Inline Oxygen Monitor
PNA Series

INSTRUCTION MANUAL

SM-A10371-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 inline oxygen monitor.
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.

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, JFPS 2008 (the latest edition of each standard), the High Pressure Gas Safety Act, the Industrial Safety and Health Act, other safety rules, organization standards, relevant laws and regulations

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 its 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 environments 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 nitrogen-rich 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.

CONTENTS

1. PRODUCT OVERVIEW

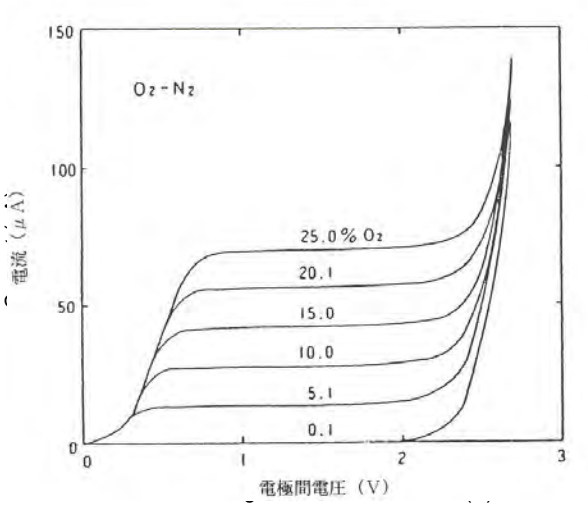
1.1 Description of operation

■ Overview

This device has a highly reliable O2 detection element using stabilized zirconia solid electrolyte and can measure the oxygen concentration upon power-up, without requiring any reference gas.
It has a switch output port and an analogue output port and can be easily connected to any external device or recorder.

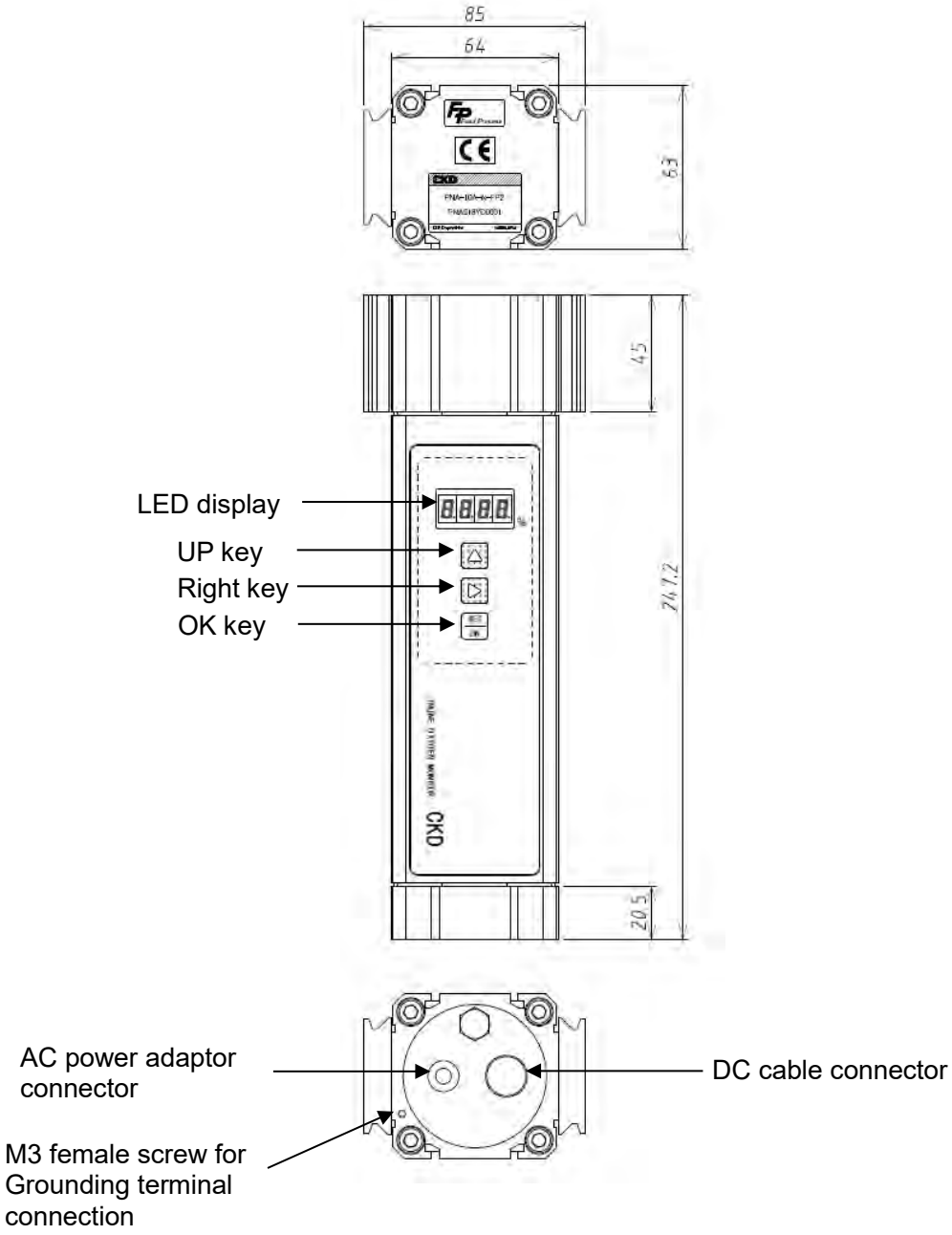
■ Principle of operation

Stabilized zirconia is known as an oxygen ion conductor. Stabilized zirconia is used as the substrate, on a face of which a platinum electrode and oxygen diffusion limiting pores are formed and on the other face a platinum heater is formed. When the heater is energized to heat the substrate up to around 500°C and a voltage is applied between the electrodes in order to obtain a practical oxygen ion conductivity, the current flows through the substrate, with oxygen ions serving as carriers.
However, the oxygen diffusion limiting pores formed on the cathode limits the amount of oxygen flowing into it and a flat range (limit current) is observed on the current-voltage characteristic. As the limit current changes according to the oxygen concentration, the oxygen concentration in the air can be understood by measuring the limit current.

