



Safety precautions

FP Series: Warnings and Cautions

Be sure to read this section before use.

Refer to "Pneumatic Cylinders I (CB-029SA)", "Pneumatic Cylinders II (CB-030SA)", "Pneumatic Valves (CB-023SA)", "Pneumatic, Vacuum, and Auxiliary Components (CB-024SA)", and "Fluid Control Valves (CB-03-1SA)" for general and product-specific precautions. Although the above general catalog states that products are not applicable for equipment or applications with direct contact with beverages/foodstuffs, the FP2 Series products can be used in such applications as long as they are within the range of the product specifications.

Design/selection

CAUTION

- "Food Sanitation Act compliant" refers to products with materials (resin, rubber) conforming to the compliant of the Food Sanitation Act.
- Use after confirming the structure and material, valve structure, working fluids, and working atmospheres of each component carefully yourself.
- Depending on the model, internal parts may wear when the valve operates. If affected, take necessary measures such as installing a filter on the secondary side.
- If the fluid is water or water drops remain inside, rust may be generated and flow to the secondary side depending on the model. Take necessary measures in that case.
- Bearings used in cylinders contain trace amounts of mineral oil. Within the product specifications range, it is processed so as not to discharge, but please carefully consider the installation location.
- The protection structure and material (except lubricant) of the 4G-FP1 Series are the same as those of standard products. Therefore, leakage or corrosion may occur in an environment with a high temperature and humidity or where the product is exposed to water. Select installation locations with care.

When using the product

CAUTION

- After installation, check for leaks from pipes, for proper wire connections and that the product is installed correctly.
- Do not use the product as footing or place any heavy objects on top of the product.
- If the product has been out of use for one month or more, perform a test run before starting the actual operation.
- 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 coils are touched directly.



Safety precautions

FP Series: Warnings/Cautions

Be sure to read this section before use.

Refer to "Electric Actuator Motorless (CB-055A)" and "Electric Actuator EBS-M/EBR-M Series (CC-1422A)" for general and product-specific precautions.

Product-specific cautions: Electric actuator EBS-M/EBR-M/EBL-L/EBR-L/EKS-L/ETS/ETV/ECS/ECV Series

Design/selection

1. Common

⚠ CAUTION

- Do not hit the trolley table against the stroke end.
- Indicate the maintenance conditions in the device's instruction manual.
- The product's functionality may drop too low to maintain an appropriate safety level depending on usage conditions, working environment and maintenance status. With correct maintenance, the product functions can be used to the fullest.
- Regarding installing, setting up, and/or adjusting the actuator, read through the instruction manual and operate correctly.
- The product is manufactured in conformity with the related standards. Do not disassemble or modify the product.
- Refer to the instruction manual of the motor mounted to the product and control for your safety before wiring and designing.
- The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

2. EBS-M/EBR-M Series

⚠ DANGER

- Use a DC stabilized power supply (48 VDC $\pm$ 10% or 24 VDC $\pm$ 10%) for the motor, control, and input/output circuit power supplies. Connecting directly to the AC power supply may cause fire, explosion, damage, etc.

⚠ CAUTION

- Select a power supply which provides ample capacity based on the number of installed products. Malfunction may occur if there is no excess capacity. (Guideline: □ 35...4.0A/stand, □ 42...5.2A/stand, □ 56...8.6A/base)

Use/maintenance

1. Common

⚠ CAUTION

- This product uses food-grade (NSF H1) lubricants. Do not mix with other greases.
- Regularly inspect the product at least two or three times a year to check that it operates correctly.
- Grease the product once every 3 months or at 100km intervals as a general guide. Note that grease interval differs depending on the working conditions. It is recommended to determine the interval based on initial inspection. Refer to the instruction manual for details.
- If the product has been out of use for one month or more, perform a test run before starting the actual operation.

2. EBS-M/EBR-M Series

⚠ CAUTION

- The circuit board inside the product has capacitors connected between the circuits and the metal body to prevent damage due to static electricity. Avoid withstand voltage and insulation resistance tests on equipment with this product installed. If tests are done, the product will be damaged. If necessary for the equipment, remove the product before doing the test.
- If the actuator and controller combination is changed, be sure to confirm the programs and parameters prior to operation. Otherwise, there is a risk of unexpected accidents.

Precautions for export

Products and related technologies in this catalog

The products and related technologies in this catalog are subject to US Export Administration Regulations (EAR), and display of EAR-compliant products is marked on the product page. For export or provision of products or related technologies subject to EAR regulations, we request that the US Export Administration Regulations (EAR) be observed appropriately.



Anti-bacterial/bacteria-removing/odor removal filter

Safety Precautions

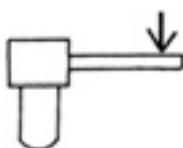
Be sure to read this section before use. Refer to "Pneumatic Components (CB-023SA)" and "Pneumatic, Vacuum, and Auxiliary Valves (CB-024SA)" for general and product-specific precautions. Although the above general catalog states that products are not applicable for equipment or applications with direct contact with beverages/foodstuffs, the FP2 Series products can be used in such applications as long as they are within the range of the product specifications.

