

# General Specifications

## IR202 Infrared Gas Analyzer

GS 11G02Q02-01EN

### ■ GENERAL

The IR202 infrared gas analyzer is capable of measuring concentration of CO<sub>2</sub>, CO, CH<sub>4</sub>, SO<sub>2</sub>, and NO components in sample gas by non-dispersive infrared method (NDIR), while measuring O<sub>2</sub> by paramagnetic or zirconia method.

A maximum of 4 components including O<sub>2</sub> (up to 3 components except for O<sub>2</sub> measurement) are simultaneously measurable.

A high-sensitivity mass flow sensor is adopted in the detection unit for the infrared method. Due to use of single beam system for measurement, low maintenance and an excellent stability are ensured for a long period of time. Microprocessor-based IR202 has a large-sized liquid crystal display, providing easy operation, high accuracy and multiple functions thus is optimum for measuring combustible gas, exhausted from boilers or incinerators.

### ■ FEATURES

#### 1. Simultaneous gas measurement

Simultaneous gas measurement up to 4 components including O<sub>2</sub> and 3 components selected from among CO<sub>2</sub>, CO, CH<sub>4</sub>, SO<sub>2</sub>, and NO.

#### 2. Excellent long-term stability

A unique optics system minimizes drift particularly due to contamination of measurement cell, ensuring excellent long-term stability : zero stability  $\pm 0.5\%$  or less FS/week.(IR202-C)

#### 3. Low maintenance

Single beam system allows for simple measurement unit construction and requires no adjustment of optical balance, resulting in low maintenance.

#### 4. Easy operation

Large LCD provides easy interactive operation.

#### 5. Extensive functions

Highly precise zero/span calibration is achieved by simply pressing calibration keys. Automatic calibration is also available.

Self-diagnostic function detects abnormality and displays an error message.

Other functions include remote range switching, range identification signal output, output signal hold, and upper/lower limit alarm.



IR202-A



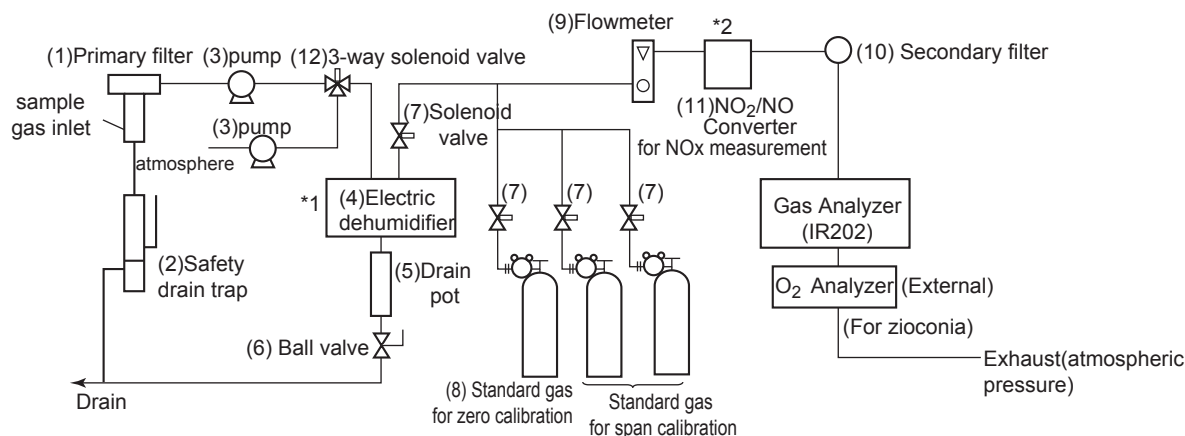
IR202-B

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## ■ Examples of sampling system configuration

Typical examples are shown below. The system configuration may vary depending on sample gas. Consult with Yokogawa.

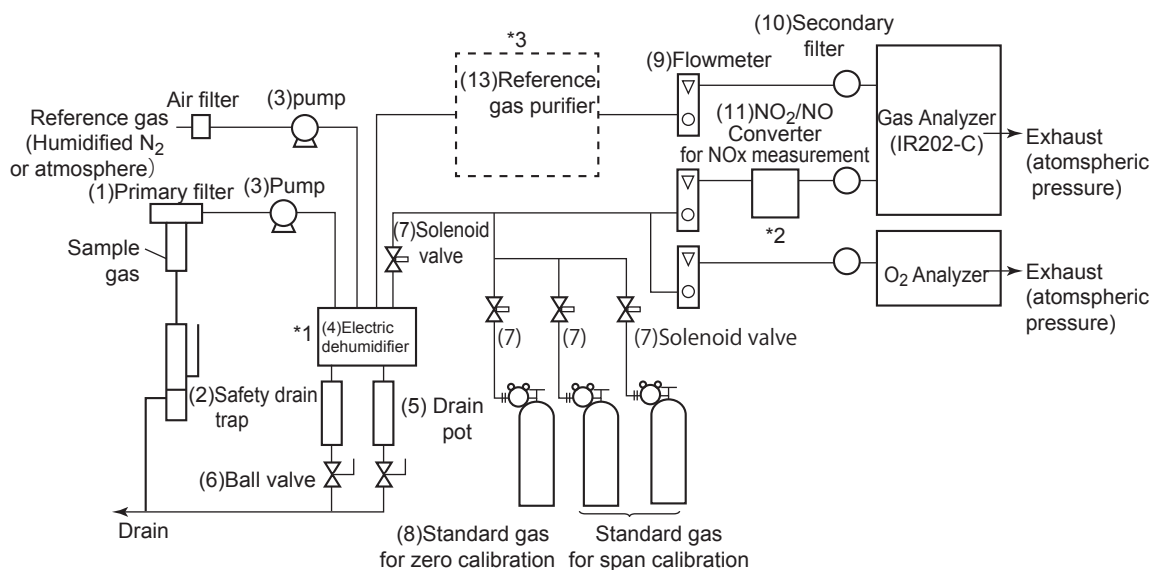
- **Measurement of sample gas with high moisture content (2°C saturation level or above) or NO, SO<sub>2</sub>, CO (0-200 ppm) measurement (Excluding IR202-C)**



\*1 : A dehumidifier must be used for NO, SO<sub>2</sub>, and CO (0-200 ppm) measurements.(approx. equal to 2°C saturation) F03.ai

\*2 : Use NO<sub>2</sub>/NO converter to measure NOx.

- **In IR202-C the measurement of sample gas with high moisture content (2°C saturation level or above)**



\*1: Make the electric dehumidifier remove the moisture so that the temperature of sample gas goes below 5°C. The water concentration should be equalized in reference gas and sample gas.

\*2: Use NO<sub>2</sub>/NO converter to measure NOx.

\*3: The concentration of measuring component in a reference gas determines whether a reference gas purifier is required or not.

If the concentration level is lower than 0.1 % FS, a reference gas purifier is not required. If atmospheric air is used as reference gas and the measuring range is lower level than the description below, the use of a reference gas purifier is recommended. However, for measuring CO<sub>2</sub>, atmospheric air should not be used as reference gas. NO analyzer : 0-100 ppm or less, SO<sub>2</sub> analyzer : 0-50 ppm or less, CO analyzer : 0-1000 ppm or less. Consult us on suitable reference gas purifier to each component.

F03-1.ai

Item	Description	Item	Description
(1) Primary filter	Removes dust and mist	(8) Standard gas for calibration	Used for zero/span calibration
(2) Safety drain trap	Separates and discharges drain	(9) Flowmeter	Adjust and monitors sample gas flow rate.
(3) Pump	Sucks in sample gas.	(10) Secondary filter (membrane filter)	Removes fine dust.
(4) Electric dehumidifier	Dehumidifies sample gas	(11) NO <sub>2</sub> /NO converter	Converter NO <sub>2</sub> gas into NO gas
(5) Drain pot	Collects discharged water from dehumidifier.	(12) 3-way solenoid valve	Used for introducing humidified gas
(6) Ball valve	Used for discharging drain	(13) Reference gas purifier	Eliminates particles out of the reference gas.
(7) Solenoid Valve	Used for switching sampling and calibration lines		

## ■ SPECIFICATIONS

### Standard Specifications

Measurement principle:

CO<sub>2</sub>, CO, CH<sub>4</sub> SO<sub>2</sub> NO;

Non-dispersive infrared method

Single light source-single beam

O<sub>2</sub>: Paramagnetic type (built-in), or zirconia type (external)

Measurable gas components and measuring ranges:

Component	IR202-A		IR202-B		IR202-C		IR202-D	
	Min.range	Max.range	Min.range	Max.range	Min.range	Max.range	Min.range	Max.range
NO	0-500 ppm	0-5000 ppm	—	—	0-50 ppm	0-5000 ppm	0-200 ppm	0-5000 ppm
SO <sub>2</sub>	0-500 ppm	0-5000 ppm	0-500 ppm	0-5000 ppm	0-50 ppm	0-5000 ppm	0-200 ppm	0-10 vol%
CO <sub>2</sub>	0-500 ppm	0-100 vol%	0-500 ppm	0-100 vol%	0-50 ppm	0-5000 ppm	0-100 ppm	0-100 vol%
CO	0-200 ppm	0-100 vol%	0-500 ppm	0-100 vol%	0-50 ppm	0-5000 ppm	0-200 ppm	0-100 vol%
CH <sub>4</sub>	0-1000 ppm	0-100 vol%	0-1000 ppm	0-100 vol%	—	—	0-500 ppm	0-100 vol%
O <sub>2</sub> (Built-in paramagnetic)	0-5 vol%	0-100 vol%	—	—	0-5 vol%	0-100 vol%	0-5 vol%	0-100 vol%
O <sub>2</sub> (Dedicated Zirconia)	0-5 vol%	0-25 vol%	—	—	0-5 vol%	0-25 vol%	0-5 vol%	0-25 vol%

- IR202-A, IR202-C, IR202-D are capable of measuring up to 4 components including O<sub>2</sub>.

- 1 or 2 measuring ranges per component.

- Max measuring range ratio:

IR202-A, ≤1:10 (except built-in paramagnetic O<sub>2</sub> analyzer)

≤1:5 (built-in paramagnetic O<sub>2</sub> analyzer)

IR202-B, ≤1:10

IR202-C, IR202-D ≤1:10(except built-in paramagnetic O<sub>2</sub> analyzer)

≤1:5 (built-in paramagnetic O<sub>2</sub> analyzer)

- For measurable components and possible combinations of measuring ranges, see pages p14 through p.17.

Display: Digital, 4-digit LCD with LED backlight

- Instantaneous value of each component

- Instantaneous value after O<sub>2</sub> correction (only in CO, SO<sub>2</sub>, NO with O<sub>2</sub> measurement)

- Average value after O<sub>2</sub> correction (only in CO, SO<sub>2</sub>, NO with O<sub>2</sub> measurement)

Analog output signal:

4 to 20 mA DC or 0 to 1 V DC, (isolated from ground wire or internal circuit, non-isolated between output cables) .

Analog output corresponds one-to-one with measured value indication.

Permissible load resistance;

550 Ω max. for 4 to 20 mA DC

100 kΩ min. for 0 to 1 V DC

Max points of

IR202-A; 7 points

IR202-B; 4 points

IR202-C, IR202-D; 11 points

\* See page.25 for <Measurable Components and the Corresponding Channel Numbers> .

Analog input signal (IR202-A, IR202-C, IR202-D):

For signal input from external O<sub>2</sub> analyzer\*

Input section is not isolated.

Signal requirement:

(1) Signal from Yokogawa's zirconia O<sub>2</sub> sensor (Model ZX8D)

(2) 0 to 1 V DC from an O<sub>2</sub> sensor

\* External O<sub>2</sub> sensor should be purchased separately.

Contact output:

Model	IR202-A	IR202-C	IR202-D
<b>Contacts</b>	1a relay contact	1c relay contact	
	1c relay contact		
<b>Contact Capacity</b>	250 V AC/2 A resistive load	24 V DC/1 A resistive load	
<b>Max. number of output points</b>	1a relay 13 points	15 points	
	1c relay 5 points		
<b>Isolation of the relay contacts and the internal circuit</b>	All relay contacts are isolated mutually and from the internal circuit.		
<b>Output signal</b>	Instrument error, Calibration error, Range identification, Auto calibration status, Solenoid valve drive signal for automatic calibration, Pump ON/OFF, High/Low limit alarm*1, Peak alarm*2		

\* 1 : High/Low limit alarm on 4 component (including O<sub>2</sub>) analyzer of IR202-C, IR202-D have 3 points of output signal.

\* 2 : applies only to IR202-A.

