

General Specifications

GS 11M12A01-01E

Model ZR22G, ZR402G, and ZR202G Direct In Situ Zirconia Oxygen Analyzers and High temperature Humidity Analyzers

EXATI



Overview

This analyzer consists basically of a probe and a converter that are used for both the Zirconia Oxygen Analyzer and the High temperature Humidity Analyzer. The probe is of direct insertion type, and the converter uses a digital display.

Two types of analyzers are available: separate type and integrated type. As its name implies, the integrated type combines probe and converter.

Separate and integrated type Zirconia oxygen analyzers need not use a sampling device, and allow direct installation of the probe in the wall of a flue or furnace to measure the concentration of oxygen in the stack gas.

The converter displays the cell temperature and cell emf in addition to the oxygen concentration.

This analyzer is most suitable for monitoring the oxygen concentration of combustion gases in large or small boilers, various industrial furnace and combustion devices, or for the control of low-oxygen combustion.

Separate type and integrated type Zirconia High temperature Humidity Analyzers are used in driers which require vapor and an electrical heat source to measure the humidity of hot gases continuously. It can also be used in a variety of manufacturing applications in humidifiers, as well as in driers, for humidity measurement and control. It can help improve productivity in these application fields.

Features:

- The built-in heater assembly of the probe can be replaced on site, reducing maintenance costs.
- The probe uses a long-life, high-reliability Zirconia sensor.
- The probe uses three-reference air (natural convection, instrument air, and pressure compensation) methods in its applications.
- The separate type converter incorporates a LCD touch-panel for ease of operation.
- This converter can be used as an oxygen analyzer as well as a high temperature humidity analyzer.
- The integrated type integrates both probe and converter, to reduce wiring, piping, and installation costs. This type of unit uses optical switch for ease of operation at the site.
- Remote maintenance using digital communications (HART) reduces maintenance costs. *1
- Approval is pending for CENELEC, CSA, and FM explosionproof equipment safety certification.



ZR22G

ZR402G



ZR202G

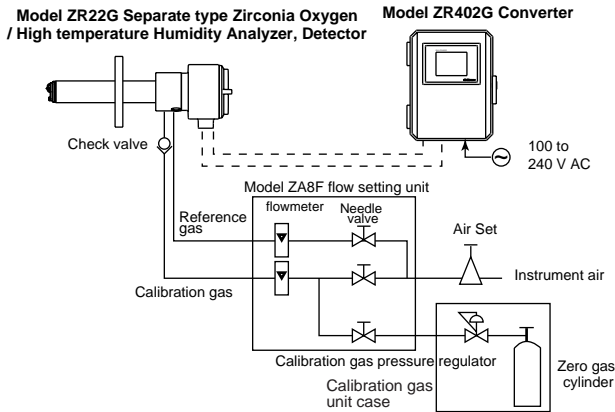
*1: HART is a registered trademark of HART Communication Foundation.

Basic System Configuration

System configuration — Separate type (Example 2)

System configuration Example 2 of Separate type Analyzer

- Instrument air is used as the reference gas. A standard gas cylinder is used for the calibration gas and highly accurate measurements are made.
- Application example: Oxygen concentration monitoring and control in large boilers (for private power generation and for business use) and in heating furnaces. Humidity monitoring and control in drying furnaces and humidifiers.

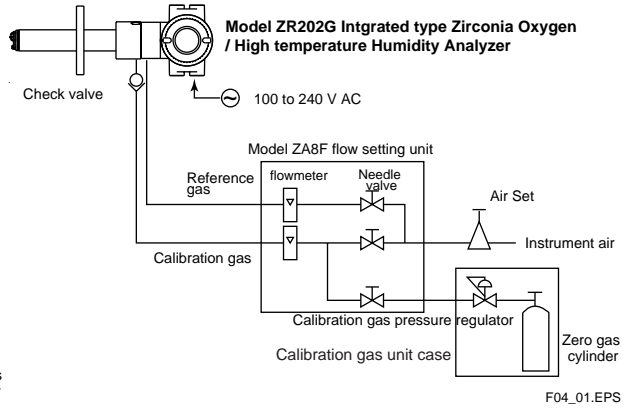


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System configuration — Integrated type (Example 2)

System configuration Example 2 of Integrated type Analyzer

- Instrument air is used as the reference gas. A standard gas cylinder is used for the calibration gas and highly accurate measurements are made.
- Application example: Oxygen concentration monitoring and control in large boilers (for private power generation and for business use) and in heating furnaces. Humidity monitoring and control in drying furnaces and humidifiers.

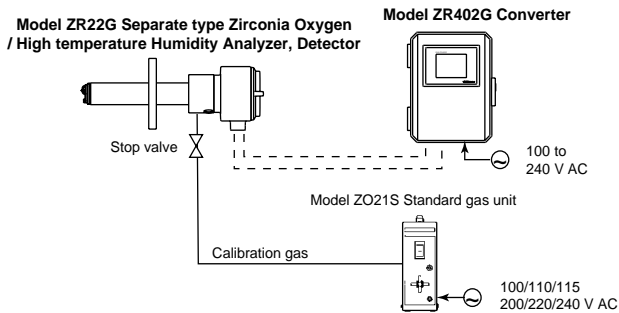


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System configuration — Separate type (Example 3)

System configuration Example 3 of Separate type Analyzer

- Natural convection is used as the reference gas. A portable standard gas unit (ZO21S) is used for the calibration. This unit is connected only when the calibration is made.
- Application example: Oxygen concentration monitoring and control in packaged boilers. Humidity monitoring and control in drying furnaces or a humidifiers.

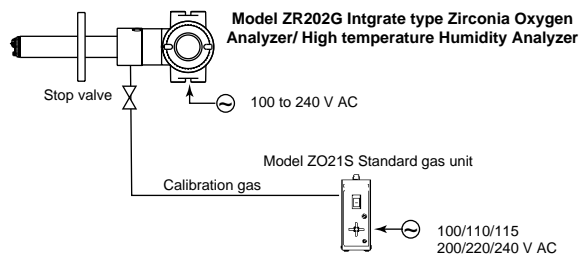


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System configuration — Integrated type (Example 3)

System configuration Example 3 of Integrated type Analyzer

- Natural convection is used as the reference gas. A portable standard gas unit (ZO21S) is used for the calibration. This unit is connected only when the calibration is made.
- Application example: Oxygen concentration monitoring and control in packaged boilers. Humidity monitoring and control in drying furnaces or a humidifiers.



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Note: The installation temperature limits range for integrated type analyzer is -20 to 55 °C.


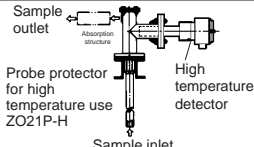
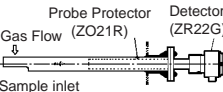
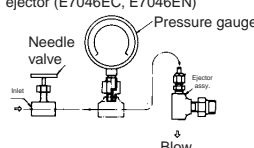

System Components

System Components		Separate type			Integrated type		
		System config.			System config.		
		Ex.1	Ex.2	Ex.3	Ex.1	Ex.2	Ex.3
1	Model ZR22G Separate type Zirconia Oxygen Analyzers/ High temperature Humidity Analyzers,Detector	●	●	●			
2	Model ZR402G Separate type Zirconia Oxygen / High temperature Humidity Analyzer, Converter(*1)	●	●	●			
3	Model ZR202G Integrated type Zirconia Oxygen Analyzers/ High temperature Humidity Analyzers				●	●	●
4	Model ZO21P Adapter for High temperature Probe of separate type Zirconia Oxygen Analyzer	○	○	○			
5	E7046EC, E7046EN Auxiliary Ejector for High temperature of separate type Oxygen Analyzer	○	○	○			
6	Model ZO21R Probe Protector for Zirconia Oxygen Analyzers	○	○	○	○	○	○
7	K9471UA Filter for Oxygen Analyzer	○	○	○	○	○	○
8	Model ZH21B Dust Protector for High temperature Humidity Analyzers	○	○	○	○	○	○
9	Model ZO21S Standard Gas Unit			●			●
10	Model ZA8F Flow setting unit for manual calibration		●			●	
11	Model ZR40H Automatic Calibration Unit for Separate type Analyzer (*2)	●					
12	Automatic Calibration Unit for Integrated type Analyzer (*2)				(●)		
13	L9852CB, K9471UN Stop Valve for Calibration-gas line		(●)	(●)		(●)	(●)
14	K9292DN,K9292DS Check Valve for Calibration-gas line	(●)	(●)			(●)	
15	G7011XF, E7040EL Air Set	●	●		●	●	
16	G7001ZC Zero-gas Cylinder	●	●		●	●	
17	G7013XF, G7014XF Pressure Regulator for Gas Cylinder	●	●		●	●	
18	E7044KF Case Assembly for Calibration-gas Cylinder	●	●		●	●	

- : Items required for the above system example
- : To be selected depending on each application. For details, refer to Chapter of Options.
- (*1): When used as a high temperature humidity analyzer, specify /HS options.
- (*2): Will be available in the near future.

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Detector Components

Process gas temperature 0 to 700 °C				Process gas temperature 0 to 1400 °C	
Mounting	Insertion length	General-use Probe	Application	High temperature detector	Application
Horizontal to vertical	0.4 to 2m		Boiler Heating furnace		Heating furnace
Vertical	2.5m				
Horizontal to vertical	3m or less		For pulverized coal boiler with gas flow velocity 10 m/s or more	Temperature: Probe material SUS310S 750 degC Probe material SiC 1400 degC Mounting: Vertical downwards Insertion length: 1.0m, 1.5m When duct pressure is atmospheric or negative, attach air ejector.	
Horizontal to vertical	0.4 to 2m	Detector(ZR22G)	Black liquid recovery boiler Cement Kiln		
Vertical	2.5m or more	Filter (K9471UA) + 			

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Application Example:

Separate and integrated type Zirconia Oxygen Analyzers

- Large, medium and small boilers (boilers for power generation: heavy oil, gas or coal)
 - Various industrial furnaces (refinery process/iron manufacture heating furnace, coal kiln, and black liquid recovery boilers)
- For other applications, contact Yokogawa Electric Corporation.

■ STANDARD SPECIFICATIONS (Oxygen Analyzer)

General Specifications

Oxygen Analyzer

Measurement Objects: Oxygen concentration in combustion exhaust gas and mixed gas (excluding inflammable gases)

Measurement System: Zirconia system

Measurement Range: 0.01 to 100 vol%O₂

Output Signal: 4 to 20 mA DC (maximum load resistance 550 Ω)

Oxygen Concentration: Any setting in the range of 0 to 5 through 0 to 100 vol%O₂ (in 1 vol%O₂), or partial range

Digital Communication (HART): 250 to 550 Ω, depending on quantity of field devices connected to the loop (multi-drop mode).

Note: HART is a registered trademark of the HART Communication Foundation.

Display Range: 0 to 100 vol%O₂

Warm-up Time: Approx. 20 min.

Repeatability: (Excluding the case where the reference air is by natural convection)
± 0.5% Maximum value of setted range. (less than 0 to 25 vol%O₂ range)
± 1 % Maximum value of setted range. (0 to 25 vol%O₂ or more and up to 0 to 100 vol%O₂ range)

Linearity: (Excluding standard gas tolerance)
(Excluding the case where the reference air is by natural convection)
± 1% Maximum value of setted range.; less than 0 to 25 vol%O₂ range
(Sample gas pressure: within ± 4.9 kPa)
± 3% Maximum value of setted range.; 0 to 25 vol%O₂ or more and less than 0 to 50 vol%O₂ range
(Sample gas pressure: within ± 0.49 kPa)
± 5% Maximum value of setted range.; 0 to 50 vol%O₂ or more and up to 0 to 100 vol%O₂ range
(Sample gas pressure: within ± 0.49 kPa)

Drift: (Excluding the first two weeks in use)
(Excluding the case where the reference air is by natural convection.)
both zero and span ± 2% Maximum value of setted range/month

Response Time: Response of 90% within 5 seconds.
(Measures after gas is introduced from calibration gas inlet and analog output start changing.)

1. ZR22G Separate type Zirconia Oxygen Analyzer/High temperature Humidity Analyzer

Oxygen Analyzer

For use in the range more than 0 to 25 vol%O₂ or more, mount the probe horizontal.

Sample Gas Temperature: 0 to 700 °C (Probe only)

It is necessary to mount the cell using Inconel cell-bolts when the temperature measures more than 600 °C.

700 to 1400 °C (with High Temperature Probe Adapter)

For high-temperature sample gas, apply 0.15m length probe and High temperature Probe Adapter ZO21P-H.

Sample Gas Pressure: - 5 to + 250 kPa (When the pressure in the furnace exceeds 3 kPa, it is recommended to compensate the pressure. When the pressure in the furnace exceeds 5 kPa, you must conduct pressure compensation.)

Probe Length: 0.15, 0.4, 0.7, 1.0, 1.5, 2.0, 2.5, 3.0, 3.6, 4.2, 4.8, 5.4 m

Probe Material: SUS 316

Ambient Temperature: -20 to +150 °C

Reference Air System: Natural Convection, Instrument Air, Pressure Compensation (other than the probe length 0.15m)

Instrument Air System (excluding Natural Convection): Pressure; 200 kPa + the pressure inside the furnace (It is recommended to use air which is dehumidified to dew point -20°C or less, and dust or oil mist are removed.)
Consumption; Approx. 1NI/min

Material in Contact with Gas: SUS 316, Zirconia, SUS 304 (flange), Hastelloy B, (Inconel 600, 601)

Construction: Heater and thermocouple replaceable construction. Non explosion-proof.
JIS C 0920, equivalent to NEMA 4X/IP 66 (recirculation to furnace with pressure compensation only)

Terminal Box Case: Material; Aluminium alloy

Terminal Box Paint Color: Case: Off-white (Munsell 0.6GY3.1/2.0)

Cover: Moss green (Munsell 2.5Y8.4/1.2)

Finish: Polyurethane corrosion-resistance coating

Gas Connection: Rc 1/4 or 1/4 FNPT

Wiring Connection: G1/2, Pg13.5, M20 by 1.5mm, 1/2 NPT

Installation: Flange mounting

Probe Mounting Angle: Horizontal to vertically downward.

When the probe insertion length is 2 m or less, installing at angles from horizontal to vertical downward is available.

When the probe insertion length is 2.5 or more, mount vertically downward (within ±5°), and if installing at angles from horizontal to vertical downward (within ±5°), use a probe protector.

When the probe insertion length exceeds 2.5 m, mount vertically downward (within ±5°) and use a probe protector.

Weight:

Insertion length of 0.4m: approx. 6 kg (JIS 5K-65) / approx. 11 kg (ANSI 150-4)

Insertion length of 1.0m: approx. 8 kg (JIS 5K-65) / approx. 13 kg (ANSI 150-4)

Insertion length of 1.5m: approx. 10 kg (JIS 5K-65) / approx. 15 kg (ANSI 150-4)
 Insertion length of 2.0m: approx. 12 kg (JIS 5K-65) / approx. 17 kg (ANSI 150-4)
 Insertion length of 3.0m: approx. 15 kg (JIS 5K-65) / approx. 20 kg (ANSI 150-4)
 Insertion length of 3.6m: approx. 17 kg (JIS 5K-65) / approx. 22 kg (ANSI 150-4)
 Insertion length of 4.2m: approx. 19 kg (JIS 5K-65) / approx. 24 kg (ANSI 150-4)
 Insertion length of 4.8m: approx. 21 kg (JIS 5K-65) / approx. 26 kg (ANSI 150-4)
 Insertion length of 5.4m: approx. 23 kg (JIS 5K-65) / approx. 28 kg (ANSI 150-4)

2. ZR402G Separate type Zirconia Oxygen Analyzer/High temperature Humidity Analyzer

Oxygen Analyzer

Operated using an LCD touchpanel on the converter.

