ULVAC

# Residual Gas Analyzer/ Process Gas Monitor

Qulee

# (BGM2-101/102/201/202) Specification

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Document No.: SK00-8718-E8-002-01E

## 1.Overview

Features of the “Qulee” series residual gas analyzer / process monitor include the following.

- Transducer type that permits connection of the control power supply to the analyzer tube, which has realized reduction of space.
- Measurement results can be displayed without connecting to PC by the control power supply with displaying function.
- Leak test and monitoring of impurities can be made by operating only two buttons.
- Connecting PC by Ethernet, the instrument permits detailed data analysis using the dedicated software “Qulee QCS(after Ver.4.x)”.
- Compatible with RoHS directive.

Qulee BGM is suitable for residual gas monitoring and leak test on sputtering system, vacuum evaporation system.

- Qulee Series are great in specifications Residual Gas Analyzer and Process Gas Monitor and at the same time have achieved reasonable pricing.

## 2.Components

2.1.Standard Construction

| | | |
|---|---|---|
| Qulee Sensor Unit | BGM2-101/102/201/202 | 1 |
| Qulee Analyzer Tube | BGM-AN01/02 （Built in envelope） | 1 |
| Envelope for analyzer tube | BGM-TU01/02 | 1 |
| Software | Qulee QCS (Ver.4.X after) (Install Disk) | 1 |
| Power Connector | MSTBV2.5/3-STF-5.08 (Phoenix) | 1 |
| Ethernet communication cable | 3m | 1 |
| Bolt / Nut / Washer | M6 size （Bolt length ; 35mm） | 6pcs 1set |
| Gascket | ICF070G | 1 |
| Operation manual | Qulee Series Operation manual （include in software install disk） | 1 |
| | Software “QuleeQCS” Operation manual （include in software install disk） | |

## 3.Specification

### 3.1. Gas Analyzer

| | | | | |
|---|---|---|---|---|
| Series | BGM2 ※1) | | | |
| Model | BGM2-101 | BGM2-102 | BGM2-201 | BGM2-202 |
| Mass Number Range(amu) | 1～100 | | 1～200 | |
| Resolution(M/ΔM) | M/ΔM＝1M(10%P.H.) | | | |
| Mass Spectrometer | Quadrupole type | | | |
| Detector | FC | FC/SEM | FC | FC/SEM |
| Sensitivity(A/Pa) | 1e-7 | 4※3) | 1e-7 | 4※3) |
| Minimum detectable partial presure(Pa) | e-8order | e-12order | e-8order | e-12order |
| Max operating pressure(Pa) | 1e-2 | | | |
| Total pressure measurement | valid | | | |
| Total press. measurement range | 1e-2 ～ e-5 Pa order | | | |
| Linearity(Pa) | - | | | |
| Ion source | B-A type with total pressure measurement function | | | |
| Filament | Ir/$Y_2O_3$ 2pc. | | | |
| Ionization voltage(eV) | 50 | | | |
| emission curent(mA) | 0.5 | | | |
| DEGAS | electron bombard 330V, 5mA | | | |
| Voltage applied to SEM(kV) | - | -1.0～-3.0 | - | -1.0～-3.0 |
| Max. baking temparature (when sensorunit is seted) | 120℃ | | | |
| Max. baking temparature (when sensorunit is removed) | 250℃ | | | |
| Power requirements(V) | DC24V±10% | | | |
| Power consumption(W) | 50W | | | |
| Ripple & noise(Vp-p) | Less 240mV | | | |
| Rush current ※3) | 8.5(room temperatue 25℃ at cold start) | | | |
| Power connector | MSTB2.5V/3-GF-5.08 | | | |
| External I/O connector ※4) | D-SUB 15pin(M2.6 screw) | | | |
| Communication connector | RJ45 female | | | |
| Fuse | 6.3A | | | |
| Weight(analyzer tube)(kg) | 0.55 | 0.64 | 0.55 | 0.64 |
| Weight(Sensor unit)(kg) | 2.1(Less SEM )2.2( with SEM) | | | |
| CE standard ※5) | [Emission Test] EN61326-1:2013<br>Radiation field intensity measurement:CISPR11:2009+A1:2010 Group1 Class A<br>[Immunity Test] EN61326-1:2013<br>Radiation electromagnetic field test: IEC61000-4-3:2006+A1:2007+A2:2010<br>Static electricity test : IEC61000-4-2:2008<br>Transient burst test : IEC61000-4-4:2004+A1:2010<br>Lightening surge test: IEC61000-4-5:2005<br>Conduction test : IEC61000-4-6:2008<br>Commercial magenic field test: IEC61000-4-8:2009 | | | |
| IP protection class | IP30(Sensor unit) | | | |
| Operating temperatue range ※6) | 10 - 40℃ | | | |
| Operating humidity range ※6) | 15 - 80% (not condensing) | | | |
| Communication cable | Cat5e(Straight、with seild, max. Length=100m) | | | |
| Commnunication spec. ※7) | Ethernet (TCP/IP ver4) | | | |

