



# Operation Manual

PRODUCT NAME

High Vacuum L Type Valve

MODEL / Series / Product Number

XLF-2 Series

**SMC Corporation**

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# 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 10218-1992: Manipulating industrial robots -Safety.

etc.



## 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

### 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.



# Safety Instructions

## 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 regulation 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.**

# 1. Product Specific Precautions 1



## Precautions 1

Be sure to read before handling.

Piping



### Caution

1. Refer to the Fittings and Tubing Precautions on the SMC website for handling One-touch fittings.
2. 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.
3. When connecting pipes, fittings, etc., be sure that chips from the pipe threads and sealing material do not enter the valve. Furthermore, when sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



Leave 1.5 to 2 threads

Air Supply



### Warning

1. Please consult with SMC when using the product in applications other than compressed air.
2. Compressed air containing a large amount of drainage can cause malfunction of pneumatic equipment. An air dryer or water separator should be installed upstream from filters.
3. If condensation in the drain bowl is not emptied on a regular basis, the bowl will overflow and allow the condensation to enter the compressed air lines. It causes malfunction of pneumatic equipment. If the drain bowl is difficult to check and remove, installation of a drain bowl with an auto drain option is recommended.
4. Do not use compressed air that contains chemicals, synthetic oils including organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction.



### Caution

1. When extremely dry air is used as the fluid, degradation of the lubrication properties inside the equipment may occur, resulting in reduced reliability (or reduced service life) of the equipment. Please consult with SMC.
2. Install an air filter at the upstream side of valve. Select an air filter with a filtration degree of 5  $\mu\text{m}$  or finer.
3. Compressed air that contains a large amount of drainage can cause malfunction of pneumatic equipment such as valves. Therefore, take appropriate measures to ensure air quality, such as by providing an aftercooler, air dryer, or water separator.
4. Ensure that the fluid and ambient temperature are within the specified range. If the fluid temperature is 5°C or less, the moisture in the circuit could freeze, causing damage to the seals and equipment malfunction. Therefore, take appropriate measures to prevent freezing.
5. Moisture condensation can occur inside pneumatic systems due to a drop in temperature caused by the piping or operating conditions. This can degrade or wash away grease, resulting in shortened service life or malfunctions. For details, refer to the catalog "Precautionary measures against condensation in a pneumatic system" (CAT.P-E01-11).

For compressed air quality, refer to the SMC catalog "Air preparation system" (CAT.P-E06-3).

## 2. Product Specific Precautions 2



### Precautions 2

Be sure to read before handling.

#### Design



### Warning

- All models

1. The body material is A6063, and other metal seal material is SUS304 and A2017. Refer to Chapter 5, "Construction and Dimensions" (P. 11) for details.  
Standard seal material in the vacuum section is FKM that can be changed to the other materials. (Refer to Chapter 3, "Product Specific Precautions 3" (P. 7 to 8) for details.)  
After confirming the type of material used, be sure to use compatible fluids. Grease for vacuum is applied to the sliding part for the seals (Fluorine grease: Y-VAC2).
2. Select materials for the actuation pressure piping and heat resistant fittings that are suitable for the applicable operating temperatures.

- Models with auto switch

1. Keep the temperature of the switch below 60°C

- With heater (thermistor)

1. When using a model with a heater, a mechanism to prevent overheating should be installed.
2. If using gases that generate a large amount of deposits, it is recommended that the valve body be heated to prevent deposits from sticking to the valve surfaces.

#### Selection



### Caution

- All models

1. When controlling valve responsiveness, take note of the size and length of piping, as well as, the flow rate characteristics of the actuating solenoid valve.
2. Keep the pilot pressure within the specified range.
3. Operate within the specified operating pressure range.
4. Operate within the specified operating temperature range.
5. Please note, when selecting a product without an auto switch(es) (excluding those with built-in magnet), it is not possible to mount an auto switch(es) following receipt of the product from an SMC factory.

#### Mounting



### Caution

- All models

1. In high humidity environments, keep the valve packed until the time of installation.
2. For models with switches, secure the lead wires so that they have sufficient slack, without any unreasonable force applied to them.
3. Perform piping so that excessive force is not applied to the flange sections. When there is vibration from heavy objects or attachments, etc., fix piping so that vibration will not apply torque directly to the flange section.
4. Vibration resistance allows for normal operation of up to 30m/s<sup>2</sup> (45 to 250Hz).  
Be advised that continuous vibration may cause a decline in durability.  
Arrange piping to avoid excessive vibration or impacts.

●High temperature type (temperature specification / H0 H4 H5)

1. In models with a heater (thermistor), take care not to damage the insulation components of the lead wires and connector section.
2. The set temperature for models with a heater should be established at normal ambient temperature 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.
3. When installing heater accessories or mounting a heater, check insulation resistance at the actual operating temperature. A current leakage breaker or fuse should be installed.
4. If the valve is to be insulated, only the body should be insulated, excluding the bonnet part.
5. 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.
6. The heater temperature will initially decrease several % after the heating starts and then gradually becomes stable. (The heater temperature may decrease approximately 5 to 10% due to individual differences.)

Piping

 **Caution**

1. Before mounting, clean the surface of the flange seal and the O-ring with ethanol, etc.
2. There is an indentation of 0.1 to 0.2mm designed to protect the flange seal surface.  
Be careful when handling the product to prevent any damage to the seal surface .

