

CO/O₂ GAS ANALYZER FOR STACK GAS

DATA SHEET

ZSQ

This instrument is equipped with a non-dispersive infrared CO sensor and a zirconia O₂ sensor. It is used for measuring CO and O₂ in the gas emitted from a garbage incinerator to meet Japanese regulation on emission control of dioxins (tetrachlorodibenzoparadioxins).

CO instantaneous value, O₂ instantaneous value, CO instantaneous value after O₂ correction and CO average values after O₂ correction (1-hour and time-variable averagings) can be output, and a peak count/alarm function is incorporated.

FEATURES

1. Suitable functions for emission control of dioxins.
 - Output includes CO instantaneous value, O₂ instantaneous value, CO instantaneous value after O₂ correction and CO average values after O₂ correction (1-hour and time-variable averagings).
 - Count/alarm function against excess over specified value
2. Space-saving configuration by unitizing the analyzer and sampling device into 19-inch types.
3. Easy to maintain with auto calibration and with "From the front maintenance construction".
4. A microjet recorder (Fuji Electric's type PHC or PHE) can be built in for recording measured gas concentration and temperature values.

SPECIFICATIONS

- **Measuring system:**
Non-dispersive infrared absorption (NDIR) method for CO
Zirconia method for O₂
- **Measurable component and range:**
CO ; 0~200/500ppm
 0~200/1000ppm
 0~500/1000ppm
 0~500/2000ppm
O₂ ; 0~25vol%
- **Repeatability:** ±0.5% of full scale
- **Zero drift:** Max. ±2.0% of full scale/week for CO
 Max. ±2.0% of full scale/month for O₂
- **Span drift:** Max. ±2.0% of full scale/week
- **Linearity:** Max. ±1.0% of full scale
- **Sample gas extracting rate:**
Approx. 2 ℓ /min
- **Response time:** Within 90 seconds for 90% indication (after extracting sample gas through the inlet)
- **Warm-up time:** Within 4 hours after power-on



- **Output signals:** Each signal within range from 4 to 20 mA DC
Non-isolated (isolated output available at option)
CO instantaneous value
O₂ instantaneous value
CO instantaneous value after O₂ correction
1-hour moving average CO value after O₂ correction
Moving average CO value after O₂ correction (averaging time variable)
Time setting in 1 to 59 minutes (1-minute increment) or 1 to 4 hours (1-hour increment)
Allowable load resistance 550 Ω or less
- **Contact output:** 1a no-voltage contact (contact capacity 250 V AC, 2 A)
Peak count alarm, CO instantaneous value upper limit alarm, auto calibration and maintenance statuses, calibration error, analyzing block error and range discrimination
- **Contact input:** No-voltage contact (ON/0V, OFF/5 V DC, DC 5mA at ON)
Auto calibration remote start (for 500 msec or longer), remote range changeover
Remote average value resetting (for 500 msec or longer)
- **Indication:** LCD with back light for indicating CO instantaneous value, O₂ instantaneous value, CO instantaneous value after O₂ correction and CO average values after O₂ correction (1-hour and time-variable averagings), peak count value and parameter assignment

- **Recorder (option):**
100 mm-width recorder (Fuji Electric's type PHC or PHE) built in, max. 6 points recordable
- **Gas extractor:** Electrical heating type (filter built in)
 - Filter mesh; 40µm mesh of SUS 316 stainless steel
 - Probe; SUS 316 stainless steel of 300, 400, 600 or 800 mm length
 - Flange; JIS 5K65AFF
 - Mass; Approx. 9 kg
- **Sample inlet tube:**
φ10/φ8 Teflon tube or heating tube (max. 30 m)
- **Functions:**
 - 1) **O₂ correction**
Conversion of measured CO gas concentration into a value at standard O₂ concentration

