

Gas Exchange Device

Technical Specifications

Version 1.01



CE



J-SCIENCE LAB

Classification of the Instrument

Environmental Conditions

- Internal use.
- Altitude up to 2000 meters.
- Temperature from 15 to 35 °C.
- Maximum relative humidity between 30% and 85%.
- Voltage variations not exceeding 10% of the nominal value.
- Transients according to installation categories II.
- Degree of pollution according to IEC 664 (3.7.3) 2.

1. Principle

1.1 Gas Exchange Device

This instrument converts various gases to the high purity argon gas without losing the fine particles contained in gas. While introducing the sample gas into the Gas Exchange Device, the sample gas is passed through the glass tubes of two layers with a membrane structure. Gas exchange process is carried out continuously. As a result, outlet gas of Gas Exchange Device can be introduced directly into the ICP-MS.

The workings of "GED-cell" tube; Partial pressure (concentration) difference between the inside gas and the sweep gas on the outside of the membrane provides the driving force, and sample gas is introduced into a cell and diffuses to the outside of a membrane. Argon gas diffuses to the inside of a membrane, and as the diffusion speed of fine particles in a gas is very slow, they remain on inside of this membrane. The transportation of particles is not affected in the process and, therefore, introduced into the ICP-MS unchanged.

Note: Gas sample throughput; GED-01 250 ml/min, GEDQ-01 800ml/min.

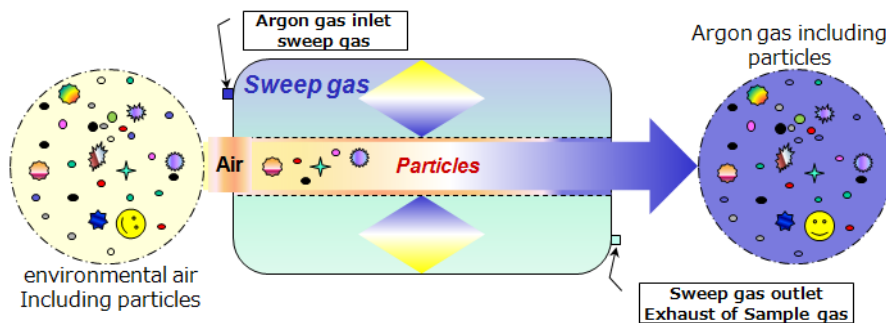


Figure 1 Principle of Gas Exchange Device

1.2 Gas Paticulation Device

This instrument can make the trace level of gas in larger particles by the reaction process.

By using in combination with the Gas Exchange Device, large particles are not passing through the membrane of GED cell tube; it can be transferred into ICP-MS. As a result, it will be able to measure the ultra trace gases.

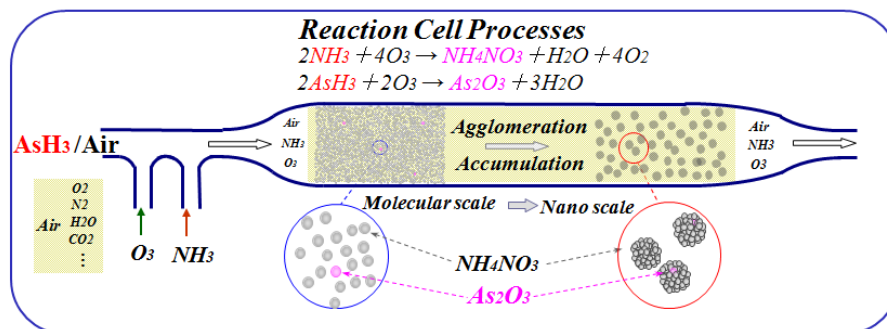



Figure 2 Principle of Gas Paticulation Device


2 Technical Features

The following table summarizes the major technical features of the Gas Exchange Device and accessories.


