

GS 11G2L1-01E

GENERAL

Model IR100 is an intelligent universal infrared gas analyzer for CO₂, CO and CH₄. The analyzer is easy to maintain and works steadily over long periods. The ideal application of this analyzer is continuous measurement for the control and monitoring of combustion in various industrial furnaces as well as continuous measurement for the study of plants.

FEATURES

1) Two available models

The IR100TA and IR100A, dedicated for analysis of either CO₂, CO, or CH₄, IR100TB and the IR100B, dedicated for simultaneous analysis of CO₂ and CO, are available. The minimum measuring range for each gas is described below.

- CO₂: 0 to 500 ppm
- CO: 0 to 500 ppm
- CH₄: 0 to 1000 ppm

2) Stable operation over long periods

A special optical system reduces drift, which is usually caused by dirt on the measurement cell; therefore, the analyzer operates stably over long periods.

3) Influenced less by presence of another interfering gas

A two-layer serial infrared transmission system minimizes influence by another interfering gas, for example, the vapor content in the object gas.

4) Easy maintenance

Maintenance of this instrument is easy since the analyzer can be easily separated into several basic units. Optical balance adjustment is also unnecessary.



Model IR100TA
Model IR100TB



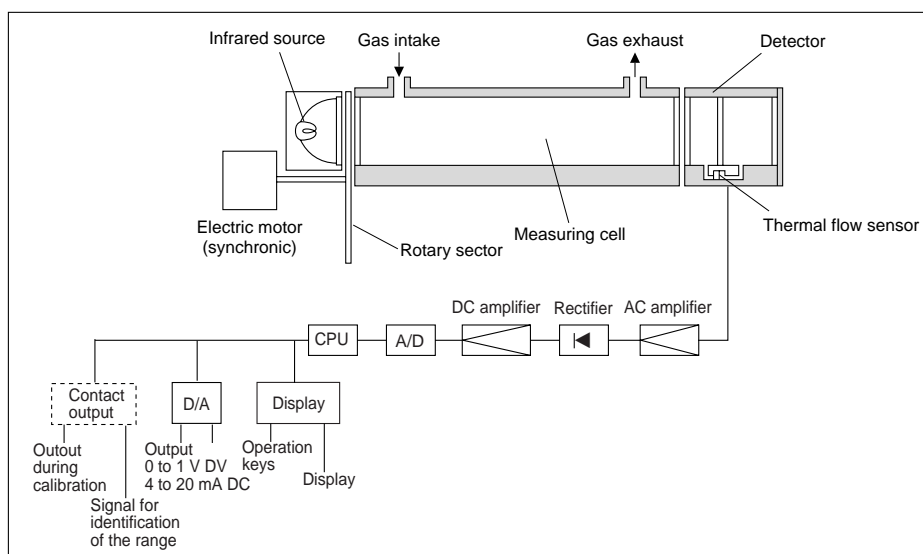
Model IR100A
Model IR100B

5) Wide variety of additional functions

- a) Self-diagnosis: indicates error code to notify the operator of an abnormality.
- b) Simple calibration: allows the operator to perform zero- and span-calibration by only pressing the calibration key while the reference gas is flowing.
- *c) Automatic calibration: automatically performs zero- and span-calibrations periodically at predefined intervals. This function can calibrate CO₂ and CO simultaneously.
- *d) Remote switching of the measuring range: allows a range to be switched to another range by transmitting signals from a distance. This function is available for each gas.
- *e) Range identification: outputs contact signals to identify the range which is being selected. These signals are output for each gas.

Note: The functions marked with an asterisk (*) are optional.

BASIC CONFIGURATION



STANDARD SPECIFICATIONS

Models:

- Horizontal model IR100A (single-gas analyzer),
IR100B(dual-gas analyzer)
- Vertical model IR100TA (single-gas analyzer),
IR100TB(dual-gas analyzer)

Operating principle: Non-dispersive infrared absorption, deflection method, single infrared-source, single-flux (single-beam)

Measured gas: CO₂, CO, CH₄

Measuring range: Refer to MODEL AND SUFFIX CODES.

For the secondary range of the IR100B, you can specify the range as either two or 2.5 times that of the primary range.

Output signals:

- Output 1: 0 to 1 V DC, non-insulated, linearized output signals
- Output 2: 4 to 20 mA (maximum allowable load resistance: 550 Ω), simultaneous, non-insulated, or linearized output signals

Contact materials with gas

- Connection: SUS 304 stainless steel
- Cell window: CaF
- Material of cell: Gold or SUS 304 stainless steel
- O-ring: Neoprene

Power supply:

- 100 V AC ±10%, 50/60 Hz
- 115 V AC ±10%, 50/60 Hz
- 220 V AC ±10%, 50/60 Hz

Power consumption: Max. 37 VA

Ambient temperature: -5° to +45°C

Ambient humidity: 90 % RH or less

Casings: Steel, for indoor use

Style:

- IR100A/B Select either desk-top, 19-inch rack-mounted, or panel-mounted model.
- IR100TA/TB Select either panel-mounted or wall-mounted model.

Weight: approximately 12 kg

Storage conditions:

- Temperature: -20°C to +60°C
- Humidity: 100% RH or less (Avoid condensation.)

