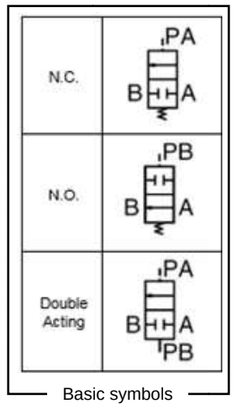
55-LVA-SMX16

SMC

ORIGINAL INSTRUCTIONS

Refer to Declaration of Conformity for relevant Directives

Instruction Manual
55-LVA Series
Air operated valves



Basic symbols

ATEX classification
II 2 G Ex h IIB T5..T4 Gb 0°C ≤ Ta ≤ +60°C
II 2 D Ex h IIIB T85..T125°C Db
55-LVA10* and 55-LVA12* gas classification only.

Certificate reference: SMC 19.0006 X
For special conditions of use see section 1.2.

The intended use of this product is to control the flow of chemical fluids or gases in industrial applications.

1 Safety Instructions

1.1 General 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.

1.2 Special conditions of use

⚠ Warning

- Protect from impacts using an ATEX compliant enclosure.
- 2-port (SUS body) and all 3-port valves must be connected to earth.
- Do not install in areas subject to electrostatic charging mechanisms.
- Clean only with a damp cloth and allow to dry naturally.

2 Specifications

2.1 Valve specifications

Common specifications

Valve construction	Air-operated valve Diaphragm type
Withstand pressure (MPa)	1
Valve leakage (cm^3/min)	Zero leakage (with water pressure)
Max. operating freq. (Hz)	1
Fluid temperature (°C)	0 - 60[1)] (Temp Class T5, T85°C) 61 to 100 (Temp Class T4, T125°C)
Ambient temperature (°C)	0 to 60

Note 1) Maximum temperature when the diaphragm is NBR or EPR.

2-port valve [55-LVA10 / 20 / 30]

Model		55-LVA10	55-LVA20	55-LVA30
Orifice diameter (mm)		Ø2	Ø4	Ø8
Port size		1/8, 1/4	1/8, 1/4	1/4, 3/8
Operating pressure (MPa)	A->B	0 to 0.5	0 to 0.5	
	B->A	0 to 0.05	0 to 0.2	
Back pressure (MPa)	NC/NO[2)]	0.15 or less	0.3 or less	
	Double acting	0.3 or less	0.4 or less	
Pilot air pressure (MPa)		0.3 to 0.5		

Note 2) The N.O. type is not available for 55-LVA10.

2-port valve [55-LVA40 / 50 / 60]

Model		55-LVA40	55-LVA50	55-LVA60
Orifice diameter (mm)		Ø12	Ø20	Ø22
Port size		3/8, 1/2	1/2, 3/4	1
Withstand pressure (MPa)		1		
Operating pressure (MPa)	A->B	0 to 0.5	0 to 0.4	
	B->A	0 to 0.2	0 to 0.1	
Back pressure (MPa)	NC/NO	0.3 or less	0.2 or less	
	Double acting	0.4 or less	0.3 or less	
Pilot air pressure (MPa)		0.3 to 0.5		

3-port valve [55-LVA200]

Model	55-LVA200
Valve construction	Air-operated 3-port valve Diaphragm type
Orifice diameter (mm)	Ø4
Port size	1/4
Operating pressure (MPa)	0 to 0.5
Pilot air pressure (MPa)	0.4 to 0.5

2.2 Production batch codes

Construction	Production batch codes											
Year / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	Xo	XP	XQ	XR	XS	XT	XU	XV	XW	XX	Xy	XZ
2020	yo	yP	yQ	yR	yS	yT	yU	yV	yW	yX	yy	yZ
…	…	…	…	…	…	…	…	…	…	…	…	…
2024	Co	CP	CQ	CR	CS	CT	CU	CV	CW	CX	Cy	CZ

Note: The batch code is included on the product label.

3 Installation

3.1 General

⚠ Warning

- Do not install the product unless the safety instructions have been read and understood.
- Protect from impacts using an ATEX compliant enclosure.
- Do not install the product in areas subject to electrostatic charging mechanisms.
- 55-LVA10 and 55-LVA12 have gas classification only and are therefore not suitable for dust zones.
- Ensure that 2-port (SUS body) and all 3-port valves are correctly earthed. See section 3.6 for details.

