FUJI ELECTRIC

NDIR TYPE INFRARED GAS ANALYZER
(5-COMPONENT ANALYZER)

DATA SHEET ZKJ

This gas analyzer (ZKJ) is capable of measuring the concentrations of NO, SO_2, CO_2, CO, CH_4 and O_2 components in sample gas.
NO, SO_2, CO_2, CO and CH_4 are measured by non-dispersion infrared method (NDIR), while O_2 is measured by built-in type paramagnetic method sensor or external-mount type zirconia method sensor. A maximum of 5 components including O_2 (max. 4 components except for O_2 measurement) are simultaneously measurable.
The mass flow type twin detector of high sensitivity and reliability adopted in the infrared ray method detection block makes the measurement hardly affected by interfering components.
In addition, a microprocessor is built in and a large-size liquid crystal display is equipped for easier operation, higher accuracy and more functions.
Optimum as an analyzer unit of measurement system for combustion exhaust gas from refuse incinerator and boiler, or gas from different industrial furnaces.

FEATURES

1. Measure five components including O_2 simultaneously and continuously
   Simultaneously and continuously measures up to four components out of NO, SO_2, CO, CO_2 and CH_4, plus O_2, or up to totally five components.
2. Hardly affected by interference by other gases
   The mass flow type twin detector of high sensitivity and reliability adopted makes the measurement hardly affected by interfering components, ensuring a stable operation.
3. Equipped with abundant functions
   O_2 conversion, average value computation, automatic calibration, one touch calibration, upper/lower limit alarm, remote measurement range changeover, range identification signal output, etc. incorporated can configure applications to match particular uses.
4. Easy-to-see large LCD unit
   The large LCD unit adopted allows observing easily the indication of all measured components and computation values.
   The interactive operation facilitates setting.
5. 19 inch rack mount structure
   The mainframe unitized to 19 inch rack type and electrical signal input/output terminal unit also unitized easily configure a gas analyzer system.

SPECIFICATIONS

Standard Specifications

Principle of measurement:

NO, SO_2, CO_2, CO, CH_4;
Non-dispersion infrared-ray absorption method
Single light source and double beams (double-beam system)

O_2 ; Paramagnetic method (O_2 sensor built in) or zirconia sensor method (O_2 sensor externally installed)

Measurable gas components and measuring range:

	Minimum range	Maximam range
NO	0 – 100ppm	0 – 5000ppm
SO_2	0 – 100ppm	0 – 10vol%
CO_2	0 – 50ppm	0 – 100vol%
CO	0 – 100ppm	0 – 100vol%
CH_4	0 – 500ppm	0 – 100vol%
O_2 (built in)	0 – 5vol%	0 – 25vol%
O_2 (External Zirconia)	0 – 5vol%	0 – 25vol%

- Max. 5 components measurement including O_2.
- 1 or 2 measuring range per component.
- Measuring range ratio ≤ 1:5 (O_2 sensor)
  ≤ 1:20
  (except for O_2 sensor)

For measurable components and possible combinations of measuring ranges, refer to Tables 1-(1) to (7).

Measured value indication:

Digital indication in 4 digits
(LCD with back light)

- Instantaneous value of each component
- Instantaneous value after O_2 correction (only in NO, SO_2, CO measurement with O_2)
- Average value after O_2 correction (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, non-isolated output ; 12 points max.
Analog output corresponds to measured value indication in 1:1.
Permissible load resistance;
550Ω max. for 4 to 20 mA
DC100kΩ min. for 0 to 1V DC
* Refer to Table 2, for the channel No. of displayed values and analog output signals.

Analog input signal:
For signal input from externally installed O_2 sensor.
Signal requirement;
(1) Signal from Fuji's Zirconia O_2 sensor (TYPE: ZFK7)
(2) 0 to 1V DC from an O_2 sensor
Input section is not isolated. This feature is effective when an O_2 sensor is not built in.
(An input signal triggers measured concentration indication and O_2 conversion.)

Relay contact output:
1a contact (250V AC/2A, resistive load)
Instrument error, calibration error, range discrimination, auto calibration status pump ON/OFF, peak alarm.
1c contact (250V AC/2A, resistive load)
Upper/lower alarm contact output. (for each channel)
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 changeover, 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; 150VA 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 ; 100% RH max., non-condensing

Dimensions (H x W x D):
Analyzer main unit;
177 x 483 x 690mm
Input/output terminal module;
164 x 318 x 55mm

Mass: Approx. 22 kg (only Analyzer)

Finish color: Front panel; Off-white (Munsell 10Y7.5/0.5 or equivalent)
Casing; Plating, Steel-blue (gray)

Enclosure: Steel casing, for indoor use

Material of gas-contacting parts:
Gas inlet/outlet; SUS304
Sample cell; SUS304/neoprene rubber
Infrared-ray transmitting window; CaF_2
O_2 sensor sampling cell : SUS316
Internal piping; Toaron tube, Teflon tube

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

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

Standard Functions

Output signal holding:
Output signals are held during manual and auto calibrations by activation of holding (turning "ON" its setting).
The values to be held are the ones just before start calibration mode.
Indication values will not be held.

Remote output holding:
Output signal is held at the latest value by short-circuiting the remote output holding input terminals.
Holding is maintained while the terminals are short-circuited. Indication values will not be held.

Remote range changeover:
Measuring range can be changed according to an external signal when remote range changeover input is received.
Changeover is effective only when remote range setting is turned on. In this case, measuring range cannot be changed manually.
When the contact input terminals for each component are short-circuited, the first range is selected, and it is changed over to the second range when the terminals are open.

Range identification signal:
The present measuring range is identified by a contact signal.
The contact output terminals for each component are short-circuited when the first range is selected, and when the second range is selected, the terminals are open.

Auto calibration:
Auto calibration is carried out periodically at the preset cycle.
When a standard gas cylinder for calibration and a solenoid valve for opening/closing the gas flow line are prepared externally by the customer, calibration will be carried out with the solenoid valve drive contacts for zero calibration and each span calibration turned on/off sequentially at the set auto calibration timing.

Auto calibration cycle setting:
Auto calibration cycle is set.
Setting is variable within 1 to 99 hours (in increments of 1 hour) or 1 to 40 days (in increments of 1 day).

Gas flow time setting:
The time for flowing each calibration gas in auto calibration is set.
Settable within 60 to 599 seconds (in increments of 1 second)

Auto calibration remote start:
Auto calibration is carried out only once according to an external input signal. Calibration sequence is settable in the same way as the general auto calibration.
Auto calibration is started by opening the auto calibration remote start input terminals after short-circuiting for 1.5 seconds or longer.

Auto zero calibration:
Auto zero calibration is carried out periodically at the preset cycle.
This cycle is independent on "Auto calibradion" cycle.
When zero calibration gas and solenoid valve for opening/closing the calibration gas flow line are prepared externally by the customer, zero calibration will be carried out with the solenoid valve drive contact for zero calibration turned on/off at the set auto zero calibration timing.

Auto zero calibration cycle setting:
Auto zero calibration cycle is set.
Setting is variable within 1 to 99 hours (in increments of 1 hour) or Setting is variable within 1 to 40 days (in increments of 1 day)

Gas flow time setting:
The timing for flowing zero gas in auto zero calibration is set.
Settable 60 to 599 seconds (in increments of 1 second)

Upper/lower limit alarm:
Alarm contact output turns on when measurement value reach to the preset upper or lower limit alarm value.
Contacts close when the instantaneous value of each component becomes larger than the upper alarm limit value or smaller than the lower alarm limit value.

Instrument error contact output:
Contacts close at occurrence of analyzer error No. 1, 3 or 10.

Calibration error contact output:
Contacts close at occurrence of manual or auto calibration error (any of errors No. 4 to 9).

Auto calibration status contact outputs:
Contacts close during auto calibration.

Pump ON/OFF contact output:
During measurement, this contact close. While calibration gas is flowing, this contact open. This contact is connected in power supply of pump, and stop the sample gas while calibration gas flowing.

Optional Functions

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

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

C : Sample gas concentration after O_2 correction
Cs : Measured concentration of sample gas
Os : Measured O_2 concentration
On: Standard O_2 concentration (value changeable by setting)
*The upper limit value of the fractional part in this calculation is 4.
The result of calculation is indicated and output in an analog output signal.

