


**SHIMADZU**

Shimadzu Sequential Plasma Emission Spectrometer

# ICPS-7510



JQA-0376

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**SHIMADZU**

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# At your will, without restriction

“At your will, without restriction” is the key phrase of this ICPS-7510. It can be used for a wide range of analytical assessments, from research and development to environmental management - “At your will, without restriction”.



Emission spectrometry that employs inductively coupled plasma (ICP) for its light source is particularly suited to the analysis of solution samples. With the increase in recent years of the number of samples and elements analyzed, the speed and high precision of ICP emission analysis is making it widely adopted in the field of official laws, such as JIS, ISO, and the Water Works Law.

**The scope of elemental analysis using an emission spectrometer with a plasma light source is limitless.**

The ICP light source is characterized by

High detection capability on the ppb level.

Little interference between elements.

Wide range of analyzed concentrations.

Excellent precision and reproducibility.

**The sequential plasma emission spectrometer that realizes operation free of restrictions**

SEQUENTIAL PLASMA SPECTROMETER

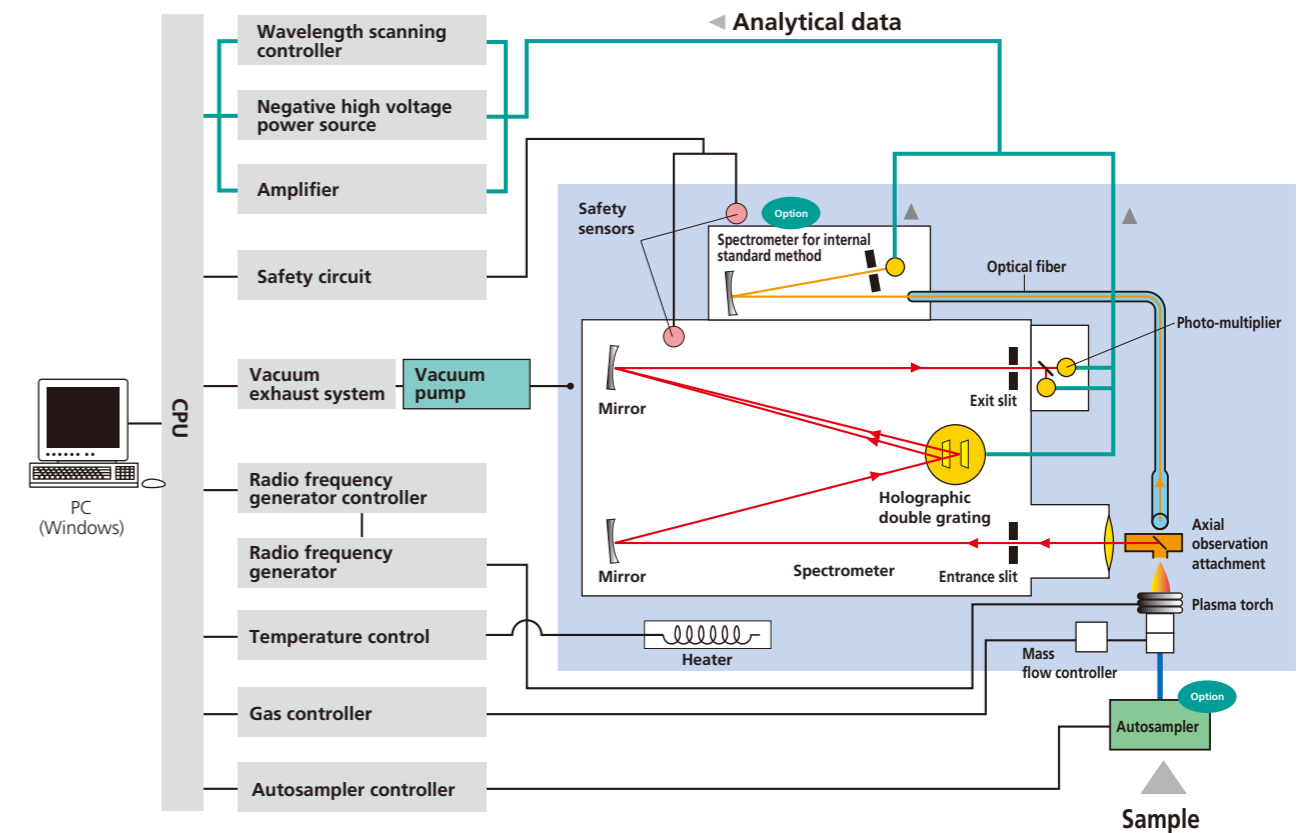
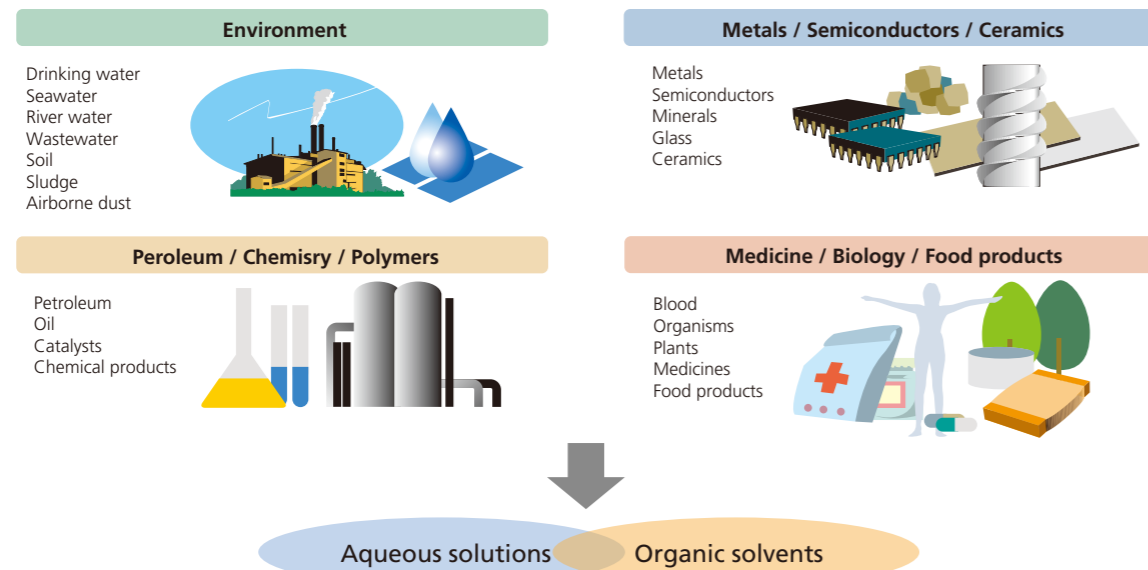
## ICPS-7510

- Accurate spectral measurement of a wide range of wavelengths at a high resolution and sensitivity.
- All types of samples can be analyzed at will, such as acidic/aqueous solutions, and organic solvents.
- The radio frequency generator has sufficient power supply (Max.1.8kW) for various analyte.
- Excellent stability in its radio frequency power source, spectrometer, and gas flow rate.
- Easy to use automated functions and a comprehensive data processing menu.
- Small installation footprint.

