

# NDIR TYPE INFRARED GAS ANALYZER

### DATA SHEET

This NDIR gas analyzer is used for measuring  $CO_2$ , CO,  $SO_2$  and  $CH_4$  and features a high accuracy, multiple functions and easy operation through use of a microprocessor. It is housed in a 19 inch rack case suitable for mounting on a panel or a table-top.

The analyzer provides a performance superior to the conventional double-beam system, is easy to maintain, and offers an excellent long-term stability. It is thus optimum for continuous measurement in the combustion control of various industrial furnaces, in research on garden-plants, and so on.



### FEATURES

- 1. The use of a microprocessor provides high accuracy, multiple functions and easy operation.
  - Zero and span calibration is accurate and easy just by pressing the calibrating keys.
  - A self-diagnosis function is included.
  - An automatic calibrating function can be provided as an option.
  - Range can be changed over by a external signal as an option.
- 2. An improved optical system provides long term stability, and there is a minimum of drift caused by contamination of the measuring cell, so the long-term stability is excellent.
- 3. Adopting a serial dual-layer type of transmission detector minimizes remarkable the interface from other gas components.
- 4. Easy maintenance.

The single-beam photometric system uses a sample cell only and eliminates the necessity of delicate adjustment for optical balance. The instrument is designed as a unit of simple construction featuring easy maintenance and checks.

### **SPECIFICATIONS**

**Dual-component** 

Measurable gas components: Single-component

CO<sub>2</sub> CO, SO<sub>2</sub>, CH<sub>4</sub>:

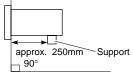
 $CO_2/CO$ : Landfill garbage application  $CO_2$ : 0 to 50%  $CH_4$ : 0 to 80%

Measuring range: Refer to measurable range combination	
table (page 5).	

Measuring syste	em:
	Non-dispersion infrared-ray absorption
	method, deviation method, single light
	source – single beam
Output signal:	Output 1; 0 to 1V DC
	Output 2; 4 to 20mA DC (optional allow-
	able load resistance $550\Omega$ or less).
Repeatability:	1st range (low range)
nepeatability.	
	Within $\pm 0.5\%$ of full scale
	2nd range (high range)
	Within $\pm$ 1% of full scale
Linearity:	±2% of full scale
Zero drift:	Within ±2% of full scale/week
Span drift:	Within ±2% of full scale/week
Response time:	Within 15 seconds max. (for 90% re-
	sponse) depending on cell length
Power supply:	100V, 115V, 220V or 240V ±10% AC, 50/
ronor ouppry:	60Hz
Power consump	
i ower consump	
	37VA max.

ZRH

Ambient temper	ature: -5 to +45°C
Ambient humidi	,
	90% RH or less
Enclosure:	Steel casing, for indoor use
Storage condition	
	Temperature; –20 to +60°C
	Humidity; 100% RH max. (free from con-
	densation)
Outer dimension	ns (H x W x D):
	Rack mounting type;
	133 x 483 x 435 mm
	Panel flush mounting type;
	133 x 443 x 435 mm
	Table-top type;
Mass weight:	Approx. 12Kg
Finish color:	Munsell 2.5Y8.4/1.2
Display:	4 digit LED for concentration display
	4 digit LED for sub-display
Output hold:	Output value before manual or automatic
output notal	calibration is hold. Whether or not to ef-
	fect hold function can be selected.
Sample gas con	
Sample gas con	Temperature; 0 to 50°C
	Dust; less than 0.3 μm
Other shared and in the	Pressure; less than 9.8 kPa
Standard adjust	
14/	Dry N <sub>2</sub> Balance
Warm up time:	Approx. 2 hours
Material of gas-	contacting parts:
	Sample cell, SUS304, neoprene rubber
	Infrared-ray transmitting window; CaF <sub>2</sub>
	or sapphire
	Internal tubing; Toaron tube
Gas inlet/outlet,	purge gas inlet size:
	Rc1/4 (PT1/4 internal thread) or NPT1/4
	internal thread
Measured gas fl	ow rate:
	1 ±0.5 liter/minutes
Purge gas flow	
	Approx. 1 liter/minute
Scope of delivery	Analyzer, power fuse, manual, mounting
	bracket in the case of panel mounting type
Mounting metho	bd:
	Mounted on 19 inch rack, or 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 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. A void vibration, and select a clean place free of corrosive and/or combustible gases. If installing outdoors, provide a suitable casing or cover to protect the analyzer from wind, rain, etc.

