

AA-6200

Shimadzu Atomic Absorption Spectrophotometer C122-E035D

AA-6200

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J.J.J. Valat

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AA-6200

Shimadzu Atomic Absorption Spectrophotometer

A Compact and Yet Sophisticated Double-Beam AA

Shimadzu has designed and manufactured Atomic Absorption spectrophotometers since 1968. This long experience, and in combination with close customer relationships all over the world, has led to an exceptional solution... The AA-6200: Easy-to-use, compact, doublebeam AAS at an affordable price.



Easy Operation

Use of Windows OS provides easy operation for system control and data processing. The Wizard function guides the user through the entire analytical procedure. Worksheets permit the experienced user direct access to all of the parameter settings.

Compactness

Shimadzu's AA-6200 uses the least linear bench space of any Atomic Absorption Spectrophotometers in the world. At only 690 mm (27 inches) wide, valuable laboratory space is saved. In spite of its compactness, the performance has not been compromised. In fact, the AA-6200 outperforms other atomic absorption instruments many times its physical size.

Double Beam

It is not just another double-beam Atomic Absorption Spectrophotometer. The double-beam system provides the superior baseline stability expected from high-performance optical systems. Additionally, the signal-to-noise ratio has been greatly enhanced by using a Chopper Mirror instead of the conventional Beam Splitters/ Combiner.

Affordable

This affordable double-beam AA-6200 is designed and manufactured to meet your laboratory needs. The instrument not only offers an affordable solution to your analytical needs and requirements, but it also provides features usually available only on high-end instruments.

Contents

P 04 - Workstation Operation

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Easy Operation by Windows

Connect to Instrument	Power On the Instrument. Then press [Connect]	X Connect
< <u>B</u> ack	Next> Cancel	Einsh

Simple Operation

The Wizard function guides the user through instrumentation and parameter setup. Simply follow the instruction on each screen and press the [Next>] key. From turning on the instrument to actual analysis via the parameter setting Wizard, clicking on the [Next>] button leads you to...

Optics for Lamp Adjustm	nent	×
Optics for Lamp Adjustr	Element Wavelength (190.0-900.0 nm) <u>I</u> urret Lamp <u>C</u> urrent (0-60 mA) <u>B</u> and Width Lamp <u>M</u> ode <u>L</u> amp Status: Ne Lamp ON	Cu 324.8 2 Y 6 0.2 Y EMISSION Y red to Perform Line Search.
	W <u>a</u> rmup Lamp.	LineSearch
< <u>B</u> ack	Next>	Cancel Einsh

...the Optical parameter setup. Selection of the element will automatically set the analytical wavelength and the lamp current for maximum sensitivity. Pushing the [Line Search] button verifies these conditions. Next, begin the lamp warm-up by selecting the [Warmup Lamp...] button. Clicking on the [Next>] button of the function Wizard guides you to...



...the Adjustment of the Lamp position window. Maximum energy of the specific hollow cathode lamp is achieved by optimization of the lamp position. Clicking on the [Next>] 1 button of the function Wizard guides you to... ...the Quantitation screen where the calibration method is selected for up to 10 standards. For accurate results, three different orders of the calibration curve are available. The standard concentration, units, and autosampler position are defined in this screen. Click the [Next>] button to open...

	Method © Calibration Curve © MSA	<u>N</u> o of S <u>C</u> onc.	TD	5
	C MSA and SMSA		Conc.	Pos.
		1	0.0000	R1
	Order 1st V	2	1.0000	R2
Card and		3	2.0000	R3
- A Contraction		4	3.0000	R4
		5	4.0000	R5
	Conc <u>U</u> nit ppm ▼			

...the Measurement Screen to provide the measurement sequence with periodic blank and sensitivity correction. Selecting the [Repeat Conditions...] button defines the number of measurement repetitions for blanks, standards, and samples. A final click on the [Next>] button leads you to...

Measurement	×
	Periodic Blank Measurement ✓ Enable ASC Position Every 1 Samples R0 ▼ Periodic Sensitivity Correction ✓ ✓ Enable ASC Position Every 20 Samples R5 ▼ Options Repeat Condition
< <u>B</u> ack	Next> Cancel Finsh

...the sample sequence table where sample identifications are entered or imported from an ASCII file. Finally, click on the [Finish] button to exit the Wizard.

