Fuji Electric

NDIR TYPE INFRARED GAS ANALYZER

(5-COMPONENT ANALYZER)

DATA SHEET ZKJ

The gas analyzer ZKJ simultaneously measures up to five components; four components among NO, SO_2, CO_2, CO, CH_4, N_2O measured by NDIR sensor, and O_2 by built-in paramagnetic sensor or external zirconia analyzer. By the use of twin mass-flow sensors that is hardly affected by interference gas, it delivers highly reliable measurement.
ZKJ is best suited to waste incineration plants, industrial furnaces and boilers.



FEATURES

1. Simultaneous and continuous measurement of up to 5 components
   Four components among NO, SO_2, CO, CO_2, CH_4, N_2O, in addition to O_2
2. Tolerant to cross interference
   The twin mass-flow sensors that has high sensitivity offers reliable measurement
3. High functionality
   O_2 conversion, average calculation, auto calibration, high/low alarm, remote switchover of measurement ranges, range identification signal output, etc.
4. Easy to use
   You can check the measured values and calculated values at glance on the easy-to-see large LCD, and can edit the settings in an interactive way.
5. Easy to install
   19-inch rack mount structure and unitized I/O terminals allow you to construct an analyzing system easily
6. User-configurable ranges with a maximum range ratio of 1 : 25
7. Zero drift for ranges above 0–200 ppm: ±1% FS per week
8. Conforms to the RoHS directive

SPECIFICATIONS

Standard Specifications

Measurement principle:

NO, SO_2, CO_2, CO, CH_4, N_2O;
Non-dispersive infrared (NDIR) method,
Single light source and double beams (double-beam system)
O_2;
Built-in paramagnetic O_2 sensor or external zirconia O_2 analyzer

Measurable gas components and measuring range:

	Minimum range	Maximum range
NO	0–50 ppm	0–5000 ppm
SO_2	0–50 ppm	0–10 vol%
CO_2	0–20 ppm	0–100 vol%
CO	0–50 ppm	0–100 vol%
CH_4	0–200 ppm	0–100 vol%
N_2O	0–200 ppm	0–2000 ppm
O_2 (built in)	0–5 vol%	0–25 vol%
O_2 (External Zirconia)	0–5 vol%	0–25 vol%

- Max. 5 components measurement including O_2.
- Measuring range ratio ≤ 1:5 (O_2)
  ≤ 1:25 (except for O_2)
- Measuring ranges are changeable between the specified minimum and maximum range.
  Settable 1 range or 2 ranges.
- If you measure N_2O only, do not let any other components be included in the sample gas.
  If you measure multiple components including N_2O, the measurement ranges of N_2O are fixed to 0–200 ppm and 0–500 ppm. If the measuring objects are N_2O and CO_2, the measurement ranges of CO_2 are fixed to 0–10% and 0–20%.

* For measurable components and possible combinations of measuring ranges, refer to Tables 1-(1) to (8).

Measured value indication:

Digital indication in 4 digits (LCD with LED back light)
- Instantaneous value of each component
- Instantaneous value after O_2 conversion
  (only in NO, SO_2, CO measurement with O_2)
- Average value after O_2 conversion
  (only in NO, SO_2, CO measurement with O_2)
- O_2 average value

Analog output signals:

* Inputs/outputs of analog signals are possible by combining with the input/output terminal module.

4 to 20mA DC or 0 to 1V DC, isolated internally from circuit and ground. Output lines are non-isolated each other; 12 points max.
max.load 550Ω for 4 to 20 mA DC
min.load 100kΩ for 0 to 1V DC

* Refer to Table 2 for channel allocation for each component.

Analog input signal:

Signal from external O_2 analyzer;
(1) Signal from Fuji zirconia O_2 analyzer (ZFK7)
(2) 0 to 1 V DC full-scale signal
- Input section is no isolated.
- External O_2 analyzer is a separate order item.

Relay contact output:

1a contact (250V AC/2A, resistive load)
Instrument error, calibration error, range identification, auto calibration status, pump ON/OFF, peak alarm.
1c contact (250V AC/2A, resistive load selectable 6 outputs)
High/Low limit alarm contact output.
Power disconnection alarm.

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

Contact input:
No-voltage contact (ON/0V, OFF/5V DC, 5mA flowing at ON)
Remote range switch, auto calibration remote start, remote holding, average value resetting, pump ON/OFF
Isolated from the internal circuit with photocoupler. Contact inputs are not isolated from one another.

Transmission output:
Solenoid valve drive signal for automatic calibration.
Transistor output (100mA or less)

Power supply:
Voltage rating; 100V to 240V AC
Allowable range; 85V to 264V AC
Frequency ; 50Hz/60Hz
Power consumption; 250VA max.
Inlet; Conform to EN60320, Protection Class 1

Operating conditions:
Ambient temperature; -5°C to 45°C
Ambient humidity; 90% RH max., non-condensing

Storage conditions:
Ambient temperature; -20°C to 60°C
Ambient humidity; 90% RH max., non-condensing

Dimensions (H x W x D):
Analyzer main unit; 177 × 483 × 599mm
Input/output terminal module; 164 × 316 × 55mm

Mass:
Approx. 22 kg (only Analyzer)

Finish color:
Front panel; Light gray (Munsell N7.2 or equivalent)
Casing; Plating, Steel-blue (gray)

Enclosure:
Steel casing, for indoor use

Material of gas-contacting parts:
Gas inlet/outlet/purging; SUS304 or resin
Sample cell; SUS304,chloroprene rubber
Infrared-ray transmitting window; CaF_2
O_2 sensor sample cell; SUS316
Internal piping; vinyl chloride, PTFE, Polypropylene

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

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

Standard Functions

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

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

Range changeover:
You can change between ranges by manually, automatically, or remotely.
Manual: by key operation
Auto: When the measured value reaches above 90% FS of the 1st range, the range automatically switches to the 2nd range. When the measured value goes down below 80% FS of the 1st range, the range automatically switches from the 2nd range to the 1st range.
Remote: by the no-voltage contact input. When the remote range changeover input terminal dedicated for each component is closed, the 1st range is effective. When the terminal is opened, the 2nd range becomes effective.

Range identification signal:
You can check which range is in use. When the 1st range is used, the range identification signal output terminal allocated for each component is closed. When the 2nd range is used, the terminal is opened.

Auto calibration:
This function requires standard gas cylinders for zero and span calibration and solenoid valves for opening/closing the gas flow line. When this function is activated, the analyzer opens and closes the solenoid valve driving contact periodically at preset cycle.
Auto calibration cycle setting:
1 hour to 99 hours (in increments of 1 hour) or 1 day to 40 days (in increments of 1 day).
Gas flow time setting:
The time during which calibration gas is supplied.
60 seconds to 900 seconds (in increments of 1 second)

Auto calibration remote start:
You can start one-time auto calibration if you open the auto calibration remote start input terminal for 1.5 seconds or longer and then close it. Calibration gas is drawn for the time set in the “gas flow time setting” for Auto calibration (see the previous item).

Auto zero calibration:
This function requires a standard gas cylinder for zero calibration and a solenoid valve for opening/closing the gas flow line. When this function is activated, the analyzer opens and closes the solenoid valve driving contact periodically at preset cycle. The cycle for the auto zero calibration and that for the auto calibration can be different.
Auto zero calibration cycle setting:
1 hour to 99 hours (in increments of 1 hour) or 1 day to 40 days (in increments of 1 day).
Gas flow time setting:
The time during which calibration gas is supplied
60 seconds to 900 seconds (in increments of 1 second)

High/low limit alarm:
When a measured value has gone beyond the upper limit or below the lower limit, the analyzer closes the contact to emit an alarm signal.

Instrument error contact output:
The contact is closed when an analyzer error (error No. 1 or 10) occurs.

Calibration error contact output:
The contact is closed if a calibration error (error No. 4, 5, 6, 7, or 9) occurs.

Auto calibration status contact output:
The contact is closed during auto calibration.

Pump ON/OFF contact output:
The contact is closed during measurement, and opened during calibration so that the sample gas flow is stopped during calibration

Optional Functions

O_2 conversion:
Conversion of measured NO, CO, and SO_2 gas concentrations into values at reference O_2 concentration

Conversion formula: $C = \frac{21-On}{21-Os} \times Cs$

C: Sample gas concentration after O_2 conversion
Cs: Measured concentration of sample gas
Os: Measured O_2 concentration (limit configurable within 1–20%)
On: Reference O_2 concentration (configurable within 0–19%)

Average value after O_2 conversion and O_2 average value calculation:

The analyzer can take measurement every 30 seconds, and calculate the moving average of:

a) the instantaneous concentrations after O_2 correction or

b) the instantaneous O_2 concentrations.

You can set the period for averaging in the range of 1–59 min (in one-minute increment) or 1–4 hour (in one-hour increment).

The analyzer transmits the moving average output every 30 seconds.

Average value resetting:

You can reset the average values by short-circuiting the average value resetting input terminal for 1.5 seconds or longer. You can start averaging over by opening it.

CO concentration peak count alarm:

(available option only for CO and O_2 analyzer)

The analyzer counts the number of times that the CO instantaneous value has reached the concentration limit you set. When the count per hour has reached the limit you set, the alarm is triggered.

Communication function:

RS-232C

9-pin D-sub connector

Half-duplex bit serial, Start-stop synchronization

Modbus RTU™ protocol

The communication function allows the analyzer to read and write parameters, and read measured concentration values and instrument status.