Design/selection

⚠ WARNING

- The antibacterial filter has an antibacterial effect on the bacteria attached to internal filter elements, suppressing bacteria growth. The working fluid has no bacteria-reducing effects. *Anti-bacterial activity value, which represents the anti-bacterial effect, is an actual value from CKD's prescribed conditions.
- The bacteria-removing filter and reduces the bacteria in the working fluid, but it does not kill all bacteria. It also does not remove viruses. LRV, which represents bacteria-removing effect, is an actual value from CKD's prescribed conditions.
- This product is for industrial use. Do not use in any equipment or circuit that concerns human life.
- This product exerts no influence on performance and a small amount of leakage is tolerable.
- Ventilate well when using nitrogen gas (N₂) and carbon dioxide (CO₂).
- This filter traps waste and bacteria in working fluids and provides clean working fluids to the secondary side. Anti-bacterial and bacteria removing functions are not added to the working fluid itself.
- It cannot be used in environments containing sodium hypochlorite, synthetic oil, organic solvents, chemicals, cutting oil, screw locking agent, leak detection solutions, or hot water, etc., or where these substances may come in contact with the product. For more information on the chemical resistance of plastic bowls and transparent cases, see page 369.
- Piping load torque
Avoid piping fixed with a single support, as this can result in excessive force and lead to damage.
[Combination, module type]
Avoid applying piping load or torque to the body or pipes.

Series	SFC3**	SFC4**	SFC8**
Max. torque N·m	50	50	100

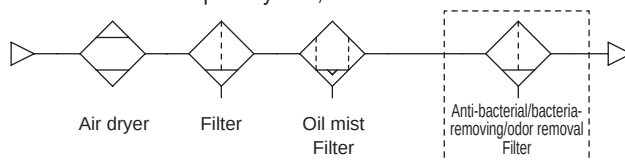


- Properly check the compliant of the material against its use conditions and environment before using this product.

⚠ CAUTION

- Check the working circuit and working fluid.

To prevent drop in filter performance, install the dryer, air filter and oil mist filter on the primary side, and remove water or oil.



- Installation order for anti-bacterial/bacteria-removing/odor removal filter
We recommend the use of the bacteria-removing unit as the final filter before the compressed air/gas contact foodstuffs.



- Do not exceed maximum working or differential pressure. Not observing this could damage the product or element.
- Do not flow over the max. processing flow rate.
Doing so may degrade the filtration accuracy and damage the element.
- This device cannot be used as an absolute filter (absolute degree of filtration).
- Do not use where the IN/OUT pressure differential exceeds 0.1 MPa.
A sudden supply of fluid to the filter (such as air blow by releasing the secondary side to the atmosphere, etc.) may reduce the removal efficiency. In this case, install a restriction valve on the filter's IN side to keep the pressure difference to 0.1 MPa or less. Consult with CKD about attaching differential pressure gauge GA400.
- High moisture levels
Install the air dryer and drain separator before the anti-bacterial/bacteria removing filter. If there is a lot of moisture from the compressor, hot and highly humid air could shorten the device's life or result in corrosion.
- For compressor circuit of water lubrication method
Take measures to prevent chlorine-based substances from entering the compressed air.
- The odor removal filter uses activated carbon to apply suction to oil vapor. Be sure to install an oil mist filter (M Series M type) on the primary side, and remove oil mist in advance.
- The odor removal filter uses suction to remove the oil vapor in compressed air (nitrogen gas, carbon dioxide). Activated carbon suction is not equally effective with all substances, so that it will not completely eliminate all odors.
- The odor removal filter does not have anti-bacterial or bacteria-removing functions.

Mounting, installation and adjustment

⚠ WARNING

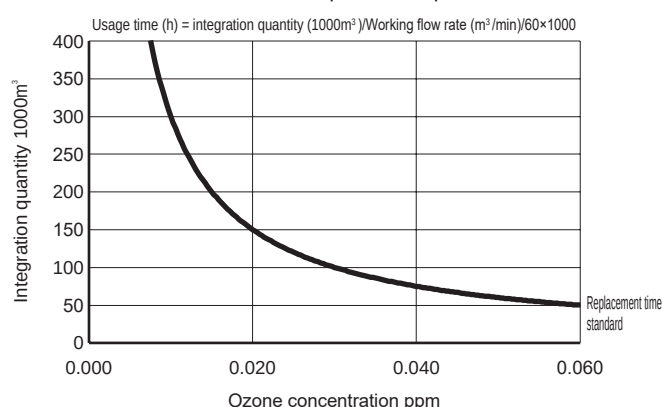
- Prevent the generated ozone from passing through the filter. Otherwise the filter element may be degraded. Take care especially when using an ozone generator (e.g., ionizer) together.

(1) Do not install in the upstream portion of the filter.
(2) When installing downstream of the filter, stop air while static electricity is neutralized since generated ozone may flow back.

- Avoid installing this product where it is subject to direct sunlight.

- If the hollow fiber membrane in the bacteria-removing filter suffers oxidative degradation from ozone or ultraviolet in the fluid, it may be damaged and allow flow over to the secondary side. Implement periodic inspections and exchange. Consult the graph below for standard replacement times.

Relation between ozone concentration and integration quantity
Filter element replacement period



⚠ CAUTION

- Check the flow direction by arrow and connect correctly.

- Securing maintenance space

Secure sufficient space for maintenance and inspection.

- After attaching the pipes, flush and clean them before use.

Dirt or foreign matter remaining in the piping will deteriorate product performance.

- Check that foreign matter does not enter when tightening pipes or fittings.

