General Specifications

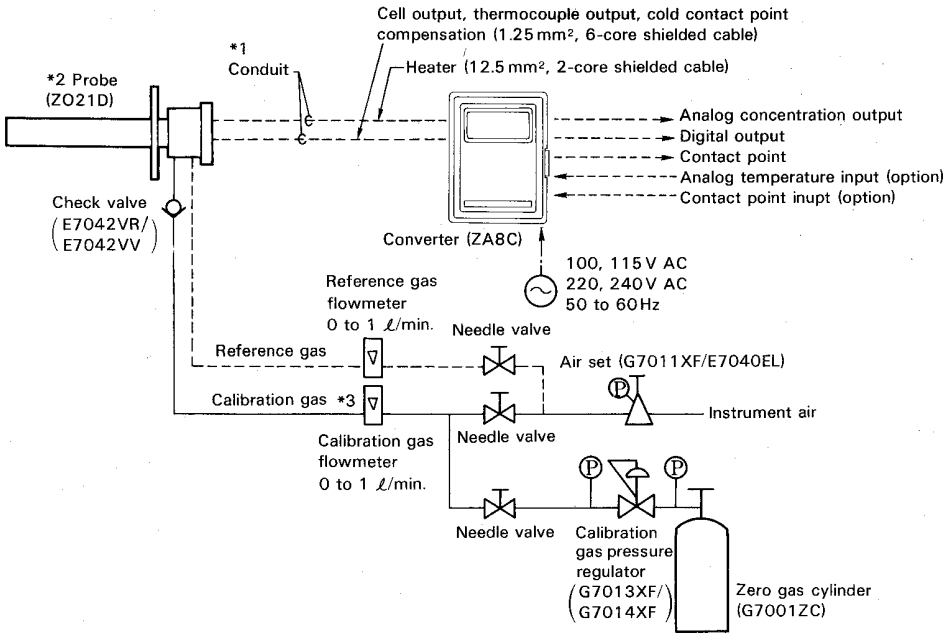
Model ZA8 Direct In-Situ Type Zirconia Oxygen Analyzer

GS 11M6A2-E

GENERAL SPECIFICATIONS

The basic analyzer consists of a direct insertion type probe and a digital display converter. Additionally, a calibration unit can be selected from among the various measuring instruments; flow setting unit, gas calibration unit, standard gas unit, etc., according to specifications. A solenoid valve unit can be added to improve the safety for unburnt gas. The probe is directly attached to the wall of the flue or furnace and absolutely no sampling device is required to measure the concentration of oxygen in the flue gas. The converter has a large-scale digital display which shows the cell temperature and cell e.m.f. in addition to the oxygen concentration. A linear output for external instruments is provided. Because of the self-diagnosis function, the analyzer can be easily incorporated in combustion control loops. This analyzer is most suitable for monitoring the oxygen concentration of combustion gas in large or small boilers, various industrial furnace and combustion devices, or for the control of low-oxygen combustion.

BASIC SYSTEM CONFIGURATION



*1 Conduits
1) When installing conduits, use flexible conduits so that the probe can be removed.
2) Use shielded cable for the signal cable and ground the shield together with the probe ground.
3) When the length of the wiring between the probe and converter is within 20 m, the signal and heater cable can be accommodated in the same conduit.
(However, if noise from the heater is induced onto the signal line, provide separate conduits for the signal and heater lines or change the installation site.)

*2 Any of the following four probe types can be selected according to the specifications: (1) Standard type (2) Probe supporter attached type (3) Probe protector attached type (4) High temperature type.

*3 When atmospheric air is used as reference gas, piping, flowmeter unit and needle valves on the reference gas line are not necessary.

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GS 11M6A2-E

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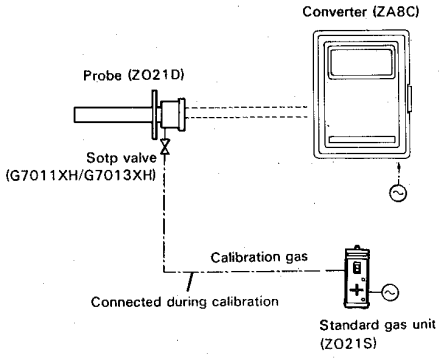
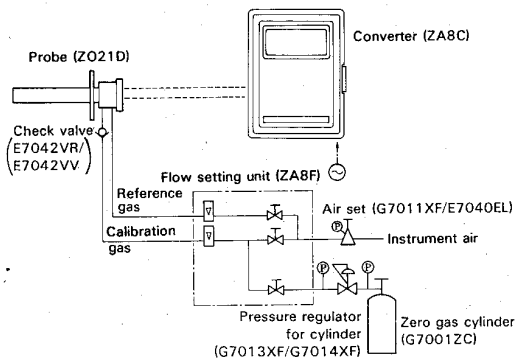
System configuration (example 1)

- Atmospheric air is used for reference gas. The portable standard gas unit (ZO21S) is used as calibration gas and permanent calibration gas piping is not used.
- Application example: Relatively simple applications such as observation of O_2 in a package boiler, etc.



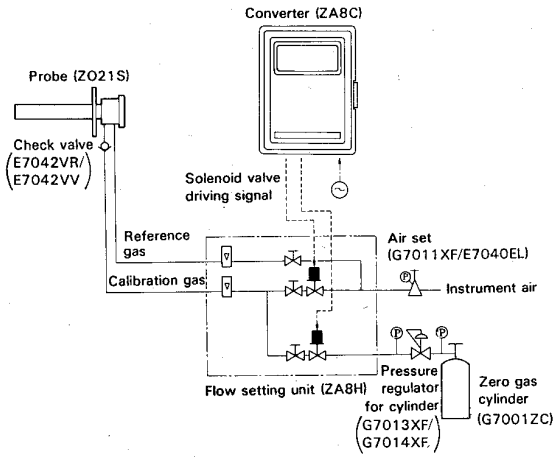
System configuration (example 2)

- Instrument air may be used as reference gas. A standard gas cylinder is used for the calibration gas and high precision measurements are made.
- Application example: Observation and control of O_2 in large-scale boilers (domestic and office use), heating furnace, etc.



System configuration (example 3)

- When calibration procedure in system configuration example 2 is automated.
- Application example: Same as example 2.



System configuration (example 4)

- When solenoid valve unit is attached to system configuration example 2 or 3.
  In the event of an emergency such as presence of inflammable gases, power to the detector heater is turned OFF through the external contact point, and at the same time, the sensor is purged with N_2 or zero gas (mostly N_2) to ensure safety.
- Application example: Same as example 2.

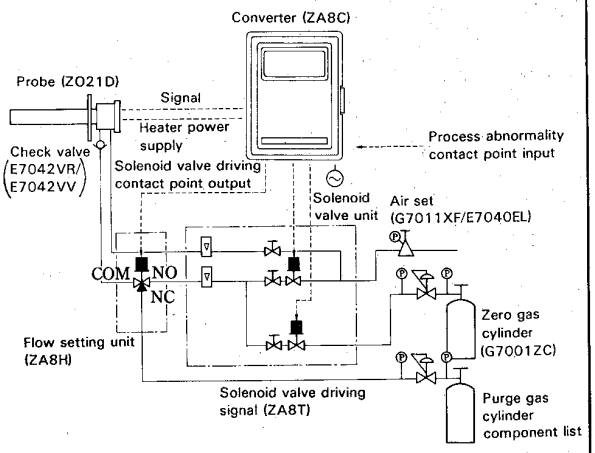
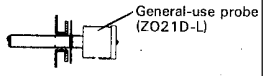
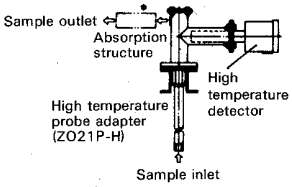
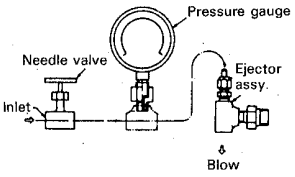
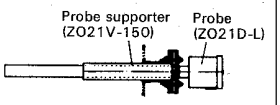
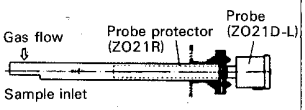
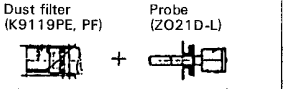


Table of components

	System 1	System 2	System 3	System 4
Probe ZO21D*	○	○	○	○
Converter ZA8C	○	○	○	○
Standard gas unit ZO21S	○			
Flow setting unit (basic) ZA8F		○		
Flow setting unit (for automatic calibration) ZA8H			○	○
Stop valve G7011XH/G7013XH	○			
Check valve E7042VR/E7042VV		○	○	○
Air set G7011XF/E7040EL		○	○	○
Zero gas cylinder G7001ZC		○	○	○
Pressure regulator for zero gas cylinder G7013XF/G7014XF		○	○	○
Solenoid valve unit ZA8T				○
Purge gas cylinder				○
Pressure regulator for zero gas cylinder				○

* Selection of probe can be done by refering to the above.

