C113-E014

Access to your success
SHIMADZU

# ICPS-8100

Shimadzu
Sequential Plasma Spectrometer


**Now Offered with Ultimate Improvements to Satisfy**
**All Requirements for ICP Emission Analysis**

# ICPS-8100

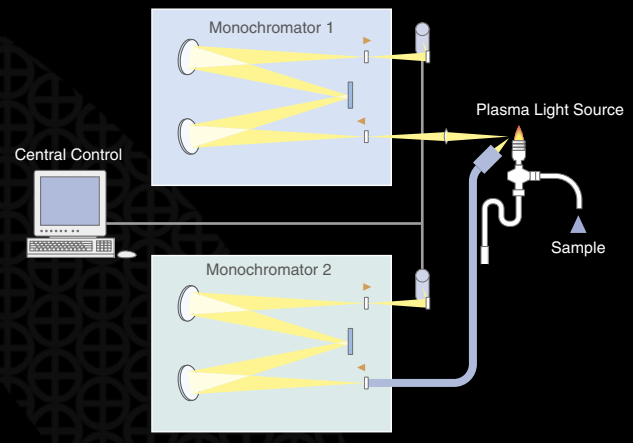
Shimadzu ICPS-8100 Twin Sequential High Frequency Plasma Emission Spectrometer
SEQUENTIAL PLASMA SPECTROMETER

Since developing its first ICP emission spectrometer in 1977, Shimadzu has sold over 1200 multi-channel and sequential model ICP emission spectrometers and has remained a world leader in ICP technology. The ICPS-8100 is a top-of-the-line ICP emission spectrometer that not only incorporates the accumulated experience, performance, and quality of Shimadzu ICP emission spectrometers, but also features significantly improved performance, reliability, and ease-of-operation.

## Advances in High Frequency Plasma

By introducing a carrier gas (Ar) and sample solution into plasma generated by passing a high-frequency current through an induction coil, a donut-shaped plasma with a lower temperature at the center than the perimeter is formed. This plasma is called inductively coupled plasma (ICP). Emission spectrometers that use this plasma as a light source offer many advantages, including a limitless wide range of applicability, over elemental analysis systems that use conventional light sources.
The ICPS-8100 minimizes losses by supplying a maximum 1.8 kW high-frequency output to the high-frequency coil via proprietary Shimadzu circuitry. Since a 27.12 MHz frequency is used to increase thermal energy, elemental excitation efficiency is high as well, resulting in an extremely high emission intensity. This allows introducing all types of solvents, such as organic solvents, hydrofluoric acid, or saturated salt water.

The twin sequential method provides stable analysis.




Benefits of the ICP light source, which is capable of highly accurate analysis of a wide variety of elements in a wide variety of samples in a wide range of concentrations

- **High detection capability to ppb-levels**
- **Low interference between elements**
- **Wide analytical concentration range**
- **Outstanding stability and reproducibility**

## Contents

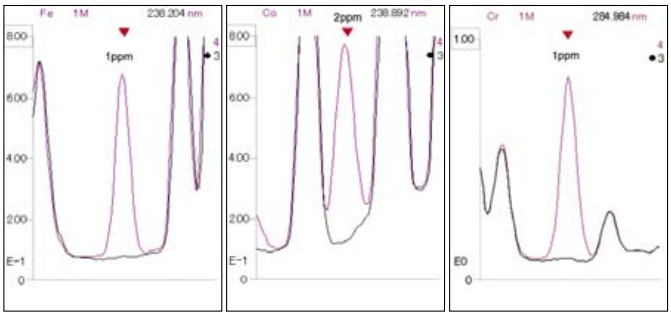
# Advanced Resolution, Speed, and Stability

Each of the two high-performance sequential monochromator units, capable of both high resolution and high speed, is equipped with a dedicated computer to achieve faster measurement and data processing speeds.
The monochromators use highly reliable Czerny-Turner mountings to provide sharp spectral lines and stability.

**High Speed Measurement** — Quantitative analysis and calculation of semi-quantitative values for **72 elements in 3 minutes**

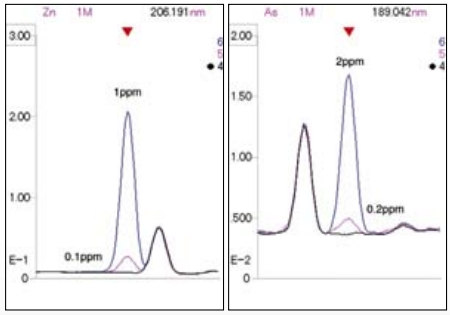
**Wide Wavelength Range** — Vacuum monochromators and wide wavelength range from **160 to 850 nm**

**High Resolution** — Unrivaled **0.0045 nm** high resolution




Trace elements in pure tungsten (0.0045 nm resolution)

Measurement Solution:
1 g/100 mL + Fe, Co, and Cr in W



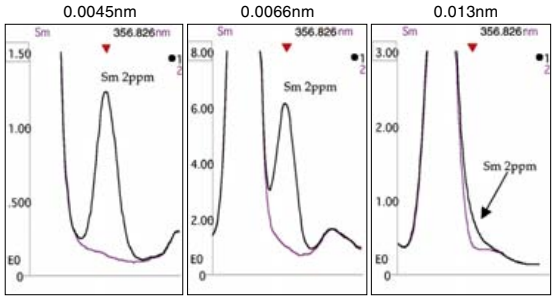

Wavelength profile of Zn 209.191 and As 189.042 in iron (0.0045 nm resolution)

