CKD

Weir Diaphragm Valve
SWD Series

INSTRUCTION MANUAL

SM-50769-A/3

- Read this Instruction Manual before using the product.
- Read the safety notes carefully.
- Keep this Instruction Manual in a safe and convenient place for future reference.

CKD Corporation

PREFACE

Thank you for purchasing CKD's **"SWD Series " Weir Diaphragm Valve**.
This Instruction Manual contains basic matters such as installation and usage instructions in order to ensure optimal performance of the product. Please read this Instruction Manual thoroughly and use the product properly.
Keep this Instruction Manual in a safe place and be careful not to lose it.

Product specifications and appearances presented in this Instruction Manual are subject to change without notice.

- The product, which uses control valves such as solenoid valves, motor valves, and air operated valves, is intended for users who have basic knowledge about materials, fluids, piping, and electricity. CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training with respect to control valves.
- Since there are a wide variety of customer applications, it is impossible for CKD to be aware of all of them. Depending on the application or usage, the product may not be able to exercise its full performance or an accident may occur due to fluid, piping, or other conditions. It is the responsibility of the customer to check the product specifications and decide how the product shall be used in accordance with the application and usage.

SAFETY INFORMATION

When designing and manufacturing any device incorporating the product, the manufacturer has an obligation to ensure that the device is safe. To that end, make sure that the safety of the machine mechanism of the device, the pneumatic or water control circuit, and the electric system that controls such mechanism is ensured.

To ensure the safety of device design and control, observe organization standards, relevant laws and regulations, which include the following:

ISO 4414, JIS B 8370 (the latest edition of each standard)

In order to use our products safely, it is important to select, use, handle, and maintain the products properly.
Observe the warnings and precautions described in this Instruction Manual to ensure device safety.

Although various safety measures have been adopted in the product, customer's improper handling may lead to an accident. To avoid this:

Thoroughly read and understand this Instruction Manual before using the product.

To explicitly indicate the severity and likelihood of a potential harm or damage, precautions are classified into three categories: "DANGER", "WARNING", and "CAUTION".

⚠ **DANGER**	Indicates an imminent hazard. Improper handling will cause death or serious injury to people.
⚠ **WARNING**	Indicates a potential hazard. Improper handling may cause death or serious injury to people.
⚠ **CAUTION**	Indicates a potential hazard. Improper handling may cause injury to people or damage to property.

Precautions classified as "CAUTION" may still lead to serious results depending on the situation.
All precautions are equally important and must be observed.

Other general precautions and tips on using the product are indicated by the following icon.

	Indicates general precautions and tips on using the product.

Precautions on Product Use

⚠ WARNING

The product must be handled by a qualified person who has extensive knowledge and experience.

The product is designed and manufactured as a device or part for general industrial machinery.

Use the product within the specifications.

The product must not be used beyond its specifications. Also, the product must not be modified and additional work on the product must not be performed.

The product is intended for use in devices or parts for general industrial machinery. It is not intended for use outdoors or in the conditions or environment listed below.

- In applications for nuclear power, railroad system, aviation, ship, vehicle, medical equipment, and equipment that directly touches beverage or food.
- For special applications that require safety including amusement equipment, emergency shut-off circuit, press machine, brake circuit, and safety measures.
- For applications where life or properties may be adversely affected and special safety measures are required.

(Exception is made if the customer consults with CKD prior to use and understands the specifications of the product. However, even in that case, safety measures must be taken to avoid danger in case of a possible failure.)

Do not handle the product or remove pipes and devices until confirming safety.

- Inspect and service the machine and devices after confirming the safety of the entire system. Also, turn off the energy source (air supply or water supply) and power to the relevant facility. Release compressed air from the system and use extreme care to avoid water or electric leakage.
- Since there may be hot or live parts even after operation has stopped, use extreme care when handling the product or removing pipes and devices.
- When starting or restarting a machine or device that incorporates pneumatic components, make sure that a safety measure (such as a pop-out prevention mechanism) is in place and system safety is secured.

Precautions on Product Disposal

⚠ CAUTION

When disposing of the product, comply with laws pertaining to disposal and cleaning of wastes and have an industrial waste disposal company dispose of the product.

Precautions on Design and Selection

⚠WARNING

If it is necessary to function as a safety valve such as an emergency shut off valve, take other measures to ensure safety.

For equipment selection and handling, it is the customer's responsibility to check the specifications of this product.

Incorrect equipment selection and handling can cause problems not only in this product, but also to your system.

Take measures to prevent physical harm or property damage in the event of failure of this product.

Follow the precautions below regarding the surrounding environment.

- Check the compatibility of product component materials and the atmosphere.
- Make sure that no fluid adheres to anything other than the flow path of the product.
- Use within the ambient temperature range described in the specifications.
- Do not use in places affected by vibration or shock, around heat sources, or outdoors.

If the liquid ring circuit, install a release valve.

When the valve opens and closes, the diaphragm moves up and down, which causes the flow path capacity to change inside the valve. For this reason, if the fluid is an incompressible fluid (liquid), extreme pressures will be created in the valve when operating under conditions that seal the fluid in the valve (liquid ring). In this case, install a release valve on the primary or secondary side of the valve, preventing a liquid ring circuit from forming.

Follow the precautions below depending on working fluids.