Contact input:

Model	IR202-A	IR202-C	IR202-D
<b>Contacts</b>	Non-voltage input*3	Voltage input contact	
<b>Applied voltage</b>	—	12 to 24 V DC	
<b>Required max.voltage</b>	—	15 mA	
<b>Max of input points</b>	7 points	9 points	
<b>Isolation of the relay contacts and the internal circuit</b>	Mutual contacts ; non isolation	Isolation with photocoupler	
	Internal circuit: photocoupler isolation		
<b>Input</b>	Remote range changeover, auto calibration remote start, remote (output) hold, average value reset*4		

\*3: When it is ON: 0 V DC, OFF: 5 V DC, ON: 5 mA.

\*4: applies only to IR202-C, IR202-D

NOTE: See page 22 External Connection Diagram for further information.  
Consult us on IR202-B contact input, contact output.

Power supply:

Voltage rating; 100 to 240 V AC

Allowable range; 85 to 264 V AC

Frequency; 50/60 Hz

Power consumption; Max. 100 VA (IR202-A, IR202-B, IR202-D)

Max. 120 VA (IR202-C)

Inlet; Conform to EN60320 Protection Class I (When IR202-A, IR202-C, IR202-D use other than "-NN" as power cable)

Operating conditions:

Ambient temperature; -5 to 45°C (when Measurable component code -C, -G, -H, -P is selected and you run the analyzer with electric power of larger than 200 V, the temperature is 40 °C max.)

Ambient humidity; 90 % RH max., non-condensing

Storage conditions:

Ambient temperature; -20 to 60°C

Ambient humidity; 95% RH max., non-condensing

Dimensions (H × W × D):

IR202-A; 177 × 483 × 480 mm (with slide rail for 19-inch rack mounting type)

IR202-B; 484 × 294 × 170 mm

IR202-C,IR202-D; 133 × 483 × 382 mm

Weight: Approx. 11 kg (IR202-A, IR202-C, IR202-D, ), Approx. 7 kg (IR202-B)

Finish color:

Front panel; White (Cool Gray PANTON 1C-F)

Casing; Steel-blue

Enclosure: Steel casing, for indoor use

Material of gas-contacting parts:

Gas inlet/outlet; SUS304 F  
 Sample cell; SUS304/polychloroprene  
 Infrared-ray transmitting window; CaF<sub>2</sub>  
 Internal tubing; polyvinyl chloride, Fluoropolymer (PTFE), polypropylene

Gas inlet/outlet: Rc1/4 or 1/4 NPT internal thread

Purge gas flow rate: approx. 1 L/min (when necessary)

Safety, EMC and RoHS conformity standards:

When using IR202 as CE marking compliance product, select IR202-A, IR202-C or IR202-D

Select a suffix code of Power cable : -NN or -EU.

Installation altitude; 2000 m or less

Pollution degree; 2 (Note)

Installation category; II (Note)

- Installation category, so called overvoltage category, specifies impulse withstanding voltage. Category II is for electrical equipment.
- Pollution degree indicates the degree of existence of solid, liquid, gas or other inclusions which may reduce dielectric strength. Degree 2 indicates the normal indoor environment.

Safety;

CE EN61010-1, EN IEC 61010-2-030

GB GB30439 Part 1

EAC CU TR 004/2011

EMC;

CE EN61326-1 Class A, Table 2 (for Industrial application), EN61326-2-3, EN61000-3-2, EN61000-3-3

RCM EN61326-1 Class A (IR202-B conforms with only EMC(RCM).

KC Korea Electromagnetic Conformity (only for IR202-C, IR202-D)

한국 전자파적합성 기준

EAC CU TR 020/2011

RoHS; EN IEC 63000

**Note: This instrument is a Class A product, and it is designed for use in the industrial environment. Please use this instrument in the industrial environment only.**

Information of the WEEE Directive

This product is purposely designed to be used in a large scale fixed installations only and, therefore, is out of scope of the WEEE Directive. The WEEE Directive does not apply.

The WEEE Directive is only valid in the EU.

REACH: Regulation EC 1907/2006

## Standard Functions

Output signal hold:

Output signals is held during manual and auto calibrations by activation of holding (turning on its setting). Indication of instantaneous values are not held. The values to be held are the last ones indicated just before calibration mode starts or selected setting value. Indicated values are not held.

Remote output hold: (not standard function in IR202-B)

Output signal is held at any preset value or at the last value just before contact input signal is received while voltage is input to the terminals.

Holding is maintained while the voltage is input to the terminals. Indication of instantaneous values are not held.

Range changeover:

Set a changeover among Auto, Manual, Remote. Only selected mode is effective during the operation.

Manual ; Key operation switch ranges

Auto ; When a measured value level is higher than 90 % of full scale concentration for the first range, the range switches from the first range to the second one.  
 When a measured value level is lower than 80 % of full scale concentration for the first range, the range switches from the second range to the first one.

Remote ; (not standard function in IR202-B)

When the contact input is active, a remote range switch is available. Remote range switch is active only when the first range applies, and when it is not, the second range applies

Range identification signal: (not standard function in IR202-B)

The current measuring range is identified by a contact position.

IR202-A,

When the first range is selected, the contact output terminals are closed, and when the second range is selected, they are open for each component.

IR202-C, IR202-D,

When the first range is selected, the NO side is closed, and when the second range is selected, NC side is closed for each component.

**Auto calibration: (not standard function in IR202-B)**

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: (not standard function in IR202-B)**

Auto calibration is carried out only once according to an external input signal. Calibration sequence is settable in the same way as the cyclic auto calibration.

Calibration starts by opening the auto calibration remote start input terminals after short-circuiting for 1.5 seconds or longer. Auto calibration is started when the contacts open.

**Auto zero calibration: (not standard function in IR202-B)**

Auto zero calibration is carried out periodically at the preset cycle.

This cycle is independent of "Auto calibration" 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 1 to 40 days (in increments of 1 day).

**Gas flow time setting;**

The time for flowing zero gas in auto zero calibration is set. Settable 60 to 900 seconds (in increments of 1 second)

**High/low limit alarm: (not standard function in IR202-B)**

Alarm contact output turns on when measurement value reaches the preset high or low limit alarm value

Contacts close when the instantaneous value of each channel exceeds the high alarm limit value or falls below the low alarm limit value.

**Instrument error contact output:**

Contact signals are output at occurrence of analyzer error.

Contacts close at occurrence of analyzer error No. 1, 3 or 10.

**Calibration error contact output: (not standard function in IR202-B)**

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

**Auto calibration status contact output: (not standard function in IR202-B)**

Contacts close during auto calibration.

**Pump ON/OFF contact output: (available only in IR202-A)**

During measurement, contacts close.

While calibration gas is flowing, contacts open. Contacts are connected in power supply of pump, and stop the sample gas while calibration gas is flowing.

**Optional Functions****O<sub>2</sub> correction (when /K is selected):**

Conversion of measured CO, SO<sub>2</sub> and NO gas concentrations into values at reference O<sub>2</sub> concentration.

$$\text{Correction formula: } C = \frac{21 - O_n}{21 - O_s} \times C_s$$

Where:

C: Sample gas concentration after O<sub>2</sub> correction

C<sub>s</sub>: Measured concentration of sample gas

O<sub>s</sub>: Measured O<sub>2</sub> concentration (limit set 1 to 20 % O<sub>2</sub>, initial value : 20 % )

O<sub>n</sub>: Reference O<sub>2</sub> concentration (value changeable by setting 0 to 19 % O<sub>2</sub>, initial value : 12 % )

\* 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<sub>2</sub> correction (when /K is selected):**

The result of O<sub>2</sub> correction or instantaneous O<sub>2</sub> value can be output as an average value in the determined period of time.

Moving average method is used. Sampling is carried out at intervals of 30 seconds.

(Output is updated every 30 seconds. It is updated to the averaged value of the most recent elapsed averaging time period)

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 reset (when IR202-C specifies /K or IR202-D specifies /K):

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 alarm (when /A is selected):

(available only for CO - O<sub>2</sub> measurement with IR202-A)

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 (when /C is selected):

IR202-A; RS-232C (9 pins D-sub), IR202-C or IR202-D; RS-485 (9 pins D-sub)

Half-duplex bit serial

Start-stop synchronization MODBUS™ protocol

Contents; Read / write parameters, measurement concentration and instrument status

## Performance

Model	IR202-A	IR202-B	IR202-C	IR202-D
<b>Repeatability</b>	±0.5% FS (less than 50 ppm: 1% FS)	±0.5% FS	±0.5% FS	±0.5% FS
<b>Linearity</b>	±1% FS			
<b>Zero drift</b>	±2% FS / week	±2% FS / week	±0.5% FS ±2% FS / week(O <sub>2</sub> measurement)	±2% FS / week (When measurement NO, SO <sub>2</sub> of less than 500 ppm uses auto zero.calibration )
<b>Span drift</b>	±2% FS / week			
<b>Response time (90% FS response)</b>	within.10 to 30 sec.(including sample replacement)			

Influence from other gases:

The measurement result of the following gases, if contained in sample gas, may be interfered. For detailed solution, consult our representatives.

IR202-A, IR202-C, IR202-D;

Interference component	NO analyzer	SO <sub>2</sub> analyzer	CO <sub>2</sub> analyzer	CO analyzer	CH <sub>4</sub> analyzer
CO 1000ppm	≤1.0%FS	≤1.0%FS	≤1.0%FS	—	≤1.0%FS
CO <sub>2</sub> 15%	≤1.0%FS (the range of 500 ppm: ≤2%FS)	≤1.0%FS	—	≤1.0%FS (the range of 200 ppm: ≤2%FS)	≤1.0%FS
H <sub>2</sub> O 20°C saturation	—	—	≤1.0%FS	≤1.0%FS (the range of 500 ppm: ≤2%FS)	≤1.0%FS (1% range or more)
H <sub>2</sub> O 2°C saturation	≤2%FS	≤2%FS	—	≤2%FS	≤2%FS (1% range or more)
CH <sub>4</sub> 1000ppm	—	≤20ppm	≤1.0%FS	≤1.0%FS	—

Note: Range of 0-200ppm is excluded.

IR202-B;

Interference component	NO analyzer	SO <sub>2</sub> analyzer	CO <sub>2</sub> analyzer	CO analyzer	CH <sub>4</sub> analyzer
CO 1000ppm	—	≤1.0%FS	≤1.0%FS	—	≤1.0%FS
CO <sub>2</sub> 15%	—	≤1.0%FS	—	≤1.0%FS	≤1.0%FS
H <sub>2</sub> O 20°C saturation	—	—	≤1.0%FS	≤1.0%FS (the range of 500 ppm: ≤2%FS)	≤1.0%FS (1% range or more)
H <sub>2</sub> O 2°C saturation	—	≤2%FS	—	—	≤2%FS (Less than 1% range)
CH <sub>4</sub> 1000ppm	—	≤20ppm	≤1.0%FS	≤1.0%FS	—

## Standard Requirements for Sample Gas

Flow rate:

IR202-A ;	1.0 ± 0.5 L/min
IR202-B, IR202-D ;	0.5 ± 0.2 L/min
IR202-C;	1.0 ± 0.2 L/min

Temperature: 0 to 50°C

Pressure: 10 kPa or less (Gas outlet side should be open to the atmospheric air.)

Dust: 100 µg/Nm<sup>3</sup> or less in particle size of 0.3 µm or less

Mist: Unallowable

Moisture: Below a level where saturation occurs at 2°C

Corrosive component: 1 ppm or less

## Standard gas for calibration

Measuring components excluding O<sub>2</sub>

Zero gas: N<sub>2</sub> gas

Span gas: Gas with concentration of 90% level or higher in the range of each corresponding component (the rest of it is N<sub>2</sub>)

Measuring O<sub>2</sub> (Built-in paramagnetic O<sub>2</sub> analyzer)

Zero gas: N<sub>2</sub> gas

Span gas: Gas with concentration of 90% level or higher in the range of each corresponding component (the rest of it is N<sub>2</sub> gas or atmosphere)

Measuring O<sub>2</sub> (External Zirconia O<sub>2</sub> analyzer)

Zero gas Dry air, or atmospheric air, but atmospheric air should not be contained in zero gas if CO<sub>2</sub> meter is provided.

Span gas 1 to 2% gas (the rest of it is N<sub>2</sub>)

It is understood that a large quantity of hydrogen, helium, or argon in sample gas affects the calibration model of an infrared gas analyzer (pressure broadening). When measuring such sample gas, use a gas which has similar composition to the sample gas as a span gas.

