Regulator for Chemical Liquids New



Series LVR

CAT.NAS70-43A Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com



Application Example



SMC

6

3/8"

6

1/4"

Metric

Inch

Tube extensions

Regulator for Chemical Liquids Series LVR

How to Order LVR20-Z07 Pilot port thread type Symbol Туре Nil Rc NPT Ν

Applicable tubing size

Fitting type Model

LQ1

LQ3

Integral fittings

Body class

Symbol Body class

2

4

5

Symbol

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Ζ

2

4

5

Metric size									
Cumbal	Applicable	Appl	Applicable model						
Symbol	tubing size	LVR20	LVR40	LVR50					
03	3 x 2	•							
04	4 x 3	•							
06	6 x 4	0							
10	10 x 8		•						
12	12 x 10		0	•					
19	19 x 16			0					
102									

LQ3 Metric size

LQ1

men								
Sumbol	Applicable	Applicable model						
Symbol	tubing size	LVR20	LVR40	LVR50				
06	6 x 4	0						
12	12 x 10		0					
19	19 x 16			0				

Inch size

Sumbol	Applicable	Applicable model						
tubing O.D.	tubing O.D.	LVR20	LVR40	LVR50				
03	1/8" x 0.086"	•						
05	3/16" x 1/8"	•						
07	1/4" x 5/32"	0						
11	3/8" x 1/4"		•					
13	1/2" x 3/8"		0	•				
19	3/4" x 5/8"			0				

Inch size

	Applicable	Applicable model						
Symbol	tubing O.D.	LVR20	LVR40	LVR50				
07	1/4" x 5/32"	0						
11	3/8" x 1/4"		0					
13	1/2" x 3/8"		0					
19	3/4" x 5/8"			0				

○: Basic size ●: With reducer



-						
Sumbol		Applicable model				
Symbol	Tubing O.D.	LVR20	LVR40			
07	1/4" x 5/32"	0				
11	3/8" x 1/4"		0			

SMC

10

10 x 8

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Series LVR

Flow-rate Characteristics (Representative Value)







Inlet pressure: 44 psi (0.3 MPa) Fluid: Water





Inlet pressure: 44 psi (0.3 MPa) Fluid: Water



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Regulator for Chemical Liquids Series LVR

Specifications



Mod	el	LVR20	LVR40	LVR50			
Maximum operating	g pressure psi [MPa]		73 [0.5]				
Set pressure rang	ge psi [MPa]	2.9	9 to 58 [0.02 to 0).4]			
Pilot pressure ps	si [MPa]	73 [0.5]					
Withstand pressu	ıre psi [MPa]	145 [1.0]					
Fluid		Deionized water, Chemical liquids					
Fluid temperature	°F [°C]	32 to 212 [0 to 100]					
Ambient tempera	ture °F [°C]	32 to 140 [0 to 60]					
Parts in contact	Diaphragm		PTFE				
with fluid	Body	PFA					

Construction

Integral fittings/LQ3



(8)

Tube extensions

 $\overline{(7)}$



(10) (9)

Component Parts

No. Description Material Note 1 Body PFA 2 Housing PVDF 3 Diaphragm FKM 4 Plate PVDF 5 Diaphragm PTFE 6 Housing PVDF
1BodyPFA2HousingPVDF3DiaphragmFKM4PlatePVDF5DiaphragmPTFE6HousingPVDF
2 Housing PVDF 3 Diaphragm FKM 4 Plate PVDF 5 Diaphragm PTFE 6 Housing PVDF
3 Diaphragm FKM 4 Plate PVDF 5 Diaphragm PTFE 6 Housing PVDF
4 Plate PVDF 5 Diaphragm PTFE 6 Housing PVDF
5 Diaphragm PTFE 6 Housing PVDF
6 Housing PVDF
7 Diaphragm PTFE
8 Guide PPS
9 End plate PVDF
10 Spring Stainless steel Fluorine coated
11 Nut PFA

Component Parts Note No. Description Material Body PFA 1 PVDF 2 Housing 3 Diaphragm FKM 4 Plate PVDF 5 Diaphragm PTFE **PVDF** 6 Housing 7 Diaphragm PTFE 8 Guide PPS End plate 9 **PVDF** 10 Spring Stainless steel Fluorine coated Nut PFA 11 12 Insert bushing PFA

Component Parts

No.	Description	Material	Note
1	Body	PFA	
2	Housing	PVDF	
3	Diaphragm	FKM	
4	Plate	PVDF	
5	Diaphragm	PTFE	
6	Housing	PVDF	
7	Diaphragm	PTFE	
8	Guide	PPS	
9	End plate	PVDF	
10	Spring	Stainless steel	Fluorine coated

