

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

## DATA SHEET

ZFK, ZRY

This oxygen analyzer is used to continuously measure oxygen concentration in combustion 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 (ZRY) features 3 measuring ranges, one touch calibration and NEMA4 housing.

Comparing to the current converter (ZRM), this ZRY is recognized as economical type with simple functions.



General-use detector



Converter

## FEATURES

### 1. 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.

### 2. High speed response

The adoption of a flow guide tube utilizing the flow of the measured gas assures quick response (less than 7sec).

### 3. Dust-tight and water-proof housing

Aluminum die casting housing of converter satisfies NEMA4 and IP65 standard.

### 4. 3-measuring ranges and one touch calibration

The converter has 0-5, 10, 25 vol% 3 ranges easily changed by pin connection and zero and span are simply calibrated by key operation.

## SPECIFICATIONS

### General

<b>Measuring object:</b>	Oxygen contained in noncombustible gas
<b>Measuring principle:</b>	Direct-insertion zirconia system
<b>Measuring range:</b>	0 to 5, 10 or 25 vol% O <sub>2</sub> (Changed by internal set pin)
<b>Repeatability:</b>	Within ±1.0% of full scale
<b>Linearity:</b>	±2% of full scale
<b>Response time:</b>	Within 7sec for 90% response (from calibration gas inlet)
<b>Power supply:</b>	100, 115, 220 or 230V AC, 50/60Hz
<b>Power consumption:</b>	
(approx.)	15 + 50VA (at steady state) 15 + 200VA (at start)
<b>Warmup time:</b>	Approx. 15min

### Oxygen detector (ZFK2, 5)

#### Measuring detector:

For general-use: ZFK2  
For corrosive gas: ZFK5

#### Measured gas temperature:

Flow guide tube system; -20 to +600°C

#### Measured gas pressure:

-3 to +3kPa

#### Flow guide tube:

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)

#### Ambient temperature:

-20 to +60°C for cable 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(ZFK 2); Zirconia, SUS316, platinum, SUS304  
Anticorrosive detector(ZFK 5); Zirconia, titanium, platinum, SUS316  
Flow guide tube; SUS304 or SUS316

**Calibration gas inlet:**

Brass joint for  $\phi 1/4$  inch tube.

**Reference air inlet (option):**

Rc1/8 or NPT1/8

**Detector mounting:**

Horizontal plane  $\pm 45^\circ$ , ambient surrounding air should be clean.

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

(detector)

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

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

**Finish color:**

Silver and SUS metallic color

**Oxygen converter (ZRY)**

**Measuring range:** 0-5, 10, 25 vol% O<sub>2</sub>

Changeable by internal set pin.

**Repeatability:**

$\pm 1.0\%$  of full scale

**Linearity:**

$\pm 2.0\%$  of full scale

**Indication:**

Oxygen concentration; 3-digit LED

**Oxygen concentration output signal:**

4 to 20mA DC (allowable load resistance: 500 $\Omega$  or less)

Isolated output, linear

**Fault contact output:**

250V AC, 2A rating (close contact or open contact for fault should be specified when you place an order.)

**Self-diagnoses:**

Fault of sensor temperature, zero calibration error, span calibration error

**Calibration method:**

Manual calibration with key operation

**Calibration gas:** • Recommended calibration gas concentration

Zero gas; 1.0 to 2.0% O<sub>2</sub>

Span gas; 20.6 to 21.0% O<sub>2</sub>  
(oxygen concentration in the air)

**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-tight, waterproof construction, NEMA4 (corresponding to IP65 of IEC)

**Material:** Aluminum die casting

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

220 X 230 X 95mm

**Mass {weight}:** Approx. 4.5kg (excluding cable and detector)

**Finish color:** Munsell 6PB 3.5/10.5 (blue): cover, silver; case

**Mounting method:** Mounted flush on panel

**Exclusion cable (ZRZP)**

**Cable:** 4-cores sealed wire (O<sub>2</sub> signal and R-themo couple signal) and 2-cores cable (power)

**Cable conduit:** Flexible type

**Length:** Refer to code symbols

**SCOPE OF DELIVERY**

**Detector:** Detector main unit x 1, Viton O ring x 1, mounting screw (M5mm x 12) x 6, thermal sticker x 1, flow guide tube (as specified) x 1, ceramic filter x 1, cover (as specified) x 1, reference air inlet (as specified) x 1