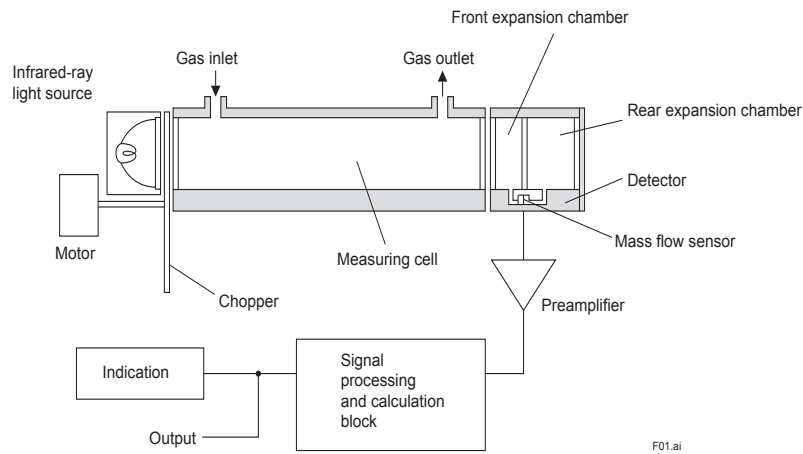
## Installation Requirements

- Indoor use: Avoid exposure to direct sunlight, weather, and radiant heat from hot substances. Where exposure to such conditions are unavoidable, a protective hood or cover should be prepared.
- Vibration-free environment
- A clean atmosphere



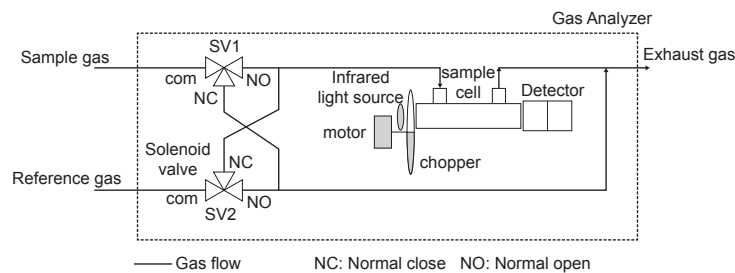
## ■ Measurement Principle

### ● Infrared gas analyzer (CO<sub>2</sub>, CO, CH<sub>4</sub>, SO<sub>2</sub>, NO)

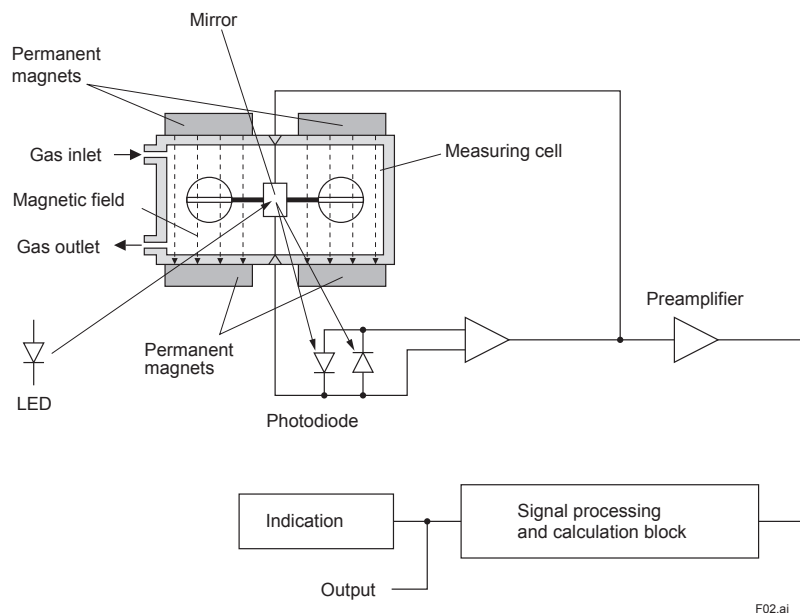


### ● Consecutive zero correction with IR202-C

Sample and reference gas are measured at each respective timing. Measured gas concentration is output by converting the difference value between the sample and reference gas into a concentration value. Continuous monitoring on the difference value between sample and reference gas leads to an elimination of influence from interference component and zero-drift.



### ● Paramagnetic oxygen analyzer (O<sub>2</sub>)



## ■ Model and Suffix Code

[Style : S2]

Model	Suffix code	Optional suffix code	Specification
IR202	-----	-----	Infrared Gas Analyzer
Type	-A -B -C -D	----- ----- ----- -----	19 inch rack mounting type *1 Wall mounting type *2 Low-concentration 19inch rack mounting type *3 19 inch rack mounting D-Sub terminal type
Measurable Component *4	-A -B -C -D -E -F -G -H -K -L -M -P	----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----	NO SO <sub>2</sub> NO+SO <sub>2</sub> CO CO <sub>2</sub> CO <sub>2</sub> +CO NO+CO NO+SO <sub>2</sub> +CO CH <sub>4</sub> CH <sub>4</sub> +CO CO <sub>2</sub> +CH <sub>4</sub> CO <sub>2</sub> +CO+CH <sub>4</sub>
O <sub>2</sub> Analyzer	N 1 2 3	----- ----- ----- -----	Without O <sub>2</sub> Analyzer External Zirconia type O <sub>2</sub> Sensor (ZX8D) *5 External O <sub>2</sub> Analyzer *6 Built-in paramagnetic type O <sub>2</sub> Sensor
Measuring range for NO *7,*8	-NN -01 -02 -03 -04 -07	----- ----- ----- ----- ----- -----	Not available Min. 0-50 ppm / Max. 0-500 ppm Min. 0-100 ppm / Max. 0-1000 ppm Min. 0-200 ppm / Max. 0-2000 ppm Min. 0-250 ppm / Max. 0-2500 ppm Min. 0-500 ppm / Max. 0-5000 ppm
Measuring range for SO <sub>2</sub> *7, *8	-NN -01 -02 -03 -04 -06 -07 -08 -09 -10 -11 -12	----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----	Not available Min. 0-50 ppm /Max. 0-500 ppm Min. 0-100 ppm /Max. 0-1000 ppm Min. 0-200 ppm /Max. 0-2000 ppm Min. 0-250 ppm /Max. 0-2500 ppm Min. 0-500 ppm /Max. 0-2500 ppm Min. 0-500 ppm /Max. 0-5000 ppm Min. 0-1000 ppm /Max. 0-5000 ppm Min. 0-1000 ppm/ Max. 0-1 % Min. 0-2000 ppm/ Max. 0-2 % Min. 0-5000 ppm/ Max. 0-5 % Min. 0-1 % / Max. 0-10 %
Measuring range for CO <sub>2</sub> *7, *8	-NN -01 -02 -03 -04 -07 -09 -10 -11 -12 -13 -14 -15 -16 -18 -24 -25 -26	----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----	Not available Min. 0-50 ppm / Max. 0-500 ppm Min. 0-100 ppm / Max. 0-1000 ppm Min. 0-200 ppm / Max. 0-2000 ppm Min. 0-250 ppm / Max. 0-2500 ppm Min.0-500 ppm / Max. 0-5000 ppm Min.0-1000 ppm/ Max. 0-1 % Min.0-2000 ppm/ Max. 0-2 % Min.0-5000 ppm/ Max. 0-5 % Min.0-1%/ Max. 0-10% Min.0-2%/ Max. 0-20% Min.0-3%/ Max. 0-25% Min.0-5%/ Max. 0-50% Min.0-10%/ Max. 0-100% Min.0-1%/ Max. 0-5% Min.0-25%/ Max. 0-100% Min.0-50%/ Max. 0-100% 0-100%

[Style : S2]

Model	Suffix code	Optional suffix code	Specification
Measuring range for CO *7,*8	-NN	-----	Not available
	-01	-----	Min. 0-50 ppm/ Max. 0-500 ppm
	-02	-----	Min. 0-100 ppm/ Max. 0-1000 ppm
	-03	-----	Min. 0-200 ppm/ Max. 0-2000 ppm
	-04	-----	Min. 0-250 ppm/ Max. 0-2500 ppm
	-07	-----	Min. 0-500 ppm/ Max. 0-5000 ppm
	-09	-----	Min. 0-1000 ppm/ Max.0-1%
	-10	-----	Min. 0-2000 ppm/ Max. 0-2%
	-11	-----	Min. 0-5000 ppm/ Max. 0-5%
	-12	-----	Min. 0-1% / Max. 0-10%
	-13	-----	Min. 0-2% / Max. 0-20%
	-14	-----	Min. 0-3% / Max. 0-25%
	-15	-----	Min. 0-5% / Max. 0-50%
	-16	-----	Min. 0-10% / Max. 0-100%
	-17	-----	Min. 0-2000 ppm/ Max. 0-1%
	-18	-----	Min. 0-1% / Max. 0-5%
	-19	-----	Min. 0-2% / Max. 0-10%
-20	-----	Min. 0-3% / Max. 0-10%	
-21	-----	Min. 0-5% / Max. 0-10%	
-22	-----	Min. 0-10% / Max. 0-50%	
-24	-----	Min. 0-25% / Max. 0-100%	
-25	-----	Min. 0-50% / Max. 0-100%	
-26	-----	0-100%	
Measuring range for CH <sub>4</sub> *7,*8	-NN	-----	Not available
	-07	-----	Min. 0-500 ppm / Max. 0-5000 ppm
	-09	-----	Min. 0-1000 ppm / Max.0-1%
	-10	-----	Min. 0-2000 ppm / Max.0-2%
	-11	-----	Min. 0-5000 ppm / Max.0-5%
	-12	-----	Min. 0-1% / Max. 0-10%
	-13	-----	Min. 0-2% / Max. 0-20%
	-14	-----	Min. 0-3% / Max. 0-25%
	-15	-----	Min. 0-5% / Max. 0-50%
	-16	-----	Min. 0-10% / Max. 0-100%
	-21	-----	Min. 0-5% / Max. 0-10%
-23	-----	Min. 0-25% / Max. 0-40%	
-26	-----	0-100%	
Measuring range for O <sub>2</sub> *7	N	-----	Not available
	1	-----	0-5/10 vol%
	2	-----	0-5/25 vol%
	3	-----	0-10/25 vol%
	6	-----	0-25 vol%
	7	-----	0-50 vol%
	8	-----	0-100 vol%
	Analog Output *9	-1	-----
-4		-----	4-20mA DC, non-isolation
Piping	R	-----	Rc1/4
	T	-----	1/4NPT
Language	J	-----	Japanese
	E	-----	English
	C	-----	Chinese*15
Power Cable *10	-NN	-----	None (Terminal block for power supply)
	-JA	-----	Rated voltage 125V AC (PSE)
	-US	-----	Rated voltage 125V AC (UL)
	-EU	-----	Rated voltage 250V AC (CEE)
	-CN	-----	Rated voltage 250V AC (CCC)
	-TW	-----	Rated voltage 125V AC (BSMI)
-KC	-----	Rated voltage 250V AC (KC)	
Mounting Type *11	-A	-----	Rack mounting with Slide rail
	-B	-----	Panel mounting
	-C	-----	Wall mounting
	-D	-----	Rack mounting
—	-N	-----	Always "-N"
—	N	-----	Always "N"

[Style : S2]

Model	Suffix code	Optional suffix code	Specification
Option		/K /A /C /U /EQ /ER	O <sub>2</sub> correction output *12 Peak count alarm output *13 Communication *14 Conversion of unit (mg/m <sup>3</sup> , g/m <sup>3</sup> ) *17 EAC with PA *16 EAC *16

Note:

- \*1: Same size as IR200 (former model) in size of an installation dimension.
- \*2: For IR202-B, measuring component including NO cannot be selected. Measuring of 3 component cannot be selected. O<sub>2</sub> measurement is not available.
- \*3: For IR202-C, components including CH<sub>4</sub> cannot be selected.
- \*4 : For NO<sub>x</sub> measurement, a NO<sub>2</sub>/NO converter (P/N K9350LE or K9350LF) should be purchased separately.
- \*5 : Purchase separately ZX8D, Zirconia O<sub>2</sub> analyzer. Prepare ZX8D StyleD as CE compliance product.
- \*6: Purchase a O<sub>2</sub> analyzer separately. A signal from the external O<sub>2</sub> analyzer has to be set as 0-1 V DC linear corresponding to full scale.
- \*7: You can choose any range within the measurable range.
- \*8 Refer to Measurable component list
- \*9 For IR202-B, both of these codes are available to choose to make output.
- \*10 Select appropriate power cables based on the required voltage and specification. The abbreviation represents each country or region that regulate the standard and certify each product. PSE-Japan, UL-US, CEE-Europe, CCC-China, BSMI-Taiwan, KC-Korea. When you select IR202-B, the power cable is always -NN. "-A" cannot be specified with "-NN" or "-KC".
- \*11: Mounting of IR202-A is always -A, IR202-B: -B or C. IR202-C and IR202-D: always -D.
- \*12: Not selectable for IR202-B. Not selectable for the unit without O<sub>2</sub> analyzer. O<sub>2</sub> correction output applies only to NO, CO, and SO<sub>2</sub>. As an option, O<sub>2</sub> correction average value is available. NO is indicated as NO<sub>x</sub>.
- \*13: Selectable only for IR202-A. Peak count alarm can be provided only for CO measurement.
- \*14: Should be specified when using MODBUS communication. RS-232C communication is used for IR202-A, and RS-485 communication is used for IR202-C and -D. Not selectable for IR202-B.
- \*15 Selectable only for IR202-C or IR202-D. User's Manuals are available in English.
- \*16 "/EQ" is EAC with Pattern Approval for Russia. "/ER" is EAC for Kazakhstan and Belarus. Selectable only for IR202-A, IR202-C or IR202-D.
- \*17 : Not selectable for IR202-B. Only the range for NO, SO<sub>2</sub> or CO are convertible. Select a range by ppm. Preset value unit of ranges before shipping is converted one ; mg/m<sup>3</sup> range (for 10000mg/m<sup>3</sup> or above, the unit is g/m<sup>3</sup>) See the following conversion table as reference.

