

Hitachi Polarized Zeeman Atomic Absorption Spectrophotometer ZA3000 Series

Hitachi HighTech
HITACHI

Model	ZA3000	ZA3300	ZA3700
Analytical method	Flame/ Graphite furnace	Flame	Graphite furnace
Measurement mode	Atomic absorption and flame photometry		Atomic absorption analyses
Optics	Double-beam method (Polarized Zeeman method)		
Background correction	Polarized Zeeman method		
Sample chamber switching	Shifting of atomization section is unnecessary		—
Monochromator			
Mount, diffraction grating	Czerny-Turner mount, 1800 Lines/mm, Blazed at 200 nm		
Wavelength range, setting	190 to 900 nm, Automatic spectral peak setting		
Focal length, reciprocal dispersion	400 mm, 1.3 nm/mm		
Slit width	4 steps (0.2, 0.4, 1.3, 2.6 nm)		
Detector	Photomultiplier × 2 pieces		
Light source			
Number of lamps, turn-on current	8 Lamps (turret), 2 Lamps simultaneous lightning, 2.5 to 20 mA (average amperage)		
Flame section			
Zeeman-effect magnet	0.9 Tesla permanent magnet *		—
Burner	Pre-mix fish-tail type		—
Burning condition setting	Automatic flow rate setting of combustion gas		
Safety monitoring function	Optical flame monitoring, flame sensor error detection, fuel/auxiliary gas pressure monitoring, drain liquid monitoring, cooling water flow monitoring, flash-back shock absorption, safety fire extinguishing at power failure (buffer tank method), flow stop check at flame turnoff, prevention of restart at reconnection of power, N ₂ O select safety mechanism		—
Graphite furnace section			
Zeeman-effect magnet	1.0 Tesla permanent magnet *		1.0 Tesla permanent magnet *
Temperature control	50 to 2,800°C, overcurrent prevention Cleaning stage: 50 to 3,000°C (Pyro tube C HR, Pyro tube D HR)		50 to 2,800°C, overcurrent prevention Cleaning stage: 50 to 3,000°C (Pyro tube C HR, Pyro tube D HR)
Heating current control	Optical temperature control, constant current control		Optical temperature control, constant current control
Gas flow rate control	Sheath gas: Ar gas, 3 L/min, Carrier gas: Ar gas 0, 10, 30, 200 mL/min. (4 steps)		Sheath gas: Ar gas, 3 L/min, Carrier gas: Ar gas 0, 10, 30, 200 mL/min. (4 steps)
Safety monitoring control	Ar gas pressure monitoring, cooling water flow monitoring, heating furnace temperature monitoring		Ar gas pressure monitoring, cooling water flow monitoring, heating furnace temperature monitoring
Graphite autosampler			
Number of sample containers	60 pcs (1.5 mL container), 96 micro plate [option]		60 pcs (1.5 mL container), 96 micro plate [option]
Autosampler sample dispensing	Dispensing by each sample, contiguous dispensing		Dispensing by each sample, contiguous dispensing
Sample injection volume	1 to 100 µL		1 to 100 µL
Sample injection speed	Selectable in 5 steps		Selectable in 5 steps
Applicable solvents	Aqueous solution, ethanol, methanol, acetone, MIBK		Aqueous solution, ethanol, methanol, acetone, MIBK
Carry-over	10 ⁻⁵ or less (for standard aqueous solution sample)		10 ⁻⁵ or less (for standard aqueous solution sample)
Heating injection function	Yes		Yes
Sample concentrating (in furnace)	1 to 25 times		1 to 25 times
Sample dilution (in furnace)	1 to 10 fold		1 to 10 fold
Data processing			
Computer	PC/AT compatible, OS: Windows® 7 Professional, 64 bit version		
Kinds of signals	Zeeman AA, sample, reference, and emission intensity		
Calibration curve	Standard sample: Up to 10 points, Calibration curve preparation: Least-squares method and Newton method, Approximation function: 3 kinds, Sensitivity correction function, standard addition method, simple standard addition method		
Data processing	Calculation mode, peak width cut-off height specifiable, removal/restoration/replacement of measurement result, change of order number of calibration curve, sample blank processing, zero correction of calibration curve, Baseline correction, Statistical calculation (mean value, standard deviation, relative standard deviation, determination coefficient), detection limit, measuring time window setting		
Quality Control function	Sample check (upper limit RSD), STD check, Quality Control sample check, calibration curve check, recovery check		
Parameter/data saving, Help function	Measurement result and measurement signal, instrument status/error information, Instruction message for preventing errors, analytical information		
Dimensions (main body, WxDxH)/weight	1,100 × 650 × 637 mm/184 kg	800 × 650 × 480 mm/101 kg	800 × 650 × 637 mm/137 kg
Power	200 V, 7.5 kVA, 50/60 Hz	100 V, 0.2 kVA, 50/60 Hz	200 V, 7.5 kVA, 50/60 Hz
Power consumption	4.3 kW or less	0.1 kW or less	4.3 kW or less

* Please ensure that pacemaker implanted persons will not approach this apparatus closer than one meter, or will not handle this apparatus.

* Windows® is a registered trademark of Microsoft Corporation in the USA and other countries.

* This product is not approved as a medical device under the Pharmaceutical Affairs Law.

ZA3000 Series

CAUTION: For correct operation, follow the instruction manual when using the instrument.

Specifications in this catalog are subject to change with or without notice, as Hitachi High-Technologies Corporation continues to develop the latest technologies and products for our customers.

NOTICE: The system is For Research Use Only, and is not intended for any animal or human therapeutic or diagnostic use.