**Converter:** Converter main unit x 1  
Accessories (AC250V 500mA T fuse x 1, AC250V 3.15A T fuse x 1)

**Items to be prepared separately:**

- (1) Standard gas for calibration  
Type ZBM NSK4-01
- (2) Reduction valve for standard gas (type ZBD61003)
- (3) Flowmeter  
Type; ZBD52203, 0.2 to 2L/min (for calibrating gas)

**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 dust more than 1g/Nm<sup>3</sup> is included in the gas, manual blow down is necessary.

**The product conforms to the requirements of the Electromagnetic compatibility Directive 89/336/EEC as detailed within the technical construction file number TZ737041. 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**

# DEVICE CONFIGURATION

The device to be combined differ according to the conditions of the gas to be measured. Please 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) Anti-corrosive use (incinerator)	600°C or less	5 to 20m/s	Less than 0.2g/m <sup>3</sup> [nor]	—	Fuel; gas, oil	ZFK□R□□4-□□□□□□	ZRY	—
			Less than 10g/m <sup>3</sup> [nor]	no	Fuel: coal with manual blow down	ZFK□R□□4-□D□□□□	ZRY	—
			Less than 25g/m <sup>3</sup> [nor]	yes	Included high moisture with manual blow down	ZFK□R□□4-□E□□□□	ZRY	—

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, when oxygen concentration in air around sensor changes.

## CODE SYMBOLS

### (Detector)

ZFK				Description								
4	5	6	7	8	9	10	11	12	13			
R	2	4								Application		
										General use.		
										For corrosive gas (refuse incinerator)		
										Cal. gas inlet		
										For φ1/4 inch tube		
										Power supply		
										100/115VAC 50/60Hz		
										200/220VAC 50/60Hz		
										230VAC 50/60Hz (CE-marking approved)		
										Flow guide tube		
										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
					6	D	8			SUS316	for high particulate	800mm
					6	E	8			SUS316	for high particulate with cover	800mm
										Protection cover		
										Y --- Without		
										A --- With		
										Reference air inlet		
										Y --- Non		
										A --- Rc1/8		
										B --- NPT1/8		

### ( Replacement Detector element)

ZFK				Description								
4	5	6	7	8	9	10	11	12	13			
R	2	4								Application		
										General use.		
										For corrosive gas (refuse in cinerator)		
										Cal. gas inlet		
										For φ1/4 inch tube		
										Power supply		
										100/115VAC 50/60Hz		
										200/220VAC 50/60Hz		
										230VAC 50/60Hz		

### (Converter)

ZRY				Description									
1	2	3	4	5	6	7	8	9	10	11	12		
Z	R	Y	1	Y	1	1	1	1	R	0		Output signal and fault output	
												4 to 20mA DC, close contact	
												4 to 20mA DC, open contact	
												Power supply	
												90 to 230V AC 50/60Hz	
												(CE marking approved)	
												Mounting method	
												1 --- Panel mounting	
												Instruction manual	
												Y --- NO	
												E --- YES (English)	