CHARACTERISTICS

Repeatability:

- ±0.5% FS for the primary range (lower range)
- ±1% FS for the secondary range (higher range)

Zero drift: ±2% FS/week

Span drift: ±2% FS/week

Response time (90% response): 15 s or less including the time required for substitution of the sample cell

INFLUENCE OF INTERFERING GAS

Interfering gas and its concentration	CO meter	CO ₂ meter	CH ₄ meter
CO 1000 ppm	—	≦ 5 ppm	≦ 10 ppm
CO ₂ 20%	≦ 5 ppm	—	≦ 10 ppm
H ₂ O saturation at 20°C	≦ 15 ppm	≦ 5 ppm	≦ 10 ppm
CH ₄ 5000 ppm	≦ 10 ppm	≦ 5 ppm	—
SO ₂ 1000 ppm	≦ 2 ppm	≦ 2 ppm	≦ 2 ppm

* The values for the CO meter are the ones for models with a CO₂ interference cell. Table 01

INSTALLTION CONDITIONS

Ambient temperature: -5° to +45°C

Ambient humidity: 90% RH or less

Vibration: should be avoided

Direct sunlight: should be avoided

Atmospheric gas concentration:

- CO₂ 2000 ppm or less
- CO 100 ppm or less
- SO₂ 5 ppm or less
- CH₄ 100 ppm or less

SAMPLE GAS CONDITIONS (WITHOUT SAMPLING SYSTEM)

Flowrate: 0.5 ~ 1 l/min

Pressure: 500 Pa or more

Temperature: 0° to +50°C

Dust: 100µg/Nm³ with the particle size of 1µm or less

Mist: none

Humidity: Avoid concentration.

Corrosive gases sampled:

- NOx 1000 ppm or less
- SO₂ 1000 ppm or less
- HCl 1 ppm or less
- Others None

APPLICATIONS

- Blast furnace: CO- 0 to 40%, CO₂- 0 to 30%, O to 40%
0 to 50%
- Converter: CO- 0 to 100% CO₂- 0 to 100%
- Electric furnace: CO- 0 to 100% CO₂- 0 to 100%
- Coke oven: CO- 0 to 100% CO₂- 0 to 100%
- Cement kiln: CO- 0 to 1%, O to 5%
- Coal kiln: CO- 0 to 1%, O to 5%
- Carbonizing furnace: CO₂- 0 to 1%, O to 2%
- Transforming furnace: CO₂- 0 to 0.5%, O to 1%

Possible applications

- Inert gas generator: CO₂- 0 to 10%, O to 20%
(O₂- 0 to 2%)
- Boiler: CO- 0 to 500 ppm,
0 to 1000 ppm (O₂- 0 to 10%, O to 25%)
- Leak gas detection: CO, CH₄
- Plant carbon dioxide assimilation: CO₂- 0 to 500 ppm,
0 to 1000 ppm
- Apple storage facility: CO₂- 0 to 5%, O to 10%
(O₂- 0 to 10%, O to 25%)
- Rice storage facility: CO₂- 0 to 50%, O to 100%
- Fermentation plant: CO₂- 0 to 10%, O to 20%
- Brewery: CO₂- 0 to 5%

MODEL AND SUFFIX CODE

1. IR100A Horizontal Single-gas Analyzer

Model	Suffix Code	Option Code	Description
IR100A	-----	-----	Single-gas analyzer
Measured gas	-1	-----	CO
	-2	-----	CO ₂
	-3	-----	CH ₄
Primary range	A	-----	0 to 500 ppm (not available for CH ₄)
	B	-----	0 to 1000 ppm
	C	-----	0 to 2000 ppm
	D	-----	0 to 2500 ppm
	E	-----	0 to 5000 ppm
	F	-----	0 to 1%
	G	-----	0 to 2%
	H	-----	0 to 5%
	J	-----	0 to 10%
	K	-----	0 to 20%
	L	-----	0 to 50%
	M	-----	0 to 100%
	P	-----	0 to 3%
Q	-----	0 to 30%	
R	-----	0 to 40%	
S	-----	0 to 70%	
Secondary range	A	-----	0 to 500 ppm (not available for CH ₄)
	B	-----	0 to 1000 ppm
	C	-----	0 to 2000 ppm
	D	-----	0 to 2500 ppm
	E	-----	0 to 5000 ppm
	F	-----	0 to 1%
	G	-----	0 to 2%
	H	-----	0 to 5%
	J	-----	0 to 10%
	K	-----	0 to 20%
	L	-----	0 to 50%
	M	-----	0 to 100%
	N	-----	Not available
Power supply	-5	-----	100 V AC, 50 Hz
	-6	-----	100 V AC, 60 Hz
	-7	-----	115 V AC, 50 Hz
	-8	-----	115 V AC, 60 Hz
	-3	-----	220 V AC, 50 Hz
	-4	-----	220 V AC, 60 Hz
Style	A	-----	Desk top
	B	-----	19-inch rack-mounted
	C	-----	Panel-mounted
Piping	A	-----	1/4 NPT
	J	-----	Rc 1/4
Panel	-E	-----	English
	-J	-----	Japanese
Additional function	/P	-----	Automatic calibration
	/J	-----	Remote range switching function and range identification functions

(Note) See "Applicable Measuring Range" on page 7 for selecting the measuring range.

