General Specifications

Explosion Protected Model
IR810S
Infrared Gas Analyzer

GS 11G06D01-01EN

■ GENERAL

The IR810S Ex model Infrared Gas Analyzer uses non-dispersive infrared method (NDIR) to measure the concentration of NO, SO_2, CO, CO_2, and CH_4 components in the sample gas, and it measures O_2 using the paramagnetic or zirconia method.

Up to five components, including O_2 (up to four components excluding O_2), can be measured simultaneously.

Using a single beam system for measurement ensures low maintenance requirements to maintain the zero point and excellent stability over a long period of time.

The color touch panel interface allows for intuitive operation and high visibility.

Ideal for measuring gas concentrations in combustible gases emitted from incinerators, boilers, and various industrial furnaces.

IR810S

■ FEAUTURES

- ***Up to 5 gas component measurement***
  Simultaneous measurement of gas concentrations of up to five components: four of NO, SO_2, CO_2, CO, CH4, and O_2.
- ***Excellent long-term stability***
  A unique optics system minimizes drift particularly due to contamination of measurement cell, ensuring excellent long-term stability.
- ***Easy operation***
  Intuitive operation by the color touch panel display. Error display for easy visibility. Error details can be checked on the display.
- **Connectable to ZR802S, etc. as oxygen analyzer**
  Supports 4-20 mA analog input for oxygen concentration measurement, allowing connection to Yokogawa Electric's ZR802S zirconia oxygen analyzer, etc.
- **Output signal: 4-20 mA**
- **Supports digital communication**
  Modbus RTU
- **Automatic validation function**
  Automatically distributes the gas used for calibration and records the values at the time of the gas distribution. Examines the condition of the detector and the appropriate maintenance cycle.
- **IECEx/ATEX ZONE1 compliant**
  Pressurized enclosure explosion protected construction. Determinable purge-gas flow rate according to the gas composition to be measured.

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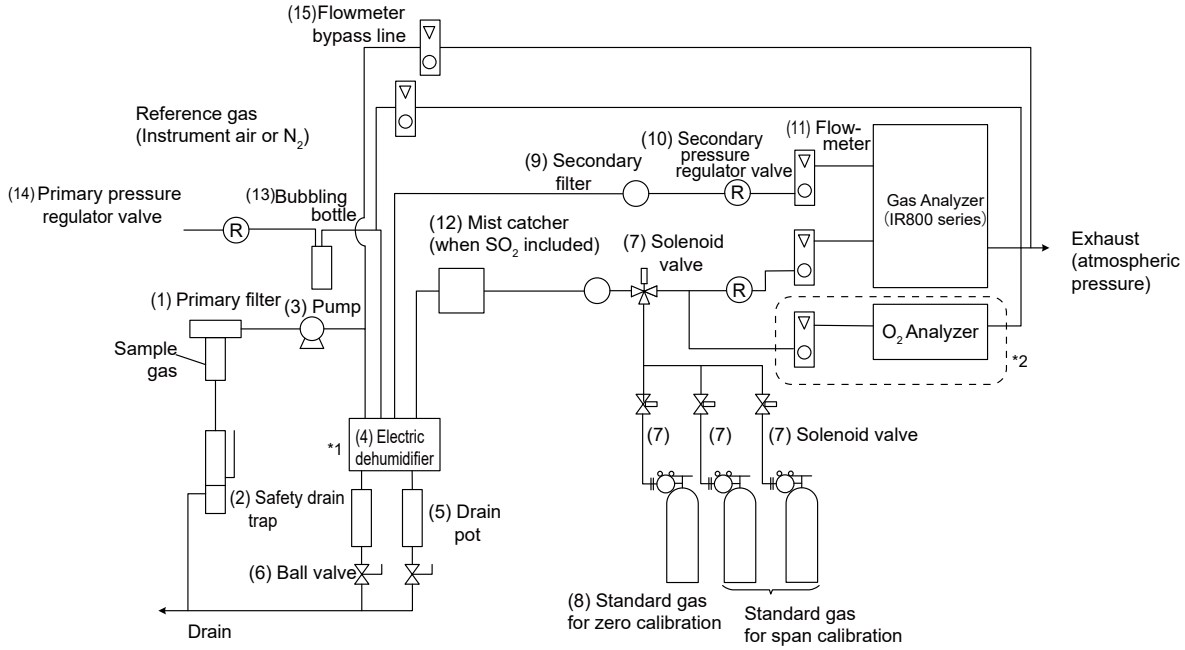
■ Example of sampling configuration including analyzer

The following is a general configuration example. Please contact us for details. When used in hazardous area, use the corresponding explosion protected equipment parts.

When the reference gas is instrument air, N_2



*1: In electric dehumidifiers, dehumidify to 5°C or less so that the moisture concentration on the sampling and reference sides is the same.

*2: Required for "External O_2 analyzer" or "ZR802S+ZR22S".

Figure.1

Item	Function	Item	Function
(1) Primary filter	Removes dust and mist from sample gas	(9) Secondary filter	Removes particulates from reference gas purifiers and NO_2/NO converters.
(2) Safety drain trap	Separates and discharges the drainage in sample gas	(10) Secondary pressure regulator valve	Adjusts pressure to 4.9-9.8 kPa. Variation to the set pressure is ±2%.
(3) Pump	For sample gas intake	(11) Flowmeter	Monitors the flow rate of gas entering the gas analyzer. Flow rate 0.5-0.8 L/min
(4) Electric dehumidifier	Dehumidifies moisture in sample gas	(12) Mist catcher	Collects sulfuric acid mist in the sample gas.
(5) Drain pot	Traps dehumidified water from the electronic dehumidifier.	(13) Bubbling bottle	Humidifies reference gases
(6) Ball valve	For draining	(14) Primary pressure regulator valve	Adjusts the pressure to correspond to the inlet pressure of (10).
(7) Solenoid valve	Switches the calibration gas and sample gas flow channel.	(15) Flowmeter bypass line	Monitors and controls the flow rate of bypass lines.
(8) Standard gas for calibration	Reference gas to calibrate zero and span Used according to measurement component Adjusts the pressure to correspond to the inlet pressure of (10).		