Display: LCD display of size 320 by 240 dot with touchpanel.

Output Signal: 4 to 20 mA DC, two points (maximum load resistance 550 Ω)

Contact Output Signal: four points (one is fail-safe, normally open)

Contact Input: two points

Auto-calibration Output: Two points (for dedicated auto-calibration unit)

Ambient Temperature: -20 to +55 °C

Storage Temperature: -30 to +70 °C

Humidity Range: 10 to 95 %RH

Installation Altitude: 2000m or less

Category based on IEC 1010: II (Note)

Pollution degree based on IEC 1010: 2 (Note)

Note: Installation category, called over-voltage category, specifies impulse withstand voltage. Category II is for electrical equipment.

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

Power Supply Voltage: Ratings; 100 to 240 V AC
 Acceptable range; 85 to 264 V AC

Power Supply Frequency: Ratings; 50/60 Hz
 Acceptable range; 45 to 66 Hz

Power Consumption: Max. 300 W, approx. 100 W for ordinary use.

Safety and EMC conforming standards

Safety: Conforms to EN 61010-1: 1993
 CSA C22.2 No.1010-1 certified
 UL 3111-1 under application

EMC: Conforms to EN 61326: 1998

Maximum Distance between Probe and Converter:
 Conductor two-way resistance must be 10 Ω or less (when a 1.25 mm² cable or equivalent is used, 300 m or less.)

Construction: Outdoor installation, JIS C 0920, equivalent to NEMA 4 (with conduit holes completely sealed with a cable gland)

Wiring Connection: G1/2, Pg13.5, M20 by 1.5mm, 1/2 NPT, eight holes

Installation: Panel, wall or 2-inch pipe mounting

Case: Aluminum alloy

Paint Color: Door: Moss green (Munsell 0.6GY3.1/2.0)

Case: Off white (Munsell 2.5Y8.4/1.2)

Finish: Polyurethane corrosion-resistance coating

Weight: Approx. 6 kg

Functions

Display Functions:

Value Display; Displays values of the measured oxygen concentration, etc

Graph Display; Displays trends of measured oxygen concentration

Data Display; Displays various useful data for maintenance, such as cell temperature, reference junction temperature, maximum/minimum oxygen concentration, or the like

Status Message; Indicates an alarm or error occurrence with flashing of the corresponding icon. Indicates status such as warming-up, calibrating, or the like by the marks.

Alarm, Error Display; Displays alarms such as "Abnormal oxygen concentration" or errors such as "Abnormal cell e.m.f." when any such status occurs.

Calibration Functions:

Auto-Calibration; Requires the Auto-calibration Unit. It calibrates automatically at specified intervals.

Semi-auto Calibration; Requires the Auto-calibration Unit. Input calibration direction on the touchpanel or contact, then it calibrates automatically afterwards.

Manual Calibration; Calibration with opening/closing the valve of calibration gas in operation interactively with an LCD panel.

Blowback Function:

Output through the contact in the set period and time. Auto/semi-auto selectable.

Maintenance Functions:

Can operate updated data settings in daily operation and checking. Display data settings, calibration data settings, blowback data settings, current output loop check, input/output contact check.

Setup Functions:

Initial settings suit for the plant conditions when installing the converter. Equipment settings, current output data settings, alarm data settings, contact data settings, other settings.

Self-diagnosis:

This function diagnoses conditions of the converter or the probe and indicates when any abnormal condition occurs.

Password Functions:

Enter your password to operate the analyzer excepting data display. Individual passwords can be set for maintenance and setup.

Display and setting content:

Measuring related items: Oxygen concentration (vol%O₂), Output current value (mA), air

- ratio, moisture quantity (in hot gases) (vol% H_2O)
- Display Items: Cell temperature ($^{\circ}C$), thermocouple reference junction temperature ($^{\circ}C$), maximum/minimum/average oxygen concentration (vol% O_2), cell e.m.f. (mV), cell internal resistance (Ω), cell condition (in four grades), heater on-time rate (%), calibration record (ten times), time (year/month/day, hour/minute)
- Calibration Setting Items: Span gas concentration (vol% O_2), zero-gas concentration (vol% O_2), calibration mode (auto, semi-auto, manual), calibration type and method (zero-span calibration, zero calibration only, span calibration only), stabilization time (min.sec), calibration time (min.sec), calibration period (day/hour), starting time (year/month/day, hour/minute)
- Equipment Related Items: Measuring gas selection
- Output Related Items: Analog output/output mode selection, output conditions when warming-up/maintenance/calibrating (during blowback)/abnormal, 4mA/20mA point oxygen concentration (vol% O_2), time constant, preset values when warming-up/maintenance/calibrating during blowback abnormal, output preset values on abnormal
- Alarm Related Items: Oxygen concentration high-alarm/high-high alarm limit values (vol% O_2), Oxygen concentration low-alarm/low-low alarm limit values (vol% O_2), Oxygen concentration alarm hysteresis (vol% O_2), Oxygen concentration alarm detection, alarm delay (seconds)
- Contact Related Items: Selection of contact input 1 and 2, selection of contact output 1 to 4 (abnormal, high-high alarm, high-alarm, low-alarm, low-low alarm, maintenance, calibrating, range switching, warming-up, calibration-gas pressure decrease, temperature high-alarm, blowback, flameout gas detection)
- Converter Output: Two points mA analog output (4 to 20 mA DC (maximum load resistance of 550 Ω)) and one mA digital output point (HART) (minimum load resistance of 250 Ω).
Range: any setting between 0 to 5 through 0 to 100 vol% O_2 in 1vol% O_2 , or partial range is available (Maximum range value/minimum range value 1.3 or more)
For the log output, the minimum range value is fixed at 0.1 vol% O_2 .
4 to 20 mA DC linear or log can be selected.
Input/output isolation
Output damping: 0 to 255 seconds.
Hold/non-hold selection, preset value setting possible with hold
- Contact Output: Four points, contact capacity 30V DC 3A, 250V AC 3A (resistive load)
Three of the output points can be selected to either normally energized or normally de-energized status.
Delayed functions (0 to 255 seconds) and hysteresis function (0 to 9.9 vol% O_2 can be added to high/low alarms.
The following functions are programmable for contact outputs.
(1) Abnormal, (2) High-high alarm, (3) High-alarm, (4) Low-low alarm, (5) Low-alarm, (6) Maintenance, (7) Calibration, (8) Range switching answer-back, (9) Warm-up, (10) Calibration-gas pressure decrease (answer-back of contact input), (11) Temperature high-alarm, (12) Blowback start, (13) Flameout gas detection (answerback of contact input)
- Contact Input: Two points, voltage-free contacts
The following functions are programmable for contact inputs:
(1) Calibration-gas pressure decrease alarm, (2) Range switching, (3) External calibration start, (4) Process alarm (if this signal is received, the heater power turns off), (5) Blow-back start
- Contact capacity: Off-state leakage current: 3 mA or less
Self-diagnosis: Abnormal cell, abnormal cell temperature (low/high), abnormal calibration, defective A/D converter, defective digital circuit
- Calibration: Method; zero/span calibration
Calibration mode; automatic, semi-automatic and manual (All are operated interactively with an LCD touchpanel). Either zero or span can be skipped.
Zero calibration-gas concentration setting range: 0.3 to 100 vol% O_2 (0.01 vol% O_2 in smallest units).
Span calibration-gas concentration setting range: 4.5 to 100 vol% O_2 (0.01 vol% O_2 in smallest units).
Use nitrogen-balanced mixed gas containing 10 vol% O_2 scale of oxygen, and 80 to 100 vol% O_2 scale of oxygen for standard zero-gas and standard span-gas respectively.
Calibration period; date/time setting: maximum 255 days
- ### 3. ZR202G Integrated type Zirconia Oxygen Analyzer/ High temperature Humidity Analyzer
- Oxygen Analyzer
Can be operated in the field without opening the cover using optical switches. For use in the range 0 to 25 vol% O_2 or more, mount the probe horizontal.
- Display: 6-digit LCD
Switch: Three optical switches
Output Signal: 4 to 20 mA DC, one point (maximum load resistance 550 Ω)
Digital Communication (HART): 250 to 550 Ω , depending on quantity of field devices connected to the loop (multi-drop mode).
Note: HART is a registered trademark of the HART Communication Foundation.
Contact Output Signal: Two points (one is fail-safe, normally open)

Contact Input Signal: Two points

Sample Gas Temperature: 0 to 700 °C

It is necessary to mount the cell using Inconel cell-bolts when the temperature measures more than 600 °C.

High-temperature service -greater than 700 °C- is not available.

Sample Gas Pressure: - 5 to + 250 kPa (When the pressure in the furnace exceeds 3 kPa, it is recommended to compensate the pressure. When the pressure in the furnace exceeds 5 kPa, you must conduct pressure compensation.)

Probe Length: (Refer to "Model Code".)

Probe Material: SUS 316

Ambient Temperature: -20 to +55 °C (- 5 to +70 °C on the case surface)

Storage Temperature: -30 to +70 °C

Humidity Range: 10 to 95 %RH

Installation Altitude: 2000 m or less

Category based on IEC 1010: II (Note)

Pollution degree based on IEC 1010: 2 (Note)

Note: Installation category, called over-voltage category, specifies impulse withstand voltage. Category II is for electrical equipment.

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

Power Supply Voltage: Ratings; 100 to 240 V AC
Acceptable range; 85 to 264 V AC

Power Supply Frequency: Ratings; 50/60 Hz
Acceptable range; 45 to 66 Hz

Power Consumption: Max. 300 W, approx. 100 W for ordinary use.

Safety and EMC conforming standards

Safety: Conforms to EN 61010-1: 1993
CSA C22.2 No.1010-1 certified
UL 3111-1 under application

EMC: Conforms to EN 61326: 1998

Reference Air System: Natural Convection, Instrument Air, Pressure Compensation

Instrument Air System (excluding Natural Convection):
Pressure; 200 kPa + the pressure inside the furnace (It is recommended to use air which is dehumidified to dew point -20°C or less, and dust or oil mist are removed.)
Consumption; Approx. 1Nl/min

Material in Contact with Gas: SUS 316, Zirconia, SUS 304 (flange), Hastelloy B, (Inconel 600, 601)

Construction: Heater and thermocouple replaceable construction. Non explosion-proof.
JIS C 0920 equivalent to NEMA 4X/IP 66 (recirculation to furnace with pressure compensation only)

Gas Connection: Rc 1/4 or 1/4 FNPT

Wiring Connection: G1/2, Pg13.5, M20 by 1.5mm, 1/2 NPT select one type (4 pieces)

Installation: Flange mounting

Probe Mounting Angle:

Horizontal to vertically downward.
When the probe insertion length is 2 m or less, installing at angles from horizontal to

vertical downward is available.

When the probe insertion length is 2.5 or more, mount vertically downward (within $\pm 5^\circ$), and if installing at angles from horizontal to vertical downward (within $\pm 5^\circ$), use a probe protector.

When the probe insertion length exceeds 2.5 m, mount vertically downward (within $\pm 5^\circ$) and use a probe protector.

Case: Aluminum alloy

Paint Color: Cover; Moss green (Munsell 0.6GY3.1/2.0)

Case: Off white (Munsell 2.5Y8.4/1.2)

Finish: Polyurethane corrosion-resistance coating

Weight:

Insertion length of 0.4m: approx. 8 kg (JIS 5K-65) / approx. 13 kg (ANSI 150-4)

Insertion length of 1.0m: approx. 10 kg (JIS 5K-65) / approx. 15 kg (ANSI 150-4)

Insertion length of 1.5m: approx. 12 kg (JIS 5K-65) / approx. 17 kg (ANSI 150-4)

Insertion length of 2.0m: approx. 14 kg (JIS 5K-65) / approx. 19 kg (ANSI 150-4)

Insertion length of 3.0m: approx. 17 kg (JIS 5K-65) / approx. 22 kg (ANSI 150-4)

Functions

Display Function: Displays values of the measured oxygen concentration, etc

Alarm, Error Display: Displays alarms such as "Abnormal oxygen concentration" or errors such as "Abnormal cell e.m.f." when any such status occurs.

Calibration Functions:

Auto-calibration; Requires the Auto-calibration Unit. It calibrates automatically at specified intervals.

Semi-auto Calibration; Requires the Auto-calibration Unit. Input calibration direction on the optical switch or contact, then it calibrates automatically afterwards.

Manual Calibration; Calibration with opening/closing the valve of calibration gas in operation interactively with the optical switch.

Maintenance Functions:

Can operate updated data settings in daily operation and checking. Display data settings, calibration data settings, test settings (current output loop check, input/output contact check).

Setup Functions:

Initial settings suit for the plant conditions when installing the converter. Current output data settings, alarm data settings, contact data settings, other settings.

Display and setting content:

Display Related Items: Oxygen concentration (vol%O₂), Output current value (mA), air ratio, moisture quantity (in hot gases) (vol%H₂O), Cell temperature (°C), thermocouple reference junction temperature (°C), maximum/minimum/average oxygen concentration (vol%O₂), cell e.m.f. (mV), cell internal resistance (Ω), cell

condition (in four grades), heater on-time rate (%), calibration record (ten times), time (year/month/day/hour/minute)

Calibration Setting Items: Span gas concentration (vol%O₂), zero-gas concentration (vol%O₂), calibration mode (auto, semi-auto, manual), calibration type and method (zero-span calibration, zero calibration only, span calibration only), stabilization time (min.sec), calibration time (min.sec), calibration period (day/hour), starting time (year/month/day/hour/minute)

Output Related Items: Analog output/output mode selection, output conditions when warming-up/maintenance/calibrating/abnormal, 4mA/20mA point oxygen concentration (vol%O₂), time constant, preset values when warming-up/maintenance/calibrating/abnormal, output preset values on abnormal

Alarm Related Items: Oxygen concentration high-alarm/high-high alarm limit values (vol%O₂), Oxygen concentration low-alarm/low-low alarm limit values (vol%O₂), Oxygen concentration alarm hysteresis (vol%O₂), Oxygen concentration alarm detection, alarm delay (seconds)

Contact Related Items: Selection of contact input 1 and 2, selection of contact output 1 and 2 (abnormal, high-high alarm, high-alarm, low-alarm, low-low alarm, maintenance, calibrating, range switching, warming-up, calibration-gas pressure decrease, flameout gas detection (answerback of contact input))

Converter Output: One mA analog output point (4 to 20 mA DC (maximum load resistance of 550 Ω)) with mA digital output point (HART) (minimum load resistance of 250 Ω). Range: any setting between 0 to 5 through 0 to 100 vol%O₂ in 1vol%O₂, and partial range is available (Maximum range value/ minimum range value 1.3 or more) For the log output, the minimum range value is fixed at 0.1 vol%O₂. 4 to 20 mA DC linear or log can be selected.
Input/output isolation
Output damping: 0 to 255 seconds.
Hold/non-hold selection, preset value setting possible with hold.

Contact Output: Two points, contact capacity 30V DC 3A, 250V AC 3A (resistive load)
One of the output points can be selected to either normally energized or normally de-energized status.
Delayed functions (0 to 255 seconds) and hysteresis function (0 to 9.9 vol%O₂) can be added to high/low-alarms.
The following functions are programmable for contact outputs.
(1) Abnormal, (2) High-high alarm, (3)

High-alarm, (4) Low-low alarm, (5) Low-alarm, (6) Maintenance, (7) Calibration, (8) Range switching answer-back, (9) Warm-up, (10) Calibration-gas pressure decrease (answerback of contact input), (11) Flameout gas detection (answerback of contact input).