For connection to RS-485 interface, an RS232C–RS485 converter is required.

Performance

Repeatability:

±0.5% of full scale

±1% of full scale (for ranges below 0–50 ppm)

Linearity:

±1% of full scale

Zero drift:

±1% of full scale per week

±2% of full scale per week (for ranges between 0–50 ppm and 0–200 ppm)

±2% of full scale per day (for ranges below 0–50 ppm)

Span drift:

±2% of full scale per week

±2% of full scale per day (for ranges below 0–50 ppm)

Response time for 90% FS response:

15 seconds electrical response

- Response time when the gas flow rate is 0.5 L/min is within 60 seconds including replacement time of sample gas.
- Gas replacement time depends on the number of measuring components and range.
- Interference from other gases: The effects differ depending on the type and concentration of gases. Please contact us if necessary.

  Paramagnetic O_2 : 2ºC saturated moisture influence within ±1.0vol%O_2

Standard Requirements for Sample Gas

Flow rate:

0.5L / min ±0.2L / min

Temperature:

0 to 50°C

Pressure:

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

Dust:

100 µg/Nm^3 or less in particle size of 0.3 µm or less

Mist:

Unallowable

Moisture:

Below a level where saturation occurs at 2°C (condensation unallowable).

Corrosive component:

1 ppm or less

Standard gas for calibration:

Zero gas; Dry N_2

Span gas; a component same as the measuring target, having concentration of 90–100% of its measuring range (recommended). Gas beyond a concentration of 100% FS is unusable.

In the case where an external zirconia O_2 analyzer is installed and calibration is carried out on the same calibration gas line as the other components:

Zero gas; Dry air or atmospheric air (Atmospheric air is not allowed if your measuring target includes CO_2.)

Span gas; For other than O_2 measurement, use a gas that has concentration of 90–100% of its measuring range. For O_2 measurement, use 1–2 vol% O_2.

Installation Requirements

- Indoor use. Select a place where the analyzer does not receive direct sunshine, wind and rain, or radiation from hot substances. If such a place cannot be found, a roof or cover should be prepared for protection.
- Avoid a place where the analyzer receives heavy vibration.
- Select a place where atmospheric air is clean.
- Discharge the exhaust gas to the safe place to the atmosphere.
- Do not use the analyzer in hazardous area.
- Altitude: up to 2187 yards (2000 m)

EU Directive Compliance

CE

LVD (2014/35/EU)

EN 61010-1

EN 61010-2-030

EN 62311

EMC (2014/30/EU)

EN 61326-1 (Table 2)

EN 55011 (Group 1 Class A)

EN 61000-3-2 (Class A)

EN 61000-3-3

EN 61326-2-3

*The analyzer conforms to the EMC requirements only when installed in a steel cabinet.

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

EN IEC63000

UK CA

LVD (S.I.2016 No.1101)

EN 61010-1

EN 61010-2-030

EN 62311

EMC (S.I.2016 No.1091)

EN 61326-1 (Table 2)

EN 55011 (Group 1 Class A)

EN 61000-3-2 (Class A)

EN 61000-3-3

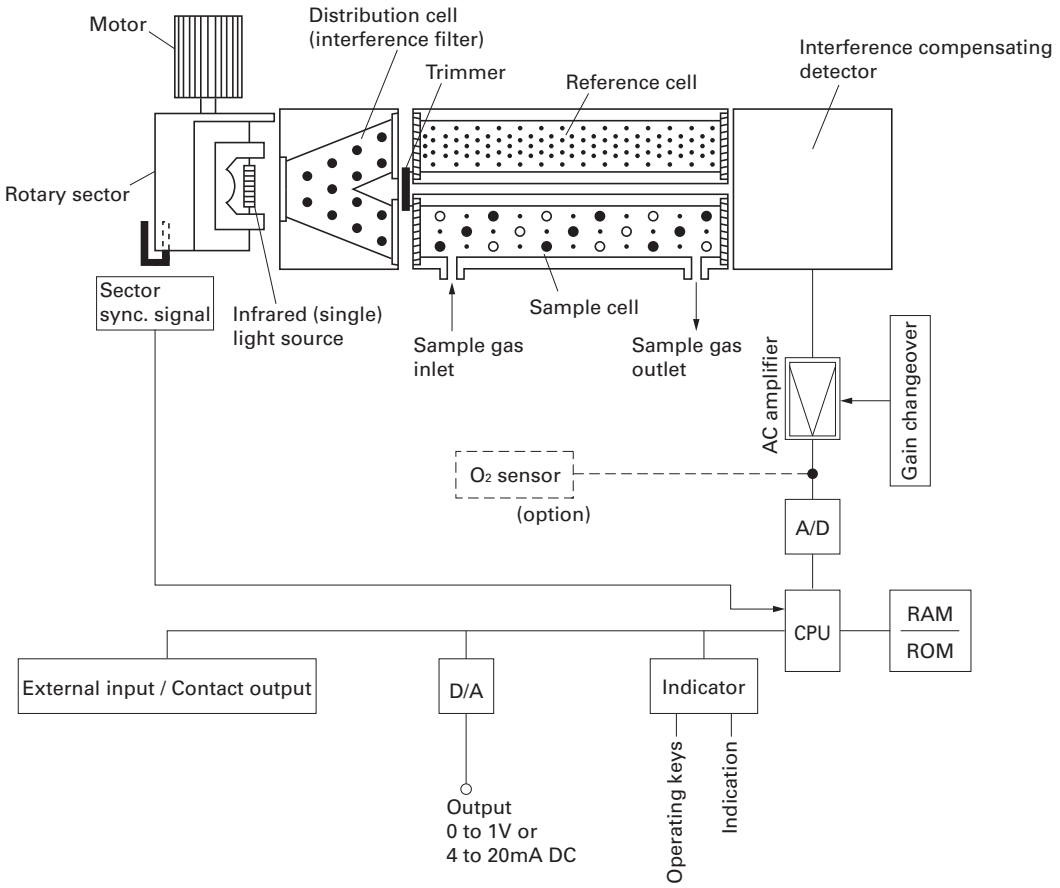
EN 61326-2-3

*The analyzer conforms to the EMC requirements only when installed in a steel cabinet.

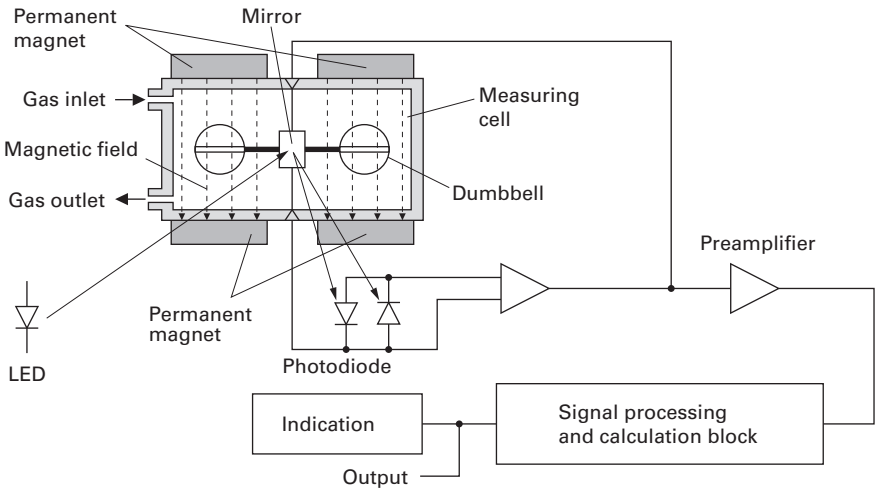
RoHS (S.I.2012 No.3032)

EN IEC63000

Principle diagram of NDIR type measurement (For NO, SO_2, CO_2, CO, CH_4, N_2O)

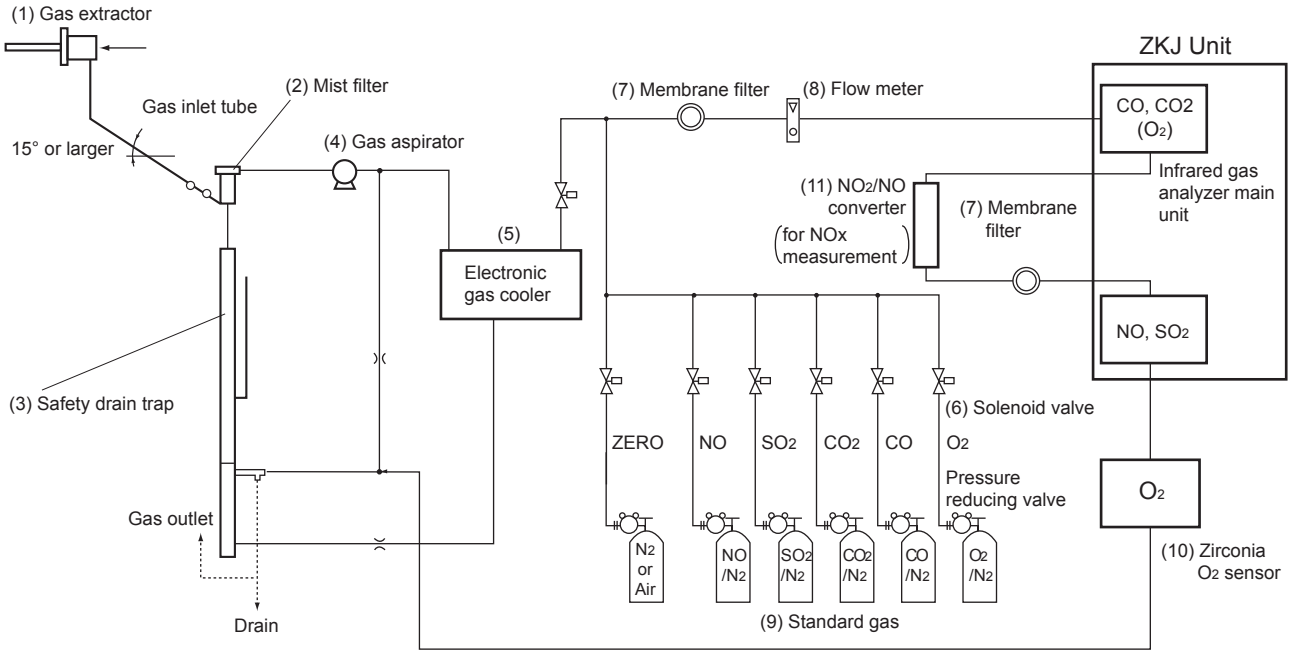


Principle diagram of paramagnetic type measurement (For O_2)



Example configuration of gas sampling system

The following illustrates a typical system configuration for 5 component gas measurement for monitoring combustion exhaust gas from boiler, refuse incinerator, etc.
Contact FUJI ELECTRIC for system configuration matching the particular use or further information.