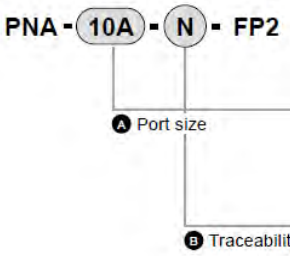


Current-voltage characteristic

1.2 Part name


85
64
63
45
74.2
20.5
LED display
UP key
Right key
OK key
CKD
AC power adaptor connector
DC cable connector
M3 female screw for Grounding terminal connection

1.3 Model Number Indication



Code	Content
A Port size	
10A	Rc3/8
10B	G3/8
10C	NPT3/8
B Traceability	
N	None
M	Traceability certification with series variation diagram and company certification

*Connector cable is not included. Refer to see the page 10 for details.

1.4 Specifications and characteristics

1.4.1 General specifications

Measurement method	Zirconia solid electrolyte type
Sampling method	Natural diffusion type
Display	Display can be switched between oxygen concentration and nitrogen concentration (100-oxygen concentration)
Working fluid	Nitrogen-rich compressed air
Working pressure MPa	0 to 1.0
Proof pressure MPa	1.5
Ambient temperature and humidity	0 to 50°C, 80%RH or less (no condensation)
Fluid temperature	0 to 50°C (no condensation)
Storage ambient temperature and humidity	-10 to 60°C, 80%RH or less (no condensation)
Maximum flow rate L/min (ANR)	500 Note 1
Measurement range $\%O_2$	0.00 to 25.00
Accuracy Note 2	For 0.00% to 1.00%O_2 ±0.05%O_2 For 1.01% to 2.50%O_2 ±0.10%O_2 *Note:There is a ±0.01% O_2 read accuracy that will be reflected in the display. For 2.51% to 10.00%O_2 ±0.5%O_2 For 10.01% to 25.00%O_2 ±1.0%O_2
Response time Note 3	90% response within 20 seconds
Analogue output	4 to 20 mA current output (for 0.00 to 25.00%O_2)
Analogue output load resistance	0 to 400 Ω
Analogue output accuracy	0.064 mA/0.1%O_2
Switch output	Set value and detection element error: 1 (relay output)
Switch output capacity	24 VDC, 1 A
Supply voltage	24 VDC ±15% (in case of use of AC adaptor: 100 VAC to 240 VAC)
Power consumption	10 W or less
Degree of protection	Equivalent to IP65
EMC Directive	EN61326-1
Weight kg	1.6
Warm-up time Note 4	About 5 minutes after power-up

Note 1: Contact CKD when 500 L/min (ANR) is exceeded.
Note 2: Value measured in dry gas consisting of oxygen and nitrogen.
Note 3: The response times are for flow rates of 5 L/min (ANR) or more.
Note 4: No analogue output or switch output is given during warm-up.

1.4.2 Switch output specifications

Detection element error	In case of oxygen detection element heater error, power circuit error or detachment of oxygen detection element, the switch output becomes ON regardless of the measured value.
Operation key	3 keys • Switching between oxygen concentration and nitrogen concentration (short press), change to upper and lower limit setting mode (long press), determination of upper and lower limit setting • Upper and lower limit setting (move between digits of set value) • Upper and lower limit setting (shift of set value)

2. INSTALLATION

2.1 Environment

⚠ WARNING

Before using the product under conditions not specified for the product or for special applications, make sure to consult CKD about its specifications.

⚠ CAUTION

Observe the following rules about installation environment.

Do not use the product at a place exposed to direct sunlight or rainwater.

In an environment as mentioned below, the device or oxygen detection element cannot deliver its full performance and may bring about error in measurement. The oxygen detection element may deteriorate.

If the detection element temperature is not within the range from 0°C to 50°C or if the composition of the ambient gas differs from the air, the device shows a larger error in measurement. Avoid using the device in such an environment.

A place where a large volume of inflammable gas (e.g. alcohol gas) exists (such a gas may bring about not only error in measurement but also explosion).

Use of air containing any corrosive gas such as chlorofluorocarbons, silicon gases, SO_x (sulfur oxides) and H_2S (hydrogen sulfide) or halogens such as Cl_2 (chlorine), F_2 (fluorine) and Br_2 (bromine) or air containing a large amount of air, dust or oil mist from which any of gases mentioned above are separated in a high temperature of about 500°C.

Environment where any liquid such as water drop or solution gets in contact with the sensor.

Use at a place subject to strong shocks or vibrations.

The device cannot indicate stable value in an environment where the pressure pulsates (continuously changes) with short cycles. Stable measurement is possible only when there is static pressure.

Use at a place where there is a strong electric field, a strong magnetic field or a strong noise.

Avoid using the device in a high humidity. Condensation may occur due to temperature change.

Use in an explosion proof environment.

Check the circuits and fluid used.

In order to prevent the performances of the oxygen monitor from worsening, provide a dryer, an air filter and an oil mist filter at the primary side to remove water and oil contents.

2.2 Unpacking

⚠ CAUTION

Do not remove the oxygen monitor from the packaging bag until just before piping.

