General Specifications

Model GC8000
Process Gas Chromatograph

GS 11B08A01-01E

■ GENERAL

A Process Gas Chromatograph analyzes a vapor or volatile liquid sample and then separates the various chemical components in the sample for individual detection and measurement. The discrete separation and positive identification of components and measurement of the composition enables the process gas chromatograph to be one of the few analyzer types available that minimizes the likelihood of cross interference during measurement. It also allows the analyzer to measure multiple chemical compounds during each analysis to levels that reach parts-per-million and even parts-per-billion levels. These performance characteristics are what have made the process gas chromatograph the workhorse of the on-line chemical analysis industry.

■ FEATURES

■ High-speed analysis with multi-oven structure

The multi-oven and multi-detector structure with simultaneous analysis settings enables each component to be measured under optimal conditions.

This feature reduces the analysis time and allows configurations to be tailored to the customers' needs.

■ Improved operation with a large touch panel

A 12.1-inch color LCD touch panel mounted on the operating display unit of the main body offers enhanced visibility and interface.

The screen displays of the main body and the PC are kept consistent to achieve intuitive, easy operations and quick acquisition of various information.

HMI-less option is also available for FM/ATEX/NEPSI/IECEx/CSA models. The screen display of a GC8000 in the network can operate other GCs including HMI-less models.

■ High reliability

Since first releasing gas chromatographs in 1959, Yokogawa has developed a reputation of dependable performance among customers. The GC8000, with its main parts such as detectors and valves embodying our long experience and know-how, delivers outstanding reliability. Furthermore, many of the serviceable parts are compatible with those used in previous GC models.

■ Improved functionality

The GC8000 offers improved functionality with the following functions:

Reanalysis of chromatograms:
This function analyzes and verifies the chromatogram data saved in the PC, to ensure the data is reliable.

Data converting to the EZChrom software:
This function shares data with the customer's other analyzers, for consistent management of various analysis results and securing traceability.



GC8000

User programming:
This function can be tailored to the customer's exact requirements, such as a customized reports or sophisticated analysis routines.

■ EXAMPLE OF APPLICATIONS IN INDUSTRIES

The gas chromatograph can be used for monitoring and quality control in the following industries and applications.

- **Petrochemicals:**
  ethylene, polypropylene, polyethylene, BTX, butadiene, vinyl chloride, styrene, alcohol, aldehyde, ester, and vinyl acetate
- **Petroleum refining:**
  distillation point analysis, PINA/PIONA analysis, FCC, sulfur recovery
- **Chemistry:** chlorides, fluorine compounds, formalin, methanol, urea, ammonia, phenol
- **Electric power/gas:**
  fuel gas, exhaust gases, coal gasification/liquefaction, fuel cell
- **Iron and steel:**
  blast furnace, coke oven
- **Air plant:** organic/inorganic gas analyses
- **Chemicals:** chemicals, agricultural chemicals
- **Environmental monitoring:**
  air/soil pollution monitoring, plant/work environmental analyses, analyses (VOC)

The GC8000 can also be used for many other applications.

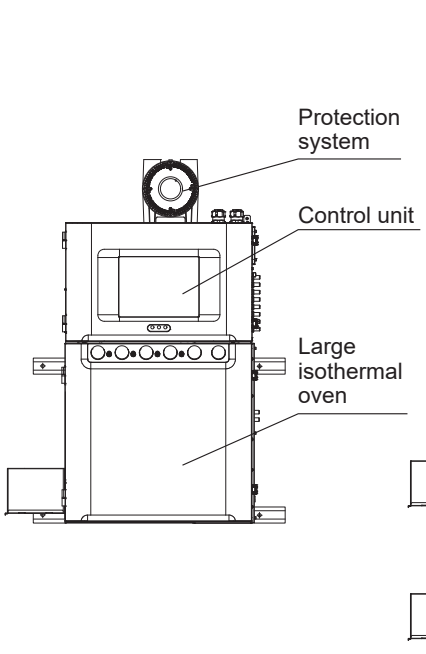
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YOKOGAWA

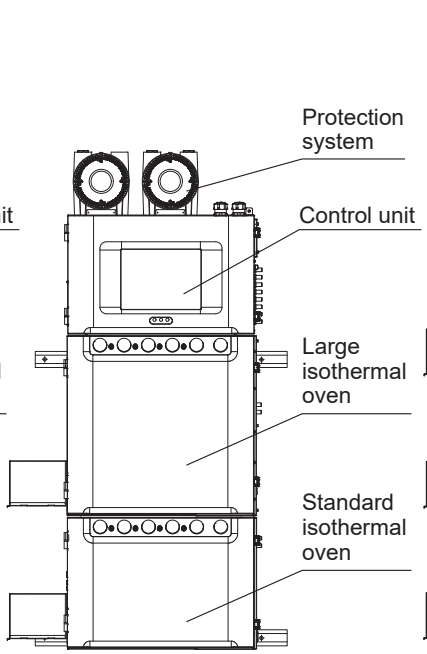
Yokogawa Electric Corporation
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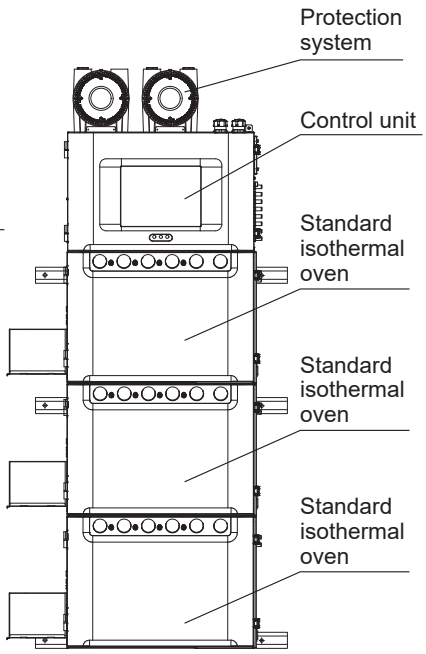
■ Configurations



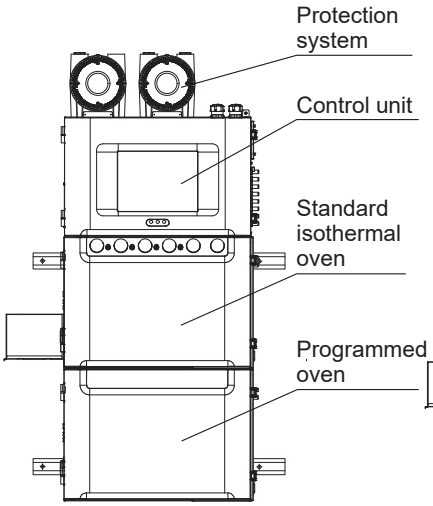
Type 1 (Wall-mounting)



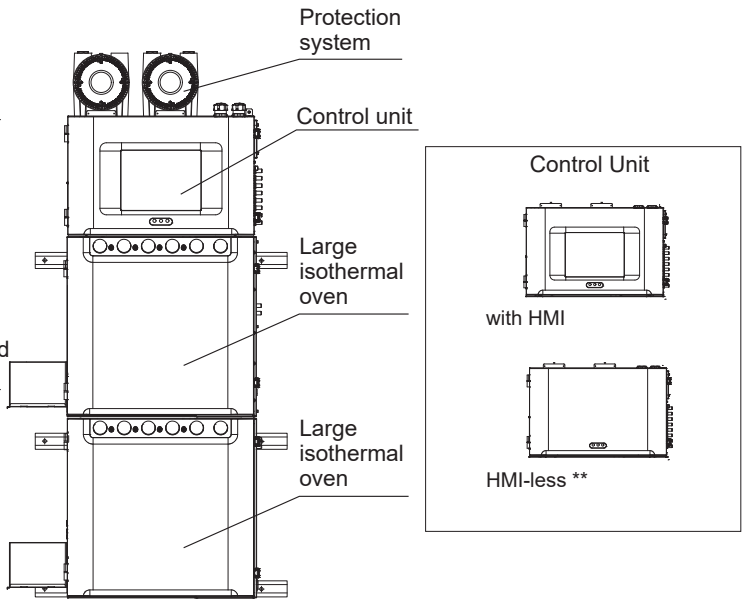
Type 2 (Wall-mounting)



Type 3 (Wall-mounting)



Type 4 (Wall-mounting)



Type 5 (Wall-mounting)

*: Wall-mounting version and self-standing version are available.
Analyzer base sampling unit (GCSMP) can be installed in the self-standing version (excluding Type 3 and Type 5). Type 5 is not available for TIIS.

**: This option is available only for FM/ATEX/NEPSI/IECEx/CSA/JPEx models. An “HMI-less” model is one that has no LCD or “Operation panel.”

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■ STANDARD SPECIFICATIONS

1. General specifications

Measurable object:
Gas or volatile liquid (400°C or lower boiling point)

Analysis method:
Gas chromatography

Detector: TCD (thermal conductivity detector)
high-sensitivity TCD
MTCD (Multiport thermal conductivity detector)
FID (flame ionization detector)
FID with methanizer
FPD (flame photometric detector) (only for large isothermal oven)

Number of detectors:
Type 1: Maximum of 2
Selectable from TCD: 2, MTCD: 2, FID: 2, FID with methanizer: 1, FPD: 1
Type 2: Maximum of 4
Selectable from TCD: 4, MTCD: 2, FID: 4, FID with methanizer: 2, FPD: 1
Type 3: Maximum of 6
Selectable from TCD: 6, FID: 6, FID with methanizer: 3
Type 4: Maximum of 2
Selectable from TCD: 2, FID: 2, FID with methanizer: 1
Type 5: Maximum of 4
Selectable from TCD: 4, MTCD: 4, FID: 4, FID with methanizer: 2, FPD: 2

Measurable range:
Depends on analysis conditions
TCD: 1 ppm to 100%
MTCD: 1 ppm to 100%
FID: 1 ppm to 100%
FID with methanizer: 1 ppm to 0.1%
FPD: 1 ppm to 0.1%

Number of components to be measured:
Maximum of 999 (total number of components in all streams including calibration standard sample streams)
Note: Maximum of 333 components per stream

Number of streams to be measured:
Maximum of 31 (including calibration standard sample streams)

Air output for automatic stream switching:
Automatic stream valves can be directly operated for up to eight streams;
Code switching circuits are necessary for nine or more streams.
Note: Applicable only to 1 GCM

Contact output for automatic stream switching:
Maximum of 20 points

Analysis period:
Maximum of 21600.0 seconds (six hours)

Quantifying method:
Absolute calibration, sensitivity-corrected absolute calibration, and corrected area normalization

Utility gas supply method:
Mechanical pressure regulator: Up to 6 for carrier gasses and up to 12 for other utility gasses (2 and 4 for each i-oven, 3 and 4 for each large i-oven)
EPC (electronic pressure controller) is optionally available. Please consult with Yokogawa or its Representative Offices.
Note: For optimal chromatography performance, Yokogawa recommends the mechanical regulators.
Stable retention times are achieved by using them with Yokogawa unique air distribution system within the ovens.
Number of carrier gasses and other utility gasses is 6 or less for each i-oven and large i-oven.

Number of valves:
Type 1: Up to 8
Selectable from 7 Rotary Valves (RV), 1 Liquid-sample Valve (LSV), and 2 Atmospheric Balance Valves (ATM-V)
Number of RV and LSV is 7 or less
Type 2: Up to 15
Selectable from 12 RV, 2 LSV, 4 ATM-V
Number of RV and LSV is 12 or less
Type 3: Up to 21
Selectable from 15 RV, 3 LSV, 6 ATM-V
Number of RV and LSV is 15 or less
Type 4: Up to 7
Selectable from 5 RV, 1 LSV, 2 ATM-V
Number of RV and LSV is 5 or less
Type 5: Up to 16
Selectable from 14 RV, 2 LSV, 4 ATM-V
Number of RV and LSV is 14 or less
Note: RVs are not available as Liquid-sample Valve, for ATEX, IECEx, NEPSI, and JPEx applications.

Material of sample-contact parts:
RV: 316SS, Hastelloy-C, Rulon, PTFE (Teflon, Bearee)
LSV: 316SS, Hastelloy-C, Rulon, Glass, PTFE (Teflon, Bearee), Fluororubber (Viton), perfluoroelastomer (Kalrez)

Sampling connection:
6 mm or 1/4″ tube (including calibration standard sample streams)
Maximum of 6 streams (up to 2 for each isothermal oven)
Note: Only one Liquid-sample Valve can be mounted in each isothermal oven.

Repeatability: Depends on analysis conditions
Gas sample:
±1% of full scale for measuring ranges (2σ)
Liquid sample:
±2% of full scale for measuring ranges (2σ)

Ambient condition during operation:
–10 to 50°C, 95%RH or less (no condensation)
For ATEX, IECEx, NEPSI and JPEx, the allowable ambient temperature range depends on the temperature class:
T1, T2: –10 to 40°C
T3: –10 to 45°C
T4: –10 to 50°C
Also depends on analysis conditions.

