

# MICROPROCESSOR BASED NDIR GAS ANALYZER

### DATA SHEET I

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  $O_2$  sensor (ZFK3) or other  $O_2$  meter enables output of an  $O_2$  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. RS232C port available (option).
- (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  $O_2$  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 ±10%, 50/60Hz Power consumption:

125VA max. (220VA max. when  $\rm CO/CO_2$  converter equipped)

Ambient temperature:

−5 to +45°C

Ambient humidity: 90%RH or less

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Enclosure: Steel casing, for indoor application
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Outer dimensions ( $H \times W \times D$ ): 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 4 digit LED for concentration Indication: 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 (due point of water vapor; less than 2°C) Dust; less than 0.3µm Pressure; less than 9.8kPa Standard adjustment: Calibration gas; Dry N2 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, 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+0.5 l /min It is necessary to purge the instrument interior when ambient air contains the corrosive gas etc. or the measuring range of  $CO_2$  is less than 0 to 50ppm. Scope of delivery: Analyzer, mounting bracket, test report, power fuse, cloth for cleaning infrared-ray transmitting window

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ZRF

#### Mounting method:

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

#### 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.

2nd range [ppm]

None, 0 to 100

None

0 to 1V or 4 to 20mA DC, linear, step-like

output which changes every 50 seconds

Within  $\pm$  1% of full scale

Within  $\pm$  1% of full scale

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

2.0 ± 0.1 ℓ /min.

Within  $\pm$  0.5% of full scale/week

Within ± 1.5% of full scale/week

None, 0 to 50, 100

None, 0 to 20, 25, 50, 100

#### Measurable component:

Measuring range:

Output signal:

Repeatability:

Linearity:

Zero drift:

Span drift:

CO (carbon monoxide)

1st range [ppm]

0 to 10

0 to 25

0 to 50

0 to 100

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

Remark: 70% or more of the analyzer weight

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 com	ponent	Min. measuring range [ppm]	Measuring range
CO CO <sub>2</sub> NO SO <sub>2</sub> CH <sub>4</sub> CC ℓ <sub>4</sub> N <sub>2</sub> O CF <sub>3</sub> CHBrC ℓ C <sub>2</sub> H <sub>5</sub> C ℓ -OCHF <sub>2</sub> C <sub>2</sub> H <sub>5</sub> OH	Carbon monoxide Carbon dioxide Nitric oxide Sulfur dioxide Methane Carbon tetrachloride Nitrous oxide Halothane Ethlane Ethlyl alcohol	0 to 100 0 to 50 0 to 100 0 to 100 0 to 500 0 to 200 0 to 200 0 to 50 0 to 50 0 to 50 0 to 250	Refer to table given in page 11 Consult to manufacturer

#### Standard two-component analyzer

Measurab (1	le component st comp. + 2nd comp.)	Min. measuring range [ppm]	Measuring range		
NO+SO <sub>2</sub>	Nitric oxide + sulfur dioxide	0 to 250/0 to 250	1		
CO+CO <sub>2</sub>	Carbon monoxide + carbon dioxide	0 to 200/0 to 200	Refer to table in		
NO+CO	Nitric oxide + Carbon monoxide	0 to 500/0 to 500	page 12		
CO <sub>2</sub> +CH <sub>4</sub>	Carbon dioxide + Methane	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 550 $\Omega$ or less), linear									
Repeatability:	Within $\pm$ 0.5% of full scale									
Linearity:	Within ± 1% of full scale									
Zero drift:	Within ± 2% of full scale/week									
Span drift:	Within $\pm$ 2% 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)

### Differential flow type

Measured gas flow rate:

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.

Meas comp	urable ponent	1st range [ppm]	2nd range [ppm]						
CO <sup>5</sup>	Carbon dioxide	- 50 to + 50 - 100 to + 100	0 to 500 0 to 1000						
CO	Carbon monoxide	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:

	1st range		2nd range							
CO <sub>2</sub>	- 1 to + 1V [	C	0 to 1V DC							
СО	0 to 1V or 4	to 20mA DC	0 to 1V or 4 to 20mA DC							
Repe	atability:	Within ± 0.5%	% of full scale							
Linea	rity:	Within ± 1%	of full scale							
Zero	drift:	Within ± 2%	of full scale/week (wihtin							
		$\pm$ 2% of full scale/day for 0 to 50ppm								
		range)								
Span	drift:	With in $\pm$ 2% of full scale/week (within								
		$\pm$ 2% of full scale/day for 0 to 50ppm								
		range)								
Resp	onse time:	25 seconds i	max. (for 90% response)							
		including gas	including gas substitution time							
Meas	ured gas fl	ow rate:								
		$0.5\pm0.25\ell$ /min. (reference gas)								
		$0.5\pm0.25~\ell$ /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 prefilter 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  $CO_2$  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  $O_2$  sensor is used for correcting the measured gas concentration into the value at standard  $O_2$  concentration.