Functions of Individual Components

(1) Gas extractor:
Gas extractor with a heating type stainless steel filter of standard mesh 40µm

(2) Mist filter:
For separation of drain and removal of dust and mist

(3) Safety drain trap:
Prevention of drain from being sucked and composite operation of constant-pressure bubbler

(4) Gas aspirator:
For aspiration of sample gas (sample gas flow rate approx. 2L/min)

(5) Electronic gas cooler:
Dries the moisture in sample gas to a dew point of approx. 2°C.

(6) Solenoid valve:
Used for introducing calibration gas.

(7) Membrane filter:
PTFE filter used to eliminate fine dust particles and permit monitoring of dust adhering condition on the front panel of the gas analyzer.

(8) Flow meter:
Adjusts and monitors the flow rate of sample gas.

(9) Standard gas:
Reference gas used for calibrating zero and span of the analyzer. Total 6 cylinders required for zero (N_2 or air) and span (NOx, SO_2, CO_2, CO, O_2) calibration.

(10) Zirconia O_2 sensor:
(This is not necessary in case when the O_2 sensor is built-in.)
External zirconia oxygen sensor used for measuring the oxygen concentration (0 to 25%) in sample gas.

(11) Converter:
Added to NOx analyzer.
A special catalyst material for efficient conversion of NO_2 gas to NO is used.

***(Note) Refer to the separate Data Sheet for each gas sampling device.**

SCOPE OF DELIVERY

- Gas analyzer ... 1 unit
- Input /output terminal module for external mounting... 1 set
- Connection cable (1m) between main unit and input /output terminal module ... 1 pc
- Power cord (standard inlet type 2m) ... 1 pc
- Spare fuses (250V, 3.15A AC, delay type) ... 2 pcs
- Cell mounting tool (when using the block cell) ... 1 pc
- Instruction manual ... 1 copy
- Relay board ... 1 pc (when the version with relay board is selected)
- Cable for relay board ... 1 pc (when the version with relay board is selected)
- Housing ... 8 pc (when the version with relay board is selected)
- Contact ... 16 pc (when the version with relay board is selected)

ORDERING INFORMATION

1. Code symbols
2. Application and composition of sample gas
   (when “Z” is selected at the 23th digit)

Items to be prepared separately

- Various sampling devices (refer to Data Sheets for the sampling devices)
- Dedicated zirconia O_2 sensor (see Page 16)

CODE SYMBOLS

Digit	Description				note	Z	K	J	F				6	-				-					-			Digit No. of code
						1	2	3	4	5	6	7	8		9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
4	<Custom specifications>																												
	Standard								F																				
5	<Measurable component (SO_2, CO_2, CO, CH_4, N_2O) >																												
	1st componet	2nd componet	3rd componet	4th componet																									
	NO									P																			
	SO_2									A																			
	CO_2									D																			
	CO									B																			
	CH_4									E																			
	NO	SO_2								F																			
	NO	CO								H																			
	CO_2	CO								G																			
	NO	SO_2	CO							L																			
	NO	SO_2	CO_2	CO						M																			
	N_2O				note 10					Q																			
	N_2O	CO_2			note 10					R																			
	NO	N_2O	CO_2		note 10					S																			
	SO_2	N_2O	CO_2		note 10					T																			
	N_2O	CO_2	CO		note 10					U																			
	CH_4	N_2O	CO_2		note 10					V																			
	NO	SO_2	N_2O	CO_2	note 10					W																			
6	<Measurable component (O_2)>										Y																		
	None										A																		
	External zirconia type O_2 analyzer (Model : ZFK7)				note 1b)						B																		
	External O_2 analyzer				note 1a)b)						C																		
	Built-in paramagnetic O_2 analyzer (for heat treatment)				note 11						D																		
	Built-in paramagnetic O_2 analyzer (for environmental measurement)																												
7	<Gas inlet/outlet>											0																	
	Rc1/4											1																	
	Rc1/4, with purging				note 2							2																	
	NPT1/4											3																	
	NPT1/4, with purging				note 2							4																	
	Resin(ø6)				note 2																								
8	<Revision code>												6																
9	<Accessories>														Y														
	None														A														
	With relay board for auto caliblation, with cable														C														
	With slide rail														D														
	With slide rail, relay board, and cable																												
10	<Indication and power cord>				note 3											J													
	Japanese, Power cord rated 125V (UL/CSA/PSE)															E													
	English, Power cord rated 125V (UL/CSA/PSE)															U													
	English, Power cord rated 250V (ENEC)															C													
	Chinese, Power cord rated 250V (CCC)																												
11	<Measuring range> 1st component				note 4																								
12	Minimum range		Maximum range														1	E											
	0 to 20ppm		0 to 500ppm		note 5												A	F											
	0 to 50ppm		0 to 1000ppm														B	G											
	0 to 100ppm		0 to 2000ppm														C	E											
	0 to 200ppm		0 to 500ppm														C	G											
	0 to 200ppm		0 to 2000ppm														C	H											
	0 to 200ppm		0 to 5000ppm														E	J											
	0 to 500ppm		0 to 1%														F	K											
	0 to 1000ppm		0 to 2%														G	L											
	0 to 2000ppm		0 to 5%														H	M											
	0 to 5000ppm		0 to 10%														J	N											
	0 to 1%		0 to 20%														K	M											
	0 to 2%		0 to 10%														K	P											
	0 to 2%		0 to 50%														M	N											
	0 to 10%		0 to 20%														M	R											
	0 to 10%		0 to 100%																										
13	<Measuring range> 2nd component				note 4																								
14	Minimum range		Maximum range																Y	-	Y								
	None		None																A	-	F								
	0 to 50ppm		0 to 1000ppm																B	-	G								
	0 to 100ppm		0 to 2000ppm																C	-	E								
	0 to 200ppm		0 to 500ppm																C	-	G								
	0 to 200ppm		0 to 2000ppm																C	-	H								
	0 to 200ppm		0 to 5000ppm																E	-	J								
	0 to 500ppm		0 to 1%																F	-	K								
	0 to 1000ppm		0 to 2%																H	-	M								
	0 to 2000ppm		0 to 5%																J	-	N								
	0 to 5000ppm		0 to 10%																K	-	P								
	0 to 1%		0 to 20%																M	-	N								
	0 to 2%		0 to 50%																M	-	R								
	0 to 10%		0 to 20%																										
	0 to 10%		0 to 100%																										
15	<Measuring range> 3rd component				note 4																								
16	Minimum range		Maximum range																			Y	Y						
	None		None																			A	F						
	0 to 50ppm		0 to 1000ppm																			B	F						
	0 to 100ppm		0 to 1000ppm																			B	G						
	0 to 100ppm		0 to 2000ppm																			C	E						
	0 to 200ppm		0 to 500ppm																			C	G						
	0 to 200ppm		0 to 2000ppm																			C	H						
	0 to 200ppm		0 to 5000ppm																			E	J						
	0 to 500ppm		0 to 1%																			F	K						
	0 to 1000ppm		0 to 2%																			G	L						
	0 to 2000ppm		0 to 5%																			H	M						
	0 to 5000ppm		0 to 10%																			J	N						
	0 to 1%		0 to 20%																			K	P						
	0 to 2%		0 to 10%																			M	N						
	0 to 10%		0 to 20%																			M	R						
	0 to 10%		0 to 100%																										

Digit	Description		note	1 2 3 4 5 6 7 8	9 10 11 12 13	14 15 16 17 18 19 20	21 22 23 ← Digit No. of code
				Z K J F	6 -	-	-
17	<Measuring range> 4th component		note 4				
18	Minimum range	Maximum range					
	None	None				Y Y	
	0 to 50ppm	0 to 1000ppm				A F	
	0 to 100ppm	0 to 2000ppm				B G	
	0 to 200ppm	0 to 500ppm				C E	
	0 to 200ppm	0 to 2000ppm				C G	
	0 to 200ppm	0 to 5000ppm				C H	
	0 to 500ppm	0 to 1%				E J	
	0 to 1000ppm	0 to 2%				F K	
	0 to 5000ppm	0 to 10%				H M	
	0 to 1%	0 to 20%				J N	
	0 to 2%	0 to 50%				K P	
	0 to 10%	0 to 20%				M N	
	0 to 10%	0 to 100%				M R	
19	<O_2 analyzer, 1st range>		note 4				
20	Minimum range	Maximum range					
	None	None				Y Y	
	0 to 5%	0 to 25%				L V	
	0 to 10%	0 to 25%				M V	
	Other					Z Z	
21	<Output>						
	4 to 20mA DC						A
	0 to 1V DC						B
	4 to 20mA DC + Communication function						C
	0 to 1V DC + Communication function						D
22	<O_2 conversion and O_2 average value output>		note 6				
	None		note 7				Y
	With O_2 conversion output						A
	With peak alarm						B
	With O_2 conversion output and peak alarm						C
23	<Adjustment, Range designation>						
	For combustion exhaust gas (specified range)		note 8a)				B
	For combustion exhaust gas						E
	For combustion exhaust gas (specified range) Unit mg/m^3		note 8a)b)				F
	For combustion exhaust gas, Unit mg/m^3		note 8b)				G
	Others		note 9				Z

Note 1 a) When “B” is specified at the 6th digit, O_2 sensor signal has to be set as 0-1V DC linear corresponding to full scale.
b) External Zirconia O_2 sensor and external O_2 analyzer are not included in the scope of supply, and has to be separately ordered.