### Optional specifications

Remote output	Analog output (DC0-1V, 4-20mA) is held
	via external signal.
	Input signal: 5V DC
Remote range c	
	Range is changeable via external signal.
	Range changeover input signal: 5V DC
Range identifica	tion signal output:
	Contact output; 1 a contact
	Contact capacity; 250V AC, 2A (resistive load)
Automatic calib	,
	Zero and span are automatically calibrated
	at the preset cycle. Calibration gas is
	supplied sequentially by driving an elec-
	tromagnetic value installed outside.
Calibration char	nnel:
	Up to 2 components can be calibrated
	simultaneously.
Zero calibration	•
Span calibratior	Fixed at 0%
Span campiation	50 to 100% full scale
Calibration start	
	Via built-in timer or remote start signal
Output hold at o	calibration:
	Possible
Calibration gas	
	(1) Zero gas
	(2) Zero gas – span gas 1
	(3) Zero gas – span gas 2 (4) Zero gas – span gas 1 – span gas 2
Calibration gas	
calibration gas	Settable from 100 to 599 sec.
Calibration cycle	
,	1 to 199 hours (in 1-hour step)
Calibration failu	re alarm:
	Provided when fault occurs during auto
	calibration.
Contact output:	
	During calibration; 1 a (N.O) contact, con-
	tact capacity 250V AC, 2A (resistive load)
	Calibration failure; 1 a (N.O) contact, con-
	tact capacity 250V AC, 2A (resistive
	load)
	Electromagnetic valve drive; 1 a (N.O)
	contact, contact capacity 250V AC, 2A
	(resistive load)
Remote start:	Remote start signal; voltage input 5V DC

# CODE SYMBOLS

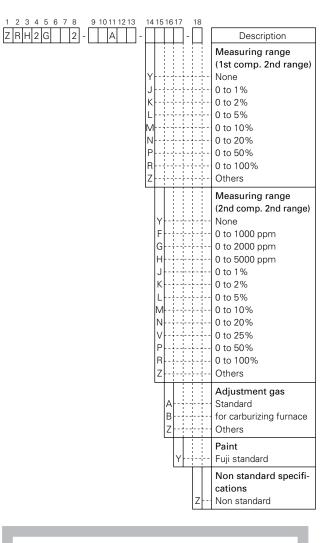
1		Υ	2	- [			Α	ł			-		Υ	ſ		]-	•[		Description
														l	ļ	-			No. of measurable components
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B	-			÷			-	÷					-	÷	÷	÷	1		со
D- E-								j						1			1		CO2 CH4
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	G U	]		Ţ				1						Ţ.	1	1	1	1	0 to 2000 ppm 0 to 2500 ppm
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	M	-		-				÷						÷	÷	÷			0 to 10%
	N- M-	1		1				1.				+ - · + - ·	(	ļ.	1	ţ.	-		0 to 20% 0 to 40%
	P	-		-				÷						÷	÷-	÷	-		0 to 50%
	X	-		÷				÷						÷	÷	÷	-		0 to 70%
	R Z -	1		1				Ì.				<u>.</u>		Ľ	İ	-1	1	1	0 to 100% Others
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				- I	1	1	÷-	ł					÷-	÷	÷	÷	÷		100V AC 60Hz Rc 1/4
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						С	1	4.				¦		÷	÷		÷		Panel mounting type
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								ľ	Y				-	÷	÷	÷	ł		None
								/	4					1-		-	1		With auto-calibration
										Y		¦	ļ	Į.	1				Optional function (2) None
										A			<u> </u>	÷	-	÷	÷		With remote range, range identification and
														1	-	-	-		remote output hold
														ł		ł	1		Measuring range (2nd range) (Note 1)
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															<u>.</u>	ļ.			Adjustment gas Standard
														E	3	-			for carburizing furnace
														Z		+-			Others (Note 4)
															Y	4.			<b>Paint</b> Fuji standard
															-		Ť		Non standard specifications
																		zł-	Non standard

