

# INFRARED GAS ANALYZER

DATA SHEET

ZPA

This gas analyzer (ZPA) is capable of measuring the concentration of NO, SO<sub>2</sub>, CO<sub>2</sub>, CO, CH<sub>4</sub> and O<sub>2</sub> components in sample gas. NO, SO<sub>2</sub>, CO<sub>2</sub>, CO and CH<sub>4</sub> are measured by non-dispersion infrared method (NDIR), while O<sub>2</sub> is measured by fuel cell or paramagnetic and zirconia method. Optimum use as an analyzer unit for measurement of combustion exhaust gas from refuse incinerators and boilers, or gas from various industrial furnaces.



## FEATURES

### 1. High sensitivity

Equipped with the newest upgraded mass flow sensor.

### 2. Easy maintenance

Maintenance is easy due to the simple measurement unit of single-beam system adapted.

### 3. Small and light

The size is small 133x483x382mm (HxWxD). (This is for 19inch rack mounting type) and light (11kg). The unit is capable of measuring up to 5 gas components in one analyzer.

### 4. Extensive functions

Various optional functions are available such as auto calibration control, atmospheric pressure correction, high and low concentration alarms, remote range switch, and range identification signal, etc.

### 5. User-friendly operation

Clear and easy-to-read display of all five gas concentrations at once.

Simple status and maintenance messages.

## SPECIFICATIONS

### Standard Specifications

#### Principle of measurement:

NO, SO<sub>2</sub>, CO<sub>2</sub>, CO, CH<sub>4</sub> ;

Non-dispersion infrared-ray absorption method

Single light source and single beams (single beam system)

O<sub>2</sub> ; Fuel cell O<sub>2</sub> analyzer (build-in) or paramagnetic O<sub>2</sub> analyzer (build-in) or zirconia O<sub>2</sub> analyzer (externally installed TYPE: ZFK7)

#### Measurable gas components and measuring range:

	Minimum range	Maximum range
NO	0 - 200ppm	0 - 5000ppm
SO <sub>2</sub>	0 - 200ppm	0 - 10vol%
CO <sub>2</sub>	0 - 100ppm	0 - 100vol%
CO	0 - 200ppm	0 - 100vol%
CH <sub>4</sub>	0 - 500ppm	0 - 100vol%
O <sub>2</sub> (Built in fuel cell)	0 - 10vol%	0 - 25vol%
O <sub>2</sub> (Built-in Paramagnetic)	0 - 5vol%	0 - 100vol%
	None	100 - 95vol%
O <sub>2</sub> (External Zirconia)	0 - 5vol%	0 - 25vol%

- Max. 5 components measurement including O<sub>2</sub>.

For reverse range O<sub>2</sub> measurement, infrared gas measurement is not available (single range O<sub>2</sub> only).

- Measuring range ratio max. 1:10 (except O<sub>2</sub>)

- Measuring ranges are changeable between the specified minimum and maximum range

Settable one range or two ranges

\* In measurement range low range is called first range, high range is called second range.

- For possible combinations of components and ranges, refer to Table1.

#### Measured value indication:

Digital indication in 4 digits (LCD panel with LED back light)

- Instantaneous value of each component
- Instantaneous value after O<sub>2</sub> correction (only in NO, SO<sub>2</sub>, CO measurement with O<sub>2</sub>)
- Average value after O<sub>2</sub> correction (only in NO, SO<sub>2</sub>, CO measurement with O<sub>2</sub>)
- O<sub>2</sub> average value

**Analog output signals:**

4 to 20mA DC or 0 to 1V DC, isolated internally from circuit and ground. Output lines are non-isolated each other.; 12 outputs max.

Allowable load 550Ω for 4 to 20mA DC  
Allowable load 100KΩ for 0 to 1V DC

\* Refer to Table 2 for the channel No. of displayed values and analog output signals.

**Analog input signal:**

For signal input from externally installed O<sub>2</sub> analyzer.

Signal requirement;

(1) Signal from Fuji's Zirconia O<sub>2</sub> analyzer (TYPE: ZFK7)

(2) 0 to 1V DC from an O<sub>2</sub> analyzer

Input section is not isolated. This feature is effective when an O<sub>2</sub> analyzer is not built in.

\* Externally installed O<sub>2</sub> analyzer should be purchased separately.

**Digital output: (Option)**

1c contact (24V DC/1A, resistive load)  
max.15 outputs

Instrument error, calibration error, range identification, auto calibration status, solenoid valve drive for auto calibration, High/Low limit alarm contact output.

\* All relay contacts are isolated mutually and from the internal circuit.

**Digital input: (Option)**

Voltage contact (supply 12-24VDC (15mA Max.)) Max. 9 inputs

Remote range change over, auto calibration remote start, remote hold, average value reset, Isolated from the internal circuit with photocoupler.

**Power supply:**

Voltage rating ; 100V to 240V AC

Allowable range ; 85V to 264V AC

Frequency ; 50Hz/60Hz

Power consumption ; 100VA max.

**Operation conditions:**

Ambient temperature ;

-5°C to 45°C

(40°C max. when 2 optical system at 200V AC power source)

Ambient humidity ; 90% RH max.,

non-condensing

**Storage conditions:**

Ambient temperature ; -20°C to 60°C

Ambient humidity ; 100% RH max.,

non-condensing

**Dimensions (H × W × D):**

133 x 483 x 382mm

**Mass:**

Approx. 11 kg max.

**Finish color:**

Front panel; Cool gray (PANTON 1C-F)

**Enclosure:**

Steel casing, for indoor use

**Material of gas-contacting parts:**

Gas inlet/outlet; SUS304

Sample cell; SUS304, chloroprene rubber

Infrared-ray transmitting window; CaF<sub>2</sub>

Internal piping; Toaron, Teflon, Polypropylene

Paramagnetic O<sub>2</sub> analyzer cell : SUS316

Fuel cell O<sub>2</sub> analyzer cell : ABS resin

Gas inlet/outlet: Rc1/4 or NPT1/4 internal thread

Purge gas flow rate: 1L/min (when required)

Life time of fuel cell O<sub>2</sub> analyzer: 2 years

**Standard Functions****Output signal holding:**

Output signals are held unchanged during manual and auto calibrations by activation of holding (turning "ON" its setting).

The values held are those just before start calibration mode or setting value.

Usage is selectable.

Indication of instantaneous values will not be held.

**Switch ranges:** The switch ranges function is available in manual, auto, and remote modes. Only preset switch method is effective.

Manual: Allows range to switch by key operation.

Auto: Automatically switched from first range to second range when the measured value exceeds 90%FS of first range.

Automatically switched from second range to first range when the measured value drops to 80% or less first range.

Remote: Voltage contact input

(Option) Allows range to switch via an external signal when remote range switch input is received.

When the contact input terminals for each component are input voltage, the first range is selected, and it is switched to the second range when the terminals are open.

\* These switch range value are settable between the first range and second range values (low/high range values).

**Optional Functions****Remote output holding:**

Output signal is held at the last value or preset value by voltage input to the remote output holding input terminals.

Holding is maintained while the voltage is input to the terminals. Indication of instantaneous values are not held.

**Range identification signal:**

The present measuring range is identified by a contact position.

The contact output terminals close for each component when the first range is selected, and open when the second range is selected.

**Auto calibration:**

Auto calibration is carried out periodically at the preset cycle.

When a standard gas cylinder for calibration and a solenoid valve for opening/closing the gas flow line are prepared externally by the customer, calibration will be carried out with the solenoid valve drive contacts for zero calibration and each span calibration turned on/off sequentially at the set auto calibration timing.

Auto calibration cycle setting:

Auto calibration cycle is set.  
Setting is variable within 1 to 99 hours  
(in increments of 1 hour) or 1 to 40 days  
(in increments of 1 day).

Gas flow time setting:

The time for flowing each calibration gas  
in auto calibration is set.  
Settable within 60 to 900 seconds (in  
increments of 1 second)

**Auto calibration remote start:**

Auto calibration starts by opening the auto  
calibration remote start input terminal  
after short circuiting for 1.5 sec or longer.  
Auto calibration starts when contacts  
open.

**Auto zero calibration:**

Auto zero calibration is carried out periodi-  
cally at the preset cycle.  
This cycle is independent from "Auto  
calibration" cycle.  
When zero calibration gas and solenoid  
valve for opening/closing the calibration  
gas flow line are prepared externally by  
the customer, zero calibration will be car-  
ried out at the set auto zero calibration  
timing.

Auto zero calibration cycle setting:

Auto zero calibration cycle is set.  
Setting is variable within 1 to 99 hours  
(in increments of 1 hour) or 1 to 40 days  
(in increments of 1 day)

Gas flow time setting:

The timing for flowing zero gas in auto  
zero calibration is set.  
Settable within 60 to 900 seconds (in  
increments of 1 second)

**High/low limit alarm:**

Alarm contact output turns on when  
measurement value reaches the preset  
high or low limit alarm value.  
Contacts close when the instantaneous  
value of each channel exceeds the high  
alarm limit value or falls below the low  
alarm limit value.

**Instrument error contact output:**

Contacts turn on at occurrence of analyzer  
error No. 1, 2, 3 or 10.

**Calibration error contact output:**

Contacts turn on at occurrence of manual  
or auto calibration error (any of errors No.  
4 to 9).

**Auto calibration status contact outputs:**

Contacts turn on during auto calibration.

**O<sub>2</sub> correction:** Correction of measured NO, SO<sub>2</sub> and CO  
gas concentrations into values at refer-  
ence O<sub>2</sub> concentration.

Correction formula:

$$C = \frac{21-O_n}{21-O_s} \times C_s$$

C : Sample gas concentration after O<sub>2</sub>  
correction

C<sub>s</sub> : Measured concentration of sample  
gas

O<sub>s</sub> : Measured O<sub>2</sub> concentration (Limit  
setting: 1 to 20% O<sub>2</sub>)

O<sub>n</sub> : Reference O<sub>2</sub> concentration  
(value changeable by setting 0 to  
19% O<sub>2</sub>)

**Average value after O<sub>2</sub> correction and O<sub>2</sub> average value  
calculation:**

The result of O<sub>2</sub> correction or instan-  
taneous O<sub>2</sub> value can be output as an  
average value over the preset period of  
time.

