

Customer :ICP-OES

ICP Atomic Emission Spectrophotometer Specifications

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Check	Inspect	Person in Charge

1 Instrument Name

ICP Atomic Emission Spectrometer

2 Introduction

This instrument is a compact, low cost, superior operation sequential high frequency inductively coupled plasma atomic emission spectrometer designed to be used for a broader range of ICP atomic emission spectrophotometry analysis needs.

This instrument has the following characteristics:

1. Can be placed on a tabletop with limited restrictions on temperature ranges etc.
2. Simple operation with efficient routine analysis.

3 Components

This instrument is comprised of the following units:

1. RF Power Supply Unit
2. Sample Introduction Unit
3. Spectroscope Unit
4. Control Unit
5. Computer Unit

4 Unit Specifications

4.1 High Frequency Power Supply Unit

Frequency	27.12MHz
Output	0.5 ~ 1.2kW (0.1kW increment settings)
Circuitry	All Solid State Circuitry
Cooling	Air-cooled
Matching	π -Type Auto Matching
Ignition	Auto Ignition

4.2 Sample Introduction Unit

Composition	Quartz Glass Torch, Concentric Nebulizer, Spray Chamber
Gas Flow Range	
Plasma Gas	14 ~ 20L/min
Auxiliary Gas	0 ~ 2L/min
Carrier Gas	0 ~ 0.4MPa
Chamber Gas	0 ~ 2L/min
Watching Device	Argon Gas Pressure Low Water Pressure Low (for work coil cooling) Torch Unit Door Open Plasma Gas Flow

4.3 Spectroscope Unit

Type	Double Monochromator Type
Wavelength Range	175nm ~ 800nm
Resolution (FWHM)	0.009nm (at 313nm)
Entrance/Exit Slit	Fixed
Wavelength Drive	Stepping Motor
Wavelength Stop	± 0.001 nm
Reproducibility	
Detector	Photomultiplier Tube : R306 and one other type

1. Order Sorter

Mount	Seya-Namioka
Focal Length	20cm
Diffraction Grating	Holographic Concave Diffraction Grating

2. Echelle Monochromator

Mount	Czerny-Turner
Focal Length	30cm
Diffraction Grating	Echelle Plane Diffraction Grating

3. Vacuum Ultraviolet Region

Can be Purged with Argon or Nitrogen Gas

4. Condensing System

Variable Observation Height (0~30mm)

4.4 Control Unit

Spectroscope Wavelength Scanning

Photomultiplier Tube Change

Photomultiplier Tube voltage Change

RF Output Control

Chamber Gas

4.5 Computer Unit

CPU	2.4GHz or Higher
RAM	8G or more
HDD	500G or more
CD-ROM	8x Speed or greater
OS	Microsoft®Windows
CRT	24" Color Monitor
Printer	A4 Laser Printer

- Pentium is a registered trademark of Intel.
- Microsoft and Windows are registered trademarks of Microsoft Corporation.

5 Software

The software for this instrument utilizes the features of the Windows system and can be operated similarly with other market software. The software has compacted the features necessary to perform analysis and provides a user friendly environment for a wide range of analysis needs. The software contains the 6 features explained below.

5.1 File

Selects the analysis and condition editing operations explained below as well as opening analysis condition and result files.

5.2 Measurement Conditions

Creates the measurement conditions necessary for quantitative and qualitative analysis measurements.

Determining Analysis Conditions

- **Measurement**

Measures in a single measurement profiles with a maximum 80 elements × 20 analysis lines.

- **Qualitative Determination**

Performs qualitative analysis based on the spectrum profile data acquired from the measurement. Identifies the elements included in the sample in 3 steps and calculates the estimated concentration.

- **Condition Determination**

Automatically creates quantitative analysis conditions based on the spectrum profile data acquired from the measurement. Select standard, blank or unknown sample. Quantitative analysis conditions such as total time, the appropriate analysis line, whether or not to perform background correction, and so on for each element analysis are automatically created.

Edit Analysis Conditions

Edits the analysis conditions used in qualitative analysis measurements. The conditions are comprised of measurement conditions for each element (analysis line), common conditions, and standard sample conditions. All necessary

conditions can be set and the file saved.

Also, during condition editing, auxiliary features including tools, analysis condition determination and qualitative determination have been added. Through this addition, the information acquired during the editing can be used immediately for settings.

5.3 Analysis

Performs qualitative and quantitative analysis.

- **Qualitative Analysis**

Performs high speed identification while measuring a maximum 72 element analysis line profile. Elements in the sample are identified in 3 steps and the estimated concentration is calculated.

- **Quantitative Analysis Manual Measurement**

Through manual operation of samples, quantitative analysis measurements of up to 80 elements, 170 samples can be performed. Edit the sample conditions for the indicated quantitative analysis conditions. Next, click the Measure button to start the measurement. During measurements, the measurement data, calibration curves and spectrum profile can be viewed.

