

# IN-SITU ZIRCONIA OXYGEN ANALYZER <ZIRCOMAT-P>

## DATA SHEET

ZFK, ZRM

This oxygen analyzer is used to continuously measure oxygen concentration in combustible exhaust gas of industrial boilers or furnaces, and is ideally suited for combustion monitoring and control.

The detector (ZFK) used with the analyzer is directly inserted into the objects measured, eliminating the need for a sampling device and provides quick response.

The converter (ZRM) features automatic calibration and blowdown functions. The adoption of liquid crystal display facilitates operation and setting in interactive mode.

Besides the general-use type detector, corrosion resisting type and high temperature type are available for selection according to applications.



General-use detector

High-temperature detector



Converter

## FEATURES

### 1. Output range easily set

Output range can be easily set in 0.5% increments within the scope of 2 to 50%. When oxygen decreases, incomplete combustion level appears on the display (rich mode; output voltage of oxygen detector), instead of oxygen concentration.

### 2. Automatic calibration/blowdown function

Automatic calibration and manual/auto blowdown functions are provided as standard functions. An external solenoid valve is required.

### 3. Easily operated in interactive mode

Interactive mode is adopted to the liquid crystal display for operation and parameter setting, facilitating use even for beginners.

### 4. Combustion efficiency display function

Combustion efficiency calculated from oxygen concentration and temperature of exhaust gas can be displayed as an optional function, which is useful to improve combustion efficiency.

### 5. Sampling device is unnecessary

Gas sampling devices such as a gas aspirator, a dehumidifier, etc. are unnecessary because of use of direct-insertion type detector. The adoption of a flow guide tube utilizing the flow of the measured gas assures quick response (less than 7sec).

### 6. Selection of detector type according to applications

Besides the general-use type detector used under temperatures of less than 600°C, a corrosion-proof detector for measuring incinerator exhaust gas, and a high temperature type detector using heat insulator for the ejector and insertion tube, capable of measuring temperatures up to 1590°C, are available for selection according to applications.

## SPECIFICATIONS

### General

**Measuring object:** Oxygen contained in noncombustible gas

**Measuring principle:**

Direct-insertion zirconia system

**Measuring range:** 0 to 2 .....50 vol% O<sub>2</sub> freely settable (in 0.5% steps)

**Repeatability:** Within ±0.5% of max. output signal

**Linearity:** ±2% of full scale

**Response time:** Within 7sec for 90% response (from calibration gas inlet)

**Power supply:** 100, 115, 220 or 230V AC, 50/60Hz

**Power consumption:**  
(approx.) 15 + 50VA (at steady state of general-use detector)

15 + 200VA (at start of general-use detector)

**Warmup time:** Approx. 15min

### Oxygen detector (ZFK2,5), ejector (ZTA)

**Measuring detector:**

For general-use: ZFK2

For corrosive gas: ZFK5

**Measured gas temperature:**

Flow guide tube system; -20 to +600°C  
(for general-use, corrosive gas)  
Ejector system; -20 to +1590 °C (for  
high-temperature gas)  
-20 to +800°C (for general-use)

**Measured gas pressure:**

-3 to +3kPa (-306 to +306mmH<sub>2</sub>O)

**Flow guide tube:**

With or without blow-down nozzle  
Flange; JIS5K 65A FF  
(JIS5K-80AFF for high particulate gas)  
Insertion length; 0.3, 0.5, 0.75, 1m  
(0.8m for high particulate gas)

**Ejector (general-use):**

Probe for guiding measured gas to de-  
tector  
Flange; JIS10K 65A RF  
Insertion length; 0.5, 0.75, 1, 1.5m  
(according to customer's specification)

**Ambient temperature:**

-20 to +60°C for cable section  
-5 to +100°C for ejector section  
125°C or less at detector flange surface  
with power applied

**Structure:**

Dust/rain-proof structure(IEC IP55  
equivalent)

**Filter:**

Alumina(filtering accuracy 50µm) and  
quartz paper

**Main materials of gas-contacting parts:**

General-use detector; Zirconia, SUS316,  
platinum  
Anticorrosive detector; Zirconia, tita-  
nium, platinum  
Flow guide tube; SUS304 or SUS316  
Ejector (general use);SUS316, SUS304  
Ejector; (for high temperature) SiC,  
SUS316, SUS304

**Calibration gas inlet:**

SUS316

**Reference air inlet (option):**

Rc1/8 or NPT1/8

**Detector mounting:**

Horizontal plane ±45°, ambient sur-  
rounding air should be clean.

**Outer dimensions: (L x max. dia.) 210mm x 100mm**

(detector)

**Mass (approx.) {weight}:**

Detector; 1.6kg  
Ejector; 15kg (insertion length 1m)  
Flow guide tube (general-use, 1m); 5kg

**Finish color:**

Silver and SUS metallic color

**Ejector air inlet flow rate:**

5 to 10 ℓ /min

**Blowdown air inlet pressure:**

200 to 300kPa {2 to 3 kgf/cm<sup>2</sup>}

**Ejector exhaust gas processing:**

Within furnace, returned to flue

**Heater temperature drop alarm output (ejector):**

Alarm output when below 100 °C  
Mechanical thermostat  
N.O. (1a) contact, 200V AC, 2A

**Oxygen converter (ZRM)**

**Measuring range:** 0 to 2 .....50 vol% O<sub>2</sub> freely settable  
(in 0.5% O<sub>2</sub> steps)

**Repeatability:** ±0.5% of full scale

**Linearity:** ±1.0% of full scale

**Indication:** Oxygen concentration; 3-digit LED  
Operation/setting display: 16-digit, 2-line  
LCD  
Mode display: 3pcs LED

**Oxygen concentration output signal:**

4 to 20mA DC (allowable load resistance:  
500Ω or less)  
or 0 to 1V (output resistance: 100Ω or  
less)  
Isolated output, linear

**Contact output signal:**

(1) Contact specification; 4 points, N.O. (1a), 250V AC, 2A  
(2) Contact function;

- Under maintenance
- Under blowdown
- Span calibrating gas
- Zero calibration gas

Following functions freely selected

- High limit alarm
- Low limit alarm
- High/low limit alarm
- Fault (abnormal)

**Contact input signal:**

Auto. calibration start (auto. calibration  
starts when contact closes)  
Calibration disable (calibration disabled  
when contact closes)  
Contact specification; isolated, ON at  
1kΩ or less

**Calibration method:**

(a) Manual calibration with key operation  
(b) Auto. calibration (standard function)  
Calibration cycle; 00 day 00 hour to 90  
days 60 hours

**Calibration gas:**

- Range settings  
Zero gas; 0.010 to 50.000% O<sub>2</sub>  
Span gas; 8.000 to 23.000% O<sub>2</sub>
- Recommended calibration gas concen-  
tration  
Zero gas; 0.25 to 2.0% O<sub>2</sub>  
Span gas; 20.6 to 21.0% O<sub>2</sub>  
(oxygen concentration in the  
air)

**Blowdown:**

A function for blowing out with com-  
pressed air dust that has deposited in the  
flow guide tube. Blowdown can be  
performed for a predetermined time and  
at predetermined intervals.  
Blowdown cycle; 00 hour 00 minute to  
99 hours 60 minutes  
Blowdown time; 0 minute 00 second to  
9 minutes 60 seconds

**Output signal hold:**

Output signal is held during calibration  
and blowdown. The hold function can  
also be released.

**Transmission function (option):**

RS-485  
Transmission distance; Max. 500m total  
Number of units connected; Max. 8 units  
Half-duplex bit serial transmission, start-  
stop synchronization.

Remark: When connecting via an RS-232C interface, a RS232 ↔ RS 485 converter should be used.

**Combustion efficiency display (option):**

This function calculates and displays combustion efficiency from oxygen concentration and measured gas temperature.

