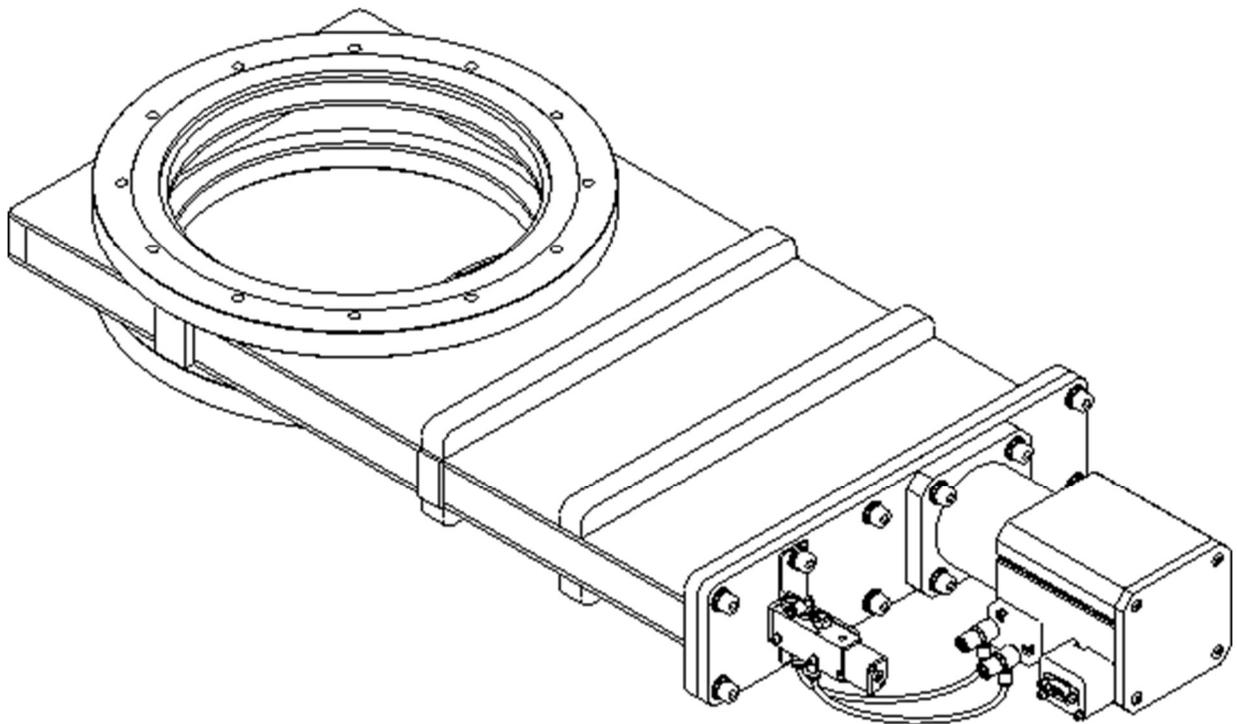


# User Manual

**Circular Gate Valve**

**Product No : V21-D-250-1-1-PECEZAB**

## Series V21



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### ■ Summary

We sincerely thank you for adopting our Circular Gate Valve .  
We stated the contents for the safest and correct use of the Product in this Manual.  
Please check and be well-informed of the contents of this Manual before using the product.

### ■ Product Packaging

This Product is consigned in the condition and form stated in the image below.  
(The pictures below may differ from the real ones, please refer to them.)  
Please check the status of the BOX when opening the product, and if there is any damage or pollution please check the detailed contents and contact us.



### ■ Warranty Period

The warranty period of this Product is 1 year, and we provide free warranty repair during the warranty period for the failure or defect which occurred during the normal transportation or operation of the product But, please consider that in the following cases there may be charged specific fees after the reparation.

- 1) Failure due to natural disasters.
- 2) Failure due to improper and negligent use of the product after installation.
- 3) Failure which occurred due to the use in an environment which does not comply with the product specifications.
- 4) Failure due to repair or modification by any person other than the service personnel of the Company.