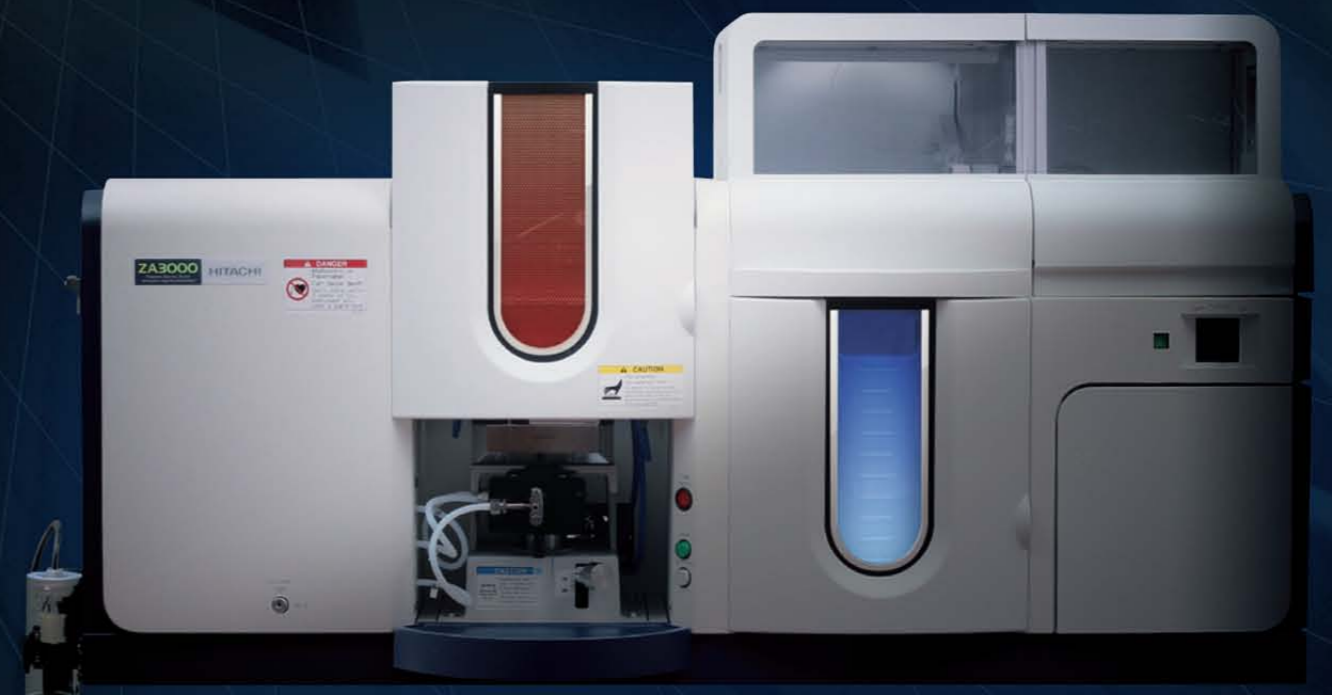
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Never Ending Evolution of Hitachi Zeeman Atomic Absorption Spectrophotometer

ZA3000 Series

ZA3000 is the new elemental analyzer which continued the fundamental performance of the high precision and sensitive analysis of polarized Zeeman Atomic Absorption Spectrophotometer, and improved functionality and reliability in response to the User's needs.



SYSTEM PERFORMANCE

- | Polarized Zeeman Method and Dual Detector
- | Separated atomization compartment
- | Environmental performance

FUNCTION

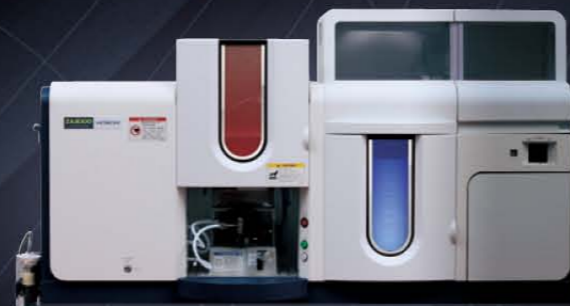
- | Analysis Assist (voice guidance) and Real Time QC **P.8**
- | Easy Start **P.8**
- | Twin injection technology **P.9**
- | Fast dispensing by graphite furnace autosampler **P.10**


EASY TO USE

- | Labor assistant switches on main unit for flame atomization **P.8**
- | Graphite furnace autosampler built in the main unit **P.10**
- | Graphite furnace dustproof cover standard-equipped **P.10**
- | Simple, GUI style operation **P.11**

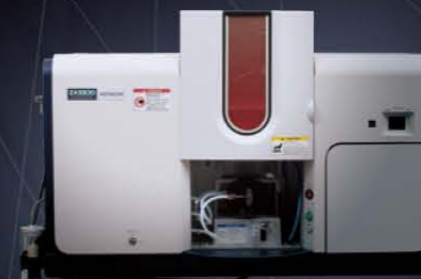
 Tandem(Flame & Graphite Furnace) type AAS


ZA3000



 Flame AAS

ZA3300



 Graphite Furnace AAS

ZA3700



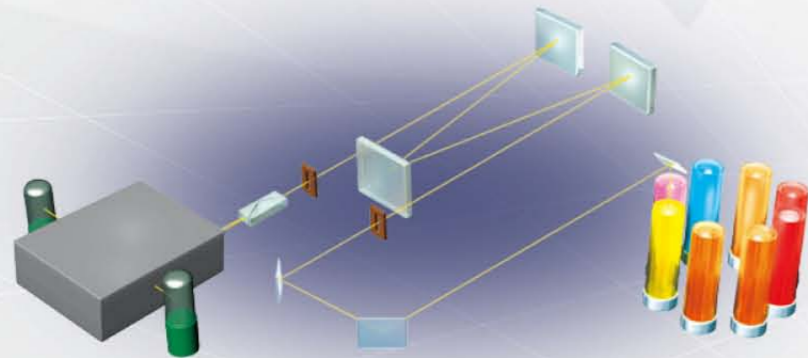
ZA3000 Series Line-up



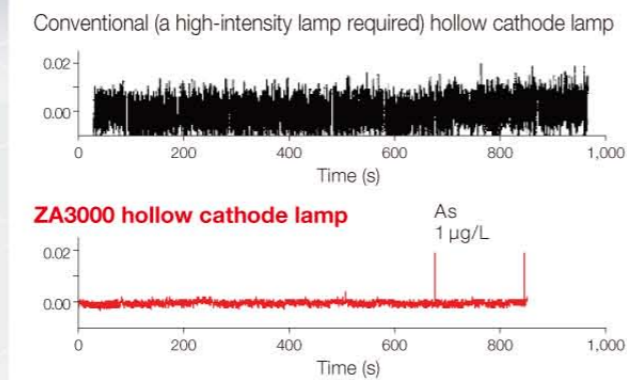
High Precision of Measurement Owing to Dual Detector Method

High Sensitivity and High Performance

A real-time background correction is realized by simultaneous measurement of sample light and reference light with two different detectors. Reproducibility and stability of analysis are improved by requiring no mechanism of switching the optical axis.

