



PRODUCT SPECIFICATIONS

Installation-type Ozone Analyzer Model ME820 Type S

Published on January 24, 2017

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1. General description

This ME820 Type S ozone analyzer using UV absorption method is an installation-type ozone analyzer that enables measurement of ozone concentrations during the ozone process. This is the ozone analyzer which measure the ozone discharged and has all-in-one measuring analyzers integrating major components (some parts are mounted externally). Ozone concentrations can be measured just by fastening the analyzer vertically and installing electrical wiring and piping. In addition, we adopt sequential zero calibration function as standard equipment to enable long-term stable measurement, and the enclosure is composed by sealed structure that consider the environmental resistance.

2. Measuring principle

This Analyzer is an UV absorption type ozone analyzer, which will detect and measure quantity of UV ray absorbed by ozone in the sample gas introduced into the detector.

A low-pressure mercury lamp (emission wavelength 253.7 nm) is used for its light source and the quantum of light absorbed by ozone existing within the optical path 'T' obeys the Lambert-Beer's Law, so that concentration of ozone can be measured as follows. Meanwhile, since the measurement is affected by temperature and pressure, the concentration is corrected in each situation using the following compensation formula.

$$C = \frac{A}{\alpha T} \times \log \left(\frac{I_0}{I_x} \right) \times \frac{273 + t}{273} \times \frac{P_0}{P + P_0}$$

where:	C: Concentration of ozone	A: Constant
	α : Absorption coefficient of ozone	t: Gas temperature
	T: Optical path length (Cell gap)	P ₀ : Atmospheric pressure
	I ₀ : Incident UV light intensity	P: Gas pressure
	I _x : Transmitted UV light intensity	

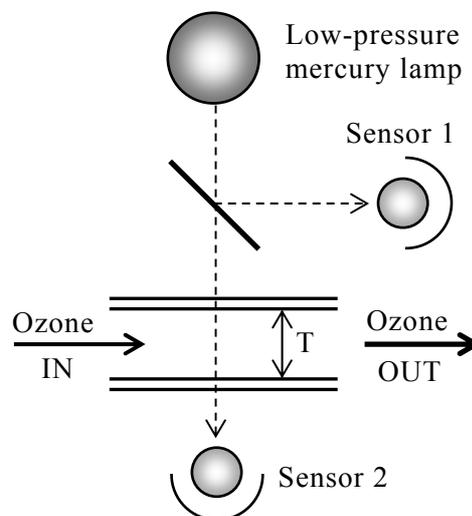


Figure-1 Logic Diagram

3. Specifications

Model:	ME820 Type S (Off-gas Ozone Analyzer)
Measuring principle:	UV absorption method
Detection target:	Exhaust ozone gas
Measuring ranges:	Selected from the following ranges 0–10.0, 0–20.0, 0–40.0 *unit: g/m ³ (N) 0–50.0, 0–100 0–1000, 2000 *unit: ppm
Measurement cycle:	Continuous measurement
Sampling method:	Suction by internal pump
Materials in contact with gas:	SUS316, SUS304, PFA, PTFE, PCTFE, PVDF, PVC, Quartz glass, Alumina, Fluorine-series resin, FKM, Glass fiber, Sapphire, etc.
(Zero gas line)	PVA, FEP, PE, NBR, PBT, POM, HNBR, FKM, SUS304, PVDF, EPDM, Phenol resin, Felt, Pyrex glass, Glass fiber, Brass, Carbon steel, Zinc alloy, Nylon, TYGON [®] , etc. * Ozone destruct: Decomposition catalyst, FKM, Felt
<p>Note: If the sample gas contains substances other than ozone, the portions inside of the analyzer that are exposed to gas may be eroded, damaged, or clouded. Please note that failures or non-measurable state resulting from such damage are not included in the warranty even during warranty period.</p>	
Sample Flow Rate:	1.0–2.0 L/min (1.0 L/min recommended)
Maximum Pressure:	Within ±10k Pa(G) (0.10 M Pa(G) or less without a sampling pump)
Outlet Pressure:	Atmospheric pressure
Span drift:	Within ±1% FS/month
Zero drift:	Within ±1% FS/month (Refer to the Note below) Note: Need to perform Zero calibration by integrated timer, performed once every 24 hours. Use a gas not contained ozone, not be polluted (dry) as a zero calibration gas.
Linearity:	Within ±1% FS
Repeatability:	0.2% FS or less
Zero Adjustment:	Zero calibration by integrated timer performed once every 24 hours (in auto operation) * Based on zero/interval setting

Display:	Main display: Red/Green 7 Segment LED (4 digits) Sub display: Red 7 Segment LED (4 digits) MODE: 5 LED Lamps MES (MEASUREMENT): Stays on during measurement/blinks during zero calibration ALM (ALARM1, 2): Blinks at occurrence of an alarm ERR (ERROR): Blinks at occurrence of analyzer error CHK: Turns on when check is being conducted/blinks during setting mode TES: Turns on when test is being conducted UNIT: LED Lamp
Span Adjustment:	Performed by digital setting (0.000–2.000)
Analyzer Output:	Relay contact output: dry contact <ul style="list-style-type: none"> • Measurement signal: output only when the measurement is progressing normally • Concentration alarm: any single-level alarm setting is available; 2 systems • Analyzer error signal: output when an abnormal condition occurs Contact rating: 250 V AC 5 A (resistance load) 250 V AC 1.5 A (induction load) 30 V DC 5 A (resistance load) 30 V DC 1.5 A (induction load) MEASUREMENT: Measurement signal (c contact) ALARM 1: Concentration alarm 1 signal (c contact) ALARM 2: Concentration alarm 2 signal (c contact) ERROR: Analyzer error signal (a contact)
Analyzer Input:	Zero calibration input signal (insulation output)
Analog Output:	0–1 V DC, 0–10 V DC 1–5 V DC, 4–20 mA DC One of the above is to be selected. * The load resistance connectable externally is 10 k Ω or more for voltage output, and 550 Ω or less for current output.
Self-diagnosis Function:	Light source abnormalities, cell contamination, sensor abnormalities, internal circuit abnormalities, and measurement accuracy analysis results are detected and displayed.
Test Mode:	Analog output, alarm contact, solenoid valve operation, and contact input can be tested.
Power Supply:	100–240 V AC \pm 10%, 50/60 Hz
Power Consumption:	55 VA or less
Dimensions:	321 (W) \times 428 (H) \times 202 (D) [mm] * Protruding parts are not included in these dimensions. Equivalent to NEMA4x (IP65)