Fuse (provided as a standard accessory)

Part No.	Description
K9358CY	125 V, 1 A
K9358CZ	250 V, 1 A

2. IR100B Horizontal Dual-gas Analyzer

Model	Suffix Code	Option Code	Description
IR100B	-----	-----	Dual-gas analyzer CO ₂ + CO
Measured gas	-G	-----	CO ₂ /CO (Primary Gas/secondary)gas
Primary range of CO ₂ (Note 1)	E	-----	0 to 5000 ppm (0 to 500 ppm cannot be specified for CO)
	F	-----	0 to 1%
	G	-----	0 to 2%
	H	-----	0 to 5%
	J	-----	0 to 10%
	K	-----	0 to 20%
	L	-----	0 to 50%
Secondary range of CO ₂ (Note 2)	1	-----	x 2
	2	-----	x 2.5
	N	-----	Not available
Primary range of CO (Note 1)	A	-----	0 to 500 ppm
	B	-----	0 to 1000 ppm
	C	-----	0 to 2000 ppm
	D	-----	0 to 2500 ppm
	E	-----	0 to 5000 ppm
	F	-----	0 to 1%
	G	-----	0 to 2%
	H	-----	0 to 5%
	J	-----	0 to 10%
	K	-----	0 to 20%
	L	-----	0 to 50%
	M	-----	0 to 100%
	Secondary range of CO (Note 2)	1	-----
2		-----	x 2.5
N		-----	Not available
Power supply	-5	-----	100 V AC, 50 Hz
	-6	-----	100 V AC, 60 Hz
	-7	-----	115 V AC, 50 Hz
	-8	-----	115 V AC, 60 Hz
	-3	-----	220 V AC, 50 Hz
	-4	-----	220 V AC, 60 Hz
Style	A	-----	Desk top
	B	-----	19-inch rack-mounted
	C	-----	Panel-mounted
Piping	A	-----	1/4 NPT
	J	-----	Rc 1/4
Panel	-E	-----	English
	-J	-----	Japanese
Additional function	/P	-----	Automatic calibration
	/J	-----	Remote range switching function and range identification functions

(Note 1) See "Applicable Measuring Range" on page 7 for selecting the measuring range.

(Note 2) See "Applicable Measuring Range" on page 8 for selecting the secondary range.

Fuse (provided as a standard accessory)

Part No.	Description
K9358CY	125 V, 1 A
K9358CZ	250 V, 1 A

3. IR100TA Vertical single-gas Analyzer

Model	Suffix Code	Option Code	Description
IR100TA	-----	-----	Single-gas analyzer
Measured gas	-1	-----	CO
	-2	-----	CO ₂
	-3	-----	CH ₄
Primary range	A	-----	0 to 500 ppm (not available for CH ₄)
	B	-----	0 to 1000 ppm
	C	-----	0 to 2000 ppm
	D	-----	0 to 2500 ppm
	E	-----	0 to 5000 ppm
	F	-----	0 to 1%
	G	-----	0 to 2%
	H	-----	0 to 5%
	J	-----	0 to 10%
	K	-----	0 to 20%
	L	-----	0 to 50%
	M	-----	0 to 100%
	P	-----	0 to 3%
Q	-----	0 to 30%	
R	-----	0 to 40%	
S	-----	0 to 70%	
Secondary range	A	-----	0 to 500 ppm (not available for CH ₄)
	B	-----	0 to 1000 ppm
	C	-----	0 to 2000 ppm
	D	-----	0 to 2500 ppm
	E	-----	0 to 5000 ppm
	F	-----	0 to 1%
	G	-----	0 to 2%
	H	-----	0 to 5%
	J	-----	0 to 10%
	K	-----	0 to 20%
	L	-----	0 to 50%
	M	-----	0 to 100%
	N	-----	Not available
Power supply	-5	-----	100 V AC, 50 Hz
	-6	-----	100 V AC, 60 Hz
	-7	-----	115 V AC, 50 Hz
	-8	-----	115 V AC, 60 Hz
	-3	-----	220 V AC, 50 Hz
	-4	-----	220 V AC, 60 Hz
Style	C	-----	Panel mount type
	D	-----	Wall mount type
Piping	A	-----	1/4 NPT
	J	-----	Rc 1/4
Panel	-E	-----	English
	-J	-----	Japanese
Additional function	/P	-----	Automatic calibration
	/J	-----	Remote range switching function and range identification functions

(Note) See "Applicable Measuring Range" on page 7 for selecting the measuring range.

Fuse (provided as a standard accessory)

