

NDIR GAS ANALYZER

<Replacement for ZRJ>

DATA SHEET

ZPAJ

<This model is a replacement for an obsoleted model ZRJ>

This gas analyzer (ZPAJ) measures the concentration of NO, SO₂, CO₂, CO, CH₄, and O₂ in sample gas. It can simultaneously measure up to four components including O₂, i.e., up to three components if O₂ measurement is not required. NO, SO₂, CO₂, CO, and CH₄ are measured by non-dispersion infrared (NDIR) method, while O₂ is measured by galvanic fuel cell sensor, paramagnetic sensor, or zirconia sensor.

The high-sensitivity mass flow sensor and the single-beam system used in NDIR measurement ensure the long-term stability and the ease of maintenance. A large LCD make the analyzer versatile and easy to operate.



FEATURES

1. Easy maintenance
Simply designed sensor eliminates the need for optical adjustment
2. Easy to operate
Large display and interactive interface
3. Various functions
Automatic calibration, remote range switching, range identification signal output, and more.

SPECIFICATIONS

Standard Specifications

Principle of measurement:

NO, SO₂, CO₂, CO, CH₄:

Non-dispersion infrared (NDIR) absorption method
Single light source and single beam (single beam system)

O₂:

Galvanic fuel cell (built-in) or
Paramagnetic sensor (built-in) or
Zirconia sensor (externally installed, Type: ZFK7)

Measurable gas components and ranges:

	Minimum range	Maximum range
NO	0–500 ppm	0–5000 ppm
SO ₂	0–500 ppm	0–5000 ppm
CO ₂	0–500 ppm	0–100 vol%
CO	0–200 ppm	0–100 vol%
CH ₄	0–1000 ppm	0–100 vol%
O ₂ (galvanic fuel cell)	0–10 vol%	0–25 vol%
O ₂ (paramagnetic)	0–5 vol%	0–100 vol%
O ₂ (zirconia)	0–5 vol%	0–25 vol%

- Number of measurable components: Up to 4 including O₂
- Number of ranges: up to 2, for each component
- Maximum rangeability 1:10
- When using two ranges, set the lower range as the 1st range, and the higher range as the 2nd range. See Table 1 to Table 12 for possible combinations of components and ranges.
- You can switch the range in use, between the 1st range or the 2nd range, manually, automatically, or remotely (See “Range changeover” on Page 2).

Measured value indication:

- 4-digit digital indication (LCD panel with LED back light)
- Instantaneous value of each component
- Instantaneous value after O₂ correction (only in NO, SO₂, CO measurement with O₂)
- Average value after O₂ correction (only in NO, SO₂, CO measurement with O₂)
- O₂ average value

Analog output signals:

4–20 mA DC or 0–1 V DC, up to 7 points
Isolated internally from circuit and ground. Output lines are non-isolated each other.
Allowable load for 4–20 mA DC: ≤ 550Ω
Allowable load for 0–1 V DC: ≥ 100 KΩ

* Refer to Table 13 for the component that each channel is allocated.

Analog input signal:

For signal input from external O₂ analyzer
(1) Signal from Fuji's Zirconia O₂ analyzer (TYPE: ZFK7)
(2) 0–1 V DC full-scale signal
Input section is not isolated.
* External O₂ analyzer is to be ordered separately.

Digital output:

1 form A contact (250 V AC / 2A, resistive load)
Instrument error, calibration error, range identification, auto calibration status, solenoid valve drive for auto calibration, pump ON/OFF

1 form C contact (250 V AC / 2A, resistive load)

Upper/lower alarm, peak count alarm

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

Digital input:

No-voltage contact (ON/0V, OFF/5V DC, 5mA flowing at ON)

Remote range changeover, auto calibration remote start, remote holding

Isolated from the internal circuit with a photocoupler.

Contact inputs are not isolated each other.

Power supply:

Voltage rating: 100–240 V AC

Allowable range: 85–264 V AC

Frequency: 50Hz/60Hz

Power rating: ≤ 100 VA

Operating conditions:

Ambient temperature: -5°C to +45°C

Ambient humidity: ≤ 90% RH, non-condensing

Storage conditions:

Ambient temperature: -20°C to +60°C

Ambient humidity: ≤ 95% RH, non-condensing

Dimensions (H × W × D):

19 inch rack mounting type: 177 × 483 × 480 mm

Desk-top type: 194 × 483 × 480 mm

Weight:

Approx. 10 kg

Finish color:

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

Enclosure:

Steel, for indoor use

Material of gas-contacting parts:

Gas inlet/outlet: Stainless steel 304

Sample cell: Stainless steel 304, chloroprene rubber

Infrared-ray transmitting window: CaF₂

Internal piping: vinyl chloride, PTFE, Polypropylene

Paramagnetic cell: Stainless steel 316

Galvanic fuel cell: ABS resin

Gas inlet/outlet:

Rc1/4 or NPT1/4 internal thread

Purge gas flow rate:

1 L/min (when required)

Lifetime of galvanic fuel cell:

2 years

Standard Functions

Output signal holding:

Enables you to hold the output signal during calibration, to the value right before the calibration is started or the user-specified value. Values indicated on LCD will not be held.

Range changeover:

You can change between ranges by manually, automatically, or remotely.

Manual: by key operation

Auto: When the measured value reaches above 90% FS of the 1st range, the range automatically switches to the 2nd range. When the measured value goes down below 80% FS of the 1st range, the range automatically switches from the 2nd range to the 1st range.

Remote: by the contact input. When the specified voltage (the remote range changeover signal) is applied on the contact dedicated for each component, the 1st range is effective. When no voltage is applied, the 2nd range becomes effective.

Remote output holding:

Applying the specified voltage on the dedicated terminal allows you to hold the output signal to the last value or the user-specified value. Holding is effective while the voltage is applied. Values indicated on LCD are not held.

Range identification signal:

You can check which range is in use.

Auto calibration:

This function requires standard gas cylinders for calibration and solenoid valves for opening/closing the gas flow line. When this function is activated, the analyzer opens and closes the solenoid valve driving contact periodically at preset cycle.

Auto calibration cycle setting:

1 hour to 99 hours (in increments of 1 hour) or

1 day to 40 days (in increments of 1 day).

Gas flow time setting:

The time during which calibration gas is drawn

60 seconds to 900 seconds (in increments of 1 second)

Auto calibration remote start:

When you apply the specified voltage for 1.5 seconds or longer on the auto calibration remote start contact and then open the contact, one-time auto calibration starts. Calibration gas is drawn for the time set in the "gas flow time setting" for Auto calibration (see the previous item).