Probe Configuration

Process gas temperature 0 to 600°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	 Temperature: Probe material SUS310S 750°C Probe material SK 1400°C Mounting: Vertical downwards Insertion length: 1.0m, 1.5m When duct pressure is atmospheric or negative, attach air ejector. * High-temperature auxiliary ejector 	· Heating furnace
Vertical	3m				
Horizontal	3m		· Boiler · Heating furnace		
Horizontal to vertical	0.4 to 2m		· For pulverized coal boiler with gas flow velocity 10m/s or more · Cement kiln		
Horizontal to vertical	1.0 to 2m		· Black liquid recovery boiler · Cement kiln		
Vertical	3m				

Application Example

- Large, medium and small size boiler (boilers for dynamos: heavy oil, gas, coal or bark)
- Various industrial furnaces (refinery process/iron manufacture heater furnace, coal kiln, black liquid recovery boiler, etc.)

Please contact Yokogawa for other applications.

STANDARD SPECIFICATIONS

1. General Specifications

Measurement Objects: Oxygen concentration in combustion exhaust gas and mixed gas (excluding inflammable gases)
Measurement System: Zirconia system
Measurement Range: Display; 0 to 100 vol%O_2 (3 digital display).
Output: 0 to 5 vol%O_2 to 0 to 100 vol%O_2
Warm-up Time: Approx. 10 minutes
Maximum Distance Between Probe and Converter: Conductor two-way resistance must be 10 Ω or less (300 m or less with 1.25 mm^2 conductors)
Power Supply: 100, 115, 220, 240 V AC + 10%, −15% 50/60 Hz
Power Consumption: Approx. 80 V A for ordinary use, Max. 270 VA

CHARACTERISTICS

Repeatability: ±0.5% F.S.
Linearity: ±1% F.S. (less than 0 to 25% range)
Drift: Both zero and span ±2% F.S/month
Response time: Response of 90% within 5 seconds; when gas is fed through a calibartion gas inlet and measured when analog output signal is changed.

2. Probe

2.1 General-Use Probe ZO21D-L

Zirconia cell is heated up to 750°C. In cases where gas may remain unburnt in the furnace, use solenoid valve unit to prevent explosion inside furnace.
Sample Gas Temperature: 0 to 600°C
Sample Gas Pressure: −500 to +500 mm H_2O
Insertion Length: 0.4, 1.0, 1.5, 2.0, 3.0 m
Ambient Temperature: −10°C to +80°C
Material in Contact with Gas: SUS316, Zirconia, SUS304 (Flange)
Installation: Flange mounting (FF type)
Probe Mounting Angle: Horizontal to vertically downward.
When probe insertion length is 2 m or less, installing at angles from horizontal to vertical downward is available.
When probe insertion length 2 m, mount vertically downward (within ±5°), and if installing at angles from horizontal to vertical downward (within ±5°), use a probe supporter.
Connection: Rc1/8 or 1/8NPT
Flange: JIS 5K65A FF or equivalent. ANSI 4B 150LB FF equivalent (no serration) or DIN PN10-DN50-A equivalent. Flange thickness differs.
Construction: Non-explosion proof and rain-proof construction.
Case: Material; SPCC
Paint color; Munsell 2.0 GY 3.1/0.5 or equivalent
Finish; Resin baked epoxy
Weight: Insertion length 0.4 m: approx. 4/8/6.5 kg (JIS/ANSI/DIN)
Insertion length 1.0 m: Approx. 6/9/7.5 kg (JIS/ANSI/DIN)
Insertion length 1.5 m: Approx. 7/10/8.5 kg (JIS/ANSI/DIN)
Insertion length 2.0 m: Approx. 8.5/11/9.5 kg (JIS/ANSI/DIN)
Insertion length 3.0 m: Approx. 10.5/13.5/12 kg (JIS/ANSI/DIN)

2.2 Probe Supporter ZO21V

Used for probe protection when probe or over 2 m is mounted at angles other than vertical downward.
Insertion Length: 1.5 m (when insertion length of probe is 3 m)
Material: SUS316, SU304 (Flange)
Installation: Flange mounting (FF type)
Flange: JIS 5K6SAFF equivalent. ANSI 4B150LB FF (no serration) equivalent or DIN PN10-DN50-A equivalent. Flange thickness varies.
Probe Installation Angle: Horizontal to vertical downward.
Weight: Approx. 10/13/11.5 kg (JIS/ANSI/DIN)

2.3 High Temperature Probe (ZO21D-H) with High Temperature Probe Adapter (ZO21P-H)

Temperature probe adapter is required for high temperatures.
Sample Gas Temperature: 0 to 1400°C (when using SiC probe)
0 to 750°C (when using SUS310S probe)
Sample Gas Pressure: −50 to +500 mm H_2O (Auxiliary ejector is reqired in cases of negative pressure)
Insertion Length: 1 m, 1.5 m
Ambient Temperature: −10 to +150°C
Material in Contact with Gas: SUS316, Zirconia, SiC or SUS310S, SUS304 (flange)
Installation: Flange mounting (FF type or RF type)
Flange; JIS5K50A FF equivalent. ANSI14B 150LB RF equivalent (no serration) or DIN PN10-DN50-A equivalent.
Probe mounting angle; vertical downward (within +5°C)
SUS310S probe can be mounted horizontally.
Construction: Non explosion-proof, rain-proof construction
Case Material: SUS304
Weight: Insertion length 1 m: Approx. 6.5/8.5/7 kg (JIS/ANSI/DIN)
Insertion length 1.5 m: Approx. 7.5/9.5/8 kg (JIS/ANSI/DIN)

3. Converter ZA8C

Display Section: Measured value display section; 4 digit LED. Talk and response display; 40 character LCD dot matrix display with back light.

Display Content:

LED: Oxygen concentration (vol %) error code display

LCD: Measured value (1st level) group A:

Analog bar (output range, alarm setting values, simultaneous display) Max./Min. O_2 value, average value (period setting possible), cell e.m.f. (mV), cell temperature (°C), thermocouple e.m.f. (mV), analog output (mA)/output range (vol %), date/time (year/month/day/hour/minute), over concentration ratio.

Measured Value Group B (2nd level):

Dehydrated O_2 concentration, span correction rate/record, zero correction rate/record, cell response time (seconds), cell resistance (Ω), cell condition, estimated cell life-span, thermocouple cold junction temperature (°C), heater ON time rate, combustion efficiency (%) (optional)

Set Value Group C (calibration related):

Calibration gas concentration (%O_2), calibration mode (one-touch, semi-auto, auto), stabilization time, calibration time, calibration cycle, calibration starting time

Set Value Group D (output related):

Output range 1,2 (%O_2), presence or absence of output hold, preset value, analog output selection (4 to 20 mA/0 to 20 mA, linear/log, humidified/dehumidified O_2), analog output smoothing constant

Set Value Group E (alarm):

HH alarm, H alarm, LL alarm, L alarm set value, contact point output delay (second)/hysteresis (% span)

Status Message Group:

Self-diagnosis, calibrating, warming-up, stabilizing, abnormal content

Talk and Response Message Group:

Calibration operation indicator, component check indicator, refer to instruction manual indicator, enter password indicator

Help Message:

Supplementary information to display content

Analog Output Signal:

Range: Any settings between 0 to 5 through 0 to 100% switching between 2 ranges by external contact point input (option). Partial range (span/zero rate ≧ 1.3)

4 to 20 mA DC or 0 to 20 mA (Max. load resistance 550 Ω) can be selected.

Linear or log is selectable.

Input/output insulation

Output dumping: 0 to 255 seconds, dumping released during abrupt output change (releasing range: 0 to 30 vol%)

Hold/non-hold selection, preset value setting possible with hold

Choice of Humidified/Dehumidified concentration

Contact Point Output Signal:

3 points, contact point capacity 30 V DC 2 A, 250 V AC 2 A (resistance load)

Choice of fail-safe condition (normally energized, normally de-energized) NO, NC selected at jumper pin. Delay function (0 to 255 sec.), Hysteresis function (0 to 25% span) can be set for Hi/Lo alarm.

The following functions of the various contact point output is programmable:

(1) Abnormal (self-diagnosis) (2) HiHi alarm (3) Hi alarm (4) LoLo alarm (5) Lo alarm (6) Entry (7) Range switching answer back (8) Warming-up (9) Pressure reduction of calibraton gas (repeat output of contact point input) (11) Calibration (12) Operating of package unit (13) Blow-back

If any one combination is applicable during default, contact points will operate

Contact point 1: NC, normally energized (1) Abnormal

Contact point 2: NO, de-energized, (6) Entry + (11) Calibration + (8) Warming-up

Contact point 3: NO, de-energized, (3) Hi alarm + (5) Lo alarm

Contact Point Input (optional): 2 points, isolated.