# The ICP that works at your will, without restrictions

Produces high precision analytical results in all kinds of fields, such as the detection of ultra trace elements, and chemical composition analysis.

The "Shimadzu Sequential Plasma Emission Spectrometer ICPS-7510" can be employed in applications where a broad range of highly precise analytical assessments are required, from ultra trace elements to analyses involving high concentrations, such as in chemical composition analysis. Such applications include high precision elemental analysis for research and development, analysis of the important major elements in production control, and environmental management analyses such as water quality control, which has a great effect on our lives.



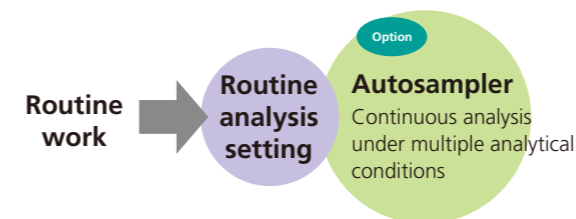
Elements analyzed by the ICPS-7510

| 1a       | 2a       | 3b       | 4b       | 5b       | 6b       | 7b       | 8        | 1b       | 2b       | 3a       | 4a       | 5a        | 6a        | 7a        | 0         |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|----------|----------|
| 1<br>H   |          |          |          |          |          |          |          |          |          |          |          |           |           |           | 2<br>He   |          |          |
| 3<br>Li  | 4<br>Be  |          |          |          |          |          |          |          |          | 5<br>B   | 6<br>C   | 7<br>N    | 8<br>O    | 9<br>F    | 10<br>Ne  |          |          |
| 11<br>Na | 12<br>Mg |          |          |          |          |          |          |          |          | 13<br>Al | 14<br>Si | 15<br>P   | 16<br>S   | 17<br>Cl  | 18<br>Ar  |          |          |
| 19<br>K  | 20<br>Ca | 21<br>Sc | 22<br>Ti | 23<br>V  | 24<br>Cr | 25<br>Mn | 26<br>Fe | 27<br>Co | 28<br>Ni | 29<br>Cu | 30<br>Zn | 31<br>Ga  | 32<br>Ge  | 33<br>As  | 34<br>Se  | 35<br>Br | 36<br>Kr |
| 37<br>Rb | 38<br>Sr | 39<br>Y  | 40<br>Zr | 41<br>Nb | 42<br>Mo | 43<br>Tc | 44<br>Ru | 45<br>Rh | 46<br>Pd | 47<br>Ag | 48<br>Cd | 49<br>In  | 50<br>Sn  | 51<br>Sb  | 52<br>Te  | 53<br>I  | 54<br>Xe |
| 55<br>Cs | 56<br>Ba | *<br>L   | 72<br>Hf | 73<br>Ta | 74<br>W  | 75<br>Re | 76<br>Os | 77<br>Ir | 78<br>Pt | 79<br>Au | 80<br>Hg | 81<br>Tl  | 82<br>Pb  | 83<br>Bi  | 84<br>Po  | 85<br>At | 86<br>Rn |
| 87<br>Fr | 88<br>Ra | **<br>A  |          |          |          |          |          |          |          |          |          |           |           |           |           |          |          |
| *<br>L   | 57<br>La | 58<br>Ce | 59<br>Pr | 60<br>Nd | 61<br>Pm | 62<br>Sm | 63<br>Eu | 64<br>Gd | 65<br>Tb | 66<br>Dy | 67<br>Ho | 68<br>Er  | 69<br>Tm  | 70<br>Yb  | 71<br>Lu  |          |          |
| **<br>A  | 89<br>Ac | 90<br>Th | 91<br>Pa | 92<br>U  | 93<br>Np | 94<br>Pu | 95<br>Am | 96<br>Cm | 97<br>Bk | 98<br>Cf | 99<br>Es | 100<br>Fm | 101<br>Md | 102<br>No | 103<br>Lr |          |          |

Detection limits of the ICPS-7510:  
 1 ppb and below (lightest pink)  
 Between 1 and 10 ppb (light pink)  
 Between 10 and 100 ppb (medium pink)  
 100 ppb and above (darkest pink)

## The routine analysis setting supports analytical work

The routine analysis setting is convenient in analyses such as water quality inspection and quality control where analysis is repeated under set analytical conditions. Continuous analysis can be executed under multiple analytical conditions, and automatic analysis employing the autosampler (option) can achieve significant labor savings.



The setting of analytical conditions, the condition of the instruments, and the settings of each type of controller required in analysis are all controlled with the PC.

## Spectrometer temperature regulation to achieve precision with stability

The main spectrometer and the spectrometer for internal standard method (option) are constantly regulated to a fixed temperature to maintain a high degree of precision and stability in the analytical results.

## The optimal plasma power controls high precision analysis

The optimal power settings are made automatically in order to execute high precision analysis with the best plasma flame.

## The mass flow controller controls the gas flow rate for stable analysis

Control over the gas flow rate is exercised through the digital mass flow controller. This prevents variations in analytical precision caused by changes in the gas flow rate.

# Applicable to all types of analytical assessments

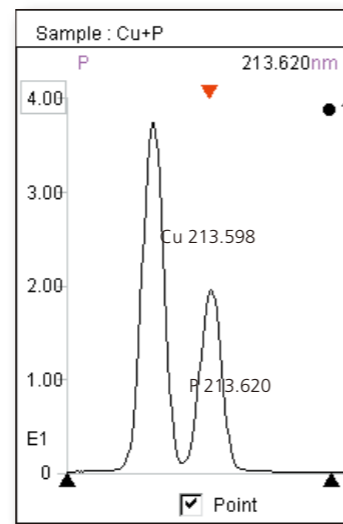
## Resolution

0.0066nm  
0.013nm

## High Resolution

The resolution is high, at 0.0066nm (160 to 458nm) and 0.013nm (458 to 850nm).

The effect of adjacent spectra is minimal, which enables high precision trace analysis.



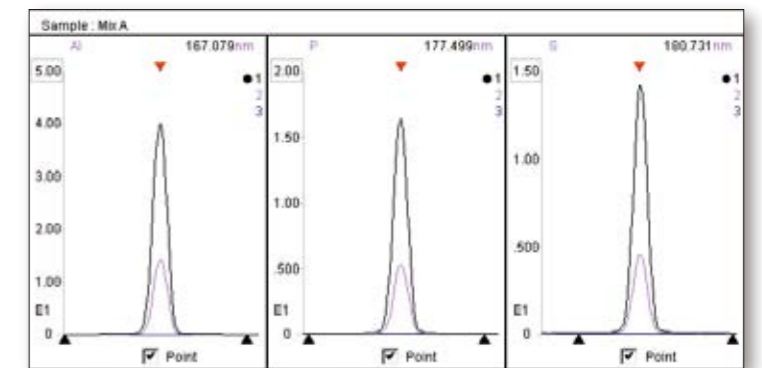
The ICPS-7510 sharply resolves the Cu 213.598nm and the P 213.620nm.

