

# MICROPROCESSOR BASED NDIR GAS ANALYZER

DATA SHEET

ZRF

This NDIR gas analyzer features a high accuracy, multiple functions and easy operation through use of a microprocessor. It also utilizes a mass flow detector noted for its high sensitivity and reliability. Being housed in a 19 inch rack case suitable for mounting on a panel or a table top, this analyzer is applicable not only for measurement of environmental pollution but for use in various processes and/or experimental laboratories.



## FEATURES

- (1) Use of a microprocessor provides high accuracy, multiple functions and easy operation.
  - The built-in automatic calibrating function allows calibration of up to three components (option).
  - The signal from a zirconia O<sub>2</sub> sensor (ZFK3) or other O<sub>2</sub> meter enables output of an O<sub>2</sub> correction value (option).
  - Includes an alarm function providing an upper/lower limit contact output (option).
  - Range can be changed over by external signal (option).
  - Zero and span calibration is accurate and easy by means of operating keys.
  - A self-diagnosis function is included.
- (2) This analyzer utilizes a mass flow detector featuring high sensitivity and reliability. It is equipped with two standard ranges for a range ratio of up to 1:20.
- (3) Addition of a zirconia O<sub>2</sub> sensor (ZFK3) to the one/two-component analyzer allows measurement of up to three components simultaneously.
- (4) Besides the standard method of measurement, a sample switching system and differential flow system are also available.

## SPECIFICATIONS

### General items

**Power supply:** 100, 115 or 220V AC  $\pm 10\%$ , 50/60Hz  
**Power consumption:** 125VA max. (220VA max. when CO/CO<sub>2</sub> converter equipped)  
**Ambient temperature:** -5 to +45°C  
**Ambient humidity:** 90%RH or less  
**Enclosure:** Steel casing, for indoor application

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

Rack mounting type;  
220 x 483 x 463mm  
 Panel flush mounting type;  
220 x 443 x 463mm  
 Table top type;  
232 x 443 x 463mm

**Mass {weight}:** Approx. 20kg

**Finish color:** Munsell 2.5Y8.4/1.2

**Indication:** 4 digit LED for concentration  
4 digit LED for sub-indication

**Output hold:** Output value before manual or automatic calibration is held. Whether or not to effect hold function can be selected.

### Sample gas condition:

Temperature; 0 to 50°C (dew point of water vapor; less than 2°C)  
 Dust; less than 0.3 $\mu$ m  
 Pressure; less than 9.8kPa

### Standard adjustment:

Calibration gas; Dry N<sub>2</sub> Balance  
 Interface compensation Dew point of 2°C water vapor in N<sub>2</sub>

**Warm up time:** Approx. 4 hours

### Material of gas-contacting parts:

Sample cell; SUS304, neoprene rubber  
 Infrared-ray transmitting window: CaF<sub>2</sub> or sapphire  
 Internal tubing; Teflon tube, silicone tube, Toaron tube

### Gas inlet/outlet, purge gas inlet size:

Rc1/4 (PT1/4 internal thread) or NPT1/4 internal thread

### Purge gas flow rate:

1 $\pm$ 0.5  $\ell$  /min  
 It is necessary to purge the instrument interior when ambient air contains the corrosive gas etc. or the measuring range of CO<sub>2</sub> is less than 0 to 50ppm.

**Scope of delivery:** Analyzer, mounting bracket, test report, power fuse, cloth for cleaning infrared-ray transmitting window

**Mounting method:**

Mounted on 19 inch rack, or flush on panel, or on table top

Remark: 70% or more of the analyzer weight should be supported at the bottom of the case.

(In case of mounting on panel or 19 inch rack, provide a support at the rear of casing).

**Installation conditions:**

Install the analyzer at a place not exposed to direct sunlight or the radiation from a high temperature object. Avoid vibration, and select a clean place free of corrosive and/or combustible gases. If installing outdoor, provide a suitable casing or cover to protect the analyzer from wind, rain, etc.

**Standard type****Measuring system:**

Non-dispersion infrared-ray absorption method, single light source – double beam

**Measurable components and measuring range:**

Standard single-component analyzer

Measurable component	Min. measuring range [ppm]	Measuring range
CO	Carbon monoxide	0 to 100
CO <sub>2</sub>	Carbon dioxide	0 to 50
NO	Nitric oxide	0 to 100
SO <sub>2</sub>	Sulfur dioxide	0 to 100
CH <sub>4</sub>	Methane	0 to 500
CCl <sub>4</sub>	Carbon tetrachloride	0 to 200
N <sub>2</sub> O	Nitrous oxide	0 to 200
CF <sub>3</sub> CHBrCℓ	Halothane	0 to 50
C <sub>2</sub> H <sub>5</sub> FCℓ-OCHF <sub>2</sub>	Ethlone	0 to 50
C <sub>2</sub> H <sub>5</sub> OH	Ethyl alcohol	0 to 250

Refer to table given in page 11

Consult to manufacturer

**Standard two-component analyzer**

Measurable component (1st comp. + 2nd comp.)	Min. measuring range [ppm]	Measuring range
NO+SO <sub>2</sub>	Nitric oxide + sulfur dioxide	0 to 250/0 to 250
CO+CO <sub>2</sub>	Carbon monoxide + carbon dioxide	0 to 200/0 to 200
NO+CO	Nitric oxide + Carbon monoxide	0 to 500/0 to 500
CO <sub>2</sub> +CH <sub>4</sub>	Carbon dioxide + Methane	0 to 100/0 to 1000

Refer to table in page 12

Consult to manufacturer

**Measuring range:** Refer to table in page 11 and 12

**Output signal:** 0 to 1V or 4 to 20mA DC (allowable load resistance 550Ω or less), linear

**Repeatability:** Within ± 0.5% of full scale (Within ± 1% of full scale)\*

**Linearity:** Within ± 1% of full scale

**Zero drift:** Within ± 2% of full scale/week (Within ± 3% of full scale/week)\*

**Span drift:** Within ± 2% of full scale/week (Within ± 3% of full scale/week)\*

**Response time:** 25 seconds max. (for 90% response) including gas substitution time; time differs with the length of sample cell

**Measured gas flow rate:**

0.5 ± 0.25 ℓ /min. (Standard)

Note\*: Shows the value in case of 0 to 50ppm range.