Mass:	Approximately 15 kg
Pipe Ports: (sample inlet, sample exhaust outlet)	Rc 1/4" socket * sample inlet: In case of connecting the sample gas that can be measured without problems and has removed moisture, without using accessory filter and valve assembly.
Pipe Ports diameter: (sample gas inlet)	Select one from the following Ø3/8 inch (Ø10 mm), switchable between Ø1/4 inch and Ø3/8 inch, switchable between Ø5/16 inch and Ø3/8 inch * In case of using accessory water trap
Wire Ports:	Power supply/control cable port: Ø9 mm–Ø22 mm Signal cable port: Ø4 mm–Ø12 mm
Ambient temperature:	0°C–45°C
Relative humidity:	90 % RH or less within the case (no condensation)
Temperature compensation:	Measurement range: 0°C–50°C Temperature compensation: 0°C (Switchable to 20°C compensation)
Others:	Warm-up time is settable for duration of 0 to 99 minutes (default: 1 minute)

◆ Option

Pressure compensation:	Compensation range: 80–130 kPa (abs) (optional) Pressure sensor (Measurement range: 0.35 MPa (abs))
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4. Function

4.1 Display function

The display is operational in the following modes: “Measurement mode,” “Setting mode,” “Check mode,” and “Test mode.”

(1) Measurement mode

Ozone concentrations are measured in this mode.

(2) Setting mode

The following settings can mainly be made: Alarm setting, temperature/pressure compensation setting, offset setting, measured concentration unit setting, temperature compensation type setting, analog full scale setting, analog output mode setting, zero calibration mode setting, warm-up operation time setting (pressure compensation type setting, pressure sensor atmospheric pressure calibration setting, pressure sensor span setting).

(3) Check mode

The following items can mainly be checked: sensor output, temperature/pressure, zero calibration, concentration history display, integrated lamp time, integrated analyzer operation time, and software version.

(4) Test mode

Test 1: The voltage or current value of analog output can be output artificially.

Test 2: Measurement-in-progress signals and concentration alarm signals can be controlled artificially.

Test 3: Analyzer error signal and solenoid valve operation can be controlled.

Test 4: Contact input of zero contact input signals can be controlled to perform zero calibration.

(5) Zero calibration function

Normal zero calibration includes “Manual zero calibration,” “Intermittent zero calibration,” and “Automatic zero calibration.”

- Manual zero calibration: Zero calibration can be performed by switch operation and zero contact input signals.
- Intermittent zero calibration: Zero calibration is performed at intervals set by the internal timer.
- Automatic zero calibration: Zero calibration is performed sequentially at intervals set in advance.

4.2 Lamp heater

To stabilize the emission of the low-pressure mercury lamp, a heater is mounted near the lamp.

* A self-limiting heater is used. Auto control is performed in normal environment. The factory default setting is ON. If the internal temperature of the analyzer has increased depending on the operating environment, set it to OFF using the switch on the substrate.

4.3 Other functions

(1) Temperature compensation function

Temperature compensation function is standard equipment in this analyzer. Compensation temperature is normally set at 0°C, and it can also be set at 20°C. Temperature compensation can also be validated or invalidated.

(2) Pressure compensation function

Pressure compensation function is optionally available with this analyzer.

The pressure compensation range is from 0.01 to 0.1 MPa (G). In addition, the pressure compensation can be made valid or invalid.

- Generally, since normal pressure change (approximately 100 to 1020 hPa (abs)) is considered to fall within an allowable measurement error range, pressure compensation need not be performed. Meanwhile, the internal pressure of the analyzer may increase or decrease depending on the inlet/outlet side (pipe) conditions of the analyzer. In such cases, pressure compensation must be performed.

5. Installation

5.1 Installation conditions

To prevent damage and failure of the analyzer and ensure stable operation and safety, install the analyzer, avoiding the following places:

- A place subject to salt damage, and a place containing corrosive gases such as hydrogen sulfide, sulfur dioxide, and halogen gas
- High-temperature and high-humidity atmosphere, and a place subject to significant temperature change
- A place subject to strong or continuous vibration
- A place subject to direct sunlight
 - * Install the analyzer outdoors, taking installation environment into consideration.
- A place near strong magnetic field, electric field, and radiofrequency emission source
- A place where sufficient maintenance/inspection space cannot be ensured
- A place where an explosive gas may be generated
- A place at an altitude exceeding 2000 m
- A place where opening/closing of a door causes contamination falling on the rated Pollution Degree of 2 or higher

* Rated Pollution Degree 2

Only non-conductive pollution occurs that occasionally a temporary conductivity caused by condensation to be expected. (Example: Offices, laboratories, test stations)

**DANGER**

- This analyzer is not of explosion-proof structure.
- If the ozone analyzer is used in a place where a flammable or combustible gas exists in the atmosphere, explosion may result. Do not use the analyzer in such places.