Contact Input: Two points, voltage-free contacts
The following functions are programmable for contact inputs:

(1) Calibration-gas pressure decrease alarm, (2) Range switching, (3) External calibration start, (4) Process alarm (if this signal is received, the heater power turns off)

Self-diagnosis: Abnormal cell, abnormal cell temperature (low/high), abnormal calibration, A/D converter abnormal, digital circuit abnormal

Calibration: Method; zero/span calibration
Calibration mode; automatic, semi-automatic and manual (All are operated using optical switches). Either zero or span can be skipped.

Zero-calibration gas concentration setting range: 0.3 to 100 vol%O₂ (in 0.01 vol%O₂).
Span-calibration gas concentration setting range: 4.5 to 100 vol%O₂ (in 0.01 vol%O₂).
Use nitrogen-balanced mixed gas containing 10 vol%O₂ scale of oxygen for standard zero-gas, and 80 to 100 vol%O₂ scale of oxygen for standard span-gas.
Calibration period; date/time setting: maximum 255 days

■ STANDARD SPECIFICATIONS (High temperature Humidity Analyzer)

Examples of Application

Separate/Integrated type Zirconia High temperature Humidity Analyzer

- Coloring processes in the textile industry
- Steam curing processes for concrete products
- Manufacturing processes in the cigarette, food, paper or pulp industries
- Drying processes in various manufacturing of building materials, lumber, plasterboard, food or the like
- Humidifying processes in various manufacturing of food or the like

Please contact us for other applications.

General Specifications

High temperature Humidity Analyzer

Measurement Objects: Water vapor (in vol%) in mixed gases (air and water vapor)

Measurement System: Zirconia system

Measurement Range: 0.01 to 100 vol%O₂, 0 to 100 vol%H₂O or 0 to 1.000 kg/kg

Output Signal: 4 to 20 mA DC (maximum load resistance 550 Ω)

- Oxygen concentration; Any setting in the range of 0 to 5 through 0 to 100 vol%O₂ (in 1 vol%O₂), or partial range.
 Moisture quantity; 0 to 25 through 0 to 100 vol%H₂O (in 1 vol%H₂O), or partial range.
 Mixture ratio 0 to 0.2 through 0 to 1.000 kg/kg (in 0.001 kg/kg), or partial range.
- Digital Communication (HART): 250 to 550 Ω, depending on quantity of field devices connected to the loop (multi-drop mode).
 Note: HART is a registered trademark of the HART Communication Foundation.
- Display Range: Oxygen concentration 0 to 100 vol%O₂, Moisture quantity 0 to 100 vol%H₂O, Mixture ratio 0 to 1 kg/kg, Relative humidity 0 to 100 %RH, Dew point -40 to 370 °C
- Warm-up Time: Approx. 20 min.
- Repeatability: (Excluding the case where the reference air is by natural convection.)
 ± 1 vol%H₂O (sample gas pressure 2 kPa or less)
- Linearity: (Excluding standard gas tolerance) (Excluding the case where the reference air is by natural convection.)
 ± 2 vol%H₂O; (Sample gas pressure: within ± 0.49 kPa)
 ± 3 vol%H₂O; (Sample gas pressure: 2 kPa or less)
- Drift: (Excluding the first two weeks in use) (Excluding the case where the reference air is by natural convection.)
 both zero and span ± 3 vol%H₂O/month
- Response Time: Response of 90 % within 5 seconds. (Measures after gas is introduced from calibration-gas inlet and analog output start changing.)
1. ZR22G Separate type Zirconia Oxygen Analyzer/ High temperature Humidity Analyzer
 High temperature Humidity Analyzer
 Sample Gas Temperature: 0 to 700 °C (Probe only)
 It is recommended to mount the cell using Inconel cell-bolts when the temperature measures more than 600 °C.
 Sample Gas Pressure: - 5 to + 20 kPa
 Probe Length: 0.4, 0.7, 1.0, 1.5, 2.0, 2.5, 3.0 m
 Probe Material: SUS 316
 Ambient Temperature: -20 to +150 °C
 Reference Air System: Natural Convection, Instrument Air
 Instrument Air System (excluding Natural Convection):
 Pressure; 200 kPa + the pressure inside the furnace, (It is recommended to use air which is dehumidified to dew point - 20 °C or less, and dust or oil mist are removed.)
 Consumption; Approx. 1Nl/min
 Material in Contact with Gas: SUS 316, Zirconia, SUS 304 (flange), Hastelloy B, (Inconel 600, 601)
 Construction: Heater and thermocouple replaceable construction. Non explosion-proof JIS C0920 / IP44 or equivalent.
 Terminal Box Case: Material; Aluminium alloy
 Gas Connection: Rc 1/4 or 1/4 FNPT
 Wiring Connection: G1/2, Pg13.5, M20 by 1.5mm, 1/2 NPT
 Installation: Flange mounting
 Probe Mounting Angle: Horizontal to vertically downward.
 When the probe insertion length is 2 m or less, installing at angles from horizontal to vertical downward is available.
 When the probe insertion length exceeds 2.5 m, mount vertically downward (within ±5°) and use a probe protector.
- Weight:
 Insertion length of 0.4m: approx. 6 kg (JIS 5K-65) / approx. 11 kg (ANSI 150-4)
 Insertion length of 1.0m: approx. 8 kg (JIS 5K-65) / approx. 13 kg (ANSI 150-4)
 Insertion length of 1.5m: approx. 10 kg (JIS 5K-65) / approx. 15 kg (ANSI 150-4)
 Insertion length of 2.0m: approx. 12 kg (JIS 5K-65) / approx. 17 kg (ANSI 150-4)
 Insertion length of 3.0m: approx. 15 kg (JIS 5K-65) / approx. 20 kg (ANSI 150-4)
2. ZR402G Separate type Zirconia Oxygen Analyzer/ High temperature Humidity Analyzer
 High temperature Humidity Analyzer
 Operated using an LCD touchpanel on the converter.
 Display: LCD display of size 320 by 240 dot with touchpanel.
 Output Signal: 4 to 20 mA DC, two points (maximum load resistance 550 Ω)
 Contact Output Signal: four points (one is fail-safe, normally open)
 Contact Input: two points
 Analog Input: one point (thermal input 4-20 mA)
 Auto-calibration Output: Two points (for dedicated auto-calibration unit)
 Ambient Temperature: -20 to +55 °C
 Storage Temperature: -30 to +70 °C
 Humidity Range: 10 to 95 %RH
 Installation Altitude: 2000 m or less
 Category based on IEC 1010: II (Note)
 Pollution degree based on IEC 1010: 2 (Note)
 Note: Installation category, called over-voltage category, specifies impulse withstand voltage. Category II is for electrical equipment.
 Pollution degree indicates the degree of existence of solid, liquid, gas or other inclusions which may reduce dielectric strength. Degree 2 is the normal indoor environment.
 Power Supply Voltage: Ratings; 100 to 240 V AC
 Acceptable range; 85 to 264 V AC
 Power Supply Frequency: Ratings; 50/60 Hz
 Acceptable range; 45 to 66 Hz
 Power Consumption: Max. 300 W, approx. 100 W for ordinary use.
 Safety and EMC conforming standards
 Safety: Conforms to EN 61010-1: 1993
 CSA C22.2 No.1010-1 certified
 UL 3111-1 under application

EMC: Conforms to EN 61326: 1998
 Maximum Distance between Probe and Converter:
 Conductor two-way resistance must be 10 Ω
 or less (when a 1.25 mm² cable or equivalent is used, 300 m or less.)
 Construction: Outdoor installation, JIS C 0920 NEMA4
 or equivalent (with conduit holes completely sealed with a plastic cable gland optional)
 Wiring Connection: G1/2, Pg13.5, M20 by 1.5mm, 1/2 NPT, eight holes
 Installation: Panel, wall or pipe mounting
 Case: Aluminum alloy
 Paint Color: Door: Moss green (Munsell 0.6GY3.1/2.0)
 Case: Off white (Munsell 2.5Y8.4/1.2)
 Finish: Polyurethane corrosion-resistance coating
 Weight: Approx. 6 kg

Functions

Display Functions:

- Value Display; Displays values of the measured Oxygen concentration, moisture quantity, mixture ratio etc
- Graph Display; Displays trends of measured oxygen concentration, moisture quantity, mixture ratio etc.
- Data Display; Displays various useful data for maintenance, such as cell temperature, reference junction temperature, maximum/minimum moisture quantity, or the like.
- Status Message; Indicates an alarm or error occurrence with flashing of the corresponding icon.
Indicates status such as warming-up, calibrating, or the like by the marks.

Alarm, Error Display: Displays alarms such as "Abnormal moisture quantity" or errors such as "Abnormal cell e.m.f." when any such status occurs.

Calibration Functions:

- Auto-Calibration; Requires the Auto-calibration Unit. It calibrates automatically at specified intervals.
- Semi-auto Calibration; Requires the Auto-calibration Unit. Input calibration direction on the touchpanel or contact, then it calibrates automatically afterwards.
- Manual Calibration; Calibration with opening/closing the valve of calibration gas in operation interactively with an LCD panel.

Blowback Function:

Output through the contact in the set period and time. Auto/semi-auto selectable.

Maintenance Functions:

Can operate updated data settings in daily operation and checking. Display data settings, calibration data settings, blowback data settings, current output loop check, input/output contact check.

Setup Functions:

Initial settings suit for the plant conditions

when installing the converter. Equipment settings, current output data settings, alarm data settings, contact data settings, other settings.

Self-diagnosis:

This function diagnoses conditions of the converter or the probe and indicates when any abnormal condition occurs.

Password Functions:

Enter your password to operate the analyzer excepting data display. Individual passwords can be set for maintenance and setup.

Display and setting content:

Measuring Related items: Oxygen concentration (vol%O₂), moisture quantity (vol%H₂O), mixture ratio (kg/kg), relative humidity (%RH) and dew point (°C)

Display Related Items: Oxygen concentration (vol%O₂), Moisture quantity (vol%H₂O), mixture ratio (kg/kg), relative humidity (%RH), dew point (°C), cell temperature (°C), thermocouple reference junction temperature (°C), maximum/minimum/average oxygen concentration (vol%O₂), maximum/minimum/average moisture quantity (vol%H₂O), maximum/minimum/average mixture ratio (kg/kg), cell e.m.f. (mV), output 1, 2 current (mA), cell response time (seconds), cell internal resistance (Ω), cell condition (in four grades), heater on-time rate (%), calibration record (ten times), time (year/month/day/hour/minute)

Calibration Setting Items: Span gas concentration (vol%O₂), zero gas concentration (vol%O₂), calibration mode (auto, semi-auto, manual), calibration type and method (zero-span calibration, zero calibration only, span calibration only), stabilization time (min.sec), calibration time (min.sec), calibration period (day/hour), starting time (year/month/day/hour/minute)

Output Related Items: Analog output/output mode selection, output conditions when warming-up/maintenance/calibrating/abnormal, oxygen concentration at 4mA/20mA (vol%O₂), moisture quantity at 4mA/20mA (vol%H₂O), mixture ratio at 4mA/20mA (kg/kg), time constant, preset values when warming-up/maintenance/calibrating/abnormal

Alarm Related Items: Oxygen concentration high-alarm/high-high alarm limit values (vol%O₂), Oxygen concentration low-alarm/low-low alarm limit values (vol%O₂), Moisture quantity high-alarm/high-high alarm limit values (vol%H₂O), moisture quantity low-alarm/low-low alarm limit values (vol%H₂O), mixture ratio high-alarm/high-high alarm limit value (kg/kg), mixture ratio low-alarm/low-low alarm limit values (kg/kg), oxygen concentration alarm hysteresis (vol%O₂), moisture quantity alarm hysteresis

- (vol% H_2O), mixture ratio alarm hysteresis (kg/kg), oxygen concentration/moisture quantity/mixture ratio alarm detection, alarm delay (seconds).
- Contact Related Items: Selection of contact input 1 and 2, selection of contact output 1 to 4 (abnormal, high-high alarm, high-alarm, low-alarm, low-low alarm, maintenance, calibrating, range switching, warming-up, calibration-gas pressure decrease, temperature high-alarm)
- Converter Output: Two points mA analog output (4 to 20 mA DC (maximum load resistance of 550 Ω) and one of two mA digital output points (HART) (minimum load resistance of 250 Ω). Range: any setting between 0 to 5 through 0 to 100 vol% O_2 , 0 to 25 through 0 to 100 vol% H_2O , 0 to 0.200 through 0 to 1.000 kg/kg or partial range is available. For the log output, the minimum range values are fixed to 0.1 vol% O_2 for the oxygen concentration, 0.1 vol% H_2O for the moisture quantity, and 0.01 kg/kg for the mixture ratio. 4 to 20 mA DC linear or log can be selected. Input/output isolation. Output damping: 0 to 255 seconds. Hold/non-hold selection, preset value setting possible with hold.
- Contact Output: Four points, contact capacity 30V DC 3A, 250V AC 3A (resistive load). Three of the output points can be selected to either normally energized or normally de-energized status. Delayed functions (0 to 255 seconds) and hysteresis function (0 to 9.9 vol% O_2 can be added to high/low-alarms. The following functions are programmable for contact outputs. (1) Abnormal, (2) High-high alarm, (3) High-alarm, (4) Low-low alarm, (5) Low-alarm, (6) Maintenance, (7) Calibration, (8) Range switching answer-back, (9) Warm-up, (10) Calibration-gas pressure decrease (answerback of contact input), (11) Temperature high-alarm, (12) Blowback start, (13) Flameout gas detection (answerback of contact input)
- Converter Input: Thermal input one point (4 to 20 mA DC)
- Contact Input: Two points, voltage-free contacts. The following functions are programmable for contact inputs: (1) Calibration-gas pressure decrease alarm, (2) Range switching, (3) External calibration start, (4) Process alarm (if this signal is received, the heater power turns off), (5) Blowback start
- Contact capacity: Off-state leakage current: 3 mA or less
- Self-diagnosis: Abnormal cell, abnormal cell temperature (low/high), abnormal calibration, defective A/D converter, defective digital circuit
- Calibration: Method; zero/span calibration
- Calibration mode; automatic, semi-automatic and manual (All are operated interactively with an LCD touchpanel). Either zero or span can be skipped.
- Zero calibration-gas concentration setting range: 0.3 to 100 vol% O_2 (minimum in 0.01 vol%).
- Span calibration-gas concentration setting range: 4.5 to 100 vol% O_2 (minimum in 0.01 vol%).
- Use nitrogen-balanced mixed gas containing 10% scale of oxygen for standard zero-gas, and 80 to 100 % scale of oxygen for standard span-gas.
- Calibration period; date/time setting: maximum 255 days
3. ZR202G Integrated type Zirconia Oxygen Analyzer/ High temperature Humidity Analyzer
- High temperature Humidity Analyzer
- Can be operated in the field without opening the cover using optical switches.
- Display: 6-digit LCD
- Switch: Three optical switches
- Output Signal: 4 to 20 mA DC, one point (maximum load resistance 550 Ω)
- Digital Communication (HART): 250 to 550 Ω , depending on quantity of field devices connected to the loop (multi-drop mode).
- Note: HART is a registered trademark of the HART Communication Foundation.
- Contact Output Signal: Two points (one is fail-safe, normally open)
- Contact Input Signal: Two points
- Sample Gas Temperature: 0 to 700 $^{\circ}C$
It is recommended to mount the cell using Inconel cell-bolts when the temperature measures more than 600 $^{\circ}C$.
- Sample Gas Pressure: - 5 to + 20 kPa
- Probe Length: (Refer to "Model Code".)
- Probe Material: SUS 316
- Ambient Temperature: -20 to +55 $^{\circ}C$ (- 5 to +70 $^{\circ}C$ on the case surface)
- Storage Temperature: -30 to +70 $^{\circ}C$
- Humidity Range: 10 to 95 %RH
- Installation Altitude: 2000 m or less
- Category based on IEC 1010: II (Note)
- Pollution degree based on IEC 1010: 2 (Note)
- Note: Installation category, called over-voltage category, specifies impulse withstand voltage. Category II is for electrical equipment. Pollution degree indicates the degree of existence of solid, liquid, gas or other inclusions which may reduce dielectric strength. Degree 2 is the normal indoor environment.
- Power Supply Voltage: Ratings; 100 to 240 V AC
Acceptable range; 85 to 264 V AC
- Power Supply Frequency: Ratings; 50/60 Hz
Acceptable range; 45 to 66 Hz
- Power Consumption: Max. 300 W, approx. 100 W for ordinary use.
- Safety and EMC conforming standards
- Safety: Conforms to EN 61010-1: 1993