Thermocouple (K or R) is required for temperature measurement.

**Rich mode display:**

When the detector output voltage exceeds 200mV (0.0023% O<sub>2</sub>), the rich mode (fuel rich) is indicated in LCD where the LED showing the detector output voltage flickers.

**Self-diagnosis function:**

Provided for detector temperature fault, zero calibration fault, span calibration fault, calibration disable, and detector output fault.

**Ambient temperature:**

-10 to +50°C

**Ambient humidity:** 90% RH or less

**Power supply:** 90 to 220 or 230 V AC, 50/60Hz

**Construction:** Dust-proof, rainproof construction (corresponding to IP53 of IEC)

**Material:** Steel

**Outer dimensions (H x W x D):**

220 X 193 X 89mm

**Mass (weight):** Approx. 3.5kg (excluding cable and detector)

**Finish color:** Munsell 2.5Y8.4/1.2

**Mounting method:** Mounted flush on panel or on pipe

**Electrical Safety:**

**Overvoltage category**

**; II power supply input**

**; I relay interfaces**

**(IEC1010-1)**

**External overcurrent protective device**

**; 10A**

**Equipment interfaces are safety separated (SELV)**

**The product conforms to the requirements of the Electromagnetic compatibility Directive 89/336/EEC as detailed within the technical construction file number TZ734575. The applicable standards used to demonstrate compliance are :**

**EN 55011 : 1992 CLASSA Conducted and Radiated emissions**

**EN 50082-1 : 1992 Radiated immunity, ESD and FBT**

# CODE SYMBOLS

## (Detector)

| ZFK |   |   |   | 9 10 11 12 13 |    |    |    | 14 | Description |                                                     |
|-----|---|---|---|---------------|----|----|----|----|-------------|-----------------------------------------------------|
| 4   | 5 | 6 | 7 | 9             | 10 | 11 | 12 | 13 | 14          | <b>Application</b>                                  |
|     |   |   | 4 |               |    |    |    |    |             | General use                                         |
| 2   |   |   |   |               |    |    |    |    |             | For corrosive gas (refuse incinerator)              |
| 5   |   |   |   |               |    |    |    |    |             | <b>Kinds</b>                                        |
|     |   |   |   |               |    |    |    |    |             | Standard                                            |
|     |   |   |   |               |    |    |    |    |             | <b>Cal. gas inlet</b>                               |
|     |   |   |   |               |    |    |    |    |             | For $\phi$ 6mm tube                                 |
|     |   |   |   |               |    |    |    |    |             | For $\phi$ 1/4 inch tube                            |
|     |   |   |   |               |    |    |    |    |             | <b>Power supply</b>                                 |
|     |   |   |   |               |    |    |    |    |             | 100/115VAC 50/60Hz                                  |
|     |   |   |   |               |    |    |    |    |             | 200/220VAC 50/60Hz                                  |
|     |   |   |   |               |    |    |    |    |             | 230VAC 50/60Hz (CE-marking approved)                |
|     |   |   |   |               |    |    |    |    |             | <b>Flow guide tube</b>                              |
|     |   |   |   |               |    |    |    |    |             | flange application length                           |
|     |   |   |   |               |    |    |    |    |             | 0 Y 0 None                                          |
|     |   |   |   |               |    |    |    |    |             | 5 A 3 SUS304 general use 300mm                      |
|     |   |   |   |               |    |    |    |    |             | 5 A 5 SUS304 general use 500mm                      |
|     |   |   |   |               |    |    |    |    |             | 5 A 7 SUS304 general use 750mm                      |
|     |   |   |   |               |    |    |    |    |             | 5 A 1 SUS304 general use 1000mm                     |
|     |   |   |   |               |    |    |    |    |             | 5 B 3 SUS316 for corrosive gas 300mm                |
|     |   |   |   |               |    |    |    |    |             | 5 B 5 SUS316 for corrosive gas 500mm                |
|     |   |   |   |               |    |    |    |    |             | 5 B 7 SUS316 for corrosive gas 750mm                |
|     |   |   |   |               |    |    |    |    |             | 5 B 1 SUS316 for corrosive gas 1000mm               |
|     |   |   |   |               |    |    |    |    |             | 5 C 3 SUS316 with blow-down nozzle 300mm            |
|     |   |   |   |               |    |    |    |    |             | 5 C 5 SUS316 with blow-down nozzle 500mm            |
|     |   |   |   |               |    |    |    |    |             | 5 C 7 SUS316 with blow-down nozzle 750mm            |
|     |   |   |   |               |    |    |    |    |             | 5 C 1 SUS316 with blow-down nozzle 1000mm           |
|     |   |   |   |               |    |    |    |    |             | 6 D 3 SUS316 for high particulate 300mm             |
|     |   |   |   |               |    |    |    |    |             | 6 D 5 SUS316 for high particulate 500mm             |
|     |   |   |   |               |    |    |    |    |             | 6 D 7 SUS316 for high particulate 750mm             |
|     |   |   |   |               |    |    |    |    |             | 6 D 1 SUS316 for high particulate 1000mm            |
|     |   |   |   |               |    |    |    |    |             | 6 E 3 SUS316 for high particulate with 300mm cover  |
|     |   |   |   |               |    |    |    |    |             | 6 E 5 SUS316 for high particulate with 500mm cover  |
|     |   |   |   |               |    |    |    |    |             | 6 E 7 SUS316 for high particulate with 750mm cover  |
|     |   |   |   |               |    |    |    |    |             | 6 E 1 SUS316 for high particulate with 1000mm cover |
|     |   |   |   |               |    |    |    |    |             | Z Z Z Others                                        |
|     |   |   |   |               |    |    |    |    |             | <b>Protection cover</b>                             |
|     |   |   |   |               |    |    |    |    |             | Y Without                                           |
|     |   |   |   |               |    |    |    |    |             | A With                                              |
|     |   |   |   |               |    |    |    |    |             | <b>Reference air inlet</b>                          |
|     |   |   |   |               |    |    |    |    |             | Y Non                                               |
|     |   |   |   |               |    |    |    |    |             | A Rc1/8                                             |
|     |   |   |   |               |    |    |    |    |             | B NPT1/8                                            |
|     |   |   |   |               |    |    |    |    |             | <b>Non-standard spec.</b>                           |
|     |   |   |   |               |    |    |    |    |             | Z Other non-standard items                          |

## ( Replacement Detector element)

| ZFK |   |   |   | 9 10 11 12 13 |    |    |    | Description |                                                     |
|-----|---|---|---|---------------|----|----|----|-------------|-----------------------------------------------------|
| 4   | 5 | 6 | 7 | 9             | 10 | 11 | 12 | 13          | <b>Application</b>                                  |
|     |   |   | 4 | 0             | Y  | 0  | Y  | Y           | General use (TC516041)                              |
| 2   |   |   |   |               |    |    |    |             | For corrosive gas (refer to incinerator) (TC516042) |
| 5   |   |   |   |               |    |    |    |             | <b>Kinds</b>                                        |
|     |   |   |   |               |    |    |    |             | Standard                                            |
|     |   |   |   |               |    |    |    |             | <b>Cal. gas inlet</b>                               |
|     |   |   |   |               |    |    |    |             | Polypropylene joint for $\phi$ 6 tube               |
|     |   |   |   |               |    |    |    |             | Brass joint for $\phi$ 1/4 inch tube                |
|     |   |   |   |               |    |    |    |             | <b>Power supply</b>                                 |
|     |   |   |   |               |    |    |    |             | 100/115VAC 50/60Hz                                  |
|     |   |   |   |               |    |    |    |             | 200/220VAC 50/60Hz                                  |
|     |   |   |   |               |    |    |    |             | 230VAC 50/60Hz                                      |