For obtaining the NOx and/or  $SO_2$  exhaust standard value, ZRF can measure the NOx and/or  $SO_2$  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 NOx or  $SO_2$  exhaust standard.)

$$C = \frac{21 - On}{21 - Os} \bullet Cs$$

Where, C: concentration after  $\rm O_2\ correction$ 

Cs: NOx or SO<sub>2</sub> measured concentration

 $Os: O_2$  measured concentration  $On: O_2$  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>).

#### $O_2$ output signal:

	0 to 1V or 4 to 20m	NA DC									
O <sub>2</sub> converted out	tput signal:										
-	0 to 1V or 4 to 20mA DC, linearity $\pm$ 2 of full scale; output can be provided each of 1st and 2nd components										
Alarm output:	Upper limit alarm;										
	Contact output Contact capacity tive load)	1c contact 250V, 2A AC (resis									
	Lower limit alarm; Contact output Contact capacity tive load)	1c contact 250V, 2A AC (resis									

#### 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
- $(O_2)$
- (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 (resis-
- tive load)
- Remote start: Remote start input signal; 5V DC square signal longer than 100msec. in duration Communication interface:

RS232C

### FUNDAMENTAL DIAGRAM



# DESCRIPTION OF DIFFERENTIAL FLOW SYSTEM



# DESCRIPTION OF SAMPLE SWITCHING 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 othe 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.

ZRF1,2

Sample cell

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.

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	78	9	10.1	1 12	13	14 15 1	6171	8 19 20		21	(									
ZRF		Y 2	-			[	Y			] - L			Descript	on							
												Measuring method									
	1			+								Single component analyz	er								
L												Measurable component	ł								
	A											SO <sub>2</sub>									
	В											со									
	D	+										CO <sub>2</sub>									
	E											CH₄									
	P											NO, (NOx)									
	Z											- Other non-standard component									
												1st component, 1st ran	ne								
	A											0 to 50ppm	Noto/1), Doford	a table in page 11 for manauring range							
	B				+							0 to 100ppm	Note(1). Neter 1	o table in page 11 for measuring range							
	C				+-+							0 to 200ppm									
	C				+							0 to 250ppm									
	E				+							0 to 500ppm									
	F				+							0 to 1000ppm									
	G.				t-i							0 to 2000ppm									
	F																				
	J											0 to 1%									
												0 to 5%									
	N											0 to 10%									
												0 to 20%									
	F											0 to 50%									
	F				÷							0 to 100%									
	Z				+							Other non-standard range	e								
					11							Power supply	Piping connection								
			0									100VAC 50/60Hz	RC1/4								
			2									115VAC 50/60Hz	NPT1/4								
			3									220VAC 50/60Hz	RC1/4								
			4									220VAC 50/60Hz	NPT1/4								
												Structure/output signal									
				A-	+							Table-top type	0 to 1V DC								
				B								19 inch rack mounting ty	pe 0 to 1V DC								
				C -	÷							Panel mounting type	0 to 1V DC								
				D-	$\left\{ - \right\}$							Table-top type	4 to 20mA DC								
				E-	1-1							19 inch rack mounting ty	pe 4 to 20mA DC								
				F -	1-1							Panel mounting type	4 to 20mA DC	200000							
												10 inch rock mounting to		N3232U R\$2220							
				<u> </u>  -								Panel mounting ty		N32320 R\$2320							
				<sub>k</sub> []								Table-top type	$4 \text{ to } 20\text{ m} \Delta \text{ DC}$	R\$232C							
				11.								19 inch rack mounting tv	be 4 to 20mA DC	R\$232C							
				M								Panel mounting type	4 to 20mA DC	RS232C							
				ᠲ	Ħ							Ontional components									
												Filter, Flowchecker	Pump								
				lo	ı⊧-i								<u> </u>								
				1								0	_								
				2	+							· 0	0								
				L	H							Ontingent for starting									
												Optional function (1)		Romoto rango Alarm							
														Range identification. External hold							
					<sub>Y</sub>							-	-	-							
					À							0	_	_							
					В							-	0	_							
					D								_	0							
					F							0	0	-							
					Н							0	-	0							
					K							-	0	0							
					M							0	0	0							
												1									