Calculating equation:
$$C = \frac{C_s(21-O_N)}{21-O_s}$$
 - C; CO concentration after O₂ correction
 - C_s; Measured CO concentration
 - O_s; Measured O₂ concentration (%)
 - O_N; Standard O₂ concentration (12% for garbage incinerator)
 - 2) **Auto calibration**
 - Auto calibration cycle settable range: 1 to 99 hours (1-hour step) or 1 to 40 days (1-day step)
 - Auto calibration gas flow time settable range: 60 to 599 seconds (1-sec step)
 - Auto/manual calibration error contact output: Provided when calibration quantity exceeds 50% of full scale.
 - Contact output during auto calibration and maintenance: Provided during calibration gas flow and replacement. Also provided during maintenance.
 - Auto calibration remote start contact input: Calibration starts by opening and closing the contact input of 500 msec or longer in duration.
 - 3) **Output holding function**
Output signal is held during auto calibration and maintenance.
 - 4) **Alarm**
 - ① CO instantaneous value upper limit alarm
 - ② CO instantaneous value peak count
 Alarm is issued and indicated when CO instantaneous value has exceeded the set upper limit by the set number of times. (Settable number of times: 1 to 99, settable value range: 0 to 1000 ppm)
 - 5) **Other functions**
 - Remote range changeover input: Low range is selected when closing the contact input, and high range is selected when opening the contact input
 - Average value resetting input: The output and indication of CO average value after O₂ correction is reset by opening the contact after the contact is closed for 1.5 sec or longer.
 - Range discrimination contact output: Contact closed for low range
 - Analyzing block error contact output:
 - Temperature input signal: K thermocouple input x 2 (input for recorder)

- **Standard requirements for sample gas:**
 - Temperature; 60 to 800°C
 - Dust; 100 mg/Nm³ or less
 - Pressure; -2.94 to +2.94kPa
{-300 to +300mmH₂O}
 - Components; SO₂ 500 ppm or less
NO_x 1000 ppm or less
CO₂ 0 to 15%
CO 0 to 2000 ppm
O₂ 0 to 21%
HCℓ 1000 ppm or less
N₂, H₂O Remaining percent
- **Rated operating conditions:**
 - Ambient temperature; -5 to +40°C
 - Ambient humidity; 90% RH or less
 - Power supply voltage; 100 V AC ±10 V
 - Power supply frequency;
50 or 60 Hz ±0.5 Hz
 - Power consumption; Max. 400 VA
(without gas extractor)
- **Installation requirements:**
 - 1) Selection of a place which does not receive direct sunlight or radiation from hot substances
 - 2) Avoidance of a place under heavy vibration
 - 3) Clean atmospheric air
- **External dimensions (H x W x D):**
 - Indoor type 1550 x 735 x 650 mm
 - Outdoor type 1640 x 745 x 765 mm
- **Mass:** Approx. 140 kg (excluding standard gas)
- **Cubicle finish color:** Munsell 5Y7/1 semi-gloss
- **Other:** Three standard gas (3.4 ℓ) cylinders accommodable

SCOPE OF DELIVERY

- Gas analyzer system
- Specified external drain separator
- Specified gas extractor/probe set
- Specified gas inlet tube set
- Specified standard gas set (with pressure reducing valve)
- Specified recorder to be accommodated in cubicle
- Standard accessory set