Auto zero calibration:

This function requires a standard gas cylinder for zero calibration and a solenoid valve for opening/closing the gas flow line. When this function is activated, the analyzer opens and closes the solenoid valve driving contact periodically at preset cycle. The cycle for the auto zero calibration and that for the auto calibration can be different.

Auto calibration cycle setting:

1 hour to 99 hours (in increments of 1 hour) or

1 day to 40 days (in increments of 1 day).

Gas flow time setting:

The time during which calibration gas is drawn

60 seconds to 900 seconds (in increments of 1 second)

Upper/lower limit alarm:

When an instantaneous value has gone beyond the upper limit or below the lower limit, the analyzer closes the contact to emit an alarm signal. Up to four alarms are available.

Instrument error contact output:

The contact is closed if a device error occurs.

Calibration error contact output:

The contact is closed if a calibration error occurs.

Auto calibration status contact output:

The contact is closed during auto calibration.

Pump ON/OFF contact output:

This contact is closed during measurement, and opened while calibration gas is flowing, so that the pump for gas is stopped during calibration.

Optional Functions

O₂ correction:

Conversion of measured NO, CO, and SO₂ gas concentrations into values at reference O₂ concentration

Correction formula:

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

C: Sample gas concentration after O₂ correction

Cs: Measured concentration of sample gas

Os: Measured O₂ concentration

On: Reference O₂ concentration

(changeable by setting)

* The upper limit value of the fractional part in this calculation is 4. The result of calculation is indicated and transmitted as an analog output signal.

Average value after O₂ correction and O₂ average value calculation:

The analyzer can take measurement every 30 seconds, and calculate the moving average of instantaneous concentration after O₂ correction or instantaneous O₂ value per the period you set; in the range 1–59 min (in one minute increment) or 1–4 hour (in one hour increment). The analyzer transmits the moving average output every 30 seconds.

CO concentration peak count alarm: (available only for CO/O₂ measurement)

A user can define the peak value of instantaneous CO concentration and the limit how many times the peak is allowed to occur in one hour. The analyzer emits an alarm when the peak count reaches the user-defined number of times.

Communication function:

RS-232C (9-pin D-sub)
Half-duplex bit serial
Start-stop synchronization
Modbus™ protocol
Contents: parameters (read/wright), measured concentrations and instrument status
Remark: when connecting via RS-485 interface, add an RS232-RS485 converter.

Performance

Repeatability:

±0.5% of full scale

Linearity:

±1% of full scale

Zero drift:

±2% of full scale/week

Span drift:

±2% of full scale/week

Response time (for 90% FS response):

Electrical response: 1–15 seconds
1 component analyzer: ≤ 15 seconds
CO₂/CO analyzer, CH₄/CO analyzer, CO₂/CH₄ analyzer: ≤ 15 seconds
NO/SO₂ analyzer and NO/CO analyzer: ≤ 30 seconds
Analyzers for 3 or more components: ≤ 30 seconds

* The above described response times include the replacement time of sample gas. Note that gas replacement time may vary with the number of measuring components and measuring range.

Interference from other gases:

	CO ₂ analyzer	CO analyzer	CH ₄ analyzer	SO ₂ analyzer	NO analyzer	Paramagnetic O ₂ analyzer
CO 1000 ppm	≤ 1.0 % FS	—	≤ 1.0 % FS	≤ 1.0 % FS	≤ 1.0 % FS	—
CO ₂ 15%	—	≤ 1.0 % FS ^{*1}	≤ 1.0 % FS	≤ 1.0 % FS	≤ 1.0 % FS	≤ 2.0 % FS
H ₂ O saturation at 20°C	≤ 1.0 % FS	≤ 1.0 % FS ^{*2}	≤ 1.0 % FS	—	—	—
H ₂ O saturation at 2°C	—	≤ 2.0 % FS	—	≤ 2.0 % FS	≤ 2.0 % FS	—
CH ₄ 1000 ppm	≤ 1.0 % FS	≤ 1.0 % FS	—	≤ 20 ppm	—	—

*1: ≤ 2.0% FS for 200 ppm range

*2: ≤ 2.0% FS for 500 ppm range excluding 0–200 ppm range

Requirements for Sample Gas

Flow rate:

1.0 L/min ±0.5 L/min

Temperature:

0°C to 50°C

Pressure:

10 kPa or less (Gas outlet side should be open to the atmospheric air.)

Dust:

100 µg/Nm³ or less in particle size of 0.3 µm or smaller

Mist:

Unallowable

Moisture:

NO, SO₂, and 0-200 ppm range CO analyzer: below the level where saturation occurs at 2°C

Others: below the level where saturation occurs at room temperature (no condensation).

Corrosive component:

1 ppm or less

Standard gas for calibration:

For measurement with IR and/or built-in O₂ sensor:

Zero gas: Dry N₂

Span gas: Each sample gas having concentration of 90–100% of its measuring range (recommended).

For measurement with external zirconia O₂ sensor and when calibration is carried out on the same calibration gas line:

Zero gas: dry air or atmospheric air (not allowed for CO₂ measurement)

Span gas: Other than O₂ measurement: each sample gas having concentration of 90–100% of its measuring range

O₂ measurement: 1–2 vol% O₂, balance N₂

Installation Requirements

- Indoor use. Select a place where the equipment does not receive direct sunlight, wind and 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

EU Directive Compliance



LVD (2014/35/EU)

EN 61010-1

EN 62311

EMC (2014/30/EU)

EN 61326-1 (Table 2)

EN 61000-3-2 (Class A)