### <Standard single-component analyzer> (cont'd)

1 2 3 4 5 6 7 8 9 10 11 12	213	14	1516	617	1819	20	21	1	[						
Z R F Y 2 -		-	Y				- L			Desc	ription				
							1	1	Optional function (2)						
								1	O2 indication/	O2 indic	cation/	Remote range, Alarm			
				į.				į.	correction Note (2), (4)	correct	ion Note (3), (4)	Range identification			
				ł.			ł	ļ.	(external O <sub>2</sub> analyzer connection)	(ZFK co	nnection)	(for O <sub>2</sub> )			
	Y		÷+-	1	+			<u> </u>	_		-	-			
	A		++++	+	+		-+-		0		-	-			
	В		1-1-	1	+		- + -		-		0	-			
	C		11	1				1	0		-	0			
	ט			+							0	0			
				ł.				Į.	Note(2) Any linearized 0 to 1V DC	signal from	n external O2 analyz	zer calibrated 0 to 25			
								1	vol% O2 full scale is accep	table.					
									Note(3) Standard measuring range	of O2 IS 0	to 10% and 0 to 2	5%, double range.			
									Note(4) Emission levels calculated	with O <sub>2</sub> va	alue output is availa	able only when O2			
		-	÷÷	÷		+	÷	-	indication is selected.						
				ł.				Ì.	1st component, 2nd range						
		ľ	,				1		0 to 100ppm	Note(5)	Refer to table in pa	ge 11 for measuring			
											range				
				]			].	[	0 to 200ppm		2nd range > 1st rar	nge			
		F		Į.			1.	ļ	0 to 500ppm		Range ratio : withir	n 1 : 20			
		F	<u> </u>			‡		¦	0 to 1000ppm						
		G	j					ļ	0 to 2000ppm						
		H	<u> </u>  - -			+			0 to 5000pppm						
		J		÷.		į		į	0 to 1%						
		K				¦		÷	0 to 2%						
		L		÷		÷			0 to 5%						
		M	1+-			+			0 to 10%						
		N	$\frac{1}{1}$	+		+		÷	0 to 20%						
		P	+-+-			†		÷	0 to 50%						
		R		÷		+		<u> </u>	0 to 100%						
		2				÷			Other non-standard range						
								1	Average value output time						
			0	)					Without						
			1			-1			1-hour moving average value outp	ut					
			4	·				+	4-hours moving average value out	out					
			Ľ			- i	÷	<u>;</u>	Other non-standard items						
								1	Average value output						
								1	1st component						
							ł	Į.	Instantaneous value O2 co	rrection					
				Y		}		<u> </u>	-	-					
				A		;			0	-					
				P						0					
								1	O2 standard value for emission I	eveles cal	culation (O2 corre	ction)			
					Y				None	Note(6)	O2 value must be	informed for designation			
					4			į	4%	100000	of "Z".				
					5		-+-		5%						
					6		-+-	<u> </u>	6%						
					7				7%						
					A	- †		<u> </u>	10%						
					B			 	11%						
					C		-t-	 	12%						
											100()				
					21-1				other non-standard items (speify v	vitnin U to	1370)				
					_			1	Kind of measuring gas						
					E	Yŀ			Atmospheric gas	Note(7)	Sample gas comp	onents must be informed			
				FY			1	1	Hue gas		for designation of	"Z".			
					G Z	r   7	1		Converter exhaust gas						
					L 2.	4 [		i	Other non-standard items						
									Non-standard spec.						
							Z		Other non-standard items						
							Α		Quick response Note(8) Quick resp	oonse type	e is available only 0	to 20% range or more.			