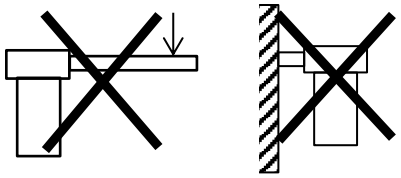
If bags are opened before the oxygen monitor is ready to be connected to the pipes, foreign matters may enter inside the oxygen monitor and may cause a failure or malfunction.

- Check that the model number ordered and the model number indicated on the product are the same.
- Check the exterior of the product for any damage.
- Secure working space around the oxygen monitor for installation, removal, wiring and piping.

2.3 Mounting

⚠ WARNING

Avoid applying any piping load or torque to pipes.
Avoid fixing a pipe in the way.
because such a fixation method puts the pipe under an excessive force, leading to breaking.



⚠ CAUTION

Tighten the screws with the appropriate tightening torque.
If assembly or tightening is not properly done, it may result in air leakage, product falling off, screw breakage, or deformation of DIN rails.

■ Mounting directly

Following parts are required for mounting directly.

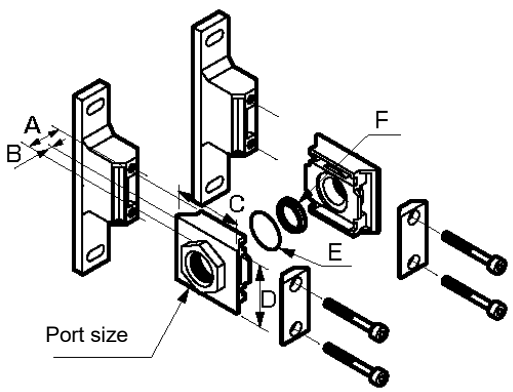
Part name	Model number
Pipe adaptor sets with T-type bracket	A400-□-W-B□W
Gasket	C4000-GASKET (5 pieces)

One gasket is attached to pipe adaptor sets, but two gaskets are required for installing this product. (one purchased separately).

● **Pipe adaptor sets with T-type bracket <A400-□-W-B□W>**

Model number	Port size	A	B	C	D	E (O-ring)	F (Gasket)
A400-8*-W-B31W	1/4	20	6	50	45	JIS B 2401-P21 1 piece	1 piece
A400-10*-W-B31W	3/8						
A400-15*-W-B31W	1/2						
A400-8*-W-B41W	1/4						
A400-10*-W-B41W	3/8						
A400-15*-W-B41W	1/2						
A400-20*-W-B41W	3/4	25	11				
A400-25*-W-B41W	1	34	20				

*Blank: Rc thread, N: NPT thread, G: G thread



■ Module connection with pneumatic components

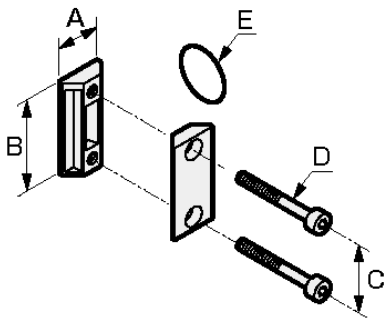
Module connection combines the product into one unit with pneumatic components (C2000, C3000, C4000 Series).
Following parts are required for combining into one unit.

Part name	Model number
Joiner set	C4000-J400-W
T-type bracket set	B310-W (for C2000, C3000 Series)
	B410-W (for C4000 Series)
Gasket	C4000-GASKET (5 pieces)

One O-ring is required When attaching this product to the primary side of the pneumatic components (O-ring is attached to Joiner set or T-type bracket set), and one gasket is required When attaching to the secondary side of the pneumatic components (purchase separately).

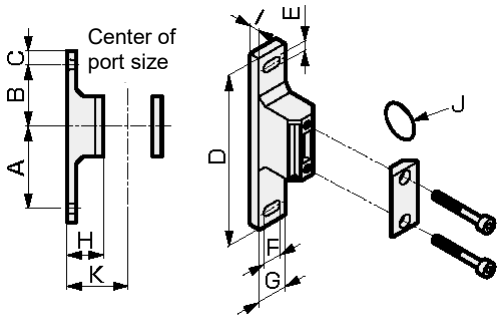
● Joiner set <C4000-J400-W>

Model number	A	B	C	D	E
C4000-J400-W	21	44	32	M5	JIS B 2401-P21



● T-type bracket set <B310-W, B410-W>

Model number	A	B	C	D	E	F	G	H	I	J	K
B310-W	60	45	10	125	7	14	22	27	7	JIS B 2401-P21	45
B410-W	60	45	10	125	7	14	22	37	7	JIS B 2401-P21	55



2.4 Piping

⚠ CAUTION

Tighten the pipes with appropriate tightening torque.
Observe the appropriate tightening torque to prevent air leakage and damage to the threads. To prevent damage to the screw threads, first use your hands to lightly tighten the screw and then use a tool to tighten the pipe further.

Check every joint in the piping for air leakage when supplying nitrogen-rich compressed air for the first time after connecting the pipes.

Do not apply high pressure suddenly when supplying nitrogen-rich compressed air for the first time after connecting the pipes.
Sudden introduction of highly-pressurized air may disconnect pipes at joints and/or cause the tubes to jump around, any of which may cause an accident.

