Direct Operated 2/3-Port Isolated Valve

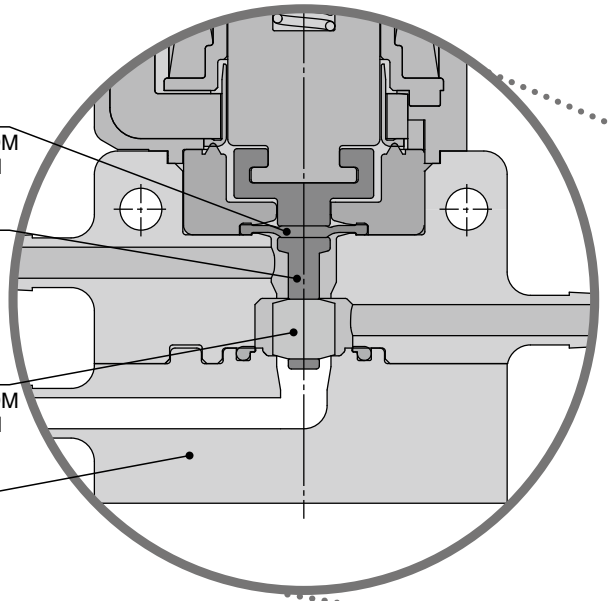
LVMK20/200 Series

Low Particle Generation | **Oil-free** | **Metal-free**

Air Water

Isolated Structure

Solenoid drive body is separated from the fluid area by block seal.