- Check the compatibility of product component materials and working fluids.
- Iron rust and debris in the fluid can cause operation faults or leaks and deteriorate product performance. Provide measures to remove foreign matter.
- When hot fluid flows during steam sterilization, the valve body becomes hot, so do not touch with your hand or body. There is a risk of burns if these are touched directly.

  Also, be careful not to place anything that may deteriorate, melt, or ignite nearby.
- While the upper side of the diaphragm (actuator side) does not come into contact with the fluid, due to changes in fluid and fluid temperature, fluid may permeate and turn into fluid atmosphere.
- Fluids that contain particles, such as slurries and UV hardeners, or that may solidify or gel, can affect performance.

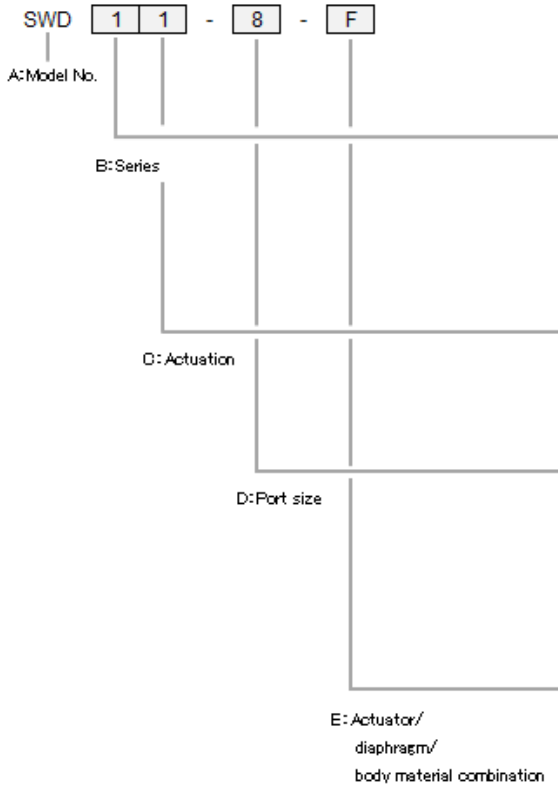
Use at the fluid temperature described in the specifications.

Use at the working pressure described in the specifications.

CONTENTS

1. PRODUCT OVERVIEW

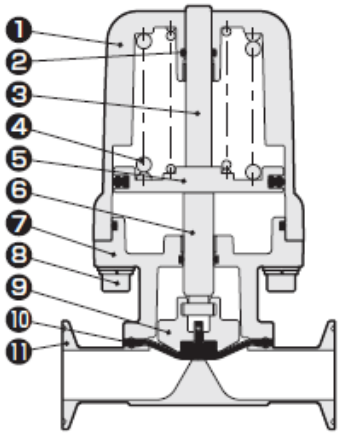
1.1 Model Number Indication



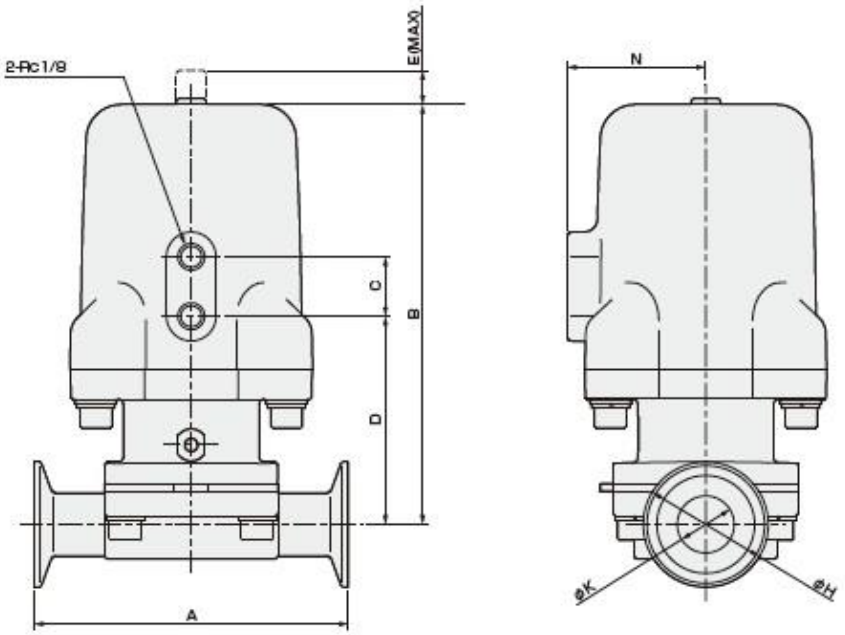
Code	Content	A: Model No. SWD1	SWD2	SWD3	SWD4	SWD5
B: Series						
1	Size1	●				
2	Size2		●			
3	Size3			●		
4	Size4				●	
5	Size5					●
C: Actuation						
1	NC type	●	●	●	●	●
2	NO type	●	●	●	●	●
3	Double acting	●	●	●	●	●
D: Port size						
8	Clamp fitting 8A	●				
10	Clamp fitting 10A	●				
15	Clamp fitting 15A		●			
25	Clamp fitting 25A(1S)			●		
40	Clamp fitting 40A(1.5S)				●	
50	Clamp fitting 50A(2S)					●

