

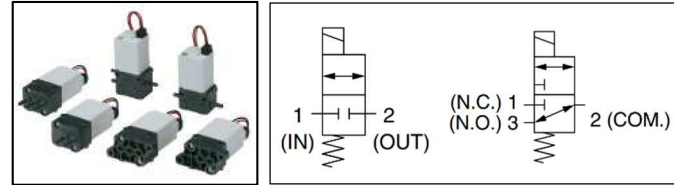


ORIGINAL INSTRUCTIONS

Instruction Manual

Direct operated 2/3 Port Isolated valve

LVMK Series



The intended use of is for the control of the downstream fluid supply.

1 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 10218-1: Manipulating industrial robots -Safety. etc.
- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
 - Keep this manual in a safe place for future reference.

Caution	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
Warning	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
Danger	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Warning

- Always ensure compliance with relevant safety laws and standards.
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

2 Specifications

2.1 General Specifications (2 Ported)

Model	Body ported (Tubing type)		Base mounted
	LVMK21	LVMK27	LVMK23
Valve type	N.C.		
Number of ports	2		
Fluid ⁽¹⁾	Air, Water, Deionized water, Diluent, Cleaning fluid		
Operating pressure range	-90 kPa to 0.2 MPa		
Orifice diameter	2 mm equivalent		
Response time ⁽²⁾	16 ms or less (air)		
Internal / External Leakage	Zero leakage (at water pressure)		
Proof pressure ⁽³⁾	0.3 MPa		
Ambient Temperature	5 to 50°C (No condensation)		
Fluid Temperature	5 to 50°C		
Mounting orientation ⁽⁴⁾	Free		
Enclosure	IP40		
Weight ⁽⁵⁾	76g	77g	76g

Table 1

2 Specification – continued

2.2 General Specifications (3 Ported)

Model	Body ported (Tubing type)		Base mounted
	LVMK202	LVMK207	LVMK205
Valve type	Universal		
Number of ports	3		
Fluid ⁽¹⁾	Air, Water, Deionized water, Diluent, Cleaning fluid		
Operating pressure range	-90 kPa to 0.2 MPa		
Orifice diameter	2 mm equivalent		
Response time ⁽²⁾	16 ms or less (air)		
Internal / External Leakage	Zero leakage (at water pressure)		
Proof pressure ⁽³⁾	0.3 MPa		
Ambient Temp.	5 to 50°C (No condensation)		
Fluid Temperature	5 to 50°C		
Mounting orientation ⁽⁴⁾	Free		
Enclosure	IP40		
Weight ⁽⁵⁾	78g	78g	79g

Table 2

2.3 Solenoid Specifications

Rated Voltage	12, 24 VDC
Voltage fluctuation ⁽⁶⁾	±10% of rated voltage
Type of coil insulation	Class B
Power Consumption (When rated voltage is 24V)	3 W (0.125 A)
Coil switching noise ⁽⁷⁾	70 dB (A)

Table 3

Notes:

- Be sure to confirm the fluid compatibility in advance.
- Based on JIS B 8419-2010 (at ambient and fluid temperature of 25°C, supply pressure of 0.2 MPa, rated voltage, and when N.C. (IN) port is pressurized) When poppet/seal material is FKM. If ambient temperature and fluid temperature is 10°C or less (guide), the response time will be longer.
- Indicates the pressure which does not generate breakage, cracks or

external leakage after a one-minute airtight test.

- When residual liquid is considered, mounting in a vertical direction with the coil at the top is recommended. When residual liquid is not considered, any mounting orientation is available.
- When lead wire length is 300 mm. For 600 mm, add 3 g, and for 1000 mm, add 7 g.
- When response time is prioritized, the voltage should be rated voltage +10%.
- The value is based on SMC's measurement conditions. The noise level will vary with conditions.

Warning

Special products might have specifications different from those shown in this section. Contact SMC for specific drawings.

3 Installation

3.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.

3.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.

3 Installation - continued

3.3 Piping

Caution

- Before connecting piping make sure to clean up chips, cutting oil, dust etc.
- When tubing is directly connected to the solenoid valve, insert the tubing straight into the barb for a complete fit. The tube I.D. should be 2 to 3.2 mm and O.D. after mounting should be 8 mm or less, but mounting force (holding force) varies depending on the tube material or dimensions, so please check that there is no problem with the leakage and mounting performance before use. After connecting the tubing, care should be taken not to put excessive force (tensile force, compression, bending, etc.) on the tubing. If 20 N or more of external force is applied to the barb, it may break the barb.

3.4 Mounting

Warning

- If air leakage increases or equipment does not operate properly, stop operation. After mounting is completed, confirm that it has been done correctly by performing a suitable function test.

Caution

- Mount the solenoid valve on the horizontal surface. Applicable model: LVMK21, 27, 202, 207 (Body ported)
- Remove dust from the solenoid mounting surface. The surface roughness of the mounting surface should be Rz3.2 or less. Applicable model: LVMK23, 205 (Base mounted)
- When mounting the solenoid valves next to each other, P (pitch) should be 23 mm or more. (See figure 1) Applicable model: LVMK23, 205 (Base mounted)

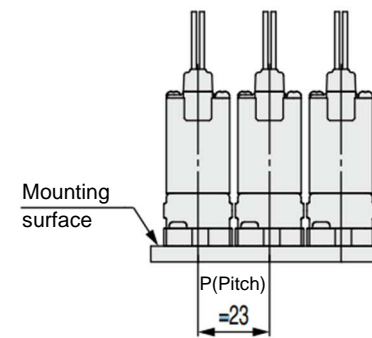


Figure 1

- Always tighten threads with the proper tightening torque.

