

Pinch Valve Solenoid Type



LPV Series



Power consumption

2.0 W^{*1}

- *1 Built-in power saving circuit (Refer to page 390.)
- *1 Excludes $\phi 6$ and $\phi 1/4$ "
- * Excludes 3-port type

Applicable tubing

- Silicone
- PharMed[®]BPT^{*2}
- Tygon[®]^{*2}

Size	(O.D.)
Metric	$\phi 3$, $\phi 4$, $\phi 6$
Inch	$\phi 1/8$ ", $\phi 5/32$ ", $\phi 1/4$ "

New A 3-port type has been added.



Valve type
 N.C. on one side (Normally in clamping position)
 N.O. on one side (Normally in unclamping position)

Compact

20 mm Valve width



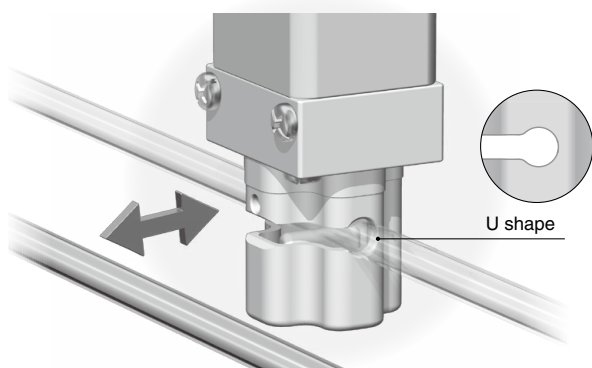
Valve type

N.C. (Normally in clamping position)
 N.O. (Normally in unclamping position)

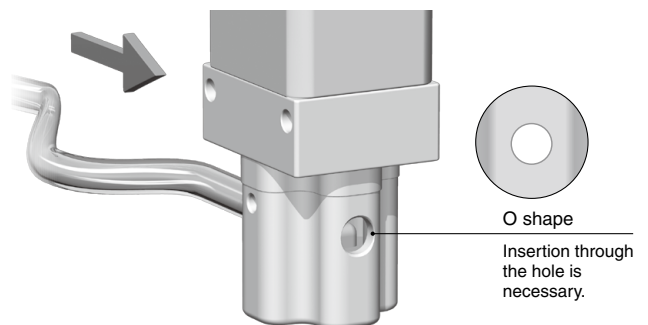
*2 PharMed[®]BPT and Tygon[®] are registered trademarks of Saint-Gobain Performance Plastics Corporation.

Easy tubing replacement

U shaped tube slot



Existing model O shaped tube slot

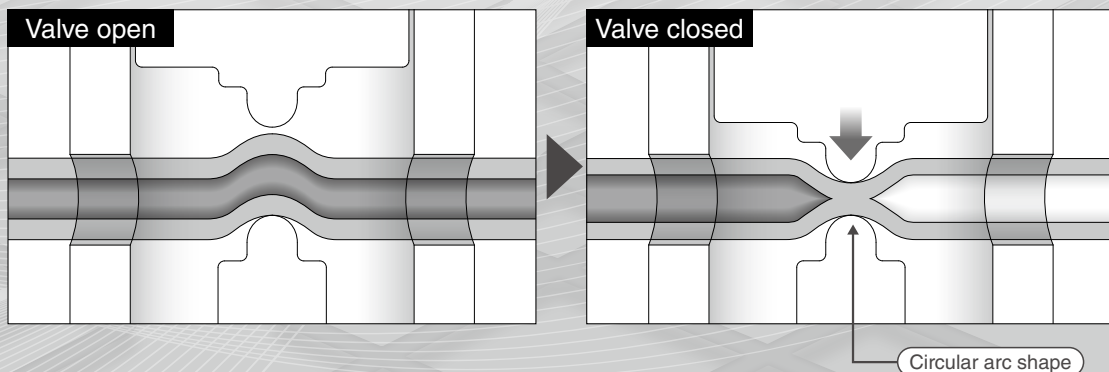


Highly resistant to contamination and reduces valve failures



Less damage to tube

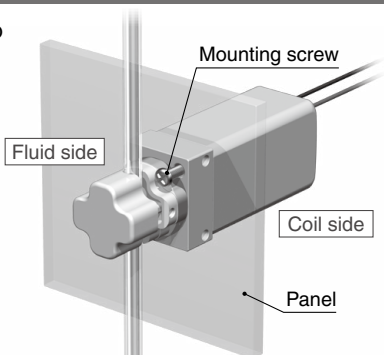
Circular arc shape of tube clamp is less likely to damage the tube.