Measurement Solution:
1 g/100 mL + Zn and As in high-purity Fe

# Top Grade ICP

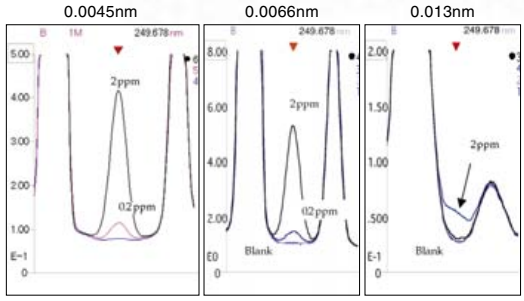
## Comparison of Resolution 1 Sm in Ce

Measurement Solutions: Ce 1000 ppm and
Ce 1000 ppm + Sm 2 ppm




## Comparison of Resolution 2 B in Steel

Measurement Solutions:
1 g/100 mL + B in high-purity Fe



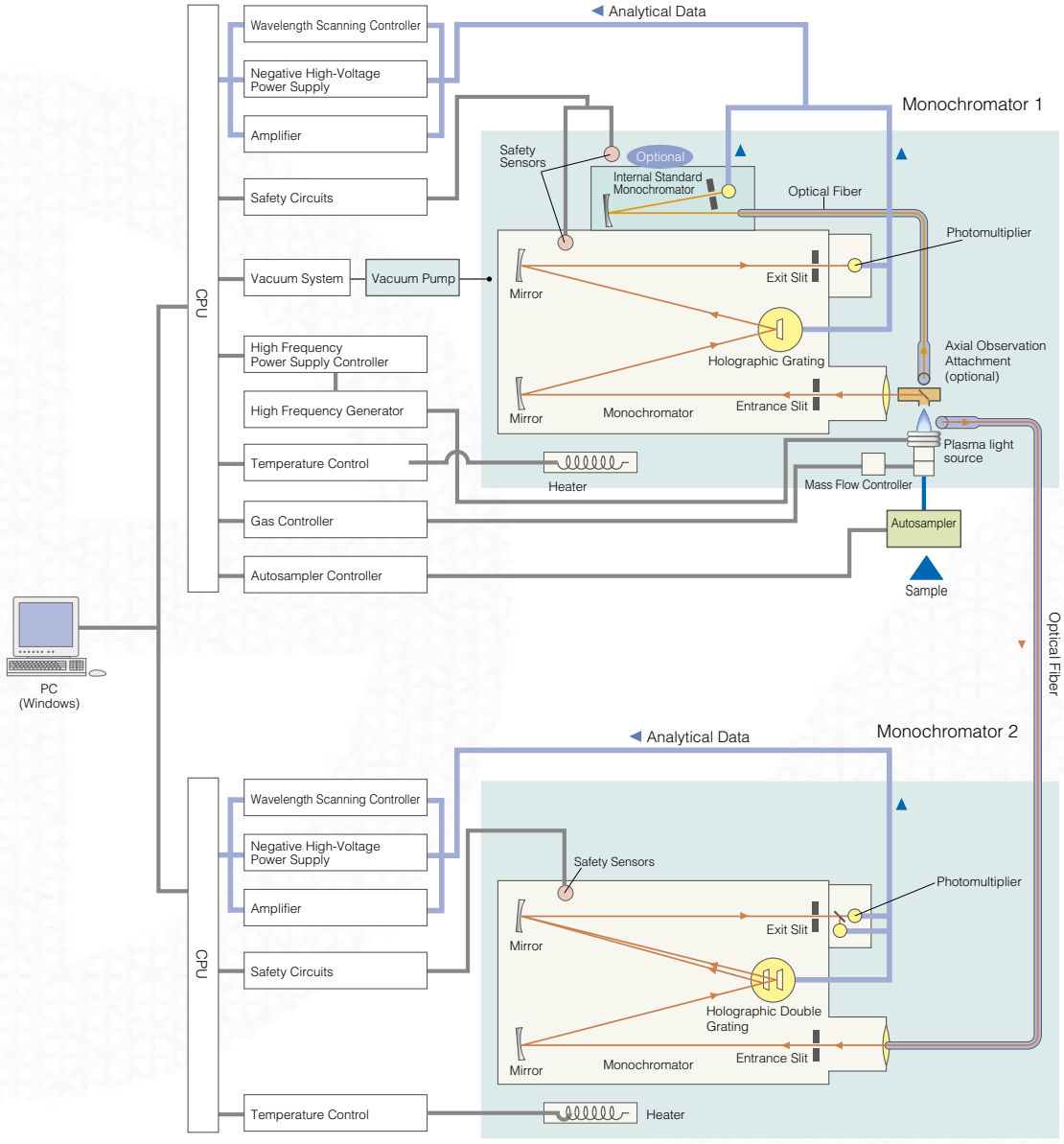

**Importance of Wavelength Resolution**

### High Resolution Required for Analysis of Metals, Rare Earths, and Rocks

High resolution is essential for analysis of metals, rare earths, and rocks. Improving the resolution helps improve separation between the target measurement wavelength and wavelengths of interfering elements or primary constituent elements. This enables highly accurate analysis of target elements down to trace levels, without being affected by interfering or primary constituent elements.

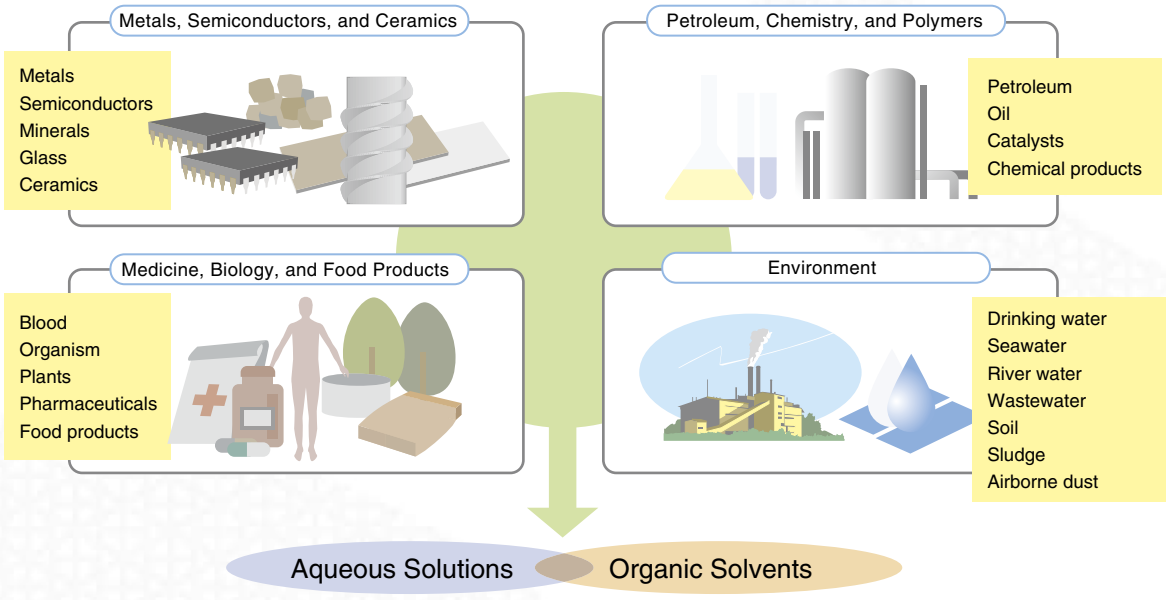
# Twin Sequential Monochromators Provide Higher Analytical Efficiency and Ensure Stability for Long Periods

Twin spectrometer systems include two sequential monochromators that can be used for a wide variety of analytical applications.
The two monochromators can be controlled independently for efficient analysis of samples. The software automatically selects the optimal monochromator for the wavelength being measured and sets the various analytical conditions.
Monochromator 1 is always kept under vacuum conditions. Since the condensing lens can be cleaned while maintaining a vacuum, the interior of the monochromator is not exposed to atmospheric conditions.
The vacuum monochromator enables high-precision analysis of elements that have highly sensitive analysis lines in the vacuum ultraviolet region, such as P, S, B, I, Br, and Al.
Since gas purging is not necessary, there is no contamination or variability caused by purge gas convection and the stabilization time is short. Therefore, it enables stable analysis over long periods.