Contact point input or Voltage input;

	ON	OFF
Contact point input	200 Ω or less	100 kΩ or more
Voltage input	−1 to +1 V DC	+4.5 to 25 V DC or more

The following functions of the various contact point input is programmable.

(1) Falling calibration gas pressure alarm (2) Range switching (3) External calibration start (4) Abnormal process alarm (When this is received, power to heater is cut OFF, solenoid valve operation and contact point output is enabled) (5) Blow-back start

Contact Point Output for Solenoid Valve (optional):

Solid State Relay (Triac) output

Rating: 250 V AC, 1 A

Leakage Current at SSR off: less than 3 mA

Serial Communication: RS422A

Self-Diagnosis: Abnormal cell, abnormal cell temperature (low) (high), abnormal calibration, abnormal ROM/RAM, power cut OFF.

Calibration:

Calibration method; one-touch auto/semi-auto (optional) (All are operated by talk and response procedure with LCD panel). With auto/semi-auto, either zero or span can be skipped.

Calibration gas concentration setting range; 0.5 to 100 vol% (smallest unit: 0.01 vol%)

Span/zero ≧ 2.0

Span/zero ≧ 1.3 for partial range

Surrounding Temperature: −20 to +55°C

Power Supply: 100, 115, 220, 240 V AC + 10%, −15%, 50/60 Hz

Construction: JIS C0920 waterproof, NEMA 4 or equivalent
Power Connection Inlet: Detector connection; two connections ϕ27 holes five connections ϕ22 holes.
Air-Purge: Rc1/4(F) or 1/4NPT (F) connection
Installation: Panel, wall or pipe
Case: Alloy of aluminum
Paint Color: Bright gray green (2.5 GY 5.0/6.0)
Painting: Baked polyurethane
Weight: Approx. 10.0 kg (100 ~ 115 V)
Approx. 11.5 kg (220 ~ 240 V)

OPTIONS

4. Stop Valve G7011XH/G7013XH

These values are recommended as they feature non-leakage construction. They should be mounted on the calibration gas line.
Connection: Rc1/8 or 1/8NPT (F)
Material: BS
Weight: Approx. 80 g

5. Check Valve E7042VR/E7042VV

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 0.5 kg/cm^2 or more is needed, standard gas unit cannot be used.
Connection: PT1/8 or 1/8NPSC (F) (R1/8 or 1/8NPT (M) connection possible)
Material: SUS304
Pressure: Between 0.5 kg/cm^2 G or more 3.0 kg/cm^2 G or less
Weight: Approx. 50 g

6. Auxiliary ejector for High Temperature E7046EC/E7046EN

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

6.1 Ejector Assembly

Ejector Inlet Air Pressure: 0.3 to 0.7 kg/cm^2 G
Air Consumption: Approx. 30 to 40 ℓ/min
Suction gas flow rate: 4 to 7 ℓ/min
Connection: Rc1/4 or 1/4NPT (F), SUS304
Tube Connection: (ϕ6/ϕ4 or 1/4" copper tube or stainless tube)

6.2 Pressure Gauge Assembly

Pressure Gauge
Type: JIS B7505, A1.5U3/8 × 75
Material in Contact with Gas: SUS316
Case Material: Aluminium alloy (Paint color; black)
Scale: 0 to 1 kg/cm^2 G
Bushing (G3/8 × R1/4 or 1/4NPT, SUS304)

6.3 Needle Valve (Rc1/4 or 1/4NPT (F))

Material: SUS316

(Note) Pipes and connectors are not provided.

7. Prove Protector ZO21R

Used when sample gas flow velocity is approximately 10 m/s or more and dust particles wears the detector in cases such as pulverized coal boiler of fluidized bed furnace (or burner) to protect the detector from wearing by dust particles.
Insertion Length: 1.05 m, 1.55 m, 2.05 m.
Flange: JIS 5K 65A FF equivalent. ANSI 4B 150LB FF (without serration) equivalent or DIN PN10-DN50-A equivalent. However, flange thickness is different.
Material: SUS316, SUS304 (Flange)
Weight: 1.0 m; Approx. 6/10/8.5 kg (JIS/ANSI/DIN), 1.5 m; Approx. 9/13/11.5 kg (JIS/ANSI/DIN), 2.0 m; Approx. 12/16/14.5 kg (JIS/ANSI/DIN)
Installation: Bolts, nuts, and washers are provided for detector, probe adapter and process-side flange.

8. Filter E7042UQ

This filter is used to protect the cell from corrosive dust components or high velocity dust in recovery boilers and cement kiln.
Mesh: 70 (Filter)
Material: Carborundum (Filter), SUS316
Weight: Approx. 650 g

9. Flow Setting Unit (ZA8F, H)

This unit controls flow rate 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 rain-proof 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 1/4NPT (F)

9.1 Model ZA8F

Used when instrument air is provided.
Reference Air: Clean air supply of pressure 0.5 to 7 kg/cm^{2}G
Air Consumption: Approx. 1.5 ℓ/min
Weight: Approx. 2 kg

9.2 Model ZA8H

Used when instrument air is provided and an automatic calibration unit is attached. A solenoid valve is supplied with the standard model.

Reference Air: Clean instrument air with pressure of 0.5 to 7 kg/cm²G

Air Consumption: Approx. 1.5 ℓ/min

Weight: Approx. 3.5 kg

10. Air Set (G7011XF/E7040EL)

Primary Pressure: Max. 20 kg/cm²G

Secondary Pressure: 0.1 to 2 kg/cm²G

Connection: Rc1/4 or 1/4NPT (F)

11. Calibration Gas Unit

Sealed Zero Gas Cylinder G7001ZC;

3.4 ℓ, Filled pressure ... 100 to 120 kg/cm²G

Composition ... 0.95 to 1.0 vol% O_2 remaining N_2

Cylinder Pressure Regulator G7013XF/G7014XF;

Pressure gauge ... Primary 0 to 200 kg/cm²G,
Secondary 0 to 5 kg/cm²G

Connection ... Inlet W22 14 threads, right hand screw
Outlet Rc1/4 or 1/4NPT (F)

Material ... Yellow copper body

Case Paint: Baked epoxy resin, Jade green (Munsell 7.5 BG 4/1.5)

Installation: 2B pipe mounting

Weight: Approx. 10 kg

Connection: Rc1/4 or 1/4NPT (F)

12. Standard Gas Unit Z021S

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 provided):

Capacity: 1 ℓ

Filled pressure: 7 kg/cm² G (at 35°C)

Composition: 0.95 to 1.0 vol% O_2 + N_2 balance

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

Power Consumption: Max. 5 V A

Paint Color: Mainframe; Munsell 2.0 GY, 3.1/0.5 or equivalent

Cover; Munsell 2.8 GY, 6.4/0.9 or equivalent

Weight: Approx. 3 kg

13. Solenoid Valve Unit ZA8T

Used for preventing explosion caused by unburnt gas inside furnace.

Operation:

Operating signal is sent to the solenoid valve of the purge unit from the converter ZA8C when it is informed of abnormalities in the furnace by an external contact point signal. Through the purge unit, process gas is purged form the sensor. Power to converter and detector heater is cut OFF and temperature of sensor lowered.

Purge Gas:

Type; N_2 gas

Pressure; Approx. 0.5 kg/cm² G

Flow rate; Approx. 4 ℓ/min

Connection: Rc1/4 (F) or 1/4NPT (F)

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

Construction: Dust-proof and rain-proof construction

Installation: Panel, wall or pipe mounting

Plate Material: SPCC

Painting: Baked epoxy resin, Dark green (Munsell 2.0 GY 3.1/0.5 or equivalent)

Weight: Approx. 0.8 kg

14. CE Conformity Standard

Emission

CE certificate is approved for model ZA8C.

The standards are describes as following.

14.1 Applicable standard of emission is based on EN55011: 1991.

Table 1. Emission-Enclosure port

No.	Test item	Frequency range	Limits	Basic standard
1	Electromagnetic radiation disturbance	30 MHz to 230 MHz	30 dB (μV/m) quasi peak measured at 30 m distance	CISPR 11 Class A Group 1
		230 MHz to 1000 MHz	37 dB (μV/m) quasi peak measured at 30 m distance	
		1 GHz to 18 GHz except 11.7 GHz to 12.7 GHz	Under consideration	
		11.7 GHz to 12.7 GHz	57 dB (PW) erp	

Table 2. Emission-AC mains port

No.	Test item	Frequency range	Limits	Basic standard
1	Mains terminal disturbance voltage	0.15 MHz to 0.5 MHz	79 dB (μV) quasi peak 66 dB (μV) average	CISPR 11 Class A Group 1
		0.5 MHz to 5.0 MHz	73 dB (μV) quasi peak 60 dB (μV) average	
		5 MHz to 30 MHz	73 dB (μV) quasi peak 60 dB (μV) average	

14.2 Immunity

Applicable standard of immunity is based on EN 50082-2: 1995.