Average value after O_2 correction and O_2 average value calculation:
The result of O_2 correction or instantaneous O_2 value can be outputted as an average value in the determined period of time.
Used for averaging is the moving average method in which sampling is carried out at intervals of 30 seconds.
(Output is updated every 30 seconds. It is the average value in the determined period of time just before the latest updating.)
Averaging time is settable within 1 to 59 minutes (in increments of 1 minute) or 1 to 4 hours (in increments of 1 hour).

Average value resetting:
The above-mentioned output of average value is started from the initial state by opening the average value resetting input terminals after short-circuiting for 1.5 seconds or longer.
Output is reset by short-circuiting and restarted by opening.

CO concentration peak count alarm:
(added only for CO/O_2 measurement)
Alarm output turns on according to the preset concentration and count.
Whenever the instantaneous value of CO exceeds the preset concentration value, count increments. If the count exceeds the preset value in one hour, the alarm contacts close.

Communication function:
RS-232C (9pins D-sub)
Half-duplex bit serial
Start-stop synchronization
Modbus™ protcol
Contents: Read/Wright parameters
Read measurement concentration and instrument status
Remark: When connecting via RS-485 interface, a RS-232C ⟷ RS-485 converter should be used.

Performance

Repeatability : ±0.5% of full scale
Linearity : ±1% of full scale
Zero drift : ±2% of full scale/week
Span drift : ±2% of full scale/week
Response time :
(for 90% FS response)
Within 60 seconds including replacement time of sample gas (when gas flow rate is 0.5L / min)

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 side should be open to the atmospheric air.)
Dust : 100μg/Nm^3 or less in particle size of 1μm or less
Mist : Unallowable
Moisture : Below a level where saturation occurs at 2˚C (condensation unallowable).
Corrosive component:
HCl 1 ppm or less
Standard gas for calibration:
Zero gas ; Dry N_2
Span gas ; Each sample gas having concentration 90 to 100% of its measuring range (recommended).
Gas beyond concentration 100%FS is unusable.
In case a zirconia O_2 analyzer is installed externally and calibration is carried out on the same calibration gas line:
Zero gas ; Dry air or atmospheric air (provided without CO_2 sensor)
Span gas ; For other than O_2 measurement, each sample gas having concentration 90 to 100% of its measuring range.
For O_2 measurement, O_2 gas of 1 to 2 vol%.

Installation Requirements

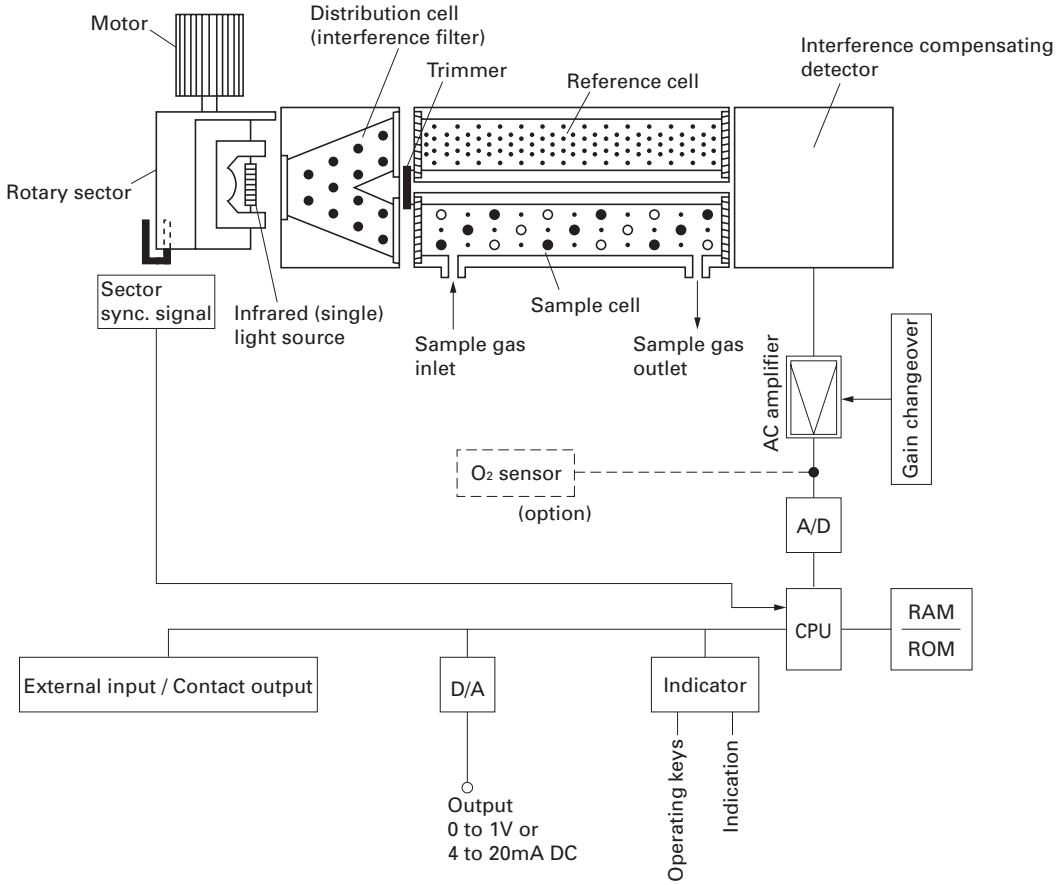
- Indoor use. (Select a place where the equipment does not receive direct sunshine, draft/rain or radiation from hot substances. If such a place cannot be found, a roof or cover should be prepared for protection.)
- Avoide a place where receives heavy vibration
- Select a place where atmospheric air is clean

EC Directive Compliance

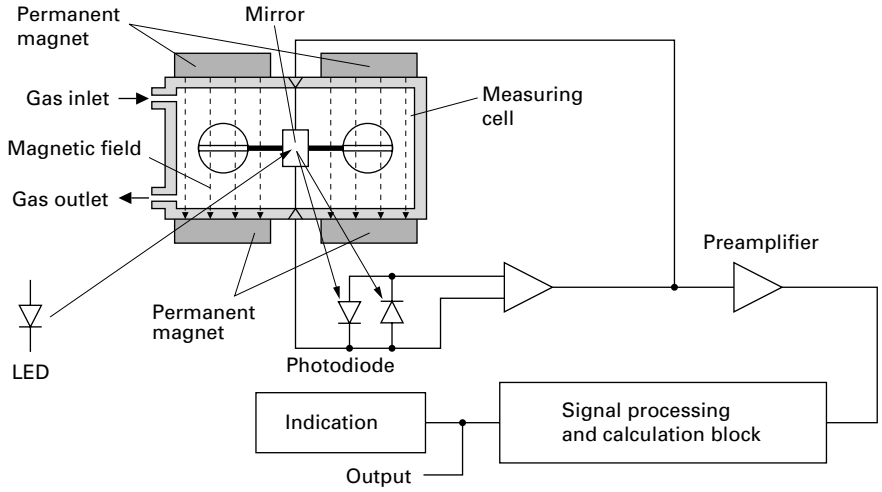
The product conforms to the requirements of the Low Voltage Directive 73/23/EEC and EMC directive 89/336/EEC (as amended by Directive 92/31/EEC), both as amended by Directive 93/68/EEC.
It conforms to following standards for product safety and electromagnetic compatibility ;

EN61010-1 : 2001 Safety requirements for electrical equipment for measurement, control and laboratory use.
"Installation Category II"
"Pollution Degree 2"
EN61326-1 : 1997, AI: 1998, A2: 2001
Electrical equipment for measurement, control and laboratory use — EMC requirements.
*The product mounted in a steel enclosure conforms to the requirements of EMC directive.

