



Safety Precautions

Be sure to read this section before use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured.

It is important to select, use, handle and maintain the product appropriately to ensure that the CKD product is used safely.

Observe warnings and precautions to ensure device safety.

Check that device safety is ensured, and manufacture a safe device.





WARNING


- 1** This product is designed and manufactured as a general industrial machine part. It must be handled by an operator having sufficient knowledge and experience.
 - 2** Use this product in accordance with specifications.

This product must be used within its stated specifications. In addition, never modify or additionally machine this product. This product is intended for use in general industrial machinery equipment or parts. It is not intended for use outdoors (except for products with outdoor specifications) or for use under the following conditions or environments.
(Note that this product can be used when CKD is consulted prior to its usage and the customer consents to CKD product specifications. The customer should provide safety measures to avoid danger in the event of problems.)

 - 1** Use for applications requiring safety, including nuclear energy, railways, aircraft, marine vessels, vehicles, medical devices, devices or applications in contact with beverages or foodstuffs, amusement devices, emergency cutoff circuits, press machines, brake circuits, or safety devices or applications.
 - 2** Use for applications where life or assets could be significantly affected, and special safety measures are required.
 - 3** Observe organization standards and regulations, etc., related to the safety of device design and control, etc. ISO4414, JIS B 8370 (Pneumatics fluid power - General rules and safety requirements for systems and their components) JFPS2008 (Principles for pneumatic cylinder selection and use)
Including the High Pressure Gas Safety Act, Industrial Safety and Health Act, other safety rules, organization standards and regulations, etc.
 - 4** Do not handle, pipe, or remove devices before confirming safety.
 - 1** Inspect and service the machine and devices after confirming safety of all systems related to this product.
 - 2** Note that there may be hot or charged sections even after operation is stopped.
 - 3** When inspecting or servicing the device, turn OFF the energy source (air supply or water supply), and turn OFF power to the facility. Discharge any compressed air from the system, and pay attention to possible water leakage and leakage of electricity.
 - 4** When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.
 - 5** Observe warnings and cautions in the following pages to prevent accidents.
- The precautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

 **DANGER:** When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, and when there is a high degree of emergency to a warning.

 **WARNING:** If handled incorrectly, a dangerous situation may occur, resulting in death or serious injury.

 **CAUTION:** When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation. Every item provides important information and must be observed.

Warranty

- 1** **Warranty period**

The product specified herein is warranted for one (1) year from the date of delivery to the location specified by the customer.
- 2** **Warranty coverage**

If the product specified herein fails for reasons attributable to CKD within the warranty period specified above, 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:

 - 1) 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 the Instruction Manual.
 - 2) Failure caused by use of the product exceeding its durability (cycles, distance, time, etc.) or caused by consumable parts.
 - 3) Failure not caused by the product.
 - 4) Failure caused by use not intended for the product.
 - 5) Failure caused by modifications/alterations or repairs not carried out by CKD.
 - 6) Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
 - 7) 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.
Note: For details on the durability and consumable parts, contact your nearest CKD sales office.
- 3** **Compatibility check**

The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.



Pneumatic Component (Nitrogen Extraction Unit)

To Use This Product Safely

Be sure to read this before use.

Individual Precautions: Nitrogen Extraction Unit NS, NSU Series

*For precautions regarding PNA, NS-QFS series, refer to the individual precautions for each model (P. 36-37).

During Design / Selection

Warning

■ Nitrogen gas may run the risk of acid deficiency.

- Use in a well-ventilated location.
- Ventilate while using nitrogen gas.
- Regularly inspect the leakage of nitrogen gas piping.

■ Oxygen-rich gas is discharged from the exhaust port of the membrane unit.

- Install away from fire and combustibles.
- Ventilate during equipment operation.

■ Do not use for purposes directly involving human life.