Table 3. Immunity-Enclosure port

No.	Test item	Test specification	Basic standard	Performance criteria See Note 5
1	Electrostatic discharge	4 kV (contact) 8 kV (air)	EN 61000-4-2 IEC 1000-4-2: 1995 Level 3	B
2	Radio-frequency electromagnetic field Amplitude modulated	80 to 1000 MHz 10 V/m (unmodulated) See Note 1 80% AM (1 kHz)	ENV 50140 IEC 1000-4-3: 1995 Level 3	A
3	Radio-frequency electromagnetic field Pulse modulated	900 MHz 10 V/m (unmodulated) Duty cycle 50% Rep. freq. 200 Hz	ENV 50204	A
4	Power-frequency magnetic field	50 Hz 30 A (rms)/m See Note 2	EN 61000-4-8 IEC 1000-4-8: 1993 Level 4	A

Note 1: Except for the ITU broadcast frequency bands: 87 MHz to 108 MHz, 174 MHz to 230 MHz, and 470 MHz to 790 MHz where the level shall be 3 V/m.

Note 2: CRT display interference is allowed above 3 A/m. Applicable only to apparatus containing devices susceptible to magnetic fields, e.g. hall elements, electrodynamic microphones, etc.

Table 4. Immunity-Ports for signal lines and data buses not involved in process control, etc.

No.	Test item	Test specification	Basic standard	Performance criteria See Note 5
1	Fast transients common mode	1 kV 5/50 Tr/Th ns 5 kHz REP. See Note 3	EN 61000-4-4 IEC 1000-4-4: 1995 Level 3	B
2	Radio-frequency common mode Amplitude modulated	0.15 to 80 MHz 10 V(unmodulated) See Notes 3 & 4 80% AM (1 kHz) Source impedance 150 Ω	ENV 50141 Draft IEC 1000-4-6: 1995 Level 3	A

Table 5. Immunity-Ports for process, measurement and control lines, and long bus control lines

No.	Test item	Test specification	Basic standard	Performance criteria See Note 5
1	Fast transients common mode	2 kV 5/50 Tr/Th ns 5 kHz REP.	EN 61000-4-4 IEC 1000-4-4: 1995 Level 3	B
2	Radio-frequency common mode Amplitude modulated	0.15 to 80 MHz 10 V(unmodulated) See Notes 3 & 4 80% AM (1 kHz) Source impedance 150 Ω	ENV 50141 Draft IEC 1000-4-6: 1995 Level 3	A

Table 6. Immunity-Ports for input power lines

No.	Test item	Test specification	Basic standard	Performance criteria See Note 5
1	Fast transients common mode	2 kV 5/50 Tr/Th ns 5 kHz REP.	EN 61000-4-4 IEC 1000-4-4: 1995 Level 3	B
2	Radio-frequency common mode Amplitude modulated	0.15 to 80 MHz 10 V(unmodulated) See Notes 3 & 4 80% AM (1 kHz) Source impedance 150 Ω	ENV 50141 Draft IEC 1000-4-6: 1995 Level 3	A

Note 3: Applicable only to parts interfacing with cables whose total length according to the manufacturer's functional specification may exceed 3 m.

Note 4: Except for the ITU broadcast frequency bands: 47 MHz to 68 MHz where the level shall be 3 V/m.

Note 5: Performance criteria

Performance Criterion A: normal performance within the specification limits

Performance Criterion B: temporary degradation or less of function or performance which is self-recoverable

Performance Criterion C: temporary degradation or loss of function or performance which requires operator intervention or system reset

Performance Criterion D: degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data

MODEL AND SUFFIX CODE

1. General-Use Probe (0 to 600°C)

Model	Suffix code	Option code	Description
ZO21D	-L		General-use Probe
	-E		CE conformity standard Note1
Insertion length	-040		0.4 m
	-100		1.0 m
	-150		1.5 m
	-200		2.0 m
	-300		3.0 m
Flange connector	-J		JIS5K 65A FF equivalent, Rc1/8
	-A		ANSI 4B 150LB FF equivalent, 1/8NPT (F)
	-E		DIN PN10-DN50-A equivalent, 1/8NPT (F)
Style code	*B		Style B
Check valve		/CV	With check valve
Stop valve		/SV	With stop valve

Note 1: Select E if CE conformity standard is necessary.

1.1 Probe Suporter

Model	Suffix code	Option code	Description
Z021V			Probe Suporter
Insertion length	-150		For 3.0 m probe
Flange	-J		JIS 5K 65A FF equivalent
	-A		ANSI 4B 150LB FF equivalent
	-E		DIN PN10-DN50-A equivalent, 1/8NPT (F)
Style code	*B		Style B

1.2 Probe Protecter

Model	Suffix code	Option code	Description
ZO21R	-L		Probe Protecter (0 to 600°C)
Insertion length	-100		1.05 m
	-150		1.55 m
	-200		2.05 m
Flange	-J		JIS 5K 65A FF equivalent
	-A		ANSI 4B 150LB FF equivalent
	-E		DIN PN10-DN50-A equivalent
Style code	*B		Style code

1.3 Filter

Part No.	Description
E7042UQ	Filter

2. High Temperature Probe (0 to 1400°C)

Model	Suffix code	Option code	Description
ZO21D	-H		High Temperature Probe
	-F		CE conformity standard Note1
	-015		Always -015
Flange	-F		JIS 5K 32A FF equivalent, Rc1/8
	-K		JIS 5K 32A FF equivalent, 1/8NPT
Style code	*A		Style A
Check valve		/CV	With check valve
Stop valve		/SV	With stop valve

Note1: Select F if CE conformity standard is necessary.

2.1 High Temperature Probe Adapter

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 50A FF
	-A		ANSI 4B 150LB RF
	-E		DIN PN10-DN50-A equivalent
Style code	*A		Style A

2.2 High Temperature Probe

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

2.3 Auxiliary Ejector for High Temperature

Part No.	Description
E7046EL	Rc1/4, ϕ6/ϕ4 TUBE joint: SUS304
E7046EN	1/4NPT, 1/4TUBE joint: SUS304

3. Converter

Model	Suffix code	Option code	Description
ZA8C			Converter
Display	-E		CE conformity standard
	-S		Standard Note1
Power supply	-3		220V AC, 50/60Hz
	-4		240V AC, 50/60Hz
	-5		100V AC, 50/60Hz
	-8		115V AC, 50/60Hz
Digital communication	-N		Not required
	-A		RS232C(Available in only ZA8C-S:Non CE marking)
	-B		RS422A
Contact input	-0		Not required
	-1		2 points
Process temperature input	-N		Not required
	-A		4-20mA(Available in only ZA8C-S:Non CE marking)
Auto calibration	-0		Not required
	-1		required
Panel letter	-E		English
	-G		German
	-F		French
	-J		Japanese
Style code	*B		Style B
Air purge hole		/AP1	Rc1/4
		/AP2	1/4 NPT (F)
Water tight cable grand		/ECG	JIS A20 equivalent water tight plastics cable grand

Note1: Select E if CE conformity standard is necessary.

4. Stop Valve (Using Calibration Gas Line)

Part No.	Description
G7011XH	Joint: Rc1/8, material: BS
G7013XH	Joint: 1/8NPT (F) with adapter, material: BS

5. Check Valve (Using Calibration Gas Line)

Part No.	Description
E7042VR	Joint: Rc1/8, material: SUS304
E7042VV	Joint: 1/8NPT (F), material: SUS304

6. Flow Setting Unit

6.1 Using Instrument Air

Model	Suffix code	Option code	Description
ZA8F	.....	.....	Flow Setting Unit
Joint	-J	.....	Rc1/4
	-A	.....	1/4NPT (F) with adapter
Style code	*A.....	.....	Style A

6.2 With Auto Calibration (Using Instrument Air)

Model	Suffix code	Option code	Description
ZA8H	.....	.....	Flow Setting Unit (with solenoid valve)
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
Joint	-J	.....	Rc1/4
	-A	.....	1/4NPT (F) with adapter
Style code	*A.....	.....	Style A

7. Airset

Part No.	Description
G7011XF	Joint: Rc1/4, material: A ℓ
E7040EL	Joint: 1/4NPT (F), material: A ℓ with adapter

8. 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
	-E	.....	English
Style code	*A.....	.....	Style A

STANDARD ACCESSORIES (Converter)