		Sample	Pos	WF	VF	٠
	1	River water 1	1	10.0000	100.0000	
	2	River water 2	2	10.0000	100.0000	
	3	River water 3	3	10.0000	100.0000	
	4	River water 4	4	10.0000	100.0000	
	5	River water 5	5	10.0000	100.0000	
	6	Waste water 1	6	10.0000	100.0000	
	7	Waste water 2	7	10.0000	100.0000	•
	•				Þ	
	Samp	Die <u>N</u> umber	6			
		Auto	Liea	ite	Import	_
<back< td=""><td></td><td>Next></td><td>Canc</td><td>el</td><td>Finsh</td><td></td></back<>		Next>	Canc	el	Finsh	

From Raw Data to Summary Report

Digital and analog measuring of real-time signals.

Users have a choice of calibration curves for real-time monitoring of the standards. Double clicking on the calibration curve (below) will display the screen to the right, which will allow for printing the calibration curve, equation, and curve fit.



sophisticated Summary Report (right). The report summarizes sample identification versus all elements analyzed.



The Help function displays detailed explanations of parameter settings and operational procedures. The search and call functions are provided for easy access to the electronic instruction manual, eliminating the need to search volumes of manuals located elsewhere.



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	Sample	Cu Actual Conc	Cu Conc Unit	Zn Actual Conc	Zn Conc Unit	0.0 Pb Actual Conc	5.0 Pb Conc Unit	Ni Actual Conc	Ni Conc Unit	Fe Actual Conc	Fe Conc Unit	
	Sample ID River water 1	Cu Actual Conc 9.9426	Cu Conc Unit	Zn Actual Conc 10.4643	Zn Conc Unit	0.0 Pb Actual Conc 10.5253	5.0 Pb Conc Unit	Ni Actual Conc 8.1586	Ni Conc Unit	Fe Actual Conc 7.9509	Fe Conc Unit	7.8
	Sample ID River water 1 River water 2	1.0 0.0 Cu Actual Conc 9.9426 7.9280	Cu Conc Unit ppm ppm	Zn Actual Conc 10.4643 10.7641	5.0 Zn Conc Unit ppm ppm	0.0 Pb Actual Conc 10.5253 9.0716	5.0 Pb Conc Unit ppm	Ni Actual Conc 8.1586 6.7548	Ni Conc Unit ppm	Fe Actual Conc 7.9509 6.5988	Fe Conc Unit ppm	7.8
	Sample ID River water 1 River water 2 River water 3	1.0 0.0 Cu Actual Conc 9.9426 7.9280 3.9364	Cu Conc Unit ppm ppm	Zn Actual Conc 10.4643 10.7641 10.2212	50 Zn Conc Unit ppm ppm ppm	0.0 Pb Actual Conc 10.5253 9.0716 7.6034	5.0 Pb Conc Unit ppm ppm ppm	Ni Actual Conc 8.1586 6.7548 9.0118	Ni Conc Unit ppm ppm	Fe Actual Conc 7.9509 6.5988 6.7962	Fe Conc Unit ppm ppm	7.8 6.4 6.6
	Sample ID River water 1 River water 2 River water 3 River water 4	1.0 0.0 Cu Actual Conc 9.9426 7.9280 3.9364 7.4844	Cu Conc Unit ppm ppm ppm	Zn Actual Conc 10.4643 10.7641 10.2212 17.3015	50 Zn Conc Unit ppm ppm ppm	0.0 Pb Actual Conc 10.5253 9.0716 7.6034 7.8197	5.0 Pb Conc Unit ppm ppm ppm ppm	Ni Actual Conc 8.1586 6.7548 9.0118 9.3798	Ni Conc Unit ppm ppm ppm	Fe Actual Conc 7.9609 6.5988 6.7962 8.8839	Fe Conc Unit ppm ppm ppm	7.8 6.4 6.6 6.8
	Sample ID River water 1 River water 2 River water 3 River water 4 River water 5	1.0 0.0 Cu Actual 0.9.9426 7.9280 3.9364 7.4844 5.9581 5.9581	5 Cu Conc Unit ppm ppm ppm ppm ppm	Zn Actual Conc 10.4643 10.7641 10.2212 17.3015 13.6276	50 Zn Conc Unit ppm ppm ppm ppm ppm	0.0 Pb Actual Conc 10.5253 9.0716 7.6034 7.8197 6.7038	5.0 Pb Conc Unit ppm ppm ppm ppm ppm	Ni Actual Conc 8.1586 6.7548 9.0118 9.3798 9.3798 9.7789	Ppm ppm ppm ppm ppm	Fe Actual Conc 7.9609 6.5988 6.7962 8.8839 9.2455	Fe Conc Unit ppm ppm ppm ppm ppm	7.8 6.4 6.6 6.8 7.0