5.2 Installation method

Bore M8 (mm), or $\times \text{Ø}8.5$ (mm) holes on the wall or anchor to which the analyzer is to be fastened at a mounting pitch of 380 mm (W) \times 380 mm (H) in advance.

* Note that screws for mounting are not supplied. Provide screws of M8 \times 20 mm or longer.

**CAUTION**

- Select a wall or anchor that has strength enduring four times or more the weight of the analyzer.
- Mount the analyzer at a stable installation place. If the analyzer is mounted at a shaky place, a failure may result, or the analyzer may fall off.

5.3 Installation place

Install the analyzer in a place where sufficient maintenance space is allowed as shown in Figure-2, piping and wiring can be installed, and maintenance can be performed easily. Select a sturdy and stable wall or anchor that can endure the weight of the analyzer, and select a place where the analyzer can be mounted vertically without fail.

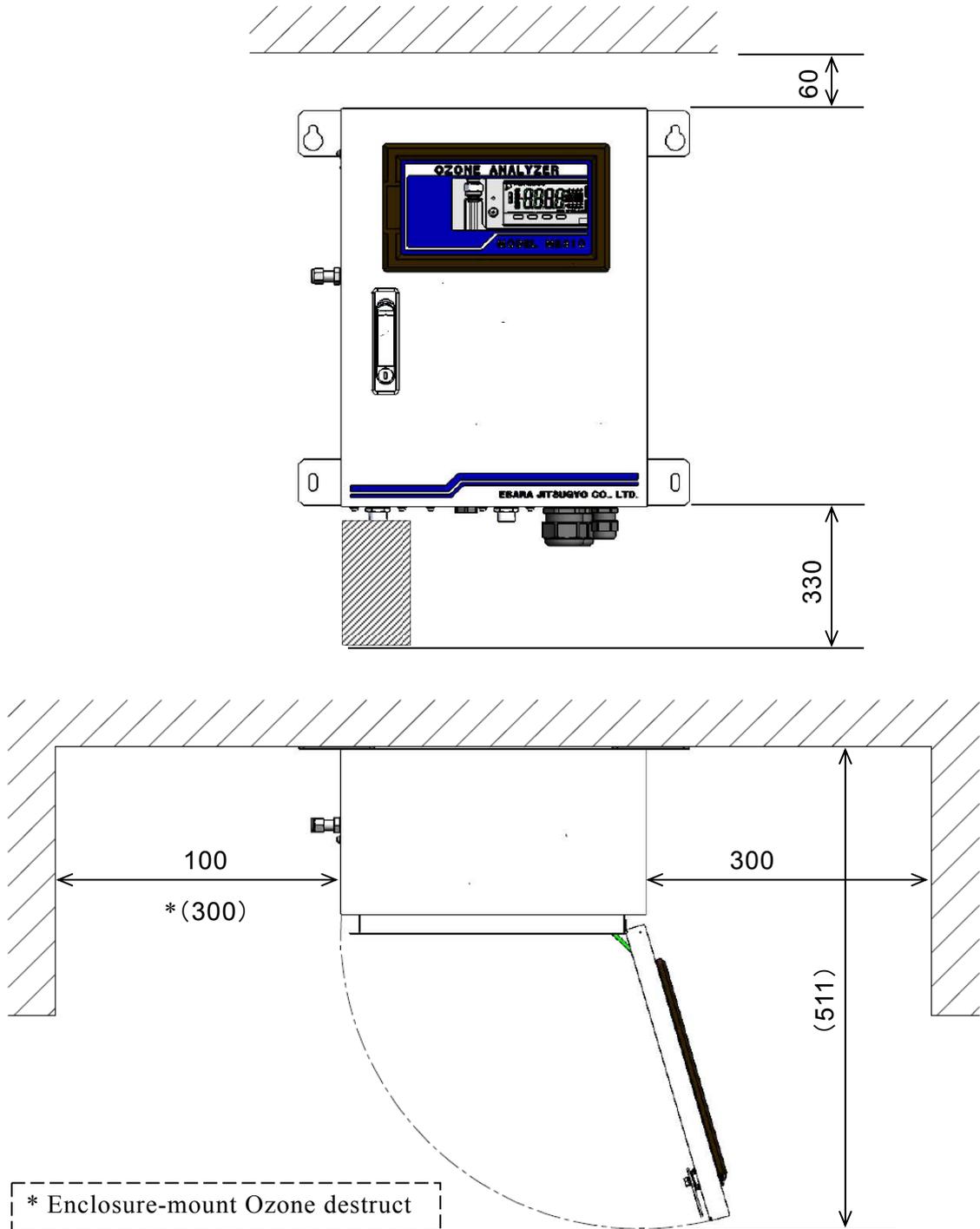


Figure-2 Maintenance space

* The maintenance space shown in Figure-2 illustrates the minimum required space not including piping and wiring installation space. Install the analyzer, taking these conditions into consideration.

5.4 Wiring

5.4.1 Connection of power cable

Be sure to install a circuit breaker on the primary side of the power supply of the analyzer to allow the main power to be interrupted. Check the specifications of the power supply of the analyzer and select a circuit breaker that satisfies the standard requirements of the nation where the breaker is to be used.

(1) Power supply specifications

Voltage: 100 to 240 V AC $\pm 10\%$, 50/60 Hz

Current: Steady state; 0.3 A or lower, Rush state: 4 A or lower

(2) Specifications and treatment of power cable

Use a power cable that satisfies standard requirements of the nation where the cable is to be used and that has been certified or approved by an authorized testing organization.