※1) Model with differential pumping system is available. The specifications above are those of the analyzer tube and sensor unit only.

※2) Sensitivity when the SEM voltage is set at −3kV. Normally, use at 5 mA/Pa or less

※3) Power thermistor is used to prevent rush current. Wait until the sensor unit cools down before turning on power again。

※4) Analog inputs and partial pressure/total pressure setpoints are effective when dedicated software is used for connection. START input is effective in the local mode.

※5) If measurement is made in an environment where measurement data is subject to electromagnetic interference at a frequency of about 170 MHz, measurement data is subject to variation.

※5) If the measurement cable and I/O cable are subjected to a high noise, the measurement data may change.

※6) If the temperature and/or humidity change, resolution will change and the mass number will change. Adjust resolution and calibrate mass number when temperature and humidity are stable.

※7) TCP / IP communication can be used only with wired connection with Windows PC with dedicated software QuleeQCS (Ver 4.x or later) installed. Qulee does not support communication with communication devices other than Windows PC at all

## 3.2.Software

(1) Measuring Mode

There is following Six measuring mode, by making measurement Recipe.

・Scan Mode

Mode to scan arbitrary range continuously and measure mass spectrum. The setting mass number is depending on the specification of connecting sensor.

・Trend Mode

Mode to scan arbitrary mass number selectively and measure the change per time of each measurement mass number. It is available to measure maximum 20ch. The setting mass number is depending on the specification of connected sensor.

・Analog Mode

Mode to provide peak top setting value of analog spectrum of sensor that is used on scan mode or trend mode. This is called mass number adjust. In this mode, analog spectrum of sensor is verified.

・Sensitivity Calibration Mode

Mode to calibrate sensitive of mainly SEM detector of sensor. The supplied voltage to SEM is moved up or down to keep setting ion current.

・DEGAS Mode

Mode to degas ion source of sensor.

It is available only when the connected sensor is CGM2/BGM2/HGM2

・Helium Leak Test Mode

Mode to helium leak test. (Setting to mass number 4)

(2) Recipe setting

・Number of recipes registered

Up to a total of 100 (60 user areas), including each sensor type, can be registered, of which 40 areas have been registered as default recipe (cannot be changed) corresponding to each sensor.

・Recipe Name

Name the recipe you created.

・Measurement Mode

Select [Scan], [Trend], [Analog], [Sensitivity Calibration], [Degas], [He Leak] modes.

・Sweep Speed

Select speed of measurement for each 1 mass. It is selectable 50, 100, 200, 500, 1000, and 2000ms.

・Sampling Interval

① When [Auto] is checked, measurement data is updated and is saved each time measurement is repeated by one scan.

② Stores data in PC memory at each set time. The range of set values is 0.5 to 1000 sec (trend) or 1 to 1000 sec (scan).

・Measurement end time

[Cont.] : As long as the user does not stop measurement, the measurement is continued.

[Spec.] : When the set time elapses, the measurement is stopped and a measurement data file is generated.

[Repeat] : Each time the set time elapses, a measurement data file is generated and measurement operation is continued.

