



ORIGINAL INSTRUCTIONS

Instruction Manual

High Vacuum Angle Valve with Heater

Series XL\*-\*\*H\*-\*

Heater assembly

Series XL\*A25-60\*-\*



The intended use of this heater is warm up the XL series angle valve for bake-out.

1 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)<sup>(1)</sup>, and other safety regulations.

- <sup>(1)</sup> 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.

<b>Caution</b>	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
<b>Warning</b>	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
<b>Danger</b>	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.

2 Specifications

2.1 General Specifications

Model	XLA(Q), XLD(Q)	XLC	XLH
Valve type	Normally closed	Double acting	Manual
Fluid	Inert gas		
Operating temperature range	5 to 150 °C		
Operating pressure range	Atmospheric pressure to 1 x 10 <sup>-6</sup>		
Pilot pressure range	0.4 to 0.7 MPa	0.3 to 0.6 MPa (Size 16 to 40) 0.4 to 0.6 MPa (Size 50 to 160)	-
Leakage <small>Note 1)</small>	Internal	1.3 x 10 <sup>-10</sup> Pa.m <sup>3</sup> /s	
	External	1.3 x 10 <sup>-11</sup> Pa.m <sup>3</sup> /s	
Body material	Aluminum alloy		
Seal material	FKM		
Other material in contact with gas <small>Note 2)</small>	Stainless steel		

Note 1) Leakage when the ambient temperature is at 20°C. Gas permeation is not included.

Note 2) Vacuum grease (Y-VAC2) is applied to the sliding areas of the seal material.

2 Specifications - continued

Model	XLF	XLG
Valve type	Normally closed	Double acting
Fluid	Inert gas	
Operating temperature range	5 to 150 °C	
Operating pressure range	Atmospheric pressure to 1 x 10 <sup>-5</sup>	
Pilot pressure range	0.4 to 0.7 MPa	0.3 to 0.6 MPa (Size 16 to 40) 0.4 to 0.6 MPa (Size 50 to 160)
Leakage <small>Note 1)</small>	Internal	1.3 x 10 <sup>-10</sup> Pa.m <sup>3</sup> /s
	External	1.3 x 10 <sup>-10</sup> Pa.m <sup>3</sup> /s
Body material	Aluminum alloy	
Seal material	FKM	
Other material in contact with gas <small>Note 2)</small>	Stainless steel	

Note 1) Leakage when the ambient temperature is at 20°C. Gas permeation is not included.

Note 2) Vacuum grease (Y-VAC2) is applied to the sliding areas of the seal material.

2.2 Connection / Flow specifications

Model	Flange Type	Flange Size	Conductance L/s <small>Note 1)</small>
XL*-16	KF	16	5
XL*-25	KF	25	14
XL*-40	KF	40	45
XL*-50	KF	50	80
XL*-63	KF/K	63	180
XL*-80	KF/K	80	200
XL*-100	KF/K	100	300
XL*-160	KF/K	160	800

Note 1) Conductance is the value for the elbow with the same dimensions.

2.3 Weight (kg)

Model	XLA	XLC	XLD	XLF	XLG	XLH
XL*-16	0.25	0.28	-	0.25	0.28	0.23
XL*-25	0.45	0.46	0.5	0.45	0.46	0.41
XL*-40	1.1	1.1	1.2	1.1	1.1	1.05
XL*-50	1.6	1.4	1.8	1.6	1.4	1.62
XL*-63	2.9	2.3	3.4	3.0	2.3	-
XL*-80	5.0	4.0	5.6	4.8	4.1	-
XL*-100	10.6	8.7	11.5	10.0	7.6	-
XL*-160	18.5	14.5	20.0	18.0	14.9	-

Model	XLA-2	XLC-2	XLF-2	XLG-2	XLAQ	XLDQ
XL*-16	0.28	0.27	0.29	0.26	0.33	-
XL*-25	0.47	0.45	0.49	0.44	0.6	-
XL*-40	1.1	1.0	1.2	1.0	1.3	1.5
XL*-50	1.7	1.4	1.9	1.5	2.0	2.2
XL*-63	3.1	2.4	3.3	2.4	-	-
XL*-80	5.1	3.9	5.7	4.1	-	-

2.4 Heater electrical specifications

Voltage range	110 to 240 VAC
Insulation test voltage	3790 V
Resistance at 25°C	300 to 900 Ω
Maximum inrush current at 230V	7A
Power in ice-water at 0°C at 230V (internal standard)	120W ± 10%
Power at 230V free in the air with ambient temperature 20°C approx.	14W ± 10%
Surface temperature at 230V free in the air with ambient temperature 20°C approx.	225°C

2 Specifications - continued

2.5 Specifications of set temperature

XL*-25			
Symbol	H5	Heater assembly P/N	XL*A25-60*-1
		Qty. of heater assemblies	1pc
		Power consumption (W) (Inrush / Steady)	100VAC 200/40 200VAC 800/40

