ORIGINAL INSTRUCTIONS

Instruction Manual
55-LVA Series
Air operated valves

For ISO symbols
See section 2.3

Ex 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

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: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.

- 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 Safety Instructions - continued

1.2 Special conditions of use

Warning

- The product shall be protected from impacts in compliance with the applicable explosive atmosphere standards.
- To avoid the build-up of electrostatic charge, do not mount in areas subject to electrostatic charging mechanisms and clean only with a damp cloth and allow to dry naturally.

2 Specifications

2.1 Valve specifications

Common specifications

Valve construction	Air-operated, Diaphragm type	
Fluid	Refer to standard on-line catalogue	
Withstand pressure [MPa]	1	
Valve leakage [cm³/min]	0 (with water pressure)	
Max. operating freq. [Hz]	LVA10 to LVA40	LVA50, 60
	1 1)	0.5 1)
Fluid temperature [°C]	0 - 60 2) (Temp Class T5, T85°C) >60 to 100 (Temp Class T4, T125°C)	
Ambient temperature [°C]	0 to 60	
Min. operating frequency	Contact SMC	
Mounting orientation	Any	

Note 1) Maximum value shown, actual value will depend on operating conditions.
Note 2) Maximum temperature when the diaphragm is NBR or EPR.

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

Model		55-LVA10	55-LVA20	55-LVA30
Orifice Ø [mm]		2	4	8
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]	N.C./N.O.1)	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 1) 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 Ø [mm]		12	20	22
Port size		3/8, 1/2	1/2, 3/4	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]	N.C./N.O.	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 Ø [mm]	4
Port size	1/4
Operating pressure [MPa]	0 to 0.5
Pilot air pressure [MPa]	0.4 to 0.5

- For specifications not shown above, refer to the standard LVA on-line catalogue.

2.2 Production batch codes

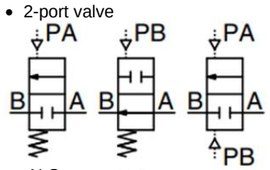
Construction	Production batch codes											
Year / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2022	Ao	AP	AQ	AR	AS	AT	AU	AV	AW	AX	Ay	AZ
2023	Bo	BP	BQ	BR	BS	BT	BU	BV	BW	BX	By	BZ
…	…	…	…	…	…	…	…	…	…	…	…	…
2026	Eo	EP	EQ	ER	ES	ET	EU	EV	EW	EX	Ey	EZ

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

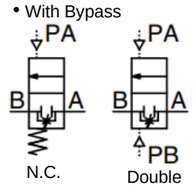
2 Specifications - continued

2.3 Pneumatic symbols

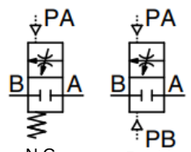
- 2-port valve



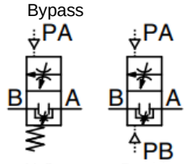
- With Bypass



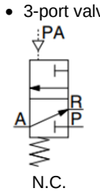
- With Flow rate adjustment



- With Flow rate adjustment & Bypass



- 3-port valve



3 Installation

3.1 General

Warning

- Do not install the product unless the safety instructions have been read and understood.
- The product shall be protected from impacts in compliance with the applicable explosive atmosphere standards.
- 55-LVA10 and 55-LVA12 have gas classification only and are therefore not suitable for dust zones.
- Ensure that 2-port (stainless steel body) and all 3-port valves are correctly earthed. See section 3.4 for details.

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 following table.

3 Installation - continued

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.
- Tighten fittings to the specified tightening torque.

Fitting tightening torque - **Stainless steel and PFA body**

Thread size	Tightening Torque [N·m]	
	Stainless steel 1)	PFA
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

Note 1) When metal fitting is installed.