ORDERING INFORMATION

1. Code symbols
2. Necessity of spares for 1-year measurement
3. Type of recorder (option)
4. Anchor bolt

CODE SYMBOLS

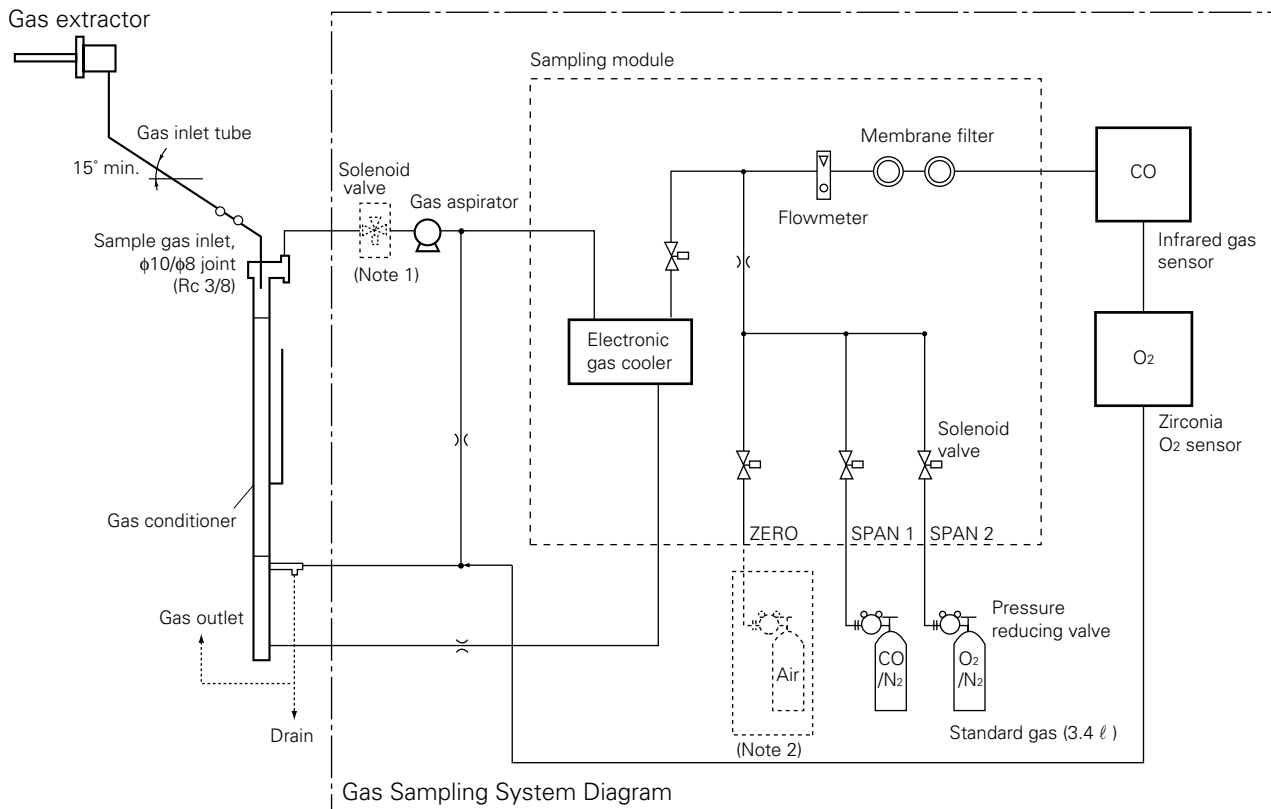
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17																	
Z	S	Q	1														Description
																	Measurement range (5th code)
				A													0~200 / 500 ppmCO 0~25% O ₂
				B													0~200 / 1000 ppmCO 0~25% O ₂
				C													0~500 / 1000 ppmCO 0~25% O ₂
				D													0~500 / 2000 ppmCO 0~25% O ₂
																	Power supply (6th code)
																	AC 100V 50Hz
																	AC 100V 60Hz
																	AC 115V 60Hz
																	AC 230V 50Hz
																	Cubicle structure (7th code)
				A													Indoor type
				B													Outdoor type
				C													} Specify when installation place is at -5°C or lower (-10°C min.)
				D													
																	Gas pressure at extraction point (9th code)
																	1 - 0.98~+4.90kPa (-100~+500mmHzO)
																	2 - 2.94~+2.94kPa (-300~+300mmHzO)
																	3 - 4.90~+0.98kPa (-500~+100mmHzO)
																	External drain separator (10th code)
																	Y - Not provided
																	A - Provided (Note 1)
																	Recorder (11th code)
																	Y - Not provided
																	} (Note 2) (Recorder hardware needs to be prepared separately.)
																	E - With 2-point recorder PHE
																	Isolated output (12th code)
																	0 - Non-isolated output
																	5 - Isolated output (5 outputs)
																	Jpavn quality assurance organization test (13th code)
																	0 - No
																	1 - Yes (Test of individual products needs to be ordered separately.)
																	Standard gas (14th code)
																	1 - Not provided (space for accommodating three 3.4ℓ cylinders of air + O ₂ /N ₂ + CO/N ₂)
																	2 - Not provided (space for accommodating two 3.4ℓ cylinders of O ₂ /N ₂ + CO/N ₂)
																	3 - Air + O ₂ /N ₂ + CO/N ₂ (3.4ℓ, 3 cylinders)(incorporated) with official organization's test
																	4 - O ₂ /N ₂ + CO/N ₂ (3.4ℓ, 2 cylinders)(incorporated)
																	5 - Air + O ₂ /N ₂ + CO/N ₂ (3.4ℓ, 3 cylinders)(incorporated)
																	Gas extractor flange size (15th code)
																	Y - Without gas extractor
																	A - JIS 5K 65A
																	Gas extractor insertion length (16th code)
																	Y - Without gas extractor
																	A - 300mm
																	B - 400mm
																	C - 600mm
																	D - 800mm
																	Sample inlet tube type Length (17th code)
																	Y - Not provided Not provided
																	A - φ10/ φ8 Teflon tube 5m
																	B - φ10/ φ8 Teflon tube 10m
																	C - φ10/ φ8 Teflon tube 15m
																	D - φ10/ φ8 Teflon tube 20m
																	E - φ10/ φ8 Teflon tube 25m
																	F - φ10/ φ8 Teflon tube 30m
																	G - Heating tube 10m
																	H - Heating tube 15m
																	J - Heating tube 20m
																	K - Heating tube 25m
																	L - Heating tube 30m
																	} Specify when the ambient temperature may fall to -5°C or lower (-10°C at the lowest level).