	Sample ID River water 1 River water 2 River water 3 River water 4 River water 5 Waste water 1	Cu Actual Conc 9.9426 7.9280 3.9364 7.4844 5.9681 2.8458	Cu Conc Unit ppm ppm ppm ppm ppm	Zn Actual Conc 10.4643 10.7641 10.2212 17.3015 13.6276 13.8146	Zn Conc Unit ppm ppm ppm ppm ppm ppm	0.0 Pb Actual Conc 10.5253 9.0716 7.6034 7.8197 6.7038 7.6654	5.0 Pb Conc Unit ppm ppm ppm ppm ppm ppm	Ni Actual Conc 8.1586 6.7548 9.0118 9.3798 9.7789 5.6890	Ni Conc Unit ppm ppm ppm ppm ppm	Fe Actual Conc 7.9509 6.5988 6.7962 8.8839 9.2455 9.6380	Fe Conc Unit ppm ppm ppm ppm ppm ppm	7.8 6.4 6.6 6.8 7.0 7.3
	Sample ID River water 1 River water 2 River water 3 River water 4 River water 5 Waste water 1 Waste water 2	10 00 Cu Actual Conc 9.9426 7.9280 3.9364 7.4844 5.9581 2.8458 7.2580	Cu Conc Unit ppm ppm ppm ppm ppm ppm	Zn Actual Conc 10.4643 10.7641 10.2212 17.3015 13.6276 13.8146 11.3676	5.0 Zn Conc Unit ppm ppm ppm ppm ppm ppm	0.0 Pb Actual Conc 10.5253 9.0716 7.6034 7.8197 6.7038 7.6654 6.5901	5.0 Pb Conc Unit ppm ppm ppm ppm ppm ppm	Ni Actual Conc 8.1586 6.7548 9.0118 9.3798 9.7789 5.6890 5.8334	Ni Conc Unit ppm ppm ppm ppm ppm ppm	Fe Actual Conc 7.9509 6.5988 6.7962 8.8839 9.2455 9.6380 8.0869	Fe Conc Unit ppm ppm ppm ppm ppm ppm ppm	7.8 6.4 6.6 6.8 7.0 7.3 7.5
	Sample ID River water 1 River water 2 River water 3 River water 4 River water 4 Waste water 5 Waste water 2 Waste water 3	10 0.0 Cu Actual Conc 9.9426 7.9280 3.9364 7.4844 5.9581 2.8458 7.2580 7.4200	5 Cu Conc Unit ppm ppm ppm ppm ppm ppm ppm	Zn Actual Conc 10.4643 10.7641 10.2212 17.3015 13.6276 13.8146 11.3676 11.7223	5.0 Zn Conc Unit ppm ppm ppm ppm ppm ppm ppm	0.0 Pb Actual Conc 10.5253 9.0716 7.6034 7.8197 6.7038 7.6654 6.5901 6.7520	5.0 Pb Conc Unit ppm ppm ppm ppm ppm ppm ppm	Ni Actual Conc 8.1586 6.7548 9.0118 9.3798 9.3798 9.7789 5.6890 5.6890 5.8334 5.9854	Ni Conc Unit ppm ppm ppm ppm ppm ppm ppm	Fe Actual Conc 7.9509 6.5988 6.7962 8.8839 9.2455 9.6380 8.0869 8.3854	Fe Conc Unit ppm ppm ppm ppm ppm ppm ppm ppm	7.8 6.4 6.6 6.8 7.0 7.3 7.5 7.8
	Sample ID River water 1 River water 2 River water 3 River water 4 River water 5 Waste water 2 Waste water 3 Waste water 3 Waste water 4	10 0.0 Cu Actual Conc 9.9426 7.9280 3.9364 7.4844 5.9581 2.8458 7.2580 7.4200 9.8676	Cu Conc Unit ppm ppm ppm ppm ppm ppm ppm ppm	Zn Actual Conc 10.4643 10.7641 10.2212 17.3015 13.6276 13.8146 11.3676 11.7223 12.1000	5.0 2n Conc Unit ppm ppm ppm ppm ppm ppm ppm pp	0.0 Pb Actual Conc 10.5253 9.0716 7.6034 7.6034 7.6654 6.5901 6.7520 10.7056	5.0 Pb Conc Unit ppm ppm ppm ppm ppm ppm ppm	Ni Actual Conc 8.1586 6.7548 9.0118 9.3798 9.7789 5.6890 5.6890 5.8334 5.9854 6.5545	Ni Conc Unit ppm ppm ppm ppm ppm ppm ppm ppm	Fe Actual Conc 7.9609 6.5988 6.7962 8.8839 9.2455 9.6380 8.0869 8.3854 8.7067	Ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	7.8 6.4 6.6 7.0 7.3 7.5 7.8 8.1
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Double Beam - High Performance