■ Standard Specifications

Measurement principle:
NO, SO_2, CO_2, CO, CH_4:
Non-dispersive infrared method
Single light source-single beam
O_2: Paramagnetic type (built-in), or analog input (external)

Measurable gas components and measurement range:

Table 1 Measurement range

	General Range	Optional range*
NO	0-200 to 0-5000 ppm	0-50 to 0-199 ppm
SO_2	0-200 to 0-5000 ppm	0-50 to 0-199 ppm
	0-2 to 0-10 vol%	—
CO	0-200 to 0-5000 ppm	0-50 to 0-199 ppm
	0-2 to 0-50 vol%	0-51 to 0-100 vol%
CO_2	0-0.5 to 0-5 vol%	0-1000 to 0-4999 ppm
	0-5 to 0-25 vol%	0-26 to 0-100 vol%
CH_4	0-2 to 0-50 vol%	0-51 to 0-100 vol%

* Measurement accuracy varies in optional ranges.
See Performance on page 5

Table 2 O_2 analyzer

	Min.range	Max.range
O_2 Built-in paramagnetic type	0-5 vol%	0-100 vol%
O_2 Built-in paramagnetic type for hydrogen background	0-25 vol%	0-100 vol%
O_2 External analyzer	0-5 vol%	0-100 vol%

Display: QVGA LCD color touch panel
(Note) Due to the characteristics of the panel, chips, afterimages, and uneven brightness may appear on the display screen, but these are not defects.
- 4-digit display
- Instantaneous value display for each component
- Instantaneous value after O_2 correction (only in CO, SO_2, NO meters with O_2 measurement)
- Average value after O_2 correction (only in CO, SO_2, NO meters with O_2 measurement)

Analog output signal:
Isolated output: 4-20 mA DC
Maximum load capacity: 550 Ω
Number of outputs: 4
Output Item: NAMUR NE43 burnout
Hold function: available

Analog input (when O_2 analyzer: -1 or -2 is selected)
Number of input points; 1 point (for connection to external O_2 analyzer)
Input signal; 4-20 mA DC (Max 40 mA)
Functions: Oxygen concentration display, oxygen concentration conversion

Contact output
Contact type; 1a relay contact, 1c relay contact
Output points
1a; 11 points
1c; 6 points
Contact capacity;
24 V DC, 1A (resistance load)
Insulation; Internal circuit: Reinforced insulation
Between contacts: Basic insulation
Function; Instrument error, Calibration error, Automatic calibration in progress, Solenoid valve drive CH1 to CH5 for automatic calibration, Range identification CH1 to CH5, Blowback, alarms 1 to 6, Peak alarm output, Maintenance in progress, Power status

Contact input
Contact type; no-voltage or voltage contact input
Input points; 8 points
On/Off;
No-voltage contact input
Resistance value below 200 Ω; closed
Resistance value of 100 kΩ or more; open
Voltage contact input
Voltage -1 to +1 V DC; closed
Voltage value +4.5 to +25 V DC; open
Contact capacity: Leakage current 3 mA or less when OFF
Insulation
Contacts mutual; non-insulating
Internal circuit; transformer isolation
Function; Remote hold, average value reset, automatic calibration start, auto zero calibration start, automatic validation start, remote range changeover, blowback contact for ZR802S, calibration error for ZR802S

Digital Communications:
RS-485 (Modbus RTU): 115200/38400/9600 bps
Cable length: Up to 600 m (115200 bps)
Up to 1200 m (38400/9600 bps)
shield ground

24 VDC for Signal interrupter output
Number of output points;
1 (for signal interrupter K8019KA) (*1)
4 (for signal interrupter K8019KB) (*2)
Functions; Monitors internal pressure inside equipment and provides 24 VDC power to signal circuit interrupters under normal conditions
*1: Used for the following combinations
- When O_2 analyzer 1 or 2 is selected
- When "-R" (digital communication) is specified.
- When both of the above are selected

*2:
- One K8019KB can support up to 5 contact outputs.
- Prepare K8019KB according to the contact output to be used.
- If all 17 points are used, four K8019KB are required.

Annunciator contact output:
Number of contact points; 1
Functions; Outputs the internal pressure status (state 1 or state 2) of the equipment
state1; Outputs status during override, analyzer power off, scavenging, or insufficient internal pressure
state2; Outputs status after completion of sweeping
Contact type; Relay contact output, 1c relay contact (NC/NO/COM)
Contact capacity; 30 VDC, 100 mA
Contact operation; OPEN/CLOSE

Contact	Annunciator output	
	NC-COM	NO-COM
state 1	OPEN	CLOSE
state 2	CLOSE	OPEN

Operating conditions:
Ambient temperature; 0 to 45°C
Protective gas temperature; 5 to 45°C
Ambient humidity; 10 to 90%RH (at 40°C, no condensation)
Storage temperature -10 to +50°C
Storage humidity; 35 to 85%R.H. (no condensation)

Power supply voltage:
Voltage rating;100 to 240 V AC
Allowable range;85 to 264 V AC

Power supply frequency;
Rated frequency; 50/60 Hz
Allowable range; 47 to 63 Hz
Power consumption: Max. 120 VA
Dimensions (W x D x H): 429 x 243 x 947 mm
Weight: approx. 35 kg
Finish color: silver gray
Enclosure: steel casing, for indoor use
Material of gas-contacting parts:
Gas inlet/outlet; SUS316
Internal tubing; SUS304, SUS316, Fluoropolymer (PTFE, PFA), PP, PPS, fluoroelastomer, calcium fluoride (CaF_2), PEEK (only for O_2 Analyzer "-3" or "-4")
Gas inlet/outlet: Rc1/4 or 1/4 NPT internal thread

Safety, EMC and RoHS conformity standards

Safety conformity standards:
CE EN 61010-1, EN IEC 61010-2-030
GB GB30439
Installation altitude: 2000 m or less
Installation category; (IEC 61010)II (Note 1)
Pollution degree; (IEC 61010); 2 (Note 2)
Note1: Installation category, so called overvoltage category, specifies impulse withstanding voltage. Category II overvoltage applies to equipment intended to be powered from the building wiring.
Note2: 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.

EMC:
CE EN61326-1 Class A, Table 2 (For use in industrial locations)
EN61326-2-3, EN61000-3-2,
EN IEC 61000-3-2, EN61000-3-3
RCM EN61326-1 CLASS A, Table2
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.
· Influence of immunity environment (Criteria A): Output shift is specified within ±15% of F.S.

Environmental regulation
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.
REACH; Regulation EC 1907/2006

Explosion protection approval

Explosion protection approval of major standards and directives		IR810S
EU-TYPE (ATEX):	Applicable Standard:	EN IEC 60079-0
		EN 60079-1
		EN 60079-2
	Type of protection	Ex II 2 G Ex db pxb IIB + H2 T4 Gb
	Ambient temperature	0ºC to 45ºC
	Enclosure Rating	IP4X
IECEx:	Applicable Standard:	IEC 60079-0
		IEC 60079-1
		IEC 60079-2
	Type of protection:	Ex db pxb IIB + H2 T4 Gb
	Ambient temperature	0ºC to 45ºC
	Enclosure Rating	IP4X
GB EX:	Applicable Standard:	GB/T 3836.1
		GB/T 3836.2
		GB/T 3836.5
	Type of protection:	Ex db pxb IIB+H2 T4 Gb
	Ambient temperature	0ºC to 45ºC
	Enclosure Rating	IP4X
TAIWAN EX:	Registration	IECEx registered and approved for use in Taiwan. For explosion protection specifications, please refer to the IECEx section.
INDIA EX:	Approval	IECEx approved for use in India. For explosion protection specifications, please refer to the IECEx section. However, in India, only IECEx certificate of conformity for "d", "p" is applicable.