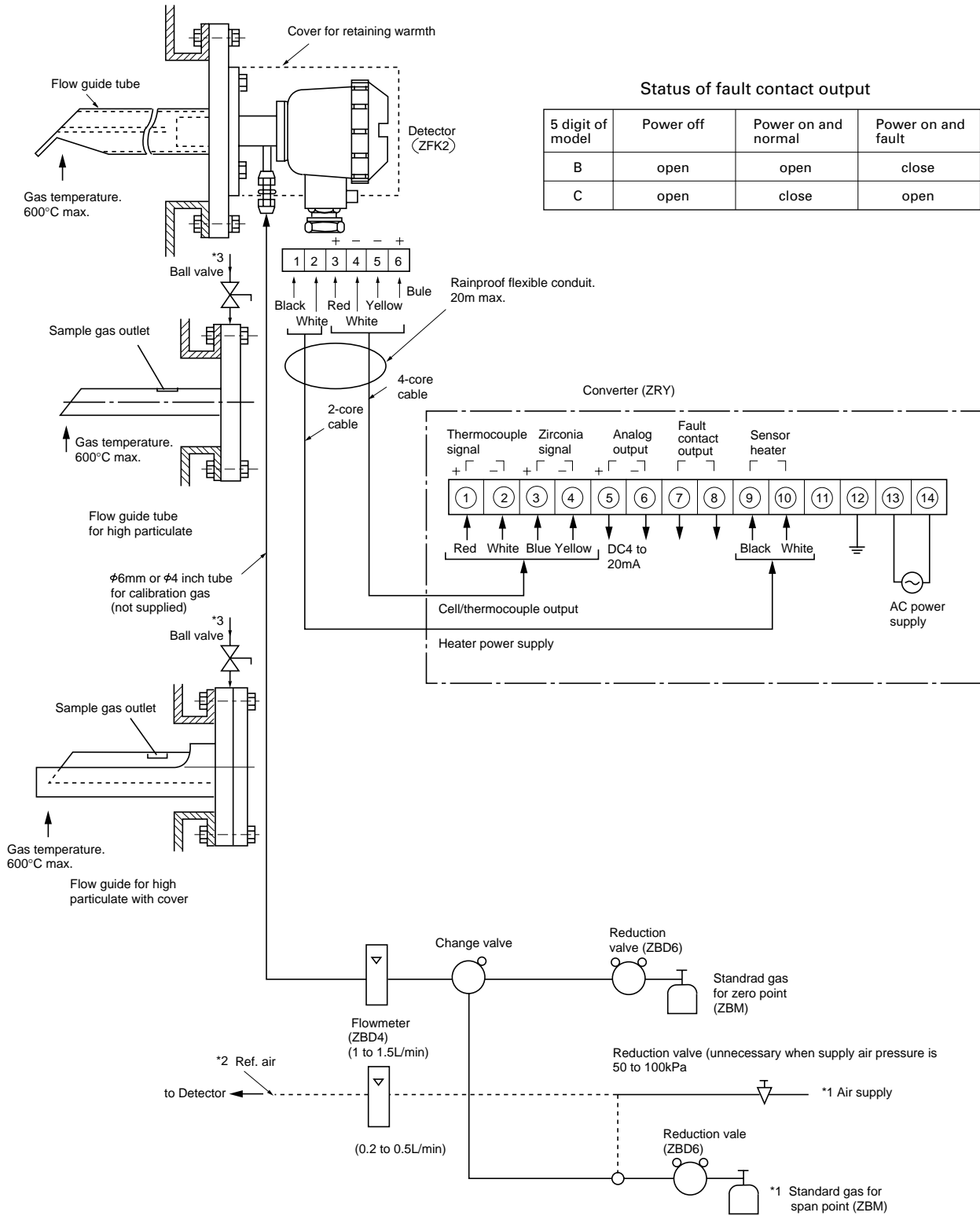
### (Exclusive-special cable)

ZRP				Description							
1	2	3	4	5	6	7	8	9			
Z	R	Z	P	R					Connectable devices		
									For ZRY		
									Types		
									For R thermocouple		
									Conduit length		
									Cable length		
									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
									Cable end treatment		
									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