**Sample switching type**

This is an optimum analyzer for measurement of low concentrations or for eliminating the effects of interfering components.

**Measuring system:**

Non-dispersion infrared-ray absorption method, single light source – double beam, sample switching system with integrated zero air generator.

**Measurable component:**

CO (carbon monoxide)

**Measuring range:**

1st range [ppm]	2nd range [ppm]
0 to 10	None, 0 to 20, 25, 50, 100
0 to 25	None, 0 to 50, 100
0 to 50	None, 0 to 100
0 to 100	None

**Output signal:** 0 to 1V or 4 to 20mA DC, linear, step-like output which changes every 50 seconds

**Repeatability:** Within ± 1% of full scale (Within ± 2% of full scale)\*

**Linearity:** Within ± 1% of full scale

**Zero drift:** Within ± 0.5% of full scale/week (Within ± 1% of full scale/week)\*

**Span drift:** Within ± 1.5% of full scale/week (Within ± 2.5% of full scale/week)\*

**Response time:** Within 120 seconds (for 90% response)

**Measured gas flow rate:**

2.0 ± 0.1 ℓ /min.

Note\*: Shows the value in case of 0 to 10ppm range.

**Differential flow type**

This is an optimum gas analyzer for measurement in two modes, absolute concentration and concentration difference.

**Measuring system:**

Non-dispersion infrared-ray absorption method, single light source – double beam, flow differential system with integrated zero air generator for CO.

**Measurable components and measuring range:**

Remark: There are restrictions on the reference gas conditions.

Measurable component	1st range [ppm]	2nd range [ppm]
CO <sub>2</sub>	Carbon dioxide	- 50 to + 50 - 100 to + 100
CO	Carbon monoxide	0 to 500 0 to 1000
		0 to 100 0 to 200 0 to 250
		None, 0 to 200, 250, 500 None, 0 to 500 None, 0 to 500

**Output signal:**

Remark: Linear output

	1st range	2nd range
CO <sub>2</sub>	- 1 to + 1V DC	0 to 1V DC
CO	0 to 1V or 4 to 20mA DC	0 to 1V or 4 to 20mA DC

**Repeatability:** Within ± 0.5% of full scale

**Linearity:** Within ± 1% of full scale

**Zero drift:** Within ± 2% of full scale/week (within ± 2% of full scale/day for 0 to 50ppm range)

**Span drift:** Within ± 2% of full scale/week (within ± 2% of full scale/day for 0 to 50ppm range)

**Response time:** 25 seconds max. (for 90% response) including gas substitution time

**Measured gas flow rate:**

0.5 ± 0.25 ℓ /min. (reference gas)  
0.5 ± 0.25 ℓ /min. (sample gas)

**Optional specifications**

(These are added on request. Refer to the "Code symbols".)

**Filter, flow checker:**

Membrane filter and flow checker are built in.

Remark: The built-in membrane filter is a glass-fiber paper monitoring type. The pre-filter should be prepared separately.

**Pump:**

A small two-throw electromagnetic pump is built in, so sample gas and reference gas can be sampled separately at the same time.

**CO/CO<sub>2</sub> converter (emission level calculation):**

This converter uses a special catalyst for converting efficiently into CO<sub>2</sub> the CO contained in sample gas which is used in the sample switching type etc. The converter is built in the analyzer.

**O<sub>2</sub> correction output (emission levels calculation):**

An exclusive O<sub>2</sub> sensor is used for correcting the measured gas concentration into the value at standard O<sub>2</sub> concentration.

For obtaining the NO<sub>x</sub> and/or SO<sub>2</sub> exhaust standard value, ZRF can measure the NO<sub>x</sub> and/or SO<sub>2</sub> concentration and simultaneously the residual oxygen concentration in exhaust gas, and then correct according to the following equation. (Application of this equation is mandatory for the NO<sub>x</sub> or SO<sub>2</sub> exhaust standard.)

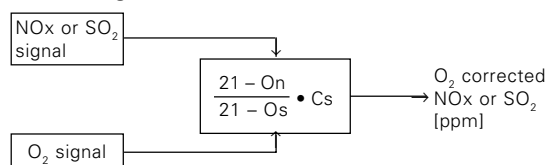
$$C = \frac{21 - O_n}{21 - O_s} \cdot C_s$$

Where, C: concentration after O<sub>2</sub> correction

C<sub>s</sub>: NO<sub>x</sub> or SO<sub>2</sub> measured concentration

O<sub>s</sub>: O<sub>2</sub> measured concentration

O<sub>n</sub>: O<sub>2</sub> standard concentration

**Block diagram**

The O<sub>2</sub> measured signal is according to the exclusive O<sub>2</sub> sensor (type ZFK) or external O<sub>2</sub> meter (0 to 1V DC/0 to 25% O<sub>2</sub>).