Part No.	Description
K9358CY	125 V, 1 A
K9358CZ	250 V, 1 A

4. IR100TB Vertical Dual-gas Analyzer

Model	Suffix Code	Option Code	Description
IR100TB	-----	-----	Dual-gas analyzer CO ₂ + CO
Measured gas	-G	-----	CO ₂ /CO (Primary Gas/secondary)gas
Primary range of CO ₂ (Note 1)	E	-----	0 to 5000 ppm (0 to 500 ppm cannot be specified for CO)
	F	-----	0 to 1%
	G	-----	0 to 2%
	H	-----	0 to 5%
	J	-----	0 to 10%
	K	-----	0 to 20%
	L	-----	0 to 50%
Secondary range of CO ₂ (Note 2)	1	-----	x 2
	2	-----	x 2.5
	N	-----	Not available
Primary range of CO (Note 1)	A	-----	0 to 500 ppm
	B	-----	0 to 1000 ppm
	C	-----	0 to 2000 ppm
	D	-----	0 to 2500 ppm
	E	-----	0 to 5000 ppm
	F	-----	0 to 1%
	G	-----	0 to 2%
	H	-----	0 to 5%
	J	-----	0 to 10%
	K	-----	0 to 20%
	L	-----	0 to 50%
	M	-----	0 to 100%
	Secondary range of CO (Note 2)	1	-----
2		-----	x 2.5
N		-----	Not available
Power supply	-5	-----	100 V AC, 50 Hz
	-6	-----	100 V AC, 60 Hz
	-7	-----	115 V AC, 50 Hz
	-8	-----	115 V AC, 60 Hz
	-3	-----	220 V AC, 50 Hz
	-4	-----	220 V AC, 60 Hz
Style	C	-----	Panel mount type
	D	-----	Wall mount type
Piping	A	-----	1/4 NPT
	J	-----	Rc 1/4
Panel	-E	-----	English
	-J	-----	Japanese
Additional function	/P	-----	Automatic calibration
	/J	-----	Remote range switching function and range identification functions

(Note 1) See "Applicable Measuring Range" on page 7 for selecting the measuring range.

(Note 2) See "Applicable Measuring Range" on page 8 for selecting the secondary range.

Fuse (provided as a standard accessory)

Part No.	Description
K9358CY	125 V, 1 A
K9358CZ	250 V, 1 A

Measuring Range (Combination of Two Ranges or Gases)

(1) Combination of two ranges for IR100A and for IR100TA

Secondary Range	A	B	C	D	E	F	G	H	J	K	L	M
Primary Range	0 to 500ppm	0 to 1000ppm	0 to 2000ppm	0 to 2500ppm	0 to 5000ppm	0 to 1%	0 to 2%	0 to 5%	0 to 10%	0 to 20%	0 to 50%	0 to 100%
A 0 to 500ppm	○◎	○◎	○◎	○◎								
B 0 to 1000ppm		○◎△	○◎△	○◎△	○◎△							
C 0 to 2000ppm			○◎△	○◎△	○◎△	○◎△						
D 0 to 2500ppm				○◎△	○◎△	○◎△				Not available		
E 0 to 5000ppm					○◎△	○◎△	○◎△					
F 0 to 1%						○◎△	○◎△	○◎△				
G 0 to 2%							○◎△	○◎△	○◎△			
H 0 to 5%								○◎△	○◎△	○◎△		
J 0 to 10%			Not available						○◎△	○◎△	○◎	
K 0 to 20%									○◎△	○◎△	○◎△	○◎
L 0 to 50%											○◎△	○◎△
M 0 to 100%												○◎△
P 0 to 3%								○◎△	○◎△			
Q 0 to 30%											○◎△	○◎△
R 0 to 40%											○◎△	○◎△
S 0 to 70%												○◎△

○: CO can be measured ◎: CO₂ can be measured △: CH₄ can be measured

(2) Combination of two gases for IR100B and for IR100TB

Secondary Gas(CO)	A	B	C	D	E	F	G	H	J	K	L	M
Primary Gas(CO ₂)	0 to 500ppm	0 to 1000ppm	0 to 2000ppm	0 to 2500ppm	0 to 5000ppm	0 to 1%	0 to 2%	0 to 5%	0 to 10%	0 to 20%	0 to 50%	0 to 100%
A 0 to 500ppm												
B 0 to 1000ppm				Not available								
C 0 to 2000ppm												
D 0 to 2500ppm												
E 0 to 5000ppm		○	○	○	○	○	○	○	○	○	○	○
F 0 to 1%	○	○	○	○	○	○	○	○	○	○	○	○
G 0 to 2%	○	○	○	○	○	○	○	○	○	○	*○	○
H 0 to 5%	○	○	○	○	○	○	○	○	○	○	○	○
J 0 to 10%	○	○	○	○	○	○	○	○	○	○	○	○
K 0 to 20%	○	○	○	○	○	○	○	○	○	○	○	○
L 0 to 50%	○	○	○	○	○	○	○	○	○	○	○	○
M 0 to 100%	○	○	○	○	○	○	○	○	○	○	○	○

○ : Both gases can be measured.

Note that for the secondary range of the IR100B, you can specify the range as either two or 2.5 times that of the first range.

However, for a section marked with *○ the combination of 0 to 2/5% CO₂ and 0 to 20/50% CO is not available.

(The combination of 0 to 2% CO₂ and 0 to 20/50%, CO is not available)

Applicable Secondary Range

(1) Applicable secondary range when the primary gas (CO₂) for IR100B, TB is selected

(○ : applicable, × : not applicable, * : range not applicable)

CO ₂ Primary range selection	E	F	G	H	J	K	L	M
Secondary range	0 to 0.5%	0 to 1%	0 to 2%	0 to 5%	0 to 10%	0 to 20%	0 to 50%	0 to 100%
F 0 to 1%	○							
* 0 to 1.25%	×							
G 0 to 2%		○						
* 0 to 2.5%		×				Not available		
* 0 to 4%			×					
H 0 to 5%			○					
J 0 to 10%				○				
* 0 to 12.5%				×				
K 0 to 20%					○			
* 0 to 25%					×			
* 0 to 40%		Not available				×		
L 0 to 50%						○		
M 0 to 100%							○	
* 0 to 125%							—	
* 0 to 200%								—
* 0 to 250%								—

(2) Applicable secondary range when the secondary gas (CO) for IR100B, TB is selected