When screwing in piping or fittings, check that swarf from port threads or sealant does not get inside. Dirt or foreign matter remaining in the piping will deteriorate product performance. In particular, if swarf from the OUT side port thread on the last-installed unit is produced, that swarf will be blown through too. During piping, tighten at or below the torque determined in the catalog, and then flush thoroughly before use.

- Install the drain cock downward and vertically.

- Piping screw-in torque

[Combination, module type]

Make sure that excessive torque is not applied on the body and piping when piping.

Series	SFC3**	SFC4**	SFC8**
Max. torque N·m	30	30	70



[Inline]

Port thread	Tightening torque N·m
Rc1/4	6 to 8
Rc3/8	13 to 15

- Drain piping

- The drain piping for the plastic bowl has a barbed nipple, and can be directly installed. However, confirm that the drain cock is closed before inserting the tube. Do not route it vertically. Pipe so that no lateral load is applied on the bowl. Do not fix the tube connected to the drain outlet with a lateral load applied. If drainage is performed with a lateral load applied, external leakage may occur.

- Tightening torque of drain cock

- The maximum tightening torque of the drain cock of the plastic bowl is 0.5 N·m.

- Perform piping so no excessive force is applied to the product. When piping or installing, do not apply tension, compression, bending or external force from tubes, etc.

- When supplying working fluid after connecting pipes, do not suddenly apply high pressure.

Connected piping could be dislocated and tubing could fly off.

- Select the appropriate piping tube.

- Securely insert a tube into the push-in fitting before use.

- Use the width across flats of the connection part when piping.

[Inline]

In the case of Rc thread piping, apply the wrench to the width across flats of the connection part. Do not apply it to any other part when tightening.

- Attach the maintenance label to this product to make maintenance periods clear.

- Storage

Do not store this product in a hot, humid atmosphere or atmospheric conditions outside of the specified range for a prolonged period of time. Resin or rubber parts could deteriorate, and the resin element housing could become discolored. Contact CKD when storing products exceeding specifications.

Anti-bacterial/bacteria-removing filter

Use/maintenance

⚠ WARNING

- Perform a periodic inspection once every six months or less to check for any cracks, scratches, and other damage to the plastic bowl and transparent housing. If cracks, scratches or other deterioration are found, they may cause damage. Please replace the bowl or the product with a new one.
- Check the plastic bowl periodically for contamination.
 - If parts are heavily contaminated or if transparency has decreased, replace with a new bowl.
 - Use a diluted neutral household detergent to wash parts, and then rinse well with clean water. Use of other agents could result in breakage.
- Removing the bowl

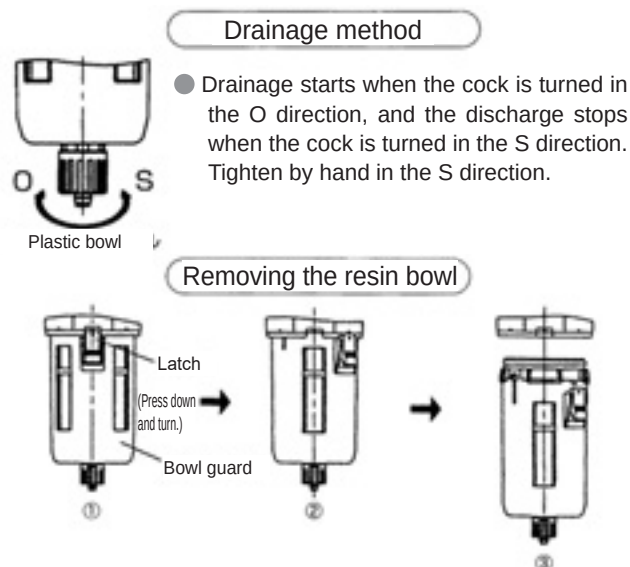
Stop the working fluid supply. Release the pressure in the bowls completely and make sure that there is no residual pressure before removing the bowls.
- Remove air filter drain.

Components could malfunction if moisture flows into the secondary side.
- Do not disinfect or clean using alcohol. It may deteriorate or damage the plastic part.

⚠ CAUTION

- Anti-bacterial and bacteria removing effects lessen when there are dirt or oil deposits in the filter element. Periodically implement inspections and replacements. Contact CKD for maintenance details.
- Do not modify the product.

- Read instructions and precautions attached with the product before use or maintenance. Wash your hands before attaching new elements.



- This filter cannot be flushed with air, water, etc., and reused. When 1 year (6,000 hours) has passed or the pressure drops to 0.1MPa, replace the element with a new one.
 - We ask that customers perform element replacement maintenance by themselves.
 - During element replacement, take consideration that bacteria, foreign materials, or foreign matter deposits in the primary side do not flow into the secondary side.
- While operating, do to apply vibration, impact, or other external force from tube.

Chemical resistance of plastic

⚠ WARNING

- The chemical resistance of plastic parts is shown below.
- Avoid using products in an atmosphere where chemicals are contained in working fluid or atmosphere, or where they could adhere to parts.
- Use in the above state could lead to bowl damage and accidents.

Chemical resistance of plastic bowl and clear housing

Consult CKD when using in environments filled with the following chemicals.
Check whether the testing solutions, sealants and adhesives contain the following chemicals.