Note 2 Resin coupling with purging cannot be manufactued.

Note 3 Rated voltage, plug type and applicable standard of the attached power cord is different depending on the code “J”, ”E”, ”U” and “C” in the 10th digit.
Select appropriate cord according to operating power supply voltage in the final destination.

Note 4 Measuring range can be selected within either the minimum or maximum range.
(Within min. or max. range, you can change the actual range settings locally.)
Initial setting from Fuji factory is Min. range for the 1st range, and Max. range for the 2nd range.
When range preset at Fuji factory is required, please select “specified range” at 23rd digit and inform Fuji of specified range table.
Refer to Table 1, for possible combination of measuring components and ranges in the data sheet.

Note 5 “1E” can be specified at 11th & 12th digits, ONLY for CO_2 measurement.
In this case, be sure to select “with purging” at 7th digit.

Note 6 O_2 conversion is calculated only for NO, SO_2 and CO.
Both average value output after O_2 calculation and O_2 average value output are provided at the same time.
a) Peak count alarm can be added only for CO measurement.

Note 7 When “Y” is specified at the 6th digit, 22nd digit always has to be specified as “Y”.

Note 8 a) If you would like Fuji to deliver ZKJ analyzer with specific range setting, select “specified range” and separately inform Fuji of the actual range of each component together with your purchase order.
b) In case that the measurement unit is specified as “mg/m3”, it is necessary to select “unit : mg/m^3” (Code “F” or “G”) at the 23rd digit.
Please refer to the table shown below for the corresponding range code based on “mg/m^3”.

			Corresponding range in mg/m^3 or g/m^3					
	In ppm		NO		SO_2		CO	
Range code	Min. range	Max. range	Min. range	Max. range	Min. range	Max. range	Min. range	Max. range
AF	0-50ppm	0-1000ppm	0-70mg/m^3	0-1300mg/m^3	0-150mg/m^3	0-2800mg/m^3	0-65mg/m^3	0-1250mg/m^3
BG	0-100ppm	0-2000ppm	0-140mg/m^3	0-2600mg/m^3	0-300mg/m^3	0-5500mg/m^3	0-130mg/m^3	0-2500mg/m^3
CH	0-200ppm	0-5000ppm	0-280mg/m^3	0-6600mg/m^3	0-600mg/m^3	0-14g/m^3	0-250mg/m^3	0-6250mg/m^3

Note 9 When “Z” is specified at the 23rd digit, a gas composition table of actual measued gas has to be sent to Fuji together with your purchase order.

Note 10 When only N_2O analyzer is used, make sure not to contain any components other than N_2O.
Multicomponent analyzers including N_2O analyzer + CO_2 analyzer are used for sludge incineration.
In this case, the range of N_2O is 0 to 200ppm/500ppm, and the range of CO_2 is 0 to 10%/20%.

Note 11 When the hydrogen concentration in sample gas is 1% or more, select "C."

Table 1. Measurable component and range — availability check table —

(1) Components of single-component analyzer and double-component analyzer (NO/CO), and CO of 3-component analyzer (NO/SO_2/CO)

As shown in the range code, when "P", "A", "D", "B", and "E" are specified at 5th digit, each component is given at 11th and 12th digits. When "H" is specified, NO is given at 11th and 12th digits and CO at 13th and 14th digits. When "L" is specified, CO is given at 15th and16th digits.

	Range code	1E	AF	BG	CH	EJ	FK
Code symbol 5th digit	Range / Components	0-20ppm 0-500ppm	0-50ppm 0-1000ppm	0-100ppm 0-2000ppm	0-200ppm 0-5000ppm	0-500ppm 0-1%	0-1000ppm 0-2%
P,H	NO		○	○	○		
A	SO_2		○	○	○	○	
D	CO_2	○	○	○	○	○	○
B,H,L	CO		○◎	○◎	○◎	○	○
E	CH_4				○	○	○

	Range code	GL	HM	JN	KM	KP	MR	CG
Code symbol 5th digit	Range / Components	0-2000ppm 0-5%	0-5000ppm 0-10%	0-1% 0-20%	0-2% 0-10%	0-2% 0-50%	0-10% 0-100%	0-200ppm 0-2000ppm
P,H	NO							
A	SO_2				○			
D	CO_2	○	○	○		○	○	
B,H,L	CO		○	○		○	○	
E	CH_4	○	○	○		○	○	
Q	N_2O							○

○ : Single component analyzers (5th code P, A, D, B, E), NO of NO/CO analyzer (5th code H)
◎ : CO of NO/CO analyzer (5th code H) , CO of NO/SO_2/CO analyzer (5th code L)

(2) NO/SO_2 of double-component analyzer (NO/SO_2), three-component analyzer (NO/SO_2/CO) and 4-component analyzer (NO/SO_2/CO_2/CO)

		Measurable components	2nd component SO_2		
		Code symbol, 13th, and 14th digits.	AF	BG	CH
Measurable components	Code symbol, 11th, and 12th digits.	2nd / 1st	0-50ppm 0-1000ppm	0-100ppm 0-2000ppm	0-200ppm 0-5000ppm
1st component, NO	AF	0-50ppm 0-1000ppm	○	○	
	BG	0-100ppm 0-2000ppm	○	○	
	CH	0-200ppm 0-5000ppm			○

○ : Combination is available.

(3) CO_2/CO of 2-component analyzer (CO_2/CO) and 4-component analyzer (NO/SO_2/CO_2/CO)

When "G" is specified at 5th digit, CO_2 is given at 11th and 12th digits, and CO at 13th and 14th digits.
When "M" is specified, CO_2 is given at 15th and 16th digits, and CO at 17th and 17th digits.

		Measurable components	2nd component, CO								
		Range code	AF	BG	CH	EJ	FK	HM	JN	KP	MR
Measurable components	Range code	2nd / 1st	0-50ppm 0-1000ppm	0-100ppm 0-2000ppm	0-200ppm 0-5000ppm	0-500ppm 0-1%	0-1000ppm 0-2%	0-5000ppm 0-10%	0-1% 0-20%	0-2% 0-50%	0-10% 0-100%
1st component, CO_2	AF	0-50ppm 0-1000ppm	○◎	○◎	○◎						
	BG	0-100ppm 0-2000ppm	○◎	○◎	○◎	○					
	CH	0-200ppm 0-5000ppm	○◎	○◎	○◎	○					
	EJ	0-500ppm 0-1%				○	○				
	FK	0-1000ppm 0-2%					○				
	GL	0-2000ppm 0-5%						○			
	HM	0-5000ppm 0-10%						○	○		
	JN	0-1% 0-20%							○	○	
	KP	0-2% 0-50%								○	
	MR	0-10% 0-100%									○
	MN	0-10% 0-20%	○◎	○◎	○◎	○					

○ : CO_2/CO analyzer (5th code G)
◎ : NO/SO_2/CO_2/CO analyzer (5th code M)

(4) N_2O/CO_2 of 2-component analyzer N_2O/CO_2, 3-component analyzer $NO/N_2O/CO_2$, $SO_2/N_2O/CO_2$, $N_2O/CO_2/CO$, $CH_4/N_2O/CO_2$ and 4-component analyzer ($NO/SO_2/N_2O/CO_2$)

Range code: When code symbol is "R" or "U", N_2O is 11th and 12th digit, CO_2 is 13th and 14th digit.
When code symbol is "S", "T" or "V", N_2O is 13th and 14th digit, CO_2 is 15th and 16th digit
When code symbol is "W", N_2O is 15th and 16th digit, CO_2 is 17th and 18th digit

		Measurable components	2nd component, CO_2
		Range code	MN
Measurable components	Range code		0-10% 0-20%
1st component, N_2O	CE	0-200ppm 0-500ppm	○

○ : Combination is available.

(5) CO_2 range selection of 3-component analyzer ($N_2O/CO_2/CO$)

Range code: N_2O is 11th and 12th digit, CO_2 is 13th and 14th, CO is 15th and 16th digit.
The range code of CO_2 is "MN".

		Measurable components	2nd component, CO
		Range code	BF
Measurable components	Range code		0-100ppm 0-1000ppm
1st component, N_2O	CE	0-200ppm 0-500ppm	○

○ : Combination is available.