Provide a power cable having round sheath (matching cable diameter: $\text{Ø}9.8$ to 12 mm) and solid 3-wire – $\text{Ø}2$ mm conductor cable.

Treat the cable as shown below, and attach a solderless terminal for M5 to the protective ground wire (PE wire). Be sure to install the protective ground wire to the protective conductive terminal (PE terminal).

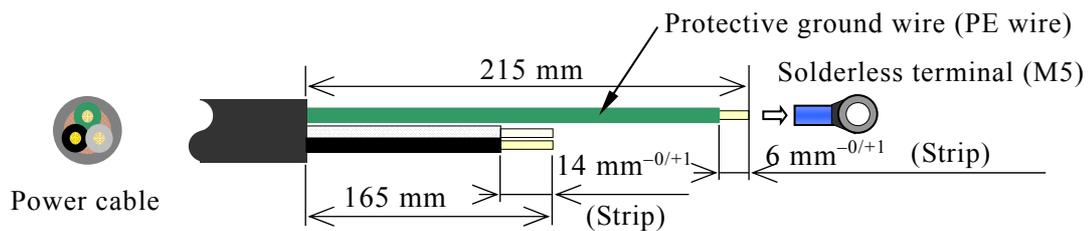


Figure-3 Treatment of power cable

* Use a green/yellow wire when a single PE wire is to be used.

5.4.2 Connection of control cable

(1) Specifications and treatment of control cable

Use a control cable that satisfies standard requirements of the nation where the cable is to be used and that has been certified or approved by an authorized testing organization.

Provide a control cable having a round sheath (matching cable diameter: $\text{Ø}14.5$ to 17 mm) and conductor of AWG18 or higher.

Do not use Interface cable over than 30 m in length for keeping its performance.

Treat the cable as shown below, and attach a solderless terminal for M3.

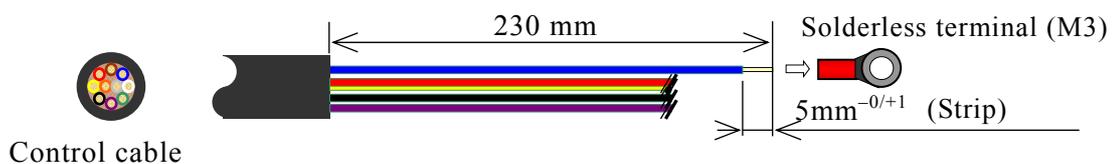


Figure-4 Treatment of control cable

* Use a cable of your specified color.

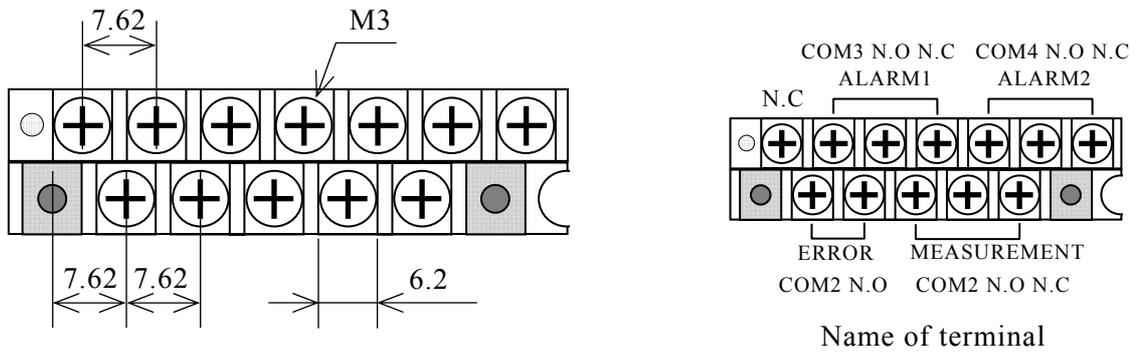


Figure-5 Analyzer output terminal block (TB1)

(2) Types of control cable signals

- Measurement-in-progress signal output (MEASUREMENT)

This signal is a no-voltage “c” contact output. In the case of “a” contact output operation, the contact is made (ON) while measurement is made, and the contact is broken (OFF) while measurement is not made due to an error, etc. In the case of output on the “b” contact side, the operation is reversed. The contact capacity is 250 V AC/30 V DC 5A (resistance load), and 250 V AC/30 V DC 1.5 A (inductive load).

- Concentration alarm output (ALARM)

This signal is a no-voltage “c” contact output. ALARM 1 (AL1) and ALARM 2 (AL2) series are available as concentration alarm signals. The “a” contact is made (ON) when the ozone concentration increases to the setting or higher, and is broken (OFF) when the value decreases to the setting or lower. In the case of output on the “b” contact side, the operation is reversed. The contact capacity is 250 V AC/30 V DC 5A (resistance load), and 250 V AC/30 V DC 1.5 A (inductive load).

- Error signal output (ERROR)

This signal is a no-voltage “a” contact output. The contact is made (ON) when an error is detected by the self-diagnostic function, and is broken (OFF) when the error is reset. The contact capacity is 250 V AC/30 V DC 5A (resistance load), and 250 V AC/30 V DC 1.5 A (inductive load).

5.4.3 Connection of signal cable

(1) Specifications and treatment of signal cable

Use a signal cable that satisfies standard requirements of the country where the cable is to be used and that has been certified or approved by an authorized testing organization.

Provide a signal cable having a round sheath (matching cable diameter: $\varnothing 4.5$ to 6 mm) and conductor of AWG26 or higher.

Do not use Interface cable over than 30 m in length for keeping its performance.

Treat the cable as in Figure-6, and attach a solderless terminal for M3.

