exhaust at stations where the exhaust is to be separated.

Individual SUP spacer
VV72-P-03
By mounting individual supply spacers on a manifold block, supply ports can be provided individually for each valve.

Blocking plate (for pilot EXH passage)
AZ512-49A
When a valve's pilot valve exhaust effects other valves in a circuit, blocking plates are used between stations where the pilot exhaust passages are to be separated.

Individual EXH spacer
VV72-R-03
By mounting individual exhaust spacers on a manifold block, exhaust ports can be provided individually for each valve.

(3, 6 common exhaust type)

Throttle valve spacer
AXT510-32A
By mounting a throttle valve spacer on a manifold block, a cylinder's speed can be controlled by throttling the exhaust.
**Reverse pressure spacer**

**AXT512-19A-2**

With reverse pressure control manifold specifications, when pressure is changed individually on one side (ex. high speed cylinder return), pressure can be supplied individually to the R2 side by mounting a reverse pressure spacer. (Port 3 (R2) is individual and 5 (R1) is common)

---

**Main EXH back pressure check plate**

**AXT512-25A**

In cases where back pressure effects actuator operation due to simultaneous operation of manifold valves, etc., this effect can be eliminated by installing a plate between the manifold block and the valve from which back pressure is to be prevented.

---

**R1, R2 individual EXH spacer**

**VV72-R2-04**

By mounting an individual exhaust spacer on a manifold block, individual exhaust is possible from both R1 and R2. (3 (R2) and 5 (R1) are individual ports)

---

**Adapter plate for locking cylinder**

**AXT602-6A**

When using a locking cylinder with 2 valves for control, this spacer can be used by mounting on a manifold block. It consists of a circuit equipped with a function to prevent lurching during release.

---

**Conversion adapter plate**

**VV72-V-1**

This conversion adapter plate allows a VQ7-6 (size 1) valve to be mounted on a VQ7-8 manifold base. (V type)
Optional Manifold Parts

Double check spacer

**VV72-FPG**

By combining a 3 position exhaust center valve with a double check spacer, an intermediate stopping position of a cylinder can be held for an extended period. It can also be used for drop prevention at the cylinder stroke end when releasing residual supply pressure, by combination with a 2 position single or double valve.

**Specifications**

<table>
<thead>
<tr>
<th>Applicable solenoid or air operated valve</th>
<th>VV72-FPG</th>
<th>Series VT-8, VSA7-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leakage cm³/min (ANR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One solenoid energized (One pilot pressurized)</td>
<td>P</td>
<td>R₁</td>
</tr>
<tr>
<td></td>
<td>R₂</td>
<td>280</td>
</tr>
<tr>
<td>Both solenoids unenergized (Both pilots unpressurized)</td>
<td>P</td>
<td>R₁</td>
</tr>
<tr>
<td></td>
<td>R₂</td>
<td>280</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>R₁</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>R₂</td>
</tr>
</tbody>
</table>

**Silencer box**

**VV72-□□□□□-SB**

This can be provided as a unit on the end plate to reduce manifold exhaust noise and piping labor.

**Interface regulator**

**ARB350-00-□□**

By mounting an interface regulator on a manifold block, it is possible to regulate each valve.

**Part No.**

- **P reduced pressure** ARB350-00-P
- **A reduced pressure** ARB350-00-A
- **B reduced pressure** ARB350-00-B

⚠️ **Caution**

- When combining a pressure center valve and interface regulator with reduced pressure at ports A and B, use model ARB310-□□.
- When combining a reverse pressure valve and interface regulator, use model ARB310-□□.
- Further, it cannot be used with reduced pressure at port P.
- When combining a double check valve and interface regulator, use a manifold or sub plate as a base, and assemble by stacking in the order of double check spacer, interface regulator and valve.
- When combining a closed center valve and interface regulator with reduced pressure at ports A and B, it cannot be used for intermediate cylinder stops because of air leakage from the regulator's relief port.
### VQ7-6 mounting bolt part numbers

<table>
<thead>
<tr>
<th>Number of options</th>
<th>0</th>
<th>Single stack</th>
<th>Double stack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting bolt</td>
<td></td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Part No.</td>
<td>AXT632-45-1</td>
<td>AXT632-45-2</td>
<td>AXT632-45-3</td>
</tr>
<tr>
<td>Size</td>
<td>M5 X 35 with SW</td>
<td>M5 X 35 with SW</td>
<td>M5 X 45 with SW</td>
</tr>
<tr>
<td>Size</td>
<td>M5 X 45 with SW</td>
<td>M5 X 55 with SW</td>
<td>M5 X 65 with SW</td>
</tr>
<tr>
<td>Size</td>
<td>M5 X 75 with SW</td>
<td>M5 X 90 with SW</td>
<td>M5 X 100 with SW</td>
</tr>
<tr>
<td>Option mounting diagram</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Option mounting diagram