(Note 1) Specify this code when the downward inclination of the sample inlet tube from the gas extraction point to the analyzer gas inlet is less than 15°, or when the water contents at the gas extraction point exceed 30 vol%.

(Note 2) Recorder assignment is as follows.

In 6-point recording:
 CH1; CO instantaneous value
 CH2; O₂ instantaneous value
 CH3; CO instantaneous value after O₂ correction
 CH4; 1-hour average CO value after O₂ correction
 CH5; K thermocouple 1
 CH6; K thermocouple 2

In 2-point recording:
 CH1; CO instantaneous value
 CH2; O₂ instantaneous value



Note 1: Solenoid valve for using atmospheric air as zero gas

Note 2: Unnecessary when atmospheric air is used as zero gas

Functions of Individual Components

- **Gas extractor:** Gas extraction, with heating type stainless steel filter having a standard diameter of 40μm
- **Gas conditioner:** For separation of drain, prevention of drain from being sucked through secondary filter and composite operation of constant-pressure bubbler.
- **Gas aspirator:** For aspiration of sample gas (sample gas flow rate approx. 2 l /min).
- **Sampling module:** Incorporates electronic gas cooler, solenoid valve, membrane filter and flowmeter.
 - **Electronic gas cooler;** Dries the moisture in sample gas to a dew point of approx. 2°C.
 - **Solenoid valve;** Used for introducing calibration gas.
 - **Membrane filter;** Glass fiber and PTFE filter used to eliminate fine dust particles and permit monitoring of dust adhering condition on the front panel of the gas analyzer.
 - **Flowmeter;** Adjusts and monitors the flow rate of sample gas.
- **Standard gas:** Reference gas used for calibrating zero and span of the analyzer; air and CO for span, and O₂ for zero.
- **Zirconia O₂ sensor:** Zirconia oxygen sensor used for measuring the oxygen concentration (0 to 25%) in sample gas.
- **Solenoid valve for atmospheric air:** Can be built in for using the atmospheric air instead of standard air.

Standard Accessories

No.	Name	Type/part No.	Quantity
1	Filter paper for membrane filter/as spare	TK7H6750P1	2 sheets
2	Filter paper for membrane filter/as spare	TK700735P3	2 sheets
3	Fuse (2A)/as spare	75718N9	2 fuses
4	Fuse (3.2A)/as spare	75718N10	2 fuses
5	Standard gas joint R1/4-φ6	TK7M6047P1	3 joints (2 pieces for using only 2 standard gases)
6	Hose band for fixing standard gas cylinder	TK7M2005P2	12bands (8 pieces for using only 2 standard gases)
7	Toalon tube for standard gas connection, 0.45 m and φ9/φ5	TK727528P1	1 tube
8	Polyethylene tube for standard gas connection, 5 m and φ6/φ4	415966P4	1 tube
9	Water bottle for injection into gas conditioner	TK7H3493P1	1
10	Gas extractor flange packing	TK7H4240P1	1 sheet
11	Gas extractor fastening bolt and nut		1 set
12	O-ring (G50) for gas extractor/as spare		1
13	Heating tube support	TK7N0820C1	1 set (only when the heating tube has been specified)
14	Instruction manual	INZ-TN4ZSQ	1 copy