Notes : (1) Refer to measurable range combined table (2) Output signal are provided simultaneously (3) 0 to 100mV, 0 to 10mV DC is available on request

(4) To be adviced components of sample gas

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No. of measurable components           Dual component           Dual component           Generation           Generation           Measurable component           CO2/CO           Measurable component           CO2/CO           Measurable component           CO2/CO           Measurable component           CO2/CO           Measurable component           Correct           Measurable component           Correct           Measurable component           Oto 50%           N         Oto 50%           N         Oto 50%           N         Oto 50%           R         Oto 5000 ppm           J         Oto 50%           R         Oto 50%           R         Oto 50%           N         Oto 50%           N         Oto 50%           N         Oto 50%           N         Oto 50%		7		II	9	10		12	13	1	14	15	16	17	1 1	18	
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G         Measuring range (1st comp. 1st range) Note (5, 6)           J         0 to 500 ppm           J         0 to 5%           M         0 to 2%           L         0 to 5%           M         0 to 10%           R         0 to 50%           Z         Othors           B         0 to 50%           CHers         Measuring range (2nd comp. 1st range) Note (5, 6)           K         0 to 500 ppm           G         0 to 50%           M         0 to 50%           M         0 to 50%           M         0 to 50%           C         0 to 50%           C         0 to 50%           G         0 to 50% <td></td> <td>-</td> <td>-</td> <td>_</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td>_</td> <td>_</td> <td></td> <td></td> <td></td> <td></td>		-	-	_							_	_	_				
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J								{									 
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L N N O to 5% O to 10% O to 20% O to 20% P O to 50% P O to 50% P O to 50% P O to 100% C thers Power supply, Piping connection 100V AC 50Hz Rc 1/4 1 00V AC 50Hz Rc 1/4 115V AC 60Hz Rc 1/4 220V AC 50Hz Rc 1/4 115V AC 60Hz Rc 1/4 220V AC 50Hz NC 1/4 5 O to 100V AC 50Hz NC 1/4 115V AC 60Hz NPT 1/4 5 O to 20% P D to 20% P D to 100% C D to 10V/DC 4 to 20mA DC D to 11V/DC 4 to 20mA DC																	
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P       0 to 50%         Q       0 to 100%         Z       0 to 100%         Others       Power supply, Piping connection         100V AC 50Hz Rc 1/4       100V AC 60Hz Rc 1/4         1       200V AC 60Hz Rc 1/4         2       115V AC 60Hz NPT 1/4         3       220V AC 50Hz NPT 1/4         4       100V AC 60Hz NPT 1/4         5       100V AC 50Hz NPT 1/4         6       115V AC 60Hz NPT 1/4         7       220V AC 50Hz NPT 1/4         8       220V AC 50Hz NPT 1/4         9       240V AC 50Hz NPT 1/4         9       19 inch rack mounting type         19 inch rack mounting type       19 inch rack mounting type         19 inch rack mounting type       0 to 1V/DC 4 to 20mA DC         100V       10V/DC 4 to 20mA DC         100V       100V/DC 4 to 20mA DC         100V       100V/DC 4 to 20mA DC         100V       100V/DC 4 to 20mA DC         <																	