### VQ7-8 mounting bolt part numbers

<table>
<thead>
<tr>
<th>Number of options</th>
<th>0</th>
<th>Single stack</th>
<th>Double stack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting bolt</td>
<td></td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Part No.</td>
<td>AXT632-54-1</td>
<td>AXT632-54-2</td>
<td>AXT632-54-3</td>
</tr>
<tr>
<td>Size</td>
<td>M6 X 45 with SW</td>
<td>M6 X 45 with SW</td>
<td>M6 X 55 with SW</td>
</tr>
<tr>
<td>Size</td>
<td>M6 X 55 with SW</td>
<td>M6 X 65 with SW</td>
<td>M6 X 75 with SW</td>
</tr>
<tr>
<td>Size</td>
<td>M6 X 90 with SW</td>
<td>M6 X 100 with SW</td>
<td>M6 X 110 with SW</td>
</tr>
<tr>
<td>Option mounting diagram</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Option mounting diagram

<table>
<thead>
<tr>
<th>Number of options</th>
<th>Triple stack</th>
<th>Double stack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting bolt</td>
<td></td>
<td>--------------</td>
</tr>
<tr>
<td>Part No.</td>
<td>AXT632-54-12</td>
<td>AXT632-54-13</td>
</tr>
<tr>
<td>Size</td>
<td>M6 X 105 with SW</td>
<td>M6 X 110 with SW</td>
</tr>
<tr>
<td>Option mounting diagram</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### VQ7-8 mounting bolt part numbers

#### Spacers
- Main exhaust back pressure check plate
- Throttle valve spacer
- Release valve spacer
- Spacer 1
- Individual supply spacer
- Individual exhaust spacer
- R1, R2 individual exhaust spacer
- Reverse pressure spacer
- Residual pressure release valve spacer
- Individual supply spacer with residual pressure release valve
- Spacer 2
- Interface regulator (P reduced pressure)
- Interface regulator (A reduced pressure)
- Interface regulator (B reduced pressure)
- Double check spacer
- Double check spacer with residual pressure release valve

---

Note 1: A throttle valve spacer and double check spacer (including those with residual pressure release valve) cannot be combined.

Note 2: When a double check spacer (Top) (including those with residual pressure release valve) and individual exhaust spacer (Bottom) are combined with a R1, R2 individual exhaust spacer (Bottom), be careful regarding the installation position.

Note 3: When an interface regulator (Top) and double check spacer (Bottom) (including those with residual pressure release valve) (Bottom) are combined, be careful regarding the installation position.
Series VQ7-6

Manifold Exploded View

<table>
<thead>
<tr>
<th>D side end plate assembly</th>
<th>Tension bolt</th>
<th>Manifold block assembly</th>
<th>U side end plate assembly</th>
</tr>
</thead>
</table>

**< End plate assembly >**

**AXT502 - A**

- **End plate position**
  - L: L side
  - R: R side

- **P, R port size**
  - 02: Rc1/4
  - 03: Rc3/8
  - C12: φ12 One-touch fitting

**< Tension bolt part number >**

**AXT502 - 34**

- **Number of stations**
  - 2: For 2 stations
  - 3: For 3 stations
  - 10: For 10 stations

Note: These tie-rods are solid pieces for each number of stations.

**< Manifold block assembly >**

**AXT502 - 1A**

- **Wiring specification**
  - A: Side
  - B: Bottom

- **Cylinder port position**
  - L: L side
  - R: R side

- **Cylinder port size**
  - 02: φ6 One-touch fitting
  - 03: φ8 One-touch fitting
  - C10: φ10 One-touch fitting

Note 1: Side ported only

**< Manifold block replacement parts >**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Qty.</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>AXT502-19</td>
<td>O-ring</td>
<td>4</td>
<td>NBR</td>
</tr>
<tr>
<td>AXT502-20</td>
<td>O-ring</td>
<td>2</td>
<td>NBR</td>
</tr>
<tr>
<td>AXT502-22-2</td>
<td>Plate</td>
<td>1</td>
<td>SPCC</td>
</tr>
<tr>
<td>AXT502-31</td>
<td>Gasket</td>
<td>1</td>
<td>NBR</td>
</tr>
<tr>
<td>M4 X 8</td>
<td>Oval countersunk head screw</td>
<td>2</td>
<td>SWRH3</td>
</tr>
</tbody>
</table>
## Manifold Exploded View

<table>
<thead>
<tr>
<th>D side end plate assembly</th>
<th>Manifold block assembly</th>
<th>U side end plate assembly</th>
</tr>
</thead>
</table>