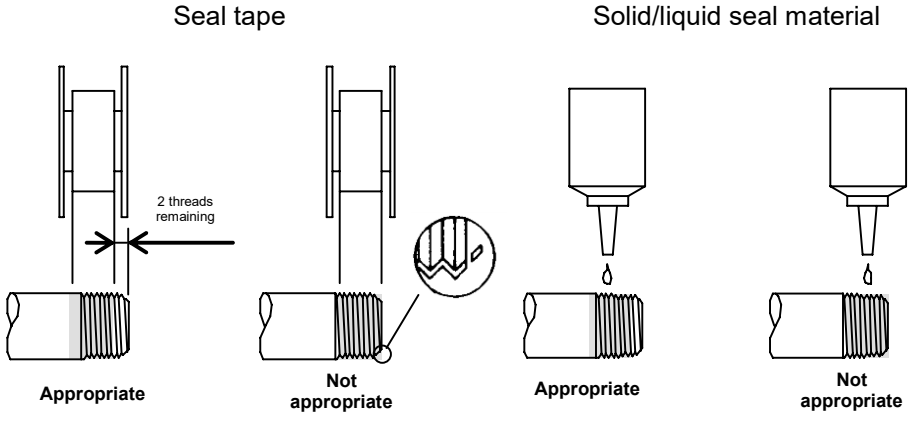
2.4.1 Cleaning of pipes

Before piping, blow the pipes to remove any foreign materials or chips from the inside. Any remaining foreign materials or chips may lead to a failure.

2.4.2 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 the inside of the piping or device 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 the tape down with your fingers to attach it firmly.
When using a liquid seal material, take care not to apply it to resin parts. It damages resin parts, causing a failure or malfunction. Also, do not apply seal material to internal threads.



Once a pipe is detached, seal material may remain on the threads. Therefore, remove the material when re-piping.

2.4.3 Recommended tightening torque

Tightening torque for Rc3/8 screws shall be 3 N•m to 5 N•m.

2.4.4 Piping direction

Fluid can flow in any direction.

2.5 Wiring

⚠ DANGER

Do not put the device under a voltage out of the supply voltage range.

A voltage exceeding the specified supply voltage range may lead to bursting, electric shock or fire.

⚠ WARNING

When wiring, be sure to check the colors of the connector pins and cable conductors.

Wrong wiring may lead to breaking, failure or malfunction of this product. Be sure to check the colors of wiring in Instruction Manual before wiring.

Check the insulation of wiring.

Make sure absence of contact with other circuits, ground fault or insulation fault between terminals. Such conditions may expose this product to overcurrent and break it.

Place this product and its wiring as far as possible from any noise source such as high-current lines.

Take separate measures against surge on the power line.

Do not short-circuit the load.

Doing so may lead to bursting or burning.

Do not mix up the polarity of power supply.

Doing so may lead to bursting or burning.

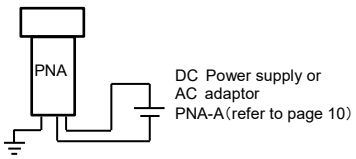
Check of power supply

Before turning on the power of this device, make sure that the power supply wiring have been correctly made and that the supply voltage and polarity are correct.

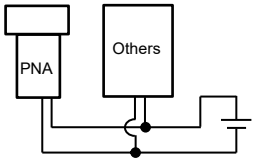
⚠ CAUTION

When using this product as a CE compliant product, prepare a dedicated power supply. Be sure to ground the product.

Example of proper wiring



Example of improper wiring



Working conditions for CE compliance

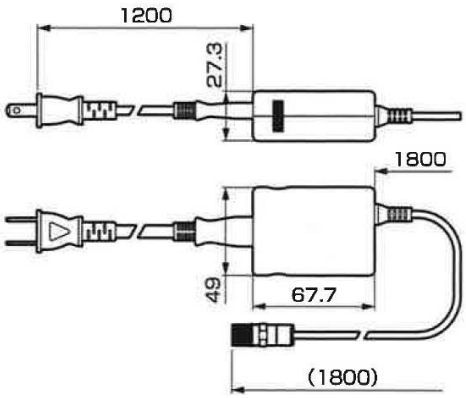
This product is CE-marked, indicating conformity with the EMC Directives. The standard for the immunity for industrial environments applied to this product is EN61326-1. The following stability is applicable in an EMC Directive demand test environment.

Stability ±0.5%O2±1digit(0.00～10.00%O2 の場合)
±1.0%O2±1digit(10.01～25.00%O2 の場合)

2.5.1 AC adaptor

If the device is fed from AC power supply, use an AC adaptor.

Model	PNA-A 、PNA-AG（With conversion plug B、C、O、BF）
Input voltage	AC90V to AC264V
Output voltage	24.0 V DC ±1.2 V
Connector shape	Phoenix Contact SACC-M8FS-3CON-M-SH (3-pin, socket type, M8 size)

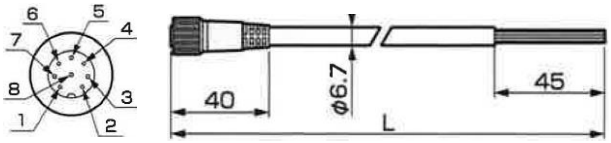


Full view of AC adaptor

- After making sure that wiring is correct, turn on the power of the product.
- The AC adaptor does not have power switch. To shut off the power, disconnect the power plug from the receptacle.
- The portion from the AC adaptor connector to the power plug is not water proof. Do not use it in a place subject to splash of liquid. Doing so may lead to heating, fire, electric shock or failure due to short-circuit of the electronic circuit. If it suffers any liquid splash, immediately disconnect the power plug.

2.5.2 DC cable

If the device is fed from DC power supply and the analogue output and switch output are used, use DC cables.



