

General Specifications

IR400 Infrared Gas Analyzer

GS 11G02N01-01E

[Style : S4]

The IR400 infrared gas analyzer is capable of measuring the concentrations of NO, SO₂, CO₂, CO, CH₄ and O₂ components in sample gas.

NO, SO₂, CO₂, CO and CH₄ are measured by non-dispersive infrared method (NDIR), while O₂ is measured by built-in paramagnetic sensor or external zirconia analyzer. A maximum of 5 components including O₂ (up to 4 components except for O₂ measurement) are simultaneously measurable.

The mass flow type twin detector of high sensitivity and reliability adopted in the infrared ray method detection unit makes the measurement hardly affected by interfering components.

In addition, the IR400 includes a microprocessor and has a large-size liquid crystal display, providing easy operation, high accuracy and multiple 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. Simultaneous and continuous measurement of up to 5 components including O₂
O₂ and 4 components selected from among NO, SO₂, CO, CO₂, and CH₄.
2. Minimal interference from other gas components
The mass flow type twin detector of high sensitivity and reliability minimizes interference from other gas components, ensuring excellent stability.
3. Extensive functions
Incorporating O₂ correction, average value computing, automatic calibration, one touch calibration, upper/lower limit alarm, remote measurement range changeover, range identification signal output, etc., the analyzer accommodates different application requirements.
4. Easy-to-read, large LCD
Large LCD provides clear indications of all measured components and computed values and easy interactive operation.
5. 19-inch rack mounting
Unitized construction of the main body on the 19-inch rack and of the signal input/output terminal module allows easy configuration of a gas analyzer system.
6. Maximum measuring range ratio
A maximum range ratio of 1:25 is achieved.
7. Zero drift
±1% of full scale/week (for range more than 200ppm)



■ Specifications

Standard Specifications

Measurement principle:

- NO, SO₂, CO₂, CO, CH₄: Non-dispersive infrared method
Single light source-double beams
- O₂: Paramagnetic type (built-in), or zirconia type (external)

Measurable gas components and measuring ranges:

Component	Range	Minimum range	Maximum range
NO		0 – 50 ppm	0 – 5000 ppm
SO ₂		0 – 50 ppm	0 – 10 vol%
CO ₂		0 – 20 ppm	0 – 100 vol%
CO		0 – 50 ppm	0 – 100 vol%
CH ₄		0 – 200 ppm	0 – 100 vol%
O ₂ (paramagnetic)		0 – 5 vol%	0 – 25 vol%
O ₂ (zirconia)		0 – 5 vol%	0 – 25 vol%

- Measurement of up to 5 components including O₂.
- 1 or 2 measuring range per component.
- Measuring range ratio ≤ 1:5 (O₂ analyzer) ≤ 1:25 (except O₂ analyzer)

For measurable components and possible combinations of measuring ranges, refer to Measurable Components and Ranges page 10 through 11.

Display: Digital indication in 4 digits (LCD with backlight)

- Instantaneous value of each component
- Instantaneous value after O₂ correction (only in NO, SO₂, CO with O₂ measurement)
- Average value after O₂ correction (only in NO, SO₂, CO with O₂ measurement)
- Average O₂ value

Analog output signal:

4 to 20 mA DC or 0 to 1 V DC, non-isolated, 12 points max.

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

- * Input/Output of analog signals is available in combination with the input/output terminal module.

Permissible load resistance:

550 Ω max. for 4 to 20 mA DC

100 kΩ min. for 0 to 1 V DC

- *: Refer to the table "Measurable Components and the Corresponding Channel Numbers" of Page 17, for the channel numbers of displayed values and analog output signals.

Analog Input Signal :

For signal input from external O₂ analyzer,
Signal requirement;

- (1) Signal from Yokogawa's zirconia O₂ analyzer (Model ZX8D*C or ZX8D*D)
- (2) 0 to 1V DC from an O₂ sensor
Input section is not isolated. This feature is effective when built-in O₂ sensor is not used.

(An input signal triggers measured concentration indication and O₂ correction.)

* : External O₂ analyzer should be purchased separately.

Relay contact output:

1a contact (250 V AC/2 A, resistive load)
Instrument error, calibration error, range identification, auto calibration status, pump ON/OFF, peak alarm.

1c contact (250 V AC/2 A, resistive load)
Selectable 6 outputs.

High/Low limit alarm contact output (for each channel).

Power disconnection alarm.

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

Contact input:

Non-voltage contact (ON/0 V, OFF/5 VDC , 5 mA flowing at ON). Remote range changeover, auto calibration remote start, remote hold, average value reset, 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 (100 mA or less)

* For details, see External Connection Diagram on page 16.

Power supply:

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

Operating conditions:

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

Storage conditions:

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

Dimensions (H × W × D):

Analyzer main unit;
177 × 483 × 599 mm
Input/Output terminal module;
164 × 316 × 55 mm

Weight: 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; CaF₂
O₂ analyzer sampling cell; SUS316
Internal piping; Toaron tube, Teflon tube

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

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

Safety, EMC and RoHS conformity standards:

When using IR400 in Europe, select "Indication, Power cable" :C in the suffix code.

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,
EN61326-2-3,
EN61000-3-2, EN61000-3-3, EN61000-6-2
EMC Regulatory Arrangement in
Australia and New Zealand (RCM)
Korea Electromagnetic Conformity (KC)

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; EN50581

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.

Options**Dedicated relay board (Option code: /R)**

This relay board receives signals from connector CN3 of the IR400 I/O terminal module and activates the calibration solenoid valve directly.

Relay Contact 1a contact (250 V AC/2 A, resistive load)
Contact Action

During measurement; CN1: ON
Others: OFF

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

Recommended connector (CN1 to CN9)

Housing; VHR-2N (JST, Japan Solderless Terminals,)
Contact; SVH-21T-1-1 (JST)

Standard Functions**Output signal hold:**

Output signals are kept on hold during the manual or auto calibrations by activation of holding (turning "ON" its setting).

The values to be on hold are the ones obtained just before calibration mode starts.

Indication values will not be on hold.

Remote output hold:

Output signal holds the latest value or setting value by short-circuiting the remote-output-hold input terminals.

Holding is maintained while the terminals are short-circuited. But the indicated instantaneous values will not be on hold.

Switch range :

The range changeover is available in manual, auto, and remote modes. Only preset changeover method is valid.

Manual; Allows range to switch by key operation.

Auto; Allows range to switch from low to high range when 90%FS or more is available in the low range.

Allows range to switch from high to low range when 80%FS or less is available in the low range.

Remote; Non-voltage contact input (for measurable components)

Allows range to switch via an external signal when remote range changeover input is received.

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 a 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 900 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 starts by opening the auto-calibration-remote-start input terminals after short-circuiting them for 1.5 seconds or longer.

Auto zero calibration:

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, the zero calibration will be carried out at the preset auto zero calibration timing with the solenoid valve drive contact (for zero calibration) turned on/off.

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)

Upper/lower limit alarm:

Alarm contact output turns on when measurement value reaches the preset upper or lower limit of 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 an 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 output:

Contacts close during auto calibration.

Pump ON/OFF contact output:

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 (available with specifying optional code)**O₂ correction:(-/K)**

Conversion of measured NO, SO₂ and CO gas concentrations into values at reference O₂ concentration.

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

Where:

C: Sample gas concentration after O₂ correction

C_s: Measured concentration of sample gas

O_s: Measured O₂ concentration (limit setting: 1 to 20%O₂, default 17%)

O_n: Reference O₂ concentration (value changeable by setting: 0 to 19%O₂, default 4%)

The result of calculation is indicated and output in an analog output signal.

Average value after O₂ correction and O₂ average value calculation (-/K):
 The result of O₂ correction or instantaneous O₂ 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 reset (-/K):
 The above-mentioned output of average value starts from the initial state by opening the average-value-resetting input terminals after short-circuiting them for 1.5 seconds or longer.
 Output is reset by short-circuiting and restarted by opening.

CO concentration peak count alarm (-/A):
 (available only for CO + O₂ 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 (-/C):
 RS-232C (9 pins D-sub)
 Half-duplex bit serial
 Start-stop synchronization
 ModbusTM protocol

Contents; Read/write 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 (±1% of full scale for range less than 0-50 ppm)
Linearity: ±1% of full scale
Zero drift: ±1% of full scale/week
 (±2% of full scale/week for range equal to or more than 50 ppm and less than 200ppm)
 (±2% of full scale/day for range less than 0-50 ppm)
Span drift: ±2% of full scale/week
 (±2% of full scale/day for range less than 0-50 ppm)
Response time (for 90%FS response) :
 Within 60 seconds including replacement time of sample gas (when gas flow rate is 0.5 L/min). Gas replacement time depends on the number of measuring components, and measuring range effects of interfering gases.

Effects of interfering gases:

When sample gas contains gas components listed below, the measurement accuracy may suffer. Consult Yokogawa for the countermeasures or the effect on accuracy.

