

**Release of AA-7000 Series Atomic Absorption Spectrophotometers
and Discontinuation of AA-6300 and AA-6800 Series**

This is the notification of the launch of the AA-7000 Series Atomic Absorption Spectrophotometers.



AA-7000F Dual Atomizer System (with options attached)



AA-7000F



AA-7000G (with options attached)

Shimadzu's new AA-7000 Series atomic absorption spectrophotometers that replace the AA-6300 and AA-6800 Series feature high sensitivity, excellent stability, and a high level of functionality.

The optical system automatically switches between the optical double beam for flame analysis and the high-throughput single beam for furnace analysis. This unique instrument achieves the optimal performance for each measurement method.

The AA-7000 Series inherits the two-way background correction method (D2 method and SR method), high-sensitivity nebulizer, and pure titanium burner head from the previous series to offer the same high levels of functionality and performance.

The optional AAC-7000 Auto Atomizer Changer offers automated switching between flame and furnace measurements, automatic burner height adjustment, and automatic setting.

The AA-7000 Series are the first instruments in the world fitted with a vibration sensor as standard. This is world-class safety technology that automatically extinguishes the flame when big vibration such as an earthquake is detected.

The popular WizAArd software has now been further improved. It can be combined with CLASS-Public Agent software to support FDA 21 CFR Part 11 compliance.

Due to the launch of the new AA-7000 Series, the AA-6300, AA-6800F, and AA-6800G instruments will be discontinued when stock runs out.

•Discontinued Products

Part Number	Part Name
206-50500-91/92/93/37	AA-6800F (100 V/120 V/220 V/230-240 V)
206-50700-91/92/93/37	AA-6800G (100 V/120 V/220 V/230-240 V)
206-50180-31/32/34	AA-6300 (100 V/120 V/230 V)

Options for the AA-6300 and AA-6800 Series currently remain in production to meet demands for retrofitting. Production of these options is planned to be ended three years after sale of AA-6300 and AA-6800 Series instruments is discontinued.

•For AA-6800

Part Number	Part Name
206-50100-31/32/38	ASC-6100 (100 V/120 V/200 V)
206-51000-90/93/34/35	GFA-EX7 (200 V/220 V/230 V/240 V)
206-64843-92	ACF-6800

•For AA-6300

Part Number	Part Name
206-52140-91	ASK-6300
206-50950-91	Micro sampling kit
206-52100-90/93/34/35	GFA-EX7i (200 V/220 V/230 V/240 V)

•For AA-6800 and 6300

Part Number	Part Name
206-50200-91	ASK-6100

Sale of the following options will be continued.

Part Number	Part Name
206-50100-30/39	ASC-6100F (100 V/200 V) (option for AA-6200, SPCA-6210, ICPE-9000)
206-50300-92	High-temperature burner head for AA-6800 (consumable)
206-50300-93	High-temperature burner head for AA-6300 (consumable)

1. Ordering Guide

Part Number	Part Name	Code
206-77000-32 206-77000-33 206-77000-34	AA-7000F 120 V (With WizAArd, Instruction Manual (English Ver.)) 220 V (With WizAArd, Instruction Manual (Chinese Ver.)) 230 V (With WizAArd, Instruction Manual (English Ver.))	A3
206-77100-32 206-77100-33 206-77100-34	AA-7000G 120 V (With WizAArd, Instruction Manual (English Ver.)) 220 V (With WizAArd, Instruction Manual (Chinese Ver.)) 230 V (With WizAArd, Instruction Manual (English Ver.))	A3

Contents of the PC Set

Personal Computer / Monitor

Operating system	Microsoft Windows Vista Business or XP Professional
CPU	Intel® Celeron 420 (1.60 GHz) or higher
RAM	1 GB or higher (Vista) or 512 MB or higher (XP)
Monitor	XGA (1024 × 768 dots) or higher
Storage device	One CD-ROM drive (for installing a software) Requires 60 MB min. hard disk space for installation.
I/O port	One serial port (for AA control)

3. Printer

The WizAArd software for the AA-7000 color printing of peak profile graphs, etc. A color inkjet printer can be used in addition to a monochrome laser printer.