Types of chemicals	Categories of chemicals	Main products of chemicals	General applications	Nylon
Inorganic chemicals	Acids	Sodium hypochlorite, hydrochloric acid, sulfuric acid, hydrofluoric acid, phosphoric acid, chromic acid, etc.	Sterilization, acid washing of metals, acidic degreasing solutions, coating treatment solutions, etc.	x
	Alkalines	Alkali substances such as caustic soda, caustic potash, calcium hydroxide, aqueous ammonia, and sodium carbonate	Alkaline degreasing solution for metals Soluble cutting oil, leakage detection agent	○
	Inorganic salts	Sodium sulfide, sodium nitrate, potassium bichromate, sulfate of soda, etc.		○
Organic chemicals	Aromatic Hydrocarbons	Benzene, toluene, xylene, ethyl benzene, styrene, etc.	Contained in paint thinner (benzene, toluene, and xylene)	x
	Chlorinated aliphatic hydrocarbons	Methyl chloride, ethylene chloride, methylene chloride, acetylene chloride, chloroform, trichlene, perchlene, carbon tetrachloride	Organic solvent-based washing solution for metals (trichlene, perchlene, carbon tetrachloride, etc.)	○
	Chlorinated aromatic hydrocarbons	Chlorobenzene, dichlorobenzene, benzene hexachloride (B/H/C), etc.	Agricultural chemicals	○
	Petroleum components	Solvent naphtha, gasoline, kerosene		○
	Alcohols	Methyl alcohol, ethyl alcohol, cyclohexanol, benzyl alcohol	Used as antifreezing agent Leakage detection agent	x
	Phenol	Carbolic acid, cresol, naphthol, etc.	Disinfectant solution	x
	Ethers	Methyl ether, methyl ethyl ether, ethyl ether	Additive of brake oil	○
	Ketones	Acetone, methyl ethyl ketone, cyclohexanone, acetone, etc.		x
	Carboxylic acids	Formic acid, acetic acid, butyl acid, acrylic acid, oxalic acid, phthalic acid, etc.	Dyes/oxalic acid for aluminum processing, phthalic acid for paint base and leakage detection agents	x
	Esters	Dimethyl phthalate (DMP), diethyl phthalate (DEP), dibutyl phthalate (DBP), dioctyl phthalate (DOP)	Lubricant, synthetic oil, rust preventing agent additive plasticizer for synthetic resin	○
	Oxyacids	Glycol acid, lactic acid, malic acid, citric acid, tartaric acid		x
	Nitro Compounds	Nitromethane, nitroethane, nitroethylene, nitrobenzene, etc.		○
	Amines	Methylamine, dimethylamine, ethylamine, aniline, acetanilide, etc.	Additive of brake oil	x
	Nitriles	Acetonitrile, acrylonitrile, benzonitrile, acetoisonitrile, etc.	Raw material for nitrile rubber	○



Pneumatic components (nitrogen gas extraction unit)

Safety Precautions

Be sure to read this section before use. Refer to [Pneumatic, Vacuum and Auxiliary Components (No. CB-024SA)] for general pneumatic components precautions. Although the above general catalog states that products are not applicable for equipment or applications with direct contact with beverages/foodstuffs, the FP2 Series products can be used in such applications as long as they are within the range of the product specifications.

Product-specific cautions: Nitrogen gas extraction unit NS, NSU, PNASeries

Design/selection

CAUTION

■ Working environment

- Avoid installing this product where it will be subject to direct sunlight or rain.
- As the bowl material is polycarbonate, avoid use with the following chemicals or in an atmosphere containing these chemicals. [NSU Series]
- Avoid use in environments where ozone is generated.
- Avoid use where vibration and impact are present.
- Avoid using this product where it will be subject to air with a relative humidity of 50% or more. (Performance will decrease sharply if the separation membrane gets wet with droplets. (such as water))
- Avoid using air containing corrosive gases (strong acidic gases such as hydrogen sulfide, sulfur dioxide, hydrogen chloride, fluorine, etc.) or strong alkali gases (amines, ammonia, caustic soda, etc.).

■ The needle valve cannot be used as a stop valve that requires no leakage.

Slight leakage is allowed for in this product's specifications.

■ Dust cannot be completely kept out of the flow path.

Install a final clean filter if dust could be a problem with the circuit. (Use anti-bacterial/bacteria-removing filters for food processes.)

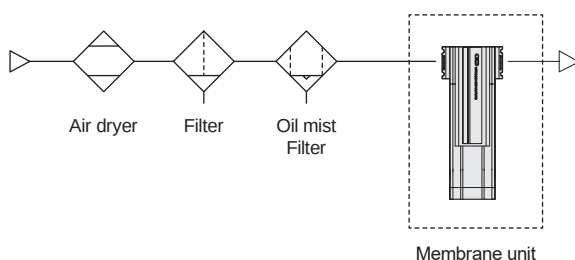
■ "Compatible with Food Sanitation Act" indicates that the product material compliants to the Food Sanitation Act.

■ Use after confirming the structure and material, valve structure, working fluids, and working atmospheres of each component carefully for yourself.

■ Internal parts may wear when the needle valve operates. If the product is affected, take necessary measures, such as installing a filter on the secondary side.

■ Check the working circuit and working fluid.

To prevent drop in membrane unit performance, install the dryer, air filter and oil mist filter on the primary side, and remove water or oil. If the working fluid could contain hydrocarbons, install an activated carbon filter.