Fitting tightening torque - **PPS body**

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

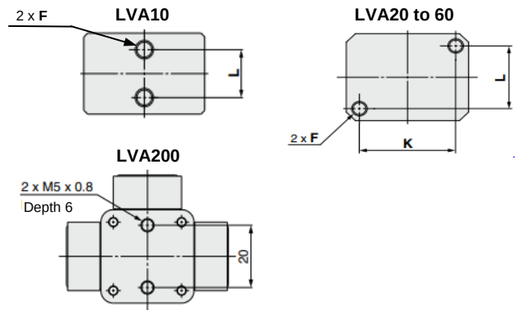
Fitting tightening torque - **Pilot and sensor ports (all valves)**

Thread	Appropriate tightening torque [N·m]
M3	1/4 turn with a tightening tool after first tightening by hand
M5	1/6 turn with a tightening tool after first tightening by hand
1/8	0.8 to 1.0

3.4 Earth connection

Warning

If the installation requires the connection of an earth terminal to the valves with conductive bodies (2-port with SUS body and all 3-port), then the threaded mounting holes can be used for this purpose. See fig.1 for mounting hole location.



Model	F	K	L
LVA10	M5 x 0.8 x 4	-	13
LVA20	M5 x 0.8 x 5	22	22
LVA30	M6 x 1.0 x 8	37	26
LVA40	M8 x 1.25 x 10	47.5	33.5
LVA50/60	M8 x 1.25 x 10	60	43

Fig.1 - Mounting hole location

3.5 Lubrication

Caution

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

3 Installation - continued

3.6 Pilot air supply

Warning

- Use clean air. If the compressed air supply includes chemicals, synthetic materials (including organic solvents), salinity, corrosive gas etc., it can lead to damage or malfunction.

Caution

- Install an air filter upstream of the valve. Select an air filter with a filtration size of 5 µm or smaller.

3.7 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

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.

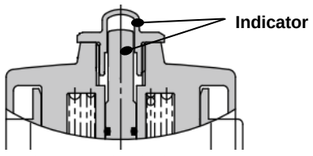


Fig.2 - Mechanical indicator

4.2 Flow rate adjustment (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.

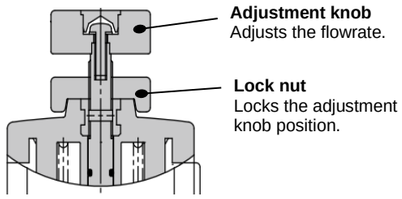


Fig.3 - Flow-rate adjustment

4.3 Bypass (fig.4)

- The bypass 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 bypass feature, open gradually starting from the fully closed condition. Ensure lock nut is loosened.
- Opening is accomplished by turning the adjustment knob counter-clockwise.

4 Settings - continued

- 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 bypass 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.

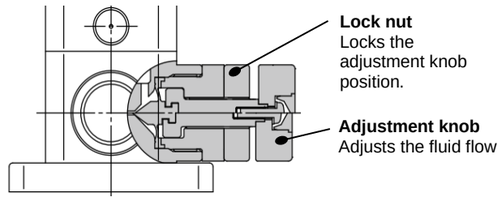


Fig.4 - Bypass

5 How to Order

Refer to the 55-LVA catalogue located on the SMC website.

6 Outline Dimensions

Refer to the standard LVA catalogue located on the SMC website.

7 Maintenance

7.1 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.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- In the case of long-term storage, thoroughly remove all moisture to prevent rust and deterioration of rubber materials, etc.

Warning

- After undertaking maintenance work ensure that earth connections, where applicable, are replaced and have electrical continuity. See section 3.4.

8 Limitations of Use

8.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

Warning

- Refer to the Ex 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.
- In a closed circuit, when liquid is static, pressure could rise due to changes in temperature. This pressure rise could cause malfunction and damage to components such as valves. To prevent this, install a relief valve in the system.
- When an impact caused by the rapid change in pressure is applied (e.g. water hammer), the valve may be damaged. Install water hammer relief equipment (e.g. an accumulator) or consider adjusting the pilot pressure with a speed controller. If water hammer occurs; the flow rate, pressure and piping conditions should be reviewed.

9 Product Disposal

This product shall not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

10 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor/importer.

SMC Corporation

URL : https:// www.smcworld.com (Global) https:// www.smc.eu (Europe)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan

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