**O<sub>2</sub> output signal:**

0 to 1V or 4 to 20mA DC

**O<sub>2</sub> converted output signal:**

0 to 1V or 4 to 20mA DC, linearity ± 2% of full scale; output can be provided for each of 1st and 2nd components

**Alarm output:**

Upper limit alarm;  
Contact output 1c contact  
Contact capacity 250V, 2A AC (resistive load)  
Lower limit alarm;  
Contact output 1c contact  
Contact capacity 250V, 2A AC (resistive load)

**Remote range changeover:**

Range is changeable via external signal.  
Range changeover input signal: 5V DC (minimum range selection at 5V input)

**Range identification signal output:**

Contact output 1a contact  
Contact capacity 250V, 2A AC (resistive load)

**External output hold:**

Output signal is held via external signal.  
Output hold input signal: 5V DC

**Average value output:**

Average or moving average value output is available.

Average value is output every one or four hours.

Moving average value is output every one minutes it is averaged for one or four hours. (When select four hours average output the analyzer has only one average value output.)

Output signal; 0 to 1V or 4 to 20mA DC, linear

**Automatic calibration:**

Zero and span are automatically calibrated at the preset cycle.

Both of calibration gas and electromagnetic valve are not included.

**Calibration channel:**

Up to 3 components can be calibrated simultaneously.

**Zero calibration point:**

Fixed at 0% (Zirconia O<sub>2</sub> meter allows setting zero points)

**Span calibration point:**

0 to 100% full scale

**Calibration start:**

Via built-in timer or remote start signal

**Output hold at calibration:**

Possible

**Calibration gas flow mode:**

- (1) Zero gas
- (2) Zero gas – span gas 1
- (3) Zero gas – span gas 1 – span gas 2
- (4) Zero gas – span gas 1 – span gas 3 (O<sub>2</sub>)
- (5) Zero gas – span gas 1 – span gas 2 – span gas 3 (O<sub>2</sub>)

**Calibration gas flow time:**

Settable from 100 to 599 seconds

**Calibration cycle:**

1 to 99 hours (1-hour step) or 1 to 7 days (1-day step)

**Calibration failure alarm:**

Provided when fault occurs during auto calibration.

**Contact output:**

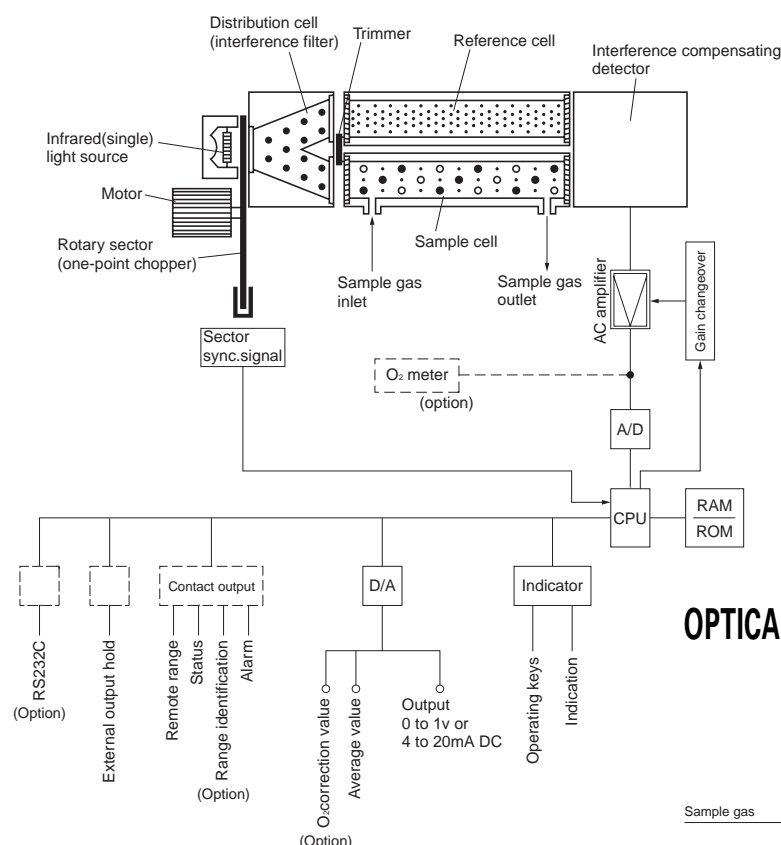
During calibration; 1a contact, contact capacity 250V, 2A AC (resistive load)  
Calibration failure; 1a contact, contact capacity 250V, 2A AC (resistive load)  
Electromagnetic valve drive; 1a contact, contact capacity 250V, 2A AC (resistive load)