The operation has been confirmed for the recommended printers below.

Printer modes
Epson LP-S300 laser printer
Canon PIXUS-iP4500 color inkjet printer
USBCB2 USB printer cable

* The Epson LP-S300 laser printer can be used with the conventional parallel printer cable.

Part Number	Part Name	Code	Remarks
088-52077-25	PRCB4N cable	A3	

4. System Configurations (flame, furnace, dual atomizer)

	Unit	GFA	Autosampler	Upgrade to Dual Atomizer System
Flame system (flame continuous method only)	AA-7000F	/	ASC-7000 ASC stand kit	Add GFA-7000. Add ASK-7000. Add AAC-7000.
Flame system (compatible with flame single drop method)	AA-7000F	/	ASC-7000 ASC stand kit Micro sampling kit	Add GFA-7000. Add ASK-7000. Add AAC-7000.
Furnace system	AA-7000G	GFA-7000	ASC-7000 ASK-7000	/
Dual atomizer system (flame/furnace)	AA-7000F AAC-7000	GFA-7000	ASC-7000 ASK-7000	/
Dual atomizer system (compatible with flame/furnace and flame single drop methods)	AA-7000F AAC-7000	GFA-7000	ASC-7000 ASK-7000 Micro sampling kit	/

5. Options (Special Accessories)

For Flame Analysis

Part Number	Part Name	Code	Remarks
206-77530-91	High-temperature burner head	A9	Made of titanium. 5 cm slot for N ₂ O-C ₂ H ₂ flame
206-77617-91	Flow meter kit	A3	Float-type flow meter for support gas
206-77655-91	Sample platform	A3	Dimensions: 250 W × 130 D × 170 H mm Vial mounting platform: 220 W × 95 D mm Vial positions: 5-step switching
208-91750-36	Low-noise air compressor, 6-15-230-SMZ1	A3	230 VAC, 50/60 Hz, with mist separator, includes Instruction Manual (English Ver.)
208-91753-91	Air compressor, 0.2LE-6.0S 100 V	A3	100 VAC, 50/60 Hz, with mist separator, includes Japanese/English Instruction Manual
200-82005-01	Transformer A-5 for 110-120 V	A9	Required if using an air compressor other than above.
200-45100-02	Transformer B-5 for 220-240 V		
206-52458-91	Mist separator kit		
040-72020-01	YR-71 compressed gas regulator	A9	For C ₂ H ₂
040-72019-11	MAF-85S compressed gas regulator	A9	For dinitrogen oxide gas
206-77620-92	O-ring set	A9	O-ring set for organic solvents

For Furnace Analysis

Part Number	Part Name	Code	Remarks
206-77700-33	Graphite furnace atomizer GFA-7000 220 V CHN	A3	Instruction Manual (Chinese Ver.) Instruction Manual (English Ver.) Instruction Manual (English Ver.)
206-77700-34	GFA-7000 230 V ENG		
206-77700-35	GFA-7000 240 V ENG		
206-50587	High-density graphite tube	A9	
206-50588	Pyro-coated graphite tube	A9	
206-50887-02	Platform tube	A9	
040-72019-21	MAF-106S compressed gas regulator	A9	For argon
044-01809-03	CA-1112 cooling water circulation unit	A3	Operational temperature range: -10 to +40 °C, 100 V
200-82005-01	Transformer A-5 for 110-120 V	A9	For using CA-1112
200-45100-02	Transformer B-5 for 220-240 V		
206-84373-91	Cooler connection kit		
206-51028-91	Cooling water tube ASSY	A9	Required to use tap water as cooling water
206-86147-91	Regulator ASSY	A9	Cooling-water decompression valve. Required to use tap water as cooling water.

Shimadzu strongly recommends the use of a cooling water circulation unit as the cooling water supply, due to its high level of safety and stability.

If the use of tap water is unavoidable, purchase both the cooling water tube ASSY and the regulator ASSY.