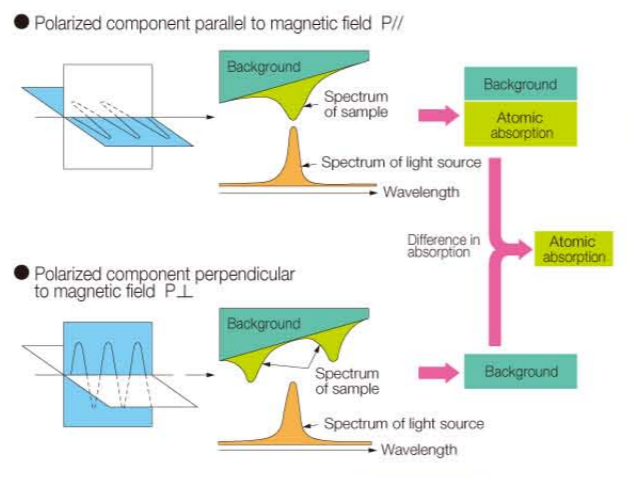


The new optical system and the improved graphite furnace power supply circuit ensure high sensitivities. Using an ordinary hollow cathode lamp, the ZA3000 Series spectrophotometer is capable of analyzing As, Se and Sb in tap water and environmental water, which previously have only been measurable using an EDL high-intensity or high-power lamp in a conventional graphite furnace analyses. This shows how noise can be reduced significantly to ensure high sensitivity.



Principle of Polarized Zeeman Correction

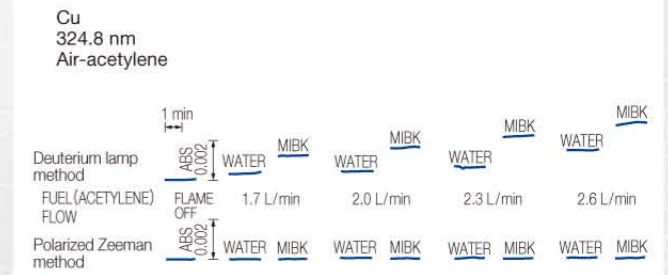
When a magnetic field is applied to a sample, the light component polarized parallel to the magnetic field ($P//$) is absorbed by the atoms of the sample, while the light component polarized perpendicular to the magnetic field ($P\perp$) is absorbed to a small extent by the atoms of the sample. On the other hand, background components, such as molecules and particles, are not affected by the applied magnetic field. Accordingly, both the light components, $P//$ and $P\perp$, are attenuated by the background components by the same amount. As a result, the background contribution of absorption can be eliminated by taking the difference between the signals of two light components, thereby the desired atomic absorption signal is obtained. Since the same light source is used to measure both light components, $P//$ and $P\perp$, full double beam photometry is obtained, and accurate background correction is obtained throughout the entire wavelength range. With a continuous spectrum light source such as the D_2 lamp, molecular absorption can be corrected only within a limited wavelength region, but neighboring line absorption cannot be corrected. Further, in case of self-reverse method, there is a problem of a significant decrease in sensitivity depending on the element to be assayed. There are other problems that the light beam is not precisely equivalent between low current and high current conditions, and that the dedicated light source lamp has heavy consumption.



Assay of High Reliability Using the Polarized Zeeman Method

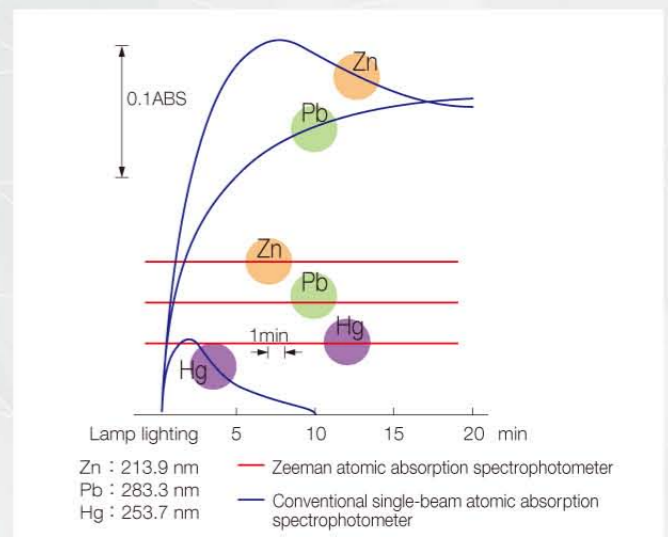
Baseline Stability

Analysis of high precision can be realized by means of double beam photometry. A stable baseline is provided for both flame atomization and graphite furnace atomization. The baseline stability is not affected by the introduction of an organic solvent.



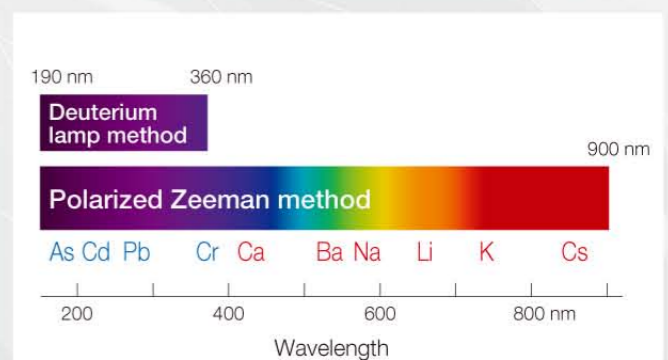
Quick Start up Saves Running Cost

Ideal double beam photometry using polarized Zeeman method is provided for both flame atomization and graphite furnace atomization. In case of Pb and Zn assays, it usually takes 10 to 25 minutes before the baseline becomes stable. In case of the polarized Zeeman method, however, the baseline is stable immediately after turning on the hollow cathode lamp. Since stabilization time is not needed for the hollow cathode lamp, most of the lamp service life can be used for the assay, thus running cost can be saved substantially.



Background Correction for Entire Wavelength Range using Only Hollow Cathode Lamp

Background correction can be carried out over the entire wavelength range using light from the hollow cathode lamp for measurement. The capability of performing atomic absorption and background correction at the same wavelength and in the same spectral width is one of the major advantages of the polarized Zeeman method.



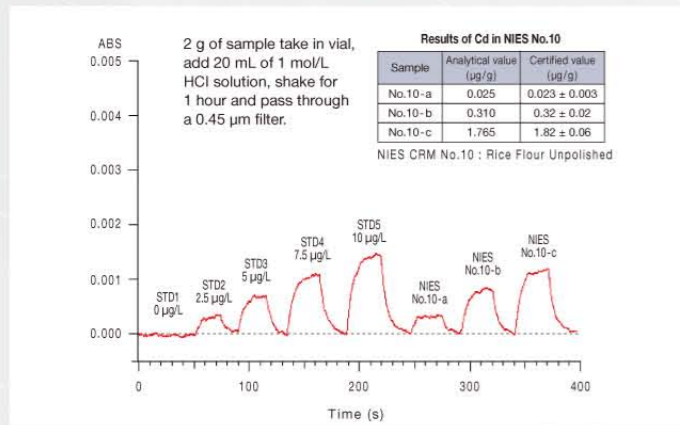


- The flame atomization polarized Zeeman method is adopted, which features low noise, high stability, and high throughput
- Easy to use thanks to Analysis Assist, Real Time QC, and Easy Start functions
- Improved safety owing to computer-controlled flame ignition sequence
- Labor assistant switches convenient for "Measurement start"