E: Actuator/diaphragm/body material combination									
	Actuator	Diaphragm	Body					
F	ADC12	PTFE/EPDM	SUS316L	●	●	●	●	●

1.2 Internal Structure, Dimensions



No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	O-ring	FKM	Fluoro rubber
3	Indicator	SUS304	Stainless steel
4	Spring	SUS304（or SWP、SWOSC）	Stainless steel（or Piano wire, oil temper wire）
5	Piston	A2017	Aluminum
6	Piston rod	SUS304	Stainless steel
7	Rod cover,yoke	ADC12	Aluminum die-casting
8	Hexagon socket head cap screw	SUS304、SUSXM7	Stainless steel
9	Compressor	SCS13	Stainless steel
10	Diaphragm	PTFE、EPDM SUS303、SUS304	Fluoro resin, ethylene propylene rubber, stainless steel
11	Body	SUS316L	Stainless steel



Model No.	A	B	C	D	E	H	K	M	N	Weight [kg]		
										NC	NO	Double acting
SWD1※8-F	90	99.5	22	60	7	34	10.5	32	40	0.6		
SWD1※-10-F	90	101	22	61.5	7	34	14	32	40	0.6		
SWD2※-15-F	108	130	22	73	8.5	34	17.5	38	46.5	1.2		
SWD3※-25-F	127	170	24	84	12.5	50.5	23	49	56	2.7	2.3	2.3
SWD4※-40-F	159	212	28	97	16.5	50.5	35.7	57	66	5.1	4.1	4.0
SWD5※-50-F	190	241.5	47	118	23	64	47.8	76.5	87.5	9.5	7.8	7.5

1.3 Product Specifications

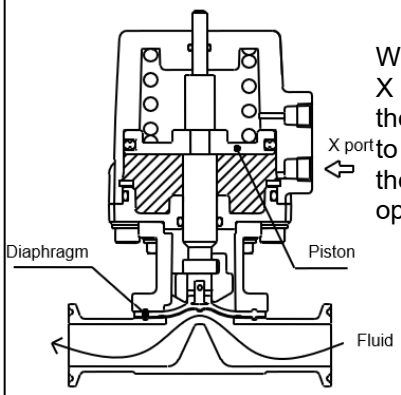
Item			SWD※1	SWD※2	SWD※3
Actuation			Normally closed	Normally open	Double acting
Working fluid			Water, pure water, chemical liquids (fluids that do not corrode wetted part		
Working pressue		MPa	0 to 0.6		
Proof pressure (at water pressure)		MPa	2.0		
Fluid temperature		℃	5 to 90(during steam sterilization 130)		
Ambient temperature		℃	0 to 60		
Frequency		cycle/min	SWD1 to SWD4：20 or less SWD5：10 or less		
Valve seat leakage		cm^3/min	0 (at water pressure)		
Mounting orientation		CAUTION 1	Unrestricted		
Operating port			Rc1/8		
Operating fluid			Air		
Operating pressure	SWD1※-8	MPa	0.35 to 0.7	0.25 to 0.35	0.2 to 0.3
	SWD1※-10				
	SWD2※-15				
	SWD3※-25		0.4 to 0.7	0.3 to 0.35	0.25 to 0.3
	SWD4※-40			0.35 to 0.4	0.3 to 0.35
	SWD5※-50			0.27 to 0.32	0.2 to 0.25
Cv	SWD1※-8		2.3		
	SWD1※-10		2.6		
	SWD2※-15		4.5		
	SWD3※-25		13		
	SWD4※-40		27		
	SWD5※-50		50		
Material	Diaphragm		PTFE/EPDM		
	Body		SUS316L (buff polishing #400 or equiv.,electrolytic polishing)		
	Actuator		ADC12（fluoro resin coating）		

CAUTION 1：For horizontal piping, piping at the angles shown in Table 1 on page 7 minimizes valve fluid pooling.

1.4 Operation Explanation

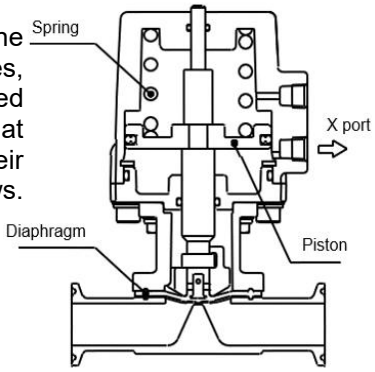
1、Normally closed — Connect the operating air to the X port.

When opened



When air is applied to the X port, the piston rises, the diaphragm connected to the piston also rises at the same time, the weir opens and the fluid flows.

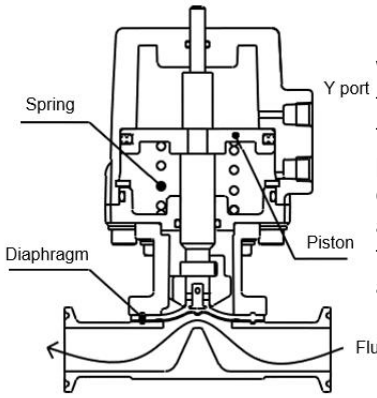
When closed



When air in the X port is exhausted, the force of the spring lowers the piston, and the diaphragm connected to the piston also lowers at the same time, closing the weir and sealing the fluid.