2 patterns of mounting

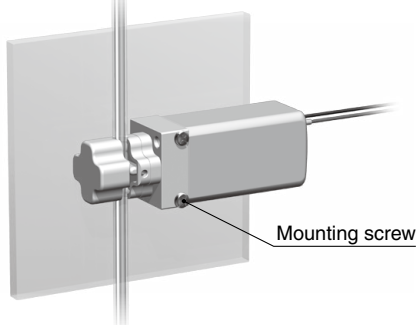
Panel mounting

Electrical faults due to scattering of liquid prevented by panels between the flow and coil sides



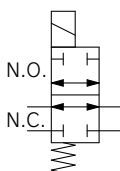
Direct mounting

Can be mounted from the front

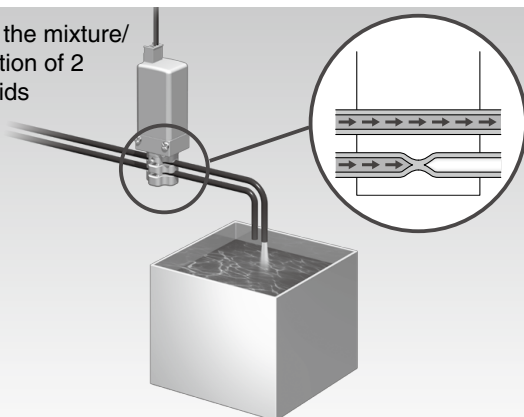


New A 3-port type has been added.

Symbol



For the mixture/dilution of 2 liquids



Application Examples

- Waste liquid line for the blood analyzer



- Bacteria identification and inspection device



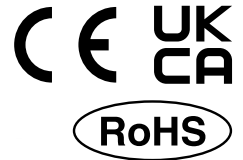
- DNA analyzer



- Liquid filling device



Pinch Valve Solenoid Type LPV Series



How to Order

LPV **21** - **5** **K** **□** - T **3** - **□**

①
②
③
④
⑤
⑥



① Symbol

Symbol	Valve type
21	2-port N.C.
22	2-port N.O.
23	3-port (N.C. on one side, N.O. on one side)

④ Light

Symbol	Light
Nil	None
Z	Yes

⑥ Lead wire length

Nil	300 mm
6	600 mm
10	1000 mm

* Only for the electrical entry type using a G type grommet

② Coil voltage

Symbol	Voltage
5	24 VDC
6	12 VDC

⑤ Tubing size

Symbol	O.D. x I.D.	Inscribed number
3	ø3 x ø1	3
3A	ø1/8" x ø1/16"	
4	ø4 x ø2	4
4A	ø5/32" x ø1/32"	
6	ø6 x ø4	6
6A	ø1/4" x ø1/8"	

* When tubing is needed to be included, order using the product code shown below. Saint-Gobain made PharMed®BPT tubing, 100 mm, will be provided as an accessory.
* Only symbols "3," "3A," "4," and "4A" can be selected for the LPV23 3-port type.

Tube no.: LPV20 - 7 - T **3**

Tubing size

Symbol	O.D. x I.D.	Length
3	ø3 x ø1	100 mm
3A	ø1/8" x ø1/16"	
4	ø4 x ø2	
4A	ø5/32" x ø1/32"	
6	ø6 x ø4	
6A	ø1/4" x ø1/8"	

③ Electrical entry

Symbol	Electrical entry, Lead wire length	
K	Plug connector, 300 mm	
KO	Plug connector, Without connector	
G (Option)	Grommet, 300 mm	

* The plug connector is included but does not come assembled.
* If a lead wire length of 600 mm or more is required, select "KO" (Without connector) and then add the connector part number shown below under the valve part number when ordering.