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

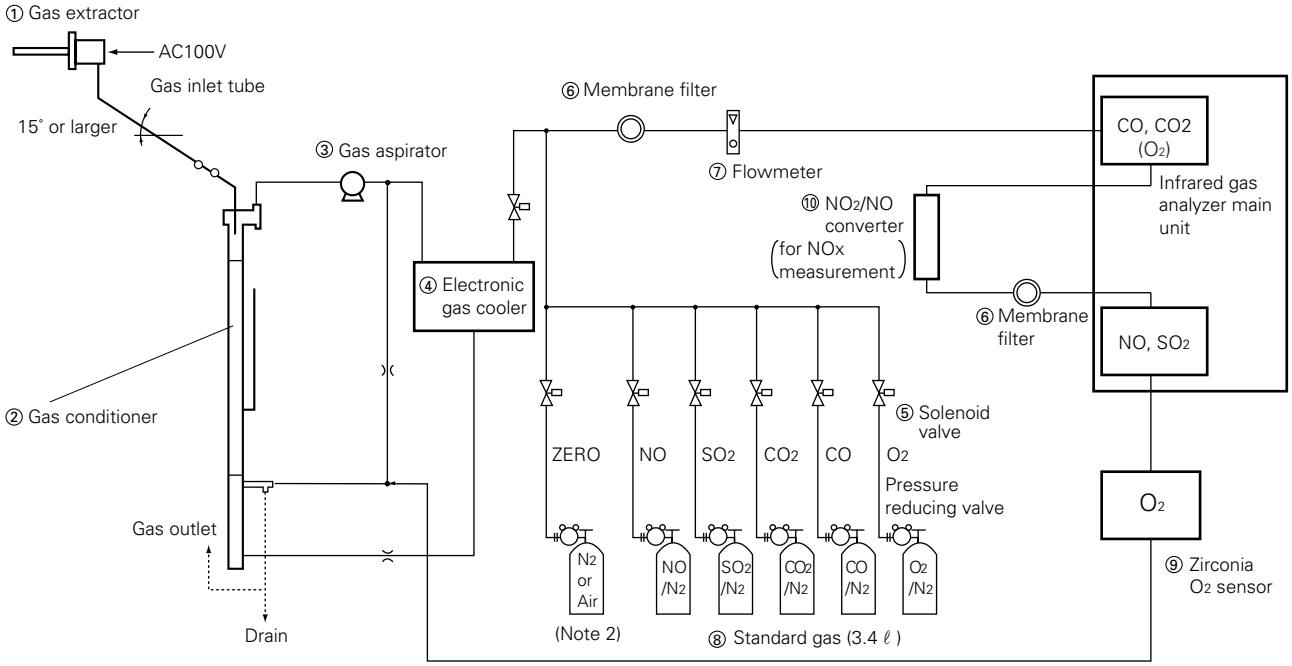


Principle diagram of paramagnetic type measurement (For O_2)



Example configuration of gas sampling system

The following illustrates a typical system configuration for five 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 Gas conditioner: For separation of drain, prevention of drain from being sucked through secondary filter and composite operation of constant-pressure bubbler

③ Gas aspirator: For aspiration of sample gas (sample gas flow rate approx. 2L/min)

④ Electronic gas cooler: Dries the moisture in sample gas to a dew point of approx. 3˚C.

⑤ Solenoid valve: Used for introducing calibration gas.

⑥ 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.

⑦ Flowmeter: Adjusts and monitors the flow rate of sample gas.

⑧ Standard gas: Reference gas used for calibrating zero and span of the analyzer. Total 6 cylinders required for air, zero gas, span gas NO, SO_2, CO, CO_2 and O_2.

⑨ Zirconia O_2 sensor: (This is not necessary in case when the zirconia type O_2 sensor is built-in.) External zirconia oxygen sensor used for measuring the oxygen concentration (0 to 25%) in sample gas.

⑩ Converter: Added to NOx analyzer. A special catalyst material for efficient conversion of NO_2 gas to NO is used.

*(Note) For each gas sampling device, refer to the separate Data Sheet for each gas sampling device.

CODE SYMBOLS

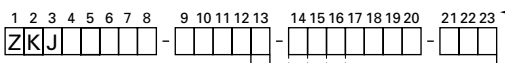
Digit	Description				note	Z K J	4	5	6	7	8	-	9	10	11	12	13	-	14	15	16	17	18	19	20	-	21	22	23
4	<Custom specifications> Standard						F																					
5	<Measurable component (SO_2, CO_2, CO, CH_4) >																											
	1st componet	2nd componet	3rd componet	4th componet																								
	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																				
6	<Measurable component (O_2)>				note 1				Y																			
	None								A																			
	External zirconia type O_2 sensor (Model : ZFK7)								B																			
	External O_2 analyzer								C																			
	Built-in paramagnetic type O_2 sensor																											
7	<Power supply and gas inlet/outlet>				note 7					0																		
	100 to 240V AC, Rc1/4									1																		
	100 to 240V AC, Rc1/4, with purging									2																		
	100 to 240V AC, NPT1/4									3																		
	100 to 240V AC, NPT1/4, with purging																											
8	<Revision code>										2																	
9	<Structure>												B															
	19-inch rack mounting type												C															
	19-inch rack mounting type with slide rail																											
10	<Indication and power supply cable>				note 8									J														
	In Japanese, power cable rated 125V													E														
	In English, power cable rated 125V (UL)													U														
	In English, power cable rated 250V (CEE)																											
11	<Measuring range> 1st component, 1st range				note 2											A												
	0 to 50ppm				note 6											B												
	0 to 100ppm															C												
	0 to 200ppm															D												
	0 to 250ppm															E												
	0 to 500ppm															F												
	0 to 1000ppm															G												
	0 to 2000ppm															H												
	0 to 5000ppm															J												
	0 to 1%															K												
	0 to 2%															Q												
	0 to 3%															L												
	0 to 5%															M												
	0 to 10%															N												
	0 to 20%															W												
	0 to 40%															P												
	0 to 50%															X												
	0 to 70%															R												
	0 to 100%																											
12	<Measuring range> 1st component, 2nd range				note 2												Y											
	None																B											
	0 to 100ppm				note 6												C											
	0 to 200ppm																D											
	0 to 250ppm																E											
	0 to 500ppm																F											
	0 to 1000ppm																G											
	0 to 2000ppm																H											
	0 to 5000ppm																J											
	0 to 1%																K											
	0 to 2%																Q											
	0 to 3%																L											
	0 to 5%																M											
	0 to 10%																N											
	0 to 20%																W											
	0 to 40%																P											
	0 to 50%																X											
	0 to 70%																R											
	0 to 100%																											

Digit No. of code

(note1) External O_2 sensor signal should be 0-1VDC linear of full scale, when " B " is specified at the 6th digit. External Zirconia O_2 sensor and external O_2 analyzer are not included in this order.

(note2) Allowable combinations of ranges are specified in the table 1-(1) to 1-(7) in page 9 and 10.

(note8) " E " and " U " means in English indication, but differ in attached power supply cable (rating and plug type). Select according to operating power supply voltage.
The plug type of cable is "North American type" when " E " is specified, "European type" when " U " is specified.



Digit	Description	note
13	<Measuring range> 2nd component, 1st range	note 2
	None	Y
	0 to 100ppm	B
	0 to 200ppm	C
	0 to 250ppm	D
	0 to 500ppm	E
	0 to 1000ppm	F
	0 to 2000ppm	G
	0 to 5000ppm	H
	0 to 1%	J
	0 to 2%	K
	0 to 3%	Q
	0 to 5%	L
	0 to 10%	M
	0 to 20%	N
	0 to 40%	W
	0 to 50%	P
	0 to 70%	X
	0 to 100%	R
14	<Measuring range> 2nd component, 2nd range	note 2
	None	Y
	0 to 200ppm	C
	0 to 250ppm	D
	0 to 500ppm	E
	0 to 1000ppm	F
	0 to 2000ppm	G
	0 to 5000ppm	H
	0 to 1%	J
	0 to 2%	K
	0 to 3%	Q
	0 to 5%	L
	0 to 10%	M
	0 to 20%	N
	0 to 40%	W
	0 to 50%	P
	0 to 70%	X
	0 to 100%	R
15	<Measuring range> 3rd component, 1st range	note 2
	None	Y
	0 to 100ppm	B
	0 to 200ppm	C
	0 to 250ppm	D
	0 to 500ppm	E
	0 to 1000ppm	F
	0 to 2000ppm	G
	0 to 5000ppm	H
	0 to 1%	J
	0 to 2%	K
	0 to 3%	Q
	0 to 5%	L
	0 to 10%	M
	0 to 20%	N
	0 to 40%	W
	0 to 50%	P
	0 to 70%	X
	0 to 100%	R
16	<Measuring range> 3rd component, 2nd range	note 2
	None	Y
	0 to 200ppm	C
	0 to 250ppm	D
	0 to 500ppm	E
	0 to 1000ppm	F
	0 to 2000ppm	G
	0 to 5000ppm	H
	0 to 1%	J
	0 to 2%	K
	0 to 3%	Q
	0 to 5%	L
	0 to 10%	M
	0 to 20%	N
	0 to 40%	W
	0 to 50%	P
	0 to 70%	X
	0 to 100%	R

(note2) Allowable combinations of ranges are specified in the table 1-(1) to 1-(7) in page 9 and 10.