# Provides Highly Accurate Analytical Results for All Kinds of Fields, Such As the Detection of Ultra Trace Elements and Analysis of Chemical Compositions

The Shimadzu ICPS-8100 High Frequency Sequential Plasma Emission Spectrometer can be used wherever high accuracy and a broad scope of analytical assessment is required, whether analyzing ultra trace elements or high concentrations in chemical composition analysis. Applications include elemental analysis for research and development, analysis of important elements for production control, and analysis for environmental management, such as water quality control, which has a significant impact on our lives.




## ICPS-8100 Analytical Sensitivity Chart

Below 1 ppm | 1 to 10 ppb | 10 to 100 ppb | Other

| 1a | 2a | 3b | 4b | 5b | 6b | 7b | 8 | 1b | 2b | 3a | 4a | 5a | 6a | 7a | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 H | | | | | | | | | | | | | | | 2 He |
| 3 Li | 4 Be | SHIMADZU INDUCTIVELY COUPLED PLASMA SPECTROMETER | | | | | | | | 5 B | 6 C | 7 N | 8 O | 9 F | 10 Ne |
| 11 Na | 12 Mg | | | | | | | | | 13 Al | 14 Si | 15 P | 16 S | 17 Cl | 18 Ar |
| 19 K | 20 Ca | 21 Sc | 22 Ti | 23 V | 24 Cr | 25 Mn | 26 Fe | 27 Co | 28 Ni | 29 Cu | 30 Zn | 31 Ga | 32 Ge | 33 As | 34 Se | 35 Br | 36 Kr |
| 37 Rb | 38 Sr | 39 Y | 40 Zr | 41 Nb | 42 Mo | 43 Tc | 44 Ru | 45 Rh | 46 Pd | 47 Ag | 48 Cd | 49 In | 50 Sn | 51 Sb | 52 Te | 53 I | 54 Xe |
| 55 Cs | 56 Ba | * L | 72 Hf | 73 Ta | 74 W | 75 Re | 76 Os | 77 Ir | 78 Pt | 79 Au | 80 Hg | 81 Tl | 82 Pb | 83 Bi | 84 Po | 85 At | 86 Rn |
| 87 Fr | 88 Ra | ** A | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | 57 La | 58 Ce | 59 Pr | 60 Nd | 61 Pm | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu |
| A | 89 Ac | 90 Th | 91 Pa | 92 U | 93 Np | 94 Pu | 95 Am | 96 Cm | 97 Bk | 98 Cf | 99 Es | 100 Fm | 101 Md | 102 No | 103 Lr |

Detection Limit of ICPS-8100 (ppb)

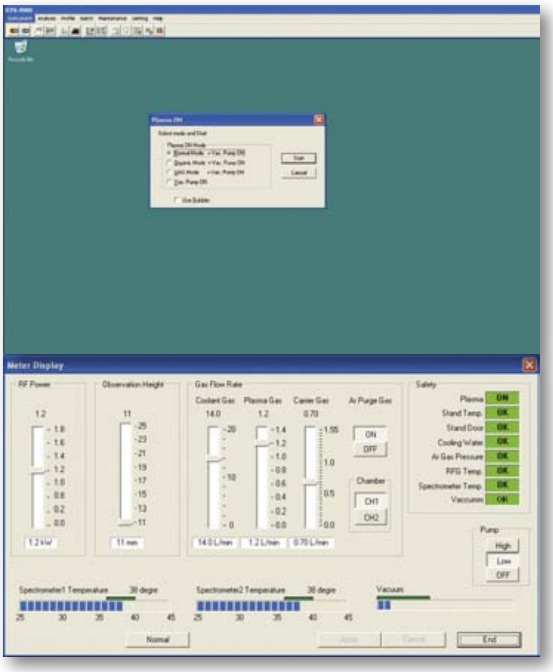
- Below 1 ppm
- 1 to 10 ppb
- 10 to 100 ppb
- Other

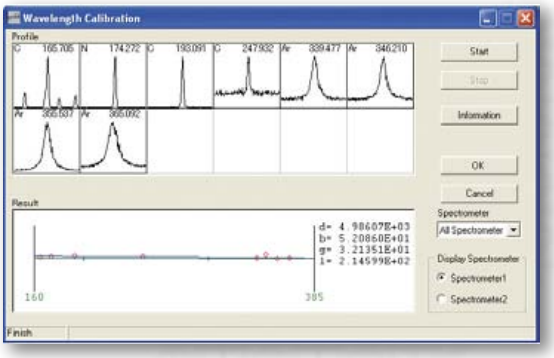
# Analytical Operations Performed and Instrument Controlled Easily by a PC

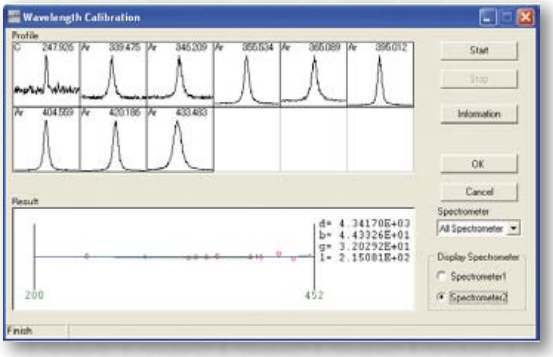
All analytical and instrument control operations are performed by a PC. Parameters for instrument control and analysis can also be easily changed.
Each monochromator includes a dedicated control computer that allows confirming analytical conditions, checking calibration curves, or processing data and profiles from samples already measured, even while analyses are in progress. Respective processes can be performed without interrupting analyses, which can significantly shorten analysis times.

All operations can be performed via software windows, from igniting the torch and confirming the plasma status, to confirming the safety status or controlling the instrument.