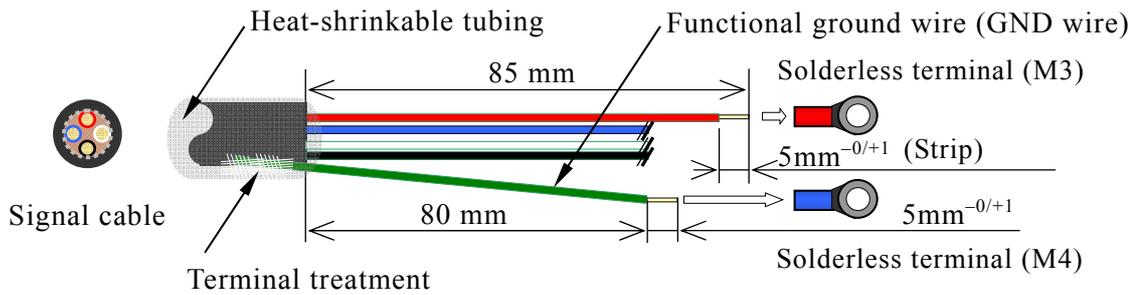


Figure-6 Treatment of signal cable

* Use a cable of your specified color.

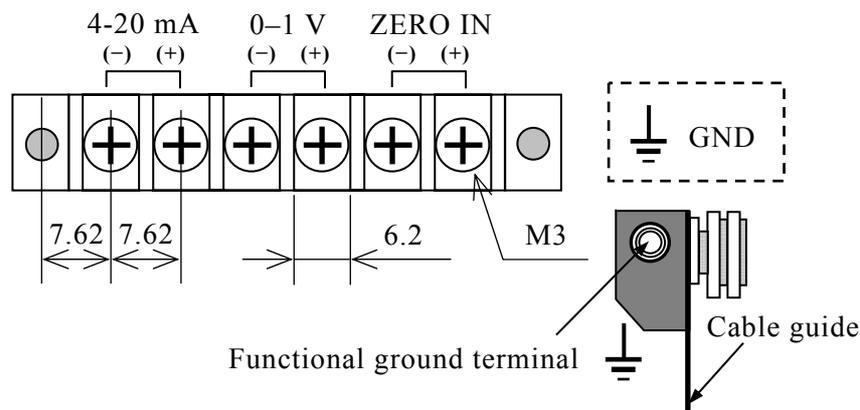


Figure-7 Analog output/ analyzer input terminal block (TB2)

(2) Types of signal cables

• Analog output (insulation output)

As analog output, one series only selected from the following four types can be used: Current output; 4–20 mA DC, voltage output; 0–1 V DC, 0–10 V DC, and 1–5 V DC. Default setting is 4–20 mA DC for current output.

To change the setting to voltage output, change the setting and then change the terminal block connection to “0–1 V”.

Current output and voltage output are output from respective terminal blocks. Load resistance is 550 Ω or lower on the current output side, and 10 k Ω or higher for the voltage output side.

* Be sure to connect the shield (functional ground wire: GND wire) to the GND terminal (functional ground terminal) in front of the terminal block. On the control side (on the side receiving signals from this analyzer) also, connect the GND wire (shield) to the functional ground terminal on the control side.

• Zero contact input signal

By short-circuiting this terminal, zero calibration function is actuated. A no-voltage contact (relay contact 1a) is recommended for short circuit. When short circuit is performed using an open collector, etc., select a circuit capable of feeding 10 mA to 15 mA DC current. Check the setting before operation.

* The (+) terminal is pulled up by 5 V DC, and the (–) terminal is GND.

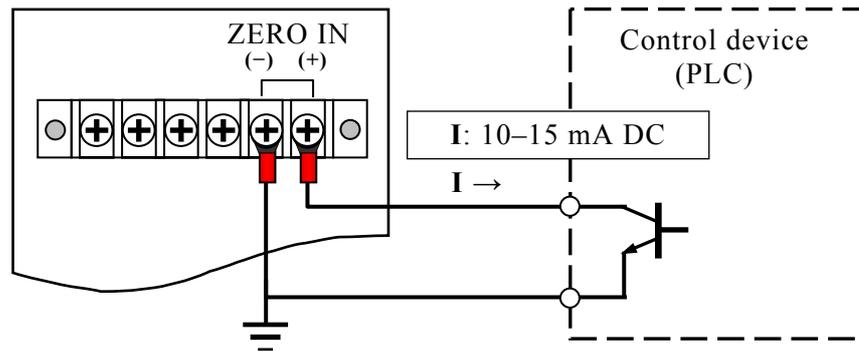


Figure-8 Zero contact input circuit (Example of use of open collector)

5.5 Piping

Piping method of Off-gas Ozone Analyzer

(1) Water trap sample gas inlet (COALESCER INLET)

Connect a PTFE tube or PFA tube to the water trap sample gas inlet (resin coupling).

- * The 30-series coupling (for 3/8 inch / Ø10 mm) for sample gas inlet by Flowell® is mounted as standard equipment.
- * Pipes are not accessories. Provide pipes matching the coupling.
- * The pipe length is limited depending on pipe diameter.

Flow rate Pipe diameter	Recommended pipe length	Maximum pipe length		
	1.0 L/min	1.0 L/min	1.5 L/min	2.0 L/min
1/4 inch / Ø6 mm, 5/16 inch / Ø8 mm	2.5 M	50 M	30 M	20 M
3/8 inch / Ø10 mm	10 M	200 M	100 M	75 M

- * The above pipe lengths are guidelines. Note that the length may become shorter depending on piping conditions and measurement environment. Install piping, ensuring sufficient allowance.
- * Recommended pipe length is the one that allows pressure loss within the pipe to be ignored.
However, in some cases, pressure compensation may be necessary.