Maintenance

 **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).

 **Caution**

1. When removing deposits from the valve, take care not to damage any part of the valve.
2. Replace the bonnet assembly when the valve is approaching the end of its service life.  
Refer to Chapter 6, "Period and Scope of Warranty" (P. 13) for details regarding endurance cycles.
3. 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 (valve seal 1, 2) due to handling or operating conditions, please replace the parts with new ones.  
Refer to Chapter 3, "Product Specific Precautions 3" (P. 7 to 8) and Chapter 5, "Construction and Dimensions" (P. 11) for maintenance parts. Parts with the indication of "Maintenance part" can be replaced.
4. SMC specified parts should be used for service. Refer to the Construction / Maintenance parts table.
5. 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. (Refer to Chapter 7, "Parts Replacement Procedure" (P. 14 to 18) for details.)

### 3. Product Specific Precautions 3



#### Precautions 3 Be sure to read before handling

Maintenance Parts



#### Caution

SMC specified parts should be used for maintenance service.

Refer to Chapter 5, "Construction and Dimensions" (P. 11) for the part indication numbers.

#### Bonnet assembly/Part indication number (1)

Temperature specifications	Indicator	Valve size			
		16	25	40	50
General use	Without	XLF16-30-1-2	XLF25-30-1-2	XLF40-30-1-2	XLF50-30-1-2
	With	XLF16A-30-1-2	XLF25A-30-1-2	XLF40A-30-1-2	XLF50A-30-1-2
High temperature	Without	XLF16-30-1H-2	XLF25-30-1H-2	XLF40-30-1H-2	XLF50-30-1H-2
	With	XLF16A-30-1H-2	XLF25A-30-1H-2	XLF40A-30-1H-2	XLF50A-30-1H-2

Temperature specifications	Indicator	Valve size	
		63	80
General use	Without	XLF63-30-1-2	XLF80-30-1-2
	With	XLF63A-30-1-2	XLF80A-30-1-2
High temperature	Without	XLF63-30-1H-2	XLF80-30-1H-2
	With	XLF63A-30-1H-2	XLF80A-30-1H-2

Note 1) Add the seal material symbol shown on page 8 at the suffix of the model number. This is not necessary for the standard seal material valve seal 1 and 2 (**FKM: Compound No. 1349-80**).  
e.g.) XLF16A-30-1-2-XN1

Note 2) The magnet for auto switch is not provided. When the magnet for auto switch is necessary, add "-M9/" at the suffix of the part number. (There is no magnet for auto switch for high temperature.)  
e.g.) XLF16-30-1-2M9//

Note 3) Auto switch is not attached. When the auto switch is necessary as a set, add the symbols of the auto switch at the suffix of the part number.  
e.g.) XLF16A-30-1-2M9NA-XN1

Note 4) Bonnet assembly contains the valve seal 1, valve seal 2, and nut assembly. It does not contain external seal. Order separately if it is required.

#### External seal, Valve seal 1, Valve seal 2

Description Part indication No.	Material	Valve size			
		16	25	40	50
External seal (4)	Standard	AS568-025V	AS568-030V	AS568-035V	AS568-039V
	Special	AS568-025**	AS568-030**	AS568-035**	AS568-039**
Valve seal 1 (2)	Standard	B2401-V15V	B2401-V24V	B2401-P42V	AS568-227V
	Special	B2401-V15**	B2401-V24**	B2401-P42**	AS568-227**
Valve seal 2 (3)	Standard	B2401-P4V	B2401-P5V	B2401-P6V	B2401-P8V
	Special	B2401-P4**	B2401-P5**	B2401-P6**	B2401-P8**

Description Part indication No.	Material	Valve size	
		63	80
External seal (4)	Standard	AS568-043V	AS568-045V
	Special	AS568-043**	AS568-045**
Valve seal 1 (2)	Standard	AS568-233V	B2401-V85V
	Special	AS568-233**	B2401-V85**
Valve seal 2 (3)	Standard	B2401-P8V	B2401-P10V
	Special	B2401-P8**	B2401-P10**

Note 1) Add the seal material symbol shown on page 8 at the end of the model number (in place of \*\*). This is not necessary for the standard seal material (**FKM: Compound No. 1349-80**).  
e.g.) AS568-025-XN1

## Nut assembly

Description Part indication No.	Valve size	16	25	40	50
	Nut assembly (9)	XL1A16-10-1	XL1A25-10-1	XL1A40-10-1	XL1A50-10-1
Description Part indication No.	Valve size	63	80		
	Nut assembly (9)	XL1A50-10-1	XL1A80-10-1		

## Suffix for seal materials

Seal material	EPDM	Barrel Perfluoro®	Kalrez®	Chemraz®			VMQ	FKM for PLASMA
Combination No.	2101-80	70W	4079	SS592	SS630	SSE38	1232-70	3310-75
Symbol	<b>-XN1</b>	<b>-XP1</b>	<b>-XQ1</b>	<b>-XR1</b>	<b>-XR2</b>	<b>-XR3</b>	<b>-XS1</b>	<b>-XT1</b>

Note 1) Barrel Perfluoro® is a registered trademark of MATSUMURA OIL Co.,Ltd.

Kalrez® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

Chemraz® is a registered trademark of Greene, Tweed Technologies, Inc.

## Heaters

Temperature specifications	Valve size				
	25	40	50	63	80
H4 (100 °C)	-	XL1A25-60S-1	XL1A25-60S-1	XL1A25-60S-2	XL1A25-60S-3
H5 (120 °C)	XL1A25-60S-1	XL1A25-60S-2	XL1A25-60S-2	XL1A25-60S-3	XL1A25-60S-2(2 sets)

Example) The heaters included with XLF-80H5-2 are 2 pieces of XL1A25-60S-2 (a set including 2 heater units).