Standard Functions

Output signal hold: Measured value output can be held during calibration or operation by automatic or on-screen operation, or by remote execution instructions. The output at hold can be selected from the previous value and the set value.
Range changeover: The output range of measured values can be changed automatically or manually. Range changeover can also be turned off.
Range identification signal: When using the range changeover function, it is possible to output whether the low or high range is being used.
Blowback: Can open/close the contact output for blowback by a scheduled cycle or by an execution command. Blowback can set the blowback time and the gas displacement time after blowback (output hold time).
Auto calibration: Can be calibrated automatically by scheduled cycles or execution commands. If the calibration coefficient is outside the normal range, an alarm is issued. The alarm can be assigned to a contact output.
Auto zero calibration: Separate from the schedule set for Auto calibration, Auto calibration for

Zero Point only can be set. If the timing of Auto calibration and the Auto zero calibration are to occur at the same time, the Auto calibration takes precedence.

Auto validation: -V is selected, the automatic validation function is available. The automatic validation function flows the calibration gas through the measurement line and records the measured value according to a scheduled cycle or execution command. If the measured value deviates from the set threshold value, an alarm can be issued and the alarm can be assigned to a contact output. This function allows the user to verify the normality of the instrument.

Contact output during auto-calibration/validation: Displays the status of automatic calibration and validation. Status can be assigned to a contact output.

High/low limit alarm: Upper or lower thresholds can be set and alarmed if exceeded. Alarms can be assigned to contact outputs.

Instrument error contact output: If an instrument error occurs, an alarm is issued. The alarm is assigned to a contact output.

Calibration error contact output: If calibration is not performed properly, an alarm is issued. The alarm is assigned to a contact output

Optional Functions

/U: unit conversion (mg/m^3, g/m^3)
Changes the units for instantaneous values, O_2 conversion, and average values of NO, SO_2 , and CO to mg/m^3or g/m^3. If the measurement range is set to vol%, no conversion is made. See Table 3 for the corresponding values.

Table 3 ppm-mg/m^3 range

ppm range	Corresponding range in mg/m^3		
	NO	SO_2	CO
0-50 ppm	0-65.0 mg/m^3	0-140 mg/m^3	0-60.0 mg/m^3
0-100 ppm	0-130 mg/m^3	0-280 mg/m^3	0-125 mg/m^3
0-200 ppm	0-260 mg/m^3	0-570 mg/m^3	0-250 mg/m^3
0-250 ppm	0-325 mg/m^3	0-700 mg/m^3	0-300 mg/m^3
0-300 ppm	0-400 mg/m^3	0-850 mg/m^3	0-375 mg/m^3
0-500 ppm	0-650 mg/m^3	0-1400 mg/m^3	0-600 mg/m^3
0-1000 ppm	0-1300 mg/m^3	0-2800 mg/m^3	0-1250 mg/m^3
0-2000 ppm	0-2600 mg/m^3	0-5600 mg/m^3	0-2500 mg/m^3
0-2500 ppm	0-3300 mg/m^3	0-7100 mg/m^3	0-3000 mg/m^3
0-3000 ppm	0-4000 mg/m^3	0-8500 mg/m^3	0-3750 mg/m^3
0-5000 ppm	0-6600 mg/m^3	0-14.00 g/m^3	0-6250 mg/m^3

/A: CO Peak Alarm:
An alarm is issued when the number of times the measured concentration of CO peaks above the upper limit exceeds the set value. The alarm is assigned to a contact output.

/K: O_2 correction; Instantaneous O_2 correction values and O_2 correction average values of NO, SO_2, and CO can be calculated and output.

/NX: NO on the measurement screen is displayed as NOx: NO is displayed as NOx. /U. When used in conjunction with /U, the units are converted as NO

/PR: Pressure regulator valve (Set for sample gas/ reference gas): Includes one pressure regulator valve for reference gas and one for sample gas.

Pressure regulator valve for sample gas
Part Number: K8019GA
Inlet pressure: 7 to 18 kPa
Outlet pressure: 5±0.05 kPa
Gas contact material: Stainless steel
Pipe connection: Ø6 mm/Ø4 mm PTFE tube

Pressure regulator valve specifications for reference gas
Part Number: K8019GB
Inlet pressure: 7 to 18 kPa
Outlet pressure: 5±0.05 kPa
Gas contact material: aluminum
Pipe connection: ø6 mm/ø4 mm PTFE tube

/CG1~/CG4: Cable gland for wiring:
Cable gland for wiring is included. If you do not provide your own, please select the required number of cable glands.

Performance

$NO/SO_2/CO/CO_2/CH_4$
Repeatability: ± 0.5% F.S. (±1% F.S. when the optional range is included)
Linearity: ±1% F.S.
Zero drift: ±1.0% F.S./week (±2% F.S./week when the optional range is included)
Span drift: ± 2.0% F.S./week
Response time (90% F.S. response): 30 sec. or less
Interference: ± 2.0% F.S. (for sample gas compositions in the normal range)

Built-in paramagnetic oxygen analyzer
Repeatability: ±0.5% F.S.
Linearity: ±1% F.S.
Zero drift: ±2% F.S./week
Span drift: ±2% F.S./week
Response time (90% F.S. response) 30 sec. or less

Sample gas conditions

Flow rate: 0.5 to 0.8 L/min
Temperature: 5 to 40°C
Pressure: 4.9 to 9.8 kPa (Gas outlet side should be open to the atmospheric air. The pressure fluctuation relative to the set pressure shall be within ±2%.)
Dust: 2 µm or less in particle size
Mist: Unallowable
Moisture: Below a level where saturation occurs at 5°C (No condensation)
No other corrosive gas

Reference gas conditions

Gas: Atmosphere, instrument air or N_2
Flow rate: 0.5 to 0.8 L/min
Temperature: 5 to 40°C
Pressure: 4.9 to 9.8 kPa (Gas outlet side should be open to the atmospheric air. The pressure fluctuation relative to the set pressure shall be within ±2%.)
Dust: 2 µm or less in particle size
Mist: Unallowable
Moisture: Below a level where saturation occurs at 5°C (No condensation)
Impurities other than CO_2: 0.1% F.S. or less of minimum measurement range.
When the measurement range of the CO_2 meter is C1, C2, C3, or C4, be sure to use N_2 as the reference gas.

Standard gas for calibration

Zero gas: Dry N_2
Span gas:
80 - 90% concentration of the range of each component to be measured (recommended)
Concentrations above 105% F.S. are not allowed.
Dry Air or Atmosphere can be used as the span gas for the O_2 analyzer.
However, if a zirconia type O_2 analyzer manufactured by YOKOGAWA is installed externally and calibrated with the same calibration gas line, use 1 to 2 vol% O_2 as Zero gas.