(2) Sample discharge port (EXHAUST OUTLET)

Connect the pipe to the exhaust outlet to allow outdoor treatment to be performed.

- * Pipe connection port is Rc1/4.
- * Provide coupling and pipes, which are not accessories.

6. Option

The optional accessories of this analyzer are as shown below. The pressure sensor assembly as an optional function is available only when the analyzer is purchased.

(1) Optional function (common option)

- Pressure sensor assembly (absolute pressure): Product code: BZ626A

(2) Common optional parts

- [1] Roof assembly: Product code: BZ627A
- [2] External ozone destruct
 - * Coupling: 1/4 inch (Swagelok®): Product code: BZ325A or
 - Coupling: 3/8 inch (Flowell®): Product code: BZ325B

7. Maintenance

7.1 Parts to be replaced periodically

The following genuine parts should be used as replacement parts. The normal warranty period is 12 months after delivery.

Note, however, that the parts may not be covered by the warranty depending on the state of use even within the warranty period.

Product	Parts name	Product code	Quantity	Replacement guideline	Note
Common	Lamp unit	BZ107A	1 set	2 years	Low-pressure mercury lamp
Off-gas Ozone Analyzer (ME820)	3-way solenoid valve assembly	BZ144A	1 pc.	3 years	With coupling/pipe (Standard)
		BZ144B			With coupling/pipe (For mounting of an optional pressure sensor)
	Sample gas filter	NF012A	1 pc.	1 year	(External color: Blue)
	Zero gas filter	NF008A	1 pc.	1 year	(External color: Transparent)
	Sample gas pump assembly	BZ405A	1 pc.	2 years	With rubber cushion
	Ozone destruct ^(*1)	BZ326B	1 pc.	3 years	With coupling

* The replacement period may become shorter depending on the operating environment. In that case, make optimum replacement interval setting.

*1: When acidic gases such as nitrogen oxides are contained in the sample gas and at the same time humidity is high, the catalyst may degrade and thus decomposition performance may deteriorate at an early stage. (Such cases are not covered by the warranty.) The replacement guideline has been set, assuming that zero calibration is performed once daily.

◆ Contact us for the contents (decomposition catalyst set (BZ327A)).

7.2 Ozone destruct (Optional parts)

The ozone destructs (enclosure-mount ozone destruct and external ozone destruct) are designed to ensure long-term operation under normal operating conditions.

However, when acidic gases such as nitrogen oxides are contained in the sample gas and at the same time humidity is high, the catalyst may degrade and thus decomposition performance may deteriorate at an early stage. In such cases, set an optimum replacement period depending on operating environment and conditions.

8. Storage

If the analyzer is not operated for a long period of time, perform the following:

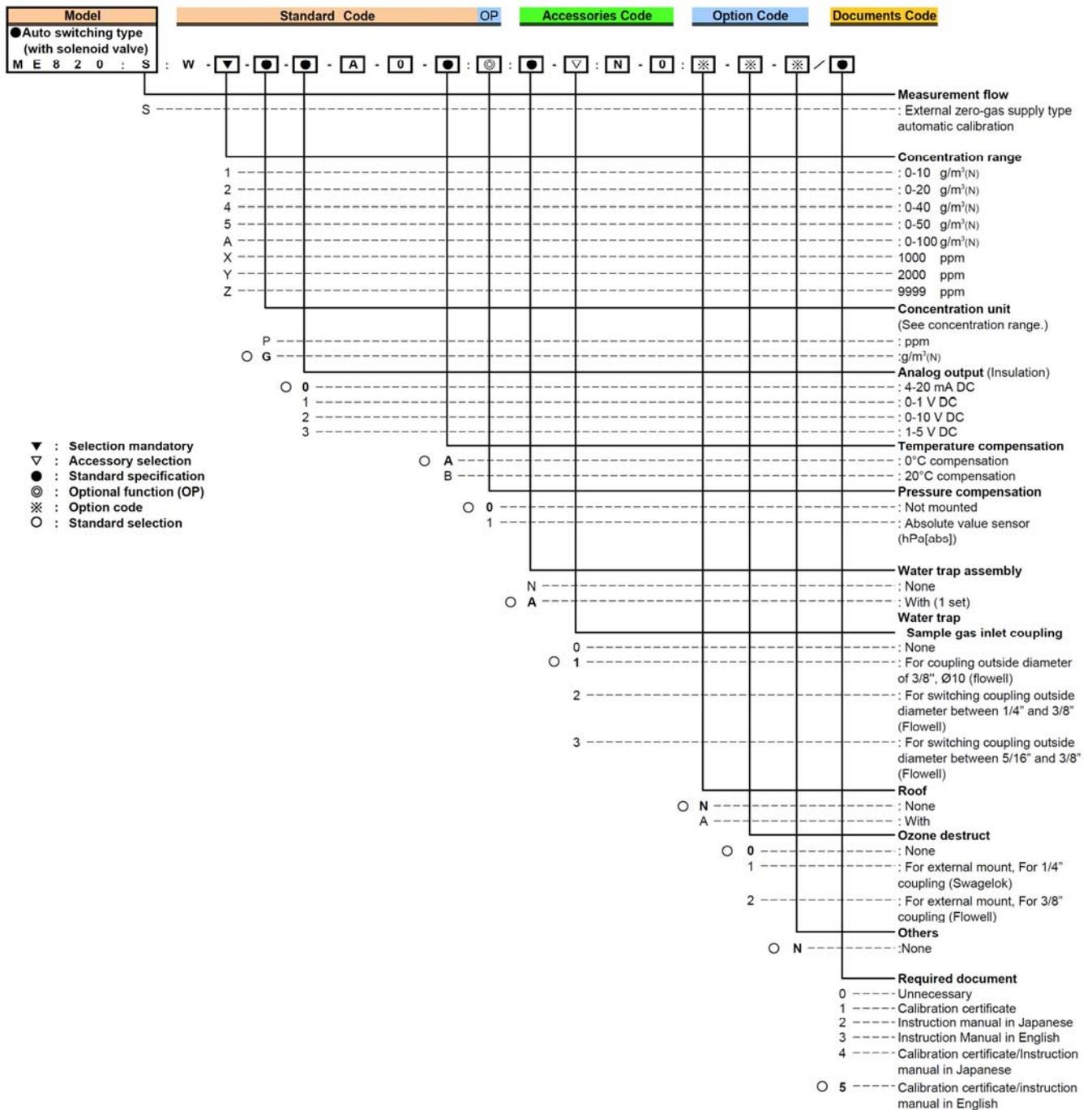
- Set the main power and the power switch to OFF
- In the case of Off-gas Ozone Analyzer, close the following needle valve:
 - Close the needle valve of the flowmeter.
- Storage environment
 - Store the analyzer in the ambient environment and humidity environment specified in the specification.