Moving average method is used. Sampling  
interval is 30 seconds.

(Output is updated every 30 seconds.  
Update is the averaged value of the most  
recent elapsed averaging time period.)  
Averaging time period is settable within 1  
to 59 minutes (in increments of 1 minute)  
or 1 to 4 hours (in increments of 1 hour).

**Average value resetting:**

The above-mentioned output of average  
value is started from the initial state by  
opening the average value resetting input  
terminals after short circuiting for 1.5 sec  
or longer.

Output is reset by input voltage and  
restarted by opening the terminal circuit.

**Communication function:**

RS-485 (9pins D-sub connector)

Half-duplex bit serial

Start-stop synchronization

Modbus RTU™ protocol

Contents : Read/Write parameters  
Read measurement concen-  
tration and instrument status

Remark : When connecting via RS-  
232C interface, an RS-232C  
↔ RS-485 converter should  
be used.

**Atmospheric pressure correction:**

Measure atmospheric pressure and cal-  
culate compensation (for use, be sure to  
relieve the exhaust gas from analyzer to  
the atmosphere)

After atmospheric pressure correction;

Zero point : No influenced

Span point: The change is 0.5% measured  
value or less relating to the  
change of the atmospheric  
pressure 1%.

Correction range: 700hPa-1050hPa

**Performance**

**Repeatability:** ±0.5% of full scale  
**Linearity:** 1% of full scale prior to atmospheric pressure correction (option)  
**Zero drift:** ±2% of full scale/week  
 In the case of Auto zero calibration use for 500ppm or less range.  
**Span drift:** ±2% of full scale/week  
**Response time (for 90% FS response) :**  
 1 to 15 sec electrical response. Within 10-30 seconds including replacement time of sampling gas.  
 Gas replacement time depends on the number of measuring components, and measuring range.

**Interference from other gases:**

Interference component	CO <sub>2</sub> analyzer	CO analyzer	CH <sub>4</sub> analyzer	SO <sub>2</sub> analyzer	NO analyzer
CO 1000ppm	≤1.0%FS	—	≤1.0%FS	≤1.0%FS	≤1.0%FS
CO <sub>2</sub> 15%	—	≤1.0%FS <sup>*1)</sup>	≤1.0%FS	≤1.0%FS	≤1.0%FS <sup>*2)</sup>
H <sub>2</sub> O saturation at 20°C	≤1.0%FS	≤1.0%FS <sup>*2)</sup>	≤1.0%FS	—	—
H <sub>2</sub> O saturation at 2°C	—	≤2.0%FS	—	≤2.0%FS	≤2.0%FS
CH <sub>4</sub> 1000ppm	≤1.0%FS	≤1.0%FS	—	≤20ppm	—

\*1) 0-200ppm range ≤ 2.0%FS  
 \*2) 0-500ppm range or less ≤ 2.0%FS

**EC Directive Compliance**

The product conforms to the requirements of the Low Voltage Directive 2006/95/EC and EMC directive 89/336/EEC (as amended by Directive 92/31/EEC), both as amended by Directive 93/68/EEC.

It conforms to following standards for product safety and electromagnetic compatibility ;

EN61010-1:2010, EN62311:2008

Safety requirements for electrical equipment for measurement, control and laboratory use.  
 "Installation Category II"  
 "Pollution Degree 2"

EN61326-1:2006, EN61326-2-3:2006,  
 EN61000-3-2:2006, A1:2009, A2:2009  
 EN61000-3-3:2008

Electrical equipment for measurement, control and laboratory use — EMC requirements.  
 CE

**Requirements for Sample Gas**

**Flow rate:** 0.5 ±0.2L / min  
**Temperature:** 0 to 50°C  
**Pressure:** 10 kPa or less (Gas outlet side should be open to the atmospheric air.)  
**Dust:** 100 µg/Nm<sup>3</sup> or less in particle size of 0.3 µm or smaller  
**Mist:** Unallowable  
**Moisture:** For sample gases NO, SO<sub>2</sub>, CO(0-200 ppm range): less than 2°C saturation point.  
 For most other sample gases: less than standard room temperature saturation point.

**Corrosive component:** 1 ppm or less

**Standard gas for calibration:**

- Infrared-ray measurable component, standard O<sub>2</sub>  
 Zero gas ; Dry N<sub>2</sub>  
 Span gas ; Each sample gas having concentration 90 to 100% of its measuring range (recommended).

In case a zirconia O<sub>2</sub> analyzer is installed externally and calibration is carried out on the same calibration gas line:

Zero gas ; Dry air or atmospheric air (Do not use with CO<sub>2</sub> measurement)

Span gas ; For other than O<sub>2</sub> measurement, each sample gas having concentration 90 to 100% of its measuring range  
 For O<sub>2</sub> measurement, O<sub>2</sub> gas of 1 to 2 vol%/remains N<sub>2</sub> gas

- Reverse range O<sub>2</sub> measurement

Zero gas ; 100vol% O<sub>2</sub>

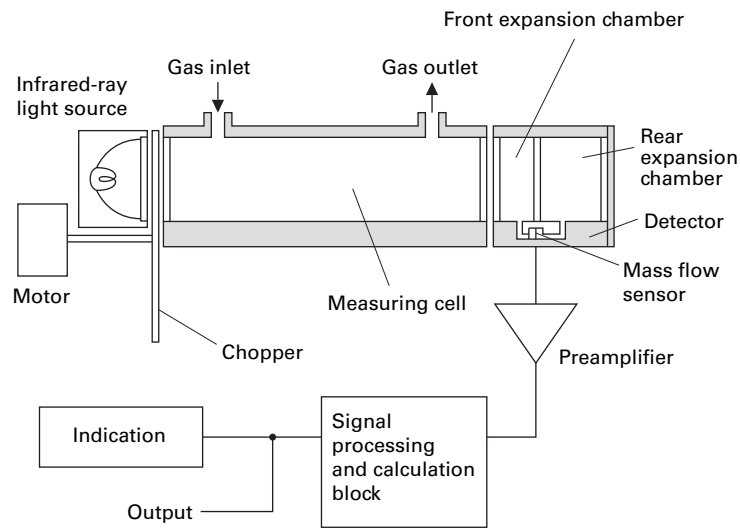
Span gas ; For O<sub>2</sub> measurement, O<sub>2</sub> gas of 95.0~95.5vol%/remains N<sub>2</sub> gas

\*For reverse range O<sub>2</sub> measurement, infrared measurable component is not measurable.

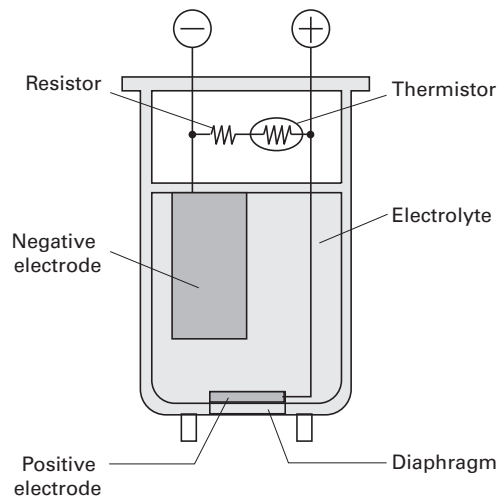
**Installation Requirements**

- Indoor use (Select a place where the equipment does not receive direct sunlight, draft/rain or radiation from hot substances. If such a place cannot be found, a roof or cover should be prepared for protection.)
- Avoid a place where unit receives heavy vibration
- Select a place where atmospheric air is clean

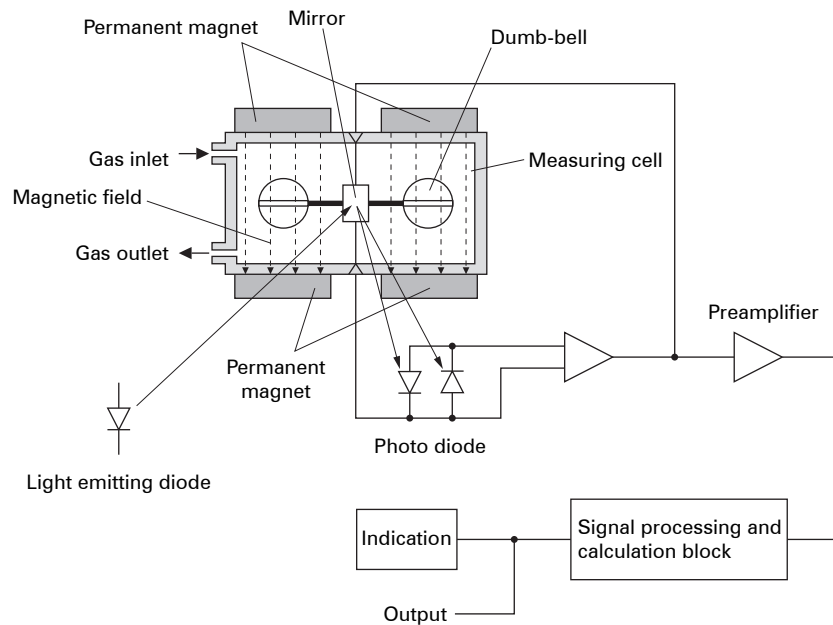
### Principle diagram of NDIR type measurement (For NO, SO<sub>2</sub>, CO<sub>2</sub>, CO, CH<sub>4</sub>)