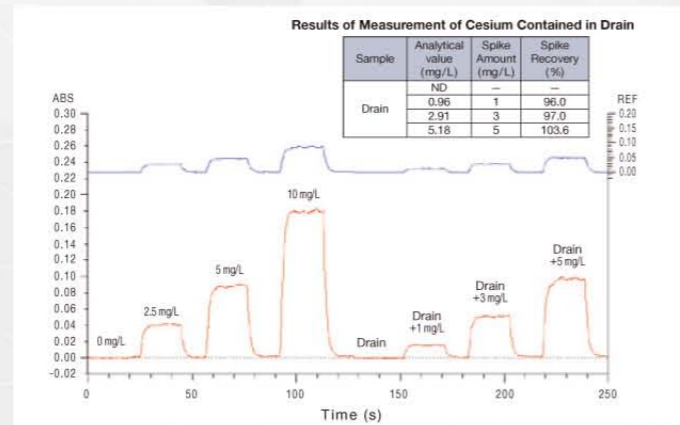
SYSTEM PERFORMANCE

Polarized Zeeman Method and Dual Detector

The combined method of the polarized Zeeman method plus the dual detector method allows concurrent detection of sample light and reference light, and a truly real-time background correction is thus realized. Now, polarized Zeeman atomic absorption spectrophotometers of higher precision and higher sensitivity are offered.



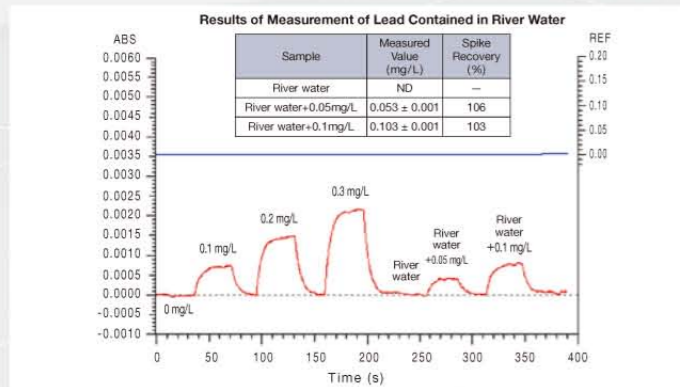
Cadmium concentration levels of µg/L can be accurately assayed.



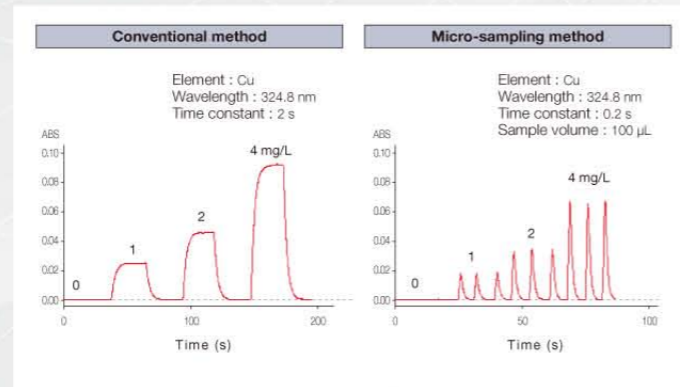
Even for cesium, which has a long absorption wavelength (852.1 nm), accurate background correction can be achieved.

Baseline Stability

A stable baseline is provided by using the combination method of the polarized Zeeman method plus the dual detector method.



Since the baseline is stable, lead concentration levels of 0.1 mg/L can be accurately assayed.



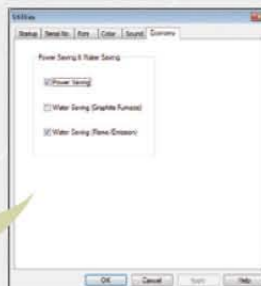
Since the baseline is stable, the method of micro sampling can be effectively carried out.

Water Saving and Power Saving

NEW

When the stand-by condition lasts for a certain period of time, for example, after the completion of assay, the feed of cooling water is stopped (water saving mode), and the hollow cathode lamp is turned off (power saving mode). The water saving mode and power saving mode can be enabled or disabled, as desired.

* Model ZA3000 is equipped with the water saving mode.



Safety Functions

- Computer-controlled flame ignition and extinguishing sequence
- Continuous monitoring of combustion gas pressure (upper and lower limits)
- Monitoring of supporting gas pressure
- Automatic gas feed stop at flame turning-off
- Interlock mechanism for dinitrogen oxide - acetylene gas burner head
- Monitoring of burner drain level
- Monitoring of cooling water flow rate
- Prevention of backfire caused by supporting gas buffer tank at power failure
- Monitoring of malfunction of solenoid valve opening and closing
- Monitoring of flame sensor abnormalities
- Gas leakage check at flame ignition

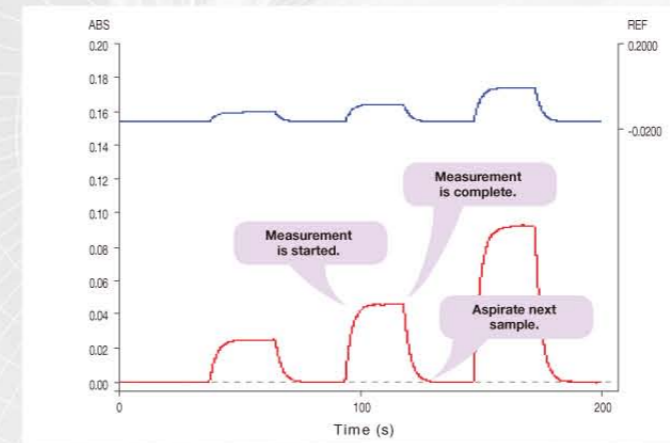


Safety-minded ignition sequence

FUNCTION

Easy Start

Just inject the sample in question; thereafter the measurement is started automatically at an appropriate timing when the condition is ready for the assay.



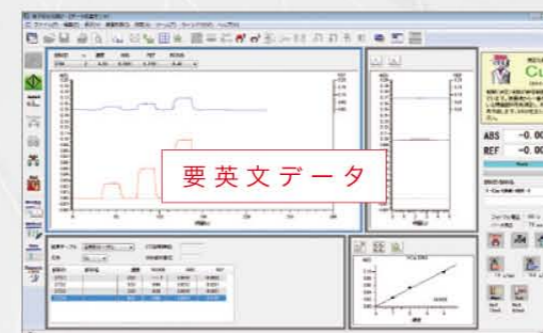
Analysis Assist Provides Simple Operation

Screen instructions and audio prompts help you to readily follow the course of the measurement procedure.