(○ : applicable, × : not applicable, * : range not applicable)

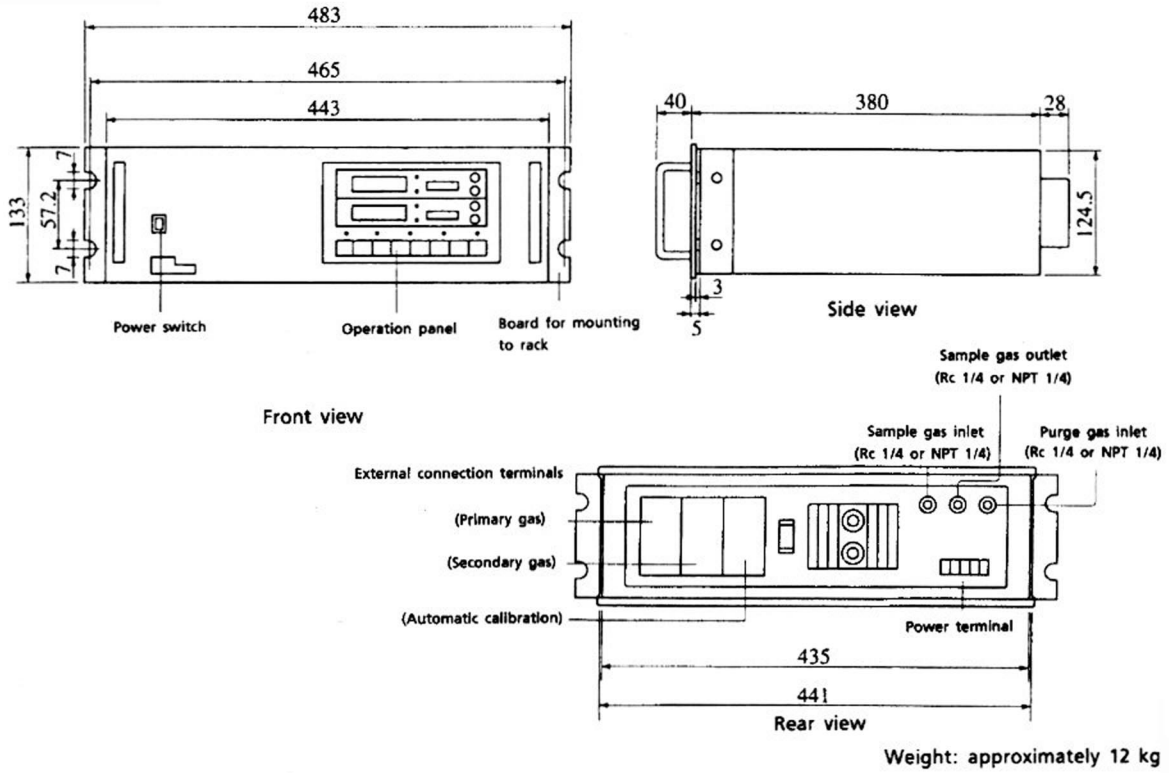
CO Primary range selection	A	B	C	D	E	F	G	H	J	K	L	M
Secondary range	0 to 500ppm	0 to 1000ppm	0 to 2000ppm	0 to 2500ppm	0 to 0.5%	0 to 1%	0 to 2%	0 to 5%	0 to 10%	0 to 20%	0 to 50%	0 to 100%
B 0 to 1000ppm	○											
* 0 to 1250ppm	×											
C 0 to 2000ppm		○										
D 0 to 2500ppm		○										
* 0 to 4000ppm			×									
E 0 to 5000ppm			○									
* 0 to 6250ppm				×						Not available		
F 0 to 1%					○							
* 0 to 1.25%					×							
G 0 to 2%						○						
* 0 to 2.5%						×						
* 0 to 4%							×					
H 0 to 5%							○					
J 0 to 10%								○				
* 0 to 12.5%			Not available					×				
K 0 to 20%									○			
* 0 to 25%									×			
* 0 to 40%										×		
L 0 to 50%										○		
M 0 to 100%											○	
* 0 to 125%											—	
* 0 to 200%												—
* 0 to 250%												—