## 4. Specifications

### 4-1. Valve specifications

Model	XLF-16-2	XLF-25-2	XLF-40-2	XLF-50-2	XLF-63-2	XLF-80-2	
Flange (valve) size	16	25	40	50	63	80	
Actuating type	Normally closed						
Fluid	Vacuum of inert gas						
Operating temperature °C	5 to 60 (5 to 150 for high temperature type)						
Operating pressure Pa(abs)	Atmospheric pressure to $1 \times 10^{-5}$						
Conductance l/s <sup>Note 1)</sup>	5	14	45	80	160	200	
Leakage Pa·m <sup>3</sup> /s	Internal	1.3 x 10 <sup>-10</sup> for the standard material (FKM) at ambient temperatures , excluding gas permeation					
	External	1.3 x 10 <sup>-10</sup> for the standard material (FKM) at ambient temperatures , excluding gas permeation					
Flange type	KF (NW)			KF (NW), K (DN)			
Main material <sup>Note 2)</sup>	Body: aluminum alloy, Main part: SUS304 and FKM (standard sealant material)						
Surface treatment for body	Outside: hard anodized Inside: basis material						
Actuation pressure MPa(G)	0.4 to 0.7						
Air consumption cm <sup>3</sup> <sup>Note 3)</sup>	for 0.5MPa	31	61	220	390	680	1420
Port size	M5			Rc 1/8			
Weight kg	0.29	0.49	1.2	1.9	3.3	5.7	

Note 1) Conductance is "molecular flow" measured with an elbow pipe which has the same dimension as each applicable flange.

Note 2) Grease for vacuum is applied to the sliding part for the seals (Fluorine grease: Y-VAC2).

Note 3) For one cycle of cylinder.

#### 4-2. Heater specifications

Item		XLF-25-2	XLF-40-2	XLF-50-2	XLF-63-2	XLF-80-2	
Rated voltage of the heater		90 to 240 ACV					
S y m b o l	H4	Heater assembly number	-	XL1A25-60S-1	XL1A25-60S-1	XL1A25-60S-2	XL1A25-60S-3
		No. of heater assemblies	-	1 pc.	1 pc.	1 pc.	1 pc.
		Initial power / Power consumption (W)	100 VAC	-	200/40	200/50	400/100
	200 VAC		-	800/40	800/50	1600/100	2400/150
	H5	Heater assembly number	XL1A25-60S-1	XL1A25-60S-2	XL1A25-60S-2	XL1A25-60S-3	XL1A25-60S-2
		No. of heater assemblies	1 pc.	1 pc.	1 pc.	1 pc.	2 pcs.
Initial power / Power consumption (W)		100 VAC	200/40	400/70	400/80	600/130	800/180
	200 VAC	800/40	1600/80	1600/80	2400/130	3200/180	

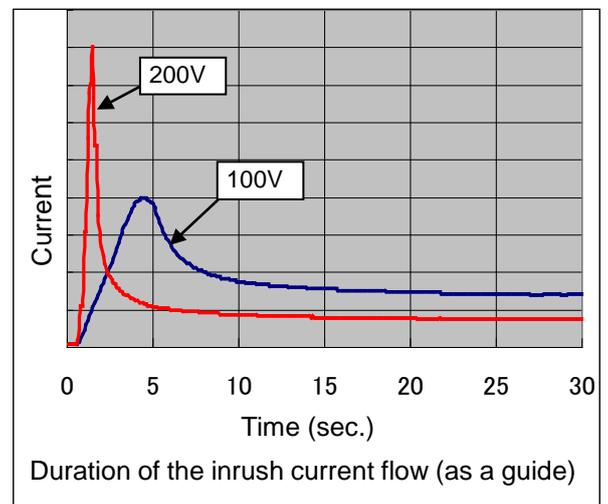
Note 1) Initial power and power consumption are nominal values.

Note 2) Heaters are not available for size 16.

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.

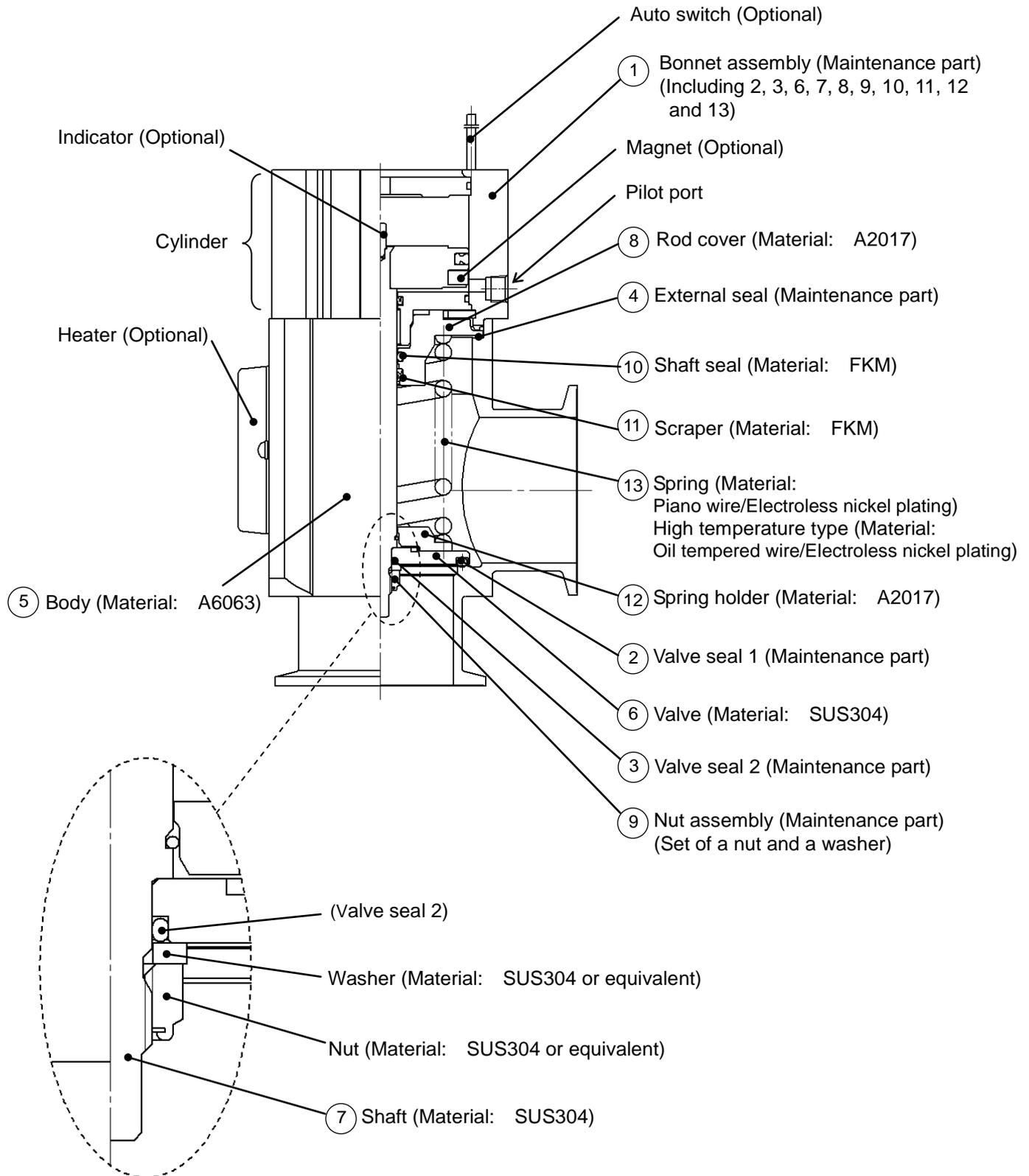
If the temperature of the PTC heaters fitted exceeds 200°C, then it may fail. The maximum operating temperature for the valve is 150°C. If the heater temperature is over 200°C or valve temperature is over 150°C, please use thermostat to control the heaters to prevent overheating.