* The storage period is included in the warranty period.

9. Model code

● Off-gas Ozone Analyzer model code

◇Off-gas Ozone Analyzer Model Code



* When placing an order with us, specify the model of your desired analyzer, and select specifications from the above model codes.

Be sure to select mandatory items marked with [▼]. If there is no designation, standard selection [○] will become applicable.

Normally in standard specification, optional functions (OP) and optional codes are [None].

10. Warranty

The analyzer will be warranted for a period of 12 months from the date of delivery.

Note, however, that the following items are not covered by the warranty even within the warranty period:

◇ Following events that occur during the warranty period

- (1) Failure due to improper handling
- (2) Failure caused by improper repair or modification not using genuine parts
- (3) Failure and damage due to fall after delivery or during transportation
- (4) Failure and damage caused by fire, salt damage, gas damage, earthquake, wind and flood damage, lightning, abnormal voltage, and other force majeure
- (5) Failure due to degradation of consumables (such as packing, sealing materials, and filters)
- (6) Degradation of catalyst caused by existence of high-concentration acidic gases, etc., in the sample gas
- (7) Pump failure and performance degradation due to the effect of moisture and acidic gas (Degradation of diaphragm material, degradation and adhesion of valve material, etc.)

This product only is covered by the warranty during the warranty period. We are not responsible for compensating any damage caused by its use (such as lost earnings, personal injury, and damage to other equipment).

◇ Others

- (1) Contact your dealer when repair is necessary.
- (2) The minimum retaining period of performance components for repair of this analyzer is 7 years after the discontinuance of production.
 - * The performance parts for repair are defined as parts necessary to maintain the intended performance of products.
- (3) The scope of warranty for failures due to unprecedented causes will be determined by discussion on a case-by-case basis.

Note that this specification is subject to change without prior notice due to improvement.