### <Standard dual-component analyzer>

ZRF 2-011				De	scription
		Measuring meth	od		
2		Neasurable com	nalyzer		
F		NO (NOx) $+$ SO <sub>2</sub>	ponent		
G		$CO + CO_2$			
Z		Other non-standar	rd componen <sup>.</sup>	ts	
		1st component, <sup>2</sup>	lst range		
C		0 to 200ppm	-	Note(9	) Refer to table in page 12 for measuring range
D		0 to 250ppm 0 to 500ppm			
F		0 to 1000ppm			
G		0 to 2000ppm			
J		0 to 1%			
К		0 to 2%			
M		0 to 5% 0 to 10%			
N		0 to 20%			
P		0 to 50%			
Z		Other non-standar	rd range		
		2nd component,	1st range		
C		0 to 200ppm	, e		
D		0 to 250ppm			
F		0 to 1000ppm		N	
G		0 to 2000ppm		Note(1	<ul> <li>Neter to table in page 12 for measuring range</li> </ul>
H		0 to 5000ppm 0 to 1%			
К		0 to 2%			
		0 to 5%			
N		0 to 20%			
P		0 to 50%			
R		0 to 100% Other non-standa	rd range		
		Power supply	Pipin	ng connecti	on
0		100VAC 50/60Hz	RC1/	4	
2		115VAC 50/60Hz	NPT1 BC1/	1/4 /4	
4		220VAC 50/60Hz	NPT1	- I/4	
		Structure/output	signal		
A		Table-top type	(	0 to 1V DC	
C		Panel mounting ty	rting type (	0 to 1V DC	
D		Table-top type		4 to 20mA	00
Et-i Et-i		19 inch rack mour Panel mounting to	nting type	4 to 20mA   4 to 20mA	
G		Table-top type	(	0 to 1V DC	RS232C
H		19 inch rack mour	nting type	0 to 1V DC	RS232C
		Table-top type	,he (	4 to 20mA	DC RS232C
	 	19 inch rack mour	nting type	4 to 20mA	DC RS232C
		Panel mounting ty	vhe v	4 to 20mA	JU KSZ3ZU
		Filter, Flowched	ients sker P	Pump	
0-		-		-	
1-				-	
		Optional function	ייייי ו (1)		
		Auto calibration	Average val	ue Re	mote range, Alarm
	γ		output –	Ra	nge identification, External hold
	A	0	-		-
	C  F		0		-
		0	0		-
	J	0	-		0
	N	0	0		0
	1		-		

<standard dual-com<="" th=""><th>npon</th><th>ent</th><th>tana</th><th>alyz</th><th>er&gt; (cont'd)</th><th></th><th></th><th></th></standard>	npon	ent	tana	alyz	er> (cont'd)									
1 2 3 4 5 6 7 8 9 10 11 12 13	14 15 1	6 17 18	3 19 20	21			Description							
		++-	+	H	Optional function (2)		Description							
					O2 indication/		O2 indication/	Remote range, Alarm						
					correction Note (11), (13	)	correction Note (12), (13)	Range identification						
					(external O2 analyzer con	nnection)	(ZFK connection)	(for O <sub>2</sub> )						
Y⊧	-++-	·	+	+	-		-	-						
A- B-				+	0		-	-						
C-			ļ	4.4	- 0		-	0						
D-				+			0	0						
					Note(11) Any linearized vol% O2 full so Note(12) Standard mea: Note(13) Emission level indication is so	0 to 1V DC cale is accept suring range ls calculated elected.	signal from external O2 anal otable. e of O2 is 0 to 10% and 0 to I with O2 value output is ava	yzer calibrated 0 to 25 25%, double range. ilable only when O2						
	Y E G H L M N P R Z				Without 2nd range 0 to 500ppm 0 to 1000ppm 0 to 2000ppm 0 to 5000ppm 0 to 5000ppm 0 to 1% 0 to 2% 0 to 5% 0 to 5% 0 to 10% 0 to 20% 0 to 50% 0 to 100% 0 to 100% Other non-standard range	e	Range rate :	within 1 : 20						
					2nd component, 2nd ra	ange	Note(15) 2nd range >	1st range						
				+	- Without 2nd range		Range rate :	within 1 : 20						
	E -				- 0 to 1000ppm									
	G	+-+-			0 to 2000ppm									
	H-	+ + + + + + + + + + - + − − 0 to 5000ppm J - + - + - + - + - + - + - + - − 0 to 1%												
				+	) to 1%									
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	M				0 to 10%									
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	P	1-1-		+	- 0 to 50%									
	7				- 0 to 100% - Other non-standard rand	ie								
	4													
		) 	ļļ.	<u> </u>	- Without	line								
	1			+-+	1-hour moving average	1-hour moving average value output								
	4	1		+-+	4-hours moving average value output									
	Z	<u></u>		+-+	Other non-standard item	IS								
					Average value output									
					1st compone	nt Os sorrasti	2nd cor							
		$ \gamma $	ļļ.		Without	Without	Without	Without						
		A-	+		0	-	-	-						
		B	+		0	-	0	-						
		C			0	-	-	0						
					_	0		_						
		F-	¦¦-			0	-	0						
		G	÷		. –	-	0	-						
		H	+		-	-	-	0						
		4			O2 standard value for e	mission lev	veles calculation							
		Y		·	- None		Note(16) O2 value must be	informed for designation						
		4			- 4%		of "Z".							
		5			- 5%									
		7			- 7%									
		Á			- 10%									
		В	<u>}</u> †-		- 11%									
			<u> </u>	11-	12%									
					- Other non-standard item	ıs (speifv wi	thin 0 to 19%)							
		4	+		Kind of measuring care									
			EY -		Atmospheric das		Noto(17) Sample and activ	ononte must be informe -						
			FY		Flue gas		for designation of	"7"						
			GY		Converter exhaust gas		for designation of							
			ZZ -	+	Other non-standard item	IS								
					Non-standard spec.		Note(18) Quick response to	pe is available only						
				A	Quick response	15	0 to 20% range o	r more.						

