# General Specifications

Model SG750
Stack Gas Analyzer

EXA IR

**GS 11G04G01-01E**

## GENERAL

The SG750 Stack Gas Analyzer consists of an infrared gas analyzer, a zirconia oxygen analyzer, and a sampling unit.

The SG750 can simultaneously measure up to five components: sulfur dioxide ($SO_2$), nitrogen oxides ($NO_X$), carbon monoxide (CO), carbon dioxide ($CO_2$) and oxygen ($O_2$).

## FEATURES

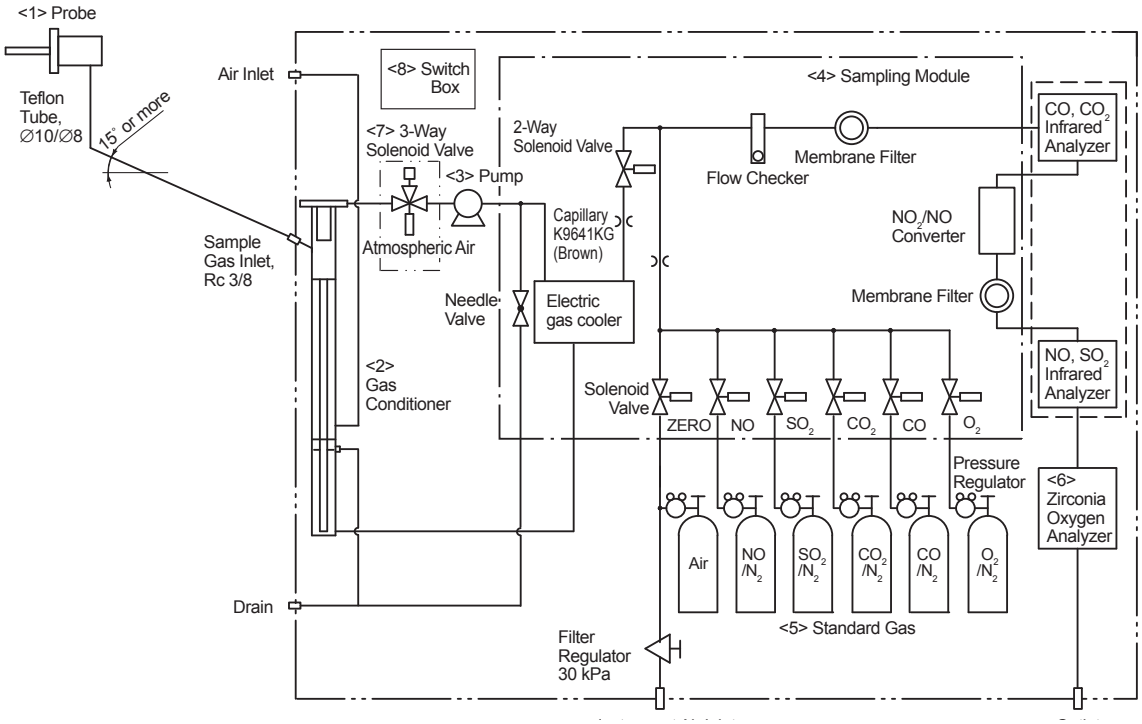
1. **Simultaneously measures up to five gas components**
   The SG750 uses a combination of an infrared gas analyzer(s) and a dedicated zirconia or paramagnetic oxygen analyzer to simultaneously determine concentrations of up to five gas components - $NO_X$, $SO_2$, CO, $CO_2$ and $O_2$.
2. **Minimizes the effects of interference from other gas components**
   The use of interference compensation in the analyzer virtually eliminates the effects of interference from other gas components.
3. **Saving the installation space by front panel maintenance.**
   Unitized structure of the analyzing block and gas sampling module enables better maintenance.

4. **Provides a wealth of functions**
   The SG750 provides a variety of standard functions, including reliability-enhancing self-diagnosis, auto matic calibration, correction to $O_2$ values, averaging, high and low limit alarms, and more.
5. **Wide dynamic range**
   The SG750 is highly sensitive with a wide dynamic range which can be switched up to 1:25 and which can be changed arbitrarily.

## SAMPLING SYSTEM CONFIGURATION

**Example 1: Five Gas Components Gas Sampling System Configuration**

● Standard System

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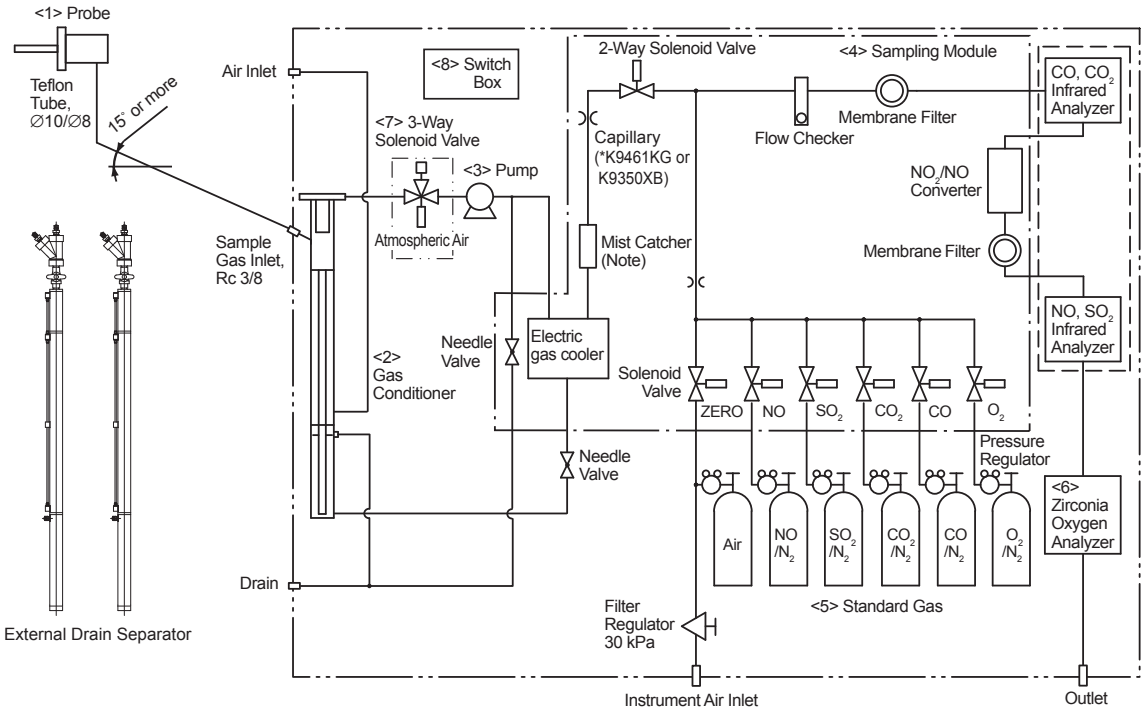
**Example 2: Five Gas Components Gas Sampling System Configuration**
**● $SO_2$ 1st range of 500 ppm or higher and option code "Mist Catcher: /SO1" is specified**




**(Note) When $SO_2$ 1st range is less than 500 ppm, mist catcher is not existence.**
*** K9350XB: Brown, K9461KG: Green**

## System Components

<1> Probe
A gas sampling probe to removes dust in sample gas. For details, see page 6 and 7.

<2> Gas conditioner
Separates and drain in sample gas, dust and mist in sample gas and adjusts sample gas pressure.

<3> Pump
A sample gas aspirator with a flow rate of approximately 2 L/min.

<4> Sampling module
Consists of the following components.
- Electric gas cooler: Dehumidifies sample gas.
- Solenoid valve: Used for introducing calibration standard gas.
- Membrane filter: Glass fiber filter or PTFE filter removes fine dust. Dust buildup conditions can be monitored through the front panel of the analyzer.
- Flow checker: Monitors the flow rate of sample gas.
- $NO_2$/NO converter: Uses a special catalytic material for efficient conversion of $NO_2$ to NO gas. Also used for reducing errors due to the $NO_2$ interference with $SO_2$ analyzer.
  The recommended catalyst replacement interval is 8 months (when $NO_2$ is 10 ppm).
- Mist catcher: Removes sulfuric acid mist in sample gas.When the $SO_3$ concentration is 30 ppm, the replacement interval is approximately 4 months. Should be used when $SO_2$ is 500 ppm or higher, or for oil/coal boilers.
- Needle valve: Keep the flow rate of sampling gas at a fixed level.

<5> Standard gas
Used for zero and span calibrations of the infrared gas analyzer. When a zirconia oxygen analyzer is used, instrument air (dew point of -10°C or less) and atmospheric air can be used for zero calibration of $NO_X$, $SO_2$, $CO_2$, and CO analyzers and for span calibration of the oxygen analyzer.

<6> Zirconia oxygen analyzer
Measures oxygen concentrations (0 to 25%) of sample gas. Used in combination with an infrared gas analyzer.

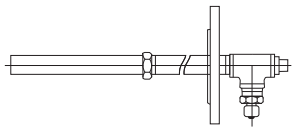
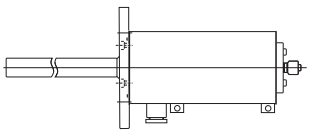
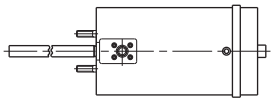
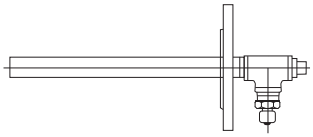
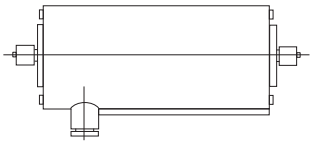
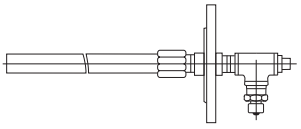
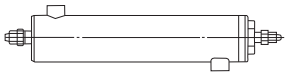
<7> 3-way solenoid valve
Incorporated when using atmospheric air instead of standard gas cylinder.

<8> Switch box
Contains 7 on/off switches for the following equipment.
- Probe
- Pump
- Built-in fan
- Fluorescent lamp and service outlet (2 A max.)
- Sampling module, built-in recorder, converter (for $NO_X$ measurement), and electric gas cooler.
- Zirconia oxygen analyzer
- Built-in space heater of gas conditioner
  Besides the above, contains 2 molded case circuit breakers for the main power supply and the heating tube.

• For the selection of system configuration, refer to the SG750 Inquiry Form on pages 24 to 26.

## SYSTEM CONFIGURATION

For the selection of instruments, refer to the Inquiry Form on pages 24 to 26.

| Probe | External Primary filter |
|---|---|
| Type F filtering probe (K9718VC)  | Unnecessary |
| Type M1E filtering probe (K9219ED)  | Unnecessary |
| Type M2E filtering probe (K9718VE)  | Unnecessary |
| Type M2 open type probe (K9718PD)  | Type M1E external primary filter (K9718TA: Electric heating type)  OR |
| Type M3 open type probe (K9718QA)  | Type MS external primary filter (K9718UA: Steam heating type)  |

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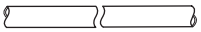
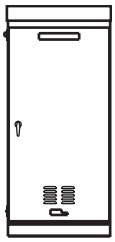
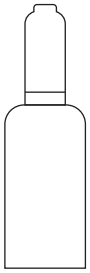
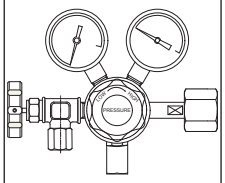
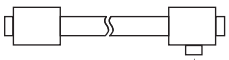
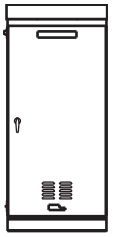
| Ambient Temperature | External Drain Separator (K9641EA) | External Tube | Stack Gas Analyzer | Standard Gas | Pressure Reducing Valve (L9850BA) |
|---|---|---|---|---|---|
| -5 to 40°C | Used when the tilt of the sampling tube between the probe and the analyzer is 15° or less. Use two drain separators when the $SO_2$ concentration is 500 ppm or greater.  | Sampling tube (10 mm O.D./8 mm I.D.) SG8SAP-L□□ Specify the length in meters (50 m max.)  | Standard type  | A standard gas cylinder contains 3.4L 3.4L  | Necessary for every standard gas.  |
| -15 to 40°C | Unnecessary (Can't use this unless anti-freeze measures can be taken.) | Heating sampling tube (10 mm O.D./8 mm I.D.) SG8HSAP-L□□ Specify the length in meters (50 m max.)  An 100 V AC power supply from the SG750. | Specify the cold-district version Option code /T1 : -15 to 40°C /T2 : -10 to 40°C  | | |
| Other than the range noted above | | | Out of scope of the standard specifications | | |

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## GENERAL SPECIFICATIONS

### 1. Stack Gas Analyzer

**Measurement object:**
Measure the concentration of gases such as $NO_X$, $SO_2$, $CO_2$, CO and $O_2$ contained in the flue gas.

**Measuring method:**
$NO_X$, $SO_2$, $CO_2$, CO: Non-dispersive infrared method
$O_2$: Zirconia or paramagnetic method

**Measuring range:**
$NO_X$: 0-50 ppm to 0-5000 ppm
$SO_2$: 0-100 ppm to 0-1000 ppm
$CO_2$: 0-10 vol% to 0-20 vol%
CO: 0-50 ppm to 0-5000 ppm
$O_2$: 0-10/0-25 vol%
Each is 2 range type.
Maximum range ratio is 1:25, except $O_2$ measurement.