■ Flow diagram

Flow diagram of Off-gas Ozone Analyzer Type S

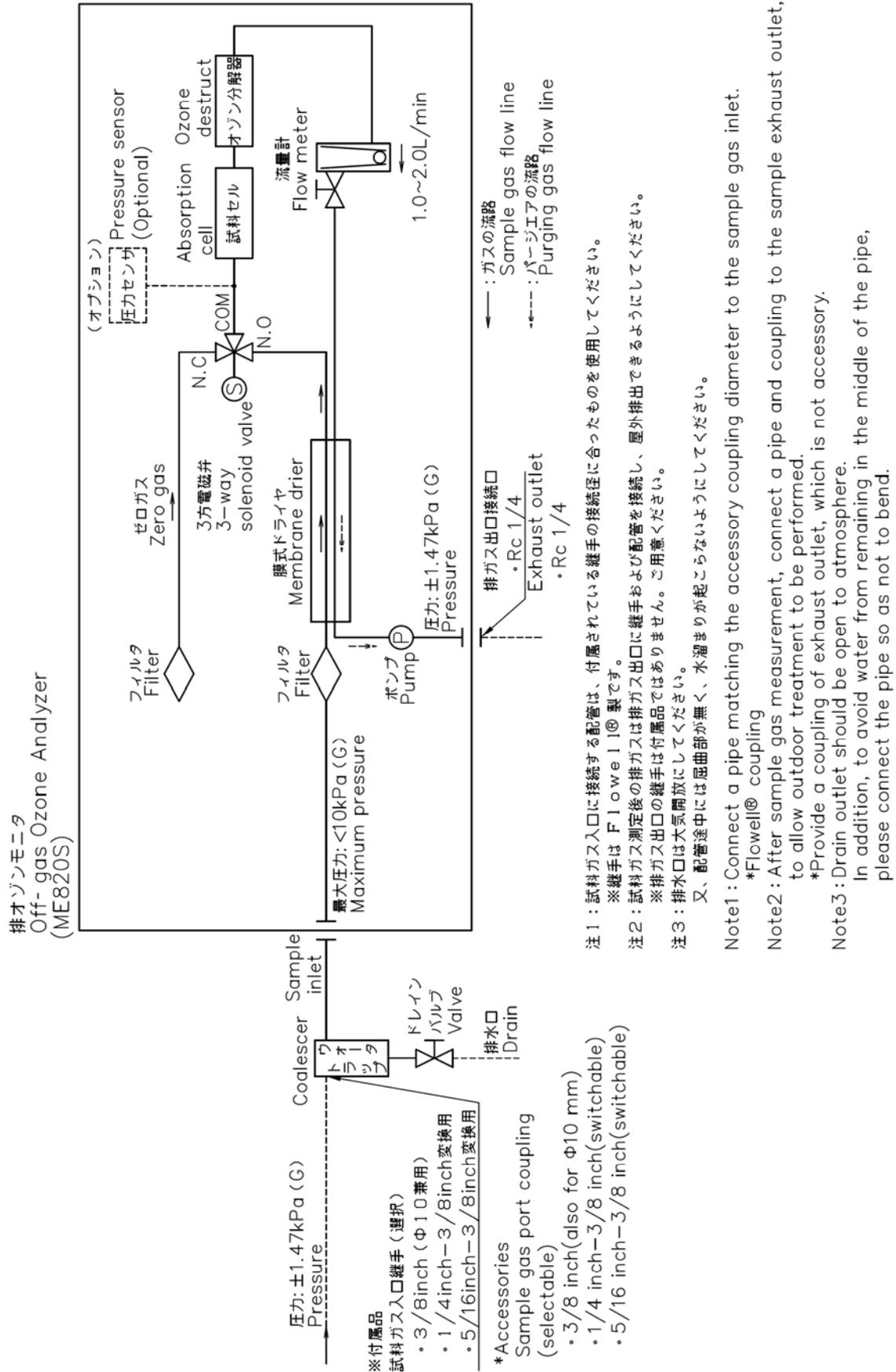


Figure-9 Flow diagram of Off-gas Ozone Analyzer (Type S)

■ Outline drawing

● Outline drawing of Type S Off-gas Ozone Analyzer

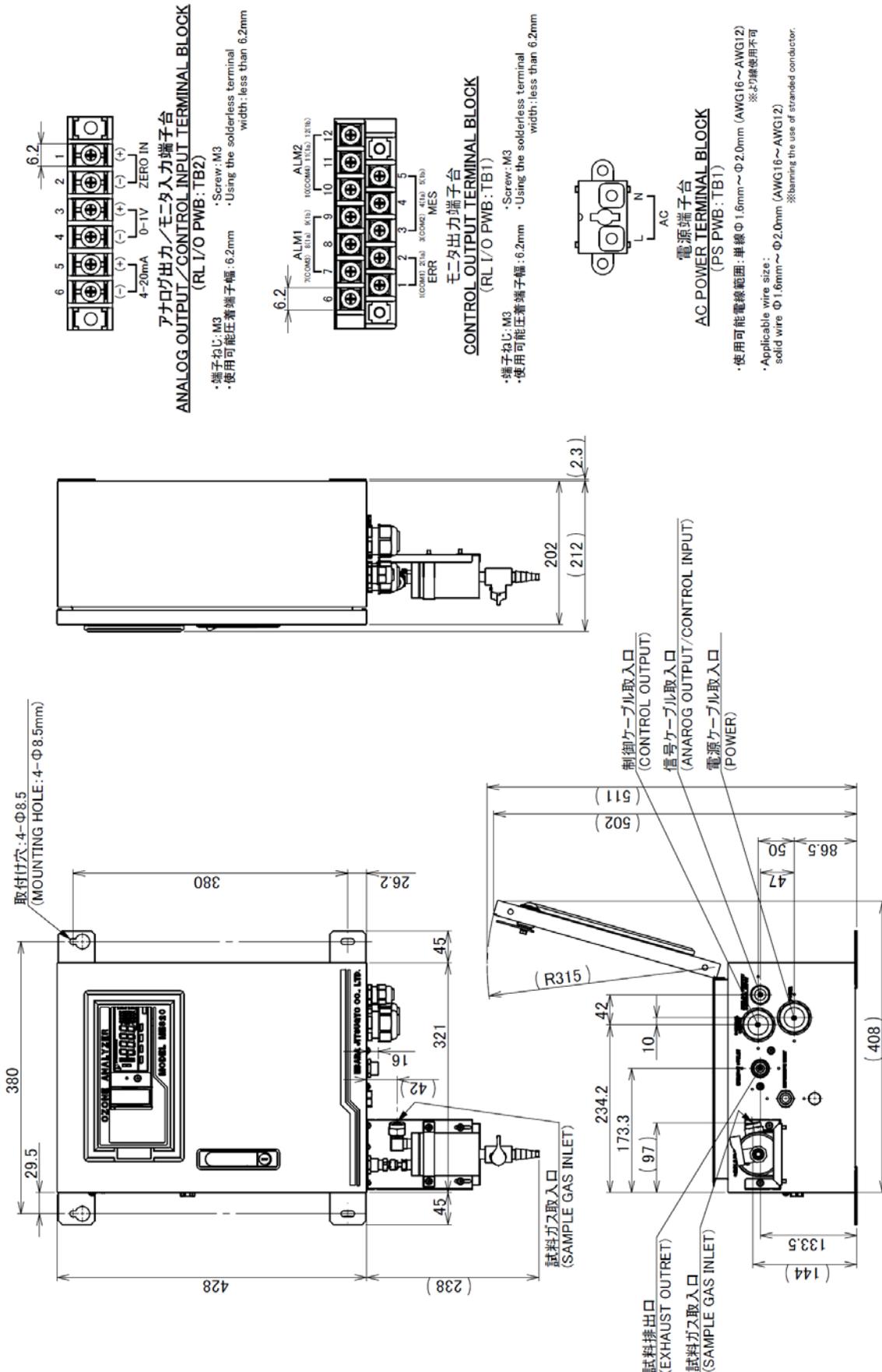


Figure-10 Outline drawing of Off-gas Ozone Analyzer (Type S)

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