Model	Length
PNA-1D	1000
PNA-3D	3000
PNA-5D	5000

Full view of connector

Terminal 1	White	Power supply +	Power supply terminal 24 V DC
Terminal 2	Brown	Power supply -	
Terminal 3	Green	Output +	Analogue output 4-20 mA DC
Terminal 4	Yellow	Output -	
Terminal 5	Gray	Contact	Switch output terminal
Terminal 6	Pink	Contact	
Terminal 7	Blue	-	-
Terminal 8	-	-	-

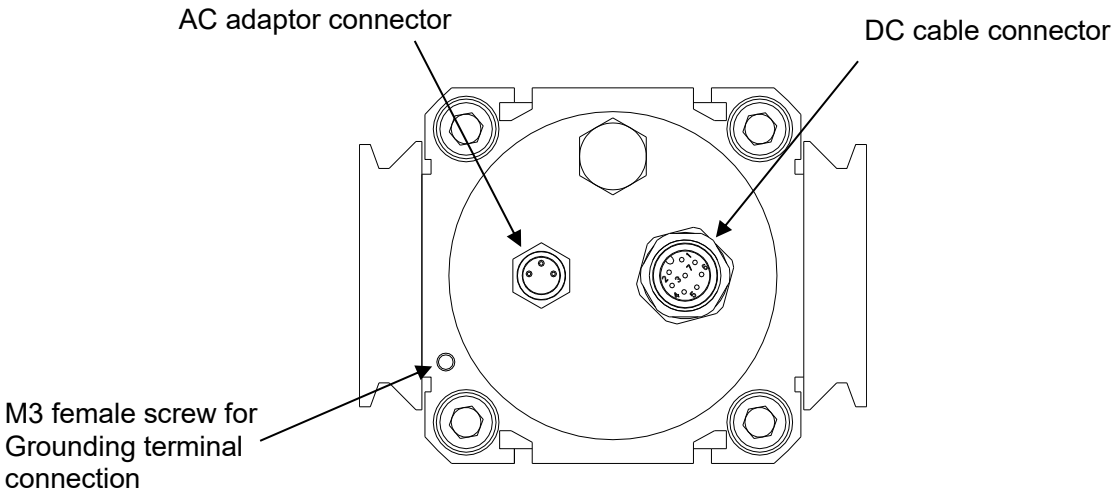
*Connector: Phoenix connector / to be connected to 8-pin, socket type, M12 size

2.5.3 Connection

1 Remove the water proof caps from “AC adaptor connector” and “DC cable connector” on the bottom of the product.

2 To feed the product from AC adaptor, connect a dedicated AC adaptor to “AC adaptor connector”.
Connect a DC cable or a cable prepared by yourself to “DC cable connector”.
*If you do not use the AC adaptor, put a waterproof cap on the “AC adaptor connector”.
*If you do not use the DC, put a waterproof cap on the “DC cable connector”. (For ensuring Degree of protection)

3 Connect a ground wire to M3 female screw for Grounding terminal connection.
*Recommended screw: M3 x 6



Bottom of product

2.5.4 Cable connection

1 Insert the DC cable (socket) into the DC cable connector (8-pin, plug) of the oxygen monitor, while aligning it with the key groove.

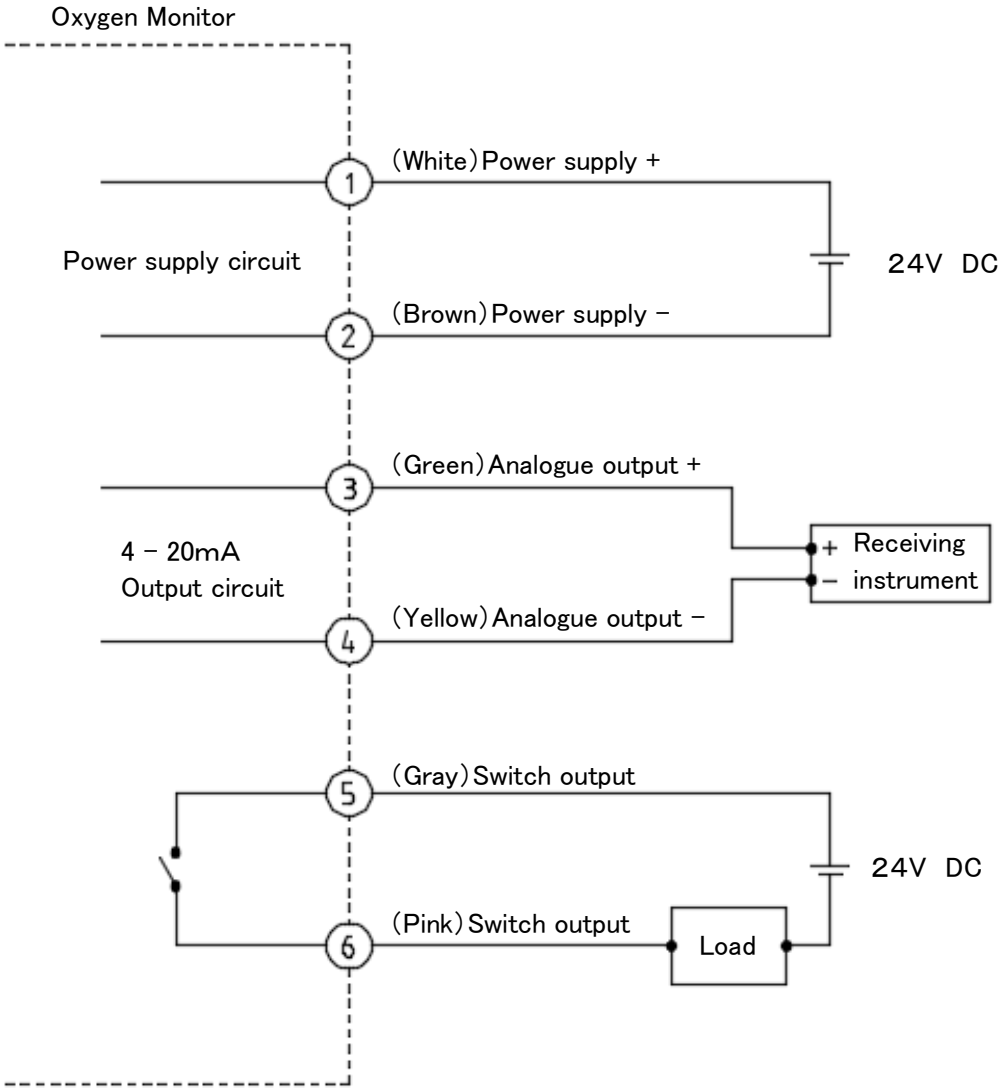
Tighten the lock nut on the DC cable side by manually turning it. Make sure that the connector does not move.