**Display:** LCD with backlight

**Indication:**
Instantaneous value ($NO_X$, $SO_2$, $CO_2$, CO, $O_2$), $O_2$ correction instantaneous value ($NO_X$, $SO_2$, CO with $O_2$ measurement), $O_2$ correction average value ($NO_X$, $SO_2$, CO with $O_2$ measurement), Average $O_2$ value (when provided with $O_2$ measurement), Peak count value (CO), Parameter settings

**Output signal:**
4-20 mA DC or 0-1 V DC
5 outputs for instantaneous values ($NO_X$, $SO_2$, $CO_2$, CO, $O_2$), 3 outputs for $O_2$ correction instantaneous values ($NO_X$, $SO_2$, CO), 3 outputs for $O_2$ correction average values ($NO_X$, $SO_2$, CO), 1 output for average $O_2$ value.
Permissible load resistance: 550 Ω max. (750 Ω max. for isolated output)

**$O_2$ correction concentration:**

$NO_X$, $SO_2$, and CO are corrected for $O_2$ reference value. The results are displayed, and output as a 4-20 mA DC signal.

Example:

$O_2$ correction concentration = $\frac{21 - O_n}{21 - O_S} \times C_S$

Where:

$C_S$ : $NO_X$, $SO_2$ and CO measured concentration

$O_S$ : $O_2$ concentration

$O_n$ : $O_2$ reference value

Setting range: 0 to 19%, (factory default: 4%)

Reference: $O_2$ correction reference value

(1) Oil fired boiler 4%, (2) Gas fired boiler 5%,
(3) Solid fuel fired boiler/oil heating furnace 6%,
(4) Coke oven 7%, (5) Incinerator 12%.

**$O_2$ correction average and average $O_2$ values:**

- $NO_X$, $SO_2$, and CO are corrected to $O_2$ and averaged and results are displayed, and output as a 4-20 mA DC signal.
- Averaging time is user configurable.
- Setting range: 1 to 59 minutes, 1 to 4 hours (factory default: 1 hour)

**Automatic range switching:**

- Automatically switchable from low to high range or vise versa.

Low to high: Switched at 90% of low range.

High to low: Switched at 80% of low range.

**Automatic calibration:**

- Interval range: 1 to 99 hours (1 hour increments) or 1 to 40 days (1 day increments)
- Time of calibration gas flow: 60 to 900 seconds (1 second increments)
- Manual/automatic calibration failure contact output: Released when calibration volume exceeds 50%FS.
- Automatic calibration status and maintenance status contact output: Released while calibration gas is flowing and being replaced.
- Automatic calibration remote start contact input: Calibration starts when the input is opened after it has been shorted for at least 1.5 seconds.
- Calibration gas consumption: Approximately 1 year when 3.4 L cylinder is used at intervals of 7 days.

**Contact output:**

(1) Each 1a contact
(contact capacity 250 V AC/2 A, or 30 V DC/3 A)
- Each component range identification, analyzer failure, calibration failure, calibration status, maintenance status.
- CO peak count alarm

(2) Each 1c contact
(contact capacity 250 V AC/1 A or 30 V DC/1 A)
- Each instantaneous value alarm (H/L/HL configurable)
- Analyzer power shutdown

Range identification;
- Identification of high/low range by contact output.
- Low range when the contact is closed.

Instantaneous concentration alarm;
- Instantaneous value alarm is settable for each sample component. High, Low, High or Low is settable (by keys at the front of analyzing block).
- Contact output hysteresis is also settable.
- Contact is 1c type

CO peak count alarm;
- An alarm is sounded and displayed when the CO instantaneous value exceeds the set-point for more-than the specified times.
  Count setting range: 1 to 99 times
  Alarm setting range: 10 to 1000 ppm (5 ppm increments)
- The number of times it is exceeded per hour is displayed.

Analyzer failure;
Contact output is released when the analyzer is abnormal.

**Contact input:**

Voltage-free contact (1.5 seconds or longer)
Auto calibration start, average value reset.
Voltage-free contact (status hold)
Remote range switching (1st range when contact closes), remote output hold, remote pump on/off (off when contact closes.)

Remote output hold;
- Whole output signals for concentration values are held by external contact input.
- Outputs are held while the input is shorted.

Average reset;
- Output and display of $O_2$ correction average value is reset by external contact input.
- Reset when the input is shorted for at least 1.5 seconds.

Remote range switching;
- Switchable between low and high ranges for each measurement component by external contact input.
- High range with the input opened; low range with the input shorted.

**Temperature input signal;**

2 inputs, K thermocouple (for input of optional re-corder)

**Power supply:**

100/110/115/200/230 V AC ±15%, 50/60 Hz ±0.5 Hz

**Power consumption:**

Approx. 600 VA (depending on specifications), excluding probe and heating sample tube.

**Main wetted materials:**

304 SS, Neoprene, $CaF_2$, Teflon, Polyethylene, Viton, PVC

**Construction:**

Outdoor/indoor stand-alone system, non-explosion-proof, rainproof, single swing front door, standard plate thickness of 2.3 mm (both housing and door)
Color: Munsell 5Y7/1 semigloss
Paint coating thickness: Outside/inside 40 µm or more
Finish: Melamine resin, baked.

**Installation conditions:**

Avoid direct sunlight and vibration
Ambient temperature: -5 to 40˚C
-15 to 40˚C (cold district version: specify “/T1”)
-10 to 40˚C (cold district version: specify “/T2”)
Ambient humidity: 90%RH or less

**Weight:** Approximately. 300 kg (without standard gases)

**Sample gas conditions**

Temperature : 1400˚C or less
Dust : 500 mg/$Nm^3$ or less
Pressure : -1 to 5 kPa, -3 to 3 kPa, -5 to 1 kPa
Note: For pressures outside the above range, consult with Yokogawa.
Flow rate : Approximately 2 L/min

**Sample gas components and their range:**

- $NO_X$: 5000 ppm or less
- $SO_2$ (*): 1000 ppm or less
- $NO_2$: 10 ppm or less
- $CO_2$: 20 vol% or less
- CO: 5000 ppm or less
- $O_2$: 0 to 21 vol%
- $NH_3$: Should be excluded
- $H_2O$: 0 to 20 vol%
- HF, $H_2S$: 1 ppm or less
- $N_2$: Carrier gas

(*) When the $SO_2$ concentration exceeds 500 ppm, the option code "/SO1" must be specified.

**[Restrictions]**

The standard system is not applicable to the following applications and sample gas conditions due to measurement restrictions. Consult with Yokogawa.

1. Sample gas containing $SO_3$ mist of concentration greater than 30 ppm
2. Exhaust gas of diesel engines
3. Outlet gas of glass melting furnaces
4. Sample gas containing dust whose concentration exceeds 500 mg/$Nm^3$
5. Sample gas containing corrosive components such as HCl, $Cl_2$, and $Na_2SO_4$

**Characteristics**

- Repeatability : ± 0.5% of FS
- Linearity : ± 1.0% of FS
- Stability :
  - Zero drift : ±1% of FS/week,
    ±2% of FS/week for the range of 200 ppm or less
    ±2% of FS/month for zirconia oxygen analyzer
  - Span drift : ±2% of FS/week
    ±2% of FS/month for zirconia oxygen analyzer
  - 90% response time : (From the inlet of the system)
    Approximately 4 minutes for $SO_2$
    Approximately 2 minutes for others
  - Warm-up time: Approximately 4 hrs. (after power-on)

Note: Fluctuation in the operation period of 4 hours from the end of warm-up time is within ±2% FS.

- Effects of interfering gases:
  When the sample gas contains the gas components listed below, the measurement accuracy may suffer. Consult with Yokogawa for countermeasures or the effect on accuracy.

| Analyzer | Interfering | Effect |
|---|---|---|
| $SO_2$ analyzer | $NO_2$ | 50 ppm of $NO_2$ is equivalent to -6 ppm of $SO_2$ |
| CO analyzer | $CO_2$ | 15% of $CO_2$ is is equivalent to 7-10 ppm of CO |
| CO analyzer | $N_2O$ | 1000 ppm of $N_2O$ is equivalent to 80 ppm of CO |

## 2. Probes and External Primary Filters

### 2.1 Filtering probes

The Type F filtering probe is Yokogawa's standard probe and widely used in many applications including boilers. When using the filtering probe, the temperature at a sampling point must be higher than the dew point (approx. 150˚C). For the conditions for selecting a filtering probe, refer to Table 1, "Selection of Filtering Probes" in the Inquiry Form on page 24.

| Name | Type F Filtering Probe | Type M1E Filtering Probe | Type M2E Filtering Probe |
|---|---|---|---|
| Part number | K9718VC | K9219ED | K9718VE |
| Operating temperature | 150 to 400°C | 150 to 700°C (*2) | 150 to 700°C (*2) |
| Probe material | 304 SS | 304 SS | 316 SS |
| Filter | 304 SS (20 µm) | 304 SS (20 µm) | 316 SS (5 µm) |
| Position of filter | Inside stack | Outside stack | Outside stack |
| Heating method | None | Electricity at approx. 80 VA (*1) | Electricity at approx. 130 VA (*1) |
| Flange material | JIS 5K 80 RF (304 SS) | JIS 5K 80 RF (304 SS) | JIS 10K 50 FF (304 SS) |
| Insertion length | 700 mm | 700 mm | 1000 mm |
| Weight | Approx. 5 kg | Approx. 11 kg | Approx. 15 kg |
| Filter element | K9718RS | K9718RX | K9718VF |

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(*1) When wiring the power supply to the heater of the Type M1E and M2E filtering probes use a heat-proof cable equivalent to JIS C3323-KGB.

(*2) When the temperature at a sampling point is lower than the acid dew point (approx. 150˚C), use Type M1E or M2E filtering probes. As condensation tends to form on the mounting point of the probe, this point needs to be insulated or heated to more than the acid dew point (heating/insulation to be provided by customer). For details, refer to pages 21, 22, and 23.

### 2.2 Open type probes and external primary filters

The open type probe should be selected according to the dust volume, moisture content, temperature and $SO_2$ concentration range of the sample gas. The external primary filter should be selected according to the heating method (utility). For the conditions for selecting an open type probe and an external primary filter, refer to Table 2, “Selection of Open Type Probe and External Primary Filter” in the inquiry form on pages 24, 25.

**• Open type probes**

| Name | Type M2 Open Type Probe | Type M3 Open Type Probe |
|---|---|---|
| Part number | K9718PD | K9718QA |
| Operating temperature range | 800˚C max. | 1400˚C max. |
| Probe material | 310S SS | SiC |
| Flange (material) | JIS 5K 80 RF (304 SS) | JIS 5K 80 RF (304 SS) |
| Insertion length | 700 mm | 1040 mm |
| Weight | Approx. 5 kg | Approx. 5 kg |

Note: As probe material of M3 is SiC, do not add a mechanical impact.

**• External primary filters**

| Name | Type M1E External Primary Filter | Type MS External Primary Filter |
|---|---|---|
| Part number | K9718TA | K9718UA |
| Filter container material | 304 SS | 304 SS |
| Filter | 304 SS (20 microns) | 304 SS (20 microns) |
| Heating method | Electricity, approx. 80 VA | Saturated steam, 100 to 300 kPa |
| Weight | Approx. 7 kg | Approx. 7 kg |
| Filter element | K9718RX | K9718US |

Note: When wiring the power supply to the heater of the Type M1E external primary filter, use a heat-proof cable equivalent to JIS C3323-KGB.

## 3. External Drain Separator

(1) Used when the sampling tube between the probe and the analyzer is placed at a 15 degree angle or less

(2) When the $SO_2$ concentration is 500 ppm or more, two drain separators should be used.
Part number: K9641EA
Material of parts in contact with gas: Vinyl chloride
Weight: Approx. 3.5 kg
Ambient temperature: -5 to 40˚C

## 4. Sampling Tubes (Refer to page 13)

### 4.1 Sampling tubes (SG8SAP-L☐☐)

Length: 50 m max.
Material: Polytetrafluoroethylene (Teflon)
Diameter: 10 mm O.D./8 mm I.D.
Operating temperature: -5 to 200˚C

### 4.2 Heating sampling tubes (SG8HSAP-L☐☐)

(1) Used in cold districts where drain in the sampling tube is likely to freeze

(2) Used when the $SO_2$ concentration in the sample gas is 100 ppm or less. The heating sampling tube comes with an Input Power Kit (for the power supply) and a Termination Kit (for tube-end processing), with which the tube should be assembled in the field.
Length: 50 m max.
Material: Polytetrafluoroethylene (Teflon)
Sheath: PVC (93˚C max.)
Tube diameter: 10 mm O.D./8 mm I.D.
Heating sampling tube: 33 mm O.D.
Tracing temperature: Outdoor temperature plus approximately 90˚C
Power consumption: Approximately 36.5 VA/m (at 100 V AC)

## 5. Standard gas cylinders (Refer to pages 13 and 14 for their part numbers)

Part number: See the Model Codes
Composition: See the Model Codes
Pressure: Approximately 10 MPa
Capacity: 3.4 L
Weight: Approximately 6 kg

## 6. Pressure Reducing Valves for Gas Cylinders

Part number: L9850BA
Pressure gauge:
Primary: 0 to 25 MPa
Secondary: 0 to 0.1 MPa
Operating pressure range: 0.01 to 0.06 MPa (30 kPa for the SG750 analyzer)
Connection: Inlet: W22 14 TPI (female) right-hand thread
Outlet: Rc1/4
Weight: Approximately 1.5 kg

## 7. Recorders

- A recorder can be installed in the SG750 by specifying the option code “/M☐”. Use Yokogawa’s µR10000 (maximum 6-point recording).
Refer to the GS 04P01B01-01E general specifications for the details.
- Choose “V DC” input for the input signal and 100 V AC for the power supply voltage to the recorder. When the output of the SG750 is 4 to 20 mA DC, prepare a 250 Ω shunt resistance.