Installation Requirements

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

• Signal Interrupter specification

Weight: Approx. 500 g
Installation environment: Non-hazardous locations
*: For installation in a hazardous area, use an explosion protected construction certified by the relevant explosion protection authentication entity.
Operating ambient conditions:
-10 to 50°C, 95%RH or less (no condensation)
Interpolated ambient conditions:
-40°C to 85°C, no condensation
Safety conformance standard: EN 61010-1
EMC: EN 61326-1 Class A, Table 2
(For use in industrial locations)
RoHS: EN IEC 63000

For RS-485: K8019KA

Number of communication ports: 1 port
Communication speed: 115200 bps max.
Power supply: 24 V DC (output from external signal interrupter terminal in IR810S)
Grounding: Functional grounding

For analog input: K8019KA

Analog input: 1 point
Input current: 4-20 mA DC
Power supply: 24 V DC (output from external signal interrupter terminal in IR810S)
Grounding: Functional grounding

For contact output (DC): K8019KB

Contact output: 5 points
Rated input: 30 V DC, 1A (resistive load)
Power supply: 24 V DC (output from external signal interrupter terminal in IR810S)
Grounding: Functional grounding

■ Model and Suffix Code

Model	Suffix code	Option code	Description
IR810S	.....	.....	Explosion-protected model Infrared Gas Analyzer
Type	-AT	.....	ATEX ZONE1
	-EC	.....	IECEx ZONE1 (*1)
	-NE	.....	NEPSI
Measuring Components	-A1	.....	NO
	-A2	.....	SO_2
	-A3	.....	CO
	-A4	.....	CO_2
	-A5	.....	CH_4
	-B1	.....	$NO+SO_2$
	-B2	.....	NO+CO
	-B4	.....	$CO+CO_2$
	-B5	.....	$CO+CH_4$
	-B6	.....	CO_2+CH_4
	-C1	.....	$NO+SO_2+CO$
	-C4	.....	$CO+CO_2+CH_4$
	-D1	.....	$NO+SO_2+CO+CO_2$
O_2 Analyzer	-N	.....	None
	-1	.....	ZR802S+ZR22S (*2)
	-2	.....	External O_2 analyzer (*2)
	-3	.....	Build-in paramagnetic O_2
	-4	.....	Build-in paramagnetic O_2 (H_2 background) (*3)
NO Measuring Range	- □□	.....	See ■ Measuring gas range
SO_2 Measuring Range	- □□	.....	See ■ Measuring gas range
CO Measuring Range	- □□	.....	See ■ Measuring gas range
CO_2 Measuring Range	- □□	.....	See ■ Measuring gas range
CH_4 Measuring Range	- □□	.....	See ■ Measuring gas range
O_2 Measuring Range	- □□	.....	See ■ Measuring gas range
Digital Communication	-N	.....	None
	-R	.....	RS-485
Automatic Validation	-N	.....	None
	-V	.....	Automatic Validation
Gas Connection	-R	.....	Rc1/4
	-T	.....	1/4 NPT
Protection System Cable Glands	-MN	.....	M25 (No cable glands) (*11)
	-TN	.....	3/4 NPT (No cable glands) (*11)
	-MC	.....	With cable glands (M25)
Air Purge Gas Flow Rate	-10	.....	100L/min For high flammable gas concentration (*4)
	-05	.....	50L/min For middle flammable gas concentration (*4)
	-02	.....	20L/min For low flammable gas concentration (*4)
Display Language	-E	.....	English
	-C	.....	Chinese
	-J	.....	Japanese
Mount Type	-W	.....	Wall mount
—	-NN	.....	Always "-NN"
—	-NN	.....	Always "-NN"
Option Code		/U	Unit change (mg/m3, g/m3) (*5)
		/CG1	Cable glands for I/O wiring (ATEX, IECEx, NEPSI)x 6 (*6)
		/CG2	Cable glands for I/O wiring (ATEX, IECEx, NEPSI) x 10 (*6)
		/CG3	Cable glands for I/O wiring (ATEX, IECEx, NEPSI) x 12 (*6)
		/CG4	Cable glands for I/O wiring (ATEX, IECEx, NEPSI) x 16 (*6)
		/A	Peak alarm (*7)
		/K	O_2 compensation (*8)
		/NX	Display NOx instead of NO (*9)
		/PR	Pressure Regulator (For Sample/Reference gas line, Pair) (*10)

(*1) Select -EC if you want to order Taiwan Ex specification (Taiwan Ex registration based on IECEx) or Indian Ex specification (Indian Ex approval based on IECEx).
(*2) Oxygen analyzer is not included. Please arrange it separately.
(*3) If the sample gas contains more than 100 ppm hydrogen, select the "-4" specification for H_2 background.
(*4) The flow rate of air purge gas must be determined according to the type and concentration of combustible gas contained in the sample gas. See ■ Purge flow rate decision flowchart on page 11 for the selection.

(*5) Select this option when one or more of NO, SO_2, or CO is included in the measuring component.
(*6) Prepare one from the following (a) to (c).
(a) Order one from /CG1 to /CG4. Cable glands of the same type as in (b) are packaged with the product. Select the amount you need. The following is for reference only.
/CG1: Wiring only RS-485 and power supply
/CG2: 1-2 Component measurement
/CG3: Three or more component measurements without RS-485 or without external zirconia (ZR802S+ZR22S)/external O_2 analyzer.
/CG4: Other than the above
(b) Prepare cable glands, U. I. Lapp GmbH article number 53112720 (SKINTOP MS-M20ATEX Thread size: M20 × 1.5, Cable diameter 7-13, Torque 12 N・m)
(c) Prepare cable glands according to each applicable certification standard.
Cable glands with thread size M20 × 1.5, IP66 rating, and heat resistance of 85°C shall comply with Ex d(db) IIC or Ex e(eb) IIC protection standards and be certified according to the applicable regulatory requirement: ATEX (-AT), IECEx (-EC), and GB standard (-NE), and shall be installed to maintain the specified degree of protection of the equipment.
(*7) Available only when CO is included in the measuring component.
(*8) Available when the O_2 analyzer specification is other than "-N" and one or more of NO, SO_2, or CO is included in the measuring component.
(*9) NOx converter is not included. Prepare a product that conforms to the standard.
(*10) One pressure regulator valve for the sample gas and one for the reference gas are included. Select this option if input pressure is not stable.
(*11) Cable glands, adapters, and/or blanking elements shall have thread size M20 × 1.5, IP66 rating, and heat resistance of 85°C, and shall be certified to Ex d(db) IIC according to the applicable regulatory requirement: ATEX (-AT), IECEx (-EC), or GB standard (-NE), and shall be installed so as to maintain the specific degree of protection of the equipment.