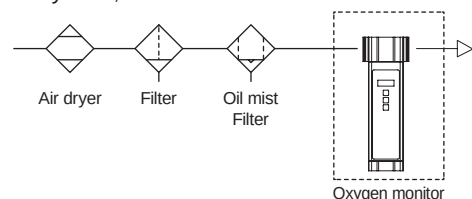
Precautions for the inline oxygen monitor

■ Working environment

- Avoid installing this product where it will be subject to direct sunlight or rain.
- Using the oxygen sensor in the following atmospheres may cause measurement errors and lower performance of the Component and oxygen detector.
- Use outside the 0 to 50°C temperature range or with elements other than air causes significant measurement errors. Avoid using in such conditions.
- The device cannot be used in air containing freon gas, silicon gases, corrosive gases such as SO_x (sulfur oxides) or H₂S (hydrogen sulfide), or halogen gases such as Cl₂ (chlorine), F₂ (fluorine), or Br₂ (bromine), or in air containing constituents which cause these gases to separate at high temperatures of approximately 500°C.
- Use with air that contains combustible gas causes the gas to burn, lowering indications.
- Use in air containing large amounts of dust or oil mist leads to element deterioration.
- Coming into contact with water drops, solutions, or other liquids leads to element damage.
- The element will be damaged if used in locations with strong impacts or vibrations.
- Avoid use in locations with strong magnetic fields or significant electrical noise.
- Indications are not stabilized in environments in which pressure pulses (continuously changes) on a short cycle. Static pressure is required for stable measurements.

■ Check the working circuit and working fluid.

To prevent decreased oxygen concentration monitor performance, install the dryer, air filter and oil mist filter on the primary side, and remove water or oil.



■ This product does not have explosion-proof specifications. Since the detection element is heated by the heater, it may lead to an explosion if used in an explosive atmosphere.

■ This product is not an oxygen detector. Do not use it as an oxygen concentration monitor in accordance with the Industrial Safety and Health Act.

■ When using this product as a CE compliant product, prepare a dedicated power supply.

■ Compliant CE product working conditions

This product is CE-marked, indicating conformity with the EMC Directives. The standard for the immunity for industrial environments applied to this product is EN61326-1. The following stability is applicable in an EMC Directive demand test environment.

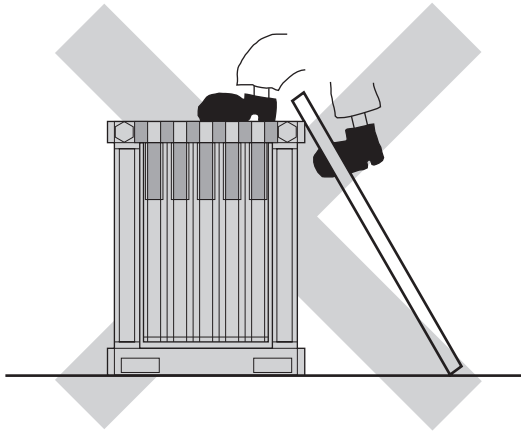
Stability $\pm 0.5\%$ O₂ 0.00 digit (for 10.00% to 2 O₂)
 $\pm 1.0\%$ O₂ 10.01 digit (for 25.00% to 2 O₂)

Types of chemicals	Categories of chemicals	Main products of chemicals	General applications	Polycarbonate
Inorganic compounds	Acids	Hydrochloric acid, sulfuric acid, fluorine, phosphoric acid, chromic acid, etc.	Acid washing of metals, acidic degreasing solutions, coating treatment solutions	x
	Alkalines	Caustic soda, caustic potash, calcium hydroxide, aqueous ammonia, sodium carbonate, etc.	Alkaline degreasing solution for metals	x
	Inorganic salts	Sodium sulfide, potassium nitrate, potassium bichromate, sodium sulfate, etc.		x
Organic compounds	Aromatic hydrocarbons	Benzene, toluene, xylene, ethyl benzene, styrene, etc.	Contained in paint thinner (benzene, toluene, and xylene)	x
	Chlorinated aliphatic hydrocarbons	Methyl chloride, ethylene chloride, methylene chloride, acetylene chloride, chloroform, trichlene, perchlene, carbon tetrachloride	Organic solvent-based washing solution for metals (trichlene, perchlene, carbon tetrachloride, etc.)	x
	Chlorinated aromatic hydrocarbons	Chlorobenzene, dichlorobenzene, benzene hexachloride (B/H/C), etc.	Agricultural chemicals	x
	Petroleum components	Solvent, naphtha, gasoline		x
	Alcohols	Methyl alcohol, ethyl alcohol, cyclohexanol, benzyl alcohol	Used as antifreezing agent	x
	Phenol	Carbolic acid, cresol, naphthol, etc.	Disinfectant solution	x
	Ethers	Methyl ether, methyl ethyl ether, ethyl ether	Additive of brake oil	x
	Ketones	Acetone, methyl ethyl ketone, cyclohexanone, acetophenone, etc.		x
	Carboxylic acids	Formic acid, acetic acid, butyl acid, acrylic acid, oxalic acid, phthalic acid, etc.	Dyes; oxalic acid for aluminum processing; phthalic acid for paint base	x
	Phosphate ester	Dimethyl phthalate (DMP), diethyl phthalate (DEP), dibutyl phthalate (DBP), dioctyl phthalate (DOP)	Lubricant, synthetic coolant, rust preventing agent additives used as plasticizer for synthetic resin	x
	Oxyacids	Glycol acid, lactic acid, malic acid, citric acid, tartaric acid		x
	Nitro compounds	Nitromethane, nitroethane, nitroethylene, nitrobenzene, etc.		x
	Amines	Methylamine, dimethylamine, ethylamine, aniline, acetanilide, etc.	Additive of brake oil	x
	Nitriles	Acetonitrile, acrylonitrile, benzonitrile, acetoisocyanide, etc.	Raw material for nitrile rubber	x

Mounting, installation and adjustment

⚠ CAUTION

- Do not step on this product.