### ■ Request for Repair and Other Information

In case of any anomaly of the product please check the contents of the Trouble Shooting Item (Page 13) in this Product Instruction Manual, and if the reparation is required, please let us know the Product Number, Management Number and the Trouble which occurred.

Additional 1) Please refer to the contents of Page 13 for more detailed information.

Additional 2) Please consider that the contents of this Manual may be modified without prior notice for the improvement of the product.

Also, if there is any unclear/imprecise matter in the contents of this Manual or any omission therein, please do not hesitate to contact us.

Circular Gate Valve / Series V21

■ Explanation on Product

Type of Product : Circular Gate Valve / DN 250

Product Number : V21-D-250-1-1-PECEZAB

■ Product Specification

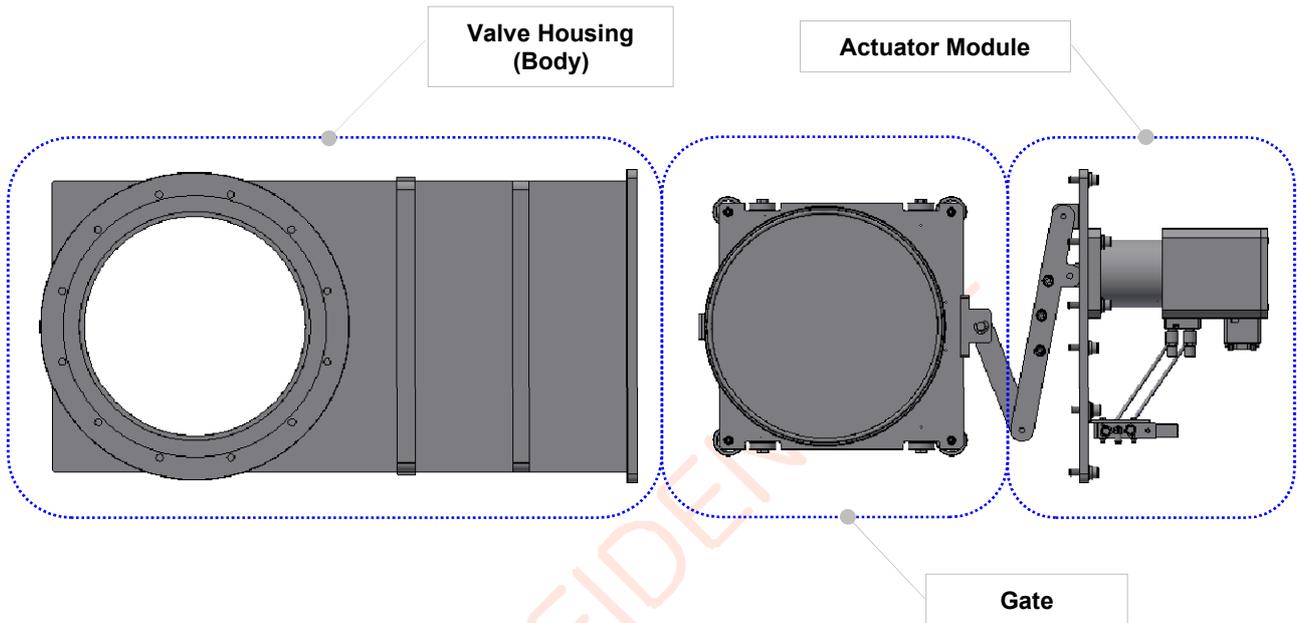
1	Product Name (Series)		Circular Gate Valve
2	Product Number (Drawing No)		V21-D-250-1-1-PECEZAB-0
3	Fitting Standard		ISO-F
4	Gate Size (mm)		DN250
5	Pressure Range		1.0xE-6 Pa to 1.2xE5 Pa(abs)
6	Differential pressure on the gate in opening direction		≤ 0.12 MPa
