

Daiichi Nekken Co., Ltd.

Company brochure



We are special manufacture of Zirconia oxygen analyzer and Ultrasonic gas analyzer.

Please feel free to contact us about gas measuring.

We are aiming for the contribution to the earth, people, and society through gas analyzers.

Company profile

Name: Daiichinekken Co., Ltd.

Address: 〒659-0026 13-22 Nishikura-cho Ashiya-city Hyogo-pref.

TEL:+81-797-31-2410 FAX:+81-797-31-8951

WEB:<http://www.daiichinekken.co.jp>

Mail: info@daiichinekken.co.jp

Capital: JPY30,000,000 **Company members:** 23

Foundation: November 17, 1972

President: Keishi Nakagawa

Main product: Zirconia Oxygen Analyzer

Ultra Sonic Gas Analyzer

Gas Analyzer Panel

Thermco Products (Gas Mixer, Gas Analyzer etc.)

Red Lion Products (Digital Panel Meter, Signal Conditioner etc.)

Bank: Minato Bank (Nishinomiya Branch),

Shoko Chukin (Amagasaki Branch),

Sumitomo Mitsui Banking Corporation (Ashiya Ekimae Branch)

Bank of Tokyo-Mitsubishi UFJ, Ltd. (Ashiya Branch)

Customers

KOBE STEEL, LTD. , JFE STEEL CORPORATION , CHUGAI RO CO., LTD. ,

NORITAKE TCF CO., LTD., SENJU METAL INDUSTRY CO., LTD. ,

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MISUZU INDUSTRIAL CORPORATION, TAIYO YUDEN CO., LTD.,

AIR WATER INC., TAIYO NIPPON SANSEI CORPORATION,

IWATANI CORPORATION, SUMITOMO SEIKA CHEMICALS CO., LTD.,

TORII DENGYO INC., SANYO ELECTRIC CO., LTD.,

SHOWA ENGINEERING CO., LTD.,

KYOTO ELECTRONICS MANUFACTURING CO., LTD.

Vendors

CHINO CORPORATION, NIKKATO CORPORATION,

KYOCERA CORPORATION, FUJIKURA LTD., CHUGAI SHOKO CO., LTD.

KOJIMA INSTRUMENTS INC., SWAGELOK COMPANY

Agent

KOREA, SINGAPORE, TAIWAN, CHINA, THAILAND, INDIA

 ***Daiichi Nekken***

Company History

- Nov.1972** Founded as an engineering company of energy-saving products by CEO Masayoshi Nakagawa.
- Feb.1973** As a part of business, aimed at its future of Oxygen analyzers for exhaust gas started importing and selling of Oxygen analyzers. Took the initiative in spreading maintenance-free Oxygen analyzers in the country.
- Feb.1977** As the import agent contract was over, started independent production to meet convenience of domestic users. In June sold the first product made in Japan. Since then constantly studied and developed as a specialist to manufacturer of Oxygen analyzers, today become the leading company of industrial Oxygen analyzers.
- May.1988** Made an import-sales contract with Thermco Instrument Co.,Ltd. in the U.S.A to start importing and selling of gas analyzers and gas mixers
- Apr.1995** Made a contract with Red Lion Controls in the U.S.A to supply us special intelligent digital meters.
- Mar.2000** ISO 9001 Acquired for design, development, manufacture, and additional service of Zirconia oxygen analyzer
- May.2001** Started the joint development about the ultrasonic gas analyzer with Himeji Institute of Technology (presently University of Hyogo).
- Jun.2003** Started the sale of the ultrasonic gas module.
- Aug.2003** The 2nd factory was completed in the adjacent to the head office building.
- Jan.2005** The first president Masayoshi Nakagawa became chairman. And Keishi Nakagawa became the second president.
- Sep.2006** Started the sale of the ultrasonic gas analyzer.
- Apr. 2008** Received New technology and new product commendation from The Resona Foundation For Small And Medium Enterprise Promotion.
- Feb. 2012** ISO 9001 Acquired for design, development, manufacture, and additional service of Ultrasonic gas analyzer.



Zirconia oxygen analyzer



Main products : TB series

Features

- Experience for 40 years
- Wide range application, from 1ppm to 100% oxygen.
- Built-in multi filter protects detector from dirt and corrosion
- Easy maintenance

Applications

Clean gas

- Nitrogen PSA
- Production gas
- Factory Piping
- Enclose nitrogen

Exhaust gas

- Steel, ferrite, kiln
- Boiler
- Incinerator
- IGS • IGG

Atmosphere

- Vacuum
- Reduction
- Electronics
- Reflow, Dip

Ultrasonic gas analyzer



Features

- Measurement of all kinds of mixture of two gases possible
- Continuous measurement possible
- Short warm-up time and power saving
- No need of maintenance for a long time
- No consumption parts, Long-lasting sensor
- No necessity of relative gas

Applications

- Ventilator ● Nitrous Oxide ● Oxygen generator
- Nitrogen generator ● Recovery system for CF4 and SF6
- Recovery system for mixed gas of Xe and Ne ● Shielding gas
- Gas mix equipment ● Atmosphere furnace ● Baking furnace
- Leak detector for Helium ● Process enclosure gas etc.

Gas analyzer panel

We design and manufacture gas analyzer panel in which gas analyzer instruments, sampling devices, and control devices are installed.

It is possible to combine various analytical instruments according to facilities because the panels are made to order.



Import

Authorized import agent of Thermco Instrument Corporation (U.S.A)
Handling product: Gas mixer, Thermal conductivity gas analyzers

Authorized import agent of Red Lion Controls Inc. (U.S.A)
Handling product: Touch panel, Signal converter, Digital meter etc.



Contact us

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DaiichiNekken Co., Ltd.

THE REPRESENTATIVE OF DNK

EQUIPMENT MANUFACTURING

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SUMITOMO SEIKA CHEMICALS CO., LTD.

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END USER

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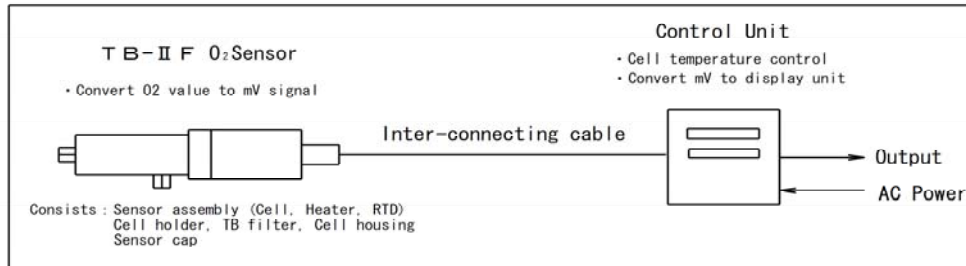
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TB series guidance

INTRODUCTION

This instrument is the oxygen analyzer of Zirconia electro-chemical method. It can indicate and output Oxygen analysis continuously. Mainly it consists of following units.



FEATURES

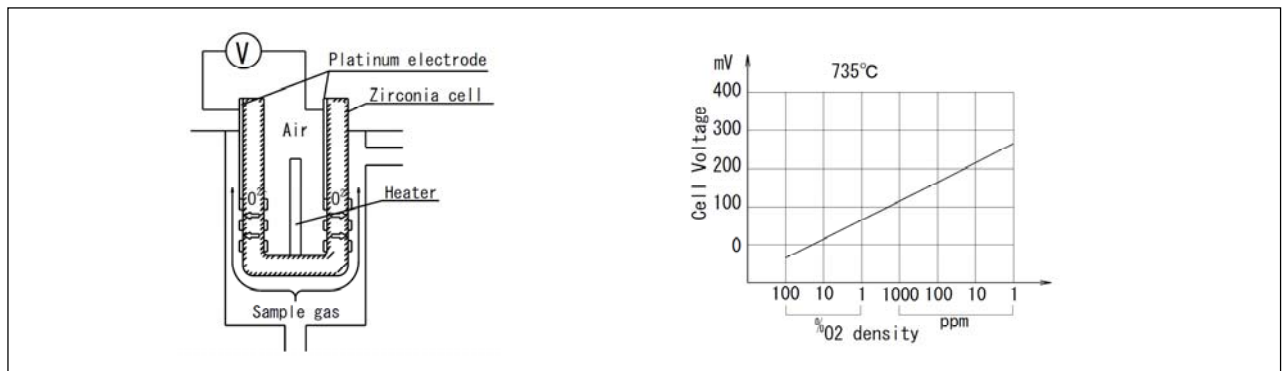
- ◎ Wide application (Refer to Specification list.)
- ◎ Easy handling due to small size.
- ◎ Easy maintenance because of simple structure.
- ◎ Saving power
- ◎ Selectable range by user.

PRINCIPLE

Sensing cell is 90mm length and 7mm diameter tube made of stabilized Zirconia. One of the end of cell is closed. When it is heated, it becomes an electrolyte and the oxygen ions can move through the cell.

If there are two different gases inside and outside, a voltage is produced between both sides. Sensing cell inside contacts the air as reference gas and the outside contacts the sample gas. Then it produces voltage correspond to oxygen density. The cell voltage (Cell EMF) is also related to cell temperature.

Therefore the cell is controlled constantly by using inserted heater and Resistance Temperature Detector (RTD).



The oxygen density is calculated from following formula.

$$E = 0.0496 \cdot T \log \frac{\text{Air (20.6\% = 206,000ppm = 0.206atm)}}{\text{Sample = O}_2\%, \text{O}_2\text{ppm, O}_2\text{atm}} + C$$

E: Cell EMF(mV) T: Cell temperature(K) C: Air drift value(mV)

O₂atm: Atomic pressure of sample gas

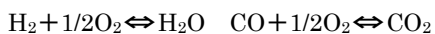
When there is air on both side of sensing cell, it produces no EMF theoretically. Oxygen density of sample gas is Lower and lower, EMF is bigger.

Application list

Field 1	Field 2	Application	Example of density	Sensor	Control unit
Clean gas	Low density oxygen	High purity gas, N ₂ PSA	1ppmO ₂ ~	TB-II F	C-28C、C-48
		High purity gas, N ₂ PSA	1ppmO ₂ ~	CG-SM	IMD
Electronics	Semiconductor equipment	Diffusion furnace、CVD	1ppmO ₂ ~	TB-II F	C-28C、C-48
	Soldering equipment	N ₂ Reflow furnace、Dip furnace	10ppmO ₂ ~	TB-II F	C-28C、C-101
Heat treatment	Atmosphere furnace	Inert gas, H ₂ + N ₂	1~10-30atm	TB-II F	C-48
	Vacuum furnace		1~10-30atm	TB-II V	C-48
	Direct-fired furnace	CO + H ₂	-5~ +5%O ₂	TB-II G	C-28C
Flue gases	Steel	Dust-coal blow / the air conditioning	0~ 10%O ₂	TB-II G	C-28C、C-48
		Coke	0~ 5%O ₂	TB-II G	C-28C、C-48
		Sintering	0~ 5%O ₂	TB-II G	C-28C、C-48
		Hot blast	0~ 5%O ₂	TB-II G	C-28C、C-48
		Continuous casting	0~ 2%O ₂	TB-II G	C-28C、C-48
		Holding, Heating Hammering-out	0~ 5%O ₂	TB-II G	C-28C、C-48
		CAL、CGL (direct-fired)	-5~ +5%O ₂	TB-II G	C-28C
		CAL、CGL (Radiant tube)	0~ 10%O ₂	TB-II G	C-28C
	Nonferrous metals	Fusion	0~ 5%O ₂	TB-II G	C-28C、C-48
		Heating, Annealing	0~ 5%O ₂	TB-II G	C-28C、C-48
	Pottery	Glass fusion, Holding	0~ 5%O ₂	TB-II G	C-28C、C-48
		Ceramic baking (direct fired)	-5~ +5%O ₂	TB-II G	C-28C
		Ceramic baking (electric)	0~1000mV	TB-II F	C-28C、C-48
	Environment	Trash incinerator	0~ 25%O ₂	TB-II G	C-28C
		Sludge incinerator	0~ 25%O ₂	TB-II G	C-28C
		Evaporation fusion	0~ 25%O ₂	TB-II G	C-28C
		RDF	0~50%H ₂ O	TB-II G	C-28C
	Ship	IGS、IGG	0~ 25%O ₂	TB-II F	C-28C
	Utility	Boiler	0~ 10%O ₂	TB-II G	C-28C、C-48
Others	Vacuum atmosphere	Glove panel Vacuum chamber	0~1000ppm	TB-II V	C-28C
	High temperature moisture	Drying	0~50%H ₂ O	TB-II G	C-28C
	Fuel cell	Anode Cathode	1~10 ⁻³⁰ atm	TB-II F	C-48
	High density O ₂	O ₂ PSA O ₂ enricher Synthetic air for medical	1~99%O ₂	FG Series	IMD

※Analysis of reducing atmosphere

Reduction atmosphere is used for metal heat treatment and ceramic firing etc. In the reduction atmosphere, the cell measures the tiny amount of oxygen produced by the dissociation of water and carbon dioxide at high operating temperature according to following equilibrium.



The order of the pO_2 should be under 10^{-20}atm .

※Analysis of vacuum atmosphere

This instrument measures oxygen partial pressure referred to atmospheric pressure.

Therefore the same sample gas in different pressure are measured as different values.

For example, the pressure reduced to 1 Torr, oxygen density of air ($206,000\text{ppmO}_2$) is to be shown as 270ppm.

($206,000 \times 1/760 = \text{about } 270$)

TB-Ⅱ F can be used in the 10^{-3} Torr atmosphere. TB-Ⅱ V can be used in the 10^{-5} Torr.

※Measuring $(\text{CO}+\text{H}_2)\%$ in excess fuel combustion

In direct firing atmospheric furnace $(\text{CO}+\text{H}_2)\%$ can be measured by measuring dissociated pO_2 from $\text{CO}+\text{H}_2/\text{CO}_2+\text{H}_2\text{O}$ equilibrium condition.

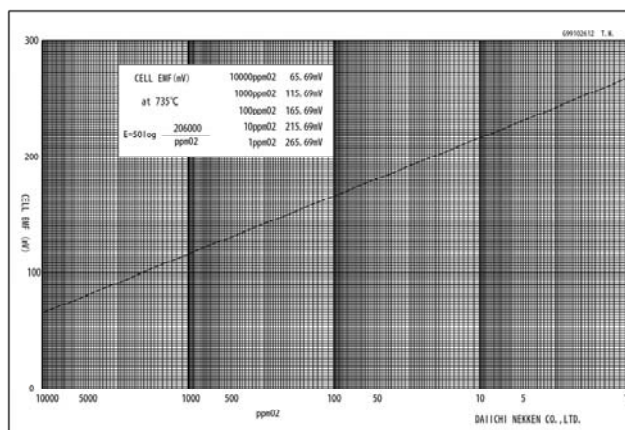
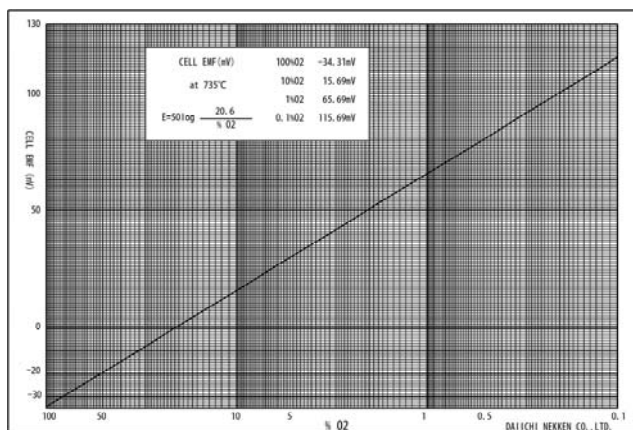
$1\%(\text{CO}+\text{H}_2) + 1/2\% \text{O}_2 \rightleftharpoons 1\%(\text{CO}_2+\text{H}_2\text{O})$, so $1\%(\text{CO}+\text{H}_2)$ corresponds to $-1/2\% \text{O}_2$.

Control unit C-28C have $\pm 0.2\%$.(Option)

※EMF Curve

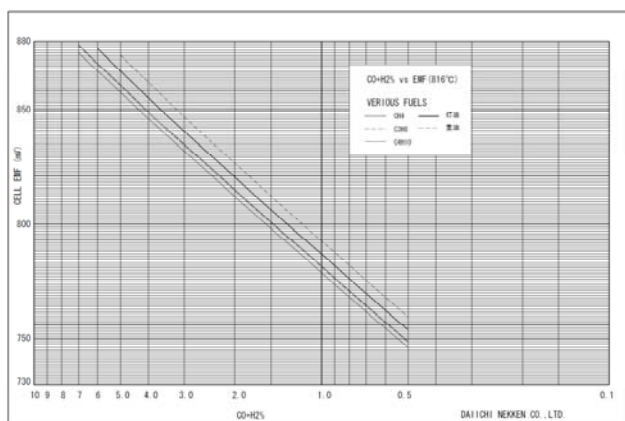
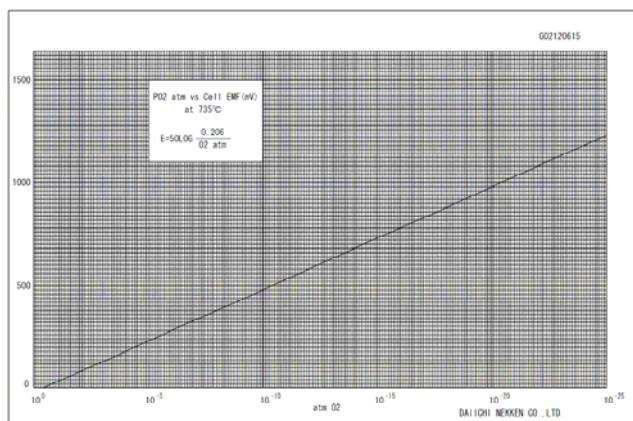
$\% \text{O}_2$

ppmO_2



atmO_2

$\% (\text{CO}+\text{H}_2)$



※Sample condition

1.Sample gas temperature

Normally, sample gas temperature at sensor inlet should be less than 300°C. When sample temperature is higher than 300°C, the sensor should leave from the wall of furnace to cool the introducing sample gas under 300°C. 1500°C sample gas needs 300mm space from the wall.

2.Sample pressure

This instrument measures oxygen partial pressure as mentioned above. Therefore the same sample gas in different pressure are measured as different oxygen density. (1% of measuring value for 100mmAq pressure difference) In constant pressure condition there is no problem by field calibration.

However, remarkable pressure condition needs pressure conversion.

3.Influence of Combustible gases

Combustible gases (CO, H₂, CmHn) react chemically with oxygen in the sample gas on surface of the heated cell. Therefore oxygen is consumed and it occurs error to measuring evident oxygen density.

However in the absence of oxygen condition such as reducing atmosphere, the instrument measures dissociated tiny oxygen and can control reducing/oxidizing potential.

4.Moisture in Sample

When water drops contact directly with heated ceramic cell, the cell would be broken by heat shock.

The sample gas (For example flue combustible gas, the humidification atmosphere, and the atmosphere in the dry furnace etc.) included less than 50% moisture can be measured when making no dew such as direct mounting on the furnace, sample line heating or install the drain separating.

5.Life shortening gas

Following gases in the sample gas shorten the life of cell.

SO ₂	2000ppm or more	NO _x	500ppm or more
HCL	1000ppm or more	H ₂ S	20ppm or more
NH ₃	50ppm or more		

Halogen gas (Cl₂, F etc.), Si vapor, metal vapor, alkaline vapor, Tar vapor produce troubles of measurement.

For inquiry

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E-mail info@daiichinekken.co.jp

Zirconia Sensing Oxygen Sensor TB-ⅡF

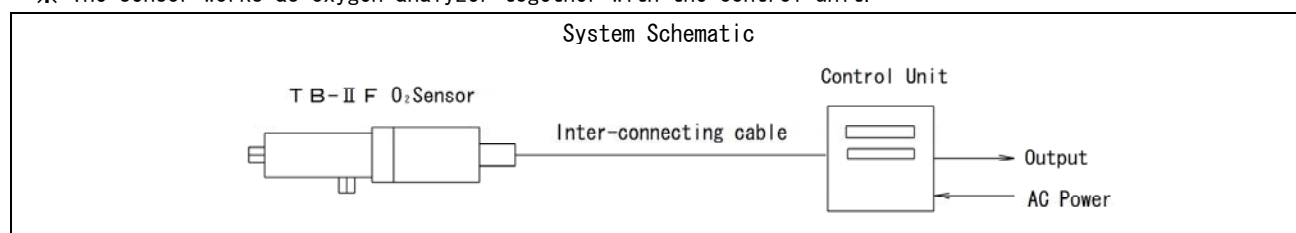


What's TB-ⅡF

Detective element is made of Zirconia electrolyte.

The main use of this sensor is for measurement of trace or low oxygen in inert gas, moreover for dirty gas such as flue gas can be used well.

※ The sensor works as oxygen analyzer together with the control unit.