2 In the same way, connect the AC adaptor (socket) to the AC adaptor connector (3-pin, plug).

- When inserting or removing a connector, be sure to hold the connector.
- Do not hold and pull the cable to disconnect the connector.
- When fitting the connector, sufficiently insert it and tighten the fixture, being careful not to damage the threads.
- Tighten the fixture until the threads of the mating part become invisible. (0.39 to 0.49 N•m)

2.5.5 Example of wiring

When using the DC cable, wire according to the following example.



3. USAGE

⚠ WARNING

Stop the device before changing any set value.
The control system may function in an unintended way.

Do not disassemble or modify the product.
Doing so may lead to a failure.

3.1 Action up to start of measurement (warm-up)

1 The product starts operation upon power-up.

2 The heater of the detection element heats up to the measurement-ready temperature.
The LED display indicates “H-UP”.
The time required for heat-up is within about 5 minutes.

The outputs at heat-up are as follows.

- 4 mA for 4-20 mA output
- Switch output is open

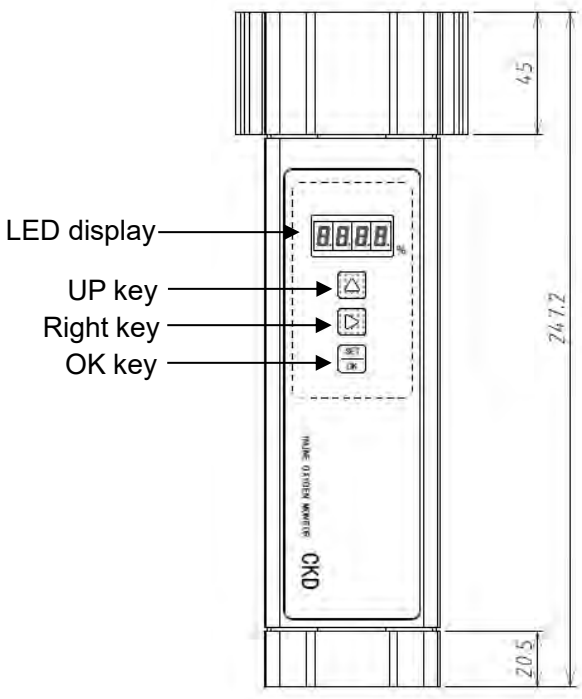
3 After the heater heats up, the oxygen concentration is displayed.

The outputs at oxygen concentration display are as follows.

- Value corresponding to the measured value for 4-20 mA output (0.064 mA/0.1%O2)
- Switch output is the contact ON/OFF status according to the lower and upper limits.

3.2 Operation method before start of measurement

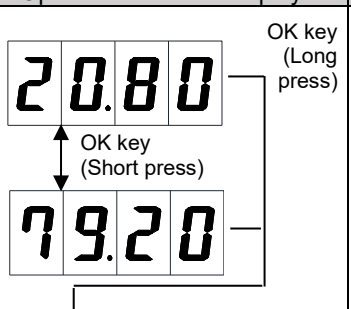
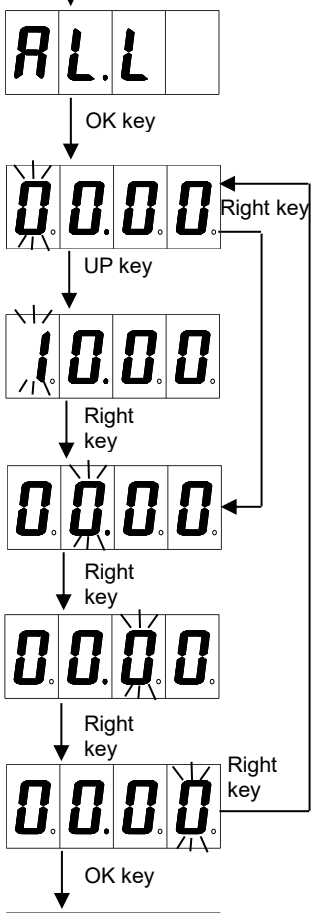
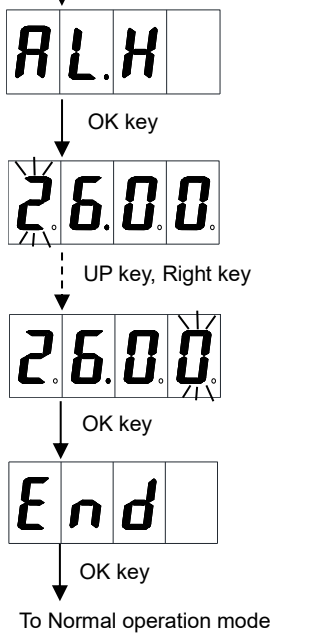
Purpose	Name of keys	Action
Switch the display between oxygen concentration and nitrogen concentration	OK key	Short press When decimal point is lit: Oxygen concentration When decimal point is blinking: Nitrogen concentration (100-oxygen concentration)
Change upper and lower limit settings	OK key	Long press (numbers blink) After changing the setting, move to far right digit with Right key and short press OK key.
	Right key	Press to move to the next digit (right).
	UP key	Press to increase the value



Front face of product

For the operation flow and display, see the operation flow diagram on p.15.