7	Differential pressure on the gate in closing direction		≤ 0.12 MPa
8	Differential pressure at opening		≤ 0.003 MPa
9	Helium Leak Rate	External	< 1.0xE-10 Pa*m³/sec
		Internal	< 1.0xE-10 Pa*m³/sec
* Detecting for 30 seconds right after Helium spray (at 20°C) * No leak at the lowest allowed air pressure			
10	Feed through		Welded Bellows Seal
11	Actuator type		Double Acting
12	Air connection		Solenoid Valve OD Ø4, One-Touch Type
13	Volume of air cylinder		Open: 237cm³ , Close: 395cm³
14	Air Pressure	Operation Pressure	0.5 MPa (Tolerance level : 0.45 ~ 0.6 MPa)
		Design Pressure	≤1 MPa
* Should be operated normally at the lowest allowed air pressure and no leak at the highest allowed air pressure			
15	Open / Close Time	Open	Min 4 sec (Setting 5.0 ± 1.0 sec)
		Close	Min 4 sec (Setting 5.0 ± 1.0 sec)
* Air Tube & length : OD Ø4, 2M / * Air pressure : 0.5 MPa / Solenoid valve : Flow Coefficient(Cv) 9.5mm²(0.53)			
16	Air Less Lock	Open	No
		Close	Lock
17	Mounting position		Any
18	Interface		* Refer to the drawing
19	Life cycles	Mechanism	50,000
		Bellows	50,000
		O-Ring(Seal)	50,000
		Lubrication	50,000
20	Temperature	Valve Body	≤ 120°C
		Gate(Seat)	≤ 120°C
		Actuator	≤ 60°C
21	Weight		< 55Kgf