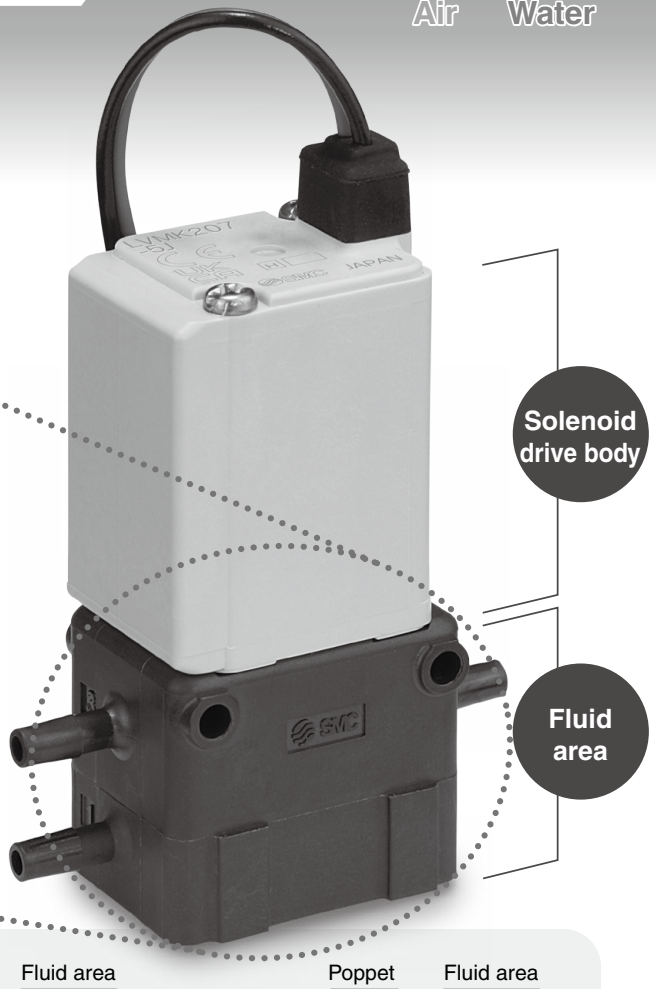


Block seal
Material: EPDM
FKM

Shaft
Material: PPS

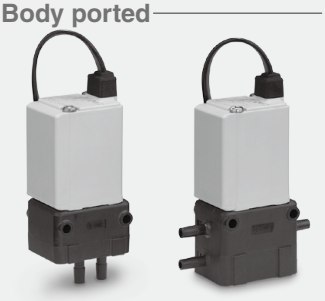
Poppet
Material: EPDM
FKM

Body
Material: PPS



Easy piping

Body ported

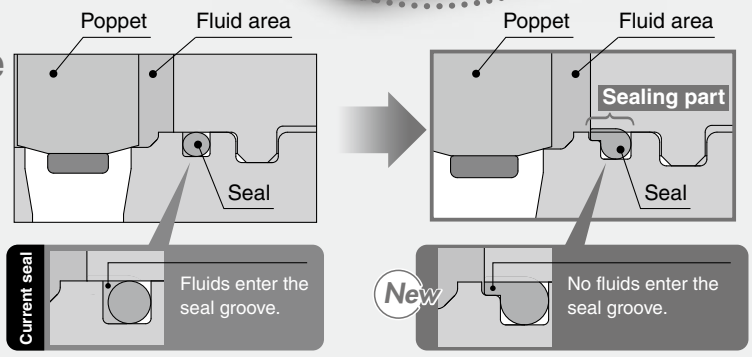


Bottom ported Side ported

Base mounted

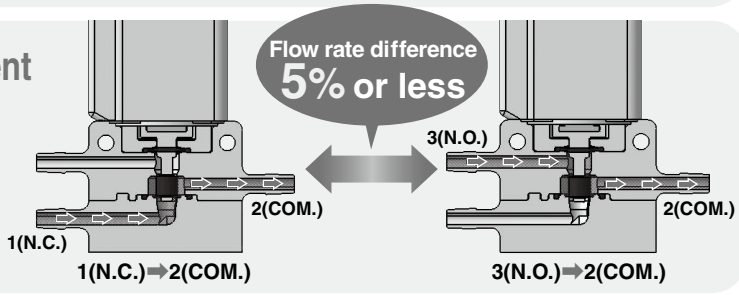
Minimal dead space

No fluids enter the seal groove.



Flow adjustment not required

As the flow rate difference is **5%** or less, no flow rate adjustment is required at inlet and outlet side.



Application Examples

Oil-free, clean, low particle generation applications

Clean

- Pure water purification equipment

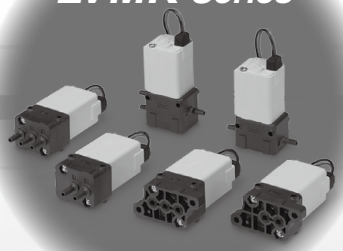
- Semiconductor equipment (CMP equipment)

- Water dispenser
  Beverage dispenser

- Blood analyzer

- Water processing facility (water quality analysis)
- Dental equipment etc.
- Immunity inspection device

LVMK Series



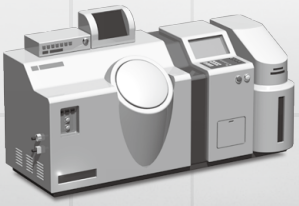
Water

- Automatic faucet

- Liquid filling instrument

Chemical liquids

- Atmospheric pollution analyzer



- Ink dispenser

- Elution tester

General environments

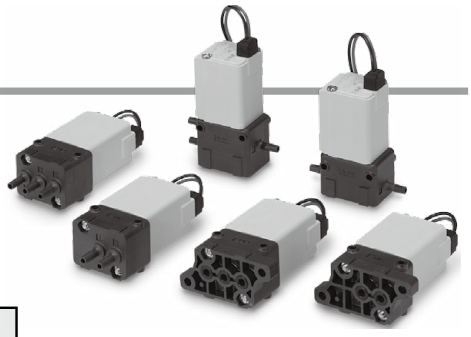
- Ion cleaner
- Dying machine etc.

Variations

Model		Valve type	Piping direction	Voltage	Fluid contact material
Body Ported	LVMK21	N.C.	Bottom ported	24 VDC 12 VDC	Body: PPS Seal: EPDM, FKM
	LVMK27		Side ported		
	LVMK202	Universal	Bottom ported		
	LVMK207		Side ported		
Base Mounted	LVMK23	N.C.	—		
	LVMK205	Universal	—		

Direct Operated 2/3-Port Isolated Valve

LVMK20/200 Series



How to Order

Number of ports/Valve type/Piping direction

Symbol	Number of ports	Valve type	Piping direction	Recommended tubing diameter
21	2	N.C.	Bottom ported	I.D. 2 to 3.2 mm, O.D. after mounting 8 mm or less
27			Side ported	
202	3	Universal	Bottom ported	
207			Side ported	

Body ported LVMK **202** – **5** **J** – □

Base mounted LVMK **205** – **5** **J** – □

Number of ports/Valve type

Symbol	Number of ports	Valve type
23	2	N.C.
205	3	Universal

Coil voltage

Symbol	Voltage
5	24 VDC
6	12 VDC

Fluid contact material

Symbol	Body	Poppet/Seal
J	PPS	EPDM
K	PPS	FKM

Lead wire length

Nil	300 mm
6	600 mm
10	1000 mm

Specifications

Model	Body ported (Tubing type)				Base mounted	
	LVMK21	**LVMK27**	**LVMK202**	**LVMK207**	**LVMK23**	**LVMK205**
Valve construction	Direct operated poppet					
Valve type	N.C.		Universal		N.C.	Universal
Number of ports	2		3		2	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 (at pneumatic pressure)					
Leakage	Zero leakage, either external or internal (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 equivalent					
Weight∗7	76 g	77 g	78 g	78 g	76 g	79 g
Rated voltage	12, 24 VDC					
Allowable voltage fluctuation∗5	±10% of rated voltage					
Type of coil insulation	Class B					
Power consumption (When rated voltage is at 24 V)	3 W (0.125 A)					
Coil switching noise∗6	70 dB (A)					