(6) SO_2 range selection of 3-component analyzer ($SO_2/N_2O/CO_2$)

Range code: SO_2 is 11th and 12th digit, N_2O is 13th and 14th, CO_2 is 15th and 16th digit.
The range code of CO_2 is "MN".

		Measurable components	2nd component, N_2O
		Range code	CE
Measurable components	Range code		0-200ppm 0-500ppm
1st component, SO_2	AF	0-50ppm 0-1000ppm	○

○ : Combination is available.

(7) CH_4 range selection of 3-component analyzer ($CH_4/N_2O/CO_2$)

Range code: CH_4 is 11th and 12th digit, N_2O is 13th and 14th, CO_2 is 15th and 16th digit.
The range code of CO_2 is "MN".

		Measurable components	2nd component, N_2O
		Range code	CE
Measurable components	Range code		0-200ppm 0-500ppm
1st component, CH_4	CH	0-200ppm 0-5000ppm	○

○ : Combination is available.

(8) $NO/SO_2/N_2O$ range selection of 4-component analyzer ($NO/SO_2/N_2O/CO_2$)

Range code: NO is 11th and 12th digit, SO_2 is 13th and 14th, N_2O is 15th and 16th , CO_2 is 17th and 18th digit.
The range code of CO_2 is "MN".

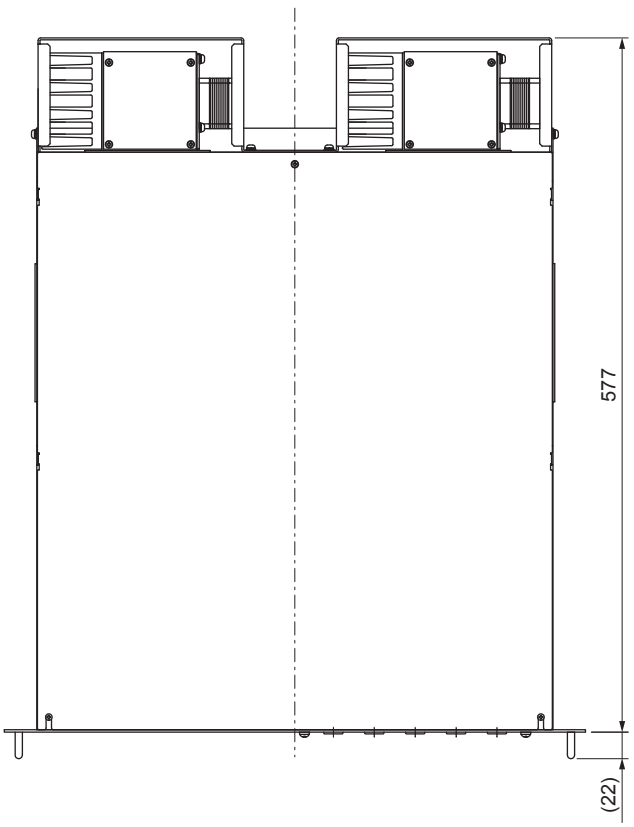
		Measurable components	2nd component, SO_2	3nd component, N_2O
		Range code	AF	CE
Measurable components	Range code		0-50ppm 0-1000ppm	0-200ppm 0-500ppm
1st component, NO	AF	0-50ppm 0-1000ppm	○	○
	BG	0-100ppm 0-2000ppm	○	○

○ : Combination is available.

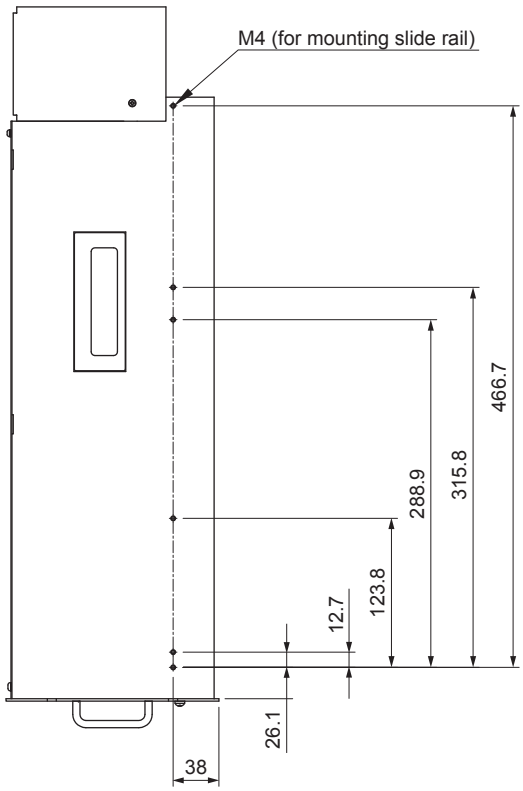
OUTLINE DIAGRAM (Unit: mm)

<Analyzer main unit>

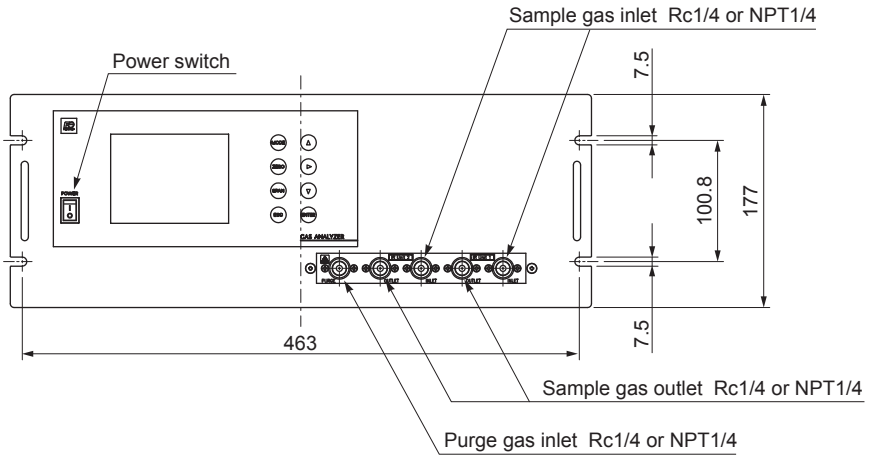
<Upper>



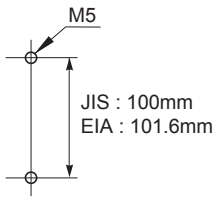
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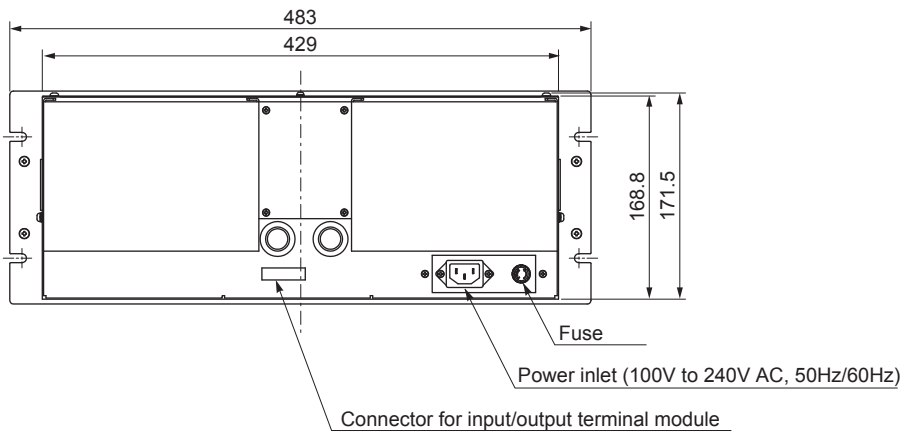
<Front>