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12

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Series LVR

Dimensions

Integral fittings/LQ3



4 x ø7 Mounting hole 1/8 (Rc, NPT) Pilot port

Breathing port M5 x 0.8 T Щ, ¢ Breathing port M5 x 0.8

Model	Α		E	В		С	D	E
LVR20-Z07(06)	40		40)		49.3	68	20.1
LVR40-Z11(10)	82	.5	82	2.5		89	115	33
LVR40-Z13(12)	82	82.5		2.5		89	115	33
LVR50-Z19	100		100) 117.		17.5	135	45
Model	F		G	H	I	J		
LVR20-Z07(06)	8	2	7	5	6	88		
LVR40-Z11(10)	14	6	4.5	10	0	150.	5	
		i —			_			
LVR40-Z13(12)	14	6	4.5	10	0	159.	5	

LVR49-213

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Model	A		E	3		С	[)	Ε
LVR20-V07(06)	40		4()		49.3	6	68	20.1
LVR40-V11(10)	82	.5	82	2.5		89	1	15	33
LVR40-V13(12)	82	82.5 82		2.5	89		1	15	33
LVR50-V19	100		100		117.5		13	35	45
Model	F		G	H		J			
LVR20-V07(06)	8	2	7	5	6	77			
LVR40-V11(10)	14	6	4.5	10	0	140.	5		
LVR40-V13(12)	14	6	4.5	10	0	140.	5		
LVR50-V19	22	8	0	12	0	169			

Tube extensions



			_			•	-	_
Model	A		E	3		С	D	E
LVR20-T07(06)	40		40)	2	19.3	68	20.1
LVR40-T11(10)	82.	5	82	.5	8	39	115	33
Model	F		GH		I	J	K	<u> </u>
LVR20-T07(06)	8	2	7	5	6	33.5	126	6.2
LVR40-T11(10)	14	6	4.5	10	0	40	183	3.3



Integral fittings/LQ1

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Applicable Fluids

Regulator for Chemical Liquids Material and Fluid Compatibility Check List

Chemical		Compatibility
Acetone		O Note 1, 2)
Ammonium hydroxide		O Note 2)
Isobutyl alcohol		O Note 1, 2)
Isopropyl alcohol		O Note 1, 2)
Hydrochloric acid		O Note 2)
Ozone		0
Hydrogen peroxide	Concentration 5% or less, Temperature 50°C or less	0
Ethyl acetate		O Note 1, 2)
Butyl acetate		O Note 1, 2)
Nitric acid (except fuming nitric acid)	Concentration 10% or less	O Note 2)
Deionized water		0
Sodium hydroxide	Concentration 50% or less	0
Nitrogen gas		0
Ultrapure water		0
Toluene		O Note 1, 2)
Hydrofluoric acid		O Note 2)
Sulfuric acid (except fuming sulfuric a	acid)	O Note 2)
Phosphoric acid	Concentration 80% or less	0

Table symbols

- Can be used. Can be used under certain conditions.
- x: Cannot be used.

The material and fluid compatibility check list provides reference values as a guide only.

Note 1) Since static electricity may be generated, implement suitable countermeasures.

Note 2) Use caution as permeation may occur. The permeated fluid may effect the parts of other materials.

• Compatibility is indicated for fluid temperatures of 100°C or less.

• The material and fluid compatibility check list provides reference values as a guide only, therefore we do not guarantee the application to our product.

- The data above is based on the information presented by the material manufacturers.
- SMC is not responsible for its accuracy and any damage happened because of this data.



Series LVR Specific Product Precautions 1

Be sure to read this before handling. Refer to the back cover for Safety Instructions. For 2 Port Solenoid Valves for Fluid Control, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com

Design / Selection

\land Warning

1. Check the specifications.

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

2. Fluids

Operate after confirming the compatibility of the product's component materials with fluids, using the check list on page 6. Please contact SMC regarding fluids other than those in the check list.

3. Fluid pressure range

Keep the supplied fluid pressure within the operating pressure range shown in the catalog.

4. Ambient environment

Operate within the ambient operating temperature range. After confirming the compatibility of the product's component materials with the ambient environment, operate so that fluid does not adhere to the product's exterior surfaces.

5. Maintenance space

Ensure the necessary space for maintenance and inspections.

6. Liquid seals

When circulating fluid:

Provide a relief valve in the system so that fluid does not get into the liquid seal circuit.

If the inlet pressure is released with the pressure enclosed at the outlet pressure, the outlet pressure (residual pressure at the outlet side) cannot be released.

7. Countermeasures for static electricity

Since static electricity may be generated depending on the fluid being used, implement suitable countermeasures.

\land Caution

1. Pressure increase in the closed circuit

If the product is used with a closed circuit, the outlet pressure increases when valve leakage occurs. If the outlet side is closed, install a bypass circuit to make the circuit open.

Mounting

\land Warning

1. Breathing ports

If the direct suction and exhaust are not desired due to ambient environment or dust dispersion, connect additional piping so that suction and exhaust are performed in a clean location.

No corrosive fluids should not be entered into the vent hole. Malfunction may occur due to corrosion of components.