Name	Quantity	Remarks
Fuse	2	3.15A
	2	0.5A
Converter terminal screw	5	M4

9. Calibration Gas Unit

9.1 Sealed Zero Gas Cylinder

Part No.	Description
G7001ZC	3.4 ℓ container, 0.95 to 1.0 VOL%O_2 N_2Bal

9.2 Reducing Valve for Cylinder

Part No.	Description
G7013XF	Inlet: W22 14 threads Outlet: Rc1/4
G7014XF	Inlet: W22 14 threads Outlet: 1/4NPT(F)

9.3 Case Assembly

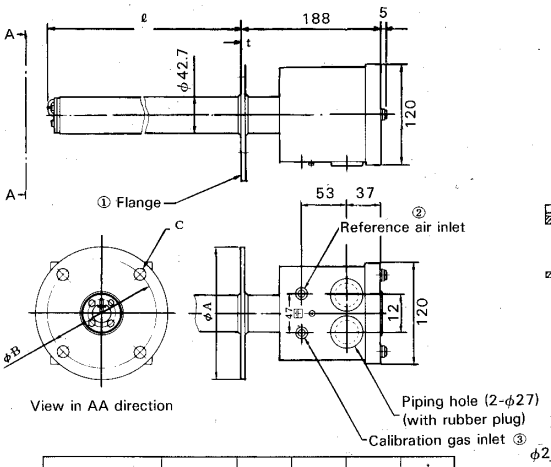
Part No.	Description
E7044KF	Calibration gas unit case

10. Solenoid Valve Unit

Model	Suffix code	Option code	Description
ZA8T	.....	.....	Purge Unit
Power supply	-2	.....	200V AC 50/60Hz
	-3	.....	220V AC 50/60Hz
	-4	.....	240V AC 50/60Hz
	-5	.....	100V AC 50/60Hz
	-7	.....	110V AC 50/60Hz
	-8	.....	115V AC 50/60Hz
Joint	-J	.....	Rc1/4
	-A	.....	1/4NPT (F) with joint
Style code	*A.....	.....	Style A

DIMENSIONAL OUTLINE DRAWING

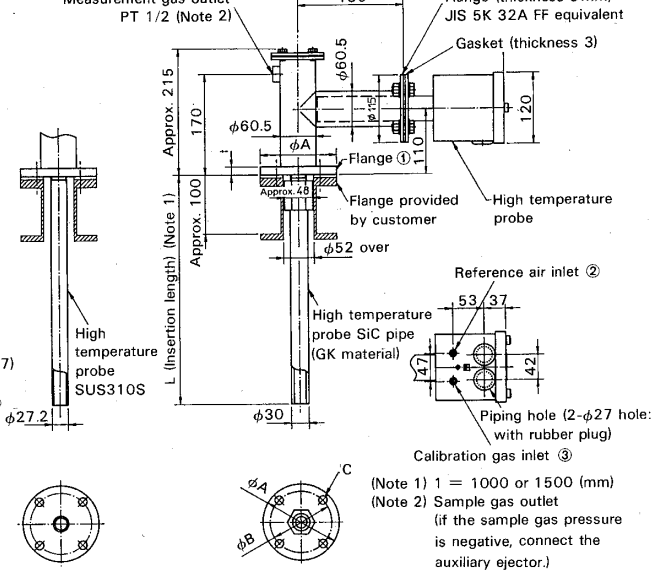
Unit: mm



① Flange	②, ③ Joint	A	B	C	t (Note 2)
JIS5K 65A FF or equivalent	PT1/8(F)	155	130	4-ϕ15	5
ANSI 4B 150LB FF or equivalent	1/8NPT(F)	228.6	190.5	8-ϕ19	12
DIN PN10-DN50-A or equivalent	1/8NPT	165	125	4-ϕ18	12

(Note 1) ℓ = 400, 1000, 1500, 2000, 3000 (mm)

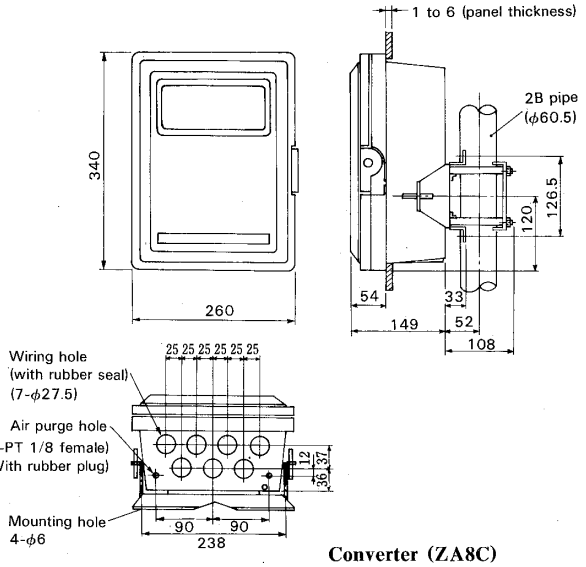
General-Use Detector (ZO21D-L)



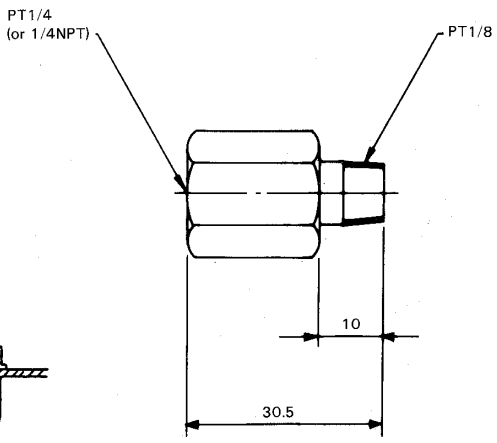
(Note 1) L = 1000 or 1500 (mm)
(Note 2) Sample gas outlet (if the sample gas pressure is negative, connect the auxiliary ejector.)

① Flange	②, ③ Joint	A	B	C
JIS5K 50A FF	Rc1/8	130	105	4-ϕ15
ANSI 4B 150LB RF	1/8NPT(F)	228.6	190.5	8-ϕ19
DIN PN10-DN50-A equivalent	1/8NPT(F)	165	125	4-ϕ18

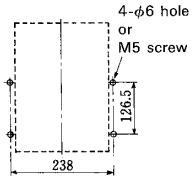
High Temperature Detector with High Temperature Probe (ZO21P-H)



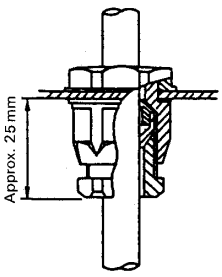
Converter (ZA8C)



Air Purge Connecter

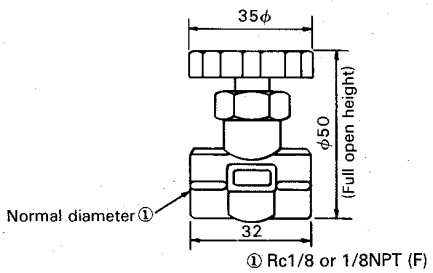


Surface Mounting Holes

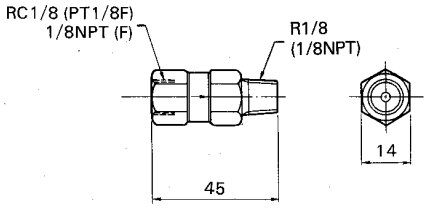


Water Tight Plastics Cable Grand

Unit: mm

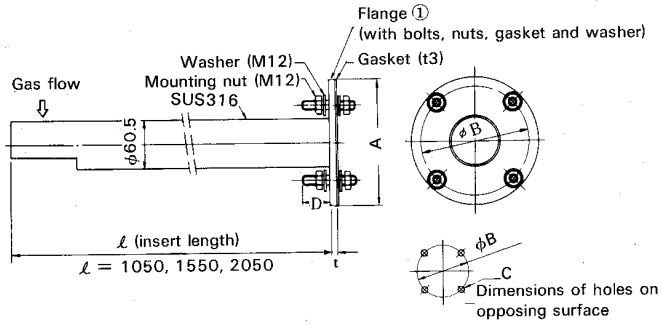


Stop Valve (G7011XH/G7013XH)



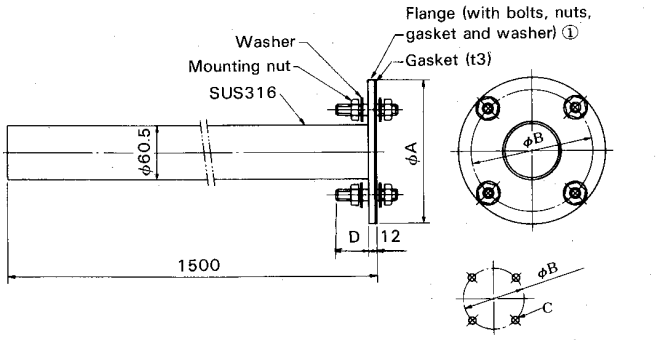
Check Valve (E7042VR/E7042VV)