Real Time QC

QC check can be carried out in parallel with measurement, thereby securing the accuracy of measurement, not only for the assay using an autosampler, but also for the assay by manual operation.

- Calibration check
- Concentration/ reproducibility check
- QC sample check, etc.



EASY TO USE

Automatic Setting of Analytical Conditions

Equipped with a large turret-type lamp holder, on which 8 hollow cathode lamps can be mounted. Lamp positioning, fine adjustment, and lamp current setting are all carried out automatically for the element to be measured. Spectral peaks can be located accurately owing to the micro-drive spectrum search function. The spectral profile is displayed on the screen, along with useful information, such as neighboring spectral lines.

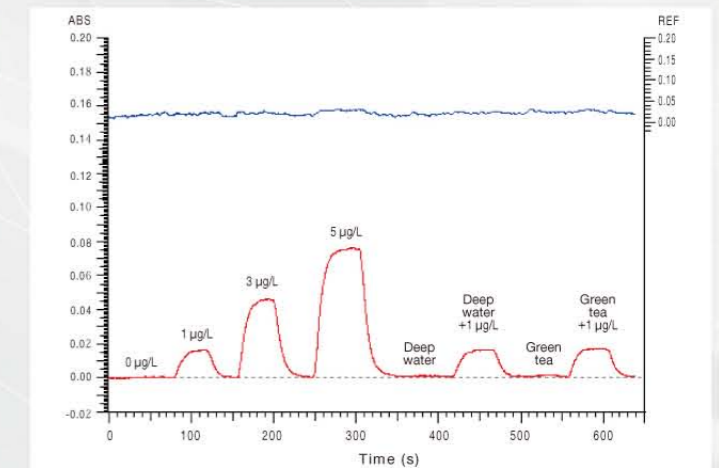
Improved Operability thanks to Labor assistant Switches

"Measurement Start" and "Auto Zero" buttons are arranged as standard on the front of the spectrophotometer. Operation of switches on the front of the apparatus allows measurement by manual operation. The measurement by manual operation can be carried out without the trouble of having to move for PC operation.



Hydride Generator Unit (optional)

Also for measurement using the hydride generator unit (HFS-3), a stable baseline can be achieved with measurement by the polarized Zeeman method. There is no need for troublesome waiting time for lamp stabilization.



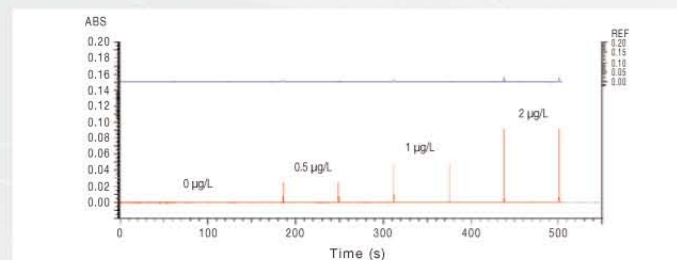
The baseline is stable immediately after turning on the hollow cathode lamp, and an arsenic concentration levels of 1 µg/L can be readily measured.

- High accuracy background correction is available owing to the use of the DC polarized Zeeman method
- Main body integral standardly equipped with autosampler plus graphite furnace dustproof cover
- Improved accuracy of measurement for large volume samples owing to twin injection technology
- Automatic bumping detection function allows detection of sample bumping during drying process

SYSTEM PERFORMANCE

Polarized Zeeman Method plus Dual Detector Method

The combined method of the polarized Zeeman method plus the dual detector method allows concurrent detection of sample light and reference light, and a truly real-time background correction is realized. Now, polarized Zeeman atomic absorption spectrophotometers of higher precision and higher sensitivity are offered.

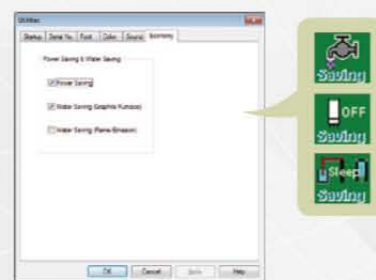


Low concentration levels of cadmium can be measured with a high reproducibility.

Water Saving and Power Saving **NEW**

When the stand-by condition lasts for a certain period of time, for example, after the completion of the assay, the feed of cooling water is stopped (water saving mode), and the hollow cathode lamp is turned off and the autosampler power consumption is reduced (power saving mode). The water saving mode and power saving mode can be enabled or disabled, as desired.

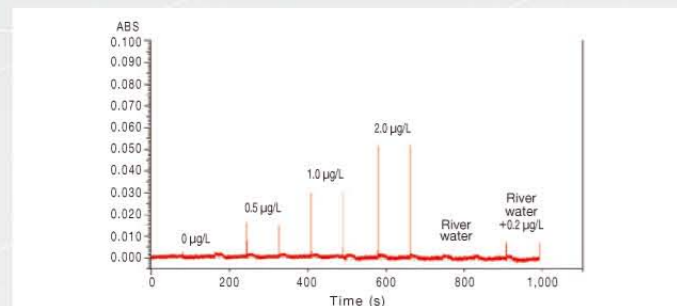
* Model ZA3000 is equipped with the water saving mode.



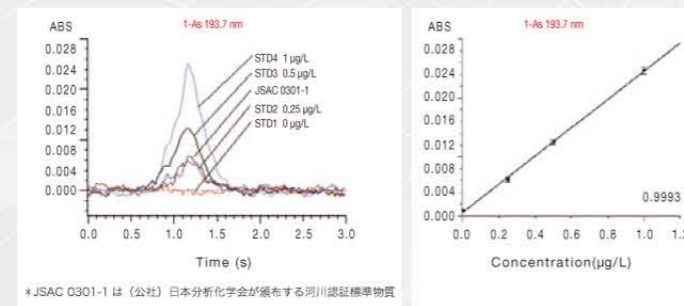
FUNCTION

Twin Injection Technology **NEW**

Sensitivity can be improved readily by injecting a large volume of sample. There are two sample injection holes in the cuvette. By preparing two sample injection holes, the contact area between sample and cuvette becomes larger, thereby the efficiency of heat conduction to the sample is improved. Consequently, a shorter duration of drying process is allowed even for the assay of a sample with a large volume.



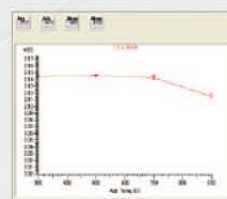
Antimony concentration levels of 0.2 µg/L contained in river water can be measured without concentrating by heating.