Accessories

Name	Qty	Code Specification	Description
Fuse (for main body)	2	Pre-installed in equipment	250 V/5 A delay type 5×20 mm IEC 60127-2 sheet3
Ferrite Cores for Power Cable	1	none	A1179MN
Fuse (for pressurized enclosure)	2	Pre-installed in equipment	250 V/1.25 A delay type 5×20 mm IEC 60127-2 sheet3
Cable clip	2	—	—
Screw for fixing cable clip	2	none	M5, 8 mm length
Bolt	4	none	M8, 35 mm length
Washer	8	none	M8
Nut	4	none	M8
Thread conversion connector	4	Gas connection "-T"	Rc 1/4 male to 1/4 NPT female
Key for door opening/closing	2	none	—
Thread conversion connector	2	Protection system cable glands "-TN"	M25×1.5 male to 3/4 NPT female
O-ring	2	Protection system cable glands "-TN" or "-MC"	—
Cable glands	2	Protection system cable glands "-MC"	Applicable cable diameter Ø9.5 to 15.4 mm, Connecting thread M25×1.5
Cable glands	6	”/CG1” cable glands for I/O wiring x6	Applicable cable diameter Ø7 to Ø13 mm, Connecting thread M20×1.5
	10	”/CG2” cable glands for I/O wiring x10	
	12	”/CG3” cable glands for I/O wiring x12	
	16	”/CG4” cable glands for I/O wiring x16	
Pressure Regulator	1	”/PR" For Sample/Reference gas line, Pair	Pressure Regulator (Stainless)
	1	”/PR" For Sample/Reference gas line, Pair	Pressure Regulator (Aluminium)

Spare Parts

Name	Part No.	Q´ty	Name	Part No.	Q´ty
C-type snap ring	Y9011EV	1 (*1)	Filter	K8020PW	1
Plate	K9213FB	1	Snap ring plier	K9643ZE	1

*1: The minimum purchase quantity is 10 per order.

Optical Unit Parts

Maintenance and replacement of the optical unit are performed by our trained service engineers.

Name	Part No.	Qty for 1 unit	Description	Recommended replacement interval (Year)	Applicable model
Packing	K8020QJ	2 (*1)	Packing for Lamp unit	1	All model
Base block	K8020QK	1	Solenoid valve and Capillary mount base	1	All model
Solenoid Valve	A1050MS	2 (*1)	Solenoid Valve for switching sample gas and reference gas	1	All model
Packing	K8020QM	2 (*1)	Packing for Capillary	1	All model
Elbow connector	K8020QB	4 (*1)	Connector for low range Cell	1	Measuring range "-E□"
O-ring	K8020QD	3 (*2)	O-ring for low range cell	1	Measuring range "-E□"
O-ring	K8020QE	2 (*1)	O-ring for low range cell	1	Measuring range "-E□"
O-ring	K8020QF	2 (*1)	O-ring for high range cell	1	Measuring range "-P□"
Elbow connector	K8020QB	2	Connector for high range Cell	1	Measuring range "-P□"
Elbow connector	K8020QH	2 (*1)	Connector for high range Cell	1	Measuring range "-P□"
Spacer	K8020QN	1	Spacer for CO_2 Cell	1	CO_2 measurement included model
Sheet	K8020QQ	1	Sheet for CO_2 Cell	1	CO_2 measurement included model
O-ring	K8020QF	1	O-ring for CO_2 Cell (Lamp side)	1	CO_2 measurement included model
O-ring	K8020QR	1	O-ring for CO_2 Cell (Detector side)	1	CO_2 measurement included model
Packing	K8020QS	2	Packing for CO_2 Cell (Lamp side)	1	CO_2 measurement included model
Packing	K8020QA	1	Packing for CO_2 Cell (Detector side)	1	CO_2 measurement included model
Straight connector (3mm-6mm)	K8020PX	4 or 6 (*3)	3mm-6mm Straight connector	1	All model, Build-in O_2 model requires 2 extra connectors
Metal hose band for 3mm	K8020PY	10 (*4)	Metal Clip for 3mm hose	1	All model
Metal hose band for 6mm	K8020PZ	10 (*4)	Metal Clip for 6mm hose	1	All model
High range Cell	K8020QG	1	Short measuring cell	2	Measuring range "-P□"
Low range Cell	K8020QC	1	Long measuring cell	3	Measuring range "-E□"
CO_2 Cell	A1262UY	1	CO_2 cell for low range	3	CO_2 measuring range "-C1, -C2, -C3, -C4"
CO_2 Cell	A1260UY	1	CO_2 cell for middle range	3	CO_2 measuring range "-C5"
CO_2 Cell	A1261UY	1	CO_2 cell for high range	3	CO_2 measuring range "-C6"
Lamp unit	A1121PE	1	Infrared light source	5	All model
Capillary	K8020QL	2	Capillary for flow control	5	All model
Cell Heater	A1259UY	1	Heater to control cell temperature	5	Measuring range "-E□"

*1: The minimum purchase quantity is 2 per order.
*2: The minimum purchase quantity is 3 per order.
*3: The minimum purchase quantity is 6 per order.
*4: The minimum purchase quantity is 10 per order.

<Items specified at order IR810S>

TAGNO. (only if necessary)
You can create TAGNO. (tag number) with alphanumeric characters described in the next table. 16 characters at maximum can be used.
If you specify TAGNO., it is printed on the stainless name plate/tag label affixed to the instrument.

Symbol (Note)	-	Hyphen	_	Underscore
	=	Equal	+	Plus
	/	Slash	:	Colon
	(	Left parenthesis	)	Right parenthesis
	#	Hash	!	Exclamation mark
	.	Period		
Number	0, 1, 2, 3, 4, 5, 6, 7, 8, 9			
Upper case alphabetics	A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z			
lower case alphabetics	a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z			

(Note): The spaces specified for the TAGNO. are removed. The string is left-squeezed.

■ Measuring gas range

Select the range for the sample gas selected under "Measuring Component". Select "None (-NN)" for gases not included in the measurement component. This product is free-range. You can set the range within the selected measurement range. The measurement accuracy varies when the measurement range is set within the optional range. For details, refer to Performance.
For multi-component meters, the measurement ranges for $NO/SO_2/CO/CH_4$ measurement cannot be combined with "-E□" and "-P□" together.

(Example) Measuring component code - B1 ($NO+SO_2$ meter)
NO measurement range: -E3 (0-200/2000 ppm), SO_2 measurement range: -E6 (0-500/5000 ppm)
=> Both are -E ranges, so they can be combined.
NO measurement range: -E3 (0-200/2000 ppm), SO_2 measurement range: -P1 (0-2/10 vol%)
=> Not possible due to a mix of -E and -P ranges.

/U: See Table 3 for unit conversion options.