■ Product Specification

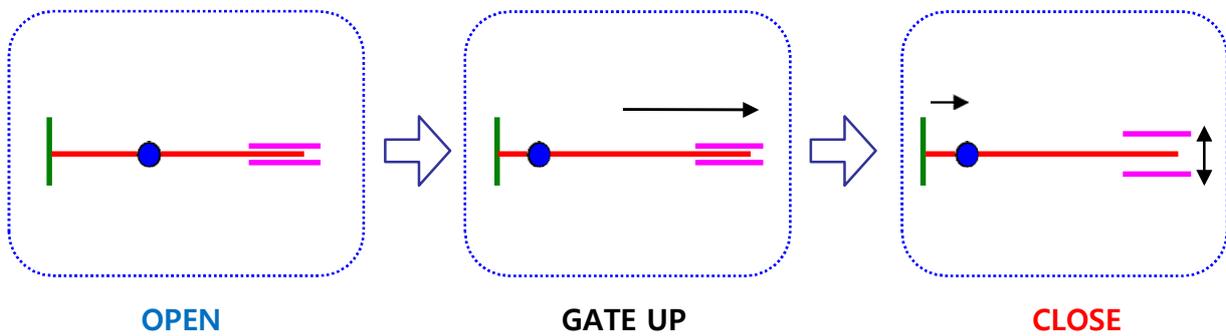
22	Lubrication	Vacuum Inside	PFPE Grease								
		Mechanism	PFPE Grease								
23	Materials	Valve Body	STS304								
		Gate(Seat)	STS304								
		Bonnet	STS304								
		Shaft(Stem)	STS304								
		Mechanism(Cylinder)	AL6061								
		Bellows	AM350								
		Bellows End Piece	STS304								
		Valve Body Seal	N/A								
		Gate Seal	FKM								
		Bonnet Seal	FKM								
		Vacuum Seal	FKM								
		Pneumatic Seal	FKM								
		24	Surface treatment	Valve Body	Buffing						
Gate(Seat)	Vibration Sanding										
Bonnet	Bead Blasting										
Shaft(Stem)	Bare										
Actuator	Anodizing										
25	Electrical Connection	Sensor	* Type : Reed switch * Q'ty : 2ea * Maker : SMC * Model : D-A93 * Operating voltage range : DC24V * Max. output current : 5 ~ 40mA * Operating In temperatures : -5 ~ 70 °C								
		Connector	D-Sub 9P Male								
		Pin Assign	<table border="1"> <tr> <td>1. ( + ) - Brown</td> <td>OPEN</td> <td>2. ( + ) - Brown</td> <td>CLOSE</td> </tr> <tr> <td>7. ( OUT ) - Blue</td> <td></td> <td>8. ( OUT ) - Blue</td> <td></td> </tr> </table>	1. ( + ) - Brown	OPEN	2. ( + ) - Brown	CLOSE	7. ( OUT ) - Blue		8. ( OUT ) - Blue	
		1. ( + ) - Brown	OPEN	2. ( + ) - Brown	CLOSE						
7. ( OUT ) - Blue		8. ( OUT ) - Blue									
Solenoid Valve	* Maker : TPC * Model : DS2120-5G-01 * Rated Voltage : DC 24V * Wire Length: 300mm										
26	Warranty Conditions	1. In case of product failure within 12 months after delivery due to manufacturer's design fault, manufacturing fault, warranty repair or product exchange will be provided. (exception: No warranty when mechanical life cycles until first service is over even if within 12 months after delivery. 2. In-direct damage(e.g. process shut down cost) is not manufacturer's responsibility. 3. Consumable parts(O-rings, Grease) will be charged even if warranty period. 4. Product failure due to process gas, cleaning gas, by-product will not be warranted. 5. No warranty will be provided in case of instruction not-kept usage.									
27	Packing Specifications	1. First vacuum packing 2. Second box packing with buffer 3. Final examination report included									