Autosampler

Part Number	Part Name	Code	Remarks
	Autosampler	A3	
206-77600-32	ASC-7000 100 V system ENG		Instruction Manual (English Ver.)
206-77600-33	ASC-7000 200 V system CHN		Instruction Manual (Chinese Ver.)
206-77600-38	ASC-7000 200 V system ENG		Instruction Manual (English Ver.)
206-77650-91	ASC stand kit	A3	Required to mount ASC-7000 to conduct flame analysis only.
206-77550-91	ASK-7000 extension unit for furnace analysis	A3	Permits both flame and furnace analysis.
206-77540-91	Micro sampling kit	A3	Required to use the flame single drop method.
206-67563	Nozzle ASSY, HVG	A9	Required to use ASC-7000 and HVG-1.

Dual Atomizer System

Part Number	Part Name	Code	Remarks
206-77701-91	AAC-7000 auto atomizer changer	A3	Required to add GFA-7000 to AA-7000F to conduct furnace analysis. Permits automatic burner position setting for flame analysis with AA-7000F.

Hollow Cathode Lamp (Manufactured by Hamamatsu Photonics)

Part Number	Part Name	Code	Remarks
200-38422-XX	L-233 series	A9	
200-38456-XX	L-2433 series	A9	For SR method

Note) XX in the part number differs according to the element. See the Price List for details.

FDA 21 CFR Part 11 Compliance

Part Number	Part Name	Code	Remarks
	WizAArd Agent connection kit	A3	
206-77741-92	English version		
206-77741-93	Chinese version		
	CLASS-Public Agent Ver. 2.32	L5	
223-18236-92	English version, 1 license		
223-18236-95	Chinese version, 1 license		

Other Accessories

Part Number	Part Name	Code	Remarks
204-21932-01 -30	MVU-1A mercury vaporizer unit, 100 V MVU-1A mercury vaporizer unit, 100 V for CE marking	A3	100 V Step-down Transformer A-2 or B-2 is necessary.
201-98687	Gas flow cell	A9	For MVU
206-77703-91	Holder for gas flow cell	A9	For MVU
206-17143-92 -93 -94 -34	HVG-1 hydride vapor generator, 115 V 220 V 240 V 230 V, CE marking	A3	

208-97249	SARF-16C atomic muffle furnace	A3	For HVG-1. Requires a mounting adaptor to mount to instrument. The atomic muffler cannot be used when an AAC-7000 is installed on an AA-7000F.
206-52135-91	Mounting adaptor	A9	Required when an SARF-16C is installed on an AA-7000F.
206-83755-91	Mounting adaptor	A9	Required when an SARF-16C is installed on an AA-7000G.
206-77707-91	Analog output cable	A9	Used for analog output to a pen recorder, etc. One cable required per channel (atomic absorption/energy signal, background signal).

6. Features

1) High Sensitivity

Improvements to the optical system efficiency achieve top-class lower limits of detection for furnace measurements.

2) Smallest Installation Footprint

AA-7000 achieves the world's smallest installation footprint for a dual atomizer system and a world-class small footprint for a dedicated furnace AA instrument.

3) Excellent Stability

The double-beam optical system and robust hardware achieve excellent stability.

4) Easy Operation

The optional auto atomizer changer automates the atomizer unit and allows easy setup from a PC.

5) Extensive Product Lineup Covers All Requirements

In addition to individual flame and furnace AA instruments, the full system can be configured by adding a graphite furnace atomizer and auto atomizer changer to a flame AA.

6) Comprehensive Safety Measures

Incorporates safety features essential for an atomic absorption spectrophotometer that uses flammable gases: multimode automatic gas leak check function, flame vibration sensor (world first), flame-retardant materials, and the use of durable and reliable piping components.