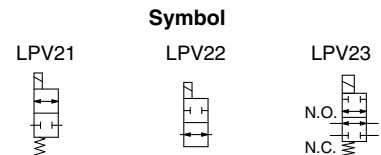
Plug connector part no.: AXT661 - 14A - **6**

Lead wire length

6	600 mm
10	1000 mm

Specifications

Model	LPV21	LPV22	LPV23
Valve type	2-port N.C.	2-port N.O.	3-port (N.C. on one side, N.O. on one side)
Applicable tubing*6	Silicone, PharMed®BPT, "Hardness of 64 (shore A) or lower (reference)"		
Applicable fluid	Gas and liquid applicable to the tube		
Type of actuation	Direct operated solenoid		
Operating pressure range*1	0 to 0.2 MPa		
Rated voltage	24/12 VDC		
Allowable voltage fluctuation*2	±10% of the rated voltage		
Type of coil insulation	Class B		
Ambient temperature*2	0 to 50°C		
Fluid temperature*2	0 to 50°C (No freezing)		
Mounting orientation	Free		
Enclosure	IP40 equivalent		
Impact/Vibration resistance*3	150/30 m/s ²		
Tube effective area*4	70% or more		
Coil switching noise*5	80 dB		
Power consumption	T3(A), Starting	8 W	24 W
	T4(A), Holding	2.0 W [Built-in power saving circuit]	2.9 W [Built-in power saving circuit]
	T6(A), Starting	24 W	—
	T6(A), Holding	2.9 W [Built-in power saving circuit]	—

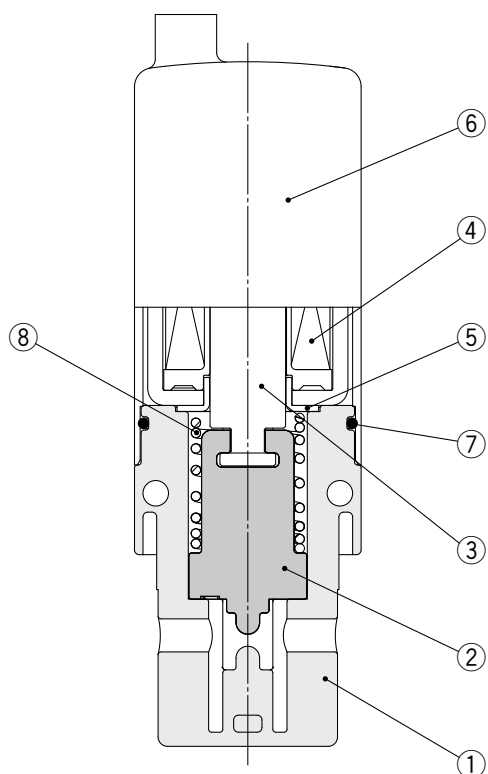


- *1 Check the operating pressure range of a tube to be used.
- *2 Allowable voltage range and operating temperature varies depending on the characteristics of tubes. Refer to "3. Tube conditions" on page 393 for details.
- *3 Impact resistance: No malfunction occurred when tested in the axial direction and at a right angle to the armature in both an energized and a de-energized state, once in each condition. (Value in the initial state)
Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Test was performed at both an energized and a de-energized state in the axial direction and at a right angle to the main valve and armature. (Value in the initial state)
- *4 When the tube is installed
- *5 The value is based on SMC's measurement conditions. The noise level will vary according to the actual conditions.
- *6 For the 3-port type, use the same type of tubing for the N.C. and N.O. sides.