Analyzer	Interference gas	Effect
SO ₂ analyzer	NO ₂	50 ppm of NO ₂ is equivalent to -6 ppm of SO ₂
CO analyzer	CO ₂	10 % of CO ₂ is equivalent to 3 ppm of CO
	N ₂ O	1000 ppm of N ₂ O is equivalent to 80 ppm of CO
CH ₄ analyzer	CO ₂	15% of CO ₂ is equivalent to 3 ppm of CH ₄

Standard Requirements for Sample Gas

Flow rate: 0.5±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/Nm³ or less in particle size of 1 µm 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 N₂
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 O₂ analyzer is installed externally and calibration is carried out on the same calibration gas line:

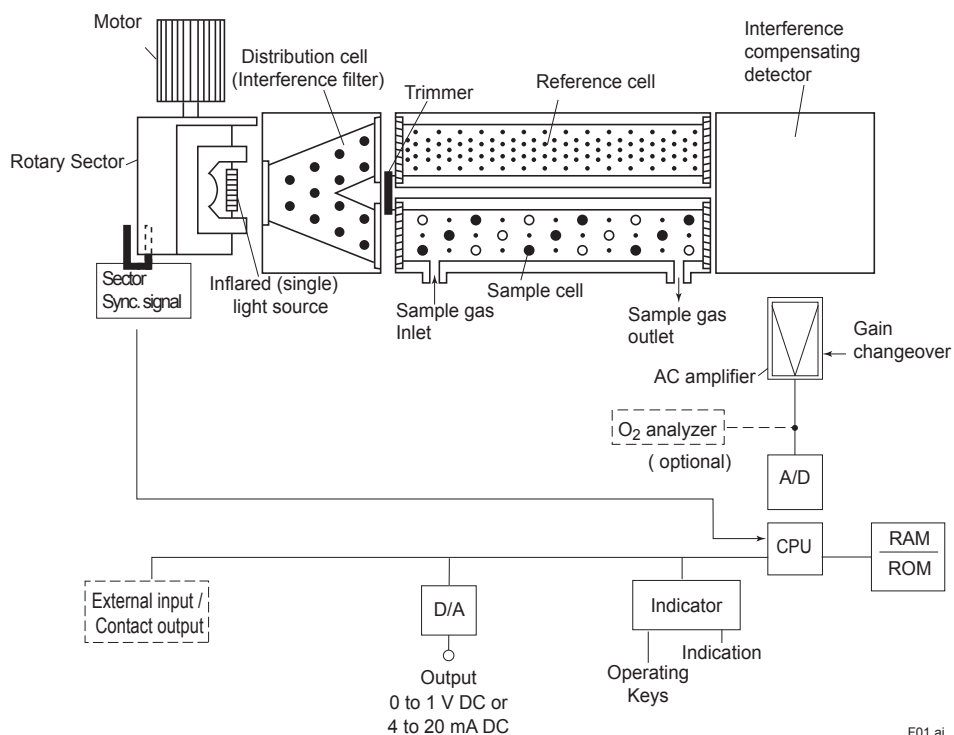
Zero gas; Dry air or atmospheric air (provided without CO₂ sensor)
Span gas; For other than O₂ measurement, each sample gas having concentration 90 to 100% of its measuring range.
 For O₂ measurement, O₂ gas of 1 to 2 vol%.

Installation Requirements

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

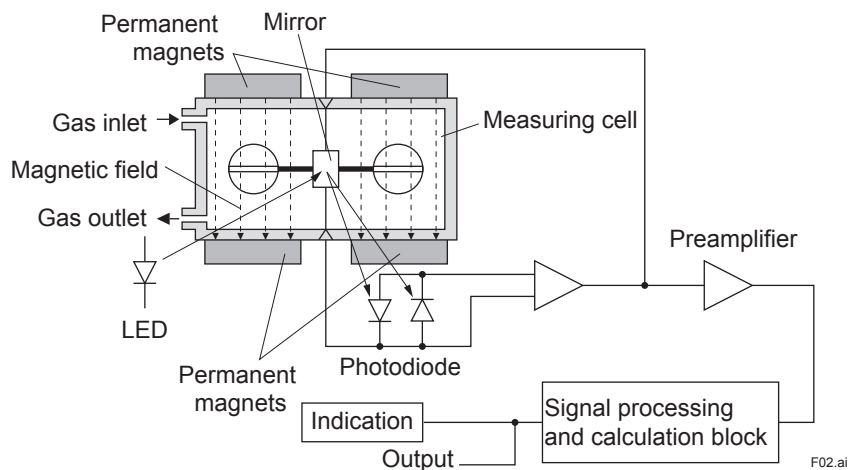
■ Measurement Principle

Infrared gas analyzer (NO, SO₂, CO₂, CO, CH₄)



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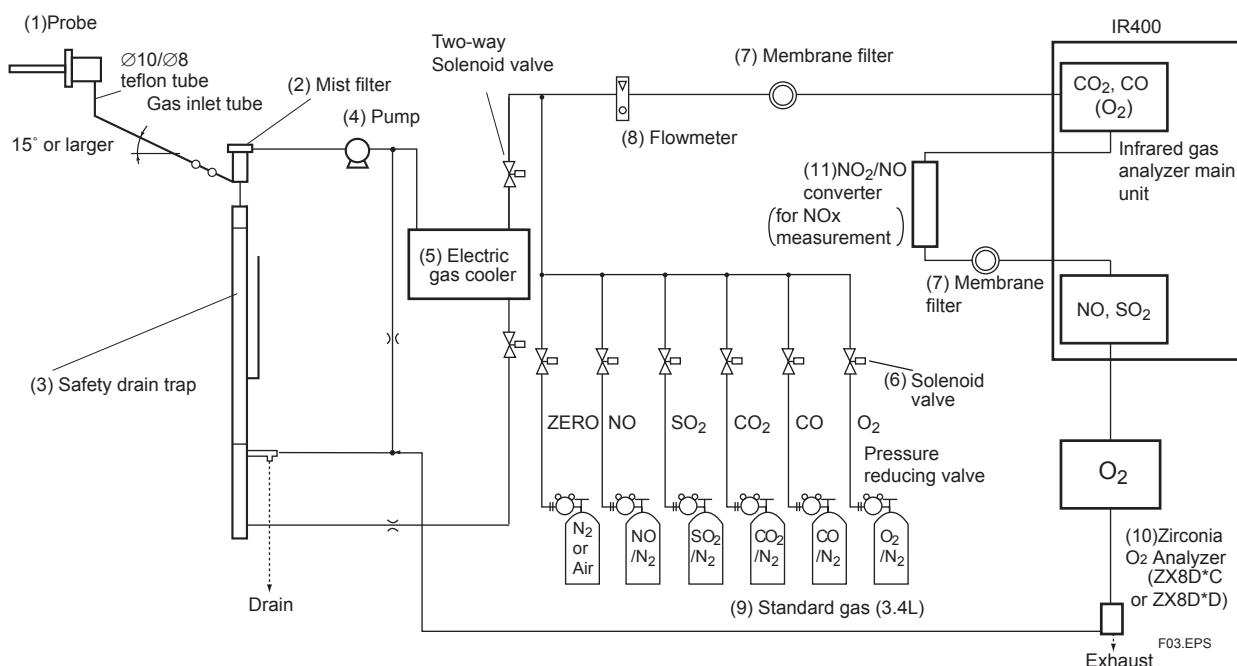
Paramagnetic oxygen analyzer



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■ Example of gas sampling system configuration

The following illustrates a typical system configuration for five component gas measurement which monitors combustion exhaust gas from boiler, refuse incinerator, etc. Contact Yokogawa for system configuration for particular use or further information.



Typical sampling system components

Item	Description
(1)Probe	With a heating type stainless steel filter. Standard pore size: 40 µm
(2)Mist filter	Separates drain and removes dust and mist.
(3)Safety drain trap	Prevents drain from being sucked. Composite operation of constant-pressure bubbler.
(4)Pump	Sucks in sample gas. Sample gas flow rate: approx. 2 L/min
(5)Electric gas cooler	Dehumidifies sample gas.
(6)Solenoid valve	Used for introducing calibration gas.
(7)Membrane filter	Glass fiber or PTFE filter removes fine dust. Dust buildup conditions can be monitored through front panel of analyzer.
(8)Flowmeter	Adjusts and monitors sample gas flow rate.
(9)Standard gas	Used for zero/span calibration. Zero, NO, SO ₂ , CO, CO ₂ , and O ₂ gas cylinders.
(10)Zirconia O ₂ analyzer	Not required when built-in type is used. Installed externally. Measures O ₂ concentration (0 to 25%) of sample gas.
(11)NO ₂ /NO converter	Required for NO _x measurement. Converts NO ₂ to NO gas efficiently using special catalyst.

For each sampling component, consult with Yokogawa.