Table 1. Operation flow diagram

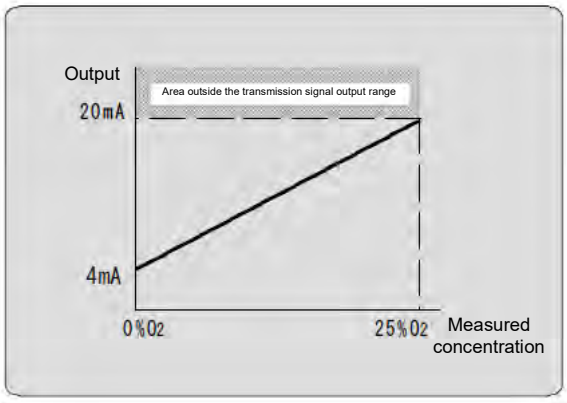
No.	Mode	Operation flow and display	Remarks
1	Normal operation mode		⊙ The device displays the measured oxygen concentration and gives switch outputs according to the set upper and lower limit values. ⊙ The display switches between oxygen concentration and nitrogen concentration (100-oxygen concentration) each time OK key is pressed. ⊙ The decimal is lit when oxygen concentration is displayed and the decimal point blinks when nitrogen concentration (100-oxygen concentration) is displayed. ⊙The device shifts to the lower limit setting mode by long pressing the OK key when the oxygen concentration or nitrogen concentration is displayed.
2	Lower limit setting mode (Set to 00.00% at the factory) *Lower limit: any value can be selected from 0 to 26%		⊙ The set value before change is displayed (10's place blinks) ⊙ The value increases every time when UP key is pressed. (1 → 2 → 3 ..... 9 → 0 → 1 ...) ⊙ The digit to be changed shifts every time when Right key is pressed. ⊙ The mode can be switched to the upper limit setting change mode by pressing OK key only while the 2nd decimal digit is blinking. Note) Set the lower limit to a value smaller than the upper limit.
3	Upper limit setting mode (Set to 26.00% at the factory) *Upper limit: any value can be selected from 0 to 26%		⊙ In the same way as described in 2 above for the lower limit setting change mode, select a digit by Right key and change the value by UP key. Note) Set the upper limit to a value larger than the lower limit. ⊙ Press OK key to quit the setting change mode and to return to the normal operation mode.

3.3 Action after start of measurement

1 4-20 mA analogue output

In normal conditions, the transmission signal corresponding to the measured oxygen concentration is outputted.

Minimum output value	4 mA (0.00%O_2)
Maximum output value	20 mA (25.00%O_2)
Resolution	0.064 mA (0.1%O_2)
Load range	0 to 400 Ω
Measurement accuracy	For 0.00% to 1.00%O_2 ±0.05%O_2 For 1.01% to 2.50%O_2 ±0.10%O_2 For 2.51% to 10.00%O_2 ±0.5%O_2 For 10.01% to 25.00%O_2 ±1.0%O_2 *In dry gas consisting of oxygen and nitrogen.



In abnormal conditions, the output is fixed at 0 mA.

2 Indication

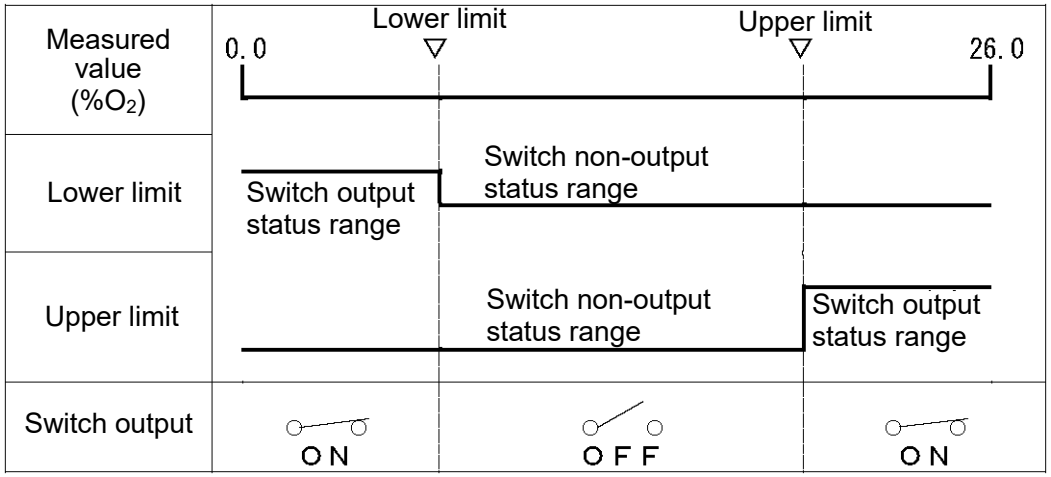
In normal conditions, the value corresponding to the measured oxygen concentration is displayed.
In abnormal conditions, an error message as shown below is displayed.

- In case of error of internal electronic circuit board: “Err1”
- In case of error of oxygen element: “Err2”

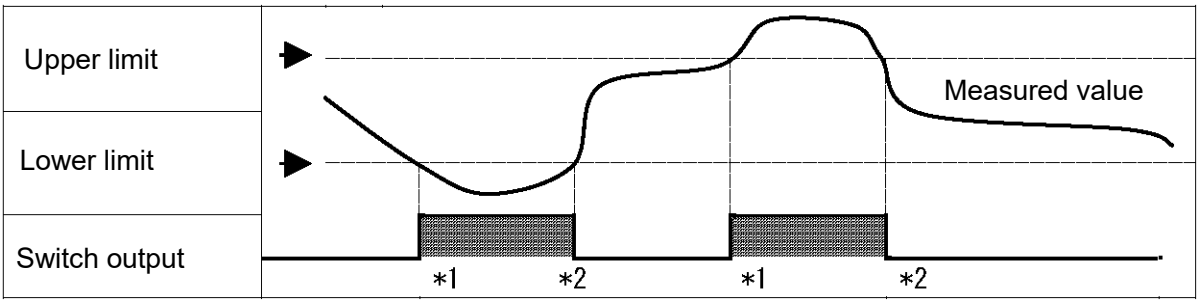
If an error message is displayed, check the wire connection, etc. and turn on the power again. If the error message reappears, the device seems to be defective.