## Stable analysis with a vacuum type spectrometer

The inside of the spectrometer is a vacuum. This enables highly sensitive analysis of Al, P, S, B, I, Br, Hg etc. which have intense spectra in the vacuum ultraviolet region.

A gas purge is unnecessary, which means that there is no fluctuation due to convection of the purge gas, and no distortion of the optical system. This leads to a short stabilization time, and the continuance of stable analysis over a long period of time.

The condenser lens can be cleaned in the vacuum, which means that the internal parts of the spectrometer will not be exposed to the atmosphere.



Limits of detection(3σ)

| Element | Wavelength | μg/L |
|---------|------------|------|
| Al      | 167.079    | 0.3  |
| P       | 177.499    | 2.0  |
| S       | 180.731    | 4.0  |

\* Using the standard nebulizer (measurement in the radial direction)

## Holographic double grating

For short wavelengths: 3600grooves / mm

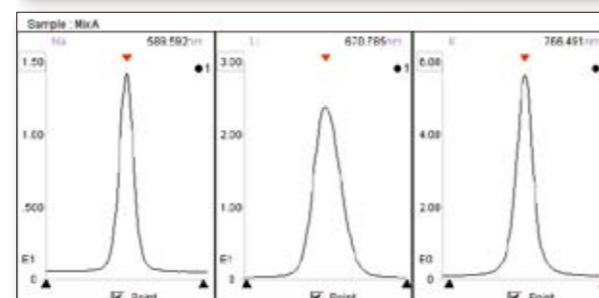
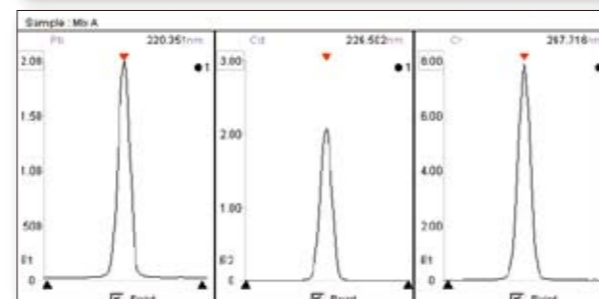
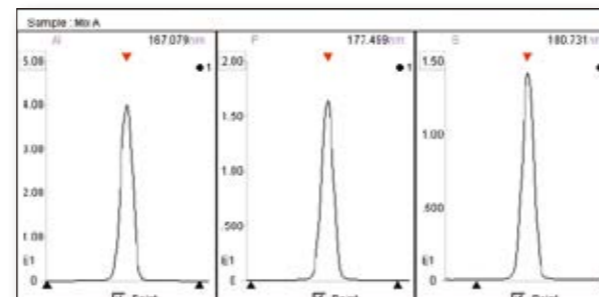
For long wavelengths: 1800grooves / mm

160nm~850nm

## Covers a wide range of spectral measurements

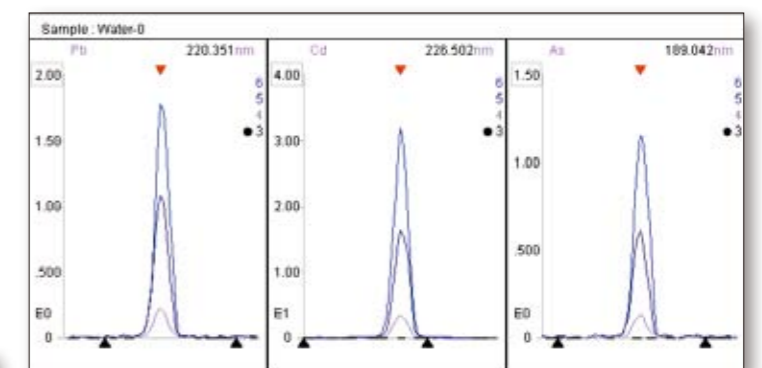
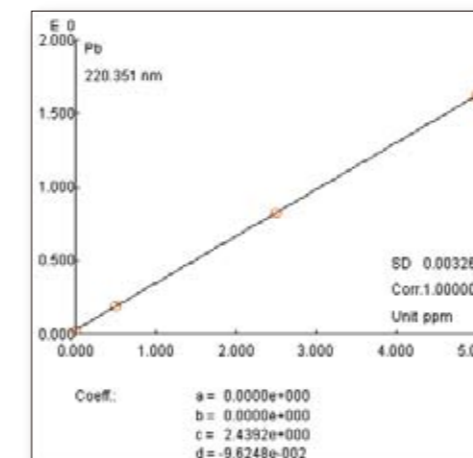
A holographic double grating with 3600 grooves/mm for short wavelengths and 1800 grooves/mm for long wavelengths is installed. A wide range of spectra from 160nm to 850nm can be measured at will under computer control.

High precision analysis is possible for elements that have intense spectra in the vacuum ultraviolet region - Al, P, S, B - as well as for elements that have their spectra in the near infrared region such as Li, K, and Rb.



## Highly sensitive analysis through axial observation

With the attachment for observing the light in the axial direction that comes as standard, the ICPS-7510 is configured for ultra trace analysis. Combined with the observation of the plasma in the radial direction, analyses can be made from ultra trace amounts to high concentrations.



Limits of detection (3σ)

| Element | Wavelength | μg/L |
|---------|------------|------|
| Pb      | 220.351    | 2.0  |
| Cd      | 226.502    | 0.3  |
| As      | 189.042    | 4.0  |

\* Using the standard nebulizer

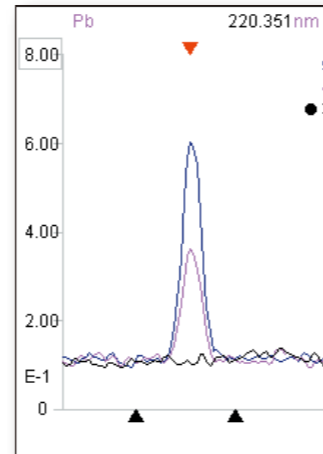
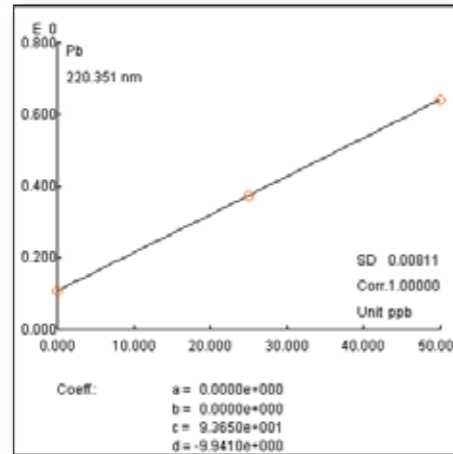
# Applications at your will, without restrictions

## Environmental standards

### River water

Example of the measurement of Pb in river water

By using the axial observation system and the ultrasound nebulizer (option), the spectrometer is configured for applications that demand high sensitivity, such as those concerned with environmental standards and the Water Works Law.