Features

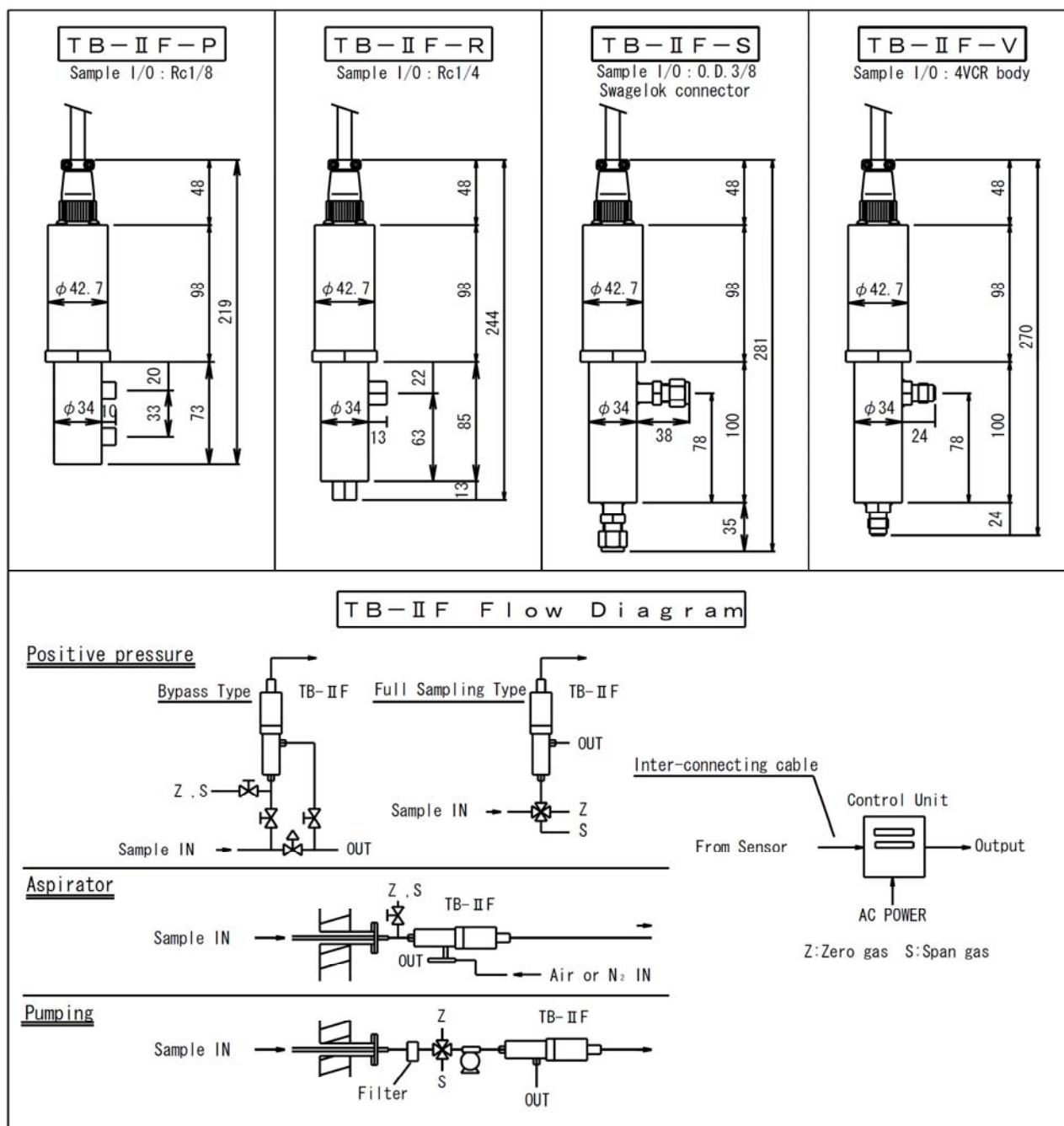
- ◎ Wide range application, from 1ppm to 100%O₂.
- ◎ Built-in multi-filter protects detector from dirt and corrosion.
- ◎ Accepts 0.2 to 5 L/min flow rate.
- ◎ Simple structure, easy maintenance.

Specifications

Model	TB-ⅡF-P	Rc1/8 female connector
	TB-ⅡF-R	Rc1/4 female connector
	TB-ⅡF-S	O. D. 3/8 Swagelok
	TB-ⅡF-V	4VCR fitting
Measuring Range	1ppm~100%O ₂ , 1~10 ⁻³⁰ atmO ₂	
Linearity	The Larger either of less than ±1%FS or ±1ppm	
Repeatability	The Larger either of less than ±1%FS or ±1ppm	
Response	90% reading 10sec. (Swinging to a high density side)	
Drift	Less than ±2%FS/wk	
Sample Flow Rate	0.2~2L/min (TB-ⅡF-P)、others 0.5~5L/min	
Sample Temp.	300°C MAX.	
Sample pressure	TB-ⅡF-V 203kPa~1.33×10 ⁻³ Pa (2atm~10 ⁻⁵ Torr) Others 203kPa~1.33×10 ⁻¹ Pa (2atm~10 ⁻³ Torr)	
Warm up time	About 20 minutes	

※For the improvement, the specification and design may be changed without prior notice.

Dimensions & Flow Diagram



For inquiry contact:

 **Daiichi Nekken CO., LTD**

13-22 Nishikura-Cyo Ashiya-City
Hyogo-Prefecture Japan

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URL <http://www.daiichinekken.co.jp>

E-mail info@daiichinekken.co.jp

Zirconia Sensing Oxygen Sensor TB—Ⅱ V



What's TB—Ⅱ V

Detective element is made of Zirconia electrolyte.

The mainly use of this sensor is for measurement of partial oxygen pressure in the vacuum atmosphere.

※The sensor works as oxygen analyzer together with the control unit.

Features

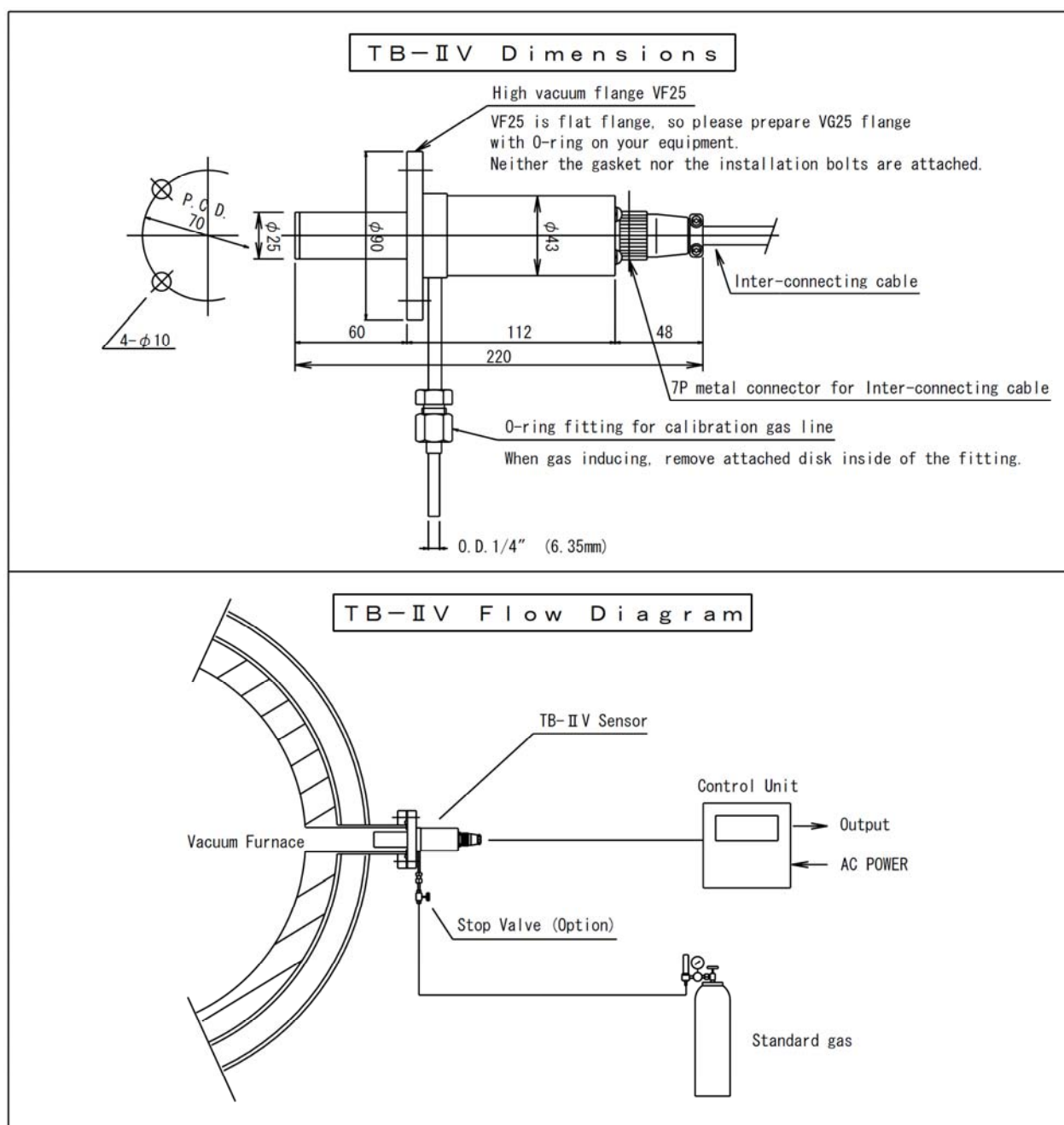
- ◎ Direct installation for sealed vessel or vacuum furnace.
- ◎ Measuring vacuum atmosphere under the pressure of $1 \times 10^{-3} \text{Pa}$ ($1 \times 10^{-5} \text{Torr}$) .
- ◎ Optional mounting flange is available.

Specifications

Installation	Vertical ~ Horizontal, VG25 vacuum flange (Customer preparation)
Calibration gas inlet	SUS TP 0. D. 1/4 (O-ring fitting)
Measuring range	1ppm~100%O ₂ 1~ $1 \times 10^{-30} \text{atm O}_2$
Linearity	Large one either of less than $\pm 1\% \text{FS}$ or $\pm 1 \text{ppm}$
Repeatability	Large one either of less than $\pm 1\% \text{FS}$ or $\pm 1 \text{ppm}$
Response	90% reading 10sec. (Swinging to a high density side)
Drift	Less than $\pm 2\% \text{FS} / \text{wk}$
Sampling	Diffusion
Sample Temp.	300°C MAX
Sample pressure	2atm~ $1 \times 10^{-3} \text{Pa}$ ($1 \times 10^{-5} \text{Torr}$)
Warm up time	About 20 minutes
Option	Kind and size of flange, Standard gas line stop valve

※For the improvement, the specification and design may be changed without prior notice.

Dimensions & Flow Diagram



※ There is an explosion hazard if there was cell breakage when measuring the combustible gas atmosphere such as hydrogen under decompression etc.

Inquiry

Daiichi Nekken CO., LTD

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 Hyogo-Prefecture Japan

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URL <http://www.daiichinekken.co.jp>

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Zirconia Sensing Oxygen Sensor TB—ⅡVN series



What's TB—ⅡVN series

Detective element is made of Zirconia electrolyte.

The mainly use of this sensor is for measurement of partial oxygen pressure in the vacuum atmosphere.

※The sensor works as oxygen analyzer together with the control unit.

Features

- ◎ Direct installation for sealed vessel or vacuum furnace.
- ◎ Measuring vacuum atmosphere under the pressure of $1 \times 10^{-3} \text{Pa}$ ($1 \times 10^{-5} \text{Torr}$) .
- ◎ Optional mounting flange is available.

Specifications

Flange size	VF25, NW40, NW25 etc. (Please feel free to contact for other sizes)
Installation	Vertical ~ Horizontal, above vacuum flange (Customer preparation)
Calibration gas inlet	SUS TP 0.D.1/4 (O-ring fitting)
Measuring range	1ppm~100%O ₂ 1~ $1 \times 10^{-30} \text{atm O}_2$
Linearity	Large one either of less than $\pm 1\% \text{FS}$ or $\pm 1 \text{ppm}$
Repeatability	Large one either of less than $\pm 1\% \text{FS}$ or $\pm 1 \text{ppm}$
Response	90% reading 10sec. (Swinging to a high density side)
Drift	Less than $\pm 2\% \text{FS} / \text{wk}$
Sampling	Diffusion
Sample Temp.	300°C MAX
Sample pressure	2atm~ $1 \times 10^{-3} \text{Pa}$ ($1 \times 10^{-5} \text{Torr}$)
Warm up time	About 20 minutes
Option	The port connection for calibration ※2

※1 For the improvement, the specification and design may be changed without prior notice.

※2 The special housing is necessary for standard gas calibration.

Dimensions & Flow Diagram

TB-II VN-VF25	TB-II VN-NW40	TB-II VN-NW25
Approx. 205 Approx. 55 approx. 103 47 φ22 φ42.7 VF25 flange	Approx. 206 Approx. 54 Approx. 105 47 φ22 φ44.5 NW40 flange	Approx. 206 Approx. 54 Approx. 105 47 φ22 φ44.5 NW25 flange
Flow Diagram		
Measuring Control unit Output Power TB-II VN Sensor Inside Chamber		
Calibrating Control unit Output Power TB-II VN Sensor Port connection for calibration (Option) Standard gas ※ At the calibration, sensor is necessary to remove from the chamber and install a special port for calibration.		

- ※ NW25, NW40, ICF70 are standard model. Please feel free to contact us about other flange size.
- ※ Gasket, Volts and Nuts are not attached
- ※ There is an explosion hazard if there was cell breakage when measuring the combustible gas atmosphere such as hydrogen under decompression etc.

Inquiry

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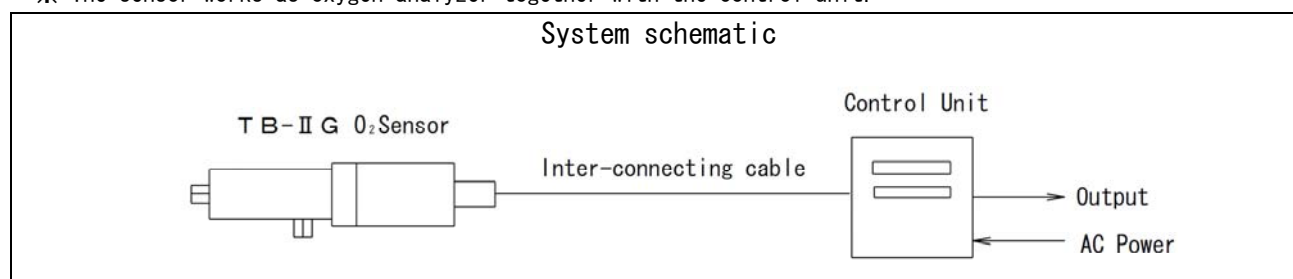
Zirconia Sensing Oxygen Sensor TB-II G



What's TB-II G

Detective element is made of Zirconia electrolyte.

※ The sensor works as oxygen analyzer together with the control unit.



Features

- ◎ Several accessories with each object facility.
- ◎ Built-in multi-filter protects detector from dirt and corrosion.
- ◎ Simple structure, easy maintenance.
- ◎ It is possible to measure CO₂+H₂ at the fuel surplus time. (display as “- O₂%”)

Application

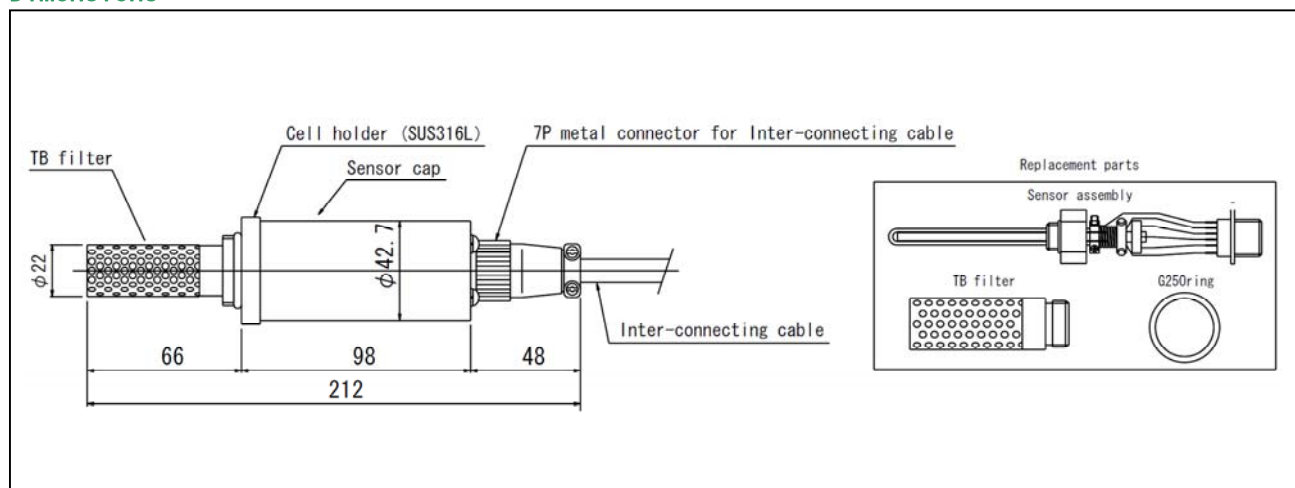
Boiler, Steel heating furnace, Glass fusion furnace, Ceramic sintering furnace, Waste heat plant,
All burning exhaust gases.

Specification

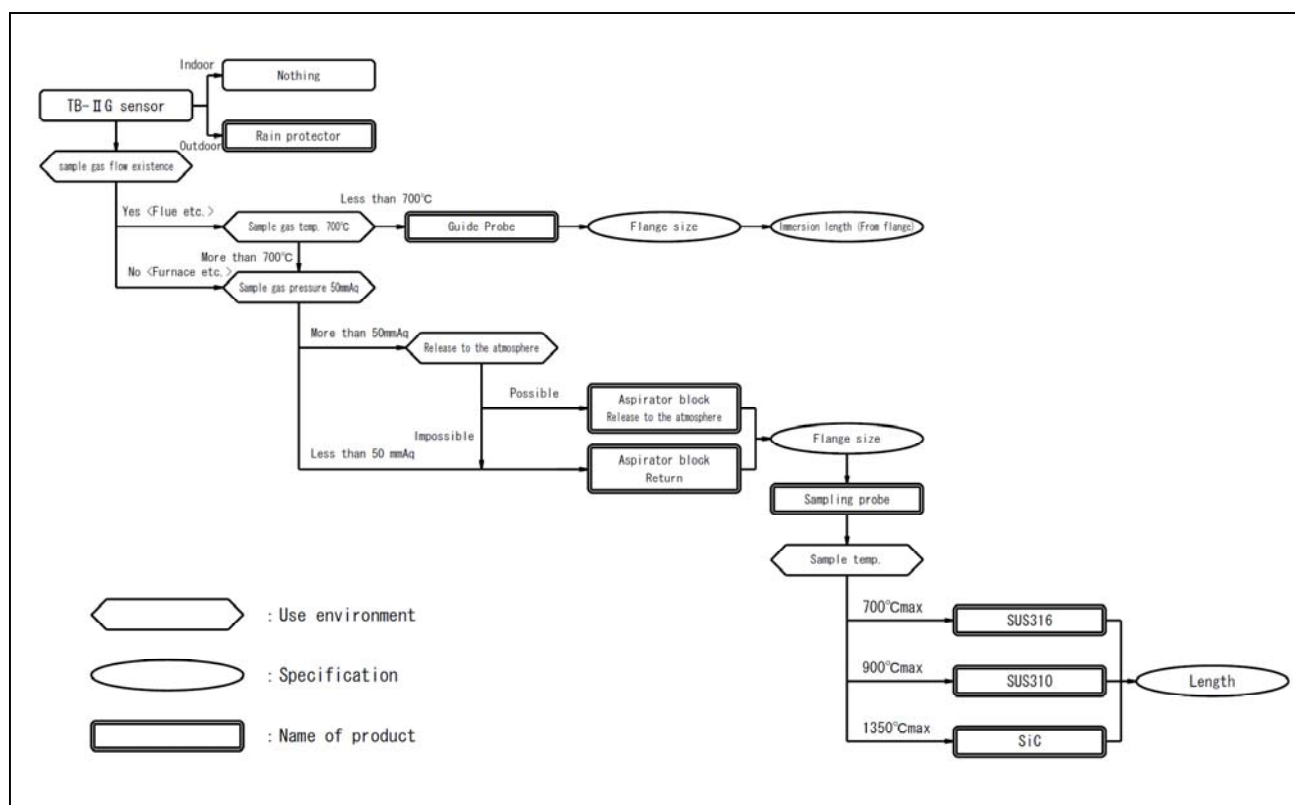
Measuring Range	-20~25%,
Linearity	Less than ±1%FS (0-25%O ₂)
Repeatability	Less than ±1%FS (0-25%O ₂)
Response	90% reading 10sec. (Swinging to a high density side)
Drift	Less than ±2%FS/week
Sample suction	With aspirator block, Guide probe
Sample pressure	0±5KPa (It depends on accessory)
Sample Temp.	300°C MAX. (Sensor part only) 0~700°C(In case of Guide Probe use) , 0~1350°C(In case of Aspirator Block use)
Warm up time	About 20 minutes
Option	Rain protector

※For the improvement, the specification and design may be changed without prior notice.

Dimensions



The choice flow chart of the accessories



Inquiry

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Aspirator Block for Oxygen Sensor TB-ⅡG



Aspirator block Introduction

The aspirator block is a suction equipment of the sample gas.

It combines with the sampling probe as the sample introduction pipe.

At first TB-ⅡG sensor should be screwed into the sensor port.

It is installed in the short-pipe and the flange which was built in the measuring point and introduce air. Then the sample gas is sucked from the tip of probe.

There are two ways to emit the sample gas. The one is to release to the atmosphere, the other is to return into the furnace. And it is possible to select them according to the facilities.

It is possible to install at the level – the vertical angle.

※Please consider about the length of short-pipe so that the temperature of the sample gas is less than 350°C in the sensor installation point.

Features

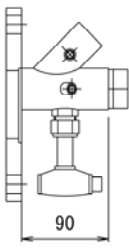
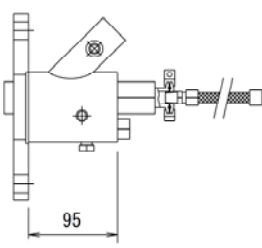
- ◎ It is possible to use in the high temperature condition.
- ◎ It is possible to select vent type or return type.
- ◎ Simple structure, easy maintenance at the site.

Specification

Material	Return type : SUS316L / Release to atmosphere type : SUS316
Installation	Return type : JIS5K65A~ / Release to atmosphere type : JIS5K40A~
Sample gas temp.	It follows to the specification of probe
Sample gas pressure	Return type : $\pm 5\text{kPa}$ / Release to atmosphere type : $-0.1\text{kPa}\sim 1\text{kPa}$
Tubing	Rc1/4

TYPE	A B C
	AB-□-□□-□□-□
A. Type	1: Vent type 2: Return type
B. Flange size	Ex. JIS5K65A:05-65
C. Heater for aspirator block	0: No need 1: Need (Only return type)

Dimension

Vent type	Return type
	

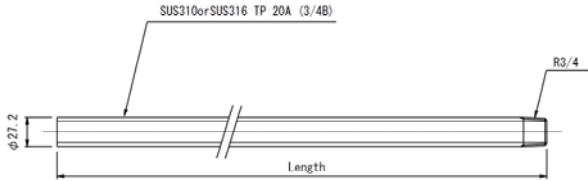
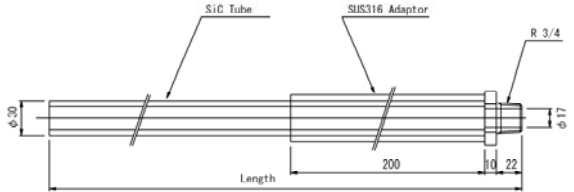
Sampling probe

Introduction

The sampling probe is a gas introduction pipe to the aspirator block. It is fixed in the sample entrance of the aspirator block. Choose probe material according to the sample gas temperature condition.