## Model and suffix codes

### 1. SG750 Stack Gas Analyzer

| MODEL | Suffix Code | Option Code | Description |
|---|---|---|---|
| SG750 | ---------- | -------- | Stack Gas Analyzer |
| Measuring component | -A | -------- | $NO_X$-($O_2$) |
| | -B | -------- | $SO_2$-($O_2$) |
| | -C | -------- | $NO_X$-$SO_2$-($O_2$) |
| | -D | -------- | CO-($O_2$) |
| | -E | -------- | $CO_2$-($O_2$) |
| | -F | -------- | $CO_2$-CO-($O_2$) |
| | -G | -------- | $NO_X$-CO-($O_2$) |
| | -H | -------- | $NO_X$-$SO_2$-CO-($O_2$) |
| | -J | -------- | NOx-$SO_2$-$CO_2$-CO-($O_2$) |
| $O_2$ Analyzer | -1 | -------- | Built-in zirconia type $O_2$ sensor |
| | -2 | -------- | Built-in paramagnetic type $O_2$ sensor |
| | -N | -------- | Without $O_2$ analyzer |
| Range of NOx | □□ | -------- | Refer to Table B of next page to select the suffix code for each measuring range.<br>Suffix code of "NN" or "04" is selectable for $CO_2$ range . |
| Range of $SO_2$ | □□ | -------- | |
| Range of $CO_2$ | □□ | -------- | |
| Range of CO | □□ | -------- | |
| Range of $O_2$ | 1 | -------- | 0-10% (1st range)/0-25% (2nd range) |
| | 2 | -------- | 0-25% (1st range)/None (2nd range) |
| | N | -------- | None |
| Output | 4 | -------- | 4-20 mA DC |
| | 1 | -------- | 0-1 V DC |
| Isolated output of analog instantaneous value (note 1) (note 2) | -A | -------- | NOx |
| | -B | -------- | $SO_2$ |
| | -C | -------- | CO |
| | -D | -------- | NOx-$SO_2$ |
| | -E | -------- | NOx-CO |
| | -F | -------- | NOx-$SO_2$-CO |
| | -G | -------- | NOx-$SO_2$-CO-$CO_2$ |
| | -H | -------- | NOx-$O_2$ |
| | -J | -------- | $SO_2$-$O_2$ |
| | -K | -------- | CO-$O_2$ |
| | -L | -------- | NOx-$SO_2$-$O_2$ |
| | -M | -------- | NOx-CO-$O_2$ |
| | -P | -------- | NOx-$SO_2$-CO-$O_2$ |
| | -Q | -------- | NOx-$SO_2$-CO-$CO_2$-$O_2$ |
| | -N | -------- | None |
| Isolated output of analog instantaneous value after $O_2$ correction (note 1) (note 2) | 1 | -------- | NOx |
| | 2 | -------- | $SO_2$ |
| | 3 | -------- | CO |
| | 4 | -------- | NOx-$SO_2$ |
| | 5 | -------- | NOx-CO |
| | 6 | -------- | $SO_2$-CO |
| | 7 | -------- | NOx-$SO_2$-CO |
| | N | -------- | None |
| Isolated output of analog average value after $O_2$ correction (note 1) (note 2) | 1 | -------- | NOx |
| | 2 | -------- | $SO_2$ |
| | 3 | -------- | CO |
| | 4 | -------- | NOx-$SO_2$ |
| | 5 | -------- | NOx-CO |
| | 6 | -------- | $SO_2$-CO |
| | 7 | -------- | NOx-$SO_2$-CO |
| | N | -------- | None |
| Sample Gas Pressure Range | 1 | -------- | -1 to 5 kPa |
| | 2 | -------- | -3 to 3 kPa |
| | 3 | -------- | -5 to 1 kPa |
| Cubicle structure | 1 | -------- | Indoor structure |
| | 2 | -------- | Outdoor structure |
| Gas inlets for gas cylinder | C | -------- | 3 inlets |
| | D | -------- | 6 inlets |
| | N | -------- | None |
| Power supply | -5 | -------- | 100V AC, 50Hz |
| | -6 | -------- | 100V AC, 60Hz |
| | -A | -------- | 110V AC, 50Hz |
| | -B | -------- | 110V AC, 60Hz |
| | -7 | -------- | 115V AC, 50Hz |
| | -8 | -------- | 115V AC, 60Hz |
| | -3 | -------- | 200V AC, 50Hz |
| | -4 | -------- | 200V AC, 60Hz |
| | -1 | -------- | 230V AC, 50Hz |
| | -2 | -------- | 230V AC, 60Hz |
| Indication | -E | -------- | English |

Continue to the next page.

**SG750 Stack Gas Analyzer (Continued)**

| Model | Suffix Code | Option Code | Description |
|---|---|---|---|
| SG750 | -□-□□□□□□□□□□□□•••••• | | Stack gas analyzer |
| Option: | Built-in recorder (note 3) | /M□ | Build-in recorder |
| | Heating/insulation of sampling tube (note 4) | /S | 50 m max. Specified when heating sampling tube is required |
| | Cold district version | /T1<br>/T2 | -15 to 40˚C (2 heaters + insulation)<br>-10 to 40˚C (1 heater) |
| | Window | /WD | With window |
| | Instrument air<br>Atmospheric air | /Q<br>/R | Instrument air is used as zero gas<br>Atmospheric air is used as zero gas |
| | Air purge | /A | Needle valve for air purge, with pressure reducing valve |
| | Arrester for power supply | /AP1<br>/AP2 | With arrester for power supply (100 V)<br>With arrester for power supply (200 V) |
| | Arrester for signal (note 5) | /AS□□ | With arrester for signal |
| | Tag plate (acryl)<br>Stainless steel | /U1<br>/U2 | With specified tag No. (attached)<br>With specified tag No. (screw on) |
| | Nameplate (acryl)<br>Stainless steel | /V1<br>/V2 | With specified name (screw on)<br>With specified name (screw on) |
| | Channel base | /W | Enclosed type |
| | High $SO_2$ concentration version | /SO1 | Gas dryer with $SO_3$ mist catcher (2 spares supplied). Required when $SO_2$ is 500 ppm or more |
| | $NO_x$ converter | /NO1 | Required when measuring only $SO_2$ in sludge incinerator to reduce NOx interference. |

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Footnotes:
1: When suffix code “N (None)” is specified, all outputs will be non-isolated. No combination of isolated outputs and non-isolated outputs is allowed.
2: For recorder output, specify the suffix codes “-N” or “N”. Use Yokogawa’s µR10000 (maximum 6-points recording) recorder. Output signals should be selected from the table A and specify the appropriate number in the option code /M□. For details, refer to GS 04P01B01-01E. When using a recorder other than the µR10000, the mounting size, and other specifications need to be checked. Any signal connected to the recorder cannot be used as an external output. A custom order is required for recorder and external outputs of the same component. Consult with Yokogawa. Up to 4 components can be specified.
3: Select components output to the recorder from Table A when specifying option code “/M□”.
4: Option code “/S” must be specified for $SO_2$ measurement of 100 ppm or less.
5: The total number of arresters for the signal should be specified with two digits.
Notes: The gas sampling probe with automatic blowback is handled as a custom order. Consult with Yokogawa.

**Table A** Selecting components to output to the recorder (option code /M□)

| | | /M1 | /M2 | /M3 | /M4 | /M5 | /M6 |
|---|---|---|---|---|---|---|---|
| $NO_x$ | Instantaneous value | – | – | ○ | – | – | ○ |
| | Average value | ○ | ○ | ○ | – | – | ○ |
| | $O_2$ correction value | – | – | ○ | – | – | ○ |
| $SO_2$ | Instantaneous value | – | – | ○ | – | ○ | – |
| | Average value | ○ | – | ○ | – | ○ | – |
| | $O_2$ correction value | – | – | – | – | ○ | – |
| CO | Instantaneous value | – | ○ | – | ○ | – | – |
| | Average value | ○ | ○ | – | ○ | – | – |
| | $O_2$ correction value | – | – | – | ○ | – | – |
| $O_2$ | Instantaneous value | ○ | ○ | ○ | ○ | ○ | ○ |
| Temperature input 1 | | ○ | ○ | – | ○ | – | – |
| Temperature input 2 | | ○ | ○ | – | ○ | – | – |

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## Guide for Selecting Measuring Components and Ranges

Select an appropriate suffix code from Table B according to the measuring range of $NO_X$, $SO_2$, $CO_2$, and CO.
The measuring range can be selected according to Tables C to E, Guides for selecting the measuring ranges.
The measuring range can be customized within the ranges specified in Tables C to E after shipping.
For components that will not be measured, select the suffix code “NN.”For the $CO_2$ measuring range, suffix code “NN” or “04” is selectable.

**Table B** List of suffix codes for the measuring range of each component

| Suffix code | Range (minimum/maximum) |
|---|---|
| **01** | 0 to 50 ppm/0 to1000 ppm |
| **02** | 0 to100 ppm/0 to 2000 ppm |
| **03** | 0 to 200 ppm/0 to 5000 ppm |
| **04** | 0 to 10%/0 to 20% |
| **NN** | Not available |

**Table C** Guide for selecting the CO measuring range when specifying suffix code of measuring components "-A", "-B", "-D", "-E", "-G", and "-H".
(One component: $NO_X$, $SO_2$, $CO_2$, CO, two components: $NO_X$/CO, three components: $NO_X$/$SO_2$/CO)

| Suffix code | 01 | 02 | 03 | 04 |
|---|---|---|---|---|
| Range (minimum/maximum) / Measuring component | 0 to 50/ 0 to1000 ppm | 0 to100/ 0 to 2000 ppm | 0 to 200/ 0 to 5000 ppm | 0 to10/0 to 20% |
| $NO_X$ | ○ | ○ | ○ | — |
| $SO_2$ | —*3 | ○*2 | ○*2 | — |
| CO | ○ | ○ | ○ | — |
| $CO_2$ | — | — | — | ○ |

How to use these tables:
1. Select the suffix code for the specified measuring component from the table.
2. Suffix codes marked with a circle are selectable.

○: Selectable
—: Not selectable

**Table D** Guide for selecting the $NO_X$/$SO_2$ measuring ranges when specifying suffix codes “-C,” “-H,” and “-J.”
(Two components: $NO_X$/$SO_2$, three components: $NO_X$/$SO_2$/CO, four components: $NO_X$/$SO_2$/$CO_2$/CO)

| | | $SO_2$ | | | |
|---|---|---|---|---|---|
| | | Suffix code | 01 | 02 | 03 |
| $NO_X$ | Suffix code | Range (minimum /maximum) | 0 to 50/ 0 to1000 ppm | 0 to100/ 0 to 2000 ppm | 0 to 200/ 0 to 5000 ppm |
| | 01 | 0 to 50/0 to1000 ppm | —*3 | ○*2 | — |
| | 02 | 0 to 100/0 to 2000 ppm | —*3 | ○*2 | — |
| | 03 | 0 to 200/0 to 5000 ppm | — | — | ○*2 |

Note:
*2: When $SO_2$ measuring range exceeds 1000 ppm, consult with YOKOGAWA.
*3: Consult with YOKOGAWA.

**Table E** Guide for selecting the $CO_2$/CO measuring ranges when specifying suffix codes “-F” and “-J.”
(Two components: $CO_2$/CO, four components: $NO_X$/$SO_2$/$CO_2$/CO)

| | | CO | | |
|---|---|---|---|---|
| | | Suffix code | 02 | 03 |
| $CO_2$ | Suffix code | Range (minimum /maximum) | 0 to100/ 0 to 2000 ppm | 0 to 200/ 0 to 5000 ppm |
| | 04 | 0 to10/0 to 20% | ○ | ○ |

## Standard Accessories (supplied with the instrument at delivery time)

| | No. | Name | Part number (*5) | Quantity | | | | Remark |
|---|---|---|---|---|---|---|---|---|
| | | | | SG750-B | SG750-C SG750-H SG750-J | SG750-A SG750-G | SG750-D SG750-E SG750-F | |
| Maintenance parts | 1 | Filter paper for membrane filter | K9350MD | — | — | 1pack | 1pack | 25 papers per pack, 0.5 µm |
| | 2 | Filter paper for membrane filter | K9219BA | 5, 10(*1) | 5, 10(*1) | — | — | (*1) PTFE 0.1 µm |
| | 3 | Filter for gas conditioner | K9350MH | 1 | 1 | 1 | 1 | |
| | 4 | O-ring for gas conditioner | K9350MF | 1 | 1 | 1 | 1 | G65 chloroprene |
| | 5 | Fuse (for device SW) | K9350VN | 2 | 2 | 2 | 2 | 2 A |
| | 6 | Fuse (for device SW) | K9350VP | 2 | 2 | 2 | 2 | 3.2 A |
| | 7 | Fuse (spare for infrared analyzer) | K9218SB | 2 | 2 | 2 | 2 | 3.15 A for infrared analyzer |
| | 8 | Catalyst for $NO_2$/NO converter | K9350LP | 1(*2) | 1 | 1 | — | For $NO_x$ analyzer or (*2) |
| | 9 | Glass wool for $NO_2$/NO converter | K9350LQ | 1(*2) | 1 | 1 | — | For $NO_x$ analyzer or (*2) |
| | 10 | $SO_3$ mist catcher | K9350XV | 2(*1) | 2(*1) | — | — | (*1) Change every four months |
| | 11 | Diaphragm for pump | K9350GE | 1 | 1 | — | — | With spanner |
| Accessories | 12 | Standard gas joint | K9219LA | (*3) | (*3) | (*3) | (*3) | (*3) For pressure regulator Rc 1/4- ∅6 |
| | 13 | Hose band for fixing standard gas cylinder | K9641KF | (*4) | (*4) | (*4) | (*4) | (*4) For pressure regulator |
| | 14 | Viton tube for standard gas connection | K9641KE | 1 | 1 | 1 | 1 | 1 m ∅8/∅5 |
| | 15 | Polyethylene tube for standard gas connection | K9641KB | 1 | 1 | 1 | 1 | 6 m ∅6/∅4 |
| | 16 | Anchor bolt for cubicle installation | K9350ZA | 4 | 4 | 4 | 4 | |
| | 17 | Water bottle for injection | K9219BG | 1 | 1 | 1 | 1 | For refilling water of gas conditioner |
| | 18 | Water bubbler bottle | K9350XR | 1 | 1 | 1 | 1 | For correction of moisture interference |
| | 19 | Cell assembling tool | K9358UA | — | 1(*6) | — | 1(*6) | For block cell |

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(*1) When option code /SO1 is selected.
(*2) When option code /NO1 is selected.
(*3) [The number of measuring components + 1] fittings are included. For external gas cylinders, the quantity is doubled.
(*4) 4X[The number of measuring components + 1] hose bands are included.
(*5) A part number contains one piece of part.
(*6) Supplied when $CO_2$ measurement is performed.