## (Ejector)

| Z T A |   |   |   |   |   |   |   | 1 |   |   |   |   |   |   |   | Description                          |
|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------------------|
| 1     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | <b>Measured gas temperature</b>      |
|       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | For high temperatures (+1590°C max.) |
|       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | General-use (+800°C max.)            |
|       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>Insertion length [mm]</b>         |
|       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 500                                  |
|       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 750                                  |
|       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1000                                 |
|       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1500                                 |
|       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>Power supply</b>                  |
|       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 100V/115V AC 50/60Hz                 |
|       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 200V/220V AC 50/60Hz                 |
|       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 230VAC 50/60Hz                       |

## (Converter)

| Z R M |   |   |   |   |   |   |   |   | 1 1 1 |   |   |   |   |   |   |   |   | Description                                           |
|-------|---|---|---|---|---|---|---|---|-------|---|---|---|---|---|---|---|---|-------------------------------------------------------|
| 1     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | <b>Output signal</b>                                  |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | 4 to 20mA DC                                          |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | 0 to 1V DC                                            |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | <b>Optional functions</b>                             |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | None                                                  |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | Serial communication (RS-485)                         |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | Combustion efficiency display                         |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | Transmission function + Combustion efficiency display |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | <b>Power supply</b>                                   |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | 90 to 220V AC 50/60Hz                                 |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | 230VAC 50/60Hz (CE marking approved)                  |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | <b>Mounting method</b>                                |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | 1 Panel mounting                                      |
|       |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   | 2 Pipe mounting                                       |

Note: Specify the detector type.  
(ZFK 2 or 5, R-type or K-type thermocouple)

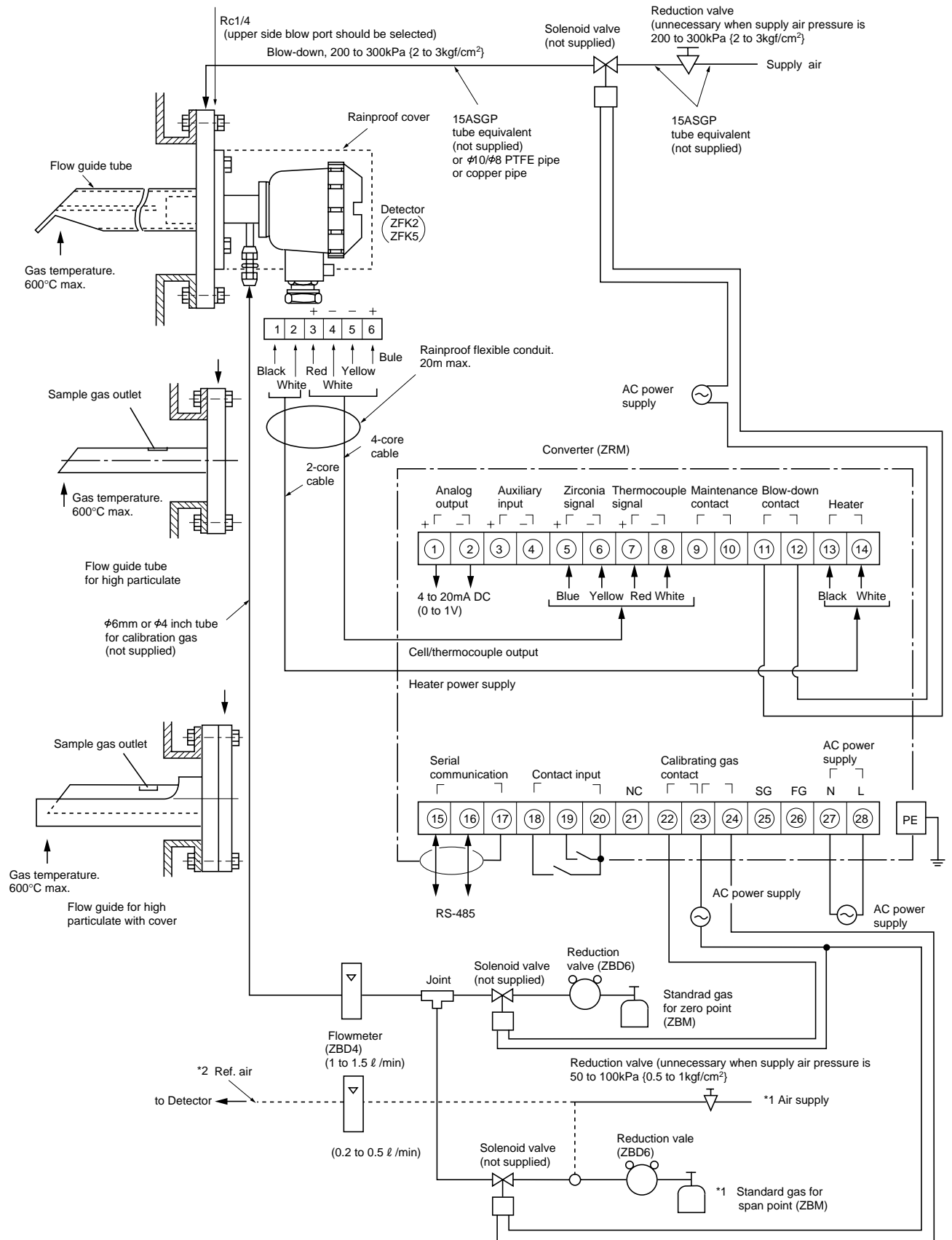
## (Exclusive-special cable)

| Z R Z M |   |   |   |   |   |   |   |   | 1 1 |   |   |   |   |   |   |   |   | Description                |
|---------|---|---|---|---|---|---|---|---|-----|---|---|---|---|---|---|---|---|----------------------------|
| 1       | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1   | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | <b>Connectable devices</b> |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | For ZRM                    |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | <b>Types</b>               |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | For R thermocouple         |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | <b>Conduit length</b>      |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | <b>Cable length</b>        |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | YA None 6m                 |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | YB None 10m                |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | YC None 15m                |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | YD None 20m                |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | YE None 30m                |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | YF None 40m                |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | YG None 50m                |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | YH None 60m                |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | YJ None 70m                |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | YK None 80m                |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | YL None 90m                |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | YM None 100m               |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | AA 6m 6m                   |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | BB 10m 10m                 |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | CC 15m 15m                 |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | DD 20m 20m                 |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | <b>Cable end treatment</b> |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | 0 None                     |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | 1 One side (detector side) |
|         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   | 2 Both sides               |

Note: For connection between detector and converter, the conduit to be used should be rainproof flexible type.