∗1: Be sure to confirm the fluid compatibility in advance.
∗2: 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.
∗3: Indicates the pressure which does not generate breakage, cracks or external leakage after a one-minute airtight test.
∗4: 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.
∗5: When response ability is prioritized, the voltage should be rated voltage +10%.
∗6: The value is based on SMC's measurement conditions. The noise level will vary with conditions.
∗7: When lead wire length is 300 mm. For 600 mm, add 3 g, and for 1000 mm, add 7 g.
∗: Refer to 10 in "Design / Selection" on page 385, if the valve is to be energized continuously for extended periods of time.

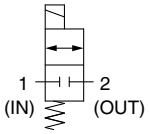
Flow Rate Characteristics

Water		Air	
Kv	Cv	C	b
0.055	0.065	0.23	0.27

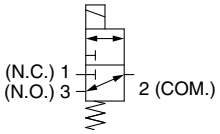
∗: The values of Kv and Cv are based on JIS B 2005:1995, C and b are based on JIB B 8390:2000.

Symbol

N.C.
LVMK21/23/27

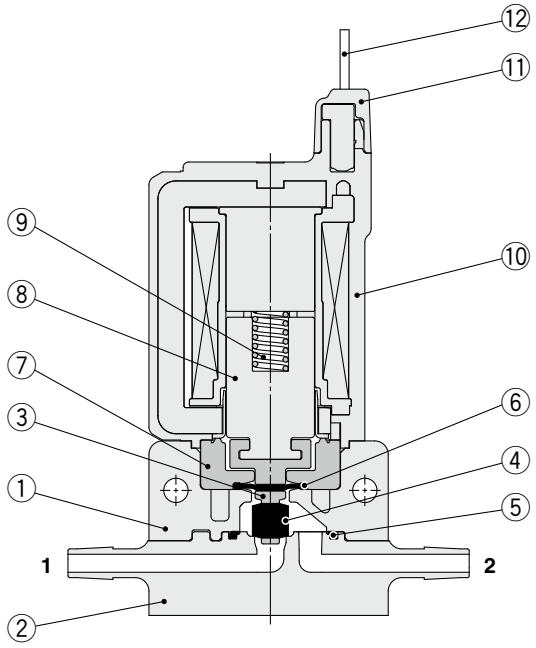


Universal
LVMK202/205/207

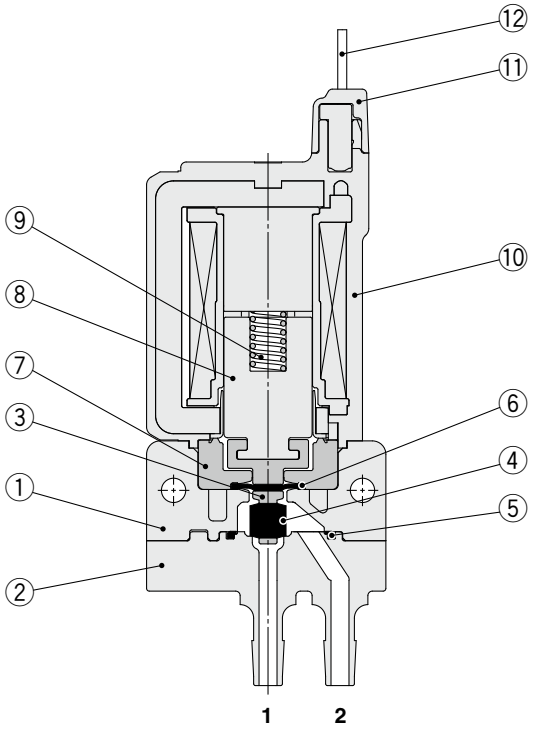


Construction: Body Ported

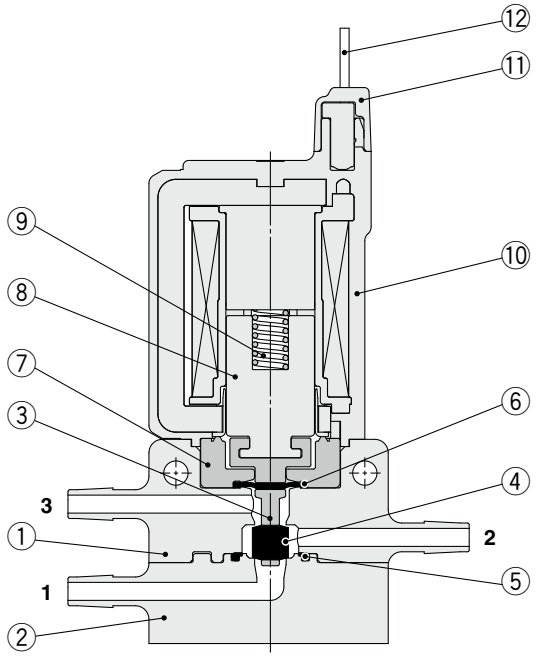
LVMK27



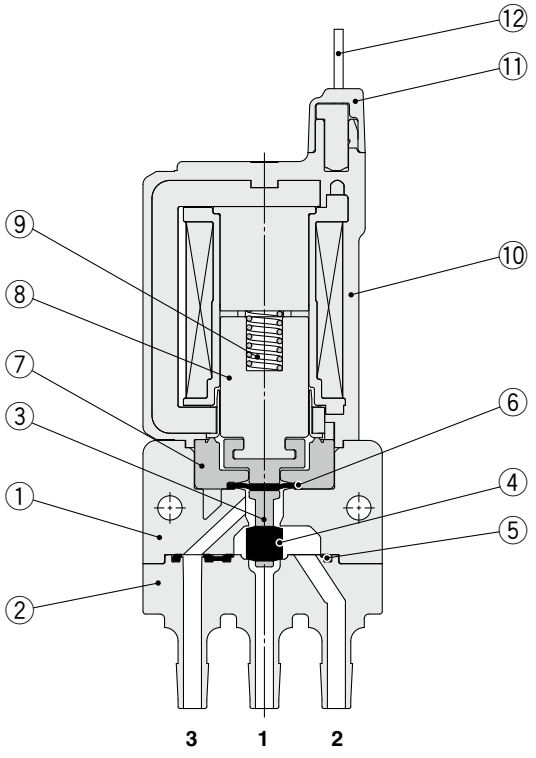
LVMK21



LVMK207



LVMK202



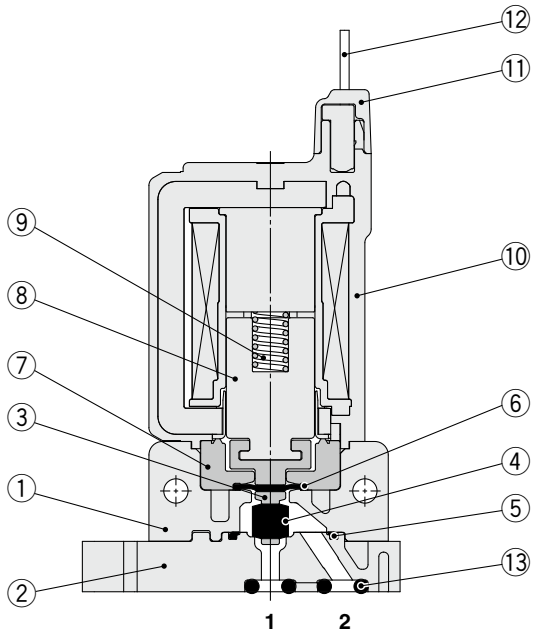
Component Parts

No.	Description	Material
1	**Body A**	PPS
2	**Body B**	PPS
3	**Shaft**	PPS
4	**Poppet**	EPDM, FKM
5	**Seal**	EPDM, FKM
6	**Block seal**	EPDM, FKM

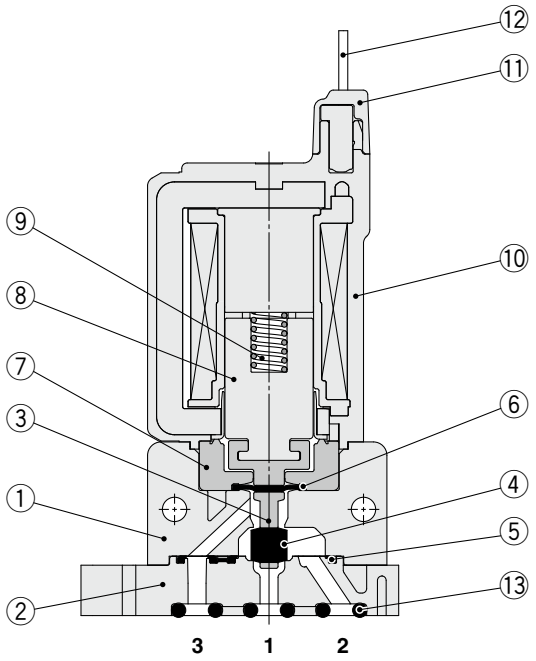
No.	Description	Material
7	**Spacer**	PBT
8	**Armature**	—
9	**Return spring**	Stainless steel
10	**Mold coil**	Molded material: PBT
11	**Cover**	NBR
12	**Lead wire**	—