- **Quantitative Analysis Autosampler Measurement (option)**

Using the autosampler, the sample is automatically introduced and quantitative analysis measurements of up to 80 elements, 170 samples can be performed. Up to 10 conditions can be selected for the quantitative analysis and continuous measurements are possible with the autosampler. An auto on/off feature for the plasma has also been added.

5.4 Data

Checks and processed data acquired from each analysis.

- **Qualitative Data**

- Displays/edits/prints data acquired from qualitative analysis.
- Displays and overlap displays the measured spectrum profile.

- **Condition Determination Data**

- Displays/edits (analysis line selection, background correction settings

etc.)/prints data acquired using condition determination.

- Displays and overlap displays the measured spectrum profile.

- **Quantitative Data**

- Displays/edits (unit conversion, dilution degree calculation, molecular weight calculation)/prints measurement data.
- Displays/edits (overlapping)/prints spectrum profiles.
- Displays/edits (create, unknown concentration calculation, standard addition method)/prints calibration curves.
- Loads Excel and pastes the profile data and calibration curve data onto an Excel sheet. This feature enables the user to freely manage the data information.

5.5 Tool

Contains the tools necessary for normal usage of such things as plasma ignition and wavelength initialization. Through instrument operation or simple measurements, condition inspection or performance checks can be performed.

- **Plasma Ignite/Extinguish**

Automatically ignites and extinguishes the plasma.

- **Wavelength Initialization**

Automatically initializes the wavelength.

- **Profile Measurement**

Promptly measures the spectrum profile without complicated condition settings. Can also overwrite up to 5 measured spectrum profiles.

- **DL Measurement**

Measures blank samples/standard samples and calculates the detection limit.

- **Distribution Measurement**

Creates a graph using the RF output or observation height on the horizontal axis and the intensity or SB ratio on the vertical axis.

- **Wavelength Correction**

Corrects the wavelength deviation of the instrument. This feature reduces the peak error in analysis.

- **Instrument Operation**

Displays the status and control of the instrument.

5.6 Settings

- **Maintenance**

Maintains the database used for each analysis or maintenance of the instrument.

- **Wavelength Database**

Used for creating the qualitative analysis line or editing the analysis or interference line.

- **System Data**

Edits various data used to control the instrument. This feature is used for instrument maintenance.

- **Error History**

Automatically records and saves the contents of errors when problems arise with the instrument. This feature is extremely helpful when troubleshooting.

- **Option Settings**

Enables changes to the display color of the spectrum profile as well as detailed settings for measurements not normally used.

6 Dimensions and Weight

Main Unit (without Autosampler)	750W × 680D × 665H(mm), 90kg
RF Power Supply	380W × 510D × 460H(mm), 32kg

7 Utilities

Cooling Water	Soft water, Pressure 0.1 ~ 0.2MPa (minimum 0.05MPa or more during pulsating current), 2L/min or more, 20 ~ 25°C is ideal. (no dew formation)
Argon Gas	Purity 99.99vol% or more, conforming to JIS specification K1105 Pressure 0.4MPa, flow 16L/min (standard usage).
Nitrogen Gas (for purging)	Nitrogen gas can be used for purging of the spectroscope instead of Argon gas. Purity 99.99vol% or more, dew point -70°C or less. Pressure 0.4MPa, flow 10L/min.
Power Supply	Single phase AC100V ± 10V 15A grounded (average consumed current 7A) Three Phase Δwire AC200V ± 20V 15A grounded (average consumed current 13A) Note: When using the circulation water cooling system (for work coil), A separate single phase AC100V 2A is required.
Duct	Flow 5m ³ /min or more, 200 °C heat resistance (intake port), diameter 200mm φ with damper attached.
Operating Temperature	Room temperature 10 ~ 30 °C and temperature changes within 5°C/30min.
Humidity	80% or less (no dew formation)

8 Warranty

The instrument is warranted for 1 year after passing inspection.

However, consumable parts and problems resulting from incorrect or inappropriate use by the operator are not covered under the scope of the warranty.

Furthermore, problems caused by earthquakes, flooding, fire and other natural disasters are not covered under the warranty.

This warranty covers the operation of the instrument and does not cover analysis values and results.

The maintenance parts is covered for a period of 7 years from the date of manufacturing.

9 Installation Inspection Conditions

Installation will have been determined complete when the following conditions have been met.

1. Delivery of the instrument.
2. Feature/performance check (using the approved BJRUI method).
3. Operation training (using the approved BJRUI method).

10 Attachments

1. Operation Manual		1 Copy
2. Test Report		1 Copy
3. Computer Attachments	1 Set	
4. Printer Attachments		1 Set
5. SPS8000A System		1
6. Tygon Tube (1/32" × 3/32")		1m
7. Tygon Tube (7/16" × 9/16")		1m
8. Teflon Tube (AWG24)		1m
9. Cone Sleeve		5

11 Special Attachments