3 Installation (continued)

⚠ Caution

- Depending on the function, the valves have ports which are open to atmosphere, refer to table in section 3.3. When used in a dust atmosphere pipe the breathing port away to a suitable area to avoid dispersion of dust.

3.2 Environment

⚠ Warning

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

3.3 Piping

⚠ Caution

- Before connecting piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1 thread exposed on the end of the pipe/fitting.
- Install piping so that it does not apply pulling, pressing, bending or other forces on the valve body.
- Do not use metal fittings for piping on taper threads made of resin, as this may cause damage to the threads.
- Use pilot ports and sensor (breathing) ports as indicated in the table below.

Function	PA Port	PB Port	Sensor port
N.C.	Pressure	Breathing	Breathing
N.O.	Breathing	Pressure	Breathing
Double acting	Pressure	Pressure	Breathing

- For details regarding pipe sizes, please refer to the catalogue for the standard LVA Series.
- Fitting tightening torque - **SUS and PFA body**

Thread size	Tightening Torque (Nm)	
	SUS body	PFA body
1/8	3 to 5	0.6 to 0.9
1/4	8 to 12	0.8 to 1.2
3/8	15 to 20	1.0 to 1.6
1/2	20 to 25	1.5 to 2.0
3/4	28 to 30	2.0 to 2.7
1	36 to 38	2.5 to 3.6

- Fitting tightening torque - **PPS body**

Valve	Thread	Breaking torque (Nm)	Tightening torque (Nm)	Guideline for tightening torque (Number of turns)[1]
55-LVA10	1/8, 1/4	2 to 3	0.5 to 1	2 to 3 turns
55-LVA20	1/4	2 to 3	0.5 to 1	2 to 3 turns
55-LVA30	3/8	6 to 8	2 to 3	3 to 4 turns
55-LVA40	1/2	11 to 14	5 to 7	3 to 4 turns

Note 1) Number of turns when the fitting is screwed into the body with 2 to 3 windings of sealant tape applied to the threads of the pipe.

- Fitting tightening torque - Pilot and sensor ports (all valves)

Thread	Appropriate tightening torque (Nm)
M3	Tightening by hand + 1/4 turn with a wrench
M5	Tightening by hand + 1/6 to 1/4 turn with a wrench
1/8	0.8 to 1.0

3.4 Lubrication

⚠ Caution

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.

3 Installation (continued)

3.5 Mounting

Tighten mounting screws to appropriate tightening torque shown in the tables below.

- **Stainless steel body**

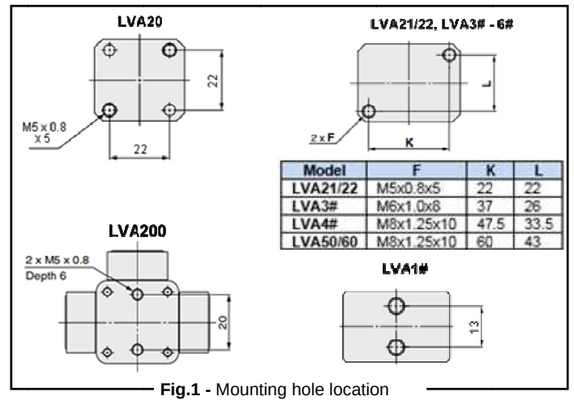
Model	Mounting	Tightening torque (N.m)
LVA10/20	M5x0.8	3 ±0.7
LVA30	M6x1.0	5 ±0.7
LVA40/50/60	M8x1.25	12 +3/-1

- **PFA body**

Model	Mounting	Tightening torque (N.m)
LVA200	M5x0.8	3 ±0.7

3.6 Earth connection

The threaded mounting holes of the 2-port (SUS body) and all 3-port valves can be used as an earth connection. See fig.1 for mounting hole location.