<Rack mounting hole>

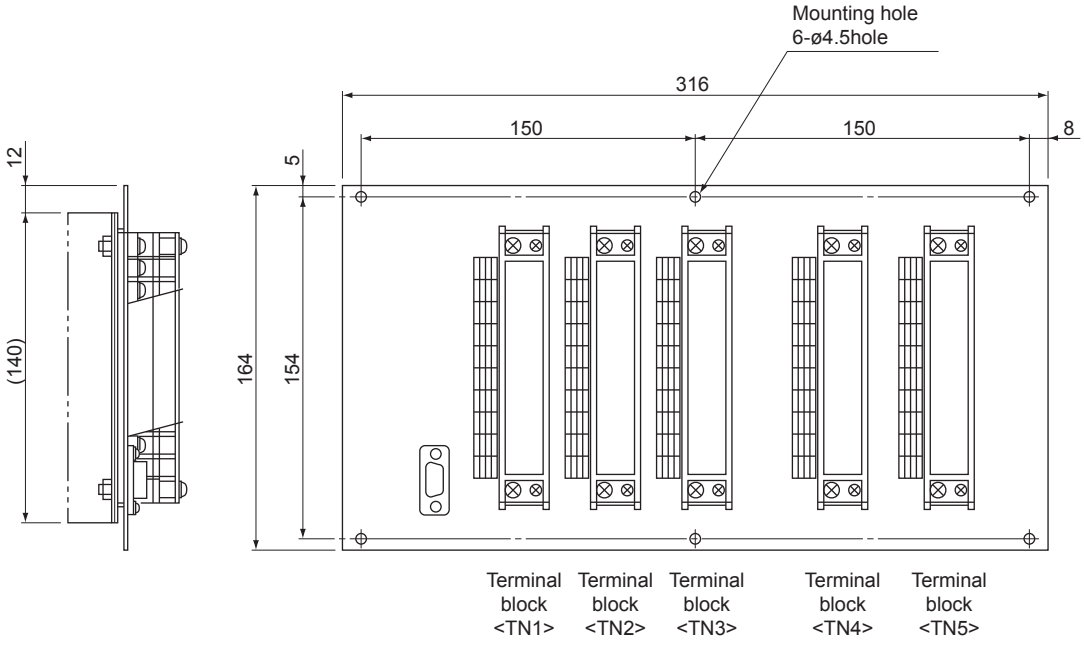


<Rear>

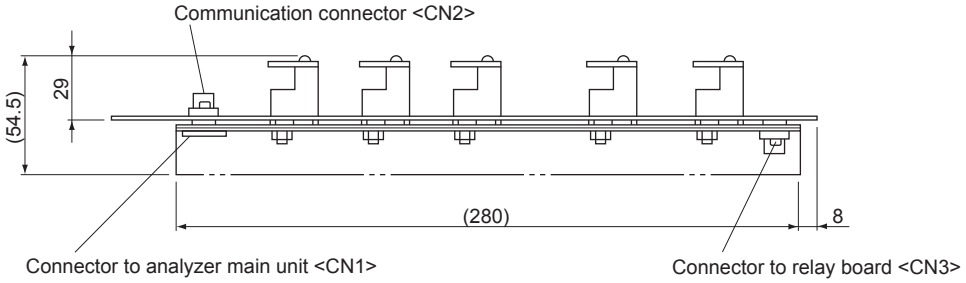


<Input / output terminal module>

(Accessory)

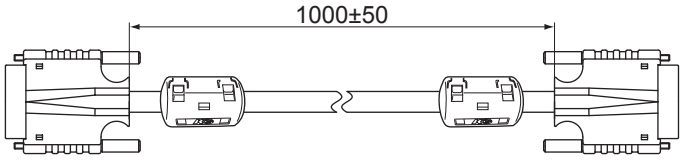


Screw terminals M3.5

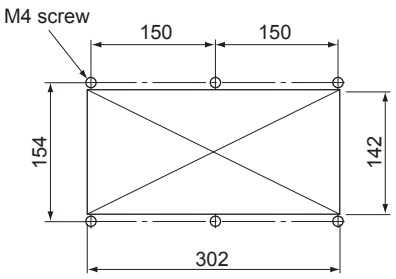


<Cable for connecting input / output terminal>

(Accessory)



<Dimensions for mounting input / output terminal module>

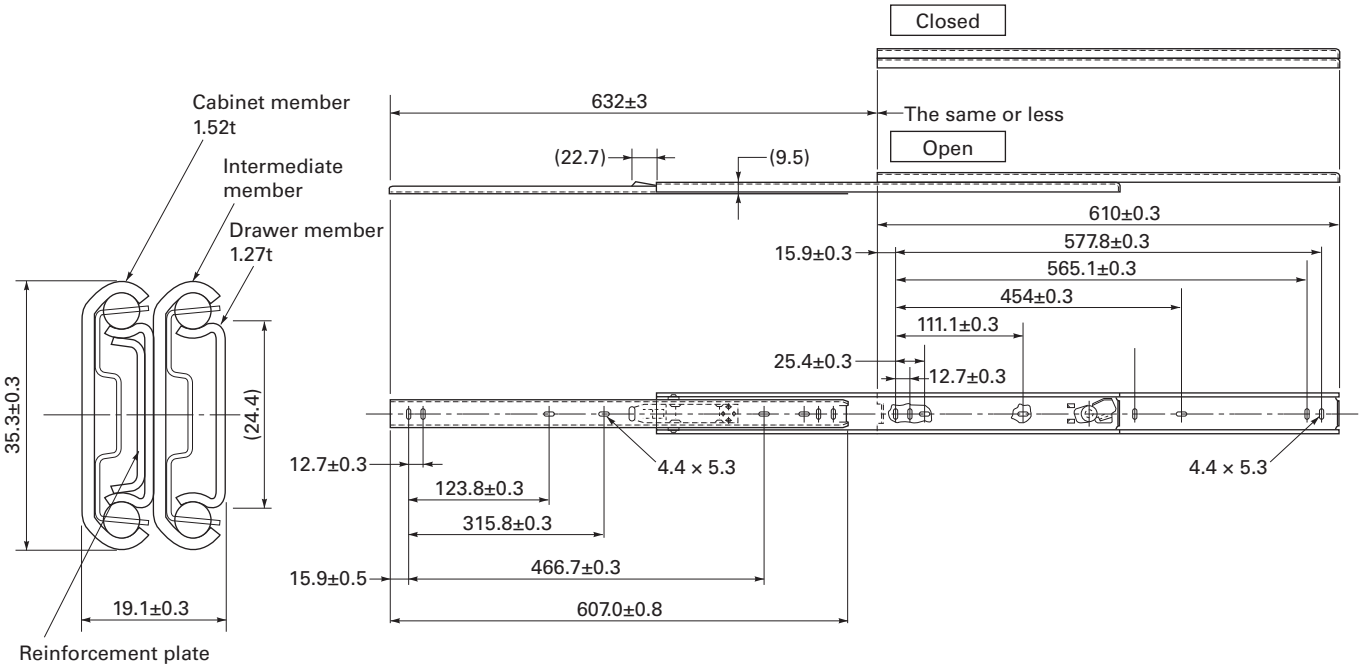


Cut M4 screw holes at 6 positions.
Drill a rectangular hole of 302 × 142mm or more in the center.

OUTLINE DIAGRAM OF ACCESSORY SLIDE RAIL (Unit: mm)

* If you selected C or D in the 9th digit of the code symbol, the analyzer comes with the slide rails attached by screws.

Model : 3532-24/SUGATSUNE KOGYO



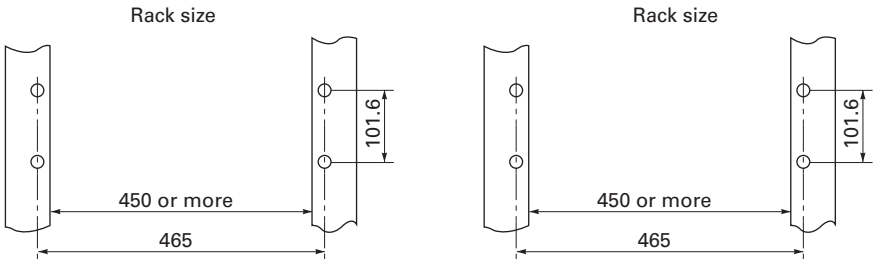
19-inch rack mounting method:

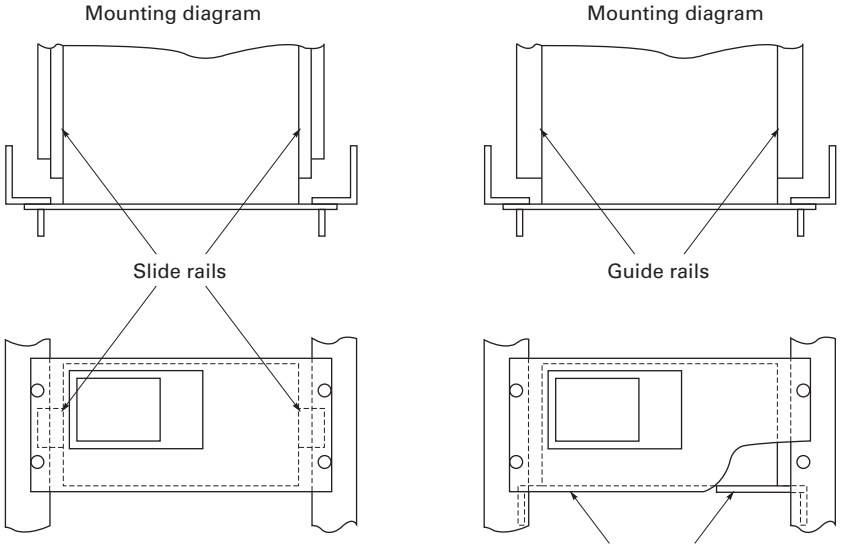
The mass of the instrument should be supported at the bottom of the unit (or the side of the unit when mounted with the slide rails).

Also, for facilitate maintenance, a structure which allows extraction of the main unit by using the slide rail is recommended.

Slide rail mounted type

Guide rail mounted type

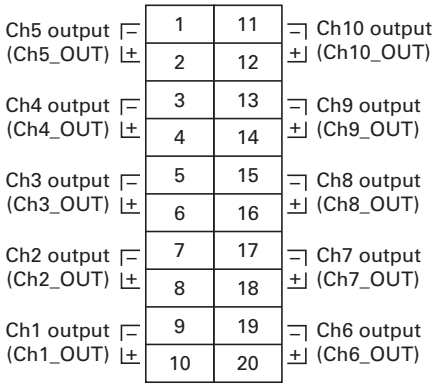




For the guide rail mounted type, a maintenance space (200mm or more) should be provided upper the main unit.