TYPE	A B
	SP-□□□-□□□□
A. Material	316 : SUS316 (700°Cmax) 310 : SUS310 (900°Cmax) SiC : AirtightnessSiC (1350°Cmax)
B. Length	Example. 700mm: 「0700」

Dimension

SUS310or316 probe	AirtightnessSiC probe
	

※In case of use except the above, consult separately.

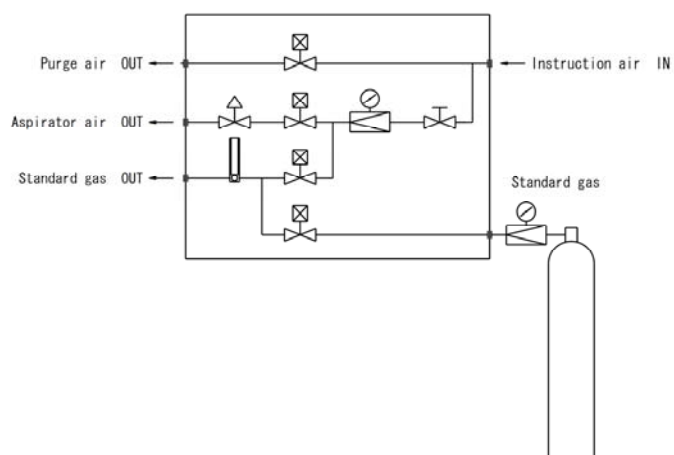
Air supply unit

Instruction

Air supply unit incorporates aspirator air, purge air, SPAN calibration air and standard gas compactly. 2 types can be chosen from to the style which is convenient for into the existing box built-in or the indoor on the wall. Choose according to the installation site.

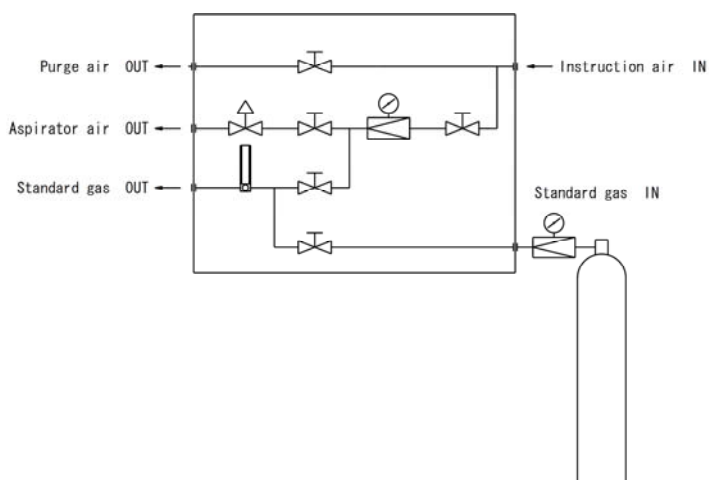
TYPE I

Purging automatically with the signal from the timer.
(installed into the panel box)



TYPE II

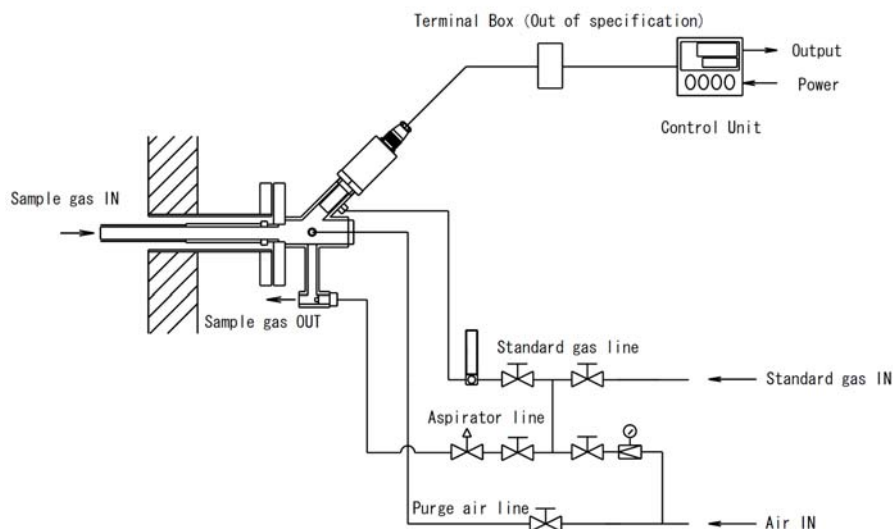
Each valve is operated manually.



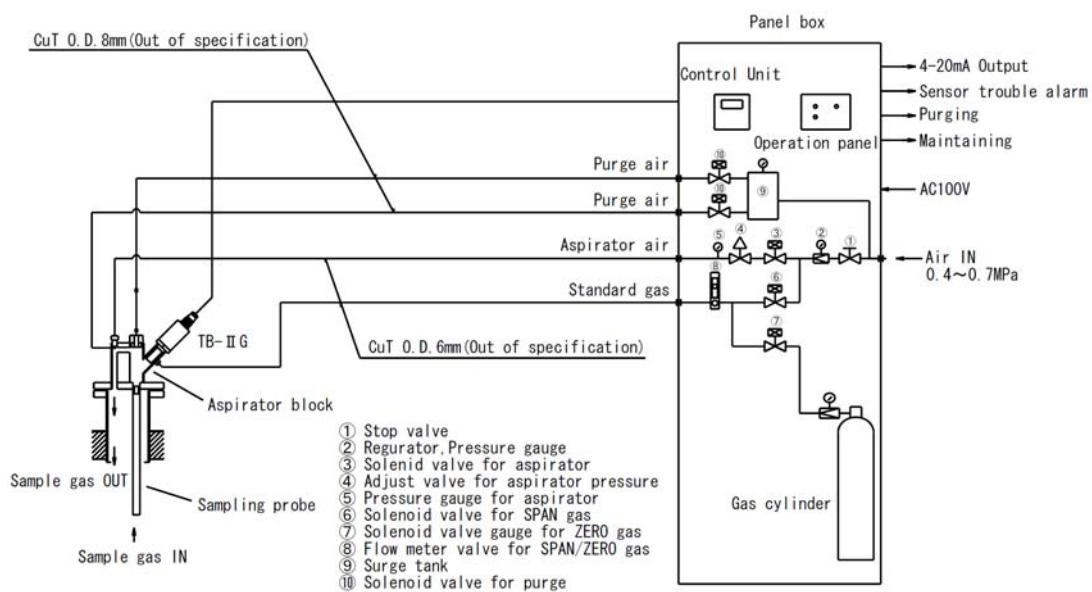
TYPE	A B
	ABC-2-□-□
A. Type	1. Automatic purge 2. Manual purge
B. Installation	1. Plate 2. Exclusive box

Flow diagram

Tubing example



Panel box type example



※The installation and the wiring and tubing constructions are out of specification.
 ※All connectings of tubing are Rc1/4.

Inquiry

Daiichi Nekken CO., LTD

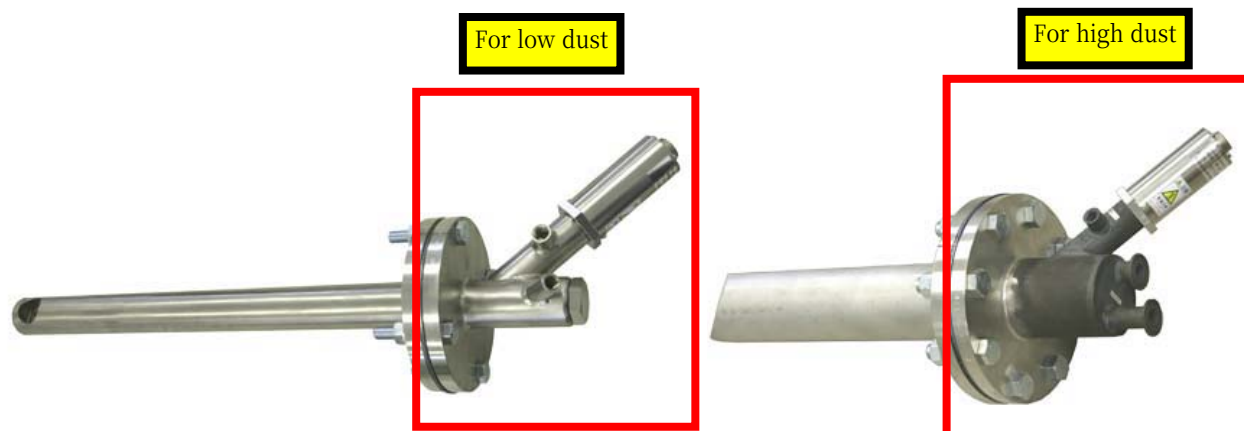
13-22 Nishikura-Cyo Ashiya-City
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Guide Probe for Oxygen Sensor TB-II G



Guide probe Introduction

The guide probe is a sampling equipment which uses a flow of sampling gas. At first TB-II G sensor should be screwed into the sensor port. And it is installed in the short-pipe and the flange which was built in the measuring point where has a flow such as a flue.

Sample gas is introduced from sample port of the tip of the probe, and led to the sensor along the guide probe. Then sample gas is discharged to the sample exit in the downstream side.

It can be mounted vertical or horizontal on the flue wall.

※Please consider about the length of short-pipe so that the temperature of the sample gas is less than 350°C in the sensor installation point.

Features

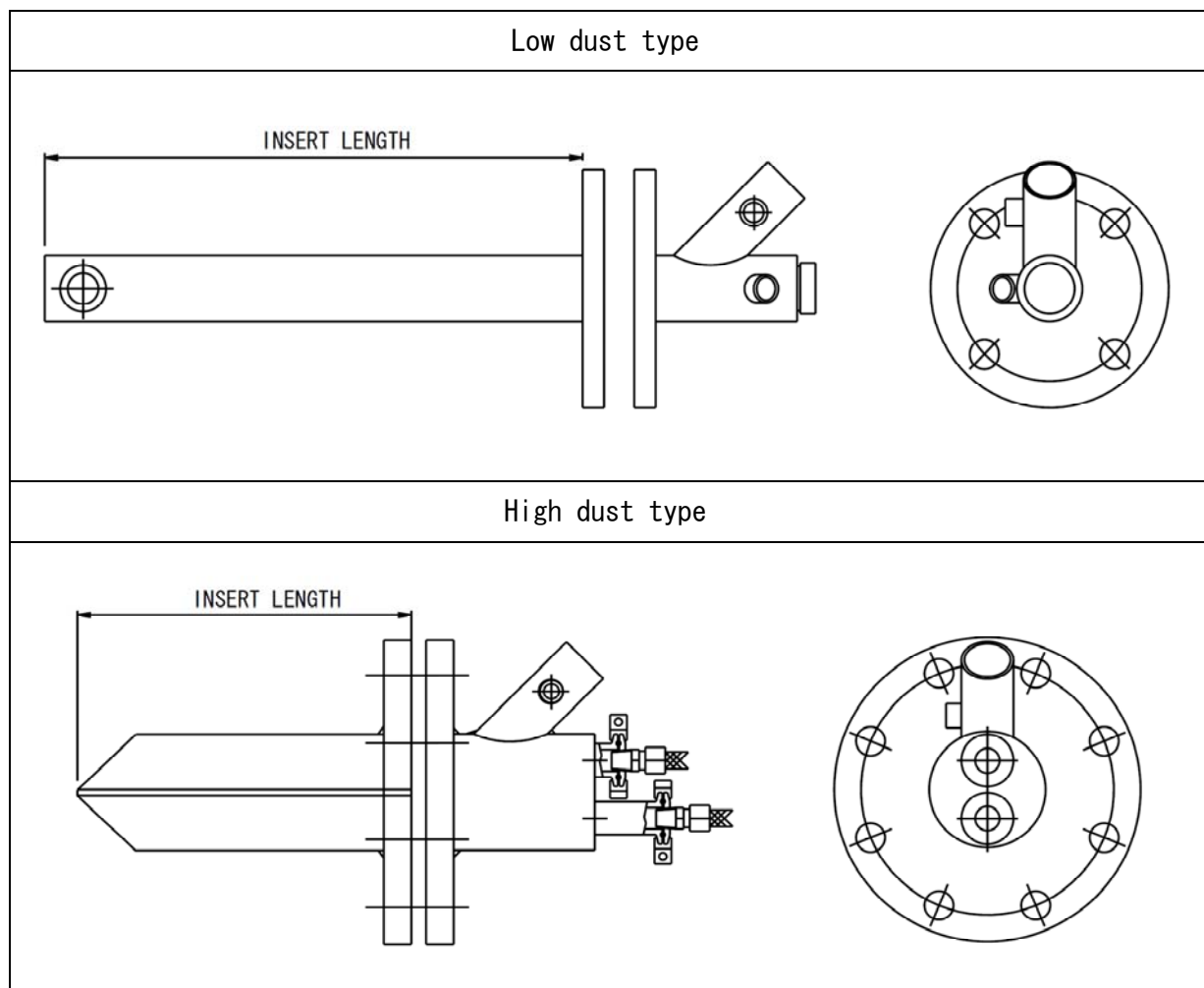
- ◎ The utility of instrumenting air and the power and so on is unnecessary because of sampling which used a sample gas stream.
- ◎ It is possible to select the low dust type or the high dust type according to the condition.
- ◎ Simple structure and easy maintenance at the site.

Specification

Material	Low dust type : SUS316 / High dust type : SUS316L
Installation	Low dust type : JIS5K50A~ / High dust type : JIS5K80A~
Length of insetion	As your specification (MAX. 1500mm)
Sample gas temp.	700°Cmax
Sample gas pressure	±5kPa
Tubing	Rc1/4

TYPE	A B C
	GP-□-□□-□□-□□□□
A. Type	1:Low dust type 2:High dust type
B. Flange size	ex. JIS5K50A : 05-50
C. Insert length	Ex. 500mm : 0500

Dimension

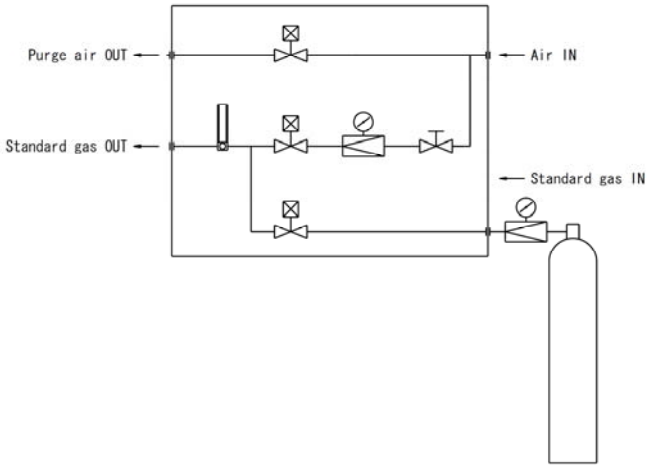
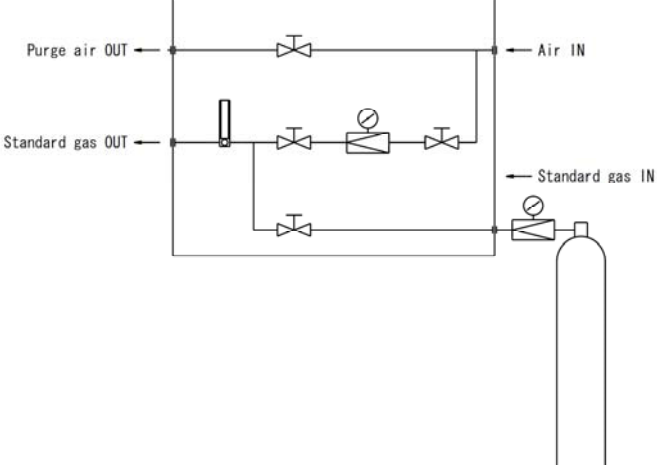


Air supply unit

Instruction

Air supply unit incorporates aspirator air, purge air, SPAN calibration air and standard gas compactly.

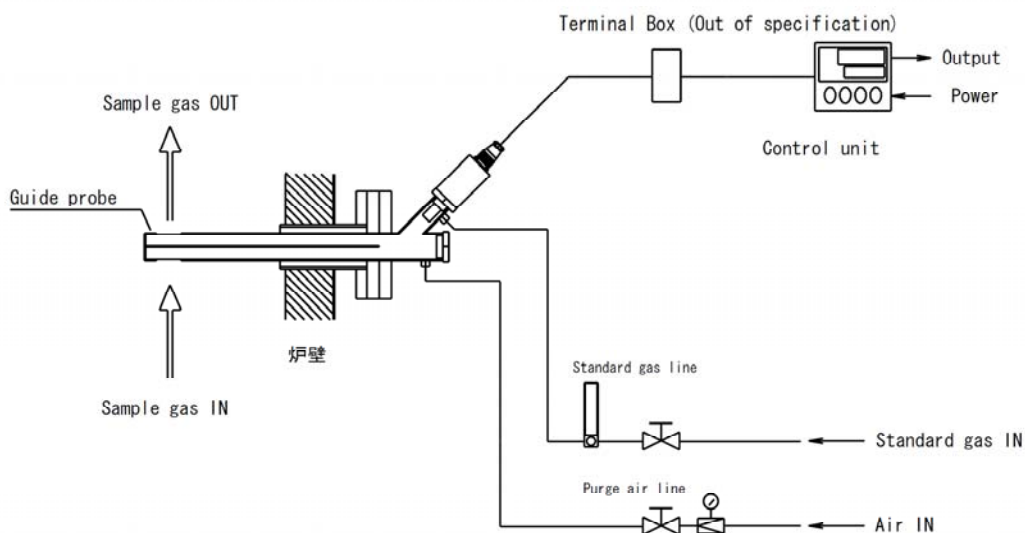
2 types can be chosen from to the style which is convenient for into the existing box built-in and the indoor tapestry. Choose according to the installation site.

TYPE I Purging automatically with the signal from the timer. (installed into the panel box)	
TYPE II Each valve is operated manually.	

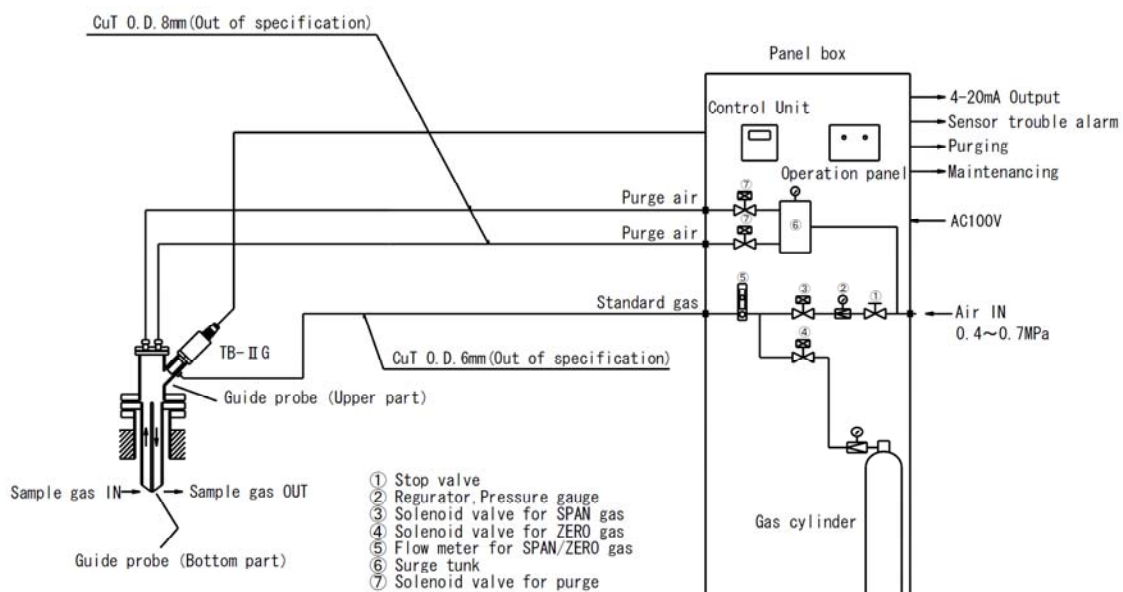
TYPE	A B ABC-1-□-□
A. Type	1. Automatic purge 2. Manual purge
B. Installation	1. Plate 2. Exclusive box

Flow diagram

Tubing example



Panel box type example



※The installation and the wiring and tubing constructions are out of specification.
 ※All connection of tubing are Rc1/4.

Inquiry

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Control Unit C-28C C-48



What's C-28C, C-48

These instruments should be combined with O₂ sensor then control cell temperature and convert cell EMF to O₂ value for display and signal output.

Features

- ⊙ Compact DIN size. (96mm × 96mm)
- ⊙ Easy to handle.
- ⊙ Readable large display.
- ⊙ Serial communication function (RS232C) is normally equipped.