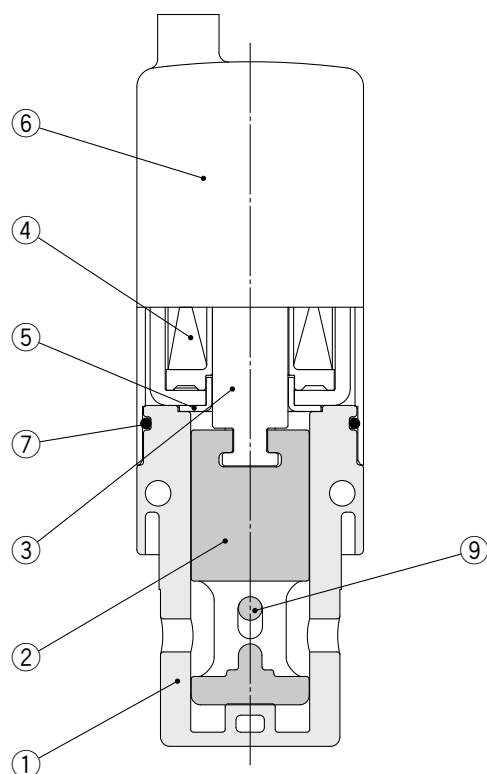
LPV Series

Construction

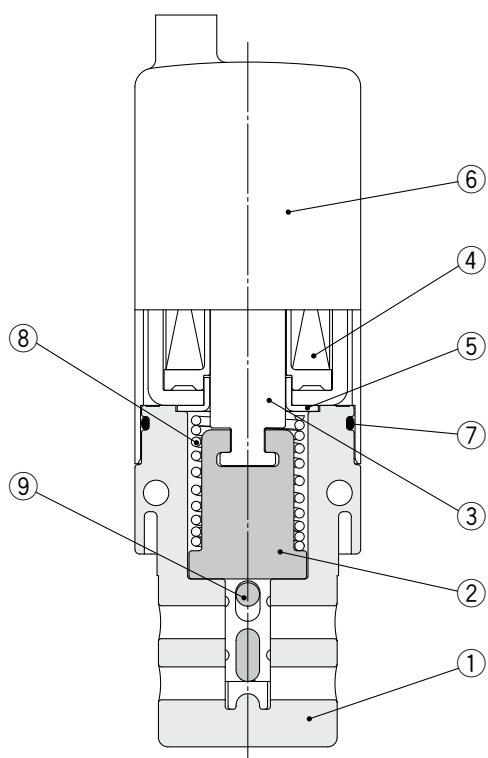
LPV21 (N.C.)



LPV22 (N.O.)