**Remote start:** Remote start input signal; 5V DC square signal longer than 100msec. in duration

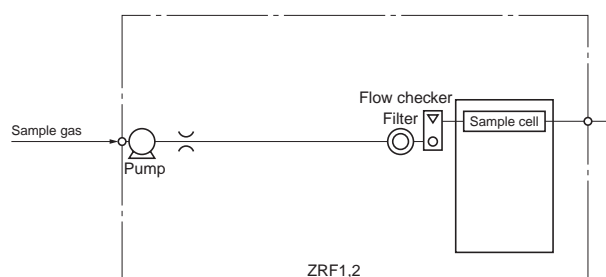
**Communication interface:**

RS232C

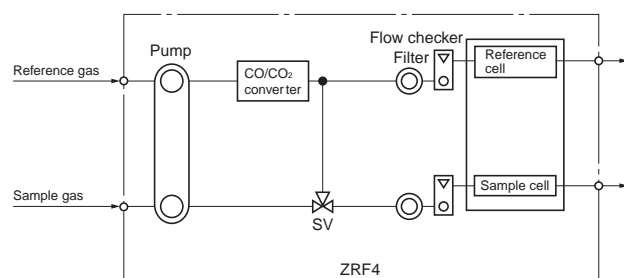
## FUNDAMENTAL DIAGRAM



## OPTICAL SAMPLING SPECIFICATION



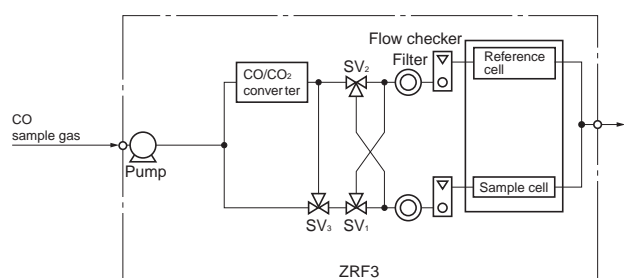
## DESCRIPTION OF DIFFERENTIAL FLOW SYSTEM



In case of carbon monoxide measurement, a high performance converter is provided to convert carbon monoxide into carbon dioxide. Here, the carbon monoxide is eliminated and the gas is led into one cell of the high-sensitivity infrared analyzer. In the other flow path, the gas is led directly into the other cell of the analyzer. The output of analyzer varies with the difference of the concentration of the carbon monoxide between two cells, eliminating the effects of interfering components.

Moreover, zero calibration can be held without zero standard gas, flowing the same reference gas into both reference and sample cell by activating changeover valve.

## DESCRIPTION OF SAMPLE SWITCHING SYSTEM



The measured gas is divided into two, and in one of the flow paths, a high-performance converter is provided to convert carbon monoxide into carbonic acid gas. Here, the carbon monoxide in the measured gas is eliminated and the gas is led into one cell of the high-sensitivity infrared analyzer. In the other flow path, the gas is led directly into the other cell of the analyzer.

These flow paths are changed over via changeover valves SV1 and SV2 every 50 seconds by means of the changeover valve drive signal transmitted from the analyzer. By carrying out this changeover cyclically, the output of the analyzer varies with the concentration of the carbon monoxide in the measured gas. Use of the obtained variation width as a measured value enables improving the S/N ratio and eliminating the effects of interfering components plus zero drift.

# CODE SYMBOLS

## <Standard single-component analyzer>

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21																				
Z	R	F																		
Description																				
<b>Measuring method</b>																				
Single component analyzer																				
<b>Measurable component</b>																				
A																				SO <sub>2</sub>
B																				CO
D																				CO <sub>2</sub>
E																				CH <sub>4</sub>
P																				NO, (NO <sub>x</sub> )
Z																				Other non-standard component
<b>1st component, 1st range</b>																				
A																				0 to 50ppm
B																				0 to 100ppm
C																				0 to 200ppm
D																				0 to 250ppm
E																				0 to 500ppm
F																				0 to 1000ppm
G																				0 to 2000ppm
H																				0 to 5000ppm
J																				0 to 1%
K																				0 to 2%
L																				0 to 5%
M																				0 to 10%
N																				0 to 20%
P																				0 to 50%
R																				0 to 100%
Z																				Other non-standard range
<b>Power supply</b>																				
0																				100VAC 50/60Hz
2																				115VAC 50/60Hz
3																				220VAC 50/60Hz
4																				220VAC 50/60Hz
<b>Piping connection</b>																				
0																				RC1/4
2																				NPT1/4
3																				RC1/4
4																				NPT1/4
<b>Structure/output signal</b>																				
A																				Table-top type
B																				19 inch rack mounting type
C																				Panel mounting type
D																				Table-top type
E																				19 inch rack mounting type
F																				Panel mounting type
G																				Table-top type
H																				19 inch rack mounting type
J																				Panel mounting type
K																				Table-top type
L																				19 inch rack mounting type
M																				Panel mounting type
<b>Optional components</b>																				
Filter, Flowchecker																				
0																				—
1																				○
2																				○
<b>Optional function (1)</b>																				
Auto calibration																				
Y																				—
A																				○
B																				—
D																				○
F																				—
H																				○
K																				○
M																				○
Average value output																				
Y																				—
A																				○
B																				—
D																				○
F																				—
H																				○
K																				○
M																				○
Remote range, Alarm																				
Y																				—
A																				—
B																				—
D																				○
F																				—
H																				○
K																				○
M																				○

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Z	R	F				Y	2	-					-	Y						

[illegible]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Z	R	F					2	-					-							