■ Explanation on Each Part of the Product



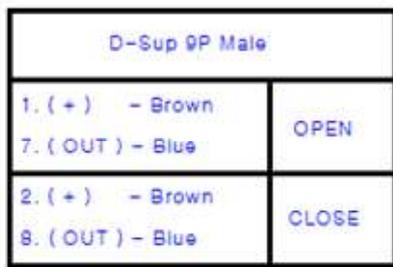
■ Operation Principle



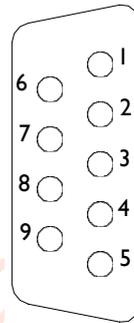
■ Control

- 1) It is processed with D-Sub 9P Male Connector.
  - 2) The Auto Switch applied in this product is the D-A93 of SMC.
  - 3) Please perform the wiring work referencing the following image for the safest and correct use of this product.
- (Attention) Always connect after checking if the voltage supplied to the product is complying with the Product Specification.

1. Valve Connector



Wiring diagrams



D-Sub 9P Male Connector

Pin No.	Description	
1	Open	(+)
2	Close	(+)
3	No Connecting	
4	No Connecting	
5	No Connecting	
6	No Connecting	
7	Open	(-)
8	Close	(-)
9	No Connecting	

2. Sensor

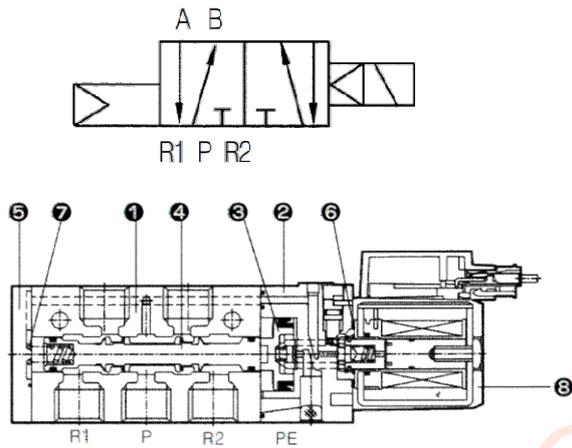


Sensor Specification

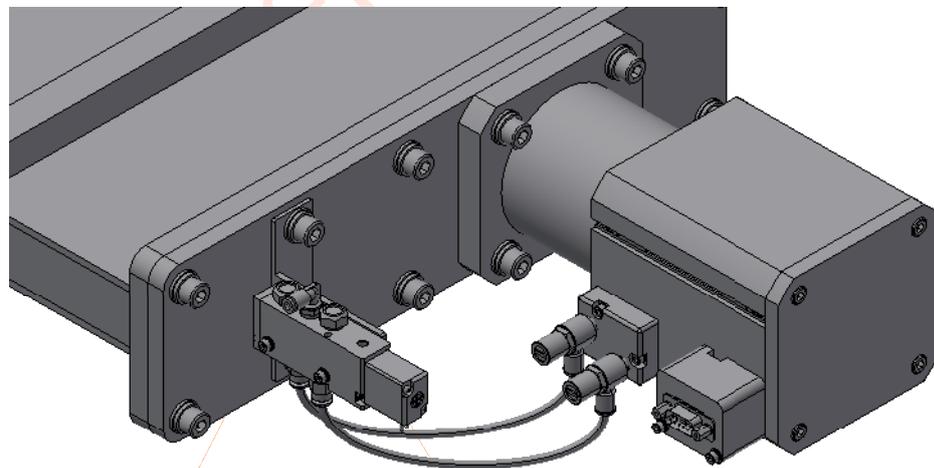
Maker	SMC
Model	D-A93
Voltage range	DC 24V
Output current	5 to 40 mA
Ambient temperature	-5 °C ~ 70 °C
Connector	D-Sub Connector (9P Male)
Wire	-

■ Control

3. Solenoid Valve



Solenoid Valve Specification	
Maker	TPC
Model	DS2120-5G-01
Rated Voltage	DC24V
Ambient temperature	Max 50 °C
Wire	300mm