LPV23

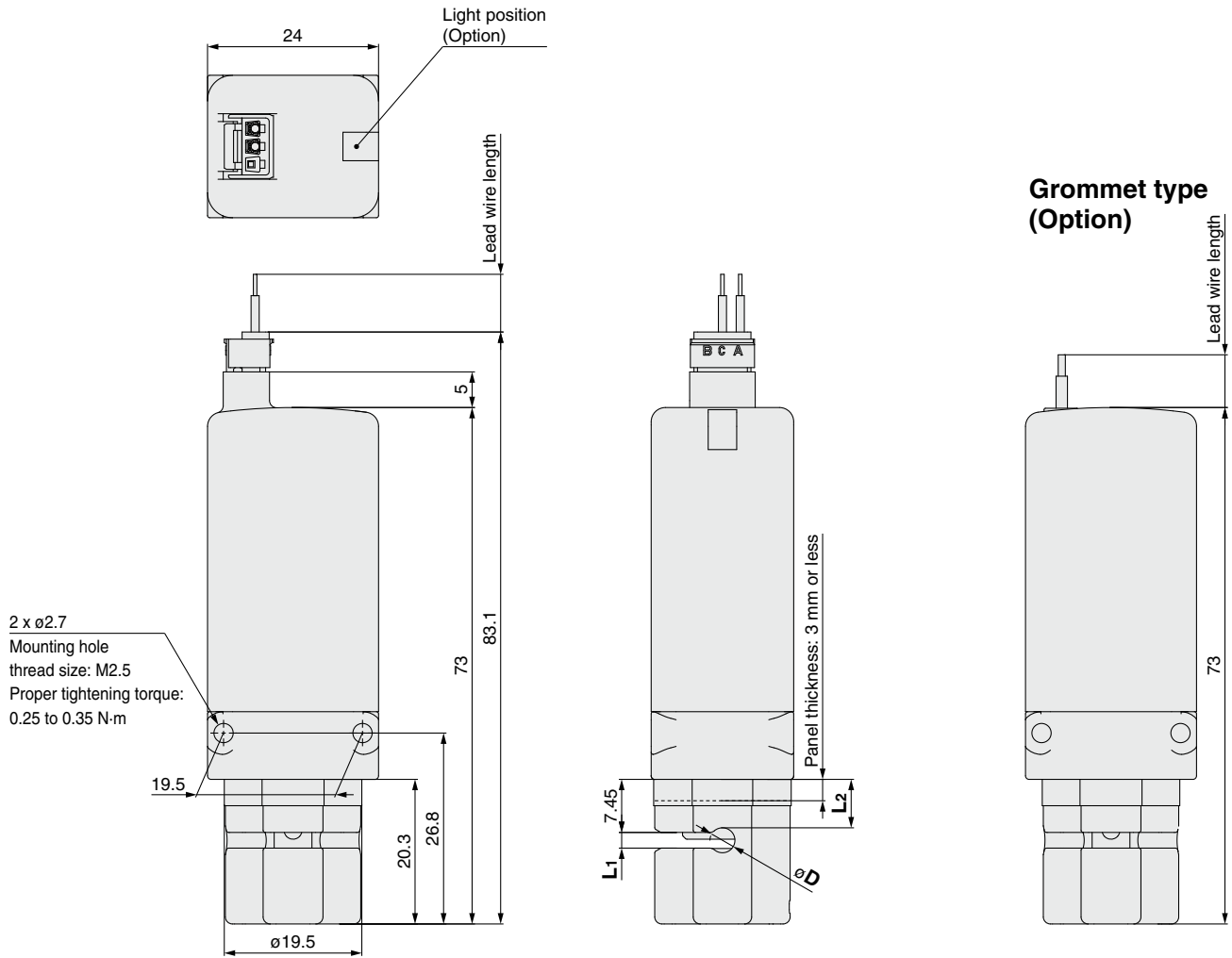


Component Parts

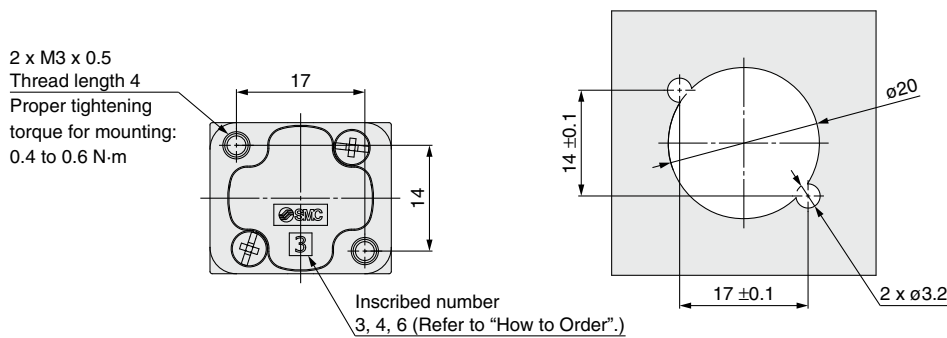
No.	Description	Material
1	Body	PBT
2	Push rod	PBT
3	Armature	Stainless steel
4	Coil/Board assembly	—
5	Sleeve	SUY (Iron)
6	Casing	PBT
7	O-ring	NBR
8	Spring	Stainless steel
9	Pin	Stainless steel