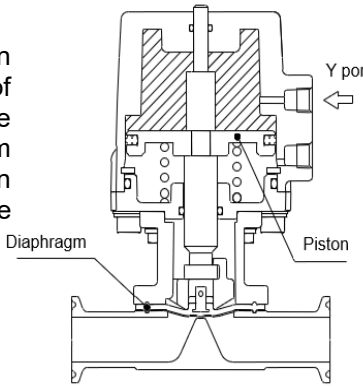
2、Normally open — Connect the operating air to the Y port.

When opened



When there is no air in the Y port, the force of the spring raises the piston, the diaphragm connected to the piston also rises at the same time, the weir opens and the fluid flows.

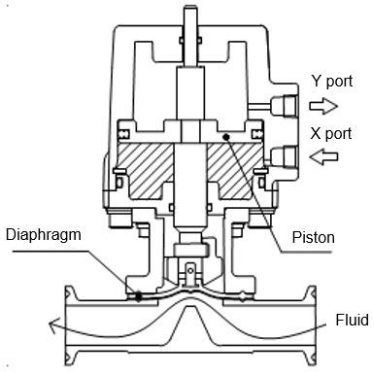
When closed



When air is applied to the Y port, the piston goes down and the diaphragm connected to the piston goes down at the same time, closing the weir and sealing the fluid.

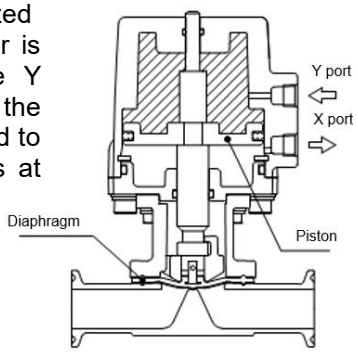
3、Double acting — Connect the operating air to the X and Y ports.

When opened



When air is pressurized to the X port and air is exhausted from the Y port, the piston rises, the diaphragm connected to the piston also rises at the same time, the weir opens and the fluid flows.

When closed



When air is pressurized to the Y port and exhausted from the X port, the piston goes down, and the diaphragm connected to the piston also goes down at the same time, closing the weir and sealing the fluid.

2. INSTALLATION

2.1 Before Installation

⚠CAUTION

Do not remove the piping port protector and do not take the product out of the plastic bag until just before piping.

If the piping port protector is removed or the product is taken out of the plastic bag before ready to begin piping, foreign matters may enter from the piping ports and cause a failure or malfunction.

Do not disassemble the valve before installation.

Even within the warranty period, disassembly for purposes other than maintenance and inspection may not be covered by the warranty.

In addition, there is a risk of causing problems due to foreign matter being mixed in.

- Check that the product model number you ordered and the model number displayed on the product are the same.
- Check that there are not abnormalities in the product such as damage to the outside of the product or loose bolts.
- When storing, store it in a box so that foreign matter does not get inside the valve, and remove it from the box when piping.

2.2 Environment

⚠WARNING

Consult CKD about the specifications before using the product outside the designated specifications or for special applications.

Do not use this product in the presence of corrosive gas or solvents.
Do not use this product in an environment where corrosive gases such as sulfur dioxide gas or solvents are present.

Do not use this product in a humid environment.
Condensation may occur due to a change in the temperature.

Do not use this product near a heat generating source or in a location where it may be exposed to radiant heat.
Use this product within the specified ambient temperature range.

⚠CAUTION

Protect the valve so that dust does not get inside.
If there are high levels of dust in the area, install a downward-facing silencer or elbow fitting on the exhaust port of the valve operating part so that dust does not enter.

- When using this product in a cold climate, take the necessary measures to prevent freezing.
- This product cannot be used outdoors. Protect the product by installing it inside a cover or a case.
- Do not use this product in an environment where vibration or inertia is applied.

2.3 Mounting

⚠WARNING

Mounting and piping should be done after thoroughly reading this Instruction Manual by a person who has a thorough understanding of safety precautions such as the system, fluid characteristics, and compatibility of fluids with related components.

Incorrect mounting and piping may cause not only troubles of this product but also system troubles of the customer, and may lead to death or serious injury of the user.

⚠CAUTION

Thoroughly read and understand this Instruction Manual before mounting the product.

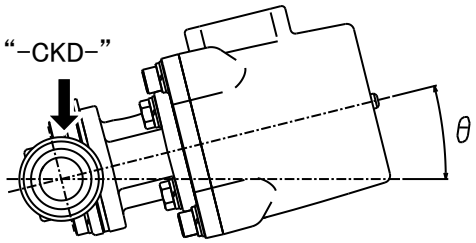
Hold the body firmly when handling and mounting the product.

After mounting, check for leaks in the piping and check the valve is mounted correctly.
This product may be heavy depending on the port size.
When mounting, piping, and removing, handle with care, such as taking measures to prevent injury due to dropping.

- For horizontal piping, liquid accumulation in the valve can be minimized (see Table 1, Fig. 1) by tilting the valve and piping. Pipe so that the “-CKD-” mark stamped on the body piping section is directly above.
- Secure enough space in consideration of safety work during maintenance and troubleshooting.