Ambient condition during storage:
–40 to 85°C, no condensation
Avoid exposure to wind, rain and sunlight

Installation location:
Maximum altitude of 2000 m
Avoid exposure to wind, rain and sunlight

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Safety standard, EMC standard, RoHS standard: See next table

Ex Certification *4	MS code	Safety Standard	EMC standard	RoHS standard
TIIS	GC8000-T (TIIS)	-	-	-
JPEx	GC8000-J (JPEx)	-	-	-
ATEX *1	GC8000-A (ATEX-X)	EN 61010-1	EN 61326-1 Class A, Table 2 EN 61326-2-3 RCM Mark Korea Electromagnetic Conformity Standard (except GC8000 -P)	EN IEC 63000 *5
IECEx *2	GC8000-E (IECEx-X)	EN 61010-2-030		-
NEPSI *3	GC8000-P (NEPSI-X)	GB 30439.1		
FM	GC8000-F (FM-X) GC8000-G (FM-Y)	FM 3810 ANSI/UL 61010-1 ANSI/UL 61010-2-030	-	-
CSA	GC8000-C (CSA-X) GC8000-D (CSA-Y)	CAN/CSA-C22.2 No. 61010-1-12 CAN/CSA-C22.2 No. 61010-2-030	-	-

*1: Analyzer base sampling unit (GCSMP) or base placed under GC8000-A is not covered by the EU-DoC nor the EC Type-examination Certificate. The empty compartment (base) placed by Yokogawa to create a Self-standing GC8000-A, does not impair the compliance of the GC8000-A.
*2: The design is based on the safety and EMC standard, though the mark of CE is not indicated.
*3: The design is based on the safety and EMC standard, though the mark of CE, KC and RCM are not indicated.
*4: KOSHA and EAC are available. Contact Yokogawa Sales or Reps.
*5: Some parts of this product include the restricted substances of RoHS Directive, but their applications are under the exemption of the directive.

Information of the WEEE Directive
GC8000, K9806AA, K9806AJ and K9806AN have been designed only for the purpose as part of a large industrial equipment at a pre-defined and dedicated location, hence the Waste Electrical and Electronic Equipment (WEEE) Directive is not applicable.
The WEEE Directive is only valid in the EU.

Type of protection:
Pressurized enclosure, flame proof enclosure, increased safety, intrinsic safety and type of protection.

Certification standard *4:
FM, CSA, ATEX (DEKRA), IECEx (DEKRA), NEPSI, TIIS, JPEx (CML)

FM/CSA: Type X Pressurization and Explosionproof for Class I, Division 1,Groups B, C and D. T1 to T4 (Described as FM-X, CSA-X hereafter)
Type X and Y Pressurization for Class I, Division 1, Groups B, C and D. T1 to T4 (Described as FM-Y, CSA-Y hereafter)

ATEX *1: II2G Ex db pxb IIB+H_2 T1, T2, T3 or T4 Gb (Described as ATEX-X hereafter)

IECEx: Ex db pxb IIB+H_2 T1, T2, T3 or T4 Gb (Described as IECEx-X hereafter)

NEPSI *3: Ex db pxb IIB+H_2 T1, T2, T3 or T4 Gb (Described as NEPSI-X hereafter)

TIIS *2: Ex pd IIB+H2 T1~T4

JPEx: Ex db pxb IIB+H2 T1, T2, T3 or T4 Gb

*1: Analyzer base sampling unit (GCSMP) or base placed under GC8000-A is not covered by the EU-DoC nor the EC Type-examination Certificate. The empty compartment (base) placed by Yokogawa to create a Self-standing GC8000-A, does not impair the compliance of the GC8000-A.
*2: TIIS: Technology Institution of Industrial Safety
*3: NEPSI: National Supervision and Inspection Centre for Explosion Protection and Safety of Instrumentation
*4: Contact Yokogawa Sales or Reps. for KOSHA and EAC.

Protection degree of enclosure:
Type 3R (ANSI/UL 50E, CSA C22.2 No. 94.2), Equivalent to IP54 (IEC 60529) (dust and water resistant structure)

Display: LCD (or without display) and LED (POWER/ALARM/RUN)

Operating display unit: Touch panel (or without operating display unit)

Coating: Polyurethane baked finish
Main body: Silver gray (Munsell 3.2PB 7.4/1.2 or its equivalent)
Gauge: Mint green (Munsell 5.6BG 3.3/2.9 or its equivalent)

Weight:

	Wall-mounting version	Self-standing version
Type 1	approx. 100 kg	approx. 140 kg
Type 2	approx. 155 kg	approx. 190 kg
Type 3	approx. 200 kg	approx. 220 kg
Type 4	approx. 140 kg	approx. 170 kg
Type 5	approx. 175 kg	approx. 195 kg

Other functions:
• Data storage
The GC8000 can save 1 week of chromatogram data, any chromatogram data (up to 20 per GCM), 30 days of analysis results, and 100 calibration factors. The number of saved data depends on analysis conditions. Saved data can be read and displayed on both the HMI and the PC.

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2. Element Specifications

2.1 Isothermal Oven

Volume:
Large isothermal oven: Approximately 45 L
Standard isothermal oven: Approximately 31 L
Oven temperature range:
55 to 225°C
(Temperature can be set in one-degree step.)
Temperature stability: ±0.03°C *
Temperature control: PID
Temperature sensor: Pt100 Ω RTD
Other functions: Over-heating prevention function

2.2 Programmed Temperature Oven

Volume: Approximately 11 L
Temperature setting method:
Constant or programmed
Oven temperature range:
With cooler: 5 to 320°C
Without cooler: 60 to 320°C
Heating rate: 1 to 30°C/min (Temperature can be set in one-degree step.)
Heating program number: Up to 3
Temperature stability: ±0.03°C at a control point in the steady state. *
Stability to ambient temperature:
±0.1°C/10°C *
Stability to supply voltage variation:
±0.03°C/10% *
Temperature control: PID
Temperature sensor: Pt100 Ω RTD
Other functions: Over-heating prevention function

2.3 Liquid-sample Valve with Vaporizer

Sample pressure: 0 to 3 MPa
Sample temperature: 150°C or lower
Sample volume: 0.25, 0.5, 1, 2, and 3 µL
Vaporizing section:
LSV temperature range: Oven temperature +5 to 250°C
Temperature stability: ±1°C *
Temperature control: PID
Temperature sensor: Pt100 Ω RTD
Other functions: Over-heating prevention function

*: Reference value

3. Utility

3.1 Power

Power supply:
Type 1, 2, 3, 5:
100/110/115/120/200/220/230/240 V AC ±10%, 50/60 Hz ±5%
Type 4: 200/220/230/240 V AC ±10%, 50/60 Hz ±5%
Note: Depends on analysis conditions.
Protection devices, such as a breaker, are required to avoid overcurrent.
Wiring method:
FM/CSA: Conduit wiring (3/4NPT(F))
ATEX, IECEx, NEPSI: Cable packing (3/4NPT(F), M25x1.5(F))
TIIS, JPEx: Cable packing (G3/4(F), 3/4NPT(F))
Note: Cable packing for TIIS, JPEx is provided by Yokogawa.
Other conduit wiring or cable packing should be prepared by the user.
Wiring connection:
FM-X, CSA-X, ATEX-X, IECEx-X, NEPSI-X, TIIS, JPEx:
Explosion proof enclosure
FM-Y, CSA-Y
Control unit
Maximum rated power:
Type 1: 0.8 to 1.6 kVA
Type 2: 1.4 to 2.9 kVA
Type 3: 2.0 to 4.3 kVA
Type 4: 1.8 to 3.7 kVA
Type 5: 1.9 to 3.0 kVA

3.2 Utility gas

Note: It may vary depending on application.

3.2.1 Instrument air

Pressure: 350 to 900 kPa
500* to 900 kPa (with FPD)
350 to 900 kPa (Programmed temperature oven without cooler)
500 to 900 kPa (Programmed temperature oven with cooler)
*: 600 kPa is required when ambient or instrument-air temperature is higher than 46°C (1 FPD) or 40°C (2 FPDs).
Maximum flowrate:
Type 1: 140 L/min
Type 1 with FPD: 440 L/min
(280 L/min typ. at Tamb=25°C)
Type 2: 210 L/min
Type 2 with FPD: 510 L/min
(340 L/min typ. at Tamb=25°C)
Type 3: 280 L/min
Type 4: Depend on the specification
210 L/min or more (Without cooler and immediate cooling function)
600 L/min or more (Without cooler with immediate cooling function)
510 L/min or more (With cooler without immediate cooling function)
510 L/min or more (With cooler and immediate cooling function)
Type 5: 210 L/min
Type 5 with 1 FPD: 510 L/min
(340 L/min typ. at Tamb=25°C)
Type 5 with 2 FPDs: 870 L/min
(550 L/min typ. at Tamb=25°C)
Temperature: –10 to 50°C
Dew point: –20°C or lower (condensation of compressed air must be avoided at the ambient temperature.)
Oil: 5 ppm or less
Cleanliness: Must be free from dust, corrosive elements, and toxic elements.
Connection:
Type 1, 2, 3, 5:
Rc1/4 or 1/4NPT (F)
Type 4: Rc1/2 or 1/2NPT (F)

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3.2.2 Carrier gas, combustion gas for FID/FPD, make-up gas for FID/FPD

Types: H_2, N_2, He, or Ar
Purity:
Measuring range from 0 to 50 ppm or more:
99.99% minimum (water: 10 ppm or less, organic components: 5 ppm or less)
Measuring range from 0 to less than 50 ppm:
99.999% minimum (water: 5 ppm or less, organic components: 0.1 ppm or less)
Pressure:
H_2: 500 ±20 kPa (72.5 ±2.9 psi) (Must be supplied at this pressure to meet the explosion-proof certification.)
Other than H_2: 400 to 700 kPa
Consumption: 60 to 300 mL/min per isothermal oven
Connection: 6 mm or 1/4″ tube

3.2.3 Combustion air for FID/FPD:

Purity:
Measuring range from 0 to 50 ppm or more:
water: 10 ppm or less,
organic components: 5 ppm or less
Measuring range from 0 to less than 50 ppm:
water: 5 ppm or less,
organic components: 0.1 ppm or less
Pressure: 400 to 700 kPa
Consumption: Approximately 300 mL/min per detector
Connection: 6 mm or 1/4″ tube

4. Input and Output Specifications

Wiring method:
FM, CSA: Conduit wiring (3/4NPT(F))
ATEX, IECEx, NEPSI:
Cable packing (3/4NPT(F), M25x1.5(F))
TIIS, JPEx: Cable packing (G3/4(F), 3/4NPT(F)), Sealing fitting (only for Ethernet cable)
Note: Cable packing for TIIS, JPEx is provided by Yokogawa.
Other conduit wiring or cable packing should be prepared by the user.
Wiring connection:
FM-X, CSA-X, ATEX-X, IECEx-X, NEPSI-X, TIIS, JPEx:
Contact outputs for System Alarm 1, Annunciator:
Explosion proof enclosure
Other I/Os: Control unit
FM-Y, CSA-Y:
All I/Os: Control unit

4.1 Communication

4.1.1 Connection to Analyzer network

Included as standard.
Communication standard: Ethernet
Connection type: IEEE802.3U
100Base-TX (RJ-45 shielded twisted pair cable) or 100Base-FX (SC fiber-optics cable for 1300 nm outdoor type : multi-mode of 50/125 µm or OM1, or for 1310 nm outdoor type : single-mode of G.652)
Channel: 1 or 2
Protocol: TCP/IP, FTP
Data to be transmitted:
Analysis results, calibration factors, alarms, status, and chromatogram
Data to be received:
Operation requests (stream sequence setting, stream setting, run, stop, pause, and range change)
Device to be connected:
PCAS, ASET, ASGW, GC8000 (LCD), OPC through FCN/FCJ, and GCVT through PCAS
Note: Do not use repeater hubs. Doing so affects the network communication.
External I/O Cutoff Output:
Number of outputs: 2
Function: Monitoring the purge air pressure in the electronics section, applying power (24 V DC) to the signal interrupter when the state is normal.
Signal interrupter (Rack-mounted type: K9806AA, Desktop type: K9806AB):
FM-X, CSA-X, ATEX-X, IECEx-X, NEPSI-X, TIIS, JPEx:
Additionally required (only with twisted pair cables). Signal is interrupted by power supply OFF signals from the external I/O cutoff output.
FM-Y, CSA-Y: Not required
Note: For installation in hazardous area, an explosion-proof structure authenticated by a relevant certified body shall be prepared by customer.

4.1.2 Connection to DCS

Both Ethernet and Serial communication are available.

(1) Ethernet communication

The same port as analyzer network is used. Refer to "4.1.1 Connection to Analyzer network".