EN 61000-3-3

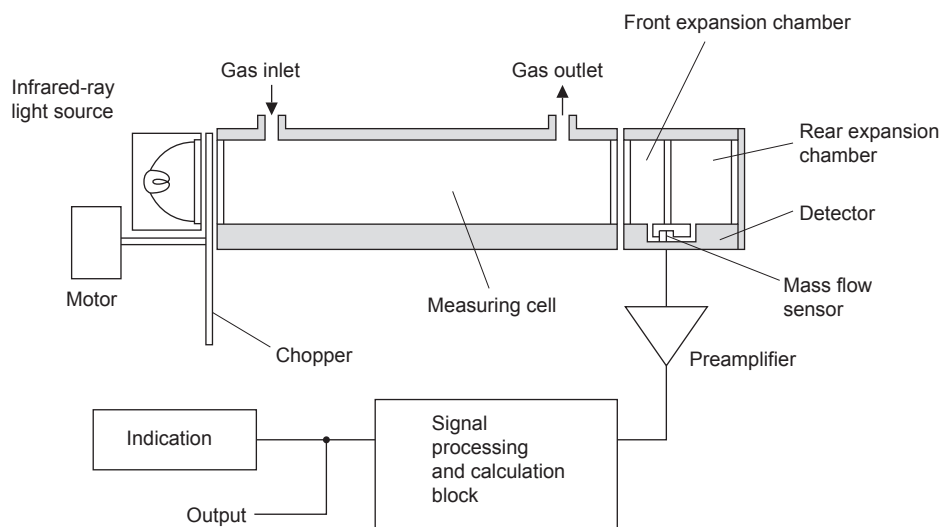
EN 61326-2-3

RoHS (2011/65/EU+(EU)2015/863)

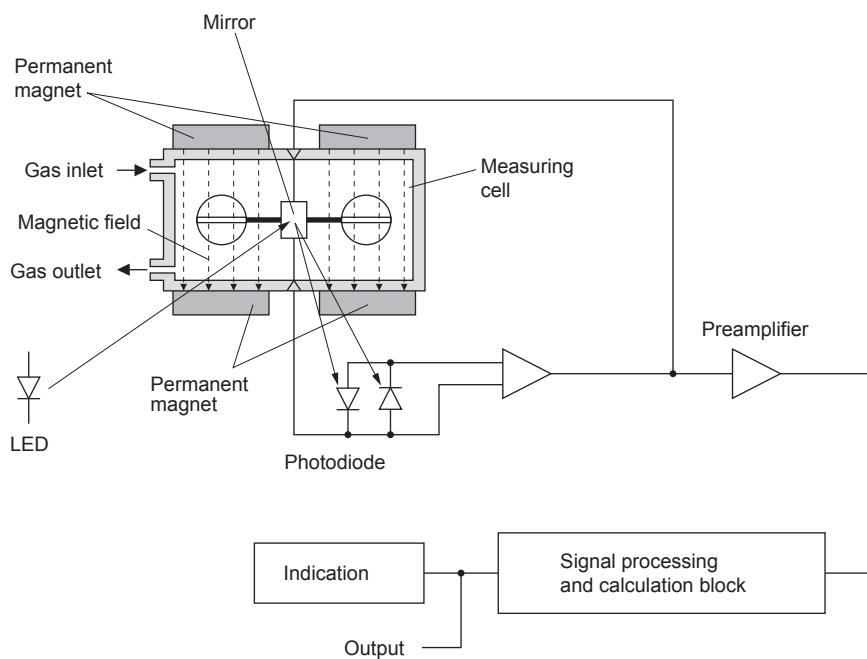
EN IEC63000

PRINCIPLE

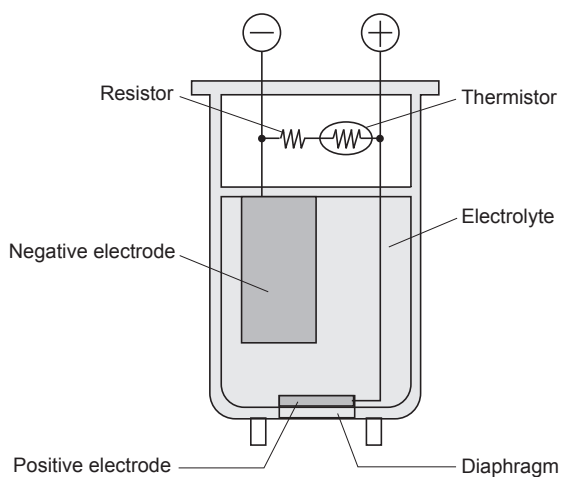
NDIR sensor (for CO₂, CO, CH₄, SO₂, NO)



Paramagnetic sensor (for O₂)

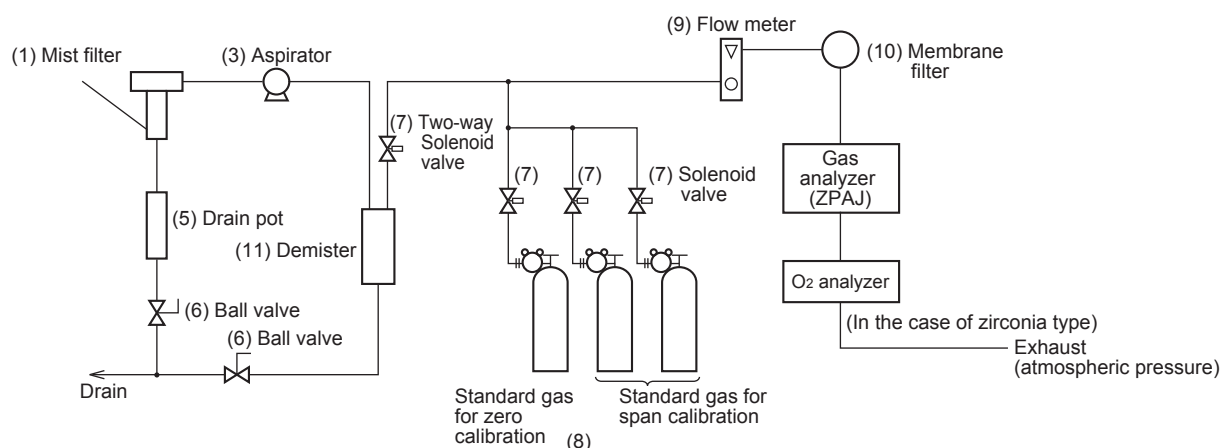


Galvanic fuel cell (for O₂)