Table 1. Port size and valve tilt angle

Model No.	Port size	Valve tilt angle（θ°）
SWD1※8-F	8A	23
SWD1※-10-F	10A	11
SWD2※-15-F	15A	14
SWD3※-25-F	25A（1S）	25
SWD4※-40-F	40A（1.5S）	24
SWD5※-50-F	50A（2S）	23



(Fig. 1) Valve tilt angle

2.4 Piping

⚠CAUTION

Secure the product when tightening or piping again.

When installing piping, avoid any application of stress on the valve body, such as bending, tension, or compression.

Secure and support the pipes to prevent the valve from being subjected to pipe loads and vibrations directly.

When piping the operation part, tighten with the recommended torque (see Table 3).

Do not use excessive seal material (seal tape, jelly-like seal material) when piping the operation part.

It may enter inside the actuator and cause a malfunction.

Install a bypass circuit to facilitate maintenance and repair work.

Do not apply high pressure suddenly when supplying fluid for the first time after connecting the pipes.

If the pipes are not secured properly, it may lead to accidents such as a pipe disconnection or a fluid leakage.

Pipe cleaning

・Before piping the product, be sure to flush it to remove foreign matter such as debris, metal chips, rust, and sealing tape.

Removal of foreign matters

・Debris or foreign matter in the fluid may prevent the valve from functioning correctly. When there is contamination, install a filter on the primary side of the valve according to the circuit used.

Piping of operation port

・Piping the operation port as shown in Table 2.

・The set screw attached to the breathing port of NC and NO actuators is a part to prevent erroneous piping, so it can be used as it is. However, in places where water drops, etc., remove the set screw and take appropriate protective measures such as piping the elbow fitting downward to prevent water from entering.

・The breathing port should be open to the atmosphere.
If there is a problem with the scattering of dust due to the exhaust to the surroundings, remove the set screw, pipe it, and let the air in and out in a place that does not matter. If there are high levels of dust in the area, it may cause malfunction or leakage. Attach a silencer or filter to the breathing port.

・Select the operating solenoid valve to be connected to the operation port according to the specifications and application.

・When piping to the operation port, be sure to secure the operation port with a spanner or vise and screw it in.
Refer to Table 3 for the tightening torque during piping.

・Compressed air contains a large amount of drainage such as water, oxidized oil, tar , and foreign matters. Such drainage my cause a significant reduction in the accuracy of the pneumatic component. Take measures against drainage (such as dehumidifying with an aftercooler or a dryer, removing foreign matters with an appropriate filter, or installing a tar removing filter).

Table 2. Operation port and breathing port according to actuation

Model No.	Actuation	Operation port	Breathing port
SWD※1-※-F	Normally closed	X port	Y port
SWD※2-※-F	Normally open	Y port	X port
SWD※3-※-F	Double acting	Open：X port Close：Y port	-

※The breathing port should be open to the atmosphere.

Table 3. Piping tightening torque of operation port

Operating port size	Recommended tightening torque (N・m)
Rc1/8	3 to 5

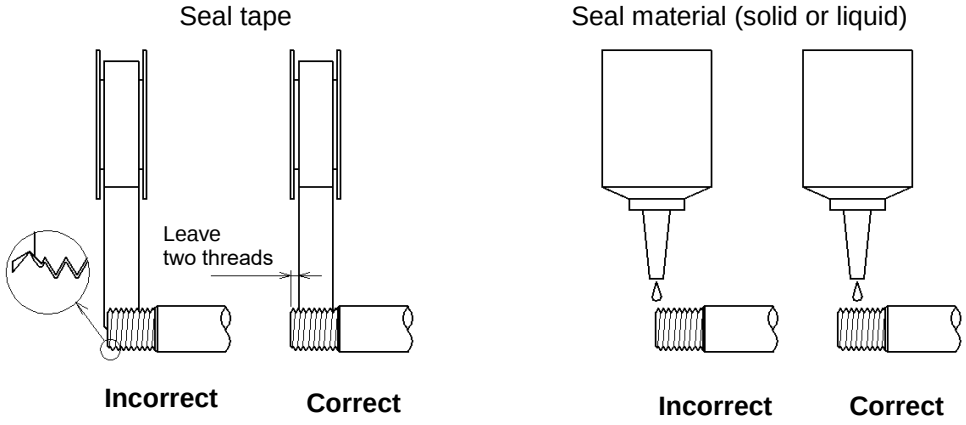
Piping of body

・The ferrule part dimensions are ISO compliant. Assemble using gaskets and clamps of appropriate size.

2.4.1 Seal material

Apply a seal tape or seal material to the screw threads leaving two or more threads at the pipe end uncovered or uncoated. If the pipe end is fully covered or coated, a shred of seal tape or residue of seal material may enter inside of the valve and cause a failure.

When using a seal tape, wind it around the screw threads in the direction opposite from the screw threads and press it down with your fingers to attach it firmly.
When using a liquid seal material, be careful not to apply it to resin parts. The resin parts can become damaged and this may lead to a failure or malfunction.
Also, do not apply seal material to the internal threads.



3. USAGE

⚠CAUTION

Pay attention to rapid changes in fluid temperature.
Rapid changes in fluid temperature may cause internal leakage.

As for compressed air for actuator operation, use air or inert gas passed through a filter with a filtration rating of 5 μm or more.