When mounting the solenoid valve, tighten it with the proper tightening torque shown below.

Tightening torque

Location	Model	Thread Size	Proper tightening torque
Body ported Side, (Location.1)	LVMK21, 27, 202, 207	M2.5	0.25 to 0.35
Body ported, bottom (Location.2)	LVMK27, 207	M3	0.4 to 0.6
Base mounted, Body mounted. (Location.3)	LVMK23, 205	M3	0.4 to 0.6

Table 4

3 Installation - continued

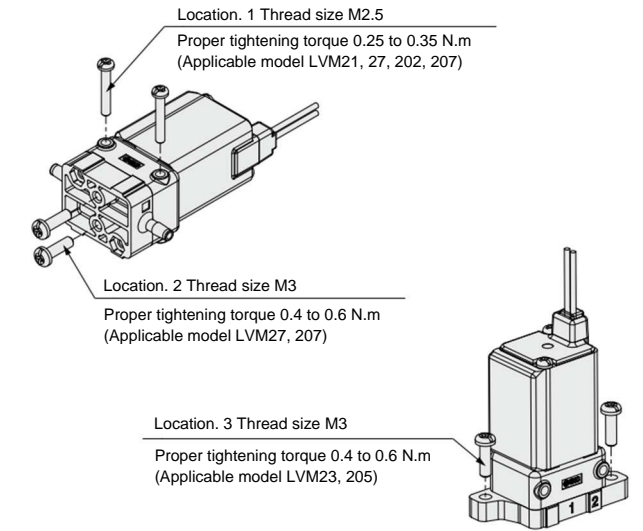


Figure 2

3.5 Wiring

Caution

- Use electrical circuits which do not generate chattering in their contacts.
- Use voltage which is within ±10% of the rated voltage. However, when the response time is important, control the voltage to avoid variation on the minus side.
- Apply the correct voltage. Applying incorrect voltage may cause a malfunction or a burned coil.
- Connect the wires so that an external force of 10N or greater is not applied to the lead wire. Otherwise the coil will burn.
- This solenoid valve has no polarity.

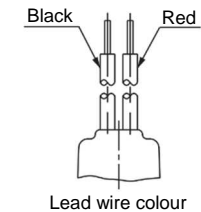


Figure 3

3.6 Fluid Quality

Warning

- Water. Install a filter strainer of about 100 mesh on the inlet side of the piping.
- Air. Compressed air filtered with a filter with filtration rating of 5 µm or less, which is mounted on the inlet side of the piping, should be used.

4 How to Order

Refer to [drawings or catalogue](#) for 'How to Order'.

5 Outline Dimensions (mm)

Refer to [drawings or catalogue](#) for outline dimensions.

6 Maintenance

6.1 General Maintenance

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.

6 Maintenance - continued

- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Before operating, remove residual chemicals and completely replace it with de-ionized water, air, etc.
- Maintenance space
The installation should allow sufficient space for maintenance activities.

7 Limitations of Use

7.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

Warning

- **Do not use this product in applications which may adversely affect human life (e.g. medical equipment connected to the human body for drip infusion).**
- **Confirm the specifications.**
Give careful consideration to the operating conditions such as the application, fluid and environment, and use within the operating ranges specified in the catalogue.
- **Fluid**
Be sure to confirm the compatibility between the component material and the fluid.

- **Liquid (chemicals)**

Component may crystallise or clot depending on the fluids' nature. Leakage will occur when crystallised or clotted component is caught between the sealing parts. Take measures to clean such component if necessary.

- **Fluid pressure range**
Fluid pressure should be within the allowable pressure range.
- **Ambient environment**
Use within the allowable ambient temperature range. Be sure that the liquid or corrosive gas does not touch the external surface of the product.
- **Countermeasures against static electricity**
Take measures to prevent static electricity since some fluids can cause static electricity.
- **Pressure (including vacuum) holding**
It is not usable for an application such as holding the pressure (including vacuum) inside of a pressure vessel because air leakage is entailed in a valve.
- **Cannot be used as an emergency shutoff valve etc.**
The valves 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.
- **Extended periods of continuous energization**
When a solenoid valve is continuously energized for long periods of time, temperature increase from coil heat release can result in worsening performance and shortened service life of the solenoid valve, as well as adverse effects on peripheral equipment in the vicinity. For this reason, when valves are to be continuously energized for extended periods, use a fan or take other measures to disperse heat and keep valve surface temperatures at 70°C or less.
Table 5 shows reference values for continuously energized valves (single unit) when surface temperature is 70°C or less.

7 Limitations of Use - continued

Period of continuous energisation	30 minutes or less
Duty ratio (ON Time / Total Time)	50% or less
Ambient temperature	25°C or less

Table 5

Please use a fan or take other measures to disperse heat and keep temperatures within the specified range when mounting the solenoid valves inside control panels, etc. Be especially careful when using three or more adjacent valves with manifolds and keeping them continuously energized for extended period, as this may result in dramatic increases in temperature.

Coil generates heat when it is energized in general, so do not touch it by hand.

- **Low temperature environments**

When poppet/seal material is FKM, if ambient temperature and fluid temperature is 10°C or less (guide), the response time of the solenoid valve will be longer.

Caution

- **Leakage voltage**
The leakage voltage should be 2% or less of the rated voltage. If the leakage voltage exceeds this value, valve may not turn OFF.

8 Product disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

9 Contacts

Refer to www.smcworld.com or www.smc.eu for contacts.

SMC Corporation

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 Specifications are subject to change without prior notice from the manufacturer.
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