Communication standard:	Ethernet
Protocol:	Modbus/TCP
Communication speed:	100 Mbps
Number of DCS connections:	Maximum of 4

(2) Serial communication (Option)

Channel: 1 or 2
Communication standard: RS-422
Transmission: Full duplex (4-wire system)
Protocol: Modbus, Y-Protocol (GC1000/GC8, GC6 and BTU for Japan)
Note: Concurrent usage of Y-Protocol is not available.
Start-stop (asynchronous) communication:
Start bit 1, Data bits 7 (ASCII)/Data bits 8 (RTU), Parity bit 1, Stop bit 1
Parity check: Odd/even/none
Communication speed:
1200/2400/9600/19200/38400 bps
Transmission mode:
ASCII or RTU
Note: Only the ASCII format is used in the Y-Protocol.
Communication control:
None/handshake
Data to be transmitted:
Analysis results, calibration factors, and alarms
Data to be received:
Operation requests (stream sequence setting, stream setting, run, stop, pause, and range change)

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External I/O Cutoff Output:
Number of outputs: 1 or 2
Function: Monitoring the purge air pressure in the electronics section, applying power (24 V DC) to the signal interrupter/the communication converter when the state is normal.
Signal interrupter (Rack-mounted type: K9806AE):
FM-X, CSA-X, ATEX-X, IECEx-X, NEPSI-X, TIIS, JPEx:
Additionally required.
RS-422 output signal is interrupted by power supply OFF signals from the external I/O cutoff output.
FM-Y, CSA-Y:
Not required
Note: For installation in hazardous area, an explosion-proof structure authenticated by a relevant certified body shall be prepared by customer.
Communication converter (Rack-mounted type: K9806AS, Desktop type: K9806AT):
RS-422/232C communication converter with signal interrupter function.
Signal is interrupted by power supply OFF signals from the external I/O cutoff output.
Note: Two units are required for 2 channel communication.
Note: For installation in hazardous area, an explosion-proof structure authenticated by a relevant certified body shall be prepared by customer.

4.2 Input/Output

System alarm 1 and Annunciator are provided as standard contact outputs. Other Input/Output can be added depending on specifications.
Note: Up to 5 optional cards are selectable.
Note: The maximum number of the contact inputs is 32 and outputs is 20, with any combination of contact input cards, contact output cards, and contact I/O cards.

4.2.1 Contact Output for System Alarm 1

Number of contact outputs: 1
Function: Activated when Level 1 alarm occurs.
Contact specification:
Relay contact output, c-contact (NC/NO/COM)
Contact rating: 30 V DC, 100 mA
Contact operation: Open/Close

Contact	System alarm	
	Between NC and COM terminals	Between NO and COM terminals
Activated	Open	Close
Not activated	Close	Open
Power supply: OFF	Open	Close

4.2.2 Contact Output for Annunciator

Number of contact outputs: 1
Function: Outputting the state of the purge air pressure in the isothermal oven and the electronics section (State 1 or State 2)
State 1: Outputting the states of override mode ON, power supply of the analyzer OFF, purging, or insufficient pressure
State 2: Outputting the state after the purge
Contact specification:
Relay contact output, c-contact (NC/NO/COM)
Contact rating: 30 V DC, 100 mA
Contact operation: Open/Close

Contact	Annunciator Output	
	Between NC and COM terminals	Between NO and COM terminals
State 1	Open	Close
State 2	Close	Open
Power supply: OFF	Open	Close

4.2.3 Analog Output (Option, Up to 4 cards)

Number of outputs:
8 per card, maximum of 32
Signal type: 4 to 20 mA DC
Isolation: Channel isolation, system isolation (selectable)
Load: 300 Ω or less
Output Types:
Analysis results (analog hold output)/ Chromatogram output
The maximum number of outputs is 32 analog hold outputs, and 8 chromatogram outputs even in multi-analog output card.
Output range:
Any setting is possible within the measuring range. Auto gain can be set for chromatogram output.

4.2.4 Analog Input (Option, Up to 4 cards)

Number of inputs: 4 per card, maximum of 16
Signal types: 1 to 5 V DC, 4 to 20 mA DC
Input signal range: 0.6 to 5.4 V DC, 2.4 to 21.6 mA DC
Note: This value shows effective conversion range.
Max. Rating of transient overvoltage: ±100 V
Isolation: Channel isolation
Accuracy: ±0.5% of full scale (–10 to 50°C)
Input types: Analysis results (e.g. other analyzers), temperature (e.g. ambient temperature), pressure, etc.
Function: The following values can be output by Modbus protocol in the DCS communication after computing input values.
Average value:
The one-second average of analog values measured at every 200 msec and filtered by a predetermined constant
Current value:
The value at the time set in a cycle time
External I/O Cutoff Output:
Number of outputs: 1
Function: Monitoring the purge air pressure in the electronics section, applying power (24 V DC) to the signal interrupter when the state is normal.
Signal interrupter (Rack-mounted type: K9806AE):
FM-X, CSA-X, ATEX-X, IECEx-X, NEPSI-X, TIIS, JPEx:
Additionally required. Signal is interrupted by power supply OFF signals from the external I/O cutoff output.
FM-Y, CSA-Y: Not required
Note: For installation in hazardous area, an explosion-proof structure authenticated by a relevant certified body shall be prepared by customer.
The same number unit of the signal interrupter as input card is required.

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4.2.5 Contact Output (Option, Up to 4 cards)

Number of contacts: 5 per card, maximum of 20
Function: The following settings are possible at each contact point.
- Stream sequence: Outputs when the specified stream sequence is operated.
- Stream: Outputs when the specified stream is operated.
- Operation mode: Outputs when the specified operation mode is operated.
- Alarm:
  - System alarm: Outputs when the system alarm occurs.
  - Composition Alarm: Outputs when the concentration alarm or the retention time alarm occurs.
- Timing: Outputs at the time to be set.
- Calibration/Validation: Outputs when the specified calibration or validation is operated.
- Stream valve selection: Output for the external sampling equipment, up to 20.
- Stream identifying: Output for the analog hold output, up to 5 points per 1 GCM (5 bits, up to 31 streams)

Contact specifications: SSR or Relay contact output, c-contact (NO, NC, COM)
Contact rating:
- SSR contact output: 100 to 240 V AC, max. 2 A (Load),
- Relay contact output: 24 V DC, max. 2 A (Load)

Contact operation: ON/OFF operation
Contact state: Selectable from Open or Close on operation (Open when power supply is turned off.)
External I/O Cutoff Output:
- Number of outputs: 1
- Function: Monitoring the purge air pressure in the electronics section, applying power (24 V DC) to the signal interrupter when the state is normal.

Signal interrupter (Rack-mounted type, AC:K9806AN, DC:K9806AJ):
- FM-X, CSA-X, ATEX-X, IECEx-X, NEPSI-X, TIIS, JPEx: Additionally required. Signal is interrupted by power supply OFF signals from the external I/O cutoff output.
- FM-Y, CSA-Y: Not required

Note: For installation in hazardous area, an explosion-proof structure authenticated by a relevant certified body shall be prepared by customer. The same number unit of the signal interrupter as contact output card is required.

4.2.6 Contact Input (Option, Up to 4 cards)

Number of contacts: 8 per card, maximum of 32
Function: The following settings are possible at each contact point.
- Alarm: Occurrence of external contact alarm (level 2 or 3)
- Stream sequence: Performing the specified stream sequence
- Stream (continuous): Measuring the specified stream continuously
- Stream (once): Measuring the specified stream one time
- Calibration/Validation: Calibrating or validating the specified stream
- Operation mode: Changing the operation mode (run, pause, stop)
- Range change: Changing the stream and peak ranges

Contact specifications: Zero voltage contact input
Contact rating: 5 V DC, 20 to 50 mA
Input signal:
- Open signal: Input load 100 kΩ or more
- Close signal: Input load 200 Ω or less

Operation on input: NC or NO (selectable)

4.2.7 Contact Input/Output (Option, Up to 4 cards)

Number of contacts: 3 for input and 3 for output per card, maximum of 12 for input and output each
Function, Contact specification, Contact rating, Operation specification:
- Contact output: The same functions as in “4.2.5 Contact Output (Option, Up to 4 cards)”
- Contact input: The same functions as in “4.2.6 Contact Input (Option, Up to 4 cards)”

External I/O Cutoff Output:
- Number of outputs: 1
- Function: Monitoring the purge air pressure in the electronics section, applying power (24 V DC) to the signal interrupter when the state is normal.

Signal interrupter (Rack-mounted type, AC:K9806AN, DC:K9806AJ):
- FM-X, CSA-X, ATEX-X, IECEx-X, NEPSI-X, TIIS, JPEx: Additionally required. Signal is interrupted by power supply OFF signals from the external I/O cutoff output (contact output only).
- FM-Y, CSA-Y: Not required

Note: For installation in hazardous area, an explosion-proof structure authenticated by a relevant certified body shall be prepared by customer. The same number unit of the signal interrupter as contact output card is required.

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4.3 Air output

Atmospheric balance valve:

Number of points:	Maximum of 6 (1 for a GCM, up to 2 for an isothermal oven)
Pressure:	350 kPa
Connection:	6 mm or 1/4″ tube, the pressure control section of the oven unit

Stream switching valve:

Up to eight automatic valve streams:

Number of points:	Maximum of 8 points
Pressure:	350 kPa
Output method:	1 to 1 output

Nine or more automatic valve streams (Note: Applicable only to 1 GCM):

Number of points:	4 points (4 bits, 1 to 15 streams) or 5 points (5 bits, 16 to 31 streams)
Pressure:	350 kPa
Output method:	Binary code output
Connection:	6 mm or 1/4″ tube, the pressure control section of the oven unit

4.4 User Programming (Option, Up to 1 unit)

The following functions can be set:

- Calculation of analysis results
- Changing operation mode
- ON/OFF operation of DO
- Reading states of DI, AI

5. Communication converter/Signal interrupter

Weight:	Approximately 500 g
Installation location:	Non hazardous area (For installation in hazardous area, an explosion-proof structure authenticated by a relevant certified body shall be prepared by customer.)
Ambient condition during operation:	-10 to 50°C, 95% RH or less (no condensation)
Ambient condition during storage:	-40 to 85°C, no condensation
Safety standard:	EN 61010-1 CAN/CSA-C22.2 No. 61010-1-04 UL Std. No.61010-1
EMC standard *:	EN 61326-1 Class A, Table 2 (For use in industrial locations) Korea Electromagnetic Conformity Standard RCM Mark

*: Except RS-422/RS-232C converter K9806AS and K9806AT

RoHS standard:	EN IEC 63000

5.1 Communication converter

- **RS-422/RS-232C converter: (Rack-mounted type: K9806AS, Desktop type: K9806AT)**

Number of port:	1
Communication speed:	maximum of 38400 bps
Power supply:	24 V DC (Supplied from External I/O Cutoff Output of Serial communication card in GC8000)
Earth:	Functional earth
Other function:	Signal interrupter function

5.2 Signal interrupter

- **For Ethernet twisted pair cables: (Rack-mounted type: K9806AA, Desktop type: K9806AB)**

Number of port: 2

Communication speed:	maximum of 100 Mbps
Power supply:	24 V DC (Supplied from External I/O Cutoff Output of CPU board in GC8000)
Earth:	Functional earth

- **For RS-422 output: K9806AE**

Number of port:	2
Communication speed:	maximum of 38400 bps
Power supply:	24 V DC (Supplied from External I/O Cutoff Output of Serial communication card in GC8000)
Earth:	Functional earth

- **For analog input: K9806AE**

Number of input:	4
Input current:	4 to 20 mA DC
Input voltage:	1 to 5 V DC
Power supply:	24 V DC (Supplied from External I/O Cutoff Output of Analog input card in GC8000)
Earth:	Functional earth

- **For contact output (AC): K9806AN**

Number of output:	5
Rated input:	240 V AC, 2 A DC
Power supply:	24 V DC (Supplied from External I/O Cutoff Output of Contact output card in GC8000)
Earth:	Protective earth