Use the operating air pressure within the specified pressure range.
Normally open and Double-acting valves may damage the diaphragm if pressure exceeding the specified range is applied.
In addition, the life will be longer if the setting is low within the specified pressure range.
If the operating pressure cannot be controlled, we recommend selecting the normally closed type.

Check that the pressure port on the valve is correct.
(Normally closed：X port、Normally open：Y port、Double-acting：X port ・ Y port)
Applying pressure to the wrong operating port can cause diaphragm breakage or malfunction.

If the product has been out of use for one month or more, perform a test run before starting actual operation.

If the product has been out of use for one month or more, completely remove any water left in the product.
Water residue will cause rusting and may lead to malfunction or leaks.
If the residual water cannot be removed, operate the valve several times a day and pass water through to ensure ideal use.

Observe the valve operation frequency.
The valve operation frequency is 20 times / min or less for SWD1 to SWD4 and 10 times / min or less for SWD5.
If the operating air supply time or exhaust time is short, the valve actuation may be unable to keep up.
If you use the product infrequently, contact CKD.

Make sure that no fluid adheres to anything other than the flow path of the product.

Pay attention to the fluid pressure and piping conditions.
Water hammer and vibration may occur in certain fluid pressure and piping conditions. In most cases, this can be resolved by adjusting the open-close speed using a speed controller, etc. If a problem persists, review and revise the fluid pressure and piping conditions.

Be careful of grease adhesion on the indicator.
Indicator rises during valve opening. Since grease is applied to the indicator part, be careful of adhesion.

Do not use valves as footing or place any heavy objects on top of the valves.

3.1 Checks to Make Before Use (Checks Made After Mounting)

⚠WARNING

Close the main cock and discharge the fluid in the valve before performing an appearance check.

Appearance check

- Check that the valve is securely fixed to the piping by pressing it by hand.
- Check that the piping is secure.
- Check that the threaded parts are not loose.
- Check that the operating pressure is correct.

Operation check

- Before pressurizing the working fluid, pressurize the operating air and make sure the valve works. You can check the valve working with the indicator on the top of the actuator.

Leakage check

- Pressurize the operating air and check for leaks from the piping connections.
- Pressurize the fluid to check for leakage from the piping connections.

3.2 Safety Instructions

The operating port and operating pressure differ depending on the valve model number and actuation.
See Table 4.

Table 4. Operating port and operating pressure according to operating method

Model No. (actuation)		SWD※1	SWD※2	SWD※3
Actuation		Normally closed	Normally open	Double acting
Operation port		X port	Y port	Open：X port Close：Y port
Breathing port		Y port	X port	―
Model No. (size)	SWD1※-8	0.35 MPa to 0.7 MPa	0.25 MPa to 0.35 MPa	0.2 MPa to 0.3 MPa
	SWD1※-10			
	SWD2※-15			
	SWD3※-25	0.4 MPa to 0.7 MPa	0.3 MPa to 0.35 MPa	0.25 MPa to 0.3 MPa
	SWD4※-40		0.35 MPa to 0.4 MPa	0.3 MPa to 0.35 MPa
	SWD5※-50		0.27 MPa to 0.32 MPa	0.2 MPa to 0.25 MPa

4. MAINTENANCE AND INSPECTION

⚠DANGER

Thoroughly read and understand this Instruction Manual before maintenance and inspection.

Valve performance may not be maintained if disassembled and reassembled.

Release operating air and fluid pressure before maintenance and inspection.

When replacing the valve, wash it with pure water or air before starting work.

Make sure that the remaining chemicals do not affect surrounding equipment or people. Also, when touching the valve, please read the Material Safety Data Sheet (SDS) and wear the necessary protective equipment.

Surely follow the "4.2 Disassembling and Assembling" replacement procedure.

Absolutely perform a test run after reassembling.

⚠CAUTION

When replacing the product, be sure to use the product with the same model number.

Specifications may differ even if they have the same appearance.

Do not store in direct sunlight or places with high temperatures.

When handling the product, do not subject it to shocks or scratches due to throwing, dropping, hooking, etc.

If the product has been out of use for one month or more, perform a test run before starting actual operation.

(1) Perform daily and regular inspections to use this product in the optimum condition.
(2) Daily check
・Please refer to "3.1 Checks to Make Before Use (Checks Made After Mounting)" for the inspection contents.
(3) Periodic inspection
・Normally, disassemble the valve once every six months and inspect the seal. Although it depends on the conditions of use, we recommend that you replace the diaphragm once a year. If there is no abnormality in the diaphragm during regular inspection, it can be reused, but be careful not to change the combination of diaphragm and body.
・Since the durability of the diaphragm varies greatly depending on the type of fluid, pressure, temperature, and operating frequency, the frequency of periodic inspections should be performed in consideration of the customer's usage conditions.
・The durability of the actuator varies depending on the fluid temperature and air quality, so perform regular maintenance.

4.1 Maintenance Parts

⚠CAUTION

Disassembled or replaced products and parts, and defects caused by work are excluded from the scope of warranty.

(1) Diaphragm
・Replace if any abnormality such as leakage, malfunction or delay is found during use.

4.2 Disassembling and Assembling

⚠DANGER

Do not disassemble the actuator part.