・Total pressure/analog input

Sets the record of analog input and total pressure data of the sensor.

・Partial Pressure Ratio

In trend mode Recipe, Record the ratio value of the set mass numbers. Among the two points including the analog input, you can set any two points.

・Setting the unit of vertical axis

Sets the unit of data record. Select one from ion current [A], partial pressure [Pa] and concentration [ppm].

When partial pressure [Pa] is selected, Select one of "ref. of partial pressure" (sensitivity calibration value, total pressure, analog 1, analog 2) and perform partial pressure conversion.

When partial pressure [ppm] is selected, Record the ratio from the largest numerical value among the data under measurement.

・Partial pressure warning setting

Sets the value of alarm/warning output at a set mass number in trend measurement mode. [Error Value (Lower)] < [Warning value (Lower)] < [Warning Value (Upper)] < [Error Value (Upper)] can be set.

・Data Save

[AutoSave] : The file name is generated from the clock of PC automatically, and when the measurement stops, the measurement data is written in HDD.

(Example)

Start sensor 1 measurement on 10:10 January 13, 2001 by scan mode, the file name would be "S1_010113_101000.qss".

[Confirmation] : The data saving dialog appears when measurement is stopped. The default filename is assigned according to the same file name rule as [AutoSave].

[No Save] : The confirmation dialog appears when data is not saved but the connection window is closed.

[at Sampling]: Save data on HDD at each measurement sampling. Even if any problem like stop PC action occurs during measurement, data until that time can be saved.

Data File capacity (for example)

Measurement Mode is selected Scan Mode, Sweep Speed is 200ms, Sampling Interval select Auto, Mass Range is 2 to 200, Measurement Time is 6 hours → File Capacity would be 432kB.

・For other details, refer to the QuleeQCSVer 4.x standard specification.

(3) PC specification for QuleeQCS

Please verify PC specification if meets on following items.

LAN port (RJ45) ×1

CD-ROM Drive ×1

OS :Windows7 ,8, 10,11 English version

CPU :Intel Pentium3 1GHz or more

HDD Capacity : Empty Capacity Approx. 4MB or more. (Not including capacity for measuring data and communication log data)

Memory :Recommended 2GB or more

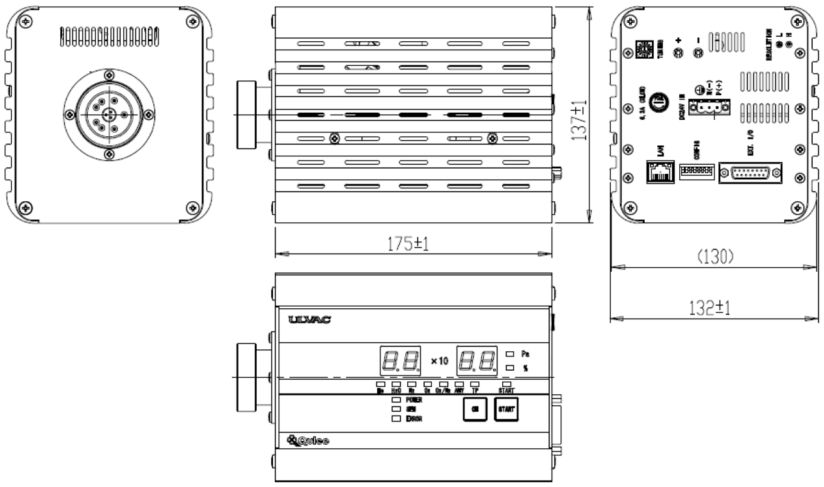
Display Size :1024x768 or more

## 3.3. Options

| | |
|---|---|
| LAN cable | 3m,10m,15m, 20m, 30m, 50m |
| AC adaptor | SPU61A-108 |
| AC adaptor power cable | Korea ; AC250V 7A 2m K Type<br>China ; AC250V 10A 2m GB Type<br>Germany ; AC250V 10A 1.8m CCC7 Type<br>USA ; AC125V 15A 2m A Type |
| Wired LAN Adaptor | LUA4-U3-AGT/Giga |
| Switching Hub | 8 port type (FL SWITCH SFNB 8TX) |
| | 16 port type (FL SWITCH SFN 16TX) |
| EXT I/O Connector | D-sub15 socket (M2.6 screw), clamp hood |
| Baking jacket | BGM-JH01 |
| I type piping | C70-NW16, C70-NW25, C70-NW40 |
| Carrying case | CB-001 |
| Acrylic Case for AnlyzerTube | For BGM-AN101/201, BGM-AN102/202 |
| Inspection record | |