Caution

■ About Operating Environment

- Do not use in direct sunlight or rain.
- The bowl is made of polycarbonate and should not be used in the following chemicals or in an atmosphere. [NSU Series]
- Avoid use in ozone-generating environments.
- Avoid use in locations with vibration and shock.
- Avoid use in humid air with relative humidity of 50% or higher. (If the separation membrane is wetted by droplets (such as water), the performance will deteriorate significantly.)
- Do not allow air containing corrosive gases (strongly acidic gases such as hydrogen sulfide, sulfur dioxide, hydrogen chloride, and fluorine) or strongly alkaline gases (amine, ammonia, sodium hydroxide, etc.) to flow.

■ The needle valve cannot be used as a stop valve requiring zero leakage.

A certain amount of leakage is allowed due to product specifications.

■ Dust in the flow channel is not zero.

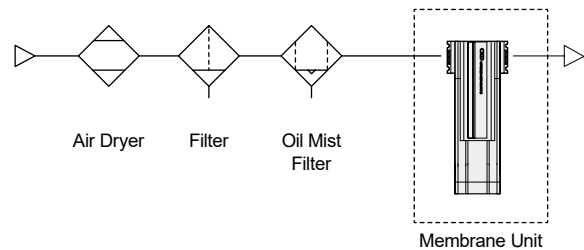
In circuits where particle generation is a problem, use together with a final clean filter. (In food processes, use antibacterial/sterilizing filters.)

■ Use after sufficiently confirming the suitability of the constituent materials and valve structure of each component, operating fluid, and operating atmosphere at the customer's discretion.

■ The operation of the needle valve may cause internal parts to wear out. If affected, implement necessary measures such as installing a filter on the secondary side.

■ Check the operating circuit and operating fluid.

To prevent membrane unit performance degradation, install a dryer, air filter, and oil mist filter on the primary side to remove moisture and oil. If the operating fluid may contain hydrocarbons, install an activated carbon filter.



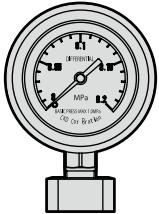
■ For water droplet and oil removal, be sure to install an oil removal filter (M type) immediately upstream of the membrane unit. Nitrogen concentration may decrease if oil adheres to the separation membrane.

■ The regulator should be installed on the exit side of the membrane unit.

■ When installing NS (2·3·4 pcs), fix the inlet and outlet piping or fix the main unit with a bracket.

■ When installing NS (6 pcs or more), select a sturdy, level surface free from vibration, and fix the base with anchor bolts.

- The lifespan of the oil mist filter is when the pressure drop reaches 0.07 MPa, or 1 year, whichever comes first. When the lifespan is reached, replace the mantle with a new one. (Check pressure drop with a differential pressure gauge.) (Do not touch the urethane rubber foam layer when replacing the mantle)
[NSU Series]



0.07 MPa

- The lifespan of the membrane unit varies depending on operating conditions, but replace it with a guideline of 3 to 5 years.
- Be careful as time is required after supplying compressed air until the necessary nitrogen concentration is obtained.