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
17	<Measuring range> 4th component, 1st range	note 2	
	None		Y
	0 to 100ppm		B
	0 to 200ppm		C
	0 to 250ppm		D
	0 to 500ppm		E
	0 to 1000ppm		F
	0 to 2000ppm		G
	0 to 5000ppm		H
	0 to 1%		J
	0 to 2%		K
	0 to 3%		Q
	0 to 5%		L
	0 to 10%		M
	0 to 20%		N
	0 to 40%		W
	0 to 50%		P
	0 to 70%		X
	0 to 100%		R
18	<Measuring range> 4th component, 2nd range	note 2	
	None		Y
	0 to 200ppm		C
	0 to 250ppm		D
	0 to 500ppm		E
	0 to 1000ppm		F
	0 to 2000ppm		G
	0 to 5000ppm		H
	0 to 1%		J
	0 to 2%		K
	0 to 3%		Q
	0 to 5%		L
	0 to 10%		M
	0 to 20%		N
	0 to 40%		W
	0 to 50%		P
	0 to 70%		X
	0 to 100%		R
19	<O_2 analyzer, 1st range>		
	None		Y
	0 to 5%		L
	0 to 10%		M
	0 to 25%		V
20	<O_2 analyzer, 2nd range>		
	None		Y
	0 to 10%		M
	0 to 25%		V
21	<Output>		
	4 to 20mA DC		A
	0 to 1V DC		B
	4 to 20mA DC + Commnication function		C
	0 to 1V DC + Commnication function		D
22	<O_2 correction and O_2 average value output>	note 3	
	None	note 4	Y
	With O_2 correction output		A
	With peak alarm		B
	With O_2 correction output and peak alarm		C
23	<Adjustment>	note 5	
	For combustion exhaust gas		B
	Others		Z

(note1) External O_2 sensor signal should be 0-1VDC linear of full scale, when " B " is specified at the 6th digit. External Zirconia O_2 sensor and external O_2 analyzer are not included in this order.
(note2) Allowable combinations of ranges are specified in the table 1-(1) to 1-(7) in page 9 and 10.
(note3) O_2 correction is carried out for CO, SO_2 and NO. At the same time, average value output after O_2 correction and O_2 average value output are added. Peak count alarm is carried out for CO.
(note4) " Y " should be specified when without O_2 measurement (when 6th digit is Y).
(note5) A gas composition table should be issued when " Z " is specified.
(note6) Only O_2 sensor can be specified.
(note7) When specifying the 3-and 4-component analyzer for purging, only one set of gas inlet / outlet is provided. The NO_2/NO converter cannot be arranged between the gas inlet and outlet.
(note8) " E " and " U " means in English indication, but differ in attached power supply cable (rating and plug type). Select according to operating power supply voltage.
The plug type of cable is "North American type" when " E " is specified, "European type" when " U " is specified.

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

(1) Single-component analyzer (NO, SO_2, CO_2, CO or CH_4)

☆ : NO analyzer measurable range　□ : SO_2 analyzer measurable range　◎ : CO_2 analyzer measurable range

○ : CO analyzer measurable range　△ : CH_4 analyzer measurable range

1st range \ 2nd range		B	C	D	E	F	G	H	J	K
		0 to 100ppm	0 to 200ppm	0 to 250ppm	0 to 500ppm	0 to 1000ppm	0 to 2000ppm	0 to 5000ppm	0 to 1%	0 to 2%
A	0 to 50ppm	◎	◎	◎	◎	◎	—	—	—	—
B	0 to 100ppm	—	☆□◎○	☆□◎○	☆□◎○	☆□◎○	☆□◎○	—	—	—
C	0 to 200ppm	—	—	☆□◎○	☆□◎○	☆□◎○	☆□◎○	—	—	—
D	0 to 250ppm	—	—	—	☆□◎○	☆□◎○	☆□◎○	☆□◎○	—	—
E	0 to 500ppm	—	—	—	—	☆□◎○△	☆□◎○△	☆□◎○△	□◎○△	—
F	0 to 1000ppm	—	—	—	—	—	☆□◎○△	☆□◎○△	□◎○△	□◎○△
G	0 to 2000ppm	—	—	—	—	—	—	☆□◎○△	□◎○△	□◎○△
H	0 to 5000ppm	—	—	—	—	—	—	—	□◎○△	□◎○△
J	0 to 1%	—	—	—	—	—	—	—	—	□◎○△
K	0 to 2%	—	—	—	—	—	—	—	—	—
Q	0 to 3%	—	—	—	—	—	—	—	—	—
L	0 to 5%	—	—	—	—	—	—	—	—	—
M	0 to 10%	—	—	—	—	—	—	—	—	—
N	0 to 20%	—	—	—	—	—	—	—	—	—
W	0 to 40%	—	—	—	—	—	—	—	—	—
P	0 to 50%	—	—	—	—	—	—	—	—	—
X	0 to 70%	—	—	—	—	—	—	—	—	—
R	0 to 100%	—	—	—	—	—	—	—	—	—

1st range \ 2nd range		Q	L	M	N	W	P	X	R
		0 to 3%	0 to 5%	0 to 10%	0 to 20%	0 to 40%	0 to 50%	0 to 70%	0 to 100%
A	0 to 50ppm	—	—	—	—	—	—	—	—
B	0 to 100ppm	—	—	—	—	—	—	—	—
C	0 to 200ppm	—	—	—	—	—	—	—	—
D	0 to 250ppm	—	—	—	—	—	—	—	—
E	0 to 500ppm	—	—	—	—	—	—	—	—
F	0 to 1000ppm	—	—	—	—	—	—	—	—
G	0 to 2000ppm	□◎○△	—	—	—	—	—	—	—
H	0 to 5000ppm	□◎○△	□◎○△	□◎○△	—	—	—	—	—
J	0 to 1%	□◎○△	□◎○△	□◎○△	◎○△	—	—	—	—
K	0 to 2%	□◎○△	□◎○△	□◎○△	◎○△	◎○△	—	—	—
Q	0 to 3%	—	◎○△	□◎○△	◎○△	◎○△	◎○△	—	—
L	0 to 5%	—	—	□◎○△	◎○△	◎○△	◎○△	◎○△	◎○△
M	0 to 10%	—	—	—	◎○△	◎○△	◎○△	◎○△	◎○△
N	0 to 20%	—	—	—	—	◎○△	◎○△	◎○△	◎○△
W	0 to 40%	—	—	—	—	—	◎○△	◎○△	◎○△
P	0 to 50%	—	—	—	—	—	—	◎○△	◎○△
X	0 to 70%	—	—	—	—	—	—	—	◎○△
R	0 to 100%	—	—	—	—	—	—	—	◎○△

(2) Double-component analyzer (NO and SO_2)

○ : Double components measurable range. 1st component ; NO, 2nd component ; SO_2.

1st component ↓(NO),1st range		2nd component (SO_2), 1st range → SO_2						
		B	C	D	E	F	G	H
		0 to 100ppm	0 to 200ppm	0 to 250ppm	0 to 500ppm	0 to 1000ppm	0 to 2000ppm	0 to 5000ppm
NO	B 0 to 100ppm	○	○	○	○	○	○	—
	C 0 to 200ppm	○	○	○	○	○	○	—
	D 0 to 250ppm	○	○	○	○	○	○	—
	E 0 to 500ppm	○	○	○	○	○	○	○
	F 0 to 1000ppm	○	○	○	○	○	○	○
	G 0 to 2000ppm	○	○	○	○	○	○	○
	H 0 to 5000ppm	—	—	—	○	○	○	○

※ 1st range (low range) must meet the combination in above table.
2nd range, both NO and SO_2 measurements must be greater than and, smaller than 20 times, the 1st range.

(3) Double-component analyzer (NO and CO)

Both NO and CO analyzer must meet the range in Table 1-(1); single component analyzer.