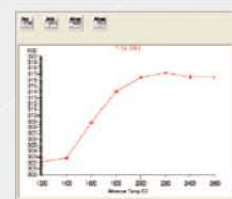
Arsenic concentration levels of 0.2 µg/L contained in river water can be measured without concentrating by heating.

Support of Automatic Temperature Programming

A temperature program, by which the maximum absorbance or the minimum RSD can be achieved, can be generated automatically by carrying out test cycles with step-wise incremental temperature parameters for drying, ashing, and atomization.



Ashing Temperature Graph



Atomization Temperature Graph

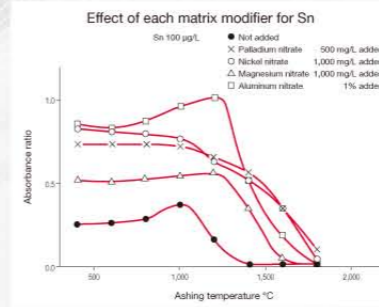
Cuvette Cleaning **NEW**

This function minimizes memory effects of high melting point elements, which may be left in the cuvette after previous measurement, by heating the cuvette before subsequent measurement. There are two ways of heating treatment: One is "Heating" mode, in which the duration of maximum heating is specified, and the other is "Temperature Program" mode, in which a desired cleaning temperature program is specified.

FUNCTION

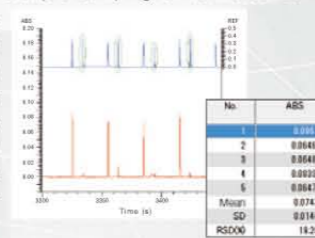
Four Kinds of Matrix Modifiers Can Be Applied

Addition of appropriate reagent(s) to the sample can lead to interference suppression and sensitivity improvement. Further, since the ashing temperature is increased, the reagent addition is effective for the removal of organic substances and other coexisting substances, possibly leading to the improvement of spike recovery of the target element, the improvement of the limit of detection, and the removal of background components. The appropriate matrix modifiers depend on the element of analysis, and up to four kinds of matrix modifiers can be applied.



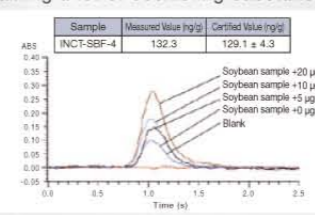
Automatic Bumping Detection Function **NEW**

If sample bumping occurs during the drying process, the accuracy of measurement would be compromised. Sample bumping is monitored during measurement, and the "P" label is attached to the measured value when sample bumping is suspected during measurement. Accordingly, the possible occurrence of sample bumping can be checked after the measurement, and this information is useful for the analysis of factors responsible for poor reproducibility.



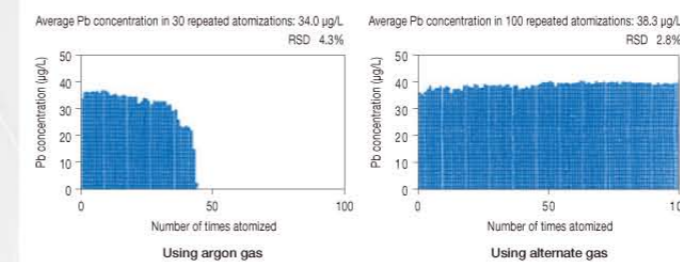
High-performance Omega Platform Cuvette

High accuracy assay of samples containing a lot of coexisting substances is possible. By carrying out the sample atomization when thermal equilibrium within the cuvette is achieved, interference caused by the coexisting substances can be reduced. Interference caused by the matrix can be reduced, and high accuracy assay is possible.



Alternate Gas is Available (optional)

An alternate gas, other than Ar gas, can be used during the ashing process. By the use of Ar gas containing 5 to 10% of oxygen, interference caused by background or coexisting substances can be reduced.



EASY TO USE

Automatic Setting of Analytical Conditions

Equipped with a large turret-type lamp holder, on which 8 hollow cathode lamps can be mounted. Lamp positioning, fine adjustment, and lamp current setting are all carried out automatically for the element to be measured. Spectral peaks can be located accurately owing to the micro-drive spectrum search function. The spectral profile is displayed on the screen, along with useful information, such as neighboring spectral lines. The carrier gas flow rate at each stage of heating to specified temperatures is under automatic control by computer. Optical temperature control is utilized for atomization heating. Assays of high sensitivity and high accuracy can be accomplished.

High-performance Autosampler Built in the Main Body

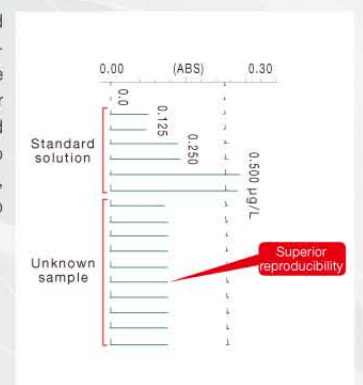
- Up to 60 samples can be loaded.
- Only the specified samples can be measured by the use of random-access function.
- Sample injection volume can be specified up to 100 µL in increments of 1 µL.
- Sample injection speed can be selected among 5 speeds depending on the liquid characteristics of sample.
- An appropriate concentration of the sample can be achieved by the use of either the intra-furnace concentrating or the intra-furnace dilution mode.
- Methanol, ethanol, MIBK, and other organic solvent samples can be measured.
- 96 Micro-plates (optional) can be used for sample injection.

Fast Dispensing by Autosampler (Contiguous Dispensing) **NEW**

When multiple solutions of sample plus matrix modifiers are injected into the cuvette, the first solution is sucked, then air, then another solution, then air, and so on. Finally, the multiple solutions that are sucked are injected all together into the cuvette. The vigorous discharge facilitates the mixing of the sample with matrix modifiers. Due to this mixing effect, the concentration or the addition volume of matrix modifiers may be lowered. In the case of dispensing 20 µL of a sample plus 10 µL of a matrix modifier, the dispensing time can be reduced by about 40% compared with the usual dispensing method.