7. Specifications

7.1 Common Specifications

Optics	
Wavelength range	185.0 to 900.0 nm
Monochromator	Aberration-corrected Czerny-Turner mounting
Bandwidth	0.2, 0.7, 1.3, 2.0L nm (4-step automatic switching)
Detector	Photomultiplier tube
Optics	<ul style="list-style-type: none"> •Flame: optical double beam •Furnace: high-throughput single beam
Background correction	<ul style="list-style-type: none"> •BGC-SR (high-speed self-reversal method) •BGC-D₂ (D₂ lamp method)
Number of HC lamps	6-lamp turret, 2 lamps simultaneously lit (1 for measurement, 1 warming up for next measurement)
Lamp mode	EMISSION, NON-BGC, BGC-D ₂ , BGC-SR
Data processing	
Software requirements	Microsoft Windows Vista Business / XP Professional

Parameter setting	Wizard method
Measurement mode	Flame continuous method, flame single drop method, furnace method
Concentration computation mode	<ul style="list-style-type: none"> •Calibration curve method (select primary, secondary, tertiary) •Standard addition method, simple standard addition method (primary expression)
Repeat analysis	Up to 20 repetitions. Mean value, standard deviation (SD) and coefficient of variation (RSD) display Automatic exclusion of deviant values by setting SD and %RSD
Baseline correction	Automatic correction of baseline drift by offset correction in peak height / peak area modes.
Signal processing segment setting	Signal processing segments can be changed in peak height / peak area modes.
Sensitivity correction	Automatic calibration curve correction function using sensitivity monitoring
Analog output	2 channels (atomic absorption/energy signal, background signal) Output range: 5.0, 2.5, 1.25, 0.625 Abs./V (each settable in 4 stages) Fixed at 1 V F.S. in EMISSION mode.
Tabular data processing	Final concentration calculations based on sampled volume, dilution rate, fixed volume, and factor inputs
Recall of parameters	Template functions available
Procedure/result display	MRT (Measurement Results Table) worksheet
Report generation	Summary report available
QA/QC	Select whether to continue or discontinue measurements based on results of evaluation on coefficient of correlation, %RSD, ICV•ICB, CCV•CCB, PB, LCS, SPK, PDS, and DUP.
Re-analysis	<ul style="list-style-type: none"> •Select whether on not to conduct re-analysis. •Automatic dilution and re-analysis of unknown samples via autosampler (flame single drop method, furnace method)
Digital recording	<ul style="list-style-type: none"> •Management by login ID and password •Control user access authority by user level •Log record •Audit trail •Electronic signatures
Power requirements	120 VAC (English Ver.), 220 VAC (Chinese Ver.), or 230 VAC (English Ver.), 230 VA, 50/60 Hz Power is required separately for the personal computer.
Dimensions and weight	AA-7000F: 700 W × 588 D × 714 H mm, 72 kg AA-7000G: 700 W × 580 D × 538 H mm, 65 kg (Protruding parts and optional equipment are not included.)
Ambient temperature / humidity	10 to 35 °C, 20 to 80% (less than 70% when temperature is higher than 30 °C)

7.2 Flame (continuous method, single drop method)

Burner unit	
Type	Air-cooled pre-mix type
Flame types	Air-C ₂ H ₂ , N ₂ O-C ₂ H ₂
Burner head	Titanium 10 cm slot (5 cm titanium slot for N ₂ O-C ₂ H ₂ flame available as an option)
Nebulizer	Pt-Ir capillary PTFE orifice Ceramic impact bead (capable of handling hydrofluoric acid)
Chamber	Engineering plastics
Positioning	AA-7000F <ul style="list-style-type: none"> •Lateral/vertical manual adjustment AA-7000F with an optional auto atomizer changer mounted •Automatic flame/furnace switching by motor •Automatic search of optimum burner height
Angle adjustment	0 to 90° Angle adjustment is not possible if the optional auto atomizer changer and GFA-7000 are both installed.
Gas control	

Flow rate control	Automatic fuel gas flow rate setting (0.1 L/min step) Automatic search of optimum gas flow rate
Safety measures	<ul style="list-style-type: none"> •Automatic gas leak check •Automatic Air-N₂O switching as C₂H₂ flow rate increases •Flame monitor •Prevention of wrong burner head use •Gas pressure monitor •Drain tank level monitor •Automatic flame extinction upon power outage or sudden power interruption •Automatic flame extinction via flame vibration sensor •Flashback detection •Internal fan stop sensor