R       0 to 100%         Q       Others         Power supply, Piping connection       100V AC 50Hz Rc 1/4         1       100V AC 50Hz Rc 1/4         1       200V AC 50Hz Rc 1/4         2       115V AC 60Hz Rc 1/4         2       115V AC 60Hz Rc 1/4         3       220V AC 50Hz Rc 1/4         4       100V AC 60Hz Rc 1/4         4       100V AC 60Hz NPT 1/4         5       115V AC 60Hz NPT 1/4         6       220V AC 50Hz NPT 1/4         7       220V AC 50Hz NPT 1/4         8       220V AC 50Hz NPT 1/4         9       240V AC 50Hz Rc 1/4         8       19 inch rack mounting type         19 inch rack mounting type       19 inch rack mounting type         0 to 1V/DC 4 to 20mA       DC         9       0 to 1V/DC 4 to 20mA         9       0 to 1V/DC 4 to 20m	P R										<b>.</b>						
Z       Others         0       Power supply, Piping connection         1       100V AC 50Hz Rc 1/4         1       100V AC 60Hz Rc 1/4         2       115V AC 60Hz Rc 1/4         3       220V AC 50Hz Rc 1/4         4       100V AC 60Hz Rc 1/4         5       100V AC 60Hz Rc 1/4         100V AC 60Hz Rc 1/4         4       220V AC 50Hz Rc 1/4         100V AC 60Hz NPT 1/4         5       220V AC 50Hz NPT 1/4         6       220V AC 50Hz NPT 1/4         7       220V AC 50Hz NPT 1/4         8       220V AC 50Hz NPT 1/4         9       240V AC 50Hz Rc 1/4         9       240V AC 50Hz Rc 1/4         9       19 inch rack mounting type         19 inch rack mounting type       19 inch rack mounting type         0 to 1V/DC 4 to 20mA DC       DC         9       0 to 1V/DC 4 to 20mA DC         9       0 to 1V/DC 4 to 20mA DC         9       0 to 1V/DC 4 to 20mA DC         9       0 to 1V/DC 4 to 20mA DC         9       0 to 1V/DC 4 to 20mA DC																	
Power supply, Piping connection         0         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2         1         2 <td></td> <td></td> <td></td> <td></td> <td></td> <td>[]</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>											[]						
Connection           0         100V AC 50Hz Rc 1/4           1         100V AC 60Hz Rc 1/4           2         115V AC 60Hz Rc 1/4           3         220V AC 50Hz NPT 1/4           4         100V AC 60Hz NPT 1/4           5         100V AC 50Hz NPT 1/4           6         115V AC 60Hz NPT 1/4           7         220V AC 50Hz NPT 1/4           8         220V AC 50Hz NPT 1/4           9         240V AC 50Hz NPT 1/4           9         19 inch rack mounting type           19 inch rack mounting type         19 inch rack mounting type           0         0 to 1V/DC 4 to 20mA DC           9         0 to 1V/DC 4 to 20mA DC           9         0 to 1V/DC 4 to 20mA DC           9         0 to 1V/DC 4 to 20mA DC           10         0 to 1V/DC		Ľ					_	_		_	_	_	_				
1       100V AC 60Hz Rc 1/4         2       115V AC 60Hz Rc 1/4         3       220V AC 50Hz Rc 1/4         4       100V AC 60Hz NPT 1/4         5       100V AC 60Hz NPT 1/4         6       115V AC 60Hz NPT 1/4         7       220V AC 50Hz NPT 1/4         8       220V AC 50Hz NPT 1/4         9       240V AC 50Hz NPT 1/4         9       240V AC 50Hz Rc 1/4         9       240V AC 50Hz NPT 1/4         9       240V AC 50Hz Rc 1/4         8       240V AC 50Hz Rc 1/4         9       19 inch rack mounting type         19 inch rack mounting type       19 inch rack mounting type         0       0 to 1V/DC 4 to 20mA DC         0       0 to 1V/DC 4 to 20mA DC         0       0         10       10         10       10         10       10         10       10         10       10         10       10         10 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>																	