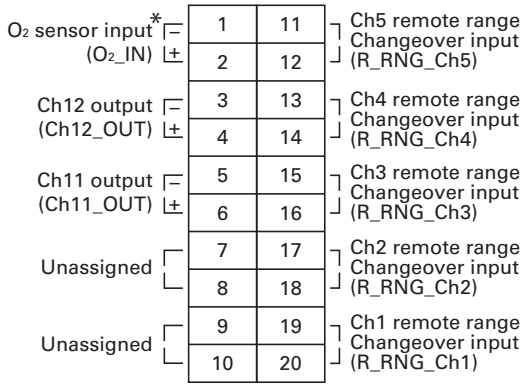
EXTERNAL CONNECTION DIAGRAM

Terminal block 1
<TN1>



(M3.5 screw)

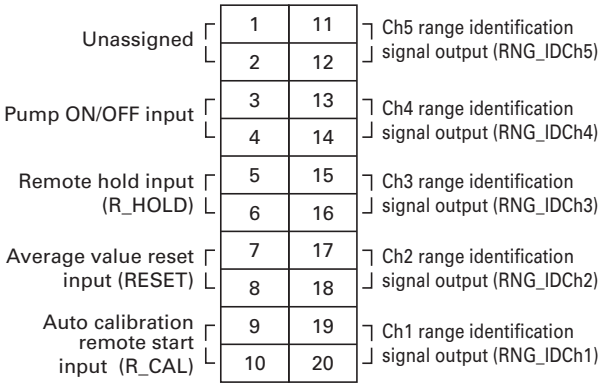
Terminal block 2
<TN2>



(M3.5 screw)

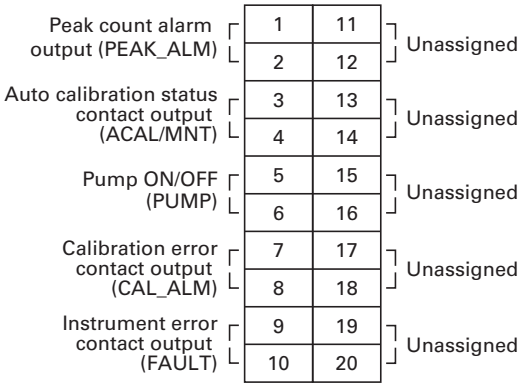
∗ : For external O_2 sensor input.

Terminal block 3
<TN3>



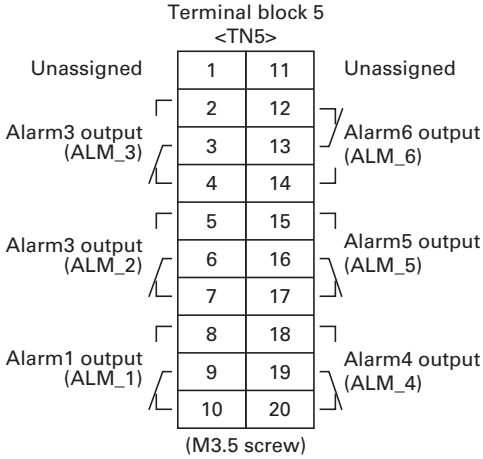
(M3.5 screw)

Terminal block 4
<TN4>



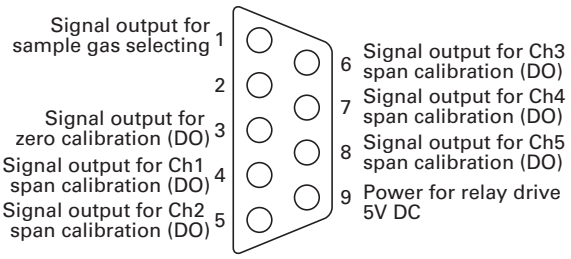
(M3.5 screw)

Terminal block 5
<TN5>



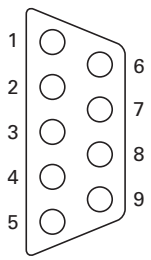
(M3.5 screw)

Connector
<CN3>
Solenoid valve drive signal output for calibration



<D-sub 9P>

Connector
<CN2>
For serial communication



Note 1) Unassigned terminals are used for internal connection.
So they should not be used as repeating terminals either.

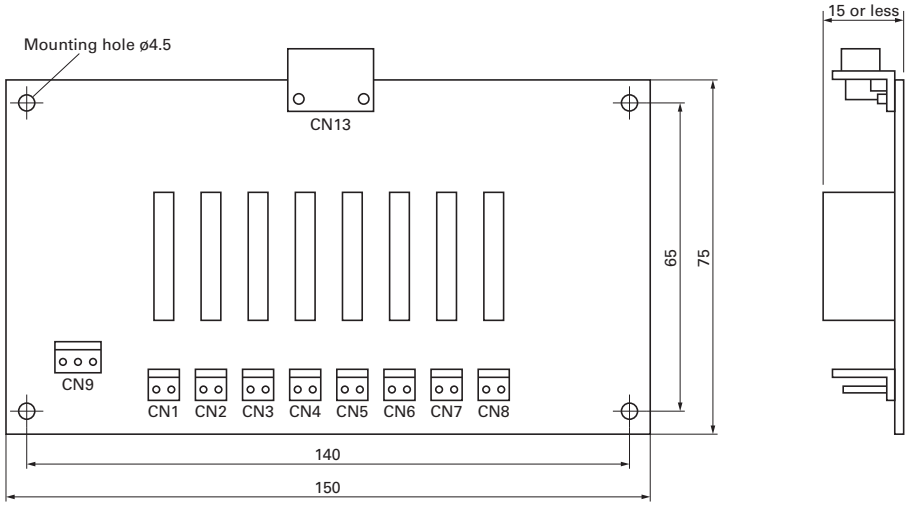
Note 2) The allocation of each Channel (Ch1 to Ch12) depends on measured gas components. Refer to Table 2.

Dedicated relay board

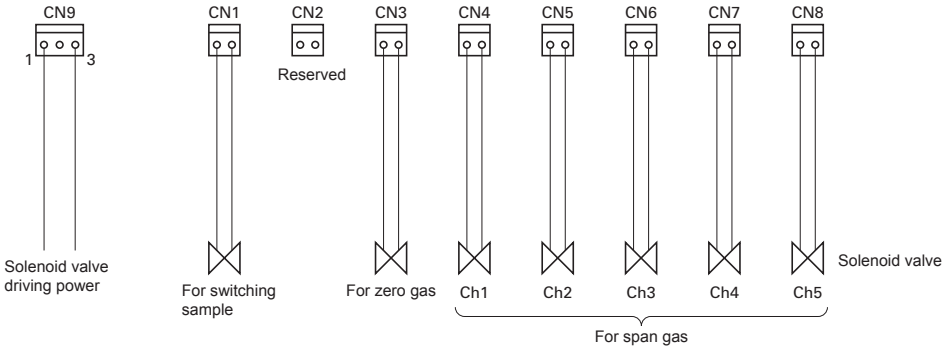
This relay board receives signals from connector CN3 of the ZKJ I/O terminal module and activates the calibration solenoid valve directly.

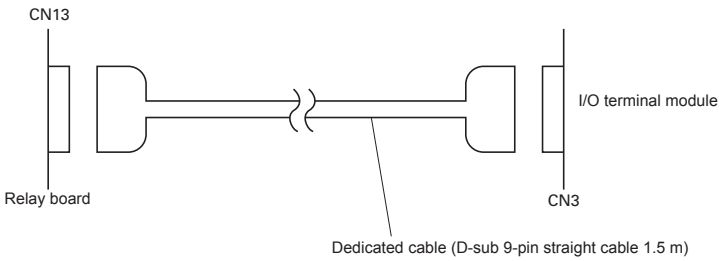
• Relay contact : 1 normally closed contact
Contact capacity; 250V/2A AC
(resistive load)

OUTLINE DIAGRAM (Unit: mm)



CONNECTIONS





Recommended connector

•CN1 to CN8 : Housing ; VHR-2N
(Nihon Solderless Terminal)
•CN9 : Housing ; VHR-3N
(Nihon Solderless Terminal)
Contact ; SVH-21T-1.1
(Nihon Solderless Terminal)

When “A” or “D” is specified at the 9th digit, housing and contact are attached.

Contact action

•During measurement : CN1 ; ON
Others ; OFF
•During calibration : CN1 ; OFF
Others ; Contact corresponding to calibration timing is ON

Table 2. Correspondence between measurement channels and measured value

The following table gives measurement channels and their contents according to the code symbols.