## Instrument Start up

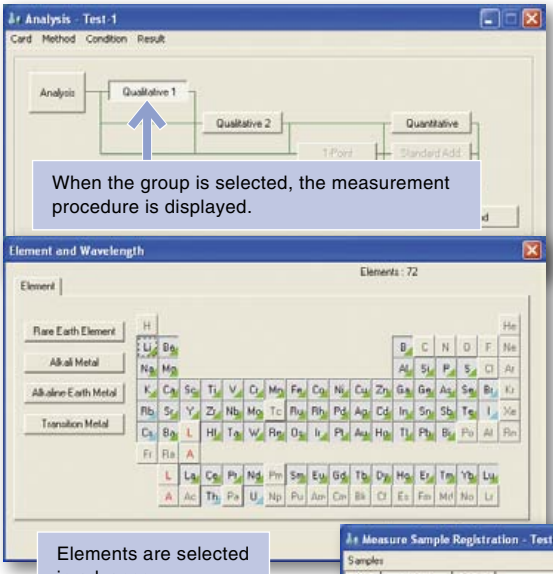




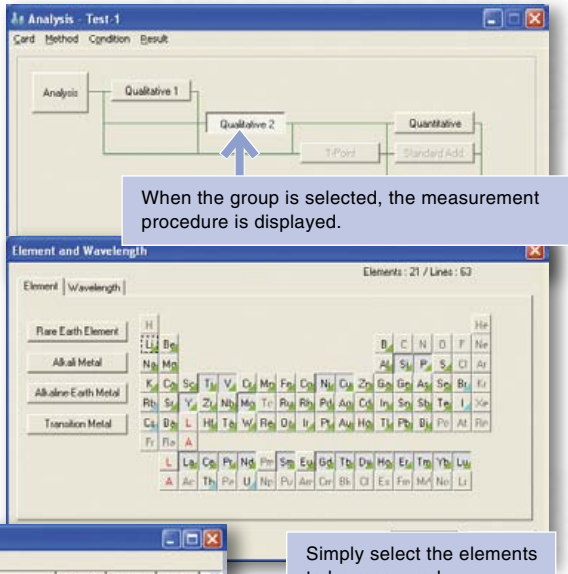

# Top Grade ICP

## Qualitative Analysis of All Elements

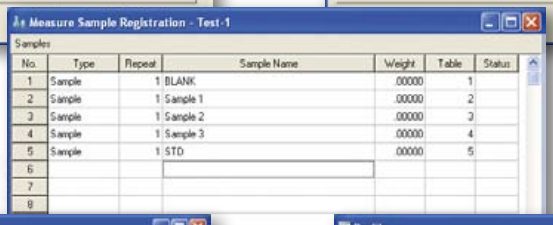


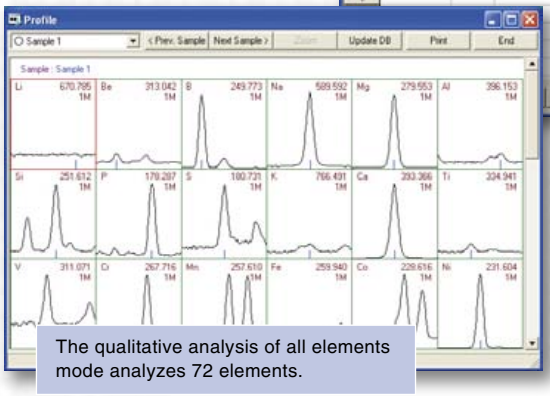

Elements are selected in advance.

## High Accuracy Qualitative Analysis

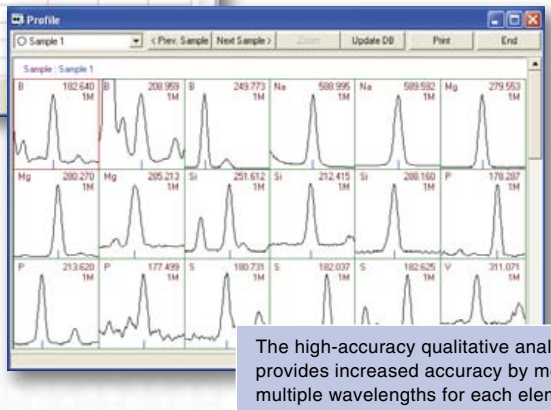



Simply select the elements to be measured.

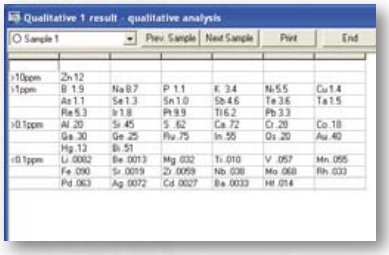


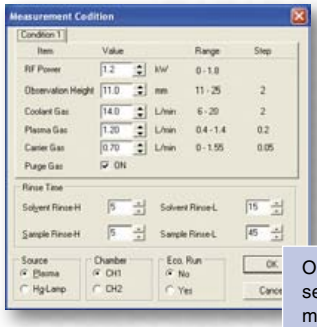




The qualitative analysis of all elements mode analyzes 72 elements.

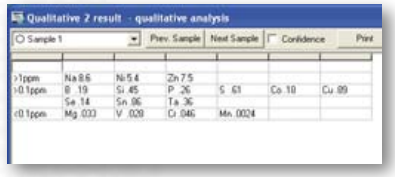



The high-accuracy qualitative analysis mode provides increased accuracy by measuring multiple wavelengths for each element.