- **For contact output (DC): K9806AJ**

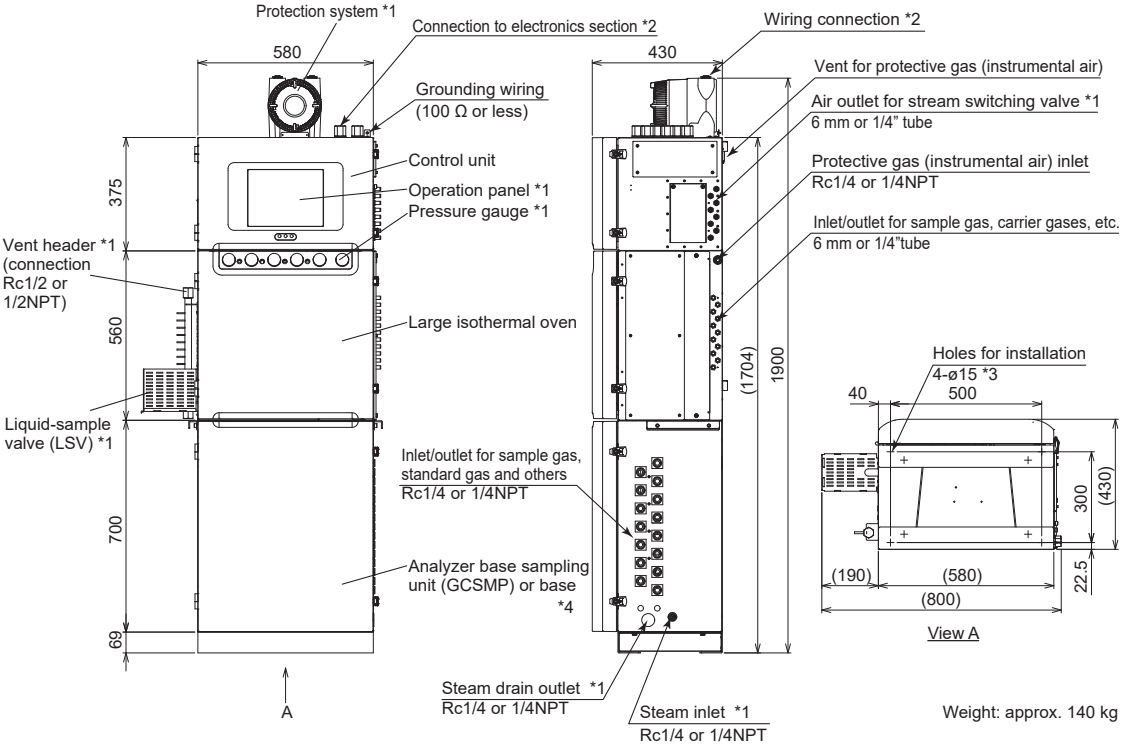
Number of output:	5
Rated input:	30 V DC, 2 A DC
Power supply:	24 V DC (Supplied from External I/O Cutoff Output of Contact output card in GC8000)
Earth:	Functional earth

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■ EXTERNAL DIMENSIONS

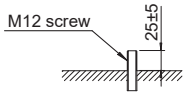
Type 1 (Self-standing)

Unit: mm



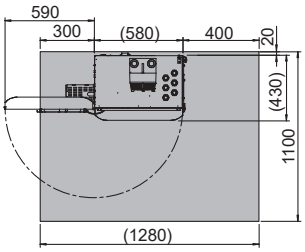
Weight: approx. 140 kg

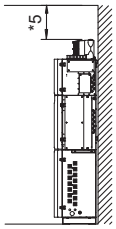
*1: It depends on specifications.
*2: Wiring connections are shown in right figures.
*3: The four outer holes are used for installation.
The height of M12 screw (prepared by user) is 25 ±5 mm from the floor.



*4: The empty compartment (base) placed by Yokogawa to create a Self-standing GC8000-A, does not impair the compliance of the GC8000-A.

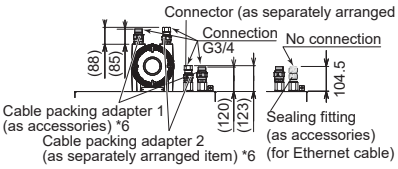
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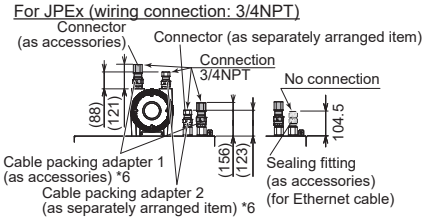


*5: Required clearance needed for wiring.

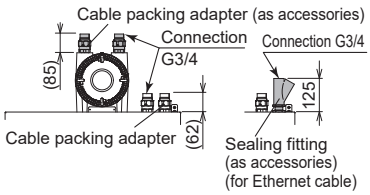
For JPEx (wiring connection: G3/4)



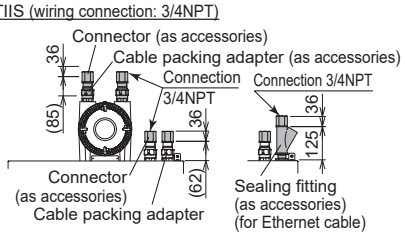
For JPEx (wiring connection: 3/4NPT)



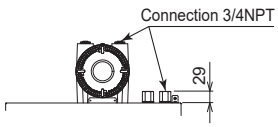
For TIIS (wiring connection: G3/4)



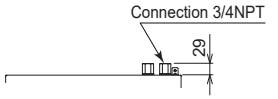
For TIIS (wiring connection: 3/4NPT)



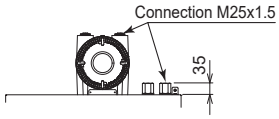
For FM-X, CSA-X (wiring connection: 3/4NPT)



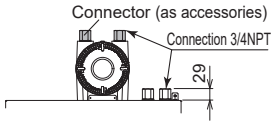
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



For ATEX, IECEx, NEPSI (wiring connection: 3/4NPT)

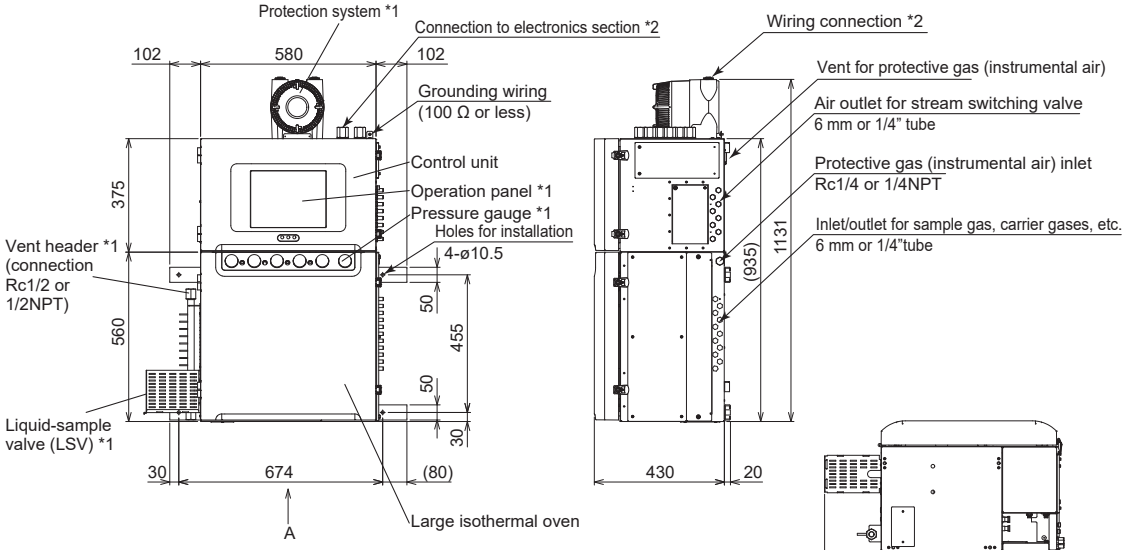


*6: The cable packing adapter 1 (ø10.0 to ø16.0) is included as an accessory. Additionally, the cable packing adapter 2 (ø6.0 to ø12.0) is available as a separately arranged item. Please use the appropriate fitting according to the cable diameter.

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Type 1 (Wall-mounting)

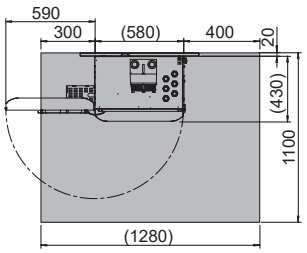
Unit: mm



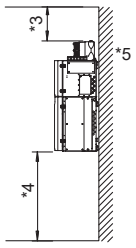
*1: It depends on specifications.
*2: Wiring connections are shown in right figures.

Weight: approx. 100 kg

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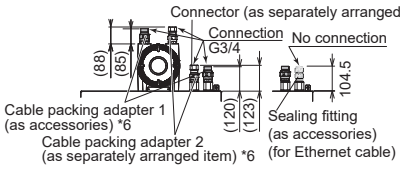


*3: Required clearance needed for wiring.
*4: It is recommended to mount at approx. 1000 mm above the floor for easy operation or maintenance.
*5: The wall construction for mounting has to be designed to withstand 4 times the analyzer's own weight.

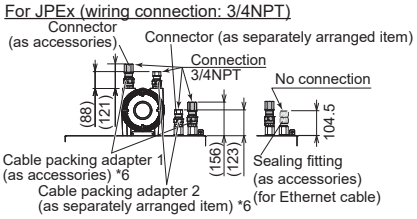


*6: The cable packing adapter 1 (ø10.0 to ø16.0) is included as an accessory. Additionally, the cable packing adapter 2 (ø6.0 to ø12.0) is available as a separately arranged item. Please use the appropriate fitting according to the cable diameter.

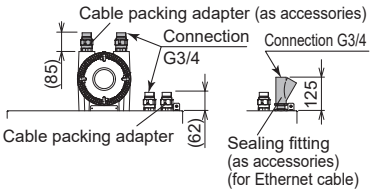
For JPEx (wiring connection: G3/4)



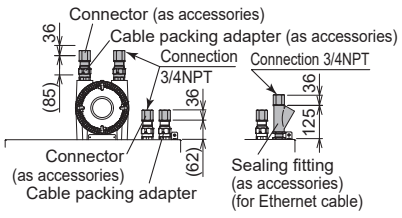
For JPEx (wiring connection: 3/4NPT)



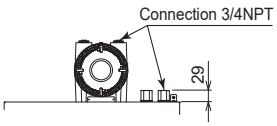
For TIIS (wiring connection: G3/4)



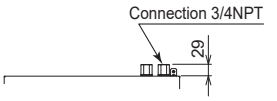
For TIIS (wiring connection: 3/4NPT)



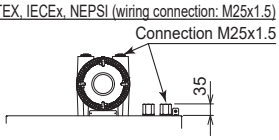
For FM-X, CSA-X (wiring connection: 3/4NPT)



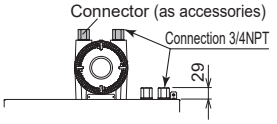
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



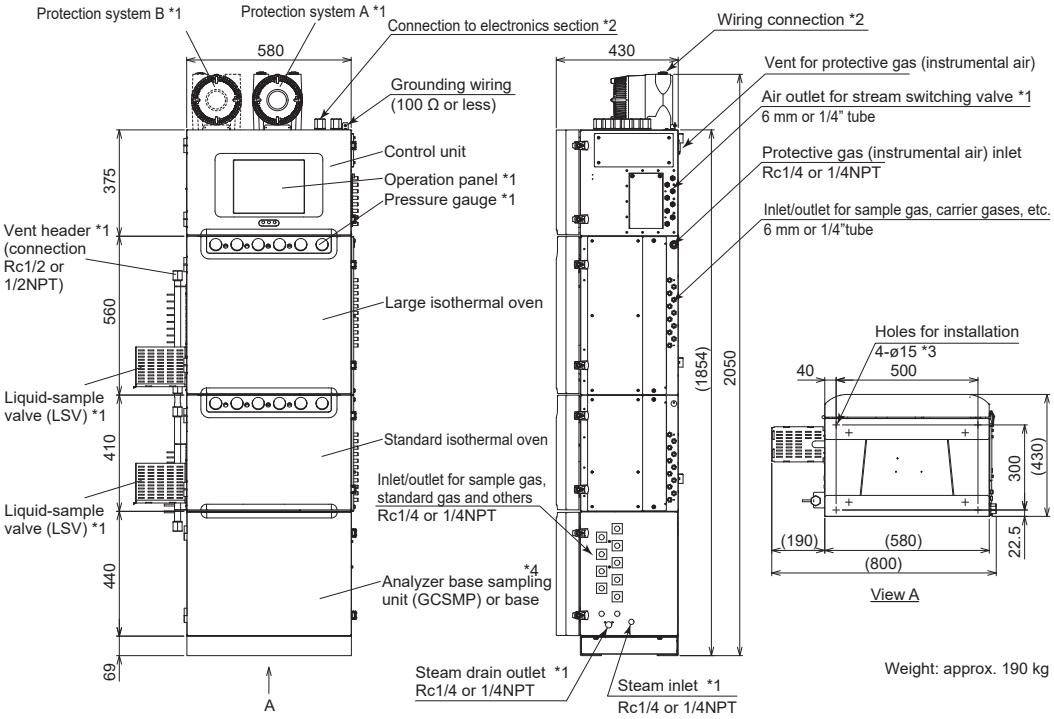
For ATEX, IECEx, NEPSI (wiring connection: 3/4NPT)



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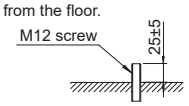
Type 2 (Self-standing)

Unit: mm



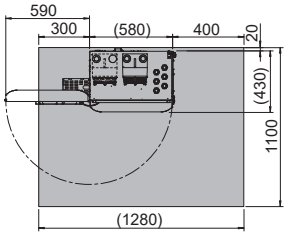
Weight: approx. 190 kg

*1: It depends on specifications.
*2: Wiring connections are shown in right figures.
*3: The four outer holes are used for installation.
The height of M12 screw (prepared by user) is 25 ±5 mm from the floor.