Excellent Baseline Stability

The double-beam optical system of the AA-6200 measures the sample and reference signals alternately; any fluctuation in the light output is automatically compensated by taking the ratio of the two. This results in improved reproducibility.

Sealed Optical Compartment

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The sealed optical compartment protects the optics from laboratory environments. This ensures high sensitivity and reproducibility over the lifetime of the instrument.

Improved Signal-to-Noise

Shimadzu utilizes a rotating chopper mirror to improve sensitivity. The signal-to-noise ratio is doubled compared to a conventional beam splitter/combiner. Also, the brushless type chopper motor significantly increases the operating lifetime.

Deuterium Background Correction

The BGC-D2 (Deuterium Background Correction) provides the highest sensitivity compared to any background correction technique available. This method for background compensation of interference is a standard feature on the Shimadzu AA-6200.

Optical System

DATA SHEET

The Calibration Curve for Cu.





Real signals of three times measurement of a 2ppm Cu standard solution.

The result of 100 minutes of continuous measurement of a Cr standard solution. One plot shows the average absorbance value of 10 times measurement of a Cr standard solution. (The average R .S .D < 0.5%.)





Optional Accessories

Optional attachments are available for specialized determination of trace elements.

AutoSampler

ASC-6100F

(Cat. N0.206-50100-30: AC100V ~ 120V) -39: AC220V ~ 240V)

The interchangeable carousel accommodates 60 samples for automatic measurements. The ASC-6100F ensures exceptionally high productivity in routine analysis.

Hydride Vapor Generator

HVG-1

(Cat. N0.206-17143-XX)

The nascent hydrogen released by the decomposition of sodium borohydride reduces the elements in the sample to a vapor. The vapor is then heated and atomized in an absorption cell to allow high-sensitivity measurement.

- As, Se, Hg, Sn, Sb, Te, Bi, etc. may be determined.
- The unique flush function eliminates carryover from high-concentration samples.
- Note : Automated analysis is made possible by using the ASC-6100F and Nozzle Assy (Cat. No .206-67563) .

Mercury Vaporizer Unit

MVU-1A

(Cat. N0.204-21932-XX)

This mercury vaporizer unit reduces and vaporizes elemental mercury in accordance with official methods. Water analysis is highly sensitive, yet easy to perform. **Specifications**

Vaporization method

Reduction and vaporization using reduction agent Measurement method: Circulation method Air flow rate: 6 L/min Flow cell: Optical path length up to 100 mm Sample volume: Up to 250mL Exhaust contamination prevention Adsorption collection using mercury collection vial Size: 200W x 288D x 287H mm Weight: Approx. 10 kg

Note : The following items must be ordered separately: Gas flow cell (cat. No. 201-98687) Gas now flow cell holder (Cat. No. 202-35867) Hg hollow cathode lamp (Cat. No. 200-38422-28)







Other Options

Cat. No. 206-50300-91High-temperature Burner HeadCat. No. 200-38422-xxHollow cathode lampsCat. No. 200-64020DS-02 Drain SeparatorCat. No. 040-72020-01YR-71 Compressed Gas Regulator for C2H2*Cat. No. 040-72019-11MAF85S Compressed Gas Regulator for N20**Not available in U.S.A. and Canada.