Table 4 NO

Range	Code	Note
None	-NN	—
0-50/500 ppm	-E1	Optional range
0-100/1000 ppm	-E2	Optional range
0-200/2000 ppm	-E3	—
0-250/2500 ppm	-E4	—
0-300/3000 ppm	-E5	—
0-500/5000 ppm	-E6	—

Table 5 SO_2

Range	Code	Note
None	-NN	—
0-50/500 ppm	-E1	Optional range
0-100/1000 ppm	-E2	Optional range
0-200/2000 ppm	-E3	—
0-250/2500 ppm	-E4	—
0-300/3000 ppm	-E5	—
0-500/5000 ppm	-E6	—
0-2/10 vol%	-P1	—

Table 6 CO

Range	Code	Note
None	-NN	—
0-50/500 ppm	-E1	Optional range
0-100/1000 ppm	-E2	Optional range
0-200/2000 ppm	-E3	—
0-250/2500 ppm	-E4	—
0-300/3000 ppm	-E5	—
0-500/5000 ppm	-E6	—
0-2/20 vol%	-P1	—
0-3/30 vol%	-P2	—
0-5/50 vol%	-P3	—
0-10/100 vol%	-P4	Optional range

Table 7 CO_2

Range	Code	Note
None	NN	—
0-1000/5000 ppm (*1)	-C1	Optional range
0-2000/10000 ppm (*1) (*2)	-C2	Optional range
0-0.5/2.5 vol% (*1) (*3)	-C3	—
0-1/5 vol% (*1)	-C4	—
0-5/25 vol%	-C5	—
0-20/100 vol% (*4)	-C6	Optional range

(*1) For multi-component meters, other components can only be selected from "-E□". Always use N_2 for reference gas.
(*2) Measured values exceeding 9999 ppm are displayed as ++++.
(*3) Measurements are displayed in vol% only.
(*4) For multi-component meters, other components can only be selected from "-P□".

Table 8 CH_4

Range	Code	Note
None	-NN	—
0-2/20 vol%	-P1	—
0-3/30 vol%	-P2	—
0-5/50 vol%	-P3	—
0-10/100 vol%	-P4	Optional range

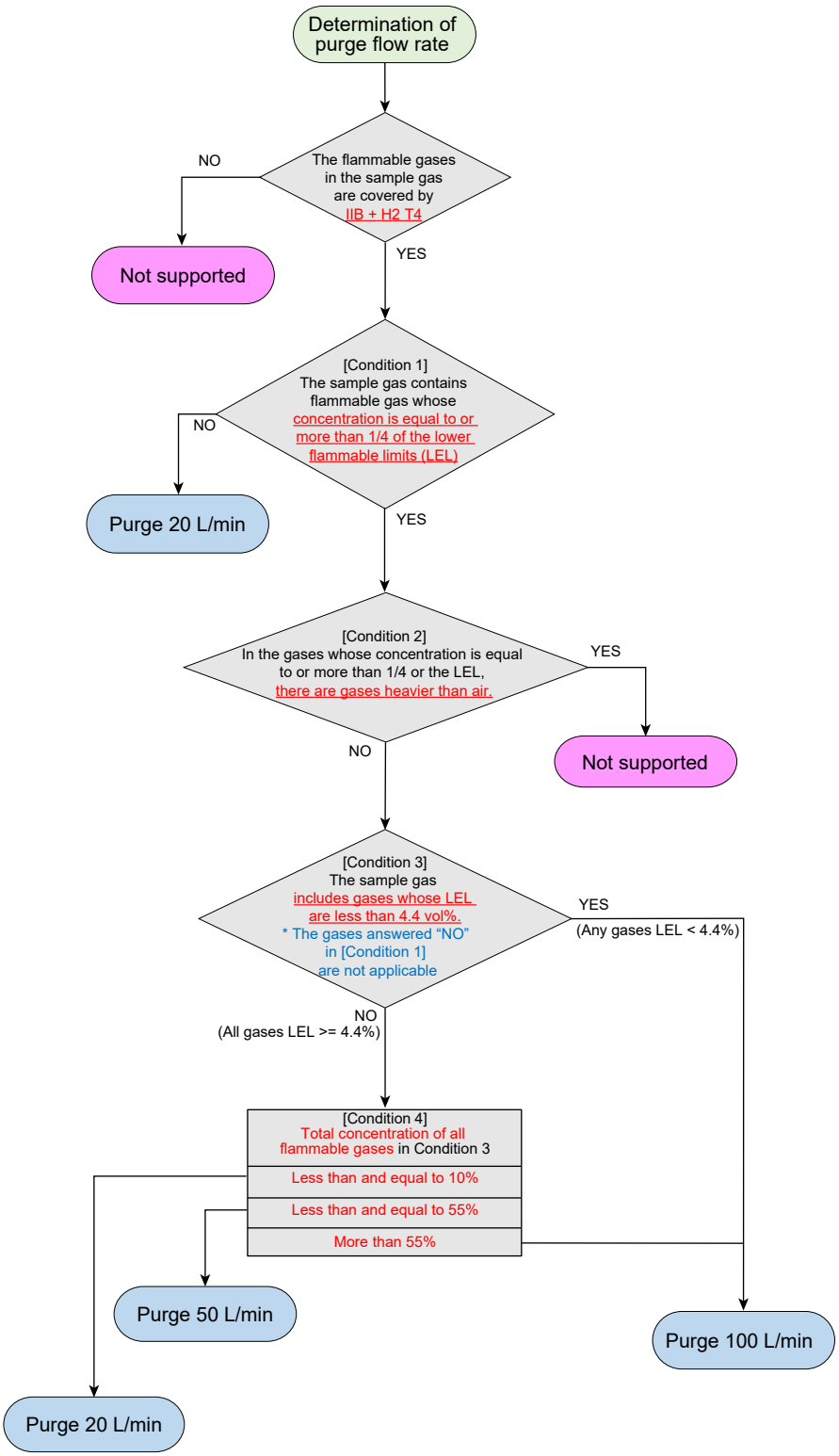
Table 9 O_2

Range	Code	Note
None	-NN	—
0-5/25 vol% (*1)	-M1	for built-in paramagnetic O_2 analyzer
0-25/100 vol% (*2)	-M2	for built-in paramagnetic O_2 analyzer
0-5/100 vol% (*3)	-R1	For ZR802S and other external O_2 analyzer