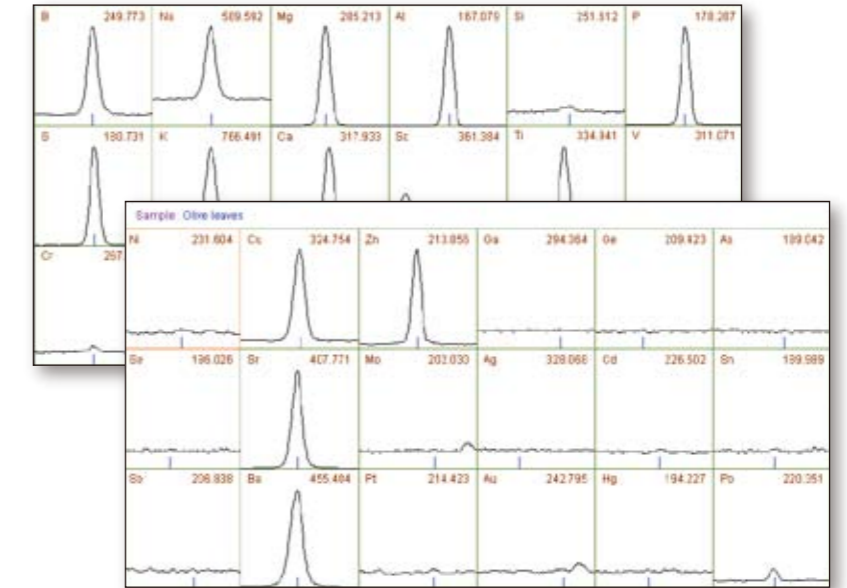


## Safety standards

### Food products / Medical supplies

Example of the qualitative analysis of an olive leaf

It can be used for a variety of samples such as raw materials, produce, and additives. Multiple element, simultaneous analysis can be performed, such as analysis of nutritional compounds.

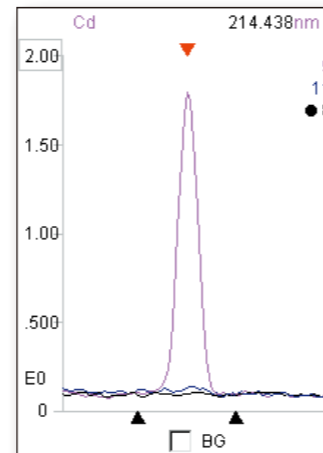
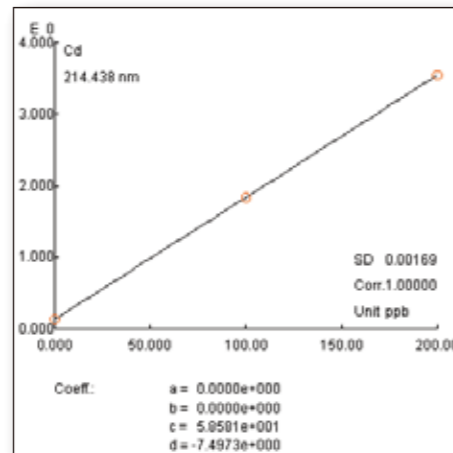


## Environmental standards

### Sea water

Example of analysis of Cd in sea water

The direct injection of high matrix samples is possible, and trace elements can be measured with a high degree of sensitivity.

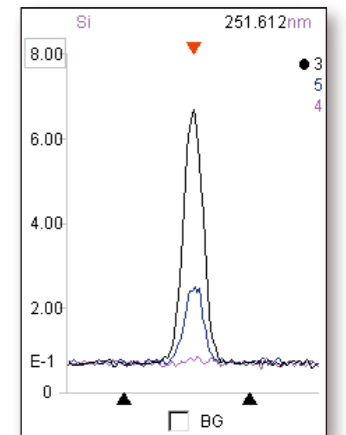
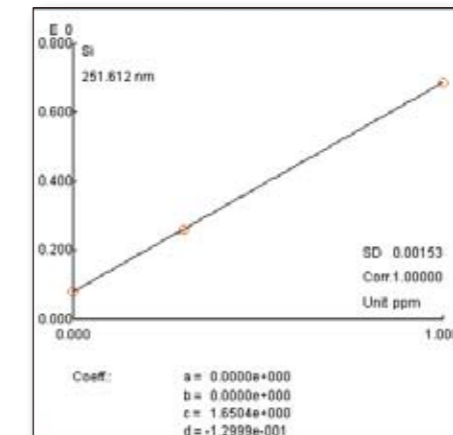


## Organic solvents

### Vegetable oil

Example of analysis of vegetable oil (xylene diluted)

The direct injection of organic solvents can be done with ease due to the excellent radio frequency generator. In addition, high sensitivity measurement can be achieved within organic solvents as well.

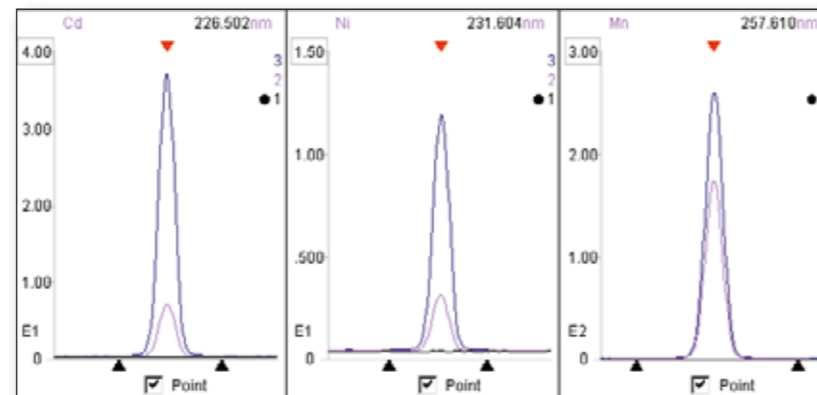


## Atmosphere

### Airborne dust

Example of analysis of standard urban airborne dust substances (NIST SRM1648)

Ultra trace amounts of dust samples collected with an air sampler can be easily measured at a high sensitivity through simultaneous analysis.

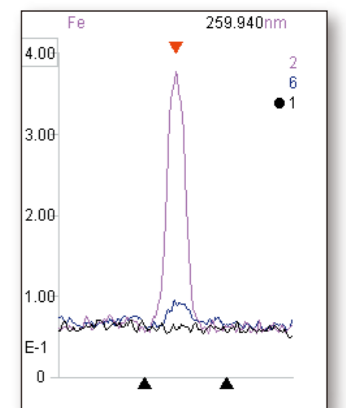
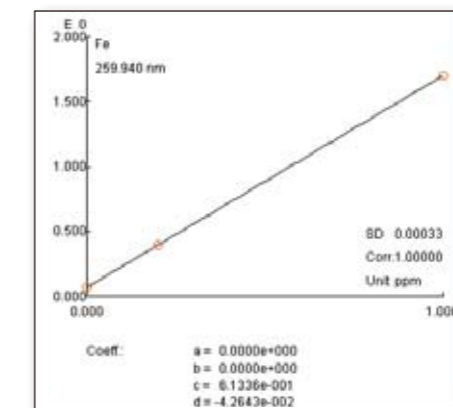


## Analysis of chemical products

### Synthetic resins

Example of the analysis of a synthetic resin (dissolved in DMAC)

Even solid chemical products such as synthetic resins can be measured with ease and at a high degree of sensitivity, either directly after being dissolved in a solvent, or by dilution.