With PTC type heaters, there is an initial surge of current (inrush current) after the power is supplied. These inrush current 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 prevent harmful large initial surge.

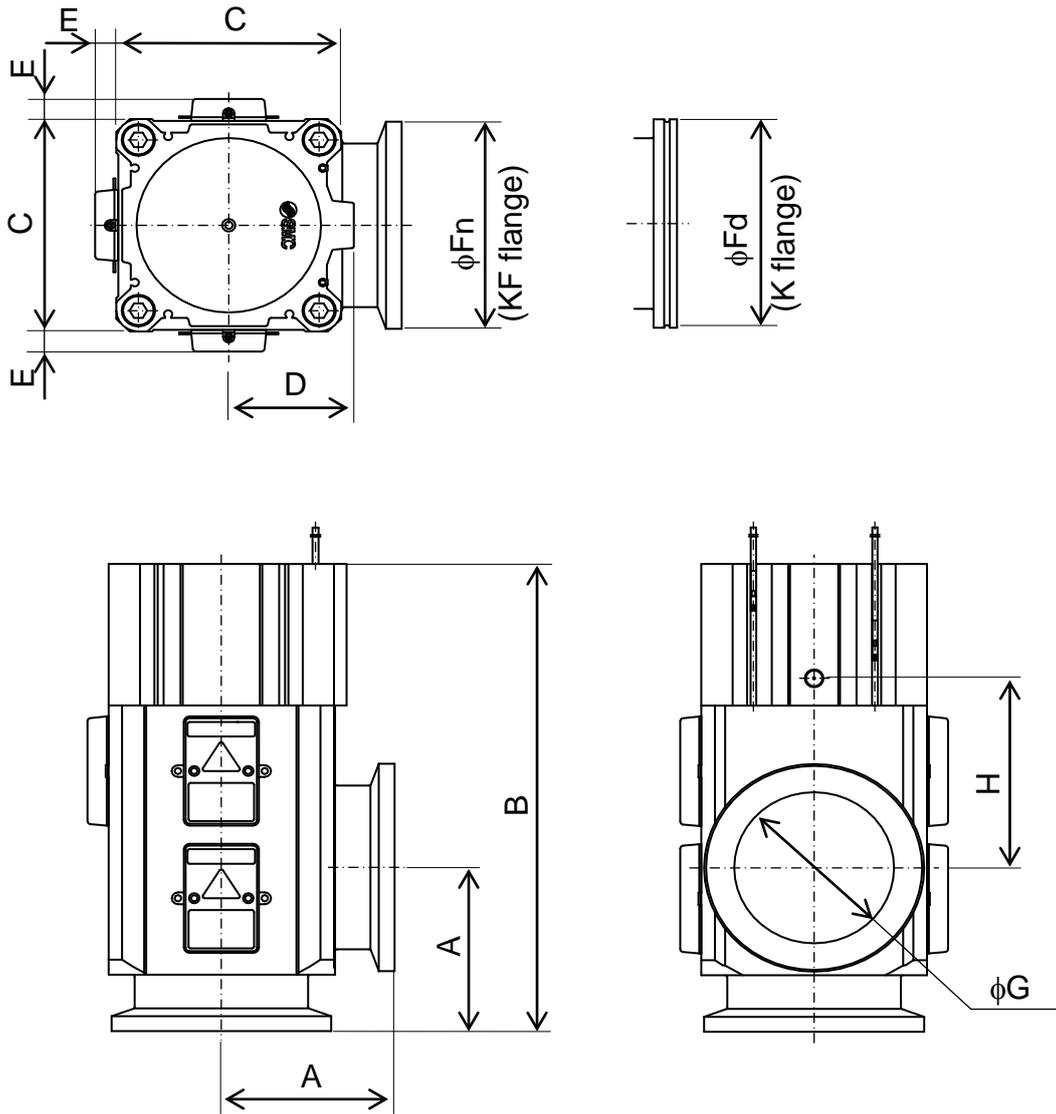


# 5. Construction and Dimensions

## 5-1. Construction



5-2.Dimensions



Unit: mm

Model	A	B	C	D	E	F <sub>n</sub>	F <sub>d</sub>	G	H
XLF-16-2	40	108	38	20	-	30	-	17	44
XLF-25-2	50	121	48	27	12	40	-	26	44
XLF-40-2	65	171	66	39	11	55	-	41	67
XLF-50-2	70	185	79	46	11	75	-	52	72
XLF-63-2	88	212	100	55	11	87	95	70	76
XLF-80-2	90	257	117	65	11	114	110	83	104