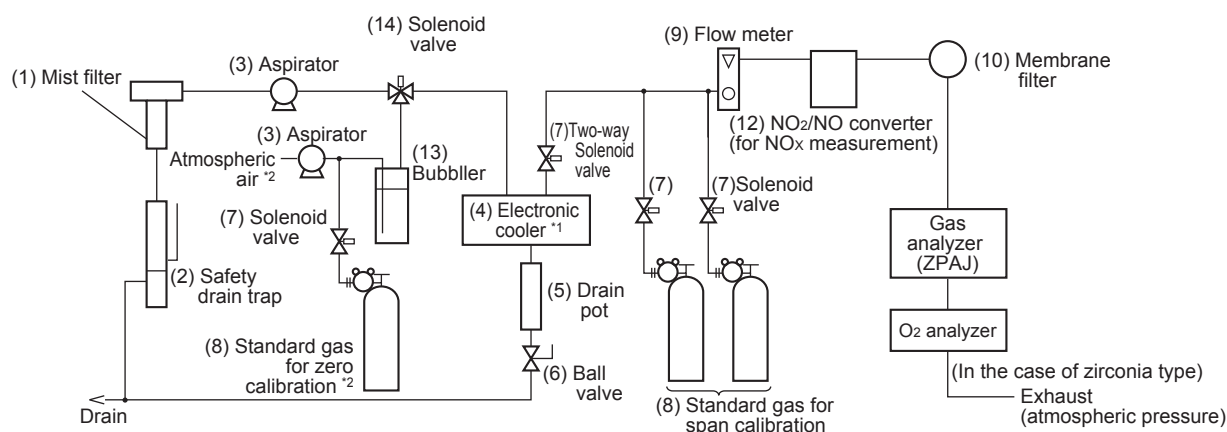


SYSTEM CONFIGURATION EXAMPLES

CO, CO₂, or CH₄ with low-level moisture



NO, SO₂, 0-200 ppm range CO, or other gases with high-level moisture



Notes:

1. For NO, SO₂, or 0–200 ppm range CO measurement, be sure to use an electronic cooler to keep the moisture content below the level saturated at 2°C.
2. For zero calibration line, use either atmospheric air or standard gas from cylinder, and condition it through a bubbler and an electronic cooler.

List of sampling devices

No.	Device name	Model
(1)	Mist filter	ZBBK1V03-0
(2)	Safety drain trap	ZBH51603
(3)	Aspirator	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 ₂ /NO converter	ZDL02001
(13)	Bubbler	ZBH65003
(14)	Solenoid valve	

CODE SYMBOLS

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	26	← Digit
4	<Specification/Structure> Replacement for ZRJ (with power inlet and power cable)	note1	Z	P	A	J				2	-																		
5	<Mounting> Table-top type 19inch rack mounting type 19inch rack mounting type, with slide rail					J		A	B	S																			
6	<Measurable component (NDIR)> 1st component 2nd component 3rd component	note2						Y	P	A	D	B	E																
	None - - -																												
	NO - - -																												
	SO ₂ - - -																												
	CO ₂ - - -																												
	CO - - -																												
	CH ₄ - - -																												
	NO SO ₂ - -																												
	NO CO - -																												
	CO ₂ CO - -																												
	CH ₄ CO - -																												
	CO ₂ CH ₄ -																												
	NO SO ₂ CO																												
	CO ₂ CO CH ₄																												
	Others																												
7	<Measurable component (O ₂)> None External O ₂ analyzer External zirconia O ₂ sensor (ZFK7) Built-in galvanic fuel cell O ₂ sensor Built-in paramagnetic O ₂ sensor	note3						Y	1	2	3	4																	
8	<Revision code>									2																			
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	—																			Y									
16	—																			Y									
17	<Measuring range (O ₂)> None 0-5/10% 0-5/25% 0-10/25% 0-5% 0-10% 0-25% 0-50% 0-100% Others	note4																		Y	A	B	C	L	M	V	P	R	Z
18	<Gas connection> Rc1/4 NPT1/4																			1	2								
19	<Output> 0-1V DC 4-20mA DC 0-1V DC+Communication function 4-20mA DC+Communication function																				A	B	C	D					
20	<Indication/power supply cord> Japanese, cord rated 125V (PSE) English, cord rated 125V (UL) English, cord rated 250V (CEE)	note5																			J	E	U						
21	<Optional functions> None O ₂ correction CO peak count alarm O ₂ correction and CO peak count alarm	note6																				Y	A	B	C				
22	<DIO> FAULT A. Cal. H/L Alarm RangeID/Remote range ○ ○ ○ ○																						H						
23	—																						Y						
24	<Unit> ppm, vol% mg/m ³ , g/m ³	note7																							A	B			
25	<Adjustment> For standard For heat treatment furnace For converter Others	note8 note9																								A	C	D	Z
26	<Others> Non-Standard																												Z

NDIR range codes

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

O₂ range codes

Measurement range	Range code	Golvanic fuel cell (built - in)	Paramagnetic cell (built - in)	Zirconia cell (external)
0 – 5/10 vol%	A		○ note10	○
0 – 5/25 vol%	B		○ note10	○
0 – 10/25 vol%	C	○	○	○
0 – 5 vol%	L		○ note10	○
0 – 10 vol%	M	○	○	○
0 – 25 vol%	V	○	○	○
0 – 50 vol%	P		○	
0 – 100 vol%	R		○	

Notes:

- The analyzer comes with the power cable. Specify the rating of the power cable in the 20th code.
- If you only use this analyzer only for oxygen measurement, select "Y" in the 6th code.
- If you use an external O₂ sensor (7th code "1"), set 0–1 V DC linear signals from the external O₂ analyzer so that they corresponds to the full scale setting of the analyzer.
Note that the external O₂ analyzer (7th code "1") and the external zirconia O₂ sensor ZFK7 (7th code "2") need to be ordered separately.
- Check the possible combination of measuring components and ranges in Tables 1–12. Specify the range with the range codes shown in the above tables.
- Select the appropriate cable specification for end user in the 20th code.
- O₂ correction is provided only for NO, SO₂, and CO measurement.
- Even if you selected "B" in the 24th code, select the range in ppm that is shown in the above "NDIR range codes" table. We will set the analyzer after converting the ppm ranges into mg/m³ ranges. For the converted ranges, see the "ppm-mg/m³ conversion table" shown below.
- When A to D is specified at 25th digit, the analyzer will be adjusted and delivered with the following balance gasses.
Standard "A": balance gas N₂.
For heat treatment furnace "C": CO₂ analyzer: 25% CO + 30% H₂ + residue N₂
CO analyzer: 5% CO₂ + 30% H₂ + residue N₂
CH₄ analyzer: 25% CO + 30% H₂ + residue N₂
For converter "D": balance gas CO, CO₂.
When other adjustment is required, please specify "Z".
When "Z" is specified, please attach a list of gas composition contained in the measuring gas.
- When the 25th code is "C", the range code "X" and "R" are not available.
- NDIR range codes "V", "W", "P", "X", and "R" are not available.