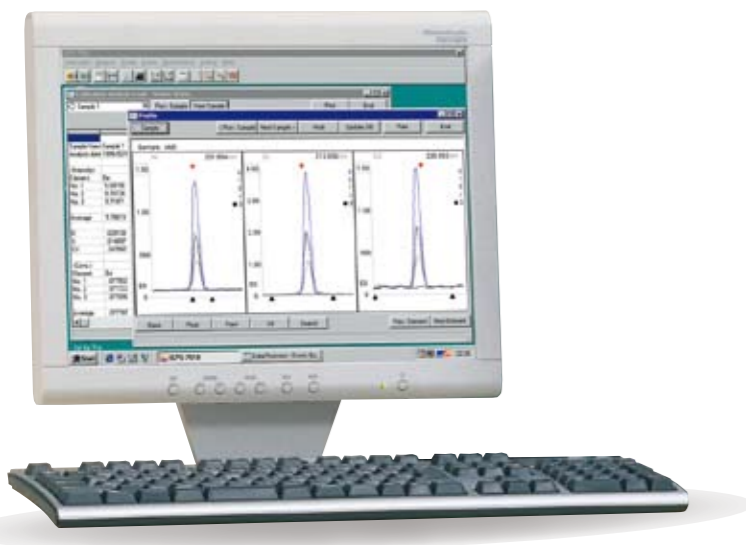


# Operation is of course at your will, without restriction

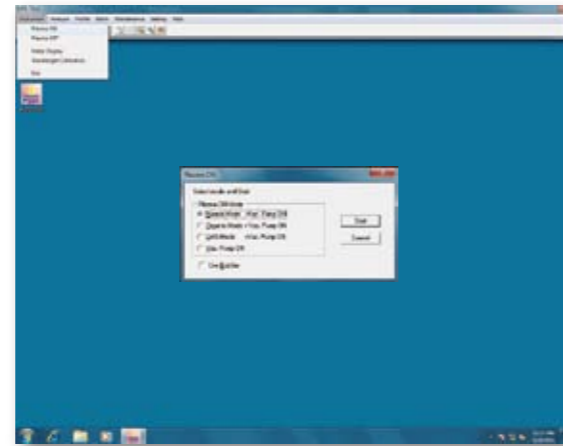
Control over the whole device, including analytical operation, is exercised through a personal computer. Device control and alteration of analytical conditions is possible at will, and without restrictions. Analysis can be performed through simple operations made possible by PC control. Features include the routine analysis mode where multiple types of samples can be analyzed continuously, and the ability to print out measurement results in report format.

The emission spectrometer is controlled by a PC

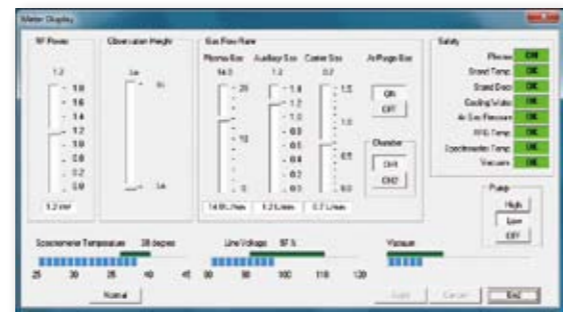
- All aspects of control over the device, and not just the analytical operation, can be exercised through instructions given on the PC screen.
- Analysis can be started by just registering the name of the sample since the analytical conditions have been readied beforehand.
- The analytical conditions can be altered with ease, and incorporated into the routine. A routine analysis mode that performs continuous analysis under multiple conditions has also been set.
- The measurement results can be expanded directly in a report format into software commonly available on the market.



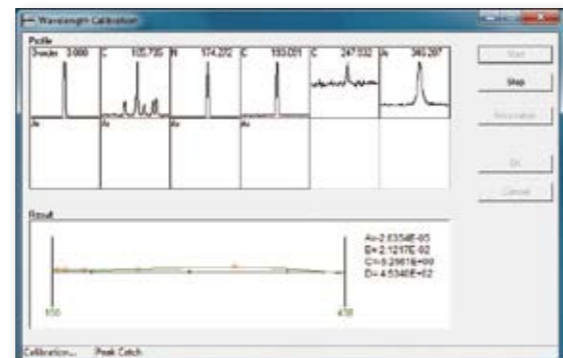
## Starting up the program



Program start up Plasma ignition

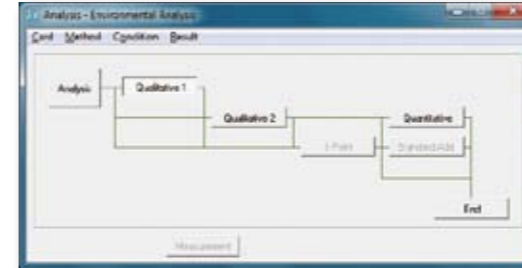


Meter display



Wavelength calibration

## All element determination



Analytical route map

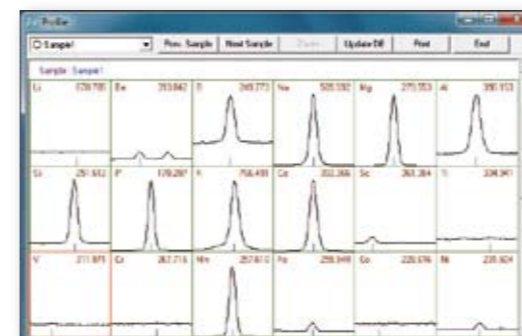


Selection of element wavelengths

All that is required is to select the wavelength

| No. | Type   | Repeat | Sample Name | Weight | Table | Status |
|-----|--------|--------|-------------|--------|-------|--------|
| 1   | Sample | 1      | Sample1     | 0.0000 | 1     |        |
| 2   | Sample | 1      | Sample2     | 0.0000 | 2     |        |
| 3   | Sample | 1      | Sample3     | 0.0000 | 3     |        |
| 4   | Sample | 1      | Sample4     | 0.0000 | 4     |        |
| 5   | Sample | 1      | Sample5     | 0.0000 | 5     |        |

