



# Installation and Maintenance Manual

LVM10/100

2/3 Port Solenoid Valve for Chemicals



Read this manual before using this product

- The information within this document is to be used by pneumatically trained personnel only.
- For future reference, please keep manual in a safe place.
- This manual should be read in conjunction with the current catalogue.

## 1 SAFETY

### 1.1 General recommendation

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO4414 (NBS1), JIS B 8370 (NBS2) and other safety practices.

Note 1:ISO 4414:Pneumatic fluid power – General rules relating to systems.  
Note 2:JIS B 8370:Pneumatic system axiom.

**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.

### WARNING:

- **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.
  - **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.
  - **Do not service machinery/equipment or attempt to remove components until safety is confirmed.**
    - Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
    - When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.
    - Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Bled air into the system gradually to create backpressure, i.e. incorporate a soft-start valve).
  - **Ensure that the air supply system is filtered to 5 micron.**
    - Conditions and environments beyond the given specifications, or if product is used outdoors.
    - Installations on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
    - An application, which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.
- CAUTION:**
- Ensure that the air supply system is filtered to 5 micron.

### 1.2 Conformity to standard

This product is certified to and complies with the following standards:

EMC Directive 89/336/EEC	EN61000-6, EN55011
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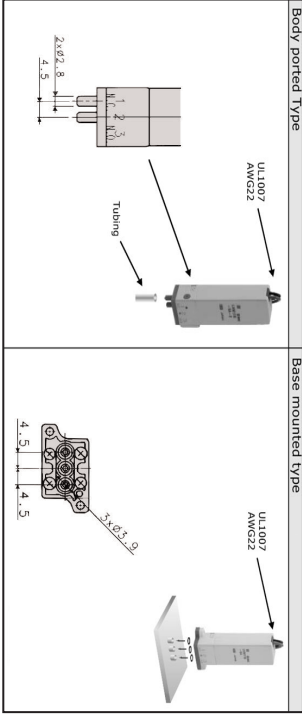
## 2 INTENDED CONDITIONS OF USE

### 2.1 Specifications

Model	Body ported type	Body ported type (Tubing type)			Base mounted type			
	LVM11	LVM11R	LVM12R	LVM112	LVM13R	LVM14R	LVM16R	LVM115
Valve construction	Diaphragm type direct operated poppet (Rocket type)							
Valve type	N.C.	N.C.	N.O.	Universal	N.C.	N.O.	N.C.	Universal
Number of ports	2	2		3	2		3	
Fluid (Note 1)	Air, Water, Pure water, Diluent, Cleaning solvent							
Operating pressure range	0 to 0.25 MPa							
Pressure range	-75 KPa to 0.25 MPa							
Orifice diameter	1.5mm		1.4mm					
Flow characteristics (CV factor)	0.04		0.03					
Response time	10ms or less							
Leakage	Zero leakage, either external or internal (at hydraulic pressure)							
Proof pressure (Note 2)	0.38 MPa							
Ambient temperature	0 to 50°C							
Fluid temperature	0 to 50°C (with no condensation)							
Volume of storage chamber (Note 3)	11μl	20μl						
Mounting orientation	Free							
Enclosure	IP40 or equivalent							
Weight	30g	34g (without sub-plate), 42g (with sub-plate)						
Rated voltage	12.24 VDC							
Allowable voltage fluctuation (Note 3)	±10% of rated voltage							
Type of coil insulation	Class B							
Power consumption	Inrush: 2.5W at 120VAC Holding: 1.5W (with built-in power saving circuit)		1.5W					
Coil switching noise (Note 6)	50dB							

- Note 1) Select an appropriate material for the wetted part when fluid such as a cleaning solvent is used. Also, be sure to confirm the fluid compatibility in advance.
- Note 2) Indicates the pressure which does not generate breakage, cracks or external leakage after a one-minute airtight test.
- Note 3) Indicates the volume of clearance inside the valve chamber after the volume of the diaphragm is subtracted.
- Note 4) Since the body (orifice shape) is designed to eliminate residual liquid, mounting in a vertical direction with the coil at the top is recommended. When residual liquid is not considered, any mounting style is available.
- Note 5) When the response speed is regarded as important, prevent negative fluctuation of the voltage by adequate regulation.
- Note 6) The value is based on SMC's measurement conditions. The noise level will vary with conditions.