## 6. Period and Scope of Warranty

The warranty period is 3 million cycles for sizes 16, 25 and 40, 2 million cycles for size 50,63 and 80 (under SMC's endurance test conditions), 1 year in service or within 1.5 years after delivery, whichever comes first.

If the valve has been used outside of the specifications, or if a failure occurs as a result of mounting onto a machine or replacement of an assembly, seals, or etc. by the user, the warranty will not be applied.

Note) The endurance of the product will depend on the operating conditions (such as if the flow rate is large).

For any failure reported within the warranty period which is clearly our responsibility, the whole valve will be replaced. This guarantee does not apply to any damage incurred due to the failure of the valve.

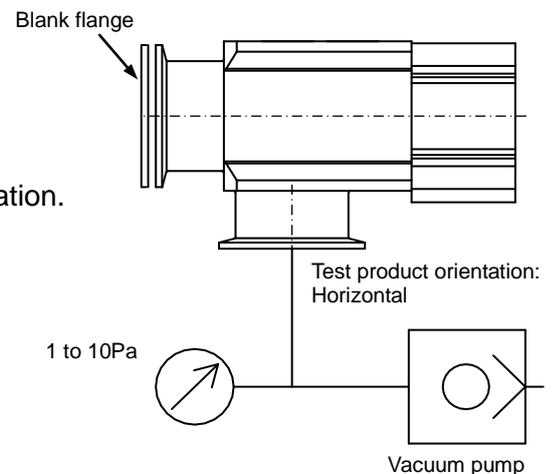
### Result of endurance test

(Using the circuit shown on the right)

The valve was opened and closed in an internal vacuum state at nominal (room) temperature and checked for internal and external leakage and proper operation.

We confirmed that the product satisfies the product specifications of 3 million cycles (for size 16, 25, 40) or 2 million cycles (for size 50, 63, 80).

The test was performed with FKM, the standard sealant material.

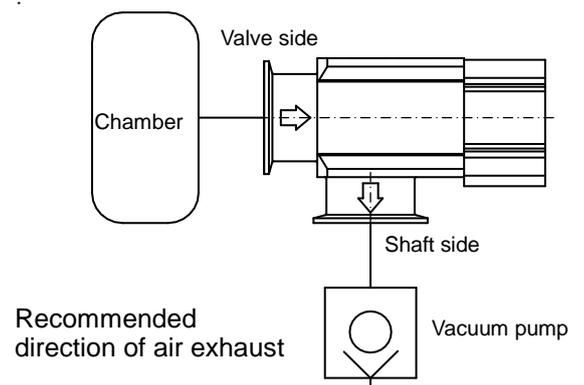


Endurance test conditions

### <Reference>

The pumping direction is not limited, but if the pumping creates a flow stream, the durability of the product could be impaired.

Therefore, the pumping direction shown on the right figure (shaft side pumping) is recommended. Also, the operating conditions should be checked prior to use, as this affects the life of the product.



## 7. Parts Replacement Procedure

### 7-1. Precautions

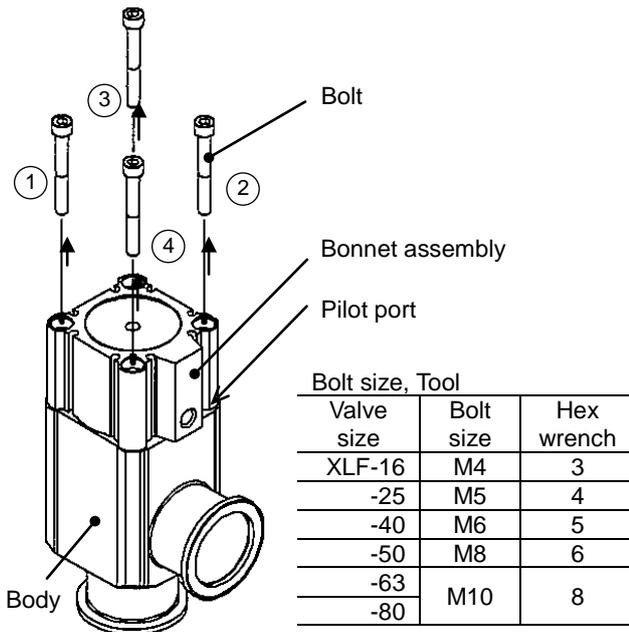
Be sure to adhere to the instructions given in “2. Precautions 2”, when disassembling the product for maintenance. Along with the precautions listed in Chapter 2, the user should comply with those listed below.

### **Warning**

- If it is expected that product materials may get stuck to the product, ensure safety is confirmed before handling. It is recommended that the user wear gloves and a mask.
- Pay attention to the handling of components in accordance with the procedures outlined, hereafter. Do not apply excessive force or impact. This may damage the product, as well as, decrease its performance and life expectancy.
- The cylinder portion of this product cannot be disassembled. When the cylinder portion or the bonnet assembly is damaged or is expected to have been damaged, replace the whole product or the bonnet assembly.
- Do not disassemble the parts that are not explained in this operation manual. This may decrease the performance and life expectancy of these parts. In addition, disassembly may cause danger.
- **Torque values specified in this manual must be followed.** Not adhering to these specifications, can result in damage to the product.