### <Sample switching system>

1234	15	67	8		9	10	111	213	3	14	151	161	71	8 1	920	)	21												
ZRF		Y	2	-					-		Y	0	Y١	1		-						D	escript)	tion					
									į.					÷.					Measuring m	ethod									
3	3		÷			-+		- <u>+</u> -	÷						+-	<u> </u>			Sample switching system										
	B																		Measurable c	ompo	nent								
	Z				}	·-ł		÷	÷-	<u> </u>	r-†-				÷	÷			Other non-standard components										
		v																	1st range 0 to 10ppm										
		тŀ·	į		i			. į	÷-	<u>.</u>		-÷-		- <del> </del> -	÷				0 to 25ppm										
		A-					·	·	÷										0 to 50ppm										
		B	<u> </u>			÷	÷	1	Ť	t	r-h			+-	1	÷	- 1		0 to 100ppm	0 to 100ppm									
		Zŀ	<u>†</u>						ţ.	브	<u></u> ;	-†-			1				Other non-star	ndard i	tems								
					0 2 3								- + -				4		Power supply 100VAC 50/60 115VAC 50/60 220VAC 50/60	r IHz IHz IHz	Pij RC NF RC	<b>ping connec</b> C1/4 PT1/4 C1/4	tion						
					4	-+			÷					÷	÷-	÷			220VAC 50/60	Hz	NF	PT1/4							
						A B C D	- 4 -		· · · · · · · · · · · · · · · · · · ·	41 41 41	+								Structure/out Table-top type 19 inch rack m Panel mountin Table-top type	put sig nountin ng type	gnal Ig type	0 to 1V D0 0 to 1V D0 0 to 1V D0 4 to 20mA							
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						ĸ-			Ļ.				÷	÷-	÷	ļ			Table-top type	3 .//		4 to 20mA	A DC	RS232C					
						L			+-					÷-					19 inch rack m	nountin	ig type	4 to 20mA	A DC	RS232C					
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								1	1			÷	1	1	ł	1			Optional com	poner	nt								
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														ł	ł				Auto calibra	tion	Ren	note range, A	Alarm						
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										Ν	<u>⊦</u> -∔-			į.		ļ			50ppm	100p	pm	Without							
										P	r-+-					÷	25ppm 50ppm 100ppm												
										Z	ct			-		¦			Other non-star	ndard r	ange		_						
	Kind of measuring gas													Sample gas components must be informed															
														E	Y	<u></u>			Atmospheric g	jas		INC	76(19)	for designation of "7"					
														Z	Z	<u> </u>			Other non-star	ndard i	tems								
																	Z		Non-standard Other non-star	<b>I spec.</b> ndard i	tems								