The customer is requested to never disassemble the actuator part. It is very dangerous because it has a built-in high-load spring. If you need to disassemble, please contact your dealer or distributor.

⚠WARNING

Before disassembling and assembling, release the operating air and liquid pressure to discharge the fluid in the product.

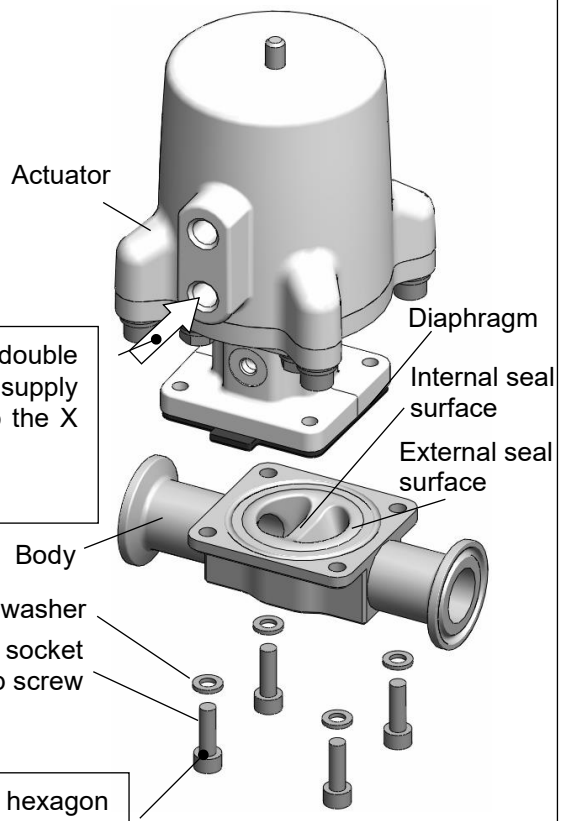
■Before diaphragm replacement

(1) Before disassembling, be sure to release the operating air / fluid pressure and check that no pressure is applied inside the valve.
(2) When replacing the diaphragm, replace it with pure water so that the remaining fluid does not affect surrounding equipment and people, and purge it with dry air or an inert gas before starting work. Also, when touching the fluid passage of the valve, read the Material Safety Data Sheet (SDS) and wear the necessary protective equipment.
(3) The diaphragm can be replaced with the body piped, but it is recommended to replace the diaphragm with it removed from the plumbing.
(4) Be sure to use the specified diaphragm.

■Diaphragm replacement procedure（See page 15）

①After confirming that there is no fluid or pressure, supply operating air to the X port for NC type and double acting types, and open the valve. (See Table 4 in "3.2 Safety Instructions" for operating pressure.)
NO type does not require pressurization.
②Remove the hexagon socket head cap screws and spring washers and remove the actuator and diaphragm from the body.
③For NC type, exhaust the operating air and keep the valve closed. For NO type and double acting type, supply operating air to the Y port and keep the valve closed.
(Refer to Table 4 in "3.2 Safety Instructions" for operating pressure.)
※Please be careful about the behavior of the diaphragm.
④Rotate the diaphragm 90 degrees and remove it from the compressor.
⑤Check the compressor is clean and install a new diaphragm.
After inserting the diaphragm as far as it will go, rotate it 90 degrees in the same way as when disassembling. After rotation, make sure that the diaphragm and the actuator mounting holes are aligned.
⑥Check that the sealing surface of the body (both internal and external seals) is free of dirt, scratches, and foreign matter. ※These will cause leakage.
⑦In the same way as (1), supply the operating air to the X port again and open the valve.
⑧Set the actuator on the body and align the convex part of the diaphragm with the concave part of the body.
⑨Tighten the hexagon socket head cap screws evenly. See Table 5 for tightening torque.
Tighten the screws diagonally gradually to avoid one-sided tightening. Excessive tightening will put an excessive load on the diaphragm and shorten its life, so tighten it while checking the torque with a torque wrench or the like.
⑩Open and close the valve and check that it operates smoothly. Pipe and pressurize the fluid to make sure there are no leaks from the pipe.
⑪Check each time to see if the torque can be maintained even after operation.

＜4.2 ①～②＞

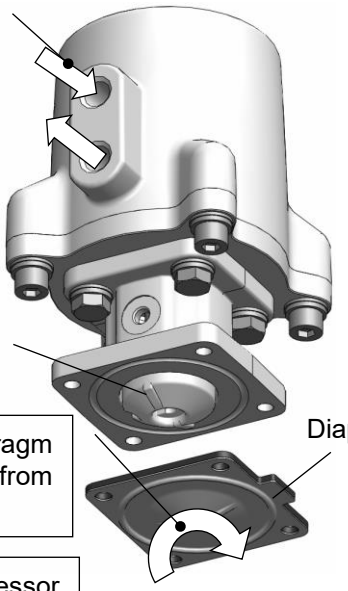


①NC type and double acting type supply operating air to the X port.

②Remove the hexagon socket head cap screws and spring washers.

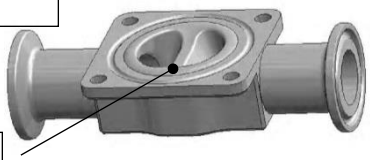
＜4.2 ③～⑥＞

③ NO type and double acting type supply operating air to the Y port. NC type exhausts operating air from the X port.