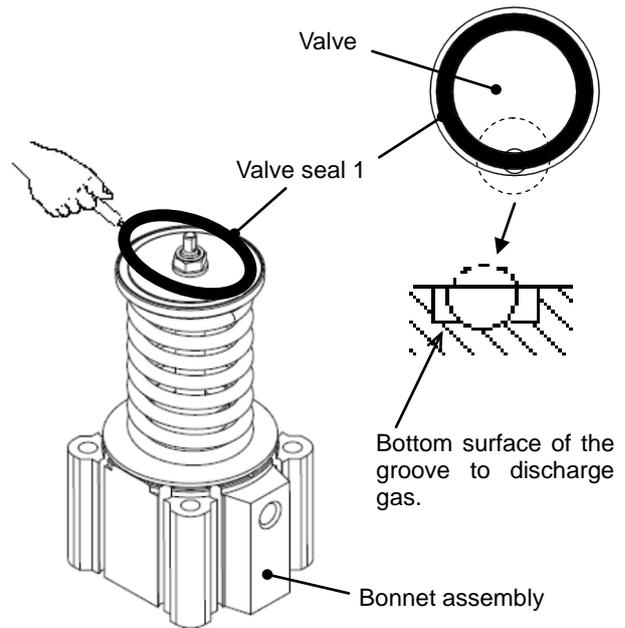
## 7-2. Disassembly Procedure

### Step 1 Removal of bonnet assembly



Supply air pressure of 0.4MPa (G) to the pilot port. Loosen the bolts in numerical order to disassemble the body and the bonnet assembly. When it is difficult to remove the bonnet assembly due to adhesion of the external seal, pull the bonnet assembly straight up slowly without twisting the bonnet.

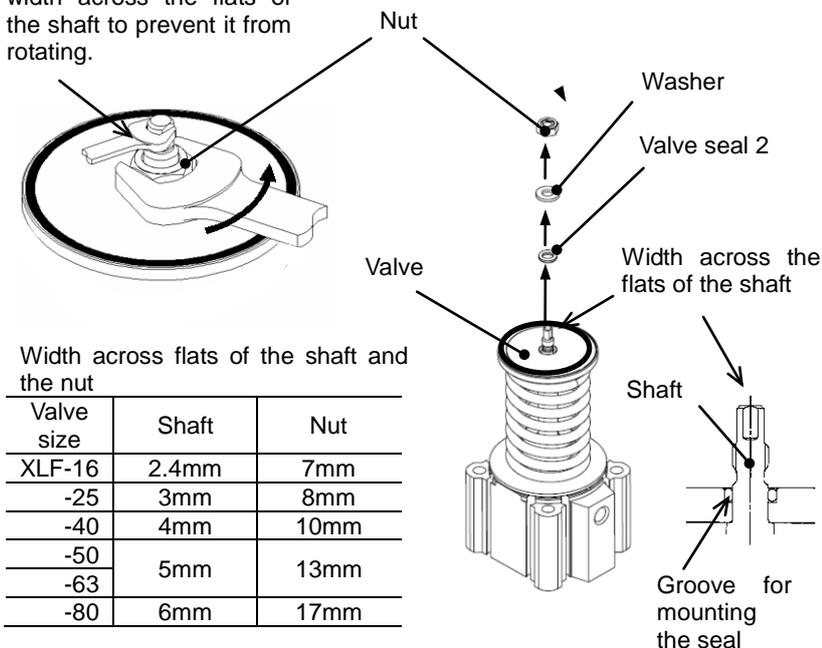
### Step 2 Removal of valve seal 1



Remove the valve seal 1 from the seal mounting groove. Use a tool (e.g. which has a finger that is not longer than the depth from the bottom to the top of the groove). Use caution not to scratch the mounting groove surface of the seal.

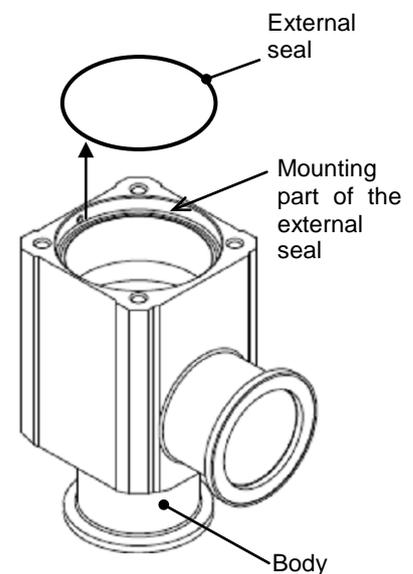
### Step 3 Removal of valve seal 2

Apply a spanner to the width across the flats of the shaft to prevent it from rotating.



Apply a spanner to the width across the flats of the shaft of the bonnet assembly to hold the shaft, and remove the nut. Be careful not to damage the valve. Remove the washer and valve seal 2. Do not apply air pressure to the pilot port with the nut removed.

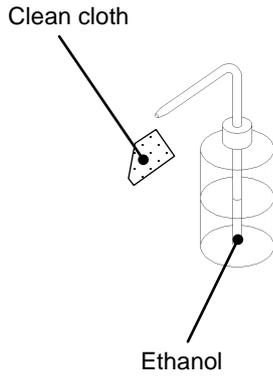
### Step 4 Removal of external seal



Remove the external seal from the body. (Take care not to damage the surface of the seal mounting groove.)