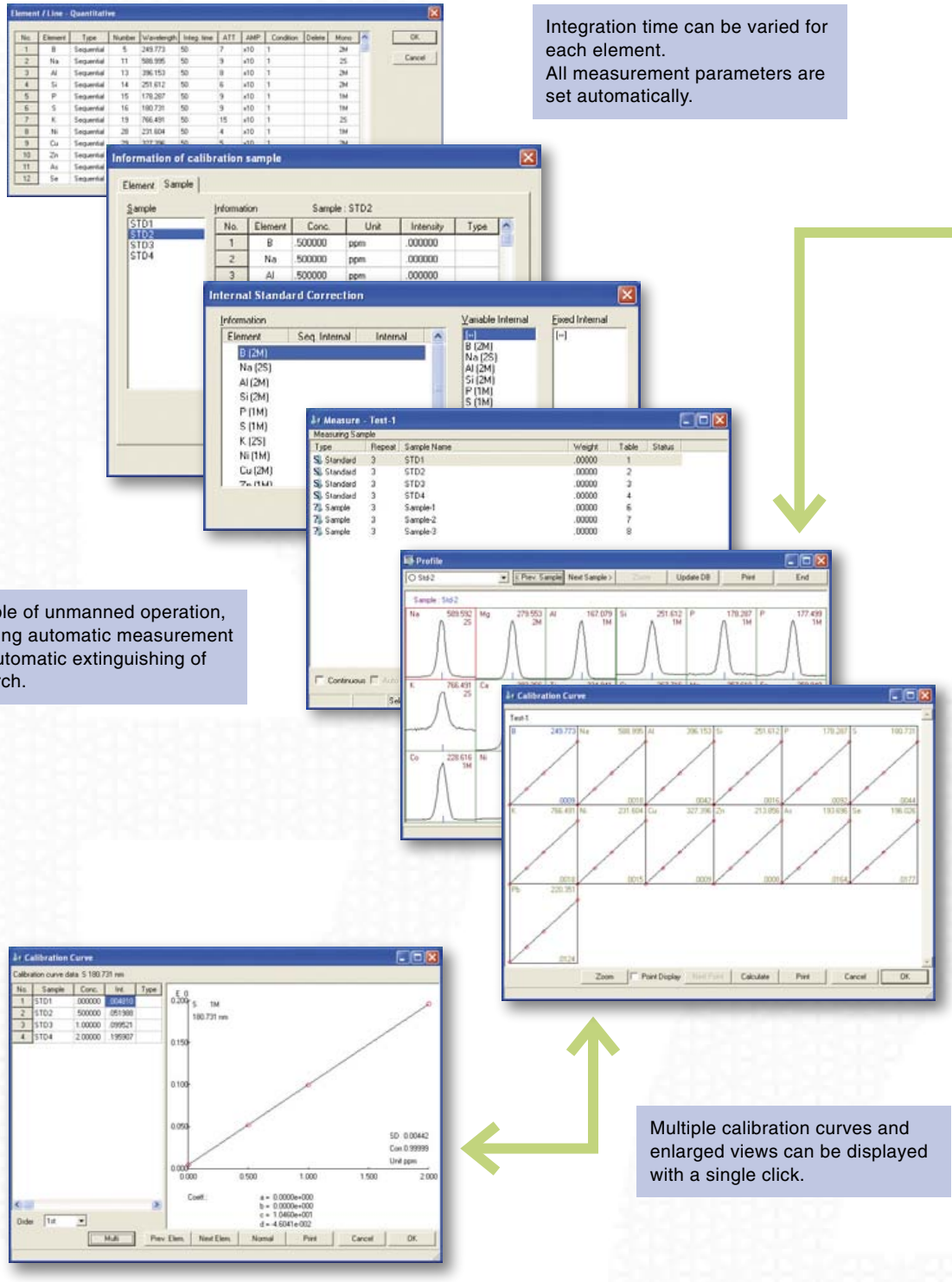




Optimal measurement parameters are selected. Parameters can be set manually as well.



# Automatically Sets Measurement Parameters for Qualitative to Quantitative Analysis

## Quantitative Analysis




Integration time can be varied for each element.
All measurement parameters are set automatically.

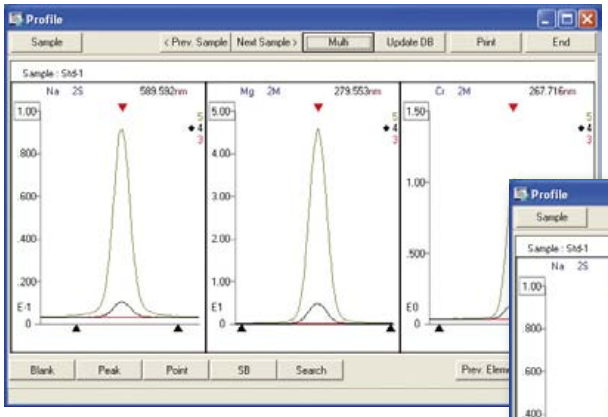
Capable of unmanned operation, including automatic measurement and automatic extinguishing of the torch.

Multiple calibration curves and enlarged views can be displayed with a single click.

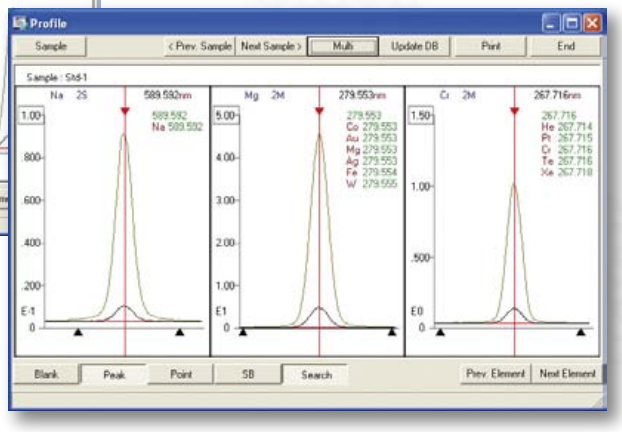
# Top Grade ICP

If qualitative analysis is performed, measurement parameters are automatically transferred for quantitative analysis. Analyses can be performed using optimal parameters from qualitative analysis results. Even if starting with quantitative analysis, **measurement parameters are set automatically**.

In addition, searching for interfering elements after measurements can be performed by **single-click operations on the enlarged peak view window**. The instrument automatically determines the optimal background position as well.




Search for and identify interfering peaks easily in the enlarged peak view




Enlarged views of profiles and searches for interfering elements can be displayed with single clicks.

Calibration method result - Manual

Sample 1 | Prev. Sample | Next Sample

| | | | | |
|---|---|---|---|---|
| Sample Name | Sample 1 | | | |
| Analysis date | 2009/07/01 | 11:06 | | |
| | | | | |
| <Intensity> | | | | |
| Element | Mg | Ca | Fe | Zn |
| No. 1 | 539.964 | 4197.65 | 4.63065 | 1.20923 |
| No. 2 | 541.555 | 4226.84 | 4.56807 | 1.21678 |
| No. 3 | 540.164 | 4277.76 | 4.60248 | 1.21289 |
| | | | | |
| Average | 540.561 | 4234.08 | 4.60040 | 1.21297 |
| | | | | |
| R | 1.59052 | 80.1025 | .062581 | .007545 |
| S | .866421 | 40.5395 | .031342 | .003773 |
| CV | .160282 | .957457 | .681298 | .311043 |
| | | | | |
| <Conc.> | | | | |
| Element | Mg | Ca | Fe | Zn |
| No. 1 | 2.39016 | 12.3731 | .359349 | .073727 |
| No. 2 | 2.39717 | 12.4595 | .354103 | .074258 |
| No. 3 | 2.39104 | 12.6102 | .356988 | .073984 |
| | | | | |
| Average | 2.39279 | 12.4809 | .356813 | .073990 |
| | | | | |
| R | .007017 | .237065 | .005246 | .000531 |
| S | .003822 | .119978 | .002627 | .000266 |
| CV | .159742 | .961288 | .736322 | .358941 |