### < End plate assembly >

**AXT512 - A -**

- **End plate position**
  - L: L side
  - R: R side

- **P, R port size**
  - 04: Rc1/2
  - 06: Rc3/4
  - C12: φ12 One-touch fitting

### < Manifold block assembly >

**AXT512 - 1A -**

- **Wiring specification**
  - A: Side
  - B: Bottom

- **Cylinder port position**

### < Manifold block replacement parts >

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Qty.</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>AXT512-13</td>
<td>O-ring</td>
<td>2</td>
<td>NBR</td>
</tr>
<tr>
<td>AS568-022</td>
<td>O-ring</td>
<td>1</td>
<td>NBR</td>
</tr>
<tr>
<td>AS568-020</td>
<td>O-ring</td>
<td>2</td>
<td>NBR</td>
</tr>
<tr>
<td>AXT512-5</td>
<td>Gasket</td>
<td>1</td>
<td>NBR</td>
</tr>
<tr>
<td>AXT512-4</td>
<td>Plate</td>
<td>1</td>
<td>SPCC</td>
</tr>
<tr>
<td>M4X10</td>
<td>Oval countersunk head screw</td>
<td>2</td>
<td>SWRH3</td>
</tr>
<tr>
<td>AXT512-6-1</td>
<td>Connection fitting A</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>AXT512-6-4</td>
<td>Connection fitting B</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>AXT512-6-3</td>
<td>Hexagon socket head screw</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
### Failures and Countermeasures

#### Problem 1: Valve has any problems, follow the instructions below.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Possible Cause of Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The main valve is &quot;sticking&quot;</td>
<td>V-Contamination in the supply air is adhering to the main valve, causing little or no movement.</td>
<td>Replace the valve, V-Clean the air supply (See P.4)</td>
</tr>
<tr>
<td>2. Pressure drop</td>
<td>The pressure of the air supply has dropped, failing to reach the minimum operating pressure, which has resulted in the valve not shifting.</td>
<td>Adjust the pressure within the operating pressure of the valve.</td>
</tr>
<tr>
<td>3. Electrical problem</td>
<td>V-Sequence failure, V-Wrong wiring, V-Disconnection of the fuse and lead wire, V-Voltage drop</td>
<td>Check each electrical system and deal with any problem.</td>
</tr>
<tr>
<td>4. Voltage drop</td>
<td>Even if the light is on, a valve sometimes does not shift due to the voltage drop.</td>
<td>Check the voltage, then if it is dropping, readjust.</td>
</tr>
</tbody>
</table>

#### Malfunction (Valve is not shifting)

- **Does the valve shift when the manual override is pushed in?**
  - NO
  - YES

- **Does the indicator light come on when solenoid is energized?**
  - NO
  - YES

#### Slow response

- **The valve operates but response is very slow.**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Possible Cause of Problem</th>
<th>Solution</th>
</tr>
</thead>
</table>
| 1. Leak Current | Slow response was due to the pressing of residual voltage in the deenergized state (OFF position) | Check the residual voltage. Keep the residual voltage at the following values of the rated voltage:  
  - DC coil: 22 or less  
  - AC coil: 12.5% or less |
| 2. Main Valve Problem | Contamination from the air supply entered into the pilot valve and caused the pilot valve to malfunction. V-Coil is disconnected. | Replace the pilot valve Assy.  
  | Pilot valve Assy Parts No.  
  | VQZ1100 - 1100VAC  
  | VQZ1100 - 220VAC  
  | VQZ1100 - 512VDC  
  | V-Clean the air supply (See P.4). |

---

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<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible cause of problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air leakage</td>
<td>1) The mounting bolts might be loose. (See P.6).</td>
<td>Tighten the mounting bolts. Proper tightening torque:</td>
</tr>
<tr>
<td></td>
<td>1) The mounting bolts might be loose. (See P.6).</td>
<td><strong>VQ7-6</strong>: 2.3 to 3.7N·m <strong>VQ7-8</strong>: 4.0 to 6.0N·m</td>
</tr>
<tr>
<td></td>
<td>If the gasket is damaged, replace it.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) From the R exhaust port.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Note: In the case of the metal seal type valve,</td>
<td><strong>VQ7-6</strong>: about 230cm³/min per port (at 0.3MPa) <strong>VQ7-8</strong>: about 320cm³/min per port (at 0.3MPa)</td>
</tr>
<tr>
<td></td>
<td>air leaks across the spool by as follows.</td>
<td>This is within specifications.</td>
</tr>
<tr>
<td></td>
<td>3-2) The inside leakage increased because dust particles from the air supply were</td>
<td><strong>V6</strong>: Replace the valve. <strong>V1</strong>: Clean the air supply (See P.4).</td>
</tr>
<tr>
<td></td>
<td>caught in the main valve.</td>
<td></td>
</tr>
</tbody>
</table>