2       115V AC 60Hz Rc 1/4         3       220V AC 50Hz Rc 1/4         4       100V AC 50Hz NPT 1/4         5       115V AC 60Hz NPT 1/4         6       115V AC 60Hz NPT 1/4         7       220V AC 50Hz NPT 1/4         8       220V AC 50Hz NPT 1/4         9       240V AC 50Hz Rc 1/4         8       240V AC 50Hz Rc 1/4         9       19 inch rack mounting type         19 inch rack mounting type       0utput signal (Output 1/2) (Notes 2, 3)         0 to 1V/DC 4 to 20mA DC       DC         9       0to 1V/DC 4 to 20mA DC         9       0ptional function (1)         None       With auto-calibration         9       0ptional function (2)         None       With remote range, range identification and </td <td></td> <td></td> <td></td> <td></td> <td>0</td> <td></td> <td> 100V AC 50Hz Rc 1/4</td>					0												 100V AC 50Hz Rc 1/4
3       220V AC 50Hz Rc 1/4         4       100V AC 50Hz NPT 1/4         5       100V AC 60Hz NPT 1/4         6       220V AC 50Hz NPT 1/4         7       220V AC 50Hz NPT 1/4         8       220V AC 50Hz NPT 1/4         9       240V AC 50Hz Rc 1/4         8       19 inch rack mounting type         19 inch rack mounting type       19 inch rack mounting type         0       0 to 1V/DC 4 to 20mA DC         4       0 to 1V/DC 4 to 20mA DC         Y       Y         A       Y         A       Y         A       Y         A       Y         A       Y         A       Y         A       Y         A       Y         Y       Y         A       Y         Y       Y         A       Y         Y       Y         Y       Y         Y       Y         Y       Y					1												
4																	
5       100V AC 60Hz NPT 1/4         6       115V AC 60Hz NPT 1/4         7       220V AC 50Hz NPT 1/4         8       240V AC 50Hz NPT 1/4         9       19 inch rack mounting type         19 inch rack mounting type       Panel mounting type         0       0tpt triggal (Output 1/2) (Notes 2, 3)         0 to 1V/DC 4 to 20mA DC       DC         Y       Y         A       Y         A       Y         A       Y         A       Y																	
6																	
7       220V AC 50Hz NPT 1/4         8       240V AC 50Hz NPT 1/4         9       240V AC 50Hz Rc 1/4         A       Table top type         19 inch rack mounting type         C       Panel mounting type         Quiput signal (Output 1/2) (Notes 2, 3)         0 to 1V/DC 4 to 20mA DC         Y       Quiput signal function (1)         None         Y       Quiput signal function (2)         None       With remote range, range identification and					~												
9 240V AC 50Hz Rc 1/4 A A B C C C C C C C C C C C C C C C C C					7												
A B					8												 240V AC 50Hz NPT 1/4
A Table top type 19 inch rack mounting type C Panel mounting type C Panel mounting type Output signal (Output 1/2) (Notes 2, 3) 0 to 1V/DC 4 to 20mA DC V V Vith auto-calibration V Vith auto-calibration V Vith remote range, range identification and					9												 240V AC 50Hz Rc 1/4
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Y     DC       Y     Optional function (1)       None     With auto-calibration       Y     Optional function (2)       Y     None       Y     With remote range, range identification and																	
Y     Optional function (1)       A     None       Y     With auto-calibration       Y     Optional function (2)       Y     None       V     With remote range, range identification and							A										
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I I I I I I I I I I I I I I I I I I I																	-
																	remote output hold