Specification

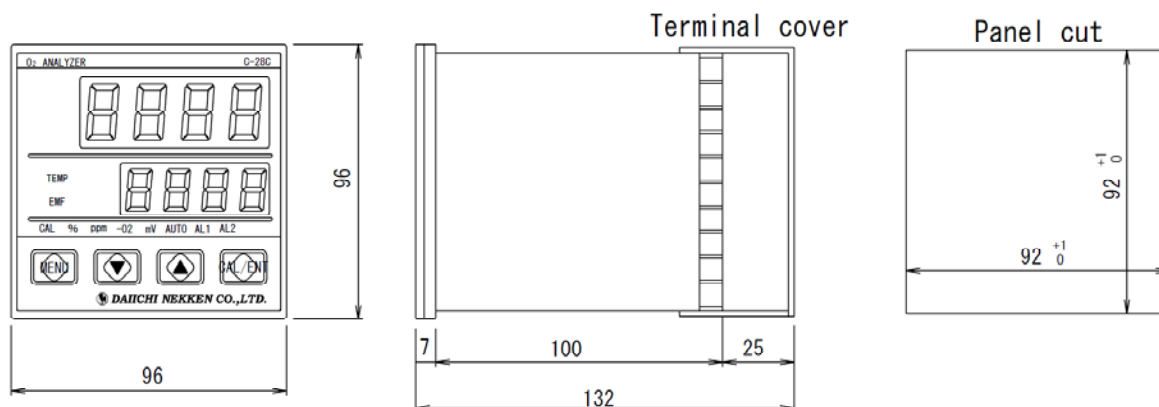
		C-28C		C-48	
Dimensions		96W×96H×132D			
Weight		About 500g			
		Power 100~240VAC			
Display		Upper	4 figures LED	Upper	5 figures LED
		Lower	4 figures LED	Lower	5 figures LED
Display Ranges		R1 : %	0-99.99、0-100.0、 -19.99~+99.99%	R1	% : 0.00-100.00
		R2 : ppm	0-9999、0-999.9ppm	R2	ppm : 0.0-9999.9
		R3 : mV	-525-1575mV	R3	atm : -35.00-0.00 mV : -40.0-1500.0
Output ※1	DCA	D. C. 4-20mA			
	DCV	D. C. 0 to 1V、0 to 5V、0 to 10V			
Communication		RS232C			
Range Select		Manual／Auto		Manual／Auto／Remote	
Alarm		Output : Hi/Lo、Hi/H・Hi、Lo/L・Lo Failure : Sensor temp. abnormal			
Other functions		Cell EMF and/or Cell temp. are shown on lower display. Range answer-back, hold, one-touch calibration equipped.			

※1 It is possible to set arbitrarily within the range of the above-mentioned.

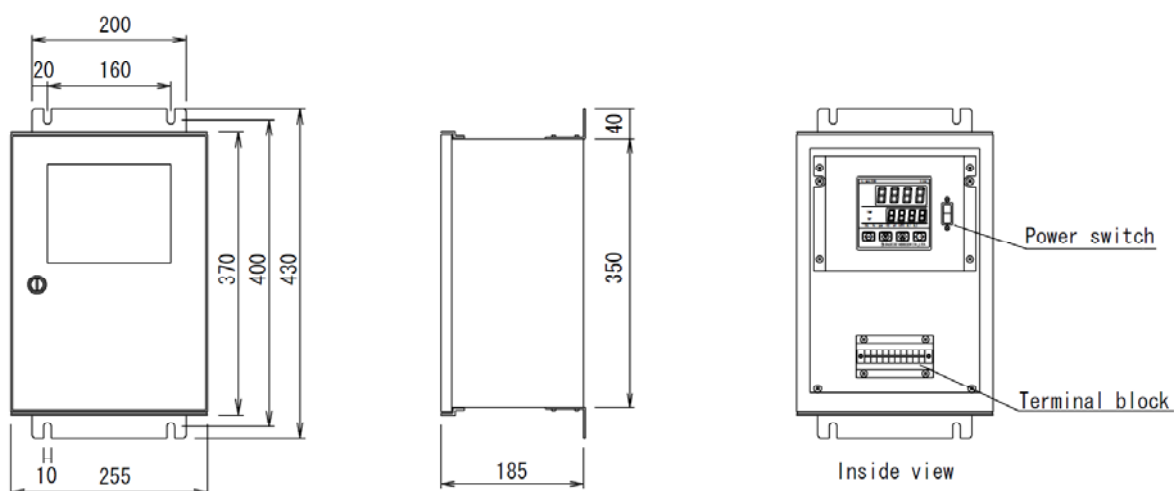
※2 For the improvement, the specification and design may be changed without prior notice.

Dimensions

Panel Mount



Wall Mount



Inquiry

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Control Unit C-201W



What's C-201W

These instruments should be combined with O₂ sensor then control cell temperature and convert cell EMF to O₂ value for display and signal output. This is the special model for abroad that simplified the specification and made reasonable price.

Features

- ⊙ Easy to handle.
- ⊙ Readable large display.
- ⊙ A lot of functions.
(Back light, interactive display for setting and calibration, Output hold, Remote calibration etc.)
- ⊙ Serial communication function (RS232C) is normally equipped.

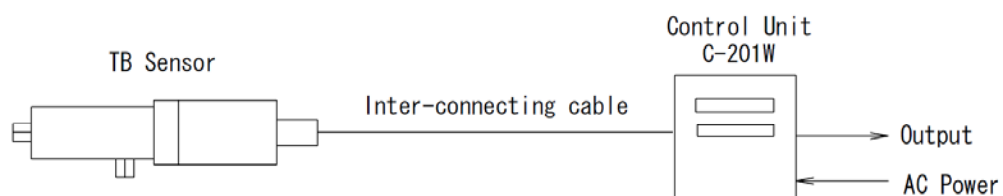
Specification

MODEL : C-201W		
Dimensions	215W × 292H × 95D	
Weight	Approx. 2500g	
Power	85~264VAC	
Display	Upper	4 figures LED
	Lower	LCD
Display Ranges	R1 : %	0~99.99%
	R2 : ppm	0~9999ppm
Output ※1	DCA	D. C. 4~20mADC/0-1VDC/0-5VDC/0-10VDC (select one of them)
Communication	RS232C	
Range Select	Manual / Auto / Remote	
Alarm	Output : Hi/Lo、Hi/H・Hi、Lo/L・Lo	
	Failure : Sensor temp. abnormal (Either of open collectors)	
Other functions	Cell EMF and/or Cell temp. are shown on lower display. Range answer-back, hold, one-touch calibration equipped.	

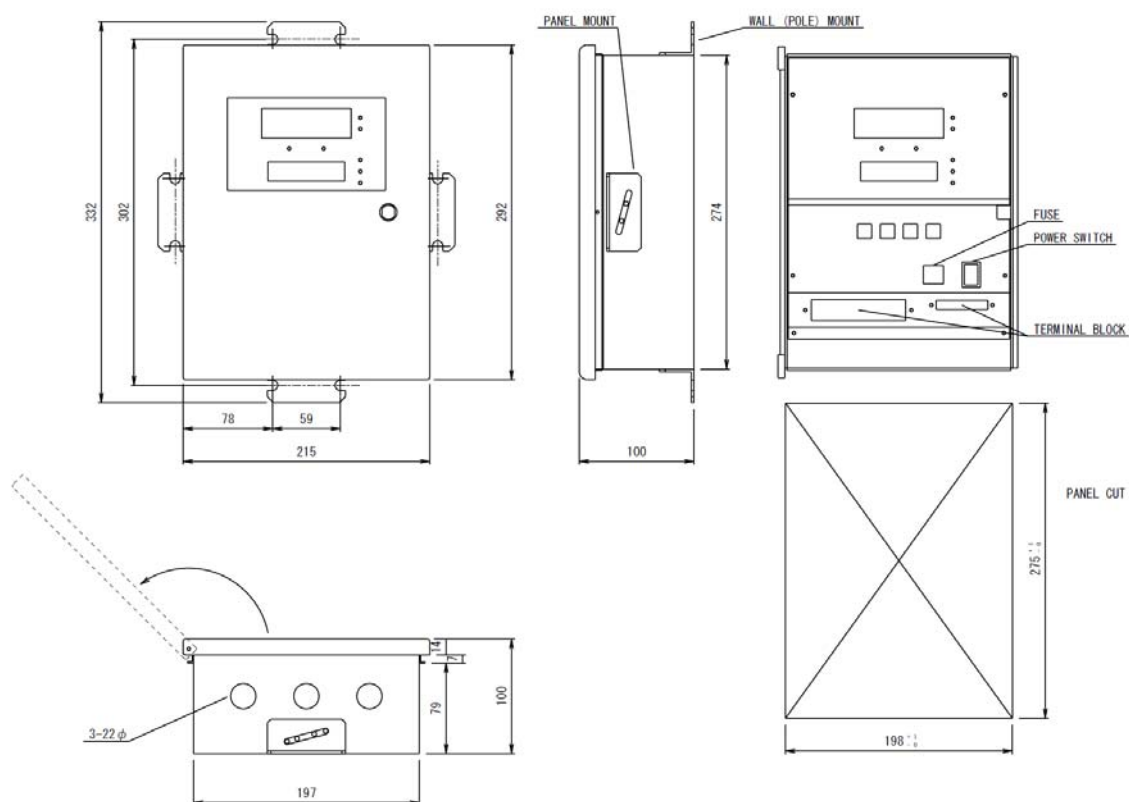
※1 It is possible to set arbitrarily within the range of the above-mentioned.

※2 For the improvement, the specification and design may be changed without prior notice.

Introduction drawing



Dimensions



Inquiry

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Portable Oxygen Analyzer TB—FI series



What's TB-FI series

Detective element is made of Zirconia electrolyte.

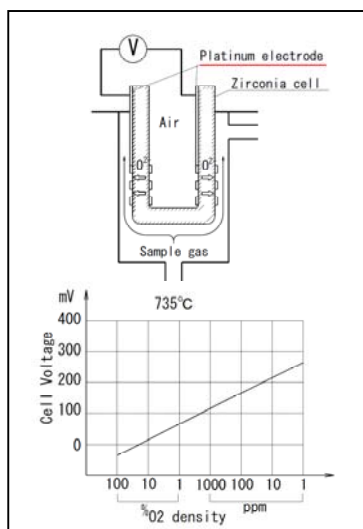
TB—IF—P sensor and C—101 control unit are installed altogether in a box for portable uses.

This analyzer can be used for every application where range of 1ppm to 100%, but for accurate measurement of high % oxygen, we recommend FG-X series.

Feature

- ◎ Wide range application, from 1ppm to 100%O₂.
- ◎ Built-in multi-filter protects detector from dirt and corrosion.
- ◎ Output range can select freely.
- ◎ Serial communication function is equipped normally.
- ◎ AC85V~260V power supply can be applied.

Principle



Sensing cell is a closed end, 90mm length and 7mm diameter. Tube made of Zirconium oxide. When it is red hot, it becomes a oxygen measuring cell because of movement of oxygen ions in its crystal structure.

If there are two different oxygen gases on both side of the cell, a voltage is produced.

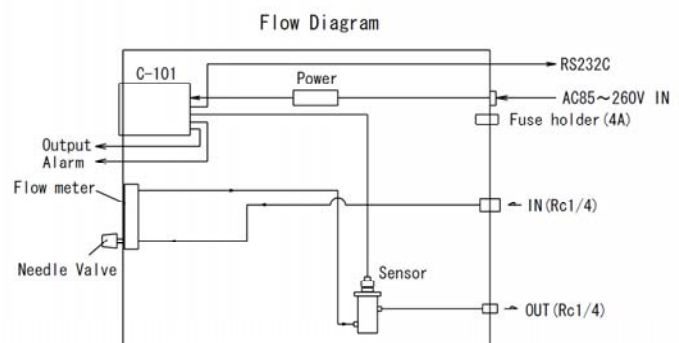
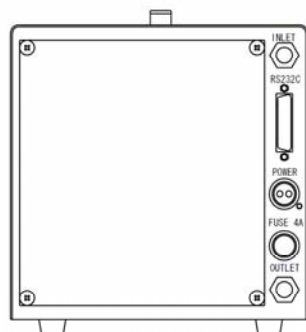
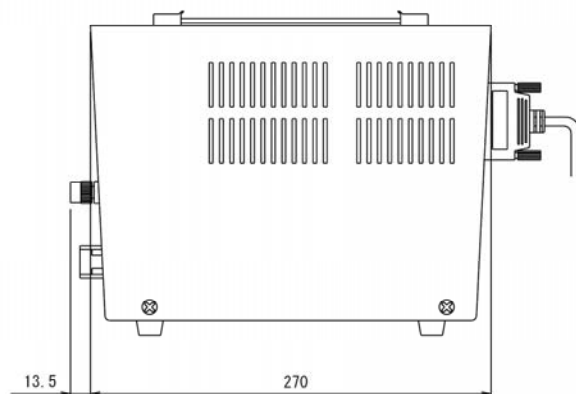
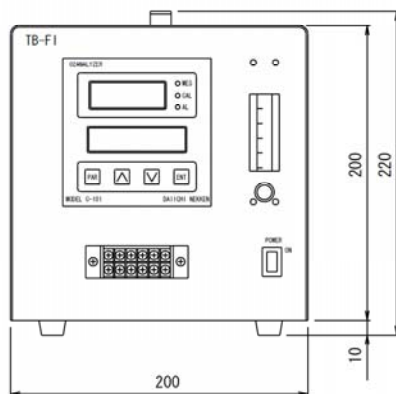
For the oxygen in combustible gases, the oxygen value is calculated from following formula:

$$E = 0.0496 \cdot T \log \frac{\text{Air (20.6\% = 206,000ppm = 0.206atm)}}{\text{Sample = O}_2\%, \text{ O}_2\text{ppm, O}_2\text{atm}} + C$$

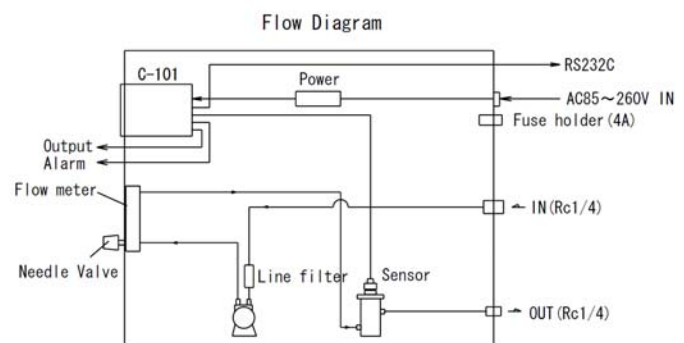
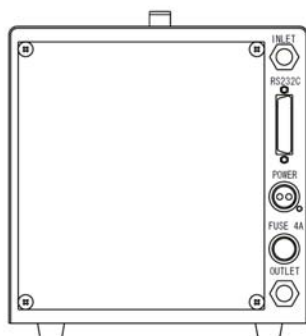
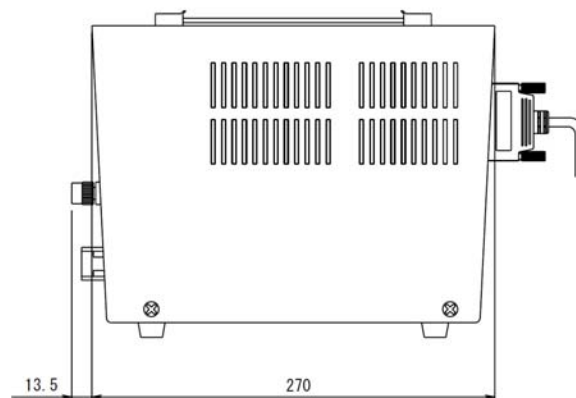
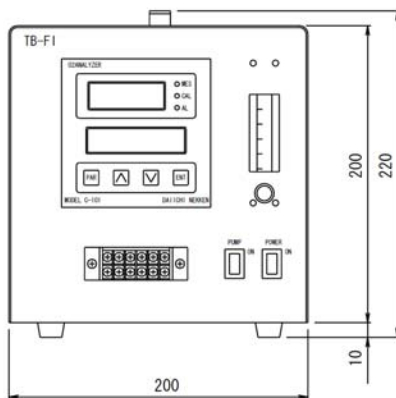
E: cell voltage(mV) T: absolute cell temperature C: cell constant(mV)
O₂atm: vol% of oxygen of the sample gas (atomic pressure)

MODEL

TB-FI

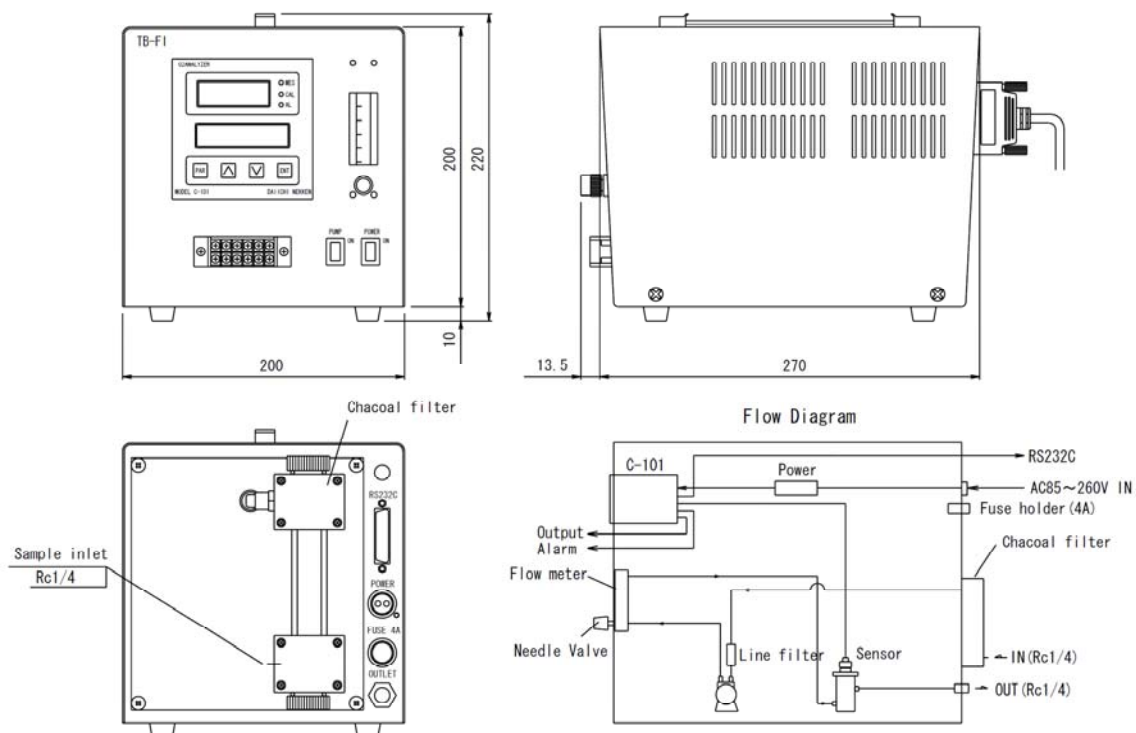


TB-FI-P

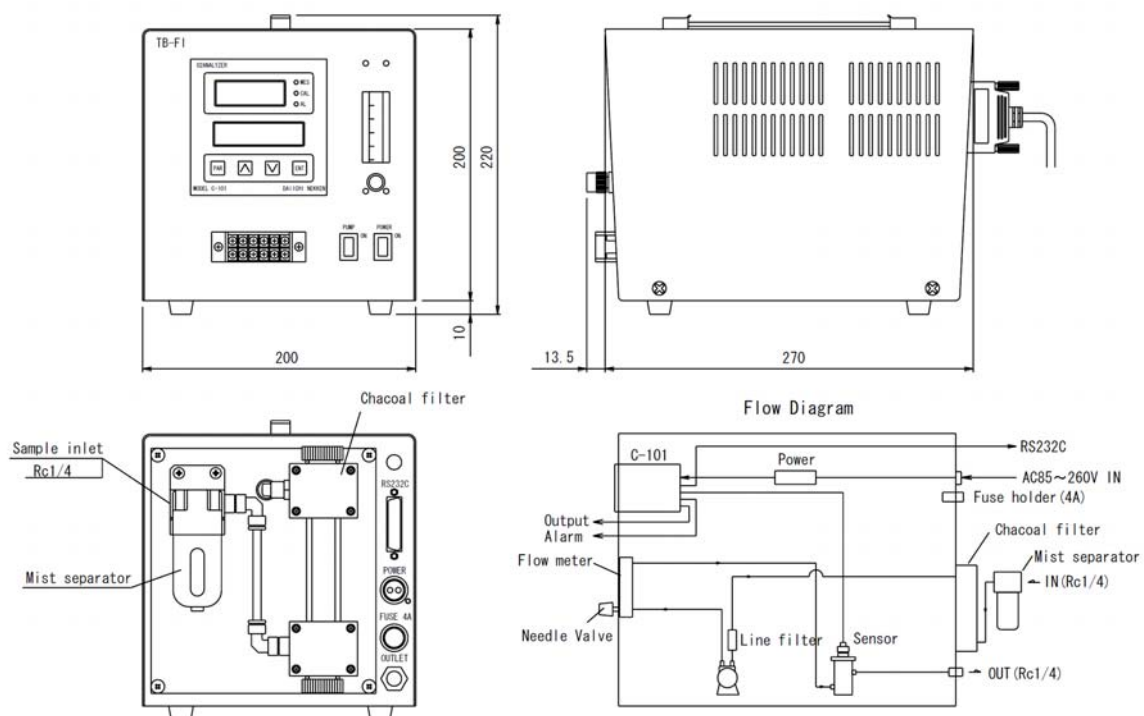


MODEL

TB-FI-PC



TB-FI-PR



Specifications

Principle	Zirconia electro-chemical cell	
Structure	SS box, TB-IP sensor, C-101 control unit, needle valve, flow meter etc.	
Model	TB-FI	Pressurized sample
	TB-FI-P	Sampling pump installed
	TB-FI-PC	Sampling pump and charcoal filter installed
	TB-FI-PR	Sampling pump and charcoal filter and mist-separator installed
Measuring range	1ppm~100%O ₂	
Display	% : 0~99.99%O ₂ ppm : 0~9999ppmO ₂	
Output	D.C.4~20mA, 0~1V or 0~10V (isolated) F.S. can be set within the range of the above-mentioned display freely. RS232C	
Range change	Auto/Manual	
Initial setting	0~25%O ₂ /0~1000ppmO ₂	
Alarm	Output : Hi/Lo, HHi/Hi or Lo/LLo (each A Point of contact・LCD Display) Failure : Disconnection of Heater, RTD (LCD Display)	
Linearity	Large one either of less than $\pm 1\%$ FS or ± 1 ppm	
Repeatability	Large one either of less than $\pm 1\%$ FS or ± 1 ppm	
Response	90% reading 10sec. (Swinging to a high density side)	
Drift	Less than $\pm 2\%$ FS/wk	
Piping	Rc1/4	
Sample Flow Rate	0.2~2L/min	
Sample Temp.	80°C MAX.	
Warm up time	About 20 minutes	
AC Power	AC85V~AC260V	
Accessory	Power supply code	

※For the improvement, the specification and design may be changed without prior notice.

Inquiry

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Portable Oxygen Analyzer TB – WI



What's TB-W I

Detective element is made of Zirconia electrolyte.