Dimensions

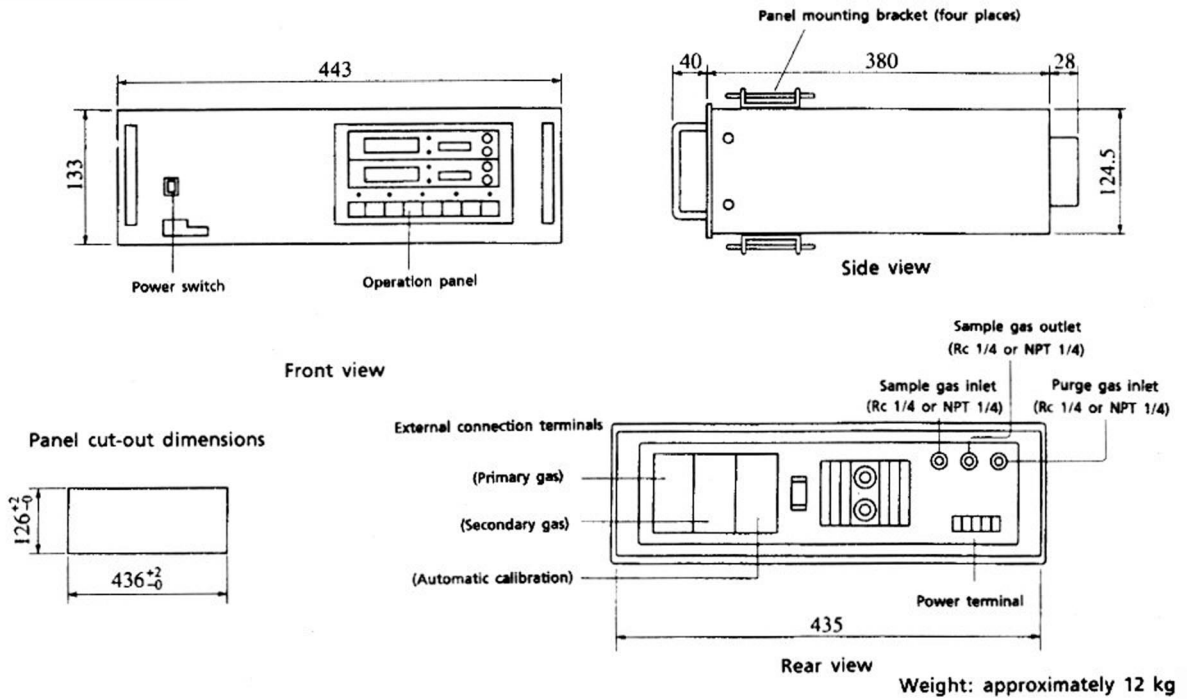
1. IR100A/B Horizontal

Unit: mm

(1) Rack-mounted



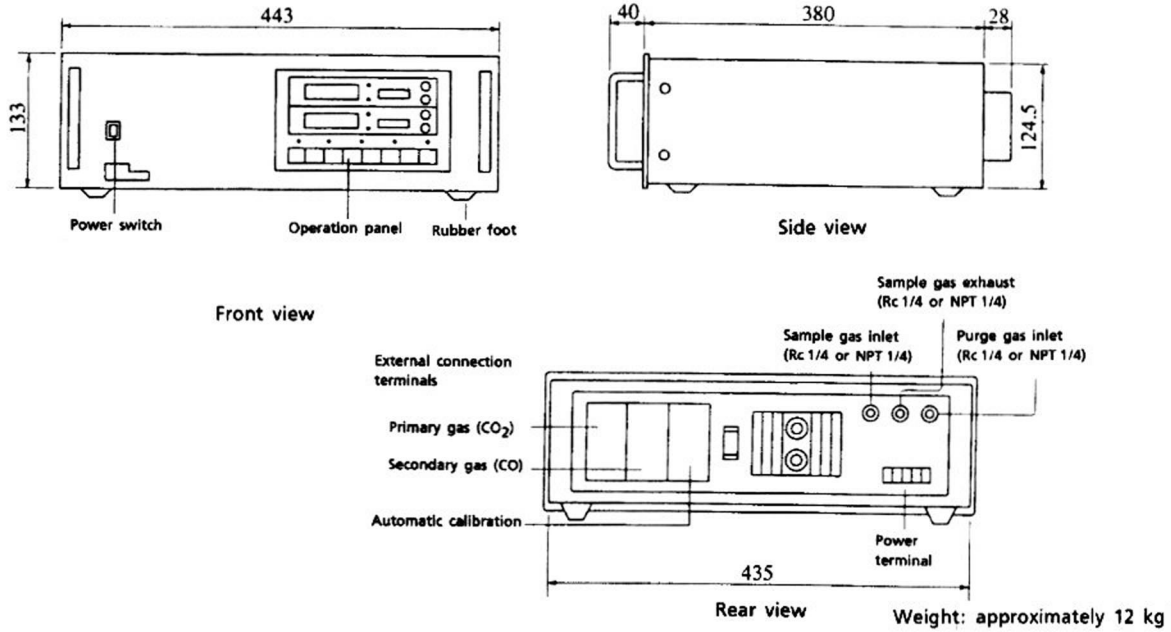
(2) Panel-mounted



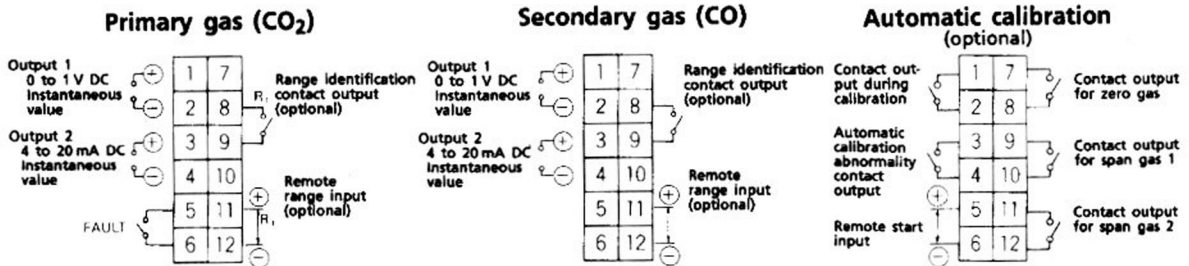
Dimensions

(3) Desk-top

Unit: mm



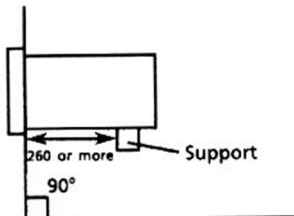
External Connector Terminals



Mounting

Three styles are available: 19-inch rack-mounted, panel-mounted, and desktop models.