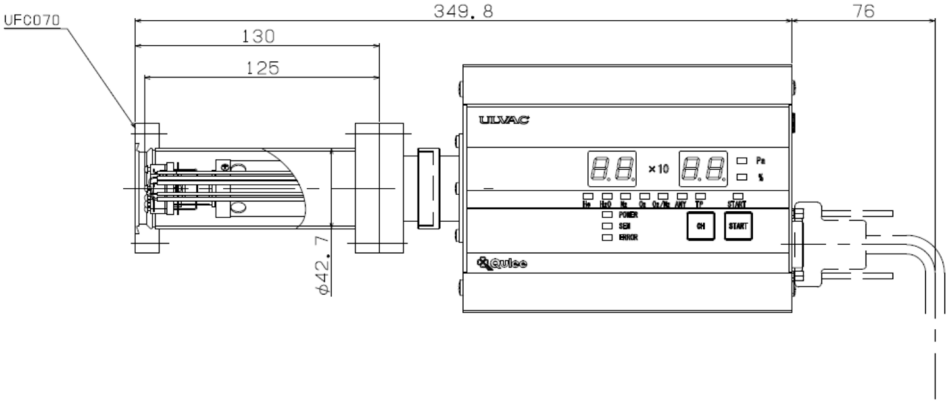
## 4. Dimensions/Configuration Drawing

### 4.1. SensorUnit

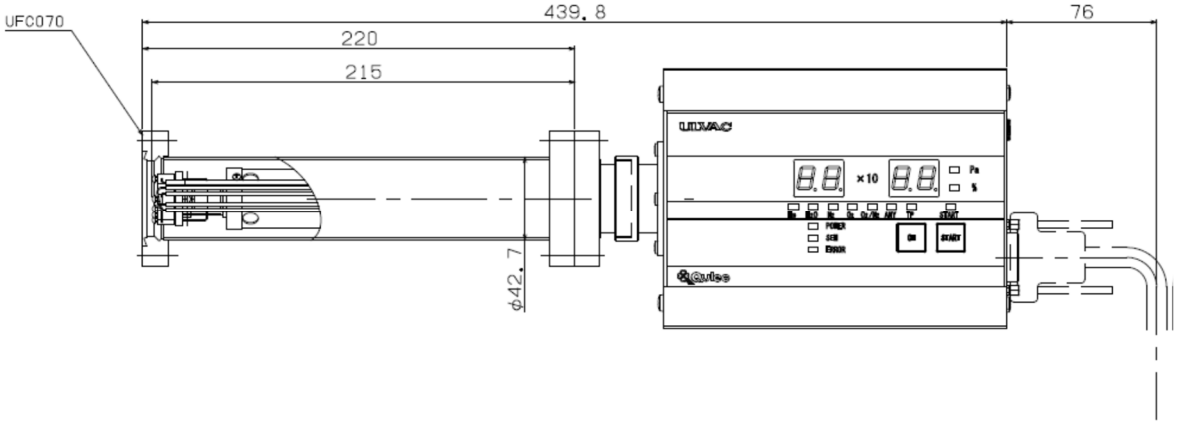



### 4.2.Analyzer + SensorUnit

(1)BGM2-101/201




(2)BGM2-102/202



## 5. Factory Inspection Test, Inspection Item

Ulvac shall be done Factory Inspection Test based on ULVAC Standard Test.

## 6. Utility

・Power Input for Qulee ;DC24V 50W

※ When purchasing an optional AC power supply adaptor, please prepare AC90～264V、2A @90VAC 50Hz.