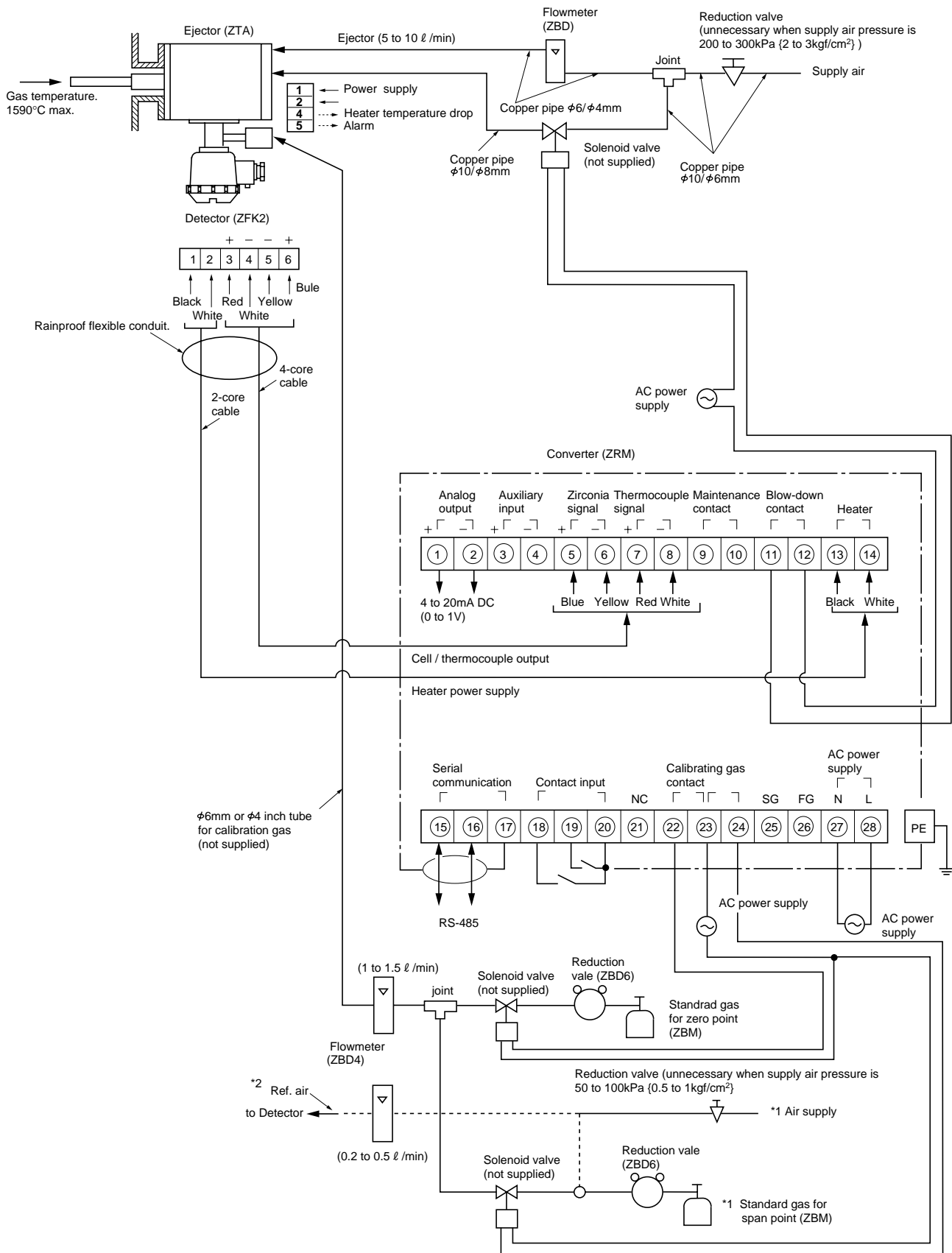
# CONFIGURATION

## Flow guide tube system



Note \*1 Standard gas or instrumentation air can be used in place of span gas.  
 \*2 Instrument quality air or bottled air is available as reference air instead of ambient air.

Ejector system



Note: \*1 Standard gas or instrumentation air can be used in place of span gas.  
 \*2 Instrument quality air or bottled air is available as reference air instead of ambient air.

## SCOPE OF DELIVERY

|                   |                                                                                                                                                                                           |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Detector:</b>  | Detector main unit x 1, Viton O ring x 2, mounting screw (M5mm x 16) x 6, thermal sticker x 1, flow guide tube (as specified) x 1, ceramic filter x 1, rainproof cover (as specified) x 1 |
| <b>Converter:</b> | Converter main unit x 1, mounting bracket set, (according to specification) x 1<br>Accessories (AC250V 500mA T fuse x 2, AC250V 3.15A T fuse x 2)                                         |
| <b>Ejector:</b>   | Ejector main unit x 1, insertion tube x 1, M16mm nut, and washer x 4, packing x 1                                                                                                         |

### Items to be prepared separately:

- (1) Standard gas for calibration
  - Type ZBM□NSH4-01 (up to 5% O<sub>2</sub> range)
  - Type ZBM□NSJ4-01 (over 5% O<sub>2</sub> range)
- (2) Reduction valve for standard gas (type ZBD61003)
- (3) Flowmeter
  - Type; ZBD42203, 0.2 to 2 ℓ /min (for calibrating gas)
  - Type; ZBD42403, 1 to 10 ℓ /min (for ejector)

## CAUTIONS

- If combustible gas (CO, H<sub>2</sub> etc.) exists in the measured gas, error will occur due to burning at the sensor section. The inclusion of corrosive gas (Si vapor, alkaline metal, P, Pb etc.) will shorten the life of the sensor.
- When the measured gas temperature is high (+300°C or higher), the flange should be separated from the furnace wall in order to bring the detector flange surface temperature below the specified value +125°C). The flow guide should be attached in the direction in which the gas flow to the detector decreases.
- When much dust is included in the gas, the flow guide tube should be attached at an inclination so that the flow goes from below to above. And the flow guide should be attached in the direction in which the gas flow to the detector decreases.
- In the case of a refuse incinerator, automatic blow down of the flow guide should not be performed (to prevent corrosion of the flow guide tube due to drainage). Blow-down should be performed manually when change in the indication has become very little with the furnace stopped.

## DEVICE CONFIGURATION

The device to be combined differ according to the conditions of the gas to be measured. Select the devices to be combined with reference to the following table.

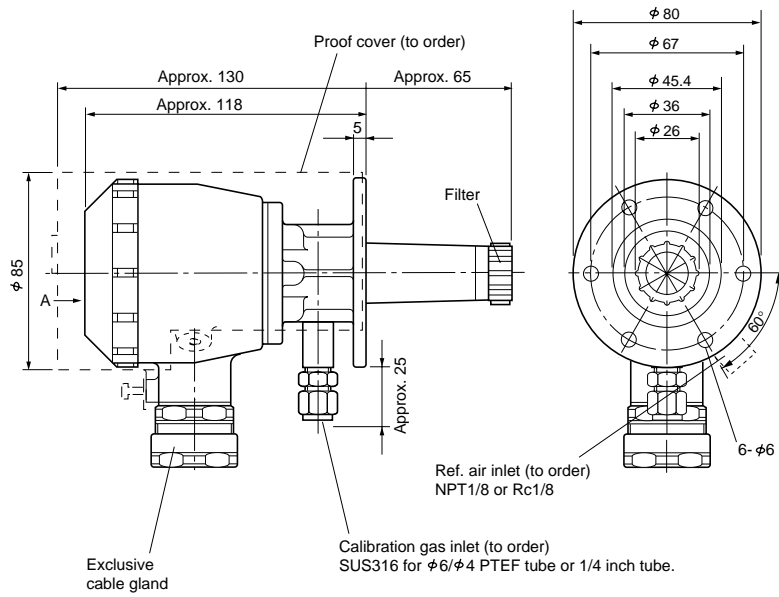
| Measured gas                           |                |                |                                |                  |                                       | Device configuration |                |              |
|----------------------------------------|----------------|----------------|--------------------------------|------------------|---------------------------------------|----------------------|----------------|--------------|
| Application                            | Temperature    | Gas Flow       | DUST                           | Protection cover | Note                                  | Detector type        | Converter type | Ejector type |
| General-use (boiler)                   | 600°C or less  | 5 to 20m/s     | Less than 0.2g/mm <sup>3</sup> | —                | Fuel; gas, oil                        | ZFK2R□□4-□A□□□       | ZRM            | —            |
|                                        |                |                | Less than 10g/Nm <sup>3</sup>  | —                | Fuel: coal with blow down             | ZFK2R□□4-□C□□□       | ZRM            | —            |
| For corrosive gas (refuse incinerator) | 600°C or less  | 5 to 20m/s     | Less than 1g/Nm <sup>3</sup>   | —                | Included low moisture                 | ZFK5R□□4-□B□□□       | ZRM            | —            |
|                                        |                |                | Less than 10g/Nm <sup>3</sup>  | —                | Included low moisture with blow down  | ZFK5R□□4-□C□□□       | ZRM            | —            |
|                                        |                |                | Less than 25g/Nm <sup>3</sup>  | no               | Included low moisture with blow down  | ZFK5R□□4-□D□□□       | ZRM            | —            |
|                                        |                |                | Less than 25g/Nm <sup>3</sup>  | yes              | Included high moisture with blow down | ZFK5R□□4-□E□□□       | ZRM            | —            |
| General-use (boiler)                   | 800°C or less  | Less than 1m/s | Less than 1g/Nm <sup>3</sup>   | —                | SUS316 tube with blow down            | ZFK2R□□4-OYO□□       | ZRM            | ZTA2         |
|                                        | 1590°C or less | Less than 1m/s | Less than 1g/Nm <sup>3</sup>   | —                | SIC tube with blow down               | ZFK2R□□4-OYO□□       | ZRM            | ZTA1         |

Note (1) Dust volume is approximate value.