Model	F	K	L
LVA21/22	M5x0.8x5	22	22
LVA3#	M6x1.0x8	37	26
LVA4#	M8x1.25x10	47.5	33.5
LVA50/60	M8x1.25x10	60	43

Fig.1 - Mounting hole location

4 Settings

4.1 **Indicator** (fig.2)

- Valves with indicator have a mechanical indicator to indicate when the valve is open.
- The indicator shows blue when the valve is open.

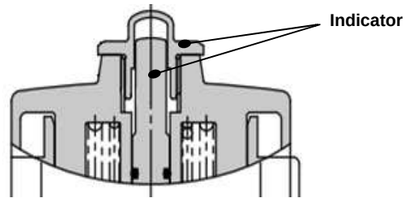


Fig.2 - Mechanical indicator

4.2 **Flow rate adjuster** (fig.3)

- To adjust the flow rate for valves with flow rate adjustment, open gradually starting from the fully closed condition. Ensure lock nut is loosened.
- Opening is accomplished by turning the adjustment knob counter-clockwise.
- Do not apply excessive force to the adjustment knob when approaching the fully open or closed state. This may result in deformation of the orifice sheet surface or damage to the threaded part of the adjustment mechanism.
- Once the required flow rate is achieved, the adjuster can be locked in position by tightening the lock nut in a clockwise direction.
- The product is supplied in the fully closed position.
- The valve may vibrate if operated at very low flow rates, depending on the operating conditions. Therefore, review the flow rate, operating pressure and piping conditions.

4 Settings (continued)

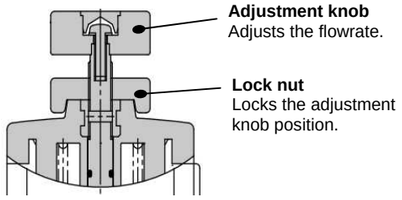


Fig.3 - Flow-rate adjuster

4.3 By-pass (fig.4)

- The by-pass feature allows a small amount of fluid from the inlet side to flow continuously to the outlet side.
- To adjust the fluid flow for valves with the by-pass feature, open gradually starting from the fully closed condition. Ensure lock nut is loosened.
- Opening is accomplished by turning the adjustment knob counter-clockwise.
- Do not apply excessive force to the adjustment knob when approaching the fully open or closed state. This may result in deformation of the orifice sheet surface or damage to the threaded part of the adjustment mechanism.
- Once the required by-pass flow is achieved, the adjuster can be locked in position by tightening the lock nut in a clockwise direction.
- The product is supplied in the fully closed position.

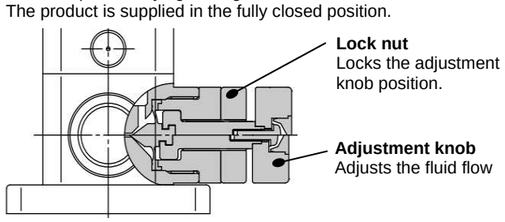
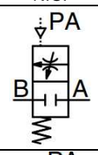
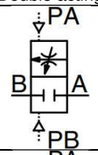
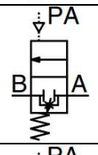
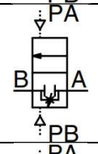
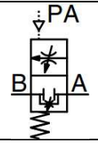
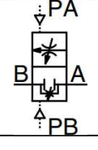


Fig.4 - By-pass

5 Circuit symbols (flowrate adjustment/By-pass)

Option	Valve function/Symbol	
	N.C.	Double acting
With Flow adjuster		
With By-Pass		
With Flow adjuster and By-Pass		

6 How to order

Please refer to the 55-LVA how to order in the on-line ATEX catalogue.

7 Outline Dimensions

Please refer to the information contained in the standard LVA Web catalogue.

8 Maintenance

8.1 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.
- 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.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

⚠ Warning

- After undertaking maintenance work, check the electrical continuity of all 2-port (SUS body) and 3-port valve earth connections.

9 Limitations of Use

8.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

⚠ Warning

- Refer to the ATEX classification for the product.
- Refer to the ‘Special conditions of use’, section 1.2.
- 55-LVA10* and 55-LVA12* are not suitable for dust zones.

10 Contacts

Refer to Declaration of Conformity and www.smcworld.com for contacts.

SMC Corporation

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