Measurement

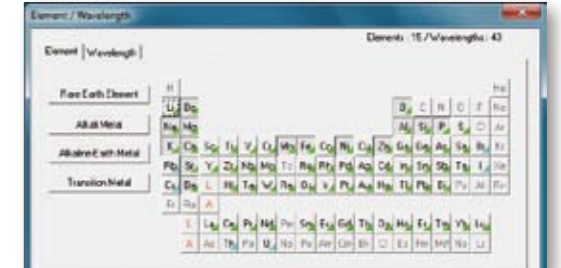


Measurement results: Display of profiles

| Concentration | Element  | Element  | Element  | Element  | Element  | Element  |
|---------------|----------|----------|----------|----------|----------|----------|
| >100ppm       | Na 120   | K 160    |          |          |          |          |
| >1ppm         | Mg 7.1   | Al 1.4   | P 6.3    | Ca 1.8   | Mn 1.3   |          |
| >0.1ppm       | Si 50    |          |          |          |          |          |
| <0.1ppm       | Li 0.048 | Be 0.015 | B 0.039  | Sc 0.068 | Ti 0.063 | V 0.058  |
|               | Cr 0.036 | Fe 0.027 | Co 0.020 | Ni 0.032 | Cu 0.077 | Zn 0.093 |
|               | Ge 0.033 | Ge 0.011 | As 0.011 | Se 0.010 | Sr 0.051 | Y 0.006  |
|               | Zr 0.016 | Nb 0.021 | Mo 0.027 | Pd 0.016 | Ag 0.034 | Cd 0.007 |

Display of the measurement results values

## High precision determination



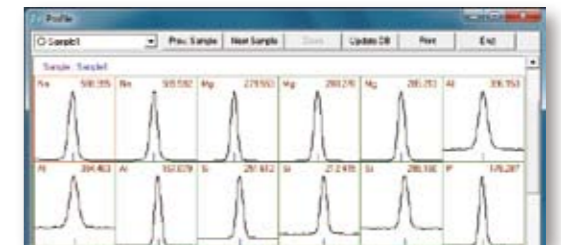
Selection of element wavelengths

All that is required is to select the wavelength

| Wavelength                                  | BEC    | ATT | Wavelength | Order |
|---|--------|-----|------------|-------|
| <input checked="" type="checkbox"/> 213.856 | 060000 | 15  | 213.923    | 1     |
| <input checked="" type="checkbox"/> 202.551 | 140000 | 15  | 202.616    | 2     |
| <input checked="" type="checkbox"/> 206.191 | 180000 | 15  | 206.257    | 3     |
| <input type="checkbox"/> 334.502            | 220000 | 15  | 334.598    |       |
| <input type="checkbox"/> 330.259            | 130000 | 15  | 330.354    |       |

Selection of measurement wavelength

The measurement wavelengths are set automatically



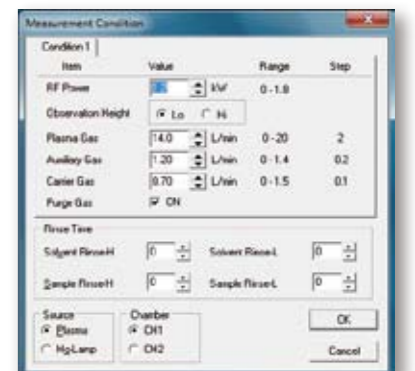
Display of the results values

| Concentration | Element  | Element  | Element  | Element  | Element  | Element  |
|---------------|----------|----------|----------|----------|----------|----------|
| >100ppm       | Na 120   | K 160    |          |          |          |          |
| >1ppm         | Mg 7.1   | Al 1.4   | P 6.3    | Ca 1.8   | Mn 1.3   |          |
| >0.1ppm       | Si 50    |          |          |          |          |          |
| <0.1ppm       | Li 0.048 | Be 0.015 | B 0.039  | Sc 0.068 | Ti 0.063 | V 0.058  |
|               | Cr 0.036 | Fe 0.027 | Co 0.020 | Ni 0.032 | Cu 0.077 | Zn 0.093 |
|               | Ge 0.033 | Ge 0.011 | As 0.011 | Se 0.010 | Sr 0.051 | Y 0.006  |
|               | Zr 0.016 | Nb 0.021 | Mo 0.027 | Pd 0.016 | Ag 0.034 | Cd 0.007 |

Display of the results values

## Setting the measurement conditions

Although it is preset to the optimal conditions, it can be changed at will



# Data Search and Report Formation at your will, and without restrictions

## Quantitative analysis

The conditions for quantitative analysis are automatically generated from qualitative analysis in order to minimize the labor required to prepare for measurement.

The sensitivity of each element is set automatically

The sensitivity of each element is set automatically

## Processing the analytical data

The results of the qualitative analysis 1, qualitative analysis 2, and the quantitative analysis of the measured data will be filed. The measurements profiles will of course be filed in the same way.

## Creating the report

The name of the analysis, sample name, date etc. are searched for out of the filed quantitative results. Analytical reports can be easily created based on the results of these searches.

Reading the data

The data can be easily recalled from the files.

Data display

Paste into generic software

Creating the report

The analysis/search results can be pasted into various word processing and spreadsheet software such as Microsoft Excel, helping in the creation of reports etc.