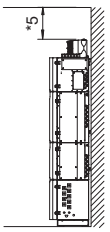


*4: The empty compartment (base) placed by Yokogawa to create a Self-standing GC8000-A, does not impair the compliance of the GC8000-A.

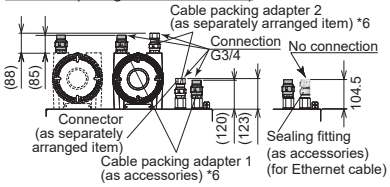
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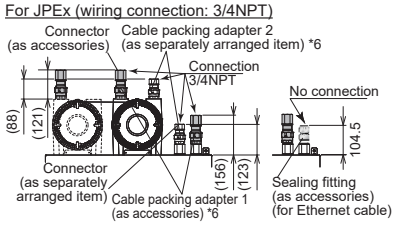
*5: Required clearance needed for wiring.



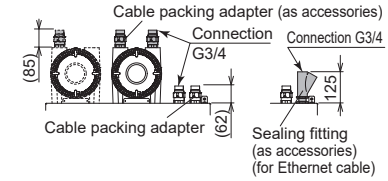
For JPEx (wiring connection: G3/4)



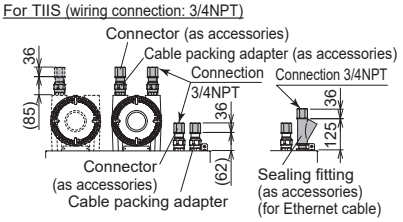
For JPEx (wiring connection: 3/4NPT)



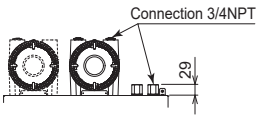
For TIIS (wiring connection: G3/4)



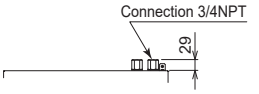
For TIIS (wiring connection: 3/4NPT)



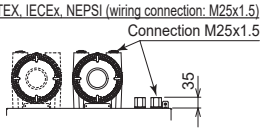
For FM-X, CSA-X (wiring connection: 3/4NPT)



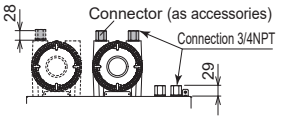
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



For ATEX, IECEx, NEPSI (wiring connection: 3/4NPT)

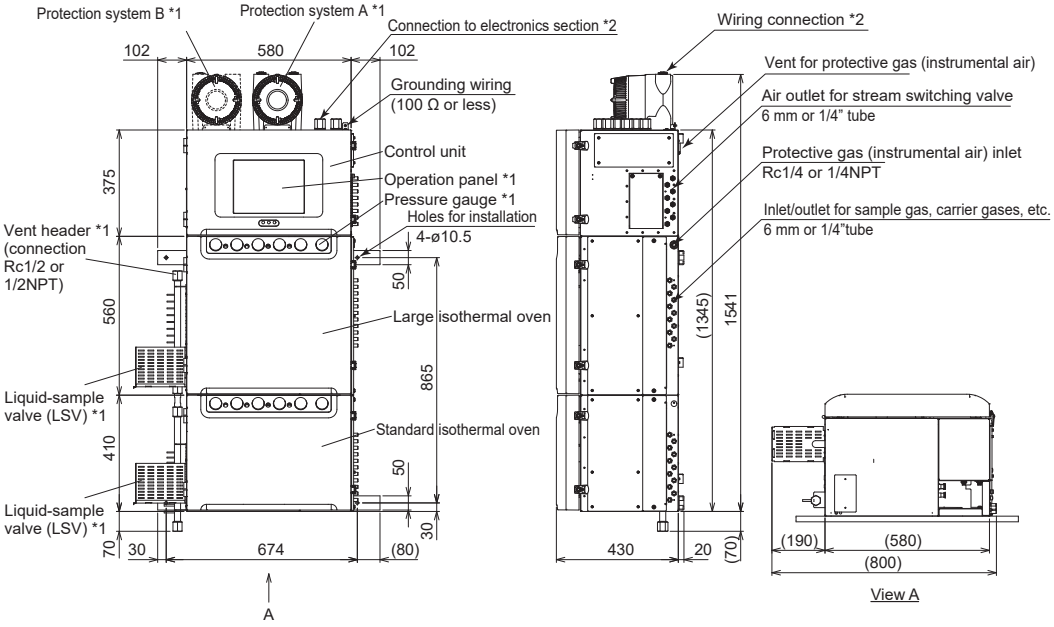


*6: The cable packing adapter 1 (ø10.0 to ø16.0) is included as an accessory. Additionally, the cable packing adapter 2 (ø6.0 to ø12.0) is available as a separately arranged item. Please use the appropriate fitting according to the cable diameter.

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Type 2 (Wall-mounting)

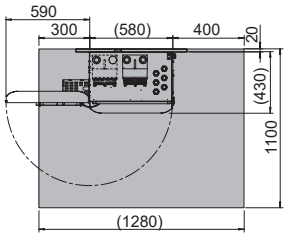
Unit: mm



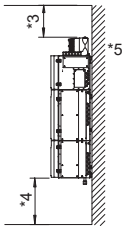
Weight: approx. 155 kg

*1: It depends on specifications.
*2: Wiring connections are shown in right figures.

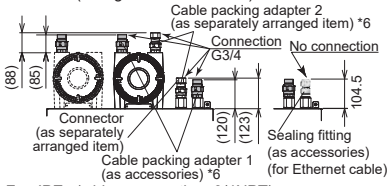
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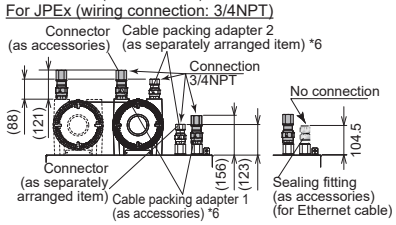
*3: Required clearance needed for wiring.
*4: It is recommended to mount at approx. 500 mm above the floor for easy operation or maintenance.
*5: The wall construction for mounting has to be designed to withstand 4 times the analyzer's own weight.



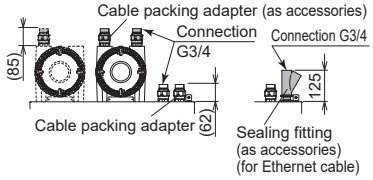
For JPEx (wiring connection: G3/4)



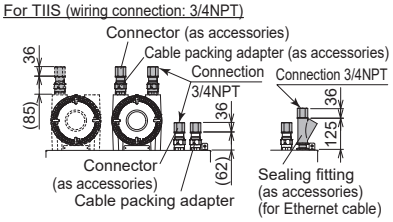
For JPEx (wiring connection: 3/4NPT)



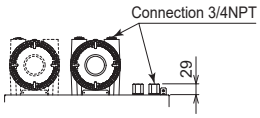
For TIIS (wiring connection: G3/4)



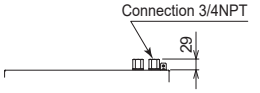
For TIIS (wiring connection: 3/4NPT)



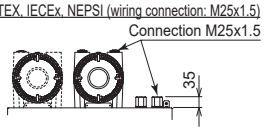
For FM-X, CSA-X (wiring connection: 3/4NPT)



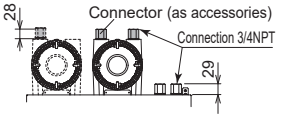
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



For ATEX, IECEx, NEPSI (wiring connection: 3/4NPT)

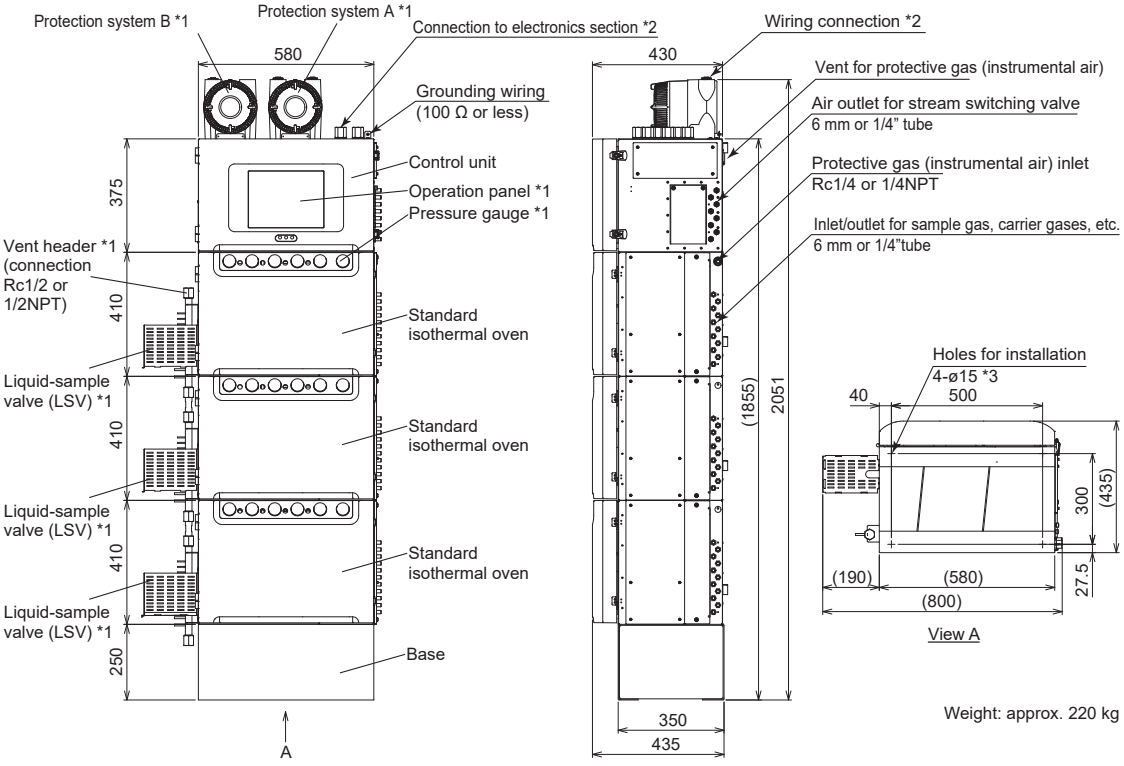


*6: The cable packing adapter 1 (ø10.0 to ø16.0) is included as an accessory. Additionally, the cable packing adapter 2 (ø6.0 to ø12.0) is available as a separately arranged item. Please use the appropriate fitting according to the cable diameter.

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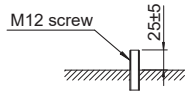
Type 3 (Self-standing)

Unit: mm

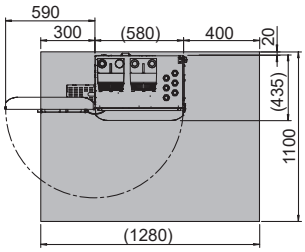


Weight: approx. 220 kg

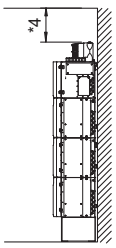
*1: It depends on specifications.
*2: Wiring connections are shown in right figures.
*3: The four outer holes are used for installation.
The height of M12 screw (prepared by user) is 25 ±5 mm from the floor.



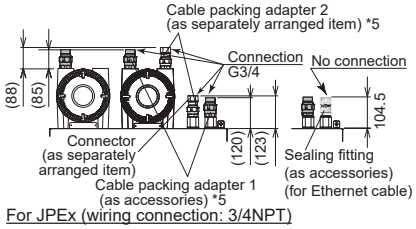
<Maintenance space>



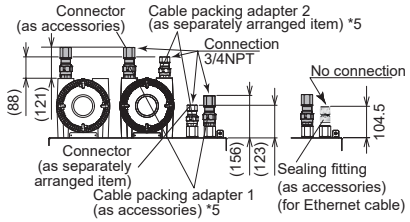
*4: Required clearance needed for wiring.