## One-Year-Usage Spare Parts (Optional)

| No. | Name | Part number (*3) | Quantity | | | | Remark |
|---|---|---|---|---|---|---|---|
| | | | SG750-B | SG750-C SG750-H SG750-J | SG750-A SG750-G | SG750-D SG750-E SG750-F | |
| 1 | Catalyst for $NO_2$/NO converter | K9350LP | 2(*2) | 2 | 2 | — | For $NO_x$ analyzer or (*2) |
| 2 | Glass wool for $NO_2$/NO converter | K9350LQ | 2(*2) | 2 | 2 | — | For $NO_x$ analyzer or (*2) |
| 3 | Fitting for $NO_2$/NO converter | K9350LV | 4(*2) | 4 | 4 | — | For $NO_x$ analyzer or (*2) |
| 4 | Filter for gas conditioner | K9350MH | 2 | 2 | 2 | 2 | |
| 5 | O-ring for gas conditioner | K9350MF | 2 | 2 | 2 | 2 | G65 chloroprene |
| 6 | Filter paper for membrane filter | K9350MD | — | — | 1 | 1 | 25 papers per pack, 0.5 µm |
| 7 | Filter paper for membrane filter | K9219BA | 12 | 12 | — | — | PTFE 0.1 µm |
| 8 | O-ring for membrane filter | K9350MF | 2 | 2 | 2 | 2 | G65 chloroprene |
| 9 | O-ring for membrane filter | K9350ML | 2 | 2 | 2 | 2 | Chloroprene |
| 10 | Fuse (for device SW) | K9350VN | 4 | 4 | 4 | 4 | 2 A |
| 11 | Fuse (for device SW) | K9350VP | 4 | 4 | 4 | 4 | 3.2 A |
| 12 | Capillary | K9350XB | 1(*1) | 1(*1) | — | — | 50 kPa/0.5 L, Green (*1) |
| 13 | Capillary | K9641KG | 1 | 1 | 1 | 1 | Ø1x100 mm, Brown |
| 14 | Diaphragm for pump | K9350GE | 1 | 1 | 1 | 1 | |
| 15 | Valve for pump | K9350GF | 1 | 1 | 1 | 1 | |
| 16 | $SO_3$ mist catcher | K9350XW | 1(*1) | 1(*1) | — | — | Change every four months (*1) |

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(*1) When option code /SO1 is selected.
(*2) When option code /NO1 is selected.
(*3) A part number contains one piece of part or one set of parts.

## One-Year-Usage Spare Parts Set (Optional)

| No. | Name | Part number (*3) | Quantity | | | | Remark |
|---|---|---|---|---|---|---|---|
| | | | SG750-B | SG750-C SG750-H SG750-J | SG750-A SG750-G | SG750-D SG750-E SG750-F | |
| 1 | Spare parts set for 1 year | K9641QA | 1 | — | — | — | |
| 2 | Spare parts set for 1 year | K9641QB | 1(*2) | 1 | — | — | (*2) |
| 3 | Spare parts set for 1 year | K9641QC | — | — | 1 | — | |
| 4 | Spare parts set for 1 year | K9641QD | — | — | — | 1 | |
| 5 | Spare parts set for 1 year | K9641QE | 1(*1) | — | — | — | (*1) |
| 6 | Spare parts set for 1 year | K9641QF | 1(*1)(*2) | 1(*1) | — | — | (*1), (*2) |

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(*1) When option code /SO1 is selected.
(*2) When option code /NO1 is selected.
(*3) A part number contains one piece of part or one set of parts.

## Recommended Spare Parts

| NO. | Name | Part number (*1) | Quantity per replacement | Recommended quantity |
|---|---|---|---|---|
| 1 | Filter element for Type F filtering probe | K9718RS | 1 | 2 |
| 2 | Filter element for Type M1E filtering probe | K9718RX | 1 | 2 |
| 3 | Filter element for Type M2E filtering probe | K9718VF | 1 | 2 |
| 4 | O-ring for Type M2E filtering probe | Y9144XB | 2 | 8 |
| 5 | Filter element for Type M1E external primary filter | K9718RX | 1 | 2 |
| 6 | Filter element for Type MS external primary filter | K9718US | 1 | 2 |

(*1) Part numbers refer to each one piece. When separately ordering more than one of a part, specify the required quantity of the parts as well as the part number.

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Note: Order more spare parts at parts replacement time, to maintain the recommended quantity of spare parts.

## 2. Probes and External Primary Filters

| Name | Part Number | Temperature of Sample Gas | Utility | Configuration |
|---|---|---|---|---|
| Type F filtering probe | K9718VC | 150 to 400˚C | —— | Probe integrated with filter |
| Type M1E filtering probe | K9219ED | 150 to 700˚C (*1) | Supply voltage: 100 to 115 V, approx. 80 VA max. | Probe integrated with filter |
| Type M2E filtering probe | K9718VE | 150 to 700˚C (*1) | Supply voltage: 100 to 115 V, approx. 130 VA max. | Probe integrated with filter |
| Type M2 open type probe | K9718PD | 800˚C max. | —— | Probe |
| Type M3 open type probe | K9718QA | 800 to 1400˚C | —— | Probe |
| Type M1E external primary filter | K9718TA | —— | Supply voltage: 100 to 115 V, approx. 80 VA max. | Filter |
| Type MS external primary filter | K9718UA | —— | Steam pressure: 100 to 300 kPa | Filter |

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(*1) For applications where the ambient temperature is the acid dew point (150°C) or less, there are restrictions on sampling system installation, so refer to pages 21 to 23.

## 3. External Drain Separator

| Part Number | Description |
|---|---|
| K9641EA | —— |

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## 4. Sampling Tubes

### 4.1 Sampling tube

| Model | Suffix Code | Description |
|---|---|---|
| SG8SAP | | 10 mm O.D./8 mm I.D. Teflon tube |
| Length | -L□□ | Length in meters, 50 m max. |

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### 4.2 Heating sampling tube

| Model | Suffix Code | Description |
|---|---|---|
| SG8HSAP | | 10 mm O.D./8 mm I.D. heat insulating Teflon tube (with termination kit) |
| Length | -L□□ | Length in meters, 50 m max. |

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## 5. Standard Gas Cylinders

Export of high pressure filled gas cylinders to most countries is prohibited or restricted.

### 5.1 Standard gas cylinder for NO: NO + $N_2$

| Range | NO Concentration | Part Number (3.4L) | Part Number of Pressure Reducing Valve |
|---|---|---|---|
| 0 to 50 ppm | 45 to 50 ppm | K9354DA | L9850BA |
| 0 to 100 ppm | 90 to 100 ppm | K9354DB | L9850BA |
| 0 to 200 ppm | 180 to 200 ppm | K9354DC | L9850BA |
| 0 to 250 ppm | 225 to 250 ppm | K9354DD | L9850BA |
| 0 to 300 ppm | 270 to 300 ppm | K9354DH | L9850BA |
| 0 to 500 ppm | 450 to 500 ppm | K9354DE | L9850BA |
| 0 to 0.1% | 0.09 to 0.1% | K9354DF | L9850BA |
| 0 to 0.2% | 0.18 to 0.2% | K9354DG | L9850BA |
| 0 to 0.5% | 0.45 to 0.5% | K9354DJ | L9850BA |

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### 5.2 Standard gas cylinder for $SO_2$: $SO_2$ + $N_2$

| Range | $SO_2$ Concentration | Part Number (3.4L) | Part Number of Pressure Reducing Valve |
|---|---|---|---|
| 0 to 50 ppm | 45 to 50 ppm | K9354HA | L9850BA |
| 0 to 100 ppm | 90 to 100 ppm | K9354HB | L9850BA |
| 0 to 200 ppm | 180 to 200 ppm | K9354HC | L9850BA |
| 0 to 250 ppm | 225 to 250 ppm | K9354HD | L9850BA |
| 0 to 300 ppm | 270 to 300 ppm | K9354HN | L9850BA |
| 0 to 500 ppm | 450 to 500 ppm | K9354HE | L9850BA |
| 0 to 0.1% | 0.09 to 0.1% | K9354HF | L9850BA |
| 0 to 0.2% | 0.18 to 0.2% | K9354HG | L9850BA |

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### 5.3 Standard gas cylinder for CO: CO + $N_2$

| Range | CO Concentration | Part Number (3.4L) | Part Number of Pressure Reducing Valve |
|---|---|---|---|
| 0 to 50 ppm | 45 to 50 ppm | K9134UA | L9850BA |
| 0 to 100 ppm | 90 to 100 ppm | K9134UB | L9850BA |
| 0 to 200 ppm | 180 to 200 ppm | K9134UC | L9850BA |
| 0 to 250 ppm | 225 to 250 ppm | K9354YB | L9850BA |
| 0 to 300 ppm | 270 to 300 ppm | K9354NA | L9850BA |
| 0 to 500 ppm | 450 to 500 ppm | K9134UD | L9850BA |
| 0 to 0.1% | 0.09 to 0.1% | K9134UE | L9850BA |
| 0 to 0.2% | 0.18 to 0.2% | K9134UF | L9850BA |
| 0 to 0.5% | 0.45 to 0.5% | K9134UG | L9850BA |
| 0 to 1% | 0.9 to 1% | K9134UH | L9850BA |
| 0 to 2% | 1.8 to 2% | K9134UJ | L9850BA |

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### 5.4 Standard gas cylinder for $CO_2$: $CO_2$ + $N_2$

| Range | $CO_2$ Concentration | Part Number (3.4L) | Part Number of Pressure Reducing Valve |
|---|---|---|---|
| 0 to 1% | 0.9 to 1% | K9134WH | L9850BA |
| 0 to 2% | 1.8 to 2% | K9134WJ | L9850BA |
| 0 to 5% | 4.5 to 5% | K9134WK | L9850BA |
| 0 to 10% | 9 to 10% | K9134WL | L9850BA |
| 0 to 20% | 18 to 20% | K9134WM | L9850BA |

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### 5.5 Standard gas cylinder for $O_2$: $O_2$ + $N_2$

Dry air cylinders are used as zero gas for NO, $SO_2$, CO and $CO_2$ analyzers.

| Range | $O_2$ Concentration | Part Number (3.4L) | Part Number of Pressure Reducing Valve |
|---|---|---|---|
| 0 to 10% | 9 to 10% | K9354ZF | L9850BA |
| 0 to 25% | 20 to 21.5% | K9354ZG | L9850BA |

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### 5.6 Zero gas cylinder for NO, $SO_2$, $CO_2$, CO, $O_2$ (paramagnetic type $O_2$ analyzer): $N_2$

| $N_2$ Concentration | Part Number (3.4L) | Part Number of Pressure Reducing Valve |
|---|---|---|
| 99.99% or more | K9134TA | L9850BA |

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### 5.7 Zero gas cylinder for $O_2$: $O_2$ + $N_2$

Used only with the system using a zirconia oxygen analyzer

| $O_2$ Concentration | Part Number (3.4L) | Part Number of Pressure Reducing Valve |
|---|---|---|
| 0.95 to 1.0% | G7001ZC | L9850BA |

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## 6. Pressure Reducing Valve for Gas Cylinder

| Application | Part Number | Description |
|---|---|---|
| Span gas cylinder | L9850BA | For low-concentration cylinders, containing less than 5% of combustible gases, used for CO analyzers and others, and for non-combustible gas cylinders |
| Zero gas cylinder | L9850BA | For any non-combustible gas cylinder |