ppm range	range mg/m <sup>3</sup>		
	NO	SO <sub>2</sub>	CO
0-50 ppm	0-65.0 mg/m <sup>3</sup>	0-140 mg/m <sup>3</sup>	0-60.0 mg/m <sup>3</sup>
0-100 ppm	0-130 mg/m <sup>3</sup>	0-280 mg/m <sup>3</sup>	0-125 mg/m <sup>3</sup>
0-200 ppm	0-260 mg/m <sup>3</sup>	0-570 mg/m <sup>3</sup>	0-250 mg/m <sup>3</sup>
0-250 ppm	0-325 mg/m <sup>3</sup>	0-700 mg/m <sup>3</sup>	0-300 mg/m <sup>3</sup>
0-300 ppm	0-400 mg/m <sup>3</sup>	0-850 mg/m <sup>3</sup>	0-375 mg/m <sup>3</sup>
0-500 ppm	0-650 mg/m <sup>3</sup>	0-1400 mg/m <sup>3</sup>	0-600 mg/m <sup>3</sup>
0-1000 ppm	0-1300 mg/m <sup>3</sup>	0-2800 mg/m <sup>3</sup>	0-1250 mg/m <sup>3</sup>
0-2000 ppm	0-2600 mg/m <sup>3</sup>	0-5600 mg/m <sup>3</sup>	0-2500 mg/m <sup>3</sup>
0-2500 ppm	0-3300 mg/m <sup>3</sup>	0-7100 mg/m <sup>3</sup>	0-3000 mg/m <sup>3</sup>
0-5000 ppm	0-6600 mg/m <sup>3</sup>	0-14.00 g/m <sup>3</sup>	0-6250 mg/m <sup>3</sup>

## ■ Standard Accessories

Name	Qty	Description	Code Specification
Fuse	2	250 V/2A delay type (K9642CJ *1) Time-Lag Low-breaking capacity 5x20 mm Meet the IEC 60127-2	
Input/output terminal module	1	Connector for external O <sub>2</sub> analyzer	O <sub>2</sub> analyzer "1", "2" Type, "C", "D"
Power cable	1	(varies with type of power cables) come with a cable stopper	power cable "-JA", "-US", "-EU", "-CN", "-TW", "-KC"
Ferrite Cores for Power Cable	1		power cable "-NN"
Ferrite Cores for digital I/O	3		Type; "-A", "-B"
Analog output, digital I/O connector	4	D-sub connector 25 pins with 8 male screws	Type, "-C", "-D"
Communication Connector	1	D-sub connector 9 pins with 2 screws	Option "-C"
Mounting plate	4		Mounting type "-B"
Slide rail	2		Mounting type, Factory-installed delivery..

\*1: K9642CJ cannot be purchased in Korea.

## ■ Measurable Components and Ranges

A : IR202-A, B : IR202-B, C: IR202-C, D : IR202-D

### (1) Single-component analyzer (NO, SO<sub>2</sub>, CO<sub>2</sub>, CO, CH<sub>4</sub>)

Code	Range Minimum/Maximum	Component				
		NO *1	SO <sub>2</sub>	CO <sub>2</sub>	CO	CH <sub>4</sub> *2
-01	0-50ppm/0-500ppm	C	C	C	C	—
-02	0-100ppm/0-1000ppm	C	C	CD	C	—
-03	0-200ppm/0-2000ppm	CD	CD	CD	ACD	—
-04	0-250ppm/0-2500ppm	CD	CD	CD	CD	—
-05	0-300ppm/0-2500ppm	—	—	—	—	—
-06	0-500ppm/0-2500ppm	—	—	—	—	—
-07	0-500ppm/0-5000ppm	ACD	ABCD	ABCD	ABCD	D
-08	0-1000ppm/0-5000ppm	—	—	—	—	—
-09	0-1000ppm/0-1%	—	ABCD	ABD	ABD	ABD
-10	0-2000ppm/0-2%	—	ABD	ABD	ABD	ABD
-11	0-5000ppm/0-5%	—	BD	ABD	ABD	ABD
-12	0-1%/0-10%	—	BD	ABD	ABD	ABD
-13	0-2%/0-20%	—	—	ABD	ABD	ABD
-14	0-3%/0-25%	—	—	ABD	ABD	ABD
-15	0-5%/0-50%	—	—	ABD	ABD	ABD
-16	0-10%/0-100%	—	—	ABD	ABD	ABD

\*1 : IR202-B cannot measure NO.

\*2 : IR202-C cannot measure CH<sub>4</sub>.

### (2) Two-component analyzer

Refer to the table (1) regarding measuring range (Minimum / Maximum.)

#### a. NO+SO<sub>2</sub> (1st component is NO, 2nd component is SO<sub>2</sub>)

IR202-B is not applicable.

2nd comp. range 1st comp. range		SO <sub>2</sub>				
		-01	-02	-03	-04	-07
NO	-01	C	C	C	C	C
	-02	C	C	C	C	C
	-03	C	C	CD	CD	CD
	-04	C	C	CD	CD	CD
	-07	C	C	CD	CD	ACD

**b. CO<sub>2</sub>+CO (1st component is CO<sub>2</sub>, 2nd is CO)**

Blank represents "not available."

2nd comp. range 1st comp. range		CO														
		-01	-02	-03	-04	-07	-09	-17	-10	-11	-18	-12	-19	-13	-20	-14
CO <sub>2</sub>	-01	C	C	C		C										
	-02	C	C	CD	D	C										
	-03			D	D	CD										
	-04			D	D	CD										
	-07					ABCD										
	-09					ABD	ABD	ABD	ABD	ABD	ABD	ABD	ABD		ABD	
	-10						ABD	ABD	ABD	ABD	ABD	ABD	ABD		ABD	ABD
	-11					ABD	ABD	ABD	ABD	ABD	ABD	ABD	ABD	ABD	ABD	ABD
	-18					ABD	ABD	ABD	ABD	ABD	ABD	ABD	ABD	ABD	ABD	ABD
	-12					ABD	ABD	ABD		ABD	ABD	ABD	ABD	ABD	ABD	ABD
	-13					ABD	ABD	ABD		ABD	ABD	ABD	ABD	ABD	ABD	ABD
	-14					ABD	ABD	ABD		ABD	ABD	ABD	ABD	ABD	ABD	ABD
	-15					ABD	ABD	ABD		ABD	ABD	ABD	ABD	ABD	ABD	ABD
	-16						ABD	ABD		ABD	ABD	ABD	ABD	ABD	ABD	ABD
	-24						ABD	ABD		ABD	ABD	ABD	ABD	ABD	ABD	ABD
-25						ABD	ABD		ABD	ABD	ABD	ABD	ABD	ABD	ABD	
-26						ABD	ABD		ABD	ABD	ABD	ABD	ABD	ABD	ABD	

2nd comp. range 1st comp. range		CO						
		-21	-15	-22	-16	-24	-25	-26
CO <sub>2</sub>	-01							
	-02							
	-03							
	-04							
	-07							
	-09	ABD	BD	ABD				
	-10	ABD	BD	ABD				
	-11	ABD	BD	ABD		ABD	ABD	ABD
	-18	ABD	ABD	ABD	ABD	ABD	ABD	ABD
	-12	ABD		ABD	ABD	ABD	ABD	ABD
	-13	ABD	ABD	ABD		ABD	ABD	ABD
	-14	ABD	ABD	ABD	ABD	ABD	ABD	ABD
	-15	ABD	ABD	ABD	ABD	ABD	ABD	ABD
	-16	ABD	ABD	ABD	ABD	ABD	ABD	ABD
	-24	ABD	ABD	ABD	ABD	ABD	ABD	ABD
-25	ABD	ABD	ABD	ABD	ABD	ABD	ABD	
-26	ABD	ABD	ABD	ABD	ABD	ABD	ABD	

**C. NO+CO(1st component is NO, 2nd is CO)**

IR202-B is not applicable.

2nd comp. range 1st comp. range		CO				
		-01	-02	-03	-04	-07
NO	-01	C	C	C	C	C
	-02	C	C	C	C	C
	-03	C	C	CD	CD	CD
	-04	C	C	CD	CD	CD
	-07	C	C	ACD	CD	ACD

**d. CH<sub>4</sub>+CO(1st component is CH<sub>4</sub>, 2nd is CO)**  
 IR202-C is not applicable. Blank represents "not available."

2nd comp. range 1st comp. range		CO														
		-03	-04	-07	-09	-17	-10	-11	-18	-12	-19	-13	-20	-14	-21	-15
CH <sub>4</sub>	-07	D	D													
	-09			AD												
	-10				AD	AD		AD	AD		AD	AD	AD		AD	
	-11				AD	AD		AD	AD			AD	AD	AD	AD	AD
	-12			AD	AD	AD			AD	AD	AD		AD		AD	AD
	-13			AD	AD	AD	AD		AD	AD	AD	AD	AD		AD	AD
	-14				AD	AD	AD		AD	AD	AD	AD	AD		AD	AD
	-21				AD	AD		AD	AD	AD	AD	AD	AD	AD	AD	AD
	-15				AD	AD		AD	AD				AD	D	AD	AD
	-16							AD	AD	AD	AD		AD		AD	AD
-23				AD	AD		AD	AD	AD	AD	AD	AD	D	AD	AD	
-26							AD	AD	AD	AD	AD	AD		AD	AD	

2nd comp. range 1st comp. range		CO			
		-16	-24	-25	-26
CH <sub>4</sub>	-07				
	-09				
	-10				
	-11				
	-12		AD	AD	AD
	-13	AD	AD	AD	AD
	-14	AD	AD	AD	AD
	-21	AD	AD	AD	AD
	-15	AD	AD	AD	AD
	-16		AD	AD	AD
-23	AD	AD	AD	AD	
-26	AD	AD	AD	AD	

**e. CO<sub>2</sub>+CH<sub>4</sub> (1st component is CO<sub>2</sub>, 2nd is CH<sub>4</sub>)**  
 IR202-C is not applicable. Blank represents "not available."

2nd comp. range 1st comp. range		CH <sub>4</sub>											
		-07	-09	-10	-11	-12	-13	-14	-21	-15	-16	-23	-26
CO <sub>2</sub>	-02	D											
	-03	D	D										
	-04	D	D										
	-07		AD	AD					AD				
	-09			AD			AD		AD				
	-10			AD	AD		AD		AD				
	-11	AD	AD	AD		AD	AD		AD			AD	
	-18	AD	AD	AD		AD	AD	AD	AD	AD		AD	
	-12	AD	AD	AD		AD	AD	AD	AD	AD		AD	
	-13	AD	AD	AD		AD			AD		AD	AD	AD
	-14	AD	AD	AD	AD	AD	AD	AD	AD	AD		AD	AD
	-15		AD	AD		AD	AD	AD	AD	AD		AD	AD
	-16			AD		AD			AD	AD	AD	AD	AD
	-24			AD		AD	AD	AD	AD	AD	AD	AD	AD
	-25			AD		AD	AD	AD	AD	AD	AD	AD	AD
	-26			AD		AD	AD	AD	AD	AD	AD	AD	AD



**(3) Three-component analyzer (NO and CO)**

IR202-B is not designed for three component analyzer.

**a. NO+SO<sub>2</sub>+CO (1st component is NO, 2nd is SO<sub>2</sub>, 3rd is CO)**

IR202-B is not applicable. Blank represents "not available."