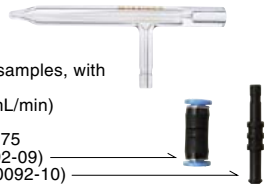
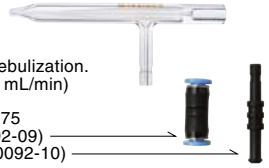
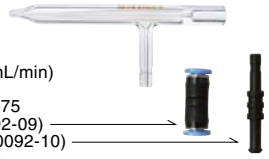
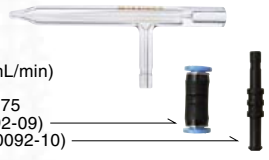
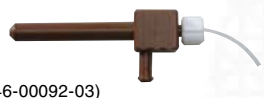
Measurement data is saved as a file.
Of course, profile data is similarly saved.
Data can be transferred to commercial software to freely create reports. Since the instrument is connected to the data processor via a LAN, data can be processed from a separate office.

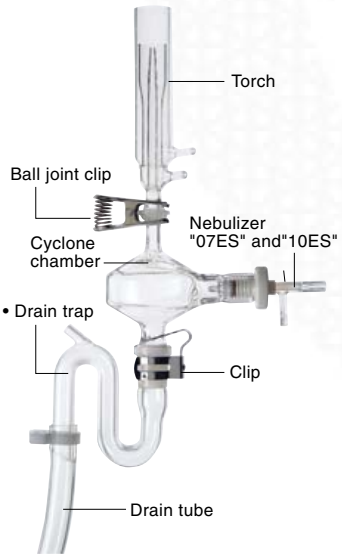
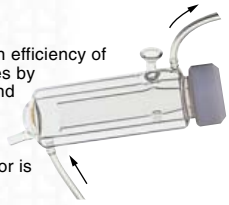
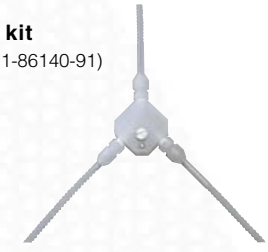
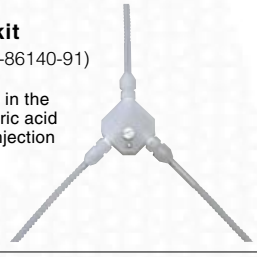
Profile data and measurement results can be pasted in commercial spreadsheet software to allow easy formatting of reports.

# ICPS-8100 Accessories

## Recommended Combinations for Sample Injection Systems

Note) Purchase items individually for sample types without a part number (P/N)

| Item / Sample Type | Nebulizers | Sample Take-Up Tubing |
|---|---|---|
| **Standard Set**<br>ICPS-8100<br>Standard Accessories | **Nebulizer, 10ES**<br>(P/N 046-00092-02)<br>Designed for high-concentration samples, with high-efficiency nebulization.<br>(Sample take-up rate approx. 1 mL/min)<br>• Sample take-up tube ASSY, S-075<br>• Connector, QSM (P/N 046-00092-09)<br>• Tube adaptor, 0735 (P/N 046-00092-10)<br>These are included.<br>  | **Sample take-up tube ASSY, S-075**<br>(P/N 046-00092-06)<br>For "10ES" and "07ES" nebulizers.<br>  |
| **For Small Volume Samples** | **Nebulizer, 07ES**<br>(P/N 046-00092-01)<br>A nebulizer with high-efficiency nebulization.<br>(Sample take-up rate approx. 0.6 mL/min)<br>• Sample take-up tube ASSY, S-075<br>• Connector, QSM (P/N 046-00092-09)<br>• Tube adaptor, 0735 (P/N 046-00092-10)<br>These are included.<br>  | **Sample take-up tube ASSY, S-075**<br>(P/N 046-00092-06)<br>For "10ES" and "07ES" nebulizers.<br>  |
| **High Salt Samples**<br>Used to inject high salt concentration samples | **Nebulizer, 10ES**<br>(P/N 046-00092-02)<br>(Sample take-up rate approx. 1 mL/min)<br>• Sample take-up tube ASSY, S-075<br>• Connector, QSM (P/N 046-00092-09)<br>• Tube adaptor, 0735 (P/N 046-00092-10)<br>These are included.<br>  | **Sample take-up tube ASSY, S-075**<br>(P/N 046-00092-06)<br>For "10ES" and "07ES" nebulizers.<br>  |
| **Organic Solvent Samples**<br>Injection systems for organic solvents | **Nebulizer, 10ES**<br>(P/N 046-00092-02)<br>(Sample take-up rate approx. 1 mL/min)<br>• Sample take-up tube ASSY, S-075<br>• Connector, QSM (P/N 046-00092-09)<br>• Tube adaptor, 0735 (P/N 046-00092-10)<br>These are included.<br>  | **Sample take-up tube ASSY, S-075**<br>(P/N 046-00092-06)<br>For "10ES" and "07ES" nebulizers.<br>  |
| **Water-Cooled Chamber Kit for Organic Solvent Samples**<br>Controls evaporation of solvents | — | — |
| **Hydrofluoric Acid Sample Injection System**<br>(P/N 211-42853-03)<br>Used for hydrofluoric acids | **Nebulizer, 10CPS**<br>(P/N 046-00092-14)<br>• PTFE Tube, 1.27×1500L (P/N 046-00092-03)<br>• Tube adaptor, 0735 (P/N 046-00092-10)<br>These are included.<br>  | — |