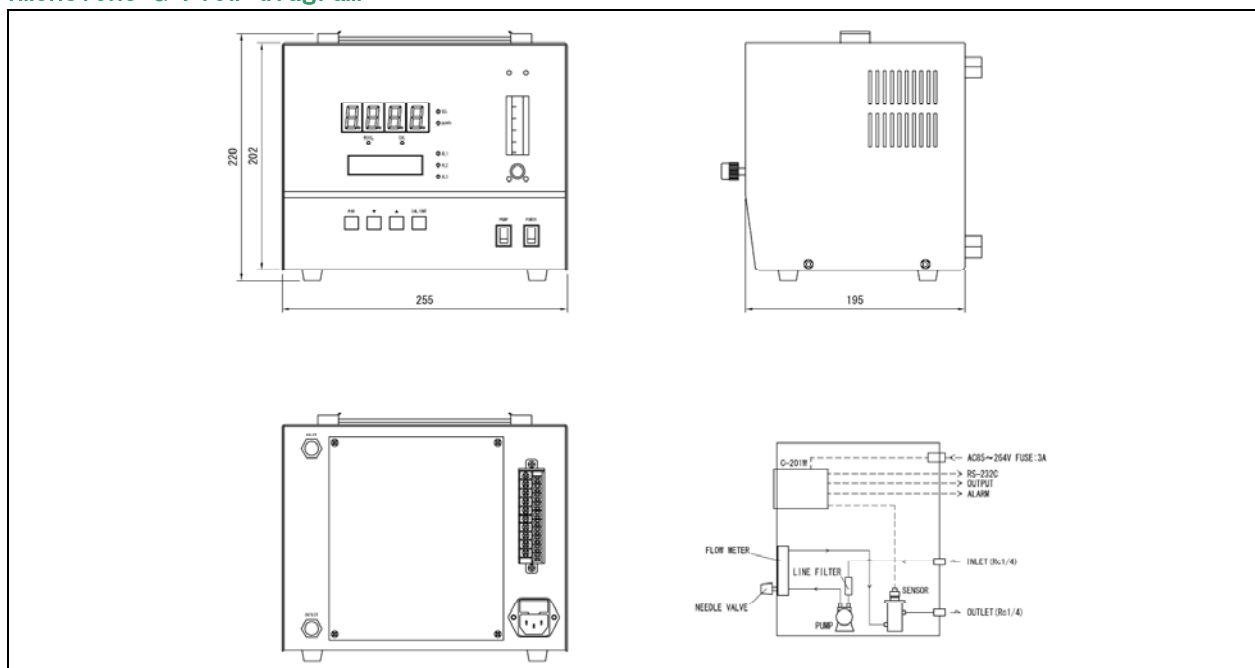
TB-II F-P sensor and C-201W control unit are installed altogether in a box for portable uses.

This analyzer can be used for every application where range of 1ppm to 100%.

Feature

- ◎ Wide range application, from 1ppm to 100%O₂.
- ◎ Output range can select freely.
- ◎ Serial communication function is equipped normally.
- ◎ 85V~264VAC power supply can be applied.

Dimensions & Flow diagram



Specifications

Principle	Zirconia electro-chemical cell
Structure	SS box, TB-II P sensor, C-201W control unit, pump, needle valve, flow meter etc.
Measuring range	1ppm~100%O ₂
Display	% : 0~99.99%O ₂ ppm : 0~9999ppmO ₂
Output	4~20mA DC/0~1VDC/0~5VDC/0~10VDC (Select the one of them) RS-232C
Range change	Auto/Manual/Remote
Initial setting	0~25%O ₂ /0~1000ppmO ₂
Alarm	Hi/Lo, Hi/H・Hi、Lo/L・Lo Failure : Disconnection of Heater, RTD (All of them are open collector output)
Linearity	The Larger either of less than $\pm 1\%FS$ or $\pm 1ppm$
Repeatability	The Larger either of less than $\pm 1\%FS$ or $\pm 1ppm$
Response	90% reading 5sec. (Swinging to a high density side)
Drift	Less than $\pm 2\%FS/wk$
Piping	Rc1/4
Sampling	Supplying sample gas or vacuuming by inside pump
Sample Flow Rate	0.2~2L/min
Sample Temp.	100°C
Warm up time	About 10min.
AC Power	85~264VAC
Accessory	Power supply code

※For the improvement, the specification and design may be changed without prior notice.

Inquiry

Daiichi Nekken CO., LTD

13-22 Nishikura-Gyo Ashiya-City

Hyogo-Prefecture Japan

TEL 0797-31-2410 / FAX 0797-31-8951

URL <http://www.daiichinekken.co.jp>

E-mail info@daiichinekken.co.jp

N₂PSA O₂ Analyzer CG-SM



What's CG-SM

This is a small and light oxygen analyzer that has a detective element made of Zirconia electrolyte.

Features

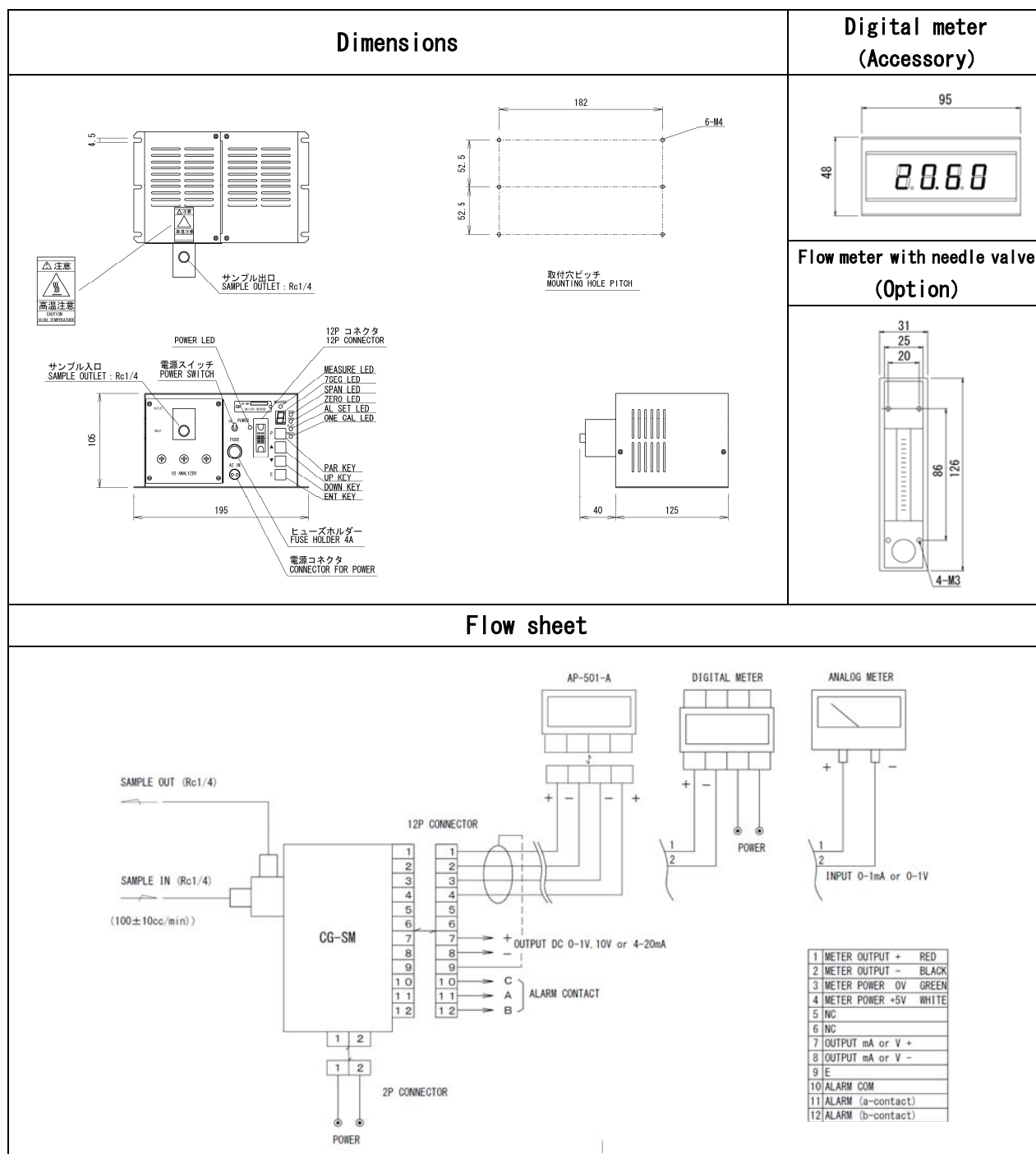
- ◎ Small amount sampling.
- ◎ Compact design.
- ◎ Simple structure, easy maintenance.

Specification

Installation	Indoor type、Plane・Wall type ※ Meter: Panel type
Measuring Range	10ppmO ₂ ~25%O ₂
D i s p l a y	Digital 3 1/2 digit or 4 digit display
R a n g e	1range : Decide in the above measuring range or display range. Min. range : 0-100ppmO ₂
O u t p u t	D.C. 0-1V or D.C. 4-20mA (Option)
A l a r m	The high-alarm 1point C contact
L i n e a r i t y	Less than ±1%FS
R e s p o n s i b i l i t y	Less than ±1%FS
R e s p o n s e	90% reading in 10 sec. (Swinging to a high density side)
D r i f t	Less than ±2%FS/week
Sample Condition	Not include water, corrosive, halogen, combustible
Sample flow	100±10cc/min
S a m p l i n g	Introduce (positive pressure)
Sample pressure	0.01~0.05 MPa
Sample temperature	80°C MAX.
P i p i n g	Inlet and Outlet Rc1/4
W a r m - u p	About 20 minutes
P o w e r	Power : AC100±10V 50/60Hz 200VA MAX.
Using temp.	-5~45°C
A c c e s s o r y	Panel meter、Power cord(3m)、Meter connection cord(3m)
O p t i o n	Flow meter with needle valve

※For the improvement, the specification and design may be changed without prior notice.

Dimensions & Flow Diagram



Inquiry

Daiichi Nekken CO., LTD

13-22 Nishikura-Cyo Ashiya-City
Hyogo-Prefecture Japan

TEL 0797-31-2410 / FAX 0797-31-8951

URL <http://www.daiichinekken.co.jp>

E-mail info@daiichinekken.co.jp

High density Oxygen Analyzer FG series



What's FG series

This is high density oxygen analyzer using limiting current method of Zirconia electrolyte.

Features

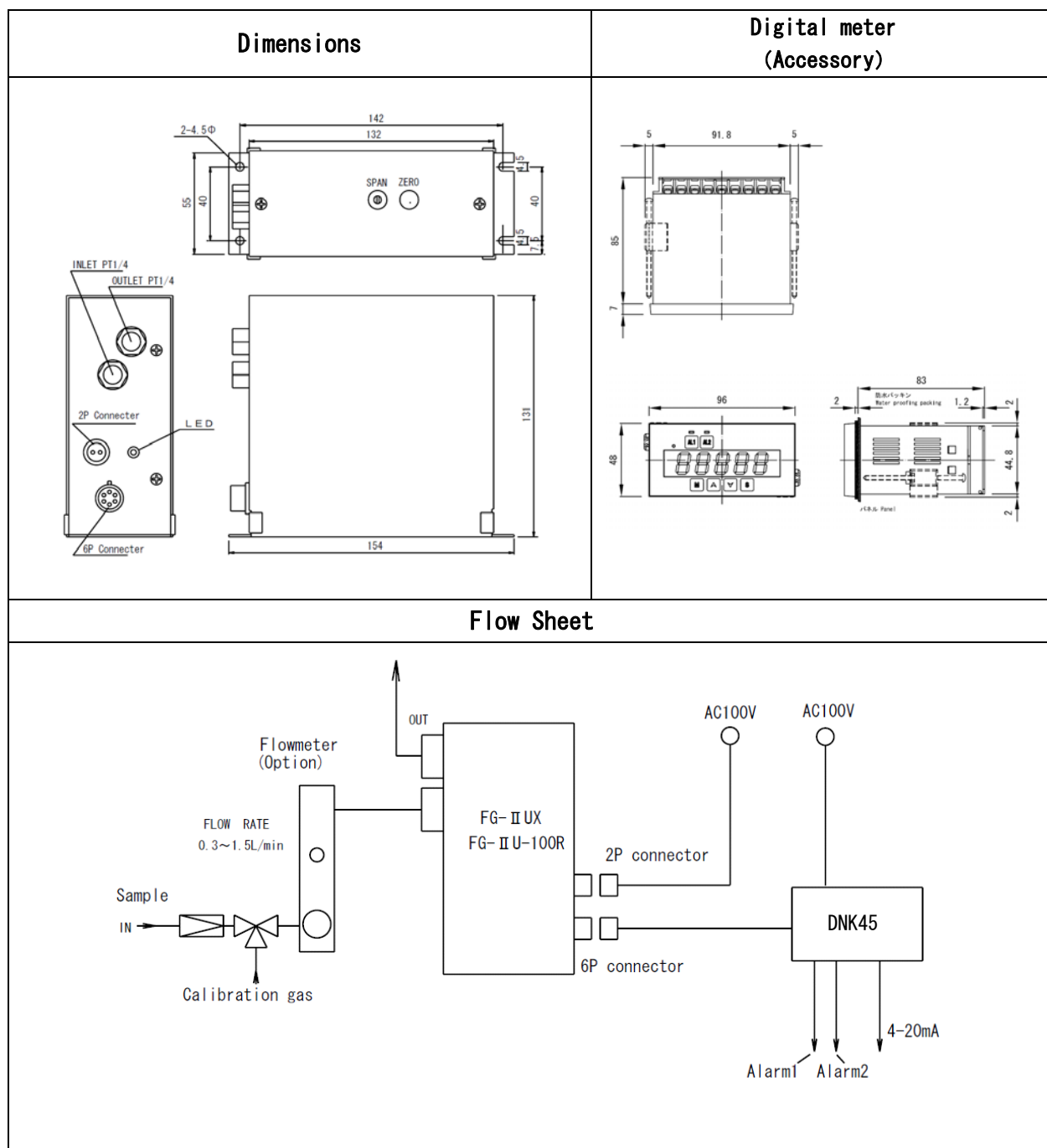
- ◎ It does not need reference gas and not be influenced by environment.
- ◎ Long-term stability measurement.
- ◎ Small and light.

Specification

M o d e l	FG -IIUX-S	FG-IIU-100RS
P r i n c i p l e	Limiting current method of Zirconia electrolyte	
I n s t a l l a t i o n	Indoor type、Plane・Wall type ※ Meter: Panel type	
A p p l i c a t i o n	O ₂ PSA、The oxygen enricher etc.	Synthetic air for the hospital etc.
R a n g e	0%O ₂ ~95%O ₂	0%O ₂ ~25%O ₂
D i s p l a y	00.00%~100.00%O ₂	00.00%~25.00%O ₂
O u t p u t	D.C. 4~20mA to 0~100%O ₂	D.C. 4~20mA to 0~25%O ₂
A l a r m	Output alarm 2 points	
L i n e a r i t y	Less than ±1%FS	
R e p e a t a b i l i t y	Less than ±1%FS	
R e s p o n s e	90% reading in 10 sec. (Swinging to a high density side)	
D r i f t	Less than ±1%/month	
S a m p l i n g	Introduce (positive pressure)	
G a s P r e s s u r e	0.01~0.05 MPa	
G a s t e m p e r a t u r e	80°C max	
T u b i n g	Inlet & Outlet PT1/4	
W a r m - u p	About 20 minutes	
P o w e r	Power : AC100±10V 50/60Hz 50VA max	
T e m p e r a t u r e	0~50°C	
A c c e s s o r y	Connecting cord、Power cord 3m、Digital meter (DNK45)	
O p t i o n	Flow meter with needle valve	

※For the improvement, the specification and design may be changed without prior notice.

Dimensions & Flow Diagram



Inquiry

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Hyogo-Prefecture Japan

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URL <http://www.daiichinekken.co.jp>

E-mail info@daiichinekken.co.jp

Super high density Oxygen Analyzer FG-ISX



What's FG-ISX

This is high density oxygen analyzer using limiting current method of Zirconia electrolyte.

Features

- ◎ It can measure over 99.9% Oxygen at high accuracy and stability.
- ◎ It does not need reference gas and not be influenced by environment.
- ◎ Simple structure, maintenance free.
- ◎ Power saving.

Applications

- ◎ Air separation plant, Oxygen filling station, Liquid Oxygen tank, Oxygen piping maintenance, Oxygen PSA, Laboratory etc.

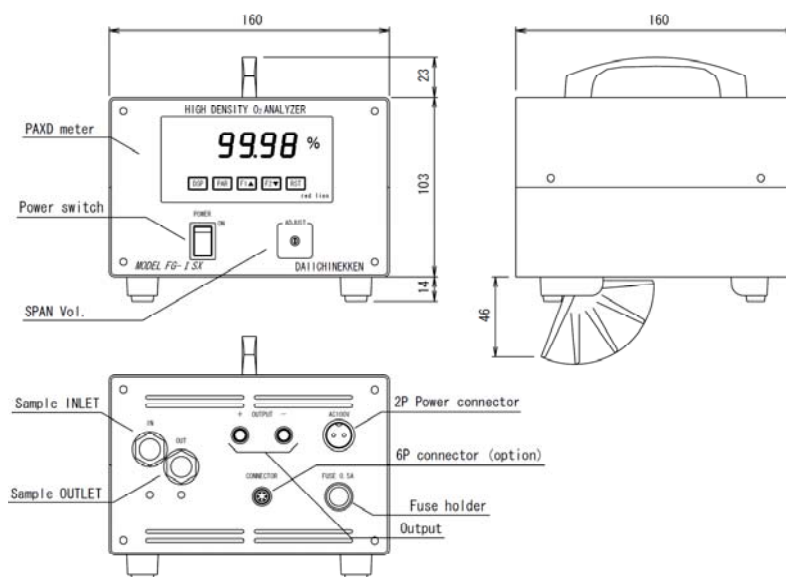
Specification

Handling	Portable		
Measuring Sphere	0~100%O ₂		
Display	00.00%~100.00%O ₂		
Range	1Range (0 to 100%O ₂ or 90 to 100%O ₂)		
Output Signal	D.C. 4~20mA or D.C. 0~10V		
Alarm Output	Hi/Lo 2points (Option)		
Serial Comm.	RS232 or RS485 (Option)		
Linearity	Less than ±1%O ₂ (0%~90%O ₂), ±0.1%O ₂ (90%~100%O ₂)		
Repeatability	Less than ±1%O ₂ (0%~90%O ₂), ±0.1%O ₂ (90%~100%O ₂)		
Response	90% reading in 10 sec. (Swinging to a high density side)		
Sample Condition	Not include water, corrosive, halogen, combustible Introduce (positive pressure)		
Sampling	0.5~2.0L/min	Power Source	AC100±10V 50/60Hz 50VA MAX.
Flow rate	50°C MAX.	Ambient Temp.	0 to 50°C
Sample Temp.	INLET&OUTLET Rc1/4	Attachment	Power cord 3m
Warm Up Time	About 10 minutes	Option	Signal & communication cable 3m

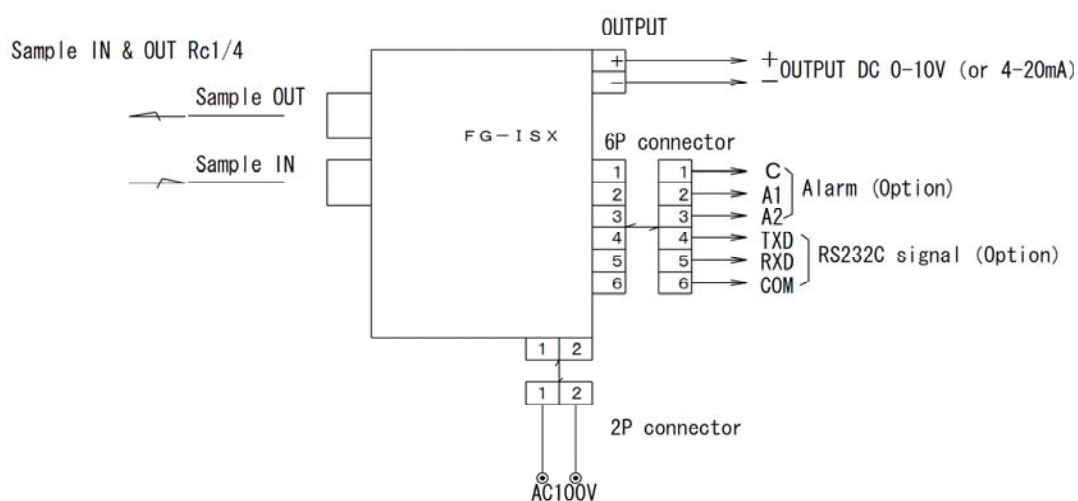
※For the improvement, the specification and design may be changed without prior notice.

Dimensions & Flow Diagram

Dimensions



Flow Sheet



Inquiry

Daiichi Nekken CO., LTD

13-22 Nishikura-Gyo Ashiya-City
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TEL 0797-31-2410 / FAX 0797-31-8951
URL <http://www.daiichinekken.co.jp>
E-mail info@daiichinekken.co.jp

Fixed type OXYGEN MONITOR Air-C Series



Remote sensor
(Air-CR series)



Features

- Long term stability measurement
(2 years warranty※)
- Maintenance free
- Analog output 4~20mA
- Remote measurement (3m, 5m, 10m)

Application

- Laboratory, warehouse
- Atmosphere using inert gas (N₂, Ar etc.)
- Underground pit

etc.

Specification

This is an oxygen analyzer using limiting current method of Zirconia electrolyte.

MODEL	Air-C	Air-CR3	Air-CR5	Air-CR10
MOUNT	Wall mounting (Indoor)			
MEASUREMENT	0~25 vol%O ₂			
DISPLAY	0.0~25.0 vol%O ₂			
ALARM	Low Alarm(Contact A, Lamp, Buzzer) It is possible to set in 18~21% (Default: 19%O ₂), Self-maintenance(Default) or Automatic reset selectable			
OUTPUT	4~20mADC towards 0~25vol%O ₂			
SAMPLING	Diffusion	Remote		
		Cable 3m	Cable 5m	Cable 10m
ACCURACY	Less than ±0.5vol%O ₂			
ALARM DELAY TIME	Less than 5sec. after detecting 10~11vol% oxygen gas on 19vol% low alarm setting			
DRIFT	Less than ±0.5vol%O ₂ /month			
ATMOSPHERE	Less than 90%RH (No-condensing)			
WARM-UP TIME	Approx. 5min.			
POWER	90~240VAC 50/60Hz 8VA			
OPERATING TEMP.	0~45°C (No-flammable gas)			

※ For the improvement, the specification and design may be changed without prior notice.