### Principle diagram of fuel cell type measurement (For O<sub>2</sub>)

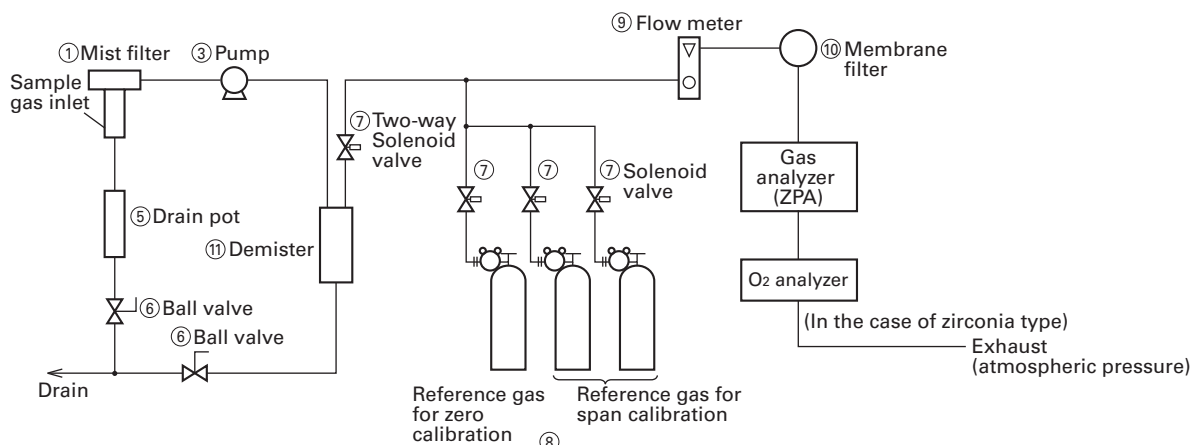


### Principle diagram of paramagnetic type measurement (For O<sub>2</sub>)

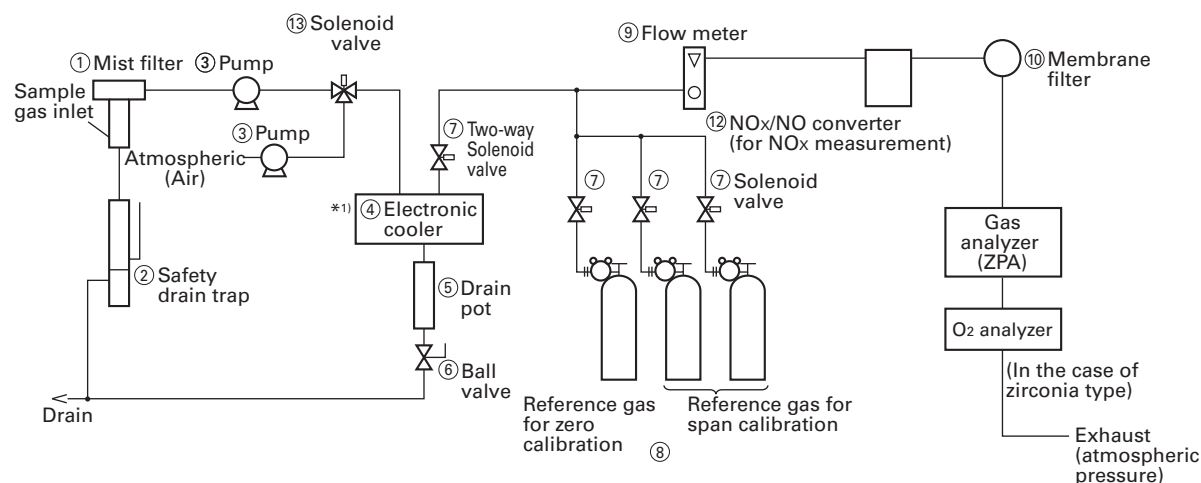


## Examples of sampling system configuration including gas analyzer (for reference only)

To measure low moisture content (saturated at room temperature or lower) sample gas (CO, CO<sub>2</sub>, CH<sub>4</sub>)



To measure high moisture content sample gas, NO, SO<sub>2</sub>, or CO (0 to 200 ppm range)



\*1) Be sure to use a dehumidifier such as electronic cooler for NO, SO<sub>2</sub>, and CO analyzers of 0 to 200 ppm range (≒2°C saturation or lower).

## List of sampling devices (example)

No.	Device name	Fuji's type
①	Mist filter	ZBBK1V03-0
②	Safety drain trap	ZBH51603
③	Pump	ZBG80
④	Electric cooler	ZBC91004
⑤	Drain pot	ZBH13003 (Length 255mm)
⑥	Ball valve	ZBFB1
⑦	Two-way solenoid valve	
⑧	Standard gas for calibration	ZBM□Y04-0□ (Codes in □ to be selected depending on application)
⑨	Flow meter	ZBD42203
⑩	Membrane filter	ZBBM2V03-0
⑪	Demister	ZBH35003
⑫	NO <sub>2</sub> /NO converter	ZDL02001
⑬	Three-way solenoid valve	

Note) The above is a typical configuration example. As configuration may differ depending on measuring objects, please consult us.

# CODE SYMBOLS

## standard multi components

Digit	Description	note	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
4	<Specification/Structure> Horizontal type (Terminal block for power supply) Horizontal type (Power inlet, with lock)	note1	Z	P	A	B				1																	
5	<Mounting> 19inch rack mounting type EIA conformity					B																					
6	<Measurable component (NDIR)> 1st component   2nd component   3rd component   4th component	note2																									
	None																										
	NO																										
	SO <sub>2</sub>																										
	CO <sub>2</sub>																										
	CO																										
	CH <sub>4</sub>																										
	NO	SO <sub>2</sub>																									
	NO	CO																									
	CO <sub>2</sub>	CO																									
	CH <sub>4</sub>	CO																									
	CO <sub>2</sub>	CH <sub>4</sub>																									
	NO	SO <sub>2</sub>	CO																								
	CO <sub>2</sub>	CO	CH <sub>4</sub>																								
	NO	SO <sub>2</sub>	CO <sub>2</sub>	CO																							
	Others																										
7	<Measurable component (O <sub>2</sub> )> None External O <sub>2</sub> analyzer External zirconia O <sub>2</sub> analyzer (ZFK7) Built-in fuel cell O <sub>2</sub> analyzer Built-in paramagnetic O <sub>2</sub> analyzer	note3																									
	None																										
	External O <sub>2</sub> analyzer																										
	External zirconia O <sub>2</sub> analyzer (ZFK7)																										
	Built-in fuel cell O <sub>2</sub> analyzer																										
	Built-in paramagnetic O <sub>2</sub> analyzer																										
8	<Revision code>									1																	
9	<Measuring range (NDIR)->1st component, 1st range	note4																									
10	<Measuring range (NDIR)->1st component, 2nd range	note4																									
11	<Measuring range (NDIR)->2nd component, 1st range	note4																									
12	<Measuring range (NDIR)->2nd component, 2nd range	note4																									
13	<Measuring range (NDIR)->3rd component, 1st range	note4																									
14	<Measuring range (NDIR)->3rd component, 2nd range	note4																									
15	<Measuring range (NDIR)->4th component, 1st range	note4																									
16	<Measuring range (NDIR)->4th component, 2nd range	note4																									
17	<Measuring range (O <sub>2</sub> )> None 0-5/10vol% 0-5/25vol% 0-10/25vol% 0-5vol% 0-10vol% 0-25vol% 0-50vol% 0-100vol% 100-95vol% Others																										
	None																										
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	0-10/25vol%																										
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	0-50vol%																										
	0-100vol%																										
	100-95vol%																										
	Others																										
18	<Gas connection> Rc1/4 NPT1/4																			1							
	Rc1/4																			2							
	NPT1/4																										
19	<Output> DC0-1V DC4-20mA DC0-1V+Communication function DC4-20mA+Communication function																										
	DC0-1V																										
	DC4-20mA																										
	DC0-1V+Communication function																										
	DC4-20mA+Communication function																										
20	<Indication/power supply cord> In Japanese, cord rated 125V (PSE) In English, cord rated 125V (UL) In English, cord rated 250V (CEE) In Chinese, cord rated 250V (CCC)	note5 note5 note5 note5																									
	In Japanese, cord rated 125V (PSE)	note5																									
	In English, cord rated 125V (UL)	note5																									
	In English, cord rated 250V (CEE)	note5																									
	In Chinese, cord rated 250V (CCC)	note5																									
21	<O <sub>2</sub> correction and O <sub>2</sub> correction average output> None O <sub>2</sub> correction O <sub>2</sub> correction average O <sub>2</sub> correction and O <sub>2</sub> correction average	note6																									
	None																										
	O <sub>2</sub> correction																										
	O <sub>2</sub> correction average																										
	O <sub>2</sub> correction and O <sub>2</sub> correction average																										
22	<Optional function (DIO)> FAULT   A. Cal.   H/L Alarm   Rangeld/Remote range																										
	None																										
	○																										
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Digit	Description	note	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	← Digit
23	<Pressure compensation> None Pressure compensation		Z	P	A					1																		
24	<Unit> ppm, vol% mg/m <sup>3</sup> , g/m <sup>3</sup>	note8																										
25	<Adjustment> For standard For heat treatment furnace For converter Others	note9 note10																										

**RANGE CODE**

Range	Code	Range	Code
None	Y	0~1vol%	J
0~100ppm	B	0~2vol%	K
0~200ppm	C	0~3vol%	Q
0~250ppm	D	0~5vol%	L
0~300ppm	S	0~10vol%	M
0~500ppm	E	0~20vol%	N
0~1000ppm	F	0~25vol%	V
0~2000ppm	G	0~40vol%	W
0~2500ppm	U	0~50vol%	P
0~3000ppm	T	0~70vol%	X
0~5000ppm	H	0~100vol%	R
		Others	Z

**O<sub>2</sub> measurement range**

Measurement range	Range code	Fuel cell O <sub>2</sub> analyzer (built - in)	Paramagnetic O <sub>2</sub> analyzer (built - in)	Zirconia O <sub>2</sub> analyzer (external)
0~5/10 vol%	A		○	○
0~5/25 vol%	B		○	○
0~10/25 vol%	C	○	○	○
0~5 vol%	L		○	○
0~10 vol%	M	○	○	○
0~25 vol%	V	○	○	○
0~50 vol%	P		○	
0~100 vol%	R		○	
100~95 vol%	S		○	

note1)When "D" is specified at 4th digit, Power supply cord is supplied in the scope of supply. Cord specification should be specified at the 20th digit.