Construction: Base Mounted

LVMK23



LVMK205



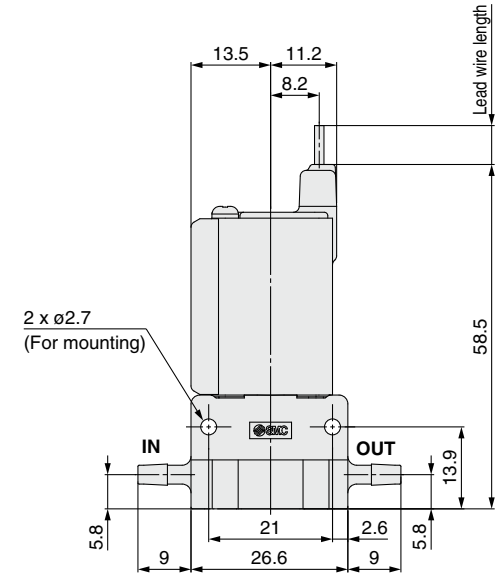
Component Parts

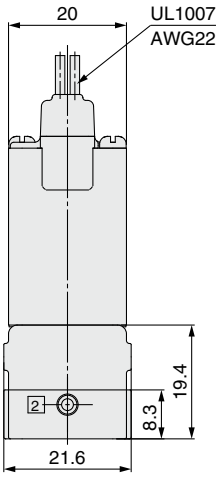
No.	Description	Material
1	**Body A**	PPS
2	**Body B**	PPS
3	**Shaft**	PPS
4	**Poppet**	EPDM, FKM
5	**Seal**	EPDM, FKM
6	**Block seal**	EPDM, FKM
7	**Spacer**	PBT

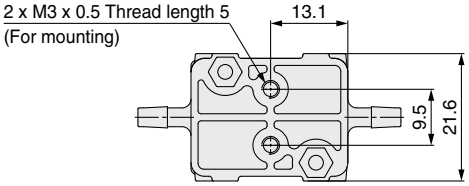
No.	Description	Material
8	**Armature**	—
9	**Return spring**	Stainless steel
10	**Mold coil**	Molded material: PBT
11	**Cover**	NBR
12	**Lead wire**	—
13	**O-ring**	EPDM, FKM

Dimensions: Body Ported (Side Ported)