7

## &lt;Standard dual-component analyzer&gt; (cont'd)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21							
Z	R	F					2	-																			
Description																											
Optional function (2)																											
O <sub>2</sub> indication/ correction Note (11), (13) (external O <sub>2</sub> analyzer connection)							O <sub>2</sub> indication/ correction Note (12), (13) (ZFK connection)							Remote range, Alarm Range identification (for O <sub>2</sub> )													
—							—							—													
○							—							—													
—							○							—													
○							—							○													
—							○							○													
Note(11) Any linearized 0 to 1V DC signal from external O <sub>2</sub> analyzer calibrated 0 to 25 vol% O <sub>2</sub> full scale is acceptable.																											
Note(12) Standard measuring range of O <sub>2</sub> is 0 to 10% and 0 to 25%, double range.																											
Note(13) Emission levels calculated with O <sub>2</sub> value output is available only when O <sub>2</sub> indication is selected.																											
1st component, 2nd range																											
Without 2nd range							Note(14) 2nd range > 1st range Range rate : within 1 : 20																				
Y							0 to 500ppm																				
E							0 to 1000ppm																				
F							0 to 2000ppm																				
G							0 to 5000ppm																				
H							0 to 1%																				
J							0 to 2%																				
K							0 to 5%																				
L							0 to 10%																				
M							0 to 20%																				
N							0 to 50%																				
P							0 to 100%																				
R							Other non-standard range																				
Z																											
2nd component, 2nd range																											
Without 2nd range							Note(15) 2nd range > 1st range Range rate : within 1 : 20																				
Y							0 to 500ppm																				
E							0 to 1000ppm																				
F							0 to 2000ppm																				
G							0 to 5000ppm																				
H							0 to 1%																				
J							0 to 2%																				
K							0 to 5%																				
L							0 to 10%																				
M							0 to 20%																				
N							0 to 50%																				
P							0 to 100%																				
R							Other non-standard range																				
Z																											
Average value output time																											
Without																											
0																											
1							1-hour moving average value output																				
4							4-hours moving average value output																				
Z							Other non-standard items																				
Average value output																											
1st component							2nd component																				
Instantaneous value							O <sub>2</sub> correction							Instantaneous value							O <sub>2</sub> correction						
Without							Without							Without							Without						
Y							○							—							—						
A							○							—							—						
B							○							—							○						
C							○							—							—						
D							—							○							—						
E							—							○							—						
F							—							○							—						
G							—							—							○						
H							—							—							○						
O <sub>2</sub> standard value for emission leveles calculation																											
None							Note(16) O <sub>2</sub> value must be informed for designation of "Z".																				
Y							4%																				
4							5%																				
5							6%																				
6							7%																				
7							10%																				
A							11%																				
B							12%																				
C							15%																				
F							Other non-standard items (speify within 0 to 19%)																				
Z																											
Kind of measuring gas																											
EY							Atmospheric gas							Note(17) Sample gas components must be informed for designation of "Z".													
FY							Flue gas																				
GY							Converter exhaust gas																				
ZZ							Other non-standard items																				
Non-standard spec.																											
Z							Note(18) Quick response type is available only 0 to 20% range or more.																				
A							Other non-standard items																				
							Quick response																				



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
Z	R	F				Y	2	-					-	Y	O	Y	Y			-	

Note(19) Sample gas components must be informed for designation of "Z".

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
Z	R	F				Y	2	-					-		Y	0	Y	Y		-	

Measuring method		Description	
Differential flow system			
Measurable component		1st range	
CO <sub>2</sub> (Carbon dioxide)		350 ± 50ppm 350 ± 100ppm	
CO (Carbon monoxide)		0 to 100ppm 0 to 200ppm 0 to 250ppm	
Power supply		Piping connection	
100VAC 50/60Hz		RC1/4	
115VAC 50/60Hz		NPT1/4	
220VAC 50/60Hz		RC1/4	
220VAC 50/60Hz		NPT1/4	
Structure/output signal			
Table-top type		0 to 1V DC	
19 inch rack mounting type		0 to 1V DC	
Panel mounting type		0 to 1V DC	
Table-top type		4 to 20mA DC	
19 inch rack mounting type		4 to 20mA DC	
Panel mounting type		4 to 20mA DC	
Table-top type		0 to 1V DC	RS232C
19 inch rack mounting type		0 to 1V DC	RS232C
Panel mounting type		0 to 1V DC	RS232C
Table-top type		4 to 20mA DC	RS232C
19 inch rack mounting type		4 to 20mA DC	RS232C
Panel mounting type		4 to 20mA DC	RS232C
Note(20) When the 5th and 6th digit are "DQ" or "DS", the output is available only voltage output. (1st range:-1V to 1V, 2nd range:0 to 1V)			
Optional components			
Filter, Flowchecker	Pump	CO/CO <sub>2</sub> converter	Note (21)
—	—	—	} Available only for 5th digit "D"
○	—	—	
○	○	—	
○	—	○	} Available only for 5th digit "B"
○	○	○	
Optional function (1)			
Auto calibration	Remote range, Alarm Range identification, External hold		
—	—		
—	○		
○	—		
○	○		
2nd range			
Without			
200ppm (Available only for 1st range CO 0 to 100ppm)			
250ppm (Available only for 1st range CO 0 to 100ppm)			
500ppm (Not available for 1st range CO <sub>2</sub> ±100ppm)			
1000ppm (Available only for 1st range CO <sub>2</sub> ±100ppm)			
Kind of measuring gas			
Atmospheric gas		Note(22) Sample gas components must be informed for designation of "Z".	
Other non-standard items			
Non-standard spec.			
Other non-standard items			

# NDIR TYPE INFRARED GAS ANALYZER

(Standard single-component analyzer measuring ranges)