(4) Double-component analyzer (CO_2 and CO)

○□△ : Double components measurable. 1st component ; CO_2, 2nd component ; CO.

			2nd component (CO), 1st range ⟶ CO							
1st component ↓ (CO_2), 1st range			B	C	D	E	F	G	H	J
			0 to 100ppm	0 to 200ppm	0 to 250ppm	0 to 500ppm	0 to 1000ppm	0 to 2000ppm	0 to 5000ppm	0 to 1%
CO_2	G	0 to 2000ppm	□×2.5	□×2.5	□×2.5	□×5	□×10	□×10	○	○
	H	0 to 5000ppm	□×1	□×1	□×1	□×2	□×4	□×4	○	○
	J	0 to 1%				□×1	□×2	□×2	□×10	○
	K	0 to 2%					□×1	□×1	□×5	□×10
	L	0 to 5%							□×2	□×5
	M	0 to 10%	□×2	□×2	□×2	□×2	△×2×10	△×2×5	□×2	□×5
	N	0 to 20%	□×1	□×1	□×1	□×1	△×1×10	△×1×5	□×1	□×2.5

※ 1st range (low range) must meet the combination in above table.
2nd range, ○ is specified; both CO_2 and CO measurements must be greater than and, smaller than 20 times, the 1st range.
□ is specified; CO measurements must be greater than and, smaller than 20 times, the 1st range.
CO_2 measurements must be greater than and, smaller than the maximum ratio writen after the □ mark, the 1st range.
△ is specified; both CO_2 and CO measurements must be greater than and, smaller than the maximum ratio writen after the △ mark, the 1st range.
The ratio, first value is for CO_2, second value is for CO.
example : △×2×5 means, 2nd range of CO_2 must be smaller than 2 times of 1st range, 2nd range of CO must be smaller than 5 times of 1st range.
× 1 means only 1st range.

(5) Three-component analyzer (NO, SO_2 and CO)

NO/SO_2 analyzer must meet the combination range in Table 1-(2): Double-component analyzer. CO analyzer must meet the range in Table 1-(1): Single component analyzer.

(6) Four-component analyzer (NO, SO_2, CO_2 and CO)

NO/SO_2 analyzer must meet the combination range in Table 1-(2): Double-component analyzer. CO_2/CO analyzer must meet the range in Table 1-(4): Double-component analyzer.

(7) O_2 analyzer

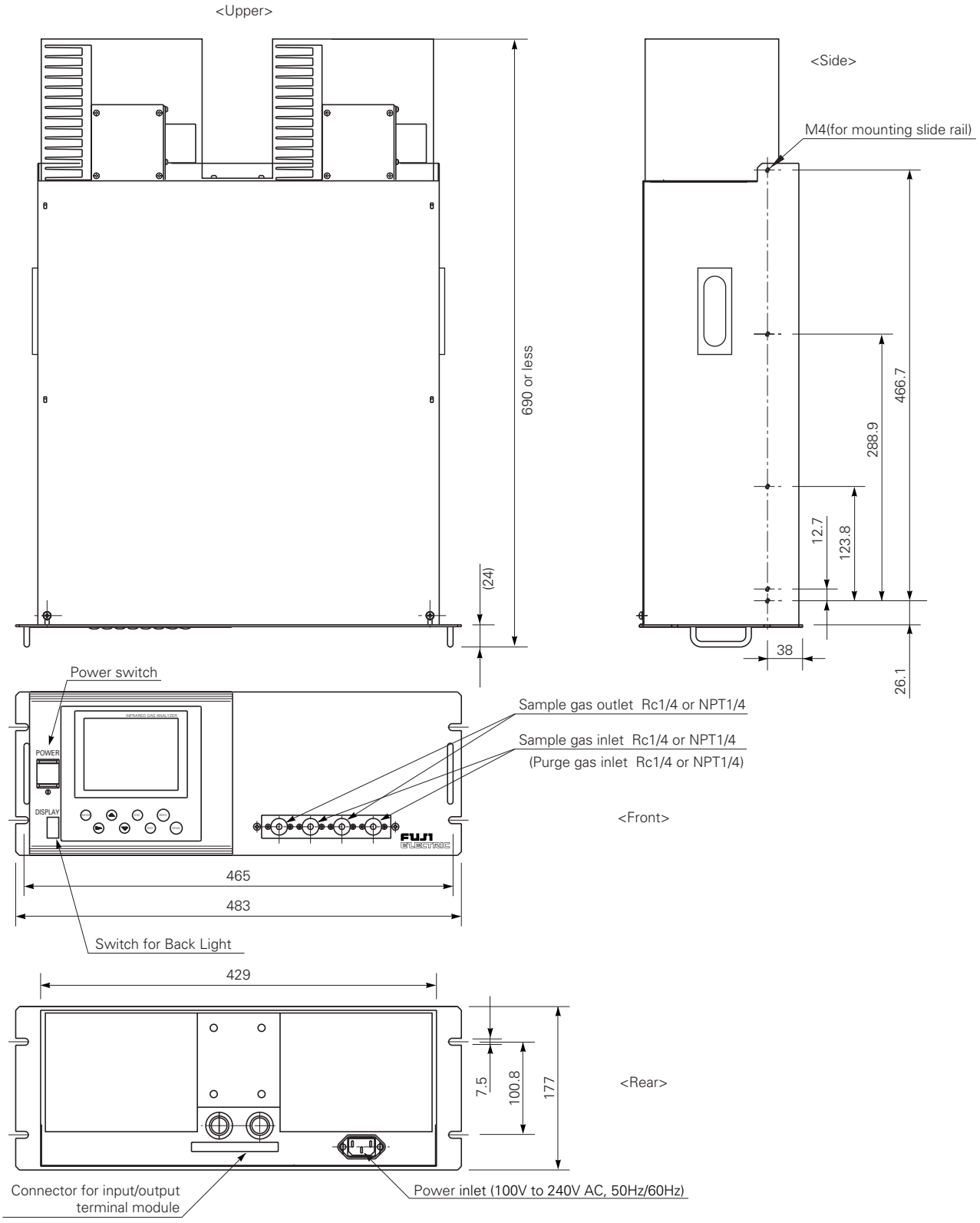
○ : Built-in O_2 analyzer measurable range,
△ : External zirconia type O_2 analyzer measurable range

2nd range / 1st range		M	V
		0 to 10%	0 to 25%
L	0 to 5%	○△	○△
M	0 to 10%	—	○△
V	0 to 25%	—	○△

*O_2 analyzer is selectable indifferently to combination with other components.
External zirconia type O_2 analyzer is assumed to be Fuji's type ZFK7.