note2)When only O<sub>2</sub> measurement is necessary, "Y" should be specified at 6th digit.

note3)When "1" is specified at 7th digit, O<sub>2</sub> pt analyzer signal has to be set as 0-1V DC linear corresponding to full scale. External zirconia O<sub>2</sub> analyzer and external O<sub>2</sub> analyzer are not included in the scope of supply, and has to be separately ordered.

note4)Refer to Table 1 for possible combination of measuring components and ranges in this manual. When "Y" is specified at 6th digit, "Y" should be specified at 9th to 16th digit. For fuel cell O<sub>2</sub> analyzer, range is 0-10vol% or more.

note5)Select the type of voltage rating, plug type and applicable standard of the power supply cord by 20th digit. Select a power supply cord for using at the location of end-user. When "A" is specified at 4th digit, Power supply cord will not be included in scope of delivery. When English is specified for display language, "E" should be selected at 20th digit.

note6)O<sub>2</sub> correction is calculated only for NO, SO<sub>2</sub> and CO.

note7)When 5 components measurement is specified, "H" must not be specified at 22nd digit. When 4 components measurement is specified and "H" is specified at 22nd digit, 3 points is maximum for alarm output function.

note8) When "B" is specified at 24th digit, measuring range should be specified by ppm range code. In this case NO, SO<sub>2</sub> and CO measuring range are corresponding range in mg/m<sup>3</sup>. Please refer to the table shown below for the corresponding range code based on "mg/m<sup>3</sup>".

note9) When A to D is specified at 25th digit, the analyzer will be adjusted and delivered with the following gasses. Standard "A": balance gas N<sub>2</sub>.

For heat treatment furnace "C": balance gas 30vol% H<sub>2</sub>/remaining N<sub>2</sub>.

For converter "D": balance gas CO, CO<sub>2</sub>.

When other adjustment is required, please specify "Z".

When "Z" is specified, please attach a list of gas composition contained in the measuring gas.

note10) When the 25th code is "C", the range code "X" and "R" are not available.

Corresponding mg/m<sup>3</sup>

Range code	Unit : ppm	Corresponding range in mg/m <sup>3</sup>		
		NO	SO <sub>2</sub>	CO
B	0-100ppm	0-130mg/m <sup>3</sup>	0-280mg/m <sup>3</sup>	0-125mg/m <sup>3</sup>
C	0-200ppm	0-260mg/m <sup>3</sup>	0-570mg/m <sup>3</sup>	0-250mg/m <sup>3</sup>
D	0-250ppm	0-325mg/m <sup>3</sup>	0-700mg/m <sup>3</sup>	0-300mg/m <sup>3</sup>
S	0-300ppm	0-400mg/m <sup>3</sup>	0-850mg/m <sup>3</sup>	0-375mg/m <sup>3</sup>
E	0-500ppm	0-650mg/m <sup>3</sup>	0-1,400mg/m <sup>3</sup>	0-600mg/m <sup>3</sup>
F	0-1,000ppm	0-1,300mg/m <sup>3</sup>	0-2,800mg/m <sup>3</sup>	0-1,250mg/m <sup>3</sup>
G	0-2,000ppm	0-2,600mg/m <sup>3</sup>	0-5,600mg/m <sup>3</sup>	0-2,500mg/m <sup>3</sup>
U	0-2,500ppm	0-3,300mg/m <sup>3</sup>	0-7,100mg/m <sup>3</sup>	0-3,000mg/m <sup>3</sup>
T	0-3,000ppm	0-4,000mg/m <sup>3</sup>	0-8,500mg/m <sup>3</sup>	0-3,750mg/m <sup>3</sup>
H	0-5,000ppm	0-6,600mg/m <sup>3</sup>	0-14.00g/m <sup>3</sup>	0-6,250mg/m <sup>3</sup>

The conversion formula "ppm" unit into "mg/m<sup>3</sup>" unit.  
 NO (mg/m<sup>3</sup>) = 1.34 × NO (ppm)  
 SO<sub>2</sub> (mg/m<sup>3</sup>) = 2.86 × SO<sub>2</sub> (ppm)  
 CO (mg/m<sup>3</sup>) = 1.25 × CO (ppm)



**Table 1 Measurable component and range - availability check table -**

Procedure of range selection

On one component analyzer:

First determine 1st range, then select 2nd range from the corresponding right column.

More than two components analyzer:

The 2nd range in the tables for two and more components is maximum available range.

Select the 2nd range less than or equal to the "2nd range (max)".

**1-component analyzer : CO**

1st range	2nd range
0 - 200ppm	None, 0 - 250ppm,300ppm,500ppm,1000ppm,2000ppm
0 - 250ppm	None, 0 - 300ppm,500ppm,1000ppm,2000ppm,2500ppm
0 - 300ppm	None, 0 - 500ppm,1000ppm,2000ppm,2500ppm
0 - 500ppm	None, 0 - 1000ppm,2000ppm,2500ppm,3000ppm,5000ppm
0 - 1000ppm	None, 0 - 2000ppm,2500ppm,3000ppm,5000ppm,1%
0 - 2000ppm	None, 0 - 2500ppm,3000ppm,5000ppm,1%,2%
0 - 2500ppm	None, 0 - 3000ppm,5000ppm,1%,2%
0 - 3000ppm	None, 0 - 5000ppm,1%,2%
0 - 5000ppm	None, 0 - 1%,2%,3%,5%
0 - 1%	None, 0 - 2%,3%,5%,10%
0 - 2%	None, 0 - 3%,5%,10%,20%
0 - 3%	None, 0 - 5%,10%,20%,25%
0 - 5%	None, 0 - 10%,20%,25%,40%,50%
0 - 10%	None, 0 - 20%,25%,40%,50%,70%,100%
0 - 20%	None, 0 - 25%,40%,50%,70%,100%
0 - 25%	None, 0 - 40%,50%,70%,100%
0 - 40%	None, 0 - 50%,70%,100%
0 - 50%	None, 0 - 70%,100%
0 - 70%	None, 0 - 100%
0 - 100%	None

**1-component analyzer : CO2**

1st range	2nd range
0 - 100ppm	None, 0 - 200ppm,250ppm,300ppm,500ppm,1000ppm
0 - 200ppm	None, 0 - 250ppm,300ppm,500ppm,1000ppm,2000ppm
0 - 250ppm	None, 0 - 300ppm,500ppm,1000ppm,2000ppm,2500ppm
0 - 300ppm	None, 0 - 500ppm,1000ppm,2000ppm,2500ppm
0 - 500ppm	None, 0 - 1000ppm,2000ppm,2500ppm,3000ppm,5000ppm
0 - 1000ppm	None, 0 - 2000ppm,2500ppm,3000ppm,5000ppm,1%
0 - 2000ppm	None, 0 - 2500ppm,3000ppm,5000ppm,1%,2%
0 - 2500ppm	None, 0 - 3000ppm,5000ppm,1%,2%
0 - 3000ppm	None, 0 - 5000ppm,1%,2%
0 - 5000ppm	None, 0 - 1%,2%,3%,5%
0 - 1%	None, 0 - 2%,3%,5%,10%
0 - 2%	None, 0 - 3%,5%,10%,20%
0 - 3%	None, 0 - 5%,10%,20%,25%
0 - 5%	None, 0 - 10%,20%,25%,40%,50%
0 - 10%	None, 0 - 20%,25%,40%,50%,70%,100%
0 - 20%	None, 0 - 25%,40%,50%,70%,100%
0 - 25%	None, 0 - 40%,50%,70%,100%
0 - 40%	None, 0 - 50%,70%,100%
0 - 50%	None, 0 - 70%,100%
0 - 70%	None, 0 - 100%
0 - 100%	None

**2-component analyzer : NO/SO2**

1-component : NO		2-component : SO2	
1st range	2nd range (max.)	1st range	2nd range (max.)
0 - 200ppm	0 - 2000ppm	0 - 200ppm	0 - 2000ppm
0 - 250ppm	0 - 2500ppm	0 - 250ppm	0 - 2500ppm
0 - 300ppm	0 - 2500ppm	0 - 300ppm	0 - 2500ppm
0 - 500ppm	0 - 5000ppm	0 - 500ppm	0 - 5000ppm
0 - 1000ppm	0 - 5000ppm	0 - 1000ppm	0 - 5000ppm
0 - 2000ppm	0 - 5000ppm	0 - 2000ppm	0 - 5000ppm
0 - 2500ppm	0 - 5000ppm	0 - 2500ppm	0 - 5000ppm
0 - 3000ppm	0 - 5000ppm	0 - 3000ppm	0 - 5000ppm
0 - 5000ppm	None	0 - 5000ppm	None

• The 2nd component should be selected as shown in the right table.