Chemicals	Classification of Chemicals	Main Chemical Products	General Usage Examples	Polycarbonate
Inorganic Compounds	Acids	Hydrochloric acid, Sulfuric acid, Hydrofluoric acid, Phosphoric acid, Chromic acid, etc.	Metal pickling solutions / Acidic degreasing solutions Coating treatment solutions	×
	Alkalis	Caustic soda, Caustic potash, Slaked lime, Ammonia water, Sodium carbonate, etc.	Metal alkaline degreasing solutions	×
	Inorganic Salts	Sodium sulfide, Potassium nitrate, Potassium dichromate, Sodium sulfate, etc.		×
Organic Compounds	Aromatic Hydrocarbons	Benzene, Toluene, Xylene, Ethylbenzene, Styrene, etc.	Contained in paint thinners (Benzene, Toluene, Xylene)	×
	Chlorinated Aliphatic Group Hydrocarbons	Methyl chloride, Ethylene chloride, Methylene chloride, Acetylene chloride, Chloroform, Trichlene, Perchloroethylene, Carbon tetrachloride	Metal organic solvent based cleaning solutions (Trichlene, Perchloroethylene, Carbon tetrachloride, etc.)	×
	Chlorinated Aromatic Group Hydrocarbons	Chlorobenzene, Dichlorobenzene, Hexachlorobenzene (BHC), etc.	Pesticides	×
	Petroleum Components	Solvent Naphtha / Gasoline		×
	Alcohols	Methyl alcohol, Ethyl alcohol, Cyclohexanol, Benzyl alcohol	Used as antifreeze	×
	Phenols	Carbolic acid, Cresol, Naphthol, etc.	Disinfectants	×
	Ethers	Methyl ether, Methyl ethyl ether, Ethyl ether	Brake fluid additives	×
	Ketones	Acetone, Methyl ethyl ketone, Cyclohexanone, Acetophenone, etc.		×
	Carboxylic Acids	Formic acid, Acetic acid, Butyric acid, Acrylic acid, Oxalic acid, Phthalic acid, etc.	Dyes / Oxalic acid is aluminum treatment agent Phthalic acid used as paint base	×
	Phosphate Esters	Dimethyl phthalate (DMP), Diethyl phthalate (DEP), Dibutyl phthalate (DBP), Dioctyl phthalate (DOP)	Additives for lubricating oil, synthetic hydraulic fluid, rust preventive oil Used as plasticizer for synthetic resin	×
	Oxy Acids	Glycolic acid, Lactic acid, Malic acid, Citric acid, Tartaric acid		×
	Nitro Compounds	Nitromethane, Nitroethane, Nitroethylene, Nitrobenzene, etc.		×
	Amines	Methylamine, Dimethylamine, Ethylamine, Aniline, Acetanilide, etc.	Brake fluid additives	×
Nitriles	Acetonitrile, Acrylonitrile, Benzonitrile, Acetoisocyanide, etc.	Raw material for nitrile rubber	×	

For precautions during mounting, installation, adjustment, use, and maintenance, refer to the CKD Component Product Site (<https://www.ckd.co.jp/kiki/en/>)→"Model No." → **Instruction Manual**



Pneumatic Component (Flow Sensor)

To Use This Product Safely

Be sure to read this before use.

Individual Precautions: Flow Sensor NS-QFS Series

During Design / Selection

About Operating Fluid

Danger

- Never use with flammable fluids.

Warning

- Cannot be used as a meter for transactions. Does not comply with the Measurement Act, so do not use for commercial transactions. Use as an industrial sensor.
- Do not use fluids other than the applicable fluid.
- Use clean dry gas that does not contain corrosive components such as chlorine, sulfur, acids, etc., and does not contain dust or oil mist.
- Depending on the quality of the fluid, leaving the fluid stagnant for a long time may adversely affect performance. Do not seal the fluid inside the piping for a long time.
- Operating Pressure Range / Operating Flow Rate Range
Use above the maximum operating pressure or below the minimum operating pressure, or outside the operating flow rate range, will cause malfunction, so use within the specification range.
- When using a valve on the primary side of the sensor, use an oil-free specification valve. Scattering of grease, oil, etc., may cause the sensor to malfunction or be destroyed. Additionally, depending on the valve, wear particles may be generated. To prevent these particles from flowing into the sensor, install a filter before use.

About Operating Environment

Danger

- Explosion-proof environments: Never use this product in an explosive gas atmosphere. It does not have an explosion-proof structure, so it may cause an explosion or fire.

Warning

- Corrosive environments: Do not use this product in an atmosphere containing corrosive gases such as sulfur dioxide.
- Ambient/fluid temperatures: Use ambient/fluid temperatures from 5 to 50°C within the specified range. Note that even within the temperature range, do not use in locations where ambient temperature/fluid temperature changes rapidly causing condensation.

- Drip-proof environments: The degree of protection of this product is equivalent to IP40. Do not install in locations with moisture, salt, dust, cutting chips, or under pressurized/depressurized environments. Cannot be used in locations with rapid temperature changes or high humidity environments as condensation inside the main unit may cause problems.

About 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 mass flow rate is converted to volume flow rate at 20°C, 1 atm (101 kPa), relative humidity 65% RH.