Code	Min / Max range	1st component NO
-01	0-50ppm/0-500ppm	C
-02	0-100ppm/0-1000ppm	C
-03	0-200ppm/0-2000ppm	CD
-04	0-250ppm/0-2500ppm	CD
-05	0-300ppm/0-2500ppm	—
-06	0-500ppm/0-2500ppm	—
-07	0-500ppm/0-5000ppm	ACD
-08	0-1000ppm/0-5000ppm	—
-09	0-1000ppm/0-1%	—
-10	0-2000ppm/0-2%	—
-11	0-5000ppm/0-5%	—
-12	0-1%/0-10%	—
-13	0-2%/0-20%	—
-14	0-3%/0-25%	—
-15	0-5%/0-50%	—
-16	0-10%/0-100%	—

3rd comp. range \ 2nd comp. range		CO				
		-01	-02	-03	-04	-07
SO <sub>2</sub>	-01	C	C	C		
	-02	C	C	C		
	-03	C	C	CD	CD	
	-04	C	C	CD	CD	
	-06			AD	AD	AD
	-07			C	C	C
	-08					AD

b. CO<sub>2</sub>+CO+CH<sub>4</sub> (1st component is CO<sub>2</sub>, 2nd is CO, 3rd is CH<sub>4</sub>)  
 IR202-B, IR202-C are not applicable. Blank represents "not available."

2nd comp. range 1st comp. range		CO														
		-07	-09	-17	-10	-11	-18	-12	-19	-13	-20	-14	-21	-15	-22	-16
CO <sub>2</sub>	-11	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	
	-18	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	D	AD	AD	AD	AD
	-12	AD	AD	AD		AD	AD	AD	AD	AD	AD	D	AD		AD	AD
	-13	AD	AD	AD		AD	AD	AD	AD	AD	AD	D	AD	AD	AD	AD
	-14	AD	AD	AD		AD	AD	AD	AD	AD	AD	D	AD	AD	AD	AD
	-15	AD	AD	AD		AD	AD	AD	AD	AD	AD	D	AD	AD	AD	AD
	-16		AD	AD		AD	AD	AD	AD	AD	AD	D	AD	AD	AD	AD
	-24		AD	AD		AD	AD	AD	AD	AD	AD	D	AD	AD	AD	AD
	-25		AD	AD		AD	AD	AD	AD	AD	AD	D	AD	AD	AD	AD
-26		AD	AD		AD	AD	AD	AD	AD	AD	D	AD	AD	AD	AD	

2nd comp. range 1st comp. range		CO		
		-24	-25	-26
CO <sub>2</sub>	-11	AD	AD	AD
	-18	AD	AD	AD
	-12	AD	AD	AD
	-13	AD	AD	AD
	-14	AD	AD	AD
	-15	AD	AD	AD
	-16	AD	AD	AD
	-24	AD	AD	AD
	-25	AD	AD	AD
-26	AD	AD	AD	

Code	Min./Max range	3rd component CH <sub>4</sub>
-01	0-50ppm/0-500ppm	—
-02	0-100ppm/0-1000ppm	—
-03	0-200ppm/0-2000ppm	—
-04	0-250ppm/0-2500ppm	—
-05	0-300ppm/0-2500ppm	—
-06	0-500ppm/0-2500ppm	—
-07	0-500ppm/0-5000ppm	—
-08	0-1000ppm/0-5000ppm	—
-09	0-1000ppm/0-1%	—
-10	0-2000ppm/0-2%%	—
-11	0-5000ppm/0-5	AD *1
-12	0-1%/0-10%	AD
-13	0-2%/0-20%	AD
-14	0-3%/0-25%	AD *2
-15	0-5%/0-50%	—
-16	0-10%/0-100%	—
-21	0-5%/0-10%	AD*2
-23	0-25%/0-40%	AD*3
-26	0-100%	AD*4

\*1: CO range -16, -24, -25, -26 are not applicable.

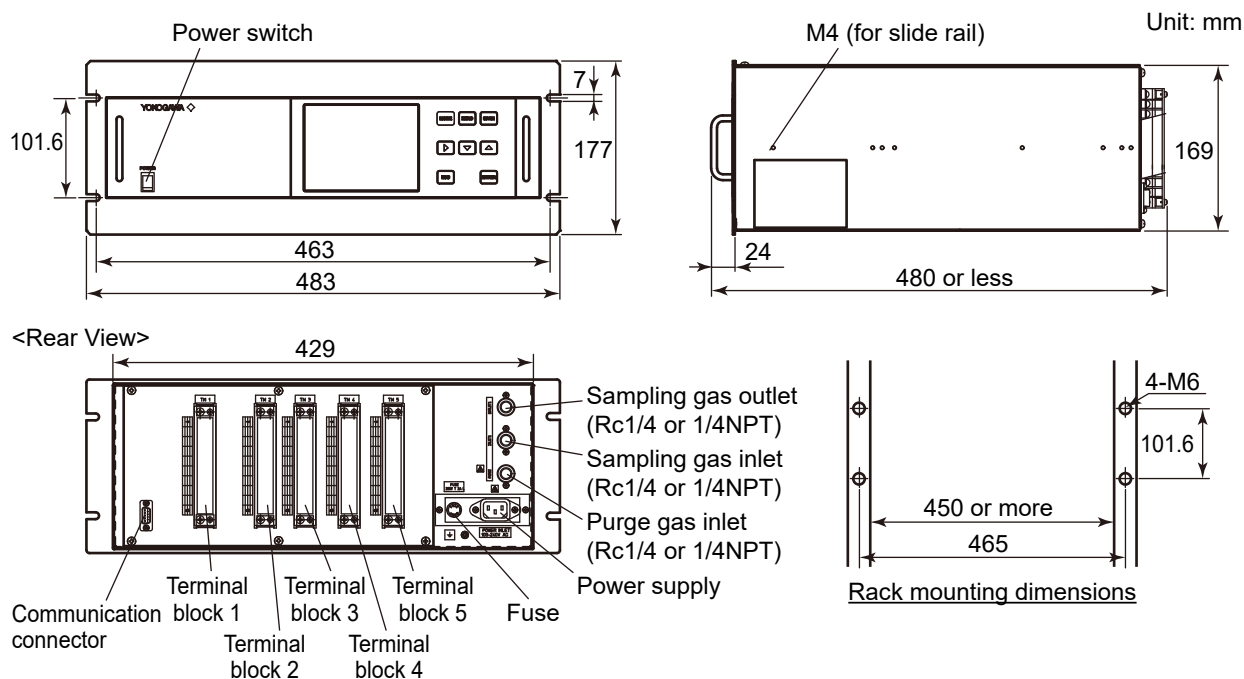
\*2: CO range -07 is not applicable.

\*3: CO range -07, -09, -17, -10 are not applicable.

\*4: CO<sub>2</sub> range -11, -18, -12, are not applicable.  
 CO range -07, -09, -17, -10 are not applicable.

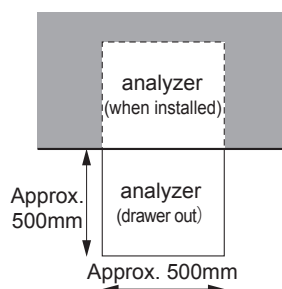
## External Dimensions

### •IR202-A



### <Maintenance space>

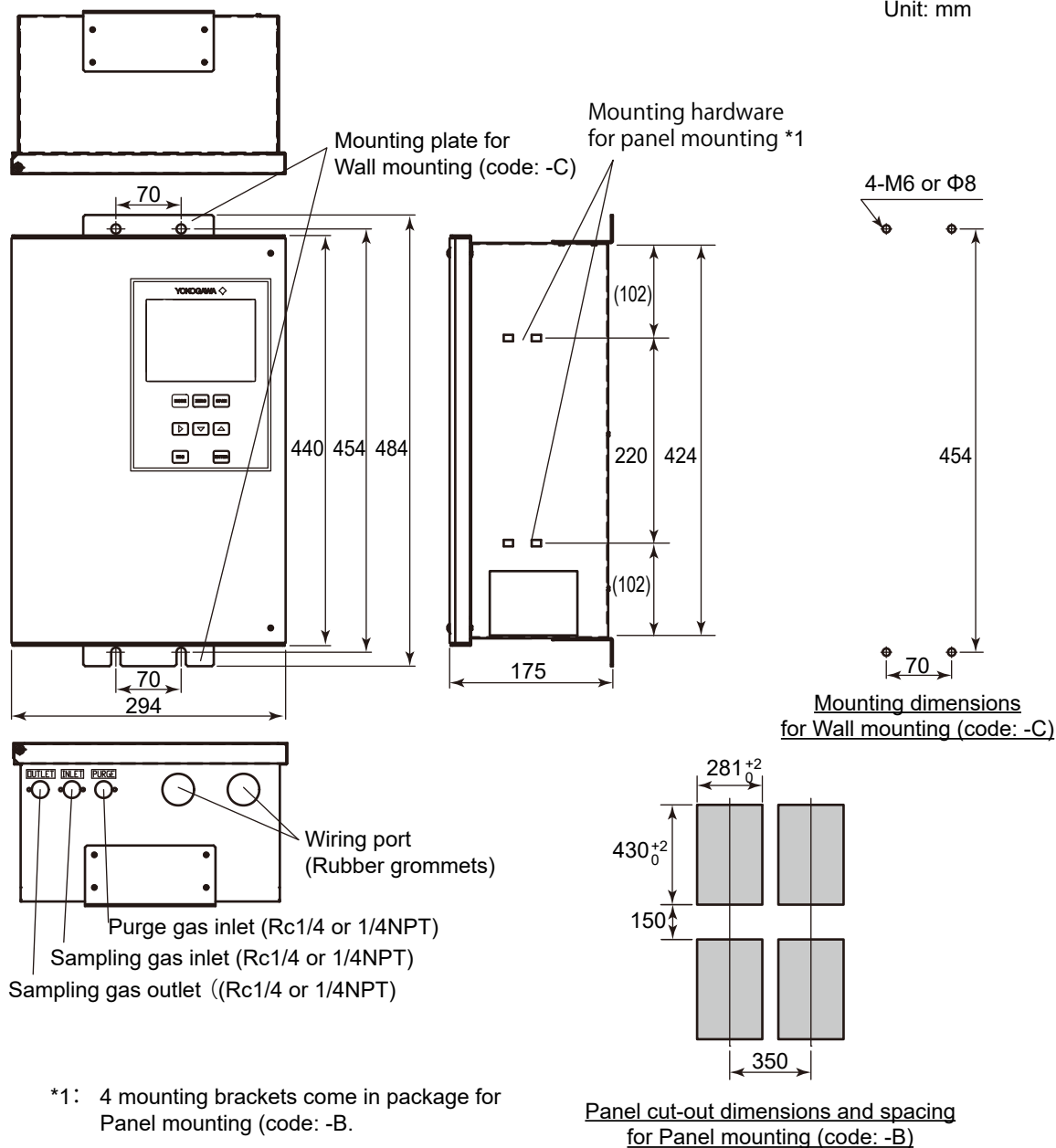
Secure the work area as shown in the picture.



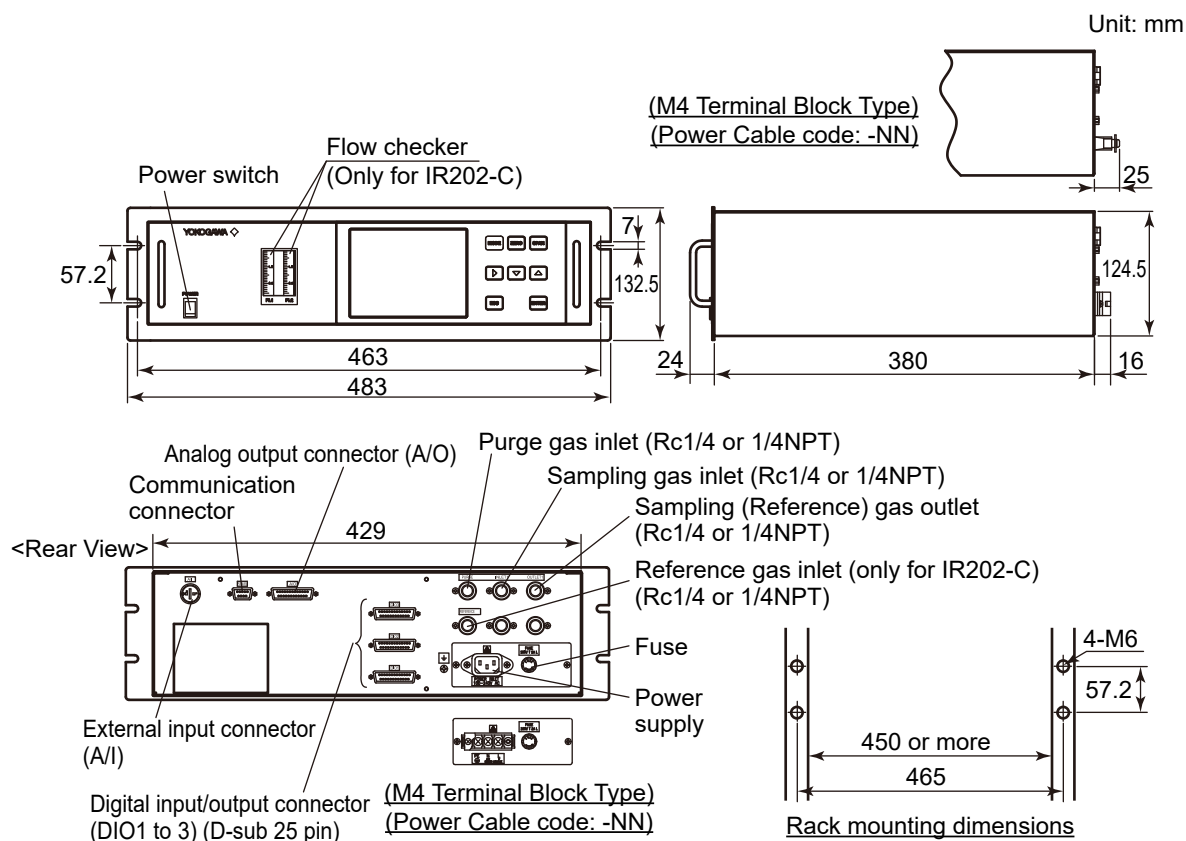
When IR202 is embedded in a panel or in a rack, clear the space of 10 cm on top of each analyzer to expel the radiant heat. When some analyzers are installed in several racks in a unit, clear the space on top of each analyzer.