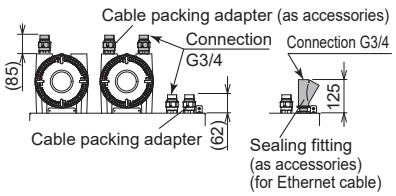
For JPEx (wiring connection: G3/4)



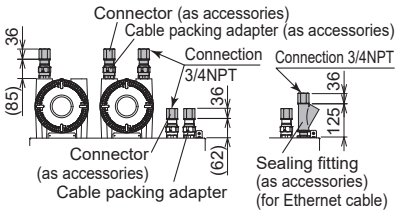
For JPEx (wiring connection: 3/4NPT)



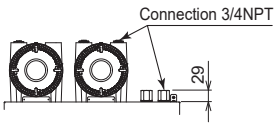
For TIIS (wiring connection: G3/4)



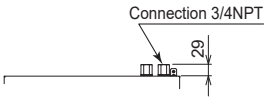
For TIIS (wiring connection: 3/4NPT)



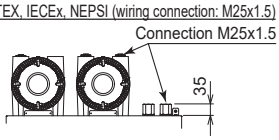
For FM-X, CSA-X (wiring connection: 3/4NPT)



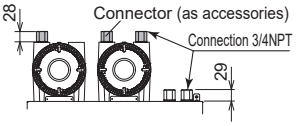
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



For ATEX, IECEx, NEPSI (wiring connection: 3/4NPT)

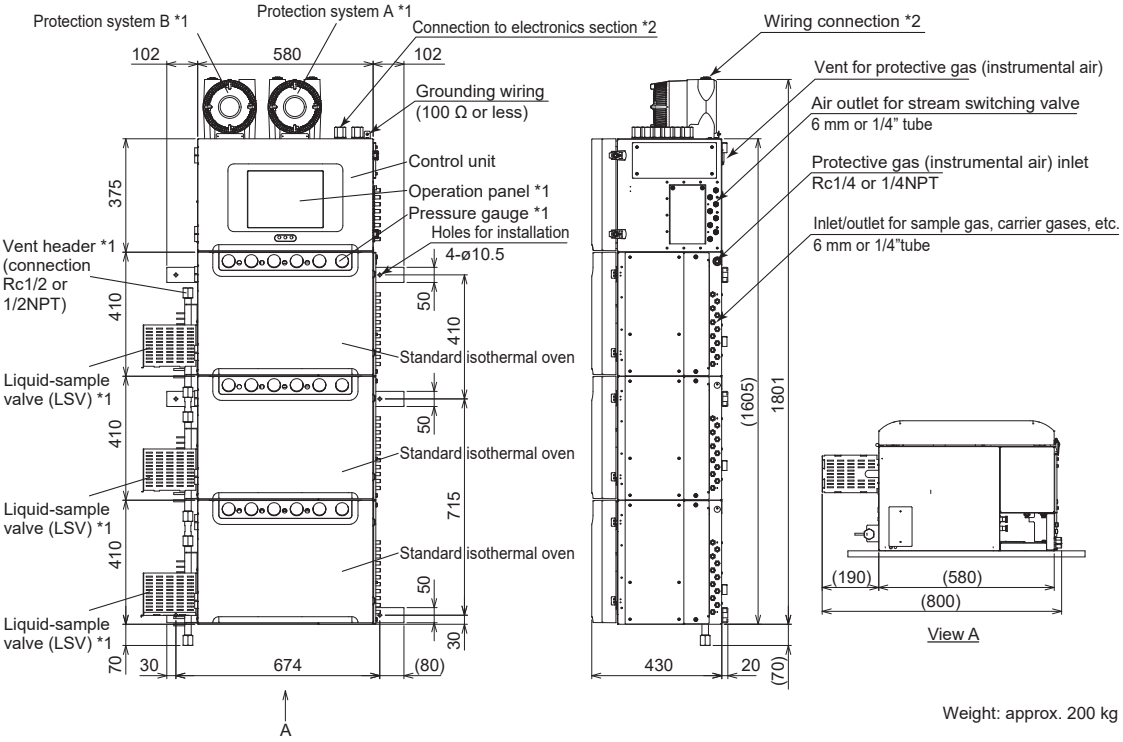


*5: The cable packing adapter 1 (ø10.0 to ø16.0) is included as an accessory. Additionally, the cable packing adapter 2 (ø6.0 to ø12.0) is available as a separately arranged item. Please use the appropriate fitting according to the cable diameter.

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Type 3 (Wall-mounting)

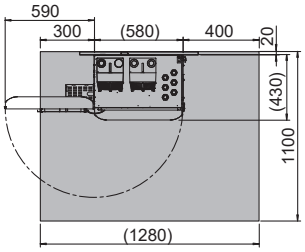
Unit: mm



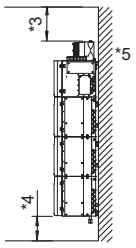
Weight: approx. 200 kg

*1: It depends on specifications.
*2: Wiring connections are shown in right figures.

<Maintenance space>

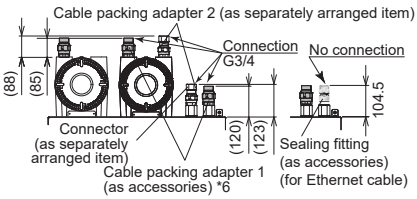


*3: Required clearance needed for wiring.
*4: It is recommended to mount at approx. 250 mm above the floor for easy operation or maintenance.
*5: The wall construction for mounting has to be designed to withstand 4 times the analyzer's own weight.

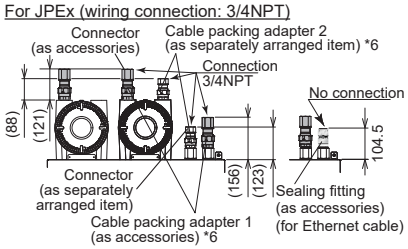


*6: The cable packing adapter 1 (ø10.0 to ø16.0) is included as an accessory. Additionally, the cable packing adapter 2 (ø6.0 to ø12.0) is available as a separately arranged item.
Please use the appropriate fitting according to the cable diameter.

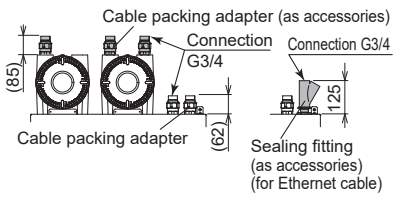
For JPEx (wiring connection: G3/4)



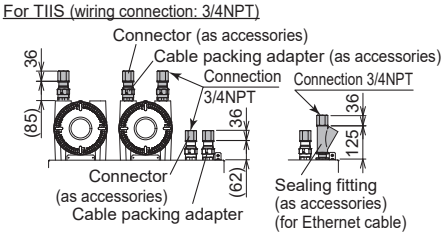
For JPEx (wiring connection: 3/4NPT)



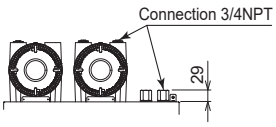
For TIIS (wiring connection: G3/4)



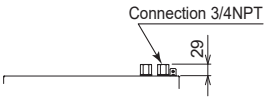
For TIIS (wiring connection: 3/4NPT)



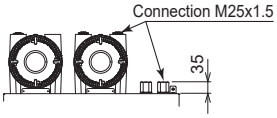
For FM-X, CSA-X (wiring connection: 3/4NPT)



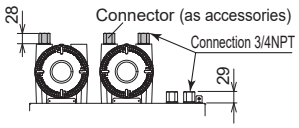
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



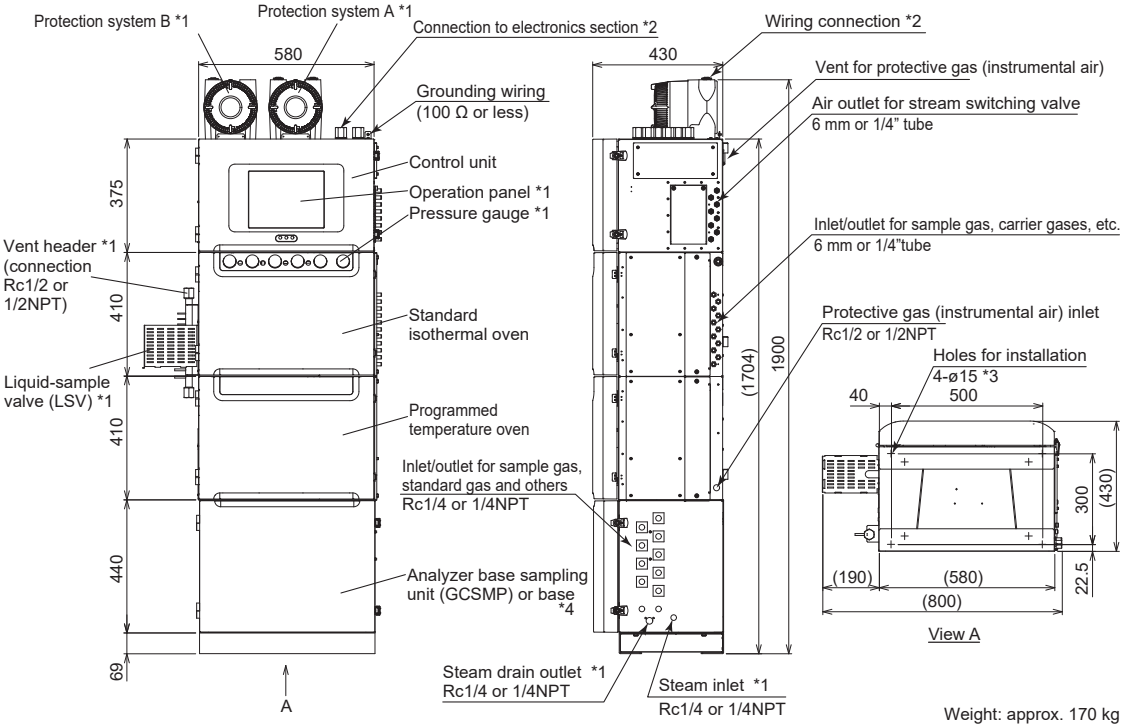
For ATEX, IECEx, NEPSI (wiring connection: 3/4NPT)



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Type 4 (Self-standing)

Unit: mm

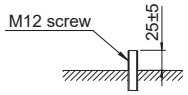


Weight: approx. 170 kg

*1: It depends on specifications.

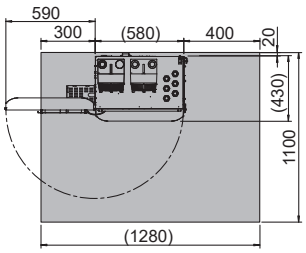
*2: Wiring connections are shown in right figures.

*3: The four outer holes are used for installation.
The height of M12 screw (prepared by user) is 25 ±5 mm from the floor.

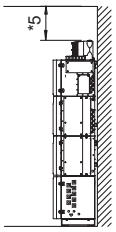


*4: The empty compartment (base) placed by Yokogawa to create a Self-standing GC8000-A, does not impair the compliance of the GC8000-A.

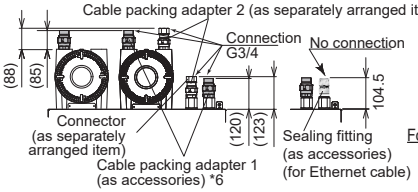
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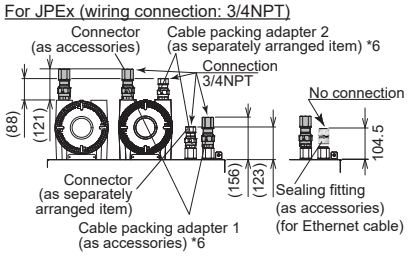
*5: Required clearance needed for wiring.