Code symbol			Contents
5th digit	6th digit	22nd digit	
P	Y	Y	Ch1: NO
A	Y	Y	Ch1: SO_2
D	Y	Y	Ch1: CO_2
B	Y	Y	Ch1: CO
E	Y	Y	Ch1: CH_4
F	Y	Y	Ch1: NO, Ch2: SO_2
H	Y	Y	Ch1: NO, Ch2: CO
G	Y	Y	Ch1: CO_2, Ch2: CO
L	Y	Y	Ch1: NO, Ch2: SO_2, Ch3: CO
M	Y	Y	Ch1: NO, Ch2: SO_2, Ch3: CO_2, Ch4: CO
P	A, B, C, D	A	Ch1: NO_X, Ch2: O_2, Ch3: Converted NO_X, Ch4: Converted NO_X average, Ch5: O_2 average
A	A, B, C, D	A	Ch1: SO_2, Ch2: O_2, Ch3: Converted SO_2, Ch4: Converted SO_2 average, Ch5: O_2 average
B	A, B, C, D	A	Ch1: CO, Ch2: O_2, Ch3: Converted CO, Ch4: Converted CO average, Ch5: O_2 average
F	A, B, C, D	A	Ch1: NO_X, Ch2: SO_2, Ch3: O_2, Ch4: Converted NO_X, Ch5: Converted SO_2, Ch6: Converted NO_X average, Ch7: Converted SO_2 average, Ch8: O_2 average
H	A, B, C, D	A	Ch1: NO_X, Ch2: CO, Ch3: O_2, Ch4: Converted NO_X, Ch5: Converted CO, Ch6: Converted NO_X average, Ch7: Converted CO average, Ch8: O_2 average
G	A, B, C, D	A	Ch1: CO_2, Ch2: CO, Ch3: O_2, Ch4: Converted CO, Ch5: Converted CO average, Ch6: O_2 average
L	A, B, C, D	A	Ch1: NO_X, Ch2: SO_2, Ch3: CO, Ch4: O_2, Ch5: Converted NO_X, Ch6: Converted SO_2, Ch7: Converted CO, Ch8: Converted NO_X average, Ch9: Converted SO_2 average, Ch10: Converted CO average, Ch11: O_2 average
M	A, B, C, D	A	Ch1: NO_X, Ch2: SO_2, Ch3: CO_2, Ch4: CO, Ch5: O_2, Ch6: Converted NO_X, Ch7: Converted SO_2, Ch8: Converted CO, Ch9: Converted NO_X average, Ch10: Converted SO_2 average, Ch11: Converted CO average, Ch12: O_2 average
B	A, B, C, D	B	Ch1: CO, Ch2: O_2
H	A, B, C, D	B	Ch1: NO, Ch2: CO, Ch3: O_2
G	A, B, C, D	B	Ch1: CO_2, Ch2: CO, Ch3: O_2
L	A, B, C, D	B	Ch1: NO, Ch2: SO_2, Ch3: CO, Ch4: O_2
M	A, B, C, D	B	Ch1: NO, Ch2: SO_2, Ch3: CO_2, Ch4: CO, Ch5: O_2
B	A, B, C, D	C	Ch1: CO, Ch2: O_2, Ch3: Converted CO, Ch4: Converted CO average, Ch5: O_2 average
H	A, B, C, D	C	Ch1: NO_X, Ch2: CO, Ch3: O_2, Ch4: Converted NO_X, Ch5: Converted CO, Ch6: Converted NO_X average, Ch7: Converted CO average, Ch8: O_2 average
G	A, B, C, D	C	Ch1: CO_2, Ch2: CO, Ch3: O_2, Ch4: Converted CO, Ch5: Converted CO average, Ch6: O_2 average
L	A, B, C, D	C	Ch1: NO_X, Ch2: SO_2, Ch3: CO, Ch4: O_2, Ch5: Converted NO_X, Ch6: Converted SO_2, Ch7: Converted CO, Ch8: Converted NO_X average, Ch9: Converted SO_2 average, Ch10: Converted CO average, Ch11: O_2 average
M	A, B, C, D	C	Ch1: NO_X, Ch2: SO_2, Ch3: CO_2, Ch4: CO, Ch5: O_2, Ch6: Converted NO_X, Ch7: Converted SO_2, Ch8: Converted CO, Ch9: Converted NO_X average, Ch10: Converted SO_2 average, Ch11: Converted CO average, Ch12: O_2 average
Q	Y	Y	Ch1:N_2O
R	Y	Y	Ch1:N_2O, Ch2:CO_2
S	Y	Y	Ch1:NO, Ch2:N_2O, Ch3:CO_2
T	Y	Y	Ch1:SO_2, Ch2:N_2O, Ch3:CO_2
U	Y	Y	Ch1:N_2O, Ch2:CO_2, Ch3:CO
V	Y	Y	Ch1:CH_4, Ch2:N_2O, Ch3:CO_2
W	Y	Y	Ch1:NO, Ch2:SO_2, Ch3:N_2O, Ch4:CO_2
S	A, B, C, D	Y	Ch1:NO, Ch2:N_2O, Ch3:CO_2,Ch4:O_2
T	A, B, C, D	Y	Ch1:SO_2, Ch2:N_2O, Ch3:CO_2,Ch4:O_2
U	A, B, C, D	Y, B	Ch1:N_2O, Ch2:CO_2, Ch3:CO, Ch4:O_2
V	A, B, C, D	Y	Ch1:CH_4, Ch2:N_2O, Ch3:CO_2,Ch4:O_2
W	A, B, C, D	Y	Ch1:NO, Ch2:SO_2, Ch3:N_2O, Ch4:CO_2, Ch5:O_2
S	A, B, C, D	A	Ch1:NOx, Ch2:N_2O, Ch3:CO_2, Ch4:O_2, Ch5:Converted NOx, Ch6:Converted NOx average, Ch7:O_2 average
T	A, B, C, D	A	Ch1:SO_2, Ch2:N_2O, Ch3:CO_2,Ch4:O_2, Ch5:Converted SO_2, Ch6:Converted SO_2 average, Ch7:O_2 average
U	A, B, C, D	A, C	Ch1:N_2O, Ch2:CO_2, Ch3:CO, Ch4:O_2, Ch5:Converted CO, Ch6:Converted CO average, Ch7:O_2 average
V	A, B, C, D	A	Ch1:CH_4, Ch2:N_2O, Ch3:CO_2,Ch4:O_2,Ch5:O_2 average
W	A, B, C, D	A	Ch1:NOx, Ch2:SO_2, Ch3:N_2O, Ch4:CO_2, Ch5:O_2, Ch6:Converted NOx, Ch7:Converted SO_2, Ch8:Converted NOx average, Ch9:Converted SO_2 average, Ch10:O_2 average

Note

Note: When the 22nd digit code is A or C, the component of the NO analyzer is displayed as NOx.

Zirconia O_2 analyzer (to be purchased separately)

Measuring method:
Zirconia system

Measurable component and measuring range:

Measurable component		Range
O_2	Oxygen	0 to 25vol%

Repeatability: Within ± 0.5% of full scale
Linearity: Within ± 1% of full scale
Zero drift: Within ± 1% of full scale/week
Span drift: Within ± 2% of full scale/week
Response time: Approx. 20 seconds (for 90% response)
Measured gas flow rate:
0.5 ± 0.25L / min

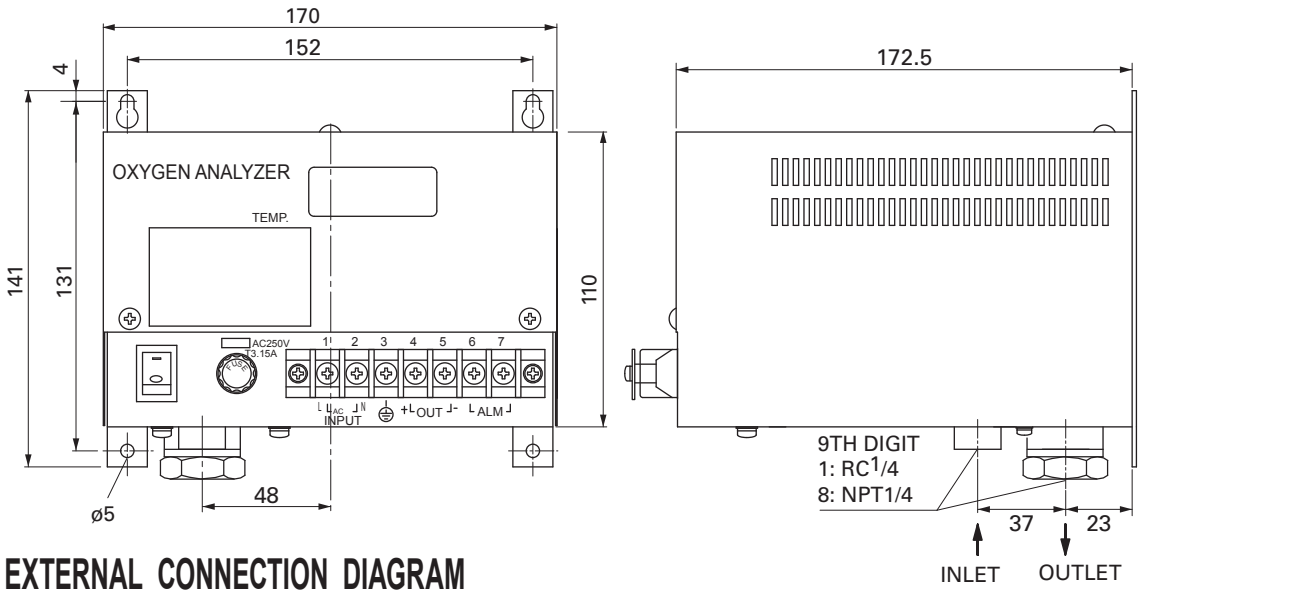
Notes:
- If process gas is combustible, measurement error may occur due to oxygen contained in the process gas.
- If process gas is corrosive (for example, SO_2 beyond 250 ppm range), the service life of zirconia sensor may be shortened.

Gas inlet/outlet size:
Rc1/4 or NPT1/4
Power supply: Rated voltage ; 100 to 115V AC or 200 to 240V AC
Rated frequency ; 50Hz/60Hz
Max. rated power ; 215VA (at start up) 65VA (during normal operation)
Enclosure: Steel casing, for indoor application
Indication: Temperature indication (LED)
Temperature alarm output:
Contact output 1 from A contact,
Contact capacity 220V AC, 1A (resistive load)
Outer dimensions (H x W x D):
141 x 170 x 190mm
Weight: Approx. 3kg
Finish color: Munsell 5Y 7/1

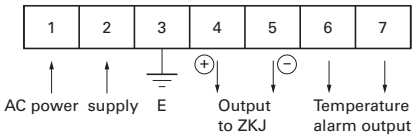
CODE SYMBOLS

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

DIMENSIONS (Unit: mm)



EXTERNAL CONNECTION DIAGRAM



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

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