Dimensions

LPV21/22



Recommended panel hole dimensions for valve mounting

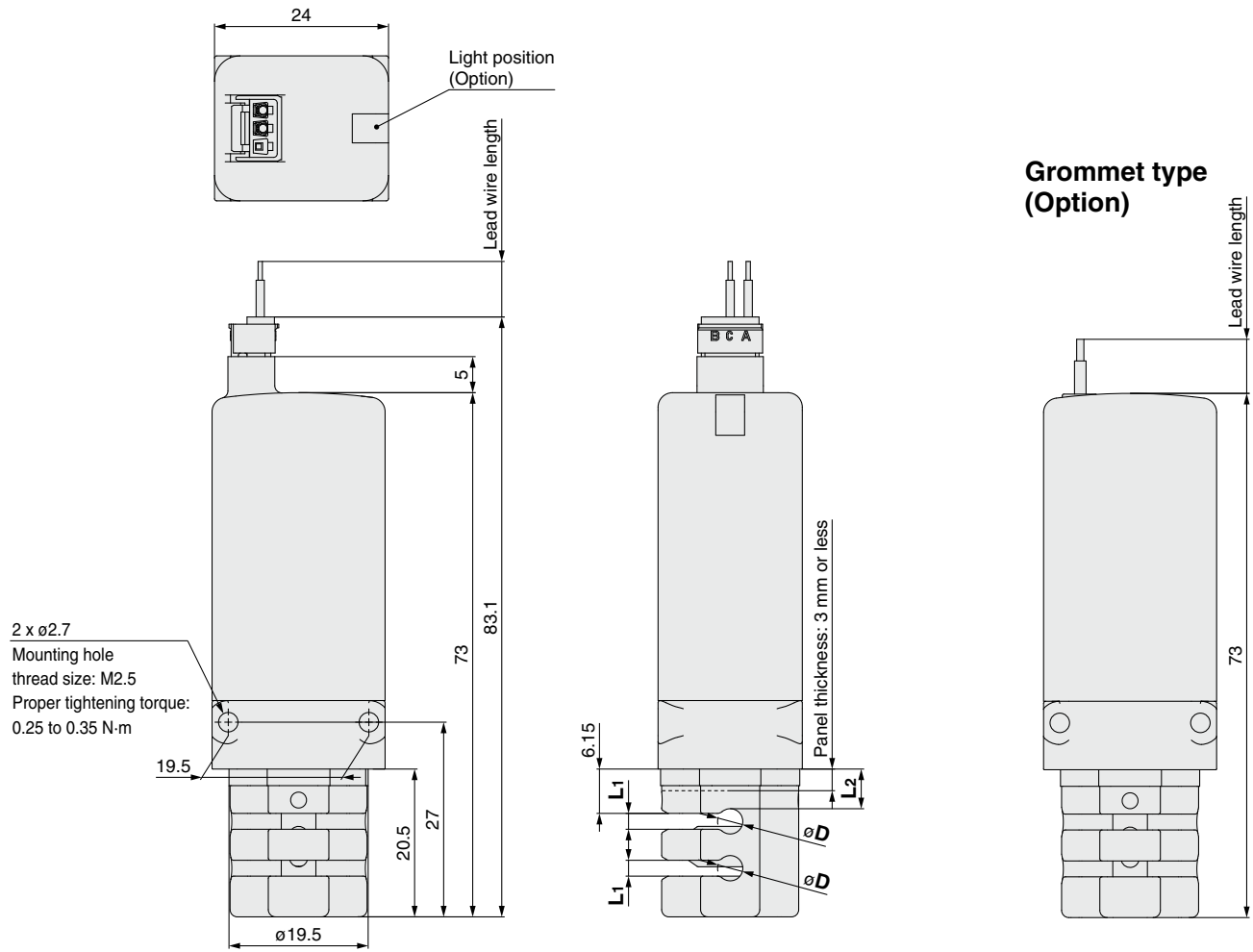


Part no.	D	L ₁	L ₂
LPV21/22-□□-T3(A)-□	$\phi 3.5$	2.2	6.8
LPV21/22-□□-T4(A)-□	$\phi 4.5$	2.8	6.6
LPV21/22-□□-T6(A)-□	$\phi 6.5$	3.5	6