Spare Parts for 1-Year Measurement

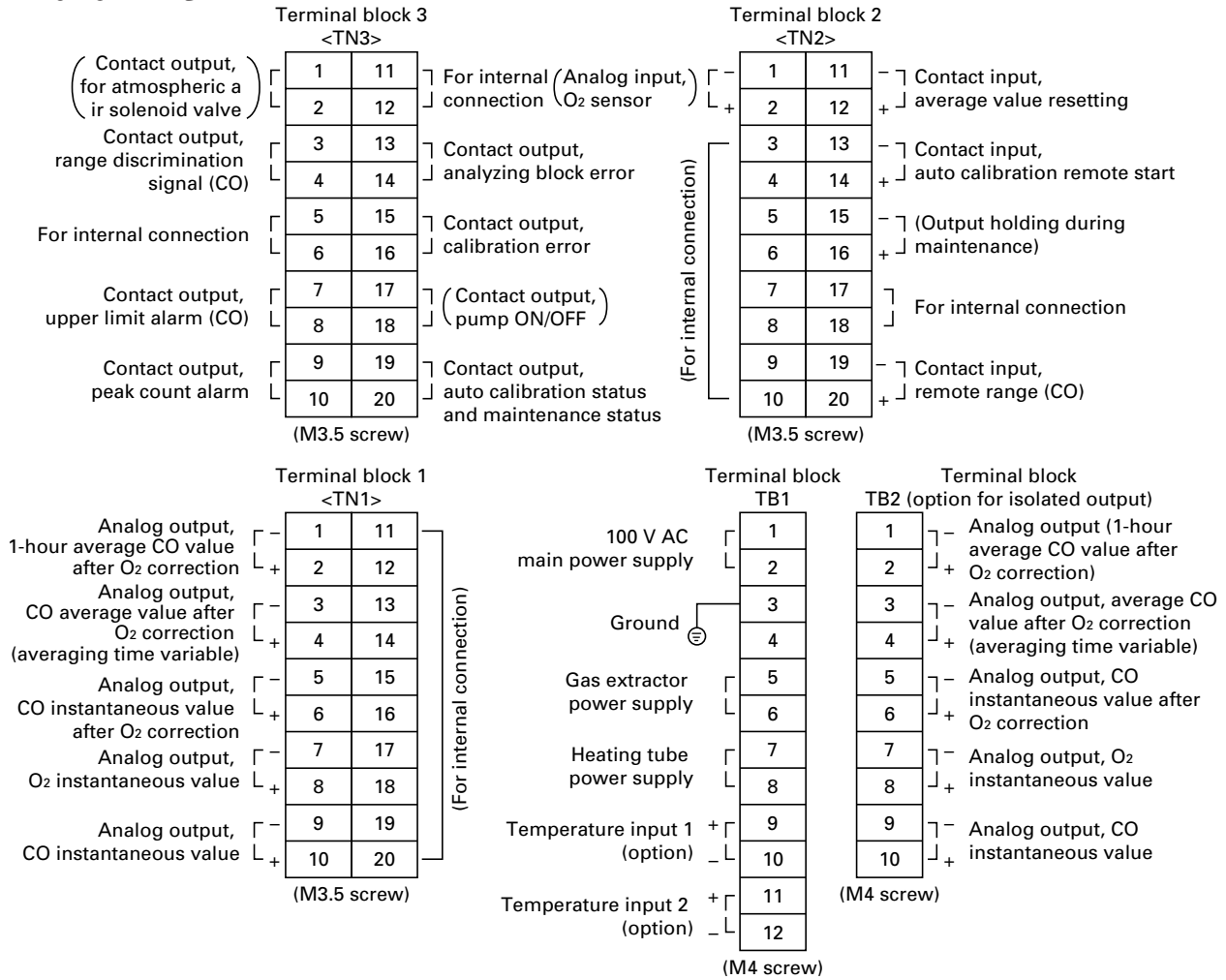
Type: ZBNISQ12 (without gas extractor)

Type: ZBNISQ42 (with gas extractor)