Note (5) Refer to measurable range combination table (6) 1st comp. is CO<sub>2</sub>, 2nd comp. is CO.



The product conforms to the requirements of the Electromagnetic compatibility Directive 89/336/EEC as detailed within the technical construction file number TZ734576. The applicable standards used to demonstrate compliance are :

EN 50081-1 : 1991 CLASS AConducted and Radiated emissionsEN 50082-1 : 1992Radiated immunity, ESD and FBT

ZRH

### Measurable range combination table

#### (1) Single-component (CO<sub>2</sub>• CO• CH<sub>4</sub>)

	2nd range	F	G	U	Н	J	K	L	Μ	Ν	Р	R
1st	range	0 to 1000 ppm	0 to 2000 ppm	0 to 2500 ppm	0 to 5000 ppm	0 to 1%	0 to 2%	0 to 5%	0 to 10%	0 to 20%	0 to 50%	0 to 100%
E	0 to 500 ppm	00	00	00	_	_	_	—	—	—	—	
F	0 to 1000 ppm	_	$\bigcirc \bigcirc \land \Box$	$\bigcirc \bigcirc \land \square$	$\bigcirc \bigcirc \land \square$	_	_		—	_	—	
G	0 to 2000 ppm	_	—	$\bigcirc \bigcirc \land \square$	$\odot \circ \land \Box$	$\odot \bigcirc \triangle$	—	_	—	_	—	—
U	0 to 2500 ppm		—		$\bigcirc \bigcirc \land \square$	$\odot \bigcirc \bigtriangleup$			—	_		—
Н	0 to 5000 ppm	_	—		_	$\bigcirc \bigcirc \triangle$	$\bigcirc \bigcirc \land$		_	_		
J	0 to 1%		—				$\odot \bigcirc \bigtriangleup$	$\odot \bigcirc \triangle$		—		
Κ	0 to 2%	_	—	—		_	_	$\odot \bigcirc \triangle$	$\odot \bigcirc \triangle$	—		—
Q	0 to 3%		—	—	_			$\odot \bigcirc \triangle$	$\odot \bigcirc \triangle$	—	—	—
L	0 to 5%	_				_	_	_	$\odot \bigcirc \triangle$	$\odot \bigcirc \triangle$		
Μ	0 to 10%	_	—		—	_	_	_	—	$\odot \bigcirc \triangle$	$\bigcirc \bigcirc \land$	—
Ν	0 to 20%		—	—	_				—	_	$\odot \bigcirc \triangle$	00
W	0 to 40%	_	_	—	—	_	—	—	—	—	$\odot \bigcirc \triangle$	$\odot \bigcirc \triangle$
Ρ	0 to 50%	_		—	_	_	_	_		—		$\odot \bigcirc \triangle$
X	0 to 70%		_	_	_			_	—	_		$\odot \bigcirc \triangle$
R	0 to 100%	_	_	—	_	_			_		_	$\odot \bigcirc \triangle$

 $\bigcirc$  :CO<sub>2</sub>  $\bigcirc$  :CO △ : CH<sub>4</sub>  $\square$  :SO<sub>2</sub> —: Impossible \* Also single range is possible

#### (2) Dual-components (CO<sub>2</sub>/CO)

	2	2nd component		<u>CO</u>													
1 of oo		1st range	E	F	G	Н	J	K	L	М	N	V	Р	R			
1st co 1st rar		nent	0 to 500ppm	0 to 1000ppm	0 to 2000ppm	0 to 5000ppm	0 to 1%	0 to 2 %	0 to 5%	0 to 10%	0 to 20%	0 to 25%	0 to 50%	0 to 100%			
	Н	0 to 5000 ppm	-	0	0	0	0	0	0	0	0	0	0	0			
	J	0 to 1%	0	0	0	0	0	0	0	0	0	0	0	0			
	Κ	0 to 2%	0	0	0	0	0	0	0	0	0	0	* 0	0			
<u> </u>	L	0 to 5%	0	0	0	0	0	0	0	0	0	0	0	0			
CO <sup>5</sup>	Μ	0 to 10%	0	0	0	0	0	0	0	0	0	0	0	0			
	Ν	0 to 20%	0	0	0	0	0	0	0	0	0	0	0	0			
	Ρ	0 to 50%	0	0	0	0	0	0	0	0	0	0	0	0			
	R	0 to 100%	0	0	0	0	0	0	0	0	0	0	0	0			

1st component is  $CO_{2'}$  2nd component is CO.