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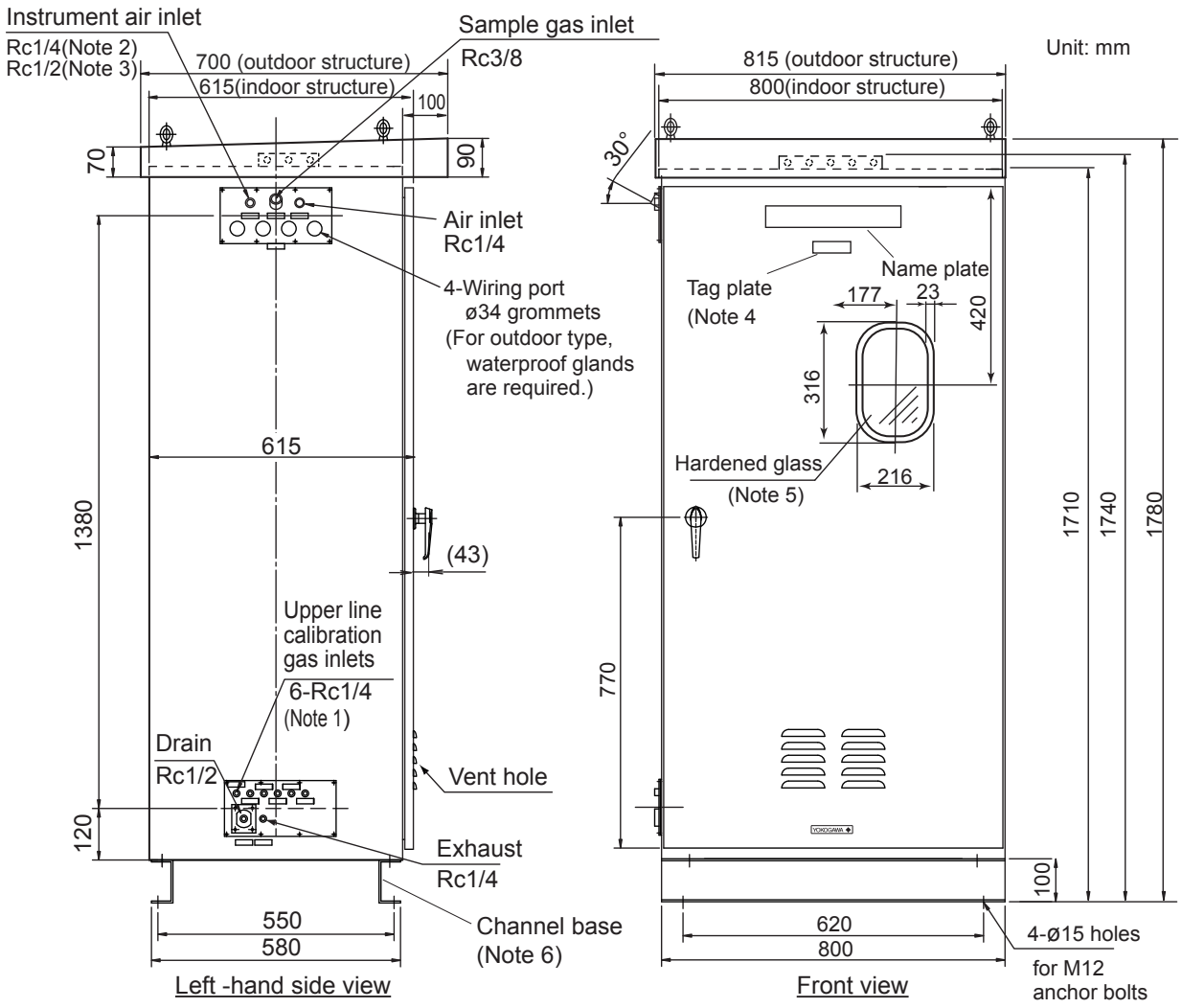
## 7. Recorders

- A recorder can be installed in the SG750 by specifying the option code "/M□". Use Yokogawa's μR10000 recorder (maximum 6-point recording) for the built-in recorder. For details of the μR10000, refer to GS 04P01B01-01E. To use recorders other than the μR10000, contact Yokogawa to confirm the specifications including mounting dimensions.
- Any signal connected to the recorder cannot be used as an external output. If an external output is required, contact Yokogawa. Choose "V DC" input as the input signal and 100 V AC as the power supply voltage to the recorder. When the output of the SG750 is 4 to 20 mA DC, prepare a 250 Ω shunt resistance.

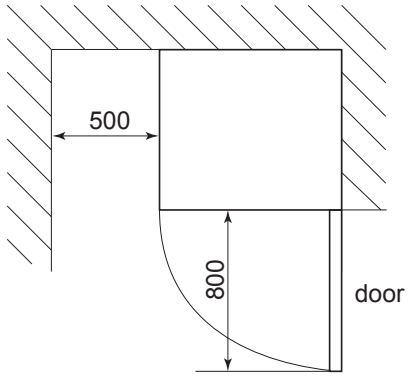
## EXTERNAL DIMENSIONS

### 1. SG750 Stack Gas Analyzer

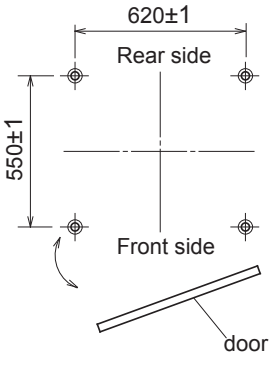



Weight : approx. 300 kg

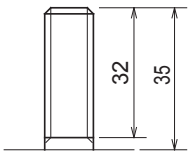
Maintenance space and door swing




Anchor Bolt Plan




Anchor bolt ( Optional)
(4-M12×160×50)

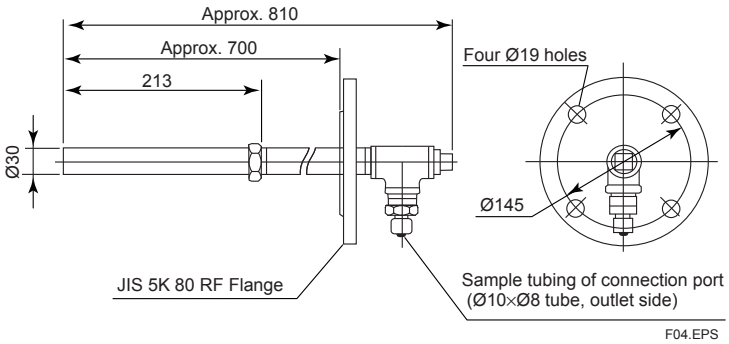



(Note 1) Provided when code of gas inlets for gas cylinder “C (3 inlets)” or “D (6 inlets) ” is selected.
(Note 2) Provided when option code /Q (Instrument air is used as zero gas) is specified.
(Note 3) Provided when option code /A (Needle valve for air purge, with pressure reducing valve) is specified.
(Note 4) Provided when option code /U1 or /U2 (With specified tag No.) is specified.
(Note 5) Provided when option code /WD ( With window) is specified.
(Note 6) Added to not only front and back but also right and left channel bases when option code /W (Enclosed type) is specified.

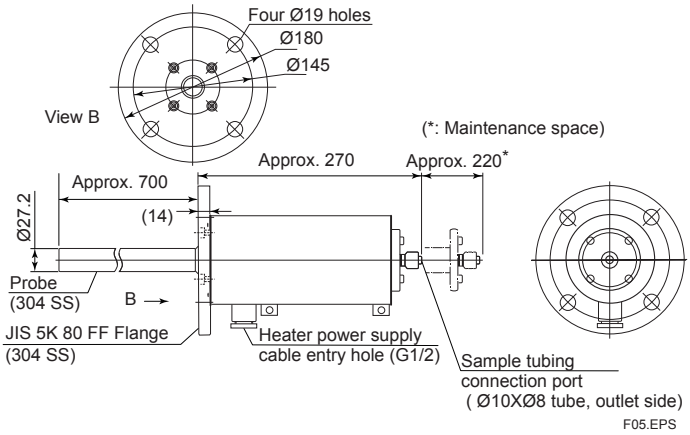
## 2. Filtering probes

Unit: mm

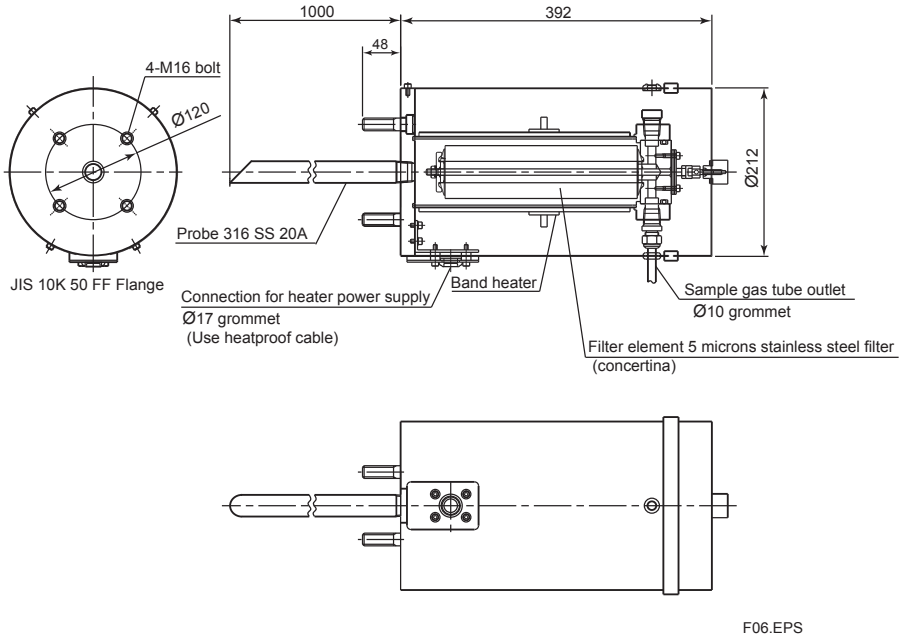
- **Type F filtering probe (K9718VC)**




- **Type M1E filtering probe (K9219ED)**



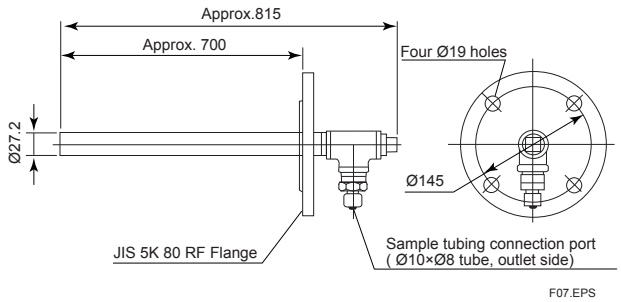

- **Type M2E filtering probe (K9718VE)**



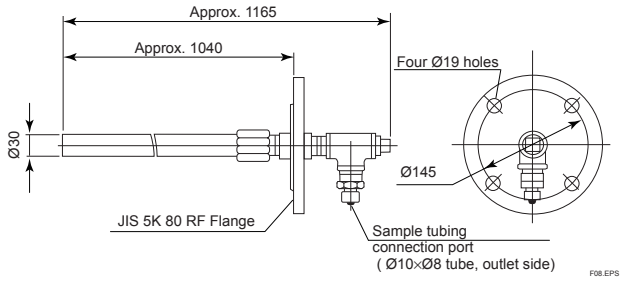
Unit: mm

## 3. Open type probe

- **Type M2 open type probe (K9718PD)**

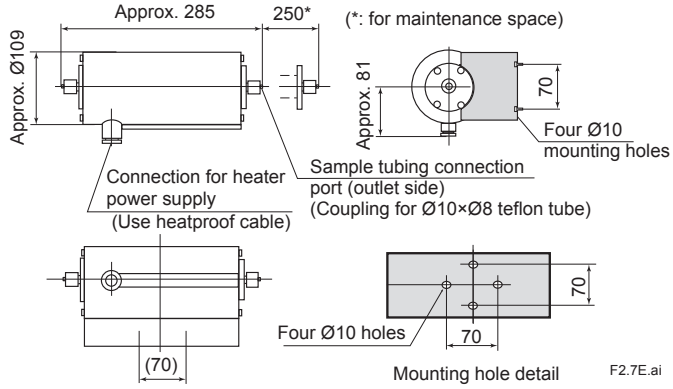



- **Type M3 open type probe (K9718QA)**

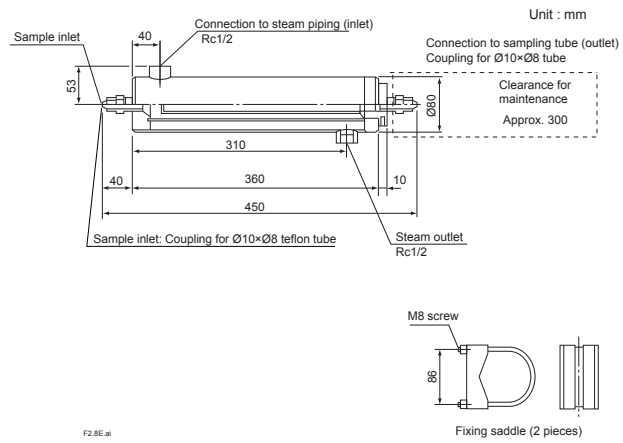



## 4. External Primary Filters

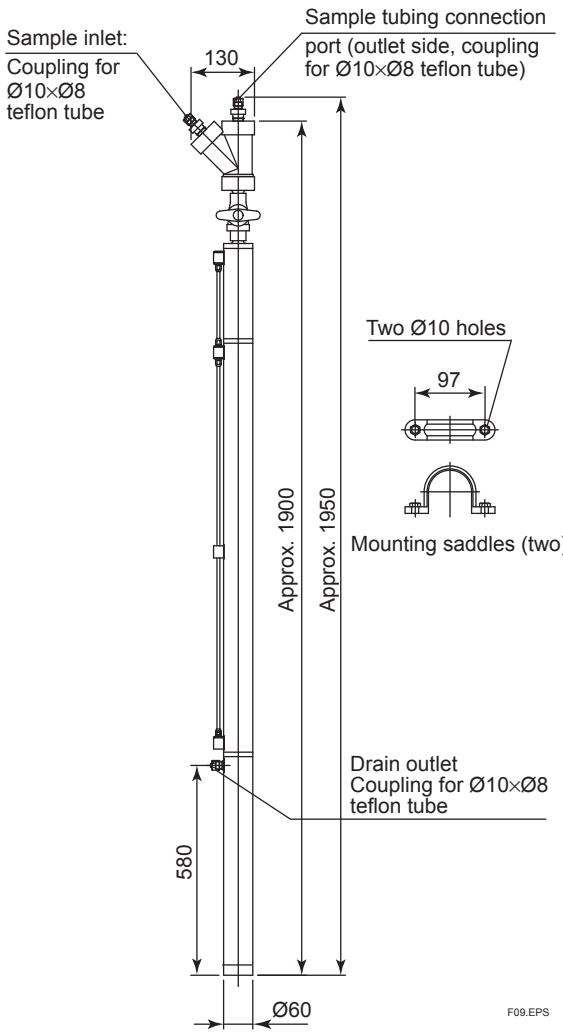
- **Type M1E external primary filter (K9718TA)**