Contents

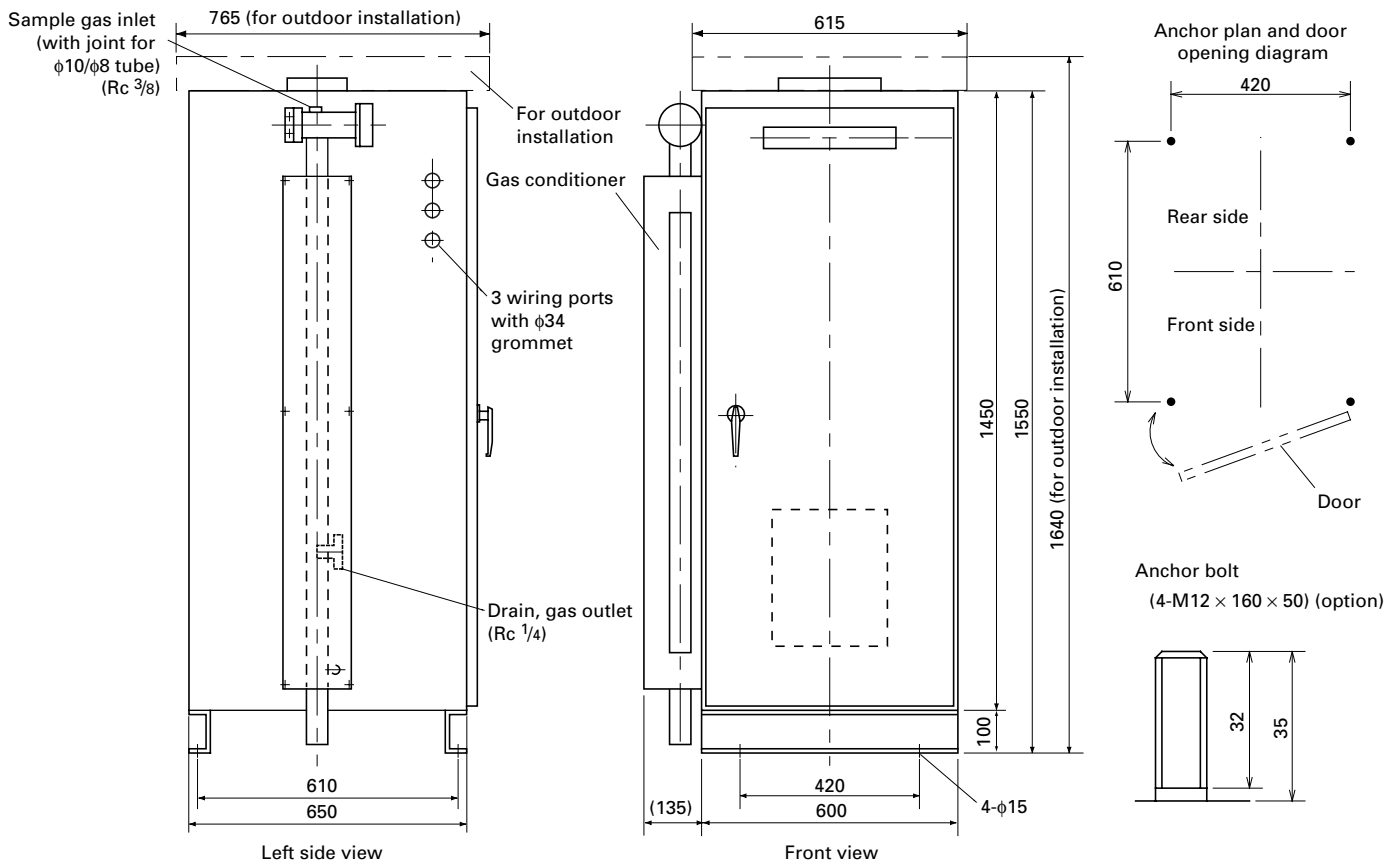
- 25-sheet filter paper for membrane filter × 1
 - 2-sheet filter paper for membrane filter × 1
 - Membrane filter O-ring (P49) × 2
 - Membrane filter O-ring (P3) × 2
 - Fuse (2 A) × 3
 - Fuse (3.2 A) × 4
 - Filter for gas conditioner × 2
 - O-ring (G65) for gas conditioner × 2
 - Diaphragm for gas aspirator × 1
 - Valve for gas aspirator × 1
 - Fixed restrictor (φ1) × 1
 - Fixed restrictor (φ1.4) × 1
 - O-ring (G50) for gas extractor × 1
 - O-ring (G45) for gas extractor × 1
 - Packing for gas extractor mesh filter × 1
 - Mesh filter for gas extractor × 1
- } when equipped
with gas extractor