### 2.2 Piping



### 2.3 Circuit Symbols

Symbol	Number of ports	Valve Type	Connection
11		N.C.	MS thread
11R	2	N.C.	
12R		N.O.	
112	3	Universal	Tubing type

Symbol	Number of ports	Valve type
13R		N.C.
14R	2	N.O.
16R		N.C.
115	3	Universal

## 3 INSTALLATION

### WARNING:

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

### 3.1 Environment

### WARNING:

- Do not use in an environment where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.
- Do not use in an explosive atmosphere.
- The product should not be exposed to prolonged sunlight. Use a protective cover.
- Do not mount the product in a location where it is subject to strong vibrations and/or shock. Check the product specifications for above ratings.
- Do not mount the product in a location where it is exposed to radiant heat.

### 3.2 Piping

### CAUTION:

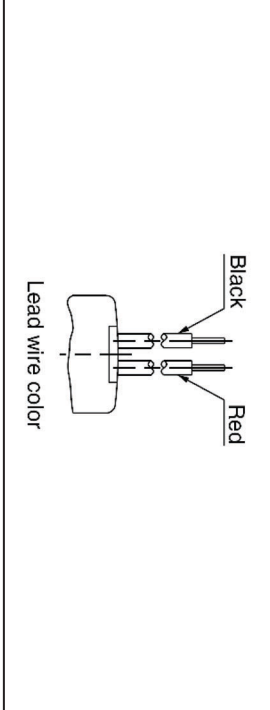
- Before piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fitting into a port, ensure that sealant material does not enter the port inside. When using seal tape, leave 1.5 to 2 threads exposed on the end of pipe/fitting.

Body ported type LVM11	Thread size	Proper tightening torque N.m
Base mounted type LVM13R, 14R, 16R 115	M5 M2 (Note 4) M6 or 1/4-28UNF	1.5 to 2 0.15 to 0.2 1.5 to 2

### 3.3 Electrical connection

### CAUTION:

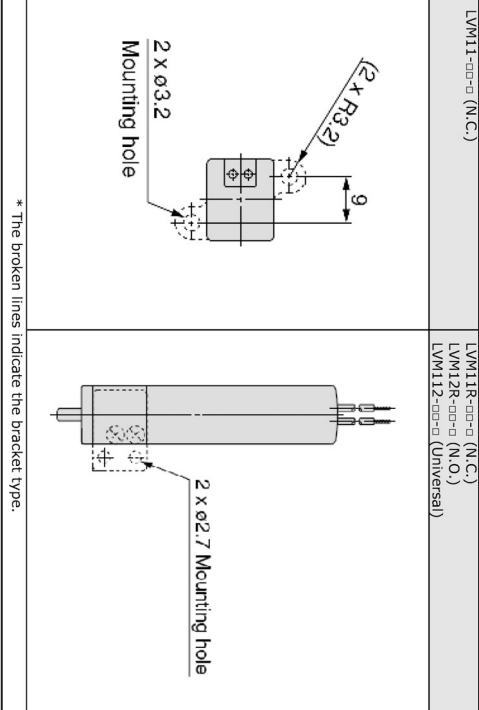
- When DC power is connected to a solenoid valve equipped with light and/or surge voltage suppressor, check for polarity indications.
- For polarity indications:
  - No diode to protect polarity: If polarity connection is wrong, the diode in the valve or switching device at control equipment or power supply may be damaged.
  - With diode to protect polarity: If polarity connection is wrong, the valve does not switch.
- **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 greater than 10N is not applied to the lead wire. Otherwise the coil will burn.
- Only the LVM 11 model has the polarity due to its power saving circuit. Red (+), Black (-).



### 3.4 Mounting

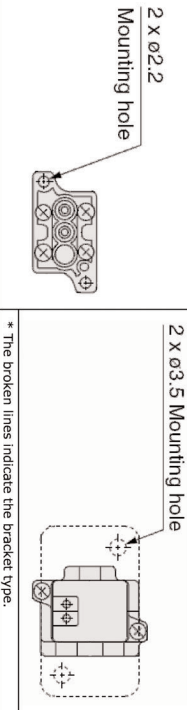
- If air leakage increases or equipment does not operate properly, stop operation. After mounting is completed, confirm that it has been done correctly by performing a suitable function test.
  - Since the body (orifice shape) is designed to eliminate residual liquid, mounting in a vertical direction with the coil at the top is recommended. When residual liquid is not considered, any mounting position is possible.