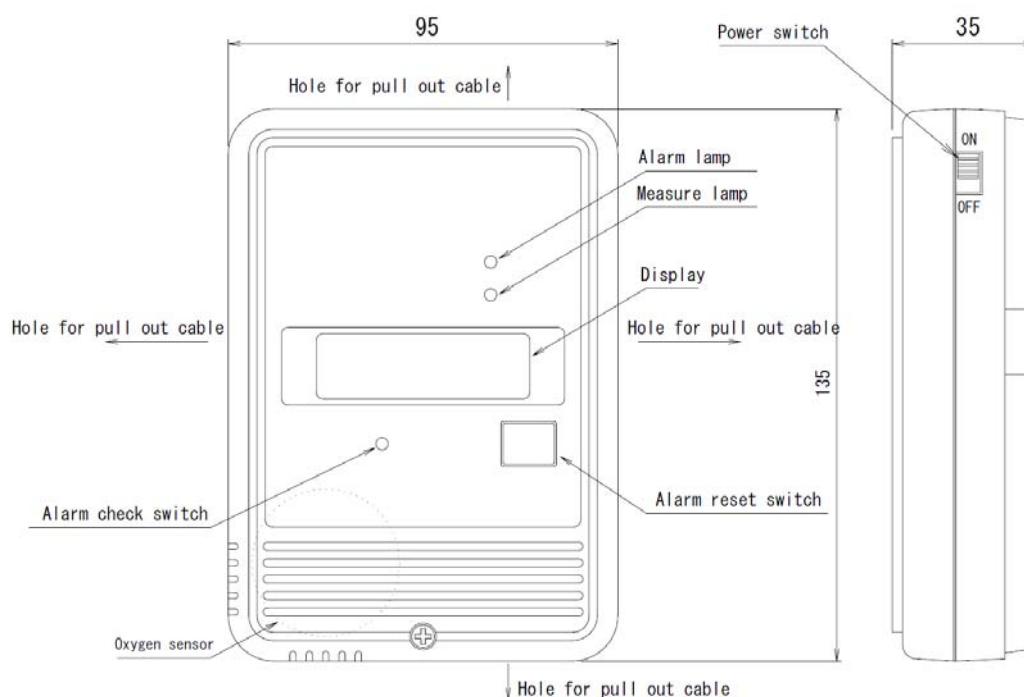
※ About 2 years warranty •It is limited to our original products.

•It may become out of warranty in case of the strong acidity, strong alkaline corrosive gas are included in a sample.

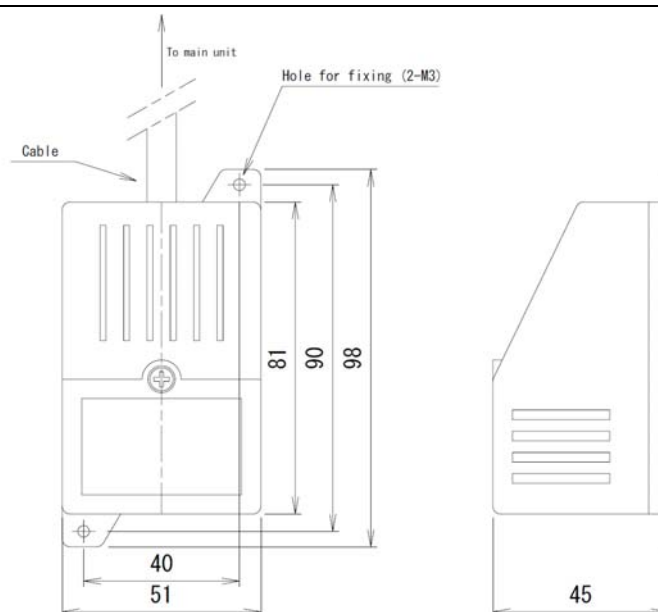
Consult with us when you would like to use besides above specification.

Main unit & Remote sensor dimensions

Dimensions (Main unit)



Remote sensor



Inquiry

 **Daiichi Nekken CO., LTD.**

3-22 Nishikura-Cyo Ashiya-City
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ULTRASONIC GAS ANALYZER

 **DAICHINEKKEN CO.,LTD.**

◆ ULTRASONIC GAS ANALYZER US series

These analyzers have ultrasonic sensors for gas detecting.

These analyzers indicate concentration, outputs analog voltage and electrical current by measuring speed of sound and temperature of mixture of two gases.

PRINCIPLE

Speed of sound what carries in the gases depends on molecular weight of the gas.

If sound speeds and temperature in the gas are found, average molecular weight can be calculated.

If the average molecular weight of measured gas is known, each concentration of two known gases is found.

<Average molecular weight in ideal gas>

$$M = (\gamma \times R \times T \div V^2) \times 10^3$$

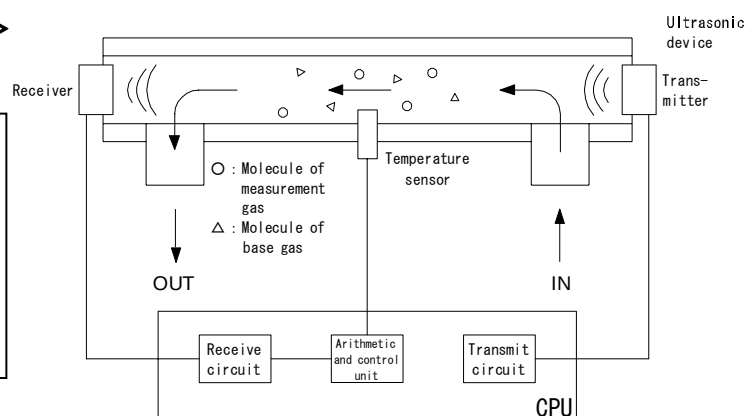
M is average molecular weight of mixed gas.

T is absolute temperature of the gas.

γ is the ratio of heat capacity at constant volume to heat capacity at constant pressure.

V is speed of sound in the mixed gases.

R is constant of the gas : (8.314).



Product lineup I

T Y P E	US-100-5VS type2	US- I X	US- II E	US- I T-BT
PICTURE				
DISPLAY UNIT	—	Digital Meter	—	5.7 inch TFT color LCD monitor
OPERATION	Optional switchboard	Switch	Optional switchboard	Touch panel
R A N G E	1			1~10
O U T P U T	DC0-1V	—	DC0-1V	—
P I P I N G	hose of φ5~6.5 mm in inside diameter		1/4" Swagelok or 3/8" Swagelok	1/4" Swagelok or 1/8" Swagelok
S A M P L E T E M P .	Normal temperature (Max. 50°C)			
S A M P L I N G	Sample gas pressure			
F L O W R A T E	0.5 ~ 5.0L/min		0.5 ~ 2.0L/min	
S A M P L E P R E S S . ※ 3	Atmospheric pressure ~ +20kpa	Atmospheric pressure ~ +5kpa	Atmospheric pressure ~ +20kpa	
I N S T A L L A T I O N	Fixed	Portable	Fixed	Portable
P O W E R S U P P L Y	DC+5.0V or DC+12.0V	7.2V lithium ion battery	DC+5.0V or DC+12.0V	12V lithium ion battery
C H A R G E T I M E	—	Approx. 4 hours	—	Approx. 4 hours
M A S S	Approx. 0.1kg	Approx. 0.6kg (include soft case)	Approx. 1kg	Approx. 7kg
E X T E R N A L D I M E N S I O N S	W100×D50×H25.6	W150×D40×H111	W165×D100×H135.2	W330×D304×H150

Product lineup II

T Y P E	US-ⅡT-S(R)	US-ⅡT-P	US-ⅠT-P	US-ⅡT-SH
PICTURE				
DISPLAY UNIT	5.7 inch TFT color LCD monitor			
OPERATION	Touch panel			
R A N G E	1 ~ 10 (Please contact our company)			
A N A L O G O U T P U T	DC4-20mA DC0-1V or 0-10V			
CONTACT OUTPUT※1	—	7 points (all A)		—
I N P U T SIGNAL※2	—	Remote calibration signal		—
P I P I N G	Rc1/4 or 1/4" VCR			Rc1/4
S A M P L E T E M P .	Normal temperature (Max. 50℃)			
SAMPLING	Sample gas pressure		Suction by pump Max. 46.7kpa	Sample gas pressure
FLOW RATE	0.5 ~ 2.0L/min	0.5 ~ 2.0L/min With flow meter needle valve		0.5 ~ 2.0L/min
S A M P L E P R E S S . ※3	Atmospheric pressure ~ +20kpa		—	Atmospheric pressure ~ +20kpa
INSTALLATION	Panel mounting		Portable	Portable or Panel mounting
POWER SUPPLY	AC85 ~ 260V		AC90 ~ 110V	AC85 ~ 260V
M A S S	Approx. 5kg	Approx. 6kg	Approx. 7kg	Approx. 6.5kg
EXTERNAL DIMENSIONS	W220×D252×H150	W290×D235×H170	W294×D330×H170	Portable: W220×D268×H200 Panel mounting: W220×D268×H150

※1 Concentration alarm 2 points, Failure alarm and Signal whole calibration, Others are used to the optional function. Exp) auto calibration function

Resistance load : AC250V 5.0A, DC30V 5.0A

Inductive load : AC250V 2.0A, DC30V 2.0A

US-ⅡT-SR has Concentration alarm 2 point (or a Concentration alarm and a Failure alarm).

※2 Non-voltage input (Isolation)

※3 Sample pressure has indicated the case of exhaust to atmosphere.

Sample pressure (+1.0 Mpa or less) ±0.05Mpa is possible to specify.

(Pressure-resistant of US-100-5VS & US-ⅠX is +0.1MPa. Pressure-resistant of US-ⅡT-P is +0.8MPa.)

Please specify part and the composition of the measurement gas when you order.

1. ULTRASONIC GAS MODULE US-100-5VS type.2

STRONG POINT

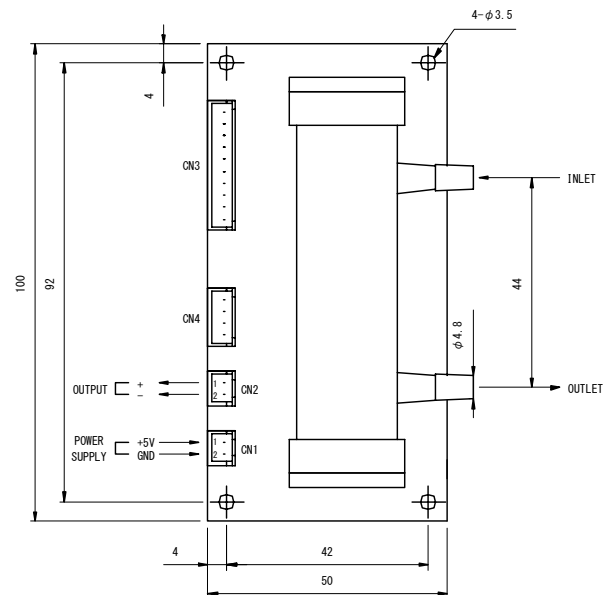
- ◎ No consumables and long-lasting
- ◎ Calibration and maintenance are unnecessary for a long time
- ◎ Warm-up time is short and power saving
- ◎ Compact, Light, Easy installation



SPECIFICATIONS

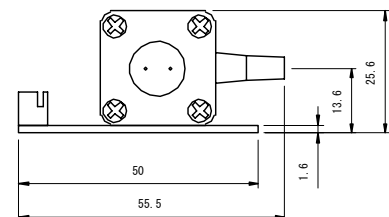
WARM-UP TIME Approx. 10 seconds
SAMPLE TEMP. Normal temperature (Max. 50°C)
SAMPLE PRESS. Atmospheric pressure ~ +20kpa
FLOW RATE 0.5 ~ 5.0L/min
POWER SUPPLY Less than $\pm 0.3V$ of DC+5.0V
(option : DC+12.0V)
AMBIENT TEMP. 5 ~ 45°C/90%RH or less
P I P I N G Hose of $\phi 5 \sim 6.5$ mm in
inside diameter
ANALOG OUTPUT DC0-1V
RESPONSE TIME 90% reading is within 10sec.
LINEARITY/ REPEATABILITY Less than $\pm 1\%$ of full
scale (max range)
M A S S Approx. 0.1kg
E X T E R N A L
D I M E N S I O N S W100 × D50 × H25.6

OUTLINE DIAGRAM



PERFORMANCE

Composition	MEASUREMENT MAX RANGE	MEASURABLE MINIMUM DIGIT
He/N2	0~ 50%	0.1 %
He/Air	0~ 50%	0.1 %
O2/N2	0~100%	0.4 %
Xe/Ar	0~100%	0.05%
Kr/N2	0~100%	0.05%
CF4/N2	0~100%	0.05%
Xe/N2	0~100%	0.03%
SF6/N2	0~100%	0.03%
CO2/Ar	0~ 50%	0.1 %



2. ULTRASONIC PORTABLE GAS ANALYZER US-IX

● Portable



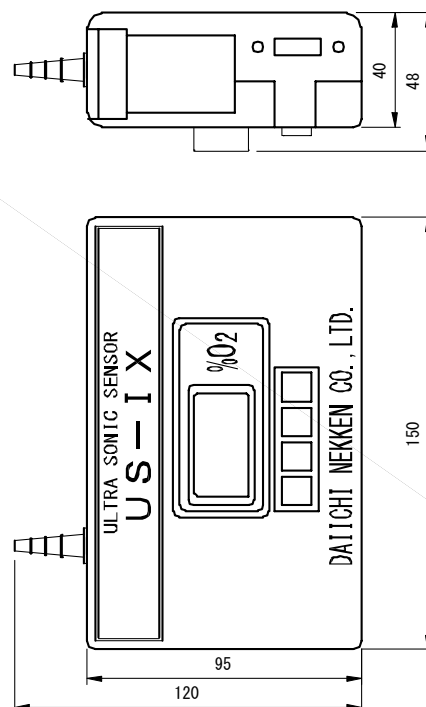
STRONG POINT

- ◎ No consumables and long-lasting
- ◎ Calibration and maintenance are unnecessary for a long time
- ◎ Warm-up time is short and power saving
- ◎ Compact, Light, Easy to carry
- ◎ With soft case
- ◎ Continuous measurements up to approx. 10 hours possible

SPECIFICATIONS

MEASUREMENT RANGE	0 ~ 99.9%O ₂
WARM-UP TIME	Approx. 10 seconds
SAMPLE TEMP.	Normal temperature (Max. 50°C)
SAMPLE PRESS.	Atmospheric pressure ~ +5kpa
FLOW RATE	0.5 ~ 5.0L/min
POWER SUPPLY	7.2V lithium ion battery
CHARGE TIME	Approx. 4 hours
AMBIENT TEMP.	5 ~ 45°C/90%RH or less
P I P I N G	Hose of ϕ 5~6.5 mm in inside diameter
RESPONSE TIME	90% reading is within 10sec.
LINEARITY/ REPEATABILITY	Less than ± 2 vol % of full scale
M A S S	Approx. 0.6kg (include soft case)
E X T E R N A L D I M E N S I O N S	W150 × D40 × H111

OUTLINE DIAGRAM



※Performance is equivalent to Ultrasonic gas module.

3. ULTRASONIC GAS ANALYZER US-II E

● Space-saving



STRONG POINT

- ◎ No consumables and long-lasting
- ◎ Calibration and maintenance are unnecessary for a long time
- ◎ Warm-up time is short and power saving
- ◎ Analog output only

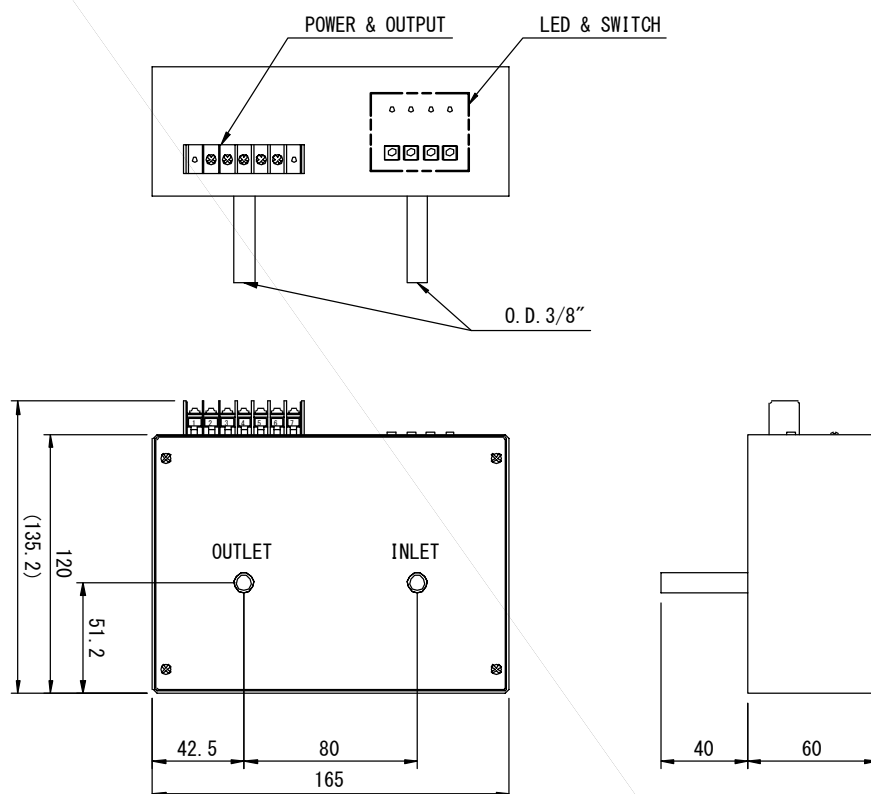
SPECIFICATIONS

INSTALLATION	Fixed
WARM-UP TIME	Approx. 10 seconds
SAMPLE TEMP.	Normal temperature (Max. 50°C)
SAMPLE PRESS.	Atmospheric pressure ~ +20kpa
FLOW RATE	0.5 ~ 2.0L/min
POWER SUPPLY	DC+5.0V $\pm$ 0.3V 以内 (DC+12.0V $\pm$ 1.0V 以内)
AMBIENT TEMP.	5 ~ 45°C/90%RH or less
P I P I N G	1/4" Swagelok or 3/8" Swagelok
ANALOG OUTPUT	DC0-1V
RESPONSE TIME	90% reading is within 10sec.
LINEARITY/ REPEATABILITY	Less than $\pm$ 1% of full scale (max range)
M A S S	Approx. 1kg
E X T E R N A L D I M E N S I O N S	W165×D100×H135.2

PERFORMANCE

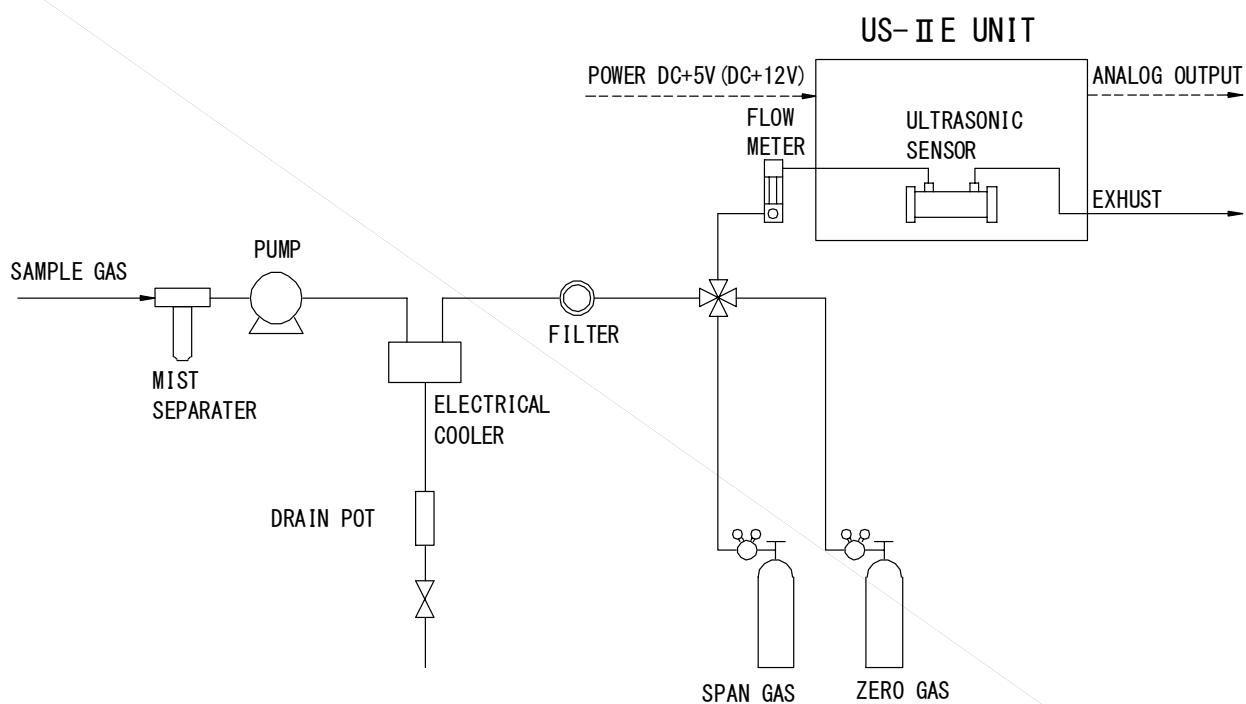
Composition	MEASUREMENT MAX RANGE	MEASURABLE MINIMUM DIGIT
H ₂ /N ₂	0~ 50%	0.04 %
He/N ₂	0~ 50%	0.04 %
He/Air	0~ 50%	0.04 %
O ₂ /N ₂	0~100%	0.2 %
Xe/Ar	0~100%	0.02 %
Kr/N ₂	0~100%	0.02 %
CF ₄ /N ₂	0~100%	0.02 %
Xe/N ₂	0~100%	0.01 %
SF ₆ /N ₂	0~100%	0.01 %
CO ₂ /Ar	0~ 50%	0.1 %

OUTLINE DIAGRAM



EXAMPLE OF FLOW

<EXAMPLE OF MEASURING INDUSTRIAL FURNACES>



※If sample gas is DRY, it is not necessary to prepare mist separator and electrical cooler.