### 7-3. Assembly Procedure

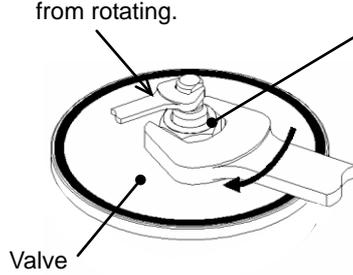
#### Step 1 Preparation



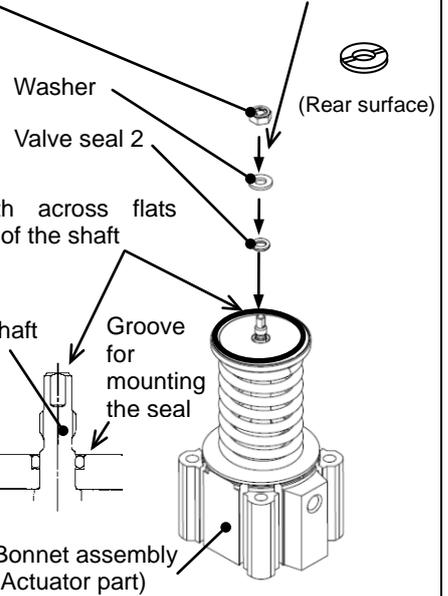
Assemble parts eliminating any dust or debris. Wipe off dust with a clean cloth soaked with ethanol. Blow parts with clean air if necessary. (Ensure there are no fibers or dust.)

#### Step 2 Reassembly of valve seal 2

Apply a spanner to the width across the flats of the shaft to prevent it from rotating.



Note)  
For XLF-16/25, mount the washer in the orientation that the groove of the washer faces to the valve seal 2.



Width across flats of the shaft and the nut,  
Tightening torque of nut (N·m)

Valve size	Shaft	Nut	Tightening torque
XLF-16	2.4mm	7mm	0.9
-25	3mm	8mm	1.5
-40	4mm	10mm	2.5
-50	5mm	13mm	6.3
-63		17mm	14

Mount the valve seal 2 and washer.

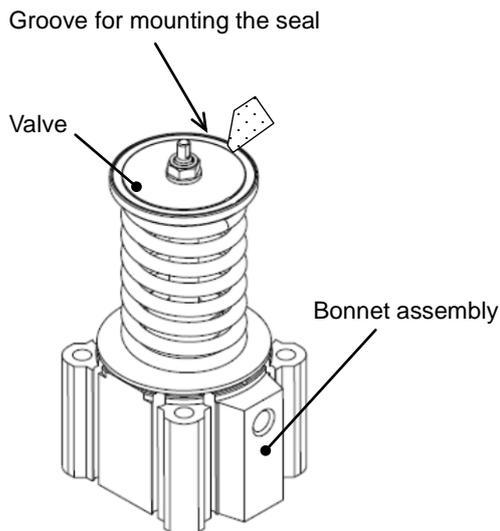
Securely mount the valve seal 2 into the seal mounting groove with caution not to damage the seal.

Mount the nut and hold the shaft at the width across the flats with a spanner, and tighten the nut with another spanner.

Secure the nut using the torque specified in the table.

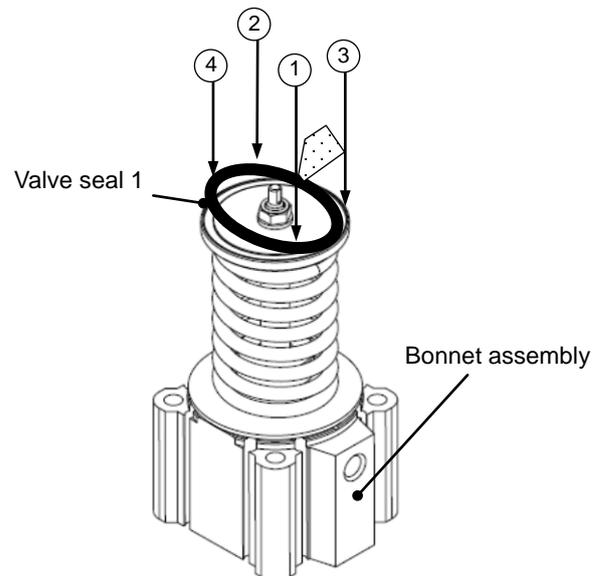
Be sure to tighten the nut to the torque specified in the table as torques other than that specified may cause a loose nut or damage to the valve.

#### Step 3 Reassembly of valve seal 1 (No.1)



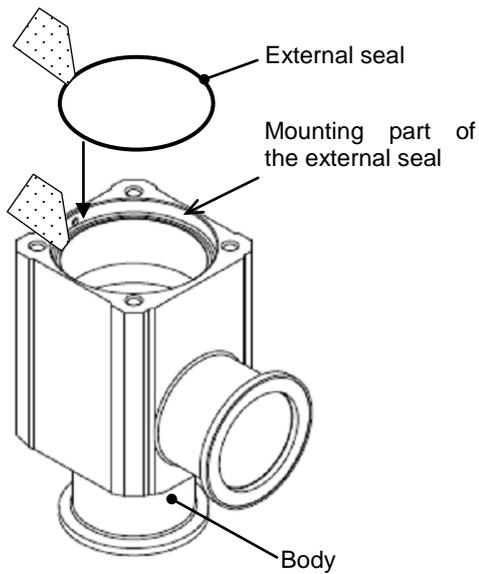
Eliminate any dust within groove for mounting the seal of the valve.