7.3 Furnace

Graphite furnace atomizer	
Control	RS-232C communication control from AA unit
Heating temperature range	Ambient to 3,000 °C
Heating control system	<ul style="list-style-type: none"> •Drying: digital current control (with automatic temperature calibration function) •Ashing, Atomization: digital temperature control via optical sensor
Setting heating conditions	<ul style="list-style-type: none"> •Maximum 20 stages •Heating mode: RAMP/STEP •Inner gas type: dual automatic switching type •High-sensitivity mode setting •Enrichment in furnace: maximum 20 times •Optimum temperature program search support function •Inner gas flow rate: 0 to 1.5 L/min
Safety measures	<ul style="list-style-type: none"> •Cooling water flow rate monitor •Gas pressure monitor •Overcurrent protection unit (double check by breaker and optical sensor) •Furnace block cooling check
Positioning	AA-7000G <ul style="list-style-type: none"> •Lateral/vertical manual adjustment AA-7000F with an optional auto atomizer changer mounted <ul style="list-style-type: none"> •Automatic flame/furnace switching by motor
Power requirements	220 VAC (Chinese Ver.), 230 VAC (English Ver.), or 240 VAC (English Ver.), 6 kVA, 50/60 Hz
Dimensions and weight	260 W × 560 D × 510 H mm, 46 kg

7.4 Autosampler

Common Specifications	
Control	RS-232C communication control from AA unit
Functions	Zero-point detection, auto diagnosis, auto rinse, random access
Maximum reagent / sample positions	Reagents: 8 positions Samples: 60 positions (random access available with reagents or samples)
Rinse water bottle	2 L
Power requirements	120 VAC (English Ver.), 220 VAC (Chinese Ver.), or 230 VAC (English Ver.), 50 VA, 50/60 Hz

Flame Continuous Method	
Sample volume	Sample vials: 15 mL, reagent vials: 53 mL
Dimensions and weight	Sampler: 340 W × 280 D × 270 H mm, 8 kg Controller (including stand): 260 W × 200 D × 320 H mm, 7 kg

Furnace Method Flame Single Drop Method	
Functions	Zero-point detection, auto diagnosis, auto rinse, auto mixing, random access
Sample volume	Sample vials: 2 mL, reagent vials: 20 mL

Nozzle rinse	Solvent rinse discharge method
Sampling functions	Dilution function, reagent addition function
Syringe	250 μ L
Injection volume	2 to 90 μ L
Repeatability	1%RSD (20 μ L)
Carryover	Rinse port: less than 0.0001 Mixing port: less than 0.00001
Mixing port rinse	Solvent rinse discharge method, solvent discharge and rinse with next sample
Mixing function	Performed in mixing port. Maximum mixture volume: 0.6 mL
Maximum number of mixing reagents added	Up to 4 solutions Number of solutions possible for mixing •Calibration curve method: 5 solutions max. (sample + dilute solution + 3 types of reagents) •Standard addition method: 6 solutions max. (sample + standard solution + dilute solution + 3 types of reagents)
Auto dilution / re-analysis	For measurement result on unknown samples: •If extrapolation of calibration curve is possible: automatic calculation of dilution rate and dilution to bring concentration within calibration curve range •If extrapolation of calibration curve is not possible: dilution rate fixed at 10x
Dimensions and weight	Sampler (including sliding parts): 340 W \times 280 D \times 400 H mm, 11 kg Controller: 235 W \times 110 D \times 240 H mm (built into GFA-7000), 6 kg