XL*-40			
Symbol	H4	Heater assembly P/N	XL*A25-60*-1
		Qty. of heater assemblies	1pc
		Power consumption (W) (Inrush / Steady)	100VAC 200/40 200VAC 800/40
Symbol	H5	Heater assembly P/N	XL*A25-60*-2
		Qty. of heater assemblies	1pc
		Power consumption (W) (Inrush / Steady)	100VAC 400/70 200VAC 1600/80

XL*-50			
Symbol	H4	Heater assembly P/N	XL*A25-60*-1
		Qty. of heater assemblies	1pc
		Power consumption (W) (Inrush / Steady)	100VAC 200/50 200VAC 800/50
Symbol	H5	Heater assembly P/N	XL*A25-60*-2
		Qty. of heater assemblies	1pc
		Power consumption (W) (Inrush / Steady)	100VAC 400/80 200VAC 1600/80

XL*-63			
Symbol	H4	Heater assembly P/N	XL*A25-60*-2
		Qty. of heater assemblies	1pc
		Power consumption (W) (Inrush / Steady)	100VAC 400/100 200VAC 1600/100
Symbol	H5	Heater assembly P/N	XL*A25-60*-3
		Qty. of heater assemblies	1pc
		Power consumption (W) (Inrush / Steady)	100VAC 600/130 200VAC 2400/130

XL*-80			
Symbol	H4	Heater assembly P/N	XL*A25-60*-3
		Qty. of heater assemblies	1pc
		Power consumption (W) (Inrush / Steady)	100VAC 600/150 200VAC 2400/150
Symbol	H5	Heater assembly P/N	XL*A25-60*-2
		No. of heater assemblies	2pcs
		Power consumption (W) (Inrush / Steady)	100VAC 800/180 200VAC 3200/180

XL*-100			
Symbol	H4	Heater assembly P/N	XL*A25-60*-2
		Qty. of heater assemblies	2pcs
		Power consumption (W) (Inrush / Steady)	100VAC 800/220 200VAC 3200/220
Symbol	H5	Heater assembly P/N	XL*A25-60*-2
		Qty. of heater assemblies	3pcs
		Power consumption (W) (Inrush / Steady)	100VAC 1200/300 200VAC 4800/300

2 Specifications - continued

XL*-160			
Symbol	H4	Heater assembly P/N	XL*A25-60*-2
		Qty. of heater assemblies	3pcs
		Power consumption (W) (Inrush / Steady)	100VAC 1200/350 200VAC 4800/350
Symbol	H5	Heater assembly P/N	XL*A25-60*-2
		Qty. of heater assemblies	4pcs
		Power consumption (W) (Inrush / Steady)	100VAC 1600/400 200VAC 6400/400

**Warning**

Special products (-X) might have specifications different from those shown in this section. Contact SMC for specific drawings.

3 Installation

3.1 Selection

**Warning**

- Type of fluid  
Before using actual fluid, check whether it is compatible with the materials of component parts.
- Use clean air. Do not use compressed air that contains chemicals, synthetic oils that include organic solvents, salt, corrosive gases, etc., as it can cause damage or malfunction.
- Install an air filter, if necessary. Install an air filter close to the valve on the upstream side.
- Avoid the entry of foreign matter.
- Use within the operable ambient temperature range. Check the compatibility between the product's materials and any fluid contained in the ambient atmosphere. Ensure that any harmful fluid used does not touch the external surface of the product.
- Take measures to prevent static electricity since some fluids can cause it.

3.2 Valve Mounting

**Warning**

- 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.
- Avoid sources of vibration or adjust the arm from the body to the minimum length so that resonance will not occur.
- Painting and coating  
Warnings or specifications printed or labelled on the product should not be erased, removed, or covered up.

3.3 Heater Installation

**Warning**

- Take care not to damage the insulation components of the lead wires and connector section.
- The set temperature for models with a heater should be established without any drafts or heat insulation. The temperature will change depending on conditions such as, heat insulation measures and the heating of other piping. Fine adjustment is not possible.
- When installing heater accessories or mounting a heater, check insulation resistance at the actual operating temperature. An Earth leakage current breaker or fuse should be installed.
- If the valve is to be insulated, only the body should be insulated, excluding the bonnet part.
- In models with a heater, when the heater is in operation, the entire valve becomes hot. Be careful not to touch the valve with bare hands, as burns will result.
- Only use this heater for the XL series.

### 3 Installation - continued

#### 3.4 Environment

##### Warning

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

#### 3.5 Precautions on Design

##### Caution

- **Not suitable for use as an emergency shut-off valve, etc.**  
These valves are not designed for safety applications such as an emergency shutoff valve. If the valves are used for the mentioned applications, additional safety measures should be adopted.