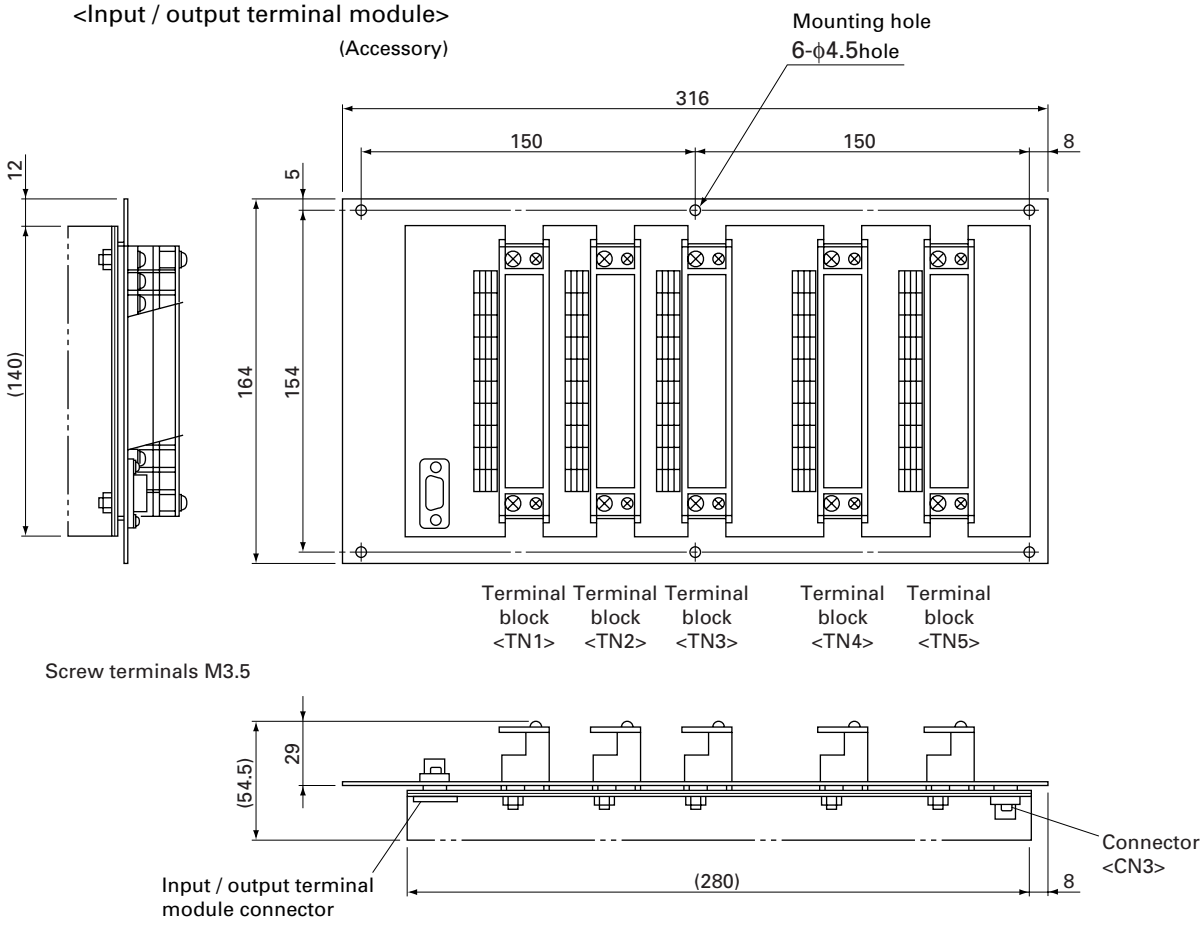
OUTLINE DIAGRAM (Unit: mm)

<Analyzer main unit>



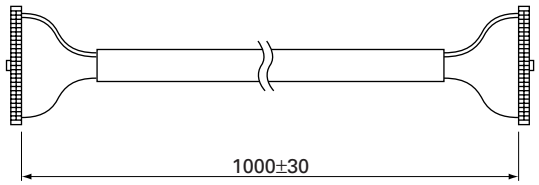
<Input / output terminal module>

(Accessory)

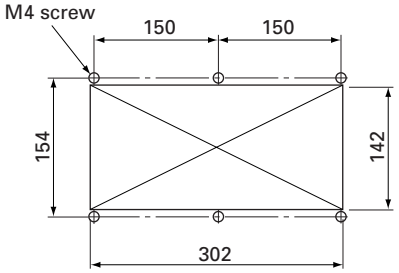


<Cable for connecting input / output terminal>

(Accessory)



<Dimensions for mounting input / output terminal module>

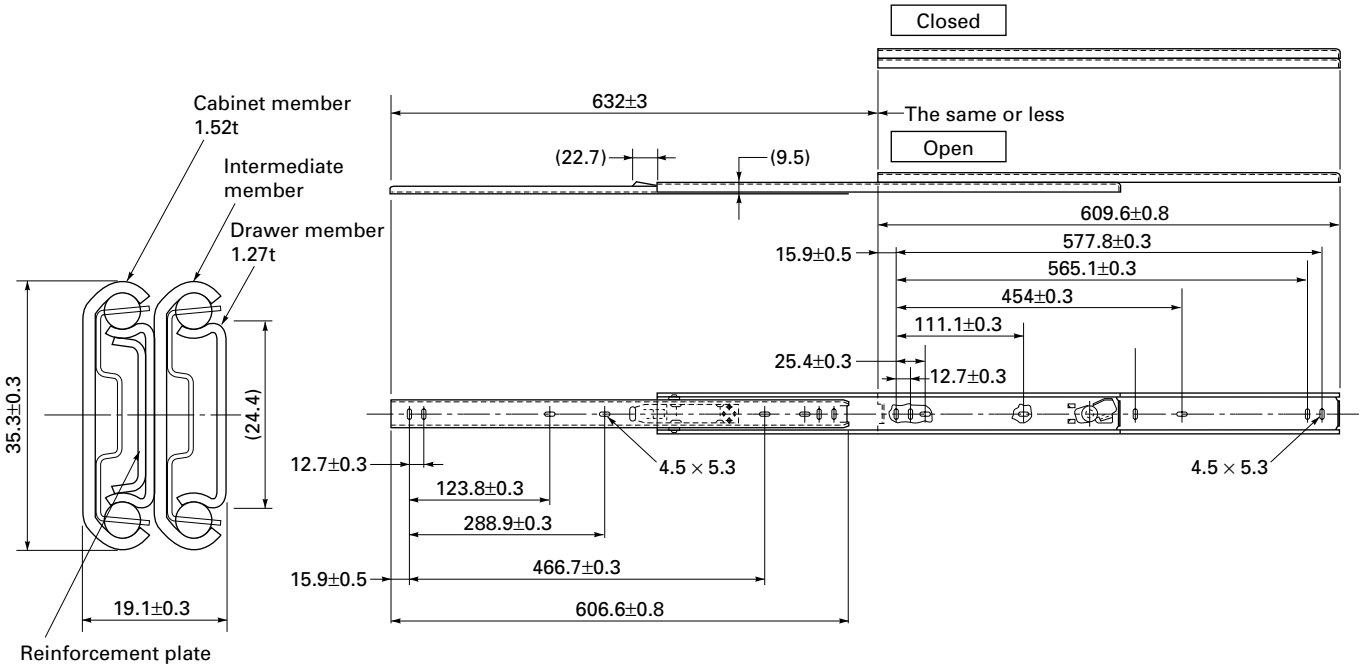


Cut M4 screw holes at 6 positions.
Drill a rectangular hole of 302 × 142mm or more in the center.

OUTLINE DIAGRAM OF ACCESSORY SLIDE RAIL (Unit: mm)

* The slide rails are attached to this equipment when designated.

Model : 305A-24/Accuride International Inc.

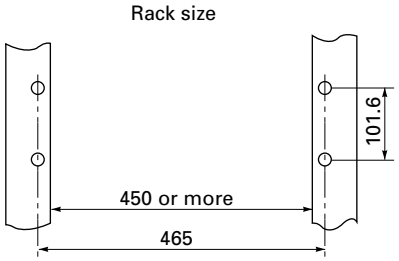


19-inch rack mounting method:

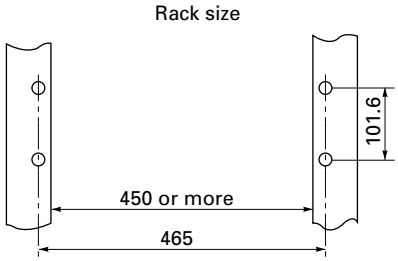
The mass of the instrument should be supported at the bottom of the unit (or the side of the unit when mounted with the slide rails).