### <Differential flow system>

		Description	n
	Measuring method		
4	Differential flow system		
	Measurable component	1st range	
	CO <sub>2</sub>	350 ± 50ppm	
	(Carbon dioxide)	350 ± 100ppm	
	(Carbon monoxide)	0 to 200ppm	
B D		0 to 250ppm	
	Power supply Pip	bing connection	
	115\/AC 50/60Hz RC	1/4 T1/4	
3	220VAC 50/60Hz RC	1/4	
4	220VAC 50/60Hz NP	T1/4	
	Structure/output signal		
A	Table-top type	0 to 1V DC	
B	19 inch rack mounting type	0 to 1V DC	
C	Panel mounting type	0 to 1V DC	
D	Table-top type	4 to 20mA DC	
	19 inch rack mounting type	4 to 20mA DC	
	Panel mounting type	4 to 20mA DC	62226
Ц	19 inch rack mounting type		5232C \$232C
	Panel mounting type	0 to 1V DC R	S232C
К	Table-top type	4 to 20mA DC R	\$232C
	19 inch rack mounting type	4 to 20mA DC R	S232C
M	Panel mounting type	4 to 20mA DC R	S232C
	Note(20) When the 5th and	6th digit are "DQ" or "I	DS", the output is available only
	voltage output.		
	voltage output. (1st range:–1V to 1	V, 2nd range:0 to 1V)	
	voltage output. (1st range:-1V to 1 Optional components	V, 2nd range:0 to 1V)	
	voltage output. (1st range:–1V to 1 Optional components Filter, Flowchecker Pump	V, 2nd range:0 to 1V)	r Note (21)
0	Voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump	V, 2nd range:0 to 1V)	r Note (21)
0	Voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O -	V, 2nd range:0 to 1V) CO/CO2 converte	r Note (21) Available only for 5th digit "D"
0	Voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O O O -	V, 2nd range:0 to 1V) CO/CO2 converte 0	r Note (21) Available only for 5th digit "D"
0	Voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  0 - 0 0 0 - 0 0 0 - 0 0	V, 2nd range:0 to 1V) CO/CO2 converte	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B"
0	Voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  0 - 0 - 0 0 0 - 0 0 0 0 0 0	V, 2nd range:0 to 1V) CO/CO2 converte	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B"
	Voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O - O 0 Optional function (1) Auto calibration Rem	V, 2nd range:0 to 1V)	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B"
	Voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O 0 O Optional function (1) Auto calibration Rem	V, 2nd range:0 to 1V)	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B" rnal hold
0 	Voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O 0 Optional function (1) Auto calibration Rem Rang	V, 2nd range:0 to 1V)	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B" rnal hold
0 1	Voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O - O - O - O - O	V, 2nd range:0 to 1V)	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B" rnal hold
0	Voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O - O - O - O - O	V, 2nd range:0 to 1V)	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B" rnal hold
0	Voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O 0 O - O 0 O Optional function (1) Auto calibration Rem Rang - - O O O O O O O O O O O O O	V, 2nd range:0 to 1V) CO/CO2 converte C C C C C C C C C C C C C C C C C C C	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B" rnal hold
0	voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O 0 Optional function (1) Auto calibration Rem Rang  O O 2nd range	V, 2nd range:0 to 1V) CO/CO2 converte C C CO/CO2 converte C C C C C C C C C C C C C C C C C C C	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B" rnal hold
0	Voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O 0 Optional function (1) Auto calibration Rem Rang  O 2nd range Without	V, 2nd range:0 to 1V) CO/CO2 converte C C CO/CO2 converte C C C C C C C C C C C C C C C C C C C	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B" rnal hold
0	voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O - O Optional function (1) Auto calibration Rem Rany - - O O 2nd range Without 500ppm For 1st range CO2	V, 2nd range:0 to 1V) CO/CO2 converte C C CO/CO2 converte C C C C C C C C C C C C C C C C C C C	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B" rnal hold
0	voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O - O Optional function (1) Auto calibration Rem Rang  O 2nd range Without 500ppm For 1st range CO2 1000ppm For 1st range CO2	V, 2nd range:0 to 1V) CO/CO2 converte C C CO/CO2 converte C C C C C C C C C C C C C C C C C C C	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B" rnal hold
0	voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O O O Optional function (1) Auto calibration Rem Rang  O 2nd range Without 500ppm For 1st range CO2 200ppm For 1st range CO2 200ppm For 1st range CO2	V, 2nd range:0 to 1V) CO/CO2 converte CO/CO2 converte CO CO CO2 converte CO CO CO CO CO CO CO CO CO CO CO CO CO	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B" rnal hold
0 	voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O O 0 Optional function (1) Auto calibration Rem Rang  O 2nd range Without 500ppm For 1st range CO2 200ppm - For 1st range C	V, 2nd range:0 to 1V) CO/CO2 converte C CO/CO2 converte C C C C C C C C C C C C C C C C C C C	r Note (21) Available only for 5th digit "D" Available only for 5th digit "B" rnal hold
0 1 2 3 4 Y Y 	voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O - O - O - O - O	V, 2nd range:0 to 1V) CO/CO2 converte C C CO/CO2 converte C C C C C C C C C C C C C C C C C C C	r       Note (21)         Available only for         5th digit "D"         Available only for         5th digit "B"
0	voltage output. (1st range:1V to 1 Optional components Filter, Flowchecker Pump  O - O - O - O - O - O - O	V, 2nd range:0 to 1V) CO/CO2 converte C CO/CO2 converte C C C C C C C C C C C C C C C C C C C	r       Note (21)         Available only for         5th digit "D"         Available only for         5th digit "B"
0 1 2 3 4 Y Y A Y H Y Y C C C C C C C C C C C C C	voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O - O - O - O - O	V, 2nd range:0 to 1V)  CO/CO2 converte	r       Note (21)         Available only for         5th digit "D"         Available only for         5th digit "B"
	voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O - O - O - O - O	V, 2nd range:0 to 1V)	r       Note (21)         Available only for         5th digit "D"         Available only for         5th digit "B"    rnal hold          Sample gas components must be informed or designation of "7"
	voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O - O - O - O - O	V, 2nd range:0 to 1V)  CO/CO2 converte  C C C C C C C C C C C C C C C C C C	r       Note (21)         Available only for         5th digit "D"         Available only for         5th digit "B"
	voltage output. (1st range:-1V to 1 Optional components Filter, Flowchecker Pump  O - O - O - O - O - O - O	V, 2nd range:0 to 1V)  CO/CO2 converte  C C C C C C C C C C C C C C C C C C	r       Note (21)         Available only for         5th digit "D"         Available only for         5th digit "B"    rnal hold           Sample gas components must be informed or designation of "Z".