Specifications

Atomic Absorption Spectrophot	meter AA-6200 (Cat. No. 206-50000-36)
Optics	Double Beam (chopper mirror)
Monochromator	Aberration corrected Czerny-Turner monochromator
	Holographic grating (1,600 lines/mm)
Wavelength range	190-900nm
	Automated wavelength selection
Slit	0.2nm, 0.7nm Manual setting
Background Correction	D2-Lamp method
Lamp Turret	2-lamps simultaneously lit (manual turret)
Lamp Mode	Emission, Non-BGC, BGC-D2
Frequency	100HZ
Nebulizer	Nebulizer integrated impact bead and jacket tip
	Pt/Ir capillary
Chamber	Polypropylene
Burner	Fixed back/forward position and burner height
	(Simple switching of Air/C2H2 and N2O/C2H2 burner)
	Titanium 10cm slot burner (Optional high-temperature burner)
Gas Control	Manual setting of flow rate
	Automatic Air/N2O switching system
Safety	Gas pressure monitoring to prevent flashback
	Automatic flame monitoring
	Safety interlock for misuse of burner
	Automatic flame extinguish when power failure
Ignition	Push ignite button
Software	Software based on MS Windows [®] 2000/XP
Dimension and weight	W690 x D425 x H370mm, 38kg
Power requirements	AC220V, 230V, 50/60Hz, 300VA
	(Requires transformer for AC115V)
	(Certification of CE marking)
Ambient temperature	Temperature : 10-35°C
Humidity range	Humidity : 45-80% (less than 70% when temperature is greater than 30°C)
Standard accessories	Burner Head of 10cm slot. Nebulizer assembly. Deuterium lamp. Drain tube.
	Teflon tube for sample suction. Hose assembly for Air. Hose assembly for C ₂ H ₂ .
	RS-232C connection cable (9P-9P). AC cable for 220, 230V.

Personal Computer requirements

Operating environment : MS Windows [®] 2000 / XP	XHXHXH
CPU : Pentium I 200MHz or better	THE ACTION OF A CONTRACT OF A CONTRACTACT OF A CONTRACT OF A CONTRACTACT OF A CONTRACTACT OF A CONTRACTACT OF A CONTRACT OF A CONTRACTACT OF A CONTRACTACTACTACTACTACTACTACTACTACTACTACTACTA
RAM : More than 128MB	YAYAY
Display : SVGA(800 x 600) or better	(BX(BX(B))
Hard disk : More than 20MB required to install the AA software	
3.5"Floppy disk drive : One or more units	VAVAVAVA

Personal computer, display, software for operating system, and printer are not included in the standard setup.

Installation Site Preparation

1. LAB Bench

The bench must be at least 120cm long and 60cm deep, and must be sturdy enough to support 80kg.

Leave 15cm to 20cm space to the left and back of the instrument.

2.Ventilation-DO NOT INSTALL the AA-6200 WITHOUT PROPER EXHAUST

Prepare an exhaust duct above combustion chamber. Very high temperatures will be generated when using the flame; use appropriate materials for the duct.



3. Gas Connection

Place the gas cylinders in an environment that meets required safety regulations for the facility. Use metal tubing.



Example of Tubing to the AA Spectrophotometer

WARNING:

 Do not allow acetylene to flow through pipes, and do not use equipment made from copper, silver, mercury, or their alloys.
 Do not use Oxygen.



Founded in 1875, Shimadzu Corporation, a leader in the development of advanced technologies, has a distinguished history of innovation built on the foundation of contributing to society through science and technology. We maintain a global network of sales, service, technical support and applications centers on six continents, and have established long-term relationships with a host of highly trained distributors located in over 100 countries. For information about Shimadzu, and to contact your local office, please visit our Web site at **www.shimadzu.com**



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