#### Step 4 Reassembly of valve seal 1 (No.2)



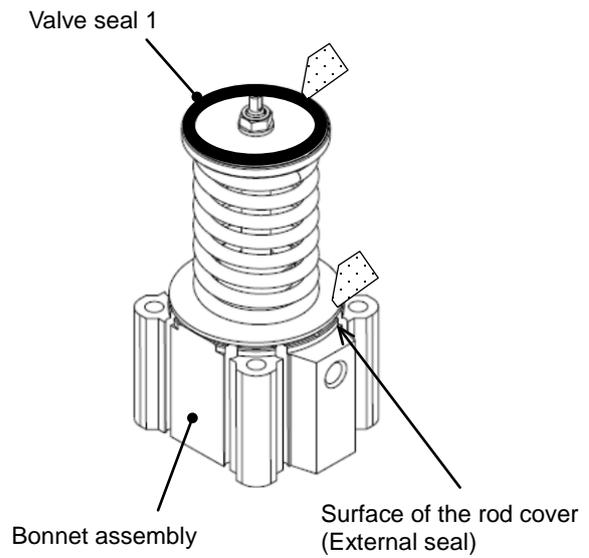
Wipe off any dust on the surface of the valve seal 1, then place the valve seal 1 in the seal mounting groove. Press the seal into the groove in numerical order (press diagonally) to fit the valve seal 1 into the groove. Do not twist the valve seal 1. Use dust-free gloves.

### Step 5 Remount of external seal



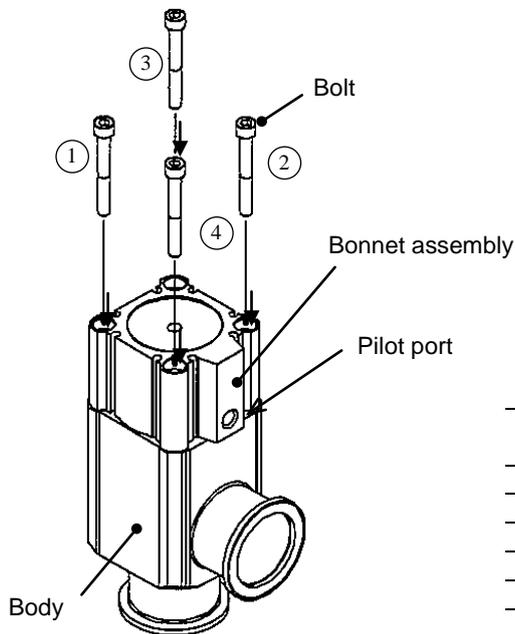
Wipe off any dust from the surface of the external seal and the mounting surface of the external seal on the body, then place the external seal in the mounting position on the body.

### Step 6 Reassembly of bonnet assembly (No.1)



Wipe off any dust from the surfaces of the valve seal 1 and the rod cover.

### Step 7 Reassembly of bonnet assembly (No.2)



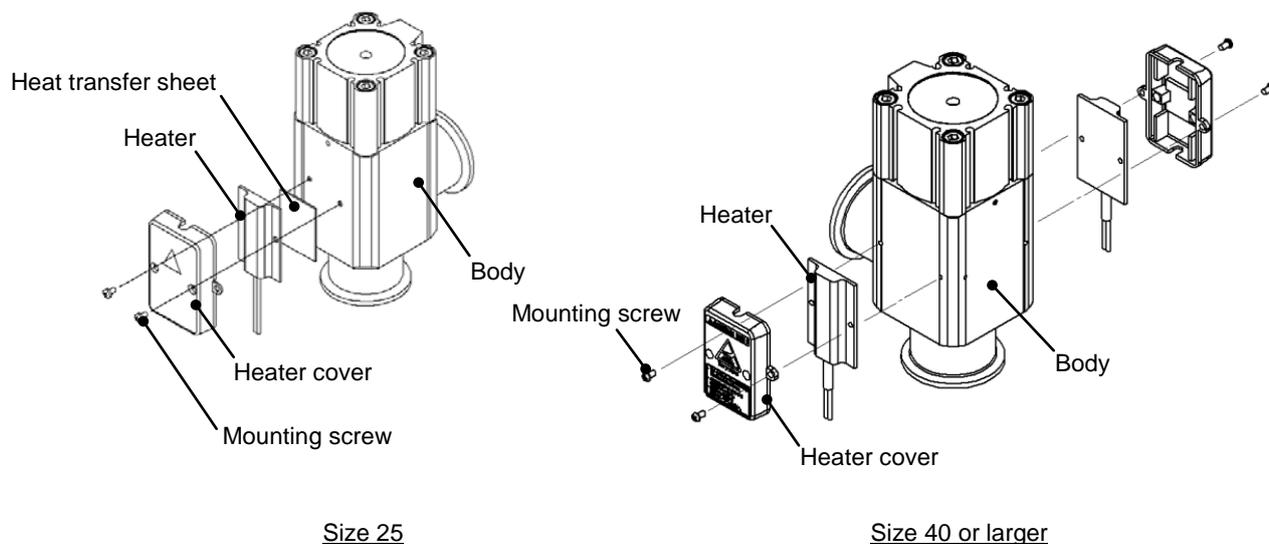
Bolt size, Tool, Tightening torque of bolt (N·m)

valve size	Bolt size	Hex wrench	Tightening torque
XLF-16	M3	3	0.7
-25	M5	4	1.5
-40	M6	5	2.5
-50	M8	6	6.1
-63	M10	8	15
-80			

Supply air pressure of 0.4MPa (G) to the pilot port. Tighten the bolts in numerical order to re-assemble the body with the bonnet assembly. Manually tighten screws until the external seal is compressed. Perform final torqueing of the bolts in the same numerical order (diagonally).

## 7-4. Heater Replacement Procedure

### Step 1 Assembly of heater



Put heat transfer sheet(Note1), heater, heater cover to backside of body.  
Tighten the mounting screws to install heater assembly.

Tightening torque: 0.3N·m

For detachment, remove the mounting screws.

Note 1) Heat transfer sheet to seat only size 25.

Note 2) Heaters are not available for size 16.

Revision history
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1st printing: VZ

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.  
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