**1-component analyzer : NO**

1st range	2nd range
0 - 200ppm	None, 0 - 250ppm,300ppm,500ppm,1000ppm,2000ppm
0 - 250ppm	None, 0 - 300ppm,500ppm,1000ppm,2000ppm,2500ppm
0 - 300ppm	None, 0 - 500ppm,1000ppm,2000ppm,2500ppm
0 - 500ppm	None, 0 - 1000ppm,2000ppm,2500ppm,3000ppm,5000ppm
0 - 1000ppm	None, 0 - 2000ppm,2500ppm,3000ppm,5000ppm
0 - 2000ppm	None, 0 - 2500ppm,3000ppm,5000ppm
0 - 2500ppm	None, 0 - 3000ppm,5000ppm
0 - 3000ppm	None, 0 - 5000ppm
0 - 5000ppm	None

**1-component analyzer : SO2**

1st range	2nd range
0 - 200ppm	None, 0 - 250ppm,300ppm,500ppm,1000ppm,2000ppm
0 - 250ppm	None, 0 - 300ppm,500ppm,1000ppm,2000ppm,2500ppm
0 - 300ppm	None, 0 - 500ppm,1000ppm,2000ppm,2500ppm
0 - 500ppm	None, 0 - 1000ppm,2000ppm,2500ppm,3000ppm,5000ppm
0 - 1000ppm	None, 0 - 2000ppm,2500ppm,3000ppm,5000ppm,1%
0 - 2000ppm	None, 0 - 2500ppm,3000ppm,5000ppm,1%,2%
0 - 2500ppm	None, 0 - 3000ppm,5000ppm,1%,2%
0 - 3000ppm	None, 0 - 5000ppm,1%,2%
0 - 5000ppm	None, 0 - 1%,2%,3%,5%
0 - 1%	None, 0 - 2%,3%,5%,10%
0 - 2%	None, 0 - 3%,5%,10%
0 - 3%	None, 0 - 10%
0 - 5%	None, 0 - 10%
0 - 10%	None

**1-component analyzer : CH4**

1st range	2nd range
0 - 500ppm	None, 0 - 1000ppm,2000ppm,2500ppm,3000ppm,5000ppm
0 - 1000ppm	None, 0 - 2000ppm,2500ppm,3000ppm,5000ppm,1%
0 - 2000ppm	None, 0 - 2500ppm,3000ppm,5000ppm,1%,2%
0 - 2500ppm	None, 0 - 3000ppm,5000ppm,1%,2%
0 - 3000ppm	None, 0 - 5000ppm,1%,2%
0 - 5000ppm	None, 0 - 1%,2%,3%,5%
0 - 1%	None, 0 - 2%,3%,5%,10%
0 - 2%	None, 0 - 3%,5%,10%,20%
0 - 3%	None, 0 - 5%,10%,20%,25%
0 - 5%	None, 0 - 10%,20%,25%,40%,50%
0 - 10%	None, 0 - 20%,25%,40%,50%,70%,100%
0 - 20%	None, 0 - 25%,40%,50%,70%,100%
0 - 25%	None, 0 - 40%,50%,70%,100%
0 - 40%	None, 0 - 50%,70%,100%
0 - 50%	None, 0 - 70%,100%
0 - 70%	None, 0 - 100%
0 - 100%	None

**2-component analyzer : NO/CO**

1-component : NO		2-component : CO	
1st range	2nd range (max.)	1st range	2nd range (max.)
0 - 200ppm	0 - 2000ppm	0 - 200ppm	0 - 2000ppm
0 - 250ppm	0 - 2500ppm	0 - 250ppm	0 - 2500ppm
0 - 300ppm	0 - 2500ppm	0 - 300ppm	0 - 2500ppm
0 - 500ppm	0 - 5000ppm	0 - 500ppm	0 - 5000ppm
0 - 1000ppm	0 - 5000ppm	0 - 1000ppm	0 - 5000ppm
0 - 2000ppm	0 - 5000ppm	0 - 2000ppm	0 - 5000ppm
0 - 2500ppm	0 - 5000ppm	0 - 2500ppm	0 - 5000ppm
0 - 3000ppm	0 - 5000ppm	0 - 3000ppm	0 - 5000ppm
0 - 5000ppm	None	0 - 5000ppm	None

• The 2nd component should be selected as shown in the right table.



2-component analyzer: CO<sub>2</sub>/CH<sub>4</sub>

1-component: CO <sub>2</sub>		2-component: CH <sub>4</sub>
1st range	2nd range (max.)	1st range/2nd range (max.)
0-100ppm	0-1000ppm	0-500/5000ppm, 0-1000/5000ppm, 0-2000/5000ppm, 0-2500/5000ppm, 0-3000/5000ppm, 0-5000ppm
0-200ppm	0-2000ppm	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/1%, 0-2500ppm/1%, 0-3000ppm/1%, 0-5000ppm/1%, 0-1%
0-250ppm	0-2500ppm	
0-300ppm	0-2500ppm	
0-500ppm	0-2500ppm	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/2%, 0-2/10%, 0-3/10%, 0-5/10%, 0-10%
0-500ppm	0-5000ppm	0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/2%, 0-2/10%, 0-3/10%, 0-5/10%, 0-10%
0-1000ppm	0-2500ppm	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/3%, 0-1/3%, 0-2/20%, 0-3/20%, 0-5/20%, 0-10/20%, 0-20%
0-1000ppm	0-5000ppm	0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/3%, 0-1/3%, 0-2/20%, 0-3/20%, 0-5/20%, 0-10/20%, 0-20%
0-1000ppm	0-1%	0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/3%, 0-1/3%, 0-2/20%, 0-3/20%, 0-5/20%, 0-10/20%, 0-20%
0-2000ppm	0-2500ppm	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/5%, 0-1/5%, 0-2/20%, 0-3/20%, 0-5/20%, 0-10/20%, 0-20%
0-2000ppm	0-5000ppm	0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/5%, 0-1/5%, 0-2/20%, 0-3/20%, 0-5/20%, 0-10/20%, 0-20%
0-2000ppm	0-2%	0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/5%, 0-1/5%, 0-2/20%, 0-3/20%, 0-5/20%, 0-10/20%, 0-20%
0-2500ppm	0-5000ppm	0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/5%, 0-1/5%, 0-2/20%, 0-3/20%, 0-5/25%, 0-10/25%, 0-20/25%, 0-25%
0-2500ppm	0-2%	0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/5%, 0-1/5%, 0-2/20%, 0-3/20%, 0-5/25%, 0-10/25%, 0-20/25%, 0-25%
0-3000ppm	0-2%	0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/5%, 0-1/5%, 0-2/20%, 0-3/20%, 0-5/25%, 0-10/25%, 0-20/25%, 0-25%
0-5000ppm	0-3%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/20%, 0-3/20%, 0-5/50%, 0-10/50%, 0-20/50%, 0-25/50%, 0-40/50%, 0-50%
0-5000ppm	0-5%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/20%, 0-3/20%, 0-5/20%, 0-10/50%, 0-20/50%, 0-25/50%, 0-40/50%, 0-50%
0-1%	0-10%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/20%, 0-3/25%, 0-5/50%, 0-10/50%, 0-20/50%, 0-25/50%, 0-40/50%, 0-50%
0-2%	0-20%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/10%, 0-3/10%, 0-5/25%, 0-10/100%, 0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%, 0-70/100%, 0-100%
0-2%	0-10%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/20%, 0-3/25%, 0-5/50%, 0-10/100%, 0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%
0-3%	0-25%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/20%, 0-3/25%, 0-5/25%, 0-10/100%, 0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%, 0-70/100%, 0-100%
0-5%	0-20%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/20%, 0-3/25%, 0-5/50%, 0-10/100%, 0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%, 0-70/100%, 0-100%
0-5%	0-50%	0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/20%, 0-3/25%, 0-5/50%, 0-10/50%, 0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%, 0-70/100%, 0-100%
0-10%	0-20%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/20%, 0-3/25%, 0-5/50%, 0-10/100%, 0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%
0-10%	0-50%	0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/20%, 0-3/25%, 0-5/50%, 0-10/100%, 0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%, 0-70/100%, 0-100%
0-20%		
0-25%		
0-40%		
0-10%	0-100%	0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/10%, 0-3/10%, 0-5/50%, 0-10/100%, 0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%, 0-70/100%, 0-100%
0-20%	0-100%	0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/10%, 0-3/25%, 0-5/50%, 0-10/100%, 0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%, 0-70/100%, 0-100%
0-25%	0-100%	0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/2%, 0-1/10%, 0-2/20%, 0-3/25%, 0-5/50%, 0-10/100%, 0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%, 0-70/100%, 0-100%
0-40%		
0-50%		
0-70%		
0-100%	None	

3-component analyzer: NO/SO<sub>2</sub>/CO >>> Combination of 1st component NO and 2nd component SO<sub>2</sub> / 3rd component CO

1-component: NO		+	2-component: SO <sub>2</sub>		3-component: CO	
1st range	2nd range (max.)		1st range	2nd range (max.)	1st range/2nd range (max.)	
0-200ppm	0-2000ppm		0-200ppm	0-2000ppm	0-200/2000ppm, 0-250/2500ppm, 0-300/2500ppm, 0-500/2500ppm, 0-1000/2500ppm, 0-2000/2500ppm, 0-2500ppm	
0-250ppm	0-2500ppm		0-250ppm	0-2500ppm		
0-300ppm	0-2500ppm		0-300ppm			
0-500ppm	0-5000ppm		0-500ppm	0-2500ppm	0-200/2000ppm, 0-250/2500ppm, 0-300/2500ppm, 0-500/5000ppm, 0-1000/5000ppm, 0-2000/5000ppm, 0-5000ppm	
0-1000ppm	0-5000ppm		0-1000ppm			
0-2000ppm	0-5000ppm		0-2500ppm	None		
0-2500ppm	0-5000ppm		0-1000ppm	0-5000ppm	0-500/5000ppm, 0-1000/5000ppm, 0-2000/5000ppm, 0-2500/5000ppm, 0-3000/5000ppm, 0-5000ppm	
0-3000ppm	0-5000ppm		0-2000ppm			
0-5000ppm	None		0-2500ppm			
			0-3000ppm			
			0-5000ppm	None		

3-component analyzer: CO<sub>2</sub>/CO/CH<sub>4</sub> >>> Combination of 1st component CO<sub>2</sub> / 2nd component CO and 3rd component CH<sub>4</sub>