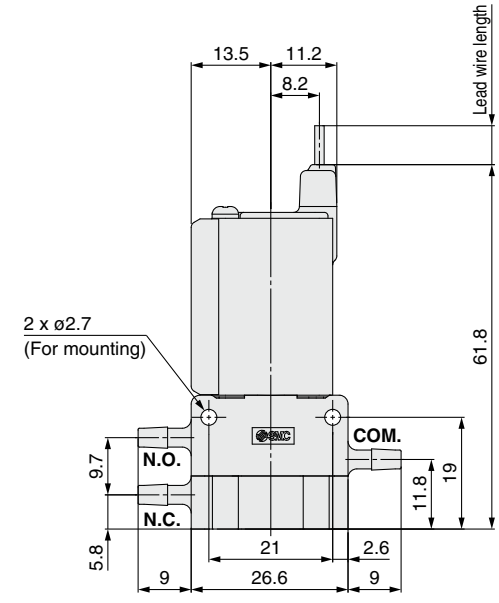
LVMK27-□□-□

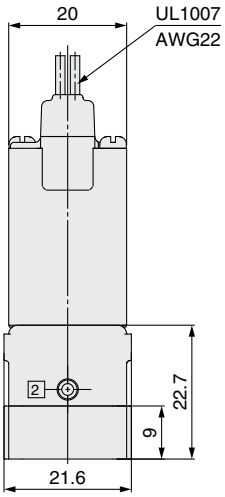


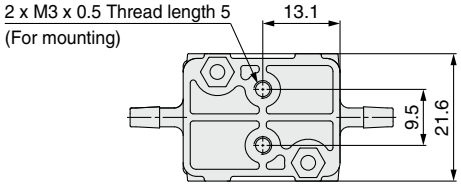




LVMK207-□□-□

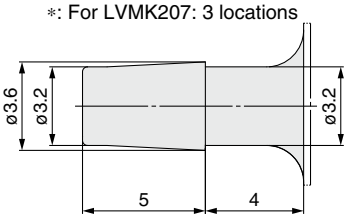






Tubing insertion dimension

∗: For LVMK27: 2 locations
∗: For LVMK207: 3 locations

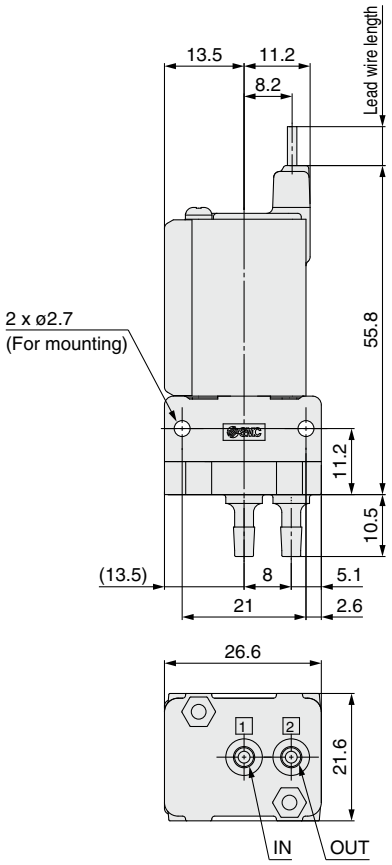


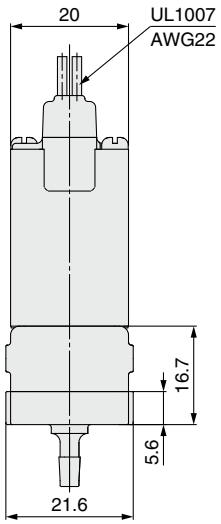
Recommended tubing diameter:
I.D. ø2 to ø3.2, O.D. after mounting ø8 or less

∗: 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.

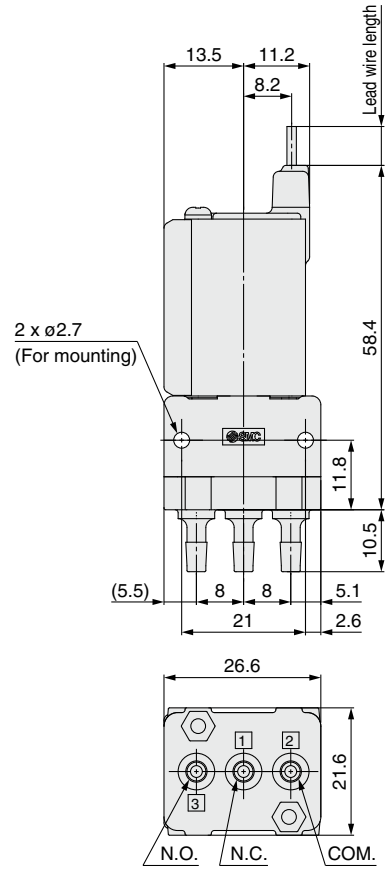
Dimensions: Body Ported (Bottom Ported)

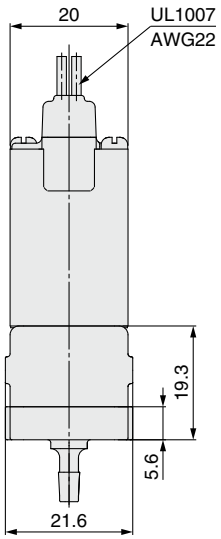
LVMK21-□□-□





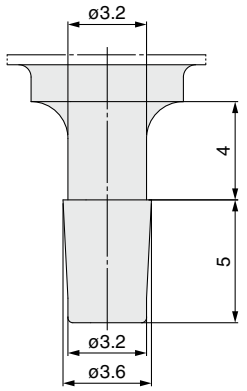
LVMK202-□□-□





Tubing insertion dimension

∗: For LVMK21: 2 locations
∗: For LVMK202: 3 locations

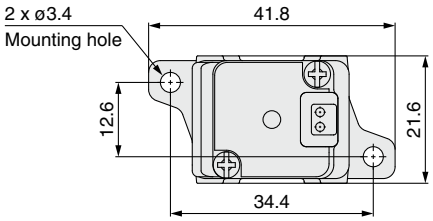


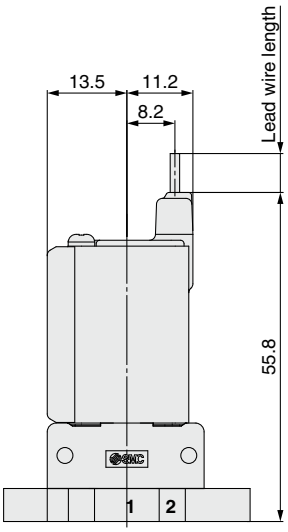
Recommended tubing diameter:
I.D. ø2 to ø3.2, O.D. after mounting ø8 or less

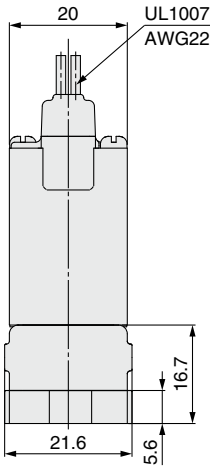
∗: Mounting force (holding force) varies depending on the tube material or dimensions, so please check that there is no problem with the leakage and mounting performance before use.