- When piping, remove cutting oil, rust preventing agent or contaminants, etc.
- Mount air filters or oil mist filters so that the drain outlet faces straight downward. Use a bore size $\phi 5.7$ to $\phi 6$ tube for drain discharge piping, and keep the length within 5 m. Avoid vertical piping. [NSU Series]
- Install an oil removing filter (M type) in front of the membrane unit inlet to remove all water drops and oil. If oil adheres to the separation membrane, nitrogen concentration may decrease.
- Install the regulator on the outlet side of the membrane unit.
- When installing NS (2, 3 units), fix the inlet and outlet pipes or fix the body with a bracket.
- When installing NS (6 units or more), place it on a solid and flat surface that does not vibrate and fix the base with anchor bolts.

Precautions for needle valves with adjusting dial

- To adjust the flow rate, turn the dial to the right to open or the left to close.
- After adjustment, lock the dial with the sliding lock lever.
- The flow rate control range is from "1" to "12" or "13".
Do not set the flow rate outside this range. Turning the dial to the fully closed or fully open position forcibly may result in failure or abnormal flow characteristics.
- Even when the needle is fully closed, the dial display is not 0.
Calibration of the dial indicator flow rate is performed when the needle is not fully closed. Note that 0 is not necessarily indicated when the needle is fully closed. After "0", either "19" or no number at all is displayed.
- Do not remove the dial from the body.
If the dial is removed, readjustment and calibration of flow characteristics cannot be performed.

Use/maintenance

⚠ WARNING

- **There may be oxygen deficiency in the nitrogen gas. Observe the following instructions when using.**

- Use in well ventilated locations.
- Ventilate the work area when nitrogen gas is being used.
- Periodically inspect nitrogen gas piping for leakage.

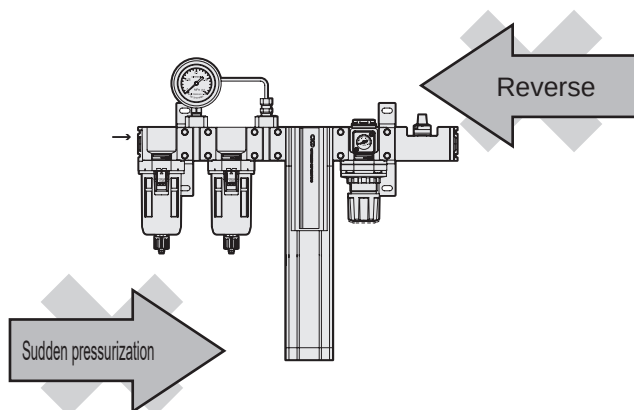
- **Oxygen-rich gas is discharged from the exhaust port of the membrane unit, so be aware of the following points when installing the equipment.**

- Install away from fire or flammable objects.
- Ventilate the work area during operation of the equipment.

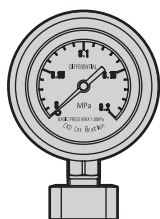
- Do not use the product for any purpose directly related to human life.

⚠ CAUTION

- Do not use reverse air flow.
Do not pressurize suddenly. The differential pressure gauge or mantle may be damaged. [NSU Series]



- The oil mist filter life is spent when the pressure drops to 0.07MPa or after one year of use, whichever comes first. Replace the mantle with a new one at the end of its life. (Check the pressure drop with the differential pressure gage.) (Do not touch the urethane rubber foam layer when replacing the mantle) [NSU Series]



0.07MPa

- The service life of the membrane unit differs according to the working conditions. As a guideline, replace the membrane every 3 to 5 years.

- Confirm that pressure has been released before mounting or removing the bowl and bowl guard. [NSU Series]

- Be aware that adequate time is necessary to obtain a required nitrogen concentration after compressed air is supplied.

Precautions for the inline oxygen monitor

- Do not disassemble or modify this product. Doing so could result in faults.

- The sensor may deteriorate depending on the working conditions. To maintain performance longer, yearly calibration is recommended.



Pneumatic components (flow rate sensor)

Safety Precautions

Be sure to read this section before use. pneumatic components Refer to “Pneumatic, Vacuum and Auxiliary Components (No. CB-024SA)” for general precautions. Although the above general catalog states that products are not applicable for equipment or applications with direct contact with beverages/foodstuffs, the FP2 Series products can be used in such applications as long as they are within the range of the product specifications.

Product-specific cautions: Flow rate sensor NS-QFS Series

Design/selection

Working fluids

DANGER

- Do not use this product with flammable fluids.