1-component: CO <sub>2</sub>		2-component: CO		+	3-component: CH <sub>4</sub>		
1st range	2nd range (max.)	1st range	2nd range (max.)		1st range	2nd range (max.)	Availability of product
0-500ppm	0-3%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/5%, 0-1/10%, 0-2/20%			0-5000ppm	0-5%	Product available only when CO analyzer measuring range is 50% or less
0-1%	0-5%	0-3/25%, 0-5/50%, 0-10/100%, 0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%, 0-70/100%, 0-100%					
0-2%	0-5%				0-1%	0-10%	Product available
0-500ppm	0-5%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/5%, 0-1/10%, 0-2/20%			0-2%	0-20%	
0-1%	0-10%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/5%, 0-1/10%, 0-2/20%			0-3%	0-25%	Product available only when CO analyzer measuring range is 0 to 1000ppm or more.
0-2%	0-20%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/5%, 0-1/10%, 0-2/20%			0-5%	0-10%	
0-2%	0-10%	0-500/5000ppm, 0-1000ppm/1%, 0-2000ppm/2%, 0-2500ppm/2%, 0-3000ppm/2%, 0-5000ppm/5%, 0-1/10%, 0-2/20%			0-10%	0-20%	Product available only when CO analyzer measuring range is 0 to 5000ppm or more.
0-3%	0-25%	0-3/25%, 0-5/50%, 0-10/100%, 0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%, 0-70/100%, 0-100%			0-20%	0-25%	
0-5%	0-50%				0-25%	0-40%	
0-10%	0-100%	0-1000ppm/1%, 0-2000ppm/1%, 0-2500ppm/1%, 0-3000ppm/2%			0-40%	0-50%	
0-20%		0-5000ppm/5%, 0-1/10%, 0-2/20%, 0-3/25%, 0-5/50%, 0-10/100%			0-50%	0-70%	Product available only when CO analyzer measuring range is more than 5000ppm and CO <sub>2</sub> analyzer range is more than 2%.
0-25%		0-20/100%, 0-25/100%, 0-40/100%, 0-50/100%, 0-70/100%, 0-100%			0-70%	0-100%	
0-40%							
0-50%							
0-70%							
0-100%	None				0-100%	None	

4-component analyzer: NO/SO<sub>2</sub>/CO<sub>2</sub>/CO >>> Combination of 1st component NO/4th component CO and component 2nd component SO<sub>2</sub>/3rd component CO<sub>2</sub>

1-component: NO		4-component: CO	
1st range	2nd range (max.)	1st range/2nd range (max.)	
0-200ppm	0-2000ppm	0-200/2000ppm, 0-250/2500ppm, 0-300/2500ppm, 0-500/2500ppm, 0-1000/2500ppm, 0-2000/2500ppm, 0-2500ppm, None	
0-250ppm	0-2500ppm		
0-300ppm	0-2500ppm		
0-500ppm	0-2000ppm		
0-1000ppm	0-2000ppm		
0-2000ppm	None		
0-500ppm	0-5000ppm		0-500/2500ppm, 0-1000/2500ppm, 0-2000/2500ppm, 0-2500ppm, None
0-1000ppm	0-5000ppm		
0-2000ppm	0-5000ppm		
0-2500ppm	0-5000ppm		
0-3000ppm	0-5000ppm		
0-5000ppm	None		

+

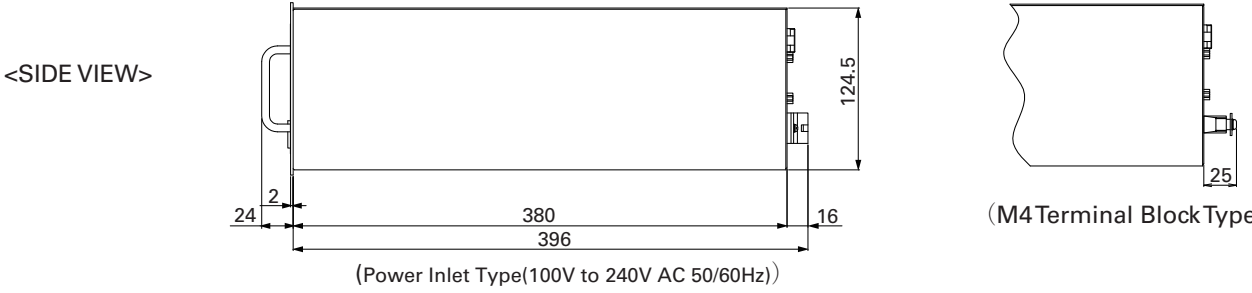
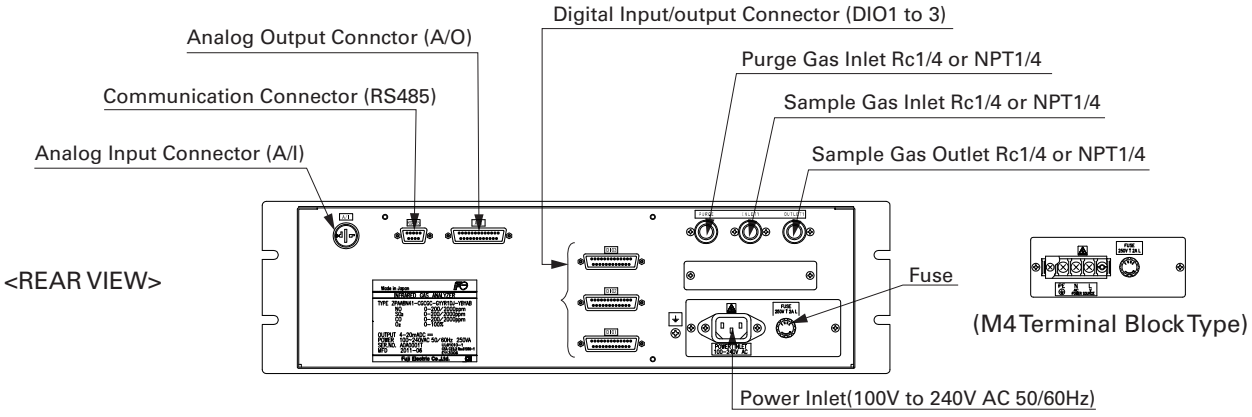
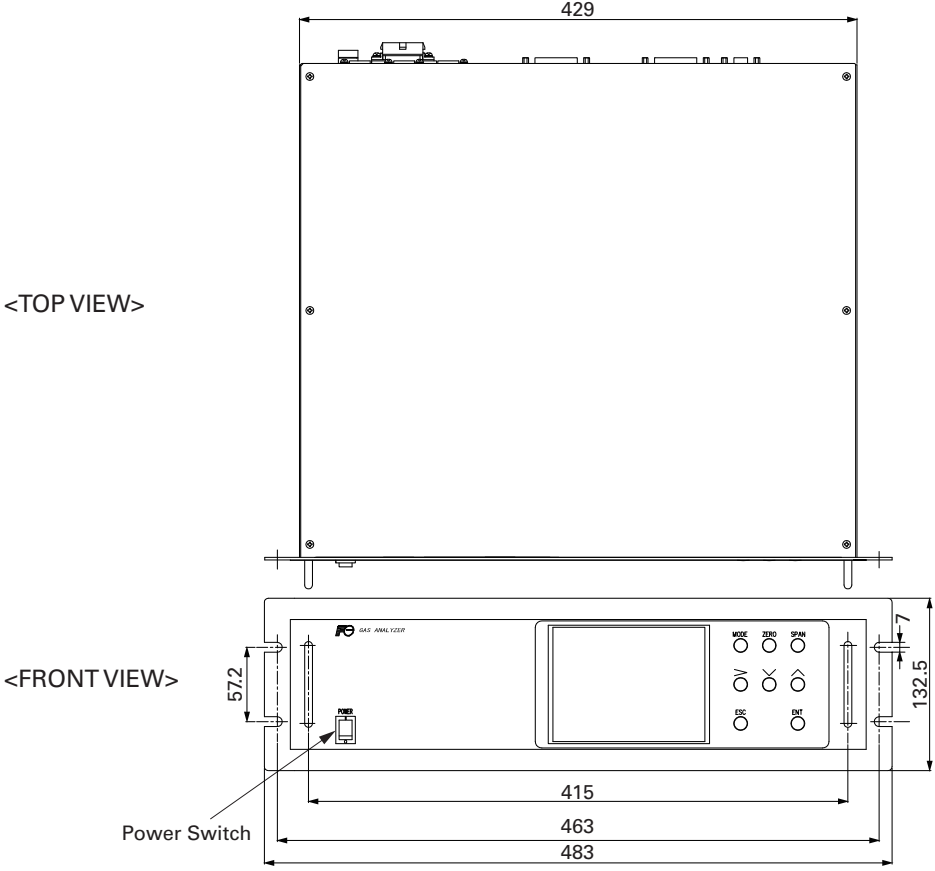
2-component analyzer: SO <sub>2</sub>		3-component analyzer: CO <sub>2</sub>
1st range	2nd range (max.)	1st range/2nd range (max.)
0-200ppm	0-2000ppm	0-1/10%, 0-2/20%, 0-3/20%, 0-5/50%, 0-10/50%, 0-20/50%, 0-25/50%, 0-40/50%, 0-50%/None
0-250ppm	0-2500ppm	
0-300ppm	0-2500ppm	
0-500ppm	0-5000ppm	
0-1000ppm	0-5000ppm	
0-2000ppm	0-5000ppm	
0-2500ppm	0-5000ppm	
0-3000ppm	0-5000ppm	
0-5000ppm	None	