Air Tube Connection  
Ø4, One Touch Type

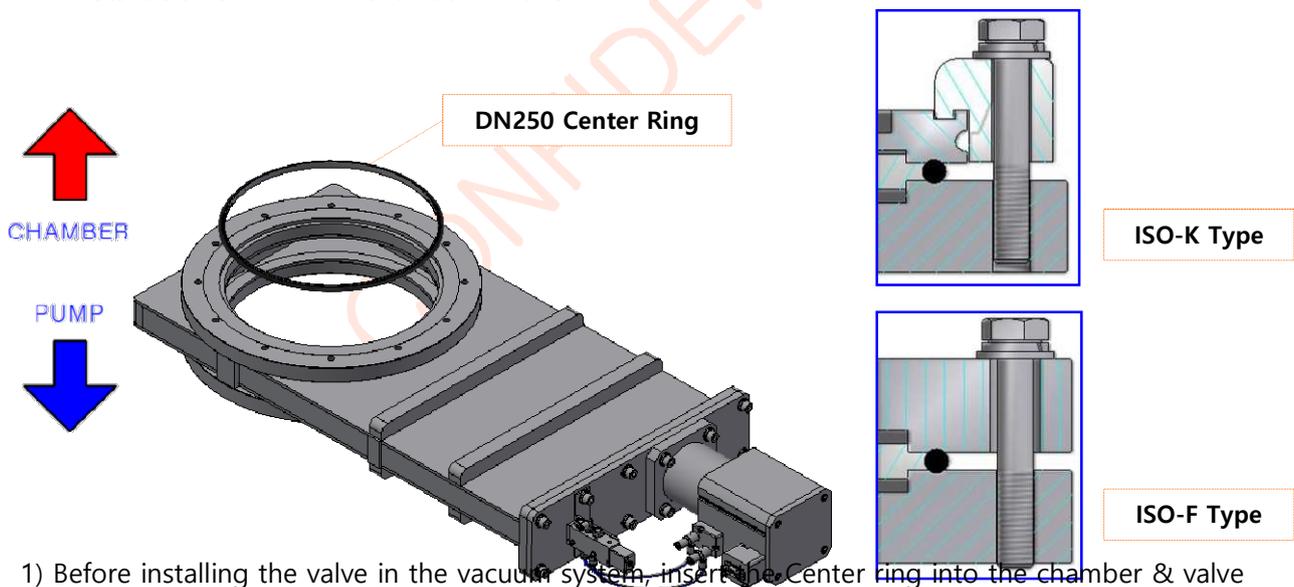
Solenoid Valve

### ■ Installation and Use of Product

#### 1. Precautions and Warnings

- 1) Please clean the product before installation to prevent any intrusion of foreign substance into the Valve.  
(Reference) The product is consigned after being cleaned before consignment.
- 2) Since this product is heavy, please work with 2 or more people.
- 3) Install the product in the vacuum SYSTM, and perform the AIR TUBE and wiring works.  
(Caution) There may occur accident due to malfunction or negligence.
- 4) Please do not touch the product when it is running.  
(Danger) There is risk of amputation (cut) and confinement.  
(Danger) There is risk of electric shock.

#### 2. Installation of VALVE in the Vacuum SYSTEM



- 1) Before installing the valve in the vacuum system, insert the Center ring into the chamber & valve side and fix it with a bolt.