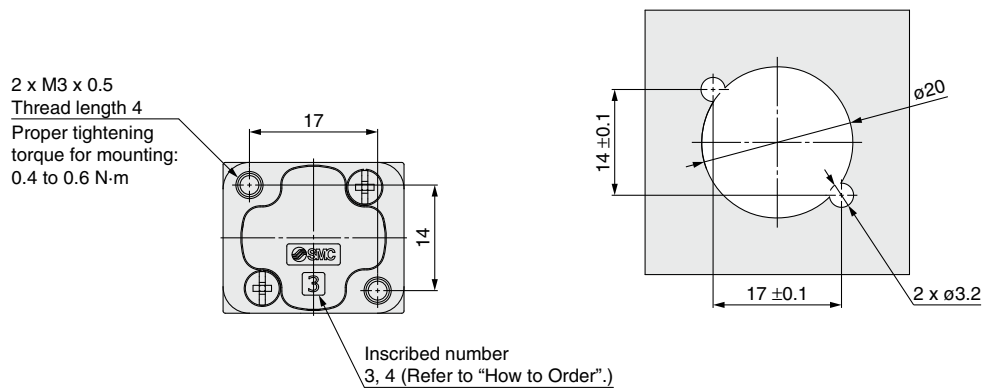
LPV Series

Dimensions

LPV23



Recommended panel hole dimensions for valve mounting



Part no.	D	L1	L2
LPV23-□□□-T3(A)-□	$\phi 3.5$	2.2	5.5
LPV23-□□□-T4(A)-□	$\phi 4.5$	2.8	5.3



LPV Series

Specific Product Precautions 1

Be sure to read this before handling the products. Refer to page 501 for safety instructions. For 2-port solenoid valve for fluid control precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

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 specified operating ranges indicated in the catalog. Ensure that product and tubing are properly matched in the main specifications such as operation, leakage, flow rate, and endurance.

3. Tube conditions

Be sure to confirm the compatibility of a tube to be used with fluid before use. The operating pressure and operating method shall be complied with the precautions described by its manufacturer.

The following table shows the allowable voltage range of 5°C or higher and 40°C or lower in case of the ambient and fluid temperatures.

Use the appropriate solenoid valve with the part numbers shown in the table under the specified conditions.

Solenoid valve part number	Allowable voltage range [Ambient and fluid temperatures: 5°C or higher and 40°C or lower]
LPV21-□□-T4 LPV21-6□□-T6(A) LPV22-□□□-T4A LPV22-□□□-T6A	+10%/–5% of the rated voltage

Repeated and prolonged grip of a tube can shorten its product life, causing the solenoid valve to operate unsteadily. Thus, a used tube should be replaced with a new one or put in a different grip position after the operating cycles of 1 million times are reached as the guideline.

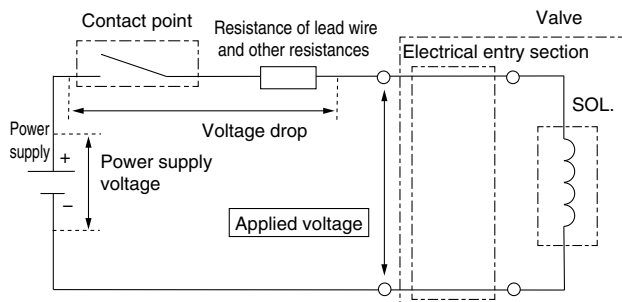
In addition, when replacing the tubing for the LPV23 3-port type, replace the tubing on both the N.C. and N.O. sides at the same time.

4. Ambient environment

Use within the allowable ambient temperature range. Also, do not use the product in an environment where corrosive gases, chemicals, liquid can come in contact with its outside surface.

When the product is used in an environment where ambient/fluid temperature declines to 5°C or lower or rises to 40°C or higher, or the temperature of the valve surface rises to 60°C or higher, the hardness of the tube can increase or decrease depending on its characteristics, which will reduce the responsiveness of the valve or decline the vibration resistance/shock resistance of it. In such a case, the voltage to be applied to the valve should be reduced to within +10/–5% the rated voltage or other consideration should be taken to ensure that the valve conditions shall be compatible with the system requirements.

And, since the contacts and wiring routing (the resistance of lead wires) can cause a voltage drop, the applied voltage should be adjusted to within the allowable voltage range.



Warning

5. Extended periods of continuous energization

The temperature rise due to heat generation in the coil may cause a decline in solenoid valve performance and reduce its service life. Therefore, if the solenoid valve is energized for long periods, take measures to cool the solenoid valve to keep the surface temperature at 70°C or lower by paying attention to the radiated heat from the ambient equipment. When energizing adjacent solenoids at the same time continuously, the temperature increase will be greater. When the solenoid valve is to be mounted in a control panel, take precautions to cool down the heat of the valve with proper measures, including placing a fan in the position, to keep the inside within the specified ambient temperature range.

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

Period of continuous energization	30 min. or less
Ambient temperature	25°C or lower

6. Energizing time

This solenoid valve has a built-in power saving circuit. The start-up of the power-saving type unit is set to take 100 msec. This valve should be in the ON position after the energizing time of 100 msec. or longer.