Note that when the analyzer is mounted to a rack or panel, support must be placed beneath the analyzer near the rear so that the support bears 70% or more of the weight of the analyzer.

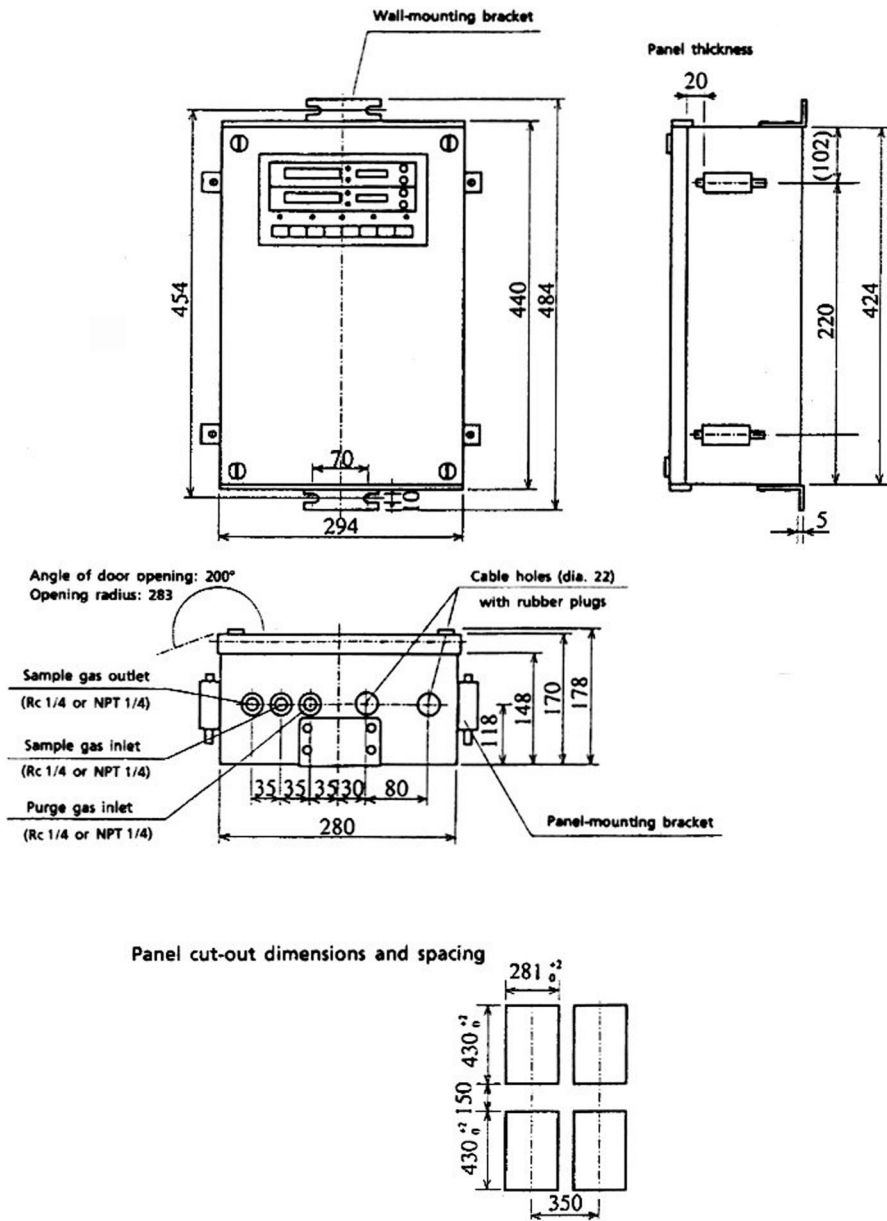


Dimensions

2. IR100TA/TB Vertical Model

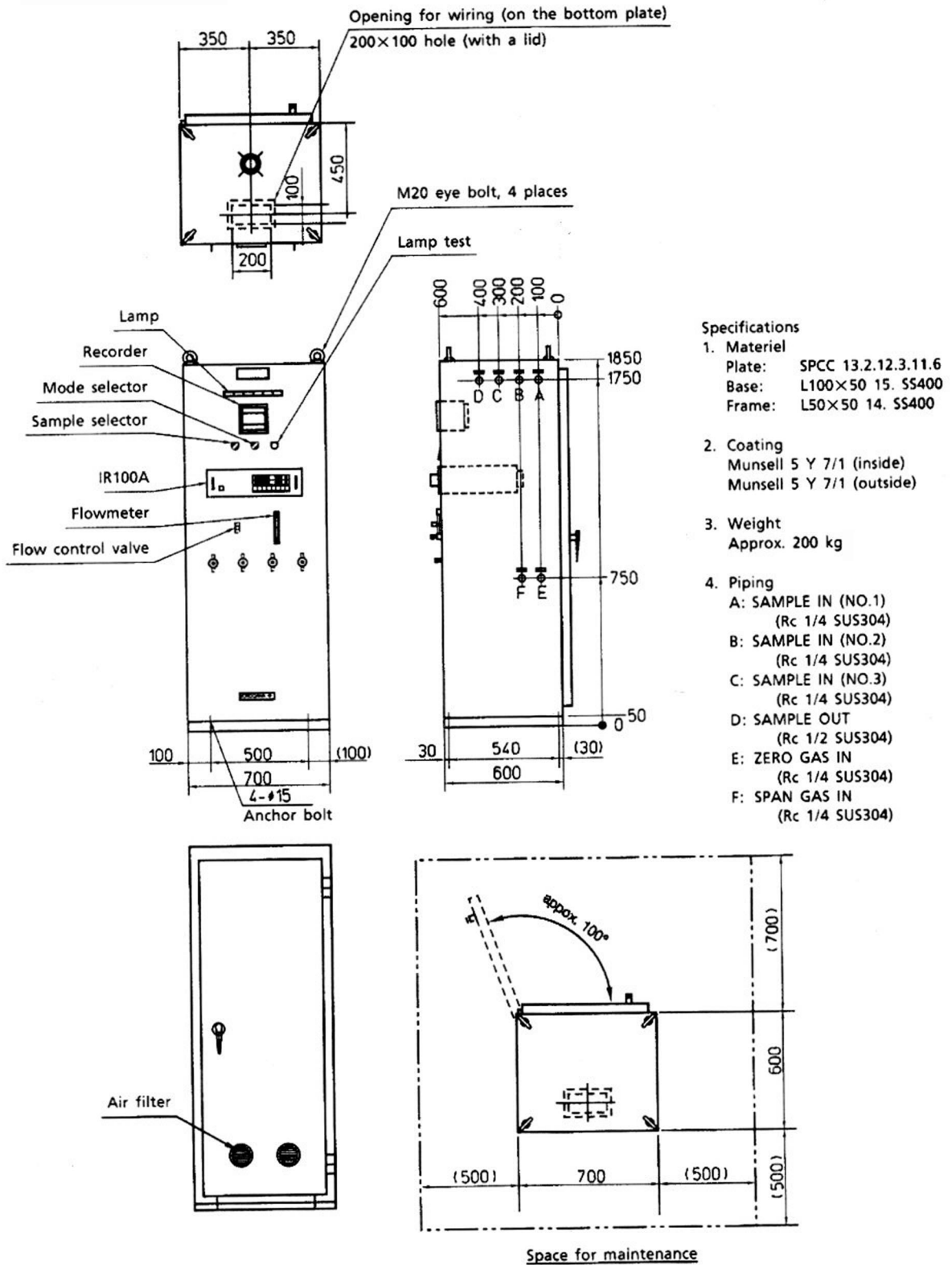
Panel-mounted

Unit: mm



Dimensions

Flue gas sampling system example (for reference only)



Inquiry Sheet for IR100 Infrared Gas Analyzer

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

1. General Information

Company: _____ Delivery destination: _____
 Responsible person: _____ Section: _____ (Phone No. _____)
 Plant name: _____ Measurement location: _____
 Purpose: Indication reading, cording, Telemeter transmission, Alarm, Control, Other _____

2. Requirements

Measured gas: CO, CO₂, CH₄, Other gas _____, O₂
 Measuring range:
 Primary range of CO₂: 0 to 500 ppm, 0.1%, 0.2%, 0.25%, 0.5%, 1%, 2%, 5%, 10%, 20%,
 50%, 100%
 Secondary range of CO₂: Not necessary, 0 to 500 ppm, 0.1%, 0.2%, 0.25%, 0.5%, 1%, 2%, 5%,
 10%, 20%, 50%, 100%
 Primary range of CO: Not necessary, × 2, × 2.5
 Power supply: 100 V AC, 115 V AC, 220 V AC, 0.1%, Other _____, 50Hz, 60Hz
 Style:
 Vertical, IR100TA (single-gas analyzer) or IR100TB (dual-gas analyzer)