<p>CSA C22.2 No.1010-1 certified UL 3111-1 under application</p> <p>EMC: Conforms to EN 61326: 1998</p> <p>Reference Air System: Natural Convection, Instrument Air, Instrument Air System (excluding Natural Convection): Pressure; 200 kPa + the pressure inside the furnace (It is recommended to use air which is dehumidified to dew point -20°C or less, and dust or oil mist are removed.)</p> <p>Consumption; Approx. 1Nl/min</p> <p>Material in Contact with Gas: SUS 316, Zirconia, SUS 304 (flange), Hastelloy B, (Inconel 600, 601)</p> <p>Construction: Heater and thermocouple replaceable construction. Non explosion-proof JIS C0920 / equivalent to IP44D.</p> <p>Gas Connection: Rc 1/4 or 1/4 FNPT</p> <p>Wiring Connection: G1/2, Pg13.5, M20 by 1.5mm, 1/2 NPT select one type (4 pieces)</p> <p>Installation: Flange mounting</p> <p>Probe Mounting Angle: Horizontal to vertically downward. When the probe insertion length is 2 m or less, installing at angles from horizontal to vertical downward is available. When the probe insertion length is 2.5 or more, mount vertically downward (within ±5°), and if installing at angles from horizontal to vertical downward (within ±5°), use a probe protector. When the probe insertion length exceeds 2.5 m, mount vertically downward (within ±5°) and use a probe protector.</p> <p>Case: Aluminum alloy</p> <p>Paint Color: Cover; Moss green (Munsell 0.6GY3.1/2.0) Case: Off white (Munsell 2.5Y8.4/1.2)</p> <p>Finish: Polyurethane corrosion-resistance coating</p> <p>Weight: Insertion length of 0.4m: approx. 8 kg (JIS 5K-65) / approx. 13 kg (ANSI 150-4)</p> <p>Insertion length of 1.0m: approx. 10 kg (JIS 5K-65) / approx. 15 kg (ANSI 150-4)</p> <p>Insertion length of 1.5m: approx. 12 kg (JIS 5K-65) / approx. 17 kg (ANSI 150-4)</p> <p>Insertion length of 2.0m: approx. 14 kg (JIS 5K-65) / approx. 19 kg (ANSI 150-4)</p> <p>Insertion length of 3.0m: approx. 17 kg (JIS 5K-65) / approx. 22 kg (ANSI 150-4)</p> <p>Functions</p> <p>Display Function: Displays values of the measured oxygen concentration, moisture quantity, mixture ratio etc</p> <p>Alarm, Error Display: Displays alarms such as "Abnormal moisture quantity" or errors such as "Abnormal cell e.m.f." when any such status occurs.</p> <p>Calibration Functions:</p> <p>Auto-calibration; Requires the Auto-calibration Unit. It calibrates automatically at specified intervals.</p> <p>Semi-auto Calibration; Requires the Auto-calibration Unit. Input calibration direction on the</p>	<p>optical switch or contact, then it calibrates automatically afterwards.</p> <p>Manual Calibration; Calibration with opening/closing the valve of calibration gas in operation interactively with the optical switch.</p> <p>Maintenance Functions: Can operate updated data settings in daily operation and checking. Display data settings, calibration data settings, test settings (current output loop check, input/output contact check).</p> <p>Setup Functions: Initial settings suit for the plant conditions when installing the converter. Current output data settings, alarm data settings, contact data settings, other settings.</p> <p>Display and setting content: Display Related Items: Oxygen concentration (vol%O₂), Moisture quantity (vol%H₂O), mixture ratio(kg/kg), relative humidity(%RH), dew point (°C), cell temperature (°C), thermocouple reference junction temperature (°C), maximum/minimum/average oxygen concentration (vol%O₂), maximum/minimum/average moisture quantity (vol%H₂O), maximum/minimum/average mixture ratio (kg/kg), cell e.m.f. (mV), output 1, 2 current (mA), cell response time (seconds), cell internal resistance (Ω), cell condition (in four grades), heater on-time rate (%), calibration record (ten times), time (year/month/day/hour/minute)</p> <p>Calibration Setting Items: Span gas concentration (vol%O₂), zero-gas concentration (vol%O₂), calibration mode (auto, semi-auto, manual), calibration type and method (zero-span calibration, zero calibration only, span calibration only), stabilization time (min.sec), calibration time (min.sec), calibration period (day/hour), starting time (year/month/day/hour/minute)</p> <p>Output Related Items: Analog output/output mode selection, output conditions when warming-up/maintenance/calibrating/abnormal, oxygen concentration at 4mA/ 20mA (vol%O₂), moisture quantity at 4mA/ 20mA (vol%H₂O), mixture ratio at 4mA/ 20mA (kg/kg), time constant, preset values when warming-up/maintenance/calibrating/abnormal, output preset values on abnormal</p> <p>Alarm Related Items: Oxygen concentration high-alarm/high-high alarm limit values (vol%O₂), Oxygen concentration low-alarm/low-low alarm limit values (vol%O₂), Moisture quantity high-alarm/high-high alarm limit values (vol%H₂O), moisture quantity low-alarm/low-low alarm limit values (vol%H₂O), mixture ratio high-alarm/high-high alarm limit values (kg/kg), mixture ratio low-alarm/low-low alarm limit values (kg/kg), oxygen concentration alarm hysteresis (vol%O₂),</p>
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moisture quantity alarm hysteresis (vol% H_2O), mixture ratio alarm hysteresis (kg/kg), oxygen concentration/moisture quantity/ mixture ratio detection, alarm delay (seconds)

Contact Related Items: Selection of contact input 1 and 2, selection of contact output 1 and 2 (abnormal, high-high alarm, high-alarm, low-alarm, low-low alarm, maintenance, calibrating, range switching, warming-up, calibration-gas pressure decrease, flameout gas detection)

Converter Output: One mA analog output point (4 to 20 mA DC (maximum load resistance of 550 Ω)) with mA digital output point (HART) (minimum load resistance of 250 Ω).
Range: any setting between 0 to 25 through 0 to 100 vol% H_2O , and partial range is available (Maximum range value/minimum range value 1.3 or more)
For the log output, the minimum range values are fixed to 0.1 vol% O_2 for the oxygen concentration, 0.1 vol% H_2O for the moisture quantity, and 0.01 kg/kg for the mixture ratio.
4 to 20 mA DC linear or log can be selected.
Input/output isolation
Output damping: 0 to 255 seconds.
Hold/non-hold selection, preset value setting possible with hold.

Contact Output: Two points, contact capacity 30V DC 3A, 250V AC 3A (resistive load)
Normally energized or normally de-energized can be selected.
Delayed functions (0 to 255 seconds) and hysteresis function (0 to 9.9 vol% O_2) can be added to high/low-alarms.
The following functions are programmable for contact outputs.
(1) Abnormal, (2) High-high alarm, (3) High-alarm, (4) Low-low alarm, (5) Low-alarm, (6) Maintenance, (7) Calibration, (8) Range switching answer-back, (9) Warm-up, (10) Calibration-gas pressure decrease (answerback of contact input), (11) Flameout gas detection (answerback of contact input).

Contact Input: Two points, voltage-free contacts
The following functions are programmable for contact inputs:
(1) Calibration-gas pressure decrease alarm, (2) Range switching, (3) External calibration start, (4) Process alarm (if this signal is received, the heater power turns off)

Contact capacity: Off-leakage current; 3 mA or less.
Self-diagnosis: Abnormal cell, abnormal cell temperature (low/high), abnormal calibration, A/D converter abnormal, digital circuit abnormal

Calibration: Method; zero/span calibration
Calibration mode; automatic, semi-automatic and manual (All are operated using optical switches). Either zero or span can be skipped.

Zero calibration-gas concentration setting range: 0.3 to 100 vol% O_2 (0.01 vol% in smallest units).
Span calibration-gas concentration setting range: 4.5 to 100 vol% O_2 (0.01 vol% in smallest units).
Use nitrogen-balanced mixed gas containing 10% scale of oxygen for standard zero-gas, and 80 to 100% scale of oxygen for standard span-gas.
Calibration period; date/time setting: maximum 255 days

■ OPTIONS

4. ZO21P-H High temperature Prove Adapter for separate type Oxygen Analyzer

Measuring O_2 in the high temperature gases (exceeds 700 $^{\circ}C$) requires a general-use probe ZR22G of 0.15 m length and a high-temperature prove adapter.

Sample gas temperature: 0 to 1400 $^{\circ}C$ (when using SiC probe)
0 to 1000 $^{\circ}C$ (when using SUS 310S probe adapter)

Sample gas pressure: -0.49 to + 4.9 kPa. When using in the range of 0 to 25 vol% O_2 or more, the sample gas pressure should be in the range of -0.49 to +0.49 kPa. (Where the sample gas pressure for the high-temperature probe is negative, an auxiliary ejector is necessary.)

Insertion length: 1m, 1.5m

Material in Contact with Gas: SUS 316, Zirconia, SiC or SUS 310S, SUS 304 (flange)

Probe Material: SiC, SUS 310S

Installation: Flange mounting (FF type or RF type)

Probe Mounting Angle: Vertically downward within $\pm 5^{\circ}$
Where the probe material is SUS 310S, horizontal mounting is available.

Construction: Non explosion-proof. Rainproof construction

Weight: Insertion length of 1.0m: approx. 6.5 kg (JIS) / approx. 8.5 kg (ANSI)

Insertion length of 1.5m: approx. 7.5 kg (JIS) / approx. 9.5 kg (ANSI)

5. E7046EC/E7046EN Auxiliary ejector for High Temperature of separate type Oxygen Analyzer

For use in cases where pressure of sample gas for high temperature detector is negative.

5.1 Ejector Assembly

Ejector Inlet Air Pressure: 29 to 68 kPa G

Air Consumption: Approx. 30 to 40 l/min

Suction gas flow rate: 3 to 7 l/min

Connection: Rc1/4 or 1/4 FNPT, SUS304

Tube Connection: (\varnothing 6/ \varnothing 4 or 1/4" copper tube or stainless tube)

5.2 Pressure Gauge Assembly

Pressure Gauge

Type: JIS B7505, A1.5U3/8 x75
 Material in Contact with Gas: SUS316
 Case Material: Aluminum alloy (Paint color; black)
 Scale: 0 to 100 kPa G

Bushing (G3/8 x Rc1/4 or 1/4NPT, SUS304)

5.3 Needle Valve

Connection: Rc1/4 or 1/4FNPT
 Material: SUS316
 (Note) Pipes and connectors are not provided.

6. ZO21R Probe Protector for Zirconia Oxygen Analyzer

Used when sample gas flow velocity is approx. 10m/sec or more and dust particles wears the detector in cases such as pulverized coal boiler or fluidized bed furnace (or burner) to protect the detector from wearing by dust particles. When probe insertion length is 2.5m or more and horizontal installation, specify the ZO21R-L-□□□-□B to reinforce the probe.

Insertion Length: 1.05m, 1.55m, 2.05m.
 Flange: JIS 5K 65A FF equivalent. ANSI CLASS 150-4-FF (without serration) equivalent or DIN PN10-DN50-A equivalent. However, flange thickness is different.

Material: SUS316, SUS304 (Flange)
 Weight: 1.05m; Approx. 6/10/8.5kg (JIS/ANSI/DIN), 1.55m; Approx. 9/13/11.5kg (JIS/ANSI/DIN), 2.05m; Approx. 12/16/14.5kg (JIS/ANSI/DIN)

Installation: Bolts, nuts, and washers are provided for detector, probe adapter and process-side flange.

7. Filter for Oxygen Analyzer K9471UA

This filter is used to protect the cell from corrosive dust components or high velocity dust in recovery boilers and cement kiln. Measured gas flow rate is needed to be 1m/sec or more to replace gas inside zirconia sensor.

Mesh: 30 microns
 Material: Carborundum (Filter), SUS316
 Weight: Approx. 0.2 kg

8. ZH21B Dust Protector for High-temperature Humidity Analyzer

This protector is designed to protect the probe output from dust agitation (i.e., to prevent combustible materials from entering the probe cell) where humidity measurements are made under dusty environments.

Insertion length: 0.416m
 Flange: JIS 5K-80-FF equivalent or ANSI CLASS150-4-FF equivalent. (However, flange thickness is different.)

Material: SUS 316, SUS 304 (flange)
 Weight: Approx. 6kg (JIS), approx. 8.5kg (ANSI)
 Mounting: Mounted on the probe or process flange with bolts and the associated nuts and washers.

9. ZO21S Standard Gas Unit

Function: Portable unit for calibration gas supply consisting of span gas (air) pump, zero gas cylinder with sealed inlet, flow rate checker and flow rate needle valve.

Sealed Zero Gas Cylinders (6 provide): E7050BA

Capacity: 1 l

Filled pressure: Approx. 686 kPa G (at 35 °C)

Composition: 0.95 to 1.0 vol% O₂+N₂ balance

Power Supply: 100, 110, 115, 200, 220, 240V AC± 10%, 50/60Hz

Power Consumption: Max.5 VA

Paint Color: Mainframe; Munsell 2.0 GY3.1/0.5 equivalent

Cover; Munsell 2.8 GY6.4/0.9 equivalent

Weight: Approx. 3kg

10. ZA8F Flow Setting Unit

Used when instrument air is provided.

This unit controls flow rates of calibration gas and reference gas and consists of flowmeter

and flow rate control valve.

Flowmeter: Calibration gas; 0.1 to 1.0 l/min. Reference air; 0.1 to 1.0 l/min.

Construction: Dust-proof and rainproof construction

Case Material: SPCC, Dark-green (Munsell 2.0 GY 3.1/0.5 or equivalent)

Painting: Baked epoxy resin

Tube Connections: Rc1/4 or 1/4FNPT

Reference Air pressure: Clean air supply of measured gas pressure+approx. 70 kPa G (pressure at inlet of the auto-calibration unit)

Air Consumption: Approx. 1.5 l/min

Weight: Approx. 2kg

Note: Used instrument air for span calibration gas, if without instrument air is used, contact YOKOGAWA.

11. ZR40H Auto-calibration Unit (for Separate type)

This unit is used when the instrument air is provided and the auto-calibration unit is attached.

Solenoid valves are provided as standard equipment.

Reference air pressure: Clean air supply of measured gas pressure+approx. 70 kPa G (pressure at inlet of the auto-calibration unit)

Air consumption: Approx. 1.5 l/min

Weight: Approx. 3.5 kg

12. Auto-calibration Unit (for Integrated type)

This unit is used when the instrument air is provided and the auto-calibration unit is attached.

Solenoid valves are provided as standard equipment.

This unit is attached when the code of "with auto-calibration unit" (-A or -B) in the basic code is selected for the Integrated type Zirconia Oxygen Analyzer/High temperature Humidity Analyzer ZR202G.