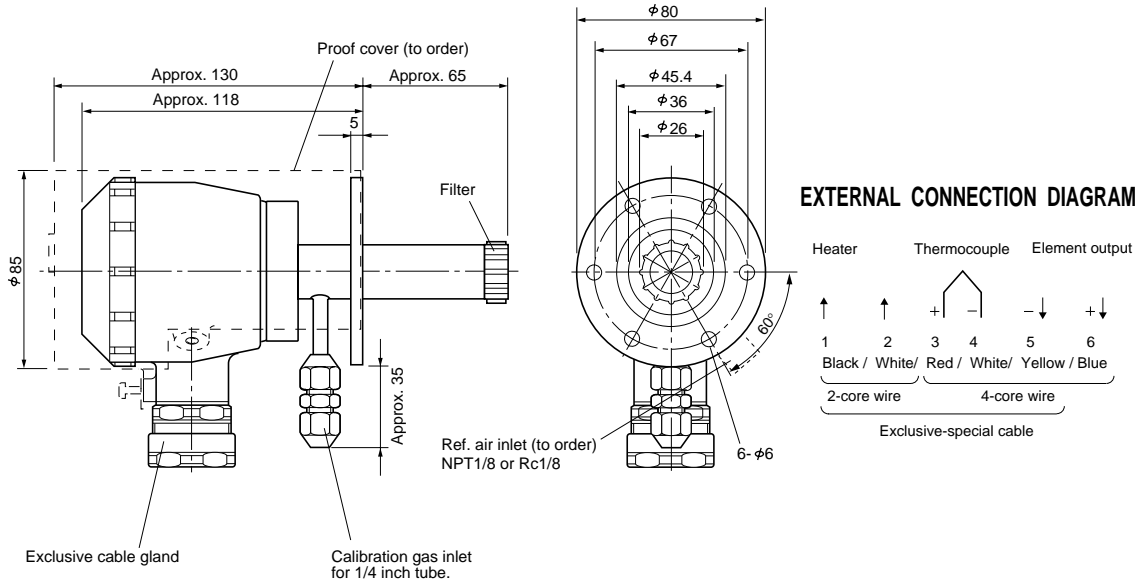
## Flow guide tube system



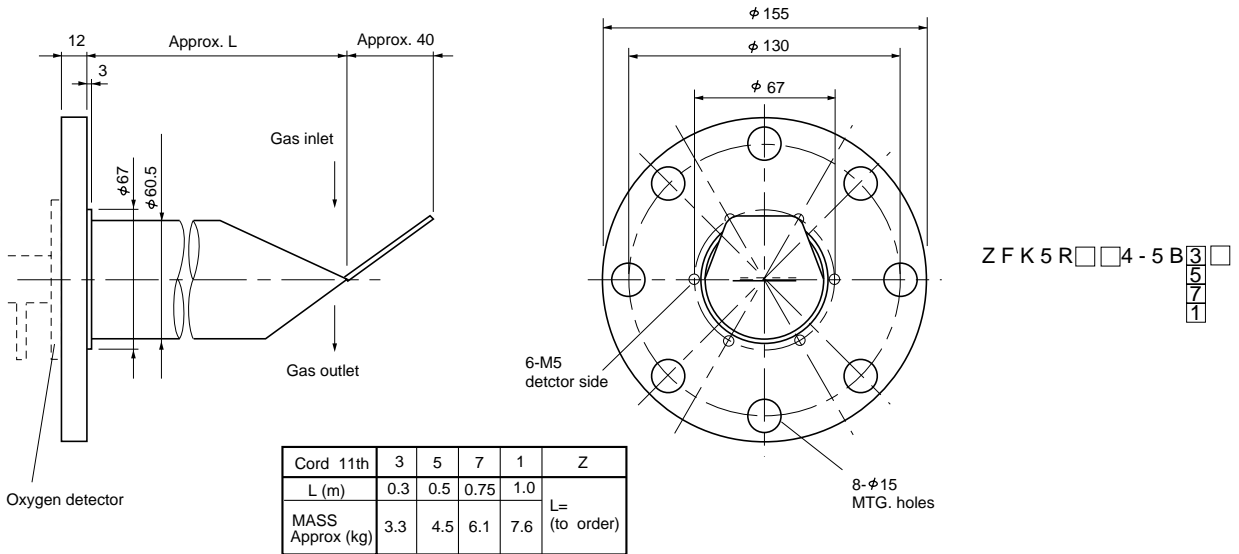
- Note
- \*1 Standard gas or instrumentation air can be used in place of span gas.
  - \*2 Instrument quality air or bottled air is available as reference air instead of ambient air, when oxygen concentration in air around sensor changes.
  - \*3 Blow down air inlet pressure in 200 to 300kpa.