※ When using a personal PC, please prepare power supply for personal PC separately.

・Setting Space ;Please refer to clause 4.

・Operating Temperature Range ;10～40℃

・Operating Humidity Range ;15～80%

## 7. Acceptance

The instrument shall be finally accepted when it is delivered to the user at the specified location. Refer to 2.1 for the standard components and accessories.

## 8. General Specification

8.1. Shipping and delivery

- Installation Location
  As specified by the customer
- Delivery Point
  As described on Contract
- Delivery Term
  As described on Contract

This system is to be delivered as following condition. ULVAC may ask the customer to regulate environment of the stored area that is free from the effects of temperature, humidity, corrosive gas, dust and vibration conditions such as the area where this system is installed.

8.2. Standard

CE

8.3. Warranty

This system is guaranteed for a period of twelve (12) months from the date of FOB.

ULVAC shall be repair or replace concerned parts to correct any problem caused by the design or manufacturing of the system during the warranty period. However, the following cases listed below are not covered by this warranty.

1) Failure caused by improper operation of the equipment.
2) Consumable parts and disconnection of filament, dirt of ion source and analyzer tube, corrosion, etc.
3) Damage caused by natural disasters or fire.
4) Damage or consumption of parts caused by corrosive gas or dust.
5) Damage caused by fall, shock or vibration.
6) The case if utilized in the environment of higher than 40℃.
7) Sensitivity if analyzer tube is not stored in vacuum environment.

8) The data stored in stored device and the operate error of software caused by replace of personal computer or OS.
9) Performance when using the software that is modified by out of components division, Ulvac, Inc.
10) The case if using under out of environment that described on item 8.1.

8.4. Item out of Warranty

The following items listed below are not included in this quotation.

1) Wiring work and piping work of primary side.
2) Exclusive earth wiring and piping work.
3) Work and materials belong to building of setting room.
4) Connection work and materials with other system (process side).
5) Patrol visit by service man.
6) Disposal expense of this instrument.
7) Decontamination expense when overhaul at ULVAC site.
8) Consumable parts (listed below)
   - Cupper gasket for UFC flange (ICF-070G)
   - Ion source (BGM-IS01)
   - SEM (BGM-EM01)
   - Analyzer tube (BGM-AN101/201 or AN201/202)

8.5. Copyright and license of software

1). Copyright
- Windows and Windows NT are the registered trade names of Microsoft Corporation, USA, and other countries.
- Intel, Pentium and Celeron are the registered trade names of Intel Corporation, USA, and other countries.
- Names of companies and products are the registered trade names and trade names of respective companies.
- All rights of related documents, such as software, manuals and others, are reserved by ULVAC. No part may be copied for use by a third party without consent by ULVAC in writing.

2). Software product license
- The user is allowed to install the software in one PC only. If the software is reproduced for backup, however, the user is allowed to make only one copy.
- The user is not allowed to share one license on the software between different PCs nor to use them at the same time.
- The user is not allowed to rent the software.

8.6. Miscellaneous

1) It is to be understood that if any operation or work outside of ULVAC's assignment is to be performed, the user shall make arrangements so that it does not cause any problem to ULVAC's work process.
2) If any change is made to the contents of this specification, the quotation is subject to change accordingly through discussion by both parties.
3) Matters determined through discussion after this specification is submitted shall be kept as minutes of meeting and take precedence over this specification.
4) If a third party's right is directly infringed upon by a design instructed by the buyer, ULVAC

shall not be held liable to the infringement.

5) Secrecy agreement shall be concluded between both parties as and if necessary.

6) If any question or dispute arises on the contents of this specification or matters not set forth in this specification, both parties shall negotiate with each other for amicable solution.

Revision history

| Revision history | Revision No. | Contents | Approval | Examination | Create |
|---|---|---|---|---|---|
| 2018/11/26 | 0 | Create New | Nakajima | Nakajima | Kurokawa |
| 2022/08/01 | 1 | Add Windows 11 to the ″OS″ field.<br>Remove option's clean paper<br>Change from UFC to ICF | Nakajima | Tanaka | Shirasu |