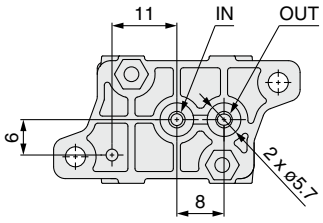
Dimensions: Base Mounted

LVMK23-□□-□



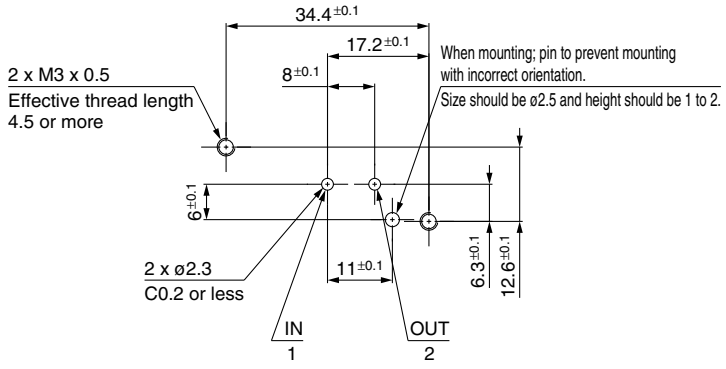






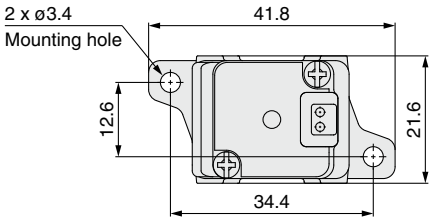
Recommended interface dimension

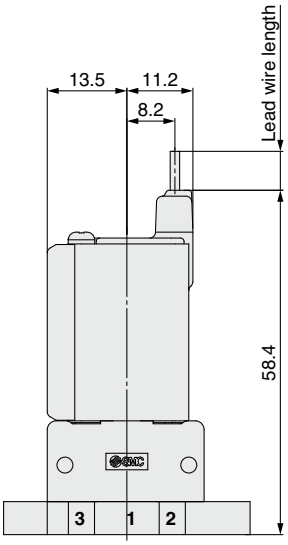
∗: Surface roughness = Rz3.2 or less

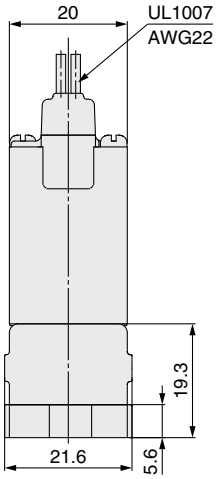


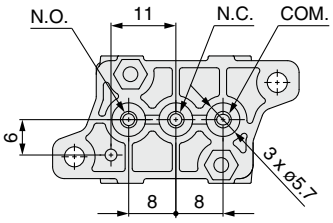
Dimensions: Base Mounted

LVMK205-□□-□



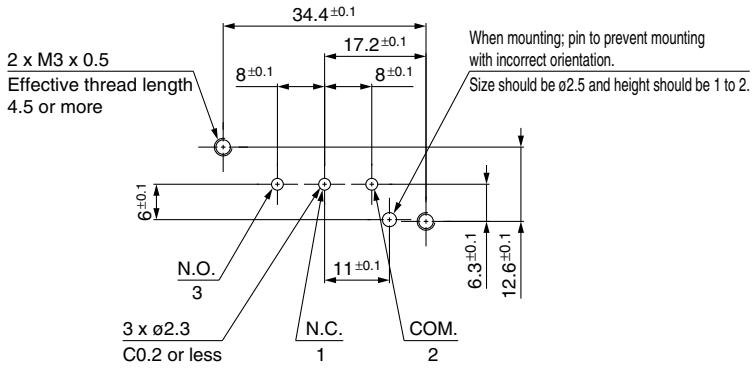






Recommended interface dimension

∗: Surface roughness = Rz3.2 or less



LVMK Series
Specific Product Precautions 1

Be sure to read this before handling the products. Please contact SMC when it is used in conditions other than the specifications.