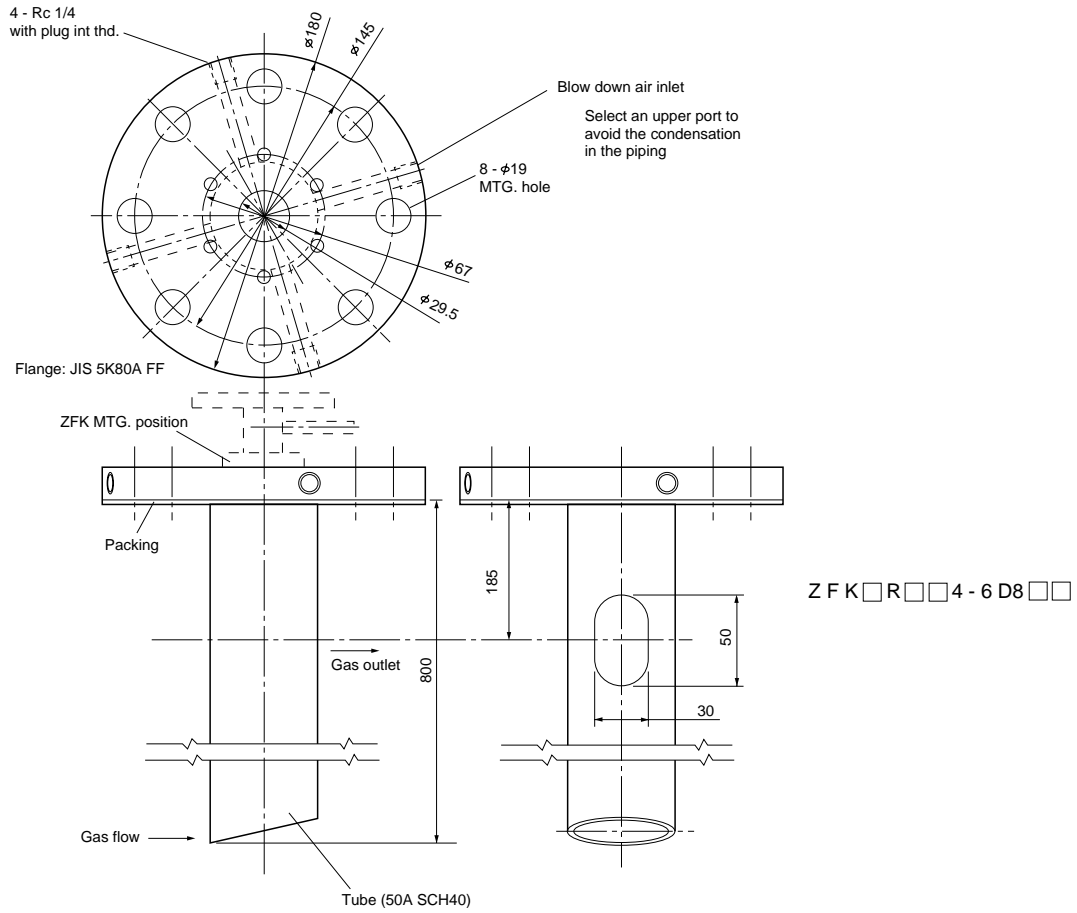
Detector (ZFK5)