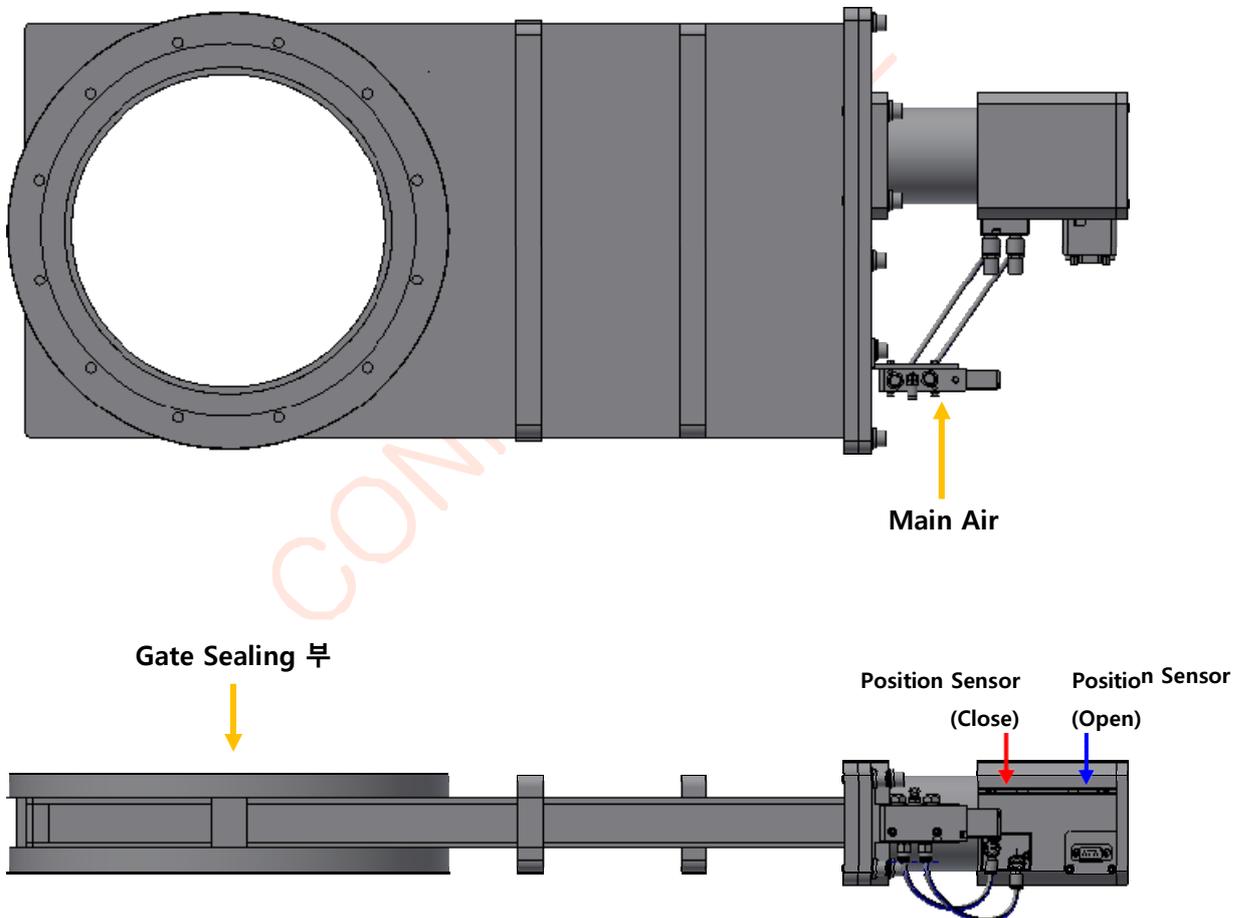
\* Attention

- Check the status of Seal O-Ring of the attaching part before operation  
(There may occur Leak due to foreign substances or by damage in the O-Ring)
- Check the installation location and attachment status  
(Leak may occur if the attachment status is faulty or when the installation location is incorrect)

### ■ Installation and Use of Product

#### 3. Air Tube Connection and Wiring Work

- 1) Compressed air pressure: 0.5 Mpa (Tolerance level: 0.45~0.6MPa) / 62-87 psi
- 2) Air Connection: OD Ø4  
: Connect the tube according to the label adhered as "open, close". (Refer to the Image)



### ■ MAINTENANCE AND REPAIRS

#### 1. Maintenance and Preparation for Operation

No particular maintenance is required for this product under Clean Environmental Conditions during the designated cycle, but according to the utilization environment, the user may be required to perform maintenance or repair before the designated cycle.

(Attention) Please perform the operation in Clean Environment to prevent entrance of any pollution or particle into the product, and please be fully informed on matters on handling such as installation or operation for the safety of the operator before operation and pay special attention.

##### 1.1 Parts and Tools for Maintenance

- 1) Wrench set (mm)
- 2) O-Ring Pick
- 3) Rubber Gloves
- 4) D.I(Deionize) Water
- 5) Clean Wiper