- **Type MS external primary filter (K9718UA)**

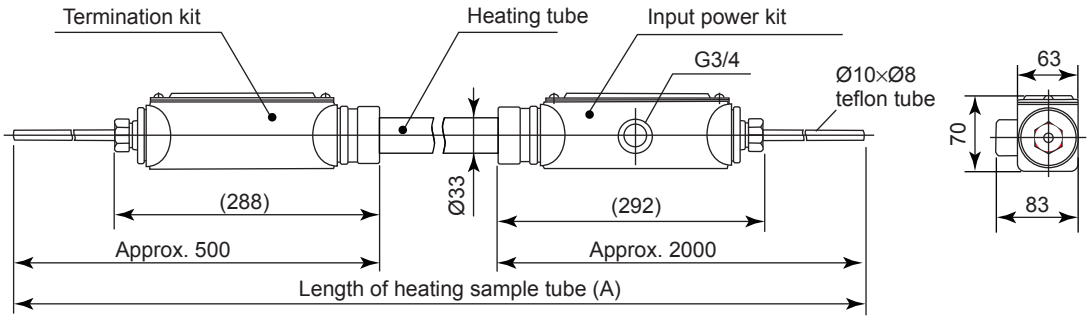



## 5. External Drain Separator (K9641EA)



## 6. Heating Sampling Tube (SG8HSAP-L□□)

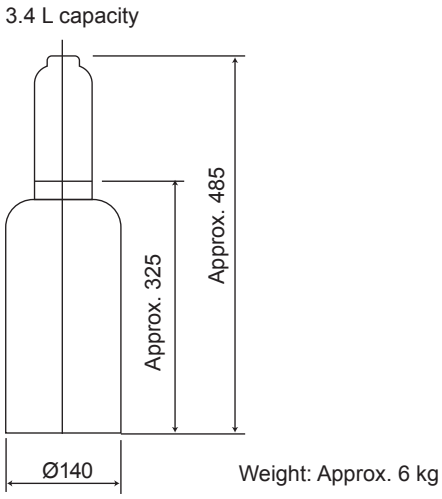
Unit: mm




Weight (kg) = 2.7 + 0.7 × A  A: length in meter (50m Max.)

F14.EPS

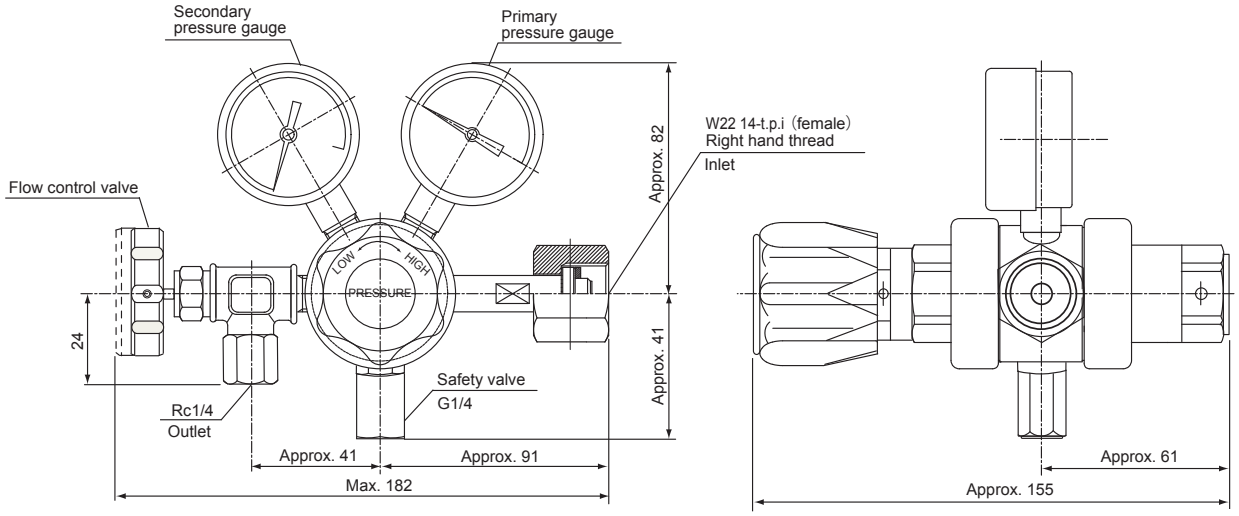
## 7. Standard Gas Cylinder




Weight: Approx. 6 kg

F12.EPS

## 8. Pressure Reducing Valve for Gas Cylinder (L9850BA)



## EXTERNAL TERMINAL CONNECTION DIAGRAM

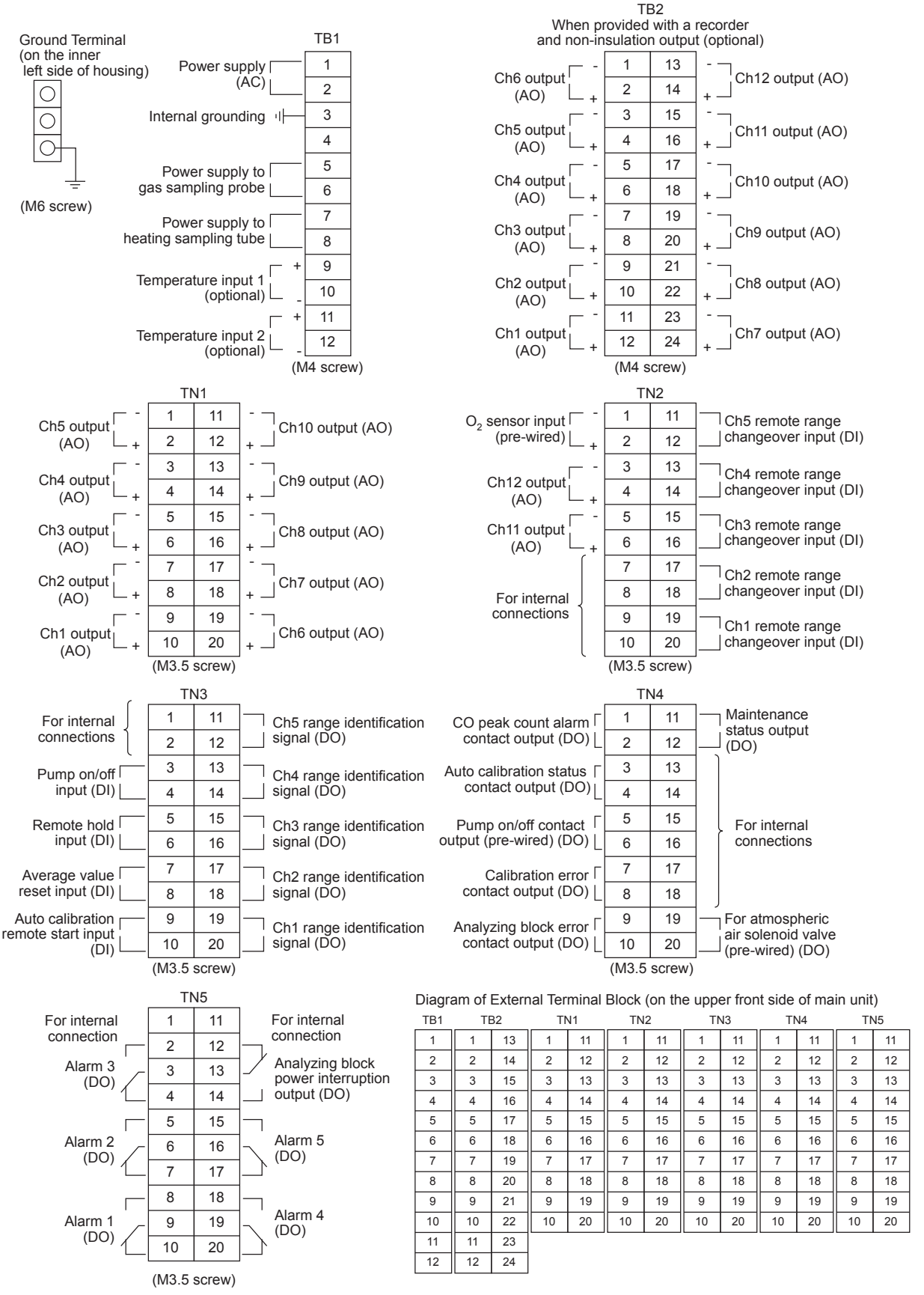



Diagram of External Terminal Block (on the upper front side of main unit)

| TB1 | TB2 | | TN1 | | TN2 | | TN3 | | TN4 | | TN5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 13 | 1 | 11 | 1 | 11 | 1 | 11 | 1 | 11 | 1 | 11 |
| 2 | 2 | 14 | 2 | 12 | 2 | 12 | 2 | 12 | 2 | 12 | 2 | 12 |
| 3 | 3 | 15 | 3 | 13 | 3 | 13 | 3 | 13 | 3 | 13 | 3 | 13 |
| 4 | 4 | 16 | 4 | 14 | 4 | 14 | 4 | 14 | 4 | 14 | 4 | 14 |
| 5 | 5 | 17 | 5 | 15 | 5 | 15 | 5 | 15 | 5 | 15 | 5 | 15 |
| 6 | 6 | 18 | 6 | 16 | 6 | 16 | 6 | 16 | 6 | 16 | 6 | 16 |
| 7 | 7 | 19 | 7 | 17 | 7 | 17 | 7 | 17 | 7 | 17 | 7 | 17 |
| 8 | 8 | 20 | 8 | 18 | 8 | 18 | 8 | 18 | 8 | 18 | 8 | 18 |
| 9 | 9 | 21 | 9 | 19 | 9 | 19 | 9 | 19 | 9 | 19 | 9 | 19 |
| 10 | 10 | 22 | 10 | 20 | 10 | 20 | 10 | 20 | 10 | 20 | 10 | 20 |
| 11 | 11 | 23 | | | | | | | | | | |
| 12 | 12 | 24 | | | | | | | | | | |

## MEASURABLE COMPONENTS AND THEIR OUTPUT CHANNELS

| Suffix Code | | Output Channel | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measurable Component | $O_2$ Analyzer | Ch1 | Ch2 | Ch3 | Ch4 | Ch5 | Ch6 | Ch7 | Ch8 | Ch9 | Ch10 | Ch11 | Ch12 |
| — A | — N | $NO_X$ | | | | | | | | | | | |
| — B | — N | $SO_2$ | | | | | | | | | | | |
| — C | — N | $NO_X$ | $SO_2$ | | | | | | | | | | |
| — D | — N | CO | | | | | | | | | | | |
| — E | — N | $CO_2$ | | | | | | | | | | | |
| — F | — N | $CO_2$ | CO | | | | | | | | | | |
| — G | — N | $NO_X$ | CO | | | | | | | | | | |
| — H | — N | $NO_X$ | $SO_2$ | CO | | | | | | | | | |
| — J | — N | $NO_X$ | $SO_2$ | $CO_2$ | CO | | | | | | | | |
| — A | — 1, — 2 | $NO_X$ | $O_2$ | Corrected $NO_X$ | Corrected $NO_X$ average | $O_2$ Average | | | | | | | |
| — B | — 1, — 2 | $SO_2$ | $O_2$ | Corrected $SO_2$ | Corrected $SO_2$ average | $O_2$ Average | | | | | | | |
| — C | — 1, — 2 | $NO_X$ | $SO_2$ | $O_2$ | Corrected $NO_X$ | Corrected $SO_2$ | Corrected $NO_X$ average | Corrected $SO_2$ average | $O_2$ Average | | | | |
| — D | — 1, — 2 | CO | $O_2$ | Corrected CO | Corrected CO average | $O_2$ Average | | | | | | | |
| — E | — 1, — 2 | $CO_2$ | $O_2$ | $O_2$ Average | | | | | | | | | |
| — F | — 1, — 2 | $CO_2$ | CO | $O_2$ | Corrected CO | Corrected CO average | $O_2$ Average | | | | | | |
| — G | — 1, — 2 | $NO_X$ | CO | $O_2$ | Corrected $NO_X$ | Corrected CO | Corrected $NO_X$ average | Corrected CO average | $O_2$ Average | | | | |
| — H | — 1, — 2 | $NO_X$ | $SO_2$ | CO | $O_2$ | Corrected $NO_X$ | Corrected $SO_2$ | Corrected CO | Corrected $NO_X$ average | Corrected $SO_2$ average | Corrected CO average | $O_2$ Average | |
| — J | — 1,— 2 | $NO_X$ | $SO_2$ | $CO_2$ | CO | $O_2$ | Corrected $NO_X$ | Corrected $SO_2$ | Corrected CO | Corrected $NO_X$ average | Corrected $SO_2$ average | Corrected CO average | $O_2$ Average |