7. Do not use the switch unless the equipment operates normally.

After mounting, perform suitable function and leak tests to confirm that the mounting is correct.

8. Avoid installing the coil vertically with its top to a downward direction.

Should the tube break, the fluid could enter into the coil, causing the coil to burn out.

9. Countermeasures against static electricity

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

10. Do not use in explosive atmospheres.

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

12. Ensure sufficient space for maintenance activities.

When installing the products, allow access for maintenance and inspection.

13. Fluid pressure range

Fluid pressure should be within the allowable pressure range.

14. Cannot be used as an emergency shut-off valve, etc.

The valves presented in this catalog are not designed for safety applications such as an emergency shut-off valve. If the valves are used in this type of system, other reliable safety assurance measures should also be adopted.

15. Do not use in locations subject to excessive vibration or impact.

Impact resistance of this solenoid valve is 150 m/s². Vibration resistance of this solenoid valve is 30 m/s².

16. Do not disassemble the solenoid valve.

A disassembled product will void our warranty. If you absolutely require it be disassembled, contact SMC.



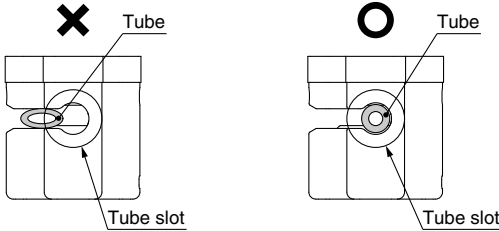
LPV Series

Specific Product Precautions 2

Be sure to read this before handling the products. Refer to page 501 for safety instructions. For 2-port solenoid valve for fluid control precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

⚠ Caution

1. Be sure to fully insert the tube into the tube clamp of the solenoid valve.



2. Apply the correct voltage.

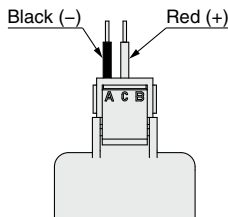
Applying incorrect voltage may cause a malfunction or a burned coil.

3. Connect the wires so that an external force of 10 N or more is not applied to the lead wire.

Otherwise, the coil will burn.

4. This solenoid valve has a built-in power saving circuit, which has polarity.

Red (+), Black (-)



5. Removing the solenoid valve

Shut off the fluid supply and release the fluid pressure in the system. Shut off the power supply before removing the solenoid valve.

6. 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.

7. When the tubing is long or according to the operating conditions, tubing may thrash about, causing damage to the tube slot of the solenoid valve, or the tubing to come off or deteriorate.

In this case, secure the tubing to prevent its uncontrolled movement.

8. Leakage voltage

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

⚠ Caution

9. Power saving circuit

The power saving circuit (PWM control) contained in this product reduces the power consumption through the switching operation at high speeds in the PWM control circuit after the rated voltage is applied for approx. 100 msec. since energizing the circuit. Please note that the effect of this PWM control can cause the following problems, depending on the type of a used switch and drive circuit.

1. When a mechanical type relay is used in the drive circuit, the circuit cannot turn on normally if chattering occurs in the relay just when the rated voltage is applied for approx. 100 msec. after energizing the valve.
2. When a filter or another device is added to between the power supply and the product to achieve the noise elimination, the current required for driving the product can be decreased through its filtering effect, disabling the drive to operate normally.
3. When the SSR (Solid state relay) with a built-in photo coupler is used in the drive circuit, the photo coupler may not turn off, disabling the product to be switched off (held in the ON condition).

10. For the 3-port pinch valve tubing, use tubing made of the same material on both the N.C. and N.O. sides.

11. When replacing the 3-port pinch valve tubing, use new tubing on both the N.C. and N.O. sides.

How to Use Plug Connector

⚠ Caution

Attaching connectors

Hold the lever and connector unit between your fingers and insert straight onto the pins of the solenoid valve so that the lever's pawl is pushed into the groove and locks.

Detaching connectors

Remove the pawl from the groove by pushing the lever downward with your thumb, and pull the connector straight out.