Unit: mm



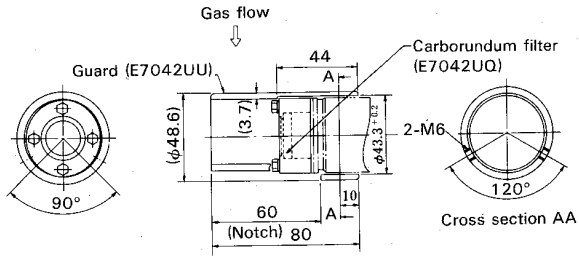
Flange ①	A	B	C	D
JIS5K 65A FF or equivalent	155	130	4-φ15	40
ANSI 4B 150LB FF or equivalent	228.6	190.5	8-φ19	50
DIN PN10-DN50-A or equivalent	165	125	4-φ18	50

Probe Supporter (ZO21V)

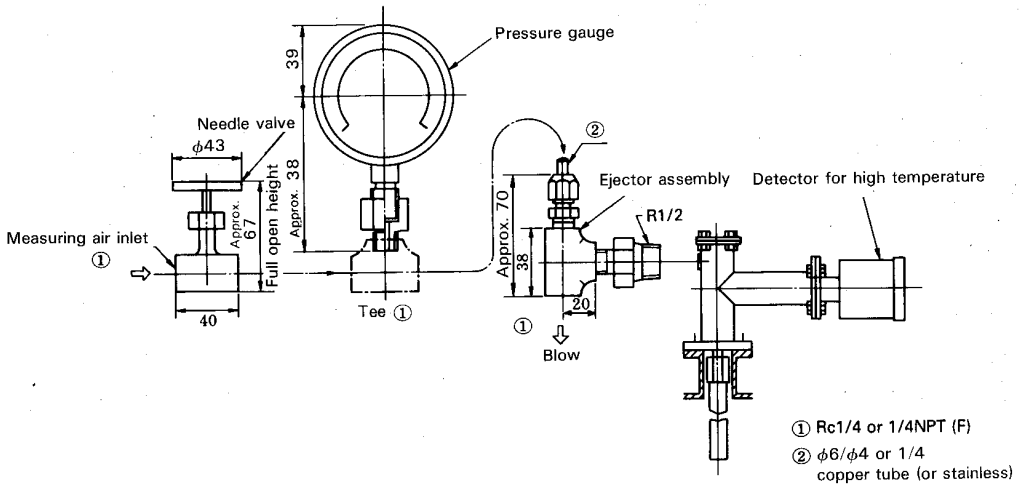


Flange ①	A	B	C	t	D
JIS5K 65A FF or equivalent	155	130	4-φ15	5	40
ANSI 4B 150LB FF or equivalent	228.6	190.5	8-φ19	20	50
DIN PN10-DN50-A or equivalent.	165	125	4-φ18	12	50

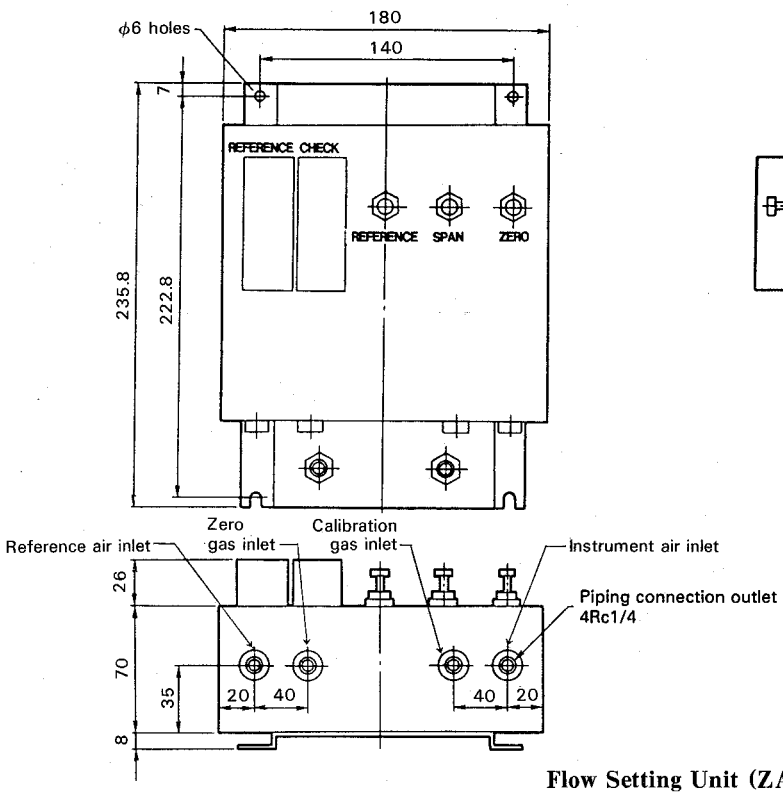
Probe Protector (ZO21R)



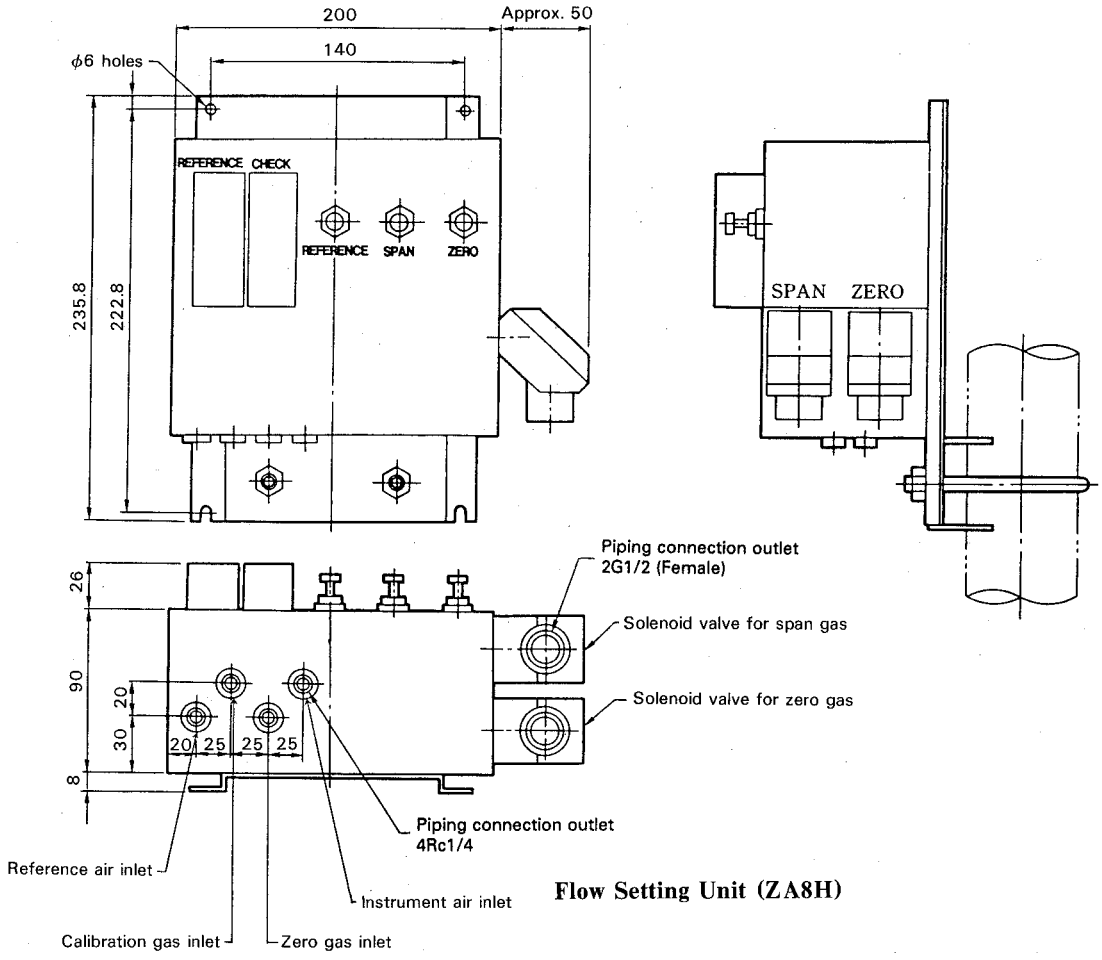
Filter (E7042UQ)