Measurable component	2nd range	1st measuring range														
		50ppm	100ppm	200ppm	250ppm	500ppm	0.1%	0.2%	0.5%	1%	2%	5%	10%	20%	50%	100%
CO	x 0	—	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	x 2	—	○	○	○	○	○	○	○	○	○	○	○	○	○	—
	x 2.5	—	○	○	○	○	○	○	○	○	○	○	○	○	—	—
	x 4	—	○	○	○	○	○	○	○	○	○	○	○	○	—	—
	x 5	—	○	○	○	○	○	○	○	○	○	○	○	—	—	—
	x 8	—	○	○	○	○	○	○	○	○	○	○	—	—	—	—
	x 10	—	○	○	○	○	○	○	○	○	○	○	—	—	—	—
CO <sub>2</sub>	x 20	—	○	○	○	○	○	○	○	○	○	○	—	—	—	—
	x 0	—	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	x 2	—	○	○	○	○	○	○	○	○	○	○	○	○	○	—
	x 2.5	—	○	○	○	○	○	○	○	○	○	○	○	○	—	—
	x 4	—	○	○	○	○	○	○	○	○	○	○	○	○	—	—
	x 5	—	○	○	○	○	○	○	○	○	○	○	○	○	—	—
	x 8	—	○	○	○	○	○	○	○	○	○	○	○	—	—	—
NO	x 10	○	○	○	○	○	○	○	○	○	○	○	○	—	—	—
	x 20	○	○	○	○	○	○	○	○	○	○	○	—	—	—	—
	x 0	△	○	○	○	○	○	○	△	—	—	—	—	—	—	—
	x 2	△	○	○	○	○	○	○	△	—	—	—	—	—	—	—
	x 2.5	△	○	○	○	○	○	△	—	—	—	—	—	—	—	—
	x 4	△	○	○	○	○	△	—	—	—	—	—	—	—	—	—
	x 5	△	○	○	○	○	△	—	—	—	—	—	—	—	—	—
SO <sub>2</sub>	x 8	△	○	○	○	△	—	—	—	—	—	—	—	—	—	—
	x 10	△	○	○	○	△	—	—	—	—	—	—	—	—	—	—
	x 20	△	○	○	○	△	—	—	—	—	—	—	—	—	—	—
	x 0	△	○	○	○	○	○	○	○	○	○	○	○	—	—	—
	x 2	△	○	○	○	○	○	○	○	○	○	○	—	—	—	—
	x 2.5	△	○	○	○	○	○	○	○	○	○	○	—	—	—	—
	x 4	△	○	○	○	○	○	○	○	○	○	○	—	—	—	—
CH <sub>4</sub>	x 5	△	○	○	○	○	○	○	○	○	○	—	—	—	—	—
	x 8	△	○	○	○	○	○	○	○	○	—	—	—	—	—	—
	x 10	△	○	○	○	○	○	○	○	○	—	—	—	—	—	—
	x 20	△	○	○	○	○	○	○	○	—	—	—	—	—	—	—
	x 0	—	—	△	△	○	○	○	○	○	○	○	○	○	○	○
	x 2	—	—	△	△	○	○	○	○	○	○	○	○	○	○	—
	x 2.5	—	—	△	△	○	○	○	○	○	○	○	○	○	○	—
	x 4	—	—	△	△	○	○	○	○	○	○	○	○	○	—	—
	x 5	—	—	△	△	○	○	○	○	○	○	○	○	○	—	—
	x 8	—	—	△	△	○	○	○	○	○	○	○	○	—	—	—
	x 10	—	—	△	△	○	○	○	○	○	○	○	—	—	—	—
	x 20	—	—	△	△	○	○	○	○	○	○	—	—	—	—	—

Remarks: (1) ○ : standard measuring range  
 (2) △ : Consult with us regarding capability of manufacture, price and delivery period.  
 (3) — : outside of manufacturing range.

## (Standard dual-component analyzer measuring ranges)

Combination of 1st, 2nd measurable components, measuring ranges:

Manufacture is possible as non-standard specifications even for some items not given in the table, so please consult to us and our distributor.

NO	250 ppm	500 ppm
SO <sub>2</sub>	○	○
250ppm	○	○
500ppm	○	○

NO	500 ppm	1000 ppm
CO	○	○
500ppm	○	○
1000ppm	○	○

Remarks: (1) ○ : available range for 1st measuring range.  
Up to 1:20 possible for 2nd range.  
(Max. 2000ppm for NO analyzer)

Garbage application

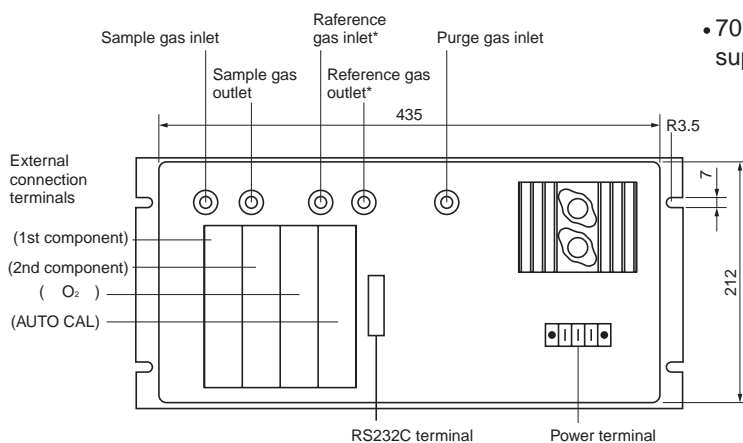
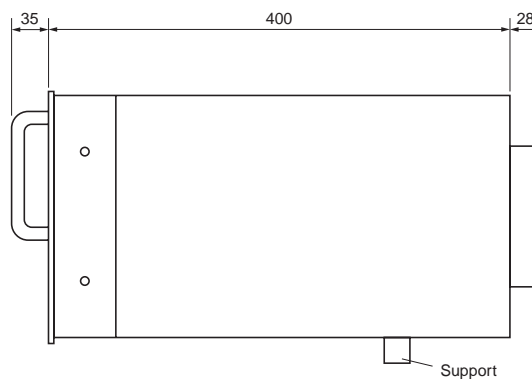
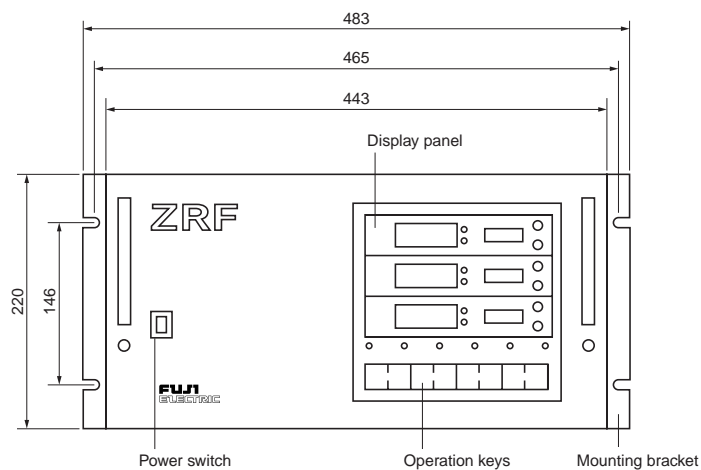
( CO<sub>2</sub>: 0 to 50%  
CH<sub>4</sub>: 0 to 80%