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

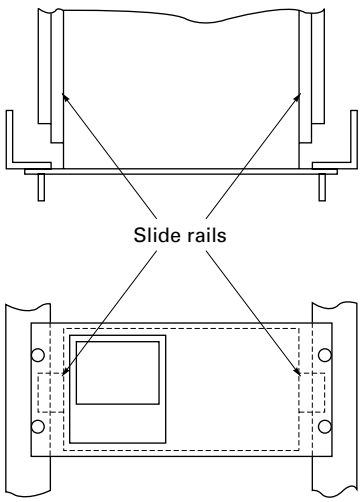
Slide rail mounted type



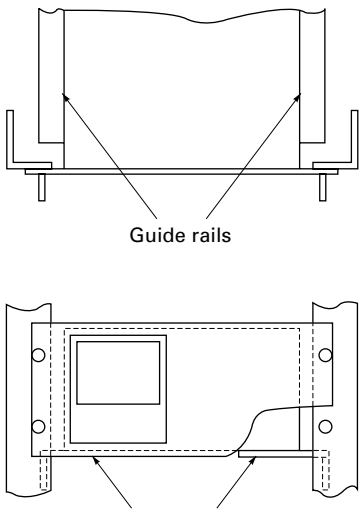
Guide rail mounted type



Mounting diagram



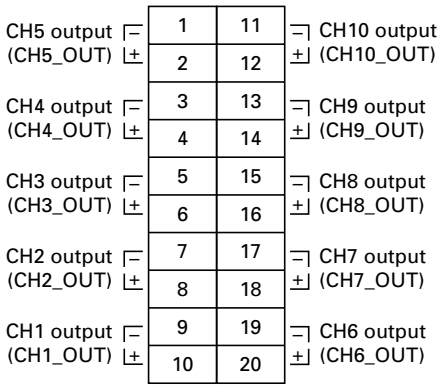
Mounting diagram



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

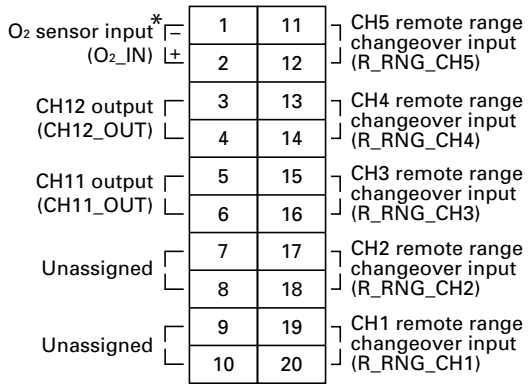
EXTERNAL CONNECTION DIAGRAM

Terminal block 1
<TN1>



(M3.5 screw)

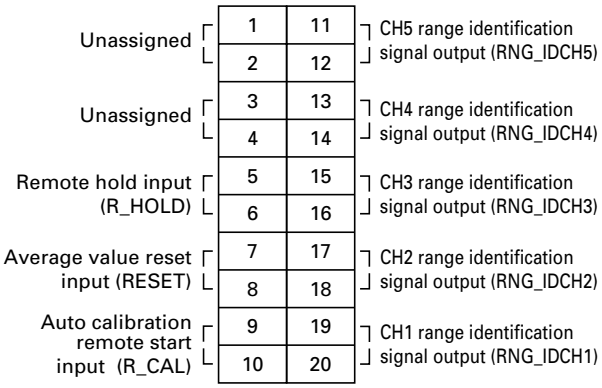
Terminal block 2
<TN2>



(M3.5 screw)

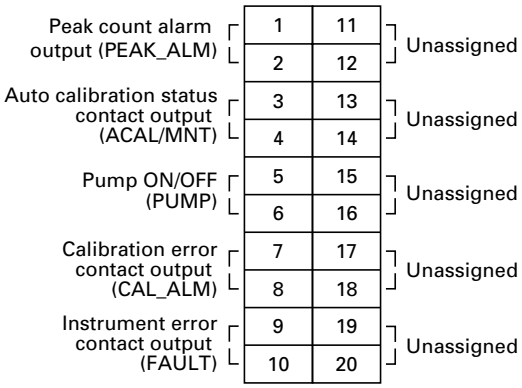
∗ : For external O_2 sensor input.

Terminal block 3
<TN3>



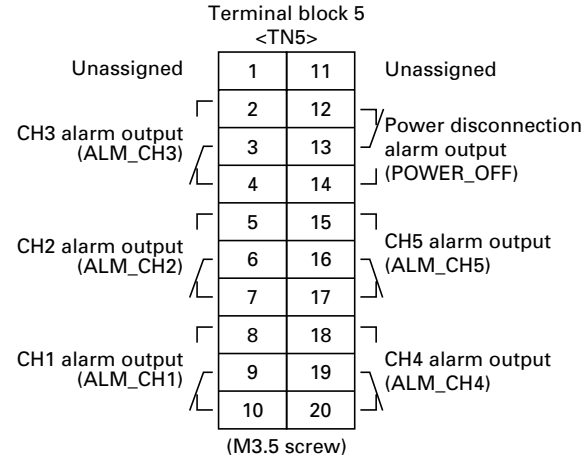
(M3.5 screw)

Terminal block 4
<TN4>



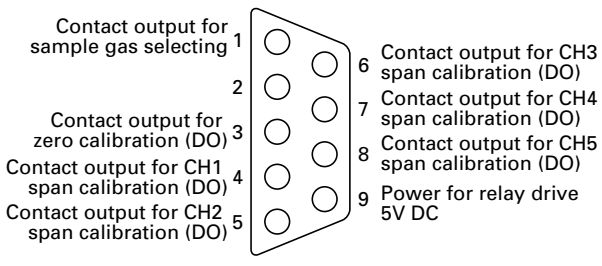
(M3.5 screw)

Terminal block 5
<TN5>



(M3.5 screw)

Connector
<CN3>
Solenoid valve drive signal output for calibration



<D-sub 9P>

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 the table on the next page.

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	22th 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
N	Y	Y	CH1: NO, CH2: CH_4, CH3: CO_2, CH4: CO
P	A, B, C	A	CH1: NO_X, CH2: O_2, CH3: Corrected NO_X, CH4: Corrected NO_X average, CH5: O_2 average
A	A, B, C	A	CH1: SO_2, CH2: O_2, CH3: Corrected SO_2, CH4: Corrected SO_2 average, CH5: O_2 average
B	A, B, C	A	CH1: CO, CH2: O_2, CH3: Corrected CO, CH4: Corrected CO average, CH5: O_2 average
E	A, B, C	A	CH1: CH_4, CH2: O_2, CH3: O_2 average
F	A, B, C	A	CH1: NO_X, CH2: SO_2, CH3: O_2, CH4: Corrected NO_X, CH5: Corrected SO_2, CH6: Corrected NO_X average, CH7: Corrected SO_2 average, CH8: O_2 average
H	A, B, C	A	CH1: NO_X, CH2: CO, CH3: O_2, CH4: Corrected NO_X, CH5: Corrected CO, CH6: Corrected NO_X average, CH7: Corrected CO average, CH8: O_2 average
G	A, B, C	A	CH1: CO_2, CH2: CO, CH3: O_2, CH4: Corrected CO, CH5: Corrected CO average, CH6: O_2 average
L	A, B, C	A	CH1: NO_X, CH2: SO_2, CH3: CO, CH4: O_2, CH5: Corrected NO_X, CH6: Corrected SO_2, CH7: Corrected CO, CH8: Corrected NO_X average, CH9: Corrected SO_2 average, CH10: Corrected CO average, CH11: O_2 average
M	A, B, C	A	CH1: NO_X, CH2: SO_2, CH3: CO_2, CH4: CO, CH5: O_2, CH6: Corrected NO_X, CH7: Corrected SO_2, CH8: Corrected CO, CH9: Corrected NO_X average, CH10: Corrected SO_2 average, CH11: Corrected CO average, CH12: O_2 average
B	A, B, C	B	CH1: CO, CH2: O_2
H	A, B, C	B	CH1: NO, CH2: CO, CH3: O_2
G	A, B, C	B	CH1: CO_2, CH2: CO, CH3: O_2
L	A, B, C	B	CH1: NO, CH2: SO_2, CH3: CO, CH4: O_2
M	A, B, C	B	CH1: NO, CH2: SO_2, CH3: CO_2, CH4: CO, CH5: O_2
B	A, B, C	C	CH1: CO, CH2: O_2, CH3: Corrected CO, CH4: Corrected CO average, CH5: O_2 average
H	A, B, C	C	CH1: NO_X, CH2: CO, CH3: O_2, CH4: Corrected NO_X, CH5: Corrected CO, CH6: Corrected NO_X average, CH7: Corrected CO average, CH8: O_2 average
G	A, B, C	C	CH1: CO_2, CH2: CO, CH3: O_2, CH4: Corrected CO, CH5: Corrected CO average, CH6: O_2 average
L	A, B, C	C	CH1: NO_X, CH2: SO_2, CH3: CO, CH4: O_2, CH5: Corrected NO_X, CH6: Corrected SO_2, CH7: Corrected CO, CH8: Corrected NO_X average, CH9: Corrected SO_2 average, CH10: Corrected CO average, CH11: O_2 average
M	A, B, C	C	CH1: NO_X, CH2: SO_2, CH3: CO_2, CH4: CO, CH5: O_2, CH6: Corrected NO_X, CH7: Corrected SO_2, CH8: Corrected CO, CH9: Corrected NO_X average, CH10: Corrected SO_2 average, CH11: Corrected CO average, CH12: O_2 average

note

note: When "A", "B" or "C" is specified at 6th digit, the NO measurement is displayed "NOx".