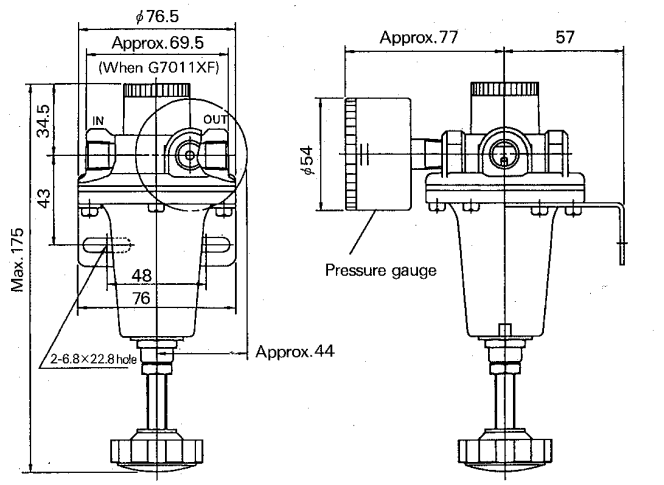
Auxiliary Ejector for High Temperature (E7046EC/E7046EN)



Flow Setting Unit (ZA8F)

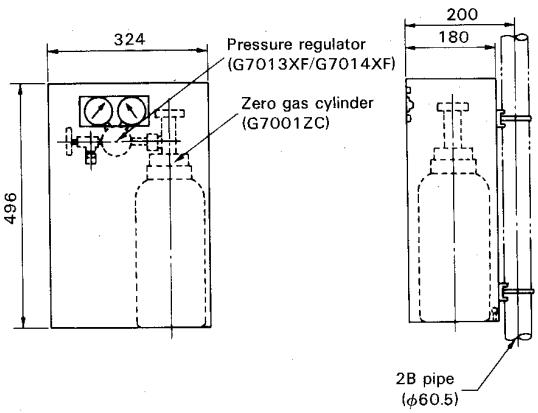


Flow Setting Unit (ZA8H)



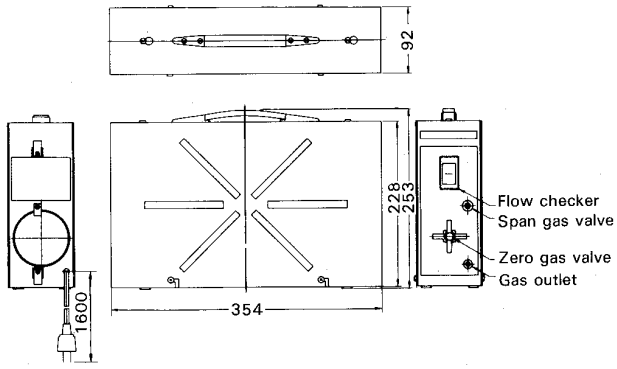
G7011XF : Piping connection (IN : Primary side, OUT: Secondary side), Re 1/4 (PT 1/4 female)
E7040EL : Piping connection (IN : Primary side, OUT: Secondary side), 1/4 NPT female (with tapered joint)

Unit: mm

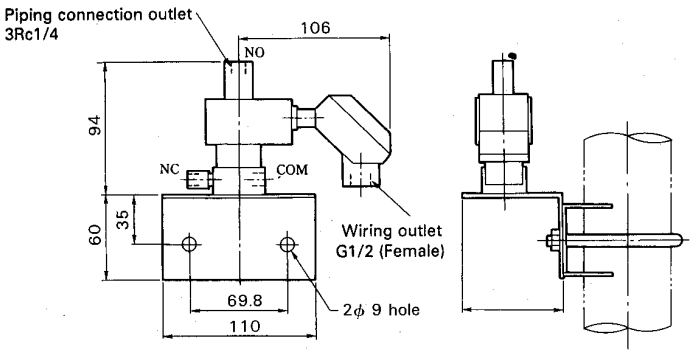


(Note) K9119CS (case assembly) has no zero gas cylinder and pressure regulator

Calibration Gas Unit (E7044KF)

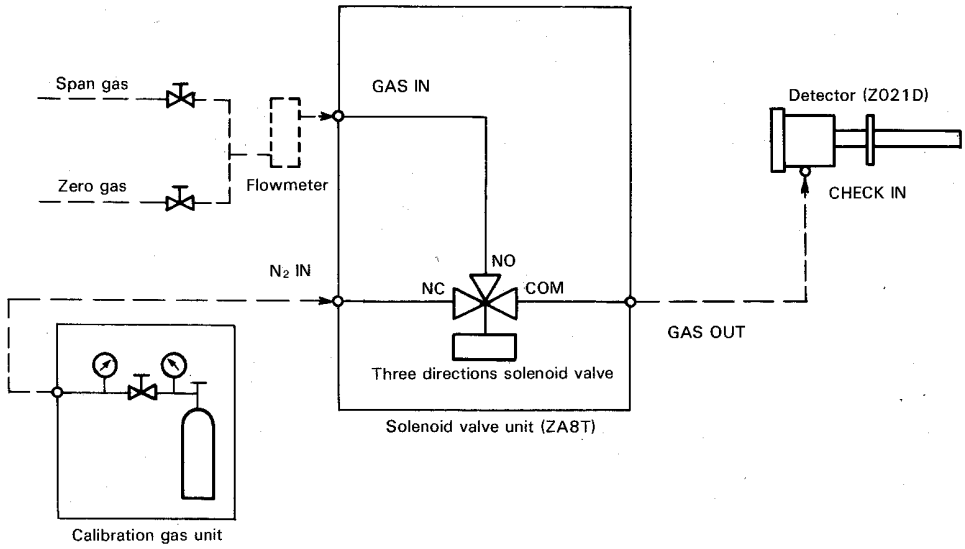


Standard Gas Unit (Z021S)

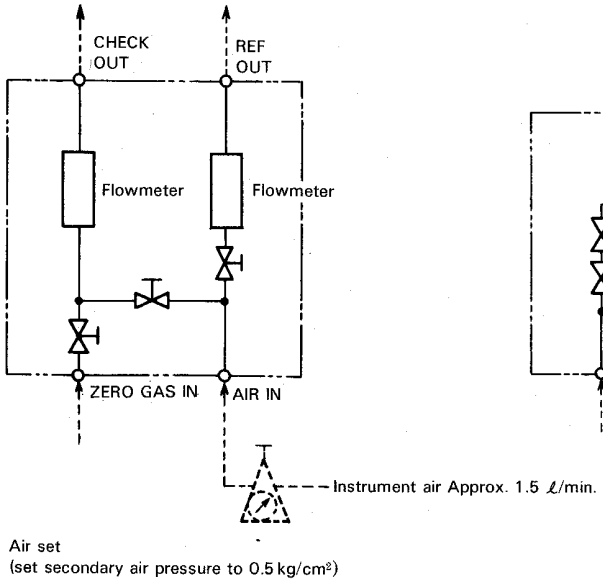


Solenoid Valve Unit (ZA8T)