About Excess Flow Rate

Caution

- The sensor can withstand excess flow up to approximately twice the measurement range without issue. However, applying dynamic pressure near the maximum operating pressure (specifically, when the pressure difference between the primary and secondary sides exceeds the maximum operating pressure) may cause sensor damage. When dynamic pressure is applied, such as during workpiece filling for leak inspection, be sure to provide a bypass circuit or restriction to prevent dynamic pressure from being applied to the sensor.

Other

Caution

- Since particle generation within the flow path is not zero, if particle generation is a problem, use together with a final clean filter.

About Piping

Caution

- Do not install pressure reducing valves (regulators), solenoid valves, etc., immediately before this product. Unbalanced flow may occur, causing errors.
- This product is dedicated to the Nitrogen Extraction Unit System Type NSU. When piping, use modular connection with our products.

For precautions during mounting, installation, adjustment, use, and maintenance, refer to the CKD Component Product Site (<https://www.ckd.co.jp/kiki/en/>)→"Model No." → [\[Instruction Manual\]](#).



To Use This Product Safely

Be sure to read this before use.

Product-specific cautions: Oxygen Concentration Monitor PNA Series

During Design / Selection

Caution

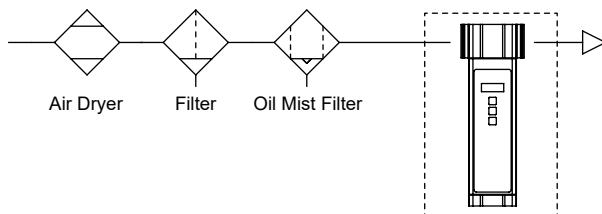
■ About Operating Environment

- Avoid use in places exposed to direct sunlight or rain.
- The oxygen analyzer may produce measurement errors or its performance/oxygen detector may be impaired in the following atmospheres.
- Avoid use outside the temperature range of 0 to 50°C, or if components differ from air, as measurement errors will increase.
- Air containing corrosive gases such as Freon gas, silicon-based gases, SO_x (sulfur oxides), H₂S (hydrogen sulfide), halogen gases such as Cl₂(chlorine), F₂(fluorine), Br₂(bromine), or air where the above gases separate at high temperatures of about 500°C cannot be used.
- Using in air containing combustible gas will cause the combustible gas to burn, lowering the indication.
- Using air containing large amounts of dust or oil mist will cause element deterioration.
- If liquid such as water droplets or solutions touches the sensor, the element will be destroyed.
- Using in locations with strong impact or vibration will destroy the element.
- Avoid use in locations with strong magnetic fields or strong electrical noise.
- Indication is unstable in environments where pressure pulsates (changes continuously) over a short period. Static pressure is required for stable measurement.

- Use after sufficiently confirming the suitability of the constituent materials and valve structure of each component, operating fluid, and operating atmosphere at the customer's discretion.

■ Check the operating circuit and operating fluid.

To prevent oxygen analyzer performance degradation, install a dryer, air filter, and oil mist filter on the primary side to remove moisture and oil.



- This product does not have an explosion-proof specification. The detection element is heated by a heater, so using it in an explosive atmosphere may cause induced explosion.

- This product is not an oxygen deficiency meter. Do not use as an oxygen analyzer under the Industrial Safety and Health Act.

- When using this product as a CE compliant prepare a dedicated power supply for this product.

■ Conditions for Use for CE Compliance

This product is a CE compliant product adapted to the EMC Directive. The harmonized standard regarding immunity applied to this product is EN61326-1, but the following stability applies under the EMC Directive required test environment.

Stability $\pm 0.5\%O_2 \pm 1$ digit (for 0.00 to 10.00%O₂)
 $\pm 1.0\%O_2 \pm 1$ digit (for 10.01 to 25.00%O₂)

- Do not disassemble or modify as it will cause malfunction.

- The sensor may deteriorate depending on the operating conditions. To maintain performance longer, calibration every 1 year is recommended.

For precautions during mounting, installation, adjustment, use, and maintenance, refer to the CKD Component Product Site (<https://www.ckd.co.jp/kiki/en/>)→"Model No."→ [Instruction Manual](#).