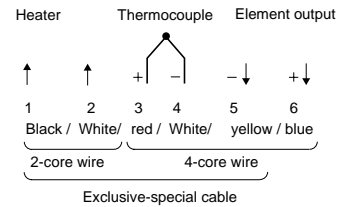
(2) Instrument quality air or bottled air is available as reference air by selecting detector with reference air inlet.

OUTLINE DIAGRAM (Unit:mm)

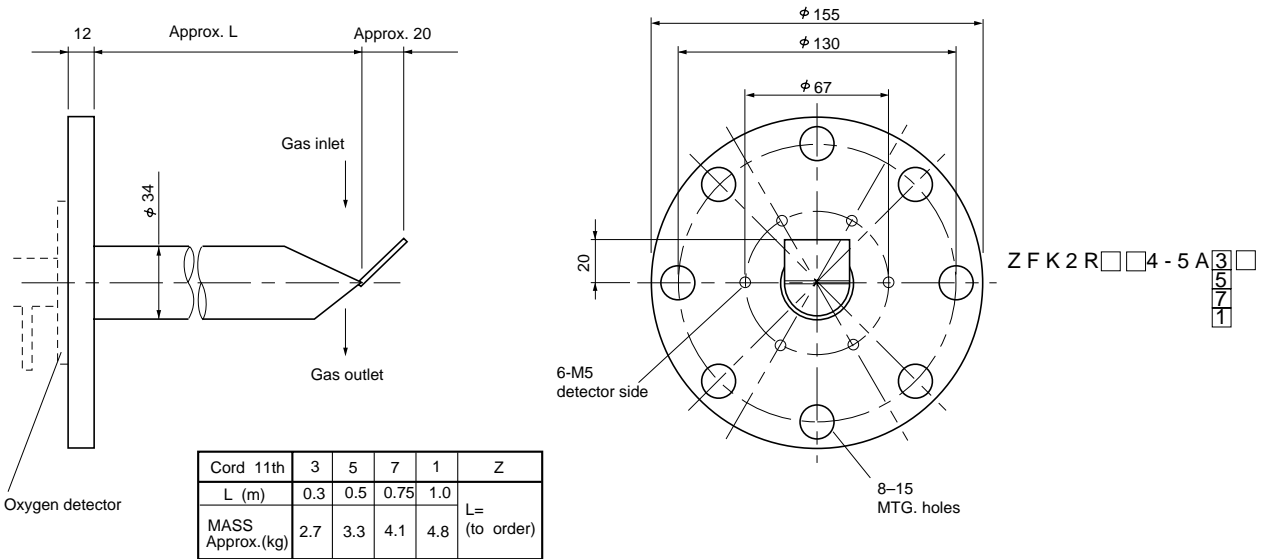
Detector (ZFK2)



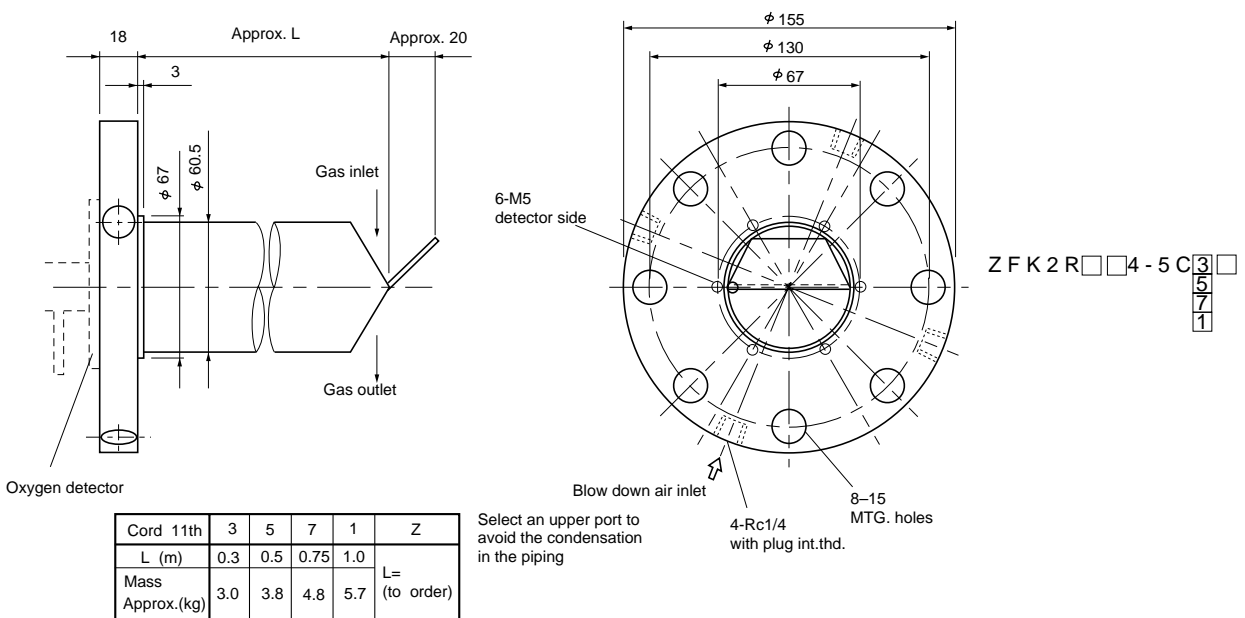
EXTERNAL CONNECTION DIAGRAM



Flow guide tube

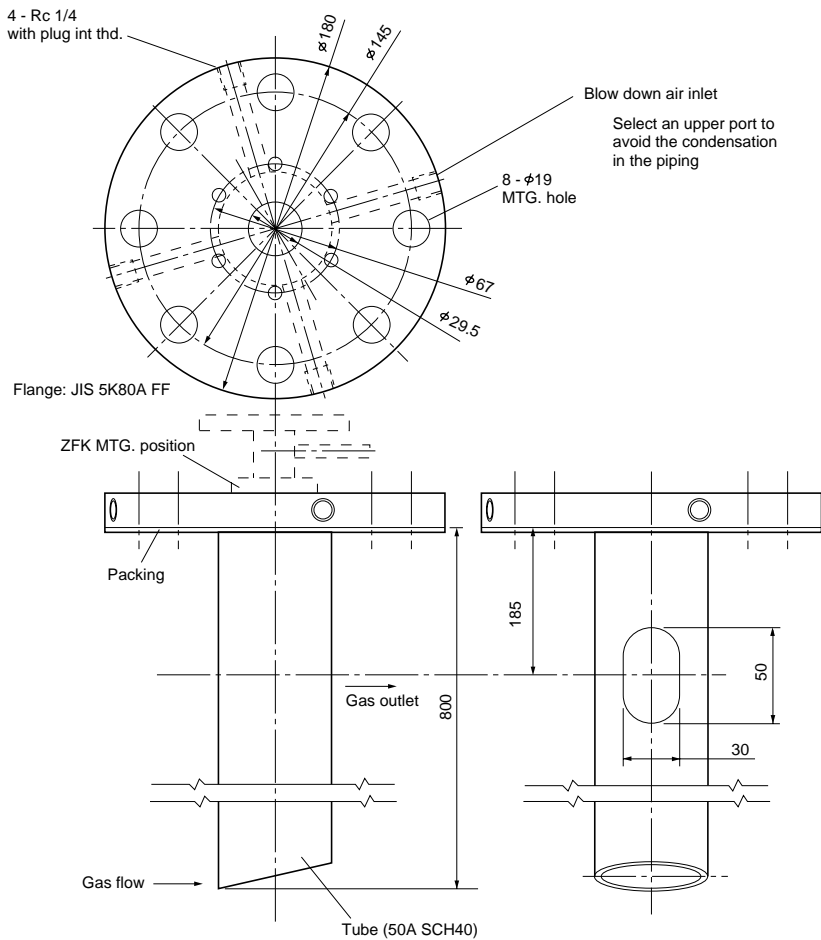


Flow guide tube (with blow-down nozzle)