## ●IR202-B

Unit: mm

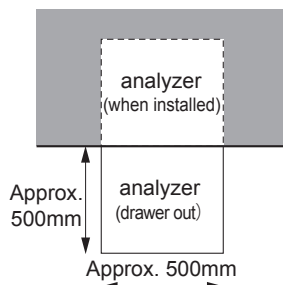


●IR202-C or IR202-D



<Maintenance space>

Secure the work area as shown in the picture.



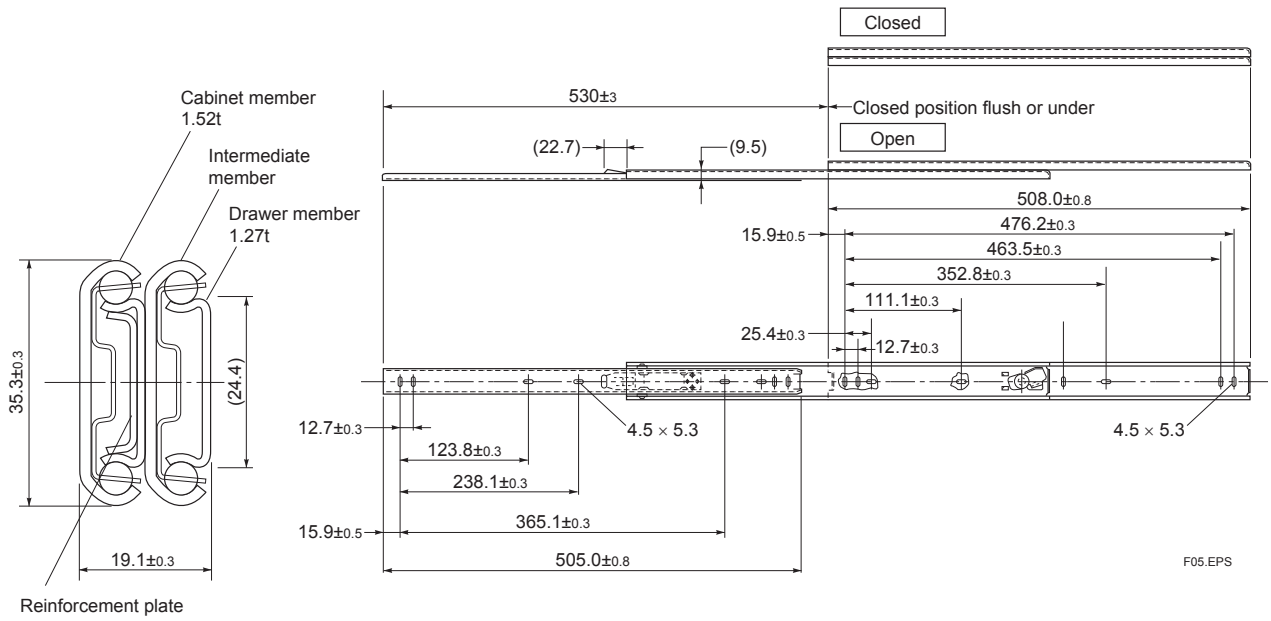
When IR202 is embedded in a panel or in a rack, clear the space of 10 cm on top of each analyzer to expel the radiant heat. When some analyzers are installed in several racks in a unit, clear the space on top of each analyzer.

**Accessories**

●Slide rail (Model : 305A-20/Acuride International Inc.)

Only when Mounting type -A is selected, the slide rail is available. The rail is pre-installed at factory before delivery.

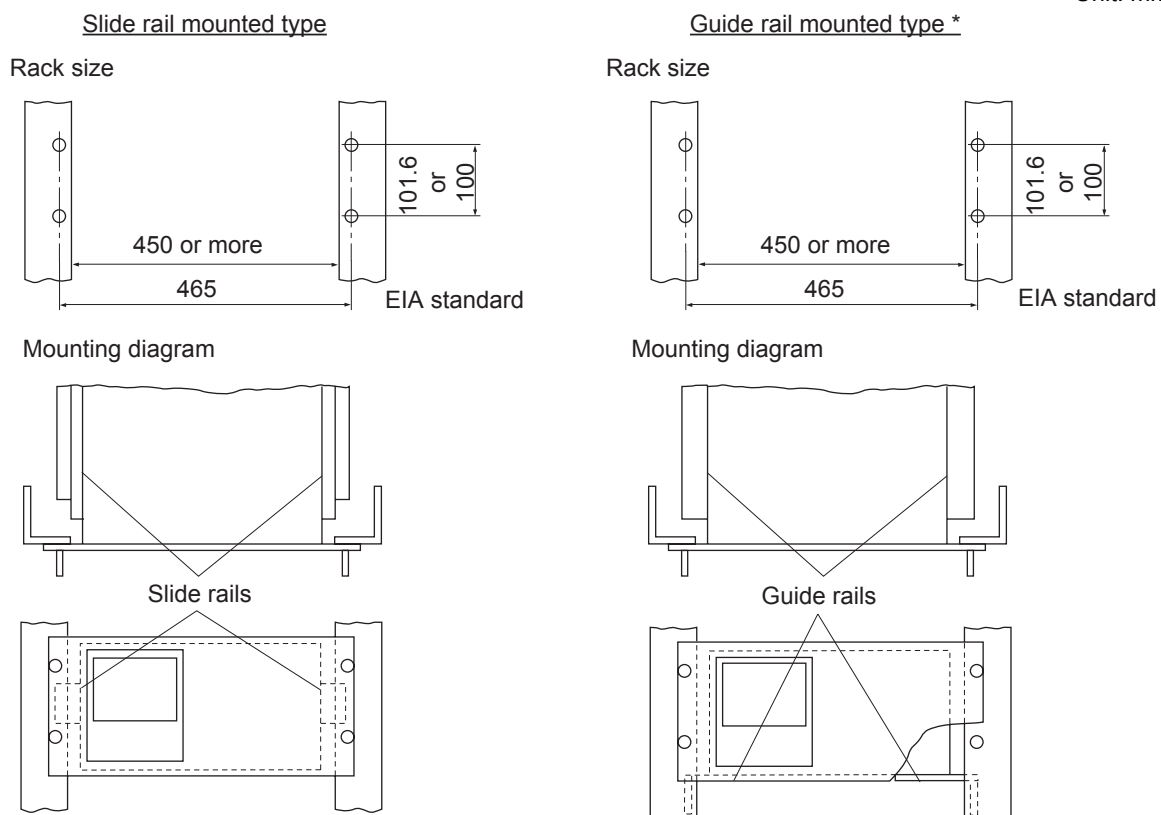
Unit: mm



**<19-inch rack mounting method:>**

The instrument weight should be supported at the bottom of the unit (or the side of the unit when mounted with the slide rails). For easy maintenance, it is recommended to have an installation that allows the instrument to be withdrawn along the slide rail

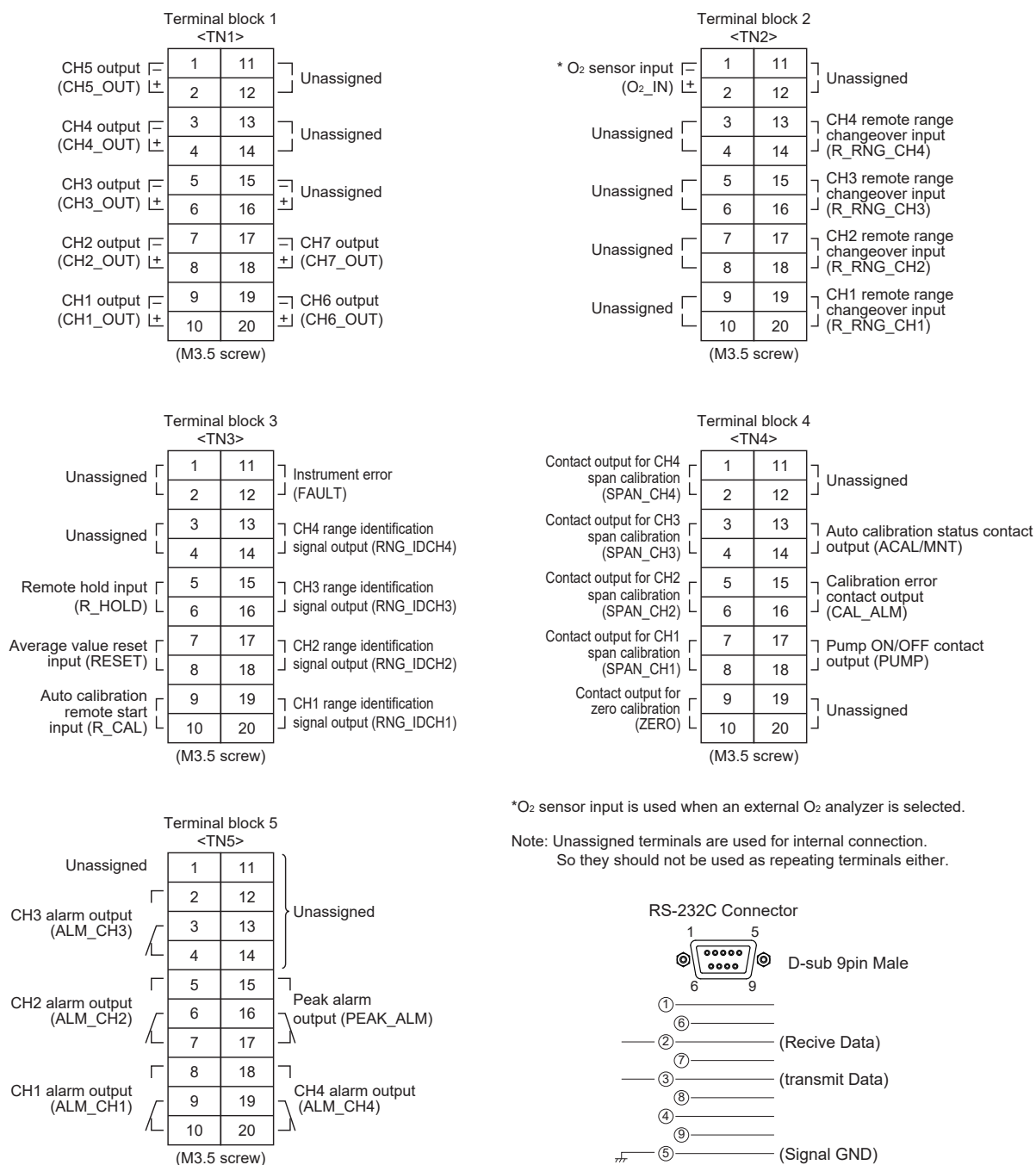
Unit: mm



\* For the guide rail mounted type, a maintenance space (200 mm or more) should be provided on top of the main unit.

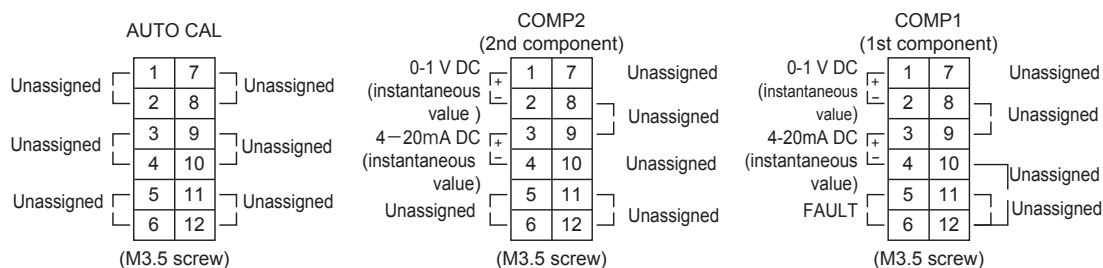
## External Connection Diagram

### ●IR202-A





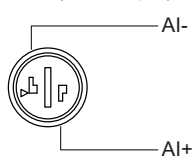
●IR202-B



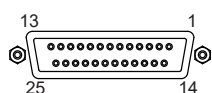
(Note) Unassigned terminals are used for internal connection. So they should not be used as repeating terminals, either.