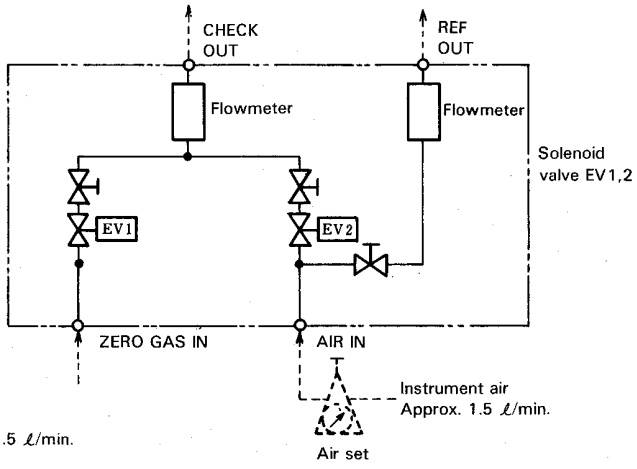
PIPING FLOW CHART



Piping in Solenoid Unit (ZA8T) Setting

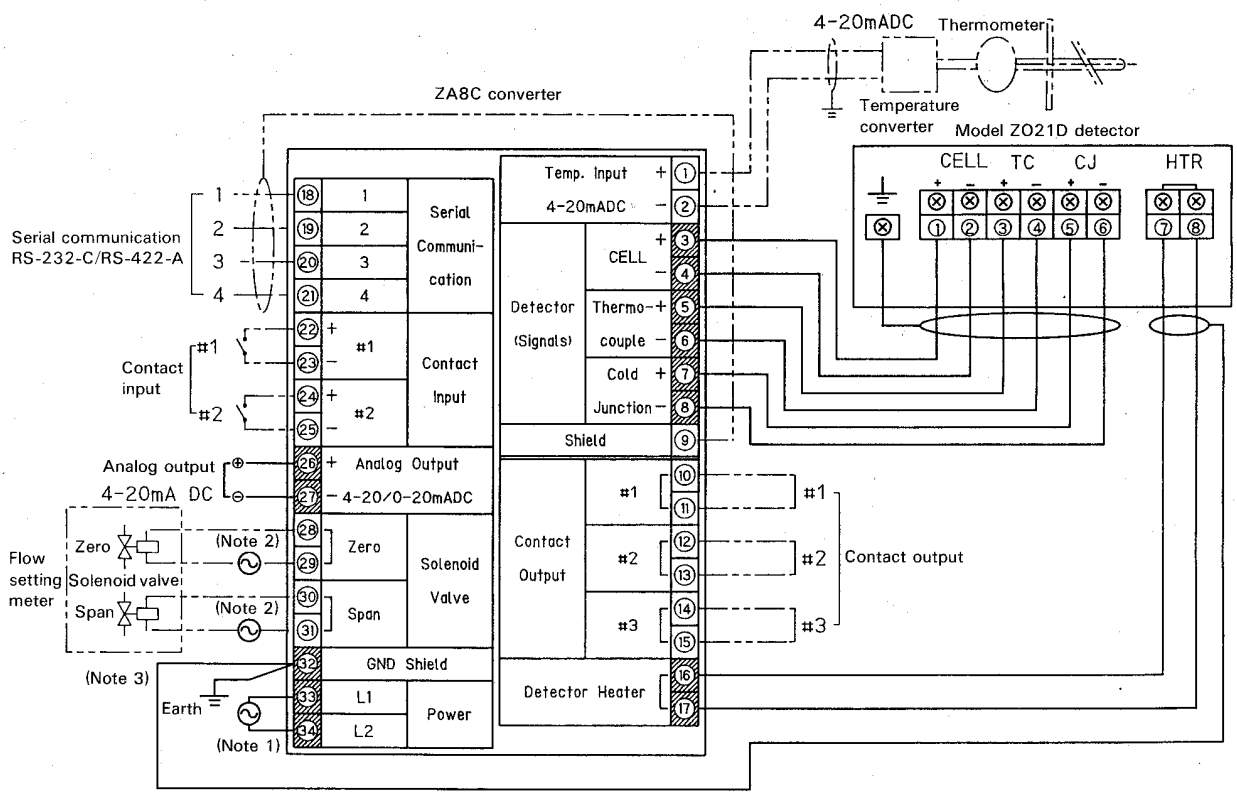


Piping in Flow Setting Unit (ZA8F)



Piping in Flow Setting Unit (ZA8H)

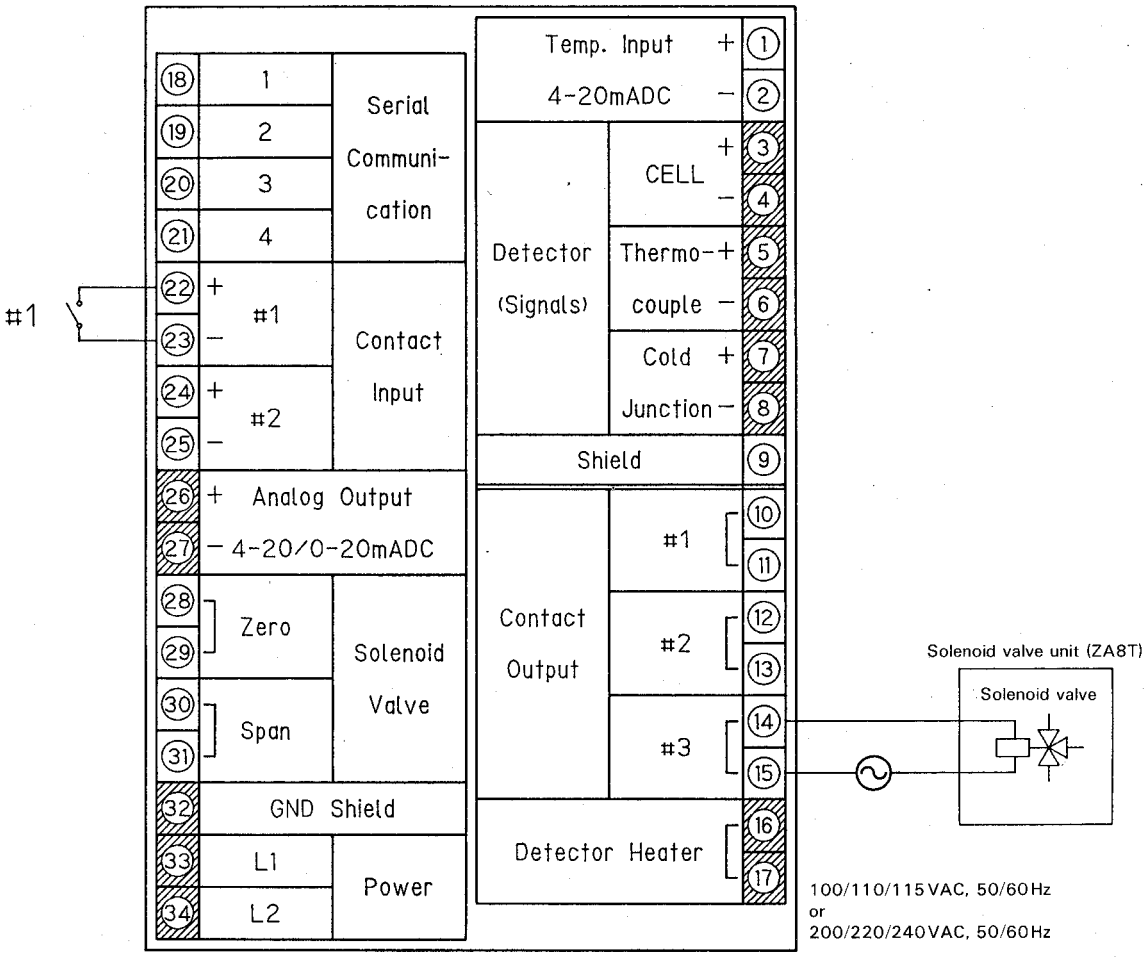
WIRING DIAGRAM



(Note 1) Converter power supply: 100/115/220/240V AC, 50/60Hz
In case of using 220/240V AC, terminal of ㉜ to ㉞ are exclusive use.
(Note 2) Flow setting unit power supply: 100/110/115/200/220/240V AC
(Note 3) Connect the shield of detector HTR cable to terminal of ㉜

Converter (ZA8C)

WIRING DIAGRAM



Using Solenoid Valve Unit (ZA8T)

INQUIRY SHEET

1. General Informations

Customer : _____

Application : ☐ Boiler ☐ furnace
☐ others _____

Fuel : ☐ gas ☐ oil ☐ coal
☐ others _____

Object : ☐ record ☐ control
☐ alarm ☐ indication

Use of analyser : ☐ continuously ☐ _____ per _____

Power supply : A.C. _____V. _____Hz

2. Process Conditions

Description of process : _____

Sample temperature : Nor._____ Min._____ Max._____ ☐ °C, ☐ °F

Sample pressure : Nor._____ Min._____ Max._____ ☐ mmH_2O, ☐ kg/cm^2

Oxygen concentration : Nor._____ Min._____ Max._____ ☐ $vol\%O_2$, ☐

Sample gas flow : Nor._____ Min._____ Max._____ ☐ m/sec, ☐

Dust content : Nor._____ Min._____ Max._____ ☐ g/Nm^3, ☐

SO_2 content : Nor._____ Min._____ Max._____ ☐ g/Nm^3, ☐

$CO/HCl/NO_X$/content : Nor._____ Min._____ Max._____ ☐ g/Nm^3, ☐

Combustible content : Nor._____ Min._____ Max._____ ☐ g/Nm^3, ☐

Specific properties of process : _____

3. Installation data

Position of Probe : ☐ furnace ☐ stack
☐ other _____
_____

Mounting of probe : ☐ horizontal ☐ vertical
☐ _____degrees
☐ outdoor ☐ indoor

Probe length : ☐ 0.4 m ☐ 1.0 m ☐ 1.5 m ☐ 2.0 m ☐ 3.0 m

Flange : ☐ JIS ☐ ANSI ☐ DIN

Instrument air connection : ☐ No ☐ Yes, _____ bar

Automatic calibration : ☐ No ☐ Yes

Reference air connection : ☐ No ☐ Yes, _____ bar

Position of Converter : ☐ outdoor ☐ indoor
☐ cabinet

Distance probe converter : _____ m.

Cabling : ☐ combined ____ mm^2 ☐ separate ____ mm^2

4. Quotation data

☐ General-use probe	☐ Auxiliary ejector for high temperature	☐ Standard gas unit
☐ Probe supporter	☐ Converter	☐ Zero gas cylinder
☐ Probe protector	☐ Stop valve	☐ Reducing valve for cylinder
☐ Filter	☐ Check valve	☐ Auto calibrator
☐ High temperature probe	☐ Flow setting unit	☐ Safety unit
☐ High temperature probe adapter	☐ Air set	☐ Mounting stand
☐ High temperature probe	☐ Standard gas unit	☐ Others

5. Remarks

_____
_____
_____