# NDIR TYPE INFRARED GAS ANALYZER

### (Standard single-component analyzer measuring ranges)

Measurable	2nd						15	st mea	asurin	a ran	ae					
component	range	50ppm	100ppm	200ppm	250ppm	500ppm	0.1%	0.2%	0.5%	1%	2%	5%	10%	20%	50%	100%
	x 0	_	0	0	0	0	0	0	0	0	0	0	0	0	0	0
со	x 2	-	Ō	0	Ō	Ō	0	Ō	0	0	0	Ō	Ō	Ō	0	-
	x 2 5	_	0	0	0	0	0	0	0	0	0	0	0	0	_	_
	x 4	-	0	0	0	0	0	0	0	0	0	0	0	0	_	_
	x 5	-	0	0	0	0	0	0	0	0	0	0	0	_	_	
	x 8	-	0	0	0	0	0	0	0	0	0	0	-	-	-	
	x 10	-	0	0	0	0	0	0	0	0	0	0	-	-	-	
	x 20	-	0	0	0	0	0	0	0	0	0	0	-	-	-	-
	x 0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO,	x 2	-	0	0	0	0	0	0	0	0	0	0	0	0	0	-
-	x 2.5	-	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	x 4	-	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	x 5	-	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	x 8	-	0	0	0	0	0	0	0	0	0	0	0	-	-	-
	x 10	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-
	x 20	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-
	x 0	Δ	0	0	0	0	0	0	Δ	-	-	-	-	-	-	-
NO	x 2	Δ	0	0	0	0	0	0	Δ	-	-	-	-	-	-	-
	x 2.5	Δ	0	0	0	0	0	Δ	-	-	-	-	-	-	-	-
	x 4	Δ	0	0	0	0	Δ	-	-	-	-	-	-	-	-	-
	x 5	Δ	0	0	0	0	Δ	-	-	-	-	-	-	-	-	-
	x 8	Δ	0	0	0	Δ	-	-	-	-	-	-	-	-	-	-
	x 10	Δ	0	0	0	Δ	-	-	-	-	-	-	-	-	-	-
	x 20	Δ	0	0	Δ	-	-	-	-	-	-	-	-	-	-	-
	× 0	Δ	0	0	0	0	0	0	0	0	0	0	0	-	-	-
SO <sub>2</sub>	x 2	Δ	0	0	0	0	0	0	0	0	0	0	-	-	-	-
	x 2.5	Δ	0	0	0	0	0	0	0	0	0	0	-	-	-	-
	x 4	Δ	0	0	0	0	0	0	0	0	0	-	-	-	-	-
	x 5	Δ	0	0	0	0	0	0	0	0	0	-	-	-	-	-
	x 8	Δ	0	0	0	0	0	0	0	0	-	-	-	-	-	-
	x 10	Δ	0	0	0	0	0	0	0	0	-	-	-	-	-	-
	x 20	Δ	0	0	0	0	0	0	0	-	-	-	-	-	-	-
	× 0	-	-	Δ	Δ	0	0	0	0	0	0	0	0	0	0	0
CH4	x 2	-	-	Δ		0	0	0	0	0	0	0	0	0	0	-
	x 2.5	-	-			0	0	0	0	0	0	0	0	0	0	-
	x 4	-	-			0	0	0	0	0	0	0	0	0	-	-
	x 5	-	-		Δ	0	0	0	0	0	0	0	0	0	-	-
	x 8	-	-			0	0	0	0	0	0	0	0	-	-	-
	x 10	-	-			0	0	0	0	0	0	0	0	-	-	-
	x 20	-	-			0		0	0		0	0	-	-	-	-