ppm–mg/m³ conversion table

Range code	ppm	Range in mg/m ³		
		NO	SO ₂	CO
C	0–200	—	—	0–250 mg/m ³
D	0–250	—	—	0–300 mg/m ³
S	0–300	—	—	0–375 mg/m ³
E	0–500	0–650 mg/m ³	0–1400 mg/m ³	0–600 mg/m ³
F	0–1000	0–1300 mg/m ³	0–2800 mg/m ³	0–1250 mg/m ³
G	0–2000	0–2600 mg/m ³	0–5600 mg/m ³	0–2500 mg/m ³
U	0–2500	0–3300 mg/m ³	0–7100 mg/m ³	0–3000 mg/m ³
T	0–3000	0–4000 mg/m ³	0–8500 mg/m ³	0–3750 mg/m ³
H	0–5000	0–6600 mg/m ³	0–14.00 g/m ³	0–6250 mg/m ³

Conversion formula

$$\begin{aligned}\text{NO (mg/m}^3\text{)} &= 1.34 \times \text{NO (ppm)} \\ \text{SO}_2 \text{ (mg/m}^3\text{)} &= 2.86 \times \text{SO}_2 \text{ (ppm)} \\ \text{CO (mg/m}^3\text{)} &= 1.25 \times \text{CO (ppm)}\end{aligned}$$

MEASURABLE COMPONENT AND RANGE - AVAILABILITY CHECK TABLE -

Procedure of range selection

One component analyzer:

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

Two or more component analyzer:

1. Check the available options referring to Table 1 to Table 12, and determine the 1st range. Select the corresponding range code from "NDIR range codes" on Page 7.
2. The 2nd range must be greater than the 1st range but no greater than the value in the column "2nd range (max.)". Check the available options referring to Table 1 to Table 12, and determine the 2nd range. Select the corresponding range code from "NDIR range codes" on Page 7.

Table 1
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

Table 2
1-component analyzer : NO

1st range	2nd range
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

Table 3
1-component analyzer : SO₂

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
0 - 5000ppm	None

Table 4
1-component analyzer : CO₂

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

Table 5
1-component analyzer : CH₄

1st range	2nd range
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

Table 6
2-component analyzer : NO/SO₂

1st component : NO		2nd component : SO ₂	
1st range	2nd range (max.)	1st range	2nd range (max.)
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

Table 7
2-component analyzer : NO/CO

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

Table 10
2-component analyzer: CO₂/CH₄

1st component: CO ₂		2nd component: CH ₄
1st range	2nd range (max.)	1st range/2nd range (max.)
0-500ppm	0-2500ppm	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%, 0-70/100%, 0-100%
0-3%		
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%, 0-70/100%, 0-100%
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	

Table 11
3-component analyzer: CO₂/CO/CH₄

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

+

3rd component: CH ₄		Availability of product
1st range	2nd range (max.)	
0-5000ppm	0-5%	Product available only when CO analyzer max. measuring range is 50% or less
0-1%	0-10%	Product available
0-2%	0-20%	
0-3%	0-25%	Product available only when CO analyzer measuring range is 0 to 1000ppm or more.
0-5%	0-10%	
0-10%	0-20%	Product available only when CO analyzer measuring range is 0 to 5000ppm or more.
0-25%	0-40%	
0-40%	0-50%	
0-50%	0-70%	Available only when the CO analyzer range is 0-5000 ppm or more, and the CO ₂ analyzer range is 0-2% or more.
0-70%	0-100%	
0-100%	None	

Table 12
3-component analyzer: NO/SO₂/CO

1st component: NO		2nd component: SO ₂	3rd component: CO
1st range	2nd range (max.)	1st range/2nd range (max.)	
0-500ppm	0-5000ppm	0-500ppm	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	
0-2500ppm	0-5000ppm	None	
0-3000ppm	0-5000ppm	0-5000ppm	0-500/5000ppm, 0-1000/5000ppm, 0-2000/5000ppm, 0-2500/5000ppm, 0-3000/5000ppm, 0-5000ppm
0-5000ppm	None	0-2000ppm	
		0-2500ppm	
		0-3000ppm	
		0-5000ppm	
		None	

Table 13: Display/output for each channel

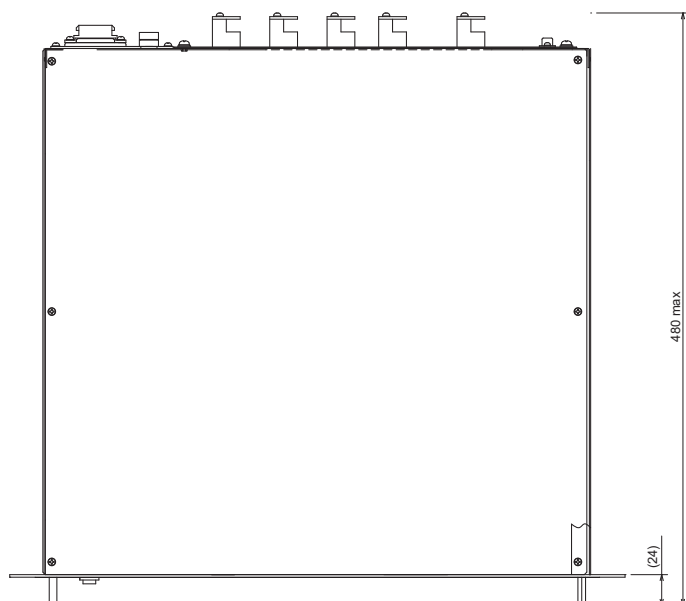
Code			Display and output						
6th	7th	21th	CH1	CH2	CH3	CH4	CH5	CH6	CH7
Y	1, 2, 3, 4	Y	O ₂						
P	Y	Y	NO						
A	Y	Y	SO ₂						
D	Y	Y	CO ₂						
B	Y	Y	CO						
E	Y	Y	CH ₄						
F	Y	Y	NO	SO ₂					
G	Y	Y	NO	CO					
J	Y	Y	CO ₂	CO					
K	Y	Y	CH ₄	CO					
L	Y	Y	CO ₂	CH ₄					
N	Y	Y	NO	SO ₂	CO				
T	Y	Y	CO ₂	CO	CH ₄				
P	1, 2, 3, 4	Y	NO	O ₂					
A	1, 2, 3, 4	Y	SO ₂	O ₂					
D	1, 2, 3, 4	Y	CO ₂	O ₂					
B	1, 2, 3, 4	Y, B	CO	O ₂					
E	1, 2, 3, 4	Y	CH ₄	O ₂					
F	1, 2, 3, 4	Y	NO	SO ₂	O ₂				
G	1, 2, 3, 4	Y, B	NO	CO	O ₂				
J	1, 2, 3, 4	Y, B	CO ₂	CO	O ₂				
K	1, 2, 3, 4	Y, B	CH ₄	CO	O ₂				
L	1, 2, 3, 4	Y	CO ₂	CH ₄	O ₂				
N	1, 2, 3, 4	Y, B	NO	SO ₂	CO	O ₂			
T	1, 2, 3, 4	Y, B	CO ₂	CO	CH ₄	O ₂			
P	1, 2, 3, 4	A ¹	NO _x	O ₂	Corrected NO _x	Corrected NO _x average	O ₂ average		
A	1, 2, 3, 4	A	SO ₂	O ₂	Corrected SO ₂	Corrected SO ₂ average	O ₂ average		
B	1, 2, 3, 4	A, C	CO	O ₂	Corrected CO	Corrected CO average	O ₂ average		
F ²	1, 2, 3, 4	A ¹	NO _x	SO ₂	O ₂	Corrected NO _x	Corrected SO ₂	Corrected NO _x average	Corrected SO ₂ average
G ²	1, 2, 3, 4	A, C ¹	NO _x	CO	O ₂	Corrected NO _x	Corrected CO	Corrected NO _x average	Corrected CO average
J	1, 2, 3, 4	A, C	CO ₂	CO	O ₂	Corrected CO	Corrected CO average	O ₂ average	
K	1, 2, 3, 4	A, C	CH ₄	CO	O ₂	Corrected CO	Corrected CO average	O ₂ average	
N ²	1, 2, 3, 4	A, C ¹	NO _x	SO ₂	CO	O ₂	Corrected NO _x	Corrected SO ₂	Corrected CO
T	1, 2, 3, 4	A, C	CO ₂	CO	CH ₄	O ₂	Corrected CO	Corrected CO average	O ₂ average