CO	200 ppm	250 ppm	500 ppm	0.1 %	0.2 %	0.5 %	1 %	2 %	5 %	10 %	20 %	50 %	100 %
CO <sub>2</sub>	○	○	○	○	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
200ppm	○	○	○	○	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
250ppm	○	○	○	○	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
500ppm	○	○	○	○	○	○	○	○	○	○	○	○	○
0.1%	⊗	⊗	⊗	○	○	○	○	○	○	○	○	○	○
0.2%	⊗	⊗	⊗	○	○	○	○	○	○	○	○	○	○
0.5%	⊗	⊗	⊗	○	○	○	○	○	○	○	○	○	○
1%	⊗	⊗	⊗	○	○	○	○	○	○	○	○	○	○
2%	⊗	⊗	⊗	○	○	○	○	○	○	○	○	○	○
5%	⊗	⊗	⊗	○	○	○	○	○	○	○	○	○	○
10%	⊗	⊗	⊗	○	○	○	○	○	○	○	○	○	○
20%	⊗	⊗	⊗	○	○	○	○	○	○	○	○	○	○
50%	⊗	⊗	⊗	○	○	○	○	○	○	○	○	○	○
100%	⊗	⊗	⊗	○	○	○	○	○	○	○	○	○	○

Remarks: (1) ○ : available range for 1st measuring range.

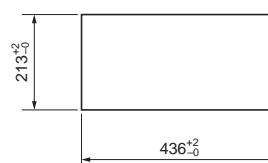
(2) ⊗ : available range for 2nd measuring range (max. range) for CO and CO<sub>2</sub>.

## OUTLINE DIAGRAM (Unit:mm)



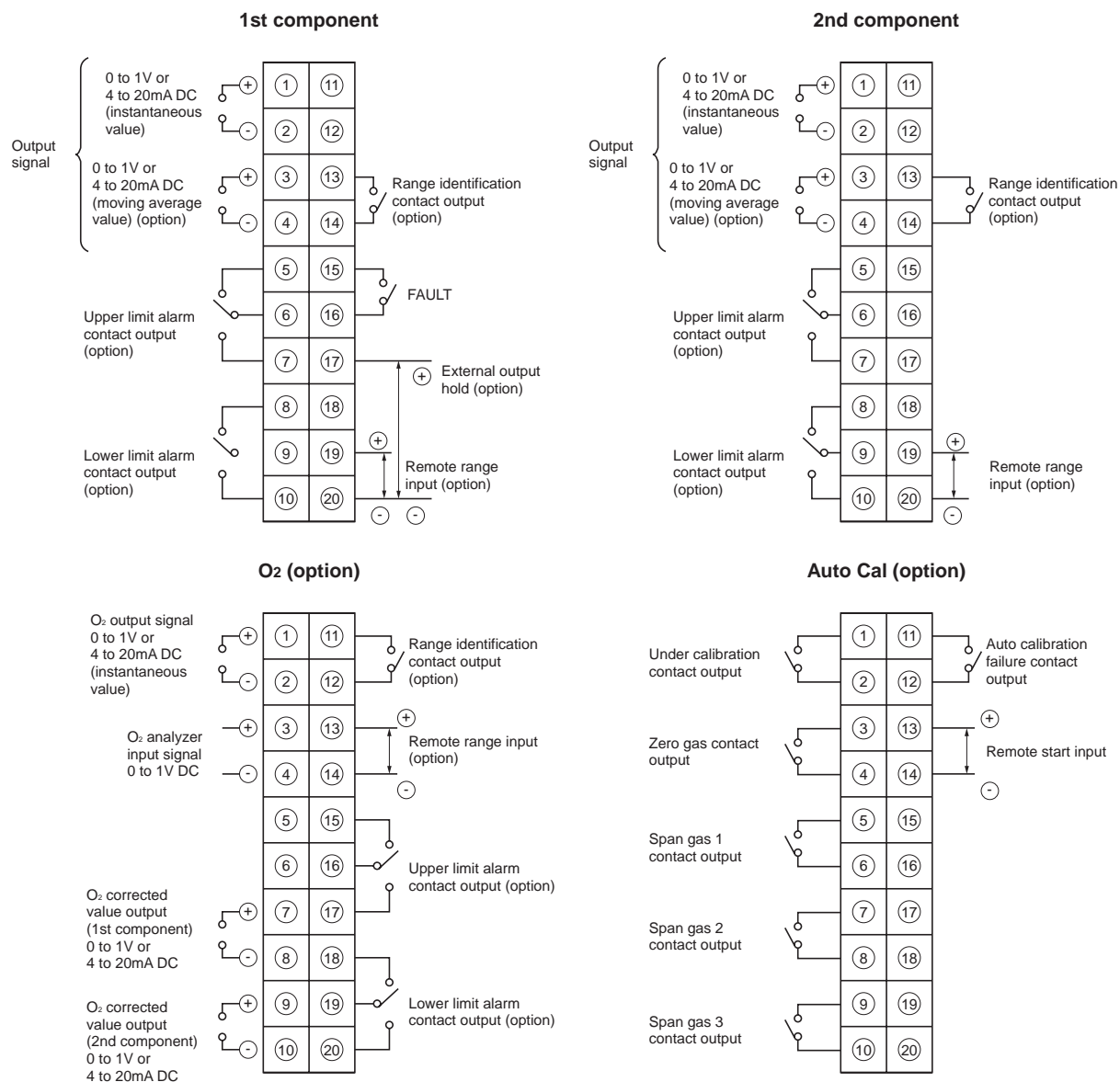
• 70% or more of instrument mass (weight) should be supported at bottom of case.