Remarks: (1) O : standard measuring range (2)  $\triangle$  : Consult with us regarding capability of manufacture, price and (2) A contract of the constant of

### (Standard dual-component analyzer measuring ranges)

# Compbination 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.

NC	) 2	250	50	00		NO	5	00	100	00	Rem	narks:	(1)	• : available range for 1st measuring range.
30 <sub>2</sub>	$\frac{1}{p}$		ph		EO	200000		om S	ppi	m				(Max. 2000ppm for NO analyzer)
Zooppri	-	0			50	Jbbu		)		,				
500ppm	ו ו	0	(	$\mathbf{D}$	10	00ppn	n (	)	С	)				
														-
CO	200	250	500	0.1	0.2	0.5	1	2	5	10	20	50	100	
	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%	%	-
200ppm	0	0	0	0	$\otimes$	$\otimes$	-	-	-	-	-	-	-	
250ppm	0	0	0	0	$\otimes$	$\otimes$	$\otimes$	-	-	-	-	-	-	
500ppm	0	0	0	0	0	0	$\otimes$	⊗	- 1	-	-	-	-	-
0.1%	$\otimes$	⊗	$\otimes$	0	0	0	$\otimes$	$\otimes$	⊗	-	-	-	-	-
0.2%	$\otimes$	⊗	⊗	$\otimes$	0	0	0	$\otimes$	⊗	⊗	- 1	-	_	-
0.5%	-	-	⊗	$\otimes$	⊗	$\otimes$	0	0	⊗	⊗	⊗	-	-	-
1%	-	-	-	$\otimes$	$\otimes$	$\otimes$	0	0	0	$\otimes$	⊗	⊗	$\otimes$	-
2%	-	-	-	-	$\otimes$	$\otimes$	$\otimes$	0	0	0	0	0	0	-
5%	-	-	-	-	-	$\otimes$	$\otimes$	$\otimes$	0	0	0	0	0	-
10%	-	-	-	-	-	-	$\otimes$	$\otimes$	0	0	0	0	0	-
20%	-	-	-	-	-	-	-	$\otimes$	0	0	0	0	0	-
50%	-	-	-	-	-	-	-	-	0	0	0	0	0	-
100%	-	-	-	-	-	-	-	-	0	0	0	0	0	-
Remarks	s: (1)	0:8	availal	ole rai	nge fo	or 1st	meas	uring	range	э.				-

(2)  $\otimes$  : available range for 2nd measuring range (max. range) for CO and CO $_2$ .

 $\bigcirc$ 

 $\bigcirc$ 

 $\bigcirc$ 

RS232C terminal

< Rear view >

• | | | •

Power terminal

66

## OUTLINE DIAGRAM (Unit:mm)



212



Garbage application

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



External connection terminals

(1st component) (2nd component)

( O<sub>2</sub> ) -

### **EXTERNAL CONNECTION DIAGRAM**



### **Exclusive Zirconia O2 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		
	O2	Oxygen	0 to 10vol%	0 to 25vol%		
Repeatabili	ty: With	nin ± 0.5%	of full scale			
Linearity:	With	nin ± 2% of	full scale			
Zero drift:	With	nin±1% of	full scale/week			

Span drift:	Within ± 2% of full scale/week
Response time:	Approx. 20 seconds (for 90% response)
Measured gas fl	ow rate:
	0.5 ± 0.25 ℓ /min
	Remark: The Zirconia system, due to its principle,

	may produce a measuring error due to relative concentration versus the com- bustible $O_2$ 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 s	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)

ZRF

 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



## OUTLINE DIAGRAM (Unit:mm)



### Fuji Electric Co.,Ltd.

#### **Head office**

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http://www.fujielectric.co.jp/eng/sg/KEISOKU/welcome.htm

### Fuji Electric Instruments Co.,Ltd.

#### Sales Div. International Sales Dept.

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