3.4 Switch output action

1 Relationship between upper and lower limits and switch output action



2 Switch output action status [▨ indicates that the switch output is ON]



*1. When the measured value exceeds the set upper or lower limit, the switch output becomes ON.

*2. It is canceled when the measured values become within the range between the upper and lower limits.

4. MAINTENANCE AND INSPECTION

4.1 Periodical Inspection

⚠ WARNING

Turn off the power, stop the supply of compressed air, and make sure that there is no residual pressure before conducting maintenance.

Observe the condition to ensure safety.

⚠ CAUTION

Plan and conduct daily and periodic inspections so that maintenance can be managed correctly.

If maintenance is not properly managed, the product's functions could deteriorate significantly and this may lead to faults (such as short service life, damage and malfunction) or accidents.

To use the oxygen monitor under optimum conditions, conduct a periodical inspection once or twice a year.

4.1.1 Periodical Inspection

Periodically check the life using air (approx. 20.8%O_2) (see Article 6-1. Definition of life). If the indicated value is out of accuracy range or if the life is considered as having expired, it is necessary to replace the device or replace or adjust the oxygen detection element.

4.1.2 Maintenance

The oxygen detection element is a consumable. To replace or adjust the oxygen detection element, return the product to CKD.

4.2 Disassembling and Assembling

⚠ WARNING

Do not disassemble or reassemble the inside of the oxygen monitor.

Disassembling and reassembling the oxygen monitor will void the warranty. Disassembling and reassembling may lead to fire or electric shock.

Storage environment

Store this product in an environment with a temperature of -10 to 60°C and a humidity of 80%rh or lower (no condensation).

Keep it in a place free from strong shocks.

Turn off the power in case of any abnormality

In case of abnormal smell, abnormal noise, smoke or high temperature, turn off the power and contact your nearest sales office or dealer of CKD.

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
Does not display any value or message	Electricity is not fed.	Turn on the power. [⇒ Article 2.5 Wiring]
Indicates an abnormal value	Oxygen concentration is abnormal.	Make sure that the display is not set to nitrogen concentration.
		Make sure that there is no gas leakage.
	Deterioration of oxygen detection element.	Carry out periodical inspections. [⇒ Article 4. MAINTENANCE AND INSPECTION]
The message “Err1” is displayed.	Error of internal electronic circuit board.	Turn on the power again. If the problem does not disappear, contact your nearest sales office or dealer of CKD.
The message “Err2” is displayed.	Error of oxygen element.	Turn on the power again. If the problem does not disappear, contact your nearest sales office or dealer of CKD.
The system does not switch to the upper or lower limit setting change mode. Display does not switch to “ALL”.	OK key has not been held down.	Hold down OK key for 3 or more seconds.
Lower limit cannot be set. Display does not switch to “ALH”.	The operator tried to set it to a larger value than the upper limit.	Set it to a value smaller than the upper limit.
		Set the upper limit to a larger value and retry setting the lower limit.
Upper limit cannot be set. Display does not switch to “End”.	The operator tried to set it to a smaller value than the lower limit.	Set it to a value larger than the lower limit.
		Set the lower limit to a smaller value and retry setting the upper limit.
Switch output remains on.	The lower limit or upper limit is set to a wrong value.	Check the set values.
Switch output is not made.	The lower limit or upper limit is set to a wrong value.	Check the set values.

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

6. WARRANTY PROVISION

6.1 Warranty Conditions

■ Warranty coverage

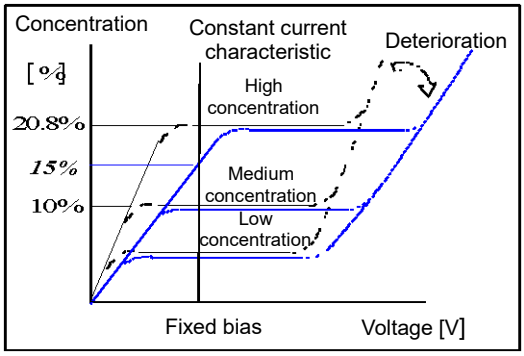
If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.
However, following failures are excluded 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, Specifications, or this Instruction Manual.
- Failure not attributable to the product.
- Failure caused by use not intended for the product.
- Failure caused by modifications/alterations and repairs not carried out by CKD.
- 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.

■ Definition of life

The life of an oxygen detection element is defined as a period until the indicated concentration becomes non-conforming to the measurement specifications.
The life corresponds to the period until the indicated value becomes lower than 15%O_2 when an air with 20.8%O_2 is introduced.



Characteristic at expiry of sensor life

However, this device cannot determine whether the life of the oxygen detection element has expired or not.
Judgment of life requires clean air (approx. 20.8%O_2).

Influence of deterioration of the oxygen detection element over measured values manifests itself as lowering of the upper limit.
For example, if the display indicates the value 18%O_2 although the ambient air (approx. 20.8%O_2) is measured, the upper limit of measurable range of the oxygen detection element is a little less than about 18%O_2.

■ Definition of failure

If the oxygen detection element is physically broken (heater wire breaking, damage to detector), the message "Err2" is displayed.
After making sure that the wire connection is correct, turn on the power again. If the problem reappears, the oxygen detection element is judged as being defective.

*If the product is used in a way not conforming to Article 2.1 "Environment", it will become defective.

■ 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.

6.2 Warranty Period

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