■ Model and Suffix Code

[Style: S4]

Model	Suffix code	Option code	Description
IR400	-----	-----	Infrared gas analyzer 19-inch rack mounting type with slide rail
Measurable component (Note 8)	-A	-----	1st: NO
	-B	-----	1st: SO ₂
	-C	-----	1st: CO ₂
	-D	-----	1st: CO
	-F	-----	1st: CH ₄
	-G	-----	1st: NO, 2nd: SO ₂
	-H	-----	1st: NO, 2nd: CO
	-J	-----	1st: CO ₂ , 2nd: CO
	-K	-----	1st: NO, 2nd: SO ₂ , 3rd: CO
-L	-----	1st: NO, 2nd: SO ₂ , 3rd: CO ₂ , 4th: CO	
O ₂ Analyzer	N	-----	Without O ₂ Analyzer
	1	-----	External zircona oxygen analyzer (purchase separately: ZX8D) (Note 7)
	2	-----	External O ₂ Analyzer (Note 1)
	3	-----	Built-in paramagnetic type O ₂ sensor
1st Component 1st Range (Note 2)	V	-----	0-20 ppm (Note 3)
	A	-----	0-50 ppm
	B	-----	0-100 ppm
	C	-----	0-200 ppm
	D	-----	0-250 ppm
	W	-----	0-300 ppm
	E	-----	0-500 ppm
	F	-----	0-1000 ppm
	G	-----	0-2000 ppm
	H	-----	0-5000 ppm
	J	-----	0-1%
	K	-----	0-2%
	L	-----	0-3%
	M	-----	0-5%
	P	-----	0-10%
	Q	-----	0-20%
	R	-----	0-40%
	S	-----	0-50%
	T	-----	0-70%
U	-----	0-100%	
1st Component 2nd Range (Note 2)	A	-----	0-50 ppm
	B	-----	0-100 ppm
	C	-----	0-200 ppm
	D	-----	0-250 ppm
	W	-----	0-300 ppm
	E	-----	0-500 ppm
	F	-----	0-1000 ppm
	G	-----	0-2000 ppm
	H	-----	0-5000 ppm
	J	-----	0-1%
	K	-----	0-2%
	L	-----	0-3%
	M	-----	0-5%
	P	-----	0-10%
	Q	-----	0-20%
	R	-----	0-40%
	S	-----	0-50%
	T	-----	0-70%
	U	-----	0-100%
N	-----	Not available	
2nd Component 1st Range (Note 2)	A	-----	0-50 ppm
	B	-----	0-100 ppm
	C	-----	0-200 ppm
	D	-----	0-250 ppm
	W	-----	0-300 ppm
	E	-----	0-500 ppm
	F	-----	0-1000 ppm
	G	-----	0-2000 ppm
	H	-----	0-5000 ppm
	J	-----	0-1%
	K	-----	0-2%
	L	-----	0-3%
	M	-----	0-5%
	P	-----	0-10%
	Q	-----	0-20%
	R	-----	0-40%
	S	-----	0-50%
	T	-----	0-70%
	U	-----	0-100%
N	-----	Not available	

[Style: S4]

Model	Suffix code	Option code	Description
2nd Component 2nd Range (Note 2)	B	-----	0-100 ppm
	C	-----	0-200 ppm
	D	-----	0-250 ppm
	W	-----	0-300 ppm
	E	-----	0-500 ppm
	F	-----	0-1000 ppm
	G	-----	0-2000 ppm
	H	-----	0-5000 ppm
	J	-----	0-1%
	K	-----	0-2%
	L	-----	0-3%
	M	-----	0-5%
	P	-----	0-10%
	Q	-----	0-20%
	R	-----	0-40%
	S	-----	0-50%
	T	-----	0-70%
	U	-----	0-100%
	N	-----	Not Available
3rd Component 1st Range (Note 2)	A	-----	0-50 ppm
	B	-----	0-100 ppm
	C	-----	0-200 ppm
	D	-----	0-250 ppm
	W	-----	0-300 ppm
	E	-----	0-500 ppm
	F	-----	0-1000 ppm
	G	-----	0-2000 ppm
	H	-----	0-5000 ppm
	J	-----	0-1%
	K	-----	0-2%
	L	-----	0-3%
	M	-----	0-5%
	P	-----	0-10%
	Q	-----	0-20%
	R	-----	0-40%
	S	-----	0-50%
	T	-----	0-70%
	U	-----	0-100%
	N	-----	Not Available
3rd Component 2nd Range (Note 2)	B	-----	0-100 ppm
	C	-----	0-200 ppm
	D	-----	0-250 ppm
	W	-----	0-300 ppm
	E	-----	0-500 ppm
	F	-----	0-1000 ppm
	G	-----	0-2000 ppm
	H	-----	0-5000 ppm
	J	-----	0-1%
	K	-----	0-2%
	L	-----	0-3%
	M	-----	0-5%
	P	-----	0-10%
	Q	-----	0-20%
	R	-----	0-40%
	S	-----	0-50%
	T	-----	0-70%
	U	-----	0-100%
	N	-----	Not Available
4th Component 1st Range (Note 2)	A	-----	0-50 ppm
	B	-----	0-100 ppm
	C	-----	0-200 ppm
	D	-----	0-250 ppm
	W	-----	0-300 ppm
	E	-----	0-500 ppm
	F	-----	0-1000 ppm
	G	-----	0-2000 ppm
	H	-----	0-5000 ppm
	J	-----	0-1%
	K	-----	0-2%
	L	-----	0-3%
	M	-----	0-5%
	P	-----	0-10%
	Q	-----	0-20%
	R	-----	0-40%
	S	-----	0-50%
	T	-----	0-70%
	U	-----	0-100%
	N	-----	Not Available

Notes:

- ## ■ Standard Accessories

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■ Measurable Components and Ranges

(1) Single-component analyzer (NO, SO₂, CO₂, CO, CH₄)

2nd range 1st range																				
	A	B	C	D	W	E	F	G	H	J	K	L	M	P	Q	R	S	T	U	N
	0-50ppm	0-100ppm	0-200ppm	0-250ppm	0-300ppm	0-500ppm	0-1000ppm	0-2000ppm	0-5000ppm	0-1%	0-2%	0-3%	0-5%	0-10%	0-20%	0-40%	0-50%	0-70%	0-100%	None
V 0-20ppm	◇	◇	◇	◇	◇	◇	—	—	—	—	—	—	—	—	—	—	—	—	—	◇
A 0-50ppm	—	■□ ◇○	■□ ◇○	■□ ◇○	■□ ◇○	■□ ◇○	■□ ◇○	—	—	—	—	—	—	—	—	—	—	—	—	■□ ◇○
B 0-100ppm	—	—	■□◇○	■□ ◇○	■□ ◇○	■□ ◇○	■□ ◇○	■□ ◇○	—	—	—	—	—	—	—	—	—	—	—	■□ ◇○
C 0-200ppm	—	—	—	■□◇ ○▲	■□◇ ○▲	■□◇ ○▲	■□◇ ○▲	■□◇ ○▲	■□◇ ○▲	—	—	—	—	—	—	—	—	—	—	■□◇ ○▲
D 0-250ppm	—	—	—	—	—	—	■□◇ ○▲	■□◇ ○▲	■□◇ ○▲	—	—	—	—	—	—	—	—	—	—	■□◇ ○▲
W 0-300ppm	—	—	—	—	—	—	■□◇ ○▲	■□◇ ○▲	■□◇ ○▲	—	—	—	—	—	—	—	—	—	—	■□◇ ○▲
E 0-500ppm	—	—	—	—	—	—	■□◇ ○▲	■□◇ ○▲	■□◇ ○▲	◇○ ○▲	—	—	—	—	—	—	—	—	—	■□◇ ○▲
F 0-1000ppm	—	—	—	—	—	—	—	■□◇ ○▲	■□◇ ○▲	◇○ ○▲	◇○ ○▲	—	—	—	—	—	—	—	—	■□◇ ○▲
G 0-2000ppm	—	—	—	—	—	—	—	—	■□◇ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	—	—	—	—	—	—	■□◇ ○▲
H 0-5000ppm	—	—	—	—	—	—	—	—	—	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	—	—	—	—	—	■□◇ ○▲
J 0-1%	—	—	—	—	—	—	—	—	—	—	◇○▲	◇○▲	◇○▲	◇○▲	◇○▲	—	—	—	—	◇○ ▲
K 0-2%	—	—	—	—	—	—	—	—	—	—	—	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	—	—	◇○ ○▲
L 0-3%	—	—	—	—	—	—	—	—	—	—	—	—	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	—	—	◇○ ○▲
M 0-5%	—	—	—	—	—	—	—	—	—	—	—	—	—	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	—	—	◇○ ○▲
P 0-10%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲
Q 0-20%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲
R 0-40%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	◇○ ○▲	◇○ ○▲	◇○ ○▲	◇○ ○▲
S 0-50%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	◇○ ○▲	◇○ ○▲	◇○ ○▲
T 0-70%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	◇○ ○▲	◇○ ○▲
U 0-100%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	◇○ ○▲

◇ : CO₂ analyzer measurable range ○ : CO analyzer measurable range ▲ : CH₄ analyzer measurable range
□ : SO₂ analyzer measurable range ■ : NO analyzer measurable range

(2) Two-component analyzer (NO and SO₂)

2nd component (SO ₂) 1st component (NO), 1st range		SO ₂									
		1st range									
		A	B	C	D	W	E	F	G	H	
NO	A 0-50ppm	○ *1	○ *2	○ *2	○ *2	○ *2	○ *2	○ *2	○ *2	—	
	B 0-100ppm	○ *3	○ *4	○ *4	○ *4	○ *4	○ *4	○ *4	○ *4	—	
	C 0-200ppm	○ *3	○ *4	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	
	D 0-250ppm	○ *3	○ *4	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	
	W 0-300ppm	○ *3	○ *4	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	
	E 0-500ppm	○ *3	○ *4	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	
	F 0-1000ppm	○ *3	○ *4	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	
	G 0-2000ppm	○ *3	○ *4	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	
	H 0-5000ppm	—	—	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	○ *5	

○ : Double components measurable range. 1st component : NO, 2nd component : SO₂.