#### 3.6 Electrical connection

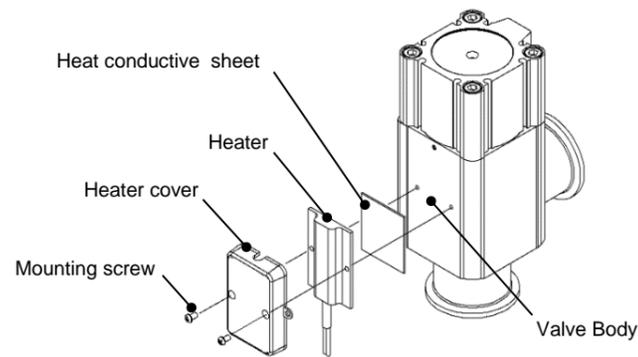
##### Caution

- Confirm the connections.
- After completing the wiring, confirm that the connections are made correctly.
- Only use in an electrical circuit that does not generate chattering in its contacts or does not have contacts that are open/closed frequently.
- Use a voltage that is within  $\pm 10\%$  of the rated voltage.
- A mechanism to prevent overheating should be installed (see section 4).

#### 3.7 Heater mounting

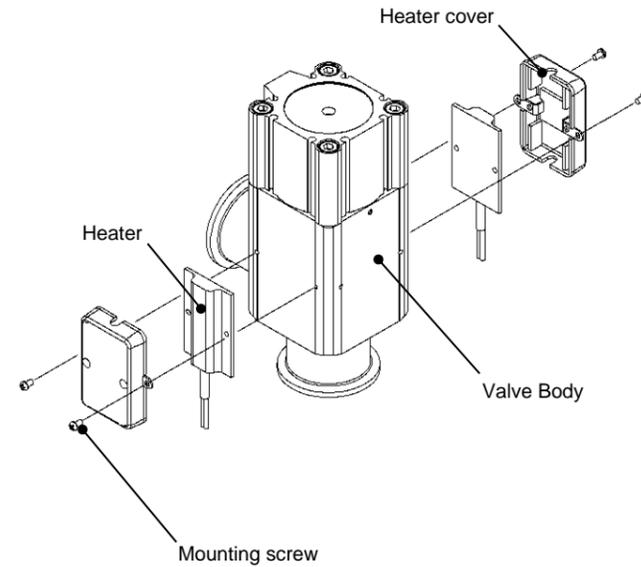
##### Caution

- XL\*-25  
Put the heat conductive sheet, heater and heater cover to backside of valve body.  
Tighten the mounting screws to install heater assembly (tighten torque: 0.3N·m).



- Other sizes  
Put the heater and heater cover to each side of the valve body.  
Tighten the mounting screws to install heater assembly (tighten torque: 0.3N·m).  
Heat conductive sheet is not used on these size valves.

### 3 Installation - continued



#### 3.8 Piping

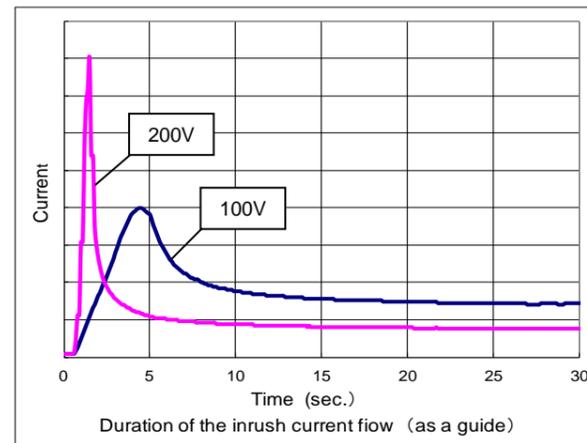
##### Caution

- 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 1.5 to 2 threads exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.

### 4 Settings

The heaters are PTC thermistor type design. These thermistors self-regulate their temperature by switching the resistance at certain critical temperatures, so a separate temperature controller is unnecessary. If the temperature of the PTC heaters fitted exceeds 200°C, then it may fail. The maximum operating temperature for the valve is 150°C. If the heater temperature is over 200°C or valve temperature is over 150°C, then please use a thermostat to control the heaters to prevent overheating.

With PTC type heaters, there is an initial surge of current (inrush current) after the power is supplied. These inrush currents will reduce overtime. If multiple heater assemblies are used, the inrush current to the heaters will be magnified and care should be taken. When multiple heater assemblies or valves are used, do not apply power to the heater assemblies simultaneously. Keep approximately 30 seconds between applications of power to each heater assembly. This will allow for incremental spacing to a harmful large initial surge.



### 5 How to Order

Refer to catalogue for 'How to Order'.

### 6 Outline Dimensions

Refer to catalogue for outline dimensions.

### 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.
- When removing deposits from the valve, take care not to damage any part of the valve.
- Replace the bonnet assembly when the valve is approaching the end of its service life.
- If potential damages are suspected prior to the end of the service life, perform maintenance earlier than noted. If there are scratches, dents, or cracks on the seals (bellows or valve) due to handling or operating conditions, please replace the parts with new ones.
- SMC specified parts should be used for service.
- When removing the valve seal and external seal, take care not to damage the sealing surfaces. When installing the valve seal and external seal, be sure that the O-ring is not twisted.

##### Warning

If the fluid or reaction product (deposit) may cause the valve to become unsafe, the valve should be disassembled, cleaned, and re-assembled by an operator who has sufficient knowledge and experience (e.g. a specialist).

### 8 Limitations of Use

#### 8.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

### 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](http://www.smcworld.com) or [www.smc.eu](http://www.smc.eu) for your local distributor/importer.

## SMC Corporation

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