7.5 Performance

Common to flame/furnace	Wavelength accuracy	$\leq \pm 0.30$ nm (253.65 nm, 365.01 nm, 435.84 nm, 546.08 nm, 585.25 nm, 640.22 nm, 724.52 nm)
	NON-BGC noise level	≤ 0.01 Abs. (Se 196.0 nm)
	BGC-D2 noise level	≤ 0.015 Abs. (Se 196.0 nm)
	Baseline drift	≤ 0.005 Abs./30 min (Cu 324.8 nm)
Flame analysis	Absorbance	≥ 0.23 Abs. (Cu 2 ppm)
	Reproducibility	$\leq 2\%$ (confidence limit 95%) (Cu 2 ppm)
	Detection lower limit	≤ 0.006 ppm (Cu)
	Fluctuation	$\leq 6\%$ (Cu 2 ppm)
Furnace analysis	Absorbance	≥ 0.15 Abs. (Mn 1 ppb)
	Reproducibility	$\leq 2.5\%$ (confidence limit 95%) (Mn 1 ppb)
	Detection lower limit	≤ 0.03 ppb (Mn)

8. Safety

1) Checking Pre Installation Requirements

It is extremely important to check the Pre Installation Requirements for the AA instrument. There have been several instances of accident due to not checking the Pre Installation Requirements. Safety-related items in the Pre Installation Requirements are indicated by ★ marks for clarity.

If possible, make a preliminary examination of the installation site two or three weeks before installation to ensure that all the safety-related items indicated by ★ marks are satisfied.

Even if the customer insists that the installation was satisfactory for a previous Shimadzu model or a competitor's instrument, it may be unsatisfactory for the AA-7000 Series. It is important to complete the checks in the requirements.

Ask the customer to remedy any deficiencies in the equipment. Make the customer aware that the AA instrument cannot be used safely unless the deficiencies are remedied.

Flashback can occur in an AA instrument. Flashback will not immediately result in an accident. However, an accident may occur if the instrument continues to be used without remedying the problem. New flashback-prevention software is installed to prevent accidents. After the software detects flashback, ignition is disabled until the instrument has been

inspected by a service technician. Continuing to use an incorrectly installed instrument results in inconvenience to the customer.

Using the instrument in an environment that does not meet the specifications in the Pre Installation Requirements voids the warranty. Be sure to check the Pre Installation Requirements.

2) Safety-Related Service Parts List

Inform the customer to replace the parts at the intervals indicated in the service parts lists. For details, refer to 8.10 Periodic Part Replacement — Safety-Related Parts in the AA-7000 Series Instruction Manual.

Note that the replacement period differs according to the solvents used.

3) Safety Education

Safety instructions are supplied with the instrument. Inform the AA user to always keep them near the instrument and to read the contents.

9. Sample Quotations

The basic configurations are shown below. Add options, as required.

9.1 Flame continuous method without ASC

(1)	206-77000-xx	AA-7000F		
		PC and printer provided locally		
				Total

9.2 Flame continuous method without ASC

(1)	206-77000-xx	AA-7000F		
(2)	206-77600-xx	ASC-7000		
(3)	206-77650-91	ASC stand kit		
		PC and printer provided locally		
				Total

9.3 Flame continuous/flame single drop methods with ASC

(1)	206-77000-xx	AA-7000F		
(2)	206-77600-xx	ASC-7000		
(3)	206-77650-91	ASC stand kit		
(4)	206-77540-91	Micro sampling kit		
		PC and printer provided locally		
				Total

9.4 Furnace system with ASC

(1)	206-77100-xx	AA-7000G		
(2)	206-77700-xx	GFA-7000		
(3)	206-77600-xx	ASC-7000		
(4)	206-77550-91	ASK-7000		
		PC and printer provided locally		
				Total

9.5 Flame continuous method / furnace system with ASC

(1)	206-77000-xx	AA-7000F		
(2)	206-77701-91	AAC-7000		
(3)	206-77700-xx	GFA-7000		
(4)	206-77600-xx	ASC-7000		

(5)	206-77550-91	ASK-7000		
		PC and printer provided locally		
				Total

9.6 Flame continuous/flame single drop methods / furnace system with ASC

(1)	206-77000-xx	AA-7000F		
(2)	206-77701-91	AAC-7000		
(3)	206-77700-xx	GFA-7000		
(4)	206-77600-xx	ASC-7000		
(5)	206-77550-91	ASK-7000		
(6)	206-77540-91	Micro sampling kit		
		PC and printer provided locally		
				Total

(This is translation from B101-0544.)



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