●IR202-C, IR202-D

Connector for external input(A/I) (for O<sub>2</sub> input)



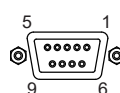
Connector for analog output(A/O)



D-sub 25pin Male

- ① AO1+
- ⑭ AO1-
- ② AO2+
- ⑮ AO2-
- ③ AO3+
- ⑯ AO3-
- ④ AO4+
- ⑰ AO4-
- ⑤ AO5+
- ⑱ AO5-
- ⑥ AO6+
- ⑲ AO6-
- ⑦ AO7+
- ⑳ AO7-
- ⑧ AO8+
- ㉑ AO8-
- ⑨ AO9+
- ㉒ AO9-
- ⑩ AO10+
- ㉓ AO10-
- ⑪ AO11+
- ㉔ AO11-
- ⑫ AO12+
- ㉕ AO12-
- ⑬

RS-485 Connector

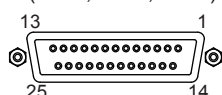


D-sub 9pin Female

- ① (GND)
- ⑥
- ② RTxD+
- ⑦ RTxD-
- ⑧
- ④
- ⑨
- ⑤

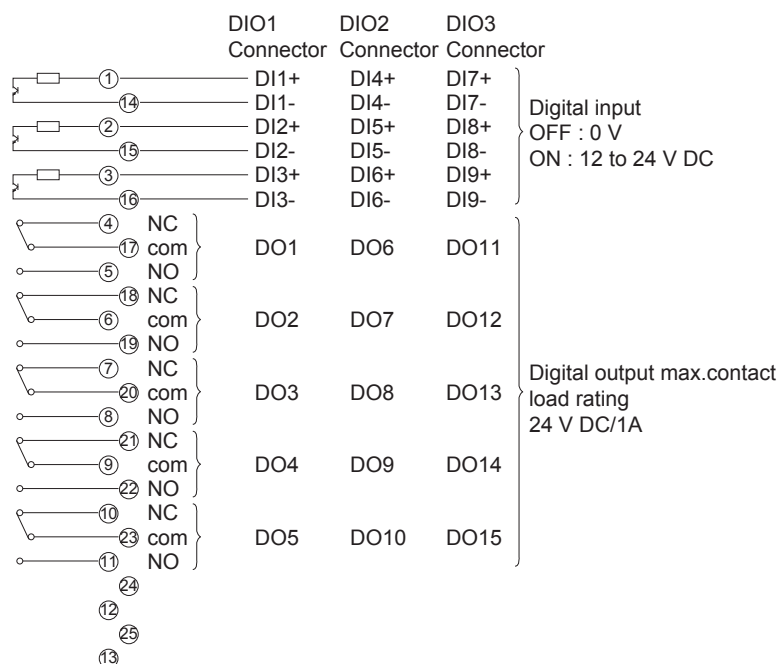
(Note) Display Ch number is same as the AO number under standard specifications.  
Do not use connectors in blank.

Connector for digital input/output  
(DIO1, DIO2, DIO3)



D-sub 25pin female

(Note) DIO1, DIO2, DIO3 have the same internal circuit of the connector. Do not use pins in blank.



#### Contents of digital input signal

DI1	Remote hold
DI2	Average value reset
DI3	Auto calibration start
DI4	Auto zero calibration start
DI5	Remote range 1
DI6	Remote range 2
DI7	Remote range 3
DI8	Remote range 4
DI9	Remote range 5

#### Contents of digital output signal

	1-compo.analyzer	2-compo.analyzer	3-compo.analyzer	4-compo.analyzer
DO1	instrument error	instrument error	instrument error	instrument error
DO2	calibration error	calibration error	calibration error	calibration error
DO3	auto calibration status	auto calibration status	auto calibration status	auto calibration status
DO4	zero	zero	zero	zero
DO5	For span gas Ch1	For span gas Ch1	For span gas Ch1	For span gas Ch1
DO6	—	For span gas Ch2	For span gas Ch2	For span gas Ch2
DO7	—	—	For span gas Ch3	For span gas Ch3
DO8	—	—	Range identification Ch1	For span gas Ch4
DO9	—	Range identification Ch1	Range identification Ch2	Range identification Ch1
DO10	Range identification Ch1	Range identification Ch2	Range identification Ch3	Range identification Ch2
DO11	Alarm 1	Alarm 1	Alarm 1	Alarm 1
DO12	Alarm 2	Alarm 2	Alarm 2	Alarm 2
DO13	Alarm 3	Alarm 3	Alarm 3	Alarm 3
DO14	Alarm 4	Alarm 4	Alarm 4	Range identification Ch3
DO15	Alarm 5	Alarm 5	Alarm 5	Range identification Ch4

Note The normal open side (NO) of digital output is closed when the function is active without range ID.  
In case of range ID, normal open (NO) side is closed with L-range.  
The normal closed (NC) side is closed with H-range.

## &lt;Measurable Components and the Corresponding Channel Numbers&gt;

Suffix/option code				Output and corresponding channels									
Type	comp	O <sub>2</sub> Analyzer	Option code*	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8	Ch9	Ch10
-A, -C, -D	-A	N	not specified	NO									
-A, -B, -C, -D	-B	N	not specified	SO <sub>2</sub>									
-A, -C, -D	-C	N	not specified	NO	SO <sub>2</sub>								
-A, -B, -C, -D	-D	N	not specified	CO									
-A, -B, -C, -D	-E	N	not specified	CO <sub>2</sub>									
-A, -B, -C, -D	-F	N	not specified	CO <sub>2</sub>	CO								
-A, -C, -D	-G	N	not specified	NO	CO								
-A, -C, -D	-H	N	not specified	NO	SO <sub>2</sub>	CO							
-A, -B, -D	-K	N	not specified	CH <sub>4</sub>									
-A, -D	-L	N	not specified	CH <sub>4</sub>	CO								
-A, -D	-M	N	not specified	CO <sub>2</sub>	CH <sub>4</sub>								
-A, -D	-P	N	not specified	CO <sub>2</sub>	CO	CH <sub>4</sub>							
-A, -C, -D	-A	1, 2, 3	not specified	NOx	O <sub>2</sub>								
-A, -C, -D	-B	1, 2, 3	not specified	SO <sub>2</sub>	O <sub>2</sub>								
-A, -C, -D	-C	1, 2, 3	not specified	NOx	SO <sub>2</sub>	O <sub>2</sub>							
-A, -C, -D	-D	1, 2, 3	not specified	CO	O <sub>2</sub>								
-A, -C, -D	-E	1, 2, 3	not specified	CO <sub>2</sub>	O <sub>2</sub>								
-A, -C, -D	-F	1, 2, 3	not specified	CO <sub>2</sub>	CO	O <sub>2</sub>							
-A, -C, -D	-G	1, 2, 3	not specified	NOx	CO	O <sub>2</sub>							
-A, -C, -D	-H	1, 2, 3	not specified	NOx	SO <sub>2</sub>	CO	O <sub>2</sub>						
-A, -D	-K	1, 2, 3	not specified	CH <sub>4</sub>	O <sub>2</sub>								
-A, -D	-L	1, 2, 3	not specified	CH <sub>4</sub>	CO	O <sub>2</sub>							
-A, -D	-M	1, 2, 3	not specified	CO <sub>2</sub>	CH <sub>4</sub>	O <sub>2</sub>							
-A, -D	-P	1, 2, 3	not specified	CO <sub>2</sub>	CO	CH <sub>4</sub>	O <sub>2</sub>						
-A, -C, -D	-A	1, 2, 3	/K	NOx	O <sub>2</sub>	Correct NOx	Correct NOx Ave.						
-A, -C, -D	-B	1, 2, 3	/K	SO <sub>2</sub>	O <sub>2</sub>	Correct SO <sub>2</sub>	Correct SO <sub>2</sub> Ave.						
-A, -C, -D	-C	1, 2, 3	/K	NOx	SO <sub>2</sub>	O <sub>2</sub>	Correct NOx	Correct SO <sub>2</sub>	Correct NOx Ave	Correct SO <sub>2</sub> Ave			
-A, -C, -D	-D	1, 2, 3	/K	CO	O <sub>2</sub>	Correct CO	Correct CO Ave.						
-A, -C, -D	-F	1, 2, 3	/K	CO <sub>2</sub>	CO	O <sub>2</sub>	Correct CO	Correct CO Ave.					
-A, -C, -D	-G	1, 2, 3	/K	NOx	CO	O <sub>2</sub>	Correct NOx	Correct CO	Correct NOx Ave	Correct CO Ave			
-A	-H	1, 2, 3	/K	NOx	SO <sub>2</sub>	CO	O <sub>2</sub>	Correct NOx	Correct SO <sub>2</sub>	Correct CO			
-C, -D	-H	1, 2, 3	/K	NOx	SO <sub>2</sub>	CO	O <sub>2</sub>	Correct NOx	Correct SO <sub>2</sub>	Correct CO	Correct NOx Ave	Correct SO <sub>2</sub> Ave	Correct CO Ave
-A, -D	-L	1, 2, 3	/K	CH <sub>4</sub>	CO	O <sub>2</sub>	Correct CO	Correct CO Ave.					
-A, -D	-P	1, 2, 3	/K	CO <sub>2</sub>	CO	CH <sub>4</sub>	O <sub>2</sub>	Correct CO	Correct CO Ave				

\*: In the column of Option code, "Not specified" refers any option code except /K (with O<sub>2</sub> correction value output).

- When CH1 has SO<sub>2</sub> in its raw, it means the Ch1 corresponds with the SO<sub>2</sub> component.
- When option /K is specified, NO is indicated as NOx.
- "Correct" represents O<sub>2</sub> correction.

## ■ Dedicated Zirconia Oxygen Analyzer ZX8D (to be purchased separately)

When selecting "O<sub>2</sub> analyzer : 1" in Model and Suffix Code of IR202, purchase this analyzer separately.

Measuring system:	Zirconia solid electrolyte
Measuring range:	Minimum range 0 to 5 vol% O <sub>2</sub> and maximum range of 0 to 25 vol% O <sub>2</sub> , if used in combination with infrared gas analyzer
Measurable component:	Oxygen in noncombustible gas or combustion exhaust gas (sensor will be burned and error will appear if combustible gas is mixed in sample gas)
Output signal:	4 to 20mA DC and 0 to 1V DC linear connected to infrared gas analyzer or direct output from sensor of the ZX8D.
Sensor output:	Logical output of zirconia sensor (with sensor temperature of 800°C)

$$E = 50.74 \log \frac{20.6}{X} - B$$

E: Logical output (mV)  
X: Measured gas concentration (%O<sub>2</sub>)  
B: Blank voltage (mV)

Temperature alarm output:	Contact output normally open, Contact capacity: 220V AC, 1A (resistive load)
Flow rate:	0.5±0.25 liter/minute (when connected with infrared gas analyzer)
NOTE :	The Zirconia system, due to its principle, may produce a measuring error due to relative concentration versus the combustible O <sub>2</sub> gas concentration. Also, a corrosive gas (SO <sub>2</sub> of 250 ppm or more, etc.) may affect the life of the sensor.
Warm up time:	Approx. 30 minutes
Ambient temperature:	0 to +45°C
Ambient humidity:	90% RH or less
Use environment:	Indoors
Mounting method:	Indoor wall mounting
Gas inlet/outlet:	Rc1/4 or 1/4NPT
Enclosure:	Steel casing
Indication:	Temperature indication (LED)
Outer dimensions (H×W×D):	141×170×190 mm
Mass:	Approx. 3 kg
Finish color:	Munsell 5Y7/1
Power supply	
Rated voltage:	100 to 115 V AC or 200 to 240V AC
Rated frequency:	50 Hz/60 Hz
Power consumption:	Max. 215 W. Approx. 65 W for ordinary use.
Fluctuation of power supply voltage:	230V AC ±10%
Repeatability:	±0.5% FS (when connected with infrared gas analyzer)
Linearity:	Within ± 1% of full scale
Zero drift:	Within ± 1% of full scale/week
Span drift:	Within ± 2% of full scale/week
Response speed:	Approx. 20 seconds for 90% response (when connected with infrared gas analyzer)

Model	Suffix code	Option code	Description
ZX8D	-----	-----	Zirconia Oxygen Analyzer
Power supply	-5	-----	100-115 V AC, 50/60 Hz
	-3	-----	200-240 V AC, 50/60 Hz
Style code	*C	-----	For IR202, IR400
	*D	-----	For IR202, IR400 (CE conformity)

Safety, EMC and RoHS conformity standards (Only ZX8D-□\*D):

Installation altitude:	2000 m or less
Pollution degree:	2
Installation category:	II

- Note
- Installation category, called overvoltage category, specifies impulse withstanding voltage. Category II is for electrical equipment.
  - Pollution degree indicates the degree of existence of solid, liquid, gas or other inclusions which reduce dielectric strength. Degree 2 is the normal indoor environment.