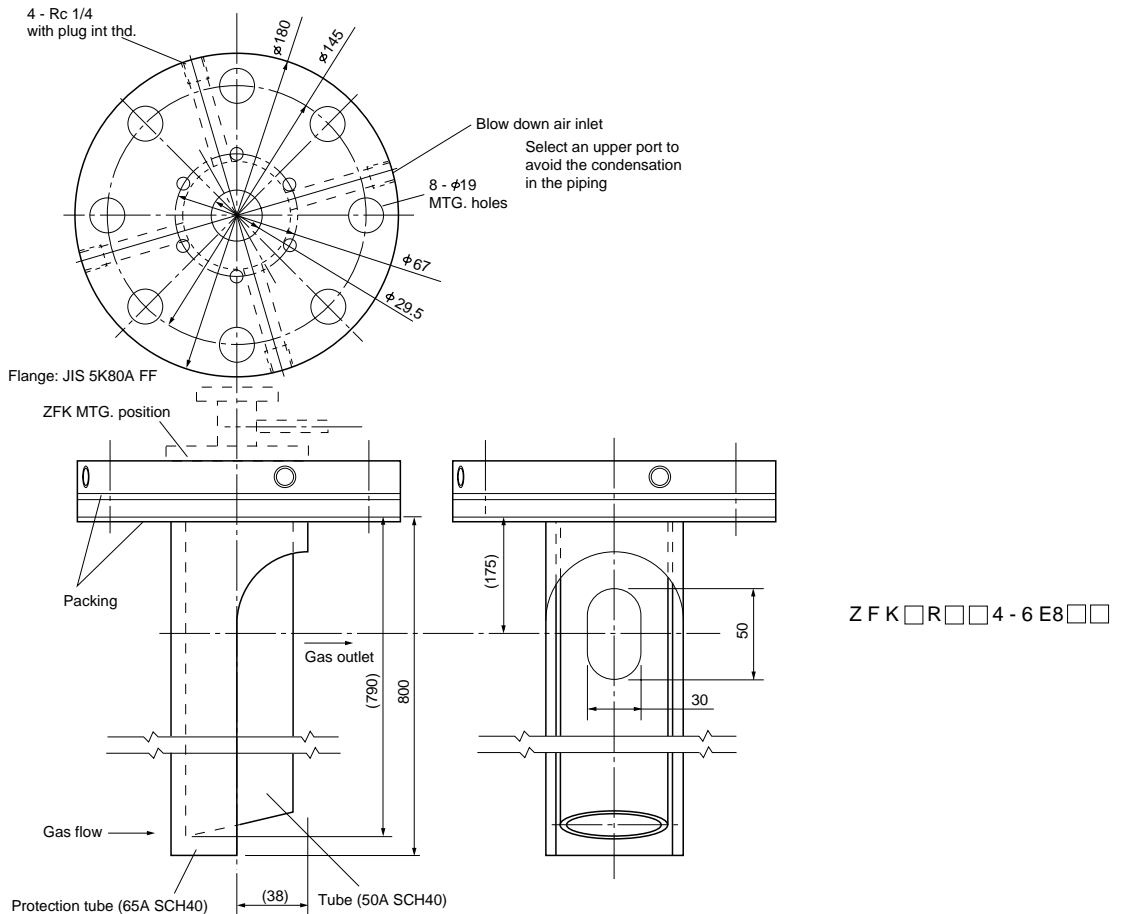
Flow guide tube



### Flow guide tube (for high particulate)

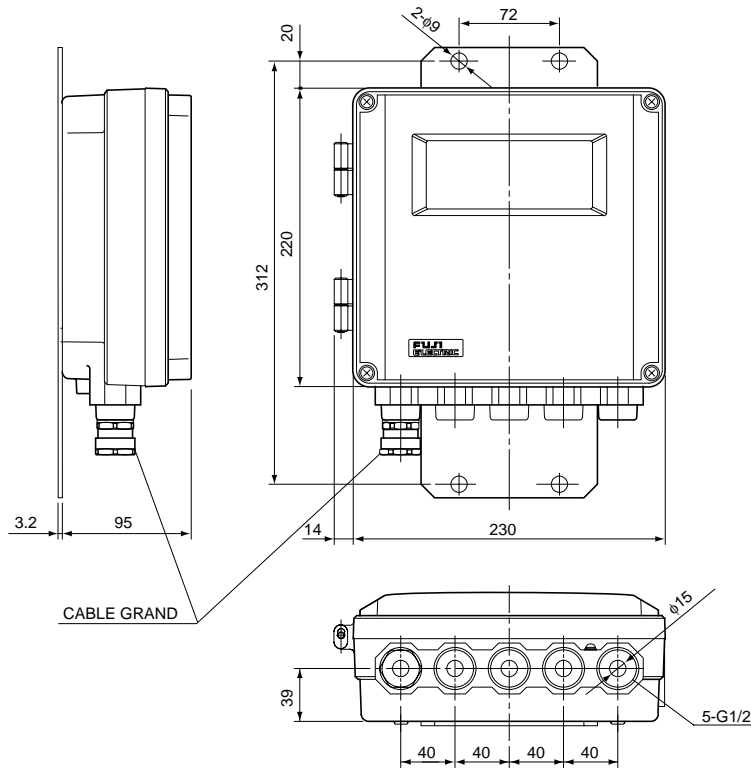


### Flow guide tube (for high particulate with cover)

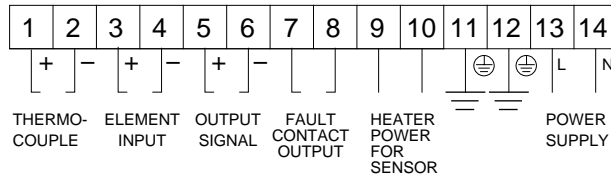


Converter (ZRY)

Panel flush mounted



CONNECTION DIAGRAM



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