| Chambers | Torches | Drains | Other |
|---|---|---|---|
| **Cyclone chamber, HE**<br>(P/N 046-00093-02)<br>  <br>• Locking screw, 0152<br>(P/N 046-00093-92)<br>• Seal, 0237<br>(P/N 046-00093-93)<br>These are included. | **Torch**<br>(P/N 204-70272)<br>  | **Drain trap,8214**<br>(P/N 046-00093-01)<br>Drain trap for cyclone chamber<br>(Indicated by "•")<br>  <br><br>(Cyclone chamber assembly) | **Ball joint clip**<br>(P/N 210-15508-01)<br>Connects the cyclone chamber and torch.<br>**Clip**<br>(P/N 046-00993-01)<br>Fixes the drain trap to the cyclone chamber.<br>**Drain tube**<br>(P/N 200-30864-24)<br>This is the tube from the drain trap to the drain. |
| **Cyclone chamber, HE**<br>(P/N 046-00093-02)<br>  <br>• Locking screw, 0152<br>(P/N 046-00093-92)<br>• Seal, 0237<br>(P/N 046-00093-93)<br>These are included. | **Torch**<br>(P/N 204-70272)<br>  | | |
| **Cyclone chamber, HE**<br>(P/N 046-00093-02)<br>  <br>• Locking screw, 0152<br>(P/N 046-00093-92)<br>• Seal, 0237<br>(P/N 046-00093-93)<br>These are included. | **Torch for high-concentration salt solution samples**<br>(P/N 204-74323)<br>  <br>Used when introducing an undiluted solution of a sample where the base element is of the % order of concentration. | | **Water bubbler**<br>(P/N 204-19281)<br>  <br>Used to prevent blockages in the nebulizer when analyzing samples containing large amounts of sodium. Inserted in the carrier gas pathway. |
| **Chamber drain straight**<br>(P/N 211-80437-01)<br>  | **Organic solvent torch**<br>(P/N 204-77296)<br>  <br>Used when analyzing organic solvent samples that are difficult to inject into the plasma. | **Drain kit**<br>(P/N 211-86140-91)<br>  | **Nebulizer holder kit type 2**<br>(P/N 211-48062)<br>  <br>Includes organic solvent resistant O-rings. They are attached to each chamber other than the cyclone chamber, and are used to support nebulizers. |
| **Water-cooled chamber kit**<br>(P/N 211-43472)<br>  <br>This increases injection efficiency of organic solvent samples by cooling the chamber and suppressing sample evaporation within the chamber.<br>*Cooling water circulator is necessary. | ——— | **Drain kit**<br>(P/N 211-86140-91)<br>  | **NCB-1200 (SP)**<br>(P/N 044-01910-01)<br>  |
| **Chamber ASSY**<br>(P/N 205-07778-02)<br>  | **Demountable torch**<br>(P/N 205-09627-01)<br>  | **Drain kit**<br>(P/N 211-86140-91)<br>(Included in the hydrofluoric acid sample injection system)<br>  | |

# A Wide Variety of Peripherals

## Accessories that enable automatic analysis and sample introduction at your discretion.

### Autosampler AS-8T
(P/N 205-04940-02)

This type handles both beakers and test tubes.
It can be loaded with 100 of the 20 mL test tubes or 50 of the 30 mL beakers. A table is necessary.

*Requires interface kit with table (P/N 211-80655).

Table size: W600×D600×H690 mm

### AS-8T for organic solvents
(P/N 211-48059-01)

### Hydrofluoric acid sample injection system HFS-2
(P/N 211-42853-03)

Samples composed primarily of silicates, such as rocks, soil, cement and ceramics, are insoluble or dissolve poorly in strong acids. When hydrofluoric acid is used to dissolve these samples, normal injection systems cannot be used as they are made of glass. A sample dissolved in hydrofluoric acid can be injected into the plasma directly by using an injection system made of fluorinated ethylene resin.

### Peristaltic pump
(P/N 204-77310-02)

Used in the analysis of high viscosity samples.
A fixed sample injection is possible.

### Monochromator for internal standard method
(P/N 205-02165-02)

This is installed in the Shimadzu sequential plasma spectrometer to perform simultaneous internal standard analysis.

*Requires attachment kit (P/N 211-82923).

Specifications
Optical mount: 0.5 m Pachen-Runge mounting
No. of grooves in the diffraction grating: 2700 grooves/mm
Internal standard element: Y (371.0 nm)
Light guide: by optical fiber
Place of installation: Inside thermostatic chamber in Monochromator 1

### Axial attachment AX-3
(P/N 211-41992)

*A cooling water system is necessary as a utility.

If water for the cooling system is not supplied from the public water system, a CA-1112 cooling water circulator and piping kit D are required.

### Ultrasonic nebulizer UAG-1
(P/N 205-09295)

This is a sample injection system developed for high-sensitivity ICP analysis. Unlike the usual nebulizer that uses the negative pressure of the carrier gas, this nebulizer uses ultrasonic energy to nebulize a solution. Ultrasonic energy can produce large amounts of extremely fine particles. This enables the UAG-1 to perform analyses at a high sensitivity of 10 to 100 times the sensitivity of conventional nebulizers.

Size: Main unit W320×D380×H540 mm
Power supply: W382×D360×H159 mm
Power supply: Single phase 100 V, 50/60 Hz, 10 A

*A cooling water system is necessary as a utility.

If water for the cooling system is not supplied from the public water system, a CA-1112 cooling water circulator and piping kit C are required.

### Table ND with caster
(P/N 219-96005) (included) Size: W600×D480×H750 mm

### Hydride generator HVG-ICP
(P/N 211-40981)

The elements within the sample are reduced and vaporized by the nascent hydrogen generated in the decomposition of sodium borohydride. Only the gas phase is injected into the plasma to achieve measurement with a high degree of sensitivity.
As, Se, Sn, Te, Bi etc. can be measured.

Size: W333×D210×H195 mm
Power supply: Single phase 100 V, 50/60 Hz, 2 A
*A table ND (with casters) is necessary.