4. ULTRASONIC PORTABLE GAS ANALYZER US- I T-BT

● Portable type



STRONG POINT

- ◎ No consumables and long-lasting
- ◎ Color LCD monitor with touch panel
- ◎ Continuous measurements up to approx. 7 hours possible
- ◎ Warm-up time is short and power saving
- ◎ Multiple range for various kinds of gases
- ◎ Free choice of sampling period by user

SPECIFICATIONS

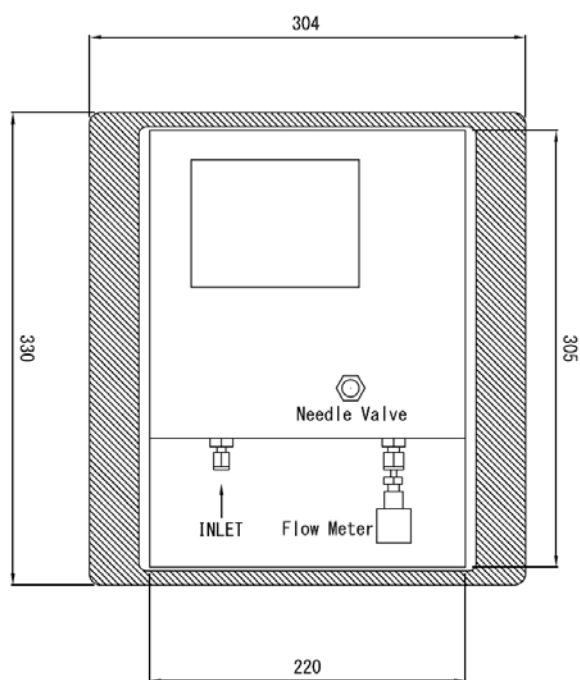
INSTALLATION	Portable
WARM-UP TIME	Approx. 10 seconds
SAMPLE TEMP.	Normal temperature (Max. 50°C)
SAMPLE PRESS.	Atmospheric pressure ~ +20kpa
FLOW RATE	0.5 ~ 2.0L/min
POWER SUPPLY	12V lithium ion battery
CHARGE TIME	Approx. 4 hours
AMBIENT TEMP.	5 ~ 40°C／90%RH or less
P I P I N G	1/4" Swagelok or 1/8" Swagelok
* 1 RESPONSE TIME	90% reading is within 10sec.
LINEARITY/ REPEATABILITY	Less than ±1% of full scale (max range)
M A S S	Approx. 7kg
E X T E R N A L D I M E N S I O N S	W330 × D304 × H150

PERFORMANCE

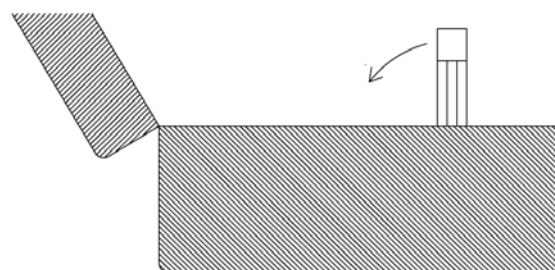
Composition	MEASUREMENT MAX RANGE	MEASURABLE MINIMUM DIGIT
H2/N2	0~ 50%	0.02 %
He/N2	0~ 50%	0.02 %
He/Air	0~ 50%	0.02 %
O2/N2	0~100%	0.1 %
Xe/Ar	0~100%	0.01 %
Kr/N2	0~100%	0.01 %
CF4/N2	0~100%	0.01 %
Xe/N2	0~100%	0.005%
SF6/N2	0~100%	0.005%
CO2/Ar	0~ 50%	0.05 %

* 1
Can be arbitrarily set by a user

OUTLINE DIAGRAM



 is rain-proof case.



When it isn't used,
push down the flow meter.

5. ULTRASONIC GAS ANALYZER US-II T-S (R)

● Standard type



STRONG POINT

- ◎ No consumables and long-lasting
- ◎ Color LCD monitor with touch panel
- ◎ Two choices of analog output
: DC 0-10V or DC 0-1V
- ◎ Warm-up time is short and power saving
- ◎ Multiple range for various kinds of gases
- ◎ Free choice of output scaling by user
- ◎ Wide power supply between AC 85V and AC 260V
- ◎ Free choice of sampling period by user
- ◎ Alarm output (only for US-II T-SR)

SPECIFICATIONS

INSTALLATION	Panel mounting
WARM-UP TIME	Approx. 10 seconds
SAMPLE TEMP.	Normal temperature (Max. 50°C)
SAMPLE PRESS.	Atmospheric pressure ~ +20kpa
FLOW RATE	0.5 ~ 2.0L/min
POWER SUPPLY	AC85 ~ 260V 50/60Hz
AMBIENT TEMP.	5 ~ 45°C/90%RH or less
P I P I N G	Rc1/4 or 1/4" VCR
ANALOG OUTPUT	DC4-20mA, 0-1V or 0-10V
*1 RESPONSE TIME	90% reading is within 10sec.
LINEARITY/ REPEATABILITY	Less than $\pm 1\%$ of full scale (max range)
M A S S	Approx. 5kg
E X T E R N A L D I M E N S I O N S	W220 × D252 × H150

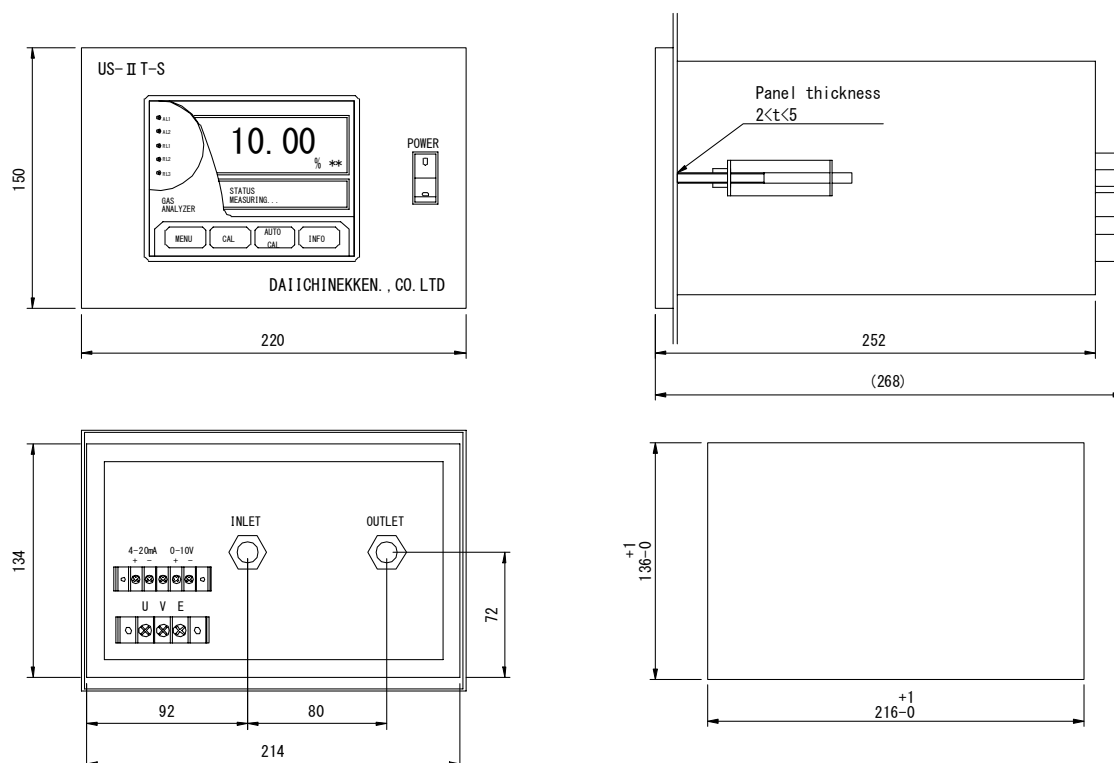
PERFORMANCE

Composition	MEASUREMENT MAX RANGE	MEASURABLE MINIMUM DIGIT
H2/N2	0~ 50%	0.02 %
He/N2	0~ 50%	0.02 %
He/Air	0~ 50%	0.02 %
O2/N2	0~100%	0.1 %
Xe/Ar	0~100%	0.01 %
Kr/N2	0~100%	0.01 %
CF4/N2	0~100%	0.01 %
Xe/N2	0~100%	0.005%
SF6/N2	0~100%	0.005%
CO2/Ar	0~ 50%	0.05 %

*1

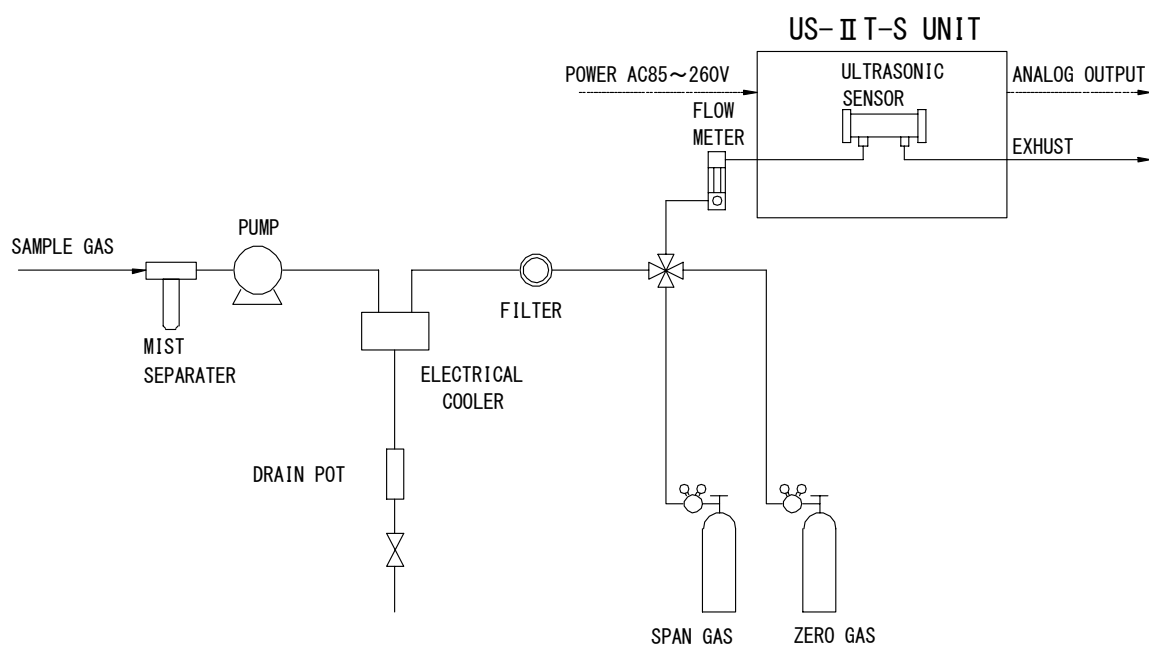
Can be arbitrarily set by a user

OUTLINE DIAGRAM



EXAMPLE OF FLOW

<EXAMPLE OF MEASURING INDUSTRIAL FURNACES>



※If sample gas is DRY, it is not necessary to prepare mist separater and electrical cooler.

6. ULTRASONIC GAS ANALYZER US-II T-P

● Type with flow meter



STRONG POINT

- ◎ No consumables and long-lasting
- ◎ Color LCD monitor with touch panel
- ◎ RS232C Serial communication function (optional)
- ◎ Two choices of analog output : DC 0-10V or DC 0-1V
- ◎ Multiple range for various kinds of gases
- ◎ Failure alarm (self-diagnosis function)
- ◎ Free choice of output scaling by user
- ◎ Auto calibration function, Remote calibration function
- ◎ Wide power supply between AC 85V and AC 260V
- ◎ Free choice of sampling period by user

SPECIFICATIONS

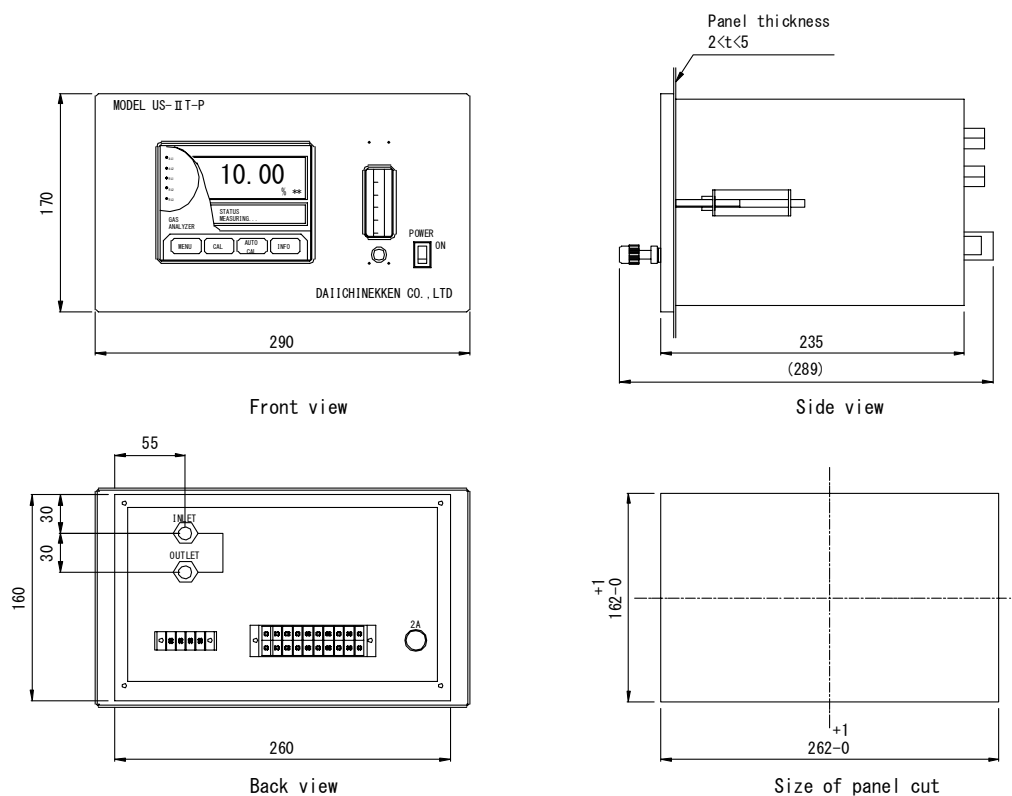
INSTALLATION	Panel mounting
WARM-UP TIME	Approx. 10 seconds
SAMPLE TEMP.	Normal temperature (Max. 50°C)
SAMPLE PRESS.	Atmospheric pressure ~ +20kpa
FLOW RATE	0.5 ~ 2.0L/min
POWER SUPPLY	AC85 ~ 260V 50/60Hz
AMBIENT TEMP.	5 ~ 45°C/90%RH or less
P I P I N G	Rc1/4 or 1/4" VCR
ANALOG OUTPUT	DC4-20mA, 0-1V or 0-10V
*1 A L A R M	Concentration alarm : 2, Failure alarm : 1
*2 CONTACT OUTPUT	7 points (all A)
INPUT SIGNAL	Remote calibration signal
*3 RESPONSE TIME	90% reading is within 10sec.
LINEARITY/ REPEATABILITY	Less than ±1% of full scale (max range)
M A S S	Approx. 6kg
EXTERNAL DIMENSIONS	W290 × D235 × H170

PERFORMANCE

Composition	MEASUREMENT MAX RANGE	MEASURABLE MINIMUM DIGIT
H2/N2	0~ 50%	0.02 %
He/N2	0~ 50%	0.02 %
He/Air	0~ 50%	0.02 %
O2/N2	0~100%	0.1 %
Xe/Ar	0~100%	0.01 %
Kr/N2	0~100%	0.01 %
CF4/N2	0~100%	0.01 %
Xe/N2	0~100%	0.005%
SF6/N2	0~100%	0.005%
CO2/Ar	0~ 50%	0.05 %

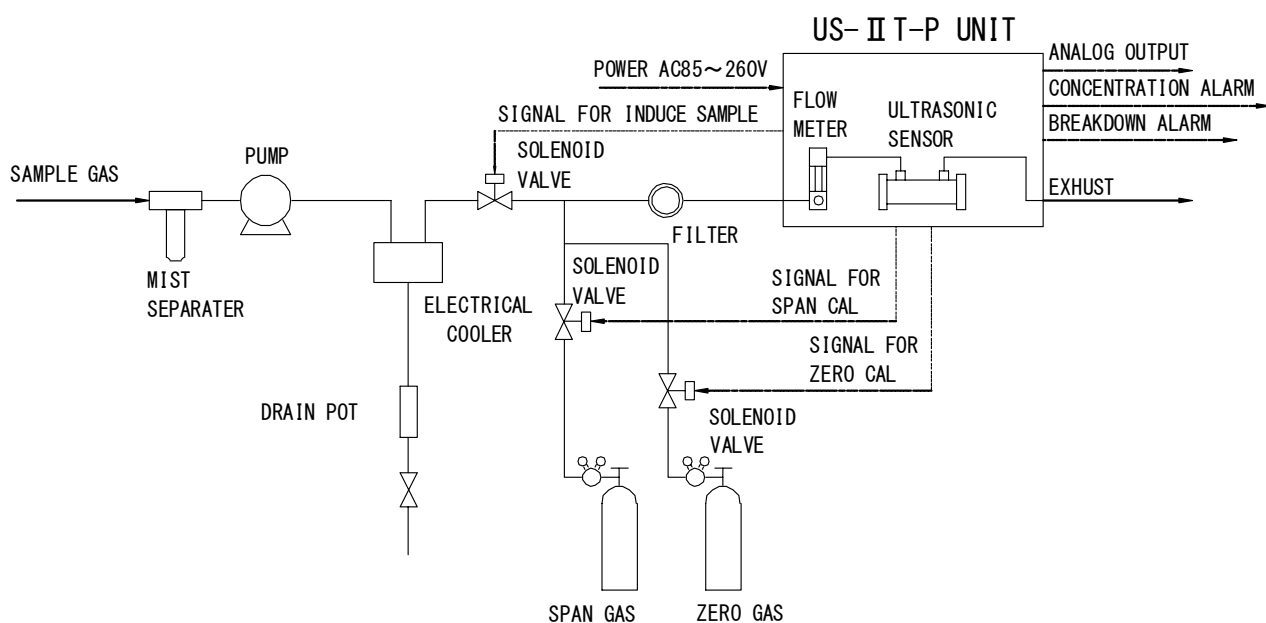
- *1
Concentration alarm 2 point, Failure alarm and
Signal whole calibration, Others are used to the
optional function. Exp) auto calibration function
Resistance load : AC250V 5.0A, DC30V 5.0A
Inductive load : AC250V 2.0A, DC30V 2.0A
- *2
Non-voltage input (Isolation)
- *3
Can be arbitrarily set by a user

OUTLINE DIAGRAM



EXAMPLE OF FLOW

<EXAMPLE OF MEASURING SAMPLE GAS>



※If sample gas is DRY, it is not necessary to prepare mist separator and electrical cooler.