13. L9852CB/K9471UN Stop Valve

The stop valve is mounted on the calibration gas line. It is attached when the suffix code (/SV) is selected for the Zirconia Oxygen Analyzer/High-temperature Humidity Analyzer prove ZR22G or the Zirconia Oxygen Analyzer/High-temperature Humidity Analyzer ZR202G.

Connection: Rc 1/4 or 1/4 FNPT
 Material: SUS/Brass
 Weight: Approx. 80 g

14. K9292DN/K9292DS Check Valve

This is used to prevent entry of process gas into calibration gas line. Purpose is the same as stop valve, but is convenient, as it does not need to be opened or closed for calibration.

Mount directly on calibration gas inlet of detector in place of stop valve. However as source pressure of 50 kPa G or more is needed, standard gas unit cannot be used.

When option code "/CV" of the ZR22G or the ZR202G is specified, check valve is provided.

Connection: Rc1/4 or 1/4FNPT
 Material: SUS316
 Pressure: Between 70 kPa G or more 350 kPa G or less
 Weight: Approx. 40g

15. G7011XF/E7040EL Air Set

Primary Pressure: Max. 2 MPa G
 Secondary Pressure: 9.8 to 196 kPa G
 Connection: Rc1/4 or 1/4FNPT with joint adapter

16. G7001ZC Calibration Gas Cylinder

Capacity: 3.4 l
 Filled pressure: 9.8 to 12 MPa G
 Composition: 0.95 to 1.0 vol% O₂ remaining N₂

17. G7013XF/G7014XF Cylinder Pressure Regulator

Pressure gauge: Primary 0 to 25 MPa G,
 Secondary 0 to 5 MPa G
 Connection: Inlet W22 14 threads, right hand screw
 Outlet Rc1/4 or 1/4FNPT
 Material: Yellow copper body

18. E7044KF Case Assembly Calibration Cylinder

Case Paint: Baked epoxy resin,
 Jade green (Munsell 7.5 BG 4/1.5)
 Installation: 2B pipe mounting
 Weight: Approx. 10kg
 Connection: Rc1/4

STANDARD ACCESSARIES

ZR402G

Item	Parts. No.	Qty	Description
Fuse	A1113EF	1	3.15A
Bracket	F9554AL	1	For pipe, panel, or wall mounting
Screws for Bracket	F9123GF	1	

T02.EPS

ZR22G

Item	Parts. No.	Qty	Description
Allen wrench	L9827AB	1	For lock screw

T02_00.eps

ZR202G

Item	Parts. No.	Qty	Description
Fuse	A1113EF	1	3.15A
Allen wrench	L9827AB	1	For lock screw

T02_01.eps

Model and Suffix Codes

1. Separate type Zirconia Oxygen / High temperature Humidity Analyzer, Converter

Model	Suffix code	Option code	Description
ZR402G	-----	-----	Separate type Zirconia Oxygen/ High temperature Humidity Analyzer, Converter
Converter thread	-P	-----	G1/2
	-G	-----	Pg13.5
	-M	-----	M20x1.5 mm
	-T	-----	1/2NPT
Display	-J	-----	Japanese
	-E	-----	English
	-G	-----	German
Instruction manual	-J	-----	Japanese
	-E	-----	English
—		-A	Always -A
Options	Certificate	/HS	Set for Humidity Analyzer (*1)
		/Q	QIS/QIC
		/H	Hood (*3)
	Tag plates	/SCT	Stainless steel tag plate (*2)
		/PT	Printed tag plate (*2)

*1 For humidity measurements, be sure to specify /HS options.
 *2 Specify either /SCT or /PT option code.
 *3 Will be available in the near future.

T09.EPS

2. Separate type Zirconia Oxygen / High temperature Humidity Analyzer, Detectors

Model	Suffix code	Option code	Description
ZR22G	-----	-----	Separate type Zirconia Oxygen/ High temperature Humidity Analyzer, Detector
Length	-015	-----	0.15 m (for high temperature use) (*1)
	-040	-----	0.4 m
	-070	-----	0.7 m
	-100	-----	1.0 m
	-150	-----	1.5 m
	-200	-----	2.0 m
	-250	-----	2.5 m (*2)
	-300	-----	3.0 m (*2)
	-360	-----	3.6 m (*2)
	-420	-----	4.2 m (*2)
	-480	-----	4.8 m (*2)
	-540	-----	5.4 m (*2)
Wetted material	-S	-----	SUS316
	-C	-----	Stainless steel with Inconel calibration gas tube
Flange (*3)	-A	-----	ANSI CLASS150-2-RF (Equivalent)
	-B	-----	ANSI CLASS150-3-RF (Equivalent)
	-C	-----	ANSI CLASS150-4-RF (Equivalent)
	-E	-----	DIN PN10-DN50-A (Equivalent)
	-F	-----	DIN PN10-DN80-A (Equivalent)
	-G	-----	DIN PN10-DN100-A (Equivalent)
	-K	-----	JIS 5K-65-FF (Equivalent)
	-L	-----	JIS 10K-65-FF (Equivalent)
	-M	-----	JIS 10K-80-FF (Equivalent)
	-P	-----	JIS 10K-100FF (Equivalent)
	-Q	-----	JIS 5K-32-FF (Equivalent) (for high temperature use) (*4)
	-R	-----	JPI CLASS150-4-RF
	-S	-----	JPI CLASS150-3-RF
-W	-----	Westinghouse	
Reference air	-C	-----	Natural convection
	-E	-----	External connection (Instrument air)
	-P	-----	Pressure compensation
Gas Thread	-R	-----	Rc 1/4
	-T	-----	1/4 FNPT
Connection box thread	-P	-----	G1/2
	-G	-----	Pg13.5
	-M	-----	M20 x1.5 mm
	-T	-----	1/2NPT
	-Q	-----	Quick connect (*9)
Instruction manual	-J	-----	Japanese
	-E	-----	English
—	-A	-----	Always -A
Options		/D	Durethane coating
		/C	Inconel bolt (*5)
	Valves	/CV	Check valve (*6)
		/SV	Stop valve (*6)
	Certificate	/Q	QIS/QIC
		/A	Flame Arrester
	Filter	/F1	Dust Filter (*7)
	Tag plates	/SCT	Stainless steel tag plate (*8)
/PT		Printed tag plate (*8)	

*1 Used with the ZO21P High temperature Probe Adapter. Select flange (-Q).

*2 When installing horizontally the probe whose insertion length is 2.5 meters or more, use the Probe Protector. Be sure to specify ZO21R-L-□□□-□. Specify the flange suffix code either -C or -K.

*3 The thickness of the flange depends on its dimensions.

*4 Not used in conjunction with -P (pressure compensation) for reference air.

*5 Inconel probe bolts are used. Use this option for high temperature use (ranging from 600 to 700 °C).

*6 Specify either /CV or /SV option code.

*7 Not used with the high temperature humidity analyzer.

*8 Specify either /SCT or /PT option code.

*9 No water proof, avoid rain. Operating maximum temperature is 80°C.

Note: ZR22G can not be connected to Model ZA8C, AV8C, HA400 converter.

T03.EPS

3. Integrated type Zirconia Oxygen / High temperature Humidity Analyzer, Converter

Model	Suffix code	Option code	Description
ZR202G	-----	-----	integrated type Zirconia Oxygen/ High temperature Humidity Analyzer
Length	-040	-----	0.4 m
	-070	-----	0.7 m
	-100	-----	1.0 m
	-150	-----	1.5 m
	-200	-----	2.0 m
	-250	-----	2.5 m (*1)
	-300	-----	3.0 m (*1)
Wetted material	-S	-----	SUS316
	-C	-----	Stainless steel with Inconel calibration gas tube
Flange (*2)	-A	-----	ANSI CLASS150-2-RF (Equivalent)
	-B	-----	ANSI CLASS150-3-RF (Equivalent)
	-C	-----	ANSI CLASS150-4-RF (Equivalent)
	-E	-----	DIN PN10-DN50-A (Equivalent)
	-F	-----	DIN PN10-DN80-A (Equivalent)
	-G	-----	DIN PN10-DN100-A (Equivalent)
	-K	-----	JIS 5K-65-FF (Equivalent)
	-L	-----	JIS 10K-65-FF (Equivalent)
	-M	-----	JIS 10K-80-FF (Equivalent)
	-P	-----	JIS 10K-100FF (Equivalent)
	-R	-----	JPI CLASS150-4-RF
	-S	-----	JPI CLASS150-3-RF
	-W	-----	Westinghouse
Auto Calibration	-N	-----	No auto calibration unit mounted
	-A	-----	Auto calibration unit mounted (*8)
Reference air	-C	-----	Natural convection
	-E	-----	External connection (Instrument air)
	-P	-----	Pressure compensation
Gas Thread	-R	-----	Rc 1/4
	-T	-----	1/4 FNPT
Connection box thread	-P	-----	G1/2
	-G	-----	Pg13,5
	-M	-----	M20x1.5 mm
	-T	-----	1/2NPT
Instruction manual	-J	-----	Japanese
	-E	-----	English
—	-A	-----	Always -A
Options	/D	-----	Durethane coating
	/C	-----	Inconel bolt (*3)
	/HS	-----	Set for Humidity Analyzer (*4)
	/CV	-----	Check valve (*5)
	/SV	-----	Stop valve (*5)
	/Q	-----	QIS/QIC
	/A	-----	Flame Arrester
	/H	-----	Hood (*8)
	/F1	-----	Dust Filter (*6)
	/SCT	-----	Stainless steel tag plate (*7)
/PT	-----	Printed tag (*7)	

*1 For the horizontal installed probe whose insertion length is 2.5 meters or more, use the Probe Protector. Be sure to specify ZO21R-L-□□□□□. Specify the flange suffix code either -C or -K.

*2 The thickness of the flange depends on its dimensions.

*3 Inconel probe bolts are used. Use this option for high temperature use (ranging from 600 to 700 °C).

*4 For humidity measurements, be sure to specify /HS options. Pressure compensation of reference air can not be selected.

*5 Specify either /CV or /SV option code.

*6 Not used with the high-temperature humidity analyzer.

T12.EPS

*7 Specify either /SCT or /PT option code.

*8 Will be available in the near future.

4. Adapter for High temperature Probe of separate type Oxygen Analyzer

Model	Suffix code	Option code	Description
ZO21P	-H		High Temperature Probe Adapter
Material	-A		SiC
	-B		SUS 310S
Insertion length	-100		1.0 m
	-150		1.5 m
Flange	-J		JIS 5K-50-FF equivalent
	-N		JIS 10K-65-FF equivalent
	-M		JIS 10K-80-FF equivalent
	-L		JIS 10K-100-FF equivalent
	-A		ANSI CLASS150-4-RF equivalent
	-R		ANSI CLASS150-2 1/2-RF equivalent
	-Q		ANSI CLASS150-3-RF equivalent
	-T		JPI CLASS150-3-RF equivalent
	-S		JPI CLASS150-4-RF equivalent
	-E		DIN PN10-DN50-A equivalent
Style code	*A		Style A

T06.EPS

Note: For this high-temperature use probe adapter, be sure to specify the ZR22G probe of its insertion length 0.15 meters.

High temperature Probes (Spare Parts)

Part No.	Description
E7046AL	SiC, insertion length 1.0 m
E7046BB	SiC, insertion length 1.5 m
E7046AP	SUS310S, insertion length 1.0 m
E7046AQ	SUS310S, insertion length 1.5 m

T07.EPS

5. Auxiliary Ejector for High-temperature Use of separate type Oxygen Analyzer

Part No.	Description
E7046EC	Rc 1/4 ϕ 6 / ϕ 4 TUBE joint: SUS304
E7046EN	1/4 NPT, 1/4 TUBE joint: SUS304

T08.EPS

6. Probe Protector for Zirconia Oxygen Analyzers

Model	Suffix code	Option code	Description
ZO21R	-L		Probe Protector(0 to 700 °C)
Insertion length	-100		1.05 m (3.5ft)
	-150		1.55 m (5.1ft)
	-200		2.05 m (6.8ft)
Flange (*1)	-J		JIS 5K-65A-FF equivalent
	-A		ANSI CLASS150-4-FF equivalent
	-E		DIN PN10-DN50-A equivalent
Style code	*B		Style B

*1 Thickness of flange depends on demensions of flange. T04.EPS

7. Filter for Zirconia Oxygen Analyzers

Part No.	Description
K9471UA	Filter

T05.EPS

8. Dust Protector for High-temperature Humidity Analyzers

Model	Suffix code	Option code	Description
ZH21B			Dust protector (0 to 600°C)
Insertion length	-040		0.409 m
Flange	-J		JIS 5 K 80 A FF equivalent
	-A		ANSI Class 150-4B FF equivalent *
Style code	*B		Style B

* The flange thickness varies. Specify the probe ZR22G-040.

T06_01_01.EPS

9. Standard Gas Unit

Model	Suffix code	Option code	Description
ZO21S			Standard gas unit
Power supply	-2		200 V AC 50/60 Hz
	-3		220 V AC 50/60 Hz
	-4		240 V AC 50/60 Hz
	-5		100 V AC 50/60 Hz
	-7		110 V AC 50/60 Hz
	-8		115 V AC 50/60 Hz
Panel	-J		Japanese version
	-E		English version
Style code	*A		Style A

T16.EPS

10. Flow setting unit for manual calibration (Needs instrument air.)

Model	Suffix code	Option code	Description
ZA8F			Flow setting unit
Joint	-J		Rc 1/4
	-A		With 1/4" NPT adapter
Style code	*A		Style A

T13.EPS

11. Automatic Calibration Unit for Separate type Analyzer (Needs instrument air.)

Will be available in the near future.

12. Automatic Calibration Unit for Integrated type Analyzer (Needs instrument air.)

Will be available in the near future.

13. Stop Valve for Calibration-gas line

Part No.	Description
L9852CB	Joint: Rc 1/4, Material: SUS316
K9471UN	Joint: 1/4 NPT, Material: BS

T10.EPS

14. Check Valve for Calibration-gas line

Part No.	Description
K9292DN	Joint: Rc 1/4, Material: SUS304
K9292DS	Joint: 1/4 NPT, Material: SUS304

T11.EPS

15. Air Set

Part No.	Description
G7011XF	Joint: Rc 1/4, Material: A I
E7040EL	Joint: 1/4 FNPT, Material: A I with adapter

T15.EPS

16. Zero-gas Cylinder

Part No.	Description
G7001ZC	3.4 l container, 0.95 to 1.0 Vol % O ₂ N ₂ Bal.