Notes:

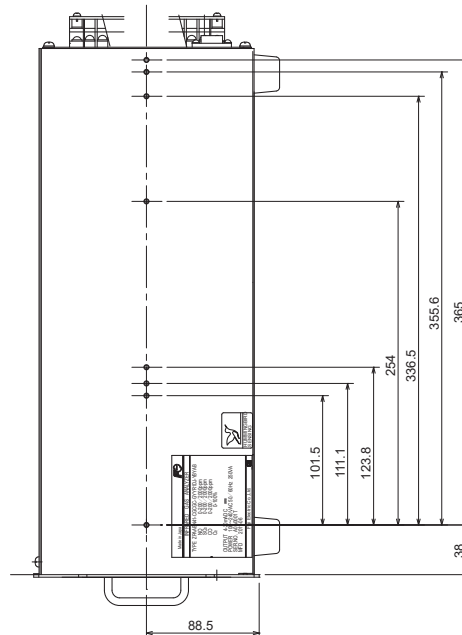
- When the 21st code is "A" or "C", CH1 shows the concentration of NO_x.
- When the 6th code is "F" or "G", and the 21st code is "A" or "C", the O₂ average value is not provided.
When the 6th code is "N" and the 21st code is "A" or "C", the instantaneous value after O₂ correction is available but the average value after O₂ correction and O₂ average value are unavailable.
- Analog outputs are transmitted from the terminal of each channel.