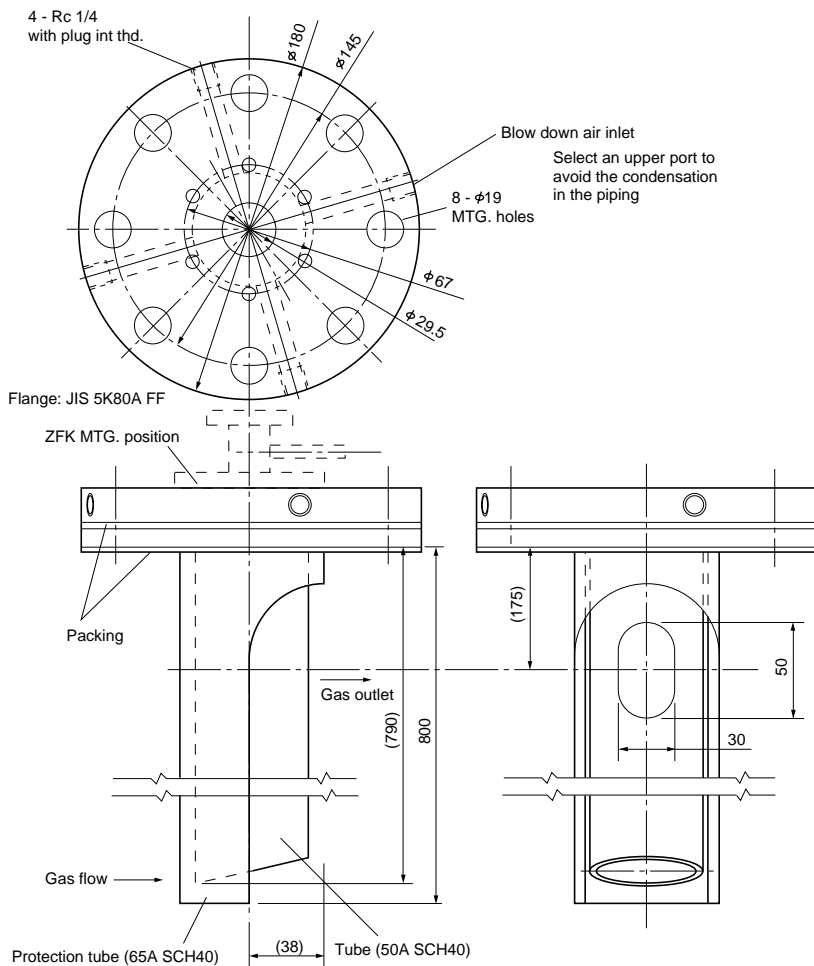
### Flow guide tube (for high particulate)



ZFK2R□□4-6D $\begin{matrix} 3 \\ 5 \\ 7 \\ 1 \end{matrix}$

|                  |     |     |      |     |               |
|------------------|-----|-----|------|-----|---------------|
| Cord 11th        | 3   | 5   | 7    | 1   | Z             |
| L (m)            | 0.3 | 0.5 | 0.75 | 1.0 | L= (to order) |
| Mass Approx.(kg) | 4.5 | 5.6 | 7.0  | 8.3 |               |

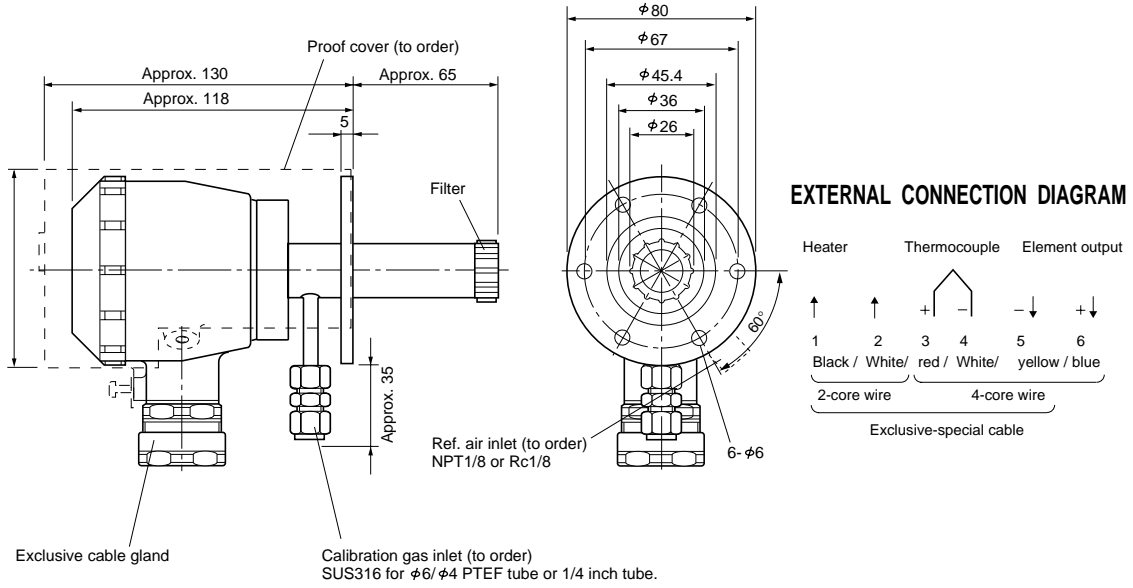
### Flow guide tube (for high particulate with cover)



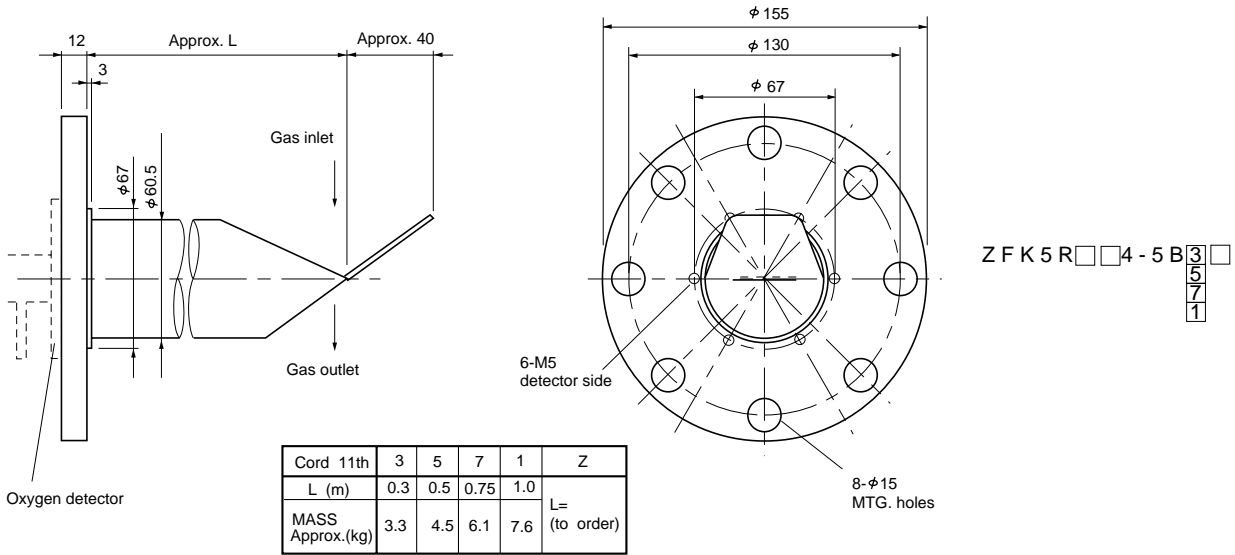
ZFK2R□□4-6E $\begin{matrix} 3 \\ 5 \\ 7 \\ 1 \end{matrix}$