T17.EPS

17. Pressure Regulator for Gas Cylinder

Part No.	Description
G7013XF	Inlet: W22 14 threads Outlet: Rc 1/4
G7014XF	Inlet: W22 14 threads Outlet: 1/4 FNPT

T18.EPS

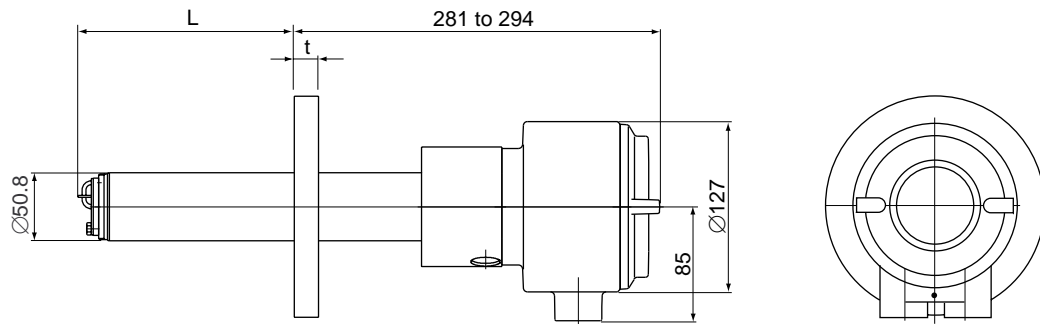
18. Case Assembly for Calibration-gas Cylinder

Part No.	Description
E7044KF	Calibration gas unit case

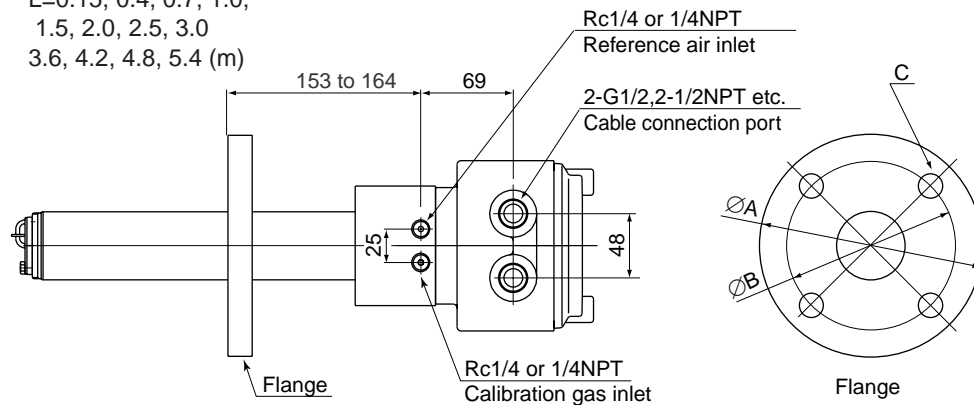
T19.EPS

EXTERNAL DIMENSIONS

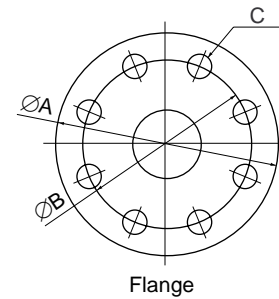
1. Model ZR22G Separate type Zirconia Oxygen / High temperature Humidity Analyzer, Detectors



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1.5, 2.0, 2.5, 3.0
3.6, 4.2, 4.8, 5.4 (m)

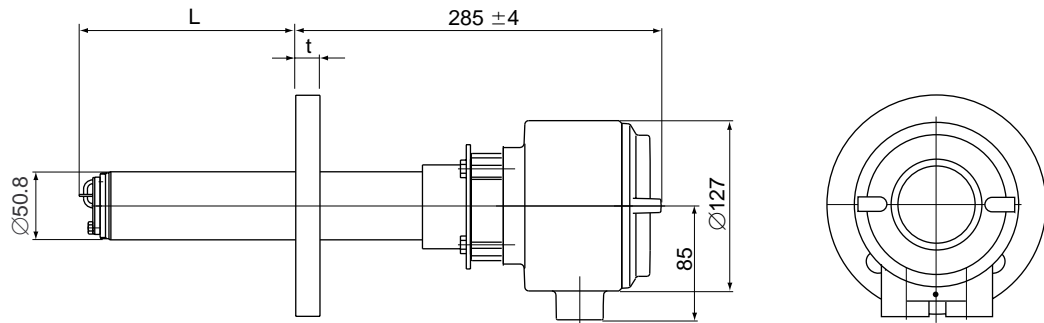


Flange	A	B	C	t
ANSI CLASS150-2-RF equivalent	152.4	120.6	4 - Ø19	19
ANSI CLASS150-3-RF equivalent	190.5	152.4	4 - Ø19	24
ANSI CLASS150-4-RF equivalent	228.6	190.5	8 - Ø19	24
DIN PN10-DN50-A equivalent	165	125	4 - Ø18	18
DIN PN10-DN80-A equivalent	200	160	8 - Ø18	20
DIN PN10-DN100-A equivalent	220	180	8 - Ø18	20
JIS 5K-65-FF	155	130	4 - Ø15	14
JIS 10K-65-FF	175	140	4 - Ø19	18
JIS 10K-80-FF	185	150	8 - Ø19	18
JIS 10K-100-FF	210	175	8 - Ø19	18
JIS 5K-32-FF	115	90	4 - Ø15	5
JPI CLASS150-4-RF equivalent	229	190.5	8 - Ø19	24
JPI CLASS150-3-RF equivalent	190	152.4	4 - Ø19	24
Westinghouse	155	127	4 - Ø11.5	14

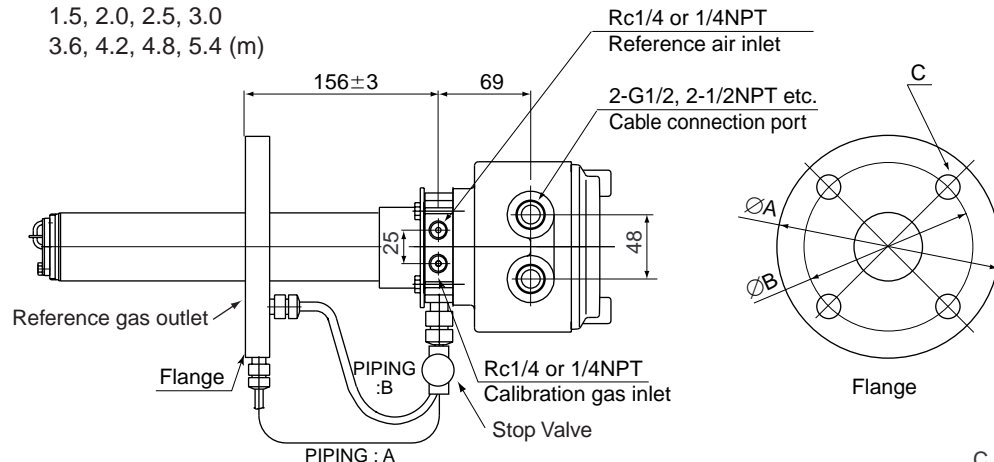


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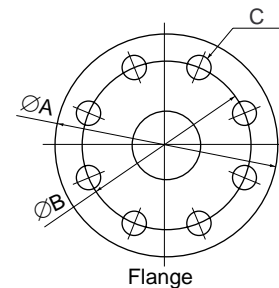
Model ZR22G...-P (with pressure compensation) Separate type Zirconia Oxygen / High temperature Humidity Analyzer, Detectors



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3.6, 4.2, 4.8, 5.4 (m)

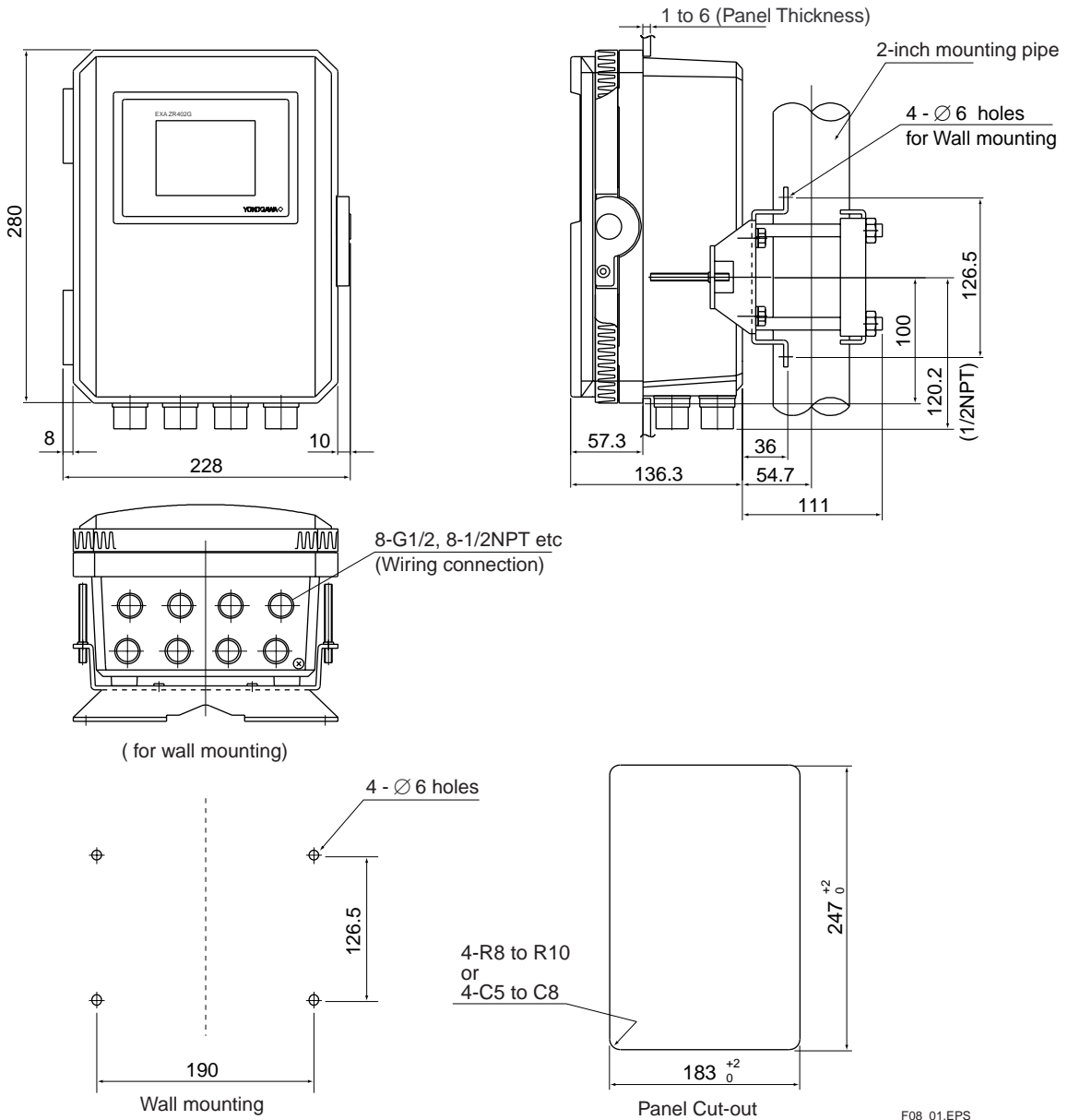


Flange	A	B	C	t	PIPING
ANSI CLASS150-2-RF equivalent	152.4	120.6	4 - Ø19	19	A
ANSI CLASS150-3-RF equivalent	190.5	152.4	4 - Ø19	24	B
ANSI CLASS150-4-RF equivalent	228.6	190.5	8 - Ø19	24	B
DIN PN10-DN50-A equivalent	165	125	4 - Ø18	18	A
DIN PN10-DN80-A equivalent	200	160	8 - Ø18	20	B
DIN PN10-DN100-A equivalent	220	180	8 - Ø18	20	B
JIS 5K-65-FF	155	130	4 - Ø15	14	A
JIS 10K-65-FF	175	140	4 - Ø19	18	A
JIS 10K-80-FF	185	150	8 - Ø19	18	B
JIS 10K-100-FF	210	175	8 - Ø19	18	B
JPI CLASS150-4-RF equivalent	229	190.5	8 - Ø19	24	B
JPI CLASS150-3-RF equivalent	190	152.4	4 - Ø19	24	B
Westinghouse	155	127	4 - Ø11.5	14	A



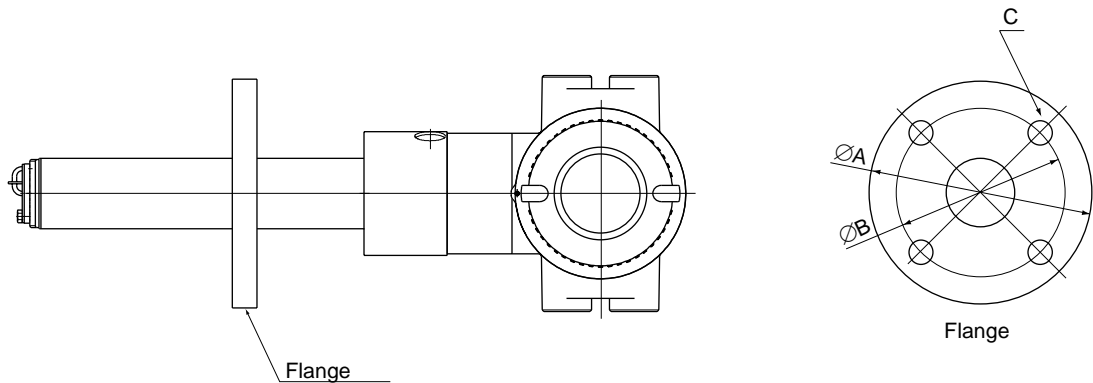
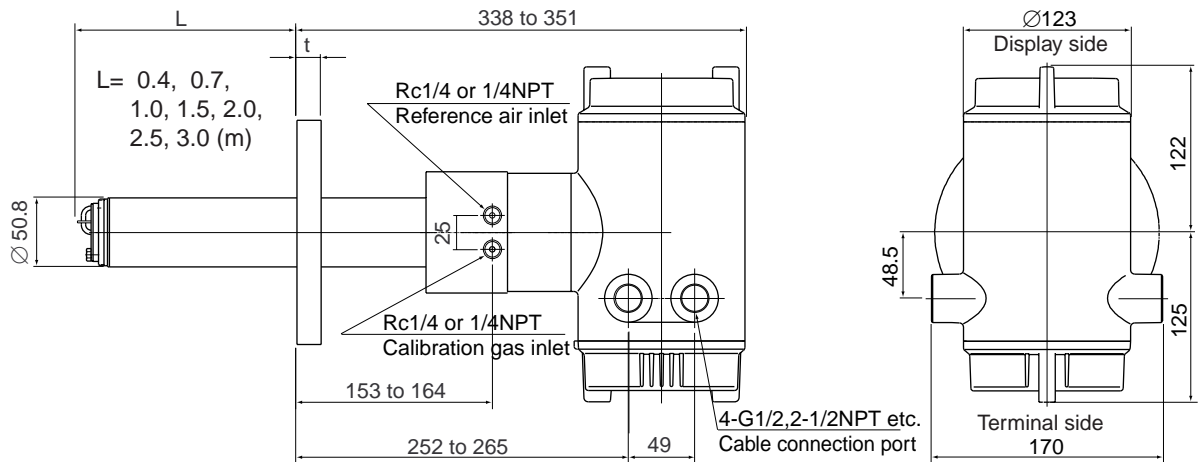
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2. Model ZR402G Separate type Zirconia Oxygen/ High temperature Humidity Analyzer, Converter

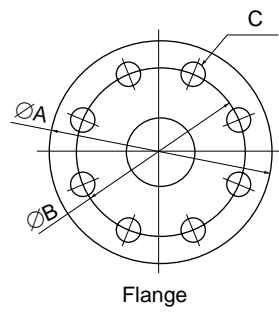


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3. Model ZR202G Integrated type Zirconia Oxygen/ High temperature Humidity Analyzers