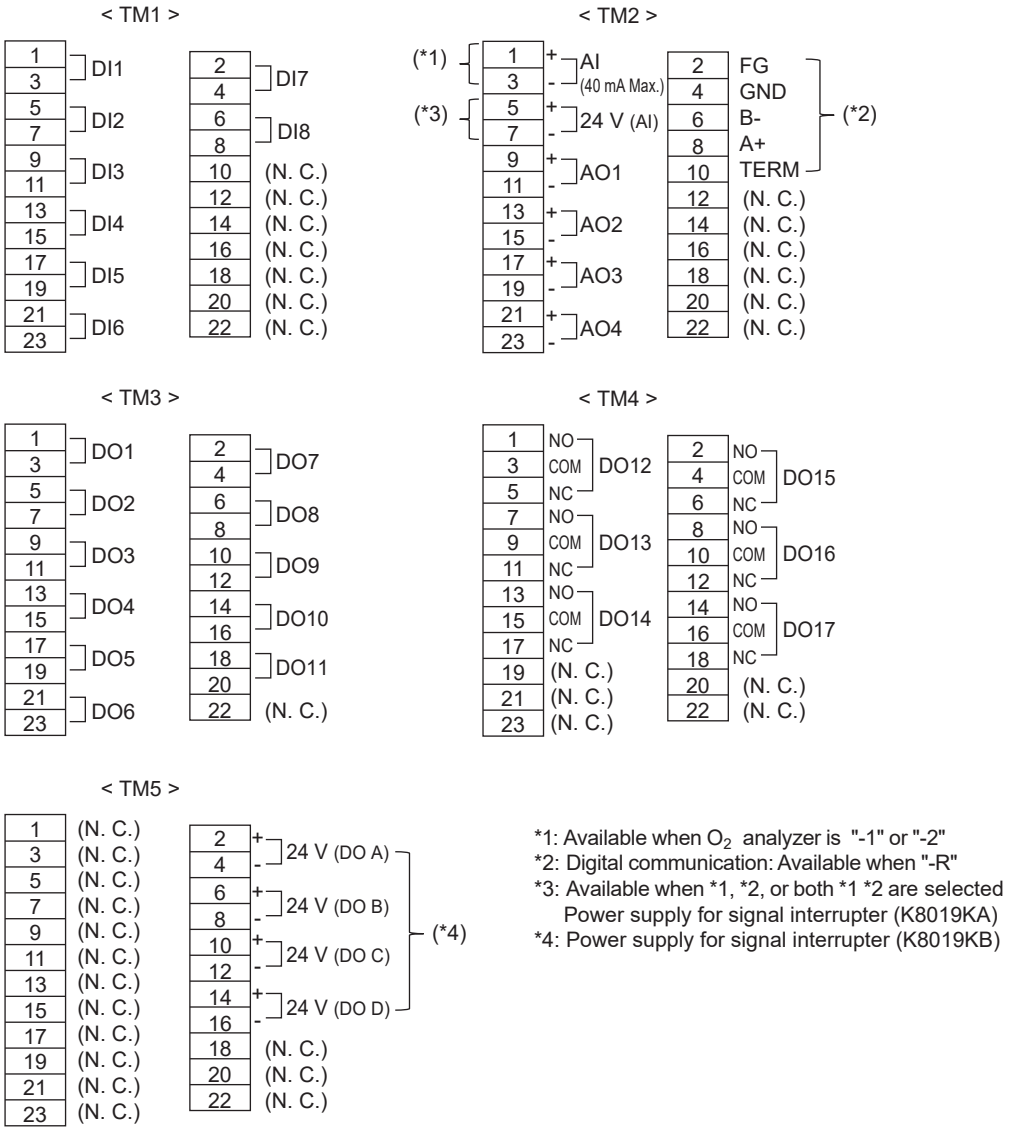
(*1) Available when the O_2 analyzer is "-3".
(*2) Available when the O_2 analyzer is "-3" or "-4".
(*3) Select this option when the O_2 Analyzer is "-1" or "-2".

■ Purge flow rate decision flowchart

Select the appropriate air purge flow rate depending on the gas component to be measured.
Follow the flowchart below to specify the suffix code for the air purge flow rate. If you do not determine the type of gas or flammable gas to which T4 is applicable or its LEL (Lower Explosive Limit), refer to TI 11G06D-01-01EN for selection.



■ Terminal assignment

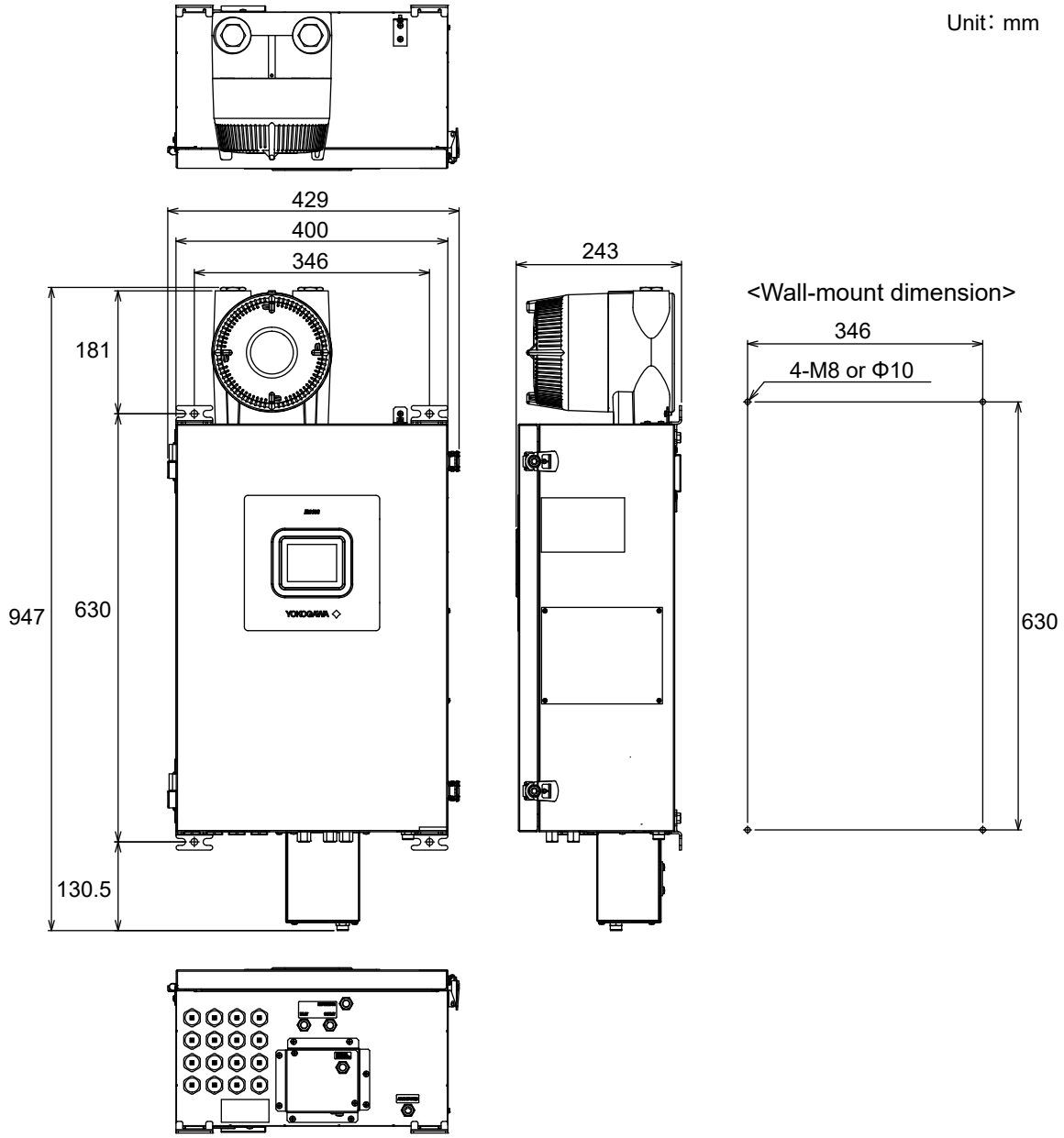


*1: Available when O_2 analyzer is "-1" or "-2"
*2: Digital communication: Available when "-R"
*3: Available when *1, *2, or both *1 *2 are selected
Power supply for signal interrupter (K8019KA)
*4: Power supply for signal interrupter (K8019KB)