Safety: EN61010-1  
 EMC: EN61326-1 Class A, Table 2 (For use in industrial locations), EN61326-2-3,  
 EN61000-3-2, EN61000-3-3  
 EMC Regulatory Arrangement in Australia and New Zealand  
 Korea Electromagnetic Conformity Standard Class A 한국 전자파적합성 기준

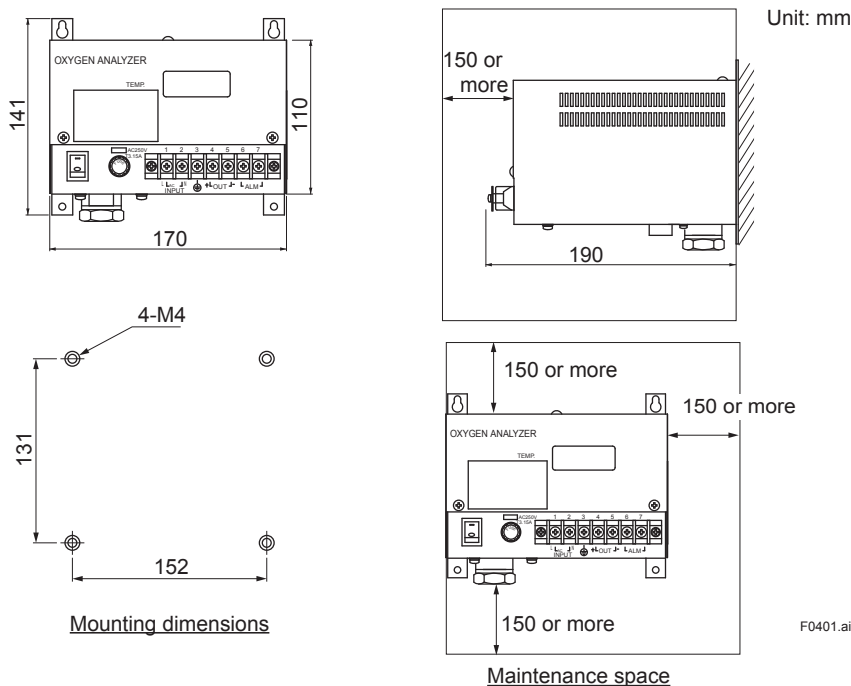
Note: The product mounted in a steel enclosure conforms to the requirements of EMC directive.

Caution: The instrument is a Class A product, and it is designed for use in the industrial environment. Please use this instrument in the industrial environment only.

RoHS: EN IEC 63000

#### Information of the WEEE Directive

This product is purposely designed to be used in a large scale fixed installations only and, therefore, is out of scope of the WEEE Directive. The WEEE Directive does not apply. The WEEE Directive is only valid in the EU.



## ■ NO<sub>2</sub>/NO Converter

Use for NO<sub>x</sub> measurement.

Part number: K9350LE  
 K9350LF

Mounting: Indoor surface mounting

Target Gases: General boiler exhaust gas, atmosphere

Catalyst: Amount; 2 cm<sup>3</sup>

Replacement cycle; Approx. 8 months (at flow rate of 0.5 L/min with 5% O<sub>2</sub>, 10 ppm NO<sub>2</sub>)

Temperature set-point; 220 ± 10°C (Sensing tip; K thermocouple)

Wetted materials: Ceramic, Fluoropolymer (PTFE), glass filter, SUS316

Conversion efficiency: 95% or higher, conforms to JIS

Temperature alarm outlet (K9350LF only): Contact output normally closed  
 Contact capacity: 220V AC/30V AC, 1A (resistive load)

Gas Flow Rate: 0.5 L/min

Gas inlet/outlet: ø6 mm PTFE tube connection

Ambient Temperature: -5 to 45°C

Power Supply: K9350LE; 100 V AC, 50/60 Hz  
 K9350LF; 100 to 240 V AC, 50/60 Hz (K9350LF)

Power consumption: Approx. 85 W

Weight: Approx. 1.1 kg (K9350LE), Approx. 1.2 kg (K9350LF)

Sample gas requirements: Dust/drain removed, gas temperature at 150°C or lower

Safety, EMC and RoHS conformity standards (K9350LF only):

Installation altitude; 2000 m or less

Pollution degree; 2 (Note)

Installation category; II (Note)

Note • Installation category, called overvoltage category, specifies impulse with standing voltage. Category II is for electrical equipment.

• Pollution degree indicates the degree of existence of solid, liquid, gas or other inclusions which reduce dielectric strength. Degree 2 is the normal indoor environment.

Safety; EN61010-1  
 EMC; EN61326-1 Class A, Table 2 (For use in industrial locations), EN61326-2-3, EN61000-3-2, EN61000-3-3  
 EMC Regulatory Arrangement in Australia and New Zealand (RCM) EN61326-1 Class A  
 Note: The product mounted in a steel enclosure conforms to the requirements of EMC directive.

Caution: The instrument is a Class A product, and it is designed for use in the industrial environment. Please use this instrument in the industrial environment only.

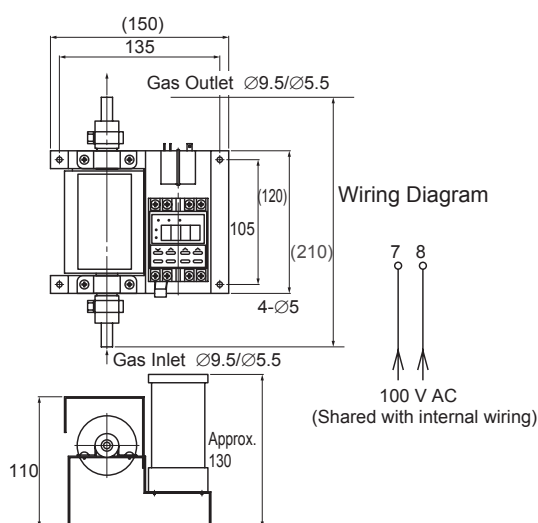
RoHS: EN IEC 63000

Spare Parts for one-year-use

Item	Part No.	Qty
Catalyst for NO <sub>2</sub> /NO converter	K9350LP	2
Glass wool for NO <sub>2</sub> /NO converter	K9350LQ	2
Fitting for NO <sub>2</sub> /NO converter	K9350LV	2

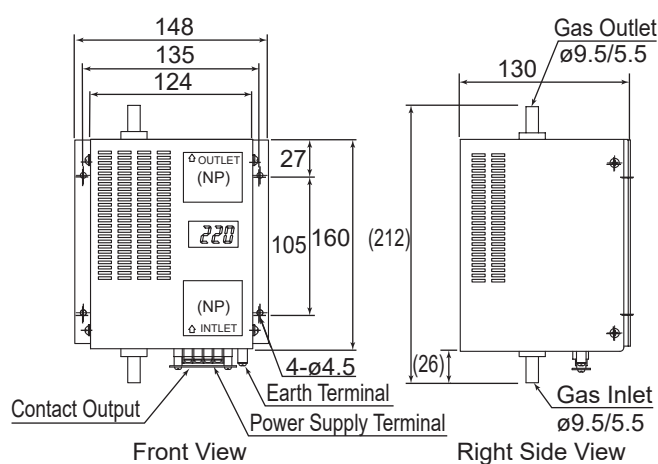
**K9350LE**

Unit: mm



**K9350LF**

Unit: mm



## Inquiry Sheet for IR202 Infrared Gas Analyzer

Place a checkmark ✓ in the appropriate box and fill in the specific information in the blanks for your reference.

### 1. General Information

Company: \_\_\_\_\_ Delivery destination: \_\_\_\_\_  
 Responsible person: \_\_\_\_\_ Section: \_\_\_\_\_ (Phone No.) \_\_\_\_\_  
 Plant name: \_\_\_\_\_ Measurement location: \_\_\_\_\_  
 Purpose:  Indication reading,  Recording,  Telemetry  Alarm,  Control  Others

### 2. Request specification

Type :  19 inch rack mounting type  Wall mounting type  
 Low-concentration 19inch rack mounting type  19 inch rack mounting D-Sub terminal type

Measured component:

	1st	2nd	3rd
<input type="checkbox"/>	NO		
<input type="checkbox"/>	SO <sub>2</sub>		
<input type="checkbox"/>	NO	SO <sub>2</sub>	
<input type="checkbox"/>	CO		
<input type="checkbox"/>	CO <sub>2</sub>		
<input type="checkbox"/>	CO <sub>2</sub>	CO	
<input type="checkbox"/>	NO	CO	
<input type="checkbox"/>	NO	SO <sub>2</sub>	CO
<input type="checkbox"/>	CH <sub>4</sub>		
<input type="checkbox"/>	CH <sub>4</sub>	CO	
<input type="checkbox"/>	CO <sub>2</sub>	CH <sub>4</sub>	
<input type="checkbox"/>	CO <sub>2</sub>	CO	CH <sub>4</sub>

Measured range:

NO \_\_\_\_\_  ppm  mg/m<sup>3</sup>  
 SO<sub>2</sub> \_\_\_\_\_  ppm  vol%  mg/m<sup>3</sup>  
 CO \_\_\_\_\_  ppm  vol%  mg/m<sup>3</sup>  
 CO<sub>2</sub> \_\_\_\_\_  ppm  vol%  mg/m<sup>3</sup>  
 CH<sub>4</sub> \_\_\_\_\_  ppm  vol%  mg/m<sup>3</sup>  
 O<sub>2</sub> \_\_\_\_\_  %  mg/m<sup>3</sup>

O<sub>2</sub> Analyzer:

Without O<sub>2</sub> analyzer  
 External zirconia type sensor (use ZX8D)  
 Style C (general)  
 Style D (CE conformity)  
 External O<sub>2</sub> analyzer  
 Built-in paramagnetic type O<sub>2</sub> sensor

NO<sub>2</sub>/NO Converter:

With NO<sub>2</sub>/NO converter  
 K9350LE (non-CE conformity)  
 K9350LF (CE conformity)  
 Without NO<sub>2</sub>/NO converter

Output:  4 – 20 mA DC  0 – 1 V DC  MODBUS communication

O<sub>2</sub> correction and O<sub>2</sub> average:  Yes  No

Peak count alarm:  Yes  No

Power Cable:  No (Screw terminals)

Voltage rating:  125V AC(PSE)  125V AC(UL)  
 250V AC(CEE)  250V AC(CCC)

Mounting Type:

Rack mounting type with slide rail (IR202-A)  
 Panel mounting type (IR202-B)  Wall mounting type (IR202-B)  
 Rack mounting type (IR202-C, -D)

### 3. Sample gas conditions

- Fuel:  Gas,  Oil,  Coal,  Refuse,  Other fuel \_\_\_\_\_
- (1) Temperature: \_\_\_\_\_ to \_\_\_\_\_, Normal temperature \_\_\_\_\_ [°C]
- (2) Pressure: \_\_\_\_\_ to \_\_\_\_\_, Normal pressure \_\_\_\_\_ [MPa]
- (3) Humidity: \_\_\_\_\_ [vol%]
- (4) Dust: \_\_\_\_\_ [mg/Nm<sup>3</sup>]
- (5) Corrosive gas:  Yes \_\_\_\_\_  No

Composition (Detailed composition of sample gas should be provided. This is important for the purpose of knowing the effect of interference gases)

Contents	Concentration range		
CO	:	to	<input type="checkbox"/> % <input type="checkbox"/> ppm
CO <sub>2</sub>	:	to	<input type="checkbox"/> % <input type="checkbox"/> ppm
CH <sub>4</sub>	:	to	<input type="checkbox"/> % <input type="checkbox"/> ppm
H <sub>2</sub>	:	to	<input type="checkbox"/> % <input type="checkbox"/> ppm
O <sub>2</sub>	:	to	<input type="checkbox"/> % <input type="checkbox"/> ppm
N <sub>2</sub>	:	to	<input type="checkbox"/> % <input type="checkbox"/> ppm
SO <sub>2</sub>	:	to	<input type="checkbox"/> % <input type="checkbox"/> ppm
NOx	:	to	<input type="checkbox"/> % <input type="checkbox"/> ppm
H <sub>2</sub> O	:	to	<input type="checkbox"/> % <input type="checkbox"/> ppm
	:	to	<input type="checkbox"/> % <input type="checkbox"/> ppm