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 cable (standard inlet type 2m) ... 1 pc
- Spare fuses (250V, 3A AC, delay type) ... 2 pcs
- Instruction manual ... 1 copy
- Slide rails ... 2 pcs (when with slide rails are selected)

ORDERING INFORMATION

1. Code symbols
2. Application and composition of sample gas

Items to be prepared separately

- Various sampling devices (refer to Data Sheets for the sampling devices)
- Dedicated zirconia O_2 sensor (see Page 16)
- Relay module for solenoid drive for calibration and dedicated cable (1.5 m) between CN3 and relay module. (For details, contact Fuji Electric.)

Exclusive Zirconia O2 Sensor (to be purchased separately)

For O_2 correction, the gas analyzer ZKJ can accept linealized 0 to 1V DC signal coming from analyzer calibrated 0 to 25% O_2 full scale. If the analyzer is not available, Fuji can supply exclusive Zirconia O_2 sensor Model ZFK.

Measuring method:
Zirconia system

Measurable component and measuring range:

Measurable component		Minimum range	Maximum range
O2	Oxygen	0 to 5vol%	0 to 25vol%

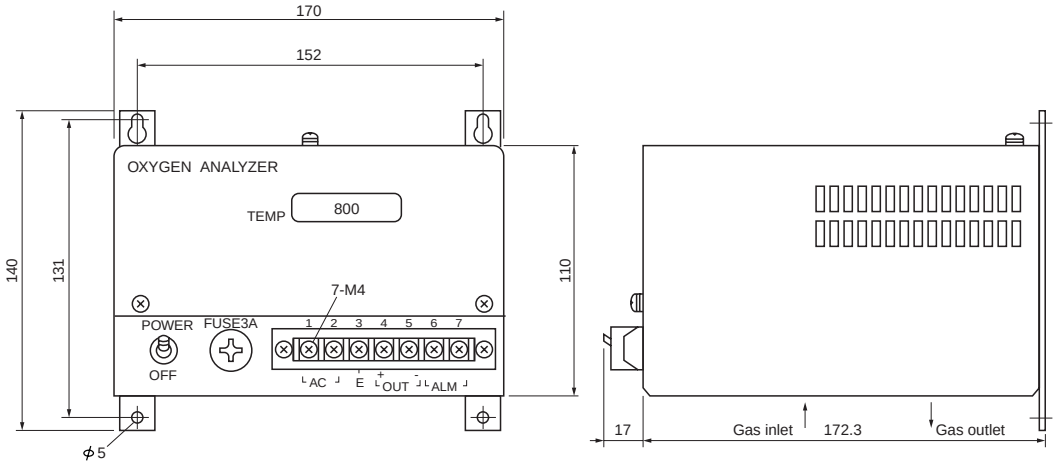
Repeatability: Within ± 0.5% of full scale
Linearity: Within ± 1% of full scale
Zero drift: Within ± 1% of full scale/week
Span drift: Within ± 2% of full scale/week
Response time: Approx. 20 seconds (for 90% response)
Measured gas flow rate:
0.5 ± 0.25L / min
Remark: The Zirconia system, due to its principle, may produce a measuring error due to relative concentration versus the combustible O_2 gas concentration. Also, a corrosive gas (SO_2 of 250 ppm or more, etc.) may affect the life of the sensor.

Gas inlet/outlet size:
Rc1/4 or NPT1/4
Power supply: 90 to 126V AC or 200 to 240V AC, 50/60Hz
Enclosure: Steel casing, for indoor application
Indication: Temperature indication (LED)
Temperature alarm output:
Contact output 1a contact,
Contact capacity 220V, 1A AC (resistive load)
Outer dimensions (H x W x D):
140 x 170 x 190mm
Mass {weight}: Approx. 3kg
Finish color: Munsell 5Y 7/1

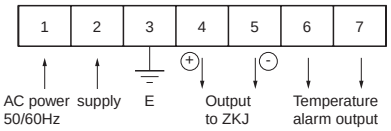
CODE SYMBOLS

1	2	3	4	5	6	7	8		9	10	11	12	13	Description
Z	F	K	7	Y	Y		4	-		Y	0	Y	Y	
			7	Y	Y									**Measuring method** Zirconia method
						1								**Power supply** 90 to 126V AC 50/60Hz
						3								200 to 240V AC 50/60Hz
									1					**Gas inlet** Rc 1/4
									8					NPT 1/4

OUTLINE DIAGRAM (Unit:mm)



EXTERNAL CONNECTION DIAGRAM



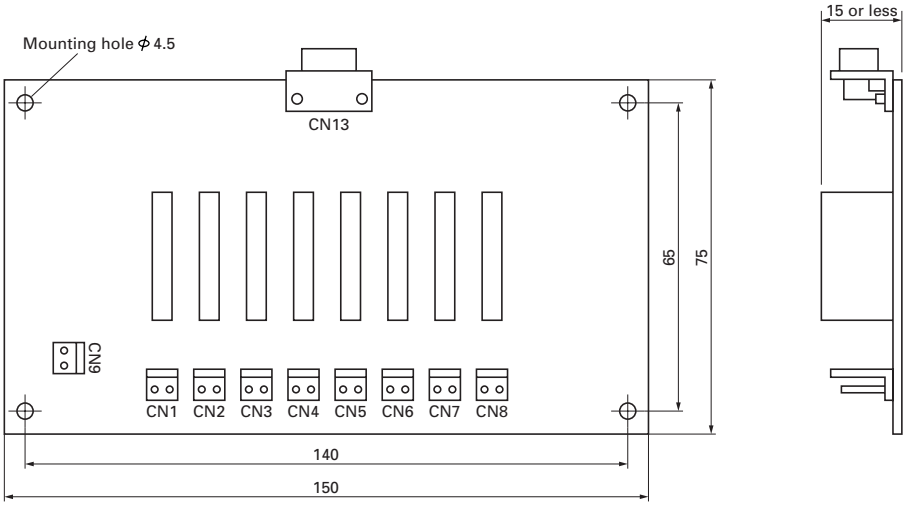
Dedicated relay board (should be prepared separately)

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

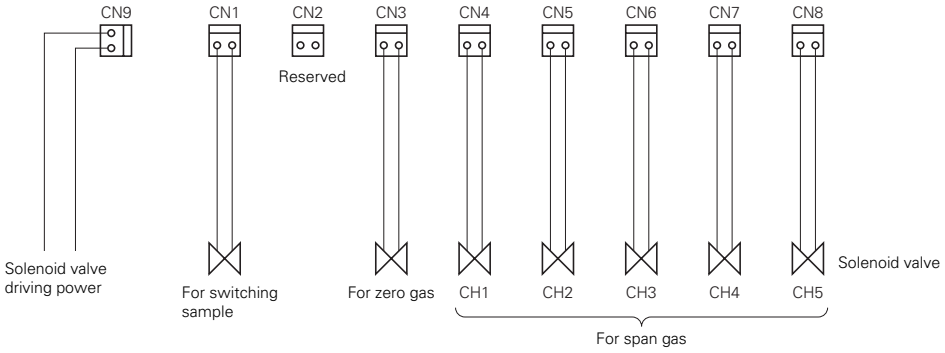
• **Relay contact :** 1 normally closed contact
Contact capacity; 250V/2A AC
(resistive load)

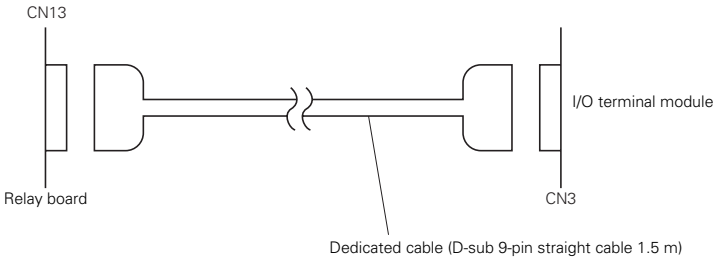
Odering code symbols
Dedicated relay board : ∗ZZPZKJ-TK7H2949C4
Dedicated cable : ∗ZZPZKJ-TK7J6733P1

OUTLINE DIAGRAM (Unit: mm)



CONNECTIONS





Recommended connector

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

Contact action

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

⚠ Caution on Safety

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

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Printed in Japan