**Table 2 Channel (Ch) No. and display/output contents comparison table**

Code symbol			Display/output contents
6th digit	7th digit	21st digit	
Y	1 to 3	Y	Ch1:O <sub>2</sub>
P	Y	Y	Ch1:NO
A	Y	Y	Ch1:SO <sub>2</sub>
D	Y	Y	Ch1:CO <sub>2</sub>
B	Y	Y	Ch1:CO
E	Y	Y	Ch1:CH <sub>4</sub>
F	Y	Y	Ch1:NO, Ch2:SO <sub>2</sub>
G	Y	Y	Ch1:NO, Ch2:CO
J	Y	Y	Ch1:CO <sub>2</sub> , Ch2:CO
K	Y	Y	Ch1:CH <sub>4</sub> , Ch2:CO
L	Y	Y	Ch1:CO <sub>2</sub> , Ch2:CH <sub>4</sub>
N	Y	Y	Ch1:NO, Ch2:SO <sub>2</sub> , Ch3:CO
T	Y	Y	Ch1:CO <sub>2</sub> , Ch2:CO, Ch3:CH <sub>4</sub>
V	Y	Y	Ch1:NO, Ch2:SO <sub>2</sub> , Ch3:CO <sub>2</sub> , Ch4:CO
P	1 to 3	Y	Ch1:NO, Ch2:O <sub>2</sub>
A	1 to 3	Y	Ch1:SO <sub>2</sub> , Ch2:O <sub>2</sub>
D	1 to 3	Y	Ch1:CO <sub>2</sub> , Ch2:O <sub>2</sub>
B	1 to 3	Y	Ch1:CO, Ch2:O <sub>2</sub>
E	1 to 3	Y	Ch1:CH <sub>4</sub> , Ch2:O <sub>2</sub>
F	1 to 3	Y	Ch1:NO, Ch2:SO <sub>2</sub> , Ch3:O <sub>2</sub>
G	1 to 3	Y	Ch1:NO, Ch2:CO, Ch3:O <sub>2</sub>
J	1 to 3	Y	Ch1:CO <sub>2</sub> , Ch2:CO, Ch3:O <sub>2</sub>
K	1 to 3	Y	Ch1:CH <sub>4</sub> , Ch2:CO, Ch3:O <sub>2</sub>
L	1 to 3	Y	Ch1:CO <sub>2</sub> , Ch2:CH <sub>4</sub> , Ch3:O <sub>2</sub>
N	1 to 3	Y	Ch1:NO, Ch2:SO <sub>2</sub> , Ch3:CO, Ch4:O <sub>2</sub>
T	1 to 3	Y	Ch1:CO <sub>2</sub> , Ch2:CO, Ch3:CH <sub>4</sub> , Ch4:O <sub>2</sub>
V	1 to 3	Y	Ch1:NO, Ch2:SO <sub>2</sub> , Ch3:CO <sub>2</sub> , Ch4:CO, Ch5:O <sub>2</sub>
P	1 to 3	A *	Ch1:NOx, Ch2:O <sub>2</sub> , Ch3:corrected NOx
A	1 to 3	A *	Ch1:SO <sub>2</sub> , Ch2:O <sub>2</sub> , Ch3:corrected SO <sub>2</sub>
B	1 to 3	A *	Ch1:CO, Ch2:O <sub>2</sub> , Ch3:corrected CO
F	1 to 3	A *	Ch1:NOx, Ch2:SO <sub>2</sub> , Ch3:O <sub>2</sub> , Ch4:corrected NOx, Ch5:corrected SO <sub>2</sub>
G	1 to 3	A *	Ch1:NOx, Ch2:CO, Ch3:O <sub>2</sub> , Ch4:corrected NOx, Ch5:corrected CO
J	1 to 3	A *	Ch1:CO <sub>2</sub> , Ch2:CO, Ch3:O <sub>2</sub> , Ch4:corrected CO
N	1 to 3	A *	Ch1:NOx, Ch2:SO <sub>2</sub> , Ch3:CO, Ch4:O <sub>2</sub> , Ch5:corrected NOx, Ch6:corrected SO <sub>2</sub> , Ch7:corrected CO
V	1 to 3	A *	Ch1:NOx, Ch2:SO <sub>2</sub> , Ch3:CO <sub>2</sub> , Ch4:CO, Ch5:O <sub>2</sub> , Ch6:corrected NOx, Ch7:corrected SO <sub>2</sub> , Ch8:corrected CO
P	1 to 3	C *	Ch1:NOx, Ch2:O <sub>2</sub> , Ch3:corrected NOx, Ch4:corrected NOx average
A	1 to 3	C *	Ch1:SO <sub>2</sub> , Ch2:O <sub>2</sub> , Ch3:corrected SO <sub>2</sub> , Ch4:corrected SO <sub>2</sub> average
B	1 to 3	C *	Ch1:CO, Ch2:O <sub>2</sub> , Ch3:corrected CO, Ch4:corrected CO average
F	1 to 3	C *	Ch1:NOx, Ch2:SO <sub>2</sub> , Ch3:O <sub>2</sub> , Ch4:corrected NOx, Ch5:corrected SO <sub>2</sub> , Ch6:corrected NOx average, Ch7:corrected SO <sub>2</sub> average
G	1 to 3	C *	Ch1:NOx, Ch2:CO, Ch3:O <sub>2</sub> , Ch4:corrected NOx, Ch5:corrected CO, Ch6:corrected NOx average, Ch7:corrected CO average
J	1 to 3	C *	Ch1:CO <sub>2</sub> , Ch2:CO, Ch3:O <sub>2</sub> , Ch4:corrected CO, Ch5:corrected CO average
N	1 to 3	C *	Ch1:NOx, Ch2:SO <sub>2</sub> , Ch3:CO, Ch4:O <sub>2</sub> , Ch5:corrected NOx, Ch6:corrected SO <sub>2</sub> , Ch7:corrected CO, Ch8:corrected NOx average, Ch9:corrected SO <sub>2</sub> average, Ch10:corrected CO average
V	1 to 3	C *	Ch1:NOx, Ch2:SO <sub>2</sub> , Ch3:CO <sub>2</sub> , Ch4:CO, Ch5:O <sub>2</sub> , Ch6:corrected NOx, Ch7:corrected SO <sub>2</sub> , Ch8:corrected CO, Ch9:corrected NOx average, Ch10:corrected SO <sub>2</sub> average, Ch11:corrected CO average

\* When the 21st digit code is A or C, the component of the NO analyzer is displayed as NOx.

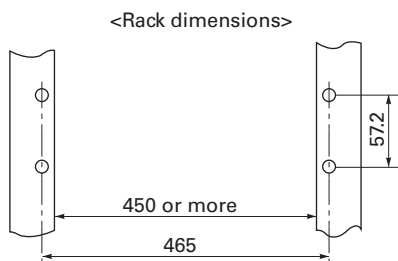
# OUTLINE DIAGRAMS (Unit : mm)



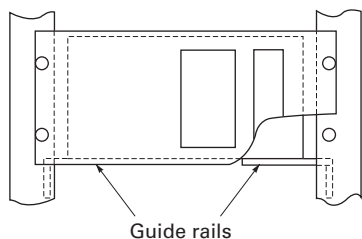
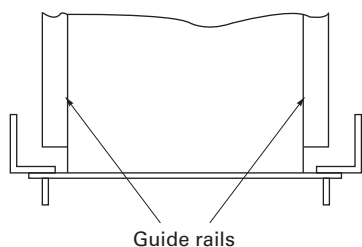
## Mounting method

The analyzer weight should be supported at the bottom of the case.

### 19-inch rack mounting type



### Mounting diagram



## SCOPE OF DELIVERY

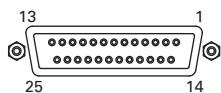
- Gas analyzer ... 1 unit
- Replacement fuse (250V, 2A AC, delay type) ... 2 pcs
- Instruction manual ... 1 copy
- Connector for I/O connection ... 1 set
- Power supply cord (standard inlet type 2m) ... 1 pc

## ORDERING INFORMATION

1. Code symbols
2. Application and composition of sample gas

## EXTERNAL CONNECTION

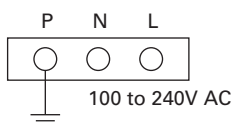
### <Analog output> A/O connector



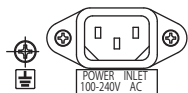
D-sub 25pins female

\* In standard, displayed Channel No. and Analog Output No. are same.

### <Screw terminal (M4)>

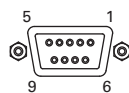


### <Power inlet>



- |   |       |
|---|-------|
| ① | AO1+  |
| ② | AO1-  |
| ③ | AO2+  |
| ④ | AO2-  |
| ⑤ | AO3+  |
| ⑥ | AO3-  |
| ⑦ | AO4+  |
| ⑧ | AO4-  |
| ⑨ | AO5+  |
| ⑩ | AO5-  |
| ⑪ | AO6+  |
| ⑫ | AO6-  |
| ⑬ | AO7+  |
| ⑭ | AO7-  |
| ⑮ | AO8+  |
| ⑯ | AO8-  |
| ⑰ | AO9+  |
| ⑱ | AO9-  |
| ⑲ | AO10+ |
| ⑳ | AO10- |
| ㉑ | AO11+ |
| ㉒ | AO11- |
| ㉓ | AO12+ |
| ㉔ | AO12- |
| ㉕ | NC    |

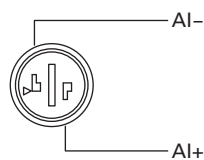
### <RS485 communication signal>



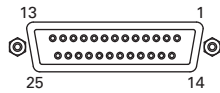
D-sub 9pins female

- |   |       |
|---|-------|
| ① | (GND) |
| ② | RTxD+ |
| ③ | RTxD- |
| ④ |       |
| ⑤ |       |
| ⑥ |       |
| ⑦ |       |
| ⑧ |       |
| ⑨ |       |

### <Analog input> A/I connector (O<sub>2</sub> signal input)



<Digital I/O> DIO 1 to 3 connector (option)

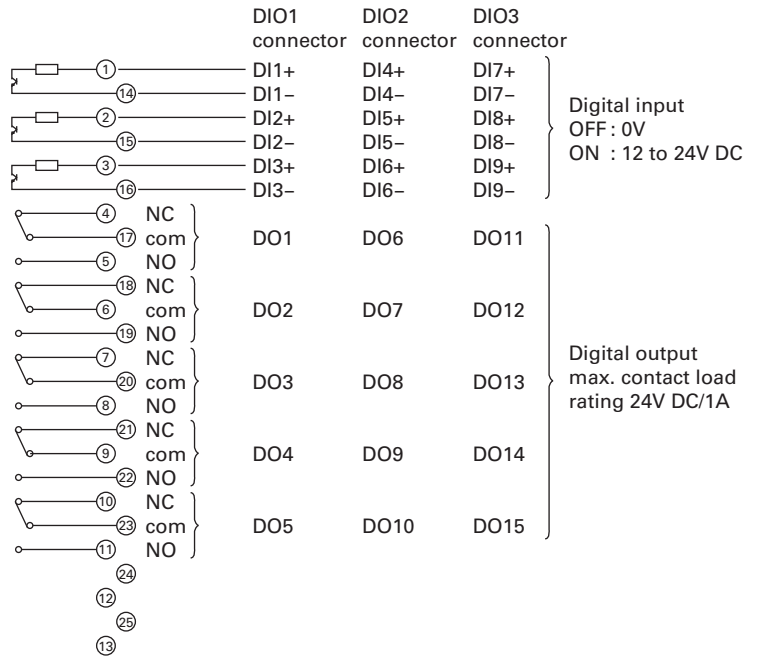


D-sub 25pins female

\* DIO 1 to 3 are all as same connector.