2.1 Power Supply

Model: POW-01		
This is dedicated DC24 V Power Supply for each instrument.		
Specifications		
• Input voltage	100~240VAC	
• Power consumption	144 W	
• Output voltage	DC 24V	
• Number of output port	5	
• Size (cm)	16.5(W) 36.0(D) 12.5(H)	
• Weight (kg)	2.9	
• AC Power cable	250V 10A, Length 1.8 m	


2.2 Gas Exchange Device

Model : GED-01		
Specifications		
• Performance of gas exchange	Over 99.99 %	
• Gas sample throughput	250 ml/min. max.	
• Pressure of the sample gas	Atmospheric pressure	
• Recovery rate of particulate	Over 95%	
• Sweep gas flow rate	Argon, 2.5 L/min.	
• Supply pressure of argon gas	0.2 ~ 0.8 MPa	
• Purity of argon gas	99.995 %	
• Input voltage	DC 24V	
• Power consumption	28 W	
• Size (cm)	30(W) 54(D) 19.4(H)	
• Weight (kg)	10.5	
• Power cable of Pump unit	13.5V 2A, Length 50 cm	
• DC Power cable	150V 6.8A, Length 1 m	


2.3 Pump Unit (Option)

Model: PU-01 (for GED-01)		
Specifications		
• Suction quantity	250 ml/min. (max.)	
• Input voltage	DC 12V, <u>Controlled by GED-01</u>	
• Power consumption	3W	
• Size (cm)	6.0(W) 23.5(D) 7.0(H)	
• Weight (kg)	0.5	


2.4 Gas Exchange Device HV

Model : GEDQ-01		
Specifications		
• Performance of gas exchange	Over 99.99 %	
• Gas sample throughput	800 ml/min. max.	
• Pressure of the sample gas	Atmospheric pressure	
• Recovery rate of particulate	Over 95%	
• Sweep gas flow rate	8.0 L/min.	
• Supply pressure of argon gas	0.2 ~ 0.8 MPa	
• Purity of argon gas	99.995 % 以上	
• Input voltage	DC 24V	
• Power consumption	28 W	
• Size (cm)	79.5(W) 20.0(D) 18.0(H)	
• Weight (kg)	10.9	
• Power cable of Pump unit	13.5V 2A, Length 8 cm	
• DC Power cable	150V 6.8A, Length 1 m	


2.5 Pump Unit HV (Option)

Model: PUQ-01 (for GEDQ-01)		
Specifications		
• Suction quantity	800 ml/min. (max.)	
• Input voltage	DC 12V, <u>Controlled by GEDQ-01</u>	
• Power consumption	3W	
• Size (cm)	6.0(W) 23.5(D) 7.0(H)	
• Weight (kg)	0.5	


2.6 Metallic-elements Standard Gas Generator (Option)

Model: MSGG-01		
Specifications		
• Argon gas flow rate (Carrier gas)	200 ml/min.	
• Supply pressure of argon gas	0.2 MPa	
• Purity of gas	99.995%	
• Input voltage	DC 24V	
• Power consumption	30 W	
• Metallic elements	Cr, Mo and W. Emission: below 2×10^{-7} mg/min.	
• Size (cm)	16.0(W) 34.0(D) 23.2(H)	
• Weight (kg)	4.6	
• DC Power cable	150V 6.8A, Length 1 m	

2.7 Nitrogen Gas Flow Controller (Option)

Model: N2U-01		
Specifications		
• Nitrogen gas flow rate	5 ~ 30 ml/min.	
• Accuracy	± 2 %	
• Supply pressure of Nitrogen gas	0.1~0.6 MPa	
• Purity of gas	99.995%	
• Input voltage	DC 24V	
• Power consumption	12 W	
• Size (cm)	16.0(W) 27.5(D) 19.2(H)	
• Weight (kg)	3.1	
• DC Power cable	150V 6.8A, Length 1 m	

2.8 Gas Particulation device (Option)

Model: GPD-01		
Specifications		
• Argon gas flow rate	26 ml/min.	
• Supply pressure (Argon)	0.2 MPa	
• Purity (Argon)	99.995%	
• Oxygen flow rate	26 ml/min.	
• Supply pressure (Oxygen)	0.6 MPa	
• Purity (Oxygen)	99.99%	
• Ozone generator	Silent discharge of the three-layer quartz tube. Input voltage: DC 24V Secondary: 10±1KV p-p Frequency: 14KHz ±10% Current: 30±5mA (rms)	
• Vaporizer	Gas-washing bottle (PFA) Ammonia water (2%) Quantity: 150 ml	
• Reaction cell	Quartz tube	
• Input voltage	DC 24 V	
• Power consumption	105 W	
• Size (cm)	30.5(W) 54(D) 35.5(H)	
• Weight (kg)	22	
• DC Power cable	150V 6.8A, Length 1 m	



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