DIMENSIONS (Unit : mm) **Analyzer main unit**

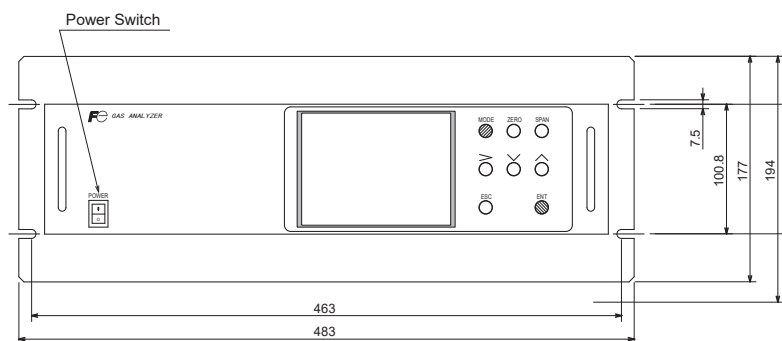
<TOP VIEW>



<SIDE VIEW>



<FRONT VIEW>

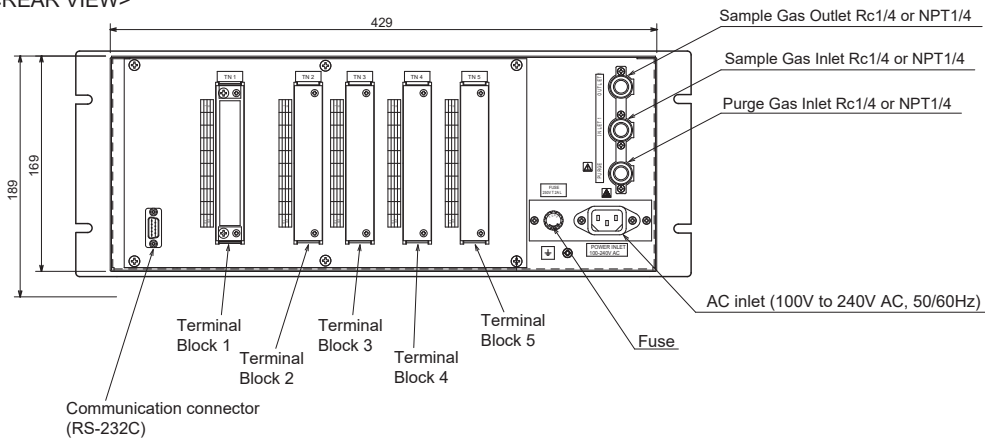


<Rack mount hole pitch>

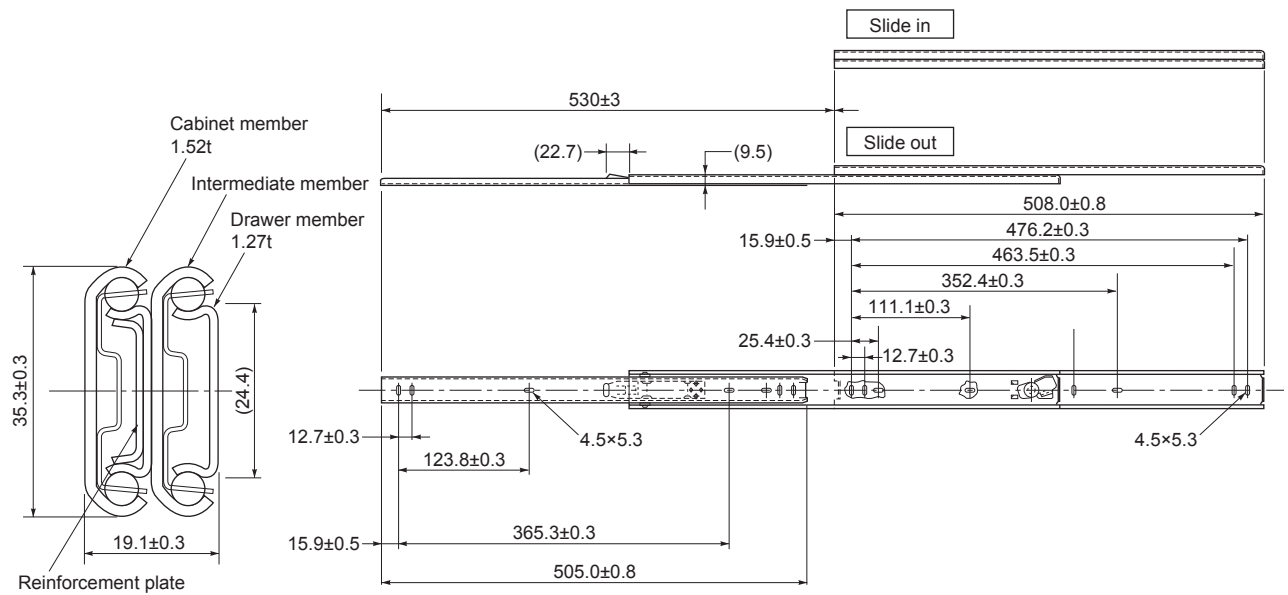
M5

Applicable both for JIS 100mm and EIA 101.6mm

<REAR VIEW>



Slide rail *Slide rail is provided when the 5th code is "S".

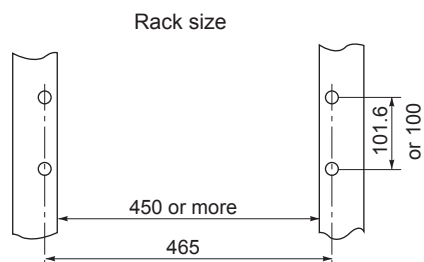


19-inch rack mounting

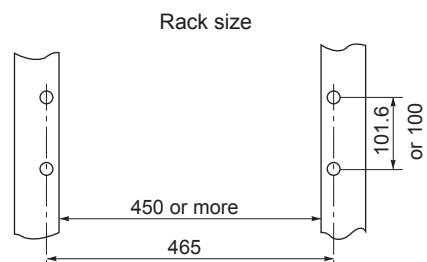
Mounting with slide rails is recommended because it makes the maintenance work easy.

Be sure to support the weight of the analyzer at the side bottoms (or the sides when using the slide rail).