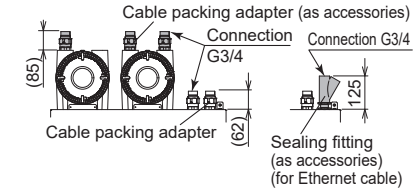
For JPEx (wiring connection: G3/4)



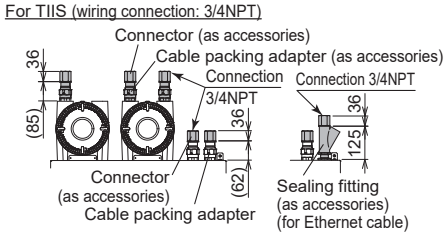
For JPEx (wiring connection: 3/4NPT)



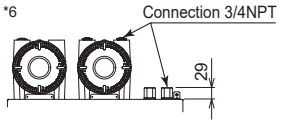
For TIIS (wiring connection: G3/4)



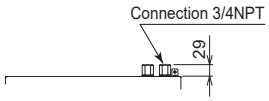
For TIIS (wiring connection: 3/4NPT)



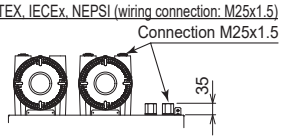
For FM-X, CSA-X (wiring connection: 3/4NPT)



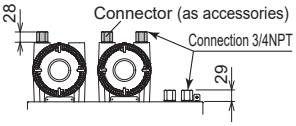
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



For ATEX, IECEx, NEPSI (wiring connection: 3/4NPT)

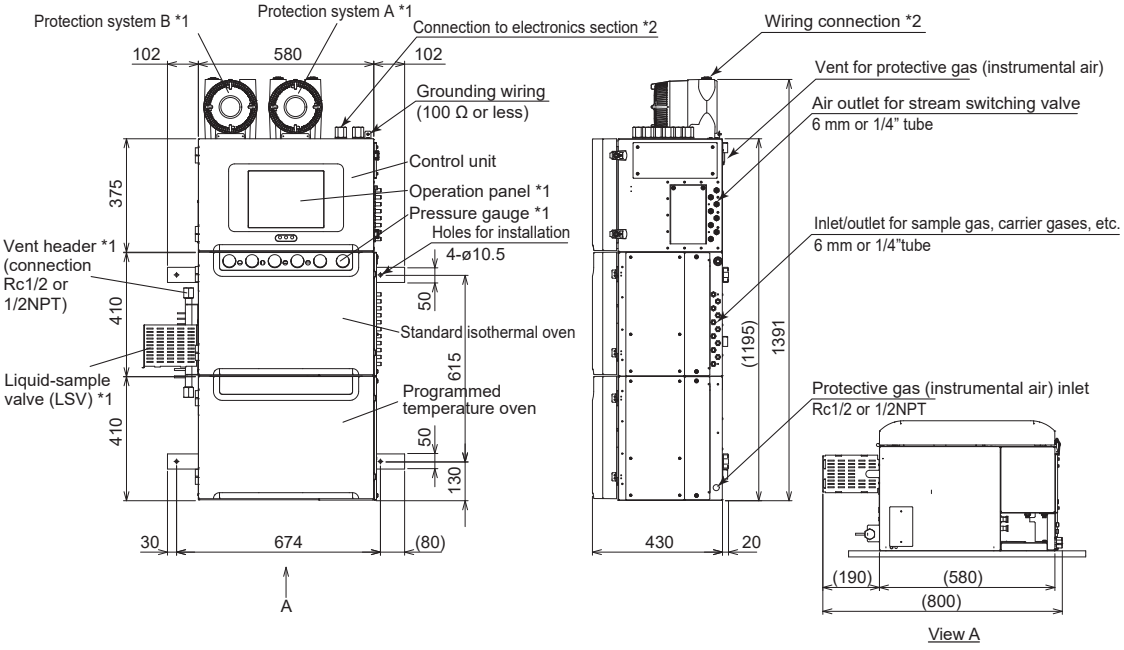


*6: The cable packing adapter 1 (ø10.0 to ø16.0) is included as an accessory. Additionally, the cable packing adapter 2 (ø6.0 to ø12.0) is available as a separately arranged item. Please use the appropriate fitting according to the cable diameter.

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Type 4 (Wall-mounting)

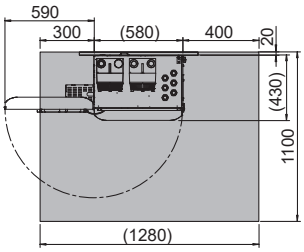
Unit: mm



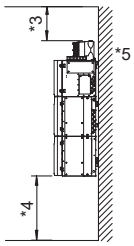
*1: It depends on specifications.
*2: Wiring connections are shown in right figures.

Weight: approx. 140 kg

<Maintenance space>

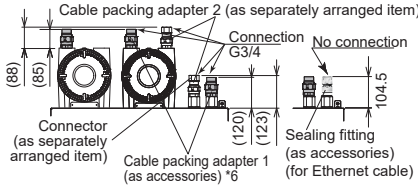


*3: Required clearance needed for wiring.
*4: It is recommended to mount at approx. 500 mm above the floor for easy operation or maintenance.
*5: The wall construction for mounting has to be designed to withstand 4 times the analyzer's own weight.

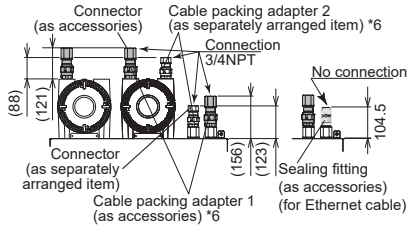


*6: The cable packing adapter 1 (ø10.0 to ø16.0) is included as an accessory. Additionally, the cable packing adapter 2 (ø6.0 to ø12.0) is available as a separately arranged item. Please use the appropriate fitting according to the cable diameter.

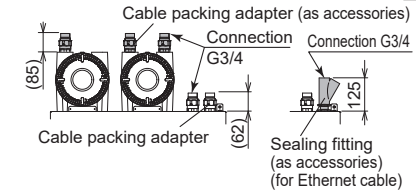
For JPEx (wiring connection: G3/4)



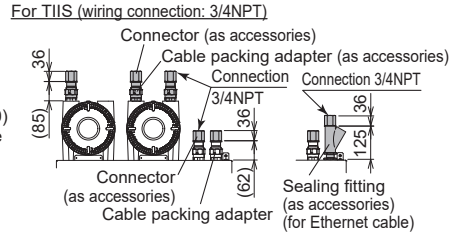
For JPEx (wiring connection: 3/4NPT)



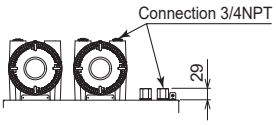
For TIIS (wiring connection: G3/4)



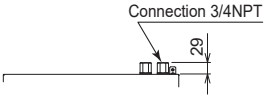
For TIIS (wiring connection: 3/4NPT)



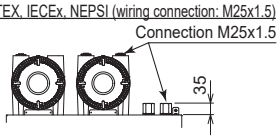
For FM-X, CSA-X (wiring connection: 3/4NPT)



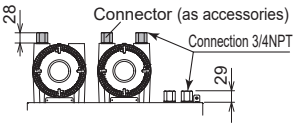
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



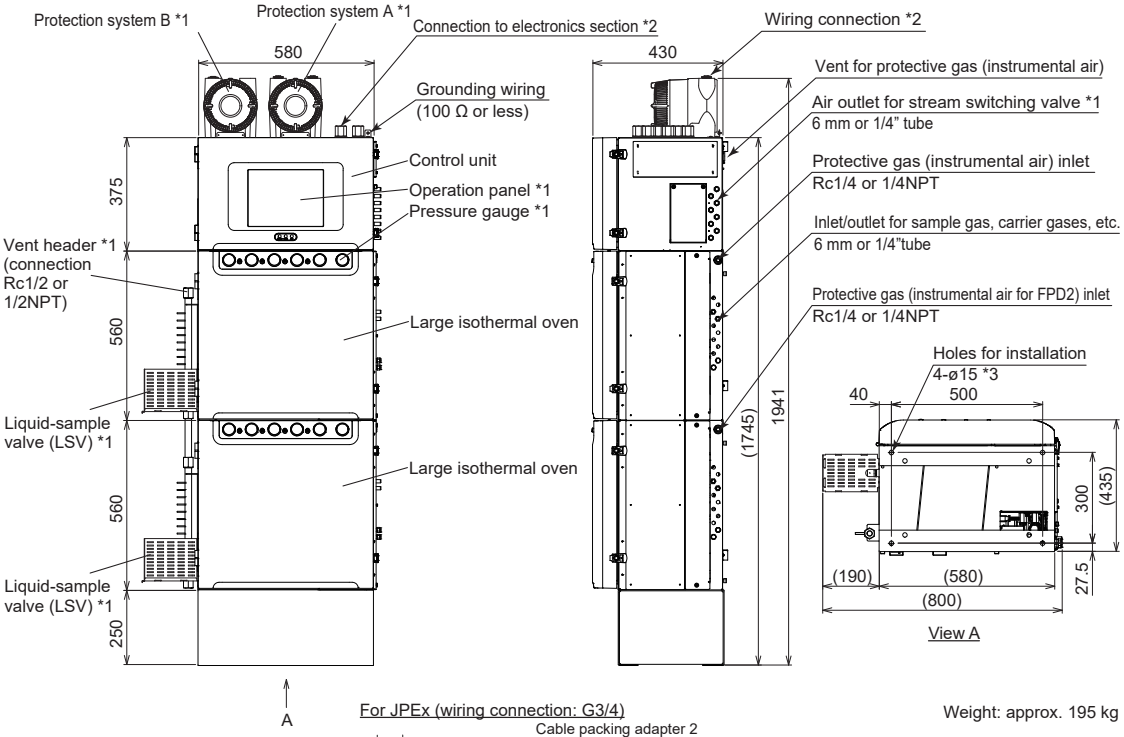
For ATEX, IECEx, NEPSI (wiring connection: 3/4NPT)



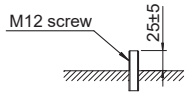
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Type 5 (Self-standing)

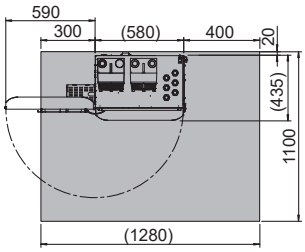
Unit: mm



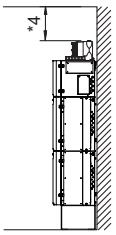
*1: It depends on specifications.
*2: Wiring connections are shown in right figures.
*3: The four outer holes are used for installation.
The height of M12 screw (prepared by user) is 25 ±5 mm from the floor.



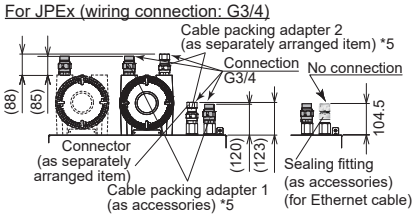
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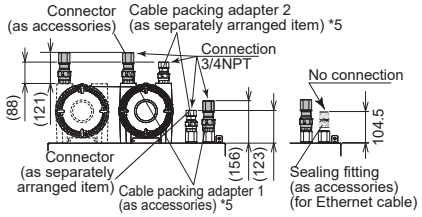
*4: Required clearance needed for wiring.
*5: The cable packing adapter 1 (ø10.0 to ø16.0) is included as an accessory. Additionally, the cable packing adapter 2 (ø6.0 to ø12.0) is available as a separately arranged item. Please use the appropriate fitting according to the cable diameter.



For JPEx (wiring connection: G3/4)

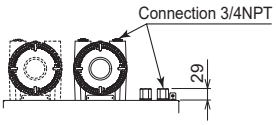


For JPEx (wiring connection: 3/4NPT)

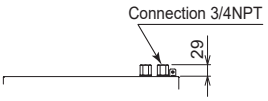


Weight: approx. 195 kg

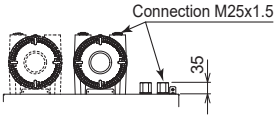
For FM-X, CSA-X (wiring connection: 3/4NPT)



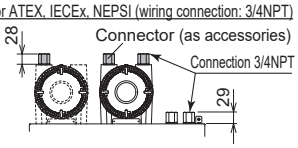
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



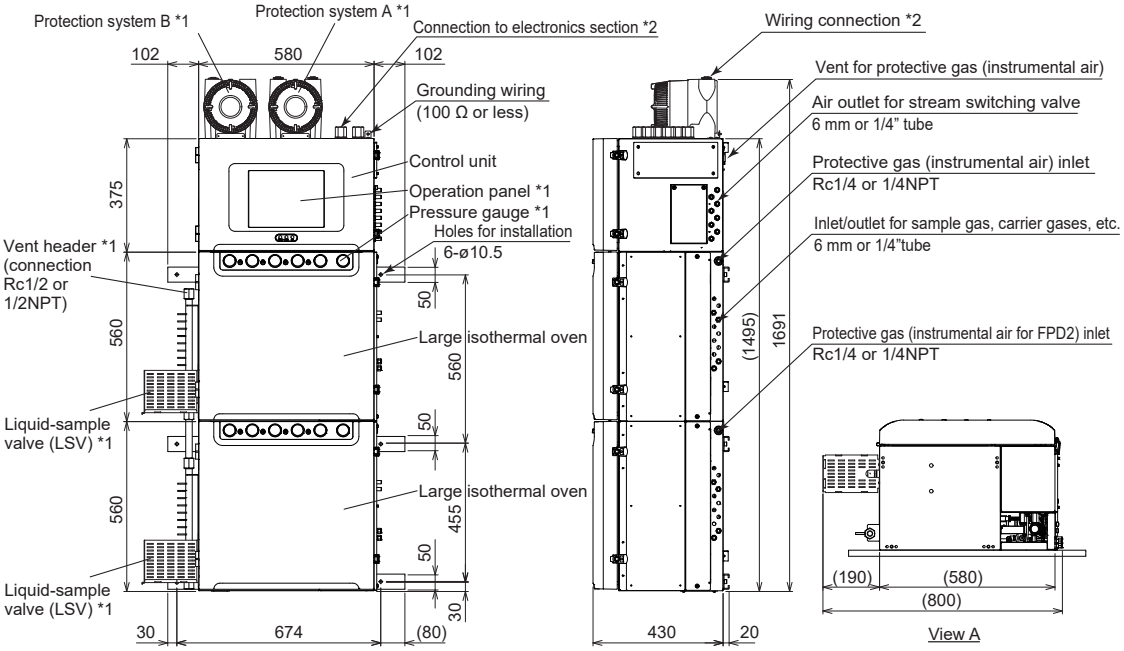
For ATEX, IECEx, NEPSI (wiring connection: 3/4NPT)



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Type 5 (Wall-mounting)

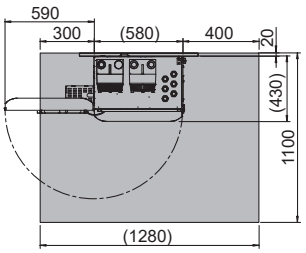
Unit: mm



Weight: approx. 175 kg

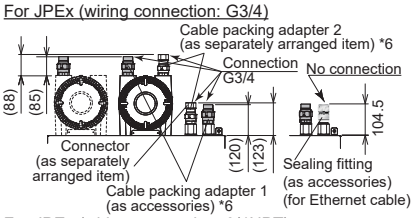
*1: It depends on specifications.
*2: Wiring connections are shown in right figures.