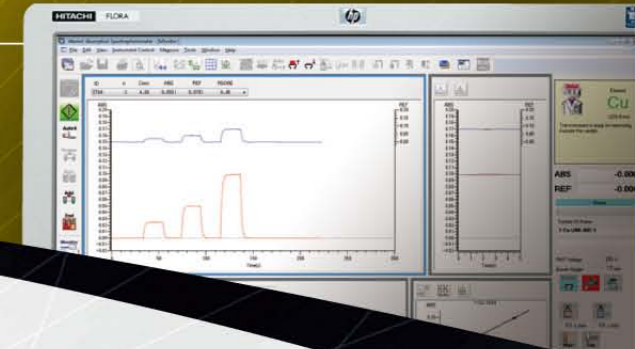
Dustproof Cover

A dustproof cover is standardly mounted above the graphite furnace and autosampler to prevent the ingress of dust in the laboratory. In addition, since the cover facing the autosampler can be opened separately to allow frequent access to the autosampler for sample replacement, the atomization section is constructed to be more resistant to pollution.



LED Spot Lighting for Illuminating Graphite Furnace **NEW**

LED spot lighting is incorporated to illuminate the graphite furnace section. As a result, the visibility during position adjustment of the autosampler nozzle or cuvette replacement is improved, also facilitating maintenance works.



- In addition to full-content functions, simple, improved GUI style operation is offered
- All the information during measurement is put together on the Monitor Screen
- Custom report generation function using Excel® (Report Generator) is incorporated
- Measurement parameters can be specified readily in a sequential manner

Monitor Screen

Monitor Signals during measurement (Zeeman correction signal and background signal) are displayed in a real-time manner. This screen displays measurement and atomization profiles, results of measurement, calibration curve, and other pertinent information, that are definitely useful for grasping the status of measurement.

Measurement profile

Atomization profile

A character corresponding to the method of analysis is shown here

Target element and wavelength are shown here

ABS and REF values are shown here

Status of apparatus is shown here

Results of measurement

Calibration curve

Level ID	Sample Name	Conc	REF	ABS	REF
1701	1.00	0.000	0.000	0.000	0.000
1702	1.00	0.000	0.000	0.000	0.000
1703	1.00	0.000	0.000	0.000	0.000

Get wanted information on sight.

Data Processing Screen

Data Operation and data processing regarding multiple elements can be readily carried out. This screen displays results of measurement, atomization profile, calibration curve, and other pertinent information, facilitating your desired operations. Data processing operation is also available even during measurement owing to multi tasking. Regarding report output after data processing, Report Generator is offered; Report Generator allows you to generate your custom reports using Excel® in the desired format in addition to the incorporated existing formats.

Results of measurement

Atomization profile

Calibration curve

Even during measurement, previously acquired data can be checked or edited.

Parameters Setting Screen

Method On this screen, you can select the element to be assayed and specify parameters of measurement. To do this, you just follow the prompts displayed on the screen. Up to 12 elements can be measured when a composite lamp is used. In case of sequential analysis of multiple elements, parameters of measurement for each kind of element can be specified together. You can also check the information of analysis for a specified element.

Since specified parameters of measurement can be saved as an electronic file, you can start routine work of measurement by opening the saved file.

Even a beginner can readily specify parameters of measurement by following the sequence of workflow.

Element Selection Screen

Autosampler Setting Screen

Automatic Self-Diagnosis Function

Diagnosis An automatic self-diagnosis function is incorporated in the ZA3000 series spectrophotometers. Since the wavelength accuracy, baseline stability, sensitivity, and reproducibility are checked automatically, you can verify the precision, accuracy, and stability of the apparatus without difficulty.

The status of the apparatus can easily be checked.

Help Function

Help Help function is offered for each screen. The features of topic search and key-word search are available, and it is helpful in clarifying ambiguities about how to operate. On the Information of the Analysis Screen, you can check the information related to each element.

Help Screen

Information on the Analysis Screen

Full-content Help function is helpful to solve your worries about measurement.

For Flame

SSC-230 Autosampler for Flame Atomization

Target sample solutions are sampled by means of random-access function, thereby measurement time being reduced, and sample consumption being minimized.

- Up to 80 samples can be loaded.
- Random-access target samples can be specified for each element, and automatic multiple-element analysis including up to 12 elements is available.
- After the completion of measurement, the burner chamber is washed, and the flame is extinguished automatically.

* The autosampler with preconditioning function SSC-400 [7J0-8830] is also available.

Mercury Analysis Accessory Unit

With this accessory unit, a reducing agent can be added to the sample solution to vaporize mercury, leading to a high sensitivity assay. The use of reaction reagent of SnCl₂ is required.

* Drying agent dehumidification type

High Temperature Burner Head

This burner is used for the measurement of elements, such as Al, B, Be, Ge, La, Nb, Si, Ta, Ti, V, W, and Zr, of which dissociation energy is high. The use of a dinitrogen oxide - acetylene gas flame is required.

Optical path length: 5 cm, Material: Titanium



Micro-Sampling Accessory Kit

Samples of 0.5 mL or less can be measured by flame atomization. This accessory kit prevents the burner slot from clogging caused by sample solutions.

HFS-3 Hydride Generator Unit

● This unit uses sodium borohydride, and enables high sensitivity assay of elements such as As and Se.

● Efficient assay is provided because sensitivity is high and measurement is fast. High accuracy assay is possible because measurement is made consistently under identical conditions by using continuous flow based on JIS standards.

Assay-applicable elements: As, Sb, and Se
The use of Heating Absorption Cell (separately supplied) is required.



Heating Absorption Cell for HFS-3

When equipped with the HFS-3 Hydride Generator Unit, this cell is mounted above the burner, and is heated by air - acetylene gas flame (cell holder supplied).

* Heating Absorption Cell without a cell holder [7J0-8861]



Burner for High Salt-Content Sample

This burner is used for the measurement of high salt-content samples. The use of air - acetylene gas flame is required.

Optical path length: 10 cm, Material: Titanium



Glass Atomizer

This atomizer is used for the assay of sample solutions that contain acids that can dissolve metals.

Even samples that contain aqua regia can be measured without erosion.

Material: Fully made of glass



For Graphite Furnace

PEEK Nozzle for Furnace Autosampler

The material PEEK, which is bend-resistant, is used for the nozzle end.

Note that this nozzle cannot be used for samples such as concentrated nitric acid, which can dissolve the PEEK.



Alternate Gas Accessory Unit

This unit accelerates the decomposition of organic substances during ashing by switching argon gas and oxygen-mixed argon gas.