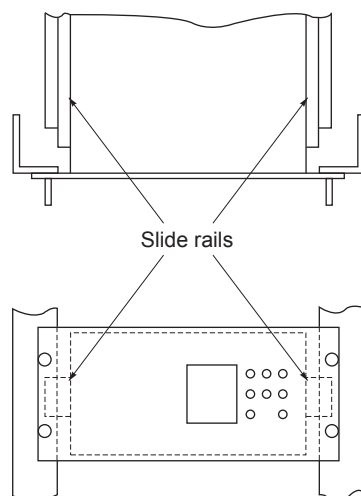
Slide rail mounting



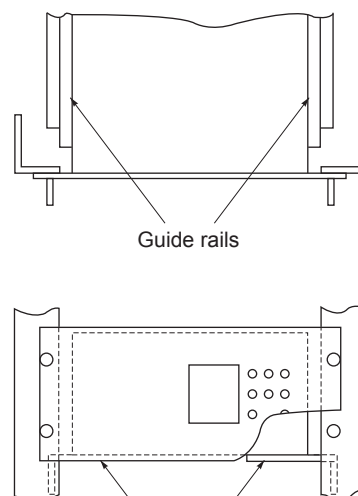
Guide rail mounting



Mounting diagram

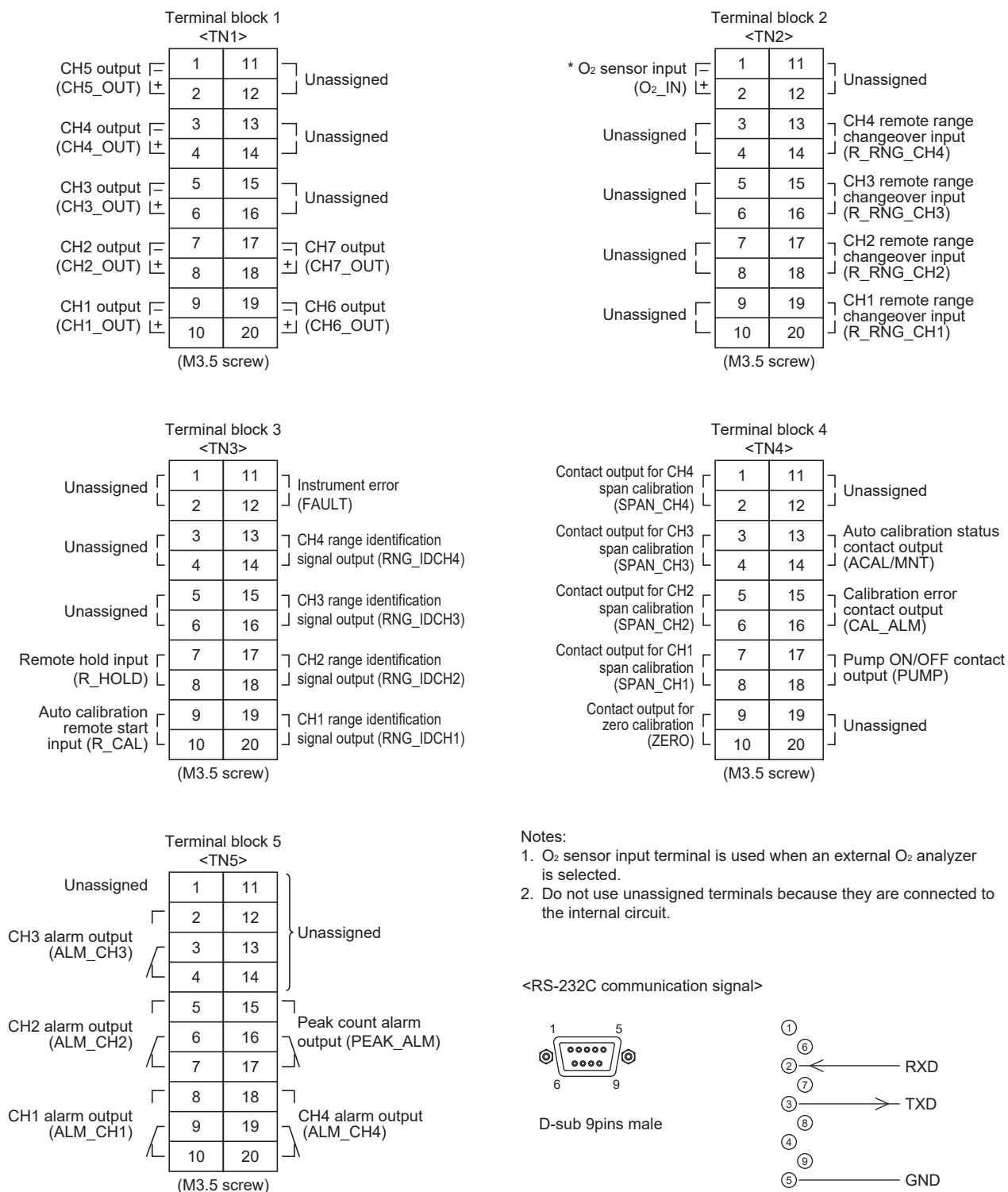


Mounting diagram



Guide rails
For maintenance work, keep a minimum clearance of 200 mm above the analyzer.

CONNECTION DIAGRAM



Differences in terminal diagram between ZRJ and ZPAJ

	ZRJ	ZPAJ
CH8 output	TN1 (15–16)	None
Average resetting	TN3 (7–8)	None
Remote hold	TN3 (5–6)	TN3 (7–8)

SCOPE OF DELIVERY

- Gas analyzer ... 1
- Power cable (standard inlet type, 2 m) ... 1
- Replacement fuse (250 V AC, 2 A, delay type) ... 2
- Instruction manual ... 1
- Slide rail (when selected) ... 2
- Ferrite core ... 5

ORDERING INFORMATION

- Code symbols
- Application and sample gas composition

ZIRCONIA O₂ ANALYZER (to be purchased separately)

Measuring method:

Zirconia system

Measurable component and measuring range:

Measurable component		Range
O ₂	Oxygen	0 to 25vol%

Repeatability: Within $\pm 0.5\%$ of full scale

Linearity: Within $\pm 1\%$ of full scale

Zero drift: Within $\pm 1\%$ of full scale/week

Span drift: Within $\pm 2\%$ of full scale/week

Response time: Approx. 20 seconds (for 90% response)

Measured gas flow rate:
 $0.5 \pm 0.25\text{L} / \text{min}$

Notes:

- If process gas is combustible, measurement error may occur due to oxygen contained in the process gas.
- If process gas is corrosive (for example, SO₂ beyond 250 ppm range), the service life of zirconia sensor may be shortened.

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 (at start up)
65VA (during normal operation)

Enclosure: Steel casing, for indoor application

Indication: Temperature indication (LED)

Temperature alarm output:

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

Outer dimensions (H x W x D):

141 x 170 x 190mm

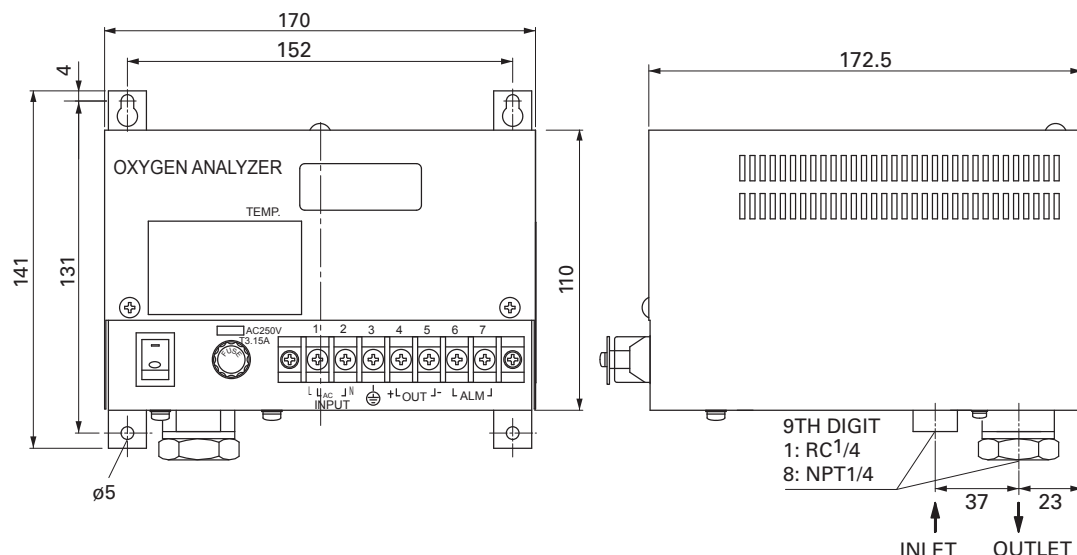
Weight: Approx. 3kg

Finish color: Munsell 5Y 7/1

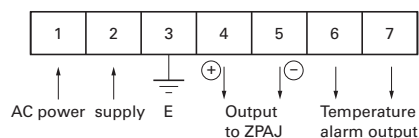
CODE SYMBOLS

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		
7YY													Measuring method
													Zirconia method
													Power supply
													100 to 115V AC 50/60Hz(Standard)
													200 to 240V AC 50/60Hz(Standard)
													200 to 240V AC 50/60Hz(CE mark)
													Gas inlet/outlet size
													Rc ¹ / ₄
													NPT ¹ / ₄

DIMENSIONS (Unit: mm)



EXTERNAL CONNECTION DIAGRAM



Information in this catalog is subject to change without notice.
Read the instruction manuals thoroughly before using the products.

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