1st range (low range) must meet the combination in above table.

*1. 2nd range of both NO and SO₂ measurements are available up to 1000 ppm.

*2. 2nd range of NO and SO₂ measurements are available up to 1000 ppm and 2000 ppm, respectively.

*3. 2nd range of NO and SO₂ measurements are available up to 2000 ppm and 1000 ppm, respectively.

*4. 2nd range of both NO and SO₂ are available up to 2000 ppm.

*5. 2nd range of both NO and SO₂ are available up to 5000 ppm.

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

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

(4) Two-component analyzer (CO₂ and CO)

2nd component (CO) 1st range		CO*									
		A	B	C	D	W	E	F	G	H	J
1st component (CO ₂), 1st range		0-50ppm	0-100ppm	0-200ppm	0-250ppm	0-300ppm	0-500ppm	0-1000ppm	0-2000ppm	0-5000ppm	0-1%
CO ₂	A 0-50ppm	a-a	a-b	a-c	a-c	a-c	a-c	a-c	a-c	a-z	—
	B 0-100ppm	b-a	b-b	b-c	b-c	b-c	b-d	b-d	b-d	b-d	b-z
	C 0-200ppm	c-a	c-b	c-c	c-c	c-c	c-d	c-d	c-d	c-d	c-z
	D 0-250ppm	c-a	c-b	c-c	c-c	c-c	c-d	c-d	c-d	c-d	c-z
	W 0-300ppm	c-a	c-b	c-c	c-c	c-c	c-d	c-d	c-d	c-d	c-z
	E 0-500ppm	c-a	c-b	c-c	c-c	c-c	d-d	d-e	d-e	d-e	d-e
	F 0-1000ppm	c-a	c-b	c-c	c-c	c-c	d-d	e-e	e-e	e-e	e-e
	G 0-2000ppm	c-a	c-b	c-c	c-c	c-c	d-d	e-e	e-e	f-g	f-g
	H 0-5000ppm	z-a	z-b	z-c	z-c	z-c	d-d	e-e	e-e	g-g	g-h
	J 0-1%	—	—	—	—	—	z-d	e-e	e-e	g-g	h-h
	K 0-2%	—	—	—	—	—	—	z-e	z-e	g-g	h-h
	L 0-3%	—	—	—	—	—	—	—	—	g-g	h-h
	M 0-5%	—	—	—	—	—	—	—	—	g-g	h-h
	P 0-10%	h-a	h-b	h-c	h-c	h-c	h-d	h-d	h-d	z-g h-d	h-h
	Q 0-20%	z-a	z-b	z-c	z-c	z-c	z-d	z-d	z-d	z-d	z-h
	R 0-40%	—	—	—	—	—	—	—	—	—	—
	S 0-50%	—	—	—	—	—	—	—	—	—	—
	T 0-70%	—	—	—	—	—	—	—	—	—	—
	U 0-100%	—	—	—	—	—	—	—	—	—	—

Symbol definition: (Example) x-y x: Selectable scale of the second range to measure CO₂.

Y: Selectable scale of the second range to measure CO.

a: Selectable up to 1000 ppm.

b: Selectable up to 2000 ppm.

c: Selectable up to 5000 ppm.

d: Selectable up to 1 %.

e: Selectable up to 2 %.

f: Selectable up to 5 %.

g: Selectable up to 10 %.

h: Selectable up to 20 %.

z: Second range is not available. (Only first range is available.)

* : Consult YOKOGAWA for information on any combination of two ranges among K through U when you measure CO as a second component at above 2% level of its first range.

(5) Three-component analyzer (NO + SO₂ + CO)

See the table (2) "Two-component analyzer" of Page 10 for NO + SO₂ measurement of three-component analyzer (NO + SO₂ + CO). See the table (1) "Single-component analyzer" of Page.10 for CO measurement.

(6) Four-component analyzer (NO + SO₂ + CO₂ + CO)

See the table (2) "Two-component analyzer" of Page 10 for NO + SO₂ measurement and (4) "Two component analyzer" for CO₂ + CO measurement.

(7) O₂ analyzer

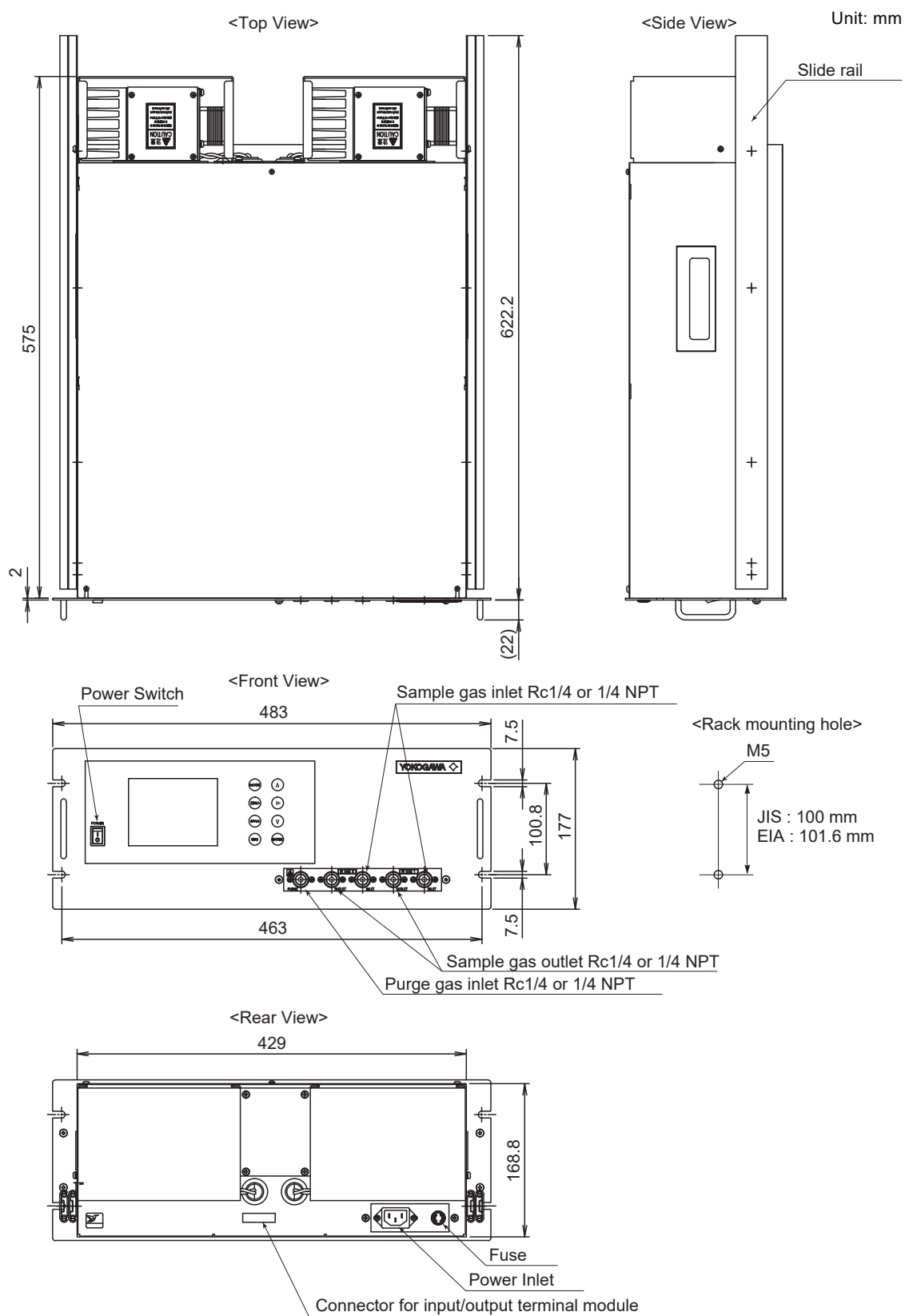
2nd range		2	3
1st range		0-10%	0-25%
1	0-5%	○▲	○▲
2	0-10%	—	○▲
3	0-25%	—	○▲

○ : Built-in O₂ analyzer measurable range

▲ : External Zirconia Oxygen Analyzer (in this case, Yokogawa's ZX8D) measurable range

*O₂ analyzer is selectable independently of its combination with other components.