<Maintenance space>

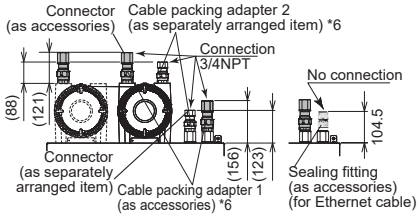


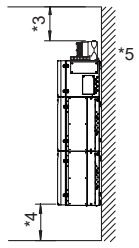
*3: Required clearance needed for wiring.
*4: It is recommended to mount at approx. 250 mm above the floor for easy operation or maintenance.
*5: The wall construction for mounting has to be designed to withstand 4 times the analyzer's own weight.
*6: The cable packing adapter 1 (ø10.0 to ø16.0) is included as an accessory. Additionally, the cable packing adapter 2 (ø6.0 to ø12.0) is available as a separately arranged item. Please use the appropriate fitting according to the cable diameter.

For JPEx (wiring connection: G3/4)

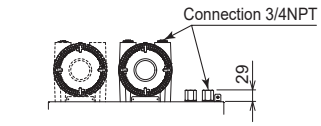


For JPEx (wiring connection: 3/4NPT)

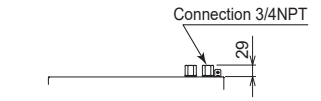




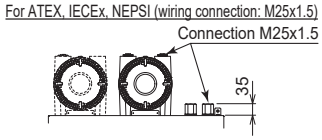
For FM-X, CSA-X (wiring connection: 3/4NPT)



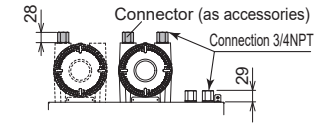
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



For ATEX, IECEx, NEPSI (wiring connection: 3/4NPT)

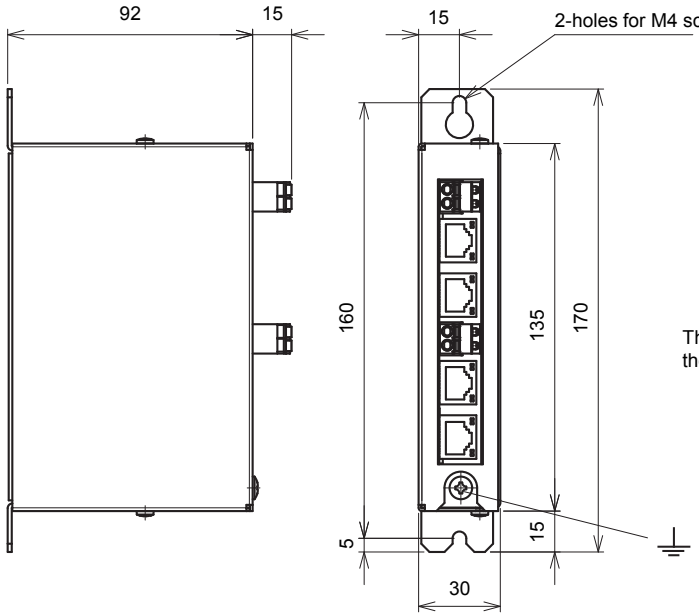


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● Communication converter/Signal interrupter

Rack-mounted type

- **Converter for RS-422/RS-232C: K9806AS***
- **Signal interrupter for Ethernet twisted pair cable: K9806AA**
- **Signal interrupter for RS-422 output, analog input: K9806AE**

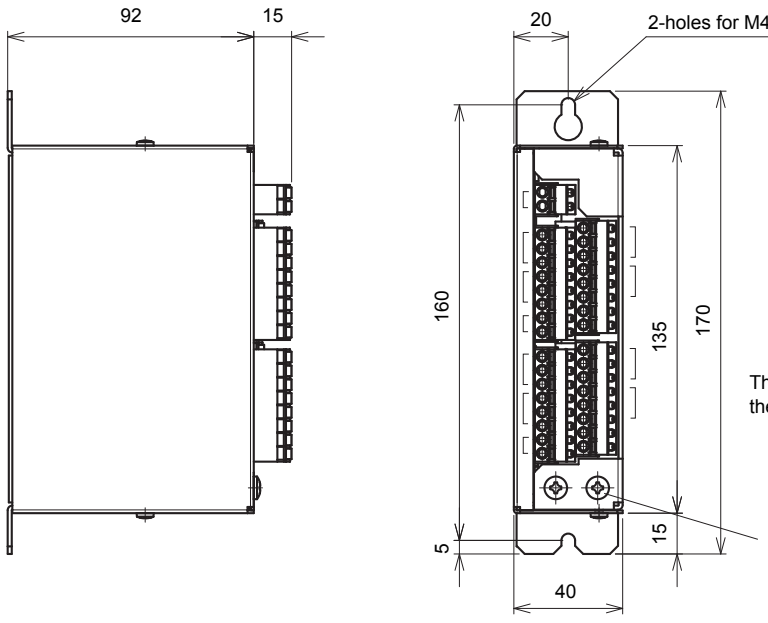


Unit: mm

The number and the location of
the terminals depend on its part number.

Weight: approx. 500 g

- **Signal interrupter for contact output (AC): K9806AN***
- **Signal interrupter for contact output (DC): K9806AJ***



Unit: mm

The number and the location of
the terminals depend on its part number.

K9806AN: Protective earth

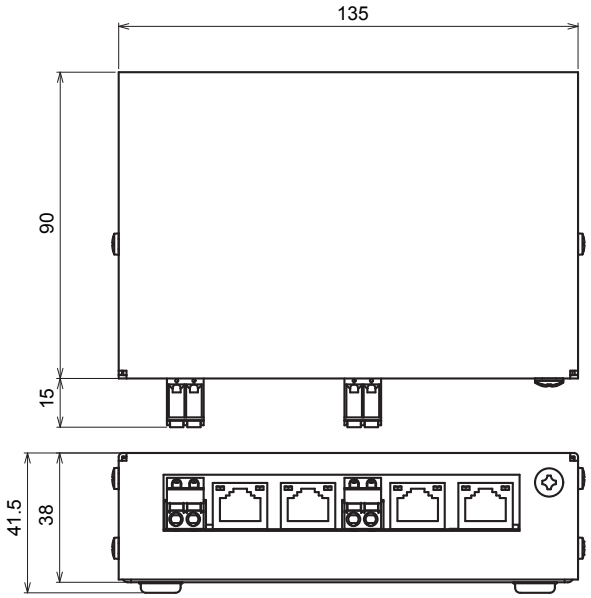
Weight: approx. 500 g

Note: Rack-mounted type should be installed vertically. The space between the converters/the signal interrupters with mark (*) should be kept more than 10 mm.
The wall construction for mounting has to be designed to withstand 4 times the product's own weight.

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Desk-top type

- **Converter for RS-422/RS-232C: K9806AT**
- **Signal interrupter for Ethernet twisted pair cable: K9806AB**



Unit: mm

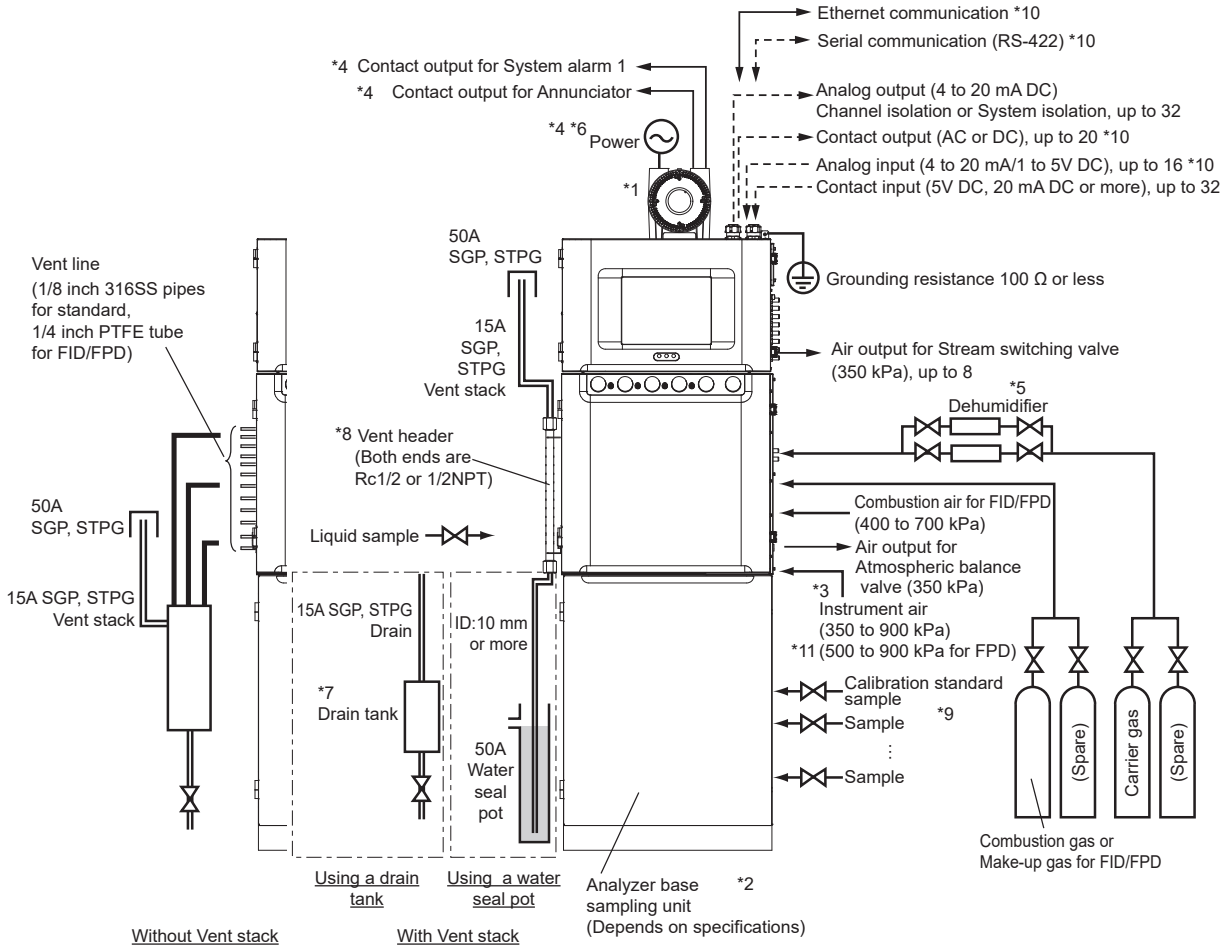
The number and the location of
the terminals depend on its part number.

Weight: approx. 500 g

Note: Desk-top type should be installed horizontally.

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■ WIRING AND PIPING DIAGRAM



*1: The specification determines the number of Explosion proof enclosures. No enclosures is needed for FM-Y, CSA-Y type.
*2: If an analyzer base sampling unit is provided, most applications require no external sampling equipment. In addition, optimum sampling systems are prepared depending on various conditions. (For details, consult Yokogawa. Optimal sampling systems will be offered.)
*3: For piping air purging, use stainless steel pipe of 1/2 inch or more.
*4: Power and contact output for system alarm 1 or annunciator are connected to control unit in case of FM-Y, CSA-Y type.
*5: Dehumidifier can be optionally provided by Yokogawa. Other wiring cables, piping and installation materials should be supplied by the user.
*6: Circuit breaker (30 AT or less) shall be suitable for the item of the power supply described in the specification, and located near the analyzer.
*7: Drain tank is needed only for GCs using FID/FPD. This is not used for GCs using TCD/MTCD.
*8: Fix venting pipes properly so that the load of the venting pipes does not apply to the assembling vents of this analyzer.
*9: The number of streams including one for calibration standard sample is as follows, in case of using GCSMP.
Type 1: Maximum of 7
Type 2, 4: Maximum of 4
*10: Signal interrupters are required depending on the specification.
*11: Air pressure set value of the regulator is depended on the source air temperature and need to tune the setting value. 600 kPa is required when ambient or instrument-air temperature is higher than 46°C (1 FPD) or 40°C (2 FPDs).

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