 Panel-mounted or wall-mounted
 Horizontal IR100A (single-gas analyzer) or IR100B (dual-gas analyzer)
 Desk-top or 19-inch rack-mounted or Panel-mounted
 Automatic calibration: Yes, No
 Remote range switching and range identification: Yes, No

3. Sample Gas

Fuel: Gas, Oil, Coal, Refuse, Other fuel _____
 (1) Temperature: _____ to _____, Normal temperature _____ [°C]
 (2) Pressure: _____ to _____, Normal temperature _____ [MPa]
 (3) Humidity: _____ [vol %]
 (4) Dust: _____ [mg/Nm³]
 (5) Corrosive gas: Yes, No, _____

Composition		Concentration range		
CO	:	_____ to _____	<input type="checkbox"/> 10%	<input type="checkbox"/> ppm
CO ₂	:	_____ to _____	<input type="checkbox"/> 10%	<input type="checkbox"/> ppm
CH ₄	:	_____ to _____	<input type="checkbox"/> 10%	<input type="checkbox"/> ppm
H ₂	:	_____ to _____	<input type="checkbox"/> 10%	<input type="checkbox"/> ppm
O ₂	:	_____ to _____	<input type="checkbox"/> 10%	<input type="checkbox"/> ppm
N ₂	:	_____ to _____	<input type="checkbox"/> 10%	<input type="checkbox"/> ppm
_____	:	_____ to _____	<input type="checkbox"/> 10%	<input type="checkbox"/> ppm
_____	:	_____ to _____	<input type="checkbox"/> 10%	<input type="checkbox"/> ppm
_____	:	_____ to _____	<input type="checkbox"/> 10%	<input type="checkbox"/> ppm