HLA-4 Hollow Cathode Lamp



Element	Ag, Al, As, Au, B, Ba, Be, Bi, Ca Cd, Co, Cr, Cu, Fe, Ga, Ge, Hf, Hg In, Ir, K, La, Li, Mg, Mn, Mo, Na Nb, Ni, Pb, Pd, Pt, Rh, Ru, Sb, Sc Se, Si, Sn, Sr, Ta, Te, Ti, Tl, V W, Y, Yb, Zn, Zr
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For both

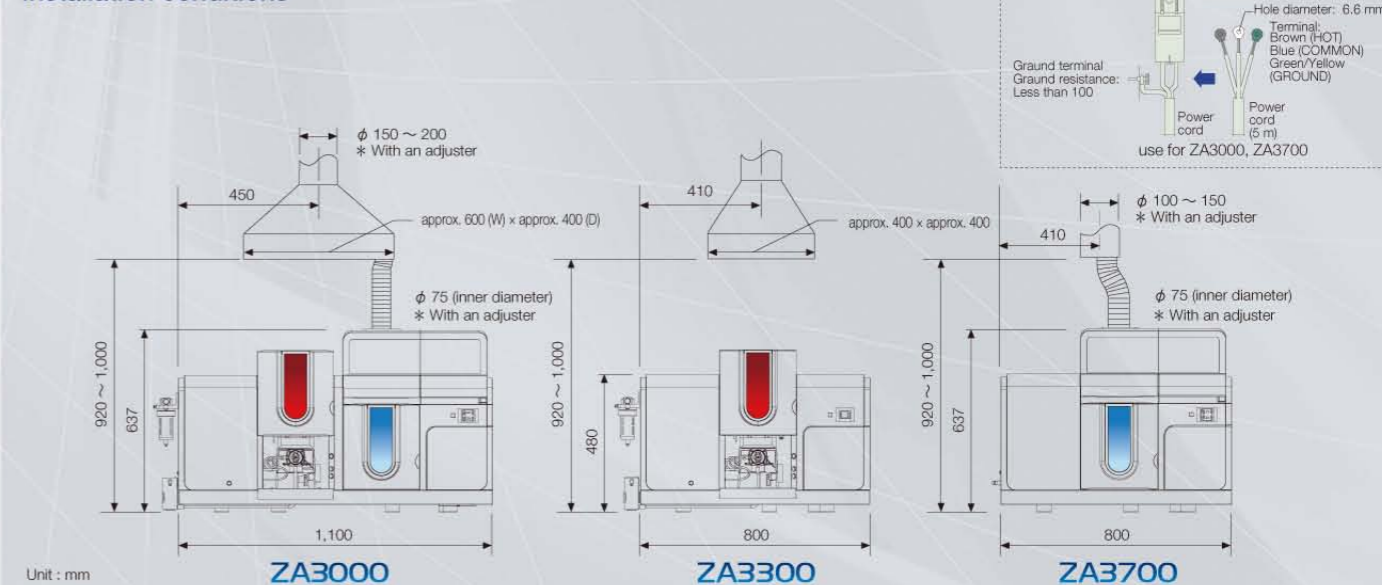
For Graphite Furnace

Cuvettes

Cuvettes	Purpose, temperature, injection volume	Configuration	Features	Suitable fields
Pyro tube C HR	Element analyses with low vapor pressure to 2,800°C to 100 µL 10 pieces/pack		● Generation of carbide can be reduced. Applicable elements: Ba, Ca, Co, Cr, Mn, Mo, Ni, Pd, Pt, Sr, Ti, V	Applicable to analyses of samples in any field. Particularly suitable for high-sensitivity analyses.
Pyro tube D HR	For twin-injection analysis. Element analyses with low vapor pressure to 2,800°C to 80 µL 10 pieces/pack		● By carrying out decantation injection, diffusion of the sample solution can be suppressed. Measurement accuracy can be improved. ● The atomizing temperature is high and general purpose cuvette. ● Generation of carbide can be reduced.	Applicable to general purpose analyses in any field.
Graphite tube HR	Element analyses with high vapor pressure to 2,800°C to 50 µL 10 pieces/pack		● The atomizing temperature is high.	Applicable to general purpose analyses in any field.
Cup-type cuvette HR	Element analyses with high vapor pressure to 2,100°C to 50 µL 10 pieces/pack		● The sample injection port is large, and diffusion of sample solution can be prevented. ● Suitable for analyses of a sample having high concentration of organic components, such as blood and urine. ● Useful for a sample that will bubble at the drying stage. ● Reproducibility can be enhanced.	Samples of high organic substance content.
OMEGA Platform Tube HR	For reduction of chemical interference to 2,600°C to 100 µL 10 pieces/pack	 Platform	● The sample is heated by radiating heat. Atomization is made at a thermal equilibrium level of gas temperature. ● Re-combination of coexistent substances and analyte element in the tube can be prevented. Also, interference by matrix can be reduced. ● The platform is preinserted and fixed in the cuvette.	Samples of high matrix content.
Ring	Ring for mounting cuvette on electrode part 4pieces/pack		● Support	

* The following tubes are also available: Inexpensive graphite tube CHR, which can be used for high concentration samples and is less sensitive than the graphite tube HR; and conventional-type Pyro tube HR.

Installation conditions



* Please make arrangements for an installation table, which can withstand the weight of all of the main body, PC, and printer.

Water supply /drain	Cooling water	12 mm chemical fluid tap (outer diameter)
	Water flow rate	Flow rate: 0.8 L/min (flame) Flow rate 2.0 L/min (graphite furnace)
	Water pressure	35 to 150 kPa
	Water supply port	Within 4 m
	Water drain port	Height : 100 mm or less Opening diameter : 50 mm or more
Gas Supplied pressure (Secondary pressure setting)	Argon	500 kpa
	Acetylene	90 kpa
	Dinitrogen oxide	400 kpa
	Air	500 kpa
Room temperature		5 to 35°C
Humidity		45 to 65%RH

Duct	Material	Stainless steel
	Dimensions	Approx. 600 (W) x 400 (D) mm (ZA3000)
		Approx. 400 (W) x 400 (D) mm (ZA3300)
Suction	φ 100 to φ 150 mm (ZA3700) 600 to 1,200 m ² /hr (frame) 10 to 25 m ² /hr (graphite furnace)	
Power supply	Model	Main unit (without PC)
	ZA3000	220/230/240 V 7.5 kVA (Power consumption under 4.3 kw) Single phase
	ZA3300	115/220/230/240 V 0.2 kVA (Power consumption under 0.1 kw) Single phase
	ZA3700	220/230/240 V 7.5 kVA (Power consumption under 4.3 kw) Single phase

- * Acetylene gas cylinder that is using DMF as the solvent can not be used.
- * For acetylene piping, use stainless steel piping of 5 mm or larger id. Do not use copper piping.
- * Provide a backfire preventive device for the acetylene gas facilities.
- * Supply of cooling water recommends the recirculating chiller.
- * In the case of the cooling water pressure exceeding 150 kPa, prepare and attach a decompression valve.

* Install the gas cylinders at a dedicated storage place, provide metallic piping from the gas cylinder storage place to the installation location, and attach a stop valve at each end of pipe.