7. ULTRASONIC GAS ANALYZER US-IT-P

- Type with flow meter
- Type with pump



STRONG POINT

- ◎ No consumables and long-lasting
- ◎ Color LCD monitor with touch panel
- ◎ RS232C Serial communication function (optional)
- ◎ Two choices of analog output : DC 0-10V or DC 0-1V
- ◎ Auto calibration function, Remote calibration function
- ◎ Multiple range for various kinds of gases
- ◎ Failure alarm (self-diagnosis function)
- ◎ Free choice of output scaling by user
- ◎ Flow meter and sampling pump installed
- ◎ Free choice of sampling period by user

SPECIFICATIONS

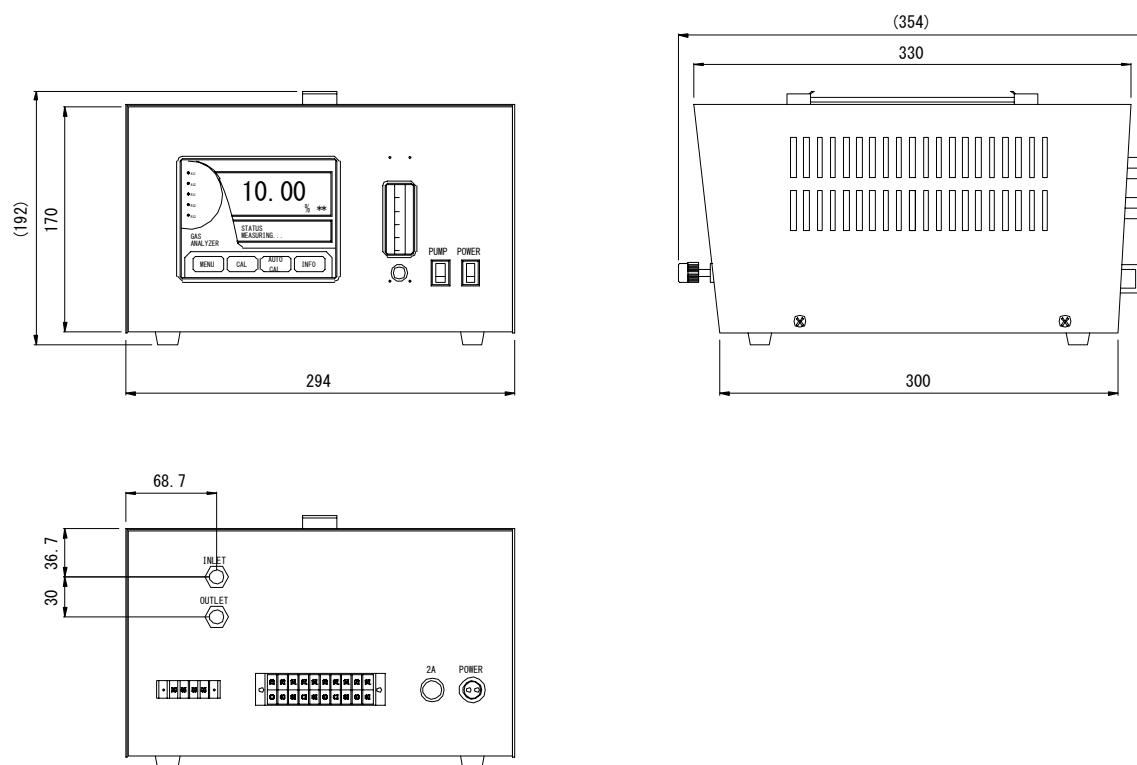
INSTALLATION	Portable
WARM-UP TIME	Approx. 10 seconds
SAMPLE TEMP.	Normal temperature (Max. 50°C)
Maximum vacuum level	46.7kpa
POWER SUPPLY	AC90 ~ 110V 50/60Hz
AMBIENT TEMP.	5 ~ 45°C/90%RH or less
P I P I N G	Rc1/4 or 1/4" VCR
ANALOG OUTPUT	DC4-20mA, 0-1V or 0-10V
A L A R M	Concentration alarm : 2, Failure alarm : 1
*1 CONTACT OUTPUT	7 points (all A)
*2 INPUT SIGNAL	Remote calibration signal
*3 RESPONSE TIME	90% reading is within 10sec.
LINEARITY/REPEATABILITY	Less than ±1% of full scale (max range)
M A S S	Approx. 7kg
EXTERNAL DIMENSIONS	W294 × D330 × H170

PERFORMANCE

Composition	MEASUREMENT MAX RANGE	MEASURABLE MINIMUM DIGIT
H2/N2	0~ 50%	0.02 %
He/N2	0~ 50%	0.02 %
He/Air	0~ 50%	0.02 %
O2/N2	0~100%	0.1 %
Xe/Ar	0~100%	0.01 %
Kr/N2	0~100%	0.01 %
CF4/N2	0~100%	0.01 %
Xe/N2	0~100%	0.005%
SF6/N2	0~100%	0.005%
CO2/Ar	0~ 50%	0.05 %

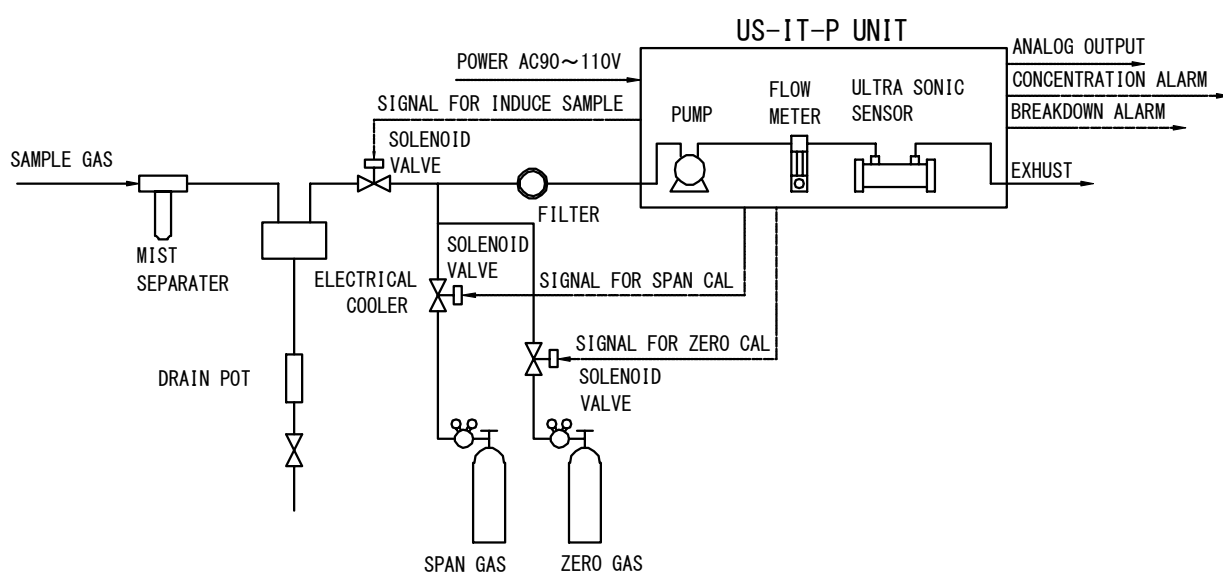
- *1
Concentration alarm 2 point, Failure alarm and Signal whole calibration, Others are used to the optional function. Exp) auto calibration function
Resistance load : AC250V 5.0A, DC30V 5.0A
Inductive load : AC250V 2.0A, DC30V 2.0A
- *2
Non-voltage input (Isolation)
- *3
Can be arbitrarily set by a user

OUTLINE DIAGRAM



EXAMPLE OF FLOW

<EXAMPLE OF MEASURING SAMPLE GAS>



※If sample is DRY, it is not necessary to prepare mist separater and electrical cooler.

8. ULTRASONIC GAS ANALYZER US-II T-SH

- Possible to measure 0–100%He
- Possible to measure 0–100%H₂



STRONG POINT

- ◎ No consumables and long-lasting
- ◎ Color LCD monitor with touch panel
- ◎ Two choices of analog output
: DC 0–10V or DC 0–1V
- ◎ Warm-up time is short and power saving
- ◎ Multiple range for various kinds of gases
- ◎ Free choice of output scaling by user
- ◎ Wide power supply between AC 85V and AC 260V
- ◎ Both portable and panel mounting are possible
- ◎ Free choice of sampling period by user

SPECIFICATIONS

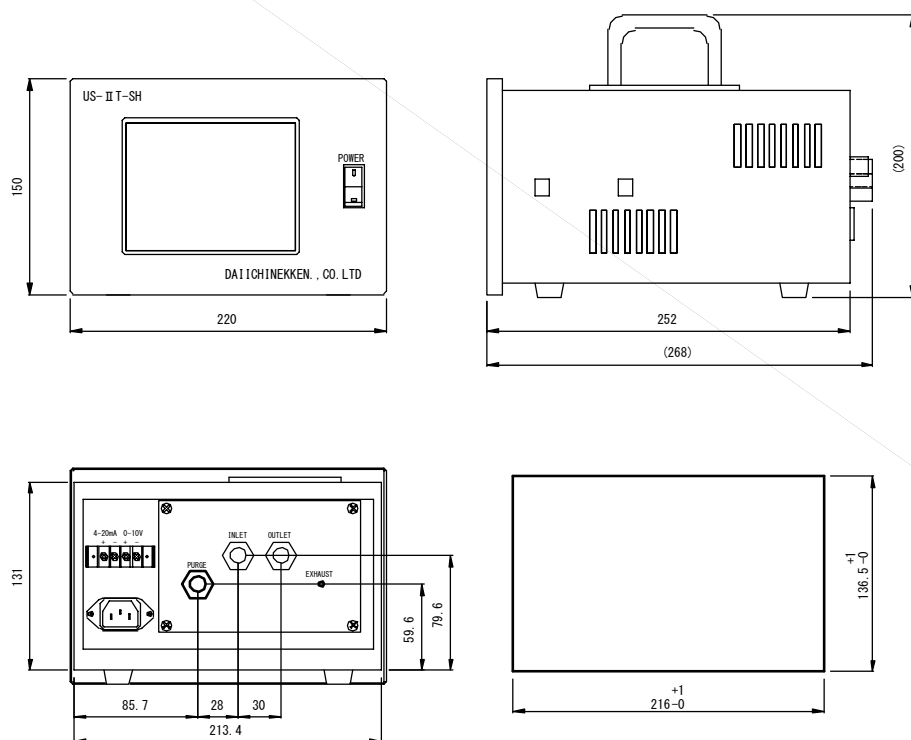
INSTALLATION	Portable or Panel mounting
WARM-UP TIME	Approx. 10 seconds
SAMPLE TEMP.	Normal temperature (Max. 50°C)
SAMPLE PRESS.	Atmospheric pressure ~ +20kpa
FLOW RATE	0.5 ~ 2.0L/min
POWER SUPPLY	AC85 ~ 260V 50/60Hz
AMBIENT TEMP.	5 ~ 45°C/90%RH or less
P I P I N G	Rc1/4
ANALOG OUTPUT	DC4–20mA, 0–1V or 0–10V
LINEARITY/ REPEATABILITY	Less than ±1% of full scale (max range)
*1 RESPONSE TIME	90% reading is within 10sec.
M A S S	Approx. 6.5kg
E X T E R N A L D I M E N S I O N S	Portable: W220 × D268 × H200 Panel mounting: W220 × D268 × H150

PERFORMANCE

Composition	MEASUREMENT MAX RANGE	MEASURABLE MINIMUM DIGIT
H ₂ /N ₂	0~100%	0.04 %
He/N ₂	0~100%	0.04 %
He/Air	0~100%	0.04 %

*1
Can be arbitrarily set by a user

OUTLINE DIAGRAM



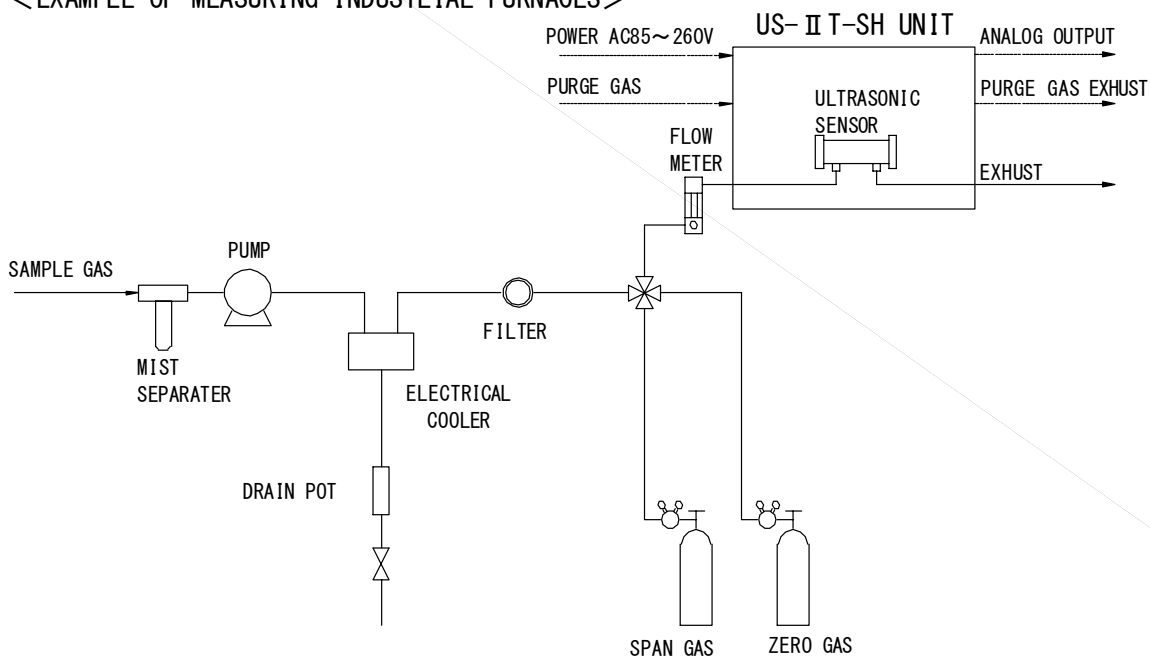
SIZE OF PANELCUT

※If it measures "He" gas, it doesn't have "PURGE" and "EXHAUST" lines.

※If it is used for Panel mounting, detach their rubber feet.

EXAMPLE OF FLOW

<EXAMPLE OF MEASURING INDUSTRIAL FURNACES>



※If sample gas is DRY, it is not necessary to prepare mist separater and electrical cooler.

※If it measures "He" gas, it doesn't have "PURGE GAS" and "PURGE GAS EXHAUST" lines.

9. ULTRASONIC GAS ANALYZER US- I

- For Portable
- For Panel mount



STRONG POINT

- ◎ No consumables and long-lasting
- ◎ Calibration and maintenance are unnecessary for a long time
- ◎ Warm-up time is short and power saving
- ◎ Compact, Light, Easy to carry
- ◎ Free choice of output scaling
- ◎ Battery powered also possible
- ◎ Special clamps for panel mounting
(Clamps are not included in the price)

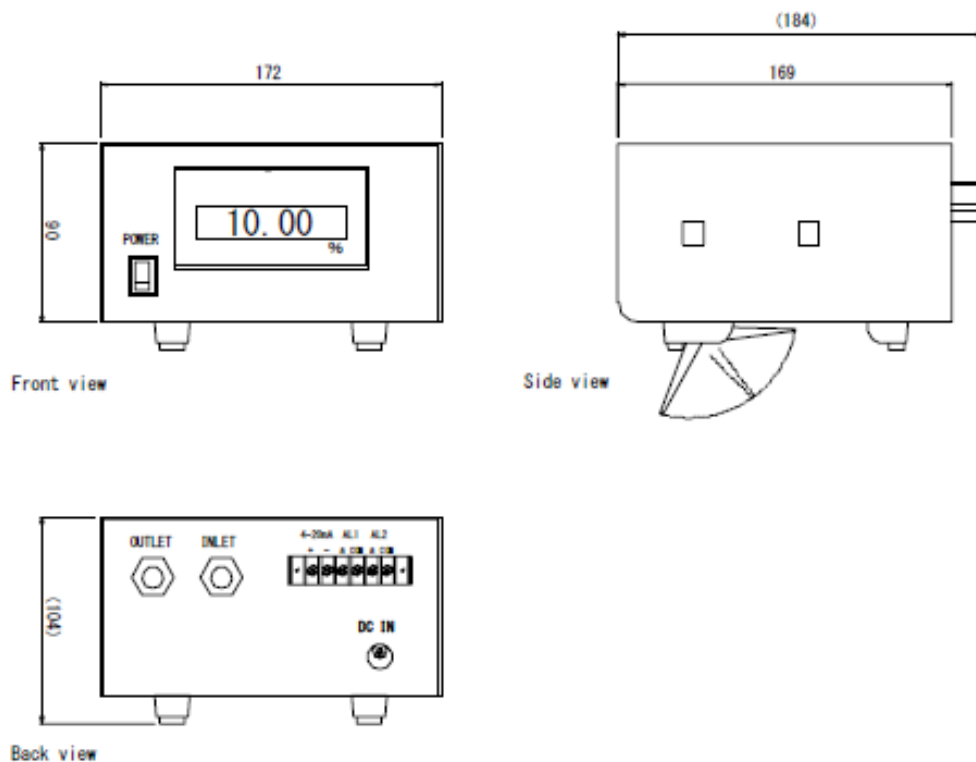
SPECIFICATIONS

INSTALLATION	Portable, Panel mount
WARM-UP TIME	Approx. 10 seconds
SAMPLE TEMP.	Normal temperature (Max. 50°C)
SAMPLE PRESS.	atmosphere ~ +20kPa
FLOW RATE	0.5 ~ 2.0L/min
POWER SUPPLY	Analyzer: DC11~48V Ac adapter: AC100~240V 50/60Hz
AMBIENT TEMP.	5 ~ 45°C/90%RH or less
P I P I N G	IN OUT : Rc1/4
ANALOG OUTPUT	D. C. 4~20mA
ALARM	Concentration alarm : 2
LINEARITY/ REPEATABILITY	Less than $\pm 1\%$ of full scale (max range)
RESPONSE TIME	90% reading is within 10sec.
M A S S	Approx. 1.7kg
EXTERNAL DIMENSIONS	W172×D184×H90 (except tilt leg)

PERFORMANCE

Composition	MEASUREMENT MAX RANGE	MEASURABLE MINIMUM DIGIT
H ₂ /N ₂	0~ 50%	0.04 %
He/N ₂	0~ 50%	0.04 %
He/Air	0~ 50%	0.04 %
O ₂ /N ₂	0~100%	0.2 %
Xe/Ar	0~100%	0.02 %
Kr/N ₂	0~100%	0.02 %
CF ₄ /N ₂	0~100%	0.02 %
Xe/N ₂	0~100%	0.01 %
SF ₆ /N ₂	0~100%	0.01 %
CO ₂ /Ar	0~ 50%	0.1 %

OUTLINE DIAGRAM



PRINCIPLE

Speed of sound what carries in the gases depends on molecular weight of gas.

ULTRASONIC SENSOR calculates average molecular weight that is changed by concentration and temperature of mixed gas, and indicates concentration of mixture of two gases.

Speed of sound goes as follows.

$$V = \sqrt{\gamma \times R \times T \div M}$$

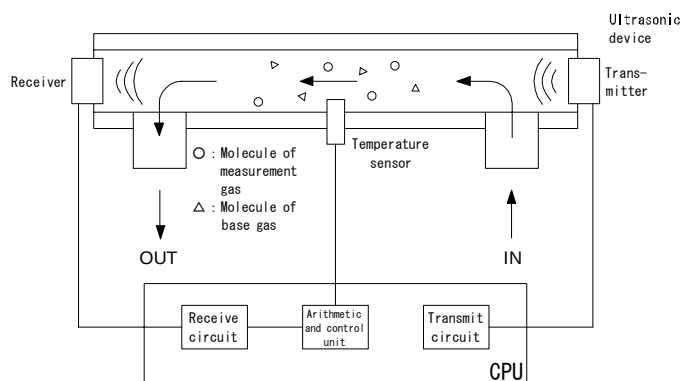
where

γ is the ratio of heat capacity at constant volume to heat capacity at constant pressure

R is constant of gas (8.314)

T is Absolute temperature of gas

M is average molecular weight of mixed gas



10. ULTRASONIC GAS ANALYZER PANEL

We design and manufacture of the gas analyzer panel installed ultrasonic gas analyzer, sampling equipments, control systems and so on into.

Some sampling equipments such as the tube, the connector, solenoid valve and control systems such as the relay are installed in the one panel.

We respond to the customer's demands such as the measured gas and auto calibration function by remote control.

It is possible to combine a various analytical instruments according to facilities.

We receive specification and the provision of instruments used.





We supply to the domestic auto parts manufacturer.

CO₂/Ar analyzer panel for outdoor

W600 × D650 × H1700

Observation item

- Measured gas : CO₂/Ar
- Analog output : 0-1V、4-20mA
- Concentration alarm :
Two-step upper limit value,
Two-step lower limit value or
Upper limit value + Lower limit value

Main instruments in panel

1. Ultrasonic gas analyzer
2. Main breaker
3. Circuit breaker
4. Gas regulator
5. Solenoid valve
6. Terminal block
7. Light with buzzer



The above-mentioned is an example.

We design and manufacture a gas analyzer panel according to the specification of the customer.

《 Corporate Profile 》

NAME OF COMPANY	DAIICHI NEKKEN CO., LTD	PRODUCTS	Gas analyzer
ADDRESS	Zip-Code 659-0026 13-22, NISHIKURA-CHO, ASHIYA-CITY, HYOGO-PREF, 659-0026, JAPAN Web: http://www.daiichinekken.co.jp E-mail: info@daiichinekken.co.jp		Gas analyzer panel Thermco products (Gas Mixer, Gas Analyzer etc.) Red Lion products (Digital panel meter, Signal conditioner etc.)
P H O N E	+81-797-31-2410	B A N K	Minato Bank (Nishinomiya Branch)
F A X	+81-797-31-8951		Shoko Chukin (Amagasaki Branch)
FOUNDATION	November 1972		Sumitomo Mitsui Banking Corporation (Ashiya Ekimae Branch)
CAPITAL	30 million yen		Bank of Tokyo-Mitsubishi UFJ, Ltd. (Ashiya Branch)
PRESIDENT	Keishi Nakagawa		Bank of Kyoto (Amagasaki Branch)
CERTIFICATION ISO	ISO9001 (JQA-QM4580)		Amagasaki Shinkin Bank (Amagasaki Branch)
MAIN PRODUCT	Zirconia oxygen analyzer 『EcoaZ』 Ultrasonic gas analyzer 『US series』		Bank of Tokyo-Mitsubishi UFJ, Ltd.

《 Corporate History 》

- Nov. 1972 Founded as an engineering company of energy-saving products by CEO Masayoshi Nakagawa.
- Feb. 1973 As a part of business, aimed at its future of Oxygen analyzers for exhaust gas started importing and selling of Oxygen analyzers.
Took the initiative in spreading maintenance-free Oxygen analyzers in the country.
- Feb. 1977 As the import agent contract was over, started independent production to meet convenience of domestic users.
In June sold the first product made in Japan.
Since then constantly studied and developed as a specialist to manufacture of Oxygen analyzers, today become the leading company of industrial Oxygen analyzers.
- May. 1984 Completed the new office building in the present address.
Expanded business from stand alone equipments manufacturing to system designing and manufacturing.
- Jun. 1987 Received New Technology Encouragement Money by Hyogo Prefecture.
- May. 1988 Made an import-sales contract with Thermco Instrument Co., Ltd. in the U.S.A to start importing and selling of gas analyzers and gas mixers.
- Apr. 1995 Made a contract with Red Lion Controls in the U. S. A to supply us special intelligent digital Meters.
- Apr. 1998 Received "Hyogo Pref. Eco-Business Promotion Prize".
- Mar. 2000 Obtained ISO 9001.
- Aug. 2000 Made an import-sales contract with Red Lion Controls in the U.S.A to start importing and selling of intelligent digital meters.
- May. 2001 Started the joint development of Himeji Institute of Technology (University of Hyogo at present) about ultrasonic gas analyzer.
- Jul. 2001 Got approval of the management innovation plan business.
- Apr. 2003 We were chosen as 100 companies of excellence of Hyogo which sponsored NIKKAN KOGYO SHIMBUN CO., LTD.
- Aug. 2003 The 2nd factory was complete in the adjacent land of the head office building of the company.
- Feb. 2004 Started the sale of ultrasonic gas module "US-100-5V".
- Aug. 2004 Started the sale of ultrasonic oxygen analyzer "US- IX".
- Jan. 2005 The first president Masayoshi Nakagawa became the chairman. And Keishi Nakagawa became the second president.
- Mar. 2005 Started the sale of ultrasonic gas analyzer.
- Aug. 2007 Started the sale of ultrasonic gas analyzer "US- II T series" equipped with the color LCD monitor with touch panel.
- Apr. 2008 Received the 20th award small and medium-sized enterprise new technology and new product prize "Excellent prize" with ultrasonic gas analyzer "US- II T-W".
- Jan. 2009 Started the sale of ultrasonic gas module "US-100-5VS".
- Sep. 2010 Started the sale of ultrasonic gas analyzer "US- II T-SH".
- Mar. 2012 The authentication of ISO9001 is acquired.
- Mar. 2013 The capital is increased to 30 million yen.
- Apr. 2014 Established 100% owned subsidiary "EZ CORPORATION".
- Dec. 2014 Acquired "KYOWA GAISHI CO., LTD ".

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