### Panel cutout dimensions (in case of panel flush mounting)



< Rear view >

## EXTERNAL CONNECTION DIAGRAM



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

For O<sub>2</sub> correction, the gas analyzer ZRF can accept linealized 0 to 1V DC signal coming from analyzer calibrated 0 to 25% O<sub>2</sub> full scale. If the analyzer is not available, Fuji can supply exclusive Zirconia O<sub>2</sub> sensor Model ZFK3.

### Measuring method:

Zirconia system

### Measurable component and measuring range:

Measurable component	1st range	2nd range
O <sub>2</sub>	Oxygen	0 to 10vol%
		0 to 25vol%

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

**Linearity:** Within  $\pm 2\%$  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  $\ell$  /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 sensor.

### Gas inlet/outlet size:

Rc1/4

**Power supply:** 90 to 126V AC or 200 to 240V AC, 50/60Hz

**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):**

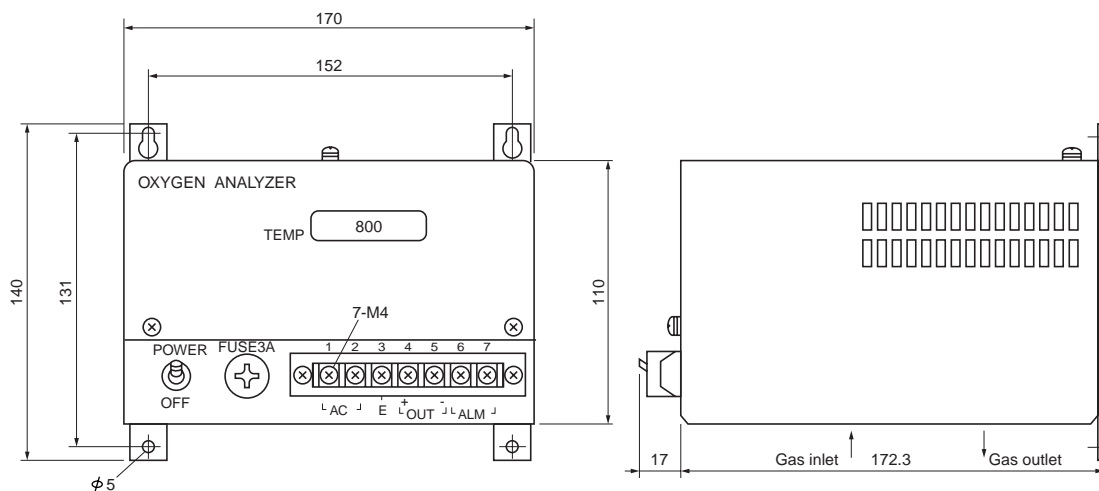
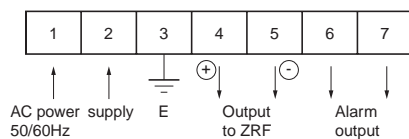
140 x 170 x 190mm

Mass {weight}: Approx. 3kg

Finish color: Munsell 5Y 7/1

**CODE SYMBOLS**

1	2	3	4	5	6	7	8	9	Description
Z	F	K	3	Y	Y	3	-	1	
				3	Y	Y			
				1					Measuring method
				3					Zirconia method
				1					Power supply
				3					90 to 126V AC 50/60Hz
				3					200 to 240V AC 50/60Hz

**OUTLINE DIAGRAM (Unit:mm)****EXTERNAL CONNECTION DIAGRAM**

The product conforms to the requirements of the Electromagnetic compatibility Directive 89/336/EEC as detailed within the technical construction file number TZ734577. The applicable standards used to demonstrate compliance are :

EN 50081-1 : 1992 Conducted and Radiated emissions

EN 50082-1 : 1992 Radiated immunity, ESD and FBT

⚠ Caution on Safety

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

ZRF

**Fuji Electric Systems Co., Ltd.**

**Head office**

6-17, Sanbancho, Chiyoda-ku, Tokyo 102-0075, Japan  
<http://www.fesys.co.jp>

**Fuji Electric Instruments Co., Ltd.**

**Sales Div.****International Sales Dept.**

No.1, Fuji-machi, Hino-city, Tokyo, 191-8502 Japan  
Phone: 81-42-585-6201, 6202  
Fax: 81-42-585-6187  
<http://www.fic-net.co.jp>