Design / Selection

⚠ Warning

1. 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).

2. 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 this catalog.

3. Fluid

Be sure to confirm the compatibility between the component material and the fluid.

4. Maintenance space

The installation should allow sufficient space for maintenance activities.

5. Fluid pressure range

Fluid pressure should be within the allowable pressure range.

6. 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.

7. Countermeasures against static electricity

Take measures to prevent static electricity since some fluids can cause static electricity.

8. 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.

9. 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.

10. 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.

The table below shows reference values for continuously energized valves (single unit) when surface temperature is 70°C or less.

Period of continuous energization	30 minutes or less
Duty ratio	50% or less
Ambient temperature	25°C or less

∗: Duty ratio: ON time/(ON time + OFF time)

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.

11. 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.

Selection

⚠ 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.

Mounting

⚠ Warning

1. 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

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 for Mounting the Solenoid Valve

Location	Model	Thread size	Proper tightening torque [N·m]
Body ported, Side of the body (See Fig. 1 below.)	**LVMK21, 27, 202, 207**	M2.5	0.25 to 0.35
Body ported, Bottom of the body (See Fig. 2 below.)	**LVMK27, 207**	M3	0.4 to 0.6
Base mounted, Body mounting (See Fig. 3 below.)	**LVMK23, 205**	M3	0.4 to 0.6

Fig. 1 Thread size: M2.5
Proper tightening torque: 0.25 to 0.35 N·m
(Applicable model: LVMK21, 27, 202, 207)

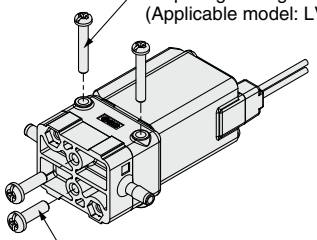
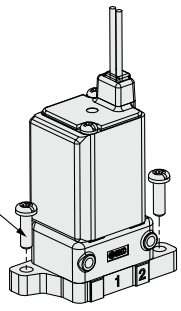


Fig. 2 Thread size: M3
Proper tightening torque: 0.4 to 0.6 N·m
(Applicable model: LVMK27, 207)

Fig. 3 Thread size: M3
Proper tightening torque: 0.4 to 0.6 N·m
(Applicable model: LVMK23, 205)



LVMK Series
Specific Product Precautions 2

Be sure to read this before handling the products. Please contact SMC when it is used in conditions other than the specifications.

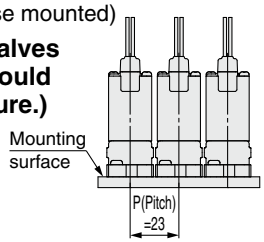
Mounting

⚠ Caution

2. Mount the solenoid valve on the horizontal surface.
Applicable model: LVMK21, 27, 202, 207 (Body ported)

3. Remove dust from the solenoid valve mounting surface completely.
The surface roughness of the mounting surface should be Rz3.2 or less.
Applicable model: LVMK23, 205 (Base mounted)

4. When mounting the solenoid valves next to each other, P (pitch) should be 23 mm or more. (See the figure.)
Applicable model: LVMK23, 205 (Base mounted)



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. 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.

Wiring

⚠ Caution

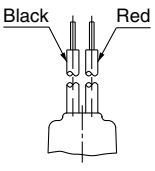
1. Use electrical circuits which do not generate chattering in their contacts.

2. 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.

3. Apply the correct voltage.
Applying incorrect voltage may cause a malfunction or a burned coil.

4. Connect the wires so that an external force of 10 N or greater is not applied to the lead wire.
Otherwise the coil will burn.

5. This solenoid valve has no polarity.



Lead wire color

Fluid Quality

⚠ Warning

Liquid (chemicals)

Component crystallizes or clots depending on its nature. Leakage will occur when a crystallized or clotted component is caught between the sealing parts. Take measures to clean such component if necessary.

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.

Operating Environment

⚠ Warning

1. Do not use in explosive atmospheres.

2. Do not use in locations subject to excessive vibration or impact.
Impact resistance of this solenoid valve is 150 m/s^2. Vibration resistance of this solenoid valve is 30 m/s^2.

3. Do not use in locations where radiated heat will be received from nearby heat sources.

4. Do not expose the solenoid valve to direct sunlight. (Including storage environment.)

Maintenance

⚠ Warning

1. Removing the product
Shut off the fluid supply and release the fluid pressure in the system. Shut off the power supply. Remove the product.

2. Before operating, remove residual chemicals and completely replace it with deionized water, air, etc.

3. Do not disassemble the product.
Products which have been disassembled cannot be guaranteed. If disassembly is necessary, please contact SMC.