# Accessories, Options

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

| Sample Type  | Item | Nebulizers   | Sample Take-up Tubing   | Chambers  | Torches  | Drains  | Other  |
|--|------|--|---|---|--|---|--|
| Standard Set<br>ICPE-7510<br>Standard Accessories  |      | <b>Nebulizer, 10ES</b><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><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>Clamp, SNP-1 (P/N 036-61113-01)<br>These are included. | <b>take-up tube, S-075</b><br>(P/N 046-00092-06)<br>For "10" and "07" nebulizers. | <b>Cyclone chamber, HE</b><br>(P/N 046-00093-02)<br><br>Locking screw, 0152 (P/N 046-00093-92)<br>Seal, 0237 (P/N 046-00093-93)<br>These are included.  | <b>Torch</b><br>(P/N 204-70272)  | <b>Drain trap, 8214</b><br>(P/N 046-00093-01)<br>Cyclone chamber Drain trap (Indicated by "•")  | <b>Ball joint clip</b><br>(P/N 210-15508-01)<br>Connects the cyclone chamber and torch.<br><br><b>Cip</b><br>(P/N 046-00993-01)<br>Fixes the drain trap to the cyclone chamber.<br><br><b>Drain tube</b><br>(P/N 200-30864-24)<br>This is the tube from the drain tube to the drain. |
| For Small Amounts of Samples   |      | <b>Nebulizer, 07ES</b><br>(P/N 046-00092-01)<br>A nebulizer with high-efficiency nebulization.<br>(Sample take-up rate approx. 0.6 ml/min)<br><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>Clamp, SNP-1 (P/N 036-61113-01)<br>These are included.                            | <b>take-up tube, S-075</b><br>(P/N 046-00092-06)<br>For "10" and "07" nebulizers. | <b>Cyclone chamber, HE</b><br>(P/N 046-00093-02)<br><br>Locking screw, 0152 (P/N 046-00093-92)<br>Seal, 0237 (P/N 046-00093-93)<br>These are included.  | <b>Torch</b><br>(P/N 204-70272)  |   |  |
| High Salt Samples<br>(Used to inject high salt concentration samples)                            |      | <b>Nebulizer, 10ES</b><br>(P/N 046-00092-02)<br>(Sample take-up rate approx. 1 ml/min)<br><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>Clamp, SNP-1 (P/N 036-61113-01)<br>These are included.  | <b>take-up tube, S-075</b><br>(P/N 046-00092-06)<br>For "10" and "07" nebulizers. | <b>Cyclone chamber, HE</b><br>(P/N 046-00093-02)<br><br>Locking screw, 0152 (P/N 046-00093-92)<br>Seal, 0237 (P/N 046-00093-93)<br>These are included.  | <b>Torch for high-concentration salt solution samples</b><br>(P/N 204-74323)<br>Used when introducing an undiluted solution of a sample where the base element is of the % order of concentration. | <br>(Cyclone chamber assembly)  | <b>Water bubbler</b><br>(P/N 204-19281)<br>Used to prevent blockages in the nebulizer when analyzing samples containing large amounts of sodium. Inserted in the carrier gas pathway.  |
| Organic Solvent Samples<br>(Injection systems for organic solvents)                              |      | <b>Nebulizer, 10ES</b><br>(P/N 046-00092-02)<br>(Sample take-up rate approx. 1 ml/min)<br><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>Clamp, SNP-1 (P/N 036-61113-01)<br>These are included.  | <b>take-up tube, S-075</b><br>(P/N 046-00092-06)<br>For "10" and "07" nebulizers. | <b>Chamber drain straight</b><br>(P/N 211-80437-01)<br><br><b>Nebulizer holder kit type 2</b><br>(P/N 211-48062)<br>Includes organic solvent resistant O-rings. They are attached to each chamber other than the cyclone chamber, and are used to support nebulizers. | <b>Organic solvent torch</b><br>(P/N 204-77296)<br>Used when analyzing organic solvent samples that are difficult to inject into the plasma.   | <b>Drain kit</b><br>(P/N 211-86140-91)<br>Used for chamber drain (straight), water-cooled chamber kit and hydrofluoric acid sample injection system. Can also be used for organic solvents. | <b>Bracket</b><br>(P/N 211-85456-91)<br>Metal fittings for drain kit installation.   |
| Organic Solvent Samples<br>(Water-cooled chamber)<br>(Controls evaporation of solvents)          |      |  |   | <b>Water-cooled chamber kit</b><br>(P/N 211-43472)<br>This increases injection efficiency of organic solvent samples by cooling the chamber and suppressing sample evaporation within the chamber.<br><br>*Cooling water circulator is necessary.                     |  | <b>Drain kit</b><br>(P/N 211-86140-91)  | <b>Low-temperature thermostatic chamber NCB-1200 (SP) for water-cooled chambers</b><br>(P/N 044-01910-01)<br><br><b>Bracket</b><br>(P/N 211-85456-91)<br>Metal fittings for drain kit installation.  |
| Hydrofluoric acid sample injection system<br>(P/N 211-42853-03)<br>(Used for hydrofluoric acids) |      | <b>Hydrofluoric acid nebulizer</b><br>(P/N 046-00092-14)<br>Includes sample take-up tube.<br><br>PTFE Tube, 1.27 x 1500L (P/N 046-00092-03)<br>Tube adaptor, 0735 (P/N 046-00092-10)<br>These are included.  |   | <b>Chamber ASSY</b><br>(P/N 205-07778-02)   | <b>Demountable torch</b><br>(P/N 205-09627-01)   | <b>Drain kit</b><br>(Included in the hydrofluoric acid sample injection system)<br>(P/N 211-86140-91)   | <b>Bracket</b><br>(P/N 211-85456-91)<br>Metal fittings for drain kit installation.<br>(Not included in the hydrochloric acid sample injection system. Please purchase separately.)   |



# Accessories that enable automatic analysis and sample introduction at your will, without restrictions

## A wide variety of peripherals

### Autosampler AS-9 (P/N 211-43575-01)

After placing the samples in the autosampler, the sample names and all the analysis conditions can be set in a PC, and several samples analyzed continuously.

Size: W470×D268×H370mm  
Electrical power is supplied from the main unit. (DC 24V, DC 5V)

**\* A table ND is necessary**  
**Table ND with caster (P/N 219-96005)**  
Size: W600×D480×H750mm



### Autosampler AS-8T (P/N 205-04940-02) For organic solvents (P/N 211-48059-01)

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

Size: W500×D680×H525mm  
Electrical power is supplied from the main unit. (Single phase 100V, 50/60Hz, 3A)

**\* A SO table is necessary**  
**SO Table (P/N 210-44026)**  
Size: W600×D600×H690mm  
With caster



### Peristaltic pump (P/N 204-77310-01)

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



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

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

#### Specifications

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

### 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×H540mm  
Power supply W382×D360×H159mm  
Power supply: Single phase 100V, 50/60Hz, 10A

**\* A cooling water system is necessary as a utility.**  
**Table ND with caster (P/N 219-96005)**  
Size: W600×D480×H750mm



### 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.

**\* Bracket (P/N 211-85456-91) is necessary.**



### 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×D214×H195mm  
Power supply: Single phase 100V, 50/60Hz, 2A

**\* A table ND (with casters) is necessary.**  
**Table ND with caster (P/N 219-96005)**  
Size: W600×D480×H750mm



### Cooling water circulator CA-1112 (P/N 044-01809-03)

For the ultrasonic nebulizer UAG-1  
For the ICPS-7510

Size: W354×D384×H851mm 41kg  
Power Supply: Single phase 100V 50/60Hz 15A

\* When only the main unit ICPS-7510 is connected the piping kit A is needed.  
When the ultrasonic nebulizer UAG-1 is also connected the piping kit B is needed.

**Piping kit A: Main unit only (P/N 211-83633-01)**  
**Piping kit B: Main unit and UAG-1 (P/N 211-83633-02)**



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

For the water cooled chamber kit

Size: W238×D450×H592mm 25kg  
Power supply: Single phase 100V, 50/60Hz, 8A



# Specifications

## Spectrometer unit

|  |   |
|--|---|
| <b>Optical system</b>  | Czerny-Turner mounting<br>Double grating  |
| <b>Focal length</b>  | 1000mm  |
| <b>No. of diffraction grating grooves and wavelength range</b> | 3600 grooves/mm for 160 to 458 nm<br>1800 grooves/mm for 458 to 850 nm  |
| <b>Reciprocal dispersion</b>                                   | 0.22nm/mm(3600grooves)<br>0.44nm/mm(1800grooves)  |
| <b>Detector</b>  | Photo-multiplier tube   |
| <b>Slit</b>  | Entrance slit 20µm<br>Exit slit 30µm  |
| <b>Wavelength scanning</b>                                     | Sine-bar method<br>Driven by a computer controlled pulse motor<br>Minimum step wavelength 0.0002nm<br>Maximum speed 50nm/sec (3600 grooves) |
| <b>Temperature control</b>                                     | Proportional control method 38 ±0.1   |
| <b>Exhaust system</b>  | Rotary pump exhaust capability 160 liters/minute<br>With oil backflow prevention valve  |