##### 1.2 Base Operation

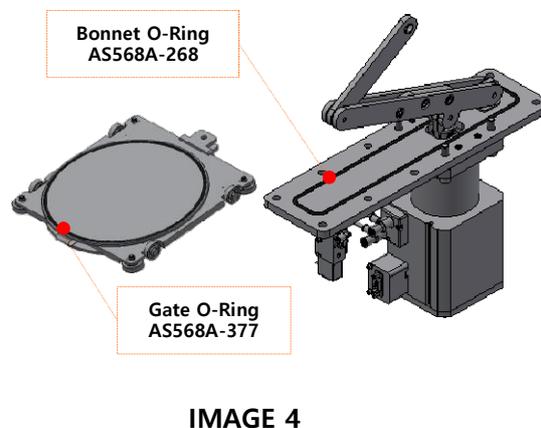
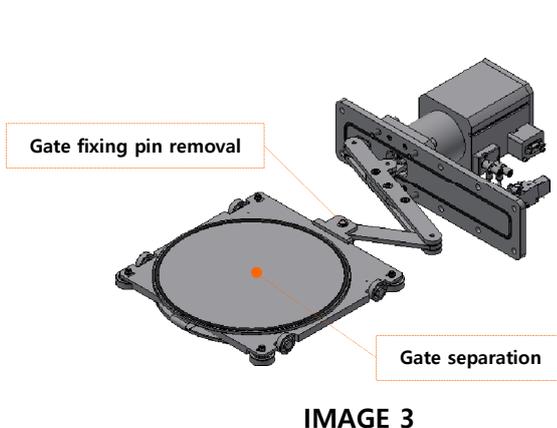
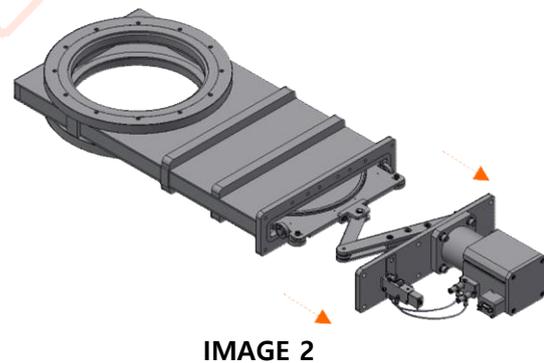
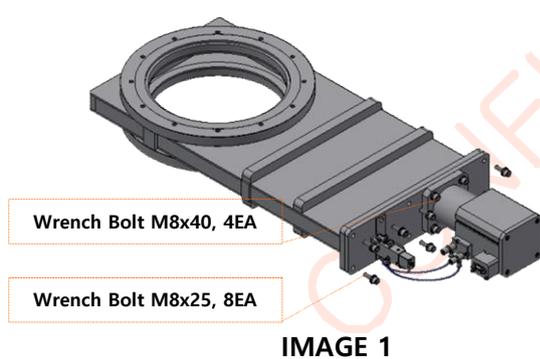
- 1) Chamber → Vent, Valve → Make to OPEN Status.
- 2) Separate the compressed air and power supply connections from the valve.

## ■ MAINTENANCE AND REPAIRS

### 2. Gate & Bonnet O-Ring Replacement

Engineers in the field should release the vacuum of the equipment and disconnect the electricity.

- 1) Loosen the Bonnet and Housing fix Wrench Bolt. (Image 1)
- 2) Separate downwards to under the Actuator Module. (Image 2)
- 3) The separated Housing (Body) is cleaned using D.I (Deionize) Water.  
( Ethanol can be used depending on the clean environment, and cleaning may vary if the degree of contamination is severe. )
- 4) After removing the gate fixing pin, separate the gate. (Image 3)
- 5) Replace the Gate O-Ring and Bonnet O-Ring. (Image 4)
- 6) Perform the assembly to the order contrary to this content after completing the operation.



### ■ TROUBLE SHOOTING

1) If there occurs any problem during the period of use of this product, please refer to the contents of the following Table and request for examination and reparation.

(Attention) It is proper to perform regular maintenance and reparation works according to the service environment of the product.

2) If you need any reparation of the product, please report us the information as Product Number, Management Number, Detailed Problem to enable the fastest respond for the problem.

Troubles	Verified Contents	Contents of Measures
Trouble in driving the VALVE	Air Cylinder Leak Check	Cylinder repair and replacement, or request for A/S
	Check Pressure of Supplied Air	Examination and adjustment of supply air pressure
	Check Air Tube connection status	Examination of Air Tube connection status and replacement
	Check Position Sensor status	Adjustment of Sensor location and replacement, or request for A/S
Trouble in the SENSOR	Check connection status of Connector	Examination of Connector connection status and replacement
	Check Position Sensor status	Adjustment of Sensor location and replacement, or request for A/S
Internal leak	Check if there is any pollution in the part of the Gate Seal	Cleaning
	Check if there is damage in the Gate seal	Replacement of O-RING of the Gate Seal
	Check Pressure of Supplied Air	Examination and adjustment of supply air pressure
External leak	Check if there is pollution in the Housing, Seal	Cleaning of each parts
	Check if there is Flange Leak	Cleaning of each parts and replacement of Flange O-ring
	Check if there is Bellows Leak	Repair in case of Trouble or request for A/S
	Check if there is Bonnet Seal damage	Replacement of Seal in case of Trouble and request for A/S