T28-2.EPS

## TYPICAL SYSTEM CONFIGURATION

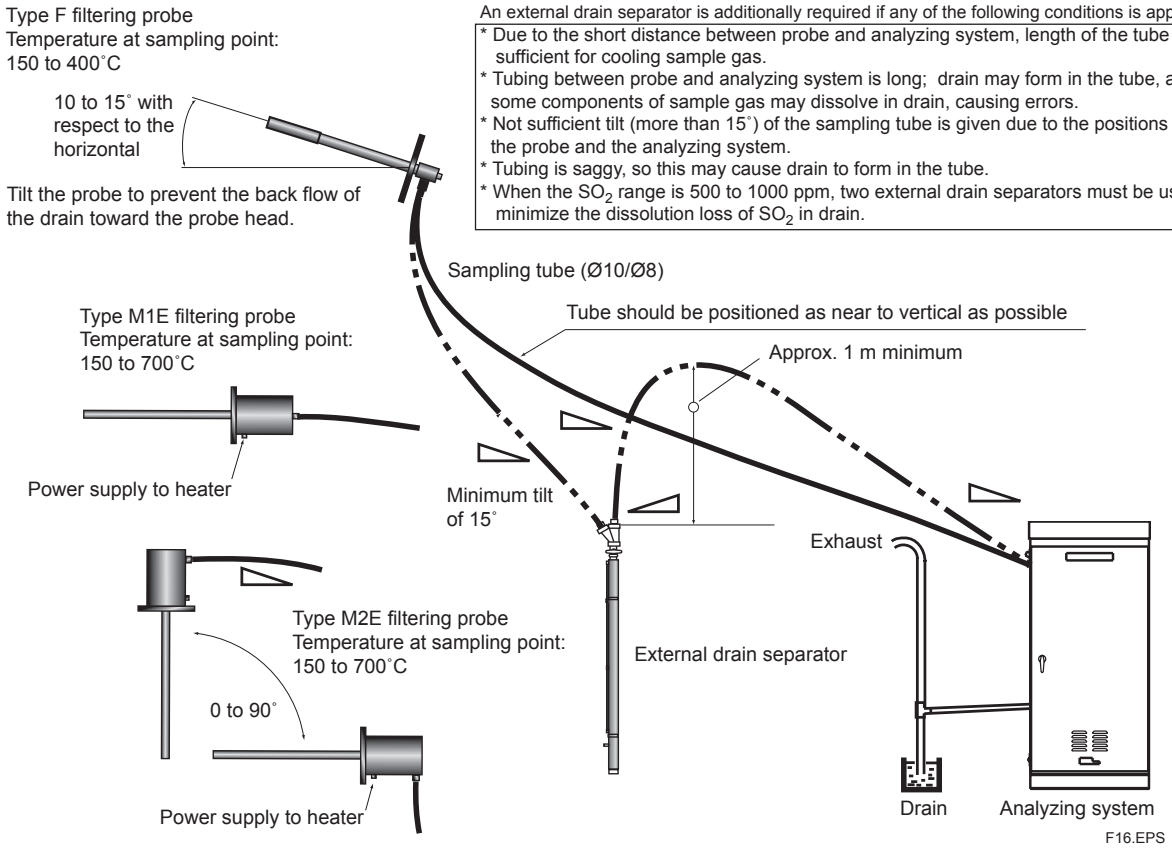
A stack gas analyzer consists of the analyzing system and the sampling system for drawing sample gas properly from the stack. The following illustrates three typical system configurations: a standard system, a system with a heating sampling tube and a system with an external primary filter.

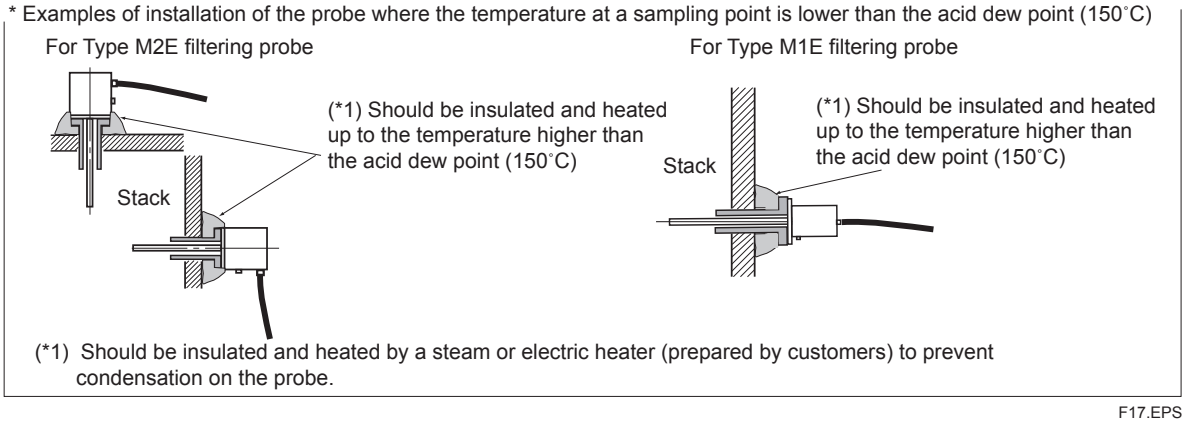
**• Standard system (Filtering probe + (external drain separator) + analyzing system)**

This system is used under the condition where the temperature at a sampling point is higher than the acid dew point (approx. 150˚C) and less than 700˚C. When the system is used in the condition where the temperature at a sampling point is lower than the acid dew point (150˚C), the mounting point of the probe should be insulated and heated to prevent condensation from forming on the probe. The sampling system consists of the filtering probe, the standard sampling tube and the external drain separator.

Any of the Type F, Type M1E (electric heating), or Type M2E (electric heating) filtering probes should be used. For the selection of filtering probes, refer to Table 1 on page 24.

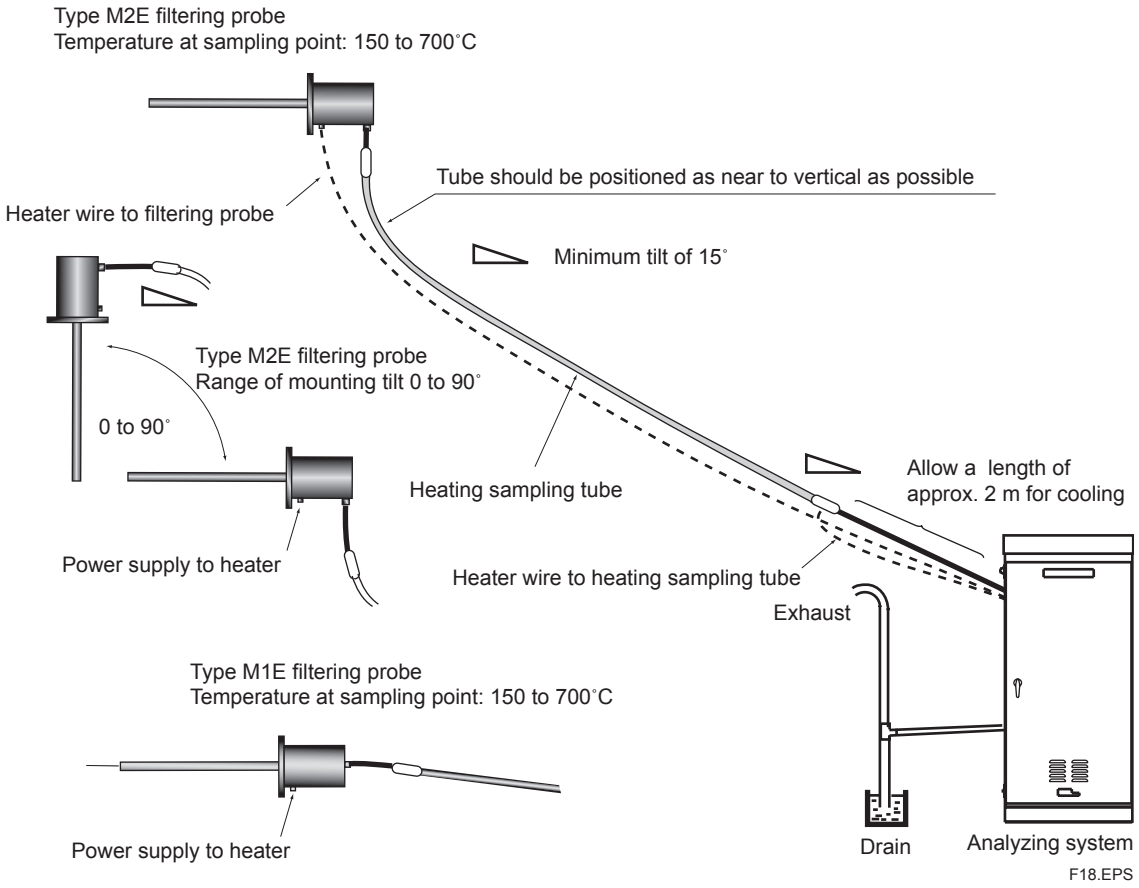
An external drain separator may be required, depending on the sample conditions.



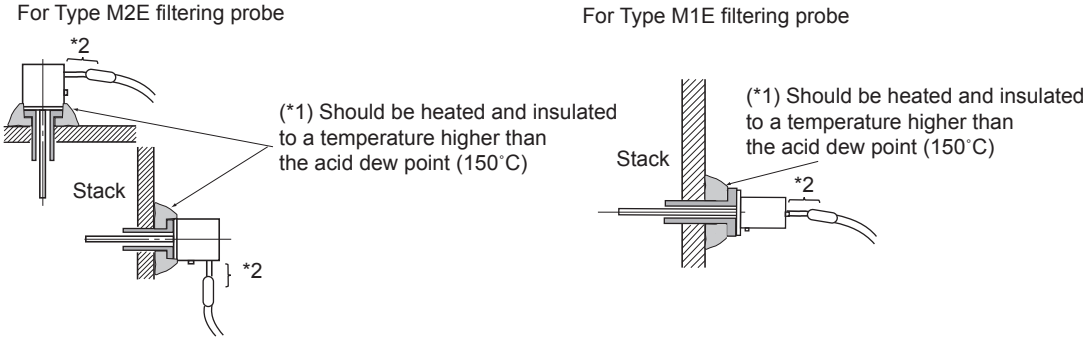
**• System with heating sampling tube (Filtering probe + heating sampling tube + analyzing system)**

When the ambient temperature is under 0˚C where drain may freeze, the sampling tube should be heated to prevent condensation and freezing. If the $SO_2$ concentration is normally below 100 ppm, the heating sampling tube should be used to prevent the formation of drain that might cause dissolution loss of sample gas. The sampling system consists of the heating filtering probe and the heating sampling tube. Either the Type M1E or Type M2E filtering probe should be used. If the system is installed where the temperature at a sampling point is under the acid dew point (approx. 150˚C), the mounting point of the probe should be insulated and heated. This system cannot be used in combination with the external primary filter.




F18.EPS

* Examples of installation of the probe where the temperature at a sampling point is lower than the acid dew point (150˚C)



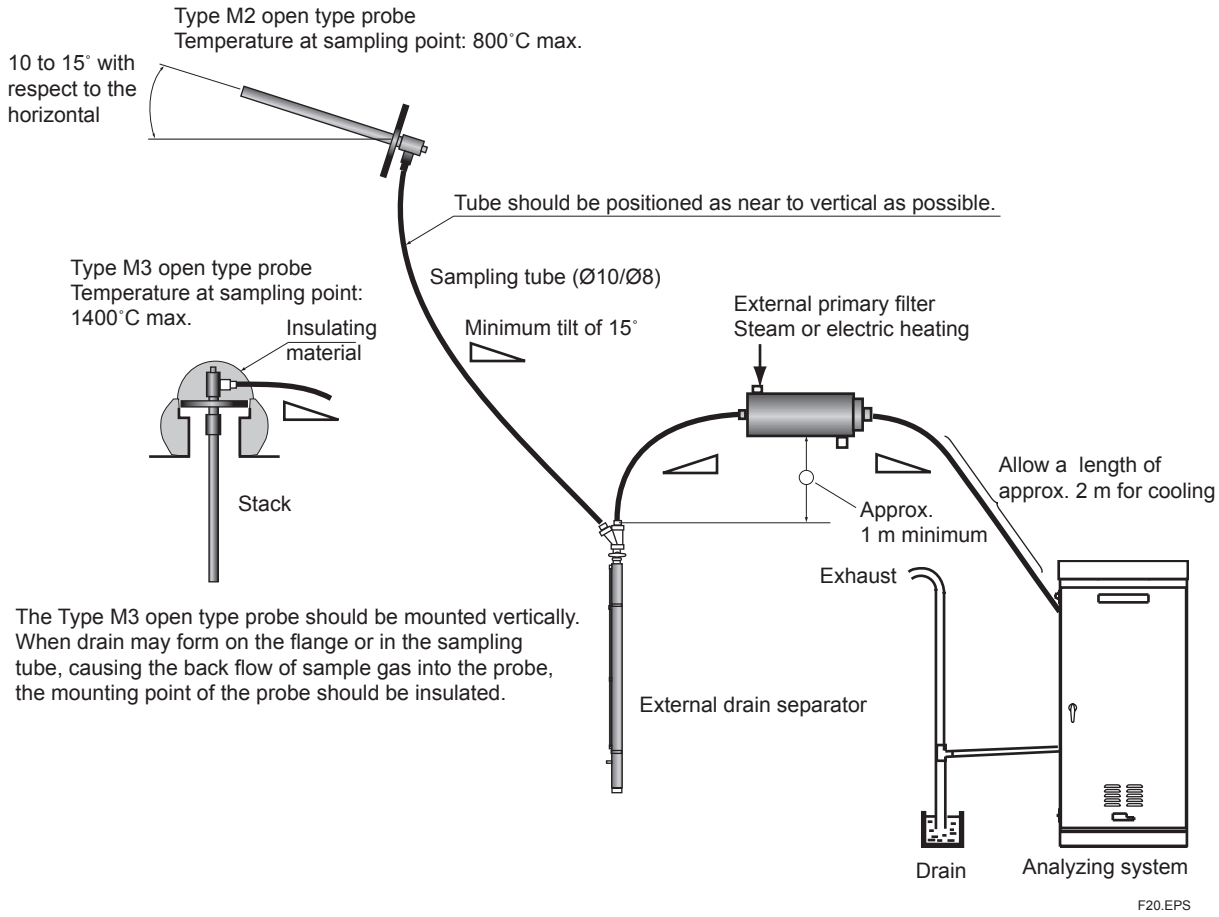

(*1) Should be heated and insulated by a steam or electric heater (provided by customer) to prevent condensation on the probe.