## ICP Light source

|                                       |  |
|---------------------------------------|--|
| <b>Torch unit</b>                     | Cyclone chamber (misting chamber)<br>Quartz plasma torch<br>Coaxial type nebulizer   |
| <b>Observation position switching</b> | Up and down, 2 steps (during radial observation)   |
| <b>Gas controller</b>                 | 3 plasma flow channels<br>Flow rate setting range (computer controlled)<br>Plasma gas 2 to 20liters/minute<br>Auxiliary gas 0.2 to 1.4liters/minute<br>Carrier gas 0.1 to 1.5liters/minute<br>Purge gas 3.5liters/minute |
| <b>Axial observation attachment</b>   | Direction of observation can be changed (radial/axial)   |

## Radio frequency generator

|  |   |
|--|---|
| <b>Oscillator</b>                      | Crystal oscillator                                    |
| <b>Frequency</b>                       | 27.120MHz ±0.05% (ISM band)                           |
| <b>Output</b>                          | 0.8, 1.0, 1.2, 1.4, 1.6, 1.8kW                        |
| <b>Output stability</b>                | Within ±0.3%  |
| <b>Radio frequency circuit element</b> | Transistor  |
| <b>Ignition method</b>                 | Fully automatic ignition                              |
| <b>Load matching</b>                   | Automatic matching (auto tuning)                      |
| <b>With safety function</b>            | Radio frequency generator temperature fault detection |

## Photometry and control

|   |                                       |
|---|---------------------------------------|
| <b>Negative high voltage power supply</b> | Variable 16 steps                     |
| <b>Photometric method</b>                 | Sequential element measurement method |
| <b>Dynamic range</b>                      | 9 figures                             |

## Data processor

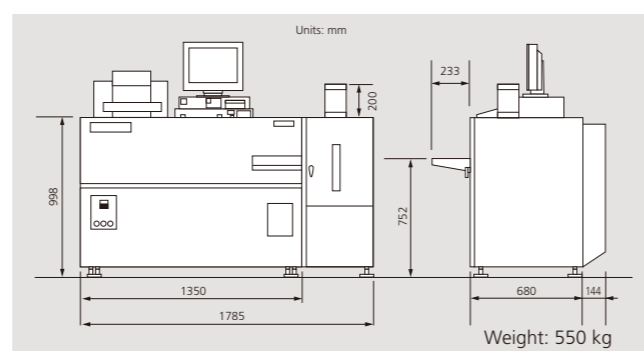
|                               |   |
|-------------------------------|---|
| <b>Personal computer</b>      |   |
| <b>CPU</b>                    | Intel Celeron 1.6GHz or higher                    |
| <b>Memory</b>                 | Main memory: RAM 512MB                            |
| <b>External memory device</b> | 1 CD-ROM installed<br>Hard disk over 80GB         |
| <b>Display</b>                | 17 inch color TFT                                 |
| <b>Printer (option)</b>       | Monochrome laser printer<br>Matrix inkjet printer |

## Software

|                                       |  |
|---------------------------------------|--|
| <b>OS</b>                             | Windows 7  |
| <b>No. of measurement wavelengths</b> | Qualitative analysis 1: 72 elements x 1 wavelength<br>Qualitative analysis 2: 72 elements Maximum 216 wavelengths<br>Quantitative analysis: 72 elements Maximum 72 wavelengths   |
| <b>Database</b>                       | Analyzed wavelengths data: 72 elements, maximum 16 wavelengths<br>Wavelength table: Approx. 110,000 wavelengths recorded   |
| <b>Analysis cards</b>                 | 100 cards  |
| <b>Quantitative analysis</b>          | Calibration curve sample Maximum 16 samples per card<br>Drift correction<br>Internal standard correction (sequential internal standard correction)<br>Background correction<br>Blank signal elimination<br>Matrix correction |

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\* Additionally, the company name and product name that has been described are the trademarks or registered trademarks of each company.  
\* Neither ™ nor ® mark are described clearly in the text.

## External Dimensions



# Installation

## Installing the ICPS-7510

### 1. Installation room environment

|   |   |
|---|---|
| Temperature                                   | 18 to 28°C (Rate of temperature change: 2°C/h or lower) |
| Humidity                                      | 70% or below  |
| Avoid places with a lot of vibration or dust. |   |

### 2. Power source

|                     |  |
|---------------------|--|
| Main unit           | 3-phase                                    |
| Data processor unit | Single phase (supplied from the main unit) |

### Options

- Autosampler AS-9/AS-6/AS-8T supplied from the main unit. (single phase 100V 3A)
- Ultrasound nebulizer UAG-1 Single phase 100V 10A
- Hydride generator HVG-ICP Single phase 100V 2A  
All of the above are grounded and require 3 pronged sockets.
- Check separately when using the cooling water circulator

### 3. Grounding

|            |                                 |
|------------|---------------------------------|
| Resistance | independent grounding below 30Ω |
|------------|---------------------------------|

### 4. Gas installation

|   |                                       |
|---|---------------------------------------|
| Type  | Argon gas of 99.95% or greater purity |
| Adjust so that the argon gas is supplied at a pressure of 350±10kPa (3.5±0.1kg/cm <sup>2</sup> ). |                                       |
| *Approximately one 7m <sup>3</sup> gas cylinder is necessary for 5 hours of operation.            |                                       |

### 5. Cooling water

|              |  |
|--------------|--|
| Water supply | Flow rate of 1L/min or greater 1 line  |
| Drainage     | Natural water flow drain (Unnecessary when using the cooling water circulator) |
| Note         | UAG-1 requires a separate supply of cooling water.                             |

\*When a cooling water circulation device is used with the main unit and UAG-1, confirm the piping kit, etc.

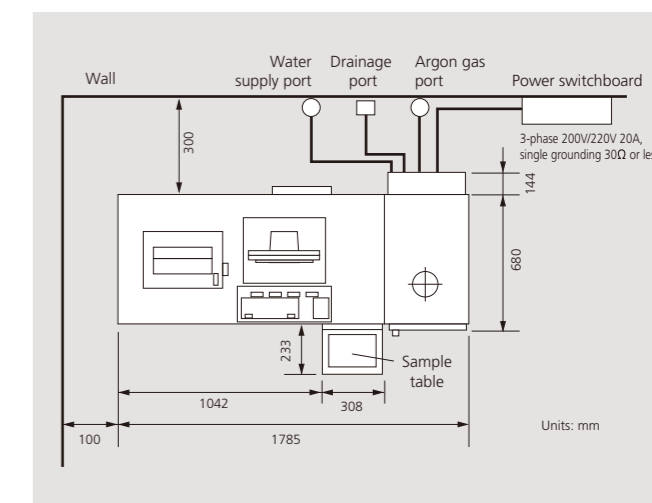
### 6. Exhaust duct

**Plasma stand**  
The exhaust gas is mostly argon. Install an exhaust duct however as it contains some metallic vapor and solvent.

### 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



- \* The placement can be easily changed because it has casters with stoppers.
- \* The sample table is detached during installation, allowing the unit to fit through an entrance width of 800mm.
- \* The dimensions at the time of installation is 735 × 1785 × 998mm.

The following warning seals are affixed onto the system. Please take sufficient care when handling these areas.

#### 1. At the gas purge tube



#### 2. At the switch panel



#### 3. At the vacuum pump and valve



#### 4. At the transformer