### Body Ported Type



### Base Mounted Type

LVM13R-□□□□ (N.C.) LVM14R-□□□□ (N.O.) LVM16R-□□□□ (N.C.) LVM115-□□□□ (Universal)	LVM13R-□□□□ (N.C.) LVM14R-□□□□ (N.O.) LVM16R-□□□□ (N.C.) LVM115-□□□□ (Universal)	(with sub-plate) (with sub-plate) (with sub-plate) (with sub-plate)
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### 3.5 Lubrication

### CAUTION:

- SMC products have been lubricated for life at manufacturer, and do not require lubrication in service.
- If a lubricant is used in the system, use turbine oil Class 1(no additive), ISO VG32. Once lubricant is used in the system, lubrication must be continued because the original lubricant applied during manufacturing will be washed away.

## 4 MAINTENANCE

### WARNING:

- Not following proper procedures could cause the product to malfunction and could lead to damage to the equipment or machine.
- If handled improperly, compressed air can be dangerous. Assembly, handling and repair of pneumatic system should be performed by qualified personnel only.
- Drain: remove condensate from the filter bowl on a regular basis.
- Shut-down before maintenance: before attempting any kind of maintenance make sure the supply pressure is shut off and all residual air pressure is released from the system to be worked on.
- Start-up after maintenance: apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, please verify product set-up parameters.
- Do not make any modification to the product
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Removal of base risks exposure to internal construction and fluids. Caution should be used when using aggressive/toxic fluids.

### 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 deionised water, air, etc.

### 3. Do not disassemble the product

- Products which have been disassembled cannot be guaranteed.
- If disassembly is necessary, contact SMC.

5 LIMITATIONS OF USE

⚠ WARNING:

- Do not exceed any of the specifications laid out in section 2 of this document or the specific product catalogue.
- Do not use in explosive atmospheres.
- Do not use in locations subject to excessive vibration or impact. Impact resistance of this solenoid valve is 150m/S2. Vibration resistance of this solenoid valve is 30m/S2.
- Do not use in locations where radiated heat will be received from nearby heat sources.

1. Confirm the specifications.

**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).**  
Give careful consideration to the operating conditions such as the application, fluid and environment, and use within the operating ranges specified in this catalog.

2. Fluid

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

3. Maintenance space

The installation should allow sufficient space for maintenance activities.

4. Fluid pressure range

Fluid pressure should be within the allowable pressure range.

5. Ambient environment

Use within the allowable ambient temperature range. Be sure that the fluid used does not touch the external surface of the product.

6. Countermeasures against static electricity

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

7. 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.

8. 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.

9. Extended periods of continuous energization

Continuous energization of a solenoid valve for a long period of time may deteriorate the performance or the life of the solenoid valve due to an increase in temperature caused by heat generated by the coil and it may adversely affect the peripheral equipment. To avoid this, take measures to release the heat (installation of a fan, etc.) so that the temperature on the surface of the solenoid valve is 70°C or less, when the solenoid valve is energized for a long period of time or when the total energizing hours per day exceeds the de-energizing hours. In addition, when a solenoid valve is mounted inside of a control panel, take measures to release the heat so that the temperature is within the temperature specification range. Special care should be taken when more than 3 manifold valve stations are simultaneously energized for a long period of time because this produces a large increase in temperature.

6 EUROPEAN CONTACT LIST

6.1 SMC Corporation

Country	Telephone	Country	Telephone
Austria	(43) 2262-62 280	Italy	(39) 02-92711
Belgium	(32) 3-355 1464	Netherlands	(31) 20-531 8888
Czech Republic	(420) 5-414 24611	Norway	(47) 67 12 90 20
Denmark	(45) 70 25 29 00	Poland	(48) 22-548 50 85
Finland	(358) 9-859 580	Portugal	(351) 22 610 89 22
France	(33) 1-64 76 1000	Spain	(34) 945-18 4100
Germany	(49) 6103 4020	Sweden	(46) 8 603 12 00
Greece	(30) 1- 342 6076	Switzerland	(41) 52-396 3131
Hungary	(36) 23 511 390	Turkey	(90) 212 221 1512
Ireland	(353) 1-403 9000	United Kingdom	(44) 1908-56 3888

6.2 Websites

SMC Corporation	www.smcworld.com
SMC Europe	www.smc.eu.com