WARNING

- This product cannot be used as a billing meter.
Do not use this product for commercial transactions as it is not compliant with the Measurement Act. Intended applications include industrial sensors.
- Do not use fluids which are not applicable.
- Use dry gas which does not contain corrosive elements such as chlorine, sulfur or acids, and which is clean and does not contain dust or oil mist.
- Depending on the fluid, retaining the fluid for long periods could adversely affect the performance. Do not seal the fluid in the pipe for long periods of time.
- Working pressure/flow rate range
Applications exceeding the max. working pressure and specified flow rate range may result in faults.
- When using a valve on the primary side of this product, use only an oil-prohibited specification valve. This sensor could malfunction or fail if exposed to splattering grease, oil, etc. As friction powder may be generated depending on the valve, mount a filter to prevent the powder from entering the sensor.

Working environment

DANGER

- Explosion-proof environments: Never use this product in an explosive gas atmosphere. The structure is not explosion-proof, and explosions or fires could occur.

WARNING

- Corrosive environment: Do not use this product in an atmosphere containing corrosive gases such as sulfur dioxide.
- Ambient/fluid temperatures: Use at ambient/fluid temperatures within the specified range of 5 to 50°C. Even if the temperature is within the specified range, do not use this product if the ambient temperature and fluid temperature could suddenly change and cause dew to condense.
- Drip-proof environment: The degree of protection of this product is equivalent to IP40. Do not install this product where water, salt, dust, or swarf is present or in a pressurized or depressurized environment. The product cannot be used with large temperature variations or high temperature/humidity since condensation may occur inside the body.

Flow rate unit

CAUTION

- This product's flow rate is measured at a mass flow rate unaffected by temperature or pressure. The unit is L/min, but this is the display when the mass flow rate is converted to volumetric flow rate at 20°C, 1 atmosphere (101 kPa) relative humidity 65%RH.

Overflow

CAUTION

- The sensor can handle an overflow double the measured range. If dynamic pressure is applied near the maximum working pressure (when a pressure difference exceeding the max. working pressure is applied between primary and secondary sides), the sensor may operate abnormally. If dynamic pressure is applied, such as when a workpiece is filled for leakage inspection, provide a bypass circuit or restrictor so that dynamic pressure is not applied to the sensor.

Other

CAUTION

- The flow path is not completely free of dust generation. A final clean filter should be used in circuits where dust generation could be a problem.

Mounting/Installation/During adjustment

Piping

⚠ CAUTION

- Always pipe before starting wiring, mount the booster.
- Align the fluid flow direction to the direction indicated on the product when connecting the pipes.
- Do not install the regulator/solenoid valve, etc., immediately before this product. Generated drift may cause errors.
- Before installing the piping, clean out the pipes using an air blower to remove all foreign matter and cutting chips from the pipes. The rectifier or sensor chip could be damaged if a large amount of foreign matter, cutting chips, etc., enters.
- Make sure that the leakage detection solution does not enter the inside of this product when inspecting the pipe for leaks.
- This product is exclusively for nitrogen gas extraction unit system type NSU. When piping, provide modular connection with our products.

Mounting

⚠ CAUTION

- The LCD display flow rate meter uses a liquid crystal display. This may be difficult to read depending on the angle.

Wiring

⚠ DANGER

- Use power supply voltage and output within the specified voltage. If voltage exceeding the specified voltage is applied, the sensor could malfunction or be damaged, or electrical shock or fire could occur. Do not use any load that exceeds the rated output. Otherwise, output may result in damage or fire.
- Stop the controls and machine devices and turn power OFF before wiring. Starting operation suddenly could cause unpredictable and dangerous operation. Conduct an energized test with controls and machine devices stopped, and set target switch data. Be sure to discharge any accumulated electrostatic charge among personnel, tools, or equipment before and during work.

⚠ WARNING

- Install the product and wiring as far away as possible from sources of noise such as power distribution wires. Provide separate countermeasures for surge applied to the power cable. The display or output could fluctuate.

- Do not short-circuit the load. Failure to observe this could result in rupture or burning.

■ Check wiring insulation.

Check that wires do not come into contact with other circuits, that no ground faults occur, and that the insulator between terminals is not defective. Overcurrent could flow in and damage the sensor.

- Check line color when wiring. As incorrect wiring could result in sensor damage and malfunctions, check wire color against the instruction manual before wiring.

- Use a stabilized DC power supply within the specified rating, insulated from the AC power supply. A non-isolated power supply could result in electrical shock. If power is not stabilized, the peak value could be exceeded. This could damage the product or impair accuracy.

- The power supply is a DC stabilized power supply completely isolated from the AC primary side. Connect either the + side or - side of the power to the FG. Connect either the + side or - side of the power to the F.G. Between the internal power circuit and the product's housing, a varistor (limit voltage approx. 40 V) is connected to prevent dielectric breakdown of the sensor. Disconnect wiring first if this testing is required. An excessive potential difference between the power supply and product housing will burn internal parts. After installing, connecting and wiring the unit, electrical welding of the device/frame, short-circuit accidents, etc., could cause welding current, excessively high voltage caused by welding, or surge voltage, etc., to run through the wiring, ground wire, or fluid path connected between the above devices, damaging wires or devices. Conduct any work such as electrical welding after removing this device and disconnecting all electric wires connected to the F.G.

- Do not use this product at levels exceeding the power supply voltage. If voltage exceeding this range or AC power is applied, the controller could rupture or burn.

- Check that stress (7N and over) is not directly applied to lead wire.