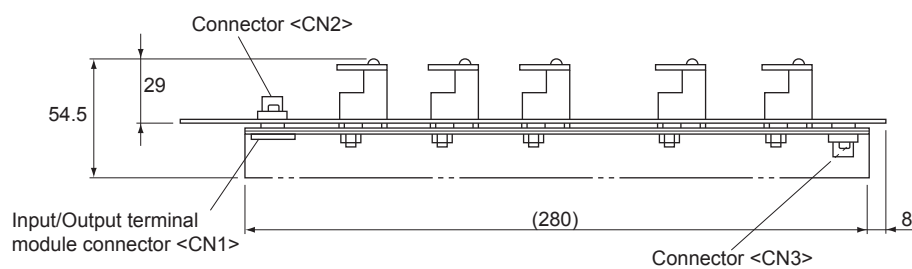
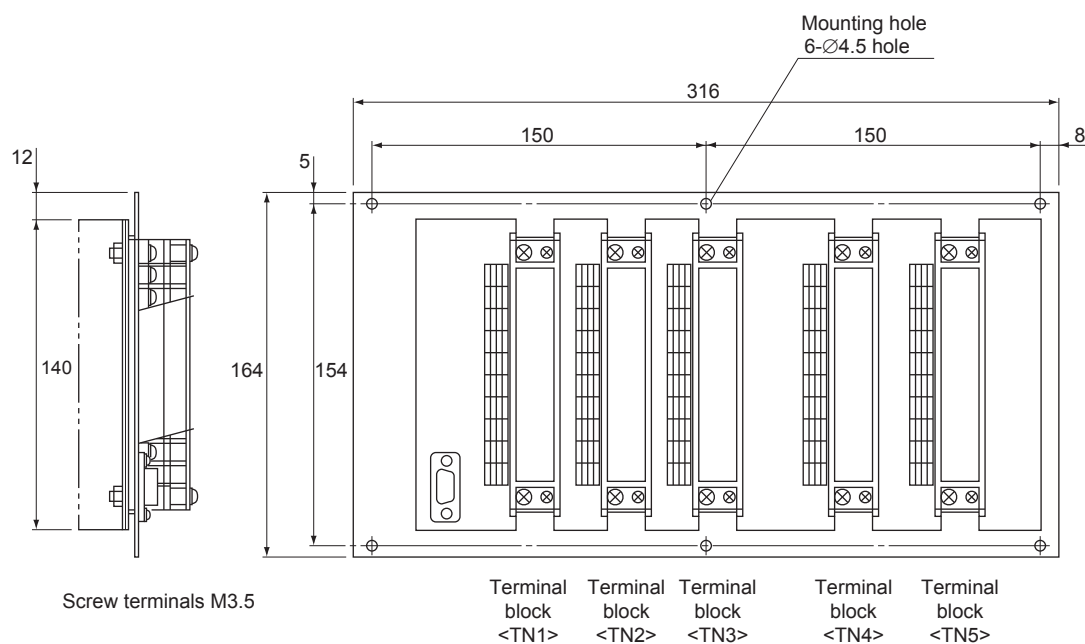
■ External Dimensions



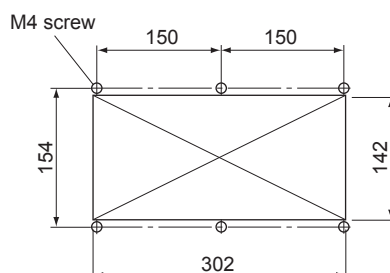
Accessory

• Input/Output Terminal Module

Unit: mm



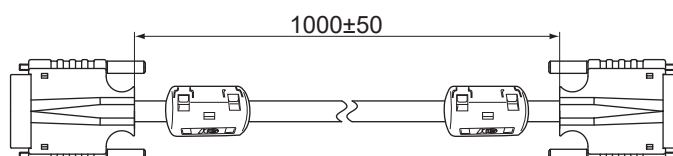
Dimensions for
Mounting Input/Output
Terminal Module



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

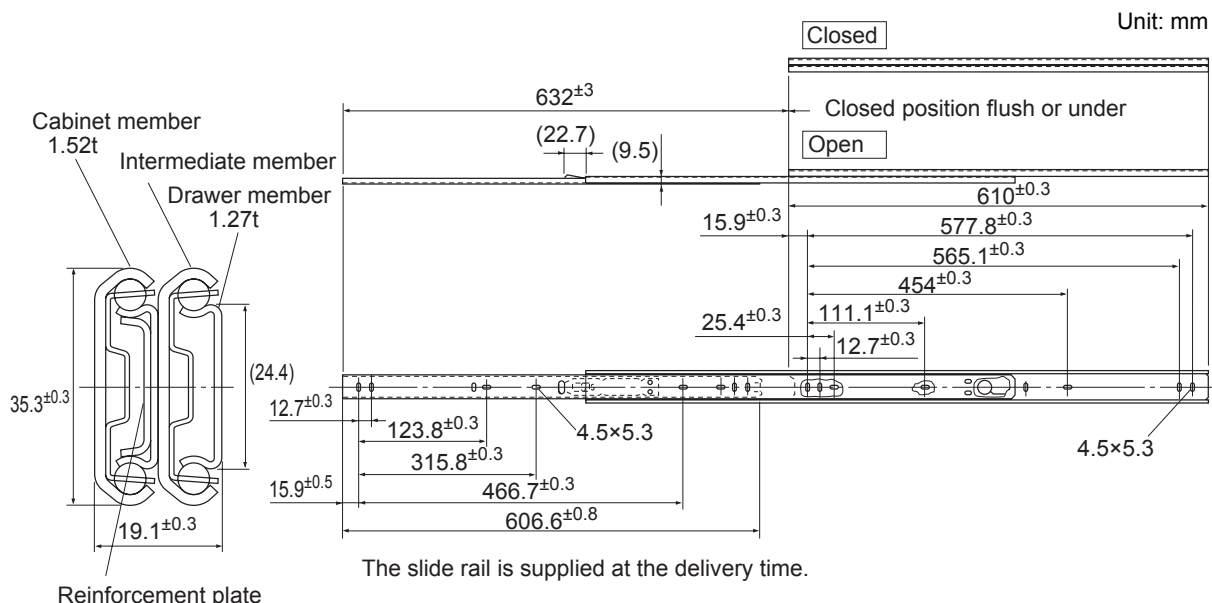
F05.ai

• Cable for connecting Input/Output Terminal



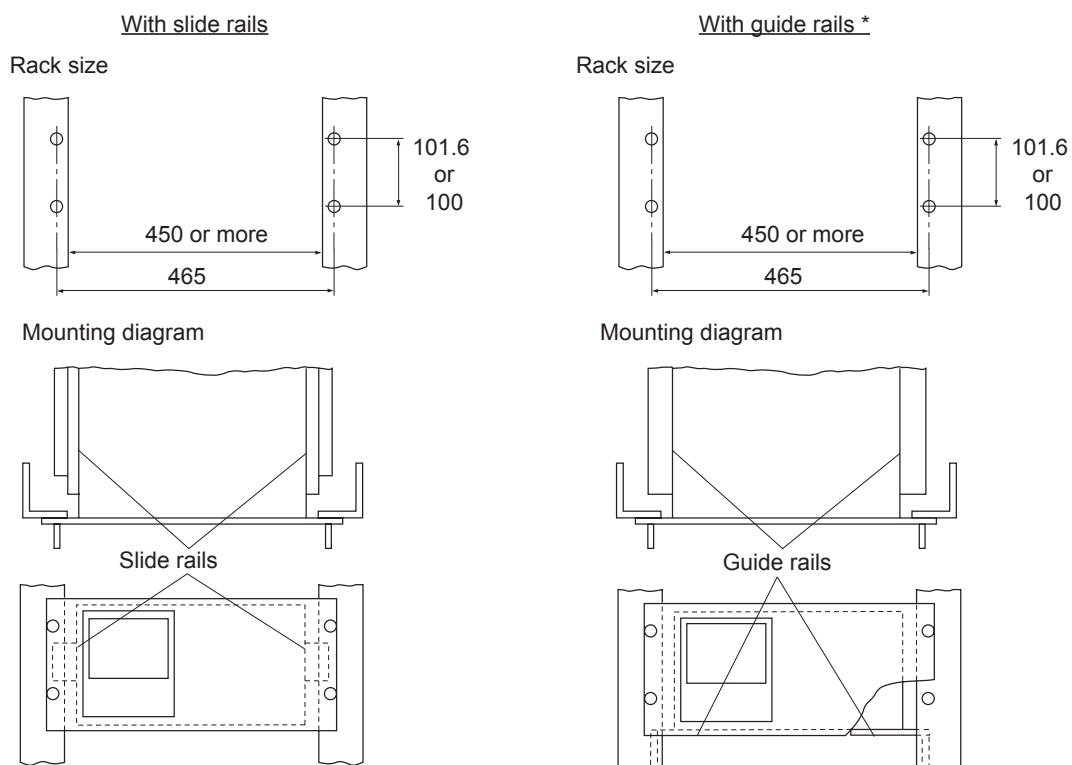
- Slide Rail

Model: equivalent to 305A-24/Accuride International Inc.