(*2) Tubing between the probe and the heating sampling tube should be insulated by a replaceable insulating material (provided and installed by customer).

F19.EPS

**• System with external primary filter (Open type probe + external drain separator + external primary filter + analyzing system)**

This system is applied to where the maintainable filtering probe cannot be installed due to the installation site or the high temperature of sample gas. The system requires the external primary filter to eliminate dust coming through the open type probe. Drain forming in the tube is eliminated by the external drain separator. The sampling system consists of the open type probe, the standard sampling tube, the external drain separator and the external primary filter. Either the Type M2 (150 to 800˚C) or Type M3 (800 to 1400˚C) open-type probe should be used. Either the Type M1E (electric heating) or Type MS (steam heating) external primary filter should be used.




The Type M3 open type probe should be mounted vertically. When drain may form on the flange or in the sampling tube, causing the back flow of sample gas into the probe, the mounting point of the probe should be insulated.

## SG750 Stack Gas Analyzer Inquiry Form

Thank you for your inquiry about our SG750 Stack Gas Analyzer. Please make inquiries by placing checkmarks in the appropriate boxes and filling in the blanks. (The items with check mark √ and descriptions previously filled on the underlines are fixed requirements.)

### 1. General Information

Company:_____Delivery destination:_____.

Responsible person:_____Section:_____(Phone No._____)

Plant name:_____Measurement location:_____.

Purpose: ☐ Indication reading, ☐ Recording, ☐ Telemeter transmission, ☐ Alarm, ☐ Control, ☐ Other,

Requested delivery date (day/month/year):_____.

### 2. Specification Requirements

**2.1 Measuring objects:** _____ Example: Sludge incinerator

**2.2 Measurement method:**

Non-dispersive infrared absorption method

$O_2$ detector, ☐ Not required ☐ Required (☐ zirconia method ) (☐ paramagnetic )

**2.3 Conditions of sample gases**

(1) Component: ☐ $NO_X$, ☐ $SO_2$, ☐ CO, ☐ $CO_2$, ☐ $O_2$, ☐ Others

(2) Temperature: ☐ 150 to 400˚C, ☐ 400 to 700˚C, ☐ 700 to 1400˚C , ☐ Others_____˚C

(3) Pressure:_____☐ MPa, ☐ -1 to 5 kPa, ☐ -3 to 3 kPa, ☐ -5 to 1 kPa

(4) Moisture: _____% (20% or less moisture is required. Dew point and normal temperature at inlet of analyzing system)

(5) Dust:_____mg/$Nm^3$ (500 mg/$Nm^3$ or less is required)

(6) Corrosive components:_____(except for $SO_2$)

(7) $SO_2$ range:_____(The range should be within 0 to 1000 ppm)

**2.4 Measuring range**

(1) ☐ $NO_X$_____ ppm (2) ☐ $SO_2$_____ ppm

(3) ☐ CO_____ ppm (4) ☐ $CO_2$_____☐ ppm ☐ %

(5) ☐ $O_2$_____vol%

### 3. Selection of Filtering Probe or Open Type Probe plus External Primary Filter

**3.1 Filtering probe (Used in normal applications):**

(1) Three types of filtering probe are available: Type F, Type M1E and Type M2E. Refer to Table 1 for the selection.

☐ Type F filtering probe (K9718VC) _____quantity

☐ Type M1E filtering probe (K9219ED)_____ quantity

☐ Type M2E filtering probe (K9718VE)_____ quantity

**3.2 Open type probe plus external primary filter**

Refer to Tables 1 and 2 for selecting the probe and external primary filter.

(1) Probe:

☐ Type M2 open type probe (K9718PD)_____quantity

Used where the temperature of the sample gas is in the range of 150 to 800˚C

☐ Type M3 open type probe (K9718QA)_____quantity

Used where the temperature of the sample gas is in the range of 800 to 1400˚C.

(2) External primary filter:

☐ Type M1E external primary filter (K9718TA)_____quantity

☐ Type MS external primary filter (K9718UA) _____quantity

**Table 1 Selection of Filtering Probe**

| Gas condition / Filtering probe | Dust g/$Nm^3$ | | Temperature | | | $SO_2$ concentration ppm *1 | |
|---|---|---|---|---|---|---|---|
| | 0.1 or less | 0.5 or less | below 150˚C | 150 to 400˚C | 400 to 700˚C | 100 ppm or less | 100 to 1000 ppm |
| (1) Type F (K9718VC) | Std. | – | – | Std. | – | – | Std. |
| (2)Type M1E (K9219ED) | Std. | – | – | Std. | Std. | – | Std. |
| (3) Type M2E (K9718VE) | Std. | Std. | Non-std. | Std. | Std. | Std. | Std. |

Std. : Applicable, Non-std : Applicable with conditions (See pages 21 and 22 for the details), – : Not applicable T29.eps

*1: Normal $SO_2$ concentration; the median of the measuring range should be taken as reference.

**Table 2 Selection of Open Type Probe and External Primary Filter**

| Gas condition / Open Type Probe and External Primary Filter | Dust g/Nm$^3$ | | Temperature | | $SO_2$ concentration ppm *1 | |
|---|---|---|---|---|---|---|
| | 0.1 or less | 0.5 or less | 150 to 800˚C | 800 to 1400˚C | 100 ppm or less | 100 to 1000 ppm |
| (1) M2 open type probe (K9718PD) | Std. | – | Std. | – | – | Std. |
| (2) M3 open type probe (K9718QA) | Std. | – | – | Std. | – | Std. |
| (1) M1E external primary filter (K9718TA) Electric heater (*2) | Std. | – | – | – | – | Std. |
| (2) MS external primary filter (K9718UA) Steam heater (*2) | Std. | – | – | – | – | Std. |

T30.eps

Std. : Applicable, - : Not applicable
*1: Normal $SO_2$ concentration; the median of the measuring range should be taken as reference.
*2: The probe should be used in combination with the external primary filter. Either an electric or steam heater should be used according to the customer's utility.

**4. Sampling tube (Used to feed sample gas from the probe to the analyzer)**
Two types - the sampling tube and the heating sampling tube - are available and each should be used properly according to the following conditions.

(1) ☐ Sampling tube (SG8SAP-L☐☐):_____(length in meters) X _____(quantity) (50 m max.) Used in the normal sample conditions. Whereas under the conditions described in (2) select the heating sampling tube.
(2) ☐ Heating sampling tube (SG8HSAP-L☐☐):_____(length in meter) X _____(quantity) (50 m max.)
Related item: Select the heat insulating teflon tube in Item 7.5 on this Inquiry Form.
* Operation conditions: (1) Ambient temperature is under 0˚C, (2) Normal $SO_2$ concentration is less than 100 ppm
* The combination of either Type M1E (K9718TA) or Type MS (K9718UA) external primary filter with heating sampling tube is not possible.

**5. ☐ External Drain Separator (K9641EA): _____ quantity**
(1) Should be specified when the tube between the probe and the analyzer is placed at a 15 degree angle or less.
(2) Two drain separators must be specified when the $SO_2$ range is 500 ppm or more.
* Required conditions (1) Antifreeze measures should be taken

**6. Restrictions by the $SO_2$ Measuring Range and Recommended System**

**6.1 For the $SO_2$ range of 500 ppm or more, the following system is recommended**
(1) System: Double external drain separators (K9641EA) +$SO_3$ mist catcher
* The option code "/SO1" should be specified. The option code "/SO1" does not include an external drain separator, so order it separately. Related item: Item 7.13 on the Inquiry Form

**6.2 Under the following condition, the $NO_X$ converter should be specified**
(1) When measuring only $SO_2$ concentration of flue gas at sludge incinerators
(2) Required to reduce the $NO_2$ interference error (e.g. approximately -6 ppm of $SO_2$ at 50 ppm of $NO_2$)
* The option code "/NO1" should be specified. ( /NO1 includes the $NO_X$ converter.) Related item: Item 7.14 on the Inquiry Form

**7. ☐ SG750 stack gas analyzer:_____quantity**

**7.1 Power supply:**
☐ 100 V AC ☐ 110 V AC ☐ 115 V AC ☐ 200 V AC ☐ 230 V AC ±15%
☐ 50 ± 0.5 Hz ☐ 60 ± 0.5 Hz
Approximately _____VA ☐ When the heating sampling tube is used for cold district, 36.5 VA per meter of tube should be added.

**7.2 Output signal:**
☐ 4 to 20 mA DC ☐ 0 to 1 V DC
☐ Non-isolated output (Recorder output) ☐ Isolated output (external output)

**7.3 Panel construction:**
☐ For indoor installation ☐ For outdoor installation

**7.4 Automatic calibration**
☐ Required

**7.5 Heating and insulation of external tubes:**
☐ None ☐ Required (Specify when using the heating sampling tube or when the $SO_2$ concentration at outlet of desulfurization/denitrification is lower than 100 ppm. 50 m max.) (Specify the option code "/S") (Related item: The length of heating sampling tube should be specified in Item 4 on the Inquiry Form)

**7.6 Built-in recorder:**
☐ None ☐ Required Signals of recording components (Specify the option code "/M☐". The μR10000 should be ordered separately.)

**7.7 Cold-district version:**
☐ None ☐ Required (Related item: Should be consistent with Item 7.16 on the Inquiry Form)
(-5 to 40˚C) ☐ -15 to 40˚C (Specify the option code "/T1")
☐ -10 to 40˚C (Specify the option code "/T2")

**7.8 Instrument air:**
☐ None ☐ Required as zero gas (Specify the option code “/Q”)

**7.9 Atmospheric air:**
☐ None ☐ Required (as zero gas) (Specify the option code “/R”)

**7.10 Tag number:**
☐ None ☐ Required (specify the tag number_____)
☐ Acryl (Specify the option code “/U1”) ☐ Stainless steel (Specify the option code “/U2”)

**7.11 Name plate:**
☐ None ☐ Required (specify the description)
☐ Acryl (Specify the option code “/V1”)
☐ Stainless steel (Specify the option code “/V2”)
☐ Customized

Note: - Specify the tag number and the description of a nameplate when ordering
- Any change after ordering should be made at least 2 weeks before the requested delivery date. Changes made immediately (within 2 weeks) before the requested delivery date may delay the delivery date.

**7.12 Channel base**
☐ Standard ☐ Enclosure-type base (Specify the option code “/ W”)

**7.13 Specification for high $SO_2$ concentration**
☐ None ☐ Required $SO_3$ mist catcher (Specify the option code “/SO1”)

**7.14 $NO_X$ converter**
☐ None ☐ Required (Specify the option code “/NO1” under conditions)
(1) in the exhaust gas measurements at sludge incinerators and
(2) to measure only the $SO_2$ concentration

**7.15 Color/Coating:**
☑ Standard Munsell 5Y7/1 equivalent (Both inside and outside), melamine resin, baked finish

**7.16 Installation condition:**
No direct sunlight and negligible vibration should be allowed at installation site.
Ambient temperature: (Related item: Should be consistent with Item 7.7 on the Inquiry Form)
☐ -5 to 40˚C
☐ -10 to 40˚C (Specify the option code “/T2”)
☐ -15 to 40˚C (Specify the option code “/T1”)

**7.17 Window:**
☐ None ☐ Required

**7.18 Air Purge:**
☐ None ☐ Required

**7.19 Arrester:**

| | | |
|---|---|---|
| For power supply | ☐ None | ☐ Required |
| For signal | ☐ None | ☐ Required |

**7.20 Weight**
Approximately 300 kg

**7.21 Others**
Use this inquiry form for consulting with your customers.
If you have any question or need further assistance, please contact Yokogawa.

(Note) Teflon is a registered trademark of DuPont.