CONNECTION DIAGRAM



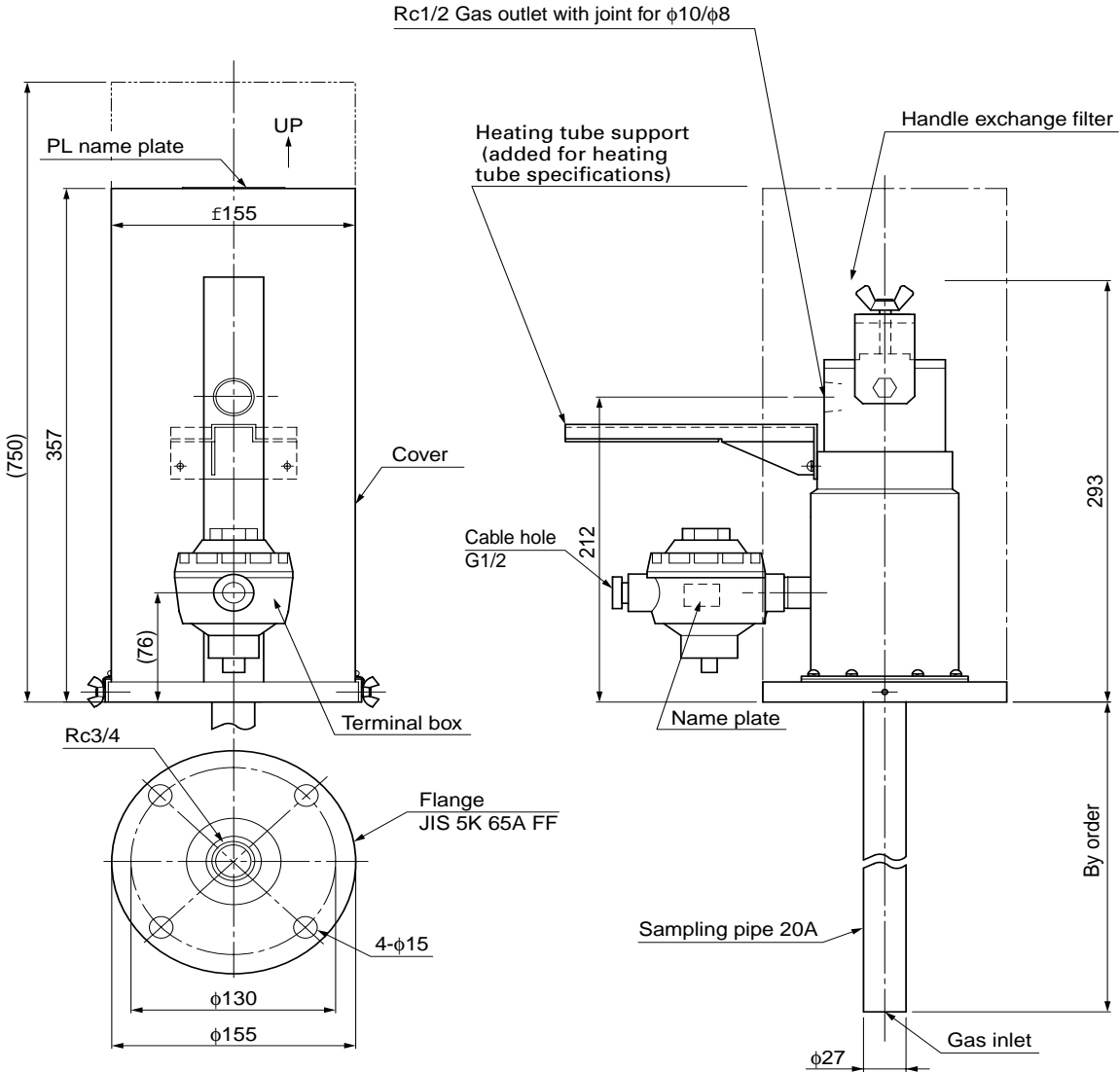
Notes: 1. Connection to the parenthesized terminals has already been made.
2. Avoid connection to the terminals for internal connection.

OUTLINE DIAGRAM (Unit: mm)



OUTLINE DIAGRAM (Unit: mm)

<Gas extractor>



⚠ Caution on Safety

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

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