■ External Dimensions

- **IR810S**

Unit：mm

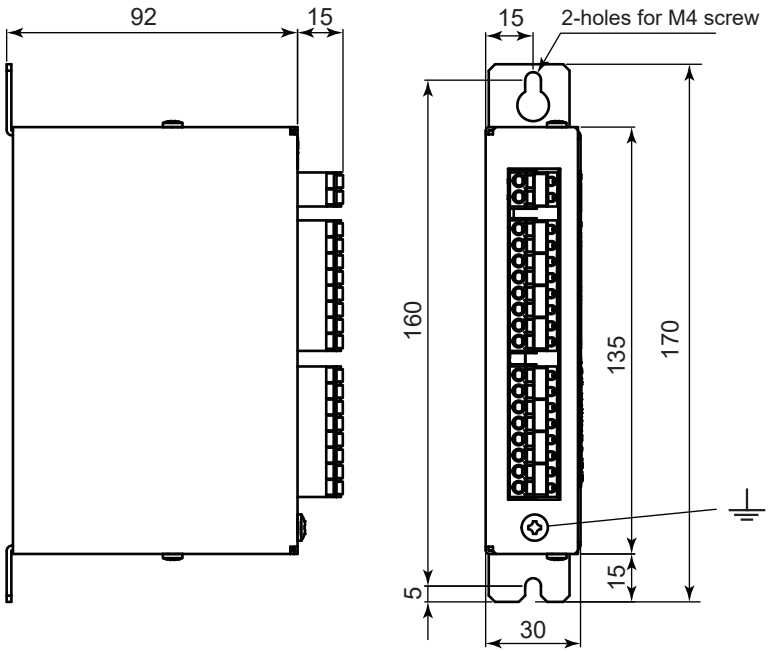


● Signal interrupter

Rack mount

• For RS-485 and Analog input: K8019KA

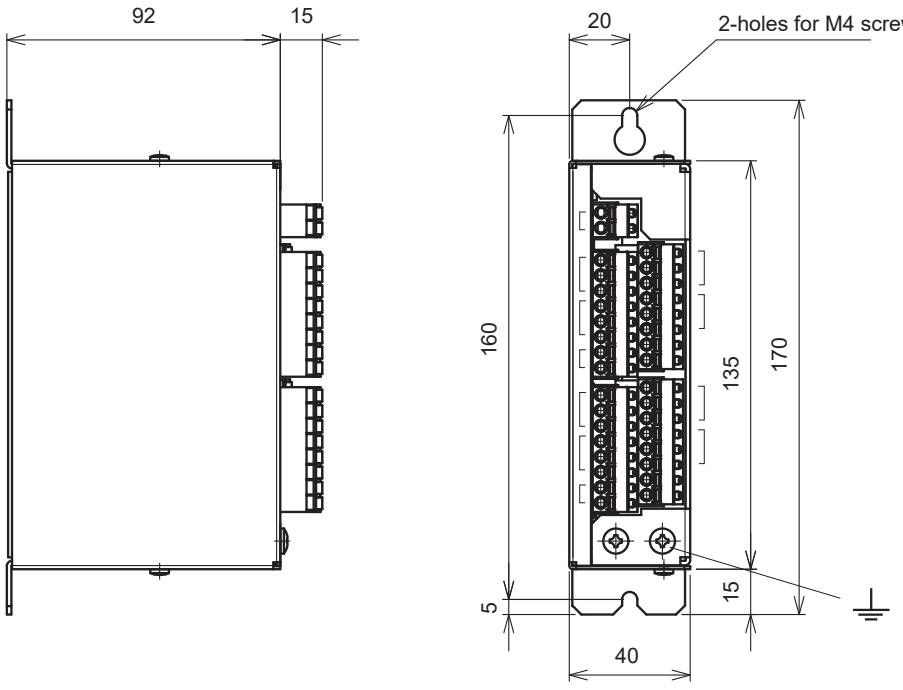
Unit: mm



Weight：Approx. 500 g

• **For contact output (DC): K8019KB***

Unit: mm



Weight：Approx. 500 g

Note：• Racks must be installed vertically.
• * require a minimum distance of 10 mm between each other when mounting.

Inquiry Sheet for IR810S 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 : ☐ ATEX (ZONE1) ☐ (IECEx ZONE1)

Measuring components:

	1st	2nd	3rd	4th
☐	NO			
☐	SO_2			
☐	CO			
☐	CO_2			
☐	CH_4			
☐	NO	SO_2		
☐	NO	CO		
☐	CO	CO_2		
☐	CO	CH_4		
☐	CO_2	CH_4		
☐	NO	SO_2	CO	
☐	CO	CO_2	CH_4	
☐	NO	SO_2	CO	CO_2

Measuring range:

☐NO _____☐ppm ☐mg/m^3

☐SO_2 _____☐ppm ☐vol% ☐mg/m^3 ☐g/m^3

☐CO _____☐ppm ☐vol% ☐mg/m^3

☐CO_2 _____☐ppm ☐vol%

☐CH_4 _____☐vol%

☐O_2 _____☐%

O_2 Analyzer:

☐ Without O_2 analyzer
☐ External O_2 analyzer: ZR802S, ZR22S (separate arrangement required)
☐ External O_2 analyzer: Separate arrangement required
☐ Built-in paramagnetic type O_2 analyzer
☐ Built-in paramagnetic type O_2 analyzer (when the sample contains more than 100 ppm hydrogen)

Modbus communication (RS-485): ☐ Yes ☐ No

Automatic validation function: ☐ Yes ☐ No

Gas connection: ☐ Rc1/4 ☐ 1/4 NPT

Air purge gas flow rate: ☐ 100L/min ☐ 50L/min ☐ 20L/min

Display language: ☐ English ☐ Chinese ☐ Japanese

Cable glands for wiring (pcs): ☐ 6 ☐ 10 ☐ 12 ☐ 16

Peak alarm: ☐ Yes ☐ No

O_2 compensation: ☐ Yes ☐ No

Display of Nitric Oxide: ☐ NO ☐ NOx

NO_2/NO Converter: ☐ With NO_2/NO converter
☐ Without NO_2/NO converter

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^3]
(5) Corrosive gas: ☐ Yes _____ ☐ No

Composition:

Please provide detailed composition information, as it is important to know the influence of interfering gases.
In particular, hydrogen and hydrocarbons must be listed since they may affect the measurement.

Contents		Concentration range		
CO	:	to	☐ %	☐ ppm
CO_2	:	to	☐ %	☐ ppm
CH_4	:	to	☐ %	☐ ppm
H_2	:	to	☐ %	☐ ppm
O_2	:	to	☐ %	☐ ppm
N_2	:	to	☐ %	☐ ppm
SO_2	:	to	☐ %	☐ ppm
NOx	:	to	☐ %	☐ ppm
H_2O	:	to	☐ %	☐ ppm
	:	to	☐ %	☐ ppm
	:	to	☐ %	☐ ppm
	:	to	☐ %	☐ ppm
	:	to	☐ %	☐ ppm
	:	to	☐ %	☐ ppm