④Rotate the diaphragm 90 ° and remove it from the compressor.

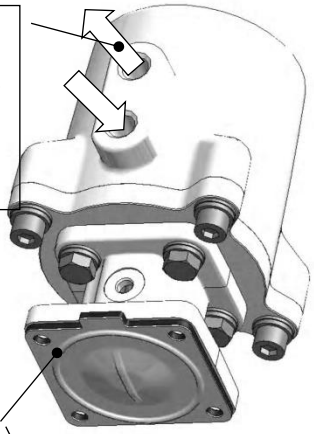
⑤Check the compressor is clean and install a new diaphragm.



⑥ Check the valve body is clean.

＜4.2 ⑦～⑧＞

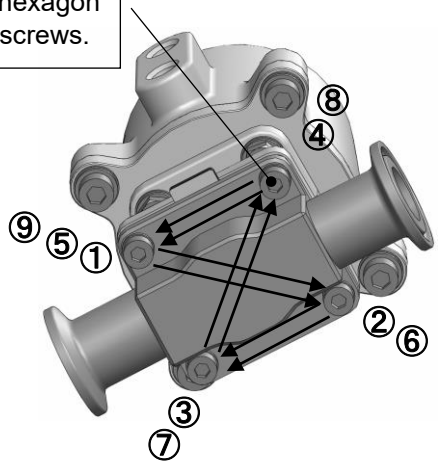
⑦ NO type and double acting type exhaust the operating air from the Y port. NC type supplies operating air to the X port.



⑧ Align the convex part of the diaphragm with the concave part of the body.

＜4.2 ⑨＞

⑨ Tighten the hexagon socket head cap screws.



Hexagon socket head cap screw tightening order

Table 5. Recommended tightening torque for hexagon socket head cap screws

Series size	Nominal diameter of screw	Tightening torque (N・m)
SWD1※	M4	1.8 to 2.2
SWD2※	M5	2.7 to 3.3
SWD3※	M8	9.0 to 11.0
SWD4※	M8	12.6 to 15.4
SWD5※	M10	25.2 to 30.8

5. TROUBLESHOOTING

5.1 Problems, Causes, and Solutions

If the product does not operate as intended, check the table below for a possible solution.

Problem			Cause	Solution
Valve does not close, or fluid is leaking.			Fluid pressure is too high.	Use within the specified range.
			Abnormality of operating solenoid valve, or operation air does not switch.	Replace the operating solenoid valve.
	Actuation	NC type	The Y port is blocked.	Open to the atmosphere.
			Operating pressure of the X port is not released.	Release the operating pressure and set it to atmospheric pressure.
		NO type Double acting type	X port is blocked.	Open to the atmosphere.
			Operating pressure is not supplied to the Y port, or it's too low.	Supply operating air within the specified range to the Y port.
Valve does not open, or flow rate is insufficient.			Fluid is not supplied.	Check the circuit and supply the fluid.
			Valve sticking is occurring.	Open and close the valve several times before use.
	Actuation	NC type	Y port is blocked.	Open to the atmosphere.
			Operating pressure is not supplied to the X port, or it's too low.	Supply operating air within the specified range to the X port.
		NO type Double acting type	X port is blocked.	Open to the atmosphere.
			Operating pressure of the Y port is not released.	Release the operating pressure and set it to atmospheric pressure.
			Used in a closed state for a long time. (NO type)	Temporarily supply operating air to the X port to return the valve.
Flow rate is not stable.			Fluid pressure is not stable.	Stabilize the fluid pressure by installing a damper on the primary side of the valve.
There is leakage to the outside.			There are scratches on the external seal point of the valve body.	Replace the product.
			There are scratches on the external seal surface of the diaphragm.	Replace the diaphragm.
			Hexagon socket head cap screws are loose.	Tighten the hexagon socket head cap screws.
There is internal leakage.			There are abrasions and scratches on the internal seal point of the valve body.	Replace the product.
			There are abrasions and scratches on the internal seal surface of the diaphragm.	Replace the diaphragm.
			Foreign matters are stuck.	Disassemble the valve body and clean flow path.
There is leakage of operating air.			There are abrasions and scratches on packing and O-ring.	Replace the actuator.

※If you have any other questions or concerns, contact your nearest CKD sales office or distributor.

6. WARRANTY PROVISIONS

6.1 Warranty Conditions

■Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.
However, following failures are excluded from this warranty:

- Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or this Instruction Manual.
- Failure caused by incorrect use such as careless handling or improper management.
- Failure not caused by the product.
- Failure caused by use not intended for the product.
- Failure caused by modifications/alterations or repairs not carried out by CKD.
- Failure that could have been avoided if the customer's machinery or device, into which the product is incorporated, had functions and structures generally provided in the industry.
- Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.

■Confirmation of product compatibility

It is the responsibility of the customer to confirm compatibility of the product with any system, machinery, or device used by the customer.

■Others

The terms and conditions of this warranty stipulate basic matters.
When the terms and conditions of the warranty described in individual specification drawings or the Specifications are different from those of this warranty, the specification drawings or the Specifications shall have a higher priority.

6.2 Warranty Period

The product is warranted for one (1) year from the date of delivery to the location specified by the customer.