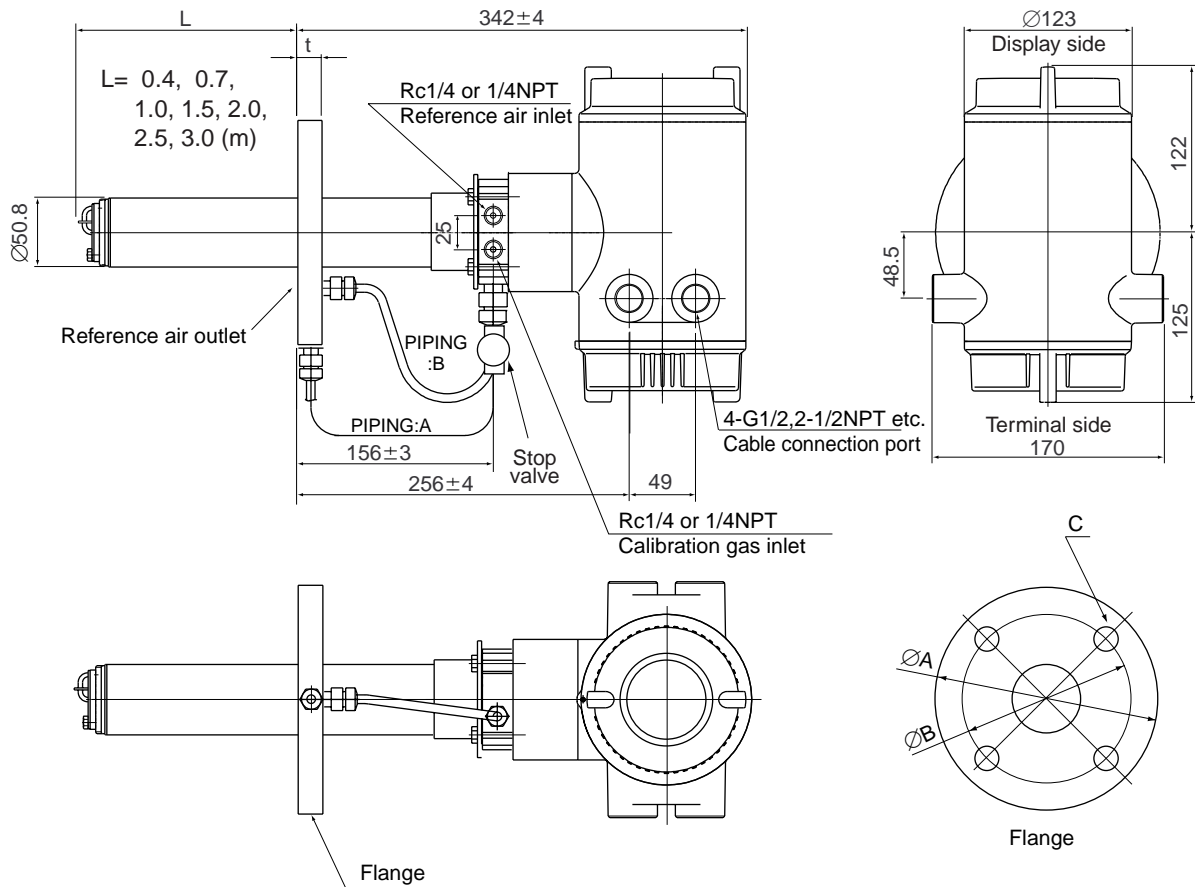


Flange	A	B	C	t
ANSI CLASS150-2-RF equivalent	152.4	120.6	4 - $\varnothing 19$	19
ANSI CLASS150-3-RF equivalent	190.5	152.4	4 - $\varnothing 19$	24
ANSI CLASS150-4-RF equivalent	228.6	190.5	8 - $\varnothing 19$	24
DIN PN10-DN50-A equivalent	165	125	4 - $\varnothing 18$	18
DIN PN10-DN80-A equivalent	200	160	8 - $\varnothing 18$	20
DIN PN10-DN100-A equivalent	220	180	8 - $\varnothing 18$	20
JIS 5K-65-FF	155	130	4 - $\varnothing 15$	14
JIS 10K-65-FF	175	140	4 - $\varnothing 19$	18
JIS 10K-80-FF	185	150	8 - $\varnothing 19$	18
JIS 10K-100-FF	210	175	8 - $\varnothing 19$	18
JPI CLASS150-4-RF equivalent	229	190.5	8 - $\varnothing 19$	24
JPI CLASS150-3-RF equivalent	190	152.4	4 - $\varnothing 19$	24
Westinghouse	155	127	4 - $\varnothing 11.5$	14

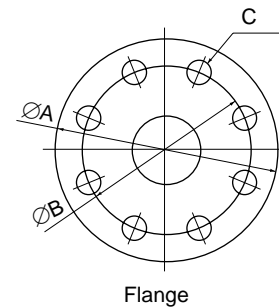


F11_01.EPS

Model ZR202G...-P (with pressure compensation) Integrated type Zirconia Oxygen / High temperature Humidity Analyzers

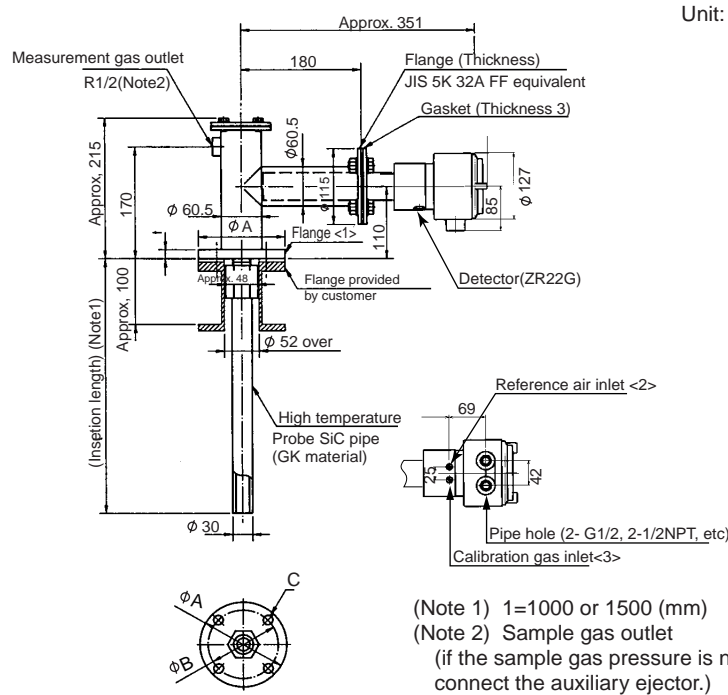


Flange	A	B	C	t	PIPING
ANSI CLASS150-2-RF equivalent	152.4	120.6	4 - $\varnothing 19$	19	A
ANSI CLASS150-3-RF equivalent	190.5	152.4	4 - $\varnothing 19$	24	B
ANSI CLASS150-4-RF equivalent	228.6	190.5	8 - $\varnothing 19$	24	B
DIN PN10-DN50-A equivalent	165	125	4 - $\varnothing 18$	18	A
DIN PN10-DN80-A equivalent	200	160	8 - $\varnothing 18$	20	B
DIN PN10-DN100-A equivalent	220	180	8 - $\varnothing 18$	20	B
JIS 5K-65-FF	155	130	4 - $\varnothing 15$	14	A
JIS 10K-65-FF	175	140	4 - $\varnothing 19$	18	A
JIS 10K-80-FF	185	150	8 - $\varnothing 19$	18	B
JIS 10K-100-FF	210	175	8 - $\varnothing 19$	18	B
JPI CLASS150-4-RF equivalent	229	190.5	8 - $\varnothing 19$	24	B
JPI CLASS150-3-RF equivalent	190	152.4	4 - $\varnothing 19$	24	B
Westinghouse	155	127	4 - $\varnothing 11.5$	14	A



F11_02.EPS

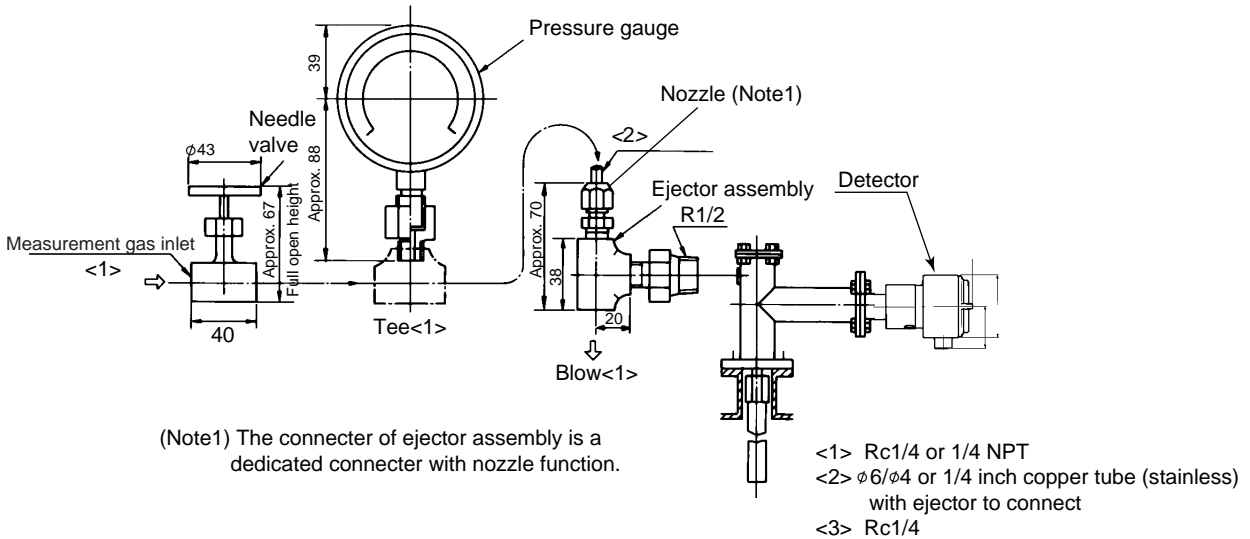
4. Model ZO21P Adapter for High temperature Probe of separate type Oxygen Analyzer



<1> Flange	<2>,<3> joint	A	B	C
JIS 5K-50-FF equivalent	Rc 1/4	130	105	4 - phi 15
ANSI CLASS 150-4-RF equivalent	1/4 FNPT	228.6	190.5	8 - phi 19

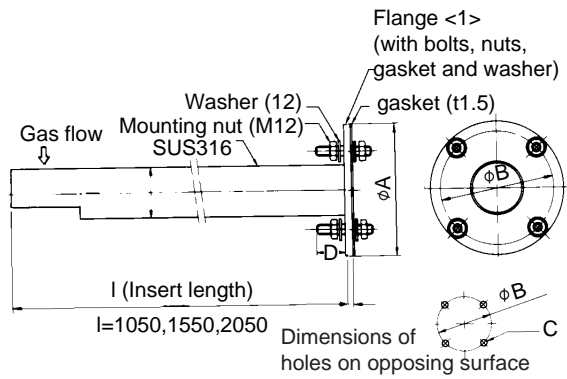
F12.EPS

5. Model E7046EC, E7046EN Auxiliary Ejector for High temperature Use of separate type Oxygen Analyzer



F19.EPS

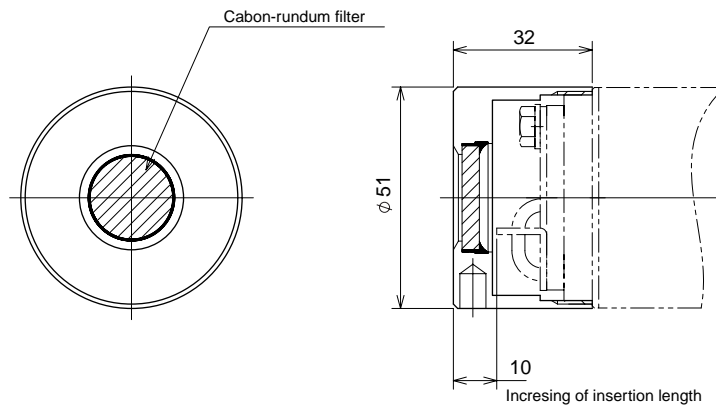
6. Model ZO21R Probe Protector for Zirconia Oxygen Analyzers



Flange<1>	A	B	C	t	D
JIS 5K-65-FF equivalent	155	130	4- φ15	5	40
ANSI CLASS 150-4-FF equivalent	228.6	190.5	8- φ19	12	50

F17.EPS

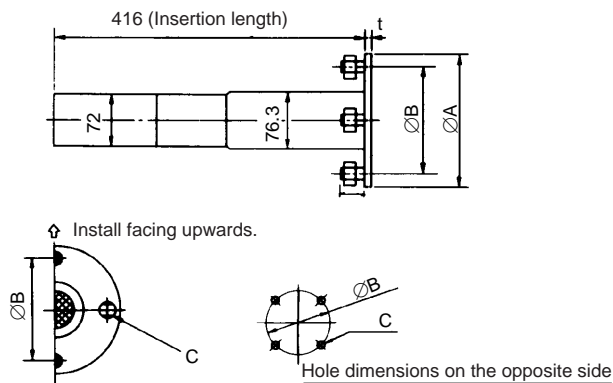
7. Model K9471UA Filter for Oxygen Analyzer



F31.EPS

8. Model ZH21B Dust Protector for High temperature Humidity Analyzers Unit: mm

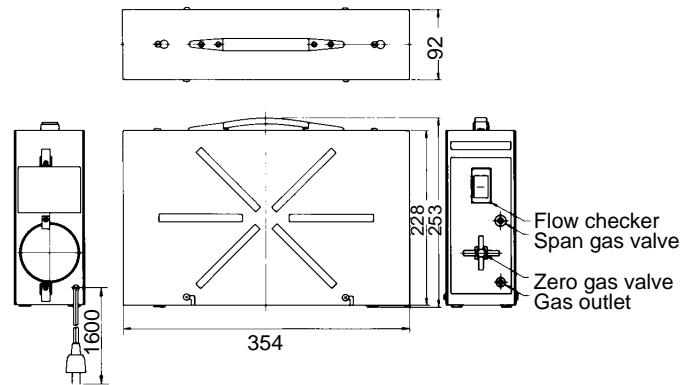
Unit: mm



Flange	A	B	C	t	D
JIS 5 K FF equivalent	180	145	4-φ19	12	40
ANSI 4 B 150 LB FF	228.5	190.5	8-φ19	12	50

F09.EPS

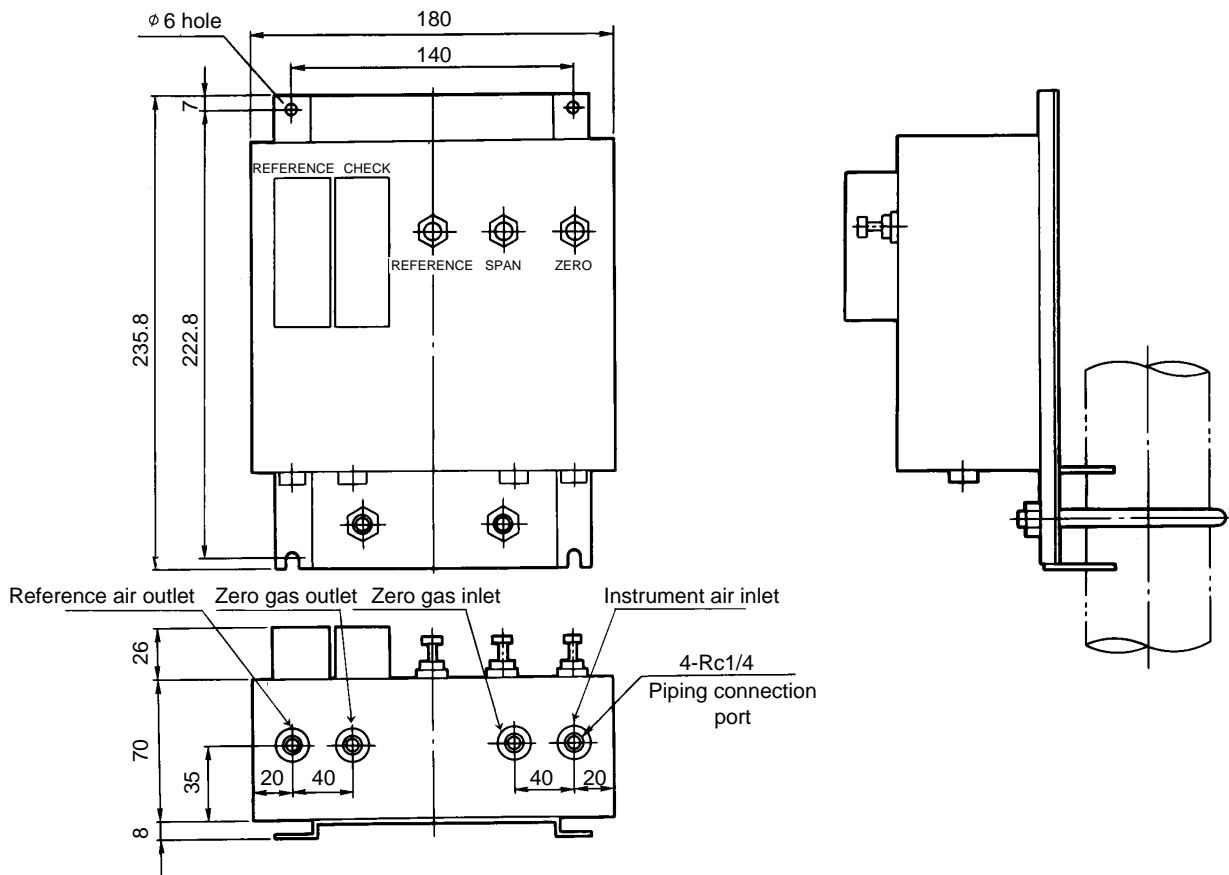
9. Model ZO21S Standard Gas Unit



Zero gas cylinder (6 cylinder): E7050BA

F24.EPS

10. Model ZA8F Flow setting unit for manual calibration



F20.EPS

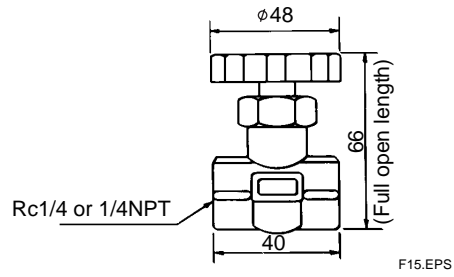
11. Model ZR40H Automatic Calibration Unit for Separate type Analyzer

Will be available in the near future.