|                  |     |     |      |      |               |
|------------------|-----|-----|------|------|---------------|
| Cord 11th        | 3   | 5   | 7    | 1    | Z             |
| L (m)            | 0.3 | 0.5 | 0.75 | 1.0  | L= (to order) |
| Mass Approx.(kg) | 7.1 | 9.0 | 11.4 | 13.6 |               |

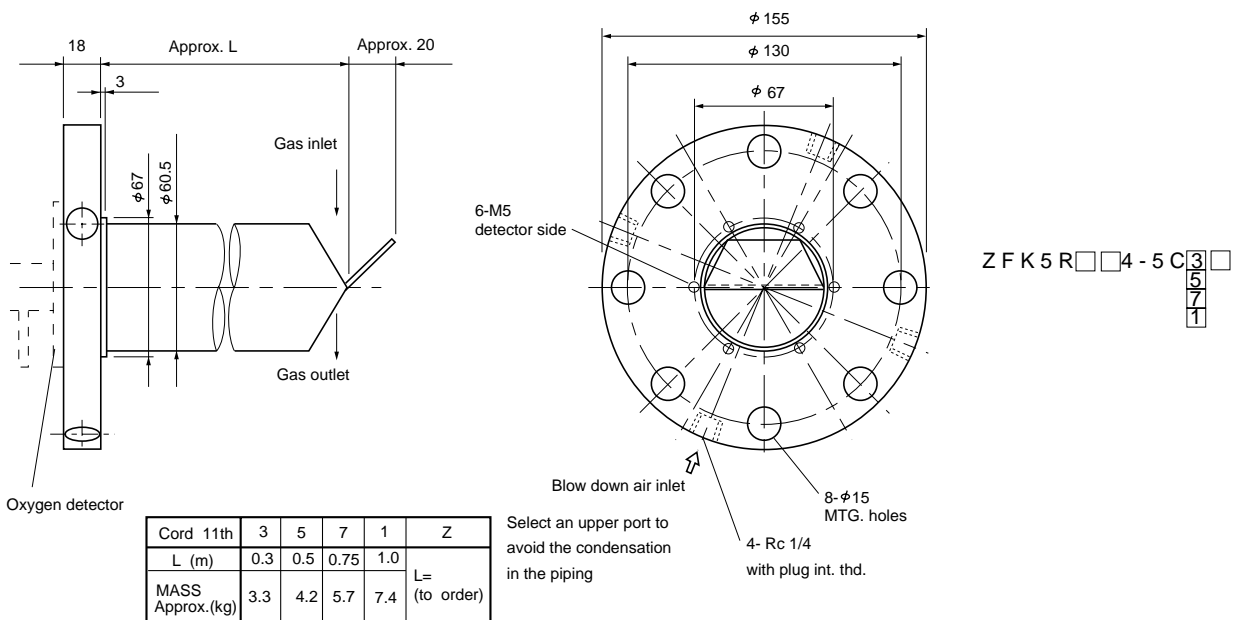
Detector (ZFK5)



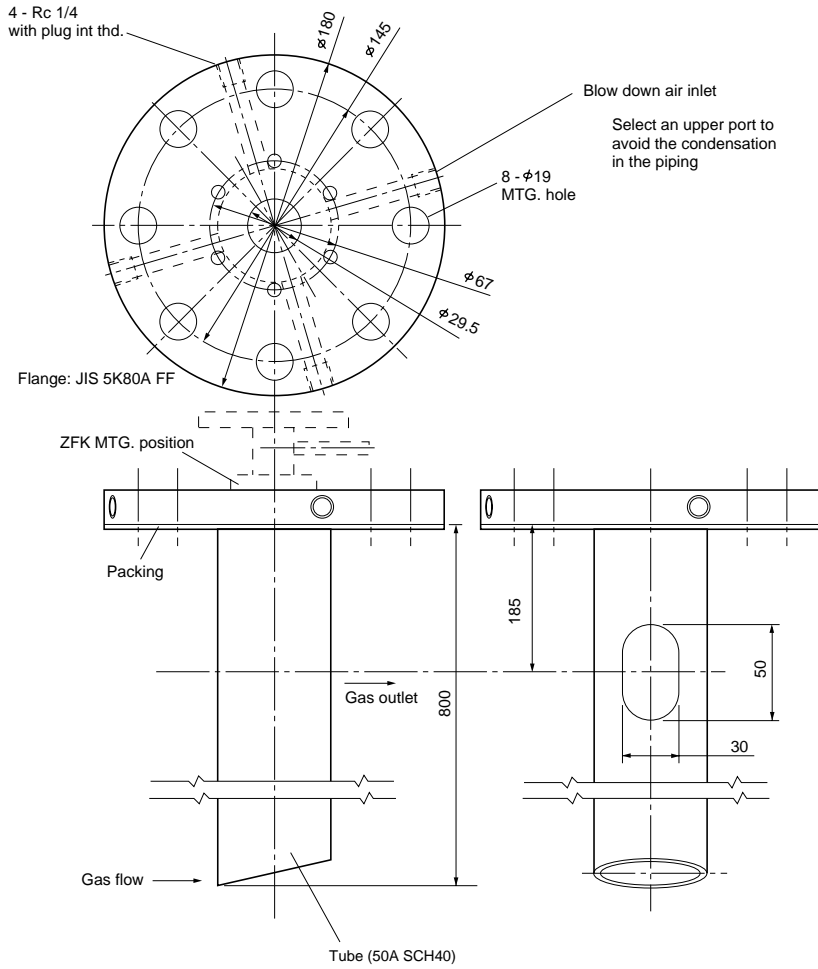
Flow guide tube



Flow guide tube (with blow - down nozzle)