Contents of digital input signal

DI1	Remote hold
DI2	Average value reset
DI3	A. cal. start
DI4	A. zero. cal. start
DI5	Remote range Ch1
DI6	Remote range Ch2
DI7	Remote range Ch3
DI8	Remote range Ch4
DI9	Remote range Ch5



Allocation table of digital input signal

22th digit →	A	B	C	D	E	F	G	H	Y
DI1	○	○	○	○	○	○	○	○	
DI2	○	○	○	○	○	○	○	○	
DI3		○			○	○	○	○	
DI4		○			○	○	○	○	
DI5				○		○	○	○	
DI6				○*		○*	○*	○*	
DI7				○*		○*	○*	○*	
DI8				○*		○*	○*	○*	
DI9				○*		○*	○*	○*	

○ sign shows the function is valid.

\* : The function might be invalid depending on the number of measurable components.

For example: DI5 corresponds to 1st component, DI6 corresponds to 2nd components.

Contents of digital output signal

22th digit →	Independent on the number of component	1-component analyzer			2-component analyzer	3-component analyzer
		B, E	D, F, G, H	B, D, E, F, G, H	B, D, E, F, G, H	
DO1	Instrument error	Instrument error	Instrument error	Instrument error	Instrument error	
DO2	Calibration error	Calibration error	Calibration error	Calibration error	Calibration error	
DO3		A.cal.status	(A.cal.status)	(A.cal.status)	(A.cal.status)	
DO4		For zero gas	(For zero gas)	(For zero gas)	(For zero gas)	
DO5		For span gas Ch1	(For span gas Ch1)	(For span gas Ch1)	(For span gas Ch1)	
DO6	(Alarm1)	(Alarm1)		(For span gas Ch2)	(For span gas Ch2)	
DO7	(Alarm2)	(Alarm2)			(For span gas Ch3)	
DO8	(Alarm3)	(Alarm3)			(Range identification Ch1)	
DO9	(Alarm4)	(Alarm4)		(Range identification Ch1)	(Range identification Ch2)	
DO10	(Alarm5)	(Alarm5)	Range identification Ch1	(Range identification Ch2)	(Range identification Ch3)	
DO11			(Alarm1)	(Alarm1)	(Alarm1)	
DO12			(Alarm2)	(Alarm2)	(Alarm2)	
DO13			(Alarm3)	(Alarm3)	(Alarm3)	
DO14			(Alarm4)	(Alarm4)	(Alarm4)	
DO15			(Alarm5)	(Alarm5)	(Alarm5)	

The items in the parentheses may not be available depending on the selected type on 22th digit.

The normal open side (NO) of digital output is close when the function is active without range ID.

In case of range ID, normal open (NO) side is close with First range.

The normal close (NC) side is close with Second range.

22th digit →	4-component analyzer				5-component analyzer		
	B, E	D, F	G	H	B, E	D, F	G
DO1	Instrument error	Instrument error	Instrument error	Instrument error	Instrument error	Instrument error	Instrument error
DO2	Calibration error	Calibration error	Calibration error	Calibration error	Calibration error	Calibration error	Calibration error
DO3	A.cal.status		A.cal.status	A.cal.status	A.cal.status		A.cal.status
DO4	For zero gas		For zero gas	For zero gas	For zero gas		For zero gas
DO5	For span gas Ch1		For span gas Ch1	For span gas Ch1	For span gas Ch1		For span gas Ch1
DO6	For span gas Ch2		For span gas Ch2	For span gas Ch2	For span gas Ch2	Range identification Ch1	For span gas Ch2
DO7	For span gas Ch3	Range identification Ch1	For span gas Ch3	For span gas Ch3	For span gas Ch3	Range identification Ch2	For span gas Ch3
DO8	For span gas Ch4	Range identification Ch2	For span gas Ch4	For span gas Ch4	For span gas Ch4	Range identification Ch3	For span gas Ch4
DO9		Range identification Ch3		Range identification Ch1	For span gas Ch5	Range identification Ch4	For span gas Ch5
DO10		Range identification Ch4		Range identification Ch2		Range identification Ch5	
DO11	(Alarm1)	(Alarm1)		(Alarm1)	(Alarm1)	(Alarm1)	Range identification Ch1
DO12	(Alarm2)	(Alarm2)	Range identification Ch1	(Alarm2)	(Alarm2)	(Alarm2)	Range identification Ch2
DO13	(Alarm3)	(Alarm3)	Range identification Ch2	(Alarm3)	(Alarm3)	(Alarm3)	Range identification Ch3
DO14	(Alarm4)	(Alarm4)	Range identification Ch3	Range identification Ch3	(Alarm4)	(Alarm4)	Range identification Ch4
DO15	(Alarm5)	(Alarm5)	Range identification Ch4	Range identification Ch4	(Alarm5)	(Alarm5)	Range identification Ch5

## Exclusive Zirconia O<sub>2</sub> analyzer (to be purchased separately)

For O<sub>2</sub> correction, the gas analyzer ZPA can accept linearized 0 to 1V DC signal from the O<sub>2</sub> analyzer calibrated 0 to 25vol% O<sub>2</sub> full scale. If the analyzer is not available, Fuji can supply exclusive Zirconia O<sub>2</sub> analyzer Model ZFK.

**Measuring method:**

Zirconia system

**Measurable component and measuring range:**

Measurable component		Range
O <sub>2</sub>	Oxygen	0 to 25vol%

- Repeatability:** Within ± 0.5% of full scale
- Linearity:** Within ± 1% of full scale
- Zero drift:** Within ± 1% of full scale/week
- Span drift:** Within ± 2% of full scale/week
- Response time:** Approx. 20 seconds (for 90% response)
- Measured gas flow rate:**

0.5 ± 0.25L / min

Remark: The Zirconia system, due to its principle, may produce a measuring error due to relative concentration versus the combustible O<sub>2</sub> gas concentration. Also, a corrosive gas (SO<sub>2</sub> of 250 ppm or more, etc.) may affect the life of the analyzer.

**Gas inlet/outlet size:**

Rc1/4 or NPT1/4

**Power supply:** Rated voltage ; 100 to 115V AC or 200 to 240V AC

Rated frequency ; 50Hz/60Hz

Max. rated power ; 215VA (during power ON)  
65VA (during steady-state operation)

**Enclosure:** Steel casing, for indoor application

**Indication:** Temperature indication (LED)

**Temperature alarm output:**

Contact output 1a contact,  
Contact capacity 220V, 1A AC (resistive load)

**Outer dimensions (H x W x D):**

141 x 170 x 190mm

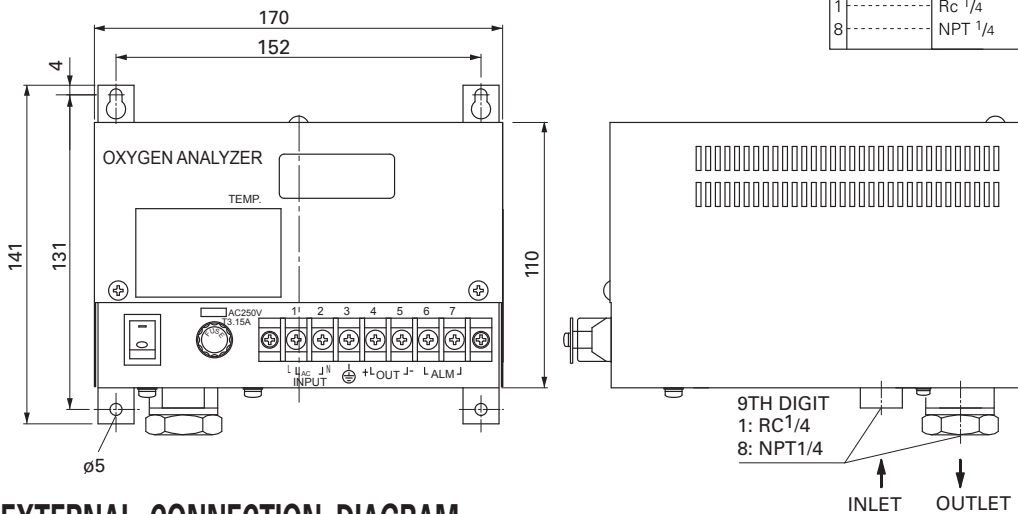
**Mass {weight}:** Approx. 3kg

**Finish color:** Munsell 5Y 7/1

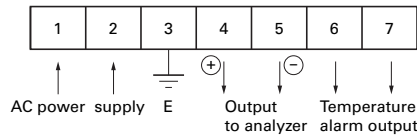
### CODE SYMBOLS

1	2	3	4	5	6	7	8	9	10	11	12	13	Description
Z	F	K	7	Y	Y	4	-	Y	0	Y	Y		<b>Measuring method</b> Zirconia method
								7	Y	Y			<b>Power supply</b> 100 to 115V AC 50/60Hz(Standard) 200 to 240V AC 50/60Hz(Standard) 200 to 240V AC 50/60Hz(CE mark)
								9					<b>Gas inlet/outlet size</b> Rc 1/4 NPT 1/4
								B					
								C					
								1					
								8					

### OUTLINE DIAGRAM (Unit:mm)



### EXTERNAL CONNECTION DIAGRAM



⚠ Caution on Safety

\*Before using this product, be sure to read its instruction manual in advance.



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