2. If air leakage increases or equipment does not operate properly, stop operation.

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

3. Operation Manual

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

Piping

\land 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.

Install piping so that it does not apply pulling, pressing, bending or other forces on the valve body.

2. Use the tightening torques shown below when making connections to the pilot port.

Pilot Port Tightening Torque

Operating port	Torque lbf-ft [N-m]
Rc, NPT1/8	0.6 to 0.7 [0.8 to 1.0]

3. Use of metal fittings

Do not connect a metal fitting to the port. This will damage the thread.

4. Breathing ports

If the direct suction and exhaust are not desired due to ambient environment or dust dispersion, connect additional piping so that suction and exhaust are performed in a clean location.

No corrosive fluids should not be entered into the vent hole. Malfunction may occur due to corrosion of components.

5. For information on tubing connection, refer to the pamphlets "High Purity Fluoropolymer Fittings Hyper Fitting Series LQ1/2 Work Procedure Instructions" (M-E05-1) or "Flare Type Series LQ3 Fitting Procedure" (M-E06-4). (The pamphlets can be downloaded from the SMC website.)



6. Tighten the nut to the end surface of the body. As a guide, refer to the proper tightening torques shown below.

Tightening Torque for Piping

Fitting nut size	LQ3	LQ1
2	1.6 to 1.8	0.3 to 0.4
3	3.2 to 3.5	0.8 to 1.0
4	5.0 to 5.3	1.0 to 1.2
5	10.0 to 10.5	2.5 to 3.0



Series LVR Specific Product Precautions 2

Be sure to read this before handling. Refer to the back cover for Safety Instructions. For 2 Port Solenoid Valves for Fluid Control, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, http://www.smcworld.com

Operating Air Supply

A Warning

1. Use clean air.

Do not use compressed air which includes chemicals, synthetic oils containing organic solvents, salt, or corrosive gases, etc., as this may cause damage or malfunction.

A Caution

1. When adjusting the pilot pressure, the SMC precision regulators IR or ARP series are recommended.

Operating Environment

\land Warning

- 1. Do not use in a location having an explosive atmosphere.
- 2. Do not operate in locations where vibration or impact occurs.
- 3. Do not use in locations where radiated heat will be received from nearby heat sources.

Maintenance

\land Warning

- 1. Maintenance should be performed in accordance with the procedures in the Operation Manual. Incorrect handling can cause damage or malfunction of machinery and equipment, etc.
- 2. Before removing equipment or compressed air supply/exhaust devices, shut off the air and power supplies, and exhaust compressed air from the system. Further, when restarting equipment after remounting or replacement, first confirm safety and then check the equipment for normal operation.
- Perform work after removing residual chemicals and carefully replacing them with DI water (deionized water) or air, etc.
- 4. Do not disassemble the product. Products which have been disassembled cannot be guaranteed. If disassembly is necessary, please contact SMC.
- 5. In order to obtain optimum performance from valves, perform periodic inspections to confirm that there are no leaks from valves or fittings, etc.

A Caution

1. Removal of drainage

Flush drainage from filters regularly.

Pressure Adjustment

\land Warning

1. Check the inlet, outlet and pilot pressure indicators while undertaking pressure and flow settings.

Pressures over the regulated range may cause damage to the internal parts.

▲ Caution

1. Without consumption of the outlet side flow, the outlet pressure will not decrease along with the pilot pressure decrease.

As this product is not fitted with a relief mechanism, without consumption of the outlet side flow, the outlet pressure will not decrease along with the pilot pressure decrease.

- 2. Set the outlet pressure to no more than 80% of the supply pressure.
- 3. When adjusting the flow, provide a restrictor on the outlet side of the product.

Without a restrictor, the stable adjustment of the flow cannot be achieved.

4. When the inlet pressure is fluctuating, take caution to the setting value of the outlet pressure.

When the setting value of the outlet pressure is over the inlet pressure, the outlet pressure cannot be stabilized.

▲ 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.

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-			П.	*
Λ	Caution	Caution indicates a hazard with a low level of risk which,	1	
/:`	\ Caulion.	if not avoided, could result in minor or moderate injury		

Warning: Warning indicates a nazero with a model. Warning indicates a hazard with a medium level of risk which,

Danger : Danger indicates a frazario while a frazario w Danger indicates a hazard with a high level of risk which,

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A Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

- 3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.
 - 1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
 - 2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully
 - 3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

- 1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
- 2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
- 3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
- 4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

-) 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.

Caution

1. The product is provided for use in manufacturing industries. The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ **Compliance Requirements**

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".

Read and accept them before using the product.

Limited warranty and Disclaimer

- 1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
- Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
- 2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
- 3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.
 - *2) Vacuum pads are excluded from this 1 year warranty. A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

- 1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
- 2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

A Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Safety Instructions Be sure to read "Handling Precautions for SMC Products" (M-E03-3) before using.



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