During adjustment

⚠ CAUTION

- If switches are operated when fluid is not stable, such as pulsating, operation may be unstable. Avoid setting switches in an unstable area, and confirm that switch operation is stable before use.

Usage/Maintenance

⚠ WARNING

■ CE-compliance working conditions

This product is CE-marked, indicating conformity with the EMC Directives. The standard for the immunity for industrial environments applied to this product is EN61000-6-2; the following requirements must be satisfied in order to conform to this standard.

Conditions

- The evaluation of this product is performed by using a lead wire that has a power supply line and a signal line paired to assess the product's performance.
 - This product is not equipped with surge protection. Implement surge protection measures on the system side.
- Do not disassemble or modify this product. Doing so could result in faults.

■ Output accuracy is affected by temperature characteristics and heat generated when energized. Provide a standby time (5 minutes or more) after turning the power ON for use.

■ This product does not use flow rate control for five seconds after power is turned ON to complete self-diagnostics. Provide a control circuit/program that ignores signals for at approximately 5 seconds after power is turned ON.

⚠ CAUTION

■ If a problem occurs during operation, immediately turn the power OFF, stop use, and contact your dealer.

■ This product uses a micro-sensor chip, and must be installed where it will not be subject to dropping, impact or vibration. Handle this product as a precision component during installation and transportation.

■ Keep this product's flow rate within the rated flow range.

■ Use this product within the working pressure.

■ Contact CKD to purchase lead wire discrete for maintenance.

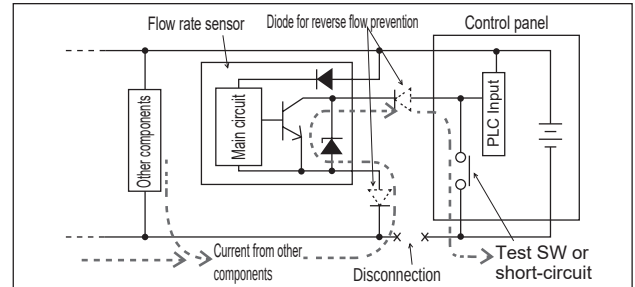
■ If the output setting value is changed, control system devices could operate unintentionally. Stop devices before changing settings.

■ Analog output continues even if the flow rate range is exceeded. For labeling, "Hi" or "Lo" are displayed. Note that this is outside the guaranteed precision.

■ The accuracy may vary from the initial status depending on the working environment or working conditions. It is recommended to check the operation of the product periodically.

■ The sensor chip will degrade when used for long periods and cause the detected flow rate to fluctuate. Periodically inspect the sensor chip.

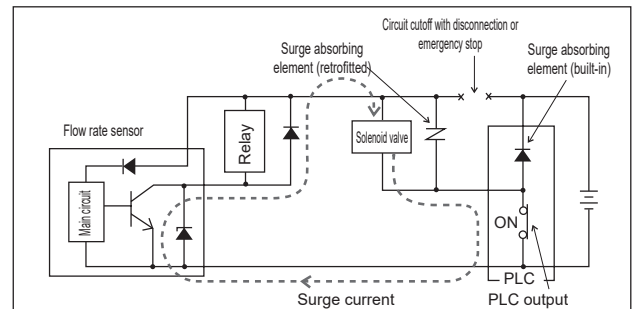
■ Pay attention to reverse currents caused by disconnected wires and wiring resistance. If other devices, including a flow rate sensor, are connected to the same power supply as the flow rate sensor, and the switch output wire and power cable negative (-) side are short-circuited to check the operation of the control panel input unit, or if the power cable negative (-) side is disconnected, reverse current could flow to the flow rate sensor's switch output circuit and cause damage.



■ Take the following measures to prevent damage caused by reverse current:

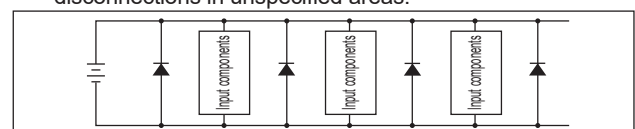
- ① Avoid centralizing current at the power cable, especially the minus side power cable, and use as thick a cable as possible.
- ② Limit the number of devices connected to the same power source as the flow rate sensor.
- ③ Insert a diode parallel to the flow rate sensor's output line to prevent reverse current.
- ④ Insert a diode parallel to the flow rate sensor power wire's negative (-) side to prevent reverse current.

■ Pay attention to surge current flow-around. When flow rate sensor power is shared with an inductive load that generates surges, such as a solenoid valve or relay, if the circuit is cut off while the inductive load is functioning, surge current could enter the switch output circuit and cause damage depending on where the surge absorbing element is installed.



Take the measures below to prevent damage from sneak surge current.

- ① Separate the power supply for output including the inductive load, such as the solenoid valve and relay, and input, such as the flow rate sensor.
- ② If a separate power supply cannot be used, directly install a surge absorption element for all inductive loads. Consider that the surge absorption element connected to the PLC, etc., protects only the individual device.
- ③ Connect a surge absorption element to places on the power wiring shown in the figure below, as a measure against disconnections in unspecified areas.



■ Do not press on the cover. This may lead to failure.

■ The display case is made of resin. Do not use solvent, alcohol or detergent in cleaning, since the resin could absorb it. There is a risk of affecting the resin. Wipe off dirt with a diluted neutral detergent solution and rag wrung out well.