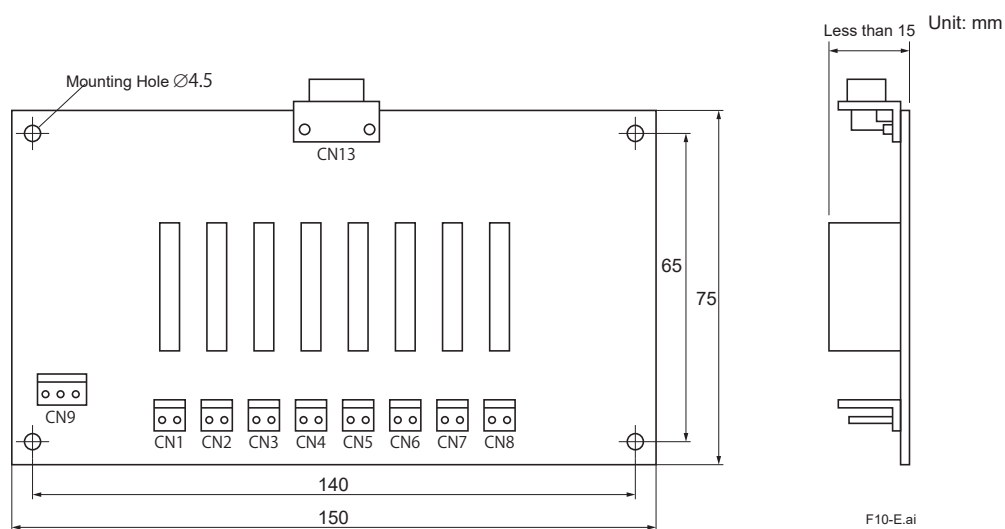
<19-inch rack mounting method>

For easy maintenance, we recommended the mounting method which allows the rack to be drawn out along the slide rail.

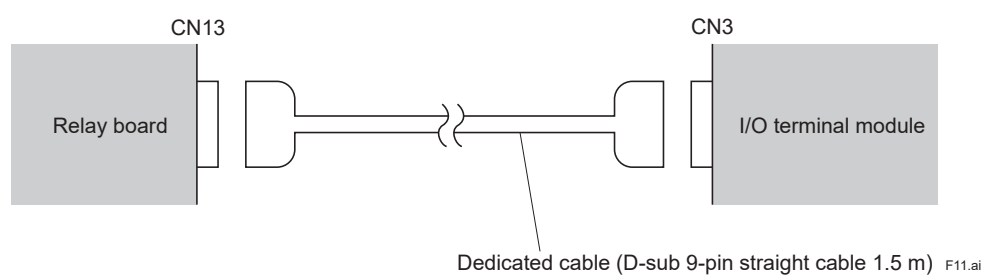
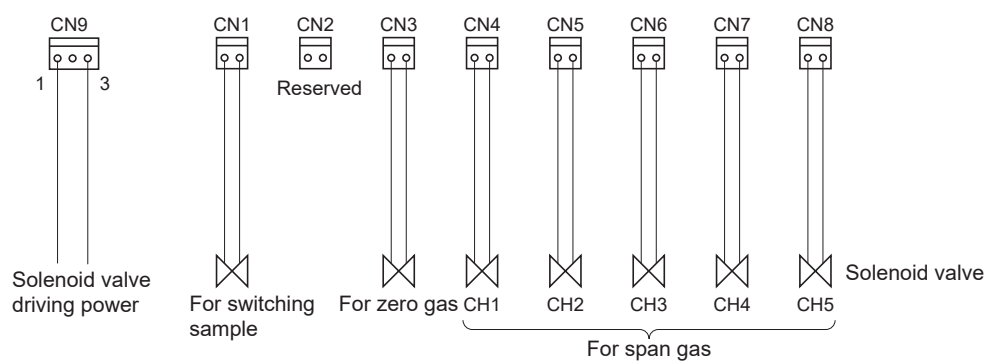


* For mounting with guide rails, a maintenance space (200 mm or more) should be provided on top of the main unit.

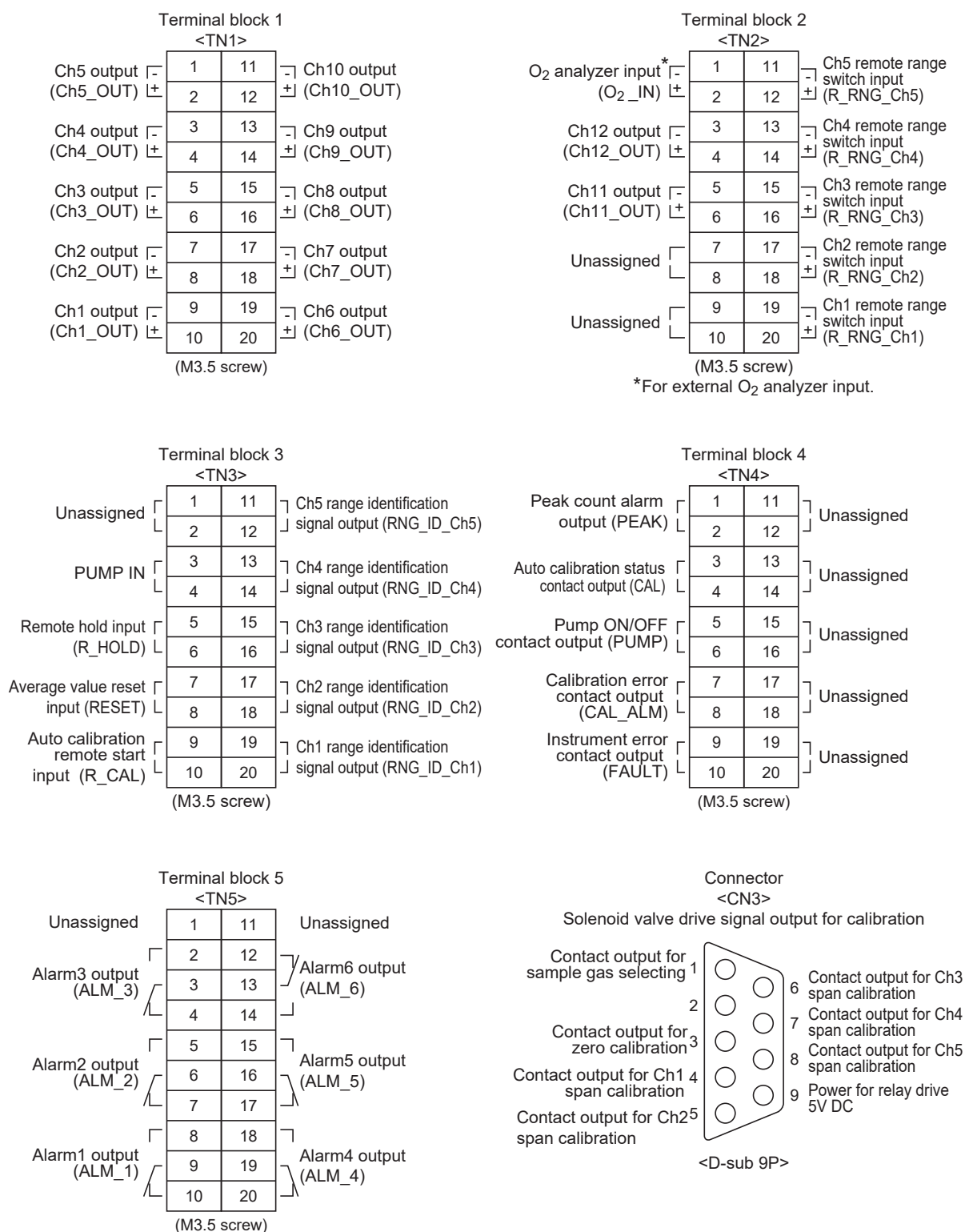
Dedicated Relay Board (option code /R)



<How to connect>



External Connection Diagram



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.