### Table ND with caster
(P/N 219-96005) Size: W600×D480×H750 mm

### Cooling water circulator CA-1114
(P/N 044-01809-07)

Size: W354×D384×H851 mm 41 kg
Power supply: Single phase 100 V, 50/60 Hz, 15 A

### Piping kit C: UAG-1 only
(P/N 211-83633-03)

### Piping kit D: AX-3 only
(P/N 211-83633-04)

### Piping kit U: AG-1 and AX-3
(P/N 211-83633-05)

### Low-temperature thermostatic water heater NCB-1200 (SP)
(P/N 044-01910-01)

For the water cooled chamber kit

Size: W210×D430×H639 mm 29 kg
Power supply: Single phase 100 V, 50/60 Hz, 9.5 A

# Specifications

| 1. Monochromator unit | |
|---|---|
| **Monochromator 1** | |
| Optical system | 1 m Czerny-Turner mounting |
| No. of diffraction grating grooves | 4960 grooves/mm |
| Wavelength range | 160 to 372 nm |
| Reciprocal dispersion | 0.15 nm/mm |
| Detector | Photomultiplier tube |
| Slit | Entrance slit 20 µm |
| | Exit slit 30 µm |
| Exhaust system | Rotary pump |
| | With oil backflow prevention valve |
| Temperature control | Available (±0.1 °C) |
| **Monochromator 2** | |
| Optical system | 1 m Czerny-Turner mounting |
| No. of diffraction grating grooves | 4320 grooves/mm |
| | 1800 grooves/mm |
| Wavelength range | 250 to 426 nm (4320 grooves/mm) |
| | 426 to 850 nm (1800 grooves/mm) |
| Reciprocal dispersion | 0.17 nm/mm (4320 grooves/mm) |
| | 0.44 nm/mm (1800 grooves/mm) |
| Detector | Photomultiplier tube |
| Slit | Entrance slit 20 µm |
| | Exit slit 30 µm |
| Light guide | Optical fiber |
| Temperature control | Available (±0.1 °C) |
| **Spectrometer for internal standard method (optional)** | |
| Optical system | 0.5 m Pachen-Runge mounting |
| No. of diffraction grating grooves | 2700 grooves/mm |
| Internal standard element | Y (371.0 nm) |
| Light guide | Optical fiber |
| Place of installation | Inside thermostatic chamber in Monochromator 1 |
| **Monochromator controller (installed on respective monochromators 1 and 2)** | |
| CPU | With 32-bit microprocessor |
| **Photometric unit (installed on each monochromator)** | |
| Negative high-voltage power supply | Variable 16 steps |
| Photometric method | Sequential element measurement method |
| **2. ICP light source** | |
| Plasma torch | Quartz plasma torch |
| Nebulizer | Coaxial type, Pyrex glass |
| Spray chamber | Cyclone chamber, Pyrex glass |
| Torch vertical actuation mechanism | Computer controlled (11 mm to 25 mm) |
| **3. Radio frequency generator** | |
| Oscillator | Crystal oscillator |
| Frequency | 27.120 MHz ±0.05 % (ISM band) |
| Output | 0.8, 1.0, 1.2, 1.4, 1.6, 1.8 kW |
| Output stability | Within ±0.3 % |
| Radio frequency circuit element | Transistor |
| Control system | CPU control |
| Ignition method | Fully automatic ignition |
| With safety function | Radio frequency generator temperature fault detection |

| 4. Four flow line gas controller (for plasma) | |
|---|---|
| Plasma gas | 0 to 20 2 L/min steps |
| Auxiliary Gas | 0 to 1.4 0.2 L/min steps |
| Carrier gas | 0 to 1.55 0.05 L/min steps |
| Purge gas (Monochromator 1) | 3.5 L/min |

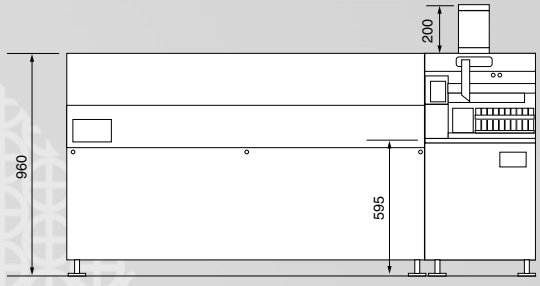
| 5. Data processor (software) | |
|---|---|
| OS | Windows XP/Windows Vista |
| No. of measurement wavelengths | Qualitative analysis 1: 72 elements × 1 wavelength |
| | Qualitative analysis 2: 72 elements, maximum 216 wavelengths |
| | Quantitative analysis: 72 elements, maximum 72 wavelengths |
| Database | Analyzed wavelengths data: 72 elements, maximum 16 wavelengths |
| | Wavelength table: Approx. 110,000 wavelengths recorded |
| Analysis cards | 100 cards |
| Quantitative analysis | Calibration curve sample, maximum 16 samples per card |
| | Drift correction |
| | Internal standard correction |
| | Background correction |
| | Blank signal elimination |
| | Matrix correction |

| 6. Safety functions | |
|---|---|
| Plasma extinguishment detection | Stand temperature check |
| Argon gas pressure check | High-frequency power supply temperature check |
| Cooling water circulation check | Monochromator vacuum check |
| Stand door open/closed check | Monochromator temperature check |

| 7. Autosampler AS-9 | |
|---|---|
| Any sample is accessible by CPU control | |
| No. of samples | 50 |
| Sample container | 20 mL test tube |
| Actuation method | X-Y actuation |

**8. External dimensions** Units: mm

W1990×D1040×H960 / Weight: Approx. 640 kg

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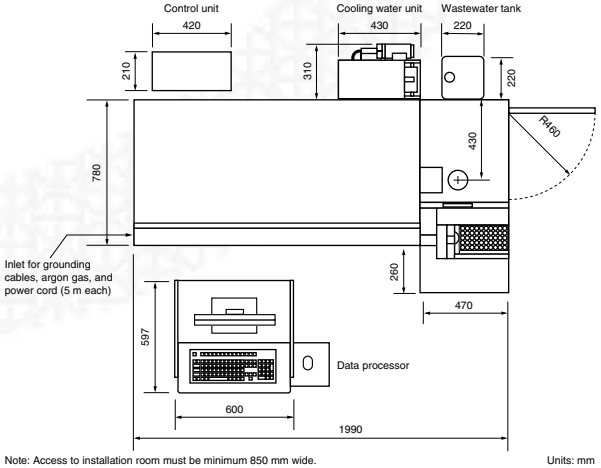
# ICPS-8100 Installation Requirements

**Prepare the following for installation.**

Refer to the installation guidelines for details.

| | |
|---|---|
| **1. Installation room environment** | Temperature: 18 to 28 °C |
| | Rate of temperature change: 2 °C/hr max. |
| | Humidity: 70 % max. |
| | Avoid places with a lot of vibration or dust. |
| | Heat generated from instrument is about 2200 kcal/hr<br>(during 1.2 kW high frequency output, excluding heat discharged to exhaust duct) |
| **2. Power source** | 3-phase: 200/220 V±10 %, 50/60 Hz, 20 A |
| | Single phase: 100 V±10 %, 50/60 Hz, 5 A |
| **3. Grounding** | Resistance: independent grounding below 30 Ω |
| **4. Gas installation** | Type: Argon gas of 99.95% or greater purity |
| | Adjust argon gas supply within 550 to 750 kPa pressure (maximum variation 100 kPa).<br>Approximately one 7 m3 gas cylinder is necessary for 5 hours of operation. |
| **5. Cooling water** | Prepare 12 L of distilled water as coolant for cooling high-frequency induction coil in main unit. |
| | If a UAG-1 ultrasonic nebulizer (optional) is included, one water cooling system is required. |
| **6. Exhaust duct** | **Plasma stand /** Exhaust gas is mostly argon, but also includes some metal vapors and solvent. Therefore, install exhaust fan blades for explosion resistant windows and exhaust ducts. |
| | **High-frequency power supply /** Ducting is not required, due to low heat generation. |
| **7. License** | Usage of this device needs to comply with the radio laws. A license for an installation using radio frequency needs to be obtained from the authority. |

**Example of installation**




Note: Access to installation room must be minimum 850 mm wide.

Units: mm

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