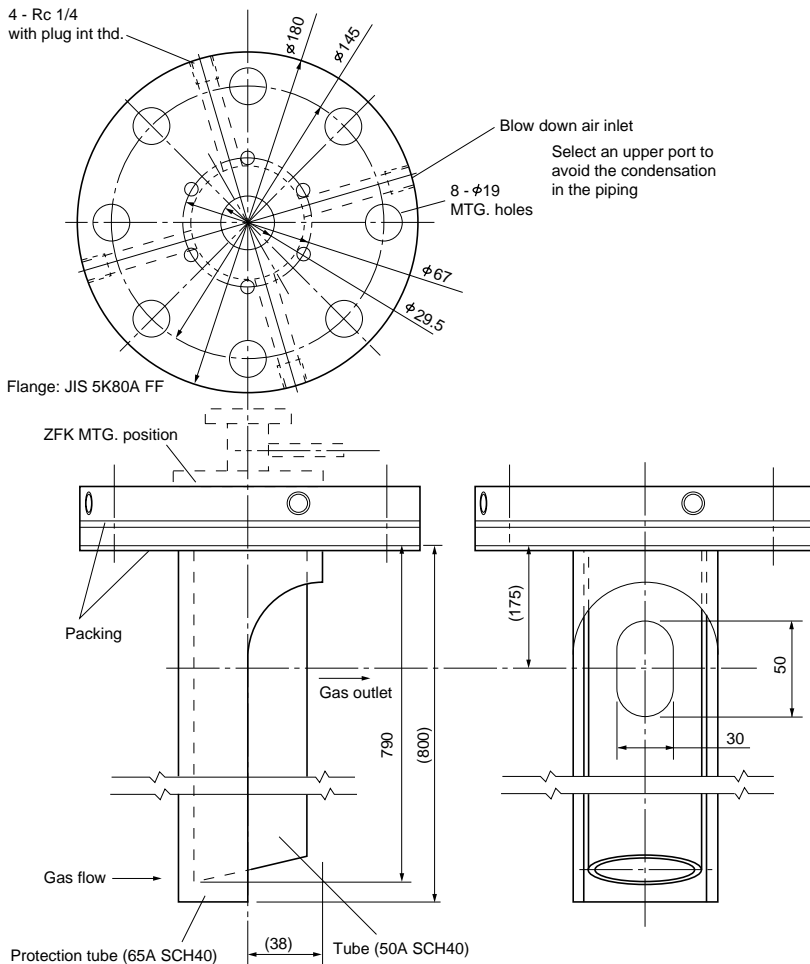
### Flow guide tube (for high particulate)



Z F K 5 R □ □ 4 - 6 D  $\begin{matrix} 3 \\ 5 \\ 7 \\ 1 \end{matrix}$  □

| Cord 11th        | 3   | 5   | 7    | 1   | Z             |
|------------------|-----|-----|------|-----|---------------|
| L (m)            | 0.3 | 0.5 | 0.75 | 1.0 | L= (to order) |
| MASS Approx.(kg) | 4.5 | 5.6 | 7.0  | 8.3 |               |

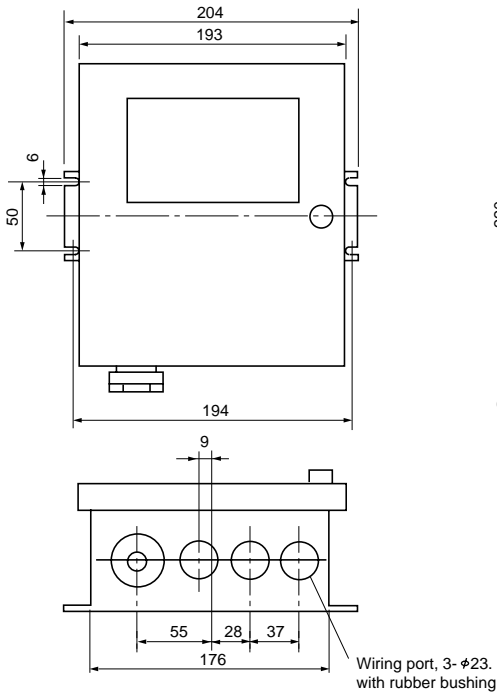
### Flow guide tube (for high particulate with cover)



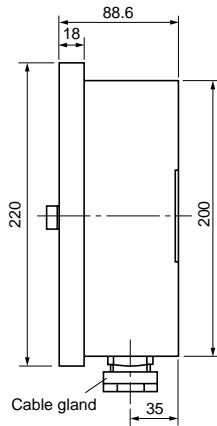
Z F K 5 R □ □ 4 - 6 E  $\begin{matrix} 3 \\ 5 \\ 7 \\ 1 \end{matrix}$  □

| Cord 11th        | 3   | 5   | 7    | 1    | Z             |
|------------------|-----|-----|------|------|---------------|
| L (m)            | 0.3 | 0.5 | 0.75 | 1.0  | L= (to order) |
| MASS Approx.(kg) | 7.1 | 9.0 | 11.4 | 13.6 |               |

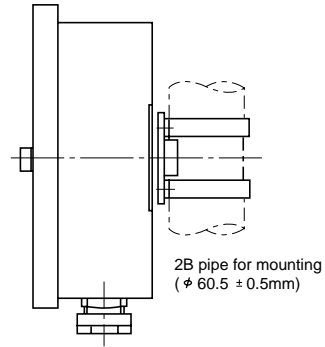
Converter (ZRM)



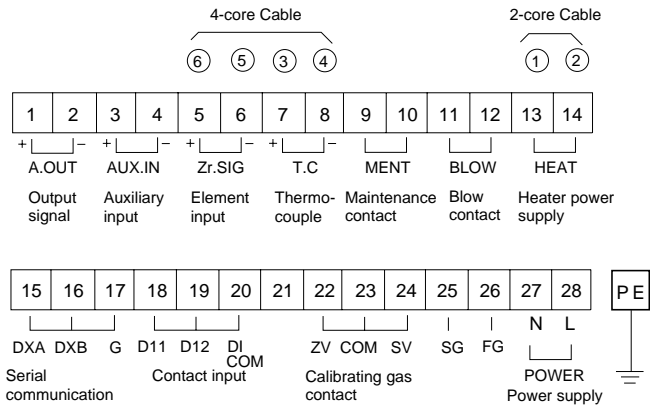
Panel flush mounting



Pipe mounting

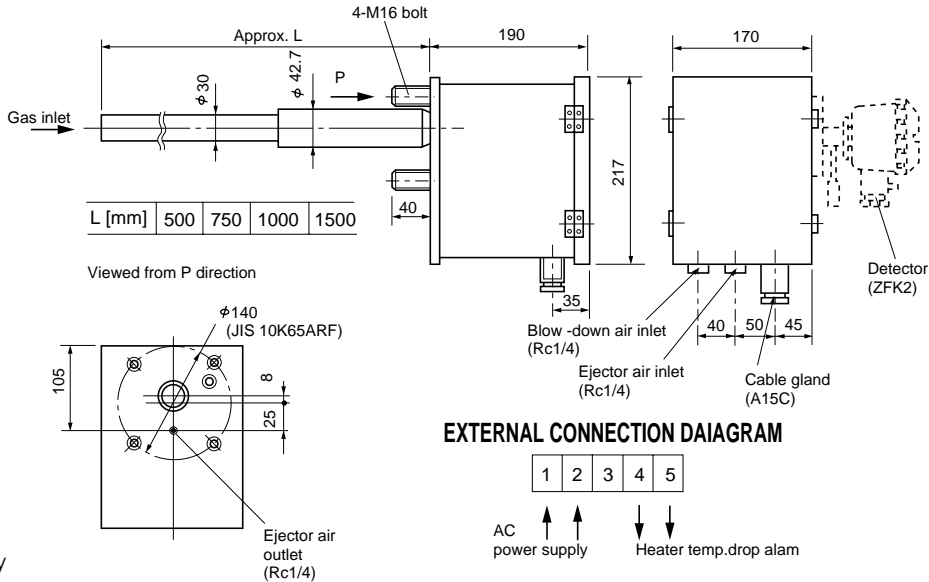


EXTERNAL CONNECTION DIAGRAM



Note (1) : The numbers ① through ⑥ denote detector terminal No. for exclusive - special cables.  
 (2) : M3 terminal screws are used for the terminal block.

Ejector (ZTA)



⚠ Caution on Safety

\*Before using this product, be sure to read its instruction manual in advance.

Fuji Electric Systems Co.,Ltd.

Head Office

Gate City Ohsaki, East Tower, 11-2, Osaki 1-chome, Shinagawa-ku, Tokyo 141-0032, Japan  
<http://www.fesys.co.jp/eng>

Instrumentation Div.

International Sales Dept.

No.1, Fuji-machi, Hino-city, Tokyo, 191-8502 Japan  
 Phone: 81-42-585-6201, 6202 Fax: 81-42-585-6187  
<http://www.fic-net.jp/eng>