12. Automatic Calibration Unit for Integrated type Analyzer

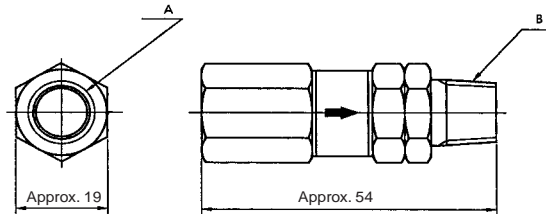
Will be available in the near future.

13. L9852CB/ K9471UN Stop Valve for Calibration-gas line

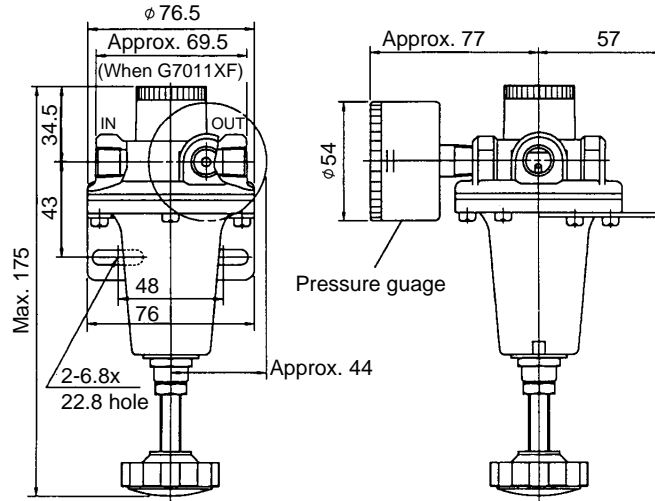


14. K9292DN/ K9292DS Check Valve for Calibration-gas line

K9292DN : Rc 1/4(A),R 1/4(B)
 K9292DS : 1/4NPT(A),1/4NPT(M)(B)

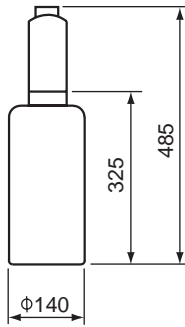


15. G7011XF/ E7040EL Air Set

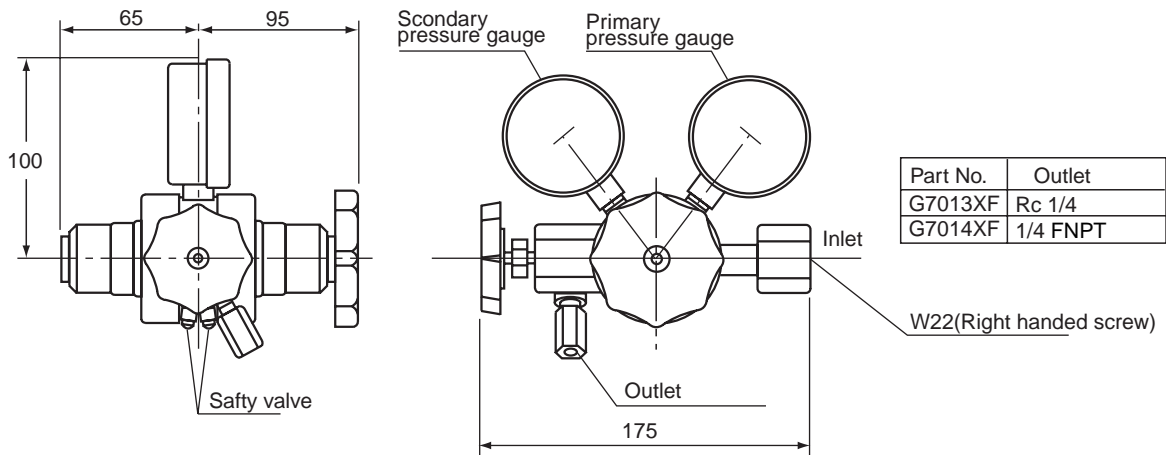


G7011XF: Piping connection (IN: Primary side, OUT: Secondary side), Rc1/4(PT1/4 female)
 E7040EL: Piping connection (IN: Primary side, OUT: Secondary side), 1/4NPT female(with tapered joint)

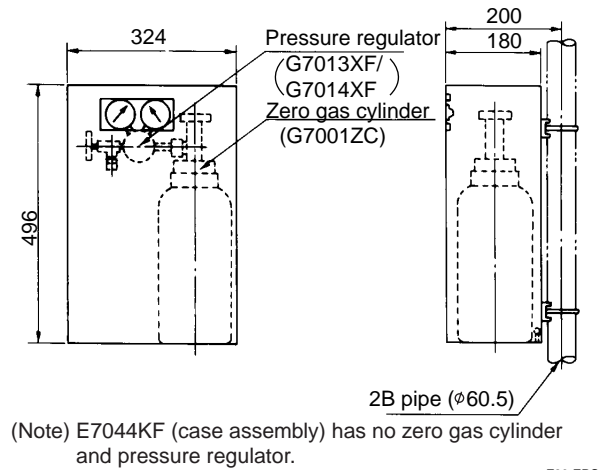
16. G7001ZC Zero-gas Cylinder



17. G7013XF, G7014XF Pressure Regulator for Gas Cylinder



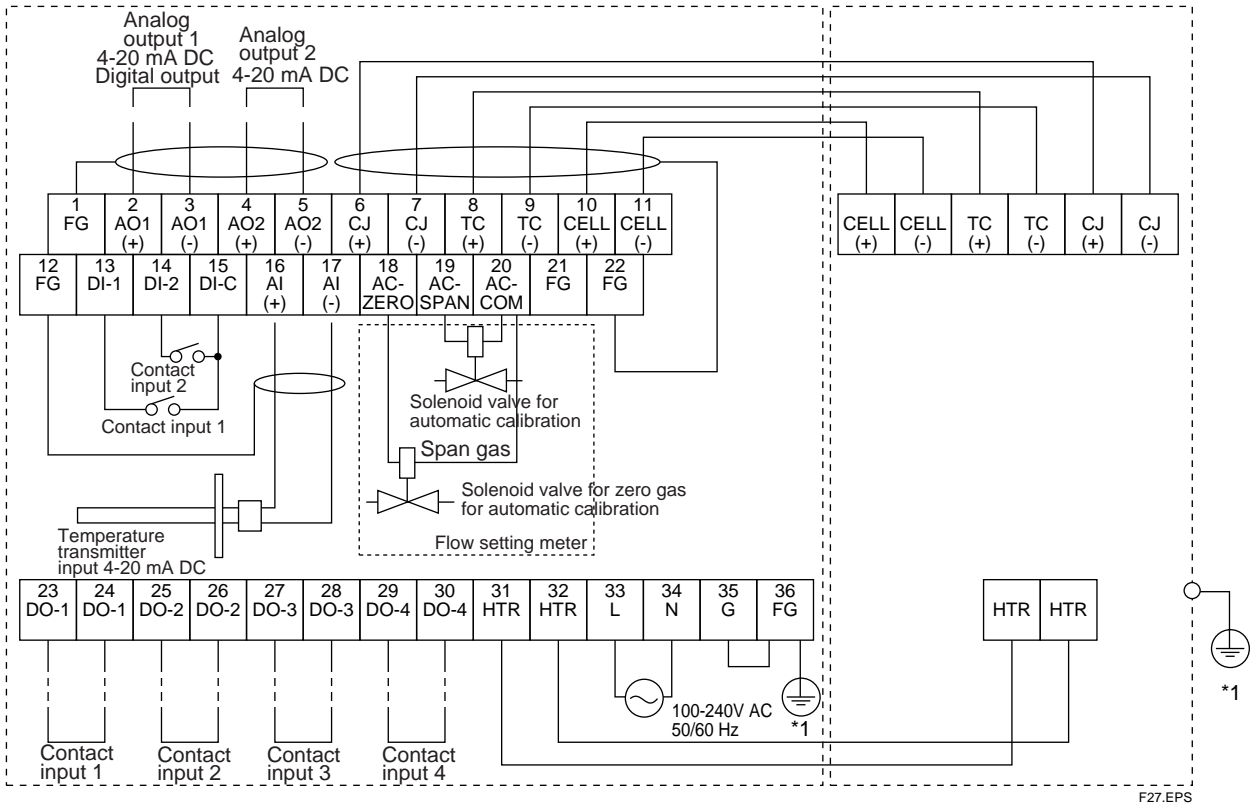
18. E7044KF Case Assembly for Calibration-gas Cylinder



WIRING CONNECTIONS

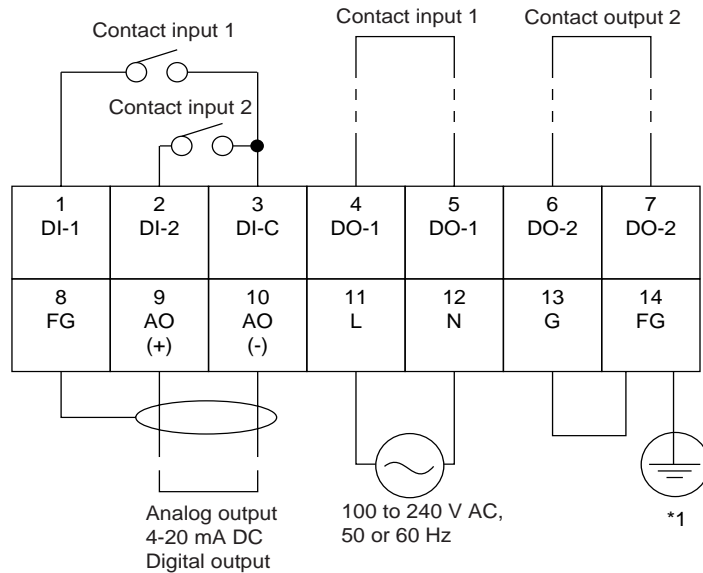
Model ZR402G Separate type Zirconia Oxygen Analyzer/
High temperature Humidity Analyzer, Converter

Model ZR22G Separate type Zirconia Oxygen /
High temperature Humidity Analyzer, Detector



F27.EPS

Model ZR202G Integrated type Zirconia Oxygen / High temperature Humidity Analyzer



*1 Ground resistance is 100 ohm or less.

F28.EPS

Inquiry Sheet for Models ZR22G, ZR402G, and ZR202G Direct In Situ Zirconia Oxygen Analyzers and High temperature Humidity Analyzers

Please place necessary checkmarks in the appropriate boxes and fill in the necessary information in the blanks.

1. General information

Customer _____ Type of analyzer : Oxygen Analyzer High temperature Humidity Analyzer

Destination of delivery _____ Sparate type Integrated type

Plant name _____ Object : indication record control alarm

Measurement points _____ Fuel : gas oil coal _____

Power requirements _____V AC _____Hz

2. Process conditions

2.1 Measurement gas components _____

2.2 Oxygen concentration Nor. _____ Min. _____ Max. _____ vol%O₂, _____

Moisture contents Nor. _____ Min. _____ Max. _____ kg/kg, Vol%H₂O

2.3 Temperature Nor. _____ Min. _____ Max. _____ °C, _____

2.4 Pressure Nor. _____ Min. _____ Max. _____ kPa, _____

2.5 Gas flow Nor. _____ Min. _____ Max. _____ m/sec, _____

2.6 Dust type, Size Nor. _____ Min. _____ μm quantity _____ g/Nm³, _____

2.7 Corrosive gas No gas Gas _____, quantity _____ ppm, _____

_____ , quantity _____ ppm, _____

2.8 Combustible gas No gas Gas _____, quantity _____ ppm, _____

_____ , quantity _____ ppm, _____

2.9 Others _____

3. Installation site conditions

3.1 Ambient temperature 1. Around Probe temp. from _____ to _____ °C, 2. Around Converter temp. from _____ to _____ °C

3.2 Vibration No vibration Vibration _____

3.3 1 Probe installation location Furnace Stack Others _____

2 Probe position Horizontal Vertical Others _____

Indoor Outdoor Covered

3 Probe insertion length (m) 0.4, 0.7, 1.0, 1.5, 2.0, 2.5, 3.0, Others _____

4 Flange JIS _____ ANSI _____ Others _____

3.4 Instrument air supply Cannot be used. Can be used. _____ kPa

3.5 Converter location Indoor Outdoor Covered (under roof)

3.6 Cable length between probe and converter _____ meters

3.7 Calibration method Manual Automatic

4. Quotation data

Quotation		Quantity	Description
Probe	Model ZR22G General-use Probe		Refer to the Probe Configuration for probe selection.
	Model ZO21P-H High temperature Use Probe Adapter		
	Model E7046EC/E7046EN Auxiliary Ejector for high temperature use.		
	Options (for general use)		
	Model ZH21B Dust Protector for high temperature humidity analyzer.		
	Model ZO21R Probe Protector for Oxgen Analyzer		
	Model K9471UA Filter		
Model ZR402G Separate type Analyzer, Converter			
Model ZR202G Integrated type Zirconia Oxygen / High temperature Humidity Analyzer			
Model ZO21S Standard Gas Unit			Select any one of Model ZO21S, ZA8F, ZR40H .
Model ZA8F Flow Setting Unit			
Model ZR40H Automatic Calibration Unit			Not required if probe options are specified.
L9852CB/K9471UN Stop Valve			
K9292DN/K9292DS Check Valve			
G7011XF/E7040EL Air Set			
G7001ZC Zero Gas Cylinder			
G7013XF/G7014XF Pressure Regulator			

T20.EPS