O : Dual-components are possible

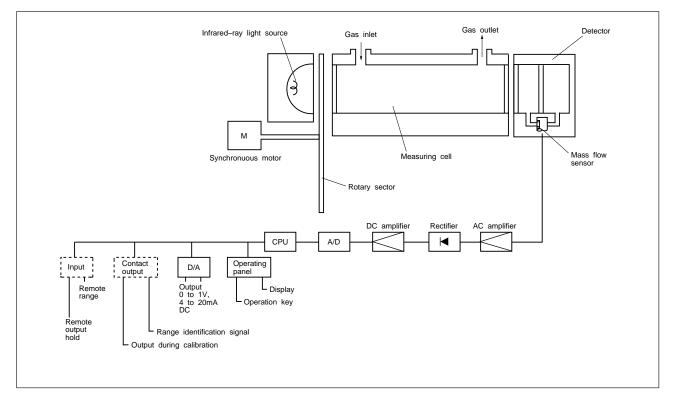
Both components are able to have 2nd range. 2nd range is x 2 or x 2.5 of 1st range, choose the Code symbols

\*O : Dual-components are possible

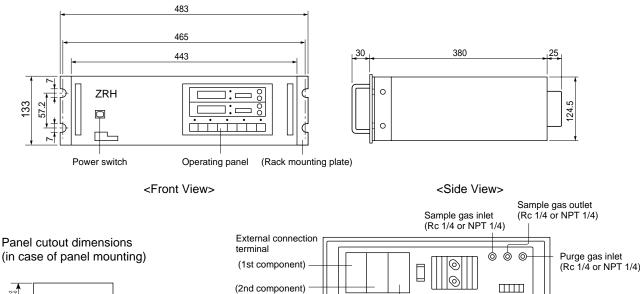
But only one component, CO, or CO, is able to have 2nd range. 2nd range is x 2 or x 2.5 of 1st range, choose the Code Symbols.

#### : Impossible.

# FUNDAMENTAL PRINCIPLE DIAGRAM

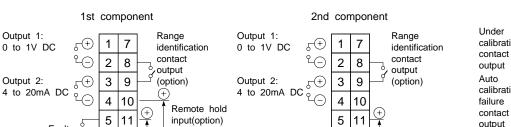


### OUTLINE DIAGRAM (Unit:mm)





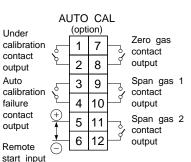
# **CONNECTION DIAGRAM**



Remote range

input(option)

(AUTO CAL)



## SCOPE OF DELIVERY

6 12

Fault

- 1 x gas analyzer main unit
- 1 x test report
- 1 x instruction manual
- 2 x Power fuse
- 4 x panel mounting bracket

# **RELATED DEVICES**

- Gas sampling device
- Accommodating locker
- Standard gas (for calibration)
- Receiving instrument

# Fuji Electric Co.,Ltd.

#### **Head office**

11-2 Osaki 1-chome, Shinagawa-ku, Tokyo, 141-0032 Japan Phone: 81-3-5435-7111

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

## ORDERING INFORMATION

Remote range

input(option)

1. Analyzer type.

6 12

2. Maximum, normal and minimum concentrations of sample gas as well as type and content (percent by volume) of concomitant gas.

Power terminals

435

<Rear View>

- 3. Temperatures (maximum, normal and minimum), pressure and humidity of sample gas.
- 4. Dust conditions (mg/Nm<sup>3</sup> or particle size, characteristics, etc.) and environmental conditions.
- 5. Other items

### 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, 6189