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<Measurable Components and the Corresponding Channel Numbers>

Suffix/Option Code			Output and Corresponding Channel											
Measurable component	O ₂ analyzer	Option code*	Ch1	Ch2	Ch3	Ch4	Ch5	Ch6	Ch7	Ch8	Ch9	Ch10	Ch11	Ch12
-A	N	Not specified	NO											
-B	N	Not specified	SO ₂											
-C	N	Not specified	CO ₂											
-D	N	Not specified	CO											
-F	N	Not specified	CH ₄											
-G	N	Not specified	NO	SO ₂										
-H	N	Not specified	NO	CO										
-J	N	Not specified	CO ₂	CO										
-K	N	Not specified	NO	SO ₂	CO									
-L	N	Not specified	NO	SO ₂	CO ₂	CO								
-A	1, 2, 3	/K	NO _x	O ₂	Correct NO _x	Correct NO _x av.	O ₂ av.							
-B	1, 2, 3	/K	SO ₂	O ₂	Correct SO ₂	Correct SO ₂ av.	O ₂ av.							
-D	1, 2, 3	/K	CO	O ₂	Correct CO	Correct CO av.	O ₂ av.							
-F	1, 2, 3	/K	CH ₄	O ₂	O ₂ av.									
-G	1, 2, 3	/K	NO _x	SO ₂	O ₂	Correct NO _x av.	Correct SO ₂	Correct NO _x av.	Correct SO ₂ av.	O ₂ av.				
-H	1, 2, 3	/K	NO _x	CO	O ₂	Correct NO _x	Correct CO	Correct NO _x av.	Correct CO av.	O ₂ av.				
-J	1, 2, 3	/K	CO ₂	CO	O ₂	Correct CO ₂ av.	Correct CO av.	O ₂ av.						
-K	1, 2, 3	/K	NO _x	SO ₂	CO	O ₂	Correct NO _x	Correct SO ₂	Correct CO	Correct NO _x av.	Correct SO ₂ av.	Correct CO av.	O ₂ av.	
-L	1, 2, 3	/K	NO _x	SO ₂	CO ₂	CO	O ₂	Correct NO _x	Correct SO ₂	Correct CO	Correct NO _x av.	Correct SO ₂ av.	Correct CO av.	O ₂ av.
-D	1, 2, 3	/A	CO	O ₂										
-H	1, 2, 3	/A	NO	CO	O ₂									
-J	1, 2, 3	/A	CO ₂	CO	O ₂									
-K	1, 2, 3	/A	NO	SO ₂	CO	O ₂								
-L	1, 2, 3	/A	NO	SO ₂	CO ₂	CO	O ₂							

■ : NO measurement in this area is displayed as NO_x.

*: In the column of Option code, "Not specified" refers the option codes except /K or /A.

Notes: Peak count alarm is a contact output.

"Correct XX" means an instantaneous XX value after O₂ correction, "Correct XX av." an average XX value after O₂ correction, and O₂ av." an average O₂ value.

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

For O₂ correction, the IR400 can accept linearized 0 to 1 V DC signal coming from an analyzer calibrated to 0 to 25% O₂ of full scale. Dedicated zirconia Oxygen Analyzer, Model ZX8D, is available from Yokogawa.

Measuring system: Zirconia solid electrolyte
 Measuring range: Minimum range 0 to 5 vol% O₂ and maximum range of 0 to 25 vol% O₂, 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 (%O₂)
 B: Blank voltage (mV)

Temperature alarm output: Contact output normally-closed contact,
 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 O₂ gas concentration. Also, a corrosive gas (SO₂ 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
 Maximum rated power: 215 VA (at power on) / 65 VA (during normal operation)
 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 -3	----- -----	100-115 V AC, 50/60 Hz 200-240 V AC, 50/60 Hz
Style code	*C *D	----- -----	For IR202, IR400 For IR202, IR400 (CE conformity)

Safety, EMC and RoHS conforming 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

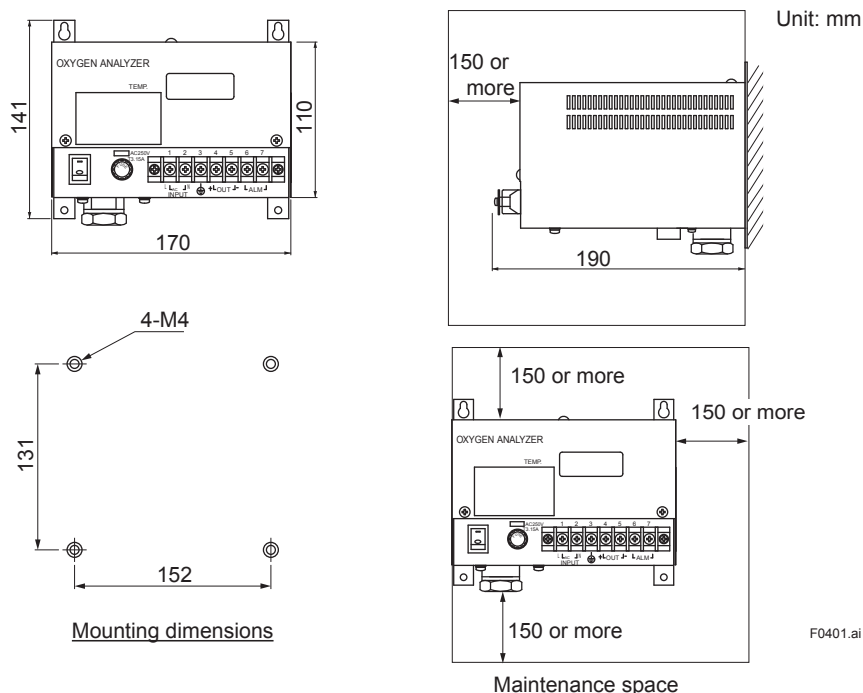
Note: The product mounted in a steel enclosure conforms to the requirements of EMC directive.

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: EN50581

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.



■ NO₂/NO Converter

Part number: K9350LE
K9350LF

Mounting: Indoor surface mounting

Target Gases: General boiler exhaust gas, atmosphere

Catalyst; Amount: 2 cm³

Replacement cycle; Approx. 8 months
(at flow rate of 0.5 L/min with 5% O₂, 10 ppm NO₂)
Temperature set-point: 220 ± 10°C
(Sensing tip; K thermocouple)

Wetted materials: Ceramic, Viton, glass filter, SUS316

Conversion efficiency: 90% or higher, conforms to JIS

Gas Flow Rate: 0.5 L/min

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)

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

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

Safety, EMC and 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

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.

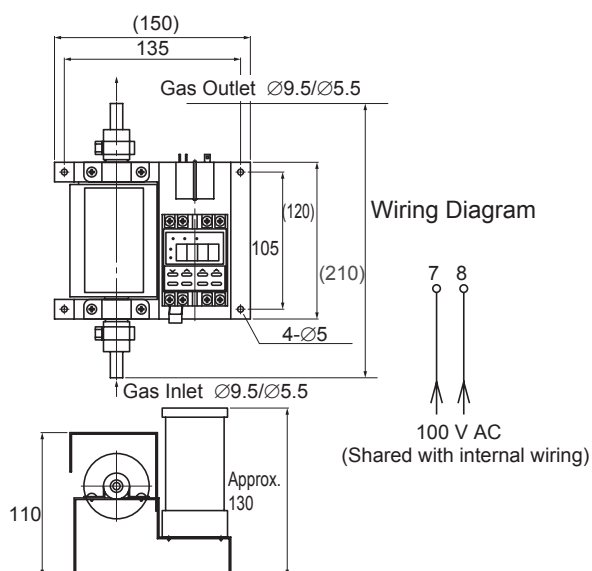
RoHS; EN50581

One-year-Use Spare Parts

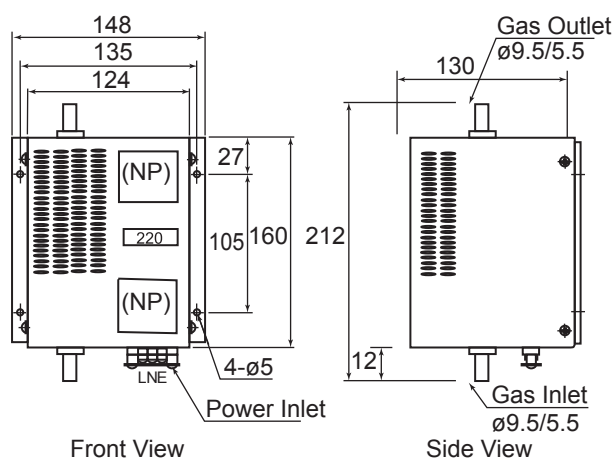
Item	Part No.	Qty
Catalyst for NO ₂ /NO converter	K9350LP	2
Glass wool for NO ₂ /NO converter	K9350LQ	2
Fitting for NO ₂ /NO converter	K9350LV	2

K9350LE

Unit: mm

**K9350LF**

Unit: mm



Inquiry Sheet for IR400 NDIR Type 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, ☐ Alarm, ☐ Control

2. Requirements

Measurable component:

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

O₂ Analyzer:

- ☐ Without O₂ analyzer
☐ External zirconia O₂ sensor (use ZX8D)
 ☐ Style C (Non-CE conformity)
 ☐ Style D (CE conformity)
☐ External O₂ analyzer
☐ Built-in paramagnetic type O₂ sensor

NO₂/NO Converter:

- ☐ With NO₂/NO converter
☐ K9350LE (non-CE conformity)
☐ K9350LF (CE conformity)
☐ Without NO₂/NO converter

Range:

1st component, 1st range	1st component, 2nd range	2nd component, 1st range	2nd component, 2nd range
<input type="checkbox"/> 0 – 20 ppm	<input type="checkbox"/> 0 – 50 ppm	<input type="checkbox"/> 0 – 50 ppm	<input type="checkbox"/> 0 – 100 ppm
<input type="checkbox"/> 0 – 50 ppm	<input type="checkbox"/> 0 – 100 ppm	<input type="checkbox"/> 0 – 100ppm	<input type="checkbox"/> 0 – 200 ppm
<input type="checkbox"/> 0 – 100 ppm	<input type="checkbox"/> 0 – 200 ppm	<input type="checkbox"/> 0 – 200 ppm	<input type="checkbox"/> 0 – 250 ppm
<input type="checkbox"/> 0 – 200 ppm	<input type="checkbox"/> 0 – 250 ppm	<input type="checkbox"/> 0 – 250 ppm	<input type="checkbox"/> 0 – 500 ppm
<input type="checkbox"/> 0 – 250 ppm	<input type="checkbox"/> 0 – 500 ppm	<input type="checkbox"/> 0 – 500 ppm	<input type="checkbox"/> 0 – 1000 ppm
<input type="checkbox"/> 0 – 500 ppm	<input type="checkbox"/> 0 – 1000 ppm	<input type="checkbox"/> 0 – 1000 ppm	<input type="checkbox"/> 0 – 2000 ppm
<input type="checkbox"/> 0 – 1000 ppm	<input type="checkbox"/> 0 – 2000 ppm	<input type="checkbox"/> 0 – 2000 ppm	<input type="checkbox"/> 0 – 5000 ppm
<input type="checkbox"/> 0 – 2000 ppm	<input type="checkbox"/> 0 – 5000 ppm	<input type="checkbox"/> 0 – 5000 ppm	<input type="checkbox"/> 0 – 1%
<input type="checkbox"/> 0 – 5000 ppm	<input type="checkbox"/> 0 – 1%	<input type="checkbox"/> 0 – 1%	<input type="checkbox"/> 0 – 2%
<input type="checkbox"/> 0 – 1%	<input type="checkbox"/> 0 – 2%	<input type="checkbox"/> 0 – 2%	<input type="checkbox"/> 0 – 3%
<input type="checkbox"/> 0 – 2%	<input type="checkbox"/> 0 – 3%	<input type="checkbox"/> 0 – 3%	<input type="checkbox"/> 0 – 5%
<input type="checkbox"/> 0 – 3%	<input type="checkbox"/> 0 – 5%	<input type="checkbox"/> 0 – 5%	<input type="checkbox"/> 0 – 10%
<input type="checkbox"/> 0 – 5%	<input type="checkbox"/> 0 – 10%	<input type="checkbox"/> 0 – 10%	<input type="checkbox"/> 0 – 20%
<input type="checkbox"/> 0 – 10%	<input type="checkbox"/> 0 – 20%	<input type="checkbox"/> 0 – 20%	<input type="checkbox"/> 0 – 40%
<input type="checkbox"/> 0 – 20%	<input type="checkbox"/> 0 – 40%	<input type="checkbox"/> 0 – 40%	<input type="checkbox"/> 0 – 50%
<input type="checkbox"/> 0 – 40%	<input type="checkbox"/> 0 – 50%	<input type="checkbox"/> 0 – 50%	<input type="checkbox"/> 0 – 70%
<input type="checkbox"/> 0 – 50%	<input type="checkbox"/> 0 – 70%	<input type="checkbox"/> 0 – 70%	<input type="checkbox"/> 0 – 100%
<input type="checkbox"/> 0 – 70%	<input type="checkbox"/> 0 – 100%	<input type="checkbox"/> 0 – 100%	<input type="checkbox"/> Not available
<input type="checkbox"/> 0 – 100%	<input type="checkbox"/> Not available	<input type="checkbox"/> Not available	

3rd component, 1st range	3rd component, 2nd range	4th component, 1st range	4th component, 2nd range
<input type="checkbox"/> 0 – 50 ppm	<input type="checkbox"/> 0 – 100 ppm	<input type="checkbox"/> 0 – 50 ppm	<input type="checkbox"/> 0 – 100 ppm
<input type="checkbox"/> 0 – 100 ppm	<input type="checkbox"/> 0 – 200 ppm	<input type="checkbox"/> 0 – 100 ppm	<input type="checkbox"/> 0 – 200 ppm
<input type="checkbox"/> 0 – 200 ppm	<input type="checkbox"/> 0 – 250 ppm	<input type="checkbox"/> 0 – 200 ppm	<input type="checkbox"/> 0 – 250 ppm
<input type="checkbox"/> 0 – 250 ppm	<input type="checkbox"/> 0 – 500 ppm	<input type="checkbox"/> 0 – 250 ppm	<input type="checkbox"/> 0 – 500 ppm
<input type="checkbox"/> 0 – 500 ppm	<input type="checkbox"/> 0 – 1000 ppm	<input type="checkbox"/> 0 – 500 ppm	<input type="checkbox"/> 0 – 1000 ppm
<input type="checkbox"/> 0 – 1000 ppm	<input type="checkbox"/> 0 – 2000 ppm	<input type="checkbox"/> 0 – 1000 ppm	<input type="checkbox"/> 0 – 2000 ppm
<input type="checkbox"/> 0 – 2000 ppm	<input type="checkbox"/> 0 – 5000 ppm	<input type="checkbox"/> 0 – 2000 ppm	<input type="checkbox"/> 0 – 5000 ppm
<input type="checkbox"/> 0 – 5000 ppm	<input type="checkbox"/> 0 – 1%	<input type="checkbox"/> 0 – 5000 ppm	<input type="checkbox"/> 0 – 1%
<input type="checkbox"/> 0 – 1%	<input type="checkbox"/> 0 – 2%	<input type="checkbox"/> 0 – 1%	<input type="checkbox"/> 0 – 2%
<input type="checkbox"/> 0 – 2%	<input type="checkbox"/> 0 – 3%	<input type="checkbox"/> 0 – 2%	<input type="checkbox"/> 0 – 3%
<input type="checkbox"/> 0 – 3%	<input type="checkbox"/> 0 – 5%	<input type="checkbox"/> 0 – 3%	<input type="checkbox"/> 0 – 5%
<input type="checkbox"/> 0 – 5%	<input type="checkbox"/> 0 – 10%	<input type="checkbox"/> 0 – 5%	<input type="checkbox"/> 0 – 10%
<input type="checkbox"/> 0 – 10%	<input type="checkbox"/> 0 – 20%	<input type="checkbox"/> 0 – 10%	<input type="checkbox"/> 0 – 20%
<input type="checkbox"/> 0 – 20%	<input type="checkbox"/> 0 – 40%	<input type="checkbox"/> 0 – 20%	<input type="checkbox"/> 0 – 40%
<input type="checkbox"/> 0 – 40%	<input type="checkbox"/> 0 – 50%	<input type="checkbox"/> 0 – 40%	<input type="checkbox"/> 0 – 50%
<input type="checkbox"/> 0 – 50%	<input type="checkbox"/> 0 – 70%	<input type="checkbox"/> 0 – 50%	<input type="checkbox"/> 0 – 70%
<input type="checkbox"/> 0 – 70%	<input type="checkbox"/> 0 – 100%	<input type="checkbox"/> 0 – 70%	<input type="checkbox"/> 0 – 100%
<input type="checkbox"/> 0 – 100%	<input type="checkbox"/> Not available	<input type="checkbox"/> 0 – 100%	<input type="checkbox"/> Not available
<input type="checkbox"/> Not available		<input type="checkbox"/> Not available	

O ₂ Analyzer, 1st range	O ₂ Analyzer, 2nd range
<input type="checkbox"/> 0 – 5%	<input type="checkbox"/> 0 – 10%
<input type="checkbox"/> 0 – 10%	<input type="checkbox"/> 0 – 25%
<input type="checkbox"/> 0 – 25%	<input type="checkbox"/> Not available
<input type="checkbox"/> Not available	

Output: ☐ 4 – 20 mA DC ☐ 0 – 1 V DC ☐ RS-232C
O₂ correction and O₂ average: ☐ Yes ☐ No
Peak count alarm: ☐ Yes ☐ No
Relay board: ☐ Yes ☐ No

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/Nm³]
(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 ₂ :	to	<input type="checkbox"/> %	<input type="checkbox"/> ppm
CH ₄ :	to	<input type="checkbox"/> %	<input type="checkbox"/> ppm
H ₂ :	to	<input type="checkbox"/> %	<input type="checkbox"/> ppm
O ₂ :	to	<input type="checkbox"/> %	<input type="checkbox"/> ppm
N ₂ :	to	<input type="checkbox"/> %	<input type="checkbox"/> ppm
SO ₂ :	to	<input type="checkbox"/> %	<input type="checkbox"/> ppm
NO _x :	to	<input type="checkbox"/> %	<input type="checkbox"/> ppm
H ₂ O :	to	<input type="checkbox"/> %	<input type="checkbox"/> ppm
:	to	<input type="checkbox"/> %	<input type="checkbox"/> ppm